TECHNICAL DATA

TUNG-SOL

ELECTRONIC TUBES

Property of
Geo. W. Linton

TUNG-SOL LAMP WORKS INC.
ELECTRONIC TUBE DIVISION
NEWARK, N. J.
U. S. A.

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INTRODUCTION

This Technical Data Book has been compiled for the use of the radio industry. Inclusion of data for a specific tube type does not necessarily mean that the tube will be available and for sale by Tung-Sol.

The technical data sheets in this book are arranged in numerical order, with respect to tube type numbers. The Table of Contents on the next page will, in all cases, list the sheets which have been issued to the current date. If any sheets, listed in the Table of Contents, are missing from your book, additional copies of such missing sheets may be obtained from the address given below.

Additional sheets covering new tube types or changes on existing tubes will be issued from time to time. A complete new index sheet will be issued with each new group of sheets.

Requests for further technical data on any Tung-Sol tubes should be addressed to

TUNG-SOL LAMP WORKS INC.
ELECTRONIC TUBE DIVISION
NEWARK, N. J.
U. S. A.

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ADDITIONAL BINDERS

Additional binders may be purchased at any time. The cost of a binder is $2.00. This offer is made for the convenience of those who wish to divide their sheets in a certain way and for those who feel the book may be getting too heavy. We prefer not to formally issue a Volume II, but to let the individual subscriber decide for himself when he would like to have two binders rather than one for his data sheets.

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IDENTIFICATION OF SYMBOLS USED ON CONTENTS PAGE

▶ A change or addition.

○ Obsolete types—for replacement use only. These types are not recommended for new equipment design. Data sheets for these types are retained for your information.

● Formerly GT/G types. The GT/G designation is now obsolete, having been superseded by GT. The data sheets for these types already in the book will remain as they are until further revisions are necessary.

⊙ Both obsolete types and former GT/G types. See ○ and ● above.

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PLATE NUMBERS REFER TO FRONT OF SHEET ONLY EXCEPT WHERE BACK OF SHEET REPRESENTS ANOTHER TUBE TYPE.

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SUPPLEMENTAL CONTENTS

This Supplemental Contents page will be revised with each monthly issue of data sheets. Since May 1, 1947 sheets have been issued on the first of each month. To do this it has been found necessary to discontinue the monthly revision of the main Contents Pages. The main Contents pages will be brought up to date approximately every six months.

Please retain in your book the main Contents pages dated July 1, 1948 in addition to the most recent Supplemental Contents page.

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DEFINITIONS

CLASS A AMPLIFIER:

The Class A Amplifier is an amplifier in which the grid bias and the exciting grid voltage are such that plate current flows approximately 360 electrical degrees of the cycle. The ideal Class A Amplifier operates on the linear portion of the plate current vs grid voltage characteristic in such a manner that the wave form of the plate current is an exact reproduction of the exciting grid voltage. The Class A Amplifier is characterized by low efficiency, low output and low percentage of harmonic distortion.

CLASS AB AMPLIFIER:

The Class AB Amplifier is an amplifier in which the grid bias and the exciting grid voltage are such that plate current flows for appreciably more than 180 electrical degrees but less than 360 electrical degrees of the cycle. This class of amplifier, sometimes designated as "Class A' (prime) Amplifier" is characterized by efficiency, output and percentage of harmonic distortion intermediate to those of Class A and Class B Amplifiers.

CLASS B AMPLIFIER:

The Class B Amplifier is an amplifier in which the grid bias and the exciting grid voltage are such that plate current flows approximately 180 electrical degrees of the cycle. The grid bias is approximately equal to the plate current cut-off value, and the power output is proportional to the square of the excitation grid voltage. The Class B Amplifier is characterized by medium efficiency, medium output and medium percentage of harmonic distortion.

CLASS BC AMPLIFIER:

The Class BC Amplifier is an amplifier in which the grid bias and the exciting grid voltage are such that the plate current flows slightly less than 180 electrical degrees of the cycle. The Class BC Amplifier is characterized by an efficiency, an output and a percentage of harmonic distortion intermediate to those of Class B and Class C Amplifiers.

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CLASS C AMPLIFIER:

The Class C Amplifier is an amplifier in which the grid bias voltage and the exciting grid voltage are such that the plate current flows for considerably less than 180 electrical degrees of the cycle. The Class C Amplifier is characterized by high plate-circuit efficiency, high power output and a high percentage of harmonic distortion.

NOTE: The suffix 1 added to the letter or letters of the class identification denotes that grid current does not flow during any part of the input cycle. The suffix 2 denotes that grid current flows during some part of the cycle.

AMPLIFICATION FACTOR:

The amplification factor μ is the ratio of a small change in plate voltage to a small change in control-grid voltage under the conditions that the plate current remains unchanged and that all other electrode voltages are maintained constant. It is a measure of the effectiveness of the control-grid voltage relative to that of the plate voltage upon the plate current.

PLATE RESISTANCE

The plate resistance r_p is the ratio of a small change in the alternating plate voltage to a small change of the in-phase component of the alternating current produced thereby, all other electrode voltages being maintained constant.

TRANSCONDUCTANCE:

Transconductance g_m from one electrode to another is the ratio of a small change in the magnitude of the alternating currents' in-phase component that flows in the second electrode to a small change in the alternating voltage of the first electrode, all other electrode voltages being maintained constant.

CONVERSION TRANSCONDUCTANCE:

Conversion transconductance s_c is the ratio of a small magnitude of single beat-frequency component $(F_1 + F_2)$ or $(F_1 - F_2)$ of the output electrode current to the magnitude of a small control-electrode voltage of frequency F_1. This is under the conditions that all direct electrode voltages and the magnitude of the electrode alternating voltage F_2 remains constant and that no impedances at the frequencies F_1 or F_2 are present in the output circuit.

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CONVERSION PLATE IMPEDANCE:

Conversion plate impedance is the ratio of a small change in the plate voltage of a frequency converter to a small change in its plate current under the conditions that all direct voltages remain constant and that no impedances to the oscillator frequency or to the measurement frequency are present in its plate circuit.

CONVERSION GAIN:

Conversion gain is the ratio of the magnitude of the intermediate frequency voltage developed at the output circuit of the frequency converter, to the magnitude of the exciting voltage applied to the signal grid.

VOLTAGE GAIN:

The voltage gain of an amplifier stage is the ratio of voltage developed across the plate impedance to the exciting grid voltage.

VOLTAGE AMPLIFIER:

A voltage amplifier is an amplifier whose primary purpose is to obtain a voltage gain without regard to the power delivered into its output circuit.

PHASE INVERTER:

Phase inverter is an amplifier whose purpose is shifting the phase of an incoming signal voltage by 180 degrees to provide a driving voltage in combination with the original signal for a push-pull amplifier.

POWER AMPLIFIER:

Power amplifier is an amplifier whose primary purpose is to deliver power into a load circuit.

PUSH-PULL AMPLIFIER:

A push-pull amplifier consists of two similar amplifiers so arranged, that the output voltage of one is 180° out of phase with the other. Push-pull amplifiers are characterized by increased power output for a given total harmonic distortion as this type of connection cancels the even harmonics.

UNDISTORTED POWER OUTPUT:

The undistorted power output is defined as the power output delivered by a vacuum tube into a resistance load, under the conditions that the total generated harmonic distortion with a sinusoidal excitation voltage shall not exceed an arbitrary criterion of permissable total harmonic distortion of five per cent.

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POWER OUTPUT:

The power output is the AC power developed in an external non-inductive resistor of rated value connected in the plate circuit of the amplifier. The maximum power output is limited by an arbitrary criterion of permissible total harmonic distortion.

POWER SENSITIVITY:

Power sensitivity of an output tube is the ratio of the undistorted power output to the square of the exciting grid voltage. The unit of power sensitivity is the mho or μmho.

MODULATION:

Modulation is the process by which some characteristic of a periodic wave is varied with time in accordance with a signal.

DEMODULATION:

The process of recovering a modulating signal (in a detector) from a modulated wave.

INTERMODULATION:

Intermodulation is the production in a non-linear circuit element of frequencies corresponding to the sums and differences of the fundamentals and harmonics of two or more frequencies which are transmitted through that element.

CROSS MODULATION:

Cross modulation is the modulation of the carrier of the desired signal by a modulating voltage of an undesired signal.

AMPLITUDE DISTORTION:

Amplitude distortion results from non-linear amplification in such a manner that the output wave form is not exactly proportional to the amplitude of the input signal, and harmonics of the signal are generated in the amplifier.

FREQUENCY DISTORTION:

Frequency distortion results when the frequency components of the input signal are not amplified with equal magnitude.

PHASE DISTORTION:

Phase distortion results when the phase relation of the frequency components in the output differ from the phase relation of the frequency components in the input.

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PEAK FORWARD ANODE VOLTAGE:

Peak forward anode voltage is the maximum instantaneous voltage appearing across the anode and cathode in the direction in which the tube is designed to conduct current.

PEAK INVERSE ANODE VOLTAGE:

Peak inverse anode voltage is the maximum instantaneous voltage appearing across the anode and cathode in the direction opposite to that in which the tube is designed to conduct current.

TUBE VOLTAGE DROP:

In a vacuum tube, the tube voltage drop varies with the current and is the anode voltage produced by a specified plate current. Tube voltage drop in a gas or vapor-filled tube is the anode to cathode voltage during the conducting period.

MAXIMUM PEAK PLATE CURRENT:

Maximum peak plate current is the highest peak current that the plate of a vacuum tube can safely pass in the direction in which the tube is designed to conduct the current.

CATHODE CURRENT:

Cathode current is the total electronic current passing to or from the cathode through the vacuous space.

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SYMBOLS OF TUBE CHARACTERISTICS

C_{gk}	Grid to cathode capacitance (input).
C_{pk}	Plate to cathode capacitance (output)
C_{gp}	Grid to plate capacitance
E_b	Average or quiescent value of plate voltage
E_{bb}	Plate supply voltage
E_c	Average or quiescent value of grid voltage
E_{c1}	Average or quiescent value of #1 grid voltage
E_{c2}	Average or quiescent value of #2 grid voltage
E_{cc1}	#1 Grid supply voltage
E_{cc2}	#2 Grid supply voltage
E_f	Filament or heater terminal voltage
E_{ff}	Heater or filament supply voltage
E_{inv}	Peak (or crest) inverse voltage
E_{sig}	Signal voltage (input to control grid)
g_m	Grid-plate transconductance (mutual conductance)
I_b	Average or quiescent value of plate current
I_c	Average or quiescent value of grid current
I_{c1}	Average or quiescent value of #1 grid current
I_{c2}	Average or quiescent value of #2 grid current
I_f	Filament or heater current
I_L	Load current
I_s	Total electron emission (total cathode current)
ma.	Current in milliamperes
megohm	Resistance in millions of ohms
mw.	Milliwatts is power expressed in thousandths of watts
P_i	Power input
P_o	Power output
P_p	Anode dissipation
RMS	Root-Mean-Square
R_L	Load resistance
r_p	Plate resistance
s_c	Conversion tranconductance
t_k	Cathode heating time
μ	Amplification factor
μfd	Capacitance in microfarads
$\mu\mu$fd	Capacitance in micro-microfarads
μmhos	Conductance in micromhos

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1944

SYMBOLS OF TUBE ELEMENTS

(AS EMPLOYED IN CONNECTION WITH BASE DIAGRAMS)

USE THIS COLUMN FOR ALL DATA SHEETS DATED PRIOR TO JUNE 15, 1944		USE THIS COLUMN FOR ALL DATA SHEETS DATED JUNE 15, 1944 AND LATER	
G_a	Anode Grid	A (A_1, A_2, etc.)	Anode
R	Ray Control Electrode	D (D_1, D_2, etc.)	Deflectors, Ray Control Electrode
F	Filament	F	Filament
F_t	Filament Tap	F_t	Filament Tap
G	Control Grid	G (G_1, G_2, etc.)	Grid
H	Heater	H	Heater
H_t	Heater Tap	H_t	Heater Tap
I_c	Internal Connection	I_c	Internal Connection (Not For External Use)
		J	Jumper
K	Cathode	K	Cathode
N_c	No Connection	N_c	No Connection
P	Plate	P (P_1, P_2, etc.)	Plate, Diode Plate
D_p	Diode Plate		
S	Metal Shell	S	Shell
S_i	Internal Shield	S_i	Internal Shield
X_s	External Shield	S_x	External Shield
T	Target	T	Target
▮	Beam Plate	▮	Beam Plate
F_c	Filament Center (Electrical)		
G_m	Modulator Grid		
G_o	Oscillator Grid		
G_s	Screen Grid		
H_c	Heater Center (Electrical)		
P_i	Input Plate		
P_o	Oscillator Plate		
P_r	Remote Cut-Off Plate		
P_s	Sharp Cut-Off Plate		
S_u	Suppressor Grid		

[A] GRID SUBSCRIPT NUMBERS ARE USED ONLY WHEN THERE IS MORE THAN ONE GRID IN THE TUBE. THEY SIGNIFY THE SEQUENCE FROM THE CATHODE. FOR EXAMPLE, G_3 INDICATES THE 3RD. GRID FROM THE CATHODE. WHEN THERE ARE TWIN ELEMENTS IN A TUBE, SUBSCRIPTS ARE USED ONLY IF THERE IS MORE THAN ONE GRID IN ANY GIVEN UNIT. FOR EXAMPLE, A TRIODE-PENTODE IS LABELLED G_2, G_3 FOR A PENTODE SECTION, WHEREAS THE TRIODE SECTION IS LABELLED G. IF THERE ARE 2 PENTODE SECTIONS, THERE ARE THEN TWO SETS OF SUBSCRIPTS.

ALL BASING DIAGRAMS ARE BOTTOM VIEWS. THEY ARE SYMBOLIC AND DO NOT NECESSARILY REPRESENT INTERNAL TUBE CONSTRUCTION.

PLATE 1453
AUG. 31 1944

RMA RECEIVING TUBE RATINGS

M8-210 IT SHALL BE STANDARD TO INTERPRET THE RATINGS ON RECEIVING TYPES OF TUBES ACCORDING TO THE FOLLOWING CONDITIONS.

1. CATHODE

THE HEATER OR FILAMENT VOLTAGE IS GIVEN AS A NORMAL VALUE UNLESS OTHERWISE STATED. THIS MEANS THAT TRANSFORMERS OR RESISTANCES IN THE HEATER OR FILAMENT CIRCUIT SHOULD BE DESIGNED TO OPERATE THE HEATER OR FILAMENT AT RATED VALUE FOR FULL-LOAD OPERATING CONDITIONS UNDER AVERAGE SUPPLY-VOLTAGE CONDITIONS. A REASONABLE AMOUNT OF LEEWAY IS INCORPORATED IN THE CATHODE DESIGN SO THAT MODERATE FLUCTUATIONS OF HEATER OR FILAMENT VOLTAGE DOWNWARD WILL NOT CAUSE MARKED FALLING OFF IN RESPONSE; ALSO, MODERATE VOLTAGE FLUCTUATIONS UPWARD WILL NOT REDUCE THE LIFE OF THE CATHODE TO AN UNSATISFACTORY DEGREE.

A. 1.4 VOLT BATTERY TUBE TYPES

THE FILAMENT POWER SUPPLY MAY BE OBTAINED FROM DRY-CELL BATTERIES, FROM STORAGE BATTERIES, OR FROM A POWER LINE. WITH DRY-CELL BATTERY SUPPLY, THE FILAMENT MAY BE CONNECTED EITHER DIRECTLY ACROSS A BATTERY RATED AT A TERMINAL POTENTIAL OF 1.5 VOLTS, OR IN SERIES WITH THE FILAMENTS OF SIMILAR TUBES ACROSS A POWER SUPPLY CONSISTING OF DRY CELLS IN SERIES. IN EITHER CASE, THE VOLTAGE ACROSS EACH 1.4-VOLT SECTION OF FILAMENT SHOULD NOT EXCEED 1.6 VOLTS. WITH POWER-LINE OR STORAGE-BATTERY SUPPLY, THE FILAMENT MAY BE OPERATED IN SERIES WITH THE FILAMENTS OF SIMILAR TUBES. FOR SUCH OPERATION, DESIGN ADJUSTMENTS SHOULD BE MADE SO THAT WITH TUBES OF RATED CHARACTERISTICS, OPERATING WITH ALL ELECTRODE VOLTAGES APPLIED AND ON A NORMAL LINE VOLTAGE OF 117 VOLTS OR ON A NORMAL STORAGE-BATTERY VOLTAGE OF 2.0 VOLTS PER CELL (WITHOUT A CHARGER) OR 2.2 VOLTS PER CELL (WITH A CHARGER), THE VOLTAGE DROP ACROSS EACH 1.4-VOLT SECTION OF FILAMENT WILL BE MAINTAINED WITHIN A RANGE OF 1.25 TO 1.4 VOLTS WITH A NOMINAL CENTER OF 1.3 VOLTS. IN ORDER TO MEET THE RECOMMENDED CONDITIONS FOR OPERATING FILAMENTS IN SERIES FROM DRY-BATTERY, STORAGE-BATTERY, OR POWER-LINE SOURCES IT MAY BE NECESSARY TO USE SHUNTING RESISTORS ACROSS THE INDIVIDUAL 1.4-VOLT SECTIONS OF FILAMENT.

B. 2.0 VOLT BATTERY TUBE TYPES

THE 2.0-VOLT LINE OF TUBES IS DESIGNED TO BE OPERATED WITH 2.0 VOLTS ACROSS THE FILAMENT. IN ALL CASES THE OPERATING VOLTAGE RANGE SHOULD BE MAINTAINED WITHIN THE LIMITS OF 1.8 VOLTS TO 2.2 VOLTS.

2. POSITIVE POTENTIAL ELECTRODES

THE POWER SOURCES FOR THE OPERATION OF RADIO EQUIPMENT ARE SUBJECT TO VARIATIONS IN THEIR TERMINAL POTENTIAL. CONSEQUENTLY, THE MAXIMUM RATINGS SHOWN ON THE RMA VACUUM TUBE DATA SHEETS HAVE BEEN ESTABLISHED FOR CERTAIN DESIGN CENTER VOLTAGES WHICH EXPERIENCE HAS SHOWN TO BE REPRESENTATIVE. THE DESIGN CENTER VOLTAGES TO BE USED FOR THE VARIOUS POWER SUPPLIES TOGETHER WITH OTHER RATING CONSIDERATIONS ARE AS GIVEN BELOW:

A. AC OR DC POWER LINE SERVICE IN U.S.A.

THE DESIGN CENTER VOLTAGE FOR THIS TYPE OF POWER SUPPLY IS 117 VOLTS. THE MAXIMUM RATINGS OF PLATE VOLTAGES, SCREEN-SUPPLY VOLTAGES, DISSIPATIONS, AND RECTIFIER OUTPUT CURRENTS ARE DESIGN MAXIMUMS AND SHOULD NOT BE EXCEEDED IN EQUIPMENT OPERATED AT A LINE VOLTAGE OF 117 VOLTS.

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B. STORAGE-BATTERY SERVICE

WHEN STORAGE-BATTERY EQUIPMENT IS OPERATED WITHOUT A CHARGER, IT SHOULD BE DESIGNED SO THAT THE PUBLISHED RMA MAXIMUM VALUES OF PLATE VOLTAGES, SCREEN-SUPPLY VOLTAGES, DISSIPATIONS AND RECTIFIER OUTPUT CURRENTS ARE NEVER EXCEEDED FOR A TERMINAL POTENTIAL AT THE BATTERY SOURCE OF 2.0 VOLTS PER CELL. WHEN STORAGE-BATTERY EQUIPMENT IS OPERATED WITH A CHARGER, IT SHOULD BE DESIGNED SO THAT 90% OF THE SAME RMA VALUES ARE NEVER EXCEEDED FOR A TERMINAL POTENTIAL AT THE BATTERY SOURCE OF 2.2 VOLTS.

C. "B" -BATTERY SERVICE

THE DESIGN CENTER VOLTAGE FOR "B" BATTERIES IS THE NORMAL VOLTAGE RATING OF THE BATTERY BLOCK, SUCH AS 45 VOLTS, 90 VOLTS, ETC. EQUIPMENT SHOULD BE DESIGNED SO THAT UNDER NO CONDITION OF BATTERY VOLTAGE WILL THE PLATE VOLTAGES, THE SCREEN-SUPPLY VOLTAGES, OR DISSIPATIONS EVER EXCEED THE RECOMMENDED RESPECTIVE MAXIMUM VALUES SHOWN IN THE DATA FOR EACH TUBE TYPE BY MORE THAN 10%.

D. OTHER CONSIDERATIONS

A. CLASS A AMPLIFIERS

THE MAXIMUM PLATE DISSIPATION OCCURS AT THE "ZERO-SIGNAL" CONDITION. THE MAXIMUM SCREEN DISSIPATION USUALLY OCCURS AT THE CONDITION WHERE THE PEAK-INPUT SIGNAL VOLTAGE IS EQUAL TO THE BIAS VOLTAGE.

B. CLASS B AMPLIFIERS

THE MAXIMUM PLATE DISSIPATION THEORETICALLY OCCURS AT APPROXIMATELY 63% OF THE "MAXIMUM-SIGNAL" CONDITION, BUT PRACTICALLY MAY OCCUR AT ANY SIGNAL VOLTAGE VALUE.

C. CONVERTERS

THE MAXIMUM PLATE DISSIPATION OCCURS AT THE "ZERO-SIGNAL" CONDITION AND THE FREQUENCY AT WHICH THE OSCILLATOR-DEVELOPED BIAS IS A MINIMUM. THE SCREEN DISSIPATION FOR ANY REASONABLE VARIATION IN SIGNAL VOLTAGE MUST NEVER EXCEED THE RATED VALUE BY MORE THAN 10%.

D. SCREEN RATINGS

WHEN THE SCREEN VOLTAGE IS SUPPLIED THROUGH A SERIES VOLTAGE-DROPPING RESISTOR, THE MAXIMUM SCREEN VOLTAGE RATING MAY BE EXCEEDED, PROVIDED THE MAXIMUM SCREEN DISSIPATION RATING IS NOT EXCEEDED AT ANY SIGNAL CONDITION, AND THE MAXIMUM SCREEN VOLTAGE RATING IS NOT EXCEEDED, AT THE MAXIMUM-SIGNAL CONDITION. PROVIDED THESE CONDITIONS ARE FULFILLED, THE SCREEN-SUPPLY VOLTAGE MAY BE AS HIGH AS BUT NOT ABOVE THE MAXIMUM PLATE VOLTAGE RATING.

3. TYPICAL OPERATION

FOR MANY RECEIVING TUBES, THE DATA SHOW TYPICAL OPERATING CONDITIONS IN PARTICULAR SERVICES. THESE TYPICAL OPERATING VALUES ARE GIVEN TO SHOW CONCISELY SOME GUIDING INFORMATION FOR THE USE OF EACH TYPE. THEY ARE NOT TO BE CONSIDERED AS RATINGS, BECAUSE THE TUBE CAN BE USED UNDER ANY SUITABLE CONDITIONS WITHIN ITS RATING LIMITATIONS.

ADOPTED STANDARD NOVEMBER, 1939
REVISED NOVEMBER 1940

PLATE 1350-1
OCT. 25 1943

TUNG-SOL

RECEIVING TUBE PREFERRED LIST

PRINCIPAL APPLICATION		BATTERY OPERATED RADIO RECEIVERS	6-VOLT HOME & AUTO RADIO RECEIVERS	AC - DC HOME RADIO RECEIVERS
RECTIFIERS		**1I7Z3**	5U4G 5Y3GT **6X4** 6X5GT	25Z6GT **35W4** 35Z5GT
CONVERTERS		**1R5**	**6BE6** 6SA7GT	**12BE6** 12SA7GT
TRIODES			**6C4** 6J5GT	
SHARP CUT-OFF PENTODES	MEDIUM G_m	**1U4**	6SJ7GT	12SJ7GT
	HIGH G_m		**6AK5** **6AU6** **6BH6**	**12AU6**
REMOTE CUT-OFF PENTODES	MEDIUM G_m	**1T4**	6SK7GT	12SK7GT
	HIGH G_m		**6BA6** **6BJ6**	**12BA6**
TWIN TRIODES			**6J6** 6SL7GT 6SN7GT **12AU7▲** **12AX7▲**	
AMPLIFIER WITH DIODES		**1S5**	**6AT6** **6BF6** 6S8GT 6SQ7GT	**12AT6** 12SQ7GT
DIODE DETECTORS			**6AL5** 6H6GT	**12AL5**
POWER TUBES		**3S4** **3V4**	**6AQ5** 6L6GA 6V6GT	25L6GT **35B5** ***5085*** 50L6GT

MINIATURE TYPES SHOWN IN BOLD FACE

▲ ADAPTABLE TO EITHER 6 OR 12 VOLT OPERATION

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MAY 3 1948

TUNG-SOL

VT NUMBERS IDENTIFICATION LIST

VT NUMBERS	RMA NUMBERS
VT-4B	211
VT-4C	211 SPECIAL
VT-17	860
VT-19	861
VT-22	204A
VT-24	864
VT-25	10
VT-25A	10 SPECIAL
VT-26	22
VT-27	30
VT-28	24, 24A
VT-29	27
VT-30	01-A
VT-31	31
VT-33	33
VT-34	207
VT-35	35/51
VT-36	36
VT-37	37
VT-38	38
VT-39	869
VT-39A	869B
VT-40	40
VT-41	851
VT-42	872
VT-42A	872A SPEC. FIL.
VT-43	845W
VT-44	32
VT-45	45
VT-46	866
VT-46A	866A
VT-47	47
VT-48	41
VT-49	39/44
VT-50	50
VT-51	841
VT-52	45 SPECIAL
VT-54	34
VT-55	865
VT-56	56
VT-57	57
VT-58	58
VT-60	850
VT-62	801,801A
VT-63	46
VT-64	800
VT-65	6C5
VT-65A	6C5G
VT-66	6F6
VT-66A	6F6G
VT-67	30 SPECIAL
VT-68	6B7
VT-69	6D6
VT-70	6F7
VT-72	842
VT-73	843
VT-74	5Z4
VT-75	75

VT NUMBERS	RMA NUMBERS
VT-76	76
VT-77	77
VT-78	78
VT-80	80
VT-83	83
VT-84	84/6Z4
VT-86	6K7
VT-86A	6K7G
VT-86B	6K7GT
VT-87	6L7
VT-87A	6L7G
VT-88	6R7
VT-88A	6R7G
VT-88B	6R7GT
VT-89	89
VT-90	6H6
VT-90A	6H6GT
VT-91	6J7
VT-91A	6J7GT
VT-92	6Q7
VT-93	6B8
VT-93A	6B8G
VT-94	6J5
VT-94A	6J5G
VT-94B	6J5 SPEC. SELEC.
VT-94C	6J5G SPEC. SELEC.
VT-94D	6J5GT/G
VT-95	2A3
VT-96	6N7
VT-96B	6N7 SPEC. SELEC.
VT-97	5W4
VT-98	6U5/6G5
VT-99	6F8G
VT-100	807
VT-100A	807 MODIFIED
VT-101	837
VT-103	6SQ7
VT-104	12SQ7
VT-105	6SC7
VT-106	803
VT-107	6V6
VT-107A	6V6GT
VT-107B	6V6G
VT-108	450TH
VT-109	2051
VT-111	5BP4/1802P4
VT-112	6AC7/1852
VT-114	5T4
VT-115	6L6
VT-115A	6L6G
VT-116	6SJ7
VT-116A	6SJ7GT
VT-116B	6SJ7Y
VT-117	6SK7
VT-117A	6SK7GT
VT-118	832
VT-119	2X2/879
VT-120	954

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PLATE 1620
NOV. 30 1945

VT NUMBER LIST

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CONTINUED FROM PRECEDING PAGE

VT NUMBERS	RMA NUMBERS	VT NUMBERS	RMA NUMBERS
VT-121	955	VT-190	7H7
VT-122	530	VT-191	316A
VT-124	1A5GT	VT-192	7A4
VT-125	1C5GT	VT-193	7C7
VT-126	6X5	VT-194	7J7
VT-126A	6X5G	VT-195	1005
VT-126B	6X5GT	VT-196	6W5G
VT-128	1630 (A-5588)	VT-197A	6Y3GT/G
VT-129	504TL	VT-198A	6G6G
VT-130	250TL	VT-199	6SS7
VT-131	12SK7	VT-200	VR105-30
VT-132	12K8 SPECIAL	VT-201	25L6
VT-133	12SR7	VT-201C	25L6GT
VT-134	12A6	VT-202	9002
VT-135	12J5GT	VT-203	9003
VT-135A	12J5	VT-204	HK24G
VT-136	1625	VT-205	6ST7
VT-137	1626	VT-206A	5V4G
VT-138	1629	VT-207	12AH7GT
VT-139	VR150-30	VT-208	7B8
VT-141	531	VT-209	12SG7
VT-143	805	VT-210	1S4
VT-144	813	VT-211	6SG7
VT-145	5Z3	VT-212	958
VT-146	1N5GT	VT-213A	6L5G
VT-147	1A7GT	VT-214	12H6
VT-148	1D8GT	VT-215	6E5
VT-149	3A8GT	VT-216	816
VT-150	6SA7	VT-217	811
VT-150A	6SA7GT	VT-218	100TH
VT-151	6A8G	VT-220	250TH
VT-151B	6A8GT	VT-221	3Q5GT
VT-152	6K6GT	VT-222	884
VT-152A	6K6G	VT-223	1H5GT
VT-153	12C8 SPECIAL	VT-224	2C34-RK34
VT-154	814	VT-225	307A
VT-161	12SA7	VT-226	3EP1/1806P1
VT-162	12SJ7	VT-227	7184
VT-163	6C8G	VT-228	8012
VT-164	1619	VT-229	6SL7GT
VT-165	1624	VT-230	350A
VT-166	371A	VT-231	6SN7GT
VT-167	6K8	VT-232	E-1148
VT-168A	6Y6G	VT-233	6SR7
VT-169	12C8	VT-236	836
VT-170	1E5-GP	VT-237	957
VT-171	1R5	VT-238	956
VT-171A	1R5 LOK. EQUIV.	VT-239	1LE3
VT-172	1S5	VT-240	710A
VT-173	1T4	VT-241	7E5/1201
VT-174	3S4	VT-243	7C4/1203A
VT-175	1613	VT-244	5U4G
VT-176	6AB7/1853	VT-245	2050
VT-177	1LH4	VT-246	918
VT-178	1LC6	VT-247	6AG7
VT-179	1LN5	VT-249	1006
VT-181	7Z4	VT-255	705A
VT-182	3B7/1291	VT-260	VR75-30
VT-183	1R4/1294	VT-264	3Q4
VT-184	VR90-30	VT-268	12SC7
VT-185	3D6/1299	VT-269	717A
VT-187	575A	VT-287	815
VT-188	7E6	VT-288	12SH7
VT-189	7F7	VT-289	12SL7GT

PLATE 1621
NOV. 30 1945

FOREWORD

The circuit diagrams in the following section have been selected to represent satisfactory commercial practice in the application of receiving tube types. None of the circuits represent an actual commercial piece of equipment but rather a composite of several designs of a particular class. This has been necessary in order to illustrate in one diagram many different circuit possibilities which may not necessarily be economical in one commercial model. It is therefore quite feasible to utilize portions of several circuits to arrive at a design for a particular service.

Wherever possible, actual circuit values are shown with the exception of parallel coil and condenser combinations which should be chosen from commercial components for the frequencies desired. While values of resistances, capacitances, and voltages are furnished, it is most important that reference be made to the individual tube rating sheets to ascertain that maximum and minimum ratings are not exceeded when attempting to combine several of these circuits.

The scope of the diagrams included represents the most popular circuit applications. As a result, a strict adherence to the current "preferred tube types" list has been made wherever possible. In several instances two tube type designations are shown since comparable performance can be expected when interchanging the indicated types.

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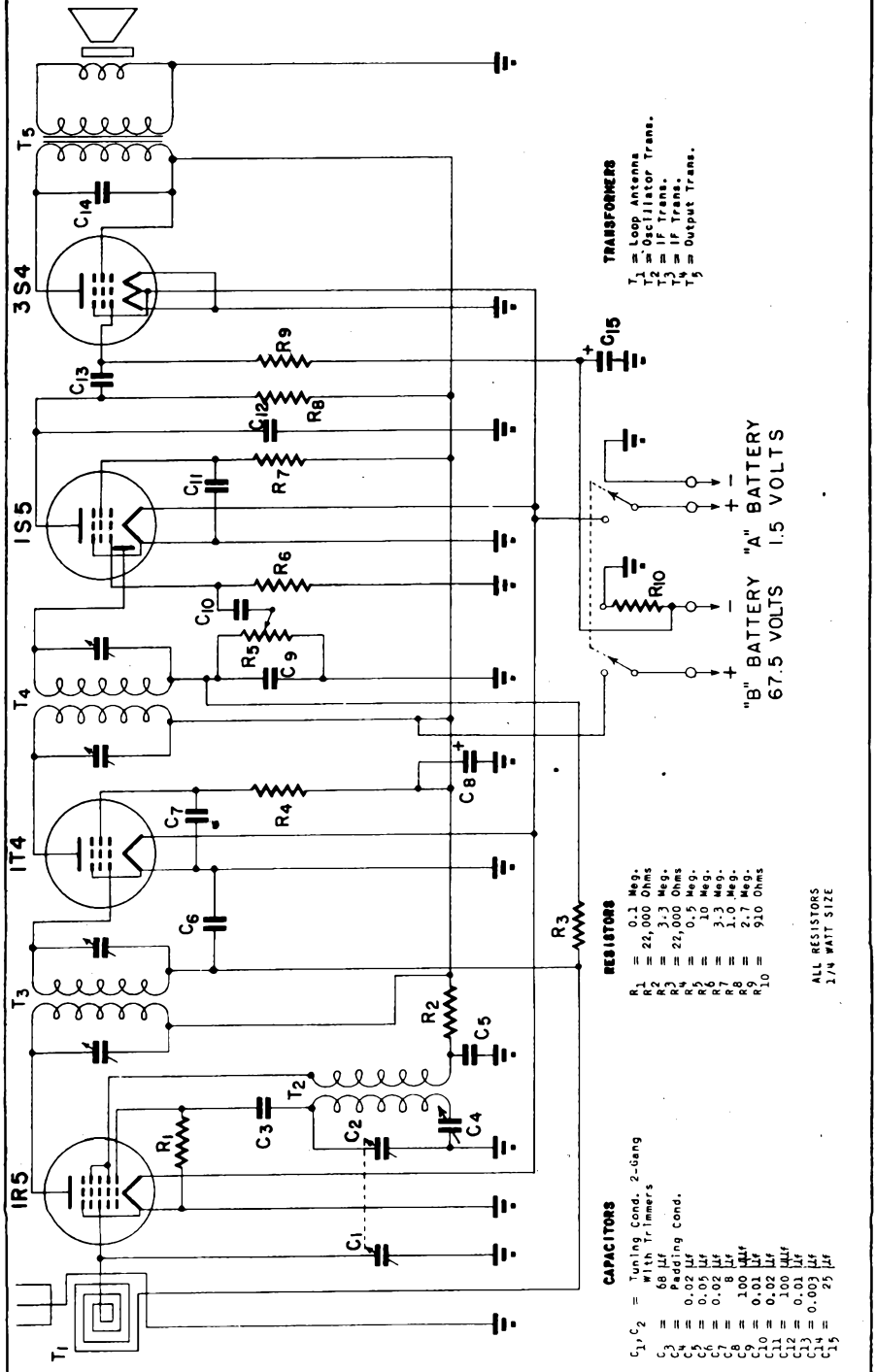
PLATE
1730
SEPT. 2
1946

4 TUBE PORTABLE SUPERHETERODYNE RECEIVER

TYPICAL CIRCUIT

TUNG-SOL



TRANSFORMERS

T1 = Loop Antenna
T2 = Oscillator Trans.
T3 = IF Trans.
T4 = IF Trans.
T5 = Output Trans.

RESISTORS

R1	=	0.1 Meg.
R2	=	22,000 Ohms
R3	=	3.3 Meg.
R4	=	22,000 Ohms
R5	=	0.5 Meg.
R6	=	10 Meg.
R7	=	3.3 Meg.
R8	=	1.0 Meg.
R9	=	2.7 Meg.
R10	=	910 Ohms

ALL RESISTORS 1/4 WATT SIZE

CAPACITORS

C1, C2	=	Tuning Cond. 2-Gang With Trimmers
C3	=	68 µf
C4	=	Padding Cond.
C5	=	0.02 µf
C6	=	0.05 µf
C7	=	0.02 µf
C8	=	8 µf
C9	=	100 MMF
C10	=	0.01 µf
C11	=	0.02 µf
C12	=	100 MMF
C13	=	0.01 µf
C14	=	0.003 µf
C15	=	25 µf

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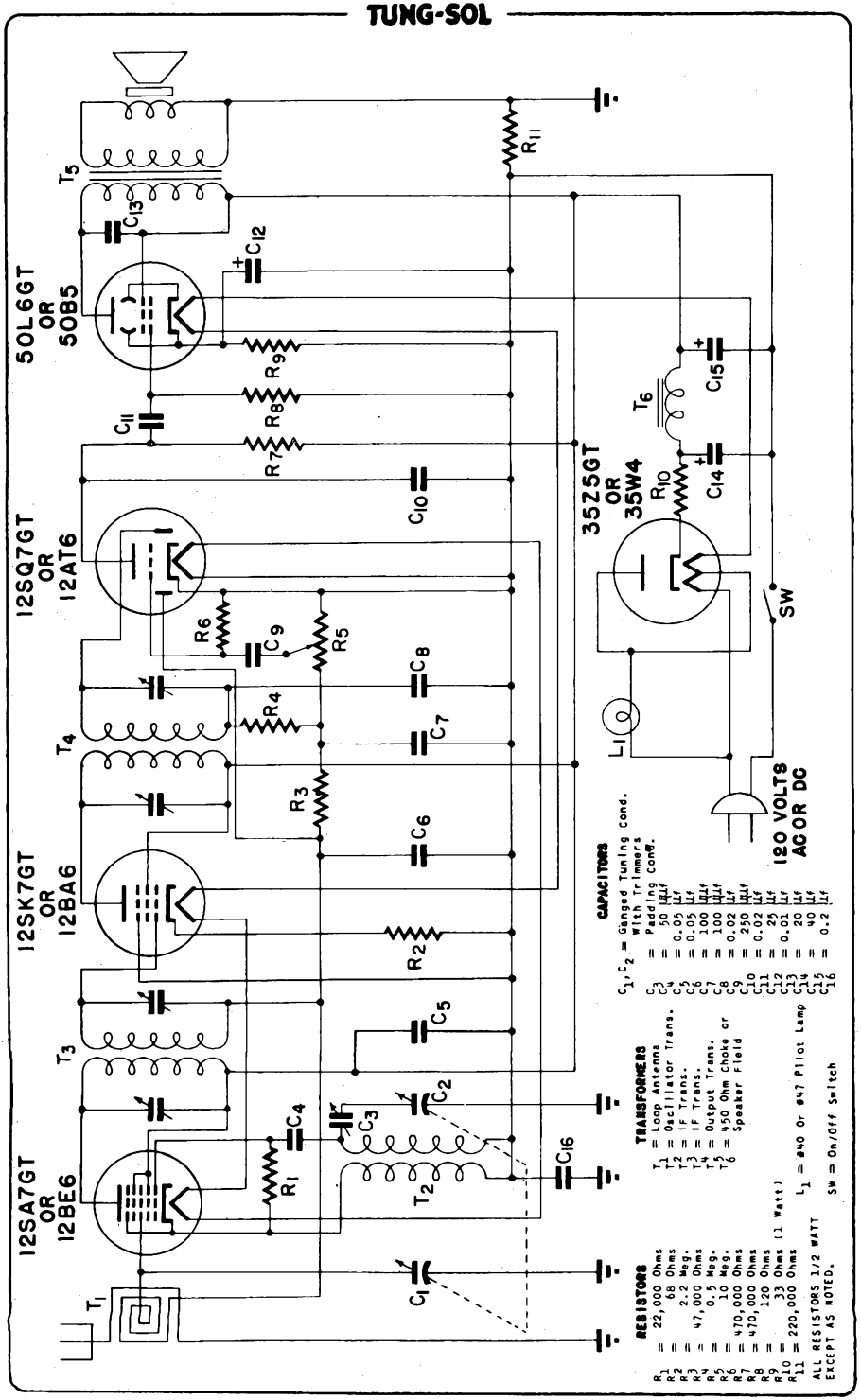
PLATE 1731
SEPT. 2 1946

5 TUBE AC/DC SUPERHETERODYNE RECEIVER

TYPICAL CIRCUIT

TUNG-SOL



RESISTORS

R1 = 22,000 Ohms
R2 = 68 Ohms
R3 = 2.2 Meg.
R4 = 47,000 Ohms
R5 = 0.5 Meg.
R6 = 10 Meg.
R7 = 470,000 Ohms
R8 = 470,000 Ohms
R9 = 120 Ohms
R10 = 33 Ohms (1 Watt)
R11 = 220,000 Ohms

ALL RESISTORS 1/2 WATT EXCEPT AS NOTED.

TRANSFORMERS

T1 = Loop Antenna
T2 = Oscillator Trans.
T3 = IF Trans.
T4 = IF Trans.
T5 = Output Trans.
T6 = 450 Ohm Choke or Speaker Field

L1 = #40 Or #47 Pilot Lamp

SW = On/Off Switch

CAPACITORS

C1, C2 = Ganged Tuning Cond. With Trimmers
C3 = 50 Mmf
C4 = 0.05 Mf
C5 = 0.05 Mf
C6 = 100 Mmf
C7 = 100 Mmf
C8 = 0.02 Mf
C9 = 250 Mmf
C10 = 0.02 Mf
C11 = 25 Mf
C12 = 0.01 Mf
C13 = 20 Mf
C14 = 40 Mf
C15 = 0.2 Mf
C16 = Padding Cond.

PLATE 1732
SEPT. 2 1946

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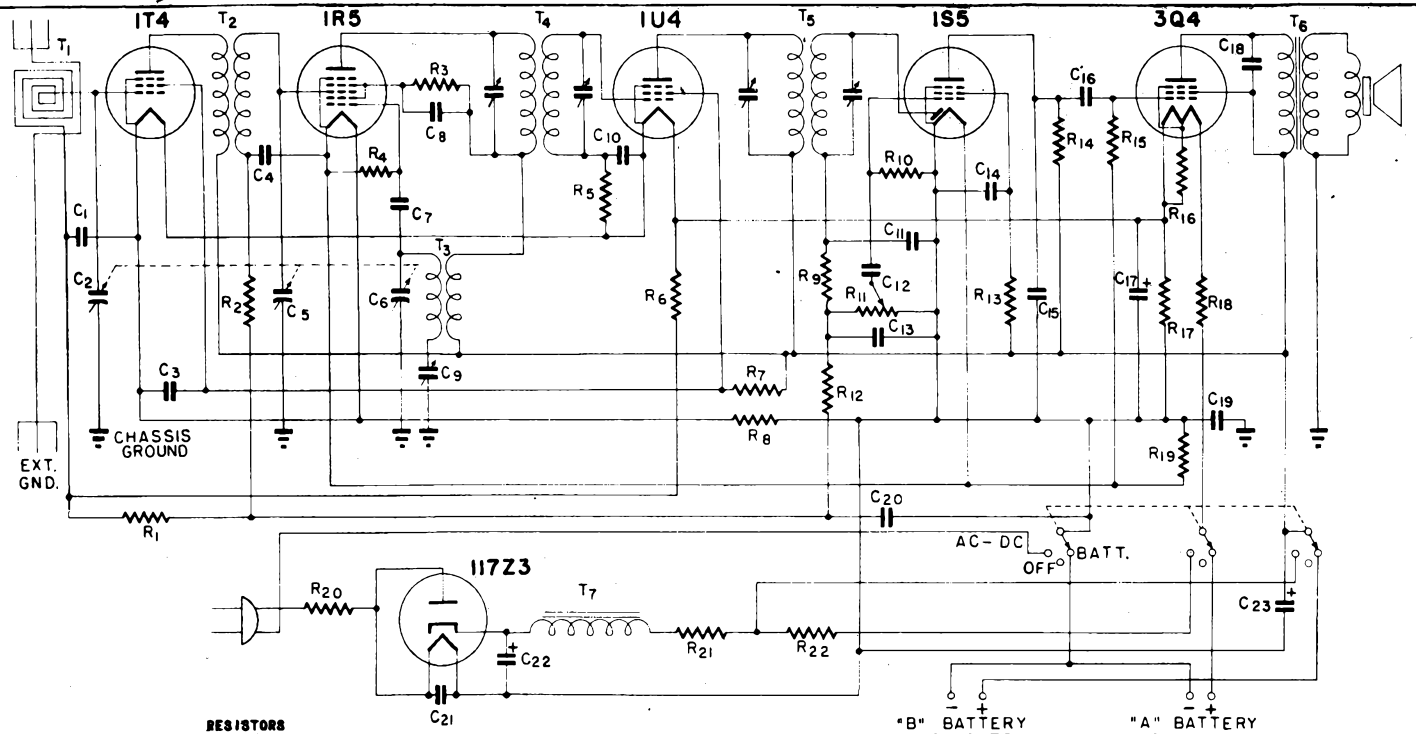
PLATE 1733 SEPT. 2 1946

6 TUBE AC/DC BATTERY PORTABLE RECEIVER

TUNG-SOL

TYPICAL CIRCUIT



RESISTORS

R_1 =	0.5 Meg.	R_9 =	47,000 Ohms	R_{16} =	270 Ohms
R_2 =	0.5 Meg.	R_{10} =	10 Meg.	R_{17} =	600 Ohms
R_3 =	10,000 Ohms	R_{11} =	1 Meg. (Vol. Control)	R_{18} =	10 Ohms
R_4 =	0.1 Meg.			R_{19} =	1000 Ohms
R_5 =	3.3 Meg.	R_{12} =	3.3 Meg.	R_{20} =	33 Ohms (1 Watt)
R_6 =	10 Meg.	R_{13} =	3.3 Meg.	R_{21} =	270 Ohms (Includes T_7)
R_7 =	15,000 Ohms	R_{14} =	1 Meg.	R_{22} =	1700 Ohms (10 Watts)
R_8 =	330 Ohms	R_{15} =	3.3 Meg.		

ALL RESISTORS 1/2 WATT SIZE EXCEPT AS NOTED

TRANSFORMERS

T_1 = Loop Antenna
T_2 = RF Trans.
T_3 = Oscillator Trans.
T_4 = IF Trans.
T_5 = IF Trans.
T_6 = Output Trans.
T_7 = Choke Coil

C_1 = 0.02 µf
C_2, C_3, C_4 = 3 Gang Variable With Trimmers
C_5 = 0.02 µf
C_6 = 0.02 µf
C_7 = 50 µµf
C_8 = 0.02 µf

CAPACITORS

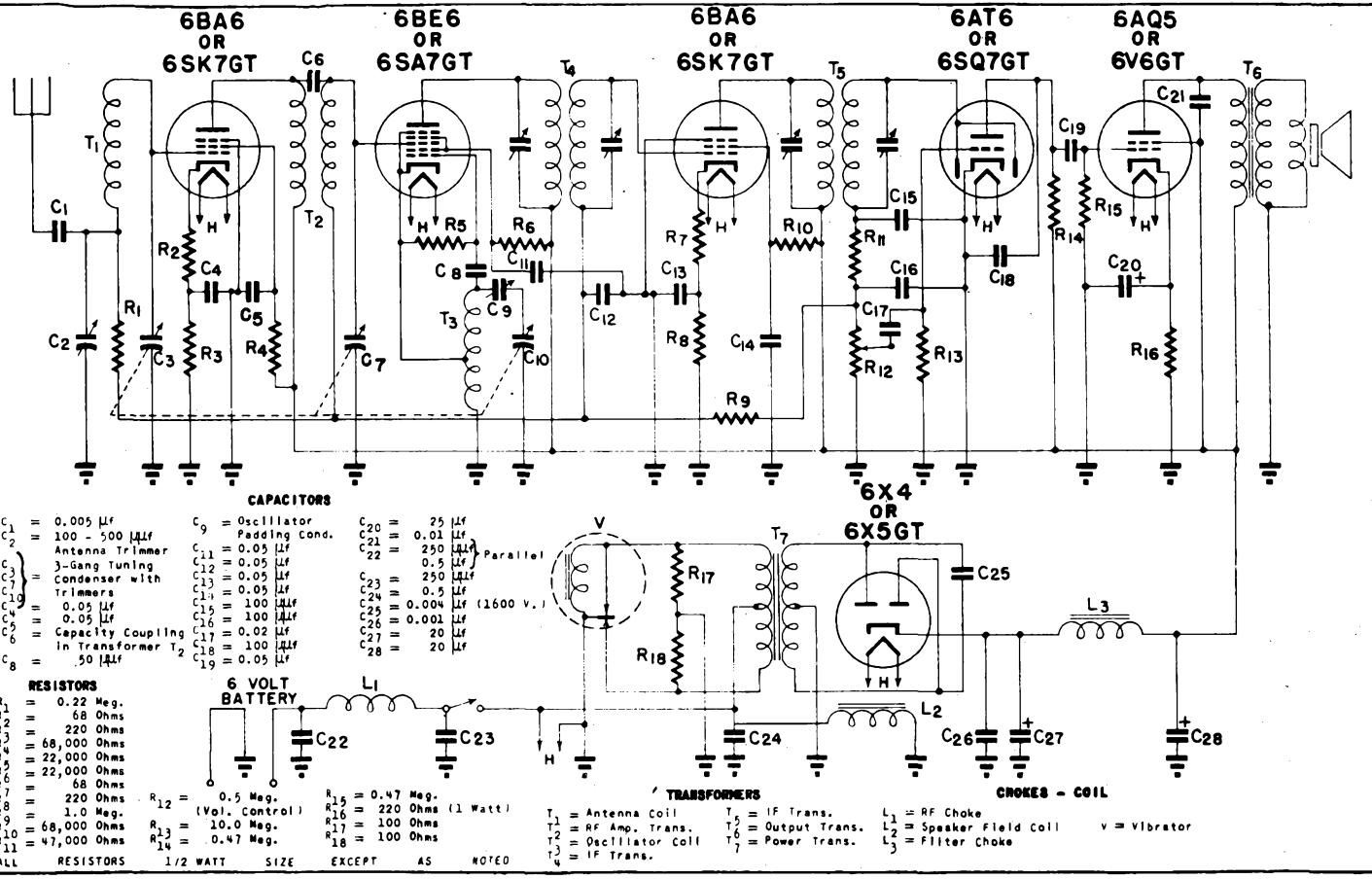
C_9 =	Padding Cond.	C_{17} =	100 µf
C_{10} =	0.02 µf	C_{18} =	0.002 µf
C_{11} =	100 µµf	C_{19} =	0.2 µf
C_{12} =	0.01 µf	C_{20} =	0.05 µf
C_{13} =	100 µµf	C_{21} =	0.05 µf
C_{14} =	0.05 µf	C_{22} =	40 µf
C_{15} =	100 µµf	C_{23} =	20 µf
C_{16} =	0.02 µf		

ELECTRONIC TUBE DIVISION NEWARK, NEW JERSEY, U.S.A.

TYPICAL CIRCUIT

6 TUBE AUTOMOBILE RECEIVER

TUNG-SOL



CAPACITORS

C_1	= 0.005 µf	C_9	= Oscillator Padding Cond.	C_{20}	= 25 µf
C_2	= 100 - 500 µµf Antenna Trimmer	C_{11}	= 0.05 µf	C_{21}	= 0.01 µf
C_3 C_7 C_{10}	= 3-Gang Tuning Condenser with Trimmers	C_{12}	= 0.05 µf	C_{22}	= 250 µµf Parallel
		C_{13}	= 0.05 µf		0.5 µf
		C_{14}	= 0.05 µf	C_{23}	= 250 µµf
C_4	= 0.05 µf	C_{15}	= 100 µµf	C_{24}	= 0.5 µf
C_5	= 0.05 µf	C_{16}	= 100 µµf	C_{25}	= 0.004 µf (1600 V.)
C_6	= Capacity Coupling in Transformer T_2	C_{17}	= 0.02 µf	C_{26}	= 0.001 µf
C_8	= 50 µµf	C_{18}	= 100 µµf	C_{27}	= 20 µf
		C_{19}	= 0.05 µf	C_{28}	= 20 µf

RESISTORS

R_1	= 0.22 Meg.	R_{12}	= 0.5 Meg. (Vol. Control)	R_{15}	= 0.47 Meg.
R_2	= 68 Ohms	R_{13} R_{14}	= 0.47 Meg.	R_{16}	= 220 Ohms (1 Watt)
R_3	= 220 Ohms			R_{17}	= 100 Ohms
R_4	= 68,000 Ohms			R_{18}	= 100 Ohms
R_5	= 22,000 Ohms				
R_6	= 22,000 Ohms				
R_7	= 68 Ohms				
R_8	= 220 Ohms				
R_9	= 1.0 Meg.				
R_{10}	= 68,000 Ohms				
R_{11}	= 47,000 Ohms				

ALL RESISTORS 1/2 WATT SIZE EXCEPT AS NOTED

TRANSFORMERS

T_1 = Antenna Coil
T_1 = RF Amp. Trans.
T_2 = Oscillator Coil
T_3 = IF Trans.
T_4 = IF Trans.
T_5 = IF Trans.
T_6 = Output Trans.
T_7 = Power Trans.

CHOKES - COIL

L_1 = RF Choke
L_2 = Speaker Field Coil
L_3 = Filter Choke

V = Vibrator

PLATE 1139 SEPT. 2 1946

10 TUBE AC SUPERHETRODYNE RECEIVER

TUNG-SOL

TYPICAL CIRCUIT

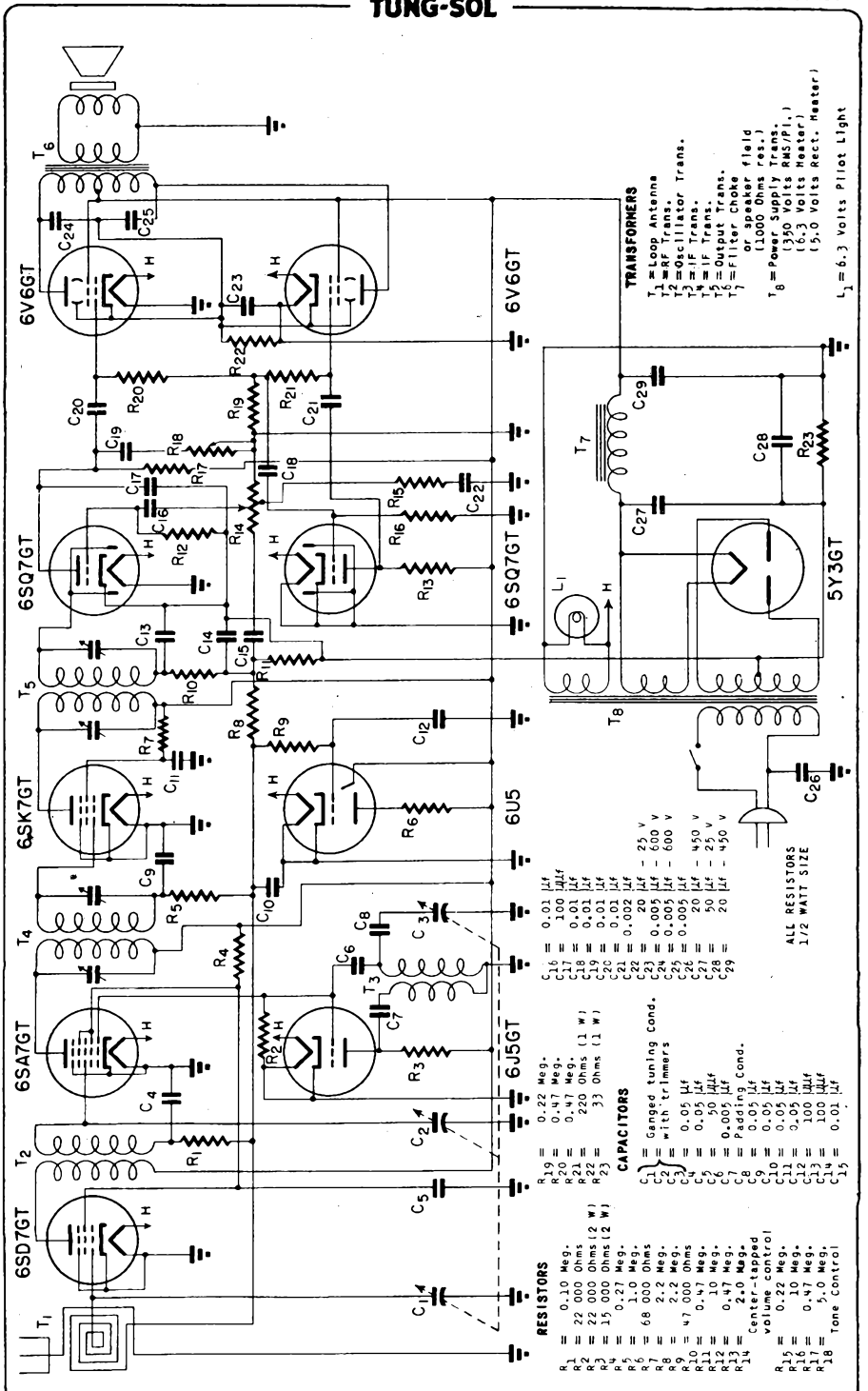


PLATE 1839
JULY 1, 1947

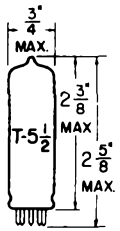
TUNG-SOL

VOLTAGE REGULATOR

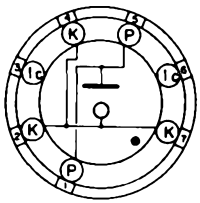
MINIATURE TYPE

COLD-CATHODE GLOW DISCHARGE

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 0A2 IS A COLD CATHODE GLOW-DISCHARGE TUBE USING THE MINIATURE CONSTRUCTION. IT IS INTENDED FOR USE AS A VOLTAGE REGULATOR TO MAINTAIN CONSTANT VOLTAGE ACROSS A LOAD WITH MODERATE CHANGES IN LOAD CURRENT AND SUPPLY VOLTAGE.

RATINGS

MAXIMUM AND MINIMUM RATINGS ARE ABSOLUTE VALUES

MAXIMUM AVERAGE STARTING CURRENT[A]	75	MA.
MAXIMUM DC OPERATING CURRENT (CONTINUOUS)	30	MA.
MINIMUM DC OPERATING CURRENT (CONTINUOUS)	5	MA.
MAXIMUM AMBIENT TEMPERATURE	+90	°C
MINIMUM AMBIENT TEMPERATURE	-55	°C

[A] AVERAGED OVER STARTING PERIOD NOT EXCEEDING 10 SECONDS.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

MINIMUM DC ANODE SUPPLY VOLTAGE[B]	185	VOLTS
DC STARTING VOLTAGE (APPROX.)	155	VOLTS
DC OPERATING VOLTAGE (APPROX.)	150	VOLTS
SERIES RESISTOR	C	
MAXIMUM SHUNT CAPACITOR	0.1	µf
REGULATION (5 TO 30 MA.)	2	VOLTS

[B] NOT LESS THAN INDICATED SUPPLY VOLTAGE SHOULD BE PROVIDED TO INSURE "STARTING" THROUGHOUT TUBE LIFE.

[C] SHOULD BE SUFFICIENT TO LIMIT OPERATING CURRENT THROUGH TUBE TO 30 MA. AT ALL TIMES AFTER THE STARTING PERIOD.

SIMILIAR TYPE REFERENCE: Ratings and characteristics somewhat similiar to type OD3/VR150.

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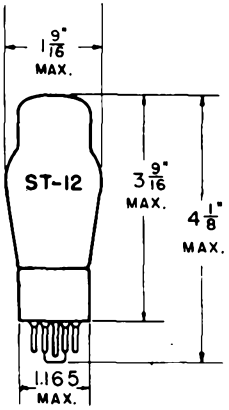
PLATE 2016
JUNE 1, 1948

TUNG-SOL

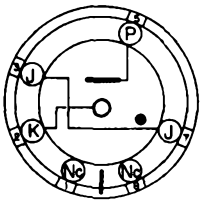


VOLTAGE REGULATOR

COLD CATHODE - GLOW DISCHARGE

GLASS BULB

SMALL SHELL OCTAL 6-PIN BASE



BOTTOM VIEW

THE 0A3/VR75, 0B3/VR90, 0C3/VR105, AND 0D3/VR150 ARE COLD-CATHODE, GLOW-DISCHARGE TUBES. THEY ARE INTENDED FOR USE AS VOLTAGE REGULATORS IN APPLICATIONS WHERE IT IS NECESSARY TO MAINTAIN A CONSTANT DC OUTPUT VOLTAGE ACROSS A LOAD, INDEPENDENT OF LOAD CURRENT AND MODERATE LINE-VOLTAGE VARIATIONS. LIKE OTHER GLOW-DISCHARGE TUBES, THEY MAY ALSO BE USED AS RELAXATION OSCILLATORS, AND FOR SPARK-OVER PROTECTION.

RATINGS AND TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

MAXIMUM AND MINIMUM RATINGS ARE ABSOLUTE VALUES

	0A3/VR75	0B3/VR90	
DC ANODE SUPPLY VOLTAGE [A]	105 MIN.	125 MIN.	VOLTS
DC OPERATING CURRENT (CONTINUOUS)	40 MAX.	30 MAX.	MA.
DC OPERATING CURRENT (CONTINUOUS)	5.0 MIN.	10 MIN.	MA.
AMBIENT TEMPERATURE RANGE	-55 TO + 90		°C
DC STARTING VOLTAGE (APPROX.)	100		VOLTS
DC OPERATING VOLTAGE (APPROX.)	75	90	VOLTS
REGULATION (5 TO 30 MA.)	3.0		VOLTS
REGULATION (5 TO 40 MA.)	5.0		VOLTS
REGULATION (10 TO 30 MA.)		8.0	VOLTS

	0C3/VR105	0D3/VR150	
DC ANODE SUPPLY VOLTAGE [A]	133 MIN.	185 MIN.	VOLTS
DC OPERATING CURRENT (CONTINUOUS)	40 MAX.	40 MAX.	MA.
DC OPERATING CURRENT (CONTINUOUS)	5.0 MIN.	5.0 MIN.	MA.
AMBIENT TEMPERATURE RANGE	-55 TO + 90	-55 TO + 90	°C
DC STARTING VOLTAGE (APPROX.)	115	160	VOLTS
DC OPERATING VOLTAGE (APPROX.)	105	150	VOLTS
REGULATION (5 TO 30 MA.)	1.0	2.0	VOLTS
REGULATION (5 TO 40 MA.)	2.0	4.0	VOLTS

[A] NOT LESS THAN INDICATED SUPPLY VOLTAGES SHOULD BE PROVIDED TO INSURE "STARTING" THROUGHOUT TUBE LIFE.

PLATE 1454
AUG. 31 1944

TUNG-SOL

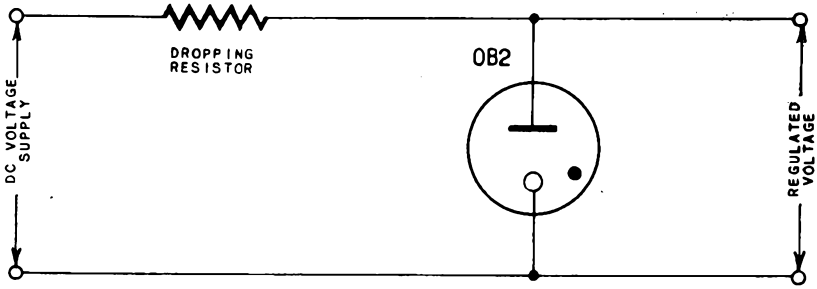
VOLTAGE REGULATOR

MINIATURE TYPE
PHYSICAL SPECIFICATIONS

EMITTER COLD CATHODE - GAS	PIN CONNECTIONS	
BASE MINIATURE BUTTON 7-PIN	PIN 1 PLATE	PIN 7 CATHODE
CAP ---	PIN 2 CATHODE	PIN 8 NONE
BULB T-5½	PIN 3 NO CONNECTION	
MAX. DIAMETER 3/4"	PIN 4 CATHODE	MOUNTING POS. ANY
MAX. SEATED HEIGHT 2 3/8"	PIN 5 PLATE	
MAX. OVERALL LENGTH 2 5/8"	PIN 6 NO CONNECTION	
"HOLD-DOWN" HEIGHT 2"(APPROX.)		

RATINGS AND CHARACTERISTICS

MINIMUM DC SUPPLY VOLTAGE	133	VOLTS
OPERATING DC VOLTAGE (APPROX.)	108	VOLTS
OPERATING CURRENT:		
MAXIMUM ALLOWED	30	MA.
MINIMUM	5	MA.
REGULATION	2	VOLTS
STARTING VOLTAGE	125	VOLTS



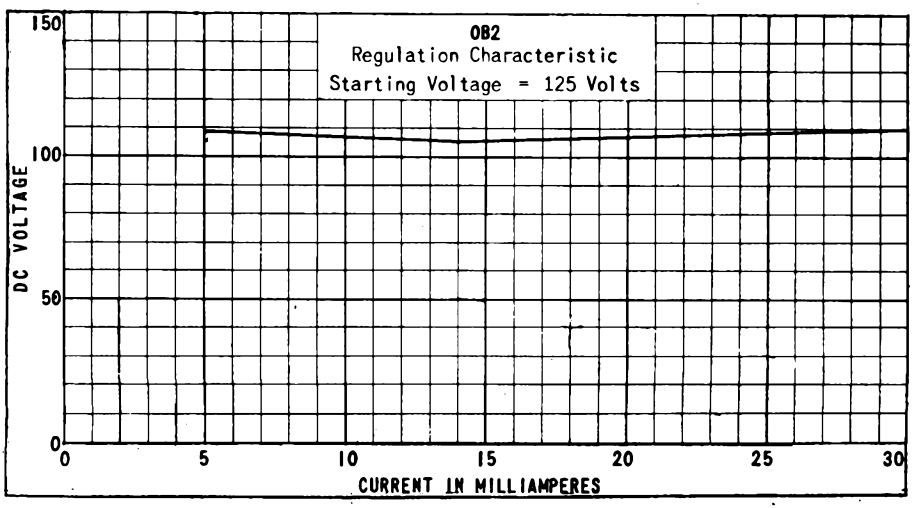


PLATE 1715
JUNE 17 1946

TUNG-SOL

GAS RECTIFIER

PHYSICAL SPECIFICATIONS

EMITTER IONICALLY HEATED	PIN CONNECTIONS	
BASE SMALL WAFER OCTAL 5-PIN	PIN 1 SHELL	PIN 7 FILAMENT
CAP ---	PIN 2 NONE	PIN 8 FILAMENT
BULB MT-8	PIN 3 STARTER ANODE	
MAX. DIAMETER 1 5/16"	PIN 4 NONE	MOUNTING POS. ANY
MAX. SEATED HEIGHT 2 1/16"	PIN 5 PLATE	
MAX. OVERALL LENGTH 2 5/8"	PIN 6 NONE	

THE OY4 IS A HALF-WAVE GAS RECTIFIER WITH A STARTER ANODE WHICH MAKES IT POSSIBLE TO OPERATE DIRECTLY FROM A 117-VOLT AC OR DC LINE.

RATINGS AND CHARACTERISTICS

HALF-WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

PINS 7 AND 8 MUST BE CONNECTED TOGETHER[A]

MAXIMUM INVERSE PEAK VOLTAGE	300	VOLTS
MAXIMUM PEAK CURRENT	500	MA.
MAXIMUM DC OUTPUT CURRENT	75	MA.
MINIMUM DC OUTPUT CURRENT	40	MA.
MINIMUM SERIES ANODE RESISTANCE (117-VOLT LINE OPERATION)	50	OHMS
APPROXIMATE TUBE DROP	12	VOLTS
MAXIMUM DC STARTING VOLTAGE[B]	95	VOLTS

[A] RAPID INTERMITTENT OPERATION IS UNDESIRABLE.

[B] WITH STARTER ANODE CONNECTED TO THE ANODE THROUGH A 10 MEGOHM RESISTOR BY-PASSED WITH A 0.002 μF CONDENSER.

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PLATE 1695
APRIL 15 1946

TUNG-SOL

GAS RECTIFIER

PHYSICAL SPECIFICATIONS

EMITTER IONICALLY HEATED	PIN CONNECTIONS	
BASE OCTAL 5-PIN DWARF	PIN 1 NO CONNECTION	PIN 7 FILAMENT
CAP ---	PIN 2 NONE	PIN 8 FILAMENT
BULB T-7	PIN 3 STARTER ANODE	
MAX. DIAMETER 1 5/64"	PIN 4 NONE	MOUNTING POS. ANY
MAX. SEATED HEIGHT 2 1/16"	PIN 5 PLATE	
MAX. OVERALL LENGTH 2 5/8"	PIN 6 NONE	

THE OY4G IS A HALF-WAVE GAS RECTIFIER WITH A STARTER ANODE WHICH MAKES IT POSSIBLE TO OPERATE DIRECTLY FROM A 117-VOLT AC OR DC LINE.

RATINGS AND CHARACTERISTICS

HALF-WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

PINS 7 AND 8 MUST BE CONNECTED TOGETHER[A]

MAXIMUM INVERSE PEAK VOLTAGE	300	VOLTS
MAXIMUM PEAK CURRENT	500	MA.
MAXIMUM DC OUTPUT CURRENT	75	MA.
MINIMUM DC OUTPUT CURRENT	40	MA.
MINIMUM SERIES ANODE RESISTANCE (117-VOLT LINE OPERATION)	50	OHMS
APPROXIMATE TUBE DROP	12	VOLTS
MAXIMUM DC STARTING VOLTAGE[B]	95	VOLTS

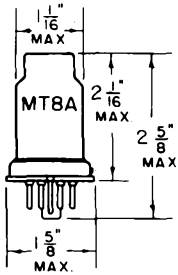
[A] RAPID INTERMITTENT OPERATION IS UNDESIRABLE.

[B] WITH STARTER ANODE CONNECTED TO THE ANODE THROUGH A 10 MEGOHM RESISTOR BY-PASSED WITH A 0.002 µF CONDENSER.

PLATE 1696
APRIL 15 1946

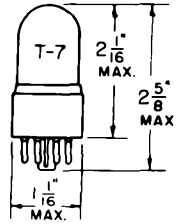
TUNG-SOL

FULL WAVE GAS FILLED RECTIFIER

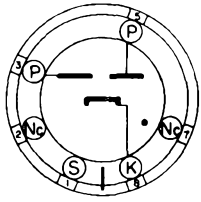


0Z4

COLD CATHODE TYPE

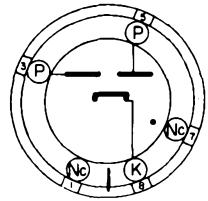


0Z4G



BOTTOM VIEW

SMALL WAFER
6 PIN OCTAL BASE



BOTTOM VIEW

DWARF SHELL
5 PIN OCTAL BASE

THE 0Z4 AND 0Z4G ARE FULL WAVE GAS FILLED RECTIFIER TUBES WITH COLD CATHODES REQUIRING NO HEATER SUPPLY VOLTAGE. THEY ARE USED WHERE HIGH OVERALL EFFICIENCY IS DESIRED.

MAXIMUM RATINGS

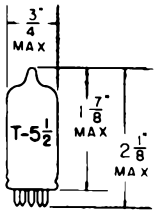
MINIMUM PEAK STARTING SUPPLY VOLTAGE PER PLATE	300	VOLTS
MAXIMUM PEAK PLATE TO PLATE VOLTAGE	1000	VOLTS
MAXIMUM PEAK PLATE CURRENT PER PLATE	200	MA.
MAXIMUM DC OUTPUT CURRENT	75	MA.
MINIMUM DC OUTPUT CURRENT	30	MA.
MAXIMUM DC OUTPUT VOLTAGE	300	VOLTS
TUBE VOLTAGE DROP	24	VOLTS

PRINTED IN U. S. A.

PLATE
1489
OCT. 31
1944

TUNG-SOL

H-F DIODE

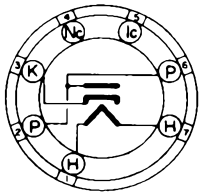


COATED UNIPOTENTIAL CATHODE

HEATER

1.4 VOLTS 0.15 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 1A3 IS A HEATER CATHODE TYPE OF MINIATURE DIODE PARTICULARLY USEFUL AS A DISCRIMINATOR TUBE IN PORTABLE FM RECEIVERS, AND IN PORTABLE HIGH FREQUENCY MEASURING EQUIPMENT. ITS INTERELECTRODE CAPACITANCES ARE VERY LOW, BEING IN THE ORDER OF 0.5 μμf. THE RESONANT FREQUENCY OF THE 1A3 IS APPROXIMATELY 1000 Mc. THE GLASS BUTTON BASE PROVIDES FOR SHORT LEADS AND SHORT LEAD INDUCTANCE.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PEAK INVERSE PLATE VOLTAGE	330	VOLTS
MAXIMUM PEAK PLATE CURRENT	5.0	MA.
MAXIMUM DC OUTPUT CURRENT	0.5	MA.
MAXIMUM DC HEATER-CATHODE POTENTIAL	140	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

HEATER TO CATHODE	0.6	μμf
PLATE TO CATHODE	0.4	μμf
PLATE TO HEATER	0.8	μμf

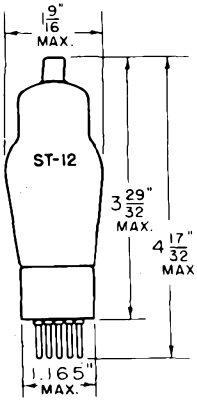
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

AC PLATE SUPPLY VOLTAGE (RMS)	117	VOLTS
FILTER INPUT CONDENSER	2.0	μf
MINIMUM TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE	0	OHMS

[A] THE CENTER HOLE IN SOCKETS DESIGNED FOR THIS BASE PROVIDES FOR THE POSSIBILITY THAT THIS TUBE TYPE MAY BE MANUFACTURED WITH THE EXHAUST-TUBE TIP AT THE BASE END. FOR THIS REASON, IT IS RECOMMENDED THAT IN EQUIPMENT EMPLOYING THIS TUBE TYPE, NO MATERIAL BE PERMITTED TO OBSTRUCT THE SOCKET HOLE.

PLATE 1490
OCT. 31 1944

TUNG-SOL



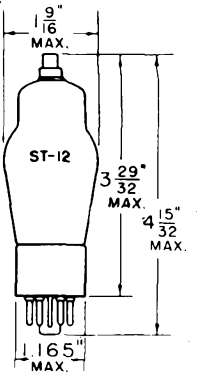
REMOTE CUT-OFF
PENTODE AMPLIFIER

COATED FILAMENT

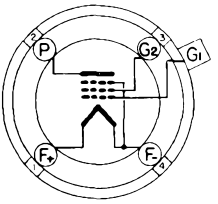
2.0 VOLTS 0.060 AMPERE

AC OR DC

GLASS BULB

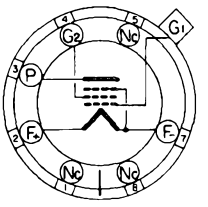


1A4P
SMALL METAL CAP
SMALL 4 PIN BASE



BOTTOM VIEW

1D5GP
MINIATURE METAL CAP
SMALL 7 PIN OCTAL BASE



BOTTOM VIEW

THESE TUBES ARE REMOTE CUT-OFF PENTODE AMPLIFIERS DESIGNED FOR USE IN BATTERY OPERATED RECEIVERS. EITHER TUBE IS SUITABLE FOR USE WITH AUTOMATIC VOLUME CONTROL IN RF AND IF AMPLIFIERS WITH A MINIMUM OF CROSS MODULATION.

MOUNTING POSITION

THESE TUBES SHOULD BE OPERATED VERTICALLY WITH THE BASE DOWN. HOWEVER, HORIZONTAL OPERATIONS MAY BE PERMITTED IN THE 1D5GP TUBE TYPE IF PINS 2 AND 7 ARE ON A VERTICAL PLANE. THE SAME WILL BE TRUE FOR THE 1A4P TUBE TYPE IF PINS 1 AND 4 ARE ON A VERTICAL PLANE.

DIRECT INTERELECTRODE CAPACITANCES

MAXIMUM CONTROL GRID TO PLATE (WITH EXTERNAL SHIELD)	0.007	μμf
INPUT (G_1 TO G_2, G_3, F)	5.0	μμf
OUTPUT (P TO G_2, G_3, F)	11	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	90	180 MAX.	VOLTS
SCREEN VOLTAGE	67.5	67.5 MAX.	VOLTS
MINIMUM CONTROL GRID VOLTAGE	-3	-3	VOLTS
PLATE CURRENT	2.2	2.3	MA.
SCREEN CURRENT	0.9	0.8	MA.
PLATE RESISTANCE (APPROX.)	0.6	1.0	MEGOHM
TRANSCONDUCTANCE	720	750	μMHOS
AMPLIFICATION FACTOR (APPROX.)	425	750	
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE OF 15 μMHOS	-15	-15	VOLTS

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PLATE 1455
AUG. 31 1944

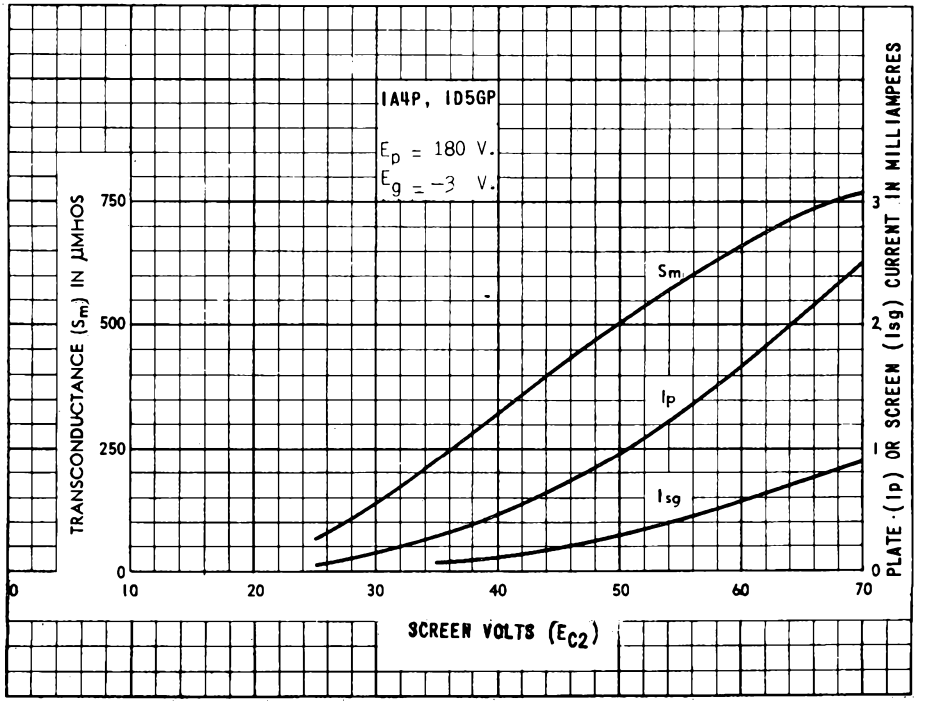

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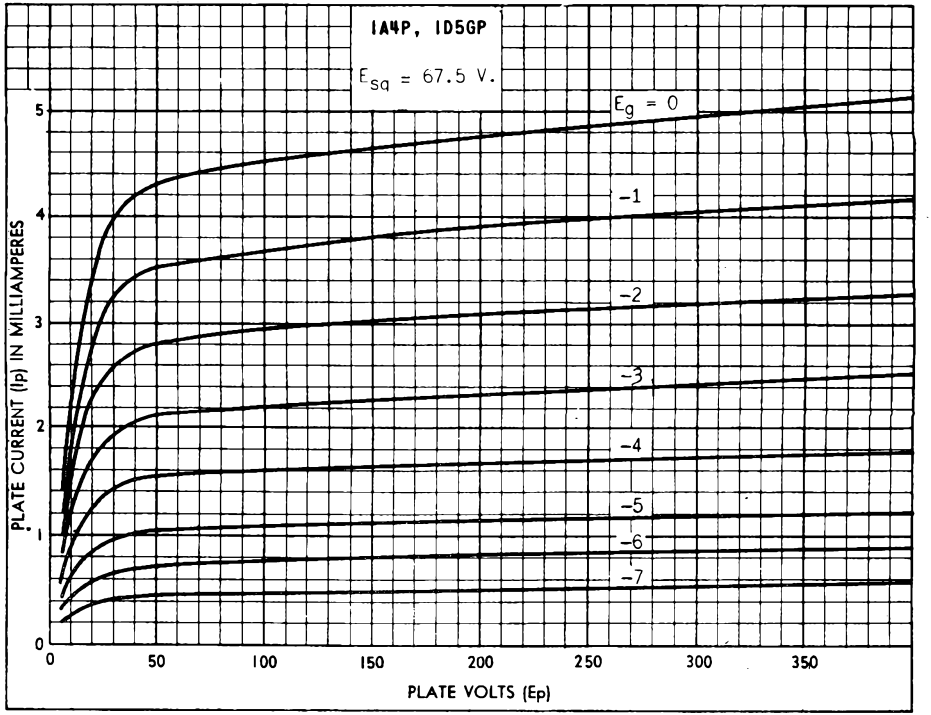
PLATE
1456
AUG. 31
1944


1A4P, 1D5GP
E_{sg} = 67.5 V.
E_g = 0
-1
-2
-3
-4
-5
-6
-7
PLATE CURRENT (Ip) IN MILLIAMPERES
0
1
2
3
4
5
0
50
100
150
200
250
300
350
PLATE VOLTS (Ep)

1A4P (1D5GP)

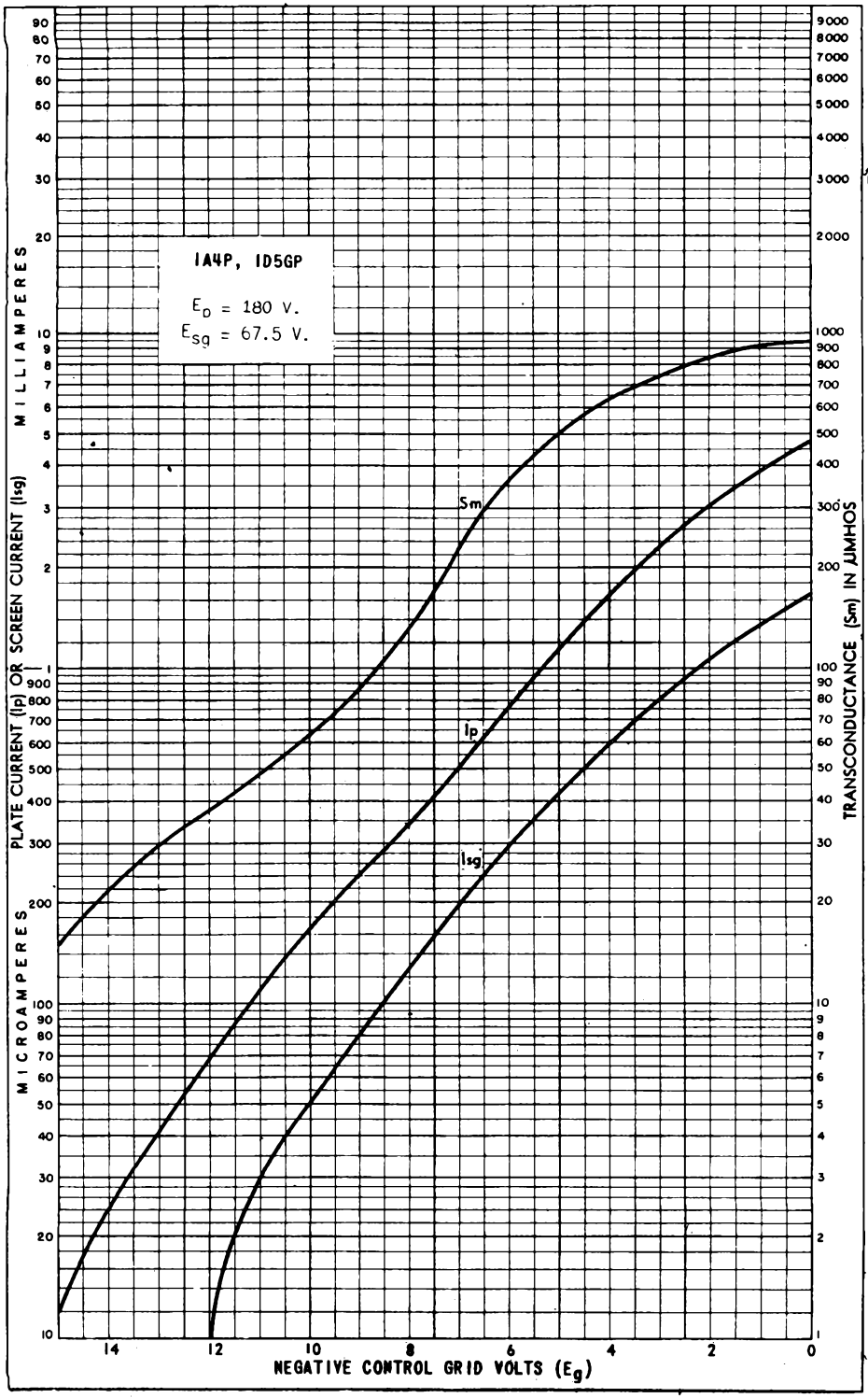
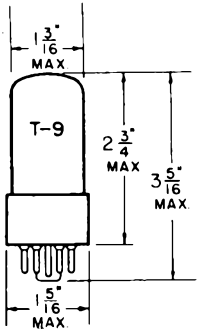


PLATE 1457
AUG. 31 1944

TUNG-SOL



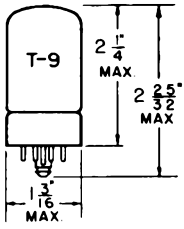
PENTODE POWER AMPLIFIER

COATED FILAMENT

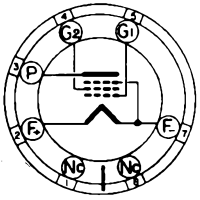
1.4 VOLTS 0.05 AMPERE

DC

GLASS BULB



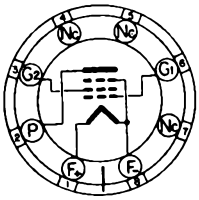
1A5GT/G ANY MOUNTING POSITION **1LA4**



BOTTOM VIEW

INTERMEDIATE SHELL

7-PIN OCTAL BASE



BOTTOM VIEW

LOCKING-IN

8-PIN

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	VOLTS
MAXIMUM CATHODE CURRENT	6.0	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	85	90	VOLTS
SCREEN VOLTAGE	85	90	VOLTS
GRID VOLTAGE[A]	-4.5	-4.5	VOLTS
PEAK A-F GRID VOLTAGE	4.5	4.5	VOLTS
ZERO-SIG. PLATE CURRENT	3.5	4.0	MA.
MAXIMUM SIG. PLATE CURRENT	3.5	4.0	MA.
ZERO-SIG. SCREEN CURRENT	0.7	0.8	MA.
MAXIMUM SIG. SCREEN CURRENT	1.0	1.1	MA.
PLATE RESISTANCE	0.3	0.3	MEGOHM
TRANSCONDUCTANCE	800	850	μMHOS
LOAD RESISTANCE	25 000	25 000	OHMS
TOTAL HARMONIC DISTORTION	10	7.0	PER CENT
MAXIMUM SIG. POWER OUTPUT	100	115	MW.

[A] RETURN TO NEGATIVE FILAMENT

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PLATE 1523

JAN. 15 1945

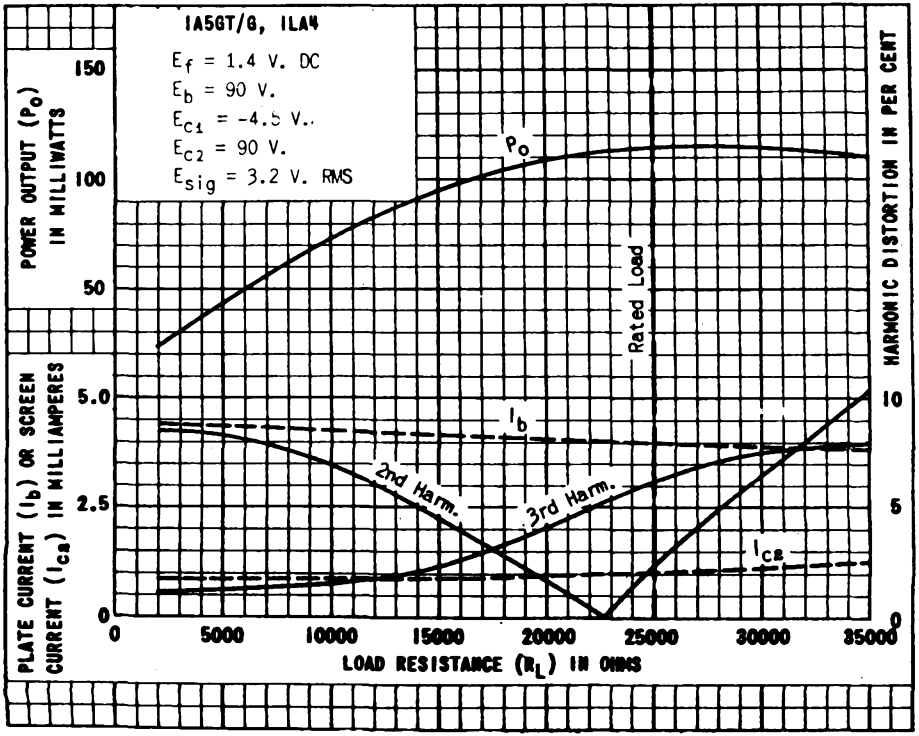
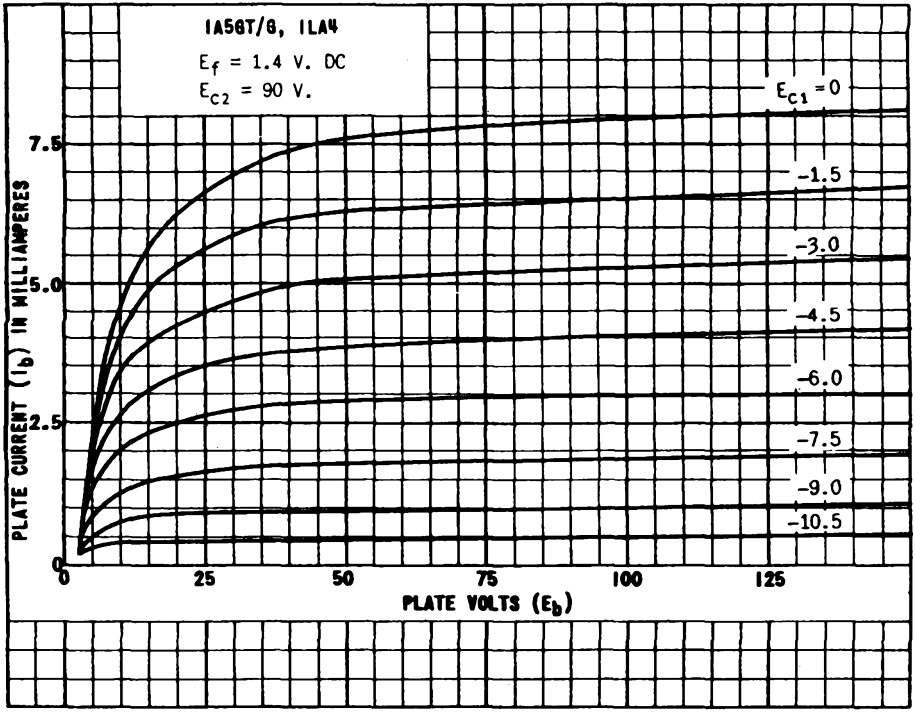
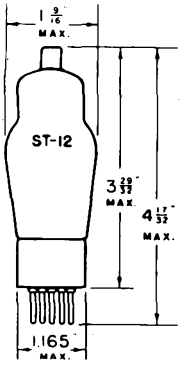


PLATE 1524
JAN. 15 1945

1A5GT/G (1LA4)


1A5GT/G, 1LA4
E_f = 1.4 V. DC
E_{c2} = 90 V.
E_{c1} = 0
-1.5
-3.0
-4.5
-6.0
-7.5
-9.0
-10.5
PLATE CURRENT (I_b) IN MILLIAMPERES
7.5
5.0
2.5
0
0
25
50
75
100
125
PLATE VOLTS (E_b)

TUNG-SOL



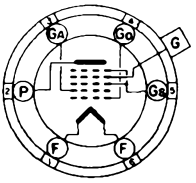
PENTAGRID CONVERTER

COATED FILAMENT

2.0 VOLTS 0.06 AMPERE
DC

GLASS BULB

SMALL 6 PIN BASE



6L

BOTTOM VIEW

THE TUNG-SOL 1A6 IS A COMBINED OSCILLATOR AND MIXER DESIGNED FOR SERVICE AS THE FIRST DETECTOR IN BATTERY OPERATED SUPERHETERODYNE RECEIVERS WHERE ECONOMY IN FILAMENT CURRENT CONSUMPTION IS DESIRED. WITH THE EXCEPTION OF CAPACITANCES ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 1D7G.

OPERATING CONDITIONS AND CHARACTERISTICS

PLATE (P) VOLTAGE MAX.	180	VOLTS
SCREEN (G_S) VOLTAGE MAX.	67.5	VOLTS
ANODE GRID (G_A) VOLTAGE MAX.	135	VOLTS
ANODE GRID (G_A) VOLTAGE SUPPLY MAX.	180 [A]	VOLTS
CONTROL GRID (G) VOLTAGE MIN.	−3	VOLTS
TOTAL CATHODE CURRENT MAX.	9	MA.

CONVERTER SERVICE

PLATE (P) VOLTAGE	135	180	VOLTS
SCREEN (G_S) VOLTAGE	67.5	67.5	VOLTS
ANODE GRID (G_A) VOLTAGE	135	135	VOLTS
ANODE GRID (G_A) SUPPLY VOLTAGE	135	180 [A]	VOLTS
CONTROL GRID (G) VOLTAGE	−3	−3	VOLTS
OSCILLATOR GRID RESISTOR	50 000	50 000	OHMS
PLATE CURRENT	1.2	1.3	MA.
SCREEN CURRENT	2.5	2.4	MA.
ANODE GRID CURRENT	2.3	2.3	MA.
OSCILLATOR GRID CURRENT	0.2	0.2	MA.
TOTAL CATHODE CURRENT	6.2	6.2	MA.
PLATE RESISTANCE	0.4	0.5	MEGOHM
CONVERSION CONDUCTANCE	275	300	μMHOS
CONTROL GRID (G) VOLTAGE APPROX.	−22.5	−22.5	VOLTS

FOR CONVERSION CONDUCTANCE = 4 μMHOS

[A] APPLIED THROUGH 20 000 OHM DROPPING RESISTOR.

CONTINUED NEXT PAGE

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PLATE 378-1

APR. 14 1939

STATIC CHARACTERISTICS OF OSCILLATOR SECTION – NOT OSCILLATING

PLATE (P) VOLTAGE	135 TO 180	VOLTS
SCREEN (G_S) VOLTAGE	67.5	VOLTS
ANODE GRID (G_A) VOLTAGE	135	VOLTS
CONTROL GRID (G) VOLTAGE	−3	VOLTS
OSCILLATOR GRID (G_O) VOLTAGE	0	VOLTS
TRANSCONDUCTANCE – OSCILLATOR GRID (G_O) TO ANODE GRID (G_A)	425	μMHOS
ANODE GRID CURRENT	2.3	MA.

DIRECT INTERELECTRODE CAPACITANCES

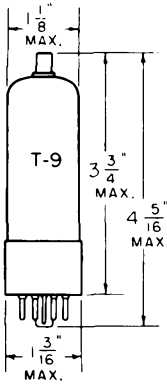
CONTROL GRID (G) TO PLATE (P)[S]	0.26	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (G_O)[S]	0.1	μμf
CONTROL GRID (G) TO ANODE GRID (G_A)[S]	0.2	μμf
OSCILLATOR GRID (G_O) TO ANODE GRID (G_A)	0.8	μμf
RF INPUT ELECTRODE, GRID (G) TO ALL OTHER ELECTRODES	10.5	μμf
OSC. INPUT ELECTRODE, GRID (G_O) TO ALL OTHER ELECTRODES	5.0	μμf
OSC. OUTPUT ELECTRODE, GRID (G_A) TO ALL OTHER ELECTRODES	6.0	μμf
MIXER OUTPUT ELECTRODE, PLATE (P) TO ALL OTHER ELECTRODES	9.0	μμf

[S] WITH SHIELD

PLATE
379-1

TUNG-SOL

PENTAGRID CONVERTER

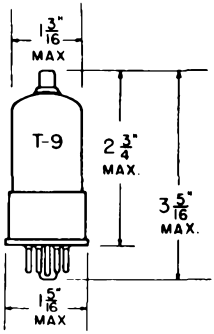


COATED FILAMENT

1.4 VOLTS 0.05 AMPERE DC

GLASS BULB

ANY MOUNTING POSITION

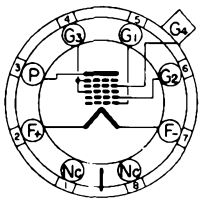


1A7G

SKIRTED MINIATURE CAP

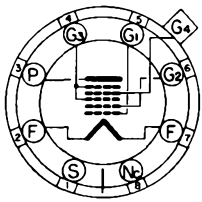
1A7GT

SKIRTED MINIATURE CAP



BOTTOM VIEW

SMALL 8 PIN OCTAL BASE



BOTTOM VIEW

SMALL WAFER 8 PIN OCTAL BASE WITH METAL SHELL

THE 1A7G AND 1A7GT ARE FILAMENT TYPE PENTAGRID CONVERTERS DESIGNED FOR SERVICE AS COMBINED OSCILLATORS AND MIXERS IN PORTABLE BATTERY OPERATED EQUIPMENT. THEY FEATURE HIGH EFFICIENCY FILAMENTS AND PROVIDE REASONABLE CONVERSION GAINS WITH LOW BATTERY VOLTAGES AND LOW ELECTRON CURRENTS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN (G3 AND G5) VOLTAGE	60	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	110	VOLTS
MAXIMUM ANODE-GRID (G2) VOLTAGE	110	VOLTS
MAXIMUM TOTAL ZERO-SIGNAL CATHODE CURRENT	4.0	MA.

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PLATE 1491
OCT. 31 1944

CONTINUED ON NEXT PAGE

CONTINUED FROM PRECEDING PAGE

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD CONNECTED TO NEGATIVE FILAMENT TERMINAL

GRID #4 TO PLATE	0.5 MAX.	μμf
GRID #4 TO GRID #2	0.4 MAX.	μμf
GRID #4 TO GRID #1	0.2 MAX.	μμf
GRID #1 TO GRID #2	0.9	μμf
GRID #4 TO ALL OTHER ELECTRODES (R-F INPUT)	7.0	μμf
GRID #2 TO ALL OTHER ELECTRODES EXCEPT GRID #1 (OSCILLATOR OUTPUT)	4.4	μμf
GRID #1 TO ALL OTHER ELECTRODES EXCEPT GRID #2 (OSCILLATOR INPUT)	3.4	μμf
PLATE TO ALL OTHER ELECTRODES (MIXER OUTPUT)	10	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

PLATE VOLTAGE	90	VOLTS
SCREEN (G2 AND G5) VOLTAGE[A]	45	VOLTS
ANODE-GRID (G2) VOLTAGE	90	VOLTS
CONTROL-GRID (G4) VOLTAGE[B]	0	VOLTS
OSCILLATOR-GRID (G1) RESISTOR	200 000	OHMS
PLATE RESISTANCE	0.6	MEGOHM
CONVERSION TRANSCONDUCTANCE	250	μMHOS
CONVERSION TRANSCONDUCTANCE WITH GRID #4 BIAS OF -3 VOLTS	5.0 APPROX.	μMHOS
PLATE CURRENT	0.6	MA.
SCREEN (G3 AND G5) CURRENT	0.7	MA.
ANODE-GRID (G2) CURRENT	1.2	MA.
OSCILLATOR-GRID (G1) CURRENT	0.035	MA.
TOTAL CATHODE CURRENT	2.5	MA.

THE TRANSCONDUCTANCE OF THE OSCILLATOR PORTION (NOT OSCILLATING) IS 550 MICROMHOS UNDER THE FOLLOWING CONDITIONS: PLATE VOLTS, 90; SCREEN VOLTS, 45; CONTROL-GRID VOLTS, 0; ANODE-GRID VOLTS, 90; AND OSCILLATOR-GRID VOLTS, 0.

[A] OBTAINED PREFERABLY BY USING A PROPERLY BY-PASSED 45 000 TO 75 000 OHM VOLTAGE-DROPPING RESISTOR IN SERIES WITH THE 90 VOLT SUPPLY.

[B] A RESISTANCE OF AT LEAST 1.0 MEGOHM SHOULD BE USED IN THE GRID RETURN TO NEGATIVE FILAMENT PIN.

PLATE 1492
OCT. 31 1944

TUNG-SOL

REMOTE CUT-OFF RF PENTODE

PHYSICAL SPECIFICATIONS

EMITTER COATED FILAMENT	PIN CONNECTIONS	
BASE LOCK-IN 8 PIN	PIN 1 FILAMENT +	PIN 7 FILAMENT-, G3
CAP ---	PIN 2 PLATE	PIN 8 FILAMENT-, G3
BULB SHORT T-9	PIN 3 GRID 2	
MAXIMUM DIAMETER 1 3/16"	PIN 4 Nc	MOUNTING POS. ANY
MAXIMUM OVERALL LENGTH 2 1/32"	PIN 5 Nc	
MAXIMUM SEATED HEIGHT 1 1/2"	PIN 6 GRID 1	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (DC)	1.2	VOLTS
HEATER OR FILAMENT CURRENT	0.130	AMP.
MAXIMUM PLATE VOLTAGE	150	VOLTS
MAXIMUM SCREEN VOLTAGE	150	VOLTS
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	0.3	WATT
MINIMUM EXTERNAL CONTROL GRID BIAS VOLTAGE	0	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	150	VOLTS

CAPACITANCES

RMA SHIELD M8-308 CONNECTED TO NEGATIVE FILAMENT

INPUT	2.80	μμf
OUTPUT	4.2	μμf
CONTROL GRID TO PLATE (MAX.)	0.25	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HEATER OR FILAMENT VOLTAGE (DC)	1.2	1.2	VOLTS
HEATER OR FILAMENT CURRENT	0.130	0.130	AMP.
PLATE VOLTAGE	90	150	VOLTS
SCREEN VOLTAGE	90	150	VOLTS
CONTROL GRID VOLTAGE	0	-1.5	VOLTS
CONTROL GRID RESISTANCE (MIN.)	1	--	MEGOHM
PLATE CURRENT	3.5	6.8	MA.
SCREEN CURRENT	0.8	2.0	MA.
MAXIMUM-SIGNAL PLATE CURRENT			MA.
MAXIMUM-SIGNAL SCREEN CURRENT			MA.
PLATE RESISTANCE	0.275	0.125	MEGOHM
TRANSCONDUCTANCE	1100	1350	μMHOS
AMPLIFICATION FACTOR			
LOAD RESISTANCE			OHMS
TOTAL HARMONIC DISTORTION			PER CENT
POWER OUTPUT			WATTS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 10 μMHOS	14	23	VOLTS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 725 μMHOS	3	6	VOLTS

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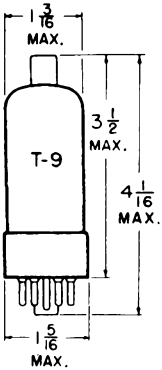
PLATE 1716
JUNE 17 1946

TUNG-SOL

DIODE



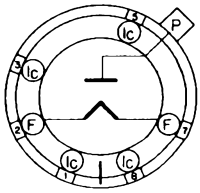
GLASS BULB
SMALL CAP

COATED FILAMENT

FILAMENT
1.25 VOLTS[A] 200 MA.
AC

ANY MOUNTING POSITION

[A] THE FILAMENT VOLTAGE MUST NEVER EXCEED 1.5 VOLTS, EVEN MOMENTARILY.



BOTTOM VIEW
SHORT INTERMEDIATE SHELL
6 PIN OCTAL

THE 1B3GT IS A FILAMENTARY DIODE DESIGNED TO OPERATE AT RELATIVELY HIGH UNIVERSE PEAK VOLTAGES OVER A CONSIDERABLE RANGE OF SUPPLY VOLTAGE FREQUENCIES. IT IS INTENDED TO SUPPLY THE REQUIRED HIGH VOLTAGES FOR THE CATHODE RAY PICTURE TUBE IN TELEVISION SERVICE.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.
WITH NO EXTERNAL SHIELD

PLATE TO FILAMENT	1.5	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	1.25	VOLTS
FILAMENT CURRENT	200	MA.
MAXIMUM PEAK INVERSE PLATE VOLTAGE	40 000	VOLTS
MAXIMUM PEAK PLATE CURRENT	17	MA.
MAXIMUM AVERAGE PLATE CURRENT	2	MA.
MAXIMUM FREQUENCY OF SUPPLY VOLTAGE	300	KC

WHEN THE FILAMENT IS TO BE OPERATED ON RF, IT IS RECOMMENDED THAT THE FILAMENT BE CONNECTED FIRST TO A DC OR LOW-FREQUENCY AC SUPPLY OF 1.25 VOLTS. THE COLOR TEMPERATURE OF THE FILAMENT CORRESPONDING TO THIS VOLTAGE MAY THEN BE CHECKED VISUALLY BY OBSERVING IN A DARKENED ROOM THE REFLECTION OF THE INCANDESCENT FILAMENT UPON THE UPPER SURFACE OF THE INTERNAL SHIELD. A VISUAL COMPARISON OF THIS COLOR TEMPERATURE WITH THAT OBTAINED WITH THE FILAMENT OPERATED FROM AN RF VOLTAGE PROVIDES A CONVENIENT MEANS FOR ADJUSTING THE AMOUNT OF RF EXCITATION TO PRODUCE 1.25 VOLTS (RMS) AT THE FILAMENT TERMINALS.

THE VOLTAGES EMPLOYED IN SOME TELEVISION RECEIVERS AND OTHER HIGH-VOLTAGE EQUIPMENT ARE SUFFICIENTLY HIGH THAT HIGH-VOLTAGE RECTIFIER TUBES MAY PRODUCE SOFT X-RAYS WHICH CAN CONSTITUTE A HEALTH HAZARD, UNLESS SUCH TUBES ARE ADEQUATELY SHIELDED. RELATIVELY SIMPLE SHIELDING SHOULD PROVE ADEQUATE, BUT THE NEED FOR THIS PRECAUTION SHOULD BE CONSIDERED IN EQUIPMENT DESIGN.

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PLATE 2008
MAY 3 1948

1B3GT

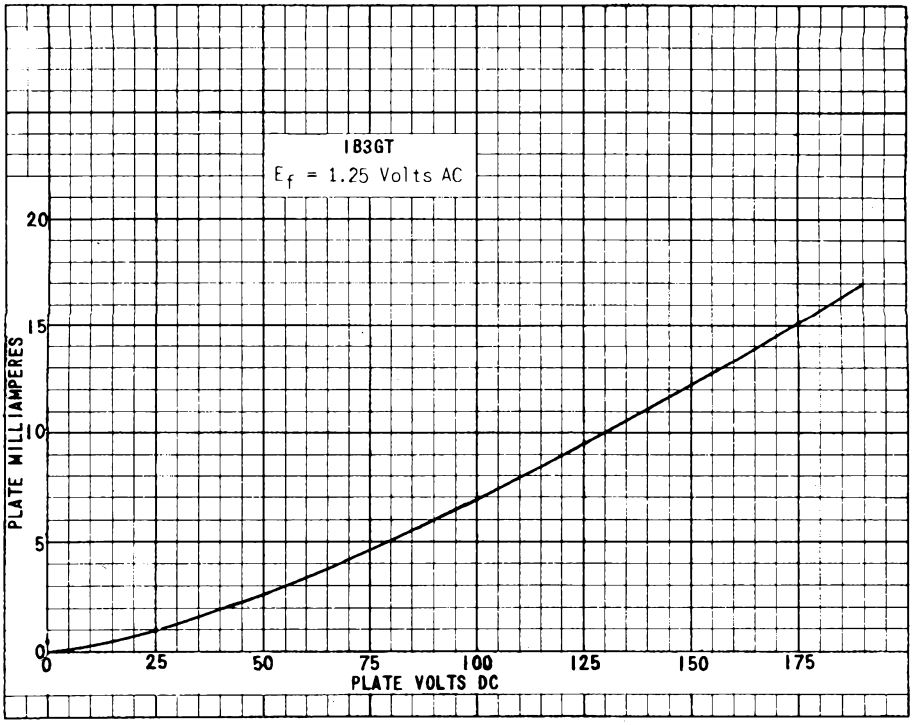
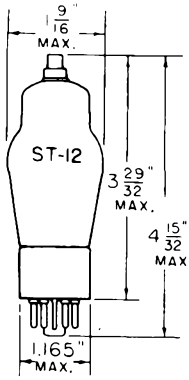


PLATE
2009
MAY 3
1948

TUNG-SOL

R-F PENTODE AMPLIFIER



1E5GP
SKIRTED MINIATURE CAP

COATED FILAMENT

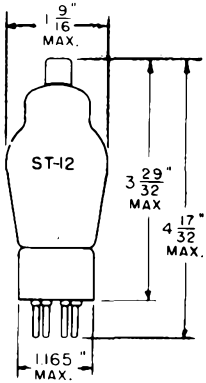
2.0 VOLTS 0.06 AMPERE

DC

GLASS BULB

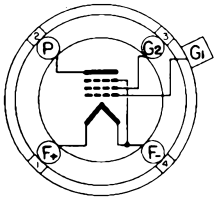
MOUNTING POSITION

FOR TUBE TYPE 1B4P, HORIZONTAL OPERATION WILL BE PERMITTED IF PINS 1 AND 4 ARE IN A VERTICAL PLANE. THE SAME WILL HOLD TRUE FOR TYPE 1E5GP IF PINS 5 AND 7 ARE IN A VERTICAL PLANE.



1B4P
SMALL METAL CAP

BOTTOM VIEW
SMALL SHELL OCTAL 7 PIN BASE



BOTTOM VIEW
SMALL 4 PIN BASE

THE 1E5GP AND 1B4P ARE DESIGNED FOR SERVICE AS GENERAL PURPOSE SHARP CUT-OFF PENTODE AMPLIFIERS IN BATTERY OPERATED EQUIPMENTS.

RATINGS

MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM SCREEN VOLTAGE	67.5	VOLTS
MAXIMUM CATHODE CURRENT	6.0	MA.

DIRECT INTERELECTRODE CAPACITANCES

GRID TO PLATE (WITH SHIELD)	0.007 MAX.	μμf
INPUT	5.0	μμf
OUTPUT	11	μμf

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PLATE 1493
OCT. 31 1944

CONTINUED ON NEXT PAGE

CONTINUED FROM PRECEDING PAGE

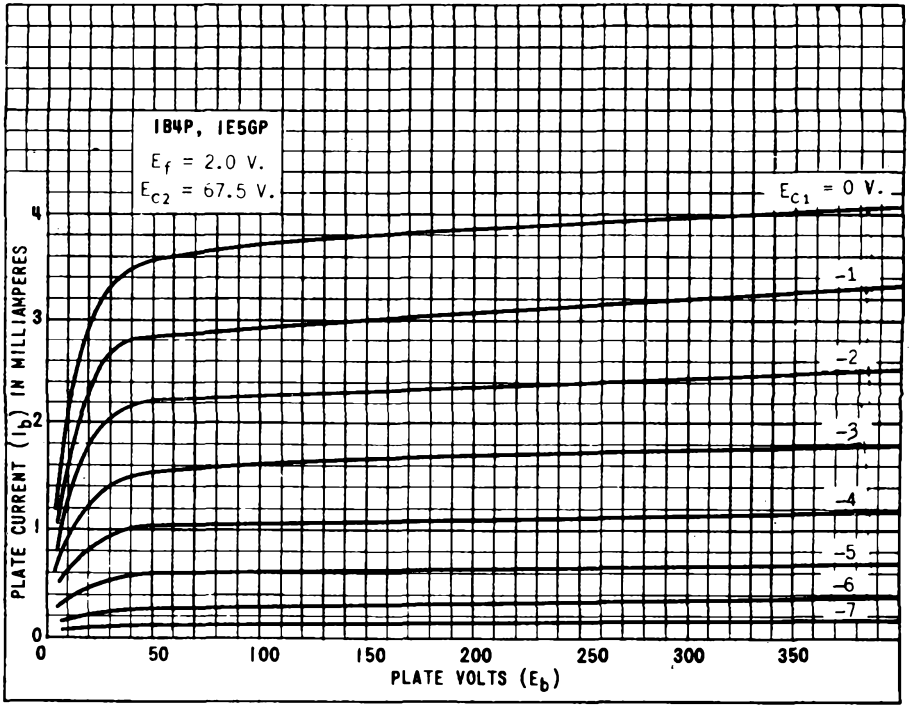
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	90	180	VOLTS
SCREEN VOLTAGE	67.5	67.5	VOLTS
CONTROL GRID VOLTAGE[A]	-3.0	-3.0	VOLTS
PLATE CURRENT	1.6	1.7	MA.
SCREEN CURRENT	0.7	0.6	MA.
PLATE RESISTANCE (APPROX.)	1.0	1.5	MEGOHMS
TRANSCONDUCTANCE	600	650	μMHOS
AMPLIFICATION FACTOR (APPROX.)	550	1000	
CONTROL GRID VOLTAGE FOR PLATE CURRENT CUT-OFF[A]	-8.0	-8.0	VOLTS

[A] RETURN TO NEGATIVE FILAMENT (PIN 07)

PLATE 1494
OCT. 31 1944



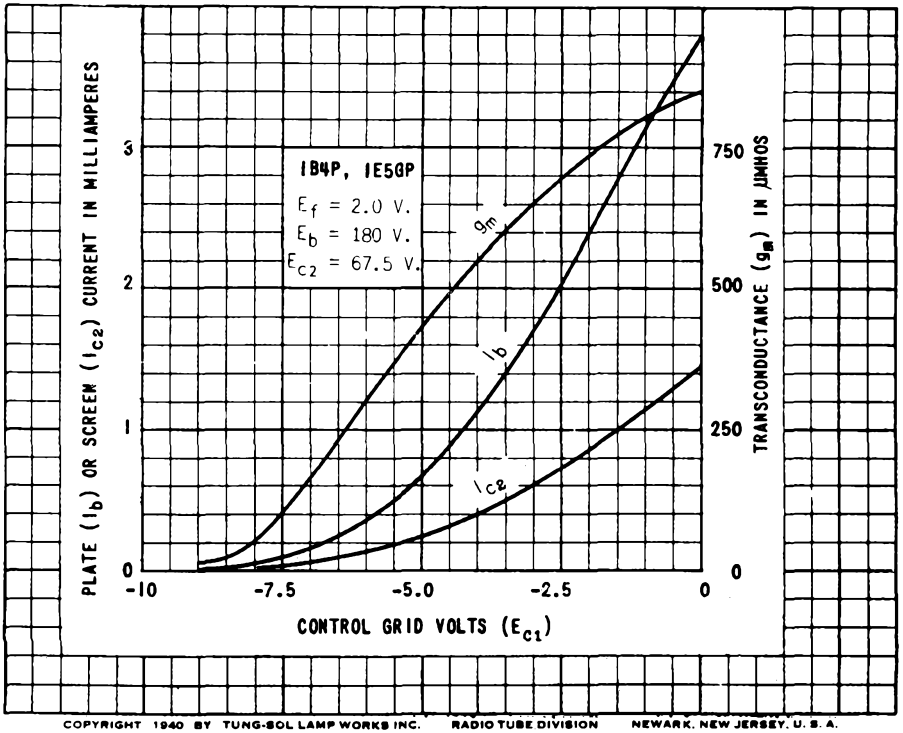
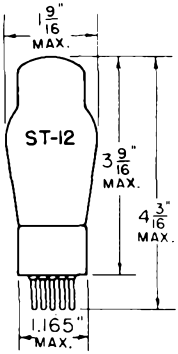


PLATE
1495
OCT. 31
1944

TUNG-SOL

DUO-DIODE TRIODE AMPLIFIER



1B5/25S

COATED FILAMENT

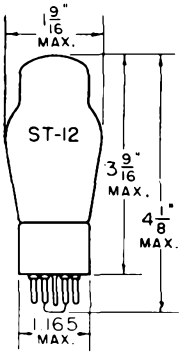
2.0 VOLTS 0.06 AMPERE

DC

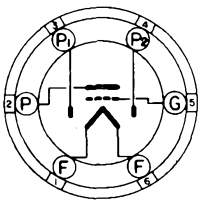
GLASS BULB

MOUNTING POSITION

THESE TUBES SHOULD BE OPERATED VERTICALLY WITH BASE DOWN. HOWEVER, HORIZONTAL OPERATION MAY BE PERMITTED FOR TUBE TYPE 1B5/25S WHEN PINS 2 AND 5 ARE HORIZONTAL. THE SAME WILL BE TRUE FOR THE 1H6G TUBE TYPE WHEN PINS 2 AND 7 ARE HORIZONTAL.

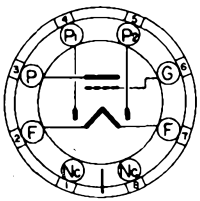


1H6G



BOTTOM VIEW

SMALL 6 PIN BASE



BOTTOM VIEW

SMALL 8 PIN OCTAL BASE

THE 1B5/25S AND 1H6G COMBINE TWO DIODES AND A TRIODE IN A SINGLE BULB. THEY ARE DESIGNED FOR SERVICE AS DIODE DETECTORS, AVC RECTIFIERS, AND IMPEDANCE OR RESISTANCE COUPLED AMPLIFIERS IN BATTERY OPERATED RECEIVERS.

DIRECT INTERELECTRODE CAPACITANCES

	1B5/25S	1H6G	
GRID TO PLATE	3.6	3.6	μμf
INPUT	1.6	1.6	μμf
OUTPUT	1.9	1.9	μμf

OPERATING CONDITIONS AND CHARACTERISTICS

TRIODE UNIT – CLASS A_1 AMPLIFIER

MAXIMUM PLATE VOLTAGE	135	VOLTS
CONTROL GRID VOLTAGE	-3.0	VOLTS
PLATE CURRENT	0.8	MA.
PLATE RESISTANCE	35 000	OHMS
TRANSCONDUCTANCE	575	μMHOS
AMPLIFICATION FACTOR	20	

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PLATE 1496
OCT. 31 1944

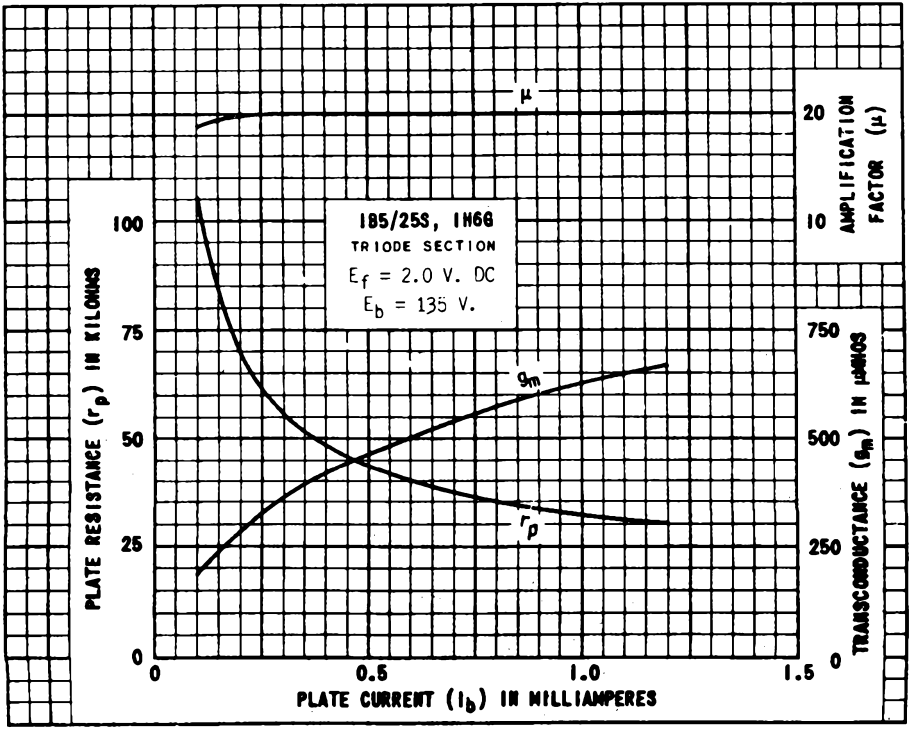
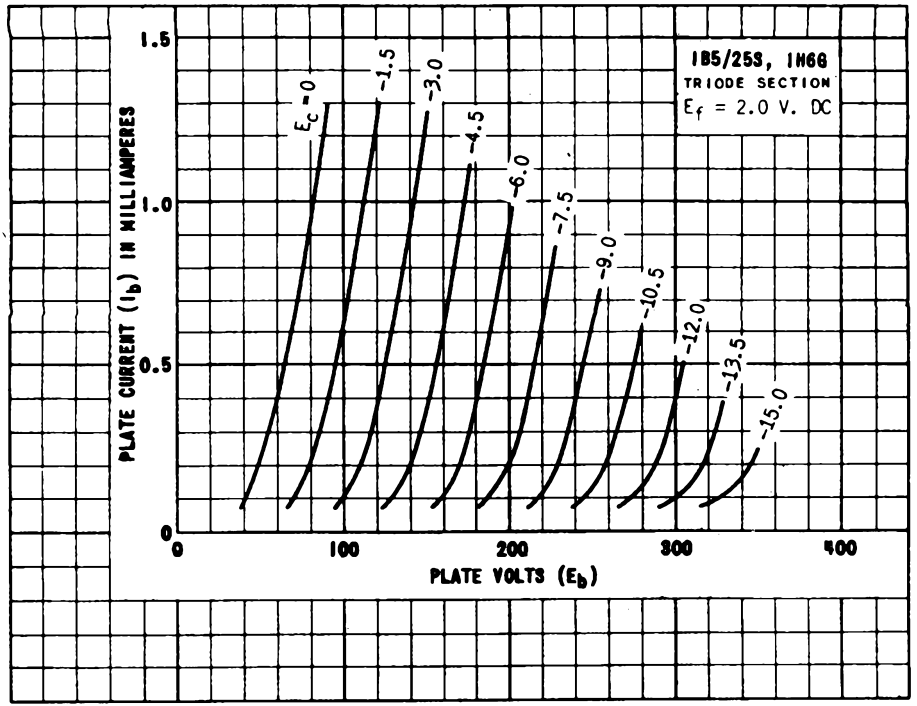


PLATE 1497
OCT. 31 1944

1B5/25S(1H6G)


1B5/25S, 1H6G
TRIODE SECTION
E_f = 2.0 V. DC
E_c = 0
-1.5
-3.0
-4.5
-6.0
-7.5
-9.0
-10.5
-12.0
-13.5
-15.0
PLATE CURRENT (I_b) IN MILLIAMPERES
1.5
1.0
0.5
0
0
100
200
300
400
PLATE VOLTS (E_b)

TUNG-SOL

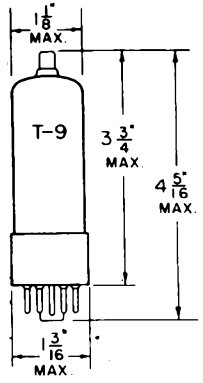
PENTAGRID CONVERTER

COATED FILAMENT

1.4 VOLTS 0.10 AMPERE

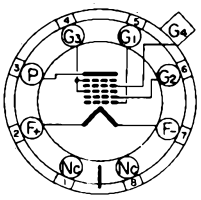
DC

GLASS BULB



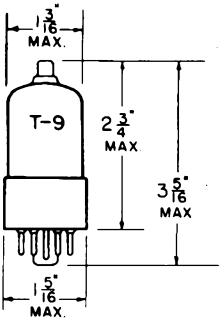
1B7G

SKIRTED MINIATURE
STYLE C CAP



BOTTOM VIEW

SMALL 8-PIN OCTAL



1B7GT

SKIRTED MINIATURE
STYLE C CAP

ANY MOUNTING POSITION

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	100	VOLTS
MAXIMUM SCREEN (G3 AND G5) VOLTAGE	55	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	90	VOLTS
MAXIMUM ANODE GRID (G2) VOLTAGE	90	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	6.0	MA.

DIRECT INTERELECTRODE CAPACITANCES

TUBE SHIELD CONNECTED TO NEGATIVE FILAMENT

SIGNAL GRID (G4) TO MIXER PLATE (P)	0.34	μμf
SIGNAL GRID (G4) TO OSC. PLATE (G2)	0.26	μμf
SIGNAL GRID (G4) TO OSC. GRID (G1)	0.12	μμf
CSC. GRID (G1) TO OSC. PLATE (G2)	0.90	μμf
SIGNAL INPUT: G4 TO (F+G1+G2+G3+G5+P+SHIELD)	7.00	μμf
OSC. OUTPUT: G2 TO (F+G3+G4+G5+P+SHIELD)	4.20	μμf
OSC. INPUT: G1 TO (F+G3+G4+G5+P+SHIELD)	4.00	μμf
MIXER OUTPUT: P TO (F+G1+G2+G3+G4+G5+SHIELD)	7.50	μμf

CONTINUED ON NEXT PAGE

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•PLATE
1525
JAN. 15
1945

CONTINUED FROM PRECEDING PAGE.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

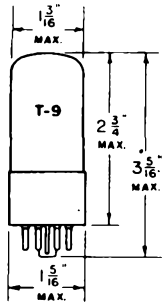
CONVERTER SERVICE

PLATE VOLTAGE	90	VOLTS
SCREEN (G3 AND G5) VOLTAGE	45	VOLTS
ANODE GRID (G2) VOLTAGE	90	VOLTS
CONTROL GRID (G4) VOLTAGE[A]	0	VOLTS
OSC. GRID (G_1) RESISTOR	200 000	OHMS
PLATE RESISTANCE	0.35	MEGOHM
CONVERSION TRANSCONDUCTANCE	350	µMHOS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE=2 µMHOS (APPROX.)	-14.5	VOLTS
PLATE CURRENT	1.5	MA.
SCREEN CURRENT	1.3	MA.
ANODE GRID CURRENT	1.6	MA.
OSC. GRID (G_1) CURRENT	0.035	MA.
TOTAL CATHODE CURRENT	4.4	MA.

[A] RETURN TO NEGATIVE FILAMENT PIN #7

PLATE 1526
JAN. 15 1945

TUNG-SOL

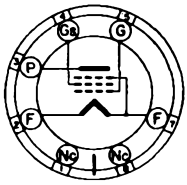


PENTODE POWER AMPLIFIER

COATED FILAMENT

1.4 VOLTS 0.10 AMPERE
DC

GLASS BULB



G-6X

BOTTOM VIEW

INTERMEDIATE 7 PIN OCTAL BASE

THE TUNG-SOL 1C5GT/G IS A LOW VOLTAGE, LOW CURRENT DRAIN, BATTERY TYPE PENTODE POWER AMPLIFIER. IT IS DESIGNED FOR SERVICE WITH 90 VOLTS OF "B" BATTERY AND A SINGLE DRY CELL "A" BATTERY.

RATINGS

MAXIMUM FILAMENT VOLTAGE		
DRY BATTERY OPERATION — VOLTAGE MUST NEVER EXCEED	1.6	VOLTS
AC — DC POWER LINE OPERATION — DESIGN CENTER	1.3	VOLTS
MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	VOLTS
MAXIMUM CATHODE CURRENT (ZERO SIGNAL)	12	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

FILAMENT VOLTAGE	1.4 DC	1.4 DC	VOLTS
FILAMENT CURRENT	0.10	0.10	AMPERE
PLATE VOLTAGE	83	90	VOLTS
SCREEN VOLTAGE	83	90	VOLTS
CONTROL GRID VOLTAGE [A]	-7.0	-7.5	VOLTS
PEAK AF SIGNAL VOLTAGE	7.0	7.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	7.0	7.5	MA.
MAXIMUM SIGNAL PLATE CURRENT	7.3	7.8	MA.
ZERO-SIGNAL SCREEN CURRENT	1.6	1.6	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	3.5	3.5	MA.
PLATE RESISTANCE APPROX.	110000	115000	OHMS
TRANSCONDUCTANCE	1500	1550	μMHOS
LOAD RESISTANCE	9000	8000	OHMS
TOTAL HARMONIC DISTORTION	10	10	PER CENT
POWER OUTPUT	200	240	MILLIWATTS

[A] REFERRED TO NEGATIVE FILAMENT TERMINAL

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PLATE 1071-3

JULY 28 1941

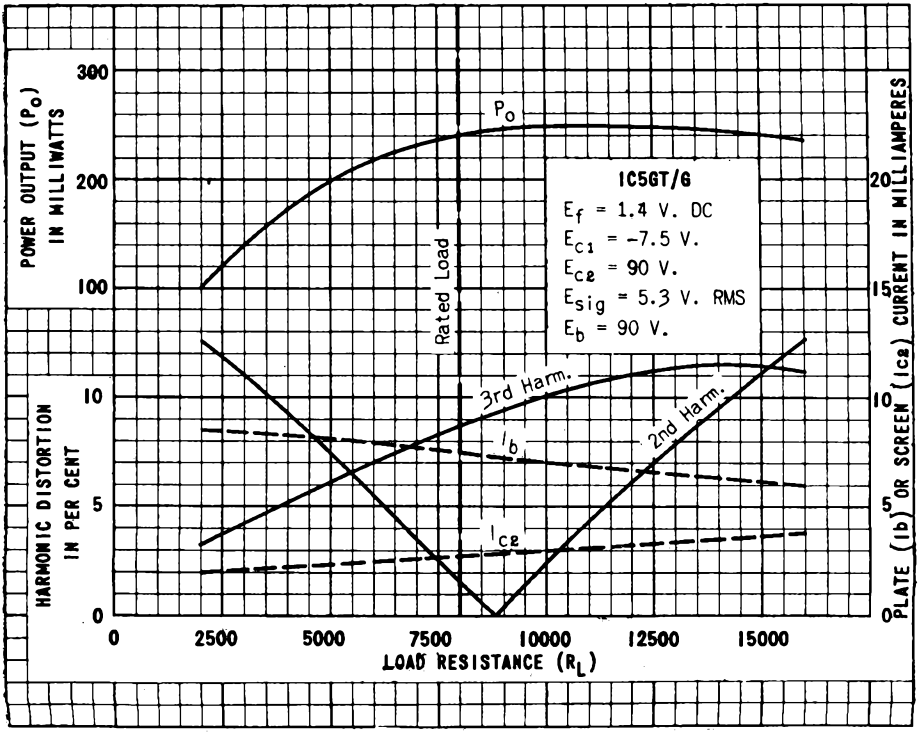
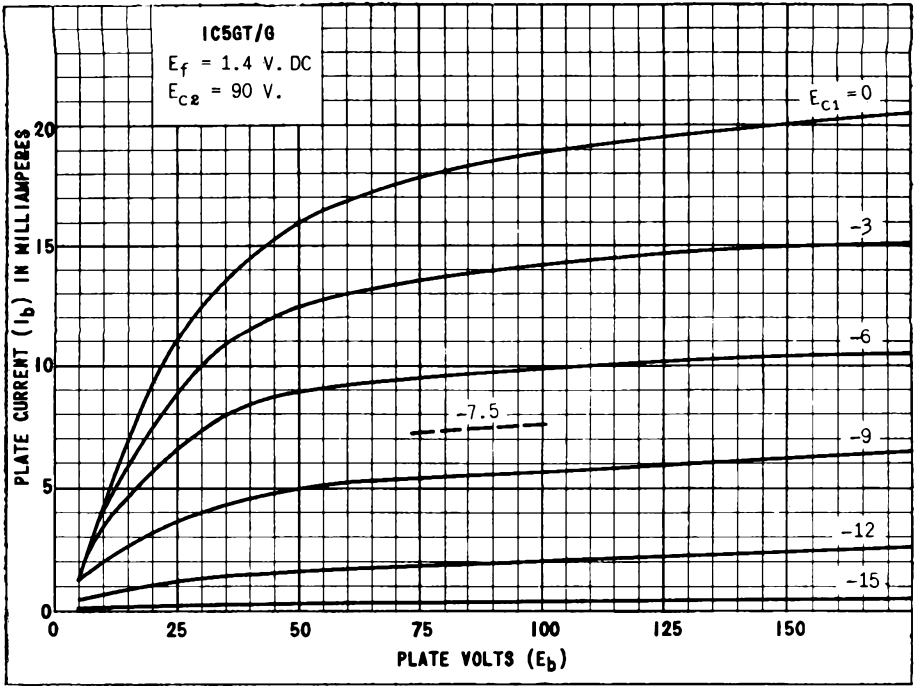
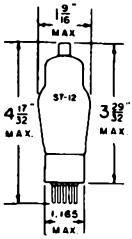


PLATE 1072-2

1C5GT/G


1C5GT/G
E_f = 1.4 V. DC
E_{c2} = 90 V.
E_{c1} = 0
-3
-6
-7.5
-9
-12
-15
PLATE CURRENT (I_b) IN MILLIAMPERES
0
5
10
15
20
0
25
50
75
100
125
150
PLATE VOLTS (E_b)

TUNG-SOL

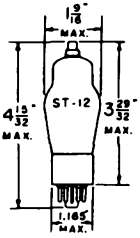


SMALL 6 PIN BASE
1C6

PENTAGRID CONVERTER

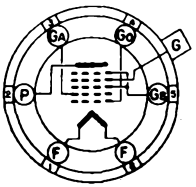
COATED FILAMENT

2.0 VOLTS 0.12 AMPERE
DC



SMALL 8 PIN OCTAL BASE
1C7G

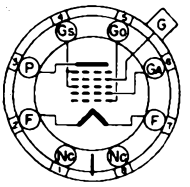
GLASS BULB



6L

BOTTOM VIEW

1C6



G-7Z

BOTTOM VIEW

1C7G

THE TUNG-SOL 1C6 AND 1C7G ARE FILAMENT TYPE PENTAGRID CONVERTERS DESIGNED FOR SERVICE AS OSCILLATORS AND MIXERS IN BATTERY OPERATED RECEIVERS.

RATINGS

MAXIMUM PLATE (P) VOLTAGE	180	VOLTS
MAXIMUM SCREEN (Gs) SUPPLY VOLTAGE	180	VOLTS
MAXIMUM SCREEN VOLTAGE	67.5	VOLTS
MINIMUM EXTERNAL CONTROL GRID (G) BIAS VOLTAGE	0	VOLTS
MAXIMUM OSCILLATOR ANODE (GA) SUPPLY VOLTAGE	180	VOLTS
MAXIMUM OSCILLATOR ANODE VOLTAGE	135	VOLTS
MAXIMUM CATHODE CURRENT	9	MA.
MAXIMUM PLATE DISSIPATION	0.3	WATT
MAXIMUM SCREEN DISSIPATION	0.2	WATT
MAXIMUM OSCILLATOR ANODE DISSIPATION	0.4	WATT

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 914-2

DEC. 30 1940

DIRECT INTERELECTRODE CAPACITANCES

	1C6	1C7G[S]	
CONTROL GRID (G) TO MIXER PLATE (P)	0.3[S]	0.26	μμf
CONTROL GRID (G) TO OSCILLATOR ANODE (GA)	0.3[S]	0.32	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (GO)	0.15[S]	0.11	μμf
OSCILLATOR GRID (GO) TO OSCILLATOR ANODE (GA)	1.5	1.2	μμf
RF INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES	10	10	μμf
OSCILLATOR INPUT: OSCILLATOR GRID (GO) TO ALL OTHER ELECTRODES	6	4.8[A]	μμf
OSCILLATOR OUTPUT: OSCILLATOR ANODE (GA) TO ALL OTHER ELECTRODES	6	5.5[B]	μμf
MIXER OUTPUT: MIXER PLATE (P) TO ALL OTHER ELECTRODES	10	14	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

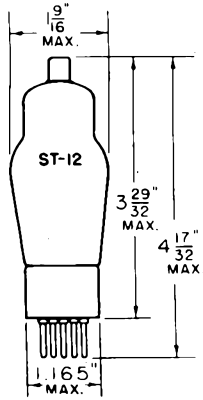
CONVERTER SERVICE

PLATE (P) VOLTAGE	135	180	VOLTS
SCREEN (GS) VOLTAGE	67.5	67.5	VOLTS
CONTROL GRID (G) VOLTAGE[C]	-3	-3	VOLTS
OSCILLATOR ANODE (GA) SUPPLY VOLTAGE[D]	135	180	VOLTS
OSCILLATOR GRID (GO) RESISTOR	50 000	50 000	OHMS
PLATE CURRENT	1.3	1.5	MA.
SCREEN CURRENT	2.5	2.0	MA.
OSCILLATOR ANODE CURRENT	3.1	4.0	MA.
OSCILLATOR GRID CURRENT	0.2	0.2	MA.
TOTAL CATHODE CURRENT	7.1	7.7	MA.
PLATE RESISTANCE APPROX.	0.6	0.7	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -1.5 V.	440	450	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -3.0 V.	300	325	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -6.0 V.	95	105	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = -14.0 V.	4	4	μMHOS

[A] EXCEPT OSCILLATOR ANODE (GA)
[B] EXCEPT OSCILLATOR GRID (GO)
[C] RETURN TO NEGATIVE FILAMENT (PIN #6 - 1C6 AND PIN #7 - 1C7G)
[D] APPLIED THROUGH 20 000 OHM DROPPING RESISTOR
[S] WITH EXTERNAL SHIELD CONNECTED TO NEGATIVE FILAMENT (PIN #6 - 1C6 AND PIN #7 - 1C7G)

PLATE 915-2

TUNG-SOL



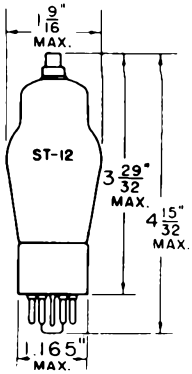
REMOTE CUT-OFF
PENTODE AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.060 AMPERE

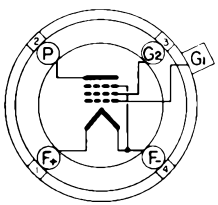
AC OR DC

GLASS BULB



1A4P
SMALL METAL CAP
SMALL 4 PIN BASE

1D5GP
MINIATURE METAL CAP
SMALL 7 PIN OCTAL BASE



BOTTOM VIEW

BOTTOM VIEW

THESE TUBES ARE REMOTE CUT-OFF PENTODE AMPLIFIERS DESIGNED FOR USE IN BATTERY OPERATED RECEIVERS. EITHER TUBE IS SUITABLE FOR USE WITH AUTOMATIC VOLUME CONTROL IN RF AND IF AMPLIFIERS WITH A MINIMUM OF CROSS MODULATION.

MOUNTING POSITION

THESE TUBES SHOULD BE OPERATED VERTICALLY WITH THE BASE DOWN. HOWEVER, HORIZONTAL OPERATIONS MAY BE PERMITTED IN THE 1D5GP TUBE TYPE IF PINS 2 AND 7 ARE ON A VERTICAL PLANE. THE SAME WILL BE TRUE FOR THE 1A4P TUBE TYPE IF PINS 1 AND 4 ARE ON A VERTICAL PLANE.

DIRECT INTERELECTRODE CAPACITANCES

MAXIMUM CONTROL GRID TO PLATE (WITH EXTERNAL SHIELD)	0.007	μμf
INPUT (G_1 TO G_2, G_3, F)	5.0	μμf
OUTPUT (P TO G_2, G_3, F)	11	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	90	180 MAX.	VOLTS
SCREEN VOLTAGE	67.5	67.5 MAX.	VOLTS
MINIMUM CONTROL GRID VOLTAGE	-3	-3	VOLTS
PLATE CURRENT	2.2	2.3	MA.
SCREEN CURRENT	0.9	0.8	MA.
PLATE RESISTANCE (APPROX.)	0.6	1.0	MEGOHM
TRANSCONDUCTANCE	720	750	μMHOS
AMPLIFICATION FACTOR (APPROX.)	425	750	
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE OF 15 μMHOS	-15	-15	VOLTS

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PLATE 1458
AUG. 31 1944

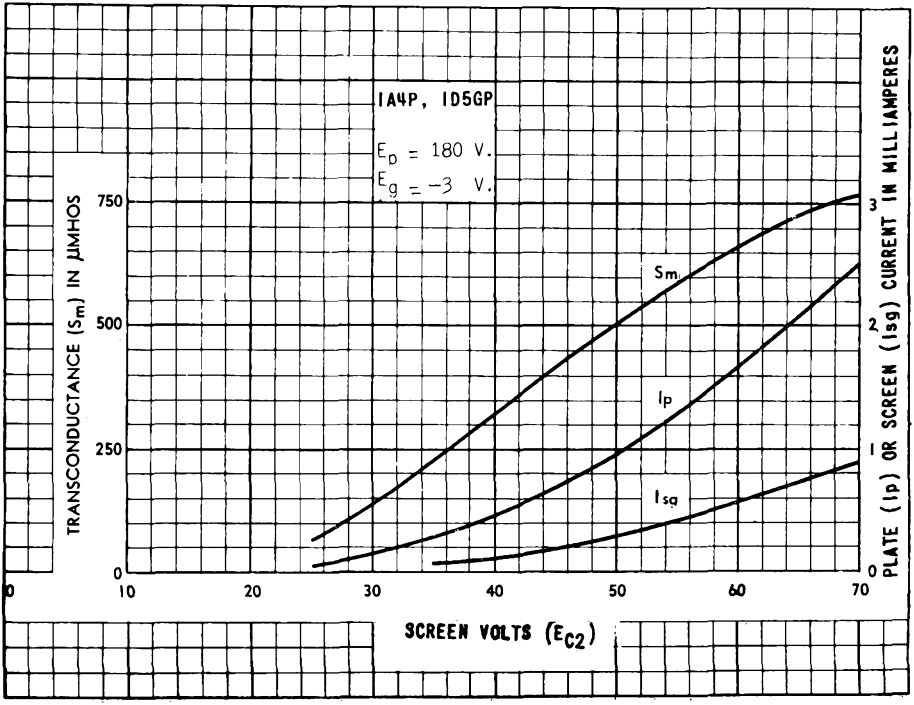

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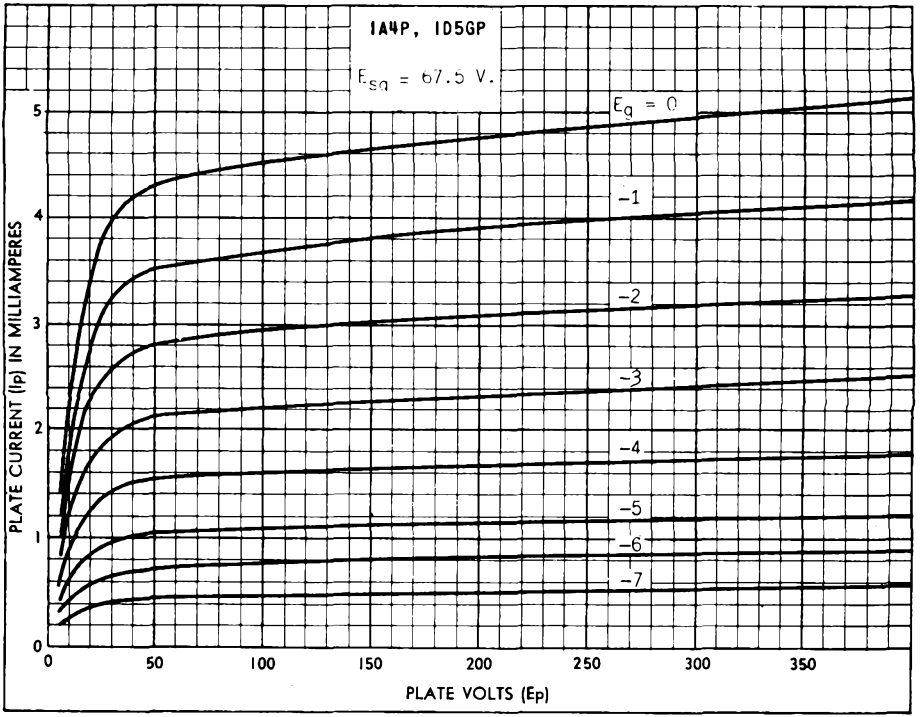
PLATE
1459
AUG. 31
1944


1A4P, 1D5GP
E_{sg} = 67.5 V.
E_g = 0
-1
-2
-3
-4
-5
-6
-7
PLATE CURRENT (Ip) IN MILLIAMPERES
0
1
2
3
4
5
0
50
100
150
200
250
300
350
PLATE VOLTS (Ep)

ID5GP (1A4P)

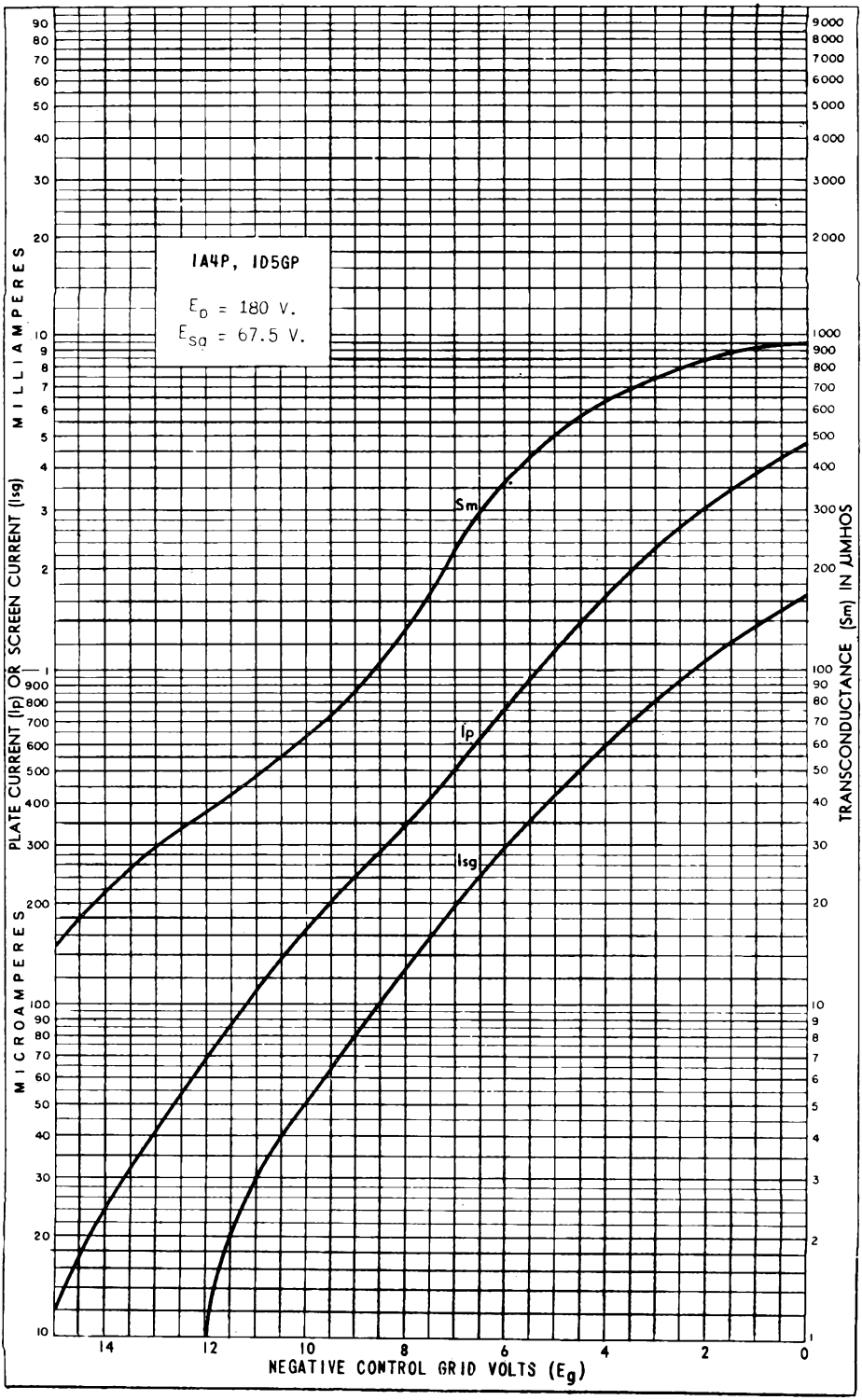
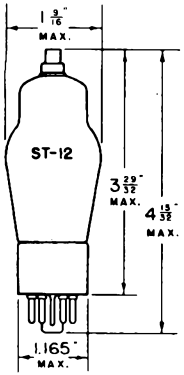


PLATE 1460
AUG. 31 1944

TUNG-SOL



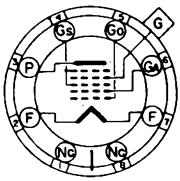
PENTAGRID CONVERTER

COATED FILAMENT

2.0 VOLTS 0.06 AMPERE
DC

GLASS BULB

SMALL 8 PIN OCTAL BASE



G-7Z

THE TUNG-SOL 1D7G IS A COMBINED OSCILLATOR AND MIXER DESIGNED FOR SERVICE AS THE FIRST DETECTOR IN BATTERY OPERATED SUPERHETERODYNE RECEIVERS WHERE ECONOMY IN FILAMENT CURRENT CONSUMPTION IS DESIRED. WITH THE EXCEPTION OF CAPACITANCES ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 1A6.

OPERATING CONDITIONS AND CHARACTERISTICS

PLATE (P) VOLTAGE MAX.	180	VOLTS
SCREEN (Gs) VOLTAGE MAX.	67.5	VOLTS
ANODE GRID (GA) VOLTAGE MAX.	135	VOLTS
ANODE GRID (GA) VOLTAGE SUPPLY MAX.	180 [A]	VOLTS
CONTROL GRID (G) VOLTAGE MIN.	−3	VOLTS
TOTAL CATHODE CURRENT MAX.	9	MA.

CONVERTER SERVICE

PLATE (P) VOLTAGE	135	180	VOLTS
SCREEN (Gs) VOLTAGE	67.5	67.5	VOLTS
ANODE GRID (GA) VOLTAGE	135	135	VOLTS
ANODE GRID (GA) SUPPLY VOLTAGE	135	180 [A]	VOLTS
CONTROL GRID (G) VOLTAGE	−3	−3	VOLTS
OSCILLATOR GRID RESISTOR	50 000	50 000	OHMS
PLATE CURRENT	1.2	1.3	MA.
SCREEN CURRENT	2.5	2.4	MA.
ANODE GRID CURRENT	2.3	2.3	MA.
OSCILLATOR GRID CURRENT	0.2	0.2	MA.
TOTAL CATHODE CURRENT	6.2	6.2	MA.
PLATE RESISTANCE	0.4	0.5	MEGOHM
CONVERSION CONDUCTANCE	275	300	μMHOS
CONTROL GRID (G) VOLTAGE APPROX.	−22.5	−22.5	VOLTS

FOR CONVERSION CONDUCTANCE = 4 μMHOS

[A] APPLIED THROUGH 20 000 OHM DROPPING RESISTOR.

CONTINUED NEXT PAGE

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PLATE
217-1

STATIC CHARACTERISTICS OF OSCILLATOR SECTION – NOT OSCILLATING

PLATE (P) VOLTAGE	135 TO 180	VOLTS
SCREEN (G_S) VOLTAGE	67.5	VOLTS
ANODE GRID (G_A) VOLTAGE	135	VOLTS
CONTROL GRID (G) VOLTAGE	-3	VOLTS
OSCILLATOR GRID (G_O) VOLTAGE	0	VOLTS
TRANSCONDUCTANCE – OSCILLATOR GRID (G_O) TO ANODE GRID (G_A)	425	μMHOS
ANODE GRID CURRENT	2.3	MA.

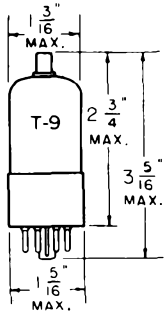
DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID (G) TO PLATE (P)	0.26	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (G_O)	0.11	μμf
CONTROL GRID (G) TO ANODE GRID (G_A)	0.32	μμf
OSCILLATOR GRID (G_O) TO ANODE GRID (G_A)	1.2	μμf
RF INPUT ELECTRODE, GRID (G) TO ALL OTHER ELECTRODES	10	μμf
OSC. INPUT ELECTRODE, GRID (G_O) TO ALL OTHER ELECTRODES	4.8	μμf
OSC. OUTPUT ELECTRODE, GRID (G_A) TO ALL OTHER ELECTRODES	5.5	μμf
MIXER OUTPUT ELECTRODE, PLATE (P) TO ALL OTHER ELECTRODES	14	μμf

[S] WITH SHIELD

PLATE
218-1

TUNG-SOL



SKIRTED MINIATURE CAP

DIODE-TRIODE POWER PENTODE AMPLIFIER

COATED FILAMENT

1.4 VOLTS 0.10 AMPERE DC

GLASS BULB

ANY MOUNTING POSITION

BOTTOM VIEW

INTERMEDIATE 8 PIN OCTAL BASE

THE 1D8GT IS A LOW VOLTAGE, LOW CURRENT BATTERY TYPE TUBE, WHICH COMBINES A SINGLE DIODE, TRIODE AND A POWER PENTODE IN ONE BULB.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE (TRIODE SECTION)	110	VOLTS
MAXIMUM PLATE VOLTAGE (PENTODE SECTION)	110	VOLTS
MAXIMUM SCREEN VOLTAGE (PENTODE SECTION)	110	VOLTS
MAXIMUM CATHODE CURRENT-ZERO SIGNAL (PENTODE SECTION)	6.0	MA.
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED	0.5	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

TRIODE UNIT

PLATE VOLTAGE	45	67.5	90	VOLTS
GRID VOLTAGE	0	0	0	VOLTS
PLATE CURRENT	0.3	0.6	1.1	MA.
PLATE RESISTANCE (APPROX.)	77 000	55 500	43 500	OHMS
TRANSCONDUCTANCE	325	450	575	UMHOS
AMPLIFICATION FACTOR	25	25	25	

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PLATE 1498
OCT. 31 1944

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PENTODE UNIT

PLATE VOLTAGE	45	62.5	67.5	90	VOLTS
SCREEN VOLTAGE	45	62.5	67.5	90	VOLTS
CONTROL GRID VOLTAGE	-4.5	-5.0	-6.0	-9.0	VOLTS
PEAK AF SIGNAL VOLTAGE	4.5	5.0	6.0	9.0	VOLTS
PLATE CURRENT	1.6	3.8	3.8	5.0	MA.
SCREEN CURRENT	0.3	0.8	0.8	1.0	MA.
PLATE RESISTANCE (APPROX.)	0.3	0.2	0.2	0.2	MEGOHM
TRANSCONDUCTANCE	650	875	875	925	UMHOS
LOAD RESISTANCE	20 000	16 000	16 000	12 000	OHMS
TOTAL HARMONIC DISTORTION	10	10	10	10	PER CENT
POWER OUTPUT	35	90	100	200	MW.

DIODE UNIT

THE DIODE IS LOCATED AT THE NEGATIVE END OF THE FILAMENT, AND IS INDEPENDENT OF THE TRIODE UNIT AND OF THE PENTODE UNIT EXCEPT FOR THE COMMON FILAMENT.

PLATE
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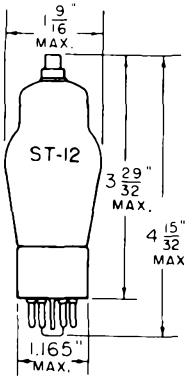
OCT. 31
1944

TUNG-SOL

R-F PENTODE AMPLIFIER



1E5GP
SKIRTED MINIATURE CAP

COATED FILAMENT

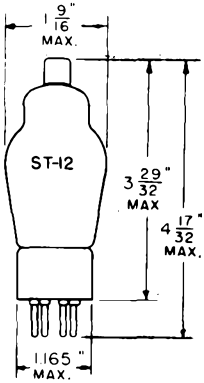
2.0 VOLTS 0.06 AMPERE

DC

GLASS BULB

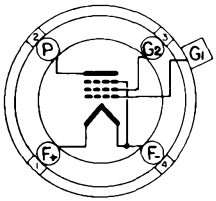
MOUNTING POSITION

FOR TUBE TYPE 1B4P, HORIZONTAL OPERATION WILL BE PERMITTED IF PINS 1 AND 4 ARE IN A VERTICAL PLANE. THE SAME WILL HOLD TRUE FOR TYPE 1E5GP IF PINS 5 AND 7 ARE IN A VERTICAL PLANE.



1B4P
SMALL METAL CAP

BOTTOM VIEW
SMALL SHELL OCTAL 7 PIN BASE



BOTTOM VIEW
SMALL 4 PIN BASE

THE 1E5GP AND 1B4P ARE DESIGNED FOR SERVICE AS GENERAL PURPOSE SHARP CUT-OFF PENTODE AMPLIFIERS IN BATTERY OPERATED EQUIPMENTS.

RATINGS

MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM SCREEN VOLTAGE	67.5	VOLTS
MAXIMUM CATHODE CURRENT	6.0	MA.

DIRECT INTERELECTRODE CAPACITANCES

GRID TO PLATE (WITH SHIELD)	0.007 MAX.	μμf
INPUT	5.0	μμf
OUTPUT	11	μμf

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PLATE 1500
OCT. 31 1944

CONTINUED ON NEXT PAGE

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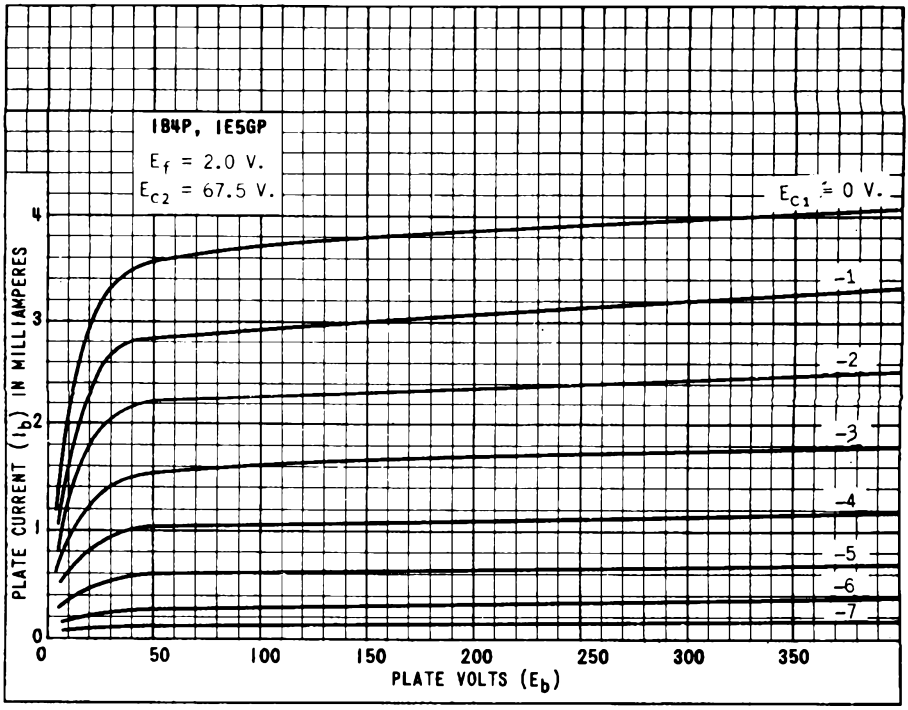
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	90	180	VOLTS
SCREEN VOLTAGE	67.5	67.5	VOLTS
CONTROL GRID VOLTAGE[A]	-3.0	-3.0	VOLTS
PLATE CURRENT	1.6	1.7	MA.
SCREEN CURRENT	0.7	0.6	MA.
PLATE RESISTANCE (APPROX.)	1.0	1.5	MEGOHMS
TRANSCONDUCTANCE	600	650	μMHOS
AMPLIFICATION FACTOR (APPROX.)	550	1000	
CONTROL GRID VOLTAGE FOR PLATE CURRENT CUT-OFF[A]	-8.0	-8.0	VOLTS

[A] RETURN TO NEGATIVE FILAMENT (PIN #7)

PLATE 1501
OCT. 31 1944



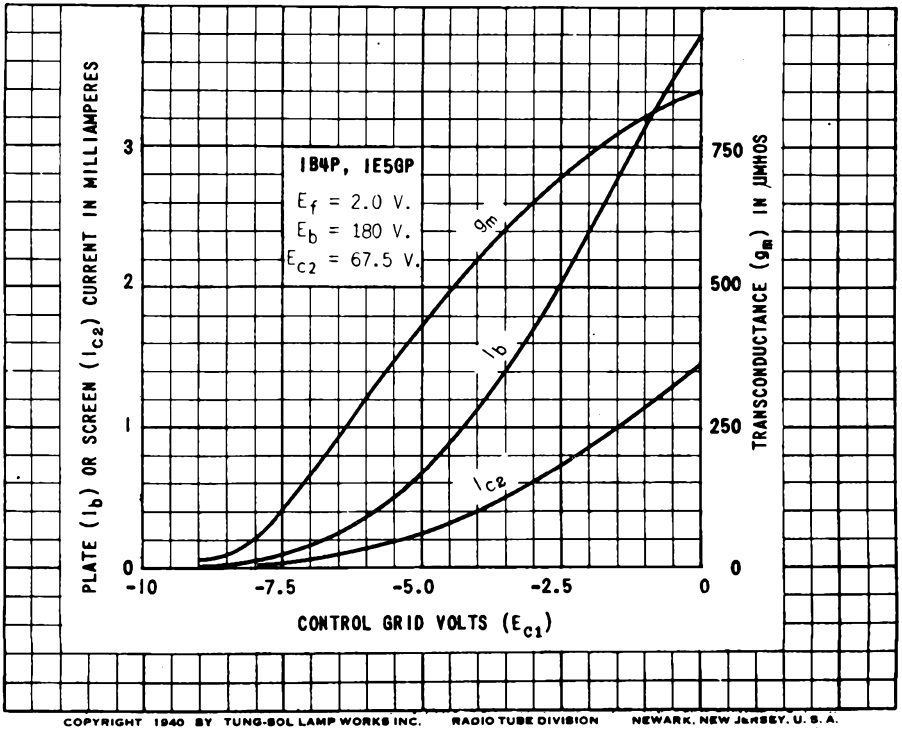
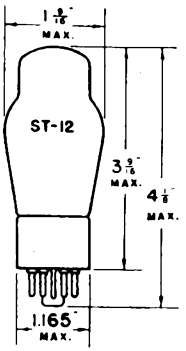


PLATE
1502
OCT. 31
1944

TUNG-SOL



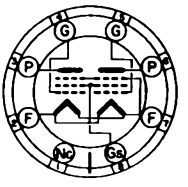
TWIN PENTODE

POWER AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.24 AMPERE
DC

GLASS BULB



G-8C

BOTTOM VIEW

SMALL 8 PIN OCTAL BASE

THE TUNG-SOL 1E7G COMBINES TWO FILAMENT TYPE POWER PENTODES IN A SINGLE BULB. IT IS DESIGNED FOR SERVICE AS A PUSH-PULL POWER AMPLIFIER IN BATTERY OPERATED RECEIVERS.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

EACH PENTODE SECTION

PLATE VOLTAGE	90	135	VOLTS
SCREEN VOLTAGE	90	135	VOLTS
CONTROL GRID VOLTAGE[A]	-3	-4.5	VOLTS
GRID CIRCUIT RESISTANCE MAX.			
FIXED BIAS	0.5	0.5	MEGOHM
SELF BIAS	1.0	1.0	MEGOHM
ZERO-SIGNAL PLATE CURRENT	3.8	7.5	MA.
ZERO-SIGNAL SCREEN CURRENT	1.1	2.2	MA.
TRANSCONDUCTANCE	1150	1425	μMHOS
AMPLIFICATION FACTOR	390	370	
LOAD RESISTANCE	20 000	16 000	OHMS
PEAK SIGNAL VOLTAGE	3	4.5	VOLTS
TOTAL DISTORTION	5.5	4.5	PER CENT
POWER OUTPUT	.110	.290	WATT

[A] RETURN TO NEGATIVE FILAMENT (PIN #7)

CONTINUED NEXT PAGE

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PLATE
241-2

DEC. 5
1938

CLASS A1 PUSH-PULL AMPLIFIER

VALUES ARE FOR TWO TUBES

PLATE VOLTAGE	135	VOLTS
SCREEN VOLTAGE	135	VOLTS
CONTROL GRID VOLTAGE	-7.5	VOLTS
GRID CIRCUIT RESISTANCE		
FIXED BIAS	0.5	MEGOHM
SELF BIAS	1.0	MEGOHM
ZERO-SIGNAL PLATE CURRENT	14	MA.
MAX.-SIGNAL PLATE CURRENT	21	MA.
ZERO-SIGNAL SCREEN CURRENT	4	MA.
MAX.-SIGNAL SCREEN CURRENT	7	MA.
LOAD RESISTANCE PLATE TO PLATE	24 000	OHMS
PEAK SIGNAL VOLTAGE GRID TO GRID	15	VOLTS
TOTAL DISTORTION	5.5	PER CENT
THIRD HARMONIC	4.5	PER CENT
POWER OUTPUT[P]	.575	WATT

[P] WITH A PEAK SIGNAL VOLTAGE (GRID TO GRID) OF 21 VOLTS, A POWER OUTPUT OF ONE WATT CAN BE OBTAINED WITH 10% DISTORTION. (CLASS A2).

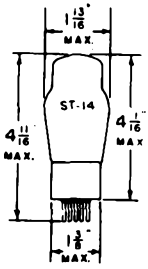
DIRECT INTERELECTRODE CAPACITANCES[S]

	PENTODE A	PENTODE B	
CONTROL GRID TO FILAMENT	7.5	7.5	μμf
PLATE TO FILAMENT	12	12	μμf
CONTROL GRID TO PLATE	0.9	0.9	μμf
CONTROL GRID A TO CONTROL GRID B	0.3		μμf
PLATE A TO PLATE B	2.0		μμf
CONTROL GRID B TO PLATE A	0.16		μμf
CONTROL GRID A TO PLATE B	0.16		μμf

PENTODE A - PENTODE WITH PLATE BROUGHT OUT TO PIN #6.
PENTODE B - PENTODE WITH PLATE BROUGHT OUT TO PIN #3.
[S] WITH SHIELD

PLATE 242-2

TUNG-SOL



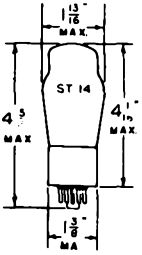
MEDIUM 5 PIN BASE
1F4

PENTODE POWER AMPLIFIER

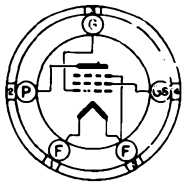
COATED FILAMENT

2.0 VOLTS 0.12 AMPERE
DC

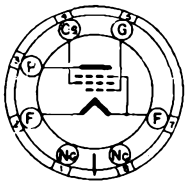
GLASS BULB



MEDIUM 7 PIN OCTAL BASE
1F5G



5K
BOTTOM VIEW
1F4



G-6X
BOTTOM VIEW
1F5G

THE TUNG-SOL 1F4 AND 1F5G ARE PENTODE POWER AMPLIFIERS OF THE FILAMENT TYPE. THEY ARE DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF BATTERY OPERATED RECEIVERS. THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM SCREEN VOLTAGE	180	VOLTS
MAXIMUM PLATE DISSIPATION	1.75	WATTS
MAXIMUM SCREEN DISSIPATION	0.75	WATT

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

PLATE
987 2

JAN. 31
1941

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	90	135	VOLTS
SCREEN VOLTAGE	90	135	VOLTS
CONTROL GRID VOLTAGE[A]	-3	-4.5	VOLTS
PEAK AF SIGNAL VOLTAGE	3	4.5	VOLTS
PLATE CURRENT	4.0	8.0	MA.
SCREEN CURRENT	1.1	2.4	MA.
PLATE RESISTANCE APPROX.	0.24	0.20	MEGOHM
TRANSCONDUCTANCE	1400	1700	μMHOS
LOAD RESISTANCE	20000	16000	OHMS
TOTAL HARMONIC DISTORTION	6	5	PER CENT
POWER OUTPUT	0.110	0.310	WATT

CLASS AB1 PUSH-PULL AMPLIFIER

VALUES ARE FOR TWO TUBES

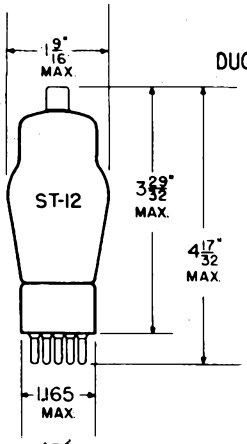
PLATE VOLTAGE	180	VOLTS
SCREEN VOLTAGE	180	VOLTS
CONTROL GRID VOLTAGE[A]	-7.5	VOLTS
PEAK AF SIGNAL VOLTAGE GRID TO GRID	15	VOLTS
ZERO-SIGNAL PLATE CURRENT	19	MA.
ZERO-SIGNAL SCREEN CURRENT	5.5	MA.
MAXIMUM-SIGNAL PLATE CURRENT	21	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	7	MA.
LOAD RESISTANCE PLATE-TO-PLATE	20000	OHMS
TOTAL HARMONIC DISTORTION	4.5	PER CENT
POWER OUTPUT	1.25	WATTS

[A] RETURN TO NEGATIVE FILAMENT (1F4: PIN #5 - 1F5G: PIN #7)

PLATE 988-2

TUNG-SOL

DUO-DIODE PENTODE AMPLIFIER



1F6

SMALL METAL CAP

COATED FILAMENT

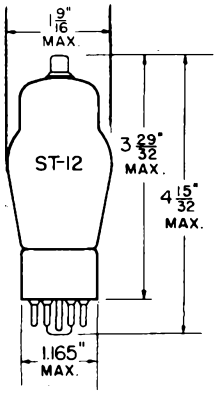
2.0 VOLTS 0.06 AMPERE

DC

GLASS BULB

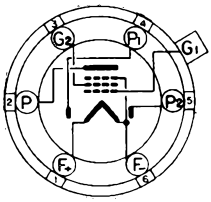
MOUNTING POSITION

HORIZONTAL OPERATION MAY BE PERMITTED IN THE 1F6 TUBE TYPE IF PINS 1 AND 6 ARE ON A VERTICAL PLANE. THE SAME WILL BE TRUE FOR THE 1F7GH TUBE TYPE IF PINS 2 AND 7 ARE ON A VERTICAL PLANE.



1F7GH

SKIRTED MINIATURE CAP



BOTTOM VIEW

SMALL 6-PIN

BOTTOM VIEW

SMALL SHELL 8-PIN OCTAL

THE 1F6 AND 1F7GH CONSIST OF TWO DIODES AND A PENTODE IN A SINGLE BULB. THEY ARE DESIGNED FOR SERVICE AS DIODE DETECTORS, AVC RECTIFIERS AND PENTODE AMPLIFIERS. WITH THE EXCEPTION OF CAPACITANCES, THEIR ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM SCREEN VOLTAGE	67.5	VOLTS
MAXIMUM PLATE DISSIPATION	0.4	WATT
MAXIMUM SCREEN DISSIPATION	0.05	WATT
MINIMUM DIODE CURRENT PER PLATE WITH 10 VOLTS DC APPLIED.	0.5	MA.
MAXIMUM DIODE CURRENT PER PLATE FOR CONTINOUS OPERATION.	0.25	MA.

CONTINUED ON NEXT PAGE

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PLATE 1527

JAN. 15 1945

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

DIRECT INTERELECTRODE CAPACITANCES

	1F6	1F7GH	
GRID TO PLATE [A]	0.007 MAX.	0.01 MAX.	μμf
INPUT: G1 TO (F+G2+G3)	4.0	3.8	μμf
OUTPUT: P TO (F+G2+G3)	9.0	9.5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

-RF OR IF AMPLIFIER

PENTODE UNIT

PLATE VOLTAGE	180	VOLTS
SCREEN VOLTAGE	67.5	VOLTS
CONTROL GRID VOLTAGE	-1.5	VOLTS
PLATE RESISTANCE (APPROX.)	1.0	MEGOHM
TRANSCONDUCTANCE	650	μMHOS
TRANSCONDUCTANCE FOR E_{C1} = -12 VOLTS	20	μMHOS
PLATE CURRENT	2.2	MA.
SCREEN CURRENT	0.7	MA.

[A] WITH SHIELD CAN

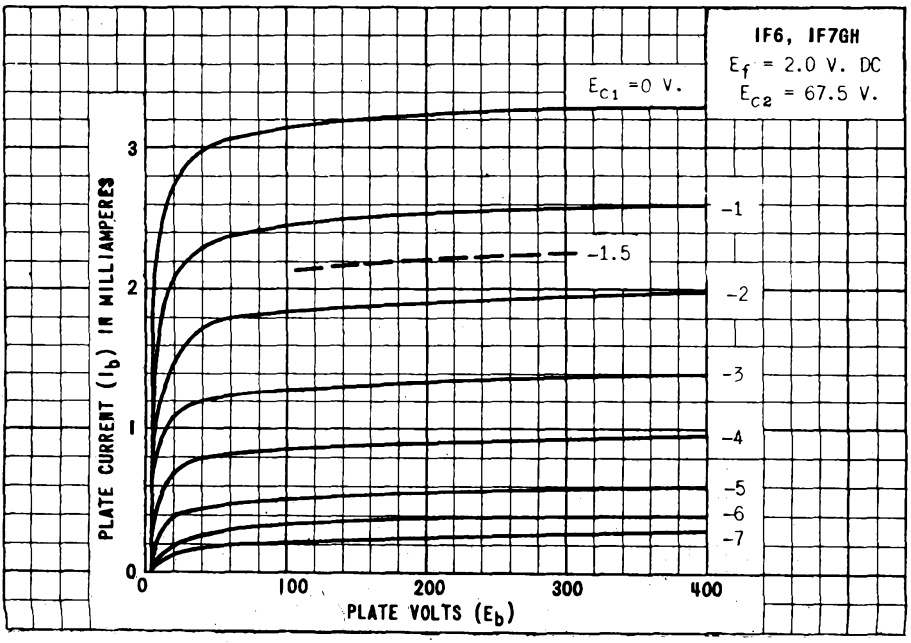
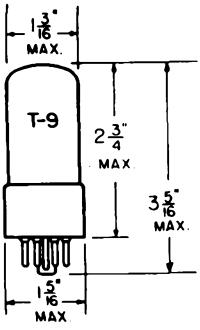


PLATE 1528
JAN. 15 1945

TUNG-SOL

TRIODE AMPLIFIER

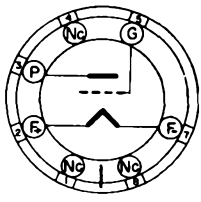


COATED FILAMENT

1.4 VOLTS 0.05 AMPERE
DC

GLASS BULB

ANY MOUNTING POSITION



INTERMEDIATE 7 PIN
OCTAL BASE

THE 1G4GT/G IS A FILAMENT TYPE GENERAL PURPOSE TRIODE ESPECIALLY DESIGNED FOR USE IN LOW DRAIN BATTERY OPERATED RECEIVERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	4.0	MA.

DIRECT INTERELECTRODE CAPACITANCES

GRID TO PLATE	2.8	μμf
INPUT	2.2	μμf
OUTPUT	3.4	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	90	VOLTS
GRID VOLTAGE[A]	-6.0	VOLTS
PLATE CURRENT	2.3	MA.
PLATE RESISTANCE	10 700	OHMS
MUTUAL CONDUCTANCE	825	μMHOS
AMPLIFICATION FACTOR	8.8	

[A] NEGATIVE FILAMENT RETURN

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PLATE
1503
OCT. 31
1944

1G4GT/G

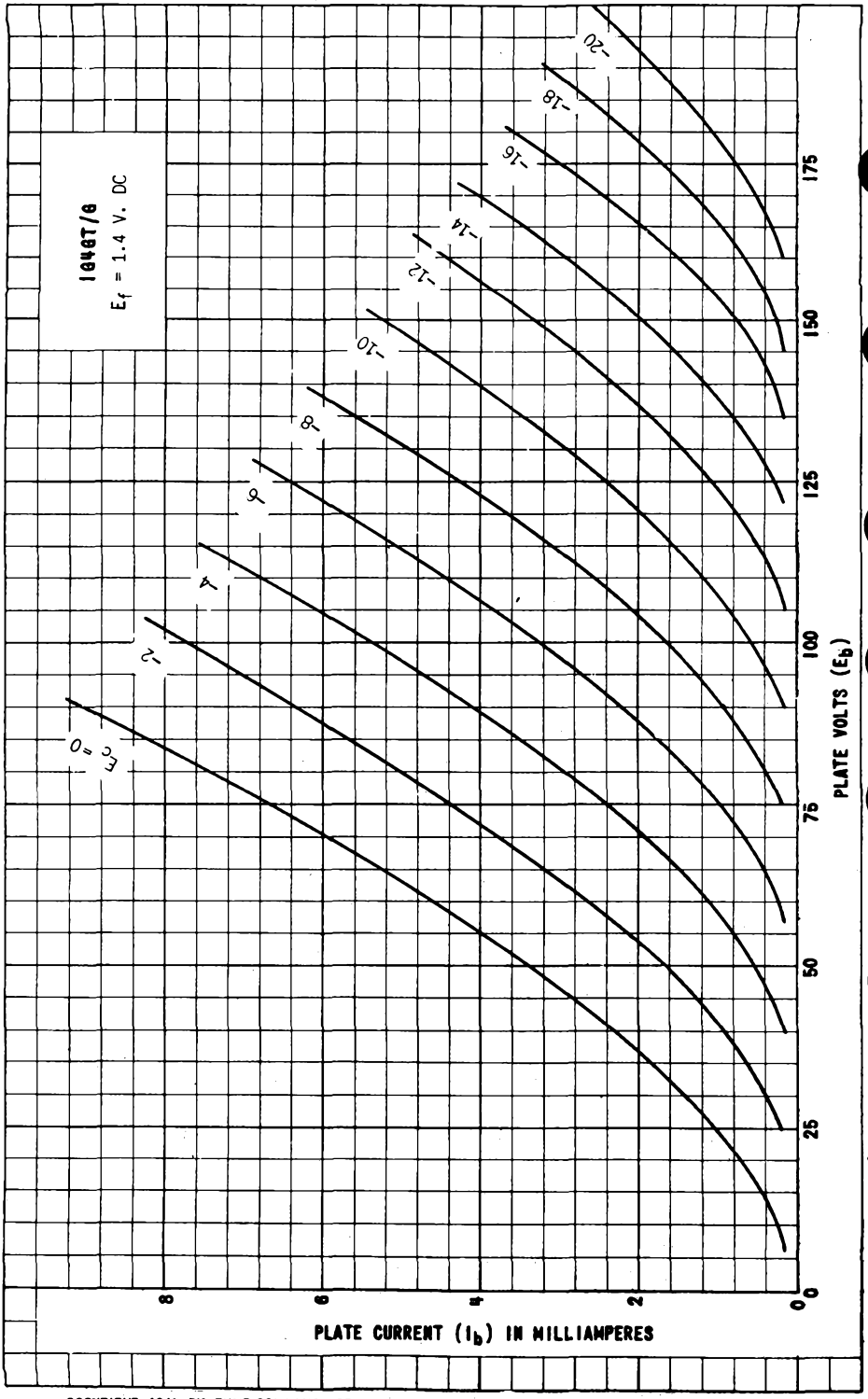
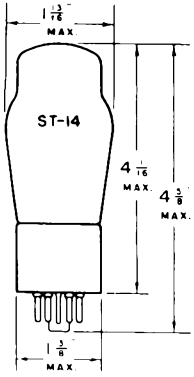


PLATE
1504
OCT. 31
1944

TUNG-SOL



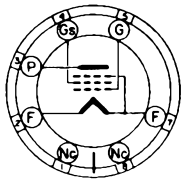
PENTODE POWER AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.12 AMPERE
DC

GLASS BULB

MEDIUM 7 PIN OCTAL BASE



6X-0-0

THE TUNG-SOL 1G5G IS A FILAMENT TYPE PENTODE POWER AMPLIFIER DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF BATTERY OPERATED RECEIVERS.

RATINGS

MAXIMUM PLATE VOLTAGE	135	VOLTS
MAXIMUM SCREEN VOLTAGE	135	VOLTS
MAXIMUM PLATE DISSIPATION	1.25	WATTS
MAXIMUM SCREEN DISSIPATION	0.6	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	90	124	135	VOLTS
SCREEN VOLTAGE	90	124	135	VOLTS
CONTROL GRID VOLTAGE[A]	-6	-11	-13.5	VOLTS
PEAK AF SIGNAL VOLTAGE	6	9.9	9.2	VOLTS
ZERO-SIGNAL PLATE CURRENT	8.5	10.0	8.7	MA.
ZERO-SIGNAL SCREEN CURRENT	2.5	3.0	2.5	MA.
MAXIMUM-SIGNAL PLATE CURRENT	8.7	10.7	9.7	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	3.0	4.3	3.6	MA.
PLATE RESISTANCE APPROX.	133 000	145 000	160 000	OHMS
TRANSCONDUCTANCE	1500	1500	1550	µMHOS
LOAD RESISTANCE	8500	8000	9000	OHMS
TOTAL HARMONIC DISTORTION	6	10.5	11	PER CENT
SECOND HARMONIC DISTORTION	3	7	8	PER CENT
THIRD HARMONIC DISTORTION	5	7.5	7	PER CENT
POWER OUTPUT	.250	.600[B]	.550[C]	WATT

[A] REFERRED TO NEGATIVE FILAMENT TERMINAL.

[B] WITH A PEAK AF GRID VOLTAGE OF 11 VOLTS, A POWER OUTPUT OF .650 WATT CAN BE OBTAINED WITH 13% TOTAL DISTORTION (6% SECOND, 11% THIRD).

[C] WITH A PEAK AF GRID VOLTAGE OF 13.5 VOLTS, A POWER OUTPUT OF .750 WATT CAN BE OBTAINED WITH 18% TOTAL DISTORTION (9 % SECOND, 15% THIRD).

CONTINUED NEXT PAGE

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PLATE
1170-3

FEB. 28
1942

1G5G

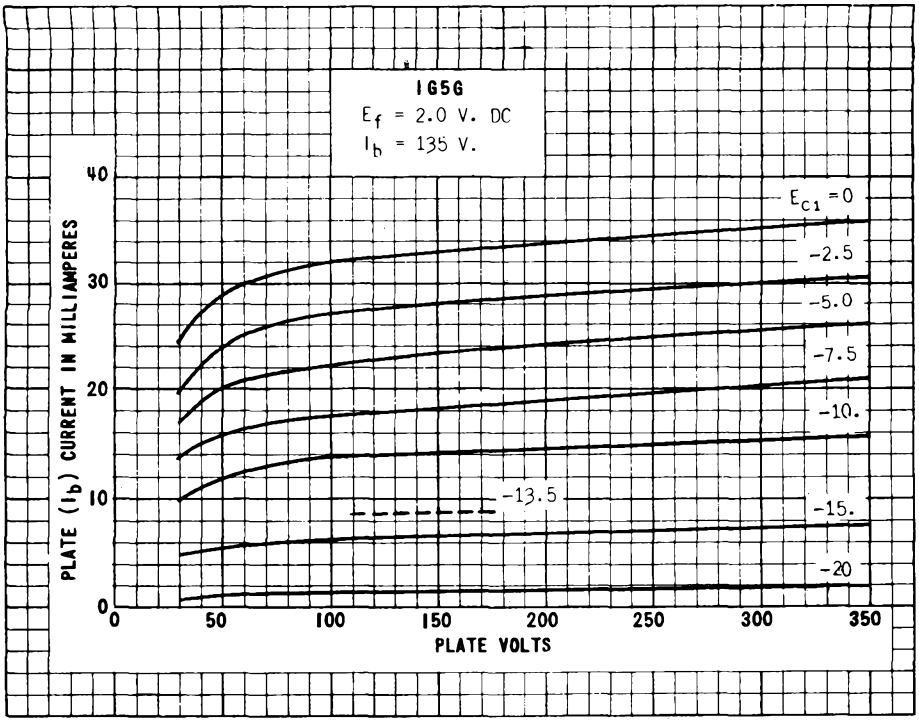
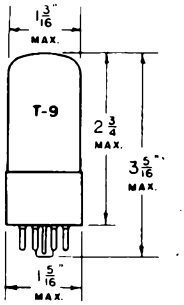


PLATE
1171-1

TUNG-SOL

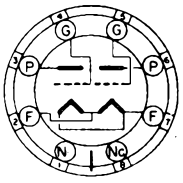


CLASS B TWIN TRIODE AMPLIFIER

COATED FILAMENT

1.4 VOLTS 0.10 AMPERE
DC

GLASS BULB



7AB-0-0

INTERMEDIATE 8 PIN OCTAL BASE

THE TUNG-SOL 1G6GT/G IS A LOW VOLTAGE, LOW CURRENT DRAIN, TWIN TRIODE AMPLIFIER. IT IS DESIGNED FOR SERVICE AS A ZERO BIAS CLASS "B" POWER AMPLIFIER.

RATINGS

MAXIMUM FILAMENT VOLTAGE		
DRY BATTERY OPERATION — VOLTAGE MUST NEVER EXCEED	1.6	VOLTS
AC — DC POWER LINE OPERATION — DESIGN CENTER	1.3	VOLTS
MAXIMUM PLATE VOLTAGE PER PLATE	110	VOLTS
MAXIMUM PEAK PLATE CURRENT PER PLATE	20	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS B POWER AMPLIFIER

VALUES ARE FOR 2 UNITS UNLESS OTHERWISE SPECIFIED

PLATE VOLTAGE	90	90	VOLTS
DC GRID VOLTAGE [A]	0	0	VOLTS
PEAK AF SIGNAL VOLTAGE GRID TO GRID [B]	42	48	VOLTS
ZERO SIGNAL DC PLATE CURRENT	2	2	MA.
MAXIMUM SIGNAL DC PLATE CURRENT	14	11	MA.
PEAK GRID CURRENT PER UNIT	5	6	MA.
PLATE SUPPLY IMPEDANCE	0	0 [C]	OHMS
EFFECTIVE GRID CIRCUIT IMPEDANCE PER UNIT	0	2530 [D]	OHMS
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	12000	12000	OHMS
TOTAL HARMONIC DISTORTION	3	4	PER CENT
POWER OUTPUT APPROX.	0.675	0.350	WATT

[A] RETURN TO NEGATIVE FILAMENT TERMINAL (PIN #7).

[B] INCLUDES PEAK GRID IMPEDANCE VOLTAGE DROP.

[C] BATTERY SUPPLY.

[D] AT 400 CYCLES THE EFFECTIVE RESISTANCE PER GRID CIRCUIT IS 2500 OHMS, AND THE LEAKAGE REACTANCE OF THE COUPLING TRANSFORMER IS 155 MILLIHENRYS.

CONTINUED NEXT PAGE

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

EACH TRIODE UNIT

FILAMENT VOLTAGE	1.4 DC	VOLTS
FILAMENT CURRENT	0.1	AMPERE
PLATE VOLTAGE	90	VOLTS
CONTROL GRID VOLTAGE [A]	0	VOLTS
PLATE CURRENT	1.0	MA.
PLATE RESISTANCE APPROX.	45000	OHMS
TRANSCONDUCTANCE	675	µMHOS
AMPLIFICATION FACTOR	30	

[A] REFERRED TO NEGATIVE FILAMENT TERMINAL.

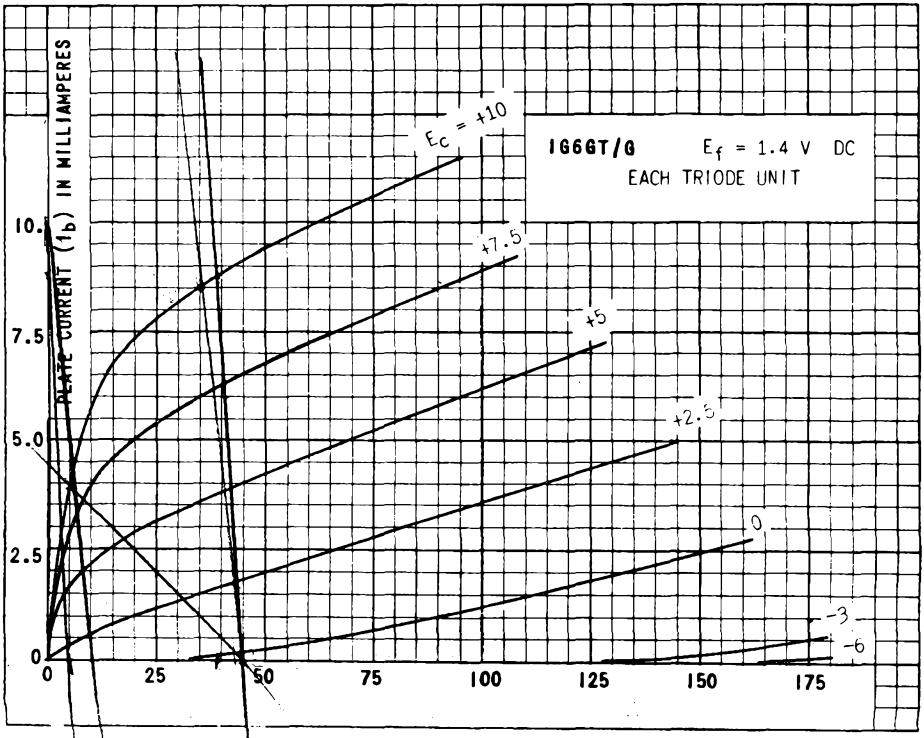
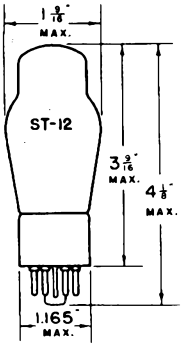


PLATE 1191-1

TUNG-SOL



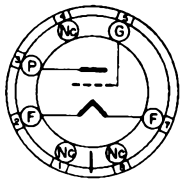
TRIODE AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.06 AMPERE
DC

GLASS BULB

SMALL 7 PIN OCTAL BASE



G-5Z

THE TUNG-SOL 1H4G IS A GENERAL PURPOSE FILAMENT TYPE TRIODE DESIGNED FOR SERVICE IN BATTERY OPERATED RECEIVERS. WITH THE EXCEPTION OF CAPACITANCES ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 30.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	90	135	180 MAX.	VOLTS
GRID VOLTAGE	-4.5	-9	-13.5	VOLTS
GRID CIRCUIT RESISTANCE MAX.	2	2	2	MEGOHMS
PLATE CURRENT	2.5	3.0	3.1	MA.
PLATE RESISTANCE	11 000	10 300	10 300	OHMS
TRANSCONDUCTANCE	850	900	900	μMHOS
AMPLIFICATION FACTOR	9.3	9.3	9.3	

DETECTOR

		BIASED		GRID LEAK	
PLATE VOLTAGE	90	135	180 MAX.	45 MAX.	VOLTS
GRID VOLTAGE	-9 A	-13.5 A	-18 A	RETURN TO (+) FILAMENT	VOLTS
PLATE CURRENT P	ADJUSTED TO 0.2 MA. WITH NO INPUT SIGNAL			—	
GRID LEAK	—	—	—	1 TO 5	MEGOHMS
GRID CONDENSER	—	—	—	250	μμf

A APPROXIMATE. GRID RETURN TO NEGATIVE END OF FILAMENT.

P WITH MAXIMUM SIGNAL THE AVERAGE DC PLATE CURRENT SHOULD NOT EXCEED 2.0 MA.

CONTINUED NEXT PAGE

TUNG-SOL

CLASS B2 AMPLIFIER

PLATE VOLTAGE	180 MAX.	VOLTS
PEAK PLATE CURRENT PER TUBE	50 MAX.	MA.
ZERO-SIGNAL PLATE CURRENT PER TUBE	1.5 MAX.	MA.

TYPICAL OPERATING CONDITIONS

VALUES ARE FOR TWO TUBES

PLATE VOLTAGE	157.5	VOLTS
GRID VOLTAGE	-15	VOLTS
ZERO-SIGNAL PLATE CURRENT	1	MA.
LOAD RESISTANCE PER TUBE	2000	OHMS
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	8000	OHMS
PEAK POWER INPUT GRID TO GRID	260 MAX.	MILLIWATTS
POWER OUTPUT[D] (6% TO 7% DISTORTION)	2.1	WATTS

[D] WITH ONE TYPE 1H4G AS DRIVER, OPERATED WITH PLATE VOLTAGE = 157.5 VOLTS, GRID VOLTAGE = -11.3 VOLTS, PLATE LOAD OF APPROXIMATELY 18 000 OHMS, AND INPUT TRANSFORMER RATIO, PRIMARY TO ONE HALF SECONDARY = 1.165.

DIRECT INTERELECTRODE CAPACITANCES [S]

GRID TO FILAMENT	3.6	μμf
PLATE TO FILAMENT	5.0	μμf
GRID TO PLATE	5.0	μμf

[S] WITH SHIELD

PLATE
207-1

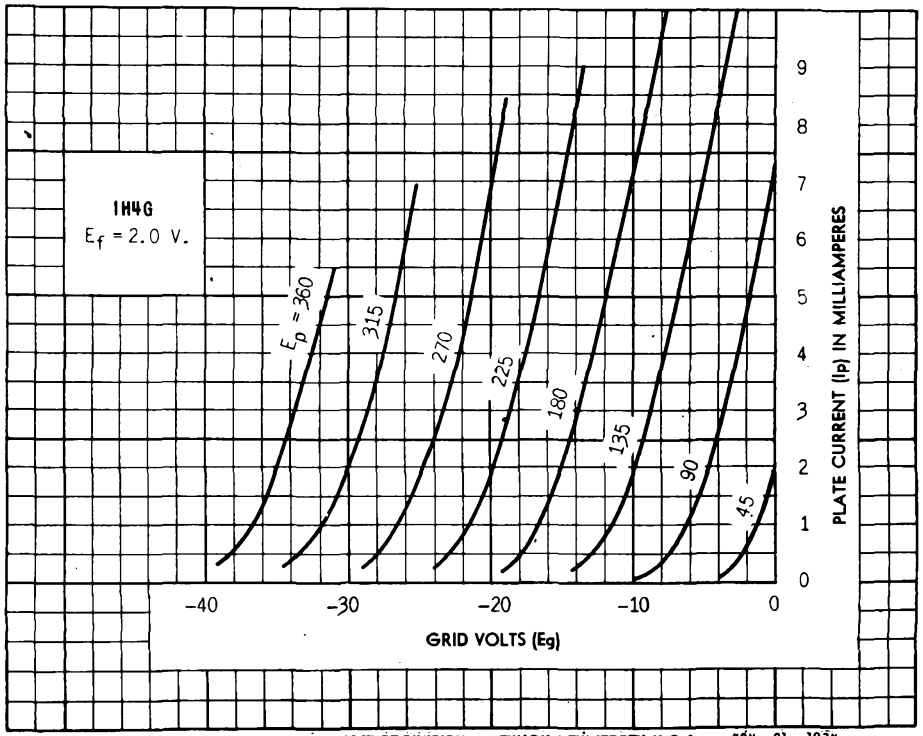


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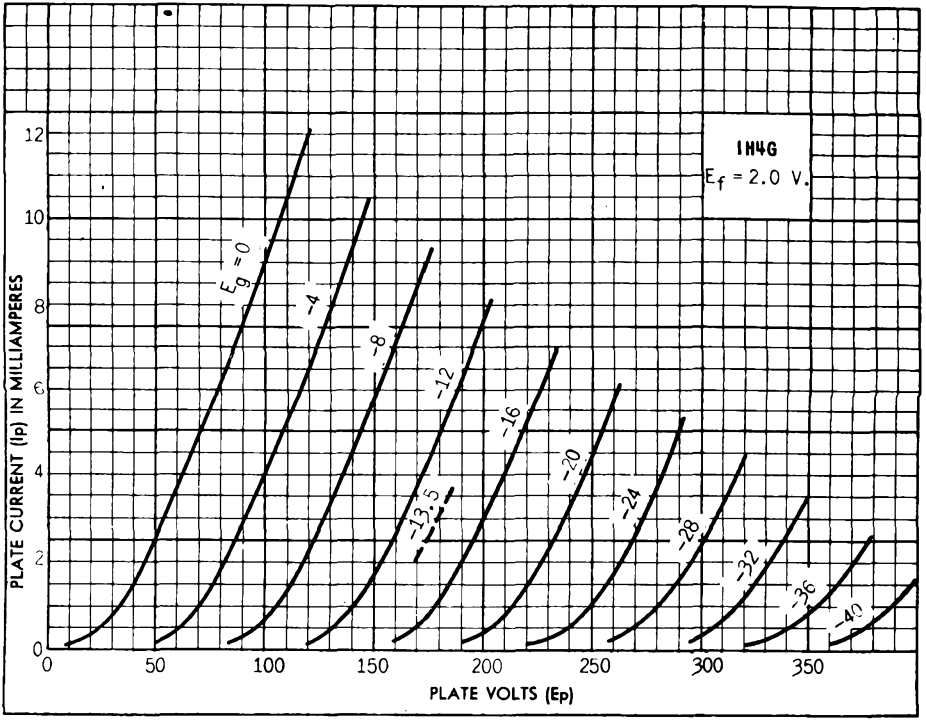
PLATE
200-1


1H4G
E_f = 2.0 V.
PLATE CURRENT (Ip) IN MILLIAMPERES
PLATE VOLTS (Ep)
0
2
4
6
8
10
12
0
50
100
150
200
250
300
350
E_g = 0
-4
-8
-12
-13.5
-16
-20
-24
-28
-32
-36
-40

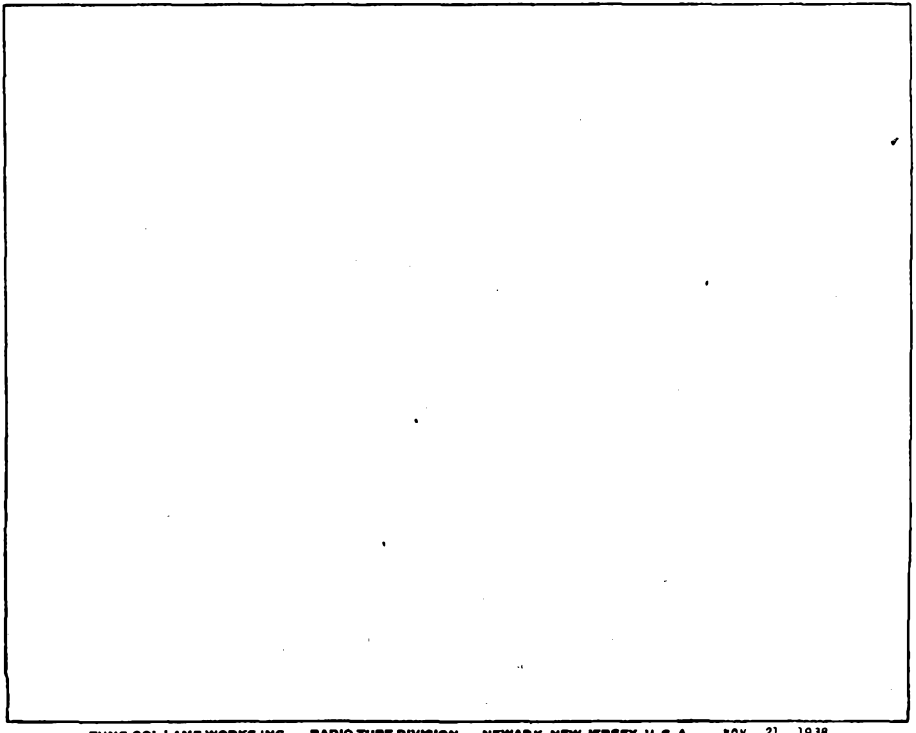
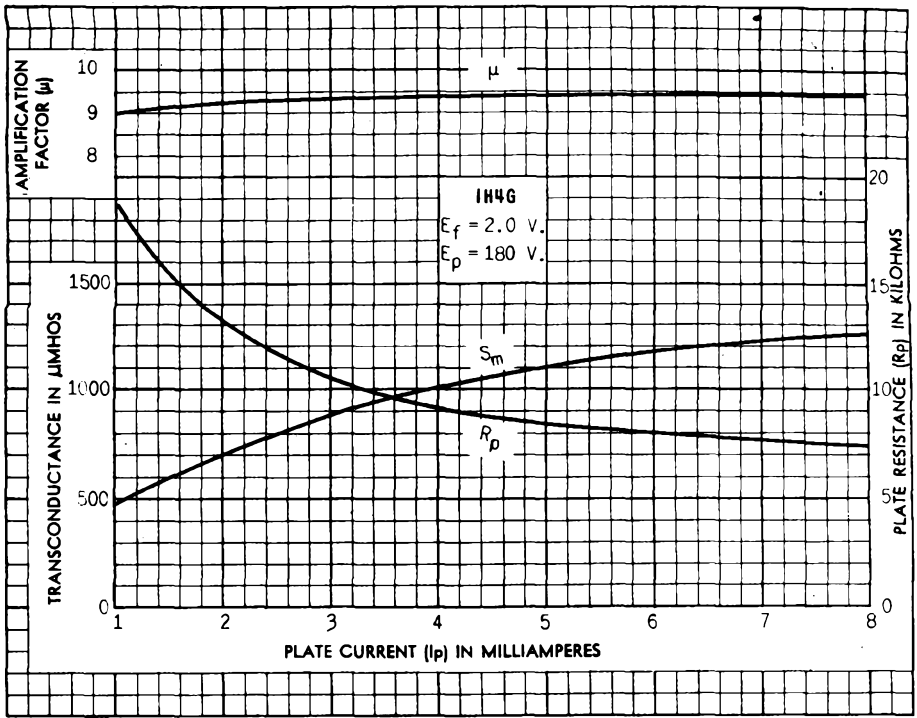
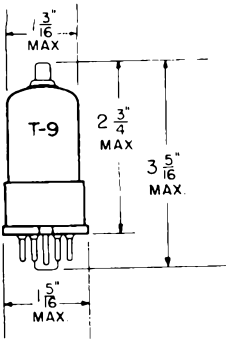


PLATE
201-1

1H4 G


AMPLIFICATION FACTOR (μ)
10
9
8
μ
1H4G
E_f = 2.0 V.
E_p = 180 V.
1500
1000
500
0
TRANSCONDUCTANCE IN μMHOS
S_m
R_p
20
15
10
5
0
PLATE RESISTANCE (R_p) IN KILOHMS
1
2
3
4
5
6
7
8
PLATE CURRENT (Ip) IN MILLIAMPERES

TUNG-SOL



1H5GT/G

SKIRTED MINIATURE CAP

DIODE TRIODE AMPLIFIER

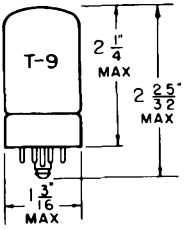
COATED FILAMENT

1.4 VOLTS 0.05 AMPERE

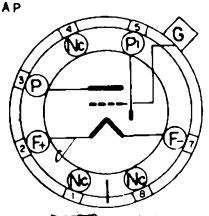
DC

GLASS BULB

ANY MOUNTING POSITION

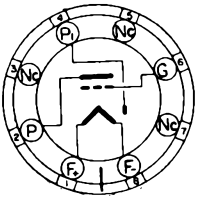


1LH4



BOTTOM VIEW

7-PIN OCTAL BASE WITH METAL SHELL



BOTTOM VIEW

LOCKING-IN 8-PIN

THE 1H5GT/G AND 1LH4 ARE TUBES COMBINING A SINGLE DIODE AND A HIGH-MU TRIODE IN ONE BULB. THEY ARE DESIGNED FOR SERVICE AS DIODE DETECTORS, AVC RECTIFIERS, AND AS RESISTANCE COUPLED AMPLIFIERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	110	VOLTS
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED	0.5	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

TRIODE UNIT

PLATE VOLTAGE	90	VOLTS
CONTROL GRID VOLTAGE [A]	0	VOLTS
PLATE CURRENT	0.15	MA.
PLATE RESISTANCE	0.24	MEGOHM
TRANSCONDUCTANCE	275	μMHOS
AMPLIFICATION FACTOR	65	

[A] REFERRED TO NEGATIVE FILAMENT TERMINAL

DIODE UNIT

THE DIODE IS LOCATED AT THE NEGATIVE END OF THE FILAMENT AND IS INDEPENDENT OF THE TRIODE UNIT EXCEPT FOR THE COMMON FILAMENT.

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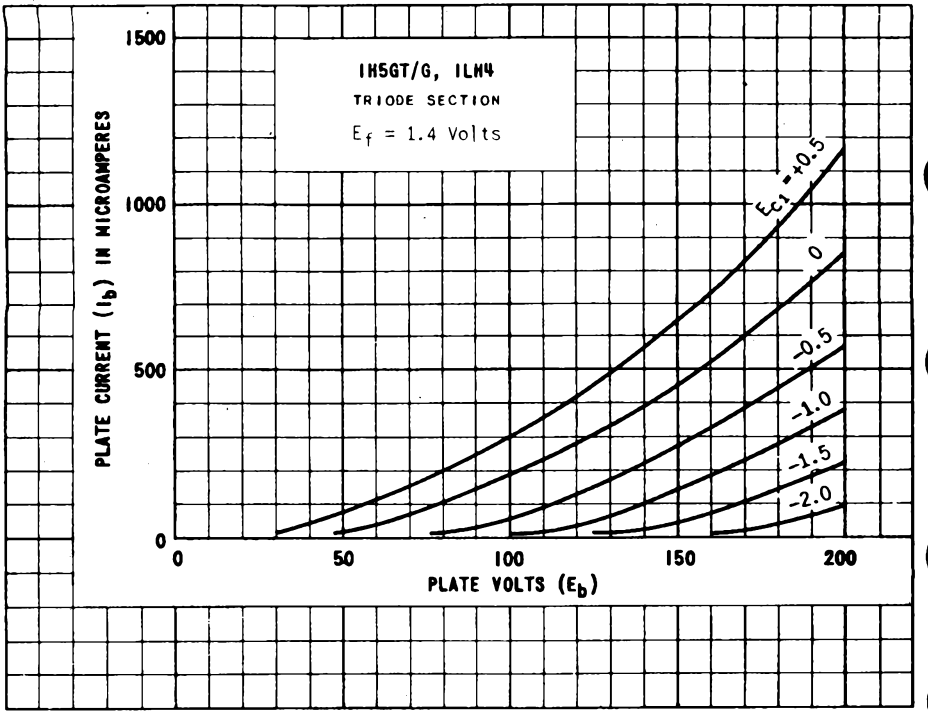
PLATE 1529
JAN. 15 1945

1H5GT/G (1LH4)



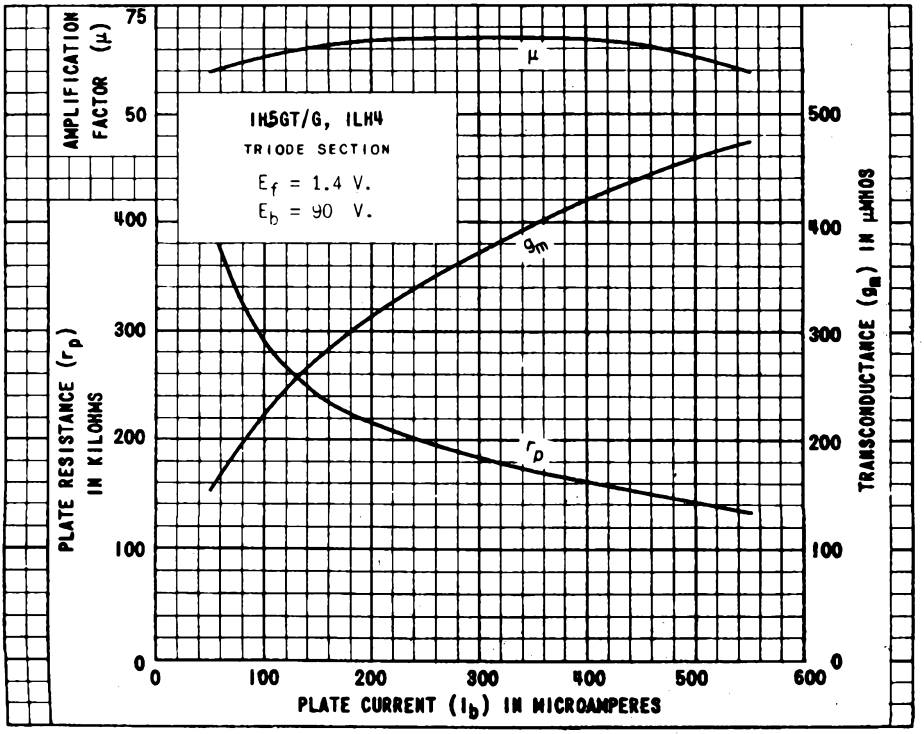
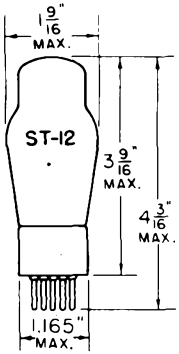


PLATE 1530
JAN. 15 1945

TUNG-SOL

DUO-DIODE TRIODE AMPLIFIER



1B5/25S

COATED FILAMENT

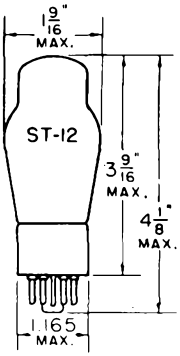
2.0 VOLTS 0.06 AMPERE

DC

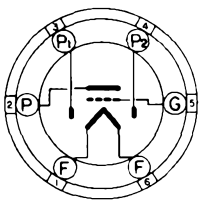
GLASS BULB

MOUNTING POSITION

THESE TUBES SHOULD BE OPERATED VERTICALLY WITH BASE DOWN. HOWEVER, HORIZONTAL OPERATION MAY BE PERMITTED FOR TUBE TYPE 1B5/25S WHEN PINS 2 AND 5 ARE HORIZONTAL. THE SAME WILL BE TRUE FOR THE 1H6G TUBE TYPE WHEN PINS 2 AND 7 ARE HORIZONTAL.

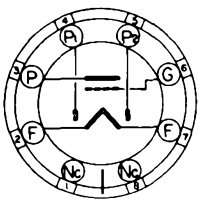


1H6G



BOTTOM VIEW

SMALL 6 PIN BASE



BOTTOM VIEW

SMALL 8 PIN OCTAL BASE

THE 1B5/25S AND 1H6G COMBINE TWO DIODES AND A TRIODE IN A SINGLE BULB. THEY ARE DESIGNED FOR SERVICE AS DIODE DETECTORS, AVC RECTIFIERS, AND IMPEDANCE OR RESISTANCE COUPLED AMPLIFIERS IN BATTERY OPERATED RECEIVERS.

DIRECT INTERELECTRODE CAPACITANCES

	1B5/25S	1H6G	
GRID TO PLATE	3.6	3.6	μμf
INPUT	1.6	1.6	μμf
OUTPUT	1.9	1.9	μμf

OPERATING CONDITIONS AND CHARACTERISTICS

TRIODE UNIT - CLASS A_1 AMPLIFIER

MAXIMUM PLATE VOLTAGE	135	VOLTS
CONTROL GRID VOLTAGE	-3.0	VOLTS
PLATE CURRENT	0.8	MA.
PLATE RESISTANCE	35 000	OHMS
TRANSCONDUCTANCE	575	μMHOS
AMPLIFICATION FACTOR	20	

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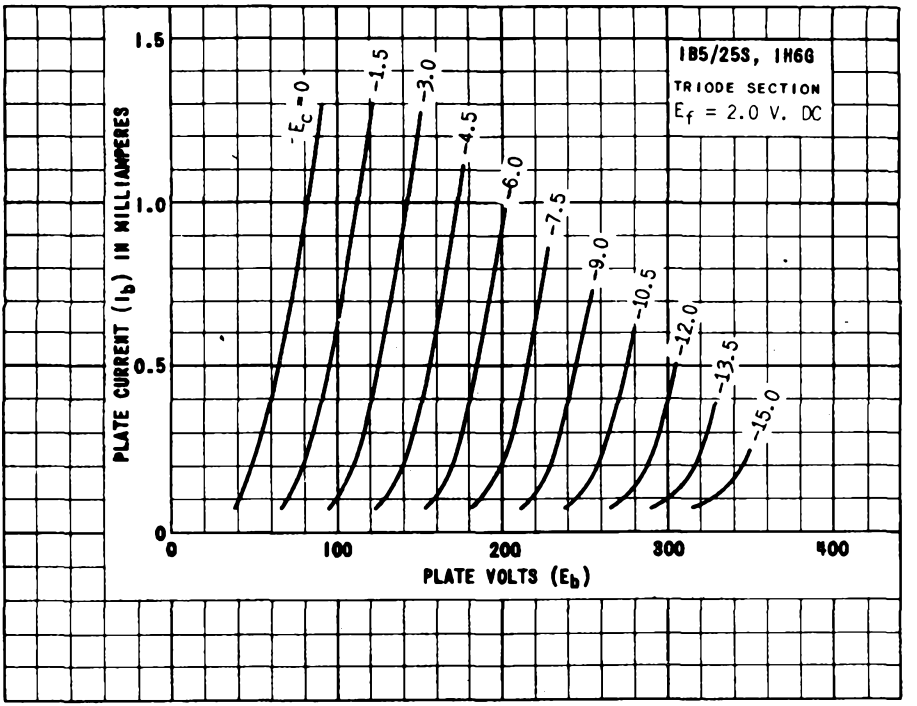
PLATE 1505
OCT. 31 1944

1H6G (1B5/25S)



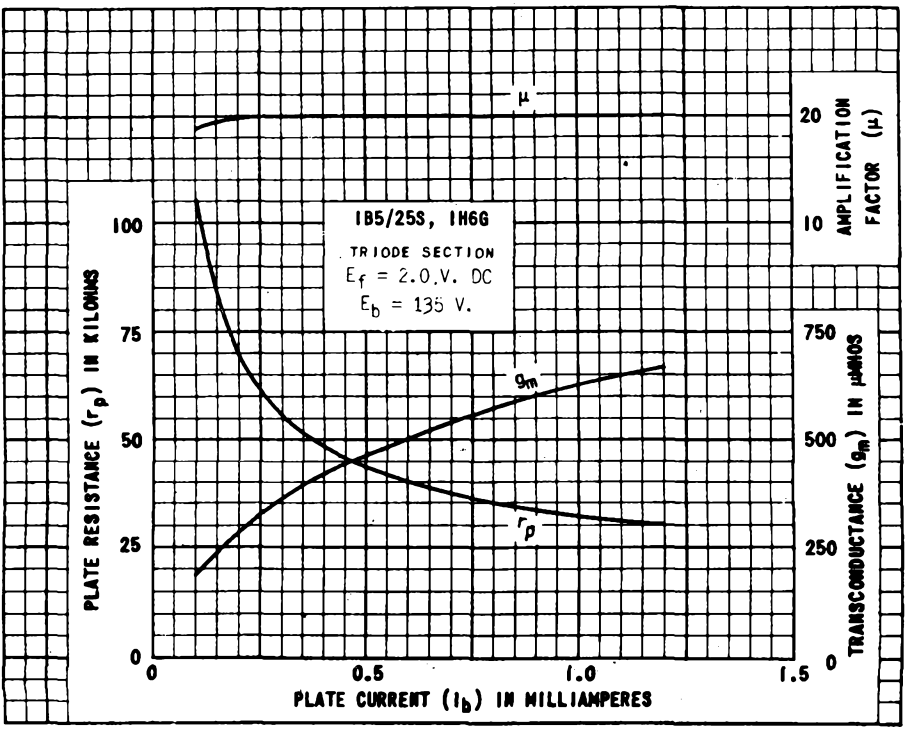
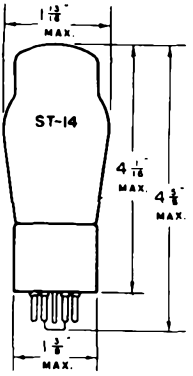


PLATE 1506
OCT. 31 1944

TUNG-SOL



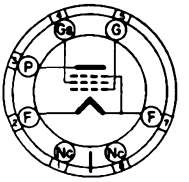
PENTODE POWER AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.12 AMPERE
DC

GLASS BULB

MEDIUM 7 PIN OCTAL BASE



G-6X

BOTTOM VIEW

THE TUNG-SOL 1J5G IS A FILAMENT TYPE PENTODE POWER AMPLIFIER DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF BATTERY OPERATED RECEIVERS. ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 950.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	135	VOLTS
SCREEN VOLTAGE	135	VOLTS
CONTROL GRID VOLTAGE [A]	-16.5	VOLTS
GRID CIRCUIT RESISTANCE WITH FIXED BIAS MAX.	0.5	MEGOHM
PLATE CURRENT	7	MA.
SCREEN CURRENT	2	MA.
TRANSCONDUCTANCE	950	μMHOS
AMPLIFICATION FACTOR	100	
LOAD RESISTANCE	13500	OHMS
POWER OUTPUT	0.45	WATT

[A] RETURN TO NEGATIVE FILAMENT (PIN #7)

DIRECT INTERELECTRODE CAPACITANCES [S]

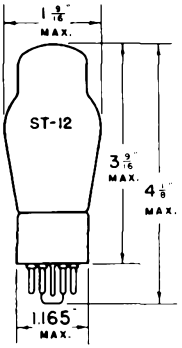
CONTROL GRID TO FILAMENT	8	μμf
PLATE TO FILAMENT	14	μμf
CONTROL GRID TO PLATE	0.8	μμf

[S] WITH SHIELD

PLATE 536-2

AUG. 14 1939

TUNG-SOL



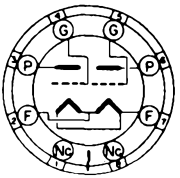
TWIN TRIODE POWER AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.24 AMPERE
DC

GLASS BULB

SMALL 8 PIN OCTAL BASE



G-7AB

BOTTOM VIEW

THE TUNG-SOL 1J6G IS DESIGNED FOR SERVICE AS A CLASS B POWER OUTPUT AMPLIFIER IN BATTERY OPERATED RECEIVERS. WITH THE EXCEPTION OF FILAMENT CURRENT AND CAPACITANCES, ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 19.

OPERATING CONDITIONS AND CHARACTERISTICS

PLATE VOLTAGE MAX.	135	VOLTS
PEAK PLATE CURRENT PER PLATE MAX.	50	MA.

CLASS B_2 AMPLIFIER

PLATE VOLTAGE MAX.	135	135	135	VOLTS
GRID VOLTAGE [A]	-6	-3	0	VOLTS
ZERO-SIGNAL PLATE CURRENT PER PLATE	0.1	1.7	5	MA.
LOAD RESISTANCE PER PLATE	2500	2500	2500	OHMS
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	10 000	10 000	10 000	OHMS
AVERAGE POWER INPUT APPROX. GRID TO GRID	0.095	0.130	0.170	WATT
POWER OUTPUT APPROX.	1.6	1.9	2.1	WATTS

[A] RETURN TO NEGATIVE FILAMENT (PIN #7)

DIRECT INTERELECTRODE CAPACITANCES [S]

	TRIODE 2		TRIODE 1	
GRID TO FILAMENT	3.2		3.2	μμf
PLATE TO FILAMENT	4.4		4.4	μμf
GRID TO PLATE	7.5		7.5	μμf
GRID 1 TO GRID 2		0.26		μμf
PLATE 1 TO PLATE 2		0.5		μμf
GRID 2 TO PLATE 1		0.05		μμf
GRID 1 TO PLATE 2		0.05		μμf

TRIODE 2 IS TRIODE HAVING GRID BROUGHT OUT TO PIN #4.
TRIODE 1 IS TRIODE HAVING GRID BROUGHT OUT TO PIN #5.
[S] WITH SHIELD

PLATE 537-2

TUNG-SOL

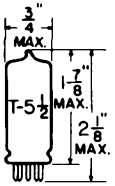
RF AMPLIFIER PENTODE

MINIATURE TYPE

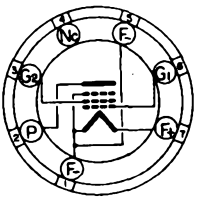
COATED FILAMENT

FILAMENT
1.4 VOLTS 0.05 AMPERE
DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 1L4 IS A RF PENTODE OF THE MINIATURE TYPE WITH A SHARP CUT-OFF CHARACTERISTIC. IT IS RECOMMENDED FOR USE WHEREVER A SHARP CUT-OFF PENTODE IS REQUIRED IN COMPACT, LIGHT-WEIGHT, PORTABLE RECEIVERS. THE TUBE IS, THEREFORE, OF INTEREST IN FM RECEIVERS AND IN OTHER CIRCUITS NOT REQUIRING AVC. THE 1L4 FEATURES INTERNAL SHIELDING WHICH ELIMINATES THE NEED FOR AN EXTERNAL BULB SHIELD, BUT A SOCKET WITH SHIELDING IS ESSENTIAL IF MINIMUM GRID-PLATE CAPACITANCE IS TO BE OBTAINED.

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G_1 TO P) MAX.	0.008	μμf
INPUT: G_1 TO (F + G_2 + G_3 + I.S.)	3.6	μμf
OUTPUT: P TO (F + G_2 + G_3 + I.S.)	7.5	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	1.4	VOLTS
MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM GRID #2 VOLTAGE	90	VOLTS
MAXIMUM GRID #2 SUPPLY VOLTAGE	110	VOLTS
MINIMUM GRID #1 VOLTAGE	0	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	6.5	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

FILAMENT VOLTAGE	1.4	1.4	VOLTS
FILAMENT CURRENT	0.05	0.05	AMP.
PLATE VOLTAGE	90	90	VOLTS
GRID #2 VOLTAGE	67.5	90	VOLTS
GRID #1 VOLTAGE	0	0	VOLTS
PLATE CURRENT	2.9	4.5	MA.
GRID #2 CURRENT	1.2	2.0	MA.
PLATE RESISTANCE (APPROX.)	0.6	0.35	MEGOHM
TRANSCONDUCTANCE	925	1 025	μMHOS
GRID #1 VOLTAGE FOR PLATE CURRENT = 10 μAMPS	-6	-8	VOLTS

SIMILIAR TYPE REFERENCE: Characteristics somewhat similiar to 1LB5 and 1N5GT.

→ INDICATES A CHANGE OR ADDITION.

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PLATE 1825
JUNE 2, 1947

1L4

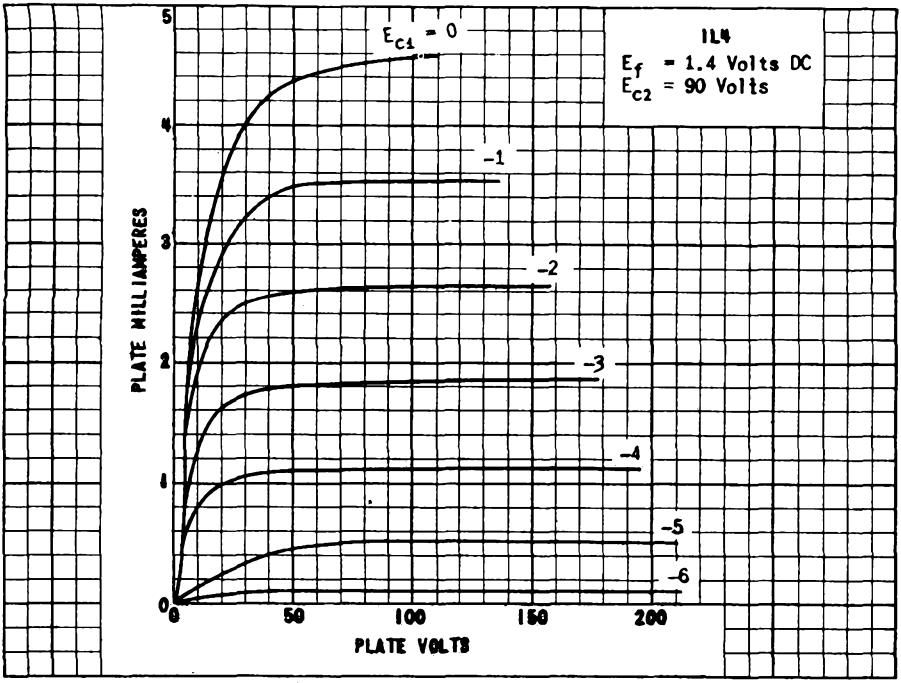
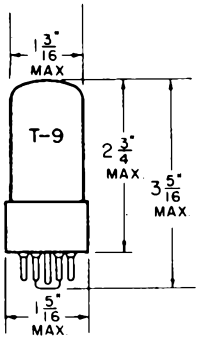


PLATE
1826
JUNE 2,
1947

TUNG-SOL



1A5GT/G

PENTODE POWER AMPLIFIER

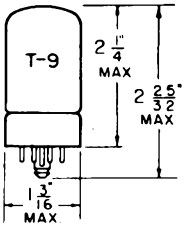
COATED FILAMENT

1.4 VOLTS 0.05 AMPERE

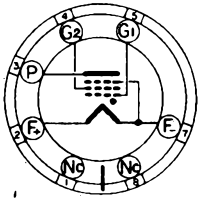
DC

GLASS BULB

ANY MOUNTING POSITION



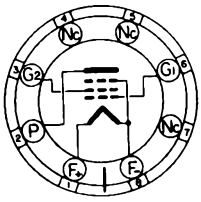
1LA4



BOTTOM VIEW

INTERMEDIATE SHELL

7-PIN OCTAL BASE



BOTTOM VIEW

LOCKING-IN

8-PIN

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	VOLTS
MAXIMUM CATHODE CURRENT	6.0	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	85	90	VOLTS
SCREEN VOLTAGE	85	90	VOLTS
GRID VOLTAGE[A]	-4.5	-4.5	VOLTS
PEAK A-F GRID VOLTAGE	4.5	4.5	VOLTS
ZERO-SIG. PLATE CURRENT	3.5	4.0	MA.
MAXIMUM SIG. PLATE CURRENT	3.5	4.0	MA.
ZERO-SIG. SCREEN CURRENT	0.7	0.8	MA.
MAXIMUM SIG. SCREEN CURRENT	1.0	1.1	MA.
PLATE RESISTANCE	0.3	0.3	MEGOHM
TRANSCONDUCTANCE	800	850	μMHOS
LOAD RESISTANCE	25 000	25 000	OHMS
TOTAL HARMONIC DISTORTION	10	7.0	PER CENT
MAXIMUM SIG. POWER OUTPUT	100	115	MW.

[A] RETURN TO NEGATIVE FILAMENT

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PLATE 1531
JAN. 15 1945

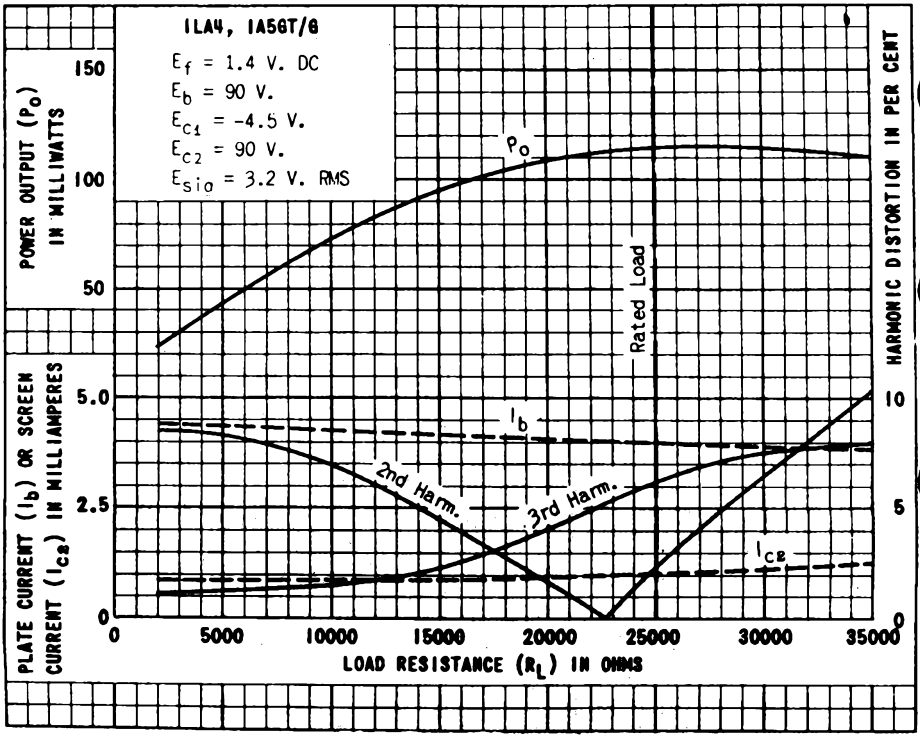
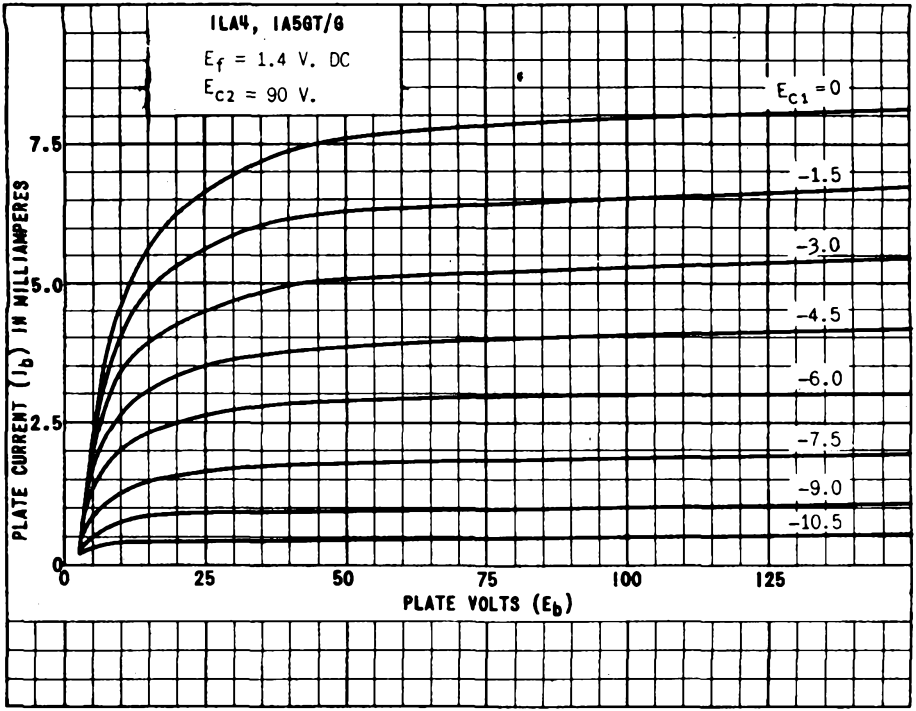
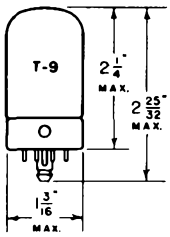


PLATE 1532
JAN. 15 1945

ILA4 (1A5GT/G)


ILA4, 1A5GT/G
E_f = 1.4 V. DC
E_{c2} = 90 V.
E_{c1} = 0
-1.5
-3.0
-4.5
-6.0
-7.5
-9.0
-10.5
PLATE CURRENT (I_b) IN MILLIAMPERES
7.5
5.0
2.5
0
0
25
50
75
100
125
PLATE VOLTS (E_b)

TUNG-SOL

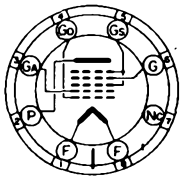


PENTAGRID CONVERTER

COATED FILAMENT

1.4 VOLTS 0.05 AMPERE
DC

GLASS BULB



7AK

BOTTOM VIEW

LOCKING-IN 8 PIN BASE

THE TUNG-SOL 1LA6 IS A LOW VOLTAGE, LOW CURRENT DRAIN, BATTERY TYPE PENTAGRID CONVERTER. IT IS DESIGNED FOR SERVICE AS AN OSCILLATOR AND MIXER IN SUPERHETERODYNE RECEIVERS WHICH REQUIRE ONLY 90 VOLTS OF "B" BATTERY AND A SINGLE DRY CELL "A" BATTERY. ITS ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 1A7G.

RATINGS

MAXIMUM FILAMENT VOLTAGE		
DRY BATTERY OPERATION — VOLTAGE MUST NEVER EXCEED	1.6	VOLTS
AC — DC POWER LINE OPERATION — DESIGN CENTER	1.3	VOLTS
MAXIMUM PLATE (P) VOLTAGE	90	VOLTS
MAXIMUM SCREEN (G_S) SUPPLY VOLTAGE	90	VOLTS
MAXIMUM SCREEN VOLTAGE[A]	55	VOLTS
MAXIMUM OSCILLATOR ANODE (G_A) VOLTAGE	90	VOLTS
MAXIMUM TOTAL CATHODE CURRENT-ZERO SIGNAL	3	MA.

[A] OBTAINED BY USING A PROPERLY BY-PASSED VOLTAGE DROPPING RESISTOR OF 45000 TO 75000 OHMS IN SERIES WITH A "B" SUPPLY VOLTAGE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1102-2
SEPT. 17 1941

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

PLATE (P) VOLTAGE	90	VOLTS
SCREEN (G_5) VOLTAGE [A]	45	VOLTS
CONTROL GRID (G) VOLTAGE [B]	0	VOLTS
OSCILLATOR ANODE (G_A) VOLTAGE	90	VOLTS
OSCILLATOR GRID (G_0) RESISTOR	200 000	OHMS
PLATE CURRENT	0.55	MA.
SCREEN CURRENT	0.6	MA.
OSCILLATOR ANODE CURRENT	1.2	MA.
OSCILLATOR GRID CURRENT	0.035	MA.
TOTAL CATHODE CURRENT	2.4	MA.
PLATE RESISTANCE	0.75	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = 0 V.	250	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID VOLTAGE = -3 V.	10	μMHOS

DIRECT INTERELECTRODE CAPACITANCES [S]

CONTROL GRID (G) TO MIXER PLATE (P)	0.4	μμf
CONTROL GRID (G) TO OSCILLATOR ANODE (G_A)	0.3	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (G_0)	0.15	μμf
OSCILLATOR GRID (G_0) TO OSCILLATOR ANODE (G_A)	0.6	μμf
RF INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES	7.7	μμf
OSCILLATOR INPUT: OSCILLATOR GRID (G_0) TO ALL OTHER ELECTRODES EXCEPT OSCILLATOR ANODE (G_A)	2.9	μμf
OSCILLATOR OUTPUT: OSCILLATOR ANODE (G_A) TO ALL OTHER ELECTRODES EXCEPT OSCILLATOR GRID (G_0)	3.3	μμf
MIXER OUTPUT: MIXER PLATE (P) TO ALL OTHER ELECTRODES	8.0	μμf

[A] OBTAINED PREFERABLY BY USING A PROPERLY BY-PASSED VOLTAGE DROPPING RESISTOR OF 45000 TO 75000 OHMS IN SERIES WITH A "B" SUPPLY VOLTAGE.

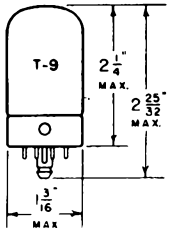
[B] A RESISTANCE OF AT LEAST 1 MEGOHM SHOULD BE IN GRID RETURN TO NEGATIVE FILAMENT TERMINAL (PIN 8).

[S] WITH EXTERNAL SHIELD CONNECTED TO NEGATIVE FILAMENT TERMINAL.

NOTE: THE TRANSCONDUCTANCE OF THE OSCILLATOR SECTION (NOT OSCILLATING) IS APPROXIMATELY 550 μMHOS, THE AMPLIFICATION FACTOR IS 40, AND THE OSCILLATOR ANODE CURRENT IS 2.2 MA. CONDITIONS: PLATE VOLTAGE = 90 VOLTS, OSCILLATOR ANODE VOLTAGE = 90 VOLTS, SCREEN VOLTAGE = 45 VOLTS, AND THE GRID VOLTAGE = 0 VOLTS.

PLATE 1103-1

TUNG-SOL



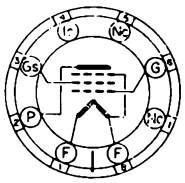
PENTODE POWER AMPLIFIER

COATED FILAMENT

1.4 VOLTS 0.05 AMPERE
DC

GLASS BULB

LOCKING-IN 8 PIN BASE



5ADα

BOTTOM VIEW

NOTE. Ic DENOTES INTERNAL CONNECTION.

THE TUNG-SOL 1LB4 IS A LOW VOLTAGE, LOW CURRENT DRAIN, BATTERY TYPE POWER PENTODE. IT IS DESIGNED FOR SERVICE WITH 90 VOLTS OF "B" BATTERY AND A SINGLE DRY CELL "A" BATTERY. ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF THE PENTODE SECTION OF THE 1D8GT.

RATINGS

MAXIMUM FILAMENT VOLTAGE:		
DRY BATTERY OPERATION — VOLTAGE MUST NEVER EXCEED	1.6	VOLTS
AC-DC POWER LINE OPERATION — DESIGN CENTER	1.3	VOLTS
MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	VOLTS
MAXIMUM CATHODE CURRENT — ZERO SIGNAL	6	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	45	62.5	67.5	90	VOLTS
SCREEN VOLTAGE	45	62.5	67.5	90	VOLTS
CONTROL GRID VOLTAGE [A]	-4.5	-5.0	-6.0	-9.0	VOLTS
PEAK AF SIGNAL VOLTAGE	4.5	5.0	6.0	9.0	VOLTS
PLATE CURRENT	1.6	3.6	3.8	5.0	MA.
SCREEN CURRENT	0.3	0.8	0.8	1.0	MA.
PLATE RESISTANCE APPROX.	0.3	0.2	0.2	0.2	MEGOHM
TRANSCONDUCTANCE	650	875	875	925	μMHOS
LOAD RESISTANCE	20000	16000	16000	12000	OHMS
TOTAL HARMONIC DISTORTION	10	10	10	10	PER CENT
POWER OUTPUT	35	90	100	200	MILLIWATTS

[A] RETURN TO NEGATIVE FILAMENT (PIN #8)

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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PLATE 989-1

JAN. 31 1941

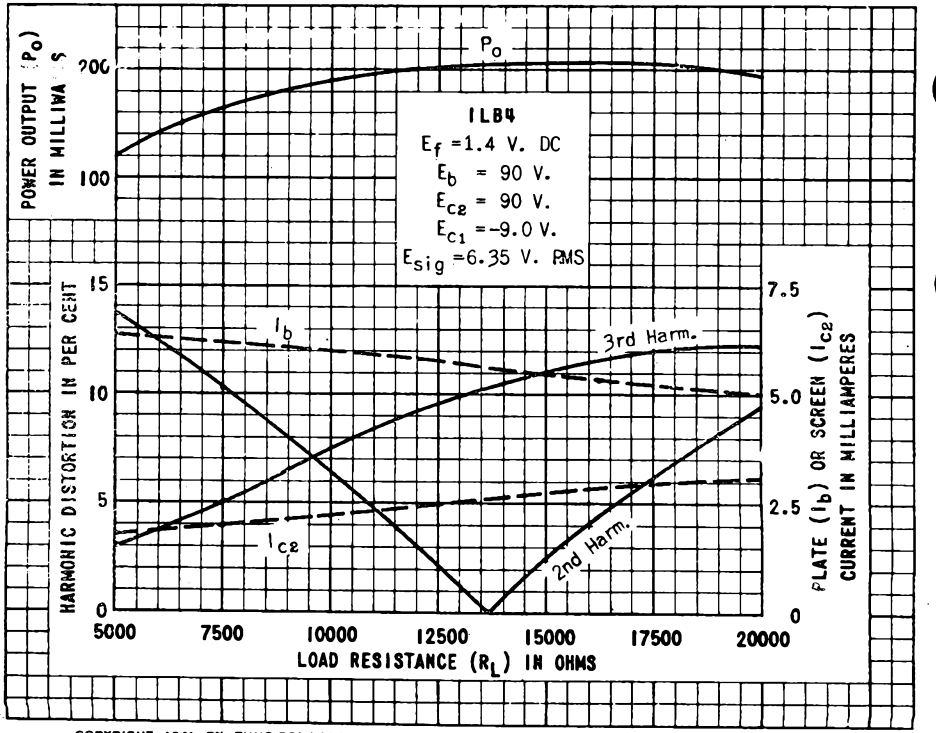
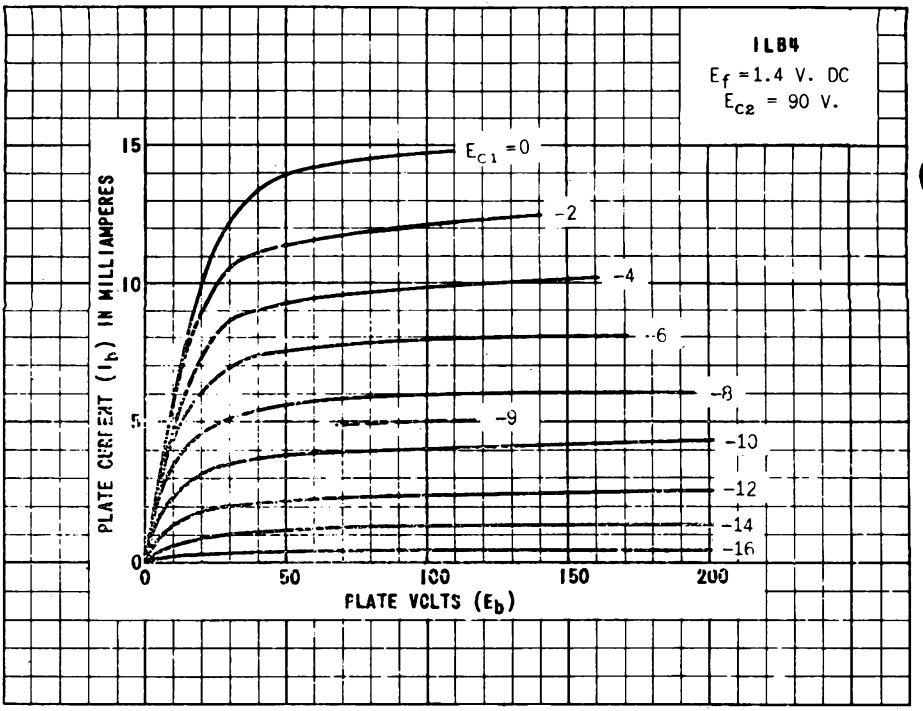
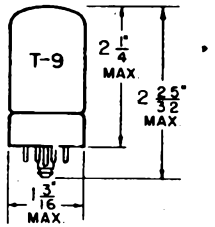


PLATE 990-1

1LB4


1LB4
E_f = 1.4 V. DC
E_{c2} = 90 V.
E_{c1} = 0
-2
-4
-6
-8
-9
-10
-12
-14
-16
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
5
10
15
0
50
100
150
200

TUNG-SOL



PENTAGRID CONVERTER

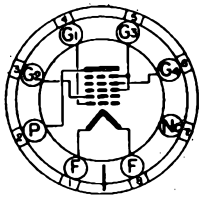
COATED FILAMENT

1.4 VOLTS 0.050 AMPERE

DC

GLASS BULB

ANY MOUNTING POSITION



BOTTOM VIEW

LOCKING-IN
8-PIN BASE

THE 1LC6 IS A PENTAGRID CONVERTER, DESIGNED FOR SERVICE AS AN OSCILLATOR AND MIXER IN SUPERHETERODYNE RECEIVERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	90	VOLTS
MAXIMUM SCREEN (G3 AND G5) VOLTAGE	35	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	90	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	3.0	MA.
MAXIMUM ANODE GRID (G2) VOLTAGE	45	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD CONNECTED TO NEGATIVE FILAMENT (PIN 8)

SIGNAL GRID (G4) TO MIXER PLATE (P)	0.28	μμf
SIGNAL GRID (G4) TO OSC. PLATE (G2)	0.38	μμf
SIGNAL GRID (G4) TO OSC. GRID (G1)	0.11	μμf
OSC. GRID (G1) TO OSC. PLATE (G2)	0.6	μμf
SIGNAL INPUT: G4 TO ALL OTHER ELECTRODES	9.0	μμf
OSC. INPUT: G1 TO ALL OTHER ELECTRODES EXCEPT G2	2.4	μμf
OSC. OUTPUT: G2 TO ALL OTHER ELECTRODES EXCEPT G1	4.8	μμf
MIXER OUTPUT: P TO ALL OTHER ELECTRODES	5.5	μμf

CONTINUED ON NEXT PAGE

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PLATE 1533

JAN. 15 1945

CONTINUED FROM PRECEDING PAGE:

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

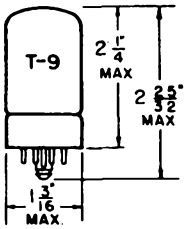
CONVERTER SERVICE

PLATE VOLTAGE	45	90	VOLTS
SCREEN (G3 AND G5) VOLTAGE	35	35	VOLTS
CONTROL GRID (G4) VOLTAGE [A]	0	0	VOLTS
ANODE GRID (G2) VOLTAGE	45	45	VOLTS
PLATE CURRENT	0.7	0.75	MA.
SCREEN CURRENT	0.75	0.7	MA.
ANODE GRID CURRENT	1.4	1.4	MA.
OSC. GRID CURRENT	0.035	0.035	MA.
TOTAL CATHODE CURRENT	2.9	2.9	MA.
OSC. GRID (G1) RESISTOR	0.2	0.2	MEGOHM
CONVERSION TRANSCONDUCTANCE AT EC4 = 0	250	275	μMHOS
CONVERSION TRANSCONDUCTANCE AT EC4 = -2	50	50	μMHOS
CONVERSION TRANSCONDUCTANCE AT EC4 = -3	5.0	5.0	μMHOS
PLATE RESISTANCE	0.3	0.65	MEGOHM

[A] UNDER MAXIMUM RATED CONDITIONS THERE SHOULD BE A RESISTANCE OF AT LEAST 1.0 MEGOHM IN THE RETURN TO THE NEGATIVE FILAMENT PIN.

PLATE 1534
JAN. 15 1945

TUNG-SOL

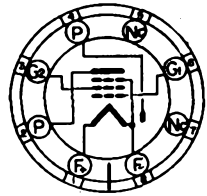


DIODE-AUDIO PENTODE

COATED FILAMENT
1.4 VOLTS 0.050 AMPERE

GLASS BULB

ANY MOUNTING POSITION



BOTTOM VIEW

LOCKING-IN
8-PIN BASE

THE 1LD5 IS A DIODE-AUDIO PENTODE DESIGNED ESPECIALLY FOR SERVICE AS A COMBINED DIODE DETECTOR AND PENTODE AUDIO AMPLIFIER. THE DIODE PLATE IS LOCATED AT THE NEGATIVE END OF THE FILAMENT.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	90	VOLTS
MAXIMUM SCREEN VOLTAGE	45	VOLTS
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED	0.5	MA.

DIRECT INTERELECTRODE CAPACITANCES

WITH SHIELD CONNECTED TO NEGATIVE FILAMENT

GRID (G1) TO PLATE	0.18 MAX.	μμf
INPUT: G1 TO (F+G2+G3)	3.2	μμf
OUTPUT: PLATE TO (F+G2+G3)	6.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PLATE VOLTAGE	45	90	VOLTS
SCREEN VOLTAGE	45	45	VOLTS
GRID VOLTAGE	0	0	VOLTS
PLATE CURRENT	0.55	0.6	MA.
SCREEN CURRENT	0.12	0.1	MA.
PLATE RESISTANCE	0.9	0.75	MEGOHM
TRANSCONDUCTANCE	550	575	μMHOS

CONTINUED ON NEXT PAGE

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PLATE
1535
JAN. 15
1945

CONTINUED FROM PRECEDING PAGE

AS RESISTANCE COUPLED AMPLIFIER

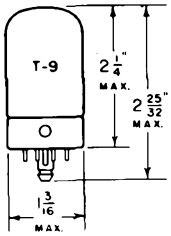
PLATE SUPPLY VOLTAGE [A]	40.5	81	VOLTS
SCREEN SUPPLY VOLTAGE [A]	40.5	81	VOLTS
GRID VOLTAGE	0	0	VOLTS
LOAD RESISTOR	1.0	1.0	MEGOHM
SERIES SCREEN RESISTOR	5.0	7.0	MEGOHMS
SCREEN BY-PASS CONDENSER	0.1	0.1	µf
GRID RESISTOR	5.0	5.0	MEGOHMS
VOLTAGE GAIN (APPROX.)	70	120	

[A] "B" SUPPLY VOLTAGE MINUS POWER OUTPUT TUBE BIAS

PLATE 1536
JAN. 15 1945

TUNG-SOL

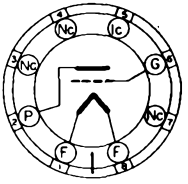
TRIODE AMPLIFIER



COATED FILAMENT

1.4 VOLTS 0.05 AMPERE
DC

GLASS BUB



4AA-L-O

LOCKING IN 8 PIN BASE

THE TUNG-SOL 1LE3 IS A LOW VOLTAGE, LOW CURRENT DRAIN, BATTERY TYPE TRIODE. IT IS DESIGNED FOR SERVICE AS AN OSCILLATOR, DETECTOR OR AMPLIFIER IN RECEIVERS USING 90 VOLTS OF "B" BATTERY AND A SINGLE DRY CELL "A" BATTERY.

RATINGS

MAXIMUM FILAMENT VOLTAGE		
DRY BATTERY OPERATION—VOLTAGE MUST NEVER EXCEED	1.6	VOLTS
AC – DC POWER LINE OPERATION – DESIGN CENTER	1.3	VOLTS
MAXIMUM PLATE VOLTAGE	110	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	90	90	VOLTS
CONTROL GRID VOLTAGE[A]	0	−3	VOLTS
PLATE CURRENT	4.5	1.4	MA.
PLATE RESISTANCE	11 200	19 000	OHMS
TRANSCONDUCTANCE	1300	760	μMHOS
AMPLIFICATION FACTOR	14.5	14.5	

DIRECT INTERELECTRODE CAPACITANCES[S]

INPUT: GRID TO FILAMENT	1.7	μμf
OUTPUT: PLATE TO FILAMENT	3.0	μμf
GRID TO PLATE	1.7	μμf

[A] RETURN TO NEGATIVE FILAMENT TERMINAL (PIN #8).

[S] WITH EXTERNAL SHIELD CONNECTED TO NEGATIVE FILAMENT TERMINAL (PIN #8).

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PLATE 1172-1

FEB. 28 1942

TUNG-SOL

PENTODE VOLTAGE AMPLIFIER

PHYSICAL SPECIFICATIONS

EMITTER COATED FILAMENT		PIN CONNECTIONS	
BASE LOCK-IN 8 PIN		PIN 1 FILAMENT +	PIN 7 Nc
CAP	---	PIN 2 PLATE	PIN 8 FILAMENT-, S_1
BULB	T-9	PIN 3 GRID 2	
MAX. DIAMETER	1 3/16"	PIN 4 GRID 3	MOUNTING POS. ANY
MAX. SEATED HEIGHT	2 1/4"	PIN 5 Ic	
MAX. OVERALL LENGTH	2 25/32"	PIN 6 GRID 1	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM FILAMENT VOLTAGE (DC)		
BATTERY OPERATION (MAX. ALLOWED)	1.6	VOLTS
AC/DC POWER LINE OPERATION	1.3	VOLTS
MAXIMUM PLATE VOLTAGE (DC)	110	VOLTS
MAXIMUM SCREEN VOLTAGE (DC)	110	VOLTS

CAPACITANCES

WITH RMA SHIELD M8-308 CONNECTED TO FILAMENT

CONTROL GRID TO PLATE (MAX.)	0.007	μμf
INPUT	3.2	μμf
OUTPUT	7.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

FILAMENT VOLTAGE (DC)	1.4	VOLTS
FILAMENT CURRENT	0.05	AMP.
PLATE VOLTAGE (DC)	90	VOLTS
SCREEN VOLTAGE (DC)	45	VOLTS
CONTROL GRID VOLTAGE (DC)	0	VOLTS
CONTROL GRID RESISTOR	2.0	MEGOHMS
PLATE CURRENT (DC)	1.7	MA.
SCREEN CURRENT (DC)	0.4	MA.
TRANSCONDUCTANCE	800	μMHOS
PLATE RESISTANCE (APPROX.)	1.0	MEGOHM
CONTROL GRID VOLTAGE FOR S_M = 10 μMHOS	-10.0	VOLTS
SUPPRESSOR GRID	CONNECTED TO FILAMENT- AT SOCKET	

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PLATE 1697
APRIL 15 1946

ILG5

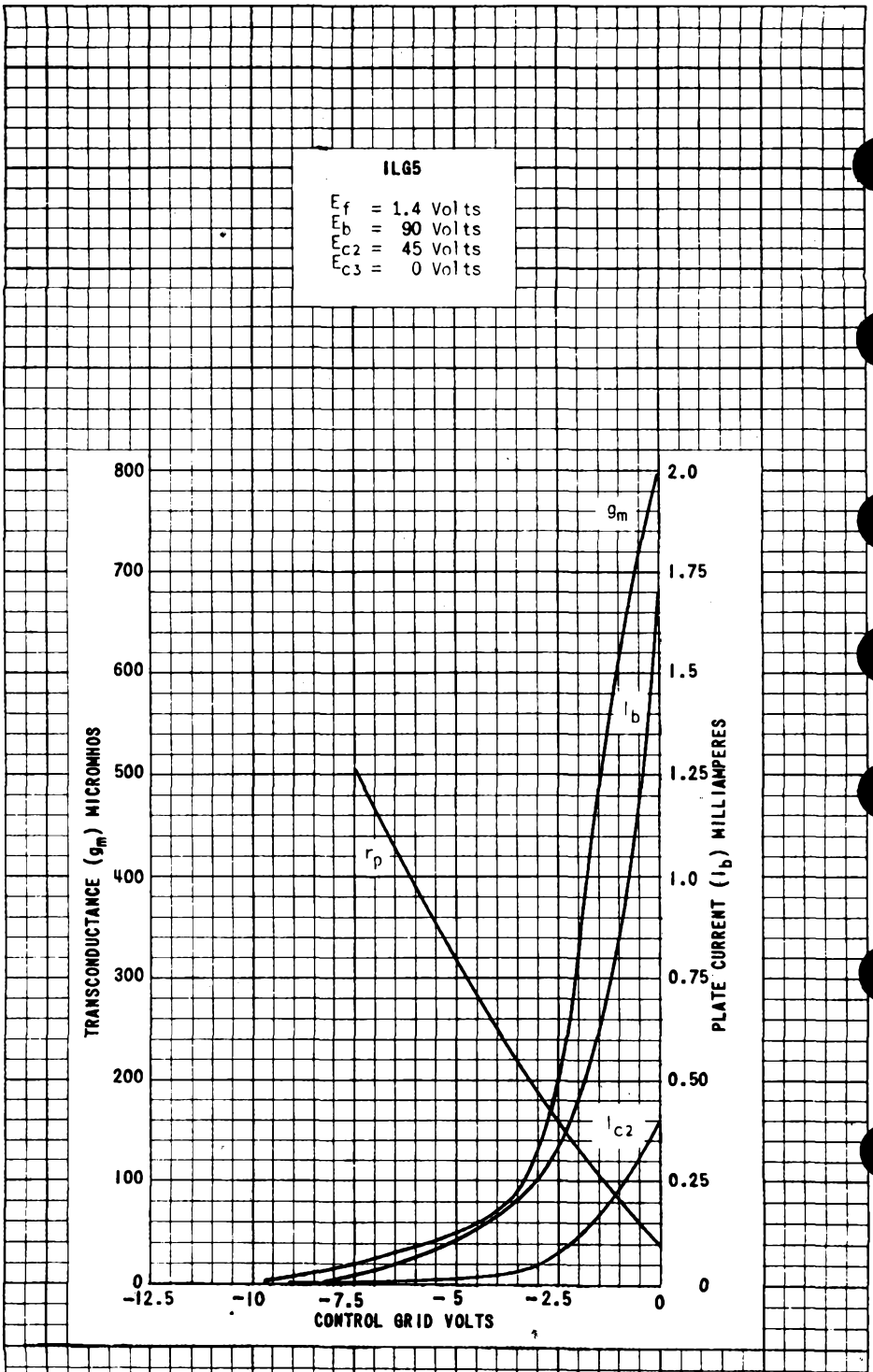

PLATE
1698
APRIL
1946

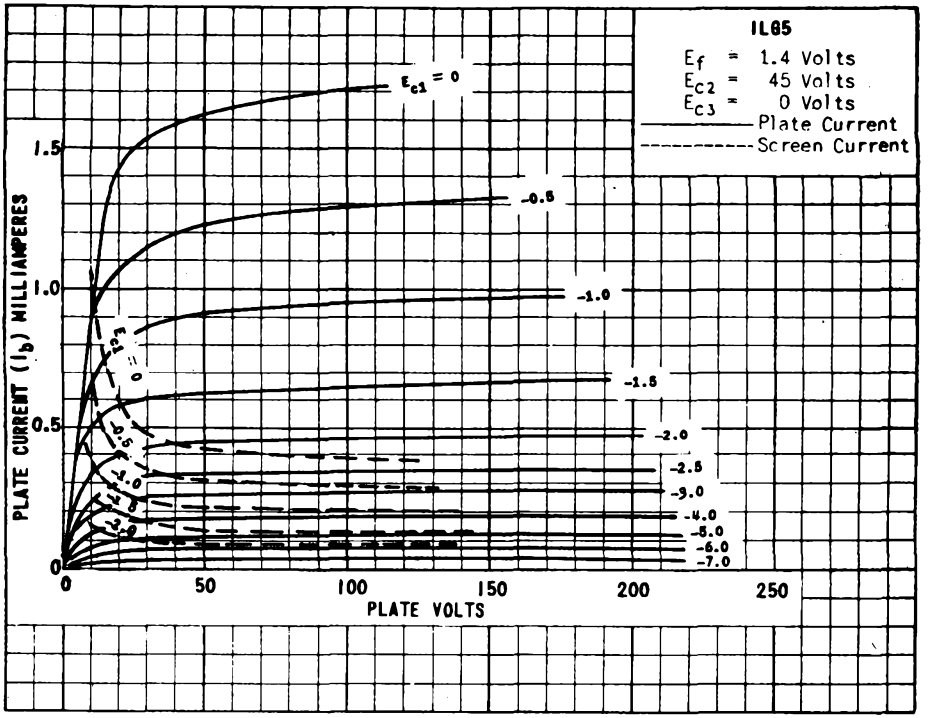

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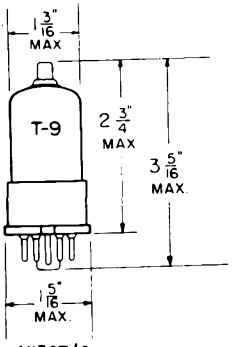
PLATE
1699
APRIL 15
1946

TUNG-SOL



DIODE TRIODE AMPLIFIER

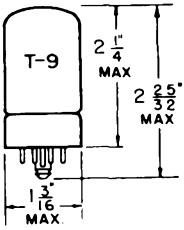
COATED FILAMENT

1.4 VOLTS 0.05 AMPERE

DC

GLASS BULB

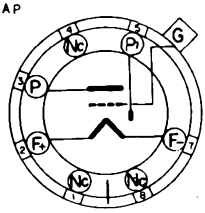
ANY MOUNTING POSITION



1H5GT/G

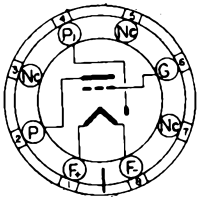
SKIRTED
MINIATURE CAP

1LH4



BOTTOM VIEW

7-PIN OCTAL BASE
WITH METAL SHELL



BOTTOM VIEW

LOCKING-IN
8-PIN

THE 1H5GT/G AND 1LH4 ARE TUBES COMBINING A SINGLE DIODE AND A HIGH-MU TRIODE IN ONE BULB. THEY ARE DESIGNED FOR SERVICE AS DIODE DETECTORS, AVC RECTIFIERS, AND AS RESISTANCE COUPLED AMPLIFIERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	110	VOLTS
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED	0.5	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

TRIODE UNIT

PLATE VOLTAGE	90	VOLTS
CONTROL GRID VOLTAGE [A]	0	VOLTS
PLATE CURRENT	0.15	MA.
PLATE RESISTANCE	0.24	MEGOHM
TRANSCONDUCTANCE	275	μMHOS
AMPLIFICATION FACTOR	65	

[A] REFERRED TO NEGATIVE FILAMENT TERMINAL

DIODE UNIT

THE DIODE IS LOCATED AT THE NEGATIVE END OF THE FILAMENT AND IS INDEPENDENT OF THE TRIODE UNIT EXCEPT FOR THE COMMON FILAMENT.

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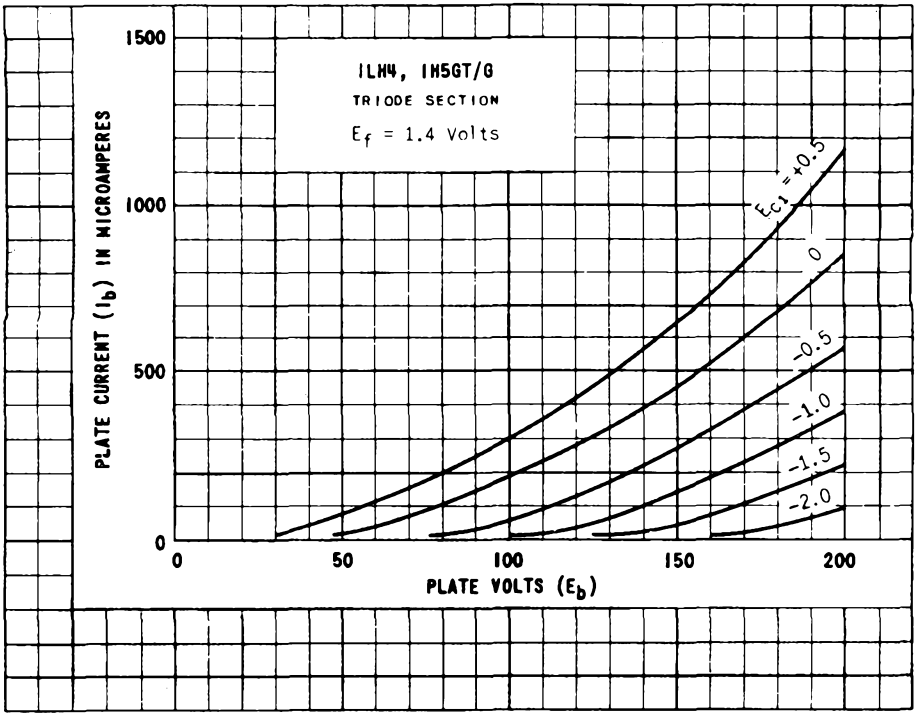
PLATE 1537
JAN. 15 1945

1LH4 (1H5GT/G)



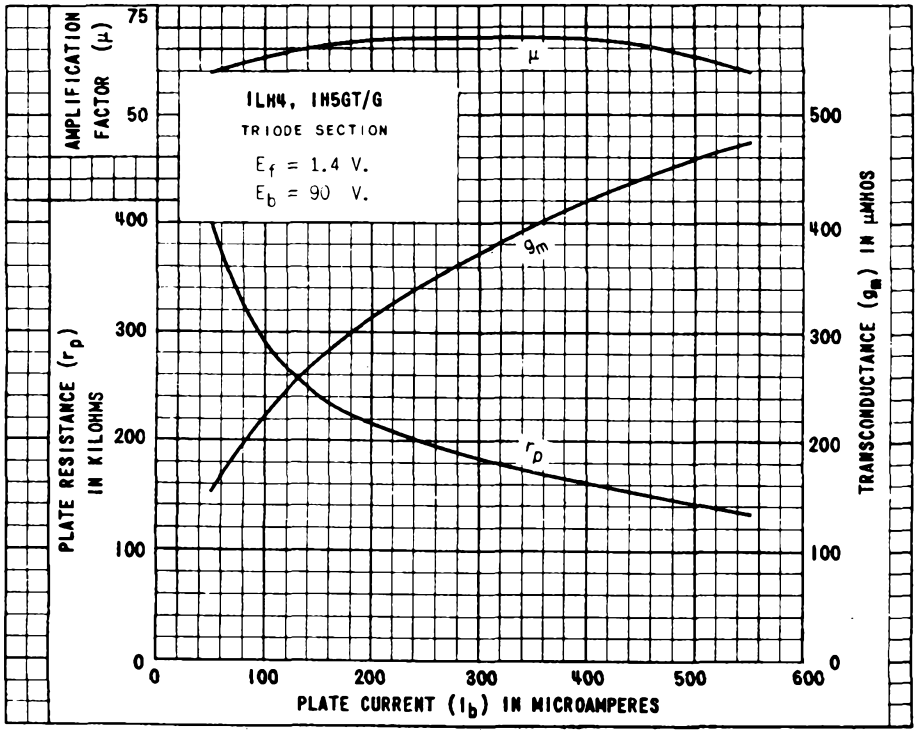
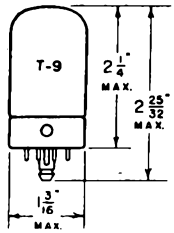


PLATE 1538
JAN. 15 1945

TUNG-SOL

PENTODE AMPLIFIER

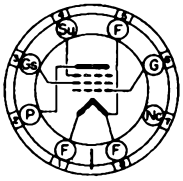


COATED FILAMENT

1.4 VOLTS 0.05 AMPERE
DC

GLASS BULB

LOCKING-IN 8 PIN BASE



7AO
BOTTOM VIEW

THE TUNG-SOL 1LN5 IS A LOW VOLTAGE, LOW CURRENT DRAIN BATTERY TYPE RF PENTODE. IT IS DESIGNED FOR SERVICE WITH 90 VOLTS OF "B" BATTERY AND A SINGLE DRY CELL "A" BATTERY. ITS ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 1N5G AND 1N5GT.

RATINGS

MAXIMUM FILAMENT VOLTAGE		
DRY BATTERY OPERATION—VOLTAGE MUST NEVER EXCEED	1.6	VOLTS
AC—DC POWER LINE OPERATION—DESIGN CENTER	1.3	VOLTS
MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	90	VOLTS
SCREEN VOLTAGE	90	VOLTS
CONTROL GRID VOLTAGE [A]	0	VOLTS
SUPPRESSOR GRID VOLTAGE	0	VOLTS
PLATE CURRENT	1.6	MA.
SCREEN CURRENT	0.35	MA.
PLATE RESISTANCE APPROX.	1.1	MEGOHM
TRANSCONDUCTANCE	800	μMHOS
CONTROL GRID VOLTAGE APPROX. FOR TRANSCONDUCTANCE = 10 μMHOS	-4.5	VOLTS

[A] RETURN TO NEGATIVE FILAMENT (PIN #5 AND #8).

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1038-2

JUNE 6 1941

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES[5]

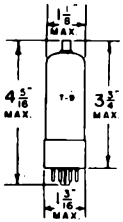
CONTROL GRID TO FILAMENT	3.4	μμf
PLATE TO FILAMENT	8.0	μμf
CONTROL GRID TO PLATE	0.007 MAX.	μμf

[5] WITH EXTERNAL SHIELD CONNECTED TO NEGATIVE FILAMENT (PIN 05 AND 08).

PLATE
1039-1

TUNG-SOL

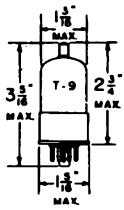
PENTODE AMPLIFIER



COATED FILAMENT

1.4 VOLTS 0.05 AMPERE
DC

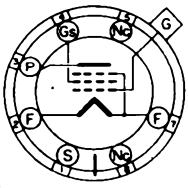
GLASS BULBS



SMALL 7 PIN OCTAL BASE
1N5G

G-5Y

BOTTOM VIEWS



5Y

7 PIN OCTAL BASE WITH METAL SHELL
1N5GT

THE TUNG-SOL 1N5G AND 1N5GT ARE LOW VOLTAGE, LOW CURRENT DRAIN BATTERY TYPE RF PENTODES. THEY ARE DESIGNED FOR SERVICE WITH 90 VOLTS OF "B" BATTERY AND A SINGLE DRY CELL "A" BATTERY. THEIR ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 1LN5.

RATINGS

MAXIMUM FILAMENT VOLTAGE		
DRY BATTERY OPERATION — VOLTAGE MUST NEVER EXCEED	1.6	VOLTS
AC — DC POWER LINE OPERATION — DESIGN CENTER	1.3	VOLTS
MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	VOLTS

DIRECT INTERELECTRODE CAPACITANCES[5]

CONTROL GRID TO FILAMENT	3.0	μμf
PLATE TO FILAMENT	10	μμf
CONTROL GRID TO PLATE	.007 MAX.	μμf

[5] WITH EXTERNAL SHIELD CONNECTED TO NEGATIVE FILAMENT (PIN #7).

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1073-3

JULY 28 1941

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	90	VOLTS
SCREEN VOLTAGE	90	VOLTS
CONTROL GRID VOLTAGE [A]	0	VOLTS
PLATE CURRENT	1.2	MA.
SCREEN CURRENT	0.3	MA.
PLATE RESISTANCE APPROX.	1.5	MEGOHM
TRANSCONDUCTANCE	750	μMHOS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 50 μMHOS	-3.2	VOLTS
CONTROL GRID VOLTAGE APPROX. FOR TRANSCONDUCTANCE = 5 μMHOS	-4.0	VOLTS

[A] RETURN TO NEGATIVE FILAMENT.

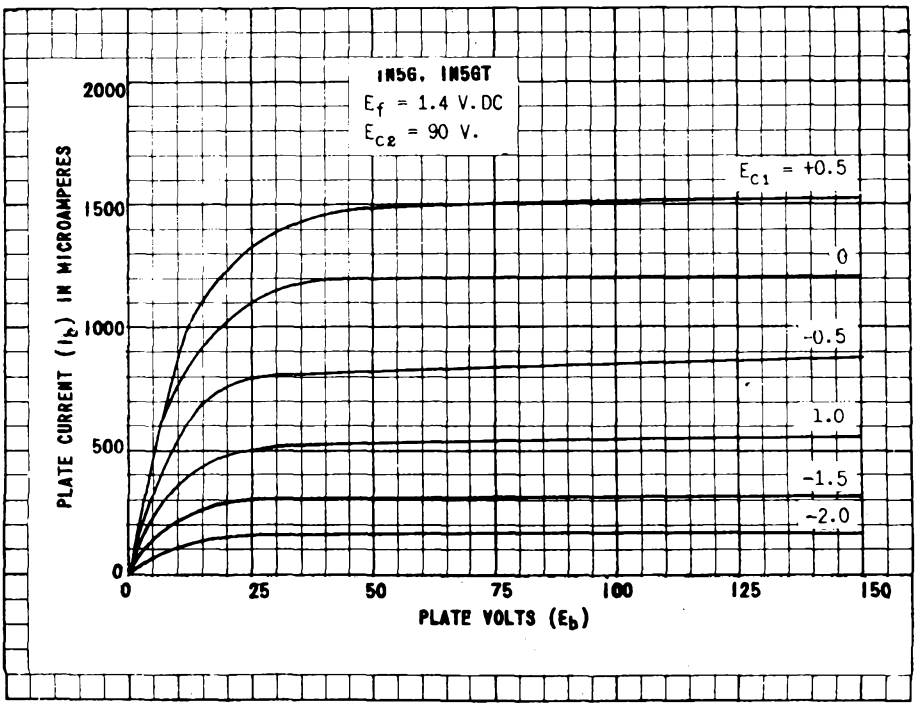
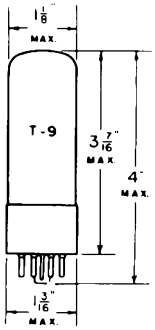


PLATE 1074-1

TUNG-SOL



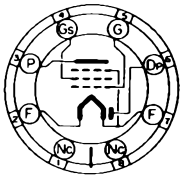
DIODE-POWER PENTODE AMPLIFIER

COATED FILAMENT

1.4 VOLTS 0.05 AMPERE
DC

GLASS BULB

SMALL 8 PIN OCTAL BASE



G-7AM

BOTTOM VIEW

THE TUNG-SOL 1N6G IS A LOW VOLTAGE, LOW CURRENT DRAIN BATTERY TYPE POWER PENTODE WITH A SINGLE DIODE SECTION. IT IS DESIGNED FOR SERVICE WITH 90 VOLTS OF "B" BATTERY AND A SINGLE DRY CELL "A" BATTERY.

RATINGS

MAXIMUM FILAMENT VOLTAGE		
DRY BATTERY OPERATION—VOLTAGE MUST NEVER EXCEED	1.6	VOLTS
AC-DC POWER LINE OPERATION—DESIGN CENTER	1.3	VOLTS
MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	VOLTS
MAXIMUM TOTAL CATHODE CURRENT OF THE PENTODE SECTION		
ZERO-SIGNAL	6	MA.
MINIMUM DIODE CURRENT[A]	0.5	MA.
WITH 10 VOLTS DC APPLIED		

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	90	VOLTS
SCREEN VOLTAGE	90	VOLTS
CONTROL GRID VOLTAGE[B]	-4.5	VOLTS
PEAK AF SIGNAL VOLTAGE	4.9	VOLTS
ZERO-SIGNAL PLATE CURRENT	3.4	MA.
ZERO-SIGNAL SCREEN CURRENT	0.7	MA.
MAXIMUM-SIGNAL PLATE CURRENT	3.4	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	1.2	MA.
PLATE RESISTANCE APPROX.	0.3	MEGOHM
TRANSCONDUCTANCE	800	μMHOS
LOAD RESISTANCE	25 000	OHMS
TOTAL HARMONIC DISTORTION	7	PER CENT
POWER OUTPUT — AT PEAK SIGNAL	100	MILLIWATTS

[A] DIODE PLATE LOCATED AT THE NEGATIVE END OF THE FILAMENT (PIN #7).

[B] RETURN TO NEGATIVE FILAMENT (PIN #7).

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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PLATE 1012-2

APR. 21 1941

TUNG-SOL

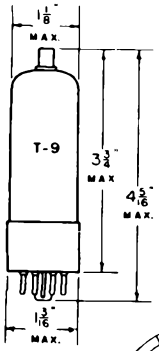
PENTODE AMPLIFIER

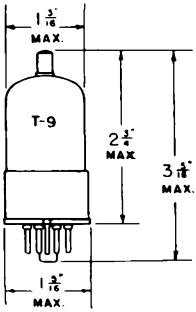
COATED FILAMENT

1.4 VOLTS 0.05 AMPERE

DC

GLASS BULB





G-5Y

5Y

BOTTOM VIEWS

THE TUNG-SOL 1P5G AND 1P5GT ARE LOW VOLTAGE, LOW CURRENT DRAIN BATTERY TYPE RF PENTODES. WITH THE EXCEPTION OF CAPACITANCES, THEIR ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM FILAMENT VOLTAGE		
DRY BATTERY OPERATION — VOLTAGE MUST NEVER EXCEED	1.6	VOLTS
AC/DC POWER LINE OPERATION — DESIGN CENTER	1.3	VOLTS
MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	VOLTS

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID TO FILAMENT	1P5G — 2.2 μμf	1P5GT — 3 μμf
PLATE TO FILAMENT	10	μμf
CONTROL GRID TO PLATE	.007	μμf

[S] WITH EXTERNAL SHIELD CONNECTED TO NEGATIVE FILAMENT (PIN #7).

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

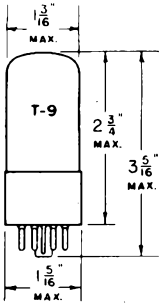
PLATE VOLTAGE	90	VOLTS
SCREEN VOLTAGE	90	VOLTS
CONTROL GRID VOLTAGE	RETURN TO NEGATIVE FILAMENT	
PLATE CURRENT	2.3	MA.
SCREEN CURRENT	0.7	MA.
PLATE RESISTANCE APPROX.	0.8	MEGOHM
TRANSCONDUCTANCE	750	μMHOS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE OF 10 μMHOS	- 12	VOLTS

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

PLATE 1013-2

APR. 21 1941

TUNG-SOL



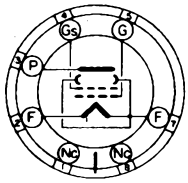
BEAM POWER AMPLIFIER

COATED FILAMENT

1.4 VOLTS 0.10 AMPERE
DC

GLASS BULB

INTERMEDIATE 7 PIN OCTAL BASE



6AF

BOTTOM VIEW

THE TUNG-SOL 1Q5GT/G IS A LOW VOLTAGE, LOW CURRENT DRAIN BATTERY TYPE BEAM POWER OUTPUT TUBE. IT IS DESIGNED FOR SERVICE WITH 90 VOLTS OF "B" BATTERY AND A SINGLE DRY CELL "A" BATTERY.

RATINGS

MAXIMUM FILAMENT VOLTAGE		
DRY BATTERY OPERATION—VOLTAGE MUST NEVER EXCEED	1.6	VOLTS
AC—DC POWER LINE OPERATION—DESIGN CENTER	1.3	VOLTS
MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	VOLTS
MAXIMUM CATHODE CURRENT (ZERO-SIGNAL)	12	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

FILAMENT VOLTAGE	1.4 DC	1.4 DC	VOLTS
FILAMENT CURRENT	0.10	0.10	AMPERE
PLATE VOLTAGE	85	90	VOLTS
SCREEN VOLTAGE	85	90	VOLTS
CONTROL GRID VOLTAGE[A]	-5	-4.5	VOLTS
PEAK AF SIGNAL VOLTAGE	5	4.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	7	9.5	MA.
ZERO-SIGNAL SCREEN CURRENT (NOMINAL)	0.8	1.3	MA.
TRANSCONDUCTANCE	1950	2200	μMHOS
LOAD RESISTANCE	9000	8000	OHMS
TOTAL HARMONIC DISTORTION	5.5	6.0	PER CENT
POWER OUTPUT	250	270	MILLIWATTS

[A] GRID RETURN SHOULD BE MADE TO NEGATIVE SIDE OF FILAMENT, PIN #7.

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PLATE 1075-3

JULY 28 1941

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

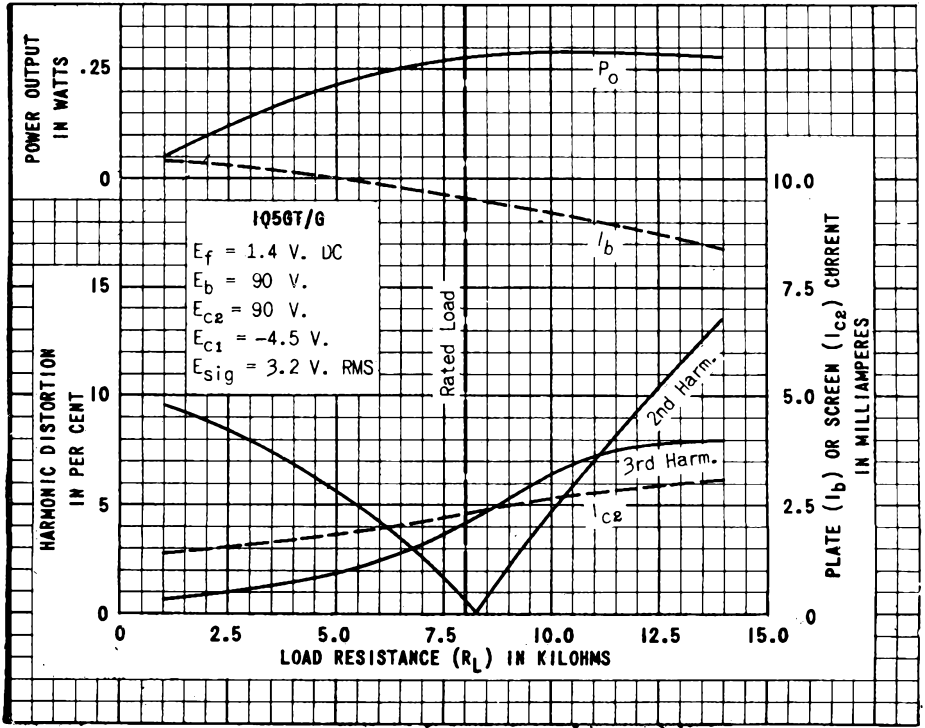
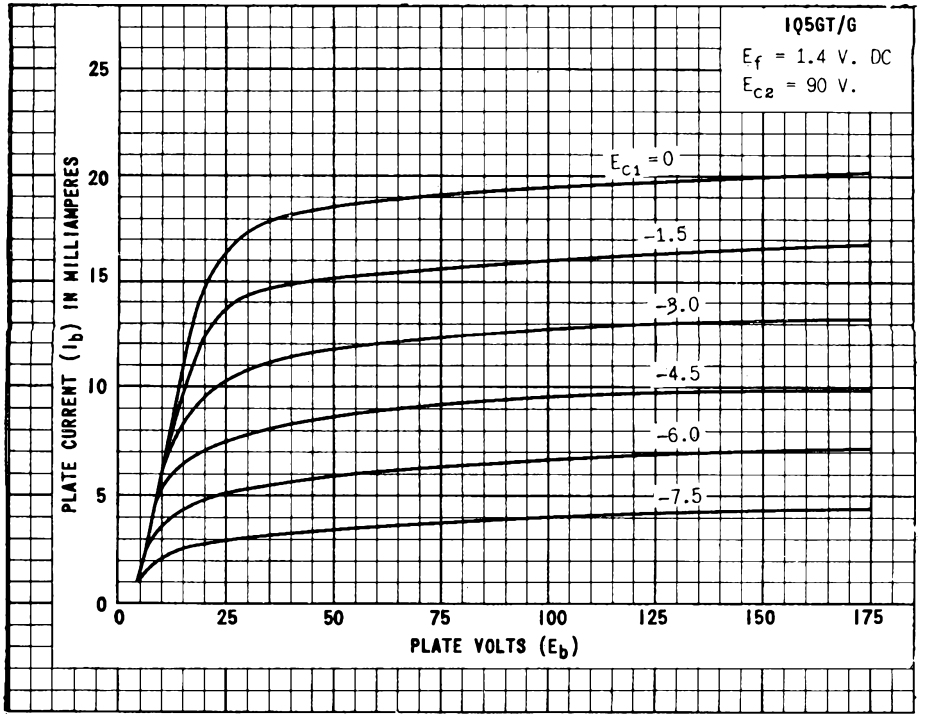


PLATE 1076-2

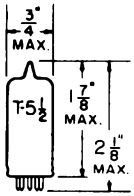
1Q5GT/G


1Q5GT/G
E_f = 1.4 V. DC
E_{c2} = 90 V.
E_{c1} = 0
-1.5
-3.0
-4.5
-6.0
-7.5
PLATE CURRENT (I_b) IN MILLIAMPERES
0
5
10
15
20
25
0
25
50
75
100
125
150
175
PLATE VOLTS (E_b)

TUNG-SOL

PENTAGRID CONVERTER

MINIATURE TYPE

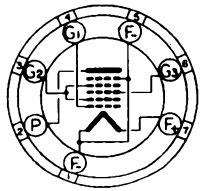


GLASS BULB

COATED FILAMENT

FILAMENT
1.4 VOLTS 0.05 AMPERE
DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 1R5 IS A PENTAGRID CONVERTER DESIGNED FOR SERVICE AS COMBINED OSCILLATOR AND MIXER IN COMPACT, LIGHT-WEIGHT, PORTABLE BATTERY OPERATED EQUIPMENT. IT FEATURES A HIGH EFFICIENCY FILAMENT, ADAPTIBILITY TO AVC AND PROVIDES REASONABLE CONVERSION GAIN WITH LOW BATTERY VOLTAGES AND LOW ELECTRODE CURRENTS. IT IS RECOMMENDED THAT NO MATERIAL BE PERMITTED TO OBSTRUCT THE HOLE IN THE BASE SOCKET AS THIS TYPE MAY BE MANUFACTURED WITH THE EXHAUST-TUBE TIP AT THE BASE END.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	1.4	VOLTS
FILAMENT CURRENT	0.05	AMP.
MAXIMUM PLATE VOLTAGE	90	VOLTS
MAXIMUM SCREEN (G_2 AND G_4) VOLTAGE	67.5	VOLTS
MAXIMUM SCREEN (G_2 AND G_4) SUPPLY VOLTAGE	90	VOLTS
MINIMUM CONTROL GRID (G_3) VOLTAGE (REFERRED TO F-)	0	VOLTS
MAXIMUM ZERO-SIGNAL TOTAL CATHODE CURRENT	5.5	MA.

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

CONTROL GRID (G_3) TO PLATE (MAX.)	0.4	μμf
OSCILLATOR GRID (G_1) TO PLATE (MAX.)	0.1	μμf
OSCILLATOR GRID (G_1) TO CONTROL GRID (G_3) (MAX.)	0.2	μμf
CONTROL GRID (G_3) TO ALL OTHER ELECTRODES (RF) INPUT	7.0	μμf
OSCILLATOR GRID (G_1) TO ALL OTHER ELECTRODES (OSC. INPUT)	3.8	μμf
PLATE TO ALL OTHER ELECTRODES (MIXER OUTPUT)	7.5	μμf

CONTINUED ON FOLLOWING PAGE

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PLATE 1738
NOV. 1, 1946

→ INDICATES A CHANGE OR ADDITION

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

PLATE VOLTAGE	45	67.5	90	90	VOLTS
SCREEN (G_2 AND G_4) VOLTAGE	45	67.5	45	67.5	VOLTS
CONTROL GRID (G_3) VOLTAGE	0	0	0	0	VOLTS
PLATE CURRENT	0.7	1.4	0.8	1.6	MA.
SCREEN (G_2 AND G_4) CURRENT	1.9	3.2	1.9	3.2	MA.
OSCILLATOR GRID (G_1) CURRENT	0.15	0.25	0.15	0.25	MA.
TOTAL CATHODE CURRENT	2.75	5.0	2.75	5.0	MA.
OSCILLATOR GRID (G_1) RESISTOR	0.1	0.1	0.1	0.1	MEGOHM
PLATE RESISTANCE (APPROX.)	0.6	0.5	0.8	0.6	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G_3) VOLTAGE = 0 VOLTS	235	280	250	300	μMHOS
CONTROL GRID (G_3) BIAS (APPROX.) FOR CONVERSION TRANSCONDUCTANCE = 5.0 μMHOS	-9	-14	-9	-14	VOLTS

OSCILLATOR TRANSCONDUCTANCE
NOT OSCILLATING

CONTROL GRID (G_3) VOLTAGE	0	VOLTS
OSCILLATOR GRID (G_1) VOLTAGE	0	VOLTS
SCREEN (G_2 AND G_4) CONNECTED TO PLATE	67.5	VOLTS
PLATE AND SCREEN (G_2 AND G_4) CURRENT	8.5	MA.
PLATE RESISTANCE (APPROX.)	2000	OHMS
TRANSCONDUCTANCE BETWEEN OSCILLATOR GRID (G_1) AND SCREEN (G_2 AND G_4) TIED TO PLATE (APPROX.)	1400	μMHOS
AMPLIFICATION FACTOR	7	

IR5

E_f = 1.4 Volts DC

CURVE	PLATE VOLTS	GRIDS 2 & 4 VOLTS	GRID 1 RESISTOR MEGOHM	GRID 1 CURRENT[A] μAMP
1	45	45	0.1	150
2	90	45	0.1	150
3	67.5	67.5	0.1	250
4	90	67.5	0.1	250

OSCILLATOR VOLTAGE ON GRIDS 2 & 4 AND ON FILAMENT = 0 VOLTS.

[A] OBTAINED BY ADJUSTMENT OF OSCILLATOR GRID (GRID 1) VOLTAGE TO GIVE INDICATED VALUES.

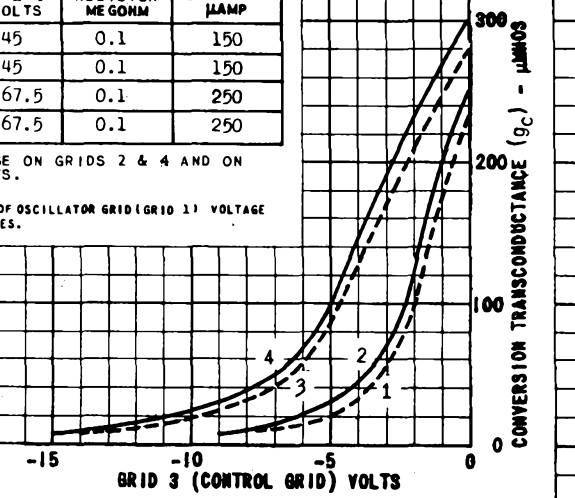

PLATE 1739
NOV. 1, 1946

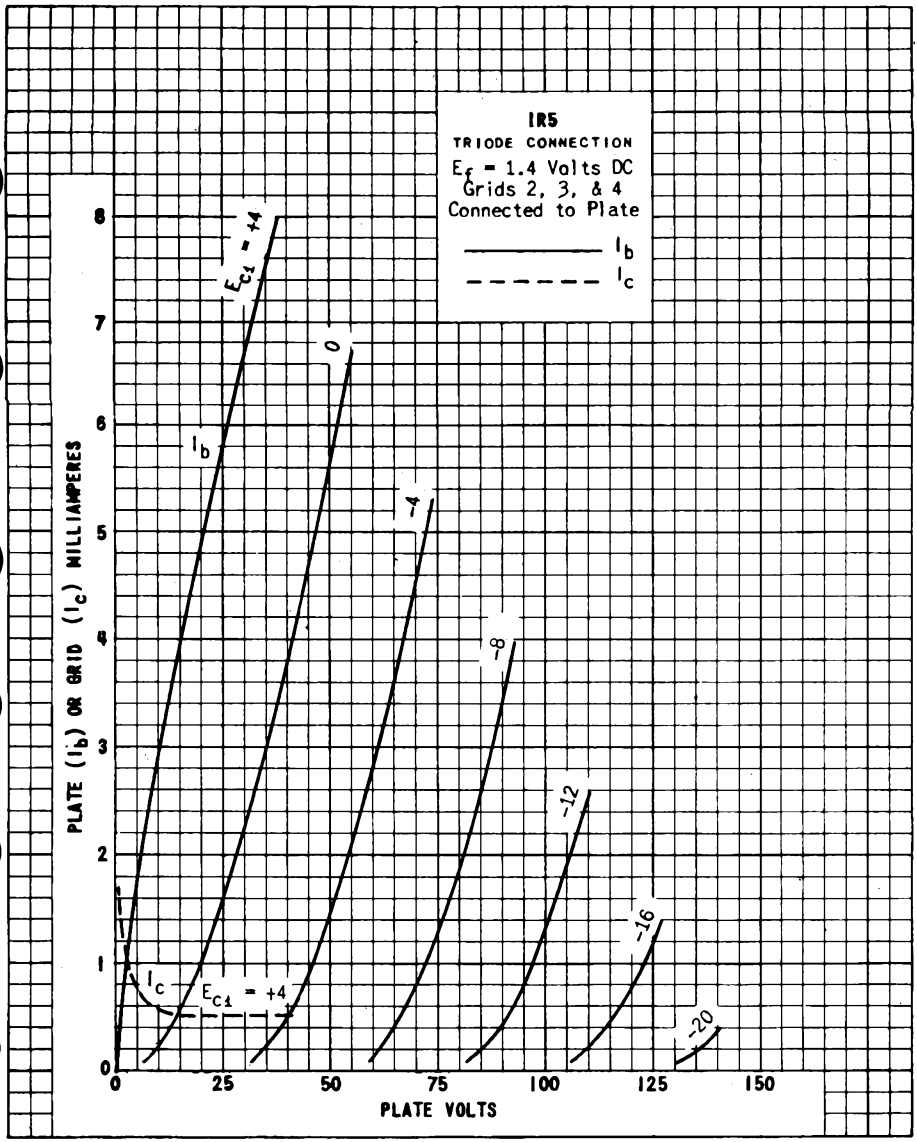

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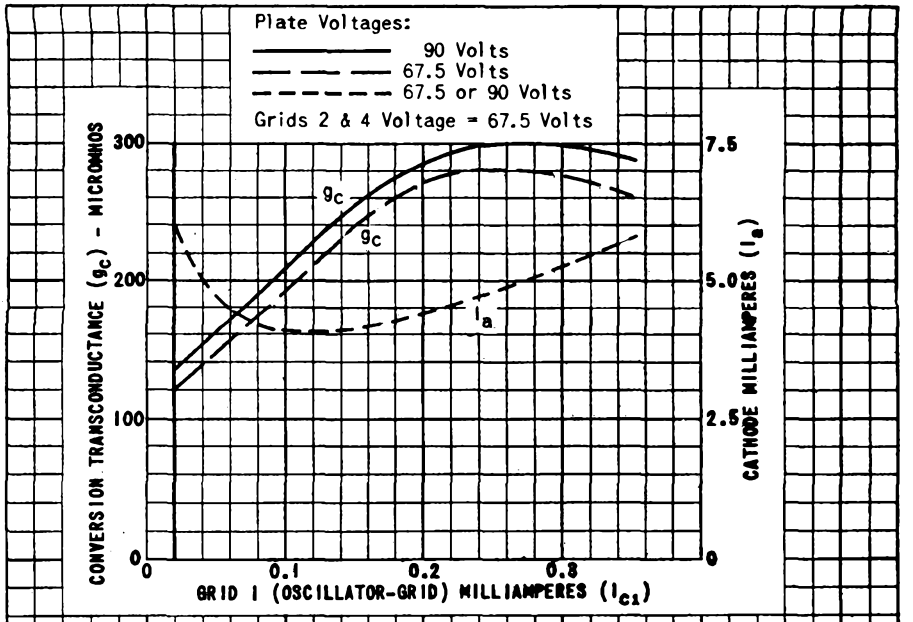
PLATE
1740
NOV. 1,
1946

IR5



IR5

E_f = 1.4 Volts DC

Grid 3 Voltage	=	0 Volts
Oscillator Voltage on Grids 2 & 4 & on Fil.	=	0 Volts
Grid 1 Resistor	=	0.1 Meg.
Recommended Min. I_{c1}	=	0.02 Ma.

Grid 1 Current Varied by Adjustment of Oscillator Voltage.

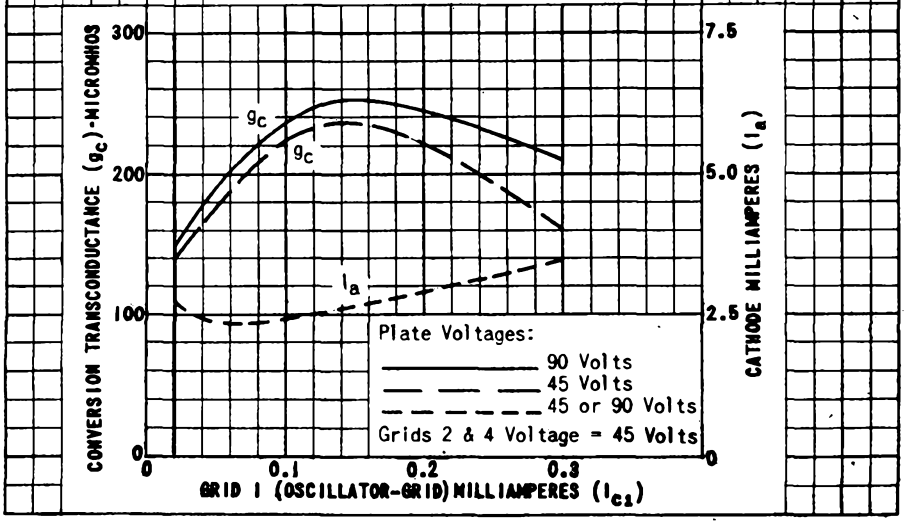
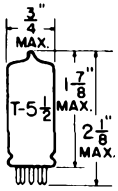


PLATE 1741
NOV. 1, 1946

TUNG-SOL

POWER AMPLIFIER PENTODE

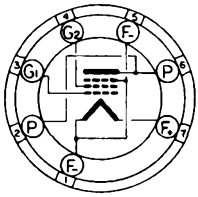


GLASS BULB

COATED FILAMENT

FILAMENT
1.4 VOLTS 0.1 AMPERE
DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 1S4 IS A POWER AMPLIFIER PENTODE OF THE MINIATURE CONSTRUCTION, ESPECIALLY DESIGNED FOR OUTPUT SERVICE IN COMPACT, LIGHT-WEIGHT PORTABLE EQUIPMENT. THE HIGH OPERATING EFFICIENCY ALLOWS THE TUBE TO BE USED EXTREMELY LOW B SUPPLY VOLTAGES.

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	1.4	VOLTS
MAXIMUM PLATE VOLTAGE	90	VOLTS
MAXIMUM GRID #2 VOLTAGE	67.5	VOLTS
MAXIMUM CATHODE CURRENT (MAX.-SIGNAL)	11	MA.
MAXIMUM CATHODE CURRENT (ZERO-SIGNAL)	9	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

FILAMENT VOLTAGE	1.4	1.4	1.4	VOLTS
FILAMENT CURRENT	0.10	0.10	0.10	AMP.
PLATE VOLTAGE	45	67.5	90	VOLTS
GRID #2 VOLTAGE	45	67.5	67.5	VOLTS
GRID #1 VOLTAGE (REFERRED TO NEG. FIL. TERMINAL)	-4.5	-7	-7	VOLTS
PEAK AF GRID VOLTAGE	4.5	7	7	VOLTS
ZERO-SIGNAL PLATE CURRENT	3.8	7.2	7.4	MA.
ZERO-SIGNAL GRID #2 CURRENT	0.8	1.5	1.4	MA.
PLATE RESISTANCE (APPROX.)	0.1	0.1	0.1	MEGOHM
TRANSCONDUCTANCE	1 250	1 550	1 575	µMHOS
LOAD RESISTANCE	8 000	5 000	8 000	OHMS
TOTAL HARMONIC DISTORTION	12	10	12	PERCENT
MAXIMUM-SIGNAL POWER OUTPUT	0.065	0.18	0.27	WATTS

SIMILIAR TYPE REFERENCE: *Characteristics somewhat similiar to type 3S4.*

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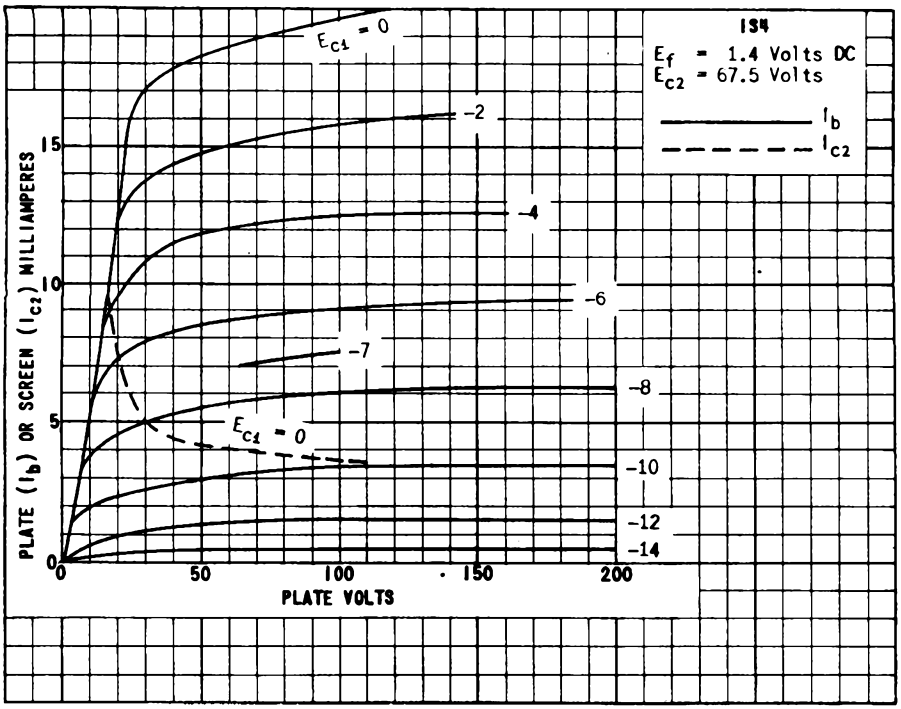
PLATE 1827T
JUNE 2, 1947

→ INDICATES A CHANGE OR ADDITION.



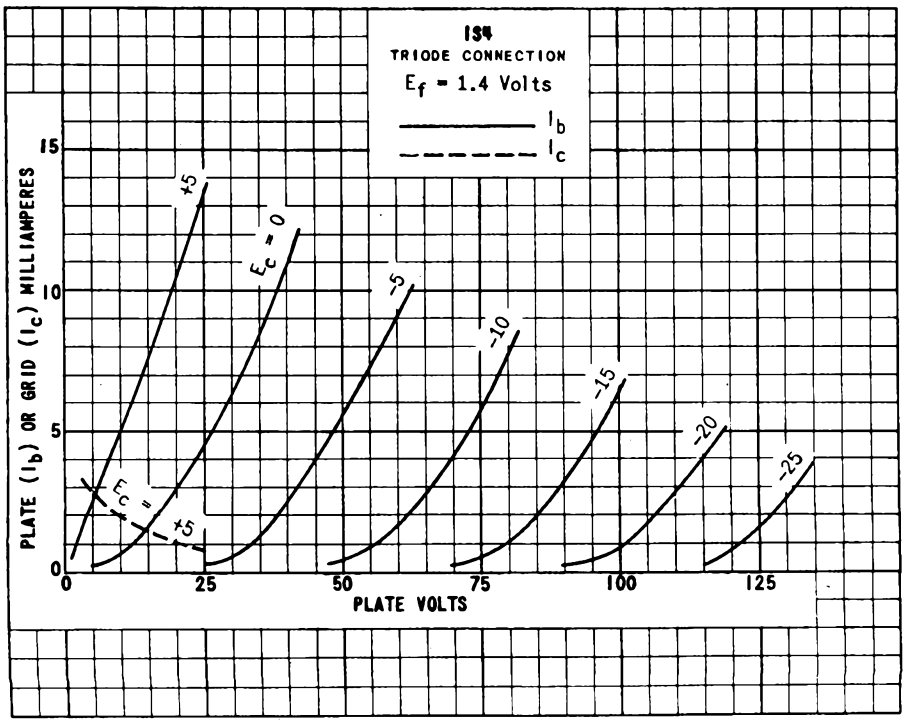


PLATE
1828
JUNE 2,
1947

1S4

E_f = 1.4 Volts DC

CURVE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	SIGNAL VOLTS
1	45	45	-4.5	3.2
2	67.5	67.5	-7	4.95
3	90	67.5	-7	4.95

——— P_o

– – – – – – Dist.

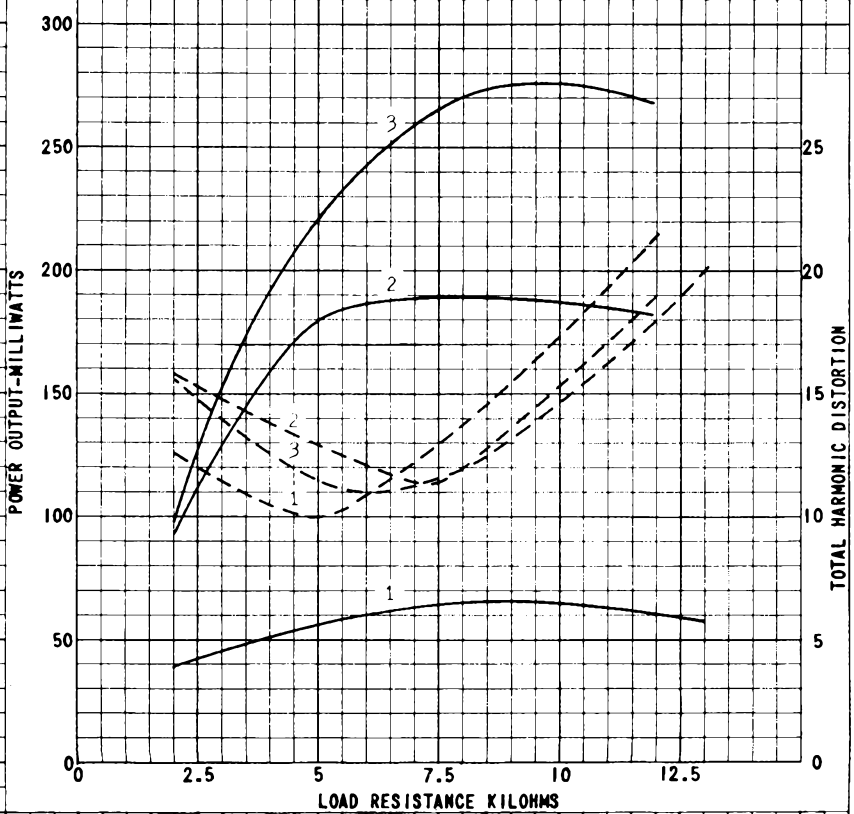


PLATE 1829
JUNE 2, 1947

TUNG-SOL

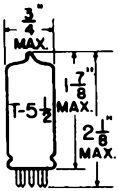
DIODE PENTODE AMPLIFIER

MINIATURE TYPE

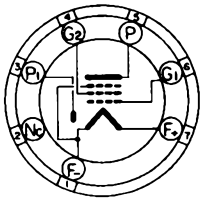
COATED FILAMENT

FILAMENT
1.4 VOLTS 0.05 AMPERE
DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7-PIN BASE

THE 1S5 IS A DIODE PENTODE AMPLIFIER ESPECIALLY DESIGNED FOR DETECTOR-AUDIO SERVICE IN COMPACT, LIGHT-WEIGHT, PORTABLE EQUIPMENT. THE HIGH OPERATING EFFICIENCY ALLOWS IT TO BE USED WITH EXTREMELY LOW PLATE-SUPPLY VOLTAGE.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	1.4	VOLTS
FILAMENT CURRENT	0.05	AMP.
MAXIMUM PLATE VOLTAGE	90	VOLTS
MAXIMUM SCREEN VOLTAGE	90	VOLTS
MINIMUM GRID VOLTAGE	0	VOLTS
MAXIMUM SIGNAL MAXIMUM TOTAL CATHODE CURRENT	4.5	MA.
MAXIMUM DIODE CURRENT (CONTINUOUS OPERATION)	0.25	MA.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

WITH NO EXTERNAL SHIELD

GRID TO PLATE	0.2	μμf
INPUT	2.2	μμf
OUTPUT	2.4	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PENTODE UNIT - CLASS A_1 AMPLIFIER

PLATE VOLTAGE	67.5	90	VOLTS
SCREEN VOLTAGE	67.5	90	VOLTS
GRID VOLTAGE	0	0	VOLTS
PLATE CURRENT	1.6	2.7	MA.
SCREEN CURRENT	0.4	0.5	MA.
PLATE RESISTANCE (APPROX.)	0.6	0.5	MEGOHM
TRANSCONDUCTANCE	625	720	μMHOS

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION.

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PLATE 1766
FEB. 3, 1947

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

RESISTANCE COUPLED AMPLIFIER

PLATE SUPPLY VOLTAGE	45	67.5	90	VOLTS
SCREEN SUPPLY VOLTAGE	45	67.5	90	VOLTS
GRID VOLTAGE	0	0	0	VOLTS
GRID RESISTOR	10	10	10	MEGOHMS
LOAD RESISTANCE	1	1	1	MEGOHM
SERIES SCREEN RESISTOR	3	3	3	MEGOHMS
SCREEN BY-PASS CONDENSER	0.1	0.1	0.1	µf
VOLTAGE GAIN (APPROX.)[A]	30	40	50	

[A] OBTAINED WHEN THE GRID OF THE PENTODE UNIT IS FED FROM A SOURCE HAVING AN IMPEDANCE OF 1.0 MEGOHM.

DIODE UNIT

THE DIODE UNIT IS LOCATED AT THE NEGATIVE END OF THE FILAMENT AND IS INDEPENDENT OF THE PENTODE UNIT EXCEPT FOR THE COMMON FILAMENT.

SIMILIAR TYPE REFERENCE: *Ratings and characteristics identical to 1U5; somewhat similar to 1LD5.*

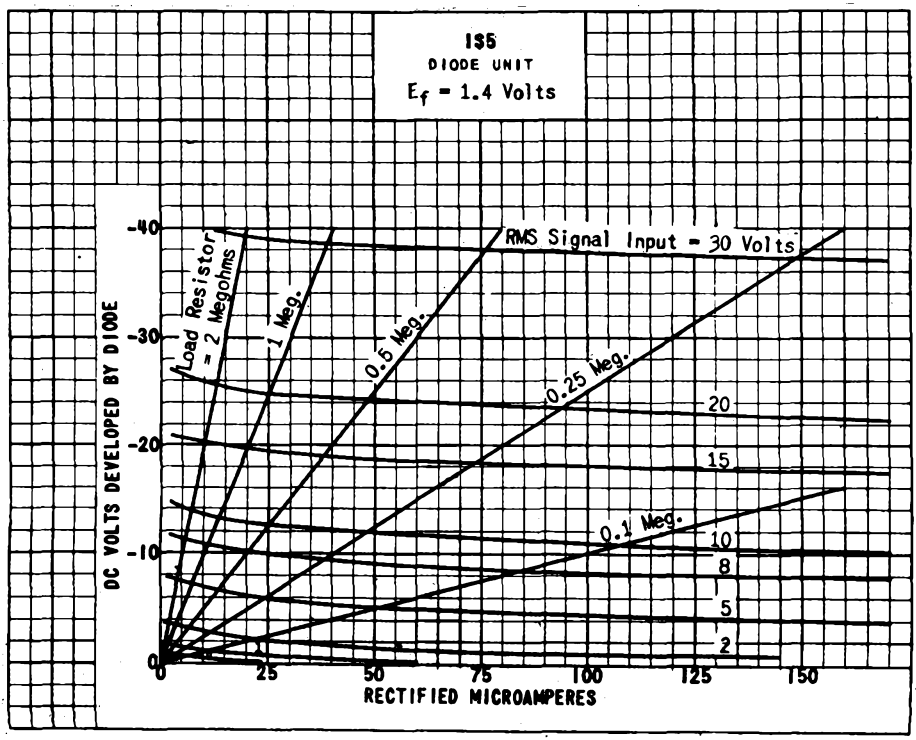
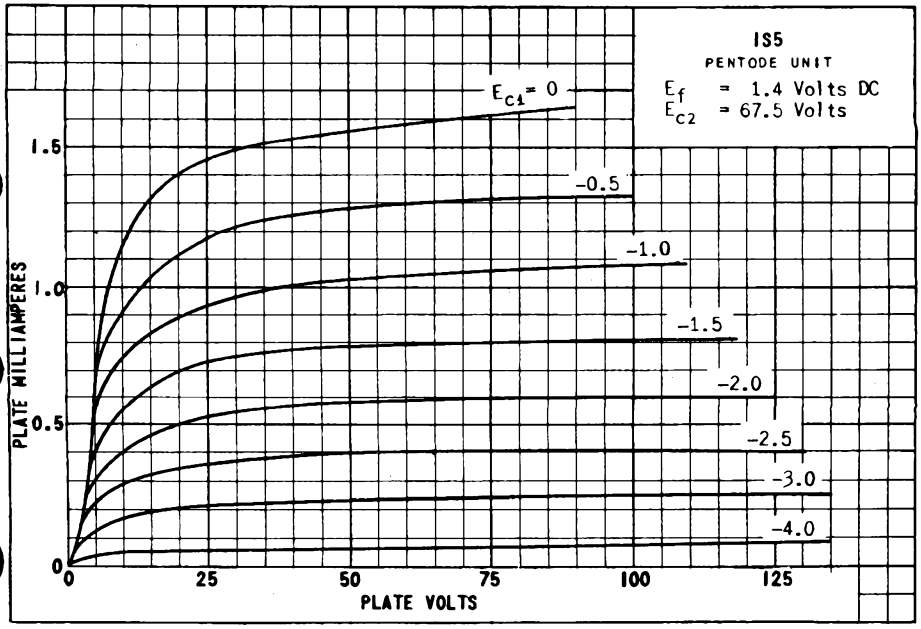


PLATE 1767
FEB. 3, 1947



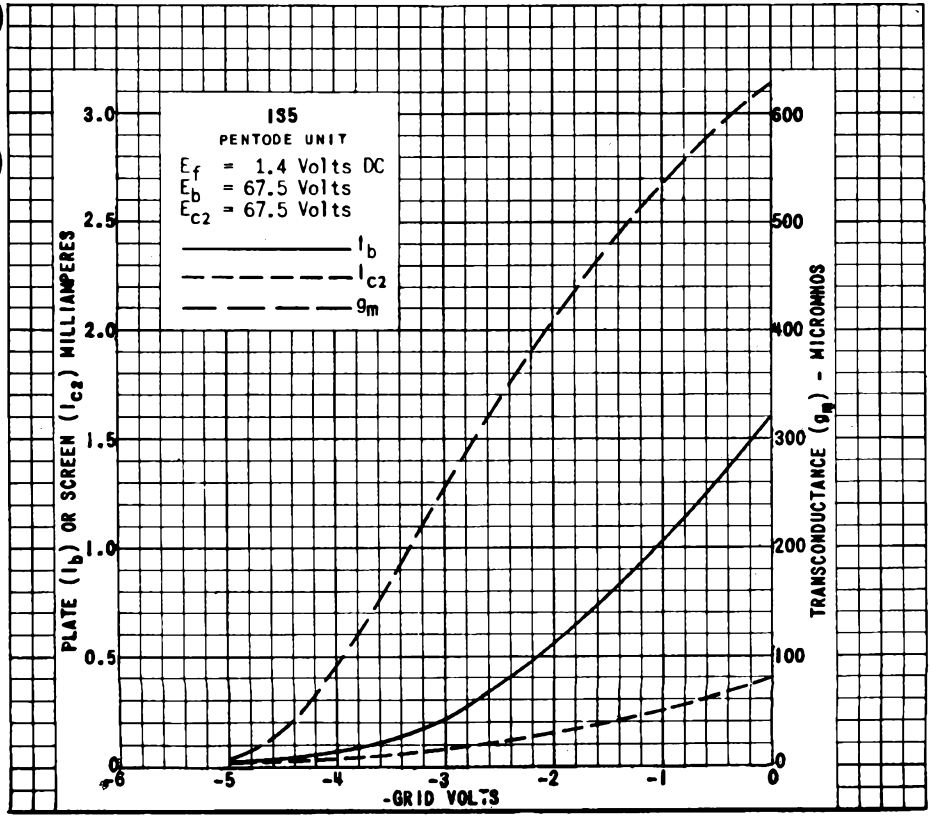


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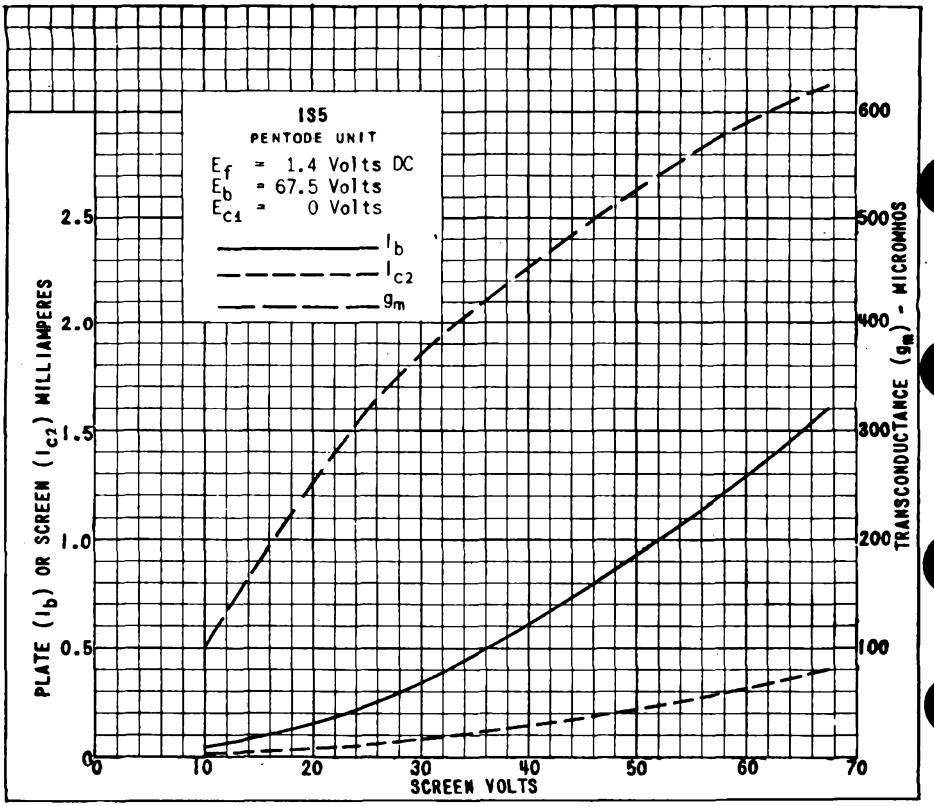
PLATE
1768
FEB. 3,
1947

IS5



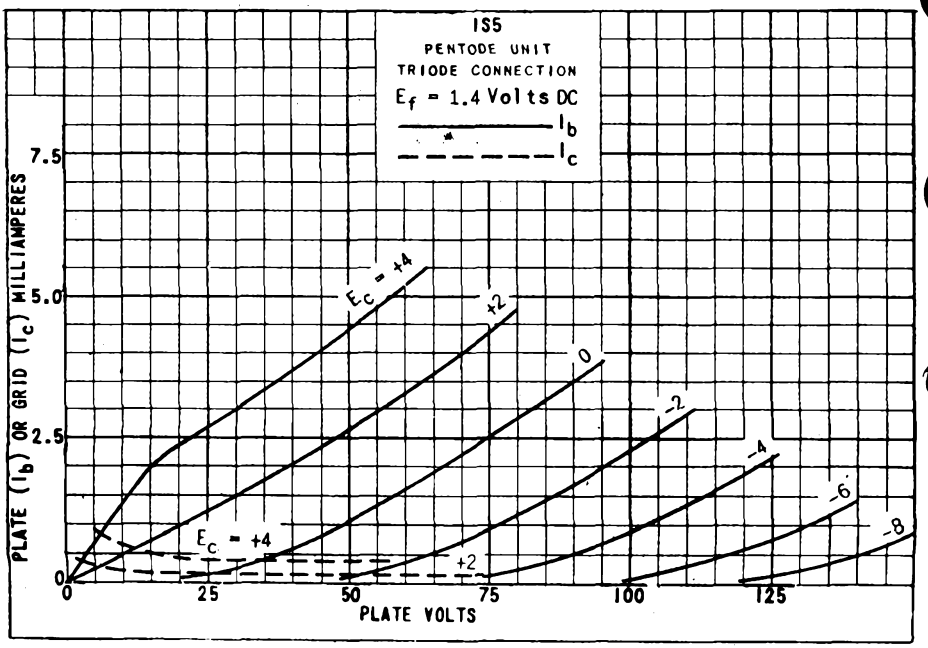
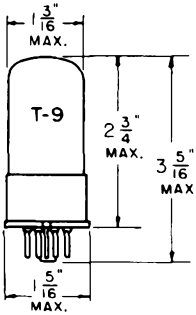


PLATE 1769
FEB. 3, 1947

TUNG-SOL

R. F. PENTODE



COATED FILAMENT

1.4 VOLTS .050 AMPERE

DC

GLASS BULB

ANY MOUNTING POSITION

BOTTOM VIEW

SMALL WAFER OCTAL 8 PIN BASE WITH METAL SHELL

1SA6GT IS A FILAMENT TYPE MEDIUM CUT-OFF PENTODE AMPLIFIER DESIGNED FOR PORTABLE EQUIPMENT. IT PROVIDES HIGH GAIN THROUGH THE USE OF HIGH TRANSCONDUCTANCE AND ADEQUATE SHIELDING TO MAINTAIN LOW GRID-PLATE CAPACITANCE WITH SINGLE ENDED STRUCTURE.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	90	VOLTS
MAXIMUM SCREEN VOLTAGE	67.5	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	6.0	MA.

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO PLATE	0.01	MAX.	μμf
INPUT (CONTROL GRID - FIL, G2, G3)	5.2		μμf
OUTPUT (PENTODE PLATE - FIL, G2, G3)	8.6		μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PLATE VOLTAGE	45	67.5	90	VOLTS
SCREEN GRID (G2) VOLTAGE	45	67.5	67.5	VOLTS
CONTROL GRID (G1) VOLTAGE	0	0	0	VOLTS
SUPPRESSOR GRID (G3) VOLTAGE	0	0	0	VOLTS
PLATE CURRENT	1.1	2.4	2.45	MA.
SCREEN GRID CURRENT	0.3	0.7	0.68	MA.
TRANSCONDUCTANCE	750	950	970	μMHOS
PLATE RESISTANCE	0.7	0.6	0.8	MEGOHM
APPROXIMATE CONTROL GRID VOLT FOR TRANSCONDUCTANCE = 5 μMHOS	-3.5	-5.5	-5.5	VOLTS

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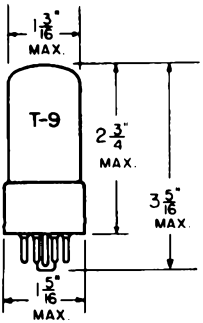
PLATE 1511
OCT. 31 1944

1SB6GT

TUNG-SOL

DIODE PENTODE AMPLIFIER



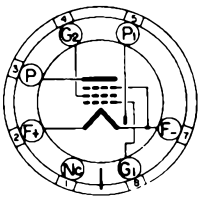
COATED FILAMENT

1.4 VOLTS 0.05 AMPERE

DC

GLASS BULB

ANY MOUNTING POSITION



BOTTOM VIEW

INTERMEDIATE SHELL

OCTAL 7 PIN BASE

THE 1SB6GT IS A LOW DRAIN FILAMENT TYPE SINGLE DIODE-PENTODE TUBE DESIGNED FOR USE IN BATTERY OPERATED EQUIPMENT. IT FEATURES SINGLE ENDED CONSTRUCTION AND INCORPORATES A PENTODE CAPABLE OF RELATIVELY HIGH VOLTAGE GAIN.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD MB-210

MAXIMUM PENTODE PLATE VOLTAGE	90	VOLTS
MAXIMUM SCREEN GRID VOLTAGE	67.5	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO PENTODE PLATE	0.25	μμf
INPUT (CONTROL GRID - FIL, G2, G3)	3.2	μμf
OUTPUT (PENTODE PLATE - FIL, G2, G3)	3.0	μμf
PENTODE PLATE TO DIODE PLATE	0.5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PENTODE PLATE VOLTAGE	45	67.5	90	VOLTS
SCREEN GRID VOLTAGE	45	67.5	67.5	VOLTS
CONTROL GRID VOLTAGE	0	0	0	VOLTS
PLATE CURRENT	0.6	1.4	1.45	MA.
SCREEN GRID CURRENT	0.16	0.4	0.38	MA.
TRANSCONDUCTANCE	500	650	665	μMHOS
PLATE RESISTANCE	0.9	0.6	0.7	MEGOHMS

AS VOLTAGE AMPLIFIER

PLATE SUPPLY VOLTAGE	45	67.5	90	VOLTS
SCREEN GRID SUPPLY VOLTAGE	45	67.5	90	VOLTS
CONTROL GRID VOLTAGE[A]	0	0	0	VOLTS
LOAD RESISTOR	1.0	1.0	1.0	MEGOHMS
SERIES SCREEN GRID RESISTOR	5.0	5.0	5.0	MEGOHMS
SCREEN GRID BY-PASS CONDENSER	0.1	0.1	0.1	μf
CONTROL GRID RESISTOR	5.0	5.0	5.0	MEGOHMS
VOLTAGE GAIN	65	90	110	

[A] REFERRED TO NEGATIVE FILAMENT TERMINAL

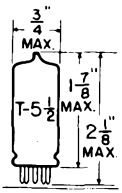
PLATE 1512

OCT. 31 1944

TUNG-SOL

PENTODE

MINIATURE TYPE

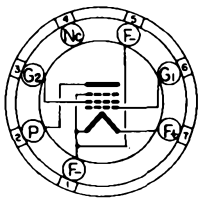


GLASS BULB

COATED FILAMENT

FILAMENT
1.4 VOLTS 50 MA.
DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 1T4 IS A MINIATURE SUPER-CONTROL RF PENTODE. IT IS RECOMMENDED FOR USE IN COMPACT, LIGHT-WEIGHT, PORTABLE RECEIVERS WHERE AVC IS REQUIRED. THE 1T4 FEATURES ADEQUATE INTERNAL SHIELDING FOR MOST PURPOSES, BUT EXTERNAL SHIELDING IS RECOMMENDED WHERE MINIMUM GRID-PLATE CAPACITANCE IS TO BE OBTAINED.

DIRECT INTERELECTRODE CAPACITANCES

WITH CLOSE-FITTING TUBE SHIELD CONNECTED TO NEGATIVE FILAMENT

GRID TO PLATE: (G_1 TO P) MAX.	0.01	μμf
INPUT: G_1 TO (F&G_3+G_2)	3.6	μμf
OUTPUT: P TO (F&G_3+G_2)	7.5	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	1.4	VOLTS
MAXIMUM PLATE VOLTAGE	90	VOLTS
MAXIMUM GRID #2 VOLTAGE	67.5	VOLTS
MAXIMUM GRID #2 SUPPLY VOLTAGE	90	VOLTS
MAXIMUM GRID #1 VOLTAGE	0	VOLTS
MAXIMUM CATHODE CURRENT	5.5	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

	CLASS A_1 AMPLIFIER				
FILAMENT VOLTAGE	1.4	1.4	1.4	1.4	VOLTS
FILAMENT CURRENT	50	50	50	50	MA.
PLATE VOLTAGE	45	67.5	90	90	VOLTS
GRID #2 VOLTAGE	45	67.5	45	67.5	VOLTS
GRID #1 VOLTAGE[A]	0	0	0	0	VOLTS
PLATE RESISTANCE (APPROX.)	0.35	0.25	0.8	0.5	MEGOHM
TRANSCONDUCTANCE	700	875	750	900	μMHOS
PLATE CURRENT	1.7	3.4	1.8	3.5	MA.
GRID #2 CURRENT	0.7	1.5	0.65	1.4	MA.
GRID #1 VOLTAGE FOR g_m = 10 μMHOS	-10	-16	-10	-16	VOLTS

[A] REFERRED TO NEGATIVE FILAMENT TERMINAL.

→ INDICATES A CHANGE OR ADDITION.

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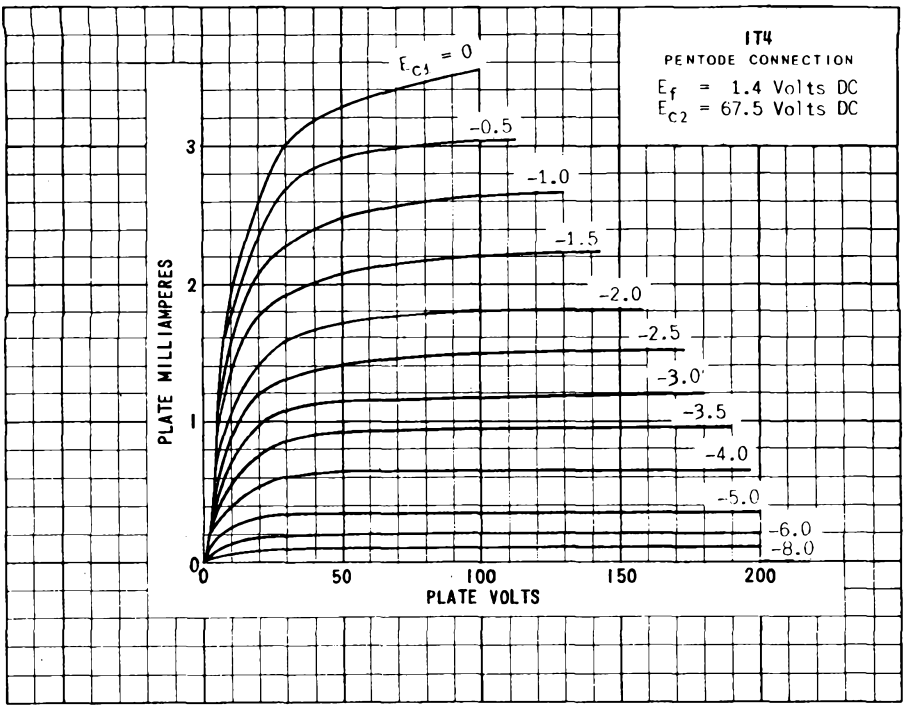
PLATE 1904
NOV. 1, 1947

1T4



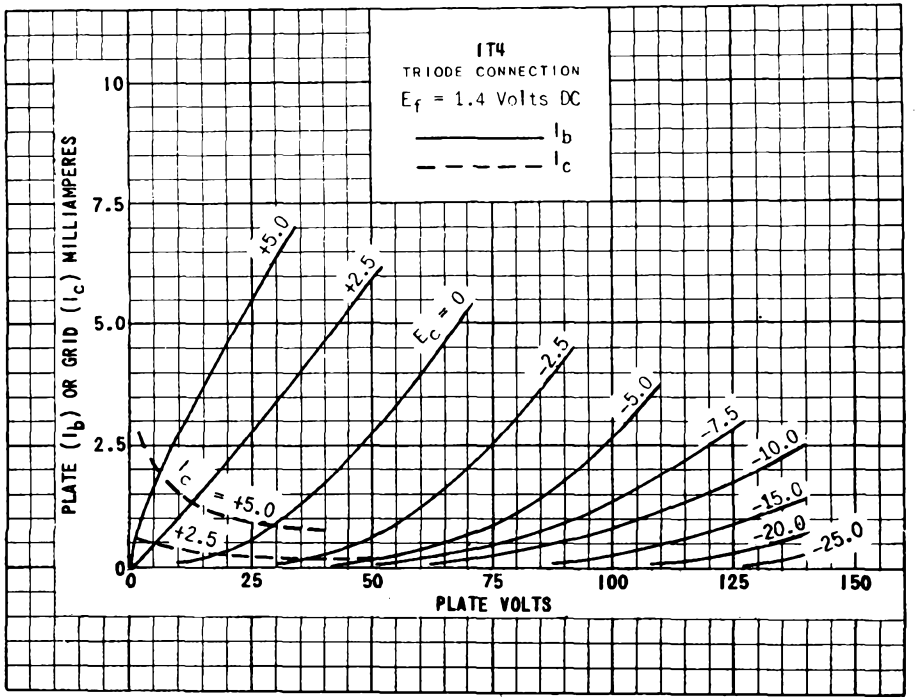


PLATE 1905
NOV. 1, 1947

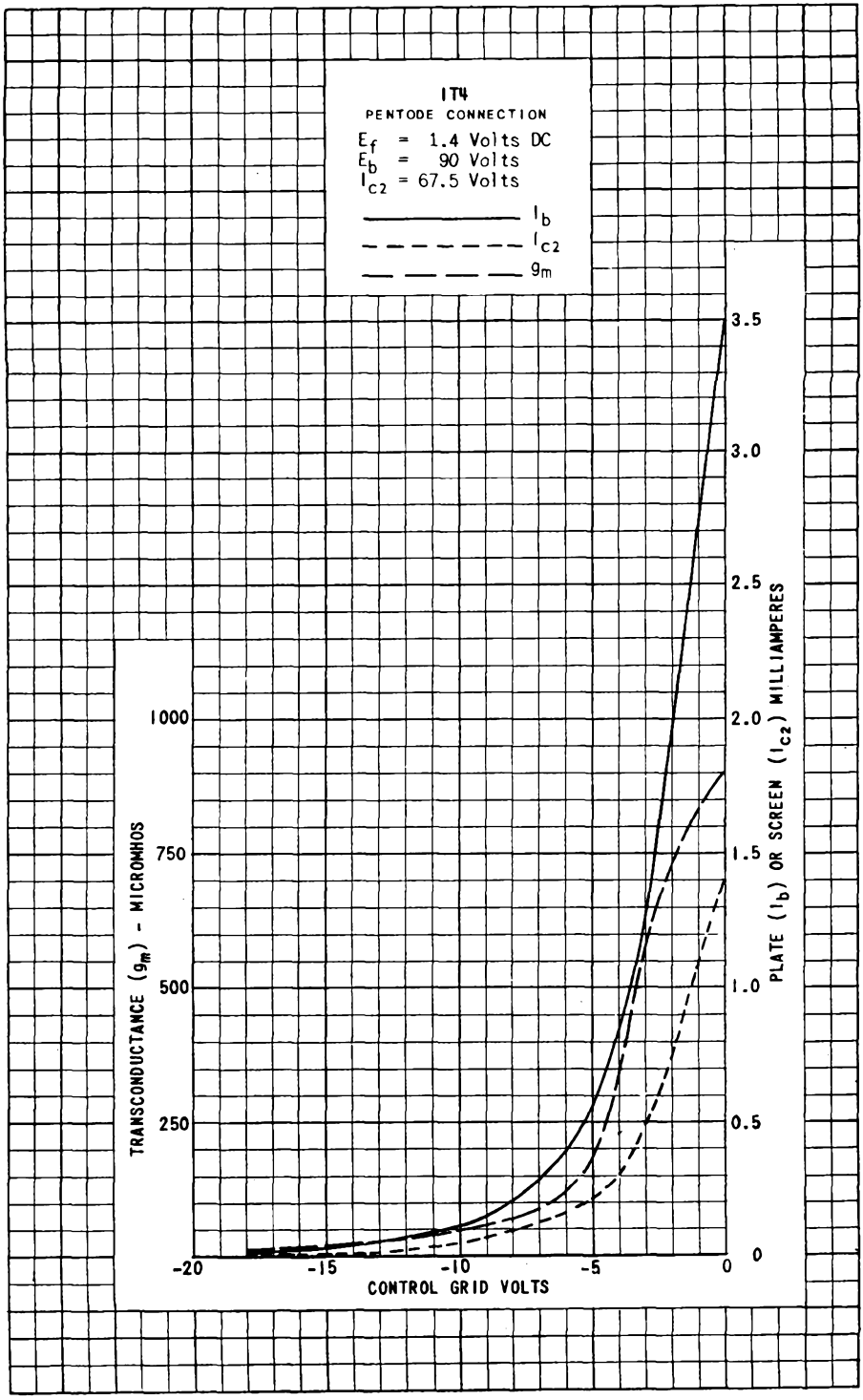


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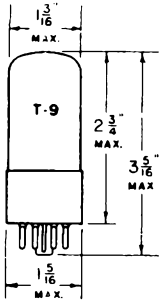
PLATE
1906
NOV. 1,
1947

TUNG-SOL



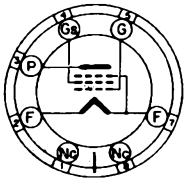
BEAM POWER AMPLIFIER

COATED FILAMENT

1.4 VOLTS 0.050 AMPERE

DC

GLASS BULB



G-6X

BOTTOM VIEW

INTERMEDIATE 7 PIN OCTAL BASE

THE TUNG-SOL 1T5GT IS A LOW VOLTAGE, LOW CURRENT DRAIN BATTERY TYPE BEAM POWER OUTPUT TUBE. IT IS DESIGNED FOR SERVICE WITH 90 VOLTS OF "B" BATTERY AND A SINGLE DRY CELL "A" BATTERY.

RATINGS

MAXIMUM FILAMENT VOLTAGE		
DRY BATTERY OPERATION — VOLTAGE MUST NEVER EXCEED	1.6	VOLTS
AC — DC POWER LINE OPERATION — DESIGN CENTER	1.3	VOLTS
MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	VOLTS
MAXIMUM CATHODE CURRENT (ZERO SIGNAL)	7.3	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

	SELF-BIAS	FIXED-BIAS	
FILAMENT VOLTAGE	1.4 DC	1.4 DC	VOLTS
FILAMENT CURRENT	0.050	0.050	AMPERE
PLATE VOLTAGE	84	90	VOLTS
SCREEN VOLTAGE	84	90	VOLTS
CONTROL GRID VOLTAGE[A]	−6	−6	VOLTS
ZERO SIGNAL PLATE CURRENT	5.4	6.5	MA.
ZERO SIGNAL SCREEN CURRENT (NOMINAL)	0.6	0.8	MA.
MAXIMUM SIGNAL PLATE CURRENT	5.5	6.5	MA.
MAXIMUM SIGNAL SCREEN CURRENT (NOMINAL)	1.5	1.5	MA.
PLATE RESISTANCE APPROX.	.25	.25	MEGOHM
TRANSCONDUCTANCE	1050	1150	μMHOS
LOAD RESISTANCE	14000	14000	OHMS
TOTAL HARMONIC DISTORTION	7.5	7.5	PER CENT
POWER OUTPUT	145	170	MILLIWATTS

[A] REFERRED TO NEGATIVE FILAMENT TERMINAL.

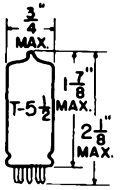
PLATE 1077-2

JULY 28 1941

TUNG-SOL

PENTODE

MINIATURE TYPE

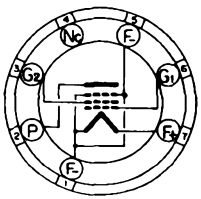


GLASS BULB

COATED FILAMENT

FILAMENT
1.4 VOLTS 50 MA.
DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 1U4 IS A MINIATURE FILAMENTARY TYPE SHARP CUT-OFF PENTODE AMPLIFIER. IT IS INTENDED FOR RF OR AF APPLICATION WHERE CONSERVATION OF BATTERY POWER IS IMPORTANT.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD MB-210

FILAMENT VOLTAGE	1.4	VOLTS
MAXIMUM PLATE VOLTAGE	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	VOLTS
MAXIMUM POSITIVE DC GRID VOLTAGE	0	VOLTS
MAXIMUM CATHODE CURRENT	6.0	MA.

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD CONNECTED TO NEGATIVE FILAMENT TERMINAL

GRID TO PLATE (MAX.)	0.01	μμf
INPUT	3.6	μμf
OUTPUT	7.5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

FILAMENT VOLTAGE	1.4	VOLTS
FILAMENT CURRENT	50	MA.
PLATE VOLTAGE	90	VOLTS
SCREEN VOLTAGE	90	VOLTS
GRID VOLTAGE	0	VOLTS
PLATE CURRENT	1.6	MA.
SCREEN CURRENT	0.5	MA.
PLATE RESISTANCE (APPROX.)	1.0	MEGOHMS
TRANSCONDUCTANCE	900	μMHOS
GRID VOLTAGE FOR I_b = 10 μA	-4.0	VOLTS

→ INDICATES A CHANGE OR ADDITION.

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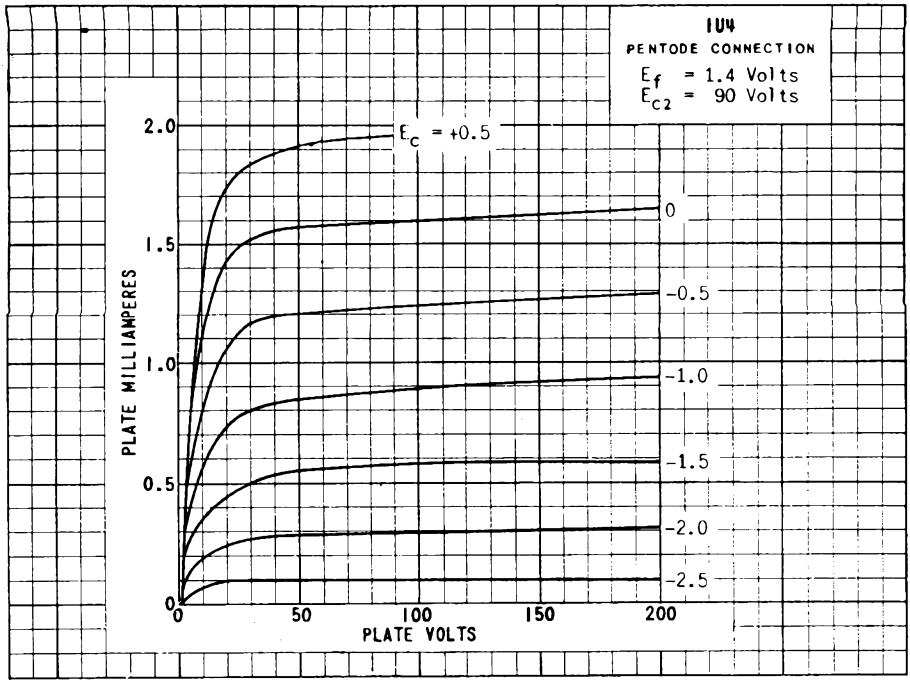
PLATE
1907
NOV. 1,
1947

1U4



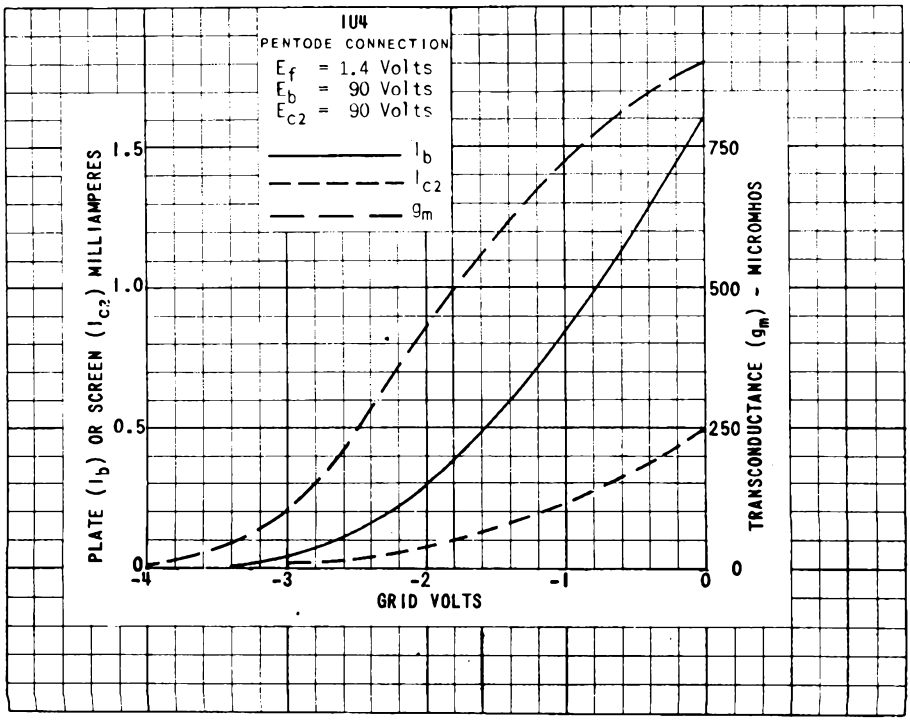
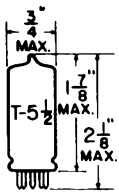


PLATE 1908
NOV. 1, 1947

TUNG-SOL

DIODE PENTODE AMPLIFIER

MINIATURE TYPE

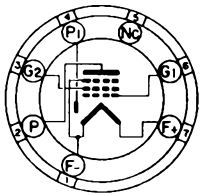


GLASS BULB

COATED FILAMENT

FILAMENT
1.4 VOLTS 0.05 AMPERE
DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 1U5 IS A MINIATURE TYPE SHARP CUT-OFF DIODE PENTODE. IT IS INTENDED FOR USE AS A COMBINED DETECTOR AND AUDIO AMPLIFIER OR AS A COMBINED IF AMPLIFIER AND DETECTOR IN PORTABLE RECEIVERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	1.4	VOLTS
FILAMENT CURRENT	0.05	AMP.
MAXIMUM PLATE VOLTAGE	90	VOLTS
MAXIMUM SCREEN VOLTAGE	90	VOLTS
MINIMUM GRID VOLTAGE	0	VOLTS
MAXIMUM-SIGNAL MAXIMUM TOTAL CATHODE CURRENT	3	MA.
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED	0.5	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PENTODE UNIT - CLASS A_1 AMPLIFIER

PLATE VOLTAGE	67.5	90	VOLTS
SCREEN VOLTAGE	67.5	90	VOLTS
GRID VOLTAGE (REFERRED TO F-)	0	0	VOLTS
PLATE CURRENT	1.6	2.7	MA.
SCREEN CURRENT	0.4	0.5	MA.
PLATE RESISTANCE (APPROX.)	0.6	0.5	MEGOHM
TRANSCONDUCTANCE	625	720	μMHOS

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION

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PLATE
1772
FEB. 3,
1947

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PENTODE UNIT – RESISTANCE COUPLED AMPLIFIER

PLATE SUPPLY VOLTAGE	45	67.5	90	VOLTS
SCREEN SUPPLY VOLTAGE	45	67.5	90	VOLTS
GRID VOLTAGE	0	0	0	VOLTS
LOAD RESISTANCE	1	1	1	MEGOHM
GRID RESISTOR	10	10	10	MEGOHMS
SERIES SCREEN RESISTANCE	3	3	3	MEGOHMS
SCREEN BY-PASS CONDENSER	0.1	0.1	0.1	µf
VOLTAGE GAIN (APPROX.)[A]	30	40	50	

[A] OBTAINED WHEN THE GRID OF THE PENTODE UNIT IS FED FROM A SOURCE HAVING AN IMPEDANCE OF 1.0 MEGOHM.

DIODE UNIT

THE DIODE UNIT IS LOCATED AT THE NEGATIVE END OF THE FILAMENT AND IS INDEPENDENT OF THE PENTODE UNIT EXCEPT FOR THE COMMON FILAMENT.

SIMILIAR TYPE REFERENCE: Ratings and characteristics identical to 1S5; somewhat similar to 1LD5.

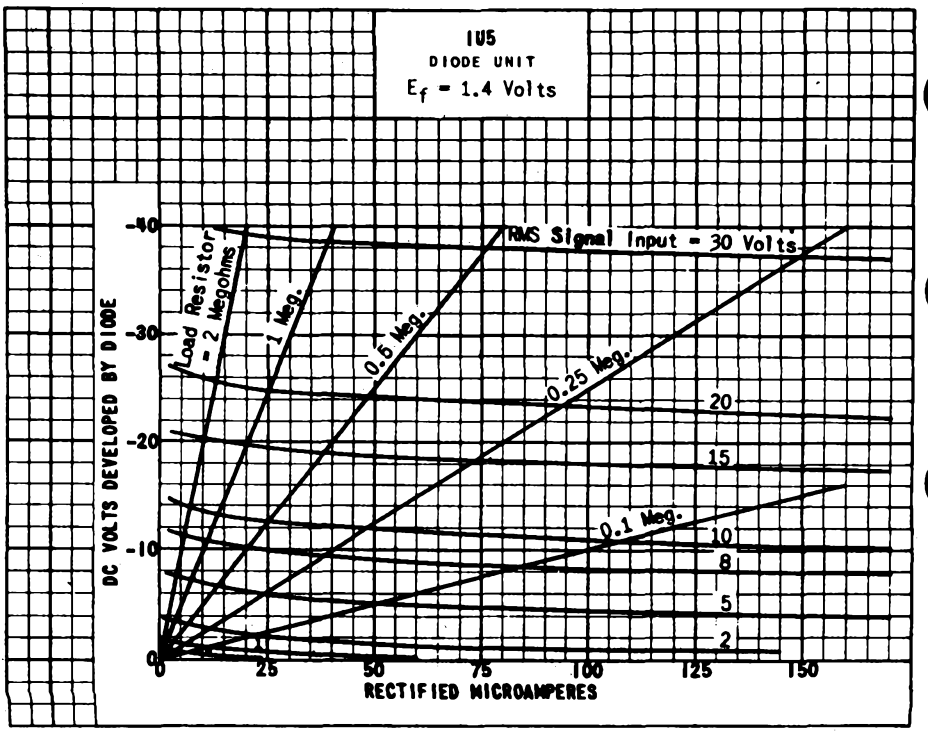
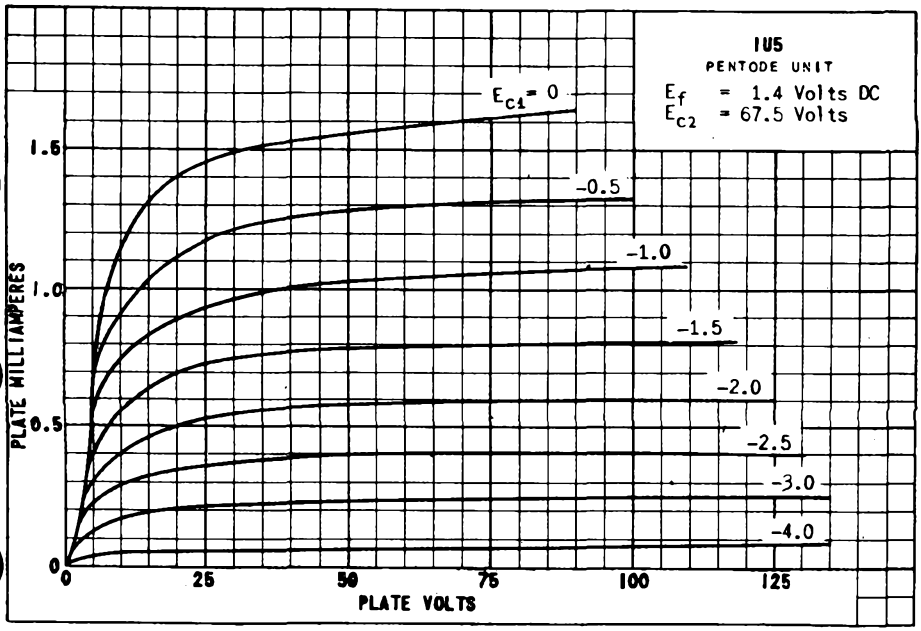


PLATE 1773 FEB. 3, 1947



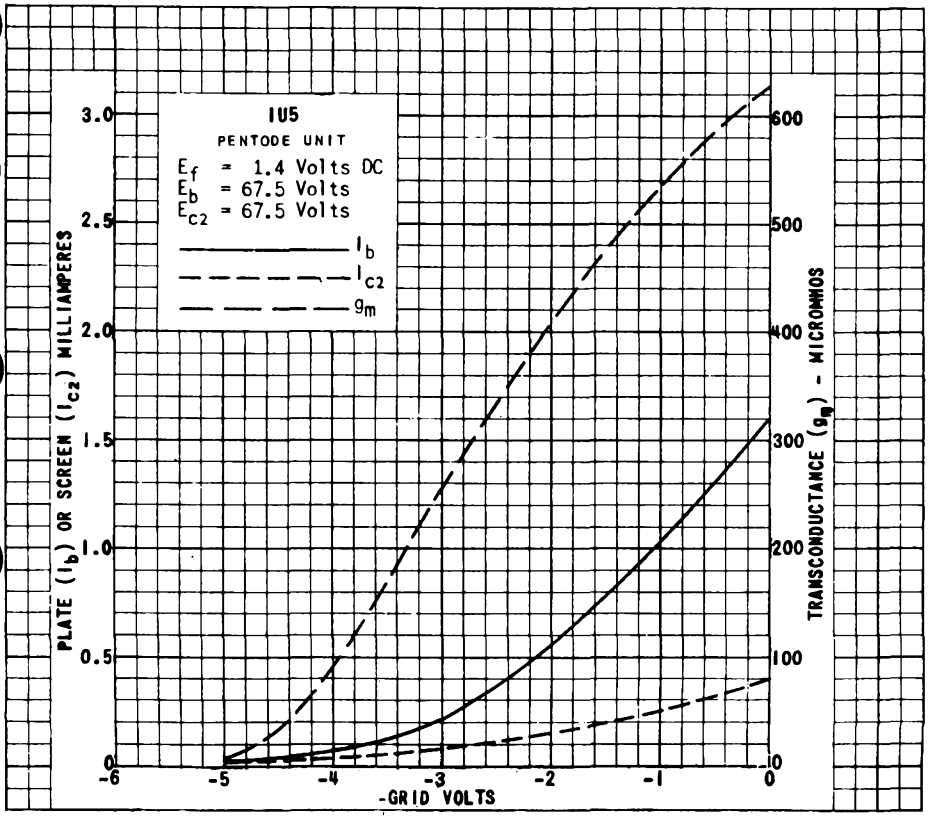


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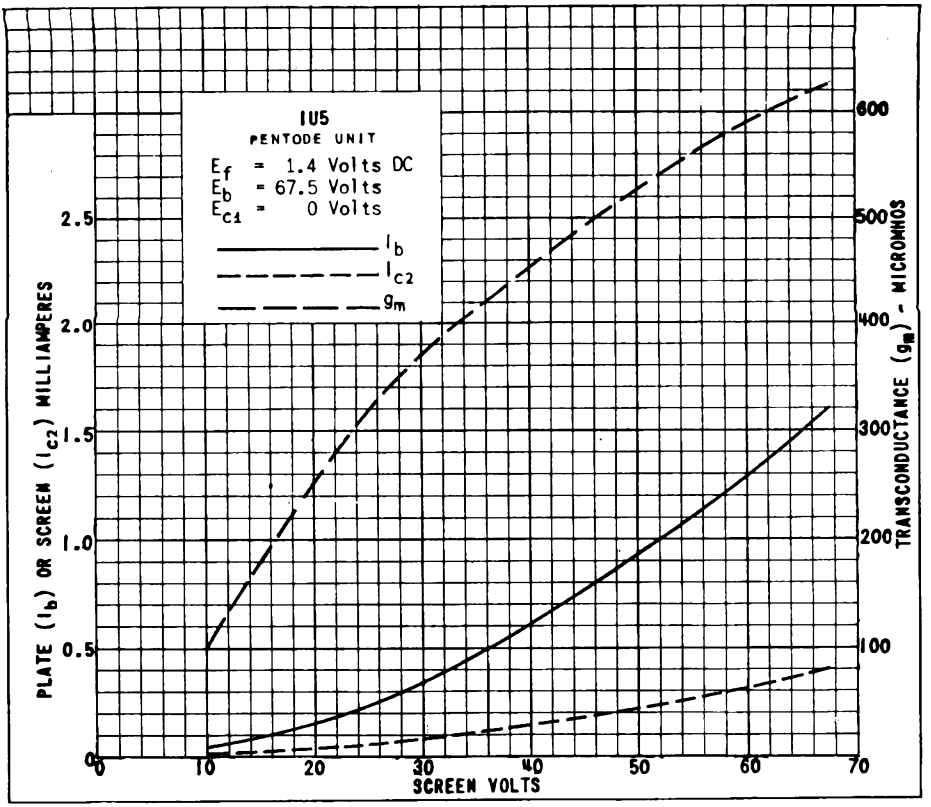
PLATE
1774
FEB. 3,
1947

1U5



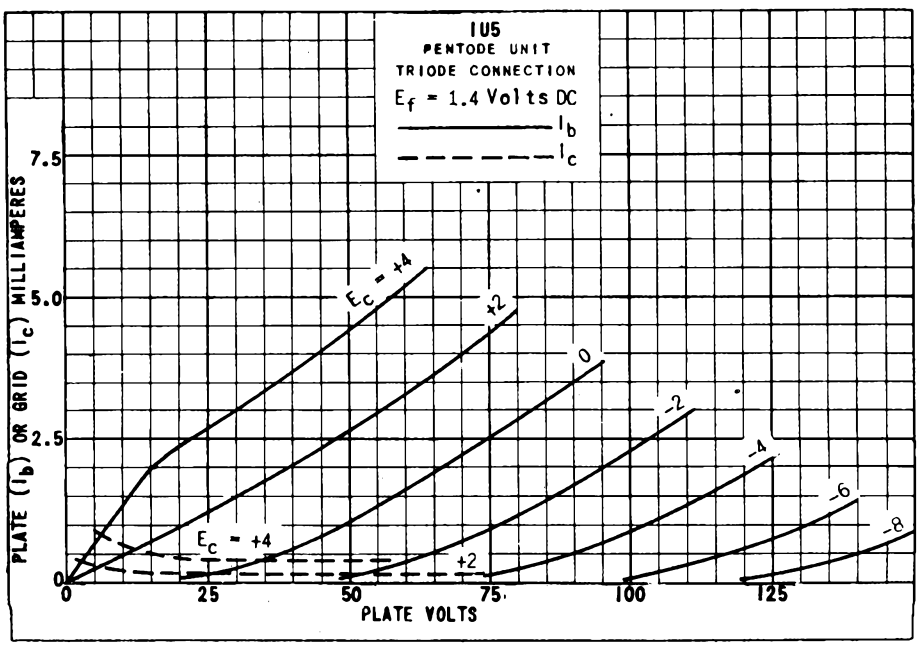
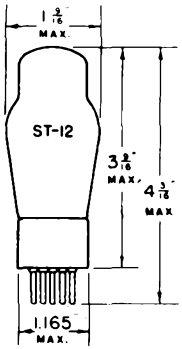


PLATE 1775
FEB. 3, 1947

TUNG-SOL



HALF WAVE

HIGH VACUUM RECTIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

4 G

BOTTOM VIEW

SMALL 4 PIN BASE

THE TUNG-SOL 1V IS DESIGNED FOR SERVICE IN EITHER STORAGE BATTERY, AC OR AC – DC OPERATED RECEIVERS.

RATINGS

MAXIMUM DC HEATER TO CATHODE POTENTIAL	500	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	1000	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT	270	MA.

OPERATING CONDITIONS AND CHARACTERISTICS

HALF WAVE RECTIFIER

CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE (RMS)	117	150	325 MAX.	VOLTS
DC OUTPUT CURRENT MAX.	45	45	45	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE MIN. A	0	30	75	OHMS
TUBE VOLTAGE DROP AT 90 MA. PLATE CURRENT	20			VOLTS

A WHEN FILTER CONDENSERS LARGER THAN 40 μFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

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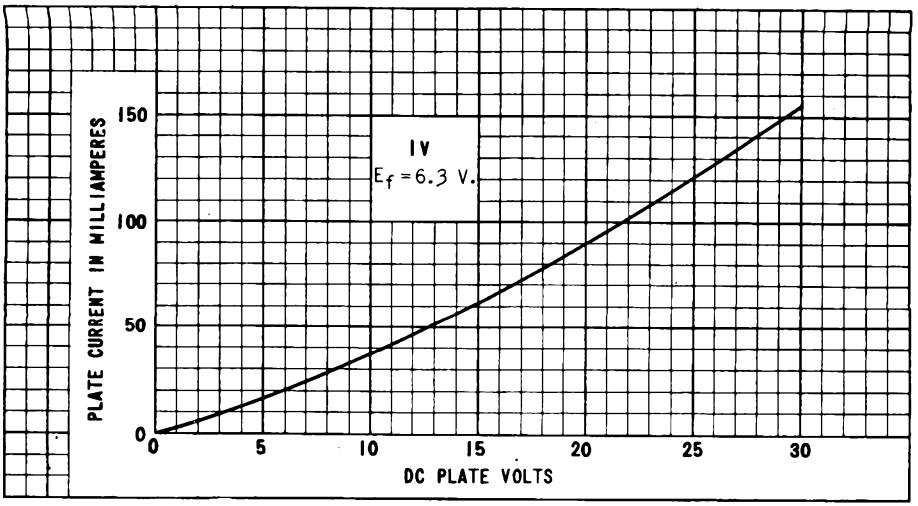
PLATE 685-2

JAN. 29 1940



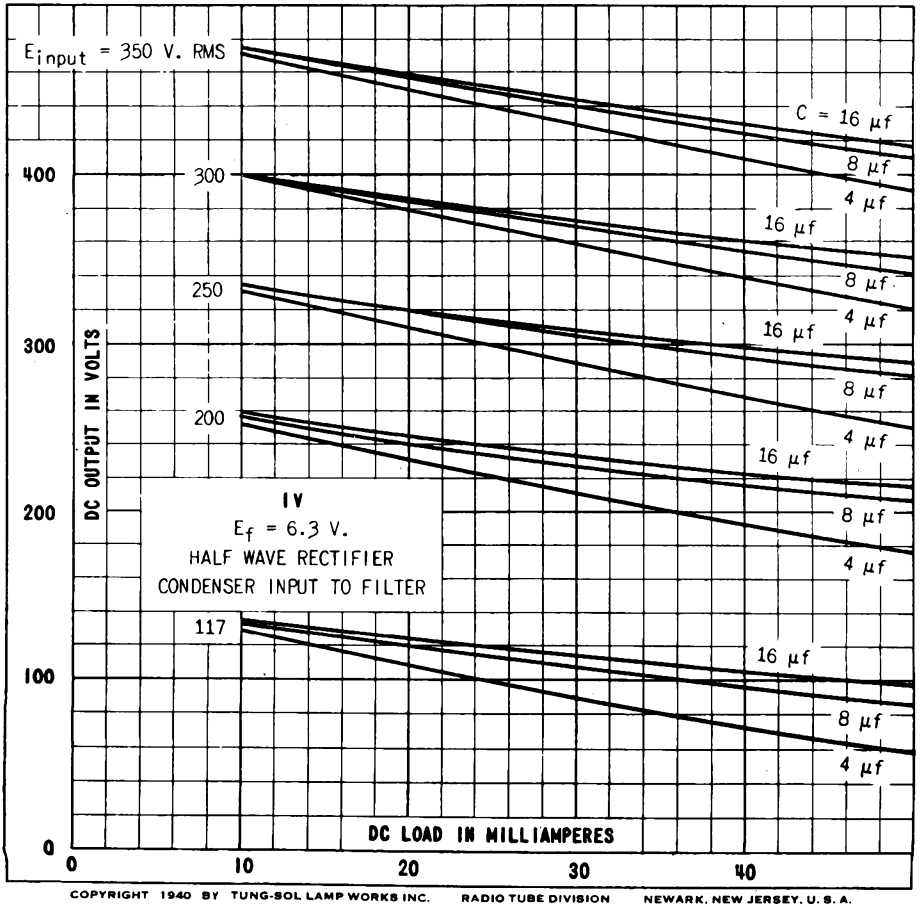


PLATE 686-1

TUNG-SOL

HALF WAVE RECTIFIER

MINIATURE TYPE

PHYSICAL SPECIFICATIONS

EMITTER FILAMENT	PIN CONNECTIONS	
BASE MINIATURE BUTTON 7-PIN	PIN 1 FILAMENT	PIN 7 FILAMENT
CAP SKIRTED MINIATURE	PIN 2 FILAMENT	PIN 8 NONE
BULB T-5½	PIN 3 FILAMENT	TOP CAP PLATE
MAX. DIAMETER 3/4"	PIN 4 FILAMENT	
MAX. SEATED HEIGHT 2 7/16"	PIN 5 FILAMENT	MOUNTING POS. ANY
MAX. OVERALL LENGTH 2 11/16"	PIN 6 FILAMENT	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	1.5	VOLTS
FILAMENT CURRENT	0.300	AMP.
MAXIMUM PEAK INVERSE VOLTAGE	20 000	VOLTS
MAXIMUM PLATE VOLTAGE (RMS)	7 800	VOLTS
TUBE VOLTAGE DROP AT 4.0 MA. PLATE CURRENT	50	VOLTS
MAXIMUM AC PEAK PLATE CURRENT	10.0	MA.
MAXIMUM DC OUTPUT CURRENT	2.0	MA.

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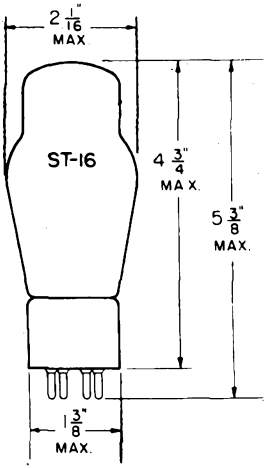
PLATE 1717
JUNE 17 1946

TUNG-SOL



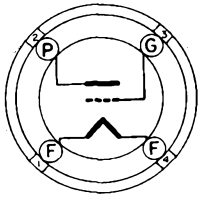
TRIODE POWER AMPLIFIER

COATED FILAMENT
2.5 VOLTS 2.5 AMPERE
AC OR DC

GLASS BULB

MOUNTING POSITION

THIS TUBE SHOULD BE MOUNTED VERTICALLY. HOWEVER HORIZONTAL OPERATION IS PERMISSIBLE IF PINS 1 AND 4 ARE IN A HORIZONTAL PLANE.



BOTTOM VIEW

MEDIUM
4-PIN BASE

THE 2A3 IS A FILAMENT TYPE TRIODE POWER AMPLIFIER. IT IS DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AUDIO AMPLIFIERS WHERE HIGH OUTPUT AND LOW HARMONIC DISTORTION IS DESIRED.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	15	WATTS

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

GRID TO PLATE	16.5	μμf
INPUT	7.5	μμf
OUTPUT	5.5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

SINGLE TUBE

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE, (MEASURED FROM MID-POINT OF AC OPERATED FILAMENT)	-45	VOLTS
MAXIMUM GRID CIRCUIT RESISTANCE		
FIXED BIAS	0.05	MEGOHM
SELF BIAS	0.5	MEGOHM
PLATE CURRENT	60	MA.
PLATE RESISTANCE	800	OHMS
TRANSCONDUCTANCE	5 250	μMHOS
AMPLIFICATION FACTOR	4.2	
LOAD RESISTANCE	2 500	OHMS
POWER OUTPUT	3.5	WATTS
SECOND HARMONIC DISTORTION	5.0	PER CENT

CONTINUED ON NEXT PAGE

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PLATE 1539
JAN. 15 1945

CONTINUED FROM PRECEDING PAGE

CLASS AB_1 AMPLIFIER — PUSH-PULL

VALUES ARE FOR TWO TUBES

	FIXED BIAS	SELF BIAS	
PLATE VOLTAGE	300	300	VOLTS
GRID VOLTAGE [A]	-62	-	VOLTS
CATHODE BIAS RESISTOR	-	780	OHMS
ZERO-SIGNAL PLATE CURRENT	80	80	MA.
LOAD RESISTANCE (PER TUBE)	750	1 250	OHMS
EFFECTIVE LOAD RESISTANCE (PLATE TO PLATE)	3 000	5 000	OHMS
TOTAL HARMONIC DISTORTION	2.5	5.0	PER CENT
POWER OUTPUT	15	10	WATTS

[A] GRID VOLTAGE MEASURED FROM MID-POINT OF AC OPERATED FILAMENT. THE TOTAL EFFECTIVE GRID CIRCUIT RESISTANCE SHOULD BE KEPT AT A MINIMUM. UNDER FIXED BIAS CONDITIONS IT SHOULD NEVER EXCEED 50,000 OHMS WHILE WITH SELF BIAS IT SHOULD NEVER EXCEED 0.5 MEGOHM.

PLATE 1540
JAN. 15 1945

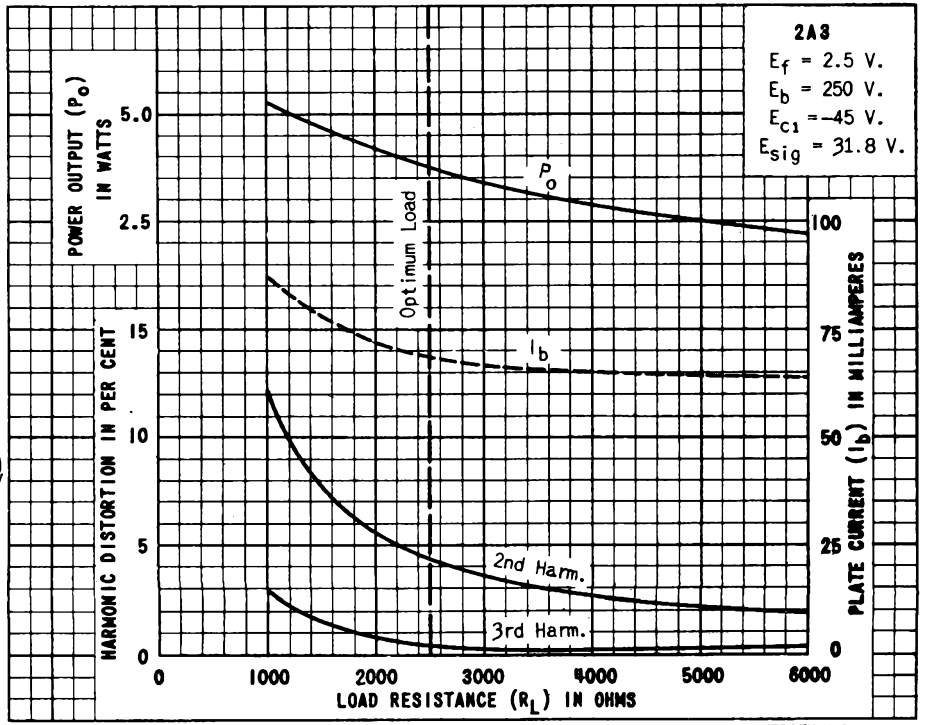
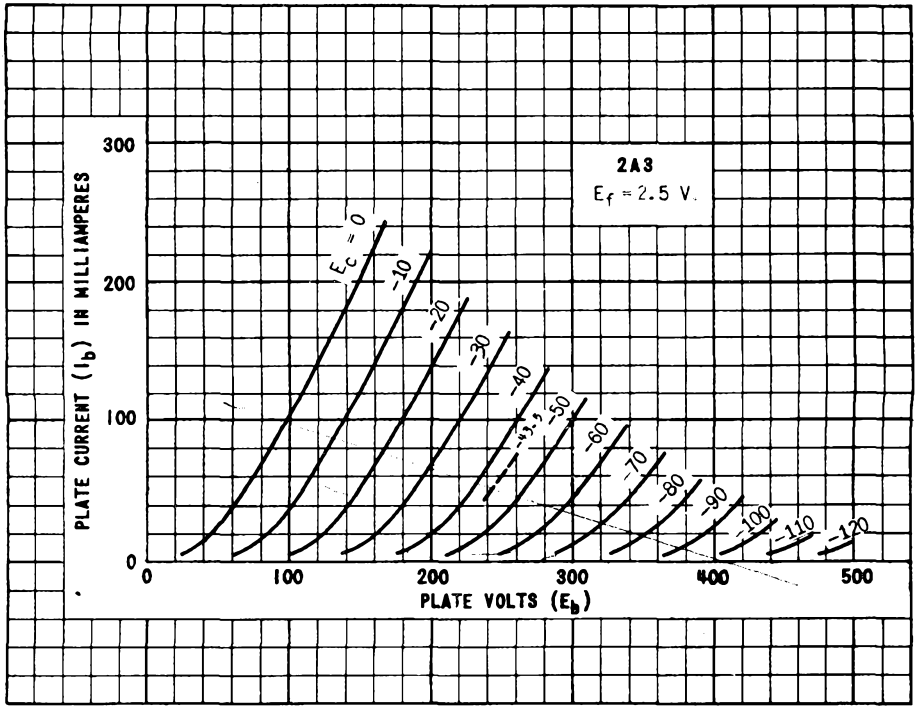


PLATE 295-1

JAN. 23 1939


2A3
E_f = 2.5 V.
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
100
200
300
400
500
E_c = 0
-10
-20
-30
-40
-43.5
-50
-60
-70
-80
-90
-100
-110
-120

2A3

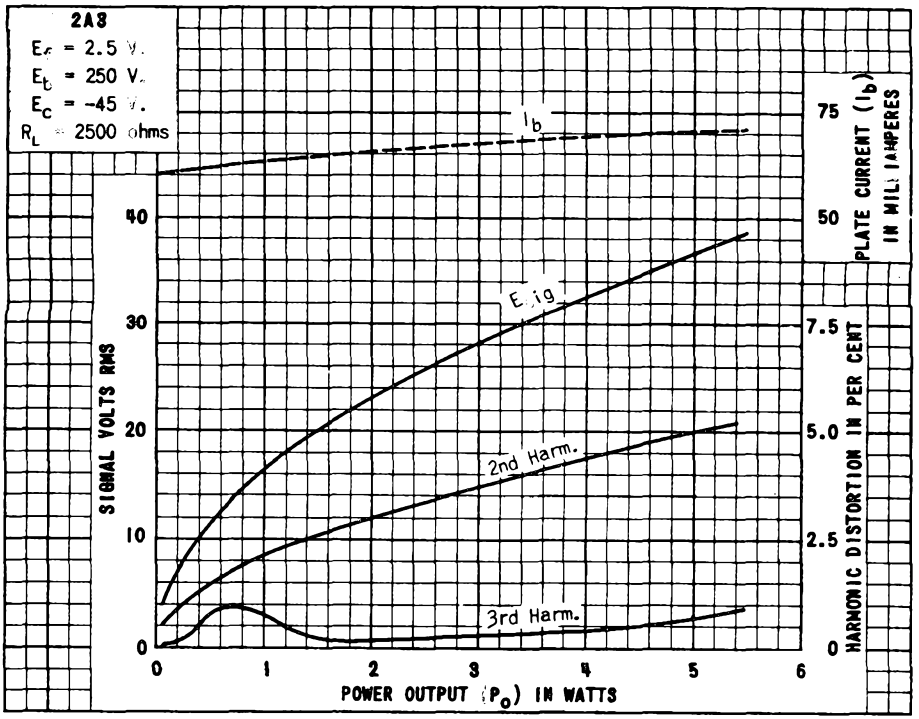
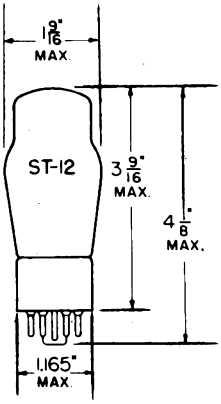


PLATE
296-1

TUNG-SOL



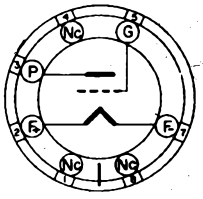
ARGON FILLED THYRATRON

COATED FILAMENT

2.5 VOLTS 2.5 AMPERE

DC

GLASS BULB



SMALL
7-PIN OCTAL BASE

THE 2A4G IS A HOT CATHODE, ARGON FILLED, SINGLE GRID, THYRATRON TUBE PARTICULARLY USEFUL IN APPLICATIONS WHERE CONSTANCY OF CHARACTERISTICS IS NECESSARY EVEN WITH LARGE VARIATIONS IN AMBIENT TEMPERATURE.

RATINGS

MAXIMUM ANODE VOLTAGE: (INSTANTANEOUS)		
FORWARD	200	VOLTS
INVERSE	200	VOLTS
MAXIMUM VOLTAGE BETWEEN ANY TWO ELECTRODES	250	VOLTS
MAXIMUM ANODE CURRENT:		
PEAK	1.25	AMPERES
AVERAGE	0.10	AMPERE
MAXIMUM AVERAGING TIME	45	SECONDS
TUBE VOLTAGE DROP	15	VOLTS
COLD STARTING TIME	2.0	SECONDS

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PLATE
1541
JAN. 15
1945

TUNG-SOL

PENTODE POWER AMPLIFIER

COATED UNIPOTENTIAL CATHODE

HEATERS

6F6, 6F6GT/G, 42 – 6.3 V., 0.7 AMPERE
2A5 – 2.5 V., 1.75 AMPERES

TYPES 6F6, 6F6GT/G, 2A5 AND 42 ARE PENTODE AMPLIFIERS DESIGNED FOR APPLICATION IN POWER OUTPUT STAGES OF RECEIVERS. WITH THE EXCEPTION OF HEATER RATINGS, THEIR ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

MAXIMUM RATINGS

	PENTODE CONNECTION	TRIODE CONNECTION	
MAXIMUM PLATE VOLTAGE	375	350	VOLTS
MAXIMUM SCREEN VOLTAGE	285	–	VOLTS
MAXIMUM PLATE DISSIPATION	11	–	WATTS
MAXIMUM SCREEN DISSIPATION	3.75	–	WATTS
MAXIMUM TOTAL PLATE AND SCREEN DISSIPATION	–	10	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER – SINGLE TUBE [C]

	PENTODE CONNECTION		TRIODE CONNECTION	
PLATE VOLTAGE	250	285	250	VOLTS
SCREEN VOLTAGE	250	285	–	VOLTS
CONTROL GRID VOLTAGE [A]	-16.5	-20	-20	VOLTS
PEAK AF SIGNAL VOLTAGE	16.5	20	20	VOLTS
ZERO-SIGNAL PLATE CURRENT	34	38	31	MA.
ZERO-SIGNAL SCREEN CURRENT	6.5	7	–	MA.
MAXIMUM-SIGNAL PLATE CURRENT	36	40	34	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	10.5	13	–	MA.
PLATE RESISTANCE (APPROX.)	80000	78000	2600	OHMS
TRANSCONDUCTANCE	2500	2550	2600	μMHOS
AMPLIFICATION FACTOR	–	–	6.8	
LOAD RESISTANCE	7000	7000	4000	OHMS
TOTAL HARMONIC DISTORTION	8	9	6.5	PER CENT
POWER OUTPUT	3.2	4.8	0.85	WATTS

PUSH-PULL AMPLIFIER – TWO TUBES [F]

	CLASS A_1 AMPLIFIER [C]	CLASS AB_2 AMPLIFIER [D]		
	PENTODE CONNECTION	PENTODE CONNECTION	TRIODE CONNECTION	
PLATE VOLTAGE	315	375	350	VOLTS
SCREEN VOLTAGE	285	250	–	VOLTS
CONTROL GRID VOLTAGE	-24 [A]	-26	-38	VOLTS
PEAK AF SIGNAL VOLTAGE (GRID TO GRID)	48	82	123	VOLTS
ZERO-SIGNAL PLATE CURRENT	62	34	48	MA.
ZERO-SIGNAL SCREEN CURRENT	12	5	–	MA.
MAXIMUM-SIGNAL PLATE CURRENT	80	82	92	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	19.5	19.5	–	MA.
EFFECTIVE LOAD RESISTANCE (PLATE TO PLATE)	10000	10000	6000	OHMS
TOTAL HARMONIC DISTORTION	4	3.5	2	PER CENT
POWER OUTPUT	11	18.5	13	WATTS

(CONTINUED NEXT PAGE)

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PLATE 1387-1
DEC. 15 1943

TUNG-SOL

TYPICAL OPERATING CONDITIONS FOR CATHODE BIAS

	CLASS A_1 AMPLIFIER [C]				CLASS AB_2 AMPLIFIER [D]		
	SINGLE TUBE AMPLIFIER			PUSH-PULL AMPLI.	PUSH-PULL AMPLI.		
	Pentode Conn.		Triode Conn.	Pentode Conn. [F]	Pentode Conn. [F]	Triode Conn. [F]	
Plate	250	285	250	315	375	350	Volts
Screen	250	285	-	285	250	-	Volts
Cathode Resistor	410	-	650	320	340 [B]	730 [E]	Ohms
Peak A-F Grid Voltage	16.5	20	20	-	-	-	Volts
Peak A-F Grid-to-Grid Voltage	-	-	-	58	94	132	Volts
Zero-Sig. Plate Cur.	34	38	31	62	54	50	Ma.
Max.-Sig. Plate Cur.	35	38	32	73	77	60	Ma.
Zero-Sig. Screen Cur.	6.8	7	-	12	8	-	Ma.
Max.-Sig. Screen Cur.	9.7	12	-	18	18	-	Ma.
Load Resistance	7000	7000	4000	-	-	-	Ohms
Effective Load Resis. (plate to plate)	-	-	-	10000	10000	10000	Ohms
Total Harmonic Dist.	8.5	9	6.5	3	5	3	%
Max.-Sig. Power Output	3.1	4.5	0.8	10.5	19	9	Watts

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER RATED MAXIMUM CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED-BIAS OPERATION.

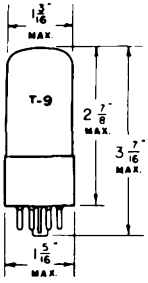
[B] THE VALUE GIVEN FOR THE CATHODE RESISTOR IS DETERMINED FOR A GRID BIAS OF -21 VOLTS.

[C] SUBSCRIPT 1 INDICATES THAT GRID CURRENT DOES NOT FLOW DURING ANY PART OF INPUT CYCLE.

[D] SUBSCRIPT 2 INDICATES THAT GRID CURRENT FLOWS DURING SOME PART OF INPUT CYCLE.

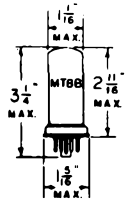
[E] THE VALUE GIVEN FOR THE CATHODE RESISTOR IS DETERMINED FOR A GRID BIAS OF -36.5 VOLTS.

[F] UNLESS OTHERWISE SPECIFIED, VALUES ARE FOR 2 TUBES.



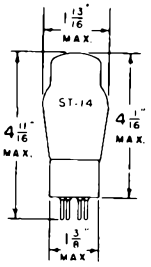
GLASS BULB

6F6GT/G



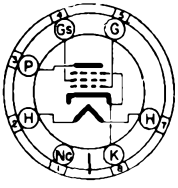
METAL SHELL

6F6

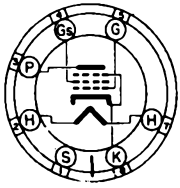


GLASS BULB

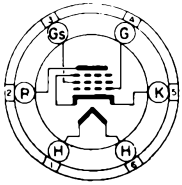
2A5 - 42



MEDIUM 7 PIN OCTAL BASE

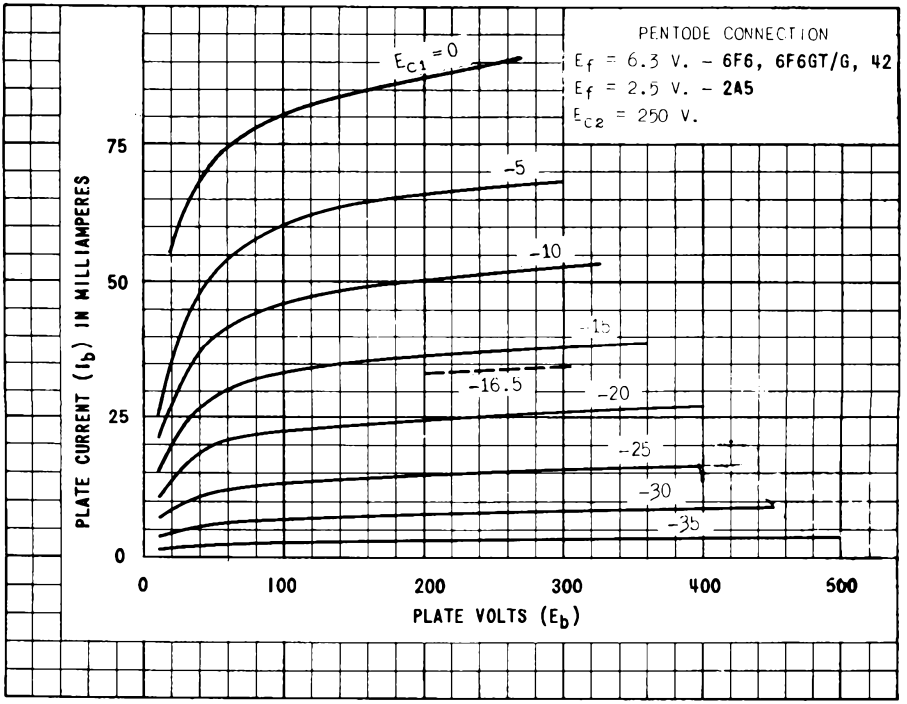


7 PIN OCTAL BASE



MEDIUM 6 PIN BASE

PLATE 1388-1
DEC. 15 1943



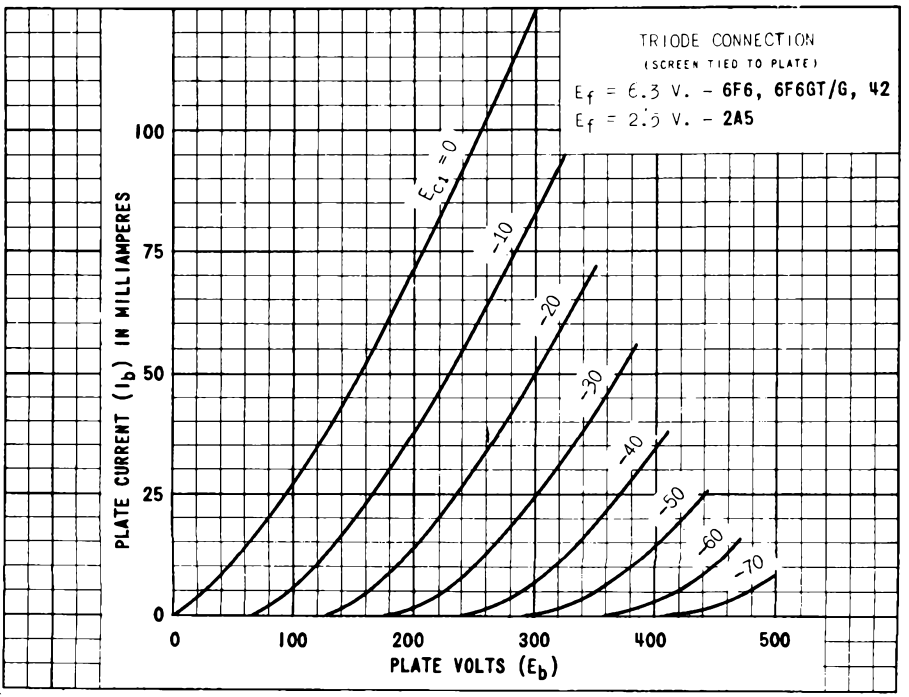


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PLATE
1370-1
OCT. 25
1943

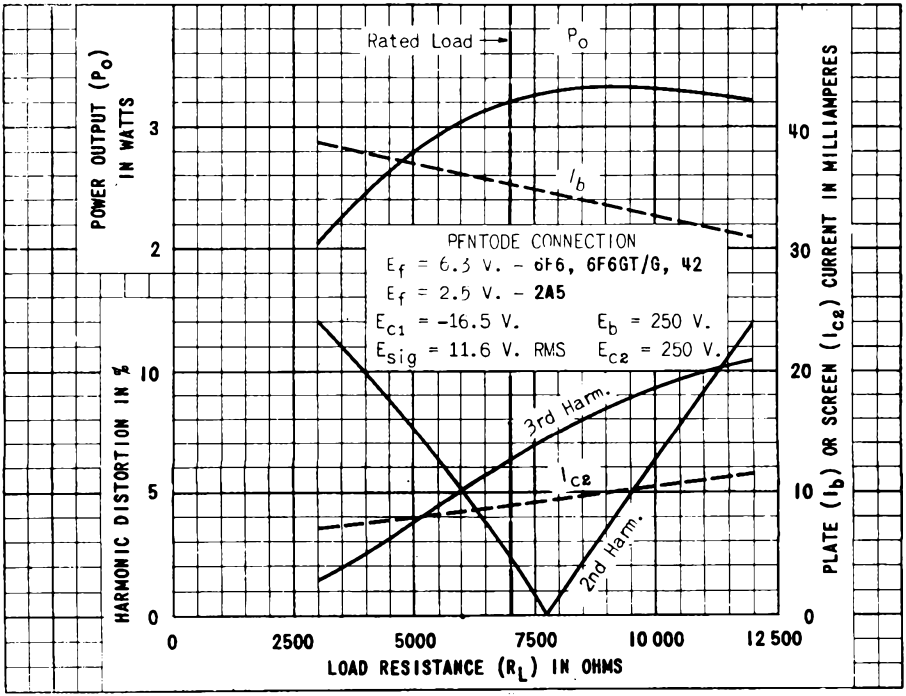
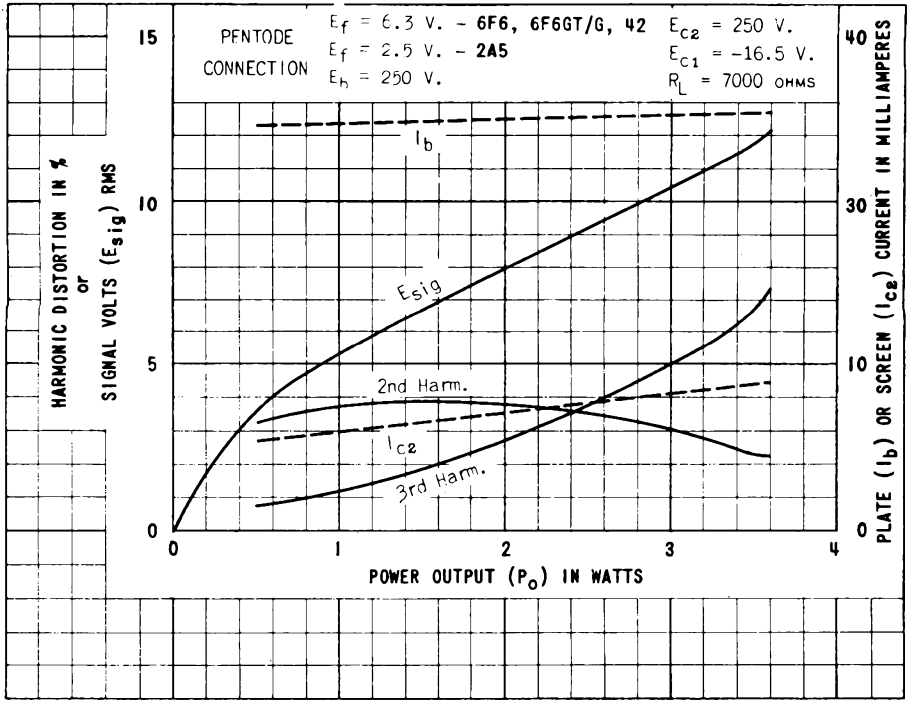
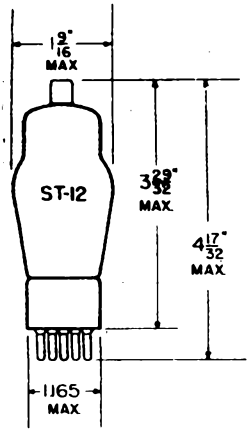


PLATE
1371-1
OCT. 25
1943

2A5 (42, 6F6, 6F6GT/G)



TUNG-SOL



2A6, 75

SMALL METAL CAP

DUO-DIODE HIGH-MU TRIODE AMPLIFIER

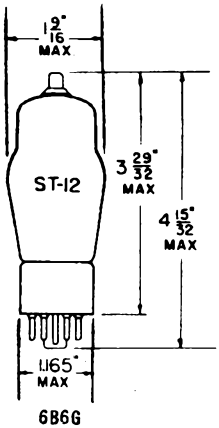
COATED UNIPOTENTIAL CATHODE

2A6	2.5 VOLTS	0.8 AMPERE
75	6.3 VOLTS	0.3 AMPERE
6B6G	6.3 VOLTS	0.3 AMPERE

AC OR DC

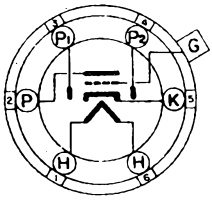
GLASS BULB

ANY MOUNTING POSITION



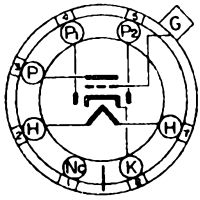
6B6G

SKIRTED MINIATURE CAP



BOTTOM VIEW

SMALL 6-PIN BASE



BOTTOM VIEW

SMALL 7-PIN OCTAL BASE

THE 2A6, 6B6G AND 75 COMBINE TWO DIODES AND A HIGH-MU TRIODE IN A SINGLE BULB, USING A COMMON CATHODE. THEY ARE DESIGNED FOR USE AS DIODE DETECTORS, AVC RECTIFIERS AND RESISTANCE COUPLED AMPLIFIERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	250	VOLTS
MINIMUM DIODE CURRENT PER PLATE WITH 10 VOLTS DC APPLIED	0.8	MA.
MAXIMUM CATHODE VOLTAGE	100	VOLTS

CONTINUED ON NEXT PAGE

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PLATE 1542
JAN. 15 1945

TUNG-SOL

CONTINUED FROM PRECEDING PAGE.

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

TRIODE UNIT

GRID TO PLATE	1.7	μμf
INPUT	1.7	μμf
OUTPUT	3.8	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

TRIODE UNIT

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-2.0	VOLTS
PLATE CURRENT	0.9	MA.
PLATE RESISTANCE	91 000	OHMS
TRANSCONDUCTANCE	1 100	μMHOS
AMPLIFICATION FACTOR	100	

RESISTANCE COUPLED AMPLIFIER

PLATE SUPPLY VOLTAGE	100	100	250	VOLTS
PLATE LOAD RESISTOR	0.25	0.25	0.25	MEGOHM
CATHODE RESISTOR	0.0	10 000	4 000	OHMS
GRID CIRCUIT RESISTOR	6.0	1.0	1.0	MEGOHMS
GRID COUPLING CONDENSER	0.01	0.05	0.05	μf
VOLTAGE GAIN	35	35	52	

PLATE 1543
JAN. 15 1945

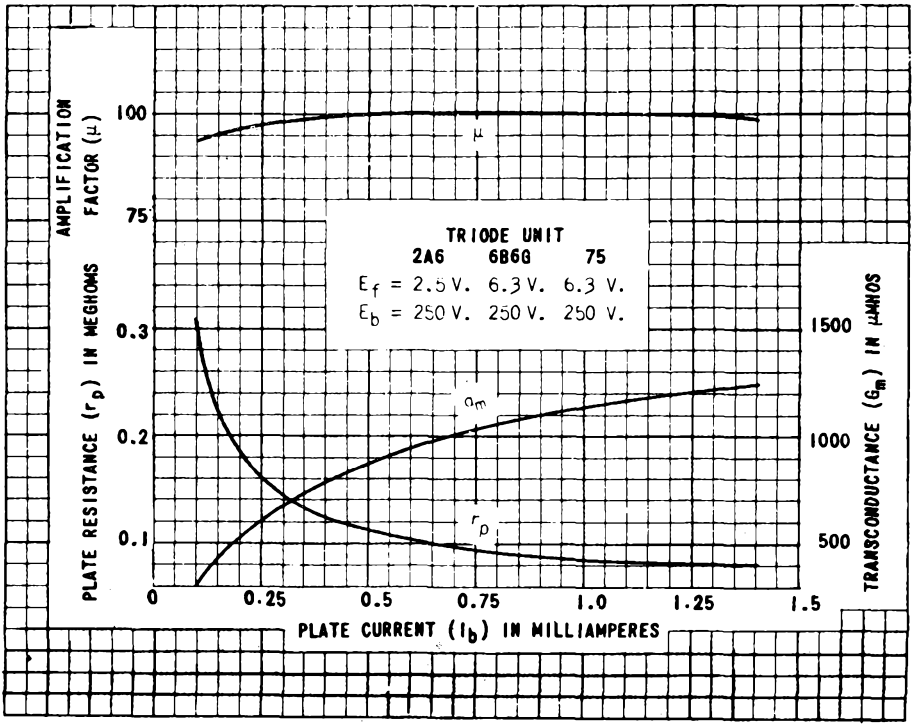

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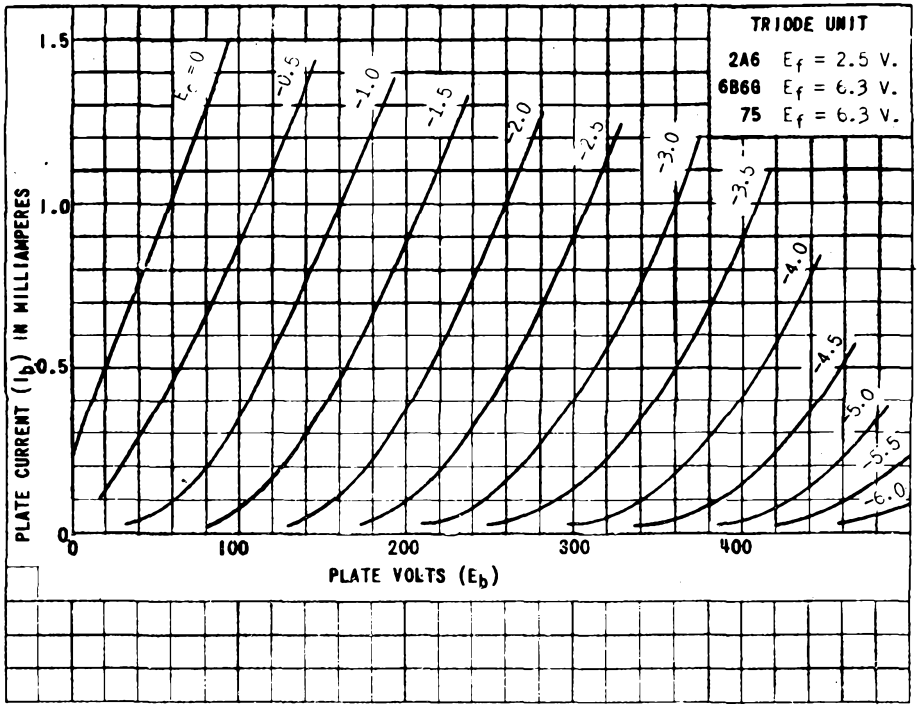
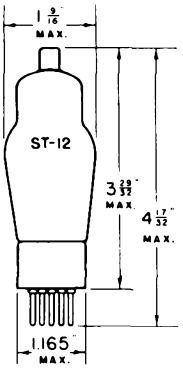
PLATE 1544
JAN. 15 1945

(75,6B6G) 2A6


TRIODE UNIT
2A6 E_f = 2.5 V.
6B6G E_f = 6.3 V.
75 E_f = 6.3 V.
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
1.5
1.0
0.5
0
100
200
300
400
E_c = 0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
-5.5
-6.0

TUNG-SOL



PENTAGRID CONVERTER

UNIPOTENTIAL CATHODE

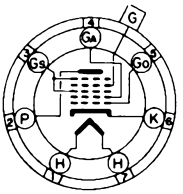
HEATER

2A7 – 2.5 VOLTS 0.8 AMPERE

6A7 – 6.3 VOLTS 0.3 AMPERE

AC OR DC

GLASS BULB



7C

BOTTOM VIEW

SMALL 7 PIN BASE

THE TUNG-SOL 2A7 AND 6A7 ARE PENTAGRID CONVERTERS DESIGNED FOR SERVICE AS OSCILLATORS AND MIXERS IN AC OPERATED AND AC-DC OPERATED RECEIVERS. WITH THE EXCEPTION OF HEATER RATINGS, THEY HAVE IDENTICAL RATINGS AND ELECTRICAL CHARACTERISTICS.

RATINGS

MAXIMUM PLATE (P) VOLTAGE	300	VOLTS
MAXIMUM SCREEN (G_S) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL CONTROL GRID (G) BIAS VOLTAGE	0	VOLTS
MAXIMUM OSCILLATOR ANODE (G_A) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM OSCILLATOR ANODE VOLTAGE	200	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	0.3	WATT
MAXIMUM OSCILLATOR ANODE DISSIPATION	0.75	WATT

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FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

PLATE 916-2

DEC. 30 1940

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID (G) TO MIXER PLATE (P)[S]	0.3	μμf
CONTROL GRID (G) TO OSCILLATOR ANODE (G_A)[S]	0.15	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (G_O)[S]	0.15	μμf
OSCILLATOR GRID (G_O) TO OSCILLATOR ANODE (G_A)	1.0	μμf
RF INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES	8.5	μμf
OSCILLATOR INPUT: OSCILLATOR GRID (G_O) TO ALL OTHER ELECTRODES	7.0	μμf μμf
OSCILLATOR OUTPUT: OSCILLATOR ANODE (G_A) TO ALL OTHER ELECTRODES	5.5	μμf
MIXER OUTPUT: MIXER PLATE (P) TO ALL OTHER ELECTRODES	9.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

PLATE (P) VOLTAGE	100	250	VOLTS
SCREEN (G_S) VOLTAGE	50	100	VOLTS
CONTROL GRID (G) VOLTAGE MIN.	−1.5	−3	VOLTS
OSCILLATOR ANODE (G_A) SUPPLY VOLTAGE[A]	–	250	VOLTS
OSCILLATOR ANODE VOLTAGE	100	–	VOLTS
OSCILLATOR GRID (G_O) RESISTOR	50 000	50 000	OHMS
PLATE CURRENT	1.1	3.5	MA.
SCREEN CURRENT	1.3	2.7	MA.
OSCILLATOR ANODE CURRENT	2.0	4.0	MA.
OSCILLATOR GRID CURRENT	0.25	0.4	MA.
TOTAL CATHODE CURRENT	4.6	10.6	MA.
PLATE RESISTANCE APPROX.	0.6	0.36	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −1.5 V.	360	–	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −3 V.	180	550	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −6 V.	50	325	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −10 V.	–	100	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = −20 V.	3	–	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = −35 V.	–	6	μMHOS

[A] APPLIED THROUGH A 20 000 OHM DROPPING RESISTOR

[S] WITH EXTERNAL SHIELD CONNECTED TO CATHODE

PLATE 917-2

TUNG-SOL

HIGH VACUUM CATHODE-RAY TUBE

ELECTROSTATIC DEFLECTION AND FOCUSING

NO. 1 PHOSPHOR
GREEN FLUORESCENT SCREEN
MEDIUM PERSISTENCE

HEATER
6.3 VOLTS (± 10%) 0.6 AMPERE
AC OR DC

COATED UNIPOTENTIAL CATHODE

GLASS BULB

SMALL SHELL MAGNAL 11 PIN BASE

RATINGS*

MAXIMUM ANODE NO. 2 VOLTAGE (HIGH VOLTAGE ELECTRODE)	1100	VOLTS
MAXIMUM ANODE NO. 1 VOLTAGE (FOCUSING ELECTRODE)	550	VOLTS
GRID VOLTAGE (CONTROL ELECTRODE)	NEVER POSITIVE	
MAXIMUM PEAK VOLTAGE BETWEEN ANODE NO. 2 AND ANY DEFLECTOR	660	VOLTS
MAXIMUM DC HEATER CATHODE POTENTIAL[A]	125	VOLTS
MAXIMUM GRID CIRCUIT RESISTANCE	1.5	MEGOHMS
MAXIMUM IMPEDANCE OF ANY DEFLECTOR CIRCUIT AT HEATER SUPPLY FREQUENCY	1.0	MEGOHM

*MAXIMUM RATINGS ARE ABSOLUTE VALUES

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

CONTROL ELECTRODE TO ALL OTHER ELECTRODES	8.0	μμf
CATHODE TO ALL OTHER ELECTRODES	5.5	μμf
D1 TO D2	0.6	μμf
D3 TO D4	1.1	μμf
D1 TO ALL OTHER ELECTRODES	8.5	μμf
D3 TO ALL OTHER ELECTRODES	9.0	μμf
D1 TO ALL OTHER ELECTRODES EXCEPT D2	8.0	μμf
D2 TO ALL OTHER ELECTRODES EXCEPT D1	4.6	μμf
D3 TO ALL OTHER ELECTRODES EXCEPT D4	7.5	μμf
D4 TO ALL OTHER ELECTRODES EXCEPT D3	3.6	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

ANODE NO. 2 VOLTAGE[B]	500	1000	VOLTS
ANODE NO. 1 VOLTAGE FOR FOCUS AT 75% OF GRID VOLTAGE CUT-OFF (APPROX.)[C]	125	250	VOLTS
GRID VOLTAGE FOR CUT-OFF[D]	-30[E]	-60[E]	VOLTS
DEFLECTION SENSITIVITY:[F]			
D1 AND D2	0.220	0.110	MM/VOLT DC
D3 AND D4	0.260	0.130	MM/VOLT DC
DEFLECTION FACTOR:[F]			
D1 AND D2	115	230	VOLTS DC/IN
D3 AND D4	98	196	VOLTS DC/IN

CONTINUED NEXT PAGE

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PLATE 1395
MARCH 15 1944

CONTINUED FROM PRECEDING PAGE

SPOT POSITION AND TEST CONDITIONS

THE UNDEFLECTED FOCUSED SPOT FALLS WITHIN A 10 MM. SQUARE CENTERED ON THE TUBE FACE.

TEST CONDITIONS ARE:

ANODE NO. 2 VOLTAGE	1000 VOLTS
ANODE NO. 1 VOLTAGE	ADJUSTED FOR FOCUS
GRID VOLTAGE	NEAR CUT-OFF
DEFLECTOR RESISTORS (CONNECTED TO ANODE NO. 2)	1 MEGOHM EACH

NOTE: SHIELD TUBE FROM ALL STRAY FIELDS.

[A] WHEN THE HEATER IS OPERATED AT A NEGATIVE POTENTIAL WITH RESPECT TO THE CATHODE THEN THE CATHODE RETURN SHOULD BE MADE AT THE CENTER TAP OF THE FILAMENT TRANSFORMER.

[B] USE OF LESS THAN 500 VOLTS RESULTS IN DECREASED BRILLIANCE.

[C] CERTAIN TUBES MAY REQUIRE ADJUSTMENT OF +20% TO -45% WITH GRID VOLTAGE BETWEEN ZERO AND CUT-OFF.

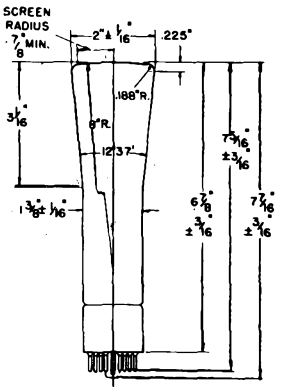
[D] THE VISUAL EXTINCTION OF A FOCUSED SPOT.

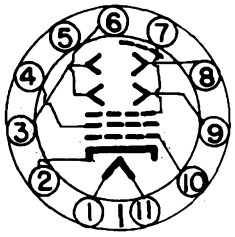
[E] THE GRID SUPPLY SHOULD BE VARIABLE TO ± 50%.

[F] VALUES SUBJECT TO VARIATION OF ± 20%.

DEFLECTOR LOCATIONS:

D1 AND D2	NEAREST TO SCREEN
D3 AND D4	NEAREST TO BASE
D1	SAME SIDE OF TUBE AS PIN NO. 4
D3	SAME SIDE AS PIN NO. 1



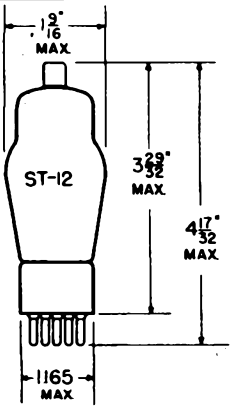


BOTTOM VIEW

1. HEATER
2. CATHODE
3. DEFLECTOR NO. 1 (D1)
4. ANODE NO. 1
5. NO CONNECTION
6. DEFLECTOR NO. 4 (D4)
7. ANODE NO. 2
8. DEFLECTOR NO. 2 (D2)
9. DEFLECTOR NO. 3 (D3)
10. GRID
11. HEATER

PLATE 1396
MARCH 15 1944

TUNG-SOL



2B7, 6B7

SMALL METAL CAP

DUO-DIODE PENTODE AMPLIFIER

COATED UNIPOTENTIAL CATHODE

2B7 - 2.5 VOLTS 0.8 AMPERE

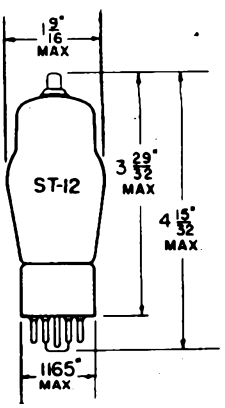
6B7 - 6.3 VOLTS 0.3 AMPERE

6B8G - 6.3 VOLTS 0.3 AMPERE

AC OR DC

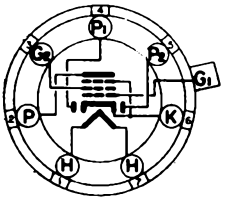
GLASS BULB

ANY MOUNTING POSITION



6B8G

SKIRTED MINIATURE CAP



BOTTOM VIEW

SMALL 7-PIN BASE

BOTTOM VIEW

SMALL SHELL 8-PIN OCTAL BASE

THE 2B7, 6B7, AND 6B8G CONSIST OF TWO DIODES AND A PENTODE UTILIZING A COMMON CATHODE. THEY ARE DESIGNED FOR SERVICE AS COMBINED DETECTORS, AVC RECTIFIERS AND PENTODE AMPLIFIERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLTS
MINIMUM DIODE CURRENT PER PLATE WITH 10 VOLTS DC	0.8	MA.
MAXIMUM PLATE DISSIPATION	2.25	WATTS
MAXIMUM SCREEN DISSIPATION	0.3	WATTS

CONTINUED ON NEXT PAGE

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PLATE 1545
JAN. 15 1945

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD CONNECTED TO CATHODE

PENTODE UNIT

	2B7, 6B7	6B8G	
INPUT: G1 TO (F+K+G2+G3)	3.5	3.6	μμf
OUTPUT: P TO (F+K+G2+G3)	9.5	9.5	μμf
CONTROL GRID TO PLATE	0.007 (MAX.)	0.01 (MAX.)	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PENTODE UNIT

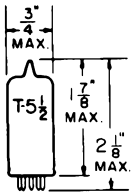
PLATE VOLTAGE	100	180	250	250	VOLTS
SCREEN VOLTAGE	100	75	100	125	VOLTS
CONTROL GRID VOLTAGE	-3.0	-3.0	-3.0	-3.0	VOLTS
PLATE CURRENT	5.8	3.4	6.0	9.0	MA.
SCREEN CURRENT	1.7	0.9	1.5	2.3	MA.
PLATE RESISTANCE (APPROX.)	0.3	1.0	0.8	0.6	MEGOHM
TRANSCONDUCTANCE	950	840	1 000	1 125	μMHOS
GRID BIAS (FOR CATHODE CURRENT CUT-OFF, APPROX.)	-17	-13	-17	-21	VOLTS

PLATE 1546
JAN. 15 1945

TUNG-SOL

THYRATRON

MINIATURE TYPE

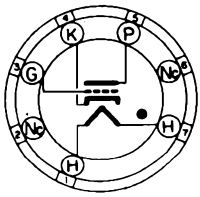


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
2.5 VOLTS 0.650 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 2C4 IS A THYRATRON DESIGNED FOR USE IN COMPACT, LIGHT-WEIGHT, PORTABLE EQUIPMENT. IT IS RECOMMENDED THAT NO MATERIAL BE PERMITTED TO OBSTRUCT THE HOLE IN THE BASE SOCKET AS THIS TYPE MAY BE MANUFACTURED WITH THE EXHAUST-TUBE TIP AT THE BASE END.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	2.5	VOLTS
HEATER CURRENT	0.650	AMP.
HEATING TIME (MINIMUM)	30	SECONDS
MAXIMUM VOLTAGE BETWEEN ELEMENTS	450	VOLTS
AVERAGE ANODE CURRENT[A]	5.0	MA.
PEAK ANODE CURRENT	20	MA.
TUBE VOLTAGE DROP AT 5.0 MA. (APPROX.)	16	VOLTS

[A] AVERAGED OVER PERIOD OF NOT MORE THAN 30 SECONDS.

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PLATE 1742
NOV. 1, 1946

→ INDICATES A CHANGE OR ADDITION.

2C4

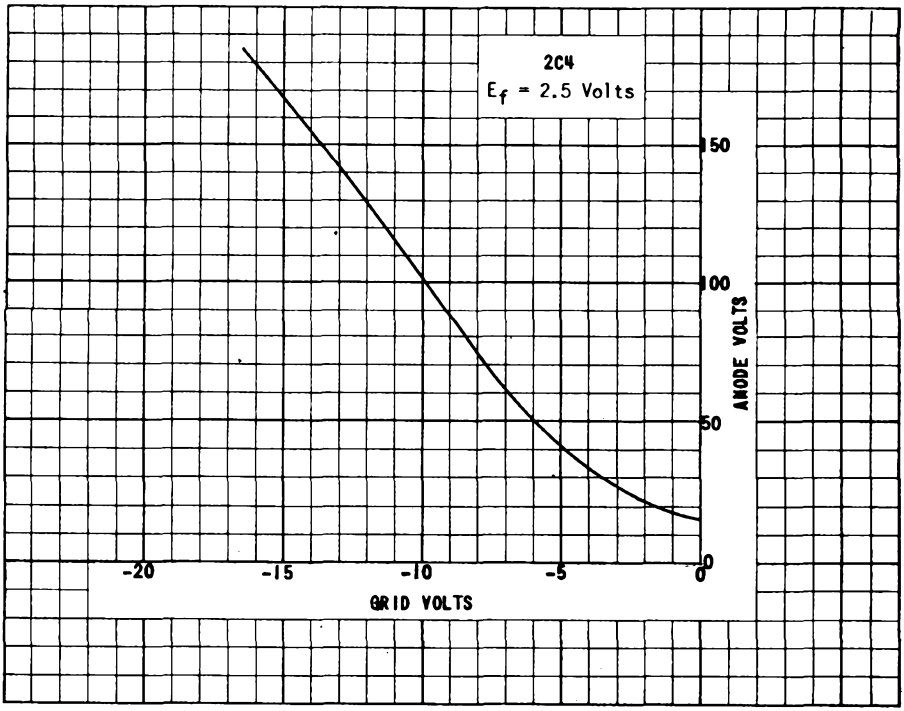
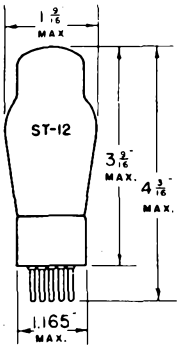


PLATE
1743
NOV. 1,
1946

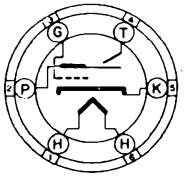


CATHODE RAY TUNING INDICATOR

UNIPOTENTIAL CATHODE

HEATER
2.5 VOLTS 0.8 AMPERE
AC OR DC

GLASS BULB



6R
BOTTOM VIEW

SMALL 6 PIN BASE

THE TUNG-SOL 2E5 CONSISTS OF A CIRCULAR FLUORESCENT TARGET WITH AN INDICATING SHADOW ANGLE CONTROLLED BY AN INTERNALLY CONNECTED SHARP CUT-OFF AMPLIFIER. WHEN THE 2E5 IS USED AS A TUNING INDICATOR AVC VOLTAGE IS APPLIED TO THE TRIODE GRID. WITH THE EXCEPTION OF HEATER RATINGS, ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF THE 6E5.

RATINGS

MAXIMUM PLATE SUPPLY VOLTAGE	250	VOLTS
MAXIMUM TARGET VOLTAGE	250	VOLTS
MINIMUM TARGET VOLTAGE	100	VOLTS

OPERATING CONDITIONS AND CHARACTERISTICS

PLATE AND TARGET SUPPLY VOLTAGE	100	200	250	VOLTS
TRIODE GRID VOLTAGE (0° SHADOW ANGLE) APPROX.	-3.3	-6.5	-8.0	VOLTS
TRIODE GRID VOLTAGE (90° SHADOW ANGLE) APPROX.	0	0	0	VOLTS
SERIES TRIODE PLATE RESISTOR	0.5	1	1	MEGOHM
TRIODE PLATE CURRENT (TRIODE GRID V.=0)	0.19	0.19	0.24	MA.
TARGET CURRENT (TRIODE GRID V.=0)[B]	1	3	4	MA.

[B] SUBJECT TO WIDE VARIATIONS

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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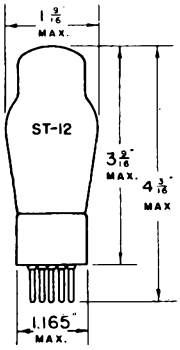
PLATE 891-2

NOV. 8 1940

TUNG-SOL

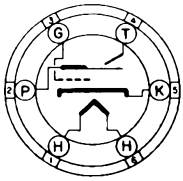


CATHODE RAY TUNING INDICATOR

UNIPOTENTIAL CATHODE

HEATER
2.5 VOLTS 0.8 AMPERE
AC OR DC

GLASS BULB



6R
BOTTOM VIEW

SMALL 6 PIN BASE

THE TUNG-SOL 2G5 CONSISTS OF A CIRCULAR FLUORESCENT TARGET WITH AN INDICATING SHADOW ANGLE CONTROLLED BY AN INTERNALLY CONNECTED REMOTE CUT-OFF AMPLIFIER. WHEN THE 2G5 IS USED AS A TUNING INDICATOR, AVC VOLTAGE IS APPLIED TO THE TRIODE GRID. WITH THE EXCEPTION OF HEATER RATINGS, ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF THE 6U5/6G5.

RATINGS

MAXIMUM PLATE SUPPLY VOLTAGE	250	VOLTS
MAXIMUM TARGET VOLTAGE	250	VOLTS
MINIMUM TARGET VOLTAGE	100	VOLTS

OPERATING CONDITIONS AND CHARACTERISTICS

PLATE AND TARGET SUPPLY VOLTAGE	100	200	250	VOLTS
TRIODE GRID VOLTAGE (0° SHADOW ANGLE) APPROX.	-8	-18.5	-22	VOLTS
TRIODE GRID VOLTAGE (90° SHADOW ANGLE) APPROX.	0	0	0	VOLT
SERIES TRIODE PLATE RESISTOR	0.5	1	1	MEGOHM
TRIODE PLATE CURRENT (TRIODE GRID V.=0)	0.19	0.19	0.24	MA.
TARGET CURRENT (TRIODE GRID V.=0)[A]	1	3	4	MA.

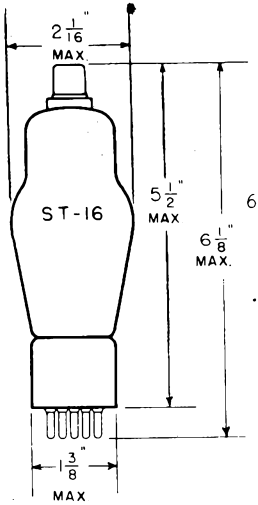
[A] SUBJECT TO WIDE VARIATIONS

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

PLATE 892-1

TUNG-SOL

PENTODE POWER AMPLIFIER OSCILLATOR



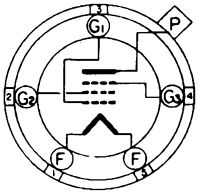
COATED FILAMENT

6.3 VOLTS[A] 1.5 AMPS.
AC OR DC

GLASS BULB

MOUNTING POSITION

HORIZONTAL OPERATION PERMITTED IF PINS 2 AND 4 ARE IN A VERTICAL PLANE.



BOTTOM VIEW

MEDIUM 5 PIN
MICANOL BASE

MEDIUM METAL CAP

TYPE 2E22 IS DESIGNED PRIMARILY FOR CLASS C AMPLIFIER OR OSCILLATOR SERVICE IN PORTABLE EQUIPMENT.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	750	VOLTS
MAXIMUM SCREEN GRID VOLTAGE	250	VOLTS
MAXIMUM CONTROL GRID VOLTAGE	-200	VOLTS
MAXIMUM PLATE DISSIPATION	30	WATTS
MAXIMUM SCREEN DISSIPATION	10	WATTS
MAXIMUM PLATE CURRENT	110	MA.
MAXIMUM CONTROL GRID CURRENT	9.0	MA.

DIRECT INTERELECTRODE CAPACITANCES

GRID TO PLATE (WITH SHIELD)	0.20 MAX.	μμf
INPUT	13	μμf
OUTPUT	8.0	μμf

[A] THE FILAMENT VOLTAGE SHOULD BE HELD AS CLOSE TO 6.3 VOLTS AS POSSIBLE. INTERMITTENT OPERATION TO AS HIGH AS 7.0 OR AS LOW AS 5.5 VOLTS IS PERMISSIBLE.

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PLATE 1562
FEB. 28 1945

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS C, R-F AMPLIFIER OR OSCILLATOR

PLATE VOLTAGE	500	500	750	750	VOLTS
SCREEN VOLTAGE	250	250	250	250	VOLTS
SCREEN RESISTOR[B]	15 000	15 000	30 000	30 000	OHMS
SUPPRESSOR VOLTAGE	0	22.5	0	22.5	VOLTS
PLATE CURRENT	100	100	100	100	MA.
SCREEN CURRENT	16	16	16	16	MA.
CONTROL GRID CURRENT (APPROX.)	6.0	6.0	6.0	6.0	MA.
CONTROL GRID RESISTOR[C]	10 000	10 000	10 000	10 000	OHMS
PEAK R-F GRID VOLTAGE (APPROX.)	100	100	100	100	VOLTS
GRID DRIVING POWER (APPROX.)	0.55	0.55	0.55	0.55	WATT
POWER OUTPUT (APPROX.)	30	34	48	53	WATTS

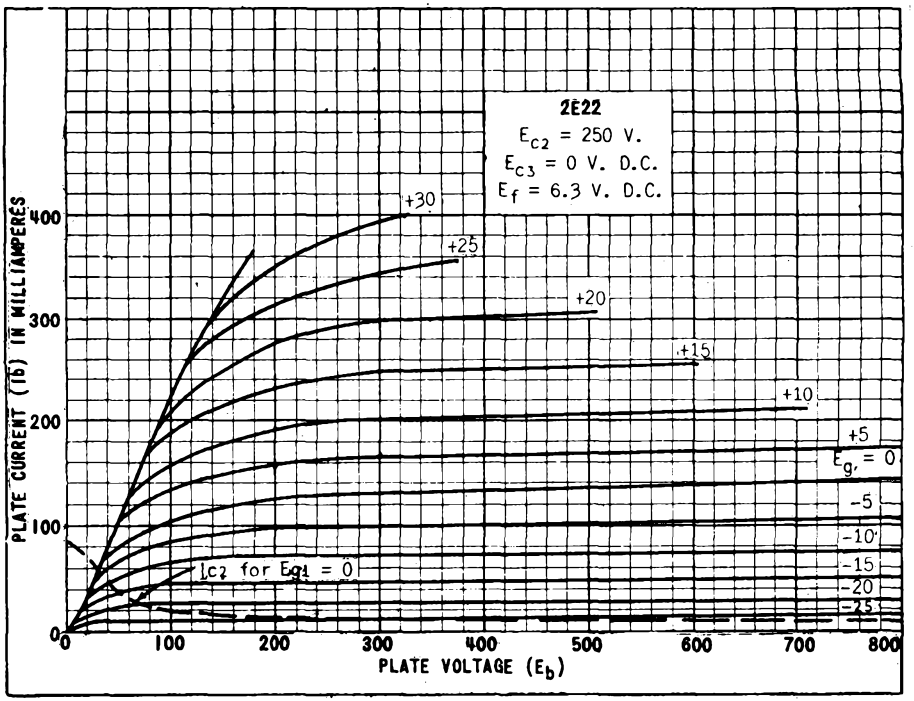
SUPPRESSOR MODULATED CLASS C AMPLIFIER

PLATE VOLTAGE	500	750	VOLTS
SCREEN VOLTAGE	250	250	VOLTS
SCREEN RESISTOR	8 500	17 000	OHMS
SUPPRESSOR VOLTAGE	-65	-90	VOLTS
PEAK A-F INPUT	65	90	VOLTS
PEAK R-F GRID VOLTAGE	100	100	VOLTS
PLATE CURRENT	50	55	MA.
SCREEN CURRENT (APPROX.)	29	29	MA.
CONTROL GRID CURRENT (APPROX.)	6.5	6.5	MA.
CONTROL GRID RESISTOR[C]	10 000	10 000	OHMS
GRID DRIVING POWER (APPROX.)	0.6	0.6	WATT
POWER OUTPUT (APPROX.)	10.5	16.5	WATTS
MODULATION	95	95	PER CENT

[B] SERIES SCREEN DROPPING RESISTOR SHOULD NOT BE USED IF UNDER KEY-UP CONDITIONS THE SCREEN VOLTAGE EXCEEDS 500 VOLTS.

[C] THE TOTAL EFFECTIVE GRID CIRCUIT RESISTANCE SHALL NOT EXCEED 25,000 OHMS.

PLATE
1563
FEB. 28
1945



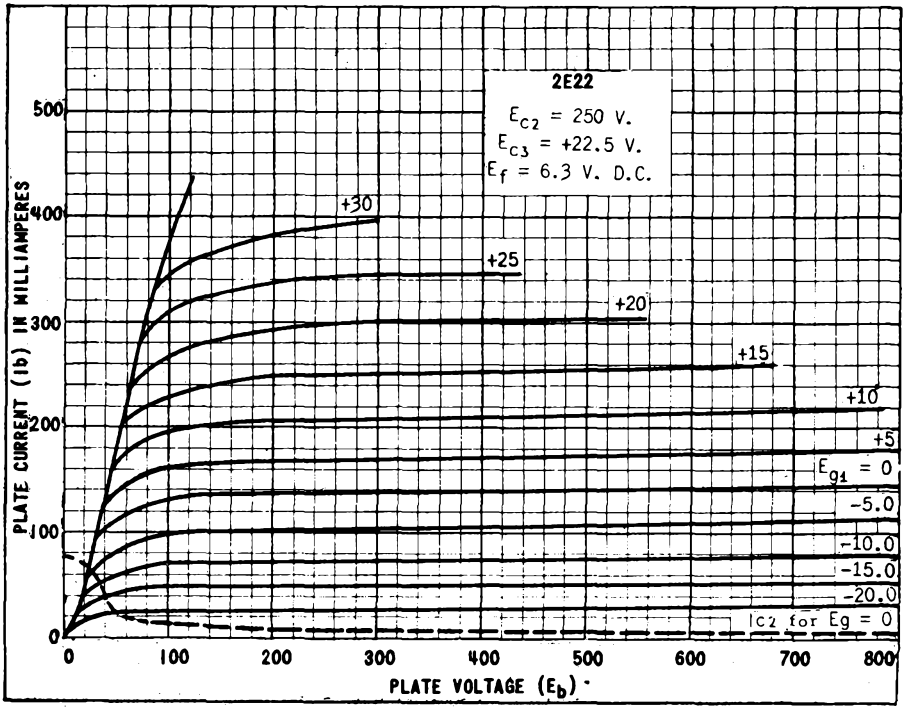


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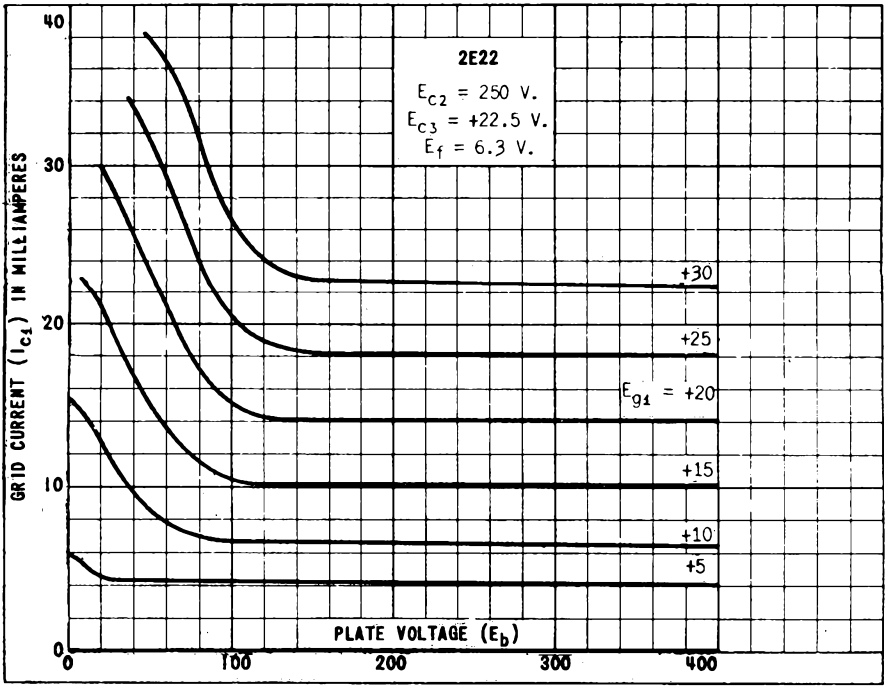
PLATE 1564
FEB. 28 1945

2E22



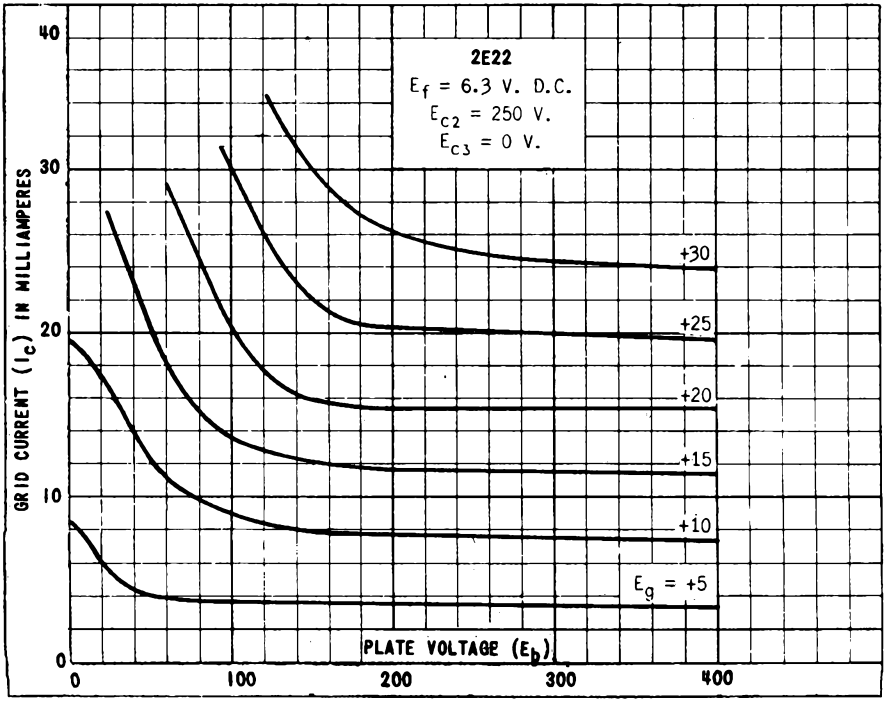
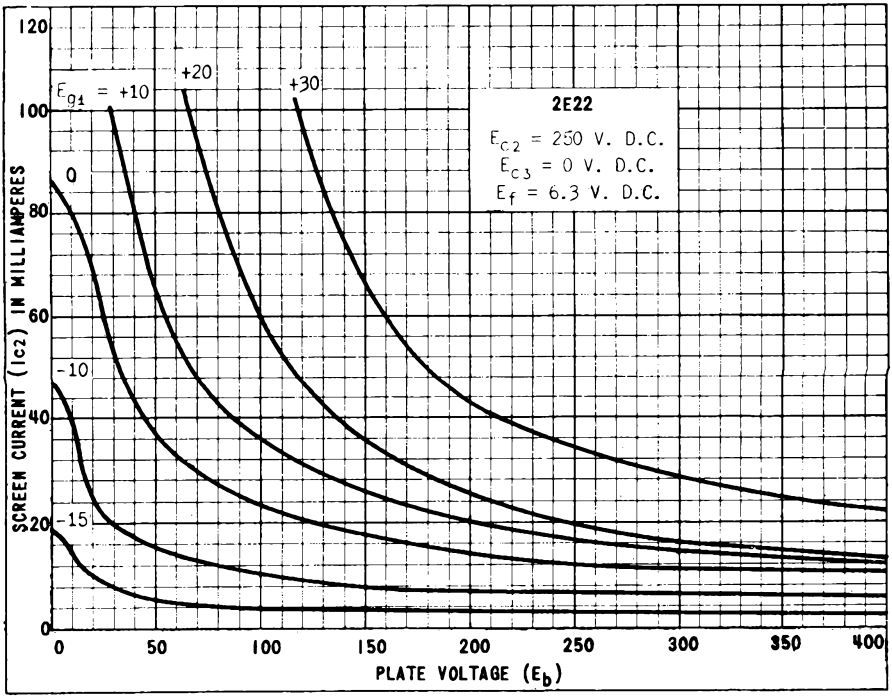


PLATE 1565
FEB. 28 1945



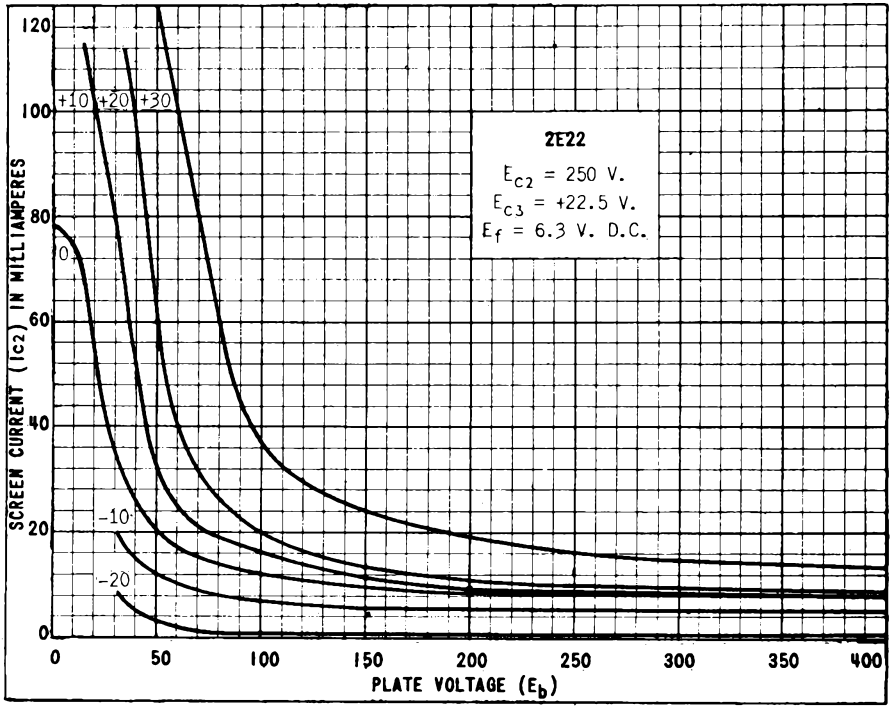


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PLATE
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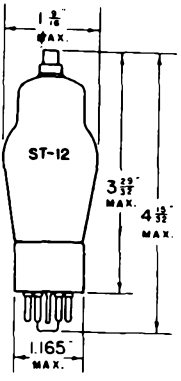
FEB. 28
1945

TUNG-SOL

HALF WAVE, HIGH VACUUM RECTIFIER



TUNGSTEN FILAMENT

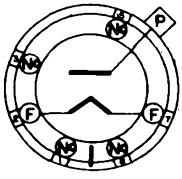
2.5 VOLTS 5 AMPERES

AC

GLASS BULB

SMALL SHELL OCTAL 6 PIN BASE

MOUNTING POSITION – VERTICAL ONLY



BOTTOM VIEW

THE 2V3G IS INTENDED FOR USE AS THE RECTIFIER IN THE HIGH VOLTAGE SUPPLY FOR CATHODE-RAY TUBES.

RATINGS*

MAXIMUM PEAK INVERSE VOLTAGE	16500	VOLTS
MAXIMUM PEAK PLATE CURRENT	12	MA.
MAXIMUM AVERAGE PLATE CURRENT	2	MA.

*INTERPRETED ACCORDING TO RMA STANDARD M8-210

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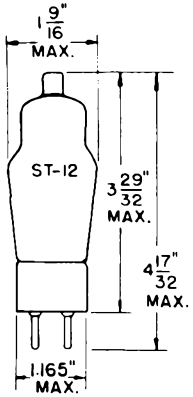
PLATE 1410
MARCH 15 1944

TUNG-SOL

HALF WAVE, HIGH VACUUM RECTIFIER



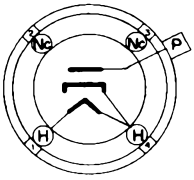
COATED UNIPOTENTIAL CATHODE

HEATER
2.5 VOLTS[A] 1.75 AMPERES
AC

GLASS BULB

SMALL 4 PIN BASE

MOUNTING POSITION – ANY



BOTTOM VIEW

THE 2X2 (879) IS INTENDED FOR USE AS THE RECTIFIER IN THE HIGH VOLTAGE SUPPLY FOR CATHODE-RAY TUBES.

RATINGS*

MAXIMUM AC PLATE VOLTAGE (RMS)[B]	4500	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	12500	VOLTS
MAXIMUM PEAK PLATE CURRENT	100	MA.
MAXIMUM DC OUTPUT CURRENT	7.5	MA.
TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE (MIN.)		

*INTERPRETED ACCORDING TO RMA STANDARD M8-210

[A] IT IS IMPORTANT THAT THE HEATER TRANSFORMER SECONDARY BE INSULATED TO WITHSTAND THE MAXIMUM PEAK INVERSE VOLTAGE ENCOUNTERED IN THE INSTALLATION.

[B] IN A VOLTAGE DOUBLER CIRCUIT THE TWO 2X2 TUBES MAY BE OPERATED TO DELIVER APPROXIMATELY TWICE THE VOLTAGE OBTAINABLE FROM A HALF-WAVE RECTIFIER CIRCUIT FOR THE SAME AC INPUT VOLTAGE. IN THIS CASE A SEPARATE HEATER SUPPLY WINDING IS REQUIRED FOR EACH TUBE.

SMOOTHING FILTER REQUIREMENTS, DUE TO THE LOW CURRENT DEMAND OF CATHODE-RAY TUBES, MAY BE MET BY A SIMPLE RESISTIVE CAPACITIVE FILTER. WITH A BLEEDER LOAD CURRENT OF 1 MILLIAMPERE A CONDENSER OF 0.05 μf FOLLOWED BY A 0.5 MEGOHM RESISTOR AND A SECOND CONDENSER OF 0.15 μf IS ADEQUATE. WHEN THE VOLTAGE DROP MUST BE KEPT AT A MINIMUM, A CONDENSER OF 0.5 TO 2 μf MAY BE SHUNTED ACROSS THE BLEEDER. FILTER CONDENSERS MUST HAVE A RATING TO WITHSTAND THE INSTANTANEOUS PEAK AC INPUT VOLTAGE.

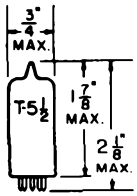
PLATE
1402
MARCH 15
1944

TUNG-SOL

POWER AMPLIFIER PENTODE

MINIATURE TYPE

COATED FILAMENT

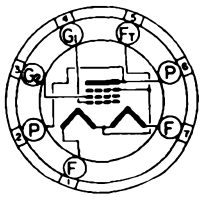


GLASS BULB

SERIES FILAMENT	PARALLEL FILAMENT
E_f APPLIED BETWEEN PINS 1 & 7	E_f APPLIED BETWEEN PIN 5 AND PINS 1 & 7 TIED TOGETHER.
E_{g1} REFERRED TO PIN 1	E_{g1} REFERRED TO PIN 5
2.8 VOLTS	1.4 VOLTS
0.1 AMP.	0.2 AMP.

DC

A SHUNTING RESISTOR MUST BE CONNECTED BETWEEN PINS 1 AND 5 FOR SERIES-FILAMENT OPERATION. ITS VALUE SHOULD BE SUCH THAT THE VOLTAGE ACROSS THE SHUNTED SECTION IS EQUAL TO THE VOLTAGE BETWEEN PINS 5 AND 7. AN ADDITIONAL SHUNTING RESISTOR MAY BE NECESSARY BETWEEN PINS 1 AND 7 IF OTHER TUBES USED IN SERIES-FILAMENT ARRANGEMENT CONTRIBUTE TO THE FILAMENT CURRENT OF THE 3A4.



BOTTOM VIEW

MINIATURE BUTTON 7 PIN BASE

ANY MOUNTING POSITION

THE 3A4 IS DESIGNED FOR USE IN COMPACT, LIGHTWEIGHT, PORTABLE EQUIPMENT. THE RELATIVELY LARGE FILAMENT EMPLOYED IN THE 3A4 ENABLES IT TO SUPPLY THE HIGH PEAK CURRENTS REQUIRED IN RF POWER APPLICATIONS. IN RF AMPLIFIER SERVICE THE 3A4 WILL DELIVER A POWER OUTPUT OF ABOUT 1.2 WATTS AT 10 MEGACYCLES. IT IS RECOMMENDED THAT NO MATERIAL BE PERMITTED TO OBSTRUCT THE HOLE IN THE BASE SOCKET AS THIS TYPE MAY BE MANUFACTURED WITH THE EXHAUST-TUBE TIP AT THE BASE END.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

	AF POWER AMPLIFIER	RF POWER AMPLIFIER	
MAXIMUM PLATE VOLTAGE	150	150	VOLTS
MAXIMUM SCREEN VOLTAGE	90	135	VOLTS
MAXIMUM GRID VOLTAGE	---	-30	VOLTS
MAXIMUM PLATE CURRENT	---	20	MA.
MAXIMUM GRID CURRENT	---	0.25	MA.
MAXIMUM TOTAL CATHODE CURRENT	18	25	MA.
MAXIMUM PLATE INPUT	---	3.0	WATTS
MAXIMUM PLATE DISSIPATION	2.0	2.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.4	0.9	WATT

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

GRID TO PLATE (MAX.)	0.34	μμf
INPUT	4.8	μμf
OUTPUT	4.2	μμf

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PLATE 1794
NOV. 1, 1946

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION

CONTINUED FROM PRECEDING PAGE

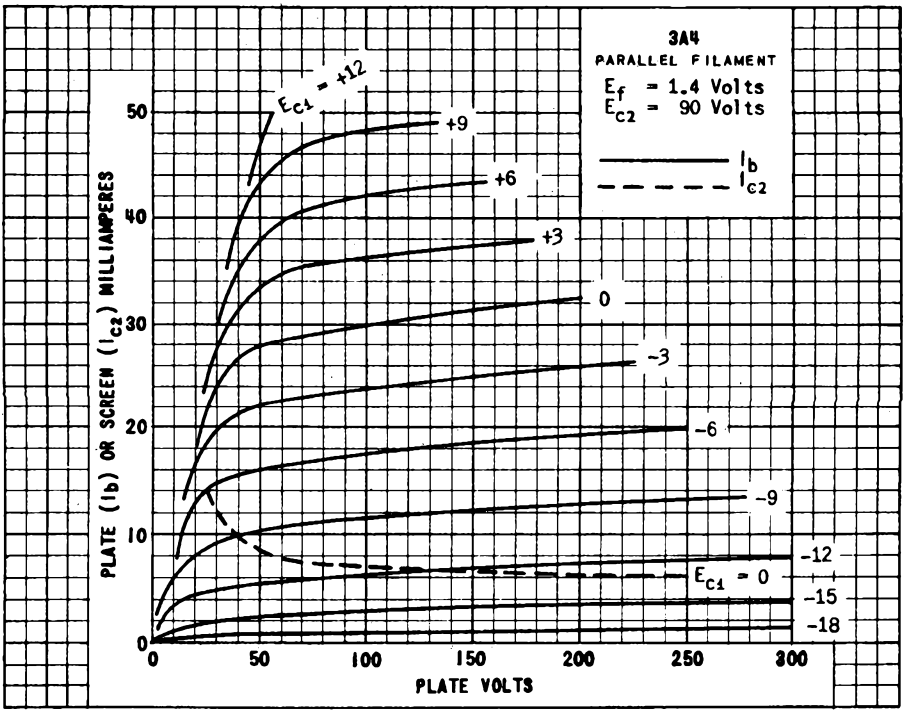
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

VALUES FOR SERIES-FILAMENT OPERATION WILL BE APPROXIMATELY THE SAME AS FOR PARALLEL-FILAMENT OPERATION.

	PARALLEL FILAMENT ARRANGEMENT			
	AF POWER AMPLIFIER		RF POWER AMPLIFIER AT 10 MC.	
PLATE VOLTAGE	135	150	150	VOLTS
SCREEN VOLTAGE	90	90	135	VOLTS
GRID VOLTAGE	-7.5	-8.4	---	VOLTS
PEAK AF GRID VOLTAGE	7.5	8.4	---	VOLTS
ZERO-SIGNAL PLATE CURRENT	14.8	13.3	---	MA.
ZERO-SIGNAL SCREEN CURRENT	2.6	2.2	---	MA.
MAXIMUM-SIGNAL PLATE CURRENT	14.9	14.1	18.3	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	3.5	3.5	6.5	MA.
GRID CURRENT	---	---	0.13	MA.
GRID RESISTOR	---	---	0.2	MEGOHM
LOAD RESISTANCE	8 000	8 000	---	OHMS
PLATE RESISTANCE	90 000	100 000	---	OHMS
TRANSCONDUCTANCE	1 900	1 900	---	μMHOS
MAXIMUM-SIGNAL POWER OUTPUT	0.6	0.7	1.2 (APPROX.)	WATTS
TOTAL HARMONIC DISTORTION	5.0	6.0	---	PER CENT

→ INDICATES A CHANGE OR ADDITION



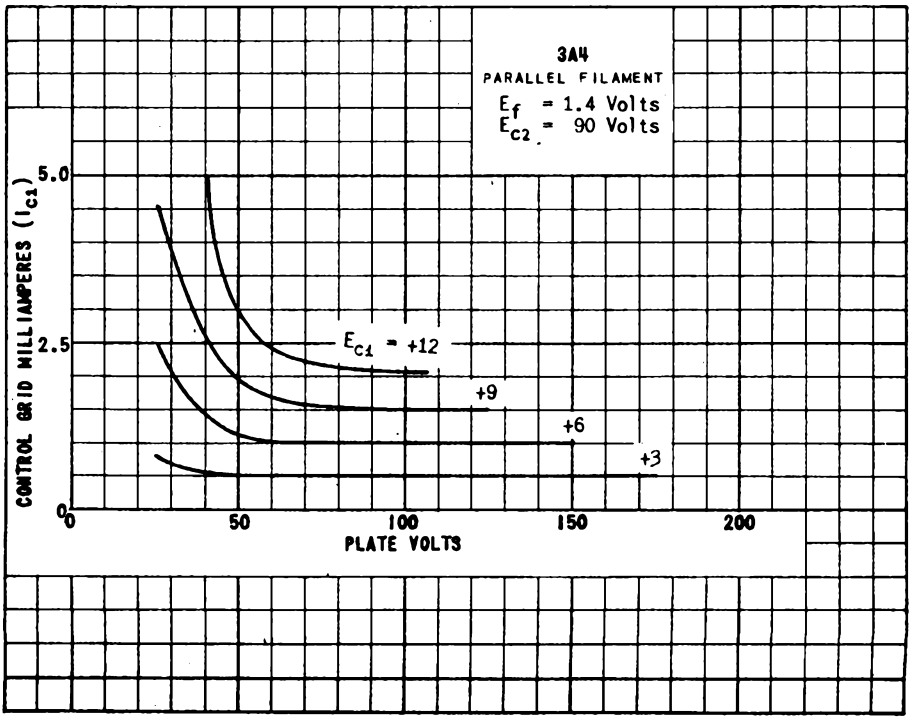


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PLATE
1796
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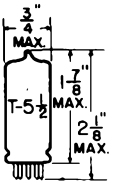
1946

TUNG-SOL

DOUBLE TRIODE

MINIATURE TYPE

COATED FILAMENT



GLASS BULB

SERIES FILAMENT
E_f APPLIED BETWEEN PINS 1 & 7
E_g REFERRED TO PIN 1

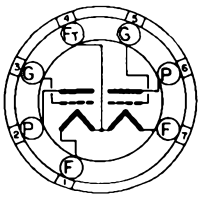
2.8 VOLTS
110 MA.

PARALLEL FILAMENT
E_f APPLIED BETWEEN PIN 4 AND PINS 1 & 7 TIED TOGETHER.
E_g REFERRED TO PIN 4

1.4 VOLTS
220 MA.

DC

A SHUNTING RESISTOR MUST BE CONNECTED BETWEEN PINS 1 AND 4 FOR SERIES-FILAMENT OPERATION. ITS VALUE SHOULD BE SUCH THAT THE VOLTAGE ACROSS THE SHUNTED SECTION IS EQUAL TO THE VOLTAGE BETWEEN PINS 4 AND 7. AN ADDITIONAL SHUNTING RESISTOR MAY BE NECESSARY BETWEEN PINS 1 AND 7 IF OTHER TUBES USED IN SERIES-FILAMENT ARRANGEMENT CONTRIBUTE TO THE FILAMENT CURRENT OF THE 3A5.



BOTTOM VIEW
MINIATURE BUTTON 7 PIN BASE

ANY MOUNTING POSITION

THE 3A5 IS INTENDED FOR USE IN HIGH FREQUENCY APPLICATIONS. THE RELATIVELY LARGE FILAMENT EMPLOYED IN THE 3A5 ENABLES IT TO SUPPLY THE HIGH PEAK CURRENTS REQUIRED IN RF POWER APPLICATIONS. IN CLASS C SERVICE, A 3A5 WITH ITS UNITS IN PUSH-PULL WILL DELIVER A POWER OUTPUT OF APPROXIMATELY 2 WATTS AT 40 MEGACYCLES. IT MAY BE USED AT STILL HIGHER FREQUENCIES WITH REDUCED EFFICIENCY. EACH TRIODE MAY BE USED INDEPENDENTLY OF THE OTHER.

DIRECT INTERELECTRODE CAPACITANCES

	TRIODE UNIT 1	TRIODE UNIT 2	
GRID TO PLATE: (G TO P)	3.2	3.2	μμf
INPUT: (G TO H)	0.9	0.9	μμf
OUTPUT: (P TO H)	1.0	1.0	μμf
PLATE TO PLATE: (P TO P)	0.32		μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

	AF AMPLIFIER	RF AMPLIFIER	
FILAMENT VOLTAGE	1.4 2.8	1.4 2.8	VOLTS
MAXIMUM PLATE VOLTAGE	135	135	VOLTS
MAXIMUM DC GRID VOLTAGE	---	-30	VOLTS
MAXIMUM PLATE CURRENT	5	---	MA.
MAXIMUM DC PLATE CURRENT (PER UNIT)	---	15	MA.
MAXIMUM DC GRID CURRENT (PER UNIT)	---	2.5	MA.
MAXIMUM PLATE DISSIPATION	0.5	---	WATT
MAXIMUM PLATE DISSIPATION (PER UNIT)	---	1.0	WATT
MAXIMUM PLATE INPUT (PER UNIT)	---	2.0	WATT

CONTINUED ON FOLLOWING PAGE

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PLATE 1909
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CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

AF AMPLIFIER

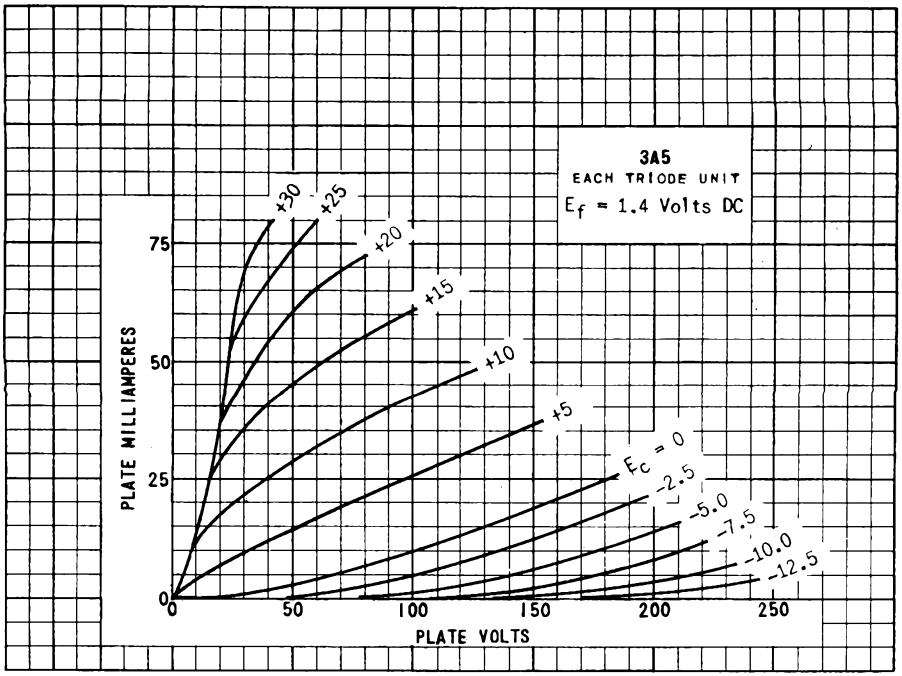
HEATER VOLTAGE	1.4	2.8	VOLTS
HEATER CURRENT	220	110	MA.
PLATE VOLTAGE	90		VOLTS
GRID VOLTAGE	-2.5		VOLTS
PLATE CURRENT	3.7		MA.
PLATE RESISTANCE	8 300		OHMS
TRANSCONDUCTANCE	1 800		μMHOS
AMPLIFICATION FACTOR	15		

RF POWER AMPLIFIER AND OSCILLATOR-CLASS "C" TELEGRAPHY

AT 40 MC WITH BOTH UNITS IN PUSH-PULL
(KEY-DOWN CONDITIONS PER TUBE WITHOUT MODULATION)

FILAMENT VOLTAGE	1.4	2.8	VOLTS
FILAMENT CURRENT	220	110	MA.
DC PLATE VOLTAGE	135		VOLTS
DC GRID VOLTAGE:			
FROM A FIXED SUPPLY OF	-20		VOLTS
FROM A GRID RESISTOR OF	4 000		OHMS
FROM A CATHODE RESISTOR OF	570		OHMS
PEAK RF GRID-TO-GRID VOLTAGE	90		VOLTS
DC PLATE CURRENT	30		MA.
DC GRID CURRENT (APPROX.)	5		MA.
DRIVING POWER (APPROX.)	0.2		WATT
POWER OUTPUT (APPROX.)	2		WATTS

PLATE 1910
NOV. 1, 1947



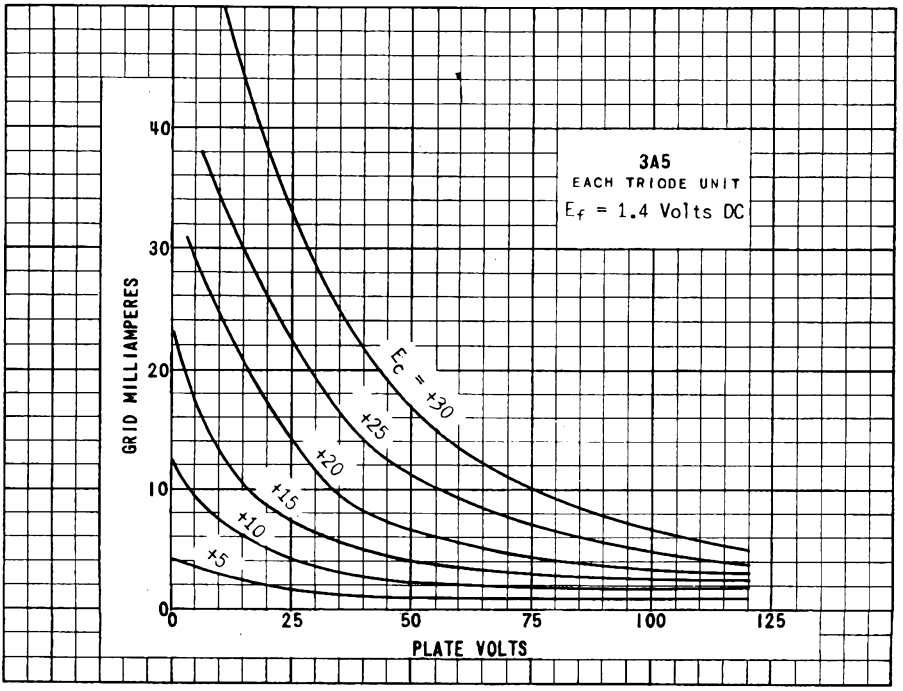


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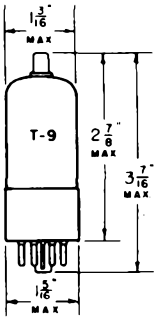
PLATE
1911
NOV. 1,
1947

TUNG-SOL

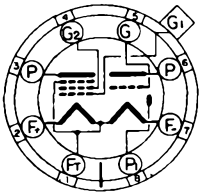


DIODE TRIODE PENTODE

DETECTOR AMPLIFIER

COATED FILAMENT

SERIES	PARALLEL
2.8 V.	1.4 V.
.05 A.	0.1 A.



BOTTOM VIEW

GLASS BULB

INTERMEDIATE 8 PIN OCTAL BASE

THE 3A8GT IS A LOW FILAMENT DRAIN TYPE INCORPORATING IN ONE ENVELOPE A SINGLE DIODE, A HIGH MU-TRIODE, AND A VOLTAGE AMPLIFIER PENTODE. THE THREE UNITS ARE INDEPENDENT WITH THE EXCEPTION OF THE COMMON TAPPED FILAMENT. THE TUBE IS ESSENTIALLY THE EQUIVALENT OF A 1H5GT AND A 1N5GT IN ONE ENVELOPE.

RATINGS

	TRIODE	PENTODE	
MAXIMUM PLATE VOLTAGE	110	110	VOLTS
MAXIMUM SCREEN VOLTAGE	–	110	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH CLOSE FITTING SHIELD CONNECTED TO FILAMENT

	TRIODE	PENTODE	
GRID TO PLATE	2.0	.012	μμf
INPUT	2.6	3.0	μμf
OUTPUT	4.2	10.0	μμf

CONTINUED NEXT PAGE

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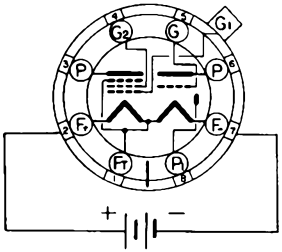
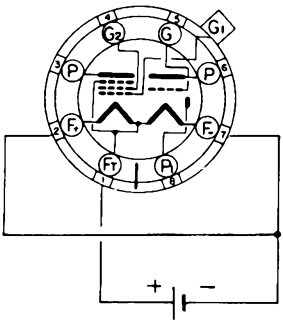
PLATE 1461
AUG. 31 1944

TUNG-SOL

FILAMENTS CONNECTED IN SERIES



FILAMENTS CONNECTED IN PARALLEL



TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

	TRIODE	PENTODE	
PLATE VOLTAGE	90	90	VOLTS
SCREEN VOLTAGE	–	90	VOLTS
GRID VOLTAGE [A]	0	0	VOLTS
PLATE CURRENT	0.2	1.5	MA.
SCREEN CURRENT	–	0.5	MA.
PLATE RESISTANCE (APPROX.)	0.2	0.8	MEGOHM
TRANSCONDUCTANCE	325	750	μMHOS
AMPLIFICATION FACTOR	65	–	

[A] GRID BIAS MEASURED FROM THE NEGATIVE FILAMENT OF EACH SECTION.

DIODE UNIT

THE DIODE PLATE IS LOCATED AT THE NEGATIVE END OF THE FILAMENT, AND IS INDEPENDENT OF THE TRIODE UNIT AND OF THE PENTODE UNIT EXCEPT FOR THE COMMON FILAMENT.

MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED IS 0.5 MA.

PLATE 1462
AUG. 31 1944

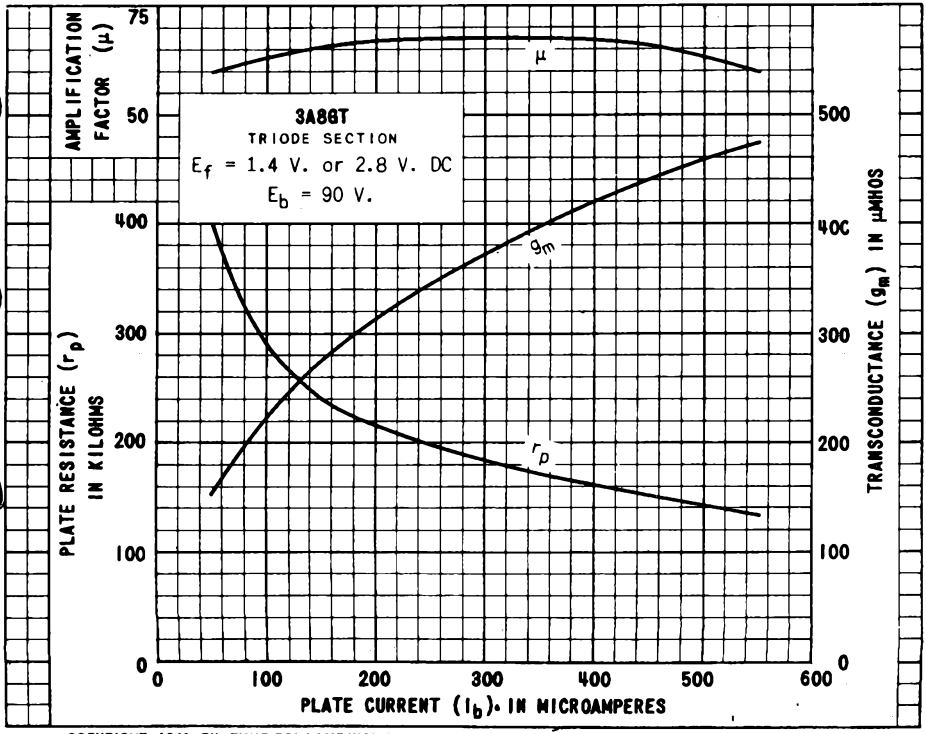
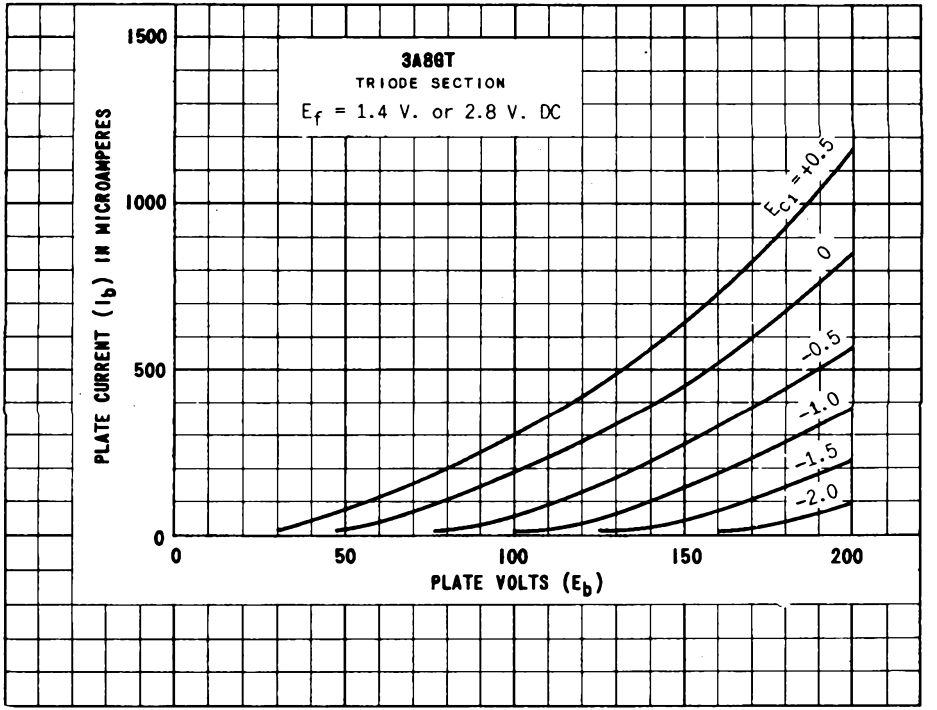
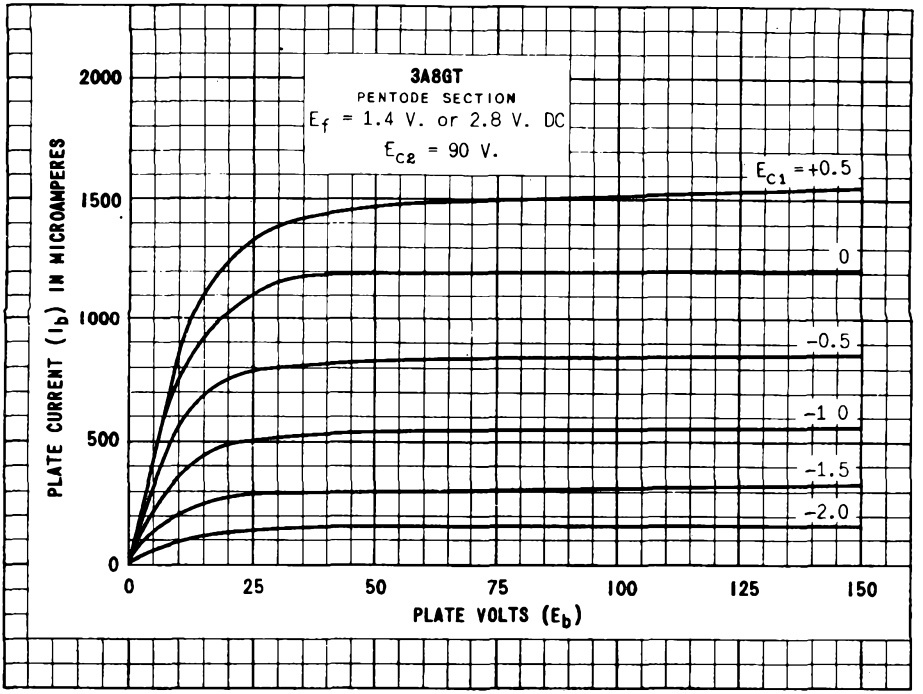


PLATE 724-1

MAY 20 1940


3A8GT
TRIODE SECTION
E_f = 1.4 V. or 2.8 V. DC
PLATE CURRENT (I_b) IN MICROAMPERES
1500
1000
500
0
0
50
100
150
200
PLATE VOLTS (E_b)
E_{c1} = +0.5
0
-0.5
-1.0
-1.5
-2.0

3A8 GT



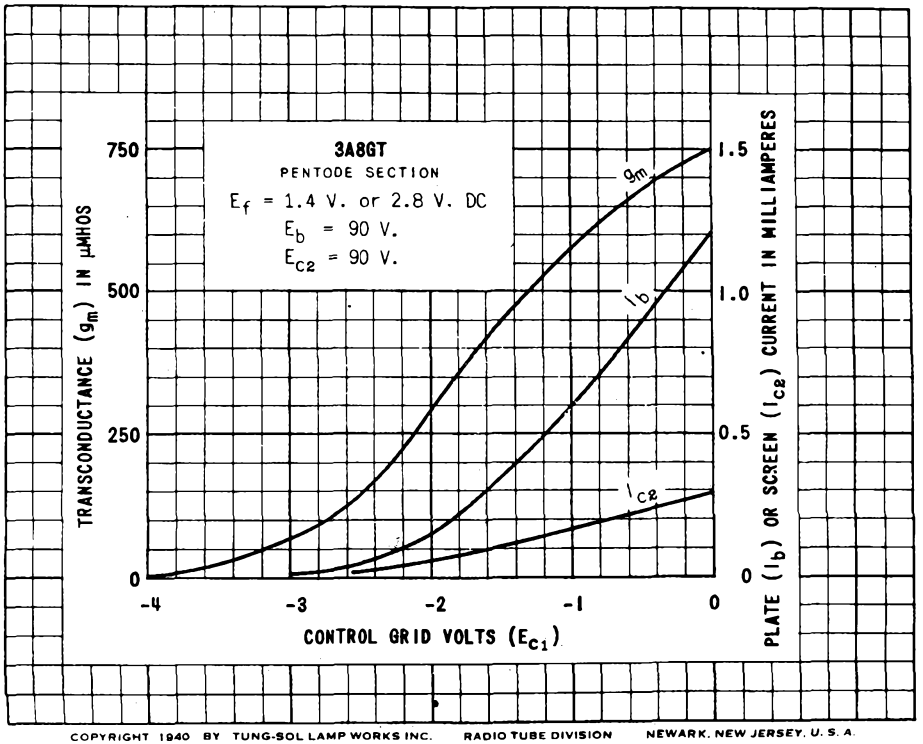
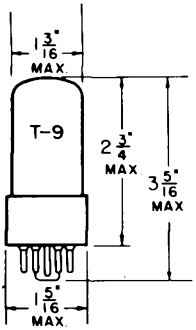


PLATE 725-1

TUNG-SOL

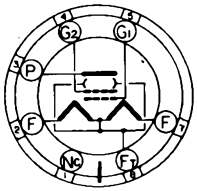


BEAM POWER AMPLIFIER

COATED FILAMENT

SERIES FILAMENTS	PARALLEL FILAMENTS
2.8 VOLTS	1.4 VOLTS
.05 AMP.	.10 AMP.

GLASS BULB



BOTTOM VIEW

INTERMEDIATE SHELL
OCTAL 7 PIN BASE

ANY MOUNTING POSITION

TYPE 3B5GT IS DESIGNED FOR AUDIO SERVICE IN PORTABLE EQUIPMENT WHERE THE PLATE VOLTAGE SUPPLY IS LIMITED.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD MB-210

	SERIES FILAMENTS	PARALLEL FILAMENTS	
MAXIMUM PLATE VOLTAGE	67.5	67.5	VOLTS
MAXIMUM CATHODE CURRENT	6.0[A]	12	MA.
MAXIMUM SCREEN VOLTAGE	67.5	67.5	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

	SERIES FILAMENTS	PARALLEL FILAMENTS		
PLATE VOLTAGE	67.5	45	67.5	VOLTS
SCREEN GRID VOLTAGE	67.5	45	67.5	VOLTS
CONTROL GRID VOLTAGE	-7.0	-4.5	-7.0	VOLTS
PLATE CURRENT	6.7	4.4	8.0	MA.
SCREEN CURRENT	0.5	0.3	0.6	MA.
TRANSCONDUCTANCE	1 500	1 400	1 650	µMHOS
PLATE RESISTANCE	0.1	0.1	0.1	MEGOHM
LOAD RESISTANCE	5 000	8 000	5 000	OHMS
POWER OUTPUT	180	70	200	MW.
TOTAL HARMONIC DISTORTION	10	12	10	PER CENT

[A] PER 1.4 VOLT FILAMENT SECTION (SHUNTING RESISTOR ACROSS NEGATIVE SECTION OF FILAMENT MAY BE NECESSARY TO LIMIT CURRENT TO VALUE SHOWN.)

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PLATE 1571
FEB. 28 1945

TUNG-SOL

HIGH VACUUM CATHODE-RAY TUBE

ELECTROSTATIC DEFLECTION AND FOCUSING

NO. 1 PHOSPHOR
GREEN FLUORESCENT SCREEN
MEDIUM PERSISTENCE

HEATER
6.3 VOLTS 0.6 AMPERE
AC OR DC

COATED UNIPOTENTIAL CATHODE

GLASS BULB

MEDIUM SHELL DIHEPTAL 12 PIN BASE

RATINGS*

MAXIMUM ANODE NO. 2 VOLTAGE (HIGH-VOLTAGE ELECTRODE)	2200	VOLTS
MAXIMUM ANODE NO. 1 VOLTAGE (FOCUSING ELECTRODE)	1100	VOLTS
GRID VOLTAGE (CONTROL ELECTRODE)	NEVER POSITIVE	
MAXIMUM PEAK VOLTAGE BETWEEN ANODE NO. 2 AND ANY DEFLECTOR	550	VOLTS
MAXIMUM DC HEATER CATHODE POTENTIAL[A]	125	VOLTS
MAXIMUM GRID CIRCUIT RESISTANCE	1.5	MEGOHMS
MAXIMUM IMPEDANCE OF ANY DEFLECTOR CIRCUIT AT HEATER SUPPLY FREQUENCY	1.0	MEGOHM

*MAXIMUM RATINGS ARE ABSOLUTE VALUES

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

GRID TO ALL OTHER ELECTRODES	8.0	μμf
CATHODE TO ALL OTHER ELECTRODES	7.0	μμf
D1 TO D2	2.0	μμf
D3 TO D4	2.0	μμf
D1 TO ALL OTHER ELECTRODES	9.0	μμf
D3 TO ALL OTHER ELECTRODES	7.0	μμf
D1 TO ALL OTHER ELECTRODES EXCEPT D2	7.0	μμf
D2 TO ALL OTHER ELECTRODES EXCEPT D1	7.0	μμf
D3 TO ALL OTHER ELECTRODES EXCEPT D4	5.0	μμf
D4 TO ALL OTHER ELECTRODES EXCEPT D3	6.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

ANODE NO. 2 VOLTAGE[B]	1500	2000	VOLTS
ANODE NO. 1 VOLTAGE FOR FOCUS AT 75% OF GRID VOLTAGE CUT-OFF[C]	430	575	VOLTS
GRID VOLTAGE FOR CUT-OFF[D]	-45[E]	-60[E]	VOLTS
DEFLECTION SENSITIVITY:[F]			
D1 AND D2	0.153	0.115	MM/VOLT DC
D3 AND D4	0.207	0.155	MM/VOLT DC
DEFLECTION FACTOR:[F]			
D1 AND D2	166	221	VOLTS DC/IN
D3 AND D4	123	164	VOLTS DC/IN

CONTINUED NEXT PAGE

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PLATE 1397
MARCH 15 1944

CONTINUED FROM PRECEDING PAGE

SPOT POSITION AND TEST CONDITIONS

THE UNDEFLECTED FOCUSED SPOT FALLS WITHIN A 15 MM. SQUARE CENTERED ON THE TUBE FACE.

TEST CONDITIONS ARE:

ANODE NO. 2 VOLTAGE	2000 VOLTS
ANODE NO. 1 VOLTAGE	ADJUSTED FOR FOCUS
GRID VOLTAGE	NEAR CUT-OFF
DEFLECTOR RESISTORS (CONNECTED TO ANODE NO. 2)	1 MEGOHM EACH

NOTE: SHIELD TUBE FROM ALL STRAY FIELDS.

[A] WHEN THE HEATER IS OPERATED AT A NEGATIVE POTENTIAL WITH RESPECT TO THE CATHODE THEN THE CATHODE RETURN SHOULD BE MADE AT THE CENTER TAP OF THE FILAMENT TRANSFORMER.

[B] USE OF LESS THAN 1500 VOLTS RESULTS IN DECREASED BRILLIANCE.

[C] CERTAIN TUBES MAY REQUIRE ADJUSTMENT OF +20% TO -35% WITH GRID VOLTAGE BETWEEN ZERO AND CUT-OFF.

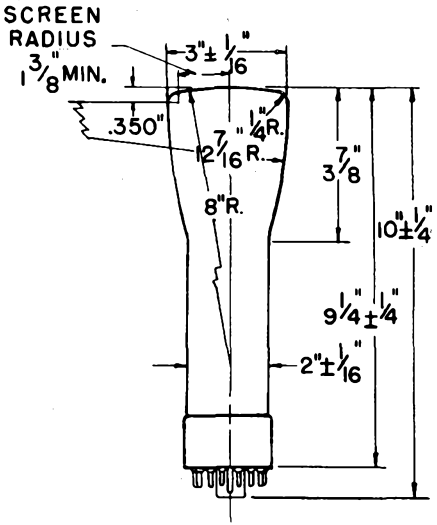
[D] THE VISUAL EXTINCTION OF A FOCUSED SPOT.

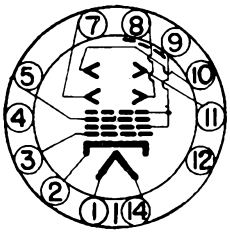
[E] THE GRID SUPPLY SHOULD BE VARIABLE TO ± 50%.

[F] VALUES SUBJECT TO VARIATION OF ± 20%.

DEFLECTOR LOCATIONS:

D1 AND D2	NEAREST TO SCREEN
D3 AND D4	NEAREST TO BASE
D1	SAME SIDE OF TUBE AS PIN NO. 5
D3	SAME SIDE AS PIN NO. 2





BOTTOM VIEW

1. HEATER
2. CATHODE
3. GRID NO. 1
4. INTERNAL CONNECTION (DO NOT USE)
5. ANODE NO. 1
7. DEFLECTOR NO. 3 (D3)
8. DEFLECTOR NO. 4 (D4)
9. GRID NO. 2
   ANODE NO. 2
10. DEFLECTOR NO. 2 (D2)
11. DEFLECTOR NO. 1 (D1)
12. NO CONNECTION
14. HEATER

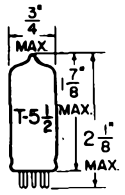
PLATE 1398
MARCH 15 1944

TUNG-SOL

PENTODE

MINIATURE TYPE

COATED FILAMENT

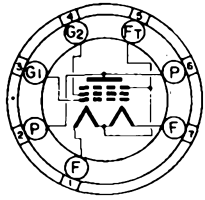


GLASS BULB

SERIES FILAMENT	PARALLEL FILAMENT
E_f APPLIED BETWEEN PINS 1 & 7	E_f APPLIED BETWEEN PIN 5 AND PINS 1 & 7 TIED TOGETHER.
E_{g1} REFERRED TO PIN 1	E_{g1} REFERRED TO -F
2.8 VOLTS 50 MA.	1.4 VOLTS 100 MA.

DC

A SHUNTING RESISTOR MUST BE CONNECTED BETWEEN PINS 1 AND 5 FOR SERIES-FILAMENT OPERATION TO BY-PASS ANY CATHODE CURRENT IN EXCESS OF THE 6 MA. RATED MAXIMUM PER SECTION. AN ADDITIONAL SHUNTING RESISTOR MAY BE NECESSARY BETWEEN PINS 1 AND 7 IF OTHER TUBES USED IN SERIES-FILAMENT ARRANGEMENT CONTRIBUTE TO THE FILAMENT CURRENT OF THE 3Q4.



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

ANY MOUNTING POSITION

THE 3Q4 IS A FILAMENTARY TYPE POWER OUTPUT PENTODE IN THE MINIATURE CONSTRUCTION. IT IS CHARACTERIZED BY ECONOMY OF FILAMENT POWER AND HIGH POWER SENSITIVITY ADAPTING IT TO USE IN THE "3-WAY" OPERATED PORTABLE RECEIVERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

	SERIES FILAMENT	PARALLEL FILAMENT	
FILAMENT VOLTAGE	2.8	1.4	VOLTS
MAXIMUM PLATE VOLTAGE	90	90	VOLTS
MAXIMUM GRID #2 VOLTAGE	90	90	VOLTS
MAXIMUM CATHODE CURRENT	6[A]	12	MA.

[A] FOR EACH 1.4 VOLT FILAMENT SECTION.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

	CLASS A_1 AMPLIFIER			
FILAMENT VOLTAGE	2.8	1.4	1.4	VOLTS
FILAMENT CURRENT	50	100	100	MA.
PLATE VOLTAGE	90	85	90	VOLTS
GRID #2 VOLTAGE	90	85	90	VOLTS
GRID #1 VOLTAGE	-4.5	-5	-4.5	VOLTS
PEAK AF SIGNAL VOLTAGE	4.5	5	4.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	7.7	6.9	9.5	MA.
ZERO-SIGNAL GRID #2 CURRENT (NOMINAL)	1.7	1.5	2.1	MA.
PLATE RESISTANCE (APPROX.)	0.12	0.12	0.1	MEGOHM
TRANSCONDUCTANCE	2 000	1 975	2 150	µMHOS
LOAD RESISTANCE	10 000	10 000	10 000	OHMS
TOTAL HARMONIC DISTORTION	7	10	7	PERCENT
POWER OUTPUT	240	250	270	MW

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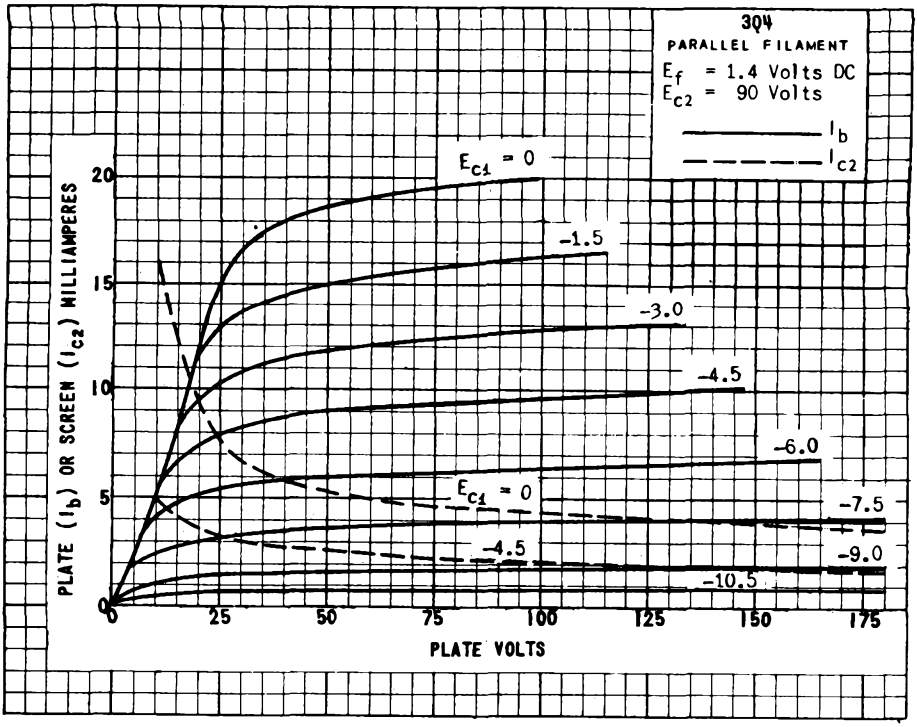
PLATE 1982
MAR. 1, 1948



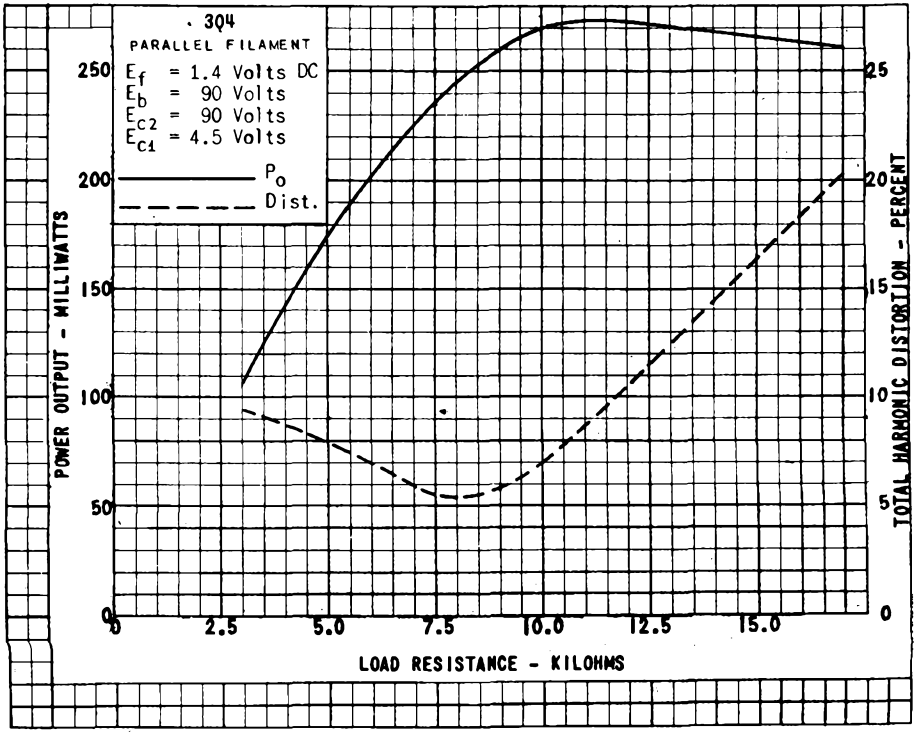
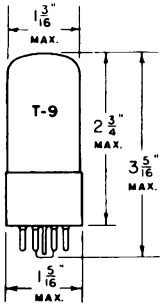


PLATE 1983
MAR. 1, 1948

TUNG-SOL



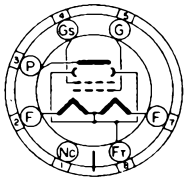
BEAM POWER AMPLIFIER

COATED FILAMENT

1.4 VOLTS 0.10 AMPERE
2.8 VOLTS 0.05 AMPERE
DC

GLASS BULB

INTERMEDIATE 7 PIN OCTAL BASE



7AP
BOTTOM VIEW

THE TUNG-SOL 3Q5GT/G IS A LOW CURRENT DRAIN FILAMENT TYPE BEAM POWER AMPLIFIER. IT IS DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF THREE WAY PORTABLE RECEIVERS. ITS ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 1Q5GT/G EXCEPT THAT THE FILAMENT IS CENTER TAPPED FOR EITHER SERIES OPERATION AT 2.8 VOLTS OR PARALLEL OPERATION AT 1.4 VOLTS.

RATINGS

	PARALLEL FILAMENT	SERIES FILAMENT	
MAXIMUM FILAMENT VOLTAGE			VOLTS
DRY BATTERY OPERATION — VOLTAGE MUST NEVER EXCEED	1.6	3.2	VOLTS
AC — DC POWER LINE OPERATION — DESIGN CENTER	1.3	2.6	VOLTS
MAXIMUM PLATE VOLTAGE	110	110	VOLTS
MAXIMUM SCREEN VOLTAGE	110	110	VOLTS
MAXIMUM CATHODE CURRENT (ZERO SIGNAL)	12	6[A]	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

	PARALLEL FILAMENT		SERIES FILAMENT	
PLATE VOLTAGE	85	90	90	VOLTS
SCREEN VOLTAGE	85	90	90	VOLTS
CONTROL GRID VOLTAGE	−5[B]	−4.5[B]	−4.5[C]	VOLTS
PEAK AF SIGNAL VOLTAGE	5	4.5	4.5	VOLTS
PLATE CURRENT	7.0	9.5	8.0	MA.
SCREEN CURRENT (NOMINAL)	0.8	1.3	1.0	MA.
PLATE RESISTANCE APPROX.	70 000	75 000	80 000	OHMS
TRANSCONDUCTANCE	1950	2200	2000	μMHOS
LOAD RESISTANCE	9000	8000	8000	OHMS
TOTAL HARMONIC DISTORTION	5.5	6.0	8.5	PER CENT
POWER OUTPUT	0.250	0.270	0.230	WATTS

[A] PER 1.4 V. FILAMENT SECTION. SHUNTING RESISTOR ACROSS NEGATIVE FILAMENT SECTION IS NECESSARY TO LIMIT CURRENT TO VALUE SHOWN.

[B] RETURN TO NEGATIVE FILAMENT (PIN #8). [C] RETURN TO NEGATIVE FILAMENT (PIN #7).

CONTINUED NEXT PAGE

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PLATE 1104-2

SEPT. 17 1941

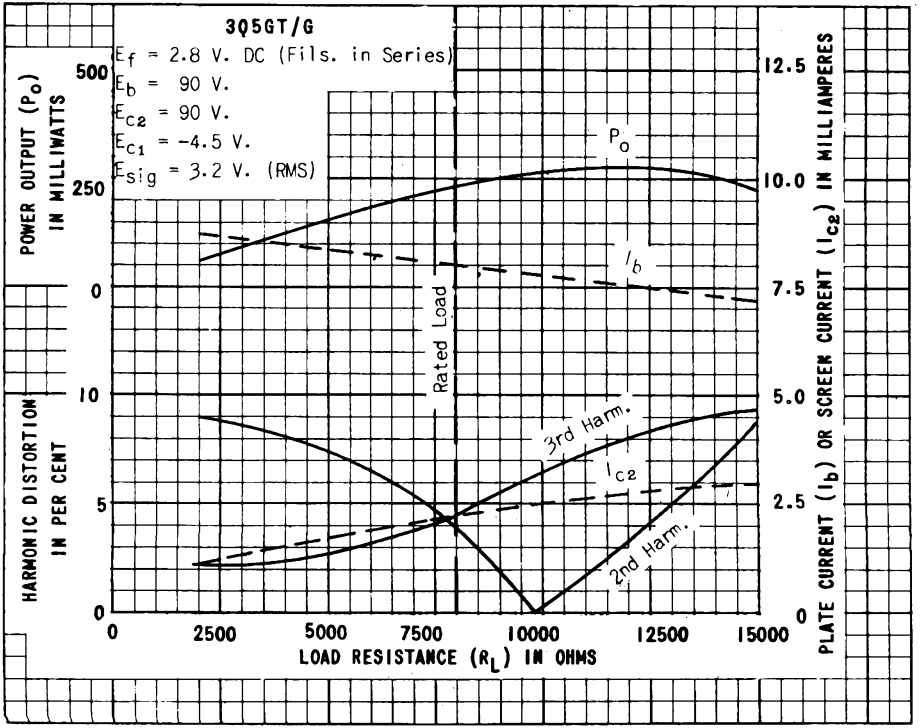
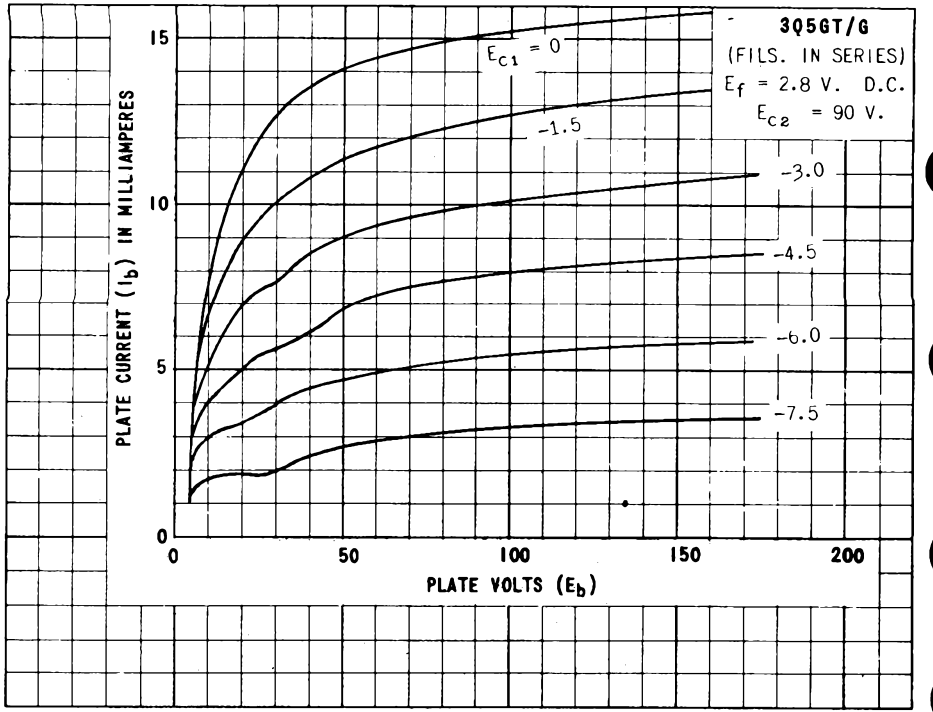


PLATE 1105-2

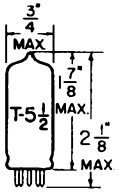
3Q5GT/G


3Q5GT/G
(FILS. IN SERIES)
E_f = 2.8 V. D.C.
E_{c2} = 90 V.
E_{c1} = 0
-1.5
-3.0
-4.5
-6.0
-7.5
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
5
10
15
0
50
100
150
200

TUNG-SOL

PENTODE

MINIATURE TYPE

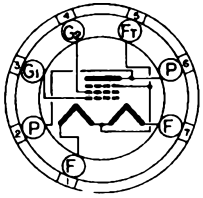


GLASS BULB

COATED FILAMENT

SERIES FILAMENT	PARALLEL FILAMENT
E_f APPLIED BETWEEN PINS 1 & 7	E_f APPLIED BETWEEN PIN 5 AND PINS 1 & 7 TIED TOGETHER
E_{g1} REFERRED TO PIN 1	E_{g1} REFERRED TO -F
2.8 VOLTS 50 MA.	1.4 VOLTS 100 MA.

DC



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

A SHUNTING RESISTOR MUST BE CONNECTED BETWEEN PINS 1 AND 5 FOR SERIES-FILAMENT OPERATION TO BY-PASS ANY CATHODE CURRENT IN EXCESS OF THE 5.5 MA. RATED MAXIMUM PER SECTION. AN ADDITIONAL SHUNTING RESISTOR MAY BE NECESSARY BETWEEN PINS 1 & 7 IF OTHER TUBES USED IN SERIES FILAMENT ARRANGEMENT CONTRIBUTE TO THE FILAMENT CURRENT OF THE 3S4.

ANY MOUNTING POSITION

THE 3S4 IS A FILAMENTARY TYPE POWER OUTPUT PENTODE IN THE MINIATURE CONSTRUCTION. IT IS CHARACTERIZED BY ECONOMY OF FILAMENT POWER AND ABILITY TO PERFORM WELL AT LOW PLATE SUPPLY VOLTAGES SUCH AS ENCOUNTERED IN PORTABLE EQUIPMENT.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

	SERIES FILAMENT	PARALLEL FILAMENT	
FILAMENT VOLTAGE	2.8	1.4	VOLTS
MAXIMUM PLATE VOLTAGE	90	90	VOLTS
MAXIMUM GRID #2 VOLTAGE	67.5	67.5	VOLTS
MAXIMUM CATHODE CURRENT (MAX-SIGNAL)	5.5[A]	11	MA.
MAXIMUM CATHODE CURRENT (ZERO-SIGNAL)	4.5[A]	9	MA.

[A] FOR EACH 1.4 FILAMENT SECTION.

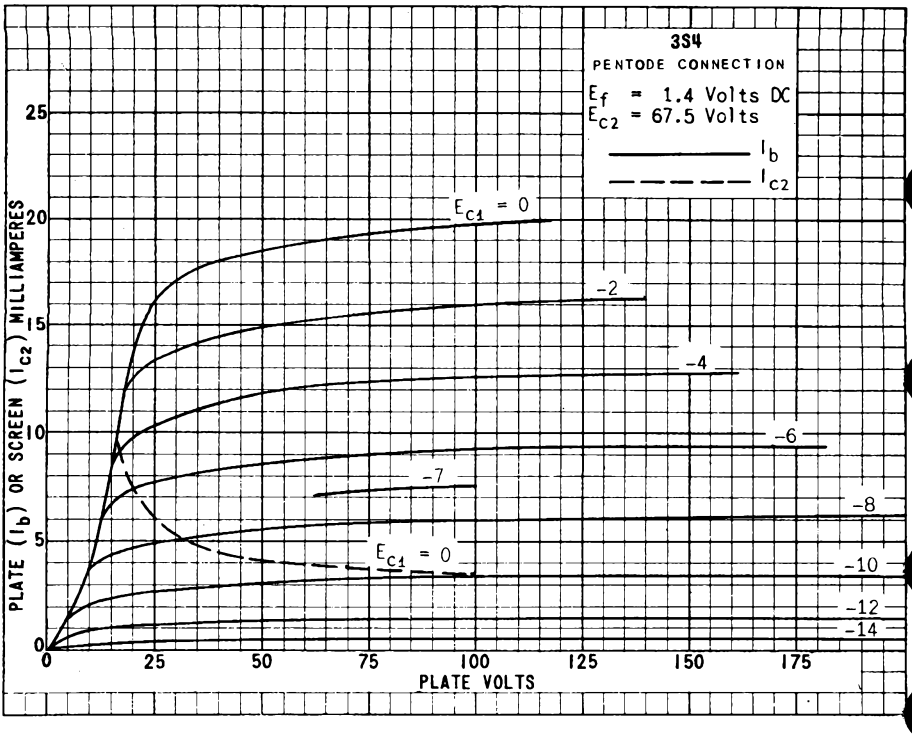
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

	SERIES FILAMENT		PARALLEL FILAMENT		
FILAMENT VOLTAGE	2.8	2.8	1.4	1.4	VOLTS
FILAMENT CURRENT	50	50	100	100	MA.
PLATE VOLTAGE	67.5	90	67.5	90	VOLTS
GRID #2 VOLTAGE	67.5	67.5	67.5	67.5	VOLTS
GRID #1 VOLTAGE	-7	-7	-7	-7	VOLTS
PEAK AF SIGNAL VOLTAGE	7	7	7	7	VOLTS
PLATE RESISTANCE (APPROX.)	0.1	0.1	0.1	0.1	MEGOHM
TRANSCONDUCTANCE	1 400	1 425	1 550	1 575	µMHOS
ZERO-SIGNAL PLATE CURRENT	6	6.1	7.2	7.4	MA.
ZERO-SIGNAL GRID #2 CURRENT	1.2	1.1	1.5	1.4	MA.
LOAD RESISTANCE	5 000	8 000	5 000	8 000	OHMS
TOTAL HARMONIC DISTORTION	12	13	10	12	PERCENT
MAXIMUM-SIGNAL POWER OUTPUT	160	235	180	270	MW

PLATE 1984
MAR. 1, 1948

3S4



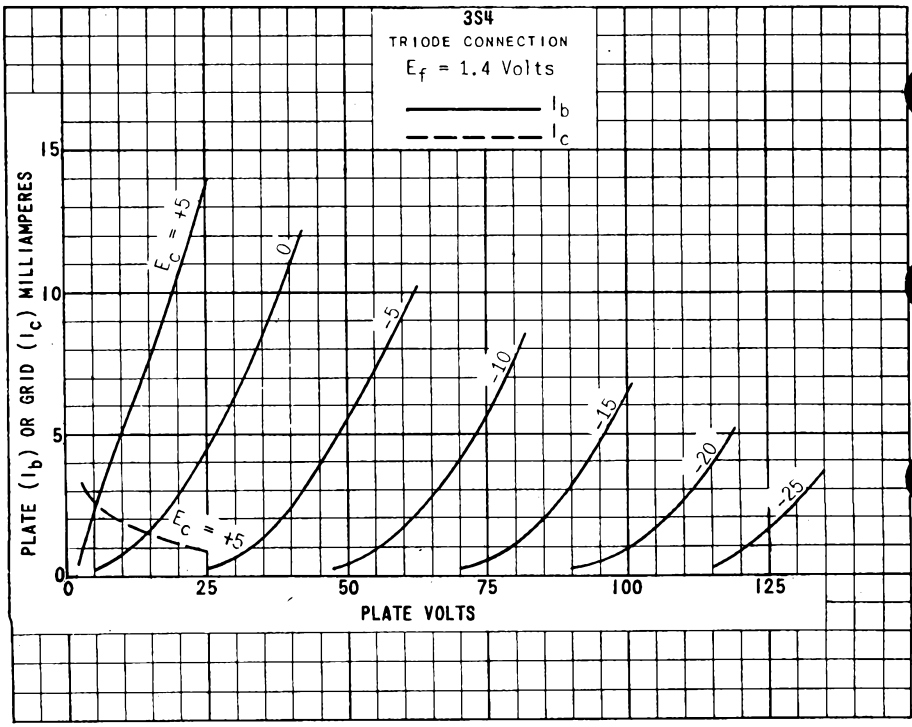


PLATE 1985
MAR. 1 1948

3S4

PENTODE CONNECTION

E_f = 1.4 Volts DC

———— P_o

– – – – – – Dist.

CURVE	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	SIGNAL VOLTS
1	45	45	-4.5	3.2
2	67.5	67.5	-7	4.95
3	90	67.5	-7	4.95

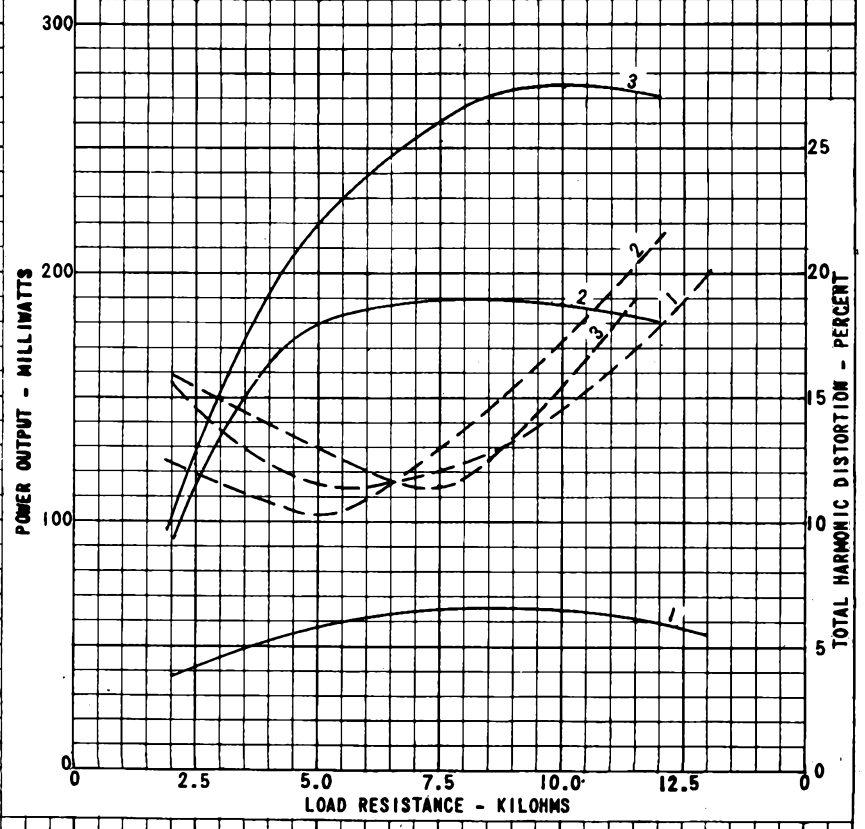


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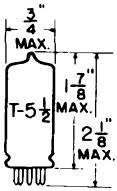
PLATE 1986
MAR. 1, 1948

TUNG-SOL

POWER AMPLIFIER PENTODE

MINIATURE TYPE

COATED FILAMENT

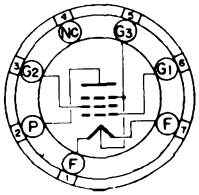


GLASS BULB

	SERIES FILAMENT	PARALLEL FILAMENT
E_f	APPLIED BETWEEN PINS 1 & 7	APPLIED BETWEEN PIN 5 AND PINS 1 & 7 TIED TOGETHER.
E_{g1}	REFERRED TO PIN 1	REFERRED TO PIN 5
	2.8 VOLTS	1.4 VOLTS
	0.05 AMP.	0.1 AMP.

DC

A SHUNTING RESISTOR MUST BE CONNECTED BETWEEN PINS 1 AND 5 FOR SERIES-FILAMENT OPERATION TO BY-PASS ANY CATHODE CURRENT IN EXCESS OF THE 6 MA. RATED MAXIMUM PER SECTION. AN ADDITIONAL SHUNTING RESISTOR MAY BE NECESSARY BETWEEN PINS 1 AND 7 IF OTHER TUBES USED IN SERIES-FILAMENT ARRANGEMENT CONTRIBUTE TO THE FILAMENT CURRENT OF THE 3V4.



BOTTOM VIEW

MINIATURE BUTTON 7 PIN BASE

ANY MOUNTING POSITION

THE 3V4 IS A POWER AMPLIFIER PENTODE UTILIZING THE MINIATURE CONSTRUCTION. IT IS DESIGNED FOR USE IN THE OUTPUT STAGE OF AC/DC BATTERY PORTABLE RECEIVERS. IT IS IDENTICAL TO THE 3Q4 EXCEPT FOR THE DIFFERENT BASING ARRANGEMENT.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

	SERIES FILAMENT	PARALLEL FILAMENT	
FILAMENT VOLTAGE	2.8	1.4	VOLTS
FILAMENT CURRENT	0.05	0.1	AMP.
MAXIMUM PLATE VOLTAGE	90	90	VOLTS
MAXIMUM SCREEN VOLTAGE	90	90	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	6[A]	12	MA.

[A] FOR EACH 1.4 VOLT FILAMENT SECTION.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

WITH NO EXTERNAL SHIELD

GRID TO PLATE	0.20	μμf
INPUT	5.5	μμf
OUTPUT	3.8	μμf

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION.

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PLATE 1776
FEB. 3, 1947

CONTINUED FROM PRECEDING PAGE

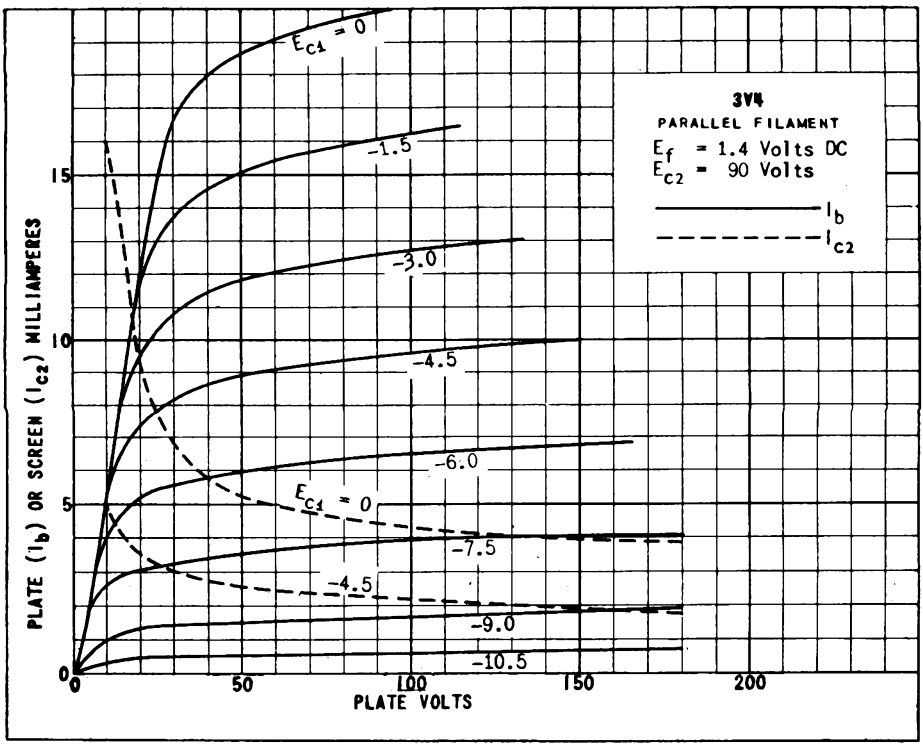
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

AF POWER AMPLIFIER – CLASS A_1

	SERIES FILAMENT	PARALLEL FILAMENT		
PLATE VOLTAGE	90	85	90	VOLTS
SCREEN VOLTAGE	90	85	90	VOLTS
GRID VOLTAGE	-4.5	-5	-4.5	VOLTS
PEAK AF GRID VOLTAGE	4.5	5	4.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	7.7	6.9	9.5	MA.
ZERO-SIGNAL SCREEN CURRENT	1.7	1.5	2.1	MA.
LOAD RESISTANCE	10 000	10 000	10 000	OHMS
PLATE RESISTANCE (APPROX.)	0.12	0.12	0.1	MEGOHM
TRANSCONDUCTANCE	2 000	1 975	2 150	μMHOS
MAXIMUM-SIGNAL POWER OUTPUT	0.24	0.25	0.27	WATT
TOTAL HARMONIC DISTORTION	7	10	7	PER CENT

SIMILAR TYPE REFERENCE: *Ratings and characteristics identical to 3QU; somewhat similar to 1Q5GT, 3Q5GT, 3LF4, 3LP4.*

PLATE 1777
FEB. 3, 1947



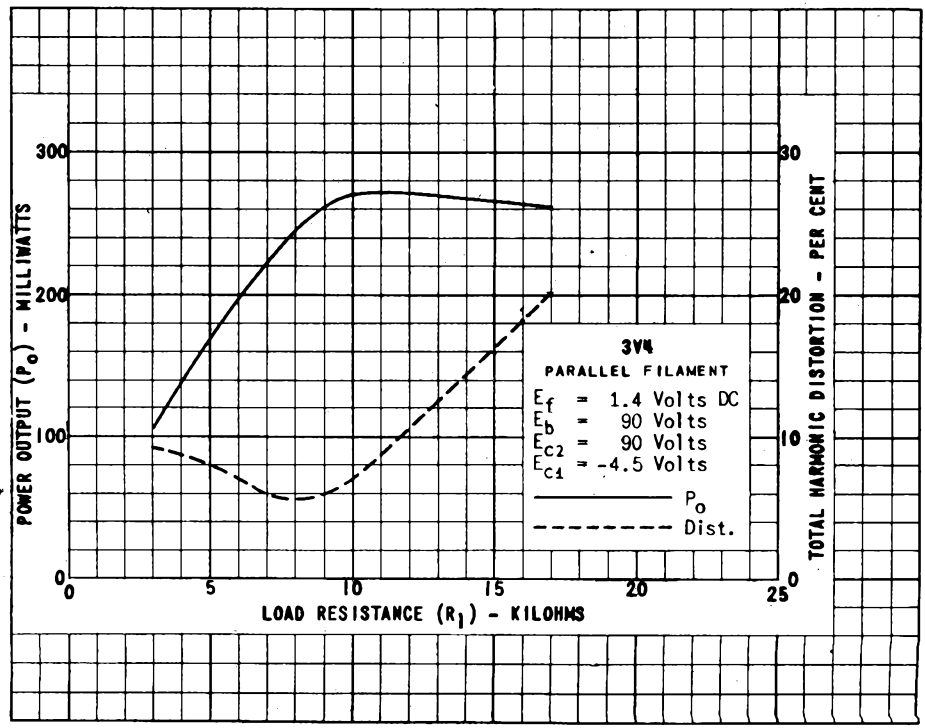


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PLATE 1778
FEB. 3, 1947

TUNG-SOL

HIGH VACUUM CATHODE-RAY TUBE

ELECTROSTATIC DEFLECTION AND FOCUSING

5CP1	5CP4
NO. 1 PHOSPHOR GREEN FLUORESCENT SCREEN MEDIUM PERSISTENCE	NO. 4 PHOSPHOR WHITE FLUORESCENT SCREEN MEDIUM PERSISTENCE

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.6 AMPERE
AC OR DC

GLASS BULB

MEDIUM SHELL DIHEPTAL 12 PIN BASE

RATINGS*

MAXIMUM ANODE NO. 3 VOLTAGE (SUPPLEMENTARY HIGH VOLTAGE ELECTRODE)	4400	VOLTS
MAXIMUM ANODE NO. 2 VOLTAGE (HIGH VOLTAGE ELECTRODE)	2200	VOLTS
MAXIMUM ANODE NO. 1 VOLTAGE (FOCUSING ELECTRODE)	1100	VOLTS
GRID VOLTAGE (CONTROL ELECTRODE)	NEVER POSITIVE	
MAXIMUM PEAK VOLTAGE BETWEEN ANODE NO. 2 AND ANY DEFLECTOR	550	VOLTS
MAXIMUM DC HEATER CATHODE POTENTIAL[A]	125	VOLTS
MAXIMUM GRID CIRCUIT RESISTANCE	1.5	MEGOHMS
MAXIMUM IMPEDANCE OF ANY DEFLECTOR CIRCUIT AT HEATER SUPPLY FREQUENCY	1.0	MEGOHM

*MAXIMUM RATINGS ARE ABSOLUTE VALUES

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

GRID TO ALL OTHER ELECTRODES	8.0	μμf
CATHODE TO ALL OTHER ELECTRODES	8.0	μμf
D1 TO D2	2.0	μμf
D3 TO D4	2.0	μμf
D1 TO ALL OTHER ELECTRODES	9.0	μμf
D3 TO ALL OTHER ELECTRODES	7.0	μμf
D1 TO ALL OTHER ELECTRODES EXCEPT D2	7.0	μμf
D2 TO ALL OTHER ELECTRODES EXCEPT D1	7.0	μμf
D3 TO ALL OTHER ELECTRODES EXCEPT D4	5.0	μμf
D4 TO ALL OTHER ELECTRODES EXCEPT D3	6.0	μμf

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PLATE
1399
MARCH 15
1944

CONTINUED NEXT PAGE

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

ANODE NO. 3 VOLTAGE	2000	3000	4000	VOLTS
ANODE NO. 2 VOLTAGE[B]	2000	1500	2000	VOLTS
ANODE NO. 1 VOLTAGE FOR FOCUS AT 75% OF GRID VOLTAGE CUT-OFF[C]	575	430	575	VOLTS
GRID VOLTAGE FOR CUT-OFF[D]	-60[E]	-45[E]	-60[E]	VOLTS
DEFLECTION SENSITIVITY:[F]				
D1 AND D2	0.350	0.370	0.280	MM/VOLT DC
D3 AND D4	0.390	0.450	0.340	MM/VOLT DC
DEFLECTION FACTOR[F]				
D1 AND D2	73	69	92	VOLTS DC/IN
D3 AND D4	64	56	74	VOLTS DC/IN

SPOT POSITION AND TEST CONDITIONS

THE UNDEFLECTED FOCUSED SPOT FALLS WITHIN A 25 MM. SQUARE CENTERED ON THE TUBE FACE.

TEST CONDITIONS ARE:

ANODE NO. 3 VOLTAGE	4000	VOLTS
ANODE NO. 2 VOLTAGE	2000	VOLTS
ANODE NO. 1 VOLTAGE	ADJUSTED FOR FOCUS	
GRID VOLTAGE	NEAR CUT-OFF	
DEFLECTOR RESISTORS (CONNECTED TO ANODE NO. 2)	1 MEGOHM EACH	

NOTE: SHIELD TUBE FROM ALL STRAY FIELDS.

[A] WHEN THE HEATER IS OPERATED AT A NEGATIVE POTENTIAL WITH RESPECT TO THE CATHODE THEN THE CATHODE RETURN SHOULD BE MADE AT THE CENTER TAP OF THE FILAMENT TRANSFORMER.

[B] USE OF LESS THAN 1500 VOLTS RESULTS IN DECREASED BRILLIANCE.

[C] CERTAIN TUBES MAY REQUIRE ADJUSTMENT OF +25% TO -30% WITH GRID VOLTAGE BETWEEN ZERO AND CUT-OFF.

[D] THE VISUAL EXTINCTION OF A FOCUSED SPOT.

[E] THE GRID SUPPLY SHOULD BE VARIABLE TO ± 50%.

[F] VALUES SUBJECT TO VARIATION OF ± 20%.

DEFLECTOR LOCATIONS:

D1 AND D2	NEAREST TO SCREEN
D3 AND D4	NEAREST TO BASE
D1	SAME SIDE OF TUBE AS PIN NO. 6
D3	SAME SIDE AS PIN NO. 2

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PLATE 1400
MARCH 15 1944

TUNG-SOL

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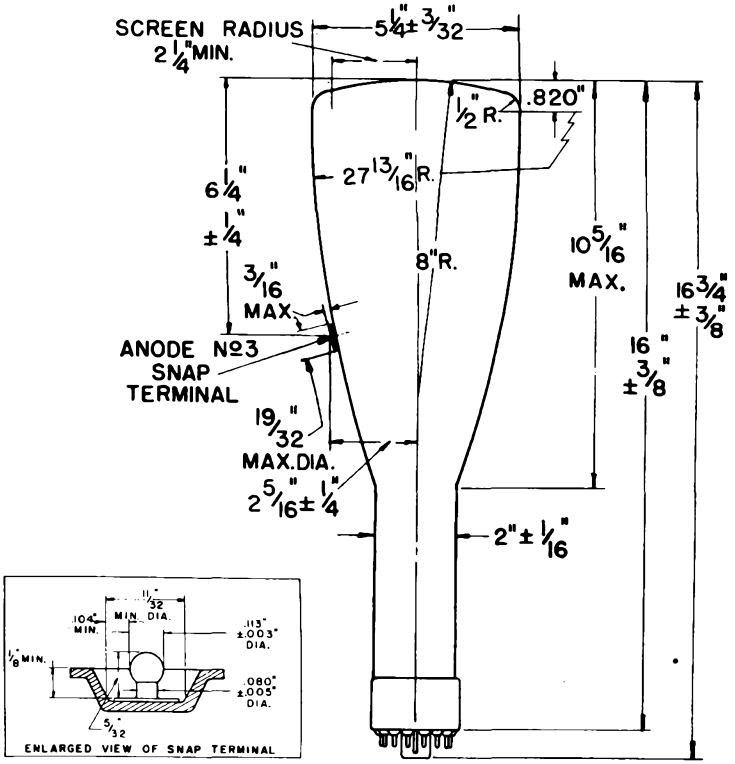

BOTTOM VIEW

1. HEATER
2. CATHODE
3. GRID NO. 1
4. INTERNAL CONNECTION (DO NOT USE)
5. ANODE NO. 1
7. DEFLECTOR NO. 3 (D3)
8. DEFLECTOR NO. 4 (D4)
9. GRID NO. 2 ANODE NO. 2
10. DEFLECTOR NO. 2 (D2)
11. DEFLECTOR NO. 1 (D1)
12. NO CONNECTION
14. HEATER

A. ANODE NO. 3 (SNAP TERMINAL)

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PLATE 1401
MARCH 15 1944

TUNG-SOL

HIGH VACUUM CATHODE-RAY TUBE

ELECTROSTATIC DEFLECTION AND FOCUSING

5CP1	5CP4
NO. 1 PHOSPHOR GREEN FLUORESCENT SCREEN MEDIUM PERSISTENCE	NO. 4 PHOSPHOR WHITE* FLUORESCENT SCREEN MEDIUM PERSISTENCE

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.6 AMPERE
AC OR DC

GLASS BULB

MEDIUM SHELL DIHEPTAL 12 PIN BASE

RATINGS*

MAXIMUM ANODE NO. 3 VOLTAGE (SUPPLEMENTARY HIGH VOLTAGE ELECTRODE)	4400	VOLTS
MAXIMUM ANODE NO. 2 VOLTAGE (HIGH VOLTAGE ELECTRODE)	2200	VOLTS
MAXIMUM ANODE NO. 1 VOLTAGE (FOCUSING ELECTRODE)	1100	VOLTS
GRID VOLTAGE (CONTROL ELECTRODE)	NEVER POSITIVE	
MAXIMUM PEAK VOLTAGE BETWEEN ANODE NO. 2 AND ANY DEFLECTOR	550	VOLTS
MAXIMUM DC HEATER CATHODE POTENTIAL[A]	125	VOLTS
MAXIMUM GRID CIRCUIT RESISTANCE	1.5	MEGOHMS
MAXIMUM IMPEDANCE OF ANY DEFLECTOR CIRCUIT AT HEATER SUPPLY FREQUENCY	1.0	MEGOHM

*MAXIMUM RATINGS ARE ABSOLUTE VALUES

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

GRID TO ALL OTHER ELECTRODES	8.0	μμf
CATHODE TO ALL OTHER ELECTRODES	8.0	μμf
D1 TO D2	2.0	μμf
D3 TO D4	2.0	μμf
D1 TO ALL OTHER ELECTRODES	9.0	μμf
D3 TO ALL OTHER ELECTRODES	7.0	μμf
D1 TO ALL OTHER ELECTRODES EXCEPT D2	7.0	μμf
D2 TO ALL OTHER ELECTRODES EXCEPT D1	7.0	μμf
D3 TO ALL OTHER ELECTRODES EXCEPT D4	5.0	μμf
D4 TO ALL OTHER ELECTRODES EXCEPT D3	6.0	μμf

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PLATE
1411
MARCH 15
1944

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

ANODE NO. 3 VOLTAGE	2000	3000	4000	VOLTS
ANODE NO. 2 VOLTAGE[B]	2000	1500	2000	VOLTS
ANODE NO. 1 VOLTAGE FOR FOCUS AT 75% OF GRID VOLTAGE CUT-OFF[C]	575	430	575	VOLTS
GRID VOLTAGE FOR CUT-OFF[D]	-60[E]	-45[E]	-60[E]	VOLTS
DEFLECTION SENSITIVITY:[F]				
D1 AND D2	0.350	0.370	0.280	MM/VOLT DC
D3 AND D4	0.390	0.450	0.340	MM/VOLT DC
DEFLECTION FACTOR[F]				
D1 AND D2	73	69	92	VOLTS DC/IN
D3 AND D4	64	56	74	VOLTS DC/IN

SPOT POSITION AND TEST CONDITIONS

THE UNDEFLECTED FOCUSED SPOT FALLS WITHIN A 25 MM. SQUARE CENTERED ON THE TUBE FACE.

TEST CONDITIONS ARE:

ANODE NO. 3 VOLTAGE	4000 VOLTS
ANODE NO. 2 VOLTAGE	2000 VOLTS
ANODE NO. 1 VOLTAGE	ADJUSTED FOR FOCUS
GRID VOLTAGE	NEAR CUT-OFF
DEFLECTOR RESISTORS (CONNECTED TO ANODE NO. 2)	1 MEGOHM EACH

NOTE: SHIELD TUBE FROM ALL STRAY FIELDS.

[A] WHEN THE HEATER IS OPERATED AT A NEGATIVE POTENTIAL WITH RESPECT TO THE CATHODE THEN THE CATHODE RETURN SHOULD BE MADE AT THE CENTER TAP OF THE FILAMENT TRANSFORMER.

[B] USE OF LESS THAN 1500 VOLTS RESULTS IN DECREASED BRILLIANCE.

[C] CERTAIN TUBES MAY REQUIRE ADJUSTMENT OF +25% TO -30% WITH GRID VOLTAGE BETWEEN ZERO AND CUT-OFF.

[D] THE VISUAL EXTINCTION OF A FOCUSED SPOT.

[E] THE GRID SUPPLY SHOULD BE VARIABLE TO ± 50%.

[F] VALUES SUBJECT TO VARIATION OF ± 20%.

DEFLECTOR LOCATIONS:

D1 AND D2	NEAREST TO SCREEN
D3 AND D4	NEAREST TO BASE
D1	SAME SIDE OF TUBE AS PIN NO. 5
D3	SAME SIDE AS PIN NO. 2

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PLATE 1412
MARCH 15 1944

TUNG-SOL

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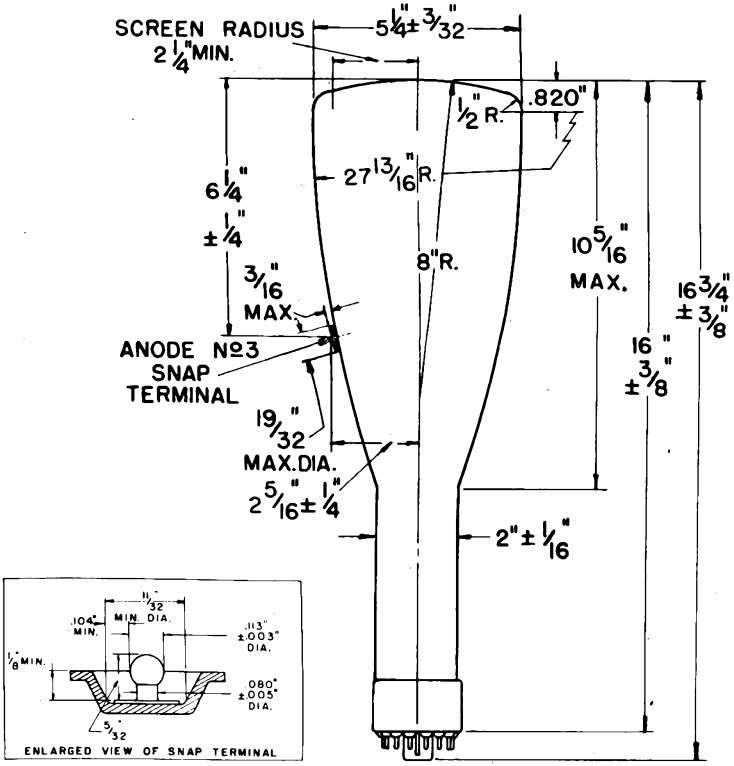

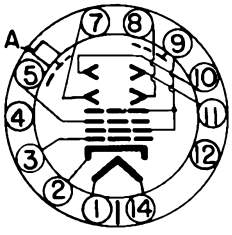

BOTTOM VIEW

1. HEATER
2. CATHODE
3. GRID NO. 1
4. INTERNAL CONNECTION (DO NOT USE)
5. ANODE NO. 1
7. DEFLECTOR NO. 3 (D3)
8. DEFLECTOR NO. 4 (D4)
9. GRID NO. 2
   ANODE NO. 2
10. DEFLECTOR NO. 2 (D2)
11. DEFLECTOR NO. 1 (D1)
12. NO CONNECTION
14. HEATER

A. ANODE NO. 3 (SNAP TERMINAL)

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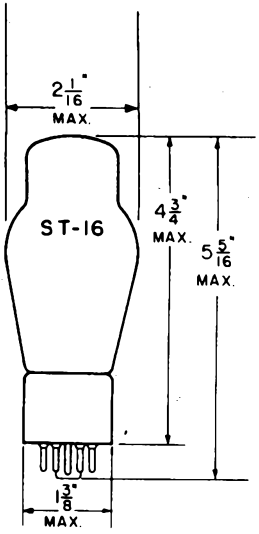
PLATE 1413
MARCH 15 1944

TUNG-SOL

FULL-WAVE HIGH-VACUUM RECTIFIER



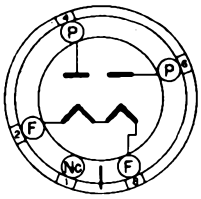
GLASS BULB

COATED FILAMENT

HEATER
5.0 VOLTS 2.0 AMPERES
AC

VERTICAL MOUNTING POSITION

HORIZONTAL OPERATION IS PERMISSIBLE IF PINS 1 AND 4 ARE IN A VERTICAL PLANE.



BOTTOM VIEW

MEDIUM SHELL 5-PIN
OCTAL MICANOL BASE

THE 5R4GY IS DESIGNED FOR RECTIFIER USE IN EQUIPMENT REQUIRING A HIGH PEAK INVERSE VOLTAGE RATING. SATISFACTORY OPERATION OF THIS TUBE TYPE UNDER CONDITIONS FALLING WITHIN AREA 1 ON CURVE NO. 1 MAY BE OBTAINED WITHOUT FILAMENT PREHEATING. FILAMENT PREHEATING FOR 10 SECONDS BEFORE PLATE VOLTAGE IS APPLIED IS RECOMMENDED FOR SATISFACTORY OPERATION UNDER CONDITIONS FALLING WITHIN AREA 2 ON THE SAME CURVE.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

FULL-WAVE RECTIFIER

FILAMENT VOLTAGE (AC)	5.0	5.0	5.0	VOLTS
FILAMENT CURRENT	2.0	2.0	2.0	AMPS.
MAX. PEAK INVERSE PLATE VOLTAGE (NO LOAD)	2100	2400	2800	VOLTS
MAX. PEAK PLATE CURRENT PER PLATE	650	650	650	MA.
DC OUTPUT CURRENT:				
WITH CONDENSER INPUT TO FILTER	250	175	150	MA.
WITH CHOKE INPUT TO FILTER	250	250[A]	175[B]	MA.

[A] FOR INPUT CHOKE FILTER=5 HENRIES MINIMUM.
[B] FOR INPUT CHOKE FILTER=10 HENRIES MINIMUM.

CONTINUED ON FOLLOWING PAGE

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PLATE 1599
OCT. 15, 1945

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

FULL-WAVE RECTIFIER

	CONDENSER-INPUT FILTER		CHOKE-INPUT FILTER		
AC PLATE-TO-PLATE SUPPLY VOLTAGE (RMS)					
FULL LOAD	1400	1800	1500	1900	VOLTS
NO LOAD	1500	2000	1700	2000	VOLTS
FILTER INPUT CONDENSER	4	4	-	-	µf
TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE PER PLATE[C]	125	575	-	-	OHMS
FILTER INPUT CHOKE	-	-	5	10	H.
DC OUTPUT CURRENT	250	250	250	175	MA.
DC OUTPUT VOLTAGE (APPROX.) (AT INPUT TO FILTER)	700	700	550	750	VOLTS
VOLTAGE REGULATION (APPROX.) (HALF-LOAD TO FULL-LOAD CURRENT)	90	110	40	60	VOLTS

[C] PEAK PLATE CURRENT WILL BE LIMITED TO MAXIMUM RATED VALUE FOR THE GIVEN CONDITIONS AND VALUES. FOR A FILTER-INPUT CONDENSER GREATER THAN 4 µf, MORE PLATE-SUPPLY IMPEDANCE MAY BE REQUIRED TO LIMIT THE PEAK PLATE CURRENT TO THE RATED VALUE.

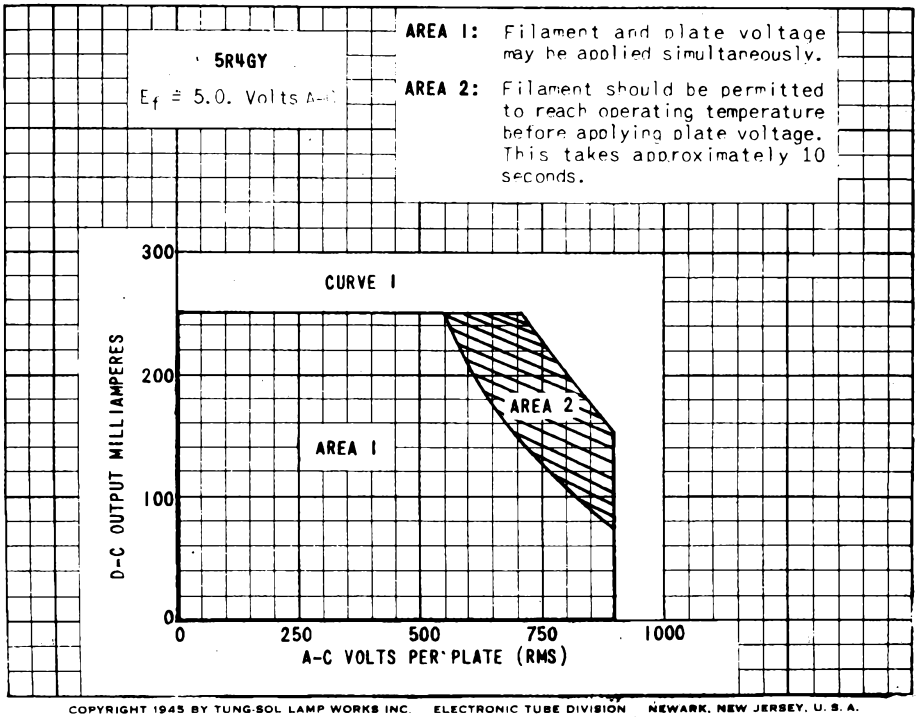
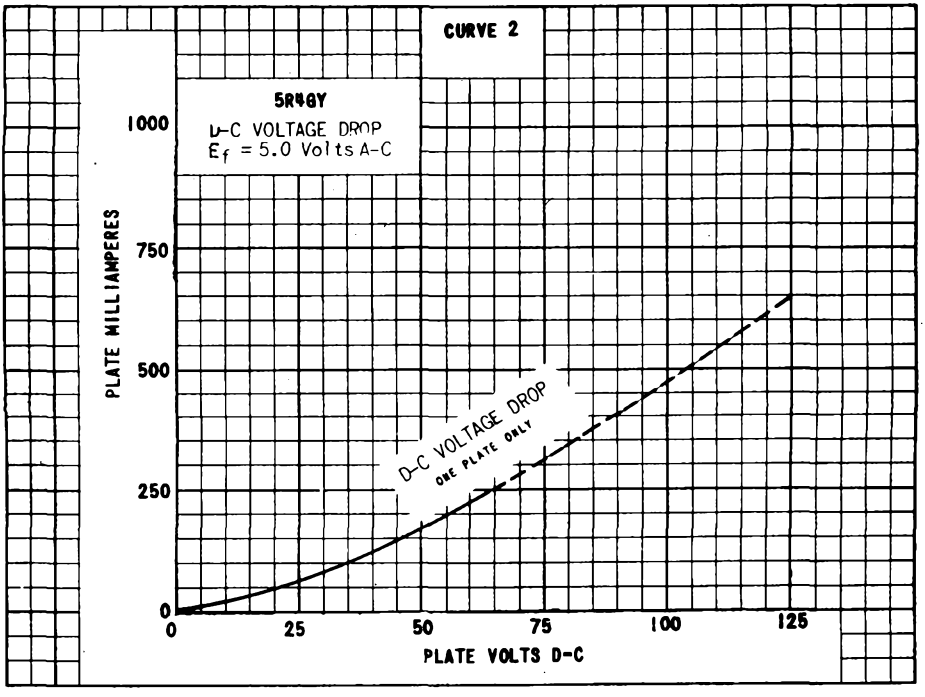


PLATE 1600
OCT. 15, 1945



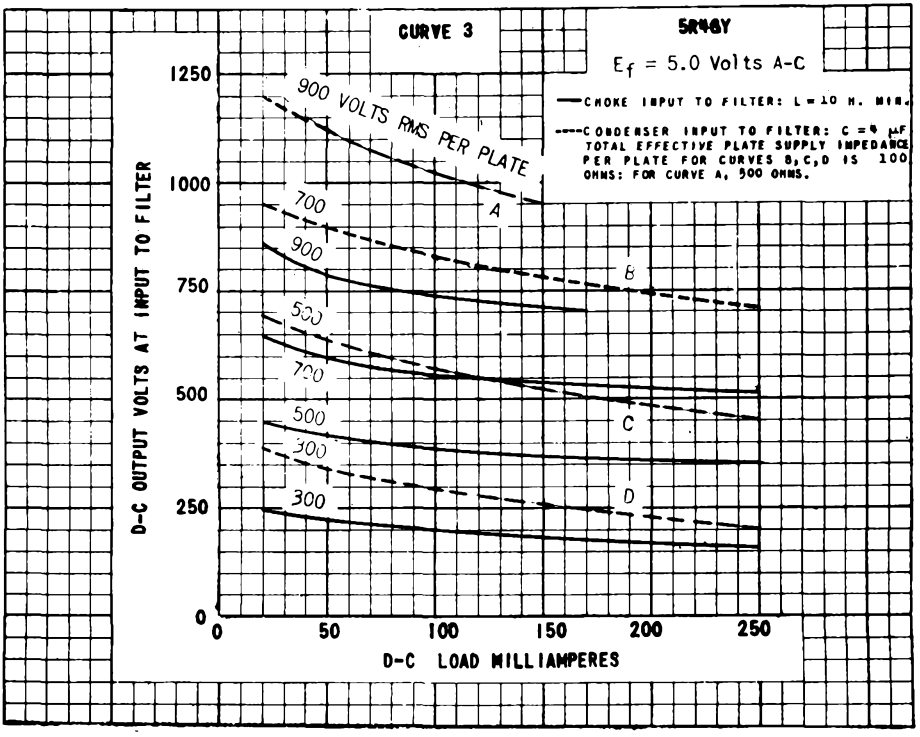


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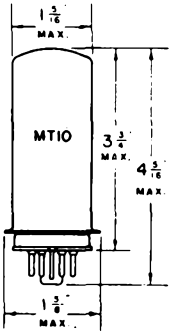
PLATE
1601
OCT. 15,
1945

TUNG-SOL



FULL WAVE

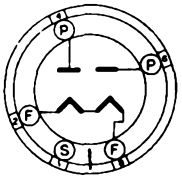
HIGH VACUUM RECTIFIER

COATED FILAMENT

5.0 VOLTS 2.0 AMPERES

AC

METAL SHELL



5T

BOTTOM VIEW

5 PIN OCTAL BASE

THE TUNG-SOL 5T4 IS DESIGNED FOR SERVICE AS A POWER RECTIFIER IN AC OPERATED RECEIVERS.

RATINGS

MAXIMUM PEAK INVERSE VOLTAGE	1550	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	675	MA.
TUBE VOLTAGE DROP AT 225 MA. DC PER PLATE	45	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	450	VOLTS
DC OUTPUT CURRENT MAX.	225	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.A	150	OHMS

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	550	VOLTS
DC OUTPUT CURRENT MAX.	225	MA.
VALUE OF INPUT CHOKE MIN.	3	HENRYS

A WHEN FILTER CONDENSERS LARGER THAN 40 MFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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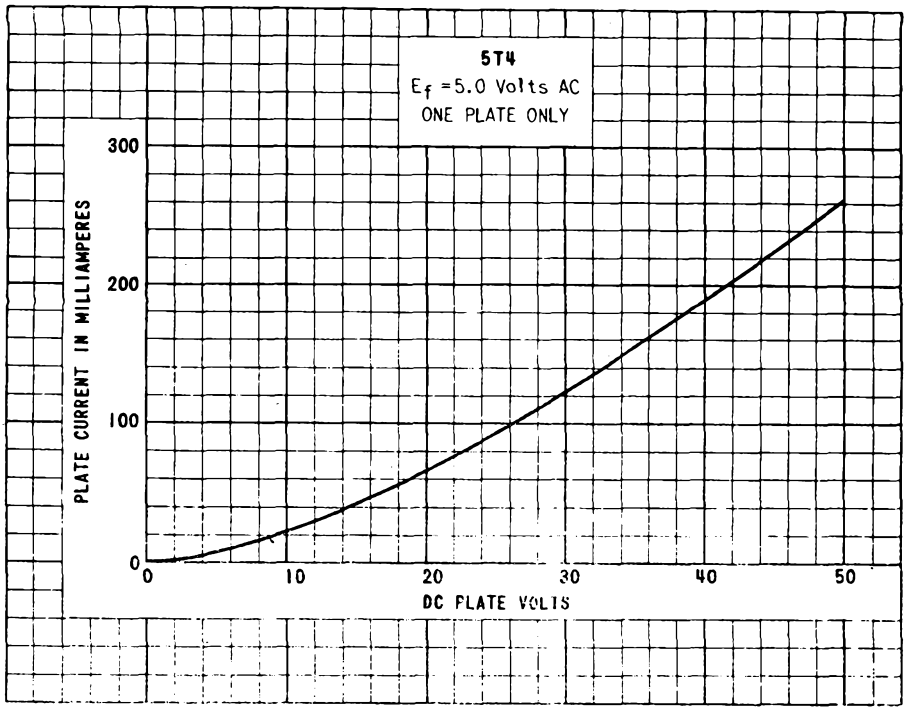
PLATE 870-1

OCT. 21 1940

5T4



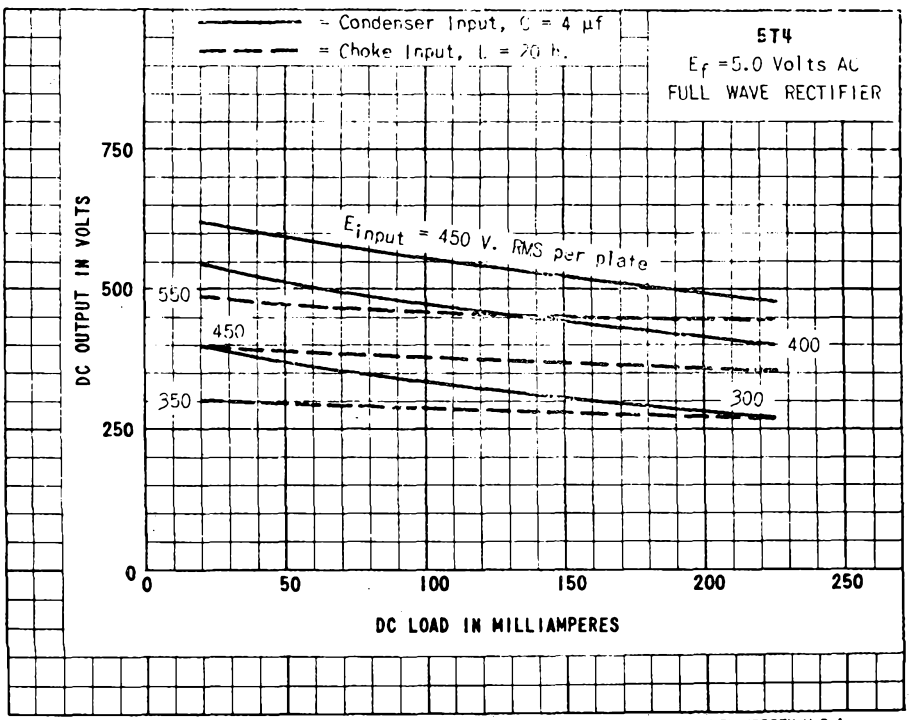
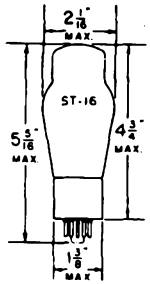


PLATE
871-1

TUNG-SOL



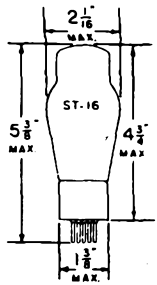
5U4G - MEDIUM 5 PIN OCTAL BASE
5X4G - MEDIUM 8 PIN OCTAL BASE

FULL WAVE
HIGH VACUUM RECTIFIER

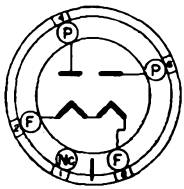
COATED FILAMENT

5.0 VOLTS 3.0 AMPERES
AC

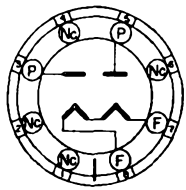
GLASS BULB



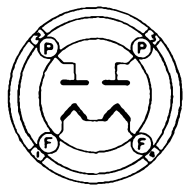
5Z3 - MEDIUM 4 PIN BASE



G-5Ta
BOTTOM VIEW
5U4G



G-5Q
BOTTOM VIEW
5X4G



4C
BOTTOM VIEW
5Z3

THE TUNG-SOL 5U4G, 5X4G AND 5Z3 ARE DESIGNED FOR SERVICE AS POWER RECTIFIERS IN AC OPERATED RECEIVERS WHICH REQUIRE HIGH CURRENTS. THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM PEAK INVERSE VOLTAGE	1550	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	675	MA.

OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	450	VOLTS
DC OUTPUT CURRENT MAX.	225	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN. A	75	OHMS

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	550	VOLTS
DC OUTPUT CURRENT MAX.	225	MA.
VALUE OF INPUT CHOKE MIN.	3	HENRYS
TUBE VOLTAGE DROP AT 225 MA. PER PLATE	58	VOLTS

A WHEN FILTER CONDENSERS LARGER THAN 40 μfds ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

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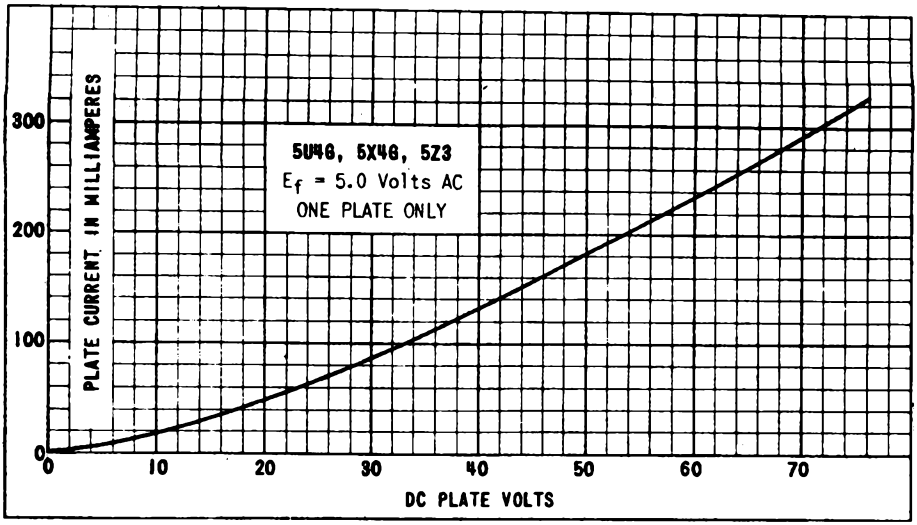
PLATE 687-2
JAN. 29 1940

5U4G (5X4G, 5Z3).



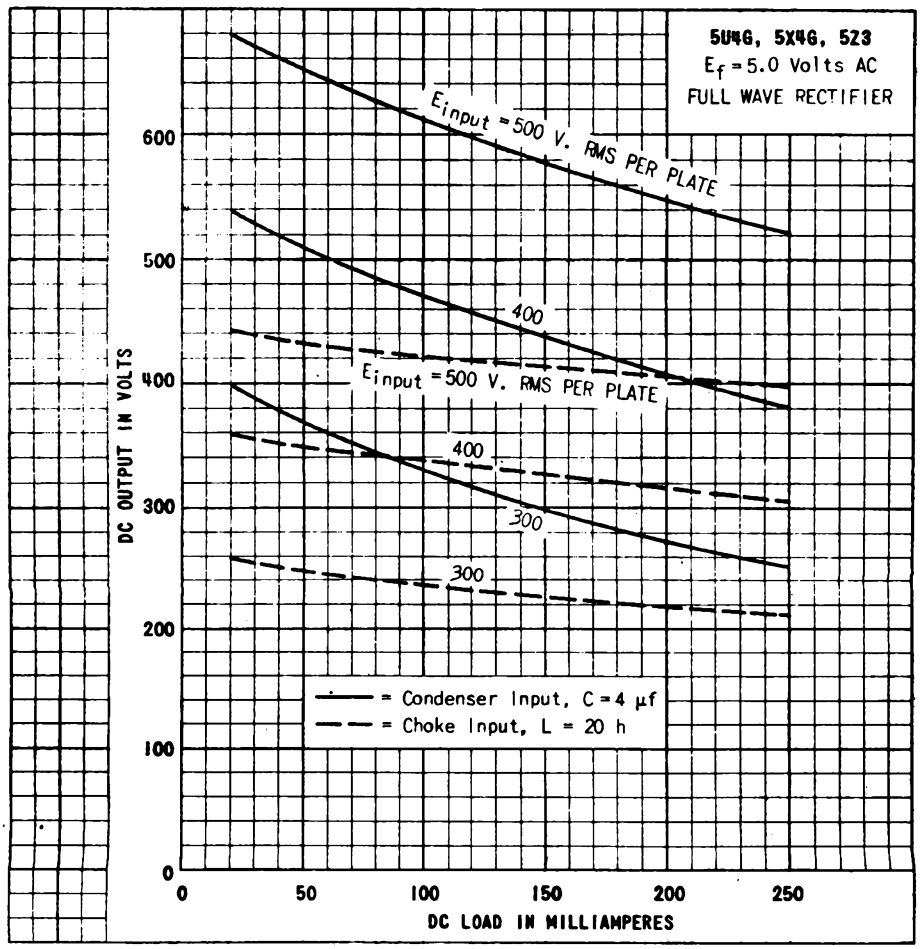
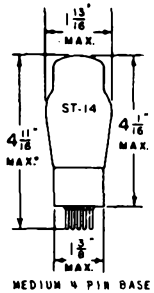


PLATE 686-1

TUNG-SOL



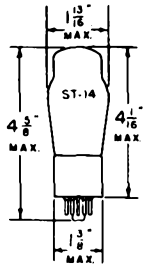
MEDIUM 4 PIN BASE
83V

FULL WAVE
HIGH VACUUM RECTIFIER

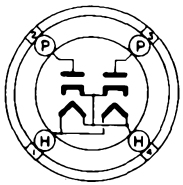
UNIPOTENTIAL CATHODE

HEATER
5.0 VOLTS 2.0 AMPERES
AC

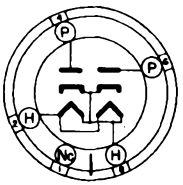
GLASS BULB



MEDIUM 5 PIN OCTAL BASE
5V4G



4L
BOTTOM VIEW



G-5L
BOTTOM VIEW

THE TUNG-SOL 5V4G AND 83V ARE POWER RECTIFIERS WITH LOW INTERNAL VOLTAGE DROPS. THEY ARE DESIGNED FOR SERVICE IN AC OPERATED RECEIVERS THAT REQUIRE HIGH CURRENTS. THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM PEAK INVERSE VOLTAGE	1400	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	525	MA.

OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	375	VOLTS
DC OUTPUT CURRENT MAX.	175	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN. [A]	65	OHMS

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	500	VOLTS
DC OUTPUT CURRENT MAX.	175	MA.
VALUE OF INPUT CHOKE MIN.	4.0	HENRYS
TUBE VOLTAGE DROP AT 175 MA. PER PLATE	23	VOLTS

[A] WHEN FILTER CONDENSERS LARGER THAN 40 µFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS", REFER TO FRONT OF BOOK.

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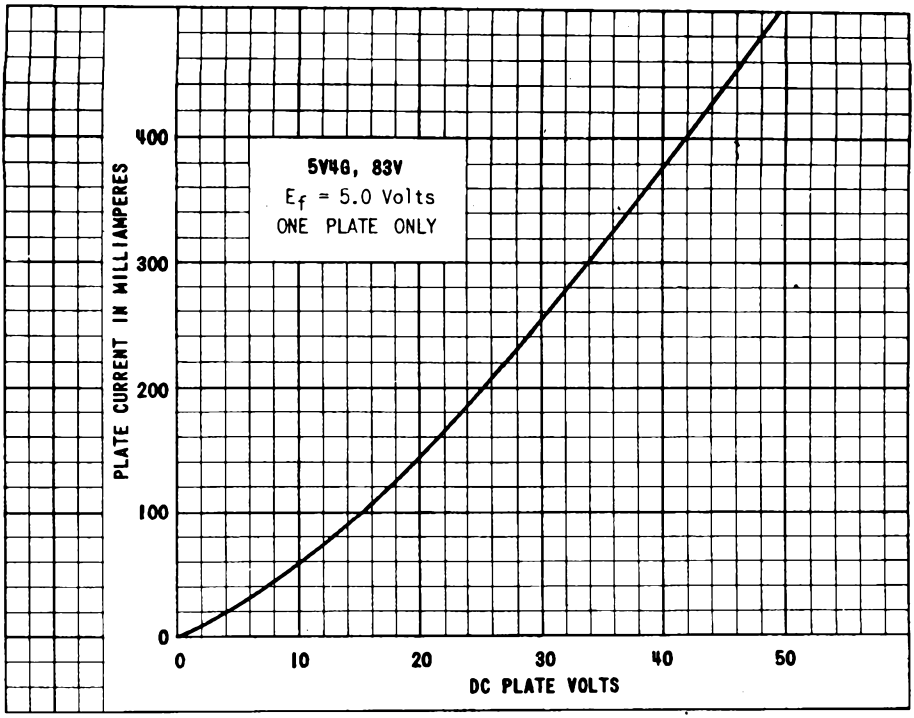
PLATE 699-2
FEB. 15 1940

5V4G (83V)



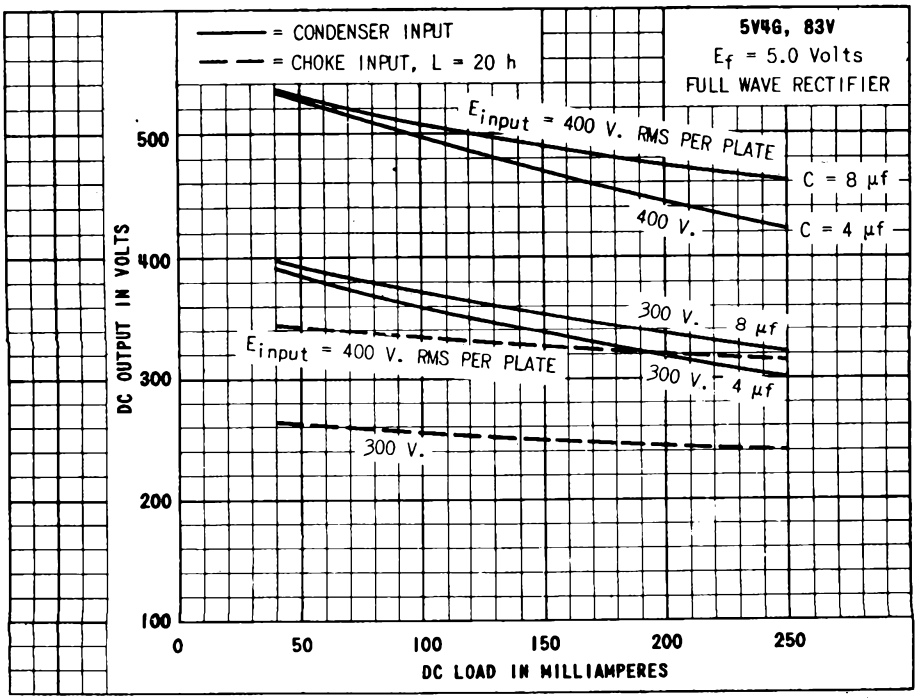
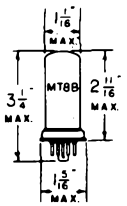


PLATE 700-1

TUNG-SOL

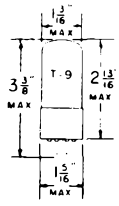


METAL SHELL
5 PIN OCTAL BASE
5W4

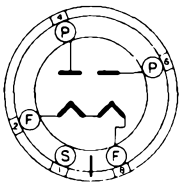
FULL WAVE

HIGH VACUUM RECTIFIER

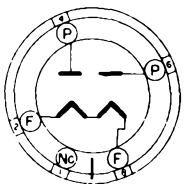
COATED FILAMENT
5.0 VOLTS 1.5 AMPERES
AC



GLASS BULB
INTERMEDIATE 5 PIN OCTAL BASE
5W4GT/G



5T
BOTTOM VIEW
5W4



G-5Ta
BOTTOM VIEW
5W4GT/G

THE TUNG-SOL 5W4 AND 5W4GT/G ARE DESIGNED FOR SERVICE AS POWER RECTIFIERS IN AC OPERATED RECEIVERS. THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM AC PLATE VOLTAGE (RMS) CONDENSER INPUT PER PLATE	350	VOLTS
MAXIMUM AC PLATE VOLTAGE (RMS) CHOKE INPUT PER PLATE	500	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	1400	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	300	MA.
TUBE VOLTAGE DROP AT 100 MA. PER PLATE	45	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS)	350	VOLTS
DC OUTPUT CURRENT MAX.	100	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.[A]	25	OHMS

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS)	500	VOLTS
DC OUTPUT CURRENT MAX.	100	MA.
VALUE OF INPUT CHOKE MIN.	6	HENRYS

[A] WHEN FILTER CONDENSERS LARGER THAN 40 MFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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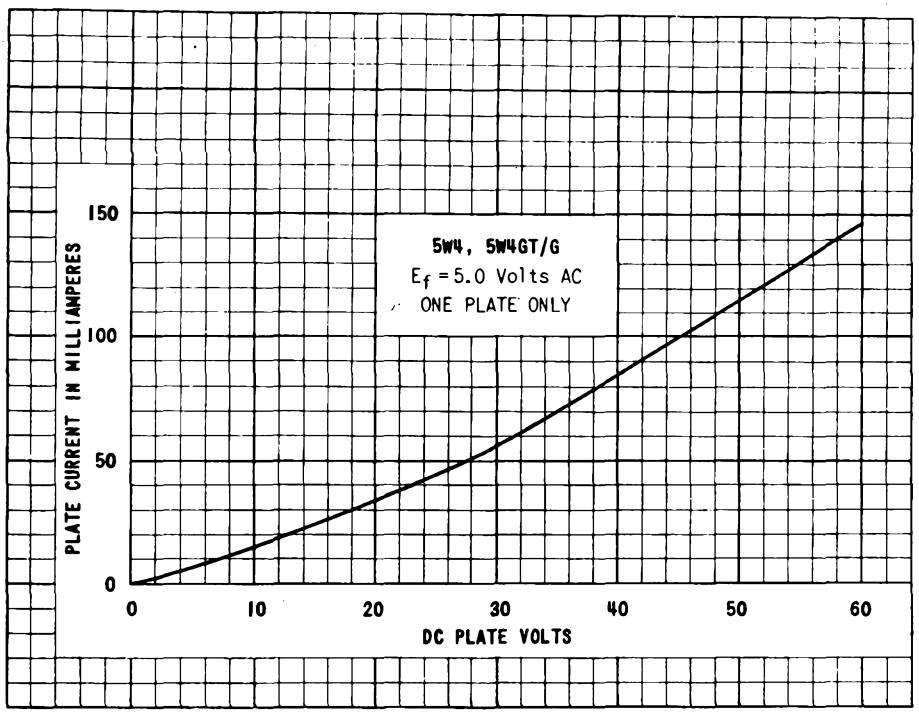
PLATE
991-2

JAN. 31
1941

5W4, 5W4GT/G



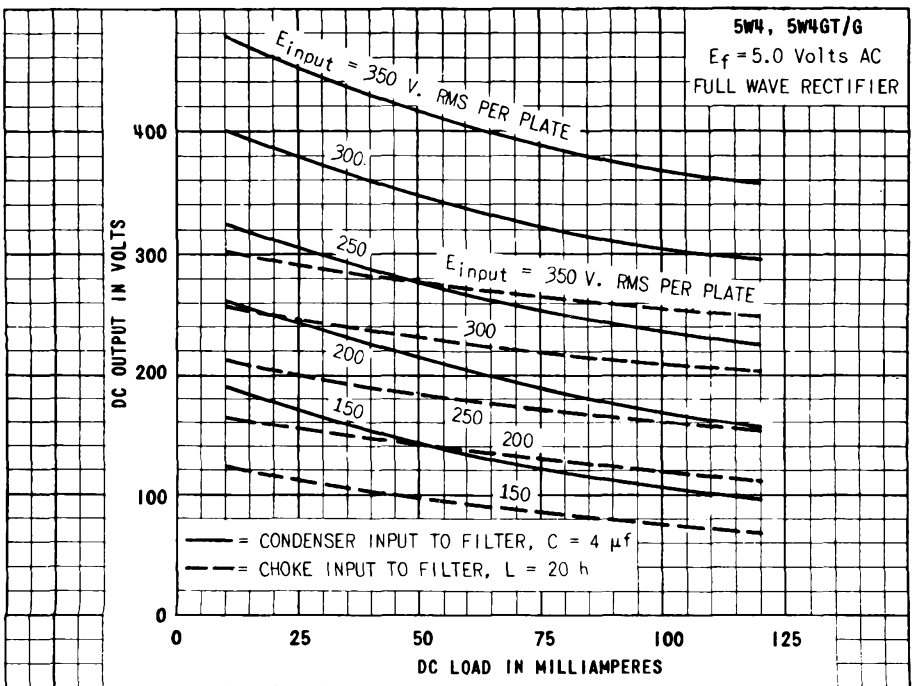
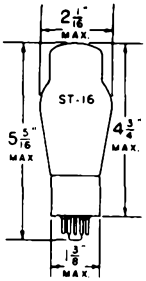


PLATE 992-2

TUNG-SOL



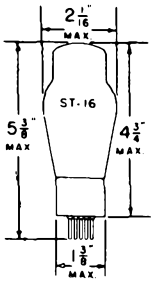
5U4G - MEDIUM 5 PIN OCTAL BASE
5X4G - MEDIUM 8 PIN OCTAL BASE

FULL WAVE
HIGH VACUUM RECTIFIER

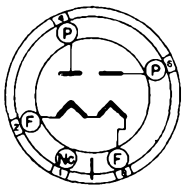
COATED FILAMENT

5.0 VOLTS 3.0 AMPERES
AC

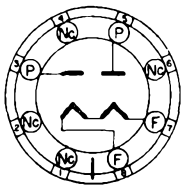
GLASS BULB



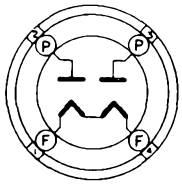
5Z3 - MEDIUM 4 PIN BASE



G-5Ta
BOTTOM VIEW
5U4G



G-5Q
BOTTOM VIEW
5X4G



4C
BOTTOM VIEW
5Z3

THE TUNG-SOL 5U4G, 5X4G AND 5Z3 ARE DESIGNED FOR SERVICE AS POWER RECTIFIERS IN AC OPERATED RECEIVERS WHICH REQUIRE HIGH CURRENTS. THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM PEAK INVERSE VOLTAGE	1550	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	675	MA.

OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	450	VOLTS
DC OUTPUT CURRENT MAX.	225	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN. [A]	75	OHMS

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	550	VOLTS
DC OUTPUT CURRENT MAX.	225	MA.
VALUE OF INPUT CHOKE MIN.	3	HENRYS
TUBE VOLTAGE DROP AT 225 MA. PER PLATE	58	VOLTS

[A] WHEN FILTER CONDENSERS LARGER THAN 40 μfds ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

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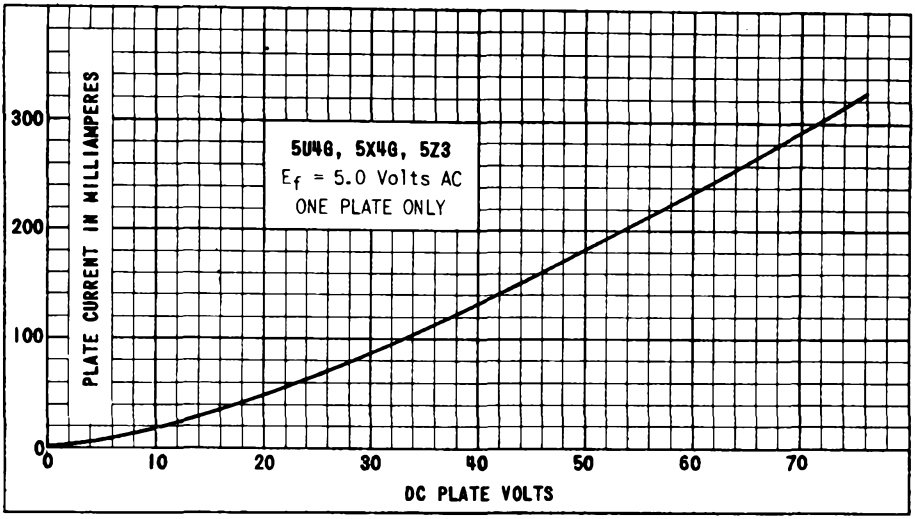
PLATE 689-2

JAN. 29 1940

5X4G (5U4G, 5Z3)



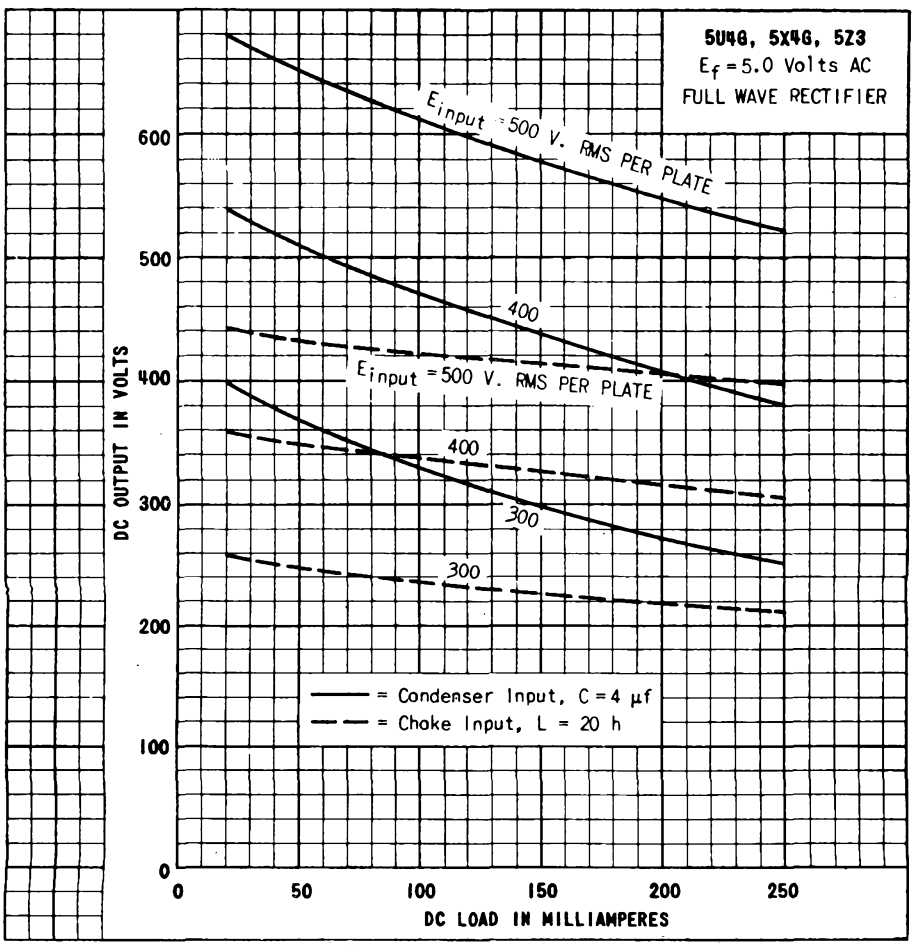


PLATE 690-1

TUNG-SOL

FULL WAVE HIGH VACUUM RECTIFIER

COATED FILAMENT

THE TUNG-SOL 5Y3GT/G,, 5Y4G AND 80 ARE DESIGNED FOR USE AS POWER RECTIFIERS IN AC OPERATED RECEIVERS. THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

HORIZONTAL OPERATION PERMITTED ONLY IF PLANE OF THE FILAMENTS IS VERTICAL.

RATINGS

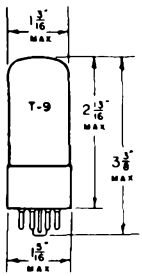
FILAMENT VOLTAGE	5.0 AC	VOLTS
FILAMENT CURRENT	2.0	AMPS.
MAXIMUM PEAK INVERSE VOLTAGE	1400	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	375	MA.
MAXIMUM AC PLATE VOLTAGE PER PLATE (RMS) CONDENSER INPUT	350	VOLTS
MAXIMUM AC PLATE VOLTAGE PER PLATE (RMS) CHOKE INPUT	500	VOLTS
TUBE VOLTAGE DROP: MEASURED WITH APPLIED DC AT 125 MA. PER PLATE	60	VOLTS

FOR INTERPRETATION OF RATINGS REFER TO RMA STANDARD M8-210

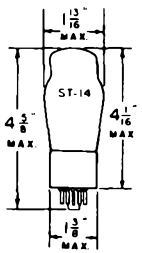
OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER

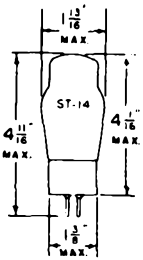
	CONDENSER INPUT	CHOKE INPUT	
FILAMENT VOLTAGE	5.0 AC	5.0 AC	VOLTS
AC PLATE VOLTAGE PER PLATE (RMS) MAX.	350	500	VOLTS
DC OUTPUT CURRENT MAX.	125	125	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.	50		OHMS
MINIMUM VALUE OF INPUT CHOKE		5	HENRYS



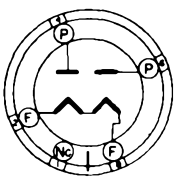
5Y3GT/G – MEDIUM 5 PIN OCTAL BASE



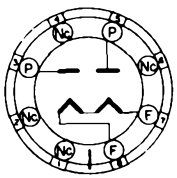
5Y4G – MEDIUM 8 PIN OCTAL BASE



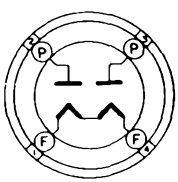
80 – MEDIUM 4 PIN BASE



5Y3GT/G



5Y4G



80

SEE OTHER SIDE OF SHEET FOR CURVES

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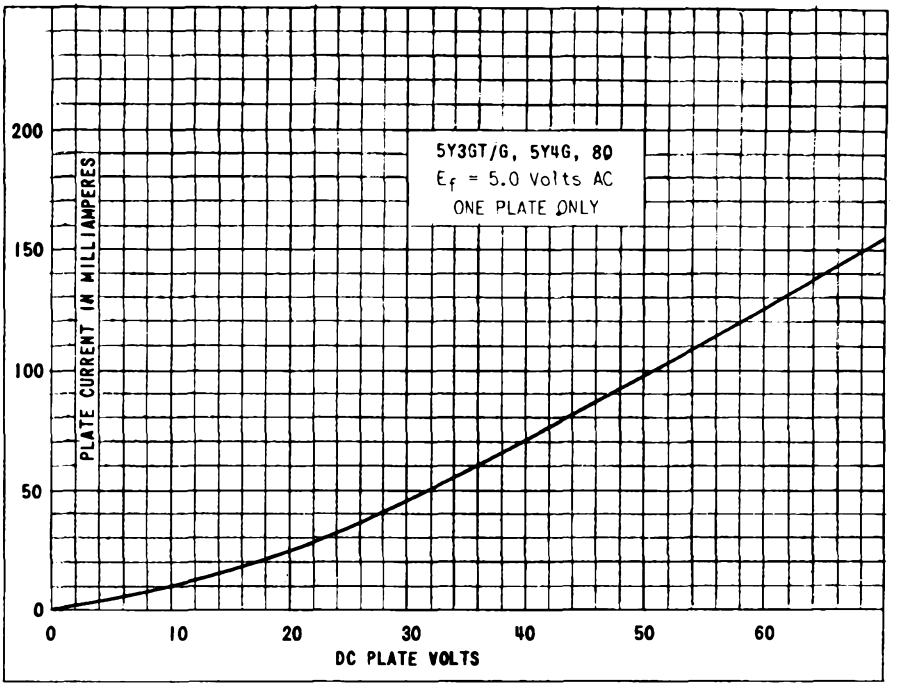
PLATE 1335-1
OCT. 25 1943

5Y3GT/G, 5Y4G (80)



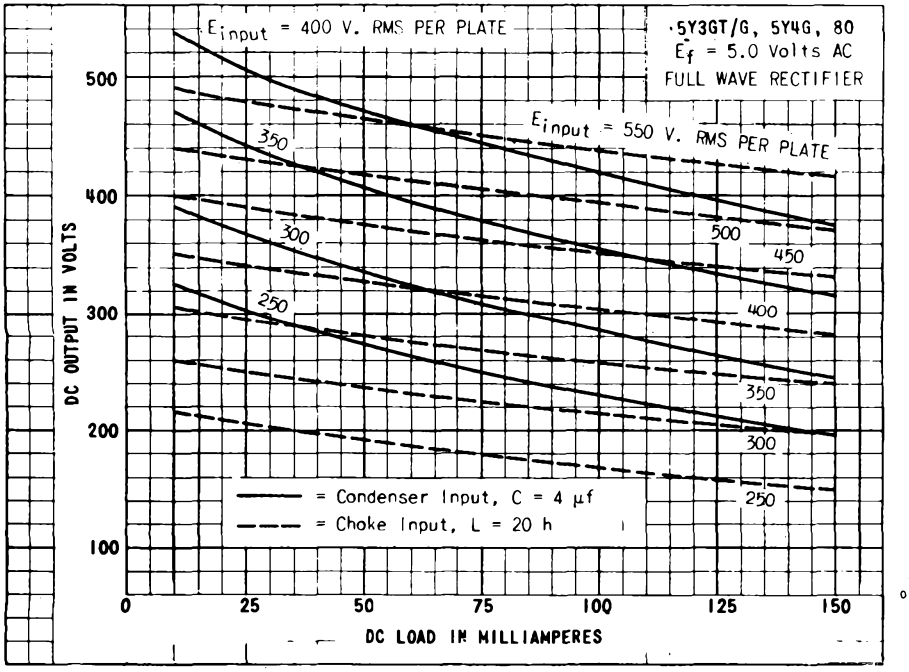
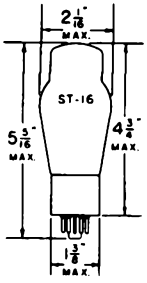


PLATE 1334-1
OCT. 21 1943

TUNG-SOL



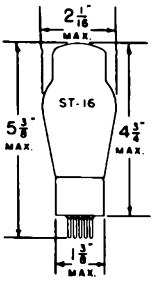
5U4G - MEDIUM 5 PIN OCTAL BASE
5X4G - MEDIUM 8 PIN OCTAL BASE

FULL WAVE
HIGH VACUUM RECTIFIER

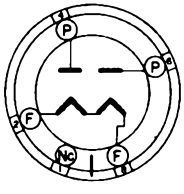
COATED FILAMENT

5.0 VOLTS 3.0 AMPERES
AC

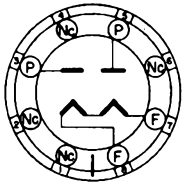
GLASS BULB



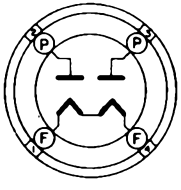
5Z3 - MEDIUM 4 PIN BASE



G-5Ta
BOTTOM VIEW
5U4G



G-5Q
BOTTOM VIEW
5X4G



4C
BOTTOM VIEW
5Z3

THE TUNG-SOL 5U4G, 5X4G AND 5Z3 ARE DESIGNED FOR SERVICE AS POWER RECTIFIERS IN AC OPERATED RECEIVERS WHICH REQUIRE HIGH CURRENTS. THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM PEAK INVERSE VOLTAGE	1550	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	675	MA.

OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS)$^{MAX.}$	450	VOLTS
DC OUTPUT CURRENT$^{MAX.}$	225	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE$^{MIN.A}$	75	OHMS

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS)$^{MAX.}$	550	VOLTS
DC OUTPUT CURRENT$^{MAX.}$	225	MA.
VALUE OF INPUT CHOKE$^{MIN.}$	3	HENRYS
TUBE VOLTAGE DROP AT 225 MA. PER PLATE	58	VOLTS

A WHEN FILTER CONDENSERS LARGER THAN 40 μfds ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

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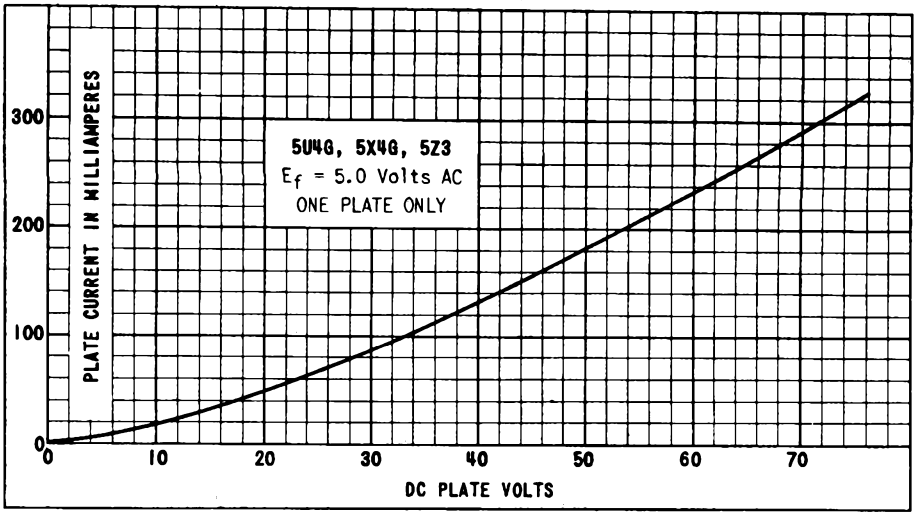
PLATE 691-2
JAN. 29 1940

5Z3 (5U4G, 5X4G)



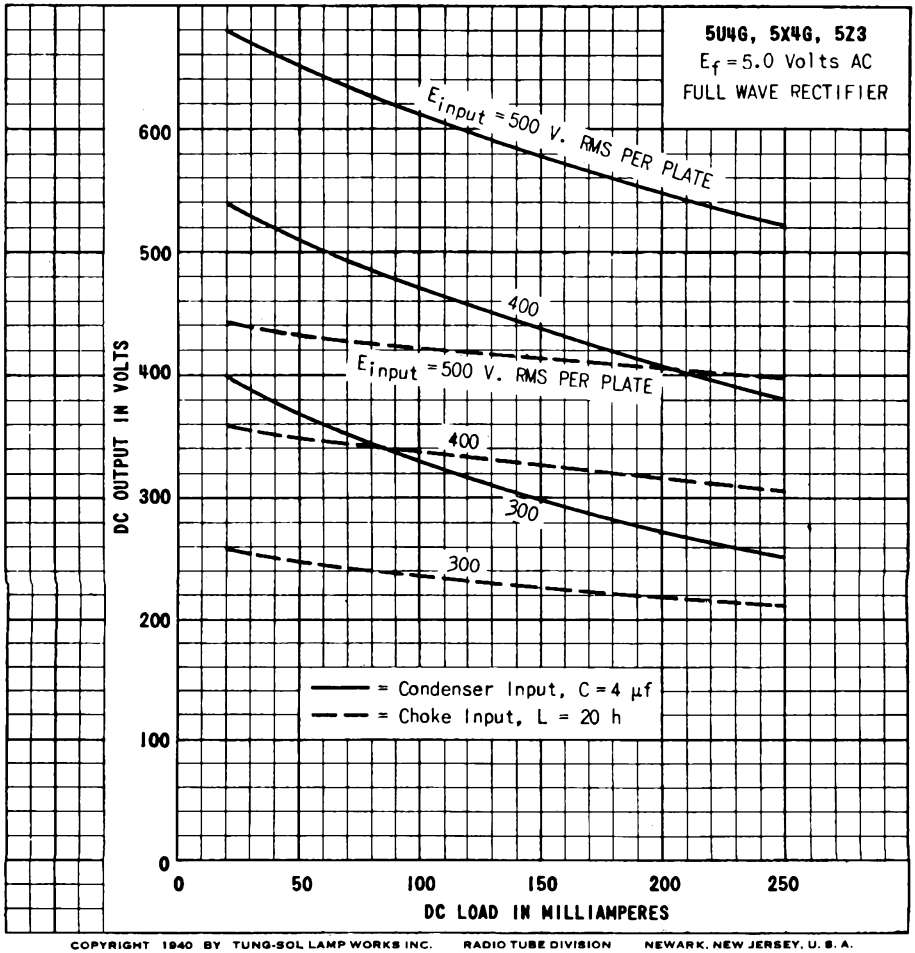
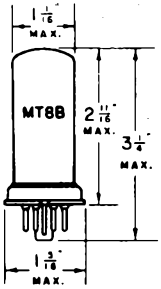


PLATE
692-1

TUNG-SOL

FULL WAVE

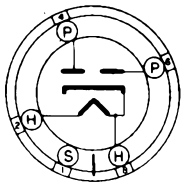
HIGH VACUUM RECTIFIER



UNIPOTENTIAL CATHODE

HEATER
5.0 VOLTS 2.0 AMPERES
AC

METAL SHELL



5L

BOTTOM VIEW

5 PIN OCTAL BASE

THE TUNG-SOL 5Z4 IS DESIGNED FOR SERVICE AS A POWER RECTIFIER IN AC OPERATED RECEIVERS.

RATINGS

MAXIMUM PEAK INVERSE VOLTAGE	1400	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	375	MA.

OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	350	VOLTS
DC OUTPUT CURRENT MAX.	125	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.[A]	30	OHMS

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	500	VOLTS
DC OUTPUT CURRENT MAX.	125	MA.
VALUE OF INPUT CHOKE MIN.	5	HENRYS
TUBE VOLTAGE DROP AT 125 MA. PER PLATE	20	VOLTS

[A] WHEN FILTER CONDENSERS LARGER THAN 40 μFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS", REFER TO FRONT OF BOOK.

PLATE 705-2

FEB. 15 1940

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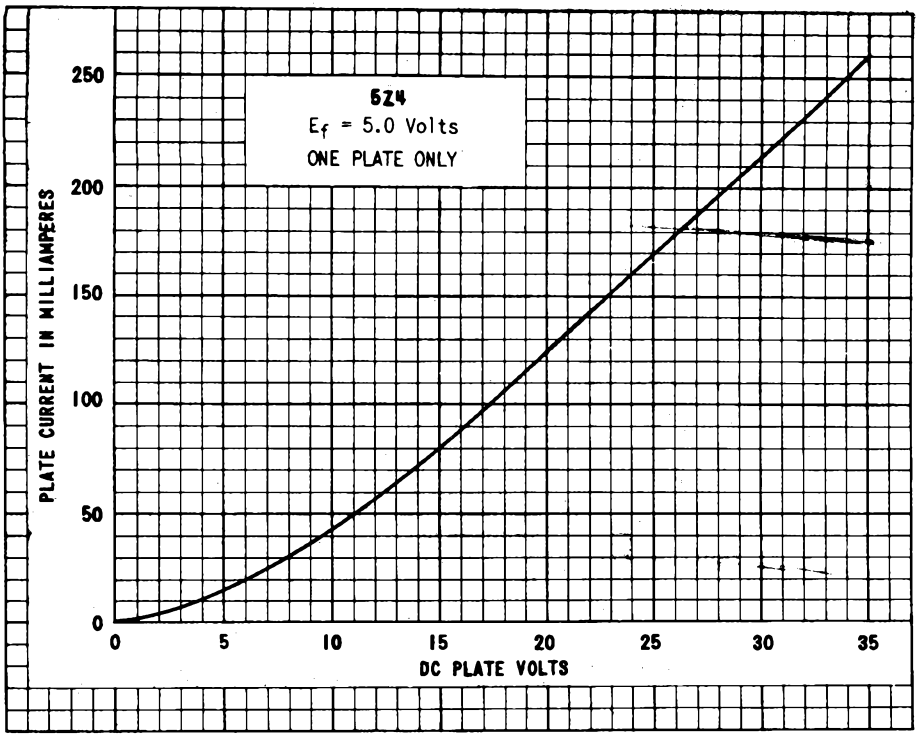
5Z4



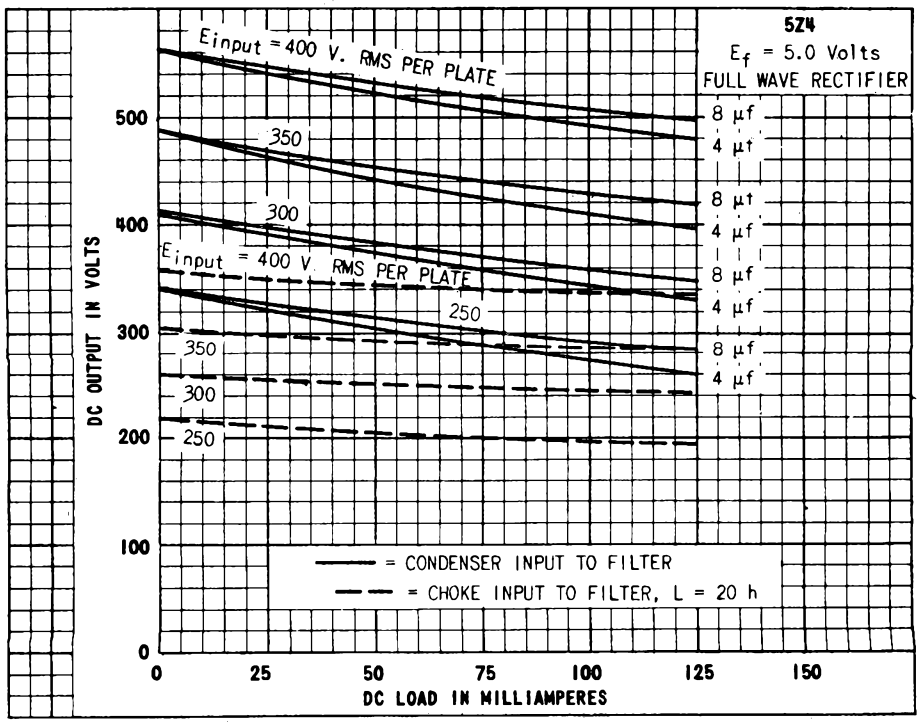
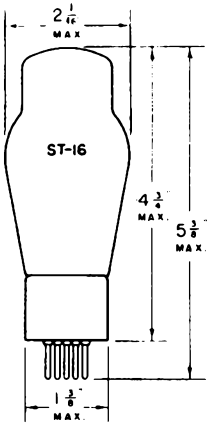


PLATE 706-1

TUNG-SOL



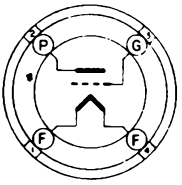
TRIODE POWER AMPLIFIER

COATED FILAMENT

6.3 VOLTS 1.0 AMPERE
AC OR DC

GLASS BULB

MEDIUM 4 PIN BASE



4D
BOTTOM VIEW

THE TUNG-SOL 6A3 IS A FILAMENT TYPE TRIODE POWER AMPLIFIER DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AUDIO AMPLIFIERS WHERE HIGH OUTPUT AND LOW HARMONIC DISTORTION ARE DESIRED. ITS RATINGS AND CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 2A3 AND 6B4G.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER – ONE TUBE

PLATE VOLTAGE MAX.	250	VOLTS
GRID VOLTAGE G	-45	VOLTS
GRID CIRCUIT RESISTANCE MAX.		
FIXED BIAS	0.05	MEGOHM
SELF BIAS	0.5	MEGOHM
PLATE CURRENT	60	MA.
PLATE RESISTANCE	800	OHMS
TRANSCONDUCTANCE	5250	μMHOS
AMPLIFICATION FACTOR	4.2	
LOAD RESISTANCE	2500	OHMS
POWER OUTPUT	3.2	WATTS
SECOND HARMONIC DISTORTION	5	PER CENT

CLASS AB1 PUSH – PULL AMPLIFIER

VALUES FOR TWO TUBES

	FIXED BIAS	SELF BIAS	
PLATE VOLTAGE MAX.	325	325	VOLTS
GRID VOLTAGE G	-68	–	VOLTS
SELF BIAS RESISTOR	–	850	OHMS
ZERO-SIGNAL PLATE CURRENT PER TUBE	40	40	MA.
LOAD RESISTANCE PER TUBE	750	1250	OHMS
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	3000	5000	OHMS
TOTAL HARMONIC DISTORTION	2.5	5	PER CENT
POWER OUTPUT	15	10	WATTS

G GRID VOLTAGE MEASURED FROM MID-POINT OF AC OPERATED FILAMENT.

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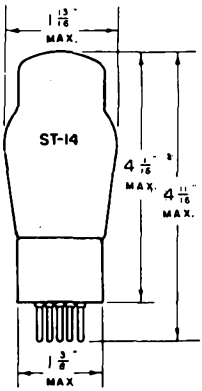
PLATE 893-2

NOV. 8 1940

6A4/LA

TUNG-SOL

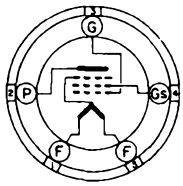


PENTODE POWER AMPLIFIER

COATED FILAMENT

6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



5B

BOTTOM VIEW

MEDIUM 5 PIN BASE

THE TUNG-SOL 6A4/LA IS A FILAMENT TYPE POWER OUTPUT PENTODE.

OPERATING CONDITIONS AND CHARACTERISTICS

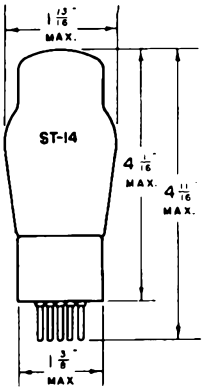
CLASS A1 AMPLIFIER

PLATE VOLTAGE	135	180 MAX.	VOLTS
SCREEN VOLTAGE	135	180 MAX.	VOLTS
CONTROL GRID VOLTAGE[A]	-9	-12	VOLTS
PLATE CURRENT	14	22	MA.
SCREEN CURRENT	2.5	3.9	MA.
PLATE RESISTANCE APPROX.	52600	45500	OHMS
TRANSCONDUCTANCE	1900	2200	μMHOS
AMPLIFICATION FACTOR APPROX.	100	100	
LOAD RESISTANCE	9500	8000	OHMS
TOTAL HARMONIC DISTORTION	9	9	PER CENT
POWER OUTPUT	0.7	1.4	WATTS

[A] GRID VOLTAGE MEASURED FROM NEGATIVE END OF DC OPERATED FILAMENT. IF THE FILAMENT IS AC OPERATED, THE TABULATED VALUES OF GRID VOLTAGE SHOULD BE INCREASED BY 4 VOLTS, AND THEY SHOULD BE REFERRED TO THE MID-POINT OF THE FILAMENT.

PLATE 894-1

TUNG-SOL



TWIN TRIODE

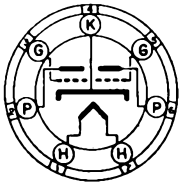
POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.8 AMPERE
AC OR DC

GLASS BULB

MEDIUM 7 PIN BASE



7B

BOTTOM VIEW

THE TUNG-SOL 6A6 IS A TWIN TRIODE DESIGNED FOR SERVICE AS A CLASS B POWER AMPLIFIER AND AS A CLASS A1 DRIVER. WITH THE EXCEPTION OF HEATER RATINGS, ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL TO THOSE OF TYPES 6N7, 6N7G, 6N7GT AND 53.

RATINGS

CLASS A1 AMPLIFIER

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PEAK PLATE CURRENT PER PLATE	125	MA.
MAXIMUM AVERAGE DISSIPATION PER PLATE	1.0	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER – TRIODES CONNECTED IN PARALLEL

PLATE VOLTAGE	250	294	VOLTS
CONTROL GRID VOLTAGE	−5	−6	VOLTS
PLATE CURRENT	6	7	MA.
PLATE RESISTANCE	11300	11000	OHMS
TRANSCONDUCTANCE	3100	3200	μMHOS
AMPLIFICATION FACTOR	35	35	

RATINGS

CLASS B POWER AMPLIFIER

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PEAK PLATE CURRENT	125	MA.
MAXIMUM AVERAGE DISSIPATION PER PLATE	5.5	WATTS

CONTINUED NEXT PAGE

PLATE 1139-2

NOV. 17 1941

TUNG-SOL

OPERATING CONDITIONS AND CHARACTERISTICS[A]

CLASS B AMPLIFIER	IDEAL	TYPICAL	
ZERO SIGNAL PLATE VOLTAGE	300	300	VOLTS
DC GRID VOLTAGE	0	0	VOLT
PEAK AF SIGNAL VOLTAGE PER GRID(B)	29	41[C]	VOLTS
MAXIMUM SIGNAL PEAK GRID CURRENT PER GRID	20	22	MA.
ZERO SIGNAL PLATE CURRENT PER PLATE	17.5	17.5	MA.
MAXIMUM SIGNAL DC PLATE CURRENT PER PLATE	35	35	MA.
GRID IMPEDANCE AT 400 CYCLES	0	516[D]	OHMS
PLATE SUPPLY IMPEDANCE	0	1000	OHMS
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	8000	8000	OHMS
TOTAL HARMONIC DISTORTION	4	8	PER CENT
THIRD HARMONIC DISTORTION	3.5	7.5	PER CENT
FIFTH HARMONIC DISTORTION	1.5	2.5	PER CENT
POWER OUTPUT	10	10	WATTS

[A] UNLESS OTHERWISE SPECIFIED, VALUES ARE FOR BOTH UNITS

[B] FOR POWER OUTPUT SHOWN.

[C] INCLUDES PEAK GRID IMPEDANCE VOLTAGE DROP.

[D] THE 516 OHMS IMPEDANCE CONSISTS OF A 50 MH. INDUCTANCE AND A 500 OHM RESISTANCE.

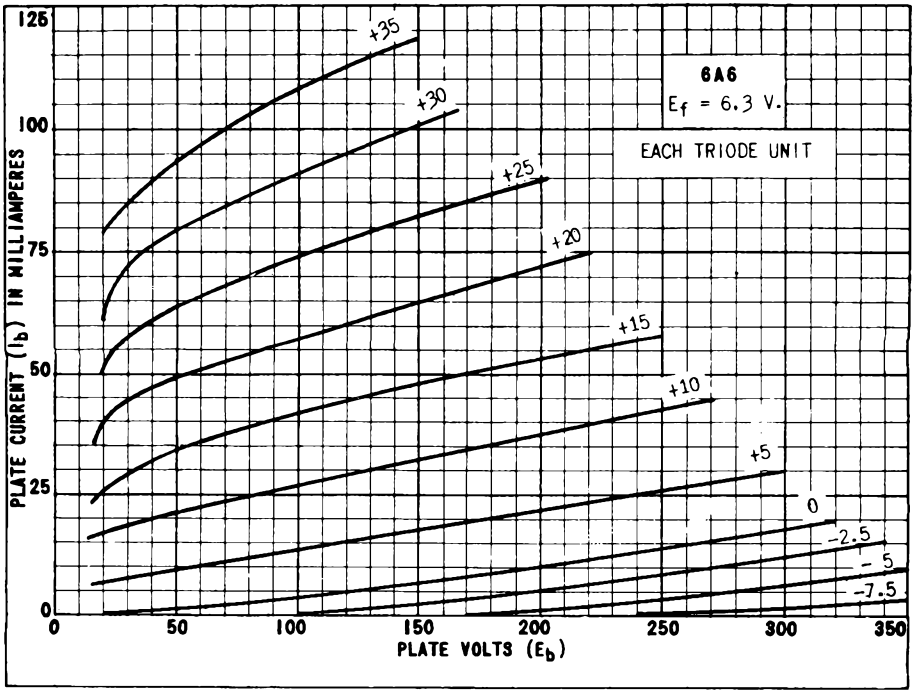
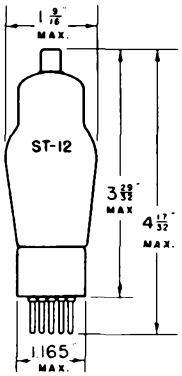


PLATE 1140-1

TUNG-SOL



PENTAGRID CONVERTER

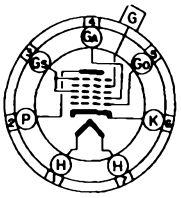
UNIPOTENTIAL CATHODE

HEATER

2A7 – 2.5 VOLTS 0.8 AMPERE

6A7 – 6.3 VOLTS 0.3 AMPERE

AC OR DC



7C

BOTTOM VIEW

GLASS BULB

SMALL 7 PIN BASE

THE TUNG-SOL 2A7 AND 6A7 ARE PENTAGRID CONVERTERS DESIGNED FOR SERVICE AS OSCILLATORS AND MIXERS IN AC OPERATED AND AC-DC OPERATED RECEIVERS. WITH THE EXCEPTION OF HEATER RATINGS, THEY HAVE IDENTICAL RATINGS AND ELECTRICAL CHARACTERISTICS.

RATINGS

MAXIMUM PLATE (P) VOLTAGE	300	VOLTS
MAXIMUM SCREEN (G_5) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL CONTROL GRID (G) BIAS VOLTAGE	0	VOLTS
MAXIMUM OSCILLATOR ANODE (G_4) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM OSCILLATOR ANODE VOLTAGE	200	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	0.3	WATT
MAXIMUM OSCILLATOR ANODE DISSIPATION	0.75	WATT

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 918-2

DEC.30 1940

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID (G) TO MIXER PLATE (P)[S]	0.3	μμf
CONTROL GRID (G) TO OSCILLATOR ANODE (G_A)[S]	0.15	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (G_0)[S]	0.15	μμf
OSCILLATOR GRID (G_0) TO OSCILLATOR ANODE (G_A)	1.0	μμf
RF INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES	8.5	μμf
OSCILLATOR INPUT: OSCILLATOR GRID (G_0) TO ALL OTHER ELECTRODES	7.0	μμf μμf
OSCILLATOR OUTPUT: OSCILLATOR ANODE (G_A) TO ALL OTHER ELECTRODES	5.5	μμf
MIXER OUTPUT: MIXER PLATE (P) TO ALL OTHER ELECTRODES	9.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

PLATE (P) VOLTAGE	100	250	VOLTS
SCREEN (G_S) VOLTAGE	50	100	VOLTS
CONTROL GRID (G) VOLTAGE MIN.	-1.5	-3	VOLTS
OSCILLATOR ANODE (G_A) SUPPLY VOLTAGE[A]	-	250	VOLTS
OSCILLATOR ANODE VOLTAGE	100	-	VOLTS
OSCILLATOR GRID (G_0) RESISTOR	50 000	50 000	OHMS
PLATE CURRENT	1.1	3.5	MA.
SCREEN CURRENT	1.3	2.7	MA.
OSCILLATOR ANODE CURRENT	2.0	4.0	MA.
OSCILLATOR GRID CURRENT	0.25	0.4	MA.
TOTAL CATHODE CURRENT	4.6	10.6	MA.
PLATE RESISTANCE APPROX.	0.6	0.36	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -1.5 V.	360	-	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -3 V.	180	550	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -6 V.	50	325	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -10 V.	-	100	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = -20 V.	3	-	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = -35 V.	-	6	μMHOS

[A] APPLIED THROUGH A 20 000 OHM DROPPING RESISTOR

[S] WITH EXTERNAL SHIELD CONNECTED TO CATHODE

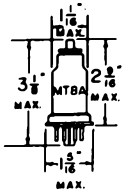
PLATE 919-2

TUNG-SOL

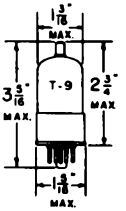
PENTAGRID CONVERTER

UNIPOTENTIAL CATHODE

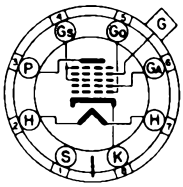
HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC



METAL SHELL
8 PIN OCTAL BASE
6A8

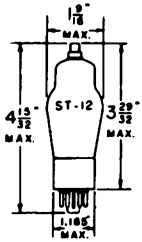


GLASS BULB
8 PIN OCTAL BASE
WITH METAL SHELL
6A8GT

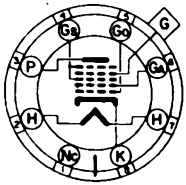


8A

BOTTOM VIEW
6A8, 6A8GT



GLASS BULB
SMALL 8 PIN OCTAL BASE
6A8G



G-8A

BOTTOM VIEW
6A8G

THE TUNG-SOL 6A8, 6A8G, AND 6A8GT ARE PENTAGRID CONVERTERS DESIGNED FOR SERVICE AS COMBINED OSCILLATORS AND MIXERS IN AC, STORAGE BATTERY, AND AC – DC OPERATED RECEIVERS. WITH THE EXCEPTION OF CAPACITANCES, THEIR RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 6A7.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN (G_s) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL CONTROL GRID (G) BIAS VOLTAGE	0	VOLTS
MAXIMUM OSCILLATOR ANODE (G_A) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM OSCILLATOR ANODE VOLTAGE	200	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	0.3	WATT
MAXIMUM OSCILLATOR ANODE DISSIPATION	.75	WATT

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE
1078-3

JULY 28
1941

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES [S]

	6A8	6A8G, 6A8GT	
CONTROL GRID (G) TO MIXER PLATE (P)	0.06	.26	μμf
CONTROL GRID (G) TO OSCILLATOR ANODE (G_A)	0.1	.19	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (G_0)	0.09	.16	μμf
OSCILLATOR GRID (G_0) TO OSCILLATOR ANODE (G_A)	0.8	1.1	μμf
RF INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES	12.0	9.5	μμf
OSCILLATOR INPUT: OSCILLATOR GRID (G_0) TO ALL OTHER ELECTRODES	6.5	6.0	μμf
OSCILLATOR OUTPUT: OSCILLATOR ANODE (G_A) TO ALL OTHER ELECTRODES	5	4.6	μμf
MIXER OUTPUT: MIXER PLATE (P) TO ALL OTHER ELECTRODES	12	12	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

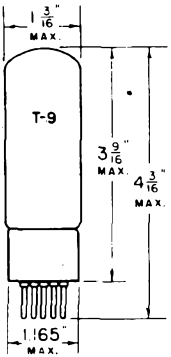
PLATE (P) VOLTAGE	100	250	VOLTS
SCREEN (G_S) VOLTAGE	50	100	VOLTS
CONTROL GRID (G) VOLTAGE MIN.	-1.5	-3	VOLTS
OSCILLATOR ANODE (G_A) SUPPLY VOLTAGE [A]	-	250	VOLTS
OSCILLATOR ANODE VOLTAGE	100	-	VOLTS
OSCILLATOR GRID (G_0) RESISTOR	50000	50000	OHMS
PLATE CURRENT	1.1	3.5	MA.
SCREEN CURRENT	1.3	2.7	MA.
OSCILLATOR ANODE CURRENT	2.0	4.0	MA.
OSCILLATOR GRID CURRENT	0.25	0.4	MA.
TOTAL CATHODE CURRENT	4.6	10.6	MA.
PLATE RESISTANCE	0.6	0.36	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -1.5 V.	360	-	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -3 V.	180	550	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -6 V.	50	325	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -10 V.	-	100	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = -20 V.	3	-	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = -35 V.	-	6	μMHOS

[A] APPLIED THROUGH A 20 000 OHM DROPPING RESISTOR

[S] WITH EXTERNAL SHIELD OR SHELL CONNECTED TO CATHODE

PLATE 1079-1

TUNG-SOL



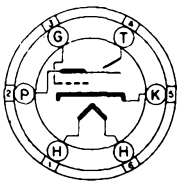
CATHODE RAY TUNING INDICATOR

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB

SMALL 6 PIN BASE



6R
BOTTOM VIEW

THE TUNG-SOL 6AB5/6N5 CONSISTS OF A CIRCULAR FLUORESCENT SCREEN WITH AN INDICATING SHADOW ANGLE, WHICH IS CONTROLLED BY AN INTERNALLY CONNECTED AMPLIFIER. WHEN THE 6AB5/6N5 IS USED AS A TUNING INDICATOR, AVC VOLTAGE IS APPLIED TO THE TRIODE GRID. IT IS RECOMMENDED FOR APPLICATIONS WHICH REQUIRE A HEATER OF LOW CURRENT DRAIN.

RATINGS

MAXIMUM PLATE SUPPLY VOLTAGE	180	VOLTS
MAXIMUM TARGET VOLTAGE	180	VOLTS
MINIMUM TARGET VOLTAGE	100	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PLATE AND TARGET SUPPLY VOLTAGE	135	VOLTS
SERIES TRIODE PLATE RESISTOR	0.25	MEGOHM
TRIODE GRID VOLTAGE (0^{o} SHADOW ANGLE)	−10 APPROX.	VOLTS
TRIODE GRID VOLTAGE (90^{o} SHADOW ANGLE)	0 APPROX.	VOLTS
TRIODE PLATE CURRENT (TRIODE GRID V.=0)	0.5 [A]	MA.
TARGET CURRENT (TRIODE GRID V.=0)	2.0 [A]	MA.

[A] SUBJECT TO WIDE VARIATION

FOR "INTERPRETATION OF RATINGS", REFER TO FRONT OF BOOK.

NOTE: THIS DOUBLE-BRANDED TUBE, 6AB5/6N5, REPLACES EITHER THE 6AB5 OR THE 6N5.

CONTINUED NEXT PAGE

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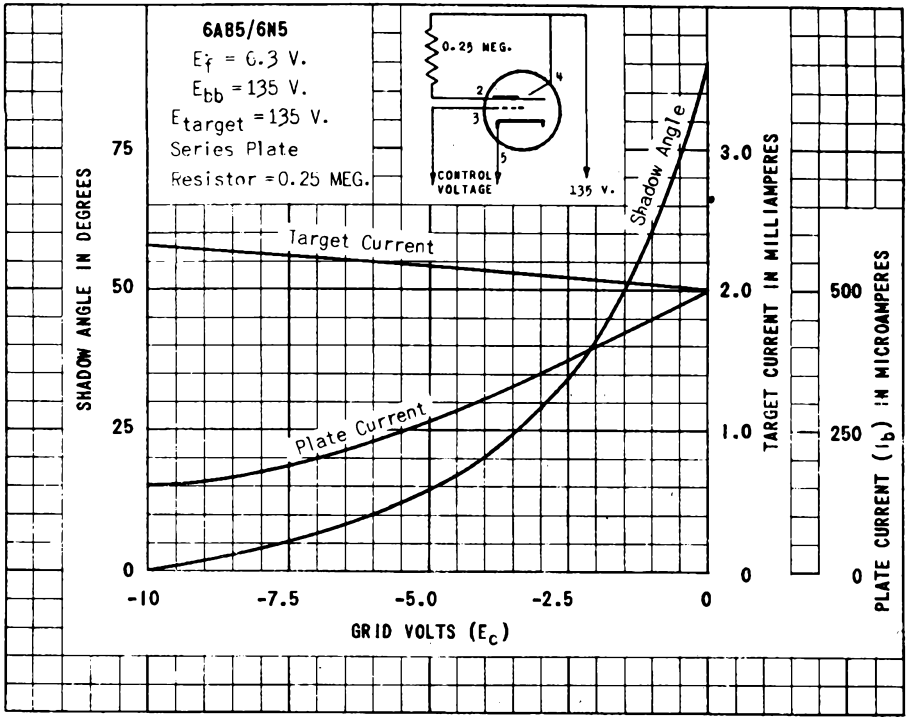
PLATE
BT2-1

OCT. 21
1940

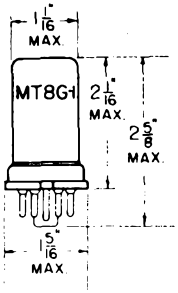
PLATE
873-1

6AB5/6N5


6AB5/6N5
E_f = 6.3 V.
E_{bb} = 135 V.
E_{target} = 135 V.
Series Plate
Resistor = 0.25 MEG.
0.25 MEG.
2
3
4
5
CONTROL VOLTAGE
135 V.
Target Current
Plate Current
Shadow Angle
SHADOW ANGLE IN DEGREES
75
50
25
0
-10
-7.5
-5.0
-2.5
0
GRID VOLTS (E_c)
3.0
2.0
1.0
0
TARGET CURRENT IN MILLIAMPERES
500
250
0
PLATE CURRENT (I_b) IN MICROAMPERES

TUNG-SOL

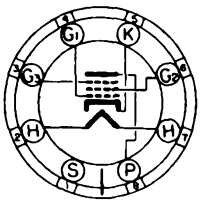
TELEVISION AMPLIFIER PENTODE



COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.45 AMPERE
AC OR DC

ANY MOUNTING POSITION



METAL SHELL

BOTTOM VIEW
SMALL WAFER
8-PIN OCTAL

THE 6AB7/1853 IS A HIGH TRANSCONDUCTANCE SEMI-REMOTE CUT-OFF AMPLIFIER TUBE. THIS TUBE IS DESIGNED FOR TELEVISION RF AND IF AMPLIFIER SERVICE. PRECAUTIONS SHOULD BE TAKEN NOT TO EXCEED DISSIPATION RATING WITH EXPECTED LINE-VOLTAGE FLUCTUATIONS, ESPECIALLY WITH FIXED-BIAS OPERATION.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER CURRENT	0.45	AMP.
MAX. PLATE VOLTAGE	300	VOLTS
MAX. SCREEN VOLTAGE	200	VOLTS
MAX. SCREEN SUPPLY VOLTAGE	300	VOLTS
MAX. PLATE DISSIPATION	3.75	WATTS
MAX. SCREEN DISSIPATION	0.65	WATT
HEATER-CATHODE VOLTAGE	AS LOW AS POSSIBLE	

DIRECT INTERELECTRODE CAPACITANCES

WITH SHELL CONNECTED TO CATHODE

GRID TO PLATE (MAX.)	0.015	μμf
INPUT	8	μμf
OUTPUT	5	μμf

CONTINUED ON FOLLOWING PAGE

PLATE 1602
OCT. 15, 1945

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

	WITH FIXED SCREEN SUPPLY	WITH SERIES SCREEN RESISTOR	
HEATER VOLTAGE	6.3	6.3	VOLTS
PLATE VOLTAGE	300	300	VOLTS
SCREEN SUPPLY VOLTAGE[A]	200	300	VOLTS
GRID VOLTAGE (MIN.)[B]	-3	-3	VOLTS
SUPPRESSOR VOLTAGE[C]	0	0	VOLTS
PLATE CURRENT	12.5	12.5	MA.
SCREEN CURRENT	3.2	3.2	MA.
PLATE RESISTANCE (APPROX.)	0.7	0.7	MEGOHM
SERIES SCREEN RESISTOR		30 000	OHMS
GRID RESISTOR (MAX.) FIXED BIAS	0.25	0.25	MEGOHM
CATHODE BIAS	0.25	0.5	MEGOHM
TRANSCONDUCTANCE	5000	5000	µMHOS
AMPLIFICATION FACTOR (APPROX.)	3500	3500	
GRID BIAS FOR TRANSCONDUCTANCE OF 50 µMHOS	-15	-22.5	VOLTS

[A] SCREEN SUPPLY VOLTAGES GREATER THAN 200 VOLTS REQUIRE THE USE OF A SERIES DROPPING RESISTOR TO LIMIT THE VOLTAGE AT THE SCREEN TO 200 VOLTS WITH NORMAL PLATE CURRENT OF 12.5 MA.

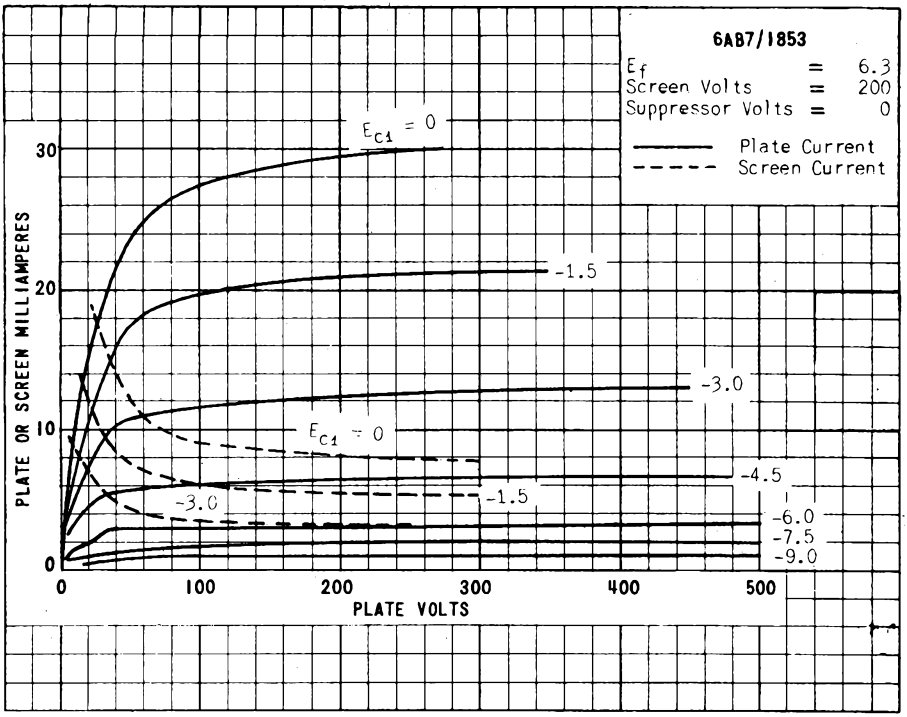
[B] THE GRID BIAS MAY BE OBTAINED FROM A CATHODE BIAS RESISTOR HAVING A VALUE OF 190 OHMS MINIMUM.

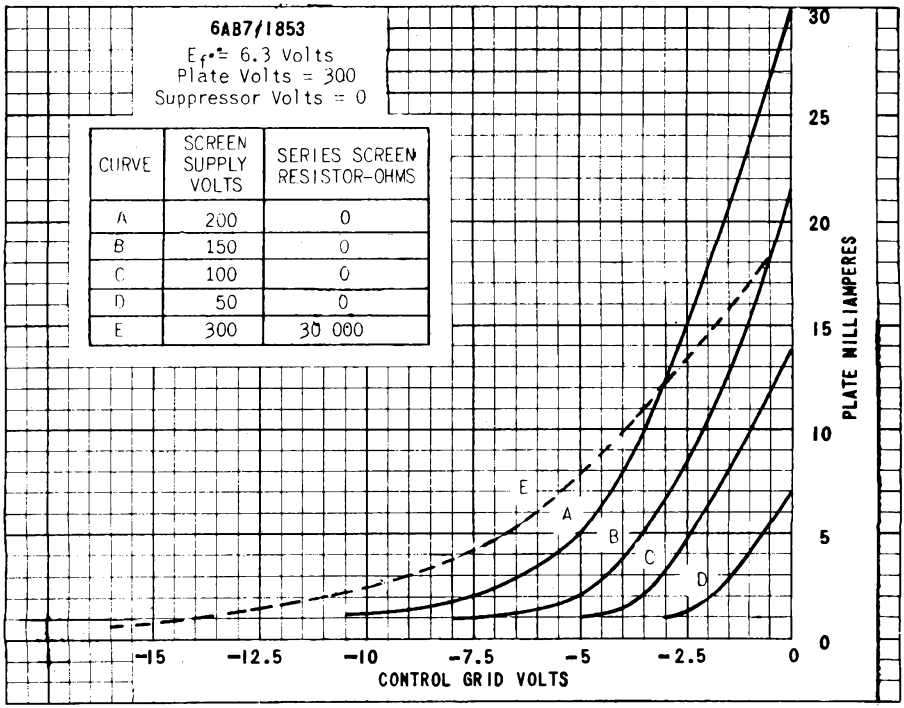
[C] IN RF AND IF STAGES, THE SUPPRESSOR SHOULD BE CONNECTED DIRECTLY TO GROUND TO MINIMIZE FEEDBACK.

NOTE: PRECAUTIONS MUST BE TAKEN IN HIGH FREQUENCY CIRCUITS TO MINIMIZE THE CHARACTERISTICALLY LARGE VARIATION OF INPUT CAPACITANCE AND INPUT CONDUCTANCE WITH PLATE CURRENT.

SIMILAR TYPE REFERENCE: Somewhat similar to type 6SG7.

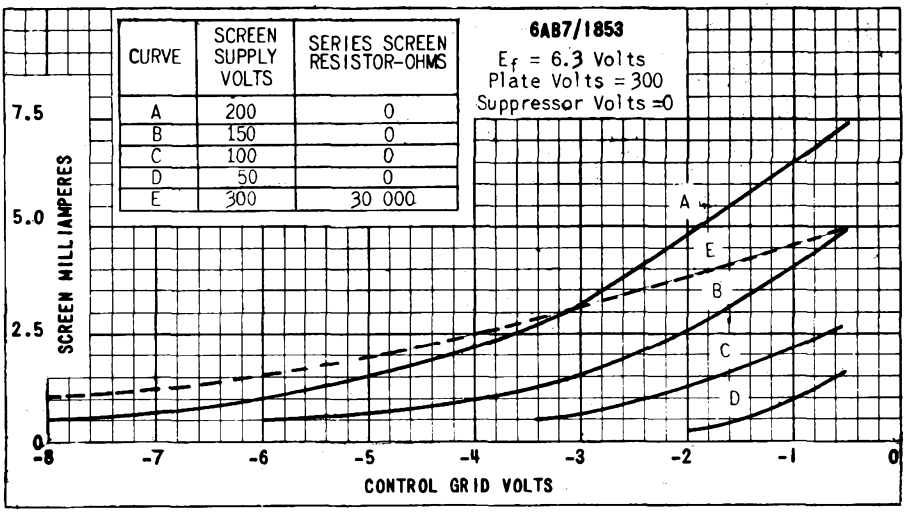
PLATE 1603
OCT. 15, 1945





PRINTED IN U.S.A.
PLATE
1622
NOV. 30
1945

6AB7/1853



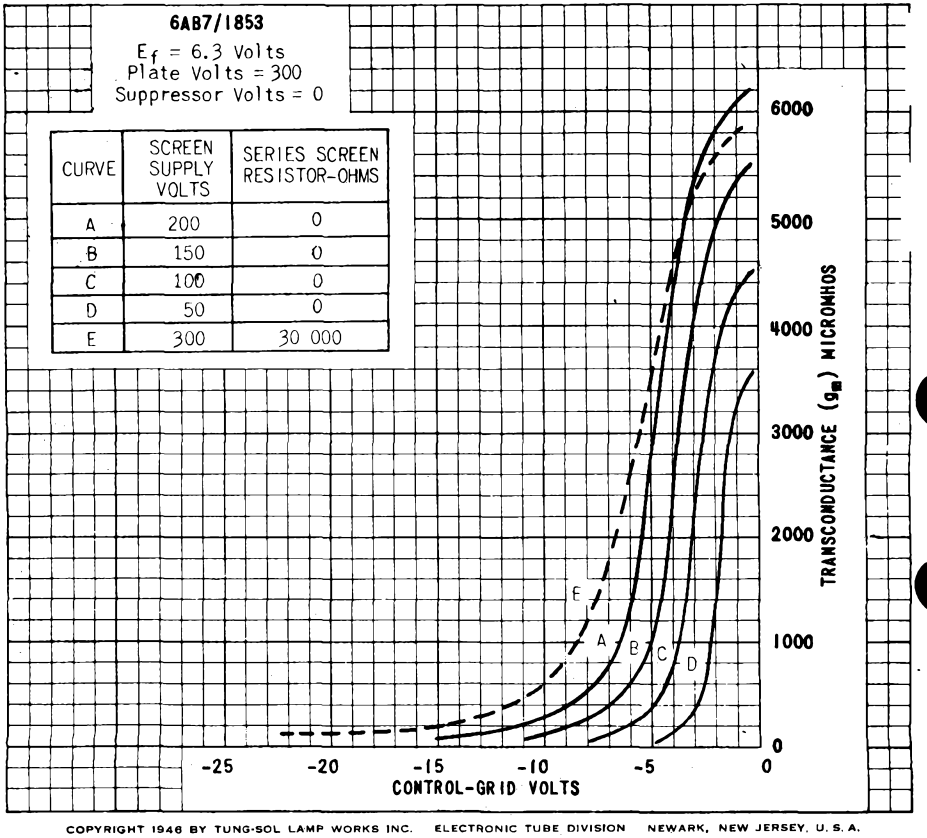
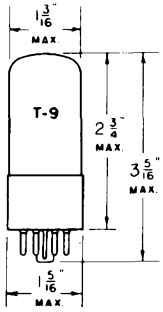


PLATE 1691 FEB. 15 1946

TUNG-SOL



HIGH-MU
TRIODE POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.4 AMPERE
AC OR DC

GLASS BULB

6Q-0-0

INTERMEDIATE & PIN OCTAL BASE

THE TUNG-SOL 6AC5GT/G IS A HIGH MU POWER OUTPUT TRIODE DESIGNED FOR SERVICE IN DYNAMIC COUPLED CIRCUITS USING A TYPE 76, 6P5GT/G OR 6J5GT/G AS A DRIVER. TWO TUNG-SOL 6AC5GT/G'S MAY BE USED AS A ZERO BIAS CLASS B AMPLIFIER.

RATINGS

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM PEAK PLATE CURRENT	110	MA.
MAXIMUM AVERAGE PLATE DISSIPATION	10	WATTS

AVERAGE CHARACTERISTICS

PLATE VOLTAGE	250	VOLTS
CONTROL GRID VOLTAGE	+13	VOLTS
PLATE CURRENT	32	MA.
GRID CURRENT	5	MA.
PLATE RESISTANCE	36 700	OHMS
TRANSCONDUCTANCE	3400	µMHOS
AMPLIFICATION FACTOR	125	

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS B POWER AMPLIFIER

VALUES ARE FOR TWO TUBES UNLESS OTHERWISE SPECIFIED

PLATE VOLTAGE	250	VOLTS
CONTROL GRID VOLTAGE	0	VOLTS
PEAK AF SIGNAL VOLTAGE GRID TO GRID	70	VOLTS
ZERO-SIGNAL PLATE CURRENT	5	MA.
PEAK PLATE CURRENT PER TUBE	110	MA.
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	10 000	OHMS
PEAK POWER INPUT	.950	WATT
POWER OUTPUT APPROX.	8	WATTS

CONTINUED NEXT PAGE

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PLATE
1173-1

FEB. 28
1942

TUNG-SOL

TYPICAL OPERATION

DYNAMIC COUPLED CLASS A1 AMPLIFIER

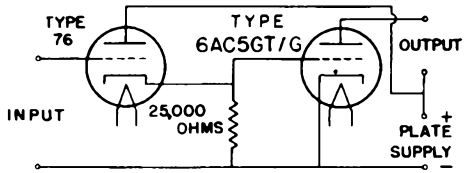
WITH TYPE 6P5GT/G OR 76 AS DRIVER

PLATE SUPPLY VOLTAGE	250	VOLTS
CONTROL GRID VOLTAGE [A]	0	VOLT
DRIVER GRID RESISTOR MAX.	1.0	MEGOHM
ZERO-SIGNAL PLATE CURRENT	32	MA.
AVERAGE PLATE CURRENT OF DRIVER	5.5	MA.
INPUT SIGNAL TO DRIVER (RMS)	16.5	VOLTS
LOAD RESISTANCE	7000	OHMS
TOTAL HARMONIC DISTORTION	10	PER CENT
POWER OUTPUT [B]	3.7	WATTS

[A] BIAS VOLTAGE FOR BOTH THE 6AC5GT/G AND THE DRIVER TUBE IS DEVELOPED BY THE "DYNAMIC COUPLED" CIRCUIT CONNECTION SHOWN BELOW. THE 25 000 OHM RESISTOR IS CONNECTED BETWEEN GRID AND CATHODE OF THE 6AC5GT/G TO PREVENT A CURRENT SURGE OCCURRING WHEN THE TUBE IS HEATING.

[B] AT THE POINT WHERE DRIVER GRID CURRENT BEGINS TO FLOW, THE POWER OUTPUT IS 4.3 WATTS WITH 16% DISTORTION.

DYNAMIC - COUPLED CONNECTION



RESISTANCE COUPLED AMPLIFIER OPERATION
ZERO CATHODE RESISTOR CIRCUIT

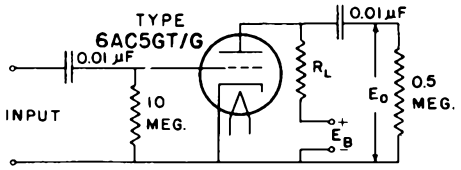
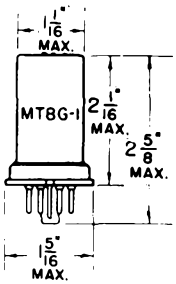


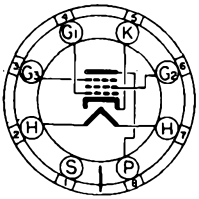
PLATE
1174-1

TUNG-SOL



AMPLIFIER PENTODE

SINGLE-ENDED METAL TYPE



BOTTOM VIEW

COATED UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.45 AMPERE

AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE. UNDER NO CONDITIONS SHOULD IT EXCEED 100 VOLTS.

METAL SHELL

SMALL WAFER OCTAL 8 PIN

THE 6AC7/1852 INCORPORATES FEATURES MAKING IT SUITABLE FOR HIGH GAIN AMPLIFIER CIRCUITS. IT HAS A HIGH RATIO OF TRANSCONDUCTANCE TO PLATE CURRENT, MAINTAINING REASONABLE LOW CAPACITANCE AND CLOSE ELECTRODE SPACING.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

AMPLIFIER

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	150	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	3.02	WATTS
MAXIMUM SCREEN DISSIPATION	0.38	WATT

DIRECT INTERELECTRODE CAPACITANCES

WITH SHELL CONNECTED TO CATHODE

MAXIMUM GRID TO PLATE	0.015	μμf
INPUT	11	μμf
OUTPUT	5.0	μμf

CONTINUED NEXT PAGE

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PLATE 1463
AUG. 31 1944

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

	CONDITION 1 [A]	CONDITION 2 [B]	
PLATE VOLTAGE	300	300	VOLTS
SUPPRESSOR [C]	0	0	VOLTS
SCREEN SUPPLY	150	300	VOLTS
SCREEN SERIES RESISTOR	–	60000	OHMS
MINIMUM CATHODE BIAS RESISTOR [D]	160	160	OHMS
PLATE RESISTANCE (APPROX.)	0.75	0.75	MEGOHM
TRANSCONDUCTANCE	9000	9000	μMHOS
PLATE CURRENT	10	10	MA.
SCREEN CURRENT	2.5	2.5	MA.
AMPLIFICATION FACTOR (APPROX.)	6750	6750	

[A] CONDITION 1 WITH FIXED SCREEN SUPPLY GIVES A SHARP CUT-OFF CHARACTERISTIC.

[B] CONDITION 2 WITH SERIES SCREEN RESISTOR GIVES AN EXTENDED CUT-OFF CHARACTERISTIC FOR APPLICATIONS WHERE GAIN IS CONTROLLED BY VARIATION OF GRID BIAS.

[C] IN ORDER TO MINIMIZE FEEDBACK THE SUPPRESSOR SHOULD BE CONNECTED DIRECTLY TO GROUND IF USED IN R-F AND I-F STAGES.

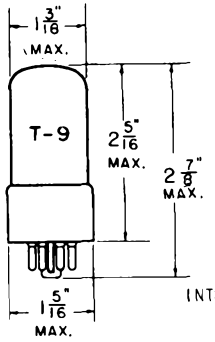
[D] CATHODE-BIAS RESISTOR SHOULD BE ADJUSTED TO GIVE A PLATE CURRENT OF 10 MA. THE DC RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 0.25 MEGOHM WHEN THE SCREEN VOLTAGE IS OBTAINED FROM A FIXED SOURCE. WHEN A SERIES SCREEN RESISTOR IS USED WITH FULL CATHODE BIAS, THE DC RESISTANCE IN THE GRID CIRCUIT MAY BE AS HIGH AS 0.5 MEGOHM.

PLATE 1464
AUG. 31 1944

TUNG-SOL

ELECTRON-RAY TUBE

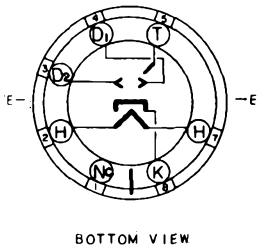
TWIN INDICATOR TYPE



COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB



BOTTOM VIEW

INTERMEDIATE SHELL OCTAL 7-PIN BASE

MOUNTING POSITION – ANY [A]

THE 6AD6G IS A TUNING INDICATOR WITH A CIRCULAR FLUORESCENT SCREEN WITH TWO INDEPENDENT INDICATING SHADOW ANGLES. EACH SHADOW ANGLE IS CONTROLLED BY A RAY-CONTROL ELECTRODE. WHEN THE TUBE IS USED AS A TUNING INDICATOR, ITS RAY-CONTROL ELECTRODES MAY BE CONNECTED IN PARALLEL TO PRODUCE TWO IDENTICAL SHADOWS, OR EACH RAY-CONTROL ELECTRODE MAY BE SUPPLIED WITH A SEPARATE CONTROLLING VOLTAGE FROM A 6AE6G TUBE.

RATINGS

INDICATOR SERVICE

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM TARGET VOLTAGE	150	VOLTS
MINIMUM TARGET VOLTAGE	100	VOLTS
MAXIMUM RAY-CONTROL ELECTRODE SUPPLY VOLTAGE	150	VOLTS
MAXIMUM HEATER-CATHODE POTENTIAL	100	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

TUNING INDICATOR

TARGET VOLTAGE	100	150	VOLTS
TARGET CURRENT (APPROX.) [B]	1.5	3.0	MA.
TARGET CURRENT (APPROX.) [C]	1.0	2.0	MA.
TARGET CURRENT (APPROX.) [D]	0.8	1.2	MA.
RAY-CONTROL ELECTRODE VOLTAGE [B]	45	75 APPROX.	VOLTS
RAY-CONTROL ELECTRODE VOLTAGE [C]	0	8.0 APPROX.	VOLTS
RAY-CONTROL ELECTRODE VOLTAGE [D]	-23	-50 APPROX.	VOLTS

[A] THE PLANE OF THE RAY-CONTROL ELECTRODES PASSES THROUGH THE LINE E-E ON THE SOCKET CONNECTION DIAGRAM.

[B] FOR SHADOW ANGLE OF 0° PRODUCED BY EITHER RAY-CONTROL ELECTRODE.

[C] FOR SHADOW ANGLE OF 90° PRODUCED BY EITHER RAY-CONTROL ELECTRODE.

[D] FOR SHADOW ANGLE OF 135° PRODUCED BY EITHER RAY-CONTROL ELECTRODE.

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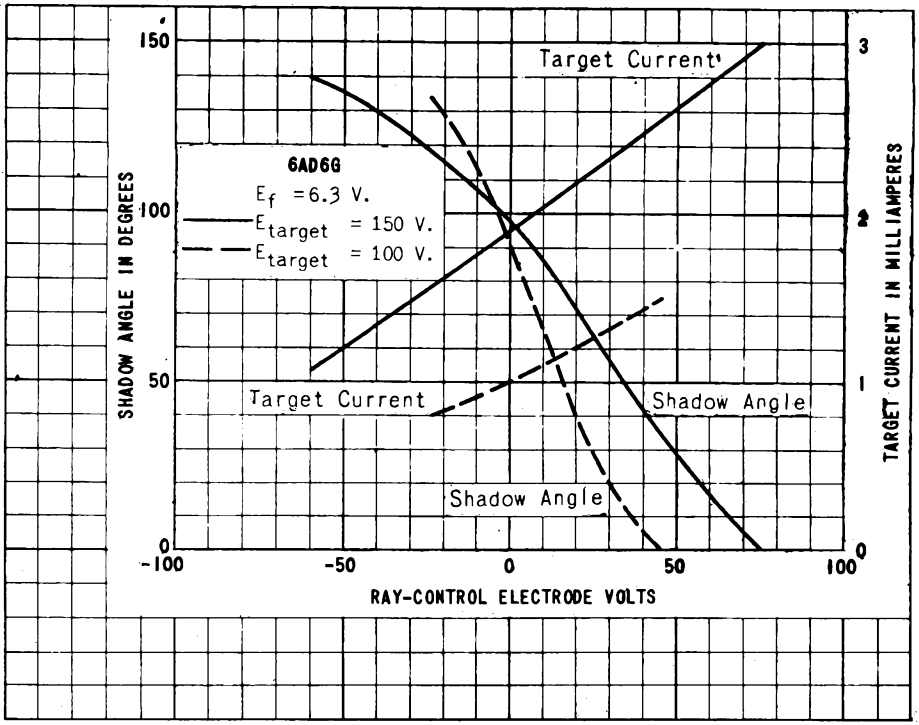
PLATE 1513
OCT. 31 1944

6AD6G



CIRCUIT FOR OPERATING A TYPE 6AD6G ON BOTH WEAK AND STRONG SIGNALS

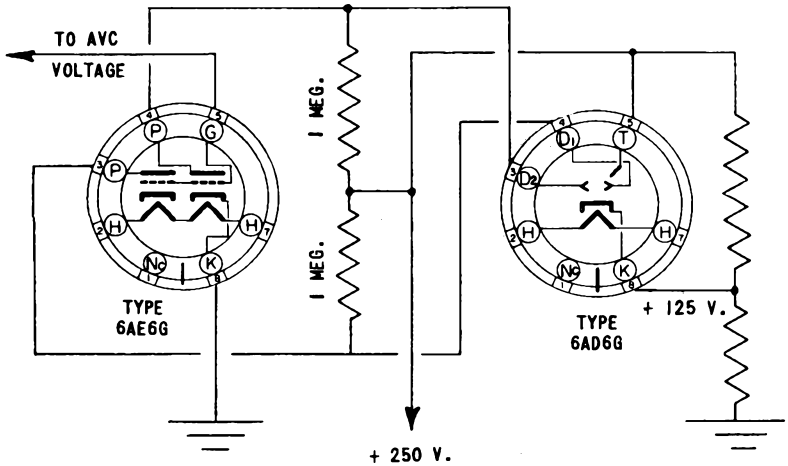
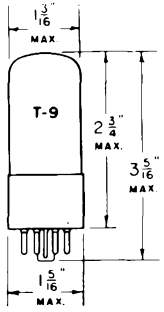


PLATE 1514
OCT. 31 1944

TUNG-SOL



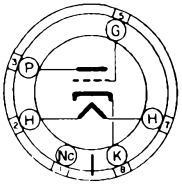
TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



6Q-0-0

INTERMEDIATE 6 PIN OCTAL BASE

THE TUNG-SOL 6AE5GT/G IS A GENERAL PURPOSE LOW-MU TRIODE. IT IS DESIGNED PRIMARILY FOR SERVICE AS A "DYNAMIC-COUPLED" DRIVER TO A 25AC5GT/G IN AC - DC OPERATED RECEIVERS.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	95	VOLTS
CONTROL GRID VOLTAGE[A]	-15	VOLTS
PLATE CURRENT	7	MA.
PLATE RESISTANCE	3500	OHMS
TRANSCONDUCTANCE	1200	μMHOS
AMPLIFICATION FACTOR	4.2	

[A] THE DC RESISTANCE IN THE GRID CIRCUIT OF THE 6AE5GT/G SHOULD NOT EXCEED 1.0 MEGOHM UNDER MAXIMUM RATED CONDITIONS.

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PLATE 1175-1

FEB. 28 1942

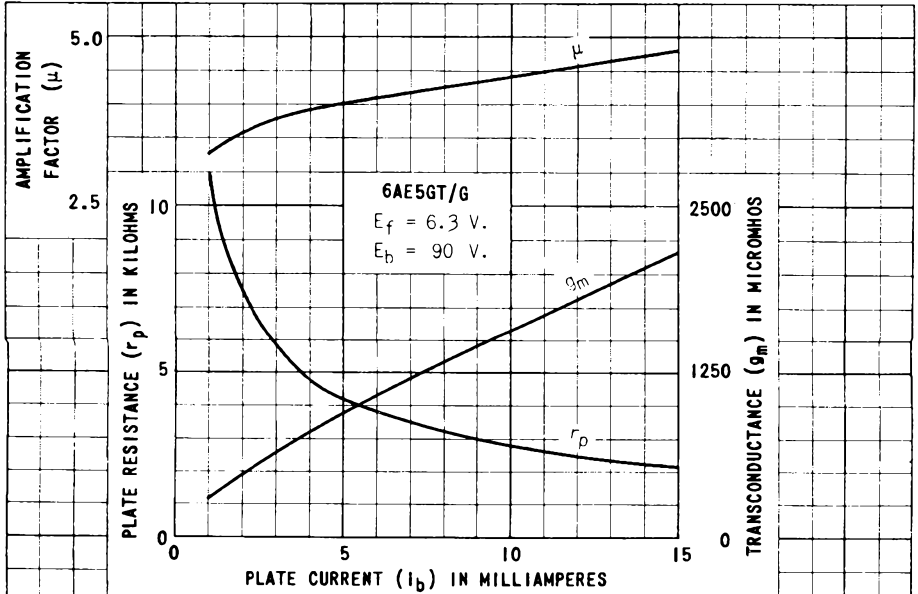
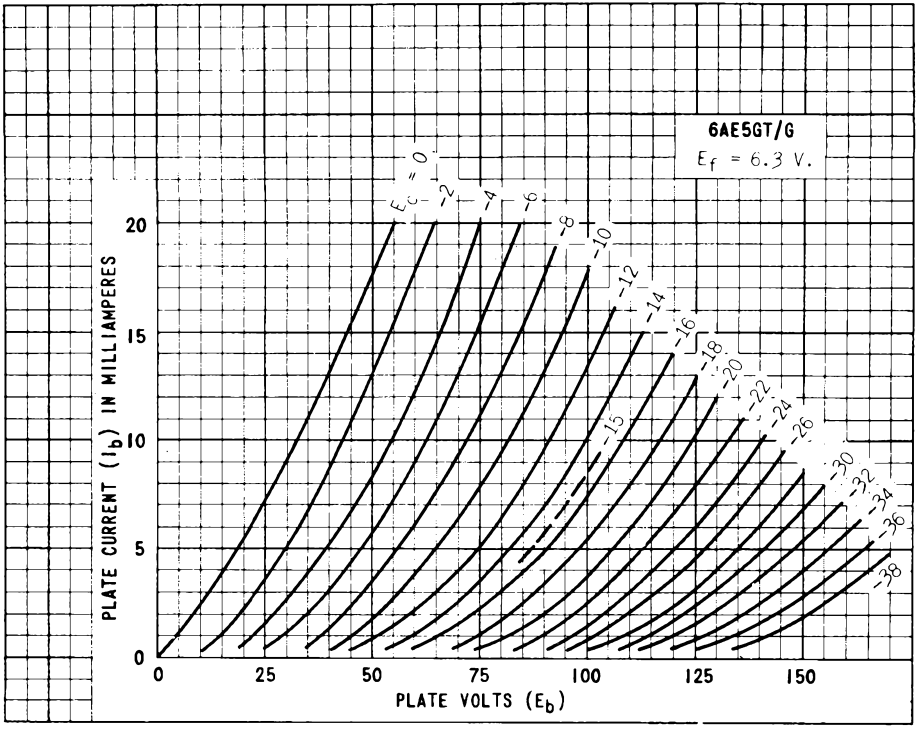
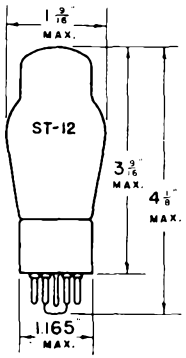


PLATE
1176-1

6AE5GT/G


6AE5GT/G
E_f = 6.3 V.
E_c = 0
-2
-4
-6
-8
-10
-12
-14
-15
-16
-18
-20
-22
-24
-26
-30
-32
-34
-36
-38
PLATE CURRENT (I_b) IN MILLIAMPERES
0
5
10
15
20
0
25
50
75
100
125
150
PLATE VOLTS (E_b)

TUNG-SOL



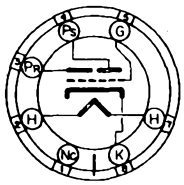
SINGLE GRID - TWIN PLATE

CONTROL TUBE

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB



G-7AH
BOTTOM VIEW

SMALL 7 PIN OCTAL BASE

THE TUNG-SOL 6AE6G CONSISTS OF A REMOTE CUT-OFF SECTION AND A SHARP CUT-OFF SECTION WHICH HAVE A COMMON CATHODE AND GRID FOR CONTROLLING ELECTRON-RAY TUNING INDICATORS. IN CONJUNCTION WITH EITHER TYPES 6AD6G OR 6AF6G, THE REMOTE CUT-OFF SECTION IS SENSITIVE TO STRONG SIGNALS, AND THE SHARP CUT-OFF SECTION IS SENSITIVE TO WEAK SIGNALS.

OPERATING CONDITIONS AND CHARACTERISTICS

REMOTE CUT-OFF SECTION (PIN #3)

PLATE VOLTAGE	250	250	250	250	VOLTS
GRID VOLTAGE	-35	-15	-6	-1.5	VOLTS
PLATE CURRENT	0.01	0.8	2.8	6.5	MA.
TRANSCONDUCTANCE				1000	µMHOS
AMPLIFICATION FACTOR				25	

SHARP CUT-OFF SECTION (PIN #4)

PLATE VOLTAGE	250	250	VOLTS
GRID VOLTAGE	-9.5	-1.5	VOLTS
PLATE CURRENT	0.01	4.5	MA.
TRANSCONDUCTANCE		950	µMHOS
AMPLIFICATION FACTOR		33	

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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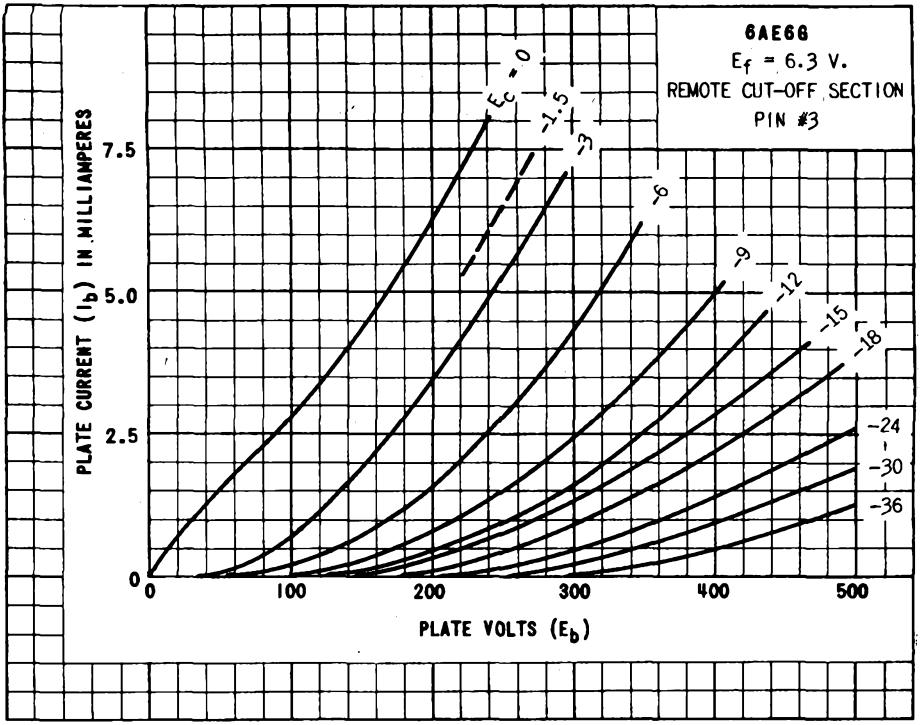
6AE6G



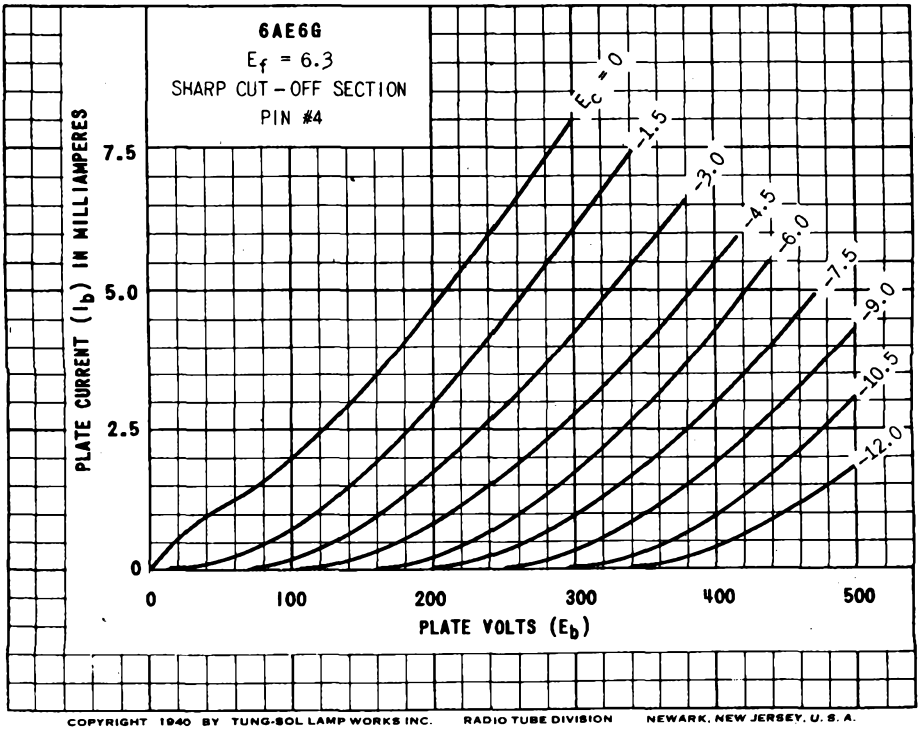
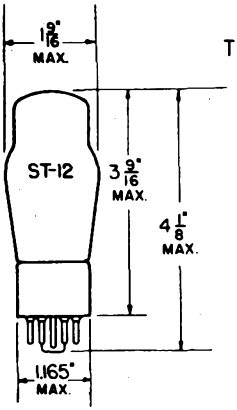


PLATE 731-1

TUNG-SOL



TRIODE VOLTAGE AMPLIFIER

UNIPOTENTIAL CATHODE

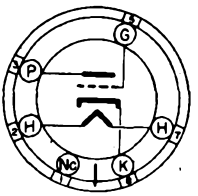
HEATER

6.3 VOLTS 0.3 AMP.

AC OR DC

GLASS BULB

ANY MOUNTING POSITION



BOTTOM VIEW

SMALL OCTAL 6 PIN BASE

TYPE 6AF5G IS A TRIODE DESIGNED SPECIFICALLY AS THE DRIVER FOR EITHER TYPE 6AC5GT OR 25AC5G WHEN USED IN DIRECT COUPLED AMPLIFIER CIRCUITS.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	180	VOLTS
GRID VOLTAGE	-18	VOLTS
PLATE CURRENT	7.0	MA.
TRANSCONDUCTANCE	1 500	µMHOS
AMPLIFICATION FACTOR	7.4	
PLATE RESISTANCE	4 900	OHMS

TYPE 6AF5G DIRECT COUPLED TO 6AC5GT OR 25AC5G

PLATE-SUPPLY VOLTAGE	165	VOLTS
POWER TUBE PLATE CURRENT	46	MA.
DRIVER TUBE PLATE CURRENT	6.6	MA.
INPUT SIGNAL (RMS)	18	VOLTS
LOAD RESISTANCE	3 500	OHMS
POWER OUTPUT (10% TOTAL DISTORTION)	3.3	WATTS

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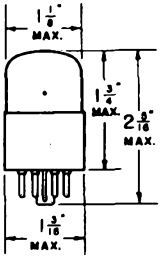
PLATE 1574
FEB. 28 1945

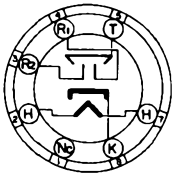
TUNG-SOL



CATHODE RAY TUNING INDICATOR

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC



G-7A

GLASS BULB

SMALL 7 PIN OCTAL BASE

THE TUNG-SOL 6AF6G CONSISTS OF A CIRCULAR FLUORESCENT SCREEN WITH TWO INDEPENDENT INDICATING SHADOW ANGLES, EACH CONTROLLED BY A RAY-CONTROL ELECTRODE. WHEN THE 6AF6G IS USED AS A TUNING INDICATOR THE SHADOW ANGLE IS CONTROLLED BY POSITIVE VOLTAGES APPLIED TO THE RAY CONTROL ELECTRODES.

OPERATING CONDITIONS AND CHARACTERISTICS

TARGET VOLTAGE MAX.	135	VOLTS
TARGET VOLTAGE MIN.	90	VOLTS
RAY-CONTROL ELECTRODE SUPPLY VOLTAGE MAX.	135	VOLTS

TUNING INDICATOR

TARGET VOLTAGE	100	135	VOLTS
TARGET CURRENT [T]	0.9	1.5	MA.
RAY-CONTROL ELECTRODE VOLTAGE [P]	60	81	APPROX. VOLTS
RAY-CONTROL ELECTRODE VOLTAGE [PP]	0	0	APPROX. VOLTS

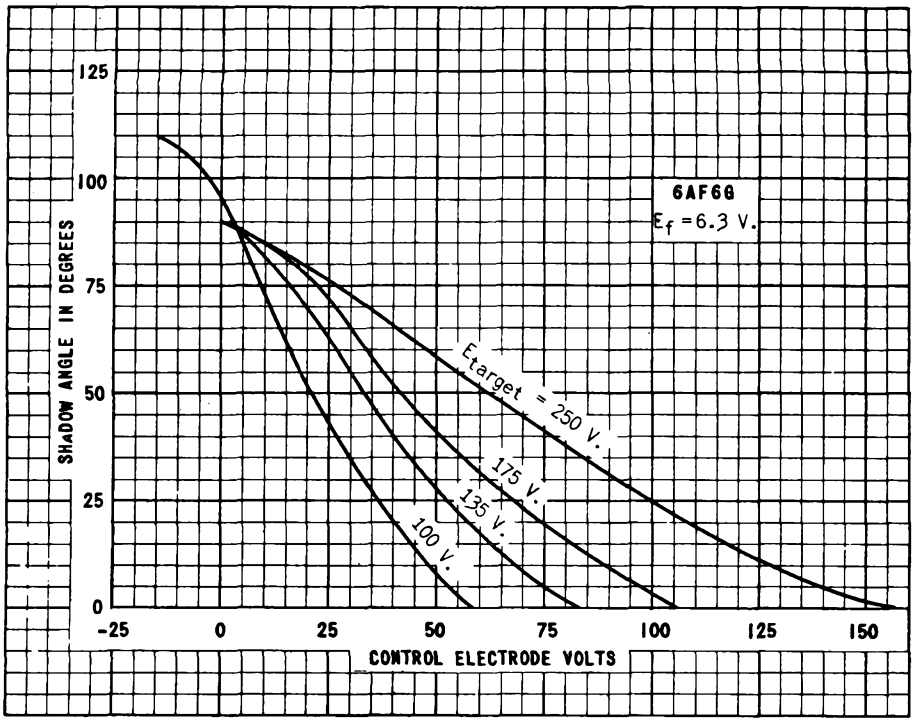
[T] WITH 0 VOLTS ON RAY-CONTROL ELECTRODES. SUBJECT TO WIDE VARIATION.
[P] FOR 0° SHADOW ANGLE PRODUCED BY EITHER RAY-CONTROL ELECTRODE.
[PP] FOR 100° SHADOW ANGLE PRODUCED BY EITHER RAY-CONTROL ELECTRODE.
THE PLANE OF THE CONTROL ELECTRODES PASSES THROUGH PINS #3 AND #7.

NOTE: A DOUBLE TRIODE, SUCH AS THE 6C8G OR THE 6F8G, CAN BE USED TO OBTAIN TWO SENSITIVITIES FOR A TUNING INDICATOR BY APPLYING FULL A.V.C. VOLTAGE TO ONE TRIODE AND 1/10 OF THE A.V.C. VOLTAGE TO THE OTHER.

IN AC-DC SUPERHETERODYNE RECEIVERS A SHADOW ANGLE VARIATION OF 0 TO 90° WITH A.V.C. ACTION MAY BE OBTAINED WITHOUT AN AMPLIFIER TUBE BY RAISING THE CATHODE OF THE 6AF6G TO +30 VOLTS, SUPPLYING I.F. TUBE SCREEN THROUGH A 50 000 OHM RESISTOR AND CONNECTING THE CONTROL ELECTRODES TO THE SCREEN.

PLATE 238-1

DEC. 12 1938



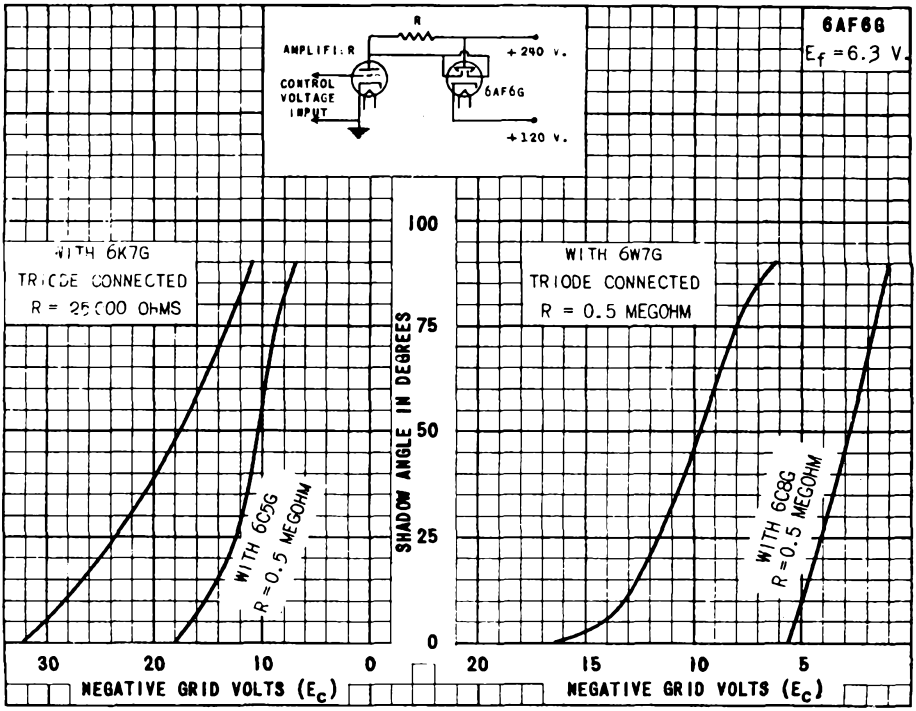


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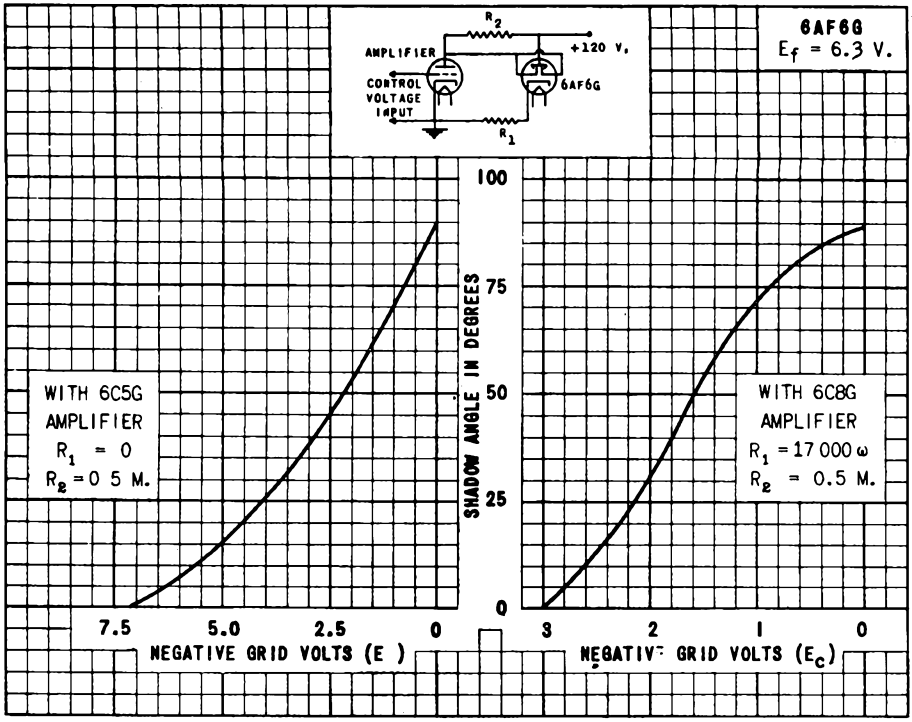
PLATE
283-1

JAN. 3
1939

6AF6 G



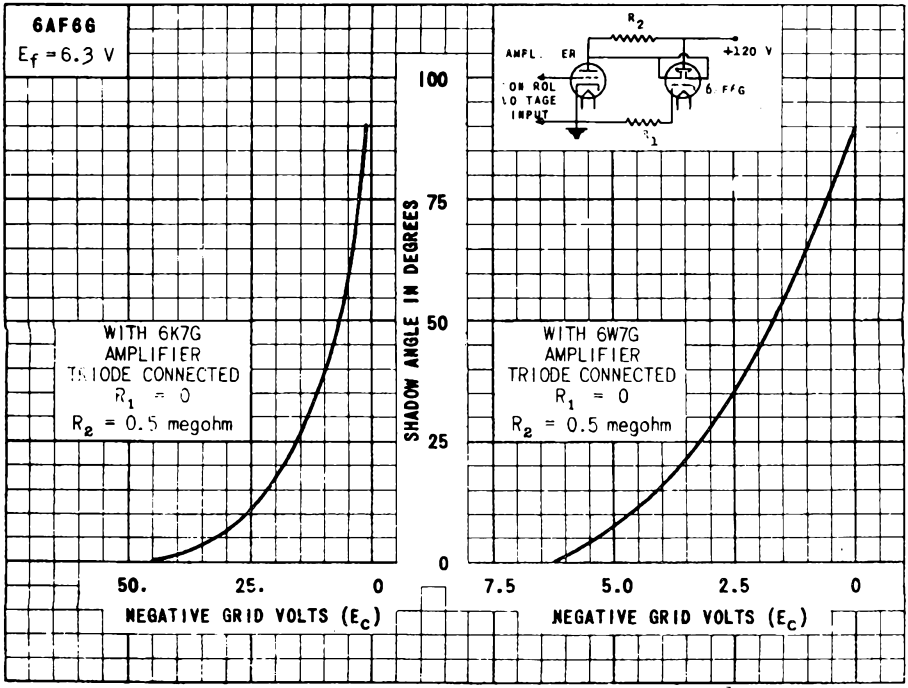
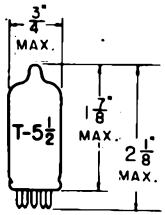


PLATE 234-1

TUNG-SOL

R-F AMPLIFIER PENTODE

MINIATURE TYPE

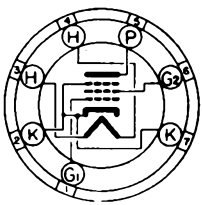


COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

MINIATURE BUTTON 7-PIN BASE [A]



BOTTOM VIEW

THE 6AG5 IS A MINIATURE TYPE R-F PENTODE HAVING A SHARP CUT-OFF CHARACTERISTIC AND A HIGH VALUE OF TRANSCONDUCTANCE. IN COMPACT, LIGHT-WEIGHT EQUIPMENT IT IS USEFUL AS AN R-F AMPLIFIER UP TO ABOUT 400 MEGACYCLES, AND AS A HIGH-FREQUENCY; INTERMEDIATE AMPLIFIER. IT HAS LOW INPUT CAPACITANCE AND LOW OUTPUT CAPACITANCE.

RATINGS

AMPLIFIER

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	150	VOLTS
MAXIMUM PLATE DISSIPATION	2.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.5	WATT
MAXIMUM HEATER-CATHODE POTENTIAL	100	VOLTS

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

WITH NO EXTERNAL SHIELD

GRID TO PLATE	0.025 MAX.	μμf
INPUT	6.5	μμf
OUTPUT	1.8	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	125	250	VOLTS
SCREEN VOLTAGE	100	125	150	VOLTS
PLATE CURRENT	5.5	7.2	7.0	MA.
SCREEN CURRENT	1.6	2.1	2.0	MA.
PLATE RESISTANCE (APPROX.)	0.3	0.5	0.8	MEGOHM
TRANSCONDUCTANCE	4 750	5 100	5 000	μMHOS
CATHODE-BIAS RESISTOR	100	100	200	OHMS
GRID BIAS FOR PLATE CURRENT = 10 μ AMPS.	-5.0	-6.0	-8.0	VOLTS

[A] THE CENTER HOLE IN SOCKETS DESIGNED FOR THIS BASE PROVIDES FOR THE POSSIBILITY THAT THIS TUBE TYPE MAY BE MANUFACTURED WITH THE EXHAUST-TUBE TIP AT THE BASE END. FOR THIS REASON, IT IS RECOMMENDED THAT IN EQUIPMENT EMPLOYING THIS TUBE TYPE, NO MATERIAL BE PERMITTED TO OBSTRUCT THE SOCKET HOLE.

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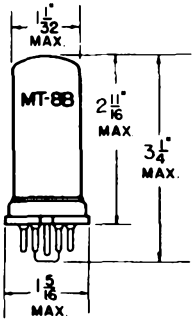
PLATE
1467
AUG. 31
1944

TUNG-SOL

PENTODE

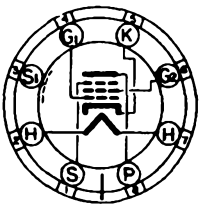


METAL SHELL

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.65 AMPERE
AC OR DC

VERTICAL MOUNTING POSITION
HORIZONTAL OPERATION PERMITTED IF PINS 2 & 7 ARE IN A VERTICAL PLANE.



BOTTOM VIEW
SMALL WAFER
8 PIN OCTAL

THE 6AG7 IS A POWER OUTPUT PENTODE USING THE OCTAL BASE AND METAL SHELL CONSTRUCTION. IT HAS HIGH PERVEANCE, LOW CAPACITANCES, AND THE POWER REQUIREMENTS NECESSARY FOR EITHER STRAIGHT VIDEO OUTPUT AMPLIFIER OR CATHODE FOLLOWER SERVICE.

DIRECT INTERELECTRODE CAPACITANCES

WITH SHELL AND INTERLEAD SHIELD CONNECTED TO CATHODE

GRID TO PLATE: (G TO P) MAX.	0.06	μμf
INPUT: G TO (H+K+G_2+G_3&S+IS)	13	μμf
OUTPUT: P TO (H+K+G_2+G_3&S+IS)	7.5	μμf
GRID #1 TO GRID #2: (G_1 TO G_2) APPROX.	5.8	μμf
GRID #1 TO CATHODE: (G_1 TO K) APPROX.	5.2	μμf
HEATER TO CATHODE: (H TO K) APPROX.	10.7	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE (SHOULD NOT DEVIATE MORE THAN 10%)	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID #2 VOLTAGE	300	VOLTS
MINIMUM NEGATIVE DC GRID #1 VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	9	WATTS
MAXIMUM SCREEN DISSIPATION	1.5	WATTS
MAXIMUM GRID #1 CIRCUIT RESISTANCE (FIXED BIAS)	0.25	MEGOHM
MAXIMUM GRID #1 CIRCUIT RESISTANCE (SELF BIAS)	1	MEGOHM

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION.

PRINTED IN U. S. A.
PLATE 1959
FEB. 2, 1948

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE (SHOULD NOT DEVIATE MORE THAN 10%)	6.3	VOLTS
HEATER CURRENT	0.65	AMP.
PLATE VOLTAGE	300	VOLTS
GRID #2 VOLTAGE	150	VOLTS
GRID #1 VOLTAGE	-3	VOLTS
PEAK AF GRID #1 VOLTAGE	3	VOLTS
ZERO-SIGNAL PLATE CURRENT	30	MA.
ZERO-SIGNAL GRID #2 CURRENT (NOMINAL)	7	MA.
MAXIMUM-SIGNAL PLATE CURRENT	30.5	MA.
MAXIMUM-SIGNAL SCREEN CURRENT (NOMINAL)	9	MA.
PLATE RESISTANCE (APPROX.)	0.13	MEGOHM
TRANSCONDUCTANCE	11 000	µMHOS
LOAD RESISTANCE	10 000	OHMS
TOTAL HARMONIC DISTORTION	7	PERCENT
POWER OUTPUT	3	WATTS

VIDEO VOLTAGE AMPLIFIER - CLASS A_1

4 MC BANDWIDTH

	GRID LEAK BIAS[A]	CATHODE BIAS	
HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	0.65	0.65	AMP.
PLATE SUPPLY VOLTAGE	300	300	VOLTS
GRID #2 VOLTAGE	115[B]	125[C]	VOLTS
GRID #1 VOLTAGE	0[D]	-2	VOLTS
GRID #1 RESISTOR (MINIMUM)	0.25	---	MEGOHM
GRID #1 RESISTOR (MAXIMUM)	0.5	---	MEGOHM
CATHODE RESISTOR (BY-PASSED BY 250 µF APPROX.)	---	57	OHMS
ZERO-SIGNAL PLATE CURRENT	45	28	MA.
ZERO-SIGNAL GRID #2 CURRENT (NOMINAL)	13	7	MA.
LOAD RESISTANCE	3 500	3 500	OHMS
PEAK TO PEAK GRID SIGNAL SWING	4	4	VOLTS
PEAK TO PEAK VOLTAGE OUTPUT	135	140	VOLTS
INTERLEAD SHIELD		CONNECTED TO GROUND	

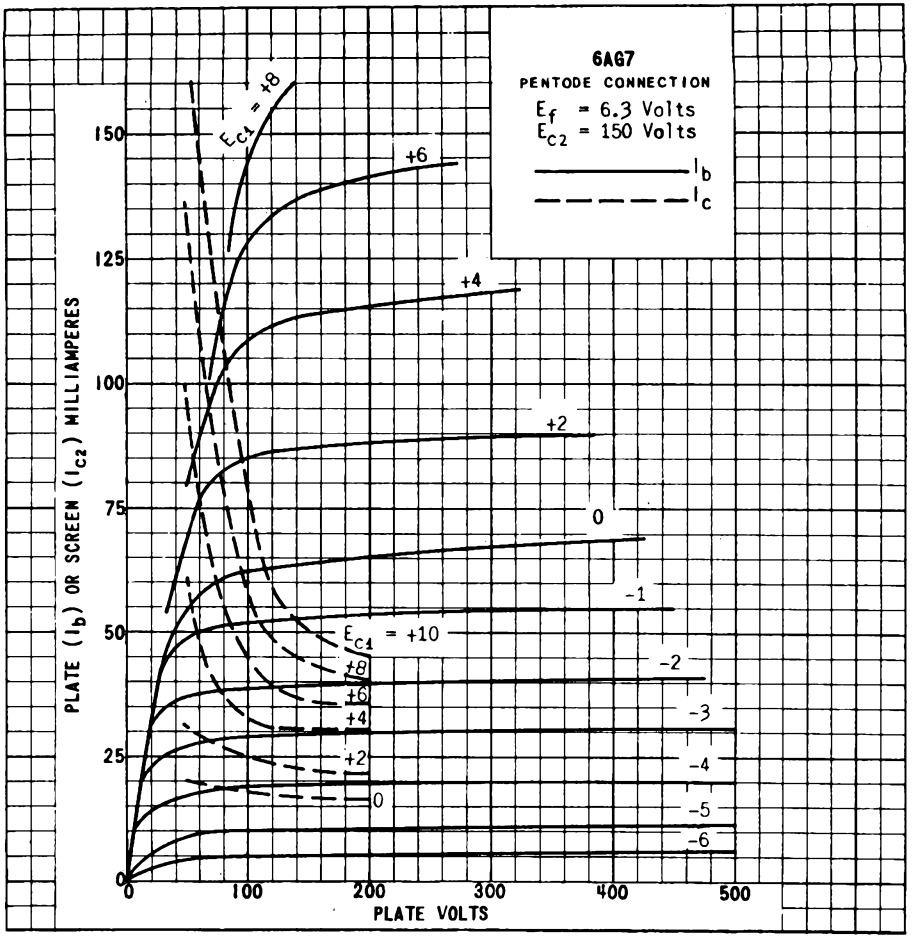
[A] TO BE USED WHERE RESISTORATION IS ACCOMPLISHED IN THE GRID CIRCUIT.

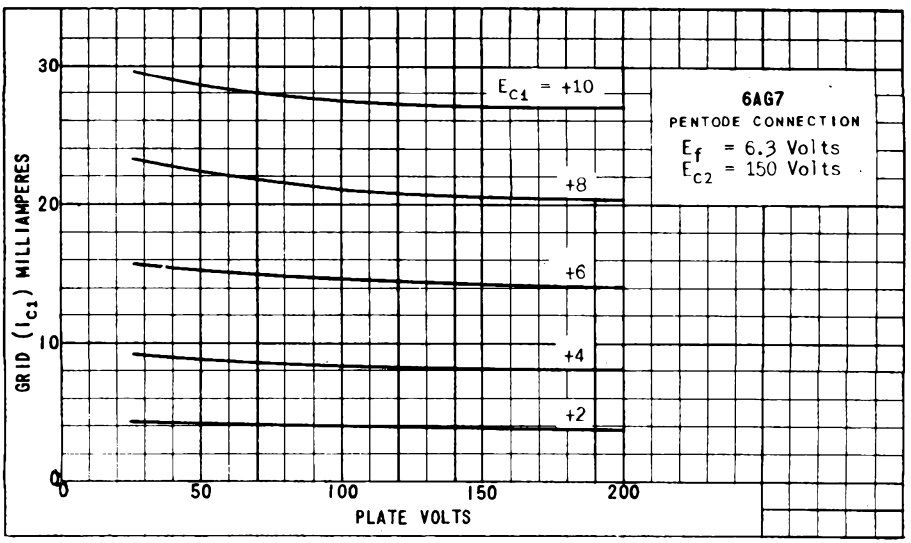
[B] OBTAINED FROM SUPPLY HAVING GOOD REGULATION.

[C] OBTAINED PREFERABLY FROM THE 300 VOLT PLATE SUPPLY THROUGH A 25000 OHM SERIES SCREEN RESISTOR.

[D] ZERO-SIGBAL VALUE.

PLATE 1955
FEB. 2, 1948

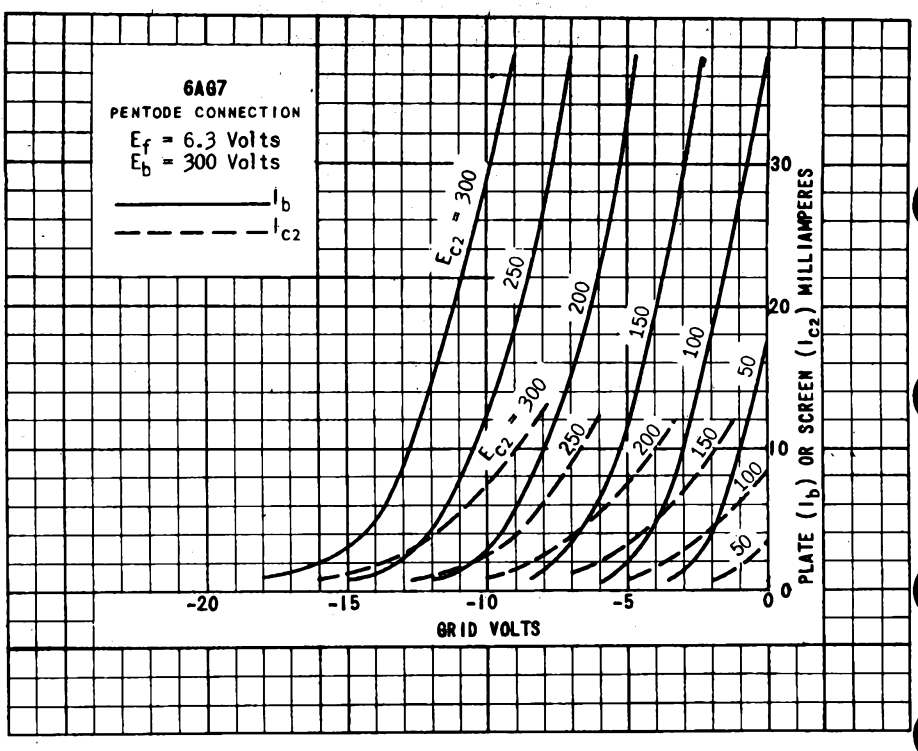




PRINTED IN U. S. A.

PLATE
1956
FEB. 2,
1948

6AG7



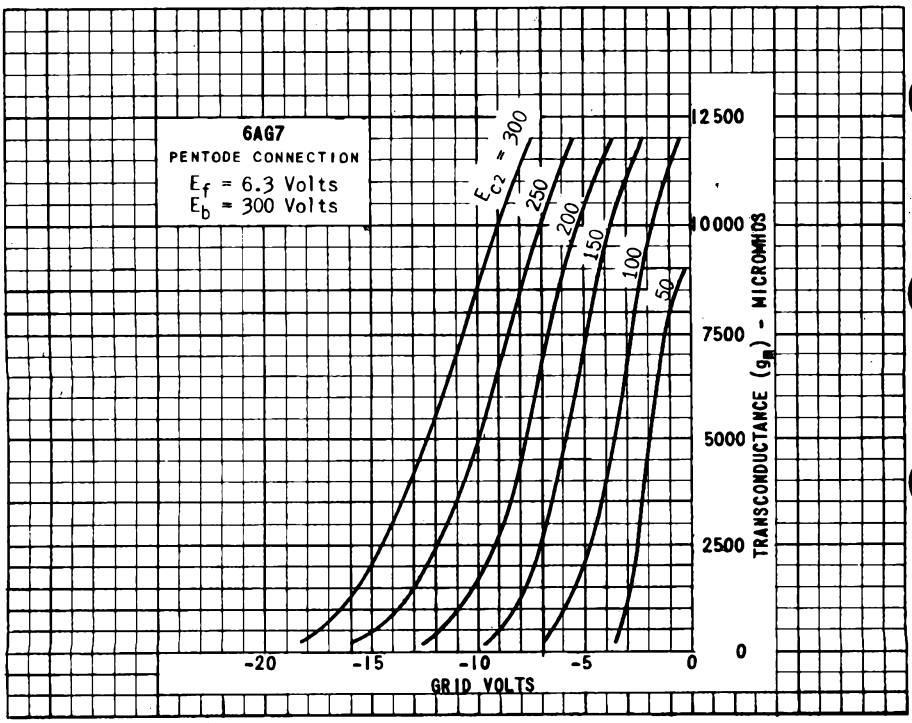
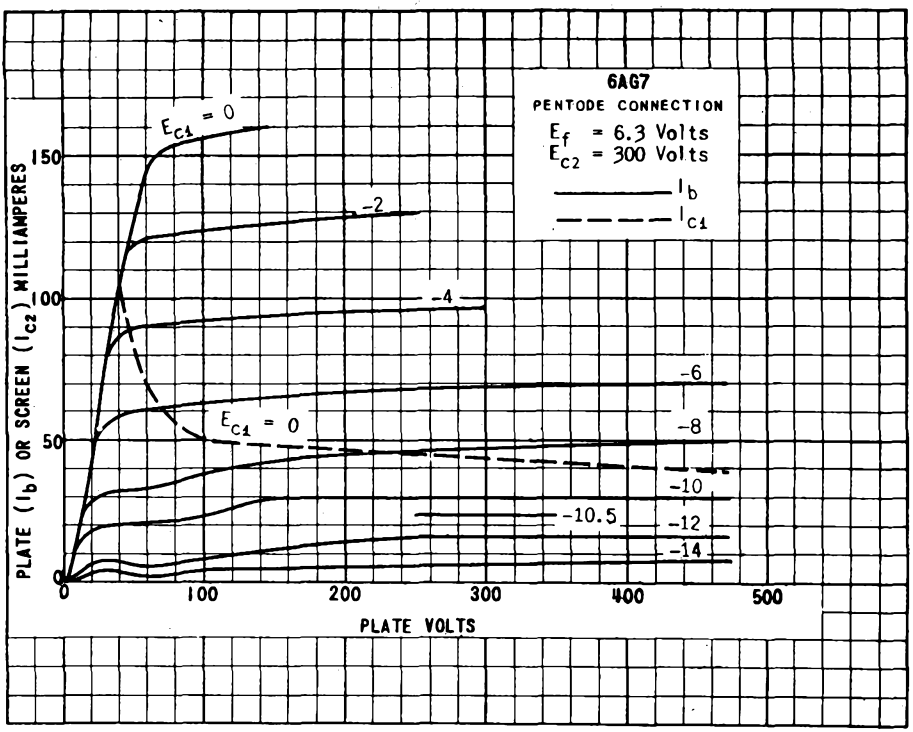
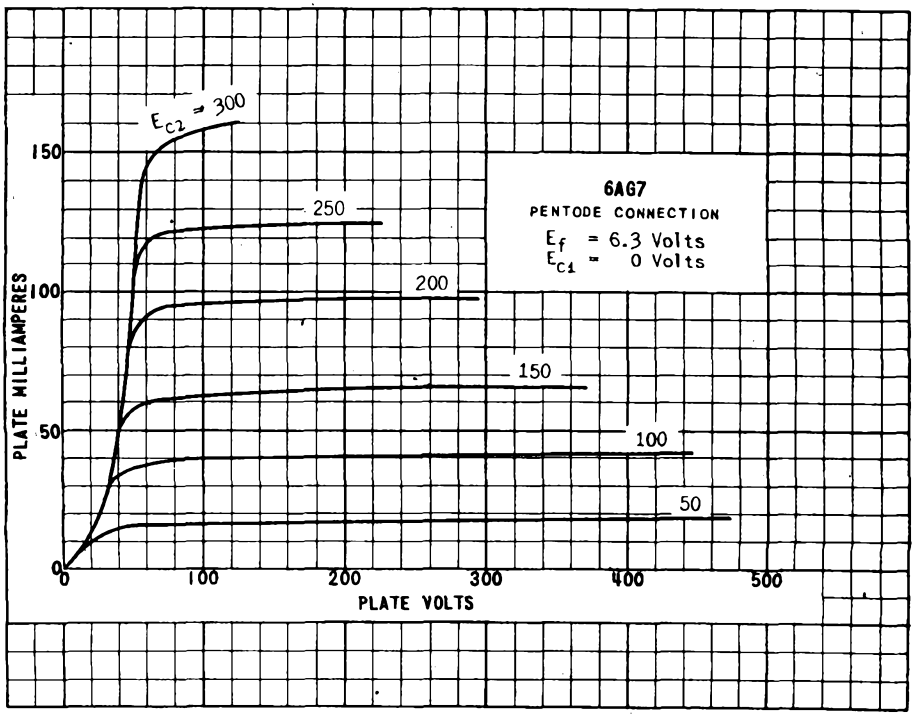


PLATE 1957
FEB. 2, 1948





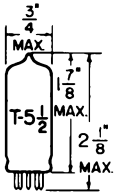
PRINTED IN U. S. A.

PLATE
1958
FEB. 2,
1948

TUNG-SOL

PENTODE

MINIATURE TYPE



GLASS BULB

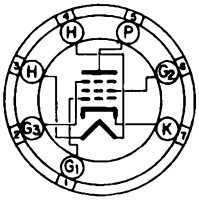
COATED UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 450 MA.

AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW

MINIATURE BUTTON
7 PIN BASE

THE 6AH6 IS A SHARP CUT-OFF VOLTAGE AMPLIFIER IN THE MINIATURE CONSTRUCTION. IT IS CHARACTERIZED BY A VERY HIGH TRANSCONDUCTANCE AND MODERATELY LOW INTERELECTRODE CAPACITANCES WHICH ADAPT IT TO WIDE BAND VIDEO AND INTERMEDIATE FREQUENCY AMPLIFIER SERVICE.

DIRECT INTERELECTRODE CAPACITANCES

	WITH EXTERNAL SHIELD[A]	WITHOUT SHIELD	
GRID TO PLATE: (G_1 TO P) MAX.	0.020	0.030	μμF
INPUT: G_1 TO (H+K+G_2+G_3)	10	10	μμF
OUTPUT: P TO (H+K+G_2+G_3)	3.6	2	μμF

[A] WITH RMA MINIATURE SHIELD NO. 313 CONNECTED TO CATHODE.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID #2 VOLTAGE	150	VOLTS
MAXIMUM PLATE DISSIPATION[B]	3.2	WATTS
MAXIMUM GRID #2 DISSIPATION	0.4	WATT
MAXIMUM CATHODE CURRENT	13	MA.

[B] AT MAXIMUM RATINGS, IT IS NECESSARY THAT AT LEAST ONE SURFACE OF THE SHIELD, IF USED, BE BLACKENED.

PRINTED IN U. S. A.

PLATE 1987
MAR. 1, 1948

CONTINUED ON FOLLOWING PAGE

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

	PENTODE CONNECTION	TRIODE CONNECTION[C]	
HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	450	450	MA.
PLATE VOLTAGE	300	150	VOLTS
GRID #2 VOLTAGE	150	---	VOLTS
CATHODE RESISTOR	160	160	OHMS
PLATE RESISTANCE (APPROX.)	0.5	0.0036	MEGOHM
TRANSCONDUCTANCE	9 000	11 000	µMHOS
AMPLIFICATION FACTOR	---	40	
PLATE CURRENT	10	12.5	MA.
GRID #2 CURRENT	2.5	---	MA.
GRID #1 VOLTAGE (APPROX.) FOR I_b = 10 µA.	-7	-7	VOLTS
TRANSCONDUCTANCE (GRID #3-PLATE)[D]			

GRID #2 AND GRID #3 CONNECTED TO PLATE.

[D] GRID #3 HAS PRACTICALLY NO CONTROL CHARACTERISTIC AND IT IS NOT INTENDED TO BE USED AS A CONTROL ELECTRODE. ITS TRANSCONDUCTANCE TO THE PLATE IS APPROXIMATELY 2 µMHOS AND THE MU IS 0.7 TO 1.0.

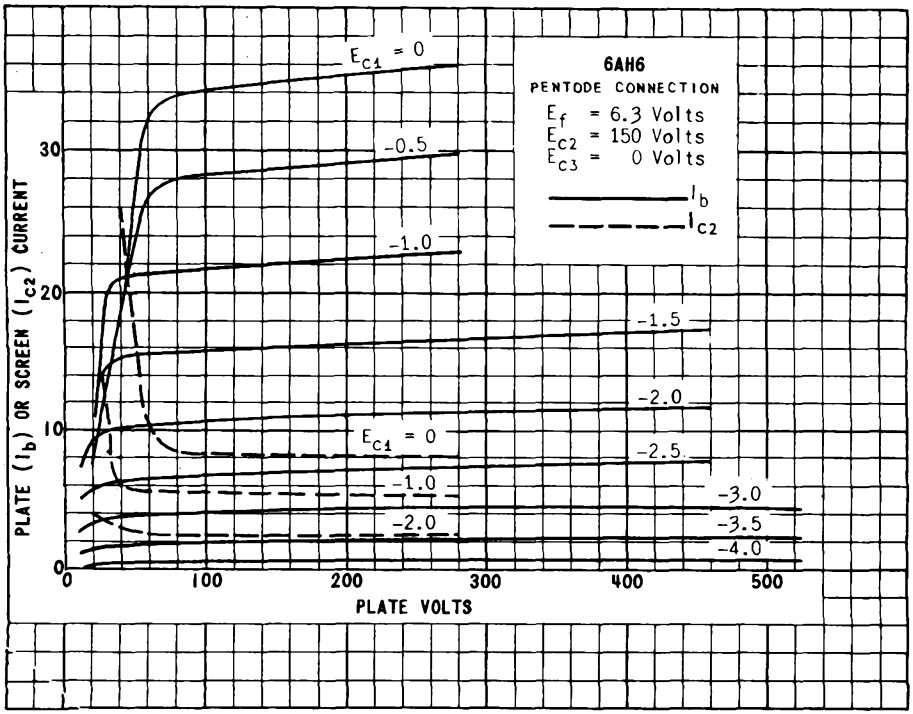
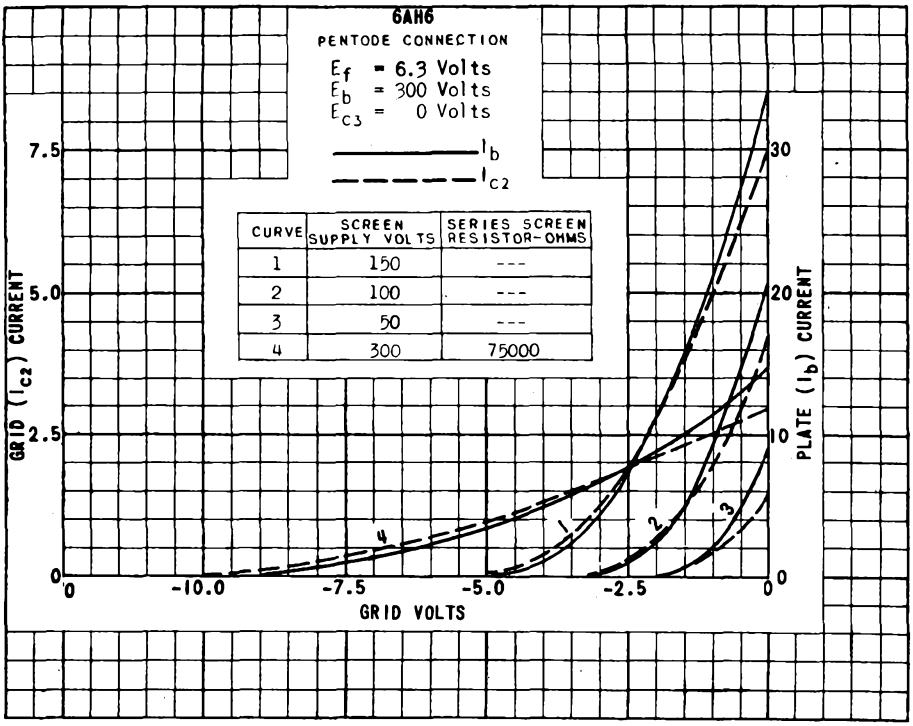


PLATE 1988
MAR. 1, 1948



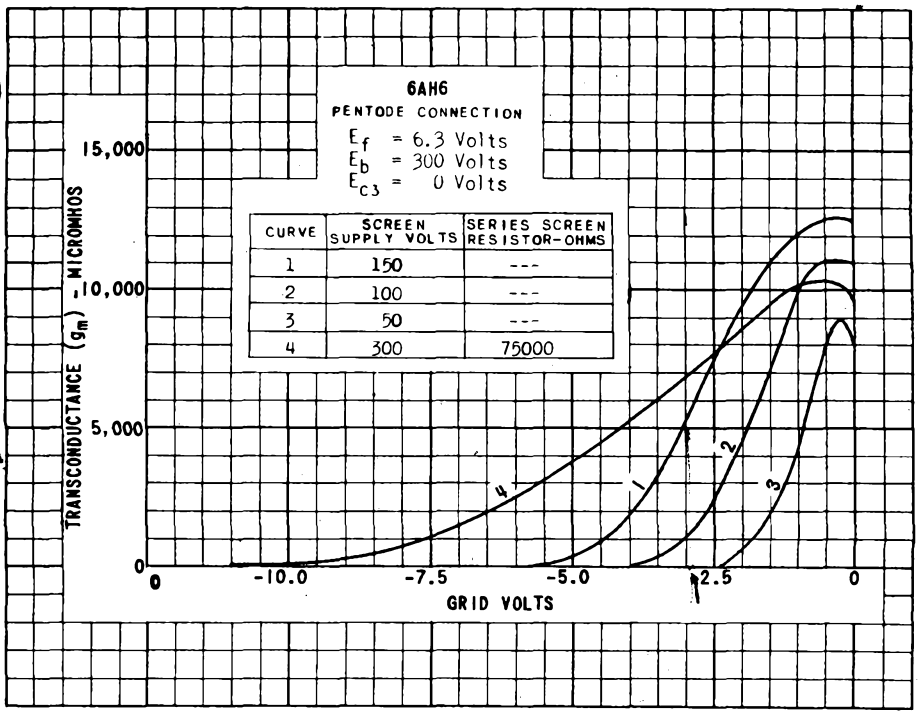


PLATE 1989
MAR. 1 1948

TUNG-SOL

PENTODE

MINIATURE TYPE

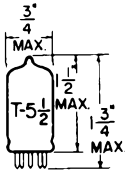
COATED UNIPOTENTIAL CATHODE

HEATER

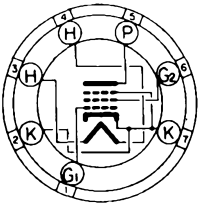
6.3 VOLTS 175 MA.

AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW

MINIATURE BUTTON
7 PIN BASE

THE 6AJ5 IS A SHARP CUT-OFF PENTODE VOLTAGE AMPLIFIER IN THE MINIATURE CONSTRUCTION. IT IS CHARACTERIZED BY LOW HEATER POWER REQUIREMENTS, HIGH TRANSCONDUCTANCE, LOW CAPACITANCES, AND HIGH INPUT IMPEDANCE. ITS LOW TRIODE-MU ADAPTS IT TO SERVICE WHERE THE PLATE AND SCREEN SUPPLY POTENTIALS ARE LOW OR TO APPLICATIONS AS A SMALL POWER AMPLIFIER.

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G TO P) WITH SHIELD	0.01	μμf
INPUT: G_1 TO (H+K&G_3+G_2)	4.1	μμf
OUTPUT: P TO (H+K&G_3+G_2)	2.0	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM GRID #2 VOLTAGE	140	VOLTS
MAXIMUM PLATE DISSIPATION	1.7	WATTS
MAXIMUM GRID #2 DISSIPATION	0.5	WATT
MAXIMUM CATHODE CURRENT	18	MA.
MAXIMUM BULB TEMPERATURE	120	°C

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	175	MA.
PLATE VOLTAGE	28	VOLTS
GRID #2 VOLTAGE	28	VOLTS
CATHODE BIAS RESISTOR	200	OHMS
PLATE RESISTANCE	90 000	OHMS
TRANSCONDUCTANCE	2 750	μMHOS
AMPLIFICATION FACTOR	250	
PLATE CURRENT	3	MA.
GRID #2 CURRENT	1.2	MA.

CONTINUED ON FOLLOWING PAGE

PLATE 2033
JULY 1, 1948

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS AB_1 AMPLIFIER - TWO TUBES

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	175	MA.
PLATE VOLTAGE	180	VOLTS
GRID #2 VOLTAGE	75	VOLTS
GRID #1 VOLTAGE	-7.5	VOLTS
LOAD IMPEDANCE (PLATE TO PLATE)	28 000	OHMS
DRIVE	TO ZERO BIAS	
OUTPUT POWER	1	WATT
SECOND HARMONIC	2	PERCENT
THIRD HARMONIC	5	PERCENT
PLATE INPUT POWER (PER PLATE)	1.1	WATTS
GRID #2 DISSIPATION (PER SCREEN)	0.35	WATT

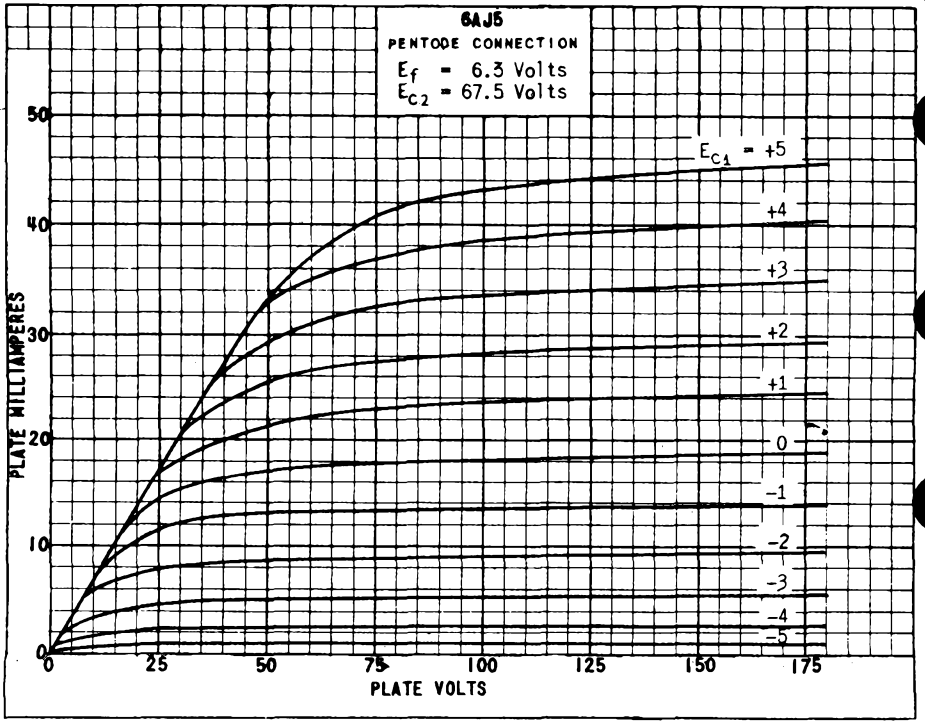
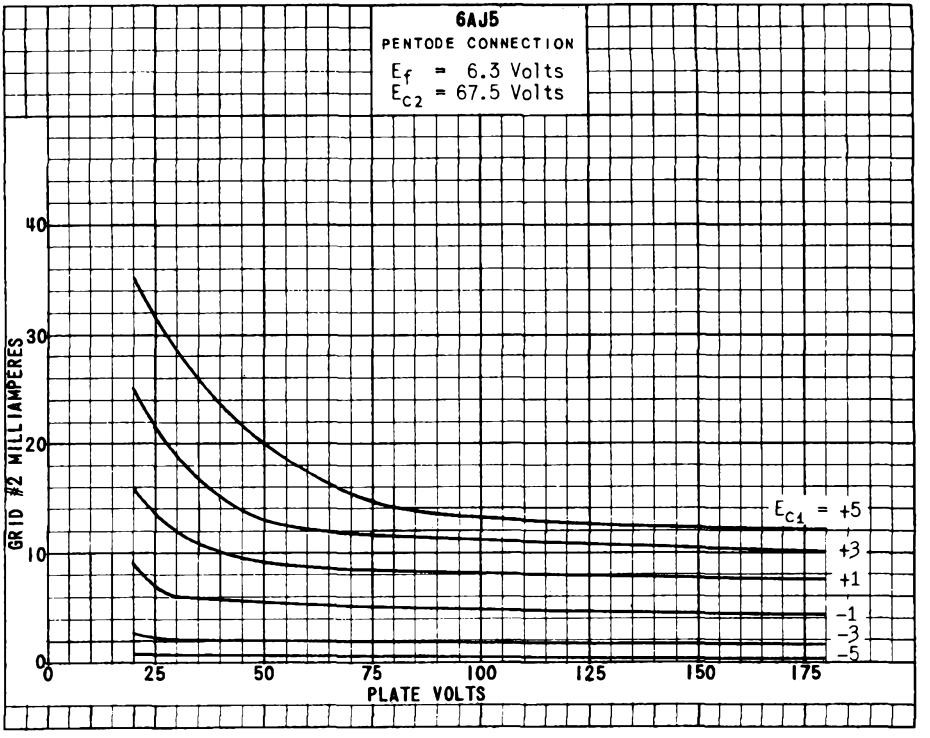
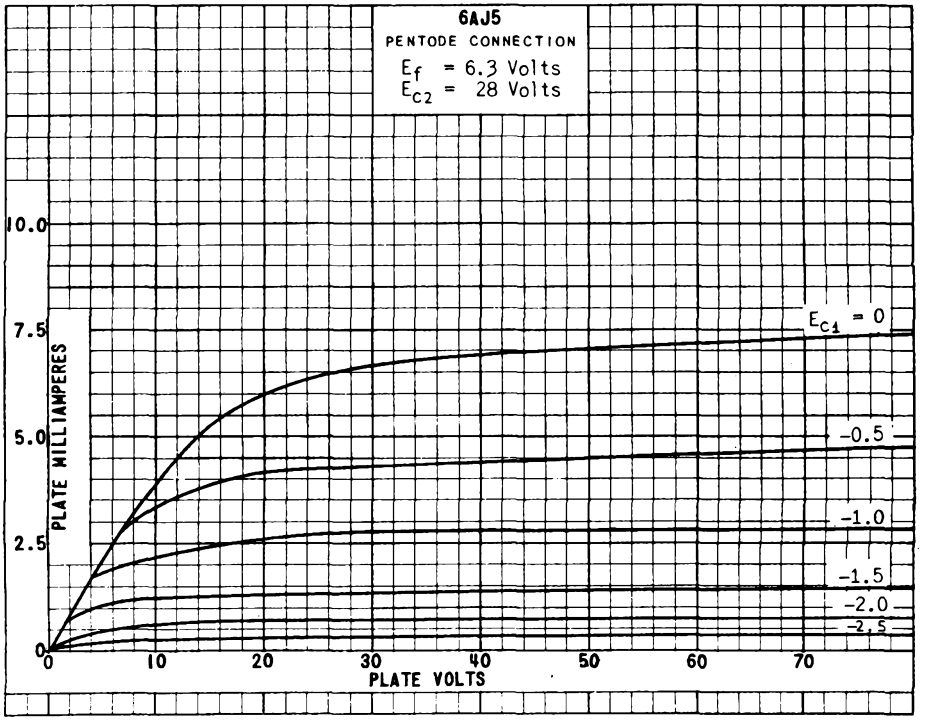


PLATE 2034
JULY 1, 1948





PRINTED IN U. S. A.

PLATE
2035
JULY 1,
1948

TUNG-SOL

PENTODE

MINIATURE TYPE

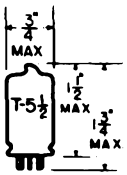
COATED UNIPOTENTIAL CATHODE

HEATER

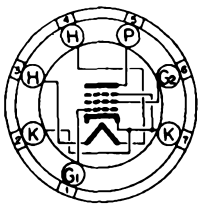
6.3 VOLTS 175 MA.

AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW

MINIATURE BUTTON 7 PIN BASE

THE 6AK5 IS A SHARP CUT-OFF VOLTAGE AMPLIFIER USING THE MINIATURE CONSTRUCTION. IT IS CHARACTERIZED BY LOW HEATER POWER REQUIREMENTS, HIGH TRANSCONDUCTANCE AND INPUT IMPEDANCE, AND LOW INTERELECTRODE CAPACITANCES AND LEAD INDUCTANCES. THESE RESULT IN A HIGHLY FAVORABLE MERIT FACTOR FOR HIGH FREQUENCY WIDE-BAND AMPLIFIER APPLICATIONS.

DIRECT INTERELECTRODE CAPACITANCES

	WITH EXTERNAL SHIELD [A]	WITHOUT SHIELD	
GRID TO PLATE: (G_1 TO P) MAX.	0.02	0.03	μμf
INPUT: G_1 TO (H+K&G_3&IS+G_2)	4.0	4.3	μμf
OUTPUT: P TO (H+K&G_3&IS+G_3)	2.8	2.1	μμf

[A] WITH EXTERNAL SHIELD CONNECTED TO CATHODE.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM GRID #2 VOLTAGE	140	VOLTS
MAXIMUM PLATE DISSIPATION	1.7	WATTS
MAXIMUM GRID #2 DISSIPATION	0.5	WATT
MAXIMUM CATHODE CURRENT	18	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

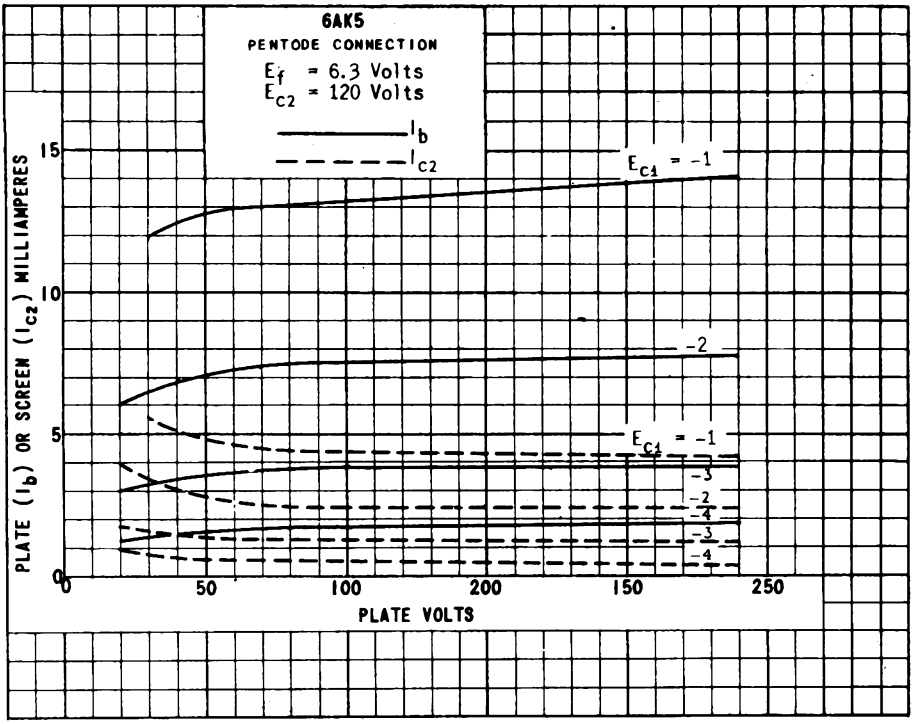
	CLASS A_1 AMPLIFIER			
HEATER VOLTAGE	6.3	6.3	6.3	VOLTS
HEATER CURRENT	175	175	175	MA.
PLATE VOLTAGE	120	150	180	VOLTS
GRID #2 VOLTAGE	120	140	120	VOLTS
CATHODE-BIAS RESISTOR[B]	200	330	200	OHMS
PLATE RESISTANCE (APPROX.)	0.34	0.42	0.69	MEGOHM
TRANSCONDUCTANCE	5000	4300	5100	μMHOS
PLATE CURRENT	7.5	7.0	7.7	MA.
SCREEN CURRENT	2.5	2.2	2.4	MA.

[B] FIXED BIAS OPERATION IS NOT RECOMMENDED.

PLATE 1942
JAN. 2, 1948

→ INDICATES A CHANGE OR ADDITION.

6AK5



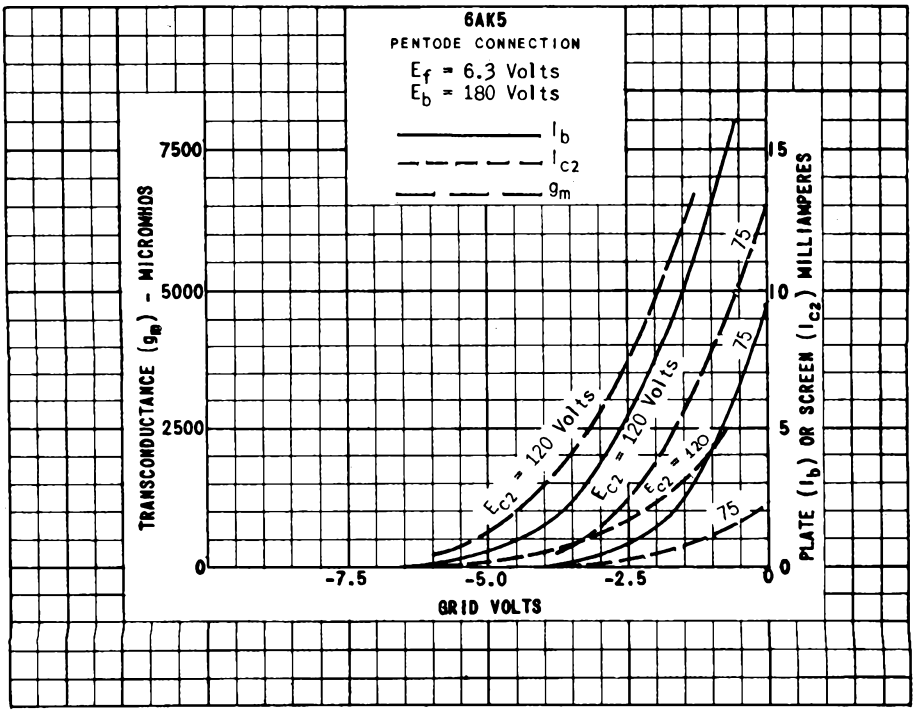


PLATE 1993
JAN. 2, 1948

TUNG-SOL

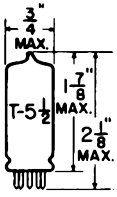
POWER AMPLIFIER PENTODE

MINIATURE TYPE

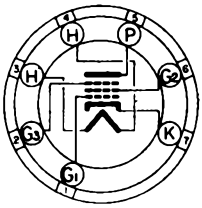
COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6AK6 IS A HEATER-CATHODE TYPE OF TUBE INTENDED FOR USE IN COMPACT, LIGHT-WEIGHT EQUIPMENT. BECAUSE OF ITS SMALL SIZE, THE 6AK6 CAN BE USED SINGLY OR IN PUSH-PULL TO EFFECT A MORE COMPACT DESIGN OF POWER-LINE RECEIVERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.15	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	2.75	WATTS
MAXIMUM SCREEN DISSIPATION	0.75	WATTS
MAXIMUM DC HEATER-CATHODE VOLTAGE	100	VOLTS

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

WITH NO EXTERNAL SHIELD

GRID TO PLATE	0.12	μμf
INPUT	3.6	μμf
OUTPUT	4.2	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	180	VOLTS
SCREEN VOLTAGE	180	VOLTS
SUPPRESSOR VOLTAGE	0	VOLTS
GRID VOLTAGE	-9	VOLTS
PEAK AF GRID VOLTAGE	9	VOLTS
ZERO-SIGNAL PLATE CURRENT	15	MA.
ZERO-SIGNAL SCREEN CURRENT	2.5	MA.
GRID RESISTOR (MAX.):		
FOR FIXED BIAS	0.1	MEGOHM
FOR CATHODE BIAS	0.5	MEGOHM
LOAD RESISTANCE	10 000	OHMS
PLATE RESISTANCE	0.2	MEGOHM
TRANSCONDUCTANCE	2 300	μMHOS
MAXIMUM-SIGNAL POWER OUTPUT	1.1	WATTS
TOTAL HARMONIC DISTORTION	10	PERCENT

SIMILIAR TYPE REFERENCE: *Rating and characteristics identical to 6G6G.*

→ INDICATES A CHANGE OR ADDITION

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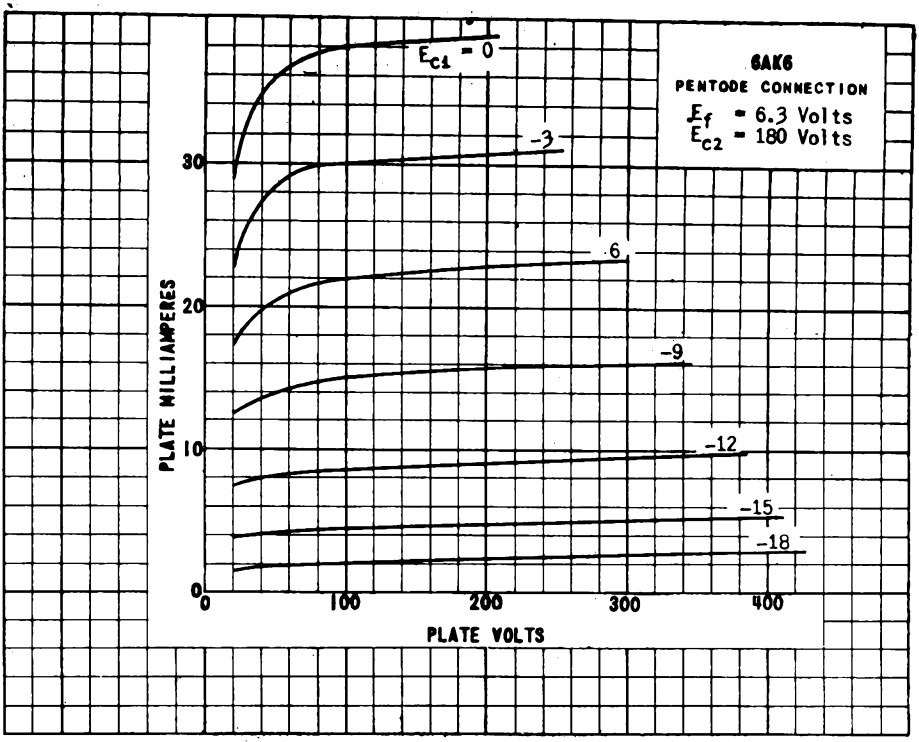
PLATE 1779
FEB. 3, 1947

6AK6



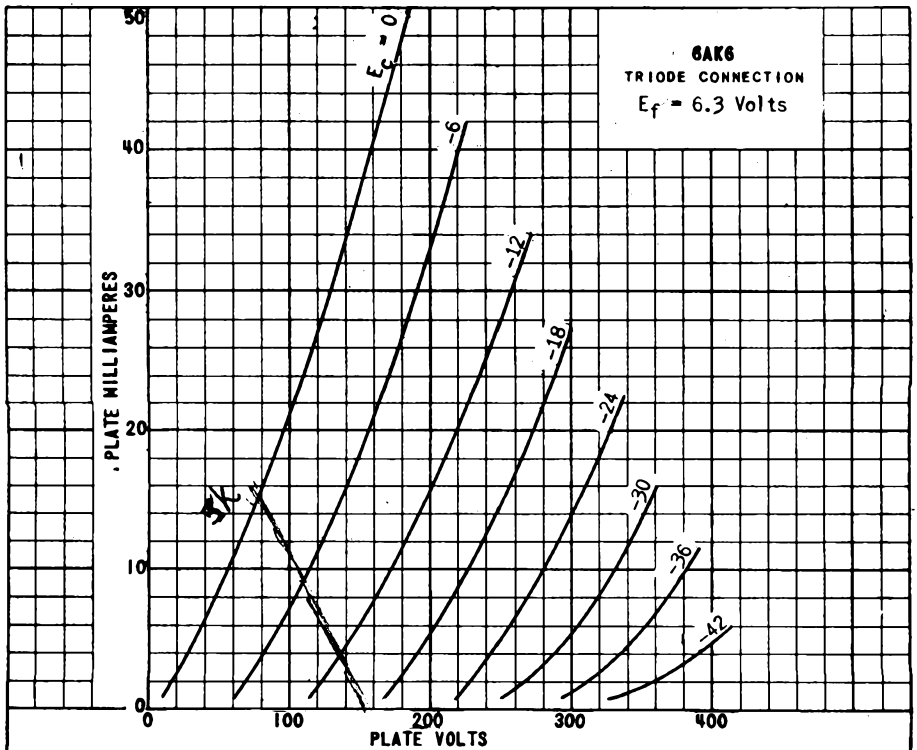
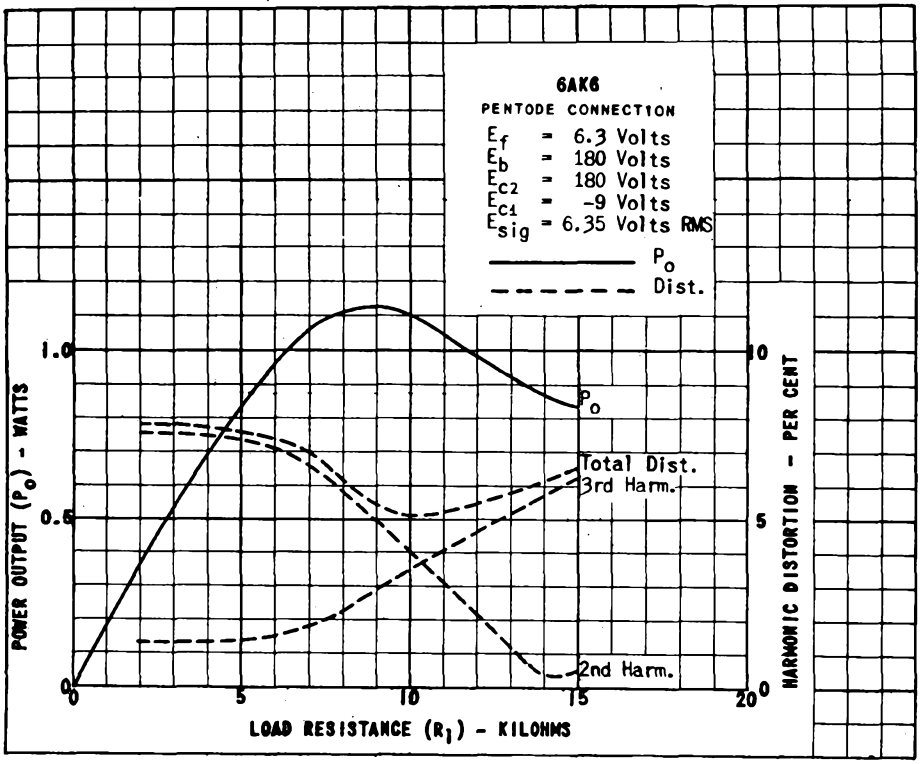


PLATE
1780
FEB. 9,
1947



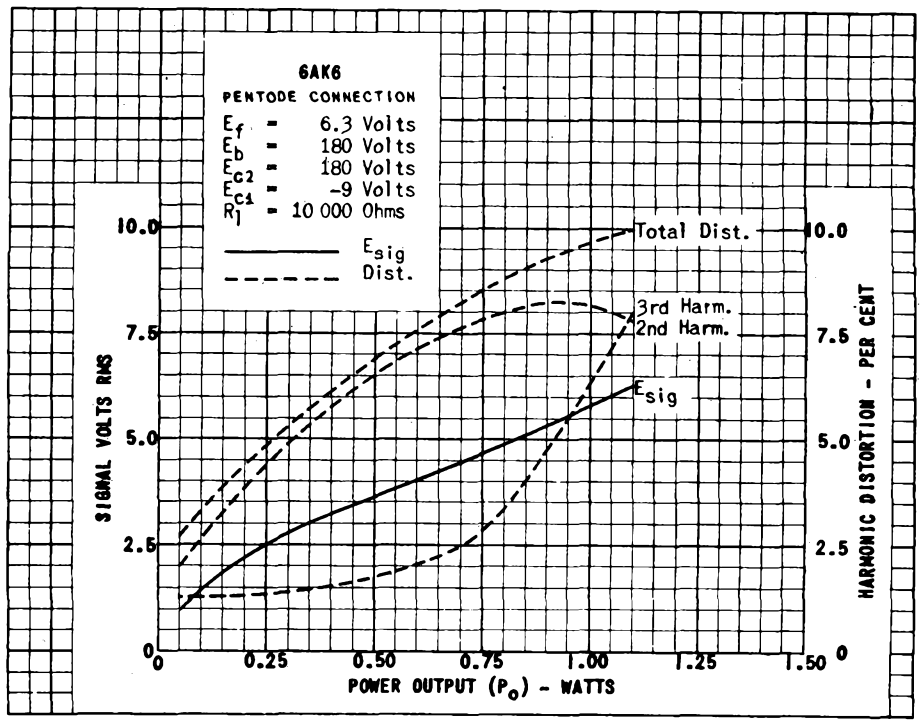


PLATE 1781
FEB. 3, 1947

TUNG-SOL

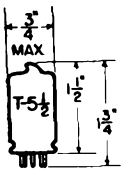
DOUBLE DIODE

MINIATURE TYPE

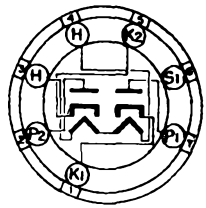
COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 300 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6AL5 COMBINES TWO INDEPENDENT DIODE UNITS IN THE 7-PIN MINIATURE CONSTRUCTION. ITS HIGH PERVEANCE PERMITS HIGH EFFICIENCY IN EITHER FM OR AM DETECTOR SERVICE.

DIRECT INTERELECTRODE CAPACITANCES

	EXTERNAL SHIELD	NO EXTERNAL SHIELD	
PLATE TO CATHODE, HEATER AND INTERNAL SHIELD: P TO (H+K+IS) EACH UNIT	3.2[A]	2.5	μμf
CATHODE TO PLATE, HEATER AND INTERNAL SHIELD: K TO (P+H+IS) EACH UNIT	3.6[B]	3.6	μμf
PLATE #1 TO PLATE #2: (P_1 TO P_2)	0.02[C]	0.08	μμf

[A] CLOSE-FITTING EXTERNAL SHIELD CONNECTED TO CATHODE.

[B] CLOSE-FITTING EXTERNAL SHIELD CONNECTED TO PLATE.

[C] CLOSE-FITTING EXTERNAL SHIELD CONNECTED TO GROUND.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	330	VOLTS
MAXIMUM PEAK INVERSE PLATE VOLTAGE	420	VOLTS
MAXIMUM PEAK PLATE CURRENT EACH PLATE	54	MA.
MAXIMUM DC OUTPUT CURRENT EACH PLATE	9	MA.
TUBE VOLTAGE DROP (MEASURED WITH TUBE CONDUCTING 60 MA. EACH PLATE)	10	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HALF-WAVE RECTIFIER

IN HALF-WAVE SERVICE THE TWO UNITS MAY BE USED SEPARATELY OR IN PARALLEL.

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	300	MA.
AC PLATE VOLTAGE EACH PLATE (RMS)	150	VOLTS
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE EACH PLATE	300	OHMS
DC OUTPUT CURRENT EACH PLATE	9	MA.

THE RESONANT FREQUENCY OF EACH UNIT IS 700 MC APPROX.

→ INDICATES A CHANGE OR ADDITION.

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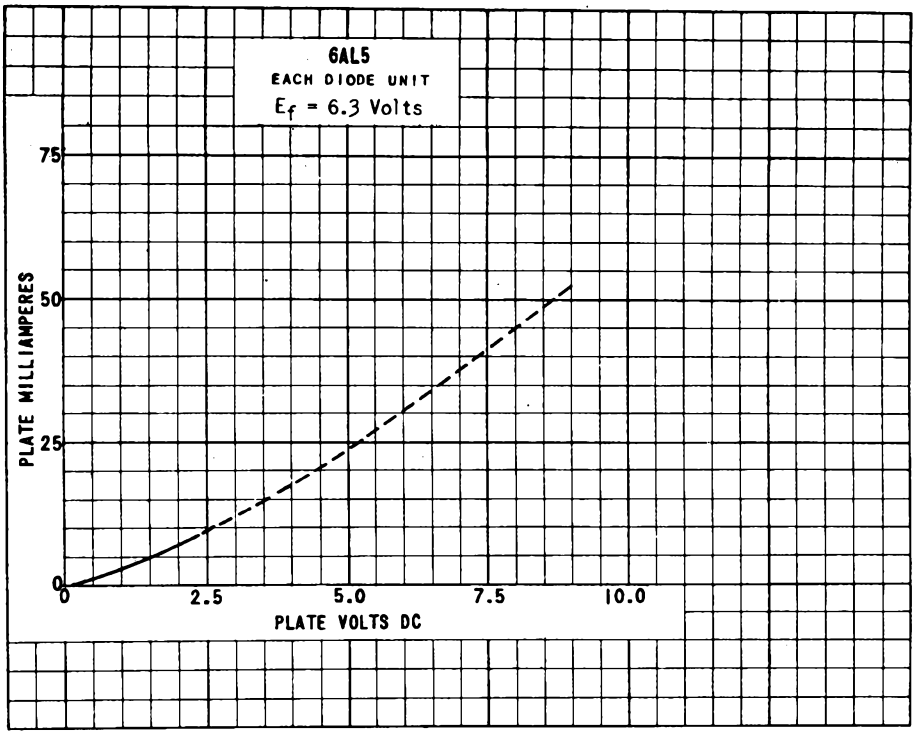
PLATE 1920
DEC. 1, 1947

6AL5



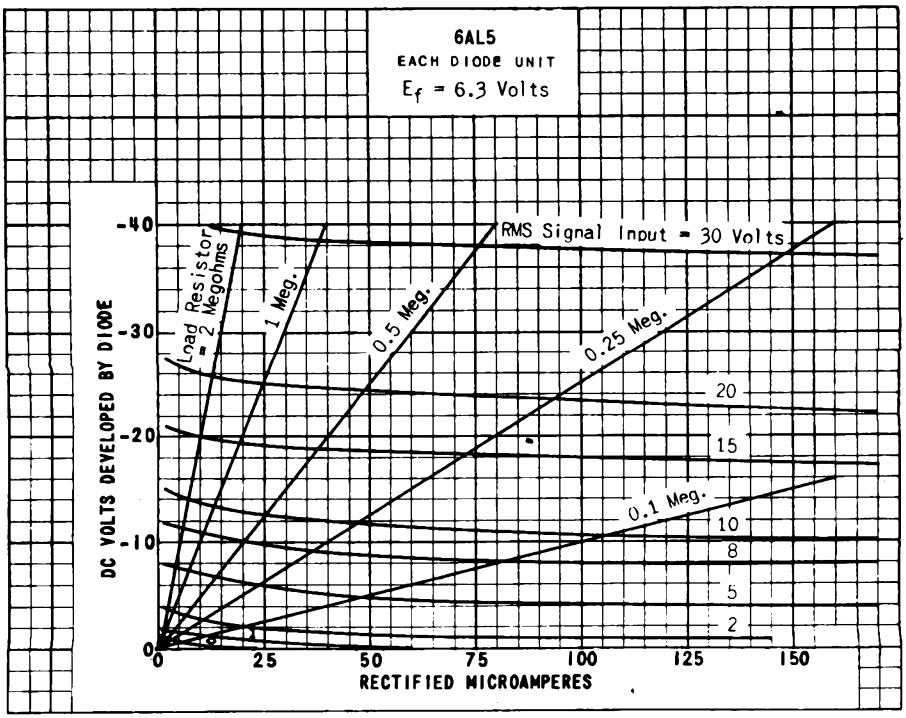
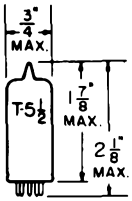


PLATE 1921
DEC. 1, 1947

TUNG-SOL

QUADRUPLE DIODE

MINIATURE TYPE



GLASS BULB

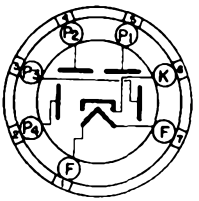
COATED UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.20 AMPERE

AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW

MINIATURE BUTTON
7 PIN BASE

THE 6AN6 IS A QUADRUPLE DIODE. IT IS DESIGNED FOR USE IN COMPACT, LIGHT-WEIGHT, PORTABLE EQUIPMENT WHERE THE RECTIFICATION OF FOUR SEPARATE VOLTAGES IS REQUIRED. IT IS RECOMMENDED THAT NO MATERIAL BE PERMITTED TO OBSTRUCT THE HOLE IN THE BASE SOCKET AS THIS TYPE MAY BE MANUFACTURED WITH THE EXHAUST-TUBE TIP AT THE BASE END.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD MB-210

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.20	AMP.
MAXIMUM PEAK INVERSE PLATE VOLTAGE PER PLATE	210	VOLTS
MAXIMUM PEAK PLATE CURRENT PER PLATE	45	MA.
MAXIMUM DC OUTPUT CURRENT PER PLATE	8.0	MA.
TUBE VOLTAGE DROP PER PLATE AT 6.6 MA.	9.0	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

PLATE 1 TO PLATES 2, 3 AND 4	1.2	μμf
PLATE 2 TO PLATES 1, 3 AND 4	1.1	μμf
PLATE 3 TO PLATES 1, 2 AND 4	1.1	μμf
PLATE 4 TO PLATES 1, 2 AND 3	1.3	μμf
PLATE TO CATHODE PER PLATE	0.5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HALF-WAVE RECTIFIER

PLATE VOLTAGE (RMS)	75	VOLTS
DC OUTPUT CURRENT PER PLATE	3.3	MA.

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PLATE 1797
NOV. 1 1946

6AN6

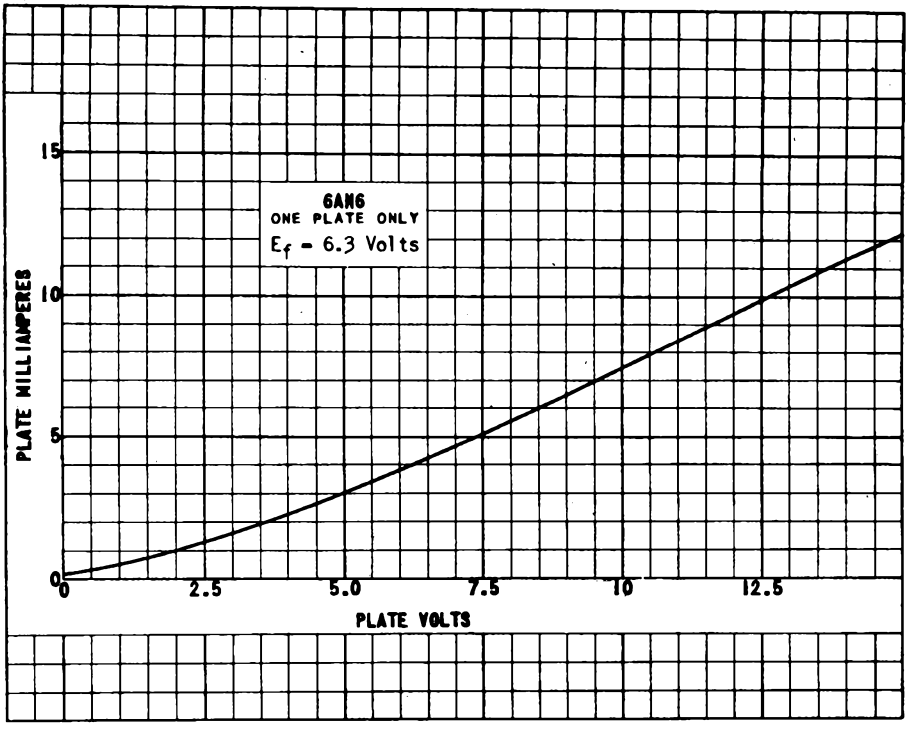
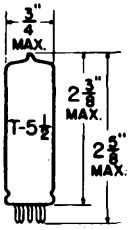


PLATE 1748
NOV. 1, 1946

TUNG-SOL

BEAM PENTODE

MINIATURE TYPE

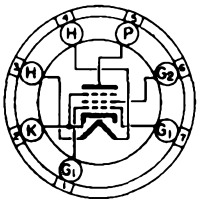


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 450 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6AQ5 IS A BEAM POWER AMPLIFIER USING THE MINIATURE CONSTRUCTION. IT IS DESIGNED FOR SERVICE IN AC AND STORAGE BATTERY OPERATED RECEIVERS WHERE HIGH POWER SENSITIVITY AND HIGH POWER OUTPUT IS DESIRED.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	450	MA.
MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	12	WATTS
MAXIMUM SCREEN DISSIPATION	2	WATTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

	WITH EXTERNAL SHIELD CONNECTED TO CATHODE	WITH NO EXTERNAL SHIELD	
GRID TO PLATE	0.17	0.35	μμf
INPUT	8	7.6	μμf
OUTPUT	11	6	μμf

PRINTED IN U.S.A.

PLATE 1856
AUG. 1, 1947

CONTINUED ON FOLLOWING PAGE

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

AF POWER AMPLIFIER - CLASS A_1

PLATE VOLTAGE	180	250	VOLTS
SCREEN VOLTAGE	180	250	VOLTS
CONTROL GRID VOLTAGE	-8.5	-12.5	VOLTS
PEAK AF GRID VOLTAGE	8.5	12.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	29	45	MA.
ZERO-SIGNAL SCREEN CURRENT (APPROX.)	3	4.5	MA.
MAXIMUM-SIGNAL PLATE CURRENT	30	47	MA.
MAXIMUM-SIGNAL SCREEN CURRENT (APPROX.)	4	7	MA.
GRID CIRCUIT RESISTANCE (MAX.):			
FOR FIXED BIAS	0.1	0.1	MEGOHM
FOR CATHODE BIAS	0.5	0.5	MEGOHM
LOAD RESISTANCE	5 500	5 000	OHMS
PLATE RESISTANCE	58 000	52 000	OHMS
TRANSCONDUCTANCE	3 700	4 100	µMHOS
MAXIMUM-SIGNAL POWER OUTPUT	2	4.5	WATTS
TOTAL HARMONIC DISTORTION	8	8	PERCENT

AF POWER AMPLIFIER - CLASS AB_1

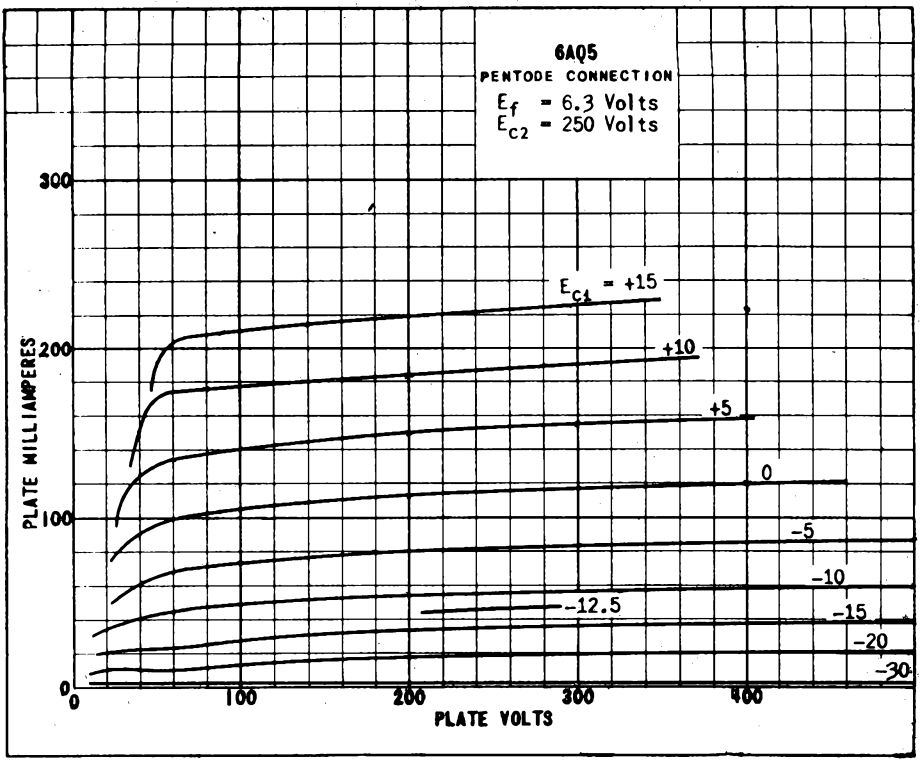
TWO TUBES

PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE	250	VOLTS
CONTROL GRID VOLTAGE	-15	VOLTS
PEAK AF GRID TO GRID VOLTAGE	30	VOLTS
ZERO-SIGNAL PLATE CURRENT	70	MA.
ZERO-SIGNAL SCREEN CURRENT	5	MA.
MAXIMUM-SIGNAL PLATE CURRENT	79	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	13	MA.
GRID CIRCUIT RESISTANCE (MAX.):		
FOR FIXED BIAS	0.1	MEGOHM
FOR CATHODE BIAS	0.5	MEGOHM
EFFECTIVE LOAD RESISTANCE - PLATE TO PLATE	10 000	OHMS
PLATE RESISTANCE - PER TUBE (APPROX.)	60 000	OHMS
TRANSCONDUCTANCE - PER TUBE	3 750	µMHOS
MAXIMUM-SIGNAL POWER OUTPUT	10	WATTS
TOTAL HARMONIC DISTORTION	5	PERCENT

SIMILIAR TYPE REFERENCE: *Characteristics identical to 6V6, 6V6G, 6V6GT within its ratings.*

PLATE 1857
AUG. 1, 1947

→ INDICATES A CHANGE OR ADDITION



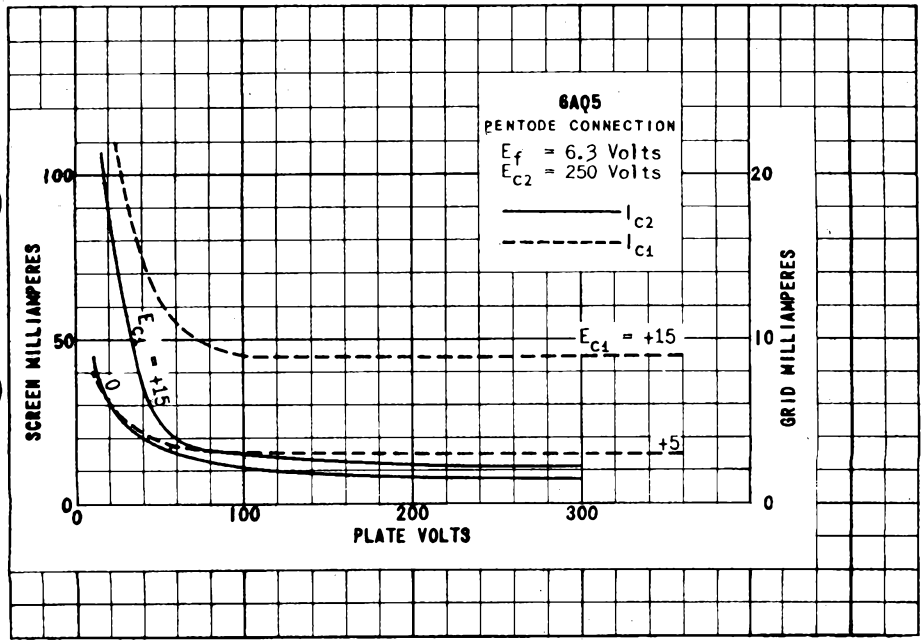
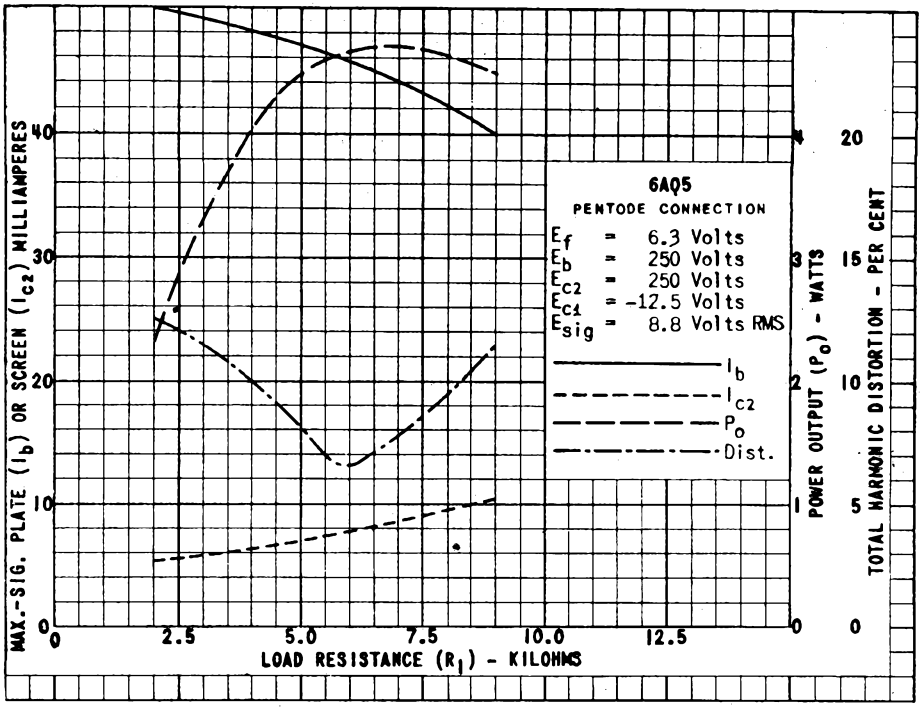


PLATE
1784
MAY 1
1947

6AQ5



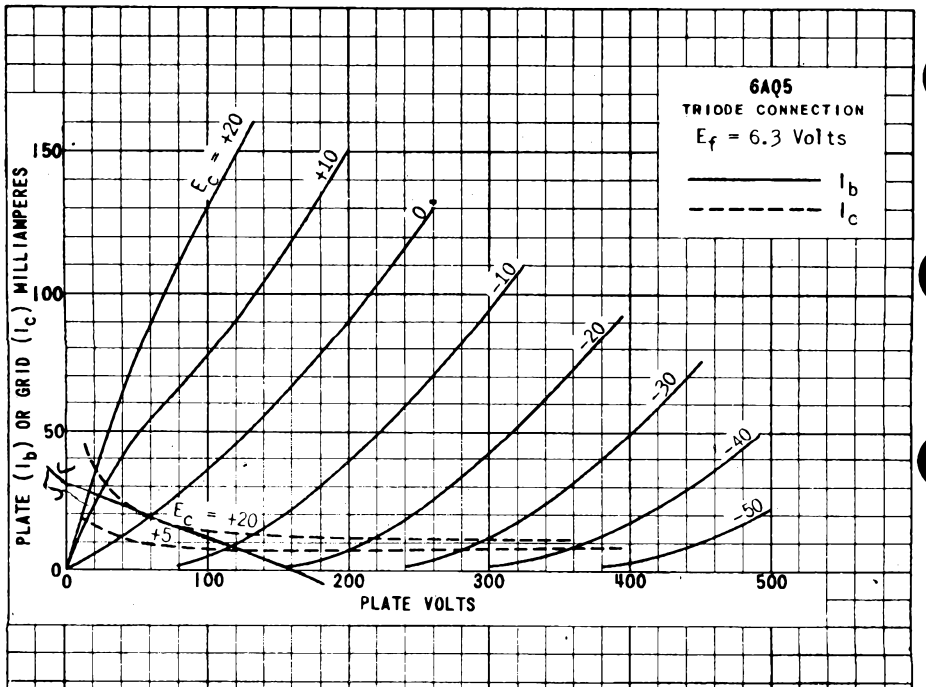


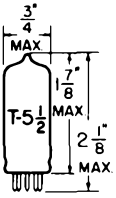
PLATE 1785
MAY 1 1947

$$\frac{\sigma}{\sqrt{n}} = \frac{\sigma}{\sqrt{5000}} = \sqrt{\frac{.03}{15000}}$$

TUNG-SOL

DOUBLE-DIODE TRIODE

MINIATURE TYPE

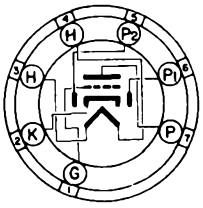


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6AQ6 COMBINES TWO DIODES AND A HIGH-MU TRIODE VOLTAGE AMPLIFIER IN THE MINIATURE CONSTRUCTION. THE THREE SECTIONS USE A COMMON CATHODE BUT ARE ADEQUATELY SHIELDED TOPROVIDE FOR SIMULTANEOUS SERVICE AS DETECTORS, AVC RECTIFIER, AND AUDIO VOLTAGE AMPLIFIER. THIS TUBE IS PARTICULARLY USEFUL IN DESIGNS REQUIRING ECONOMY OF HEATER POWER.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

TRIODE UNIT - CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	150	150	MA.
PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1	-3	VOLTS
PLATE CURRENT	0.8	1.0	MA.
PLATE RESISTANCE	61 000	58 000	OHMS
TRANSCONDUCTANCE	1 150	1 200	µMHOS
AMPLIFICATION FACTOR	70	70	

DIODE UNITS - TWO

THE DIODE UNITS ARE INDEPENDENT OF THE TRIODE UNIT EXCEPT FOR THE COMMON CATHODE SLEEVE. DIODE BIASING OF THE TRIODE IS NOT SUITABLE.

SIMILAR TYPE REFERENCE: Ratings and Characteristics somewhat similar to 6AL6, 6Q7, 6Q7GT, 6SQ7, 6SQ7GT, 7B6, 7C6.

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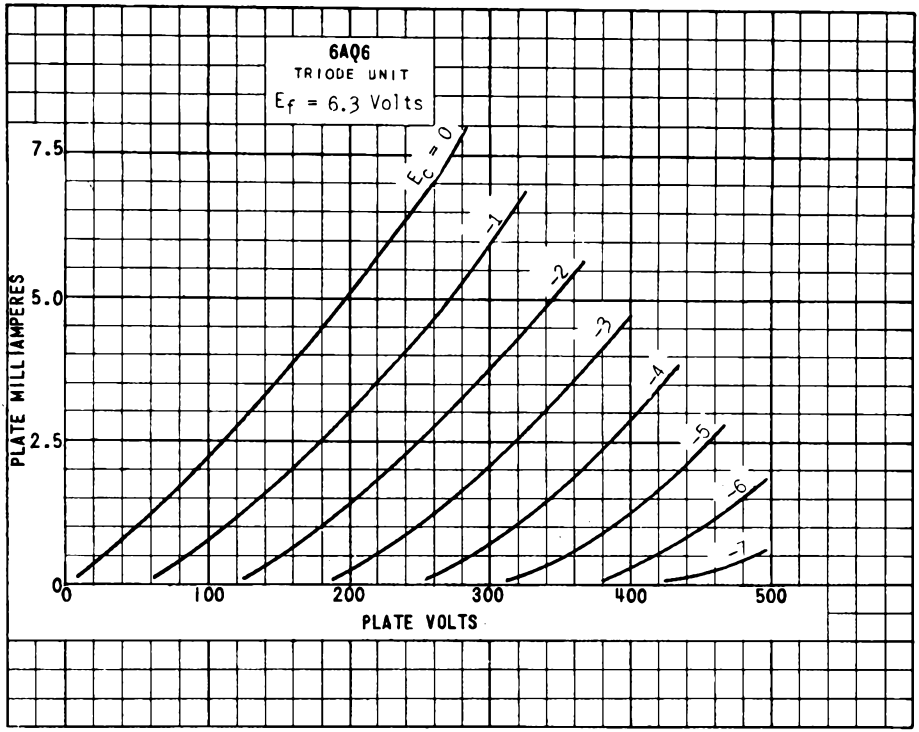
PLATE
2036
JULY 1,
1948

6AQ6



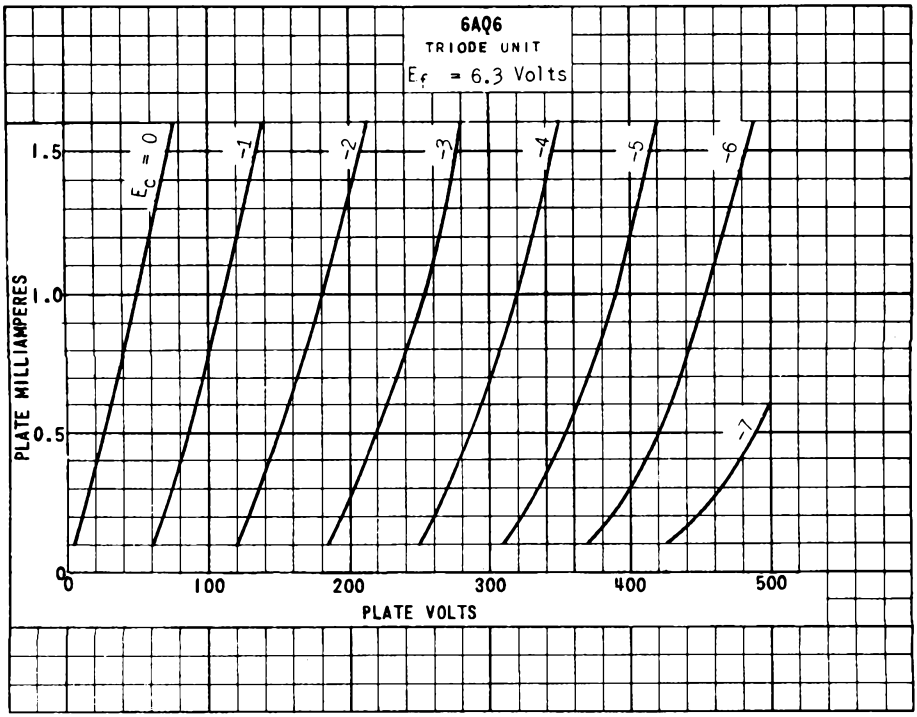


PLATE 2037
JULY 1, 1948

TUNG-SOL

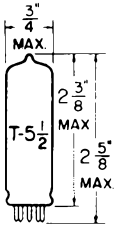
PENTODE

MINIATURE TYPE

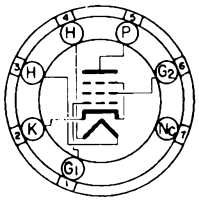
COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 400 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6AR5 IS A PENTODE POWER AMPLIFIER USING THE MINIATURE CONSTRUCTION. IT IS INTENDED FOR SERVICE IN AC AND STORAGE BATTERY OPERATED RECEIVERS WHERE MODERATE POWER SENSITIVITY AND POWER OUTPUT IS DESIRED.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD MB-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM GRID #2 VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	8.5	WATTS
MAXIMUM GRID #2 DISSIPATION	2.5	WATTS
MAXIMUM GRID #1 CIRCUIT RESISTANCE (FIXED BIAS)	0.1	MEGOHM
MAXIMUM GRID #1 CIRCUIT RESISTANCE (SELF BIAS)	0.5	MEGOHM

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

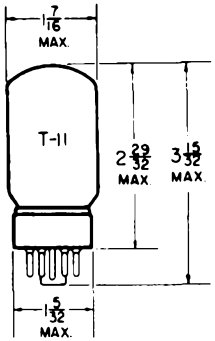
HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	400	400	MA.
PLATE VOLTAGE	250	250	VOLTS
GRID #2 VOLTAGE	250	250	VOLTS
GRID #1 VOLTAGE	-16.5	-18	VOLTS
PEAK AF GRID #1 VOLTAGE	16.5	18	VOLTS
PLATE RESISTANCE (APPROX.)	65 000	68 000	OHMS
TRANSCONDUCTANCE	2 400	2 300	µMHOS
ZERO-SIGNAL PLATE CURRENT	34	32	MA.
ZERO-SIGNAL GRID #2 CURRENT (NOMINAL)	5.7	5.5	MA.
MAXIMUM SIGNAL PLATE CURRENT	35	33	MA.
MAXIMUM SIGNAL GRID #2 CURRENT (NOMINAL)	10	10	MA.
LOAD RESISTANCE	7 000	7 600	OHMS
TOTAL HARMONIC DISTORTION	7	11	PERCENT
POWER OUTPUT	3.2	3.4	WATTS

PRINTED IN U. S. A.

PLATE
2010
MAY 3
1948

TUNG-SOL

BEAM PENTODE



GLASS BULB

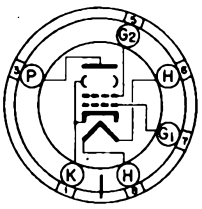
COATED UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 1.2 AMPERES

AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW

INTERMEDIATE (SHORT) SHELL 6 PIN OCTAL LOW LOSS PHENOLIC BASE

THE 6AR6 IS A BEAM POWER AMPLIFIER DESIGNED SPECIFICALLY FOR APPLICATIONS REQUIRING RELATIVELY HIGH PEAK PLATE CURRENTS AT NEGATIVE GRID POTENTIALS. IT IS CONSTRUCTED TO WITHSTAND RELATIVELY HIGH PLATE POTENTIALS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	200	VOLTS
MAXIMUM DC PLATE VOLTAGE	565	VOLTS
MAXIMUM DC GRID #2 VOLTAGE	300	VOLTS
DC GRID #1 VOLTAGE	-300 TO 0	VOLTS
MAXIMUM PLATE DISSIPATION	19	WATTS
MAXIMUM GRID #2 DISSIPATION	3.2	WATTS
MAXIMUM DC PLATE CURRENT	115	MA.

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G_1 TO P)	0.55	μμf
INPUT: G_1 TO (H + K + G_2)	11.0	μμf
OUTPUT: P TO (H + K + G_2)	7.0	μμf
HEATER TO CATHODE: (H TO K)	5.5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

	TRIODE CONNECTION	PENTODE CONNECTION	
FILAMENT VOLTAGE	6.3	6.3	VOLTS
FILAMENT CURRENT	1.2	1.2	AMP.
DC PLATE VOLTAGE	200	250	VOLTS
DC GRID #2 VOLTAGE	TIED TO PLATE	250	VOLTS
DC GRID #1 VOLTAGE	-12.5	-22.5	VOLTS
GRID #1 CIRCUIT RESISTANCE (MAX.)	100 000	100 000	OHMS
DC PLATE CURRENT	90	77	MA.
GRID #2 CURRENT	TIED TO PLATE	5	MA.
PLATE RESISTANCE (APPROX.)	1 000	21 000	OHMS
TRANSCONDUCTANCE	6 000	5 400	μMHOS
DC GRID #1 VOLTAGE FOR PLATE CURRENT CUTOFF		-65	VOLTS

→ INDICATES A CHANGE OR ADDITION

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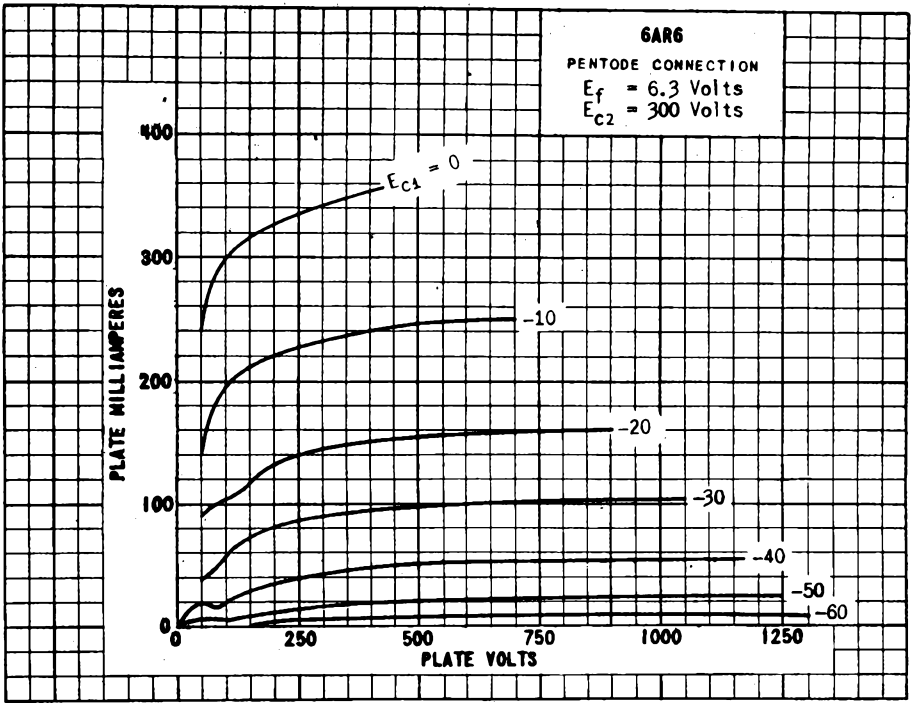
PLATE 1749
JULY 1, 1947

6AR6



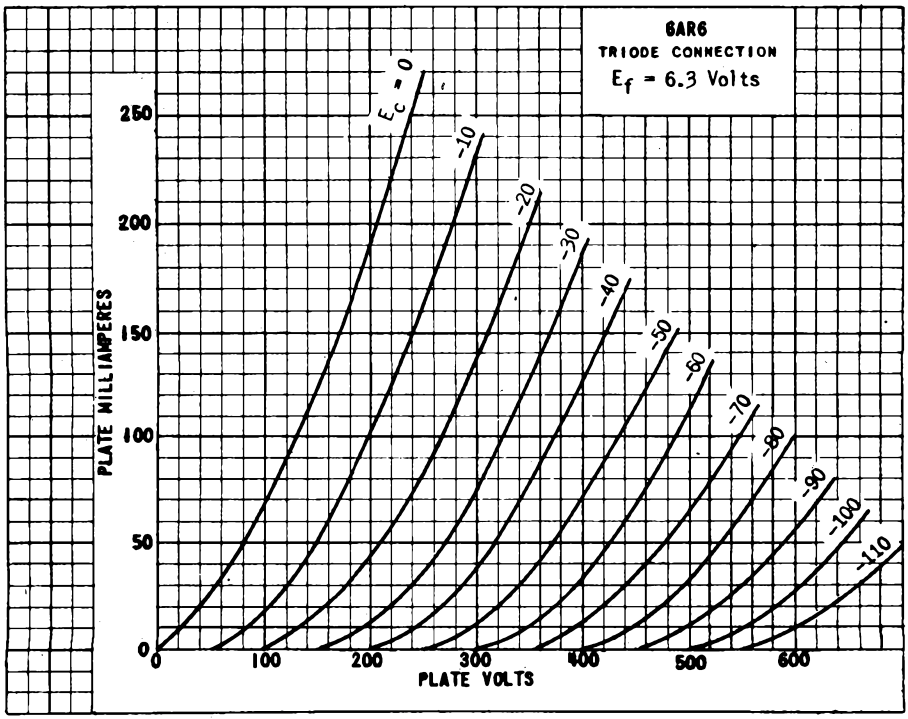
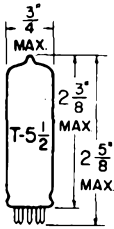


PLATE 1750
JULY 1, 1947

TUNG-SOL

BEAM PENTODE

MINIATURE TYPE



GLASS BULB

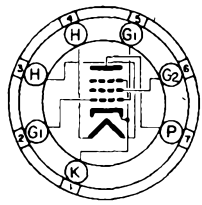
UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.8 AMPERE

AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW

MINIATURE BUTTON
7 PIN BASE

THE 6AS5 IS A BEAM POWER AMPLIFIER USING THE MINIATURE CONSTRUCTION. IT IS DESIGNED FOR USE IN MOBILE OR AC OPERATED RECEIVERS WHERE RELATIVELY HIGH POWER OUTPUT AND HIGH POWER SENSITIVITY ARE DESIRED AT LOW POWER SUPPLY VOLTAGES.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G_1 TO P)	0.6	µµf
INPUT: G_1 TO (H+K&G_3+G_2)	12	µµf
OUTPUT: P TO (H+K&G_3+G_2)	6.2	µµf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	150	VOLTS
MAXIMUM GRID #2 VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	5.5	WATTS
MAXIMUM GRID #2 DISSIPATION	1	WATT
MAXIMUM GRID #1 CIRCUIT RESISTANCE (FIXED BIAS)	0.1	MEGOHM
MAXIMUM GRID #1 CIRCUIT RESISTANCE (SELF BIAS)	0.5	MEGOHM
MAXIMUM BULB TEMPERATURE (AT HOTTEST POINT ON BULB SURFACE)	250	°C

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.8	AMP.
PLATE VOLTAGE	150	VOLTS
GRID #2 VOLTAGE	110	VOLTS
GRID #1 VOLTAGE	-8.5	VOLTS
PEAK AF GRID #1 VOLTAGE	8.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	35	MA.
ZERO-SIGNAL GRID #2 CURRENT (NOMINAL)	2	MA.
MAXIMUM SIGNAL PLATE CURRENT	36	MA.
MAXIMUM SIGNAL GRID #2 CURRENT (NOMINAL)	6.5	MA.
TRANSCONDUCTANCE	5 600	µMHOS
LOAD RESISTANCE	4 500	OHMS
TOTAL HARMONIC DISTORTION	10	PERCENT
MAXIMUM SIGNAL POWER OUTPUT	2.2	WATTS

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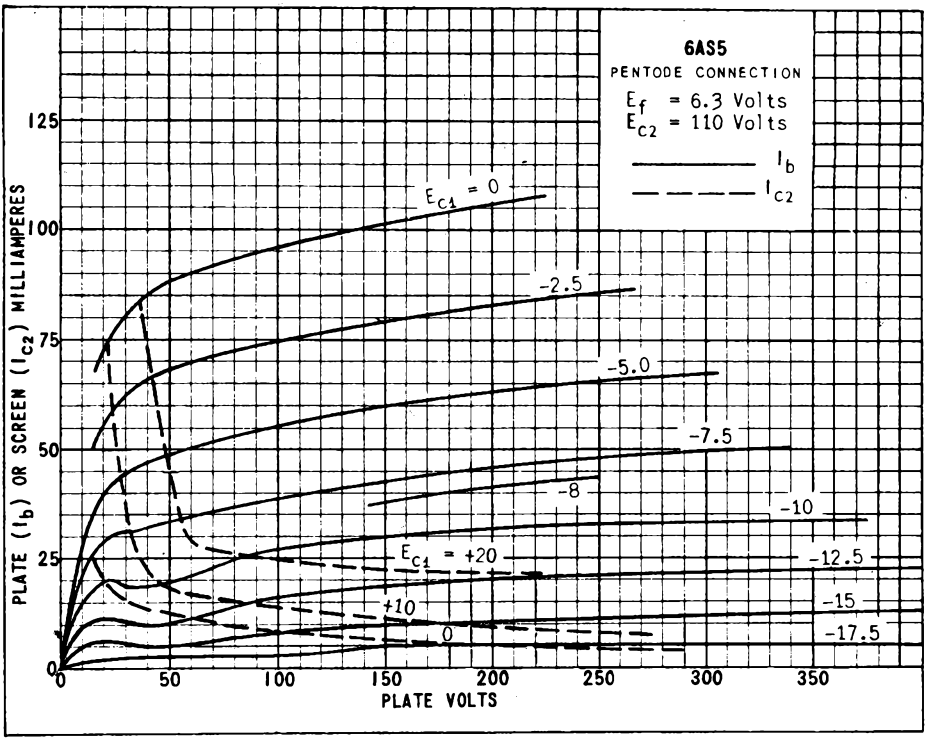
PLATE
1996
APRIL 1
1948

6AS5



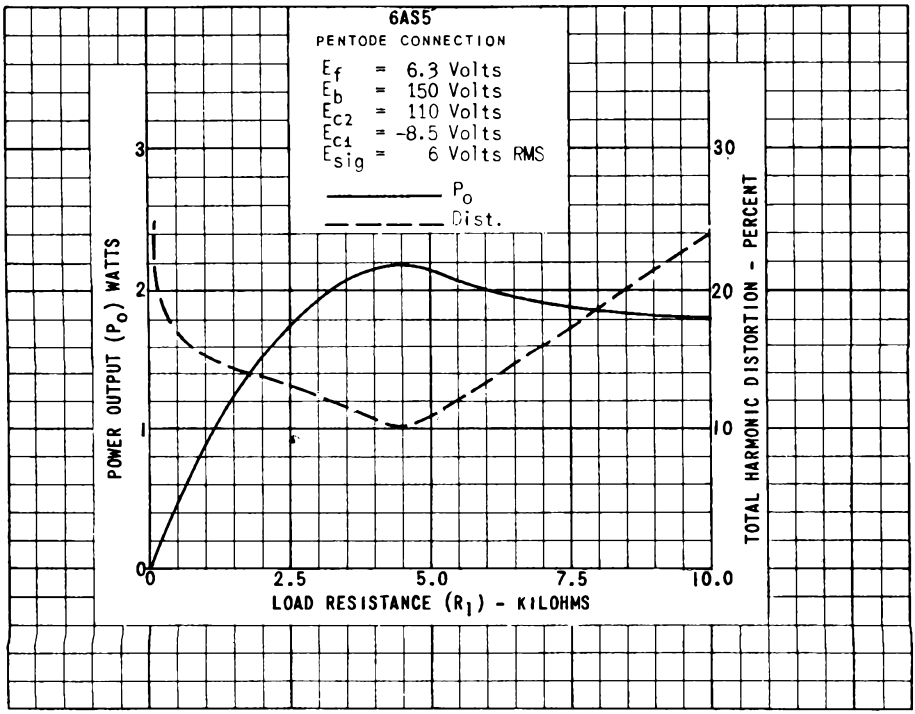


PLATE 1997
APRIL 1 1948

TUNG-SOL

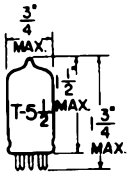
PENTODE

MINIATURE TYPE

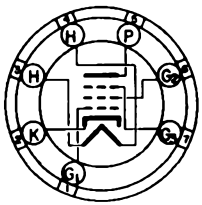
COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 175 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6AS6 IS A SHARP CUT-OFF VOLTAGE AMPLIFIER PENTODE USING THE MINIATURE CONSTRUCTION. IT IS CHARACTERIZED BY AN EFFICIENT HEATER, LOW CAPACITANCES AND HIGH TRANSCONDUCTANCE. THE SUPPRESSOR GRID IS TERMINATED IN A SEPARATE BASE CONNECTION AND IS INTENDED TO BE USED AS AN ADDITIONAL CONTROL GRID IN GATING, SWITCHING, OR MIXER SERVICE.

DIRECT INTERELECTRODE CAPACITANCES
WITH EXTERNAL SHIELD CONNECTED TO CATHODE

GRID TO PLATE: (G_1 TO P)	0.01	μμf
INPUT: G_1 TO (H+K+G_2+G_3)	3.9	μμf
OUTPUT: P TO (H+K+G_2+G_3)	3.0	μμf
GRID #1 TO GRID #3: (G_1 TO G_3)	0.1	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM GRID #2 VOLTAGE	140	VOLTS
MAXIMUM GRID #3 VOLTAGE	27	VOLTS
MAXIMUM PLATE DISSIPATION	1.7	WATTS
MAXIMUM GRID #2 DISSIPATION	0.75	WATT
MAXIMUM CATHODE CURRENT	18	MA.
MAXIMUM BULB TEMPERATURE	120	°C

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	175	175	MA.
PLATE VOLTAGE	120	120	VOLTS
GRID #2 VOLTAGE	120	120	VOLTS
GRID #3 VOLTAGE	-3	0	VOLTS
GRID #1 VOLTAGE	-2	-2	VOLTS
TRANSCONDUCTANCE (CONTROL-GRID)	1 850	3 200	μMHOS
TRANSCONDUCTANCE (SUPPRESSOR-GRID)	810	470	μMHOS
PLATE CURRENT	3.6	5.2	MA.
GRID #2 CURRENT	4.8	3.5	MA.

CONTINUED ON FOLLOWING PAGE

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PLATE 2019
JUNE 1, 1948

CONTINUED FROM PRECEDING PAGE

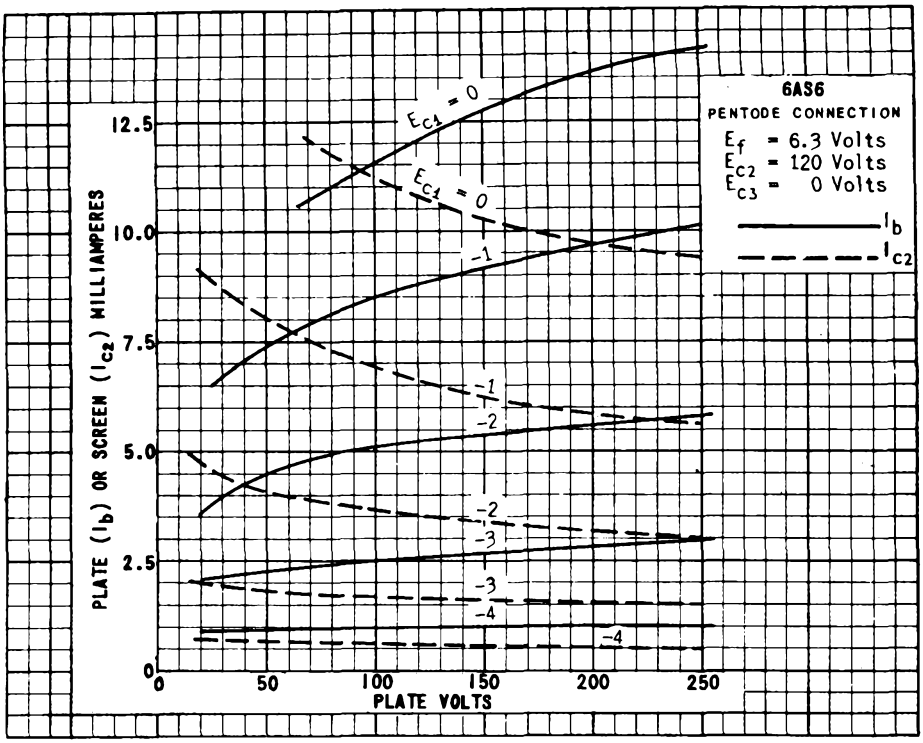
CONTROL-GRID PLATE CURRENT CUT-OFF CHARACTERISTICS

PLATE VOLTAGE	120	VOLTS
GRID #2 VOLTAGE	120	VOLTS
GRID #3 VOLTAGE	0	VOLTS
NOMINAL CUT-OFF - GRID #1	-6	VOLTS
GUARANTEED CUT-OFF - GRID #1	-10	VOLTS

SUPPRESSOR-GRID PLATE CURRENT CUT-OFF CHARACTERISTICS

PLATE VOLTAGE	120	120	VOLTS
GRID #2 VOLTAGE	120	60	VOLTS
GRID #1 VOLTAGE	-2	0	VOLTS
NOMINAL CUT-OFF - GRID #3	-10	-8	VOLTS
GUARANTEED CUT-OFF - GRID #3	-15	-10	VOLTS

PLATE 2020
JUNE 1, 1948



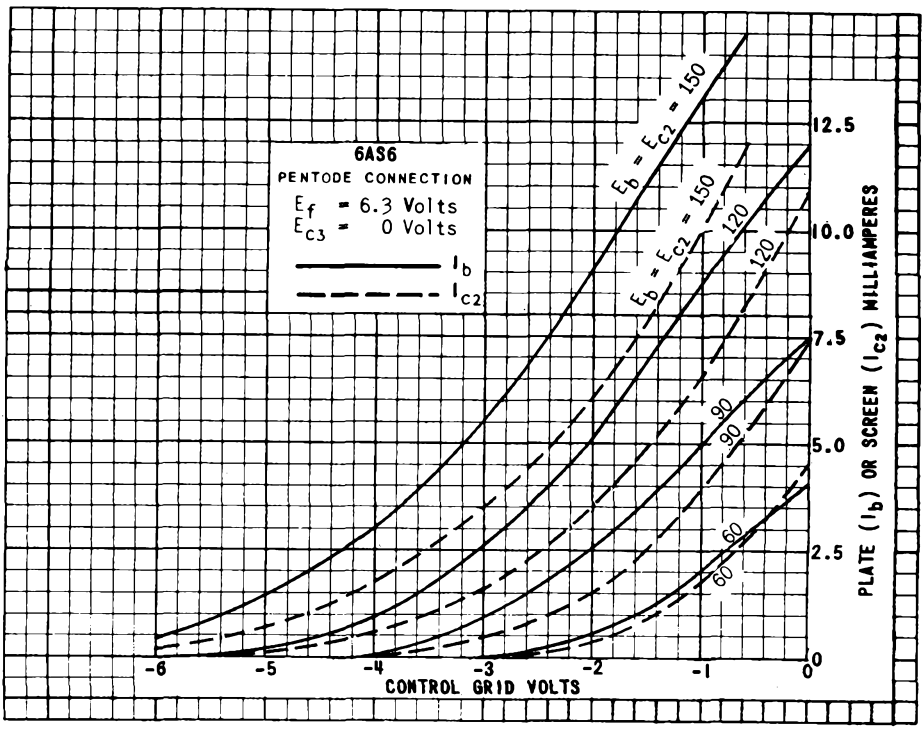


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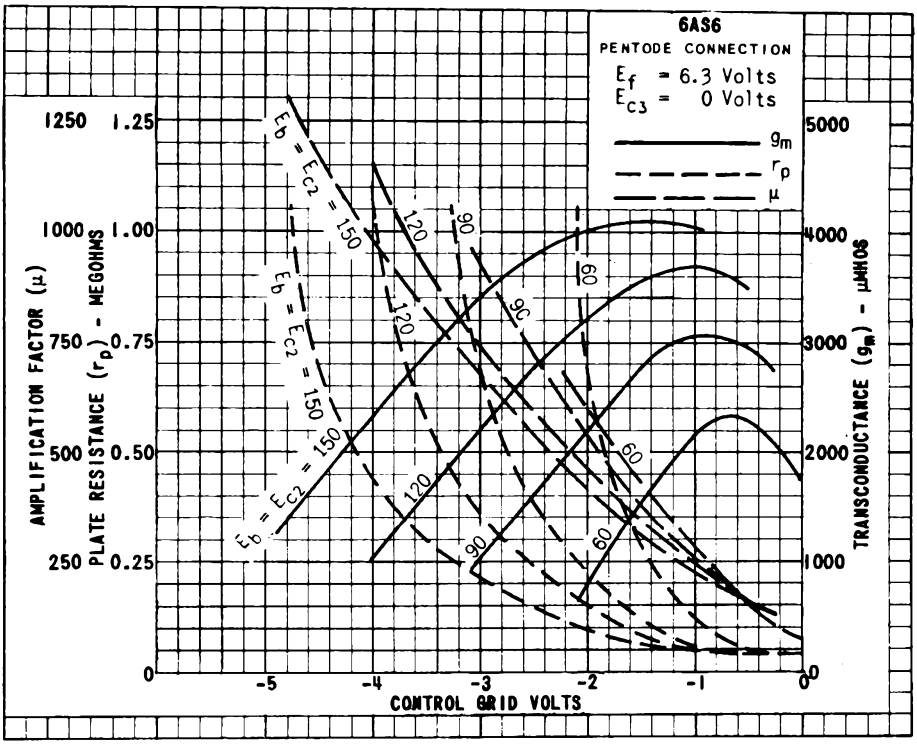
PLATE
2021
JUNE 1,
1948

6AS6



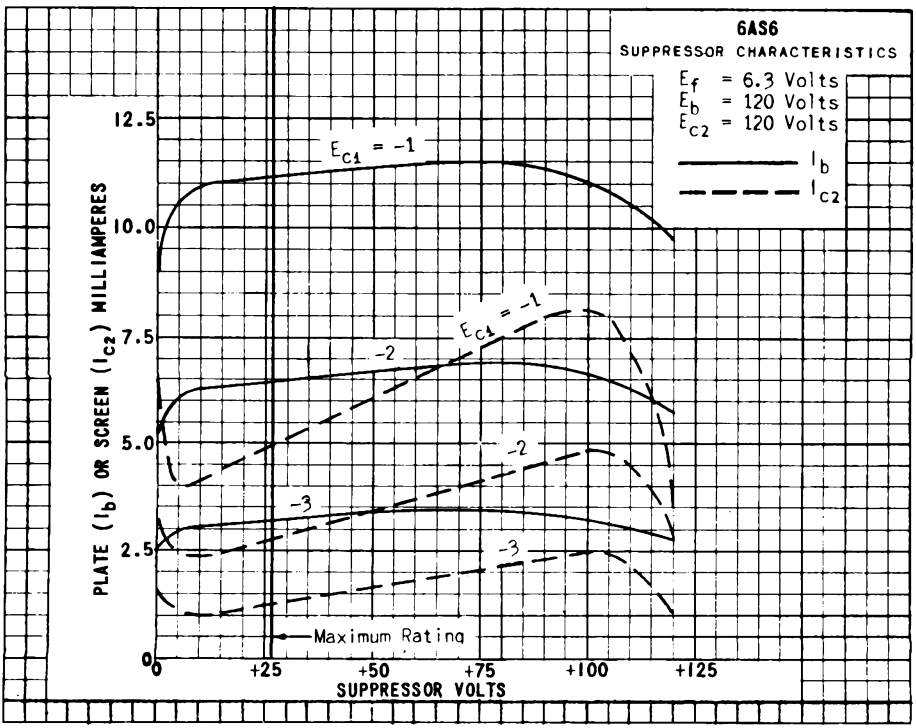
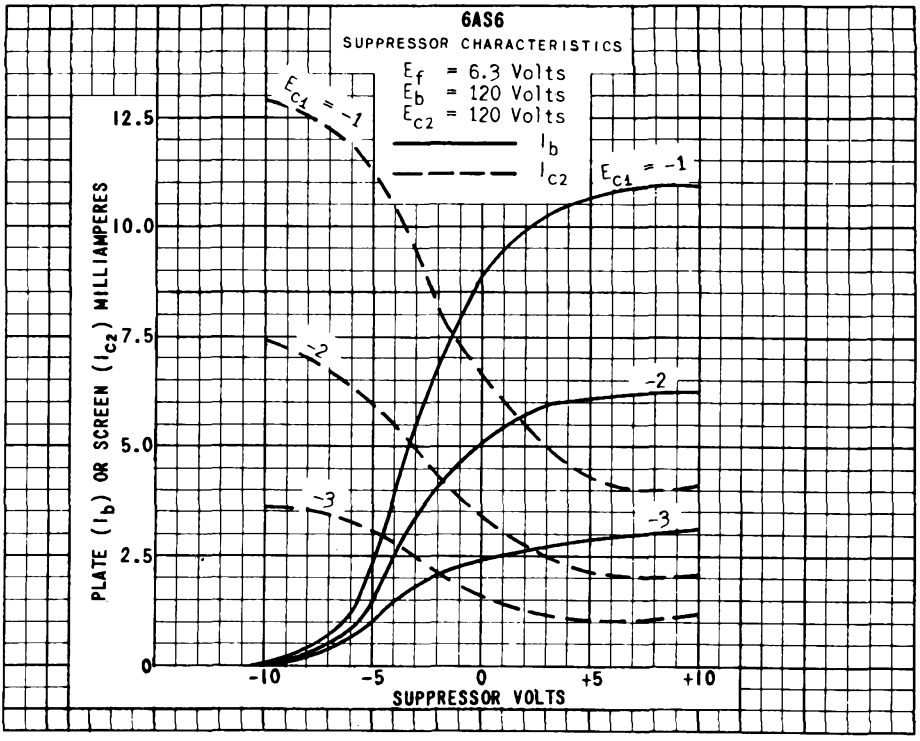


PLATE 2022
JUNE 1, 1948



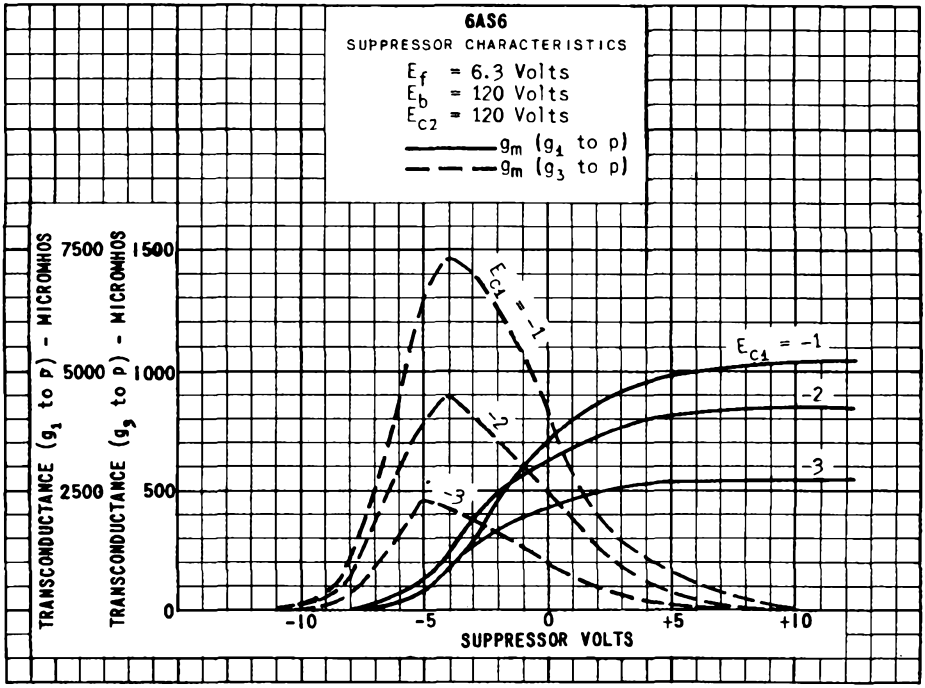


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PLATE
2023
JUNE 1,
1948

TUNG-SOL

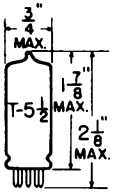
DOUBLE-DIODE TRIODE

MINIATURE TYPE

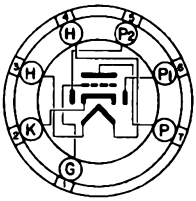
UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6AT6 IS A COMBINED HIGH-MU VOLTAGE AMPLIFIER AND DOUBLE-DIODE DETECTOR USING THE 7-PIN MINIATURE CONSTRUCTION. IT IS INTENDED TO PROVIDE OUTPUT VOLTAGE ADEQUATE FOR FULL POWER OUTPUT OF MOST BEAM-POWER TUBES.

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G TO P)	2.1	μμf
INPUT: G TO (H + K)	2.3	μμf
OUTPUT: P TO (H + K)	1.1	μμf
DIODE PLATE #2 TO TRIODE GRID: (P_2 TO G) (MAX.)	0.025	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED	0.8	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

TRIODE UNIT - CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	0.3	0.3	AMP.
PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1	-3	VOLTS
PLATE CURRENT	0.8	1.0	MA.
PLATE RESISTANCE	54 000	58 000	OHMS
TRANSCONDUCTANCE	1 300	1 200	μMHOS
AMPLIFICATION FACTOR	70	70	

DIODE UNITS - TWO

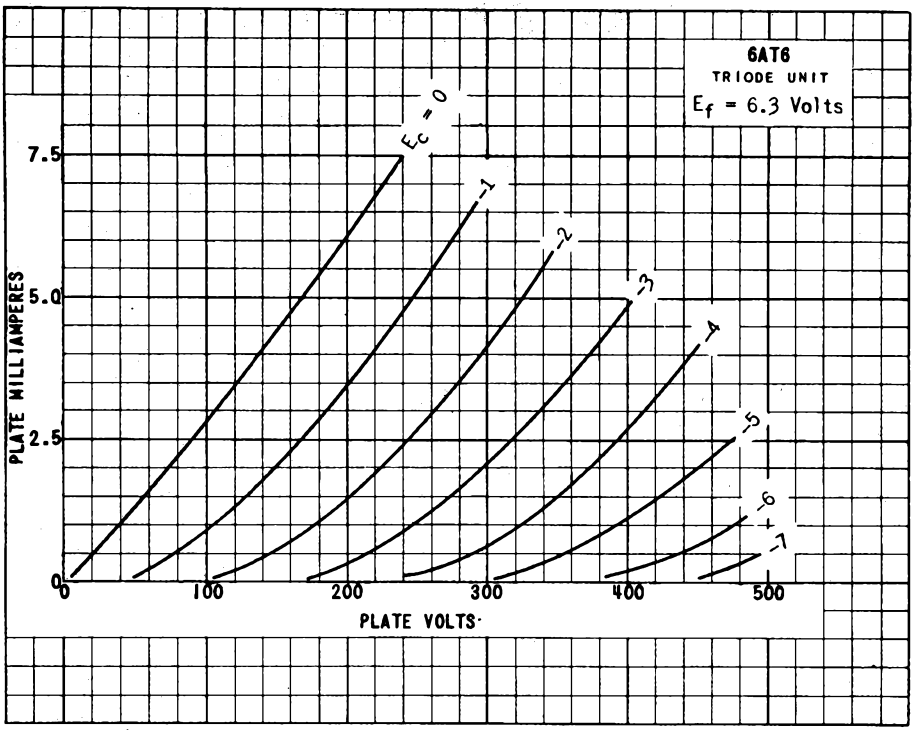
THE DIODE UNITS ARE INDEPENDENT OF THE TRIODE UNIT EXCEPT FOR THE COMMON CATHODE SLEEVE.

SIMILAR TYPE REFERENCE: Ratings and characteristics somewhat similar to 6Q7, 6Q7GT, 6SQ7, 6SQ7GT, 7B6, 7C6.

PLATE 1840
JULY 1, 1947

→ INDICATES A CHANGE OR ADDITION:

6AT6



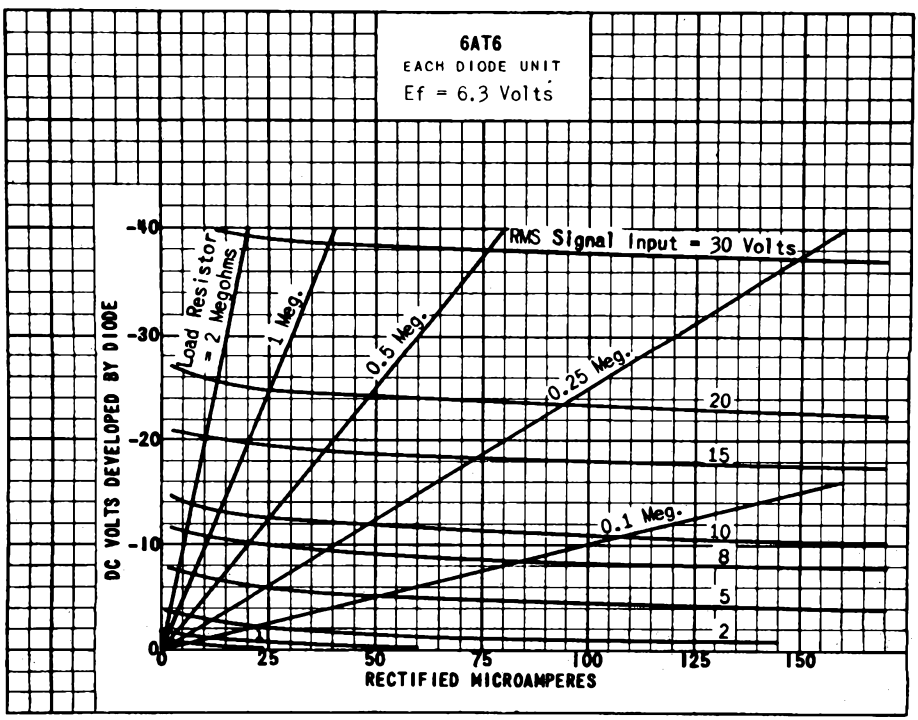


PLATE 1841
JULY 1, 1947

TENTATIVE DATA 6AS7G

TUNG-SOL

LOW-MU TWIN POWER TRIODE

PHYSICAL SPECIFICATIONS

EMITTER UNIPOTENTIAL CATHODE		PIN CONNECTIONS	
BASE MEDIUM SHELL OCTAL 8-PIN		PIN 1-G TRI. 2	PIN 7-HEATER
CAP ---		PIN 2-P TRI. 2	PIN 8-HEATER
BULB ST-16		PIN 3-K TRI. 2	
MAXIMUM DIAMETER	2 1/16"	PIN 4-G TRI. 1	MOUNTING POS. ANY
MAXIMUM OVERALL LENGTH	5 5/16"	PIN 5-P TRI. 1	
MAXIMUM SEATED HEIGHT	4 3/4"	PIN 6-K TRI. 1	

RATINGS (INTERPRETED ACCORDING TO RMA STANDARD MB-210)		PER TRIODE UNIT
HEATER OR FILAMENT VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER OR FILAMENT CURRENT	2.5	AMPS.
MAXIMUM PLATE VOLTAGE	250	VOLTS
PLATE CURRENT	125	MA.
MAXIMUM PLATE DISSIPATION	13	WATTS
MAXIMUM SCREEN DISSIPATION		WATTS
MAXIMUM PEAK HEATER CATHODE VOLTAGE:		
HEATER POS. WITH RESPECT TO CATHODE	300	VOLTS
HEATER NEG. WITH RESPECT TO CATHODE	300	VOLTS

CAPACITANCES

CONTROL GRID TO CATHODE	μμf
PLATE TO CATHODE	μμf
GRID TO PLATE	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

DC AMPLIFIER	PER TRIODE UNIT	
HEATER OR FILAMENT VOLTAGE	6.3	VOLTS
HEATER OR FILAMENT CURRENT	2.5	AMPS.
PLATE-SUPPLY VOLTAGE	135	VOLTS
CATHODE-BIAS RESISTOR	250	OHMS
PLATE CURRENT	125	MA.
PEAK AF SIGNAL VOLTAGE		VOLTS
ZERO-SIGNAL PLATE CURRENT		MA.
ZERO-SIGNAL SCREEN CURRENT		MA.
MAXIMUM-SIGNAL PLATE CURRENT		MA.
MAXIMUM-SIGNAL SCREEN CURRENT		MA.
PLATE RESISTANCE	280	OHMS
TRANSCONDUCTANCE	7500	μMHOS
AMPLIFICATION FACTOR	2.1	
TOTAL HARMONIC DISTORTION		PER CENT
POWER OUTPUT		WATTS

MAXIMUM CIRCUIT VALUES (FOR MAXIMUM RATED CONDITIONS):		
MAXIMUM GRID RESISTANCE:		
FOR CATHODE BIAS	1.0	MEGOHM
FIXED BIAS	OPERATION NOT RECOMMENDED	

PLATE 1704
APRIL 15 1946

6AS7G

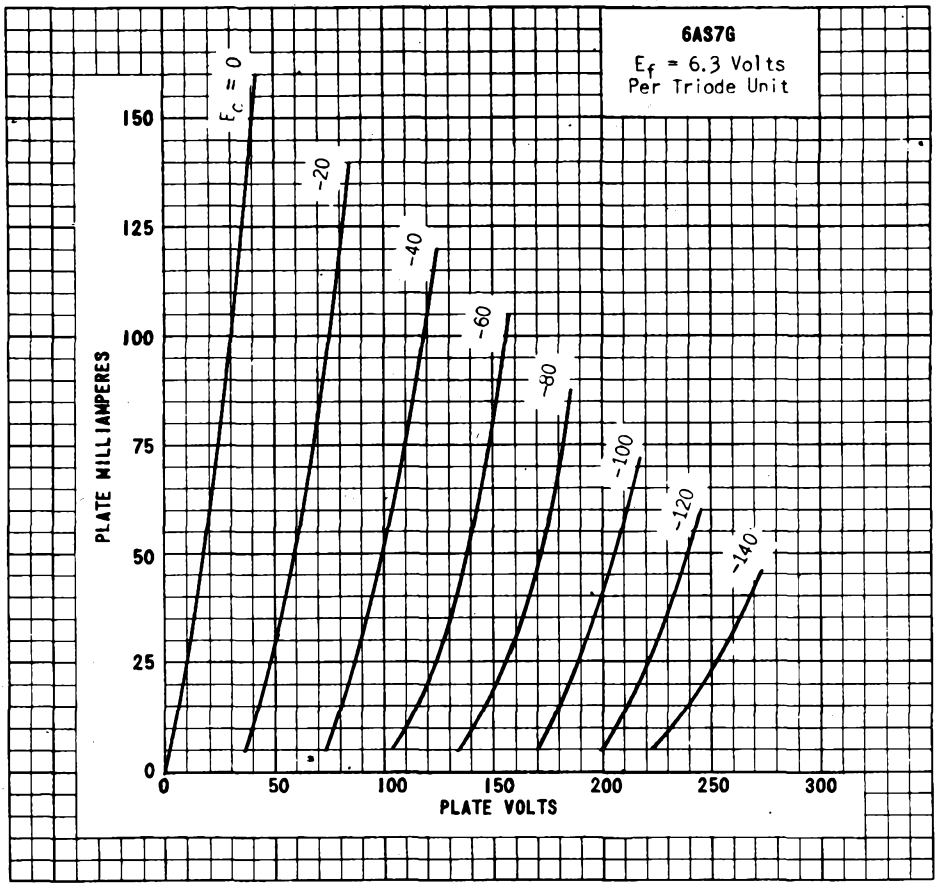
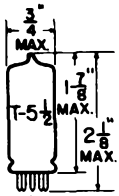


PLATE
1705
APRIL 15
1946

TUNG-SOL

RF AMPLIFIER PENTODE

MINIATURE TYPE

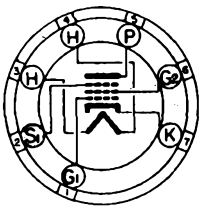


GLASS BULB

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6AU6 IS A PENTODE AMPLIFIER HAVING A SHARP CUT-OFF CONTROL CHARACTERISTIC USING THE MINIATURE CONSTRUCTION. WITH HIGH TRANSCONDUCTANCE, LOW GRID-PLATE CAPACITANCE, IT IS INTENDED FOR SERVICE AS EITHER AN RF OR AF AMPLIFIER.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.3	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	150	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM GRID VOLTAGE:		
NEGATIVE BIAS	50	VOLTS
POSITIVE BIAS	0	VOLTS
MAXIMUM PLATE DISSIPATION	3	WATTS
MAXIMUM SCREEN DISSIPATION	0.65	WATTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

GRID TO PLATE (MAX.)	0.0035	μμf
INPUT	5.5	μμf
OUTPUT	5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

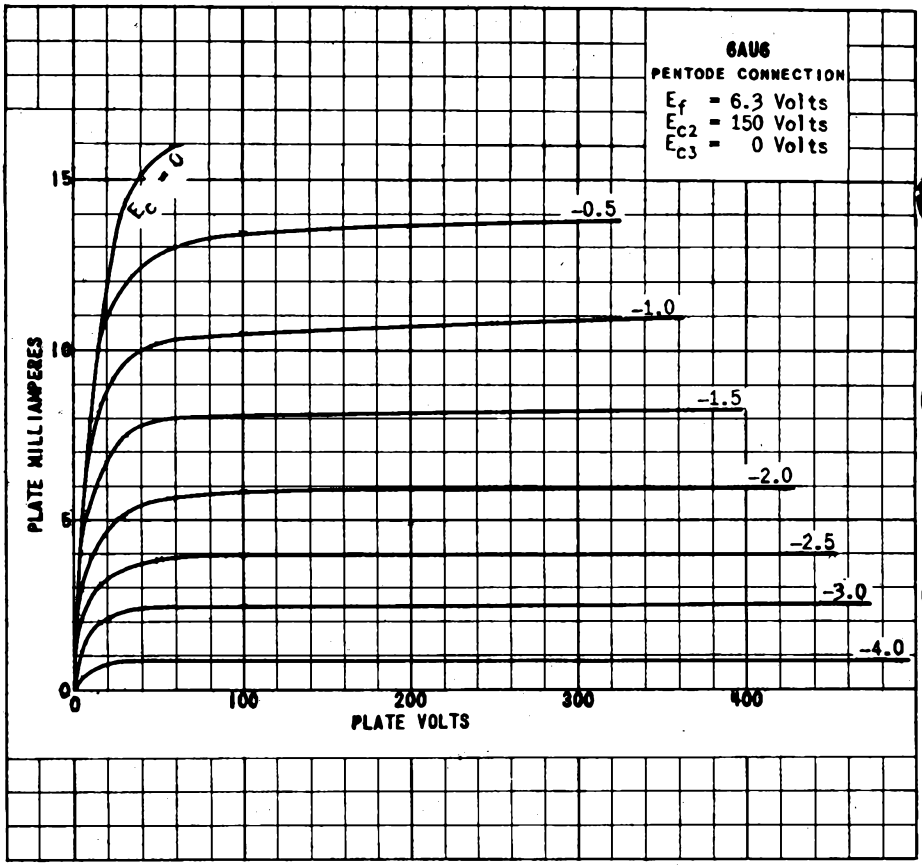
CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	250	VOLTS
SCREEN VOLTAGE	100	125	150	VOLTS
GRID VOLTAGE	-1	-1	-1	VOLT
SUPPRESSOR VOLTAGE	0	0	0	VOLTS
PLATE CURRENT	5.2	7.6	10.8	MA.
SCREEN CURRENT	2.0	3.0	4.3	MA.
PLATE RESISTANCE (APPROX.)	0.5	1.5	1	MEGOHMS
TRANSCONDUCTANCE	3 900	4 450	5 200	μMHOS
GRID VOLTAGE FOR PLATE CURRENT = 10 μA.	-4.2	-5.2	-6.2	VOLTS

PLATE 1786
MAY 1 1947

→ INDICATES A CHANGE OR ADDITION.

6AU6



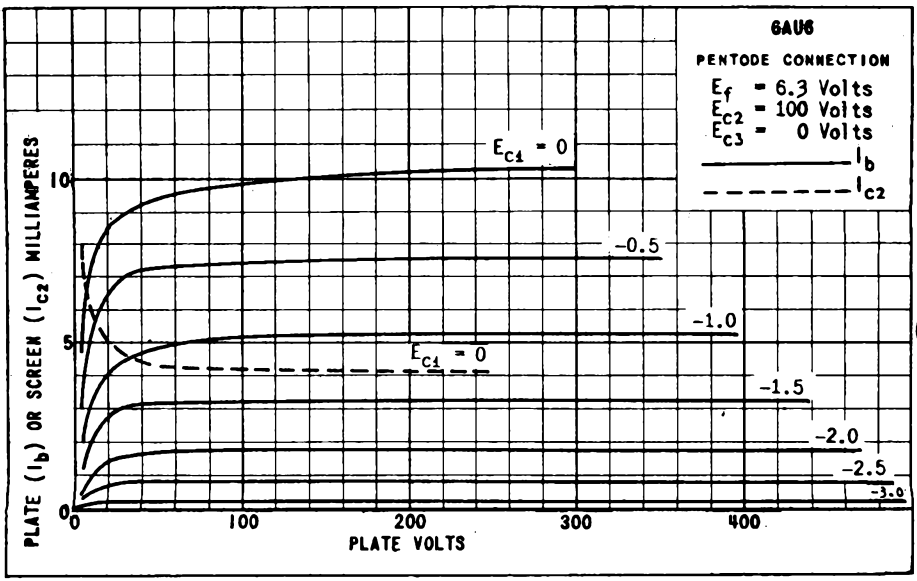
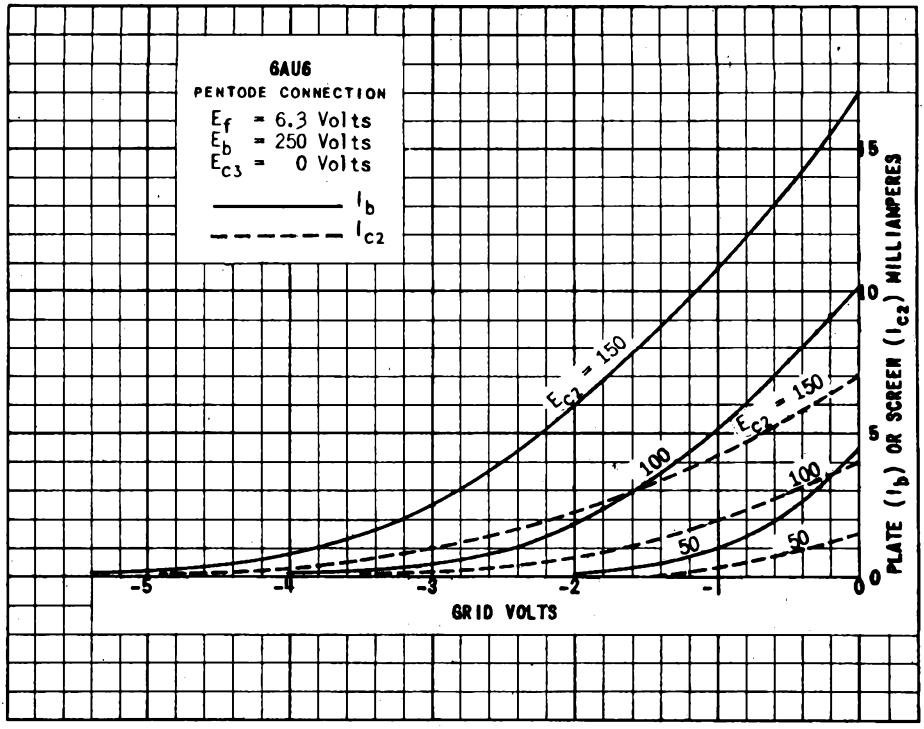


PLATE 1787
MAY 1 1947



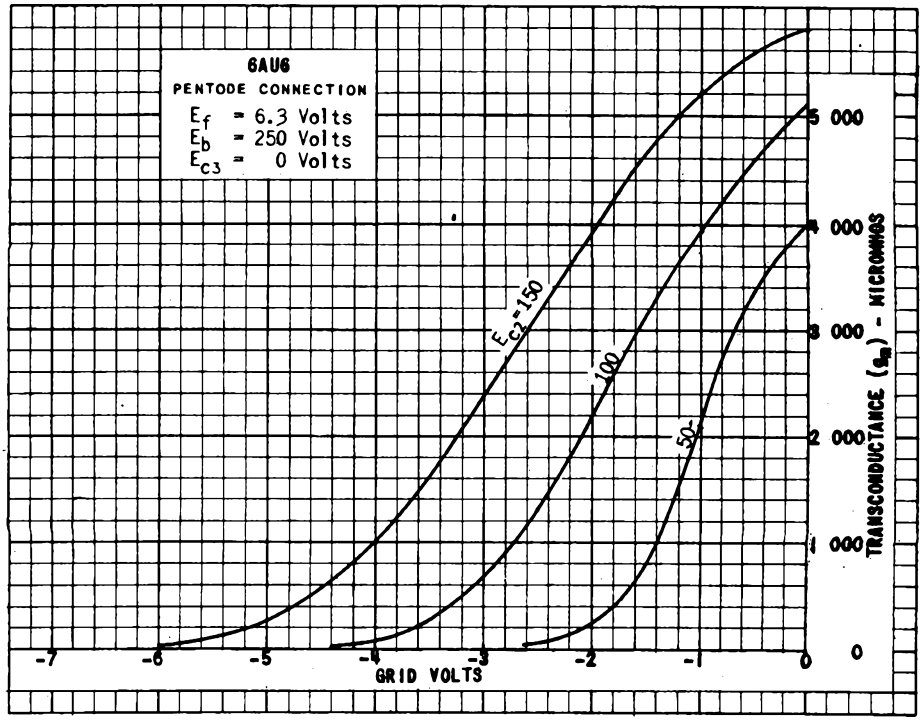


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PLATE
1788
MAY 1
1947

TUNG-SOL

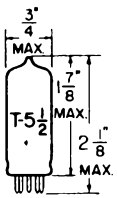
DOUBLE-DIODE TRIODE

MINIATURE TYPE

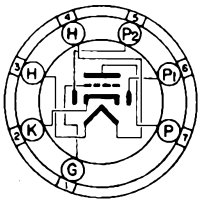
COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 300 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6AV6 COMBINES A HIGH-MU TRIODE AND TWO INDEPENDENT DIODE UNITS IN THE 7-PIN MINIATURE CONSTRUCTION. IT PERMITS A SINGLE TUBE TO FUNCTION AS DETECTOR, AVC RECTIFIER, AND AUDIO AMPLIFIER. COUPLING BETWEEN THE DIODE AND TRIODE SECTIONS IS MINIMIZED BY THE USE OF INTERNAL SHIELDING.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM DIODE CURRENT EACH PLATE FOR CONTINUOUS OPERATION	1.0	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

TRIODE UNIT - CLASS A_1 AMPLIFIER

FILAMENT VOLTAGE	6.3	6.3	VOLTS
FILAMENT CURRENT	300	300	MA.
PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1	-2	VOLTS
PLATE CURRENT	0.5	1.2	MA.
PLATE RESISTANCE	80 000	62 500	OHMS
TRANSCONDUCTANCE	1 250	1 600	µMHOS
AMPLIFICATION FACTOR	100	100	

DIODE UNITS - TWO

THE DIODE UNITS ARE INDEPENDENT OF THE TRIODE UNIT EXCEPT FOR THE COMMON CATHODE SLEEVE.

DIODE BIASING OF THE TRIODE UNIT IS NOT SUITABLE.

SIMILIAR TYPE REFERENCE: Ratings and characteristics somewhat similiar to 6AT6 except for the use of more thorough shielding of the diode units from the triode.

CONTINUED ON FOLLOWING PAGE

PRINTED IN U.S.A.
PLATE 1959
FEB. 2, 1948

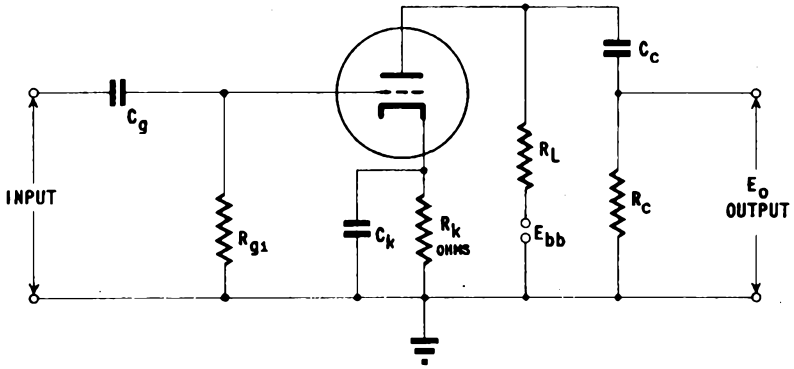
CONTINUED FROM PRECEDING PAGE

RESISTANCE COUPLED AMPLIFIER

R_L MEG.	R_c MEG.	E_{bb} = 90 VOLTS			E_{bb} = 180 VOLTS			E_{bb} = 300 VOLTS		
		R_k	GAIN	E_o	R_k	GAIN	E_o	R_k	GAIN	E_o
0.1	0.22	4700	35[A]	4	2000	47	18	1500	52	40
0.22	0.47	7400	45[B]	6	3500	59	24	2800	65	49
0.47	1.0	13000	52[C]	8	6700	66	28	5200	73	54

E_o IS RMS OUTPUT AT GRID CURRENT POINT.
GAIN MEASURED AT 5.0 VOLTS RMS OUTPUT EXCEPT AS INDICATED.

[A] OUTPUT VOLTAGE OF 2 VOLTS RMS.
[B] OUTPUT VOLTAGE OF 3 VOLTS RMS.
[C] OUTPUT VOLTAGE OF 4 VOLTS RMS.



NOTE: COUPLING CAPACITORS C_g AND C_c SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE. R_k SHOULD BE ADEQUATELY BY-PASSED BY CAPACITOR C_k.

PLATE 1960
FEB. 2, 1948

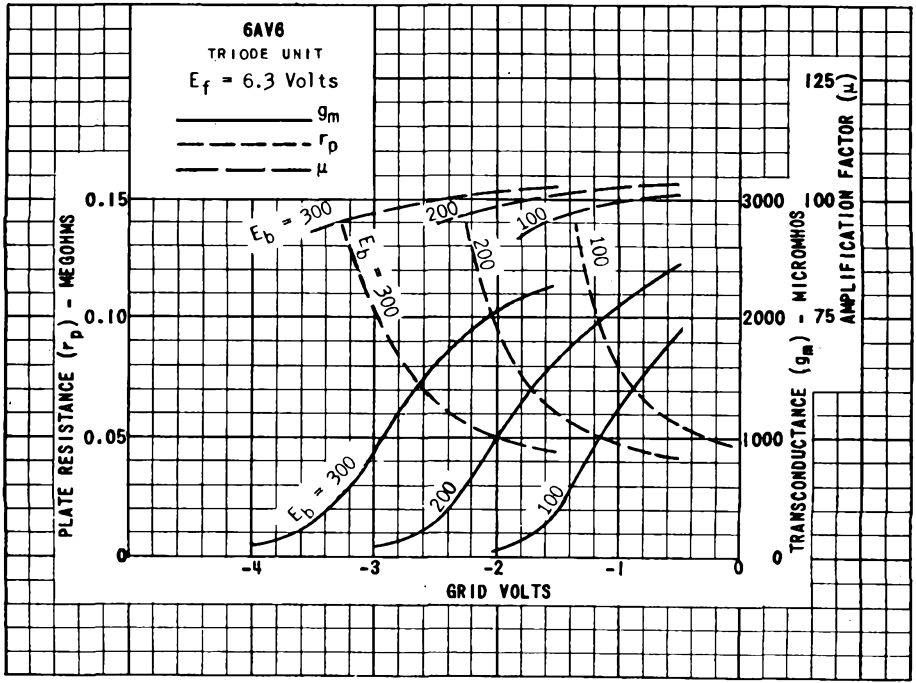


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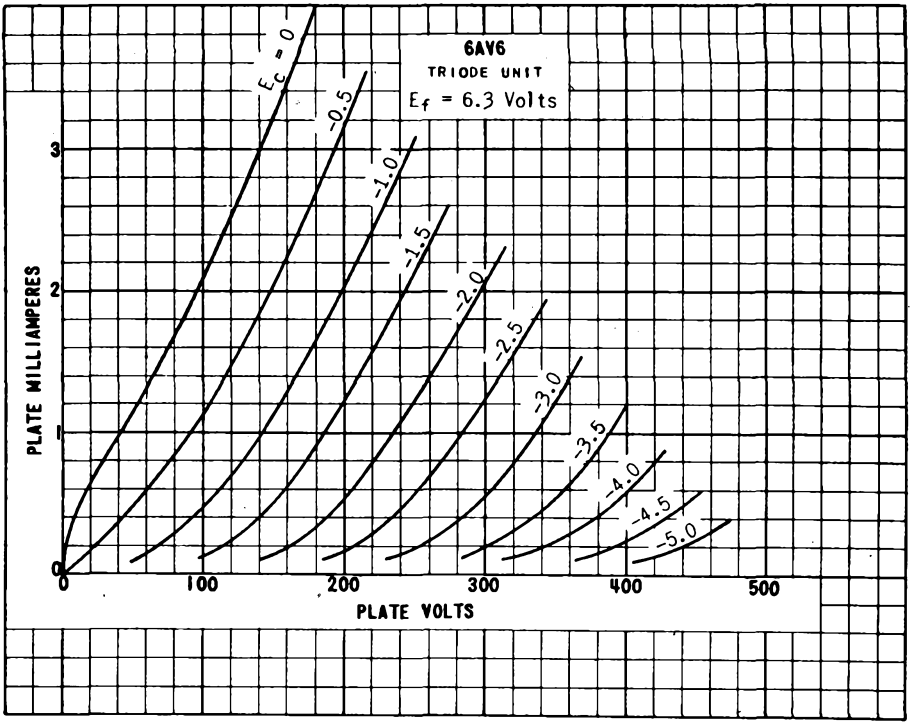
PLATE
1961
FEB. 2,
1948


6AV6
TRIODE UNIT
E_f = 6.3 Volts
E_c = 0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
PLATE MILLIAMPERES
0
1
2
3
0
100
200
300
400
500
PLATE VOLTS

6AV6

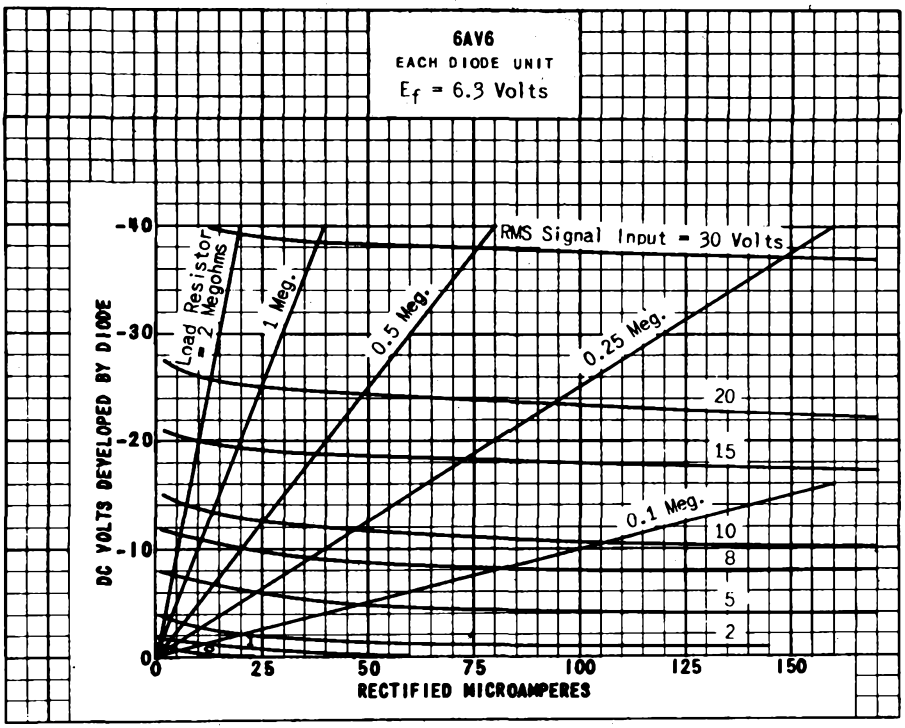


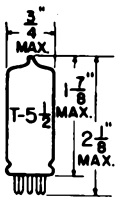
PLATE
1962
FEB. 2,
1948

 ELECTRONIC TUBE DIVISION NEWARK, NEW JERSEY, U. S. A.

TUNG-SOL

RF AMPLIFIER PENTODE

MINIATURE TYPE

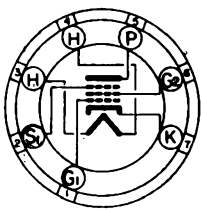


GLASS BULB

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.30 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6BA6 IS A PENTODE AMPLIFIER HAVING A REMOTE CONTROL GRID CHARACTERISTIC AND UTILIZING THE MINIATURE CONSTRUCTION. AS A RF AMPLIFIER IT IS CHARACTERIZED BY HIGH TRANSCONDUCTANCE AND LOW GRID-PLATE CAPACITANCE AND TRANSCONDUCTANCE.

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.30	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM GRID VOLTAGE:		
NEGATIVE BIAS	50	VOLTS
POSITIVE BIAS	0	VOLTS
MAXIMUM PLATE DISSIPATION	3	WATTS
MAXIMUM SCREEN DISSIPATION	0.6	WATTS
MAXIMUM PEAK HEATER-CATHODE VOLTAGE:		
HEATER NEG. WITH RESPECT TO CATHODE	90	VOLTS
HEATER POS. WITH RESPECT TO CATHODE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

GRID TO PLATE (MAX.)	0.0035	μμf
INPUT	5.5	μμf
OUTPUT	5.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

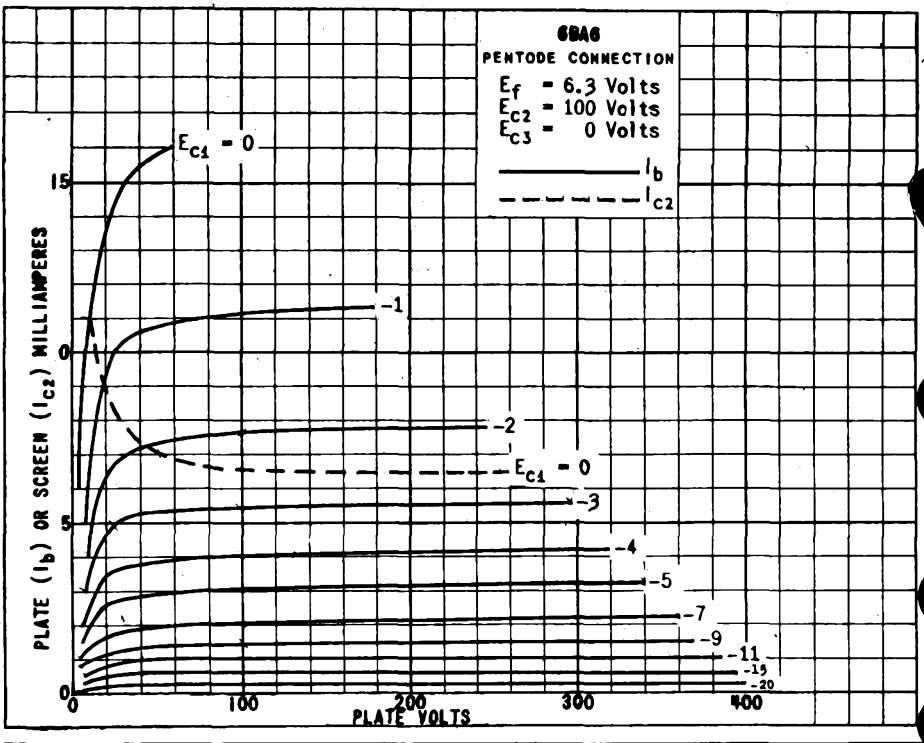
CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CATHODE BIAS RESISTOR	68	68	OHMS
SUPPRESSOR VOLTAGE	0	0	VOLTS
PLATE CURRENT	10.8	11	MA.
SCREEN CURRENT	4.4	4.2	MA.
PLATE RESISTANCE (APPROX.)	0.25	1.5	MEGOHMS
TRANSCONDUCTANCE	4 300	4 400	μMHOS
GRID VOLTAGE (APPROX.) FOR TRANSCONDUCTANCE = 40 μMHOS	-20	-20	VOLTS

→ INDICATES A CHANGE OR ADDITION.

PRINTED IN U. S. A.
PLATE 1789
MAY 1 1947

6BA6



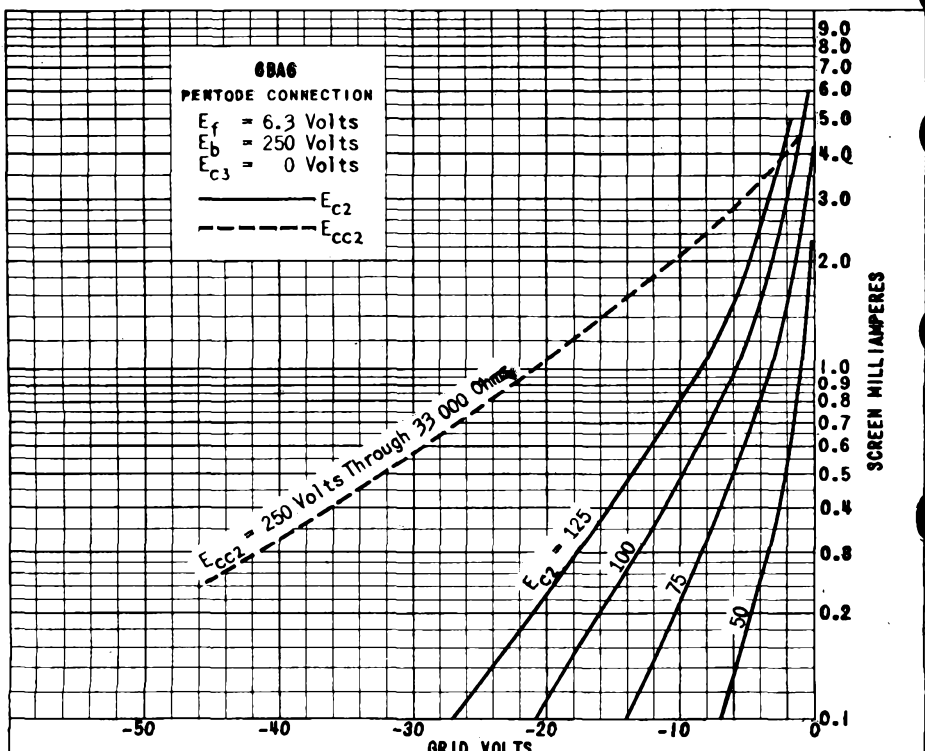


PLATE 1790
MAY 1, 1947

 ELECTRONIC TUBE DIVISION NEWARK, NEW JERSEY, U. S. A.

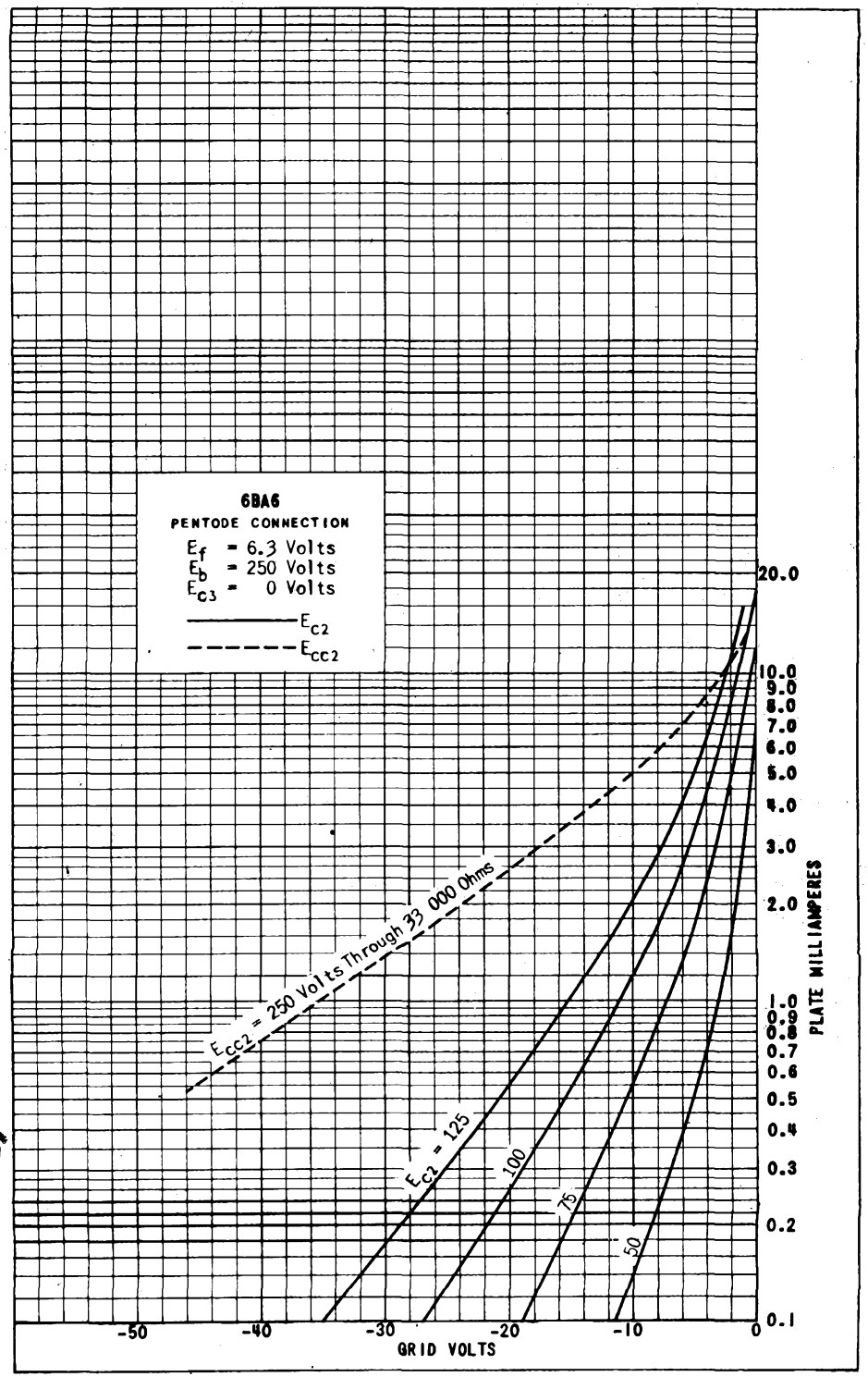


PLATE 1791
MAY 1 1947

6BA6

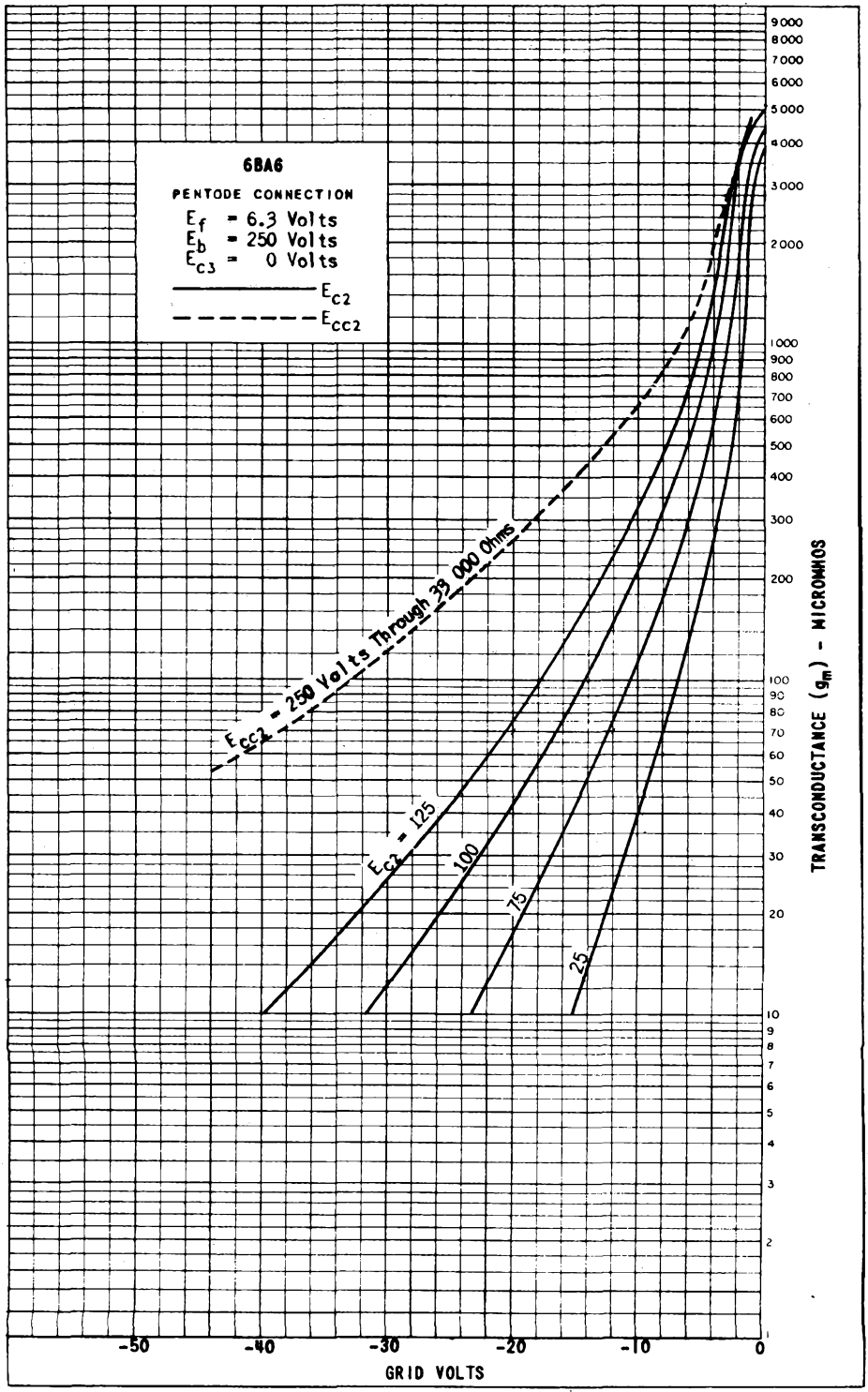


PLATE 1792
MAY 1 1947

TUNG-SOL

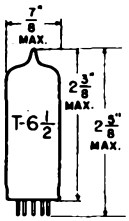
HEPTODE

MINIATURE TYPE

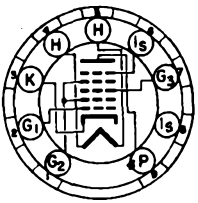
UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 300 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
SMALL BUTTON
9 PIN BASE

THE 6BA7 IS A CATHODE TYPE HIGH GAIN PENTAGRID CONVERTER IN THE SMALL 9-PIN BUTTON CONSTRUCTION. IT IS DESIGNED FOR SERVICE AS A COMBINED LOCAL OSCILLATOR AND MIXER AT HIGH FREQUENCIES, ESPECIALLY IN THE FM BROADCAST BAND.

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

GRID #3 TO PLATE: (G_3 TO P) MAX.	0.19	μμf
GRID #1 TO GRID #3: (G_1 TO G_3) MAX.	0.1	μμf
GRID #1 TO PLATE: (G_1 TO P) MAX.	0.05	μμf
GRID #1 TO CATHODE: (G_1 TO K)	3.3	μμf
GRID #1 TO ALL EXCEPT CATHODE: G_1 TO (H+G_2&G_4+G_3+G_5+P+IS)	3.4	μμf
CATHODE TO ALL EXCEPT GRID #1: K TO (H+G_2&G_4+G_3+G_5+P+IS)	4	μμf
RF INPUT: G_3 TO (H+K+G_1+G_2&G_4+G_5+P+IS)	9.5	μμf
OSCILLATOR INPUT: G_1 TO (H+K+G_2&G_4+G_3+G_5+P+IS)	6.7	μμf
MIXER OUTPUT: P TO (H+K+G_1+G_2&G_4+G_3+G_5+IS)	8.3	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRIDS #2 & #4 VOLTAGE	100	VOLTS
MAXIMUM GRIDS #2 & #4 SUPPLY VOLTAGE	300	VOLTS
MAXIMUM NEGATIVE GRID #3 VOLTAGE	100	VOLTS
MAXIMUM POSITIVE GRID #3 VOLTAGE	0	VOLTS
MAXIMUM GRID #5 & INTERNAL SHIELD VOLTAGE[A]	0	VOLTS
MAXIMUM PLATE DISSIPATION	2	WATTS
MAXIMUM GRIDS #2 & #4 DISSIPATION	1.5	WATTS
MAXIMUM CATHODE CURRENT	22	MA.

[A] INTERNAL SHIELD (PINS #6 AND #8) CONNECTED DIRECTLY TO GROUND.

PLATE 2079
OCT. 1, 1948

CONTINUED ON FOLLOWING PAGE

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE - SEPARATE EXCITATION

THE CHARACTERISTICS SHOWN WITH SEPARATE EXCITATION CORRESPOND VERY CLOSELY WITH THOSE OBTAINED IN A SELF-EXCITED OSCILLATOR CIRCUIT OPERATING WITH ZERO BIAS.

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	300	300	MA.
PLATE VOLTAGE	100	250	VOLTS
GRIDS #2 & #4 VOLTAGE	100	100	VOLTS
GRID #3 VOLTAGE	-1	-1	VOLTS
GRID #5 AND INTERNAL SHIELD[A]	CONNECTED DIRECTLY TO GROUND		
GRID #1 RESISTOR	20 000	20 000	OHMS
PLATE RESISTANCE (APPROX.)	0.5	1	MEGOHM
CONVERSION TRANSCONDUCTANCE	900	950	µMHOS
PLATE CURRENT	3.6	3.8	MA.
GRIDS #2 & #4 CURRENT	10.2	10	MA.
GRID #1 CURRENT	0.35	0.35	MA.
TOTAL CATHODE CURRENT	14.2	14.2	MA.
CONVERSION TRANSCONDUCTANCE WITH E_{c3} = -20 VOLTS	3.5	3.5	µMHOS

[A] INTERNAL SHIELD (PINS #6 AND #8) CONNECTED DIRECTLY TO GROUND.

OSCILLATOR TRANSCONDUCTANCE

NOT OSCILLATING

GRID #3 VOLTAGE	0	VOLTS
GRID #1 VOLTAGE	0	VOLTS
GRIDS #2 & #4 CONNECTED TO PLATE	100	VOLTS
PLATE CURRENT	32	MA.
TRANSCONDUCTANCE BETWEEN GRID #1 & GRIDS #2 & #4 CONNECTED TO PLATE	8 000	µMHOS
AMPLIFICATION FACTOR	16.5	

SIMILAR TYPE REFERENCE: Ratings and Characteristics similar to 6SB7Y.

PLATE 2080
OCT. 1, 1948

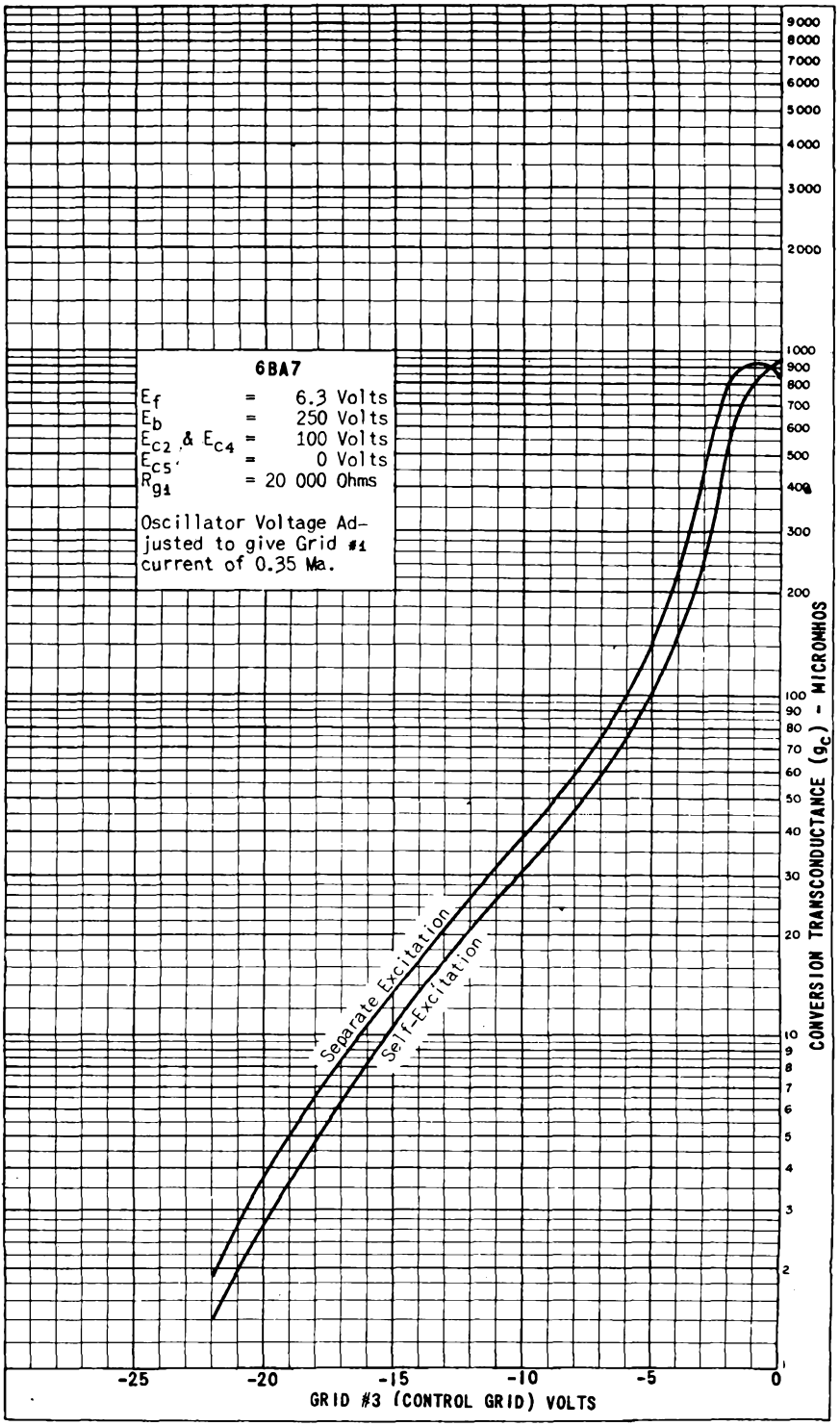


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PLATE 2081
OCT. 1, 1948

6BA7

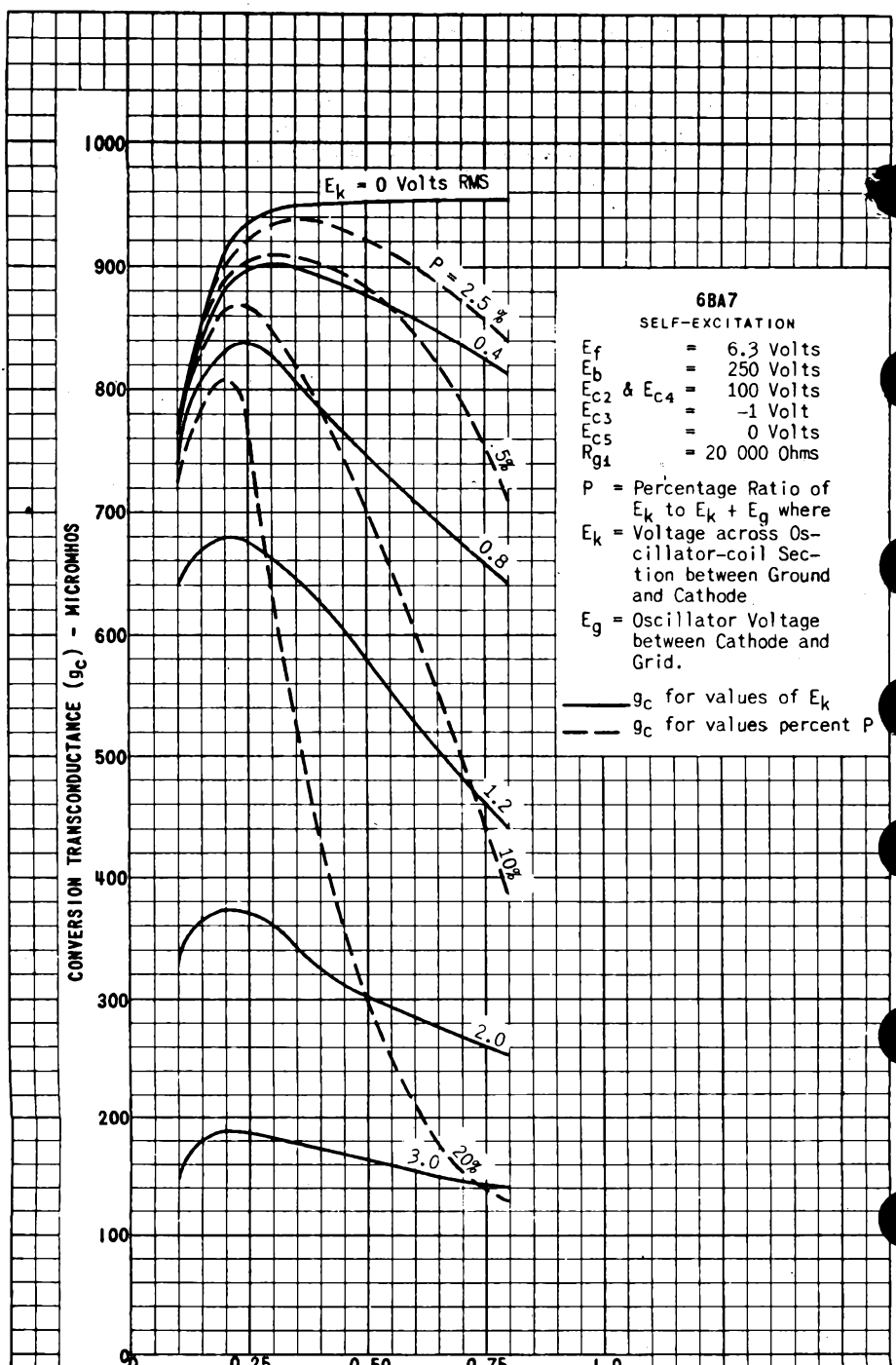


PLATE 2082
OCT. 1, 1948

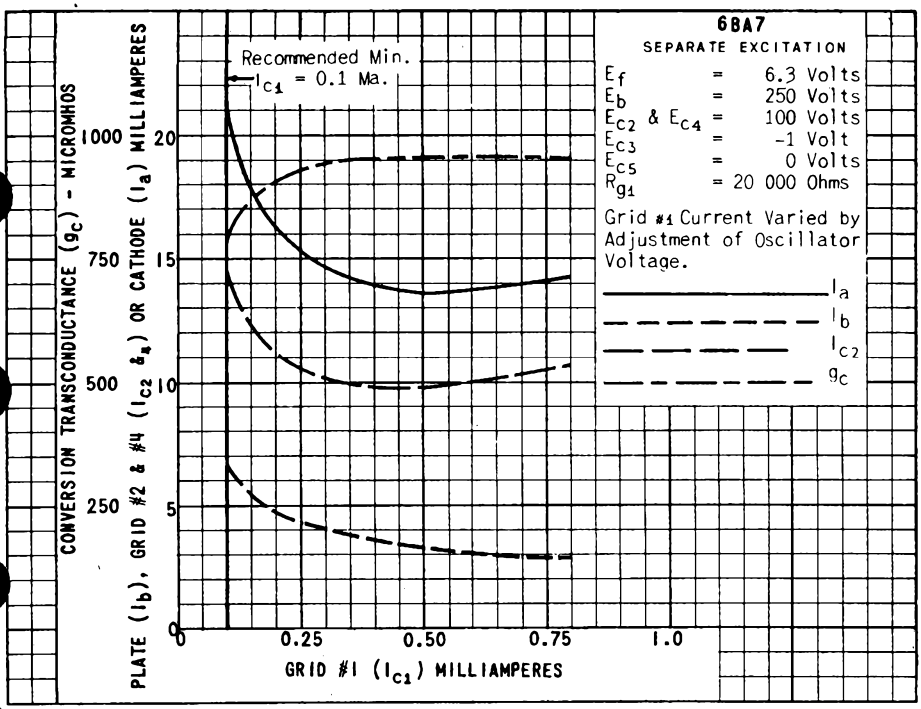
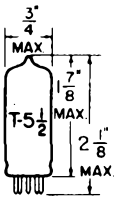


PLATE
2083
OCT. 1,
1948

TUNG-SOL

HEPTODE

MINIATURE TYPE

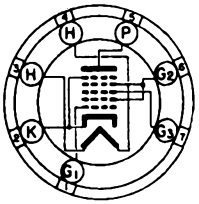


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 300 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6BE6 IS A PENTAGRID CONVERTER USING THE MINIATURE CONSTRUCTION AND, INTENDED FOR SERVICE AS COMBINED OSCILLATOR AND MIXER IN SUPERHETERODYNE RECEIVERS.

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD #316 CONNECTED TO PIN #2

SIGNAL GRID TO PLATE: (G_3 TO P) MAX. (WITHOUT SHIELD)	0.30	μμf
SIGNAL GRID TO OSC. GRID: (G_3 TO G_1) MAX.	0.15	μμf
OSC. GRID TO PLATE: (G_1 TO P) MAX.	0.05	μμf
RF INPUT: G_3 TO (H+K&G_5+G_1+G_2&G_4+P)	7.4	μμf
OSC. INPUT: G_1 TO (H+K&G_5+G_2&G_4+G_3+P)	5.7	μμf
MIXER OUTPUT: P TO (H+K&G_5+G_1+G_2&G_4+G_3)	13.6	μμf
OSC. GRID TO CATHODE: (G_1 TO K)	2.8	μμf
OSC. OUTPUT: K TO (H+G_2&G_4+G_3+P+S)	15.5	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID #2 AND #4 VOLTAGE	100	VOLTS
MAXIMUM GRID #2 AND #4 SUPPLY VOLTAGE	300	VOLTS
MAXIMUM NEGATIVE DC GRID #3 VOLTAGE	50	VOLTS
MAXIMUM POSITIVE DC GRID #3 VOLTAGE	0	VOLTS
MINIMUM GRID #3 EXTERNAL BIAS VOLTAGE[A]	0	VOLTS
MAXIMUM PLATE DISSIPATION	1	WATT
MAXIMUM GRID #2 DISSIPATION	1	WATT
MAXIMUM CATHODE CURRENT	14	MA.

[A] WITH SELF-EXCITED OSCILLATOR

CONTINUED ON FOLLOWING PAGE

PLATE 2048
AUG. 2, 1948

→ INDICATES A CHANGE OR ADDITION

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE - SEPARATE EXCITATION

CHARACTERISTICS SHOWN ARE OBTAINED IN THE STANDARD RMA CONVERSION CONDUCTANCE TEST SET WHICH USES SEPARATE EXCITATION. THE CHARACTERISTICS UNDER THESE CONDITIONS CORRESPOND VERY CLOSELY WITH THOSE OBTAINED IN A SELF-EXCITED OSCILLATORY CIRCUIT OPERATING AT ZERO-BIAS.

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	300	300	MA.
PLATE VOLTAGE	100	250	VOLTS
GRID #3 VOLTAGE	-1.5	-1.5	VOLTS
GRID #2 AND #4 VOLTAGE	100	100	VOLTS
PLATE RESISTANCE (APPROX.)	0.5	1	MEGOHM
OSCILLATOR (GRID #1) RESISTOR	20 000	20 000	OHMS
OSCILLATOR (GRID #1) CURRENT	0.5	0.5	MA.
CONVERSION TRANSCONDUCTANCE	455	475	µMHOS
PLATE CURRENT	2.8	3	MA.
GRID #2 AND #4 CURRENT	8	7.8	MA.
GRID #3 VOLTAGE (APPROX.) FOR G_c = 5 µMHOS	-30	-30	VOLTS

OSCILLATOR CHARACTERISTICS

BOOTON TYPE 10A STANDARD OSCILLATOR

PLATE VOLTAGE	100	250	VOLTS
GRIDS #2 AND #4 VOLTAGE	100	100	VOLTS
GRID #3 VOLTAGE	0	0	VOLTS
OSCILLATOR (GRID #1) RESISTOR	50 000	50 000	OHMS
OSCILLATOR (GRID #1) CURRENT FOR Z_{g-K} = 3100 OHMS	200	200	µA
OSCILLATOR (GRID #1) CURRENT FOR Z_{g-K} = 1250 OHMS	75	75	µA

OSCILLATOR TRANSCONDUCTANCE

NOT OSCILLATING

GRID #3 VOLTAGE	0	VOLTS
OSCILLATOR (GRID #1) VOLTAGE	0	VOLTS
GRID #2 AND #4 CONNECTED TO PLATE	100	VOLTS
PLATE CURRENT	25	MA.
TRANSCONDUCTANCE BETWEEN GRID #1 AND GRID #2 & #4 CONNECTED TO PLATE	7 250	µMHOS
AMPLIFICATION FACTOR	20	

PLATE 2049
AUG. 2, 1948

→ INDICATES A CHANGE OR ADDITION

(12BE6) 6BE6

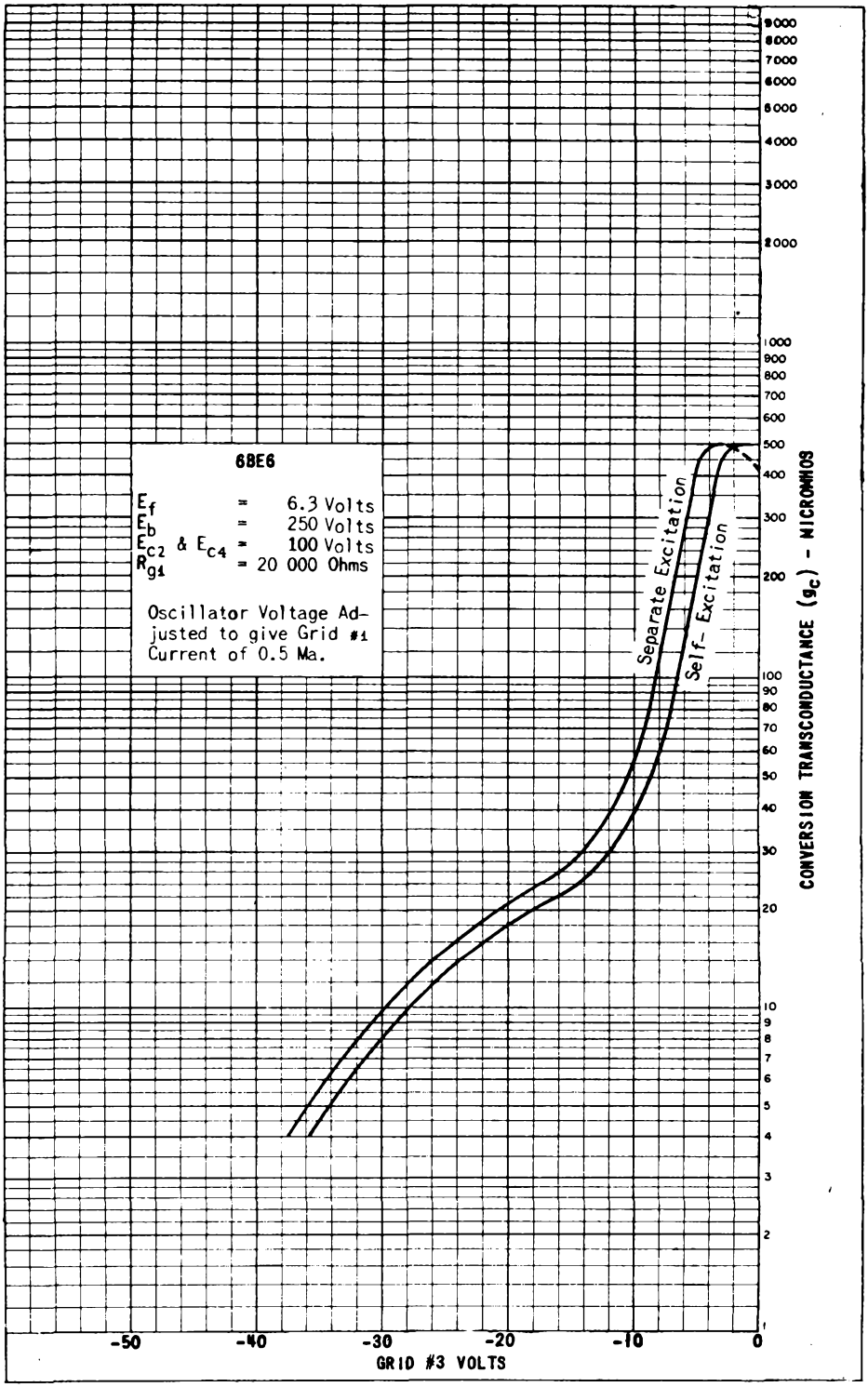


PLATE 2050
AUG. 2, 1948

6BE6 (12BE6)

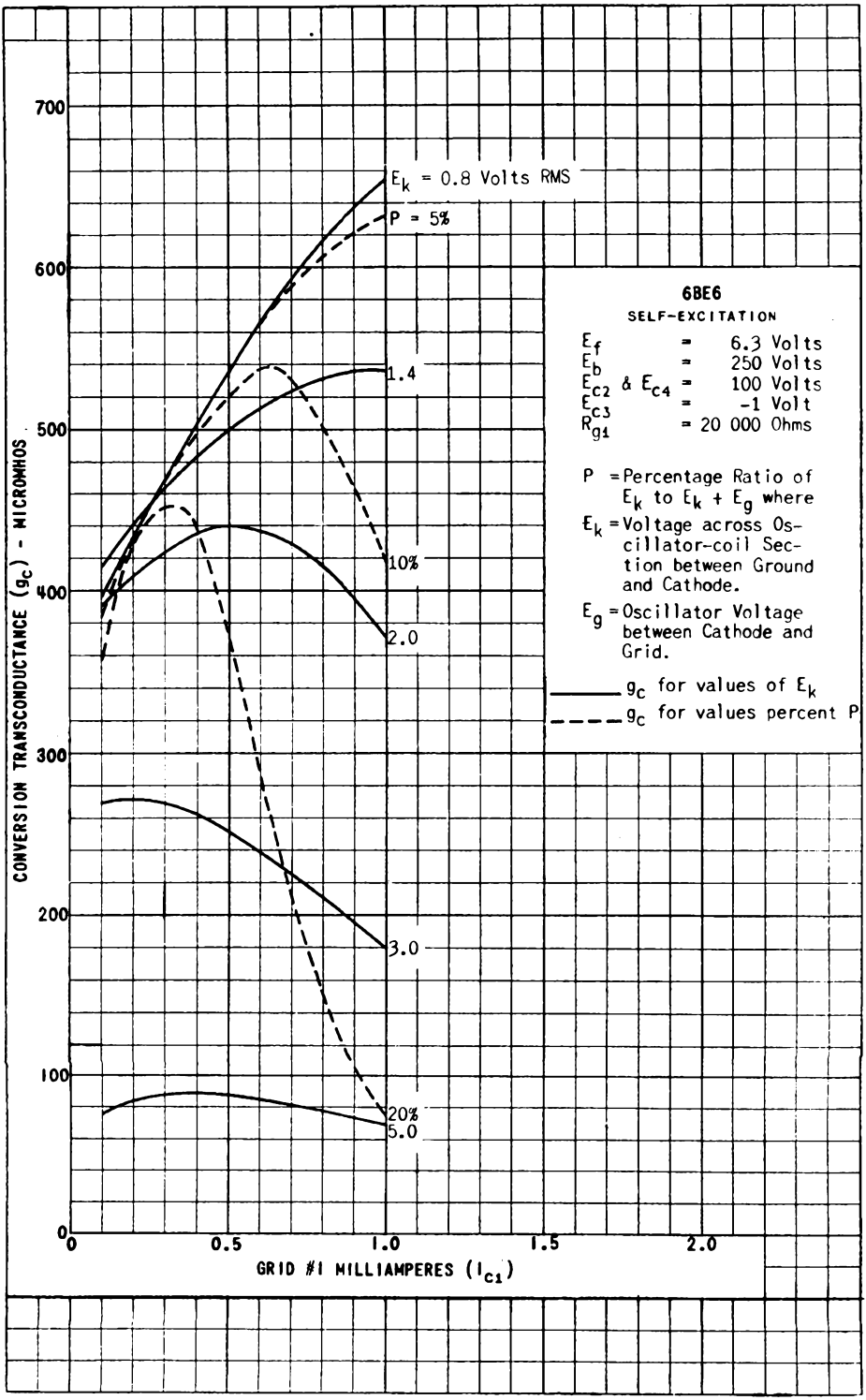
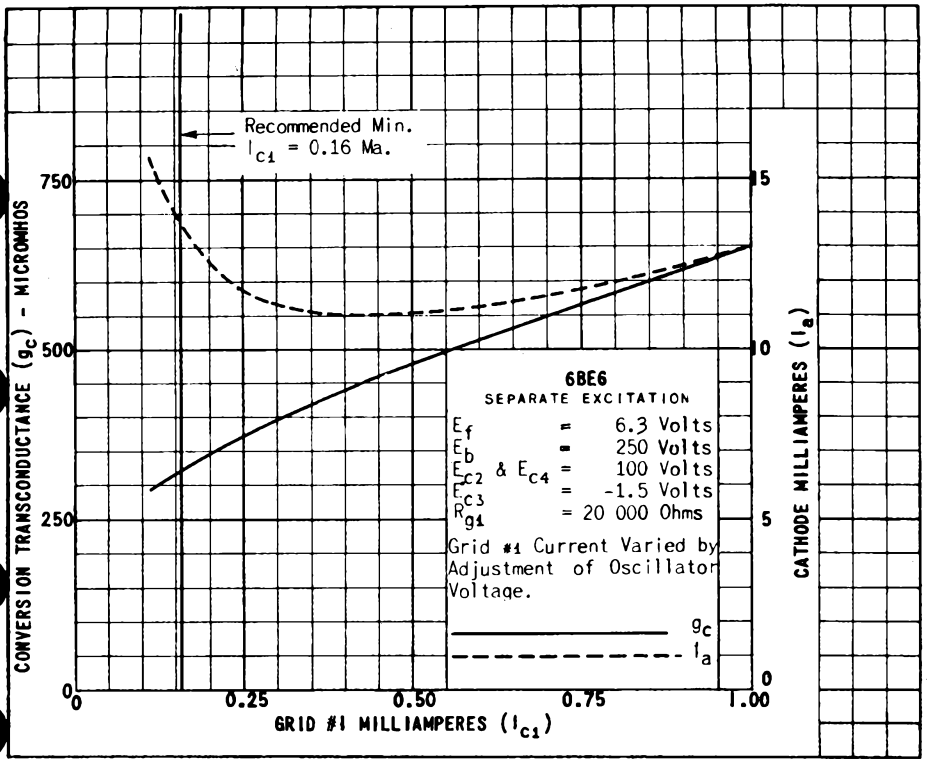


PLATE 2051
AUG. 2, 1948



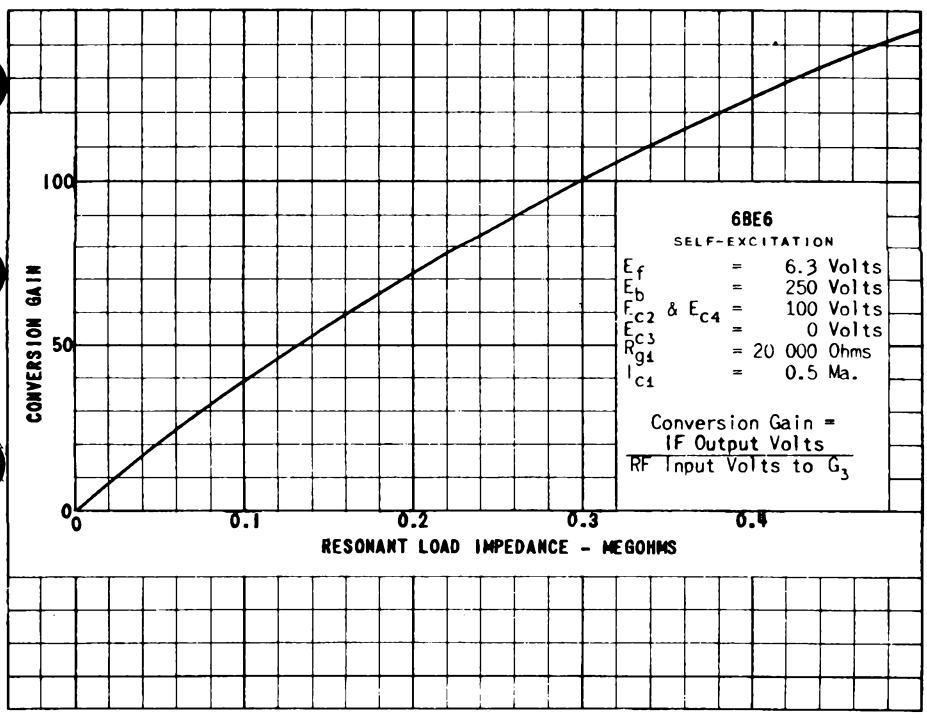


PLATE 2052
AUG. 2, 1948

TENTATIVE DATA

6BF6

TUNG-SOL

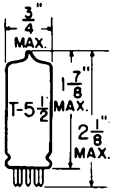
DOUBLE-DIODE TRIODE

MINIATURE TYPE

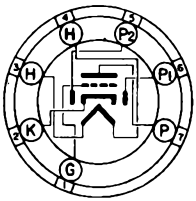
UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6BF6 IS A COMBINED LOW-MU VOLTAGE AMPLIFIER AND DOUBLE-DIODE DETECTOR USING THE 7-PIN MINIATURE CONSTRUCTION. THE LOW AMPLIFICATION FACTOR OF THE TRIODE PERMITS LARGE VALUES OF OUTPUT SIGNAL WITH LOW DISTORTION.

DIRECT INTERELECTRODE CAPACITANCES

	WITH EXTERNAL SHIELD	WITH NO EXTERNAL SHIELD	
GRID TO PLATE: (G TO P)	2.0.	2.0	μμf
INPUT: G TO (H + K)	1.8	1.8	μμf
OUTPUT: P TO (H + K)	1.4	1.1	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED (EACH DIODE)	0.8	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER – TRIODE UNIT

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.3	AMP.
PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-9	VOLTS
PLATE CURRENT	9.5	MA.
PLATE RESISTANCE	8 500	OHMS
TRANSCONDUCTANCE	1 900	μMHOS
AMPLIFICATION FACTOR	16	
LOAD RESISTANCE	10 000	OHMS
TOTAL HARMONIC DISTORTION	6.5	PERCENT
POWER OUTPUT	0.3	WATTS

DIODE UNITS – TWO

THE CATHODE OF THE 12BF6 IS COMMON TO THE TWO DIODE PLATES AND THE TRIODE UNIT. DIODE BIASING OF THE TRIODE UNIT OF THE 12BF6 IS NOT SUITABLE.

SIMILAR TYPE REFERENCE: *Ratings and characteristics identical to 6R7, 6R7GT, 6SR7, 7R6. Except for heater ratings identical to 12SR7.*

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PLATE 1842
JULY 1, 1947

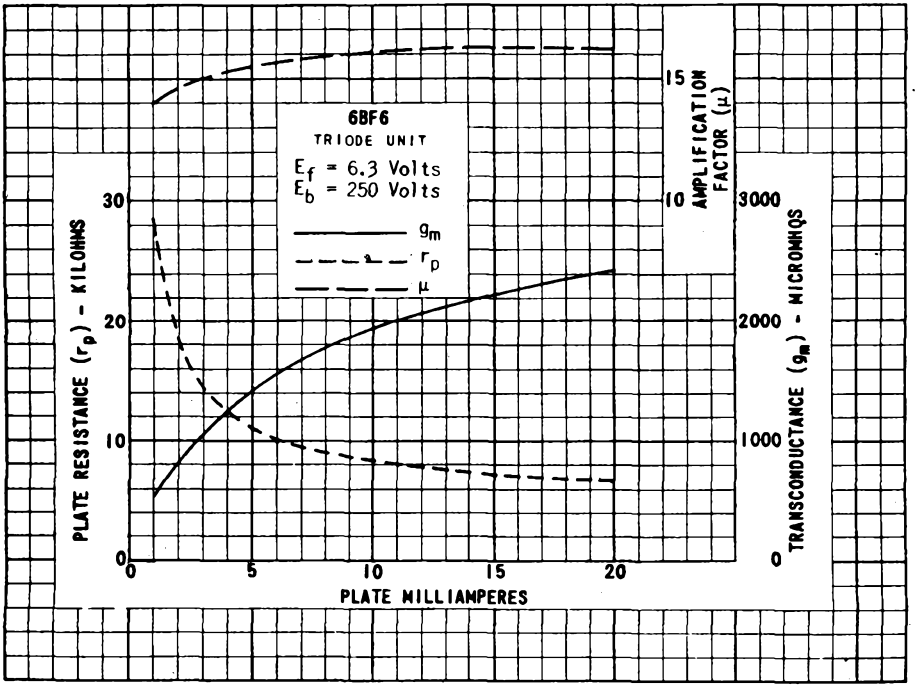
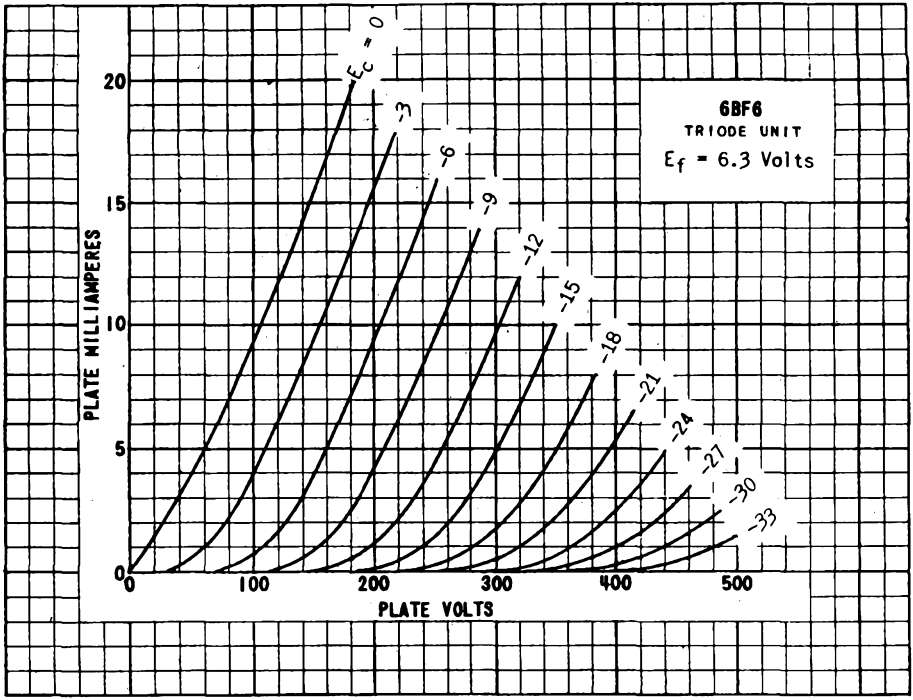


PLATE 1843
JULY 1, 1947

6BF6


6BF6
TRIODE UNIT
E_f = 6.3 Volts
E_c = 0
-3
-6
-9
-12
-15
-18
-21
-24
-27
-30
-33
PLATE MILLIAMPERES
0
5
10
15
20
0
100
200
300
400
500
PLATE VOLTS

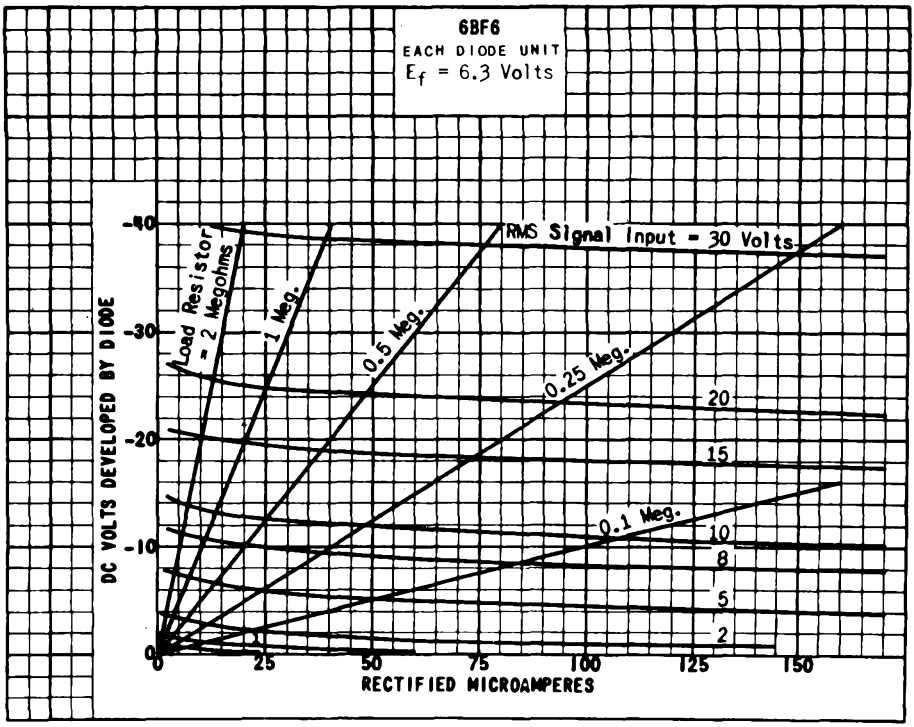


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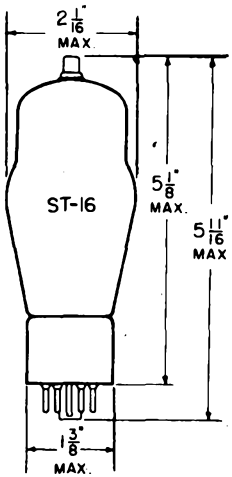
PLATE
1844
JULY 1,
1947

TENTATIVE DATA

6BG6G

TUNG-SOL

BEAM PENTODE

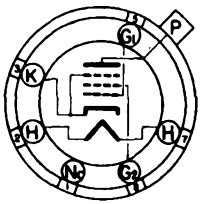


GLASS BULB
SMALL CAP

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.9 AMPERE
AC OR DC

MOUNTING POSITION
VERTICAL - BASE UP OR DOWN.
HORIZONTAL - PLANE OF PINS 2&7 VERTICAL.



BOTTOM VIEW
MEDIUM SHELL
6 PIN OCTAL

THE 6BG6G IS ESSENTIALLY A MECHANICAL REDESIGN OF TYPE 6L6G TO PERMIT OPERATION AS A HORIZONTAL DEFLECTION AMPLIFIER FOR TELEVISION SERVICE. IT USES A TOP CAP CONNECTION AND ADDITIONAL INSULATION FOR THE PLATE STRUCTURE TO WITHSTAND THE HIGH PEAK PLATE VOLTAGE ENCOUNTERED IN SUCH CIRCUITS.

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G_1 TO P) MAX.	0.50	μμf
INPUT: G_1 TO (H+K&G_3+G_2)	11	μμf
OUTPUT: P TO (H+K&G_3+G_2)	6.5	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD MB-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	135	VOLTS
MAXIMUM DC PLATE VOLTAGE	500	VOLTS
MAXIMUM PEAK POSITIVE SURGE PLATE VOLTAGE[A]	6 000	VOLTS
MAXIMUM DC GRID #2 VOLTAGE[B]	350	VOLTS
MAXIMUM DC GRID #1 VOLTAGE	-50	VOLTS
MAXIMUM PEAK NEGATIVE SURGE GRID #1 VOLTAGE	-400	VOLTS
MAXIMUM PLATE DISSIPATION	20	WATTS
MAXIMUM GRID #2 INPUT	3.2	WATTS
MAXIMUM DC PLATE CURRENT	100	MA.
MAXIMUM GRID #1 CIRCUIT RESISTANCE	1	MEGOHM

[A] THE DUTY CYCLE OF THE VOLTAGE PULSE MUST NOT EXCEED 15% OF ONE SCANNING CYCLE AND ITS DURATION MUST BE LIMITED TO TEN MICROSECONDS.

[B] PREFERABLY OBTAINED FROM PLATE-VOLTAGE SUPPLY THROUGH A SERIES DROPPING RESISTOR OF SUFFICIENT MAGNITUDE TO LIMIT THE GRID #2 INPUT TO THE RATED MAXIMUM VALUE FOR WIDE VARIATION IN GRID #2 CURRENT.

PLATE 1990
MAR. 1, 1948

CONTINUED ON FOLLOWING PAGE

TUNG-SOL

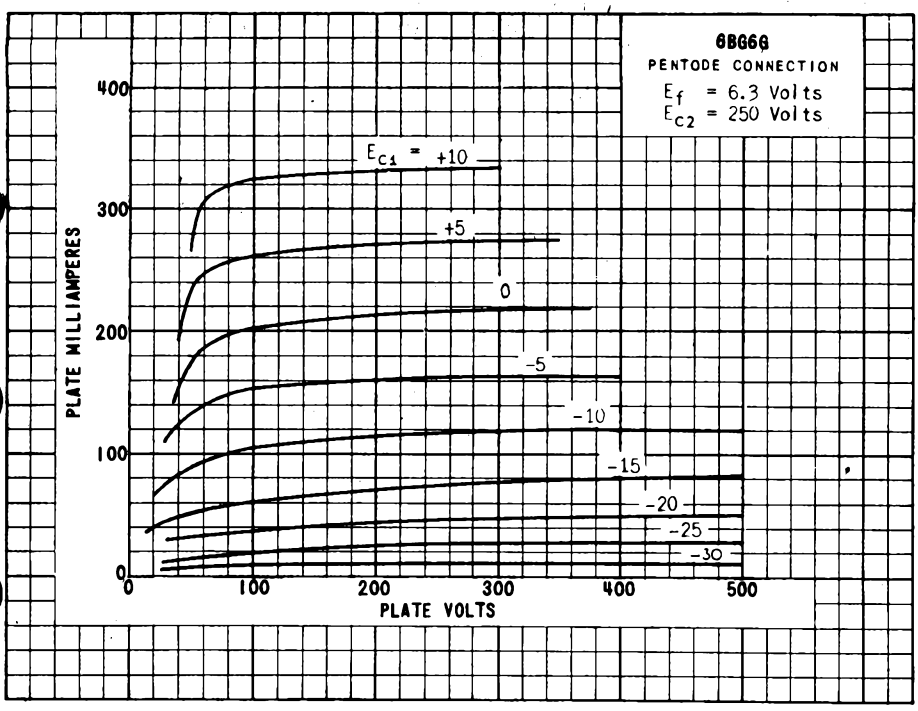
CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

DEFLECTION AMPLIFIER

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.9	AMP.
DC SUPPLY VOLTAGE	400	VOLTS
PEAK POSITIVE SURGE PLATE VOLTAGE (APPROX.)	4 000	VOLTS
PEAK NEGATIVE SURGE GRID #1 VOLTAGE	-100	VOLTS
DC PLATE CURRENT	70	MA.
DC GRID #2 CURRENT	6	MA.
DC GRID #1 CURRENT	25	μAMP

PLATE 1991
MAR. 1, 1948



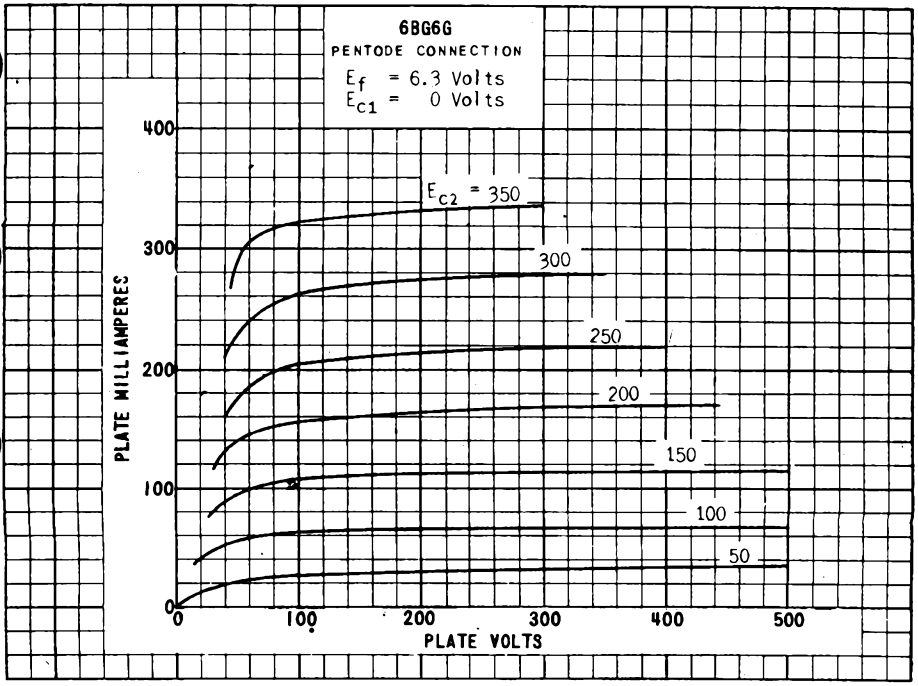


PLATE
1992
MAR. 1,
1948

6BG6G

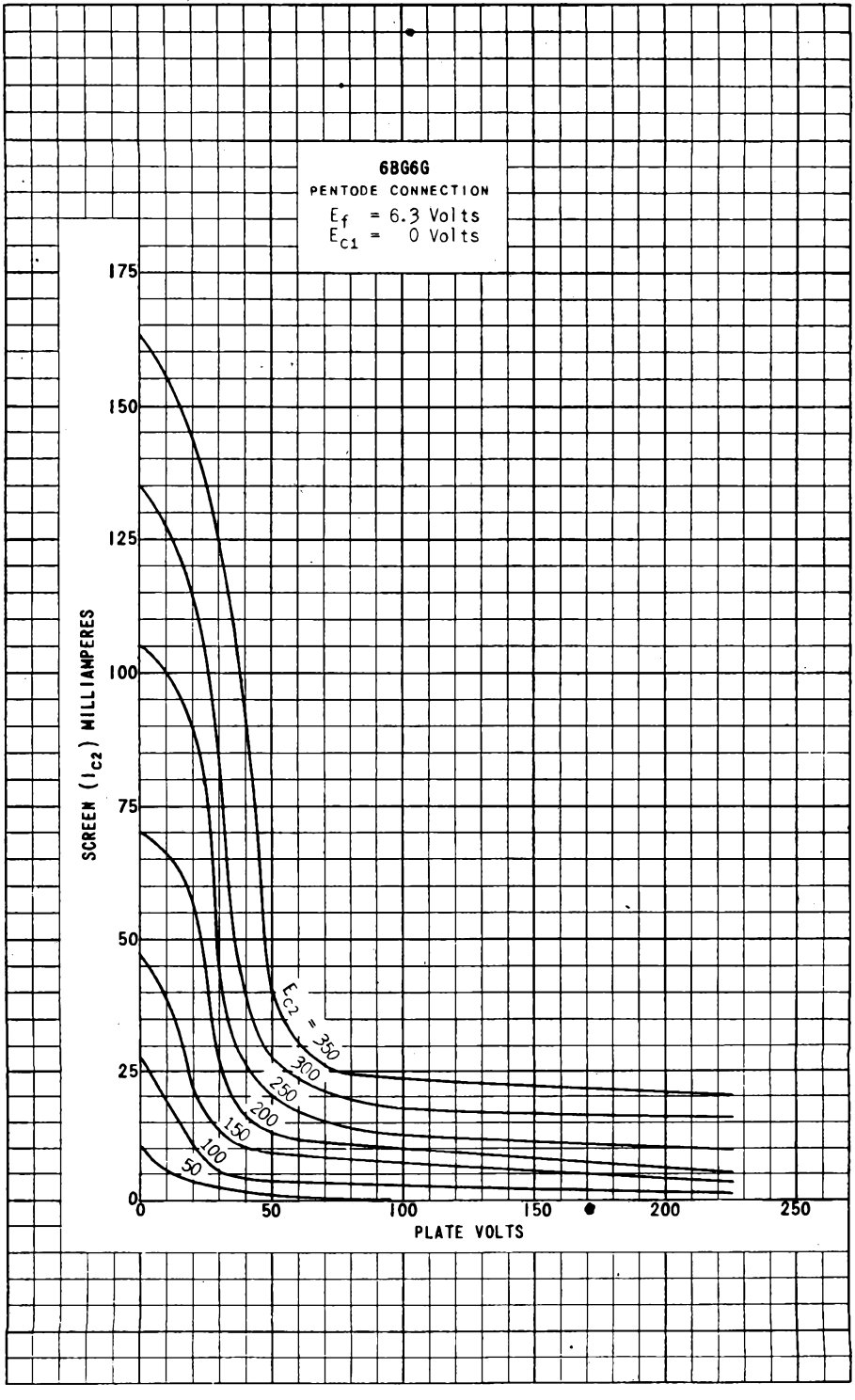
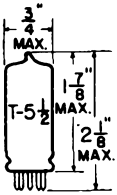


PLATE 1993
MAR. 1, 1948

TUNG-SOL

VOLTAGE AMPLIFIER PENTODE

MINIATURE TYPE



GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.15 AMPERE

AC OR DC

ANY MOUNTING POSITION

BOTTOM VIEW

MINIATURE BUTTON
7 PIN BASE

THE 6BJ6 IS A PENTODE VOLTAGE AMPLIFIER WITH A REMOTE CONTROL CHARACTERISTIC UTILIZING THE MINIATURE CONSTRUCTION. IT IS CHARACTERIZED BY HIGH TRANSCONDUCTANCE, LOW GRID-PLATE CAPACITANCE, AND AN EXTREMELY HIGH EFFICIENCY CATHODE ADAPTING IT TO APPLICATION WHERE CONSERVATION OF HEATER POWER IS IMPORTANT.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.15	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM EXTERNAL GRID VOLTAGE:		
NEGATIVE BIAS	50	VOLTS
POSITIVE BIAS	0	VOLTS
MAXIMUM PLATE DISSIPATION	3	WATTS
MAXIMUM SCREEN DISSIPATION	0.6	WATT
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

GRID TO PLATE (MAX.)	0.0035	μμf
INPUT	4.5	μμf
OUTPUT	5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
GRID VOLTAGE	-1	-1	VOLT
SUPPRESSOR VOLTAGE	0	0	VOLTS
PLATE CURRENT	9	9.2	MA.
SCREEN CURRENT	3.5	3.3	MA.
PLATE RESISTANCE (APPROX.)	0.25	1.3	MEGOHMS
TRANSCONDUCTANCE	3 650	3 800	μMHOS
GRID VOLTAGE FOR TRANSCONDUCTANCE = 15 μMHOS	-20	-20	VOLTS

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PLATE 1798
FEB. 3, 1947

6BJ6

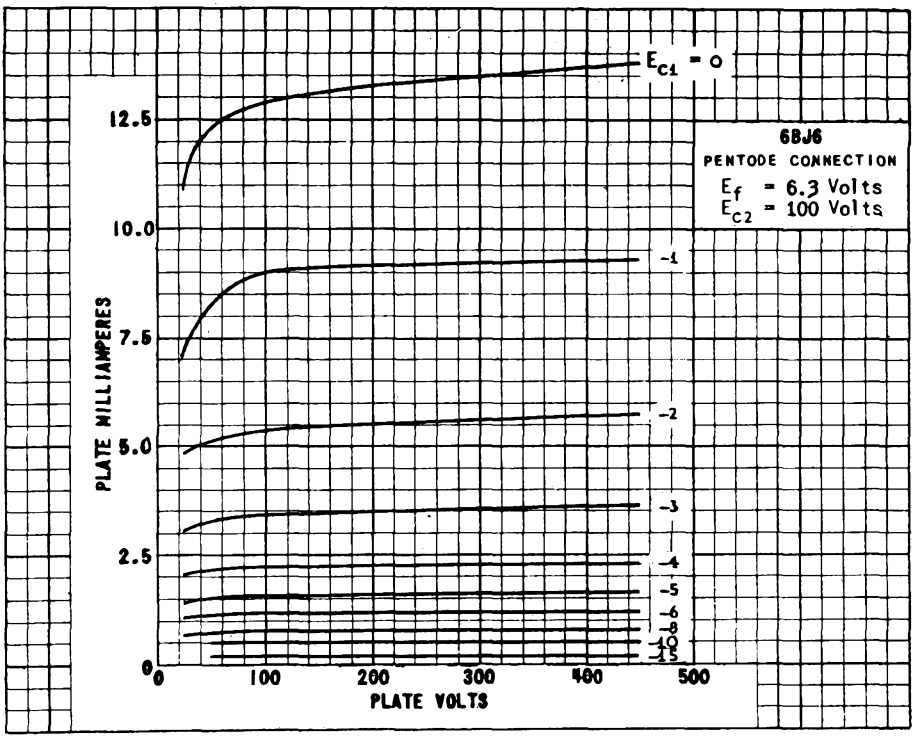
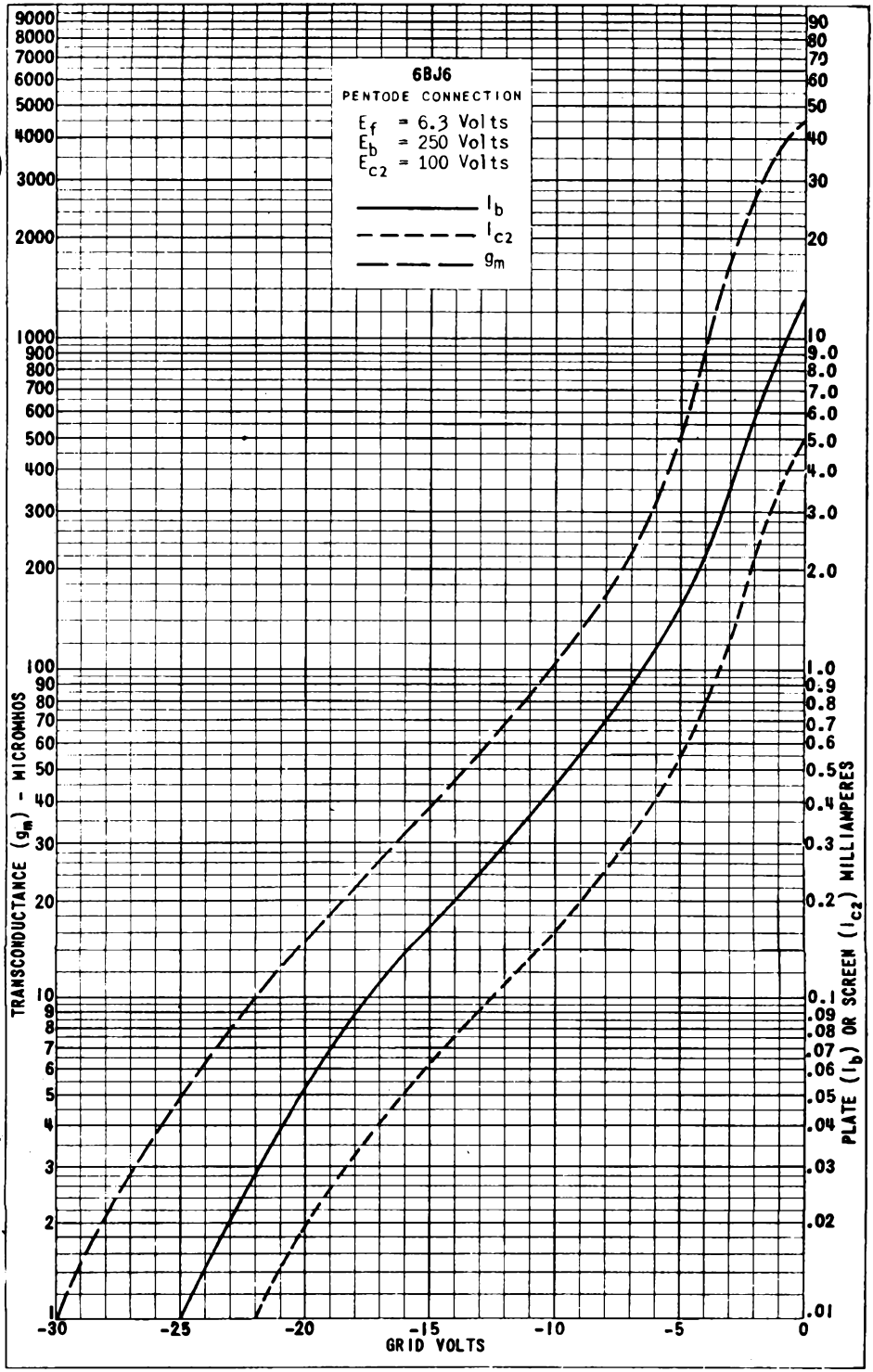


PLATE 1799
FEB. 3, 1947



PRINTED IN U. S. A.

PLATE
1800
FEB. 3,
1947

6BJ6

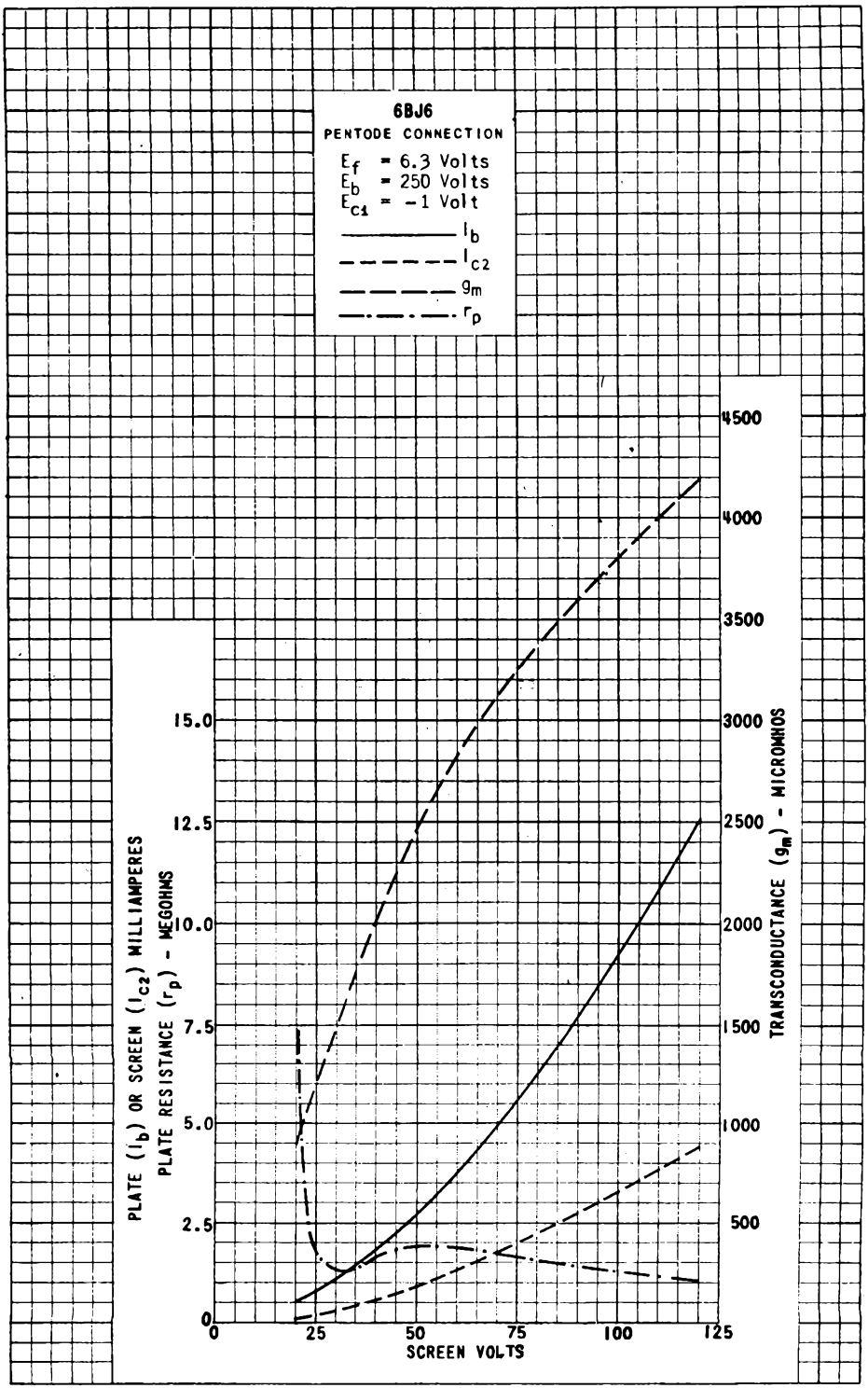
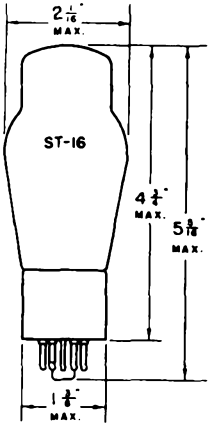


PLATE 1801
FEB. 3, 1947

TUNG-SOL



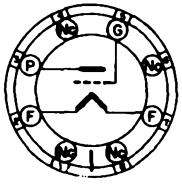
TRIODE POWER AMPLIFIER

COATED FILAMENT

6.3 VOLTS 1.0 AMPERE
AC OR DC

GLASS BULB

MEDIUM 8 PIN OCTAL BASE



G-5S

THE TUNG-SOL 6B4G IS A FILAMENT TYPE TRIODE POWER AMPLIFIER DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AUDIO AMPLIFIERS WHERE HIGH OUTPUT AND LOW HARMONIC DISTORTION ARE DESIRED. ITS RATINGS AND CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 2A3 AND 6A3.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER – ONE TUBE

PLATE VOLTAGE $^{MAX.}$	250	VOLTS
GRID VOLTAGE ^{G}	–45	VOLTS
GRID CIRCUIT RESISTANCE $^{MAX.}$		
FIXED BIAS	0.05	MEGOHM
SELF BIAS	0.5	MEGOHM
PLATE CURRENT	60	MA.
PLATE RESISTANCE	800	OHMS
TRANSCONDUCTANCE	5250	μMHOS
AMPLIFICATION FACTOR	4.2	
LOAD RESISTANCE	2500	OHMS
POWER OUTPUT	3.2	WATTS
SECOND HARMONIC DISTORTION	5	PER CENT

CLASS AB_1 PUSH – PULL AMPLIFIER

VALUES ARE FOR TWO TUBES

	FIXED BIAS	SELF BIAS	
PLATE VOLTAGE $^{MAX.}$	325	325	VOLTS
GRID VOLTAGE ^{G}	–68	–	VOLTS
SELF BIAS RESISTOR	–	750	OHMS
ZERO-SIGNAL PLATE CURRENT $^{PER\ TUBE}$	40	40	MA.
LOAD RESISTANCE $^{PER\ TUBE}$	750	1250	OHMS
EFFECTIVE LOAD RESISTANCE $^{PLATE\ TO\ PLATE}$	3000	5000	OHMS
TOTAL HARMONIC DISTORTION	2.5	5	PER CENT
POWER OUTPUT	15	10	WATTS

[G] GRID VOLTAGE MEASURED FROM MID-POINT OF AC OPERATED FILAMENT.

CONTINUED NEXT PAGE

PLATE 174-1

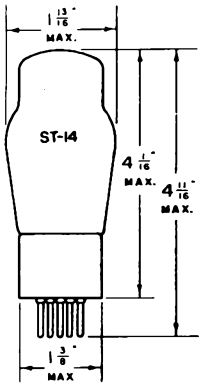
TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES

GRID TO FILAMENT	7	μμf
PLATE TO FILAMENT	5	μμf
GRID TO PLATE	16	μμf

PLATE
175-1

TUNG-SOL



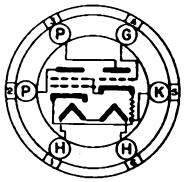
DYNAMIC COUPLED POWER AMPLIFIER

UNIPOTENTIAL CATHODES

HEATER
6.3 VOLTS 0.8 AMPERE
AC OR DC

GLASS BULB

MEDIUM 6 PIN BASE



6D6

THE TUNG-SOL 6B5 CONSISTS OF TWO DYNAMICALLY COUPLED TRIODES AND IS DESIGNED FOR SERVICE IN THE POWER OUTPUT STAGE OF AC AND STORAGE BATTERY OPERATED RECEIVERS. ALL NECESSARY BIASES ARE SUPPLIED INTERNALLY. ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 6N6G.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

OUTPUT PLATE (2) VOLTAGE	250	300	325 MAX.	VOLTS
INPUT PLATE (3) VOLTAGE	250	300	325 MAX.	VOLTS
INPUT GRID (4) VOLTAGE	0	0	0	VOLTS
GRID CIRCUIT RESISTANCE MAX.	0.5	0.5	0.5	MEGOHM
OUTPUT PLATE CURRENT	33	45	51	MA.
INPUT PLATE CURRENT	6.5	8	9	MA.
PLATE RESISTANCE		24 100		OHMS
TRANSCONDUCTANCE		2400		µMHOS
AMPLIFICATION FACTOR		58		
LOAD RESISTANCE	7000	7000	7000	OHMS
SIGNAL VOLTS (RMS)[S]	13.5	15	17	VOLTS
TOTAL HARMONIC DISTORTION	5	5	5	PER CENT
POWER OUTPUT	2.5	4	5.2	WATTS

(2) BASE PIN #2 (3) BASE PIN #3 (4) BASE PIN #4

[S] FOR RATED POWER OUTPUT

NOTE: THE VOLTAGE BETWEEN HEATER AND CATHODE SHOULD NOT EXCEED 50 VOLTS AND IN NO CASE SHOULD THE HEATER BE LEFT FLOATING.

PLATE 219-1

CONTINUED NEXT PAGE

TUNG-SOL

CLASS A1 PUSH – PULL AMPLIFIER

UNLESS SPECIFIED, VALUES ARE FOR TWO TUBES

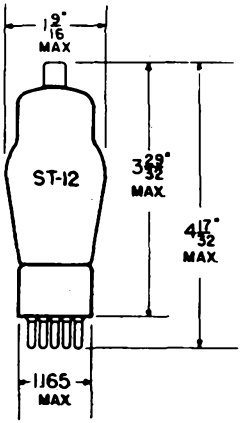
OUTPUT PLATE (2) VOLTAGE	250	300	325 MAX.	VOLTS
INPUT PLATE (3) VOLTAGE	250	300	325 MAX.	VOLTS
INPUT GRID (4) VOLTAGE	0	0	0	VOLTS
GRID CIRCUIT RESISTANCE MAX.	0.5	0.5	0.5	MEGOHM
OUTPUT PLATE CURRENT PER TUBE	33	45	51	MA.
INPUT PLATE CURRENT PER TUBE	6.5	8	9	MA.
LOAD RESISTANCE PLATE TO PLATE	10 000	10 000	10 000	OHMS
SIGNAL VOLTS (RMS) [S] GRID TO GRID	38	38	42	VOLTS
TOTAL HARMONIC DISTORTION	5	5	5	PER CENT
POWER OUTPUT	8.5	10	13.5	WATTS

(2) BASE PIN #2 (3) BASE PIN #3 (4) BASE PIN #4

[S] FOR RATED POWER OUTPUT

PLATE 220-1

TUNG-SOL



2A6, 75

SMALL METAL CAP

DUO-DIODE HIGH-MU TRIODE AMPLIFIER

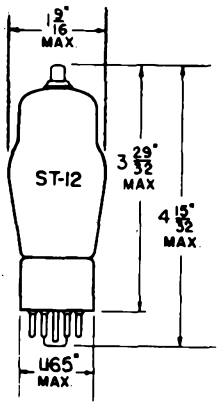
COATED UNIPOTENTIAL CATHODE

2A6	2.5 VOLTS	0.8 AMPERE
75	6.3 VOLTS	0.3 AMPERE
6B6G	6.3 VOLTS	0.3 AMPERE

AC OR DC

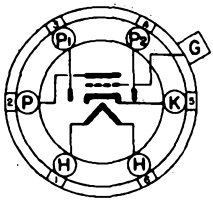
GLASS BULB

ANY MOUNTING POSITION



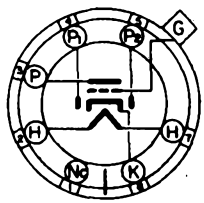
6B6G

SKIRTED MINIATURE CAP



BOTTOM VIEW

SMALL 6-PIN BASE



BOTTOM VIEW

SMALL 7-PIN OCTAL BASE

THE 2A6, 6B6G AND 75 COMBINE TWO DIODES AND A HIGH-MU TRIODE IN A SINGLE BULB, USING A COMMON CATHODE. THEY ARE DESIGNED FOR USE AS DIODE DETECTORS, AVC RECTIFIERS AND RESISTANCE COUPLED AMPLIFIERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	250	VOLTS
MINIMUM DIODE CURRENT PER PLATE WITH 10 VOLTS DC APPLIED	0.8	MA.
MAXIMUM CATHODE VOLTAGE	100	VOLTS

CONTINUED ON NEXT PAGE

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PLATE 1548
JAN. 15 1945

CONTINUED FROM PRECEDING PAGE.

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

TRIODE UNIT

GRID TO PLATE	1.7	μμf
INPUT	1.7	μμf
OUTPUT	3.8	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

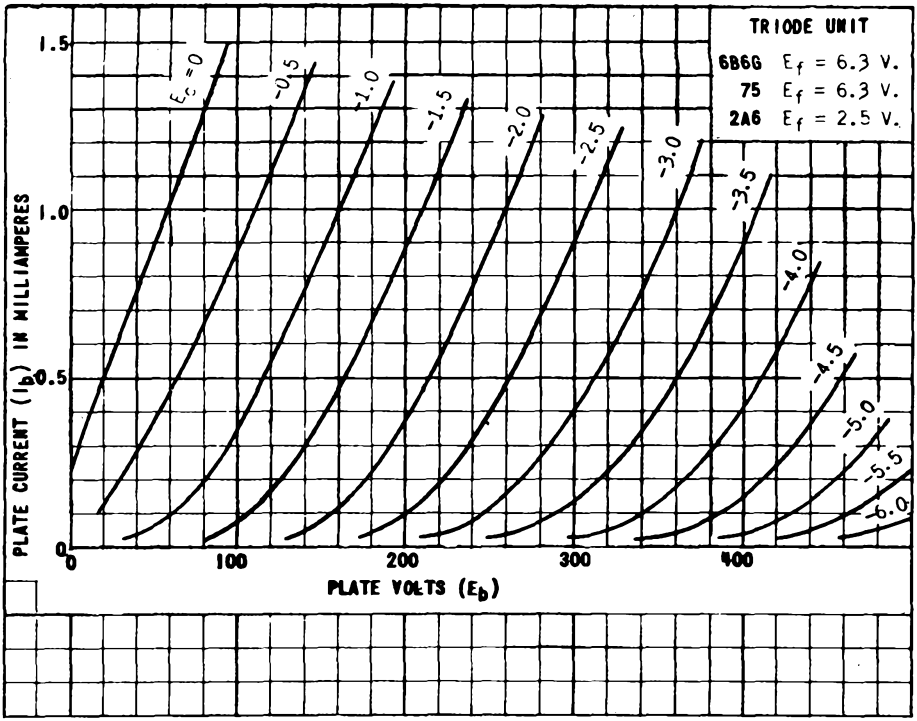
TRIODE UNIT

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-2.0	VOLTS
PLATE CURRENT	0.9	MA.
PLATE RESISTANCE	91 000	OHMS
TRANSCONDUCTANCE	1 100	μMHOS
AMPLIFICATION FACTOR	100	

RESISTANCE COUPLED AMPLIFIER

PLATE SUPPLY VOLTAGE	100	100	250	VOLTS
PLATE LOAD RESISTOR	0.25	0.25	0.25	MEGOHM
CATHODE RESISTOR	0.0	10 000	4 000	OHMS
GRID CIRCUIT RESISTOR	6.0	1.0	1.0	MEGOHMS
GRID COUPLING CONDENSER	0.01	0.05	0.05	μf
VOLTAGE GAIN	35	35	52	

(75, 2A6) 6B6G



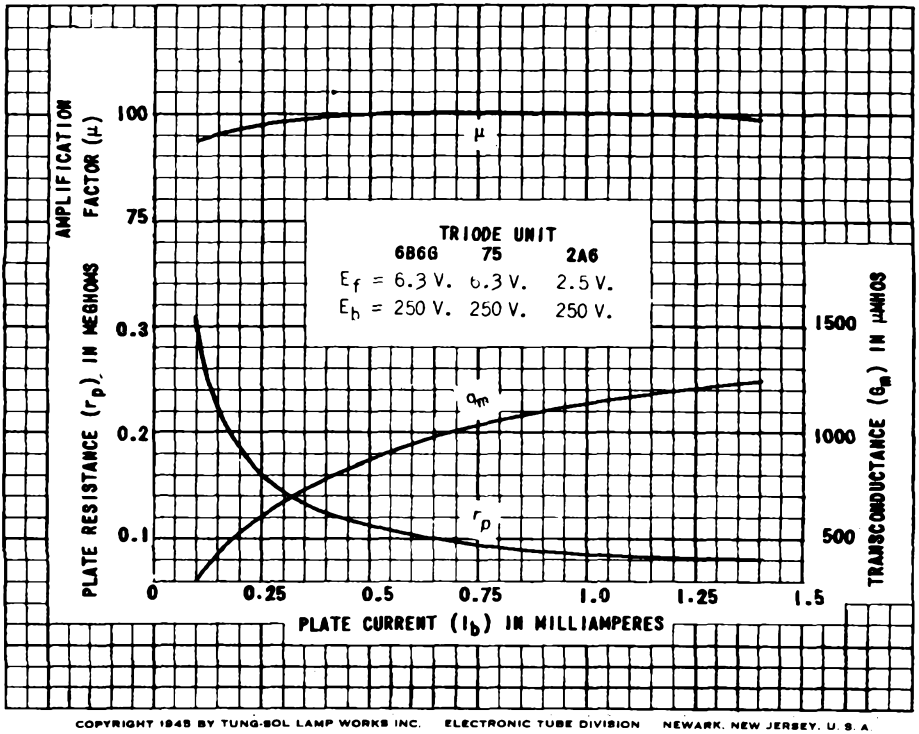
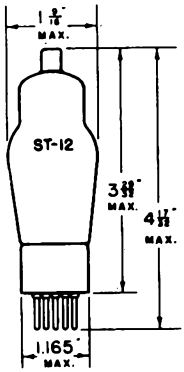


PLATE
1550
JAN. 15
1945



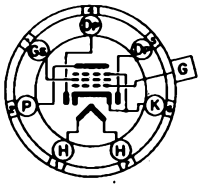
DUO-DIODE PENTODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

SMALL 7 PIN BASE



7D

THE TUNG-SOL 6B7 COMBINES TWO DIODES AND A PENTODE UTILIZING A COMMON CATHODE. IT IS DESIGNED FOR SERVICE AS A COMBINED DETECTOR, AVC RECTIFIER AND PENTODE AMPLIFIER. THE RATINGS AND CHARACTERISTICS, WITH THE EXCEPTION OF HEATER VOLTAGE AND CURRENT, ARE IDENTICAL WITH THOSE OF THE 287.

OPERATING CONDITIONS AND CHARACTERISTICS

PENTODE UNIT AS CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	180	250	250	335 MAX.	VOLTS
SCREEN VOLTAGE	100	75	100	125 MAX.	110	VOLTS
CONTROL GRID VOLTAGE	-3	-3	-3	-3	-3	VOLTS
GRID CIRCUIT RESISTANCE MAX.	1	1	1	1	1	MEGOHM
PLATE CURRENT	5.8	3.4	6.0	9.0	7.5	MA.
SCREEN CURRENT	1.7	0.9	1.5	2.3	1.8	MA.
PLATE RESISTANCE APPROX.	0.3	1.0	0.8	0.65	0.88	MEGOHM
TRANSCONDUCTANCE	950	840	1000	1125	1075	µMHOS
AMPLIFICATION FACTOR APPROX.	285	840	800	730	950	
CONTROL GRID VOLTAGE APPROX. FOR CATHODE CURRENT CUT-OFF	-17	-13	-17	-21	-17	VOLTS

PENTODE UNIT AS RESISTANCE COUPLED AMPLIFIER

PLATE, SCREEN SUPPLY VOLTAGE	100	100	250	250	VOLTS
PLATE LOAD RESISTOR	0.1	0.5	0.1	0.5	MEGOHM
CATHODE RESISTOR	2000	4800	1000	2800	OHMS
SCREEN RESISTOR	0.6	2.6	0.6	2.5	MEGOHMS
VOLTAGE GAIN	39	65	50	90	

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	3.6	µµf
PLATE TO CATHODE	9.5	µµf
CONTROL GRID TO PLATE[S]	.007 MAX.	µµf

[S] WITH SHIELD

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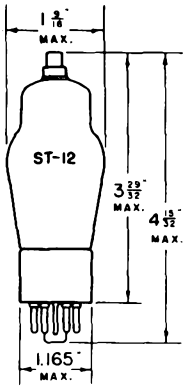
TUNG-SOL



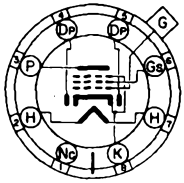
DUO-DIODE PENTODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

SMALL 8 PIN OCTAL BASE



G-8E

BOTTOM VIEW

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	3.6	μμf
PLATE TO CATHODE	9.5	μμf
CONTROL GRID TO PLATE[S]	.007 MAX.	μμf

[S] WITH SHIELD

ALL OTHER ELECTRICAL CHARACTERISTICS OF THE 6B8G ARE IDENTICAL WITH THOSE OF 6B7.

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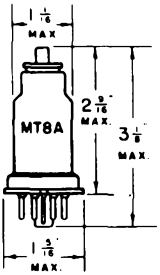
TUNG-SOL



DUO-DIODE PENTODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

METAL SHELL

8 PIN OCTAL BASE

8E
BOTTOM VIEW

THE TUNG-SOL 6B8 COMBINES TWO DIODES AND A PENTODE UTILIZING A COMMON CATHODE. IT IS DESIGNED FOR SERVICE AS A COMBINED DETECTOR. AVC RECTIFIER AND PENTODE AMPLIFIER.

OPERATING CONDITIONS AND CHARACTERISTICS

PENTODE UNIT AS CLASS A1 AMPLIFIER

PLATE VOLTAGE	250	335 MAX.	VOLTS
SCREEN VOLTAGE	125 MAX.	110	VOLTS
CONTROL GRID VOLTAGE	-3	-3	VOLTS
GRID CIRCUIT RESISTANCE	1	1	MEGOHM
PLATE CURRENT	10	8.5	MA.
SCREEN CURRENT	2.3	1.8	MA.
PLATE RESISTANCE APPROX.	0.6	0.96	MEGOHM
TRANSCONDUCTANCE	1325	1250	μMHOS
AMPLIFICATION FACTOR APPROX.	800	1200	
CONTROL GRID VOLTAGE APPROX. FOR CATHODE CURRENT CUT-OFF	-21	-19	VOLTS

PENTODE UNIT AS RESISTANCE COUPLED AMPLIFIER

PLATE, SCREEN SUPPLY VOLTAGE	100	100	250	250	VOLTS
PLATE LOAD RESISTOR	0.1	0.5	0.1	0.5	MEGOHM
CATHODE RESISTOR	2000	4800	1000	2800	OHMS
SCREEN RESISTOR	0.6	2.6	0.6	2.5	MEGOHMS
VOLTAGE GAIN	39	65	50	90	

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID TO CATHODE	6	μμf
PLATE TO CATHODE	9	μμf
CONTROL GRID TO PLATE	.005 MAX.	μμf

[S] WITH SHELL CONNECTED TO CATHODE

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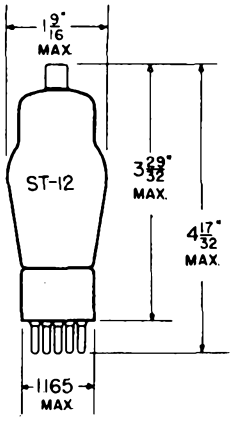
TUNG-SOL



2B7, 6B7

SMALL METAL CAP

DUO-DIODE PENTODE AMPLIFIER

COATED UNIPOTENTIAL CATHODE

2B7 - 2.5 VOLTS 0.8 AMPERE

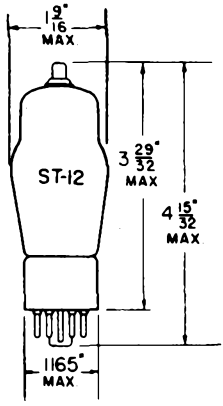
6B7 - 6.3 VOLTS 0.3 AMPERE

6B8G - 6.3 VOLTS 0.3 AMPERE

AC OR DC

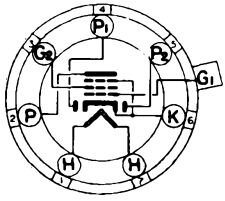
GLASS BULB

ANY MOUNTING POSITION



6B8G

SKIRTED MINIATURE CAP



BOTTOM VIEW

SMALL 7-PIN BASE

BOTTOM VIEW

SMALL SHELL 8-PIN OCTAL BASE

THE 2B7, 6B7, AND 6B8G CONSIST OF TWO DIODES AND A PENTODE UTILIZING A COMMON CATHODE. THEY ARE DESIGNED FOR SERVICE AS COMBINED DETECTORS, AVC RECTIFIERS AND PENTODE AMPLIFIERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLTS
MINIMUM DIODE CURRENT PER PLATE WITH 10 VOLTS DC	0.8	MA.
MAXIMUM PLATE DISSIPATION	2.25	WATTS
MAXIMUM SCREEN DISSIPATION	0.3	WATTS

CONTINUED ON NEXT PAGE

PRINTED IN U. S. A.

PLATE 1553
JAN. 15 1945

CONTINUED FROM PRECEDING PAGE

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD CONNECTED TO CATHODE

PENTODE UNIT

	2B7, 6B7	6B8G	
INPUT: G1 TO (F+K+G2+G3)	3.5	3.6	μμf
OUTPUT: P TO (F+K+G2+G3)	9.5	9.5	μμf
CONTROL GRID TO PLATE	0.007 (MAX.)	0.01 (MAX.)	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

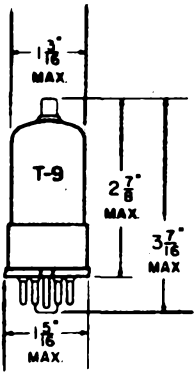
PENTODE UNIT

PLATE VOLTAGE	100	180	250	250	VOLTS
SCREEN VOLTAGE	100	75	100	125	VOLTS
CONTROL GRID VOLTAGE	-3.0	-3.0	-3.0	-3.0	VOLTS
PLATE CURRENT	5.8	3.4	6.0	9.0	MA.
SCREEN CURRENT	1.7	0.9	1.5	2.3	MA.
PLATE RESISTANCE (APPROX.)	0.3	1.0	0.8	0.6	MEGOHM
TRANSCONDUCTANCE	950	840	1 000	1 125	μMHOS
GRID BIAS (FOR CATHODE CURRENT CUT-OFF, APPROX.)	-17	-13	-17	-21	VOLTS

PLATE 1554
JAN. 15 1945

TUNG-SOL

DUO-DIODE PENTODE AMPLIFIER



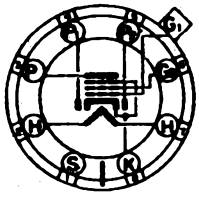
MINIATURE CAP

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMP.
AC OR DC

GLASS BULB

ANY MOUNTING POSITION



BOTTOM VIEW

SMALL WAFER OCTAL 8 PIN BASE

THE 6B8GT COMBINES TWO DIODES AND A PENTODE UTILIZING A COMMON CATHODE. IT IS DESIGNED FOR SERVICE AS A COMBINED DETECTOR, AVC RECTIFIER AND A PENTODE AMPLIFIER.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD NO-210

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	3.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.3	WATT
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD CONNECTED TO CATHODE

GRID TO PLATE	0.005	μμf
INPUT	4.5	μμf
OUTPUT	10	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PENTODE UNIT

PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE	125	VOLTS
GRID VOLTAGE	-3.0	VOLTS
PLATE RESISTANCE	0.6	MEGOHM
TRANSCONDUCTANCE	1 325	μMHOS
PLATE CURRENT	10	MA.
SCREEN CURRENT	2.3	MA.
GRID BIAS (FOR CATHODE CURRENT CUT-OFF APPROXIMATE)	-21	MA.

DIODE UNITS - TWO

MINIMUM DIODE CURRENT PER PLATE WITH 10 VOLTS DC APPLIED	0.8	MA.

PRINTED IN U.S.A.

PLATE 1576
FEB. 28 1945

TENTATIVE DATA 6BA6

TUNG-SOL

REMOTE CUT-OFF RF AMPLIFIER PENTODE

MINIATURE TYPE

PHYSICAL SPECIFICATIONS

EMITTER	UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE	MIN. BUTTON 7-PIN	PIN 1 GRID 1	PIN 7 CATHODE
CAP	NONE	PIN 2 GRID 3*	PIN 8 NONE
BULB	T-5½	PIN 3 HEATER	
MAXIMUM DIAMETER	3/4"	PIN 4 HEATER	MOUNTING POS. ANY
MAXIMUM OVERALL LENGTH	2-1/8"	PIN 5 PLATE	
MAXIMUM SEATED HEIGHT	1-7/8"	PIN 6 GRID 2	*ALSO INTERNAL SHIELD

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.30	AMPS.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MAXIMUM PLATE DISSIPATION	3.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.6	WATTS
MAXIMUM CONTROL GRID VOLTAGE: NEG. BIAS	50	VOLTS
POS. BIAS	0	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM PEAK HEATER-CATHODE VOLTAGE:		
HEATER NEG. WITH RESPECT TO CATHODE	90	VOLTS
HEATER POS. WITH RESPECT TO CATHODE	90	VOLTS

CAPACITANCES

WITH NO EXTERNAL SHIELD

GRID NO. 1 TO PLATE (C_{G1P}) (MAX.)	0.0035	μμf
INPUT C_{G1} (K+H+G_2+G_3+INTERNAL SHIELD)	5.5	μμf
OUTPUT C_P (K+H+G_2+G_3+INTERNAL SHIELD)	5.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER OR FILAMENT VOLTAGE	6.3	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.30	0.30	AMPS.
PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE			VOLTS
PEAK AF SIGNAL VOLTAGE			VOLTS
PLATE CURRENT	10.8	11	MA.
SCREEN CURRENT	4.4	4.2	MA.
MAXIMUM-SIGNAL PLATE CURRENT			MA.
MAXIMUM-SIGNAL SCREEN CURRENT			MA.
PLATE RESISTANCE (APPROX.)	0.25	1.5	MEGOHMS
TRANSCONDUCTANCE	4300	4400	μMHOS
AMPLIFICATION FACTOR			
LOAD RESISTANCE			OHMS
TOTAL HARMONIC DISTORTION			PER CENT
POWER OUTPUT			WATTS
CONTROL GRID VOLTAGE (APPROX.) FOR TRANSCONDUCTANCE 40 μMHOS	-20	-20	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET		
CATHODE-BIAS RESISTOR	68	68	OHMS

PRINTED IN U.S.A.

PLATE 1652
DEC. 15 1945

TENTATIVE DATA 6BD6

TUNG-SOL

RF PENTODE AMPLIFIER

MINIATURE TYPE

PHYSICAL SPECIFICATIONS

EMITTER CATHODE	PIN CONNECTIONS	
BASE MINIATURE BUTTON 7-PIN	PIN 1 GRID 1	PIN 7 CATHODE
CAP ---	PIN 2 SI, GRID 3	PIN 8 NONE
BULB T-5½	PIN 3 HEATER	
MAXIMUM DIAMETER 3/4"	PIN 4 HEATER	MOUNTING POS. ANY
MAXIMUM OVERALL LENGTH 2 1/8"	PIN 5 PLATE	
MAXIMUM SEATED HEIGHT 1 7/8"	PIN 6 GRID 2	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD NB-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.3	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MAXIMUM PLATE DISSIPATION	4.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.4	WATT
MAXIMUM CATHODE CURRENT	14	MA.

CAPACITANCES

	WITH RMA MIN. SHIELD CONNECTED TO CATHODE	WITHOUT SHIELD	
CONTROL GRID TO ALL OTHER ELECTRODES	4.3	4.3	μμf
PLATE TO ALL OTHER ELECTRODES	5.0	5.0	μμf
CONTROL GRID TO PLATE (MAX.)	0.005	0.004	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HEATER OR FILAMENT VOLTAGE	6.3	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.3	0.3	AMP.
PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	-1	-3	VOLTS
PEAK AF SIGNAL VOLTAGE			VOLTS
PLATE CURRENT	13	9	MA.
SCREEN CURRENT	5	3.5	MA.
MAXIMUM-SIGNAL PLATE CURRENT			MA.
MAXIMUM-SIGNAL SCREEN CURRENT			MA.
PLATE RESISTANCE	0.12	0.7	MEGOHM
TRANSCONDUCTANCE	2350	2000	μMHOS
AMPLIFICATION FACTOR			
LOAD RESISTANCE			OHMS
TOTAL HARMONIC DISTORTION			PER CENT
POWER OUTPUT			WATTS
CONTROL GRID VOLTAGE (APPROX.) FOR TRANSCONDUCTANCE = 10 μMHOS	-35	-35	VOLTS

PRINTED IN U. S. A.

PLATE 1718
JUNE 17 1946

TENTATIVE DATA

6BE6

TUNG-SOL

PENTAGRID CONVERTER
MINIATURE TYPE

PHYSICAL SPECIFICATIONS

EMITTER UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE MIN. BUTTON 7-PIN	PIN 1 GRID 1	PIN 7 GRID 3
CAP NONE	PIN 2 GRID 5, CATHODE	PIN 8 NONE
BULB T-5½	PIN 3 HEATER	
MAX. DIAMETER 3/4"	PIN 4 HEATER	MOUNTING POS. ANY
MAX. SEATED HEIGHT 1-7/8"	PIN 5 PLATE	
MAX. OVERALL LENGTH 2-1/8"	PIN 6 GRID 2, GRID 4	

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.300	AMPS.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	1.0	WATTS
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MAXIMUM GRID VOLTAGE (G_2 & G_4)	100	VOLTS
MAXIMUM GRID SUPPLY VOLTAGE (G_2 & G_4)	300	VOLTS
MAXIMUM GRID DISSIPATION (G_2 & G_4)	1.0	WATT
MAXIMUM PEAK HEATER-CATHODE VOLTAGE:		
HEATER NEG. WITH RESPECT TO CATHODE	90	VOLTS
HEATER POS. WITH RESPECT TO CATHODE	90	VOLTS
MAXIMUM GRID 3 VOLTAGE:	50	VOLTS
NEG. BIAS	50	VOLTS
POS. BIAS	0	VOLTS

CAPACITANCES
WITH NO EXTERNAL SHIELD

G_3 TO PLATE (C_{G3P}) (MAX.)	0.30	μμf
G_1 TO PLATE (C_{G1P}) (MAX.)	0.05	μμf
G_1 TO G_3 (C_{G1G3})(MAX.)	0.15	μμf
G_3 TO ALL OTHER ELECTRODES (RF INPUT)		
(C_{G3} (H+K+G_1+G_2+G_4+G_5)	7.2	μμf
PLATE TO ALL OTHER ELECTRODES (MIXER OUTPUT)		
C_P (H+K+G_1+G_2+G_3+G_4+G_5)	8.6	μμf
GRID NO. 1 TO ALL OTHER ELECTRODES		
(OSCILLATOR INPUT) C_{G1} (H+K+G_2+G_3+G_4+G_5+P)	5.5	μμf
GRID NO. 1 TO ALL OTHER ELECTRODES EXCEPT		
CATHODE C_{G1} (H+G_2+G_3+G_4+G_5+P)	2.7	μμf
GRID NO. 1 TO CATHODE (C_{G1K})	2.8	μμf
CATHODE TO ALL OTHER ELECTRODES EXCEPT G_1		
C_K (H+G_2+G_3+G_4+G_5+P)	15	μμf

CONTINUED ON FOLLOWING PAGE

PRINTED IN U.S.A.

PLATE 1678
FEB. 15 1946

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE - SEPARATE EXCITATION

PLATE VOLTAGE	100	250	VOLTS
SCREEN GRID VOLTAGE (G_2 & G_4)	100	100	VOLTS
CONTROL GRID VOLTAGE (G_3)	-1.5	-1.5	VOLTS
PLATE CURRENT	2.8	3.0	MA.
SCREEN GRID CURRENT (G_2 & G_4)	7.3	7.1	MA.
TOTAL CATHODE CURRENT	10.6	10.6	MA.
OSCILLATOR-GRID (G_1) RESISTOR	20 000	20 000	OHMS
CONVERSION TRANSCONDUCTANCE	455	475	µMHOS
PLATE RESISTANCE (APPROX.)	0.5	1.0	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR G_3 BIAS OF -30 VOLTS (APPROX.)	4.0	4.0	µMHOS
GRID (G_1) CURRENT	0.5	0.5	MA.

NOTE: (1) THE CHARACTERISTICS SHOWN WITH SEPARATE EXCITATION CORRESPOND VERY CLOSELY WITH THOSE OBTAINED IN A SELF-EXCITED OSCILLATOR CIRCUIT OPERATING WITH ZERO BIAS.

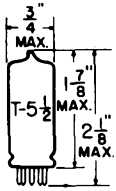
(2) THE TRANSCONDUCTANCE BETWEEN GRID 1 AND GRIDS 2 & 4 CONNECTED TO PLATE (NOT OSCILLATING) IS APPROXIMATELY 7250 MICROMHOS UNDER THE FOLLOWING CONDITIONS: GRIDS NO. 1 & NO. 3 AT 0 VOLTS; GRIDS NO. 2 & NO. 4 AND PLATE AT 100 VOLTS. UNDER THE SAME CONDITIONS, THE PLATE CURRENT IS 25 MA., AND THE AMPLIFICATION FACTOR IS 20.

PLATE 1654 DEC. 15 1945

TUNG-SOL

PENTODE

MINIATURE TYPE



GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION

BOTTOM VIEW
MINIATURE BUTTON
7-PIN BASE

THE 6BH6 IS A SHARP CUT-OFF PENTODE VOLTAGE AMPLIFIER IN THE MINIATURE CONSTRUCTION. IT FEATURES HIGH TRANSCONDUCTANCE, LOW CAPACITANCES, AND ECONOMY OF HEATER POWER AND IS USEFUL AS A GENERAL PURPOSE AMPLIFIER AT BOTH LOW AND HIGH FREQUENCIES.

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G TO P) MAX.	0.0035	μμf
INPUT: G_1 TO (H+K+G_2+G_3&IS)	5.4	μμf
OUTPUT: P TO (H+K+G_2+G_3&IS)	4.4	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID #2 VOLTAGE	150	VOLTS
MAXIMUM GRID #2 SUPPLY VOLTAGE	300	VOLTS
MAXIMUM NEGATIVE DC GRID #1 VOLTAGE	50	VOLTS
MAXIMUM POSITIVE DC GRID #1 VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	3	WATTS
MAXIMUM GRID #2 DISSIPATION	0.5	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	150	150	MA.
PLATE VOLTAGE	100	250	VOLTS
GRID #3 VOLTAGE	PIN #7 CONNECTED TO PIN #2 AT SOCKET		
GRID #2 VOLTAGE	100	150	VOLTS
GRID #1 VOLTAGE	-1	-1	VOLT
PLATE RESISTANCE (APPROX.)	0.7	1.4	MEGOHMS
TRANSCONDUCTANCE	3 400	4 600	μMHOS
PLATE CURRENT	3.6	7.4	MA.
GRID #2 CURRENT	1.4	2.9	MA.
GRID #1 VOLTAGE FOR I_b = 10 μA	-5	-7.7	VOLTS

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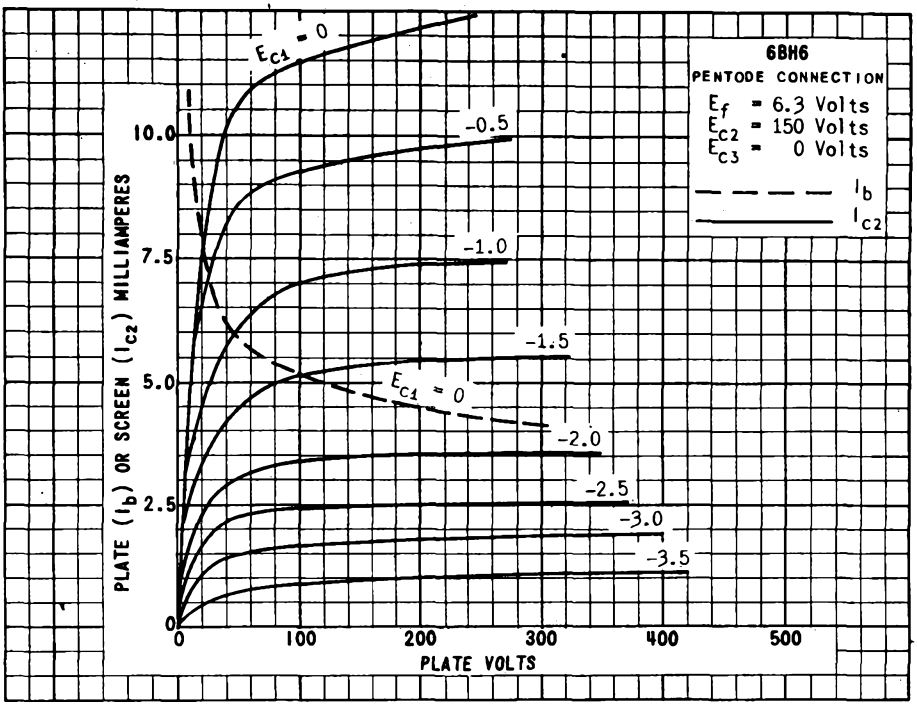
PLATE
1922
DEC. 1,
1947

6BH6



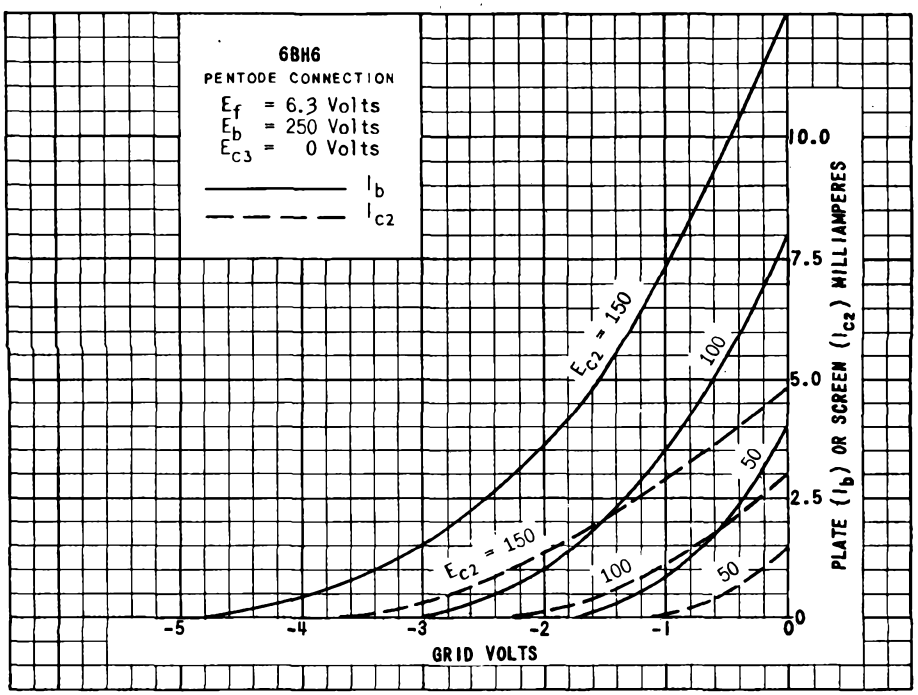


PLATE 1923
DEC. 1, 1947

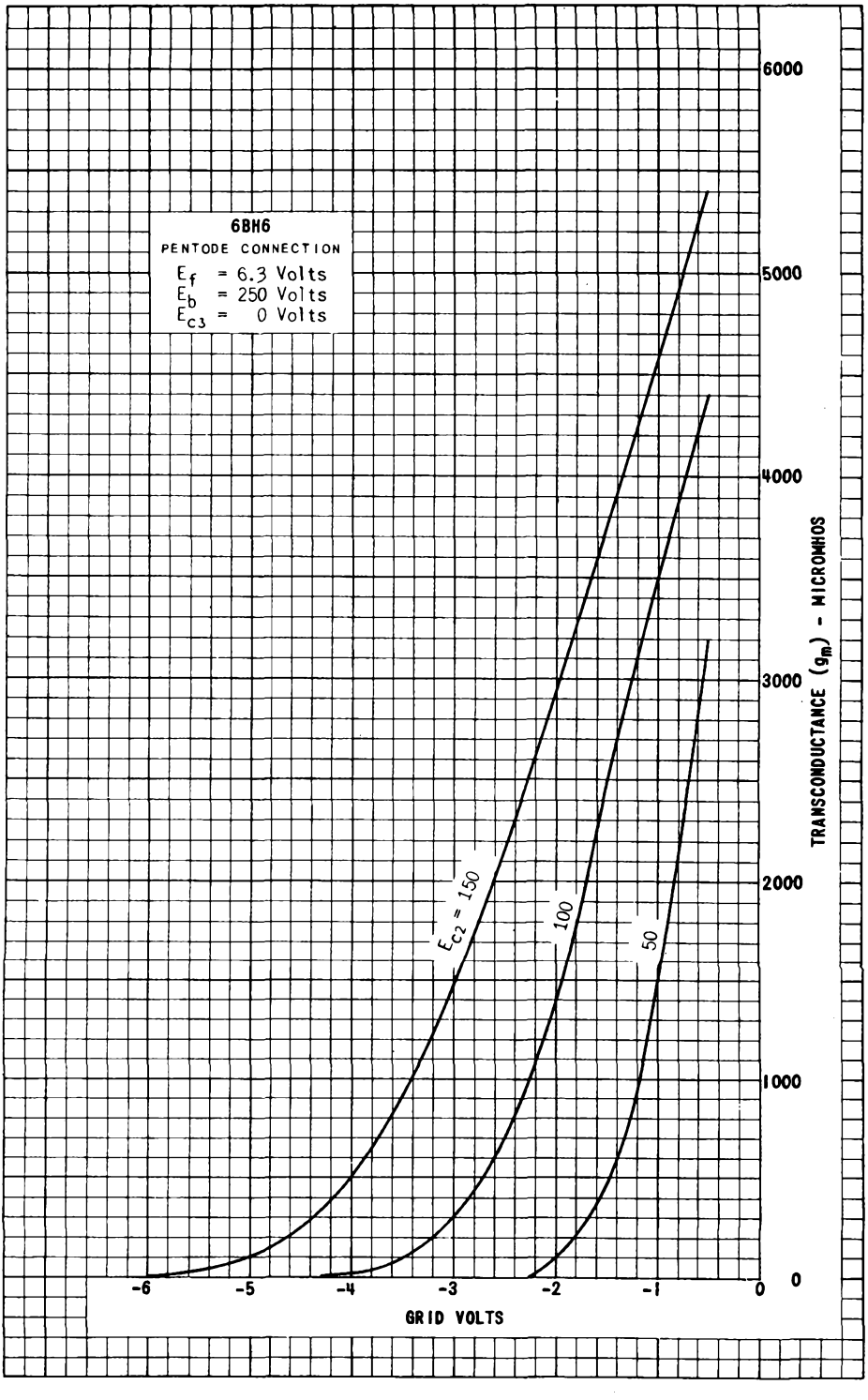


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PLATE
1924
DEC. 1,
1947

TUNG-SOL

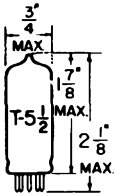
TRIODE

MINIATURE TYPE

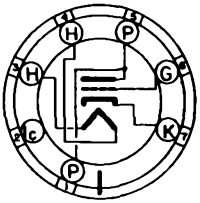
COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6C4 IS A LOW-MU TRIODE VOLTAGE AMPLIFIER OF THE MINIATURE TYPE. IT IS PARTICULARLY USEFUL AS A HIGH FREQUENCY LOW-POWER OSCILLATOR DUE TO ITS HIGH TRANSCONDUCTANCE, LOW CAPACITANCES AND LEAD INDUCTANCES. LOW HEATER POWER REQUIREMENTS MAKE IT ATTRACTIVE FOR USE IN PORTABLE AND ALSO IN SERIES-HEATER CONNECTED CIRCUITS.

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G TO P)	1.6	μμf
INPUT: G TO (H+K)	1.8	μμf
OUTPUT: P TO (H+K)	1.3	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

	AF AMPLIFIER	RF AMPLIFIER	
HEATER VOLTAGE	6.3	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	300	VOLTS
MAXIMUM NEGATIVE DC GRID VOLTAGE	---	50	VOLTS
MAXIMUM GRID CIRCUIT RESISTANCE (FIXED BIAS)	0.25	---	MEG.
MAXIMUM GRID CIRCUIT RESISTANCE (SELF BIAS)	1	---	MEG.
MAXIMUM DC PLATE CURRENT	---	25	MA.
MAXIMUM DC GRID CURRENT	---	8	MA.
PLATE DISSIPATION	3.5	5	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	150	150	MA.
PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE[A]	0	-8.5	VOLTS
PLATE CURRENT	11.8	10.5	MA.
PLATE RESISTANCE	6 250	7 700	OHMS
TRANSCONDUCTANCE	3 100	2 200	μMHOS
AMPLIFICATION FACTOR	19.5	17	

[A] THE TYPE OF INPUT COUPLING USED SHOULD NOT INTRODUCE TOO MUCH RESISTANCE IN THE GRID CIRCUIT. TRANSFORMER OR IMPEDANCE COUPLING DEVISES ARE RECOMMENDED.

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION.

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PLATE 1963
FEB. 2, 1948

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

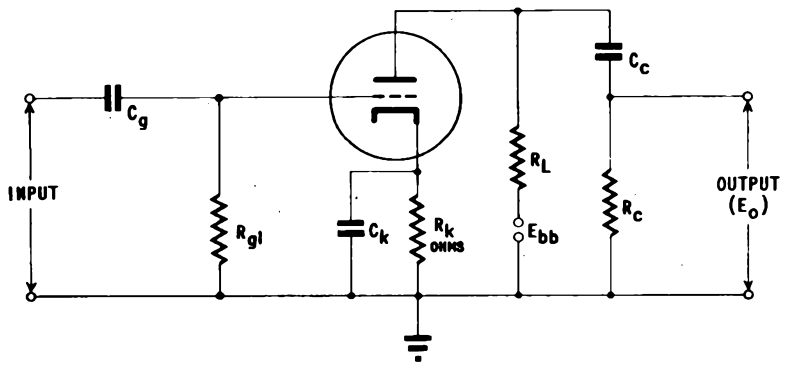
RF POWER AMPLIFIER AND OSCILLATOR - CLASS C TELEGRAPHY
AS AN OSCILLATOR AT 150 MC APPROXIMATELY 2.5 WATTS CAN BE OBTAINED WITH A GRID RESISTOR OF 10000 OHMS AND MAXIMUM RATED INPUT.

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	150	MA.
DC PLATE VOLTAGE	300	VOLTS
DC GRID VOLTAGE	-27	VOLTS
DC PLATE CURRENT	25	MA.
DC GRID CURRENT (APPROX.)	7	MA.
DRIVING POWER (APPROX.)	0.35	WATT
POWER OUTPUT (APPROX.)	5.5	WATTS

RESISTANCE COUPLED AMPLIFIER

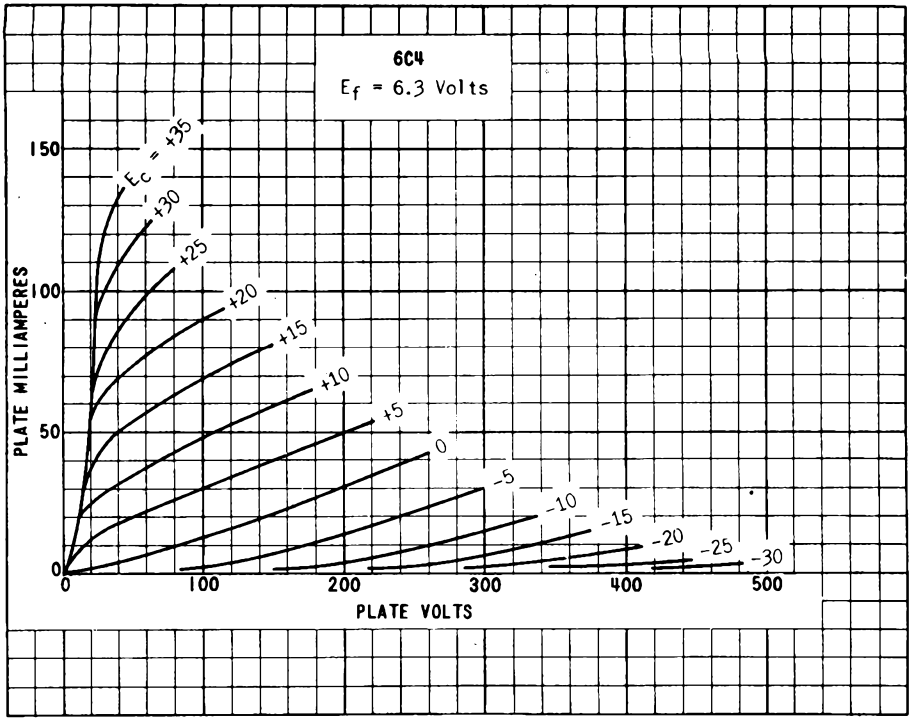
R_L MEG.	R_{g1} MEG.	R_c MEG.	E_{bb} = 90 VOLTS			E_{bb} = 180 VOLTS			E_{bb} = 300 VOLTS		
			R_k	GAIN	E_o	R_k	GAIN	E_o	R_k	GAIN	E_o
0.10	A	0.10	3000	11	12	2000	12	23	1600	13	34
0.10	A	0.24	3300	12	15	2400	12	30	1800	13	40
0.24	A	0.24	7500	12	14	4700	13	25	3600	13	37
0.24	A	0.51	8200	12	16	6200	13	32	4300	13	43
0.51	A	0.51	12000	12	13	8200	13	24	6200	13	33
0.51	A	1.0	13000	12	15	9100	13	28	6800	13	36
0.24	10	0.24	---	13	12	----	15	24	----	16	35
0.24	10	0.51	---	14	15	----	16	28	----	17	49
0.51	10	0.51	---	14	13	----	15	25	----	17	40
0.51	10	1.0	---	14	16	----	16	32	----	17	54

[A] VALUE OF R_{g1} IS NOT CRITICAL.
GAIN MEASURED AT E_o = 2.0 VOLTS RMS OUTPUT.
E_o IS RMS OUTPUT FOR 5% TOTAL HARMONIC DISTORTION.



NOTE: COUPLING CAPACITORS C_g AND C_c SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE. R_k SHOULD BE ADEQUATELY BY-PASSED BY CAPACITOR C_k.

PLATE 1969
FEB. 2, 1948



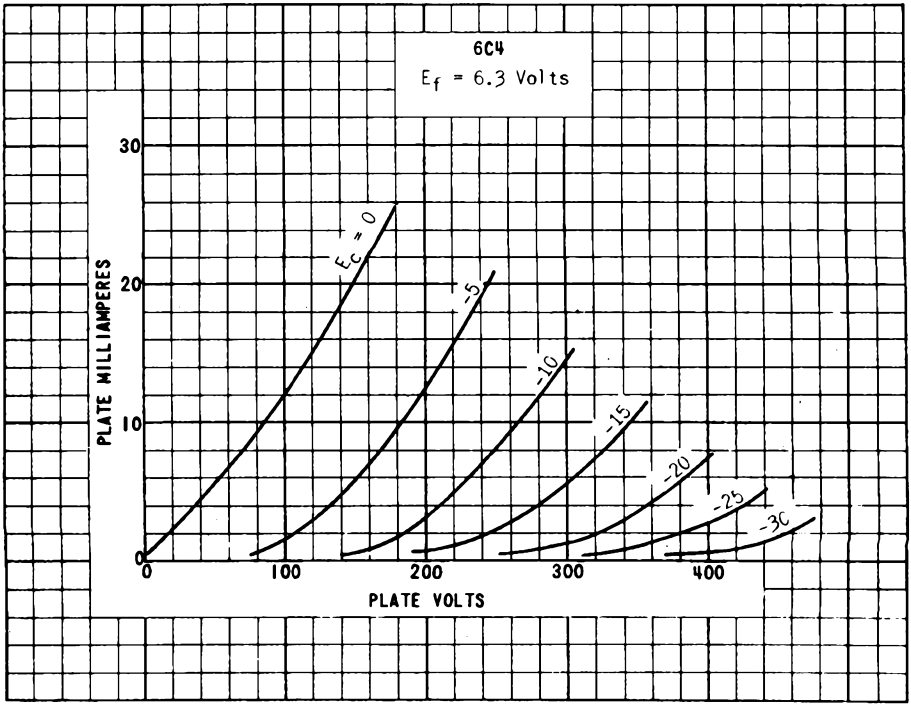


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PLATE
1963
FEB. 2,
1948

6C4

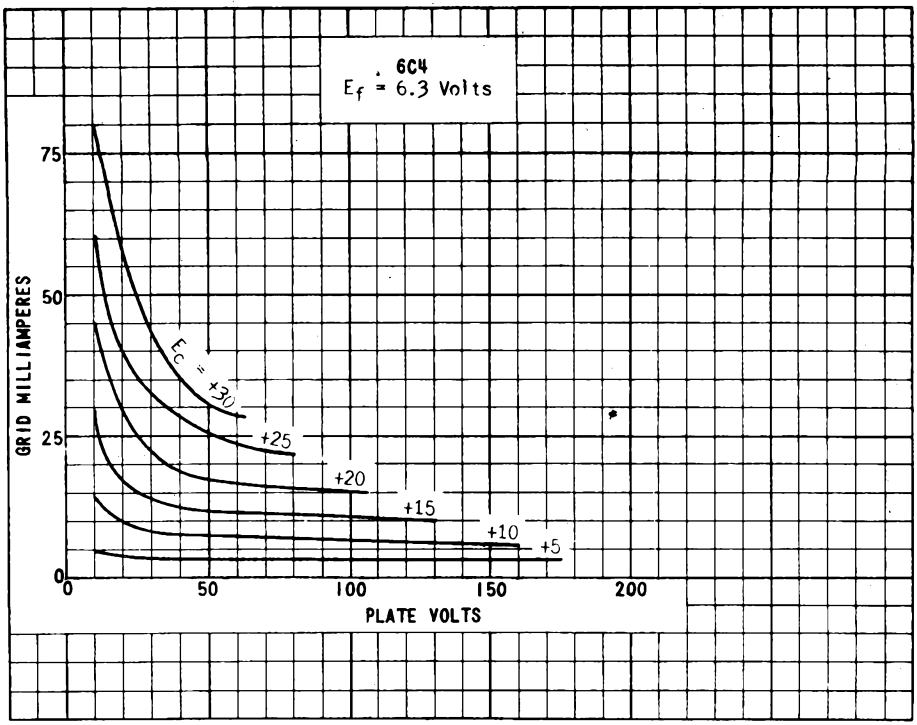
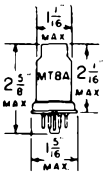


PLATE
1966
FEB. 2,
1948

TUNG-SOL

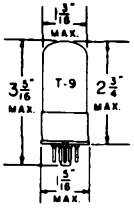


METAL SHELL
6 PIN OCTAL BASE
6C5

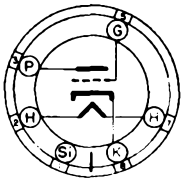
TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

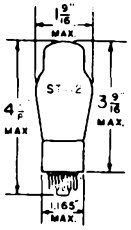


GLASS BULB
6 PIN OCTAL BASE
WITH METAL SHELL
6C5GT

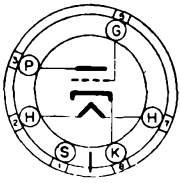


G-6Qb

BOTTOM VIEW
6C5G



GLASS BULB
SMALL 6 PIN OCTAL BASE
6C5G



6Q

BOTTOM VIEW
6C5 6C5GT

THE TUNG-SOL 6C5, 6C5G AND 6C5GT ARE GENERAL PURPOSE TRIODES DESIGNED FOR SERVICE AS OSCILLATORS, DETECTORS OR AMPLIFIERS. WITH THE EXCEPTION OF CAPACITANCES, THEIR ELECTRICAL CHARACTERISTICS ARE IDENTICAL. THEY ARE SIMILAR IN CHARACTERISTICS TO THE 6C6, 6J7 AND 57 WITH TRIODE CONNECTION.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MINIMUM GRID VOLTAGE	0	

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE[A]	-8	VOLTS
PLATE CURRENT	8	MA.
PLATE RESISTANCE	10 000	OHMS
TRANSCONDUCTANCE	2000	μMHOS
AMPLIFICATION FACTOR	20	

[A] THE DC RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 1.0 MEGOHM.

CONTINUED NEXT PAGE

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PLATE
625-2

NOV. 20
1939

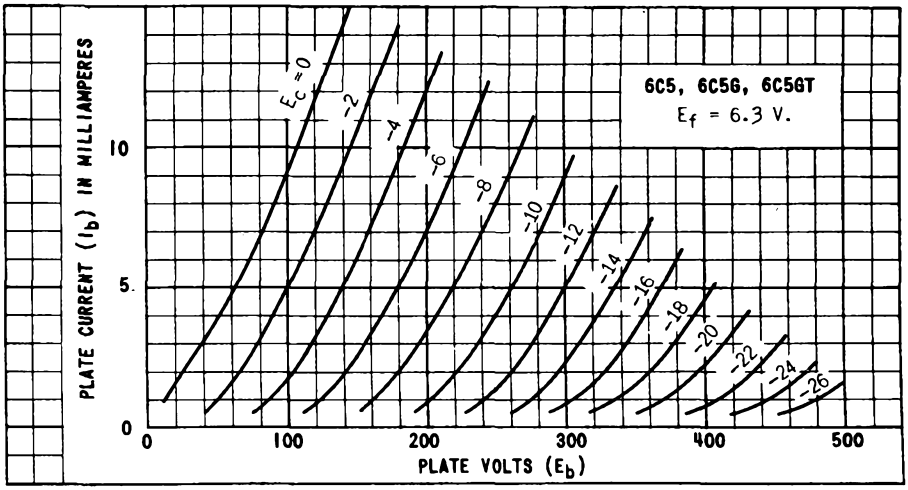
6C5, 6C5G, 6C5GT

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES[B]

	6C5	6C5G	6C5GT	
GRID TO CATHODE	3.0	4.4	3.6	μμf
PLATE TO CATHODE	11	12	11	μμf
GRID TO PLATE	2.0	2.2	1.6	μμf

[B] WITH SHELL OR SHIELD CONNECTED TO THE CATHODE



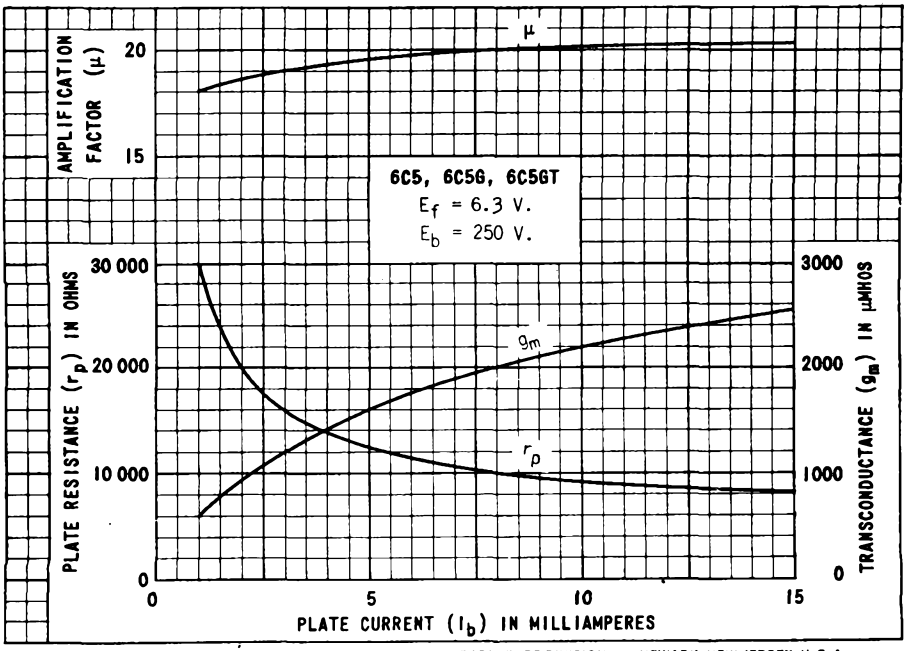
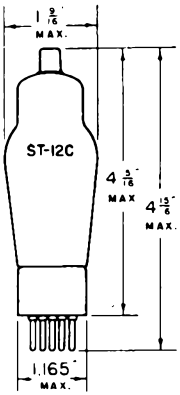


PLATE 626-2

TUNG-SOL



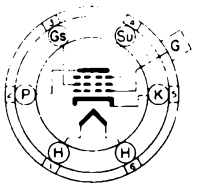
TRIPLE GRID
DETECTOR AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

SMALL 6 PIN BASE



6F

BOTTOM VIEW

THE TUNG-SOL 6C6 IS A TRIPLE GRID GENERAL PURPOSE DETECTOR AMPLIFIER. WITH THE EXCEPTION OF CAPACITANCES, ITS ELECTRICAL CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 6J7G AND THE 6J7GT.

RATINGS

	TRIODE [D] CONNECTION	PENTODE CONNECTION	
MAXIMUM PLATE VOLTAGE	250	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	PLATE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	PLATE	125	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	0	VOLTS
MAXIMUM PLATE DISSIPATION	1.75	0.75	WATTS
MAXIMUM SCREEN DISSIPATION	–	0.10	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

	TRIODE CONNECTION		PENTODE CONNECTION		
PLATE VOLTAGE	180	250	100	250	VOLTS
SCREEN VOLTAGE	PLATE	PLATE	100	100	VOLTS
CONTROL GRID VOLTAGE [A]	–5.3	–8	–3	–3	VOLTS
SUPPRESSOR GRID VOLTAGE	PLATE	PLATE	CONNECTED TO CATHODE AT SOCKET		
PLATE CURRENT	5.3	6.5	2.0	2.0	MA.
SCREEN CURRENT	–	–	0.5	0.5	MA.
PLATE RESISTANCE	.0110	.0105	1.0	– [B]	MEGOHM
TRANSCONDUCTANCE	1800	1900	1185	1225	μMHOS
AMPLIFICATION FACTOR	20	20	–	–	
CONTROL GRID BIAS [C]	–	–	–7	–7	VOLTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 1.0 MEGOHM.

[B] GREATER THAN 1.0 MEGOHM

[C] FOR CATHODE CURRENT CUT-OFF

[D] SUPPRESSOR GRID AND SCREEN TIED TO PLATE

CONTINUED NEXT PAGE

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PLATE 895-4

NOV. 8 1940

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES[S]

	TRIODE CONNECTION	PENTODE CONNECTION	
CONTROL GRID TO CATHODE	3.0	5.0	μμf
PLATE TO CATHODE	10.5	6.5	μμf
CONTROL GRID TO PLATE MAX.	2.0	.007	μμf

[S] MEASURED WITH AN EXTERNAL SHIELD. THE INTERNAL SHIELD WITHIN THE DOME OF THE 6C6 IS CONNECTED TO THE CATHODE WITHIN THE TUBE.

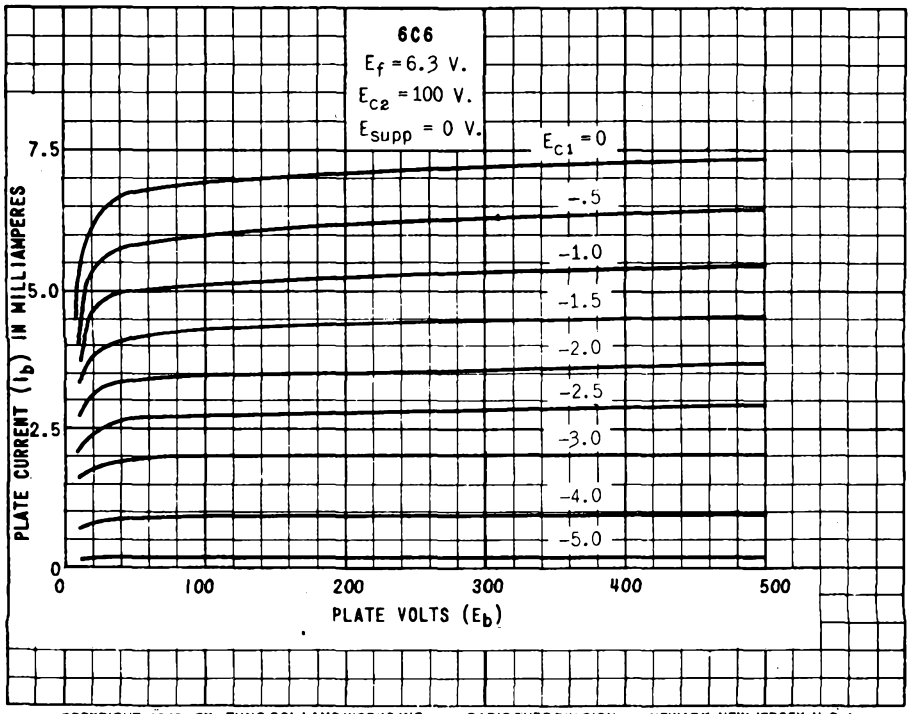

PLATE 896-2

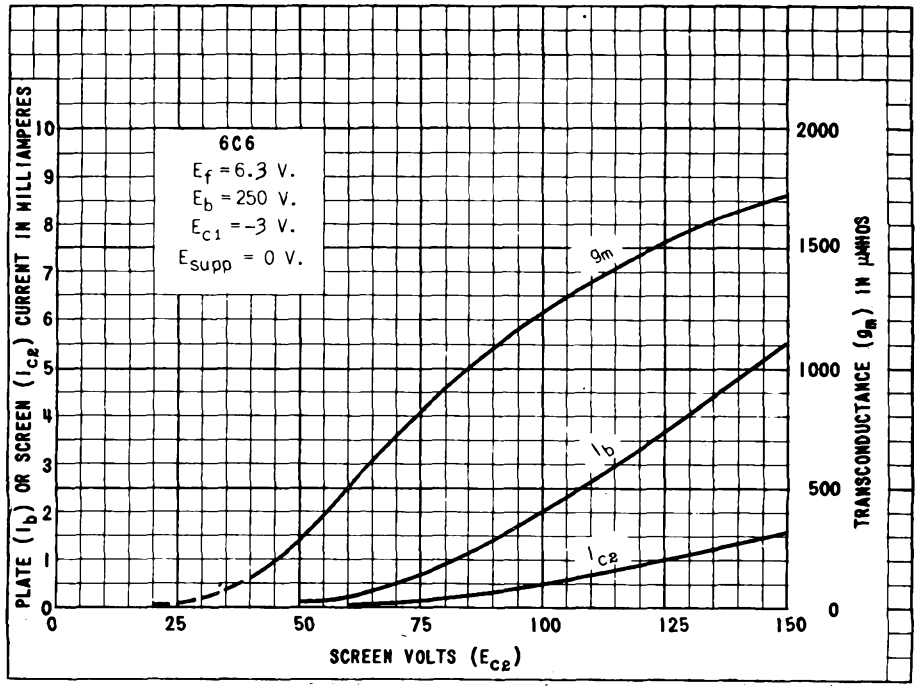

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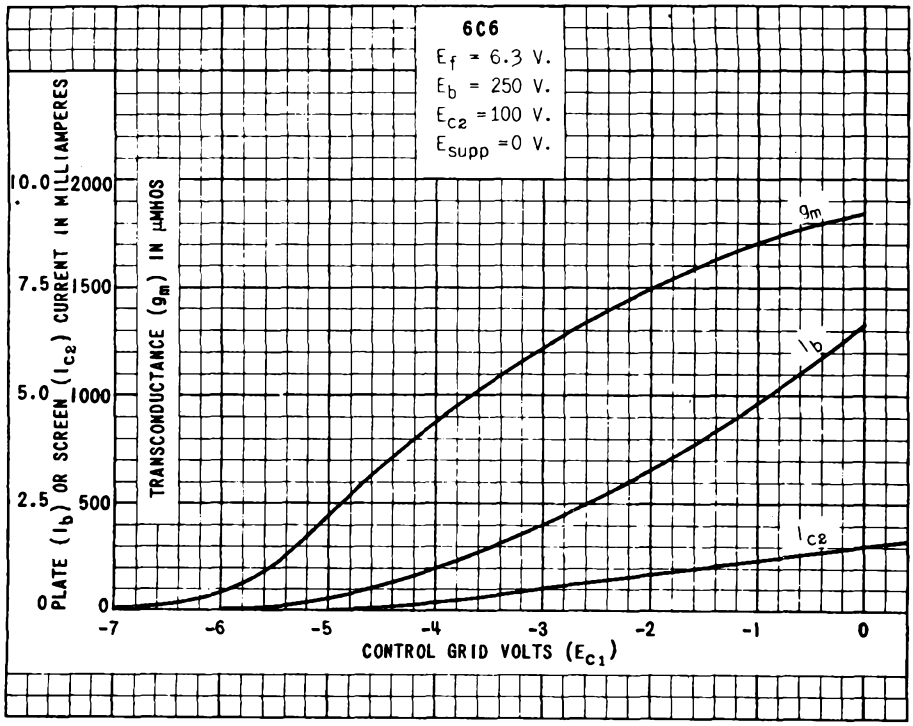
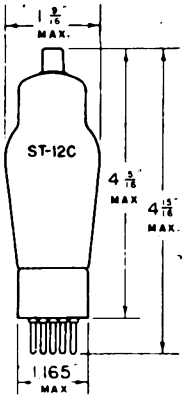
PLATE
897-2

NOV. 8
1940


6C6
E_f = 6.3 V.
E_b = 250 V.
E_{c2} = 100 V.
E_{supp} = 0 V.
PLATE (I_b) OR SCREEN (I_{c2}) CURRENT IN MILLIAMPERES
TRANSCONDUCTANCE (g_m) IN μMHOS
CONTROL GRID VOLTS (E_{c1})
10.0
7.5
5.0
2.5
0
2000
1500
1000
500
0
-7
-6
-5
-4
-3
-2
-1
0
g_m
I_b
I_{c2}

TUNG-SOL

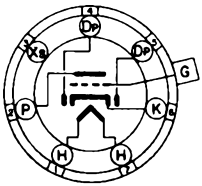


DUO-DIODE TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



7 G
BOTTOM VIEW

SMALL 7 PIN BASE

THE TUNG-SOL 6C7 CONSISTS OF TWO DIODES AND A TRIODE WITH A COMMON CATHODE. ITS ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6R7, 6R7G, AND THE 6R7GT.

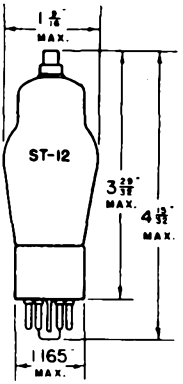
OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-9.0	VOLTS
PLATE CURRENT	4.5	MA.
PLATE RESISTANCE	16 000	OHMS
TRANSCONDUCTANCE	1250	μMHOS
AMPLIFICATION FACTOR	20	

PLATE
898-1

TUNG-SOL



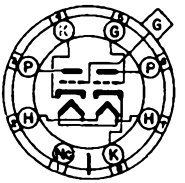
TWIN TRIODE AMPLIFIER

UNIPOTENTIAL CATHODES

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

SMALL 8 PIN OCTAL BASE



G-8G
BOTTOM VIEW

THE TUNG-SOL 6C8G IS A GENERAL PURPOSE TWIN TRIODE HAVING TWO INDEPENDENT UNITS, WITH ALL ELECTRODES BROUGHT OUT TO SEPARATE TERMINALS.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER – EACH TRIODE

PLATE VOLTAGE	250 MAX.	VOLTS
GRID VOLTAGE	-4.5	VOLTS
PLATE CURRENT	3.2	MA.
PLATE RESISTANCE	22 500	OHMS
TRANSCONDUCTANCE	1600	μMHOS
AMPLIFICATION FACTOR	36	

RESISTANCE COUPLED AMPLIFIER AND PHASE INVERTER

VALUES ARE FOR SINGLE TRIODE SECTION

PLATE SUPPLY VOLTAGE	100	100	250	250	VOLTS
PLATE LOAD RESISTOR	0.1	0.5	0.1	0.5	MEGOHM
CATHODE RESISTOR	3500	12 000	3000	10 000	OHMS
VOLTAGE GAIN	20	22	22	26	

DIRECT INTERELECTRODE CAPACITANCES

	TRIODE B	TRIODE T	
GRID TO CATHODE	3.4	2.5	μμf
PLATE TO CATHODE	3.5	3.9	μμf
GRID TO CATHODE	2.5	2.4	μμf
GRID TO GRID	0.1		μμf
PLATE TO PLATE	1.5		μμf

TRIODE B – TRIODE HAVING GRID BROUGHT OUT TO BASE PIN.
TRIODE T – TRIODE HAVING GRID BROUGHT OUT TO TOP CAP.
NOTE: THIS TUBE NOT RECOMMENDED FOR OPERATION IN SERIES WITH OTHER 0.3 AMPERE TUBES AS THE SURGE CURRENT MAY CAUSE HEATER BURNOUTS.

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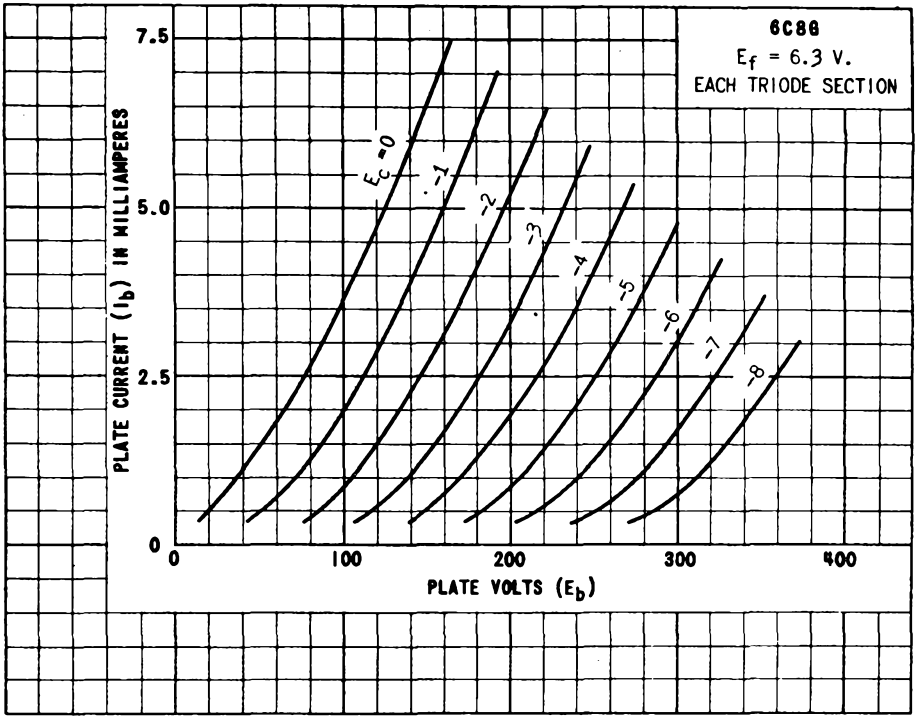
PLATE 459-2

JUNE 1 1939

6C8G



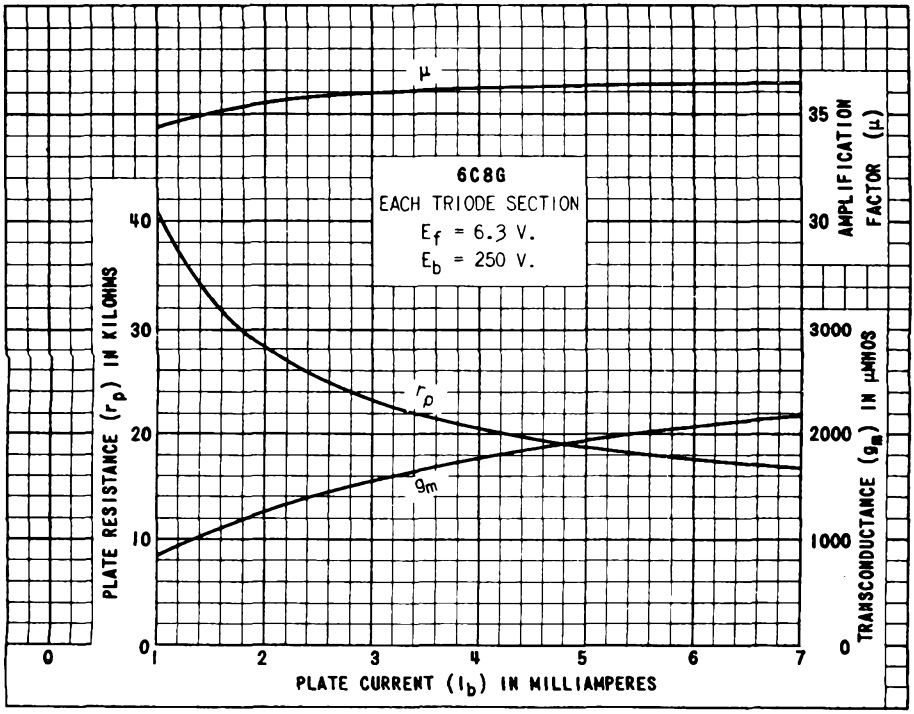


PLATE 460-1

TUNG-SOL

THYRATRON

MINIATURE TYPE

PHYSICAL SPECIFICATIONS

EMITTER COATED UNIP. CATHODE	PIN CONNECTIONS	
BASE MIN. BUTTON 7-PIN	PIN 1 GRID	PIN 7 PLATE
CAP ———	PIN 2 NO CONNECTION	PIN 8 NONE
BULB T-5½	PIN 3 HEATER	
MAX. DIAMETER 3/4"	PIN 4 HEATER	MOUNTING POS. ANY
MAX. SEATED HEIGHT 1 7/8"	PIN 5 CATHODE	
MAX. OVERALL LENGTH 2 1/8"	PIN 6 NO CONNECTION	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD NO-210

HEATER VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER CURRENT	0.250	AMPERE
MINIMUM HEATING TIME	30	SECONDS
MAXIMUM VOLTAGE BETWEEN ELEMENTS	450	VOLTS
PEAK ANODE CURRENT	100	MA.
AVERAGE ANODE CURRENT[A]	25	MA.
TUBE VOLTAGE DROP AT 25 MA. (APPROX.)	16	VOLTS

[A] AVERAGED OVER PERIOD OF 30 SECONDS MAXIMUM.

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PLATE 1679
FEB. 15 1946

6D4

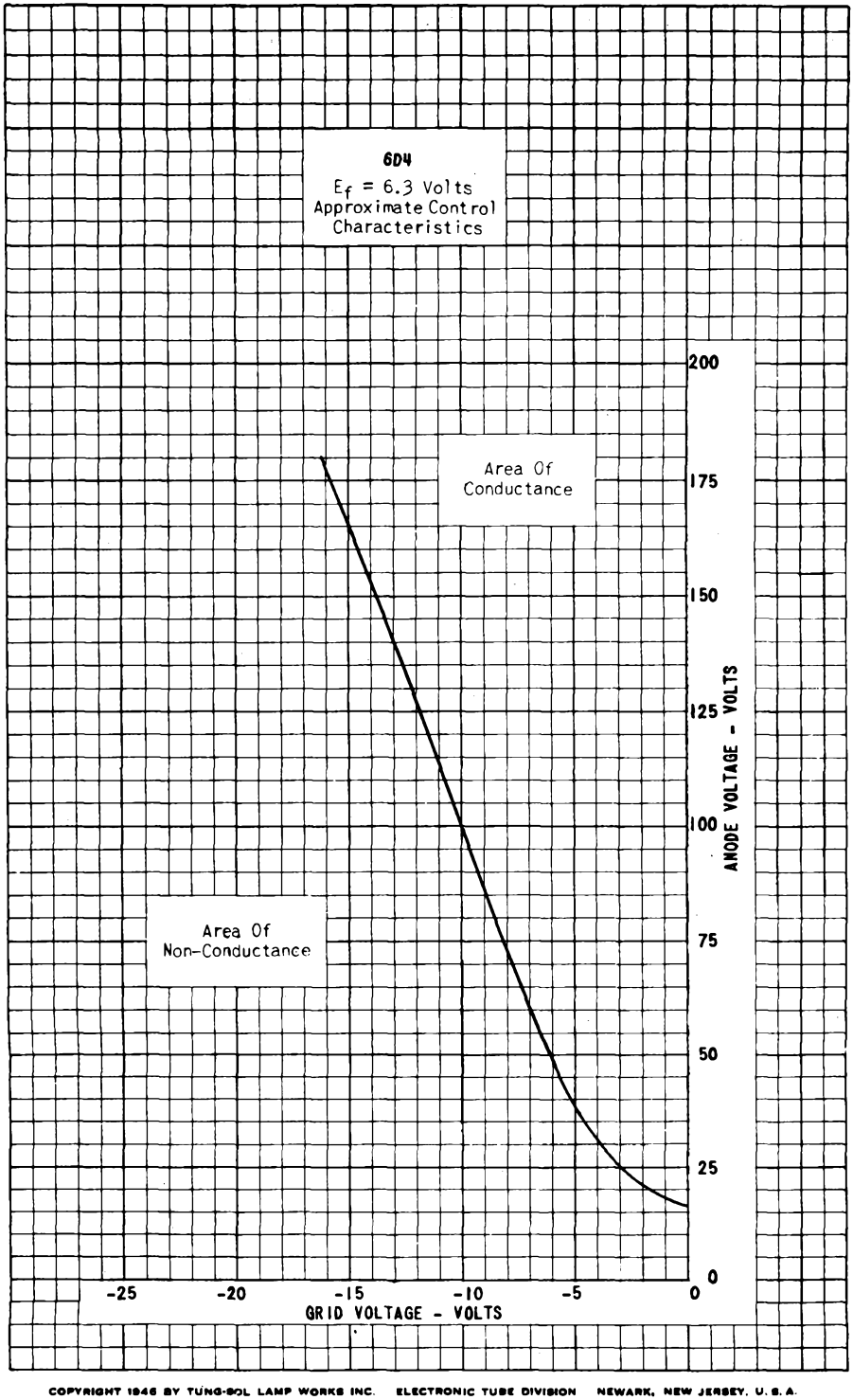
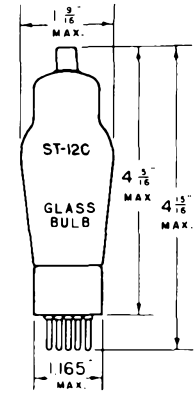


PLATE
1680
FEB. 15
1946

TUNG-SOL



SMALL 6 PIN BASE

TRIPLE GRID

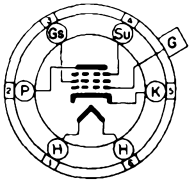
REMOTE CUT-OFF AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.3 AMPERE

AC OR DC



6F

BOTTOM VIEW

THE TUNG-SOL 6D6 IS A TRIPLE GRID VARIABLE MU AMPLIFIER. IT IS SUITABLE FOR USE WITH AVC IN RF AND IF AMPLIFIERS, AS IT MINIMIZES CROSS MODULATION. WITH THE EXCEPTION OF CAPACITANCES AND HEATER RATINGS, ITS ELECTRICAL CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 6U7G AND THE 58.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLT
MAXIMUM PLATE DISSIPATION	2.25	WATTS
MAXIMUM SCREEN DISSIPATION	0.25	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	−3	−3	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET		
PLATE CURRENT	8.0	8.2	MA.
SCREEN CURRENT	2.2	2.0	MA.
PLATE RESISTANCE APPROX.	0.25	0.8	MEGOHM
TRANSCONDUCTANCE	1500	1600	μMHOS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 2 μMHOS	−50	−50	VOLTS

TYPICAL OPERATING CONDITIONS WITH VARIABLE BIAS AS MIXER IN SUPERHETERODYNE CIRCUIT

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET		
CONTROL GRID VOLTAGE APPROX. [A]	−10	−10	VOLTS

[A] MINIMUM FOR AN OSCILLATOR PEAK VOLTAGE OF 7 VOLTS. THESE VALUES ARE OPTIMUM.

CONTINUED NEXT PAGE

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PLATE 579-A
OCT. 20 1939

6D6

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	4.7	μμf
PLATE TO CATHODE	6.5	μμf
GRID TO PLATE[$]	.007 MAX.	μμf

[$] WITH SHIELD. THE INTERNAL SHIELD WITHIN THE DOME OF THE 6D6 IS CONNECTED INTERNALLY TO THE CATHODE.

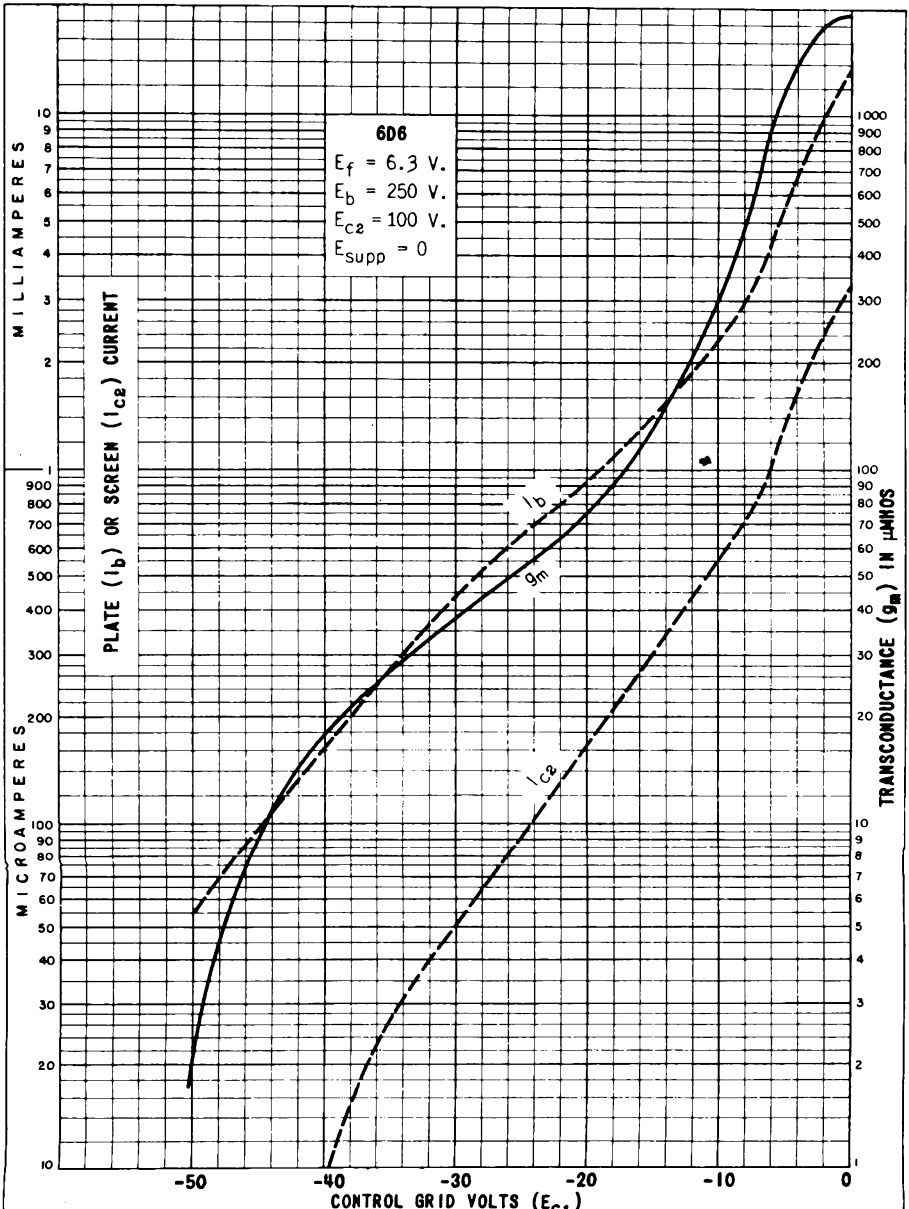


PLATE 580-4

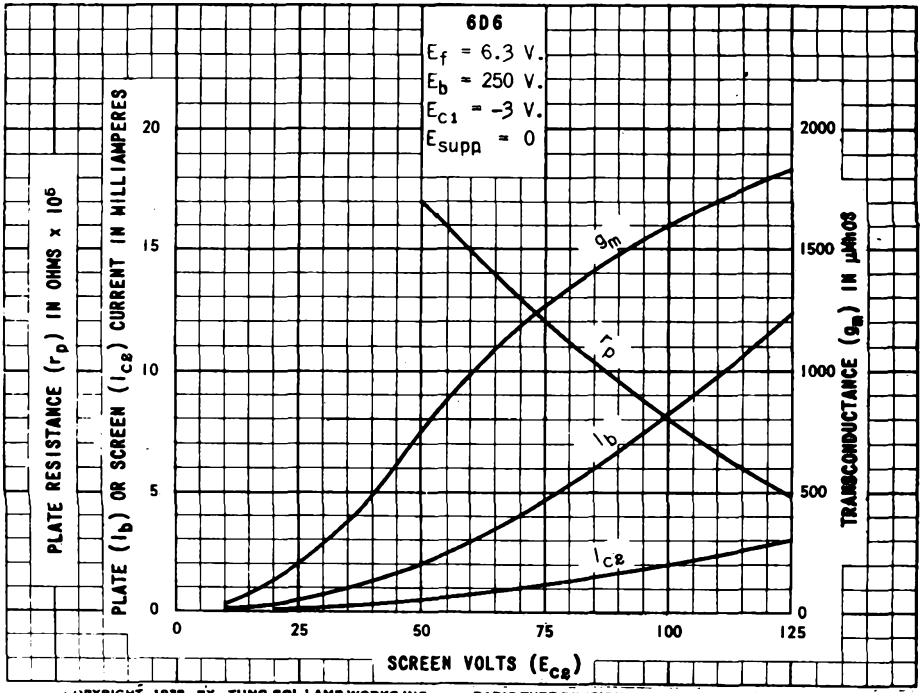
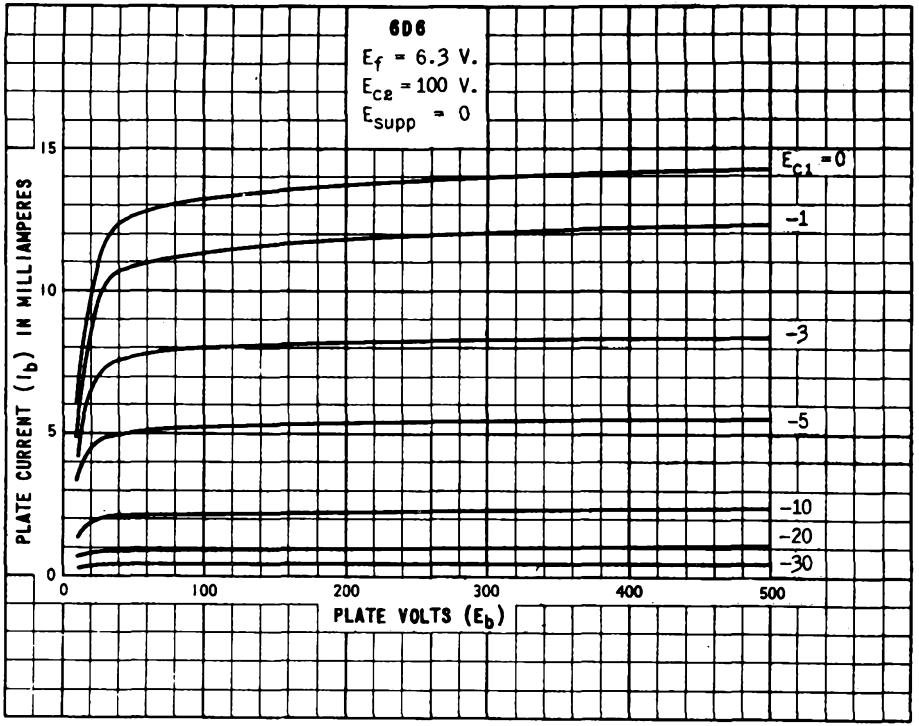
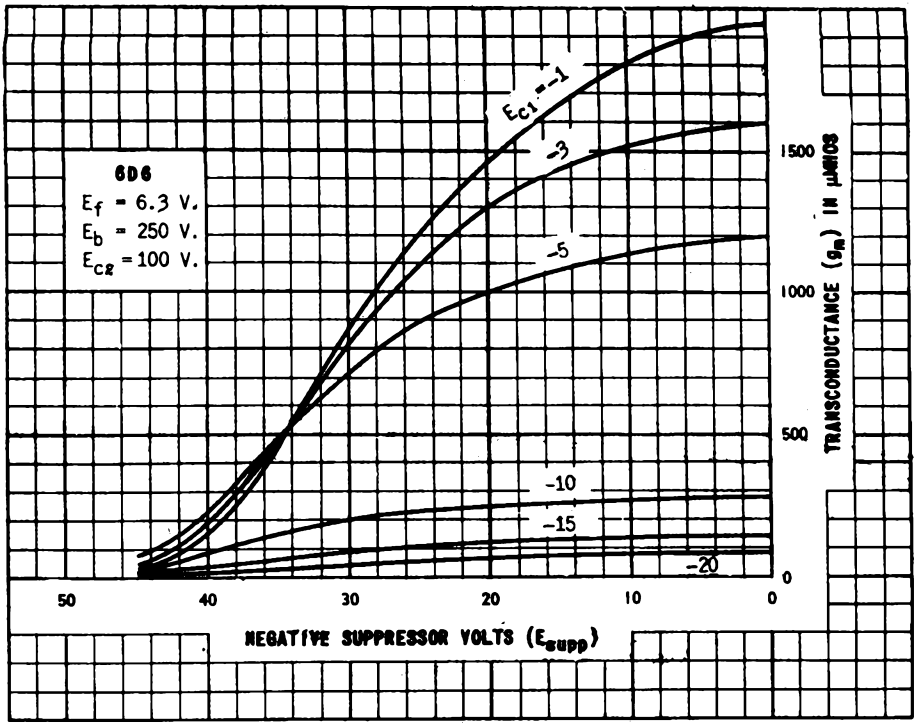


PLATE 248-1

DEC. 12 1938


6D6
E_f = 6.3 V.
E_{c2} = 100 V.
E_{supp} = 0
E_{c1} = 0
-1
-3
-5
-10
-20
-30
PLATE CURRENT (I_b) IN MILLIAMPERES
0
5
10
15
0
100
200
300
400
500
PLATE VOLTS (E_b)

6D6



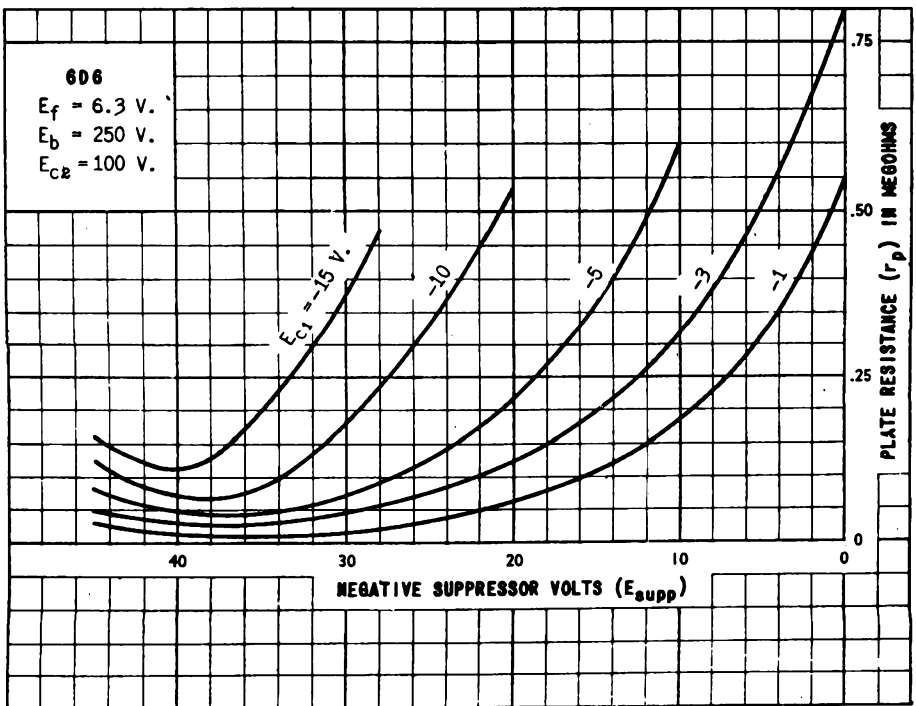
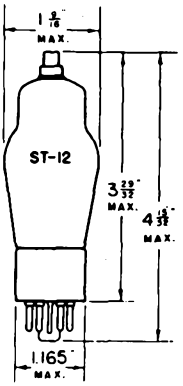


PLATE 249-1

TUNG-SOL

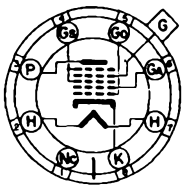


PENTAGRID CONVERTER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB



G-8A
BOTTOM VIEW

SMALL 8 PIN OCTAL BASE

THE TUNG-SOL 6D8G IS A PENTAGRID CONVERTER DESIGNED FOR SERVICE AS AN OSCILLATOR AND MIXER IN SUPERHETERODYNE CIRCUITS. IT IS RECOMMENDED FOR USE WHERE ECONOMY OF HEATER CURRENT IS IMPORTANT.

RATINGS

MAXIMUM PLATE (P) VOLTAGE	300	VOLTS
MAXIMUM SCREEN (G_S) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL CONTROL GRID (G) BIAS VOLTAGE	0	VOLTS
MAXIMUM OSCILLATOR ANODE (G_A) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM OSCILLATOR ANODE VOLTAGE	200	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	13	MA.
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	0.3	WATT
MAXIMUM OSCILLATOR ANODE DISSIPATION	0.75	WATT

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FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

PLATE
920-2

DEC. 30
1940

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID (G) TO MIXER PLATE (P)	0.20	μμf
CONTROL GRID (G) TO OSCILLATOR ANODE (G_A)	0.20	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (G_O)	0.16	μμf
OSCILLATOR GRID (G_O) TO OSCILLATOR ANODE (G_A)	1.1	μμf
RF INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES	8.0	μμf
OSCILLATOR INPUT: OSCILLATOR GRID (G_O) TO ALL ELECTRODES EXCEPT OSCILLATOR ANODE (G_A)	5.5	μμf
OSCILLATOR OUTPUT: OSCILLATOR ANODE (G_A) TO ALL OTHER ELECTRODES EXCEPT OSCILLATOR GRID (G_O)	4.6	μμf
MIXER OUTPUT: MIXER PLATE (P) TO ALL OTHER ELECTRODES	11	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

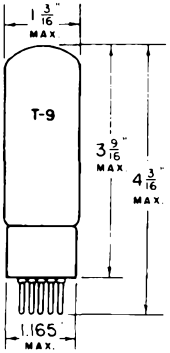
CONVERTER SERVICE

PLATE (P) VOLTAGE	135	250	VOLTS
SCREEN (G_S) VOLTAGE	67.5	100	VOLTS
CONTROL GRID (G) VOLTAGE MIN.	−3	−3	VOLTS
OSCILLATOR ANODE (G_A) SUPPLY VOLTAGE[A]	−	250	VOLTS
OSCILLATOR ANODE VOLTAGE	135	−	VOLTS
OSCILLATOR GRID (G_O) RESISTOR	50000	50000	OHMS
PLATE CURRENT	1.5	3.5	MA.
SCREEN CURRENT	1.7	2.6	MA.
OSCILLATOR ANODE CURRENT	3.0	4.3	MA.
OSCILLATOR GRID CURRENT	0.2	0.4	MA.
TOTAL CATHODE CURRENT	6.4	10.8	MA.
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −2 V.	450	−	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −3 V.	325	550	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −6 V.	75	275	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −10 V.	35	100	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = −25 V.	5	−	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = −35 V.	−	6	μMHOS

[A] APPLIED THROUGH A 20 000 OHM DROPPING RESISTOR
[S] WITH EXTERNAL SHIELD CONNECTED TO CATHODE

PLATE 921-2

TUNG-SOL

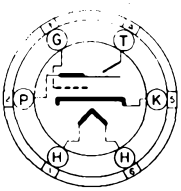


CATHODE RAY TUNING INDICATOR

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



6R

BOTTOM VIEW

SMALL 6 PIN BASE

THE TUNG-SOL 6E5 CONSISTS OF A CIRCULAR FLUORESCENT TARGET WITH AN INDICATING SHADOW ANGLE, WHICH IS CONTROLLED BY AN INTERNALLY CONNECTED SHARP CUT-OFF AMPLIFIER. WHEN THE 6E5 IS USED AS A TUNING INDICATOR, AVC VOLTAGE IS APPLIED TO THE TRIODE GRID.

RATINGS

MAXIMUM PLATE SUPPLY VOLTAGE	250	VOLTS
MAXIMUM TARGET VOLTAGE	250	VOLTS
MINIMUM TARGET VOLTAGE	100	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PLATE AND TARGET SUPPLY VOLTAGE	100	200	250	VOLTS
TRIODE GRID VOLTAGE (0° SHADOW ANGLE)	-3.3	-6.5	-8.0	VOLTS
TRIODE GRID VOLTAGE (90° SHADOW ANGLE)	0	0	0	VOLTS
SERIES TRIODE PLATE RESISTOR	0.5	1	1	MEGOHM
TRIODE PLATE CURRENT (TRIODE GRID V.=0)	0.19	0.19	0.24	MA.
TARGET CURRENT (TRIODE GRID V.=0)[A]	1	3	4	MA.

[A] SUBJECT TO WIDE VARIATIONS

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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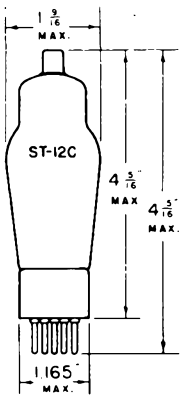
PLATE 899-2

NOV. 8 1940

TUNG-SOL



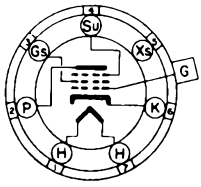
TRIPLE GRID

REMOTE CUT-OFF AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



7H
BOTTOM VIEW

SMALL 7 PIN BASE

THE TUNG-SOL 6E7 IS A TRIPLE GRID REMOTE CUT-OFF AMPLIFIER. IT IS SUITABLE FOR SERVICE WITH AVC IN RF AND IF AMPLIFIERS. ITS ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6D6, 6U7G AND THE 58.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS B_2 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	-3.0	-3.0	VOLTS
PLATE CURRENT	8.0	8.2	MA.
SCREEN CURRENT	2.2	2.0	MA.
PLATE RESISTANCE	0.25	0.8	MEGOHM
TRANSCONDUCTANCE	1500	1600	µMHOS
AMPLIFICATION FACTOR	375	1280	
CONTROL GRID VOLTAGE	-	-42.5	VOLTS
FOR TRANSCONDUCTANCE = 2 µMHOS			

SUPPRESSOR GRID CONNECTED TO CATHODE AT SOCKET

PLATE 900-1

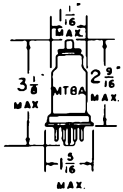
TUNG-SOL

HIGH-MU TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

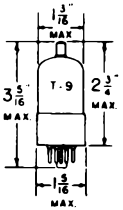
HEATER

6.3 VOLTS 0.3 AMPERE
AC OR DC



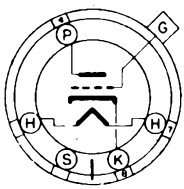
METAL SHELL
SMALL WAFER
5 PIN OCTAL BASE

6F5



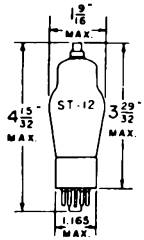
GLASS BULB
INTERMEDIATE
5 PIN OCTAL BASE

6F5GT



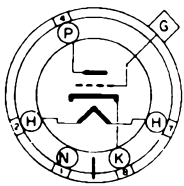
5M-0-1

6F5



GLASS BULB
SMALL 5 PIN
OCTAL BASE

6F5G



5M-0-0

6F5G, 6F5GT

THE TUNG-SOL 6F5, 6F5G AND 6F GT ARE GENERAL PURPOSE HIGH-MU TRIODES. THEY ARE DESIGNED FOR SERVICE AS HIGH GAIN S'ANCE COUPLED AMPLIFIERS IN AC AND AC-DC OPERATED RECEIVERS.

RATINGS

HEA..? VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER CURRENT	0.3	AMPERE
MAXIMUM PLATE VOLTAGE	300	VOLTS

AVERAGE CHARACTERISTICS

PLATE VOLTAGE	100	250	VOLTS
CONTROL GRID VOLTAGE	-1	-2	VOLTS
PLATE CURRENT	0.4	0.9	MA.
PLATE RESISTANCE	85 000	66 000	OHMS
TRANSCOND..CTANCE	1150	1500	μMHOS
AMPLI ICA ON FACTOR	100	100	

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE
1192-1
FEB. 28
1942

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

ZERO BIAS, RESISTANCE COUPLED, CLASS A1 AMPLIFIER

PLATE SUPPLY VOLTAGE	100		300		VOLTS
PLATE LOAD RESISTOR	0.25		0.25		MEGOHM
GRID RESISTOR	10		10		MEGOHMS
COUPLING CONDENSER	.01 TO .005		.01 TO .005		µf
GRID RESISTOR FOR FOLLOWING TUBE	.5 TO	1.0	.5 TO	1.0	MEGOHM
EXTERNAL GRID CIRCUIT IMPEDANCE	0	0	0	0	MEGOH
VOLTAGE GAIN	48	52	66	71	
VOLTAGE OUTPUT (RMS)[A]	7.0	8.5	44	50	VOLTS

[A] AT FIVE PER CENT TOTAL HARMONIC DISTORTION.

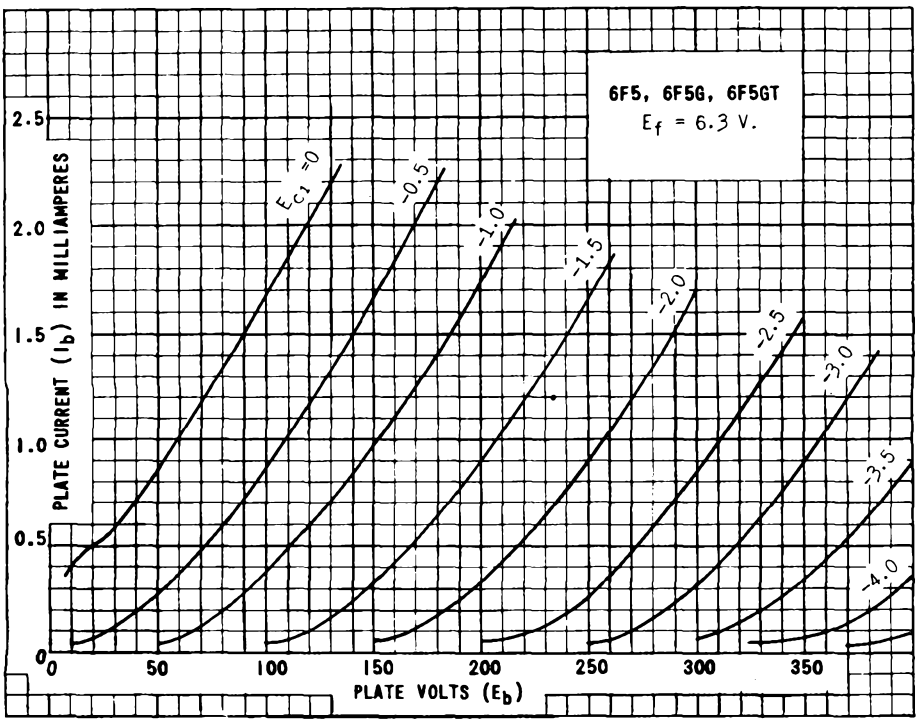

PLATE 1193-1

TUNG-SOL

PENTODE POWER AMPLIFIER

COATED UNIPOTENTIAL CATHODE

HEATERS

6F6, 6F6GT/G, 42 – 6.3 V., 0.7 AMPERE
2A5 – 2.5 V., 1.75 AMPERES

TYPES 6F6, 6F6GT/G, 2A5 AND 42 ARE PENTODE AMPLIFIERS DESIGNED FOR APPLICATION IN POWER OUTPUT STAGES OF RECEIVERS. WITH THE EXCEPTION OF HEATER RATINGS, THEIR ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

MAXIMUM RATINGS

	PENTODE CONNECTION	TRIODE CONNECTION	
MAXIMUM PLATE VOLTAGE	375	350	VOLTS
MAXIMUM SCREEN VOLTAGE	285	–	VOLTS
MAXIMUM PLATE DISSIPATION	11	–	WATTS
MAXIMUM SCREEN DISSIPATION	3.75	–	WATTS
MAXIMUM TOTAL PLATE AND SCREEN DISSIPATION	–	10	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER – SINGLE TUBE [C]

	PENTODE CONNECTION		TRIODE CONNECTION	
PLATE VOLTAGE	250	285	250	VOLTS
SCREEN VOLTAGE	250	285	–	VOLTS
CONTROL GRID VOLTAGE [A]	-16.5	-20	-20	VOLTS
PEAK AF SIGNAL VOLTAGE	16.5	20	20	VOLTS
ZERO-SIGNAL PLATE CURRENT	34	38	31	MA.
ZERO-SIGNAL SCREEN CURRENT	6.5	7	–	MA.
MAXIMUM-SIGNAL PLATE CURRENT	36	40	34	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	10.5	13	–	MA.
PLATE RESISTANCE (APPROX.)	80000	78000	2600	OHMS
TRANSCONDUCTANCE	2500	2550	2600	μMHOS
AMPLIFICATION FACTOR	–	–	6.8	
LOAD RESISTANCE	7000	7000	4000	OHMS
TOTAL HARMONIC DISTORTION	8	9	6.5	PER CENT
POWER OUTPUT	3.2	4.8	0.85	WATTS

PUSH-PULL AMPLIFIER – TWO TUBES [F]

	CLASS A_1 AMPLIFIER [C]	CLASS AB_2 AMPLIFIER [D]		
	PENTODE CONNECTION	PENTODE CONNECTION	TRIODE CONNECTION	
PLATE VOLTAGE	315	375	350	VOLTS
SCREEN VOLTAGE	285	250	–	VOLTS
CONTROL GRID VOLTAGE	-24 [A]	-26	-38	VOLTS
PEAK AF SIGNAL VOLTAGE (GRID TO GRID)	48	82	123	VOLTS
ZERO-SIGNAL PLATE CURRENT	62	34	48	MA.
ZERO-SIGNAL SCREEN CURRENT	12	5	–	MA.
MAXIMUM-SIGNAL PLATE CURRENT	80	82	92	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	19.5	19.5	–	MA.
EFFECTIVE LOAD RESISTANCE (PLATE TO PLATE)	10000	10000	6000	OHMS
TOTAL HARMONIC DISTORTION	4	3.5	2	PER CENT
POWER OUTPUT	11	18.5	13	WATTS

(CONTINUED NEXT PAGE)

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PLATE 1385-1
DEC. 15 1943

6F6, 6F6GT/G (2A5, 42)

TUNG-SOL

TYPICAL OPERATING CONDITIONS FOR CATHODE BIAS

	CLASS A_1 AMPLIFIER [C]				CLASS AB_2 AMPLIFIER [D]		
	SINGLE TUBE AMPLIFIER		PUSH-PULL AMPLI.		PUSH-PULL AMPLI.		
	Pentode Conn.	Triode Conn.	Pentode Conn. [F]		Pentode Conn. [F]	Triode Conn. [F]	
Plate	250	285	250	315	375	350	Volts
Screen	250	285	-	285	250	-	Volts
Cathode Resistor	410	-	650	320	340 [B]	730 [E]	Ohms
Peak A-F Grid Voltage	16.5	20	20	-	-	-	Volts
Peak A-F Grid-to-Grid Voltage	-	-	-	58	94	132	Volts
Zero-Sig. Plate Cur.	34	38	31	62	54	50	Ma.
Max.-Sig. Plate Cur.	35	38	32	73	77	60	Ma.
Zero-Sig. Screen Cur.	6.5	7	-	12	[A]	-	Ma.
Max.-Sig. Screen Cur.	9.7	12	-	18	18	-	Ma.
Load Resistance	7000	7000	4000	-	-	-	Ohms
Effective Load Resis. (plate to plate)	-	-	-	10000	10000	10000	Ohms
Total Harmonic Dist.	8.5	9	6.5	3	5	3	%
Max.-Sig. Power Output	3.1	4.5	0.8	10.5	19	9	Watts

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER RATED MAXIMUM CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED-BIAS OPERATION.

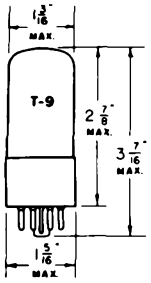
[B] THE VALUE GIVEN FOR THE CATHODE RESISTOR IS DETERMINED FOR A GRID BIAS OF -21 VOLTS.

[C] SUBSCRIPT 1 INDICATES THAT GRID CURRENT DOES NOT FLOW DURING ANY PART OF INPUT CYCLE.

[D] SUBSCRIPT 2 INDICATES THAT GRID CURRENT FLOWS DURING SOME PART OF INPUT CYCLE.

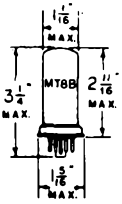
[E] THE VALUE GIVEN FOR THE CATHODE RESISTOR IS DETERMINED FOR A GRID BIAS OF -36.5 VOLTS.

[F] UNLESS OTHERWISE SPECIFIED, VALUES ARE FOR 2 TUBES.



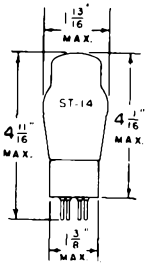
GLASS BULB

6F6GT/G



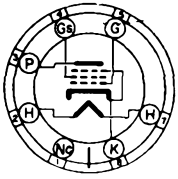
METAL SHELL

6F6

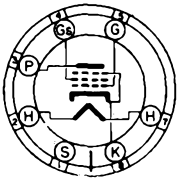


GLASS BULB

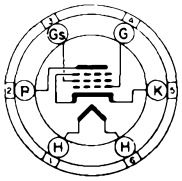
2A5 - 42



MEDIUM 7 PIN OCTAL BASE

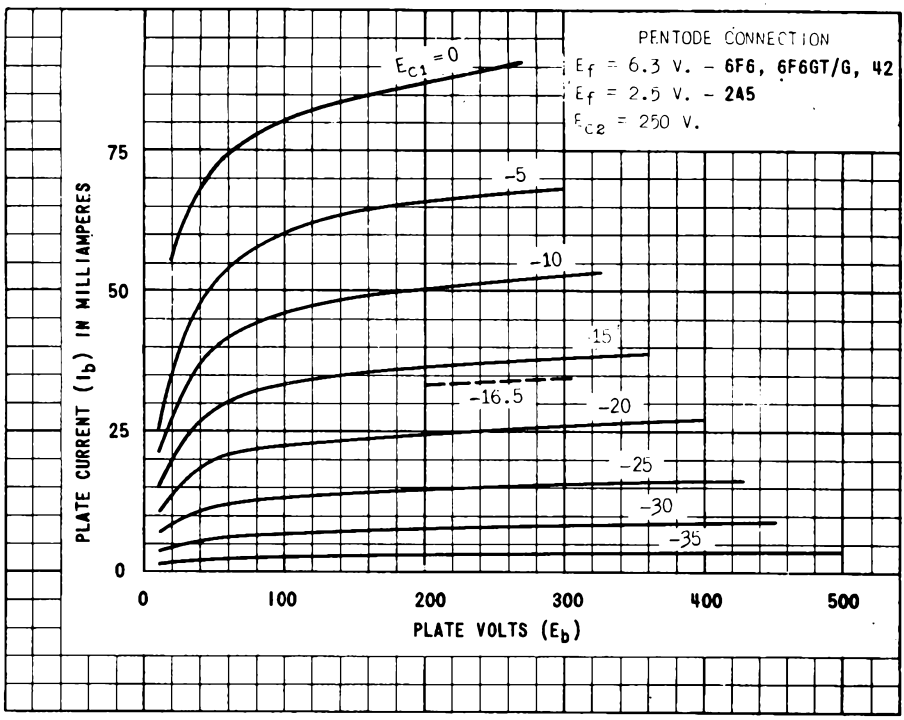


7 PIN OCTAL BASE



MEDIUM 6 PIN BASE

PLATE 1386-1
DEC. 15 1943



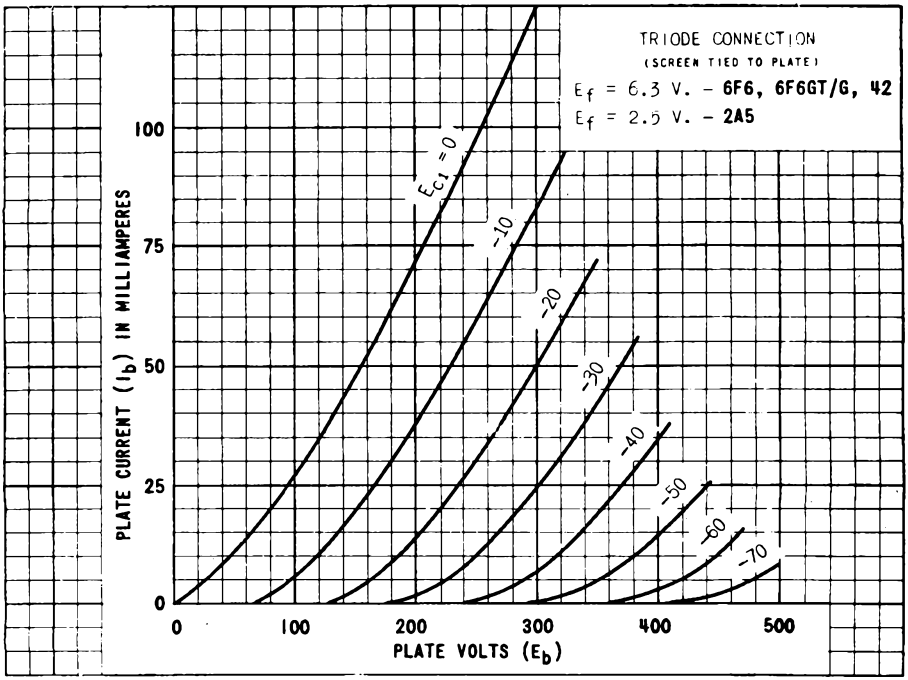


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PLATE
1339-1
OCT. 25
1943

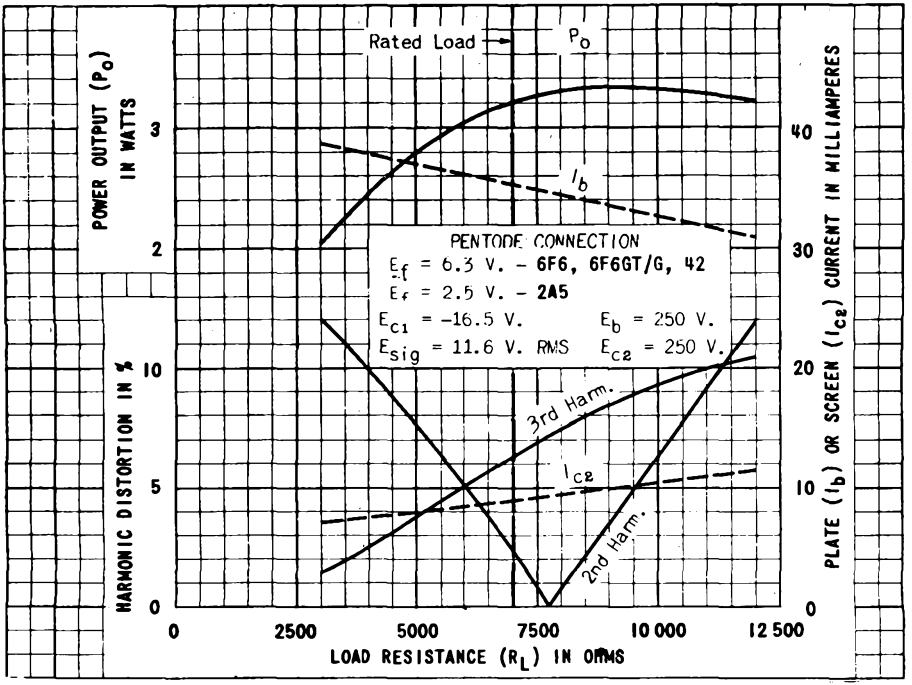
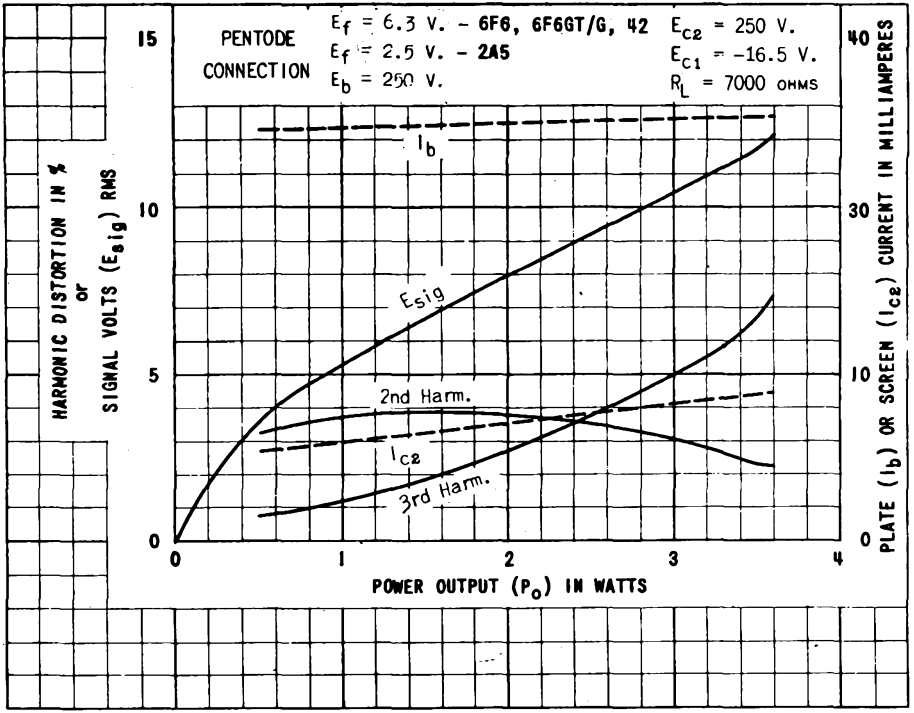
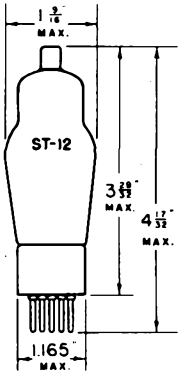


PLATE 1340-1
OCT. 25 1943

6F6, 6F6GT/G (2A5,42)



TUNG-SOL

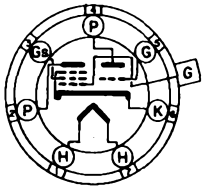


TRIODE PENTODE
AMPLIFIER AND CONVERTER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



7E

BOTTOM VIEW

SMALL 7 PIN BASE

THE TUNG-SOL 6F7 COMBINES A TRIODE AND A REMOTE CUT-OFF PENTODE, UTILIZING A COMMON CATHODE, IN A SINGLE BULB.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

	TRIODE UNIT	PENTODE UNIT		
PLATE VOLTAGE	100 MAX.	100	250 MAX.	VOLTS
SCREEN VOLTAGE MAX.	–	100	100	VOLTS
CONTROL GRID VOLTAGE MIN.	-3	-3	-3	VOLTS
PLATE CURRENT	3.5	6.3	6.5	MA.
SCREEN CURRENT	–	1.6	1.5	MA.
PLATE RESISTANCE	0.016	0.29 A	0.85 A	MEGOHM
TRANSCONDUCTANCE	500	1050	1100	μMHOS
AMPLIFICATION FACTOR	8	300 A	900 A	
TRANSCONDUCTANCE AT -35 VOLTS BIAS	–	9	10	μMHOS

A APPROXIMATE

CONVERTER SERVICE

	TRIODE UNIT	PENTODE UNIT	
PLATE VOLTAGE MAX.	100	250	VOLTS
SCREEN VOLTAGE MAX.	–	100	VOLTS
CONTROL GRID VOLTAGE	L	-3 MIN. G	VOLTS
OSCILLATOR PLATE CURRENT (AVERAGE)	4 MAX.	–	MA.

G GRID BIAS SHOULD BE AT LEAST 3 VOLTS GREATER THAN THE PEAK OSCILLATOR VOLTAGE APPLIED TO THE PENTODE GRID.

L OBTAINED BY MEANS OF A GRID LEAK.

CONTINUED NEXT PAGE

PLATE 371-2

APR. 14 1939

TYPICAL OPERATION

	TRIODE UNIT	PENTODE UNIT	
PLATE VOLTAGE	100[P]	250	VOLTS
SCREEN VOLTAGE	–	100	VOLTS
GRID BIAS	[L]	−10[B]	VOLTS
PLATE CURRENT	2.4	2.8	MA.
SCREEN CURRENT	–	0.6	MA.
GRID CURRENT	0.15	0	MA.
PLATE RESISTANCE	–	2	MEGOHMS
CONVERSION CONDUCTANCE	–	300	μMHOS
OSCILLATOR PEAK VOLTAGE INPUT	–	7	VOLTS

[B] OBTAINED BY MEANS OF A 1700 OHMS CATHODE RESISTOR.

[L] OBTAINED BY MEANS OF A GRID LEAK.

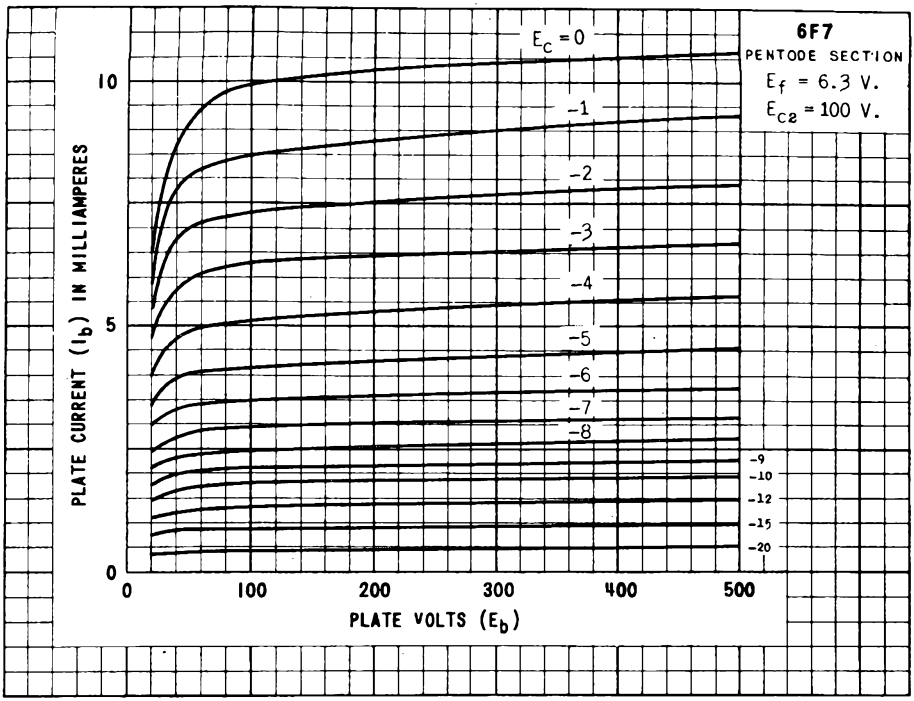
[P] MAY BE OBTAINED FROM 250 VOLT SOURCE THROUGH 60 000 OHM DROPPING RESISTOR.

DIRECT INTERELECTRODE CAPACITANCES

	TRIODE UNIT	PENTODE UNIT	
CONTROL GRID TO CATHODE	2.4	3.2	μμf
PLATE TO CATHODE	3.0	13	μμf
CONTROL GRID TO PLATE	2.0	.007 MAX. [S]	μμf

[S] WITH SHIELD

PLATE
372-2



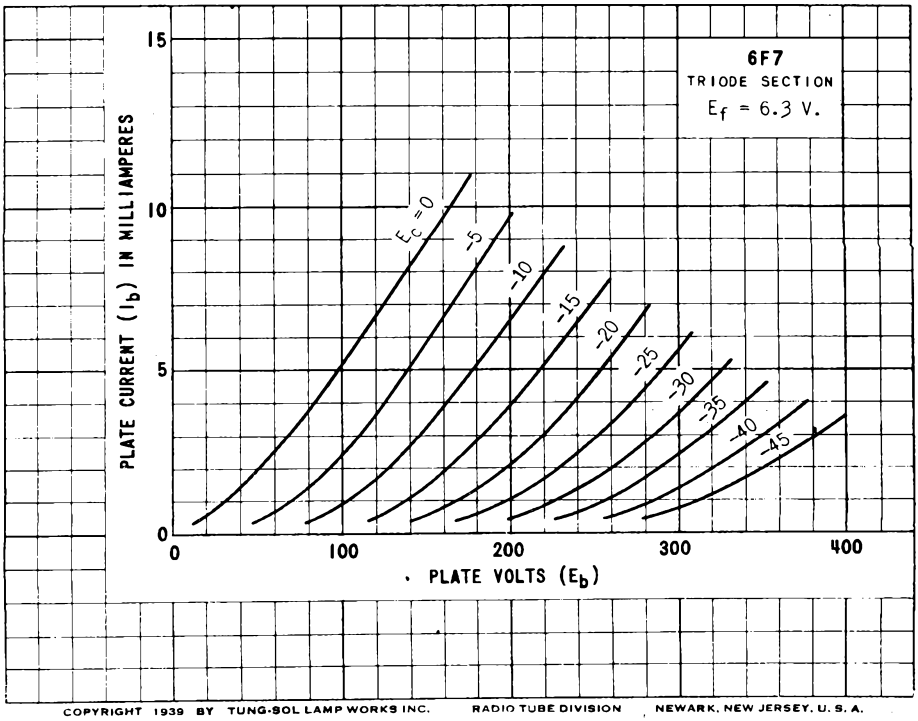


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PLATE
482-1

JUNE 26
1939

6F7

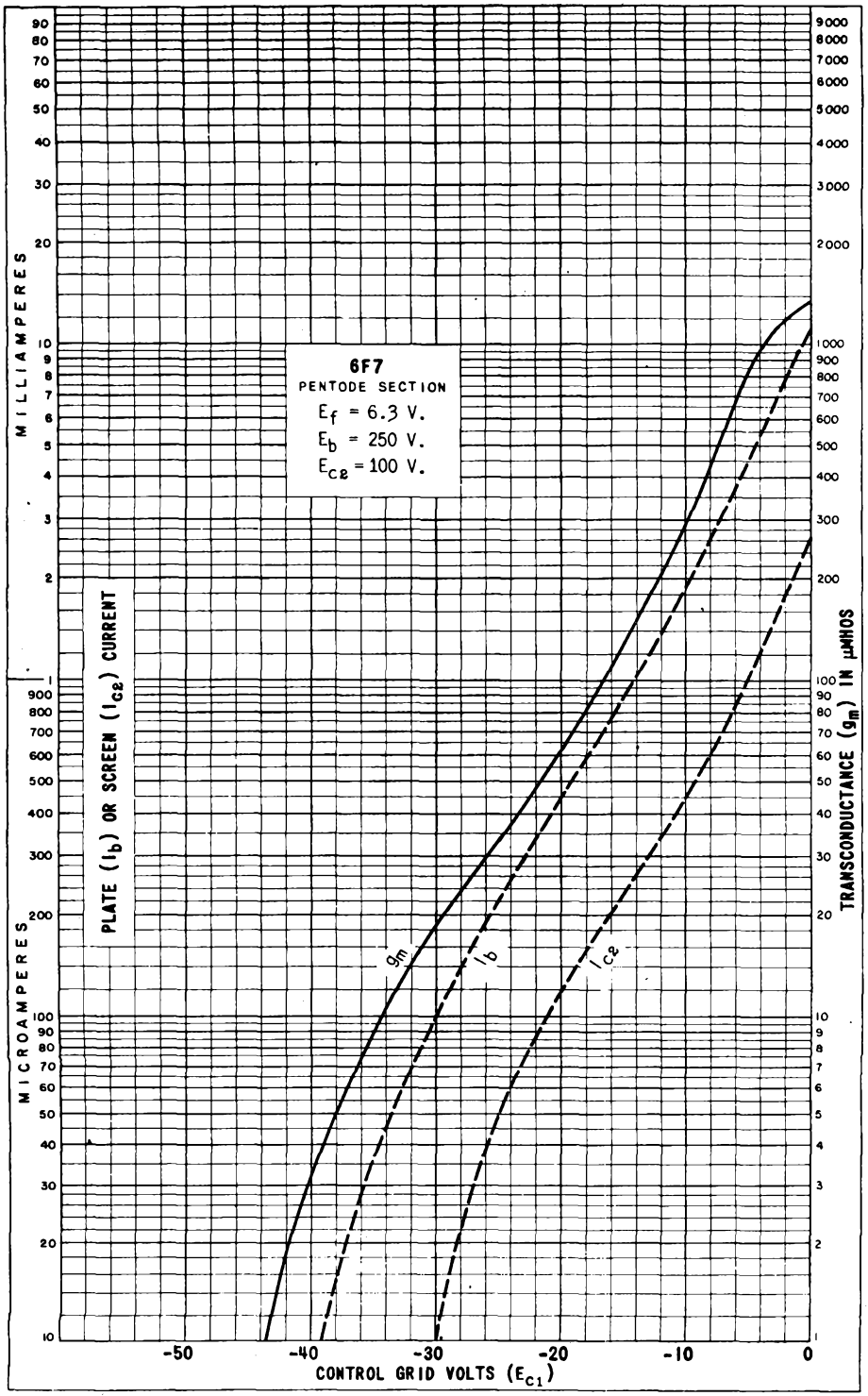
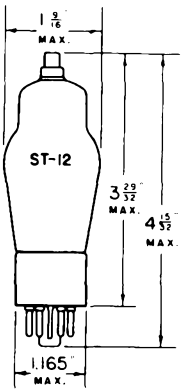


PLATE 483-1

TUNG-SOL



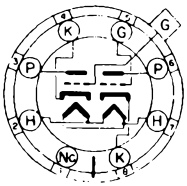
TWIN TRIODE AMPLIFIER

UNIPOTENTIAL CATHODES

HEATER
6.3 VOLTS 0.6 AMPERE
AC OR DC

GLASS BULB

SMALL 8 PIN OCTAL BASE



G-8G
BOTTOM VIEW

THE TUNG-SOL 6F8G IS A GENERAL PURPOSE TWIN TRIODE VOLTAGE AMPLIFIER HAVING TWO COMPLETELY INDEPENDENT TRIODE UNITS IN ONE BULB. WITH THE EXCEPTION OF CAPACITANCES, THE ELECTRICAL CHARACTERISTICS OF EACH TRIODE SECTION ARE IDENTICAL TO THOSE OF THE 6J5, 6J5G AND 6J5GT.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION PER UNIT	2.5	WATTS
MINIMUM CONTROL GRID VOLTAGE	0	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER (EACH UNIT)

PLATE VOLTAGE	90	250	VOLTS
CONTROL GRID VOLTAGE	0	−8	VOLTS
PLATE CURRENT	10.0	9.0	MA.
PLATE RESISTANCE	6700	7700	OHMS
TRANSCONDUCTANCE	3000	2600	μMHOS
AMPLIFICATION FACTOR	20	20	

DIRECT INTERELECTRODE CAPACITANCES[A]

	TRIODE UNIT 1		TRIODE UNIT 2	
GRID TO CATHODE	3.2		3.0	μμf
PLATE TO CATHODE	3.2		3.8	μμf
GRID TO PLATE	4.0		3.6	μμf
GRID 1 TO GRID 2		0.2		μμf
PLATE 1 TO PLATE 2		0.4		μμf
GRID 2 TO PLATE 1		0.1		μμf

[A] WITH EXTERNAL SHIELD CONNECTED TO CATHODE.

TRIODE 1 – TRIODE HAVING GRID BROUGHT OUT TO BASE PIN.

TRIODE 2 – TRIODE HAVING GRID BROUGHT TO THE TOP CAP.

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PLATE 1106-2

SEPT. 17 1941

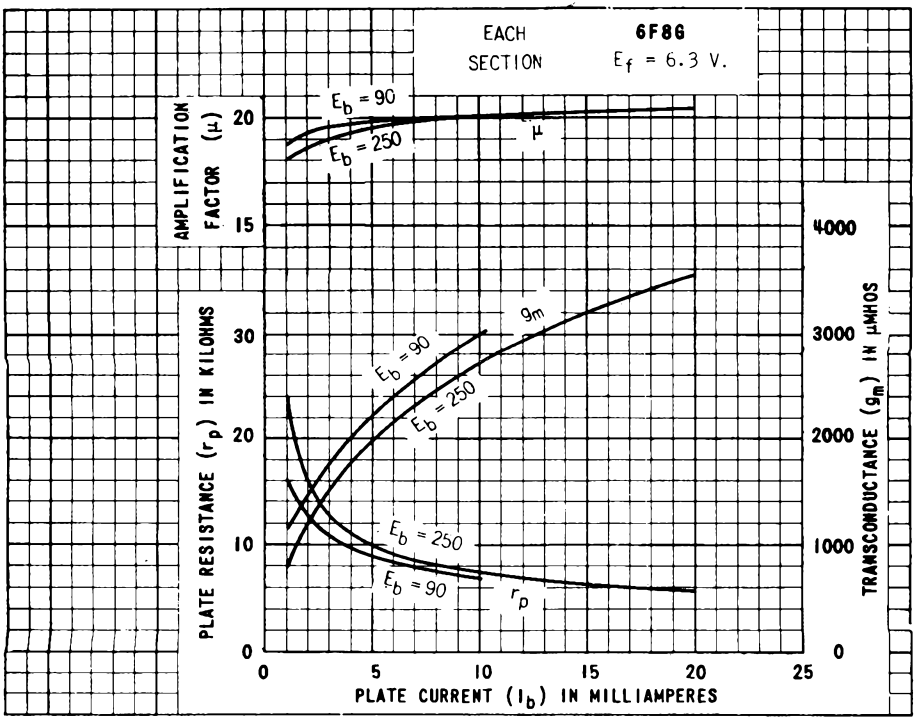
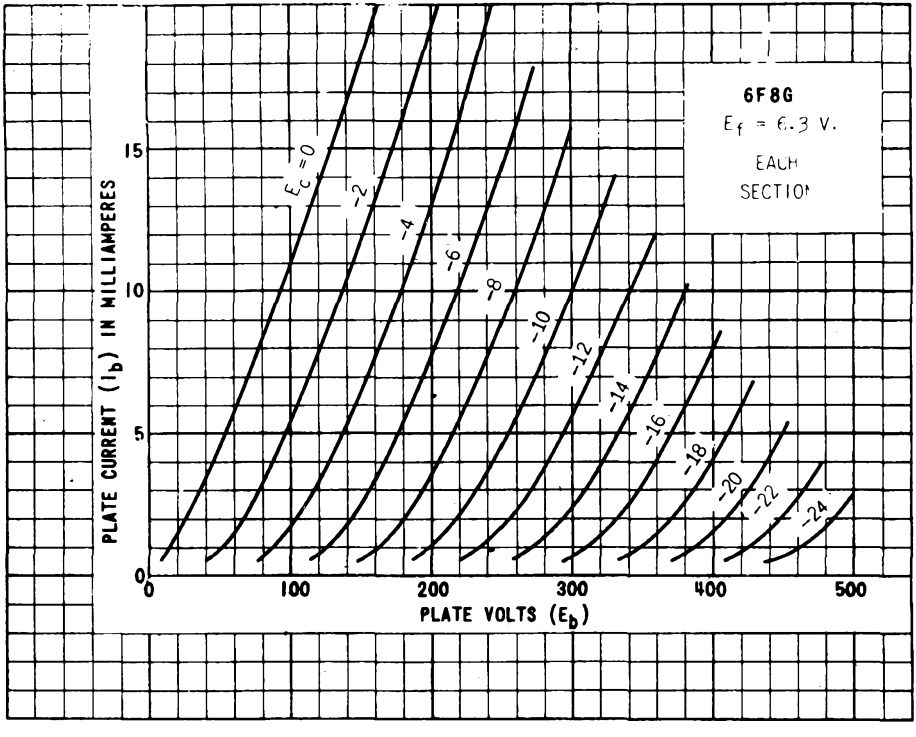
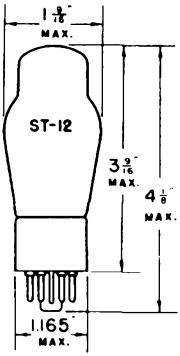


PLATE 1107-1

6F8G


6F8G
E_f = 6.3 V.
EACH
SECTION
E_c = 0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
PLATE CURRENT (I_b) IN MILLIAMPERES
0
5
10
15
0
100
200
300
400
500
PLATE VOLTS (E_b)

TUNG-SOL

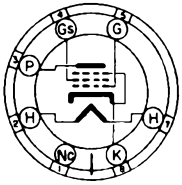


PENTODE POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB



G-7S

BOTTOM VIEW

SMALL 7 PIN OCTAL BASE

THE TUNG-SOL 6G6G IS A PENTODE POWER AMPLIFIER DESIGNED FOR SERVICE WHERE ECONOMY IN CURRENT CONSUMPTION IS DESIRED.

MAXIMUM RATINGS

MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM SCREEN VOLTAGE	180	VOLTS
MAXIMUM PLATE DISSIPATION	2.75	WATTS
MAXIMUM SCREEN DISSIPATION	0.50	WATT

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

	TRIODE	PENTODE		
PLATE VOLTAGE	180	135	180	VOLTS
SCREEN VOLTAGE	–	135	180	VOLTS
GRID VOLTAGE	-12	-6	-9	VOLTS
PEAK AF SIGNAL VOLTAGE	12	6	9	VOLTS
ZERO-SIG. PLATE CURRENT	11	11.5	15	MA.
ZERO-SIG. SCREEN CURRENT	–	2.0	2.5	MA.
PLATE RESISTANCE	4730	170 000	175 000	OHMS
TRANSCONDUCTANCE	2000	2100	2300	μMHOS
AMPLIFICATION FACTOR	9.5	360	400	
LOAD RESISTANCE	12 000	12 000	10 000	OHMS
TOTAL HARMONIC DISTORTION	5	7.5	10	PER CENT
POWER OUTPUT	0.25	0.6	1.1	WATTS

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID TO CATHODE	6	μμf
PLATE TO CATHODE	10	μμf
CONTROL GRID TO PLATE	0.2	μμf

[S] WITH SHIELD

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PLATE 468-3

JUNE 26 1939

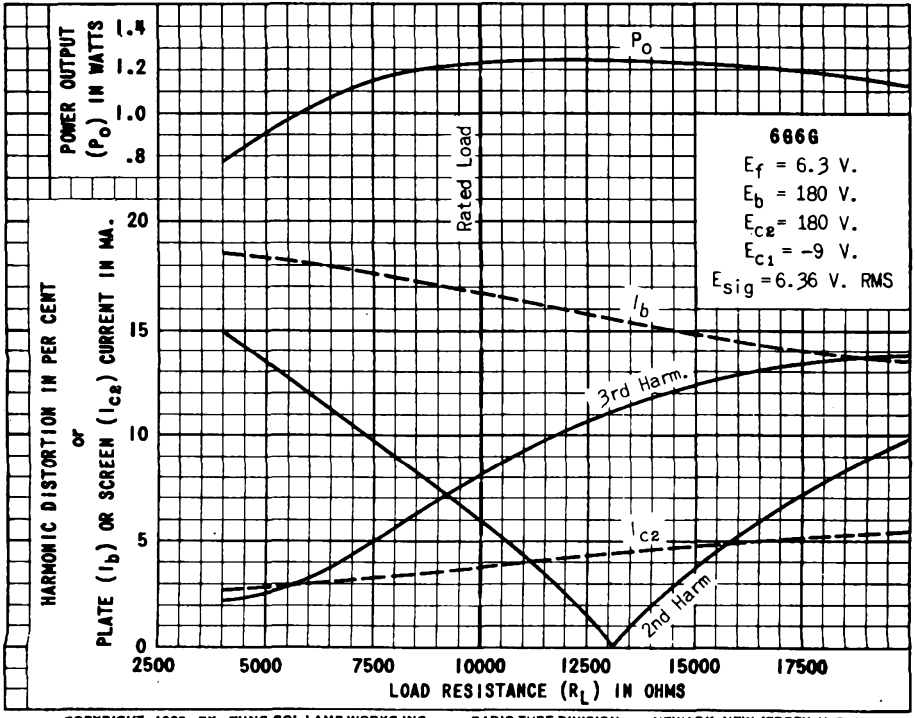
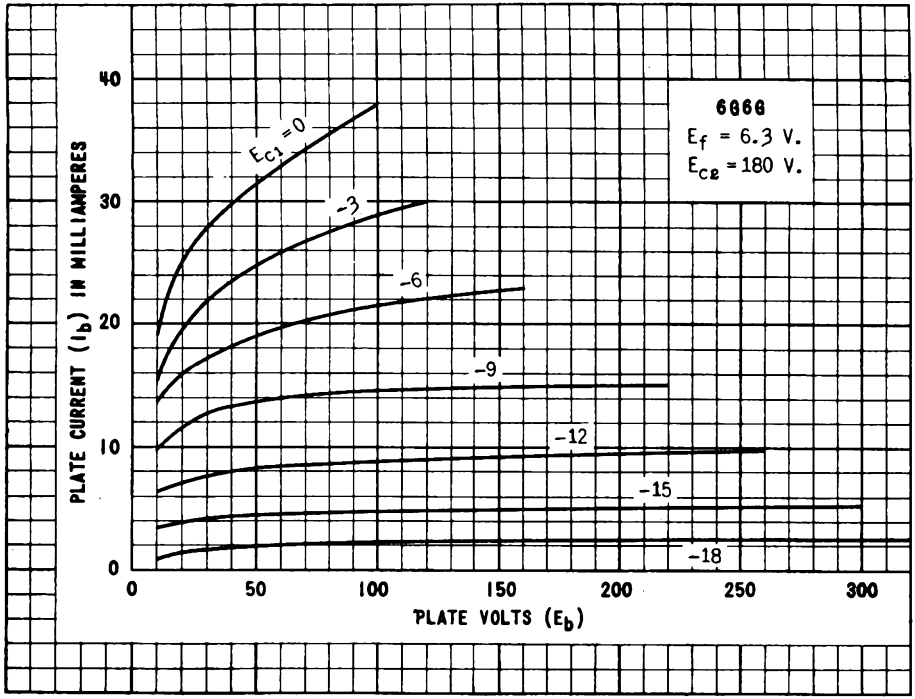
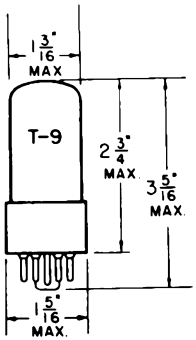


PLATE
469-1

6G6 G


6G6G
E_f = 6.3 V.
E_{c2} = 180 V.
E_{c1} = 0
-3
-6
-9
-12
-15
-18
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
10
20
30
40
0
50
100
150
200
250
300

TUNG-SOL



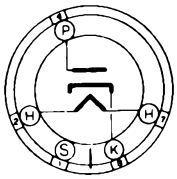
DIODE

UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.150 AMP.

AC OR DC



BOTTOM VIEW

INTERMEDIATE OCTAL
5 PIN BASE

GLASS BULB

ANY MOUNTING POSITION

RATINGS

MAXIMUM AC PLATE VOLTAGE (RMS)	100	VOLTS
MAXIMUM DC OUTPUT CURRENT	4.0	MA.
MAXIMUM PEAK PLATE CURRENT	18	MA.
PLATE RESISTANCE AT 0.25 MA. (APPROX.)	1 000	OHMS

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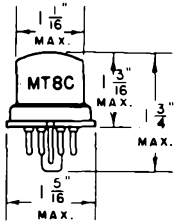
PLATE
1577
FEB. 28
1945

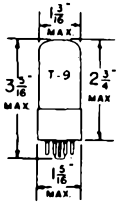
TUNG-SOL



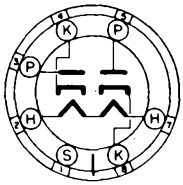
TWIN DIODE

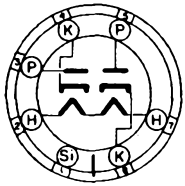
UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC



METAL SHELL
7 PIN OCTAL BASE
6H6





GLASS BULB
INTERMEDIATE
7 PIN OCTAL BASE
6H6GT/G

BOTTOM VIEWS

THE TUNG-SOL 6H6 AND 6H6GT/G ARE DESIGNED FOR USE AS DIODE DETECTORS, AVC RECTIFIERS, AND POWER RECTIFIERS IN LOW DRAIN APPLICATIONS. TWO SEPARATE RECTIFIER SECTIONS ALLOW CONSIDERABLE FLEXIBILITY IN THEIR APPLICATION. WITH THE EXCEPTION OF CAPACITANCES, THEIR ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM AC PLATE VOLTAGE PER PLATE (RMS)	150	VOLTS
MAXIMUM DC OUTPUT CURRENT PER PLATE	8	MA.
TUBE VOLTAGE DROP AT 16 MA. DC PER PLATE	11	VOLTS

DIRECT INTERELECTRODE CAPACITANCES [A]

	6H6	6H6GT/G	
PLATE (1) TO CATHODE (1)	3.0	3.0	μμf
PLATE (2) TO CATHODE (2)	3.4	4.0	μμf
PLATE TO PLATE	0.1 MAX.	0.1 MAX.	μμf

[A] WITH EXTERNAL SHIELD OR SHELL CONNECTED TO CATHODE

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE
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1943

6H6, 6H6GT/G

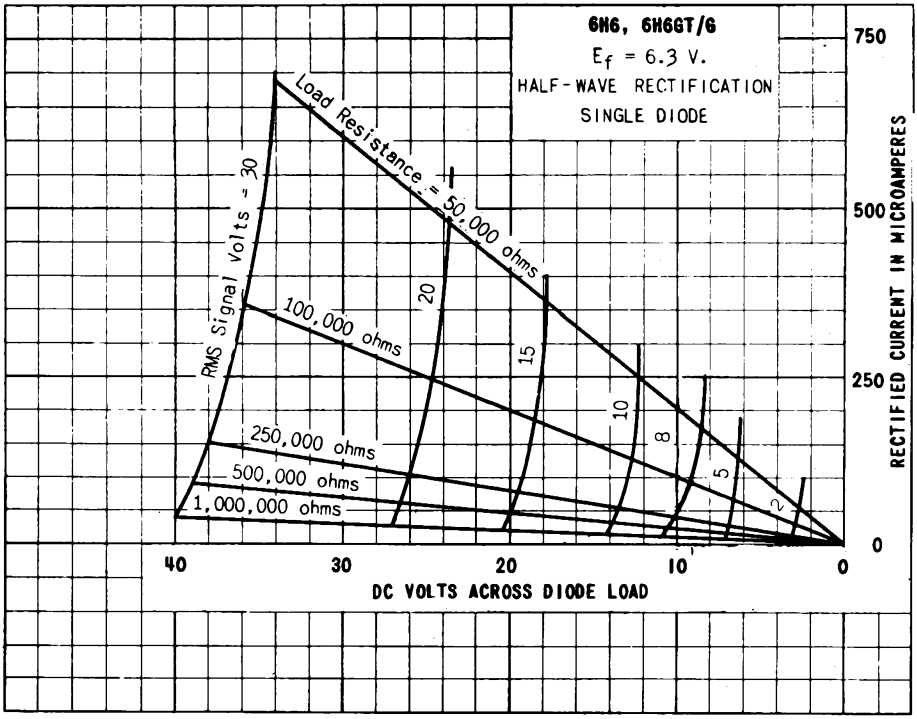


PLATE
1342-1
OCT. 25
1943

TUNG-SOL

UHF AMPLIFIER TRIODE

MINIATURE TYPE

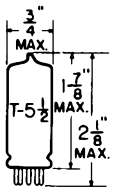
COATED UNIPOTENTIAL CATHODE

HEATER

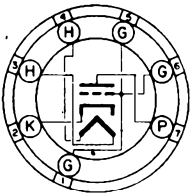
6.3 VOLTS 0.4 HEATER

AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW

MINIATURE BUTTON 7 PIN BASE

THE 6J4 IS A TRIODE USING THE MINIATURE CONSTRUCTION AND INTENDED FOR USE PRIMARILY AS A GROUNDED-GRID UHF AMPLIFIER AT FREQUENCIES UP TO APPROXIMATELY 500 MEGACYCLES. ITS DESIGN FEATURES AN AMPLIFICATION FACTOR OF 55 COMBINED WITH AN EXTREMELY HIGH TRANSCONDUCTANCE OF 12000 MICROMHOS, AND PERMITS GROUNDED-GRID OPERATION WITH A HIGH SIGNAL-TO-NOISE RATIO. THE 6J4 MAY ALSO BE USED IN CONVENTIONAL TRIODE CIRCUITS WITH UNGROUNDED GRID.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

WITH CLOSE FITTING SHIELD CONNECTED TO GRID

	EACH UNIT	
GRID TO PLATE (G TO P) MAX.	4	μμf
INPUT G TO (H + K)	5.5	μμf
OUTPUT P TO (H + K)	0.24	μμf
HEATER TO CATHODE (H TO K)	2.8	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	150	VOLTS
MAXIMUM PLATE DISSIPATION	2.25	WATTS
MAXIMUM PLATE CURRENT	20	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

GROUNDED-GRID CLASS A_1 AMPLIFIER - EACH UNIT

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	0.4	0.4	AMP.
PLATE VOLTAGE	100	150	VOLTS
GRID #1 RESISTOR[A]	100	100	OHMS
PLATE CURRENT	10	15	MA.
PLATE RESISTANCE (APPROX.)	5 000	4 500	OHMS
TRANSCONDUCTANCE	11 000	12 000	μMHOS
AMPLIFICATION FACTOR	55	55	

[A] SHOULD ALWAYS BE USED WITH A CATHODE BIAS RESISTOR SUITABLY BY-PASSED. THE DC RESISTANCE IN THE GRID CIRCUIT SHOULD NEVER EXCEED 0.25 MEGOHM UNDER MAXIMUM RATED CONDITIONS.

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PLATE 1830
JUNE 2, 1947

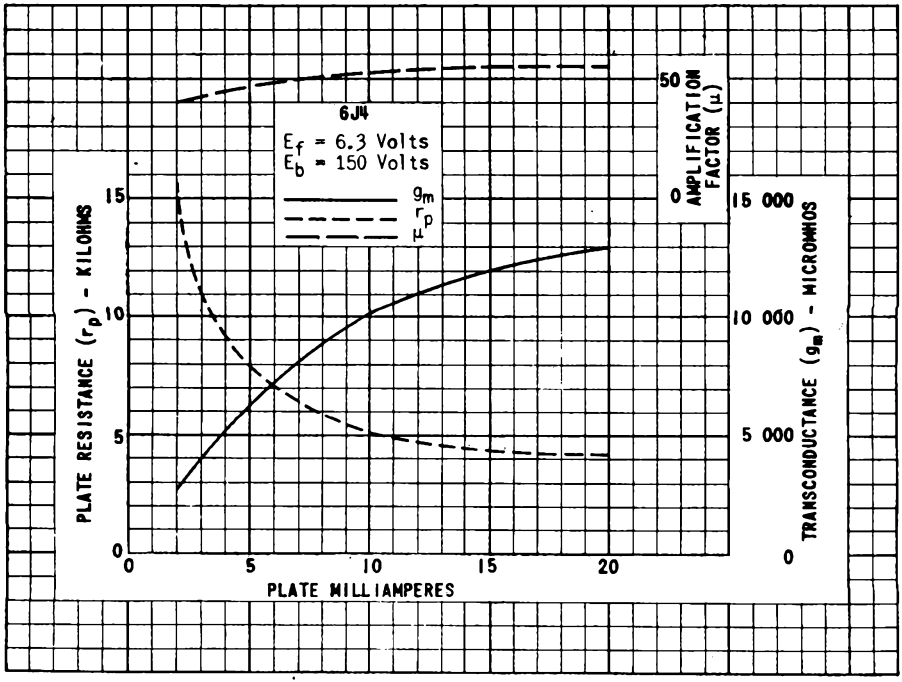
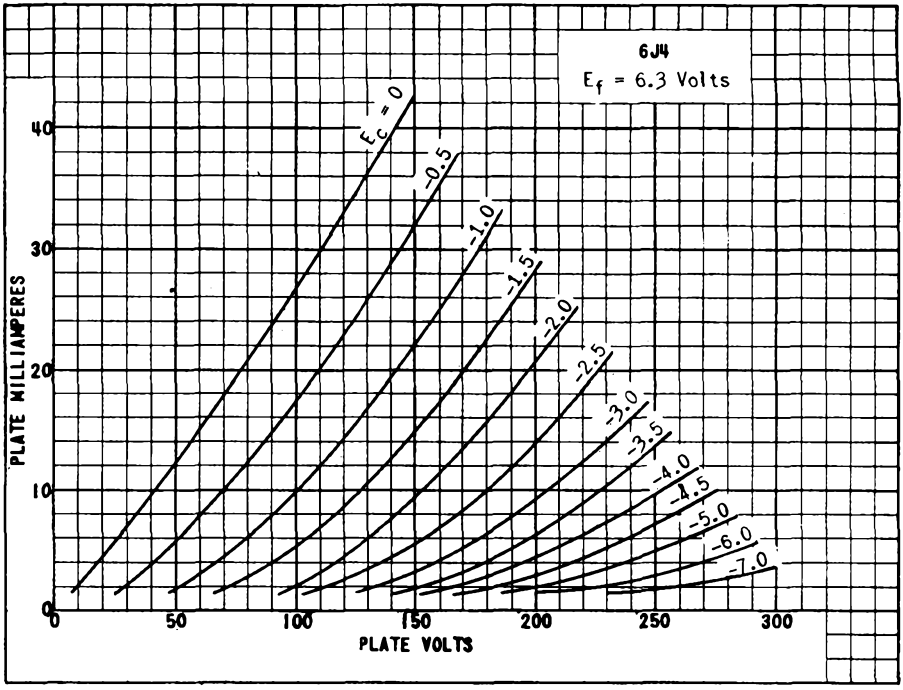


PLATE
1831
JUNE 2,
1947

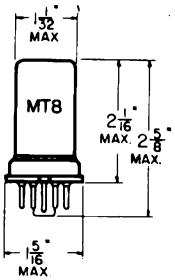
6J4


6J4
E_f = 6.3 Volts
E_c = 0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
-6.0
-7.0
PLATE MILLIAMPERES
0
10
20
30
40
0
50
100
150
200
250
300
PLATE VOLTS

TUNG-SOL

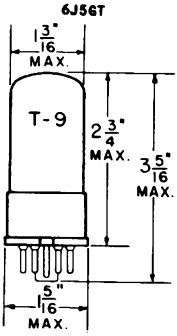
TRIODE

6J5



METAL SHELL

6J5GT

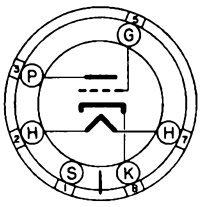


GLASS BULB

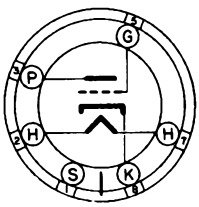
COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 300 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
SMALL WAFER
6 PIN OCTAL



BOTTOM VIEW
SMALL WAFER
6 PIN OCTAL
METAL SLEEVE

THE 6J5 AND 6J5GT ARE GENERAL PURPOSE MEDIUM-MU TRIODES. THEY ARE USEFUL FOR SERVICE AS OSCILLATORS OR AUDIO-FREQUENCY AMPLIFIERS.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

	6J5[A]	6J5GT[B]	
GRID TO PLATE: (G TO P)	3.4	3.8	μμf
INPUT: G TO (H+K)	3.4	4.2	μμf
OUTPUT: P TO (H+K)	3.6	5	μμf

[A] WITH SHELL CONNECTED TO CATHODE.

[B] WITH CLOSE-FITTING SHIELD CONNECTED TO CATHODE.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MINIMUM NEGATIVE DC GRID VOLTAGE	0	VOLTS
MAXIMUM GRID CIRCUIT RESISTANCE	1.0	MEG.
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MAXIMUM CATHODE CURRENT	20	MA.

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION

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PLATE
1944
JAN. 2,
1948

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	300	300	MA.
PLATE VOLTAGE	90	250	VOLTS
GRID VOLTAGE	0	-8	VOLTS
PLATE CURRENT	10	9	MA.
PLATE RESISTANCE	6 700	7 700	OHMS
TRANSCONDUCTANCE	3 000	2 600	µMHOS
AMPLIFICATION FACTOR	20	20	

SIMILIAR TYPE REFERENCE: Ratings and characteristics are identical to 744.

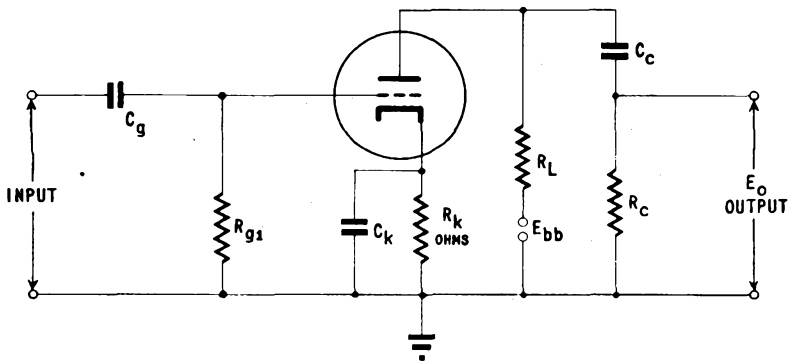
RESISTANCE COUPLED AMPLIFIER

R_1 MEG.	R_{g1} MEG.	R_s MEG.	E_{bb} = 90 VOLTS			E_{bb} = 180 VOLTS			E_{bb} = 300 VOLTS		
			R_k	GAIN	E_o	R_k	GAIN	E_o	R_k	GAIN	E_o
0.10	A	0.10	3300	14	13	2200	14	26	1800	14	40
0.10	A	0.24	3600	14	16	2700	15	33	2200	15	51
0.24	A	0.24	7500	14	16	5100	15	30	4300	15	44
0.24	A	0.51	9100	14	19	6800	15	39	5100	15	54
0.51	A	0.51	13000	14	16	9100	15	30	6800	16	40
0.51	A	1.0	15000	14	19	10000	16	32	7500	16	45
0.24	10	0.24	---	15	13	---	16	33	----	17	46
0.24	10	0.51	---	16	17	---	17	38	----	18	62
0.51	10	0.51	---	16	14	---	18	32	----	18	53
0.51	10	1.0	---	17	18	---	18	41	----	19	68

[A] VALUE OF R_{g1} IS NOT CRITICAL.

GAIN MEASURED AT E_o = 2.0 VOLTS RMS OUTPUT.

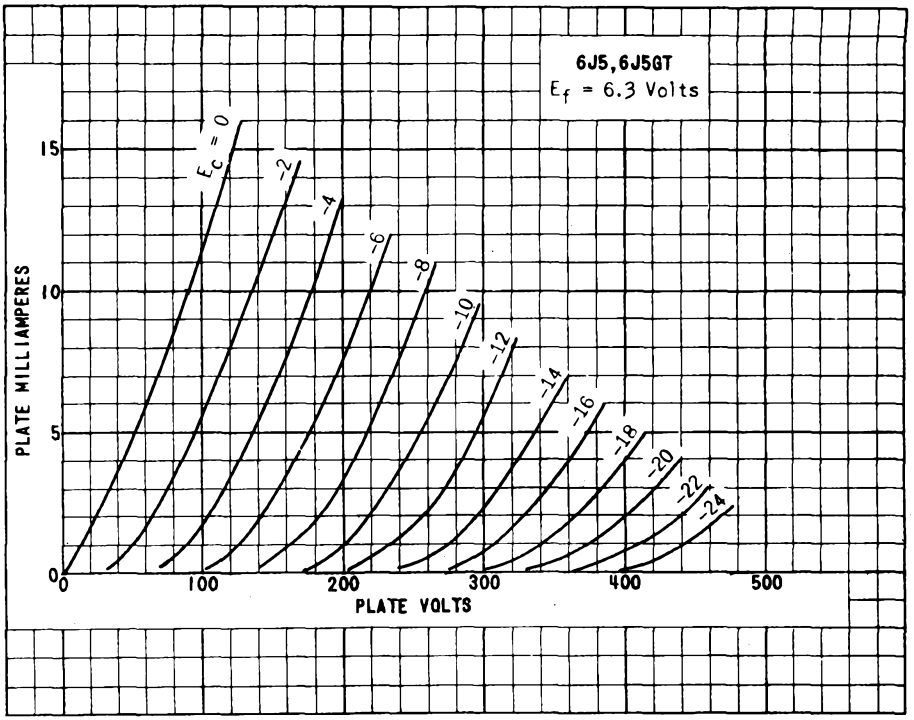
E_o IS RMS OUTPUT FOR 5% TOTAL HARMONIC DISTORTION.



NOTE: COUPLING CAPACITORS C_g AND C_c SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE. R_k SHOULD BE ADEQUATELY BY-PASSED BY CAPACITOR C_k.

→ INDICATES A CHANGE OR ADDITION

PLATE 1945
JAN. 2, 1948



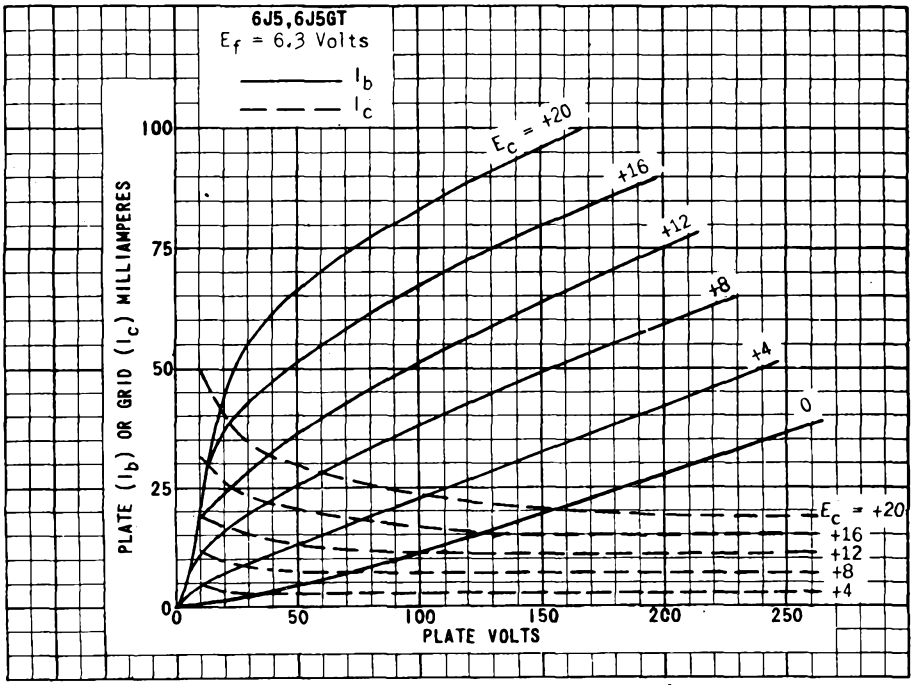


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PLATE
1946
JAN. 2,
1948

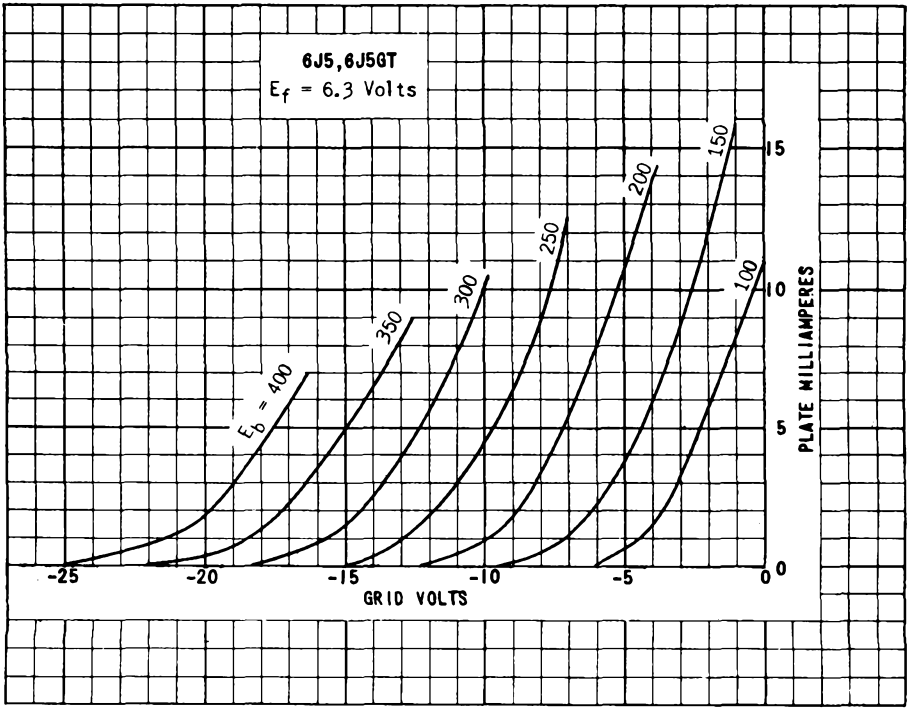
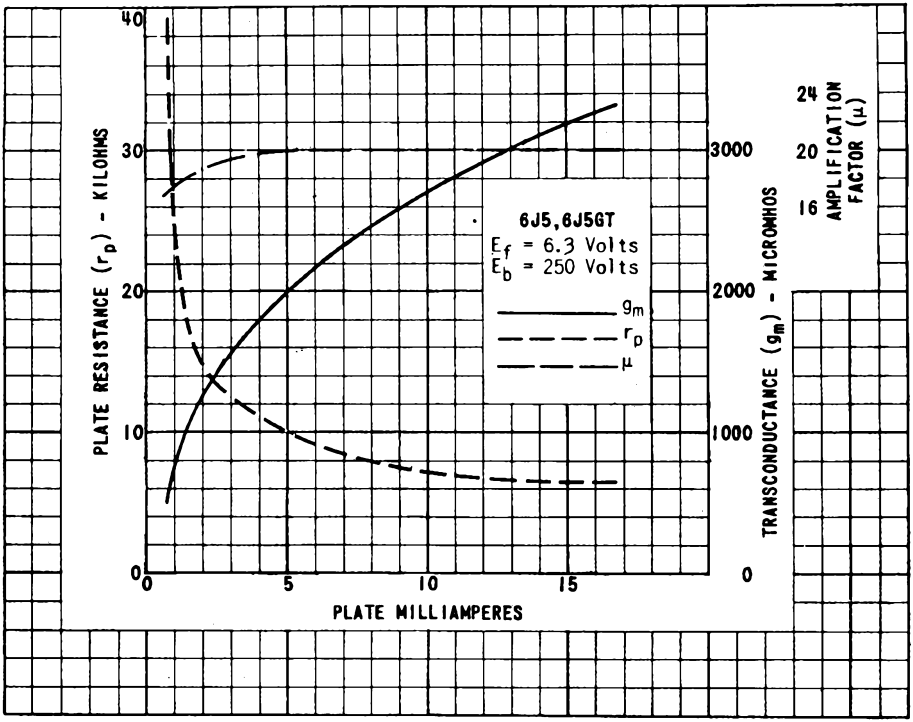


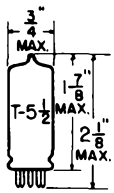
PLATE
1947
JAN. 2,
1948

6J5,6J5GT


6J5,6J5GT
E_f = 6.3 Volts
E_b = 250 Volts
g_m
r_p
μ
PLATE RESISTANCE (r_p) - KILOHMS
TRANSCONDUCTANCE (g_m) - MICROMHOS
AMPLIFICATION FACTOR (μ)
PLATE MILLIAMPERES
0
5
10
15
0
10
20
30
40
0
1000
2000
3000
16
20
24

TUNG-SOL

TWIN TRIODE

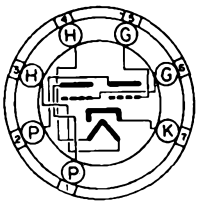


GLASS BULB

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.45 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 6J6 IS A TWIN TRIODE HAVING TWO PLATES AND TWO GRIDS WITH A COMMON CATHODE, USING THE MINIATURE CONSTRUCTION. IT MAY BE OPERATED IN PARALLEL OR PUSH-PULL. WITH THE GRIDS IN A PUSH-PULL ARRANGEMENT AND THE PLATES IN PARALLEL, THE 6J6 IS PARTICULARLY APPLICABLE AS A MIXER AT FREQUENCIES AS HIGH AS 600 MEGACYCLES. IT IS ALSO USEFUL AS AN OSCILLATOR.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

WITH NO EXTERNAL SHIELD

	EACH UNIT	
GRID TO PLATE: (G TO P)	1.6	μμf
INPUT: G TO (H + K)	2.2	μμf
OUTPUT: P TO (H + K)	0.4	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

	AF AMPLIFIER	RF AMPLIFIER	
HEATER VOLTAGE	6.3	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	100	100	VOLTS
MAXIMUM PLATE VOLTAGE	300	300	VOLTS
MAXIMUM DC GRID VOLTAGE	—	-40	VOLTS
MAXIMUM GRID RESISTOR (SELF BIAS)	0.5	—	OHMS
MAXIMUM DC PLATE CURRENT (PER UNIT)	—	15	MA.
MAXIMUM DC GRID CURRENT (PER UNIT)	—	8	MA.
MAXIMUM DC PLATE INPUT (PER UNIT)	—	4.5	WATTS
MAXIMUM PLATE DISSIPATION (PER UNIT)	1.5	1.5	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 - AF AMPLIFIER

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.45	AMP.
PLATE VOLTAGE	100	VOLTS
CATHODE BIAS RESISTOR[A] (BOTH UNITS)	50	OHMS
PLATE CURRENT	8.5	MA.
PLATE RESISTANCE	7 100	OHMS
TRANSCONDUCTANCE	5 300	μMHOS
AMPLIFICATION FACTOR	38	

[A] FIXED BIAS OPERATION NOT RECOMMENDED. THE RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 0.5 MEGOHM UNDER MAXIMUM RATED CONDITIONS.

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PLATE 1832
JUNE 2, 1947

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

RF POWER AMPLIFIER AND OSCILLATOR – CLASS C TELEGRAPHY
PUSH–PULL – BOTH UNITS

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.45	VOLTS
DC PLATE VOLTAGE	150	VOLTS
DC GRID VOLTAGE[B]	−10	VOLTS
	625	OHMS
	220	OHMS
DC PLATE CURRENT	30	MA.
DC GRID CURRENT (APPROX.)	16	MA.
DRIVING POWER (APPROX.)	0.35	WATT
POWER OUTPUT (APPROX.)	3.5	WATTS

[B] OBTAINED BY GRID RESISTOR (625 OHMS), CATHODE RESISTOR (220 OHMS), OR FIXED SUPPLY.

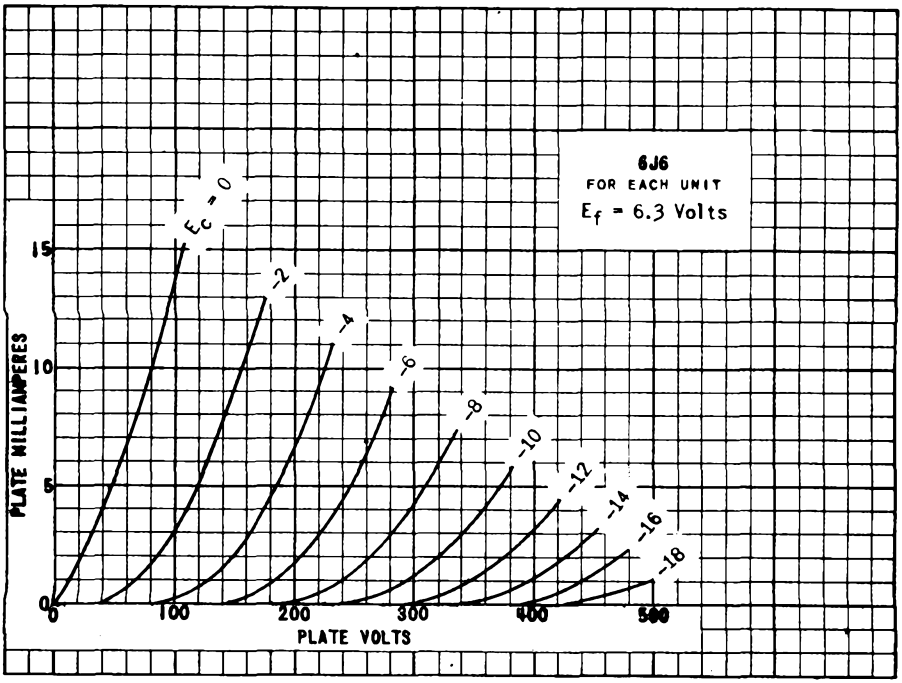
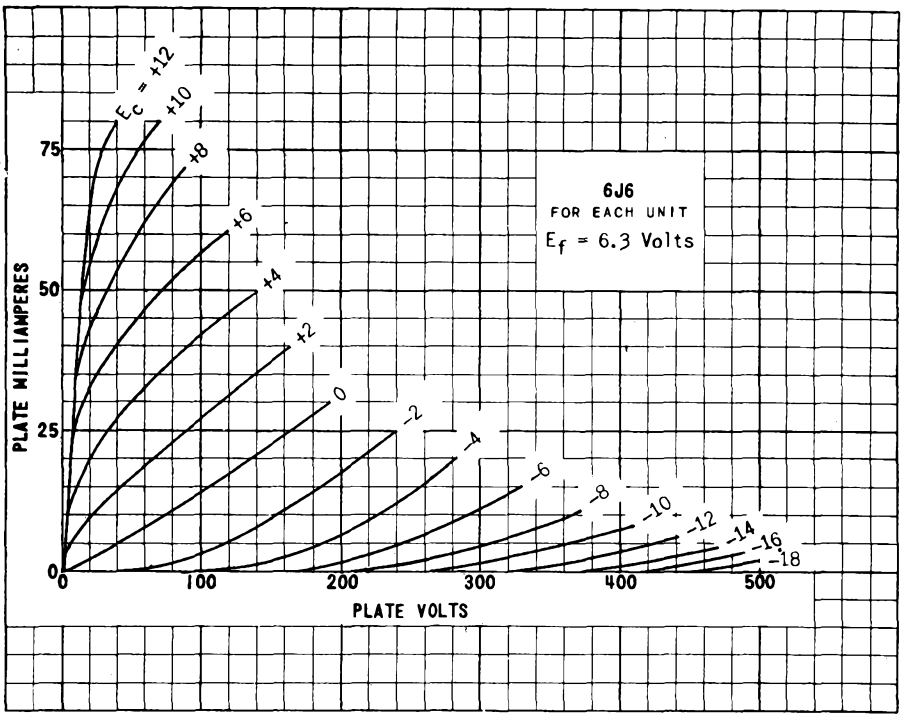


PLATE 1833
JUNE 2, 1947



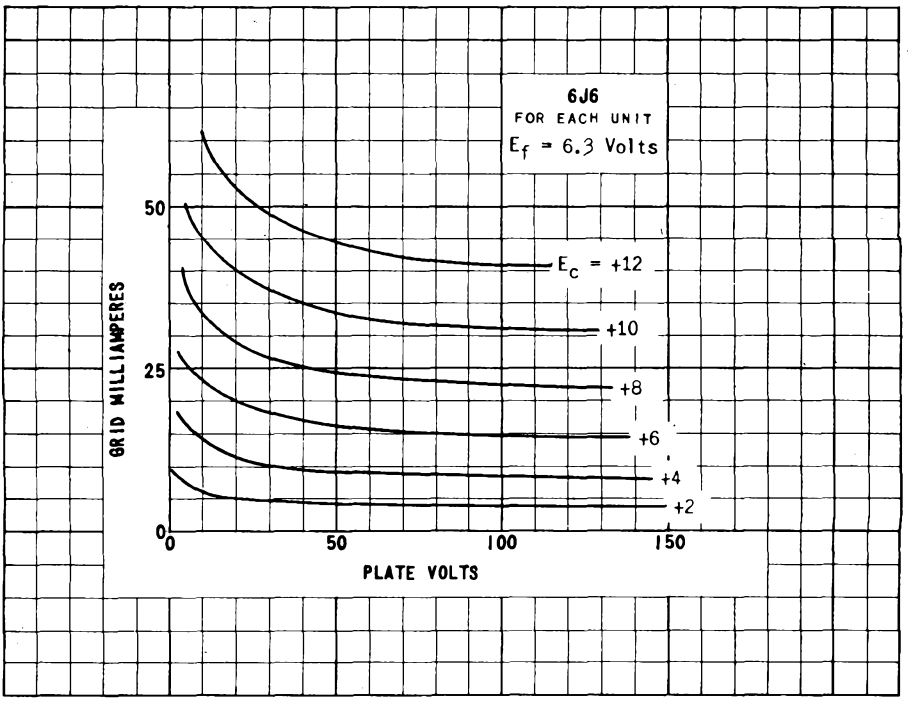


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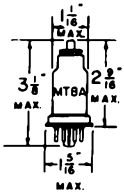
PLATE
1834
JUNE 2,
1947

TUNG-SOL



TRIPLE GRID

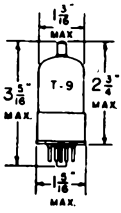
DETECTOR AMPLIFIER

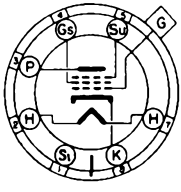
UNIPOTENTIAL CATHODE

HEATER

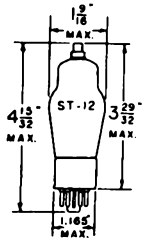
6.3 VOLTS 0.3 AMPERE

AC OR DC





G-7Ra



7R

THE TUNG-SOL 6J7, 6J7G, 6J7GT AND THE 12J7GT ARE SHARP CUT-OFF GENERAL PURPOSE AMPLIFIERS. WITH THE EXCEPTION OF HEATER AND CAPACITANCE RATINGS, THEIR ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6C6.

RATINGS

	TRIODE[A] CONNECTION	PENTODE CONNECTION	
MAXIMUM PLATE VOLTAGE	250	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	–	300	VOLTS
MAXIMUM SCREEN VOLTAGE	–	125	VOLTS
MINIMUM EXTERNAL CONTROL GRID BIAS VOLTAGE	0	0	VOLTS
MAXIMUM PLATE DISSIPATION	1.75	0.75	WATT
MAXIMUM SCREEN DISSIPATION	–	0.10	WATT

[A] SUPPRESSOR GRID AND SCREEN TIED TO PLATE

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1004-3

APR. 21 1941

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES

TRIODE CONNECTION

	6J7	6J7G	6J7GT 12J7GT
CONTROL GRID TO CATHODE	5[B]	2.6[C]	2.6[C]
PLATE TO CATHODE	14	17	17
CONTROL GRID TO PLATE	2.0	1.8	1.8

PENTODE CONNECTION

CONTROL GRID TO CATHODE	7[B]	4.6[D]	4.6[D]
PLATE TO CATHODE	12	12	12
CONTROL GRID TO PLATE MAX.	0.005	0.007	0.005

[B] WITH SHELL CONNECTED TO CATHODE
[C] WITHOUT EXTERNAL SHIELD
[D] WITH EXTERNAL SHIELD CONNECTED TO CATHODE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

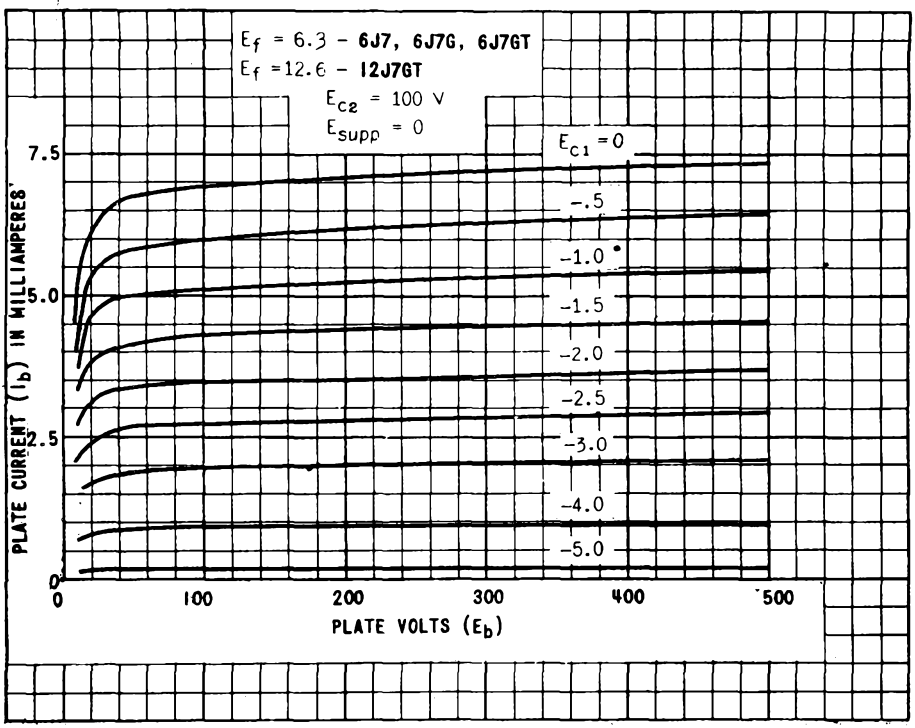
	TRIODE CONNECTION		PENTODE CONNECTION		
PLATE VOLTAGE	180	250	100	250	VOLTS
SCREEN VOLTAGE	PLATE	PLATE	100	100	VOLTS
CONTROL GRID VOLTAGE [E]	-5.3	-8	-3	-3	VOLTS
SUPPRESSOR GRID	PLATE	PLATE	CONNECTED TO CATHODE AT SOCKET		
PLATE CURRENT	5.3	6.5	2.0	2.0	MA.
SCREEN CURRENT	—	—	0.5	0.5	MA.
PLATE RESISTANCE APPROX.	0.0110	0.0105	1.0	— [F]	MEGOHM
TRANSCONDUCTANCE	1800	1900	1185	1225	μMHOS
CONTROL GRID VOLTAGE FOR CATHODE CURRENT CUT-OFF	—	—	-7	-7	VOLTS

[E] THE DC RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 1.0 MEGOHM

[F] GREATER THAN 1 MEGOHM

PLATE 1005-3

APR. 21 1941



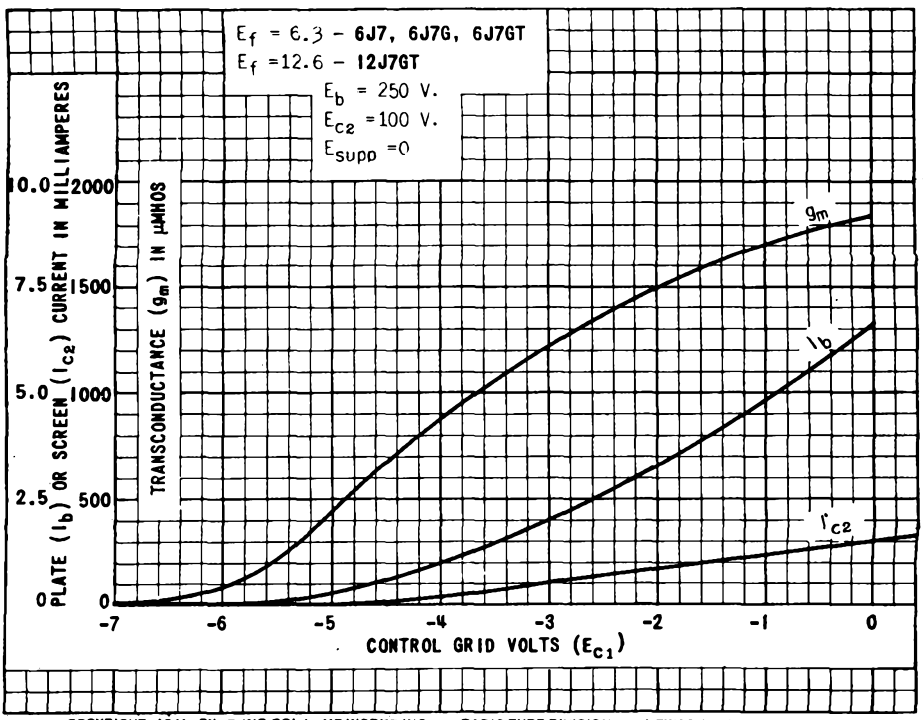


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PLATE 1006-2

APR. 21 1941

12J7GT 6J7, 6J7G, 6J7GT

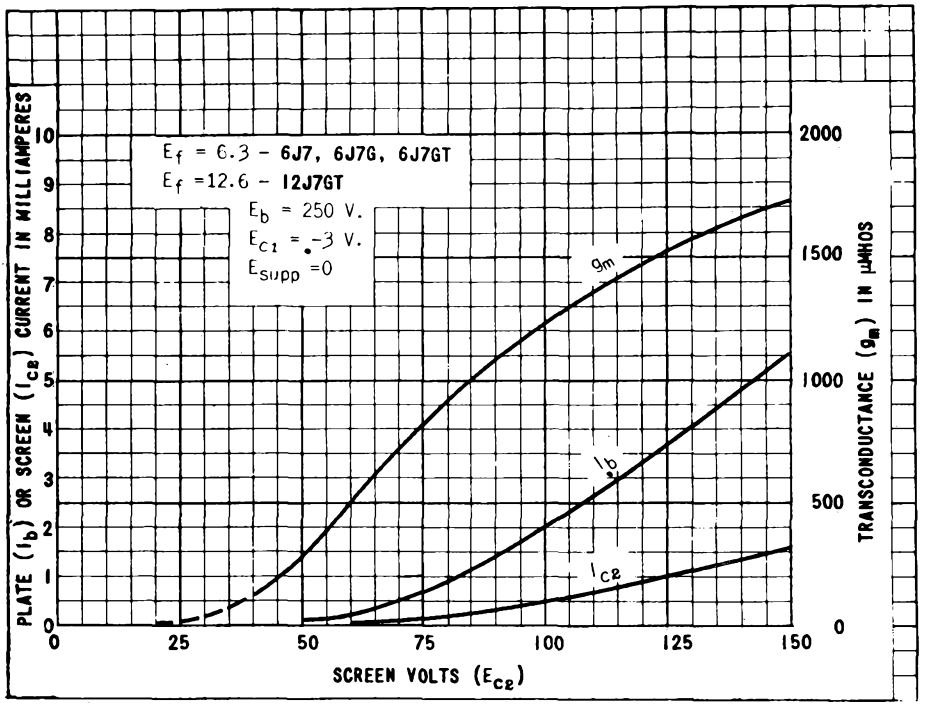
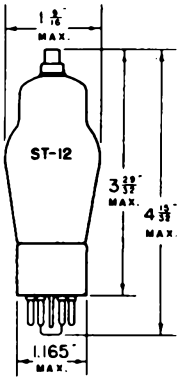


PLATE 1007-2

APR. 21 1941

TUNG-SOL



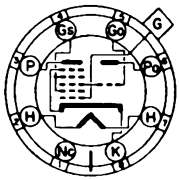
TRIODE HEPTODE CONVERTER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

SMALL 8 PIN OCTAL BASE



G-8H

THE TUNG-SOL 6J8G IS A CONVERTER TUBE DESIGNED FOR STABLE OPERATION OVER AN EXTENDED FREQUENCY RANGE. IT CONSISTS OF A HEPTODE MIXER AND A TRIODE OSCILLATOR, HAVING A COMMON CATHODE. THE INJECTOR GRID OF THE HEPTODE IS INTERNALLY CONNECTED TO THE TRIODE GRID.

OPERATING CONDITIONS AND CHARACTERISTICS

HEPTODE PLATE VOLTAGE	100	250 MAX.	VOLTS
HEPTODE CONTROL GRID VOLTAGE	-3	-3	VOLTS
HEPTODE SCREEN VOLTAGE	100 MAX.	100 MAX.	VOLTS
HEPTODE PLATE CURRENT	1.4	1.3	MA.
HEPTODE SCREEN CURRENT	3.0	2.9	MA.
TRIODE PLATE VOLTAGE	100	250 MAX. R	VOLTS
TRIODE PLATE CURRENT	3	5	MA.
TRIODE GRID RESISTOR	50 000	50 000	OHMS
TRIODE GRID CURRENT	0.3	0.4	MA.
HEPTODE PLATE RESISTANCE	0.9	4.0	MEGOHMS
CONVERSION CONDUCTANCE	250	290	μMHOS
HEPTODE CONTROL GRID VOLTAGE FOR 2 μMHOS CONVERSION CONDUCTANCE	-20	-20	VOLTS

R APPLIED THROUGH 20 000 OHMS DROPPING RESISTOR.

STATIC CHARACTERISTICS OF TRIODE SECTION

PLATE VOLTAGE	100	VOLTS
GRID VOLTAGE	0	VOLTS
PLATE CURRENT	7	MA.
PLATE RESISTANCE	10 600	OHMS
TRANSCONDUCTANCE	1600 APPROX.	μMHOS
AMPLIFICATION FACTOR	17 APPROX.	

TUNG-SOL LAMP WORKS INC. RADIO TUBE DIVISION NEWARK, NEW JERSEY, U. S. A.

DIRECT INTERELECTRODE CAPACITANCES[5]

CONTROL GRID (G) AND HEPTODE PLATE (P)	0.01 MAX.	μμf
CONTROL GRID (G) AND TRIODE PLATE (P_o)	0.16	μμf
CONTROL GRID (G) AND TRIODE GRID (G_o)	0.14	μμf
CONTROL GRID (G) AND ALL OTHER ELECTRODES	4.4	μμf
TRIODE GRID (G_o) AND TRIODE PLATE (P_o)	2.2	μμf
TRIODE GRID (G_o) AND ALL OTHER ELECTRODES	12.0	μμf
TRIODE PLATE (P_o) AND ALL OTHER ELECTRODES	5.5	μμf
HEPTODE PLATE (P) AND ALL OTHER ELECTRODES	9.0	μμf

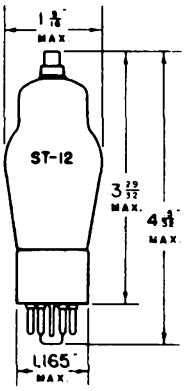
[5] WITH STANDARD TUBE SHIELD (NOT CLOSE FITTING)

NOTE: VARIATION OF THE OSCILLATOR FREQUENCY, CAUSED BY AVC VOLTAGE AND REGULATION OF THE POWER SUPPLY, IS LESS IN THE 6J8G THAN IN THE PENTAGRID CONVERTER. THIS IMPROVEMENT IN FREQUENCY STABILITY IS DUE TO THE USE OF A SEPARATE TRIODE UNIT. THE HIGH INPUT IMPEDANCE RESULTING FROM THE LOW SIGNAL GRID TO PLATE CAPACITANCE AND THE HIGH PLATE RESISTANCE, MAINTAINS THE Q OF ASSOCIATED HIGH GAIN CIRCUITS. THE COUPLING EFFECTS WITHIN THE TUBE BETWEEN THE OSCILLATOR AND SIGNAL CIRCUITS ARE SMALL.

THE OSCILLATOR GRID CURRENT SHOULD EXCEED 150 MICROAMPERES THROUGH A 50 000 OHM GRID RESISTOR, AND THE PLATE LOAD IMPEDANCE SHOULD EXCEED 0.2 MEGOHM TO OBTAIN CONVERSION GAIN COMPARABLE TO THAT OF PENTAGRID CONVERTERS. THE HIGH PLATE LOAD IMPEDANCE MAY BE OBTAINED MORE ECONOMICALLY BY USING HIGHER L-C RATIOS THAN BY HIGHER Q COILS, AS A LOWER VALUE OF TUNING CAPACITY MAY BE USED THAN IS PERMISSIBLE WITH PENTAGRID CONVERTERS. OSCILLATOR CIRCUITS THAT REDUCE THE VOLTAGE ON THE TRIODE PLATE TO LESS THAN 100 VOLTS SHOULD BE AVOIDED.

TUNG-SOL LAMP WORKS INC. RADIO TUBE DIVISION NEWARK, NEW JERSEY, U. S. A.

TUNG-SOL



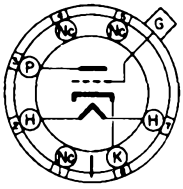
GENERAL PURPOSE

HIGH - MU TRIODE

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



G-5U

BOTTOM VIEW

SMALL 7 PIN OCTAL BASE

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1.5	-3	VOLTS
PLATE CURRENT	0.35	1.1	MA.
PLATE RESISTANCE	78 000	50 000	OHMS
TRANSCONDUCTANCE	900	1400	μMHOS
AMPLIFICATION FACTOR	70	70	

DIRECT INTERELECTRODE CAPACITANCES[S]

GRID TO CATHODE	3.0	μμf
PLATE TO CATHODE	5.5	μμf
GRID TO PLATE	2.2	μμf

[S] WITH SHIELD

PLATE 399-2

MAY 8 1939

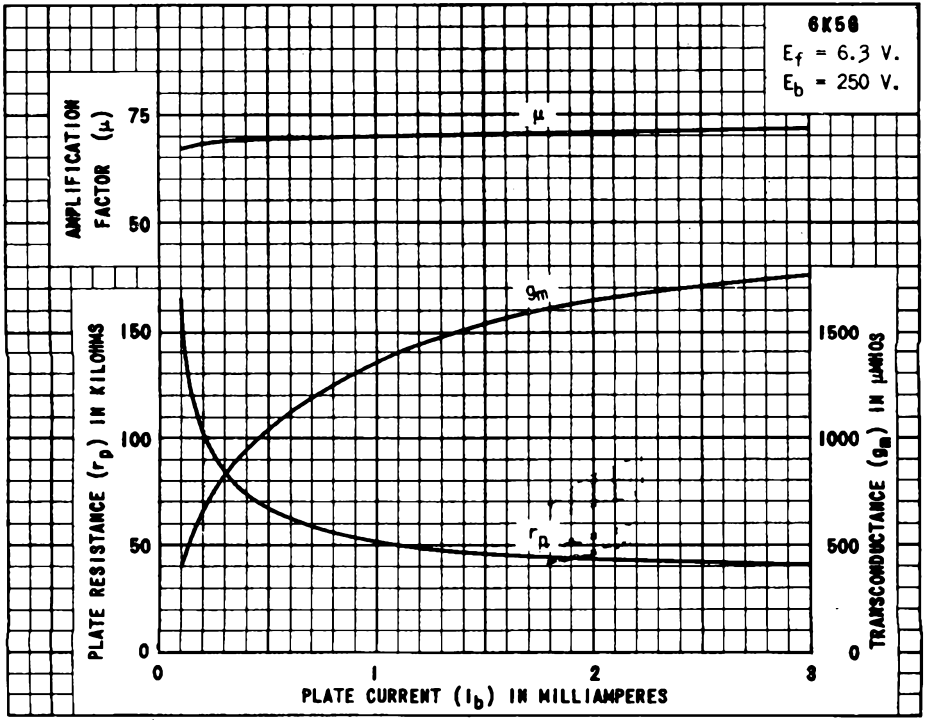
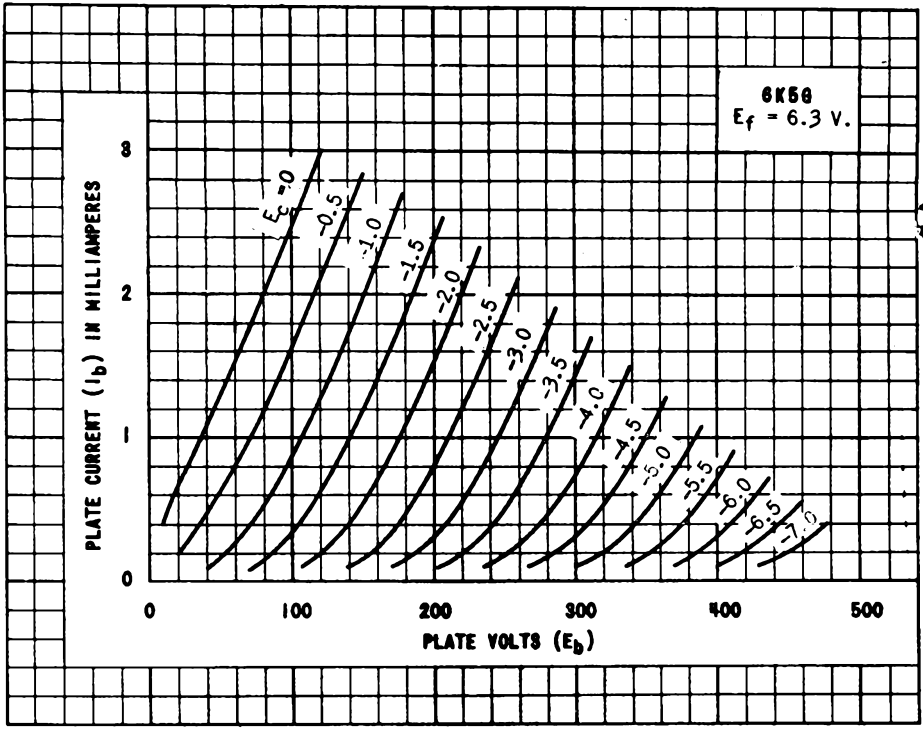
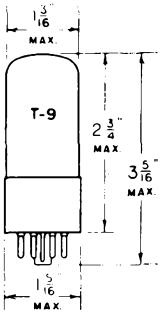


PLATE 398-1

6K5 G


6K5G
E_f = 6.3 V.
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
1
2
3
0
100
200
300
400
500
E_c =0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
-5.5
-6.0
-6.5
-7.0

TUNG-SOL

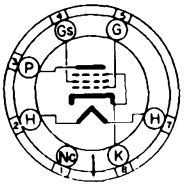


PENTODE POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.4 AMPERE
AC OR DC

GLASS BULB



G-7S
BOTTOM VIEW

INTERMEDIATE 7 PIN OCTAL BASE

THE TUNG-SOL 6K6GT/G IS DESIGNED FOR SERVICE IN THE POWER OUTPUT STAGES OF AC, AC/DC, OR STORAGE BATTERY OPERATED RECEIVERS. ITS ELECTRICAL CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE TYPE 41.

RATINGS

MAXIMUM PLATE VOLTAGE	315	VOLTS
MAXIMUM SCREEN VOLTAGE	285	VOLTS
MAXIMUM PLATE DISSIPATION	8.5	WATTS
MAXIMUM SCREEN DISSIPATION	2.8	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	315	VOLTS
SCREEN VOLTAGE	100	250	250	VOLTS
CONTROL GRID VOLTAGE[A]	-7	-18	-21	VOLTS
PEAK AF SIGNAL VOLTAGE	7	18	21	VOLTS
ZERO SIGNAL PLATE CURRENT	9.0	32	25.5	MA.
ZERO SIGNAL SCREEN CURRENT	1.6	5.5	4.0	MA.
MAXIMUM SIGNAL PLATE CURRENT	9.5	33	28	MA.
MAXIMUM SIGNAL SCREEN CURRENT	3	10	9	MA.
PLATE RESISTANCE APPROX.	104 000	68 000	75 000	OHMS
TRANSCONDUCTANCE	1500	2300	2100	μMHOS
LOAD RESISTANCE	12 000	7600	9000	OHMS
TOTAL HARMONIC DISTORTION	11	11	15	PER CENT
POWER OUTPUT	0.35	3.4	4.5	WATTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT UNDER RATED MAXIMUM CONDITIONS SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION

CONTINUED NEXT PAGE

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PLATE 1045-2
JUNE 6 191

6K6GT/G

TUNG-SOL

PUSH PULL AMPLIFIER CLASS A1

VALUES FOR TWO TUBES UNLESS OTHERWISE SPECIFIED

	FIXED BIAS	SELF BIAS[A]	
PLATE VOLTAGE	285	285	VOLTS
SCREEN VOLTAGE	285	285	VOLTS
CONTROL GRID VOLTAGE[B]	-25.5	-25.5	VOLTS
PEAK AF SIGNAL VOLTAGE GRID TO GRID	51	51	VOLTS
ZERO SIGNAL PLATE CURRENT	55	55	MA.
ZERO SIGNAL SCREEN CURRENT	9	9	MA.
MAXIMUM SIGNAL PLATE CURRENT	72	61	MA.
MAXIMUM SIGNAL SCREEN CURRENT	17	13	MA.
LOAD RESISTANCE PLATE TO PLATE	12 000	12 000	OHMS
TOTAL HARMONIC DISTORTION	6	4	PER CENT
MAXIMUM SIGNAL POWER OUTPUT	10.5	9.8	WATTS

[A] 400 OHMS, BY-PASSED.

[B] THE DC RESISTANCE IN THE GRID CIRCUIT UNDER RATED MAXIMUM CONDITIONS SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION.

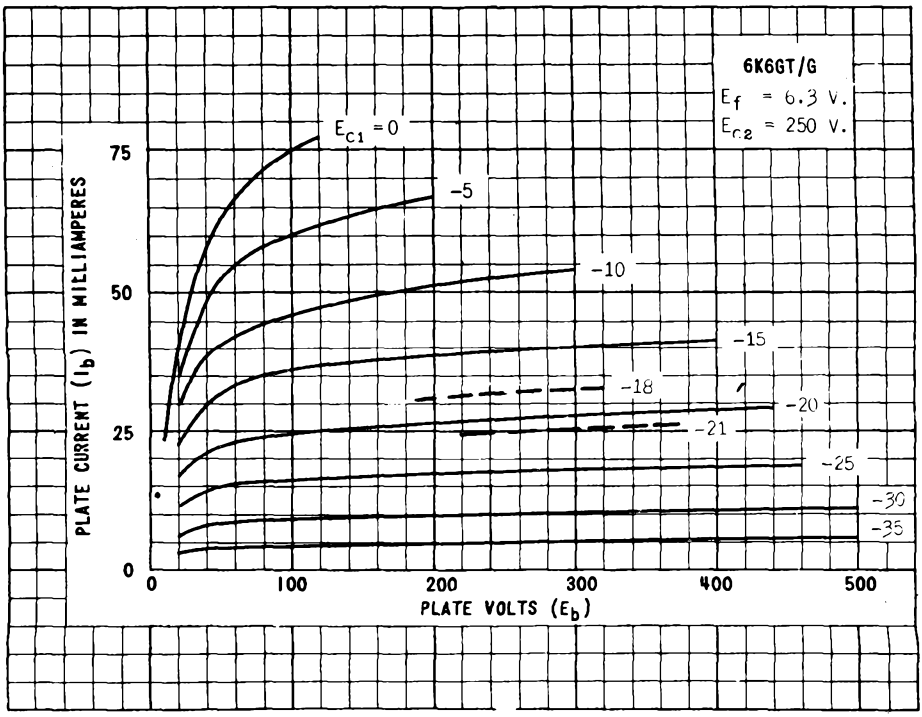

PLATE 1046-2

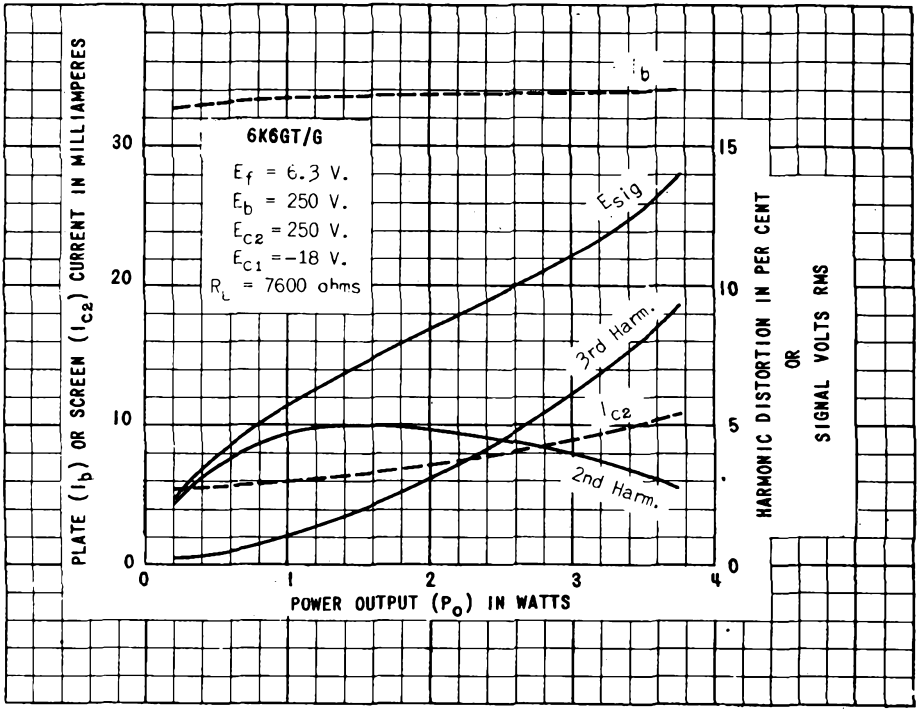

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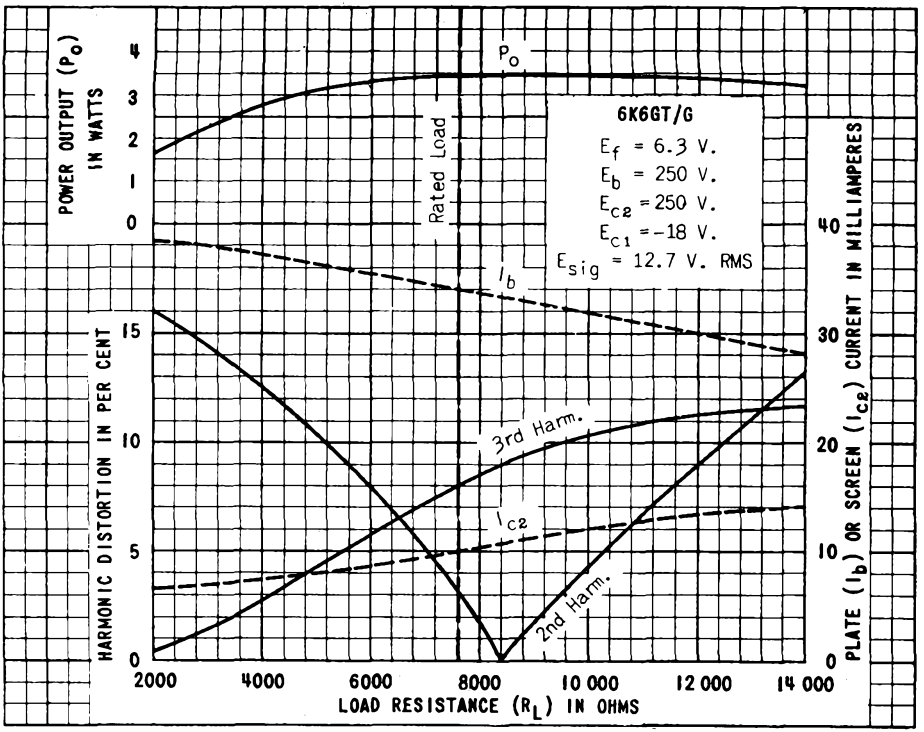
PLATE 1047-2

JUNE 6 1941

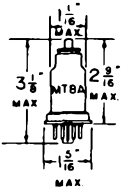

POWER OUTPUT (P_o) IN WATTS
4
3
2
1
0
P_o
Rated Load
6K6GT/G
E_f = 6.3 V.
E_b = 250 V.
E_{c2} = 250 V.
E_{c1} = −18 V.
E_{sig} = 12.7 V. RMS
I_b
HARMONIC DISTORTION IN PER CENT
15
10
5
0
3rd Harm.
I_{c2}
2nd Harm.
40
30
20
10
0
PLATE (I_b) OR SCREEN (I_{c2}) CURRENT IN MILLIAMPERES
2000
4000
6000
8000
10 000
12 000
14 000
LOAD RESISTANCE (R_L) IN OHMS

TUNG-SOL

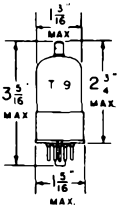
TRIPLE GRID

REMOTE CUT-OFF AMPLIFIER

UNIPOTENTIAL CATHODE
HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

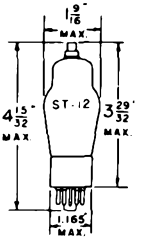


METAL SHELL
7 PIN OCTAL BASE
6K7

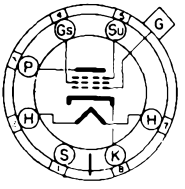


GLASS BULB
7 PIN OCTAL BASE
WITH METAL SHELL
6K7GT 12K7GT

G-7Ra
BOTTOM VIEW
6K7G



GLASS BULB
SMALL 7 PIN OCTAL BASE
6K7G



7R
BOTTOM VIEW
6K7 6K7GT

THE TUNG-SOL 6K7, 6K7G, 6K7GT AND THE 12K7GT ARE TRIPLE GRID VARIABLE MU AMPLIFIERS. THEY ARE SUITABLE FOR USE WITH AVC IN RF AND IF AMPLIFIERS, AND THEY MINIMIZE CROSS MODULATION. WITH THE EXCEPTION OF CAPACITANCES AND HEATER RATINGS THEIR ELECTRICAL CHARACTERISTICS ARE SIMILAR.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	
MAXIMUM PLATE DISSIPATION	2.75	WATTS
MAXIMUM SCREEN DISSIPATION	0.35	WATT

DIRECT INTERELECTRODE CAPACITANCES

	6K7[A]	6K7G[B]	6K7GT[A] 12K7GT[A]	
CONTROL GRID TO CATHODE	7	5	5	μμf
PLATE TO CATHODE	12	12	11	μμf
CONTROL GRID TO PLATE	.005 MAX.	.007 MAX.	.007 MAX.	μμf

[A] SHELL IS CONNECTED TO THE CATHODE.

[B] MEASURED WITH AN EXTERNAL SHIELD. THE INTERNAL SHIELD IN THE DOME IS CONNECTED TO THE CATHODE WITHIN THIS TUBE

PLATE 633-3

NOV. 20 1939

CONTINUED NEXT PAGE

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	90	180	250	250	VOLTS
SCREEN VOLTAGE	90	75	100	125	VOLTS
CONTROL GRID VOLTAGE	−3	−3	−3	−3	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET				
PLATE CURRENT	5.4	4.0	7.0	10.5	MA.
SCREEN CURRENT	1.3	1.0	1.7	2.6	MA.
PLATE RESISTANCE APPROX.	0.3	1.0	0.8	0.6	MEGOHM
TRANSCONDUCTANCE	1275	1100	1450	1650	μMHOS
CONTROL GRID BIAS APPROX. FOR TRANSCONDUCTANCE = 2 μMHOS	−38.5	−32.5	−42.5	−52.5	VOLTS

TYPICAL OPERATING CONDITIONS WITH VARIABLE BIAS

MIXER IN SUPERHETERODYNE CIRCUITS

PLATE VOLTAGE		250	VOLTS
SCREEN VOLTAGE		100	VOLTS
CONTROL GRID VOLTAGE	APPROX. A	−10	VOLTS
SUPPRESSOR GRID	CONNECTED TO THE CATHODE AT THE SOCKET		

A THE GRID BIAS SHOWN IS MINIMUM FOR AN OSCILLATOR PEAK VOLTAGE OF 7 VOLTS. THESE VALUES ARE OPTIMUM.

PLATE 634-3

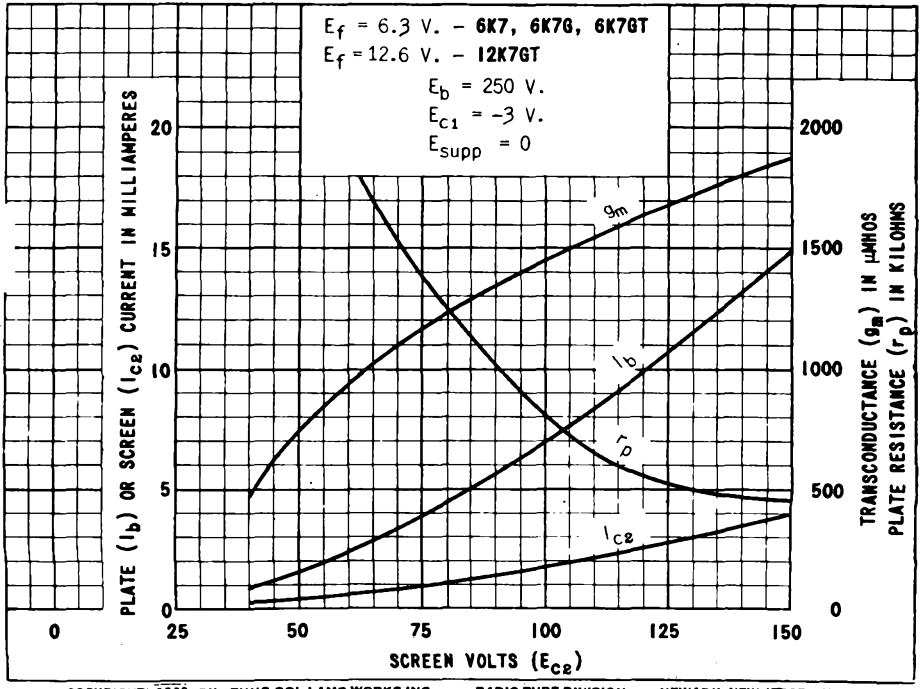
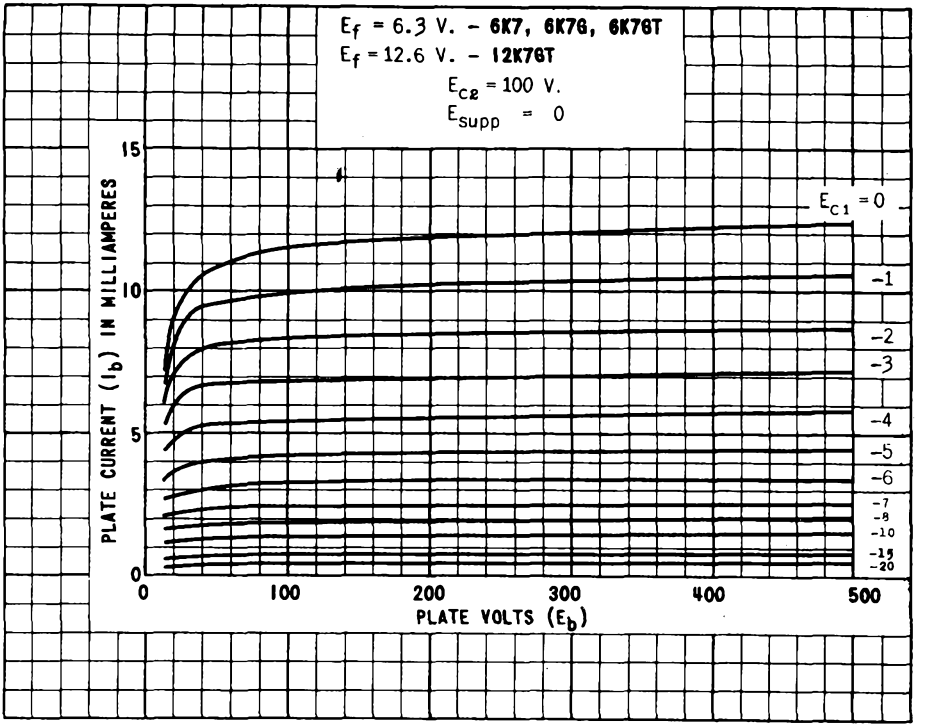


PLATE
635-1

NOV. 20
1939

(12K7GT) 6K7, 6K7G, 6K7GT



6K7, 6K7G, 6K7GT (12K7GT)

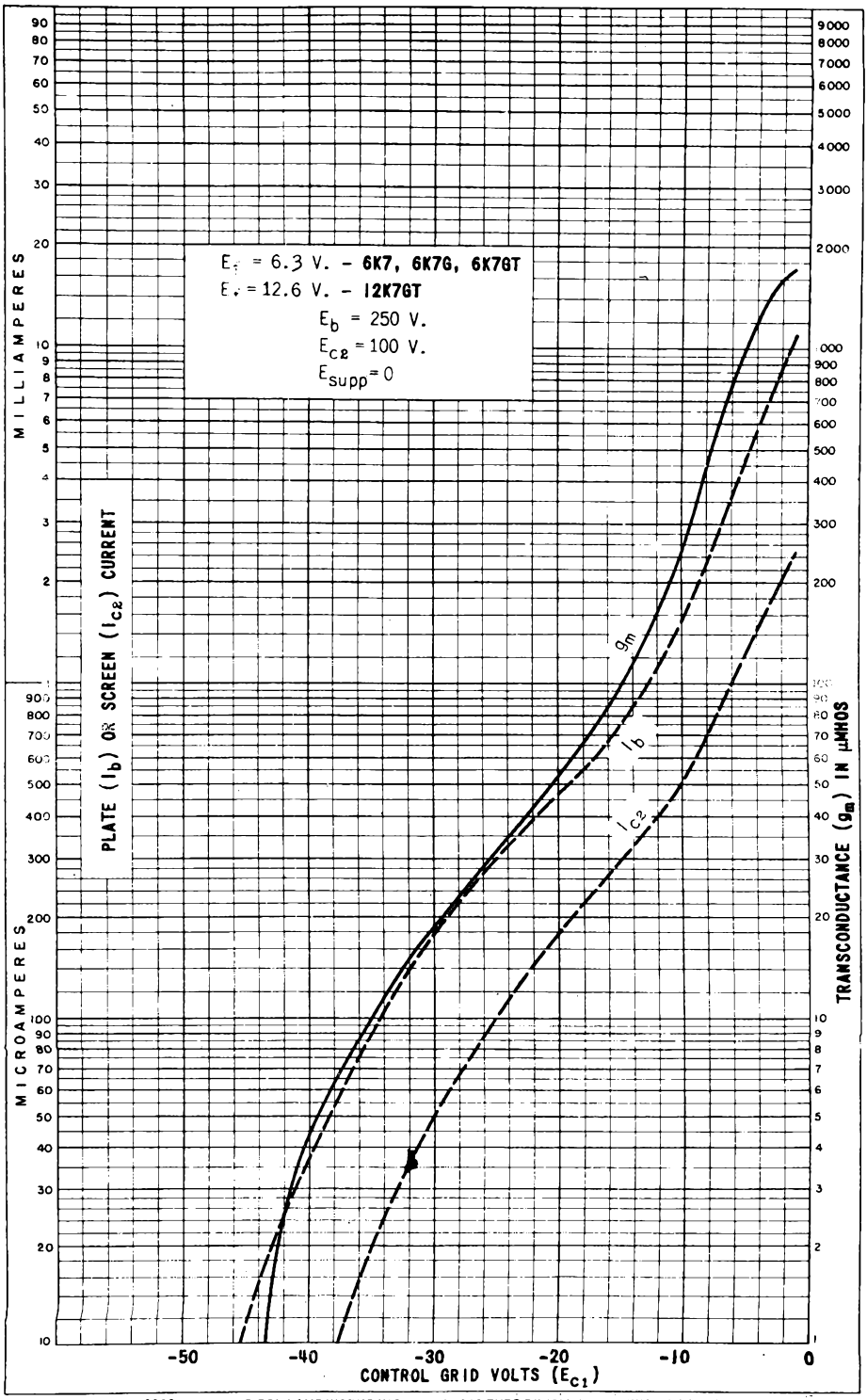


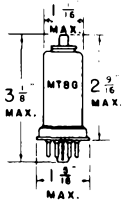
PLATE 636-1

TUNG-SOL

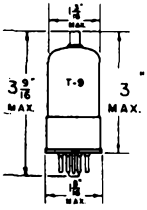
TRIODE HEXODE CONVERTER

UNIPOTENTIAL CATHODE

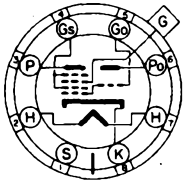
HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC



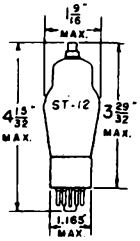
METAL TUBE
SMALL WAFER
8 PIN OCTAL BASE
6K8



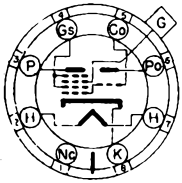
GLASS BULB
8 PIN OCTAL BASE
WITH METAL SHELL
6K8GT



8K
6K8, 6K8GT



GLASS BULB
SMALL 8 PIN OCTAL BASE
6K8G



G-8K
6K8G

THE TUNG-SOL 6K8, 6K8G AND 6K8GT CONSIST OF A TRIODE OSCILLATOR AND A HEXODE MIXER IN A COMMON ENVELOPE. THE PHYSICAL DESIGN OF THESE TUBES REDUCES INTERACTION BETWEEN THE OSCILLATOR AND MIXER SECTIONS AND MAKES FOR STABLE OPERATION IN SUPERHETERODYNE RECEIVERS ON THE HIGH FREQUENCIES AS WELL AS THE BROADCAST BAND.

RATINGS

MAXIMUM HEXODE PLATE (P) VOLTAGE	300	VOLTS
MAXIMUM HEXODE SCREEN (G_S) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM HEXODE SCREEN (G_S) VOLTAGE	150	VOLTS
MAXIMUM HEXODE PLATE DISSIPATION	0.75	WATT
MAXIMUM HEXODE SCREEN DISSIPATION	0.7	WATT
MAXIMUM TOTAL CATHODE CURRENT	16	MA.
MINIMUM EXTERNAL SIGNAL GRID (G) BIAS VOLTAGE	0	VOLTS
MAXIMUM OSCILLATOR ANODE (P_O) VOLTAGE	125	VOLTS
MAXIMUM OSCILLATOR ANODE DISSIPATION	0.75	WATT

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

PRINTED IN U.S.A.

PLATE
1108-1
SEPT. 17
1941

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

HEXODE PLATE (P) VOLTAGE	100	250	VOLTS
HEXODE SCREEN (G_S) VOLTAGE	100	100	VOLTS
HEXODE CONTROL GRID (G) VOLTAGE	−3	−3	VOLTS
OSCILLATOR ANODE (P_O) VOLTAGE	100	100	VOLTS
HEXODE PLATE CURRENT	2.3	2.5	MA.
HEXODE SCREEN CURRENT	6.2	6.0	MA.
OSCILLATOR ANODE CURRENT	3.8	3.8	MA.
OSCILLATOR GRID (G_O) CURRENT	0.15	0.15	MA.
TOTAL CATHODE CURRENT	12.5	12.5	MA.
OSCILLATOR GRID RESISTOR	50 000	50 000	OHMS
CONVERSION TRANSCONDUCTANCE	325	350	μMHOS
HEXODE PLATE RESISTANCE APPROX.	0.4	0.6	MEGOHM
HEXODE CONTROL GRID VOLTAGE APPROX. FOR CONVERSION TRANSCONDUCTANCE = 2 μMHOS	−30	−30	VOLTS

DIRECT INTERELECTRODE CAPACITANCES[5]

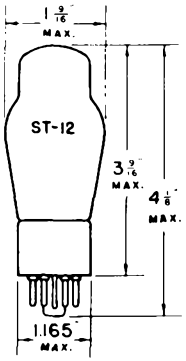
	6K8	6K8G 6K8GT	
SIGNAL GRID TO MIXER PLATE (G TO P)	0.03 MAX.	0.08 MAX.	μμf
SIGNAL GRID TO OSCILLATOR PLATE (G TO P_O)	0.02 MAX.	0.05 MAX.	μμf
SIGNAL GRID TO OSCILLATOR GRID (G TO G_O)	0.2 MAX.	0.2 MAX.	μμf
OSCILLATOR GRID TO OSCILLATOR PLATE (G_O TO P_O)	1.1	1.8	μμf
SIGNAL INPUT: G_O TO ALL OTHER ELECTRODES	6.6	4.6	μμf
OSCILLATOR INPUT: G_O TO ALL OTHER ELECTRODES EXCEPT P_O	6.0	6.5	μμf
OSCILLATOR OUTPUT: P_O TO ALL OTHER ELECTRODES EXCEPT G_O	3.2	3.4	μμf
MIXER OUTPUT: P TO ALL OTHER ELECTRODES	3.5	4.8	μμf
OSCILLATOR GRID TO MIXER PLATE (G_O TO P)	0.1 MAX.	0.15 MAX.	μμf

[A] WITH EXTERNAL SHIELD OR SHELL CONNECTED TO CATHODE.

NOTE: THE TRANSCONDUCTANCE OF THE OSCILLATOR SECTION (NOT OSCILLATING) IS APPROXIMATELY 3000 UMHOS WHEN THE TRIODE PLATE VOLTAGE IS 100 VOLTS, AND THE TRIODE GRID VOLTAGE IS ZERO VOLTS.

PLATE 1109-1

TUNG-SOL



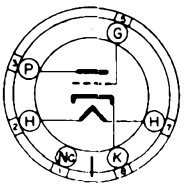
TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB

SMALL 6 PIN OCTAL BASE



G-6Qa
BOTTOM VIEW

THE TUNG-SOL 6L5G IS A GENERAL PURPOSE TRIODE DESIGNED FOR SERVICE AS AN OSCILLATOR, DETECTOR OR AMPLIFIER. IT IS RECOMMENDED FOR USE WHERE ECONOMY OF HEATER CURRENT IS IMPORTANT.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	135	250 MAX.	VOLTS
GRID VOLTAGE	-5	-9	VOLTS
PLATE CURRENT	3.5	8	MA.
PLATE RESISTANCE	11 300	9000	OHMS
TRANSCONDUCTANCE	1500	1900	μMHOS
AMPLIFICATION FACTOR	17	17	
GRID VOLTAGE APPROX. FOR CATHODE CURRENT CUT-OFF	-11	-20	VOLTS

RESISTANCE COUPLED AMPLIFIER

PLATE AND SCREEN SUPPLY VOLTAGE	100	100	250	250	VOLTS
PLATE LOAD RESISTOR	0.05	0.25	0.05	0.25	MEGOHM
CATHODE RESISTOR	2800	10 000	2600	9000	OHMS
VOLTAGE GAIN	11	12	12	13	

DIRECT INTERELECTRODE CAPACITANCES[S]

GRID TO CATHODE	2.8	μμf
PLATE TO CATHODE	5.0	μμf
GRID TO PLATE	2.8	μμf

[S] WITH SHIELD

PLATE
921-2

MAY 8
1939

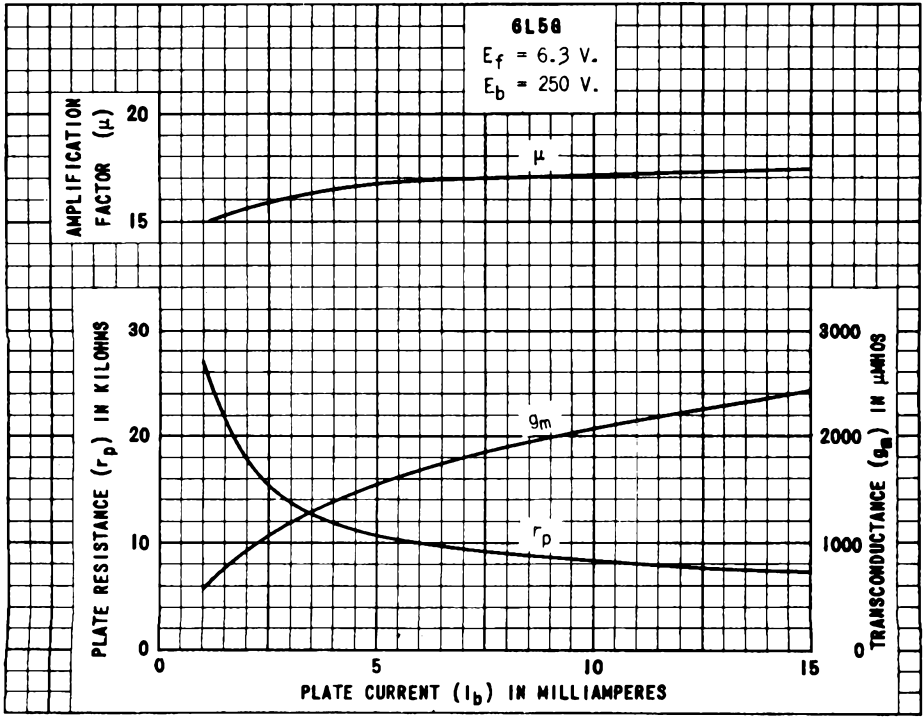
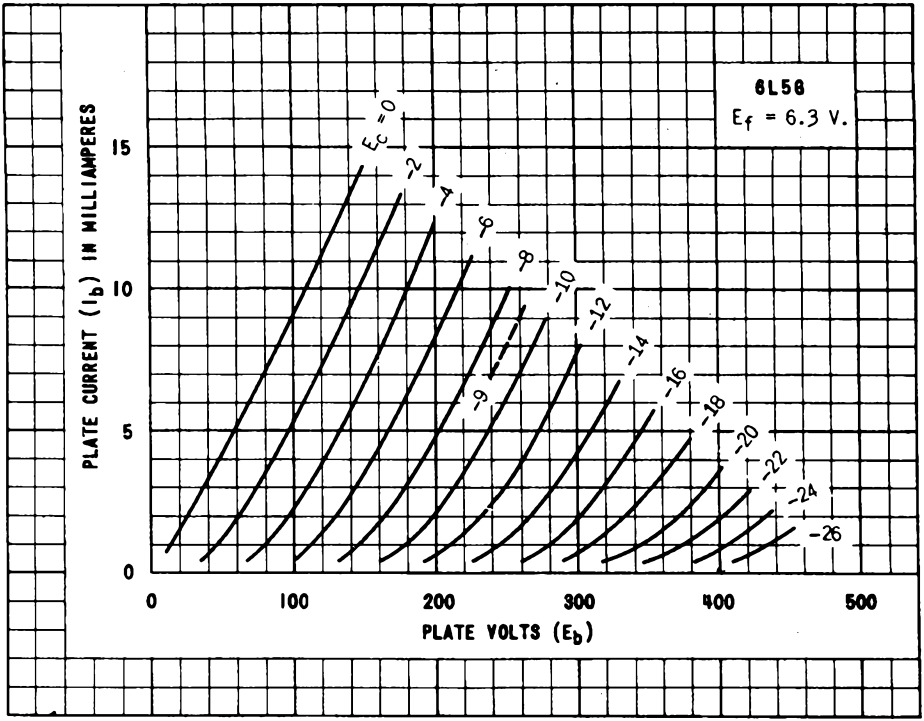


PLATE 922-1

6L5 G

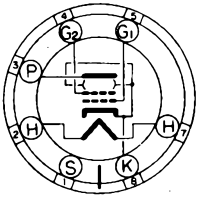

6L5G
E_f = 6.3 V.
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
E_c = 0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-9
0
5
10
15
0
100
200
300
400
500

TUNG-SOL

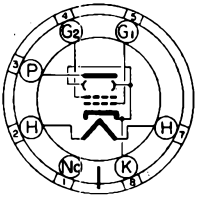
BEAM POWER AMPLIFIER

UNIPOTENTIAL CATHODE

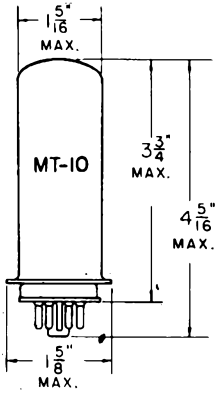
HEATER
6.3 VOLTS 0.9 AMPERE
AC OR DC



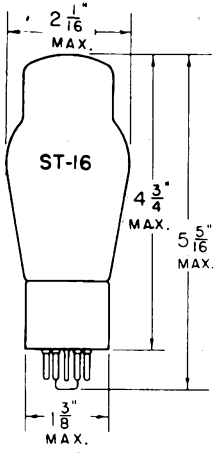
BOTTOM VIEW
6L6



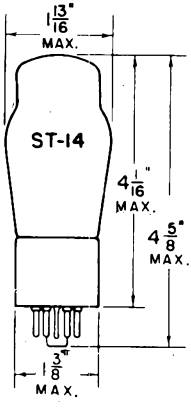
BOTTOM VIEW
6L6G, 6L6GA



METAL SHELL
7 PIN OCTAL BASE
6L6



MEDIUM SHELL
7 PIN OCTAL BASE
6L6G



MEDIUM SHELL
7 PIN OCTAL BASE
6L6GA

THE 6L6, 6L6G, AND 6L6GA ARE DESIGNED WITH A HIGH POWER SENSITIVITY AND HIGH EFFICIENCY FOR SERVICE IN THE OUTPUT STAGES OF AC RECEIVERS. THEY ARE CAPABLE OF DELIVERING AN OUTPUT AT ALL POWER LEVELS WITH A VERY LOW PERCENTAGE OF HARMONIC DISTORTION.

MAXIMUM RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

	PENTODE CONNECTION	TRIODE CONNECTION	
MAXIMUM PLATE VOLTAGE	360	250	VOLTS
MAXIMUM SCREEN VOLTAGE	270	-	VOLTS
MAXIMUM PLATE DISSIPATION	19	10	WATTS
MAXIMUM SCREEN DISSIPATION	2.5	-	WATTS

CONTINUED ON NEXT PAGE

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1517
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1944

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

SINGLE TUBE - CLASS A_1 AMPLIFIER

	PENTODE CONNECTION			TRIODE CONNECTION	
				SCREEN TIED TO PLATE	
PLATE VOLTAGE	250	300	350	250	VOLTS
GRID VOLTAGE	-14	-12.5	-18	-20	VOLTS
PEAK AF SIGNAL VOLTAGE	14	12.5	18	20	VOLTS
ZERO-SIGNAL PLATE CURRENT	72	48	54	40	MA.
ZERO-SIGNAL SCREEN CURRENT	5.0	2.5	2.5	-	MA.
MAXIMUM-SIGNAL PLATE CURRENT	79	55	66	44	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	7.3	4.7	7.0	-	MA.
PLATE RESISTANCE	22 500	35 000	33 000	1 700	OHMS
TRANSCONDUCTANCE	6 000	5 300	5 200	4 700	µMHOS
AMPLIFICATION FACTOR	-	-	-	8.0	
LOAD RESISTANCE	2 500	4 500	4 200	5 000	OHMS
TOTAL HARMONIC DISTORTION	10	11	15	5.0	PER CENT
POWER OUTPUT	6.5	6.5	10.8	1.4	WATTS
SCREEN VOLTAGE	250	200	250	-	VOLTS

CLASS A_1 PUSH-PULL AMPLIFIER

VALUES ARE FOR TWO TUBES

	PENTODE CONNECTION		
PLATE VOLTAGE	250	270	VOLTS
SCREEN VOLTAGE	250	270	VOLTS
GRID VOLTAGE	-16	-17.5	VOLTS
PEAK AF SIGNAL VOLTAGE (GRID TO GRID)	32	35	VOLTS
ZERO-SIGNAL PLATE CURRENT	120	134	MA.
ZERO-SIGNAL SCREEN CURRENT	10	11	MA.
MAXIMUM-SIGNAL PLATE CURRENT	140	155	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	16	17	MA.
PLATE RESISTANCE	24 500	23 500	OHMS
TRANSCONDUCTANCE	5 500	5 700	µMHOS
EFFECTIVE LOAD RESISTANCE (PLATE TO PLATE)	5 000	5 000	OHMS
TOTAL HARMONIC DISTORTION	2.0	2.0	PER CENT
POWER OUTPUT	14.5	17.5	WATTS

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OCT. 31 1944

CONTINUED FROM PRECEDING PAGE

CLASS AB_1 PUSH-PULL AMPLIFIER

VALUES ARE FOR TWO TUBES

	PENTODE CONNECTION		
PLATE VOLTAGE	360	360	VOLTS
SCREEN VOLTAGE	270	270	VOLTS
GRID VOLTAGE	-22.5	-22.5	VOLTS
PEAK AF SIGNAL VOLTAGE (GRID TO GRID)	45	45	VOLTS
ZERO-SIGNAL PLATE CURRENT	88	88	MA.
ZERO-SIGNAL SCREEN CURRENT	5.0	5.0	MA.
MAXIMUM-SIGNAL PLATE CURRENT	132	140	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	15	11	MA.
EFFECTIVE LOAD RESISTANCE (PLATE TO PLATE)	6 600	3 800	OHMS
TOTAL HARMONIC DISTORTION	2.0	2.0	PER CENT
POWER OUTPUT	26.5	18	WATTS

CLASS AB_2 PUSH-PULL AMPLIFIER

VALUES ARE FOR TWO TUBES

	PENTODE CONNECTION		
PLATE VOLTAGE	360	360	VOLTS
SCREEN VOLTAGE	225	270	VOLTS
CONTROL GRID VOLTAGE	-18	-22.5	VOLTS
PEAK AF SIGNAL VOLTAGE (GRID TO GRID)	52	72	VOLTS
ZERO-SIGNAL PLATE CURRENT	78	88	MA.
ZERO-SIGNAL SCREEN CURRENT	3.5	5.0	MA.
MAXIMUM-SIGNAL PLATE CURRENT	142	205	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	11	16	MA.
EFFECTIVE LOAD RESISTANCE (PLATE TO PLATE)	6 000	3 800	OHMS
TOTAL HARMONIC DISTORTION	2.0	2.0	PER CENT
POWER OUTPUT	31	47	WATTS

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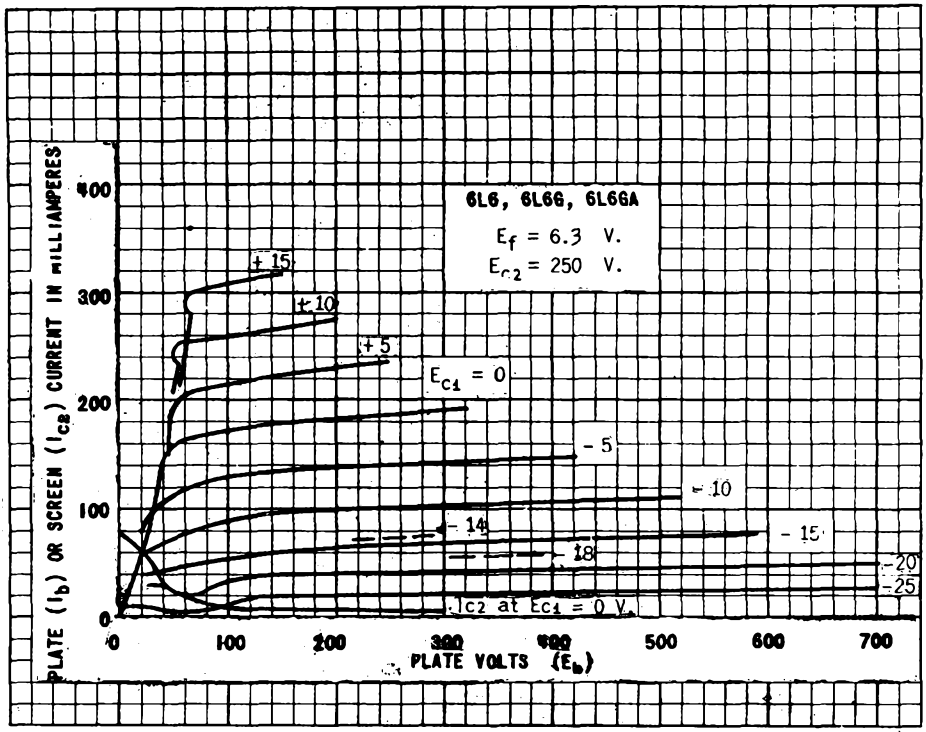
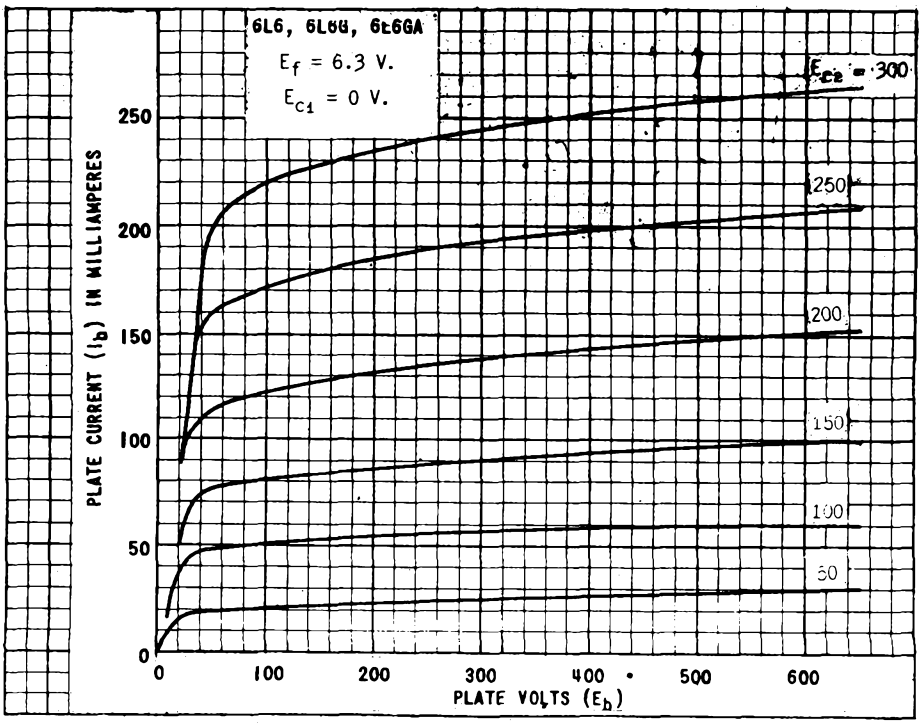
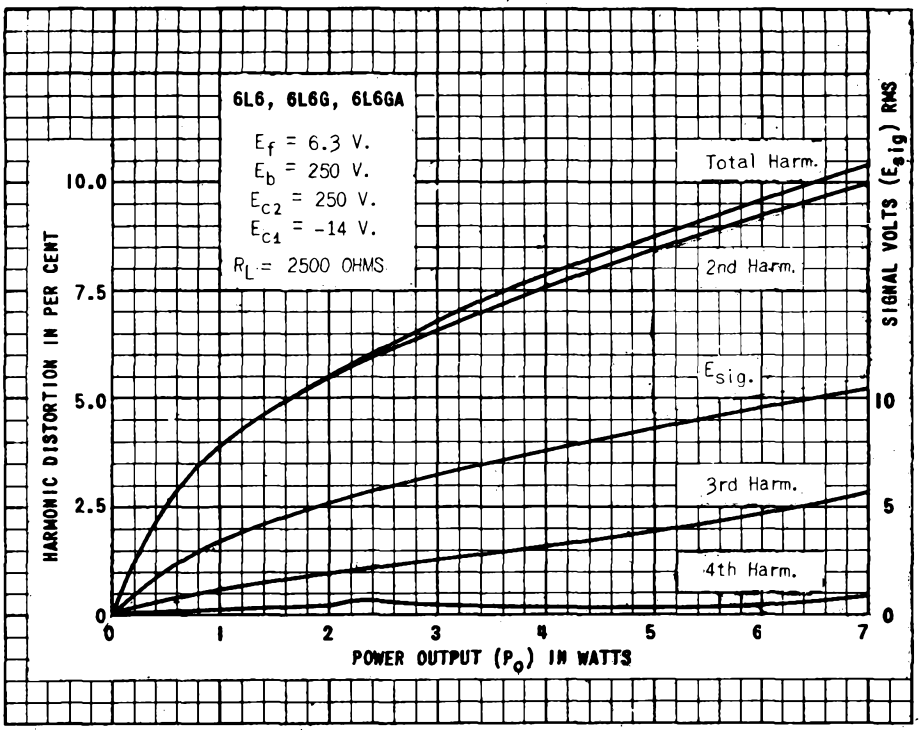
6L6, 6L6G, 6L6GA





PL TE
1471
AUG. 31
1944



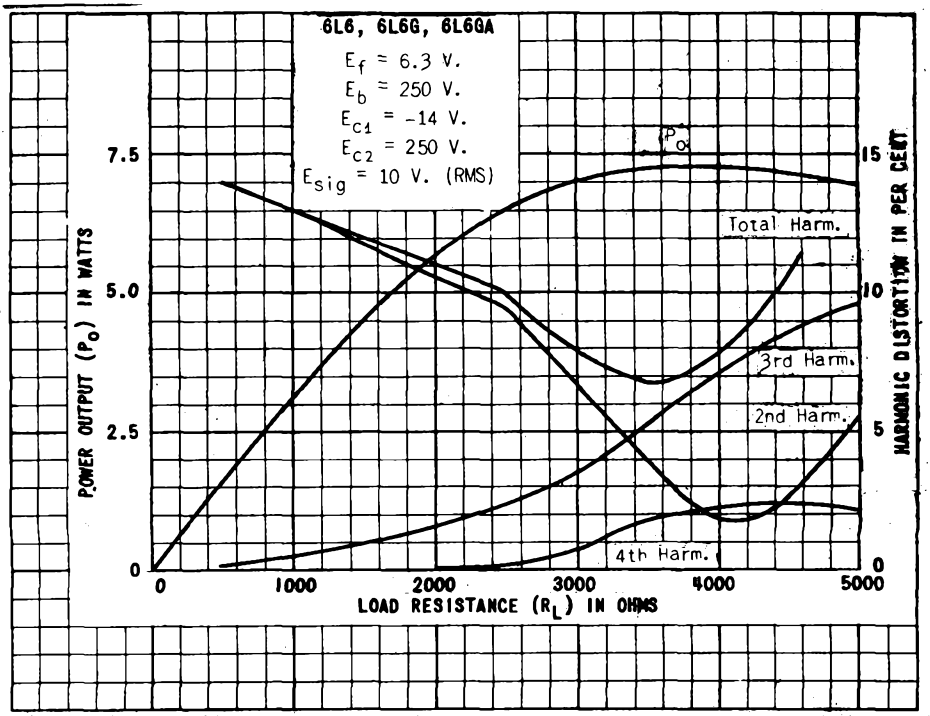


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PLATE
1472
AUG. 31
1944

6L6, 6L6G, 6L6GA

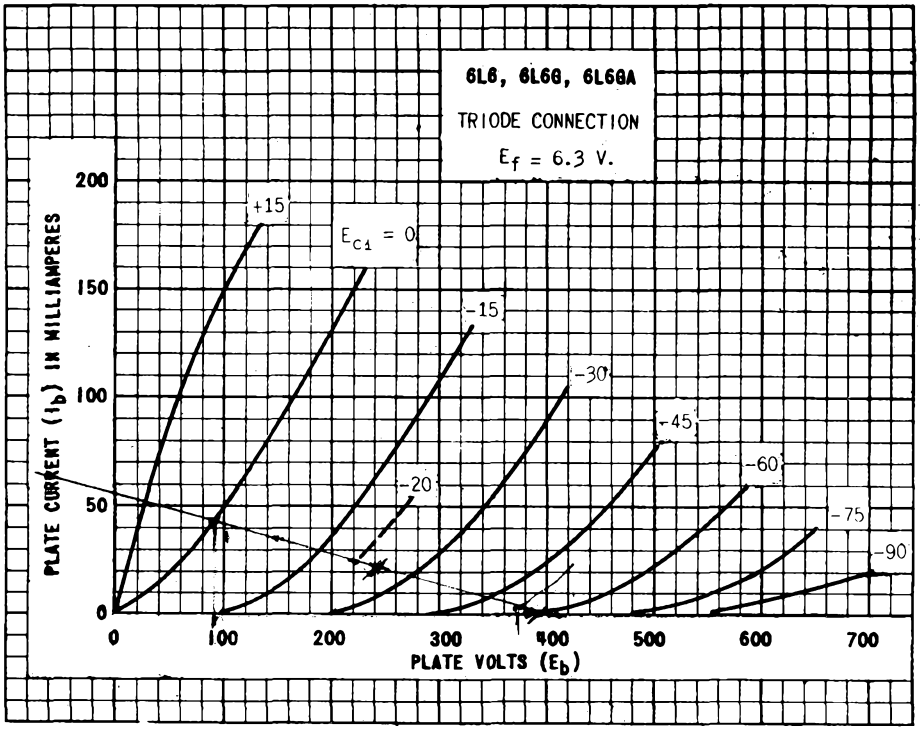
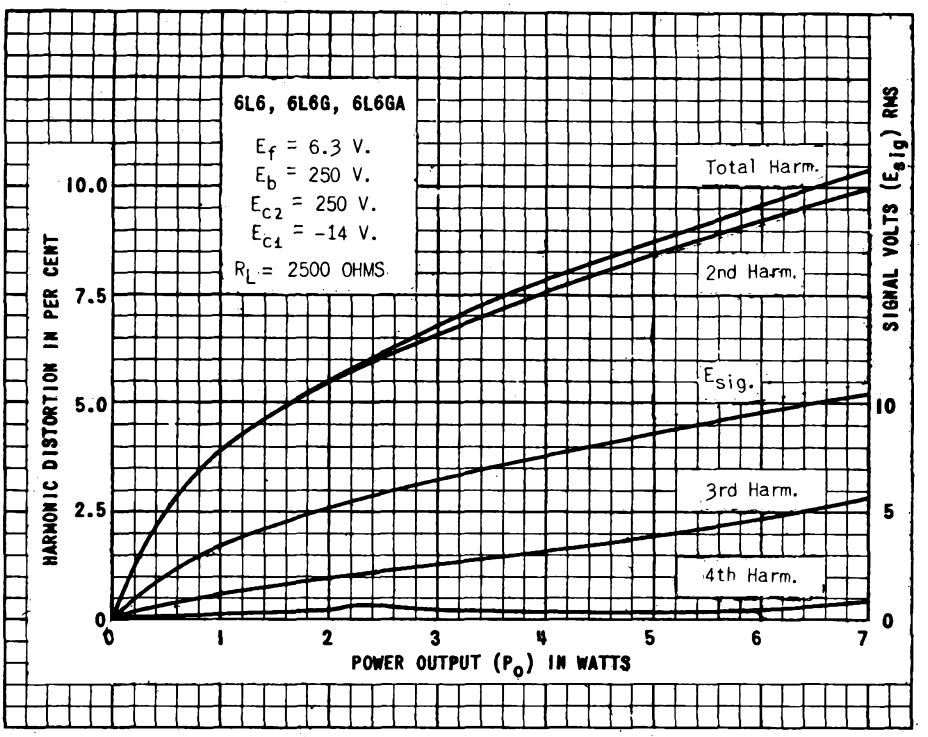


PLATE
1473
AUG. 31
1944



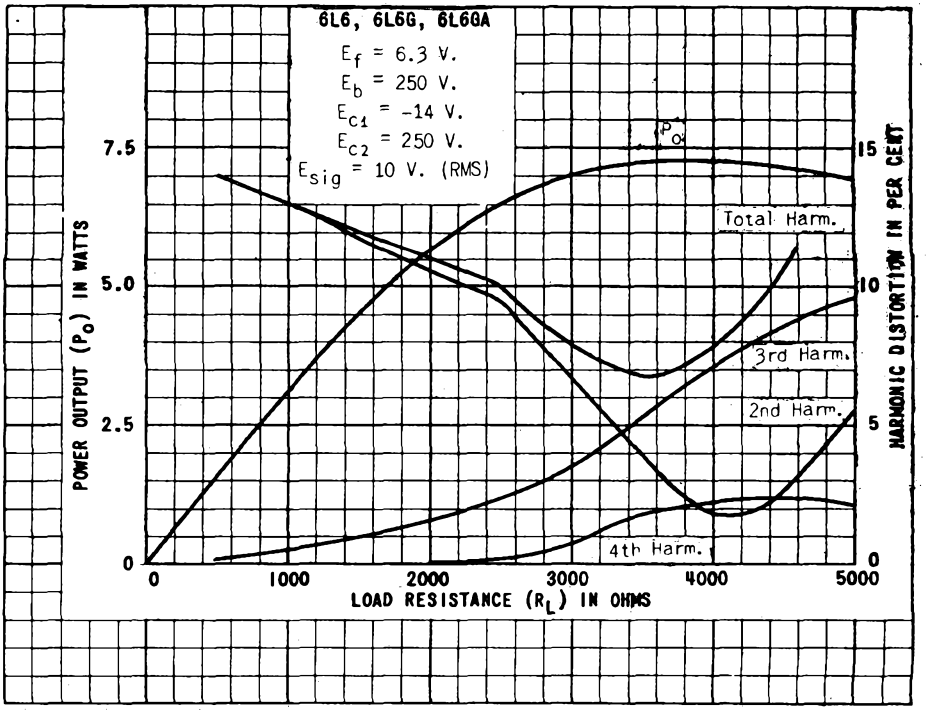


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PLATE
1472
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1944

6L6, 6L6G, 6L6GA

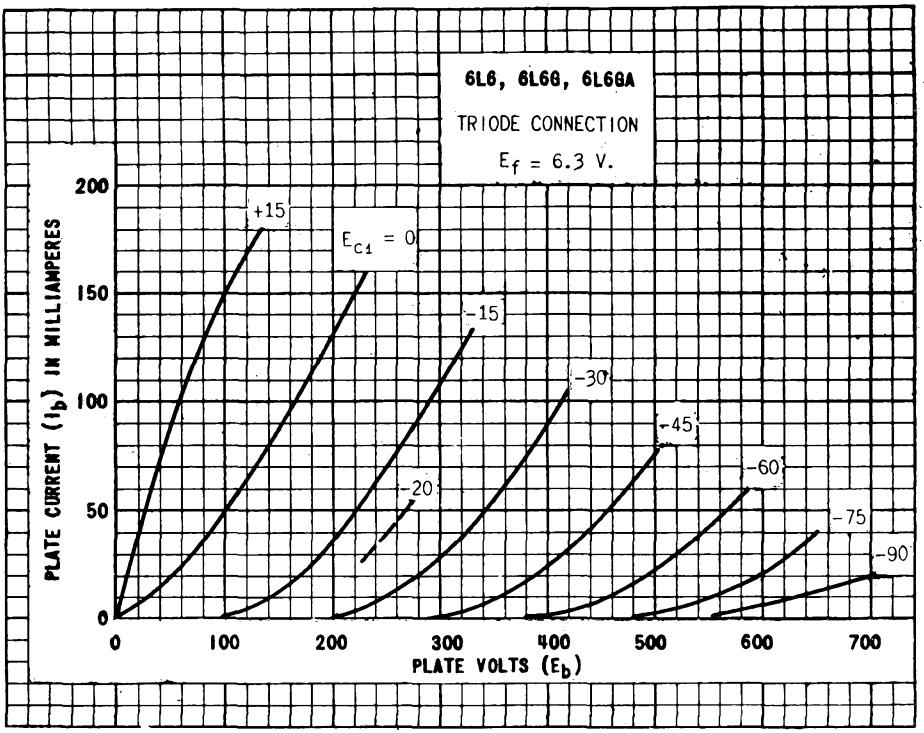

PLATE
1473
AUG. 31
1944

TENTATIVE DATA 6N4

TUNG-SOL

U-H-F AMPLIFIER - OSCILLATOR TRIODE

MINIATURE TYPE

PHYSICAL SPECIFICATIONS

EMITTER COATED UNIPOT. CATHODE	PIN CONNECTIONS	
BASE MIN. BUTTON 7-PIN	PIN 1 GRID	PIN 7 GRID
CAP ———	PIN 2 CATHODE	PIN 8 NONE
BULB T-5½	PIN 3 HEATER	
MAXIMUM DIAMETER 3/4"	PIN 4 HEATER	MOUNTING POS. ANY
MAXIMUM OVERALL LENGTH 1 3/4"	PIN 5 PLATE	
MAXIMUM SEATED HEIGHT 1 1/2"	PIN 6 CATHODE	

MAXIMUM HEIGHT TO CIRCLE OF 7/16" DIAMETER - 1 1/8±3/32"

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.200	AMP.
MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM SCREEN VOLTAGE		VOLTS
MAXIMUM PLATE DISSIPATION	3.0	WATTS
MAXIMUM SCREEN DISSIPATION		WATTS

CAPACITANCES (APPROX.)

WITH CLOSE-FITTING SHIELD CONNECTED TO GRID

GRID TO PLATE	2.35	μμf
INPUT	3.10	μμf
OUTPUT	0.55	μμf
HEATER TO CATHODE	3.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

HEATER OR FILAMENT VOLTAGE	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.200	AMPS.
PLATE VOLTAGE	180	VOLTS
SCREEN VOLTAGE		VOLTS
CONTROL GRID VOLTAGE	-3.5	VOLTS
PEAK AF SIGNAL VOLTAGE		VOLTS
ZERO-SIGNAL PLATE CURRENT		MA.
ZERO-SIGNAL SCREEN CURRENT		MA.
PLATE CURRENT	12	MA.
MAXIMUM-SIGNAL SCREEN CURRENT		MA.
PLATE RESISTANCE (APPROX.)	5400	OHMS
TRANSCONDUCTANCE (APPROX.)	6000	μMHOS
AMPLIFICATION FACTOR	32	
LOAD RESISTANCE		OHMS
TOTAL HARMONIC DISTORTION		PER CENT
POWER OUTPUT		WATTS

NOTE: THE 6N4 IS A HEATER-CATHODE TYPE OF MINIATURE TRIODE ESPECIALLY APPLICABLE AS AN AMPLIFIER OR OSCILLATOR AT FREQUENCIES EXTENDING TO APPROXIMATELY 500 MEGACYCLES.

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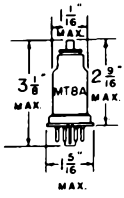
PLATE 1681
FEB. 15 1946

TUNG-SOL

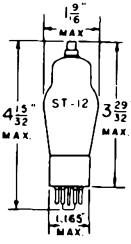


METAL SHELL
7 PIN OCTAL BASE
6L7

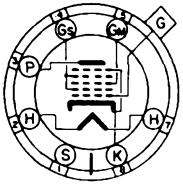
PENTAGRID MIXER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC



GLASS BULB
SMALL 7 PIN OCTAL BASE
6L7G



7T
BOTTOM VIEW
6L7

G-7T
BOTTOM VIEW
6L7G

THE TUNG-SOL 6L7 AND 6L7G IS A MIXER TUBE DESIGNED FOR SERVICE WITH A SEPARATE OSCILLATOR AS THE FIRST DETECTOR IN SUPERHETERODYNE RECEIVERS. THE CONTROL GRID (G) IS OF THE REMOTE CUT-OFF TYPE WHICH ALLOWS THE USE OF A.V.C. AND MINIMIZES CROSS-MODULATION. THE CONTROL GRID (GM) IS OF THE SHARP CUT-OFF TYPE. THE TUBE MAY BE USED AS A VOLUME EXPANDER OR AS A DOUBLY CONTROLLED GENERAL PURPOSE AMPLIFIER.

RATINGS

CLASS A1 AMPLIFIER

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM PLATE DISSIPATION	1.5	WATTS
MAXIMUM SCREEN DISSIPATION	1.0	WATT

MIXER

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	150	VOLTS
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	1.5	WATTS

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	250	VOLTS
SCREEN (G_S) VOLTAGE	100	VOLTS
CONTROL GRID (G_M) VOLTAGE	-3	VOLTS
CONTROL GRID (G) VOLTAGE	-3	VOLTS
PLATE CURRENT	5.3	MA.
SCREEN CURRENT	6.5	MA.
PLATE RESISTANCE APPROX.	0.6	MEGOHM
TRANSCONDUCTANCE [A]	1100	µMHOS
AMPLIFICATION FACTOR APPROX.	670	
TRANSCONDUCTANCE [A]	475	µMHOS
FOR CONTROL GRIDS (G & G_M) VOLTAGES =-6 VOLTS		
TRANSCONDUCTANCE [A]	75	µMHOS
FOR CONTROL GRIDS (G & G_M) VOLTAGES =-10 VOLTS		
TRANSCONDUCTANCE [A] APPROX.	5	µMHOS
FOR CONTROL GRIDS (G & G_M) VOLTAGES =-15 VOLTS		

[A] TRANSCONDUCTANCE BETWEEN THE CONTROL GRID (G) AND THE PLATE (P).

MIXER

PLATE VOLTAGE	250	250	VOLTS
SCREEN (G_S) VOLTAGE	100	150	VOLTS
OSCILLATOR GRID (G_M) VOLTAGE	-10	-15	VOLTS
PEAK OSCILLATOR VOLTAGE APPLIED TO (G_M) MIN.	12	18	VOLTS
CONTROL GRID (G) VOLTAGE MIN.	-3	-6	VOLTS
PLATE CURRENT	2.4	3.3	MA.
SCREEN CURRENT	7.1	9.2	MA.
PLATE RESISTANCE	GREATER THAN 1.0 MEGOHM		
CONVERSION TRANSCONDUCTANCE	375	-	µMHOS
FOR CONTROL GRID (G) VOLTAGE =-3 VOLTS			
CONVERSION TRANSCONDUCTANCE	225	350	µMHOS
FOR CONTROL GRID (G) VOLTAGE =-6 VOLTS			
CONVERSION TRANSCONDUCTANCE	30	75	µMHOS
FOR CONTROL GRID (G) VOLTAGE =-15 VOLTS			
CONVERSION TRANSCONDUCTANCE	5	15	µMHOS
FOR CONTROL GRID (G) VOLTAGE =-30 VOLTS			
CONVERSION TRANSCONDUCTANCE	-	5	µMHOS
FOR CONTROL GRID (G) VOLTAGE =-45 VOLTS			

PLATE 923-2

CONTINUED NEXT PAGE

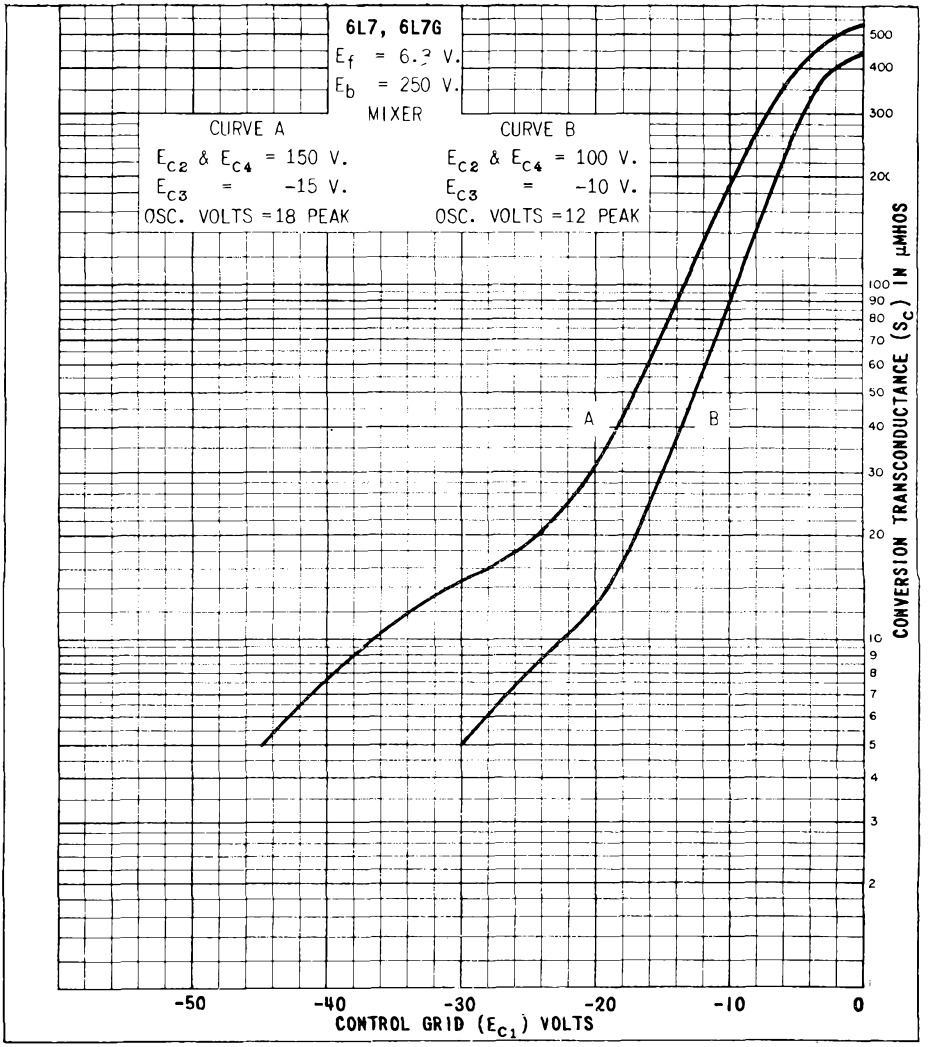
TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES

	6L7[A]	6L7G[B]	
GRID (G) TO GRID (G_M) MAX.	0.20	0.20	μμf
GRID (G) TO PLATE MAX.	0.001	0.005	μμf
GRID (G_M) TO PLATE	0.10 MAX.	0.24	μμf
GRID (G) TO ALL OTHER ELECTRODES	7.5	6	μμf
GRID (G_M) TO ALL OTHER ELECTRODES	10	12	μμf
PLATE TO ALL OTHER ELECTRODES	11	10	μμf

[A] WITH SHELL CONNECTED TO CATHODE

[B] WITH EXTERNAL SHIELD CONNECTED TO CATHODE



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6L7, 6L7G

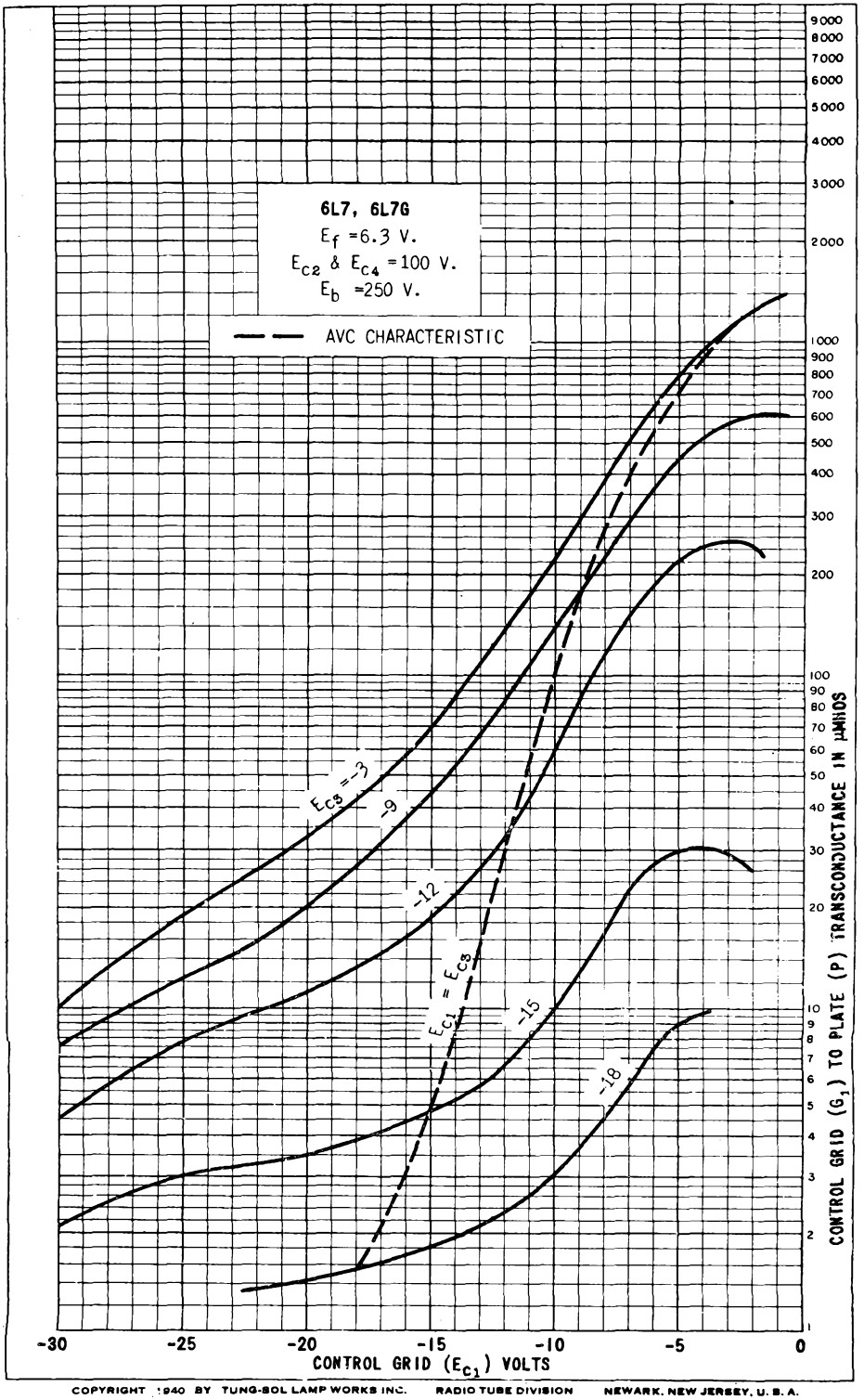
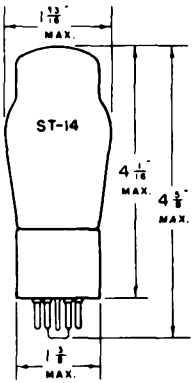


PLATE
925-1

TUNG-SOL



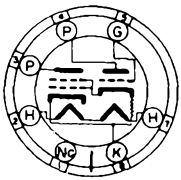
DYNAMIC COUPLED POWER AMPLIFIER

UNIPOTENTIAL CATHODES

HEATER
6.3 VOLTS 0.8 AMPERE
AC OR DC

GLASS BULB

MEDIUM 7 PIN OCTAL BASE



G-7Wb

THE TUNG-SOL 6N6G CONSISTS OF TWO DYNAMICALLY COUPLED TRIODES AND IS DESIGNED FOR SERVICE IN THE POWER OUTPUT STAGE OF AC AND STORAGE BATTERY OPERATED RECEIVERS. ALL NECESSARY BIASES ARE SUPPLIED INTERNALLY. ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 6B5.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

OUTPUT PLATE (3) VOLTAGE	250	300	325 MAX.	VOLTS
INPUT PLATE (4) VOLTAGE	250	300	325 MAX.	VOLTS
INPUT GRID (5) VOLTAGE	0	0	0	VOLTS
GRID CIRCUIT RESISTANCE MAX.	0.5	0.5	0.5	MEGOHM
OUTPUT PLATE CURRENT	33	45	51	MA.
INPUT PLATE CURRENT	6.5	8	9	MA.
PLATE RESISTANCE		24 100		OHMS
TRANSCONDUCTANCE		2400		µMHOS
AMPLIFICATION FACTOR		58		
LOAD RESISTANCE	7000	7000	7000	OHMS
SIGNAL VOLTS (RMS)[S]	13.5	15	17	VOLTS
TOTAL HARMONIC DISTORTION	5	5	5	PER CENT
POWER OUTPUT	2.5	4	5.2	WATTS

(3) BASE PIN #3 (4) BASE PIN #4 (5) BASE PIN #5

[S] FOR RATED POWER OUTPUT

NOTE: THE VOLTAGE BETWEEN HEATER AND CATHODE SHOULD NOT EXCEED 50 VOLTS AND IN NO CASE SHOULD THE HEATER BE LEFT FLOATING.

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PLATE 230-1

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CONTINUED NEXT PAGE

TUNG-SOL

CLASS A1 PUSH-PULL AMPLIFIER

UNLESS SPECIFIED, VALUES ARE FOR TWO TUBES

OUTPUT PLATE (3) VOLTAGE	250	300	325 MAX.	VOLTS
INPUT PLATE (4) VOLTAGE	250	300	325 MAX.	VOLTS
INPUT GRID (5) VOLTAGE	0	0	0	VOLTS
GRID CIRCUIT RESISTANCE MAX.	0.5	0.5	0.5	MEGOHM
OUTPUT PLATE CURRENT PER TUBE	33	45	51	MA.
INPUT PLATE CURRENT PER TUBE	6.5	8	9	MA.
LOAD RESISTANCE PLATE TO PLATE	10 000	10 000	10 000	OHMS
SIGNAL VOLTS (RMS)[3] GRID TO GRID	38	38	42	VOLTS
TOTAL HARMONIC DISTORTION	5	5	5	WATTS
POWER OUTPUT	8.5	10	13.5	WATTS

(3) BASE PIN #3 (4) BASE PIN #4 (5) BASE PIN #5

[3] FOR RATED POWER OUTPUT

PLATE 231-1

TUNG-SOL

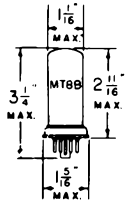
TWIN TRIODE AMPLIFIERS

COATED UNIPOTENTIAL CATHODE

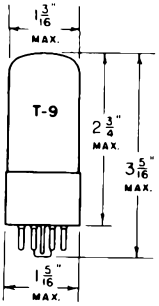
HEATER

6.3 VOLTS 0.8 AMPERE

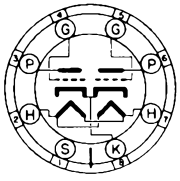
AC OR DC



METAL SHELL
8 PIN OCTAL BASE

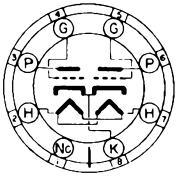


6N7



BOTTOM VIEW

6N7GT/G



BOTTOM VIEW

THE TUNG-SOL 6N7, 6N7GT/G ARE TWIN TRIODES DESIGNED PRIMARILY FOR SERVICE AS CLASS B AMPLIFIERS. THEIR ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PEAK PLATE CURRENT PER PLATE	125	MA.
MAXIMUM AVERAGE DISSIPATION PER PLATE	5.5	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

TRIODES CONNECTED IN PARALLEL

PLATE VOLTAGE	250.	294	VOLTS
GRID VOLTAGE	-5	-6	VOLTS
PLATE CURRENT	6	7	MA.
PLATE RESISTANCE	11 300	11 000	OHMS
TRANSCONDUCTANCE	3100	3200	μMHOS
AMPLIFICATION FACTOR	35	35	

RESISTANCE COUPLED AMPLIFIER AND PHASE INVERTER

PLATE SUPPLY VOLTAGE	100	100	250	250	VOLTS
PLATE LOAD RESISTOR	0.1	0.5	0.1	0.5	MEGOHM
CATHODE RESISTOR	2500	7000	1800	5000	OHMS
VOLTAGE GAIN	20	22	23	24	

CONTINUED NEXT PAGE

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1943

6N7, 6N7GT/G

TUNG-SOL

TYPICAL AND IDEAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS B_2 AMPLIFIER – PUSH-PULL

	IDEAL	TYPICAL	
ZERO-SIGNAL PLATE VOLTAGE	300	300	VOLTS
DC GRID VOLTAGE	0	0	VOLT
AF-PEAK SIGNAL VOLTAGE PER GRID [A]	29	41	VOLTS
MAXIMUM-PEAK-SIGNAL GRID CURRENT PER GRID	20	22	MA.
ZERO-SIGNAL PLATE CURRENT PER PLATE	17.5	17.5	MA.
MAXIMUM-SIGNAL DC PLATE CURRENT PER PLATE	35	35	MA.
GRID IMPEDANCE AT 400 CYCLES	0	516[B]	OHMS
PLATE SUPPLY IMPEDANCE	0	1000	OHMS
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	8000	8000	OHMS
TOTAL HARMONIC DISTORTION	4	8	PER CENT
THIRD HARMONIC	3.5	7.5	PER CENT
FIFTH HARMONIC	1.5	2.5	PER CENT
POWER OUTPUT	10	10	WATTS

[A] FOR POWER OUTPUT SHOWN

[B] 500 OHMS AND 50 MH.

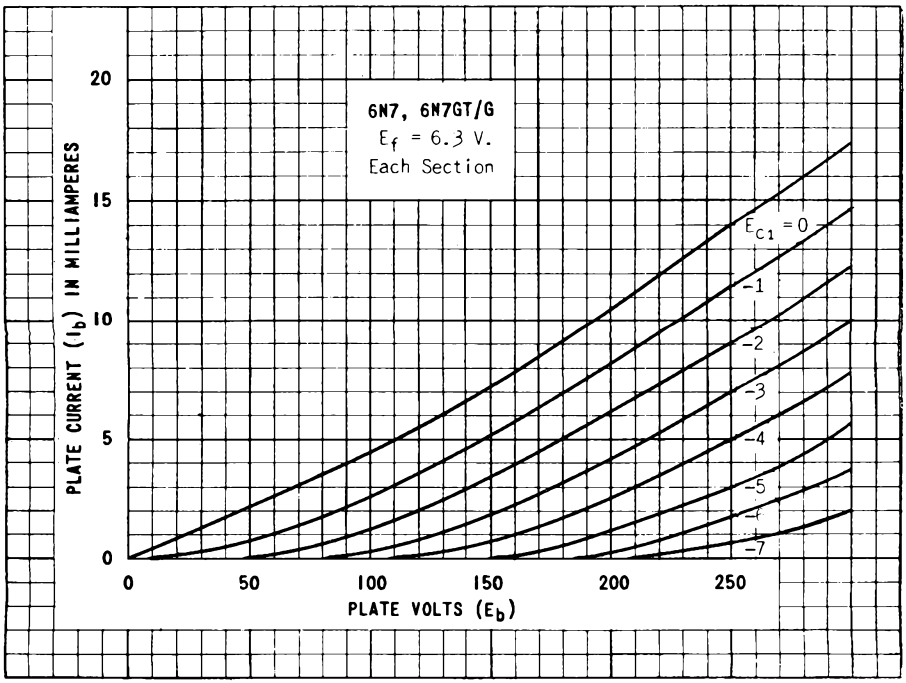
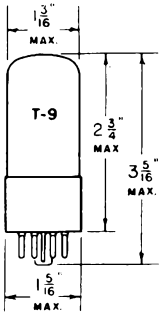


PLATE 1344-1
OCT. 25 1943

TUNG-SOL



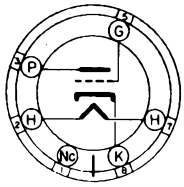
TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



G-6Qa

BOTTOM VIEW

INTERMEDIATE 6 PIN OCTAL BASE

THE TUNG-SOL 6P5GT/G IS A GENERAL PURPOSE TRIODE DESIGNED FOR SERVICE AS AN OSCILLATOR, DETECTOR OR AMPLIFIER. ITS ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF THE 76.

RATINGS

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	1.25	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
CONTROL GRID VOLTAGE[A]	-5	-13.5	VOLTS
PLATE CURRENT	2.5	5.0	MA.
PLATE RESISTANCE	12000	9500	OHMS
TRANSCONDUCTANCE	1150	1450	µMHOS
AMPLIFICATION FACTOR	13.8	13.8	

DIRECT INTERELECTRODE CAPACITANCES[S]

GRID TO CATHODE	3.4	µµf
PLATE TO CATHODE	5.5	µµf
GRID TO PLATE	2.6	µµf

[A] THE DC RESISTANCE IN THE GRID CIRCUIT OF THE 6P5GT/G, UNDER MAXIMUM RATED CONDITIONS, SHOULD NOT EXCEED 1.0 MEGOHM.

[S] WITH EXTERNAL SHIELD CONNECTED TO CATHODE.

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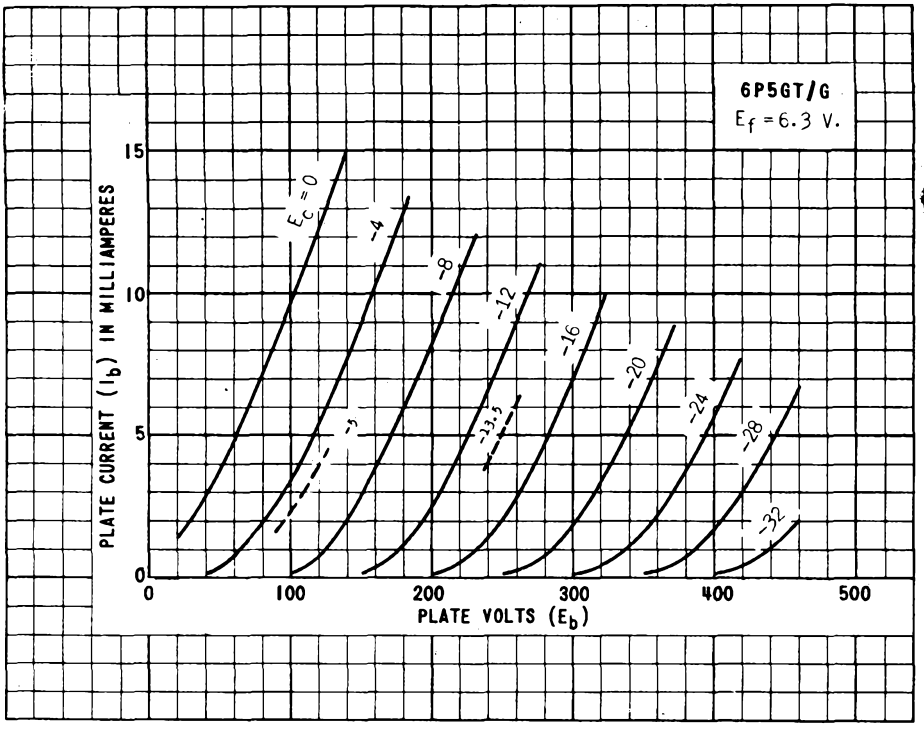
PLATE
1141-1
NOV-17
1941

6P5GT/G



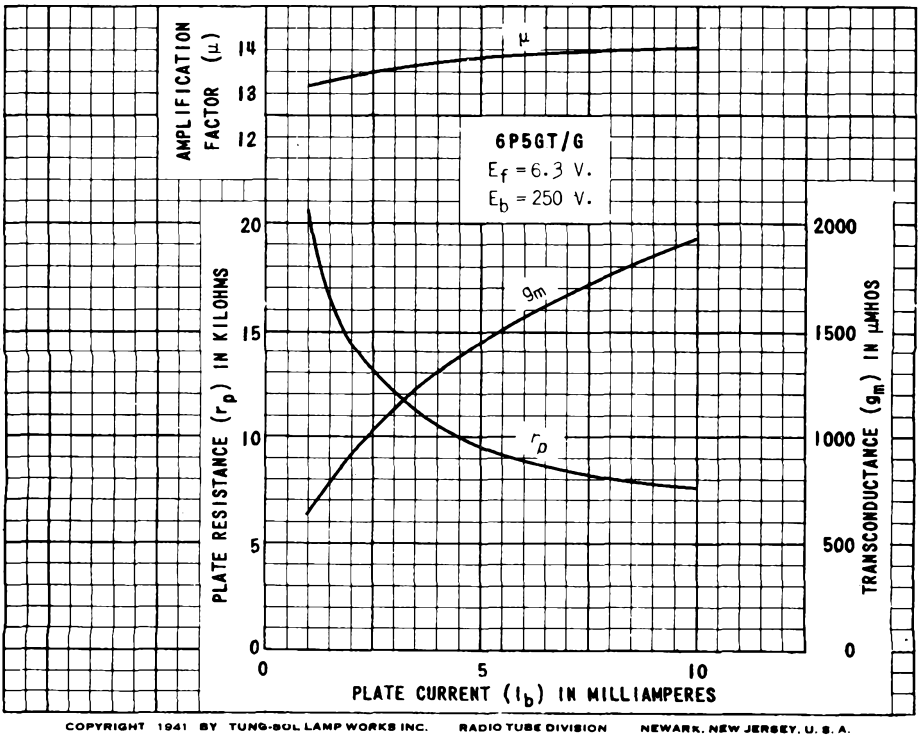
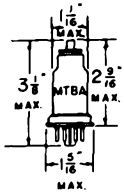


PLATE 1142-1

TUNG-SOL



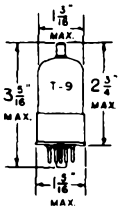
METAL SHELL
SMALL WAFER
7 PIN OCTAL BASE
6Q7

DUO-DIODE

HIGH-MU TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

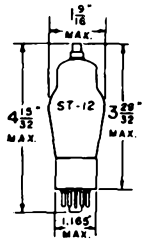
HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC



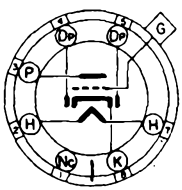
GLASS BULB
SMALL WAFER
7 PIN OCTAL BASE
6Q7GT

7V

BOTTOM VIEW
6Q7, 6Q7GT



GLASS BULB
SMALL 7 PIN
OCTAL BASE
6Q7G



G-7V

BOTTOM VIEW
6Q7G

THE TUNG-SOL 6Q7, 6Q7G AND 6Q7GT COMBINE TWO DIODES AND A HIGH-MU TRIODE IN A SINGLE ENVELOPE, USING A COMMON CATHODE. THEY ARE DESIGNED FOR SERVICE AS DIODE DETECTORS, AVC RECTIFIERS, AND AS HIGH GAIN RESISTANCE COUPLED AMPLIFIERS IN AC, STORAGE BATTERY, AND AC-DC OPERATED RECEIVERS.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED PER PLATE	0.8	MA.

AVERAGE CHARACTERISTICS OF TRIODE UNIT

PLATE VOLTAGE	100	250	VOLTS
CONTROL GRID VOLTAGE	-1	-3	VOLTS
PLATE CURRENT	0.8	1.0	MA.
PLATE RESISTANCE	58 000	58 000	OHMS
TRANSCONDUCTANCE	1200	1200	μMHOS
AMPLIFICATION FACTOR	70	70	

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PLATE
1116-4

SEPT. 17
1941

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

6Q7, 6Q7G, 6Q7GT

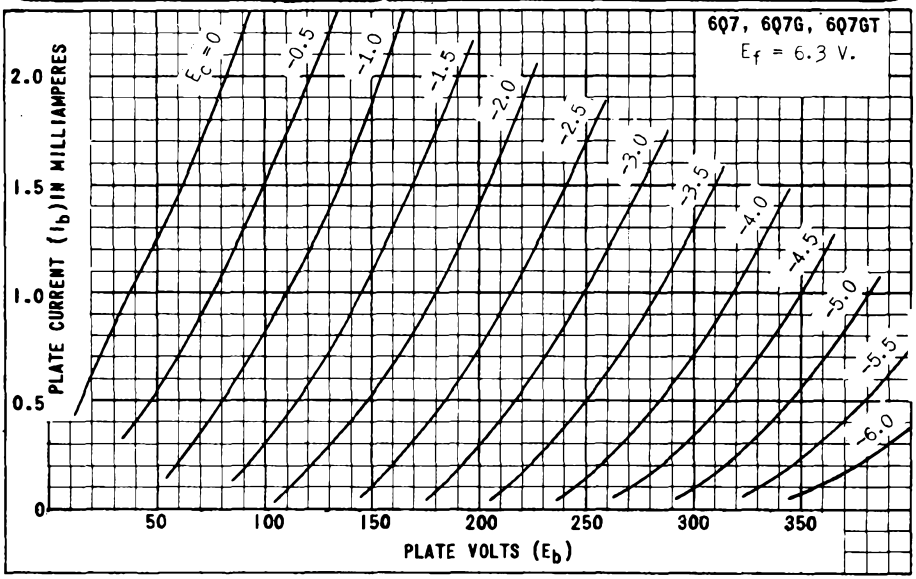
TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

ZERO BIAS, RESISTANCE COUPLED, CLASS A1 AMPLIFIER

PLATE SUPPLY VOLTAGE	100		300		VOLTS
PLATE LOAD RESISTOR	0.25		0.25		MEGOHM
GRID RESISTOR	10		10		MEGOHM
COUPLING CONDENSER	.01 TO .005		.01 TO .005		μf
GRID RESISTOR FOR FOLLOWING TUBE	.5 TO	1.0	.5 TO	1.0	MEGOHM
EXTERNAL GRID CIRCUIT IMPEDANCE	0	0	0	0	MEGOHM
VOLTAGE GAIN	40	42	50	56	
VOLTAGE OUTPUT (RMS)[A]	11	13	51	58	VOLTS

[A] AT 5% TOTAL HARMONIC DISTORTION.



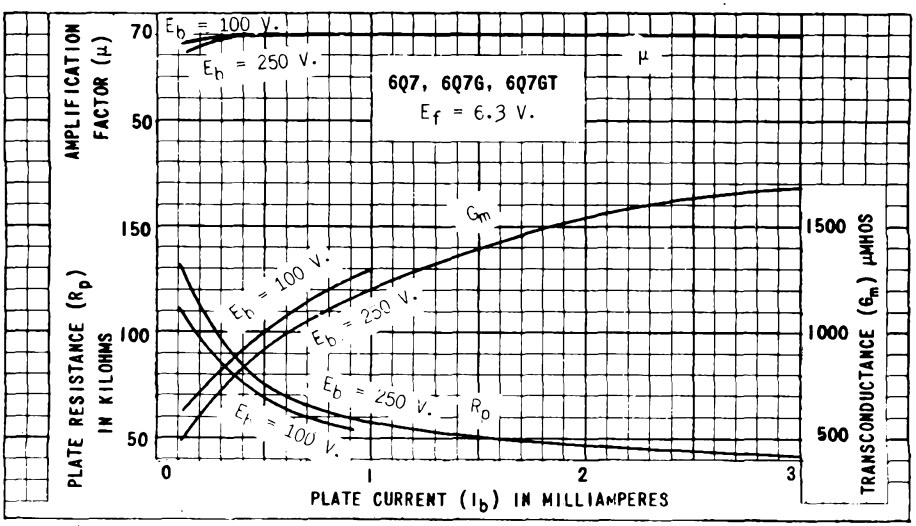
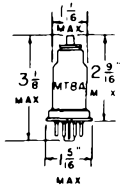


PLATE 1117-1

TUNG-SOL



METAL SHELL
SMALL WAFER
7 PIN OCTAL BASE
6R7

DUO-DIODE

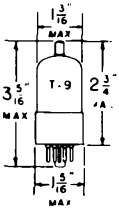
TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

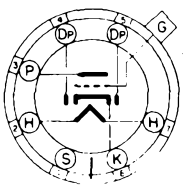
HEATER

6.3 VOLTS 0.3 AMPERE

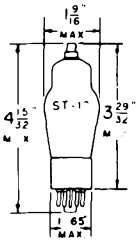
AC OR DC



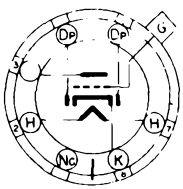
GLASS BULB
INTERMEDIATE
7 PIN OCTAL BASE
6R7GT



7V
BOTTOM VIEW
6R7



GLASS BULB
7 PIN
OCTAL BASE
6R7G



G-7V
BOTTOM VIEW
6R7G, 6R7GT

THE TUNG-SOL 6R7, 6R7G AND 6R7GT COMBINE TWO DIODES AND A TRIODE IN A SINGLE ENVELOPE, USING A COMMON CATHODE. THEY ARE DESIGNED FOR SERVICE AS DIODE DETECTORS, AVC RECTIFIERS, AND AUDIO AMPLIFIERS IN AC, STORAGE BATTERY, AND AC-DC RADIO RECEIVERS.

RATINGS

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED PER PLATE	0.8	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	250	VOLTS
CONTROL GRID VOLTAGE[A]	-9	VOLTS
PLATE CURRENT	9.5	MA.
PLATE RESISTANCE	8500	OHMS
TRANSCONDUCTANCE	1900	µMHOS
AMPLIFICATION FACTOR	16	

[A] THE DC RESISTANCE IN THE GRID CIRCUIT *UNDER MAXIMUM RATED CONDITIONS* SHOULD NOT EXCEED 1.0 MEGOHM.

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PLATE 1094
JULY 28 1941

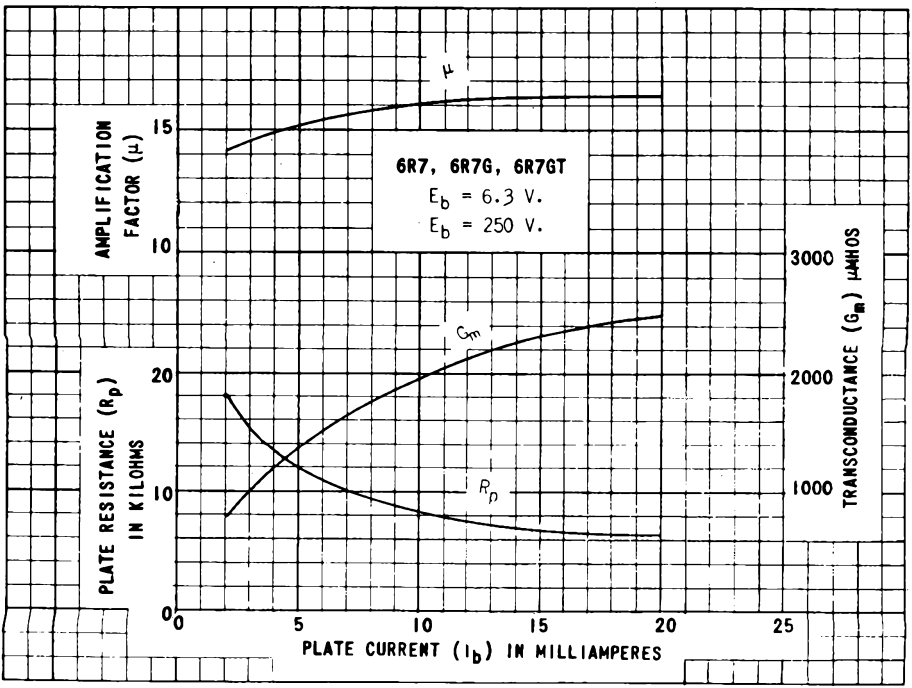
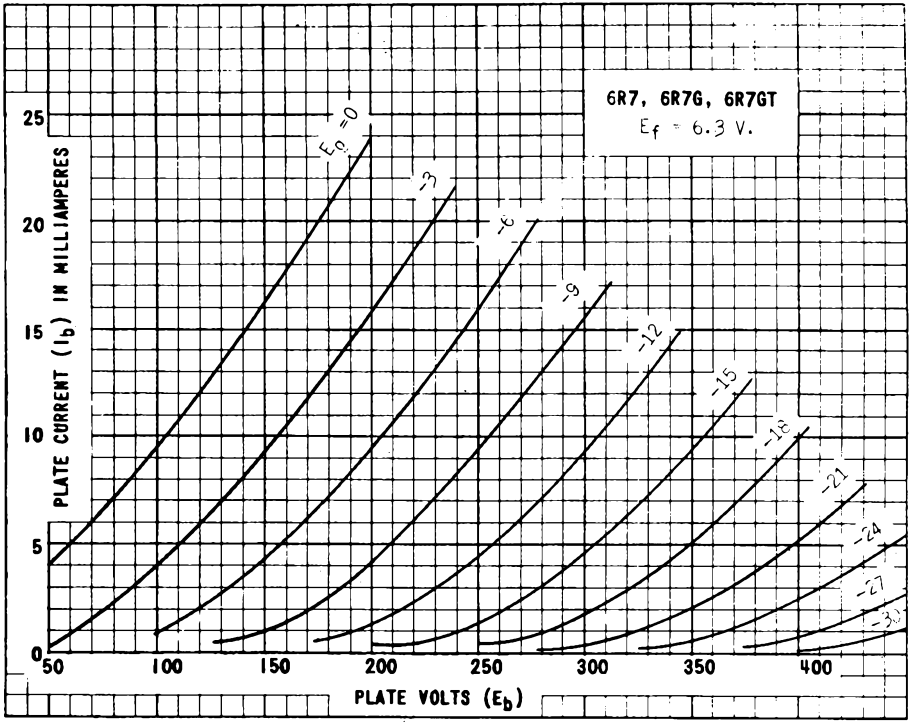


PLATE 108-2

6R7, 6R7G, 6R7GT

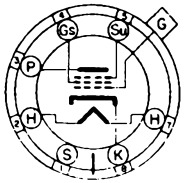


TUNG-SOL

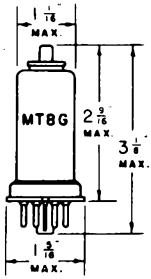
TRIPLE GRID
REMOTE CUT-OFF AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC



7R
BOTTOM VIEW
7 PIN OCTAL BASE



METAL SHELL

THE TUNG-SOL 6S7 IS A TRIPLE GRID REMOTE CUT-OFF AMPLIFIER RECOMMENDED FOR USE IN APPLICATIONS WHICH REQUIRE A HEATER OF LOW CURRENT DRAIN. IT IS SUITABLE FOR USE WITH AVC IN RF AND IF AMPLIFIERS, AND IT MINIMIZES CROSS MODULATION. ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6D6.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM PLATE DISSIPATION	2.25	WATTS
MAXIMUM SCREEN DISSIPATION	0.25	WATT
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	135	250	VOLTS
SCREEN VOLTAGE	67.5	100	VOLTS
CONTROL GRID VOLTAGE MIN.	-3	-3	VOLTS
SUPPRESSOR GRID CONNECTED TO CATHODE AT SOCKET			
PLATE CURRENT	3.7	8.5	MA.
SCREEN CURRENT	0.9	2.0	MA.
PLATE RESISTANCE APPROX.	1.0	1.0	MEGOHM
TRANSCONDUCTANCE	1250	1750	μMHOS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 10 μMHOS	-2[5]	-38.5	VOLTS

DIRECT INTERELECTRODE CAPACITANCES[5]

CONTROL GRID TO CATHODE	6.5	μμf
PLATE TO CATHODE	10.5	μμf
CONTROL GRID TO PLATE	0.005 MAX.	μμf

[5] WITH SHELL CONNECTED TO CATHODE

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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PLATE 876-1
OCT. 21 1940

6S7G

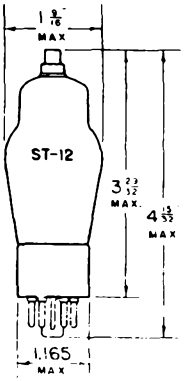
TUNG-SOL

TRIPLE GRID

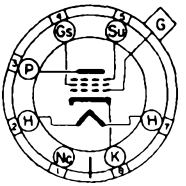
REMOTE CUT-OFF AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC



GLASS BULB



G-7Ra
BOTTOM VIEW
SMALL 7 PIN OCTAL BASE

THE TUNG-SOL 6S7G IS A TRIPLE GRID REMOTE CUT-OFF AMPLIFIER RECOMMENDED FOR USE WHERE LOW HEATER CURRENT DRAIN IS DESIRABLE. IT IS SUITABLE FOR USE WITH AVC IN RF AND IF AMPLIFIERS, AND IT MINIMIZES CROSS MODULATION. ITS ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6D6.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	2.25	WATTS
MAXIMUM SCREEN DISSIPATION	0.25	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	135	250 MAX.	VOLTS
SCREEN VOLTAGE	67.5	100 MAX.	VOLTS
CONTROL GRID VOLTAGE MIN.	-3	-3	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET		
PLATE CURRENT	3.7	8.5	MA.
SCREEN CURRENT	0.9	2.0	MA.
PLATE RESISTANCE APPROX.	1.0	1.0	MEGOHM
TRANSCONDUCTANCE	1250	1750	μMHOS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 10 μMHOS	-25	-38.5	VOLTS

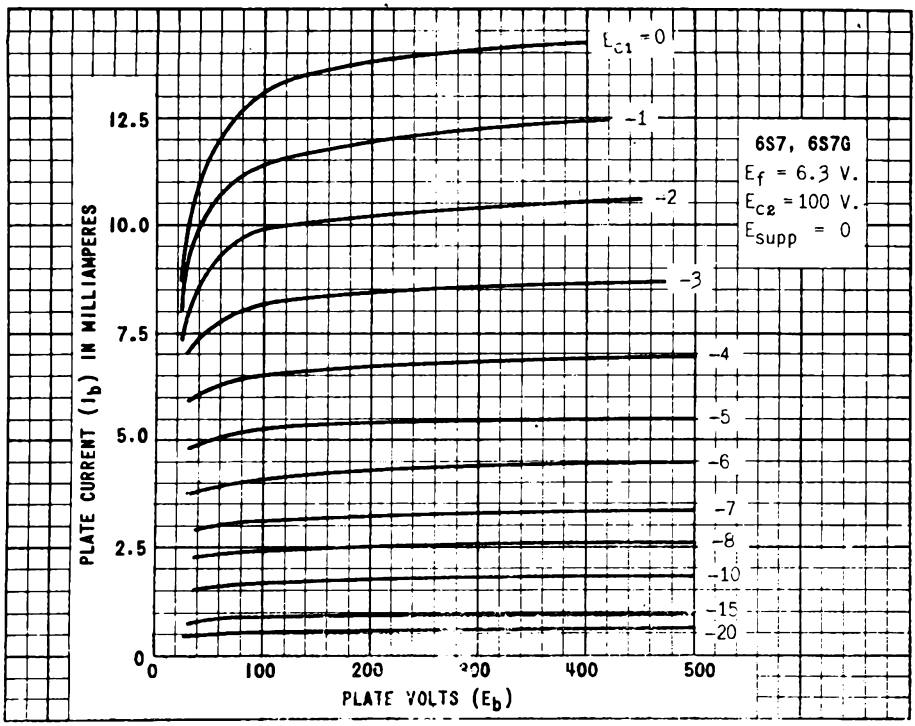
DIRECT INTERELECTRODE CAPACITANCES[A]

CONTROL GRID TO CATHODE	4.4	μμf
PLATE TO CATHODE	8.0	μμf
GRID TO PLATE	0.008 MAX.	μμf

PLATE 877-3

[A] WITH EXTERNAL SHIELD CONNECTED TO CATHODE

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.



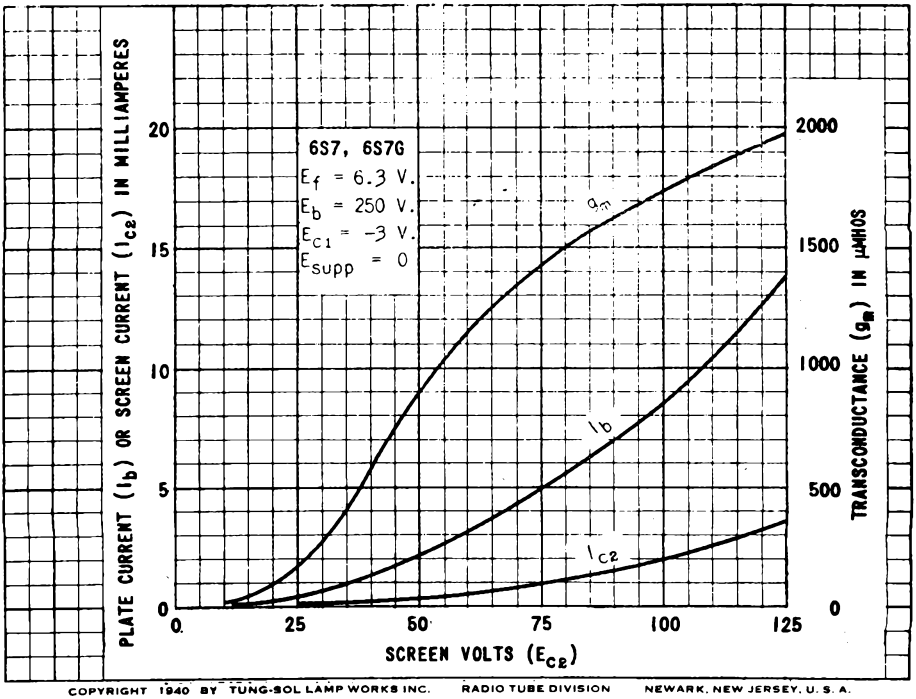


PLATE 878-3

OCT. 21 1940

6S7, 6S7G

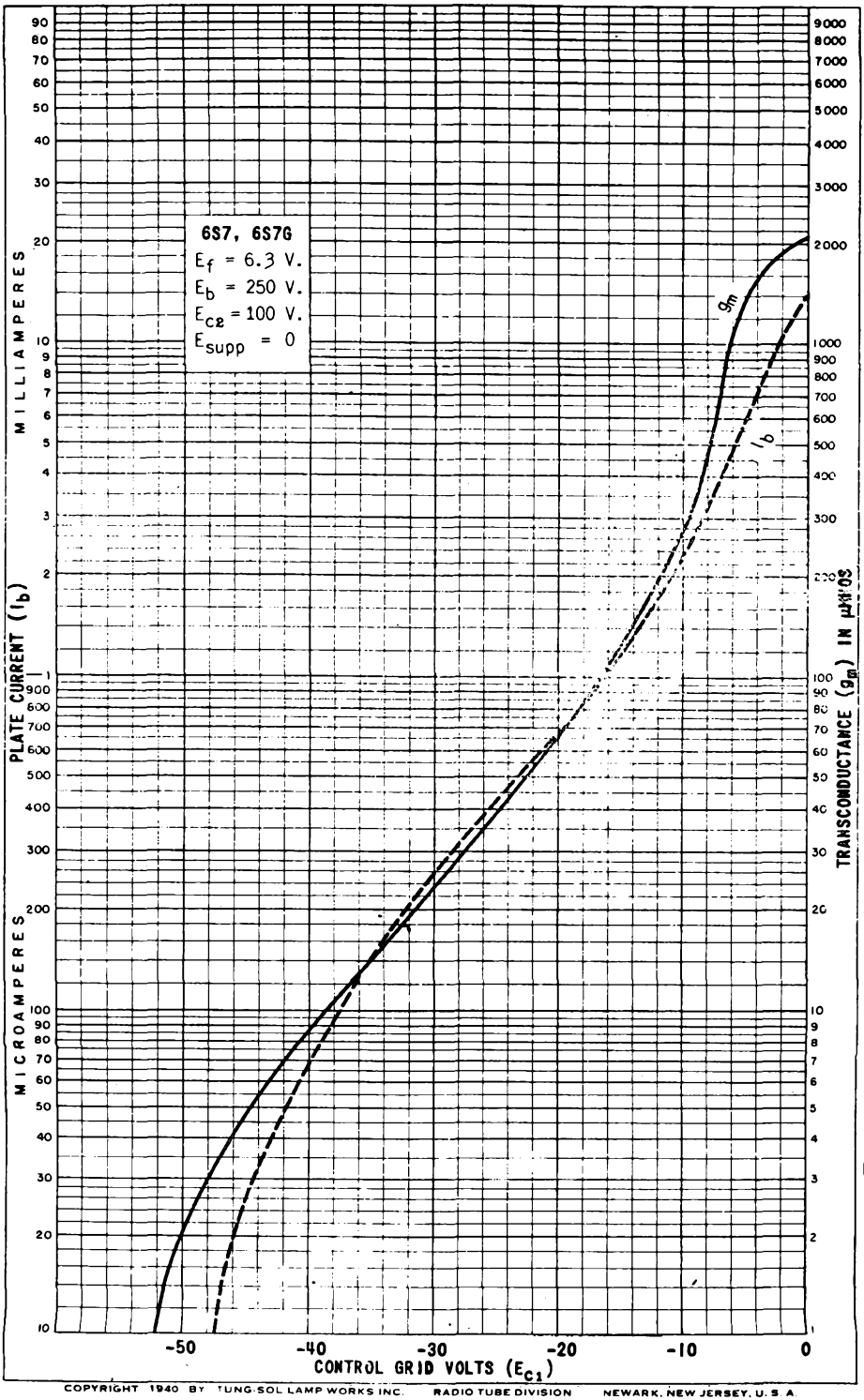
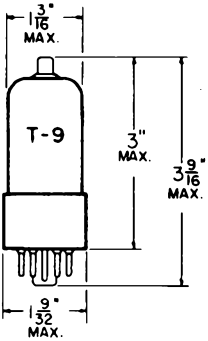


PLATE 879-3

TUNG-SOL

TRIPLE-DIODE TRIODE

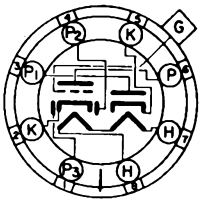


GLASS BULB
SKIRTED
MINIATURE CAP

COATED UNIPOTENTIAL CATHODES

HEATER
6.3 VOLTS 300 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
INTERMEDIATE SHELL
8 PIN OCTAL BASE

THE 6S8GT COMBINES IN ONE ENVELOPE A HIGH-MU TRIODE AND THREE SEPARATE DIODES. ONE OF THE THREE DIODES HAS A SEPARATE CATHODE PERMITTING USE AS A BALANCED DISCRIMINATOR OR DETECTOR. IN COMBINATION FM/AM RECEIVERS THIS TUBE PROVIDES THE NECESSARY ELEMENTS FOR DETECTION OF BOTH TYPES OF SIGNAL WITHOUT NEED FOR ADDITIONAL SWITCHING.

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD M8-308 CONNECTED TO CATHODE

GRID TO PLATE: (G TO P)	1.2	μμf
INPUT: (G TO K)	2.0	μμf
OUTPUT: (P TO K)	3.8	μμf
DIODE INPUT (EACH DIODE) (APPROX.)	1.0	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM TRIODE PLATE VOLTAGE	300	VOLTS
MAXIMUM TRIODE PLATE DISSIPATION	0.5	WATT
MAXIMUM CONTINUOUS DIODE CURRENT (EACH DIODE)	1.0	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HEATER VOLTAGE	6.3	6.3	6.3	VOLTS
HEATER CURRENT	300	300	300	MA.
TRIODE PLATE VOLTAGE	50	100	250	VOLTS
GRID VOLTAGE	0	-1	-2	VOLTS
GRID CIRCUIT RESISTOR	10	0	0	MEGOHM
TRIODE PLATE CURRENT	0.07	0.4	0.9	MA.
PLATE RESISTANCE	285 000	110 000	91 000	OHMS
TRANSCONDUCTANCE	300	900	1 100	μMHOS
AMPLIFICATION FACTOR	85	100	100	
AVERAGE DIODE CURRENT WITH 10 VOLTS DC APPLIED (EACH DIODE)	2.5	2.5	2.5	MA.

ONE DIODE HAS A SEPARATE CATHODE, THE OTHER CATHODE IS COMMON TO TWO DIODES AND THE TRIODE UNIT.

IT IS RECOMMENDED THAT DIODE #1 (PIN 3) AND DIODE #3 (PIN 1) BE USED IN BALANCED DETECTOR CIRCUITS.

→ INDICATES A CHANGE OR ADDITION.

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PLATE 1886
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TUNG-SOL

CONTINUED FROM PRECEDING PAGE

RESISTANCE COUPLED AMPLIFIER

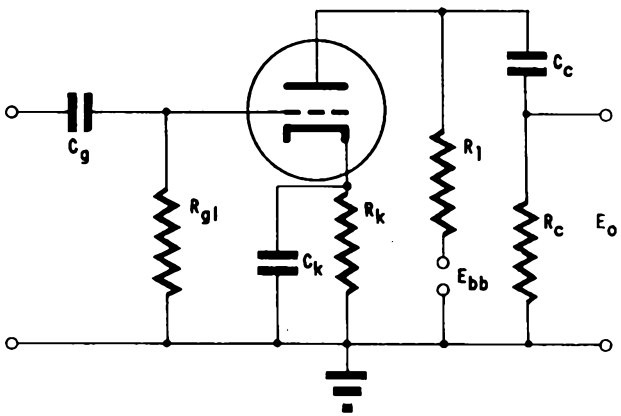
R1 MEG.	Rg1 MEG.	Rc MEG.	Ebb = 90 VOLTS			Ebb = 180 VOLTS			Ebb = 300 VOLTS		
			Rk	GAIN	Eo	Rk	GAIN	Eo	Rk	GAIN	Eo
0.1	A	0.1	6800	25	6	4700	27	10	2200	36	29
0.1	A	0.27	8200	29	7	4700	35	15	2700	45	35
0.27	A	0.27	10000	35	9	6800	44	19	4700	53	42
0.27	A	0.47	12000	39	10	6800	48	21	5600	56	48
0.47	A	0.47	18000	39	10	10000	45	24	8200	58	51
0.47	A	1	18000	46	15	12000	54	29	9100	63	59
0.27	10	0.27	---	34	5	---	54	20	---	58	40
0.27	10	0.47	---	38	6	---	57	25	---	60	49
0.47	10	0.47	---	39	7	---	60	23	---	62	47
0.47	10	1	---	42	9.5	---	65	33	---	70	63

[A] VALUE OF Rg1 IS NOT CRITICAL.

Rk TAKEN TO NEAREST RMA VALUE FOR EACH CASE INSTEAD OF ABSOLUTE OPTIMUM VALUE.

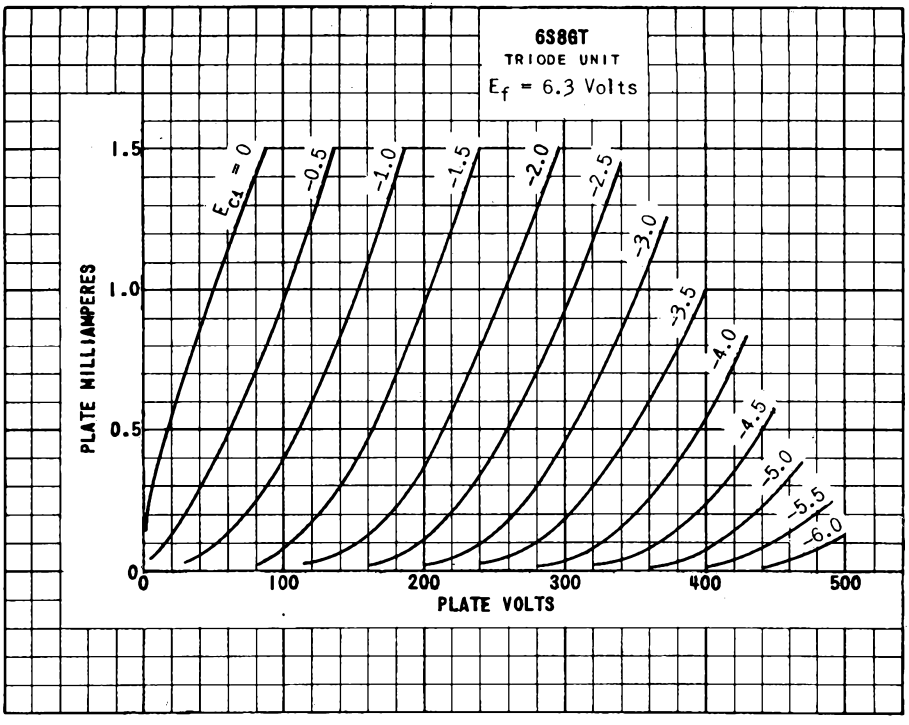
Eo IS RMS OUTPUT AT 5% TOTAL HARMONIC DISTORTION.

GAIN MEASURED AT Eo = 2.0 VOLTS RMS OUTPUT.



→ INDICATES A CHANGE OR ADDITION.

PLATE 1887
OCT. 1, 1947



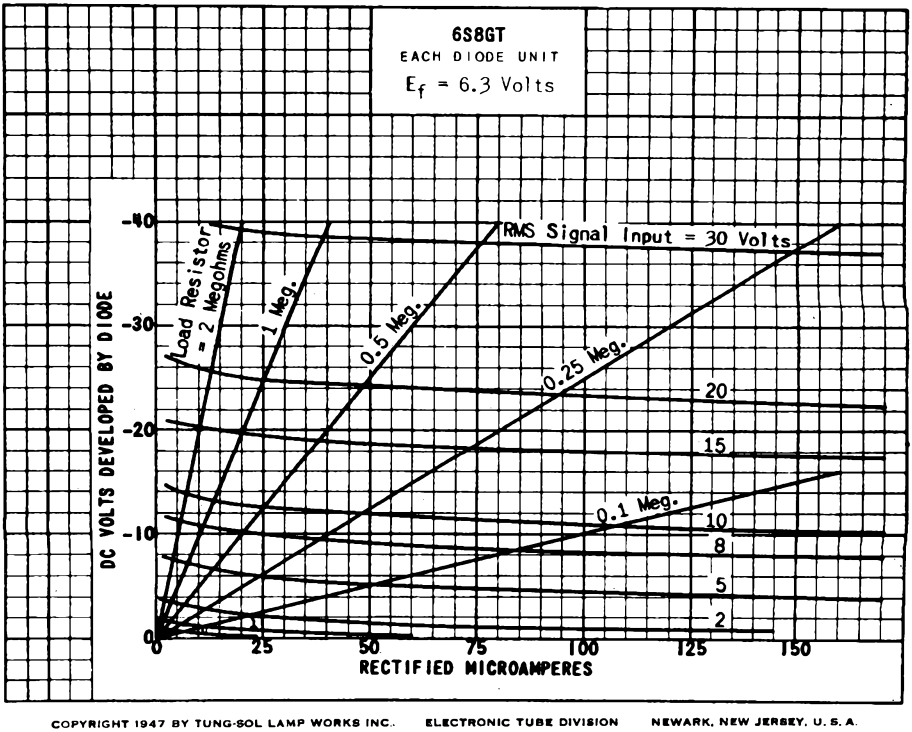


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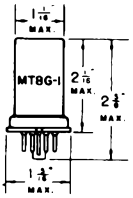
PLATE
1888
OCT. 1,
1947

TUNG-SOL



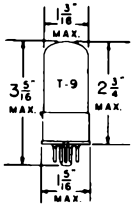
METAL TUBE
SMALL WAFER
8 PIN OCTAL BASE
6SA7

PENTAGRID CONVERTER

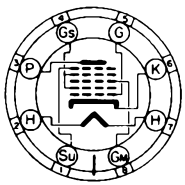
UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.3 AMPERE
AC OR DC

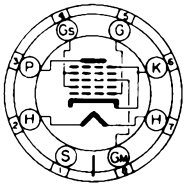


GLASS BULB
8 PIN OCTAL BASE
WITH METAL SHELL
6SA7GT/G



8R

BOTTOM VIEWS



8AD

THE TUNG-SOL 6SA7 AND 6SA7GT/G ARE PENTAGRID CONVERTERS, DESIGNED TO MINIMIZE FREQUENCY DRIFT. THEY ARE INTENDED FOR SERVICE AS COMBINED OSCILLATORS AND MIXERS IN AC, STORAGE BATTERY AND AC-DC OPERATED SUPERHETERODYNES.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN (Gs) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL CONTROL GRID (G) BIAS VOLTAGE[A]	0	VOLT
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	1.0	WATT

[A] WITH SELF-EXCITED OSCILLATOR.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE
1110-1
SEPT.17
1941

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES

	6SA7	6SA7GT/G	
CONTROL GRID (G) TO MIXER PLATE (P)[S]	0.13 MAX.	0.2 MAX.	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (Go)[S]	0.15 MAX.	0.2 MAX.	μμf
RF INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES[S]	9.5	11	μμf
OSCILLATOR GRID (Go) TO PLATE (P)[S]	0.06 MAX.	0.2 MAX.	μμf
OSCILLATOR INPUT: OSCILLATOR GRID (Go) TO ALL OTHER ELECTRODES[S]	7	8	μμf
OSCILLATOR GRID (Go) TO ALL OTHER ELECTRODES EXCEPT CATHODE (K)	4.4	5	μμf
OSCILLATOR GRID (Go) TO CATHODE (K)	2.6	3	μμf
MIXER OUTPUT: PLATE (P) TO ALL OTHER ELECTRODES[S]	12	12	μμf
CATHODE (K) TO ALL OTHER ELECTRODES EXCEPT OSCILLATOR GRID (Go)	5	30	μμf

[S] WITH SHELL CONNECTED TO CATHODE.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

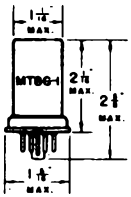
CONVERTER SERVICE - SEPARATE EXCITATION[A]

PLATE (P) VOLTAGE	100	250	VOLTS
SCREEN (Gs) VOLTAGE	100	100	VOLTS
CONTROL GRID (G) VOLTAGE	-2	-2	VOLTS
OSCILLATOR GRID (Go) RESISTOR	20000	20000	OHMS
PLATE CURRENT	3.3	3.5	MA.
SCREEN CURRENT	8.5	8.5	MA.
OSCILLATOR GRID CURRENT	0.5	0.5	MA.
TOTAL CATHODE CURRENT	12.3	12.5	MA.
PLATE RESISTANCE	0.5	1.0	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -2 V.	425	450	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -6 V.	310	325	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -10 V.	75	80	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = -35 V.	2	2	μMHOS

[A] THE CHARACTERISTICS UNDER THESE CONDITIONS CORRESPOND VERY CLOSELY WITH THOSE OBTAINED IN A SELF-EXCITED OSCILLATORY CIRCUIT OPERATING WITH ZERO-BIAS.

PLATE 1111-1

TUNG-SOL



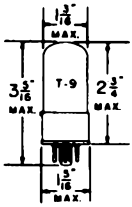
METAL TUBE
SMALL WAFER
8 PIN OCTAL BASE
6SA7

PENTAGRID CONVERTER

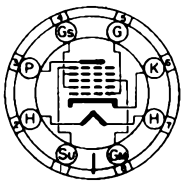
UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.3 AMPERE
AC OR DC

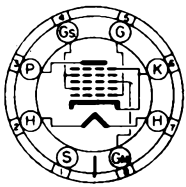


GLASS BULB
8 PIN OCTAL BASE
WITH METAL SHELL
6SA7GT/G



8R

BOTTOM VIEWS



8AD

THE TUNG-SOL 6SA7 AND 6SA7GT/G ARE PENTAGRID CONVERTERS, DESIGNED TO MINIMIZE FREQUENCY DRIFT. THEY ARE INTENDED FOR SERVICE AS COMBINED OSCILLATORS AND MIXERS IN AC, STORAGE BATTERY AND AC-DC OPERATED SUPERHETERODYNES.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN (Gs) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL CONTROL GRID (G) BIAS VOLTAGE[A]	0	VOLT
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	1.0	WATT

[A] WITH SELF-EXCITED OSCILLATOR.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE
1110-1
SEPT.17
1941

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES

	6SA7	6SA7GT/G	
CONTROL GRID (G) TO MIXER PLATE (P)[S]	0.13 MAX.	0.2 MAX.	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (Go)[S]	0.15 MAX.	0.2 MAX.	μμf
RF INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES[S]	9.5	11	μμf
OSCILLATOR GRID (Go) TO PLATE (P)[S]	0.06 MAX.	0.2 MAX.	μμf
OSCILLATOR INPUT: OSCILLATOR GRID (Go) TO ALL OTHER ELECTRODES[S]	7	8	μμf
OSCILLATOR GRID (Go) TO ALL OTHER ELECTRODES EXCEPT CATHODE (K)	4.4	5	μμf
OSCILLATOR GRID (Go) TO CATHODE (K)	2.6	3	μμf
MIXER OUTPUT: PLATE (P) TO ALL OTHER ELECTRODES[S]	12	12	μμf
CATHODE (K) TO ALL OTHER ELECTRODES EXCEPT OSCILLATOR GRID (Go)	5	30	μμf

[S] WITH SHELL CONNECTED TO CATHODE.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE – SEPARATE EXCITATION[A]

PLATE (P) VOLTAGE	100	250	VOLTS
SCREEN (Gs) VOLTAGE	100	100	VOLTS
CONTROL GRID (G) VOLTAGE	-2	-2	VOLTS
OSCILLATOR GRID (Go) RESISTOR	20000	20000	OHMS
PLATE CURRENT	3.3	3.5	MA.
SCREEN CURRENT	8.5	8.5	MA.
OSCILLATOR GRID CURRENT	0.5	0.5	MA.
TOTAL CATHODE CURRENT	12.3	12.5	MA.
PLATE RESISTANCE	0.5	1.0	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -2 V.	425	450	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -6 V.	310	325	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -10 V.	75	80	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = -35 V.	2	2	μMHOS

[A] THE CHARACTERISTICS UNDER THESE CONDITIONS CORRESPOND VERY CLOSELY WITH THOSE OBTAINED IN A SELF-EXCITED OSCILLATORY CIRCUIT OPERATING WITH ZERO-BIAS.

PLATE 1111-1

TUNG-SOL

PENTAGRID CONVERTER

PHYSICAL SPECIFICATIONS

EMITTER UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE SMALL WAFER OCTAL 8-PIN	PIN 1 SHELL, G5	PIN 7 HEATER
MICANOL	PIN 2 HEATER	PIN 8 GRID 3
BULB MT-8G	PIN 3 PLATE	
MAXIMUM DIAMETER 1 5/16"	PIN 4 GRIDS 2 & 4	MOUNTING POS. ANY
MAXIMUM OVERALL LENGTH 2 5/8"	PIN 5 GRID 1	
MAXIMUM SEATED HEIGHT 2 1/16"	PIN 6 CATHODE	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD MB-210

HEATER VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER CURRENT	0.3	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRIDS 2 & 4 VOLTAGE	100	VOLTS
MAXIMUM GRIDS 2 & 4 SUPPLY VOLTAGE	300	VOLTS
MAXIMUM GRID 3 VOLTAGE:		
NEGATIVE BIAS VOLTAGE	100	VOLTS
POSITIVE BIAS VOLTAGE	0	VOLTS
MAXIMUM PEAK HEATER-CATHODE VOLTAGE:		
HEATER NEG. WITH RESPECT TO CATHODE	90	VOLTS
HEATER POS. WITH RESPECT TO CATHODE	90	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	22	MA.
MAXIMUM PLATE DISSIPATION	2.0	WATTS
MAXIMUM GRIDS 2 & 4 DISSIPATION	1.5	WATTS

DIRECT INTERELECTRODE CAPACITANCES

GRID 3 TO ALL OTHER ELECTRODES (RF INPUT)[A] $[C_{G_3(H+K+G_1+G_2\&G_4+G_5+P)}]$	9.6	μμf
PLATE TO ALL OTHER ELECTRODES (MIXER OUTPUT)[A] $[C_{P(H+K+G_1+G_2\&G_4+G_3+G_5)}]$	9.2	μμf
GRID 1 TO ALL OTHER ELECTRODES (OSCILLATOR INPUT)[A] $[C_{G_1(H+K+G_2\&G_4+G_3+G_5+P)}]$	7.3	μμf
GRID 3 TO PLATE $[C_{G_3P}]$ (MAX.)[A]	0.15	μμf
GRID 1 TO GRID 3 $[C_{G_1G_3}]$ (MAX.)[A]	0.16	μμf
GRID 1 TO PLATE $[C_{G_1P}]$ (MAX.)[A]	0.06	μμf
GRID 1 TO ALL OTHER ELECTRODES AND SHELL EXCEPT CATHODE $[C_{G_1(S+H+G_2\&G_4+G_3+G_5+P)}]$	3.8	μμf
GRID 1 TO CATHODE $[C_{G_1K}]$	3.4	μμf
CATHODE TO ALL OTHER ELECTRODES AND SHELL EXCEPT GRID 1 $[C_{K(S+H+G_2\&G_4+G_3+G_5+P)}]$	4.5	μμf

[A] WITH SHELL CONNECTED TO CATHODE

CONTINUED ON FOLLOWING PAGE

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PLATE 1719
JUNE 17 1946

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

SEPARATE EXCITATION

CHARACTERISTICS SHOWN WITH SEPARATE EXCITATION CORRESPOND VERY CLOSELY WITH THOSE OBTAINED IN A SELF-EXCITED OSCILLATOR CIRCUIT OPERATING WITH ZERO BIAS.

PLATE VOLTAGE	100	250	VOLTS
SCREEN (GRIDS 2 & 4) VOLTAGE	100	100	VOLTS
CONTROL GRID (GRID 3) VOLTAGE	-1.0	-1.0	VOLT
PLATE CURRENT	3.6	3.8	MA.
SCREEN (GRIDS 2 & 4) CURRENT	10.2	10	MA.
OSCILLATOR (GRID 1) CURRENT	0.35	0.35	MA.
TOTAL CATHODE CURRENT	14.2	14.2	MA.
PLATE RESISTANCE (APPROX.)	0.5	1.0	MEGOHM
OSCILLATOR GRID (GRID 1) RESISTOR	20 000	20 000	OHMS
CONVERSION TRANSCONDUCTANCE	900	950	MICROMHOS
CONVERSION TRANSCONDUCTANCE (APPROX.) FOR GRID 3 BIAS = -20 VOLTS	3.5	3.5	MICROMHOS

OSCILLATOR IN FM BAND (88-108 MC.)

PLATE VOLTAGE		250	VOLTS
SCREEN (GRIDS 2 & 4) SUPPLY VOLTAGE		250	VOLTS
SCREEN (GRIDS 2 & 4) RESISTOR		12 000	OHMS
OSCILLATOR GRID (GRID 1) RESISTOR		22 000	OHMS
SIGNAL FREQUENCY	88	108	MC.
OSCILLATION FREQUENCY	98.7	118.7	MC.
PLATE CURRENT	6.8	6.5	MA.
SCREEN (GRIDS 2 & 4) CURRENT	12.6	12.5	MA.
OSCILLATOR (GRID 1) CURRENT	0.130	0.140	MA.

OSCILLATOR TRANSCONDUCTANCE

GRID 3	CONNECTED TO GROUND	
GRIDS 2 & 4 CONNECTED TO PLATE (NOT OSCILLATING)	100	VOLTS
GRID 1 SIGNAL VOLTAGE	0	VOLTS
TRANSCONDUCTANCE (APPROX.) BETWEEN GRID 1 & PLATE WITH GRIDS 2 & 4 CONNECTED TO PLATE	8000	MICROMHOS
PLATE CURRENT	32	MA.
AMPLIFICATION FACTOR	16.5	
PLATE RESISTANCE (APPROX.)	2060	OHMS

PLATE 1720
JUNE 17 1946

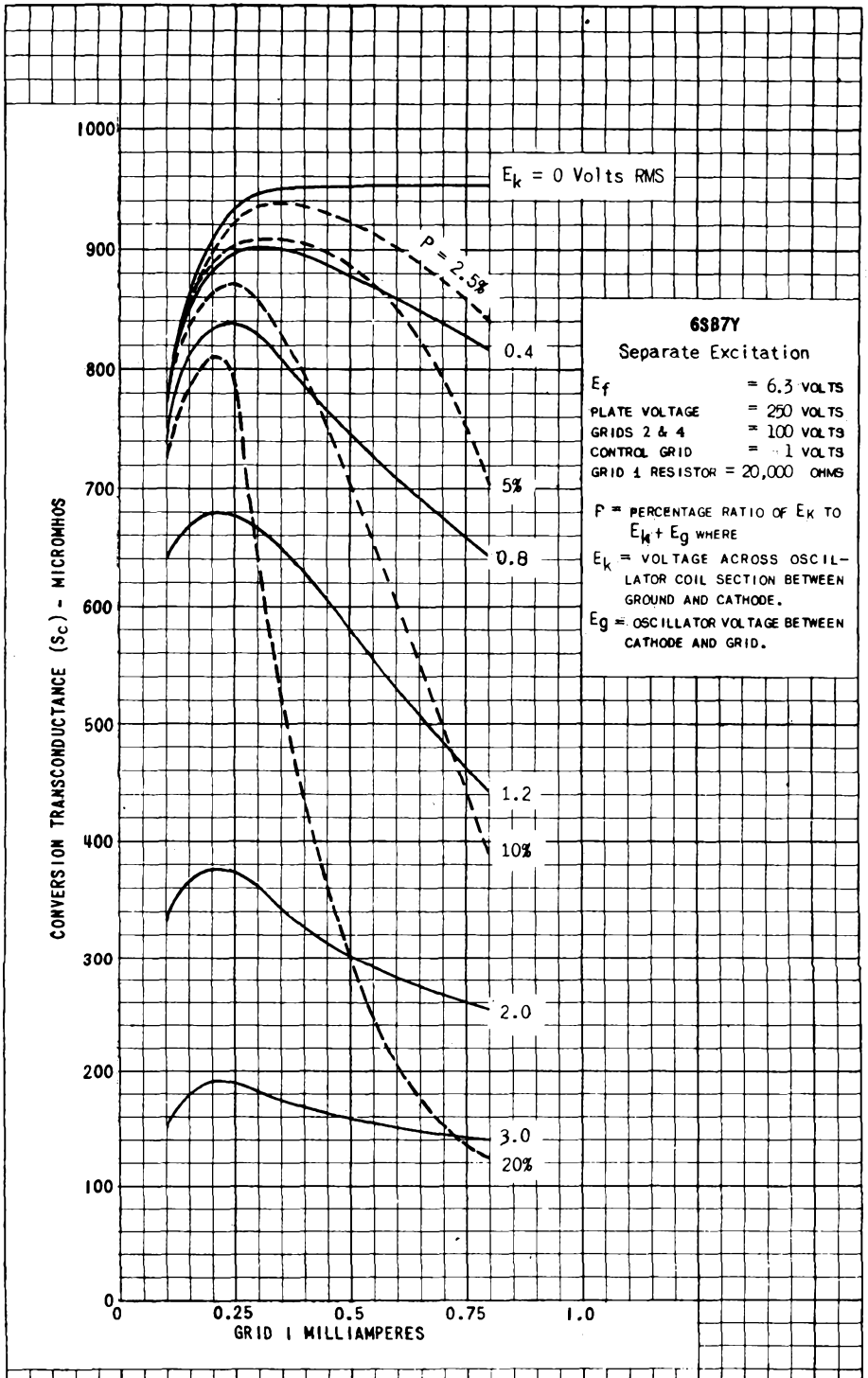

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PLATE 1721
JUNE 17 1946

6SB7Y

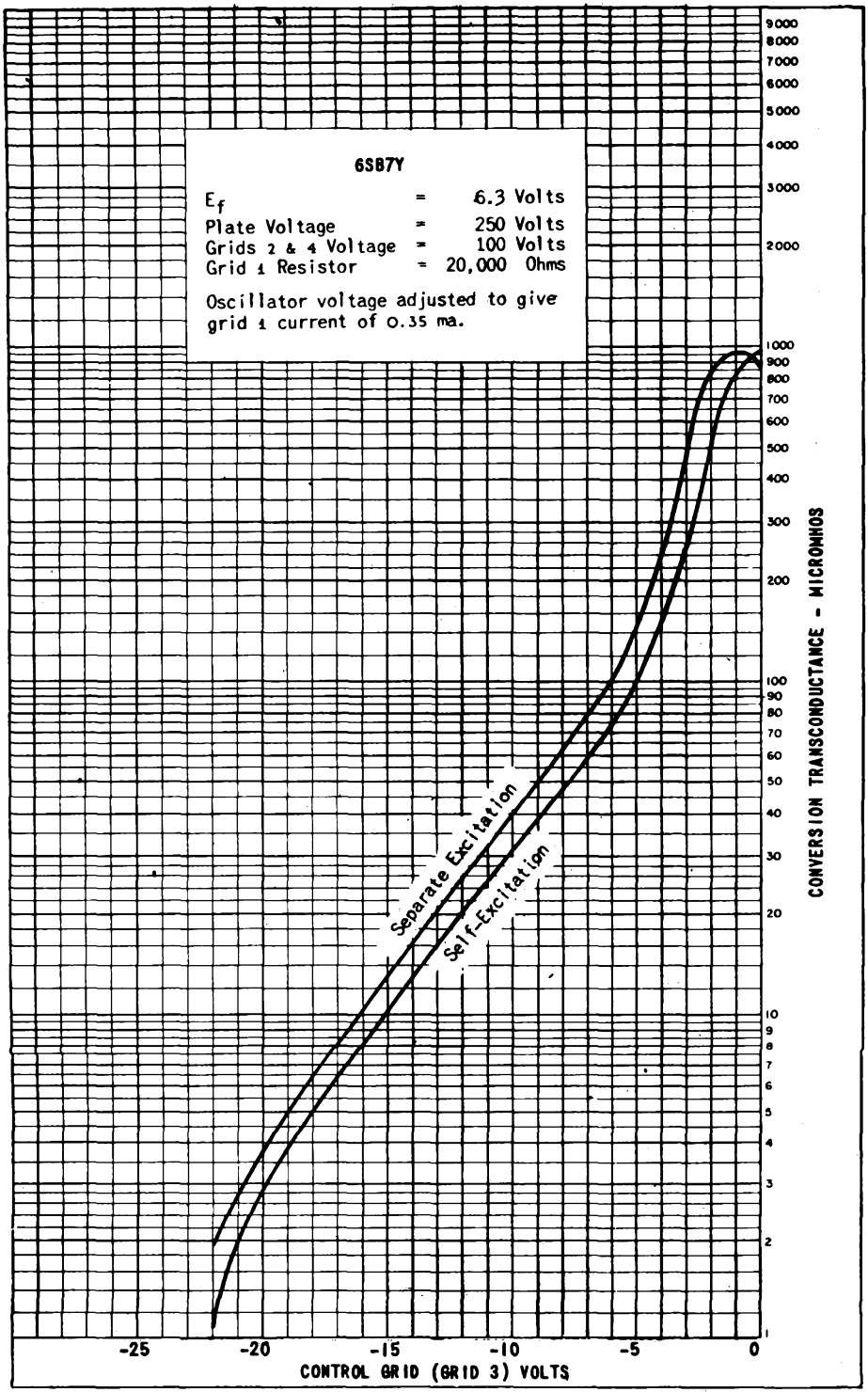

PLATE 1722
JUNE 17 1946

6SB7Y
Separate Excitation

E_f	=	6.3 Volts
Plate Voltage	=	250 Volts
Grids 2 & 4 Voltage	=	100 Volts
Grid 3 Voltage	=	1 Volt
Grid 1 Resistor	=	20,000 Ohms

Grid 1 current varied by adjustment of oscillator voltage.

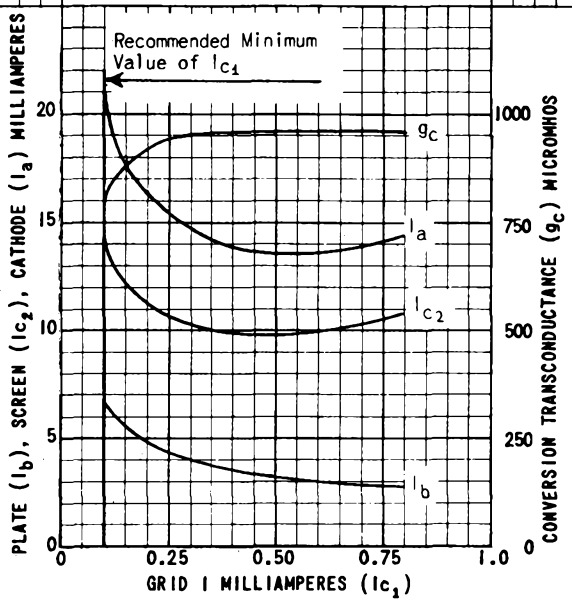

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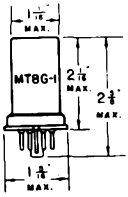
PLATE
1723
JUNE 17
1946

TUNG-SOL

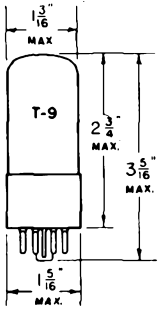


METAL SHELL

TWIN TRIODE AMPLIFIER

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS [4] 0.3 AMPERE
AC OR DC



GLASS BULB

SMALL WAFER 8 PIN OCTAL BASE

INTERMEDIATE 8 PIN OCTAL BASE

THE TUNG-SOL 6SC7 AND 6SC7GT ARE TWIN TRIODE AMPLIFIERS WITH HIGH AMPLIFICATION FACTORS. THEIR PRIMARY APPLICATION IS A PHASE INVERTER AND AUDIO AMPLIFIER.

RATINGS

MAXIMUM PLATE VOLTAGE	250	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

VALUES ARE FOR EACH TRIODE SECTION

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	−2	VOLTS
PLATE CURRENT	2	MA.
PLATE RESISTANCE	53000	OHMS
TRANSCONDUCTANCE	1325	μMHOS
AMPLIFICATION FACTOR	70	

[4] SHOULD NOT DEVIATE MORE THAN ± 10% FROM RATED VALUE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK

SEE OTHER SIDE OF SHEET FOR CURVES

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PLATE
1345-1
OCT. 25
1943

6SC7, 6SC7GT

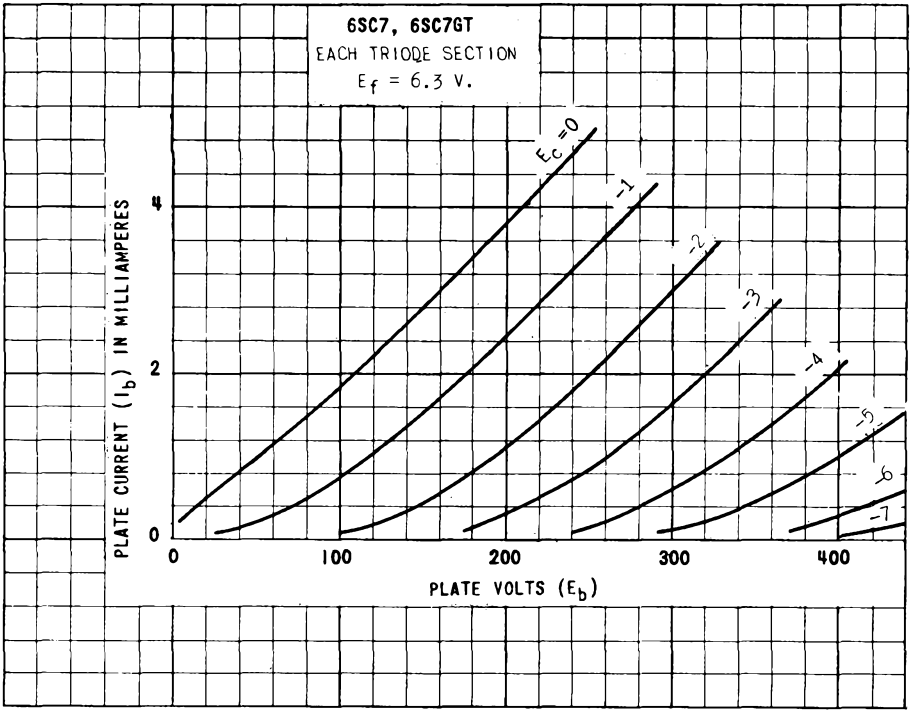
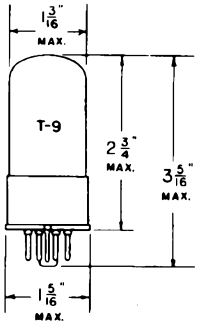


PLATE
1346-1
OCT. 25
1943

TUNG-SOL



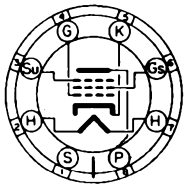
TRIPLE GRID

SEMI-REMOTE CUT-OFF AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.3 AMPERE
AC OR DC



8N

BOTTOM VIEW

GLASS BULB

SMALL WAFER 8 PIN OCTAL BASE WITH METAL SHELL

THE TUNG-SOL 6SD7GT IS A TRIPLE GRID SEMI-REMOTE CUT-OFF AMPLIFIER. IT IS DESIGNED FOR SERVICE AS A HIGH GAIN RF AND IF AMPLIFIER.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MAXIMUM PLATE DISSIPATION	4	WATTS
MAXIMUM SCREEN DISSIPATION	0.4	WATT

DIRECT INTERELECTRODE CAPACITANCES[S]

INPUT: CONTROL GRID TO ALL OTHER ELECTRODES EXCEPT PLATE	9.0	μμf
OUTPUT: PLATE TO ALL OTHER ELECTRODES EXCEPT CONTROL GRID	7.5	μμf
CONTROL GRID TO PLATE	.0035 MAX.	μμf

[S] WITH EXTERNAL SHIELD CONNECTED TO CATHODE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1143-2

NOV. 17 1941

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

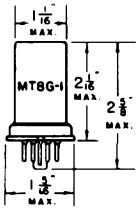
CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	250	VOLTS
SCREEN SUPPLY VOLTAGE	100	100	250	VOLTS
SCREEN VOLTAGE	100	100	125[A]	VOLTS
CONTROL GRID VOLTAGE	-2	-2	-2	VOLTS
SUPPRESSOR GRID VOLTAGE	0	0	0	VOLT
PLATE CURRENT	5.7	6.0	9.5	MA.
SCREEN CURRENT	2.0	1.9	3.0	MA.
PLATE RESISTANCE APPROX.	0.25	1.0	0.7	MEGOHM
TRANSCONDUCTANCE	3350	3600	4250	µMHOS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 20 µMHOS	-11	-11	-27	VOLTS

[A] OBTAINED THROUGH A SUITABLE VOLTAGE DROPPING RESISTOR.

PLATE 1144-1

TUNG-SOL



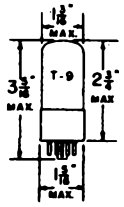
METAL SHELL
SMALL WAFER
6 PIN OCTAL BASE
6SF5

HIGH MU TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.3 AMPERE
AC OR DC



GLASS BULB
INTERMEDIATE
6 PIN OCTAL BASE
6SF5GT

6AB

BOTTOM VIEWS

G-6AB

THE TUNG-SOL 6SF5 AND 6SF5GT ARE GENERAL PURPOSE HIGH MU TRIODES. THEY ARE DESIGNED FOR SERVICE AS HIGH GAIN RESISTANCE COUPLED AMPLIFIERS IN AC AND AC-DC OPERATED RECEIVERS.

RATINGS

HEATER VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER CURRENT	0.3	AMPERE
MAXIMUM PLATE VOLTAGE	300	VOLTS

AVERAGE CHARACTERISTICS

PLATE VOLTAGE	100	250	VOLTS
CONTROL GRID VOLTAGE	-1	-2	VOLTS
PLATE CURRENT	0.4	0.9	MA.
PLATE RESISTANCE	85000	66000	OHMS
TRANSCONDUCTANCE	1150	1500	μMHOS
AMPLIFICATION FACTOR	100	100	

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

PRINTED IN U.S.A.

PLATE
1086-2

JULY 28
1941

CONTINUED NEXT PAGE

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

ZERO BIAS, RESISTANCE COUPLED, CLASS A1 AMPLIFIER

PLATE SUPPLY VOLTAGE	100		300		VOLTS
PLATE LOAD RESISTOR	0.25		0.25		MEGOHM
GRID RESISTOR	10		10		MEGOHM
COUPLING CONDENSER	.01 TO .005		.01 TO .005		μμf
GRID RESISTOR FOR FOLLOWING TUBE	.5 TO 1.0		.5 TO 1.0		MEGOHM
EXTERNAL GRID CIRCUIT IMPEDANCE	0	0	0	0	MEGOHM
VOLTAGE GAIN	48	52	66	71	
VOLTAGE OUTPUT (RMS)[A]	7.0	8.5	44	50	VOLTS

[A] AT FIVE PER CENT TOTAL HARMONIC DISTORTION

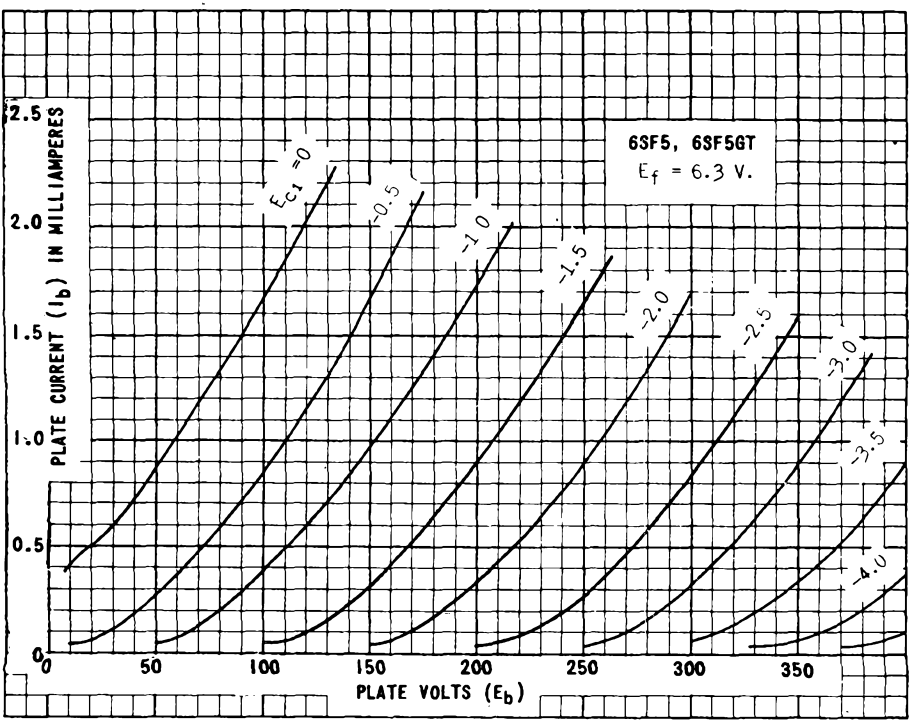
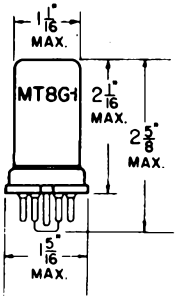


PLATE 1087-1

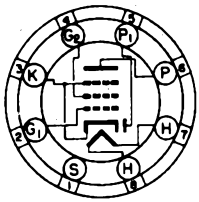
TUNG-SOL

DIODE-SUPER-CONTROL AMPLIFIER PENTODE



COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC



ANY MOUNTING POSITION

METAL SHELL

BOTTOM VIEW

SMALL WAFER
8-PIN OCTAL

THE 6SF7 COMBINES A DIODE AND PENTODE IN A SINGLE-ENDED CONSTRUCTION. IT IS DESIGNED FOR SERVICE AS A COMBINED IF AMPLIFIER, DETECTOR AND A.V.C. RECTIFIER.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

PENTODE UNIT

HEATER VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER CURRENT	0.3	AMP.
MAX. PLATE VOLTAGE	300	VOLTS
MAX. SCREEN VOLTAGE	100	VOLTS
MAX. SCREEN SUPPLY VOLTAGE	300	VOLTS
MIN. GRID VOLTAGE	0	VOLTS
MAX. PLATE DISSIPATION	3.5	WATTS
MAX. SCREEN DISSIPATION	0.5	WATT
HEATER-CATHODE VOLTAGE	AS LOW AS POSSIBLE	

DIRECT INTERELECTRODE CAPACITANCES

WITH SHELL CONNECTED TO CATHODE

PENTODE UNIT

GRID TO PLATE (MAX.)	0.004	μμf
INPUT	5.5	μμf
OUTPUT	6.0	μμf
PENTODE PLATE TO DIODE	0.8	μμf
PENTODE GRID TO DIODE (MAX.)	0.002	μμf

CONTINUED ON FOLLOWING PAGE

PRINTED IN U.S.A.

PLATE 1608
OCT. 15, 1945

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PENTODE UNIT - CLASS A_1 AMPLIFIER

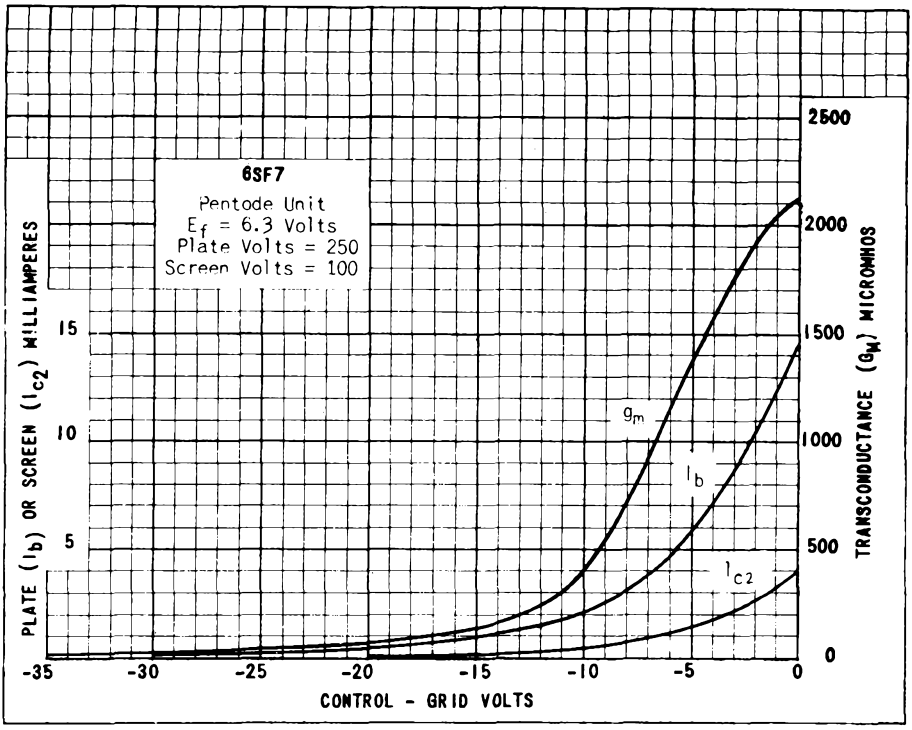
PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
GRID VOLTAGE	-1	-1	VOLTS
PLATE CURRENT	12	12.4	MA.
SCREEN CURRENT	3.4	3.3	MA.
PLATE RESISTANCE (APPROX.)	0.2	0.7	MEGOHM
TRANSCONDUCTANCE	1975	2050	µMHOS
GRID BIAS (APPROX.) FOR TRANSCONDUCTANCE OF 10 µMHOS	-35	-35	VOLTS

DIODE UNIT

THE DIODE UNIT IS PLACED AROUND THE CATHODE, THE SLEEVE OF WHICH IS COMMON TO THE PENTODE UNIT.

SIMILAR TYPE REFERENCE: Except for heater ratings, same characteristics and application as type 12SF7.

PLATE 1609
OCT. 15, 1945



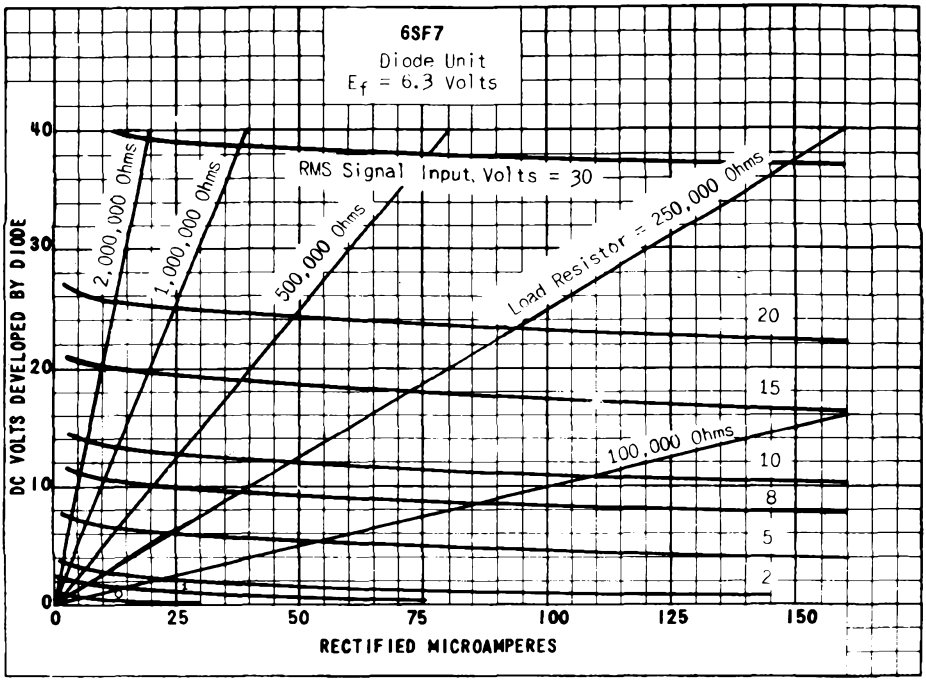
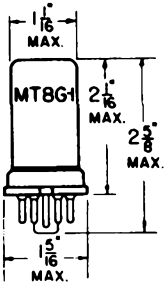


PLATE 1610
OCT. 15 1945

TUNG-SOL

PENTODE

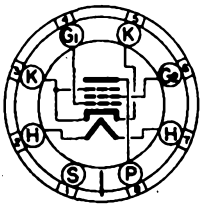


METAL SHELL

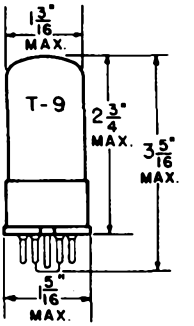
COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 300 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
SMALL WAFER
8 PIN OCTAL



GLASS BULB

THE 6SG7,6SG7GT IS A SEMI-REMOTE CUT OFF PENTODE VOLTAGE AMPLIFIER IN THE OCTAL METAL (GLASS) CONSTRUCTION. IT FEATURES HIGH TRANSCONDUCTANCE WITH LOW GRID-PLATE CAPACITANCE AND A DUAL CATHODE CONNECTION TO MINIMIZE EFFECTS OF COMMON CATHODE CIRCUIT COUPLING.

DIRECT INTERELECTRODE CAPACITANCES

	6SG7[A]	6SG7GT[B]	
GRID TO PLATE: (G TO P) MAX.	0.003	0.035	μμf
INPUT: G_1 TO (H+K&G_3+G_2)	8.5	8.5	μμf
OUTPUT: P TO (H+K&G_3+G_2)	7	7	μμf

[A] WITH SHELL CONNECTED TO CATHODE.

[B] WITH EXTERNAL SHIELD CONNECTED TO CATHODE.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID #2 VOLTAGE	200	VOLTS
MAXIMUM GRID #2 SUPPLY VOLTAGE	300	VOLTS
MINIMUM EXTERNAL GRID #1 VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	3	WATTS
MAXIMUM GRID #2 DISSIPATION	0.6	WATT

CONTINUED ON NEXT PAGE

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PLATE 2053
AUG. 2, 1948

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

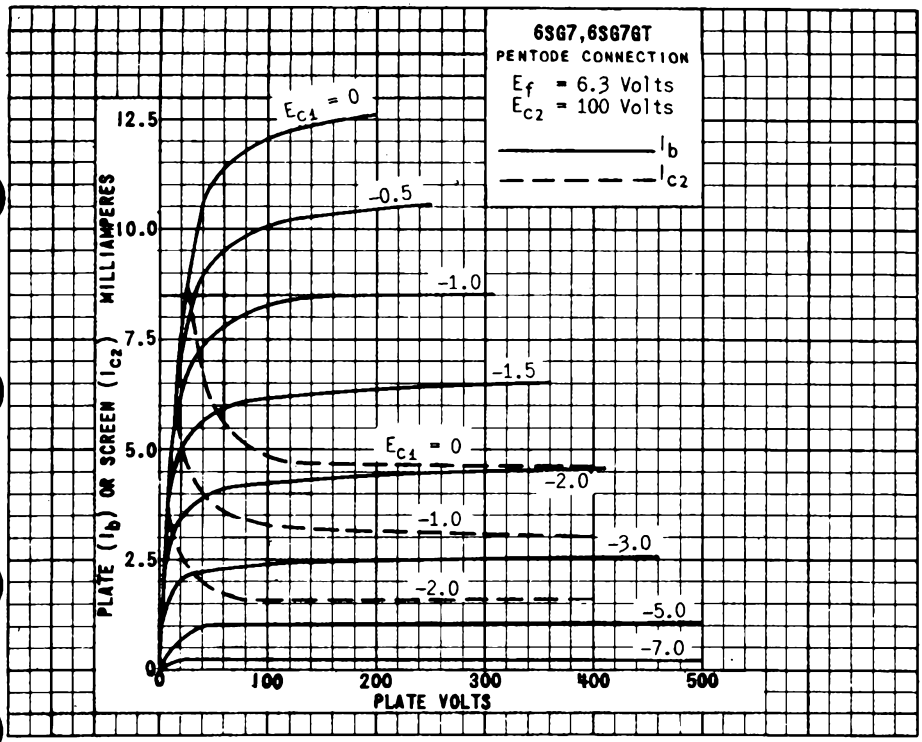
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

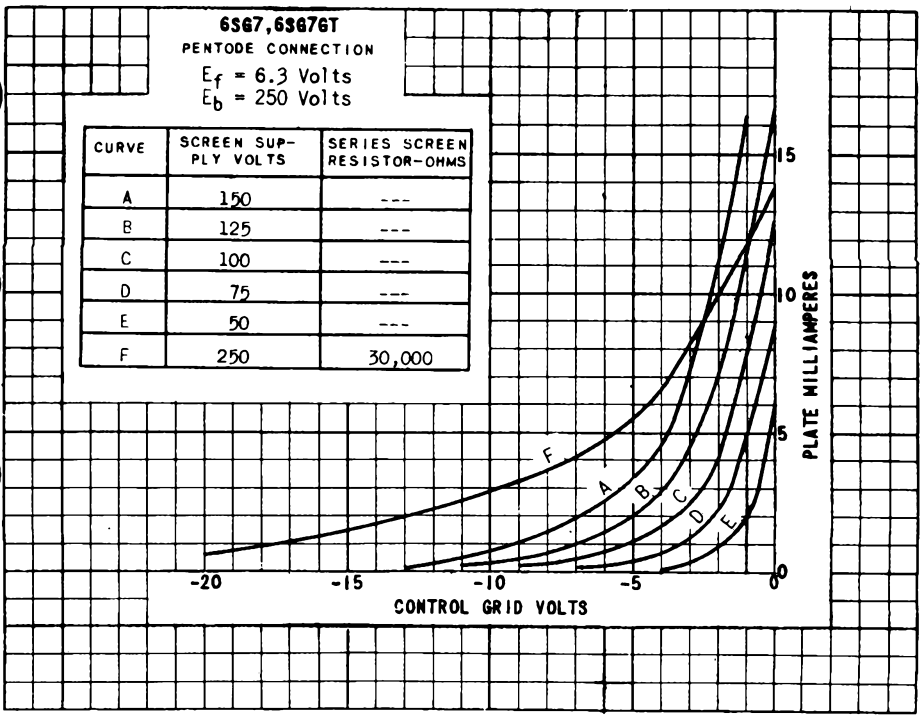
CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	6.3	6.3	VOLTS
HEATER CURRENT	300	300	300	MA.
PLATE VOLTAGE	100	250	250	VOLTS
GRID #2 VOLTAGE	100	125	150	VOLTS
GRID #1 VOLTAGE	-1	-1	-2.5	VOLTS
SELF BIAS RESISTOR	90	60	190	OHMS
PLATE RESISTANCE (APPROX.)	0.25	0.9	[C]	MEGOHM
TRANSCONDUCTANCE	4100	4700	4000	µMHOS
PLATE CURRENT	8.2	11.8	9.2	MA.
GRID #2 CURRENT	3.2	4.4	3.4	MA.
GRID #1 VOLTAGE (APPROX.) FOR g_m = 40 µMHOS	-11.5	-14	-17.5	VOLTS

[C] GREATER THAN 1.0 MEGOHM.

PLATE 2059
AUG. 2, 1948





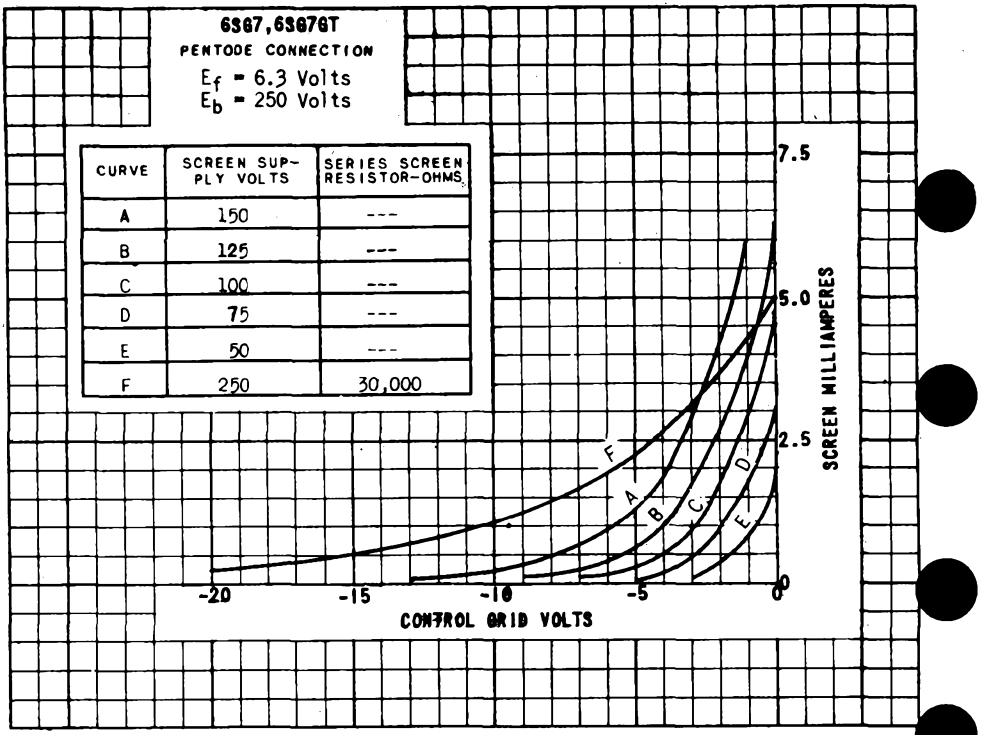
CURVE	SCREEN SUPPLY VOLTS	SERIES SCREEN RESISTOR-OHMS
A	150	---
B	125	---
C	100	---
D	75	---
E	50	---
F	250	30,000

PLATE 2055
AUG. 2, 1948

6SG7, 6SG7GT (12SG7)

6SG7, 6SG7GT
PENTODE CONNECTION
E_f = 6.3 Volts
E_b = 250 Volts

CURVE	SCREEN SUPPLY VOLTS	SERIES SCREEN RESISTOR-OHMS
A	150	---
B	125	---
C	100	---
D	75	---
E	50	---
F	250	30,000



6SG7, 6SG7GT
PENTODE CONNECTION
E_f = 6.3 Volts
E_b = 250 Volts

CURVE	SCREEN SUPPLY VOLTS	SERIES SCREEN RESISTOR-OHMS
A	150	---
B	125	---
C	100	---
D	75	---
E	50	---
F	250	30,000

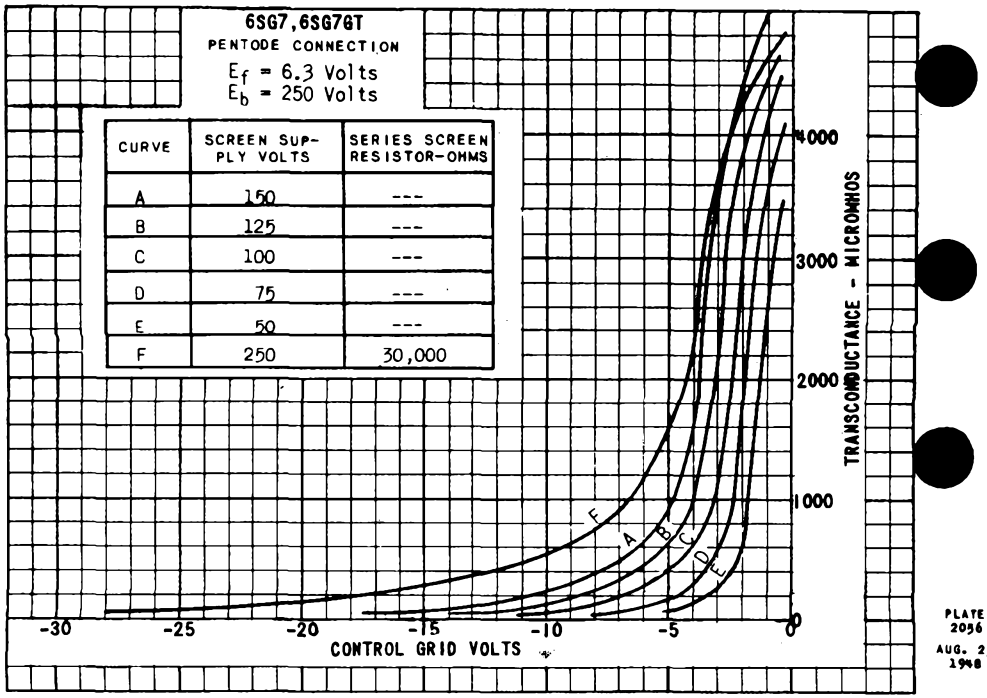
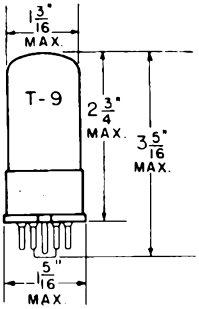


PLATE 2056
AUG. 2, 1948

TUNG-SOL

SHARP CUT-OFF RF AMPLIFIER PENTODE

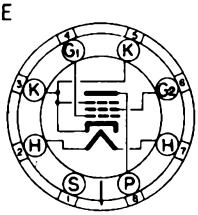


COATED UNIPOTENTIAL CATHODE
6.3 VOLTS 0.3 AMPERE
AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE.

GLASS BULB

ANY MOUNTING POSITION



BOTTOM VIEW

SMALL WAFER 8 PIN
OCTAL AND METAL SHELL

THE 6SH7GT IS A TRIPLE GRID SHARP CUT-OFF AMPLIFIER. IT IS DESIGNED FOR SERVICE IN HIGH GAIN RF AND IF AMPLIFIER APPLICATIONS AND FOR LIMITER SERVICE IN FM RECEIVERS. THE DOUBLE CATHODE CONNECTION IS USEFUL IN REDUCING CATHODE CIRCUIT COUPLING.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	150	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	3.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.7	WATT

DIRECT INTERELECTRODE CAPACITANCES

WITH SHELL CONNECTED TO CATHODE

GRID TO PLATE	0.003 MAX.	μμf
INPUT	8.5	μμf
OUTPUT	7.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	150	VOLTS
GRID VOLTAGE	-1.0	-1.0	VOLT
PLATE RESISTANCE (APPROX.)	0.35	0.90	MEGOHM
TRANSCONDUCTANCE	4 000	4 900	μMHOS
PLATE CURRENT	5.3	10.8	MA.
SCREEN CURRENT	2.1	4.1	MA.
GRID BIAS FOR PLATE CURRENT CUT-OFF (10 μA)	-4.0	-5.5	VOLTS

SIMILAR TYPE REFERENCE: Somewhat similar to type 7L7.

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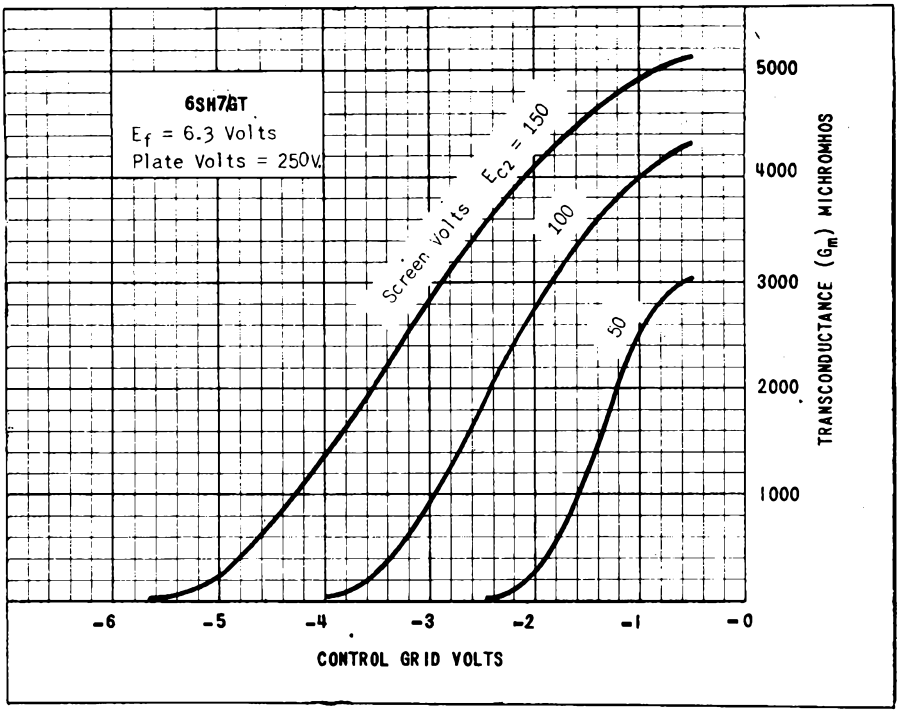
PLATE 1581
JULY 31, 1945

6SH7GT



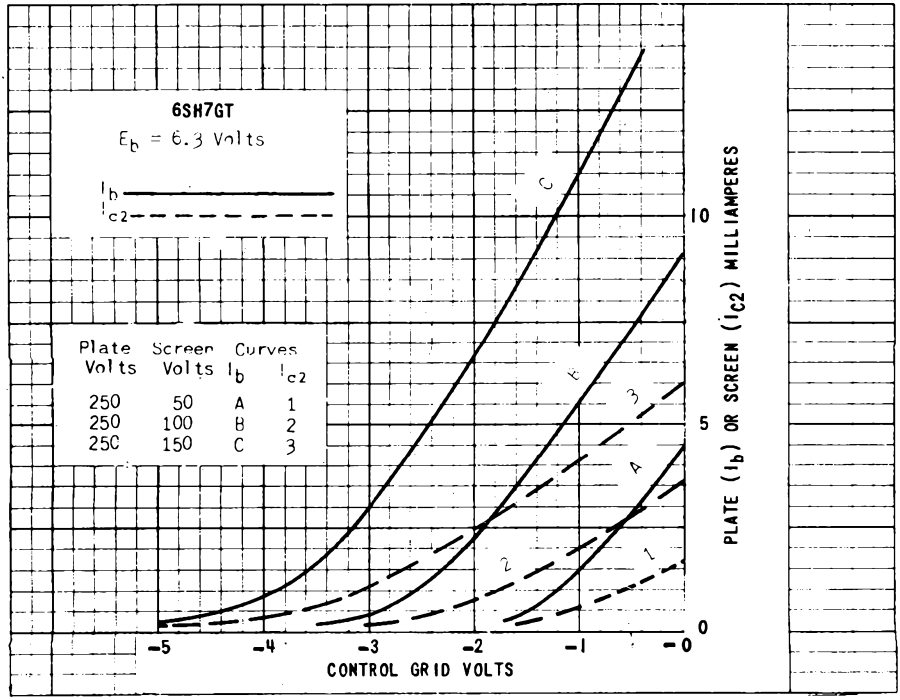
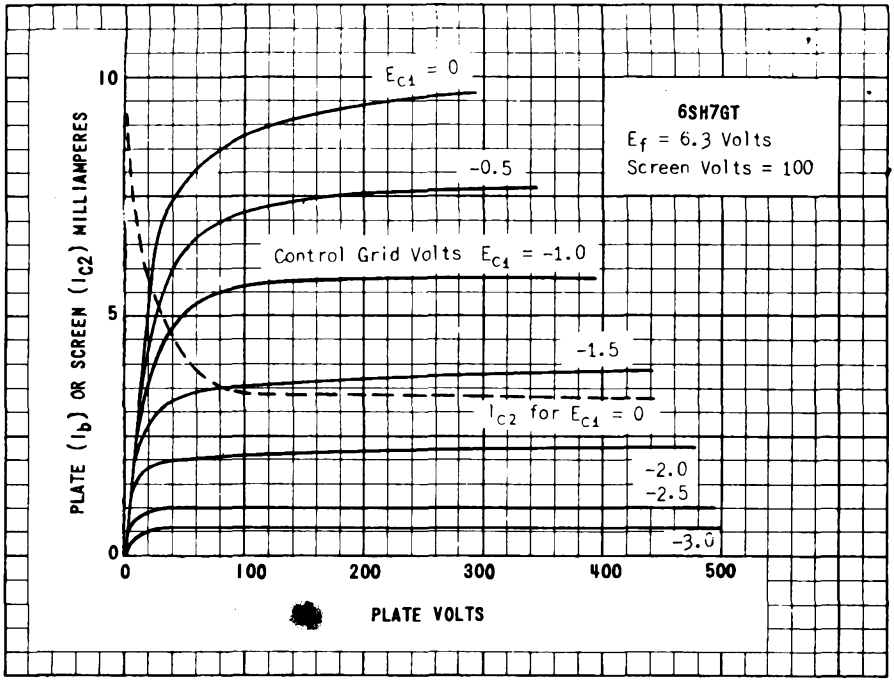


PLATE 1582
JULY 31, 1945



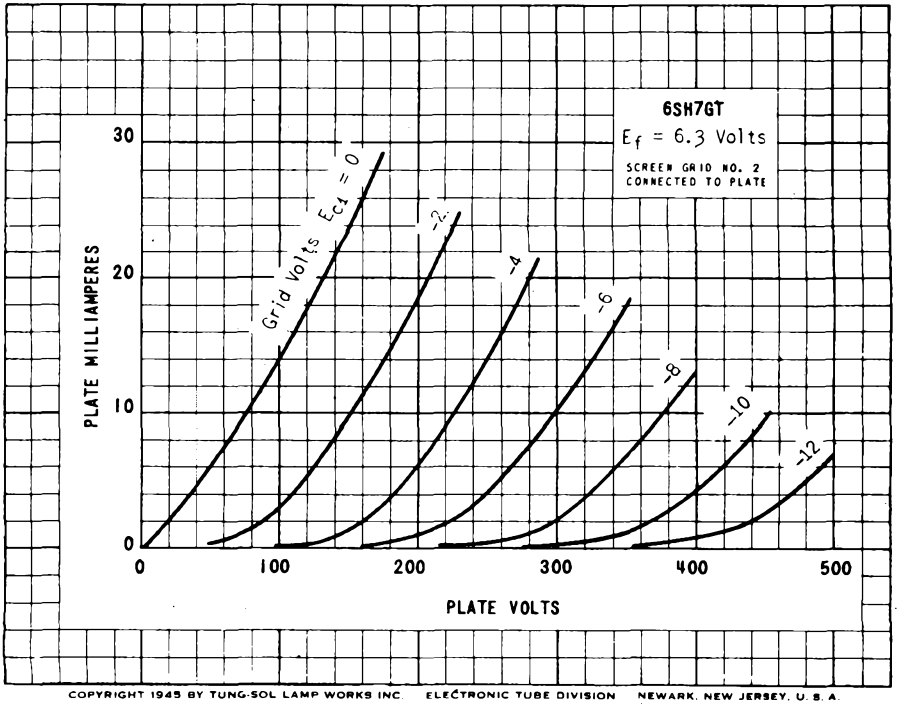


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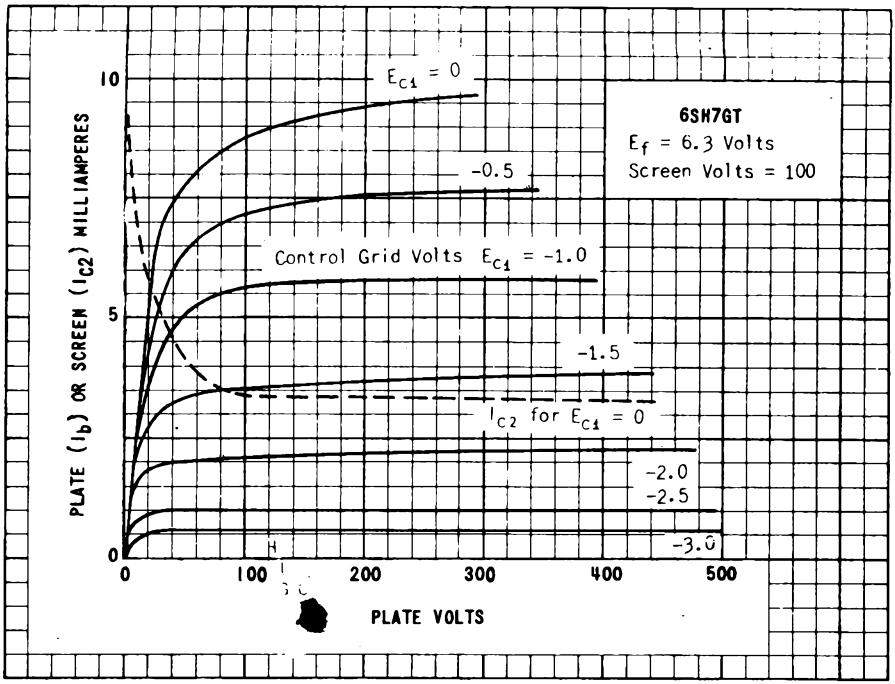
PLATE
1583
JULY 31
1945



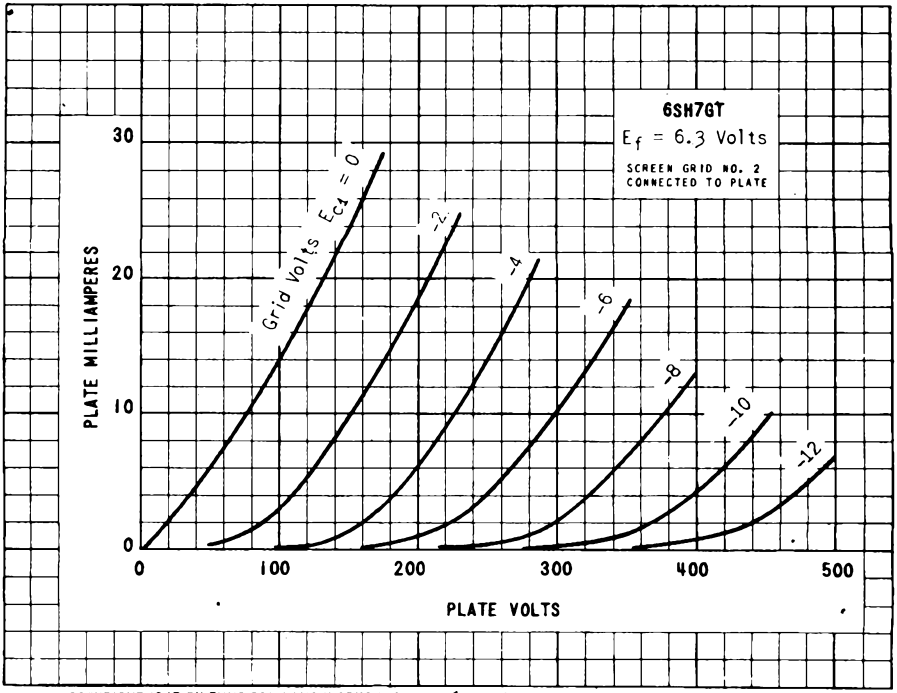


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PLATE
1583
JULY 31
1945

TENTATIVE DATA 6SH7L

TUNG-SOL

RF PENTODE AMPLIFIER

PHYSICAL SPECIFICATIONS

EMITTER COATED UNIPOT. CATHODE	PIN CONNECTIONS	
BASE SMALL WAFER OCTAL 8-PIN	PIN 1 BASE SHELL,	INTERNAL SHIELD
METAL SHELL	PIN 2 HEATER	PIN 7 HEATER
BULB T-9	PIN 3 CATHODE, G3	PIN 8 PLATE
MAXIMUM DIAMETER 1 5/16"	PIN 4 GRID 1	
MAXIMUM OVERALL LENGTH 3"	PIN 5 CATHODE, G3	
MAXIMUM SEATED HEIGHT 2 15/32"	PIN 6 GRID 2	MOUNTING POS. ANY

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD MB-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.300	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	150	VOLTS
MAXIMUM PLATE DISSIPATION	3.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.7	WATT
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MINIMUM EXTERNAL CONTROL GRID VOLTAGE	0	VOLTS

CAPACITANCES

CONTROL GRID TO CATHODE	8.5	μμf
PLATE TO CATHODE	7.0	μμf
CONTROL GRID TO PLATE (MAX.)	0.0035	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER OR FILAMENT VOLTAGE	6.3	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.300	0.300	AMP.
PLATE VOLTAGE (DC)	100	250	VOLTS
SCREEN VOLTAGE (DC)	100	150	VOLTS
CONTROL GRID VOLTAGE (DC)	-1	-1	VOLT
SUPPRESSOR VOLTAGE (DC)	0	0	VOLTS
PLATE CURRENT (DC)	5.3	10.8	MA.
SCREEN CURRENT (DC)	2.1	4.1	MA.
MAXIMUM-SIGNAL PLATE CURRENT			MA.
MAXIMUM-SIGNAL SCREEN CURRENT			MA.
PLATE RESISTANCE (APPROX.)	0.35	0.90	MEGOHM
TRANSCONDUCTANCE	4000	4900	μMHOS
AMPLIFICATION FACTOR			
LOAD RESISTANCE			OHMS
TOTAL HARMONIC DISTORTION			PER CENT
POWER OUTPUT			WATTS
CONTROL GRID VOLTAGE (DC) FOR I_b = 10 μA (DC)	-4	-5.5	VOLTS

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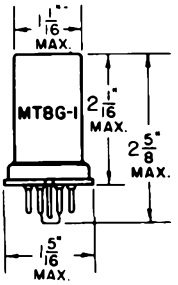
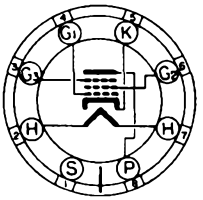
PLATE 1706
APRIL 15 1946

TUNG-SOL

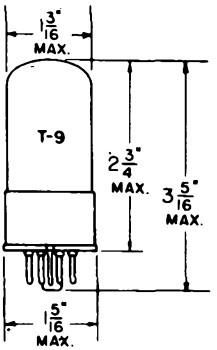
TRIPLE-GRID DETECTOR AMPLIFIER



METAL SHELL
SMALL WAFER OCTAL
8 PIN BASE
6SJ7, 12SJ7



BOTTOM VIEW
6SJ7, 6SJ7GT
12SJ7, 12SJ7GT



GLASS BULB
SMALL WAFER OCTAL 8 PIN
BASE WITH METAL SLEEVE
6SJ7GT, 12SJ7GT

UNIPOTENTIAL CATHODE

HEATER

6SJ7, 6SJ7GT - 6.3 V. 0.3 A.
12SJ7, 12SJ7GT - 12.6 V. 0.15 A.

AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN THE HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE. UNDER NO CONDITIONS SHOULD IT EXCEED 100 VOLTS.

THESE TUBES ARE SINGLE ENDED PENTODES HAVING SHARP CUT-OFF CHARACTERISTICS. THEY MAY BE USED AS BIASED DETECTORS, RADIO FREQUENCY OSCILLATORS OR AS MIXER TUBES IN PROPERLY DESIGNED CIRCUITS. WITH THE EXCEPTION OF HEATER AND CAPACITANCE RATINGS, THEIR ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MINIMUM GRID VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MAXIMUM SCREEN DISSIPATION	0.3	WATTS

CONTINUED NEXT PAGE

PRINTED IN U. S. A.

PLATE
1435
JUNE 15
1944

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES

SHELL CONNECTED TO CATHODE

	6SJ7-12SJ7	6SJ7GT-12SJ7GT	
GRID TO PLATE	0.005 MAX.	0.005 MAX.	μμf
INPUT	6.0	6.3	μμf
OUTPUT	7.0	10.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
GRID VOLTAGE	-3	-3	VOLTS
SUPPRESSOR	TIE TO CATHODE		
PLATE CURRENT	2.9	3.0	MA.
SCREEN CURRENT	0.9	0.8	MA.
PLATE RESISTANCE (APPROX.)	0.7	1.5	MEGOHMS
TRANSCONDUCTANCE	1575	1650	μMHOS
GRID VOLTAGE (FOR CATHODE CURRENT CUT-OFF)	-9	-9	VOLTS

PLATE 1436
JUNE 15 1944

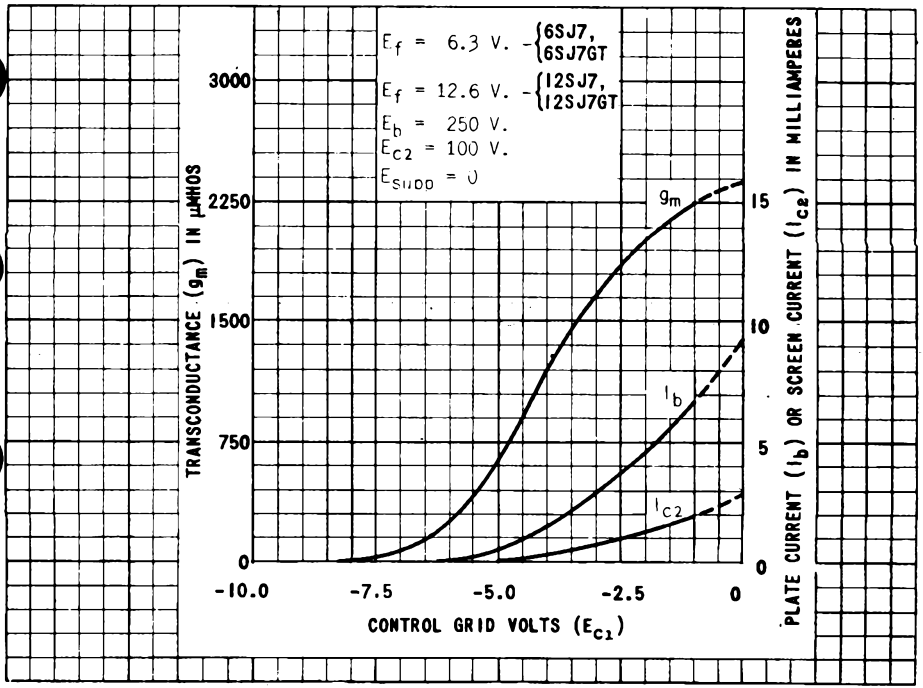
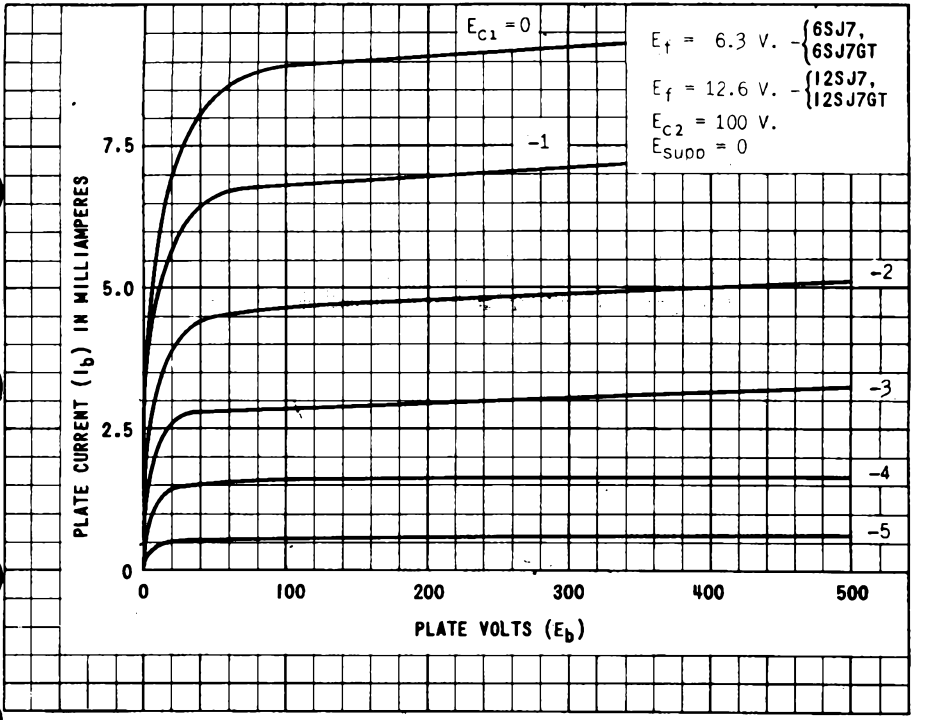


PLATE 1437
JUNE 15 1944

(12SJ7, 12SJ7GT) 6SJ7, 6SJ7GT

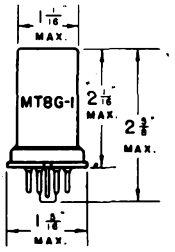


TUNG-SOL

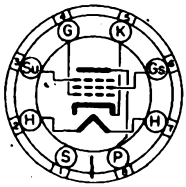
TRIPLE GRID
REMOTE CUT-OFF AMPLIFIER

UNIPOTENTIAL CATHODE

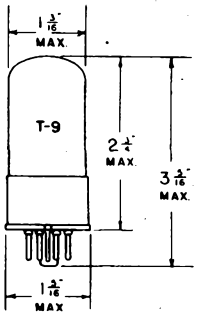
HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC



METAL SHELL
6SK7



8N
BOTTOM VIEW



GLASS BULB
6SK7GT/G

SMALL WAFER 8 PIN OCTAL BASE

THE TUNG-SOL 6SK7 AND 6SK7GT/G ARE TRIPLE GRID VARIABLE MU AMPLIFIERS. THEY ARE DESIGNED FOR USE WITH AVC IN RF AND IF AMPLIFIERS, AND THEY MINIMIZE CROSS MODULATION. WITH THE EXCEPTION OF HEATER RATINGS, THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 12SK7 AND 12SK7GT/G.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MINIMUM EXTERNAL CONTROL GRID BIAS VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	4.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.4	WATT

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

PRINTED IN U.S.A.

PLATE
1112-1

SEPT. 17
1941

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES[5]

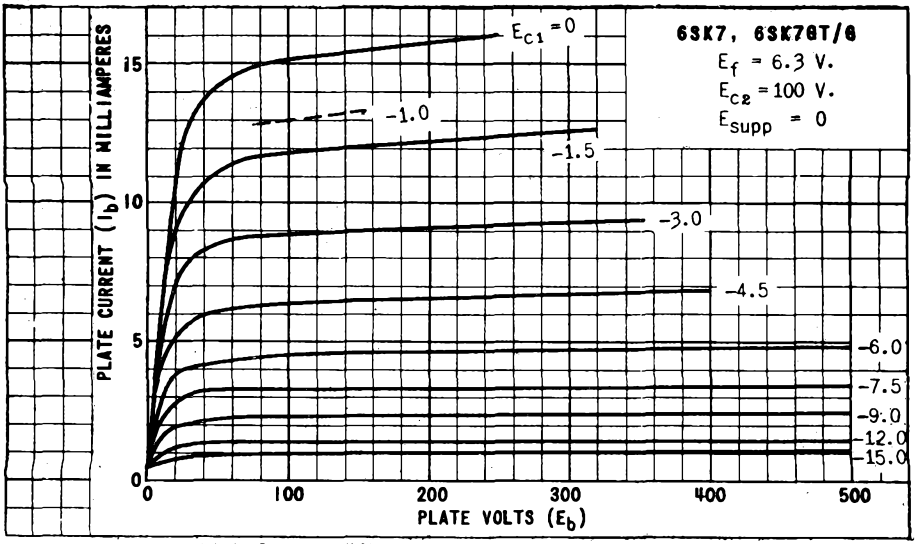
	6SK7	6SK7GT/G	
CONTROL GRID TO CATHODE	6.0	6.5	μμf
PLATE TO CATHODE	7.0	7.5	μμf
CONTROL GRID TO PLATE	0.003 MAX.	0.005 MAX.	μμf

[5] WITH SHELL CONNECTED TO CATHODE.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	−1	−3	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET		
PLATE CURRENT	13	9.2	MA.
SCREEN CURRENT	4.0	2.6	MA.
PLATE RESISTANCE APPROX.	0.12	0.8	MEGOHM
TRANSCONDUCTANCE	2350	2000	μMHOS
CONTROL GRID VOLTAGE	−35	−35	VOLTS
FOR TRANSCONDUCTANCE = 10 μMHOS	35	24	



6SK7, 6SK7GT/G

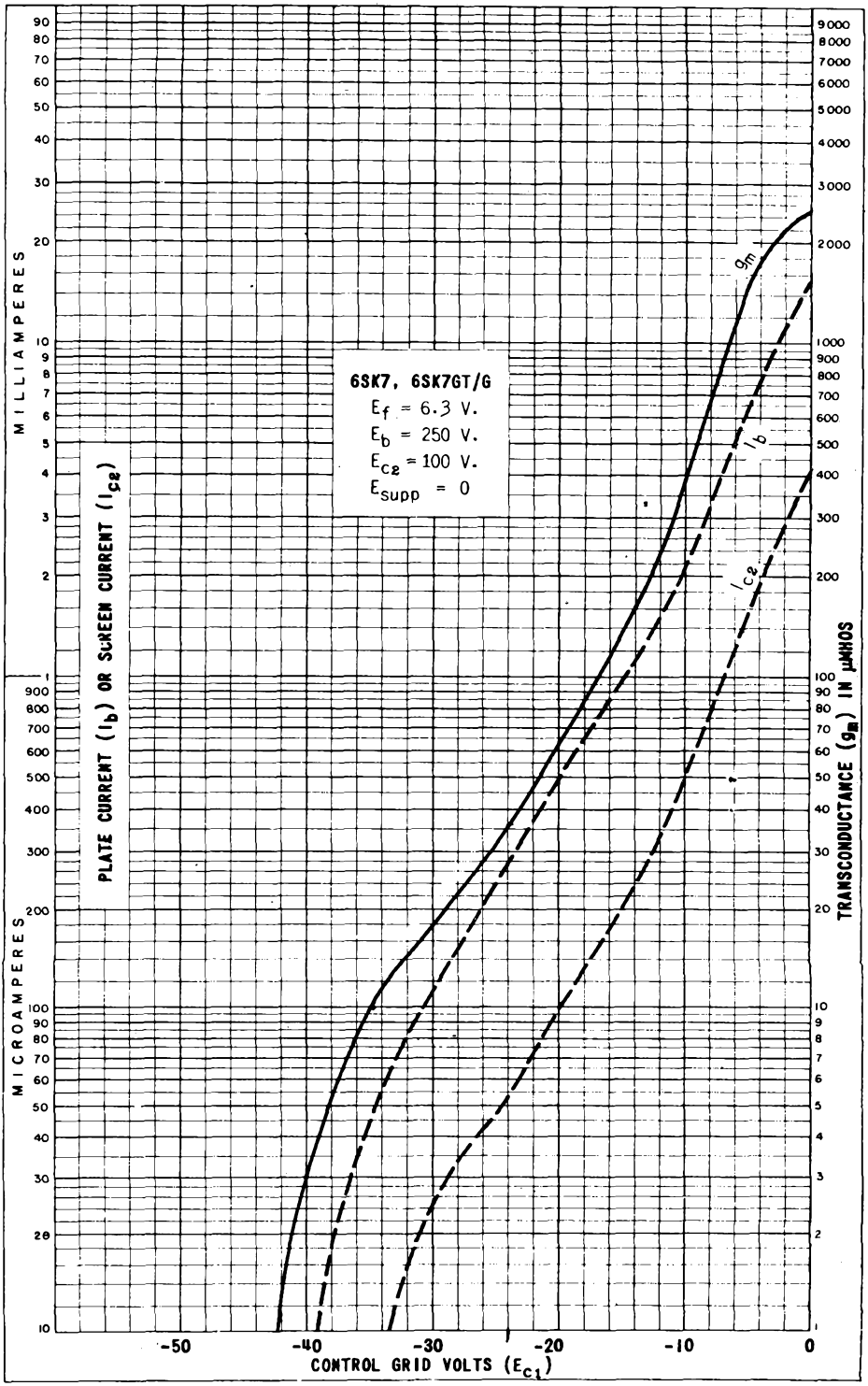


PLATE 1114-1
SEPT. 17 1941

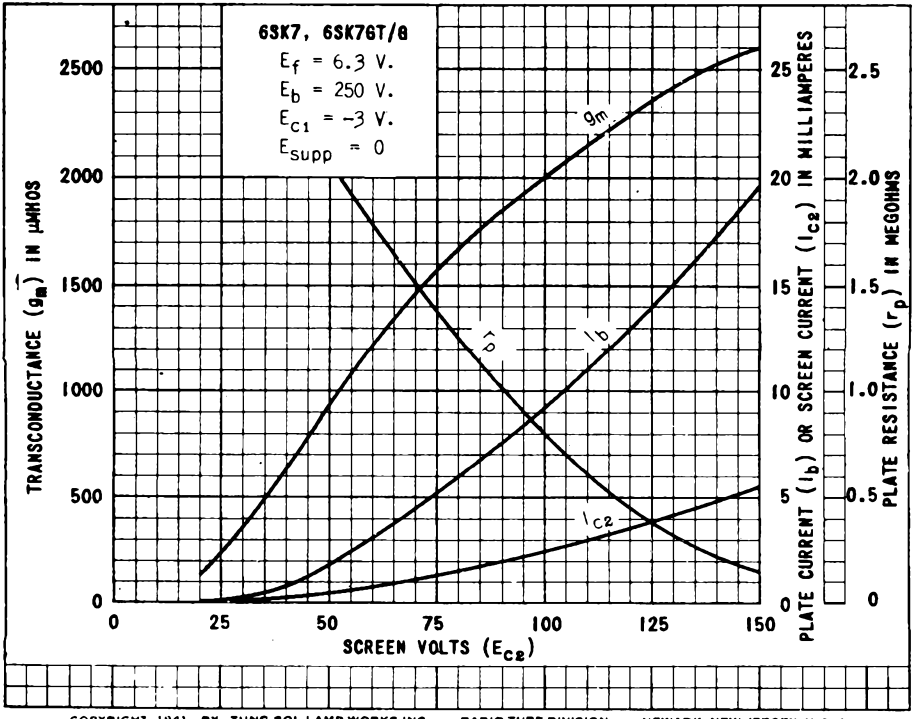
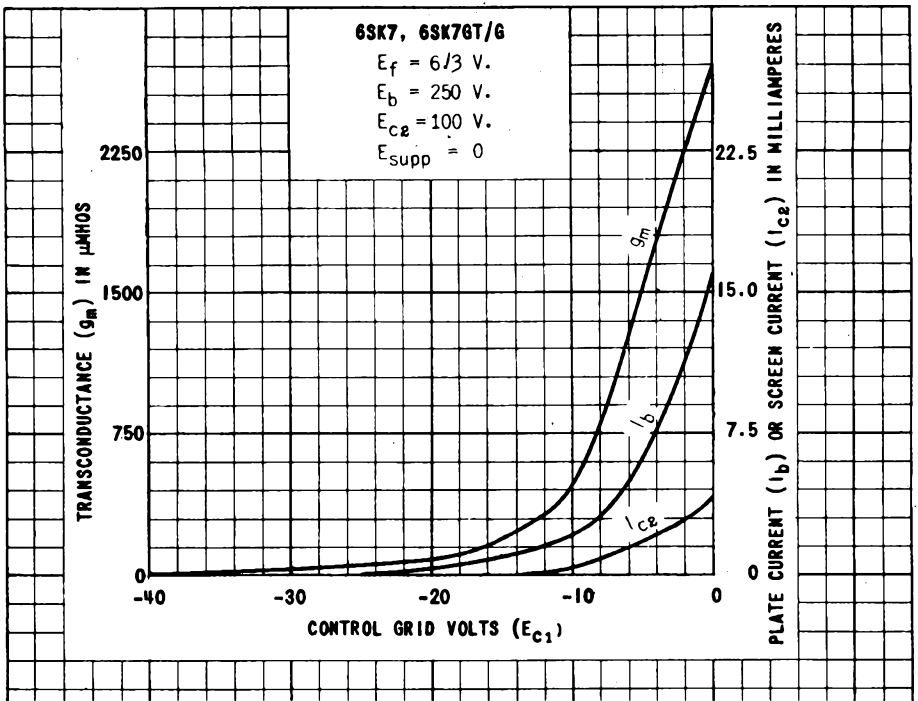


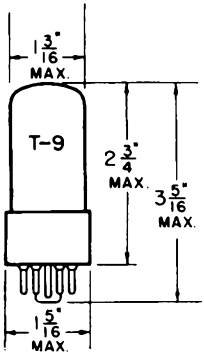
PLATE 1115-1

6SK7, 6SK7GT/G



TUNG-SOL

TWIN-TRIODE AMPLIFIER

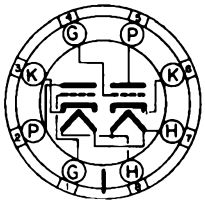


GLASS BULB

COATED UNIPOTENTIAL CATHODES

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
INTERMEDIATE SHELL
8-PIN OCTAL

THE 6SL7GT IS A TWIN-TRIODE AMPLIFIER WITH HIGH AMPLIFICATION FACTORS DESIGNED PRIMARILY FOR PHASE INVERTER SERVICE. THE TWO CATHODES ARE CONNECTED TO SEPARATE PINS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-211

AMPLIFIER - PER UNIT

HEATER VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER CURRENT	0.3	AMP.
MAX. PLATE VOLTAGE	250	VOLTS
MIN. GRID VOLTAGE	0	VOLTS
MAX. PLATE DISSIPATION	1	WATT
HEATER-CATHODE VOLTAGE	AS LOW AS POSSIBLE	

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

WITH CLOSE-FITTING SHIELD CONNECTED TO CATHODE

	TRIODE UNIT T_1		TRIODE UNIT T_2	
GRID TO PLATE	2.8		2.8	μμf
GRID TO CATHODE	3.0		3.4	μμf
PLATE TO CATHODE	3.8		3.2	μμf
PLATE TO PLATE		0.4		μμf
GRID TO GRID		0.65		μμf
GRID T_2 TO PLATE T_1		0.13		μμf

CONTINUED ON FOLLOWING PAGE

PLATE 1611
OCT. 15, 1945

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER - PER UNIT

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-2	VOLTS
PLATE CURRENT	2.3	MA.
PLATE RESISTANCE	44000	OHMS
TRANSCONDUCTANCE	1600	μMHOS
AMPLIFICATION FACTOR	70	

SIMILAR TYPE REFERENCE: Same characteristics as types 7F7, 12SL7GT; somewhat similar to types 6SC7GT, 12SC7GT.

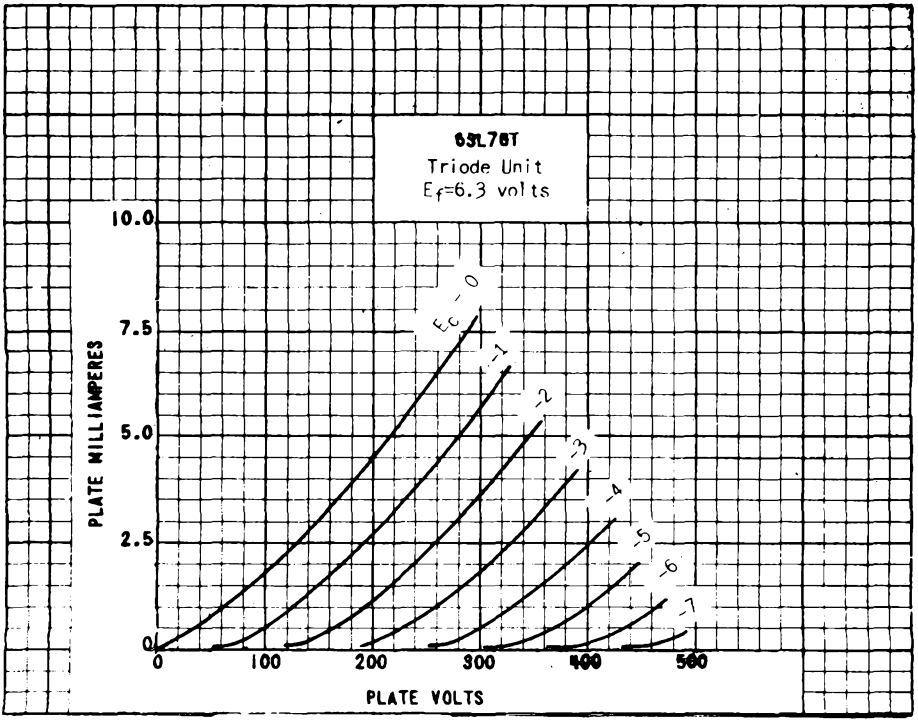
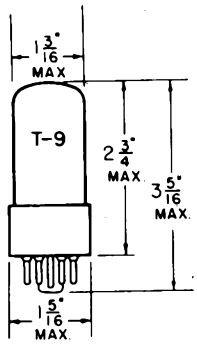


PLATE 1612
OCT. 15, 1945

TUNG-SOL

TWIN-TRIODE AMPLIFIER



COATED UNIPOTENTIAL CATHODE

6.3 VOLTS 0.6 AMPERE

AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE.

GLASS BULB

ANY MOUNTING POSITION

BOTTOM VIEW

INTERMEDIATE SHELL

OCTAL 8 PIN BASE

THE 6SN7GT IS A TWIN LOW MU TRIODE WHOSE SECTIONS ARE ELECTRICALLY INDEPENDENT EXCEPT FOR THE COMMON HEATER. IT IS USEFUL AS OSCILLATOR, CONVERTER, MULTI-VIBRATOR, AS WELL AS AUDIO AMPLIFIER.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

AMPLIFIER - EACH UNIT

MAXIMUM PLATE VOLTAGE	300	VOLTS
MINIMUM GRID VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

WITH CLOSE-FITTING SHIELD CONNECTED TO CATHODE

	TRIODE UNIT T_1	TRIODE UNIT T_2	
GRID TO PLATE	3.8	4.0	μμf
GRID TO CATHODE	2.8	3.0	μμf
PLATE TO CATHODE	.8	1.2	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	90	250	VOLTS
GRID VOLTAGE[A]	0	-8	VOLTS
AMPLIFICATION FACTOR	20	20	
PLATE RESISTANCE	6 700	7 700	OHMS
TRANSCONDUCTANCE	3 000	2 600	μMHOS
PLATE CURRENT	10	9	MA.

[A] THE D-C RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 1.0 MEGOHM UNDER MAXIMUM RATED CONDITIONS PER UNIT.

CONTINUED NEXT PAGE

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PLATE 1584

JULY 31, 1945

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

RESISTANCE COUPLED AMPLIFIER

VALUES ARE FOR ONE TRIODE UNIT

PLATE-SUPPLY VOLTAGE	90	180	300	VOLTS
PLATE RESISTOR	0.1	0.1	0.1	MEGOHM
GRID RESISTOR (FOR FOLLOWING STAGE)	0.25	0.25	0.25	MEGOHM
CATHODE RESISTOR	3 940	2 830	2 440	OHMS
CATHODE BY-PASS CONDENSER	1.29	1.35	1.42	μF
BLOCKING CONDENSER	0.012	0.012	0.0125	μF
VOLTAGE OUTPUT [B]	17	34	56	PEAK VOLTS
VOLTAGE GAIN [C]	13	14	14	

[B] VOLTAGE ACROSS GRID RESISTOR (FOR FOLLOWING STAGE) AT GRID-CURRENT POINT.

[C] AT 5.0 VOLTS (RMS) OUTPUT.

SIMILAR TYPE REFERENCE: *Same ratings, characteristics and application for each unit, as types 6J5, 6J5G, 6J5GT, 6P8G. Except for heater ratings, characteristics same as types 12SN7GT, 12J7GT, 1633.*

PLATE 1585

JULY 31, 1945

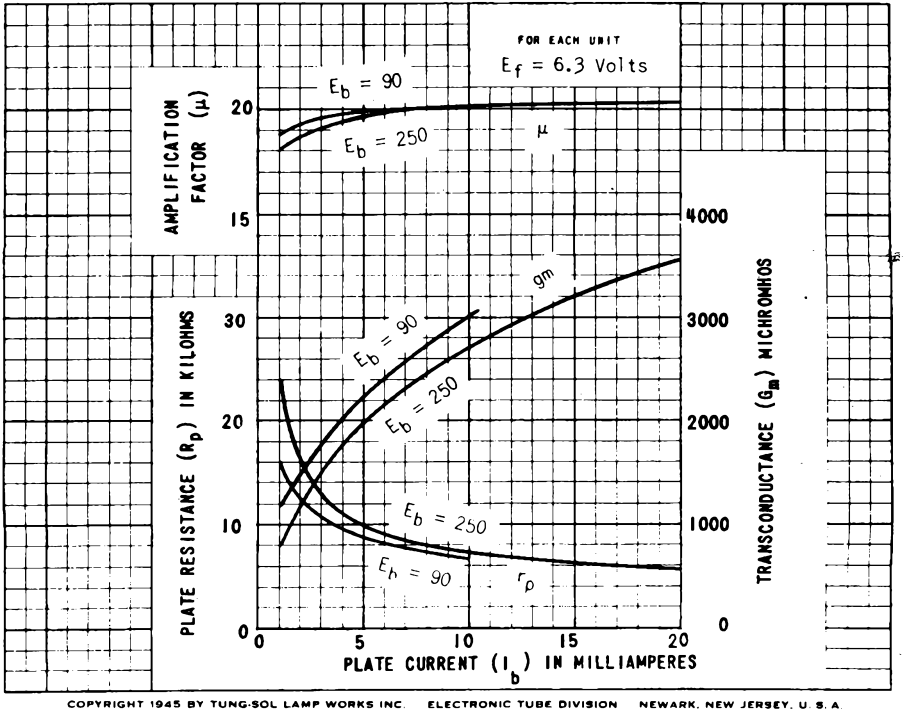

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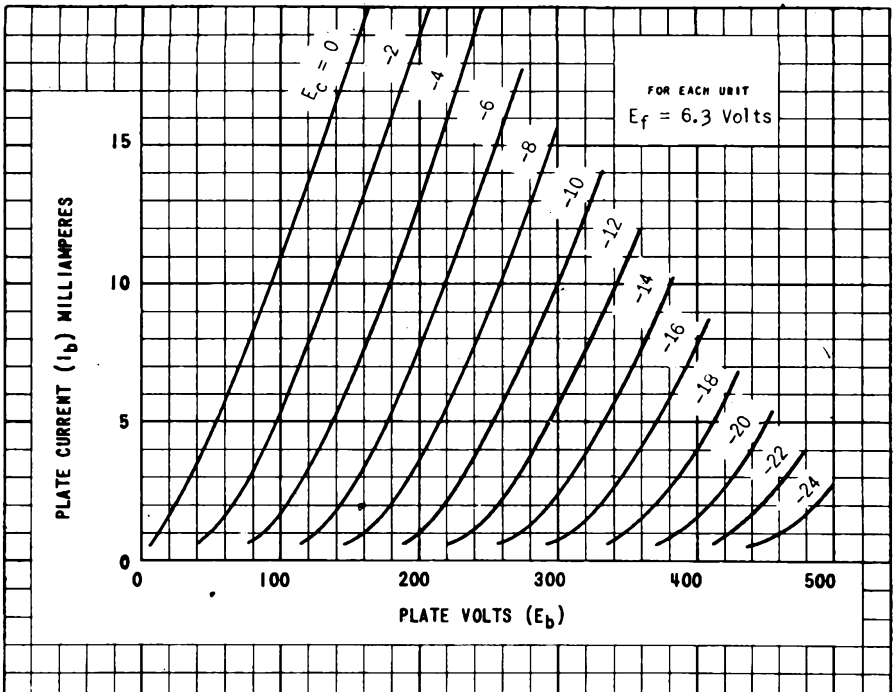
PLATE
1586
JULY 31,
1945

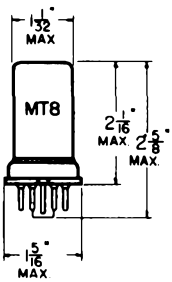
6SN7GT


FOR EACH UNIT
E_f = 6.3 Volts
E_c = 0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
PLATE CURRENT (I_b) MILLIAMPERES
0
5
10
15
0
100
200
300
400
500
PLATE VOLTS (E_b)

TUNG-SOL

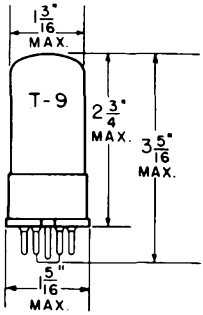
DOUBLE-DIODE TRIODE

6SQ7



METAL SHELL

6SQ7GT

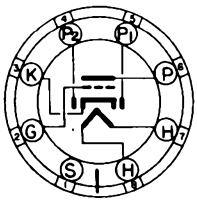


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 300 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
SMALL WAFER
8-PIN OCTAL

BOTTOM VIEW
SMALL WAFER
8-PIN OCTAL
METAL SLEEVE

THE 6SQ7 AND 6SQ7GT COMBINE TWO DIODE UNITS AND A HIGH-MU TRIODE IN A SINGLE ENVELOPE. EACH SECTION USES A COMMON CATHODE. IT IS INTENDED FOR SERVICE AS A COMBINED DETECTOR, AVC SOURCE, AND HIGH GAIN AUDIO AMPLIFIER.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

	6SQ7[A]	6SQ7GT[B]	
GRID TO PLATE: (G TO P)	1.6	1.8	μμf
INPUT: G TO (H + K)	3.2	4.2	μμf
OUTPUT: P TO (H + K)	3.0	3.4	μμf

[A] WITH SHELL CONNECTED TO CATHODE.

[B] WITH NO EXTERNAL SHIELD.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MINIMUM DIODE CURRENT EACH PLATE WITH 10 VOLTS APPLIED	0.8	MA.
MAXIMUM DIODE CURRENT EACH PLATE FOR CONTINUOUS OPERATION	1.0	MA.

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION.

PRINTED IN U.S.A.

PLATE 1925
DEC. 1, 1947

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER - TRIODE UNIT

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	300	300	MA.
PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1	-2	VOLTS
PLATE CURRENT	0.4	0.9	MA.
PLATE RESISTANCE	110 000	91 000	OHMS
TRANSCONDUCTANCE	900	1 100	μMHOS
AMPLIFICATION FACTOR	100	100	

DIODE UNITS - TWO

THE TWO DIODE PLATES ARE PLACED AROUND THE CATHODE AND ARE INDEPENDENT OF THE TRIODE UNIT EXCEPT FOR THE COMMON CATHODE.

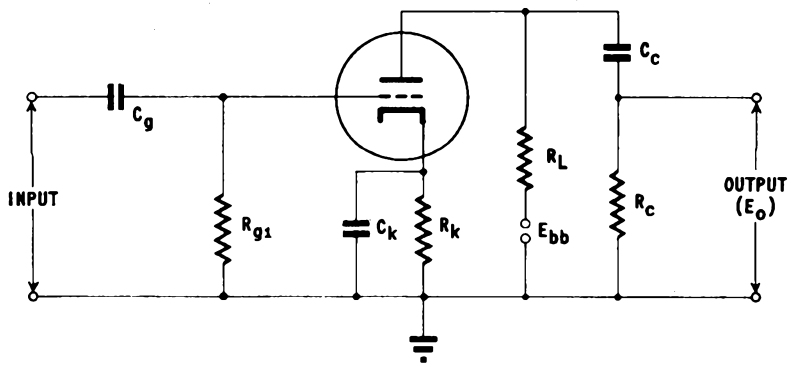
SIMILIAR TYPE REFERENCES: Ratings and characteristics identical to 7B6.

R_1 MEG.	R_{g1} MEG.	R_c MEG.	E_{bb} = 90 VOLTS			E_{bb} = 180 VOLTS			E_{bb} = 300 VOLTS		
			R_k	GAIN	E_o	R_k	GAIN	E_o	R_k	GAIN	E_o
0.10	A	0.10	4300	22	5.0	2400	29	15	2000	31	28
0.10	A	0.24	4700	27	7.0	2700	35	20	2200	38	37
0.24	A	0.24	7500	31	7.5	4300	42	20	3300	46	36
0.24	A	0.51	8200	40	10	4700	50	26	3900	52	50
0.51	A	0.51	13000	39	9.5	7500	53	24	5600	58	47
0.51	A	1.0	15000	43	11	8200	58	31	6200	62	56
0.24	10	0.24	---	39	4.5	---	45	19	---	49	38
0.24	10	0.51	---	45	6.5	---	52	24	---	57	48
0.51	10	0.51	---	48	7.0	---	59	22	---	62	42
0.51	10	1.0	---	52	8.5	---	62	25	---	66	55

[A] VALUE OF R_{g1} IS NOT CRITICAL.

GAIN MEASURED AT E_o = 2.0 VOLTS RMS OUTPUT.

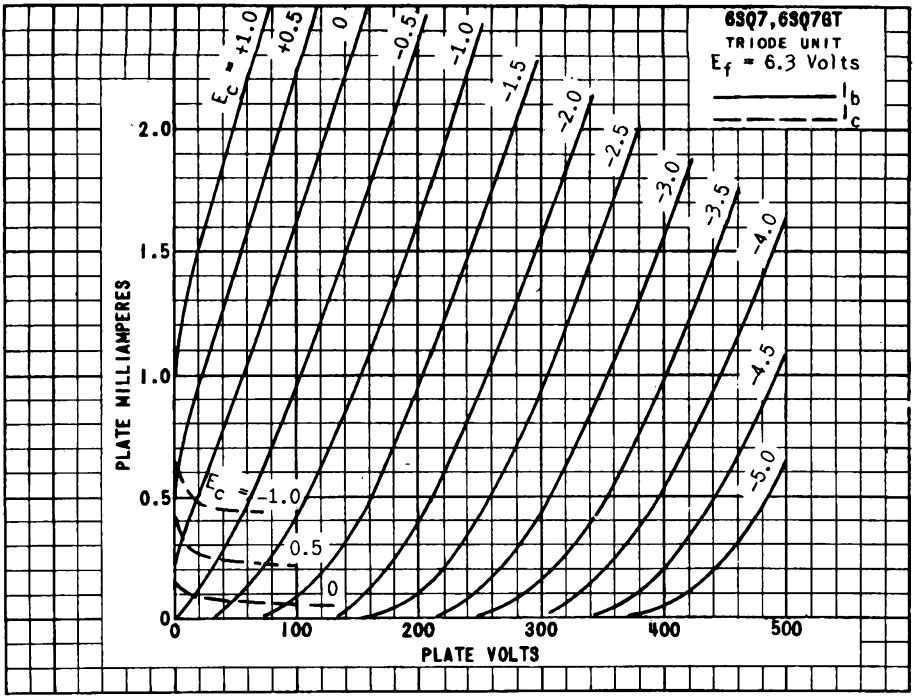
E_o IS RMS OUTPUT FOR 5% TOTAL HARMONIC DISTORTION.



NOTE: COUPLING CAPACITORS C_g AND C_c SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE. R_k SHOULD BE ADEQUATELY BY-PASSED BY CAPACITOR C_k.

→ INDICATES A CHANGE OR ADDITION

PLATE 1926
DEC. 1, 1947



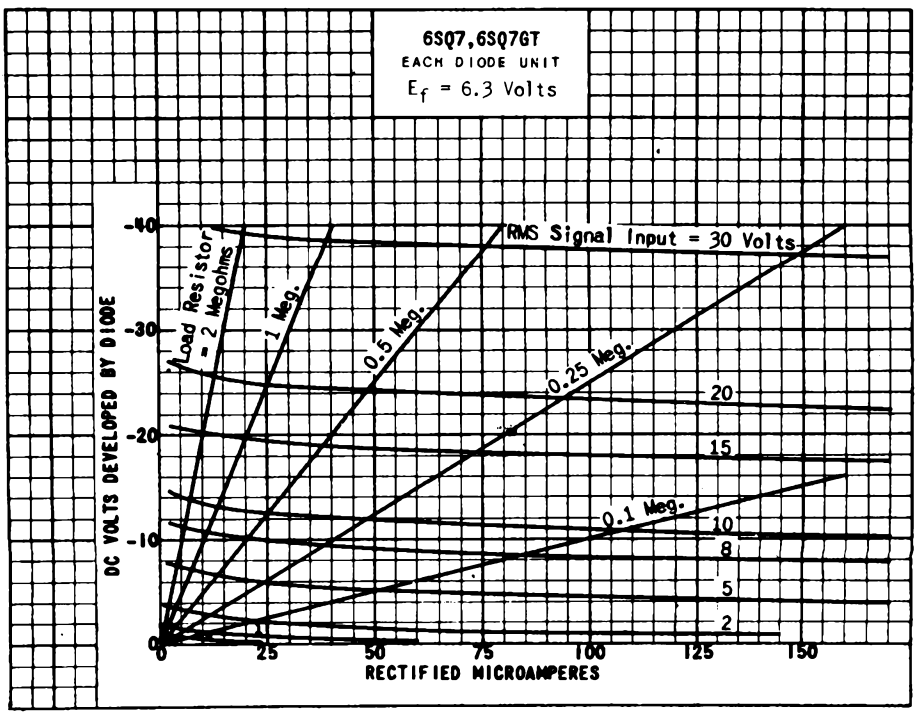


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PLATE
1967
FEB. 2,
1948

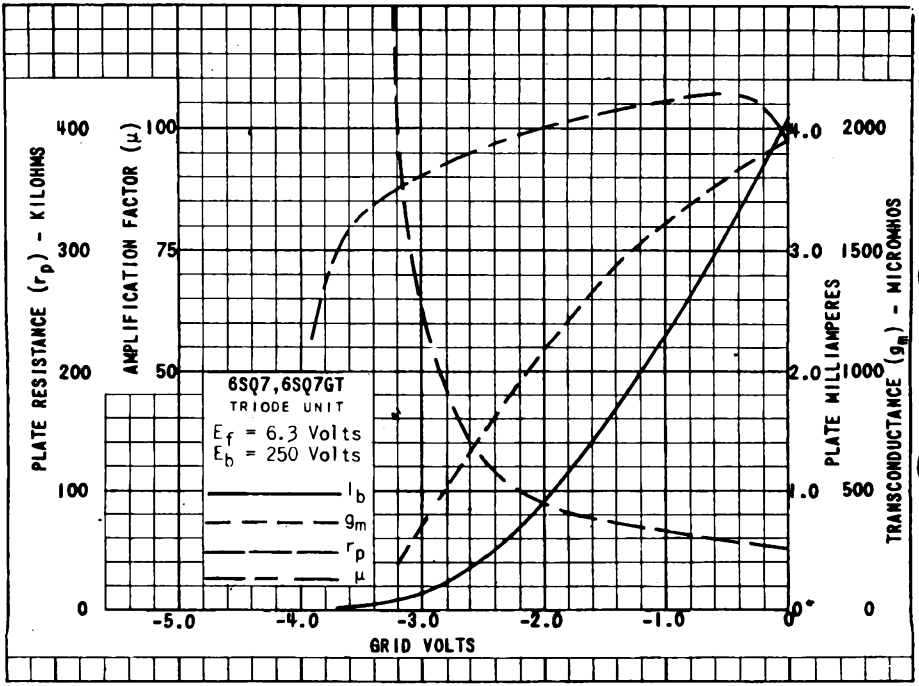
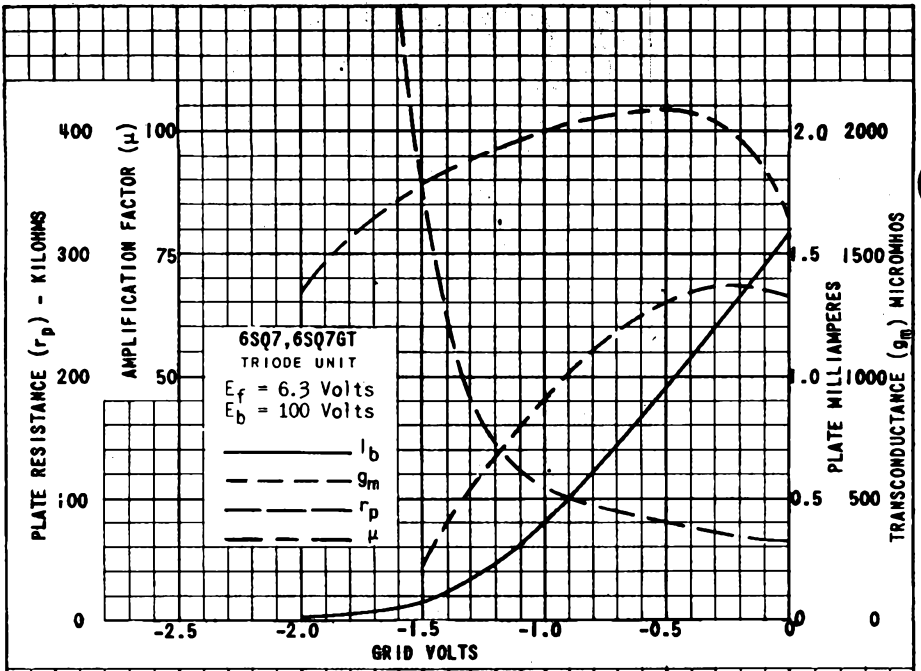
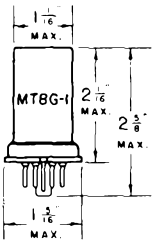


PLATE
1968
FEB. 2,
1948

6SQ7, 6SQ7GT


6SQ7, 6SQ7GT
TRIODE UNIT
E_f = 6.3 Volts
E_b = 100 Volts
I_b
g_m
r_p
μ
PLATE RESISTANCE (r_p) - KILOHMS
AMPLIFICATION FACTOR (μ)
PLATE MILLIAMPERES
TRANSCONDUCTANCE (g_m) MICROMHOS
GRID VOLTS
400
300
200
100
0
100
75
50
2.0
1.5
1.0
0.5
0
2000
1500
1000
500
0
-2.5
-2.0
-1.5
-1.0
-0.5
0

TUNG-SOL



METAL SHELL

SMALL WAFER 8 PIN OCTAL BASE

DUO-DIODE

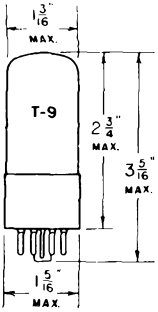
TRIODE AMPLIFIER

COATED UNIPOTENTIAL CATHODE

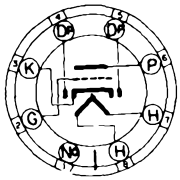
HEATER

6.3 VOLTS [4] 0.3 AMPERE

AC OR DC



GLASS BULB



INTERMEDIATE 8 PIN OCTAL BASE

THE TUNG-SOL 6SR7 AND 6SR7GT COMBINE TWO DIODES AND A TRIODE IN A SINGLE ENVELOPE USING A COMMON CATHODE. THEY ARE DESIGNED FOR SERVICE AS DIODE DETECTORS, AVC RECTIFIERS AND AS AUDIO AMPLIFIERS IN AC, STORAGE BATTERY AND AC-DC OPERATED RECEIVERS.

RATINGS

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED PER PLATE	0.8	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	250	VOLTS
CONTROL GRID VOLTAGE	−9	VOLTS
PLATE CURRENT	9.5	MA.
PLATE RESISTANCE	8500	OHMS
TRANSCONDUCTANCE	1900	μMHOS
AMPLIFICATION FACTOR	16	

[4] SHOULD NOT DEVIATE MORE THAN ± 10% FROM RATED VALUE.

SEE OTHER SIDE OF PAGE FOR CURVES

PLATE 1347-1
OCT. 25 1943

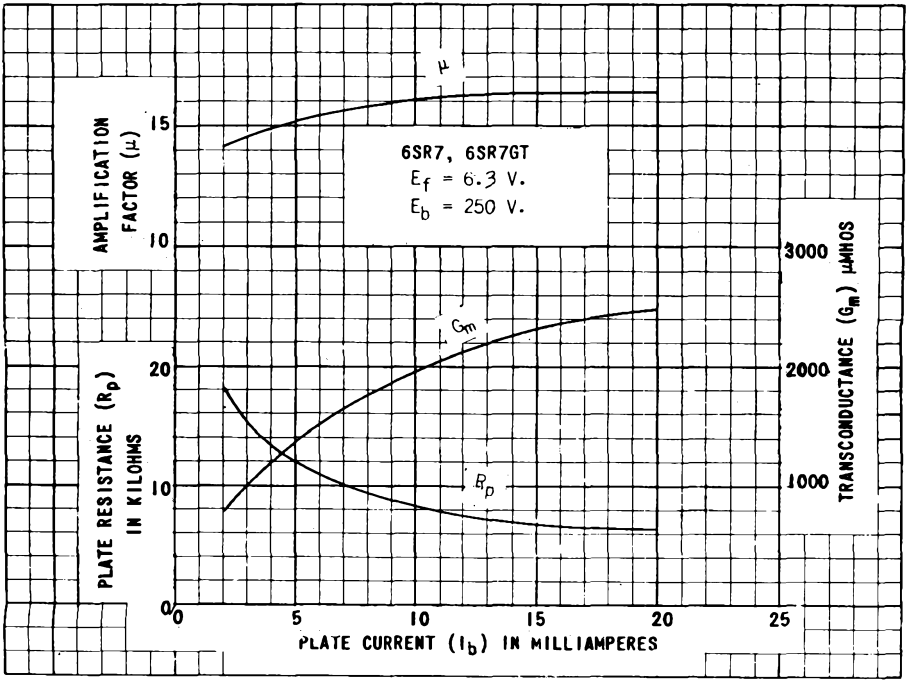
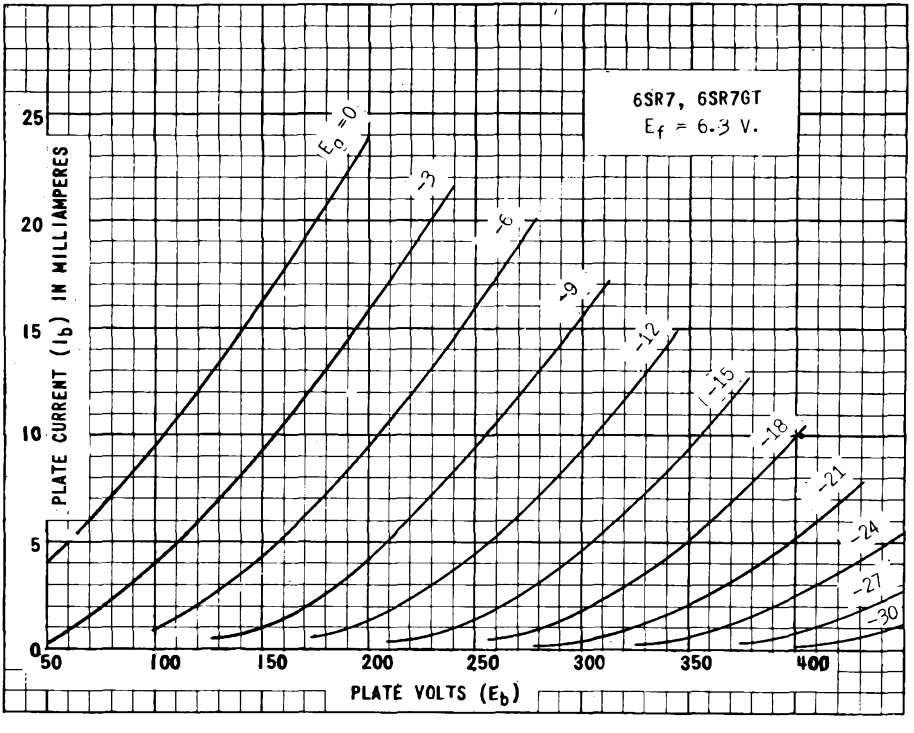


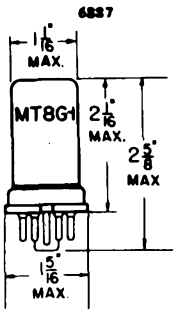
PLATE 1348-1 OCT. 25 1943

6SR7, 6SR7GT

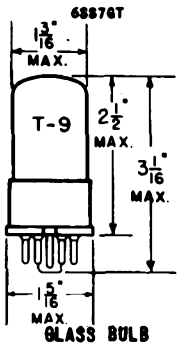

6SR7, 6SR7GT
E_f = 6.3 V.
E_c = 0
-3
-6
-9
-12
-15
-18
-21
-24
-27
-30
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
5
10
15
20
25
50
100
150
200
250
300
350
400

TUNG-SOL

PENTODE AMPLIFIER



METAL SHELL

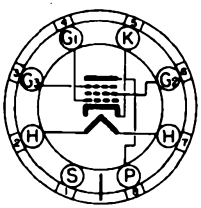


GLASS BULB

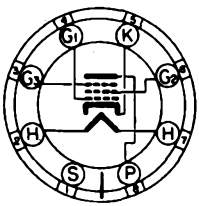
COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
SMALL WAFER
8 PIN OCTAL



BOTTOM VIEW
SMALL WAFER
8 PIN OCTAL
METAL SLEEVE

THE 6SS7 AND 6SS7GT ARE RF PENTODES WHICH HAVE REMOTE PLATE CURRENT CUT-OFF. THEY ARE SUITABLE FOR OPERATING WITH AVC IN RF AND IF AMPLIFIERS. THE USE OF THESE TUBES WILL REDUCE CROSS MODULATION EFFECTS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.15	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MINIMUM CONTROL GRID VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	2.25	WATTS
MAXIMUM SCREEN DISSIPATION	0.35	WATTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

	6SS7 WITH SHELL CONNECTED TO CATHODE	6SS7GT WITH EXTERNAL SHIELD CONNECTED TO CATHODE	
GRID TO PLATE (MAX.)	0.004	0.004	μμf
INPUT	5.5	5	μμf
OUTPUT	7	6	μμf

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PLATE 1802
MAY 1 1947

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION.

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

	6S87	6SS7GT	6SS7 6SS7GT	
PLATE VOLTAGE	100	100	250	VOLTS
SCREEN VOLTAGE	100	100	100	VOLTS
CONTROL GRID VOLTAGE	-1	-1	-3	VOLTS
SUPPRESSOR VOLTAGE	0	0	0	VOLTS
PLATE CURRENT	12.2	12.2	9	MA.
SCREEN CURRENT	3.1	3.1	2	MA.
PLATE RESISTANCE (APPROX.)	0.12	0.12	1	MEGOHM
TRANSCONDUCTANCE	1 930	2 200	1 850	µMHOS
GRID VOLTAGE (APPROX.) FOR TRANSCONDUCTANCE = 10 µMHOS	-35	-35	-35	VOLTS

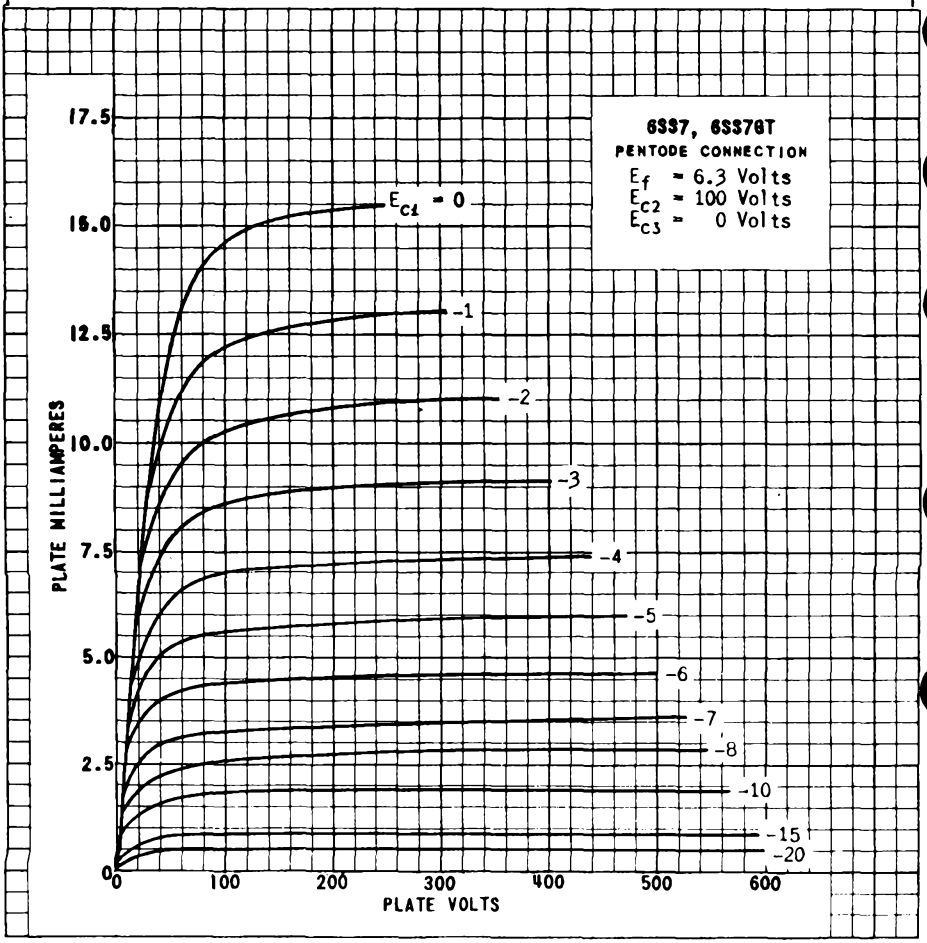
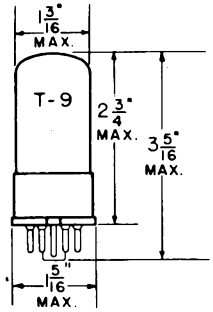


PLATE 1803
MAY 1 1947

TUNG-SOL

HI-MU TWIN TRIODE AMPLIFIER

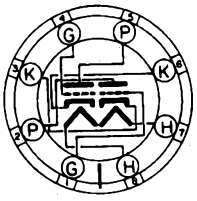


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW

INTERMEDIATE SHELL
8-PIN OCTAL MICANOL

THE TYPE 6SU7GTY IS A DOUBLE TRIODE HAVING THE SAME GENERAL CHARACTERISTICS AS THE 6SL7GT EXCEPT THAT IT HAS A LOW LOSS PHENOLIC BASE, HAS MINIMUM GAS AND LEAKAGE CURRENTS, AND IS SPECIALLY TESTED FOR PLATE CURRENT BALANCE BETWEEN THE TWO TRIODE UNITS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

AMPLIFIER - PER UNIT

HEATER VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER CURRENT	0.3	AMP.
MAX. PLATE VOLTAGE	250	VOLTS
MIN. GRID VOLTAGE	0	VOLTS
MAX. PLATE DISSIPATION	1	WATT
HEATER-CATHODE VOLTAGE	AS LOW AS POSSIBLE	

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER - PER UNIT

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-2	VOLTS
PLATE CURRENT	2.3	MA.
PLATE RESISTANCE	44 000	OHMS
TRANSCONDUCTANCE	1600	µMHOS
AMPLIFICATION FACTOR	70	

SIMILAR TYPE REFERENCE: *Same characteristics as types 6SL7GT, 7F7; except for heater ratings same characteristics as types 12SL7GT, 14F7; somewhat similar to types 6SC7GT, 12SC7GT.*

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PLATE
1684
FEB. 15
1946

6SU7GTY

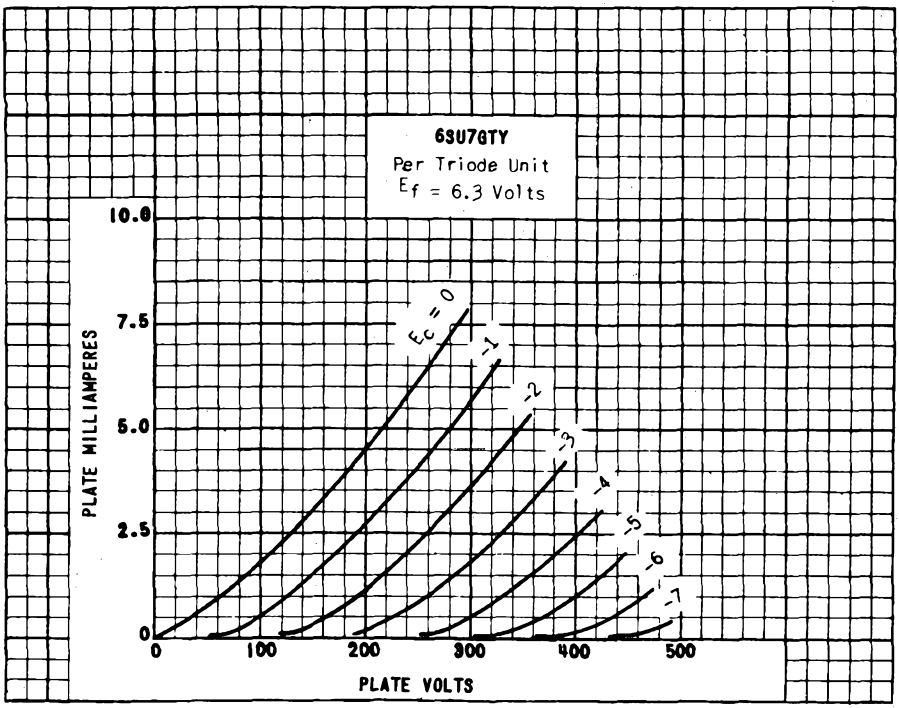

PLATE
1627
NOV. 30
1945

TENTATIVE DATA 6SZ7

TUNG-SOL

DUPLEX-DIODE HIGH-MU TRIODE

PHYSICAL SPECIFICATIONS

EMITTER UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE SMALL WAFER OCTAL 8-PIN	PIN 1 SHELL	PIN 7 HEATER
CAP ———	PIN 2 TRIODE GRID	PIN 8 HEATER
BULB MT-8G	PIN 3 CATHODE	
MAXIMUM DIAMETER 1 5/16"	PIN 4 D_P 2	MOUNTING POS. ANY
MAXIMUM OVERALL LENGTH 2 5/8"	PIN 5 D_P 1	
MAXIMUM SEATED HEIGHT 2 1/16"	PIN 6 TRI. PLATE	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE		VOLTS
MAXIMUM PLATE DISSIPATION		WATTS
MAXIMUM SCREEN DISSIPATION		WATTS
MAXIMUM PEAK HEATER CATHODE VOLTAGE:		
HEATER POS. WITH RESPECT TO CATHODE	90	VOLTS
HEATER NEG. WITH RESPECT TO CATHODE	90	VOLTS

CAPACITANCES - TRIODE UNIT (APPROX.)

WITH SHELL CONNECTED TO CATHODE

CONTROL GRID TO CATHODE	2.6	μμf
PLATE TO CATHODE	2.8	μμf
GRID TO PLATE	1.1	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER OR FILAMENT VOLTAGE (AC OR DC)	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMP.
PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE		VOLTS
CONTROL GRID VOLTAGE	-3	VOLTS
PEAK AF SIGNAL VOLTAGE		VOLTS
PLATE CURRENT	1	MA.
ZERO-SIGNAL SCREEN CURRENT		MA.
MAXIMUM-SIGNAL PLATE CURRENT		MA.
MAXIMUM-SIGNAL SCREEN CURRENT		MA.
PLATE RESISTANCE (APPROX.)	58 000	OHMS
TRANSCONDUCTANCE	1 200	μMHOS
AMPLIFICATION FACTOR	70	
LOAD RESISTANCE		OHMS
TOTAL HARMONIC DISTORTION		PER CENT
POWER OUTPUT		WATTS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE μMHOS		VOLTS

DIODE UNITS - TWO

THE TWO DIODE PLATES ARE PLACED AROUND A CATHODE, THE SLEEVE OF WHICH IS COMMON TO THE TRIODE UNIT. EACH DIODE PLATE HAS ITS OWN BASE PIN.

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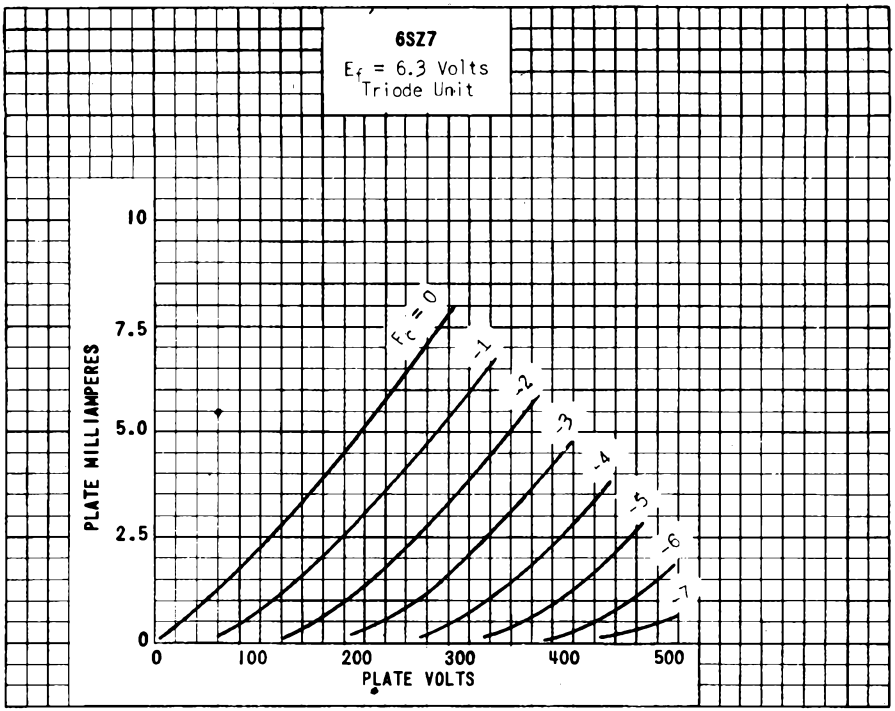
PLATE 1685
FEB. 15 1946

6SZ7



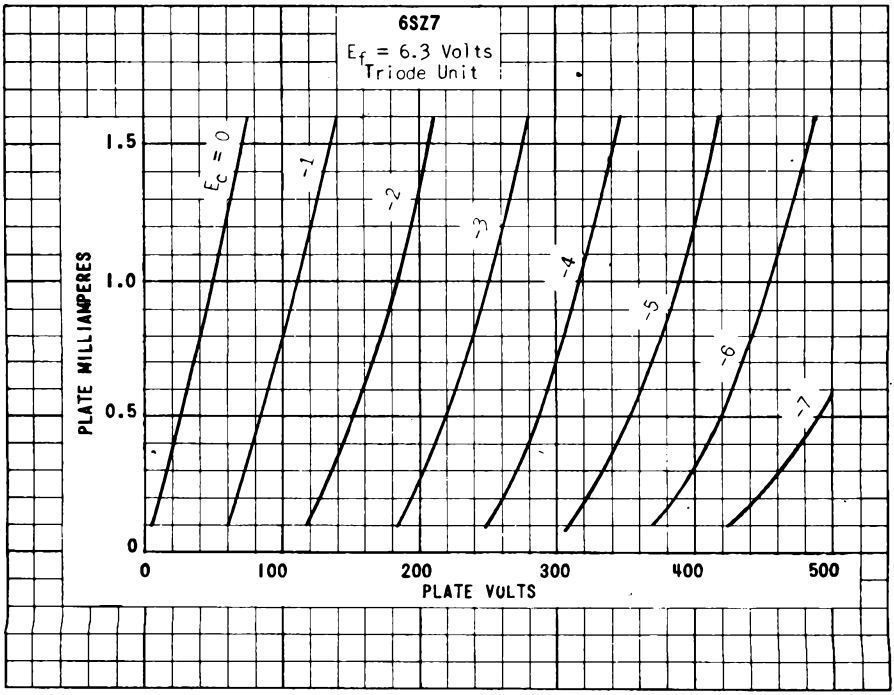
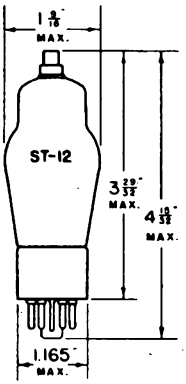


PLATE 1686
FEB. 15 1946

TUNG-SOL

DUO-DIODE

HIGH-MU TRIODE AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB

SMALL 7 PIN OCTAL BASE

G-7V

THE TUNG-SOL 6T7G COMBINES TWO DIODES AND A TRIODE IN A SINGLE BULB, USING A COMMON CATHODE. IT IS QUITE SIMILAR TO THE 6Q7G AND IS DESIGNED FOR THE SAME TYPE OF SERVICE.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER - TRIODE SECTION

PLATE VOLTAGE	135	250	VOLTS
GRID VOLTAGE	-1.5	-3	VOLTS
PLATE CURRENT	0.9	1.2	MA.
PLATE RESISTANCE	65 000	62 000	OHMS
TRANSCONDUCTANCE	1000	1050	μMHOS
AMPLIFICATION FACTOR	65	65	

DIRECT INTERELECTRODE CAPACITANCES

GRID TO CATHODE	1.2	μμf
PLATE TO CATHODE	3.7	μμf
GRID TO PLATE	2.0	μμf

TUNG-SOL LAMP WORKS INC. RADIO TUBE DIVISION NEWARK, NEW JERSEY, U. S. A.

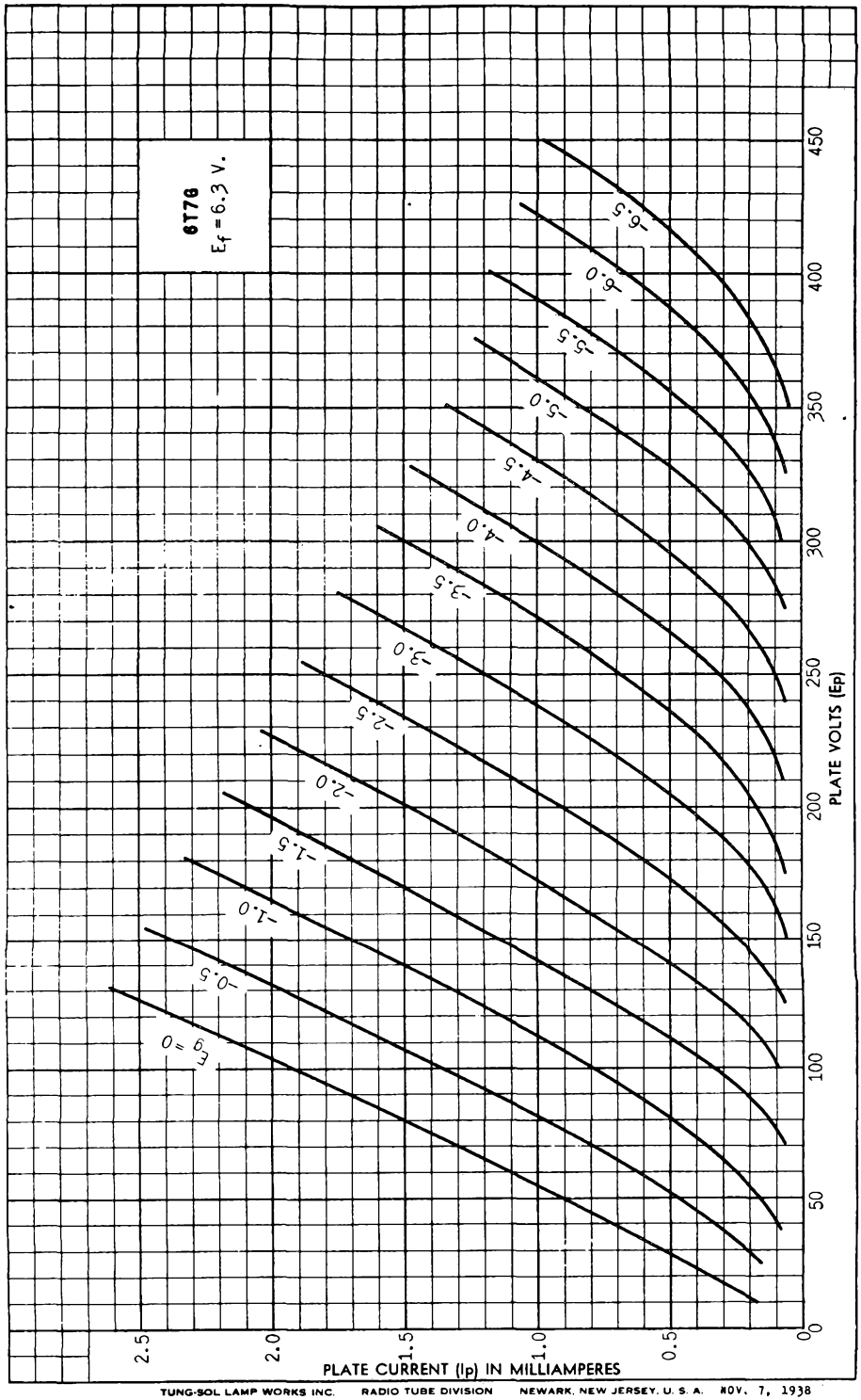


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PLATE
162-1

TUNG-SOL LAMP WORKS INC. RADIO TUBE DIVISION NEWARK, NEW JERSEY, U. S. A. NOV. 7, 1938

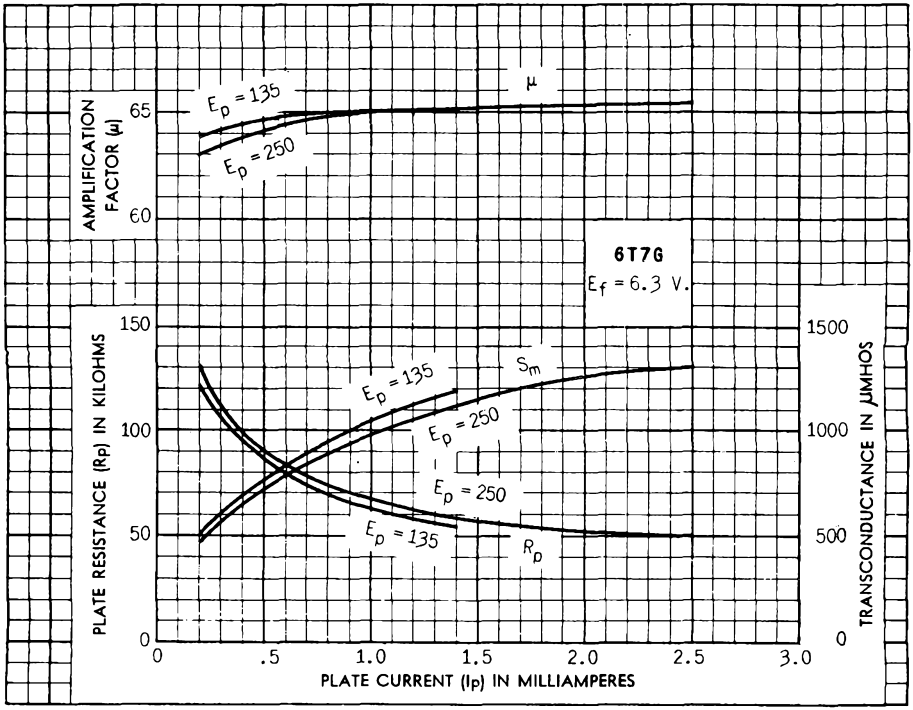
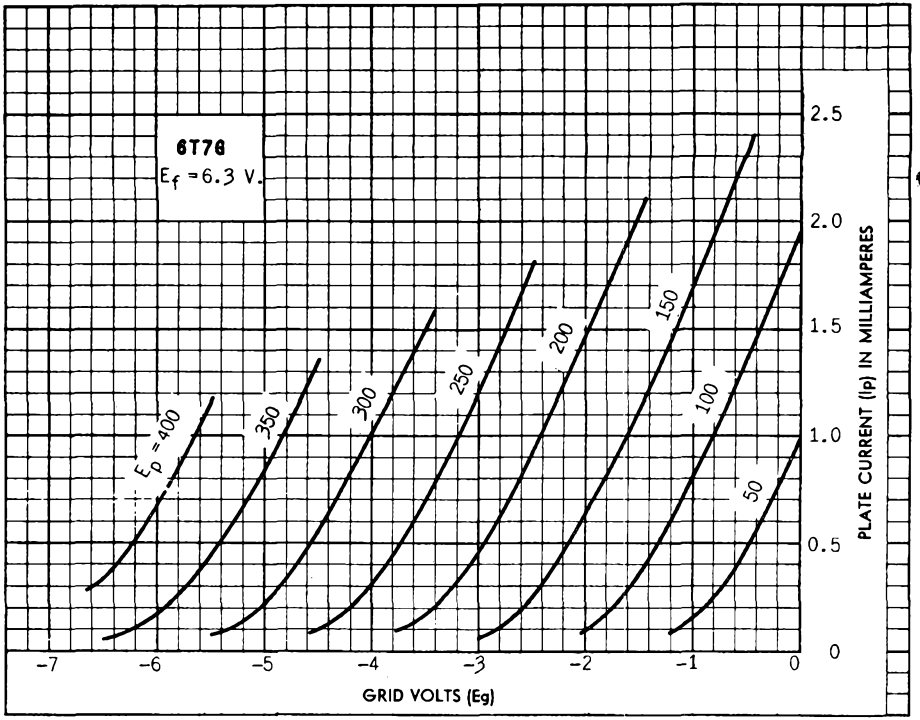

6T7G
E_f = 6.3 V.
AMPLIFICATION FACTOR (μ)
65
60
E_p = 135
E_p = 250
μ
PLATE RESISTANCE (R_p) IN KILOHMS
150
100
50
0
E_p = 135
E_p = 250
S_m
E_p = 250
E_p = 135
R_p
TRANSCONDUCTANCE IN μMHOS
1500
1000
500
0
0
.5
1.0
1.5
2.0
2.5
3.0
PLATE CURRENT (I_p) IN MILLIAMPERES

PLATE 163-1

6T7 G


6T7G
E_f = 6.3 V.
E_p = 400
350
300
250
200
150
100
50
2.5
2.0
1.5
1.0
0.5
0
PLATE CURRENT (Ip) IN MILLIAMPERES
−7
−6
−5
−4
−3
−2
−1
0
GRID VOLTS (Eg)

TUNG-SOL

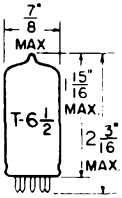
TRIPLE-DIODE TRIODE

MINIATURE TYPE

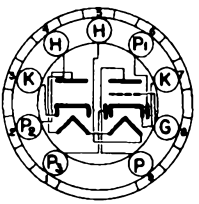
COATED UNIPOTENTIAL CATHODES

HEATER
6.3 VOLTS 450 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
SMALL BUTTON
9 PIN BASE

THE 6T8 COMPRISES THREE HIGH PERVEANCE DIODES AND A HIGH-MU TRIODE IN ONE ENVELOPE WITH THE 9-PIN MINIATURE CONSTRUCTION. ONE OF THE THREE DIODE PLATES HAS AN INDEPENDENT CATHODE PROVIDING SATISFACTORY OPERATION IN BALANCED LOW IMPEDANCE DETECTOR CIRCUITS. THIS TUBE STRUCTURE PERMITS THE CONSTRUCTION OF AM/FM RECEIVERS WITH A MINIMUM OF SWITCHING.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

WITH NO EXTERNAL SHIELD

GRID TO EACH DIODE PLATE (MAX.)	0.035	μμf
DIODE #1 INPUT: P_1 TO (H+K)	3.8	μμf
DIODE #2 INPUT: P_2 TO (H+K)	4.5	μμf
DIODE #3 INPUT: P_3 TO (H+K)	3.8	μμf
DIODE CATHODE TO ALL: K TO (H+K+P_1+P_2+P_3+P+G)	8.5	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-310

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM POSITIVE DC GRID VOLTAGE	0	VOLTS
MAXIMUM DIODE CURRENT EACH PLATE FOR CONTINUOUS OPERATION	5	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

	CLASS A_1 AMPLIFIER		
HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	450	450	MA.
PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1	-3	VOLTS
PLATE CURRENT	0.8	1	MA.
PLATE RESISTANCE	54 000	58 000	OHMS
TRANSCONDUCTANCE	1 300	1 200	μMHOS
AMPLIFICATION FACTOR	70	70	
AVERAGE DIODE CURRENT WITH 5 VOLTS DC APPLIED	20	20	MA.

ONE DIODE HAS A SEPARATE CATHODE, THE OTHER CATHODE IS COMMON TO TWO DIODES AND THE TRIODE UNIT.

IT IS RECOMMENDED THAT DIODE #2 (PIN 2) AND DIODE #3 (PIN 1) BE USED IN A RATIO-DETECTOR CIRCUIT FOR FM.

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION

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PLATE 2084
OCT. 1, 1948

CONTINUED FROM PRECEDING PAGE

RESISTANCE COUPLED AMPLIFIER

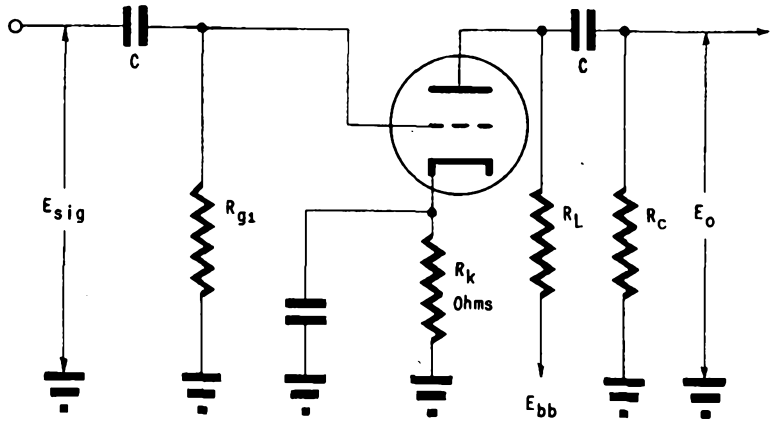
R1	Rg1	Rc	Ebb = 90 VOLTS			Ebb = 180 VOLTS			Ebb = 300 VOLTS		
MEG.	MEG.	MEG.	Rk	GAIN	Eo	Rk	GAIN	Eo.	Rk	GAIN	Eo
0.10	A	0.10	5700	21	7	2400	29	18	1800	33	35
0.10	A	0.24	6100	26	9	2700	34	23	2000	38	42
0.24	A	0.24	9100	30	10	4300	40	24	3000	44	43
0.24	A	0.51	10000	34	13	4700	45	31	3300	49	52
0.51	A	0.51	15000	37	14	7500	47	28	5600	51	50
0.51	A	1	16000	40	16	8200	50	35	6200	55	60
0.24	10	0.24	---	31	5	---	44	19	---	48	40
0.24	10	0.51	---	37	7	---	49	25	---	52	52
0.51	10	0.51	---	39	7.5	---	51	22	---	54	44
0.51	10	1	---	42	10	---	54	28	---	58	56

[A] VALUE OF Rg1 IS NOT CRITICAL.

Rk TAKEN TO NEAREST RMA VALUE FOR EACH CASE INSTEAD OF ABSOLUTE OPTIMUM VALUE.

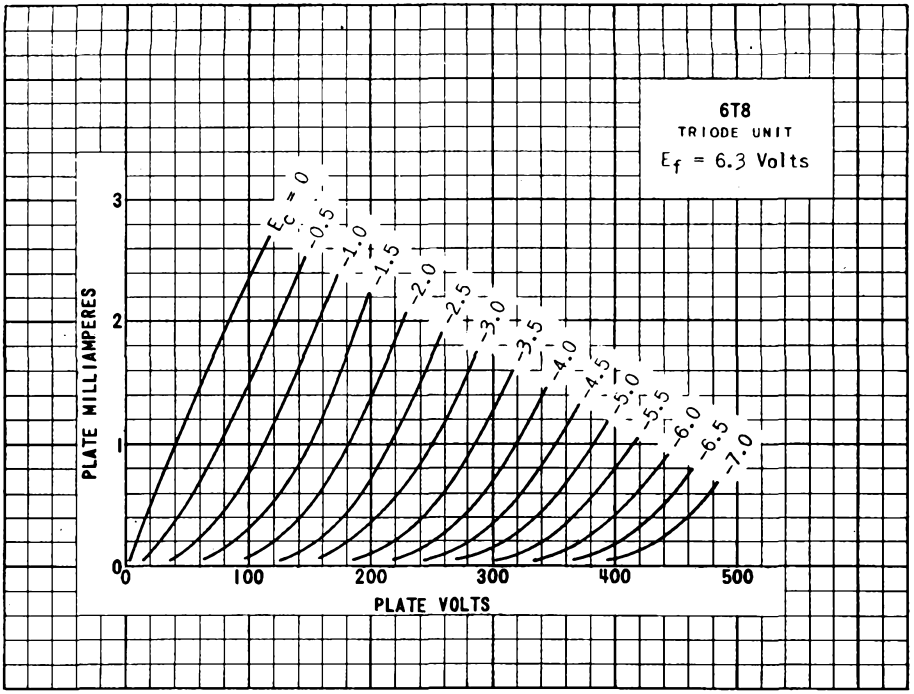
Eo IS RMS OUTPUT AT 5% TOTAL HARMONIC DISTORTION.

GAIN MEASURED AT Eo = 2.0 VOLTS RMS OUTPUT.



NOTE: COUPLING CAPACITORS (C) SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE. Rk SHOULD BE ADEQUATELY BY-PASSED.

PLATE 2085
OCT. 1, 1948



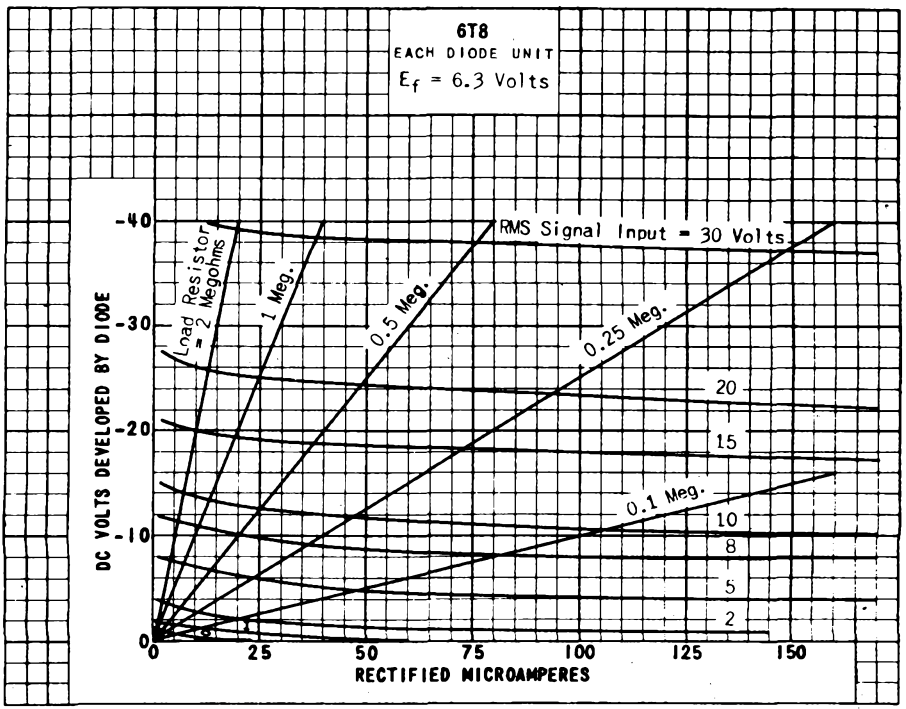


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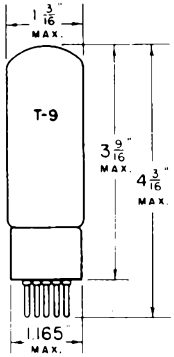
PLATE
1891
OCT. 1,
1947

TUNG-SOL



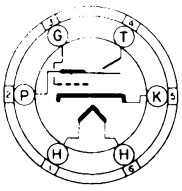
CATHODE RAY TUNING INDICATOR

UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



6R

BOTTOM VIEW

SMALL 6 PIN BASE

THE TUNG-SOL 6U5/6G5 CONSISTS OF A CIRCULAR FLUORESCENT TARGET WITH AN INDICATING SHADOW CONTROLLED BY AN INTERNALLY CONNECTED REMOTE CUT-OFF TRIODE AMPLIFIER. WHEN THE 6U5/6G5 IS USED AS A TUNING INDICATOR, AVC VOLTAGE IS APPLIED TO THE TRIODE GRID.

RATINGS

MAXIMUM PLATE SUPPLY VOLTAGE	285	VOLTS
MAXIMUM TARGET VOLTAGE	285	VOLTS
MINIMUM TARGET VOLTAGE	100	VOLTS
MAXIMUM PLATE DISSIPATION	1.0	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PLATE AND TARGET SUPPLY VOLTAGE	100	200	250	VOLTS
TRIODE GRID VOLTAGE (0° SHADOW ANGLE)[A]	-8	-18.5	-22	VOLTS
TRIODE GRID VOLTAGE (90° SHADOW ANGLE)[A]	0	0	0	VOLTS
SERIES TRIODE-PLATE RESISTOR	0.5	1	1	MEGOHM
TRIODE PLATE CURRENT (TRIODE GRID V.= 0)	0.19	0.19	0.24	MA.
TARGET CURRENT (TRIODE GRID V.= 0.)[B]	1	3	4	MA.

[A] APPROXIMATE.

[B] SUBJECT TO WIDE VARIATIONS.

NOTE: THIS DOUBLE BRANDED TUBE, 6U5/6G5, TAKES THE PLACE OF EITHER THE 6U5 OR THE 6G5. IT IS IDENTICAL ELECTRICALLY TO BOTH OF THEM. IT IS ALSO USED TO REPLACE TYPES 6T5 AND 6M5.

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PLATE
1147-3
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1941

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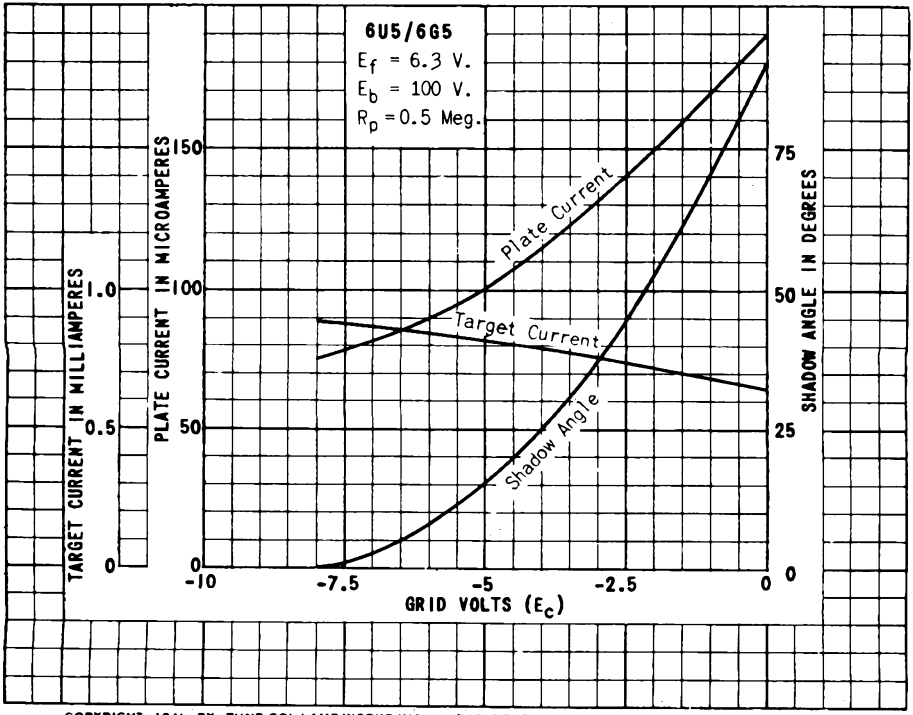
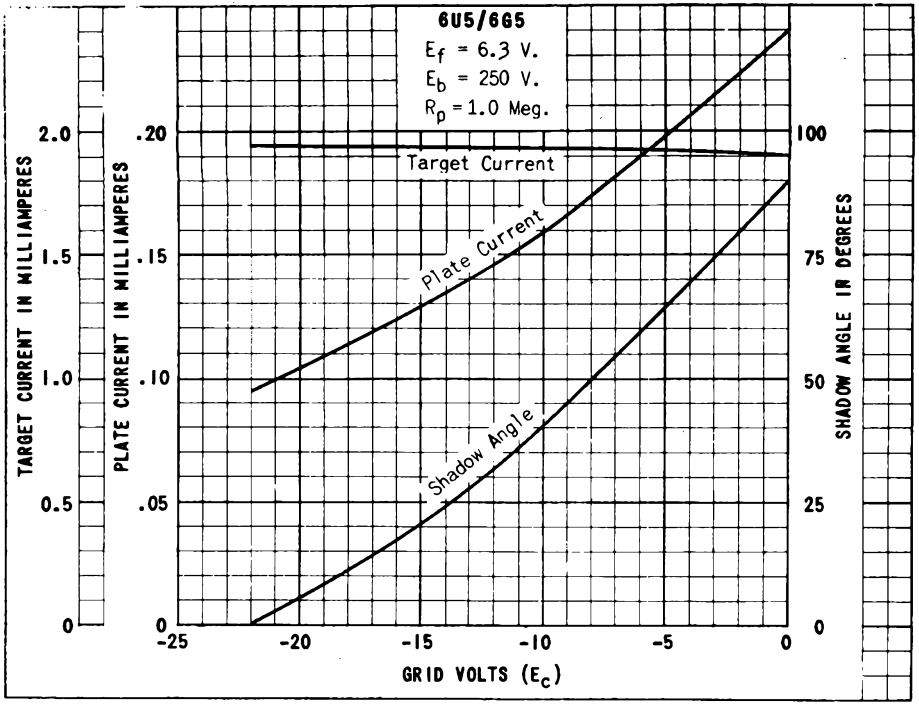
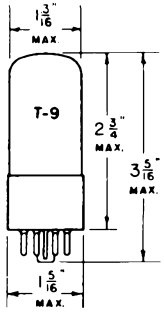


PLATE
1148-2

6U5/6G5


6U5/6G5
E_f = 6.3 V.
E_b = 250 V.
R_p = 1.0 Meg.
Target Current
Plate Current
Shadow Angle
TARGET CURRENT IN MILLIAMPERES
PLATE CURRENT IN MILLIAMPERES
SHADOW ANGLE IN DEGREES
GRID VOLTS (E_c)
2.0
1.5
1.0
0.5
0
.20
.15
.10
.05
0
100
75
50
25
0
-25
-20
-15
-10
-5
0

TUNG-SOL



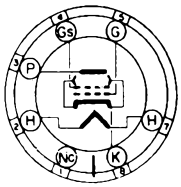
BEAM POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.75 AMPERE
AC OR DC

GLASS BULB



G-7AC
BOTTOM VIEW

INTERMEDIATE 7 PIN OCTAL BASE

THE TUNG-SOL 6U6GT IS A BEAM POWER AMPLIFIER DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF STORAGE BATTERY OPERATED RECEIVERS. IT HAS HIGH POWER SENSITIVITY AND HIGH POWER OUTPUT AT COMPARATIVELY LOW SUPPLY VOLTAGES.

RATINGS

MAXIMUM PLATE VOLTAGE	200	VOLTS
MAXIMUM SCREEN VOLTAGE	135	VOLTS
MAXIMUM PLATE DISSIPATION	11	WATTS
MAXIMUM SCREEN DISSIPATION	2	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	110	135	200	VOLTS
SCREEN VOLTAGE	110	135	135	VOLTS
CONTROL GRID VOLTAGE	-10.5	-13.5	-14	VOLTS
PEAK AF SIGNAL VOLTAGE	10.5	13.5	14	VOLTS
ZERO SIGNAL PLATE CURRENT	44	55	55	MA.
ZERO SIGNAL SCREEN CURRENT (NOMINAL)	4	5	3	MA.
MAXIMUM SIGNAL PLATE CURRENT	.47	60	62	MA.
MAXIMUM SIGNAL SCREEN CURRENT (NOM.)	11	15	13	MA.
PLATE RESISTANCE APPROX.	10 000	10 000	20 000	OHMS
TRANSCONDUCTANCE	5600	6200	6200	μMHOS
LOAD RESISTANCE	2000	2000	3000	OHMS
TOTAL HARMONIC DISTORTION	10	10	10	PER CENT
POWER OUTPUT	2.0	3.3	5.5	WATTS

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PLATE 1149-2
NOV. 27 1941

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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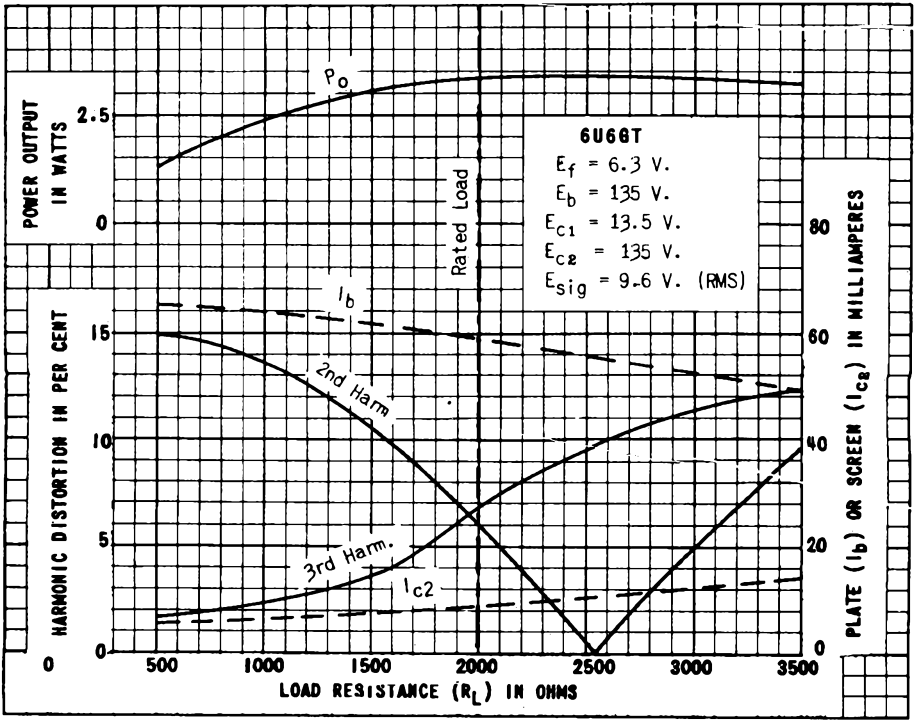
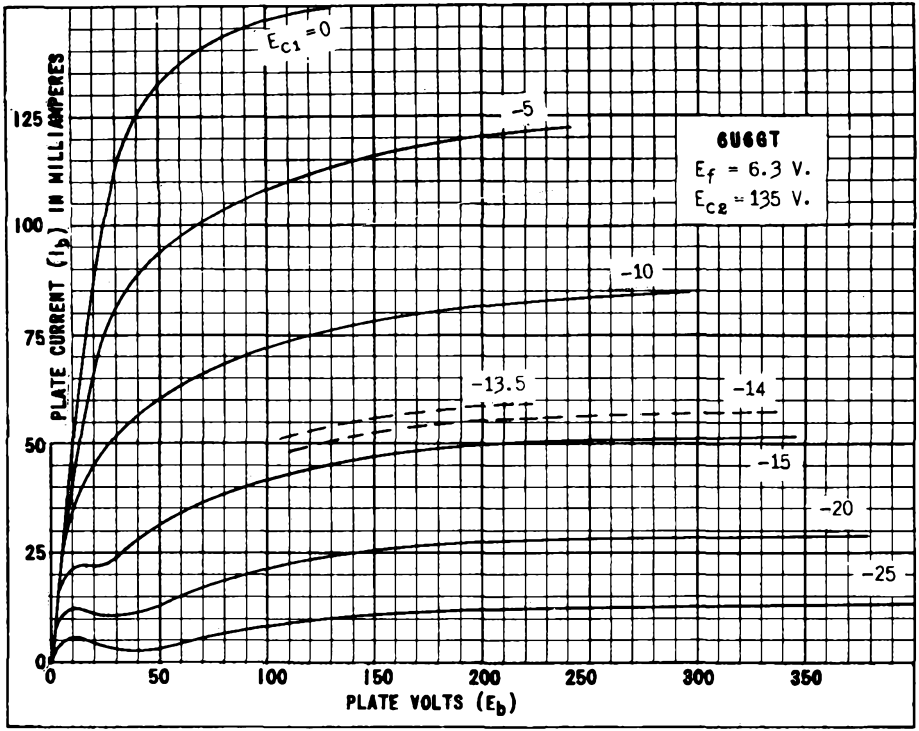
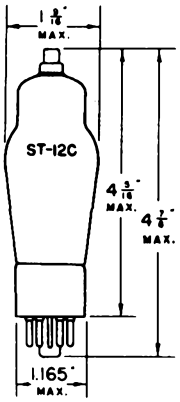


PLATE 1150-1

6U6GT


6U6GT
E_f = 6.3 V.
E_{c2} = 135 V.
E_{c1} = 0
-5
-10
-13.5
-14
-15
-20
-25
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
25
50
75
100
125
0
50
100
150
200
250
300
350

TUNG-SOL



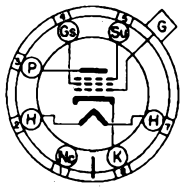
TRIPLE GRID
REMOTE CUT-OFF AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

SMALL 7 PIN OCTAL BASE



G-7Ra
BOTTOM VIEW

THE TUNG-SOL 6U7G IS A TRIPLE GRID REMOTE CUT-OFF AMPLIFIER. IT IS SUITABLE FOR USE WITH A.V.C. IN RF AND IF AMPLIFIERS AND MINIMIZES CROSS MODULATION. ITS ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6D6.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	−3	−3	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET		
PLATE CURRENT	8	8.2	MA.
SCREEN CURRENT	2.2	2	MA.
PLATE RESISTANCE APPROX.	0.25	0.8	MEGOHM
TRANSCONDUCTANCE	1500	1600	μMHOS

AS MIXER IN SUPERHETERODYNE CIRCUIT

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE APPROX. [A]	−10	−10	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET		

[A] THE GRID BIAS SHOWN IS MINIMUM FOR AN OSCILLATOR PEAK VOLTAGE OF 7 VOLTS. THESE VALUES ARE OPTIMUM.

DIRECT INTERELECTRODE CAPACITANCES [S]

GRID TO CATHODE	5	μμf
PLATE TO CATHODE	9	μμf
GRID TO PLATE	.007 MAX.	μμf

[S] WITH SHIELD

NOTE: THE INTERNAL SHIELD IN THE DOME IS CONNECTED TO THE CATHODE WITHIN THE TUBE.

CONTINUED NEXT PAGE

PLATE 497-3
AUG. 14 1939

6U7 G

RATINGS		
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM PLATE DISSIPATION	2.25	WATTS
MAXIMUM SCREEN DISSIPATION	0.25	WATT
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLTS

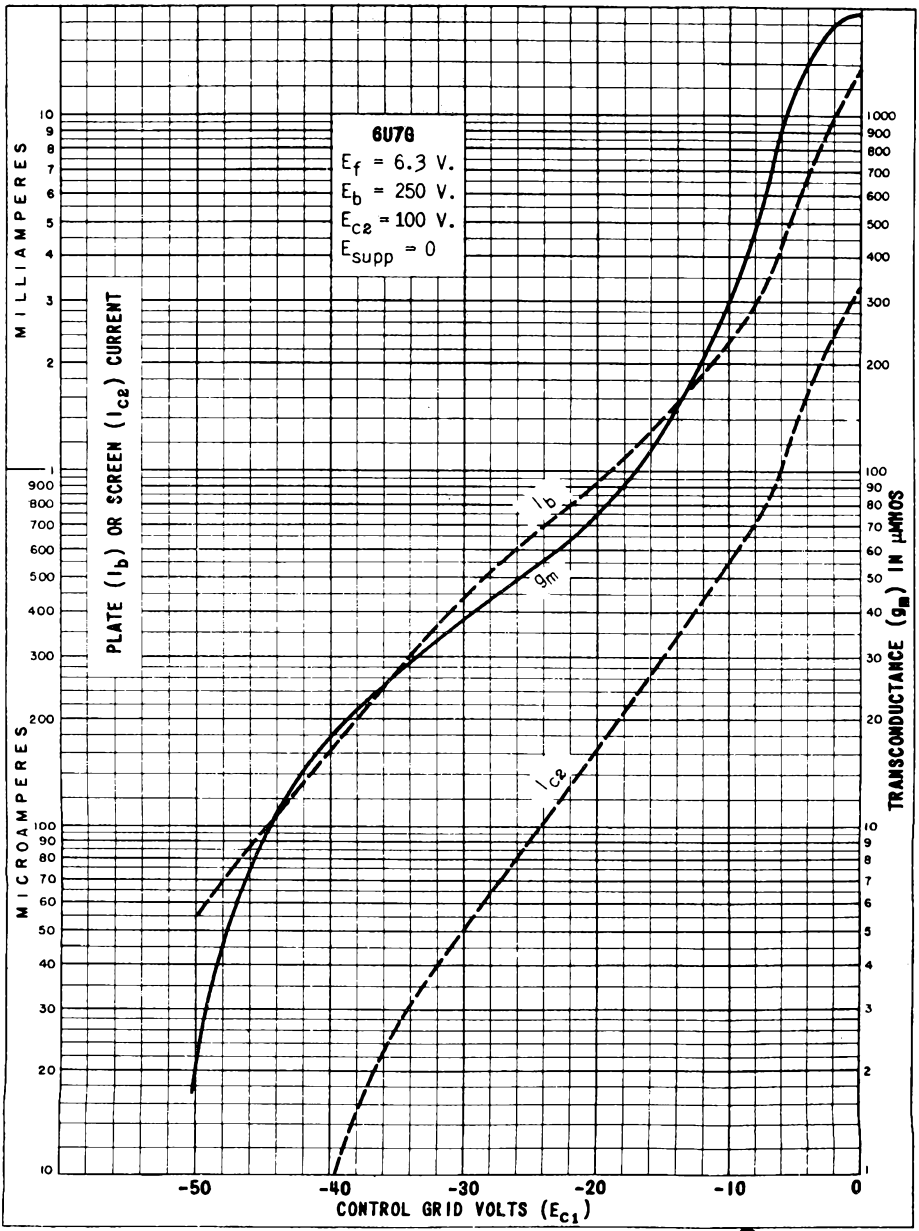


PLATE 498-2

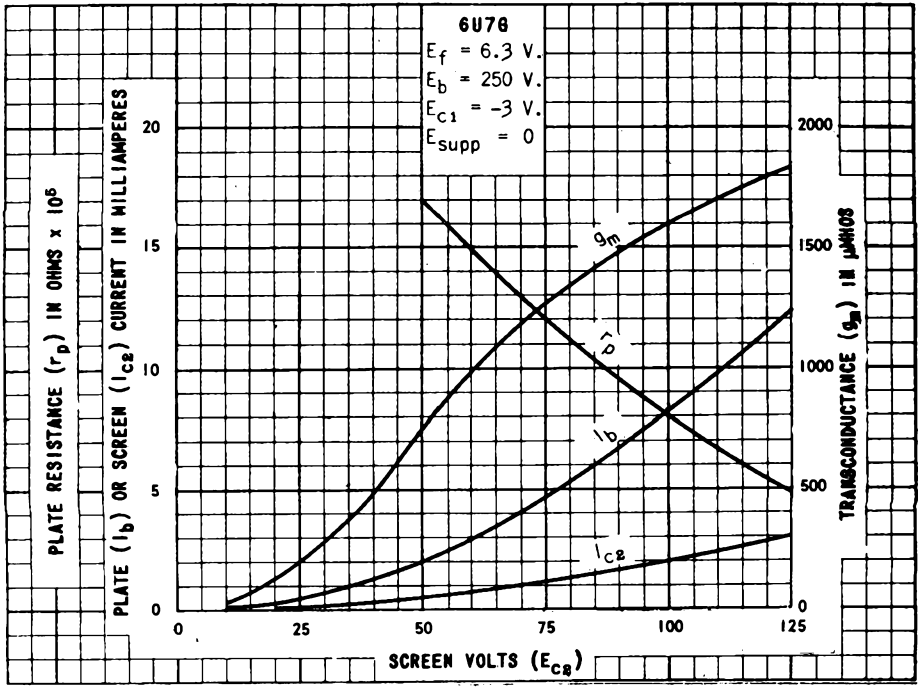
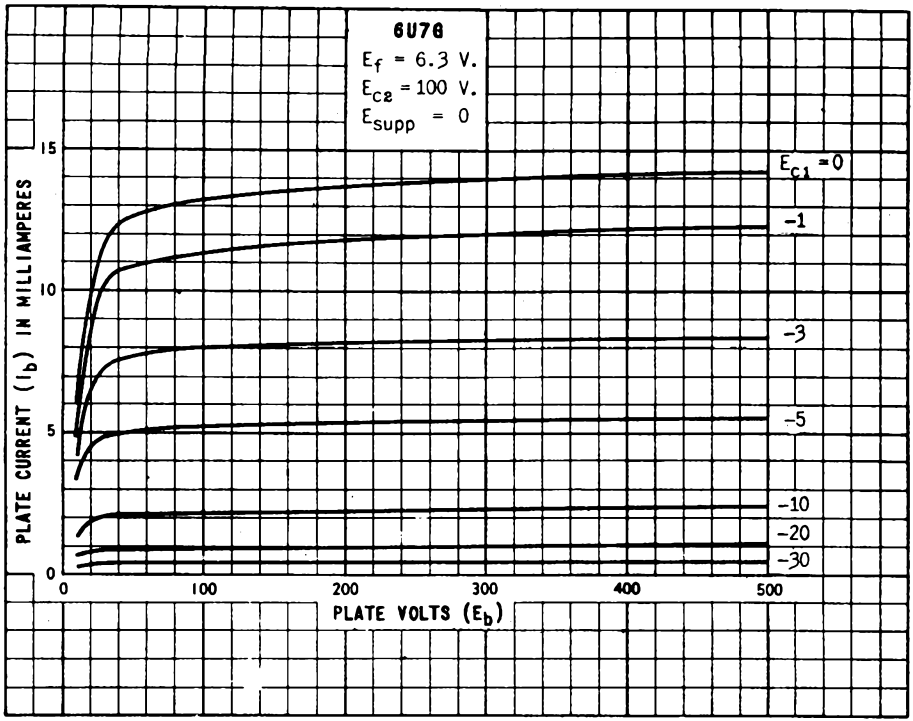
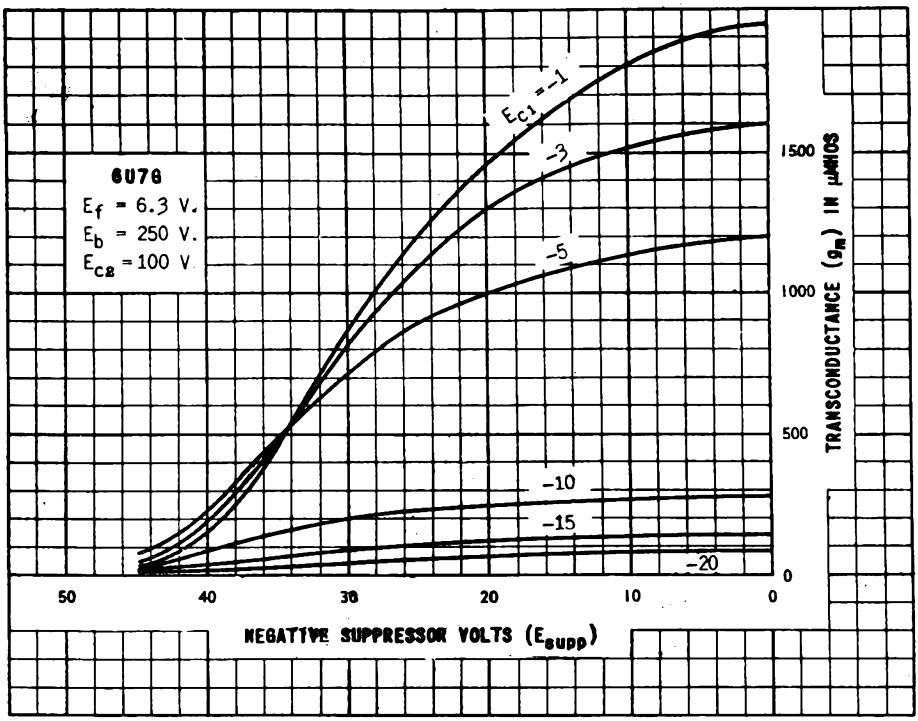


PLATE
266-1

JAN. 3
1939


6U7G
E_f = 6.3 V.
E_{c2} = 100 V.
E_{supp} = 0
E_{c1} = 0
-1
-3
-5
-10
-20
-30
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
5
10
15
0
100
200
300
400
500

6U7 G



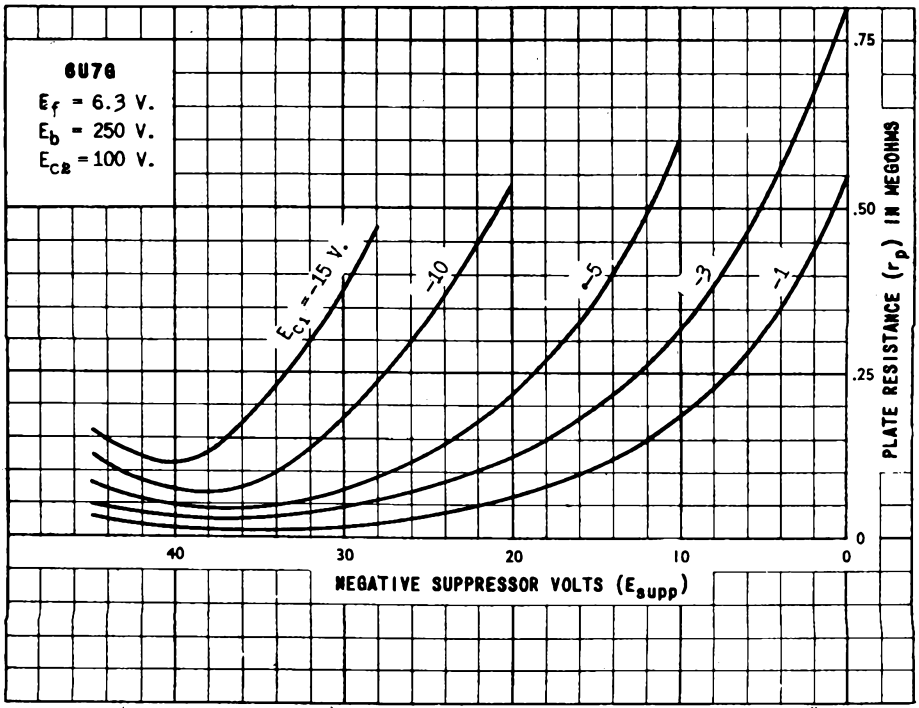


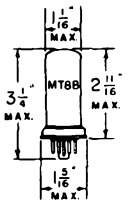
PLATE 267-1

TUNG-SOL

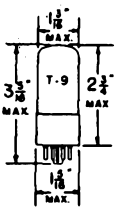
BEAM POWER AMPLIFIER

UNIPOTENTIAL CATHODE

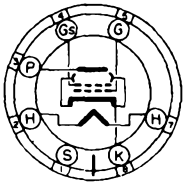
HEATER
6.3 VOLTS 0.45 AMPERE
AC OR DC



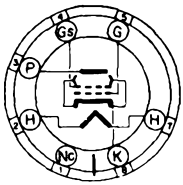
SMALL
7 PIN OCTAL BASE
METAL SHELL
6V6



INTERMEDIATE
7 PIN OCTAL BASE
GLASS BULB
6V6GT/G



7AC



G-7AC

BOTTOM VIEWS

THE TUNG-SOL 6V6 AND 6V6GT/G ARE BEAM POWER AMPLIFIERS, DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AC AND STORAGE BATTERY OPERATED RECEIVERS. THEY HAVE HIGH POWER SENSITIVITY AND HIGH POWER OUTPUT WITH COMPARATIVELY LOW SUPPLY VOLTAGES.

RATINGS

MAXIMUM PLATE VOLTAGE	315	VOLTS
MAXIMUM SCREEN VOLTAGE	285	VOLTS
MAXIMUM PLATE DISSIPATION	12	WATTS
MAXIMUM SCREEN DISSIPATION	2	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

SINGLE TUBE CLASS A1 AMPLIFIER

PLATE VOLTAGE	180	250	315	VOLTS
SCREEN VOLTAGE	180	250	225	VOLTS
CONTROL GRID VOLTAGE[A]	-8.5	-12.5	-13	VOLTS
PEAK AF SIGNAL VOLTAGE	8.5	12.5	13	VOLTS
ZERO-SIGNAL PLATE CURRENT	29	45	34	MA.
ZERO-SIGNAL SCREEN CURRENT (NOMINAL)	3	4.5	2.2	MA.
MAXIMUM-SIGNAL PLATE CURRENT	30	47	35	MA.
MAXIMUM-SIGNAL SCREEN CURRENT (NOMINAL)	4.	7	6	MA.
PLATE RESISTANCE APPROX.	58000	52000	77000	OHMS
TRANSCONDUCTANCE	3700	4100	3750	μMHOS
LOAD RESISTANCE	5500	5000	8500	OHMS
TOTAL HARMONIC DISTORTION	8	8	12	PER CENT
POWER OUTPUT	2.0	4.5	5.5	WATTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER MAXIMUM RATED CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION.

CONTINUED NEXT PAGE

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PLATE 1050-2

JUNE 6 1941

TUNG-SOL

PUSH-PULL CLASS AB1 AMPLIFIER

VALUES FOR 2 TUBES UNLESS OTHERWISE SPECIFIED

PLATE VOLTAGE	250	285	VOLTS
SCREEN VOLTAGE	250	285	VOLTS
CONTROL GRID VOLTAGE[A]	-15	-19	VOLTS
PEAK AF SIGNAL VOLTAGE GRID TO GRID	30	38	VOLTS
ZERO-SIGNAL PLATE CURRENT	70	70	MA.
ZERO-SIGNAL SCREEN CURRENT (NOMINAL)	5.0	4.0	MA.
MAXIMUM-SIGNAL PLATE CURRENT	79	92	MA.
MAXIMUM-SIGNAL SCREEN CURRENT (NOMINAL)	13	13.5	MA.
PLATE RESISTANCE APPROX.	66000	65000	OHMS
TRANSCONDUCTANCE	3750	3600	μMHOS
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	10000	8000	OHMS
TOTAL HARMONIC DISTORTION	5	3.5	PER CENT
POWER OUTPUT	10	14	WATTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER MAXIMUM RATED CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR FIXED BIAS OPERATION.

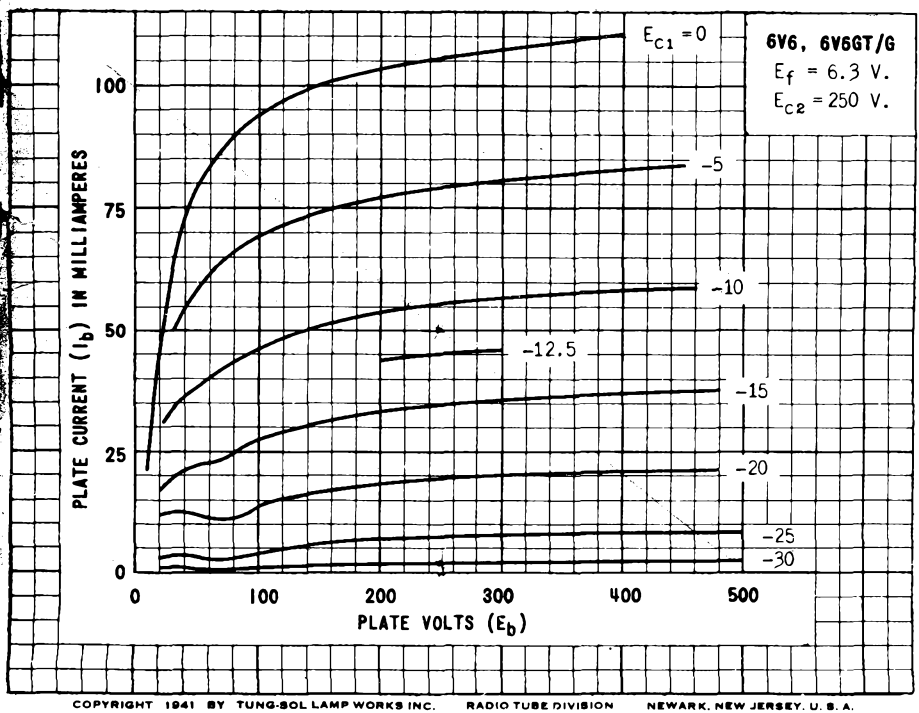


PLATE 1051-2

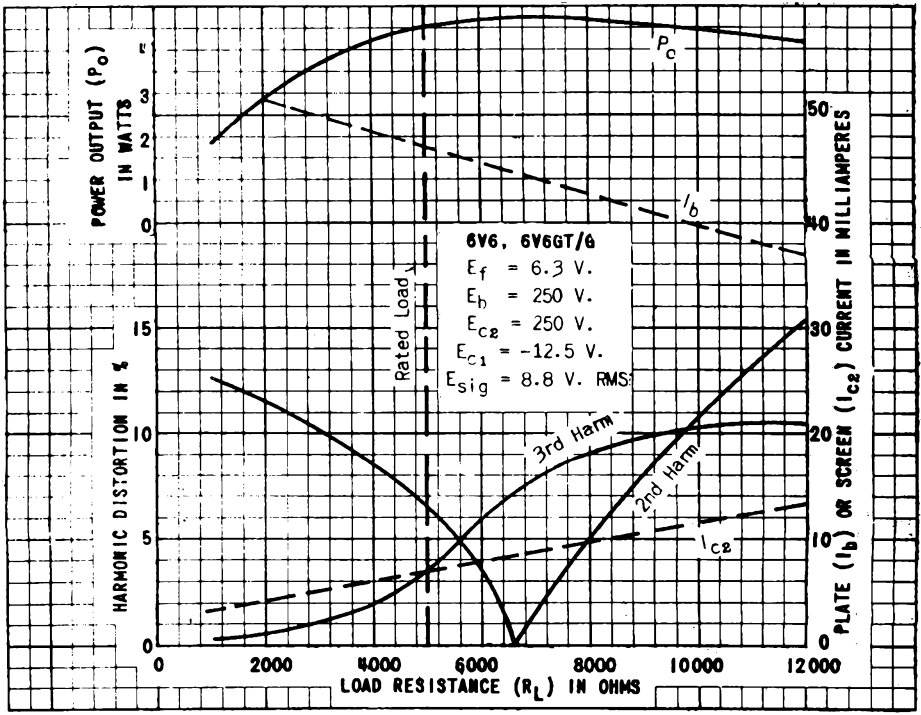
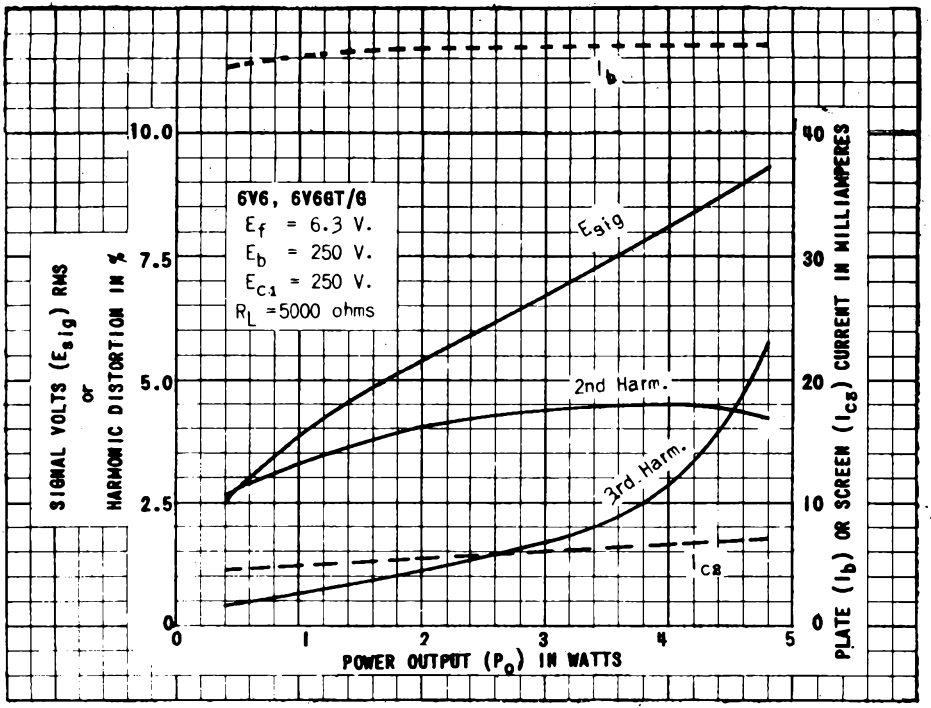
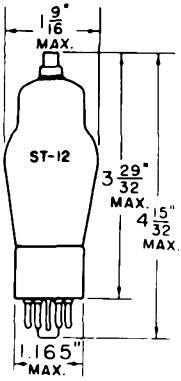


PLATE 1052-2

JUNE 6 1941


6V6, 6V6GT/G
E_f = 6.3 V.
E_b = 250 V.
E_{c1} = 250 V.
R_L = 5000 ohms
I_b
E_{sig}
2nd Harm.
3rd. Harm.
I_{c2}
SIGNAL VOLTS (E_{sig}) RMS
or
HARMONIC DISTORTION IN %
PLATE (I_b) OR SCREEN (I_{c2}) CURRENT IN MILLIAMPERES
POWER OUTPUT (P_o) IN WATTS
0
2.5
5.0
7.5
10.0
0
10
20
30
40
0
1
2
3
4
5

TUNG-SOL



6V7G
SMALL 7 PIN OCTAL BASE

DUPLEX-DIODE TRIODE

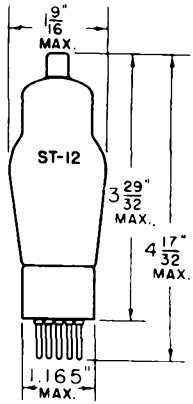
UNIPOTENTIAL CATHODE

HEATER

6V7G, 85	55
6.3 V.	2.5 V.
0.3 A.	1.0 A.

AC OR DC

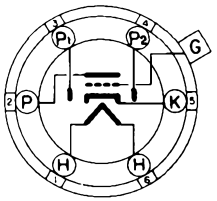
IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE. UNDER NO CONDITIONS SHOULD IT EXCEED 100 VOLTS.



55, 85
SMALL 8 PIN BASE

6V7G

BOTTOM VIEWS



55, 85

THE 6V7G, 55 AND 85 ARE HEATER CATHODE TYPE TUBES CONSISTING OF TWO DIODES AND A TRIODE IN A SINGLE BULB. THEY ARE DESIGNED FOR USE AS COMBINED DETECTORS, AMPLIFIERS AND AUTOMATIC VOLUME CONTROL TUBES.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	2.0	WATTS

DIRECT INTERELECTRODE CAPACITANCES

GRID TO PLATE	1.5	μμf
INPUT	1.5	μμf
OUTPUT	4.3	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	135	180	250	VOLTS
GRID VOLTAGE	-10.5	-13.5	-20	VOLTS
PLATE CURRENT	3.7	6.0	8.0	MA.
PLATE RESISTANCE	11000	8500	7500	OHMS
TRANSCONDUCTANCE	750	975	1100	μMHOS
AMPLIFICATION FACTOR	8.3	8.3	8.3	
LOAD RESISTANCE	25000	20000	20000	OHMS
POWER OUTPUT	75	160	350	MW.

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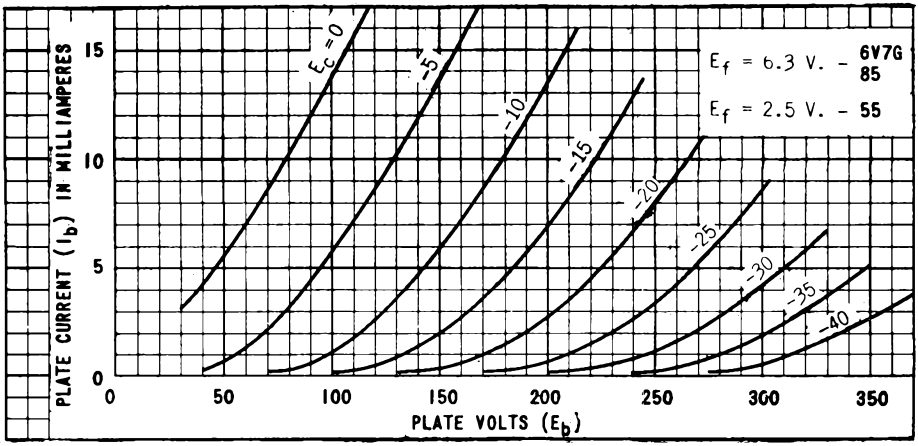
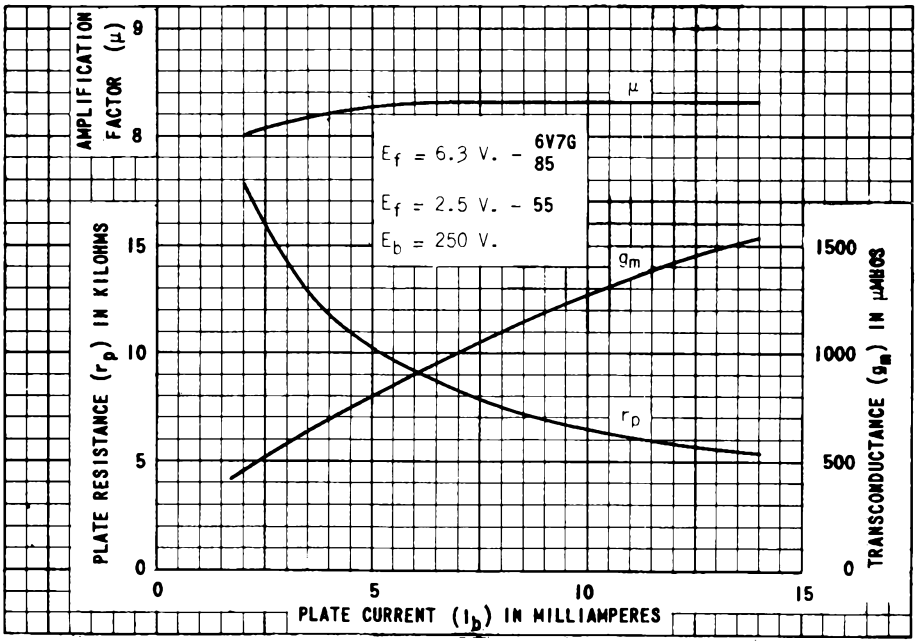
PLATE 1439
JUNE 15 1944

6V7G (55, 85)





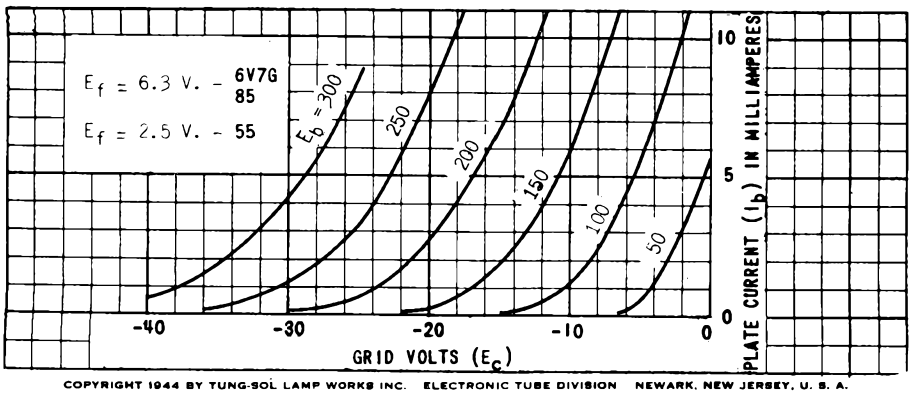
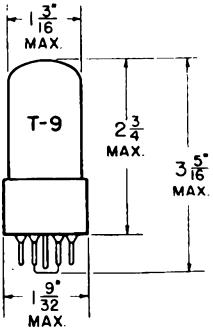


PLATE 1440
JUNE 15 1944

TUNG-SOL

DIODE



GLASS BULB

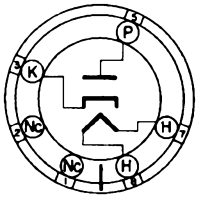
UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 1.2 AMPERES

AC

ANY MOUNTING POSITION



BOTTOM VIEW

SHORT INTERMEDIATE SHELL 6 PIN OCTAL

THE 6W4GT IS A SINGLE HIGH VACUUM DIODE OF THE SEPARATE HEATER TYPE USING THE GLASS ENVELOPE OCTAL-BASE CONSTRUCTION. IT IS INTENDED FOR USE IN A TWO TUBE POWER RECTIFIER SUPPLYING MODERATE OUTPUT CURRENT OR IN DAMPER SERVICE FOR TELEVISION HORIZONTAL DEFLECTION SYSTEMS WHERE HIGH INVERSE PEAK VOLTAGES ARE ENCOUNTERED.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM PEAK HEATER-CATHODE VOLTAGE:		
HEATER NEGATIVE WITH RESPECT TO CATHODE	450	VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE	100	VOLTS
MAXIMUM PEAK INVERSE PLATE VOLTAGE:		
FOR TELEVISION DAMPER SERVICE[A]	2 000	VOLTS
FOR CONVENTIONAL RECTIFIER SERVICE	1 250	VOLTS
MAXIMUM PEAK PLATE CURRENT	600	MA.
MAXIMUM HOT SWITCHING TRANSIENT PLATE CURRENT FOR DURATION OF 0.2 SEC. MAX.	3.5	AMP.
MAXIMUM DC OUTPUT CURRENT	100	MA.
TUBE VOLTAGE DROP (MEASURED WITH TUBE CONDUCTING 200 MA. DC)	17	VOLTS

[A] THIS RATING IS APPLICABLE WHERE THE DUTY CYCLE OF THE VOLTAGE PULSE DOES NOT EXCEED 15% OF ONE SCANNING CYCLE AND ITS DURATION IS LIMITED TO 10 MICROSECONDS.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HALF-WAVE RECTIFIER

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	1.2	AMP.
AC PLATE VOLTAGE (RMS)	350	VOLTS
FILTER-INPUT CONDENSER	20	µF
TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE	145	OHMS
DC OUTPUT CURRENT	100	MA.

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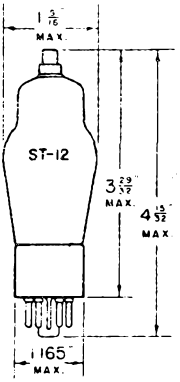
PLATE 2098
NOV. 1, 1948

TUNG-SOL



GLASS BULB

TRIPLE GRID
DETECTOR AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

G-7Ra
BOTTOM VIEW

THE TUNG-SOL 6W7G IS A TRIPLE GRID GENERAL PURPOSE DETECTOR AMPLIFIER, WHICH IS DESIGNED FOR SERVICE IN APPLICATIONS THAT REQUIRE A LOW HEATER CURRENT.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL CONTROL GRID BIAS VOLTAGE	0	VOLT
MAXIMUM PLATE DISSIPATION	0.5	WATT
MAXIMUM SCREEN DISSIPATION	0.1	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE	100	VOLTS
CONTROL GRID VOLTAGE	-3	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET	
PLATE CURRENT	2.0	MA.
SCREEN CURRENT	0.5	MA.
PLATE RESISTANCE APPROX.	1.5	MEGOHMS
TRANSCONDUCTANCE	1225	MICROMHOS
CONTROL GRID VOLTAGE APPROX. FOR CATHODE CURRENT CUT-OFF	-7	VOLTS

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID TO CATHODE	5.0	μμf
PLATE TO CATHODE	8.5	μμf
CONTROL GRID TO PLATE	0.007 MAX.	μμf

[S] WITH EXTERNAL SHIELD CONNECTED TO CATHODE. THE INTERNAL SHIELD WITHIN THE DOME OF THE 6W7G IS CONNECTED INTERNALLY TO THE CATHODE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK

CONTINUED NEXT PAGE

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PLATE 964-2

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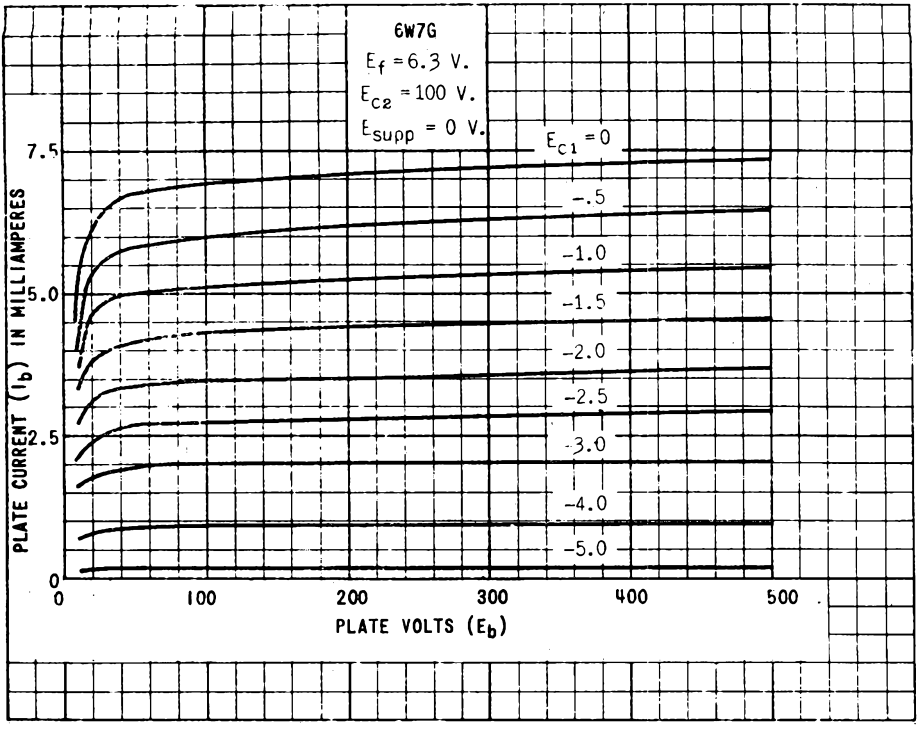
6W7G



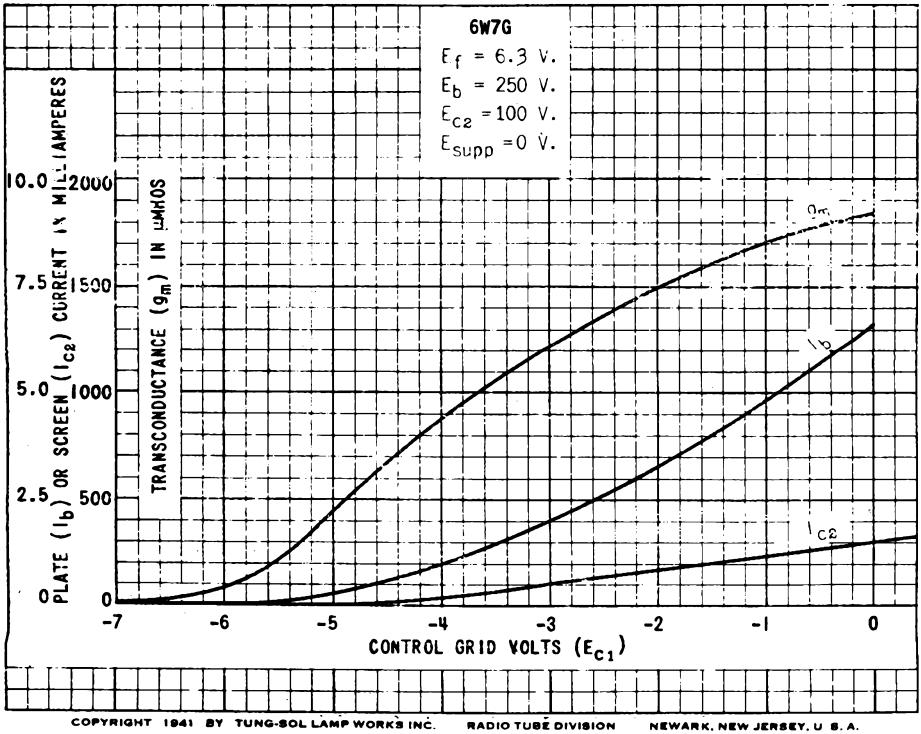


PLATE 965-2

TUNG-SOL

FULL WAVE RECTIFIER

MINIATURE TYPE

PHYSICAL SPECIFICATIONS

EMITTER	COATED UNIPOT. CATHODE	PIN CONNECTIONS	
BASE	MIN. BUTTON 7-PIN BASE	PIN 1 PLATE (UP.)	PIN 7 CATHODE
CAP	——	PIN 2 NONE	PIN 8 NONE
BULB	T-5½	PIN 3 HEATER	
MAXIMUM DIAMETER	3/4"	PIN 4 HEATER	
MAXIMUM OVERALL LENGTH	2 5/8"	PIN 5 NONE	
MAXIMUM SEATED HEIGHT	2 3/8"	PIN 6 PLATE (LOW.)	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.600	AMPS.
MAXIMUM PLATE VOLTAGE PER PLATE (RMS)		VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL,	450	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	1250	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	210	MA.
TUBE VOLTAGE DROP AT MA. PER PLATE		VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

FULL-WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

HEATER OR FILAMENT VOLTAGE	6.3	VOLTS
AC PLATE VOLTAGE PER PLATE (RMS)	325	VOLTS
DC OUTPUT CURRENT	70	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE	150	OHMS (MIN.)
FILTER INPUT CONDENSER	4	µf

FULL-WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

HEATER OR FILAMENT VOLTAGE	VOLTS
AC PLATE VOLTAGE PER PLATE (RMS)	VOLTS
DC OUTPUT CURRENT	MA.
MINIMUM VALUE OF INPUT CHOKE	HENRYS

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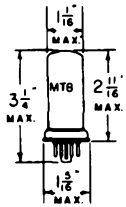
PLATE 1656
DEC. 15 1945

TUNG-SOL



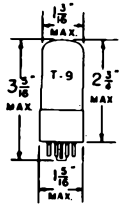
METAL SHELL
6 PIN OCTAL BASE
6X5

FULL WAVE

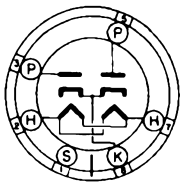
HIGH VACUUM RECTIFIER

UNIPOTENTIAL CATHODE

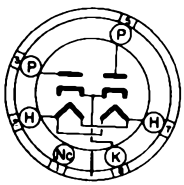
HEATER
6.3 VOLTS 0.6 AMPERE
AC OR DC



GLASS BULB
6 PIN OCTAL BASE
6X5GT/G



6S
BOTTOM VIEW
6X5



G-6S
BOTTOM VIEW
6X5GT/G

THE TUNG-SOL 6X5 AND 6X5GT/G ARE DESIGNED FOR SERVICE IN STORAGE BATTERY OR AC OPERATED RECEIVERS. THEIR CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM DC HEATER TO CATHODE POTENTIAL	450	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	1250	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	210	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	325	VOLTS
DC OUTPUT CURRENT MAX.	70	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN. [A]	150	OHMS

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	450	VOLTS
DC OUTPUT CURRENT MAX.	70	MA.
VALUE OF INPUT CHOKE MIN.	8	HENRYS
TUBE VOLTAGE DROP AT 70 MA. PER PLATE	22	VOLTS

[A] WHEN FILTER CONDENSERS LARGER THAN 40 MFDS. ARE USED IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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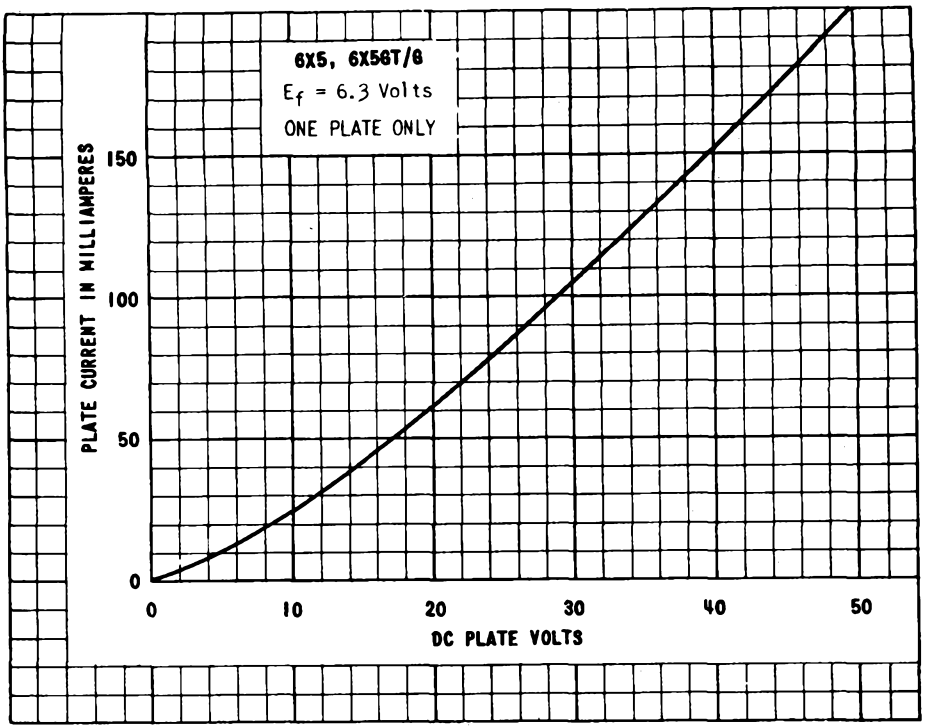
PLATE 1008-2

APR. 21 1941

6X5 6X5GT/G



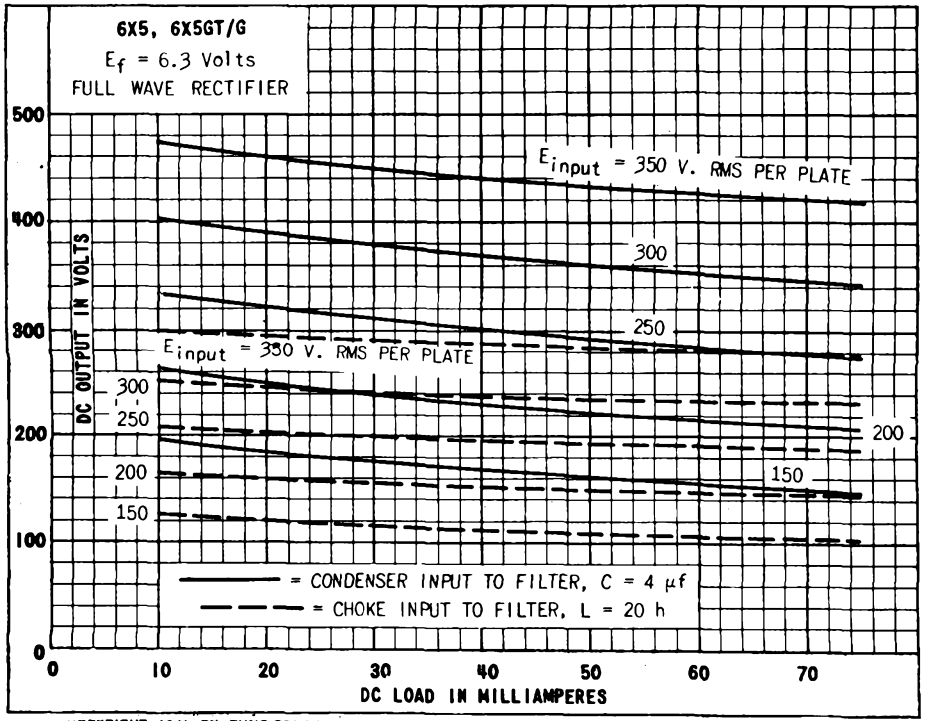
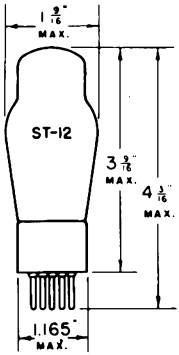


PLATE 1009-2

APR. 21 1941

TUNG-SOL



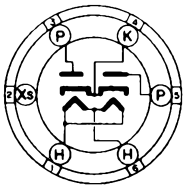
FULL-WAVE

HIGH VACUUM RECTIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.80 AMPERE
AC OR DC

GLASS BULB



6J
BOTTOM VIEW

SMALL 6 PIN BASE

THE TUNG-SOL 6Y5 IS A HEATER TYPE HIGH VACUUM FULL-WAVE RECTIFIER, WHICH IS DESIGNED FOR USE IN STORAGE BATTERY OR AC OPERATED RECEIVERS.

OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER – CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	350	VOLTS
DC OUTPUT CURRENT MAX.	50	MA.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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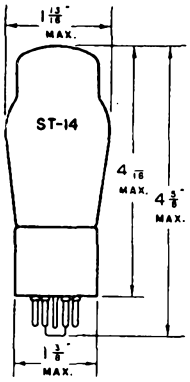
PLATE 901-1

NOV. 8 1940

TUNG-SOL



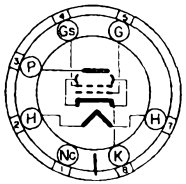
BEAM POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 1.25 AMPERES
AC OR DC

GLASS BULB

MEDIUM 7 PIN OCTAL BASE



G-7AC
BOTTOM VIEW

THE TUNG-SOL 6Y6G IS A BEAM POWER AMPLIFIER HAVING HIGH POWER SENSITIVITY AND HIGH POWER OUTPUT AT COMPARATIVELY LOW DC SUPPLY VOLTAGES.

RATINGS

MAXIMUM PLATE VOLTAGE	200	VOLTS
MAXIMUM SCREEN VOLTAGE	135	VOLTS
MAXIMUM PLATE DISSIPATION	12.5	WATTS
MAXIMUM SCREEN DISSIPATION	1.75	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	135	200	VOLTS
SCREEN VOLTAGE	135	135	VOLTS
CONTROL GRID VOLTAGE[A]	-13.5	-14	VOLTS
PEAK AF SIGNAL VOLTAGE	13.5	14	VOLTS
ZERO-SIGNAL PLATE CURRENT	58	61	MA.
ZERO-SIGNAL SCREEN CURRENT	3.5	2.2	MA.
MAXIMUM-SIGNAL PLATE CURRENT	60	66	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	11.5	9.0	MA.
PLATE RESISTANCE APPROX.	9300	18300	OHMS
TRANSCONDUCTANCE	7000	7100	MMHOS
LOAD RESISTANCE	2000	2600	OHMS
TOTAL HARMONIC DISTORTION	10	10	PER CENT
POWER OUTPUT	3.6	6.0	WATTS

[A] THE GRID CIRCUIT RESISTANCE SHOULD NOT EXCEED 0.1 MEGOHM WITH FIXED BIAS AND 0.5 MEGOHM WITH SELF BIAS.

NOTE: UNDER CONDITIONS OF MAXIMUM POWER DISSIPATION, THE HEATER VOLTAGE SHOULD NOT BE ALLOWED TO EXCEED 7.0 VOLTS WITH FLUCTUATIONS OF LINE VOLTAGE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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PLATE 995-2

JAN-31 1941

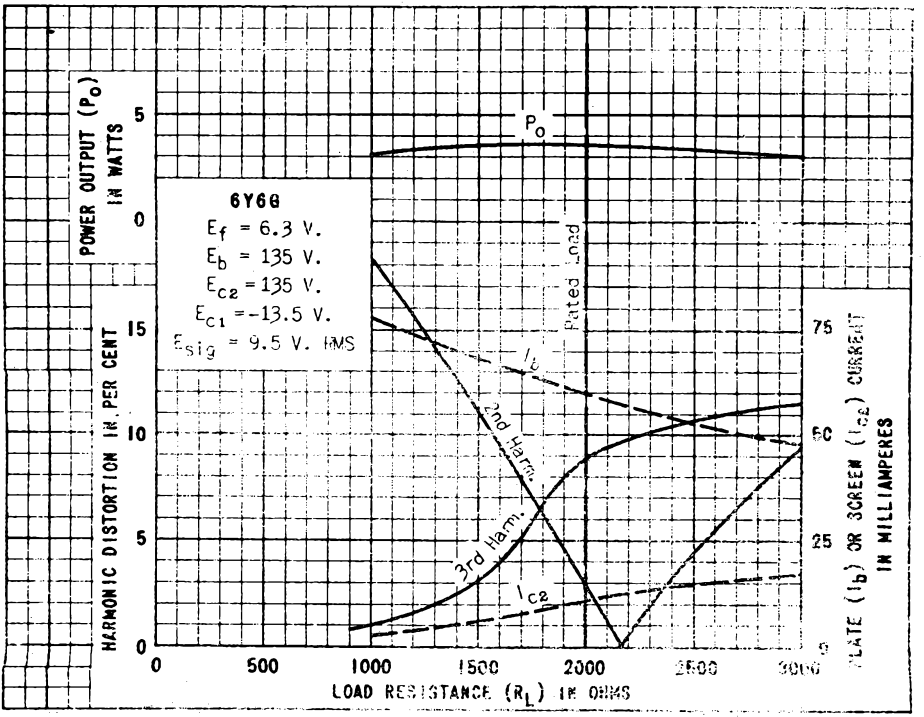
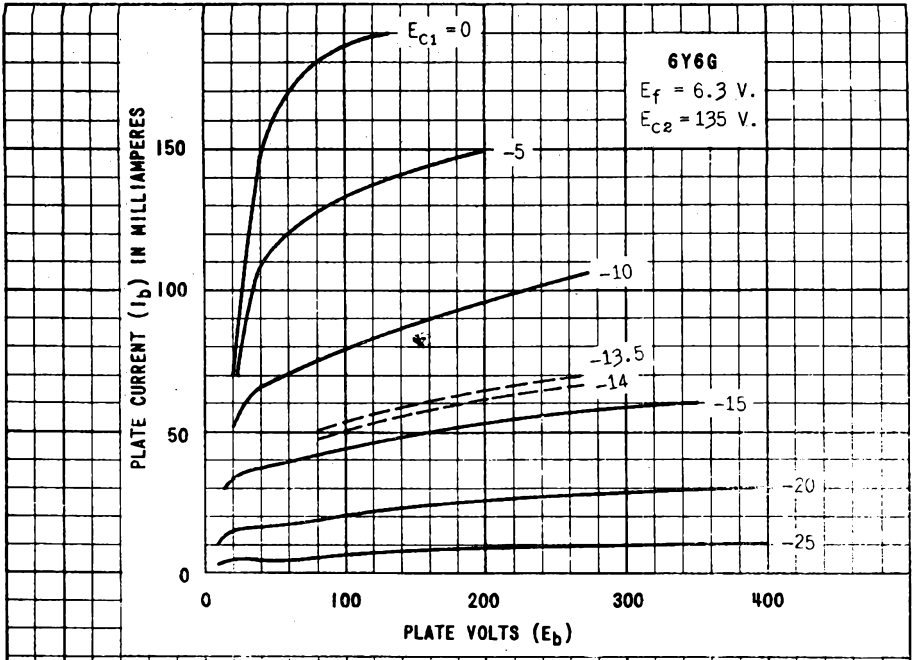
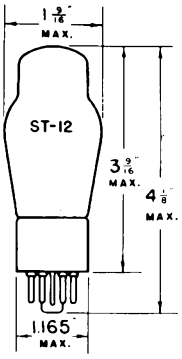


PLATE 996-2

6Y6G


6Y6G
E_f = 6.3 V.
E_{c2} = 135 V.
E_{c1} = 0
-5
-10
-13.5
-14
-15
-20
-25
PLATE CURRENT (I_b) IN MILLIAMPERES
150
100
50
0
0
100
200
300
400
PLATE VOLTS (E_b)

TUNG-SOL

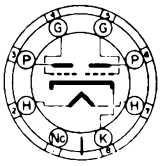


TWIN TRIODE POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.6 AMPERE
AC OR DC

GLASS BULB



G-8B

SMALL 8 PIN OCTAL BASE

THE TUNG–SOL 6Y7G IS A TWIN TRIODE DESIGNED PRIMARILY FOR SERVICE AS A CLASS B POWER AMPLIFIER, VOLTAGE AMPLIFIER OR PHASE INVERTER. WITH THE EXCEPTION OF CAPACITANCES ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 79.

OPERATING CONDITIONS AND CHARACTERISTICS

PLATE VOLTAGE MAX.	250	VOLTS
PEAK PLATE CURRENT PER PLATE MAX.	90	MA.
AVERAGE PLATE DISSIPATION MAX.	11.5	WATTS

CLASS B_2 AMPLIFIER

PLATE VOLTAGE	180	250 MAX.	VOLTS
GRID BIAS	0	0	VOLTS
ZERO–SIGNAL PLATE CURRENT PER PLATE	3.8	5.3	MA.
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	7000	14000	OHMS
AVERAGE POWER INPUT GRID TO GRID	380	380	MILLIWATTS
POWER OUTPUT APPROX.	5.5	8.0	WATTS

RESISTANCE COUPLED AMPLIFIER AND PHASE INVERTER

PLATE SUPPLY VOLTAGE	100	100	250	250	VOLTS
PLATE LOAD RESISTOR	0.1	0.5	0.1	0.5	MEGOHM
CATHODE RESISTOR	2000	6000	1200	3000	OHMS
VOLTAGE GAIN	30	35	35	43	

DIRECT INTERELECTRODE CAPACITANCES[S]

	TRIODE 2	TRIODE 1	
GRID TO CATHODE	3.6	3.6	μμf
PLATE TO CATHODE	4.6	4.6	μμf
GRID TO PLATE	2.6	2.6	μμf
GRID 1 TO GRID 2	0.3		μμf
PLATE 1 TO PLATE 2	1.7		μμf
GRID 1 TO PLATE 2	0.12		μμf
GRID 2 TO PLATE 1	0.12		μμf

TRIODE 2 IS TRIODE HAVING GRID BROUGHT OUT TO PIN #4.
TRIODE 1 IS TRIODE HAVING GRID BROUGHT OUT TO PIN #5.
S WITH SHIELD

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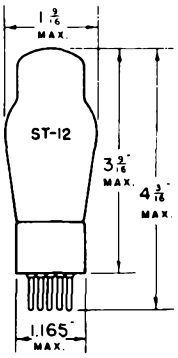
PLATE 348-2

MARCH 6 1939

TUNG-SOL

FULL WAVE

HIGH VACUUM RECTIFIER



UNIPOTENTIAL CATHODE

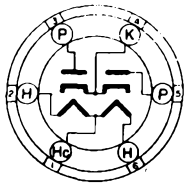
HEATER

6.3 VOLTS[A] 0.80 AMPERE

12.6 VOLTS[B] 0.40 AMPERE

AC OR DC

GLASS BULB



6K

BOTTOM VIEW

SMALL 6 PIN BASE

THE TUNG-SOL 6Z5/12Z5 IS A HEATER TYPE HIGH VACUUM FULL WAVE RECTIFIER. THE HEATER IS CENTER TAPPED SO THAT IT MAY BE OPERATED ON EITHER 6.3 VOLTS OR 12.6 VOLTS.

OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER – CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS)MAX.	230	VOLTS
DC OUTPUT CURRENTMAX.	60	MA.

[A] HEATERS CONNECTED IN PARALLEL

[B] HEATERS CONNECTED IN SERIES

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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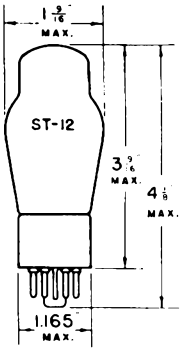
PLATE 903-1

NOV. 8 1940

TUNG-SOL

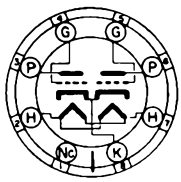


CLASS B TWIN TRIODE

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



G-8B
BOTTOM VIEW

SMALL 8 PIN OCTAL BASE

THE TUNG-SOL 6Z7G IS A TWIN TRIODE CLASS B POWER AMPLIFIER, DESIGNED PRIMARILY FOR SERVICE WHERE LOW HEATER CURRENT IS REQUIRED.

MAXIMUM OPERATING CONDITIONS

PLATE VOLTAGE	180 MAX.	VOLTS
PEAK PLATE CURRENT PER PLATE	60 MAX.	MA.
AVERAGE PLATE DISSIPATION	8 MAX.	WATTS

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS B_2 POWER AMPLIFIER

PLATE VOLTAGE	135	135	180	180	VOLTS
GRID VOLTAGE	0	0	0	0	VOLTS
ZERO SIGNAL PLATE CURRENT[P]	6	6	8.4	8.4	MA.
EFFECTIVE LOAD RESISTANCE[L]	15 000	9000	20 000	12 000	OHMS
AVERAGE POWER INPUT[G]	80	320	80	320	MILLIWATTS
POWER OUTPUT	1.5	2.5	2.2	4.2	WATTS

[P] BOTH PLATES [L] PLATE TO PLATE [G] GRID TO GRID

DIRECT INTERELECTRODE CAPACITANCES[S]

	TRIODE 1	TRIODE 2	
GRID TO CATHODE	4	4	μμf
PLATE TO CATHODE	5	5	μμf
GRID TO PLATE	5	5	μμf
GRID TO GRID	0.22		μμf
PLATE TO PLATE	0.8		μμf
GRID (2) TO PLATE (1)	0.1		μμf

TRIODE 1 IS TRIODE HAVING GRID BROUGHT OUT TO PIN #5.
TRIODE 2 IS TRIODE HAVING GRID BROUGHT OUT TO PIN #4.

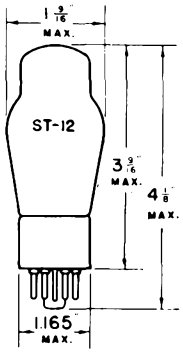
[S] WITH SHIELD

CAPACITANCES BETWEEN ELEMENTS OF ONE TRIODE ARE MEASURED WITH THE ELEMENTS OF THE OTHER TRIODE GROUNDED.

NOTE: THIS TUBE IS NOT RECOMMENDED FOR OPERATION IN SERIES WITH OTHER 0.3 AMPERE HEATER TUBES AS THE SURGE CURRENT MAY CAUSE HEATER BURNOUTS.

PLATE 904-2

TUNG-SOL



FULL WAVE

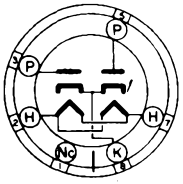
HIGH VACUUM RECTIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

SMALL 6 PIN OCTAL BASE



G-6S
BOTTOM VIEW

THE TUNG-SOL 6ZY5G IS DESIGNED FOR SERVICE IN RECEIVERS THAT REQUIRE SMALL LOAD CURRENTS, AND WHERE ECONOMY IS DESIRED IN HEATER CURRENT CONSUMPTION.

RATINGS

MAXIMUM PEAK INVERSE VOLTAGE	1250	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	450	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	120	MA.

OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS)$^{MAX.}$	325	VOLTS
DC OUTPUT CURRENT$^{MAX.}$	40	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE$^{MIN.A}$	225	OHMS

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS)$^{MAX.}$	450	VOLTS
DC OUTPUT CURRENT$^{MAX.}$	40	MA.
VALUE OF INPUT CHOKE $^{MIN.}$	13.5	HENRYS
TUBE VOLTAGE DROP AT 40 MA. PER PLATE	18	VOLTS

A WHEN FILTER CONDENSERS LARGER THAN 40 µFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS", REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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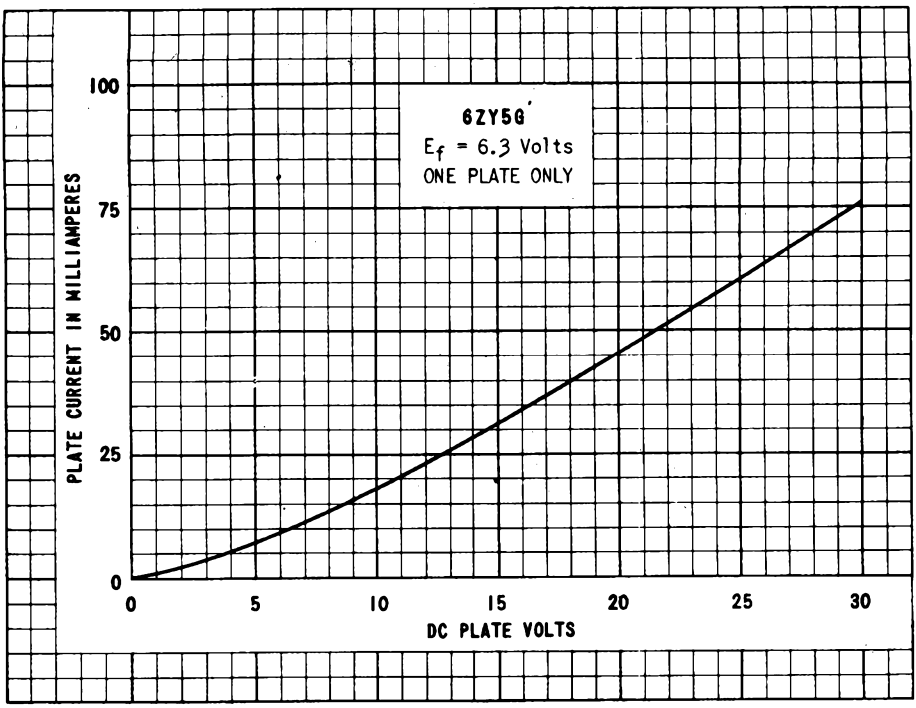
PLATE 709-2

FEB. 15 1940

6ZY5G



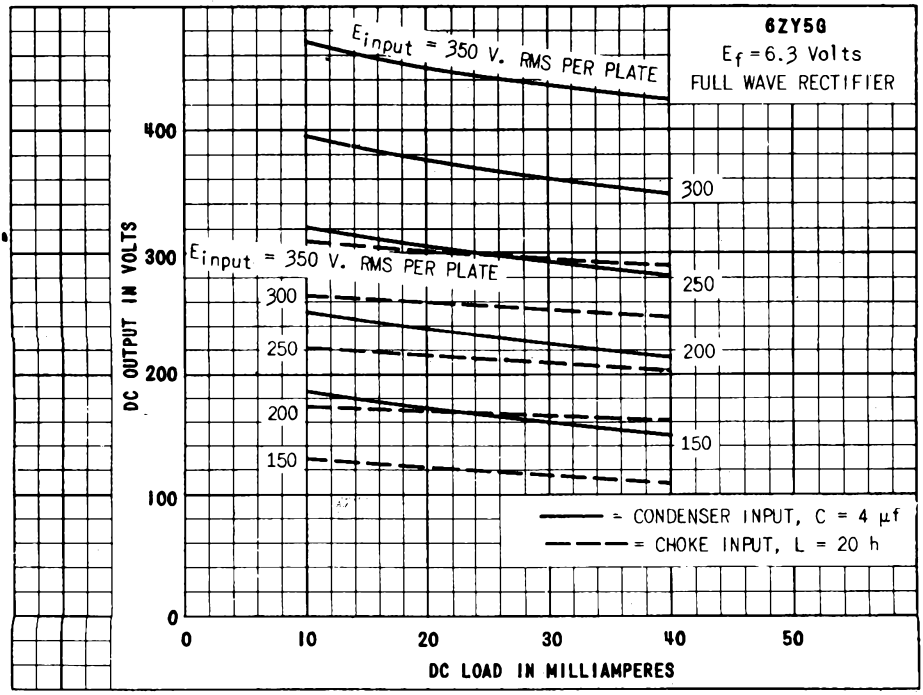
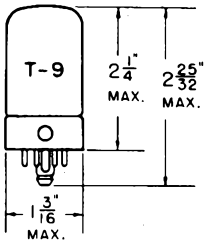


PLATE
710-1

TUNG-SOL

TRIODE AMPLIFIER



COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

LOCKING-IN 8-PIN BASE

BOTTOM VIEW

THE 7A4 IS A MEDIUM-MU GENERAL PURPOSE TRIODE AMPLIFIER WITH HIGH TRANSCONDUCTANCE. IT IS PARTICULARLY APPLICABLE IN ULTRA HIGH FREQUENCY CIRCUITS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MINIMUM GRID VOLTAGE	0	VOLTS
MAXIMUM DC HEATER-CATHODE POTENTIAL	100	VOLTS
MAXIMUM CATHODE CURRENT	20	MA.

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD CONNECTED TO CATHODE

GRID TO PLATE	4.0	μμf
INPUT	3.4	μμf
OUTPUT	3.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	90	250	VOLTS
GRID VOLTAGE[A]	0	-8	VOLTS
PLATE CURRENT	10	9.0	MA.
PLATE RESISTANCE	6 700	7 700	OHMS
TRANSCONDUCTANCE	3 000	2 600	μMHOS
AMPLIFICATION FACTOR	20	20	

[A] THE DC RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 1 MEGOHM

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PLATE
1475
AUG. 31
1944

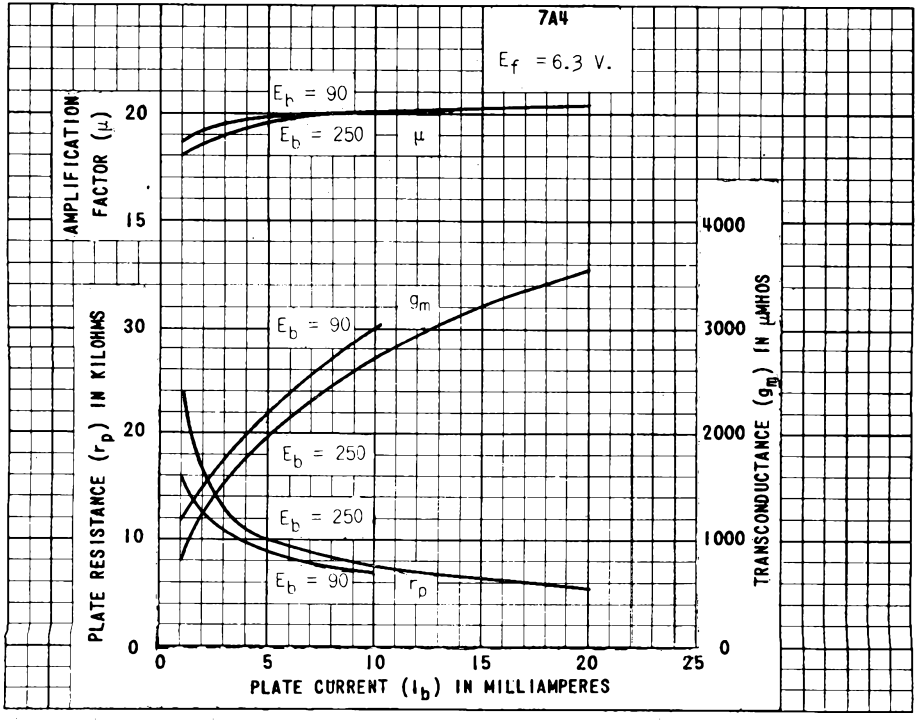
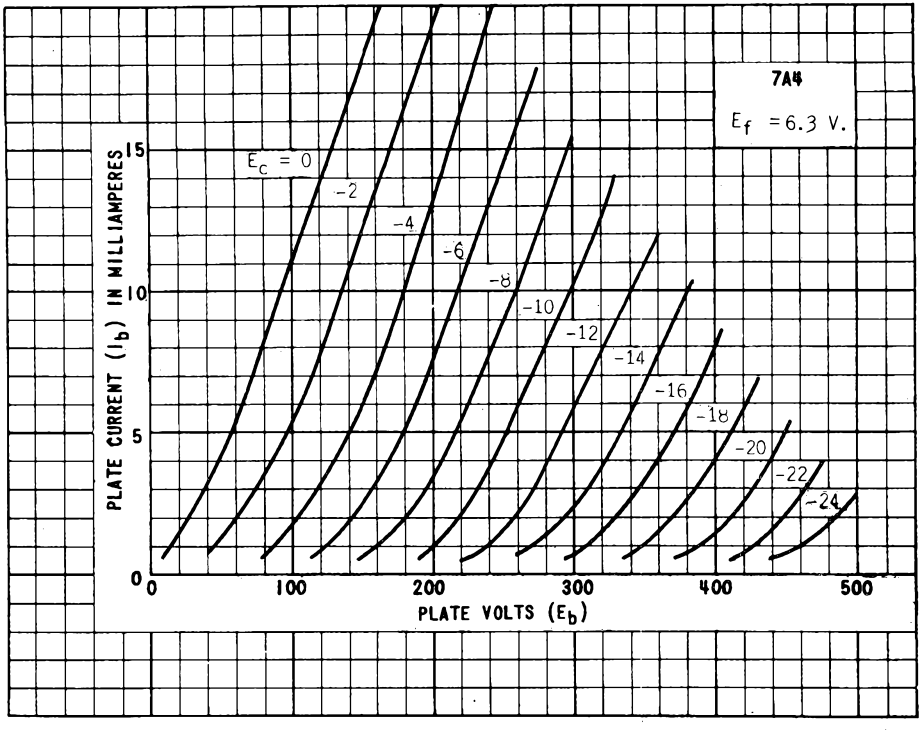


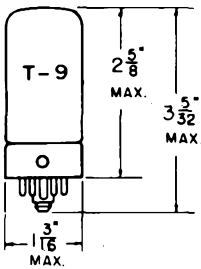
PLATE 1476
AUG. 31 1944

7A4


7A4
E_f = 6.3 V.
E_c = 0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
PLATE CURRENT (I_b) IN MILLIAMPERES
0
5
10
15
0
100
200
300
400
500
PLATE VOLTS (E_b)

TUNG-SOL

BEAM POWER AMPLIFIER

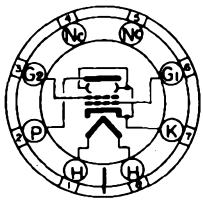


COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.75 AMPERE
AC OR DC

GLASS BULB

LOCKING-IN 8 PIN



BOTTOM VIEW

THE 7A5 IS A BEAM POWER AMPLIFIER DESIGNED PRIMARILY FOR SERVICE IN THE OUTPUT STAGE OF AUTOMOBILE OR HOUSEHOLD RECEIVERS. IT DELIVERS HIGH POWER OUTPUT WITH HIGH POWER SENSITIVITY AT LOW PLATE SUPPLY VOLTAGES.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	125	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MAXIMUM PLATE DISSIPATION	5.5	WATTS
MAXIMUM SCREEN DISSIPATION	1.2	WATTS
MAXIMUM HEATER-CATHODE POTENTIAL	100	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	110	125	VOLTS
SCREEN VOLTAGE	110	125	VOLTS
CONTROL GRID VOLTAGE[A]	-7.5	-9.0	VOLTS
PEAK A-F GRID VOLTAGE	7.5	9.0	VOLTS
ZERO-SIG. PLATE CURRENT	40	44	MA.
ZERO-SIG. SCREEN CURRENT (APPROX.)	3.0	3.3	MA.
MAXIMUM-SIGNAL PLATE CURRENT	41	45	MA.
MAXIMUM-SIGNAL SCREEN CURRENT (APPROX.)	7.0	9.5	MA.
PLATE RESISTANCE (APPROX.)	14 000	17 000	OHMS
TRANSCONDUCTANCE	5 800	6 000	µMHOS
LOAD RESISTANCE	2 500	2 700	OHMS
TOTAL HARMONIC DISTORTION	10	10	PER CENT
MAXIMUM-SIGNAL POWER OUTPUT	1.5	2.2	WATTS

[A] OBTAINED EITHER FROM A FIXED SOURCE OR SELF-BIAS FROM THE CATHODE CIRCUIT. WITH A FIXED BIAS SOURCE THE TOTAL GRID CIRCUIT RESISTANCE SHOULD NOT EXCEED 0.1 MEGOHM AND WITH SELF-BIAS THE GRID CIRCUIT RESISTANCE SHOULD NOT EXCEED 0.5 MEGOHM.

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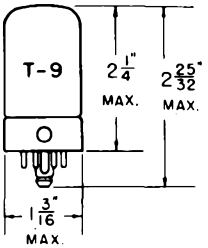
PLATE 1477
AUG. 31 1944

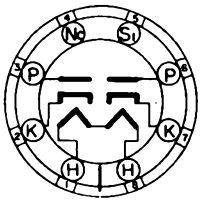
TUNG-SOL

TWIN DIODE



COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC



BOTTOM VIEW

GLASS BULB

LOCKING-IN 8-PIN BASE

THE 7A6 IS DESIGNED FOR USE AS A DIODE DETECTOR, AVC RECTIFIER AND POWER RECTIFIER IN LOW DRAIN APPLICATIONS. TWO SEPARATE RECTIFIER SECTIONS ALLOW CONSIDERABLE FLEXIBILITY IN THEIR APPLICATION. ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6H6, 6H6GT/G.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210.

MAXIMUM AC VOLTAGE PER PLATE (RMS)	150	VOLTS
MAXIMUM HEATER-CATHODE POTENTIAL	330	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	420	VOLTS
MAXIMUM STEADY STATE PEAK PLATE CURRENT PER PLATE	48	MA.
TUBE VOLTAGE DROP AT 16 MA. DC PER PLATE	11.0	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD CONNECTED TO CATHODE

PLATE TO PLATE	0.05 MAX.	μμf

CONTINUED NEXT PAGE

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PLATE 1478
AUG. 31 1944

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HALF-WAVE RECTIFIER

HEATER VOLTAGE	6.4	6.3	VOLTS
AC VOLTAGE PER PLATE (RMS)	117	150	VOLTS
MAXIMUM DC OUTPUT CURRENT PER PLATE	8.0	8.0	MA.
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE	15	40[A]	OHMS

VOLTAGE DOUBLER

	HALF-WAVE	FULL-WAVE	
HEATER VOLTAGE	6.3	6.3	VOLTS
AC VOLTAGE PER PLATE (RMS)	117	117	VOLTS
MAXIMUM DC OUTPUT CURRENT	8.0	8.0	MA.
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE	30	15	OHMS

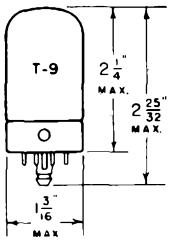
[A] WHEN FILTER CONDENSERS LARGER THAN 40 MFDS ARE USED IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

PLATE 1479
AUG. 31 1944

TUNG-SOL

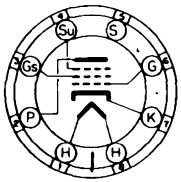
TRIPLE GRID

REMOTE CUT-OFF AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC



8V-L-5

GLASS BULB

LOCKING-IN 8 PIN BASE

THE TUNG-SOL 7A7 IS A TRIPLE GRID VARIABLE-MU AMPLIFIER. IT IS SUITABLE FOR USE WITH AVC IN RF AND IF AMPLIFIERS, AND IT MINIMIZES CROSS MODULATION. WITH THE EXCEPTION OF HEATER RATINGS AND CAPACITANCES, ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF TYPES 6SK7, 6SK7GT/G, 12SK7, 12SK7GT/G AND 14A7/12B7.

RATINGS

NOMINAL HEATER VOLTAGE	7.0	VOLTS
NOMINAL HEATER CURRENT	0.32	AMPERE
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLT
MAXIMUM PLATE DISSIPATION	4.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.4	WATT

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID TO CATHODE	6	μμf
PLATE TO CATHODE	7	μμf
CONTROL GRID TO PLATE	0.005 MAX.	μμf

[S] WITH AN EXTERNAL SHIELD CONNECTED TO CATHODE

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1177-2

FEB. 28 1942

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	0.3	0.3	AMPERE
PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	-1	-3	VOLTS
SUPPRESSOR GRID AND PIN #5 CONNECTED TO CATHODE AT SOCKET			
PLATE CURRENT	13	9.2	MA.
SCREEN CURRENT	4.0	2.6	MA.
PLATE RESISTANCE APPROX.	0.12	0.8	MEGOHM
TRANSCONDUCTANCE	2350	2000	μMHOS
CONTROL GRID VOLTAGE APPROX. FOR TRANSCONDUCTANCE = 10 μMHOS	-35	-35	VOLTS

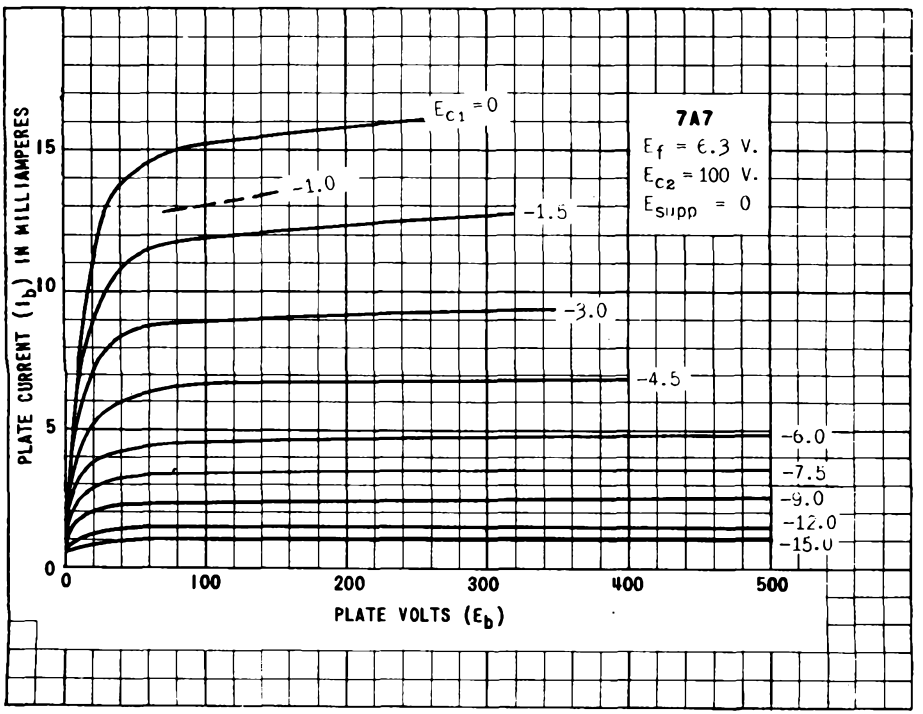
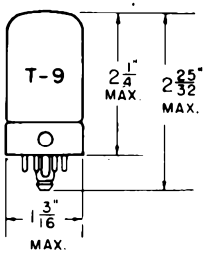


PLATE 1178-2

TUNG-SOL

OCTODE CONVERTER

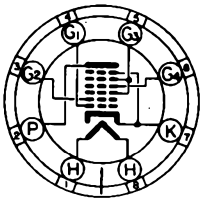
COATED UNIPOTENTIAL CATHODE



HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB

LOCKING-IN 8-PIN BASE



BOTTOM VIEW

THE 7A8 IS A PENTAGRID CONVERTER DESIGNED FOR SERVICE AS A COMBINED OSCILLATOR AND MIXER IN AC, STORAGE BATTERY, AND AC - DC OPERATED RECEIVERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

CONVERTER SERVICE

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN VOLTAGE (GRID #3 AND #5)	100	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	0.3	WATT
MAXIMUM TOTAL CATHODE CURRENT	13	MA.
MAXIMUM ANODE-GRID VOLTAGE (GRID #2)	200	VOLTS
MAXIMUM ANODE-GRID SUPPLY VOLTAGE	250	VOLTS
MAXIMUM ANODE-GRID DISSIPATION	0.75	WATT
MINIMUM CONTROL-GRID (GRID #4) VOLTAGE	0	VOLTS
MAXIMUM HEATER-CATHODE POTENTIAL	100	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH CLOSE-FITTING SHIELD CONNECTED TO CATHODE

SIGNAL GRID TO MIXER PLATE (GRID #4 TO PLATE)	0.15 MAX.	μμf
SIGNAL GRID TO OSC. PLATE (GRID #4 TO GRID #2)	0.15 MAX.	μμf
SIGNAL GRID TO OSC. GRID (GRID #4 TO GRID #1)	0.15 MAX.	μμf
OSC GRID TO OSC. PLATE (GRID #1 TO GRID #2)	0.60	μμf
SIGNAL INPUT (GRID #4 TO ALL OTHER ELECTRODES= R-F INPUT)	7.5	μμf
OSC. INPUT (GRID #1 TO ALL OTHER ELECTRODES EXCEFT GRID #2)	3.8	μμf
OSC. OUTPUT (GRID #2 TO ALL OTHER ELECTRODES EXCEPT GRID #1)	3.4	μμf
MIXER OUTPUT (PLATE TO ALL OTHER ELECTRODES)	9.0	μμf.

CONTINUED ON NEXT PAGE

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PLATE 1480
AUG. 31 1944

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PLATE VOLTAGE	100	250		VOLTS
SCREEN VOLTAGE	75	100		VOLTS
ANODE-GRID VOLTAGE	100	-		VOLTS
ANODE-GRID SUPPLY VOLTAGE[A]	-	250		VOLTS
CONTROL-GRID VOLTAGE	-3.0	-3.0		VOLTS
OSCILLATOR-GRID (GRID #1) RES.	50 000	50 000		OHMS
PLATE RESISTANCE	0.65	0.7	APPROX.	MEGOHM
CONVERSION TRANSCONDUCTANCE	375	550		μMHOS
CONVERSION TRANSCONDUCTANCE FOR GRID BIAS OF -30 VOLTS	-	2.0	APPROX.	μMHOS
PLATE CURRENT	1.8	3.0		MA.
SCREEN CURRENT	2.7	3.2		MA.
ANODE-GRID CURRENT	2.8	4.2		MA.
OSCILLATOR-GRID CURRENT	0.2	0.4		MA.
TOTAL CATHODE CURRENT	8.5	10.8		MA.

NOTE: THE TRANSCONDUCTANCE BETWEEN GRID #1 AND GRID #2 (NOT OSCILLATING) IS APPROXIMATELY 1600 MICROMHOS UNDER THE FOLLOWING CONDITIONS: PLATE VOLTS, 250; SCREEN VOLTS, 100; ANODE-GRID VOLTS, 180; OSCILLATOR-GRID VOLTS, 0; AND CONTROL-GRID CONNECTED TO CATHODE.

[A] APPLIED THROUGH A PROPERLY BY-PASSED 20 000 OHM VOLTAGE-DROPPING RESISTOR.

PLATE 1481
AUG. 31 1944

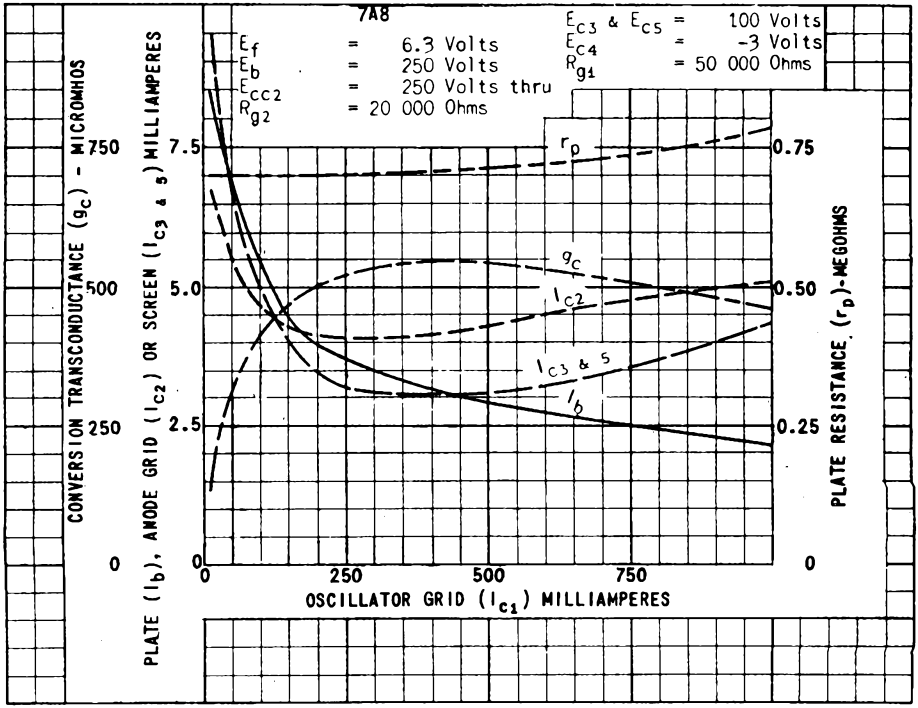

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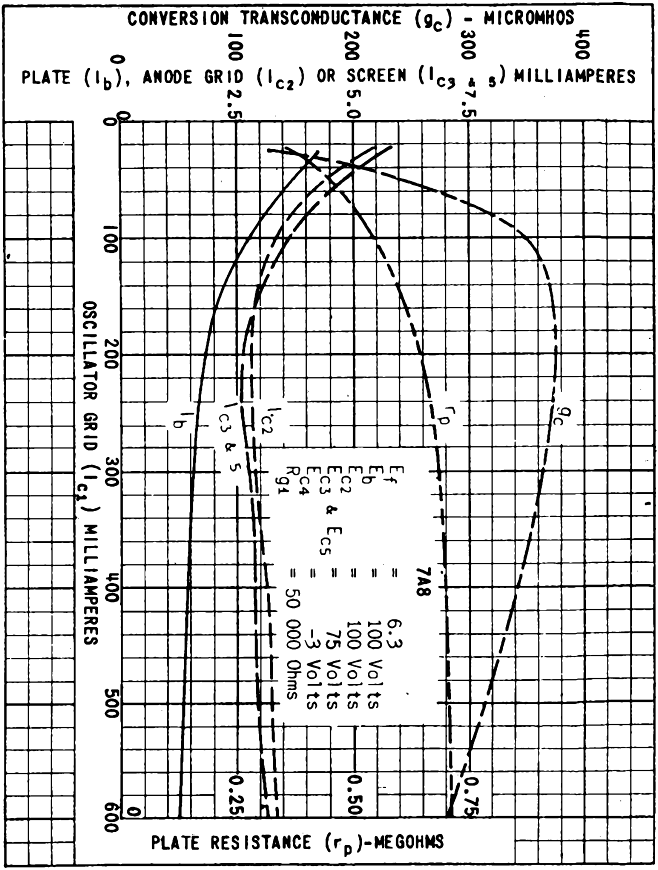
PLATE
1998
APRIL 1
1948


CONVERSION TRANSCONDUCTANCE (g_c) - MICROMHOS
0
100
200
300
400
PLATE (I_b), ANODE GRID (I_{c2}) OR SCREEN (I_{c3} & $_5$) MILLIAMPERES
0
2.5
5.0
7.5
OSCILLATOR GRID (I_{c1}) MILLIAMPERES
0
100
200
300
400
500
600
PLATE RESISTANCE (r_p)-MEGOHMS
0
0.25
0.50
0.75
I_b
I_{c3} & 5
I_{c2}
r_p
g_c
7A8
E_f = 6.3
E_b = 100 Volts
E_{c2} = 100 Volts
E_{c3} & E_{c5} = 75 Volts
E_{c4} = -3 Volts
R_{g1} = 50 000 Ohms

7A8

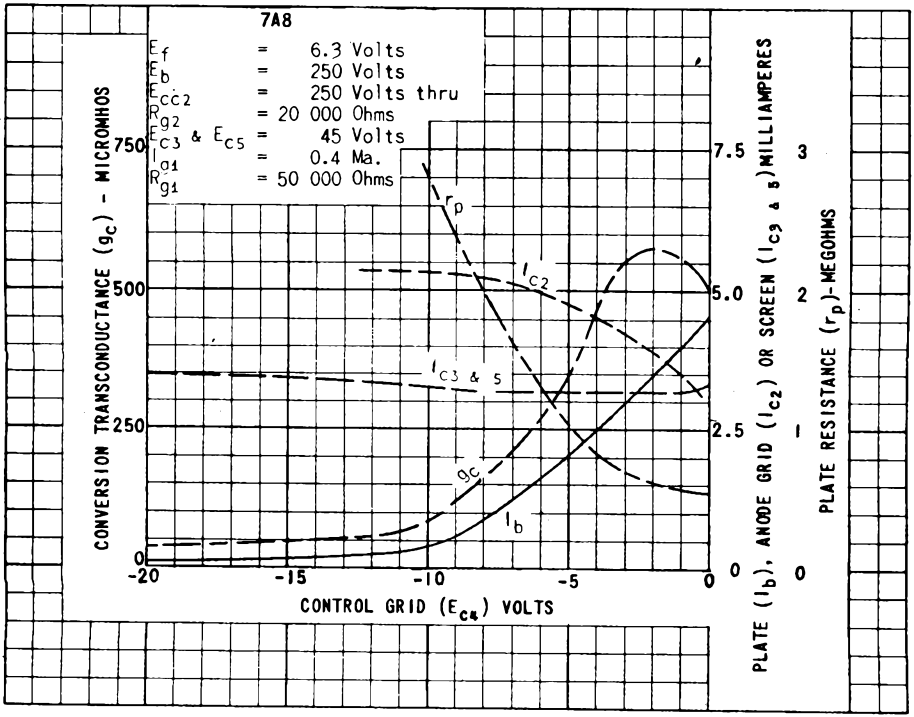
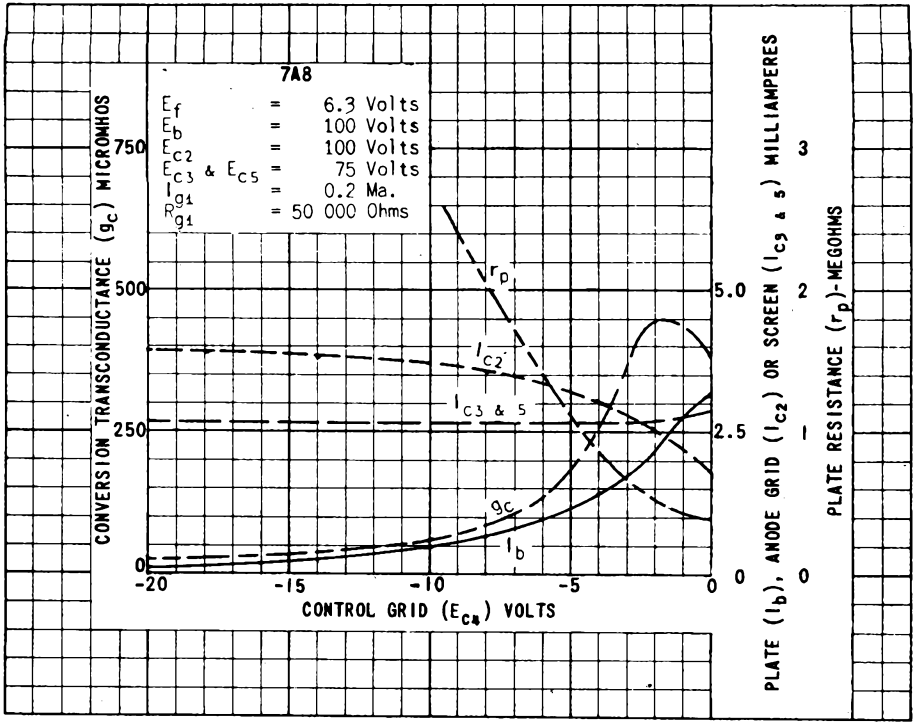


PLATE
1999
APRIL 1
1948

7A8


7A8
E_f = 6.3 Volts
E_b = 100 Volts
E_{c2} = 100 Volts
E_{c3} & E_{c5} = 75 Volts
I_{g1} = 0.2 Ma.
R_{g1} = 50 000 Ohms
CONVERSION TRANSCONDUCTANCE (g_c) MICROMHOS
750
500
250
0
r_p
I_{c2}
$I_{c3\ \&\ 5}$
g_c
I_b
-20
-15
-10
-5
0
CONTROL GRID (E_{c4}) VOLTS
5.0
2.5
0
3
2
1
0
PLATE (I_b), ANODE GRID (I_{c2}) OR SCREEN ($I_{c3\ \&\ 5}$) MILLIAMPERES
PLATE RESISTANCE (r_p)-MEGOHMS

TENTATIVE DATA 7AB7/1204

TUNG-SOL

SHARP CUT-OFF HIGH FREQUENCY RF PENTODE

PHYSICAL SPECIFICATIONS

EMITTER COATED UNIPOT. CATHODE		PIN CONNECTIONS	
BASE LOCK-IN 8-PIN		PIN 1 GRID 2	PIN 7 HEATER
CAP ———		PIN 2 HEATER	PIN 8 GRID 3, K
BULB SHORT T-9		PIN 3 PLATE	
MAXIMUM DIAMETER	1 3/16"	PIN 4 GRID 3, K	MOUNTING POS. ANY
MAXIMUM OVERALL LENGTH	2 1/32"	PIN 5 GRID 1	
MAXIMUM SEATED HEIGHT	1 1/2"	PIN 6 GRID 3, K	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (NOMINAL)	7.0	VOLTS
HEATER OR FILAMENT CURRENT	0.160	AMP.
MAXIMUM PLATE VOLTAGE (DC)	300	VOLTS
MAXIMUM SCREEN VOLTAGE (DC)	100	VOLTS
MAXIMUM PLATE DISSIPATION	1.2	WATTS
MAXIMUM SCREEN DISSIPATION	0.15	WATT
MAXIMUM SCREEN SUPPLY VOLTAGE (DC)	100	VOLTS
MINIMUM EXTERNAL CONTROL GRID VOLTAGE (DC)	0	VOLTS

CAPACITANCES

WITH RMA SHIELD NO. M8-308 CONNECTED TO CATHODE

GRID NO. 1 - PLATE (MAX.)	0.06	μμf
INPUT	3.5	μμf
OUTPUT	4.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HEATER OR FILAMENT VOLTAGE	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.150	AMP.
PLATE VOLTAGE (DC)	250	VOLTS
SCREEN VOLTAGE (DC)	100	VOLTS
CONTROL GRID VOLTAGE (DC)	-2.0	VOLTS
PEAK AF SIGNAL VOLTAGE		VOLTS
PLATE CURRENT (DC)	4.0	MA.
SCREEN GRID CURRENT (DC)	1.3	MA.
MAXIMUM-SIGNAL PLATE CURRENT		MA.
MAXIMUM-SIGNAL SCREEN CURRENT		MA.
PLATE RESISTANCE	0.5	MEGOHM
TRANSCONDUCTANCE	1800	μMHOS
AMPLIFICATION FACTOR		
LOAD RESISTANCE		OHMS
TOTAL HARMONIC DISTORTION		PER CENT
POWER OUTPUT		WATTS
CONTROL GRID VOLTAGE (DC) FOR Ib = 10 μAMPS	-9.0	VOLTS

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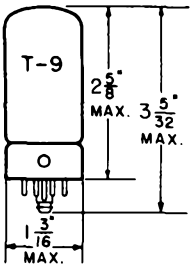
PLATE 1687
FEB. 15 1946

TUNG-SOL

PENTODE

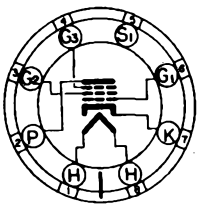


GLASS BULB

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.6 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
LOCK-IN 8 PIN BASE

THE 7AD7 IS A HEATER-CATHODE TYPE SHARP CUT-OFF PENTODE VOLTAGE AMPLIFIER USING THE LOCK-IN CONSTRUCTION. IT IS CHARACTERIZED BY A HIGH VALUE OF TRANSCONDUCTANCE WHICH MAKES IT USEFUL IN WIDE-BAND INTERMEDIATE FREQUENCY OR VIDEO AMPLIFIERS.

DIRECT INTERELECTRODE CAPACITANCES
WITH RMA SHIELD NO. 308 CONNECTED TO CATHODE

GRID TO PLATE: (G_1 TO P) MAX.	0.03	μμf
INPUT: G_1 TO (H+K+G_2+G_3+IS)	11.5	μμf
OUTPUT: P TO (H+K+G_2+G_3+IS)	7.5	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID #2 VOLTAGE	300	VOLTS
MINIMUM GRID #1 VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	10	WATTS
MAXIMUM GRID #2 DISSIPATION	1.2	WATTS
MAXIMUM GRID #1 CIRCUIT RESISTANCE (FIXED BIAS)	0.25	MEG.
MAXIMUM GRID #1 CIRCUIT RESISTANCE (SELF-BIAS)	1	MEG.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.6	AMP.
PLATE VOLTAGE	300	VOLTS
GRID #3 VOLTAGE	PINS #4 AND #5 CONNECTED TO PIN #7 AT SOCKET	
GRID #2 VOLTAGE	150	VOLTS
GRID #1 VOLTAGE[A]	-3	VOLTS
SELF BIAS RESISTOR	68	OHMS
PLATE RESISTANCE (APPROX.)	0.3	MEG.
TRANSCONDUCTANCE	9 500	μMHOS
ZERO SIGNAL PLATE CURRENT	28	MA.
ZERO SIGNAL GRID #2 CURRENT	7	MA.

[A] OBTAINED PREFERABLY BY SELF BIAS RESISTOR

CONTINUED ON FOLLOWING PAGE

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PLATE 2099
NOV. 1, 1948

TUNG-SOL

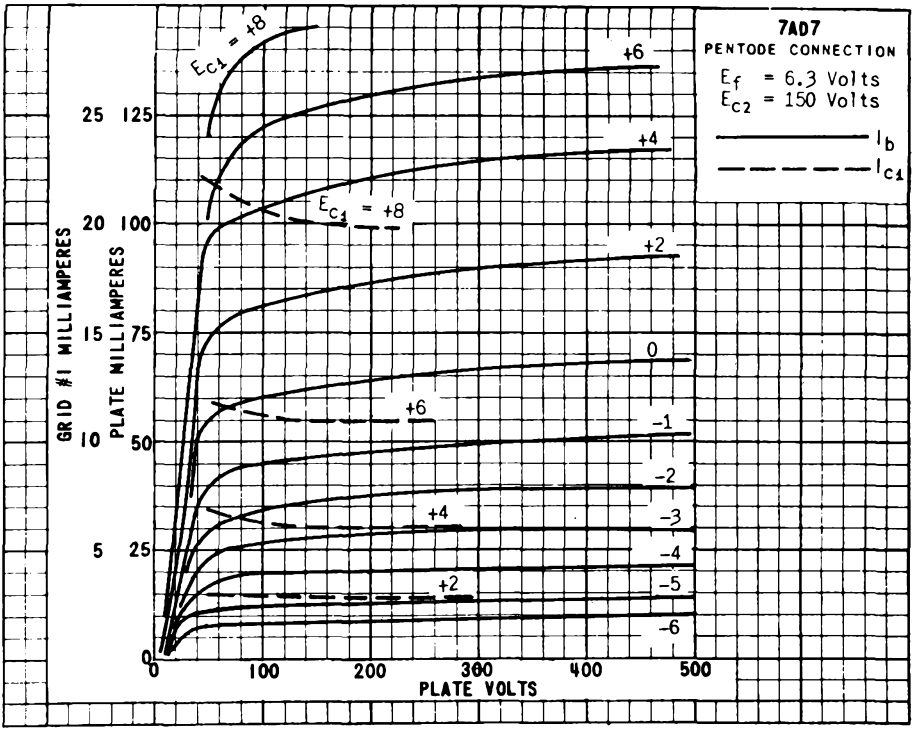
CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 TELEVISION AMPLIFIER

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	0.6	AMP.
PLATE SUPPLY VOLTAGE	300	VOLTS
GRID #3 VOLTAGE	PINS #4 AND #5 CONNECTED TO PIN #7 AT SOCKET	
GRID #2 VOLTAGE	125	VOLTS
GRID #1 VOLTAGE	-3	VOLTS
SELF BIAS RESISTOR	68	OHMS
SIGNAL VOLTAGE (PEAK TO PLATE)	4	VOLTS
ZERO SIGNAL PLATE CURRENT	25	MA.
ZERO SIGNAL GRID #2 CURRENT	6	MA.
MAXIMUM SIGNAL VOLTAGE OUTPUT (PEAK TO PEAK)	135	VOLTS

PLATE 2100
NOV. 1, 1948



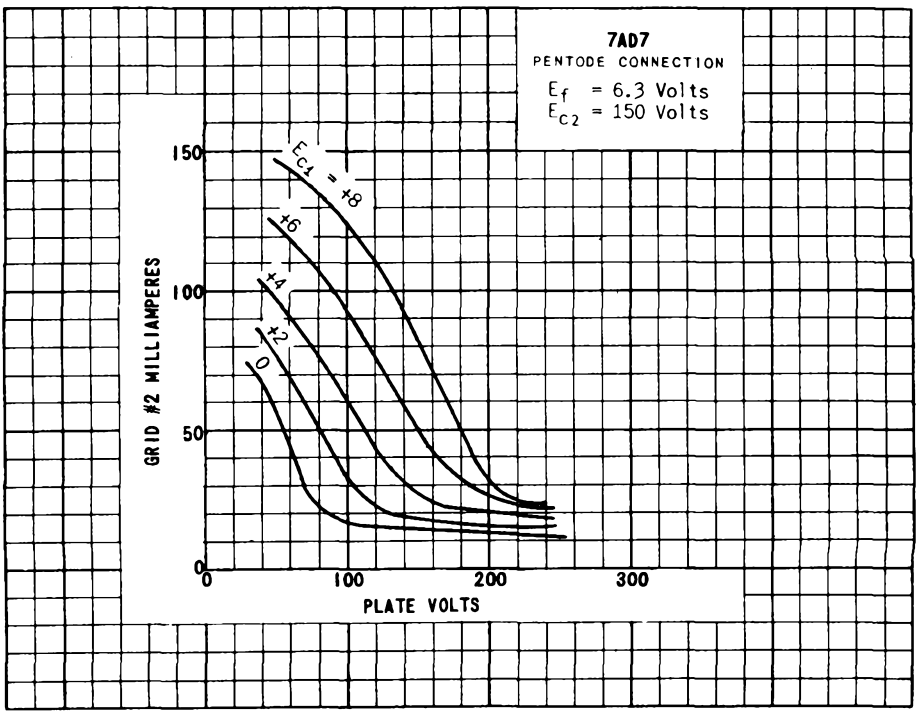


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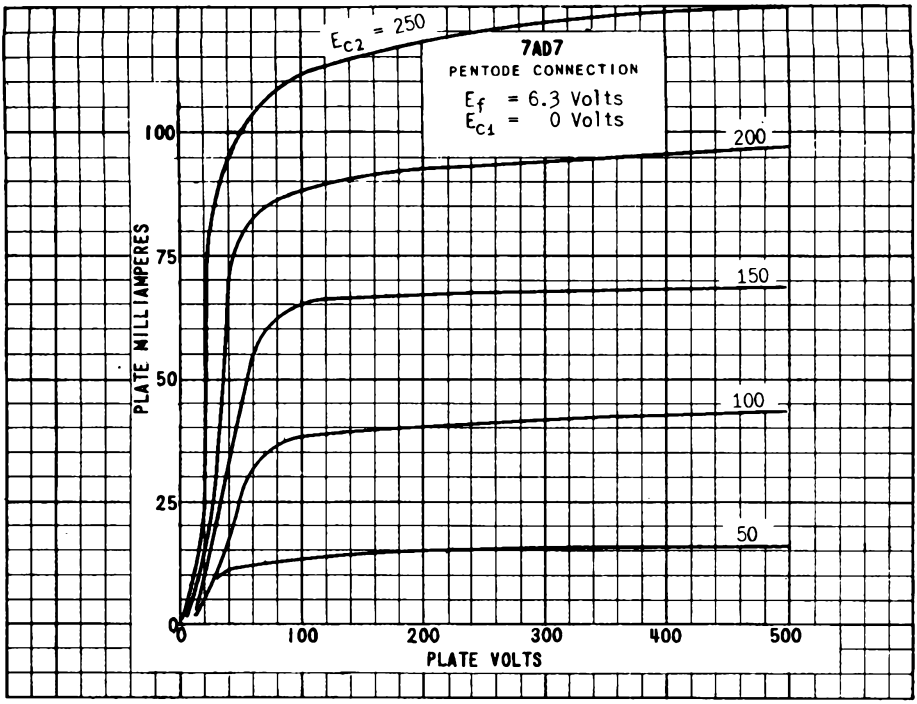
PLATE 2101
NOV. 1, 1948

7AD7



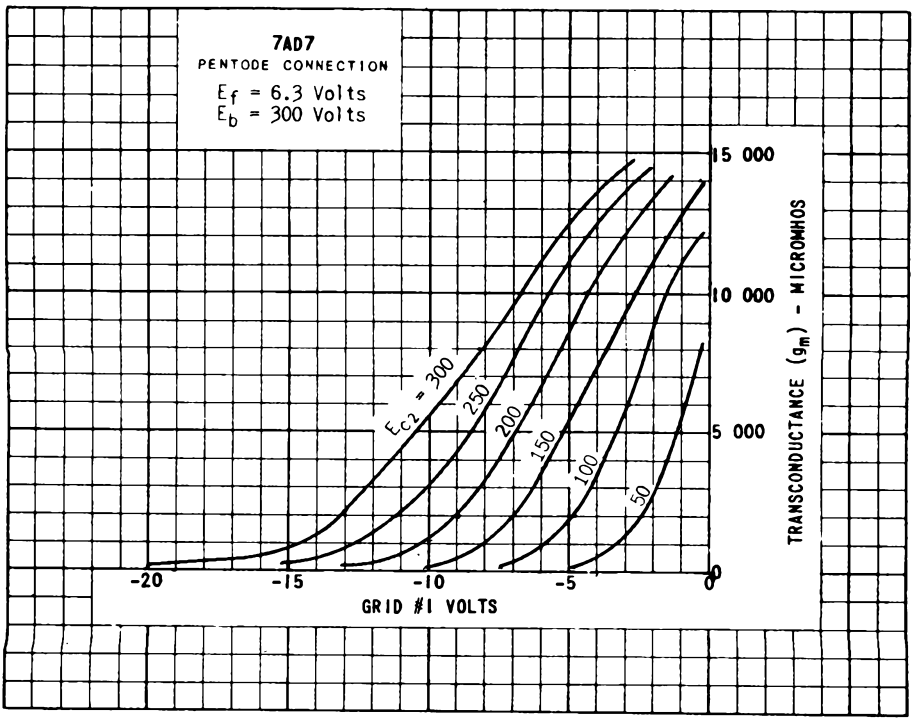


PLATE 2102
NOV. 1, 1948

TUNG-SOL

SHARP CUT-OFF PENTODE AMPLIFIER

PHYSICAL SPECIFICATIONS

EMITTER	COATED UNIPOT. CATHODE	PIN CONNECTIONS	
BASE	LOCK-IN 8 PIN	PIN 1 HEATER	PIN 7 CATHODE
CAP	---	PIN 2 PLATE	PIN 8 HEATER
BULB	T-9	PIN 3 GRID 2	
MAXIMUM DIAMETER	1 3/16"	PIN 4 GRID 3	MOUNTING POS. ANY
MAXIMUM OVERALL LENGTH	2 25/32"	PIN 5 S_1	
MAXIMUM SEATED HEIGHT	2 1/4"	PIN 6 GRID 1	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (NOMINAL)	7.0	VOLTS
HEATER OR FILAMENT CURRENT (NOMINAL)	0.160	AMP.
MAXIMUM PLATE VOLTAGE (DC)	300	VOLTS
MAXIMUM SCREEN VOLTAGE (DC)	300	VOLTS
MAXIMUM PLATE DISSIPATION	2.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.75	WATT
MINIMUM EXTERNAL CONTROL GRID VOLTAGE (DC)	-1.0	VOLTS

CAPACITANCES

RMA SHIELD M8-308 CONNECTED TO CATHODE

CONTROL GRID TO CATHODE	7.0	μμf
PLATE TO CATHODE	6.0	μμf
CONTROL GRID TO PLATE (MAX.)	0.005	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER OR FILAMENT VOLTAGE	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.150	AMP.
PLATE VOLTAGE (DC)	250	VOLTS
SCREEN VOLTAGE (DC)	250	VOLTS
CONTROL GRID VOLTAGE		VOLTS
SUPPRESOR VOLTAGE	CONNECTED TO CATHODE AT SOCKET	
CATHODE BIAS RESISTOR	250	OHMS
PLATE CURRENT (DC)	6.0	MA.
SCREEN CURRENT (DC)	2.0	MA.
MAXIMUM-SIGNAL SCREEN CURRENT		MA.
PLATE RESISTANCE	0.75	MEGOHM
TRANSCONDUCTANCE	4200	μMHOS
AMPLIFICATION FACTOR		
LOAD RESISTANCE		OHMS
TOTAL HARMONIC DISTORTION		PER CENT
POWER OUTPUT		WATTS
CONTROL GRID VOLTAGE (DC) FOR I_b = 10 μA (DC)	-10	VOLTS

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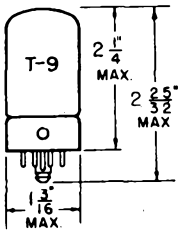
PLATE 1707
APRIL 15 1946

TUNG-SOL

HIGH MU-TRIODE

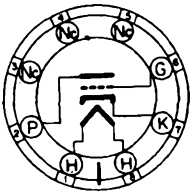


COATED UNIPOTENTIAL CATHODE
6.3 VOLTS 0.30 AMPERES
AC OR DC

In circuits where the cathode is not directly connected to the heater, the potential difference between heater and cathode should be kept as low as possible.

GLASS BULB

ANY MOUNTING POSITION



BOTTOM VIEW
LOCKING-IN 8 PIN BASE

THE 7B4 IS A GENERAL PURPOSE HIGH MU TRIODE USING THE LOCK-IN CONSTRUCTION AND IS SIMILAR TO THE 6F5GT SERIES. IT IS USEFUL AS A HIGH GAIN RESISTANCE COUPLED AUDIO AMPLIFIER.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	7.0	VOLTS
HEATER CURRENT	0.32	AMPERE
MAXIMUM PLATE VOLTAGE	300	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH M8-308 TUBE SHIELD CONNECTED TO CATHODE

GRID PLATE	1.6	μμF
INPUT	3.6	μμF
OUTPUT	3.4	μμF

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1	-2	VOLTS
PLATE CURRENT	0.4	0.9	MA.
PLATE RESISTANCE	85 000	66 000	OHMS
TRANSCONDUCTANCE	1 150	1 500	μMHOS
AMPLIFICATION FACTOR	100	100	

SIMILAR TYPE REFERENCE: *Same ratings, characteristics and application as types 6P5, 6P5G, 6P5GT, 6SP5, 6SP5GT. Somewhat similar to triode section of type 75.*

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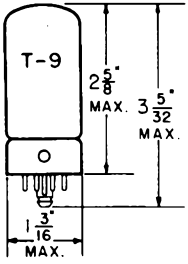
PLATE 1587
JULY 31, 1945

TUNG-SOL

PENTODE POWER AMPLIFIER



COATED UNIPOTENTIAL CATHODE

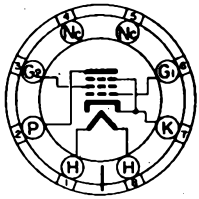
6.3 VOLTS 0.4 AMPERE

AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE.

GLASS BULB

ANY MOUNTING POSITION



BOTTOM VIEW

LOCKING IN 8 PIN BASE

THE 7B5 IS A POWER AMPLIFIER PENTODE USING THE LOCK-IN CONSTRUCTION AND IS SIMILAR TO TYPE 6K6GT/G. IT IS PARTICULARLY USEFUL FOR SERVICE IN THE OUTPUT STAGE OF STORAGE BATTERY OF AC OPERATED RECEIVERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	315	VOLTS
MAXIMUM SCREEN VOLTAGE	285	VOLTS
MAXIMUM PLATE DISSIPATION	8.5	WATTS
MAXIMUM SCREEN DISSIPATION	2.8	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	315	VOLTS
SCREEN VOLTAGE	100	250	250	VOLTS
CONTROL GRID VOLTAGE[A]	-7	-18	-21	VOLTS
PEAK AF SIGNAL VOLTAGE	7	18	21	VOLTS
ZERO SIGNAL PLATE CURRENT	9	32	25.5	MA.
ZERO SIGNAL SCREEN CURRENT	1.6	5.5	4	MA.
MAXIMUM SIGNAL PLATE CURRENT	9.5	33	28	MA.
MAXIMUM SIGNAL SCREEN CURRENT	3	10	9	MA.
PLATE RESISTANCE (APPROX.)	104 000	68 000	75 000	OHMS
TRANSCONDUCTANCE	1 500	2 300	2 100	μMHOS
LOAD RESISTANCE	12 000	7 600	9 000	OHMS
TOTAL HARMONIC DISTORTION	11	11	15	PER CENT
POWER OUTPUT (MAX. SIGNAL)	0.35	3.4	4.5	WATTS

[A] FIXED BIAS MAY BE USED FOR A RESISTANCE IN THE GRID CIRCUITS UP TO .1 MEGOHM. WITH CATHODE BIAS THE GRID CIRCUIT MAY HAVE A RESISTANCE NOT EXCEEDING 1.0 MEGOHM.

SIMILAR TYPE REFERENCE: *Same characteristics and operating conditions as types 41, 6K6G, 6K6GT, 6K6GT/G.*

PLATE 1588
JULY 31, 1945

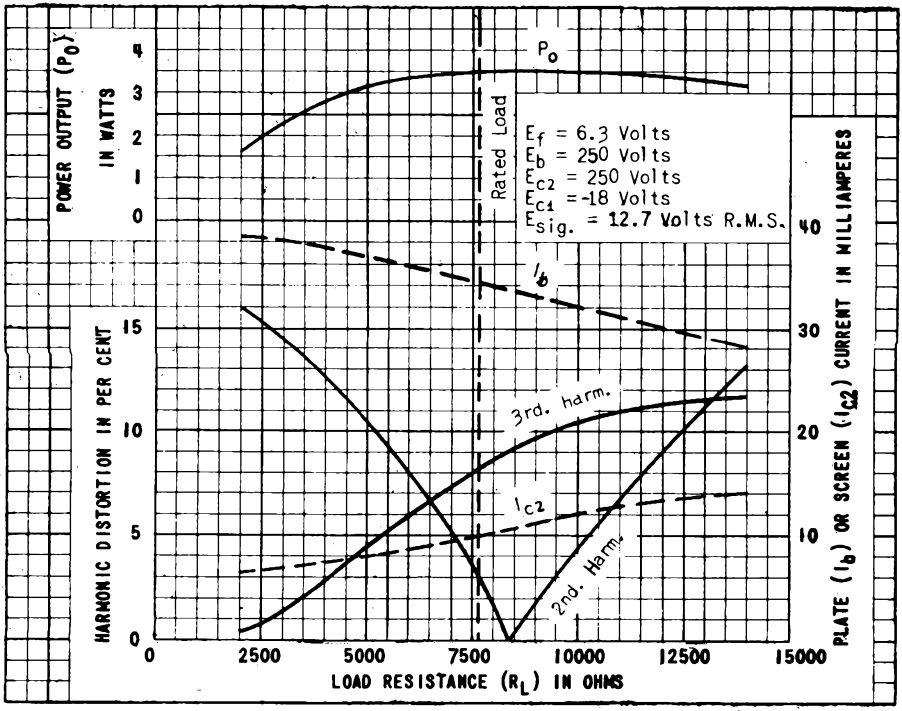
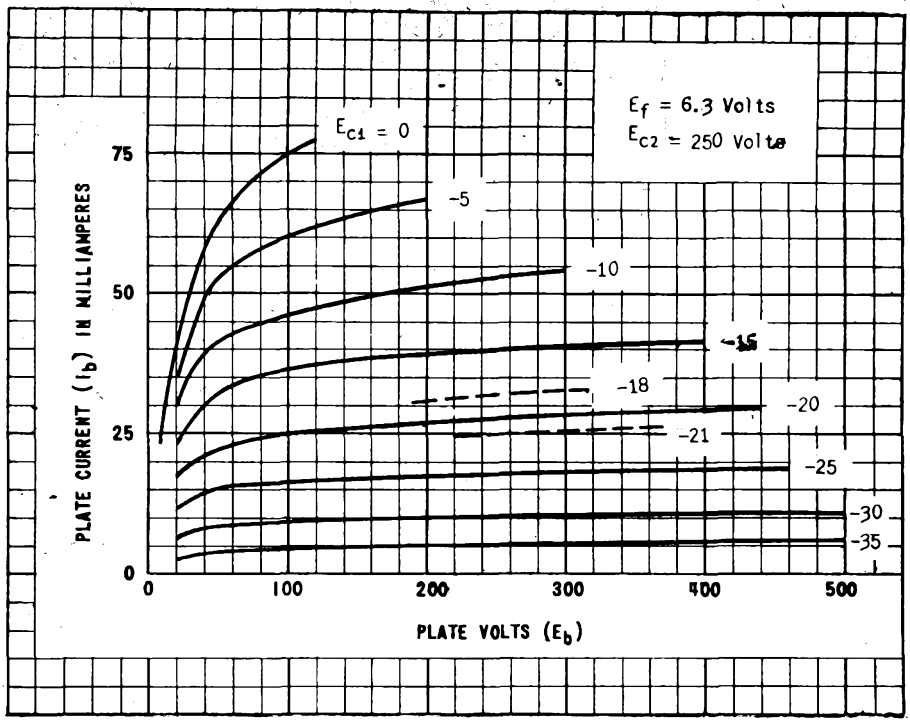


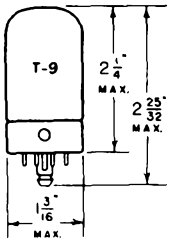
PLATE 1589
JULY 31, 1945

7B5


E_f = 6.3 Volts
E_{c2} = 250 Volts
E_{c1} = 0
-5
-10
-15
-18
-20
-21
-25
-30
-35
PLATE CURRENT (I_b) IN MILLIAMPERES
75
50
25
0
0
100
200
300
400
500
PLATE VOLTS (E_b)

TUNG-SOL

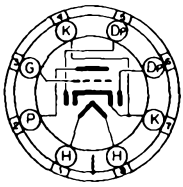
DUO-DIODE
HIGH-MU TRIODE AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



8W

BOTTOM VIEW

8 PIN LOCKING-IN BASE

THE TUNG-SOL 7B6 CONSISTS OF TWO DIODES AND A HIGH-MU TRIODE WITH A COMMON CATHODE. IT IS DESIGNED FOR SERVICE AS A DIODE DETECTOR, AVC RECTIFIER AND AN IMPEDANCE OR RESISTANCE COUPLED AMPLIFIER. ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6SQ7GT, 12SQ7GT, 75 AND THE 2A6.

RATINGS

NOMINAL HEATER VOLTAGE	7.0	VOLTS
NOMINAL HEATER CURRENT	0.32	AMP.
MAXIMUM PLATE VOLTAGE	250	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	−2	VOLTS
PLATE CURRENT	0.9	MA.
PLATE RESISTANCE	91000	OHMS
TRANSCONDUCTANCE	1100	μMHOS
AMPLIFICATION FACTOR	100	

DIODE UNITS - TWO

MINIMUM DIODE CURRENT PER PLATE WITH 10 VOLTS DC APPLIED	0.8	MA.

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PLATE 820-1

AUG. 30 1940

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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7B6

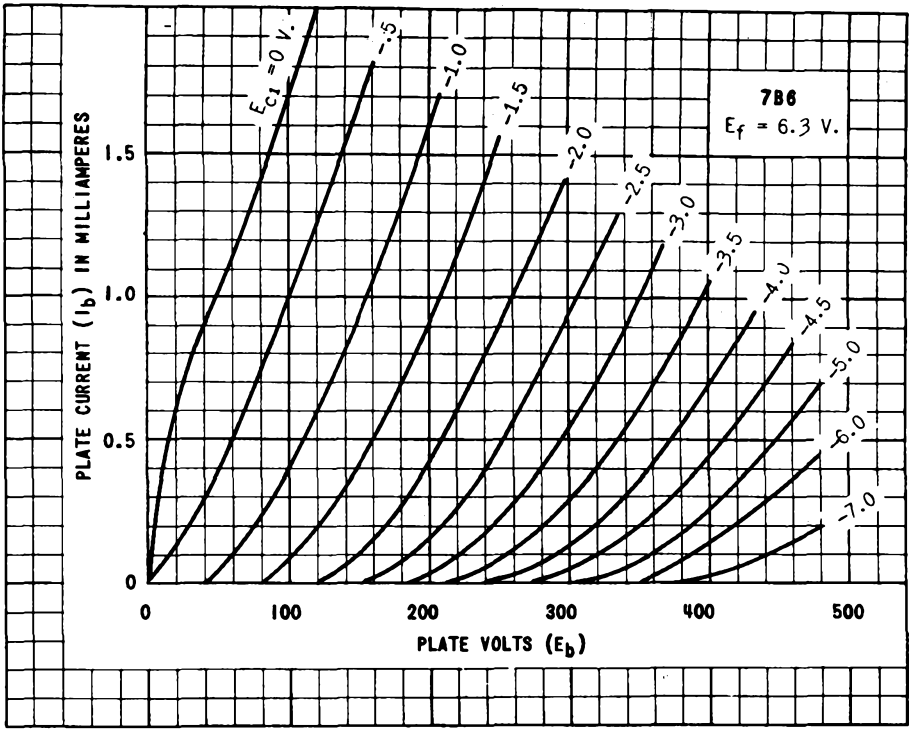
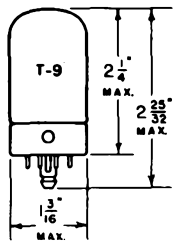


PLATE
821-1

TUNG-SOL

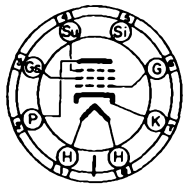
TRIPLE GRID

REMOTE CUT-OFF AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC



8V
BOTTOM VIEW

GLASS BULB

8 PIN LOCKING-IN BASE

THE TUNG-SOL 7B7 IS A TRIPLE GRID REMOTE CUT-OFF AMPLIFIER. IT IS SUITABLE FOR USE WITH AVC IN RF AND IF AMPLIFIERS.

RATINGS

NOMINAL HEATER VOLTAGE	7.0	VOLTS
NOMINAL HEATER CURRENT	0.16	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM PLATE DISSIPATION	2.25	WATTS
MAXIMUM SCREEN DISSIPATION	0.25	WATT
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLT

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID TO CATHODE	5.0	μμf
PLATE TO CATHODE	6.0	μμf
CONTROL GRID TO PLATE	0.007 MAX.	μμf

[S] WITH AN EXTERNAL SHIELD CONNECTED TO CATHODE

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 822-1

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TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	-3	-3	VOLTS
SUPPRESSOR GRID AND PIN #5 CONNECTED TO CATHODE AT SOCKET			
PLATE CURRENT	8.2	8.5	MA.
SCREEN CURRENT	1.8	1.7	MA.
PLATE RESISTANCE	0.3	0.75	MEGOHM
TRANSCONDUCTANCE	1675	1750	μMHOS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 10 μMHOS	-40	-40	VOLTS

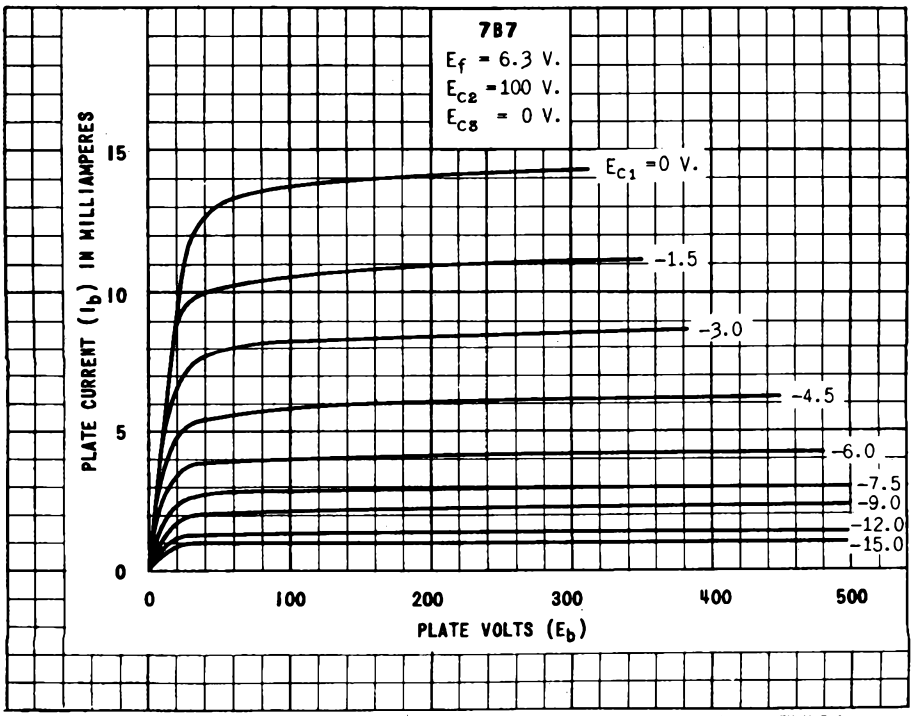
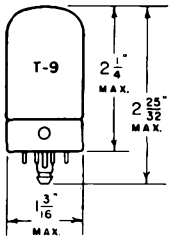


PLATE 823-1

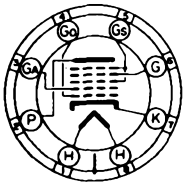
PENTAGRID CONVERTER



UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



8X
BOTTOM VIEW

LOCKING-IN 8 PIN BASE

THE TUNG-SOL 7B8 IS A PENTAGRID CONVERTER DESIGNED FOR SERVICE IN AC, AC-DC AND STORAGE BATTERY OPERATED RECEIVERS. ITS APPLICATIONS AND ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6A8, 6A8G AND 6A8GT.

RATINGS

NOMINAL HEATER VOLTAGE	7.0	VOLTS
NOMINAL HEATER CURRENT	0.32	AMPERE
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN (Gs) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN (Gs) VOLTAGE	100	VOLTS
MINIMUM EXTERNAL CONTROL GRID (G) BIAS VOLTAGE	0	VOLTS
MAXIMUM OSCILLATOR ANODE (Ga) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM OSCILLATOR ANODE (Ga) VOLTAGE	200	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	0.3	WATT
MAXIMUM OSCILLATOR ANODE (Ga) DISSIPATION	.75	WATT

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CONTINUED NEXT PAGE

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PLATE
1130-2
SEPT. 17
1941

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES[5]

CONTROL GRID (G) TO MIXER (P)	0.2 MAX.	μμf
CONTROL GRID (G) TO OSCILLATOR ANODE (G_A)	0.2 MAX.	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (G_0)	0.2 MAX.	μμf
OSCILLATOR GRID (G_0) TO OSCILLATOR ANODE (G_A)	0.9	μμf
RF INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES	10	μμf
OSCILLATOR INPUT: OSCILLATOR GRID (G_0) TO ALL OTHER ELECTRODES	5.0	μμf
OSCILLATOR OUTPUT: OSCILLATOR ANODE (G_A) TO ALL OTHER ELECTRODES	3.4	μμf
MIXER OUTPUT: MIXER PLATE (P) TO ALL OTHER ELECTRODES	9.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	0.3	0.3	AMPERE
PLATE (P) VOLTAGE	100	250	VOLTS
SCREEN (G_S) VOLTAGE	50	100	VOLTS
CONTROL GRID (G) VOLTAGE	−1.5	−3	VOLTS
OSCILLATOR ANODE (G_A) SUPPLY VOLTAGE[A]	−	250	VOLTS
OSCILLATOR ANODE (G_A) VOLTAGE	100	−	VOLTS
OSCILLATOR GRID (G_0) RESISTOR	50 000	50 000	OHMS
PLATE CURRENT	1.1	3.5	MA.
SCREEN CURRENT	1.3	2.7	MA.
OSCILLATOR ANODE CURRENT	2.0	4.0	MA.
TOTAL CATHODE CURRENT	4.6	10.6	MA.
PLATE RESISTANCE APPROX.	0.6	0.36	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −1.5 V.	360	−	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −3 V.	180	550	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −6 V.	50	325	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −10 V.	−	100	μMHOS
CONVERSION TRANCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = −20 V.	3	−	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = −35 V.	−	6	μMHOS

[A] APPLIED THROUGH A PROPERLY BY-PASSED 20000 OHM DROPPING RESISTOR.

[5] WITH EXTERNAL SHIELD CONNECTED TO CATHODE.

NOTE: THE TRANSCONDUCTANCE OF THE OSCILLATOR SECTION (NOT OSCILLATING) IS APPROXIMATELY 1150 UMHOS, THE AMPLIFICATION FACTOR IS 75 AND THE OSCILLATOR ANODE CURRENT IS 4.0 MA. CONDITIONS: PLATE VOLTAGE = 250 V., OSCILLATOR ANODE VOLTAGE = 100 V., SCREEN VOLTAGE = 55 V., CONTROL GRID VOLTAGE = −2.0 V., AND THE OSCILLATOR GRID VOLTAGE = −1.0 V.

PLATE 1131-1

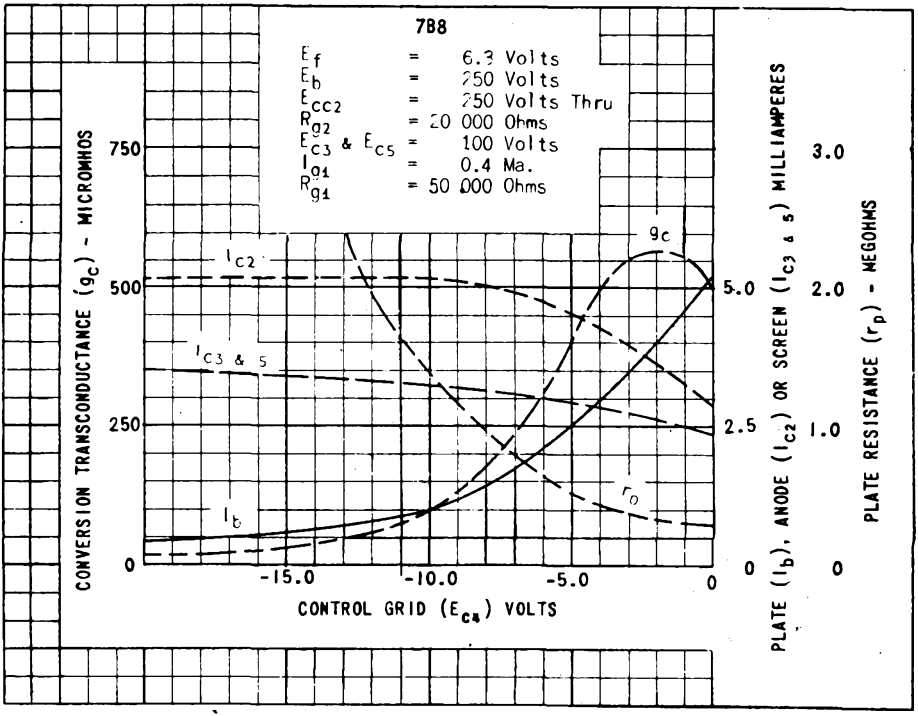
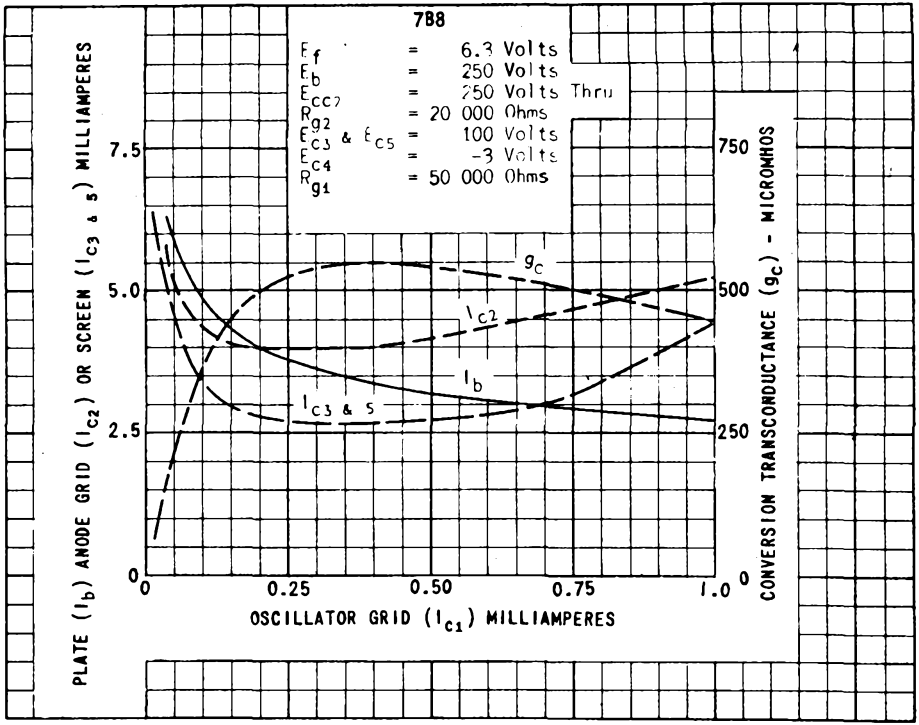


PLATE
2000
APRIL 1
1948


7B8
E_f = 6.3 Volts
E_b = 250 Volts
E_{cc7} = 250 Volts Thru
R_{g2} = 20 000 Ohms
E_{c3} & E_{c5} = 100 Volts
E_{c4} = -3 Volts
R_{g1} = 50 000 Ohms
g_c
I_{c2}
I_b
$I_{c3\ \&\ 5}$
PLATE (I_b) ANODE GRID (I_{c2}) OR SCREEN ($I_{c3\ \&\ 5}$) MILLIAMPERES
CONVERSION TRANSCONDUCTANCE (g_c) - MICROMHOS
OSCILLATOR GRID (I_{c1}) MILLIAMPERES
0
2.5
5.0
7.5
250
500
750
0.25
0.50
0.75
1.0

7B8

E_f	=	6.3 Volts
E_b	=	100 Volts
E_{c2}	=	100 Volts
E_{c3} & E_{c5}	=	50 Volts
I_{g1}	=	0.25 Ma.
R_{g1}	=	50 000 Ohms

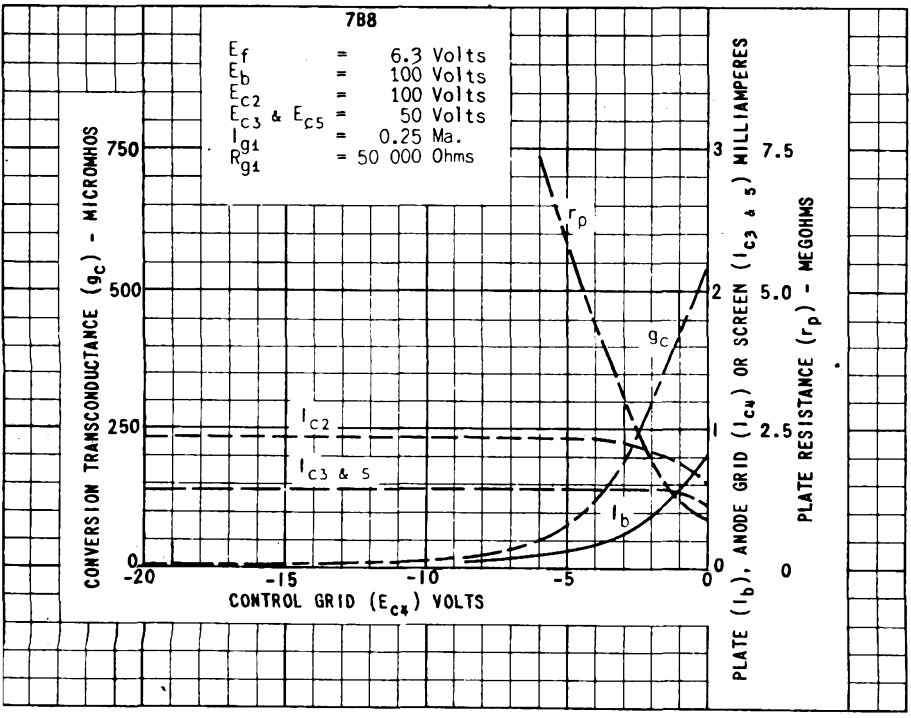


PLATE
2001
APRIL 1
1948

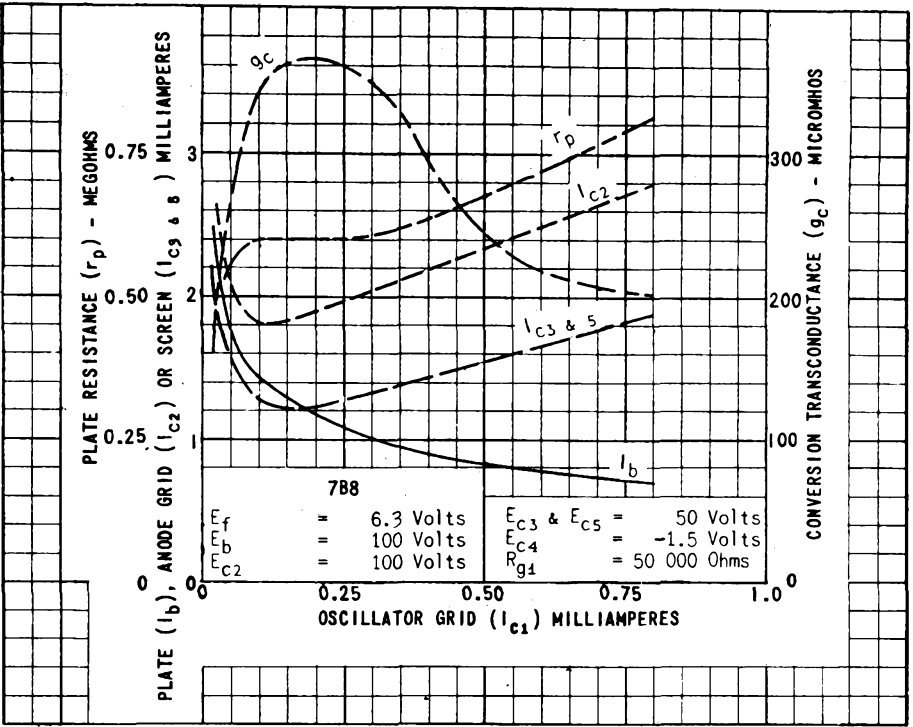
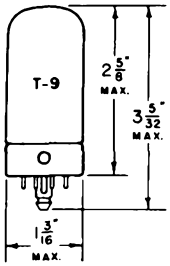


PLATE RESISTANCE (r_p) - MEGOHMS
PLATE (I_b), ANODE GRID (I_{c2}) OR SCREEN ($I_{c3\ \&\ 5}$) MILLIAMPERES
CONVERSION TRANSCONDUCTANCE (g_c) - MICROMHOS
OSCILLATOR GRID (I_{c1}) MILLIAMPERES
0.75
0.50
0.25
0
3
2
1
0
300
200
100
0
0.25
0.50
0.75
1.0
g_c
r_p
I_{c2}
$I_{c3\ \&\ 5}$
I_b
7B8
E_f = 6.3 Volts
E_b = 100 Volts
E_{c2} = 100 Volts
E_{c3} & E_{c5} = 50 Volts
E_{c4} = -1.5 Volts
R_{g1} = 50 000 Ohms

TUNG-SOL

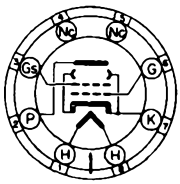


BEAM POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.45 AMPERE
AC OR DC

GLASS BULB



6AA

BOTTOM VIEW

LOCKING – IN 8 PIN BASE

THE TUNG-SOL 7C5 IS A BEAM POWER AMPLIFIER, DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AC AND STORAGE BATTERY OPERATED RECEIVERS. IT HAS HIGH POWER SENSITIVITY AND HIGH POWER OUTPUT WITH COMPARATIVELY LOW SUPPLY VOLTAGES.

RATINGS

NOMINAL HEATER VOLTAGE	7	VOLTS
NOMINAL HEATER CURRENT	0.48	AMPERE
MAXIMUM PLATE VOLTAGE	315	VOLTS
MAXIMUM SCREEN VOLTAGE	285	VOLTS
MAXIMUM PLATE DISSIPATION	12	WATTS
MAXIMUM SCREEN DISSIPATION	2	WATTS

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE
1088-2

JULY 28
1941

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

SINGLE TUBE CLASS A1 AMPLIFIER

HEATER VOLTAGE (AC OR DC)	6.3	6.3	6.3	VOLTS
HEATER CURRENT	0.45	0.45	0.45	AMPERE
PLATE VOLTAGE[A]	180	250	315	VOLTS
SCREEN VOLTAGE	180	250	225	VOLTS
CONTROL GRID VOLTAGE	-8.5	-12.5	-13	VOLTS
PEAK AF SIGNAL VOLTAGE	8.5	12.5	13	VOLTS
ZERO SIGNAL PLATE CURRENT	29	45	34	MA.
ZERO SIGNAL SCREEN CURRENT (NOMINAL)	3	4.5	2.2	MA.
MAXIMUM SIGNAL PLATE CURRENT	30	47	35	MA.
MAXIMUM SIGNAL SCREEN CURRENT (NOMINAL)	4	7	6	MA.
PLATE RESISTANCE APPROX.	58000	52000	77000	OHMS
TRANSCONDUCTANCE	3700	4100	3750	μMHOS
LOAD RESISTANCE	5500	5000	8500	OHMS
TOTAL HARMONIC DISTORTION	8	8	12	PER CENT
POWER OUTPUT	2.0	4.5	5.5	WATTS

PUSH PULL CLASS A1 AMPLIFIER

VALUES FOR TWO TUBES UNLESS OTHERWISE SPECIFIED

PLATE VOLTAGE	250	285	VOLTS
SCREEN VOLTAGE	250	285	VOLTS
CONTROL GRID VOLTAGE[A]	-15	-19	VOLTS
PEAK AF SIGNAL VOLTAGE (GRID TO GRID)	30	38	VOLTS
ZERO SIGNAL PLATE CURRENT	70	70	MA.
ZERO SIGNAL SCREEN CURRENT (NOMINAL)	5.0	4.0	MA.
MAXIMUM SIGNAL PLATE CURRENT	79	92	MA.
MAXIMUM SIGNAL SCREEN CURRENT (NOMINAL)	13	13.5	MA.
PLATE RESISTANCE APPROX.	66000	65000	OHMS
TRANSCONDUCTANCE	3750	3600	μMHOS
EFFECTIVE LOAD RESISTANCE (PLATE TO PLATE)	10000	8000	OHMS
TOTAL HARMONIC DISTORTION	5	3.5	PER CENT
POWER OUTPUT	10	14	WATTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER MAXIMUM RATED CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION.

PLATE 1089-1

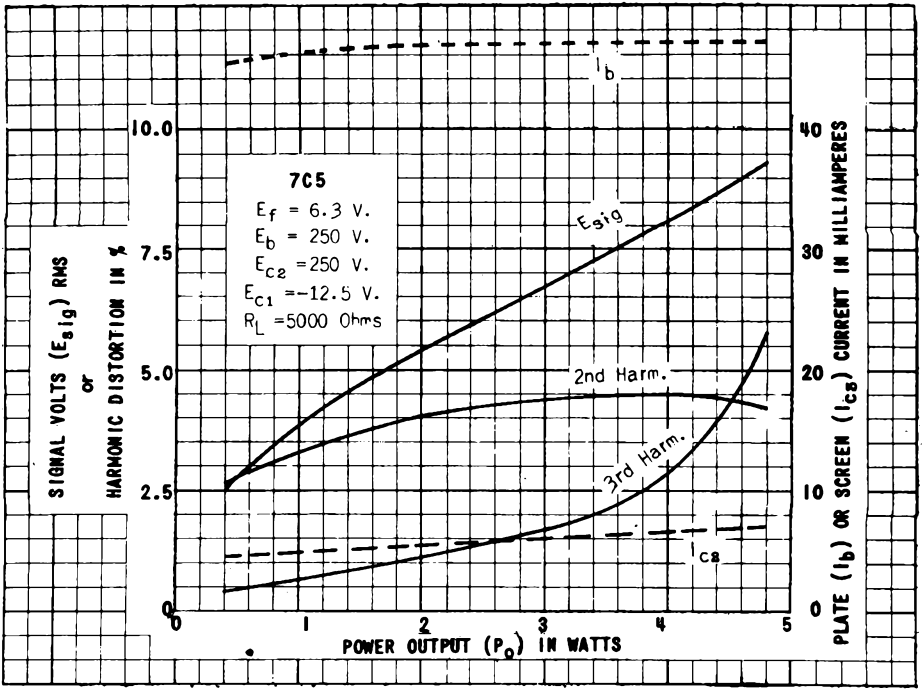

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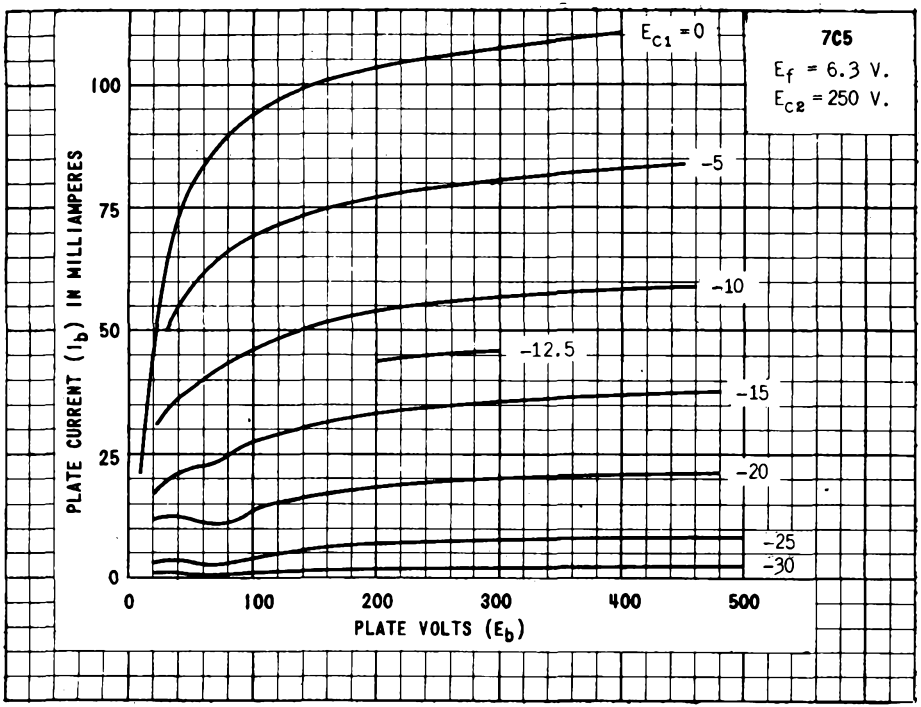
PLATE
1090-1

JULY 28
1941


7C5
E_f = 6.3 V.
E_{c2} = 250 V.
E_{c1} = 0
-5
-10
-12.5
-15
-20
-25
-30
PLATE CURRENT (I_b) IN MILLIAMPERES
0
25
50
75
100
0
100
200
300
400
500
PLATE VOLTS (E_b)

7C5

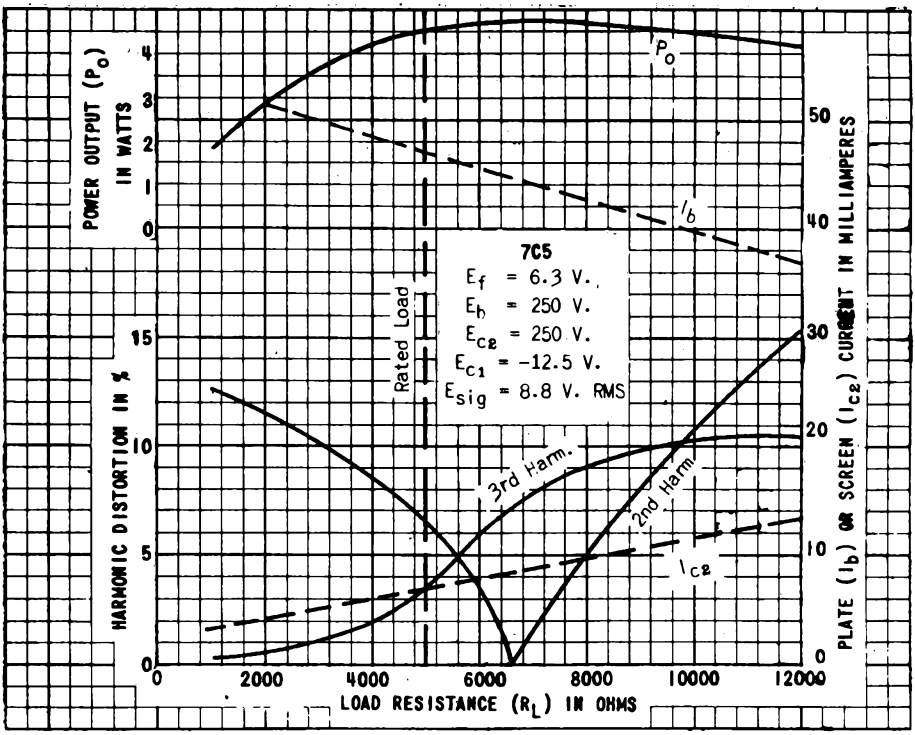
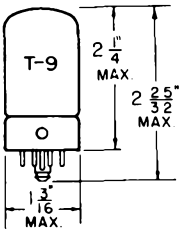


PLATE
1091-1

TUNG-SOL

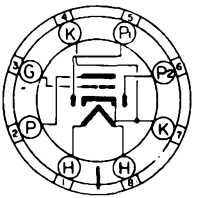
DOUBLE DIODE TRIODE



COATED UNIPOTENTIAL CATHODE

6.3 VOLTS 0.150 AMPERES
AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE.



BOTTOM VIEW
LOCKING IN 8 PIN BASE

GLASS BULB

ANY MOUNTING POSITION

THE 7C6 IS A DOUBLE DIODE HIGH MU TRIODE USING THE LOCK-IN CONSTRUCTION. IT IS DESIGNED FOR SERVICE AS A DETECTOR AND HIGH GAIN AUDIO AMPLIFIER. IT FEATURES A LOW DRAIN HEATER.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	300	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3		6.3		VOLTS
PLATE SUPPLY VOLTAGE	100		300		VOLTS
GRID LEAK	10		10		MEGOHMS
LOAD RESISTANCE	0.25		0.25		MEGOHM
COUPLING CAPACITOR	.01	TO .005	.01	TO .005	µµF
GRID RESISTOR FOR FOLLOWING TUBE	.5	1.0	0.5	1.0	MEGOHM
EXTERNAL GRID CIRCUIT IMPEDANCE	0	0	0	0	MEGOHM
VOLTAGE GAIN	38	42	54	56	
VOLTAGE OUTPUT (RMS)	5	6	37	43	VOLTS
TOTAL HARMONIC DISTORTION	5	5	5	5	PER CENT

AVERAGE CHARACTERISTICS

TRIODE UNIT

PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	0	-1	VOLTS
AMPLIFICATION FACTOR	85	100	
PLATE RESISTANCE	0.1	0.1	MEGOHM
TRANSCONDUCTANCE	850	1,000	µMHOS
PLATE CURRENT	1.0	1.3	MA

CONTINUED ON FOLLOWING PAGE.

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PLATE 1590
JULY 31, 1945

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

DIODE UNITS

TWO

DIODE CURRENT PER PLATE WITH 10 VOLTS DC APPLIED	1.0	MA.

SIMILAR TYPE REFERENCE: *Characteristics similar to type 75. Diode section similar to types 2B7, 6B7, 6B8G, 85, 55.*

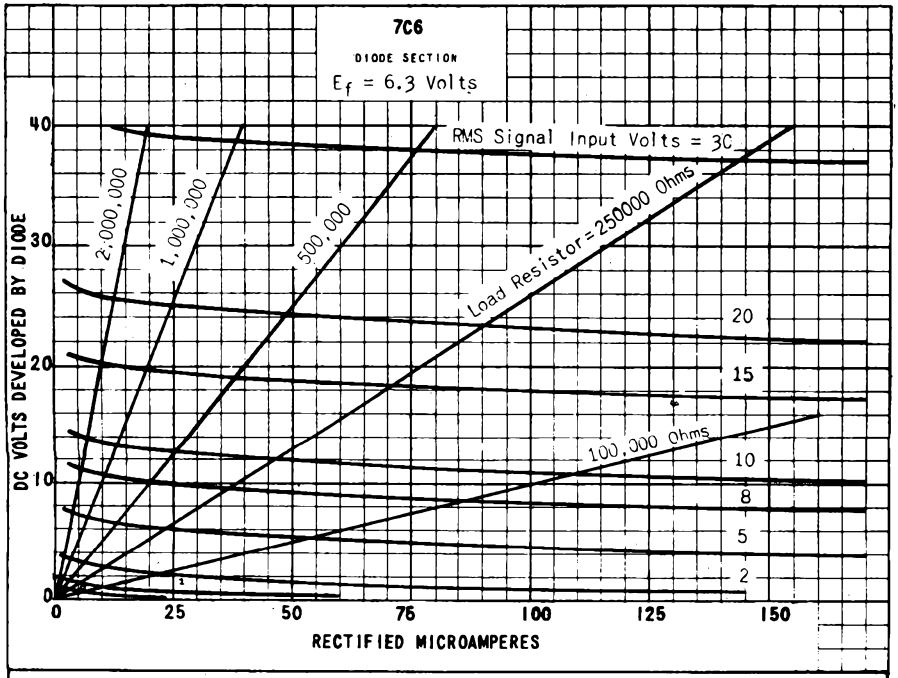
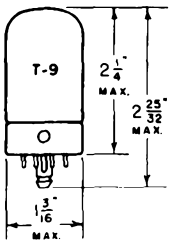


PLATE 1591
JULY 31, 1945

TUNG-SOL

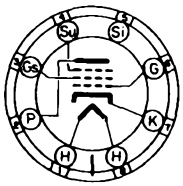
TRIPLE GRID
DETECTOR AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB



8V

BOTTOM VIEW

8 PIN LOCKING-IN BASE

THE TUNG-SOL 7C7 IS A TRIPLE GRID GENERAL PURPOSE DETECTOR AMPLIFIER. ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6W7G.

RATINGS

NOMINAL HEATER VOLTAGE	7.0	VOLTS
NOMINAL HEATER CURRENT	0.16	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLT
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	0.1	WATT

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID TO CATHODE	5.5	μμf
PLATE TO CATHODE	6.5	μμf
CONTROL GRID TO PLATE	0.007 MAX.	μμf

[S] WITH AN EXTERNAL SHIELD CONNECTED TO CATHODE

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

PLATE
831-1

AUG. 30
1940

CONTINUED NEXT PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

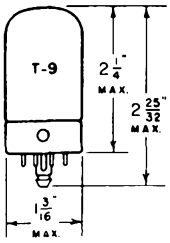
CLASS A1 AMPLIFIER

PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE	100	VOLTS
CONTROL GRID VOLTAGE	-3	VOLTS
SUPPRESSOR GRID AND PIN #5 CONNECTED TO CATHODE AT SOCKET		
PLATE CURRENT	2.0	MA.
SCREEN CURRENT	0.5	MA.
PLATE RESISTANCE APPROX.	2.0	MEGOHMS
TRANSCONDUCTANCE	1300	μMHOS
CONTROL GRID VOLTAGE FOR CATHODE CURRENT CUT-OFF	-7	VOLTS

PLATE
832-1

TUNG-SOL

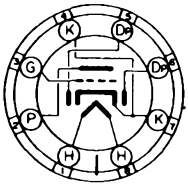
DUO-DIODE TRIODE AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



8W
BOTTOM VIEW

LOCKING-IN 8 PIN BASE

THE TUNG-SOL 7E6 CONSISTS OF TWO DIODES AND A TRIODE IN A SINGLE BULB, WITH A COMMON CATHODE. IT IS DESIGNED FOR SERVICE AS A DIODE DETECTOR, AVC RECTIFIER AND AN AUDIO AMPLIFIER. ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 6R7G AND THE 6R7GT.

RATINGS

HEATER VOLTAGE – NOMINAL	7.0	VOLTS
HEATER CURRENT – NOMINAL	0.32	AMPERE
MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MINIMUM DIODE CURRENT PER PLATE WITH 10 VOLTS DC APPLIED	0.8	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-9	VOLTS
PLATE CURRENT	9.5	MA.
PLATE RESISTANCE	8500	OHMS
TRANSCONDUCTANCE	1900	μMHOS
AMPLIFICATION FACTOR	16	

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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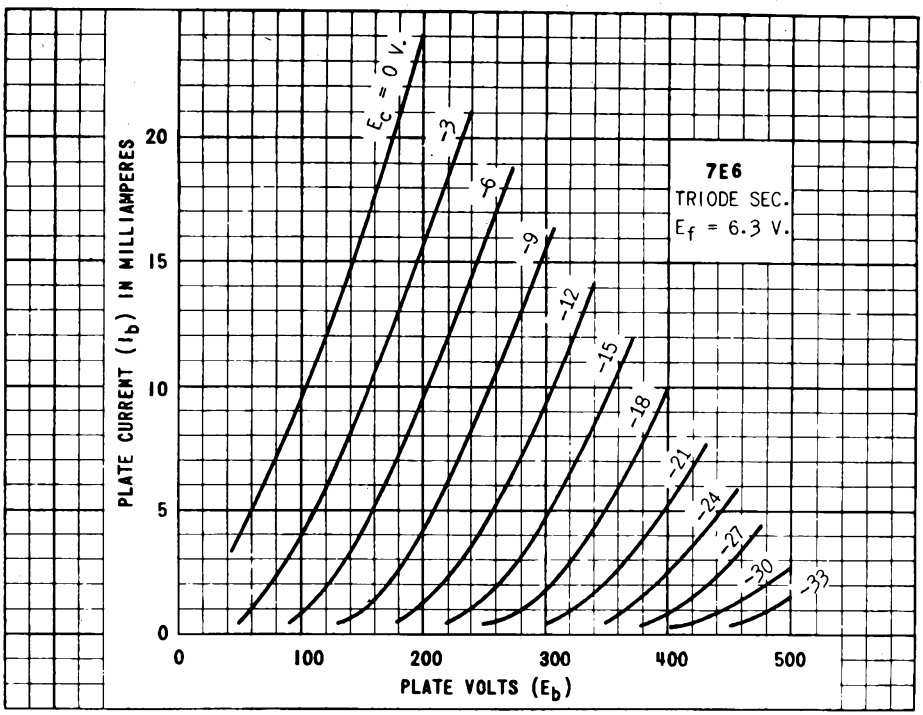
PLATE 854-1
SEPT. 23 1940

7E6



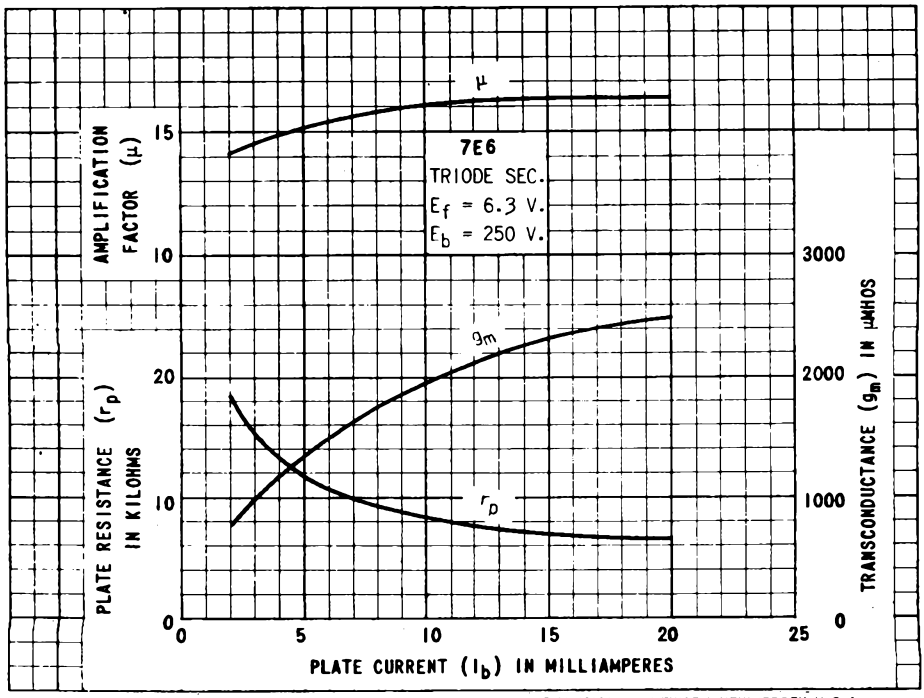
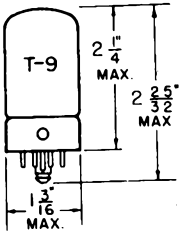


PLATE 855-1

TUNG-SOL

DOUBLE DIODE PENTODE



COATED UNIPOTENTIAL CATHODE

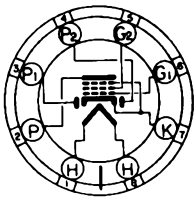
6.3 VOLTS 0.3 AMPERE

AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE.

GLASS BULB

ANY MOUNTING POSITION



BOTTOM VIEW

LOCKING IN 8 PIN BASE

THE 7E7 IS A DOUBLE DIODE REMOTE CUT-OFF PENTODE USING THE LOCK-IN CONSTRUCTION WITH CHARACTERISTICS SIMILAR TO TYPE 6B8GT. IT IS USEFUL AS A COMBINED DETECTOR, AVC RECTIFIER, AND EITHER RF, IF, OR AUDIO AMPLIFIER.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	2.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.4	WATT
MINIMUM EXTERNAL CONTROL GRID BIAS VOLTAGE	0	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH M8-308 TUBE SHIELD CONNECTED TO CATHODE

GRID TO PLATE	0.005 MAX.	μμF
INPUT	4.6	μμF
OUTPUT	4.6	μμF
COUPLING: DIODE #1 TO GRID #1	0.013 MAX.	μμF
COUPLING: DIODE #2 TO GRID #1	0.003 MAX.	μμF

CONTINUED NEXT PAGE

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PLATE 1592

JULY 31, 1943

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
GRID VOLTAGE	-1.0	-3.0	VOLTS
PLATE RESISTANCE (APPROX.)	0.15	0.7	MEGOHMS
TRANSCONDUCTANCE	1 600	1 300	µMHOS
PLATE CURRENT	10	7.5	MA.
SCREEN CURRENT	2.7	1.6	MA.
GRID BIAS (FOR S_M=2 µMHOS)	-36	-42.5	VOLTS

DIODE UNITS: TWO

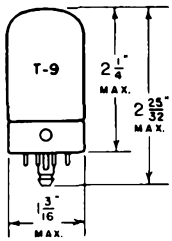
MINIMUM DIODE CURRENT PER PLATE WITH 10 VOLTS DC APPLIED	0.8	MA.
MAXIMUM DIODE CURRENT PER PLATE FOR CONTINUOUS OPERATION	1.0	MA.

SIMILAR TYPE REFERENCE: *Characteristics similar to types 2B7, 6B7, 6B8G. Application same in general as for other duo-diode high gain pentodes.*

PLATE 1593
JULY 31, 1945

TUNG-SOL

TWIN HIGH-MU
TRIODE AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

8AC
BOTTOM VIEW

GLASS BULB

LOCKING-IN 8 PIN BASE

THE TUNG-SOL 7F7 CONSISTS OF TWO INDEPENDENT HIGH-MU TRIODE SECTIONS. AS ALL ELECTRODES ARE BROUGHT OUT TO SEPARATE PIN CONNECTIONS, CONSIDERABLE FLEXIBILITY IS POSSIBLE IN ITS APPLICATION.

RATINGS

HEATER VOLTAGE — NOMINAL	7.0	VOLTS
HEATER CURRENT — NOMINAL	0.32	AMPERE
MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION PER SECTION	1	WATT
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

VALUES ARE FOR EACH TRIODE SECTION

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-2	VOLTS
PLATE CURRENT	2.3	MA.
PLATE RESISTANCE APPROX.	44000	OHMS
TRANSCONDUCTANCE	1600	μMHOS
AMPLIFICATION FACTOR	70	

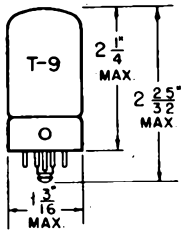
FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

PLATE 856-1

SEPT. 23 1940

TUNG-SOL

TRIPLE GRID AMPLIFIER



COATED UNIPOTENTIAL CATHODE

6.3 VOLTS 0.45 AMPERES

AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE.

BOTTOM VIEW
LOCKING IN 8 PIN BASE

GLASS BULB

ANY MOUNTING POSITION

THE 7G7/1232 IS A TRIPLE GRID SHARP CUT-OFF HIGH TRANSCONDUCTANCE AMPLIFIER USING THE LOCK-IN CONSTRUCTION. IT IS PARTICULARLY ADAPTABLE FOR SERVICE AS A HIGH GAIN RF OR IF AMPLIFIER OR AS A LIMITER IN FM EQUIPMENTS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	1.5	WATTS
MAXIMUM SCREEN DISSIPATION	0.3	WATT

DIRECT INTERELECTRODE CAPACITANCES

WITH M8-308 TUBE SHIELD CONNECTED TO CATHODE

GRID TO PLATE	0.007 MAX.	μμF
INPUT	9.0	μμF
OUTPUT	7.0	μμF

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

SUPPRESSOR VOLTAGE	0	VOLTS
INTERNAL SHIELD CONNECTED TO CATHODE		
PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE	100	VOLTS
GRID VOLTAGE	-2	VOLTS
PLATE CURRENT	6.0	MA.
SCREEN CURRENT	2.0	MA.
PLATE RESISTANCE (APPROX.)	0.8	MEGOHM
TRANSCONDUCTANCE	4 500	μMHOS
GRID VOLTAGE FOR CATHODE CURRENT CUT-OFF (APPROX.)	-6	VOLTS

SIMILAR TYPE REFERENCE: Somewhat similar to types 1231 and 7L7.

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PLATE 1594

JULY 31, 1945

TUNG-SOL

SHARP CUT-OFF DOUBLE TETRODE

PHYSICAL SPECIFICATIONS

		PIN CONNECTIONS	TETRODE NO.		TETRODE NO.
EMITTER	COATED UNIPOT. CATHODE				
BASE	LOCK-IN 8-PIN	PIN 1	HEATER	PIN 7 PLATE	1
CAP	---	PIN 2	PLATE 2	PIN 8	HEATER
BULB	SHORT T-9	PIN 3	GRID 2 1&2		
MAXIMUM DIAMETER	1 3/16"	PIN 4	GRID 1 2	MOUNTING POS.	ANY
MAXIMUM OVERALL LENGTH	2 1/32"	PIN 5	GRID 1 1		
MAXIMUM SEATED HEIGHT	1 1/2"	PIN 6	CATHODE 1&2		

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (NOMINAL) (AC OR DC)	7.0	VOLTS
HEATER OR FILAMENT CURRENT (NOMINAL)	0.320	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM PLATE DISSIPATION (PER UNIT)	1.5	WATTS
MAXIMUM SCREEN DISSIPATION (PER UNIT)	.1	WATT
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MINIMUM EXTERNAL CONTROL GRID BIAS VOLTAGE	0	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS

CAPACITANCES

WITH 1 5/16" DIAMETER SHIELD CONNECTED TO CATHODE

CONTROL GRID TO CATHODE	3.40	μμf
PLATE TO CATHODE	2.60	μμf
GRID TO PLATE (MAX.)	0.15	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PER UNIT

HEATER OR FILAMENT VOLTAGE	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.300	AMP.
PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE	100	VOLTS
GRID VOLTAGE	-2.5	VOLTS
PLATE CURRENT	4.5	MA.
SCREEN CURRENT	0.8	MA.
ZERO-SIGNAL SCREEN CURRENT		MA.
MAXIMUM-SIGNAL PLATE CURRENT		MA.
MAXIMUM-SIGNAL SCREEN CURRENT		MA.
PLATE RESISTANCE	225 000	OHMS
TRANSCONDUCTANCE	2 100	μMHOS
AMPLIFICATION FACTOR		
LOAD RESISTANCE		OHMS
TOTAL HARMONIC DISTORTION		PER CENT
POWER OUTPUT		WATTS
CONTROL GRID VOLTAGE FOR I_b = 10 μA	-10	VOLTS

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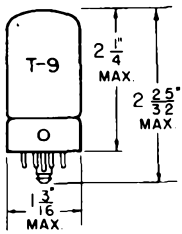
PLATE 1708
APRIL 15 1946

TUNG-SOL

PENTODE VOLTAGE AMPLIFIER



COATED UNIPOTENTIAL CATHODE
6.3 VOLTS 0.3 AMPERE
AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE.

GLASS BULB

BOTTOM VIEW

LOCKING-IN 8-PIN BASE

ANY MOUNTING POSITION

THE 7H7 IS A TRIPLE GRID SEMI-REMOTE CUT-OFF HIGH TRANSCONDUCTANCE AMPLIFIER USING THE LOCK-IN CONSTRUCTION. IT IS SIMILAR TO TYPES 6SD7GT AND 6SG7 AND IS USEFUL AS AN RF OR IF AMPLIFIER.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	150	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MAXIMUM SCREEN DISSIPATION	0.5	WATT
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH M8-308 TUBE SHIELD CONNECTED TO CATHODE

GRID TO PLATE	0.007	μμf
INPUT	8.0	μμf.
OUTPUT	7.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	150	VOLTS
GRID VOLTAGE	1.0	-2.5	VOLTS
SUPPRESSOR AND INTERNAL SHIELD (CONNECTED TO CATHODE AT SOCKET)	0	0	VOLTS
PLATE RESISTANCE (APPROX.)	0.25	0.8	MEGOHM
TRANSCONDUCTANCE	3 800	3 800.	μMHOS
PLATE CURRENT	8.2	9.5	MA.
SCREEN CURRENT	3.3	3.5	MA.
GRID VOLTAGE FOR TRANSCONDUCTANCE = 35 μMHOS (APPROX.)	-12	-19	VOLTS

SIMILAR TYPE REFERENCE: Somewhat similar to types 6SD7GT and 6SG7.

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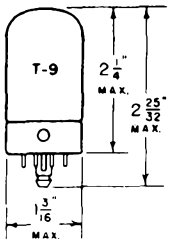
PLATE 1595
JULY 31, 1945

TUNG-SOL

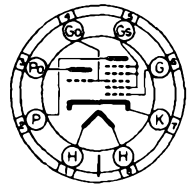
TRIODE HEXODE CONVERTER



UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



8AR
BOTTOM VIEW

LOCKING-IN 8 PIN BASE

THE TUNG-SOL 7J7 IS DESIGNED FOR SERVICE AS AN OSCILLATOR AND MIXER IN SUPERHETERODYNE CIRCUITS. IT CONSISTS OF A HEXODE MIXER AND A TRIODE OSCILLATOR WITH A COMMON CATHODE. THE INJECTOR GRID OF THE HEXODE IS INTERNALLY CONNECTED TO THE TRIODE GRID. ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6J8G

RATINGS

HEATER VOLTAGE – NOMINAL	7.0	VOLTS
HEATER CURRENT – NOMINAL	0.32	AMPERE
MAXIMUM HEXODE PLATE VOLTAGE (P)	300	VOLTS
MAXIMUM HEXODE SCREEN VOLTAGE (G_S)	100	VOLTS
MAXIMUM HEXODE SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM TRIODE PLATE VOLTAGE (P_O)	150	VOLTS
MAXIMUM TRIODE PLATE SUPPLY VOLTAGE	300	VOLTS
MAXIMUM HEXODE PLATE DISSIPATION (P)	0.5	WATT
MAXIMUM HEXODE SCREEN DISSIPATION (G_S)	0.3	WATT
MAXIMUM TRIODE PLATE DISSIPATION (P_O)	1.25	WATTS
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MINIMUM EXTERNAL SIGNAL GRID BIAS VOLTAGE (G)	0	VOLT

DIRECT INTERELECTRODE CAPACITANCES[S]

HEXODE GRID (G) TO HEXODE PLATE (P)	0.01 MAX.	μμf
HEXODE GRID (G) TO TRIODE PLATE (P_O)	0.1 MAX.	μμf
HEXODE GRID (G) TO TRIODE GRID AND HEXODE GRID (G_O)	0.2 MAX.	μμf
TRIODE GRID (G_O) TO TRIODE PLATE (P_O)	1.0	μμf
SIGNAL INPUT: HEXODE GRID (G) TO ALL OTHER ELECTRODES	5.5	μμf
OSC. INPUT: TRIODE GRID AND HEXODE GRID (G_O) TO ALL OTHER ELECTRODES EXCEPT TRIODE PLATE (P_O)	8.5	μμf
OSC. OUTPUT: TRIODE PLATE (P_O) TO ALL OTHER ELECTRODES EXCEPT TRIODE GRID AND HEXODE GRID (G_O)	2.0	μμf
MIXER OUTPUT: HEXODE PLATE (P) TO ALL OTHER ELECTRODES	7.5	μμf

[S] WITH EXTERNAL SHIELD CONNECTED TO CATHODE

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PLATE 856-1
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TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

HEXODE PLATE (P) VOLTAGE	100	250	VOLTS
HEXODE SCREEN (G_S) VOLTAGE	100	100	VOLTS
TRIODE PLATE (P_O) VOLTAGE	100	–	VOLTS
TRIODE PLATE (P_O) SUPPLY VOLTAGE	–	250[A]	VOLTS
HEXODE CONTROL GRID (G) VOLTAGE	−3	−3	VOLTS
HEXODE PLATE CURRENT	1.1	1.3	MA.
HEXODE SCREEN CURRENT	3.1	2.9	MA.
TRIODE PLATE CURRENT	3.7	5.4	MA.
TRIODE GRID (G_O) CURRENT	0.3	0.4	MA.
TOTAL CATHODE CURRENT	8.2	10.0	MA.
TRIODE GRID (G_O) RESISTOR	50000	50000	OHMS
HEXODE PLATE RESISTANCE	0.3	1.5	MEGOHMS
CONVERSION TRANSCONDUCTANCE	260	300	μMHOS
CONTROL GRID VOLTAGE FOR CONVERSION TRANSCONDUCTANCE = 2 μMHOS	−20	−20	VOLTS

[A] THIS VALUE OF TRIODE PLATE SUPPLY VOLTAGE APPLIED THROUGH A 20 000 OHM DROPPING RESISTOR.

STATIC CHARACTERISTICS OF TRIODE SECTION ONLY

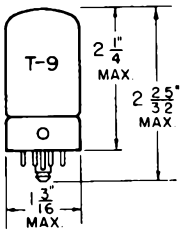
PLATE VOLTAGE	150	VOLTS
GRID VOLTAGE	−3	VOLTS
PLATE CURRENT	7.5	MA.
PLATE RESISTANCE	10400	OHMS
TRANSCONDUCTANCE	1350	μMHOS
AMPLIFICATION FACTOR	14	

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

PLATE 859-1

TUNG-SOL

PENTODE VOLTAGE AMPLIFIER



COATED UNIPOTENTIAL CATHODE
6.3 VOLTS 0.300 AMPERES
AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE.

GLASS BULB

BOTTOM VIEW
LOCKING IN 8 PIN BASE

ANY MOUNTING POSITION

THE 7L7 IS A TRIPLE GRID SHARP CUT-OFF HIGH TRANSCONDUCTANCE AMPLIFIER USING THE LOCK-IN CONSTRUCTION. IT IS SIMILAR TO TYPE 6SH7GT AND IS USEFUL AS AN IF AMPLIFIER OR LIMITER IN FM EQUIPMENTS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MAXIMUM PLATE DISSIPATION	4.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.4	WATT
MINIMUM EXTERNAL CONTROL GRID BIAS VOLTAGE	0	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH M8-308 TUBE SHIELD CONNECTED TO CATHODE

GRID TO PLATE	0.010 MAX.	μμF
INPUT	8.0	μμF
OUTPUT	6.5	μμF

CONTINUED ON FOLLOWING PAGE

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PLATE 1596
JULY 31, 1945

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

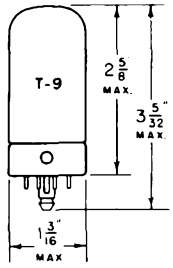
CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
GRID VOLTAGE	-1	-1.5	VOLTS
SUPPRESSOR AND INTERNAL SHIELD CONNECTED AT SOCKET	0	0	VOLTS
PLATE RESISTANCE (APPROX.)	0.1	1.0	MEGOHM
TRANSCONDUCTANCE	3 000	3 100	µMHOS
CONTROL GRID VOLTAGE FOR CATHODE CURRENT CUT-OFF	-5	-5	VOLTS
PLATE CURRENT	5.5	4.5	MA.
SCREEN CURRENT	2.4	1.5	MA.
CATHODE BIAS RESISTOR	125	250	OHMS

SIMILAR TYPE REFERENCE: Somewhat similar to type 7G7/1232 and type 6SA7GT.

PLATE 1597
JULY 31, 1945

TUNG-SOL

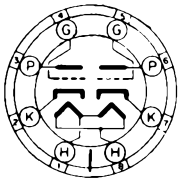


TWIN TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.6 AMPERE
AC OR DC

GLASS BULB



8AC-L-0

LOCKING-IN 8 PIN BASE

THE TUNG-SOL 7N7 IS A TWIN TRIODE VOLTAGE AMPLIFIER HAVING TWO COMPLETELY INDEPENDENT TRIODE UNITS IN ONE BULB. WITH THE EXCEPTION OF CAPACITANCES AND HEATER RATINGS, ITS ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF THE 6F8G.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION PER UNIT	2.5	WATTS
MINIMUM CONTROL GRID VOLTAGE	0	VOLT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER (EACH UNIT)

PLATE VOLTAGE	90	250	VOLTS
CONTROL GRID VOLTAGE	0	-8	VOLTS
PLATE CURRENT	10.0	9.0	MA.
PLATE RESISTANCE	6700	7700	OHMS
TRANSCONDUCTANCE	3000	2600	μMHOS
AMPLIFICATION FACTOR	20	20	

DIRECT INTERELECTRODE CAPACITANCES[5]

	TRIODE UNIT 1		TRIODE UNIT 2	
GRID TO CATHODE	3.4		2.9	μμf
PLATE TO CATHODE	2.0		2.4	μμf
GRID TO PLATE	3.0		3.0	μμf
GRID 1 TO GRID 2		0.4		μμf
PLATE 1 TO PLATE 2		0.34		μμf
GRID 2 TO PLATE 1		0.06		μμf
GRID 1 TO PLATE 2		0.08		μμf

[5] WITH EXTERNAL SHIELD CONNECTED TO CATHODE

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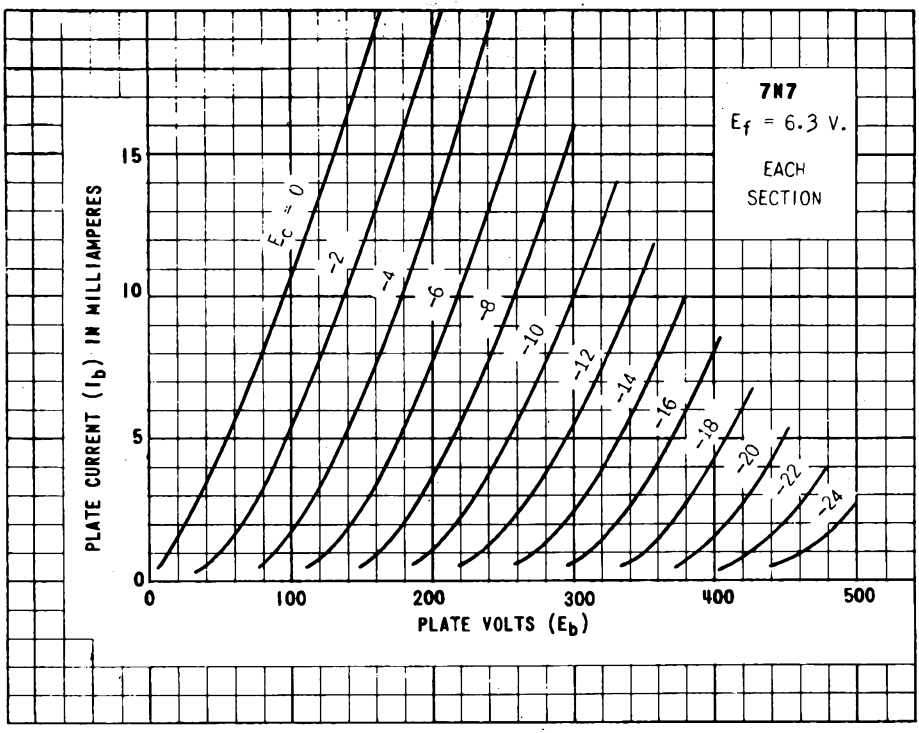
PLATE 1179-1

FEB. 28 1942

7N7



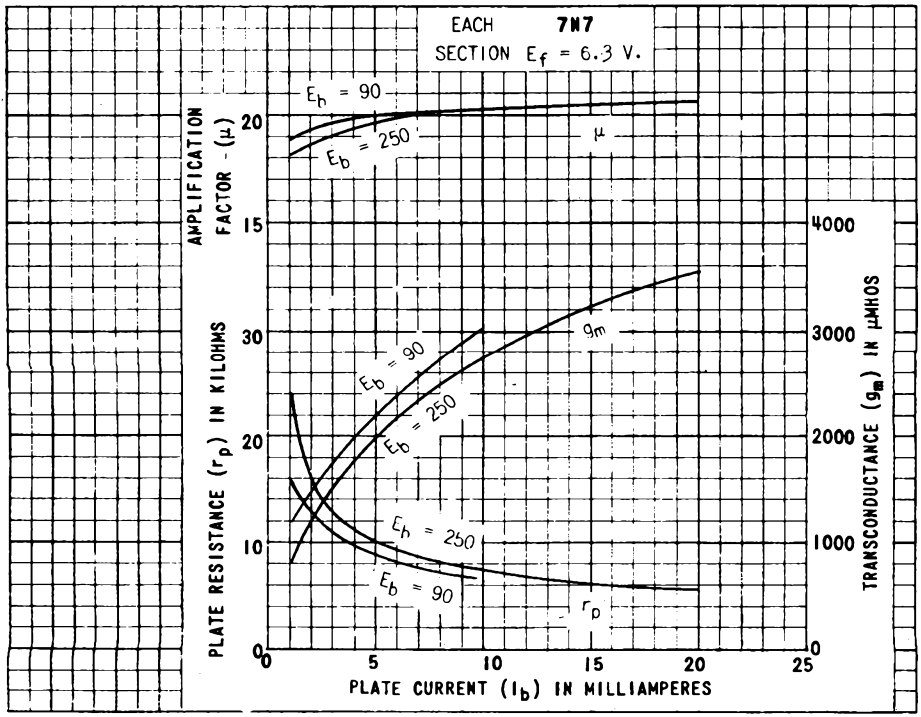


PLATE
1180-1

TUNG-SOL

PENTAGRID

PHYSICAL SPECIFICATIONS

EMITTER	UNIPOTENTIAL CATHODE	PIN CONNECTIONS			
BASE	LOCKING-IN - 8 PIN	PIN 1	HEATER	PIN 7	CATHODE
CAP	NONE	PIN 2	PLATE	PIN 8	HEATER
BULB	T-9	PIN 3	GRIDS #2 & #4		
MAXIMUM DIAMETER	1 3/16"	PIN 4	GRID #1		
MAXIMUM OVERALL LENGTH	2 25/32"	PIN 5	GRID #5	TOP CAP	NONE
MAXIMUM SEATED HEIGHT	2 1/4"	PIN 6	GRID #3		

RATINGS

HEATER OR FILAMENT VOLTAGE - NOMINAL (AC OR DC)	7.0	VOLTS
HEATER OR FILAMENT CURRENT - NOMINAL	0.32	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE (GRIDS #2 & #4)	100	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION		WATTS
MAXIMUM SCREEN DISSIPATION	1.0	WATT
MAXIMUM TOTAL PLATE AND SCREEN DISSIPATION	2.0	WATTS
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MINIMUM EXTERNAL SIGNAL GRID BIAS VOLTAGE* (GRID #3)	0	VOLTS
MAXIMUM ANODE-GRID VOLTAGE		VOLTS
MAXIMUM ANODE-GRID SUPPLY VOLTAGE		VOLTS
MAXIMUM ANODE-GRID DISSIPATION		WATT

* WITH SELF-EXCITATED OSCILLATOR

CAPACITANCES[$]

SIGNAL GRID TO MIXER PLATE (GRID #3 TO PLATE)	0.20 MAX.	μμf
SIGNAL GRID TO OSC. GRID (GRID #3 TO GRID #1)	0.20 MAX.	μμf
SIGNAL INPUT (GRID #3 TO ALL OTHER ELECTRODES)	9.0	μμf
OSC. GRID TO CATHODE (GRID #1 TO CATHODE)	2.2	μμf
OSC. GRID TO PLATE (GRID #1 TO PLATE)	0.15 MAX.	μμf
OSC. INPUT (GRID #1 TO ALL OTHER ELECTRODES)	7.0	μμf
OSC. GRID TO ALL OTHER ELECTRODES EXCEPT CATHODE	5.0	μμf
MIXER OUTPUT (PLATE TO ALL OTHER ELECTRODES)	9.0	μμf
CATHODE TO ALL OTHER ELECTRODES EXCEPT GRID #1	6.0	μμf

[$] WITH EXTERNAL SHIELD CONNECTED TO BASE SHELL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

HEATER OR FILAMENT VOLTAGE	6.3	6.3	VOLTS
HEATER OR FILAMENT CURRENT	0.3	0.3	AMP.
PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	-2	-2	VOLTS
ANODE-GRID VOLTAGE			VOLTS
PLATE CURRENT	3.3	3.5	MA.
SCREEN CURRENT	8.5	8.5	MA.
ANODE-GRID CURRENT			MA.
OSCILLATOR-GRID CURRENT	0.5	0.5	MA.
TOTAL CATHODE CURRENT	12.3	12.5	MA.
OSCILLATOR-GRID RESISTOR	20000	20000	OHMS
PLATE RESISTANCE (APPROX.)	0.5	1.0	MEGOHM
CONVERSION TRANSCONDUCTANCE	525	550	μMHOS
FOR CONTROL GRID VOLTAGE =-2 VOLTS			
CONVERSION TRANSCONDUCTANCE	275	300	μMHOS
FOR CONTROL GRID VOLTAGE =-6 VOLTS			
CONVERSION TRANSCONDUCTANCE (APPROX.)	2	2	μMHOS
FOR CONTROL GRID VOLTAGE =-35 VOLTS			
SUPPRESSOR GRID (GRID #5)	0	0	VOLTS

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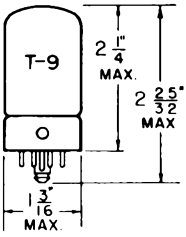
PLATE T750-1

AUG. 2 1940

TUNG-SOL

DOUBLE-DIODE PENTODE

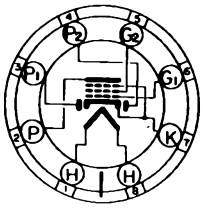


GLASS BULB

COATED UNIPOTENIAL CATHODE

HEATER
6.3 VOLTS 300 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
LOCK-IN
8 PIN BASE

THE 7R7 COMBINES TWO DIODES AND ONE SEMI-REMOTE CUT-OFF PENTODE UNITS WITH A COMMON CATHODE IN ONE ENVELOPE. IT FEATURES LOW COUPLING CAPACITANCE BETWEEN THE DIODE AND PENTODE WHICH PERMITS USE OF THE TUBE AS A COMBINED INTERMEDIATE FREQUENCY AMPLIFIER, AVC RECTIFIER, AND DETECTOR. THE PENTODE UNIT MAY ALSO BE USED IN AUDIO AMPLIFIER SERVICE.

DIRECT INTERELECTRODE CAPACITANCES
WITH EXTERNAL SHIELD

GRID TO PLATE: (G_1 TO P)	0.004	μμf
INPUT: G_1 TO (H+K&G_3+G_2)	5.6	μμf
OUTPUT: P TO (H+K&G_3+G_2)	5.3	μμf
DIODE #1 TO GRID #1: (P_1 TO G_1) MAX.	0.005	μμf
DIODE #2 TO GRID #1: (P_2 TO G_1) MAX.	0.002	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID #2 VOLTAGE	100	VOLTS
MAXIMUM GRID #2 SUPPLY VOLTAGE	300	VOLTS
MINIMUM NEGATIVE GRID #1 VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	2	WATTS
MAXIMUM GRID #2 DISSIPATION	0.25	WATT
MAXIMUM DIODE VOLTAGE DROP (MEASURED WITH DIODES CONDUCTING 0.8 MA. EACH PLATE)	10	VOLTS
MAXIMUM DIODE CURRENT EACH PLATE FOR CONTINUOUS OPERATION	1	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

	CLASS A_1 AMPLIFIER				
HEATER VOLTAGE	6.3	6.3	6.3	6.3	VOLTS
HEATER CURRENT	300	300	300	300	MA.
PLATE VOLTAGE	100	100	250	250	VOLTS
GRID #2 VOLTAGE	100	100	100	100	VOLTS
GRID #1 VOLTAGE	-2	-1	-2	-1	VOLTS
CATHODE BIAS RESISTOR	450	130	450	130	OHMS
PLATE RESISTANCE (APPROX.)	0.5	0.35	1.8	1.0	MEGOHMS
TRANSCONDUCTANCE	2 100	3 000	2 200	3 400	μMHOS
PLATE CURRENT	3.4	5.5	3.5	6.2	MA.
GRID #2 CURRENT	1.0	2.2	1.0	1.6	MA.
GRID #1 VOLTAGE (APPROX.) FOR G_m = 2 μMHOS	-16	-16	-20	-20	VOLTS

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PLATE 2011
MAY 3 1948

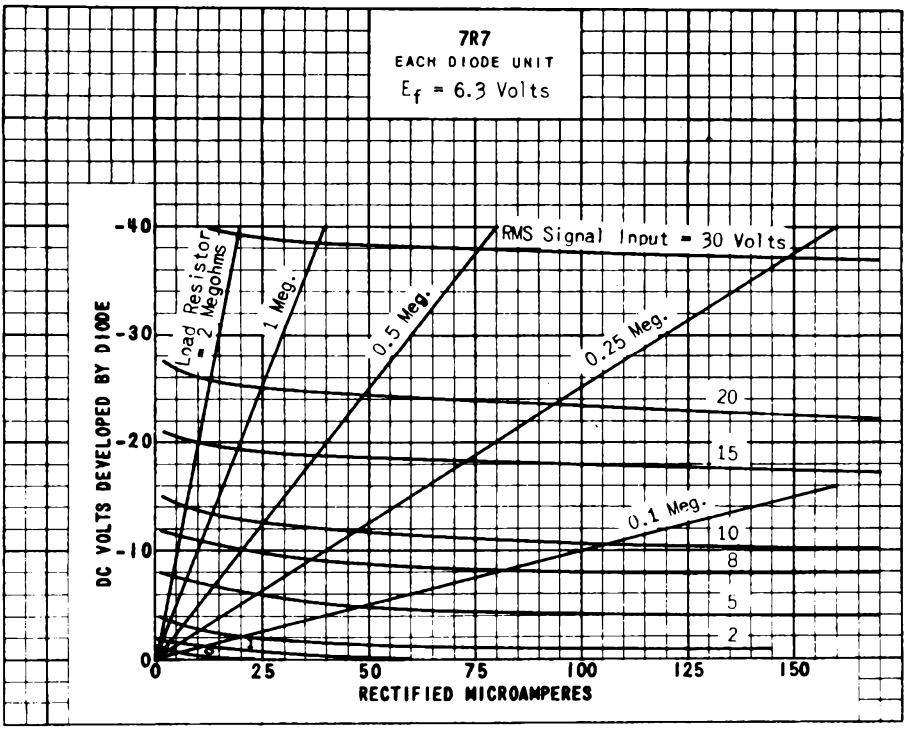
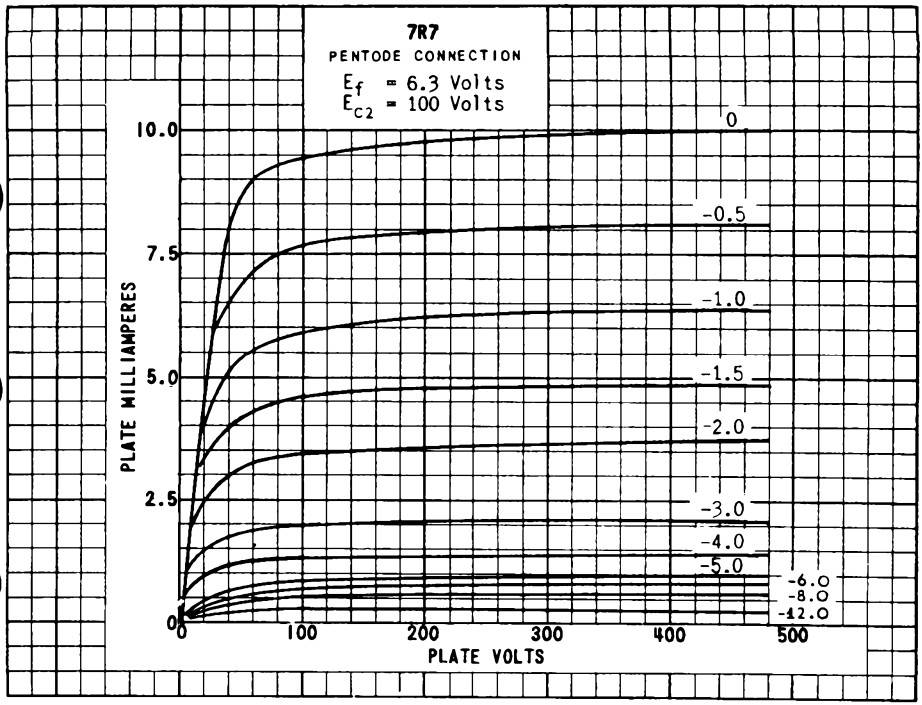


PLATE
2012
MAY 3
1948



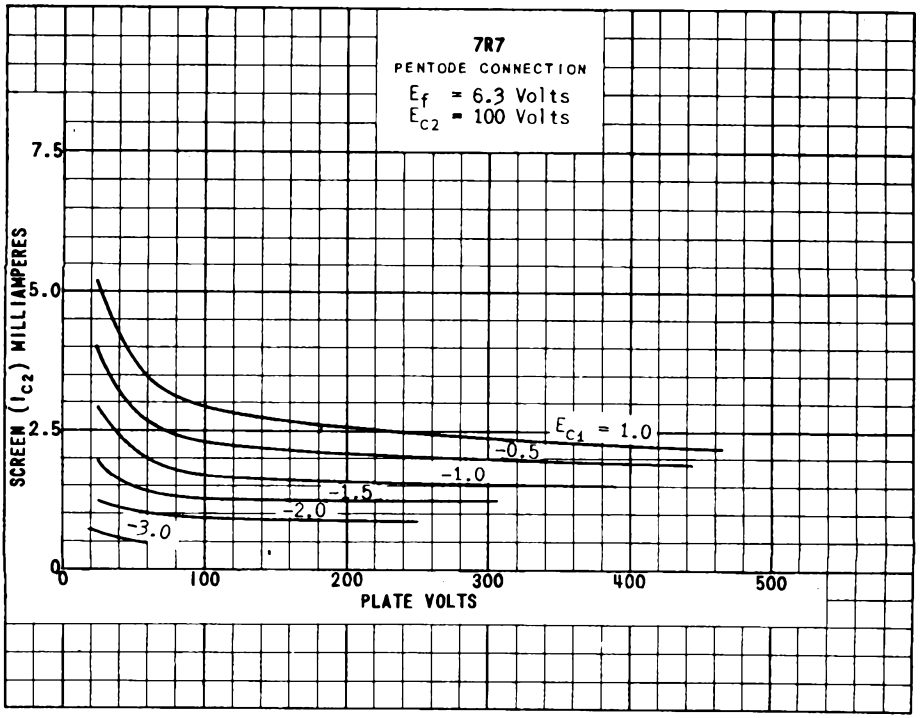


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PLATE
2013
MAY 3
1948

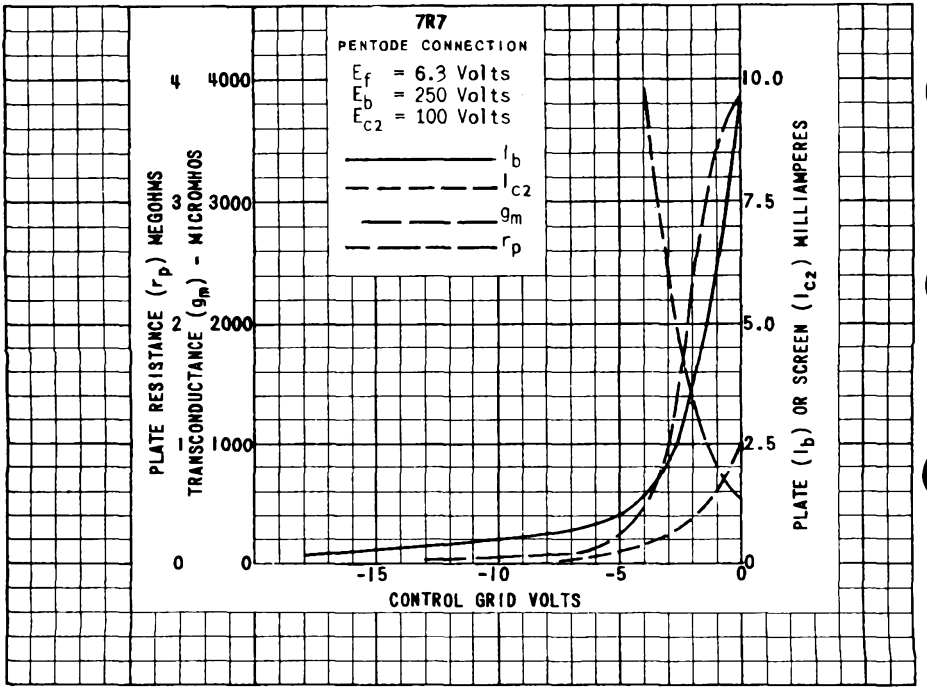
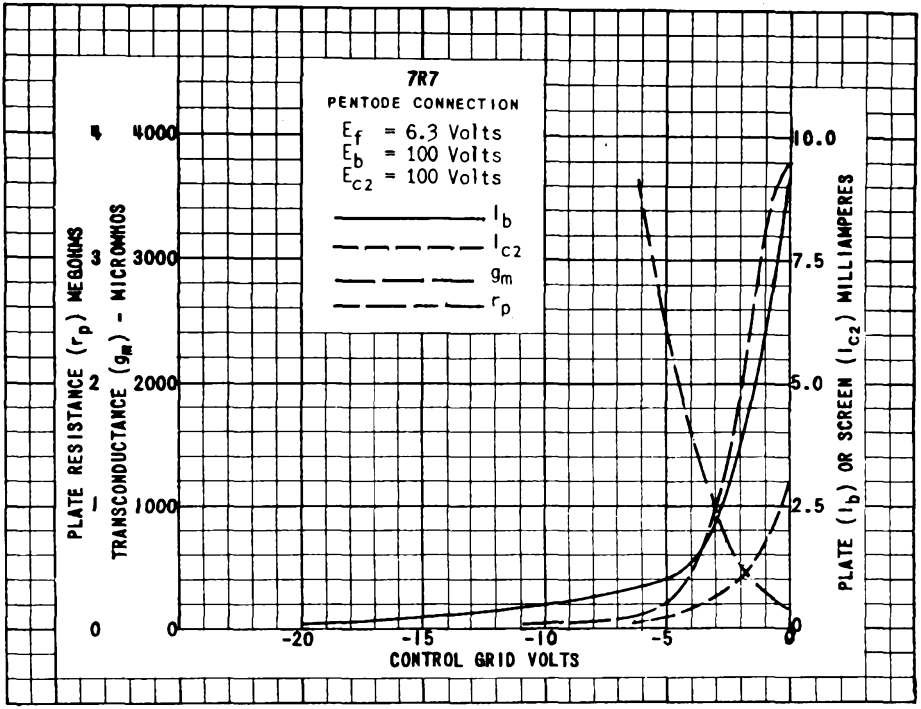


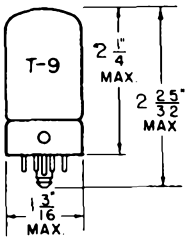
PLATE
2014
MAY 3
1948

7R7


7R7
PENTODE CONNECTION
E_f = 6.3 Volts
E_b = 100 Volts
E_{c2} = 100 Volts
I_b
I_{c2}
g_m
r_p
PLATE RESISTANCE (r_p) MEGOHMS
TRANSCONDUCTANCE (g_m) - MICROMHOS
PLATE (I_b) OR SCREEN (I_{c2}) MILLIAMPERES
CONTROL GRID VOLTS
0
1
2
3
4
1000
2000
3000
4000
2.5
5.0
7.5
10.0
-20
-15
-10
-5
0

TUNG-SOL

TRIODE-HEPTODE

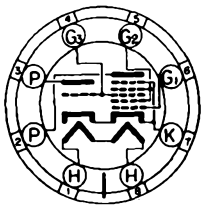


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 300 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
LOCK-IN
8 PIN BASE

THE 7S7 IS A HEATER-CATHODE TYPE COMBINING A TRIODE AND A HEPTODE IN THE LOCK-IN-CONSTRUCTION. THE TWO SECTIONS ARE INTERCONNECTED INTERNALLY TO PROVIDE FOR EFFICIENT LOCAL OSCILLATOR-MIXER SERVICE WITH A MINIMUM OF FREQUENCY SHIFT WITH VARIATION OF CONTROL GRID BIAS.

DIRECT INTERELECTRODE CAPACITANCES
WITH EXTERNAL SHIELD CONNECTED TO CATHODE

HEPTODE GRID #1 TO PLATE: (G_1 TO P_h) MAX.	0.03	μμf
HEPTODE GRID #1 TO TRIODE PLATE: (G_1 TO P_t) MAX.	0.1	μμf
HEPTODE GRID #1 TO GRID #3: (G_1 TO G_3) MAX.	0.35	μμf
TRIODE GRID TO PLATE: (G_3 TO P_t)	1	μμf
SIGNAL INPUT: G_1 TO (H+K&G_5+G_2&G_4+G_3)	5	μμf
MIXER OUTPUT: P_h TO (H+K&G_5+G_2&G_4+G_3)	8	μμf
OSC. INPUT: G_3 TO (H+K&G_5+G_2&G_4)	7	μμf
OSC. OUTPUT: P_t TO (H+K&G_5+G_2&G_4)	3.5	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD RB-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM HEPTODE PLATE VOLTAGE	300	VOLTS
MAXIMUM HEPTODE GRIDS #2 & #4 VOLTAGE	100	VOLTS
MAXIMUM HEPTODE GRIDS #2 & #4 SUPPLY VOLTAGE	300	VOLTS
MINIMUM HEPTODE GRID #1 VOLTAGE	0	VOLTS
MAXIMUM TRIODE PLATE VOLTAGE	175	VOLTS
MAXIMUM TRIODE PLATE SUPPLY VOLTAGE	300	VOLTS
MAXIMUM HEPTODE PLATE DISSIPATION	0.6	WATT
MAXIMUM HEPTODE GRIDS #2 & #4 DISSIPATION	0.4	WATT
MAXIMUM TRIODE PLATE DISSIPATION	1	WATT
MAXIMUM CATHODE CURRENT	14	MA.

PLATE 2038
JULY 1, 1948

CONTINUED ON FOLLOWING PAGE

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	300	300	MA.
HEPTODE PLATE VOLTAGE	100	250	VOLTS
HEPTODE GRIDS #2 & #4 VOLTAGE	100	100	VOLTS
TRIODE PLATE VOLTAGE	100	250[A]	VOLTS
HEPTODE GRID #1 VOLTAGE	-2	-2	VOLTS
SELF BIAS RESISTOR	240	195	OHMS
GRID #3 RESISTOR	50 000	50 000	OHMS
HEPTODE PLATE CURRENT	1.9	1.8	MA.
HEPTODE GRIDS #2 & 4 CURRENT	3	3	MA.
TRIODE PLATE CURRENT	3	5	MA.
GRID #3 CURRENT	0.3	0.4	MA.
HEPTODE PLATE RESISTANCE	0.5	1.25	MEGOHMS
CONVERSION TRANSCONDUCTANCE	500	525	µMHOS
CONVERSION TRANSCONDUCTANCE WITH E_c = -21 VOLTS	2	2	µMHOS
TOTAL CATHODE CURRENT	8.2	10.2	MA.

[A] APPLIED THROUGH 20,000 OHM DROPPING RESISTOR PROPERLY BY-PASSED.

TRIODE SECTION

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	300	MA.
PLATE VOLTAGE	100	VOLTS
GRID VOLTAGE	0	VOLTS
PLATE CURRENT	6.5	MA.
PLATE RESISTANCE	11 000	OHMS
TRANSCONDUCTANCE	1 650	µMHOS
AMPLIFICATION FACTOR	18	

SIMILAR TYPE REFERENCE: Ratings and Characteristics similar to type 7J7.

PLATE 2039
JULY 1, 1948

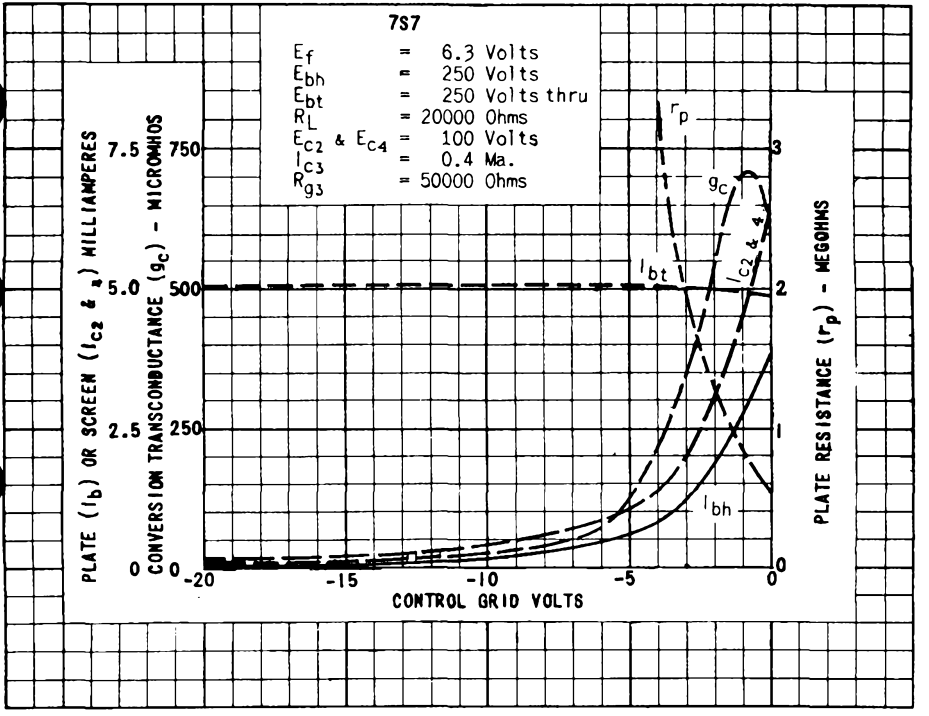
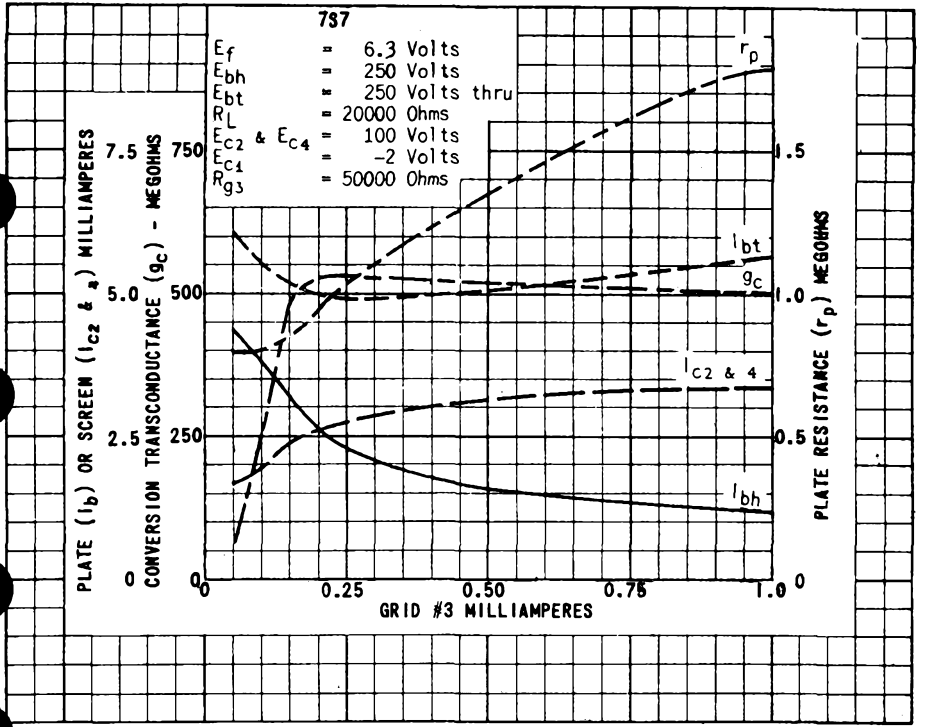


PLATE
2040
ULY 1,
1948


7S7
E_f = 6.3 Volts
E_{bh} = 250 Volts
E_{bt} = 250 Volts thru
R_L = 20000 Ohms
E_{c2} & E_{c4} = 100 Volts
E_{c1} = -2 Volts
R_{g3} = 50000 Ohms
r_p
I_{bt}
g_c
$I_{c2\ \&\ 4}$
I_{bh}
PLATE (I_b) OR SCREEN (I_{c2} & $_4$) MILLIAMPERES
CONVERSION TRANSCONDUCTANCE (g_c) - MEGOHMS
PLATE RESISTANCE (r_p) MEGOHMS
GRID #3 MILLIAMPERES
7.5
5.0
2.5
0
750
500
250
0
0.25
0.50
0.75
1.0
1.5
1.0
0.5
0

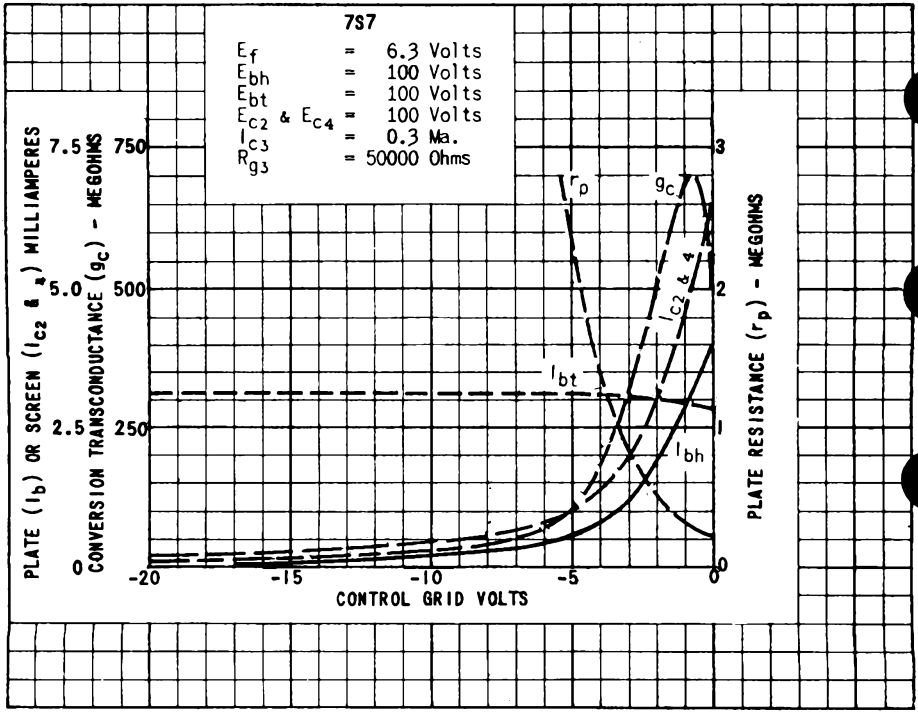
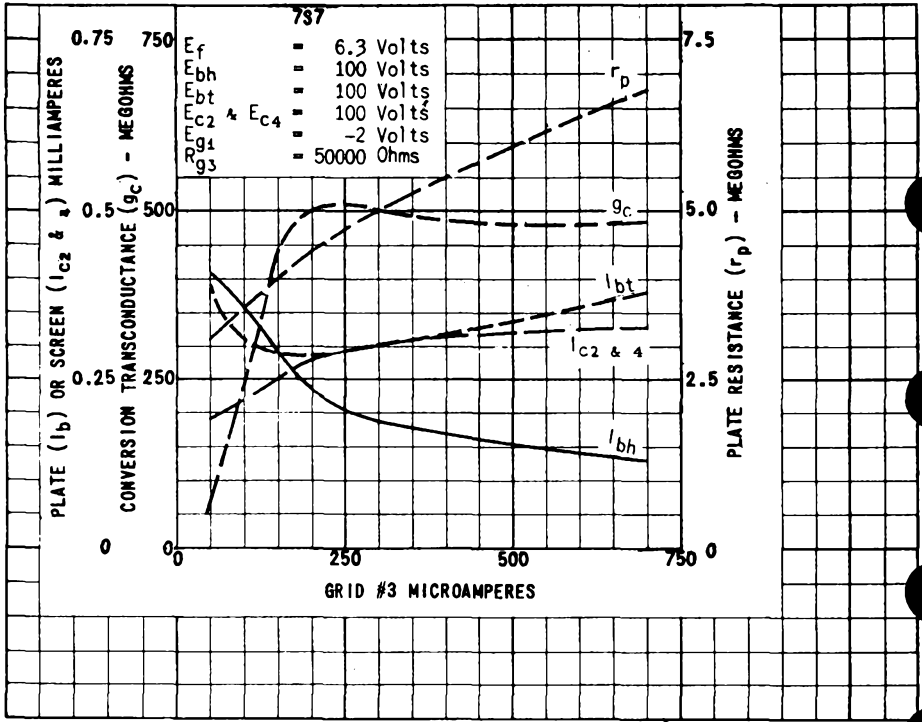


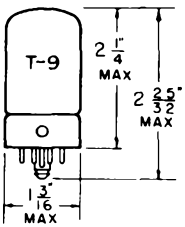
PLATE 2041
JULY 1, 1948

7S7


7S7
E_f = 6.3 Volts
E_{bh} = 100 Volts
E_{bt} = 100 Volts
E_{c2} & E_{c4} = 100 Volts
E_{g1} = -2 Volts
R_{g3} = 50000 Ohms
r_p
g_c
I_{bt}
$I_{c2\ \&\ 4}$
I_{bh}
0.75
0.5
0.25
0
750
500
250
0
7.5
5.0
2.5
0
250
500
750
PLATE (I_b) OR SCREEN (I_{c2} & $_4$) MILLIAMPERES
CONVERSION TRANSCONDUCTANCE (g_c) - MEGOHMS
PLATE RESISTANCE (r_p) - MEGOHMS
GRID #3 MICROAMPERES

TUNG-SOL

PENTODE

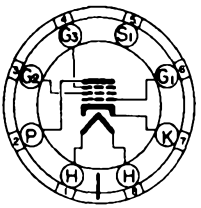


GLASS BULB

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 450 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
LOCK-IN 8 PIN BASE

THE 7V7 IS A HEATER-CATHODE TYPE SHARP CUT-OFF PENTODE VOLTAGE AMPLIFIER USING THE LOCK-IN CONSTRUCTION. IT IS CHARACTERIZED BY HIGH TRANSCONDUCTANCE AND LOW INTERELECTRODE CAPACITANCES WHICH ADAPT IT TO USE IN WIDE-BAND HIGH FREQUENCY AMPLIFIERS.

DIRECT INTERELECTRODE CAPACITANCES
WITH RMA SHIELD #308 CONNECTED TO CATHODE

GRID TO PLATE: (G_1 TO P) MAX.	0.004	μμf
INPUT: G_1 TO (H+K+G_2+G_3+IS)	9.5	μμf
OUTPUT: P TO (H+K+G_2+G_3+IS)	6.5	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID #2 VOLTAGE	150	VOLTS
MAXIMUM GRID #2 SUPPLY VOLTAGE	300	VOLTS
MINIMUM CATHODE BIAS RESISTOR	160	OHMS
MAXIMUM PLATE DISSIPATION	4	WATTS
MAXIMUM GRID #2 DISSIPATION	0.8	WATT

CONTINUED ON FOLLOWING PAGE

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PLATE 2103
NOV. 1, 1948

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

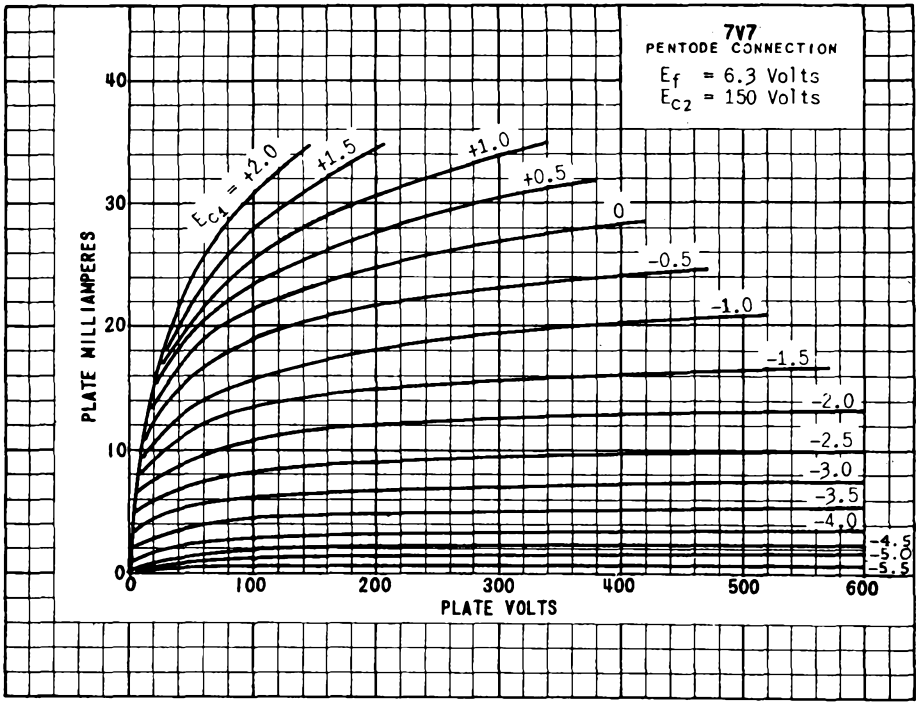
CLASS A_1 AMPLIFIER

	CONDITION 1[A]	CONDITION 2[B]	
HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	450	450	MA.
PLATE VOLTAGE	300	300	VOLTS
GRID #3 VOLTAGE	PINS #4 AND #5 CONNECTED TO PIN #7 AT SOCKET		
GRID #2 SUPPLY VOLTAGE[C]	150	300	VOLTS
GRID #2 SERIES RESISTOR	---	40 000	OHMS
CATHODE BIAS RESISTOR	160	160	OHMS
PLATE RESISTANCE (APPROX.)	0.3	0.3	MEG.
TRANSCONDUCTANCE	5 800	5 800	µMHOS
PLATE CURRENT	10	10	MA.
GRID #2 CURRENT	3.9	3.9	MA.
GRID #1 VOLTAGE FOR I_b = 10 µA	-8	-16	VOLTS

[A] CONDITION 1 WITH FIXED SCREEN SUPPLY.

[B] CONDITION 2 WITH SERIES SCREEN RESISTOR.

[C] SCREEN SUPPLY VOLTAGES IN EXCESS OF 150 VOLTS REQUIRE THE USE OF A SERIES-DROPPING RESISTOR TO LIMIT THE VOLTAGE AT THE SCREEN TO 150 VOLTS WHEN THE PLATE CURRENT IS AT ITS NORMAL VALUE OF 10 MA.



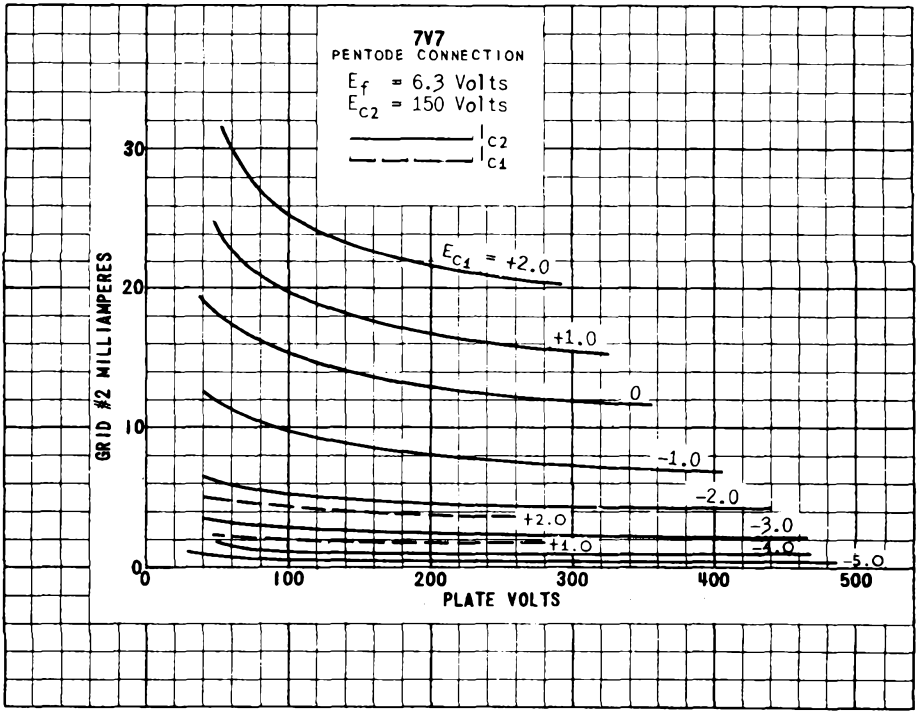


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PLATE 2105
DV. 1, 1948

7V7

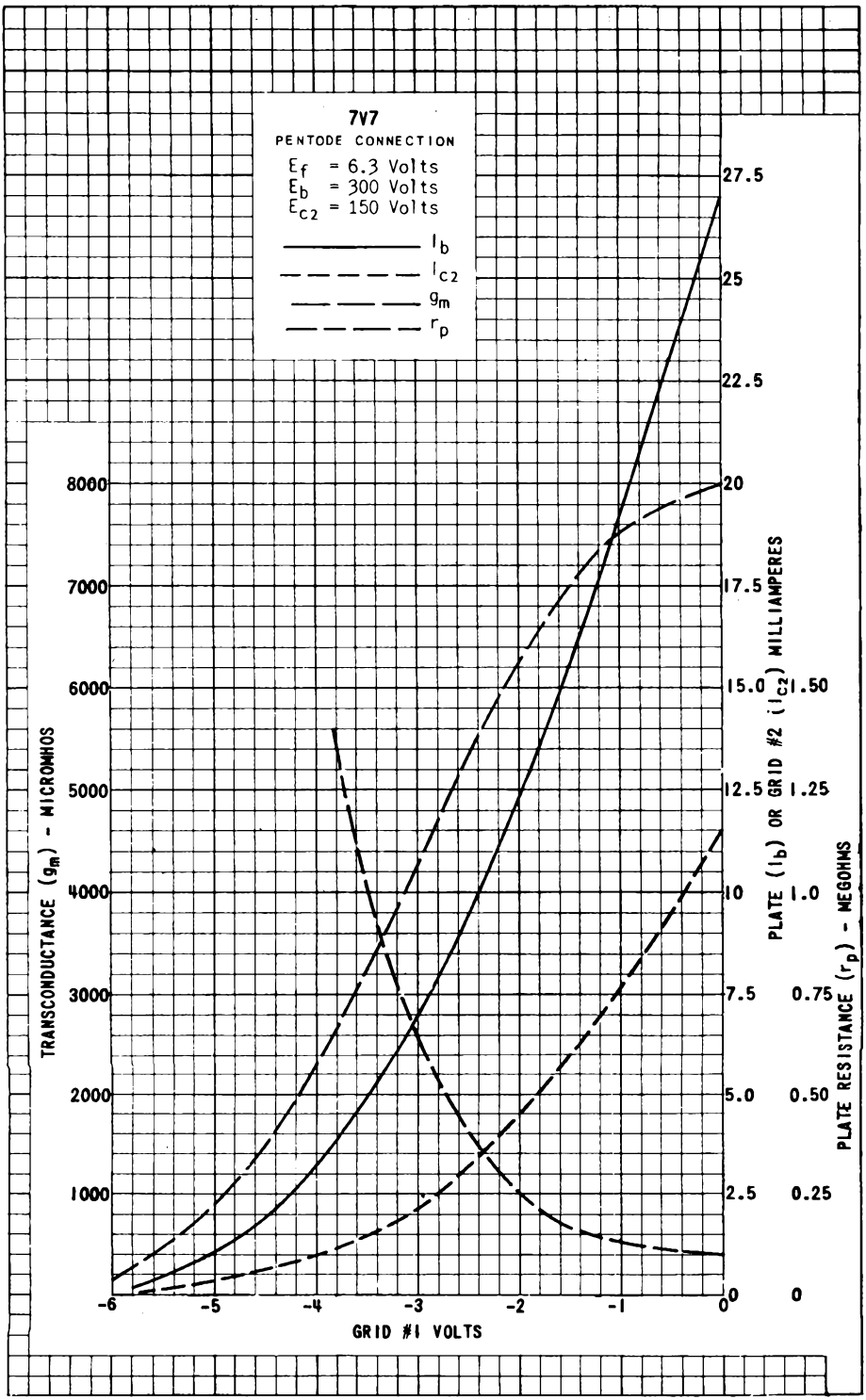
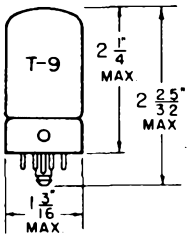


PLATE 2106
NOV. 1, 1948

TUNG-SOL

PENTODE

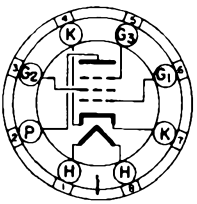


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 450 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
LOCK-IN 8 PIN BASE

THE 7W7 IS A CATHODE TYPE SHARP CUT-OFF PENTODE VOLTAGE AMPLIFIER IN THE LOCK-IN CONSTRUCTION. IT IS CHARACTERIZED BY HIGH TRANSCONDUCTANCE AND LOW GRID-TO-PLATE CAPACITANCE WHICH MAKE IT USEFUL IN HIGH GAIN NARROW BAND AMPLIFIER SERVICE.

DIRECT INTERELECTRODE CAPACITANCES
WITH EXTERNAL SHIELD CONNECTED TO CATHODE

GRID TO PLATE: (G TO P) MAX.	0.0025	μμf
INPUT: G_1 TO (H+K+G_2+G_3)	9.5	μμf
OUTPUT: P TO (H+K+G_2+G_3)	7.0	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID #2 VOLTAGE	150	VOLTS
MAXIMUM PLATE DISSIPATION	4	WATTS
MAXIMUM GRID #2 DISSIPATION	0.8	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

	WITH FIXED SCREEN SUPPLY	WITH SERIES SCREEN RESISTOR	
HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	450	450	MA.
PLATE VOLTAGE	300	300	VOLTS
GRID #3 VOLTAGE	PIN #5 CONNECTED TO PIN #4 AT SOCKET		
GRID #2 VOLTAGE	150	---	VOLTS
GRID #2 SUPPLY VOLTAGE[A]	---	300	VOLTS
GRID #2 SERIES RESISTOR	---	40 000	OHMS
CATHODE BIAS RESISTOR	160	160	OHMS
PLATE RESISTANCE (APPROX.)	0.3	0.3	MEGOHM
TRANSCONDUCTANCE	5 800	5 800	μMHOS
PLATE CURRENT	10	10	MA.
GRID #2 CURRENT	3.9	3.9	MA.
GRID #1 VOLTAGE (APPROX.) FOR i_b = 10 μA.	-8	-16	VOLTS

[A] WHEN A SCREEN SUPPLY VOLTAGE IN EXCESS OF 150 VOLTS IS USED, A SERIES SCREEN DROPPING RESISTOR MUST BE EMPLOYED TO LIMIT SCREEN VOLTAGE TO 150 VOLTS WITH PLATE CURRENT AT RATED VALUE OF 10 MA.

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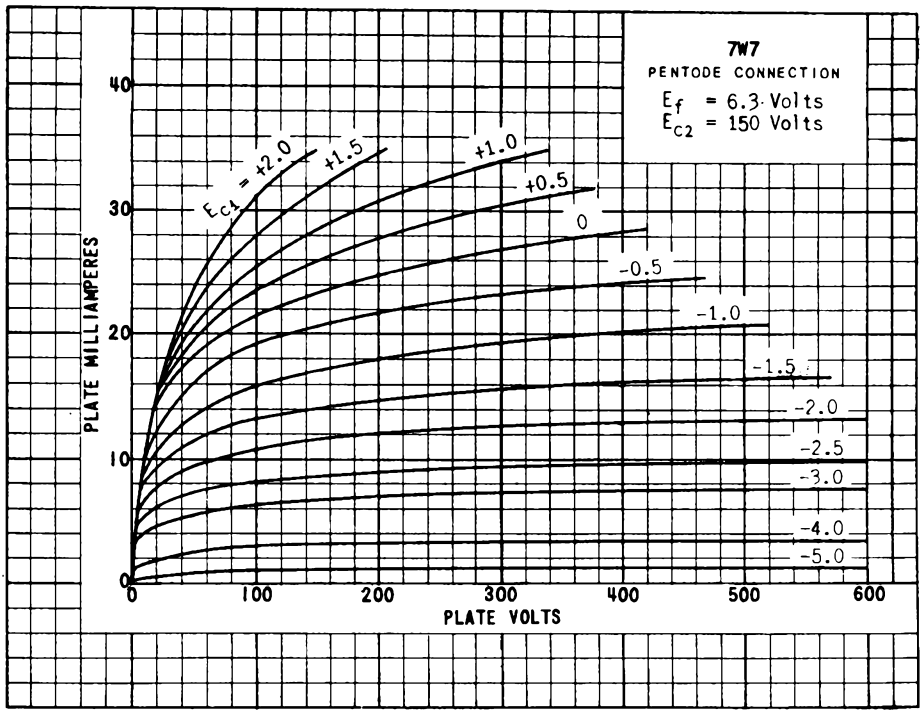
PLATE 2057
AUG. 2, 1948

7W7



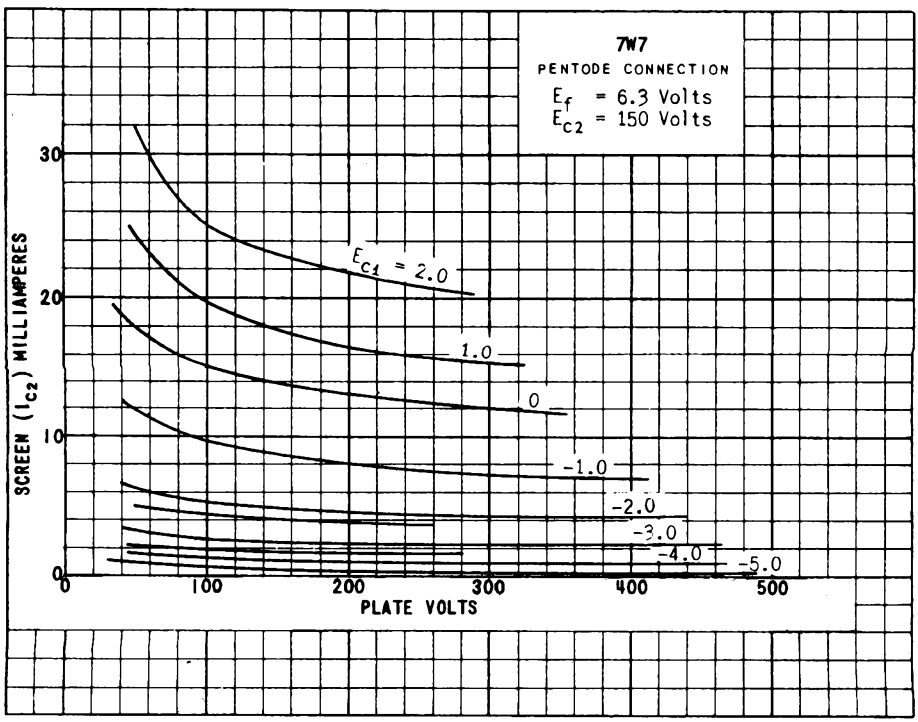


PLATE 2058
AUG. 2, 1948

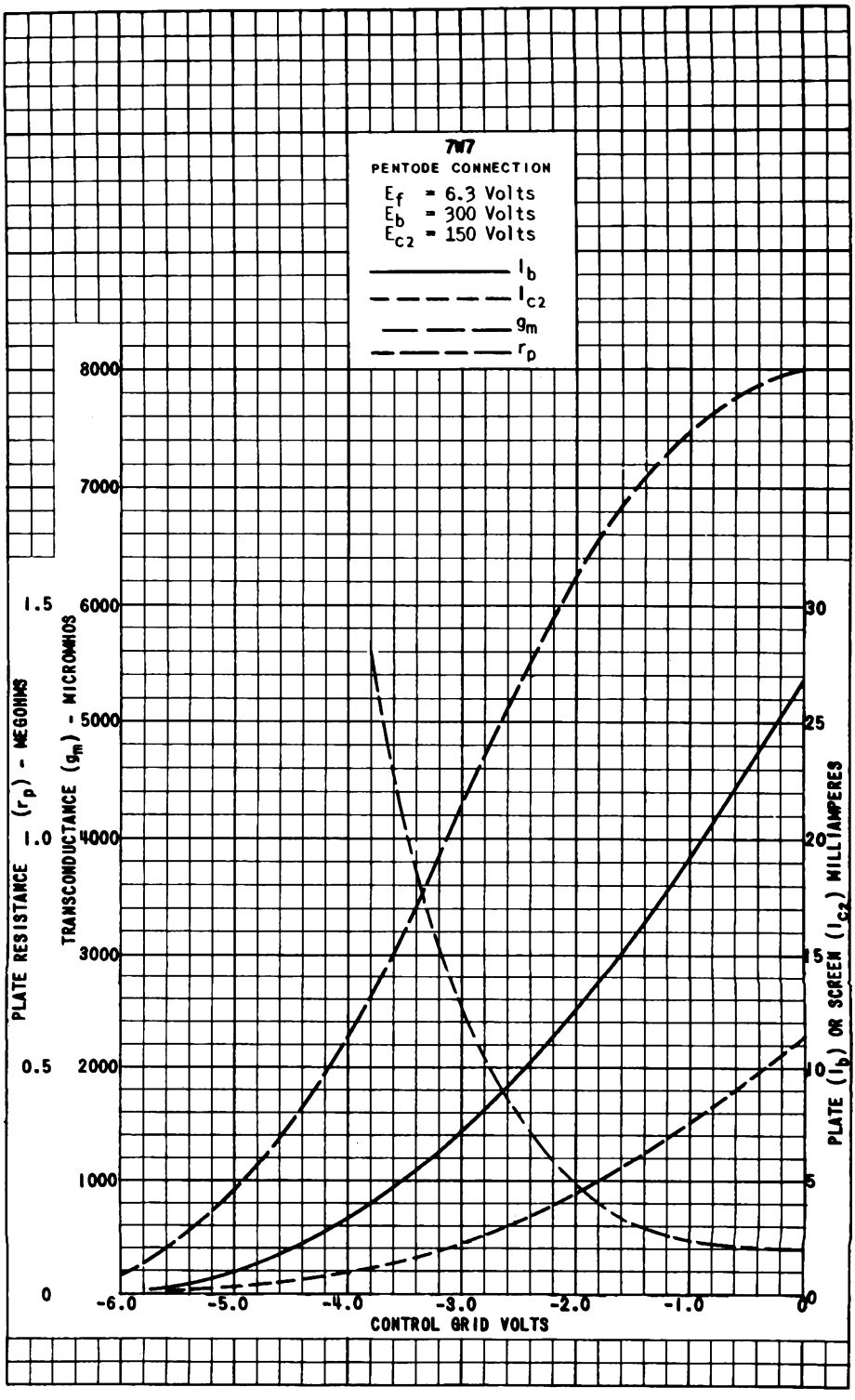


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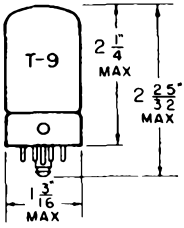
PLATE
2026
JUNE 1,
1948

TUNG-SOL

DOUBLE DIODE

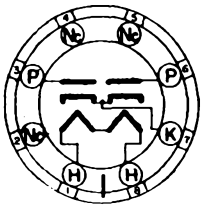


GLASS BULB

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 500 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
LOCK-IN 8 PIN BASE

THE 7Y4 IS A HEATER TYPE HIGH VACUUM TWIN DIODE USING THE LOCK-IN CONSTRUCTION. IT IS INTENDED FOR USE AS A FULL-WAVE RECTIFIER IN EITHER AC OR STORAGE BATTERY OPERATED EQUIPMENT WHERE ECONOMY OF HEATER POWER IS DESIRED.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD MB-210

HEATER VOLTAGE	6.3	VOLTS
MAXIMUM DC HEATER-CATHODE VOLTAGE	450	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	1 250	VOLTS
MAXIMUM AC PLATE VOLTAGE (RMS) CONDENSER INPUT	325	VOLTS
MAXIMUM AC PLATE VOLTAGE (RMS) CHOKE INPUT	450	VOLTS
MAXIMUM STEADY STATE PEAK PLATE CURRENT EACH PLATE	210	MA.
MAXIMUM OUTPUT CURRENT	70	MA.
TUBE VOLTAGE DROP (MEASURED WITH TUBE CONDUCTING 70 MA. EACH PLATE)	22	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER
CONDENSER INPUT TO FILTER

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	500	MA.
AC PLATE VOLTAGE EACH PLATE (RMS)	325	VOLTS
DC OUTPUT CURRENT	70	MA.
MINIMUM PLATE SUPPLY IMPEDANCE EACH PLATE[A]	150	OHMS

[A] WHEN A FILTER CONDENSER LARGER THAN 40 μF IS USED, IT MAY BE NECESSARY TO INCREASE THE SPECIFIED PLATE SUPPLY IMPEDANCE.

CHOKE INPUT TO FILTER

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	500	MA.
AC PLATE VOLTAGE EACH PLATE (RMS)	450	VOLTS
DC OUTPUT CURRENT	70	MA.
MINIMUM VALUE OF INPUT CHOKE	10	HENRYS

SIMILAR TYPE REFERENCE: Ratings and characteristics somewhat similar to types 6Z5GT and 84.

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PLATE 2107
NOV. 1, 1948

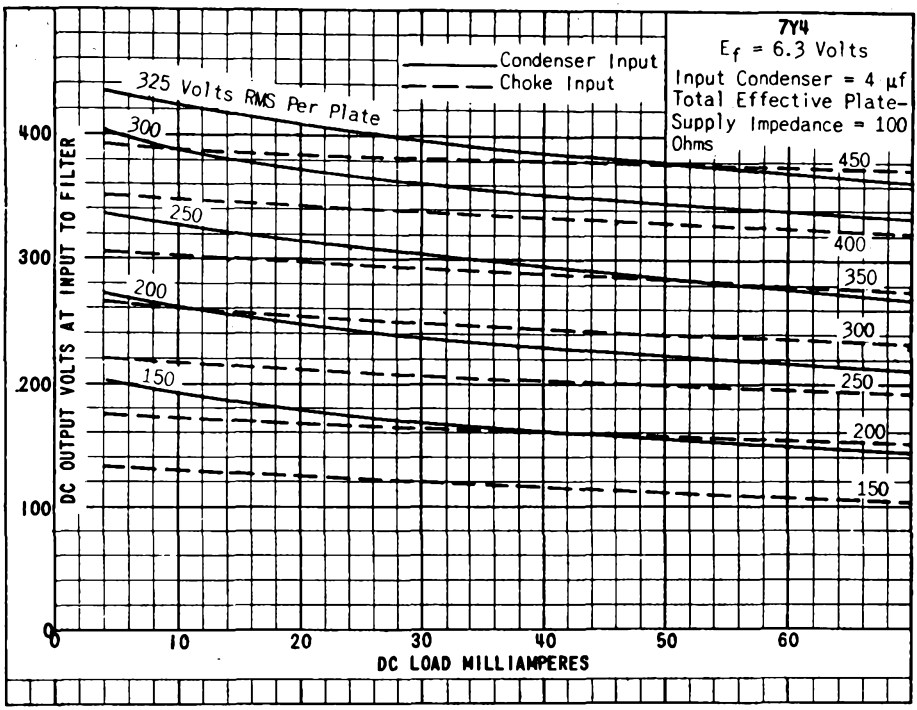
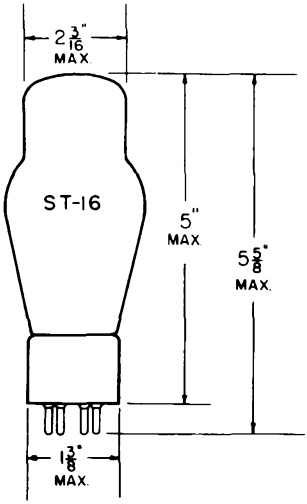


PLATE 2108
NOV. 1, 1948

TRIODE POWER AMPLIFIER



GLASS BULB

THORIATED TUNGSTEN FILAMENT

FILAMENT
7.5 VOLTS 1.25 AMPERES
AC OR DC

BOTTOM VIEW

MEDIUM 4-PIN BAYONET BASE

VERTICAL MOUNTING POSITION

TYPE 10 IS A HIGH-VACUUM, FILAMENT TYPE POWER AMPLIFIER TRIODE. IT MAY BE USED IN AUDIO STAGES AS A CLASS A AMPLIFIER OR, IN PUSH-PULL ARRANGEMENT, AS A CLASS B AMPLIFIER.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

CLASS A AMPLIFIER

FILAMENT VOLTAGE (AC OR DC)	7.5	VOLTS
FILAMENT CURRENT	1.25	AMP.
MAX. DC PLATE VOLTAGE	425	VOLTS
MAX. PLATE DISSIPATION	12	WATTS

CLASS B AMPLIFIER

FILAMENT VOLTAGE (AC OR DC)	7.5	VOLTS
FILAMENT CURRENT	1.25	AMP.
MAX. DC PLATE VOLTAGE	425	VOLTS
MAX. PLATE DISSIPATION (AVERAGED OVER ANY AF CYCLE)	12	WATTS
MAX.-SIGNAL, MAX. DC PLATE CURRENT (PER TUBE)	60	MA.
MAX.-SIGNAL, MAX. PLATE INPUT (PER TUBE)	25	WATTS

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

GRID TO PLATE	7	μμf
INPUT	4	μμf
OUTPUT	3	μμf

CONTINUED ON FOLLOWING PAGE

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PLATE 1628
NOV. 30 1945

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

AC FILAMENT VOLTAGE	7.5	7.5	7.5	VOLTS
DC PLATE VOLTAGE	250	350	425	VOLTS
DC GRID VOLTAGE[A]	-23.5	-32	-40	VOLTS
PEAK GRID SWING	18.5	27	35	VOLTS
DC PLATE CURRENT	10	16	18	MA.
CATHODE RESISTOR	2350	2000	2220	OHMS
PLATE RESISTANCE	6000	5150	5000	OHMS
LOAD RESISTANCE	13 000	11 000	10 200	OHMS
TRANSCONDUCTANCE	1330	1550	1600	µMHOS
AMPLIFICATION FACTOR	8	8	8	
UNDISTORTED POWER OUTPUT	0.4	0.9	1.6	WATTS

CLASS B AMPLIFIER
TWO TUBES

AC FILAMENT VOLTAGE	7.5	7.5	7.5	VOLTS
DC PLATE VOLTAGE	250	350	425	VOLTS
DC GRID VOLTAGE [A] (APPROX.)	-28	-40	-50	VOLTS
PEAK AF GRID VOLTAGE (APPROX.)	110	120	130	VOLTS
ZERO-SIGNAL DC PLATE CURRENT (PER TUBE)	4	4	4	MA.
MAX.-SIGNAL DC PLATE CURRENT (PER TUBE)	55	55	55	MA.
LOAD RESISTANCE (PER TUBE)	1000	1500	2000	OHMS
EFFECTIVE PLATE-TO-PLATE LOAD RESISTANCE	4000	6000	8000	OHMS
MAX.-SIGNAL DRIVING POWER (APPROX.)	2.1	2.3	2.5	WATTS
MAX.-SIGNAL POWER OUTPUT (APPROX.)	13	20	25	WATTS

[A] GRID-VOLTAGE MEASURED FROM MID-POINT OF AC OPERATED FILAMENT.

PLATE 1629
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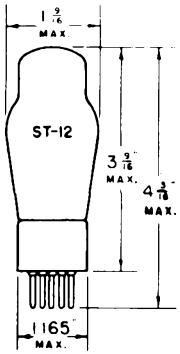
TUNG-SOL

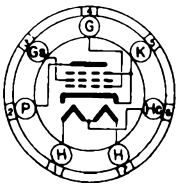


PENTODE POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS[A] 0.6 AMPERE
12.6 VOLTS[B] 0.3 AMPERE
AC OR DC

GLASS BUB



BOTTOM VIEW

SMALL 7 PIN BASE

THE TUNG-SOL 12A5 IS AN OUTPUT PENTODE WITH A CENTER TAPPED HEATER, SO THAT THE HEATER MAY BE OPERATED ON EITHER 6.3 VOLTS OR 12.6 VOLTS.

RATINGS

MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM SCREEN VOLTAGE	180	VOLTS
MAXIMUM PLATE DISSIPATION	8.25	WATTS
MAXIMUM SCREEN DISSIPATION	2.5	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	180	VOLTS
SCREEN VOLTAGE	100	180	VOLTS
CONTROL GRID VOLTAGE	−15	−25	VOLTS
PEAK AF SIGNAL VOLTAGE	15	25	VOLTS
ZERO-SIGNAL PLATE CURRENT	17	45	MA.
ZERO SIGNAL SCREEN CURRENT	3	8	MA.
MAXIMUM-SIGNAL PLATE CURRENT	19	48	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	6.5	14	MA.
PLATE RESISTANCE APPROX.	50 000	35 000	OHMS
TRANSCONDUCTANCE	1700	2400	μMHOS
LOAD RESISTANCE	4500	3300	OHMS
TOTAL HARMONIC DISTORTION	12	11	PER CENT
SECOND HARMONIC DISTORTION	8.5	6.5	PER CENT
THIRD HARMONIC DISTORTION	8	8	PER CENT
POWER OUTPUT	0.8	3.4	WATTS

[A] HEATERS CONNECTED IN PARALLEL

[B] HEATERS CONNECTED IN SERIES

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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PLATE 1323-2
SEPT. 23 1943

TUNG-SOL

BEAM POWER AMPLIFIER

PHYSICAL SPECIFICATIONS

EMITTER UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE INTER. SHELL OCTAL 7-PIN	PIN 1 NO CONN.	PIN 7 HEATER
CAP NONE	PIN 2 HEATER	PIN 8 CATH. & DEFL.
BULB T-9	PIN 3 PLATE	
MAXIMUM DIAMETER 1 5/16"	PIN 4 GRID 2	
MAXIMUM OVERALL LENGTH 3 1/4"	PIN 5 GRID 1	TOP CAP NONE
MAXIMUM SEATED HEIGHT 2 11/16"	PIN 6 NONE	

RATINGS

HEATER OR FILAMENT VOLTAGE	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMPS.
MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	7.5	WATTS
MAXIMUM SCREEN DISSIPATION	1.5	WATTS

RATINGS ARE TO BE INTERPRETED ACCORDING TO RMA STANDARD M8-210

CAPACITANCES

CONTROL GRID TO CATHODE	9.0	μμf
PLATE TO CATHODE	9.0	μμf
GRID TO PLATE	0.6 MAX.	μμf

WITH STANDARD RMA SHIELD M8-308

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER OR FILAMENT VOLTAGE	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMPS.
PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE	250	VOLTS
CONTROL GRID VOLTAGE	-12.5	VOLTS
PEAK AF SIGNAL VOLTAGE	12.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	30	MA.
ZERO-SIGNAL SCREEN CURRENT	3.5	MA.
MAXIMUM-SIGNAL PLATE CURRENT	32	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	5.5	MA.
PLATE RESISTANCE		MEGOHMS
TRANSCONDUCTANCE	3000	μMHOS
AMPLIFICATION FACTOR		
LOAD RESISTANCE	7500	OHMS
TOTAL HARMONIC DISTORTION	7	PER CENT
POWER OUTPUT	3.0	WATTS

THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER RATED MAXIMUM CONDITIONS FOR THE TYPE 12A6GT SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION.

PLATE 1303-1
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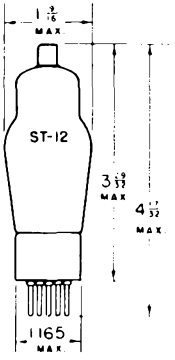
TUNG-SOL



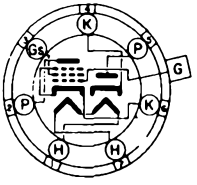
RECTIFIER

PENTODE POWER AMPLIFIER

UNIPOTENTIAL CATHODES

HEATER
12.6 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



BOTTOM VIEW

SMALL 7 PIN BASE

THE TUNG-SOL 12A7 COMBINES A HALF-WAVE RECTIFIER AND OUTPUT POWER AMPLIFIER IN A SINGLE BULB. IT IS DESIGNED FOR SERVICE IN AC – DC RECEIVERS.

OPERATING CONDITIONS AND CHARACTERISTICS

PENTODE UNIT – CLASS A_1 AMPLIFIER

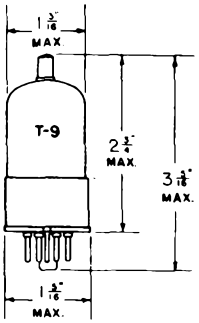
PLATE VOLTAGE	135	VOLTS
SCREEN VOLTAGE	135	VOLTS
CONTROL GRID VOLTAGE	-13.5	VOLTS
PLATE CURRENT	9.0	MA.
SCREEN CURRENT	2.5	MA.
PLATE RESISTANCE	102 000	OHMS
TRANSCONDUCTANCE	975	μMHOS
AMPLIFICATION FACTOR	100	
LOAD RESISTANCE	13 500	OHMS
POWER OUTPUT	0.55	WATT

RECTIFIER UNIT

AC VOLTAGE PER PLATE (RMS)	125 MAX.	VOLTS
DC OUTPUT CURRENT	30 MAX.	MA.

PLATE 1328-3 SEPT. 29 1943

TUNG-SOL



PENTAGRID CONVERTER

UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB

BOTTOM VIEW

SMALL WAFER 8 PIN OCTAL BASE WITH METAL SHELL

THE TUNG-SOL 12A8GT IS A PENTAGRID CONVERTER DESIGNED FOR SERVICE IN AC-DC OPERATED SUPERHETERODYNE RECEIVERS USING 150 MA. HEATER TUBES. WITH THE EXCEPTION OF HEATER RATINGS AND CAPACITANCES, ITS ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF TYPES 7B8, 6A8, 6A8G AND 6A8GT.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN (Gs) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN (Gs) VOLTAGE	100	VOLTS
MINIMUM EXTERNAL CONTROL GRID (G) BIAS VOLTAGE	0	VOLTS
MAXIMUM OSCILLATOR ANODE (Ga) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM OSCILLATOR ANODE (Ga) VOLTAGE	200	VOLTS
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	0.3	WATT
MAXIMUM OSCILLATOR ANODE (Ga) DISSIPATION	.75	WATT

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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PLATE
1324-3
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TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID (G) TO MIXER PLATE (P)	0.26 MAX.	μμf
CONTROL GRID (G) TO OSCILLATOR ANODE (G_A)	0.19 MAX.	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (G_O)	0.16 MAX.	μμf
OSCILLATOR GRID (G_O) TO OSCILLATOR ANODE (G_A)	1.1	μμf
RF INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES	9.5	μμf
OSCILLATOR INPUT: OSCILLATOR GRID (G_O) TO ALL OTHER ELECTRODES EXCEPT OSCILLATOR ANODE (G_A)	6.0	μμf
OSCILLATOR OUTPUT: OSCILLATOR ANODE (G_A) TO ALL OTHER ELECTRODES EXCEPT OSCILLATOR GRID (G_O)	4.6	μμf
MIXER OUTPUT: MIXER PLATE (P) TO ALL OTHER ELECTRODES	12	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

HEATER VOLTAGE	12.6	12.6	VOLTS
HEATER CURRENT	0.15	0.15	AMPERE
PLATE (P) VOLTAGE	100	250	VOLTS
SCREEN (G_S) VOLTAGE	50	100	VOLTS
CONTROL GRID (G) VOLTAGE	-1.5	-3	VOLTS
OSCILLATOR ANODE (G_A) SUPPLY VOLTAGE[A]	-	250	VOLTS
OSCILLATOR ANODE (G_A) VOLTAGE	100	-	VOLTS
OSCILLATOR GRID (G_O) RESISTOR	50 000	50 000	OHMS
PLATE CURRENT	1.1	3.5	MA.
SCREEN CURRENT	1.3	2.7	MA.
OSCILLATOR ANODE CURRENT	2.0	4.0	MA.
OSCILLATOR GRID CURRENT	25	0.4	MA.
TOTAL CATHODE CURRENT	4.6	10.6	MA.
PLATE RESISTANCE APPROX.	0.6	0.36	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -1.5 V.	360	-	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -3 V.	180	550	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -6 V.	50	325	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = -10 V.	-	100	μMHOS
CONVERSION TRANCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = -20 V.	3	-	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = -35 V.	-	6	μMHOS

[A] APPLIED THROUGH A PROPERLY BY-PASSED 20000 OHM DROPPING RESISTOR.

[S] WITH EXTERNAL SHIELD CONNECTED TO CATHODE.

NOTE: THE TRANSCONDUCTANCE OF THE OSCILLATOR SECTION (NOT OSCILLATING) IS APPROXIMATELY 1150 UMHOS, THE AMPLIFICATION FACTOR IS 75 AND THE OSCILLATOR ANODE CURRENT IS 4.0 MA. CONDITIONS: PLATE VOLTAGE = 250 V., OSCILLATOR ANODE VOLTAGE = 100 V., SCREEN VOLTAGE = 55 V., CONTROL GRID VOLTAGE = -2.0 V., AND THE OSCILLATOR GRID VOLTAGE = -1.0 V.

PLATE 1325-3
SEPT. 23 1943

TENTATIVE DATA

12AH7GT

TUNG-SOL

TWIN TRIODE

PHYSICAL SPECIFICATIONS

EMITTER	UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE	8-PIN OCTAL BAKELITE	PIN 1 GRID 1	PIN 7 HEATER
CAP	NONE	PIN 2 CATHODE 1	PIN 8 HEATER
BULB	T-9	PIN 3 PLATE 1	
MAXIMUM DIAMETER	1 5/16"	PIN 4 CATHODE 2	
MAXIMUM OVERALL LENGTH	3 1/16"	PIN 5 GRID 2	TOP CAP NONE
MAXIMUM SEATED HEIGHT	2 1/2"	PIN 6 PLATE 2	

RATINGS

HEATER OR FILAMENT VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER OR FILAMENT CURRENT	.150	AMPS.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE		VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MAXIMUM SCREEN DISSIPATION		WATTS

RATINGS ARE TO BE INTERPRETED ACCORDING TO RMA STANDARD M8-210

CAPACITANCES (WITH TIGHT FITTING SHIELD)

GRID TO CATHODE	3.2	2.9	MAX. μμf
PLATE TO CATHODE	3.0	2.6	MAX. μμf
GRID TO PLATE	2.2	3.0	MAX. μμf
PLATE TO PLATE	.4		MAX. μμf
GRID TO GRID	.06		MAX. μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

(EACH TRIODE SECTION)

HEATER OR FILAMENT VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER OR FILAMENT CURRENT	.150	AMPS.
PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE		VOLTS
GRID VOLTAGE	-9	VOLTS
PEAK AF SIGNAL VOLTAGE		VOLTS
PLATE CURRENT	12	MA.
ZERO-SIGNAL SCREEN CURRENT		MA.
MAXIMUM-SIGNAL PLATE CURRENT		MA.
MAXIMUM-SIGNAL SCREEN CURRENT		MA.
PLATE RESISTANCE	6600	OHMS
TRANSCONDUCTANCE	2400	μMHOS
AMPLIFICATION FACTOR	16	
PLATE CURRENT WITH EC = -30 VOLTS	10	MMA

GENERAL DESCRIPTION

APPLICATION: THE 12AH7GT IS A CATHODE TYPE OF TUBE CONSISTING OF TWO TRIODES WITHIN A SINGLE ENVELOPE. IT WAS DESIGNED FOR USE IN CONVERTER AND AUDIO APPLICATIONS. THE 12AH7GT IS A GLASS TUBE EQUIPPED WITH AN OCTAL BASE.

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PLATE 1317-1
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TUNG-SOL

TRIPLE GRID REMOTE CUT-OFF AMPLIFIER

PHYSICAL SPECIFICATIONS

EMITTER	UNIPOTENTIAL CATHODE	PIN CONNECTIONS			
BASE	LOCKING-IN 8 PIN	PIN 1	HEATER	PIN 7	CATHODE
CAP	NONE	PIN 2	PLATE	PIN 8	HEATER
BULB	T-9	PIN 3	GRID 2		
MAXIMUM DIAMETER	1 3/16"	PIN 4	GRID 3		
MAXIMUM OVERALL LENGTH	2 25/32"	PIN 5	INT. SHIELD	TOP CAP	NONE
MAXIMUM SEATED HEIGHT	2 1/4"	PIN 6	GRID 1		

RATINGS

HEATER OR FILAMENT VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMPS.
MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM PLATE DISSIPATION		WATTS
MAXIMUM SCREEN DISSIPATION		WATTS

CAPACITANCES [4]

CONTROL GRID TO CATHODE	5.5		μμf
PLATE TO CATHODE	7.0		μμf
GRID TO PLATE	0.005	MAX.	μμf

4 WITH EXTERNAL SHIELD CONNECTED TO CATHODE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

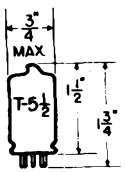
HEATER OR FILAMENT VOLTAGE	12.6	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	0.15	AMPS.
PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE (GRID 2)	100	100	VOLTS
CONTROL GRID VOLTAGE (GRID 1)	-3	-3	VOLTS
PEAK AF SIGNAL VOLTAGE			VOLTS
ZERO-SIGNAL PLATE CURRENT	8.9	9.2	MA.
ZERO-SIGNAL SCREEN CURRENT	2.6	2.4	MA.
MAXIMUM-SIGNAL PLATE CURRENT			MA.
MAXIMUM-SIGNAL SCREEN CURRENT			MA.
PLATE RESISTANCE (APPROX.)	0.25	0.8	MEGOHMS
TRANSCONDUCTANCE	1900	2000	μMHOS
AMPLIFICATION FACTOR			
LOAD RESISTANCE			OHMS
TOTAL HARMONIC DISTORTION			PER CENT
POWER OUTPUT			WATTS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE 10 μMHOS (APPROX.)		-35	VOLTS
SUPRESSOR GRID VOLTAGE	0	0	VOLTS

PLATE 1329-2
SEPT. 23 1943

TUNG-SOL

DOUBLE DIODE

MINIATURE TYPE

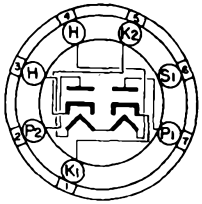


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 12AL5 COMBINES TWO INDEPENDENT DIODE UNITS IN THE 7-PIN MINIATURE CONSTRUCTION. ITS HIGH PERVEANCE PERMITS HIGH EFFICIENCY IN EITHER FM OR AM DETECTOR SERVICE.

DIRECT INTERELECTRODE CAPACITANCES

	EXTERNAL SHIELD	NO EXTERNAL SHIELD	
PLATE TO CATHODE, HEATER AND INTERNAL SHIELD: P TO (H+K+IS) EACH UNIT	3.2[A]	2.5	μμf
CATHODE TO PLATE, HEATER AND INTERNAL SHIELD: K TO (P+H+IS) EACH UNIT	3.6[B]	3.6	μμf
PLATE #1 TO PLATE #2: (P_1 TO P_2)	0.02[C]	0.08	μμf

[A] CLOSE-FITTING EXTERNAL SHIELD CONNECTED TO CATHODE.

[B] CLOSE-FITTING EXTERNAL SHIELD CONNECTED TO PLATE.

[C] CLOSE-FITTING EXTERNAL SHIELD CONNECTED TO GROUND.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	330	VOLTS
MAXIMUM PEAK INVERSE PLATE VOLTAGE	330	VOLTS
MAXIMUM PEAK PLATE CURRENT EACH PLATE	54	MA.
MAXIMUM DC OUTPUT CURRENT EACH PLATE	9	MA.
TUBE VOLTAGE DROP (MEASURED WITH TUBE CONDUCTING 60 MA. EACH PLATE)	10	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HALF-WAVE RECTIFIER

IN HALF-WAVE SERVICE THE TWO UNITS MAY BE USED SEPARATELY OR IN PARALLEL.

HEATER VOLTAGE	12.6	VOLTS
HEATER CURRENT	150	MA.
AC PLATE VOLTAGE EACH PLATE (RMS)	117	VOLTS
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE EACH PLATE	300	OHMS
DC OUTPUT CURRENT EACH PLATE	9	MA.

THE RESONANT FREQUENCY OF EACH UNIT IS 700 MC APPROX.

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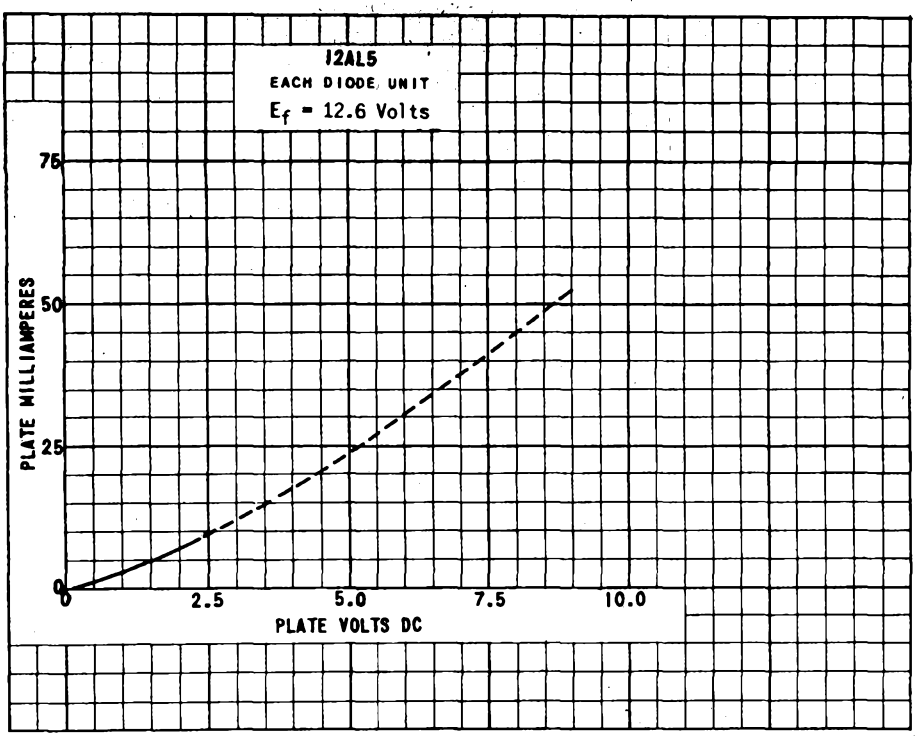
PLATE 1929
DEC. 1, 1947

12AL5



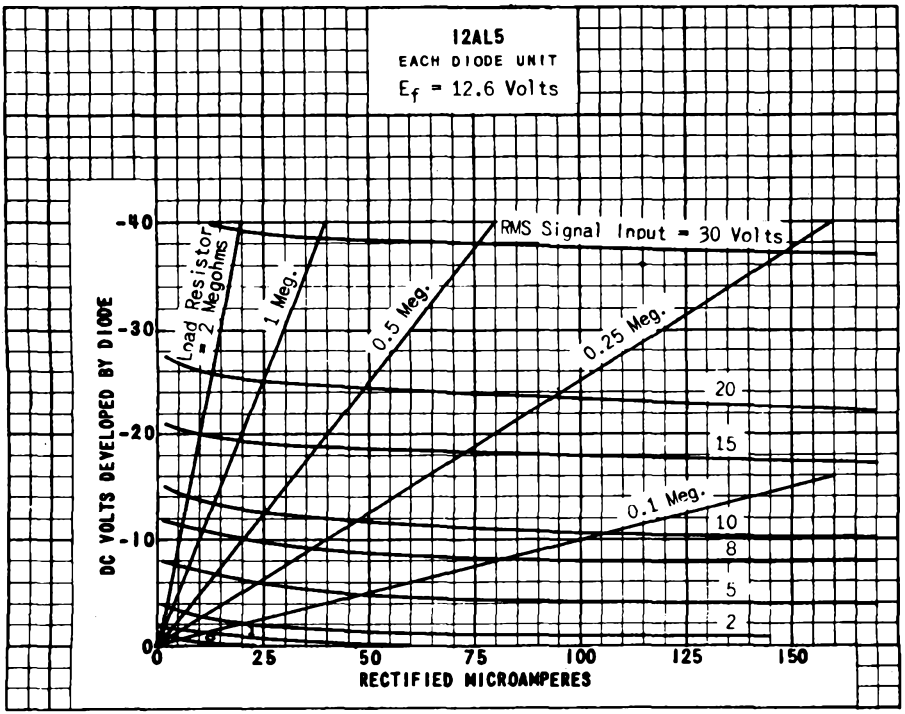


PLATE 1930
DEC. 2, 1947

TUNG-SOL

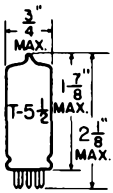
DOUBLE-DIODE TRIODE

MINIATURE TYPE

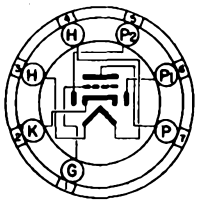
UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.15 AMPERE
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 12AT6 IS A COMBINED HIGH-MU VOLTAGE AMPLIFIER AND DOUBLE-DIODE DETECTOR USING THE 7-PIN MINIATURE CONSTRUCTION. IT IS INTENDED TO PROVIDE OUTPUT VOLTAGE ADEQUATE FOR FULL POWER OUTPUT OF MOST BEAM-POWER TUBES.

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G TO P)	2.1	μμf
INPUT: G TO (H + K)	2.3	μμf
OUTPUT: P TO (H + K)	1.1	μμf
DIODE PLATE #2 TO TRIODE GRID: (P_2 TO G)(MAX.)	0.025	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED	0.8	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

TRIODE UNIT - CLASS A_1 AMPLIFIER

HEATER VOLTAGE	12.6	12.6	VOLTS
HEATER CURRENT	0.15	0.15	AMP.
PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1	-3	VOLTS
PLATE CURRENT	0.8	1.0	MA.
PLATE RESISTANCE	54 000	58 000	OHMS
TRANSCONDUCTANCE	1 300	1 200	μMHOS
AMPLIFICATION FACTOR	70	70	

DIODE UNITS - TWO

THE DIODE UNITS ARE INDEPENDENT OF THE TRIODE UNIT EXCEPT FOR THE COMMON CATHODE SLEEVE.

SIMILAR TYPE REFERENCE: *Except for heater ratings somewhat similar to 6Q7, 6Q7GT, 6SQ7, 6SQ7GT, 786, 7C6.*

→ INDICATES A CHANGE OR ADDITION.

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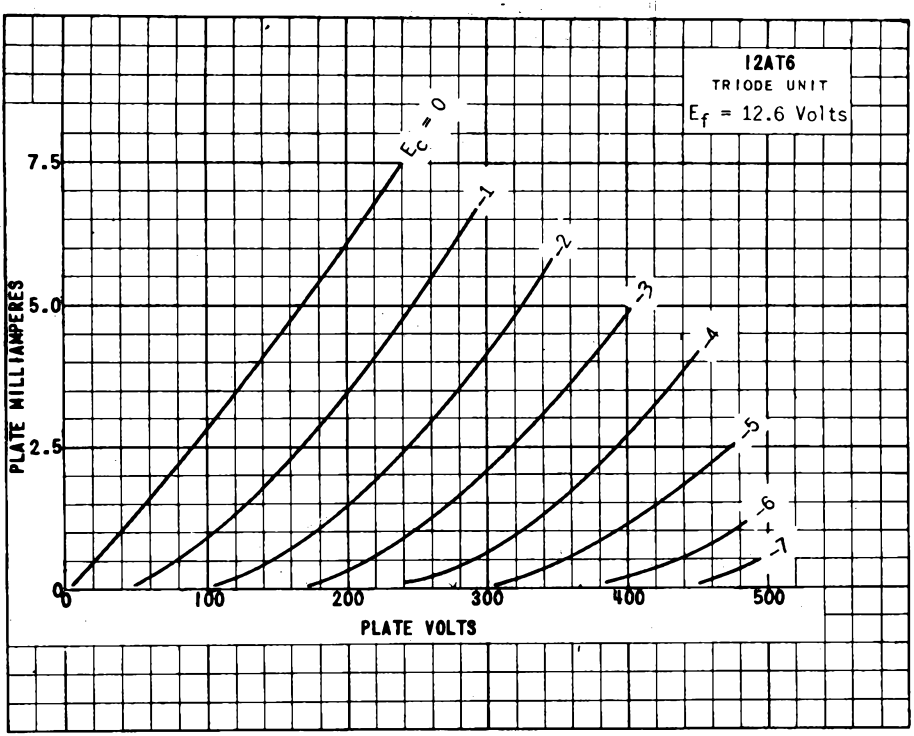
PLATE 1847
JULY 1, 1947

12AT6



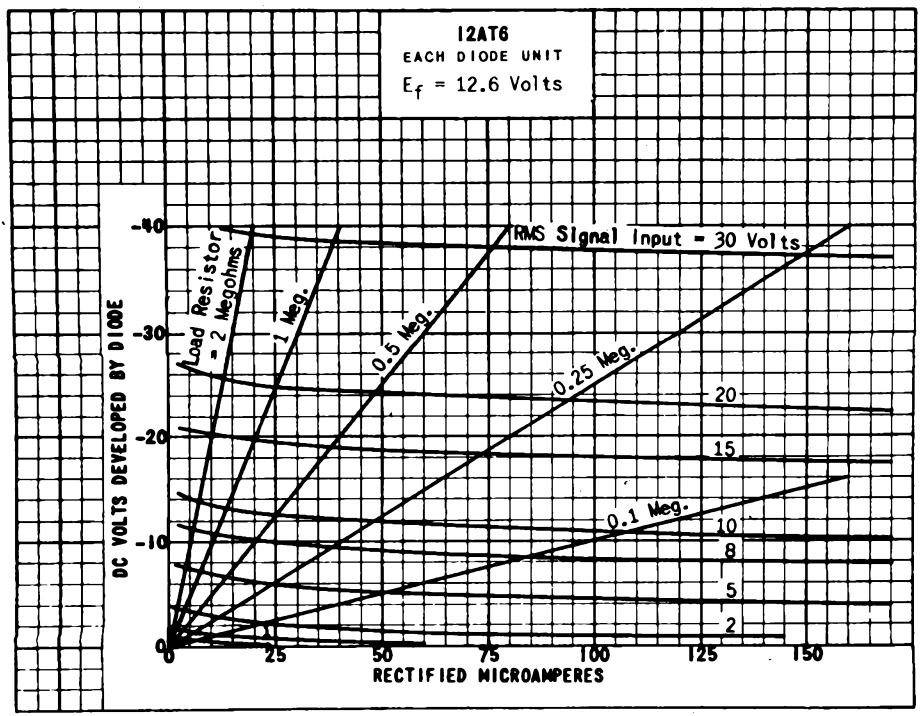


PLATE 1848
JULY 1, 1947

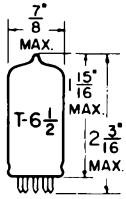
TUNG-SOL

DOUBLE TRIODE

MINIATURE TYPE

COATED UNIPOTENTIAL CATHODES

HEATER



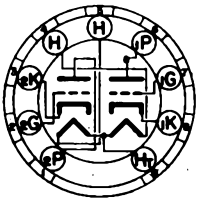
GLASS BULB

SERIES	PARALLEL
12.6 VOLTS 150 MA.	6.3 VOLTS 300 MA.

AC OR DC

FOR 12.6 VOLT OPERATION APPLY HEATER VOLTAGE BETWEEN PINS #4 AND #5. FOR 6.3 VOLT OPERATION APPLY HEATER VOLTAGE BETWEEN PIN #9 AND PINS #4 AND #5 CONNECTED TOGETHER.

ANY MOUNTING POSITION



BOTTOM VIEW
SMALL BUTTON
9 PIN BASE

THE 12AT7 COMBINES TWO HIGH TRANSCONDUCTANCE TRIODES IN A 9 PIN MINIATURE CONSTRUCTION. ITS LOW CAPACITANCE AND HIGH RATIO OF PLATE CURRENT TO TRANSCONDUCTANCE ADAPT IT TO USE AS A HIGH FREQUENCY COMBINED OSCILLATOR AND MIXER OR AS A GROUNDED GRID RADIO FREQUENCY AMPLIFIER.

DIRECT INTERELECTRODE CAPACITANCES

	WITHOUT SHIELD	WITH SHIELD #316[A]	
INPUT: G TO (H+K) (EACH SECTION)	2.2	2.2	μμf
OUTPUT: P TO (H+K) (SECTION #1)	0.5	1.2	μμf
(SECTION #2)	0.4	1.5	μμf
GRID TO PLATE: (G TO P) (EACH SECTION)	1.5	1.5	μμf
HEATER TO CATHODE: (H TO K) (EACH SECTION)	2.4	2.4	μμf

GROUNDED GRID	WITHOUT SHIELD	WITH SHIELD #316[B]	
INPUT: K TO (H+G) (EACH SECTION)	4.6	4.6	μμf
OUTPUT: P TO (H+G) (EACH SECTION)	1.8	2.6	μμf
PLATE TO CATHODE: (P TO K) (EACH SECTION)	0.2	0.2	μμf

[A] CONNECTED TO CATHODE OF SECTION UNDER TEST.

[B] CONNECTED TO GRID OF SECTION UNDER TEST.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

EACH TRIODE UNIT

HEATER VOLTAGE	12.6	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90		VOLTS
MAXIMUM PLATE VOLTAGE	300		VOLTS
MAXIMUM NEGATIVE DC GRID VOLTAGE	-50		VOLTS
MAXIMUM PLATE DISSIPATION	2.5		WATTS

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION.

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PLATE 2070
SEPT. 1 1949

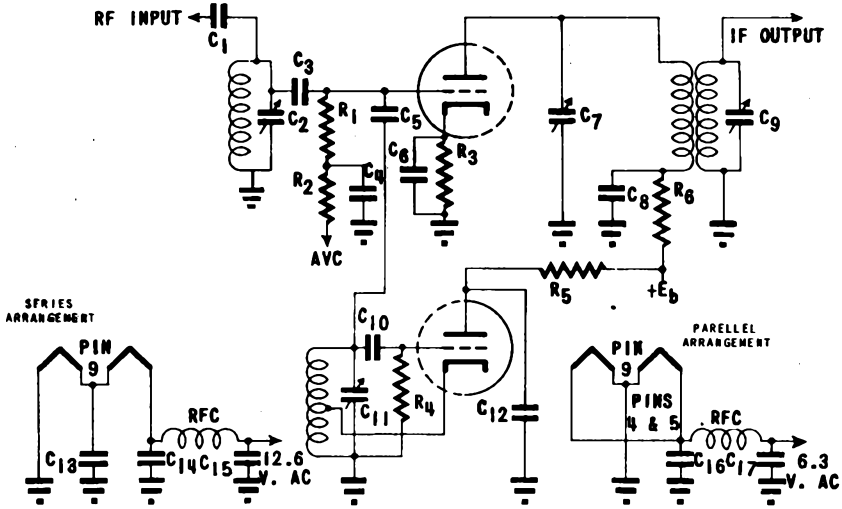
CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER – EACH TRIODE UNIT

HEATER VOLTAGE	12.6	6.3	12.6	6.3	VOLTS
HEATER CURRENT	150	300	150	300	MA.
PLATE VOLTAGE	100		250		VOLTS
CATHODE BIAS RESISTOR	270		200		OHMS
PLATE CURRENT	3.7		10		MA.
PLATE RESISTANCE	15 000		10 900		OHMS
TRANSCONDUCTANCE	4 000		5 500		μMHOS
AMPLIFICATION FACTOR	60		60		
GRID VOLTAGE (APPROX.) FOR I_b = 10 μA.	-5		-12		VOLTS

TYPICAL CIRCUIT FOR CONVERTER OPERATION AT 100 MEGACYCLES



C_1 = 100 μμF
C_2 = RF TUNING CAPACITOR
C_3 = 25 μμF
C_4 = 1000 μμF
C_5 = 1 μμF
C_6 = 1000 μμF

C_7 = 50 μμF (MAX.)
C_8 = 1000 μμF
C_9 = 50 μμF (MAX.)
C_{10} = 50 μμF
C_{11} = OSCILLATOR TUNING CAPACITOR
C_{12} = 1000 μμF

C_{13} = 1000 μμF
C_{14} = 1000 μμF
C_{15} = 1000 μμF
C_{16} = 1000 μμF
C_{17} = 1000 μμF
R_1 = 50000 OHMS

R_2 = 50000 OHMS
R_3 = 2000 OHMS
R_4 = 10000 OHMS
R_5 = 1000 OHMS
R_6 = 1000 OHMS
E_b = 100 OR 250 VOLTS

OSCILLATOR VOLTAGE APPLIED TO MIXER SHOULD BE JUST SUFFICIENT TO CAUSE GRID CURRENT TO FLOW IN THE MIXER SECTION.

→ INDICATES A CHANGE OR ADDITION.

PLATE 2071
SEPT. 1 1948

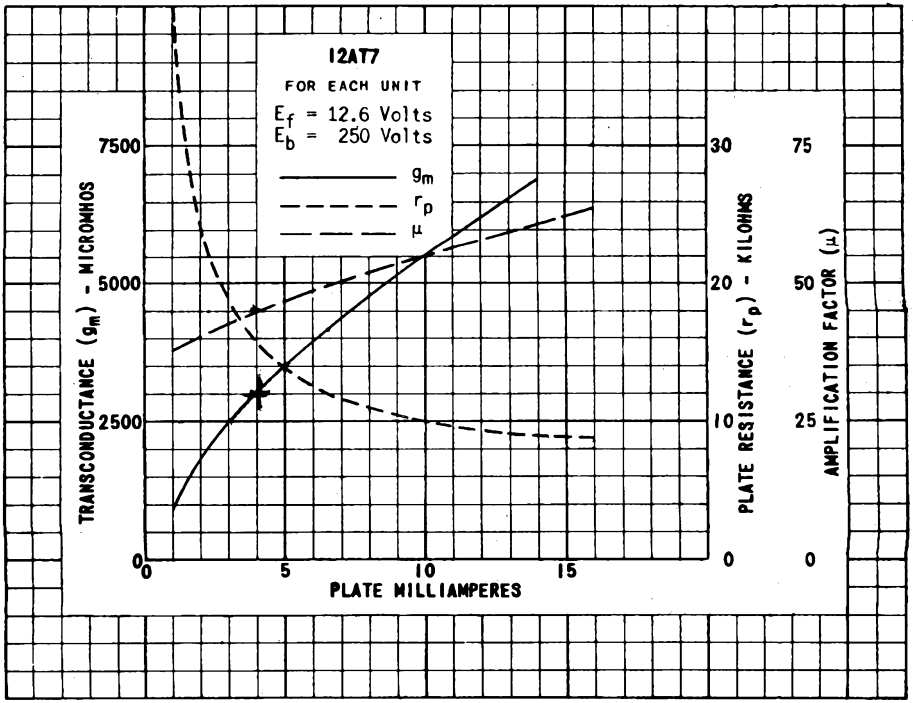


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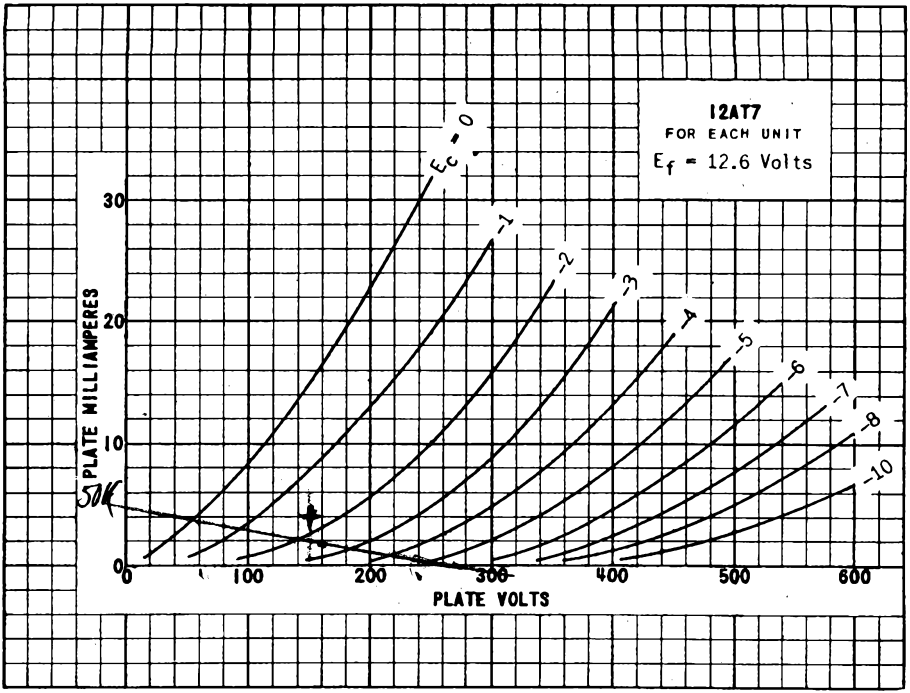
PLATE
1894
OCT. 1,
1947

5000 | 25000

12AT7



TUNG-SOL

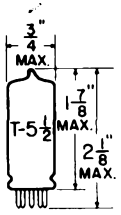
PENTODE

MINIATURE TYPE

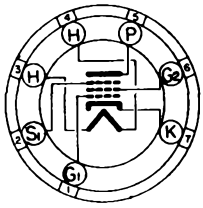
UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 12AU6 IS A PENTODE AMPLIFIER HAVING A SHARP CUT-OFF CONTROL CHARACTERISTIC USING THE MINIATURE CONSTRUCTION. WITH HIGH TRANSCONDUCTANCE, LOW GRID-PLATE CAPACITANCE, IT IS INTENDED FOR SERVICE AS EITHER AN AF OR RF AMPLIFIER.

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
HEATER CURRENT	150	MA.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	150	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM GRID VOLTAGE:		
NEGATIVE BIAS	50	VOLTS
POSITIVE BIAS	0	VOLTS
MAXIMUM PLATE DISSIPATION	3	WATTS
MAXIMUM SCREEN DISSIPATION	0.65	WATTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

GRID TO PLATE (MAX.)	0.0035	μμf
INPUT	5.5	μμf
OUTPUT	5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	250	VOLTS
SCREEN VOLTAGE	100	125	150	VOLTS
GRID VOLTAGE	-1	-1	-1	VOLT
SUPPRESSOR VOLTAGE	0	0	0	VOLTS
PLATE CURRENT	5.2	7.6	10.8	MA.
SCREEN CURRENT	2.0	3.0	4.3	MA.
PLATE RESISTANCE (APPROX.)	0.5	1.5	1	MEGOHMS
TRANSCONDUCTANCE	3 900	4 450	5 200	μMHOS
GRID VOLTAGE FOR PLATE CURRENT = 10 μA.	-4.2	-5.2	-6.2	VOLTS

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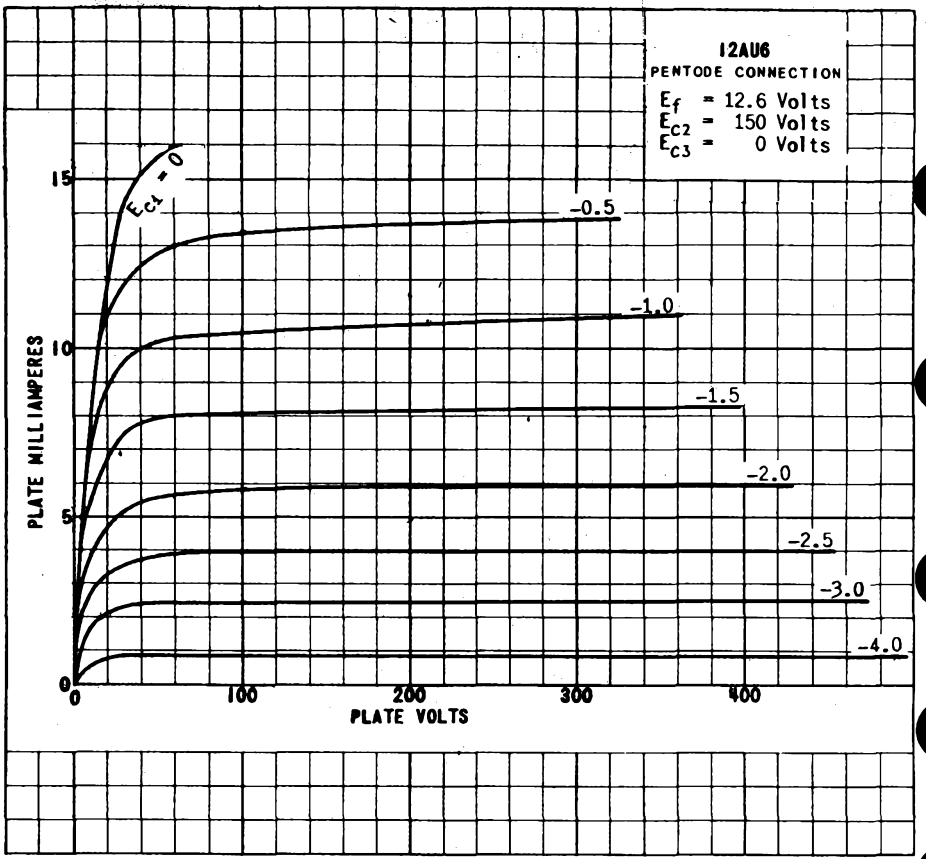
PLATE 1658
AUG. 1, 1947

12AU6



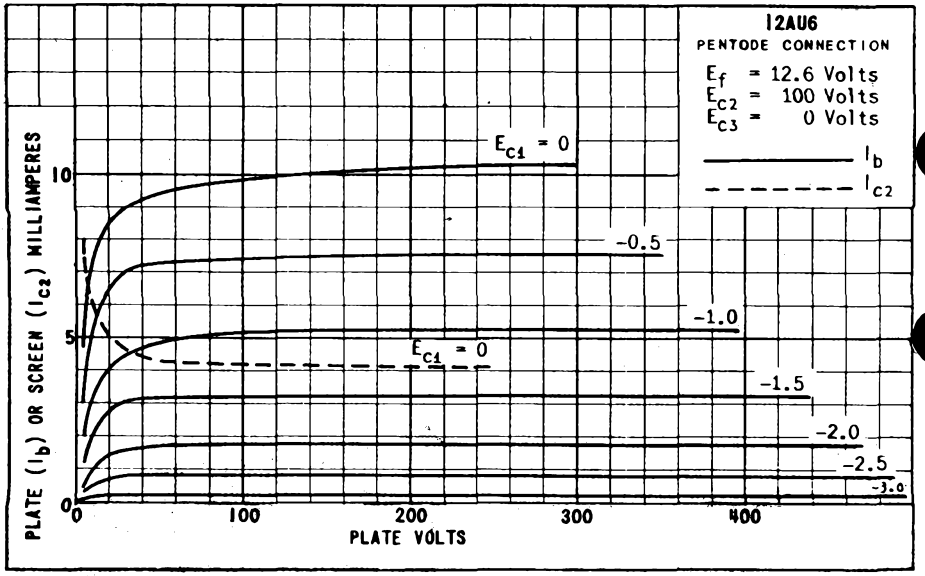
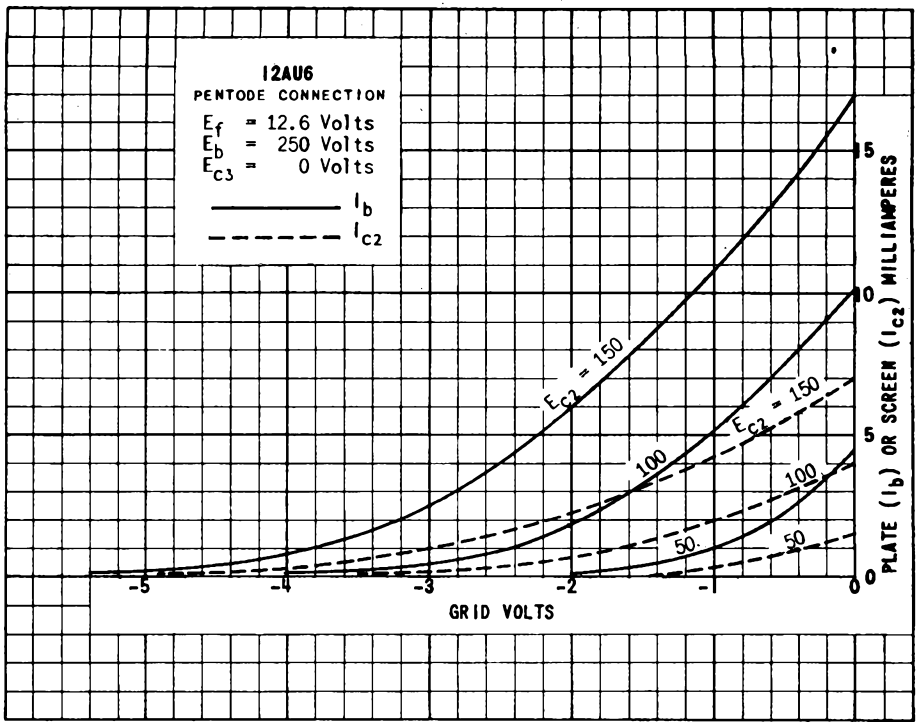


PLATE 1859
AUG. 1, 1947



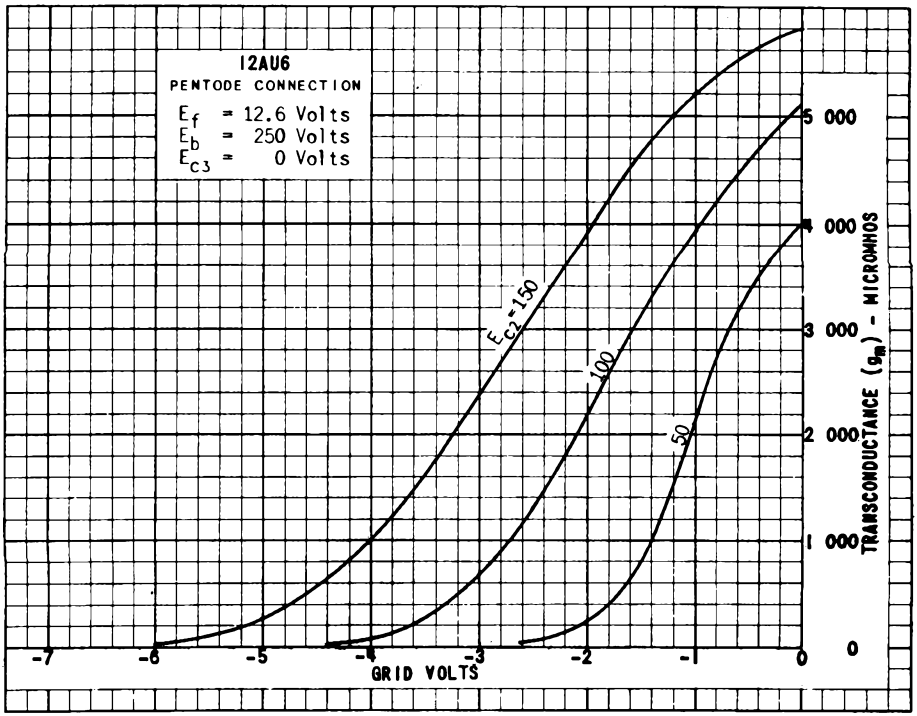


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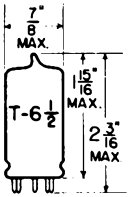
PLATE
1860
AUG. 1,
1947

TUNG-SOL

DOUBLE TRIODE

UNIPOTENTIAL CATHODES

HEATER

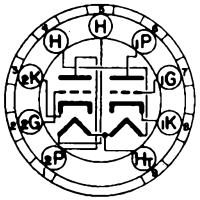


GLASS BULB

SERIES	PARALLEL
12.6 VOLTS	6.3 VOLTS
150 MA.	300 MA.

AC OR DC

FOR 12.6 VOLT OPERATION APPLY HEATER VOLTAGE BETWEEN PINS #4 AND #5. FOR 6.3 VOLT OPERATION APPLY HEATER VOLTAGE BETWEEN PIN #9 AND PINS #4 AND #5 CONNECTED TOGETHER.



BOTTOM VIEW
SMALL BUTTON
9 PIN BASE

ANY MOUNTING POSITION

THE 12AU7 COMBINES TWO INDEPENDENT MEDIUM-MU INDIRECTLY HEATED CATHODE TYPE TRIODES IN THE SMALL 9 PIN BUTTON CONSTRUCTION. IT IS ADAPTABLE TO APPLICATION EITHER AS AN AUDIO FREQUENCY AMPLIFIER OR AS COMBINED OSCILLATOR AND MIXER.

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

	TRIODE UNIT 1	TRIODE UNIT 2	
GRID TO PLATE: (G TO P)	1.5	1.5	μμf
INPUT: G TO (H + K)	1.6	1.6	μμf
OUTPUT: P TO (H + K)	0.50	0.35	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

EACH TRIODE UNIT

HEATER VOLTAGE	12.6	6.3	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	180		VOLTS
MAXIMUM PLATE VOLTAGE	300		VOLTS
MAXIMUM PLATE DISSIPATION	2.75		WATTS
MAXIMUM CATHODE CURRENT	20		MA.
MAXIMUM GRID CIRCUIT RESISTANCE (FIXED BIAS)	0.25		MEGOHM
MAXIMUM GRID CIRCUIT RESISTANCE (SELF BIAS)	1.0		MEGOHM

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER – EACH TRIODE UNIT

HEATER VOLTAGE	12.6	6.3	12.6	6.3	VOLTS
HEATER CURRENT	150	300	150	300	MA.
PLATE VOLTAGE	100		250		VOLTS
GRID VOLTAGE	0		-8.5		VOLTS
PLATE CURRENT	11.8		10.5		MA.
PLATE RESISTANCE	6 250		7 700		OHMS
TRANSCONDUCTANCE	3 100		2 200		μMHOS
AMPLIFICATION FACTOR	19.5		17		

SIMILAR TYPE REFERENCE: Each unit is identical to 6C4.

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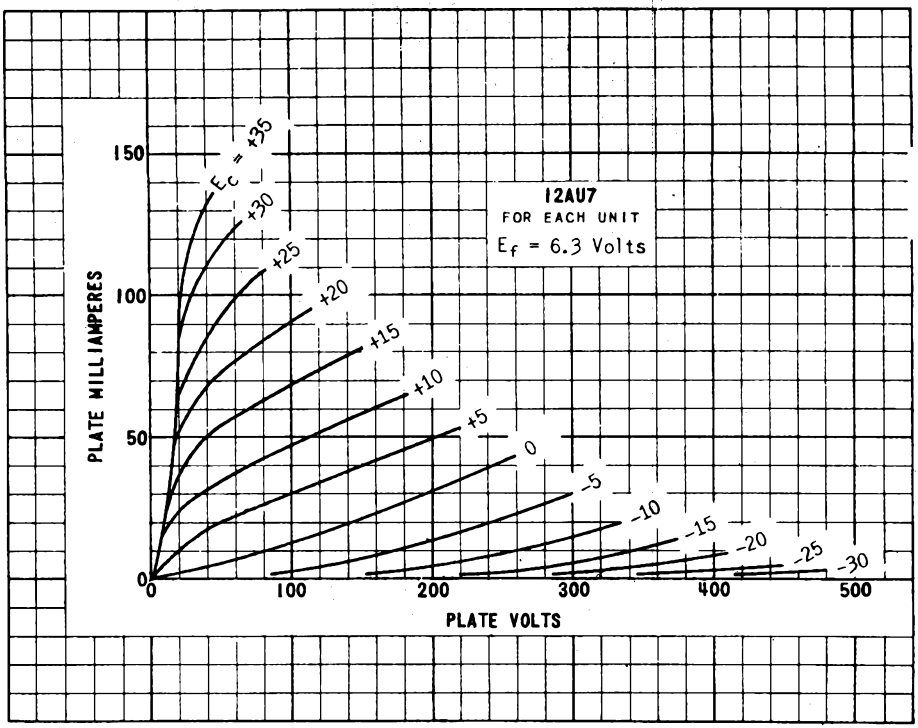
PLATE 1861
AUG. 1, 1947

12AU7



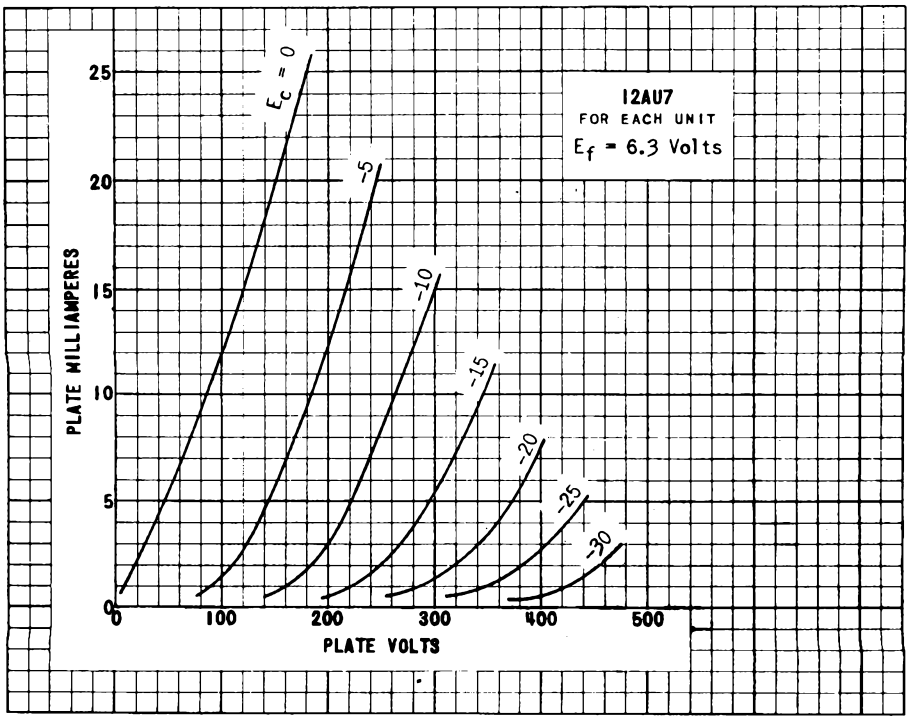


PLATE 1862
AUG. 1, 1947

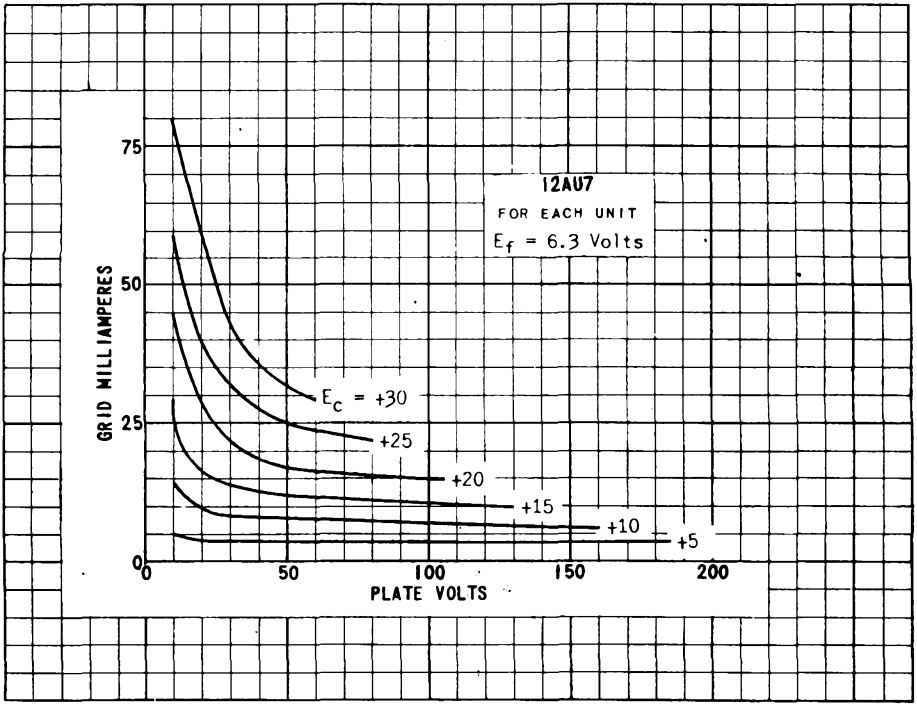


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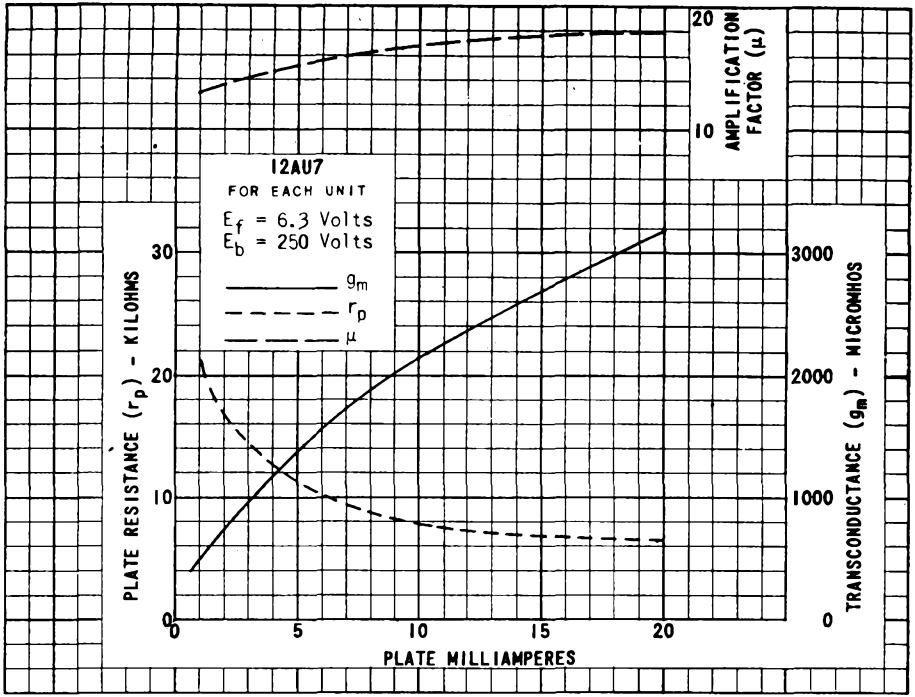
PLATE
1863
AUG. 1,
1947


12AU7
FOR EACH UNIT
E_f = 6.3 Volts
E_b = 250 Volts
g_m
r_p
μ
PLATE RESISTANCE (r_p) - KILOHMS
AMPLIFICATION FACTOR (μ)
TRANSCONDUCTANCE (g_m) - MICROMHOS
PLATE MILLIAMPERES
0
5
10
15
20
0
10
20
30
0
1000
2000
3000

TUNG-SOL

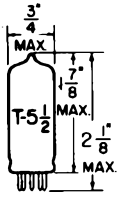
DOUBLE-DIODE TRIODE

MINIATURE TYPE

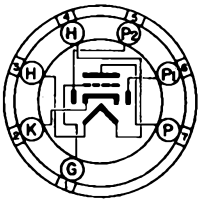
COATED UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 12AV6 COMBINES A HIGH MU-TRIODE AND TWO INDEPENDENT DIODE UNITS IN THE 7-PIN MINIATURE CONSTRUCTION. IT PERMITS A SINGLE TUBE TO FUNCTION AS DETECTOR, AVC RECTIFIER, AND AUDIO AMPLIFIER. COUPLING BETWEEN THE DIODE AND TRIODE SECTIONS IS MINIMIZED BY THE USE OF INTERNAL SHIELDING.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	12.6	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM DIODE CURRENT EACH PLATE FOR CONTINUOUS OPERATION	1.0	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

TRIODE UNIT - CLASS A_1 AMPLIFIER

FILAMENT VOLTAGE	12.6	12.6	VOLTS
FILAMENT CURRENT	150	150	MA.
PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1	-2	VOLTS
PLATE CURRENT	0.5	1.2	MA.
PLATE RESISTANCE	80 000	62 500	OHMS
TRANSCONDUCTANCE	1 250	1 600	µMHOS
AMPLIFICATION FACTOR	100	100	

DIODE UNITS - TWO

THE DIODE UNITS ARE INDEPENDENT OF THE TRIODE UNIT EXCEPT FOR THE COMMON CATHODE SLEEVE.

DIODE BIASING OF THE TRIODE UNIT IS NOT SUITABLE.

SIMILIAR TYPE REFERENCE: Ratings and Characteristics somewhat similiar to 12AT6 except for the use of more thorough shielding of the diode units from the triode.

CONTINUED ON FOLLOWING PAGE

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PLATE 1969
FEB. 2, 1948

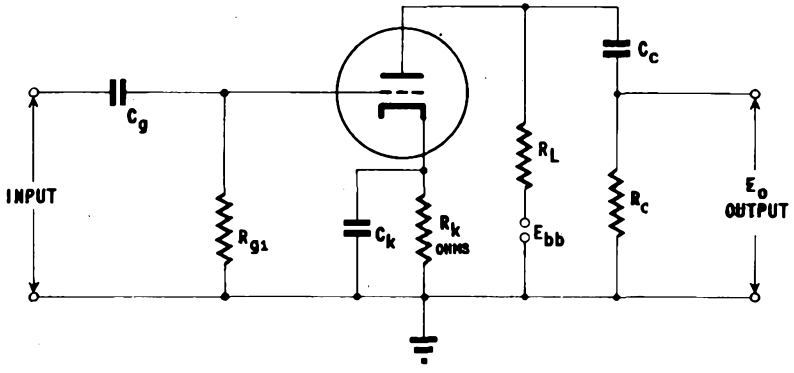
CONTINUED FROM PRECEDING PAGE

RESISTANCE COUPLED AMPLIFIER

R_L MEG.	R_c MEG.	E_{bb} = 90 VOLTS			E_{bb} = 180 VOLTS			E_{bb} = 300 VOLTS		
		R_k	GAIN	E_o	R_k	GAIN	E_o	R_k	GAIN	E_o
0.1	0.22	4700	35[A]	4	2000	47	18	1500	52	40
0.22	0.47	7400	45[B]	6	3500	59	24	2800	65	49
0.47	1.0	13000	52[C]	8	6700	66	28	5200	73	54

E_o IS RMS OUTPUT AT GRID CURRENT POINT.
GAIN MEASURED AT 5.0 VOLTS RMS OUTPUT EXCEPT AS INDICATED.

[A] OUTPUT VOLTAGE OF 2 VOLTS RMS.
[B] OUTPUT VOLTAGE OF 3 VOLTS RMS.
[C] OUTPUT VOLTAGE OF 4 VOLTS RMS.



NOTE: COUPLING CAPACITORS C_g AND C_c SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE. R_k SHOULD BE ADEQUATELY BY-PASSED BY CAPACITOR C_k.

PLATE 1970
FEB. 2, 1947

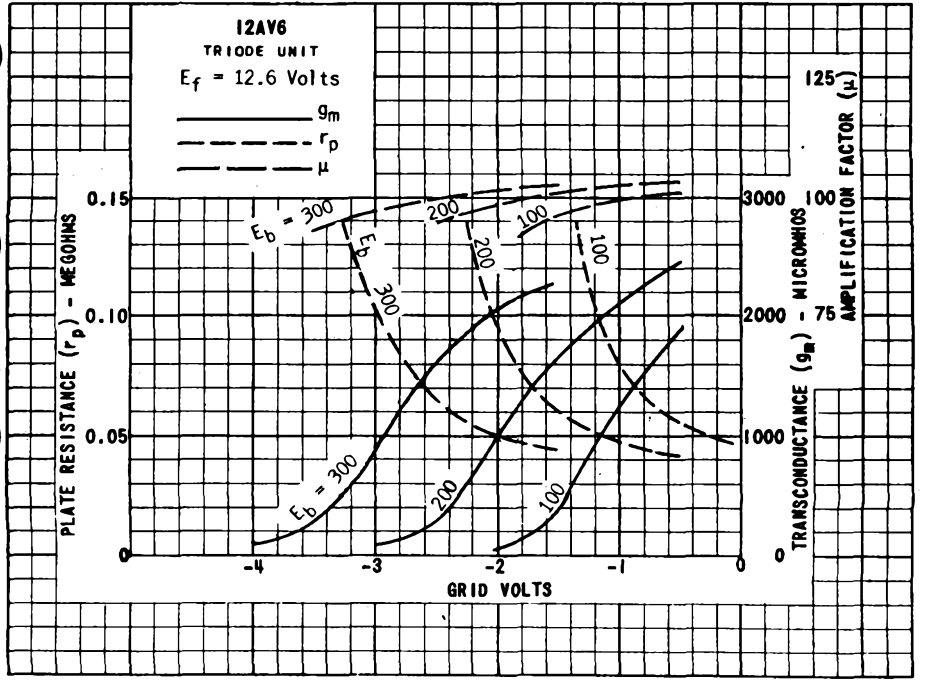


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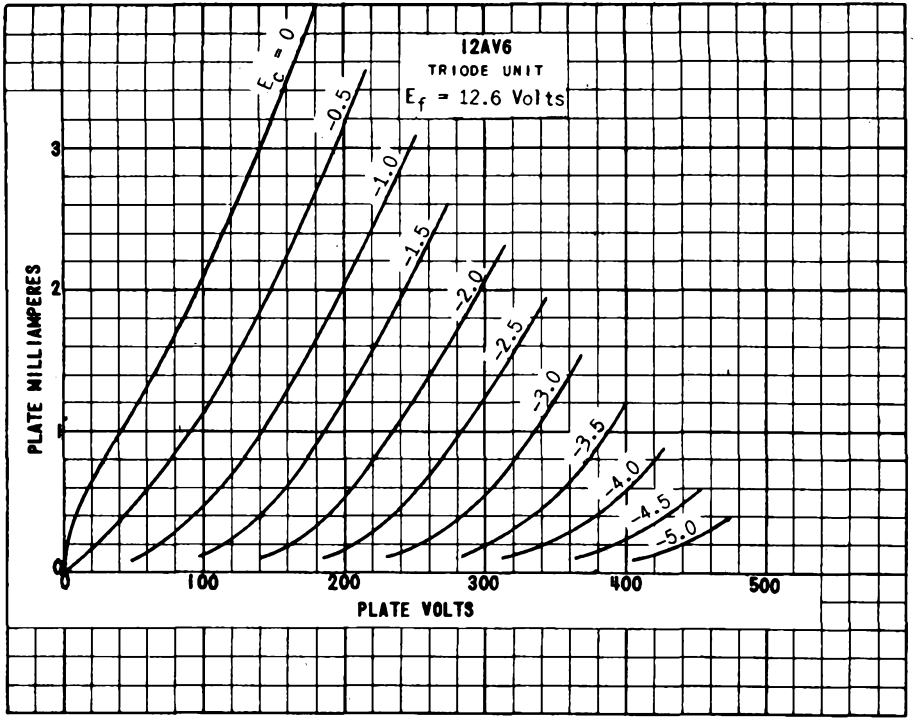
PLATE
1971
FEB. 2,
1948


12AV6
TRIODE UNIT
E_f = 12.6 Volts
E_c = 0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
PLATE MILLIAMPERES
0
1
2
3
0
100
200
300
400
500
PLATE VOLTS

12AV6

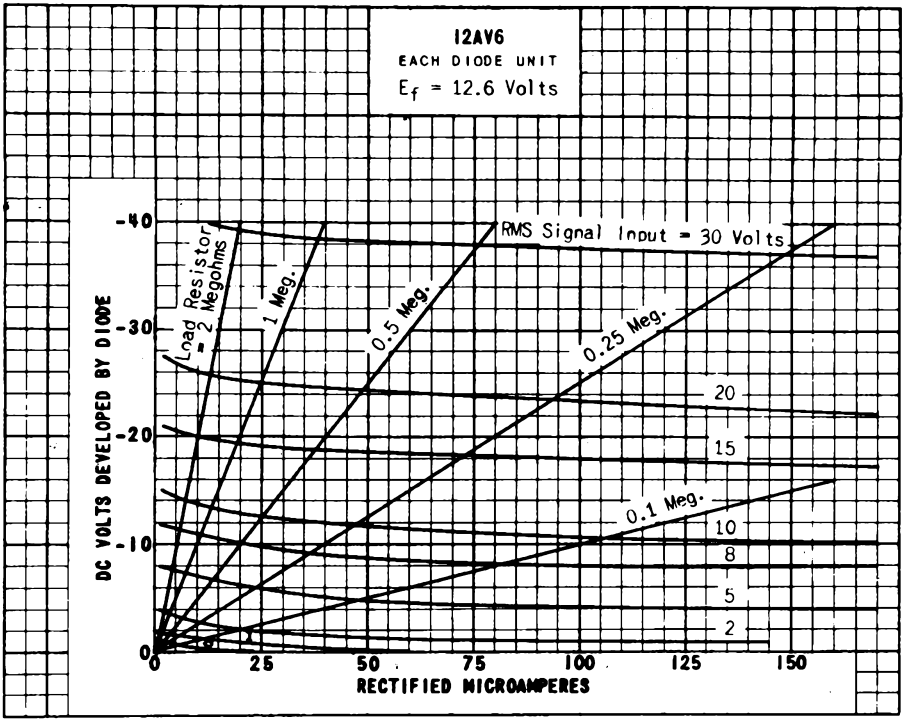
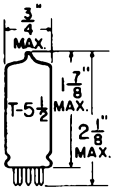


PLATE 1972
FEB. 2, 1948

TUNG-SOL

PENTODE

MINIATURE TYPE

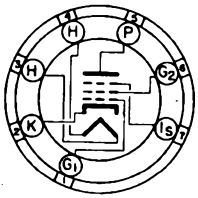


GLASS BULB

UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 12AW6 IS A MINIATURE TYPE RF PENTODE HAVING A SHARP CUT-OFF CHARACTERISTIC AND A HIGH VALUE OF TRANSCONDUCTANCE. IN COMPACT, LIGHT-WEIGHT EQUIPMENT IT IS USEFUL AS AN RF AMPLIFIER UP TO ABOUT 400 MEGACYCLES, AND AS A HIGH-FREQUENCY, INTERMEDIATE AMPLIFIER. IT HAS LOW INPUT AND OUTPUT CAPACITANCES AND A SEPARATE SUPPRESSOR CONNECTION ALL OF WHICH CONTRIBUTE TO ITS HIGH FREQUENCY PERFORMANCE. THE 12AW6 IS ELECTRICALLY EQUIVALENT TO TYPE 6AG5.

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G_1 TO P) MAX.	0.025	μμf
INPUT: G TO (H+K+G_2+G_3&IS)	6.5	μμf
OUTPUT: P TO (H+K+G_2+G_3&IS)	1.5	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

	TRIODE CONNECTION[A]	PENTODE CONNECTION	
HEATER VOLTAGE	12.6	12.6	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	300	VOLTS
MAXIMUM GRID #2 VOLTAGE	—	150	VOLTS
MAXIMUM GRID #2 SUPPLY VOLTAGE	—	300	VOLTS
MAXIMUM NEGATIVE DC GRID #1 VOLTAGE	50	50	VOLTS
MAXIMUM POSITIVE DC GRID #1 VOLTAGE	0	0	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	2	WATTS
MAXIMUM GRID #2 DISSIPATION	---	0.5	WATT

[A] GRID #2 TIED TO PLATE AND GRID #3 TIED TO CATHODE.

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PLATE 1912
NOV. 1, 1947

CONTINUED ON FOLLOWING PAGE

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER - PENTODE CONNECTION

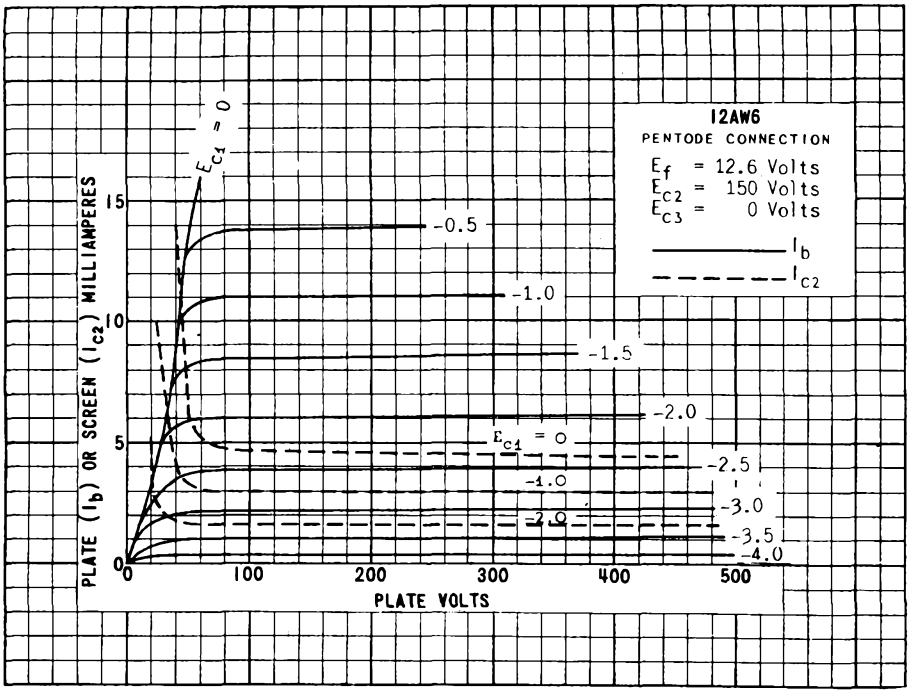
HEATER VOLTAGE	12.6	12.6	12.6	VOLTS
HEATER CURRENT	150	150	150	MA.
PLATE VOLTAGE	100	125	250	VOLTS
GRID #3 VOLTAGE		CONNECTED TO CATHODE AT SOCKET		
GRID #2 VOLTAGE	100	125	150	VOLTS
CATHODE BIAS RESISTOR	100	100	200	OHMS
PLATE RESISTANCE (APPROX.)	0.3	0.5	0.8	MEGOHM
TRANSCONDUCTANCE	4 750	5 100	5 000	µMHOS
PLATE CURRENT	5.5	7.2	7	MA.
GRID #2 CURRENT	1.6	2.1	2	MA.
GRID #1 VOLTAGE (APPROX.) FOR I_b = 10 µA.	-5	-6	-8	VOLTS

CLASS A_1 AMPLIFIER - TRIODE CONNECTION

HEATER VOLTAGE	12.6	12.6	VOLTS
HEATER CURRENT	150	150	MA.
PLATE VOLTAGE	180	250	VOLTS
CATHODE BIAS RESISTOR	350	825	OHMS
PLATE RESISTANCE	7 900	11 000	OHMS
TRANSCONDUCTANCE	5 700	3 800	µMHOS
AMPLIFICATION FACTOR	45	42	
PLATE CURRENT	7.0	5.5	MA.

SIMILIAR TYPE REFERENCE: Ratings and characteristics identical to 6AG5.

PLATE 1913
NOV. 1, 1947



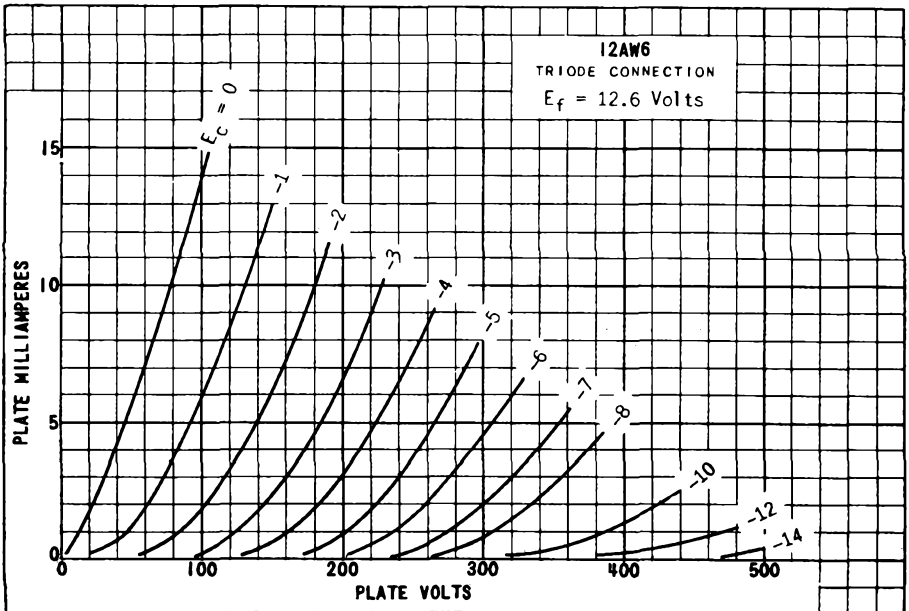


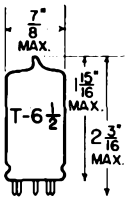
PLATE 1916
NOV. 1, 1947

TUNG-SOL

DOUBLE TRIODE

MINIATURE TYPE

UNIPOTENTIAL CATHODES



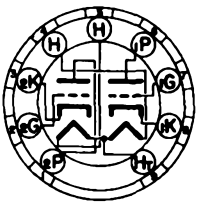
GLASS BULB

HEATER

SERIES	PARALLEL
12.6 VOLTS	6.3 VOLTS
150 MA.	300 MA.

AC OR DC

FOR 12.6 VOLT OPERATION APPLY HEATER VOLTAGE BETWEEN PINS #4 AND #5. FOR 6.3 VOLT OPERATION APPLY HEATER VOLTAGE BETWEEN PIN #9 AND PINS #4 AND #5 CONNECTED TOGETHER.



BOTTOM VIEW
SMALL BUTTON
9 PIN BASE

ANY MOUNTING POSITION

THE 12AX7 COMBINES TWO COMPLETELY INDEPENDENT HIGH-MU TRIODES IN THE SMALL 9 PIN BUTTON CONSTRUCTION. IT IS ADAPTABLE TO APPLICATIONS WHERE HIGH VOLTAGE GAIN AND LOW HEATER POWER ARE THE IMPORTANT CONSIDERATION, SUCH AS VOLTAGE AMPLIFIERS, PHASE INVERTERS AND MULTIVIBRATORS. THE CENTER TAPPED HEATER CONNECTION PERMITS OPERATION FROM EITHER A 6.3 VOLT OR 12.6 VOLT SUPPLY AND IN 300 MA. OR 150 MA. SERIES HEATER SERVICE.

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

	TRIODE UNIT 1	TRIODE UNIT 2	
GRID TO PLATE: (G TO P)	1.7	1.7	μμf
INPUT: G TO (H + K)	1.6	1.6	μμf
OUTPUT: P TO (H + K)	0.46	0.34	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

EACH TRIODE UNIT

	12.6	6.3	
HEATER VOLTAGE			VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	180		VOLTS
MAXIMUM PLATE VOLTAGE	300		VOLTS
MAXIMUM NEGATIVE DC GRID VOLTAGE	50		VOLTS
MAXIMUM POSITIVE DC GRID VOLTAGE	0		VOLTS
MAXIMUM PLATE DISSIPATION	1		WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER - EACH TRIODE UNIT

HEATER VOLTAGE	12.6	6.3	12.6	6.3	VOLTS
HEATER CURRENT	150	300	150	300	MA.
PLATE VOLTAGE	100		250		VOLTS
GRID VOLTAGE	-1		-2		VOLTS
PLATE CURRENT	0.5		1.2		MA.
PLATE RESISTANCE	80 000		62 500		OHMS
TRANSCONDUCTANCE	1 250		1 600		μMHOS
AMPLIFICATION FACTOR	100		100		

SIMILIAR TYPE REFERENCE: Characteristics somewhat similiar to types 6SL7GT and 12SL7GT.

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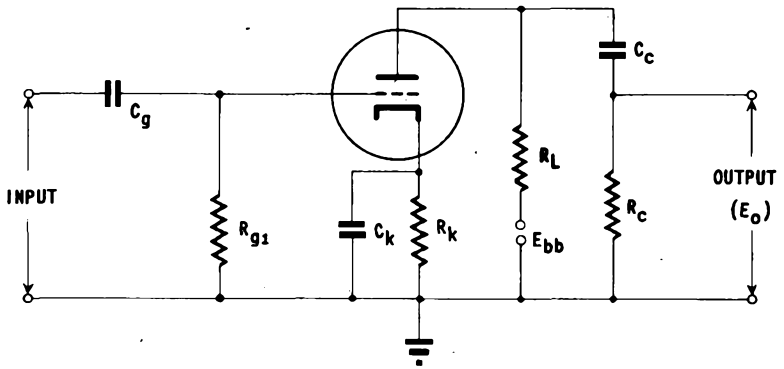
PLATE
1931
DEC. 1, 1947

CONTINUED FROM PRECEDING PAGE

RESISTANCE COUPLED AMPLIFIER

R_1 MEG.	R_C MEG.	E_{bb} = 90 VOLTS			E_{bb} = 180 VOLTS			E_{bb} = 300 VOLTS		
		R_k	GAIN	E_o	R_k	GAIN	E_o	R_k	GAIN	E_o
0.1	0.22	4700	35[A]	4	2000	47	18	1500	52	40
0.22	0.47	7400	45[B]	6	3500	59	24	2800	65	49
0.47	1.0	13000	52[C]	8	6700	66	28	5200	73	54

E_o IS RMS OUTPUT AT GRID CURRENT POINT.
GAIN MEASURED AT 5.0 VOLTS RMS OUTPUT EXCEPT AS INDICATED.
[A] OUTPUT VOLTAGE OF 2 VOLTS RMS.
[B] OUTPUT VOLTAGE OF 3 VOLTS RMS.
[C] OUTPUT VOLTAGE OF 4 VOLTS RMS.



NOTE: COUPLING CAPACITORS C_g AND C_c SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE. R_L SHOULD BE ADEQUATELY BY-PASSED BY CAPACITOR C_k.

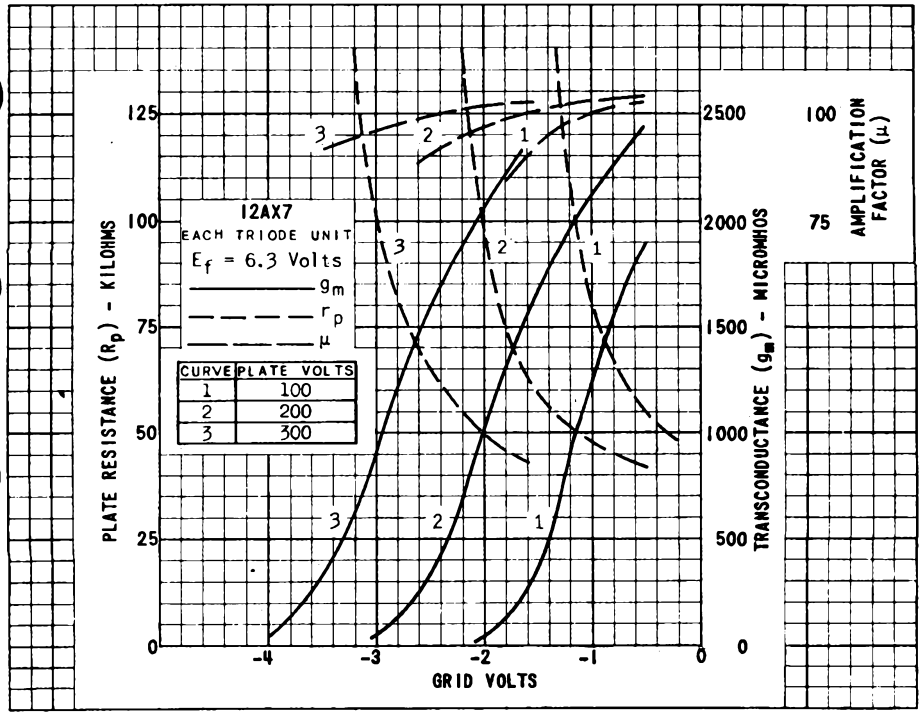


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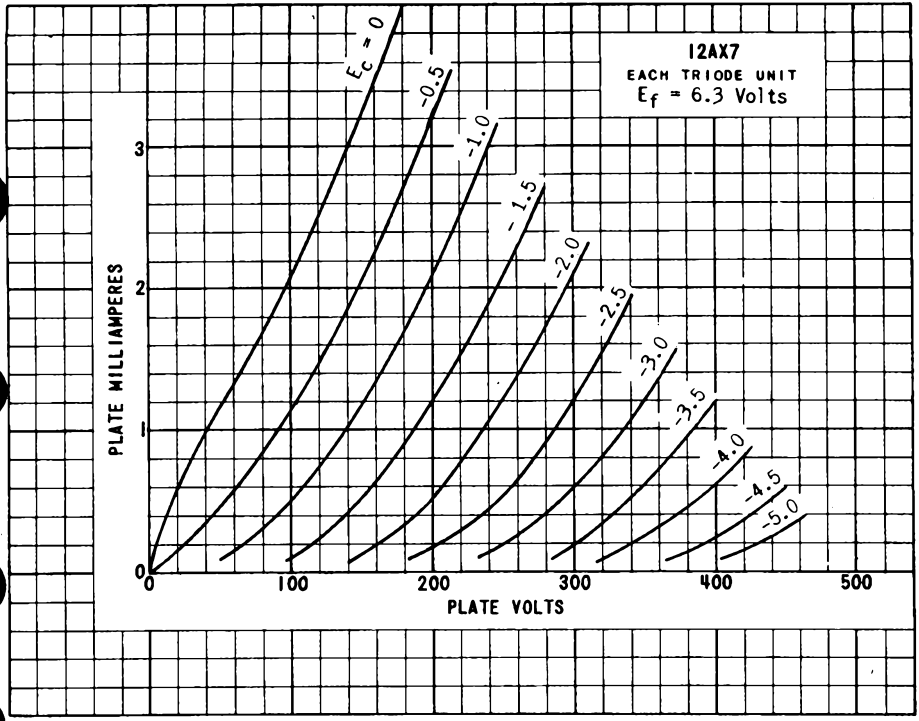
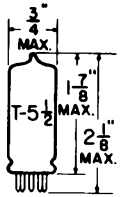
PLATE
1933
DEC. 1,
1947


12AX7
EACH TRIODE UNIT
E_f = 6.3 Volts
E_c = 0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
PLATE MILLIAMPERES
0
1
2
3
0
100
200
300
400
500
PLATE VOLTS

TUNG-SOL

RF AMPLIFIER PENTODE

MINIATURE TYPE

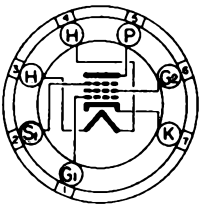


GLASS BULB

UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.15 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 12BA6 IS A PENTODE AMPLIFIER HAVING A REMOTE CONTROL GRID CHARACTERISTIC AND UTILIZING THE MINIATURE CONSTRUCTION. AS A RF AMPLIFIER IT IS CHARACTERIZED BY HIGH TRANSCONDUCTANCE AND LOW GRID-PLATE CAPACITANCE AND TRANSCONDUCTANCE.

RATINGS

.INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
HEATER CURRENT	0.15	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM GRID VOLTAGE:		
NEGATIVE BIAS	50	VOLTS
POSITIVE BIAS	0	VOLTS
MAXIMUM PLATE DISSIPATION	3	WATTS
MAXIMUM SCREEN DISSIPATION	0.6	WATTS
MAXIMUM PEAK HEATER-CATHODE VOLTAGE:		
HEATER NEG. WITH RESPECT TO CATHODE	90	VOLTS
HEATER POS. WITH RESPECT TO CATHODE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

GRID TO PLATE (MAX.)	0.0035	μμf
INPUT	5.5	μμf
OUTPUT	5.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CATHODE BIAS RESISTOR	68	68	OHMS
SUPPRESSOR VOLTAGE	0	0	VOLTS
PLATE CURRENT	10.8	11	MA.
SCREEN CURRENT	4.4	4.2	MA.
PLATE RESISTANCE (APPROX.)	0.25	1.5	MEGOHMS
TRANSCONDUCTANCE	4 300	4 400	μMHOS
GRID VOLTAGE (APPROX.) FOR TRANSCONDUCTANCE = 40 μMHOS	-20	-20	VOLTS

→ INDICATES A CHANGE OR ADDITION.

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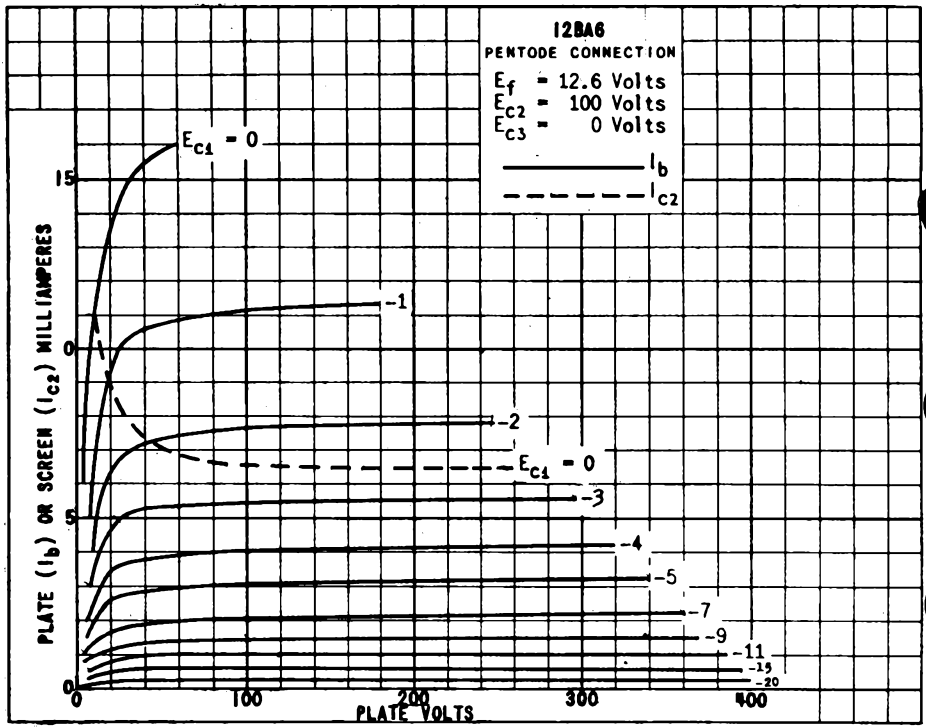
PLATE 1804
MAY 1 1947

12BA6



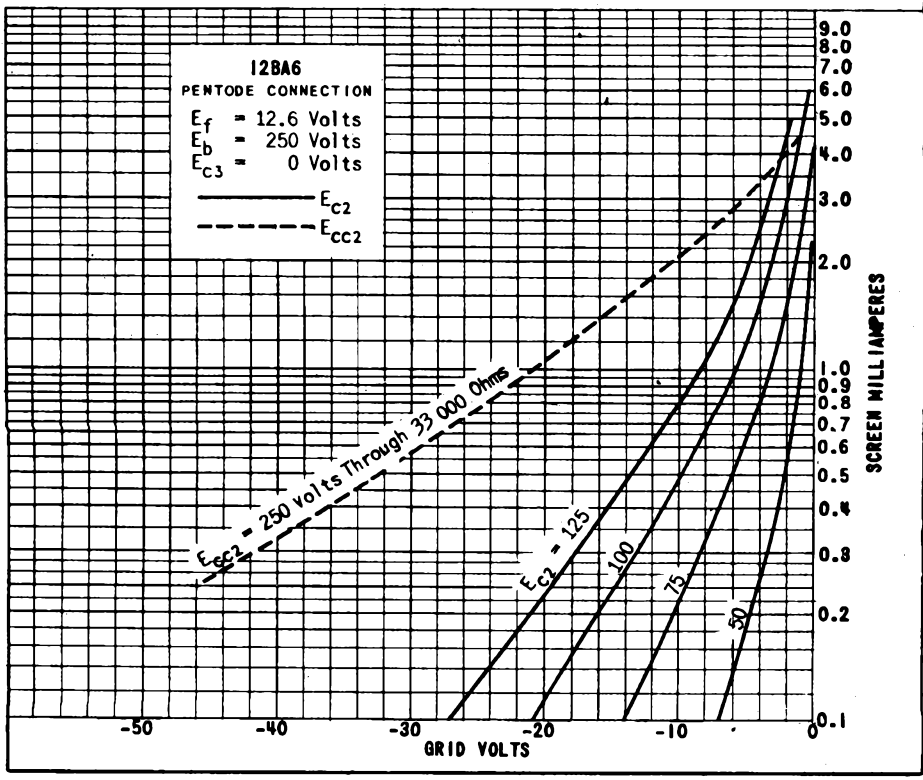


PLATE 1805
MAY 1 1947

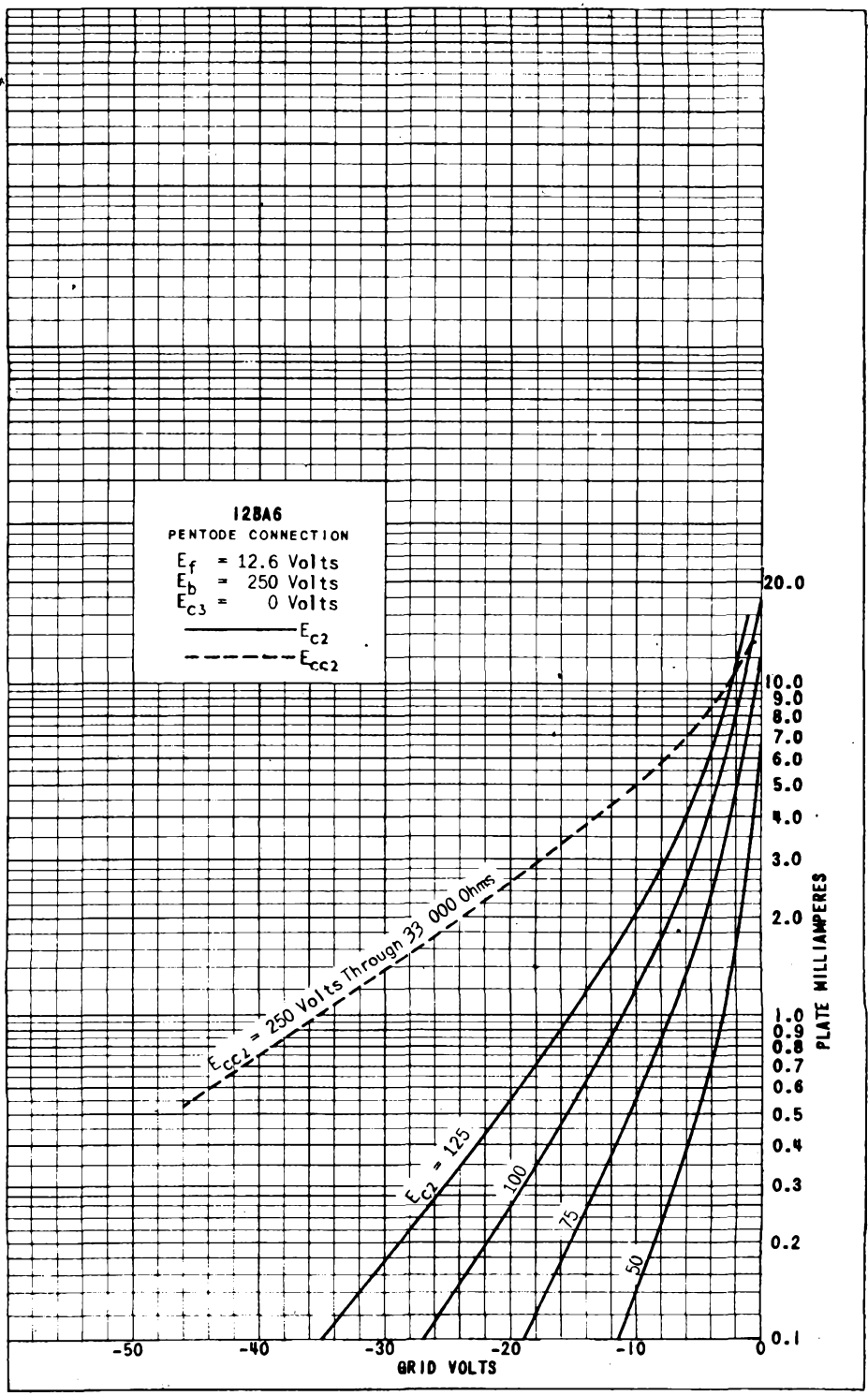


PLATE 1806
MAY 1 1947

12BA6

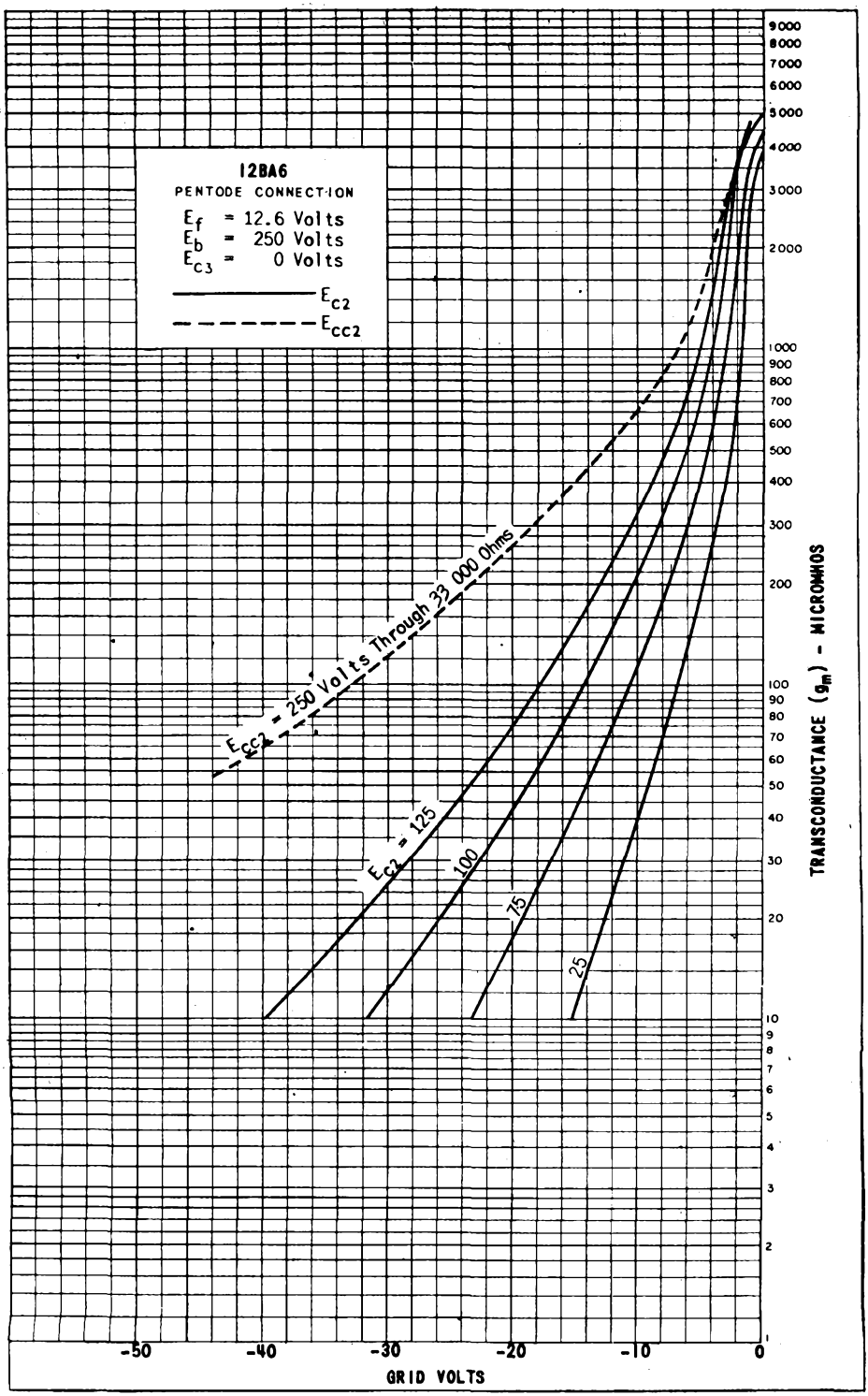


PLATE 1807
MAY 1 1947

TUNG-SOL

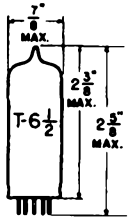
HEPTODE

MINIATURE TYPE

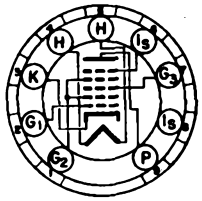
UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
SMALL BUTTON
9 PIN BASE

THE 12BA7 IS A CATHODE TYPE HIGH GAIN PENTAGRID CONVERTER IN THE SMALL 9-PIN BUTTON CONSTRUCTION. IT IS DESIGNED FOR SERVICE AS A COMBINED LOCAL OSCILLATOR AND MIXER AT HIGH FREQUENCIES, ESPECIALLY IN THE FM BROADCAST BAND.

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

GRID #3 TO PLATE: (G_3 TO P) MAX.	0.19	μμf
GRID #1 TO GRID #3: (G_1 TO G_3) MAX.	0.1	μμf
GRID #1 TO PLATE: (G_1 TO P) MAX.	0.05	μμf
GRID #1 TO CATHODE: (G_1 TO K)	3.3	μμf
GRID #1 TO ALL EXCEPT CATHODE: G_1 TO (H+G_2&G_4+G_3+G_5+P+IS)	3.4	μμf
CATHODE TO ALL EXCEPT GRID #1: K TO (H+G_2&G_4+G_3+G_5+P+IS)	4	μμf
RF INPUT: G_3 TO (H+K+G_1+G_2&G_4+G_5+P+IS)	9.5	μμf
OSCILLATOR INPUT: G_1 TO (H+K+G_2&G_4+G_3+G_5+P+IS)	6.7	μμf
MIXER OUTPUT: P TO (H+K+G_1+G_2&G_4+G_3+G_5+IS)	8.3	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRIDS #2 & #4 VOLTAGE	100	VOLTS
MAXIMUM GRIDS #2 & #4 SUPPLY VOLTAGE	300	VOLTS
MAXIMUM NEGATIVE GRID #3 VOLTAGE	100	VOLTS
MAXIMUM POSITIVE GRID #3 VOLTAGE	0	VOLTS
MAXIMUM GRID #5 & INTERNAL SHIELD VOLTAGE[A]	0	VOLTS
MAXIMUM PLATE DISSIPATION	2	WATTS
MAXIMUM GRIDS #2 & #4 DISSIPATION	1.5	WATTS
MAXIMUM CATHODE CURRENT	22	MA.

[A] INTERNAL SHIELD (PINS #6 AND #8) CONNECTED DIRECTLY TO GROUND.

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PLATE 2086
OCT. 1, 1948

CONTINUED ON FOLLOWING PAGE

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE - SEPARATE EXCITATION

THE CHARACTERISTICS SHOWN WITH SEPARATE EXCITATION CORRESPOND VERY CLOSELY WITH THOSE OBTAINED IN A SELF-EXCITED OSCILLATOR CIRCUIT OPERATING WITH ZERO BIAS.

HEATER VOLTAGE	12.6	12.6	VOLTS
HEATER CURRENT	150	150	MA.
PLATE VOLTAGE	100	250	VOLTS
GRIDS #2 & #4 VOLTAGE	100	100	VOLTS
GRID #3 VOLTAGE	-1	-1	VOLTS
GRID #5 AND INTERNAL SHIELD[A]	CONNECTED DIRECTLY TO GROUND		
GRID #1 RESISTOR	20 000	20 000	OHMS
PLATE RESISTANCE (APPROX.)	0.5	1	MEGOHM
CONVERSION TRANSCONDUCTANCE	900	950	µMHOS
PLATE CURRENT	3.6	3.8	MA.
GRIDS #2 & #4 CURRENT	10.2	10	MA.
GRID #1 CURRENT	0.35	0.35	MA.
TOTAL CATHODE CURRENT	14.2	14.2	MA.
CONVERSION TRANSCONDUCTANCE WITH E_{C3} = -20 VOLTS	3.5	3.5	µMHOS

[A] INTERNAL SHIELD (PINS #6 AND #8) CONNECTED DIRECTLY TO GROUND.

OSCILLATOR TRANSCONDUCTANCE

NOT OSCILLATING

GRID #3 VOLTAGE	0	VOLTS
GRID #1 VOLTAGE	0	VOLTS
GRIDS #2 & #4 CONNECTED TO PLATE	100	VOLTS
PLATE CURRENT	32	MA.
TRANSCONDUCTANCE BETWEEN GRID #1 & GRIDS #2 & #4 CONNECTED TO PLATE	8 000	µMHOS
AMPLIFICATION FACTOR	16.5	

SIMILAR TYPE REFERENCE: Except for heater ratings similar to 6SB7Y.

PLATE 2087
OCT. 1, 1948

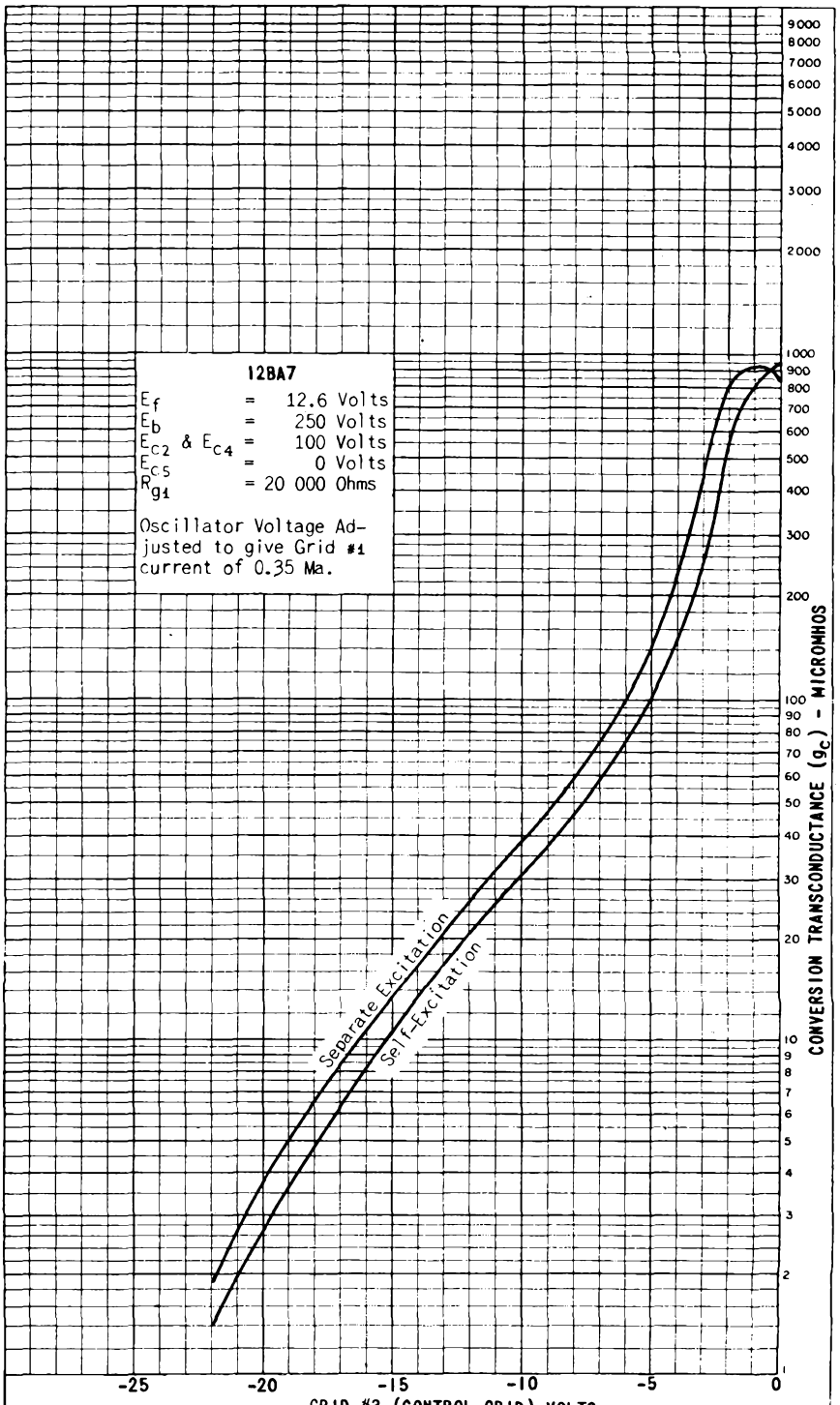

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PLATE
2088
OCT. 1,
1948

12BA7

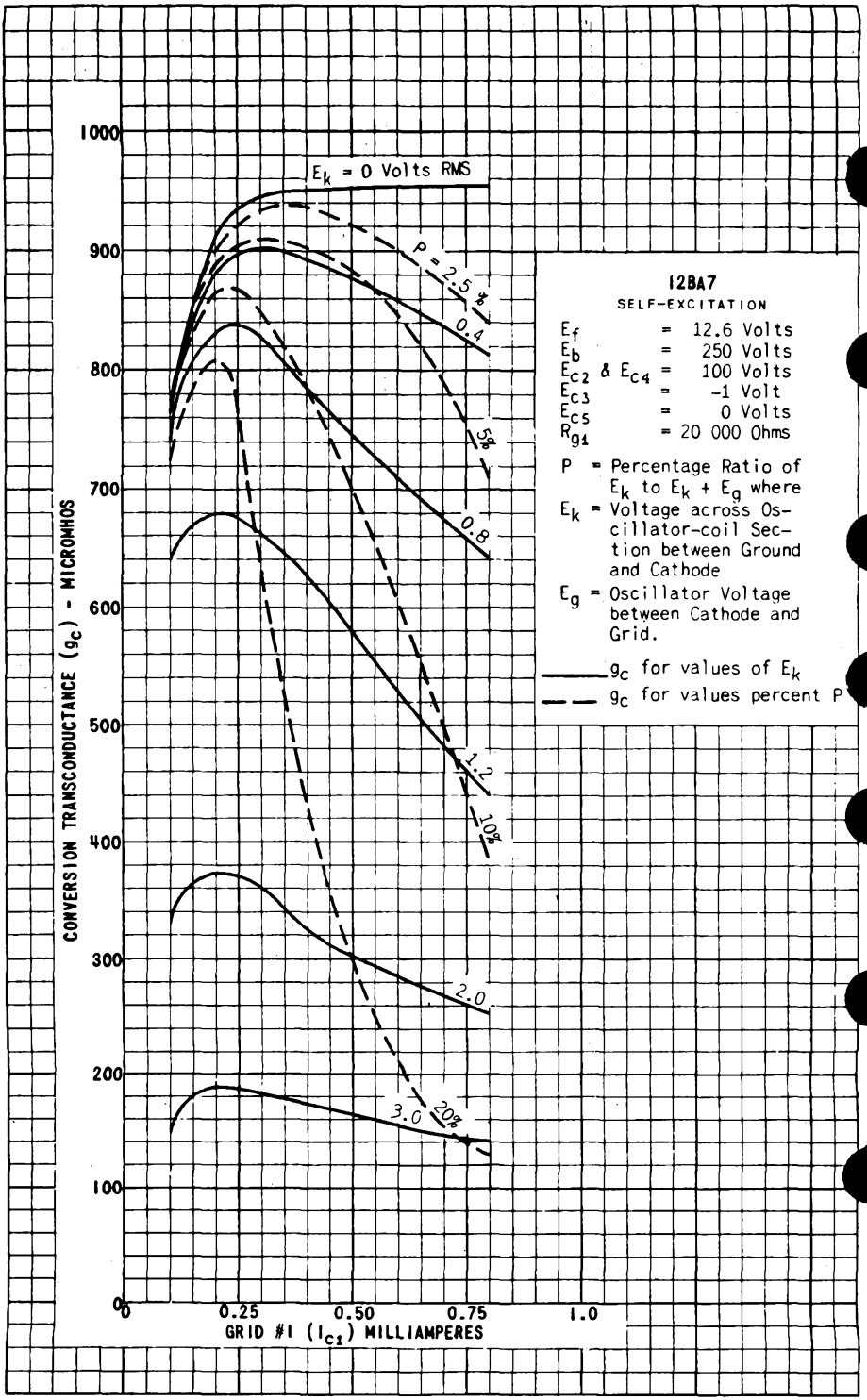


PLATE 2089
OCT. 1, 1948

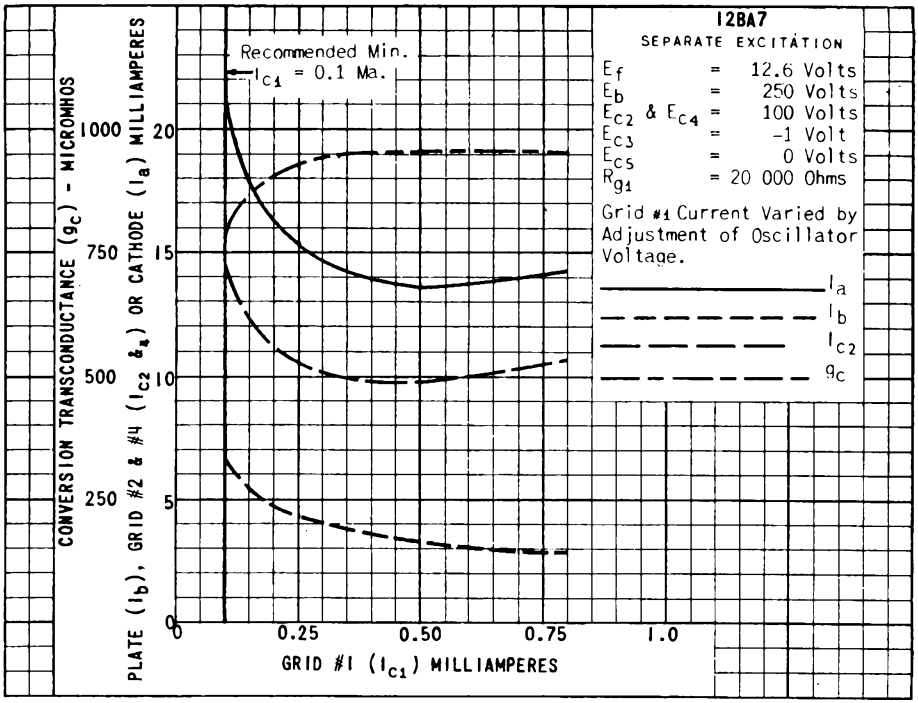


PLATE 2090
OCT. 1, 1948

TUNG-SOL

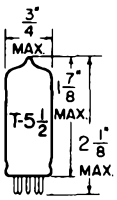
HEPTODE

MINIATURE TYPE

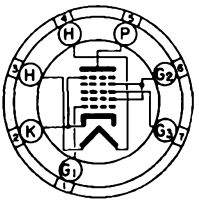
COATED UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.15 AMPERE

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 12BE6 IS A PENTAGRID CONVERTER USING THE MINIATURE CONSTRUCTION AND INTENDED FOR SERVICE AS COMBINED OSCILLATOR AND MIXER IN SUPERHETERDYNE RECEIVERS.

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD #316 CONNECTED TO PIN #2

SIGNAL GRID TO PLATE: (G_3 TO P) MAX. (WITHOUT SHIELD)	0.30	μμf
SIGNAL GRID TO OSC. GRID: (G_3 TO G_1) MAX.	0.15	μμf
OSC. GRID TO PLATE: (G_1 TO P) MAX.	0.05	μμf
RF INPUT: G_3 TO (H+K&G_5+G_1+G_2&G_4+P)	7.4	μμf
OSC. INPUT: G_1 TO (H+K&G_5+G_2&G_4+G_3+P)	5.7	μμf
MIXER OUTPUT: P TO (H+K&G_5+G_1+G_2&G_4+G_3)	13.6	μμf
OSC. GRID TO CATHODE: (G_1 TO K)	2.8	μμf
OSC. OUTPUT: K TO (H+G_2&G_4+G_3+P+S)	15.5	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID #2 AND #4 VOLTAGE	100	VOLTS
MAXIMUM GRID #2 AND #4 SUPPLY VOLTAGE	300	VOLTS
MAXIMUM NEGATIVE DC GRID #3 VOLTAGE	50	VOLTS
MAXIMUM POSITIVE DC GRID #3 VOLTAGE	0	VOLTS
MINIMUM GRID #3 EXTERNAL BIAS VOLTAGE[A]	0	VOLTS
MAXIMUM PLATE DISSIPATION	1	WATT
MAXIMUM GRID #2 DISSIPATION	1	WATT
MAXIMUM CATHODE CURRENT	14	MA.

[A] WITH SELF-EXCITED OSCILLATOR

CONTINUED ON FOLLOWING PAGE

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PLATE 2059
AUG. 2, 1948

→ INDICATES A CHANGE OR ADDITION

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE - SEPARATE EXCITATION

CHARACTERISTICS SHOWN ARE OBTAINED IN THE STANDARD RMA CONVERSION CONDUCTANCE TEST SET WHICH USES SEPARATE EXCITATION. THE CHARACTERISTICS UNDER THESE CONDITIONS CORRESPOND VERY CLOSELY WITH THOSE OBTAINED IN A SELF-EXCITED OSCILLATORY CIRCUIT OPERATING AT ZERO-BIAS.

HEATER VOLTAGE	12.6	12.6	VOLTS
HEATER CURRENT	150	150	MA.
PLATE VOLTAGE	100	250	VOLTS
GRID #3 VOLTAGE	-1.5	-1.5	VOLTS
GRID #2 AND #4 VOLTAGE	100	100	VOLTS
PLATE RESISTANCE (APPROX.)	0.5	1	MEGOHM
OSCILLATOR (GRID #1) RESISTOR	20 000	20 000	OHMS
OSCILLATOR (GRID #1) CURRENT	0.5	0.5	MA.
CONVERSION TRANSCONDUCTANCE	455	475	µMHOS
PLATE CURRENT	2.8	3	MA.
GRID #2 AND #4 CURRENT	8	7.8	MA.
GRID #3 VOLTAGE (APPROX.) FOR G_c = 5 µMHOS	-30	-30	VOLTS

OSCILLATOR CHARACTERISTICS

BOOTON TYPE 10A STANDARD OSCILLATOR

PLATE VOLTAGE	100	250	VOLTS
GRIDS #2 AND #4 VOLTAGE	100	100	VOLTS
GRID #3 VOLTAGE	0	0	VOLTS
OSCILLATOR (GRID #1) RESISTOR	50 000	50 000	OHMS
OSCILLATOR (GRID #1) CURRENT FOR Z_{g-K} = 3100 OHMS	200	200	µA
OSCILLATOR (GRID #1) CURRENT FOR Z_{g-K} = 1250 OHMS	75	75	µA

OSCILLATOR TRANSCONDUCTANCE

NOT OSCILLATING

GRID #3 VOLTAGE	0	VOLTS
OSCILLATOR (GRID #1) VOLTAGE	0	VOLTS
GRID #2 AND #4 CONNECTED TO PLATE	100	VOLTS
PLATE CURRENT	25	MA.
TRANSCONDUCTANCE BETWEEN GRID #1 AND GRID #2 & #4 CONNECTED TO PLATE	7 250	µMHOS
AMPLIFICATION FACTOR	20	

→ INDICATES A CHANGE OR ADDITION

PLATE 2060

AUG. 2, 1948

(6BE6)12BE6

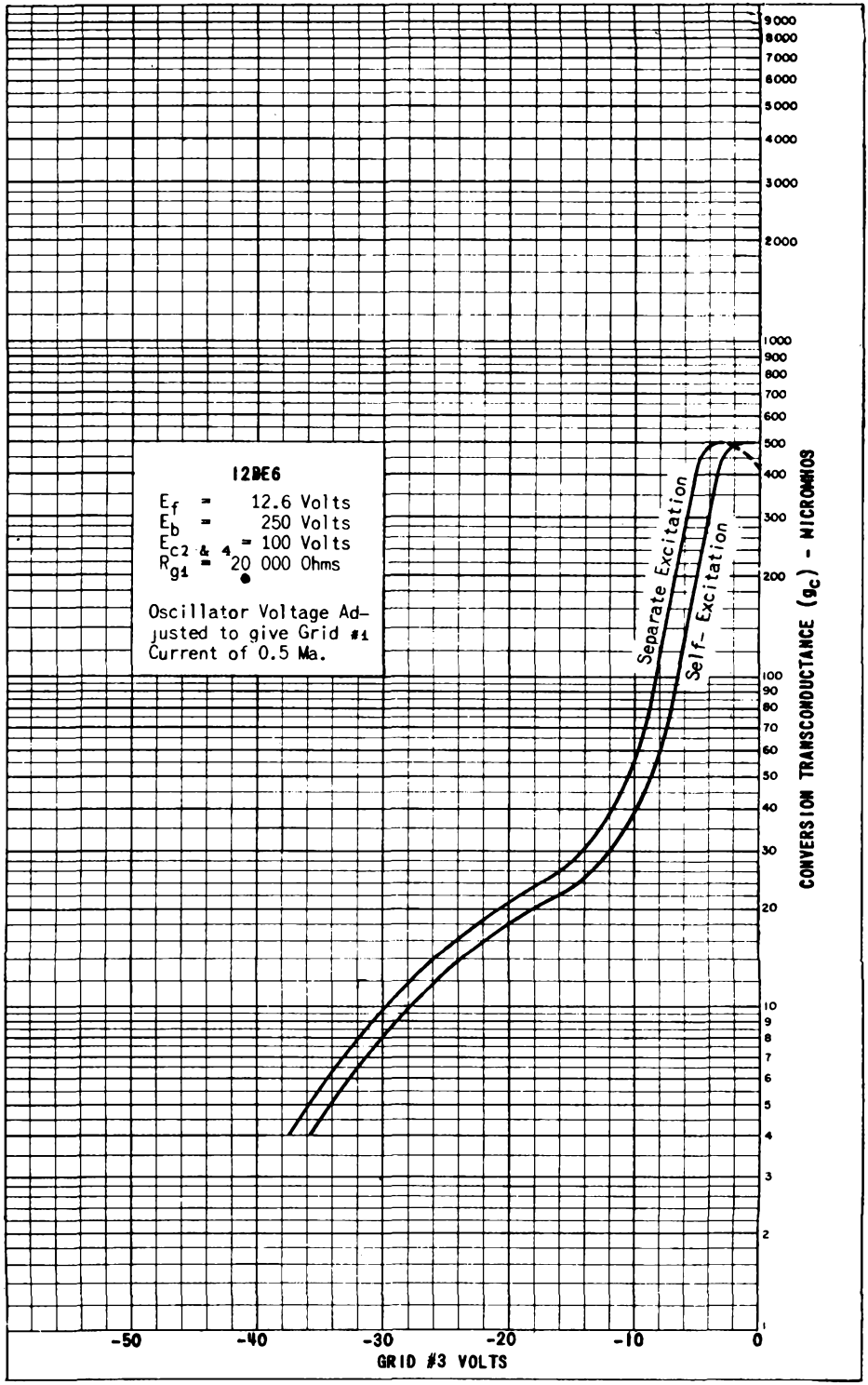


PLATE 2061
AUG. 2, 1948

12BE6 (6BE6)

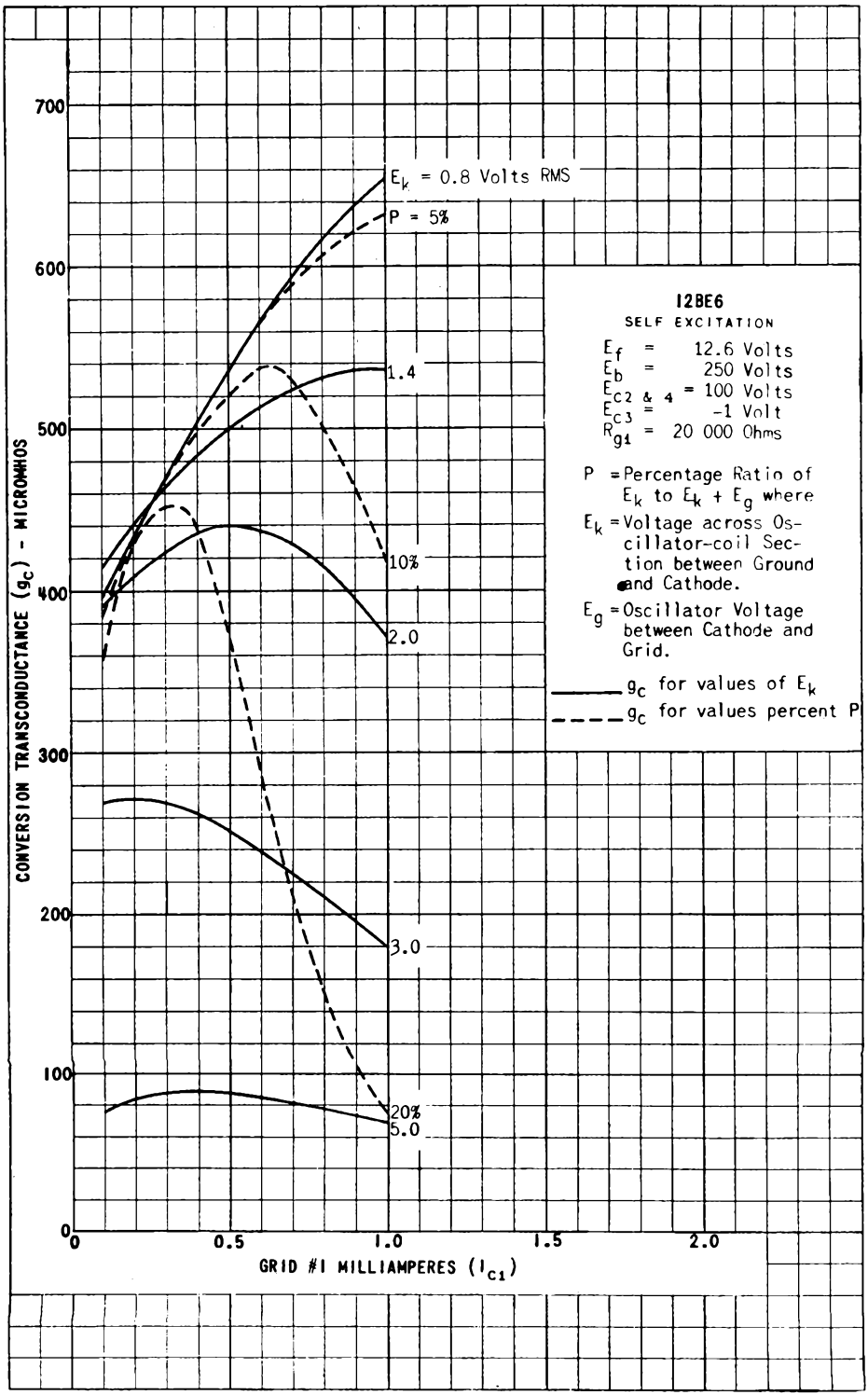
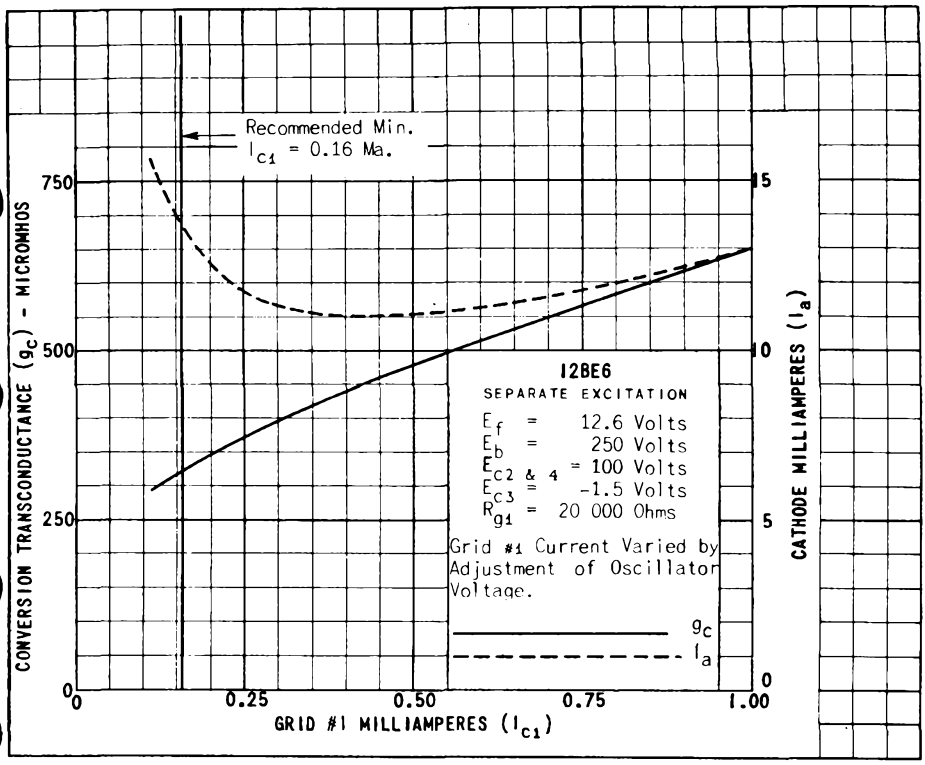


PLATE 2062
AUG. 2, 1948



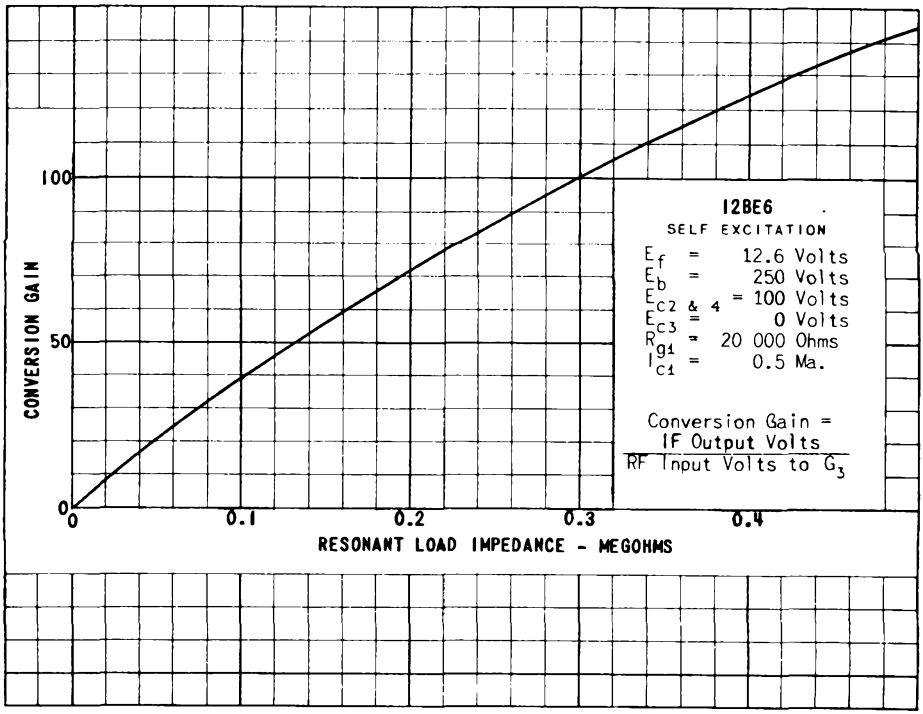


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PLATE 2063
AUG. 2, 1948

TENTATIVE DATA

12BD6

TUNG-SOL

RF PENTODE AMPLIFIER

MINIATURE TYPE

PHYSICAL SPECIFICATIONS

EMITTER CATHODE	PIN CONNECTIONS	
BASE MINIATURE BUTTON 7-PIN	PIN 1 GRID 1	PIN 7 CATHODE
CAP ---	PIN 2 S1, GRID 3	PIN 8 NONE
BULB T-5½	PIN 3 HEATER	
MAXIMUM DIAMETER 3/4"	PIN 4 HEATER	MOUNTING POS. ANY
MAXIMUM OVERALL LENGTH 2 1/8"	PIN 5 PLATE	
MAXIMUM SEATED HEIGHT 1 7/8"	PIN 6 GRID 2	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.150	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MAXIMUM PLATE DISSIPATION	4.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.4	WATT
MAXIMUM CATHODE CURRENT	14	MA.

CAPACITANCES

	WITH RMA MIN. SHIELD CONNECTED TO CATHODE	WITHOUT SHIELD	
CONTROL GRID TO ALL OTHER ELECTRODES	4.3	4.3	μμf
PLATE TO ALL OTHER ELECTRODES	5.0	5.0	μμf
CONTROL GRID TO PLATE (MAX.)	0.005	0.004	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HEATER OR FILAMENT VOLTAGE	12.6	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.150	0.150	AMP.
PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	-1	-3	VOLTS
PEAK AF SIGNAL VOLTAGE			VOLTS
PLATE CURRENT	13	9	MA.
SCREEN CURRENT	5	3.5	MA.
MAXIMUM-SIGNAL PLATE CURRENT			MA.
MAXIMUM-SIGNAL SCREEN CURRENT			MA.
PLATE RESISTANCE	0.12	0.7	MEGOHM
TRANSCONDUCTANCE	2350	2000	μMHOS
AMPLIFICATION FACTOR			
LOAD RESISTANCE			OHMS
TOTAL HARMONIC DISTORTION			PER CENT
POWER OUTPUT			WATTS
CONTROL GRID VOLTAGE (APPROX.) FOR TRANSCONDUCTANCE = 10 μMHOS	-35	-35	VOLTS

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PLATE 1724

JUNE 17 1946

TUNG-SOL

PENTAGRID CONVERTER
MINIATURE TYPE

PHYSICAL SPECIFICATIONS

EMITTER UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE MIN. BUTTON 7-PIN	PIN 1 GRID 1	PIN 7 GRID 3
CAP NONE	PIN 2 GRID 5, CATHODE	PIN 8 NONE
BULB T-5½	PIN 3 HEATER	
MAX. DIAMETER 3/4"	PIN 4 HEATER	MOUNTING POS. ANY
MAX. SEATED HEIGHT 1-7/8"	PIN 5 PLATE	
MAX. OVERALL LENGTH 2-1/8"	PIN 6 GRID 2, GRID 4	

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMPS.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	1.0	WATT.
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MAXIMUM GRID VOLTAGE (G_2 & G_4)	100	VOLTS
MAXIMUM GRID SUPPLY VOLTAGE (G_2 & G_4)	300	VOLTS
MAXIMUM GRID DISSIPATION (G_2 & G_4)	1.0	WATT
MAXIMUM PEAK HEATER-CATHODE VOLTAGE:		
HEATER NEG. WITH RESPECT TO CATHODE	90	VOLTS
HEATER POS. WITH RESPECT TO CATHODE	90	VOLTS
MAXIMUM GRID 3 VOLTAGE:		
NEG. BIAS	50	VOLTS
POS. BIAS	0	VOLTS

CAPACITANCES
WITH NO EXTERNAL SHIELD

G_3 TO PLATE (C_{G3p}) (MAX.)	0.30	μμf
G_1 TO PLATE (C_{G1P}) (MAX.)	0.05	μμf
G_1 TO G_3 (C_{G1G3})(MAX.)	0.15	μμf
G_3 TO ALL OTHER ELECTRODES (RF INPUT) (C_{G3}, (H+K+G_1+G_2+G_4+G_5)	7.2	μμf
PLATE TO ALL OTHER ELECTRODES(MIXER OUTPUT) C_P (H+K+G_1+G_2+G_3+G_4+G_5)	8.6	μμf
GRID NO. 1 TO ALL OTHER ELECTRODES (OSCILLATOR INPUT) C_{G1} (H+K+G_2+G_3+G_4+G_5+P)	5.5	μμf
GRID NO. 1 TO ALL OTHER ELECTRODES EXCEPT CATHODE C_{G1} (H+G_2+G_3+G_4+G_5+P)	2.7	μμf
GRID NO. 1 TO CATHODE (C_{G1K})	2.8	μμf
CATHODE TO ALL OTHER ELECTRODES EXCEPT G_1 C_K (H+G_2+G_3+G_4+G_5+P)	15	μμf

CONTINUED ON FOLLOWING PAGE

PRINTED IN U.S.A.

PLATE 1659
DEC. 15 1945

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE - SEPARATE EXCITATION

PLATE VOLTAGE	100	250	VOLTS
SCREEN GRID VOLTAGE (G_2 & G_4)	100	100	VOLTS
CONTROL GRID VOLTAGE (G_3)	-1.5	-1.5	VOLTS
PLATE CURRENT	2.8	3.0	MA.
SCREEN GRID CURRENT (G_2 & G_4)	7.3	7.1	MA.
TOTAL CATHODE CURRENT	10.6	10.6	MA.
OSCILLATOR-GRID (G_1) RESISTOR	20 000	20 000	OHMS
CONVERSION TRANSCONDUCTANCE	455	475	µMHOS
PLATE RESISTANCE (APPROX.)	0.5	1.0	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR G_3 BIAS OF -30 VOLTS (APPROX.)	4.0	4.0	µMHOS
GRID (G_1) CURRENT	0.5	0.5	MA.

NOTE: (1) THE CHARACTERISTICS SHOWN WITH SEPARATE EXCITATION CORRESPOND VERY CLOSELY WITH THOSE OBTAINED IN A SELF-EXCITED OSCILLATOR CIRCUIT OPERATING WITH ZERO BIAS.

(2) THE TRANSCONDUCTANCE BETWEEN GRID 1 AND GRIDS 2 & 4 CONNECTED TO PLATE (NOT OSCILLATING) IS APPROXIMATELY 7250 MICROMHOS UNDER THE FOLLOWING CONDITIONS: GRIDS NO. 1 & NO. 3 AT 0 VOLTS; GRIDS NO. 2 & NO. 4 AND PLATE AT 100 VOLTS. UNDER THE SAME CONDITIONS, THE PLATE CURRENT IS 25 MA., AND THE AMPLIFICATION FACTOR IS 20.

PLATE 1660
DEC. 23 1945

TUNG-SOL

DOUBLE-DIODE TRIODE

MINIATURE TYPE

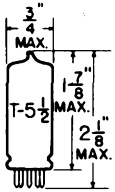
UNIPOTENTIAL CATHODE

HEATER

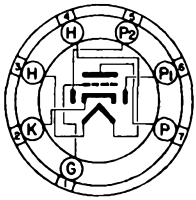
12.6 VOLTS 0.15 AMPERE

AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 12BF6 IS A COMBINED LOW-MU VOLTAGE AMPLIFIER AND DOUBLE-DIODE DETECTOR USING THE 7-PIN MINIATURE CONSTRUCTION. THE LOW AMPLIFICATION FACTOR OF THE TRIODE PERMITS LARGE VALUES OF OUTPUT SIGNAL WITH LOW DISTORTION.

DIRECT INTERELECTRODE CAPACITANCES

	WITH EXTERNAL SHIELD	WITH NO EXTERNAL SHIELD	
GRID TO PLATE: (G TO P)	2.0	2.0	μμf
INPUT: G TO (H + K)	1.8	1.8	μμf
OUTPUT: P TO (H + K)	1.4	1.1	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED (EACH DIODE)	0.8	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER - TRIODE UNIT

HEATER VOLTAGE	12.6	VOLTS
HEATER CURRENT	0.15	AMP.
PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-9	VOLTS
PLATE CURRENT	9.5	MA.
PLATE RESISTANCE	8 500	OHMS
TRANSCONDUCTANCE	1 900	μMHOS
AMPLIFICATION FACTOR	16	
LOAD RESISTANCE	10 000	OHMS
TOTAL HARMONIC DISTORTION	6.5	PERCENT
POWER OUTPUT	0.3	WATTS

DIODE UNITS - TWO

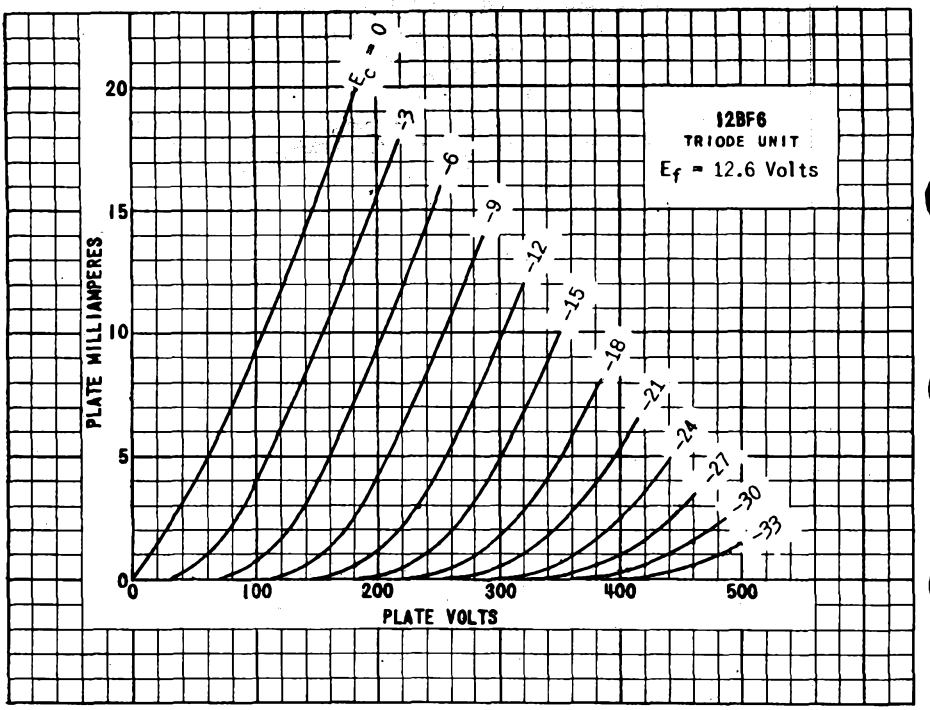
THE CATHODE OF THE 12BF6 IS COMMON TO THE TWO DIODE PLATES AND THE TRIODE UNIT. DIODE BIASING OF THE TRIODE UNIT OF THE 12BF6 IS NOT SUITABLE.

PLATE 1849
JULY 1, 1947

SIMILAR TYPE REFERENCE: *Ratings and characteristics identical to 12SR7. Except for heater ratings identical to 6R7, 6R7GT, 6SR7, 6SR7GT.*

→ INDICATES A CHANGE OR ADDITION.

12BF6



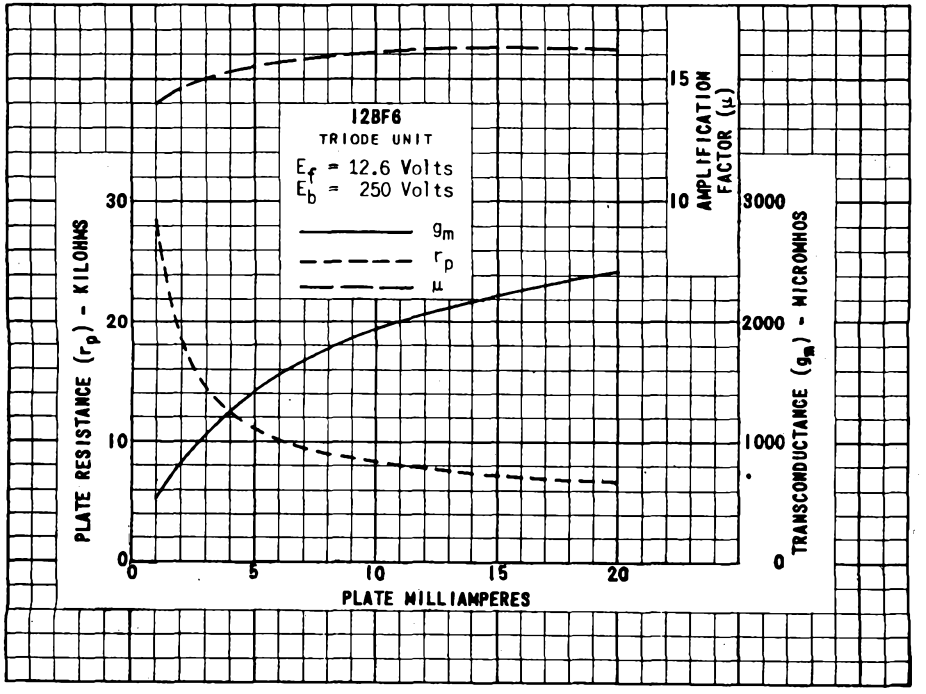


PLATE 1850
JULY 1, 1947

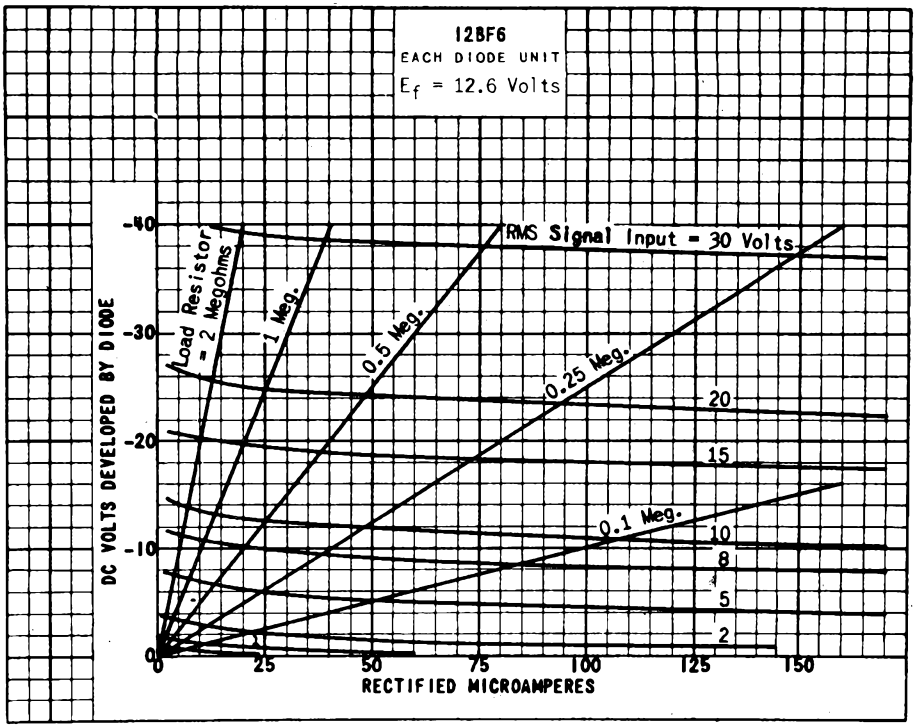


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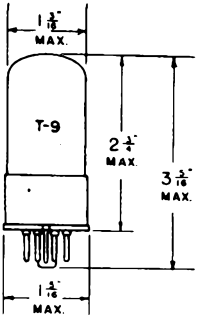
PLATE
1851
JULY 1,
1947

TUNG-SOL

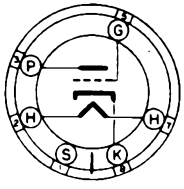


TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB



6Q

BOTTOM VIEW

SMALL WAFER 6 PIN OCTAL BASE WITH METAL SHELL

THE TUNG-SOL 12E5GT IS A GENERAL PURPOSE TRIODE DESIGNED FOR SERVICE AS AN OSCILLATOR, DETECTOR OR AMPLIFIER. WITH THE EXCEPTION OF HEATER RATINGS, ITS ELECTRICAL CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 76 AND THE 6P5GT.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250 MAX.	VOLTS
GRID VOLTAGE	-5	-13.5	VOLTS
GRID CIRCUIT RESISTANCE MAX.	1	1	MEGOHM
PLATE CURRENT	2.5	5.0	MA.
PLATE RESISTANCE	12000	9500	OHMS
TRANSCONDUCTANCE	1150	1450	μMHOS
AMPLIFICATION FACTOR	13.8	13.8	

DETECTOR

	BIASED		GRID LEAK	
PLATE VOLTAGE	100	250	45	VOLTS
GRID VOLTAGE	-8	-20	RETURN TO CATHODE	VOLTS
PLATE CURRENT	ADJUST TO 0.2 MA. WITH NO INPUT SIGNAL		—	
GRID LEAK	—	—	1 TO 5	MEGOHMS
GRID CONDENSER	—	—	250	μμf

RESISTANCE COUPLED AMPLIFIER

PLATE SUPPLY VOLTAGE	100	100	250	250	VOLTS
PLATE LOAD RESISTOR	0.05	0.25	0.05	0.25	MEGOHM
CATHODE RESISTOR	3800	15000	3800	15000	OHMS
VOLTAGE GAIN	8.5	10	9	10	

DIRECT INTERELECTRODE CAPACITANCES

GRID TO CATHODE	3.6	μμf
PLATE TO CATHODE	2.6	μμf
GRID TO PLATE	2.8	μμf

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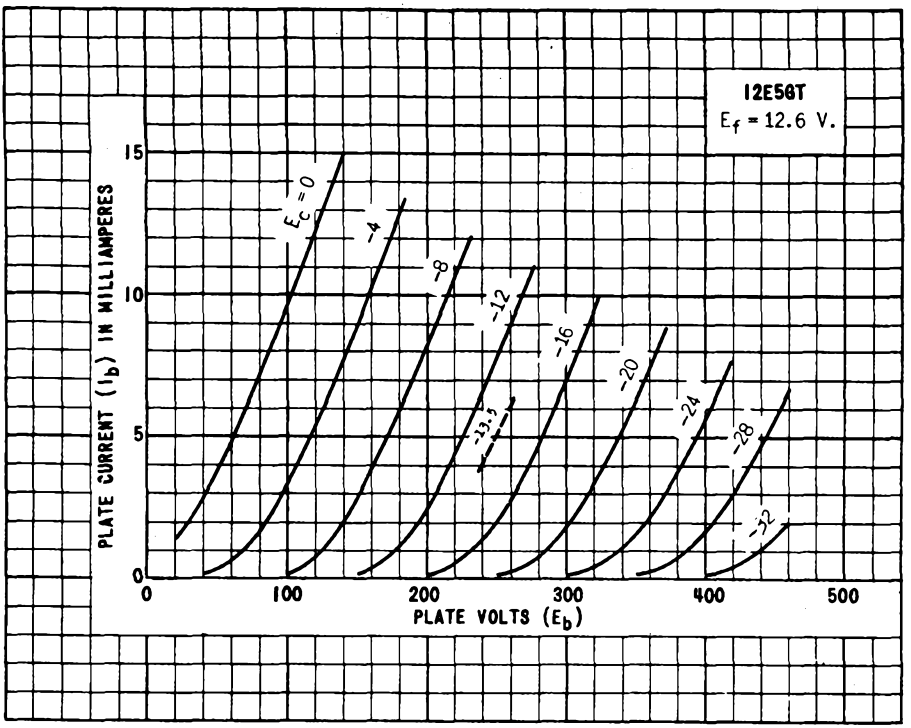
PLATE 651-1

NOV. 20 1939

12E5 GT



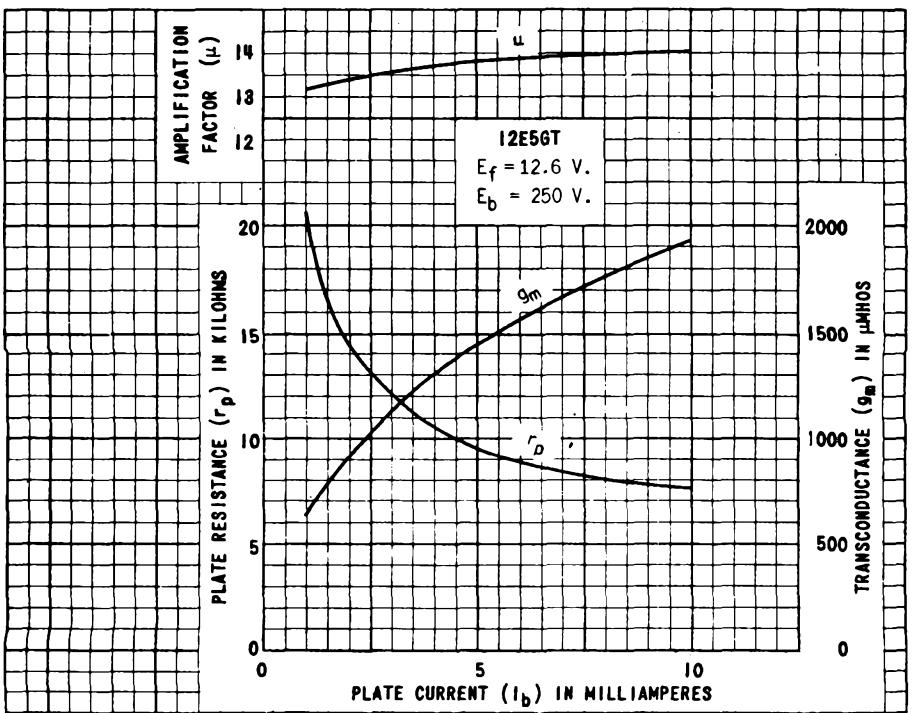
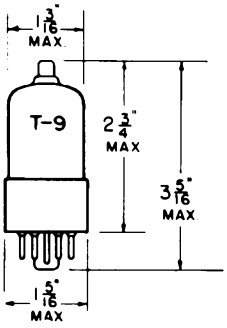


PLATE 652-1

TUNG-SOL

HIGH-MU TRIODE AMPLIFIER

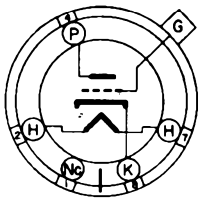


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.15 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW

INTERMEDIATE SHELL
5-PIN OCTAL

THE 12F5GT IS A GENERAL PURPOSE HIGH AMPLIFICATION FACTOR TRIODE. EXCEPT FOR THE HEATER RATING, ITS ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF THE 6F5GT.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
HEATER CURRENT	0.15	AMP.
MAX. PLATE VOLTAGE	300	VOLTS
HEATER-CATHODE VOLTAGE	AS LOW AS POSSIBLE	

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

WITH SHELL CONNECTED TO CATHODE

GRID TO PLATE	2.8	μμf
GRID TO CATHODE	2.2	μμf
PLATE TO CATHODE	3.2	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1	-2	VOLTS
PLATE CURRENT	0.4	0.9	MA.
PLATE RESISTANCE	85 000	66 000	OHMS
TRANSCONDUCTANCE	1150	1900	μMHOS
AMPLIFICATION FACTOR	100	100	

CONTINUED ON FOLLOWING PAGE

PLATE
1613
OCT. 15, 1945

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

ZERO-BIAS RESISTANCE-COUPLED AMPLIFIER CLASS A_1

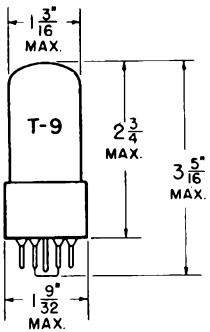
HEATER VOLTAGE	6.3			6.3		VOLTS
PLATE SUPPLY VOLTAGE	100			300		VOLTS
GRID LEAK	10			10		MEGOHM
LOAD RESISTANCE	0.25			0.25		MEGOHM
COUPLING CAPACITOR	0.01	TO	0.005	0.01	TO 0.005	µf
GRID RESISTOR FOR FOLLOWING TUBE	0.5		1.0	0.5	1.0	MEGOHM
VOLTAGE GAIN	48		52	66	71	
VOLTAGE OUTPUT (RMS) AT 5 PER CENT HARMONIC DISTORTION	7.0		8.5	44	50	VOLTS

SIMILAR TYPE REFERENCE: *Except for heater ratings, same characteristics and application as types 6F5, 6F5G, 6F5GT, 6SF5, 6SF5GT; same characteristics as types 12SF5, 12SF5GT, 784.*

PLATE 1614
OCT. 15, 1945

TUNG-SOL

TRIODE

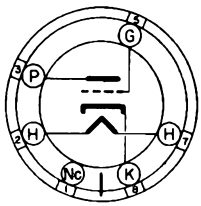


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
INTERMEDIATE SHELL
6 PIN OCTAL BASE

THE 12J5GT IS A GENERAL PURPOSE MEDIUM-MU TRIODE. IT IS USEFUL FOR SERVICE AS AN OSCILLATOR OR AUDIO-FREQUENCY AMPLIFIER.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.
WITH CLOSE FITTING SHIELD CONNECTED TO CATHODE

GRID TO PLATE: (G TO P)	3.8	μμf
INPUT: G TO (H+K)	4.2	μμf
OUTPUT: P TO (H+K)	5	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MINIMUM NEGATIVE DC GRID VOLTAGE	0	VOLTS
MAXIMUM GRID CIRCUIT RESISTANCE	1.0	MEG.
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MAXIMUM CATHODE CURRENT	20	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

	CLASS A_1 AMPLIFIER		
HEATER VOLTAGE	12.6	12.6	VOLTS
HEATER CURRENT	150	150	MA.
PLATE VOLTAGE	90	250	VOLTS
GRID VOLTAGE	0	-8	VOLTS
PLATE CURRENT	10	9	MA.
PLATE RESISTANCE	6 700	7 700	OHMS
TRANSCONDUCTANCE	3 000	2 600	μMHOS
AMPLIFICATION FACTOR	20	20	

SIMILIAR TYPE REFERENCE: Ratings and characteristics are identical to 14A4, except for heater ratings.

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION.

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PLATE
1948
JAN. 2,
1948

CONTINUED FROM PRECEDING PAGE

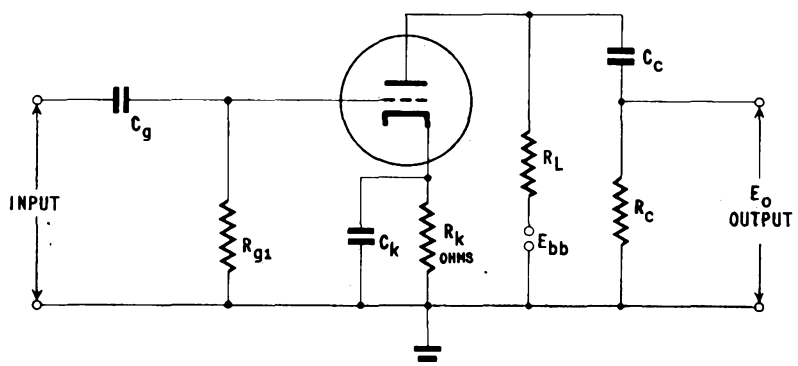
RESISTANCE COUPLED AMPLIFIER

R_1 MEG.	R_{g1} MEG.	R_s MEG.	E_{bb} = 90 VOLTS			E_{bb} = 180 VOLTS			E_{bb} = 300 VOLTS		
			R_k	GAIN	E_o	R_k	GAIN	E_o	R_k	GAIN	E_o
0.10	A	0.10	3300	14	13	2200	14	26	1800	14	40
0.10	A	0.24	3600	14	16	2700	15	33	2200	15	51
0.24	A	0.24	7500	14	16	5100	15	30	4300	15	44
0.24	A	0.51	9100	14	19	6800	15	39	5100	15	54
0.51	A	0.51	13000	14	16	9100	15	30	6800	16	40
0.51	A	1.0	15000	14	19	10000	16	32	7500	16	45
0.24	10	0.24	---	15	13	---	16	33	---	17	46
0.24	10	0.51	---	16	17	---	17	38	---	18	62
0.51	10	0.51	---	16	14	---	18	32	---	18	53
0.51	10	1.0	---	17	18	----	18	41	---	19	68

[A] VALUE OF R_{g1} IS NOT CRITICAL.

GAIN MEASURED AT E_o = 2.0 VOLTS RMS OUTPUT.

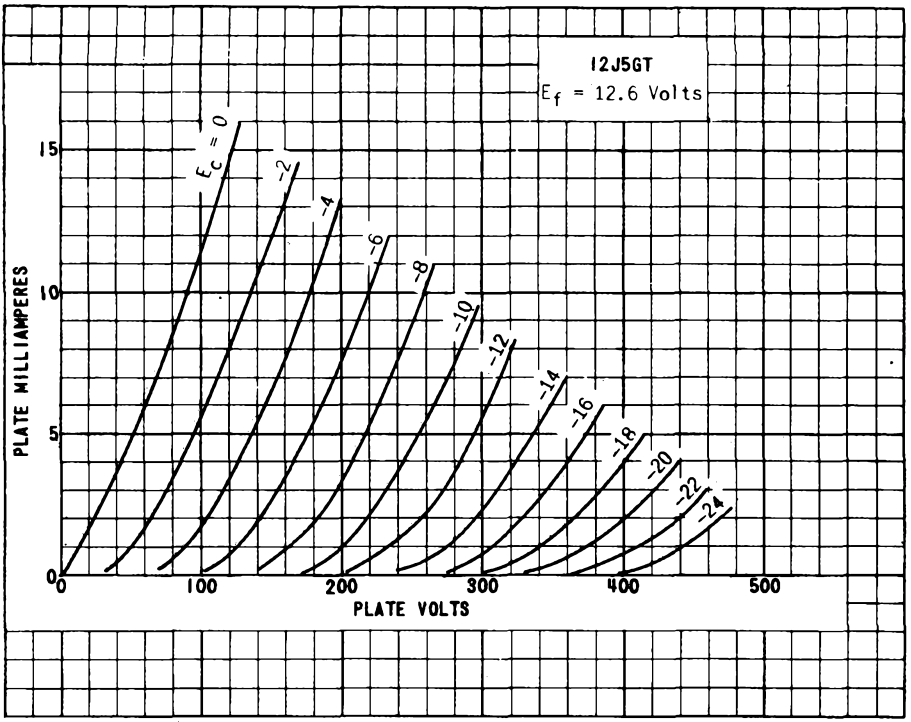
E_o IS RMS OUTPUT FOR 5% TOTAL HARMONIC DISTORTION.



NOTE: COUPLING CAPACITORS C_g AND C_c SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE. R_k SHOULD BE ADEQUATELY BY-PASSED BY CAPACITOR C_k.

PLATE 1949
JAN. 2, 1948

→ INDICATES A CHANGE OR ADDITION.



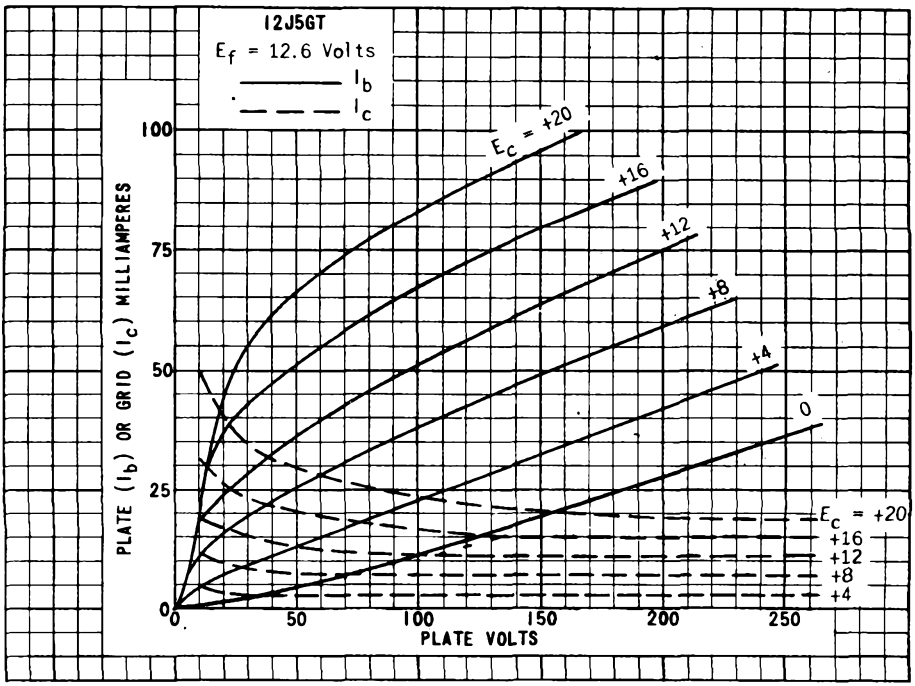


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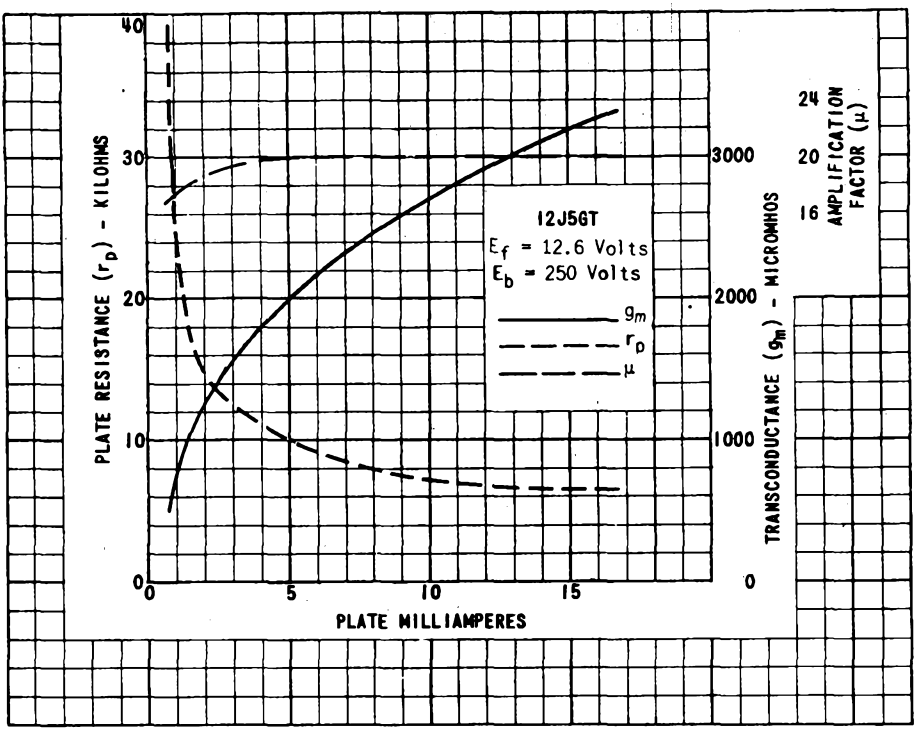
PLATE
1950
JAN. 2,
1948

12J5GT



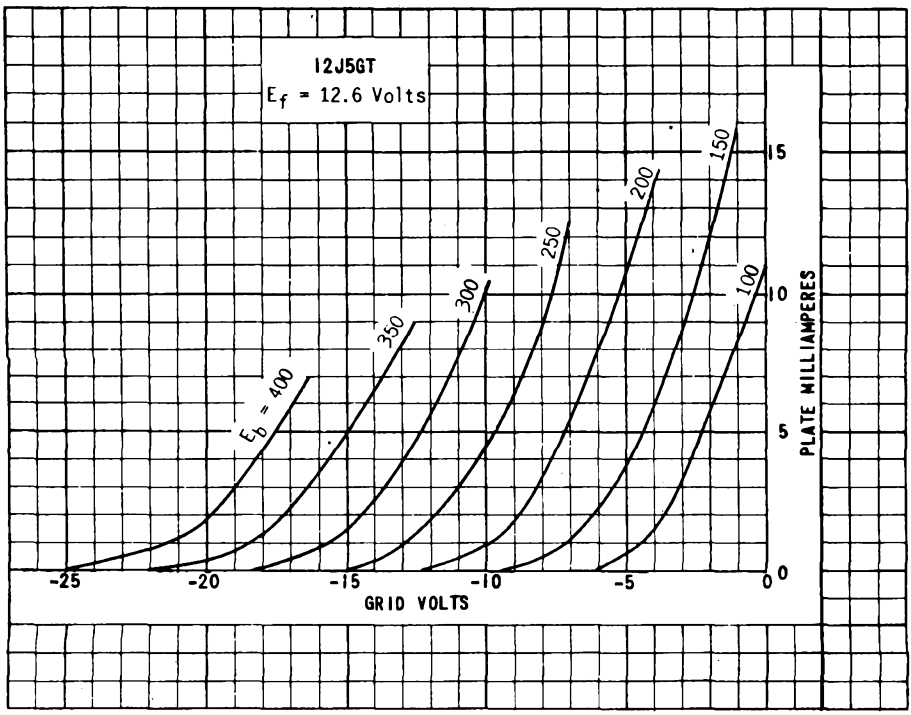
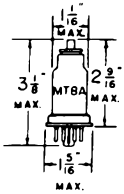


PLATE
1951
JAN. 2,
1948

TUNG-SOL

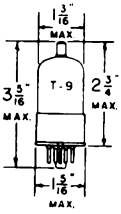


TRIPLE GRID
DETECTOR AMPLIFIER

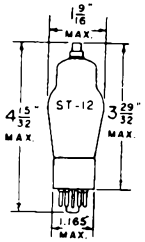
UNIPOTENTIAL CATHODE

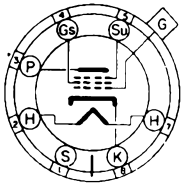
HEATER
12.6 VOLTS 0.15 AMPERE
AC OR DC

SMALL 7 PIN OCTAL BASES



G-7Ra
BOTTOM VIEW





7R
BOTTOM VIEW

THE TUNG-SOL 6J7, 6J7G, 6J7GT AND THE 12J7GT ARE SHARP CUT-OFF GENERAL PURPOSE AMPLIFIERS. WITH THE EXCEPTION OF HEATER AND CAPACITANCE RATINGS, THEIR ELECTRICAL CHARACTERISTICS ARE SIMILAR TO THOSE OF THE 6C6.

RATINGS

	TRIODE[A] CONNECTION	PENTODE CONNECTION	
MAXIMUM PLATE VOLTAGE	250	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	–	300	VOLTS
MAXIMUM SCREEN VOLTAGE	–	125	VOLTS
MINIMUM EXTERNAL CONTROL GRID BIAS VOLTAGE	0	0	VOLTS
MAXIMUM PLATE DISSIPATION	1.75	0.75	WATT
MAXIMUM SCREEN DISSIPATION	–	0.10	WATT

[A] SUPPRESSOR GRID AND SCREEN TIED TO PLATE

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1022-2

APR. 21 1941

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES

TRIODE CONNECTION

	6J7	6J7G	6J7GT 12J7GT
CONTROL GRID TO CATHODE	5[B]	2.6[C]	2.6[C]
PLATE TO CATHODE	14	17	17
CONTROL GRID TO PLATE	2.0	1.8	1.8

PENTODE CONNECTION

CONTROL GRID TO CATHODE	7[B]	4.6[D]	4.6[D]
PLATE TO CATHODE	12	12	12
CONTROL GRID TO PLATE MAX.	0.005	0.007	0.005

[B] WITH SHELL CONNECTED TO CATHODE
[C] WITHOUT EXTERNAL SHIELD
[D] WITH EXTERNAL SHIELD CONNECTED TO CATHODE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

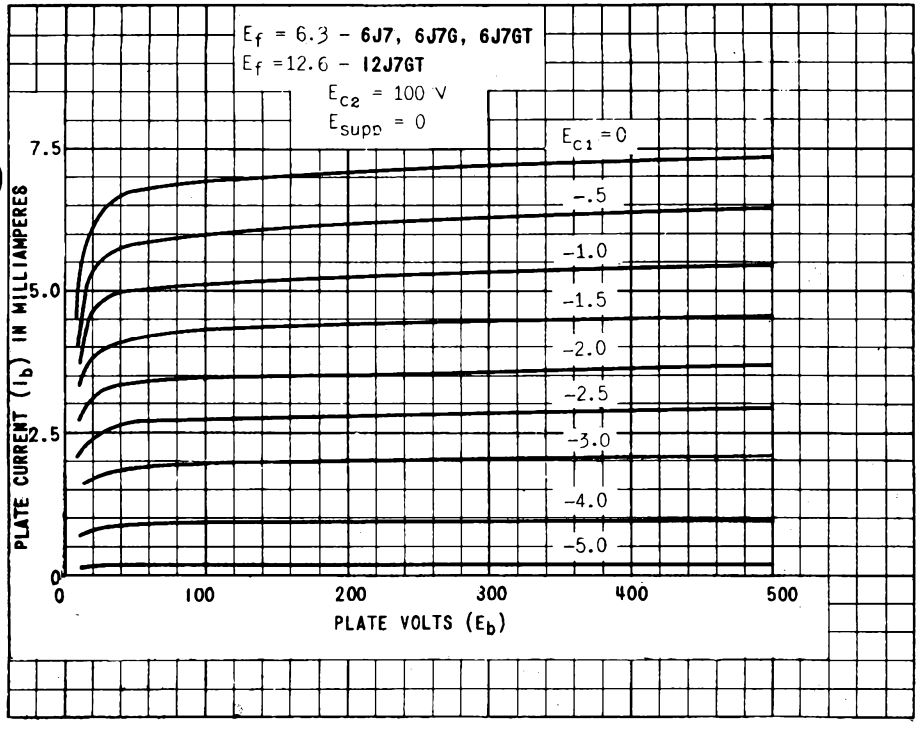
	TRIODE CONNECTION		PENTODE CONNECTION		
PLATE VOLTAGE	180	250	100	250	VOLTS
SCREEN VOLTAGE	PLATE	PLATE	100	100	VOLTS
CONTROL GRID VOLTAGE [E]	-5.3	-8	-3	-3	VOLTS
SUPPRESSOR GRID	PLATE	PLATE	CONNECTED TO CATHODE AT SOCKET		
PLATE CURRENT	5.3	6.5	2.0	2.0	MA.
SCREEN CURRENT	-	-	0.5	0.5	MA.
PLATE RESISTANCE APPROX.	0.0110	0.0105	1.0	- [F]	MEGOHM
TRANSCONDUCTANCE	1800	1900	1185	1225	µMHOS
CONTROL GRID VOLTAGE FOR CATHODE CURRENT CUT-OFF	-	-	-7	-7	VOLTS

[E] THE DC RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 1.0 MEGOHM

[F] GREATER THAN 1 MEGOHM

PLATE 1023-1

APR. 21 1941



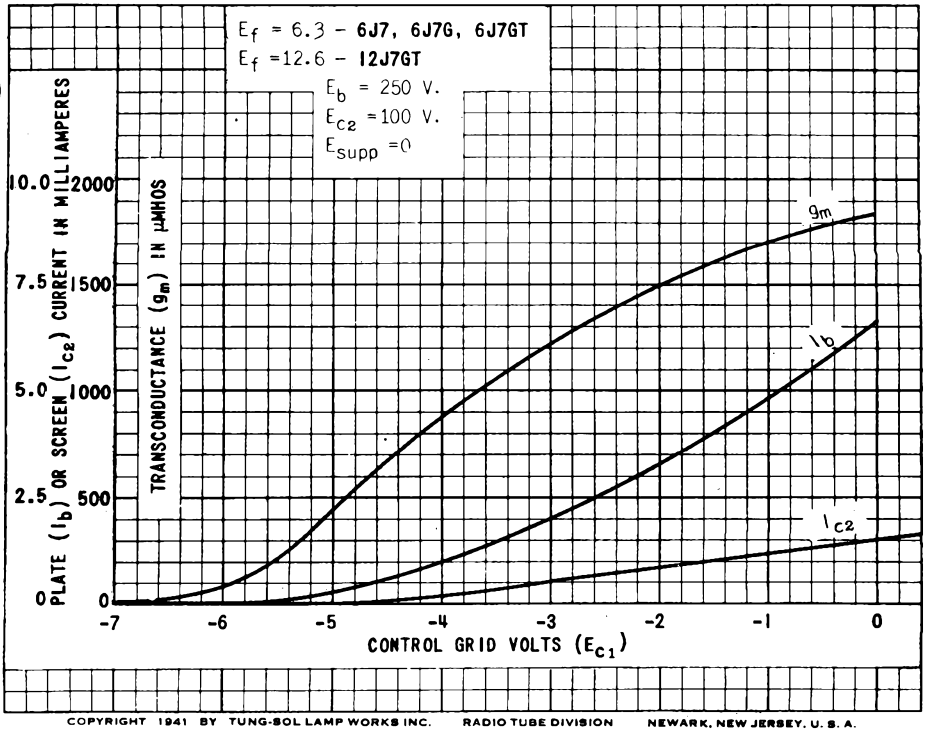


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PLATE
1024-1
APR. 21
1941

(6J7, 6J7G, 6J7GT) 12J7GT

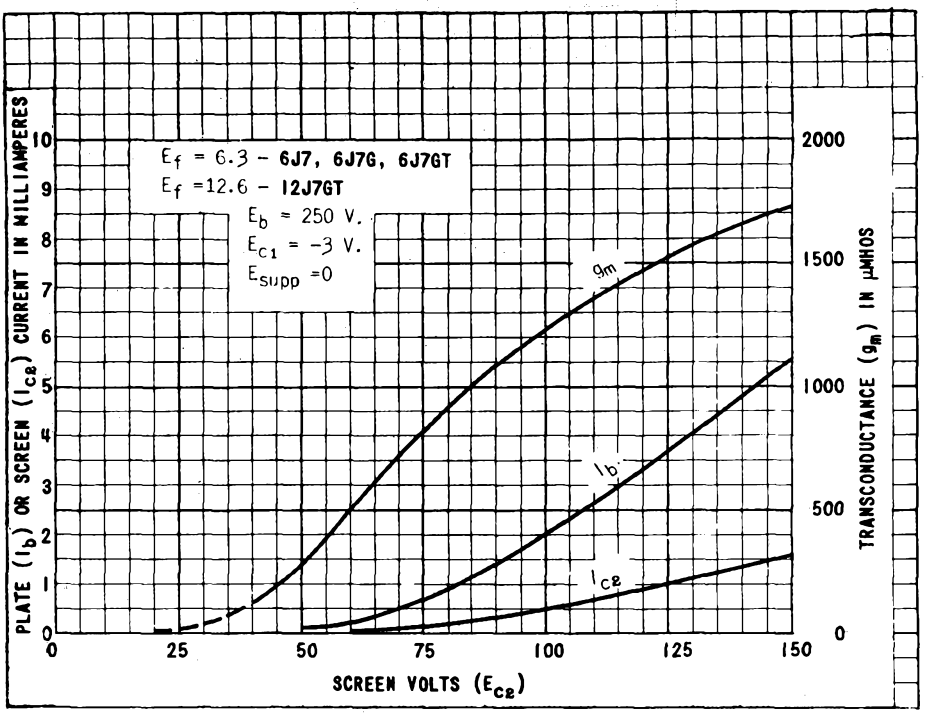


PLATE 1025-1

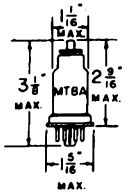
APR. 21 1941

TUNG-SOL

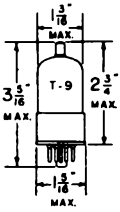
TRIPLE GRID

REMOTE CUT-OFF AMPLIFIER

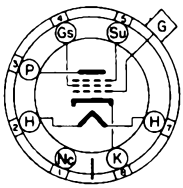
UNIPOTENTIAL CATHODE
HEATER
12.6 VOLTS 0.15 AMPERE
AC OR DC



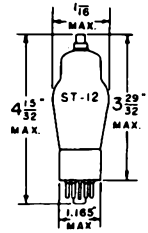
METAL SHELL
7 PIN OCTAL BASE
6K7



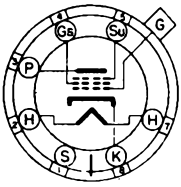
GLASS BULB
7 PIN OCTAL BASE
WITH METAL SHELL
6K7GT 12K7GT



G-7Ra
BOTTOM VIEW
6K7G



GLASS BULB
SMALL 7 PIN OCTAL BASE
6K7G



7R
BOTTOM VIEW
6K7 6K7GT 12K7GT

THE TUNG-SOL 6K7, 6K7G, 6K7GT AND THE 12K7GT ARE TRIPLE GRID VARIABLE MU AMPLIFIERS. THEY ARE SUITABLE FOR USE WITH AVC IN RF AND IF AMPLIFIERS, AND THEY MINIMIZE CROSS MODULATION. WITH THE EXCEPTION OF CAPACITANCES AND HEATER RATINGS THEIR ELECTRICAL CHARACTERISTICS ARE SIMILAR.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	
MAXIMUM PLATE DISSIPATION	2.75	WATTS
MAXIMUM SCREEN DISSIPATION	0.35	WATT

DIRECT INTERELECTRODE CAPACITANCES

	6K7[A]	6K7G[B]	6K7GT[A] 12K7GT[A]	
CONTROL GRID TO CATHODE	7	5	5	μμf
PLATE TO CATHODE	12	12	11	μμf
CONTROL GRID TO PLATE	.005 MAX.	.007 MAX.	.007 MAX.	μμf

[A] SHELL IS CONNECTED TO THE CATHODE.

[B] MEASURED WITH AN EXTERNAL SHIELD. THE INTERNAL SHIELD IN THE DOME IS CONNECTED TO THE CATHODE WITHIN THIS TUBE

CONTINUED NEXT PAGE

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PLATE 699-3
JAN. 29 1940

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	90	180	250	250	VOLTS
SCREEN VOLTAGE	90	75	100	125	VOLTS
CONTROL GRID VOLTAGE	−3	−3	−3	−3	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET				
PLATE CURRENT	5.4	4.0	7.0	10.5	MA.
SCREEN CURRENT	1.3	1.0	1.7	2.6	MA.
PLATE RESISTANCE APPROX.	0.3	1.0	0.8	0.6	MEGOHM
TRANSCONDUCTANCE	1275	1100	1450	1650	μMHOS
CONTROL GRID BIAS APPROX. FOR TRANSCONDUCTANCE = 2 μMHOS	−38.5	−32.5	−42.5	−52.5	VOLTS

TYPICAL OPERATING CONDITIONS WITH VARIABLE BIAS

MIXER IN SUPERHETERODYNE CIRCUITS

PLATE VOLTAGE		250	VOLTS
SCREEN VOLTAGE		100	VOLTS
CONTROL GRID VOLTAGE	APPROX. A	−10	VOLTS
SUPPRESSOR GRID	CONNECTED TO THE CATHODE AT THE SOCKET		

A THE GRID BIAS SHOWN IS MINIMUM FOR AN OSCILLATOR PEAK VOLTAGE OF 7 VOLTS. THESE VALUES ARE OPTIMUM.

PLATE 696-3

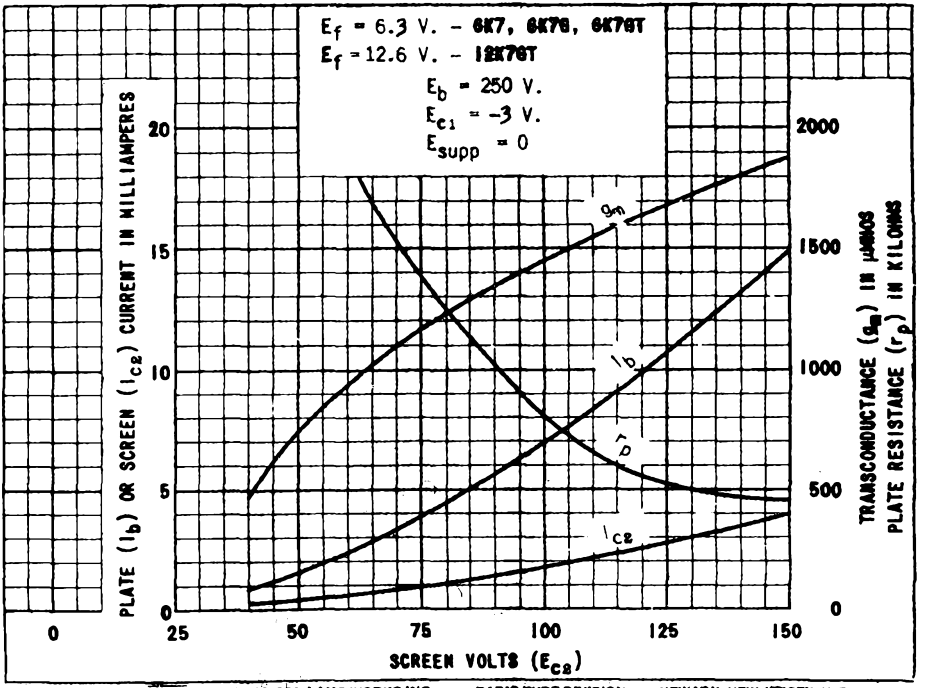
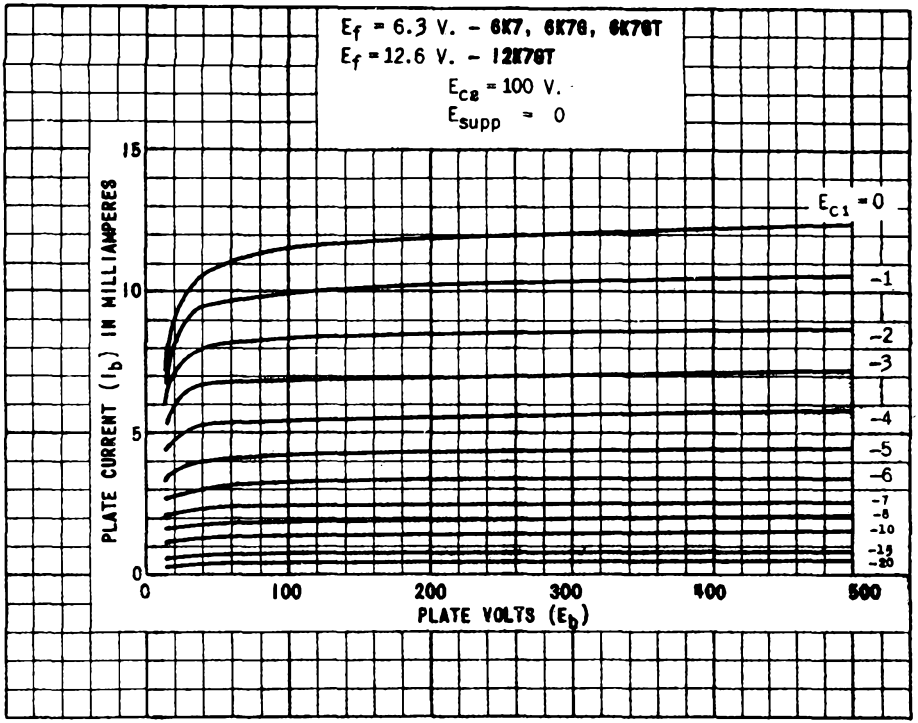


PLATE 639-1
NOV. 20 1939


E_f = 6.3 V. – 6K7, 6K7G, 6K7GT
E_f = 12.6 V. – 12K7GT
E_{c2} = 100 V.
E_{supp} = 0
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
5
10
15
100
200
300
400
500
E_{c1} = 0
-1
-2
-3
-4
-5
-6
-7
-8
-10
-15
-20

12K7GT (6K7, 6K7G, 6K7GT)

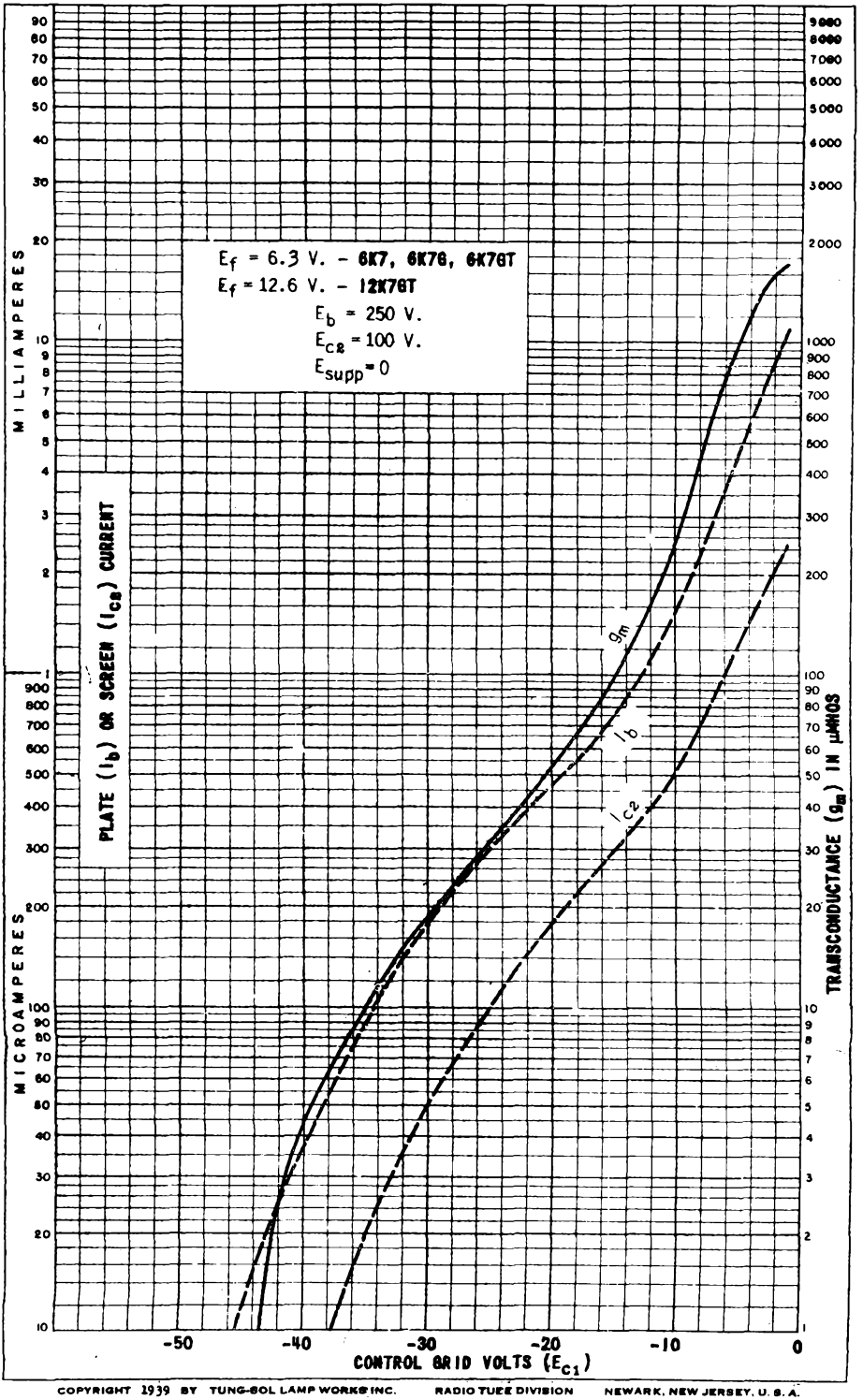
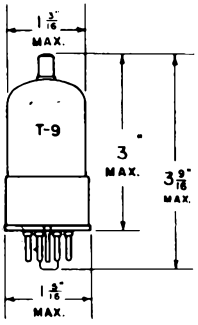


PLATE 640-1

TUNG-SOL



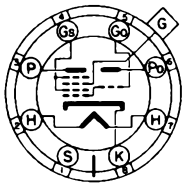
TRIODE HEXODE CONVERTER

UNIPOTENTIAL CATHODE

HEATER

12.6 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB



8K

BOTTOM VIEW

SMALL WAFER 8 PIN OCTAL BASE WITH METAL SHELL

THE TUNG-SOL 12K8GT CONSISTS OF A TRIODE OSCILLATOR AND A HEXODE MIXER IN A COMMON ENVELOPE. THE PHYSICAL DESIGN OF THIS TUBE REDUCES INTERACTION BETWEEN THE OSCILLATOR AND MIXER SECTIONS AND MAKES FOR STABLE OPERATION ON THE HIGH FREQUENCIES AS WELL AS THE BROADCAST BAND. IT IS USED IN AC-DC SUPERHETERODYNES USING 150 MA. HEATER TUBES.

RATINGS

MAXIMUM HEXODE PLATE (P) VOLTAGE	300	VOLTS
MAXIMUM HEXODE SCREEN (Gs) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM HEXODE SCREEN (Gs) VOLTAGE	150	VOLTS
MAXIMUM HEXODE PLATE DISSIPATION	0.75	WATT
MAXIMUM HEXODE SCREEN DISSIPATION	0.7	WATT
MAXIMUM TOTAL CATHODE CURRENT	16	MA.
MINIMUM EXTERNAL SIGNAL GRID (G) BIAS VOLTAGE	0	VOLT
MAXIMUM OSCILLATOR ANODE (Po) VOLTAGE	125	VOLTS
MAXIMUM OSCILLATOR ANODE DISSIPATION	0.75	WATT

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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PLATE 1151-1
NOV. 17 1941

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

HEXODE PLATE (P) VOLTAGE	100	250	VOLTS
HEXODE SCREEN (G_S) VOLTAGE	100	100	VOLTS
HEXODE CONTROL GRID (G) VOLTAGE	−3	−3	VOLTS
OSCILLATOR ANODE (P_o) VOLTAGE	100	100	VOLTS
HEXODE PLATE CURRENT	2.3	2.5	MA.
HEXODE SCREEN CURRENT	6.2	6.0	MA.
OSCILLATOR ANODE CURRENT	3.8	3.8	MA.
OSCILLATOR GRID (G_o) CURRENT	0.15	0.15	MA.
TOTAL CATHODE CURRENT	12.5	12.5	MA.
OSCILLATOR GRID RESISTOR	50 000	50 000	OHMS
CONVERSION TRANSCONDUCTANCE	325	350	μMHOS
HEXODE PLATE RESISTANCE APPROX.	0.4	0.6	MEGOHM
HEXODE CONTROL GRID VOLTAGE APPROX.	−30	−30	VOLTS

FOR CONVERSION TRANSCONDUCTANCE = 2 μMHOS

DIRECT INTERELECTRODE CAPACITANCES[5]

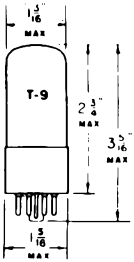
SIGNAL GRID TO MIXER PLATE (G TO P)	0.08 MAX.	μμf
SIGNAL GRID TO OSCILLATOR PLATE (G TO P_o)	0.05 MAX.	μμf
SIGNAL GRID TO OSCILLATOR GRID (G TO G_o)	0.2 MAX.	μμf
OSCILLATOR GRID TO OSCILLATOR PLATE (G_o TO P_o)	1.8	μμf
SIGNAL INPUT: G TO ALL OTHER ELECTRODES	4.6	μμf
OSCILLATOR INPUT: G_o TO ALL OTHER ELECTRODES EXCEPT P_o	6.5	μμf
OSCILLATOR OUTPUT: P_o TO ALL OTHER ELECTRODES EXCEPT G_o	3.4	μμf
MIXER OUTPUT: P TO ALL OTHER ELECTRODES	4.8	μμf
OSCILLATOR GRID TO MIXER PLATE (G_o TO P)	0.15 MAX.	μμf

[A] WITH EXTERNAL SHIELD CONNECTED TO CATHODE.

NOTE: THE TRANSCONDUCTANCE OF THE OSCILLATOR SECTION (NOT OSCILLATING) IS APPROXIMATELY 3000 UMHOS WHEN THE TRIODE PLATE VOLTAGE IS 100 VOLTS, AND THE TRIODE GRID VOLTAGE IS ZERO VOLTS.

PLATE 1152-1

TUNG-SOL

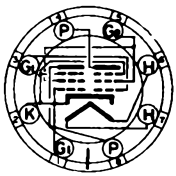


TWIN-PENTODE POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER

12.6 VOLTS 0.15 AMPERES



• THE 12L8-GT IS A HEATER-CATHODE TYPE OF TWIN-UNIT TUBE WHICH CONTAINS TWO POWER-AMPLIFIER PENTODES WHICH HAVE A COMMON CATHODE. USING SINGLE-ENDED GT-CONSTRUCTION, THE 12L8-GT IS USEFUL IN THE OUTPUT STAGE OF COMPACT, LIGHTWEIGHT EQUIPMENT WHERE MODERATE POWER OUTPUT IS DESIRED. IN SUCH SERVICE, THE UNITS MAY BE CONNECTED IN PUSH-PULL OR IN PARALLEL DEPENDING ON THE REQUIREMENTS.

RATINGS

HEATER OR FILAMENT VOLTAGE (AC OR DC)		12.6	VOLTS
HEATER OR FILAMENT CURRENT		0.15	AMP.
MAXIMUM PLATE VOLTAGE	EACH UNIT	180	VOLTS
MAXIMUM SCREEN VOLTAGE	" "	180	VOLTS
MAXIMUM PLATE DISSIPATION	" "	2.5	WATTS
MAXIMUM SCREEN DISSIPATION	" "	1.0	WATT
MAXIMUM D-C HEATER-CATHODE POTENTIAL		100	VOLTS

DIRECT INTERELECTRODE CAPACITANCES (WITH NO EXTERNAL SHIELD)

	PENTODE UNIT P1		PENTODE UNIT P2	
CONTROL GRID TO CATHODE	5.0		5.0	μμf
PLATE TO CATHODE	6.0		6.0	μμf
GRID TO PLATE	0.7		0.7	μμf
GRID TO GRID		0.08		μμf
PLATE TO PLATE		1.5		μμf
GRID OF P1-PLATE OF P2		0.2		μμf
GRID OF P2-PLATE OF P1		0.1		μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER (EACH SECTION)

HEATER OR FILAMENT VOLTAGE	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMP.
PLATE VOLTAGE	180	VOLTS
SCREEN VOLTAGE	180	VOLTS
CONTROL GRID VOLTAGE	-9	VOLTS
PEAK AF SIGNAL VOLTAGE	9	VOLTS
ZERO-SIGNAL PLATE CURRENT	13	MA.
ZERO-SIGNAL SCREEN CURRENT	2.8	MA.
MAXIMUM-SIGNAL PLATE CURRENT	13.5	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	4.6	MA.
PLATE RESISTANCE	0.16	MEGOHM
TRANSCONDUCTANCE	2150	μMHOS
LOAD RESISTANCE	10000	OHMS
TOTAL HARMONIC DISTORTION	10	PER CENT
POWER OUTPUT	1	WATT

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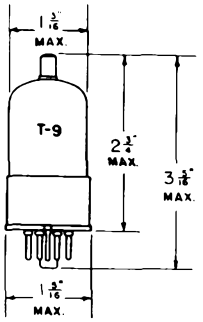
PLATE 1378-1 DEC. 15 1943

TUNG-SOL



DUO-DIODE

HIGH MU TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.15 AMPERE
AC OR DC

7V
BOTTOM VIEW

GLASS BULB

SMALL WAFER 7 PIN OCTAL BASE WITH METAL SHELL

THE TUNG-SOL 12Q7GT COMBINES TWO DIODES AND A HIGH MU TRIODE IN A SINGLE BULB, USING A COMMON CATHODE. IT IS DESIGNED FOR SERVICE AS A DIODE DETECTOR, AVC RECTIFIER, AND A HIGH GAIN RESISTANCE COUPLED AMPLIFIER IN AC – DC OPERATED RECEIVERS USING 150 MA. HEATER TUBES.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MINIMUM DIODE CURRENT WITH 10 VOLTS DC APPLIED PER PLATE	0.8	MA.

AVERAGE CHARACTERISTICS OF TRIODE UNIT

PLATE VOLTAGE	100	250	VOLTS
CONTROL GRID VOLTAGE	−1	−3	VOLTS
PLATE CURRENT	0.8	1.0	MA.
PLATE RESISTANCE	58000	58000	OHMS
TRANSCONDUCTANCE	1200	1200	μMHOS
AMPLIFICATION FACTOR	70	70	

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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1118-2

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1941

12Q7GT

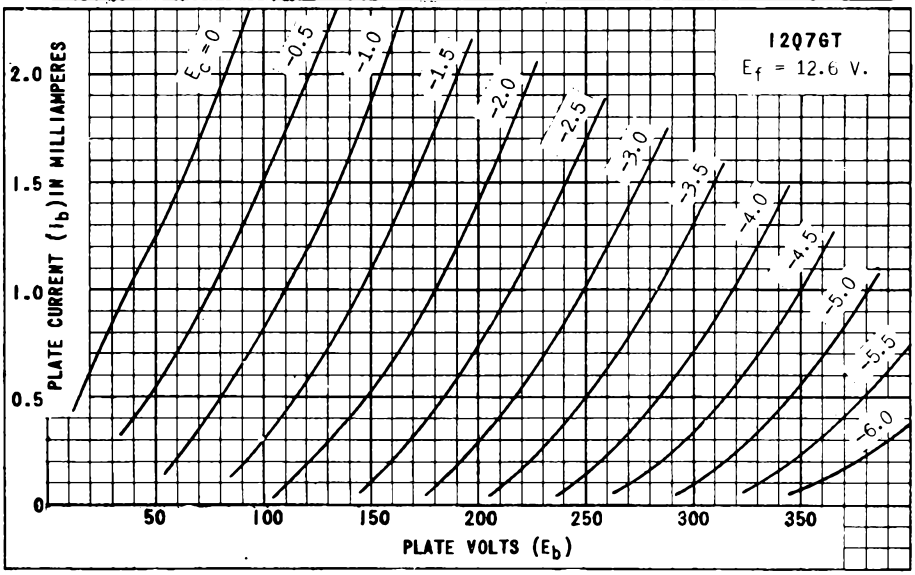
TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

ZERO BIAS, RESISTANCE COUPLED, CLASS A1 AMPLIFIER

PLATE SUPPLY VOLTAGE	100		300		VOLTS
PLATE LOAD RESISTOR	0.25		0.25		MEGOHM
GRID RESISTOR	10		10		MEGOHM
COUPLING CONDENSER	.01 TO .005		.01 TO .005		μf
GRID RESISTOR FOR FOLLOWING TUBE	.5 TO 1.0		.5 TO 1.0		MEGOHM
EXTERNAL GRID CIRCUIT IMPEDANCE	0	0	0	0	MEGOHM
VOLTAGE GAIN	40	42	50	56	
VOLTAGE OUTPUT (RMS)[A]	11	13	51	58	VOLTS

[A] AT 5% TOTAL HARMONIC DISTORTION.



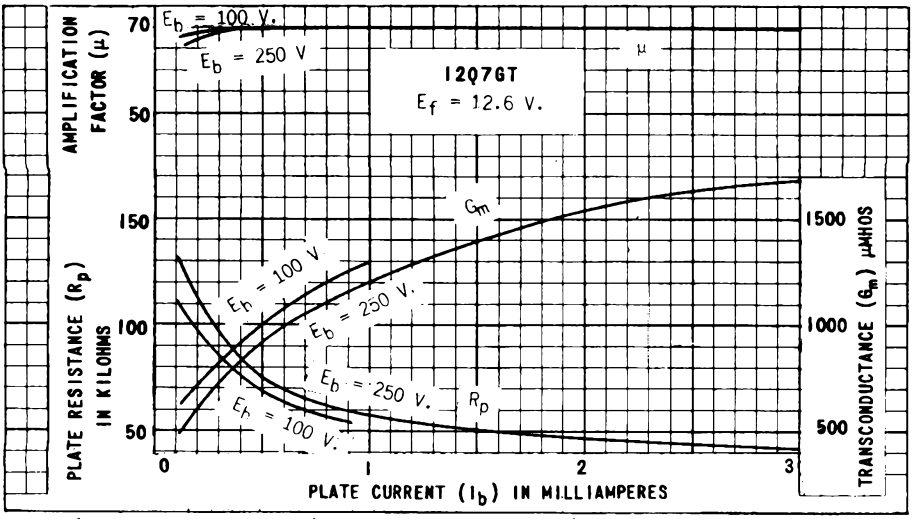
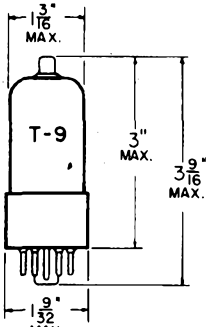


PLATE 1119-1

TUNG-SOL

TRIPLE-DIODE TRIODE

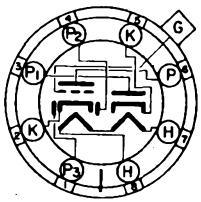


GLASS BULB
SKIRTED
MINIATURE CAP

COATED UNIPOTENTIAL CATHODES

HEATER
12.6 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
INTERMEDIATE SHELL
8 PIN OCTAL BASE

THE 12S8GT COMBINES IN ONE ENVELOPE A HIGH-MU TRIODE AND THREE SEPARATE DIODES. ONE OF THE THREE DIODES HAS A SEPARATE CATHODE PERMITTING USE AS A BALANCED DISCRIMINATOR OR DETECTOR. IN COMBINATION FM/AM RECEIVERS THIS TUBE PROVIDES THE NECESSARY ELEMENTS FOR DETECTION OF BOTH TYPES OF SIGNAL WITHOUT NEED FOR ADDITIONAL SWITCHING.

DIRECT INTERELECTRODE CAPACITANCES

WITH EXTERNAL SHIELD M8-308 CONNECTED TO CATHODE

GRID TO PLATE: (G TO P)	1.2	μμf
INPUT: (G TO K)	2.0	μμf
OUTPUT: (P TO K)	3.8	μμf
DIODE INPUT (EACH DIODE) (APPROX.)	1.0	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	150	VOLTS
MAXIMUM TRIODE PLATE VOLTAGE	300	VOLTS
MAXIMUM TRIODE PLATE DISSIPATION	0.5	WATT
MAXIMUM CONTINUOUS DIODE CURRENT (EACH DIODE)	1.0	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HEATER VOLTAGE	12.6	12.6	12.6	VOLTS
HEATER CURRENT	150	150	150	MA.
TRIODE PLATE VOLTAGE	50	100	250	VOLTS
GRID VOLTAGE	0	-1	-2	VOLTS
GRID CIRCUIT RESISTOR	10	0	0	MEGOHM
TRIODE PLATE CURRENT	0.07	0.4	0.9	MA.
PLATE RESISTANCE	285 000	110 000	91 000	OHMS
TRANSCONDUCTANCE	300	900	1 100	μMHOS
AMPLIFICATION FACTOR	85	100	100	
AVERAGE DIODE CURRENT WITH 10 VOLTS DC APPLIED (EACH DIODE)	2.5	2.5	2.5	MA.

ONE DIODE HAS A SEPARATE CATHODE, THE OTHER CATHODE IS COMMON TO TWO DIODES AND THE TRIODE UNIT.

IT IS RECOMMENDED THAT DIODE #1 (PIN 3) AND DIODE #3 (PIN 1) BE USED IN BALANCED DETECTOR CIRCUITS.

→ INDICATES A CHANGE OR ADDITION.

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TUNG-SOL

CONTINUED FROM PRECEDING PAGE

RESISTANCE COUPLED AMPLIFIER

R1 MEG.	Rg1 MEG.	Rc MEG.	Ebb = 90 VOLTS			Ebb = 180 VOLTS			Ebb = 300 VOLTS		
			Rk	GAIN	Eo	Rk	GAIN	Eo	Rk	GAIN	Eo
0.1	A	0.1	6800	25	6	4700	27	10	2200	36	29
0.1	A	0.27	8200	29	7	4700	35	15	2700	45	35
0.27	A	0.27	10000	35	9	6800	44	19	4700	53	42
0.27	A	0.47	12000	39	10	6800	48	21	5600	56	48
0.47	A	0.47	18000	39	10	10000	45	24	8200	58	51
0.47	A	1	18000	46	15	12000	54	29	9100	63	59
0.27	10	0.27	---	34	5	---	54	20	---	58	40
0.27	10	0.47	---	38	6	---	57	25	---	60	49
0.47	10	0.47	---	39	7	---	60	23	---	62	47
0.47	10	1	---	42	9.5	---	65	33	---	70	63

[A] VALUE OF Rg1 IS NOT CRITICAL.

Rk TAKEN TO NEAREST RMA VALUE FOR EACH CASE INSTEAD OF ABSOLUTE OPTIMUM VALUE.

Eo IS RMS OUTPUT AT 5% TOTAL HARMONIC DISTORTION.

GAIN MEASURED AT Eo = 2.0 VOLTS RMS OUTPUT.

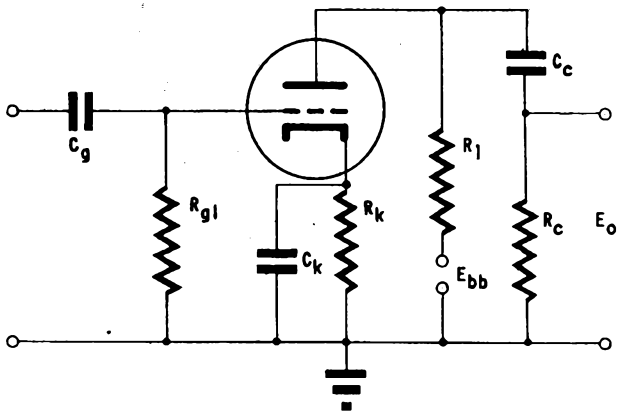
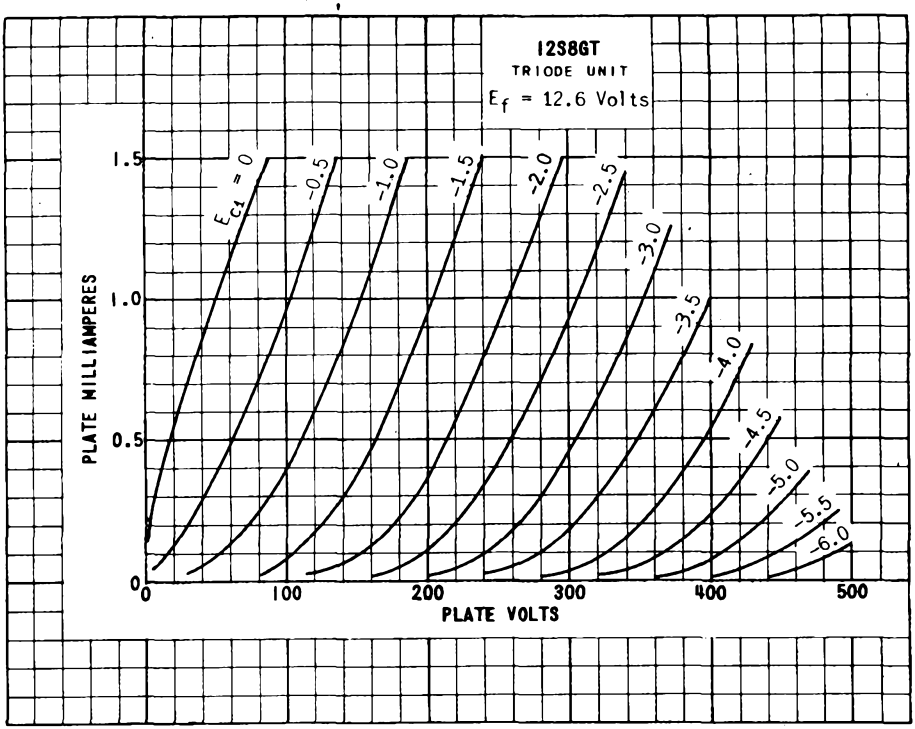
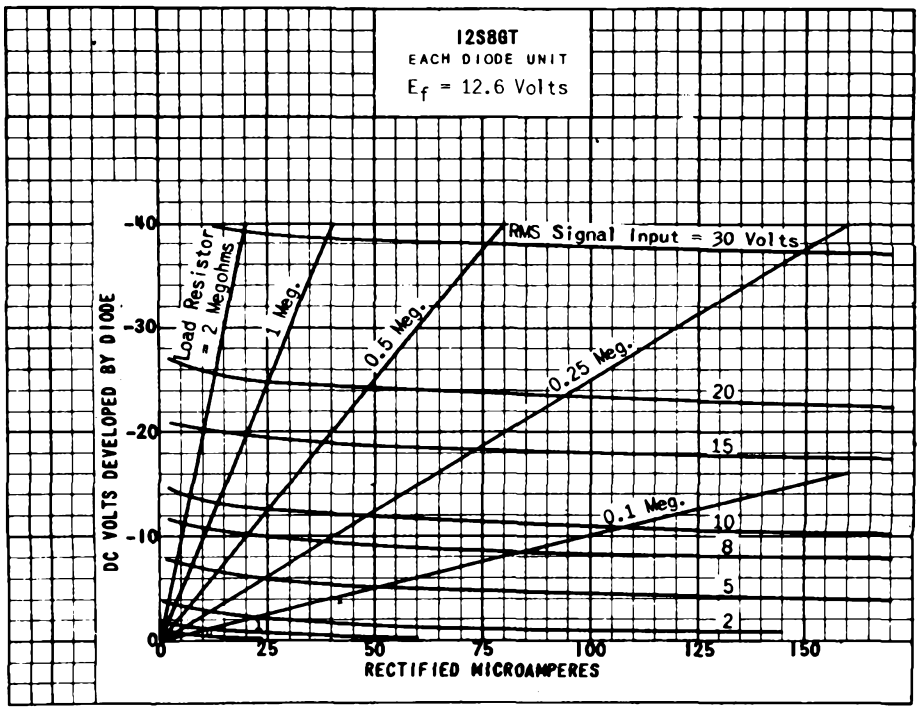


PLATE 1896
OCT. 1, 1947

→ INDICATES A CHANGE OR ADDITION.





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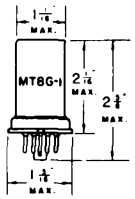
TUNG-SOL



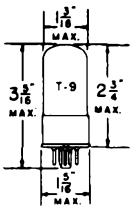
METAL TUBE
SMALL WAFER
8 PIN OCTAL BASE
12SA7

PENTAGRID CONVERTER

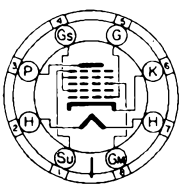
UNIPOTENTIAL CATHODE

HEATER

12.6 VOLTS 0.15 AMPERE
AC OR DC

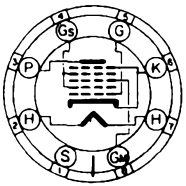


GLASS BULB
8 PIN OCTAL BASE
WITH METAL SHELL
12SA7GT/G



8R

BOTTOM VIEWS



8AD

THE TUNG-SOL 12SA7 AND 12SA7GT/G ARE PENTAGRID CONVERTERS, DESIGNED TO MINIMIZE FREQUENCY DRIFT. THEY ARE INTENDED FOR SERVICE AS COMBINED OSCILLATORS AND MIXERS IN AC-DC OPERATED SUPERHETERODYNE RECEIVERS.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN (Gs) SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL CONTROL GRID (G) BIAS VOLTAGE[A]	0	VOLT
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	1.0	WATT

[A] WITH SELF-EXCITED OSCILLATOR.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES

	12SA7	6SA7GT/G	
CONTROL GRID (G) TO MIXER PLATE (P)[S]	0.13 MAX.	0.2 MAX.	μμf
CONTROL GRID (G) TO OSCILLATOR GRID (Gθ)[S]	0.15 MAX.	0.2 MAX.	μμf
RF INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES[S]	9.5	11	μμf
OSCILLATOR GRID (Gθ) TO PLATE (P)[S]	0.06 MAX.	0.2 MAX.	μμf
OSCILLATOR INPUT: OSCILLATOR GRID (Gθ) TO ALL OTHER ELECTRODES[S]	7	8	μμf
OSCILLATOR GRID (Gθ) TO ALL OTHER ELECTRODES EXCEPT CATHODE (K)	4.4	5	μμf
OSCILLATOR GRID (Gθ) TO CATHODE (K)	2.6	3	μμf
MIXER OUTPUT: PLATE (P) TO ALL OTHER ELECTRODES[S]	12	12	μμf
CATHODE (K) TO ALL OTHER ELECTRODES EXCEPT OSCILLATOR GRID (Gθ)	5	30	μμf

[S] WITH SHELL CONNECTED TO CATHODE.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE – SEPARATE EXCITATION[A]

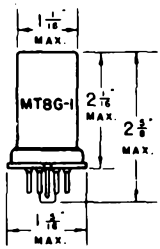
PLATE (P) VOLTAGE	100	250	VOLTS
SCREEN (Gs) VOLTAGE	100	100	VOLTS
CONTROL GRID (G) VOLTAGE	−2	−2	VOLTS
OSCILLATOR GRID (Gθ) RESISTOR	20000	20000	OHMS
PLATE CURRENT	3.3	3.5	MA.
SCREEN CURRENT	8.5	8.5	MA.
OSCILLATOR GRID CURRENT	0.5	0.5	MA.
TOTAL CATHODE CURRENT	12.3	12.5	MA.
PLATE RESISTANCE	0.5	1.0	MEGOHM
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −2 V.	425	450	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −6 V.	310	325	μMHOS
CONVERSION TRANSCONDUCTANCE FOR CONTROL GRID (G) VOLTAGE = −10 V.	75	80	μMHOS
CONVERSION TRANSCONDUCTANCE APPROX. FOR CONTROL GRID (G) VOLTAGE = −35 V.	2	2	μMHOS

[A] THE CHARACTERISTICS UNDER THESE CONDITIONS CORRESPOND VERY CLOSELY WITH THOSE OBTAINED IN A SELF-EXCITED OSCILLATORY CIRCUIT OPERATING WITH ZERO-BIAS.

PLATE 1121-1

TUNG-SOL

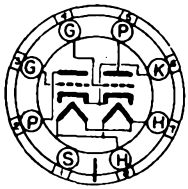
TWIN TRIODE AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.15 AMPERE
AC OR DC

METAL SHELL



8S
BOTTOM VIEW

SMALL WAFER 8 PIN OCTAL BASE

THE TUNG-SOL 12SC7 IS A SINGLE-ENDED TWIN TRIODE AMPLIFIER IN A METAL SHELL. EACH SECTION IS DESIGNED WITH A HIGH AMPLIFICATION FACTOR. ITS PRIMARY APPLICATION IS AS A PHASE INVERTER AND AUDIO AMPLIFIER.

RATINGS

MAXIMUM PLATE VOLTAGE	250	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

VALUES ARE FOR EACH TRIODE SECTION

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-2	VOLTS
PLATE CURRENT	2	MA.
PLATE RESISTANCE	53000	OHMS
TRANSCONDUCTANCE	1325	µMHOS
AMPLIFICATION FACTOR	70	

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PLATE 960-1

JAN. 6 1941

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12SC7

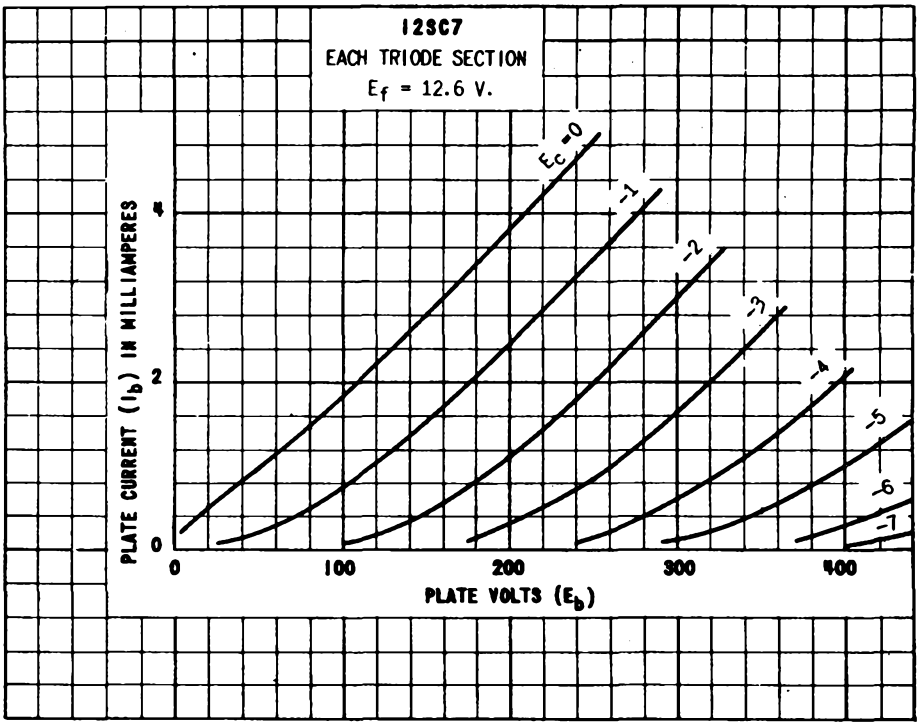
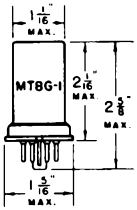


PLATE
969-1

TUNG-SOL



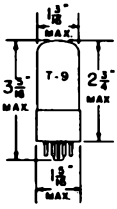
METAL SHELL
SMALL WAFER
6 PIN OCTAL BASE
12SF5

HIGH MU TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER

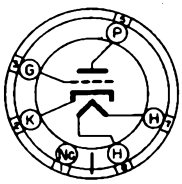
12.6 VOLTS 0.15 AMPERE
AC OR DC



GLASS BULB
INTERMEDIATE
6 PIN OCTAL BASE
12SF5GT

6AB

BOTTOM VIEWS



G-6AB

THE TUNG-SOL 12SF5 AND 12SF5GT ARE GENERAL PURPOSE HIGH MU TRIODES. THEY ARE DESIGNED FOR SERVICE AS HIGH GAIN RESISTANCE COUPLED AMPLIFIERS IN AC - DC OPERATED RECEIVERS USING 150 MA. HEATER TUBES.

RATINGS

HEATER VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER CURRENT	0.15	AMPERE
MAXIMUM PLATE VOLTAGE.	300	VOLTS

AVERAGE CHARACTERISTICS

PLATE VOLTAGE	100	250	VOLTS
CONTROL GRID VOLTAGE	-1	-2	VOLTS
PLATE CURRENT	0.4	0.9	MA.
PLATE RESISTANCE	85000	66000	OHMS
TRANSCONDUCTANCE	1150	1500	μMHOS
AMPLIFICATION FACTOR	100	100	

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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1092-2

JULY 28
1941

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

ZERO BIAS, RESISTANCE COUPLED, CLASS A1 AMPLIFIER

PLATE SUPPLY VOLTAGE	100		300		VOLTS
PLATE LOAD RESISTOR	0.25		0.25		MEGOHM
GRID RESISTOR	10		10		MEGOHMS
COUPLING CONDENSER	.01 TO .005		.01 TO .005		μμf
GRID RESISTOR FOR FOLLOWING TUBE	.5 TO 1.0		.5 TO 1.0		MEGOHM
EXTERNAL GRID CIRCUIT IMPEDANCE	0	0	0	0	MEGOHM
VOLTAGE GAIN	48	52	66	71	
VOLTAGE OUTPUT (RMS)[A]	7.0	8.5	44	50	VOLTS

[A] AT FIVE PER CENT TOTAL HARMONIC DISTORTION.

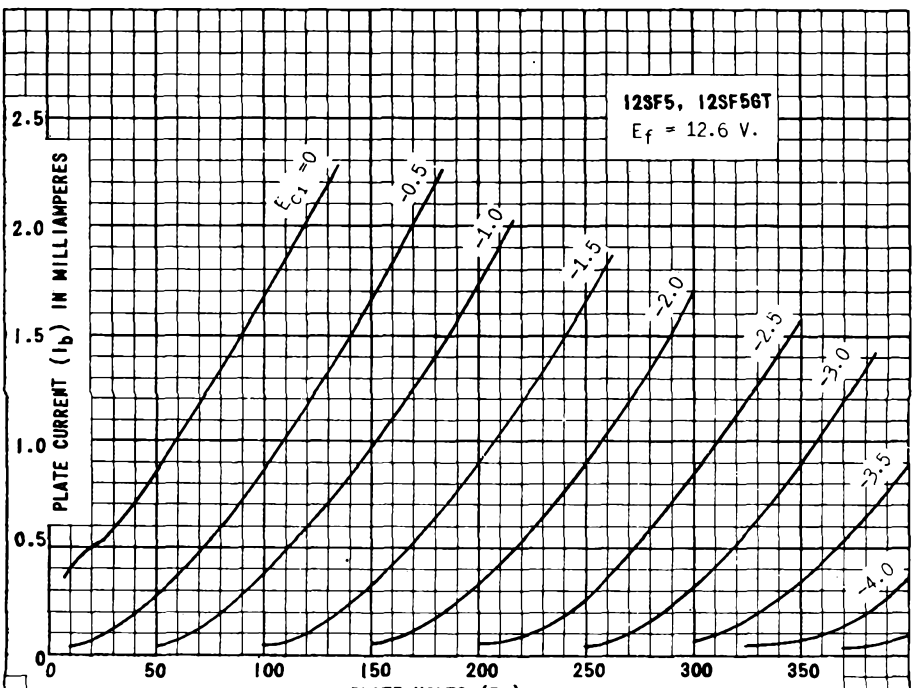

PLATE 1093-1

TENTATIVE DATA

12SF7GT

TUNG-SOL

DIODE AMPLIFIER PENTODE

PHYSICAL SPECIFICATIONS

EMITTER COATED UNIPOT. CATHODE	PIN CONNECTIONS	
BASE 8 PIN OCTAL WAFER WITH	PIN 1 BASE SHELL, INTER-PIN SHIELD	
METAL SHELL	PIN 2 GRID 1	PIN 7 HEATER
BULB T-9	PIN 3 G3, S1, K	PIN 8 HEATER
MAXIMUM DIAMETER 1 5/16"	PIN 4 GRID 2	
MAXIMUM OVERALL LENGTH 3 5/16"	PIN 5 DI. PLATE	MOUNTING POS. ANY
MAXIMUM SEATED HEIGHT 2 3/4"	PIN 6 PENT. PLATE	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD NB-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMP.
MAXIMUM PENTODE PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM PENTODE PLATE DISSIPATION	3.5	WATTS
MAXIMUM SCREEN DISSIPATION	0.5	WATT
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MINIMUM DIODE PLATE CURRENT WITH 10 VOLTS DC APPLIED	0.8	MA.

CAPACITANCES

WITH EXTERNAL SHIELD CONNECTED TO CATHODE

CONTROL GRID TO CATHODE	5.5	μμf
PENTODE PLATE TO CATHODE	6.0	μμf
GRID TO PENTODE PLATE	0.004	μμf (MAX.)
DIODE PLATE TO PENTODE GRID 1	0.002	μμf (MAX.)
DIODE PLATE TO PENTODE PLATE	1.3	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER OR FILAMENT VOLTAGE	12.6	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	0.15	AMP.
PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	-1	-1	VOLT.
PEAK AF SIGNAL VOLTAGE			VOLTS
PLATE CURRENT	12	12.4	MA.
SCREEN CURRENT	3.4	3.3	MA.
MAXIMUM-SIGNAL PLATE CURRENT			MA.
MAXIMUM-SIGNAL SCREEN CURRENT			MA.
PLATE RESISTANCE (APPROX.)	0.2	0.7	MEGOHM
TRANSCONDUCTANCE	1975	2050	μMHOS
AMPLIFICATION FACTOR			
LOAD RESISTANCE			OHMS
TOTAL HARMONIC DISTORTION			PER CENT
POWER OUTPUT			WATTS
CONTROL GRID VOLTAGE (APPROX.) FOR TRANSCONDUCTANCE=10 μMHOS	-35	-35	VOLTS

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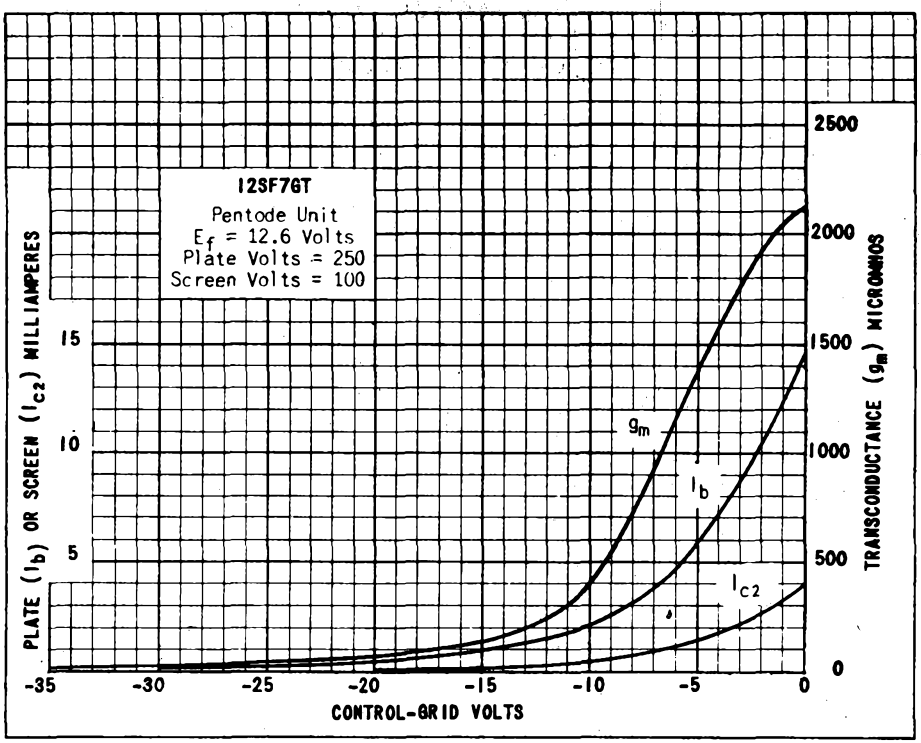
PLATE 1709

APRIL 15 1946

12SF7GT



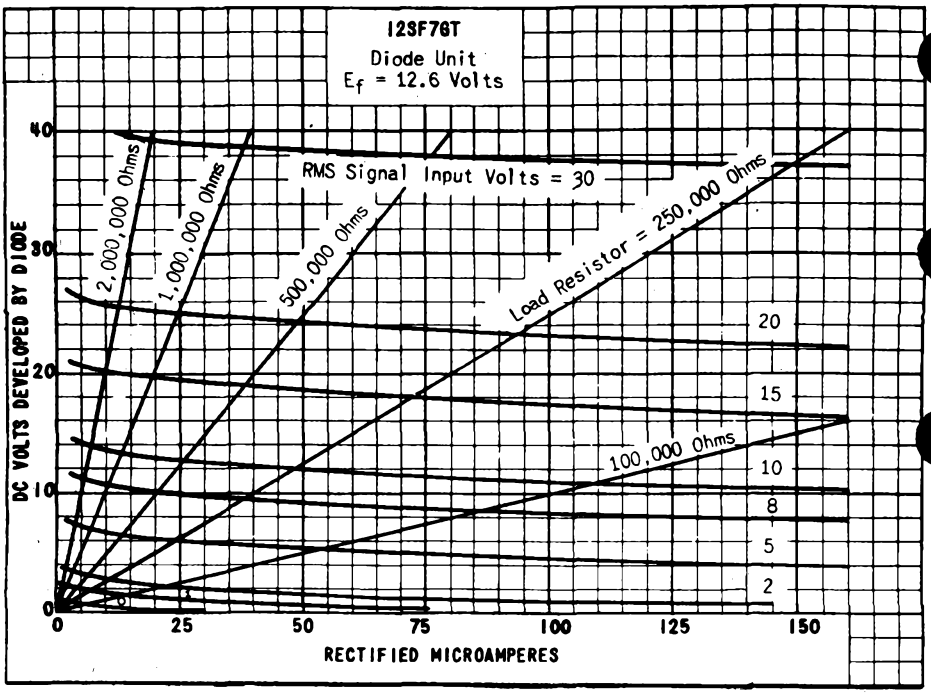
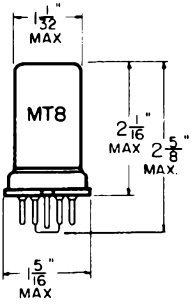


PLATE 1710
APRIL 1 1946

TUNG-SOL

PENTODE

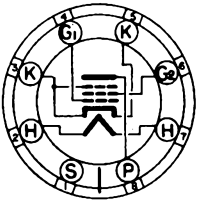


METAL SHELL

COATED UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
SMALL WAFER
8 PIN OCTAL

THE 12SG7 IS A SEMI-REMOTE CUT OFF PENTODE VOLTAGE AMPLIFIER IN THE OCTAL METAL CONSTRUCTION. IT FEATURES HIGH TRANSCONDUCTANCE WITH LOW GRID-PLATE CAPACITANCE AND A DUAL CATHODE CONNECTION TO MINIMIZE EFFECTS OF COMMON CATHODE CIRCUIT COUPLING.

DIRECT INTERELECTRODE CAPACITANCES

	12SG7[A]	
GRID TO PLATE: (G TO P) MAX.	0.003	μμf
INPUT: G_1 TO (H+K&G_3+G_2)	8.5	μμf
OUTPUT: P TO (H+K&G_3+G_2)	7	μμf

[A] WITH SHELL CONNECTED TO CATHODE.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID #2 VOLTAGE	200	VOLTS
MAXIMUM GRID #2 SUPPLY VOLTAGE	300	VOLTS
MINIMUM EXTERNAL GRID #1 VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	3	WATTS
MAXIMUM GRID #2 DISSIPATION	0.6	WATT

CONTINUED ON NEXT PAGE

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PLATE 2064
AUG. 2, 1948

CONTINUED FROM PRECEDING PAGE

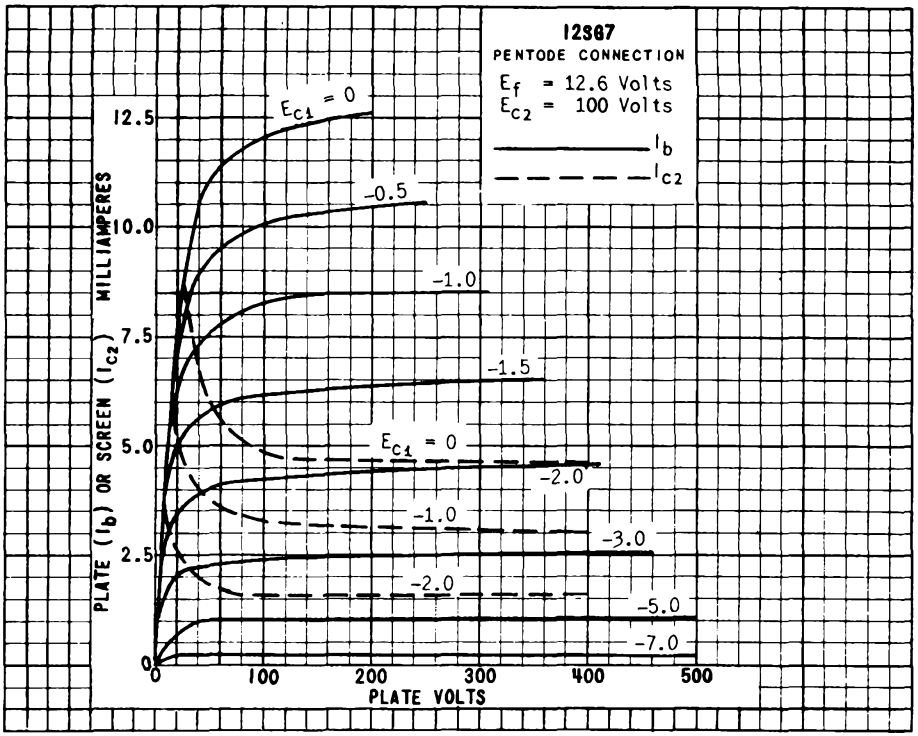
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

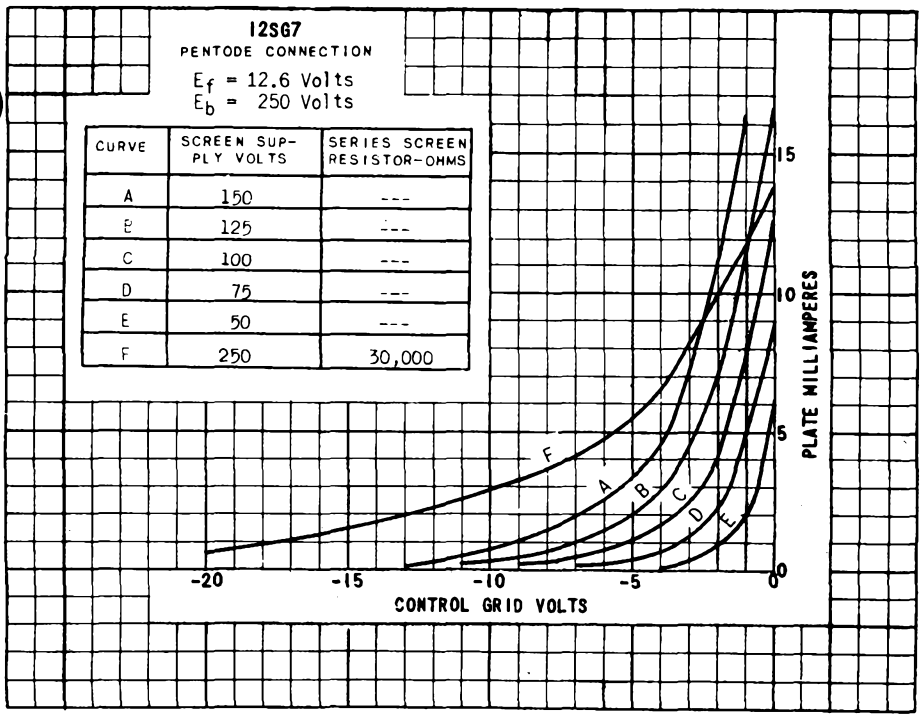
CLASS A_1 AMPLIFIER

HEATER VOLTAGE	12.6	12.6	12.6	VOLTS
HEATER CURRENT	150	150	150	MA.
PLATE VOLTAGE	100	250	250	VOLTS
GRID #2 VOLTAGE	100	125	150	VOLTS
GRID #1 VOLTAGE	-1	-1	-2.5	VOLTS
SELF BIAS RESISTOR	90	60	190	OHMS
PLATE RESISTANCE (APPROX.)	0.25	0.9	[C]	MEGOHM
TRANSCONDUCTANCE	4100	4700	4000	µMHOS
PLATE CURRENT	8.2	11.8	9.2	MA.
GRID #2 CURRENT	3.2	4.4	3.4	MA.
GRID #1 VOLTAGE (APPROX.) FOR g_m = 40 µMHOS	-11.5	-14	-17.5	VOLTS

[C] GREATER THAN 1.0 MEGOHM.

PLATE 2069
AUG. 2, 1948





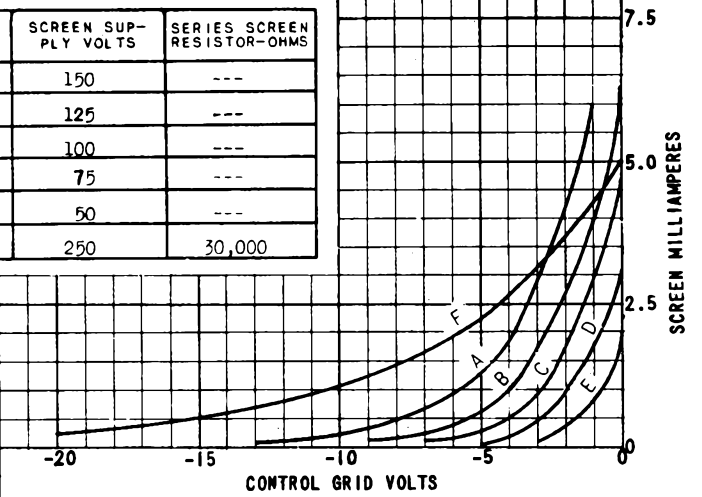
CURVE	SCREEN SUPPLY VOLTS	SERIES SCREEN RESISTOR-OHMS
A	150	---
B	125	---
C	100	---
D	75	---
E	50	---
F	250	30,000

PLATE 2066
AUG. 2, 1948

12SG7
PENTODE CONNECTION

E_f = 12.6 Volts
E_b = 250 Volts

CURVE	SCREEN SUPPLY VOLTS	SERIES SCREEN RESISTOR-OHMS
A	150	---
B	125	---
C	100	---
D	75	---
E	50	---
F	250	30,000



12SG7
PENTODE CONNECTION

E_f = 12.6 Volts
E_b = 250 Volts

CURVE	SCREEN SUPPLY VOLTS	SERIES SCREEN RESISTOR-OHMS
A	150	---
B	125	---
C	100	---
D	75	---
E	50	---
F	250	30,000

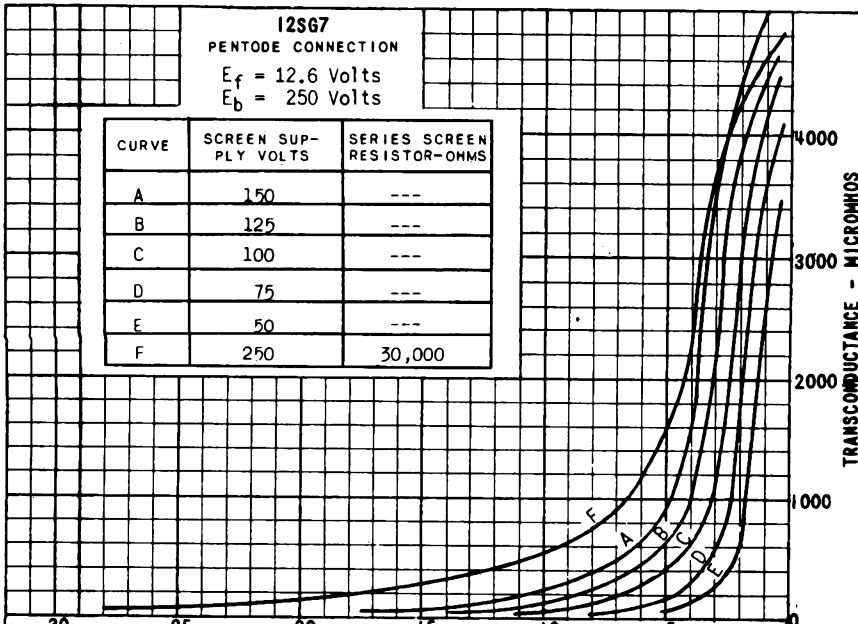
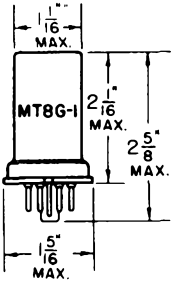


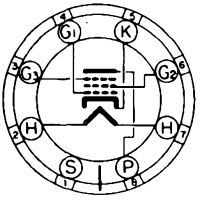
PLATE 2067
AUG. 2, 1948

TUNG-SOL

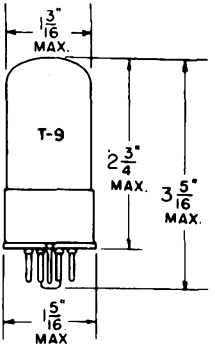
TRIPLE-GRID DETECTOR AMPLIFIER



METAL SHELL
SMALL WAFER OCTAL
8 PIN BASE
6SJ7, 12SJ7



BOTTOM VIEW
6SJ7, 6SJ7GT
12SJ7, 12SJ7GT



GLASS BULB
SMALL WAFER OCTAL 8 PIN
BASE WITH METAL SLEEVE
6SJ7GT, 12SJ7GT

UNIPOTENTIAL CATHODE

HEATER

6SJ7, 6SJ7GT - 6.3 V. 0.3 A.
12SJ7, 12SJ7GT - 12.6 V. 0.15 A.

AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN THE HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE. UNDER NO CONDITIONS SHOULD IT EXCEED 100 VOLTS.

THESE TUBES ARE SINGLE ENDED PENTODES HAVING SHARP CUT-OFF CHARACTERISTICS. THEY MAY BE USED AS BIASED DETECTORS, RADIO FREQUENCY OSCILLATORS OR AS MIXER TUBES IN PROPERLY DESIGNED CIRCUITS. WITH THE EXCEPTION OF HEATER AND CAPACITANCE RATINGS, THEIR ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MINIMUM GRID VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MAXIMUM SCREEN DISSIPATION	0.3	WATTS

CONTINUED NEXT PAGE

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PLATE 1441
JUNE 15 1944

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES

SHELL CONNECTED TO CATHODE

	6SJ7-12SJ7	6SJ7GT-12SJ7GT	
GRID TO PLATE	0.005 MAX.	0.005 MAX.	μμf
INPUT	6.0	6.3	μμf
OUTPUT	7.0	10.0	μμf

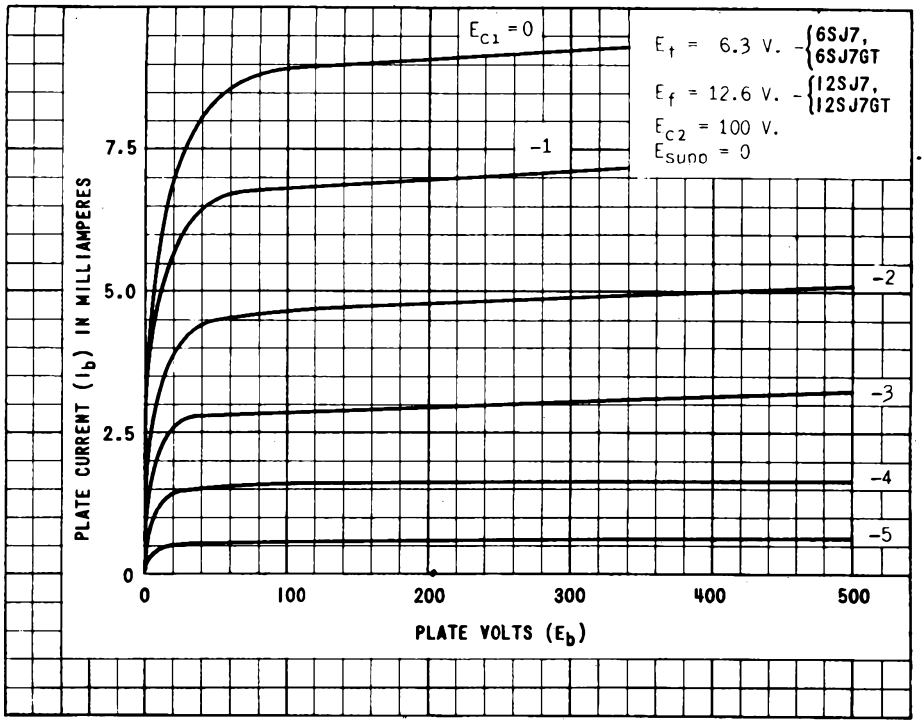
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
GRID VOLTAGE	-3	-3	VOLTS
SUPPRESSOR	TIE TO CATHODE		
PLATE CURRENT	2.9	3.0	MA.
SCREEN CURRENT	0.9	0.8	MA.
PLATE RESISTANCE (APPROX.)	0.7	1.5	MEGOHMS
TRANSCONDUCTANCE	1575	1650	μMHOS
GRID VOLTAGE (FOR CATHODE CURRENT CUT-OFF)	-9	-9	VOLTS

PLATE 1442
JUNE 15 1944

(6SJ7, 6SJ7GT) 12SJ7, 12SJ7GT



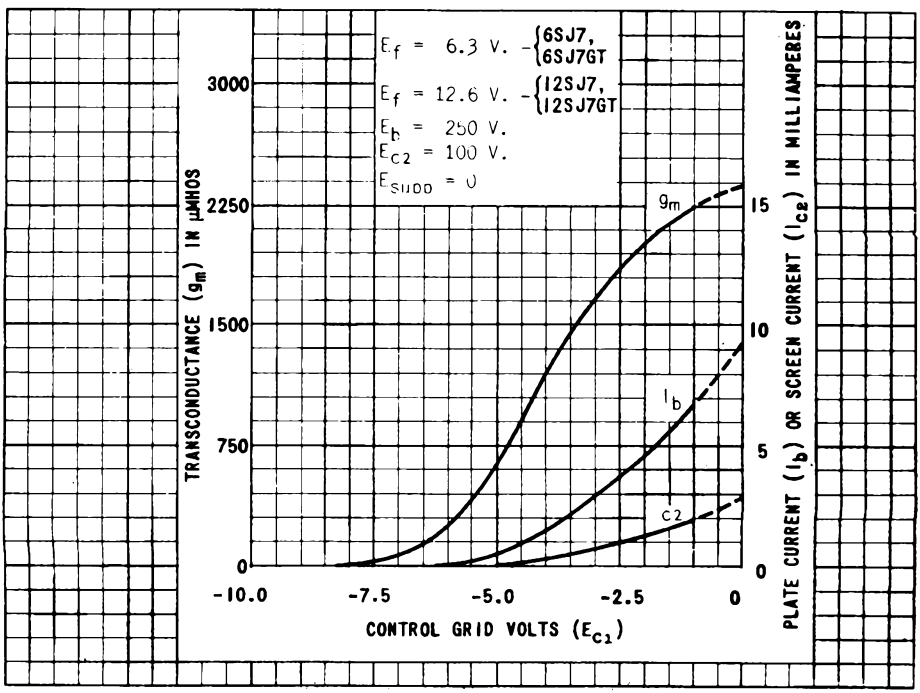


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PLATE 1443
JUNE 15 1944

TUNG-SOL

TRIPLE GRID

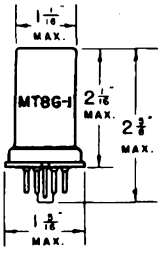
REMOTE CUT-OFF AMPLIFIER

UNIPOTENTIAL CATHODE

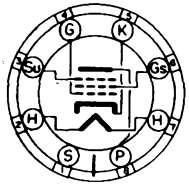
HEATER

12.6 VOLTS 0.15 AMPERE

AC OR DC

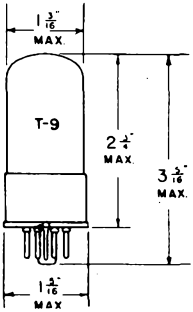


METAL SHELL
12SK7



8N

BOTTOM VIEW



GLASS BULB
12SK7GT/G

SMALL WAFER 8 PIN OCTAL BASE

THE TUNG-SOL 12SK7 AND 12SK7GT/G ARE TRIPLE GRID VARIABLE MU AMPLIFIERS. THEY ARE DESIGNED FOR USE WITH AVC IN RF AND IF AMPLIFIERS, AND THEY MINIMIZE CROSS MODULATION. WITH THE EXCEPTION OF HEATER RATINGS, THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 6SK7 AND 6SK7GT/G.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MINIMUM EXTERNAL CONTROL GRID BIAS VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	4.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.4	WATT

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE
1122-1

SEPT. 17
1941

TUNG-SOL

DIRECT INTERELECTRODE CAPACITANCES[5]

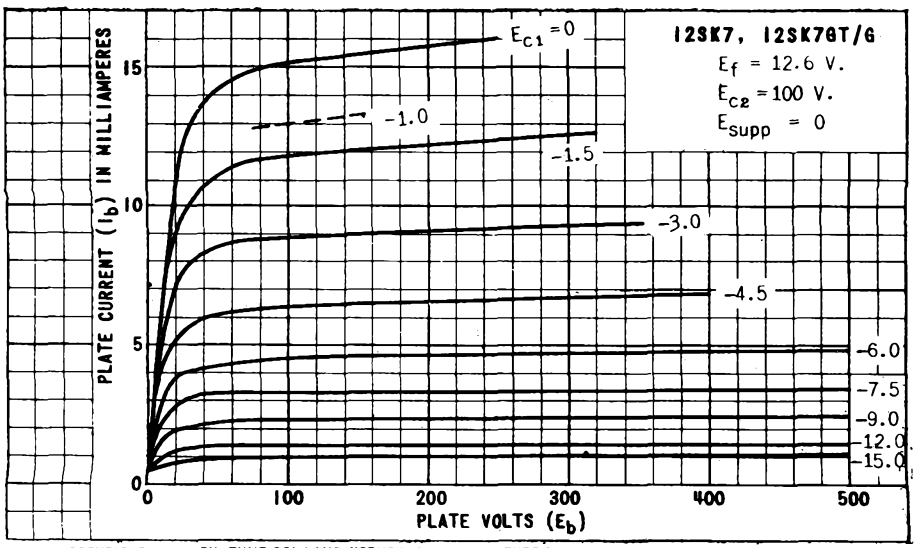
	12SK7	12SK7GT/G	
CONTROL GRID TO CATHODE	6.0	6.5	μμf
PLATE TO CATHODE	7.0	7.5	μμf
CONTROL GRID TO PLATE	0.003 MAX.	0.005 MAX.	μμf

[5] WITH SHELL CONNECTED TO CATHODE.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	-1	-3	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET		
PLATE CURRENT	13	9.2	MA.
SCREEN CURRENT	4.0	2.6	MA.
PLATE RESISTANCE APPROX.	0.12	0.8	MEGOHM
TRANSCONDUCTANCE	2350	2000	μMHOS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 10 μMHOS	-35	-35	VOLTS



12SK7, 12SK7GT/G

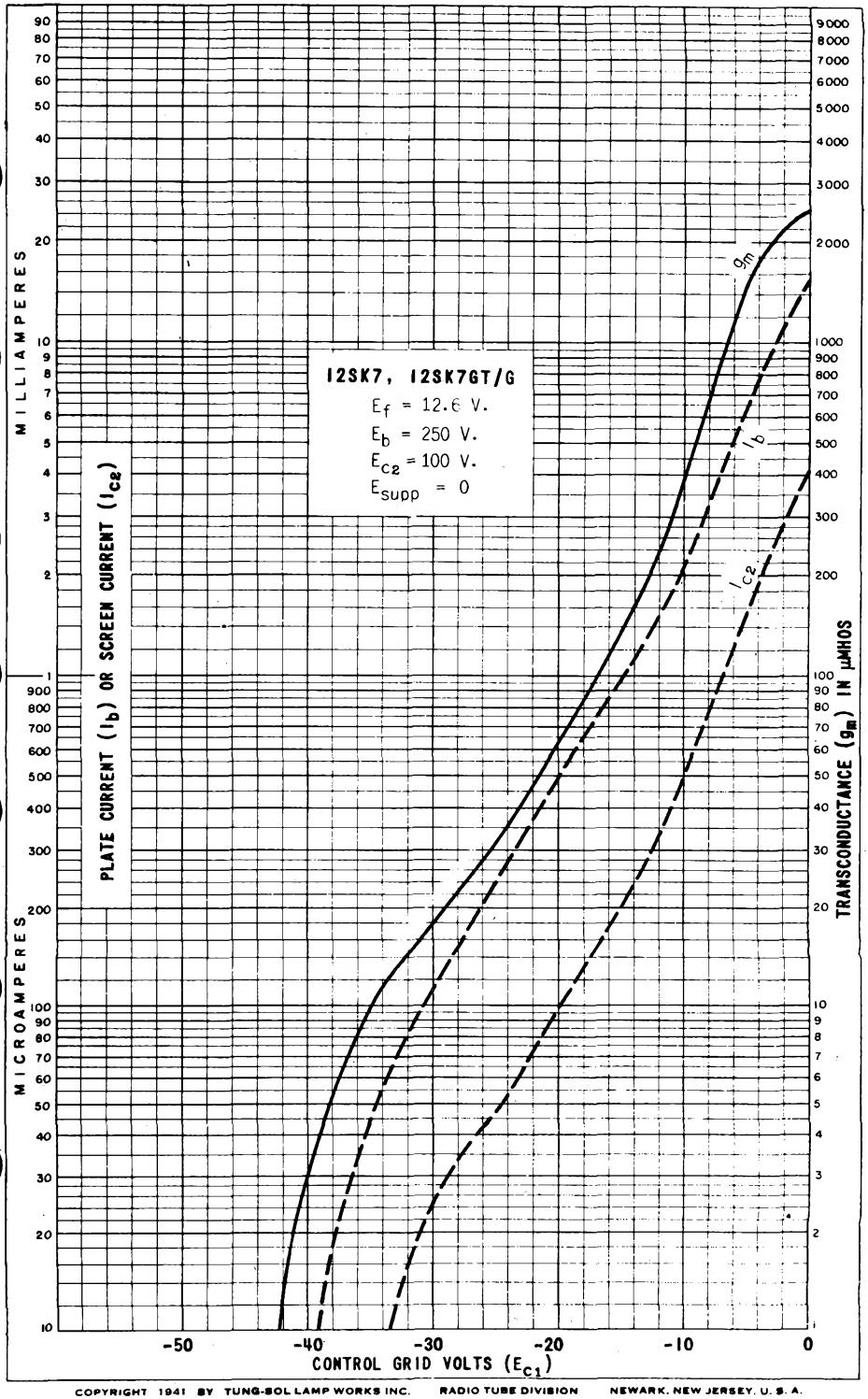


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PLATE
1124-1
SEPT. 17
1941

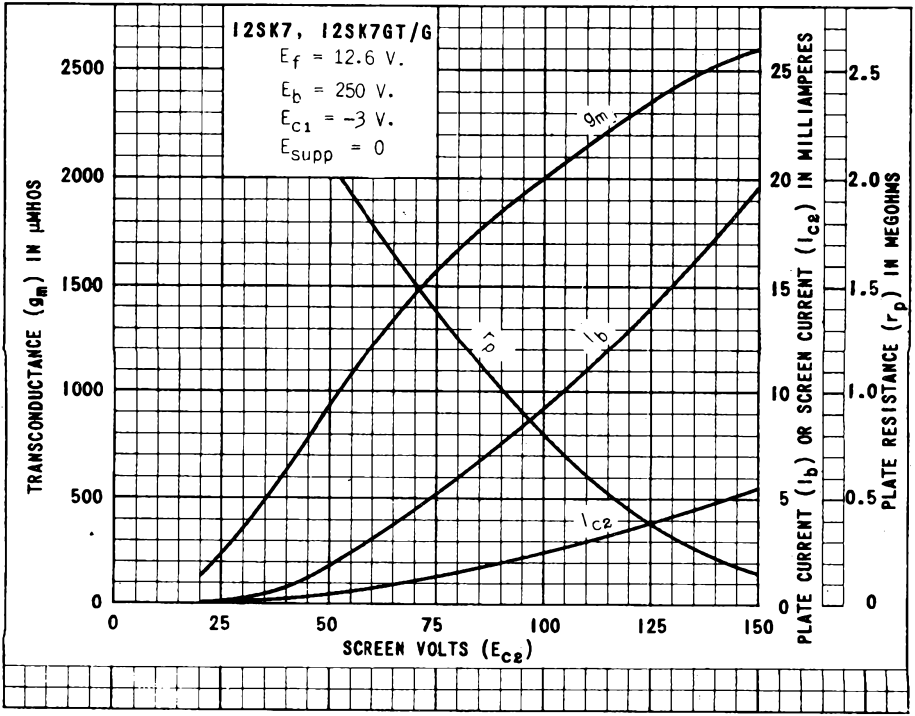
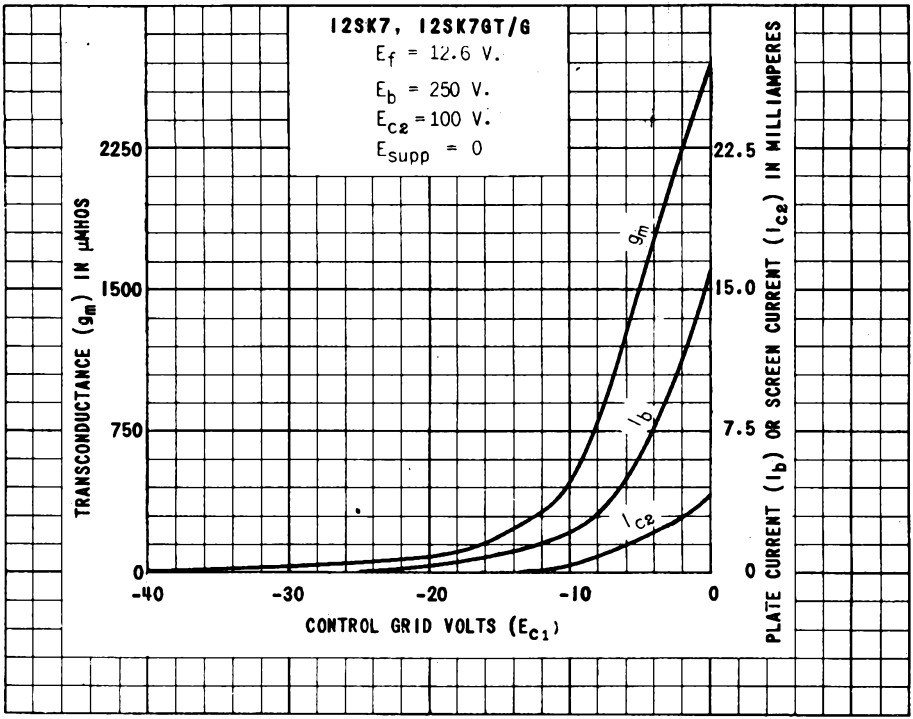


PLATE
1125-1

12SK7, 12SK7GT/G



TENTATIVE DATA

12SL7GT

TUNG-SOL

TWIN-TRIODE AMPLIFIER

PHYSICAL SPECIFICATIONS

EMITTER UNIPOTENTIAL CATHODE	PIN CONNECTIONS		
BASE INTERMEDIATE SHELL OCTAL 8-PIN	PIN 1 GRID (T2)	PIN 7	HEATER
CAP NONE	PIN 2 PLATE (T2)	PIN 8	HEATER
BULB T-9	PIN 3 CATHODE (T2)		
MAXIMUM DIAMETER 1 5/16"	PIN 4 GRID (T1)		
MAXIMUM OVERALL LENGTH 3 5/16"	PIN 5 PLATE (T1)	TOP CAP	NONE
MAXIMUM SEATED HEIGHT 2 3/4"	PIN 6 CATHODE (T1)		

RATINGS

AMPLIFIER – EACH UNIT

HEATER OR FILAMENT VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMPS.
MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM GRID VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	1	WATTS
MAXIMUM SCREEN DISSIPATION		WATTS

RATINGS ARE TO BE INTERPRETED ACCORDING TO RMA STANDARD M8-210

CAPACITANCES

	TRIODE UNIT T1	TRIODE UNIT T2	
GRID TO CATHODE	3.0	3.4	μμf
PLATE TO CATHODE	3.6	3.2	μμf
GRID TO PLATE	2.8	2.8	μμf
PLATE TO PLATE	0.4		μμf
GRID TO GRID	0.65		μμf
GRID T2 TO PLATE T1	0.13		μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER OR FILAMENT VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMPS.
PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-2	VOLTS
CONTROL GRID VOLTAGE		VOLTS
PEAK AF SIGNAL VOLTAGE		VOLTS
ZERO-SIGNAL PLATE CURRENT	2.3	MA.
ZERO-SIGNAL SCREEN CURRENT		MA.
MAXIMUM-SIGNAL PLATE CURRENT		MA.
MAXIMUM-SIGNAL SCREEN CURRENT		MA.
PLATE RESISTANCE (APPROX.)	44000	OHMS
TRANSCONDUCTANCE	1600	μMHOS
AMPLIFICATION FACTOR	70	
LOAD RESISTANCE		OHMS
TOTAL HARMONIC DISTORTION		PER CENT
POWER OUTPUT		WATTS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE μMHOS		VOLTS

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PLATE 1318-1

SEPT. 23 1943

TUNG-SOL

TWIN-TRIODE AMPLIFIER

PHYSICAL SPECIFICATIONS

EMITTER UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE INTERMEDIATE SHELL OCTAL 8-PIN	PIN 1 GRID (T2)	PIN 7 HEATER
CAP NONE	PIN 2 PLATE (T2)	PIN 8 HEATER
BULB T-9	PIN 3 CATHODE (T2)	
MAXIMUM DIAMETER 1 5/16"	PIN 4 GRID (T1)	
MAXIMUM OVERALL LENGTH 3 5/16"	PIN 5 PLATE (T1)	TOP CAP NONE
MAXIMUM SEATED HEIGHT 2 3/4"	PIN 6 CATHODE (T1)	

RATINGS

AMPLIFIER-EACH UNIT

HEATER OR FILAMENT VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.3	AMPS.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MINIMUM GRID VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS

RATINGS ARE TO BE INTERPRETED ACCORDING TO RMA STANDARD M8-210

CHARACTERISTICS CLASS A_1 AMPLIFIER

PLATE VOLTAGE	90	250	VOLTS
GRID VOLTAGE	0	-8	VOLTS
AMPLIFICATION FACTOR	20	20	
PLATE RESISTANCE	6700	7700	OHMS
TRANSCONDUCTANCE	3000	2600	UMHOS
PLATE CURRENT	10	9	MA.

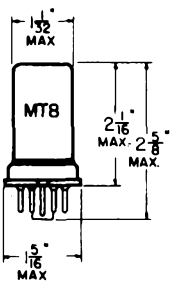
THE D-C RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 1.0 MEGOHM UNDER MAXIMUM RATED CONDITIONS PER UNIT.

PLATE 1319-1
SEPT. 23 1943

TUNG-SOL

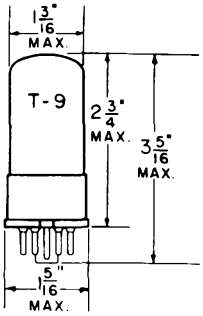
DOUBLE-DIODE TRIODE

12SQ7



METAL SHELL

12SQ7GT



GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION

BOTTOM VIEW
SMALL WAFER
8-PIN OCTAL

BOTTOM VIEW
SMALL WAFER
8-PIN OCTAL
METAL SLEEVE

THE 12SQ7 AND 12SQ7GT COMBINE TWO DIODE UNITS AND A HIGH-MU TRIODE IN A SINGLE ENVELOPE. EACH SECTION USES A COMMON CATHODE. IT IS INTENDED FOR SERVICE AS A COMBINED DETECTOR, AVC SOURCE, AND HIGH GAIN AUDIO AMPLIFIER.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

	12SQ7[A]	12SQ7GT[B]	
GRID TO PLATE: (G TO P)	1.6	1.8	μμf
INPUT: G TO (H + K)	3.2	4.2	μμf
OUTPUT: P TO (H + K)	3.0	3.4	μμf

[A] WITH SHELL CONNECTED TO CATHODE.

[B] WITH NO EXTERNAL SHIELD.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	12.6	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MINIMUM DIODE CURRENT EACH PLATE WITH 10 VOLTS APPLIED	0.8	MA.
MAXIMUM DIODE CURRENT EACH PLATE FOR CONTINUOUS OPERATION	1.0	MA.

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PLATE 1934
DEC. 1, 1947

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION.

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER - TRIODE UNIT

HEATER VOLTAGE	12.6	12.6	VOLTS
HEATER CURRENT	150	150	MA.
PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1	-2	VOLTS
PLATE CURRENT	0.4	0.9	MA.
PLATE RESISTANCE	110 000	91 000	OHMS
TRANSCONDUCTANCE	900	1 100	µMHOS
AMPLIFICATION FACTOR	100	100	

DIODE UNITS - TWO

THE TWO DIODE PLATES ARE PLACED AROUND THE CATHODE AND ARE INDEPENDENT OF THE TRIODE UNIT EXCEPT FOR THE COMMON CATHODE.

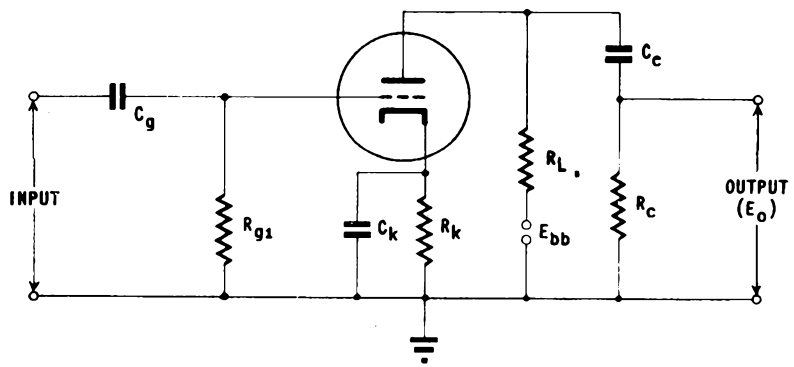
SIMILIAR TYPE REFERENCE: Ratings and characteristics identical to 1488.

R_1 MEG.	R_{g1} MEG.	R_c MEG.	E_{bb} = 90 VOLTS			E_{bb} = 180 VOLTS			E_{bb} = 300 VOLTS		
			R_k	GAIN	E_o	R_k	GAIN	E_o	R_k	GAIN	E_o
0.10	A	0.10	4300	22	5.0	2400	29	15	2000	31	28
0.10	A	0.24	4700	27	7.0	2700	35	20	2200	38	37
0.24	A	0.24	7500	31	7.5	4300	42	20	3300	46	36
0.24	A	0.51	8200	40	10	4700	50	26	3900	52	50
0.51	A	0.51	13000	39	9.5	7500	53	24	5600	58	47
0.51	A	1.0	15000	43	11	8200	58	31	6200	62	56
0.24	10	0.24	---	39	4.5	---	45	19	---	49	38
0.24	10	0.51	---	45	6.5	---	52	24	---	57	48
0.51	10	0.51	---	48	7.0	---	59	22	---	62	42
0.51	10	1.0	---	52	8.5	---	62	25	---	66	55

[A] VALUE OF R_{g1} IS NOT CRITICAL.

GAIN MEASURED AT E_o = 2.0 VOLTS RMS OUTPUT.

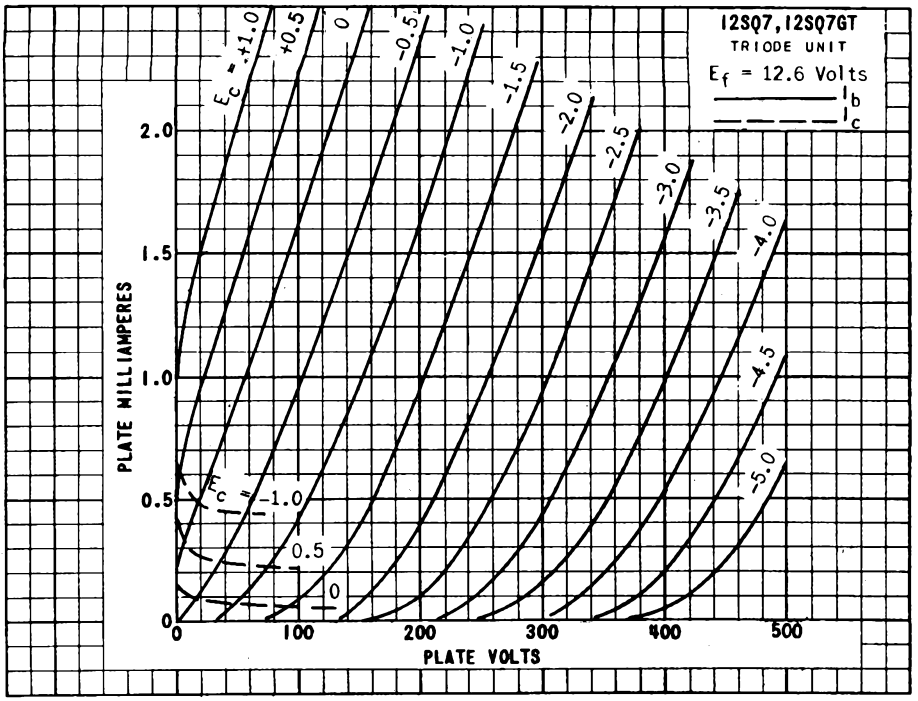
E_o IS RMS OUTPUT FOR 5% TOTAL HARMONIC DISTORTION.



NOTE: COUPLING CAPACITORS C_g AND C_c SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE. R_k SHOULD BE ADEQUATELY BY-PASSED BY CAPACITOR C_k.

→ INDICATES A CHANGE OR ADDITION

PLATE 1935
DEC. 1, 1947



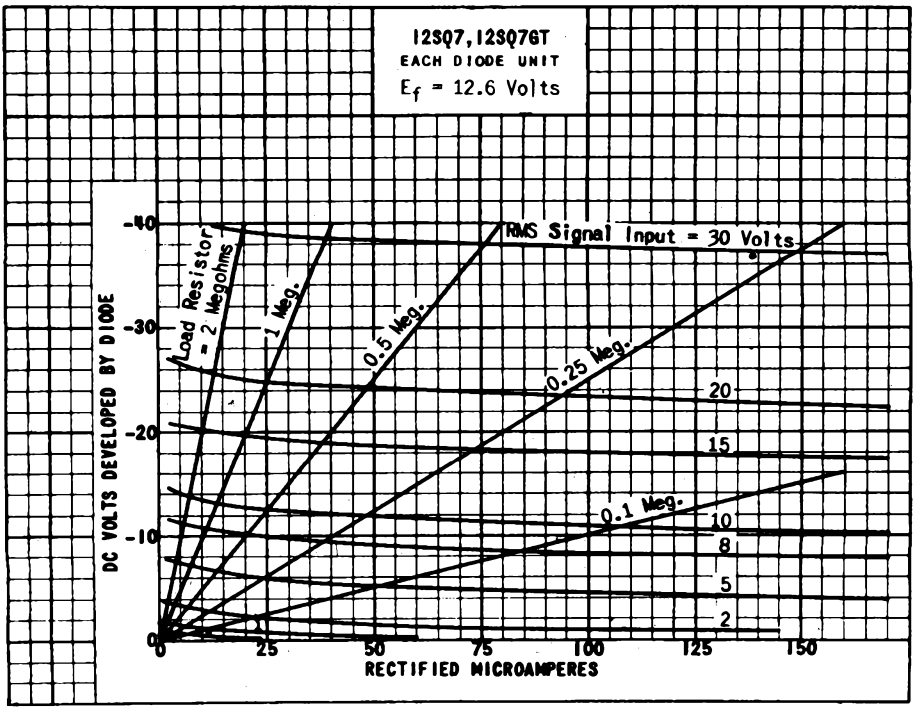


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PLATE 1973
FEB. 2, 1948

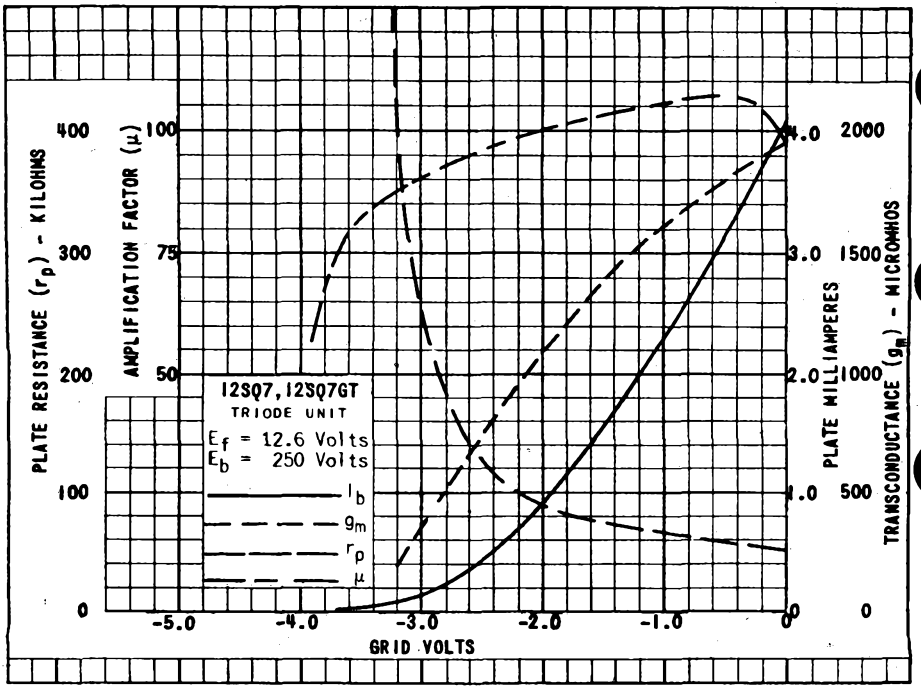
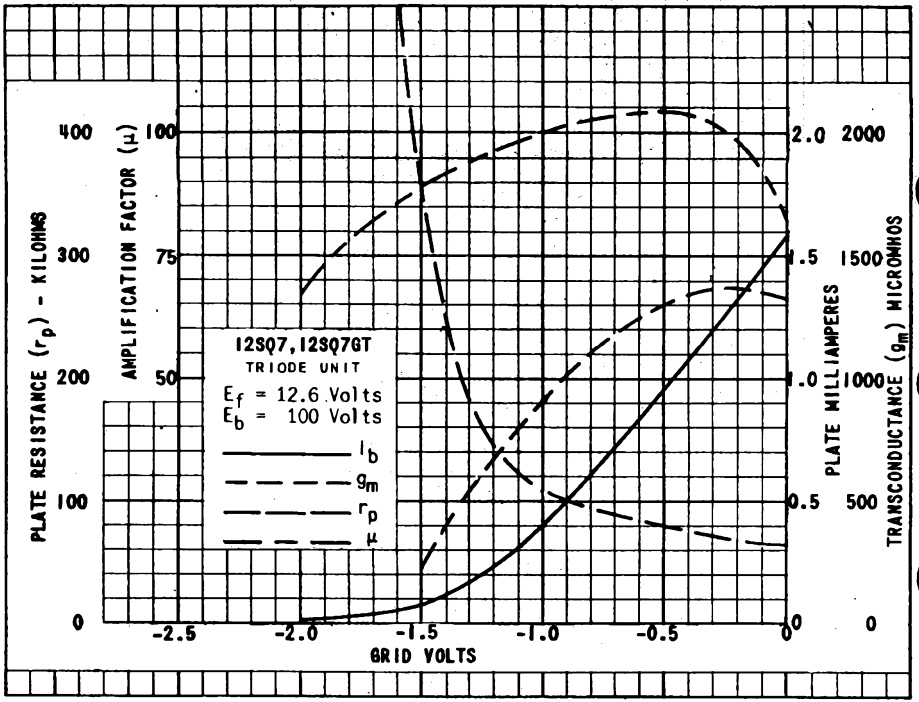


PLATE 1974
FEB. 2, 1948

12SQ7, 12SQ7GT



TENTATIVE DATA

12SR7GT

TUNG-SOL

DUO-DIODE TRIODE

PHYSICAL SPECIFICATIONS

EMITTER UNIPOTENTIAL CATHODE	PIN CONNECTIONS
BASE INTERMEDIATE SHELL OCTAL 8-PIN	PIN 1 NO CONN. / PIN 7 HEATER
CAP NONE	PIN 2 TRIODE GRID / PIN 8 HEATER
BULB T-9 GLASS	PIN 3 CATHODE AND DIODE SHIELD
MAXIMUM DIAMETER 1 5/16"	PIN 4 DIODE PLATE-RIGHT
MAXIMUM OVERALL LENGTH 3 5/16"	PIN 5 DIODE PLATE-LEFT
MAXIMUM SEATED HEIGHT 2 3/4"	PIN 6 TRIODE PLATE

RATINGS

HEATER OR FILAMENT VOLTAGE	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMPS.
MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN VOLTAGE		VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MAXIMUM SCREEN DISSIPATION		WATTS

FOR INTERPRETATION OF RATINGS, SEE "RECEIVING TUBE RATINGS" (CS-1800)

CAPACITANCES (WITH STANDARD RMA SHIELD M8-308)

CONTROL GRID TO CATHODE	3.5	μμf
PLATE TO CATHODE	3.8	μμf
GRID TO PLATE	2.3	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER TRIODE SECTION

HEATER OR FILAMENT VOLTAGE	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMPS.
PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE		VOLTS
GRID BIAS [1]	-9	VOLTS
PEAK AF SIGNAL VOLTAGE		VOLTS
PLATE CURRENT	9.5	MA.
ZERO-SIGNAL SCREEN CURRENT		MA.
MAXIMUM-SIGNAL PLATE CURRENT		MA.
MAXIMUM-SIGNAL SCREEN CURRENT		MA.
PLATE RESISTANCE	8500	OHMS
TRANSCONDUCTANCE	1900	μMHOS
AMPLIFICATION FACTOR	16	

[1] THE D-C RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 1.0 MEGOHM UNDER RATED MAXIMUM CONDITIONS.

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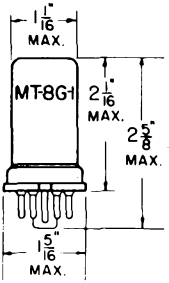
PLATE
1320-1
SEPT. 23
1943

TUNG-SOL

DUO-DIODE TRIODE

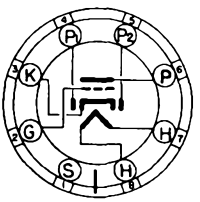


METAL SHELL

UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.15 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
SMALL WAFER
8 PIN OCTAL

THE 12SW7 HAS TWO DIODES AND A MEDIUM-MU TRIODE IN ONE ENVELOPE. IT IS DESIGNED ESPECIALLY FOR USE IN EQUIPMENT WHERE THE OPERATING VOLTAGES ARE OBTAINED FROM A 12 CELL STORAGE BATTERY AND FOR OPERATION AT A PLATE-SUPPLY VOLTAGE HAVING A DESIGN CENTER OF 26.6 VOLTS. IT MAY BE USED FOR SERVICE AS A DIODE DETECTOR, AVC RECTIFIER AND AS AN AUDIO AMPLIFIER IN AC, STORAGE BATTERY AND AC-DC OPERATED RECEIVERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD MB-210

HEATER VOLTAGE	12.6	VOLTS
HEATER CURRENT	0.15	AMP.
PLATE VOLTAGE	250	VOLTS
PLATE DISSIPATION	2.5	WATTS
PEAK HEATER-CATHODE VOLTAGE:		
HEATER NEG. WITH RESPECT TO CATHODE	90	VOLTS
HEATER POS. WITH RESPECT TO CATHODE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES - TRIODE UNIT

WITH SHELL CONNECTED TO CATHODE

GRID TO PLATE (APPROX.)	2.4	μμf
INPUT (APPROX.)	3.0	μμf
OUTPUT (APPROX.)	2.8	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	26.5	250	VOLTS
GRID VOLTAGE:			
USING FIXED SUPPLY	---	-9	VOLTS
USING GRID RESISTOR	2	---	MEGOHMS
PLATE CURRENT	1.1	9.5	MA.
PLATE RESISTANCE	15 500	8 500	OHMS
TRANSCONDUCTANCE	1 100	1 900	μMHOS
AMPLIFICATION FACTOR	17	16	

CONTINUED ON FOLLOWING PAGE

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PLATE 1751
NOV. 1, 1946

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

RESISTANCE-COUPLED AMPLIFIER

PLATE SUPPLY VOLTAGE[A]	90	180	300	VOLTS
LOAD RESISTANCE	0.1	0.1	0.1	MEGOHM
GRID RESISTOR	0.25	0.25	0.25	MEGOHMS
CATHODE RESISTOR	4 400	4 100	3 800	OHMS
CATHODE BY-PASS CONDENSER	0.9	0.9	1.1	µf
BLOCKING CONDENSER	0.01	0.01	0.015	µf
PEAK VOLTAGE OUTPUT[B]	19	43	68	VOLTS
VOLTAGE GAIN (AT 5.0 VOLTS RMS)	10	10	10	

[A] VOLTAGE AT PLATE EQUALS PLATE SUPPLY VOLTAGE MINUS VOLTAGE DROP IN LOAD RESISTANCE AND CATHODE RESISTOR.

[B] VOLTAGE ACROSS GRID RESISTOR AT GRID-CURRENT POINT.

SIMILIAR TYPE REFERENCE: *Except for heater ratings, same ratings and characteristics as 6R7, 6R7G, 6R7GT, 6SR7, 6SR7GT, 2606. Same ratings and characteristics as 12SR7GT.*

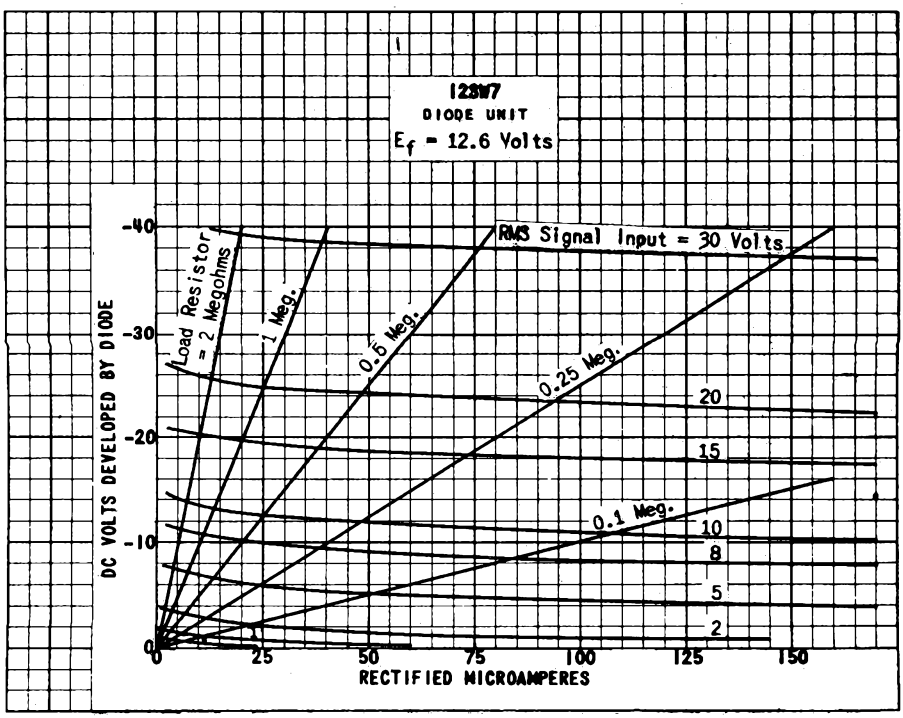
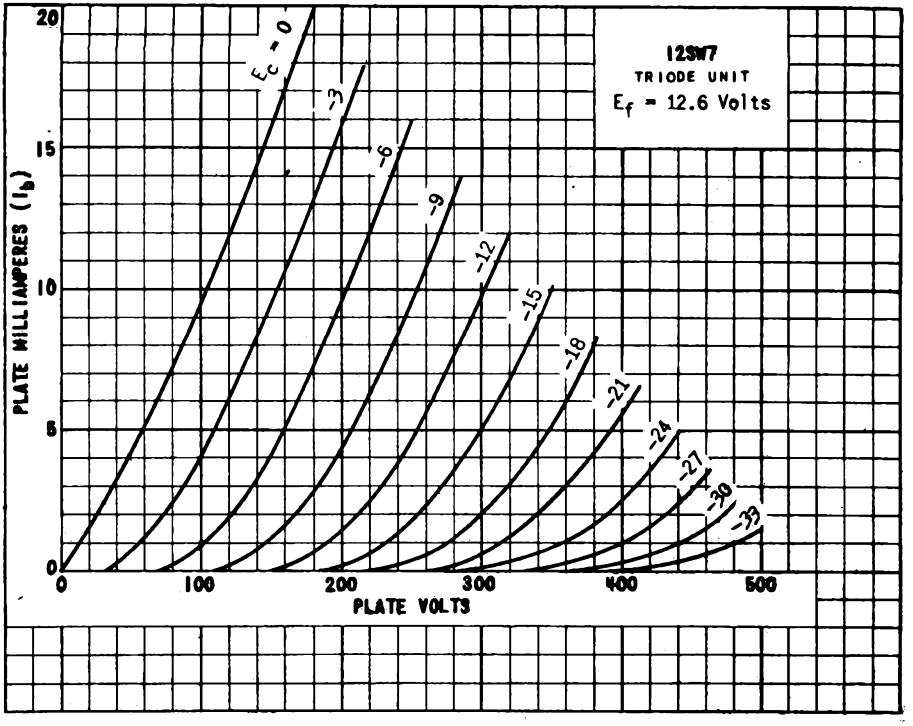


PLATE 1752
NOV. 1, 1946



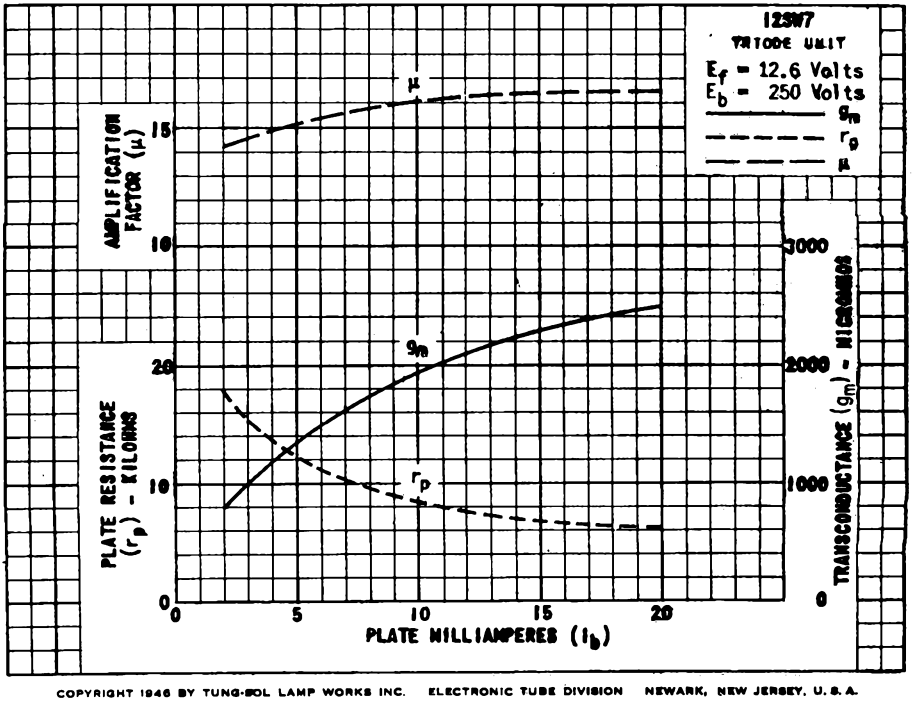


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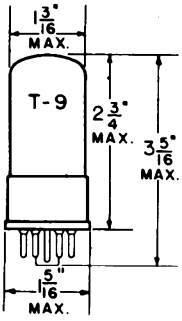
PLATE
1753
NOV. 1,
1946

TUNG-SOL

TWIN TRIODE AMPLIFIER

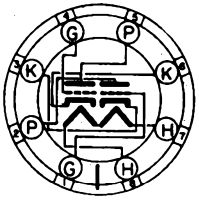


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.3 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
INTERMEDIATE SHELL
8 PIN OCTAL BASE

THE 12SX7GT IS A TWIN MEDIUM MU TRIODE WHOSE SECTIONS ARE ELECTRICALLY INDEPENDENT EXCEPT FOR THE COMMON HEATER. IT IS DESIGNED ESPECIALLY FOR USE IN EQUIPMENT WHERE THE OPERATING VOLTAGES ARE OBTAINED FROM A 12 CELL STORAGE BATTERY AND FOR OPERATION AT A PLATE-SUPPLY VOLTAGE HAVING A DESIGN-CENTER OF 26.5 VOLTS. IT IS USEFUL AS AN AUDIO AMPLIFIER, OSCILLATOR, CONVERTER AND MULTI-VIBRATOR.

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

PER AMPLIFIER UNIT

HEATER VOLTAGE	12.6	VOLTS
HEATER CURRENT	0.3	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM GRID VOLTAGE:		
NEG. BIAS VOLTAGE	50	VOLTS
POS. BIAS VOLTAGE	0	VOLTS
MAXIMUM CATHODE CURRENT	20	MA.
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MAXIMUM PEAK HEATER-CATHODE VOLTAGE:		
HEATER NEG. WITH RESPECT TO CATHODE	90	VOLTS
HEATER POS. WITH RESPECT TO CATHODE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

	TRIODE UNIT 1	TRIODE UNIT 2	
GRID TO PLATE	3.6	3.6	μμf
INPUT	3.0	2.8	μμf
OUTPUT	0.8	1.2	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER - PER UNIT

PLATE VOLTAGE	26.5	90	250	VOLTS
GRID VOLTAGE:				
USING FIXED SUPPLY	---	0	-8	VOLTS
USING GRID RESISTOR	0.05	---	---	MEGOHM
PLATE CURRENT	1.8	10	9.0	MA.
GRID CIRCUIT RESISTANCE (MAX.)	1.0	1.0	1.0	MEGOHM
PLATE RESISTANCE	11 500	6 700	7 700	OHMS
TRANSCONDUCTANCE	1 800	3 000	2 600	μMHOS
AMPLIFICATION FACTOR	21	20	20	

CONTINUED ON FOLLOWING PAGE

PRINTED IN U. S. A.
PLATE 1754
NOV. 1, 1946

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

RESISTANCE COUPLED AMPLIFIER - PER UNIT

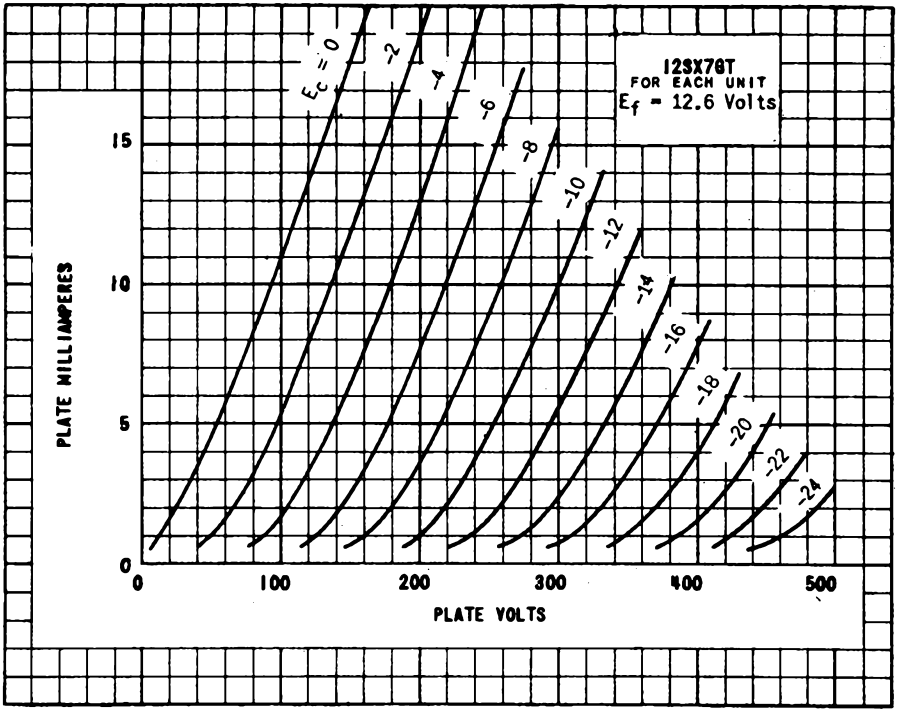
PLATE SUPPLY-VOLTAGE[A]	90	180	300	VOLTS
LOAD RESISTANCE	0.1	0.1	0.1	MEGOHM
GRID RESISTOR	0.25	0.25	0.25	MEGOHM
CATHODE RESISTOR	3 940	2 830	2 440	OHMS
CATHODE BY-PASS CONDENSER	1.29	1.35	1.42	µf
BLOCKING CONDENSER	0.012	0.012	0.0125	µf
PEAK VOLTAGE OUTPUT[B]	17	34	56	VOLTS
VOLTAGE GAIN (AT 5.0 VOLTS RMS)	13	14	14	

[A] VOLTAGE AT PLATE EQUALS PLATE-SUPPLY VOLTAGE MINUS VOLTAGE DROP IN LOAD RESISTANCE AND CATHODE RESISTOR.

[B] VOLTAGE ACROSS GRID RESISTOR AT GRID CURRENT POINT.

SIMILIAR TYPE REFERENCE: *Except for heater ratings, same ratings and characteristics per unit as 6F8G, 6J5, 6J5G, 6J5GT. Except for heater ratings, same ratings and characteristics as 6SN7GT. Same ratings and characteristics per unit as 12J5GT. Same ratings and characteristics as 12SN7GT and 1633.*

PLATE 1755
NOV. 1, 1946



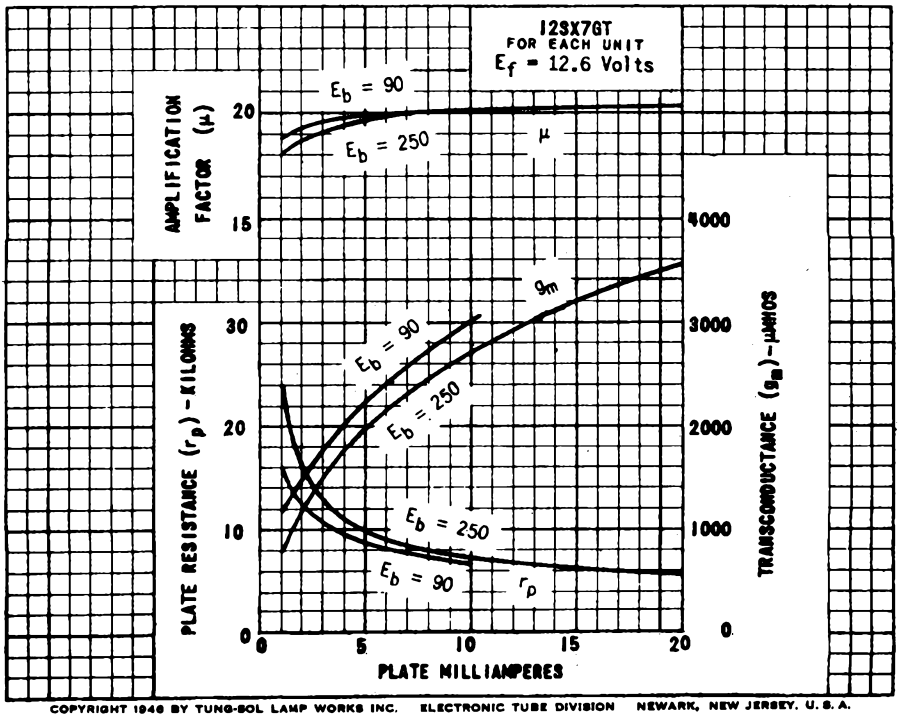


PLATE 1756
NOV. 1, 1946

TENTATIVE DATA

12SY7

TUNG-SOL

HEPTODE PENTAGRID CONVERTER

PHYSICAL SPECIFICATIONS

EMITTER COATED UNIPOT. CATHODE	PIN CONNECTIONS	
BASE SMALL WAFER OCTAL 8-PIN	PIN 1 SHELL, GRID 5	PIN 7 HEATER
PHENOLIC	PIN 2 HEATER	PIN 8 SIGNAL GRID (G3)
BULB MT-8 METAL	PIN 3 PLATE	
MAXIMUM DIAMETER 1 5/16"	PIN 4 SCR. (G2 & G4)	MOUNTING POS. ANY
MAXIMUM OVERALL LENGTH 2 5/8"	PIN 5 OSC. GRID (G1)	
MAXIMUM SEATED HEIGHT 2 1/16"	PIN 6 CATHODE	

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD NB-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	1.0	WATT
MAXIMUM TOTAL PLATE AND SCREEN DISSIPATION		WATTS
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MINIMUM EXTERNAL SIGNAL GRID BIAS VOLTAGE [A]	0	VOLTS
MAXIMUM ANODE-GRID VOLTAGE		VOLTS
MAXIMUM ANODE-GRID SUPPLY VOLTAGE		VOLTS
MAXIMUM ANODE-GRID DISSIPATION		WATT

[A] WITH SELF-EXCITED OSCILLATOR

CAPACITANCES

SIGNAL GRID TO MIXER PLATE (G3 TO P) [B]	0.13	μμf (MAX.)
K TO ALL OTHER ELECTRODES EXCEPT G1	5.0	μμf
SIGNAL GRID TO OSC. GRID (G3 TO G1) [B]	0.15	μμf (MAX.)
OSC. GRID TO MIXER PLATE (G1 TO P) [B]	0.06	μμf (MAX.)
SIGNAL INPUT (G3 TO ALL OTHER ELECTRODES) [B]	9.5	μμf
OSC. INPUT (G1 TO ALL OTHER ELECTRODES) [B]	7.0	μμf
G1 TO ALL OTHER ELECTRODES EXCEPT K	4.4	μμf
MIXER OUTPUT (P TO ALL OTHER ELECTRODES) [B]	12	μμf
G1 TO K	2.6	μμf

[B] WITH SHIELD NO. 308 CONNECTED TO CATHODE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE - SEPARATE EXCITATION

CHARACTERISTICS SHOWN ARE OBTAINED IN THE STANDARD RMA CONVERSION TRANSCONDUCTANCE TEST SET AND CORRESPOND VERY CLOSELY TO THOSE OBTAINED WITH ZERO BIAS IN A SELF-EXCITED OSCILLATOR CIRCUIT.

HEATER OR FILAMENT VOLTAGE	12.6	12.6	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	0.15	0.15	AMP.
PLATE VOLTAGE	28	100	250	VOLTS
SCREEN VOLTAGE	28	100	100	VOLTS
SIGNAL GRID BIAS	-1	-2	-2	VOLTS
ANODE-GRID VOLTAGE	0	0	0	VOLTS
PLATE CURRENT	0.5	3.3	3.5	MA.
SCREEN CURRENT	1.8	8.5	8.5	MA.
ANODE-GRID CURRENT				MA.
OSCILLATOR-GRID CURRENT	0.1	0.5	0.5	MA.
TOTAL CATHODE CURRENT	2.4	12.3	12.5	MA.
OSCILLATOR-GRID RESISTOR	20 000	20 000	20 000	OHMS
PLATE RESISTANCE (APPROX.)	---	0.5	1.0	MEGOHM

CONVERSION TRANSCONDUCTANCE

SIGNAL GRID BIAS = -1	250	---	---	μMHOS
SIGNAL GRID BIAS = -2	---	425	450	μMHOS
SIGNAL GRID BIAS = -6	8	310	325	μMHOS
SIGNAL GRID BIAS = -10	---	75	80	μMHOS
SIGNAL GRID BIAS = -35	---	2	2	μMHOS APPROX.

NOTE: WITH G2 & G4 CONNECTED TO PLATE (100 VOLTS), AND SIGNAL APPLIED TO G1 (0 VOLTS BIAS): THE TRANSCONDUCTANCE IS 4500 μMHOS, THE PLATE CURRENT IS 27 MA., AND THE AMPLIFICATION IS 13. G3 IS CONNECTED TO GROUND DURING THIS TEST.

PLATE 1711
APRIL 15 1946

TUNG-SOL

HEPTODE PENTAGRID CONVERTER

PHYSICAL SPECIFICATIONS

EMITTER COATED UNIPOT. CATHODE	PIN CONNECTIONS		
BASE SMALL WAFER OCTAL 8-PIN	PIN 1 BASE SHELL	PIN 7 HEATER	
WITH METAL SHELL	PIN 2 HEATER	PIN 8 SIGNAL GRID (G3)	
BULB T-9 GLASS	PIN 3 PLATE		
MAXIMUM DIAMETER 1 5/16"	PIN 4 SCR. (G2 & G4)	MOUNTING POS. ANY	
MAXIMUM OVERALL LENGTH 3 5/16"	PIN 5 OSC. GRID (G1)		
MAXIMUM SEATED HEIGHT 2 3/4"	PIN 6 K, G5, S1		

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	1.0	WATT
MAXIMUM TOTAL PLATE AND SCREEN DISSIPATION		WATTS
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MINIMUM EXTERNAL SIGNAL GRID BIAS VOLTAGE[A]	0	VOLTS
MAXIMUM ANODE-GRID VOLTAGE		VOLTS
MAXIMUM ANODE-GRID SUPPLY VOLTAGE		VOLTS
MAXIMUM ANODE-GRID DISSIPATION		WATT

[A] WITH SELF-EXCITED OSCILLATOR

CAPACITANCES

SIGNAL GRID TO MIXER PLATE (G3 TO P)[B]	0.2	μμf (MAX.)
K TO ALL OTHER ELECTRODES EXCEPT G1	30	μμf
SIGNAL GRID TO OSC. GRID (G3 TO G1)[B]	0.2	μμf (MAX.)
OSC. GRID TO MIXER PLATE (G1 TO P)[B]	0.2	μμf (MAX.)
SIGNAL INPUT (G3 TO ALL OTHER ELECTRODES)[B]	11	μμf
OSC. INPUT (G1 TO ALL OTHER ELECTRODES)[B]	8.0	μμf
G1 TO ALL OTHER ELECTRODES EXCEPT K	5	μμf
MIXER OUTPUT (P TO ALL OTHER ELECTRODES)[B]	12	μμf
G1 TO K	3.0	μμf

[B] WITH BASE SHELL AND STANDARD TUBE SHIELD CONNECTED TO CATHODE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE - SEPARATE EXCITATION

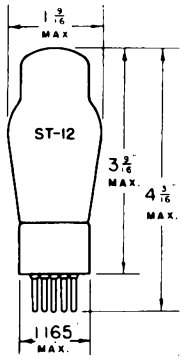
CHARACTERISTICS SHOWN ARE OBTAINED IN THE STANDARD RMA CONVERSION TRANSCONDUCTANCE TEST SET AND CORRESPOND VERY CLOSELY TO THOSE OBTAINED WITH ZERO BIAS IN A SELF-EXCITED OSCILLATOR CIRCUIT.

HEATER OR FILAMENT VOLTAGE	12.6	12.6	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	0.15	0.15	AMP.
PLATE VOLTAGE	28	100	250	VOLTS
SCREEN VOLTAGE	28	100	100	VOLTS
SIGNAL GRID BIAS	-1	-2	-2	VOLTS
ANODE-GRID VOLTAGE (G5)	0	0	0	VOLTS
PLATE CURRENT	0.5	3.3	3.5	MA.
SCREEN CURRENT	1.8	8.5	8.5	MA.
ANODE-GRID CURRENT				MA.
OSCILLATOR-GRID CURRENT	0.1	0.5	0.5	MA.
TOTAL CATHODE CURRENT	2.4	12.3	12.5	MA.
OSCILLATOR-GRID RESISTOR	20 000	20 000	20 000	OHMS
PLATE RESISTANCE (APPROX.)	---	0.5	1.0	MEGOHM
CONVERSION TRANSCONDUCTANCE:				
SIGNAL GRID BIAS = -1	250	---	---	μMHOS
SIGNAL GRID BIAS = -2	---	425	450	μMHOS
SIGNAL GRID BIAS = -6	8	310	325	μMHOS
SIGNAL GRID BIAS = -10	---	75	80	μMHOS
SIGNAL GRID BIAS = -35	---	2	2	μMHOS APPROX.

NOTE: WITH G2 & G4 CONNECTED TO PLATE (100 VOLTS), AND SIGNAL APPLIED TO G1 (0 VOLTS BIAS): THE TRANSCONDUCTANCE IS 4500 μMHOS, THE PLATE CURRENT IS 27 MA., AND THE AMPLIFICATION IS 13. G3 IS CONNECTED TO GROUND DURING THIS TEST.

PLATE 1712
APRIL 15 1946

TUNG-SOL



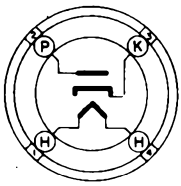
HALF WAVE

HIGH VACUUM RECTIFIER

UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



4G

BOTTOM VIEW

SMALL 4 PIN BASE

THE TUNG-SOL 1223 IS DESIGNED FOR SERVICE AS A POWER RECTIFIER IN AC-DC RECEIVERS.

RATINGS

MAXIMUM DC HEATER TO CATHODE POTENTIAL	350	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	700	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT	330	MA.

OPERATING CONDITIONS AND CHARACTERISTICS

HALF WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE (RMS)	117	150	235 MAX.	VOLTS
DC OUTPUT CURRENT MAX.	55	55	55	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE MIN. A	0	30	75	OHMS
TUBE VOLTAGE DROP AT 110 MA. PLATE CURRENT	17			VOLTS

A WHEN FILTER CONDENSERS LARGER THAN 40 μFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS", REFER TO FRONT OF BOOK.

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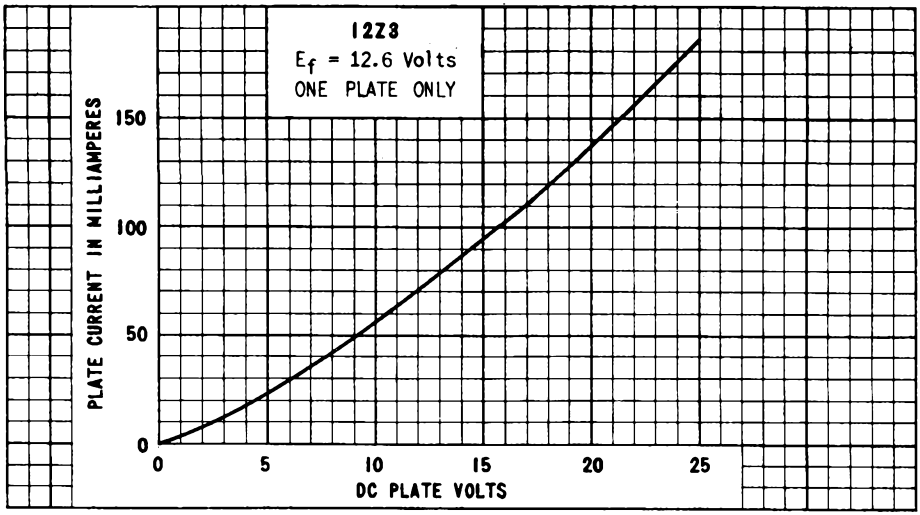
PLATE 711-2

FEB. 15 1940



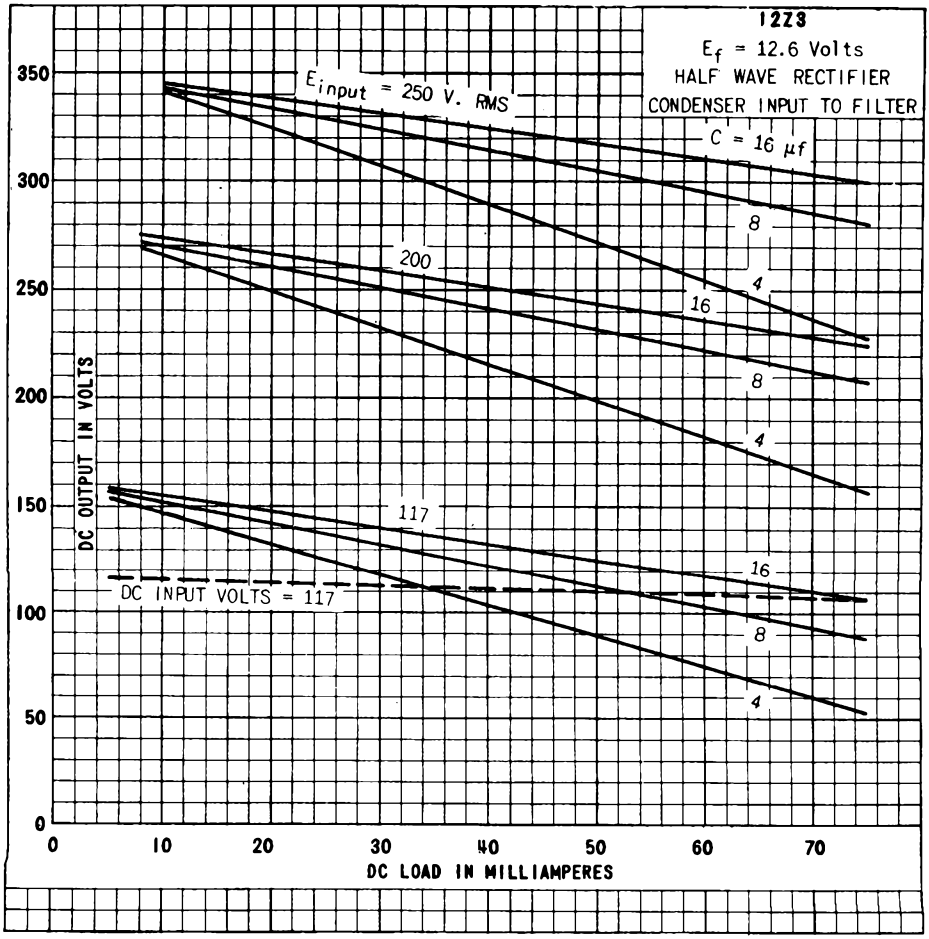
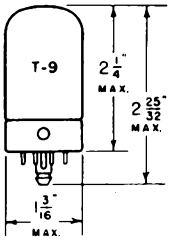


PLATE 712-1

TUNG-SOL

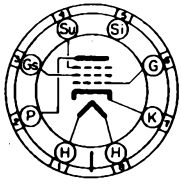
TRIPLE GRID
DETECTOR AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB



BOTTOM VIEW

LOCKING-IN 8 PIN BASE

THE TUNG-SOL 14C7 IS A TRIPLE GRID GENERAL PURPOSE DETECTOR, DESIGNED FOR SERVICE IN AC-DC RECEIVERS USING 150 MA. HEATER TUBES. WITH THE EXCEPTION OF HEATER RATINGS ITS ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF THE 7C7.

RATINGS

NOMINAL HEATER VOLTAGE	14.0	VOLTS
NOMINAL HEATER CURRENT	0.16	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLT
MAXIMUM PLATE DISSIPATION	1.0	WATT
MAXIMUM SCREEN DISSIPATION	0.1	WATT

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID TO CATHODE	6.0	μμf
PLATE TO CATHODE	6.5	μμf
CONTROL GRID TO PLATE	0.007 MAX.	μμf

[S] WITH EXTERNAL SHIELD CONNECTED TO CATHODE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1153-1
NOV-17 1941

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

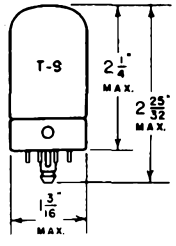
PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	-1	-3	VOLTS
SUPPRESSOR GRID AND PIN #5	0	0	VOLT
PLATE CURRENT	5.7	2.2	MA.
SCREEN CURRENT	1.8	0.7	MA.
PLATE RESISTANCE APPROX.	.325	1.0	MEGOHM
TRANSCONDUCTANCE	2275	1575	μMHOS

PLATE
1154-1

TUNG-SOL

TRIPLE GRID

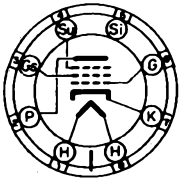
SEMI-REMOTE CUT-OFF AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER

12.6 VOLTS 0.16 AMPERE
AC OR DC



8V

BOTTOM VIEW

GLASS BULB

LOCKING IN 8 PIN BASE

THE TUNG-SOL 14H7 IS A SEMI-REMOTE CUT-OFF AMPLIFIER. IT IS SUITABLE FOR USE WITH AVC AS RF AND IF AMPLIFIERS IN AC-DC OPERATED RECEIVERS USING 150 MA. HEATER TUBES.

RATINGS

NOMINAL HEATER VOLTAGE	14.0	VOLTS
NOMINAL HEATER CURRENT	0.16	AMPERE
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	150	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	2.5	WATTS
MAXIMUM SCREEN DISSIPATION	.5	WATT

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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PLATE 1155-1
NOV. 17 1941

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

HEATER VOLTAGE	12.6	12.6	VOLTS
HEATER CURRENT	0.15	0.15	AMPERE
PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	150	VOLTS
CONTROL GRID VOLTAGE	-1	-2.5	VOLTS
SUPPRESSOR AND INTERNAL SHIELD	0	0	VOLT
PLATE CURRENT	8.2	9.5	MA.
SCREEN CURRENT	3.3	3.5	MA.
PLATE RESISTANCE APPROX.	0.25	0.8	MEGOHM
TRANSCONDUCTANCE	3800	3800	μMHOS
CONTROL GRID VOLTAGE APPROX. FOR TRANSCONDUCTANCE = 35 μMHOS	-12	-19	VOLTS

DIRECT INTERELECTRODE CAPACITANCES[5]

INPUT: CONTROL GRID TO ALL OTHER ELECTRODES EXCEPT PLATE	8.0	μμf
OUTPUT: PLATE TO ALL OTHER ELECTRODES EXCEPT CONTROL GRID	7.0	μμf
CONTROL GRID TO PLATE	0.007 MAX.	μμf

[5] WITH EXTERNAL SHIELD CONNECTED TO CATHODE.

PLATE 1156-1

TUNG-SOL

PENTAGRID

PHYSICAL SPECIFICATIONS

EMITTER	UNIPOTENTIAL CATHODE	PIN CONNECTIONS			
BASE	LOCKING-IN - 8 PIN	PIN 1	HEATER	PIN 7	CATHODE
CAP	NONE	PIN 2	PLATE	PIN 8	HEATER
BULB	T-9	PIN 3	GRIDS #2 & #4		
MAXIMUM DIAMETER	1 3/16"	PIN 4	GRID #1		
MAXIMUM OVERALL LENGTH	2 25/32"	PIN 5	GRID #5	TOP CAP	NONE
MAXIMUM SEATED HEIGHT	2 1/4"	PIN 6	GRID #3		

RATINGS

HEATER OR FILAMENT VOLTAGE - NOMINAL (AC OR DC)	14.0	VOLTS
HEATER OR FILAMENT CURRENT - NOMINAL	0.16	AMP.
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE (GRIDS #2 & #4)	100	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM PLATE DISSIPATION		WATTS
MAXIMUM SCREEN DISSIPATION	1.0	WATT
MAXIMUM TOTAL PLATE AND SCREEN DISSIPATION	2.0	WATTS
MAXIMUM TOTAL CATHODE CURRENT	14	MA.
MINIMUM EXTERNAL SIGNAL GRID BIAS VOLTAGE* (GRID #3)	0	VOLTS
MAXIMUM ANODE-GRID VOLTAGE		VOLTS
MAXIMUM ANODE-GRID SUPPLY VOLTAGE		VOLTS
MAXIMUM ANODE-GRID DISSIPATION		WATT

* WITH SELF-EXCITATED OSCILLATOR

CAPACITANCES[S]

SIGNAL GRID TO MIXER PLATE (GRID #3 TO PLATE)	0.20 MAX.	μμf
SIGNAL GRID TO OSC. GRID (GRID #3 TO GRID #1)	0.20 MAX.	μμf
SIGNAL INPUT (GRID #3 TO ALL OTHER ELECTRODES)	9.0	μμf
OSC. GRID TO CATHODE (GRID #1 TO CATHODE)	2.2	μμf
OSC. GRID TO PLATE (GRID #1 TO PLATE)	0.15 MAX.	μμf
OSC. INPUT (GRID #1 TO ALL OTHER ELECTRODES)	7.0	μμf
OSC. GRID TO ALL OTHER ELECTRODES EXCEPT CATHODE	5.0	μμf
MIXER OUTPUT (PLATE TO ALL OTHER ELECTRODES)	9.0	μμf
CATHODE TO ALL OTHER ELECTRODES EXCEPT GRID #1	6.0	μμf

[S] WITH EXTERNAL SHIELD CONNECTED TO BASE SHELL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

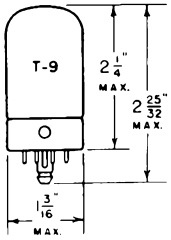
HEATER OR FILAMENT VOLTAGE	12.6	12.6	VOLTS
HEATER OR FILAMENT CURRENT	0.15	0.15	AMP.
PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	-2	-2	VOLTS
ANODE-GRID VOLTAGE			VOLTS
PLATE CURRENT	3.3	3.5	MA.
SCREEN CURRENT	8.5	8.5	MA.
ANODE-GRID CURRENT			MA.
OSCILLATOR-GRID CURRENT	0.5	0.5	MA.
TOTAL CATHODE CURRENT	12.3	12.5	MA.
OSCILLATOR-GRID RESISTOR	20000	20000	OHMS
PLATE RESISTANCE (APPROX.)	0.5	1.0	MEGOHM
CONVERSION TRANSCONDUCTANCE	525	550	μMHOS
FOR CONTROL GRID VOLTAGE =-2 VOLTS			
CONVERSION TRANSCONDUCTANCE	275	300	μMHOS
FOR CONTROL GRID VOLTAGE =-6 VOLTS			
CONVERSION TRANSCONDUCTANCE (APPROX.)	2	2	μMHOS
FOR CONTROL GRID VOLTAGE =-35 VOLTS			
SUPPRESSOR GRID (GRID #5)	0	0	VOLTS

PLATE 1181-1

FEB. 28 1942

TUNG-SOL

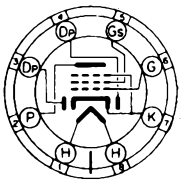
DUO-DIODE PENTODE AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER

12.6 VOLTS · 0.15 AMPERE
AC OR DC



8AE-L-7

GLASS BULB

LOCKING-IN 8 PIN BASE

THE TUNG-SOL 14R7 COMBINES TWO DIODES AND A PENTODE IN A SINGLE BULB, USING A COMMON CATHODE. IT IS DESIGNED FOR SERVICE AS A DIODE DETECTOR, AVC RECTIFIER AND PENTODE AMPLIFIER IN AC-DC RECEIVERS USING 150 MA. HEATER TUBES.

RATINGS

NOMINAL HEATER VOLTAGE	14.0	VOLTS
NOMINAL HEATER CURRENT	0.16	AMPERE
MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	250	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLT
MAXIMUM PLATE DISSIPATION	2.0	WATTS
MAXIMUM SCREEN DISSIPATION	0.25	WATT
MINIMUM DIODE CURRENT PER PLATE WITH 10 VOLTS DC APPLIED	0.8	MA.
MAXIMUM DIODE CURRENT PER PLATE FOR CONTINUOUS OPERATION	1.0	MA.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1182-1

FEB. 28 1942

DIRECT INTERELECTRODE CAPACITANCES[5]

INPUT: CONTROL GRID (G) TO ALL OTHER ELECTRODES EXCEPT PLATE (P)	5.6	μμf
OUTPUT: PLATE (P) TO ALL OTHER ELECTRODES EXCEPT CONTROL GRID (G)	5.3	μμf
CONTROL GRID (G) TO PLATE (P)	0.004 MAX.	μμf
DIODE #1 TO CONTROL GRID (G)	0.005 MAX.	μμf
DIODE #2 TO CONTROL GRID (G)	0.002 MAX.	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

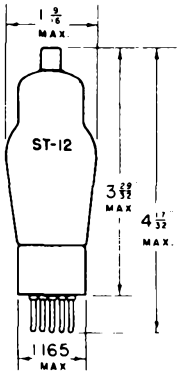
PENTODE UNIT – CLASS A1 AMPLIFIER

HEATER VOLTAGE	12.6	12.6	VOLTS
HEATER CURRENT	0.15	0.15	AMPERE
PLATE (P) VOLTAGE	100	250	VOLTS
SCREEN (Gs) VOLTAGE	100	100	VOLTS
CONTROL GRID (G) VOLTAGE	−1	−1	VOLTS
PLATE CURRENT	5.5	5.7	MA.
SCREEN CURRENT	2.2	2.1	MA.
PLATE RESISTANCE APPROX.	0.35	1.0	MEGOHM
TRANSCONDUCTANCE	3000	3200	μMHOS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 2 μMHOS	−16	−20	VOLTS

[5] WITH EXTERNAL SHIELD CONNECTED TO CATHODE.

PLATE 1183-1

TUNG-SOL

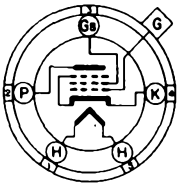


PENTODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
2.0 VOLTS 0.220 AMPERE
DC

GLASS BULB



5F

BOTTOM VIEW

SMALL 5 PIN BASE

THE TUNG-SOL 15 IS A SHARP CUT-OFF PENTODE WITH A HEATER OF LOW POWER DRAIN.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	67.5	135 MAX.	VOLTS
SCREEN VOLTAGE MAX.	67.5	67.5	VOLTS
CONTROL GRID VOLTAGE	-1.5	-1.5	VOLTS
PLATE CURRENT	1.85	1.85	MA.
SCREEN CURRENT	0.30	0.30	MA.
PLATE RESISTANCE	0.63	0.8	MEGOHM
TRANSCONDUCTANCE	710	750	μMHOS
AMPLIFICATION FACTOR	450	600	

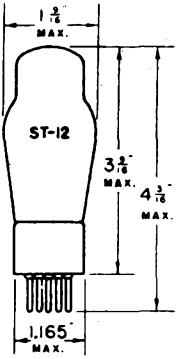
DIRECT INTERELECTRODE CAPACITANCES

GRID TO CATHODE	2.35	μμf
PLATE TO CATHODE	7.8	μμf
GRID TO PLATE [S]	0.01 MAX.	μμf

[S] WITH SHIELD

PLATE 662-2

NOV. 20 1939



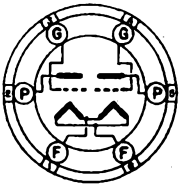
TWIN TRIODE POWER AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.26 AMPERE
DC

GLASS BULB

SMALL 6 PIN BASE



6C

BOTTOM VIEW

THE TUNG-SOL 19 IS DESIGNED FOR SERVICE AS A CLASS B POWER AMPLIFIER IN THE OUTPUT STAGE OF BATTERY OPERATED RECEIVERS. EXCEPT FOR FILAMENT CURRENT ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 1J6G.

OPERATING CONDITIONS AND CHARACTERISTICS

MAXIMUM PLATE VOLTAGE	135	VOLTS
MAXIMUM PEAK PLATE CURRENT PER PLATE	50	MA.

CLASS B2 AMPLIFIER

PLATE VOLTAGE MAX.	135	135	135	VOLTS
GRID VOLTAGE [A]	-6	-3	0	VOLTS
ZERO-SIG. PLATE CURRENT PER PLATE	0.5	2	5	MA.
LOAD RESISTANCE PER PLATE	2500	2500	2500	OHMS
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	10 000	10 000	10 000	OHMS
AVERAGE POWER INPUT GRID TO GRID APPROX.	0.095	0.13	0.17	WATT
POWER OUTPUT APPROX.	1.6	1.9	2.1	WATTS

[A] RETURN TO NEGATIVE FILAMENT (PIN #6)

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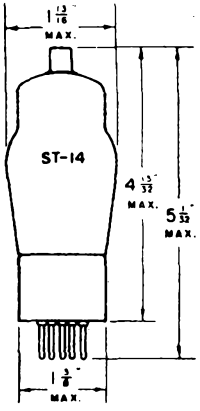
PLATE
342-2

AUG. 14
1939



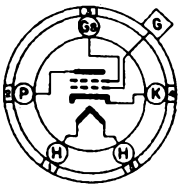
TETRODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
2.5 VOLTS 1.75 AMPERES
AC OR DC

GLASS BULB

MEDIUM 5 PIN BASE



5E

BOTTOM VIEW

THE TUNG-SOL 24 IS A SCREEN-GRID AMPLIFIER EMPLOYED PRIMARILY IN RF APPLICATIONS.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE [A]	180	250	VOLTS
SCREEN VOLTAGE MAX.	90	90	VOLTS
CONTROL GRID VOLTAGE	-3	-3	VOLTS
PLATE CURRENT	4	4	MA.
SCREEN CURRENT	1.7	1.7	MA.
PLATE RESISTANCE	0.4	0.6	MEGOHM
TRANSCONDUCTANCE	1000	1050	μMHOS
AMPLIFICATION FACTOR	400	630	

[A] MAXIMUM PLATE V. = 275 V.

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	5.3	μμf
PLATE TO CATHODE	10.5	μμf
CONTROL GRID TO PLATE [S]	.007 MAX.	μμf

[S] WITH SHIELD

PLATE 545-2

TUNG-SOL

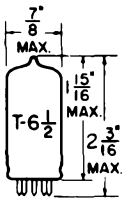
TRIPLE-DIODE TRIODE

MINIATURE TYPE

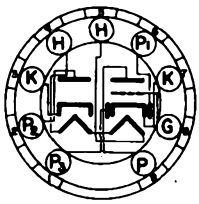
COATED UNIPOTENTIAL CATHODES

HEATER
18.9 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
SMALL BUTTON
9 PIN BASE

THE 19T8 COMPRISES THREE HIGH PERVEANCE DIODES AND A HIGH MU TRIODE IN ONE ENVELOPE WITH THE 9 PIN MINIATURE CONSTRUCTION. ONE OF THE THREE DIODE PLATES HAS AN INDEPENDENT CATHODE PROVIDING SATISFACTORY OPERATION IN BALANCED LOW IMPEDANCE DETECTOR CIRCUITS. THIS TUBE STRUCTURE PERMITS THE CONSTRUCTION OF AM/FM RECEIVERS WITH A MINIMUM OF SWITCHING.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

WITH NO EXTERNAL SHIELD

GRID TO EACH DIODE PLATE (MAX.)	0.035	μμf
DIODE #1 INPUT: P_1 TO (H+K)	3.8	μμf
DIODE #2 INPUT: P_2 TO (H+K)	4.5	μμf
DIODE #3 INPUT: P_3 TO (H+K)	3.8	μμf
DIODE CATHODE TO ALL: K TO (H+K+P_1+P_2+P_3+P+G)	8.5	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-310

HEATER VOLTAGE	18.9	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS
MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM POSITIVE DC GRID VOLTAGE	0	VOLTS
MAXIMUM DIODE CURRENT EACH PLATE FOR CONTINUOUS OPERATION	5	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	18.9	18.9	VOLTS
HEATER CURRENT	150	150	MA.
PLATE VOLTAGE	100	250	VOLTS
GRID VOLTAGE	-1	-3	VOLTS
PLATE CURRENT	0.8	1	MA.
PLATE RESISTANCE	54 000	58 000	OHMS
TRANSCONDUCTANCE	1 300	1 200	μMHOS
AMPLIFICATION FACTOR	70	70	
AVERAGE DIODE CURRENT WITH 5 VOLTS DC APPLIED	20	20	MA.

ONE DIODE HAS A SEPARATE CATHODE, THE OTHER CATHODE IS COMMON TO TWO DIODES AND THE TRIODE UNIT.

IT IS RECOMMENDED THAT DIODE #2 (PIN 2) AND DIODE #3 (PIN 1) BE USED IN A RATIO-DETECTOR CIRCUIT FOR FM.

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE OR ADDITION

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PLATE 2091
OCT. 1, 1948

CONTINUED FROM PRECEDING PAGE

RESISTANCE COUPLED AMPLIFIER

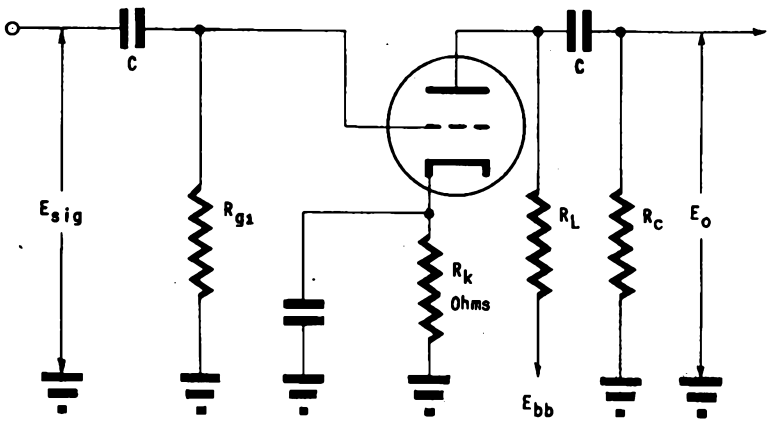
R1 MEG.	Rg1 MEG.	Rc MEG.	Ebb = 90 VOLTS			Ebb = 180 VOLTS			Ebb = 300 VOLTS		
			Rk	GAIN	Eo	Rk	GAIN	Eo	Rk	GAIN	Eo
0.10	A	0.10	5700	21	7	2400	29	18	1800	33	35
0.10	A	0.24	6100	26	9	2700	34	23	2000	38	42
0.24	A	0.24	9100	30	10	4300	40	24	3000	44	43
0.24	A	0.51	10000	34	13	4700	45	31	3300	49	52
0.51	A	0.51	15000	37	14	7500	47	28	5600	51	50
0.51	A	1	16000	40	16	8200	50	35	6200	55	60
0.24	10	0.24	---	31	5	---	44	19	---	48	40
0.24	10	0.51	---	37	7	---	49	25	---	52	52
0.51	10	0.51	---	39	7.5	---	51	22	---	54	44
0.51	10	1	---	42	10	---	54	28	---	58	56

[A] VALUE OF Rg1 IS NOT CRITICAL.

Rk TAKEN TO NEAREST RMA VALUE FOR EACH CASE INSTEAD OF ABSOLUTE OPTIMUM VALUE.

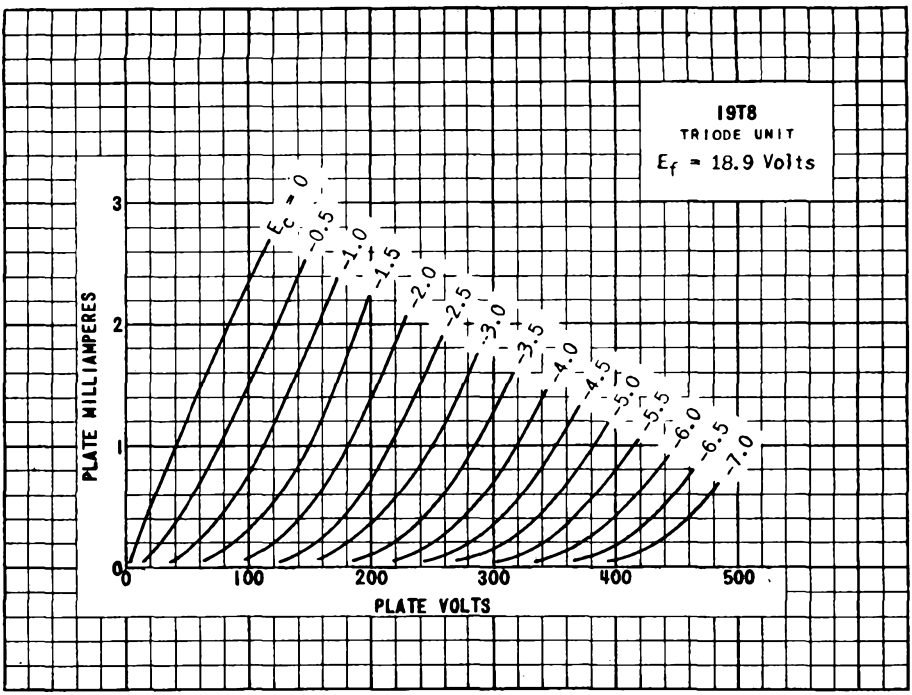
Eo IS RMS OUTPUT AT 5% TOTAL HARMONIC DISTORTION.

GAIN MEASURED AT Eo = 2.0 VOLTS RMS OUTPUT.



NOTE: COUPLING CAPACITORS (C) SHOULD BE SELECTED TO GIVE DESIRED FREQUENCY RESPONSE. Rk SHOULD BE ADEQUATELY BY-PASSED.

PLATE 2092
OCT. 1, 1948



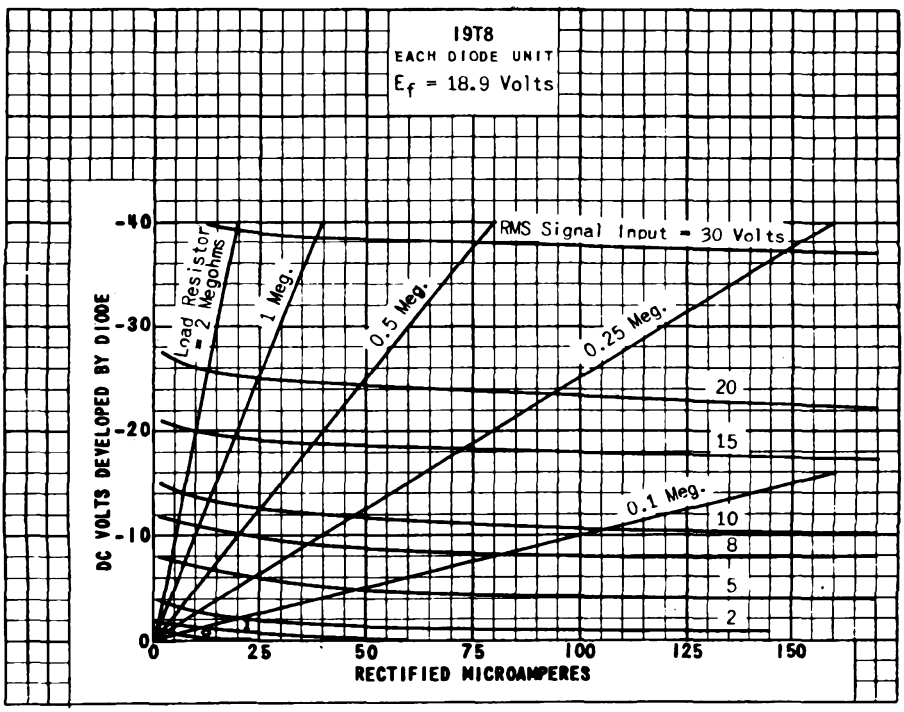


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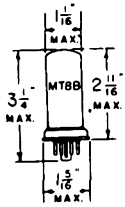
PLATE 1900
OCT. 1, 1947

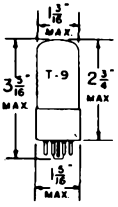
TUNG-SOL

PENTODE POWER AMPLIFIER

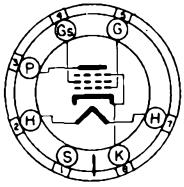
UNIPOTENTIAL CATHODE

HEATER
25 VOLTS 0.3 AMPERE
AC OR DC



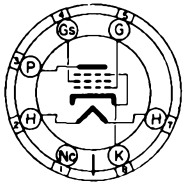


METAL SHELL
SMALL WAFER
7-PIN OCTAL BASE



7S

25A6 BOTTOM VIEW



G-7S

25A6GT/G BOTTOM VIEW

GLASS BULB
INTERMEDIATE
7-PIN OCTAL BASE

THE TUNG-SOL 25A6 AND 25A6GT/G ARE DESIGNED FOR SERVICE IN THE POWER OUTPUT STAGES OF AC – DC RECEIVERS. THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE TYPE 43

RATINGS

MAXIMUM PLATE VOLTAGE	160	VOLTS
MAXIMUM SCREEN VOLTAGE	135	VOLTS
MAXIMUM PLATE DISSIPATION	5.3	WATTS
MAXIMUM SCREEN DISSIPATION	1.9	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	95	135	160	VOLTS
SCREEN VOLTAGE	95	135	120	VOLTS
CONTROL GRID VOLTAGE[A]	−15	−20	−18	VOLTS
PEAK AF SIGNAL VOLTAGE	15	20	18	VOLTS
ZERO-SIGNAL PLATE CURRENT	20	37	33	MA.
ZERO-SIGNAL SCREEN CURRENT	4	8	6.5	MA.
MAXIMUM-SIGNAL PLATE CURRENT	22	39	36	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	8	14	12	MA.
PLATE RESISTANCE APPROX.	45000	35000	42000	OHMS
TRANSCONDUCTANCE	2000	2450	2375	μMHOS
LOAD RESISTANCE	4500	4000	5000	OHMS
TOTAL HARMONIC DISTORTION	11	9	10	PER CENT
POWER OUTPUT	0.9	2	2.2	WATTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER MAXIMUM RATED CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION.

CONTINUED NEXT PAGE

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PLATE
1056-2

JUNE 6
1941

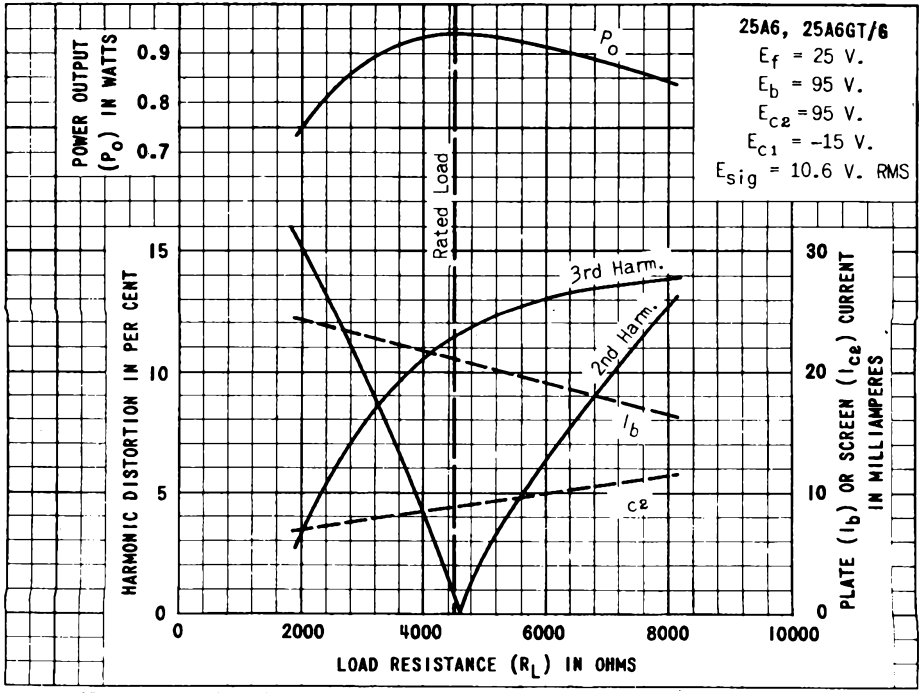
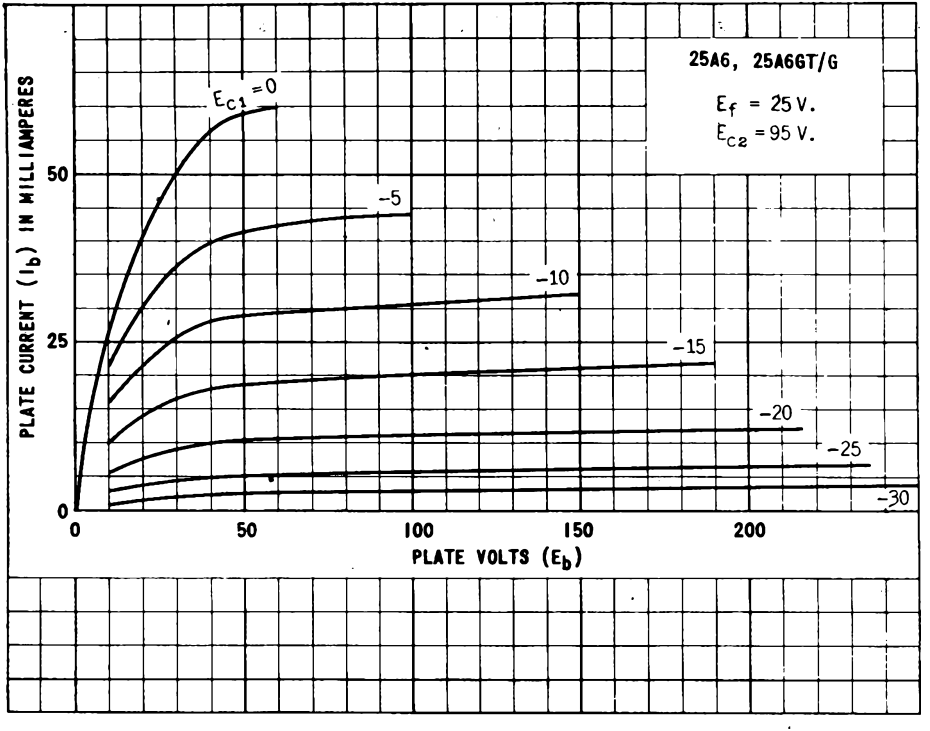
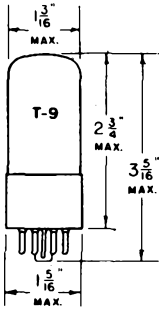


PLATE 1057-2

25A6, 25A6GT/G



TUNG-SOL



RECTIFIER

PENTODE POWER AMPLIFIER

UNIPOTENTIAL CATHODES

HEATER

25 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

G-8F

BOTTOM VIEW

INTERMEDIATE 8 PIN OCTAL BASE

THE TUNG-SOL 25A7GT/G COMBINES A HALF WAVE RECTIFIER AND A PENTODE POWER AMPLIFIER IN A SINGLE BULB. IT IS DESIGNED FOR SERVICE IN AC-DC OPERATED RECEIVERS.

RATINGS

PENTODE POWER AMPLIFIER UNIT

MAXIMUM PLATE VOLTAGE	117	VOLTS
MAXIMUM SCREEN VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	2.25	WATTS
MAXIMUM SCREEN DISSIPATION	0.8	WATT

RATINGS

RECTIFIER UNIT

MAXIMUM AC PLATE VOLTAGE (RMS)	117	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	175	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	350	VOLTS
MAXIMUM STEADY STATE PEAK PLATE CURRENT	450	MA.
TUBE VOLTAGE DROP: MEASURED WITH APPLIED DC AT 150 MA. PLATE CURRENT	23	VOLTS
MAXIMUM DC OUTPUT CURRENT	75	MA.
MINIMUM EFFECTIVE PLATE SUPPLY IMPEDANCE	15	OHMS

CONTINUED NEXT PAGE

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PLATE 1157-1

NOV. 17 1941

25A7GT/G

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	VOLTS
SCREEN VOLTAGE	100	VOLTS
CONTROL GRID VOLTAGE [A]	−15	VOLTS
ZERO-SIGNAL PLATE CURRENT	20.5	MA.
ZERO-SIGNAL SCREEN CURRENT	4	MA.
PLATE RESISTANCE	50 000	OHMS
TRANSCONDUCTANCE	1800	μMHOS
LOAD RESISTANCE	4500	OHMS
TOTAL HARMONIC DISTORTION	9	PER CENT
POWER OUTPUT	0.77	WATT

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER MAXIMUM RATED CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION.

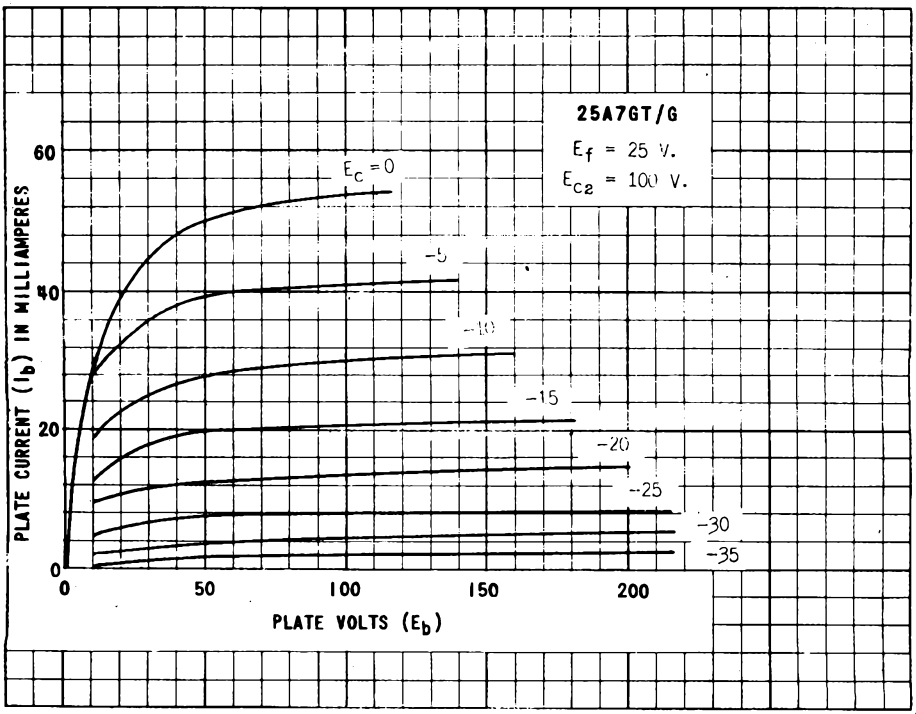
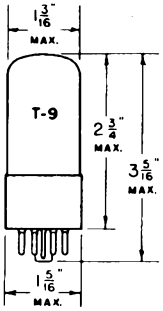


PLATE 1158-1

TUNG-SOL

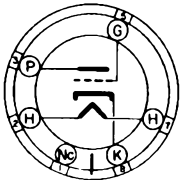


TRIODE POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
25 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



G-6Qa

BOTTOM VIEW

INTERMEDIATE 6 PIN OCTAL BASE

THE TUNG-SOL 25AC5GT/G IS A HIGH-MU POWER OUTPUT TRIODE DESIGNED FOR SERVICE WITH POSITIVE GRID BIAS IN DYNAMIC COUPLED CIRCUITS EMPLOYING A TYPE 6AE5GT/G, TYPE 6P5GT/G, TYPE 76, OR A TYPE 37 AS A DRIVER.

RATINGS

MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM PLATE DISSIPATION	10	WATTS

AVERAGE CHARACTERISTICS

PLATE VOLTAGE	110	VOLTS
CONTROL GRID VOLTAGE	+15	VOLTS
PLATE CURRENT	45	MA.
GRID CURRENT	7	MA.
PLATE RESISTANCE	15 200	OHMS
TRANSCONDUCTANCE	3800	μMHOS
AMPLIFICATION FACTOR	58	

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

DYNAMIC-COUPLED CLASS A1 AMPLIFIER

DRIVER TUBE TYPE	6AE5GT/G	6P5GT/G	37	
PLATE SUPPLY VOLTAGE	110	180	180	VOLTS
CONTROL GRID VOLTAGE	[A]	[A]	[A]	VOLTS
DRIVER GRID RESISTOR MAX.	1.0	1.0	1.0	MEGOHM
POWER TUBE PLATE CURRENT	45	27	37	MA.
DRIVER TUBE PLATE CURRENT	7	4	5.3	MA.
INPUT SIGNAL TO DRIVER VOLTAGE (RMS)[B]	22	12	17	VOLTS
LOAD RESISTANCE	2000	8000	5000	OHMS
TOTAL HARMONIC DISTORTION	10	10	10	PER CENT
POWER OUTPUT	2.0	2.0	2.7	WATTS

[A] BIAS VOLTAGE FOR BOTH THE 25AC5GT/G AND THE DRIVER ARE AUTOMATICALLY DEVELOPED BY THE "DYNAMIC COUPLED" CIRCUIT.

[B] DRIVER GRID CURRENT DOES NOT FLOW DURING ANY PART OF THE INPUT CYCLE.

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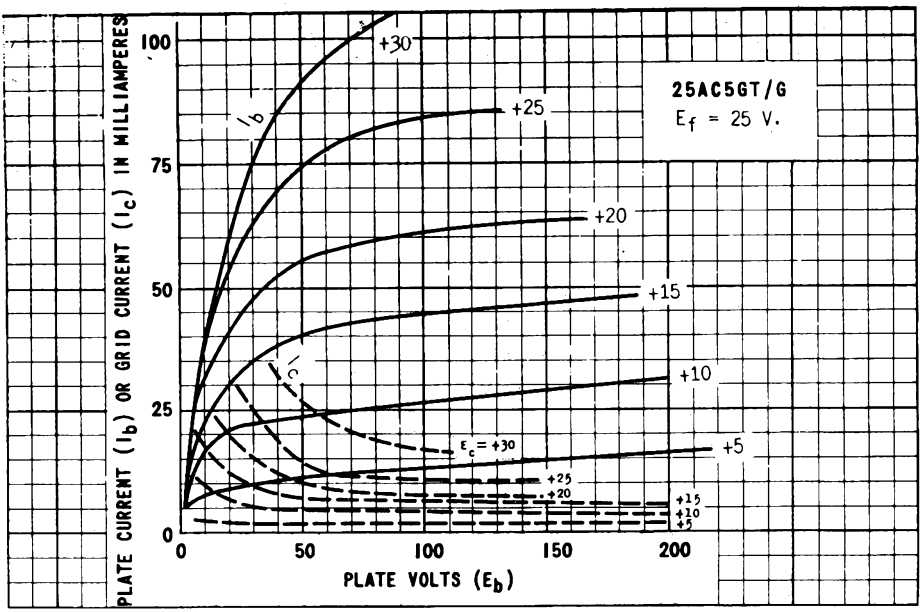
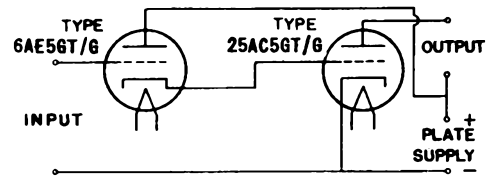
PLATE 1159-1
NOV. 17 1941

25AC5GT/G





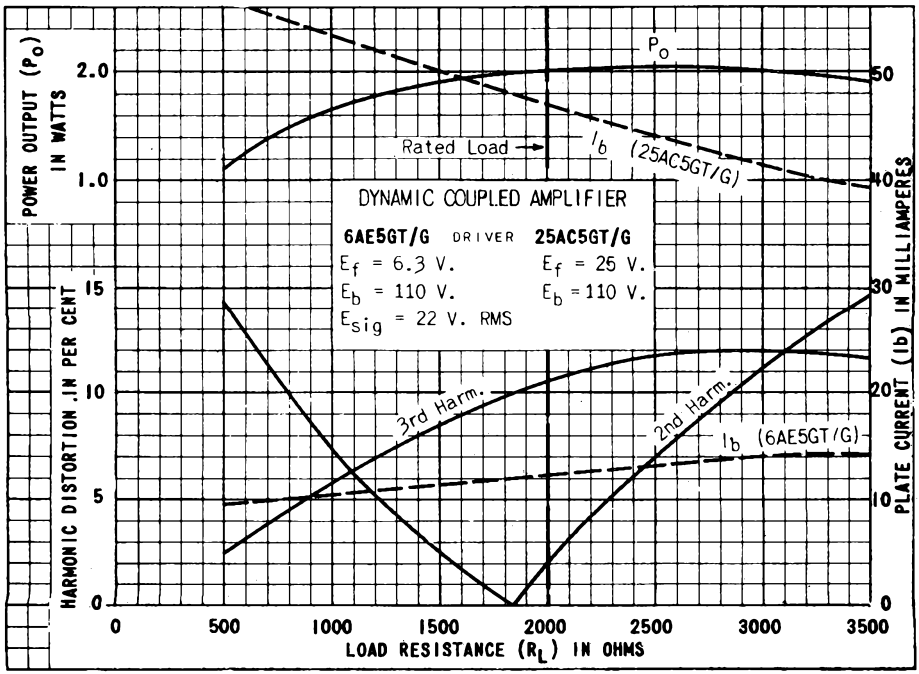
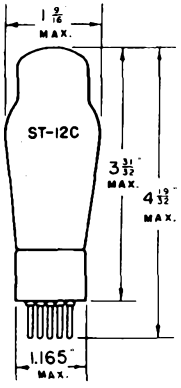


PLATE
1160-1

TUNG-SOL



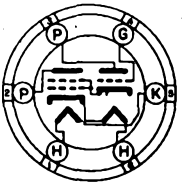
DYNAMIC COUPLED POWER AMPLIFIER

UNIPOTENTIAL CATHODES

HEATER
25 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

SMALL 6 PIN BASE



6Da
BOTTOM VIEW

THE TUNG-SOL 25B5 CONSISTS OF TWO DYNAMICALLY COUPLED TRIODES AND IS DESIGNED FOR SERVICE IN THE POWER OUTPUT STAGE OF AC-DC RECEIVERS. ALL NECESSARY BIASES ARE SUPPLIED INTERNALLY. IT RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 25N6G.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

OUTPUT PLATE (2) VOLTAGE	110	180 MAX.	VOLTS
INPUT PLATE (3) VOLTAGE	110	100 P	VOLTS
INPUT GRID (4) VOLTAGE	0	0	VOLTS
GRID CIRCUIT RESISTANCE MAX.	1	1	MEGOHM
OUTPUT PLATE CURRENT	45	46	MA.
INPUT PLATE CURRENT	7	5.8	MA.
TRANSCONDUCTANCE	2200	2300	µMHOS
AMPLIFICATION FACTOR	25	35	
LOAD RESISTANCE	2000	4000	OHMS
SIGNAL VOLTAGE (RMS) S	21	21	VOLTS
TOTAL HARMONIC DISTORTION	9	9	PER CENT
POWER OUTPUT	2.0	3.8	WATTS

(2) BASE PIN #2 (3) BASE PIN #3 (4) BASE PIN #4

S FOR RATED POWER OUTPUT

P BOTH PLATES MAY BE OPERATED AT 180 VOLTS IF THE GRID IS BIASED TO -20 VOLTS. FIXED OR SELF BIAS MAY BE USED. FOR SELF BIAS THE CATHODE RESISTOR SHOULD BE 400 OHMS.

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PLATE 461-2

JUNE 1 1939

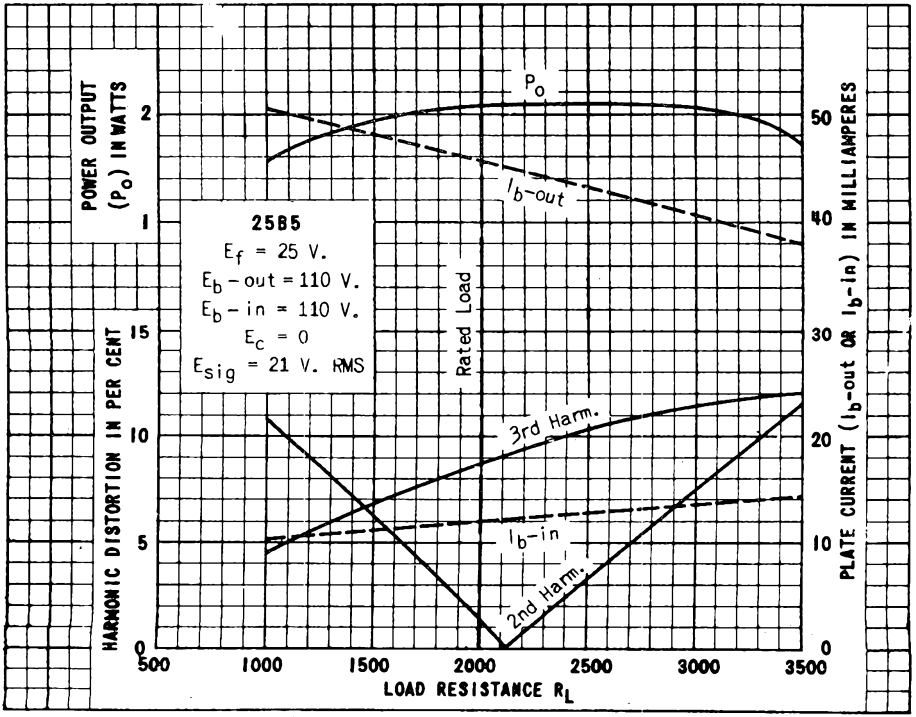
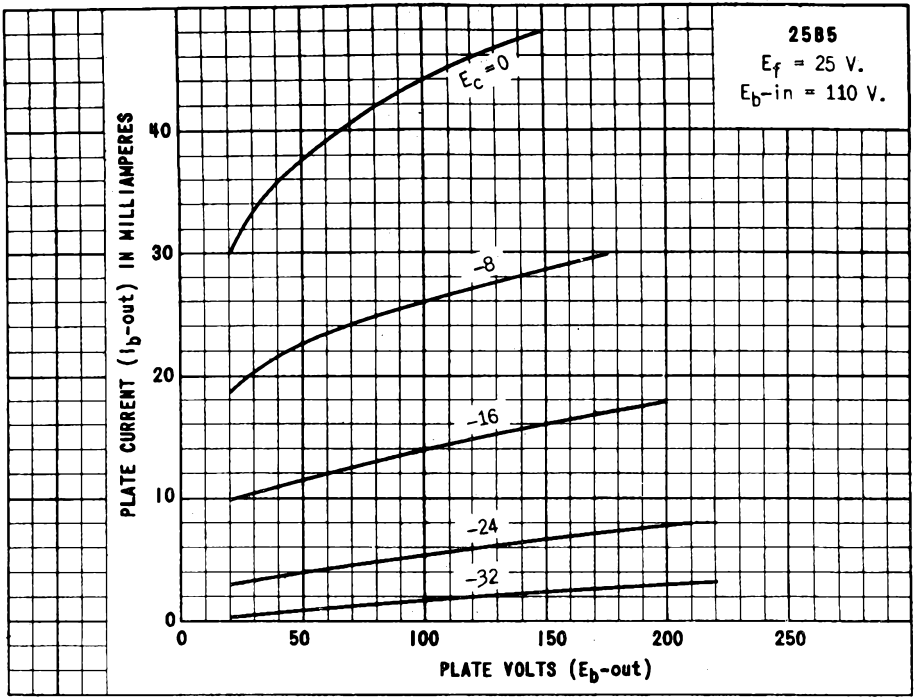
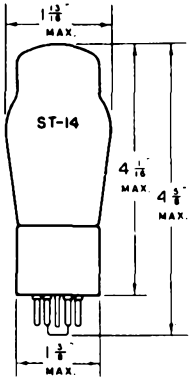


PLATE 462-1

25B5


2585
E_f = 25 V.
E_b-in = 110 V.
E_c=0
-8
-16
-24
-32
PLATE CURRENT (I_b-out) IN MILLIAMPERES
0
10
20
30
40
0
50
100
150
200
250
PLATE VOLTS (E_b-out)

TUNG-SOL



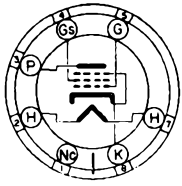
PENTODE POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
25.0 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

MEDIUM 7 PIN OCTAL BASE



G-7S
BOTTOM VIEW

THE TUNG-SOL 25B6G IS A POWER OUTPUT PENTODE, WHICH IS DESIGNED FOR SERVICE IN SERIES OPERATED HEATER CIRCUITS THAT REQUIRE A HIGH POWER OUTPUT.

RATINGS

MAXIMUM PLATE VOLTAGE	200	VOLTS
MAXIMUM SCREEN VOLTAGE	135	VOLTS
MAXIMUM PLATE DISSIPATION	12.5	WATTS
MAXIMUM SCREEN DISSIPATION	2.0	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	105	135	200	VOLTS
SCREEN VOLTAGE	105	135	135	VOLTS
CONTROL GRID VOLTAGE	-16	-22	-23	VOLTS
PEAK AF SIGNAL VOLTAGE	16	22	23	VOLTS
ZERO-SIGNAL PLATE CURRENT	48	61	62	MA.
ZERO-SIGNAL SCREEN CURRENT	2.0	2.5	1.8	MA.
MAXIMUM-SIGNAL PLATE CURRENT	55	69	71	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	10	14.5	13	MA.
PLATE RESISTANCE	15500	15000	18000	OHMS
TRANSCONDUCTANCE	4800	5000	5000	µMHOS
LOAD RESISTANCE	1700	1700	2500	OHMS
TOTAL HARMONIC DISTORTION	12.5	14	15	PER CENT
SECOND HARMONIC DISTORTION	7	8	8.5	PER CENT
THIRD HARMONIC DISTORTION	10	11	11	PER CENT
POWER OUTPUT	2.4	4.3	7.1	WATTS

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 926-2
DEC. 30 1940

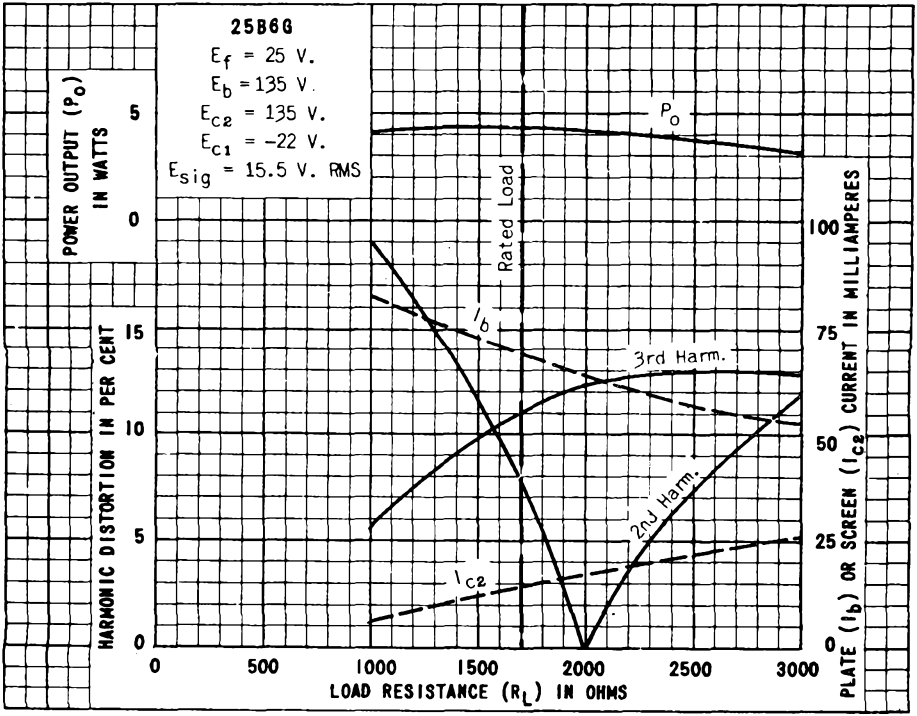
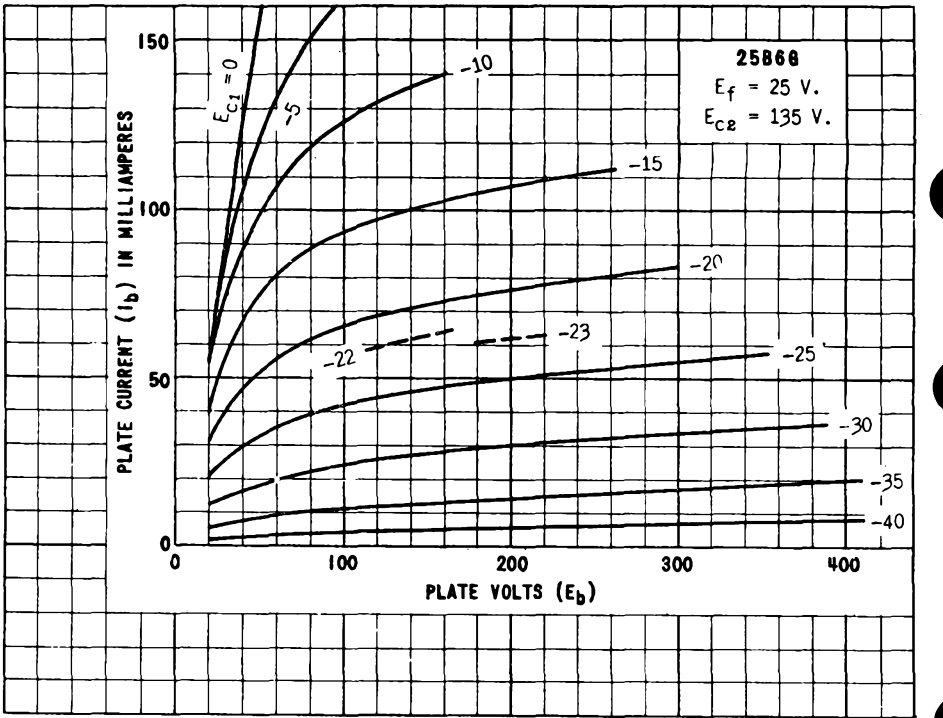


PLATE 927-2

25B6 G


25B6G
E_f = 25 V.
E_{c2} = 135 V.
E_{c1} = 0
-5
-10
-15
-20
-22
-23
-25
-30
-35
-40
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
50
100
150
0
100
200
300
400

TUNG-SOL

TRIODE-PENTODE AMPLIFIER

PHYSICAL SPECIFICATIONS

EMITTER UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE INTERMEDIATE-8 PIN OCTAL	PIN 1 PENT. CATH.*	PIN 7 PENT. HEATER
CAP SKIRTED MINIATURE-STYLE C	PIN 2 TRIODE HTR.	PIN 8 TRIODE GRID
BULB T-9	PIN 3 PENT. PLATE	
MAXIMUM DIAMETER 1 5/16"	PIN 4 PENT. GRID #2	
MAXIMUM OVERALL LENGTH 3 5/16"	PIN 5 TRIODE PLATE	TOP CAP PENT. GRID #1
MAXIMUM SEATED HEIGHT 2 3/4"	PIN 6 TRIODE CATH.	

*AND GRID #3

RATINGS

HEATER OR FILAMENT VOLTAGE (AC OR DC)	25	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMP.

DIRECT INTERELECTRODE CAPACITANCES

	PENTODE	TRIODE	
CONTROL GRID TO CATHODE	5.5	5.0	μμf
PLATE TO CATHODE	10.0	4.6	μμf
CONTROL GRID TO PLATE	0.02	2.2	μμf
PENTODE CONTROL GRID TO TRIODE GRID	0.02		μμf
PENTODE CONTROL GRID TO TRIODE PLATE	0.009		μμf
PENTODE PLATE TO TRIODE GRID	0.075		μμf

OPERATING CONDITIONS AND CHARACTERISTICS

PENTODE SECTION-CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	VOLTS
SCREEN VOLTAGE (GRID #2)	100	VOLTS
CONTROL GRID VOLTAGE (GRID #1)	-3	VOLTS
PLATE CURRENT	7.6	MA.
SCREEN CURRENT	2.0	MA.
PLATE RESISTANCE	0.185	MEGOHM
TRANSCONDUCTANCE	2000	μMHOS
AMPLIFICATION FACTOR	370	
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 2 μMHOS	-41	VOLTS

TRIODE SECTION-CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	VOLTS
GRID VOLTAGE	-1	VOLT
PLATE CURRENT	0.6	MA.
PLATE RESISTANCE	0.075	MEGOHM
TRANSCONDUCTANCE	1500	μMHOS
AMPLIFICATION FACTOR	112.5	
GRID VOLTAGE (APPROX.) FOR PLATE CURRENT CUT-OFF	-2.5	VOLTS

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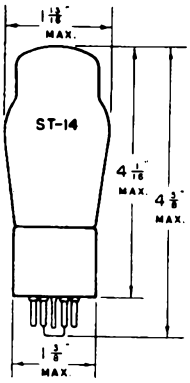
PLATE T857-1

SEPT. 23 1940

TUNG-SOL



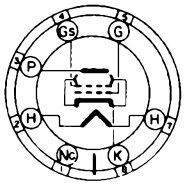
BEAM POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
25.0 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

MEDIUM 7 PIN OCTAL BASE



G-7AC

BOTTOM VIEW

THE TUNG-SOL 25C6G IS A BEAM POWER AMPLIFIER, DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AC-DC RECEIVERS. IT FEATURES HIGH POWER OUTPUT WITH LOW SUPPLY VOLTAGES.

RATINGS

MAXIMUM PLATE VOLTAGE	200	VOLTS
MAXIMUM SCREEN VOLTAGE	135	VOLTS
MAXIMUM PLATE DISSIPATION	12.5	WATTS
MAXIMUM SCREEN DISSIPATION	1.75	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	135	200	VOLTS
SCREEN VOLTAGE	135	135	VOLTS
CONTROL GRID VOLTAGE[A]	-13.5	-14	VOLTS
PEAK AF SIGNAL VOLTAGE	13.5	14	VOLTS
ZERO-SIGNAL PLATE CURRENT	58	61	MA.
ZERO-SIGNAL SCREEN CURRENT (NOMINAL)	3.5	2.2	MA.
MAXIMUM-SIGNAL PLATE CURRENT	60	66	MA.
MAXIMUM-SIGNAL SCREEN CURRENT (NOMINAL)	11.5	9	MA.
PLATE RESISTANCE APPROX.	9300	18300	OHMS
TRANSCONDUCTANCE	7000	7100	μMHOS
LOAD RESISTANCE	2000	2600	OHMS
TOTAL HARMONIC DISTORTION	10	10	PER CENT
POWER OUTPUT	3.6	6.0	WATTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER MAXIMUM RATED CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION.

PLATE 1094-2

JULY 28 1941

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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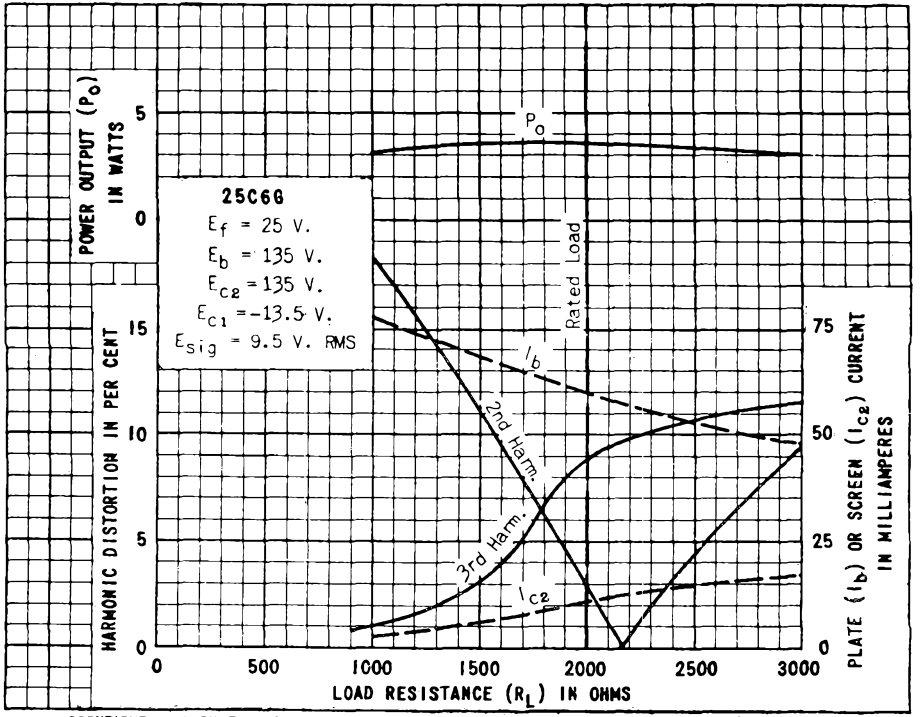
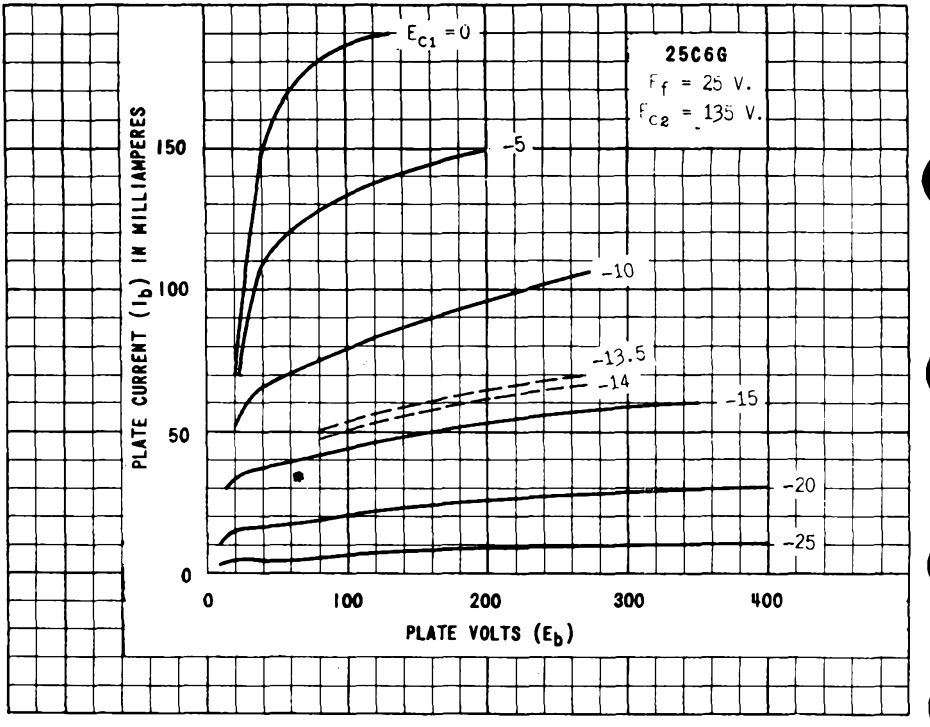


PLATE 1095-1

25C6G


25C6G
E_f = 25 V.
E_{c2} = 135 V.
E_{c1} = 0
-5
-10
-13.5
-14
-15
-20
-25
PLATE CURRENT (I_b) IN MILLIAMPERES
150
100
50
0
0
100
200
300
400
PLATE VOLTS (E_b)

TENTATIVE DATA

25D8GT

TUNG-SOL

DIODE TRIODE
REMOTE CUT-OFF PENTODE

PHYSICAL SPECIFICATIONS

EMITTER UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE INTERMEDIATE-8 PIN OCTAL	PIN 1 CATHODES*	PIN 7 TRIODE HEATER
CAP SKIRTED MINIATURE-STYLE C	PIN 2 PENT. HEATER	PIN 8 DIODE PLATE
BULB T-9	PIN 3 PENT. PLATE	
MAXIMUM DIAMETER 1 5/16"	PIN 4 PENT. GRID #2	
MAXIMUM OVERALL LENGTH 3 9/16"	PIN 5 TRIODE GRID	TOP CAP PENT. GRID #1
MAXIMUM SEATED HEIGHT 3"	PIN 6 TRIODE PLATE	

*DIODE-TRIODE CATHODE TIED TO PENTODE CATHODE

RATINGS

HEATER OR FILAMENT VOLTAGE (AC OR DC)	25.0	VOLTS
HEATER OR FILAMENT CURRENT	0.15	AMP.
MAXIMUM PLATE VOLTAGE		VOLTS

DIRECT INTERELECTRODE CAPACITANCES

	PENTODE	TRIODE	
CONTROL GRID TO CATHODE	5.2	3.7	μμf
PLATE TO CATHODE	10.0	4.5	μμf
CONTROL GRID TO PLATE	0.015 MAX.	2.5	μμf
PENTODE CONTROL GRID TO TRIODE GRID	0.01 MAX.		μμf
PENTODE CONTROL GRID TO TRIODE PLATE	0.02 MAX.		μμf
PENTODE PLATE TO TRIODE GRID	0.10 MAX.		μμf

OPERATING CONDITIONS AND CHARACTERISTICS

TRIODE SECTION – CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	VOLTS
GRID VOLTAGE	-1	VOLT
PLATE CURRENT	0.5	MA.
PLATE RESISTANCE	91000	OHMS
TRANSCONDUCTANCE	1100	μMHOS
AMPLIFICATION FACTOR	100	

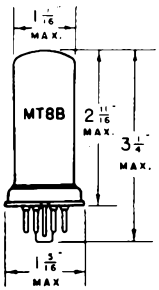
PENTODE SECTION – CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	VOLTS
SCREEN VOLTAGE (GRID #2)	100	VOLTS
CONTROL GRID VOLTAGE (GRID #1)	-3	VOLTS
PLATE CURRENT	8.5	MA.
SCREEN CURRENT	2.7	MA.
PLATE RESISTANCE APPROX.	200 000	OHMS
TRANSCONDUCTANCE	1900	μMHOS
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 2 μMHOS APPROX.	-35	VOLTS

PLATE T842-1

SEPT. 9 1940

TUNG-SOL

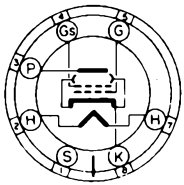


SMALL 7 PIN OCTAL BASE

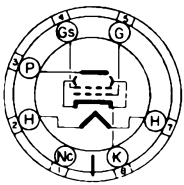
BEAM POWER AMPLIFIER

UNIPOTENTIAL CATHODE

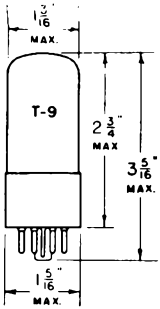
HEATER
25 VOLTS 0.3 AMPERE
AC OR DC



7AC
BOTTOM VIEW



G-7AC
BOTTOM VIEW



INTERMEDIATE 7 PIN OCTAL BASE

THE TUNG-SOL 25L6 AND 25L6GT/G ARE DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AC-DC RECEIVERS. THEY DELIVER A HIGH POWER OUTPUT WITH HIGH POWER SENSITIVITY FROM LOW SUPPLY VOLTAGES.

RATINGS

MAXIMUM PLATE VOLTAGE	200	VOLTS
MAXIMUM SCREEN VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	10	WATTS
MAXIMUM SCREEN DISSIPATION	1.25	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	110	200	VOLTS
SCREEN VOLTAGE	110	110	VOLTS
CONTROL GRID VOLTAGE[A]	-7.5	-8	VOLTS
PEAK AF SIGNAL VOLTAGE	7.5	8	VOLTS
ZERO-SIGNAL PLATE CURRENT	49	50	MA.
ZERO-SIGNAL SCREEN CURRENT - NOMINAL	4	1.5	MA.
MAXIMUM-SIGNAL PLATE CURRENT	50	55	MA.
MAXIMUM-SIGNAL SCREEN CURRENT - NOMINAL	11	6	MA.
PLATE RESISTANCE APPROX.	10 000	35 000	OHMS
TRANSCONDUCTANCE	8200	8250	μMHOS
LOAD RESISTANCE	2000	3000	OHMS
TOTAL HARMONIC DISTORTION	10	10	PER CENT
POWER OUTPUT	2.2	4.7	WATTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER MAXIMUM RATED CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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PLATE 1016-3
APR. 21 1941

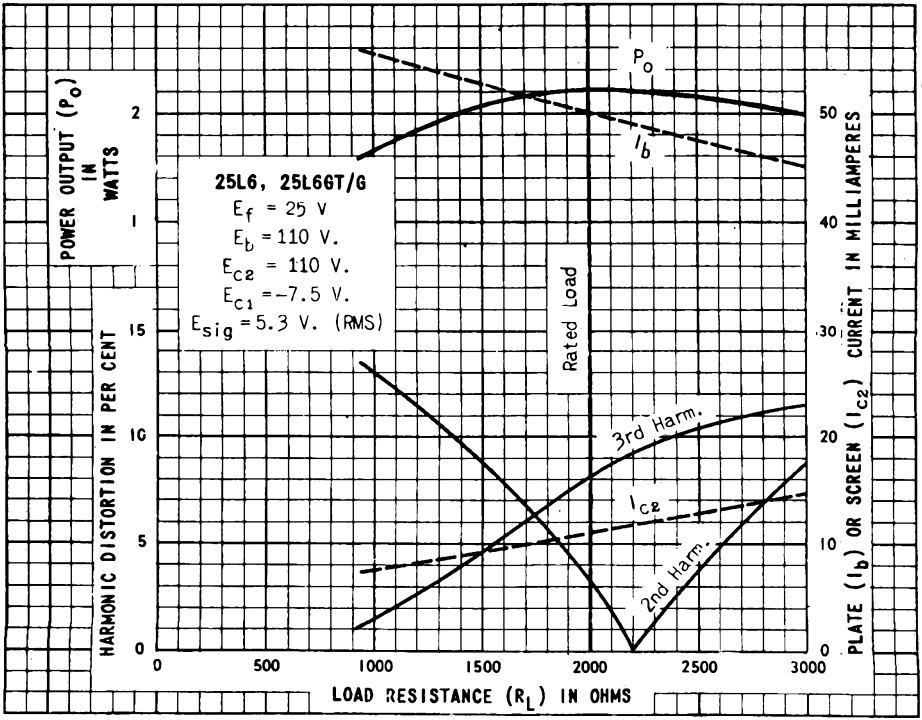
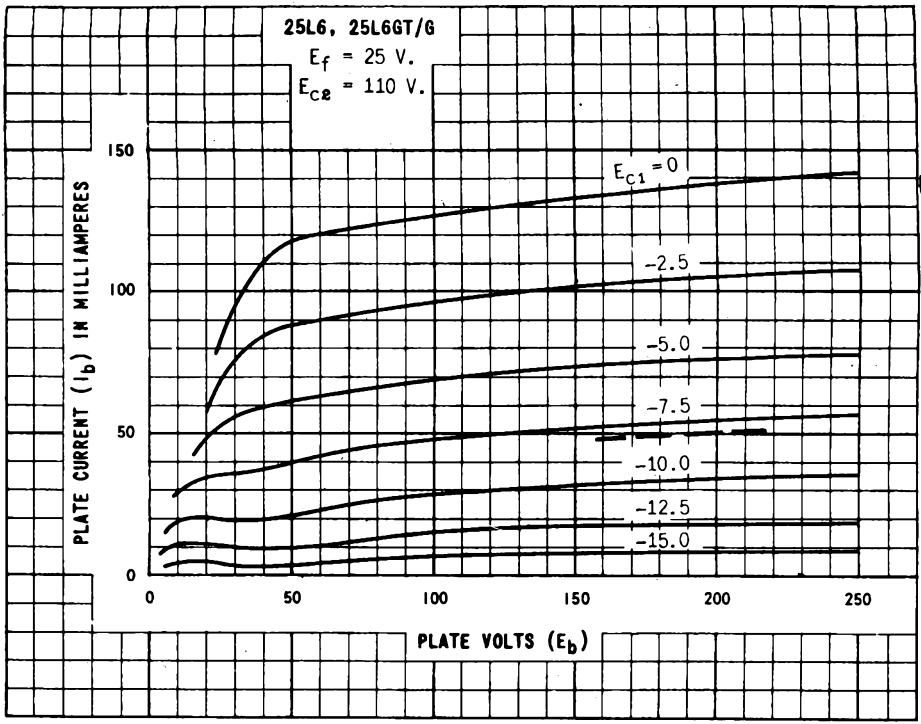
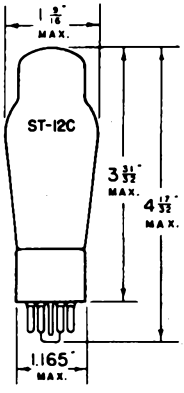


PLATE
1017-2
APR. 2
1941

25L6, 25L6GT/G



TUNG-SOL

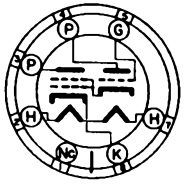


DYNAMIC COUPLED POWER AMPLIFIER

UNIPOTENTIAL CATHODES

HEATER
25 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



G-7Wa

SMALL 7 PIN OCTAL BASE

THE TUNG-SOL 25N6G CONSISTS OF TWO DYNAMICALLY COUPLED TRIODES AND IS DESIGNED FOR SERVICE IN THE POWER OUTPUT STAGE OF AC-DC RECEIVERS. ALL NECESSARY BIASES ARE SUPPLIED INTERNALLY. ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 25B5.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

OUTPUT PLATE (3) VOLTAGE	110	180 MAX.	VOLTS
INPUT PLATE (4) VOLTAGE	110	100 P	VOLTS
INPUT GRID (5) VOLTAGE	0	0	VOLTS
GRID CIRCUIT RESISTANCE MAX.	1	1	MEGOHM
OUTPUT PLATE CURRENT	45	46	MA.
INPUT PLATE CURRENT	7	5.8	MA.
TRANSCONDUCTANCE	2200	2300	μMHOS
AMPLIFICATION FACTOR	25	35	
LOAD RESISTANCE	2000	4000	OHMS
SIGNAL VOLTAGE (RMS) S	21	21	VOLTS
TOTAL HARMONIC DISTORTION	9	9	PER CENT
POWER OUTPUT	2.0	3.8	WATTS

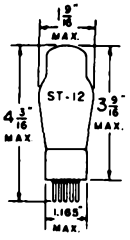
(3) BASE PIN #3 (4) BASE PIN #4 (5) BASE PIN #5

S FOR RATED POWER OUTPUT

P BOTH PLATES MAY BE OPERATED AT 180 VOLTS IF THE GRID IS BIASED TO -20 VOLTS. FIXED OR SELF BIAS MAY BE USED. FOR SELF BIAS THE CATHODE RESISTOR SHOULD BE 400 OHMS.

PLATE 215-1

TUNG-SOL



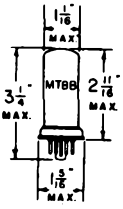
GLASS BULB
SMALL 6 PIN BASE
25Z5

TWIN DIODE HIGH VACUUM RECTIFIER

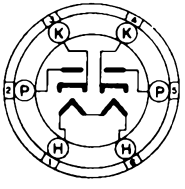
VOLTAGE DOUBLER

UNIPOTENTIAL CATHODES

HEATER
25 VOLTS 0.3 AMPERE
AC OR D



METAL SHELL
7 PIN OCTAL BASE
25Z6



6E
BOTTOM VIEW
25Z5

7Q
BOTTOM VIEW
25Z6

THE TUNG-SOL 25Z5 AND 25Z6 ARE DESIGNED PRIMARILY FOR SERVICE AS POWER RECTIFIERS IN AC-DC RECEIVERS. TWO SEPARATE RECTIFIER SECTIONS PERMIT USING THE TUBE AS A VOLTAGE DOUBLER, FULL WAVE RECTIFIER OR HALF WAVE RECTIFIER. FOR HALF WAVE OPERATION THE TWO SECTIONS MAY BE OPERATED SEPARATELY, OR IN PARALLEL TO REDUCE TUBE DROP. THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF THE 25Z6GT/G.

RATINGS

MAXIMUM AC PLATE VOLTAGE PER PLATE (RMS)	235	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	350	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	700	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	450	MA.
TUBE VOLTAGE DROP AT 150 MA. PER PLATE	22	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

VOLTAGE DOUBLER

	HALF WAVE	FULL WAVE	
AC VOLTAGE PER PLATE (RMS) MAX.	117	117	VOLTS
DC OUTPUT CURRENT MAX.	75	75	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.[A]	30	15	OHMS

[A] WHEN FILTER CONDENSER LARGER THAN 40 μFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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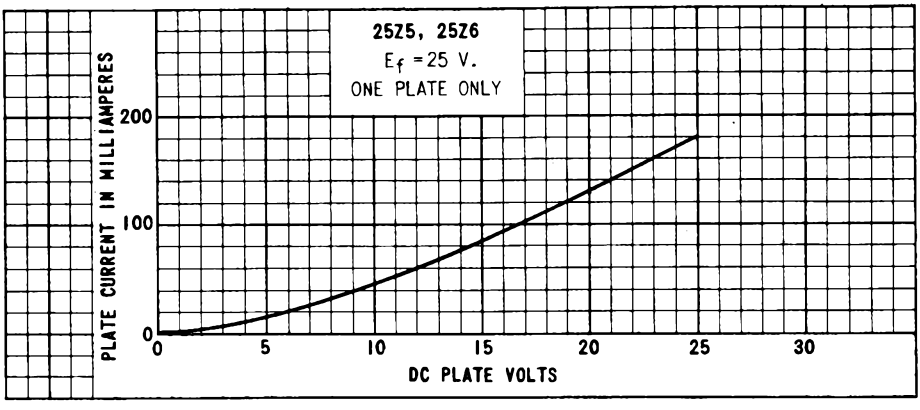
PLATE 928-3

DEC. 30 1940

TUNG-SOL

HALF-WAVE RECTIFIER

AC VOLTAGE PER PLATE (RMS) MAX.	117	150	235 MAX.	VOLTS
DC OUTPUT CURRENT PER PLATE MAX.	75	75	75	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.-A	15	40	100	OHMS



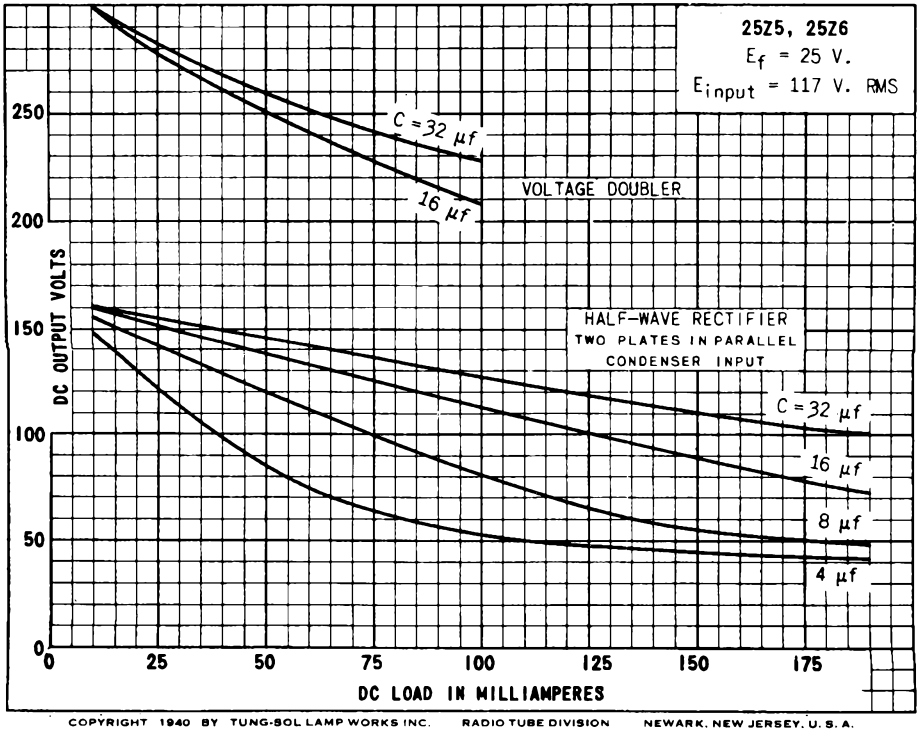
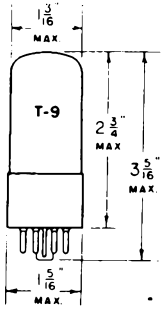


PLATE 929-3

TUNG-SOL

TWIN DIODE HIGH VACUUM RECTIFIER

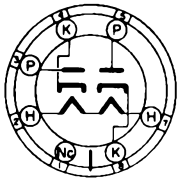
VOLTAGE DOUBLER



UNIPOTENTIAL CATHODES

HEATER
25 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



G-7Qa
BOTTOM VIEW

INTERMEDIATE 7 PIN OCTAL BASE

THE TUNG-SOL 25Z6GT/G IS DESIGNED PRIMARILY FOR SERVICE AS A POWER RECTIFIER IN AC – DC RECEIVERS. TWO SEPARATE RECTIFIER SECTIONS PERMIT USING THE TUBE AS A VOLTAGE DOUBLER, FULL WAVE RECTIFIER OR HALF WAVE RECTIFIER. FOR HALF-WAVE OPERATION THE TWO SECTIONS MAY BE OPERATED SEPARATELY, OR IN PARALLEL TO REDUCE TUBE DROP. ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF THE 25Z5 AND 25Z6.

RATINGS

MAXIMUM AC PLATE VOLTAGE (RMS)	235	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	350	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	700	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	450	MA.
TUBE VOLTAGE DROP AT 150 MA. PER PLATE	22	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

VOLTAGE DOUBLER

	HALF WAVE	FULL WAVE	
AC VOLTAGE PER PLATE (RMS) MAX.	117	117	VOLTS
DC OUTPUT CURRENT MAX.	75	75	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.[A]	30	15	OHMS

NOTE: THIS DOUBLE-BRANDED TUBE, 25Z6GT/G, REPLACES EITHER THE 25Z6G OR THE 25Z6GT.

[A] WHEN FILTER CONDENSERS LARGER THAN 40 MFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 930-9

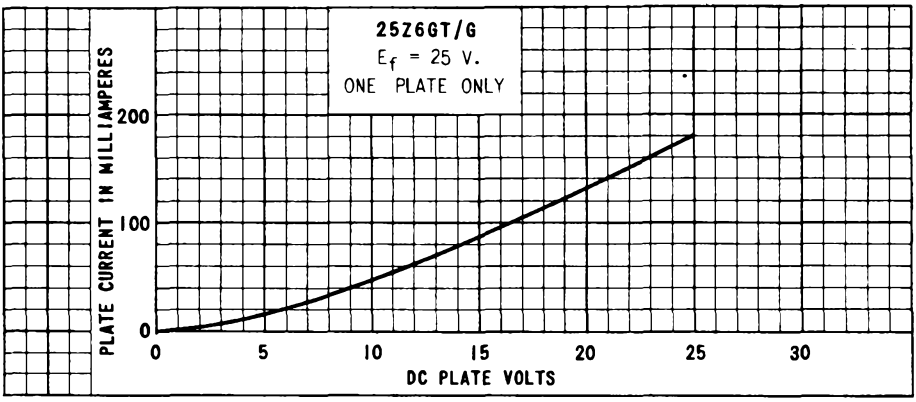
DEC.-30 1940

25Z6GT/G

TUNG-SOL

HALF-WAVE RECTIFIER

AC VOLTAGE PER PLATE (RMS)	117	150	235 MAX.	VOLTS
DC OUTPUT CURRENT PER PLATE MAX.	75	75	75	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.Ω	15	40	100	OHMS



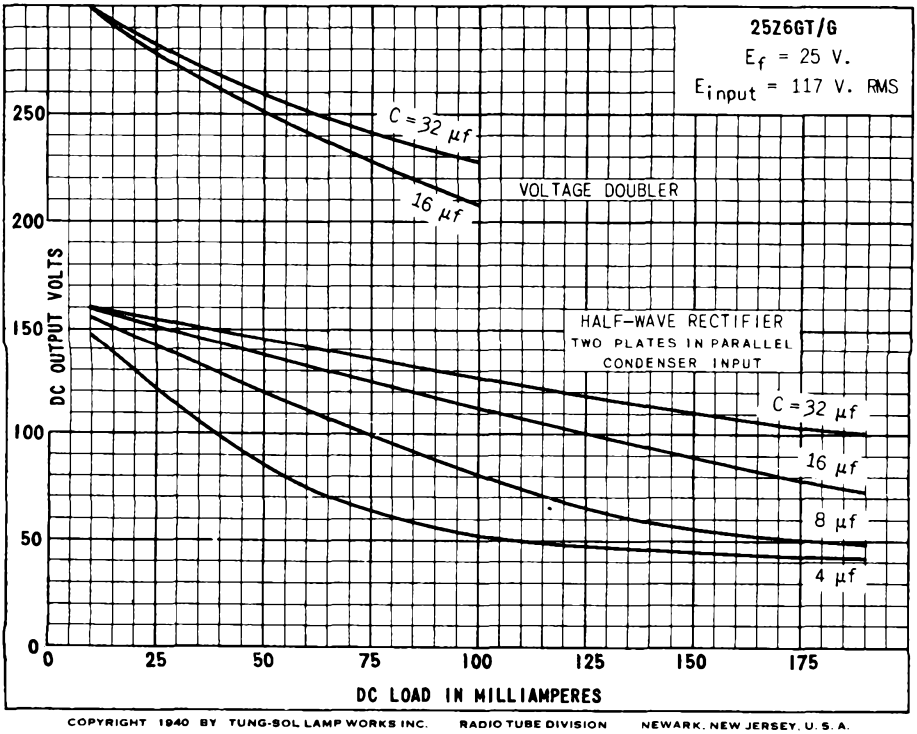
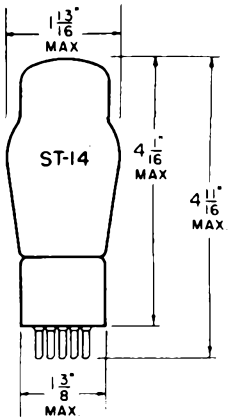


PLATE 931-4

TUNG-SOL

TRIODE AMPLIFIER

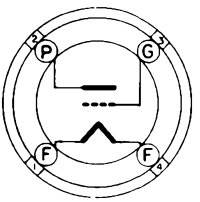


GLASS BULB

COATED FILAMENT

FILAMENT
1.5 VOLTS 1.05 AMPERES
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MEDIUM
4 PIN BASE

THE 26 IS A TRIODE AMPLIFIER INTENDED PRIMARILY FOR USE IN RF AND AF STAGES OF AC OPERATED RECEIVERS.

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

FILAMENT VOLTAGE	1.5	VOLTS
FILAMENT CURRENT	1.05	AMP.
MAXIMUM PLATE VOLTAGE	180	VOLTS

DIRECT INTERELECTRODE CAPACITANCES
WITH NO EXTERNAL SHIELD

GRID TO PLATE	8.1	μμf
INPUT	2.8	μμf
OUTPUT	2.5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	90	135	180	VOLTS
GRID VOLTAGE[A]	-7	-10	-14.5	VOLTS
PLATE CURRENT	2.9	5.5	6.2	MA.
PLATE RESISTANCE	8900	7600	7300	OHMS
TRANSCONDUCTANCE	935	1100	1150	μMHOS
AMPLIFICATION FACTOR	8.3	8.3	8.3	

[A] MEASURED FROM MIDPOINT OF AC OPERATED FILAMENT.

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PLATE
1757
NOV. 1,
1946

→ INDICATES A CHANGE OR ADDITION.

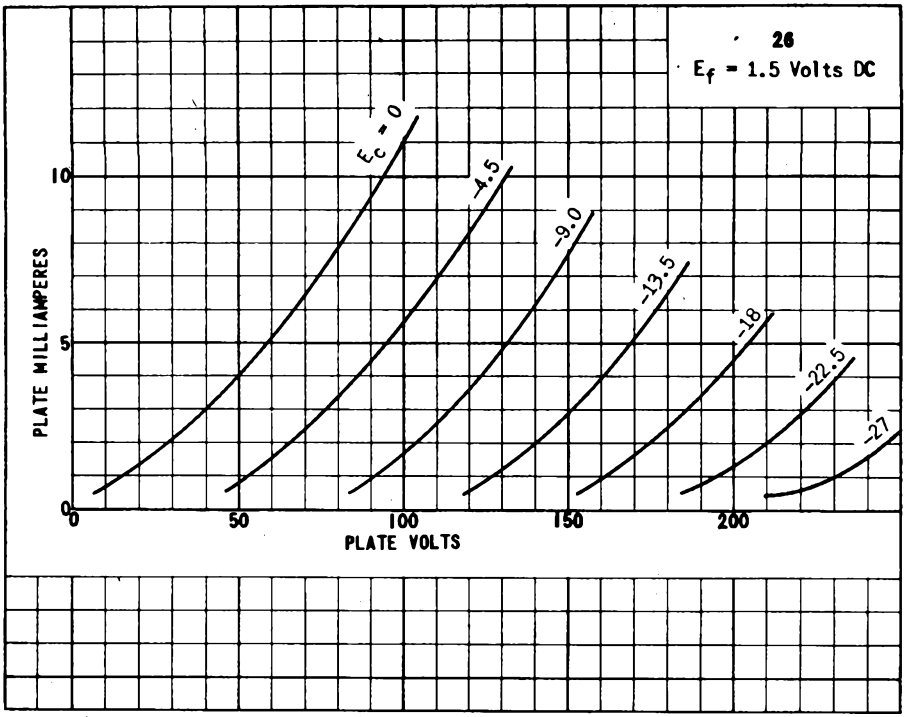

PLATE
1758
NOV. 1,
1946

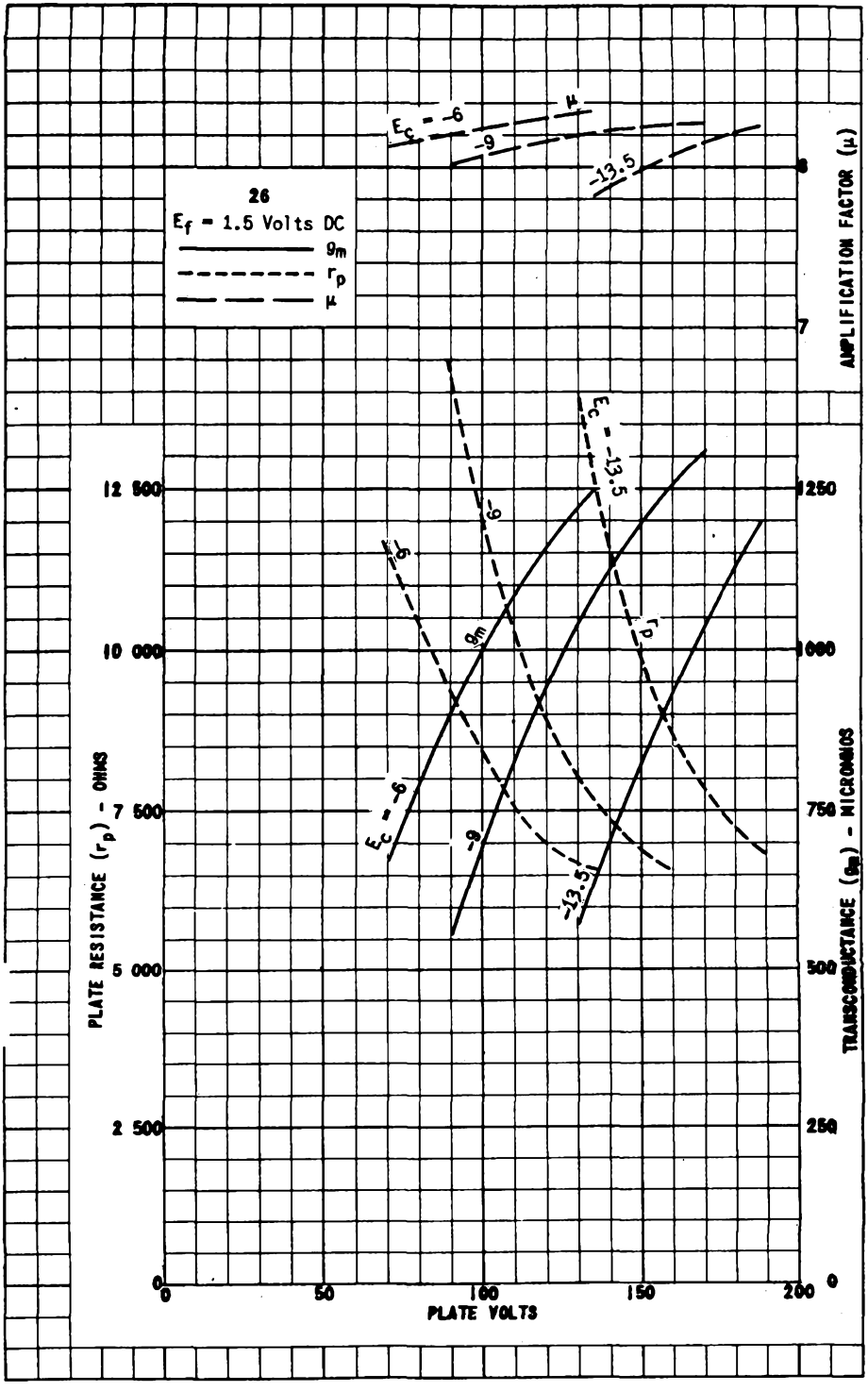

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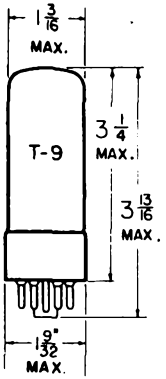
PLATE 1759
NOV. 1, 1946

TUNG-SOL

DOUBLE BEAM PENTODE

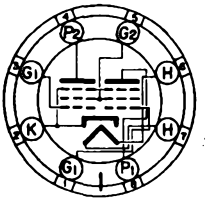


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
26.5 VOLTS 0.6 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
INTERMEDIATE SHELL
8 PIN OCTAL

THE 26A7GT IS A CATHODE TYPE TWIN BEAM POWER AMPLIFIER USING THE OCTAL BASE CONSTRUCTION. IT IS INTENDED FOR USE AS A PUSH-PULL OR PARALLEL CONNECTED POWER OUTPUT TUBE IN AIRCRAFT OR MOBILE SERVICE WHERE BOTH THE PLATE AND HEATER SUPPLY IS LIMITED TO 28 VOLTS.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.
WITH NO EXTERNAL SHIELD

	EACH UNIT	
GRID TO PLATE: (G TO P)	1.2	μμf
INPUT: G_1 TO (H+K&G_3+G_2)	16	μμf
OUTPUT: P TO (H+K&G_3+G_2)	13	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	26.5	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	~~AMP.~~ VOLTS
MAXIMUM PLATE VOLTAGE	50	VOLTS
MAXIMUM GRID #2 VOLTAGE	50	VOLTS
MAXIMUM PLATE DISSIPATION	2	WATTS
MAXIMUM GRID #2 DISSIPATION	0.5	WATT
MAXIMUM GRID #1 CIRCUIT RESISTANCE (FIXED BIAS)[A]	0.1	MEGOHM
MAXIMUM GRID #1 CIRCUIT RESISTANCE (SELF BIAS)	0.5	MEGOHM

[A] WHEN THE PLATE VOLTAGE AND THE GRID #2 VOLTAGE DO NOT EXCEED THE MAXIMUM DESIGN VALUE OF 26.5 VOLTS, THE DC RESISTANCE IN THE GRID CIRCUIT MAY BE AS HIGH AS 0.5 MEGOHM WITH GRID-RESISTOR BIAS.

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PLATE 2027
JUNE 1, 1948

CONTINUED ON FOLLOWING PAGE

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

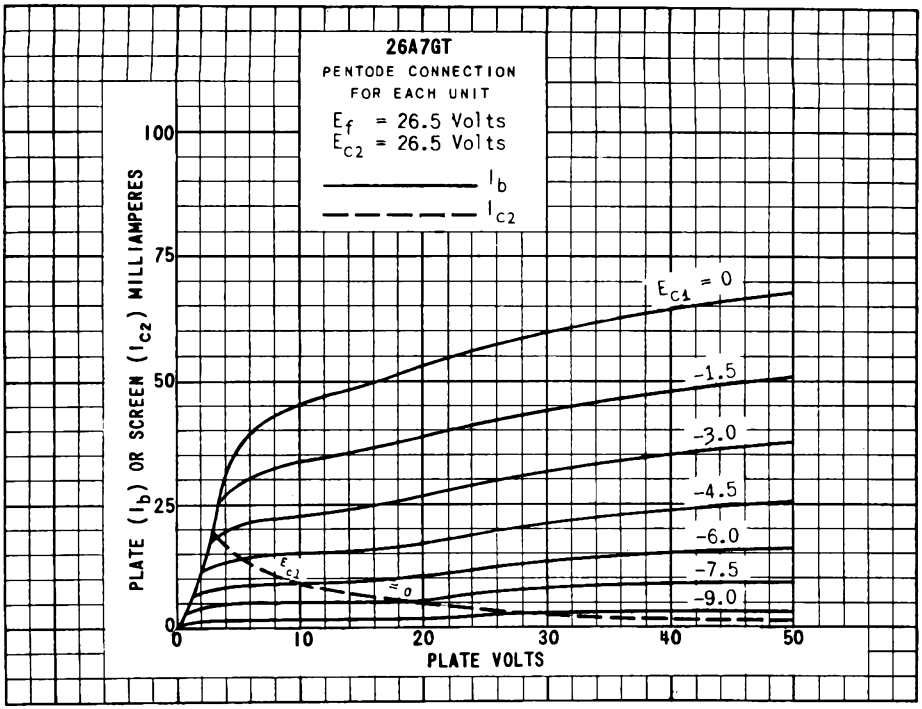
CLASS A_1 AMPLIFIER - EACH UNIT

HEATER VOLTAGE	26.5	VOLTS
HEATER CURRENT	0.6	AMP.
PLATE VOLTAGE	26.5	VOLTS
GRID #2 VOLTAGE	26.5	VOLTS
GRID #1 VOLTAGE	-4.5	VOLTS
PEAK AF SIGNAL VOLTAGE	4.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	20	MA.
ZERO-SIGNAL GRID #2 CURRENT (NOMINAL)	2	MA.
MAXIMUM-SIGNAL PLATE CURRENT	20.5	MA.
MAXIMUM-SIGNAL GRID #2 CURRENT (NOMINAL)	5.5	MA.
PLATE RESISTANCE (APPROX.)	2 500	OHMS
TRANSCONDUCTANCE	5 500	µMHOS
LOAD RESISTANCE	1 500	OHMS
TOTAL HARMONIC DISTORTION	7	PERCENT
MAXIMUM-SIGNAL POWER OUTPUT	200	MW

PUSH-PULL CLASS AB_1 AMPLIFIER - BOTH UNITS

HEATER VOLTAGE	26.5	VOLTS
HEATER CURRENT	0.6	AMP.
PLATE VOLTAGE	26.5	VOLTS
GRID #2 VOLTAGE	26.5	VOLTS
GRID #1 VOLTAGE	-7	VOLTS
PEAK AF GRID TO GRID VOLTAGE	14	VOLTS
ZERO-SIGNAL PLATE CURRENT	19	MA.
ZERO-SIGNAL GRID #2 CURRENT (APPROX.)	2	MA.
MAXIMUM-SIGNAL PLATE CURRENT	30	MA.
MAXIMUM-SIGNAL GRID #2 CURRENT (APPROX.)	8.5	MA.
EFFECTIVE LOAD RESISTANCE (PLATE TO PLATE)	2 500	OHMS
TOTAL HARMONIC DISTORTION	5	PERCENT
MAXIMUM-SIGNAL POWER OUTPUT	500	MW

PLATE 2028
JUNE 1, 1948



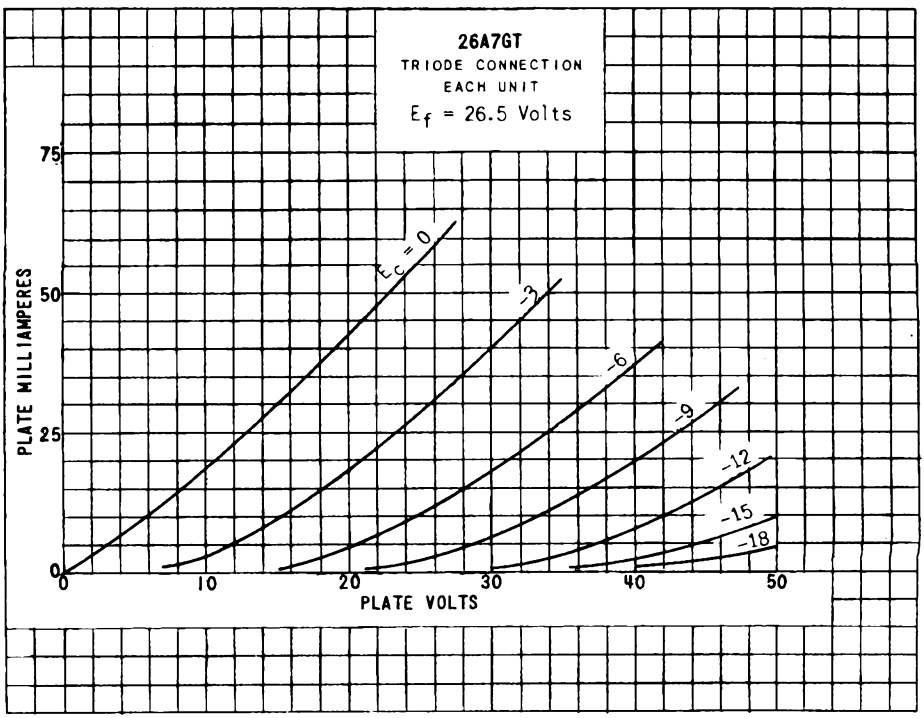


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PLATE
2029
JUNE 1,
1948

26A7GT

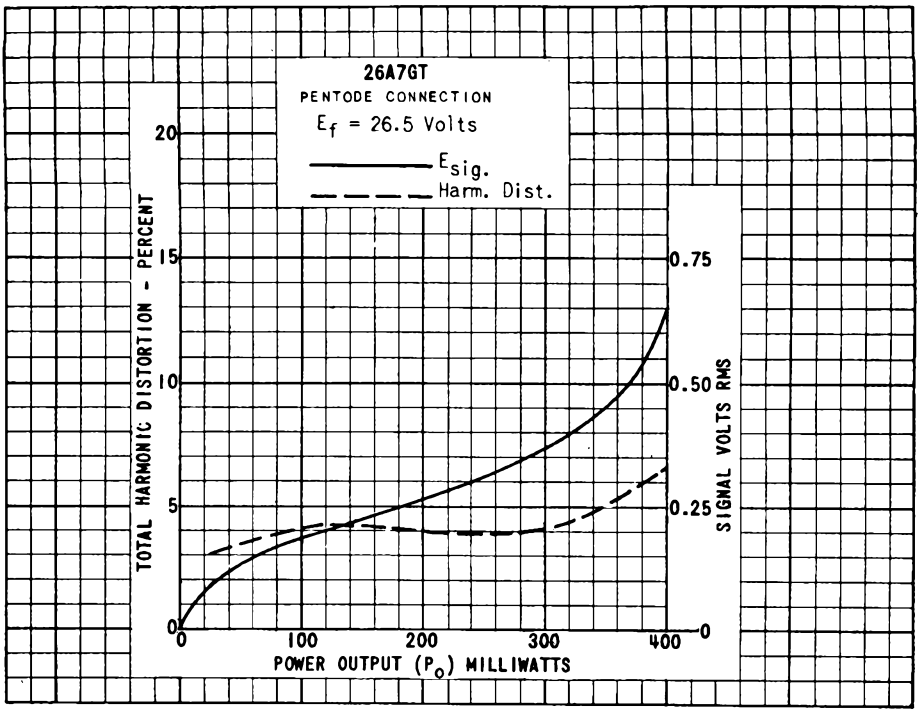
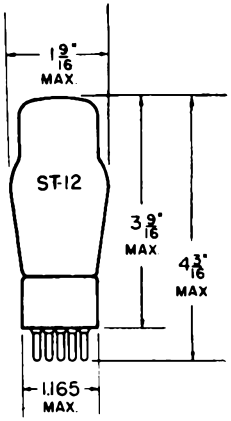


PLATE
2030
JUNE 1,
1948

 ELECTRONIC TUBE DIVISION NEWARK, NEW JERSEY, U. S. A.

TRIODE DETECTOR AMPLIFIER



GLASS BULB

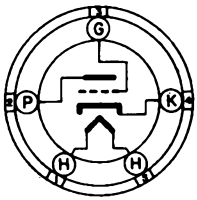
COATED UNIPOTENTIAL CATHODE

HEATER

2.5 VOLTS 1.75 AMPERES

AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW

SMALL
5 PIN BASE

THE 27 IS A GENERAL PURPOSE TRIODE DESIGNED FOR SERVICE AS AN OSCILLATOR, DETECTOR OR AMPLIFIER.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	2.5	VOLTS
HEATER CURRENT	1.75	AMP.
MAXIMUM PLATE VOLTAGE	275	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

GRID TO PLATE	3.3	μμf
INPUT	3.1	μμf
OUTPUT	2.3	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	90	135	180	250	VOLTS
GRID VOLTAGE	-6	-9	-13.5	-21	VOLTS
PLATE CURRENT	2.7	4.5	5.0	5.2	MA.
PLATE RESISTANCE	11 000	9 000	9 000	9 250	OHMS
TRANSCONDUCTANCE	820	1 000	1 000	975	μMHOS
AMPLIFICATION FACTOR	9	9	9	9	

DETECTOR

	BIASED		GRID LEAK	
PLATE VOLTAGE	250	275	45	VOLTS
GRID VOLTAGE (APPROX.)	-30	-35	RETURN TO CATHODE	VOLTS
PLATE CURRENT[A]	ADJUSTED TO 0.2 MA. WITH NO INPUT SIGNAL		---	
GRID RESISTOR:				
MINIMUM	---	---	1	MEGOHM
MAXIMUM	---	---	5	MEGOHMS
GRID CONDENSER	---	---	250	μμf

[A] MAXIMUM DC PLATE CURRENT SHOULD BE LIMITED TO 5.0 MA.

→ INDICATES A CHANGE OR ADDITION.

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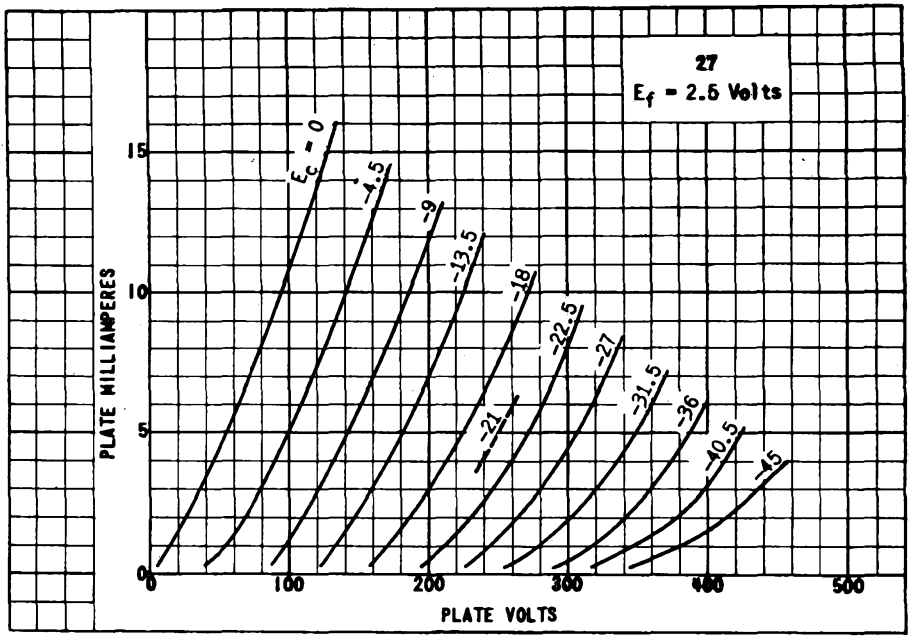
PLATE
1760
NOV. 1,
1946



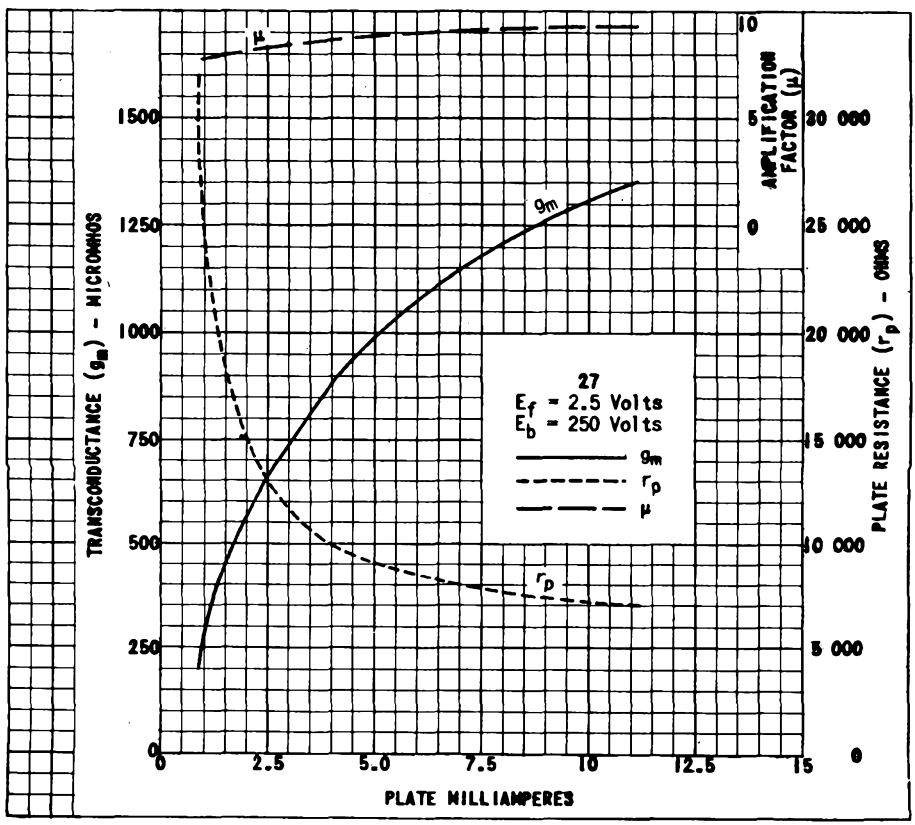
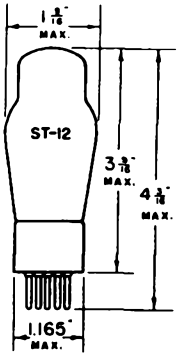


PLATE 1761
NOV. 2, 1946

TRIODE AMPLIFIER

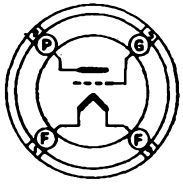


COATED FILAMENT

2.0 VOLTS 0.06 AMPERE
DC

GLASS BULB

SMALL 4 PIN BASE



4D

THE TUNG-SOL 30 IS A GENERAL PURPOSE FILAMENT TYPE TRIODE DESIGNED FOR SERVICE IN BATTERY OPERATED RECEIVERS. WITH THE EXCEPTION OF CAPACITANCES ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 1H4G.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	90	135	180 MAX.	VOLTS
GRID VOLTAGE	-4.5	-9.0	-13.5	VOLTS
GRID CIRCUIT RESISTANCE MAX.	2	2	2	MEGOHMS
PLATE CURRENT	2.5	3.0	3.1	MA.
PLATE RESISTANCE	11 000	10 300	10 300	OHMS
TRANSCONDUCTANCE	850	900	900	μMHOS
AMPLIFICATION FACTOR	9.3	9.3	9.3	

DETECTOR

	BIASED			GRID LEAK	
PLATE VOLTAGE	90	135	180 MAX.	45 MAX.	VOLTS
GRID VOLTAGE	-9 A	-13.5 A	-18 A	RETURN TO (+) FILAMENT	VOLTS
PLATE CURRENT P	ADJUST TO 0.2 MA. WITH NO INPUT SIGNAL			–	
GRID LEAK	–	–	–	1 TO 5	MEGOHMS
GRID CONDENSER	–	–	–	250	μμf

A APPROXIMATE GRID RETURN TO NEGATIVE END OF FILAMENT.

P WITH MAXIMUM SIGNAL THE AVERAGE DC PLATE CURRENT SHOULD NOT EXCEED 2.0 MA.

PLATE
186-1

CONTINUED NEXT PAGE

CLASS B_2 AMPLIFIER

PLATE VOLTAGE	180 MAX.	VOLTS
PEAK PLATE CURRENT PER TUBE	50 MAX.	MA.
ZERO-SIGNAL PLATE CURRENT PER TUBE	1.5 MAX.	MA.

TYPICAL OPERATING CONDITIONS

VALUES ARE FOR TWO TUBES

PLATE VOLTAGE	157.5	VOLTS
GRID VOLTAGE	-15	VOLTS
ZERO-SIGNAL PLATE CURRENT	1	MA.
LOAD RESISTANCE PER TUBE	2000	OHMS
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	8000	OHMS
PEAK POWER INPUT GRID TO GRID	260 MAX.	MILLIWATTS
POWER OUTPUT[D] (6% TO 7% DISTORTION)	2.1	WATTS

[D] WITH ONE TYPE 30 AS DRIVER, OPERATED WITH PLATE VOLTAGE = 157.5 VOLTS, GRID VOLTAGE = -11.3 VOLTS, PLATE LOAD OF APPROXIMATELY 18,000 OHMS, AND INPUT TRANSFORMER RATIO, PRIMARY TO ONE HALF SECONDARY = 1.165.

DIRECT INTERELECTRODE CAPACITANCES

GRID TO FILAMENT	3.0	μμf
PLATE TO FILAMENT	2.2	μμf
GRID TO PLATE	6.0	μμf

PLATE 187-1

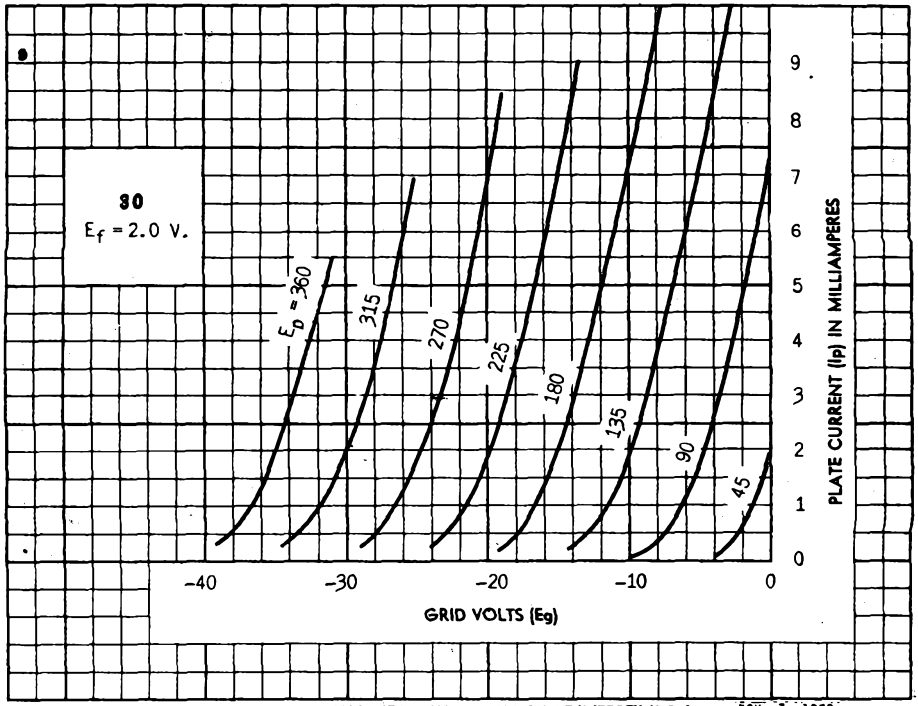


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PLATE
158-1

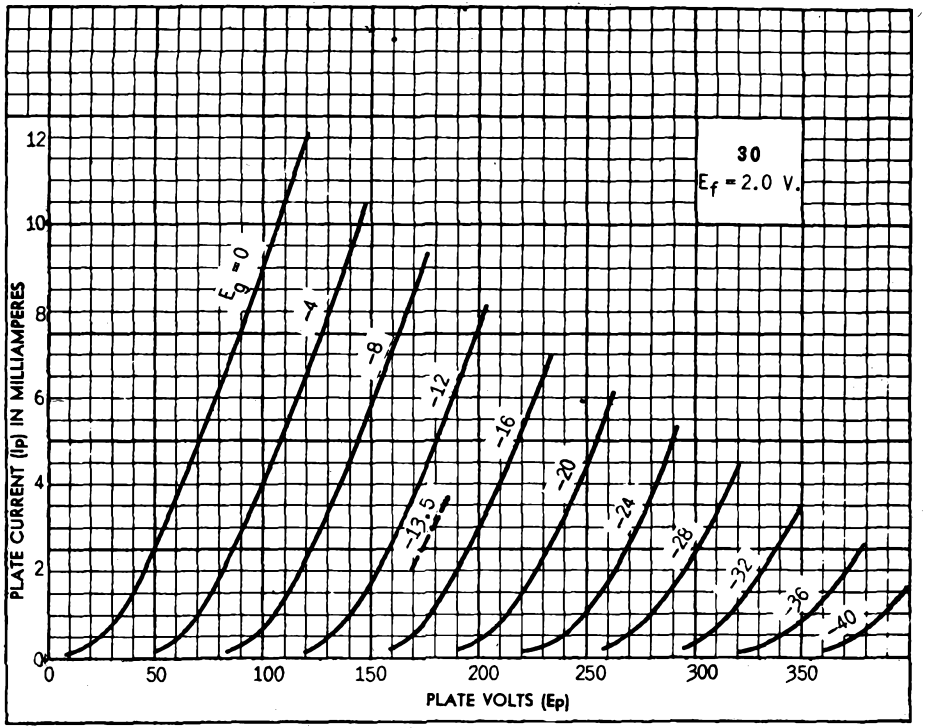
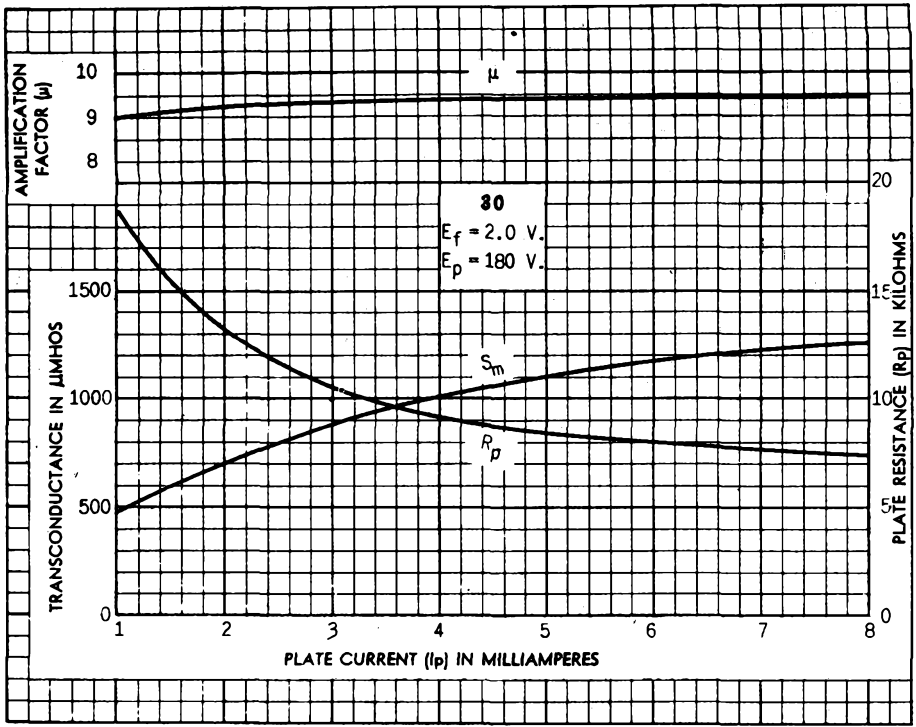
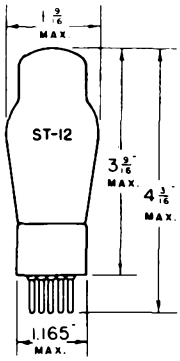

30
E_f = 2.0 V.
E_g = 0
-4
-8
-12
-13.5
-16
-20
-24
-28
-32
-36
-40
PLATE CURRENT (Ip) IN MILLIAMPERES
PLATE VOLTS (Ep)
0
2
4
6
8
10
12
0
50
100
150
200
250
300
350

PLATE
159-1


AMPLIFICATION FACTOR (μ)
10
9
8
μ
30
E_f = 2.0 V.
E_p = 180 V.
1500
1000
500
0
TRANSCONDUCTANCE IN μMHOS
S_m
R_p
20
15
10
5
0
PLATE RESISTANCE (Rp) IN KILOHMS
1
2
3
4
5
6
7
8
PLATE CURRENT (Ip) IN MILLIAMPERES



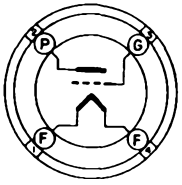
TRIODE POWER AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.13 AMPERE
DC

GLASS BULB

SMALL 4 PIN BASE



4D

BOTTOM VIEW

THE TUNG-SOL 31 IS A TRIODE POWER AMPLIFIER DESIGNED FOR BATTERY OPERATION.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	135	180	VOLTS
GRID VOLTAGE [A]	-22.5	-30	VOLTS
GRID CIRCUIT RESISTANCE [G]	0.5 MAX.	0.5 MAX.	MEGOHM
PLATE CURRENT	8	12.3	MA.
PLATE RESISTANCE	4100	3600	OHMS
TRANSCONDUCTANCE	925	1050	μMHOS
AMPLIFICATION FACTOR	3.8	3.8	
LOAD RESISTANCE	7000	5700	OHMS
POWER OUTPUT	0.185	0.375	WATT

[A] RETURN TO NEGATIVE FILAMENT (PIN #4) [G] WITH FIXED BIAS

DIRECT INTERELECTRODE CAPACITANCES

GRID TO FILAMENT	3.6	μμf
PLATE TO FILAMENT	2.8	μμf
GRID TO PLATE	5.5	μμf

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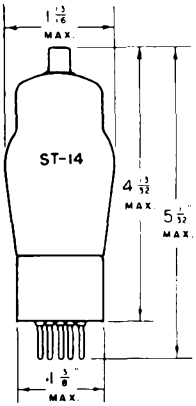
PLATE 544-2

AUG. 14 1939

TUNG-SOL



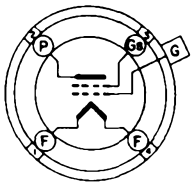
TETRODE AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.06 AMPERE
DC

GLASS BULB

MEDIUM 4 PIN BASE



4K

BOTTOM VIEW

THE TUNG-SOL 32 IS DESIGNED FOR SERVICE AS A GENERAL PURPOSE SHARP CUT-OFF TETRODE VOLTAGE AMPLIFIER IN BATTERY OPERATED RECEIVERS.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	135	180 MAX.	VOLTS
SCREEN VOLTAGE MAX.	67.5	67.5	VOLTS
CONTROL GRID VOLTAGE A	-3	-3	VOLTS
GRID CIRCUIT RESISTANCE MAX.	2	2	MEGOHMS
PLATE CURRENT	1.7	1.7	MA.
SCREEN CURRENT MAX.	0.4	0.4	MA.
PLATE RESISTANCE APPROX.	0.95	1.2	MEGOHMS
TRANSCONDUCTANCE APPROX.	640	650	μMHOS
AMPLIFICATION FACTOR APPROX.	610	780	

DETECTOR

	BIASED		GRID LEAK	
PLATE SUPPLY VOLTAGE	135	180	135	VOLTS
SCREEN VOLTAGE	45	67.5 MAX.	45 MAX.	VOLTS
PLATE RESISTOR P	0.1	0.1	0.1	MEGOHM
GRID VOLTAGE	-4.5 A	-6 A	RETURN TO + FIL. (PIN #1)	VOLTS
PLATE CURRENT	ADJUST TO 0.2 MA. WITH NO INPUT SIGNAL		—	
GRID LEAK	—	—	1 TO 5	MEGOHMS
GRID CONDENSER	—	—	250	μμf

P OR EQUIVALENT IMPEDANCE

DIRECT INTERELECTRODE CAPACITANCES

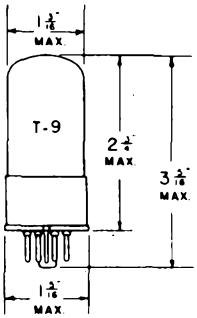
CONTROL GRID TO FILAMENT	5.5	μμf
PLATE TO FILAMENT	11	μμf
CONTROL GRID TO PLATE S	0.015 MAX.	μμf

S WITH SHIELD

A RETURN TO NEGATIVE FILAMENT (PIN #4)

PLATE 545-2

TUNG-SOL



RECTIFIER
BEAM POWER AMPLIFIER

UNIPOTENTIAL CATHODES

HEATER
32.5 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

8F

BOTTOM VIEW

8 PIN OCTAL BASE

THE TUNG-SOL 32L7GT COMBINES A HALF WAVE POWER RECTIFIER AND OUTPUT POWER AMPLIFIER IN A SINGLE BULB. IT IS DESIGNED FOR SERVICE IN AC-DC RECEIVERS.

OPERATING CONDITIONS AND CHARACTERISTICS

AMPLIFIER SECTION - CLASS A1

PLATE VOLTAGE	90	90	VOLTS
SCREEN VOLTAGE	90	90	VOLTS
CONTROL GRID VOLTAGE	-5	-7	VOLTS
PLATE CURRENT	38	27	MA.
SCREEN CURRENT	3.0	2.0	MA.
PLATE RESISTANCE	15 000	17 000	OHMS
TRANSCONDUCTANCE	6800	4800	μMHOS
AMPLIFICATION FACTOR	90	81	
LOAD RESISTANCE	2600	2600	OHMS
TOTAL HARMONIC DISTORTION	5.3	9.0	PER CENT
SECOND HARMONIC DISTORTION	2.2	6.5	PER CENT
THIRD HARMONIC DISTORTION	4.6	5.5	PER CENT
POWER OUTPUT	0.8	1.0	WATT

NOTE: THE GRID CIRCUIT RESISTANCE SHOULD NOT EXCEED 0.5 MEGOHM.

RECTIFIER SECTION

AC PLATE VOLTAGE	125 MAX.	VOLTS
DC OUTPUT CURRENT	60 MAX.	MA.

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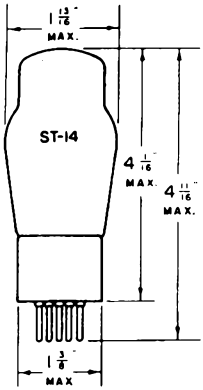
PLATE
340-1

FEB. 27
1939

TUNG-SOL



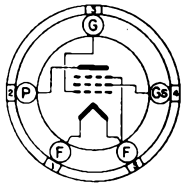
PENTODE POWER AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.26 AMPERE
DC

GLASS BULB

MEDIUM 5 PIN BASE



5K

BOTTOM VIEW

THE TUNG-SOL 33 IS A FILAMENT TYPE POWER AMPLIFIER DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF BATTERY AND DC OPERATED RECEIVERS.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	135	180 MAX.	VOLTS
SCREEN VOLTAGE	135	180 MAX.	VOLTS
CONTROL GRID VOLTAGE [A]	-13.5	-18	VOLTS
GRID CIRCUIT RESISTANCE [G]	0.5 MAX.	0.5 MAX.	MEGOHM
PLATE CURRENT	14.5	22	MA.
SCREEN CURRENT	3	5	MA.
TRANSCONDUCTANCE	1450	1700	μMHOS
AMPLIFICATION FACTOR	70	90	
LOAD RESISTANCE	7000	6000	OHMS
TOTAL HARMONIC DISTORTION	7	7	PER CENT
POWER OUTPUT	0.7	1.4	WATTS

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO FILAMENT	8	μμf
PLATE TO FILAMENT	12	μμf
CONTROL GRID TO PLATE	1	μμf

[A] RETURN TO NEGATIVE FILAMENT (PIN #5)

[G] WITH FIXED BIAS

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PLATE 507-2

AUG. 14 1939

CONTINUED NEXT PAGE

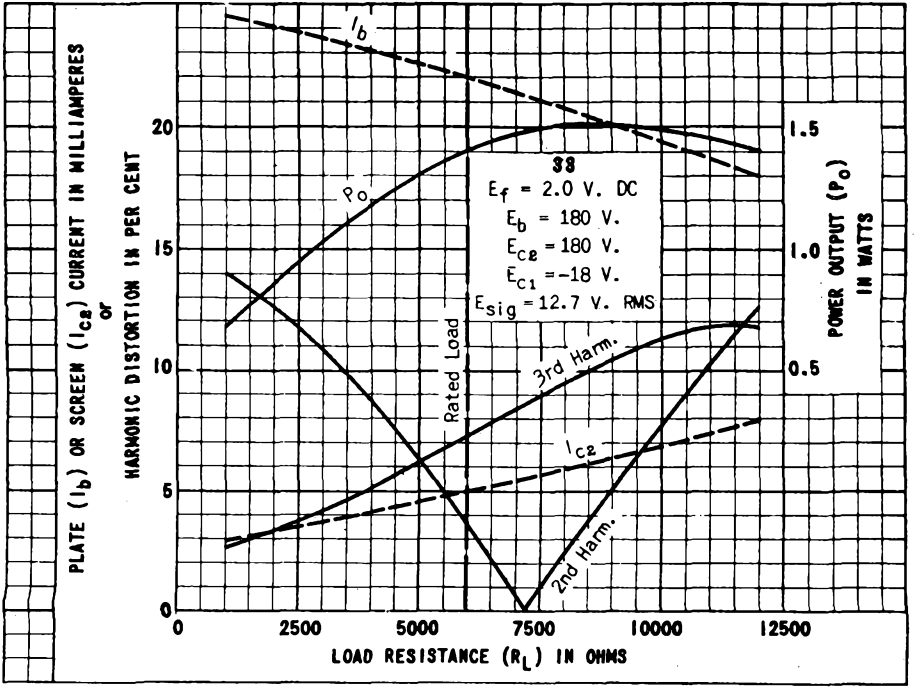
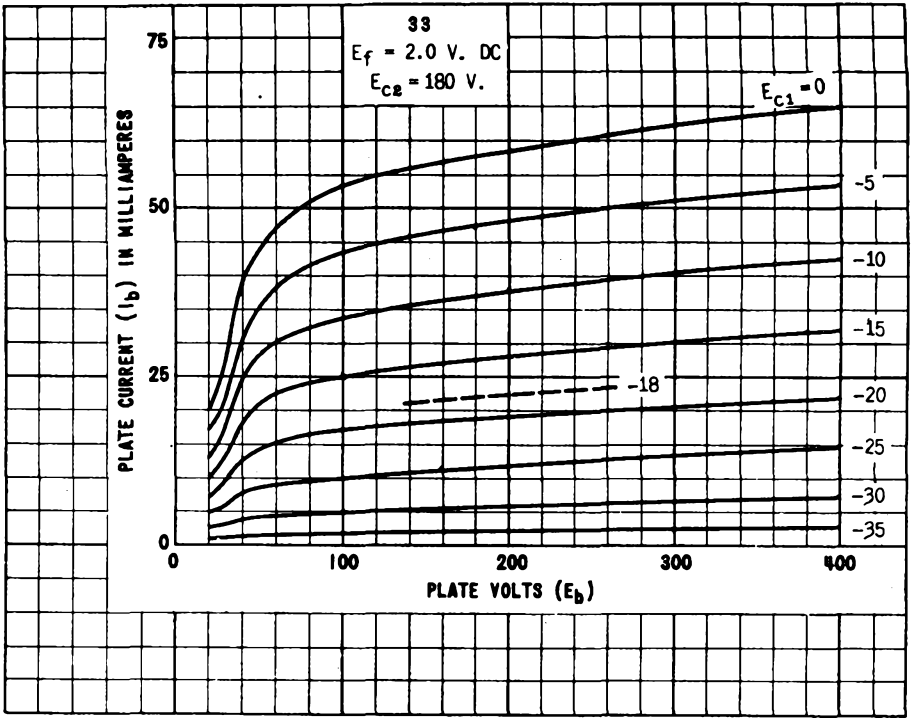


PLATE 508-1


33
E_f = 2.0 V. DC
E_{c2} = 180 V.
E_{c1} = 0
-5
-10
-15
-18
-20
-25
-30
-35
75
50
25
0
0
100
200
300
400
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)

TUNG-SOL

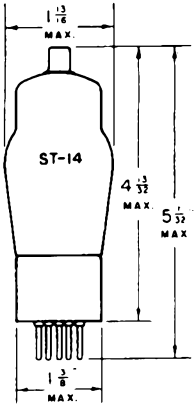


FIG. 7

REMOTE CUT - OFF

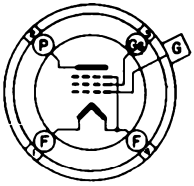
PENTODE AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.06 AMPERE

DC

GLASS BULB



4M

MEDIUM 4 PIN BASE

THE TUNG-SOL 34 IS A REMOTE CUT-OFF PENTODE AMPLIFIER DESIGNED FOR USE IN BATTERY OPERATED RECEIVERS. IT IS SUITABLE FOR USE WITH AVC IN RF AND IF AMPLIFIERS AND MINIMIZES CROSS MODULATION.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	67.5	135	180 MAX.	VOLTS
SCREEN VOLTAGE MAX.	67.5	67.5	67.5	VOLTS
CONTROL GRID VOLTAGE MIN.	-3	-3	-3	VOLTS
PLATE CURRENT	2.7	2.8	2.8	MA.
SCREEN CURRENT	1.1	1.0	1.0	MA.
PLATE RESISTANCE APPROX.	0.4	0.6	1.0	MEGOHM
TRANSCONDUCTANCE	560	600	620	μMHOS
AMPLIFICATION FACTOR APPROX.	224	360	620	
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 15 μMHOS	-22.5	-22.5	-22.5	VOLTS

AS MIXER IN SUPERHETERODYNE CIRCUIT

PLATE VOLTAGE	67.5	135	180 MAX.	VOLTS
SCREEN VOLTAGE MAX.	67.5	67.5	67.5	VOLTS
CONTROL GRID VOLTAGE APPROX. [G]	-5	-5	-5	VOLTS

[G] THIS GRID BIAS IS MINIMUM FOR AN OSCILLATOR PEAK VOLTAGE OF 4.0 VOLTS.

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO FILAMENT	6.0	μμf
PLATE TO FILAMENT	11.5	μμf
CONTROL GRID TO PLATE[S]	0.015 MAX.	μμf

[S] WITH SHIELD

PRINTED IN U. S. A.

PLATE 258-2

DEC. 12 1938

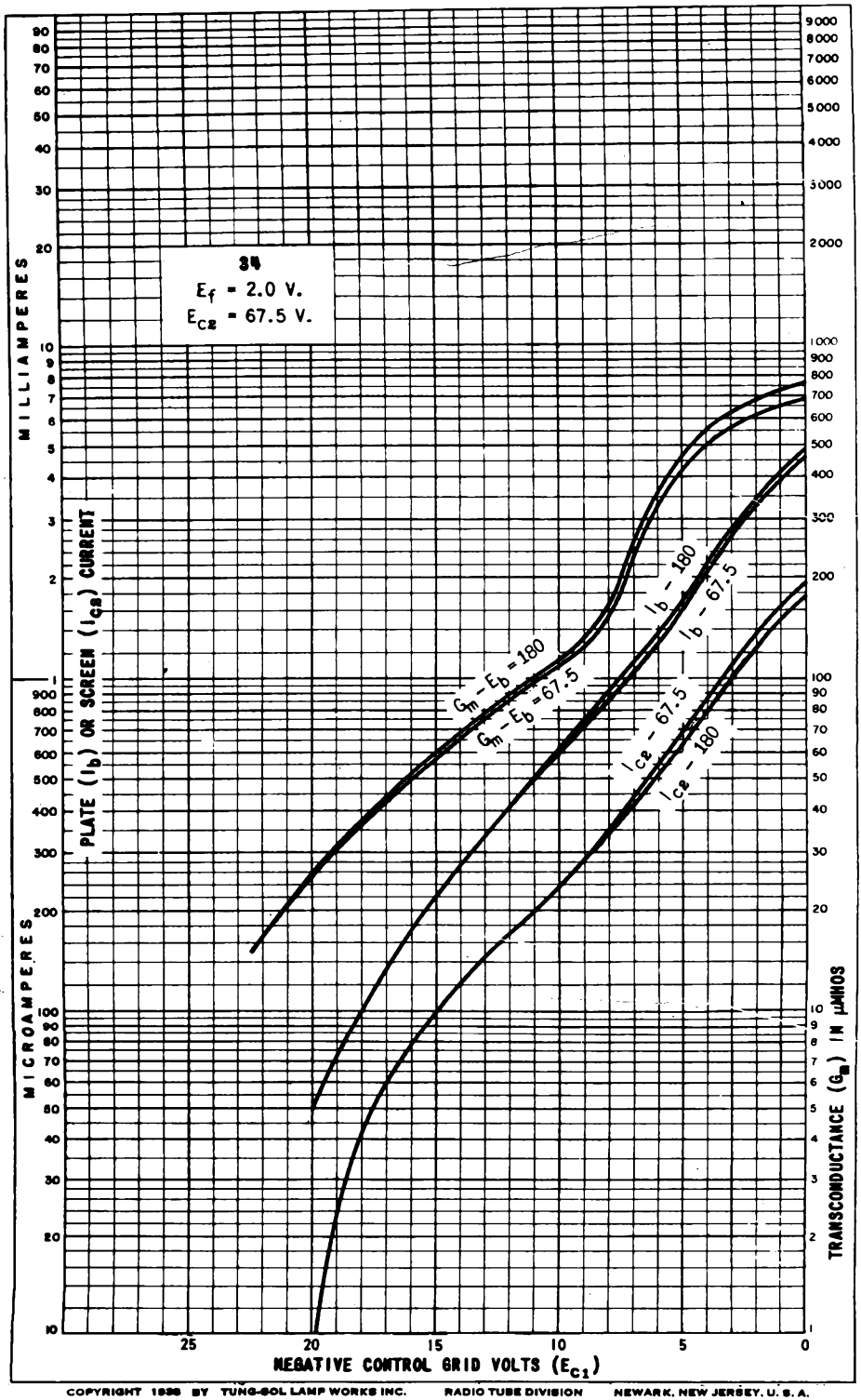


PLATE 259-1

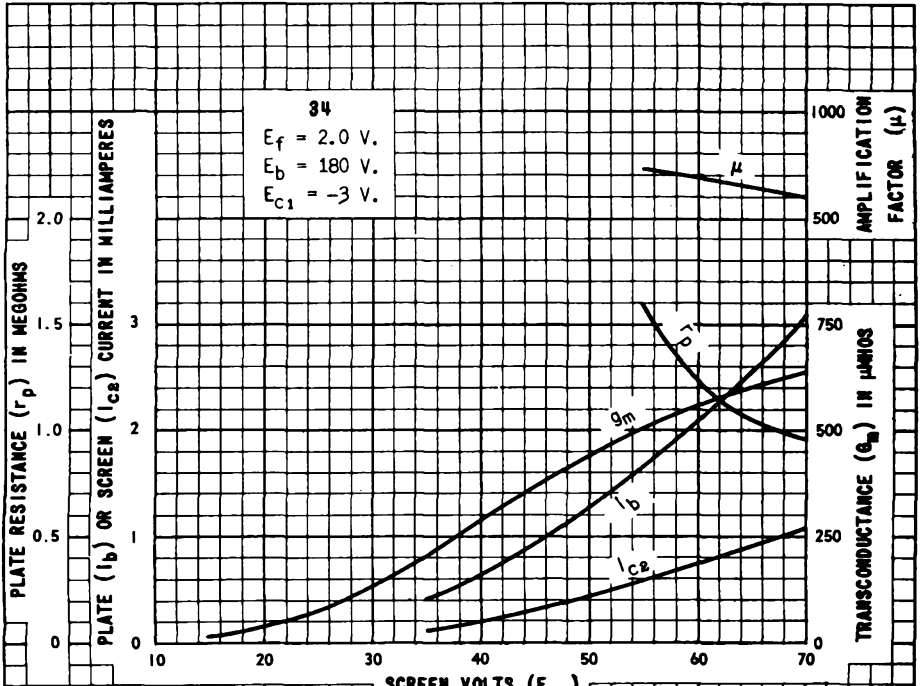
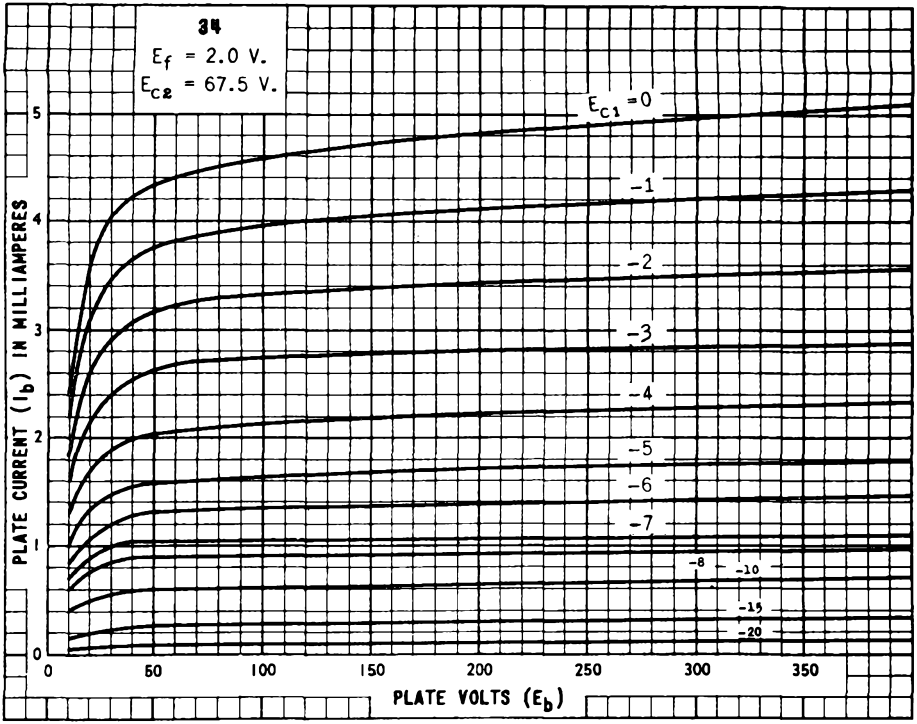


PLATE
224-1

DEC. 12
1938


34
E_f = 2.0 V.
E_{c2} = 67.5 V.
E_{c1} = 0
-1
-2
-3
-4
-5
-6
-7
-8
-10
-15
-20
PLATE CURRENT (I_b) IN MILLIAMPERES
0
1
2
3
4
5
0
50
100
150
200
250
300
350
PLATE VOLTS (E_b)

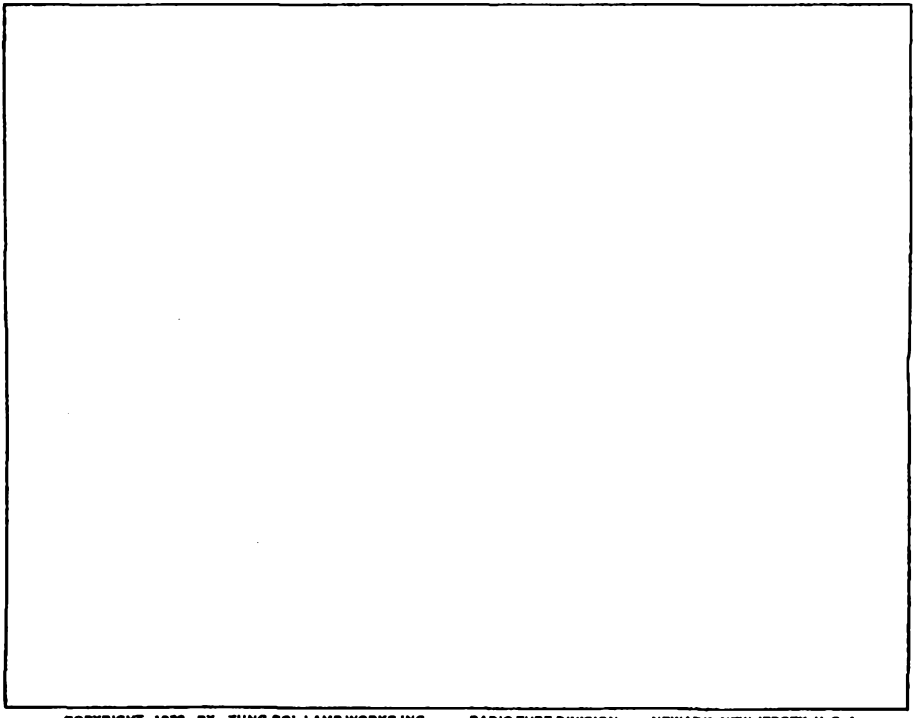
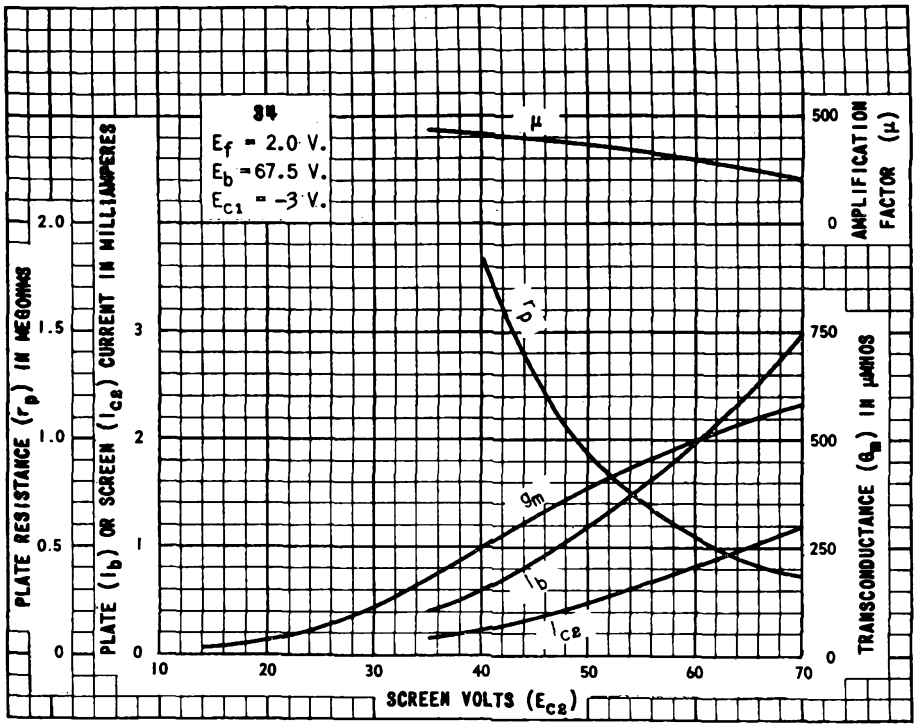
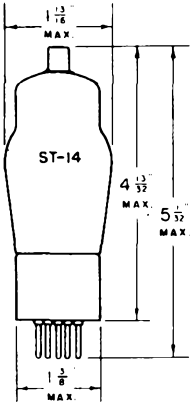


PLATE
225-1


34
E_f = 2.0 V.
E_b = 67.5 V.
E_{c1} = -3 V.
μ
r_p
g_m
I_b
I_{c2}
PLATE RESISTANCE (r_p) IN MEGOHMS
PLATE (I_b) OR SCREEN (I_{c2}) CURRENT IN MILLIAMPERES
AMPLIFICATION FACTOR (μ)
TRANSCONDUCTANCE (g_m) IN μMHOS
SCREEN VOLTS (E_{c2})
2.0
1.5
1.0
0.5
0
3
2
1
0
500
0
750
500
250
0
10
20
30
40
50
60
70



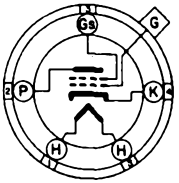
REMOTE CUT-OFF TETRODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
2.5 VOLTS 1.75 AMPERES
AC OR DC

GLASS BULB

MEDIUM 5 PIN BASE



5E

BOTTOM VIEW

THE TUNG-SOL 35 IS DESIGNED FOR USE AS AN AMPLIFIER OR MIXER IN SUPERHETERODYNE RECEIVERS.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	180	250	VOLTS
SCREEN VOLTAGE MAX.	90	90	VOLTS
CONTROL GRID VOLTAGE	-3	-3	VOLTS
PLATE CURRENT	6.3	6.5	MA.
SCREEN CURRENT	2.5	2.5	MA.
PLATE RESISTANCE	0.3	0.4	MEGOHM
TRANSCONDUCTANCE	1020	1050	μMHOS
AMPLIFICATION FACTOR	305	420	
CONTROL GRID VOLTAGE	-40	-40	VOLTS
FOR TRANSCONDUCTANCE = 15 μMHOS			

AS MIXER IN SUPERHETERODYNE CIRCUIT

PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE MAX.	90	VOLTS
CONTROL GRID VOLTAGE APPROX. [G]	-7	VOLTS

[G] THIS GRID BIAS IS MINIMUM FOR AN OSCILLATOR PEAK VOLTAGE OF 6.0 VOLTS

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	5.3	μμf
PLATE TO CATHODE	10.5	μμf
CONTROL GRID TO PLATE[S]	.007 MAX.	μμf

[S] WITH SHIELD

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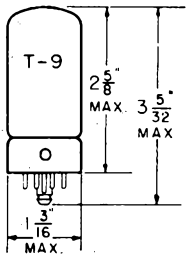
PLATE 486-1

JUNE 26 1939

TUNG-SOL

BEAM POWER AMPLIFIER

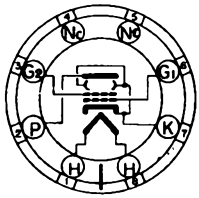


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
35 VOLTS 0.15 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
LOCKING-IN
8 PIN BASE

THE 35A5 IS A BEAM POWER AMPLIFIER OF THE HEATER-CATHODE TYPE USING THE LOCK-IN CONSTRUCTION. IT IS DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF DC AND AC-DC RECEIVERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE (AC OR DC)	35	VOLTS
HEATER CURRENT	0.15	AMP.
MAX. PLATE VOLTAGE	200	VOLTS
MAX. SCREEN VOLTAGE	117	VOLTS
MAX. PLATE DISSIPATION	8.5	WATTS
MAX. SCREEN DISSIPATION	1	WATT
HEATER-CATHODE VOLTAGE	AS LOW AS POSSIBLE	

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	110	200	VOLTS
SCREEN VOLTAGE	110	110	VOLTS
GRID VOLTAGE	7.5	-8	VOLTS
PEAK AF GRID VOLTAGE	7.5	8	VOLTS
ZERO-SIGNAL PLATE CURRENT	40	41	MA.
ZERO-SIGNAL SCREEN CURRENT (APPROX.)	3	2	MA.
MAX.-SIGNAL PLATE CURRENT	41	44	MA.
MAX.-SIGNAL SCREEN CURRENT (APPROX.)	7	7	MA.
PLATE RESISTANCE (APPROX.)	14 000	40 000	OHMS
GRID RESISTOR (MAX.)			
FIXED BIAS	0.1	0.1	MEGOHM
CATHODE BIAS	0.5	0.5	MEGOHM
LOAD RESISTANCE	2500	4500	OHMS
TRANSCONDUCTANCE	5800	5900	µMHOS
MAX.-SIGNAL POWER OUTPUT	1.5	3.3	WATTS
TOTAL HARMONIC DISTORTION	10	10	PER CENT

SIMILAR TYPE REFERENCE: *Same characteristics as type 35L6G; somewhat similar to type 25L6G, amplifier unit of type 70L7GT.*

PRINTED IN U.S.A.
PLATE 1632
NOV. 30 1945

TUNG-SOL

BEAM POWER AMPLIFIER

MINIATURE TYPE

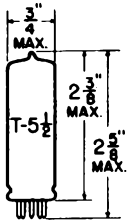
UNIPOTENTIAL CATHODE

HEATER

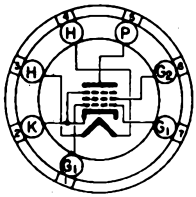
35 VOLTS 0.015 AMPERE

AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 35B5 IS A BEAM POWER AMPLIFIER IN THE MINIATURE CONSTRUCTION. BECAUSE OF ITS HIGH POWER SENSITIVITY AT LOW PLATE-SCREEN VOLTAGE, IT IS PARTICULARLY ADAPTABLE TO AC/DC RECEIVER APPLICATIONS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	35	VOLTS
HEATER CURRENT	0.15	AMP.
MAXIMUM PLATE VOLTAGE	117	VOLTS
MAXIMUM SCREEN VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	4.5	WATTS
MAXIMUM SCREEN DISSIPATION	1.0	WATTS
MAXIMUM HEATER-CATHODE VOLTAGE	150	VOLTS

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

WITH NO EXTERNAL SHIELD

GRID TO PLATE	0.4	μμf
INPUT	11	μμf
OUTPUT	6.5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	110	VOLTS
SCREEN VOLTAGE	110	VOLTS
CONTROL GRID VOLTAGE	-7.5	VOLTS
PEAK AF GRID VOLTAGE	7.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	40	MA.
ZERO-SIGNAL SCREEN CURRENT (APPROX.)	3	MA.
MAXIMUM SIGNAL PLATE CURRENT	41	MA.
MAXIMUM SIGNAL SCREEN CURRENT (APPROX.)	7	MA.
GRID CIRCUIT RESISTANCE (MAX.):		
FOR FIXED BIAS	0.1	MEGOHM
FOR CATHODE-BIAS	0.5	MEGOHM
LOAD RESISTANCE	2 500	OHMS
PLATE RESISTANCE	14 000	OHMS
TRANSCONDUCTANCE	5 800	μMHOS
MAXIMUM SIGNAL POWER OUTPUT	1.5	WATTS
TOTAL HARMONIC DISTORTION	10	PERCENT

SIMILIAR TYPE REFERENCE: *Within its ratings identical to 35L6GT. Except for heater ratings, somewhat similiar to types 7A5, 50B5.*

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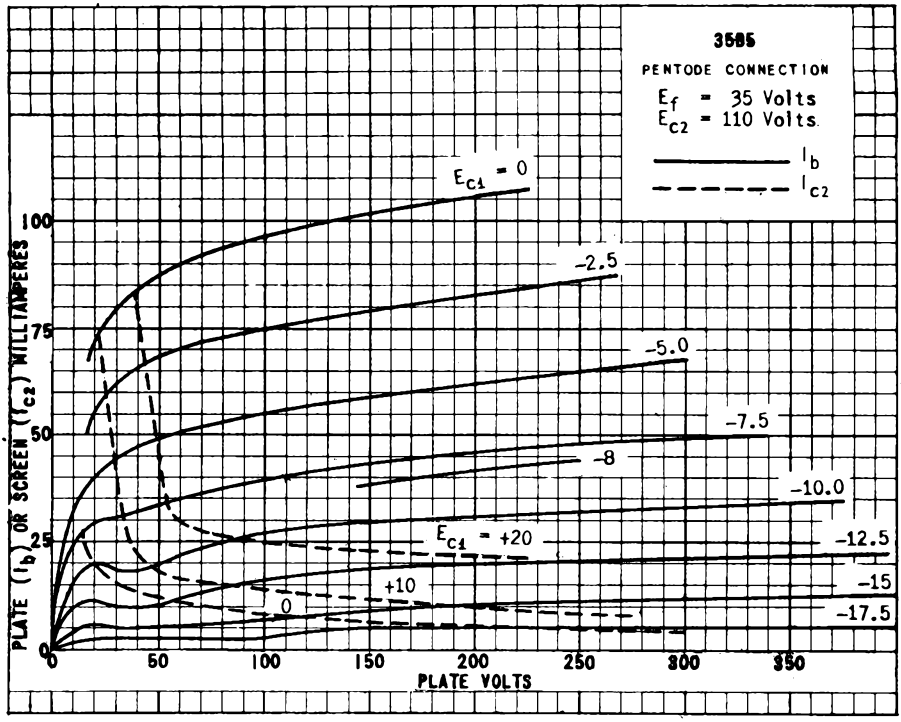
PLATE 1835
JUNE 2, 1947

35B5



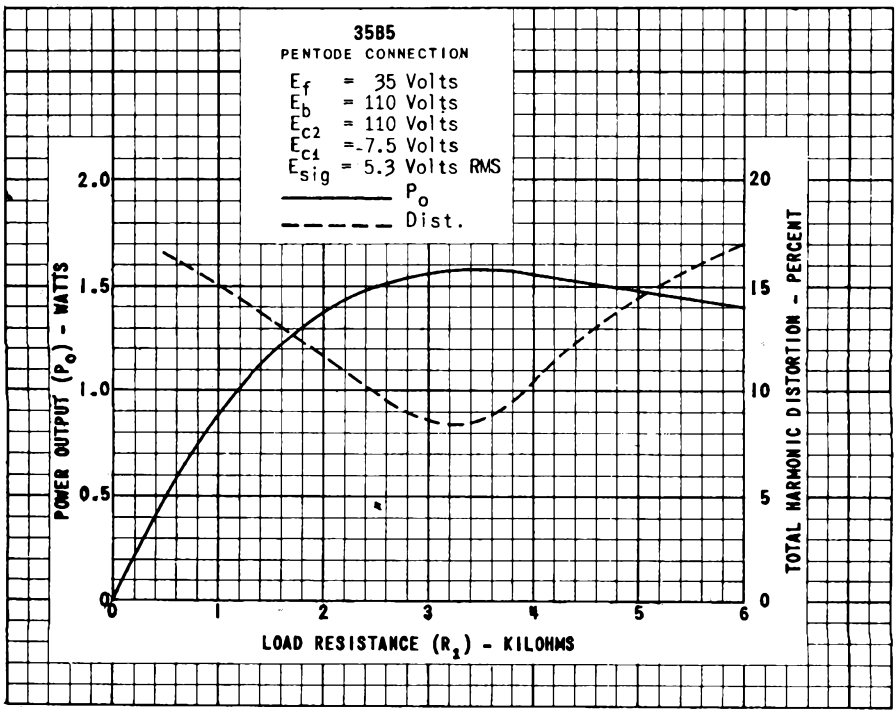


PLATE 1836
JUNE 2, 1947

TUNG-SOL

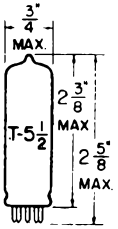
BEAM PENTODE

MINIATURE TYPE

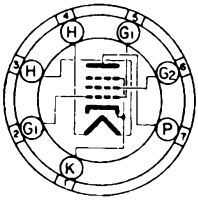
UNIPOTENTIAL CATHODE

HEATER
35 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 35C5 IS A BEAM POWER AMPLIFIER IN THE MINIATURE CONSTRUCTION. BECAUSE OF ITS HIGH POWER SENSITIVITY AT LOW PLATE-SCREEN VOLTAGE, IT IS PARTICULARLY ADAPTABLE TO AC/DC RECEIVER APPLICATIONS.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.
WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G_1 TO P)	0.57	μμf
INPUT: G_1 TO (H+K&G_3+G_2)	12	μμf
OUTPUT: P TO (H+K&G_3+G_2)	6.2	μμf

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD MB-210

HEATER VOLTAGE	35	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	180	VOLTS
MAXIMUM PLATE VOLTAGE	135	VOLTS
MAXIMUM GRID #2 VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	4.5	WATTS
MAXIMUM GRID #2 DISSIPATION	1	WATT
MAXIMUM GRID #1 CIRCUIT RESISTANCE (FIXED BIAS)	0.1	MEGOHM
MAXIMUM GRID #1 CIRCUIT RESISTANCE (SELF BIAS)	0.5	MEGOHM
MAXIMUM BULB TEMPERATURE (AT HOTTEST POINT ON BULB SURFACE)	250	°C

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

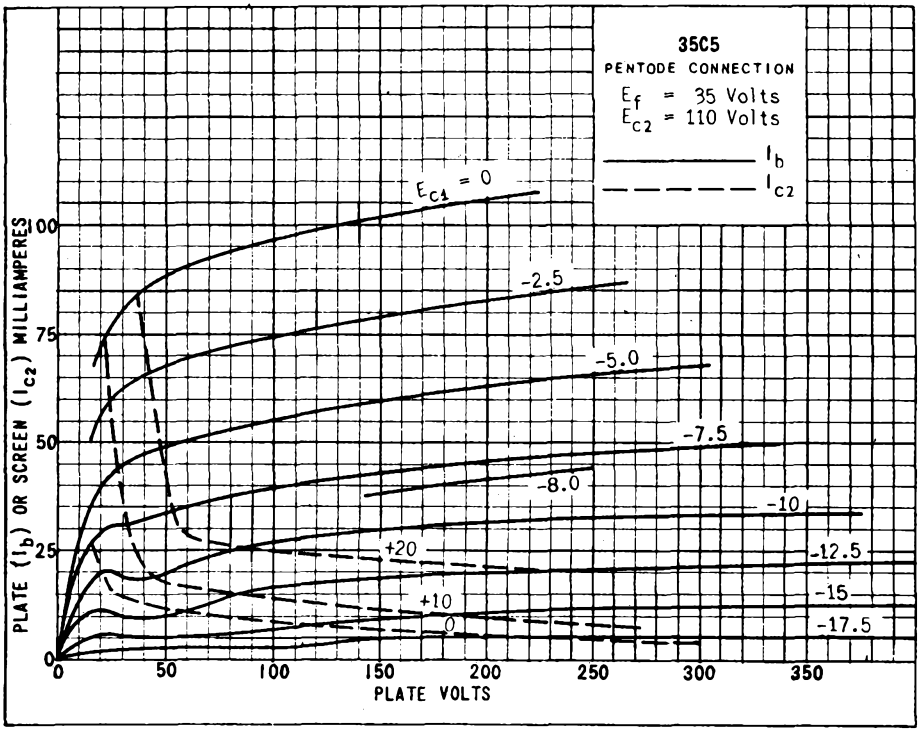
HEATER VOLTAGE	35	VOLTS
HEATER CURRENT	150	MA.
PLATE VOLTAGE	110	VOLTS
GRID #2 VOLTAGE	110	VOLTS
GRID #1 VOLTAGE	-7.5	VOLTS
PEAK AF GRID #1 VOLTAGE	7.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	40	MA.
ZERO-SIGNAL GRID #2 CURRENT (NOMINAL)	3	MA.
MAXIMUM SIGNAL PLATE CURRENT	41	MA.
MAXIMUM SIGNAL GRID #2 CURRENT	7	MA.
TRANSCONDUCTANCE	5 800	MICROMHOS
LOAD RESISTANCE	2 500	OHMS
TOTAL HARMONIC DISTORTION	10	PERCENT
MAXIMUM SIGNAL POWER OUTPUT	1.5	WATTS

SIMILAR TYPE REFERENCE: *Ratings and characteristics somewhat similar to type 35B5.*

PRINTED IN U. S. A.

PLATE 2002
APRIL 1 1948

35C5



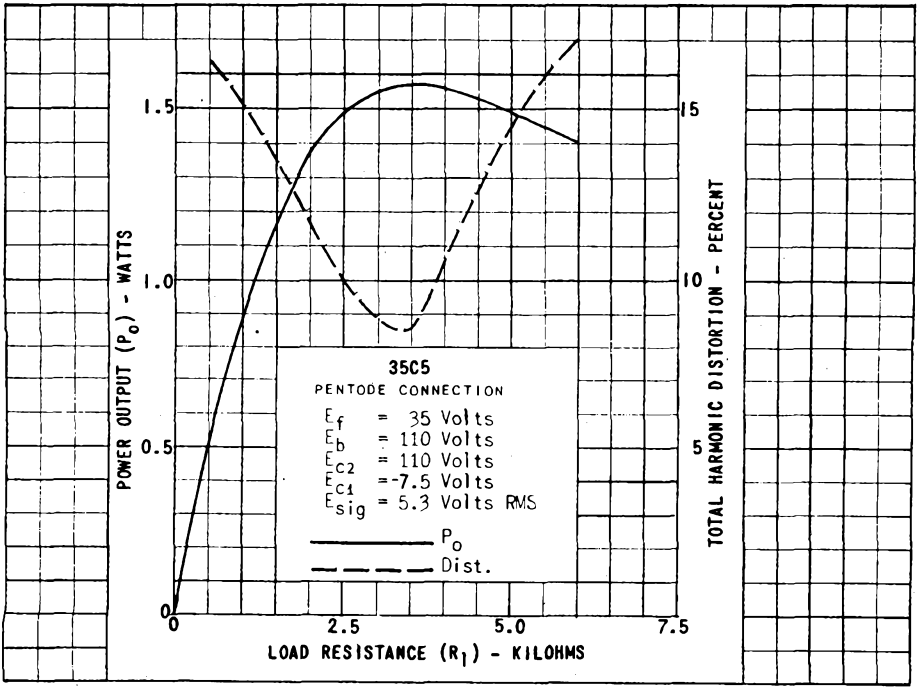
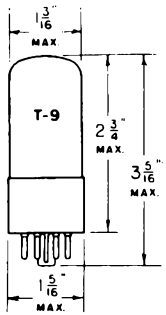


PLATE 2003
APRIL 1 1948

TUNG-SOL

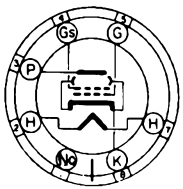
BEAM POWER AMPLIFIER



UNIPOTENTIAL CATHODE

HEATER
35 VOLTS 0.150 AMPERE
AC OR DC

GLASS BULB



7AC

BOTTOM VIEW

INTERMEDIATE 7 PIN OCTAL BASE

THE TUNG-SOL 35L6GT/G IS A BEAM POWER AMPLIFIER, DESIGNED PRIMARILY FOR SERVICE IN THE OUTPUT STAGE OF AC-DC RECEIVERS EMPLOYING 150 MA. HEATER TUBES. IT DELIVERS HIGH POWER OUTPUT WITH HIGH POWER SENSITIVITY FROM LOW SUPPLY VOLTAGES.

RATINGS

HEATER VOLTAGE (AC OR DC)	35.0	VOLTS
HEATER CURRENT	0.150	AMPERE
MAXIMUM PLATE VOLTAGE	200	VOLTS
MAXIMUM SCREEN VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	8.5	WATTS
MAXIMUM SCREEN DISSIPATION	1	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	110	200	VOLTS
SCREEN VOLTAGE	110	110	VOLTS
GRID VOLTAGE [A]	-7.5	-8	VOLTS
PEAK AF SIGNAL VOLTAGE	7.5	8	VOLTS
ZERO-SIGNAL PLATE CURRENT	40	41	MA.
ZERO-SIGNAL SCREEN CURRENT - NOMINAL	3	2	MA.
MAXIMUM SIGNAL PLATE CURRENT	41	44	MA.
MAXIMUM SIGNAL SCREEN CURRENT - NOMINAL	7	7	MA.
PLATE RESISTANCE APPROX.	14000	40000	OHMS
TRANSCONDUCTANCE	5800	5900	μMHOS
LOAD RESISTANCE	2500	4500	OHMS
TOTAL HARMONIC DISTORTION	10	10	PER CENT
POWER OUTPUT	1.5	3.3	WATTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT UNDER MAXIMUM RATED CONDITIONS SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1058-1

JUNE 6 1941

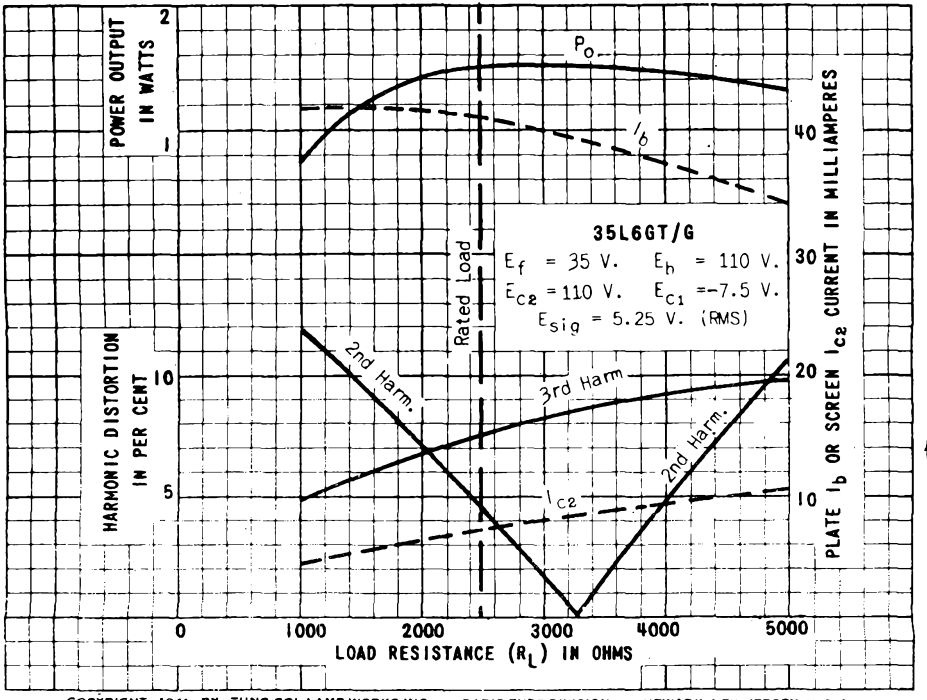
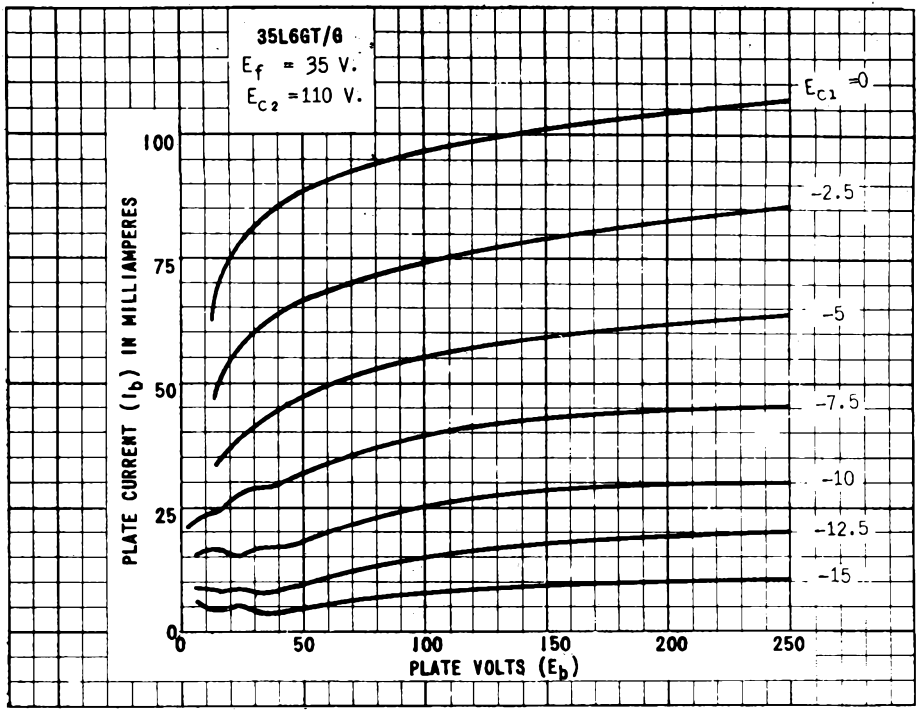


PLATE 1059-1

35L6GT/G


35L6GT/G
E_f = 35 V.
E_{c2} = 110 V.
E_{c1} = 0
-2.5
-5
-7.5
-10
-12.5
-15
PLATE CURRENT (I_b) IN MILLIAMPERES
100
75
50
25
0
0
50
100
150
200
250
PLATE VOLTS (E_b)

TUNG-SOL

· HALF-WAVE HIGH-VACUUM RECTIFIER
MINIATURE TYPE

PHYSICAL SPECIFICATIONS

EMITTER	UNIPOT. CATHODE	PIN CONNECTIONS	
BASE	MIN. BUTTON 7-PIN	PIN 1 NONE	PIN 7 CATHODE
CAP	NONE	PIN 2 NONE	PIN 8 NONE
BULB	T-5½	PIN 3 HEATER	PANEL LAMP HEATER
MAX. DIAMETER	3/4"	PIN 4 HEATER	SECTION BETWEEN
MAX. SEATED HEIGHT	2-3/8"	PIN 5 PLATE	PINS 4 & 6
MAX. OVERALL LENGTH	2-5/8"	PIN 6 HEATER TAP	MOUNTING POS. ANY

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD MB-210

	WITHOUT PANEL LAMP	WITH NO. 40 OR NO. 47 PANEL LAMP	
HEATER VOLTAGE AC OR DC:			
ENTIRE HEATER (PINS 3 & 4)	35	32	VOLTS
PANEL-LAMP SECTION (PINS 4 & 6)	7.5	5.5	VOLTS
HEATER CURRENT:			
BETWEEN PINS 3 & 4	0.15	—	AMPERE
BETWEEN PINS 3 & 6	—	0.15	AMPERE
TUBE VOLTAGE DROP WITH APPLIED DC			
AT 200 MA. PLATE CURRENT	18	18	VOLTS
MAXIMUM PEAK INVERSE PLATE VOLTAGE	330		VOLTS
MAXIMUM PEAK PLATE CURRENT	600		MA.
MAXIMUM DC OUTPUT CURRENT:			
WITH PANEL LAMP - NO SHUNTING RESISTOR	60		MA.
WITH PANEL LAMP - SHUNTING RESISTOR[A]	90		MA.
WITHOUT PANEL LAMP	100		MA.
MAXIMUM PANEL-LAMP SECTION VOLTAGE (RMS):			
WHEN PANEL LAMP FAILS	15		VOLTS
MAXIMUM PEAK HEATER-CATHODE VOLTAGE:			
HEATER POS. WITH RESPECT TO CATHODE	330		VOLTS
HEATER NEG. WITH RESPECT TO CATHODE	330		VOLTS

[A] SEE MAXIMUM CIRCUIT VALUES.

MAXIMUM CIRCUIT VALUES

MAXIMUM PANEL-LAMP SHUNTING RESISTOR[B]		
FOR DC OUTPUT CURRENT OF 70 MA.	800	OHMS
FOR DC OUTPUT CURRENT OF 80 MA.	400	OHMS
FOR DC OUTPUT CURRENT OF 90 MA.	250	OHMS

[B] REQUIRED WHEN DC OUTPUT CURRENT IS GREATER THAN 60 MA.

CONTINUED ON FOLLOWING PAGE

PRINTED IN U. S. A.
PLATE 1661
DEC. 15 1945

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

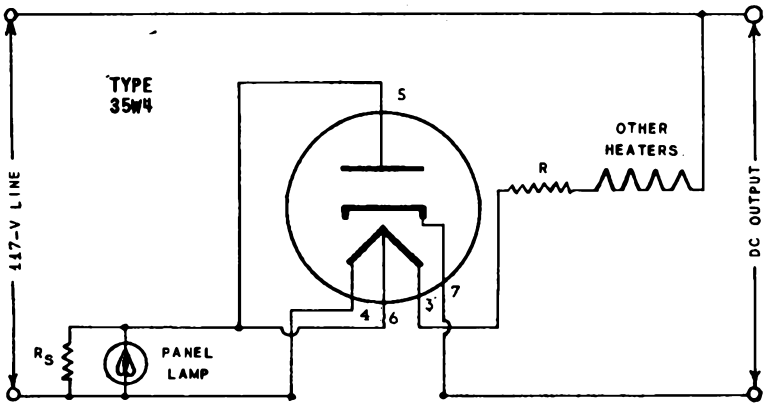
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

WITH NO. 40 OR NO. 47 PANEL LAMP IN CIRCUIT
WITH CONDENSER-INPUT FILTER

AC PLATE-SUPPLY VOLTAGE (RMS)	117	117	117	117	VOLTS
FILTER-INPUT CAPACITOR	40	40	40	40	µf
TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE (MIN.)	15	15	15	15	OHMS
PANEL-LAMP SHUNTING RESISTOR	-	300	150	100	OHMS
DC OUTPUT CURRENT	60	70	80	80	MA.

WITHOUT PANEL LAMP IN CONVENTIONAL HALF WAVE CIRCUIT WITH CONDENSER-INPUT FILTER

AC PLATE-SUPPLY VOLTAGE (RMS)	117	VOLTS
FILTER-INPUT CAPACITOR	40	µf
TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE (MIN.)	15	OHMS
DC OUTPUT CURRENT	100	MA.
DC OUTPUT VOLTAGE AT INPUT TO FILTER (APPROX.):		
AT HALF-LOAD CURRENT (50 MA.)	140	VOLTS
AT FULL-LOAD CURRENT (100 MA.)	120	VOLTS
VOLTAGE REGULATION (APPROX.):		
HALF-LOAD TO FULL-LOAD CURRENT	20	VOLTS



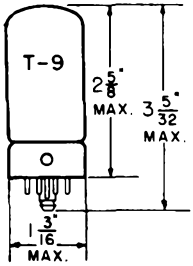
DROP ACROSS R AND ALL HEATERS (WITH PANEL LAMP) SHOULD EQUAL 117 VOLTS AT 0.15 AMPERE.

R_S = SHUNTING RESISTOR REQUIRED WHEN DC OUTPUT CURRENT EXCEEDS 60 MA.

PLATE 1662
DEC. 15 1945

TUNG-SOL

DIODE

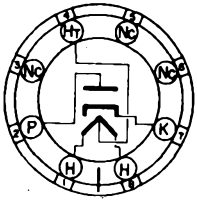


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
35 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
8 PIN LOCK-IN

THE 35Y4 IS A SINGLE DIODE IN THE LOCK-IN CONSTRUCTION INTENDED FOR HALF-WAVE POWER RECTIFIER SERVICE. IT FEATURES A TAPPED HEATER SECTION PROVIDING A BALLAST ACTION AND SOURCE OF VOLTAGE FOR A PANEL LAMP.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	35	VOLTS
MAXIMUM DC HEATER-CATHODE VOLTAGE	300	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	700	VOLTS
MAXIMUM AC PLATE VOLTAGE (RMS)	235	VOLTS
MAXIMUM STEADY STATE PEAK PLATE CURRENT	600	MA.
MAXIMUM DC OUTPUT CURRENT:		
WITHOUT PANEL LAMP	100	MA.
WITH PANEL LAMP AND SHUNTING RESISTOR	90	MA.
WITH PANEL LAMP AND NO SHUNTING RESISTOR	60	MA.
MAXIMUM VALUE OF PANEL LAMP SHUNTING RESISTOR:		
FOR 70 MA. DC OUTPUT CURRENT	800	OHMS
FOR 80 MA. DC OUTPUT CURRENT	400	OHMS
FOR 90 MA. DC OUTPUT CURRENT	250	OHMS
TAPPED SECTION VOLTAGE (BETWEEN PINS #1 & #4) WITH 150 MA. FLOWING BETWEEN PINS #1 & #8	7.5	VOLTS
MAXIMUM VOLTAGE ACROSS TAPPED SECTION WHEN PANEL LAMP FAILS (RMS)	15	VOLTS
TUBE VOLTAGE DROP (MEASURED WITH TUBE CONDUCTING 200 MA.)	20	VOLTS

CONTINUED ON FOLLOWING PAGE

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PLATE 2072
SEPT. 1 1948

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

WITH 40 MFD. INPUT CONDENSER AND #40 OR #47 PANEL LAMP

HEATER VOLTAGE (PINS #1 & #8)	32	32	32	32	32	VOLTS
HEATER CURRENT (PINS #4 & #8)	150	150	150	150	150	MA.
VOLTAGE ACROSS TAPPED SECTION OF HEATER (PINS #1 & #4)	5.5	5.5	5.5	5.5	5.5	VOLTS
AC PLATE VOLTAGE (RMS)	117	117	117	117	235	VOLTS
DC OUTPUT CURRENT	60	70	80	90	60	MA.
MINIMUM EFFECTIVE PLATE SUPPLY IMPEDANCE	15	15	15	15	100	OHMS
PANEL LAMP SHUNT RESISTOR	—	300	150	100	—	OHMS

WITH 40 MFD. INPUT CONDENSER AND NO PANEL LAMP

HEATER VOLTAGE (PINS #1 & #8)	35	35	VOLTS
HEATER CURRENT (PINS #4 & #8)	150	150	MA.
VOLTAGE ACROSS TAPPED SECTION OF HEATER (PINS #1 & #4)	7.5	7.5	VOLTS
AC PLATE VOLTAGE (RMS)	117	235	VOLTS
DC OUTPUT CURRENT	100	100	MA.
MINIMUM EFFECTIVE PLATE SUPPLY IMPEDANCE	15	100	OHMS

SIMILAR TYPE REFERENCE: *Ratings and characteristics somewhat similar to types 35W4 and 35Z5GT.*

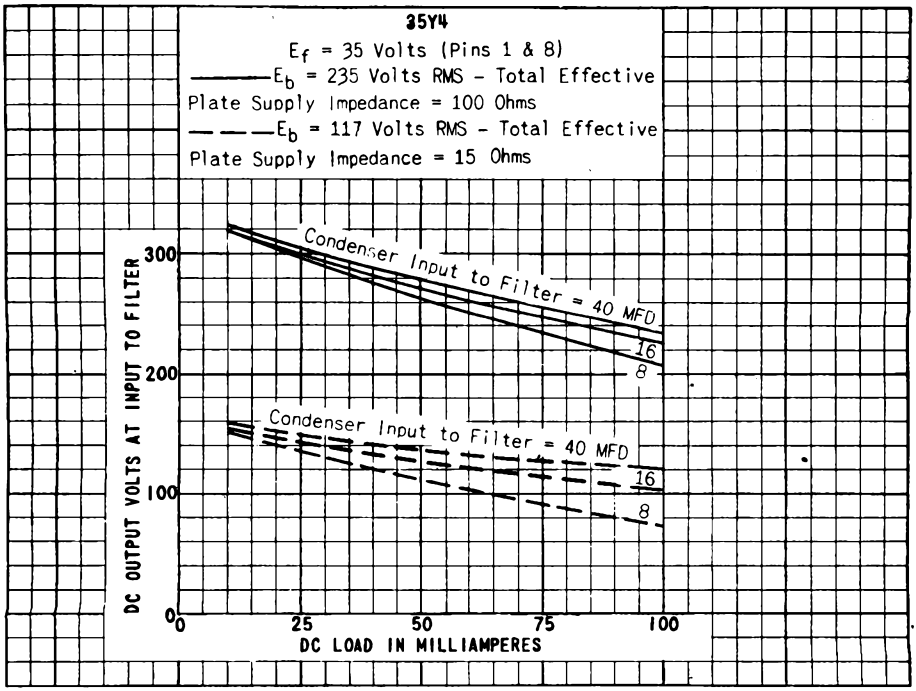
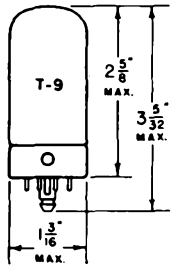


PLATE 2073
SEPT. 1 1948

TUNG-SOL

HALF WAVE

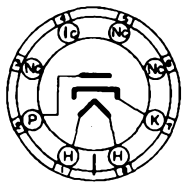
HIGH VACUUM RECTIFIER



UNIPOTENTIAL CATHODE

HEATER
32.0 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB



4Z
BOTTOM VIEW

NOTE: Ic DENOTES INTERNAL CONNECTION

8 PIN LOCKING-IN BASE

THE TUNG-SOL 3523 IS DESIGNED PRIMARILY FOR SERVICE AS A POWER RECTIFIER IN AC-DC RECEIVERS WHICH EMPLOY 150 MA. HEATER TUBES.

RATINGS

NOMINAL HEATER VOLTAGE	35.0	VOLTS
NOMINAL HEATER CURRENT	0.16	AMP.
MAXIMUM AC PLATE VOLTAGE (RMS)	235	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	700	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	350	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT	600	MA.
TUBE VOLTAGE DROP - AT 200 MA.	20	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HALF WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE (RMS)	117	150	235 MAX.	VOLTS
DC OUTPUT CURRENT MAX.	100	100	100	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE MIN.[A]	15	40	100	OHMS

[A] WHEN FILTER CONDENSERS LARGER THAN 40 μFDS. ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS", REFER TO FRONT OF BOOK.

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35Z3

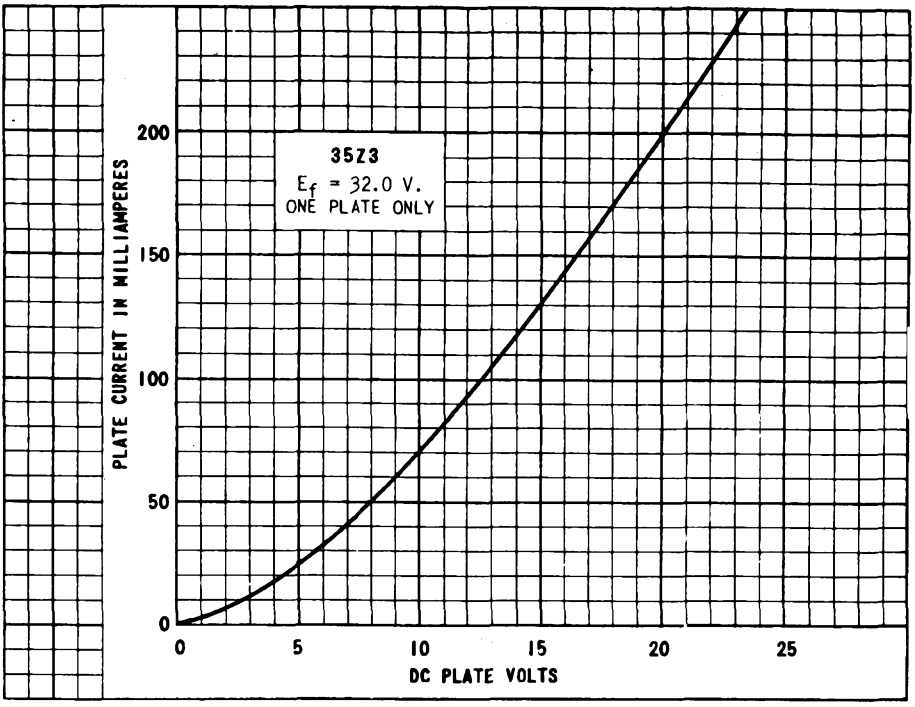
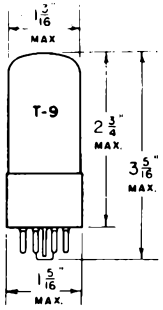


PLATE
827-1

TUNG-SOL

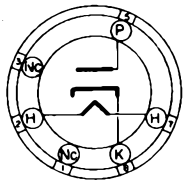


HALF WAVE

HIGH VACUUM RECTIFIER

UNIPOTENTIAL CATHODE

HEATER
35 VOLTS 0.15 AMPERE
AC OR DC



5AA
BOTTOM VIEW

GLASS BULB

INTERMEDIATE 6 PIN OCTAL BASE

THE TUNG-SOL 35Z4GT IS DESIGNED PRIMARILY FOR SERVICE AS A POWER RECTIFIER IN AC-DC RECEIVERS EMPLOYING 150 MA. HEATER TUBES.

RATINGS

MAXIMUM AC PLATE VOLTAGE (RMS)	235	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	700	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	350	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT	600	MA.
TUBE VOLTAGE DROP — AT 200 MA.	18	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HALF WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE (RMS)	117	235 MAX.	VOLTS
DC OUTPUT CURRENT MAX.	100	100	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE MIN. A	15	100	OHMS

A WHEN FIL.. CONDENSERS LARGER THAN 40 μFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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PLATE 932-3

DEC.-30 1940

35Z4 GT

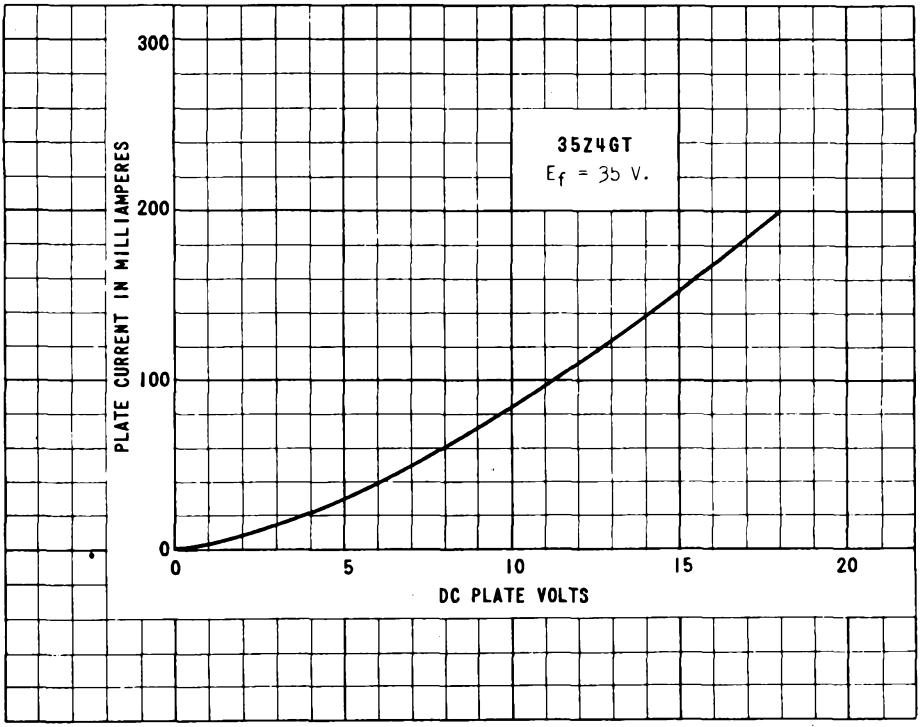
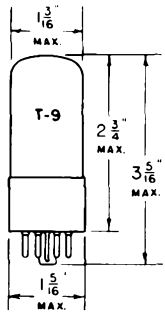


PLATE
933-3

TUNG-SOL



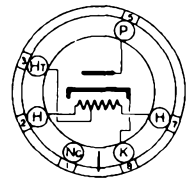
HALF WAVE

HIGH VACUUM RECTIFIER

UNIPOTENTIAL CATHODE

HEATER
35.0 VOLTS 0.150 AMPERE
AC OR DC
WITHOUT PANEL LAMP

GLASS BULB



6AD-0-0

INTERMEDIATE 6 PIN OCTAL BASE

THE TUNG-SOL 35Z5GT/G IS DESIGNED FOR USE AS A RECTIFIER IN AC-DC RECEIVERS. IT FEATURES A 35 V. 150 MA. HEATER HAVING A TAP BROUGHT OUT SO THAT, WITH PROPER EXTERNAL CONNECTIONS, THE TAPPED SECTION OF THE HEATER SERVES AS A BALLAST RESISTOR FOR A PANEL LAMP. IT IS RECOMMENDED THAT THE PLATE CURRENT OF THE RECTIFIER BE PASSED THROUGH THE PANEL LAMP AND THE TAPPED SECTION OF THE HEATER, WHICH IS ACCOMPLISHED BY CONNECTING THE PLATE OF THE RECTIFIER TO THE TAP ON THE HEATER.

RATINGS

MAXIMUM AC PLATE VOLTAGE (RMS)	235	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	700	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	350	VOLTS
MAXIMUM STEADY STATE PEAK PLATE CURRENT	600	MA.
MAXIMUM DC OUTPUT CURRENT:		
NO PANEL LAMP	100	MA.
WITH PANEL LAMP AND SHUNTING RESISTOR	90	MA.
WITH PANEL LAMP ANO NO SHUNTING RESISTOR	60	MA
MAXIMUM VALUE OF PANEL LAMP SHUNTING RESISTOR:		
FOR 70 MA. DC OUTPUT CURRENT	800	OHMS
FOR 80 MA. DC OUTPUT CURRENT	400	OHMS
FOR 90 MA. DC OUTPUT CURRENT	250	OHMS
TAPPED HEATER SECTION VOLTAGE (BETWEEN #2 AND #3) WITH 150 MA. FLOWING BETWEEN PINS #2 AND #7	7.5	VOLTS
MAXIMUM VOLTAGE ACROSS TAPPED HEATER SECTION WHEN PANEL LAMP FAILS (RMS)	15.0	VOLTS
TUBE VOLTAGE DROP AT 200 MA. DC	18	VOLTS

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PLATE 1184-1

FEB. 28 1942

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

WITH #40 OR #47 PANEL LAMP

HEATER VOLTAGE (BETWEEN PINS #2 AND #7)	32	32	32	32	32	VOLTS
HEATER CURRENT (BETWEEN PINS #3 AND #7)	.150	.150	.150	.150	.150	AMPERE
VOLTAGE ACROSS TAPPED SECTION OF HEATER (PINS #2 AND #3)	5	5.5	5.5	5.5	5.5	VOLTS
AC PLATE VOLTAGE (RMS)	117	117	117	117	235	VOLTS
DC OUTPUT CURRENT	60	70	80	90	60	MA.
MINIMUM EFFECTIVE PLATE SUPPLY IMPEDANCE	15	15	15	15	100	OHMS
PANEL LAMP SHUNT RESISTANCE	-	300	150	100	-	OHMS

WITHOUT PANEL LAMP

HEATER VOLTAGE (BETWEEN PINS #2 AND #7)	35.0	35.0	VOLTS
HEATER CURRENT (BETWEEN PINS #3 AND #7)	.150	.150	AMPERE
VOLTAGE ACROSS TAPPED SECTION OF HEATER (PINS #2 AND #3)	7.5	7.5	VOLTS
AC PLATE VOLTAGE (RMS)	235	117	VOLTS
DC OUTPUT CURRENT	100	100	MA.
MINIMUM EFFECTIVE PLATE SUPPLY IMPEDANCE	100	15	OHMS

A WHEN FILTER CONDENSERS LARGER THAN 40 UFDS. ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

THE DROP ACROSS THE SERIES RESISTANCE, IF ANY, AND ALL HEATERS SHOULD TOTAL 117 V. AT 0.15 AMPERE.

VOLTAGES SHOULD NOT BE APPLIED TO THE SOCKET WHEN TUBES ARE INSTALLED OR REMOVED.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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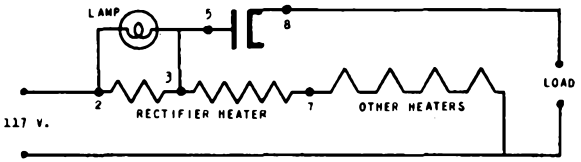
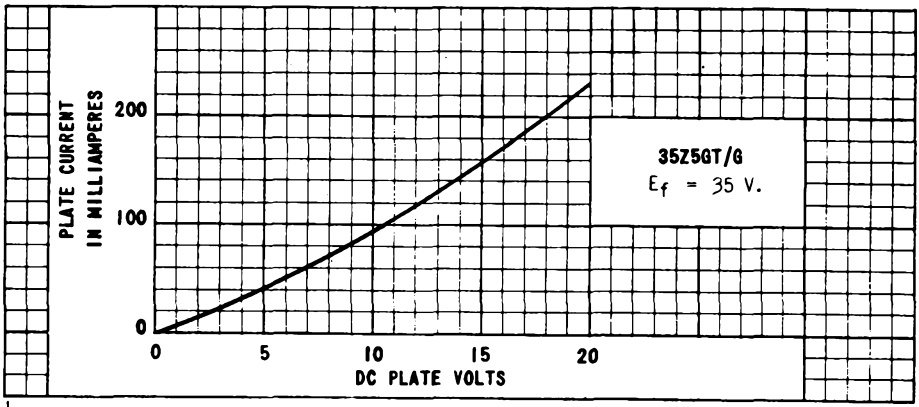
PLATE 1185-1

TUNG-SOL





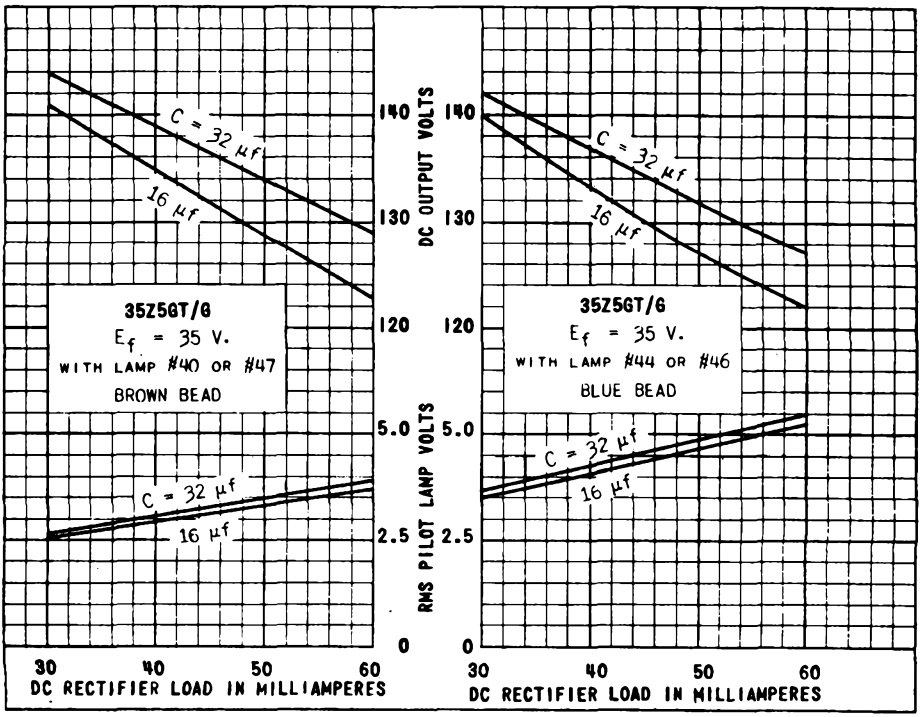


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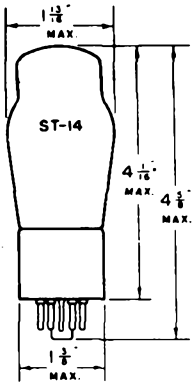
PLATE 1186-1

FEB. 28 1942

35Z6G

TUNG-SOL



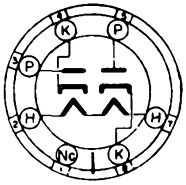
TWIN-DIODE HIGH VACUUM RECTIFIER

VOLTAGE DOUBLER

UNIPOTENTIAL CATHODES

HEATER
35 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



7Q-0-0

MEDIUM 7 PIN OCTAL BASE

THE TUNG-SOL 35Z6G IS DESIGNED PRIMARILY FOR HEAVY DUTY SERVICE AS A POWER RECTIFIER IN AC-DC CIRCUITS. TWO SEPARATE RECTIFIER SECTIONS PERMIT USING THE TUBE AS A VOLTAGE DOUBLER, FULL WAVE RECTIFIER OR HALF WAVE RECTIFIER. FOR HALF WAVE OPERATION THE TWO SECTIONS MAY BE USED SEPARATELY, OR IN PARALLEL TO INCREASE THE OUTPUT CURRENT AND REDUCE TUBE DROP.

RATINGS

MAXIMUM AC PLATE VOLTAGE (RMS)	235	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	350	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	700	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	660	MA.
TUBE VOLTAGE DROP AT 220 MA. DC PER PLATE	20	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERSTICS

VOLTAGE DOUBLER

	HALF WAVE	FULL WAVE	
AC PLATE VOLTAGE PER PLATE (RMS)	117	117	VOLTS
DC OUTPUT CURRENT MAX.	110	110	MA.
MINIMUM EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE	30	15	OHMS

HALF WAVE RECTIFIER

CONDENSER INPUT TO FILTER

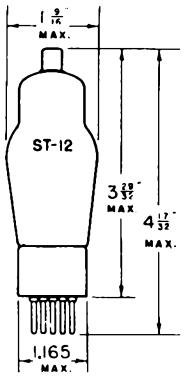
AC PLATE VOLTAGE PER PLATE (RMS)	117	150	235	VOLTS
DC OUTPUT CURRENT PER PLATE MAX.	110	110	110	MA.
MINIMUM EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE	15	40	100	OHMS

PLATE 1187-2

FEB. 28 1942

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

TUNG-SOL

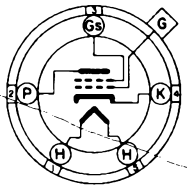


TETRODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



5E
BOTTOM VIEW

SMALL 5 PIN BASE

THE TUNG-SOL 36 IS DESIGNED FOR USE AS AN RF AMPLIFIER OR DETECTOR.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	100	135	180	250 MAX.	VOLTS
SCREEN VOLTAGE	55	67.5	90 MAX.	90 MAX.	VOLTS
CONTROL GRID VOLTAGE	-1.5	-1.5	-3	-3	VOLTS
PLATE CURRENT	1.8	2.8	3.1	3.2	MA.
SCREEN CURRENT	–	–	–	1.7 MAX.	MA.
PLATE RESISTANCE	0.55	0.475	0.50	0.55	MEGOHM
TRANSCONDUCTANCE	850	1000	1050	1080	μMHOS
AMPLIFICATION FACTOR	470	475	525	595	

DETECTOR

	BIASED			GRID LEAK	
PLATE SUPPLY VOLTAGE	100	180	250 MAX.	135	VOLTS
SCREEN VOLTAGE	55	67.5	90 MAX.	45 MAX.	VOLTS
CONTROL GRID VOLTAGE	-5 [A]	-6 [A]	-8 [A]	RETURN TO CATHODE	VOLTS
PLATE RESISTOR	0.25 [B]	0.25 [B]	0.25 [B]	0.25 [B]	MEGOHM
PLATE CURRENT	ADJUSTED TO 0.1 MA. WITH NO INPUT SIGNAL				
GRID LEAK	–	–	–	2 TO 5	MEGOHMS
GRID CONDENSER	–	–	–	250	μμf

[A] APPROXIMATE

[B] OR EQUIVALENT IMPEDANCE

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	3.7	μμf
PLATE TO CATHODE	9.2	μμf
CONTROL GRID TO PLATE [S]	.007 MAX.	μμf

[S] WITH SHIELD

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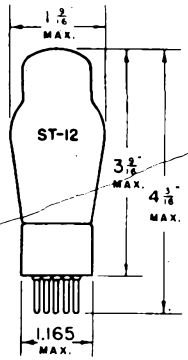
PLATE 472-1

JUNE 26 1939

TUNG-SOL

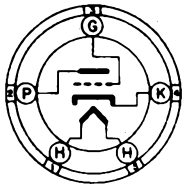


TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



5A

BOTTOM VIEW

SMALL 5 PIN BASE

THE TUNG-SOL 37 IS A GENERAL PURPOSE TRIODE DESIGNED FOR SERVICE AS AN OSCILLATOR, DETECTOR OR AMPLIFIER.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	90	135	180	250 MAX.	VOLTS
GRID VOLTAGE	-6	-9	-13.5	-18	VOLTS
PLATE CURRENT	2.5	4.1	4.3	7.5	MA.
PLATE RESISTANCE	11 500	10 000	10 200	8400	OHMS
TRANSCONDUCTANCE	800	925	900	1100	μMHOS
AMPLIFICATION FACTOR	9.2	9.2	9.2	9.2	

DETECTOR

	BIASED				GRID LEAK	
PLATE VOLTAGE	90	135	180	250 MAX.	45	VOLTS
GRID VOLTAGE	-10	-15	-20	-28	RETURN TO CATHODE	VOLTS
PLATE CURRENT	ADJUST TO 0.2 MA. WITH NO INPUT SIGNAL					
GRID LEAK	-	-	-	-	1 TO 5	MEGOHMS
GRID CONDENSER	-	-	-	-	250	μμf

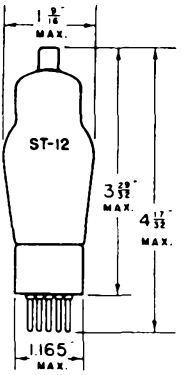
RESISTANCE COUPLED AMPLIFIER

PLATE SUPPLY VOLTAGE	250	VOLTS
PLATE RESISTOR	0.1	MEGOHM
CATHODE RESISTOR	11 000	OHMS
VOLTAGE GAIN	7	

DIRECT INTERELECTRODE CAPACITANCES

GRID TO CATHODE	3.5	μμf
PLATE TO CATHODE	2.9	μμf
GRID TO PLATE	2.0	μμf

PLATE 473-1

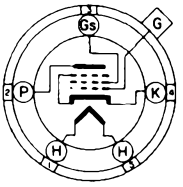


PENTODE POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



5F
BOTTOM VIEW

SMALL 5 PIN BASE

THE TUNG-SOL 38 IS A PENTODE POWER AMPLIFIER DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AC OR STORAGE BATTERY OPERATED RECEIVERS.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	100	135	180	250 MAX.	VOLTS
SCREEN VOLTAGE	100	135	180	250 MAX.	VOLTS
CONTROL GRID VOLTAGE	-9	-13.5	-18	-25	VOLTS
PLATE CURRENT	7	9	14	22	MA.
SCREEN CURRENT	1.2	1.5	2.4	3.8	MA.
PLATE RESISTANCE	0.14	0.13	0.11	0.10	MEGOHM
TRANSCONDUCTANCE	875	925	1050	1200	μMHOS
AMPLIFICATION FACTOR	120	120	120	120	
LOAD RESISTANCE	15000	13500	11600	10000	OHMS
TOTAL HARMONIC DISTORTION	8	10	8	8	PER CENT
POWER OUTPUT	0.27	0.55	1.0	2.5	WATTS

NOTE: THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE.

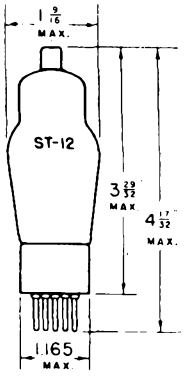
DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	3.5	μμf
PLATE TO CATHODE	7.5	μμf
CONTROL GRID TO PLATE	0.3	μμf

PLATE 470-1

JUNE 26 1939

TUNG-SOL



REMOTE CUT - OFF

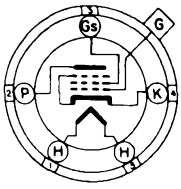
PENTODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

SMALL 5 PIN BASE



5F

BOTTOM VIEW

THE TUNG-SOL 39/44 IS DESIGNED FOR USE AS AN RF AMPLIFIER OR MIXER IN AC AND STORAGE BATTERY OPERATED SUPERHETERODYNE RECEIVERS.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	90	180	250 MAX.	VOLTS
SCREEN VOLTAGE MAX.	90	90	90	VOLTS
CONTROL GRID VOLTAGE MIN. [A]	-3	-3	-3	VOLTS
PLATE CURRENT	5.6	5.8	5.8	MA.
SCREEN CURRENT	1.6	1.4	1.4	MA.
PLATE RESISTANCE	0.375	0.75	1.0	MEGOHM
TRANSCONDUCTANCE	960	1000	1050	μMHOS
AMPLIFICATION FACTOR	360	750	1050	
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 2 μMHOS	-42.5	-42.5	-42.5	VOLTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 3 MEGOHMS.

AS MIXER IN SUPERHETERODYNE CIRCUIT

PLATE VOLTAGE	90	180	250 MAX.	VOLTS
SCREEN VOLTAGE MAX.	90	90	90	VOLTS
CONTROL GRID VOLTAGE	-7	-7	-7	VOLTS

THIS GRID BIAS IS MINIMUM FOR AN OSCILLATOR PEAK VOLTAGE OF 6 VOLTS.

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	3.5	μμf
PLATE TO CATHODE	10	μμf
CONTROL GRID TO PLATE [S]	.007 MAX.	μμf

[S] WITH SHIELD

PLATE 471-1

TUNG-SOL

PENTODE POWER AMPLIFIER

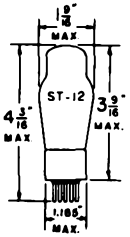
UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 0.4 AMPERE

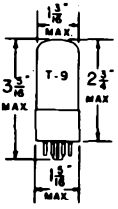
AC OR DC

GLASS BULB



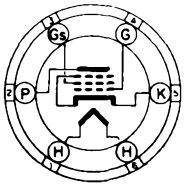
SMALL 6 PIN BASE

41



7 PIN OCTAL BASE

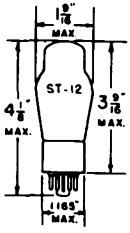
6K6GT



6B

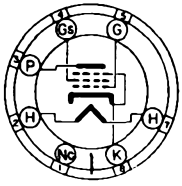
BOTTOM VIEW

41



SMALL 7 PIN OCTAL BASE

6K6G



G-7S

BOTTOM VIEW

6K6G 6K6GT

THE TUNG-SOL 6K6G, 6K6GT AND 41 ARE DESIGNED FOR SERVICE IN THE POWER OUTPUT STAGES OF AC OR STORAGE BATTERY OPERATED RECEIVERS. THEIR ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

MAXIMUM RATINGS

MAXIMUM PLATE VOLTAGE	315	VOLTS
MAXIMUM SCREEN VOLTAGE	285	VOLTS
MAXIMUM PLATE DISSIPATION	8.5	WATTS
MAXIMUM SCREEN DISSIPATION	2.8	WATTS

CONTINUED NEXT PAGE

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PLATE 669-2

NOV. 20 1939

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	315	VOLTS
SCREEN VOLTAGE	100	250	250	VOLTS
CONTROL GRID VOLTAGE	−7	−18	−21	VOLTS
PEAK AF SIGNAL VOLTAGE	7	18	21	VOLTS
ZERO-SIGNAL PLATE CURRENT	9.0	32	25.5	MA.
ZERO-SIGNAL SCREEN CURRENT	1.6	5.5	4.0	MA.
MAXIMUM-SIGNAL PLATE CURRENT	9.5	33	28	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	3	10	9	MA.
PLATE RESISTANCE	104 000	68 000	75 000	OHMS
TRANSCONDUCTANCE	1500	2300	2100	μMHOS
LOAD RESISTANCE	12 000	7600	9000	OHMS
TOTAL HARMONIC DISTORTION	11	11	15	PER CENT
POWER OUTPUT	0.35	3.4	4.5	WATTS

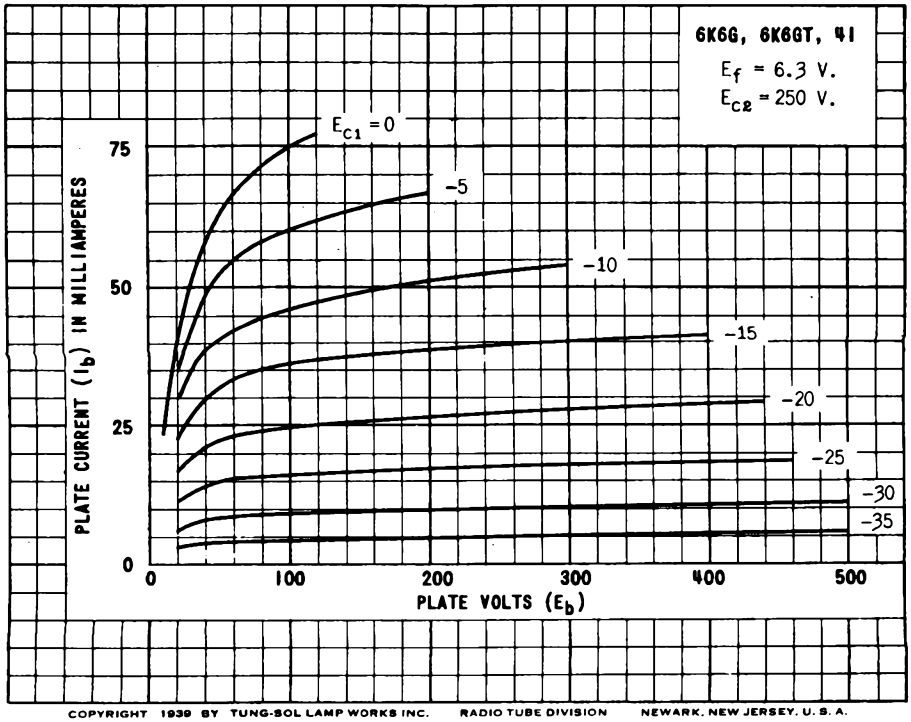


PLATE 670-2

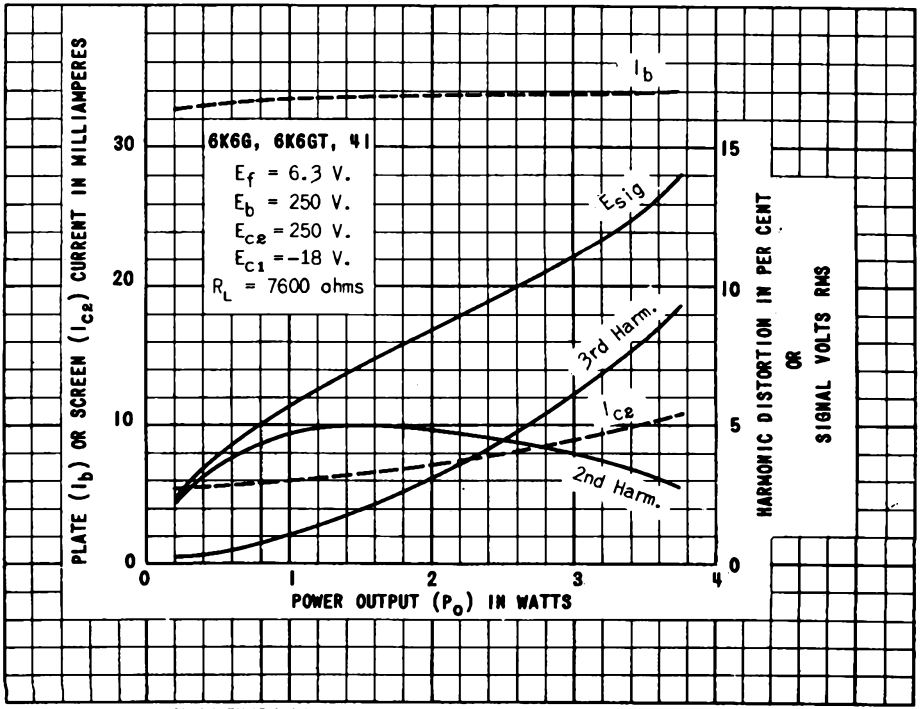
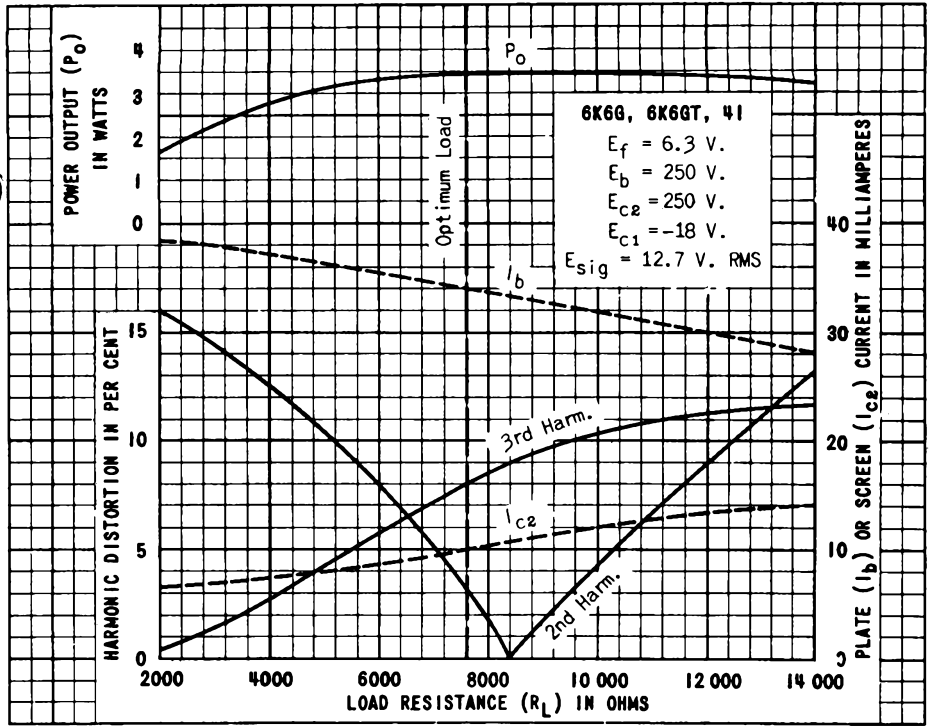


PLATE
632-S

NOV. 20
1939


POWER OUTPUT (P_o) IN WATTS
HARMONIC DISTORTION IN PER CENT
PLATE (I_b) OR SCREEN (I_{c2}) CURRENT IN MILLIAMPERES
LOAD RESISTANCE (R_L) IN OHMS
Optimum Load
P_o
I_b
I_{c2}
3rd Harm.
2nd Harm.
6K6G, 6K6GT, 41
E_f = 6.3 V.
E_b = 250 V.
E_{c2} = 250 V.
E_{c1} = -18 V.
E_{sig} = 12.7 V. RMS
0
1
2
3
4
5
10
15
20
30
40
2000
4000
6000
8000
10 000
12 000
14 000

TUNG-SOL

PENTODE POWER AMPLIFIER

COATED UNIPOTENTIAL CATHODE

HEATERS

6F6, 6F6GT/G, 42 – 6.3 V., 0.7 AMPERE
2A5 – 2.5 V., 1.75 AMPERES

TYPES 6F6, 6F6GT/G, 2A5 AND 42 ARE PENTODE AMPLIFIERS DESIGNED FOR APPLICATION IN POWER OUTPUT STAGES OF RECEIVERS. WITH THE EXCEPTION OF HEATER RATINGS, THEIR ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

MAXIMUM RATINGS

	PENTODE CONNECTION	TRIODE CONNECTION	
MAXIMUM PLATE VOLTAGE	375	350	VOLTS
MAXIMUM SCREEN VOLTAGE	285	–	VOLTS
MAXIMUM PLATE DISSIPATION	11	–	WATTS
MAXIMUM SCREEN DISSIPATION	3.75	–	WATTS
MAXIMUM TOTAL PLATE AND SCREEN DISSIPATION	–	10	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER – SINGLE TUBE [C]

	PENTODE CONNECTION		TRIODE CONNECTION	
PLATE VOLTAGE	250	285	250	VOLTS
SCREEN VOLTAGE	250	285	–	VOLTS
CONTROL GRID VOLTAGE [A]	-16.5	-20	-20	VOLTS
PEAK AF SIGNAL VOLTAGE	16.5	20	20	VOLTS
ZERO-SIGNAL PLATE CURRENT	34	38	31	MA.
ZERO-SIGNAL SCREEN CURRENT	6.5	7	–	MA.
MAXIMUM-SIGNAL PLATE CURRENT	36	40	34	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	10.5	13	–	MA.
PLATE RESISTANCE (APPROX.)	80000	78000	2600	OHMS
TRANSCONDUCTANCE	2500	2550	2600	μMHO
AMPLIFICATION FACTOR	–	–	6.8	
LOAD RESISTANCE	7000	7000	4000	OHMS
TOTAL HARMONIC DISTORTION	8	9	6.5	PER CENT
POWER OUTPUT	3.2	4.8	0.85	WATTS

PUSH-PULL AMPLIFIER – TWO TUBES [F]

	CLASS A_1 AMPLIFIER [C]	CLASS AB_2 AMPLIFIER [D]		
	PENTODE CONNECTION	PENTODE CONNECTION	TRIODE CONNECTION	
PLATE VOLTAGE	315	375	350	VOLTS
SCREEN VOLTAGE	285	250	–	VOLTS
CONTROL GRID VOLTAGE	-24 [A]	-26	-38	VOLTS
PEAK AF SIGNAL VOLTAGE (GRID TO GRID)	48	82	123	VOLTS
ZERO-SIGNAL PLATE CURRENT	62	34	48	MA.
ZERO-SIGNAL SCREEN CURRENT	12	5	–	MA.
MAXIMUM-SIGNAL PLATE CURRENT	80	82	92	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	19.5	19.5	–	MA.
EFFECTIVE LOAD RESISTANCE (PLATE TO PLATE)	10000	10000	6000	OHMS
TOTAL HARMONIC DISTORTION	4	3.5	2	PER CENT
POWER OUTPUT	11	18.5	13	WATTS

(CONTINUED NEXT PAGE)

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PLATE 1389-1
DEC. 15 1943

TUNG-SOL

TYPICAL OPERATING CONDITIONS FOR CATHODE BIAS

	CLASS A_1 AMPLIFIER [C]			CLASS AB_2 AMPLIFIER [D]			
	SINGLE TUBE AMPLIFIER		PUSH-PULL AMPLI.	PUSH-PULL AMPLI.		
	Pentode Conn.	Triode Conn.	Pentode Conn. [F]	Pentode Conn. [F]	Triode Conn. [F]	
Plate	250	285	250	315	375	350	Volts
Screen	250	285	-	285	250	-	Volts
Cathode Resistor	410	-	650	390	340 [B]	730 [E]	Ohms
Peak A-F Grid Voltage	16.5	20	20	-	-	-	Volts
Peak A-F Grid-to-Grid Voltage	-	-	-	58	94	132	Volts
Zero-Sig. Plate Cur.	34	38	31	62	54	50	Ma.
Max.-Sig. Plate Cur.	35	38	32	73	77	60	Ma.
Zero-Sig. Screen Cur.	6.5	7	-	12	8	-	Ma.
Max.-Sig. Screen Cur.	9.7	12	-	18	18	-	Ma.
Load Resistance	7000	7000	4000	-	-	-	Ohms
Effective Load Resis. (plate to plate)	-	-	-	10000	10000	10000	Ohms
Total Harmonic Dist.	8.5	9	6.5	3	5	3	%
Max.-Sig. Power Output	3.1	4.5	0.8	10.5	19	9	Watts

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER RATED MAXIMUM CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED-BIAS OPERATION.

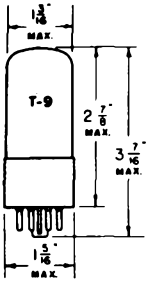
[B] THE VALUE GIVEN FOR THE CATHODE RESISTOR IS DETERMINED FOR A GRID BIAS OF -21 VOLTS.

[C] SUBSCRIPT 1 INDICATES THAT GRID CURRENT DOES NOT FLOW DURING ANY PART OF INPUT CYCLE.

[D] SUBSCRIPT 2 INDICATES THAT GRID CURRENT FLOWS DURING SOME PART OF INPUT CYCLE.

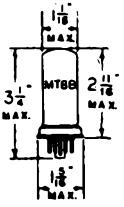
[E] THE VALUE GIVEN FOR THE CATHODE RESISTOR IS DETERMINED FOR A GRID BIAS OF -36.5 VOLTS.

[F] UNLESS OTHERWISE SPECIFIED, VALUES ARE FOR 2 TUBES.



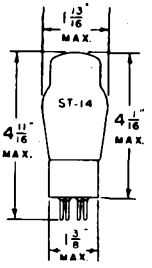
GLASS BULB

6F6GT/G



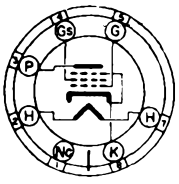
METAL SHELL

6F6

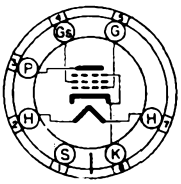


GLASS BULB

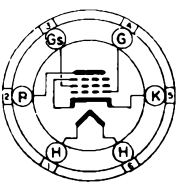
2A5 - 42



MEDIUM 7 PIN OCTAL BASE

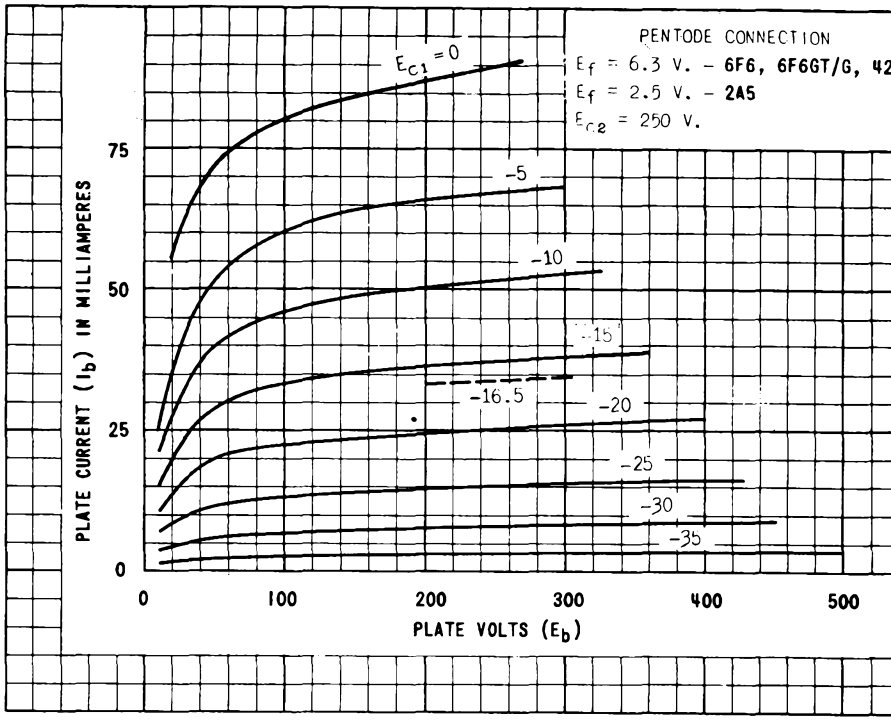


7 PIN OCTAL BASE



MEDIUM 6 PIN BASE

PLATE 1390-1 DEC. 15 1943



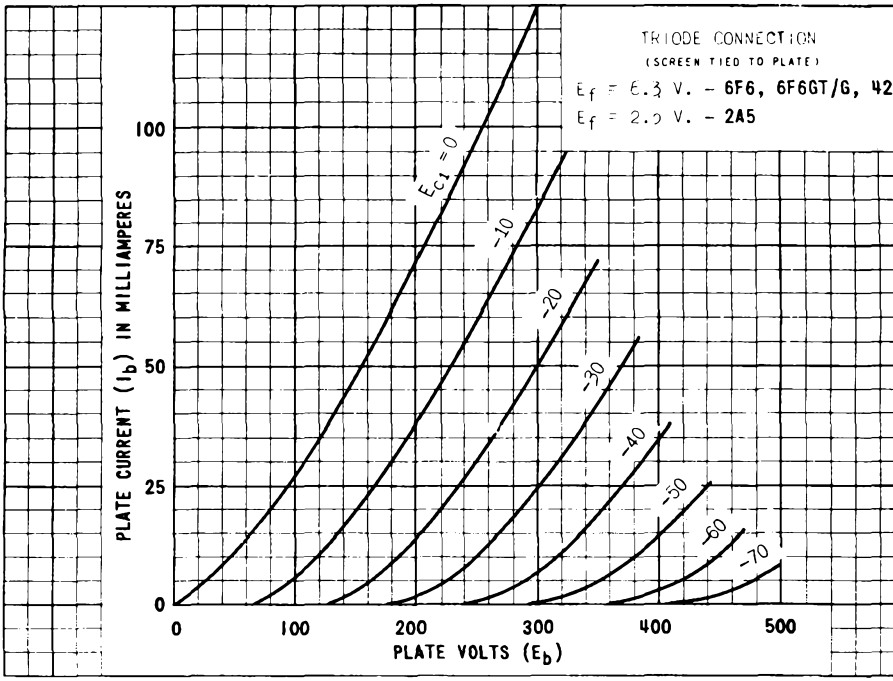


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PLATE
1372-1
OCT. 25
1943

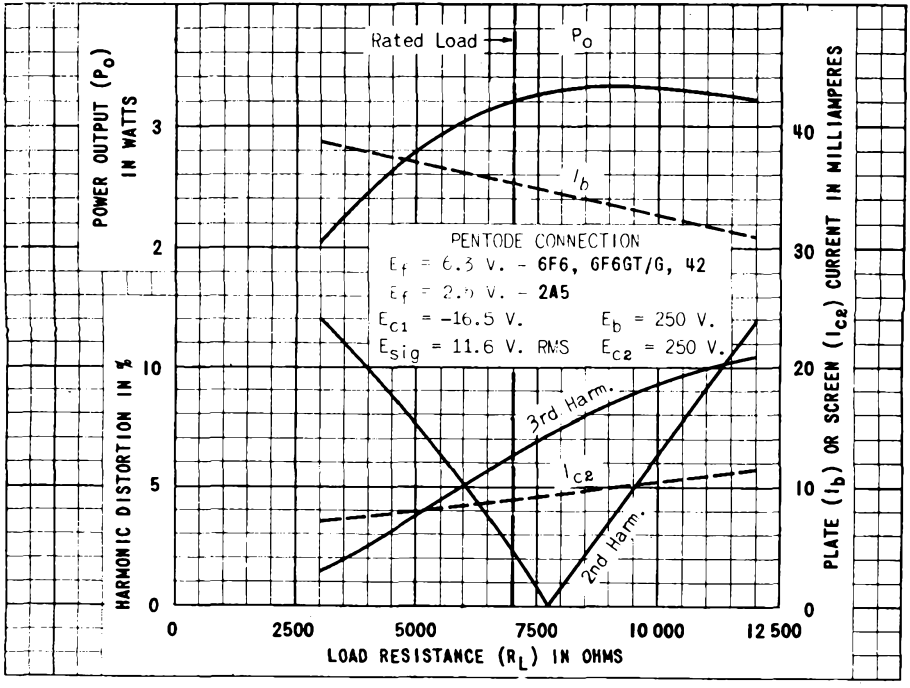
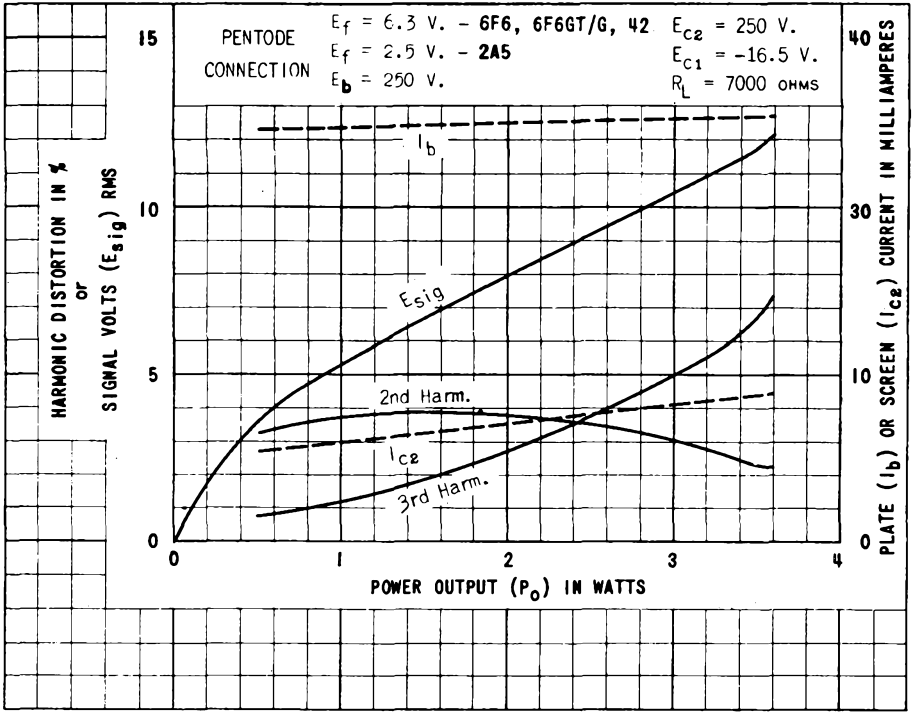
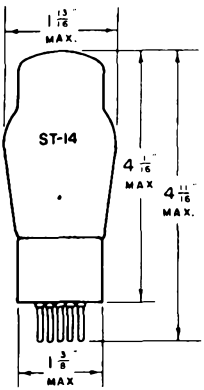


PLATE
1373-1
OCT. 25
1943


PENTODE CONNECTION
E_f = 6.3 V. – 6F6, 6F6GT/G, 42
E_f = 2.5 V. – 2A5
E_b = 250 V.
E_{c2} = 250 V.
E_{c1} = −16.5 V.
R_L = 7000 OHMS
HARMONIC DISTORTION IN %
or
SIGNAL VOLTS (E_{sig}) RMS
PLATE (I_b) OR SCREEN (I_{c2}) CURRENT IN MILLIAMPERES
POWER OUTPUT (P_o) IN WATTS
I_b
E_{sig}
2nd Harm.
I_{c2}
3rd Harm.
0
5
10
15
30
40
1
2
3
4

TUNG-SOL

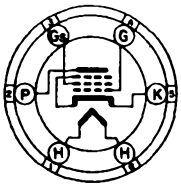


PENTODE POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
25 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



MEDIUM 6 PIN BASE

THE TUNG-SOL 43 IS DESIGNED FOR SERVICE IN THE POWER OUTPUT STAGE OF AC – DC RECEIVERS. ITS CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 25A6G.

MAXIMUM RATINGS

MAXIMUM PLATE VOLTAGE	160	VOLTS
MAXIMUM SCREEN VOLTAGE	135	VOLTS
MAXIMUM PLATE DISSIPATION	5.3	WATTS
MAXIMUM SCREEN DISSIPATION	1.9	WATTS

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	95	135	160	VOLTS
SCREEN VOLTAGE	95	135	120	VOLTS
CONTROL GRID VOLTAGE	−15	−20	−18	VOLTS
PEAK AF SIGNAL VOLTAGE	15	20	18	VOLTS
ZERO-SIG. PLATE CURRENT	20	37	33	MA.
ZERO-SIG. SCREEN CURRENT	4	8	6.5	MA.
MAX.-SIG. PLATE CURRENT	22	39	36	MA.
MAX.-SIG. SCREEN CURRENT	8	14	12	MA.
PLATE RESISTANCE	45 000	35 000	42 000	OHMS
TRANSCONDUCTANCE	2000	2450	2375	μMHOS
LOAD RESISTANCE	4500	4000	5000	OHMS
TOTAL HARMONIC DISTORTION	11	9	10	PER CENT
POWER OUTPUT	0.9	2	2.2	WATTS

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PLATE 480-2

JUNE 26 1939

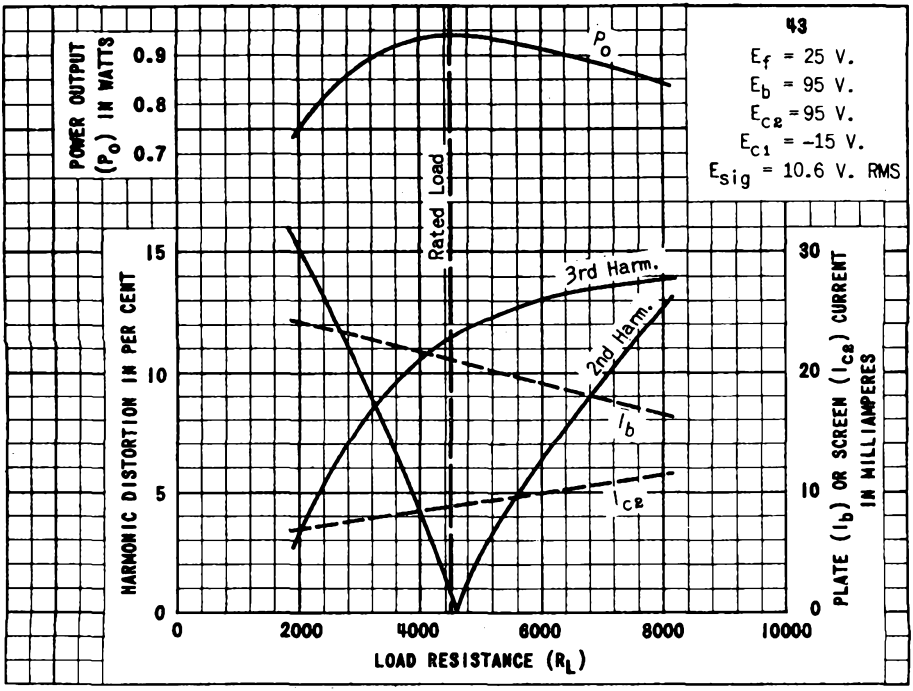
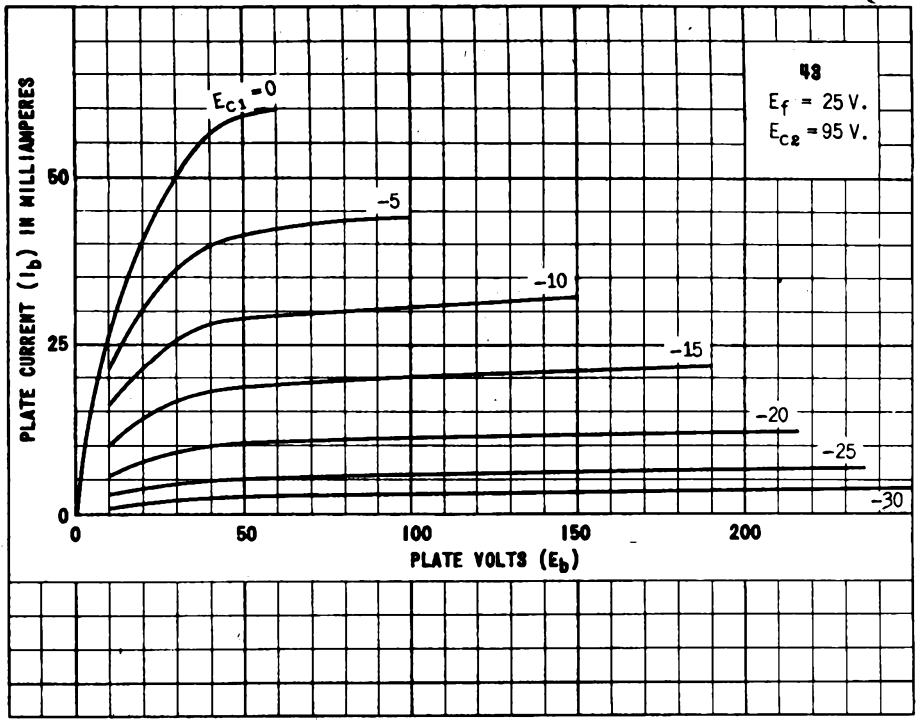
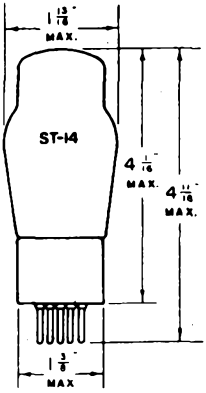


PLATE 481-1


43
E_f = 25 V.
E_{c2} = 95 V.
E_{c1} = 0
-5
-10
-15
-20
-25
-30
PLATE CURRENT (I_b) IN MILLIAMPERES
0
25
50
0
50
100
150
200
PLATE VOLTS (E_b)



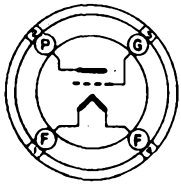
TRIODE POWER AMPLIFIER

COATED FILAMENT

2.5 VOLTS 1.5 AMPERES
AC OR DC

GLASS BULB

MEDIUM 4 PIN BASE



4D

BOTTOM VIEW

THE TUNG-SOL 45 IS A FILAMENT TYPE TRIODE POWER AMPLIFIER DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AUDIO AMPLIFIERS WHERE HIGH OUTPUT AND LOW HARMONIC DISTORTION ARE DESIRED.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	180	250	275 MAX.	VOLTS
GRID VOLTAGE G	-31.5	-50	-56	VOLTS
GRID CIRCUIT RESISTANCE MAX.				
SELF BIAS	1	1	1	MEGOHM
FIXED BIAS	0.1	0.1	0.1	MEGOHM
PLATE CURRENT	31	34	36	MA.
PLATE RESISTANCE	1650	1610	1700	OHMS
TRANSCONDUCTANCE	2125	2175	2050	µMHOS
AMPLIFICATION FACTOR	3.5	3.5	3.5	
LOAD RESISTANCE	2700	3900	4600	OHMS
POWER OUTPUT	0.825	1.6	2.0	WATTS

PUSH-PULL CLASS AB_2 AMPLIFIER T

	FIXED BIAS	SELF BIAS	
PLATE VOLTAGE	275 MAX.	275 MAX.	VOLTS
GRID VOLTAGE G	-68		VOLTS
SELF BIAS RESISTOR		775	OHMS
ZERO-SIG. PLATE CURRENT	28	36	MA.
MAX.-SIG. PLATE CURRENT	138	90	MA.
LOAD RESISTANCE PLATE TO PLATE	3200	5060	OHMS
TOTAL HARMONIC DISTORTION	5	5	PER CENT
AVERAGE POWER INPUT GRID TO GRID	656	460	MILLIWATTS
POWER OUTPUT	18	12	WATTS

(CONTINUED NEXT PAGE)

[G] GRID VOLTAGE MEASURED FROM MID-POINT OF AC OPERATED FILAMENT.

[T] VALUES SPECIFIED FOR TWO TUBES.

DIRECT INTERELECTRODE CAPACITANCES

GRID TO FILAMENT	4	μμf
PLATE TO FILAMENT	3	μμf
GRID TO PLATE	7	μμf

TUNG-SOL LAMP WORKS INC. RADIO TUBE DIVISION NEWARK, NEW JERSEY, U. S. A.

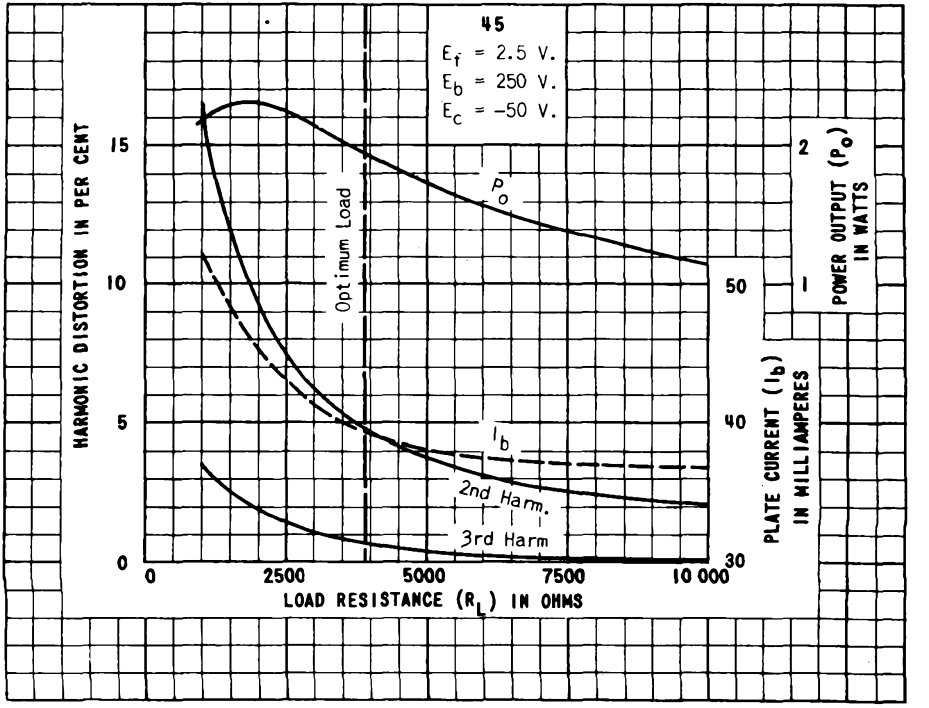


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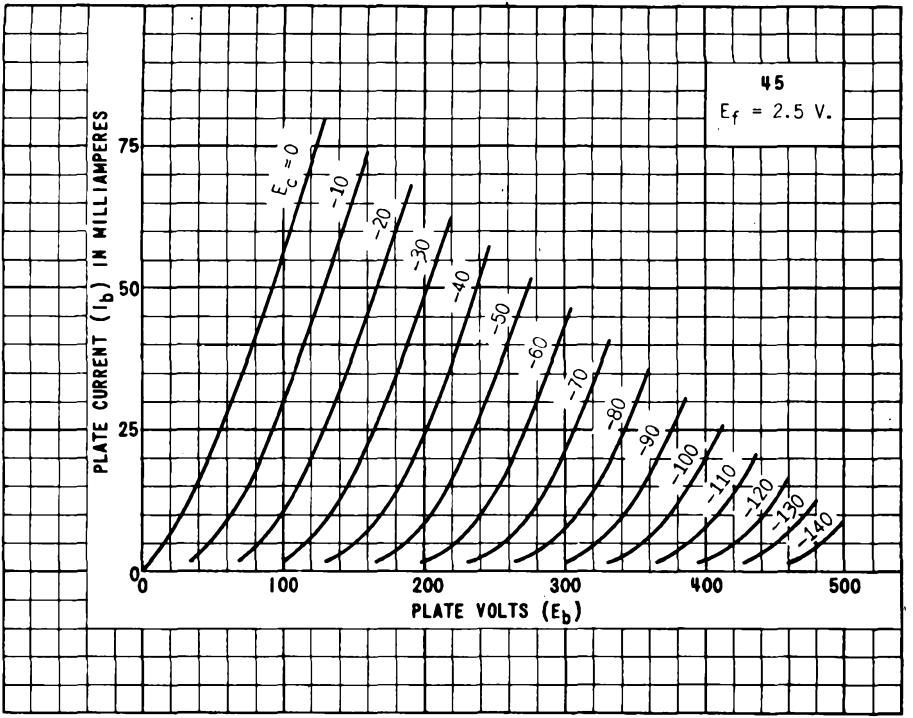
PLATE 301-1

JAN. 23 1939


45
E_f = 2.5 V.
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
25
50
75
100
200
300
400
500
E_c = 0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140

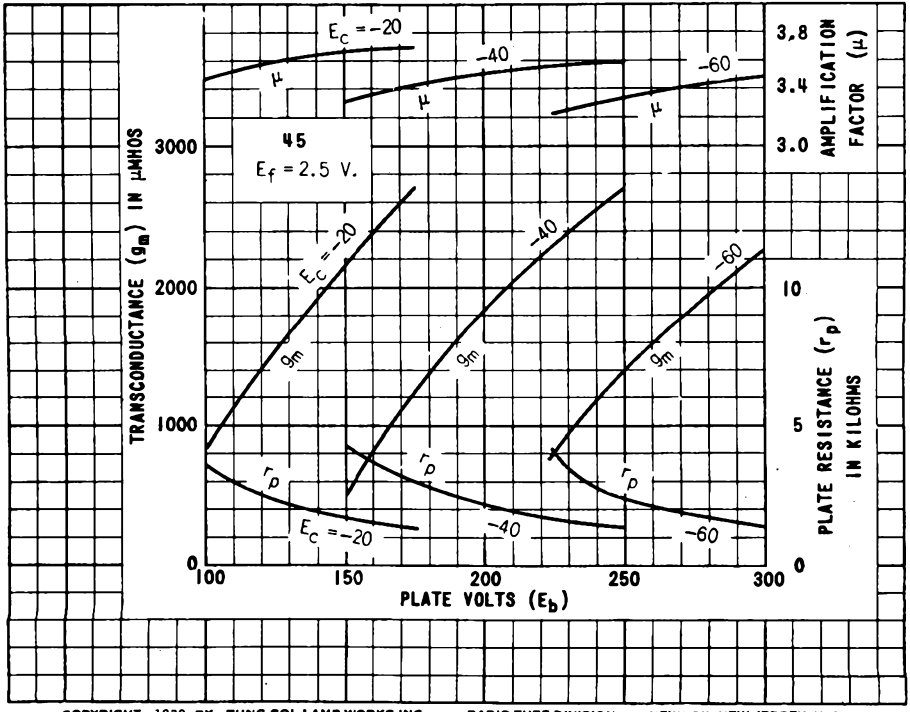
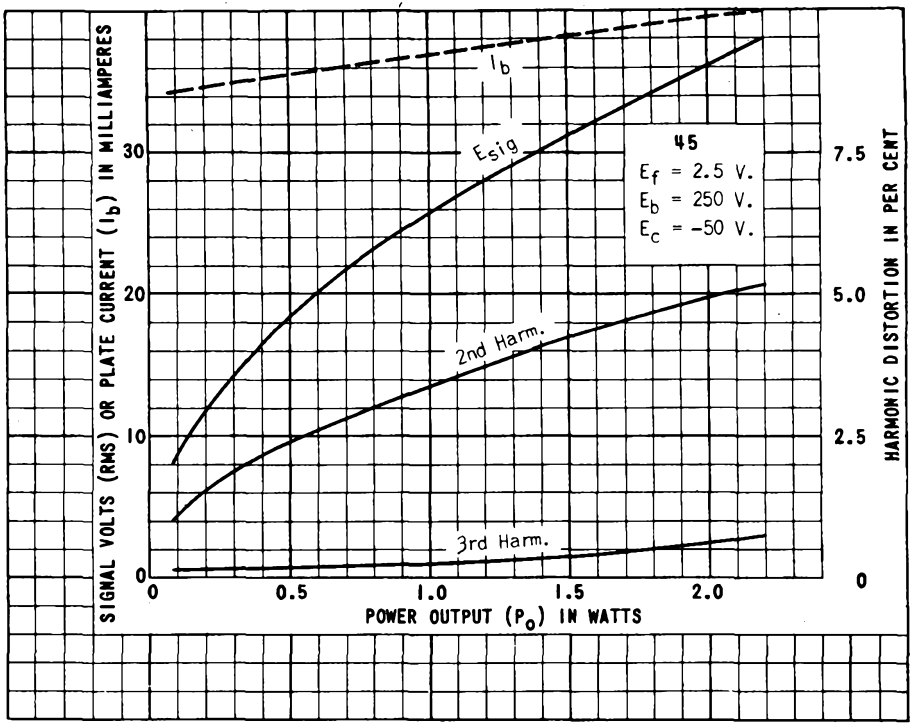
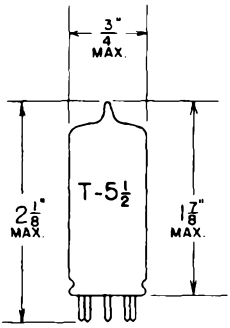


PLATE 302-1


45
E_f = 2.5 V.
E_b = 250 V.
E_c = −50 V.
I_b
E_{sig}
2nd Harm.
3rd Harm.
SIGNAL VOLTS (RMS) OR PLATE CURRENT (I_b) IN MILLIAMPERES
HARMONIC DISTORTION IN PER CENT
POWER OUTPUT (P_o) IN WATTS
0
10
20
30
2.5
5.0
7.5
0.5
1.0
1.5
2.0

TUNG-SOL

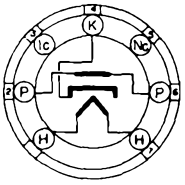


HALF-WAVE

HIGH VACUUM RECTIFIER

UNIPOTENTIAL CATHODE

HEATER
45 VOLTS 0.075 AMPERE
AC OR DC



5AM-0-0

GLASS BULB

BUTTON 7 PIN BASE

THE TUNG-SOL 45Z3 IS A MINIATURE TYPE HALF WAVE POWER RECTIFIER DESIGNED FOR SERVICE IN COMPACT THREE WAY PORTABLE RECEIVERS USING MINIATURE TYPE T[illegible]. IT IS MADE WITHOUT A SEPARATE BASE, USING THE ELECTRODE LEADS THROUGH THE "BUTTON" STEM FOR BASE PINS.

RATINGS

MAXIMUM AC PLATE VOLTAGE (RMS)	117	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	350	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	175	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT	390	MA.
TUBE VOLTAGE DROP — AT 130 MA. DC	23	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HALF WAVE RECTIFIER

AC PLATE VOLTAGE (RMS)	117	VOLTS
DC OUTPUT CURRENT MAX.	65	MA.
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE	15	OHMS

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

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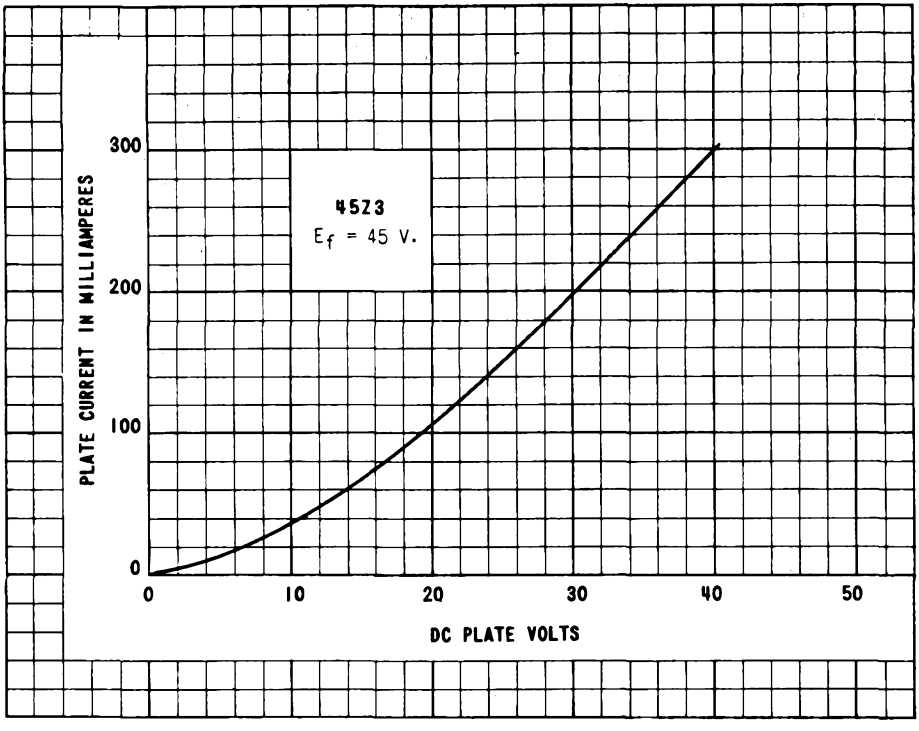
PLATE
1188-1
FEB. 28
1942

45Z3



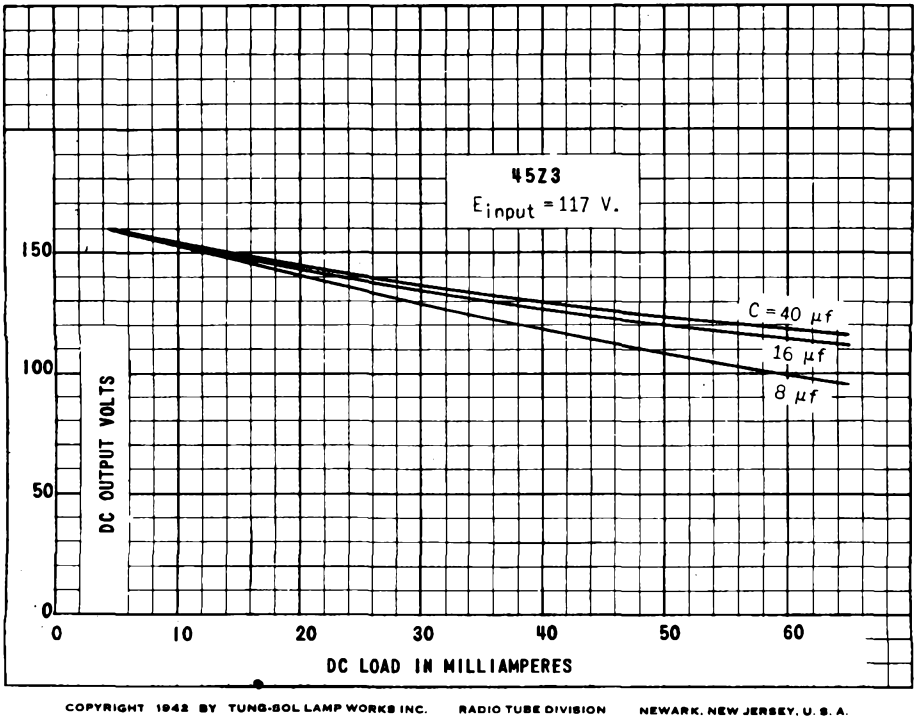
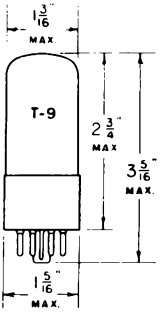


PLATE 1189-1

TUNG-SOL



HALF WAVE

HIGH VACUUM RECTIFIER

UNIPOTENTIAL CATHODE

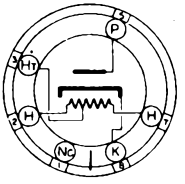
HEATER

45 VOLTS 0.15 AMPERE

AC OR DC

WITHOUT PANEL LAMP

GLASS BULB



6AD

BOTTOM VIEW

INTERMEDIATE 6 PIN OCTAL BASE

THE TUNG-SOL 45Z5GT IS DESIGNED PRIMARILY AS A POWER RECTIFIER FOR AC-DC RECEIVERS. IT FEATURES A 45 V. 150 MA. HEATER HAVING A TAP BROUGHT OUT SO THAT, WITH PROPER EXTERNAL CONNECTIONS, THE TAPPED SECTION OF THE HEATER SERVES AS A BALLAST RESISTOR FOR A PANEL LAMP. IT IS RECOMMENDED THAT THE PLATE CURRENT OF THE RECTIFIER BE PASSED THROUGH THE PANEL LAMP AND THE TAPPED SECTION OF THE HEATER, WHICH IS ACCOMPLISHED BY CONNECTING THE PLATE OF THE RECTIFIER TO THE TAP ON THE HEATER.

RATINGS

MAXIMUM AC PLATE VOLTAGE (RMS)	235	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	700	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	350	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT	600	MA.
MAXIMUM DC OUTPUT CURRENT*		
NO PANEL LAMP	100	MA.
WITH PANEL LAMP AND SHUNTING RESISTOR	90	MA
WITH PANEL LAMP AND NO SHUNTING RESISTOR	60	MA.
MAXIMUM VALUE OF PANEL LAMP SHUNTING RESISTOR:		
FOR 70 MA. DC OUTPUT CURRENT	800	OHMS
FOR 80 MA. DC OUTPUT CURRENT	400	OHMS
FOR 90 MA. DC OUTPUT CURREN	250	OHMS
TAPPED HEATER SECTION VOLTAGE BETWEEN PINS #2 AND #3) WITH 0.150 AMPERES FLOWING BETWEEN PINS #2 AND #7	7.5	VOLTS
MAXIMUM VOLTAGE ACROSS TAPPED HEATER SECTION WHEN PANEL LAMP FAILS (RMS)	15.0	VOLTS
TUBE VOLTAGE DROP AT 200 MA. DC	16	VOLTS

CONTINUED NEXT PAGE

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PLATE 860-2

SEPT. 23 1940

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

WITH #40 OR #47 PANEL LAMP

HEATER VOLTAGE (BETWEEN PINS #2 & #7)	42.0	42.0	42.0	42.0	42.0	VOLTS
HEATER CURRENT (BETWEEN PINS #3 & #7)	0.15	0.15	0.15	0.15	0.15	AMP.
VOLTAGE ACROSS TAPPED SECTION OF HEATER (PINS #2 & #3)	5.5	5.5	5.5	5.5	5.5	VOLTS
AC PLATE VOLTAGE (RMS)	117	117	117	117	235	VOLTS
DC OUTPUT CURRENT	60	70	80	90	60	MA.
EFFECTIVE PLATE SUPPLY IMPEDANCE[MIN.A.]	15	15	15	15	100	OHMS
PANEL LAMP SHUNT RESISTANCE	–	300	150	100	–	OHMS

WITHOUT PANEL LAMP

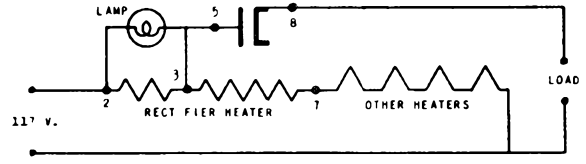
HEATER VOLTAGE (BETWEEN PINS #2 & #7)	45.0	45.0	VOLTS
HEATER CURRENT (BETWEEN PINS #3 & #7)	0.15	0.15	AMP.
VOLTAGE ACROSS TAPPED SECTION OF HEATER (PINS #2 & #3)	7.5	7.5	VOLTS
AC PLATE VOLTAGE (RMS)	235	117	VOLTS
DC OUTPUT CURRENT	100	100	MA.
EFFECTIVE PLATE SUPPLY IMPEDANCE[MIN.A]	100	15	OHMS

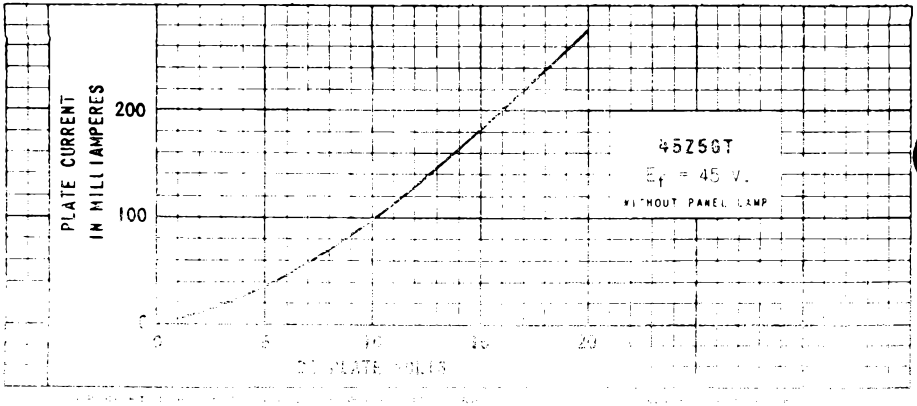
[A] WHEN FILTER CONDENSERS LARGER THAN 40 μFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

THE DROP ACROSS THE SERIES RESISTANCE, IF ANY, AND ALL HEATERS SHOULD TOTAL 117 V. AT 0.15 AMPERE.

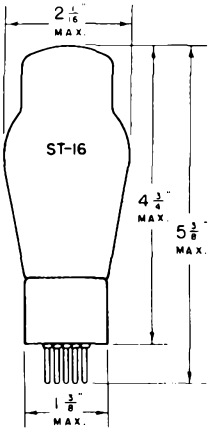
VOLTAGES SHOULD NOT BE APPLIED TO THE SOCKET WHEN TUBES ARE INSTALLED OR REMOVED.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.





TUNG-SOL



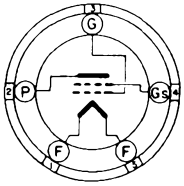
DUAL GRID POWER AMPLIFIER

COATED FILAMENT

2.5 VOLTS 1.75 AMPERES
AC OR DC

GLASS BULB

MEDIUM 5 PIN BASE



5C
BOTTOM VIEW

THE TUNG-SOL 46 IS A DUAL GRID POWER TUBE DESIGNED FOR USE IN A CLASS A OR CLASS B OUTPUT STAGE.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

GRID G_5 CONNECTED TO PLATE AT SOCKET

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE [A]	-33	VOLTS
PLATE CURRENT	22	MA.
PLATE RESISTANCE	2380	OHMS
TRANSCONDUCTANCE	2350	μMHOS
AMPLIFICATION FACTOR	5.6	
LOAD RESISTANCE	6400	OHMS
POWER OUTPUT [B]	1.25	WATTS

[A] MEASURED FROM MIDPOINT OF AC OPERATED FILAMENT.

[B] APPROXIMATELY TWICE THIS VALUE IS RECOMMENDED FOR LOAD WHEN THIS TUBE IS USED AS DRIVER FOR CLASS B STAGE.

CLASS B AMPLIFIER – TWO TUBES

GRIDS CONNECTED TOGETHER AT SOCKET

PLATE VOLTAGE	300	400 MAX.	VOLTS
GRID VOLTAGE	0	0	VOLTS
ZERO-SIGNAL PLATE CURRENT	8	12	MA.
PEAK PLATE CURRENT PER TUBE	200 MAX.	200 MAX.	MA.
MAXIMUM PLATE DISSIPATION	10	10	WATTS
LOAD RESISTANCE PLATE TO PLATE	5200	5800	OHMS
AVERAGE POWER INPUT GRID TO GRID	0.95	0.65	WATT
POWER OUTPUT	16	20	WATTS

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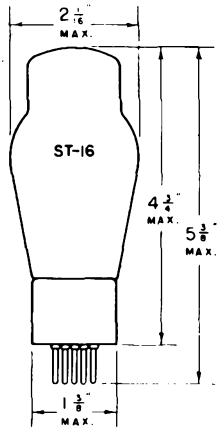
PLATE 474-1

JUNE 26 1939

TUNG-SOL



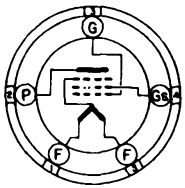
PENTODE POWER AMPLIFIER

COATED FILAMENT

2.5 VOLTS 1.75 AMPERES
AC OR DC

GLASS BULB

MEDIUM 5 PIN BASE



5B

BOTTOM VIEW

THE TUNG-SOL 47 IS A FILAMENT TYPE OUTPUT POWER PENTODE.

OPERATING CONDITIONS AND CHARACTERISTICS

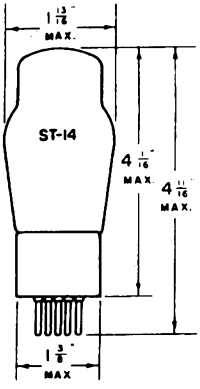
CLASS A AMPLIFIER

PLATE VOLTAGE	250 MAX.	VOLTS
SCREEN VOLTAGE	250 MAX.	VOLTS
CONTROL GRID VOLTAGE [A]	-16.5	VOLTS
PLATE CURRENT	31	MA.
SCREEN CURRENT	6	MA.
PLATE RESISTANCE	60 000	OHMS
TRANSCONDUCTANCE	2500	μMHOS
AMPLIFICATION FACTOR	150	
LOAD RESISTANCE	7000	OHMS
POWER OUTPUT [B]	2.7	WATTS

[A] MEASURED FROM MIDPOINT OF AC OPERATED FILAMENT.

[B] 6% TOTAL HARMONIC DISTORTION.

PLATE 475-1



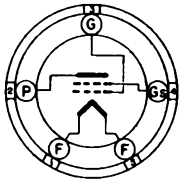
DUAL GRID POWER AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.12 AMPERE
DC

GLASS BULB

MEDIUM 5 PIN BASE



5C

BOTTOM VIEW

THE TUNG-SOL 49 IS A DUAL GRID POWER TUBE DESIGNED FOR USE IN A CLASS A OR CLASS B OUTPUT STAGE.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

GRID G2 CONNECTED TO PLATE AT SOCKET

PLATE VOLTAGE	135 MAX.	VOLTS
GRID VOLTAGE [A]	−20	VOLTS
PLATE CURRENT	6.0	MA.
PLATE RESISTANCE	4175	OHMS
TRANSCONDUCTANCE	1125	μMHOS
AMPLIFICATION FACTOR	4.7	
LOAD RESISTANCE	11000 [B]	OHMS
POWER OUTPUT	0.170	WATT

[A] RETURN TO NEGATIVE FILAMENT (PIN #5)

[B] APPROXIMATELY TWICE THIS VALUE IS RECOMMENDED FOR LOAD AS DRIVER FOR CLASS B STAGE

CLASS B_2 AMPLIFIER — TWO TUBES — PUSH-PULL

GRIDS CONNECTED TOGETHER AT SOCKET

PLATE VOLTAGE	135	180 MAX.	VOLTS
GRID VOLTAGE [E]	0	0	VOLTS
PEAK AF SIGNAL VOLTAGE PER TUBE [C]	35	35	VOLTS
ZERO-SIGNAL PLATE CURRENT PER TUBE [D]	1.3	2	MA.
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	8000	12000	OHMS
POWER OUTPUT APPROX.	2.3	3.5	WATTS

[C] FOR POWER OUTPUT SHOWN

[D] MAXIMUM PEAK PLATE CURRENT IS 50 MA.

[E] RETURN TO NEGATIVE FILAMENT (PIN #5)

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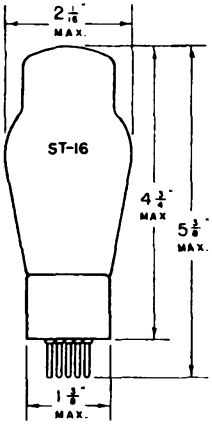
PLATE 907-2

NOV. 8 1940

FOR "INTERPRETATION OF RATINGS" REFER TO THE FRONT OF BOOK.

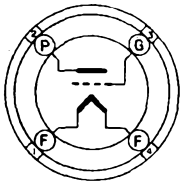


TRIODE POWER AMPLIFIER

COATED FILAMENT

7.5 VOLTS 1.25 AMPERES
AC OR DC

GLASS BULB



4D

BOTTOM VIEW

MEDIUM 4 PIN BASE

THE TUNG-SOL 50 IS A FILAMENT TYPE POWER OUTPUT TUBE.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	300	350	400	450	VOLTS
GRID VOLTAGE[A]	-54	-63	-70	-84	VOLTS
PLATE CURRENT	35	45	55	55	MA.
PLATE RESISTANCE	2000	1900	1800	1800	OHMS
TRANSCONDUCTANCE	1900	2000	2100	2100	μMHOS
AMPLIFICATION FACTOR	3.8	3.8	3.8	3.8	
LOAD RESISTANCE	4600	4100	3670	4350	OHMS
POWER OUTPUT	1.6	2.4	3.4	4.6	WATTS

[A] GRID VOLTAGE MEASURED FROM MID-POINT OF AC OPERATED FILAMENT.

SELF BIAS IS RECOMMENDED IN ALL CASES. THE GRID CIRCUIT RESISTANCE SHOULD NOT EXCEED 10 000 OHMS.

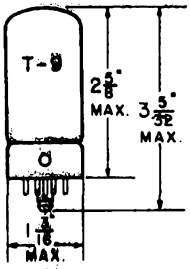
DIRECT INTERELECTRODE CAPACITANCES

GRID TO FILAMENT	4.2	μμf
PLATE TO FILAMENT	3.4	μμf
GRID TO PLATE	7.1	μμf

PLATE
908-2

TUNG-SOL

BEAM PENTODE

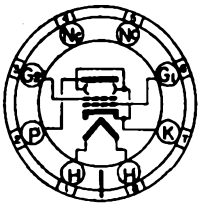


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
50 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
LOCKING—IN
8 PIN BASE

THE 50A5 IS DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AC/DC RECEIVERS. IT DELIVERS HIGH POWER OUTPUT WITH HIGH POWER SENSITIVITY FROM LOW SUPPLY VOLTAGES.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	50	VOLTS
MAXIMUM PLATE VOLTAGE	200	VOLTS
MAXIMUM GRID #2 VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	10	WATTS
MAXIMUM GRID #2 DISSIPATION	1.25	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	50	50	VOLTS
HEATER CURRENT	150	150	MA.
PLATE VOLTAGE	110	200	VOLTS
GRID #2 VOLTAGE	110	110	VOLTS
GRID #1 VOLTAGE	-7.5	-8	VOLTS
PEAK AF SIGNAL VOLTAGE	7.5	8	VOLTS
GRID CIRCUIT RESISTANCE (MAX.):			
FOR FIXED BIAS	0.1	0.1	MEGOHM
FOR CATHODE BIAS	0.5	0.5	MEGOHM
ZERO SIGNAL PLATE CURRENT	49	50	MA.
ZERO SIGNAL GRID #2 CURRENT (NOMINAL)	4	1.5	MA.
MAXIMUM SIGNAL PLATE CURRENT	50	55	MA.
MAXIMUM SIGNAL GRID #2 CURRENT (NOMINAL)	11	6	MA.
PLATE RESISTANCE (APPROX.)	10 000	35 000	OHMS
TRANSCONDUCTANCE	8 200	8 250	μMHOS
LOAD RESISTANCE	2 000	3 000	OHMS
TOTAL HARMONIC DISTORTION	10	10	PERCENT
POWER OUTPUT	2.2	4.7	WATTS

SIMILAR TYPE REFERENCE: *Ratings and characteristics identical to 50L6GT. Except for heater ratings identical to 25L6GT, somewhat similar to 35L6GT.*

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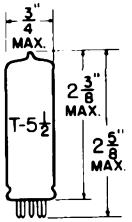
PLATE 1864
AUG. 1, 1947

TUNG-SOL

BEAM POWER AMPLIFIER

MINIATURE TYPE

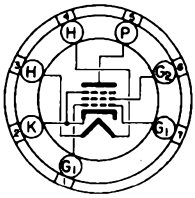


GLASS BULB

UNIPOTENTIAL CATHODE

HEATER
50 VOLTS 0.15 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 50B5 IS A BEAM POWER AMPLIFIER IN THE MINIATURE CONSTRUCTION. BECAUSE OF ITS HIGH POWER SENSITIVITY AT LOW PLATE-SCREEN VOLTAGE, IT IS PARTICULARLY ADAPTABLE TO AC/DC RECEIVER APPLICATIONS.

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	50	VOLTS
HEATER CURRENT	0.15	AMP.
MAXIMUM PLATE VOLTAGE	117	VOLTS
MAXIMUM SCREEN VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	5.5	WATTS
MAXIMUM SCREEN DISSIPATION	1.25	WATTS
MAXIMUM HEATER-CATHODE VOLTAGE	90	VOLTS

DIRECT INTERELECTRODE CAPACITANCES - APPROX.
WITH NO EXTERNAL SHIELD

GRID TO PLATE	0.5	μμf
INPUT	13	μμf
OUTPUT	6.5	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	110	VOLTS
SCREEN VOLTAGE	110	VOLTS
GRID VOLTAGE	-7.5	VOLTS
PEAK AF GRID VOLTAGE	7.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	49	MA.
ZERO-SIGNAL SCREEN CURRENT (APPROX.)	4	MA.
MAXIMUM-SIGNAL PLATE CURRENT	50	MA.
MAXIMUM-SIGNAL SCREEN CURRENT (APPROX.)	8.5	MA.
GRID CIRCUIT RESISTANCE (MAX.):		
FOR FIXED BIAS	0.1	MEGOHM
FOR CATHODE BIAS	0.5	MEGOHM
LOAD RESISTANCE	2 500	OHMS
PLATE RESISTANCE (APPROX.)	14 000	OHMS
TRANSCONDUCTANCE	7 500	μMHOS
MAXIMUM-SIGNAL POWER OUTPUT	1.9	WATTS
TOTAL HARMONIC DISTORTION	9	PERCENT

SIMILIAR TYPE REFERENCE: *Within its ratings similiar to 50L6GT. Except for heater ratings somewhat similiar to 25B5, 35B5, 35L6GT.*

→ INDICATES A CHANGE OR ADDITION.

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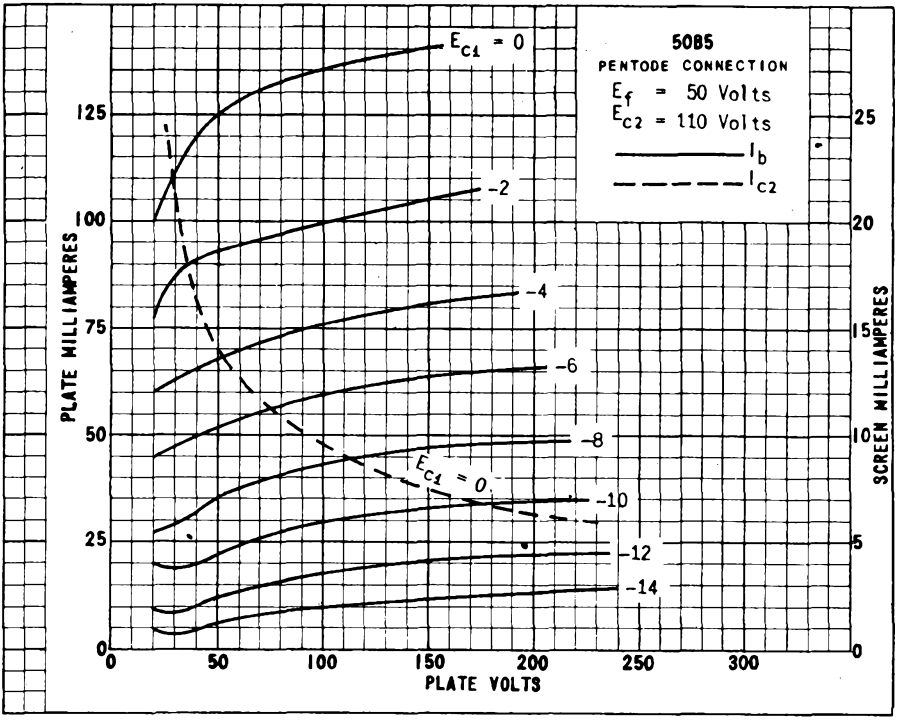
PLATE 1813
JUNE 2, 1947

5085



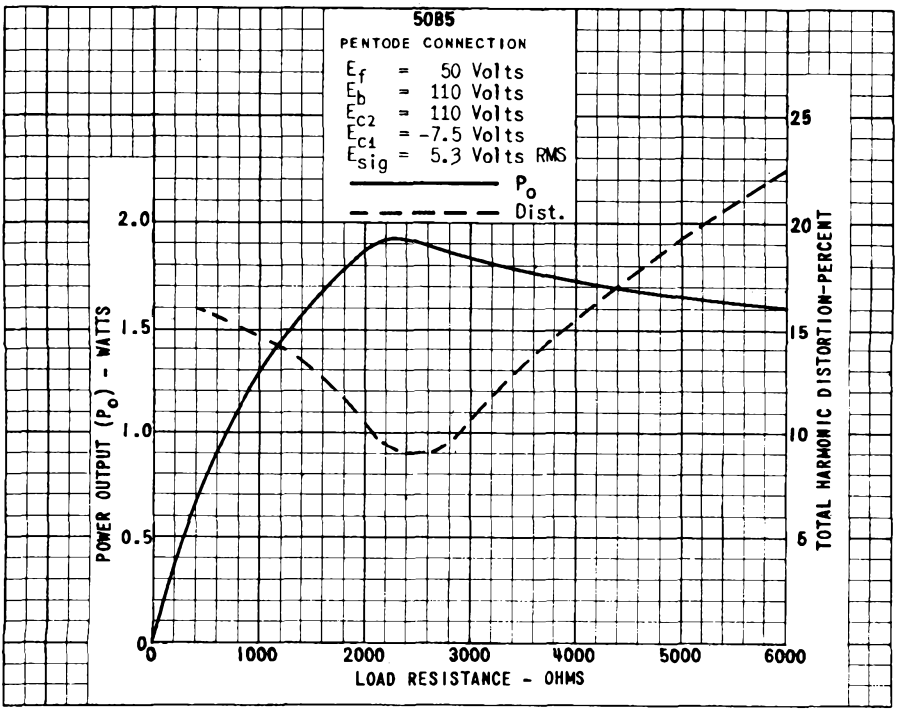


PLATE 1814
JUNE 2, 1947

TUNG-SOL

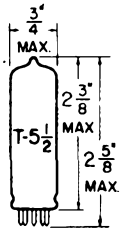
BEAM PENTODE

MINIATURE TYPE

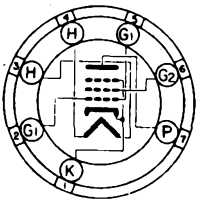
UNIPOTENTIAL CATHODE

HEATER
50 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 50C5 IS A BEAM POWER AMPLIFIER IN THE MINIATURE CONSTRUCTION. BECAUSE OF ITS HIGH POWER SENSITIVITY AT LOW PLATE-SCREEN VOLTAGE, IT IS PARTICULARLY ADAPTABLE TO AC/DC RECEIVER APPLICATIONS.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.

WITH NO EXTERNAL SHIELD

GRID TO PLATE: (G_1 TO P)	0.64	μμf
INPUT: G_1 TO (H+K&G_3+G_2)	13	μμf
OUTPUT: P TO (H+K&G_3+G_2)	6.1	μμf

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	50	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	180	VOLTS
MAXIMUM PLATE VOLTAGE	135	VOLTS
MAXIMUM GRID #2 VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	5.5	WATTS
MAXIMUM SCREEN DISSIPATION	1.25	WATTS
MAXIMUM GRID #1 CIRCUIT RESISTANCE (FIXED BIAS)	0.1	MEGOHM
MAXIMUM GRID #1 CIRCUIT RESISTANCE (SELF BIAS)	0.5	MEGOHM
MAXIMUM BULB TEMPERATURE (AT HOTTEST POINT ON BULB SURFACE)	250	°C

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	50	VOLTS
HEATER CURRENT	150	VOLTS
PLATE VOLTAGE	110	VOLTS
SCREEN VOLTAGE	110	VOLTS
GRID #1 VOLTAGE	-7.5	VOLTS
PEAK AF GRID #1 VOLTAGE	7.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	49	MA.
ZERO-SIGNAL GRID #2 CURRENT (NOMINAL)	4	MA.
MAXIMUM SIGNAL PLATE CURRENT	50	MA.
MAXIMUM SIGNAL GRID #2 CURRENT (NOMINAL)	8.5	MA.
PLATE RESISTANCE	10 000	OHMS
TRANSCONDUCTANCE	7 500	μMHOS
LOAD RESISTANCE	2 500	OHMS
TOTAL HARMONIC DISTORTION	9	PERCENT
MAXIMUM SIGNAL POWER OUTPUT	1.9	WATTS

SIMILAR TYPE REFERENCE: Ratings and characteristics somewhat similar to type 50B5.

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PLATE 2004 - APRIL 1 1948

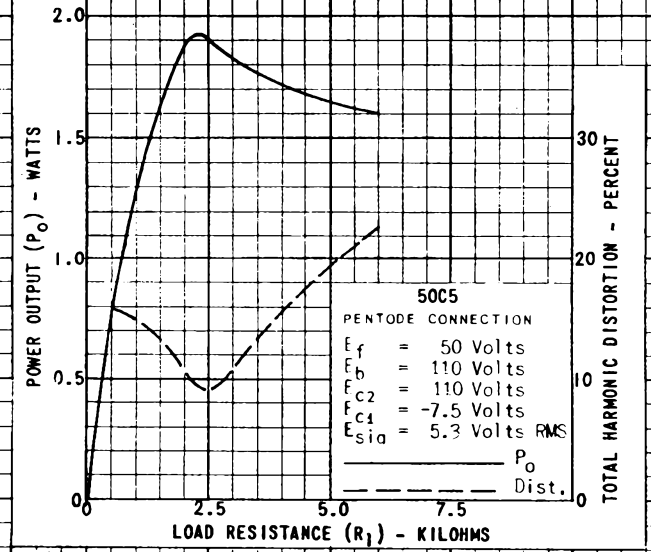
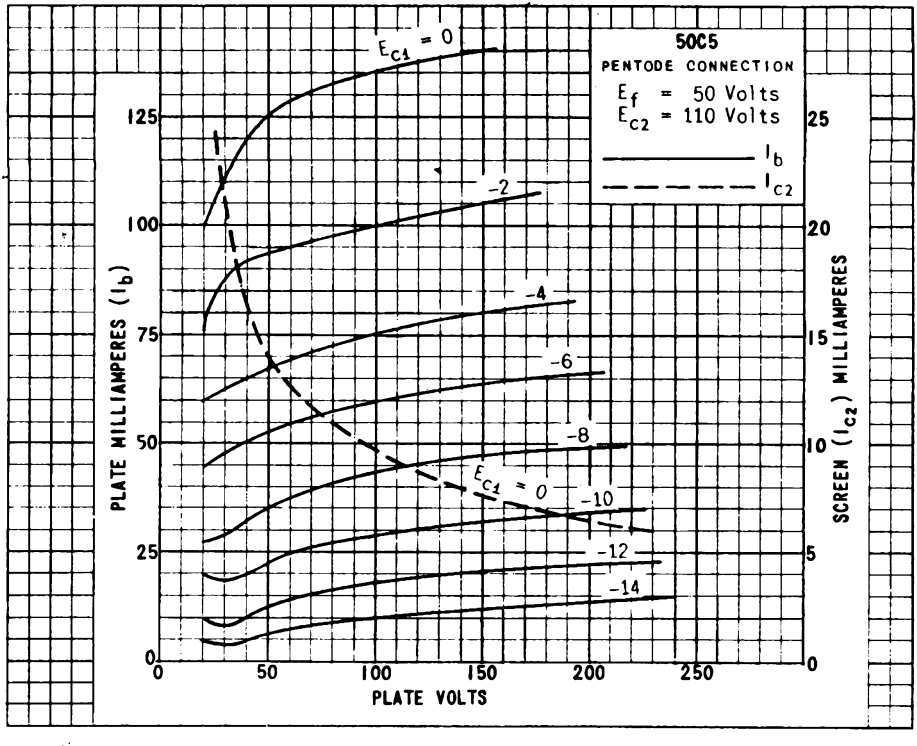
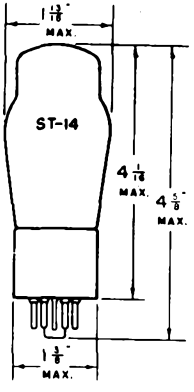


PLATE
2005
APRIL 1
1948

50C5


50C5
PENTODE CONNECTION
E_f = 50 Volts
E_{c2} = 110 Volts
I_b
I_{c2}
E_{c1} = 0
-2
-4
-6
-8
-10
-12
-14
PLATE MILLIAMPERES (I_b)
SCREEN (I_{c2}) MILLIAMPERES
PLATE VOLTS
0
25
50
75
100
125
150
200
250
5
10
15
20

TUNG-SOL



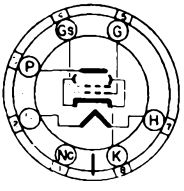
BEAM POWER AMPLIFIER

U. POTENTIAL CATHODE

HEATER
50.0 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB

MEDIUM 7 PIN OCTAL BASE



G-7AC

BOTTOM VIEW

THE TUNG-SOL 50C6G IS A BEAM POWER AMPLIFIER, DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AC-DC RECEIVERS. IT FEATURES HIGH POWER OUTPUT WITH LOW SUPPLY VOLTAGES.

RATINGS

MAXIMUM PLATE VOLTAGE	200	VOLTS
MAXIMUM SCREEN VOLTAGE	135	VOLTS
MAXIMUM PLATE DISSIPATION	12.5	WATTS
MAXIMUM SCREEN DISSIPATION	1.75	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	135	200	VOLTS
SCREEN VOLTAGE	135	135	VOLTS
CONTROL GRID VOLTAGE[A]	-13.5	-14	VOLTS
PEAK A-F SIGNAL VOLTAGE	13.5	14	VOLTS
ZERO-SIGNAL PLATE CURRENT	58	61	MA.
ZERO-SIGNAL SCREEN CURRENT (NOMINAL)	3.5	2.2	MA.
MAXIMUM-SIGNAL PLATE CURRENT	60	66	MA.
MAXIMUM-SIGNAL SCREEN CURRENT (NOMINAL)	13.5	9	MA.
PLATE RESISTANCE (APPROX.)	9300	18300	OHMS
TRANSCONDUCTANCE	7000	7100	μMHOS
LOAD RESISTANCE	2000	2600	OHMS
TOTAL HARMONIC DISTORTION	10	10	PER CENT
POWER OUTPUT	3.6	6.0	WATTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER MAXIMUM RATED CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

JUNE 6
1941

PLATE
1061-1

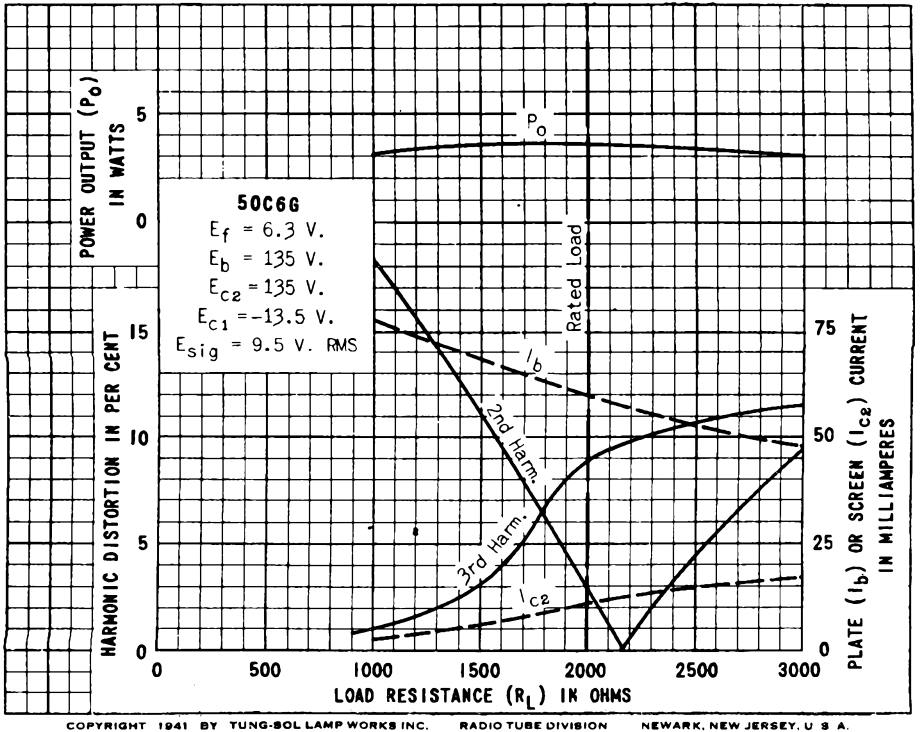
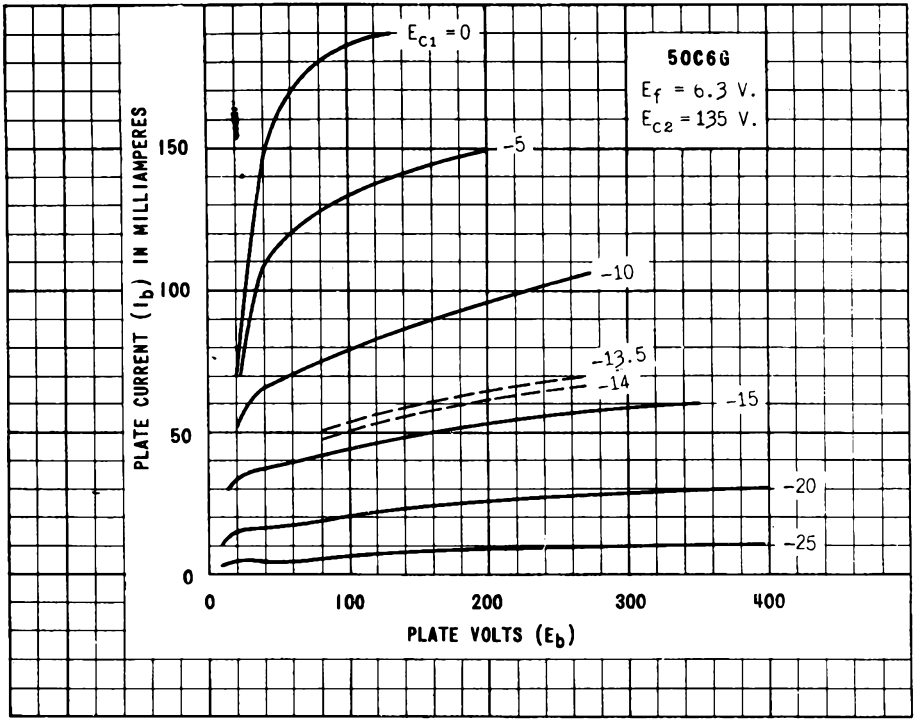


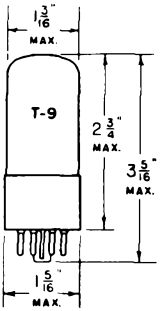
PLATE 1062-1

50C6G


50C6G
E_f = 6.3 V.
E_{c2} = 135 V.
E_{c1} = 0
-5
-10
-13.5
-14
-15
-20
-25
PLATE CURRENT (I_b) IN MILLIAMPERES
0
50
100
150
0
100
200
300
400
PLATE VOLTS (E_b)

TUNG-SOL

BEAM POWER AMPLIFIER

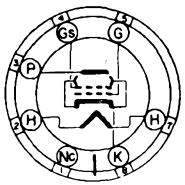


UNIPOTENTIAL CATHODE

HEATER
50 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB

INTERMEDIATE 7 PIN OCTAL BASE



G-7AC

BOTTOM VIEW

THE TUNG-SOL 50L6GT IS DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF AC-DC RECEIVERS. IT DELIVERS A HIGH POWER OUTPUT WITH HIGH POWER SENSITIVITY FROM LOW SUPPLY VOLTAGES.

RATINGS

MAXIMUM PLATE VOLTAGE	200	VOLTS
MAXIMUM SCREEN VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	10	WATTS
MAXIMUM SCREEN DISSIPATION	1.25	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	110	200	VOLTS
SCREEN VOLTAGE	110	110	VOLTS
CONTROL GRID VOLTAGE[A]	-7.5	-8	VOLTS
PEAK AF SIGNAL VOLTAGE	7.5	8	VOLTS
ZERO-SIGNAL PLATE CURRENT	49	50	MA.
ZERO-SIGNAL SCREEN CURRENT - NOMINAL	4	1.5	MA.
MAXIMUM-SIGNAL PLATE CURRENT	50	55	MA.
MAXIMUM-SIGNAL SCREEN CURRENT - NOMINAL	11	6	MA.
PLATE RESISTANCE APPROX.	10 000	35 000	OHMS
TRANSCONDUCTANCE	8200	8250	μMHOS
LOAD RESISTANCE	2000	3000	OHMS
TOTAL HARMONIC DISTORTION	10	10	PER CENT
POWER OUTPUT	2.2	4.7	WATTS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT, UNDER MAXIMUM RATED CONDITIONS, SHOULD NOT EXCEED 0.5 MEGOHM FOR SELF-BIAS OPERATION AND 0.1 MEGOHM FOR FIXED BIAS OPERATION.

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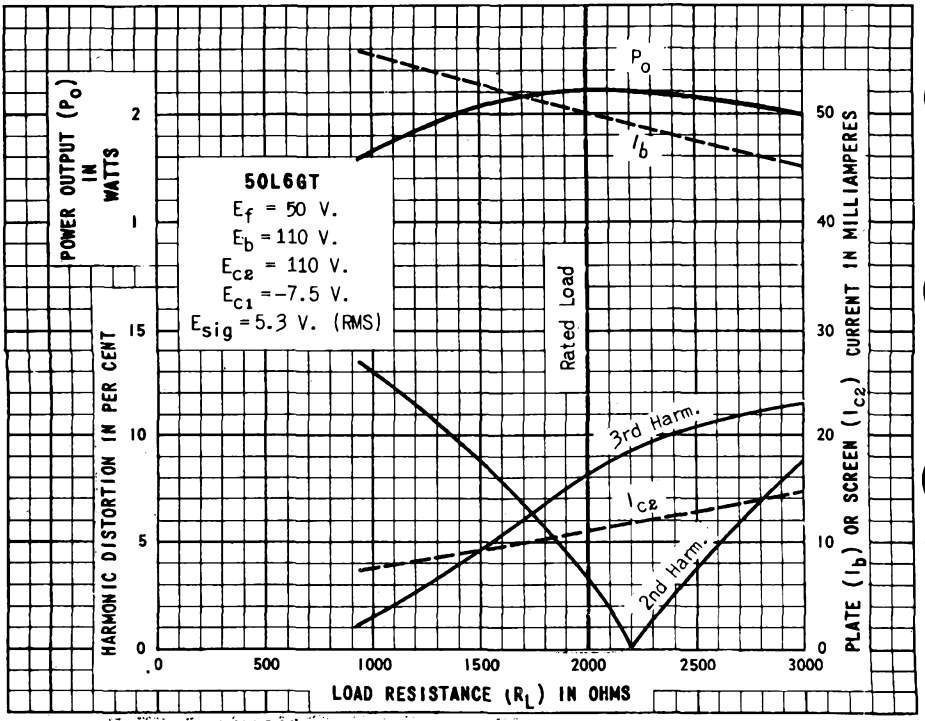
PLATE 1002-2

APR. 21 1941

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

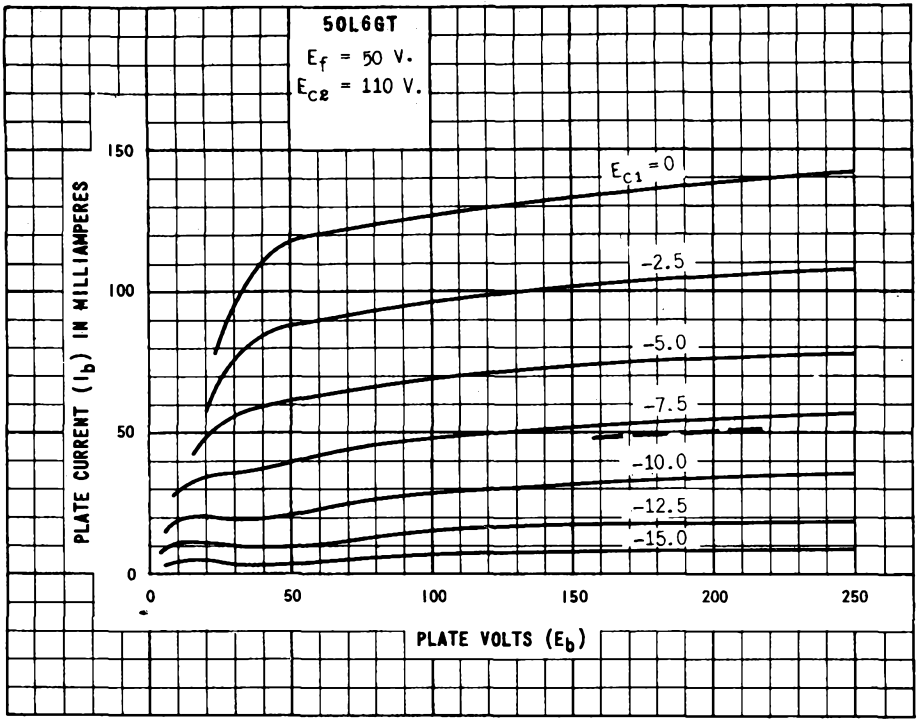
CONTINUED NEXT PAGE



PLAT
1003-

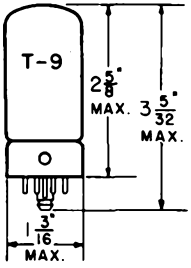
APR.
194

50L6GT


50L6GT
E_f = 50 V.
E_{c2} = 110 V.
E_{c1} = 0
-2.5
-5.0
-7.5
-10.0
-12.5
-15.0
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
50
100
150
200
250

TUNG-SOL

DOUBLE DIODE

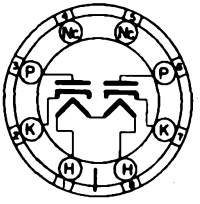


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
50 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
LOCK-IN
8 PIN BASE

THE 50X6 COMBINES TWO INDEPENDENT DIODES IN THE LOCK-IN CONSTRUCTION PERMITTING THE TUBE TO BE USED AS A POWER RECTIFIER IN EITHER HALF-WAVE, FULL-WAVE, OR VOLTAGE DOUBLER APPLICATIONS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	50	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	350	VOLTS
MAXIMUM INVERSE PLATE VOLTAGE	700	VOLTS
MAXIMUM STEADY STATE PEAK PLATE CURRENT PER PLATE	450	MA.
MAXIMUM DC OUTPUT CURRENT PER PLATE	75	MA.
TUBE VOLTAGE DROP (MEASURED WITH TUBE CONDUCTING 150 MA. AT PLATE)	22	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

VOLTAGE DOUBLER

	HALF WAVE	FULL WAVE	
HEATER VOLTAGE	50	50	VOLTS
HEATER CURRENT	150	150	MA.
AC PLATE VOLTAGE EACH PLATE RMS	117	117	VOLTS
FILTER INPUT CONDENSER	16	16	µf
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE	30	15	OHMS
DC OUTPUT CURRENT	75	75	MA.

HALF-WAVE RECTIFIER

	SINGLE SECTION	CONDENSER INPUT FILTER		
HEATER VOLTAGE	50	50	50	VOLTS
HEATER CURRENT	150	150	150	MA.
AC PLATE SUPPLY VOLTAGE RMS	117	150	235	VOLTS
FILTER INPUT CONDENSER	16	16	16	µf
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE	15	40	100	OHMS
DC OUTPUT CURRENT	75	75	75	MA.

SIMILAR TYPE REFERENCE: *Electrically equivalent to 5Y7GT without pilot lamp.*

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PLATE 2074
SEPT. 1 1948

50X6

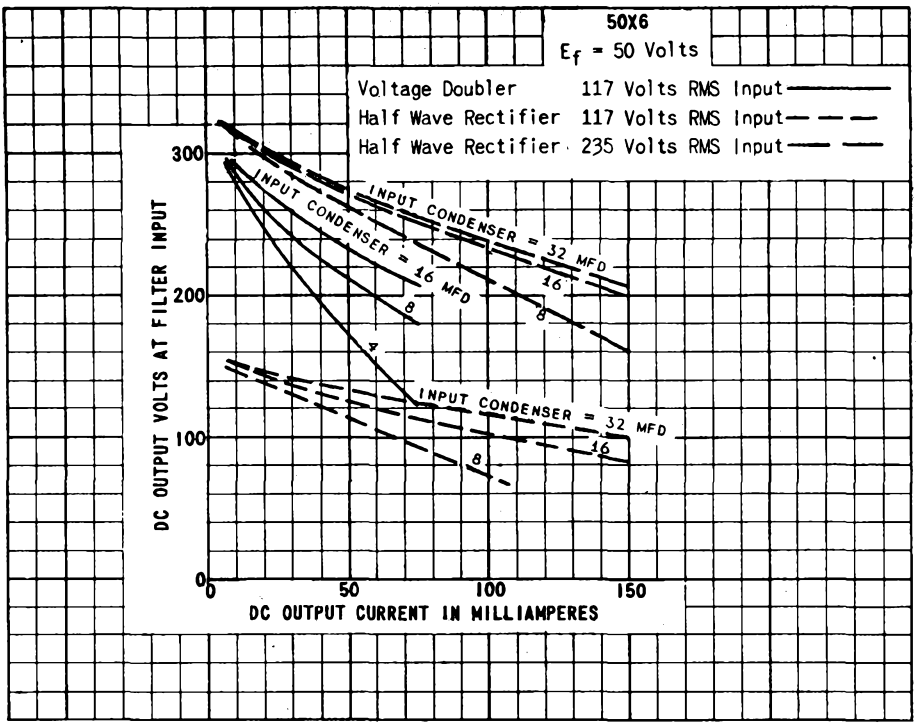
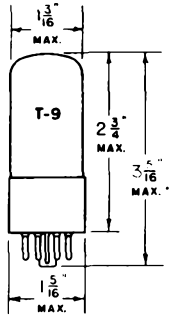


PLATE 2075
SEPT. 1 1948

TUNG-SOL

TWIN DIODE HIGH VACUUM RECTIFIER

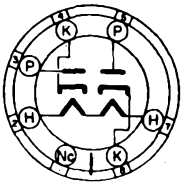
VOLTAGE DOUBLER



UNIPOTENTIAL CATHODE

HEATER
50 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB



G-7Qa

BOTTOM VIEW

INTERMEDIATE 7 PIN OCTAL BASE

THE TUNG-SOL 50Y6GT/G IS DESIGNED PRIMARILY FOR SERVICE AS A POWER RECTIFIER IN AC – DC RECEIVERS. TWO SEPARATE RECTIFIER SECTIONS PERMIT USING THE TUBE AS A VOLTAGE DOUBLER, FULL WAVE RECTIFIER OR HALF WAVE RECTIFIER. FOR HALF WAVE OPERATION THE TWO SECTIONS MAY BE OPERATED SEPARATELY, OR IN PARALLEL TO REDUCE TUBE DROP. ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF THE 25Z5 AND THE 25Z6GT/G.

RATINGS

MAXIMUM AC PLATE VOLTAGE (RMS)	235	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	350	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	700	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	450	MA.
TUBE VOLTAGE DROP AT 150 MA. PER PLATE	22	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

VOLTAGE DOUBLER

	HALF WAVE	FULL WAVE	
AC VOLTAGE PER PLATE (RMS) MAX.	117	117	VOLTS
DC OUTPUT CURRENT MAX.	75	75	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.A	30	15	OHMS

A WHEN FILTER CONDENSERS LARGER THAN 40 UFDS ARE USED IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1063-2

JUNE 6 1941

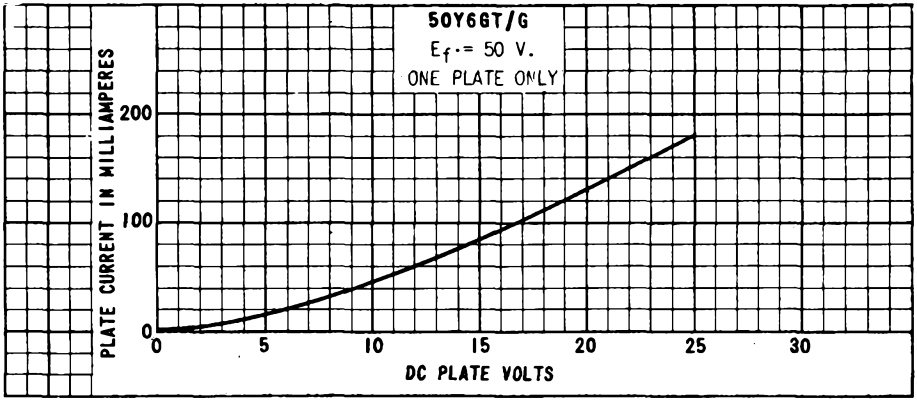
50Y6GT/G

TUNG-SOL

HALF WAVE RECTIFIER

AC PLATE VOLTAGE PER PLATE (RMS)	117	150	235 MAX.	VOLTS
DC OUTPUT CURRENT PER PLATE MAX.	75	75	75	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.A	15	40	100	OHMS

A WHEN FILTER CONDENSERS LARGER THAN 40 UFDS ARE USED IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.



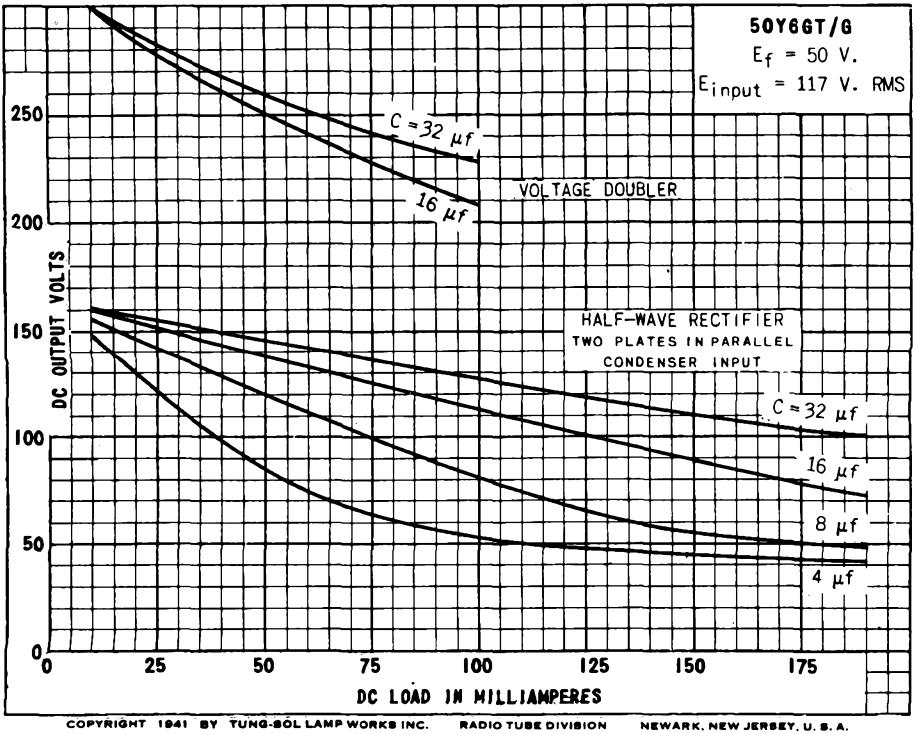
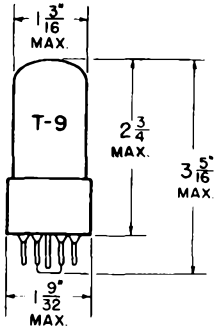


PLATE 1064-1

TUNG-SOL

DOUBLE DIODE

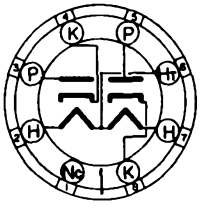


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
50 VOLTS 150 MA.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
INTERMEDIATE SHELL
8 PIN OCTAL

THE 5OY7GT IS A TWIN DIODE POWER RECTIFIER TUBE USING THE LOCK-IN CONSTRUCTION. EACH DIODE UNIT IS INDEPENDENT WHICH PERMITS OPERATION AS EITHER HALF-WAVE, FULL-WAVE, OR VOLTAGE DOUBLER. THE HEATER IS COMMON TO THE TWO UNITS AND PROVIDES A TAP CONNECTION FOR PILOT LIGHT OPERATION.

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	50	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	350	VOLTS
MAXIMUM PEAK INVERSE PLATE VOLTAGE	700	VOLTS
MAXIMUM AC PLATE VOLTAGE EACH PLATE (RMS) VOLTAGE DOUBLER HALF-WAVE RECTIFIER	 117 235	 VOLTS VOLTS
MAXIMUM STEADY STATE PEAK PLATE CURRENT EACH PLATE	450	MA.
TAPPED SECTION VOLTAGE (PINS #6 & #7)	7.5	VOLTS
MAXIMUM DC OUTPUT CURRENT EACH PLATE	75	MA.
MAXIMUM DC OUTPUT CURRENT EACH PLATE WITH PANEL LAMP	65	MA.
TUBE VOLTAGE DROP (MEASURED WITH TUBE CONDUCTING 150 MA. EACH PLATE)	22	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

VOLTAGE DOUBLER

HEATER VOLTAGE	46	VOLTS
HEATER CURRENT	150	MA.
AC PLATE SUPPLY VOLTAGE (RMS)	117	VOLTS
DC PLATE CURRENT TOTAL	65	MA.
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE EACH PLATE	15	OHMS
PANEL LAMP SHUNTING RESISTOR	250	OHMS

HALF-WAVE RECTIFIER

SINGLE SECTION CONDENSER INPUT FILTER
WITH #40 OR #47 PANEL LAMP

HEATER VOLTAGE (PINS #2 & #7)	46	46	46	VOLTS
HEATER CURRENT	150	150	150	MA.
AC PLATE SUPPLY VOLTAGE (RMS)	117	150	235	VOLTS
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE EACH PLATE	15	40	100	OHMS
DC OUTPUT CURRENT PER PLATE	65	65	65	MA.

SIMILAR TYPE REFERENCE: Without pilot lamp electrically equivalent to type 5OY6.

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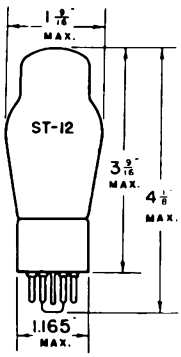
PLATE 2076
SEPT. 1 1948

TUNG-SOL



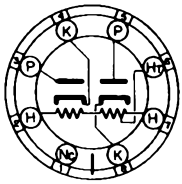
TWIN DIODE HIGH VACUUM RECTIFIER

VOLTAGE DOUBLER

UNIPOTENTIAL CATHODES

HEATER
50 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB



G-8AN
BOTTOM VIEW

SMALL 8 PIN OCTAL BASE

THE TUNG-SOL 50Z7G IS DESIGNED FOR SERVICE AS A POWER RECTIFIER IN AC-DC RECEIVERS. TWO SEPARATE RECTIFIER UNITS ALSO PERMIT THE USE OF THE TUBE AS A VOLTAGE DOUBLER, FULL WAVE RECTIFIER OR HALF WAVE RECTIFIER. WITH THE PROPER EXTERNAL CONNECTIONS, THE TAPPED SECTION OF THE HEATER SERVES AS A BALLAST RESISTOR FOR THE PANEL LAMP.

RATINGS

HEATER VOLTAGE (BETWEEN PINS #2 AND #7)	50.0	VOLTS
HEATER CURRENT (BETWEEN PINS #2 AND #7)	0.15	AMP.
MAXIMUM AC PLATE VOLTAGE PER PLATE (RMS)	235	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	700	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	350	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	400	MA.
MAXIMUM DC OUTPUT CURRENT PER PLATE WITH PANEL LAMP	65	MA.
TAPPED SECTION OF HEATER VOLTAGE (BETWEEN PINS #6 & #7) WITH 0.15 AMP. FLOWING BETWEEN PINS #2 & #7	2.0	VOLTS
TUBE VOLTAGE DROP — AT 130 MA. DC PER PLATE	21	VOLTS

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PLATE
862-1

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1940

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

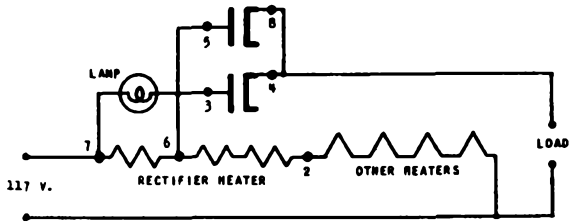
CONTINUED NEXT PAGE

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HALF WAVE RECTIFIER
WITH #292 OR #292A PANEL LAMP[A]

HEATER VOLTAGE (BETWEEN PINS #2 AND #7) APPROX.	50.0	50.0	VOLTS
HEATER CURRENT (BETWEEN PINS #2 AND #6)	0.15	0.15	AMP.
MAXIMUM VOLTAGE ACROSS TAPPED SECTION OF HEATER (BETWEEN PINS #6 AND #7)	2.5	2.5	VOLTS
AC PLATE VOLTAGE PER PLATE (RMS)	117	235 MAX	VOLTS
DC OUTPUT CURRENT PER PLATE MAX.	65	65	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.B	15	100	OHMS



VOLTAGE DOUBLER
WITH #292 OR #292A PANEL LAMP[A]

HEATER VOLTAGE (BETWEEN PINS #2 AND #7)	50.0	VOLTS
AC PLATE VOLTAGE PER PLATE (RMS) MAX.	117	VOLTS
DC OUTPUT CURRENT PER PLATE MAX.	65	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.B	15	OHMS

[A] IT IS RECOMMENDED THAT THE PLATE CURRENT OF THE RECTIFIER BE PASSED THROUGH THE PANEL LAMP AND THE TAPPED SECTION OF THE HEATER.

[B] WHEN FILTER CONDENSERS LARGER THAN 40 MFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

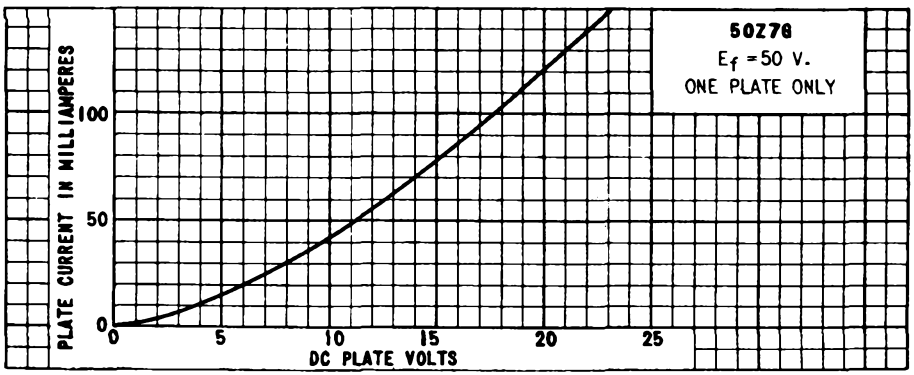
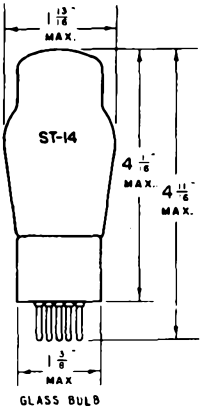


PLATE 663-1

TUNG-SOL

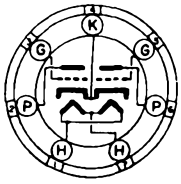


GLASS BULB

TWIN TRIODE POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
2.5 VOLTS 2.0 AMPERES
AC OR DC



7B
BOTTOM VIEW
MEDIUM 7 PIN BASE

THE TUNG-SOL 53 IS A TWIN TRIODE DESIGNED PRIMARILY FOR SERVICE AS A CLASS B POWER AMPLIFIER. EXCEPT FOR CAPACITANCES AND HEATER RATINGS, ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL TO THOSE OF THE 6N7, 6N7G AND THE 6A6.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM PEAK PLATE CURRENT PER PLATE	125	MA.
MAXIMUM AVERAGE DISSIPATION PER PLATE	5.5	WATTS

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

TRIODES CONNECTED IN PARALLEL

PLATE VOLTAGE	250	294	VOLTS
GRID VOLTAGE	-5	-6	VOLTS
PLATE CURRENT	6	7	MA.
PLATE RESISTANCE	11300	11000	OHMS
TRANSCONDUCTANCE	3100	3200	μMHOS
AMPLIFICATION FACTOR	35	35	

CLASS B_2 AMPLIFIER - PUSH-PULL

UNLESS STATED OTHERWISE, VALUES ARE FOR TWO TUBES

	IDEAL	TYPICAL	
ZERO-SIGNAL PLATE VOLTAGE	300	300	VOLTS
DC GRID VOLTAGE	0	0	VOLT
AF-PEAK SIGNAL VOLTAGE PER GRID [A]	29	41	VOLTS
MAXIMUM PEAK-SIGNAL GRID CURRENT PER GRID	20	22	MA.
ZERO-SIGNAL PLATE CURRENT PER PLATE	17.5	17.5	MA.
MAXIMUM-SIGNAL DC PLATE CURRENT PER PLATE	35	35	MA.
GRID IMPEDANCE AT 400 CYCLES	0	516 [B]	OHMS
PLATE SUPPLY IMPEDANCE	0	1000	OHMS
EFFECTIVE LOAD RESISTANCE PLATE-TO-PLATE	8000	8000	OHMS
TOTAL HARMONIC DISTORTION	4	8	PER CENT
THIRD HARMONIC	3.5	7.5	PER CENT
FIFTH HARMONIC	1.5	2.5	PER CENT
POWER OUTPUT	10	10	WATTS

[A] FOR POWER OUTPUT SHOWN

[B] 500 OHMS AND 50 MH.

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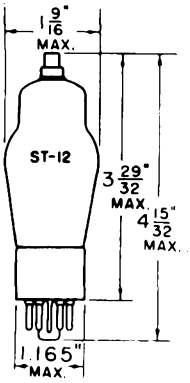
PLATE 902-2

NOV. 8 1940

TUNG-SOL



6V7G
SMALL 7 PIN
OCTAL BASE

DUPLEX-DIODE TRIODE

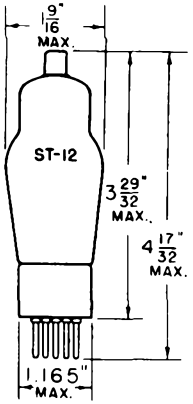
UNIPOTENTIAL CATHODE

HEATER

6V7G, 85	55
6.3 V.	2.5 V.
0.3 A.	1.0 A.

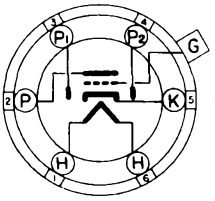
AC OR DC

IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE. UNDER NO CONDITIONS SHOULD IT EXCEED 100 VOLTS.



55, 85
SMALL 6 PIN
BASE

6V7G



55, 85

BOTTOM VIEWS

THE 6V7G, 55 AND 85 ARE HEATER CATHODE TYPE TUBES CONSISTING OF TWO DIODES AND A TRIODE IN A SINGLE BULB. THEY ARE DESIGNED FOR USE AS COMBINED DETECTORS, AMPLIFIERS AND AUTOMATIC VOLUME CONTROL TUBES.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	2.0	WATTS

DIRECT INTERELECTRODE CAPACITANCES

GRID TO PLATE	1.5	μμf
INPUT	1.5	μμf
OUTPUT	4.3	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	135	180	250	VOLTS
GRID VOLTAGE	-10.5	-13.5	-20	VOLTS
PLATE CURRENT	3.7	6.0	8.0	MA.
PLATE RESISTANCE	11000	8500	7500	OHMS
TRANSCONDUCTANCE	750	975	1100	μMHOS
AMPLIFICATION FACTOR	8.3	8.3	8.3	
LOAD RESISTANCE	25000	20000	20000	OHMS
POWER OUTPUT	75	160	350	MW.

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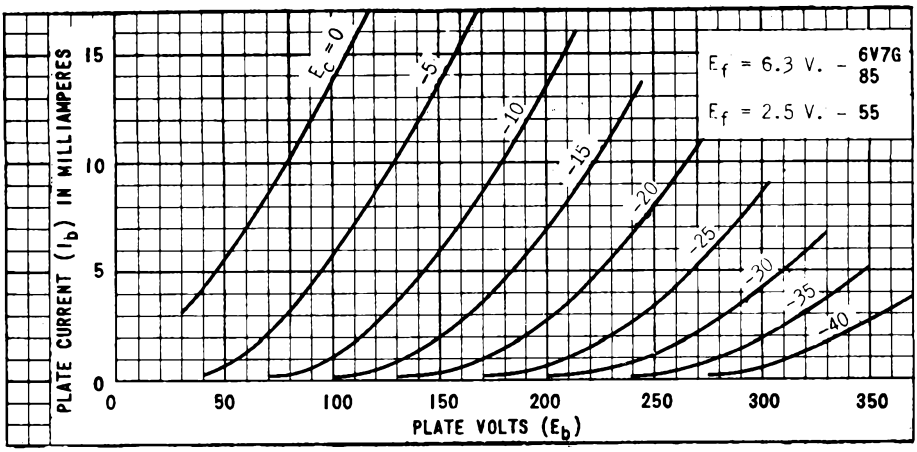
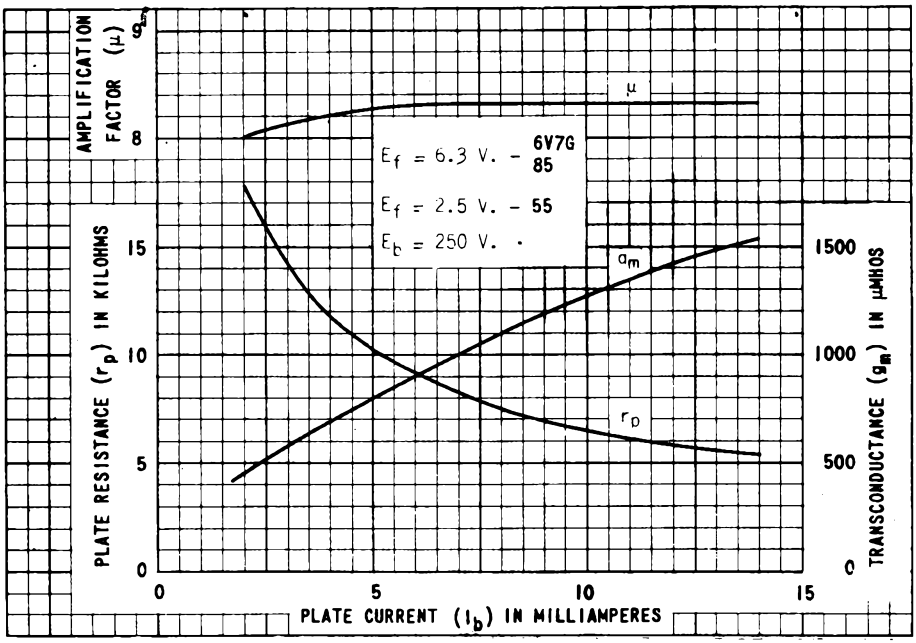
PLATE
1444
JUNE 15
1944

55 (6V7G, 85)





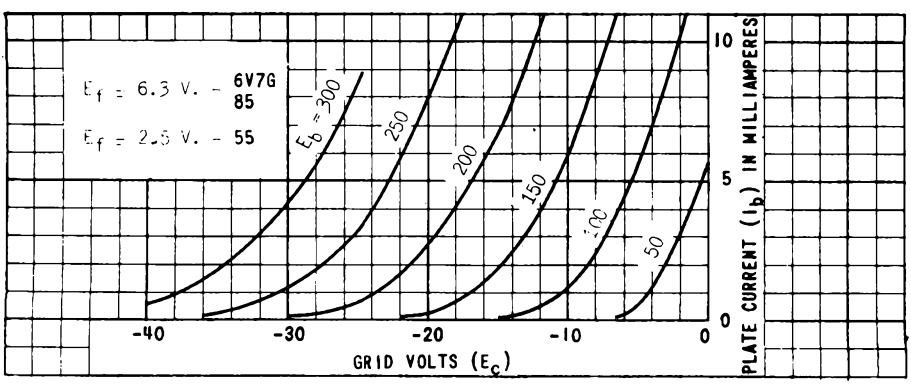
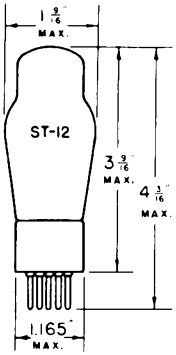


PLATE 1445
JUNE 15 1944



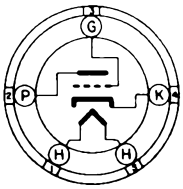
TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
2.5 VOLTS 1.0 AMPERE
AC OR DC

GLASS BULB

SMALL 5 PIN BASE



BOTTOM VIEW

THE TUNG-SOL 56 IS A GENERAL PURPOSE TRIODE DESIGNED FOR SERVICE AS AN OSCILLATOR, DETECTOR OR AMPLIFIER. EXCEPT FOR HEATER RATINGS AND CAPACITANCES, ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 76.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250 MAX.	VOLTS
GRID VOLTAGE	−5	−13.5	VOLTS
GRID CIRCUIT RESISTANCE MAX.	1	1	MEGOHM
PLATE CURRENT	2.5	5	MA.
PLATE RESISTANCE	12 000	9500	OHMS
TRANSCONDUCTANCE	1150	1450	μMHOS
AMPLIFICATION FACTOR	13.8	13.8	

DETECTOR

	BIASED		GRID LEAK	
PLATE VOLTAGE	100	250	45	VOLTS
GRID VOLTAGE	−8	−20	RETURN TO CATHODE	VOLTS
PLATE CURRENT	ADJUST TO 0.2 MA. WITH NO INPUT SIGNAL			
GRID LEAK			1 TO 5	MEGOHMS
GRID CONDENSER			250	μμf

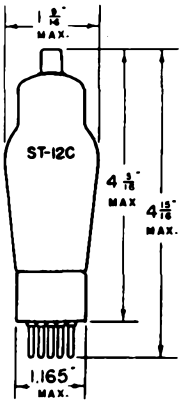
RESISTANCE COUPLED AMPLIFIER

PLATE SUPPLY VOLTAGE	100	100	250	250	VOLTS
PLATE LOAD RESISTOR	0.05	0.25	0.05	0.25	MEGOHM
CATHODE RESISTOR	3800	15 000	3800	15 000	OHMS
VOLTAGE GAIN	8.5	10	9	10	

DIRECT INTERELECTRODE CAPACITANCES

GRID TO CATHODE	3.2	μμf
PLATE TO CATHODE	2.2	μμf
GRID TO PLATE	3.2	μμf

PLATE
1446
JUNE 15
1944



TRIPLE GRID

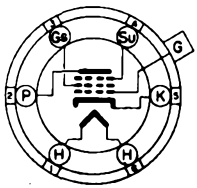
DETECTOR AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
2.5 VOLTS 1.0 AMPERE
AC OR DC

GLASS BULB

SMALL 6 PIN BASE



6F

BOTTOM VIEW

THE TUNG-SOL 57 IS A TRIPLE GRID GENERAL PURPOSE DETECTOR AMPLIFIER. EXCEPT FOR HEATER RATINGS, ITS ELECTRICAL CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 6C6.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	250	335	VOLTS
SCREEN VOLTAGE	100	100	125	110	VOLTS
CONTROL GRID VOLTAGE	-3	-3	-3	-3	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET				
PLATE CURRENT	2	2	3.7	2.7	MA.
SCREEN CURRENT	0.5	0.5	1	0.7	MA.
PLATE RESISTANCE APPROX.	1.0	1.5	1.7	2.6	MEGOHMS
TRANSCONDUCTANCE	1185	1225	1510	1325	μMHOS
AMPLIFICATION FACTOR APPROX.	1185	1850	2500	3500	
CONTROL GRID VOLTAGE FOR CATHODE CURRENT CUT-OFF	-7	-7	-9	-7.5	VOLTS

BIASED DETECTOR

PLATE SUPPLY VOLTAGE	100	100	250	VOLTS
SCREEN SUPPLY VOLTAGE	16	100	100	VOLTS
PLATE RESISTOR	1	1	0.5	MEGOHM
SCREEN RESISTOR	0	2	0	MEGOHMS
CATHODE RESISTOR	30 000	25 000	10 000	OHMS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET			

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	5	μμf
PLATE TO CATHODE	6.5	μμf
CONTROL GRID TO PLATE[3]	.007 MAX.	μμf

[3] WITH SHIELD

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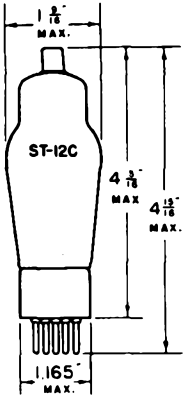
PLATE 319-1

JAN. 23 1939

TUNG-SOL



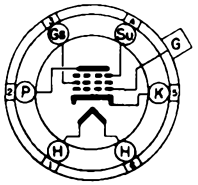
TRIPLE GRID
REMOTE CUT-OFF AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
2.5 VOLTS 1.0 AMPERE
AC OR DC

GLASS BULB

SMALL 6 PIN BASE



6F

BOTTOM VIEW

THE TUNG-SOL 58 IS A TRIPLE GRID VARIABLE MU AMPLIFIER. EXCEPT FOR HEATER RATINGS, ITS ELECTRICAL CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 6D6.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	100	100	VOLTS
CONTROL GRID VOLTAGE	-3	-3	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET		
PLATE CURRENT	8	8.2	MA.
SCREEN CURRENT	2.2	2	MA.
PLATE RESISTANCE	0.25	0.8	MEGOHM
TRANSCONDUCTANCE	1500	1600	μMHOS
AMPLIFICATION FACTOR	375	1280	
CONTROL GRID VOLTAGE FOR TRANSCONDUCTANCE = 2 μMHOS	-50	-50	VOLTS

AS MIXER IN SUPERHETERODYNE CIRCUIT

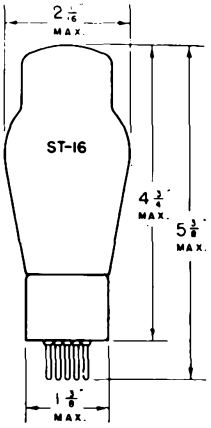
PLATE VOLTAGE	100	250 MAX.	VOLTS
SCREEN VOLTAGE MAX.	100	100	VOLTS
CONTROL GRID VOLTAGE	-10	-10	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET		

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	4.7	μμf
PLATE TO CATHODE	6.3	μμf
CONTROL GRID TO PLATE [S]	.007 MAX.	μμf

[S] WITH SHIELD

PLATE 320-1



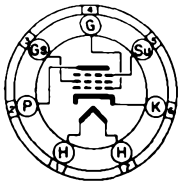
TRIPLE GRID POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
2.5 VOLTS 2.0 AMPERES
AC OR DC

GLASS BULB

MEDIUM 7 PIN BASE



7A

BOTTOM VIEW

THE TUNG-SOL 59 IS A TRIPLE GRID OUTPUT POWER TUBE WHICH MAY BE USED AS A CLASS A TRIODE, CLASS B TRIODE OR CLASS A PENTODE.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

	TRIODE[A]	PENTODE[B]	
PLATE VOLTAGE MAX.	250	250	VOLTS
SCREEN (Gs) VOLTAGE	–	250 MAX.	VOLTS
CONTROL GRID (G) VOLTAGE	-28	-18	VOLTS
PLATE CURRENT	26	35	MA.
SCREEN CURRENT	–	9	MA.
PLATE RESISTANCE	2300	40 000	OHMS
TRANSCONDUCTANCE	2600	2500	µMHOS
AMPLIFICATION FACTOR	6	100	
LOAD RESISTANCE	5000[C]	6000	OHMS
POWER OUTPUT	1.25	3.0	WATTS

[A] GRIDS G8 AND Su TIED TO PLATE
[B] GRID Su TIED TO CATHODE
[C] APPROXIMATELY TWICE THIS VALUE IS RECOMMENDED FOR THE LOAD OF THIS TUBE WHEN USED AS A DRIVER FOR A CLASS B_2 STAGE.

CLASS B_2 AMPLIFIER – TWO TUBES

GRID Su TIED TO PLATE, GRIDS G AND Gs TIED TOGETHER

PLATE VOLTAGE	300	400 MAX.	VOLTS
GRID (G & Gs) VOLTAGE	0	0	VOLTS
ZERO-SIGNAL PLATE CURRENT	20	26	MA.
LOAD RESISTANCE PLATE TO PLATE	4600	6000	OHMS
POWER OUTPUT	15	20	WATTS

NOTE: MAXIMUM PLATE DISSIPATION IS 10 WATTS. MAXIMUM PEAK PLATE CURRENT IS 200 MA.

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PLATE 529-1

AUG. 14 1939

TUNG-SOL

BEAM POWER AMPLIFIER

HALF-WAVE RECTIFIER WITH TAPPED HEATER

PHYSICAL SPECIFICATIONS

EMITTER	UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE	INTERMEDIATE 8 PIN OCTAL	PIN 1 RECT. CATHODE	PIN 7 RECT. HEATER*
CAP	NONE	PIN 2 AMP. HEATER	PIN 8 AMP. CATHODE**
BULB	T-9	PIN 3 AMP. PLATE	
MAXIMUM DIAMETER	1 5/16"	PIN 4 GRID #2	
MAXIMUM OVERALL LENGTH	3 5/16"	PIN 5 GRID #1	TOP CAP NONE
MAXIMUM SEATED HEIGHT	2 3/4"	PIN 6 RECT. PLATE*	

* PILOT LAMP CONNECTION

** AND BEAM PLATES

RATINGS

HEATER OR FILAMENT VOLTAGE	(AC OR DC)	70.0	VOLTS
HEATER OR FILAMENT CURRENT		0.15	AMP.
MAXIMUM PLATE VOLTAGE	(AMPLIFIER SECTION)	110	VOLTS
MAXIMUM SCREEN VOLTAGE	(AMPLIFIER SECTION)	110	VOLTS
MAXIMUM AC PLATE VOLTAGE (RMS)	(RECTIFIER SECTION)	125	VOLTS
TUBE VOLTAGE DROP AT 120 MA. DC	(RECTIFIER SECTION)	14	VOLTS

OPERATING CONDITIONS AND CHARACTERISTICS

AMPLIFIER SECTION – CLASS A1 AMPLIFIER

PLATE VOLTAGE	110	VOLTS
SCREEN VOLTAGE	110	VOLTS
CONTROL GRID VOLTAGE	-7.5	VOLTS
PLATE CURRENT	40	MA.
SCREEN CURRENT	3.0	MA.
TRANSCONDUCTANCE	5800	μMHOS
AMPLIFICATION FACTOR (APPROX.)	80	
LOAD RESISTANCE	2500	OHMS
TOTAL HARMONIC DISTORTION	6.5	PER CENT
POWER OUTPUT	1.5	WATTS

RECTIFIER SECTION – HALF WAVE RECTIFIER

WITH CONDENSER INPUT TO FILTER

MAXIMUM AC PLATE VOLTAGE (RMS)	125	VOLTS
MAXIMUM DC OUTPUT CURRENT	60	MA.

NOTE: THIS TUBE IS USED WITH A 0.15 AMPERE PILOT LAMP, WHICH IS CONNECTED BETWEEN PINS #6 AND #7. SINCE THE DC OUTPUT CURRENT OF THE RECTIFIER SECTION FLOWS THROUGH THE PILOT LAMP SECTION OF THE HEATER, THIS TUBE SHOULD NEVER BE USED IN CIRCUITS WITHOUT A PILOT LAMP.

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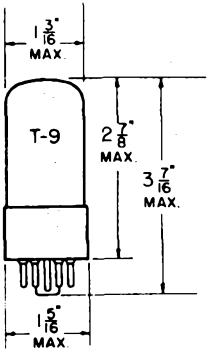
PLATE T751-1

AUG. 2 1940

TUNG-SOL

COMBINED HALF WAVE RECTIFIER AND BEAM POWER AMPLIFIER

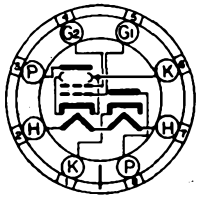


GLASS BULB

COATED UNIPOTENTIAL CATHODES

HEATER
70 VOLTS 0.15 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW

INTERMEDIATE SHELL
8-PIN OCTAL

THE 7OL7GT IS A COMBINED RECTIFIER AND POWER OUTPUT BEAM TETRODE DESIGNED FOR SERVICE IN AC-DC RECEIVERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE (AC OR DC)	70	VOLTS
HEATER CURRENT	0.15	AMP.
RECTIFIER UNIT		
MAX. PEAK INVERSE PLATE VOLTAGE	350	VOLTS
MAX. PEAK PLATE CURRENT	420	MA.
MAX. DC HEATER-CATHODE POTENTIAL	175	VOLTS
WITH CONDENSER-INPUT FILTER:		
MAX. AC PLATE VOLTAGE (RMS)	117	VOLTS
MAX. DC OUTPUT CURRENT	70	MA.
MIN. TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE[A]	15	OHMS
AMPLIFIER UNIT		
MAX. PLATE VOLTAGE	117	VOLTS
MAX. SCREEN VOLTAGE	117	VOLTS
MAX. PLATE DISSIPATION	5.0	WATTS
MAX. SCREEN DISSIPATION	1.0	WATT
HEATER-CATHODE VOLTAGE	AS LOW AS POSSIBLE[B]	

[A] WHEN A FILTER-INPUT CONDENSER EXCEEDING 40 μf IS USED, MORE PLATE SUPPLY IMPEDANCE MAY BE NECESSARY TO LIMIT THE PEAK PLATE CURRENT TO THE RATED VALUE.

[B] OBTAINED BY CONNECTING PIN #2 TO THE SIDE OF THE LINE OPPOSITE THAT TO WHICH PINS #7 AND #8 ARE CONNECTED.

PLATE 1633
NOV. 30 1945

CONTINUED ON FOLLOWING PAGE

70L7GT

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	110	VOLTS
SCREEN VOLTAGE	110	VOLTS
GRID VOLTAGE	7.5	VOLTS
PEAK AF GRID VOLTAGE	7.5	VOLTS
ZERO-SIGNAL PLATE CURRENT	40	MA.
ZERO-SIGNAL SCREEN CURRENT (APPROX.)	3	MA.
MAX.-SIGNAL PLATE CURRENT	43	MA.
MAX.-SIGNAL SCREEN CURRENT (APPROX.)	6	MA.
GRID RESISTOR (MAX.)		
FIXED BIAS	0.1	MEGOHM
CATHODE BIAS	0.5	MEGOHM
PLATE RESISTANCE	15 000	OHMS
LOAD RESISTANCE	2000	OHMS
TRANSCONDUCTANCE	7500	µMHOS
MAX.-SIGNAL POWER OUTPUT	1.8	WATTS
TOTAL HARMONIC DISTORTION	10	PER CENT

SIMILAR TYPE REFERENCE: Rectifier unit similar to types 11783 and 1178405; amplifier unit somewhat similar to types 25L6G, 3545, 35L6G.

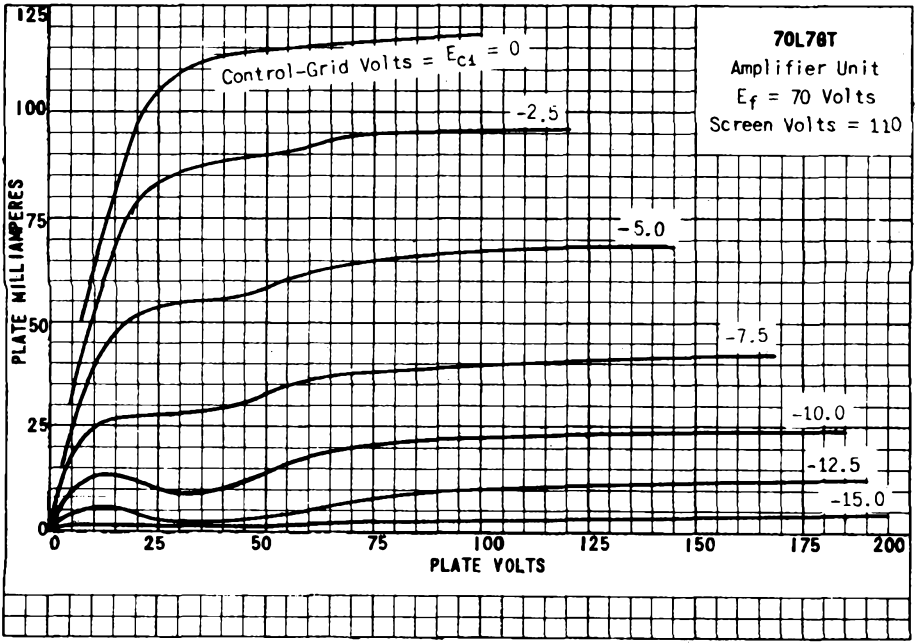
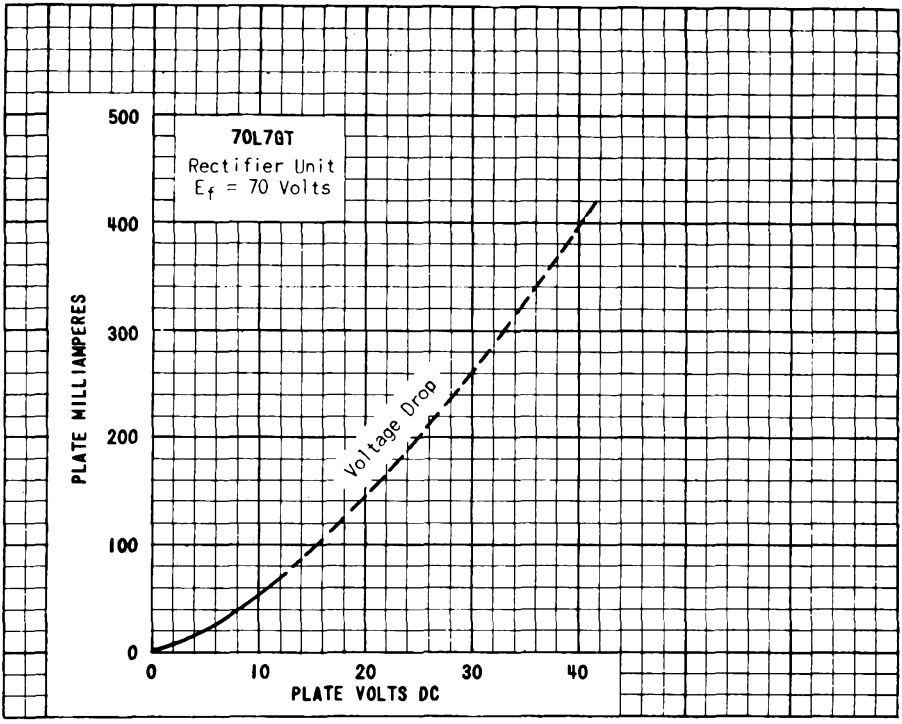


PLATE 1634
NOV. 30 1945



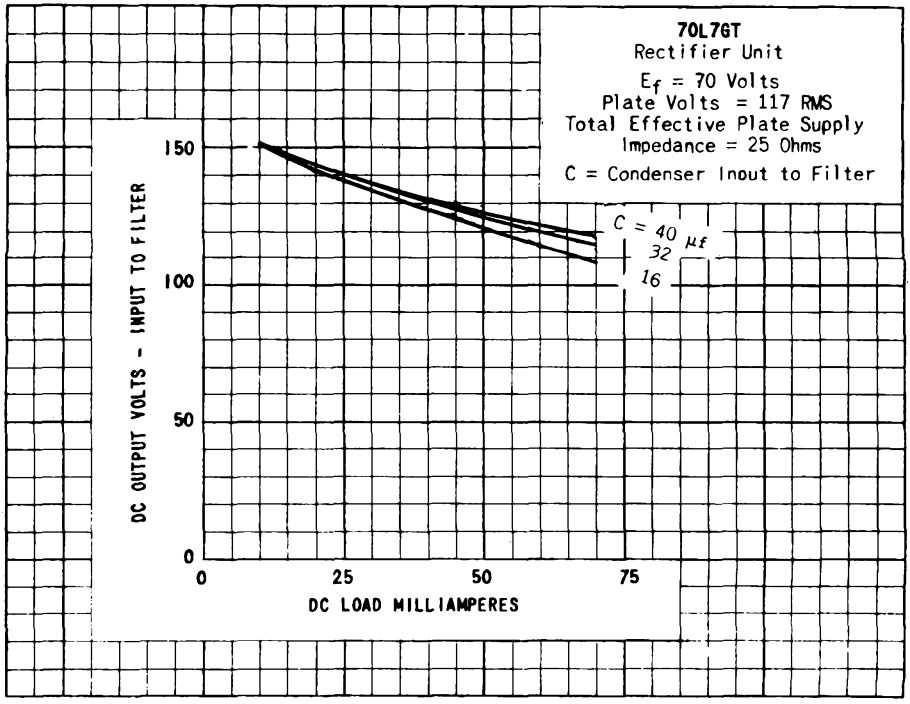


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PLATE
1635
NOV. 30
1945

70L7GT

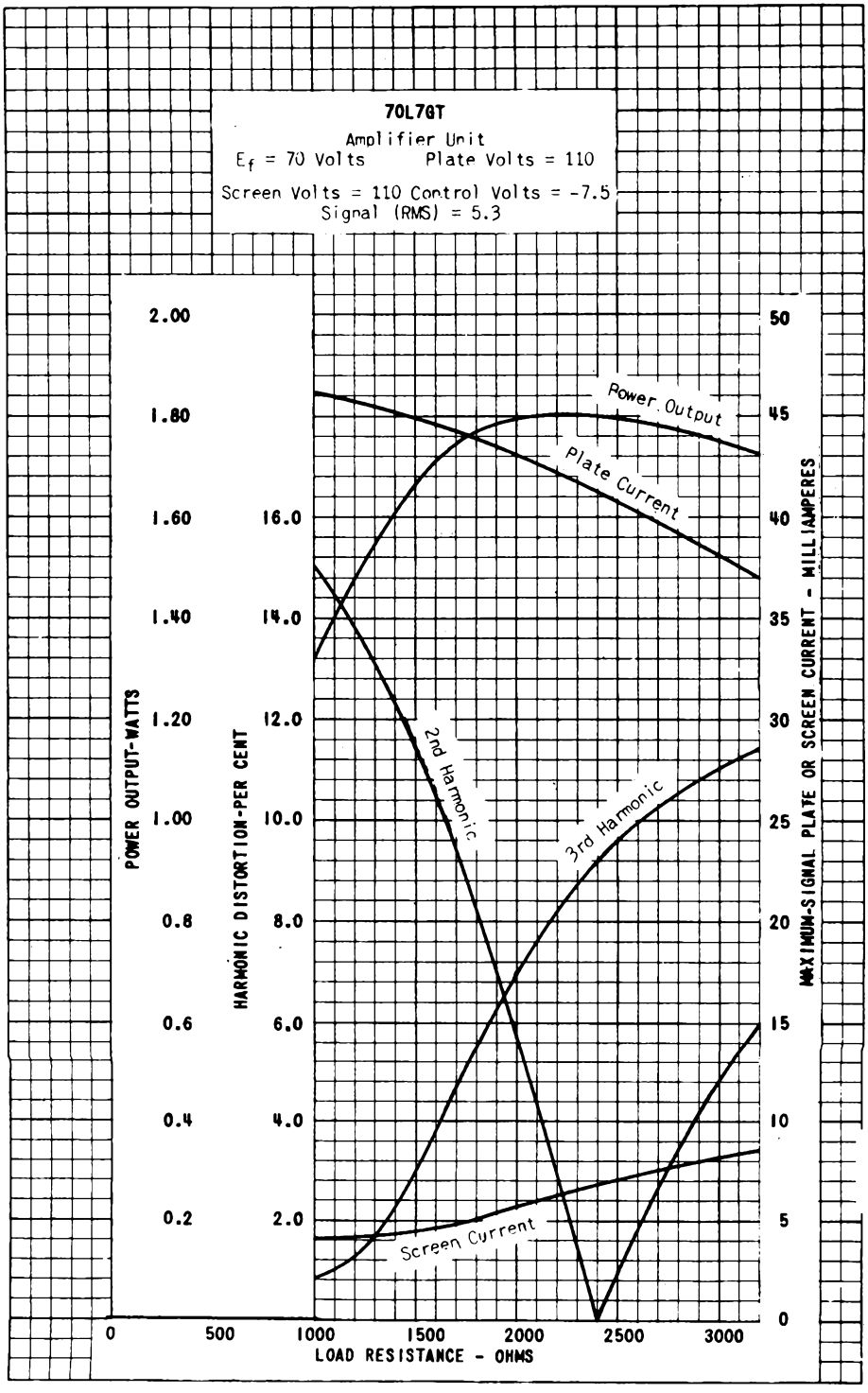
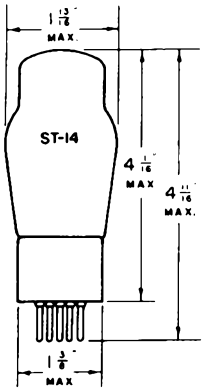


PLATE 1636
NOV. 30 1945

TUNG-SOL



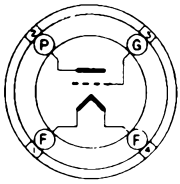
TRIODE POWER AMPLIFIER

COATED FILAMENT

5.0 VOLTS 0.25 AMPERE
AC OR DC

GLASS BULB

MEDIUM 4 PIN BASE



4D

BOTTOM VIEW

THE TUNG-SOL 71A IS A FILAMENT TYPE POWER AMPLIFIER HAVING LOW PLATE RESISTANCE.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	90	135	180 MAX.	VOLTS
GRID VOLTAGE [A]	-16.5	-27	-40.5	VOLTS
PLATE CURRENT	10	17.3	20	MA.
PLATE RESISTANCE	21 0	1820	1750	OHMS
TRANSCONDUCTANCE	1400	1650	1700	μMHOS
AMPLIFICATION FACTOR	3	3	3	
LOAD RESISTANCE	3000	3000	4800	OHMS
TOTAL HARMONIC DISTORTION	5	5	5	PER CENT
POWER OUTPUT	0.125	0.4	0.79	WATT

[A] RETURN TO NEGATIVE FILAMENT (PIN #4)

DIRECT INTERELECTRODE CAPACITANCES

GRID TO FILAMENT	3.2	μμf
PLATE TO FILAMENT	2.9	μμf
GRID TO PLATE	7.5	μμf

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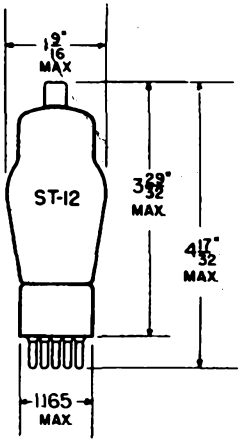
PLATE 575-1

OCT. 20 1939

TUNG-SOL



2A6, 75

SMALL METAL CAP

DUO-DIODE HIGH-MU TRIODE AMPLIFIER

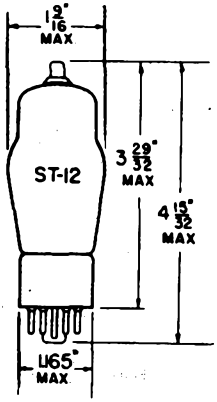
COATED UNIPOTENTIAL CATHODE

2A6	2.5 VOLTS	0.8 AMPERE
75	6.3 VOLTS	0.3 AMPERE
6B6G	6.3 VOLTS	0.3 AMPERE

AC OR DC

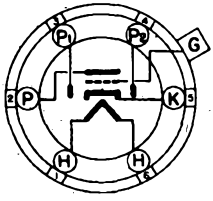
GLASS BULB

ANY MOUNTING POSITION



6B6G

SKIRTED MINIATURE CAP



BOTTOM VIEW

SMALL 6-PIN BASE

BOTTOM VIEW

SMALL 7-PIN OCTAL BASE

THE 2A6, 6B6G AND 75 COMBINE TWO DIODES AND A HIGH-MU TRIODE IN A SINGLE BULB, USING A COMMON CATHODE. THEY ARE DESIGNED FOR USE AS DIODE DETECTORS, AVC RECTIFIERS AND RESISTANCE COUPLED AMPLIFIERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	250	VOLTS
MINIMUM DIODE CURRENT PER PLATE WITH 10 VOLTS DC APPLIED	0.8	MA.
MAXIMUM CATHODE VOLTAGE	100	VOLTS

CONTINUED ON NEXT PAGE

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PLATE 1555
JAN. 15 1945

CONTINUED FROM PRECEDING PAGE.

DIRECT INTERELECTRODE CAPACITANCES (APPROX.)

TRIODE UNIT

GRID TO PLATE	1.7	μμf
INPUT	1.7	μμf
OUTPUT	3.8	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

TRIODE UNIT

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-2.0	VOLTS
PLATE CURRENT	0.9	MA.
PLATE RESISTANCE	91 000	OHMS
TRANSCONDUCTANCE	1 100	μMHOS
AMPLIFICATION FACTOR	100	

RESISTANCE COUPLED AMPLIFIER

PLATE SUPPLY VOLTAGE	100	100	250	VOLTS
PLATE LOAD RESISTOR	0.25	0.25	0.25	MEGOHM
CATHODE RESISTOR	0.0	10 000	4 000	OHMS
GRID CIRCUIT RESISTOR	6.0	1.0	1.0	MEGOHMS
GRID COUPLING CONDENSER	0.01	0.05	0.05	μf
VOLTAGE GAIN	35	35	52	

PLATE
1556
JAN. 15
1945

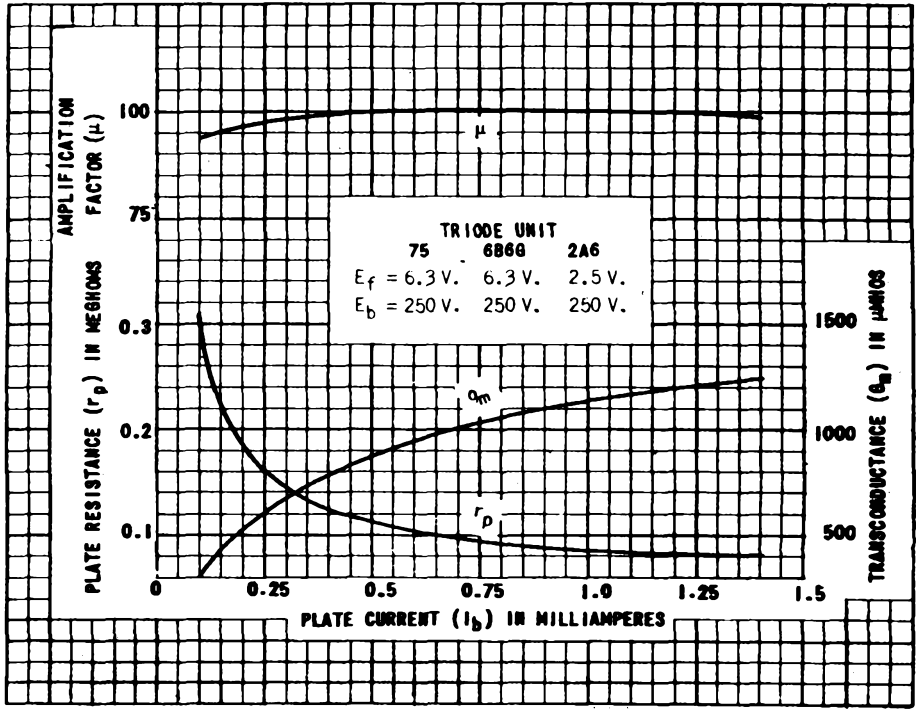

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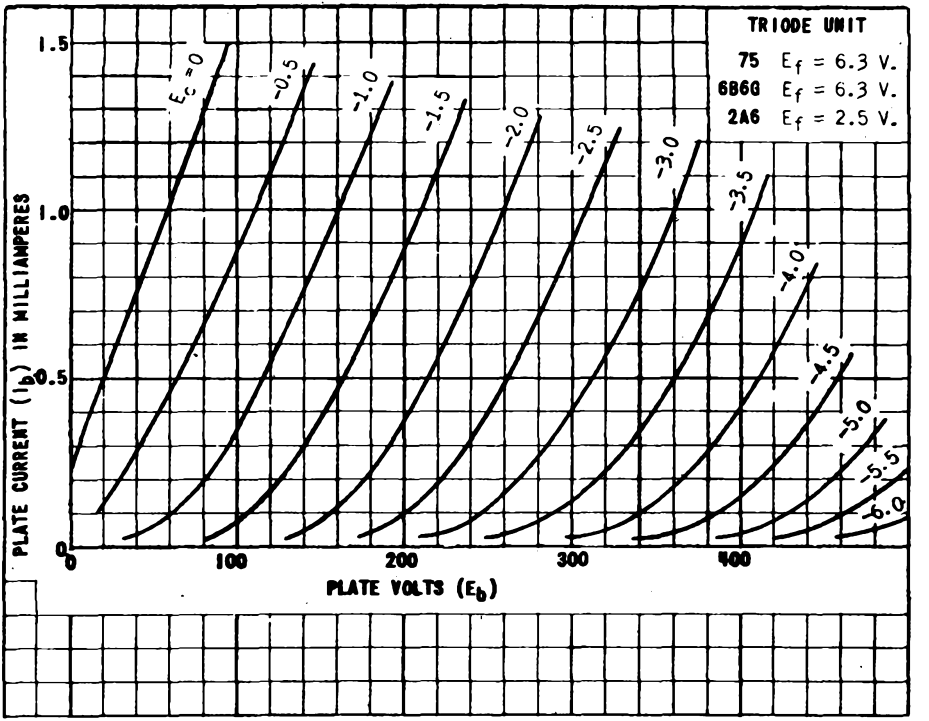
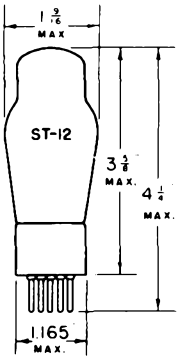
PLATE
1557
JAN. 15
1945


TRIODE UNIT
75 E_f = 6.3 V.
6B6G E_f = 6.3 V.
2A6 E_f = 2.5 V.
E_c = 0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
-5.5
-6.0
PLATE CURRENT (I_b) IN MILLIAMPERES
PLATE VOLTS (E_b)
0
0.5
1.0
1.5
100
200
300
400



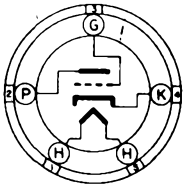
TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB

SMALL 5 PIN BASE



5A

THE TUNG-SOL 76 IS A GENERAL PURPOSE TRIODE DESIGNED FOR SERVICE AS AN OSCILLATOR, DETECTOR OR AMPLIFIER. EXCEPT FOR HEATER VOLTAGE AND CURRENT ITS CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 56.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250 MAX.	VOLTS
GRID VOLTAGE	-5	-13.5	VOLTS
GRID CIRCUIT RESISTANCE MAX.	1	1	MEGOHM
PLATE CURRENT	2.5	5	MA.
PLATE RESISTANCE	12000	9500	OHMS
TRANSCONDUCTANCE	1150	1450	μMHOS
AMPLIFICATION FACTOR	13.8	13.8	

DETECTOR

	BIASED		GRID LEAK	
PLATE VOLTAGE	100	250	45	VOLTS
GRID VOLTAGE	-8	-20	RETURN TO CATHODE	VOLTS
PLATE CURRENT	ADJUST TO 0.2 MA. WITH NO INPUT SIGNAL			
GRID LEAK			1 TO 5	MEGOHMS
GRID CONDENSER			250	μμf

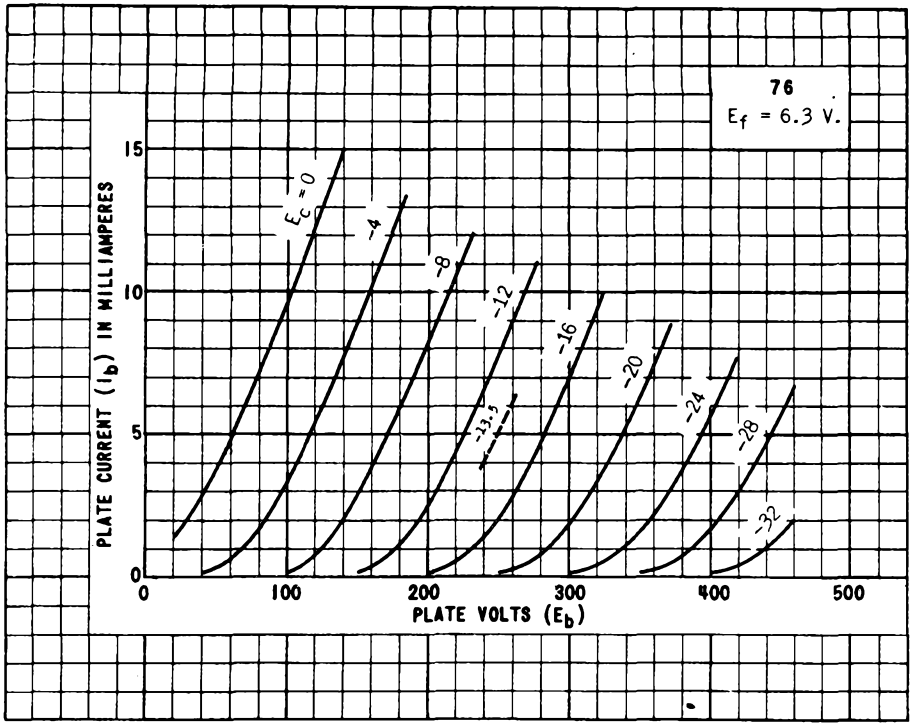
RESISTANCE COUPLED AMPLIFIER

PLATE SUPPLY VOLTAGE	100	100	250	250	VOLTS
PLATE LOAD RESISTOR	0.05	0.25	0.05	0.25	MEGOHM
CATHODE RESISTOR	3800	15000	3800	15000	OHMS
VOLTAGE GAIN	8.5	10	9	10	

DIRECT INTERELECTRODE CAPACITANCES

GRID TO CATHODE	3.6	μμf
PLATE TO CATHODE	2.6	μμf
GRID TO PLATE	2.8	μμf

TUNG-SOL LAMP WORKS INC. RADIO TUBE DIVISION NEWARK, NEW JERSEY, U. S. A.



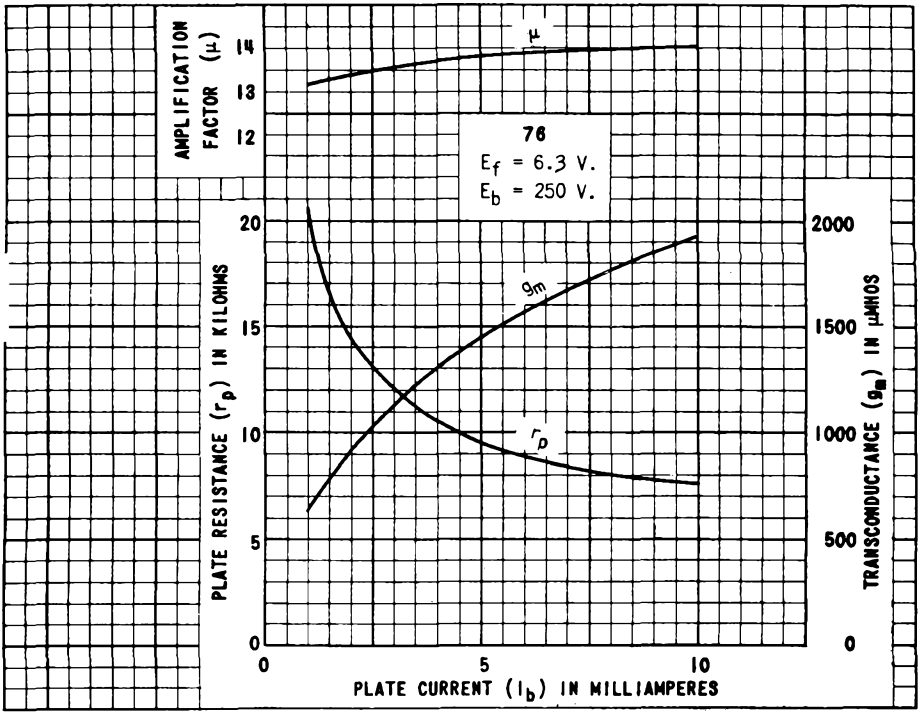


PLATE 332-1

JAN. 23 1939

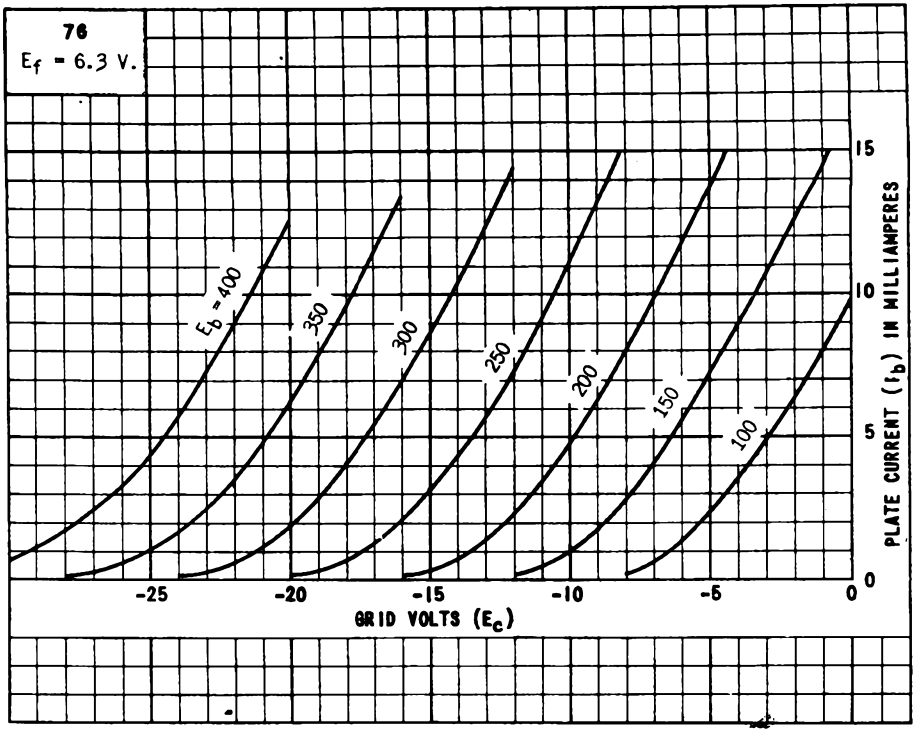
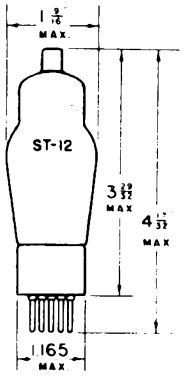


PLATE
333-1

TUNG-SOL



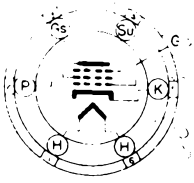
TRIPLE GRID

DETECTOR AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



6F

BOTTOM VIEW

SMALL 6 PIN BASE

THE TUNG-SOL 77 IS A TRIPLE GRID GENERAL PURPOSE DETECTOR AMPLIFIER.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	
MAXIMUM PLATE DISSIPATION	.75	WATT
MAXIMUM SCREEN DISSIPATION	.10	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	100	250	VOLTS
SCREEN VOLTAGE	60	100	VOLTS
CONTROL GRID VOLTAGE	-1.5	-3	VOLTS
GRID CIRCUIT RESISTANCE MAX.	1	1	MEGOHM
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET		
PLATE CURRENT	1.7	2.3	MA.
SCREEN CURRENT	0.4	0.5	MA.
PLATE RESISTANCE APPROX.	.6	1.0 MIN.	MEGOHM
TRANSCONDUCTANCE	1100	1250	μMHOS
CONTROL GRID VOLTAGE FOR CATHODE CURRENT CUT-OFF	-5.5	-7.5	VOLTS

CONTINUED NEXT PAGE

PLATE
635-2

10V. 20
1939

TUNG-SOL

BIASED DETECTOR

PLATE SUPPLY VOLTAGE	100	100	250	VOLTS
SCREEN SUPPLY VOLTAGE	16	100	100	VOLTS
PLATE RESISTOR	1	1	0.5	MEGOHM
SCREEN RESISTOR	0	2	0	MEGOHMS
CATHODE SELF BIASING RESISTOR	30 000	25 000	10 000	OHMS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET			

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	4.7	μμf
PLATE TO CATHODE	11	μμf
CONTROL GRID TO PLATE[S]	0.007 MAX.	μμf

[S] MEASURED WITH AN EXTERNAL SHIELD. THE INTERNAL SHIELD WITHIN THE DOME IS CONNECTED INTERNALLY TO THE SCREEN GRID (PIN #3).

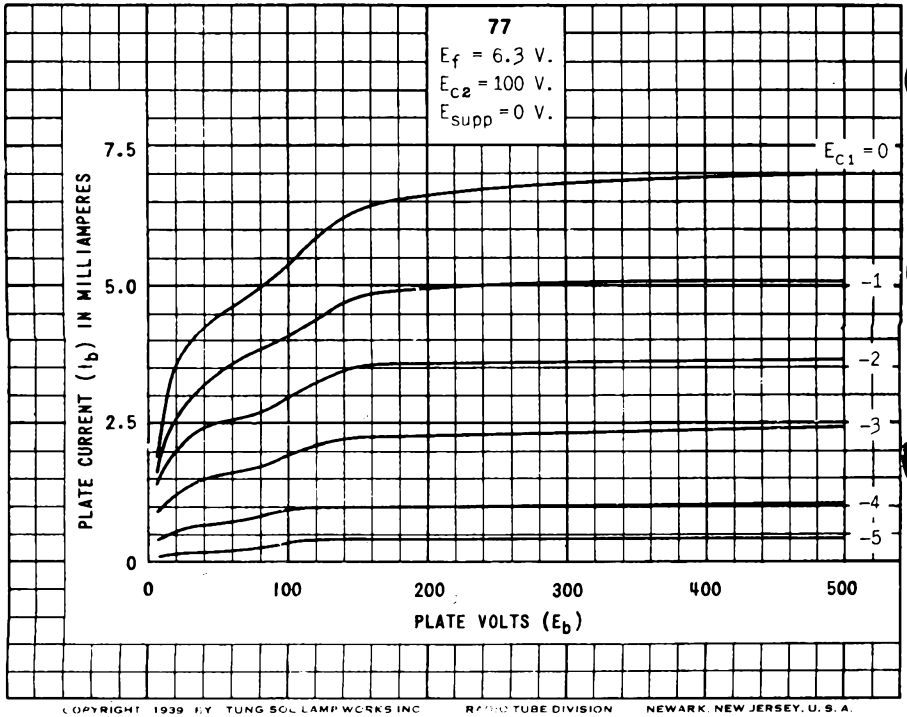
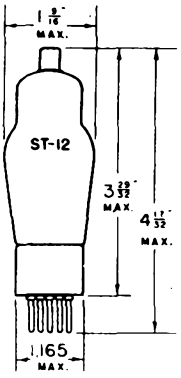


PLATE 656-1



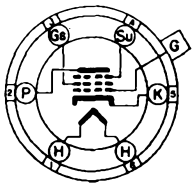
TRIPLE GRID

REMOTE CUT-OFF AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMPERE
AC OR DC

GLASS BULB



6F

BOTTOM VIEW

SMALL 6 PIN BASE

THE TUNG-SOL 78 IS A TRIPLE GRID REMOTE CUT-OFF AMPLIFIER. IT IS SUITABLE FOR USE WITH AVC IN RF AND IF AMPLIFIERS AND MINIMIZES CROSS MODULATION. WITH THE EXCEPTION OF CAPACITANCES, ITS RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 6K7, THE 6K7G AND THE 6K7GT.

RATINGS

MAXIMUM PLATE VOLTAGE	300	VOLTS
MAXIMUM SCREEN SUPPLY VOLTAGE	300	VOLTS
MAXIMUM SCREEN VOLTAGE	125	VOLTS
MINIMUM EXTERNAL GRID BIAS VOLTAGE	0	VOLTS
MAXIMUM PLATE DISSIPATION	2.75	WATTS
MAXIMUM SCREEN DISSIPATION	0.35	WATT

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	90	180	250	250	VOLTS
SCREEN VOLTAGE	90	75	100	125	VOLTS
CONTROL GRID VOLTAGE	-3	-3	-3	-3	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET				
PLATE CURRENT	5.4	4.0	7.0	10.5	MA.
SCREEN CURRENT	1.3	1.0	1.7	2.6	MA.
PLATE RESISTANCE APPROX.	0.3	1.0	0.8	0.6	MEGOHM
TRANSCONDUCTANCE	1275	1100	1450	1650	μMHOS
CONTROL GRID BIAS FOR TRANSCONDUCTANCE = 2 μMHOS	-38.5	-38.5	-42.5	-52.5	VOLTS

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PLATE 515-2
AUG. 14 1939

CONTINUED NEXT PAGE

TYPICAL OPERATING CONDITIONS WITH VARIABLE BIAS

MIXER IN SUPERHETERODYNE CIRCUITS

PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE	100	VOLTS
CONTROL GRID VOLTAGE [A]	-10	VOLTS
SUPPRESSOR GRID	CONNECTED TO CATHODE AT SOCKET	

[A] THE GRID BIAS SHOWN IS MINIMUM FOR AN OSCILLATOR PEAK VOLTAGE OF 7 VOLTS. THESE VALUES ARE OPTIMUM.

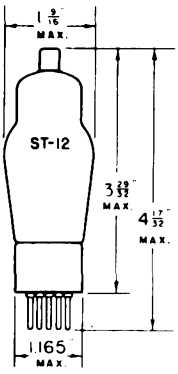
DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID TO CATHODE	4.5	μμf
PLATE TO CATHODE	11	μμf
CONTROL GRID TO PLATE	.007 MAX.	μμf

[S] MEASURED WITH AN EXTERNAL SHIELD. THE INTERNAL SHIELD IN THE DOME IS CONNECTED TO THE CATHODE WITHIN THE TUBE.

PLATE 516-2

TUNG-SOL



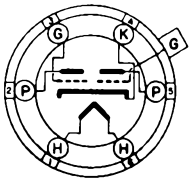
CLASS B TWIN TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.6 AMPERE
AC OR DC

GLASS BULB

SMALL 6 PIN BASE



6H
BOTTOM VIEW

THE TUNG-SOL 79 COMBINES TWO TRIODES WITH A COMMON CATHODE IN A SINGLE BULB. IT IS DESIGNED FOR SERVICE AS A CLASS B POWER AMPLIFIER, VOLTAGE AMPLIFIER OR PHASE INVERTER. WITH THE EXCEPTION OF CAPACITANCES ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 6Y7G.

OPERATING CONDITIONS AND CHARACTERISTICS

PLATE VOLTAGE MAX.	250	VOLTS
PEAK PLATE CURRENT PER PLATE MAX.	90	MA.
AVERAGE PLATE DISSIPATION MAX.	11.5	WATTS

CLASS B_2 AMPLIFIER

PLATE VOLTAGE	180	250 MAX.	VOLTS
GRID BIAS	0	0	VOLTS
ZERO-SIGNAL PLATE CURRENT PER PLATE	3.8	5.3	MA.
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	7000	14 000	OHMS
AVERAGE POWER INPUT GRID TO GRID	380	380	MILLIWATTS
POWER OUTPUT	5.5	8.0	WATTS

RESISTANCE COUPLED AMPLIFIER AND PHASE INVERTER

PLATE SUPPLY VOLTAGE	100	100	250	250	VOLTS
PLATE LOAD RESISTOR	0.1	0.5	0.1	0.5	MEGOHM
CATHODE RESISTOR	2000	6000	1200	3000	OHMS
VOLTAGE GAIN	30	35	35	43	

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PLATE
373-2

APR. 14
1939

TUNG-SOL

FULL WAVE HIGH VACUUM RECTIFIER

COATED FILAMENT

THE TUNG-SOL 5Y3GT/G, 5Y4G AND 80 ARE DESIGNED FOR USE AS POWER RECTIFIERS IN AC OPERATED RECEIVERS. THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

HORIZONTAL OPERATION PERMITTED ONLY IF PLANE OF THE FILAMENTS IS VERTICAL.

RATINGS

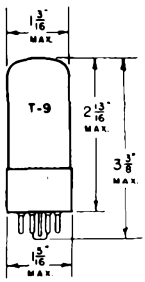
FILAMENT VOLTAGE	5.0 AC	VOLTS
FILAMENT CURRENT	2.0	AMPS.
MAXIMUM PEAK INVERSE VOLTAGE	1400	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	375	MA.
MAXIMUM AC PLATE VOLTAGE PER PLATE (RMS) CONDENSER INPUT	350	VOLTS
MAXIMUM AC PLATE VOLTAGE PER PLATE (RMS) CHOKE INPUT	500	VOLTS
TUBE VOLTAGE DROP: MEASURED WITH APPLIED DC AT 125 MA. PER PLATE	60	VOLTS

FOR INTERPRETATION OF RATINGS REFER TO RMA STANDARD M8-210

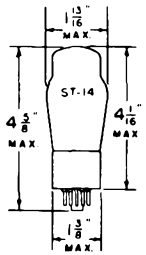
OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER

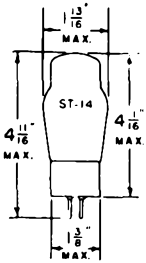
	CONDENSER INPUT	CHOKE INPUT	
FILAMENT VOLTAGE	5.0 AC	5.0 AC	VOLTS
AC PLATE VOLTAGE PER PLATE (RMS) MAX.	350	500	VOLTS
DC OUTPUT CURRENT MAX.	125	125	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.	50		OHMS
MINIMUM VALUE OF INPUT CHOKE		5	HENRYS



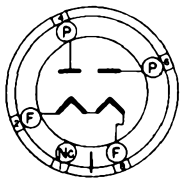
5Y3GT/G – MEDIUM 5 PIN OCTAL BASE



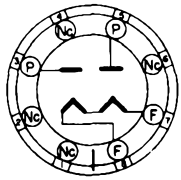
5Y4G – MEDIUM 8 PIN OCTAL BASE



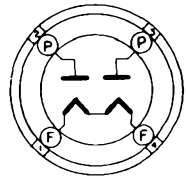
80 – MEDIUM 4 PIN BASE



5Y3GT/G



5Y4G



80

SEE OTHER SIDE OF SHEET FOR CURVES

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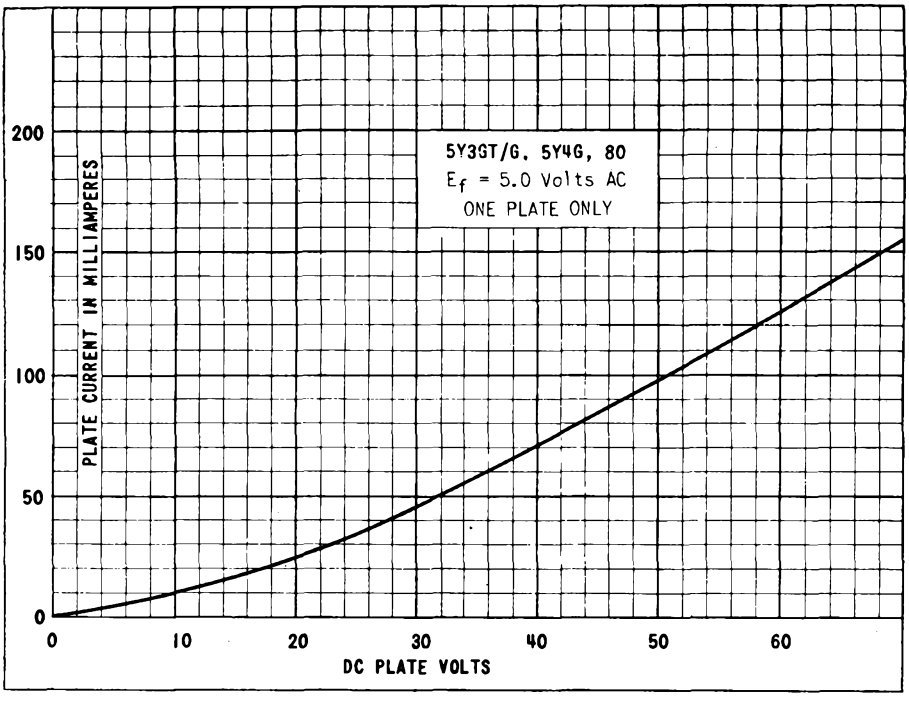
PLATE 1364-1
OCT. 25 1943



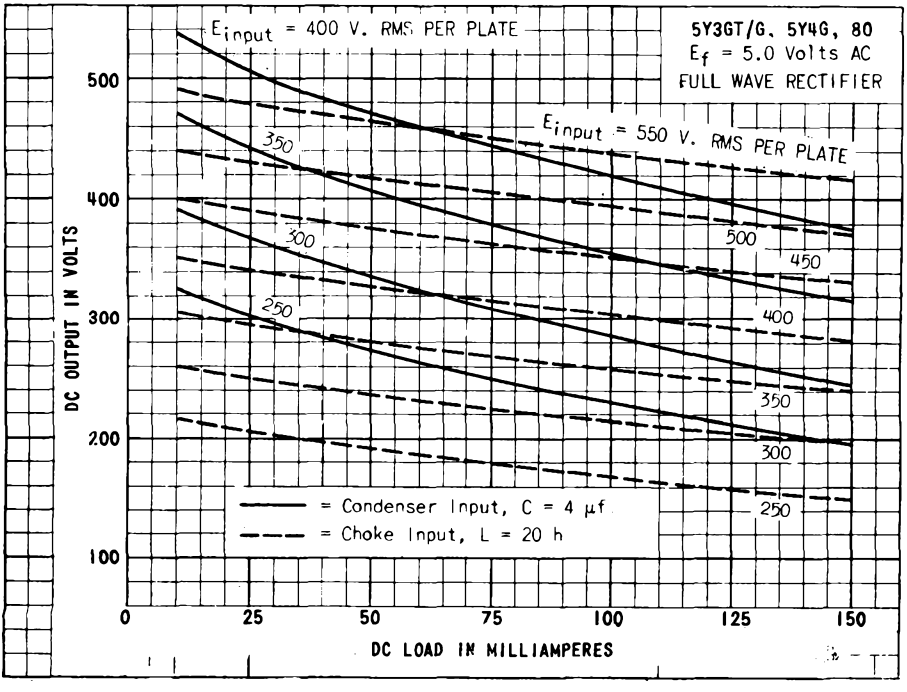
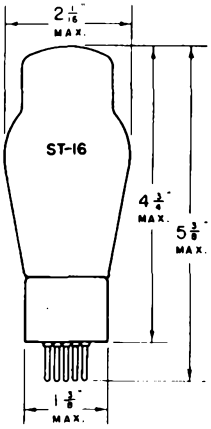


PLATE 1365-1
OCT. 25 1943

TUNG-SOL



HALF-WAVE

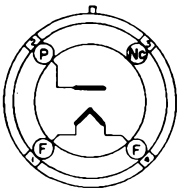
HIGH VACUUM RECTIFIER

COATED FILAMENT

7.5 VOLTS 1.25 AMPERES
AC

GLASS BULB

MEDIUM 4 PIN BAYONET BASE



4B

BOTTOM VIEW

THE TUNG-SOL 81 IS A HALF-WAVE RECTIFIER WHICH MAY BE USED WITH EITHER CHOKE OR CONDENSER INPUT TO THE FILTER.

OPERATING CONDITIONS AND CHARACTERISTICS

HALF-WAVE RECTIFIER - SINGLE TUBE

CONDENSER OR CHOKE INPUT TO FILTER

AC PLATE VOLTAGE (RMS)	700 MAX.	VOLTS
DC OUTPUT CURRENT	85 MAX.	MA.

FULL-WAVE RECTIFIER - TWO TUBES

CONDENSER OR CHOKE INPUT TO FILTER

AC PLATE VOLTAGE (RMS)	700 MAX.	VOLTS
DC OUTPUT CURRENT	170 MAX.	MA.
AVERAGE TUBE VOLTAGE DROP AT 170 MA. DC	91	VOLTS

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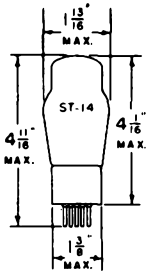
PLATE
576-1

OCT. 20
1939

TUNG-SOL



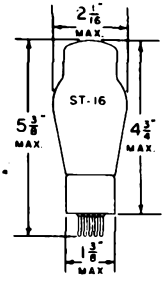
82

FULL WAVE
MERCURY VAPOR RECTIFIER

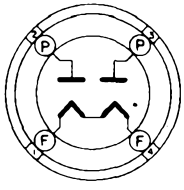
COATED FILAMENT

82 – 2.5 VOLTS 3.0 AMPERES
83 – 5.0 VOLTS 3.0 AMPERES
AC

GLASS BULB



83



4C

MEDIUM 4 PIN BASE BOTTOM VIEW
82 83

THE TUNG-SOL 82 AND 83 ARE DESIGNED FOR SERVICE AS POWER RECTIFIERS IN AC OPERATED RECEIVERS THAT REQUIRE A POWER SUPPLY WITH GOOD VOLTAGE REGULATION.

RATINGS

	82	83	
MAXIMUM PEAK INVERSE VOLTAGE	1550	1550	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	345	675	MA.

OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

	82	83	
AC PLATE VOLTAGE PER PLATE (RMS) MAX.	450	450	VOLTS
DC OUTPUT CURRENT MAX.	115	225	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN. A	50	50	OHMS
CONDENSED MERCURY TEMPERATURE OPERATING RANGE	24°–60°	20°–60°	CENTIGRADE

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

	82	83	
AC PLATE VOLTAGE PER PLATE (RMS) MAX.	550	550	VOLTS
DC OUTPUT CURRENT MAX.	115	225	MA.
VALUE OF INPUT CHOKE MIN.	6	3	HENRYS
CONDENSED MERCURY TEMPERATURE OPERATING RANGE	24°–60°	20°–60°	CENTIGRADE
APPROXIMATE TUBE VOLTAGE DROP	15	15	VOLTS

A WHEN FILTER CONDENSERS LARGER THAN 40 μFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE. THE 82 AND 83 MAY BE OPERATED WITH PLATES CONNECTED IN PARALLEL. TO EQUALIZE THE CURRENT DISTRIBUTION BETWEEN PLATES, WHEN SO CONNECTED, IT IS NECESSARY TO ADD RESISTANCE IN SERIES WITH EACH PLATE LEAD (TYPE 82: 100 OHMS, TYPE 83: 50 OHMS). FOR PARALLEL OPERATION IN A FULL-WAVE CIRCUIT, IT IS DESIRABLE THAT BOTH PLATES WITHIN THE SAME TUBE BE CONNECTED TO THE SAME TERMINAL OF THE PLATE TRANSFORMER.

FULL PLATE LOAD SHOULD NOT BE APPLIED TO THIS TUBE UNTIL THE FILAMENTS HAVE REACHED THEIR NORMAL OPERATING TEMPERATURE. UNDER NORMAL OPERATING CONDITIONS, THE FILAMENTS HEAT QUICKLY WHEN THE SET IS "TURNED ON" AND ARE READY TO SUPPLY FULL-LOAD CURRENT BEFORE THE TUBES IN THE RECEIVER REQUIRE IT.

FOR "INTERPRETATION OF RATINGS", REFER TO FRONT OF BOOK.

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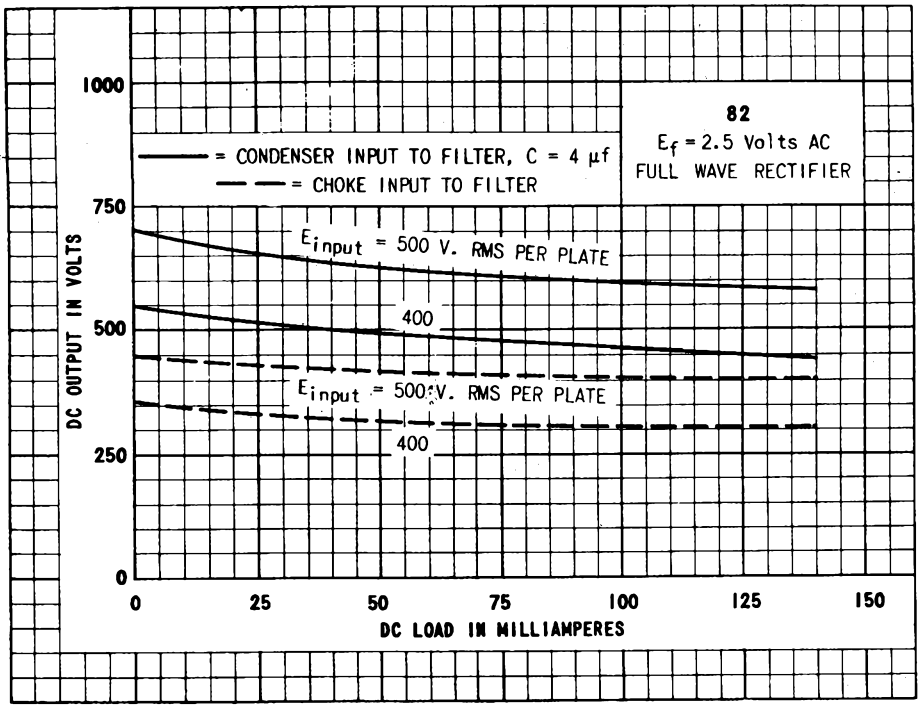
PLATE 713-1

FEB. 15 1940



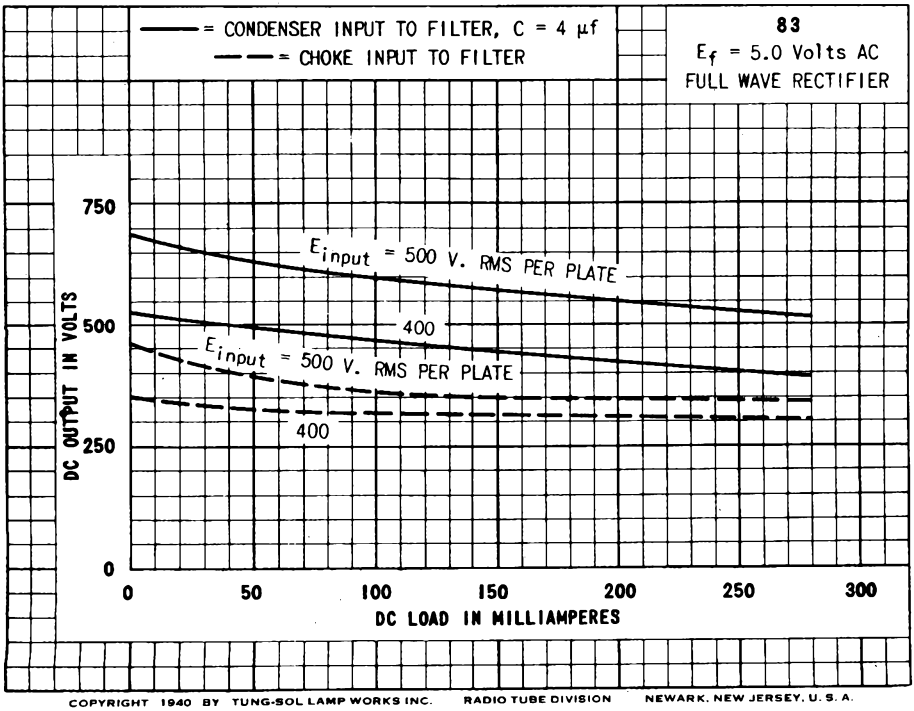
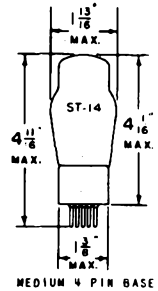


PLATE 714-1

TUNG-SOL



MEDIUM 4 PIN BASE
83V

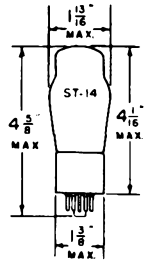
FULL WAVE

HIGH VACUUM RECTIFIER

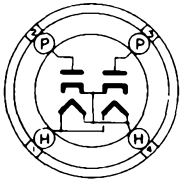
UNIPOTENTIAL CATHODE

HEATER
5.0 VOLTS 2.0 AMPERES
AC

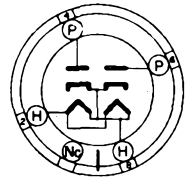
GLASS BULB



MEDIUM 5 PIN OCTAL BASE
5V4G



4L
BOTTOM VIEW



G-5L
BOTTOM VIEW

THE TUNG-SOL 5V4G AND 83V ARE POWER RECTIFIERS WITH LOW INTERNAL VOLTAGE DROPS. THEY ARE DESIGNED FOR SERVICE IN AC OPERATED RECEIVERS THAT REQUIRE HIGH CURRENTS. THEIR RATINGS AND ELECTRICAL CHARACTERISTICS ARE IDENTICAL.

RATINGS

MAXIMUM PEAK INVERSE VOLTAGE	1400	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	525	MA.

OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	375	VOLTS
DC OUTPUT CURRENT MAX.	175	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN. A	65	OHMS

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	500	VOLTS
DC OUTPUT CURRENT MAX.	175	MA.
VALUE OF INPUT CHOKE MIN.	4.0	HENRYS
TUBE VOLTAGE DROP AT 175 MA. PER PLATE	23	VOLTS

A WHEN FILTER CONDENSERS LARGER THAN 40 μFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS", REFER TO FRONT OF BOOK.

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PLATE 701-2

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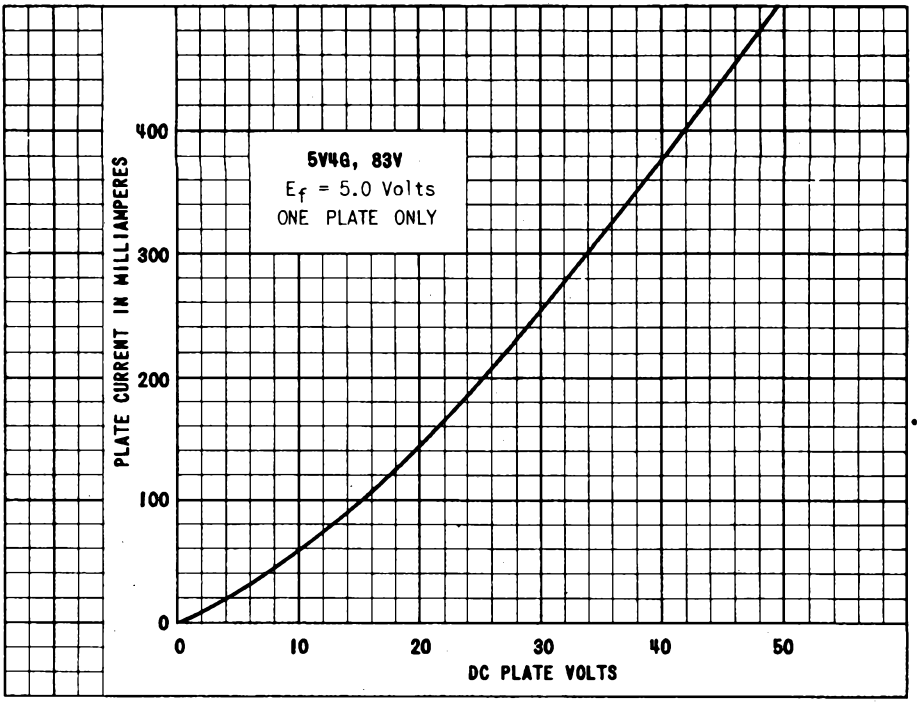
83V (5V4G)



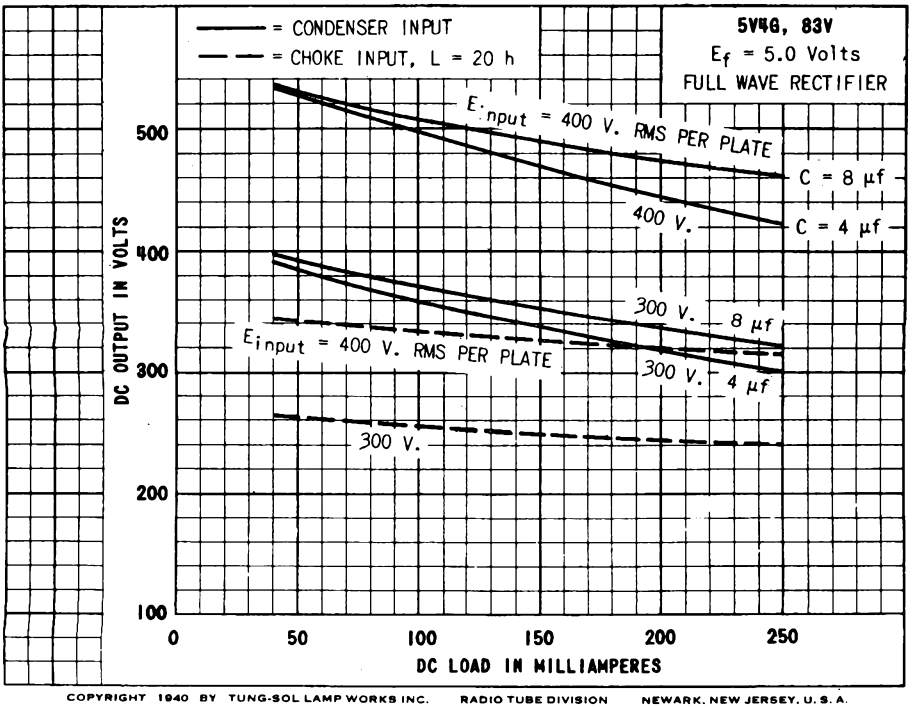
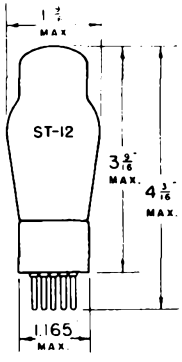


PLATE
702-1

TUNG-SOL



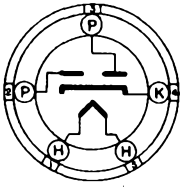
FULL WAVE

HIGH VACUUM RECTIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.5 AMPERE
AC OR DC

GLASS BULB



5D

BOTTOM VIEW

SMALL 5 PIN BASE

THE TUNG-SOL 84/6Z4 IS DESIGNED FOR USE AS A POWER RECTIFIER IN STORAGE BATTERY AND AC OPERATED RECEIVERS.

RATINGS

MAXIMUM PEAK INVERSE VOLTAGE	1250	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	450	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE	180	MA.

OPERATING CONDITIONS AND CHARACTERISTICS

FULL WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	325	VOLTS
DC OUTPUT CURRENT MAX.	60	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN.A	65	OHMS

FULL WAVE RECTIFIER WITH CHOKE INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS) MAX.	450	VOLTS
DC OUTPUT CURRENT MAX.	60	MA.
VALUE OF INPUT CHOKE MIN.	10	HENRYS
TUBE VOLTAGE DROP AT 60 MA. PER PLATE	20	VOLTS

A WHEN FILTER CONDENSERS LARGER THAN 40 MFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS", REFER TO FRONT OF BOOK.

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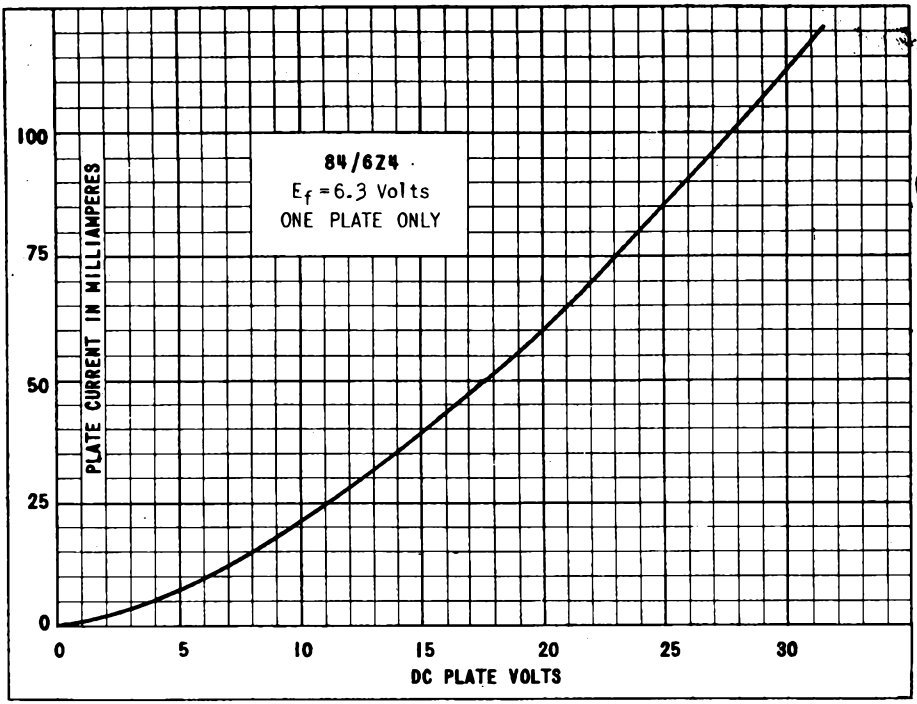
PLATE 715-2

FEB. 15 1940

84/6Z4



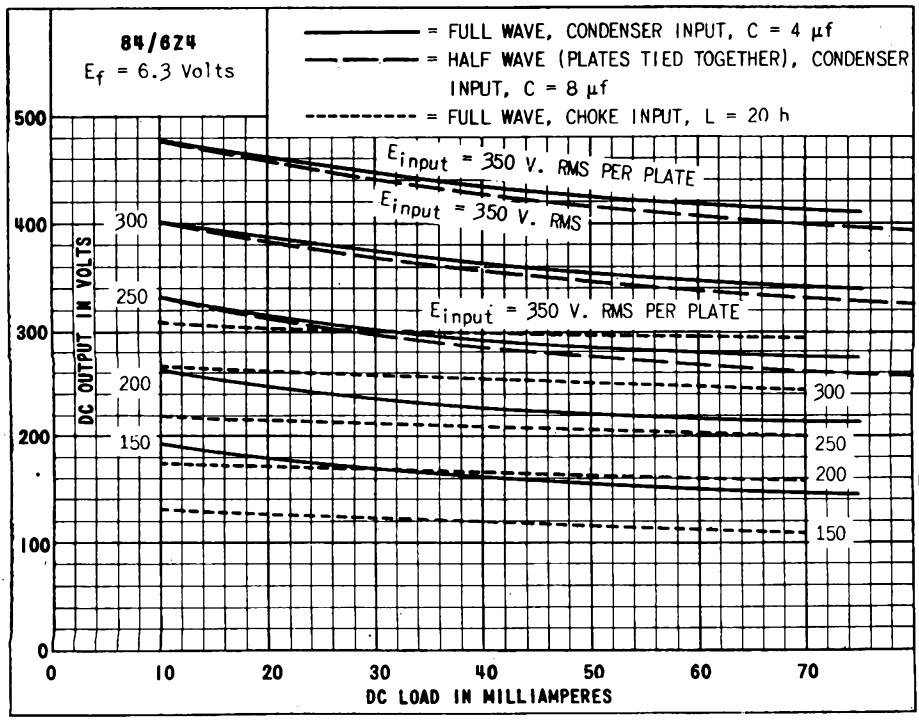
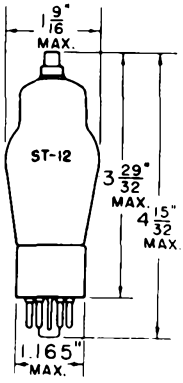


PLATE 716-1

TUNG-SOL

DUPLEX-DIODE TRIODE

UNIPOTENTIAL CATHODE



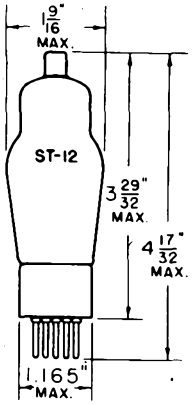
6V7G
SMALL 7 PIN OCTAL BASE

HEATER

6V7G, 85	55
6.3 V.	2.5 V.
0.3 A.	1.0 A.

AC OR DC

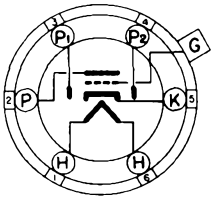
IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE. UNDER NO CONDITIONS SHOULD IT EXCEED 100 VOLTS.



55, 85
SMALL 8 PIN BASE

6V7G

BOTTOM VIEWS



55, 85

THE 6V7G, 55 AND 85 ARE HEATER CATHODE TYPE TUBES CONSISTING OF TWO DIODES AND A TRIODE IN A SINGLE BULB. THEY ARE DESIGNED FOR USE AS COMBINED DETECTORS, AMPLIFIERS AND AUTOMATIC VOLUME CONTROL TUBES.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	2.0	WATTS

DIRECT INTERELECTRODE CAPACITANCES

GRID TO PLATE	1.5	μμf
INPUT	1.5	μμf
OUTPUT	4.3	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A AMPLIFIER

PLATE VOLTAGE	135	180	250	VOLTS
GRID VOLTAGE	-10.5	-13.5	-20	VOLTS
PLATE CURRENT	3.7	6.0	8.0	MA.
PLATE RESISTANCE	11000	8500	7500	OHMS
TRANSCONDUCTANCE	750	975	1100	μMHOS
AMPLIFICATION FACTOR	8.3	8.3	8.3	
LOAD RESISTANCE	25000	20000	20000	OHMS
POWER OUTPUT	75	160	350	MW.

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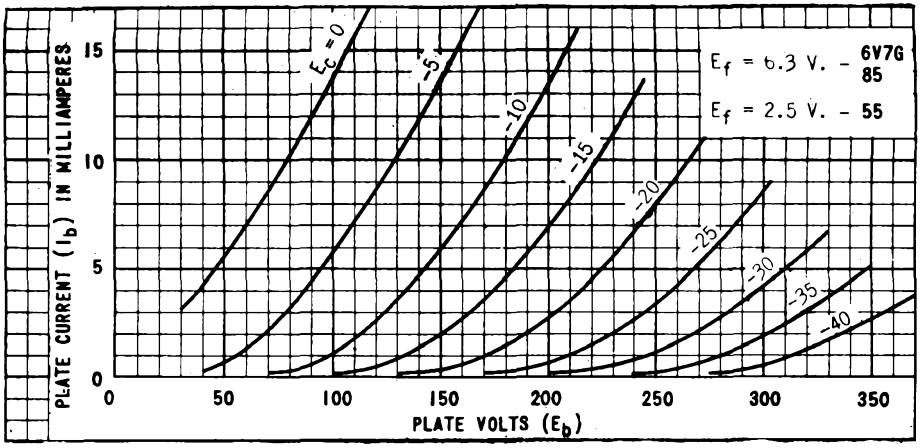
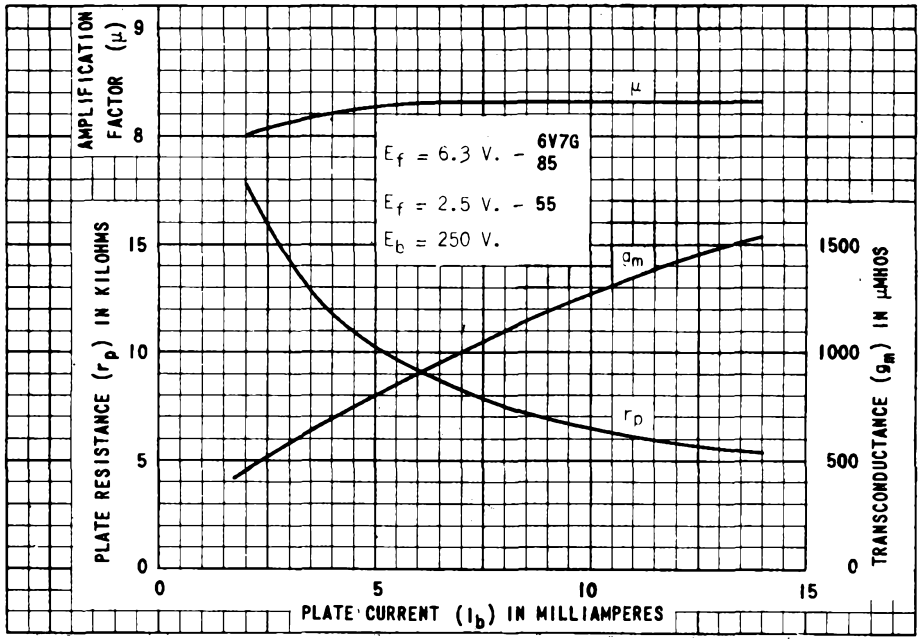
PLATE 1447
JUNE 15 1944

85 (6V7G, 55)





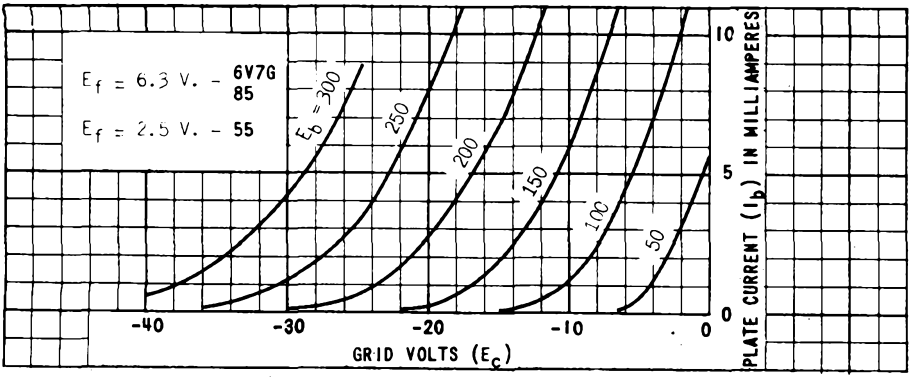
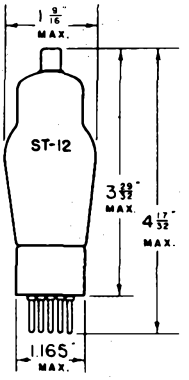


PLATE
1448
JUNE 15
1944

TUNG-SOL



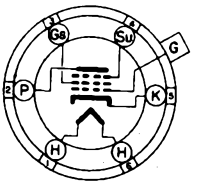
TRIPLE GRID POWER AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.4 AMPERE
AC OR DC

GLASS BULB

SMALL 6 PIN BASE



6F

THE TUNG-SOL 89 IS DESIGNED FOR SERVICE AS A PENTODE, CLASS A TRIODE, OR CLASS B TRIODE, IN THE OUTPUT STAGE OF AC OPERATED AND STORAGE BATTERY OPERATED RECEIVERS.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER – TRIODE CONNECTED

GRIDS G_S AND Su CONNECTED TO PLATE

PLATE VOLTAGE	160	180	250 MAX.	VOLTS
CONTROL GRID VOLTAGE	-20	-22.5	-31	VOLTS
GRID CIRCUIT RESISTANCE MAX.	1	1	1	MEGOHM
PLATE CURRENT	17	20	32	MA.
PLATE RESISTANCE	3300	3000	2600	OHMS
TRANSCONDUCTANCE	1425	1550	1800	µMHOS
AMPLIFICATION FACTOR	4.7	4.7	4.7	
LOAD RESISTANCE [P]	7000	6500	5500	OHMS
TOTAL HARMONIC DISTORTION MAX.	5	5	5	PER CENT
POWER OUTPUT	300	400	900	MW.

[P] WHEN USED AS A DRIVER FOR A CLASS B STAGE, APPROXIMATELY TWICE THIS VALUE OF LOAD RESISTANCE IS RECOMMENDED.

CLASS A1 AMPLIFIER – PENTODE CONNECTED

PLATE VOLTAGE	100	135	180	250 MAX.	VOLTS
SCREEN GRID VOLTAGE	100	135	180	250 MAX.	VOLTS
CONTROL GRID VOLTAGE	-10	-13.5	-18	-25	VOLTS
GRID CIRCUIT RESISTANCE MAX.	1	1	1	1	MEGOHM
SUPPRESSOR	CONNECTED TO CATHODE AT SOCKET				
PLATE CURRENT	9.5	14	20	32	MA.
SCREEN CURRENT	1.6	2.2	3.0	5.5	MA.
TRANSCONDUCTANCE	1200	1350	1550	1800	µMHOS
AMPLIFICATION FACTOR	125	125	125	125	
LOAD RESISTANCE	10 700	9200	8000	6750	OHMS
TOTAL HARMONIC DISTORTION	9	9	9	9	PER CENT
POWER OUTPUT	0.33	0.75	1.5	3.4	WATTS

CONTINUED NEXT PAGE

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PLATE 212-1

CLASS B_2 AMPLIFIER – TRIODE CONNECTION

(GRID S_M TIED TO PLATE; GRIDS G AND G_R CONNECTED TOGETHER)

PLATE VOLTAGE MAX.	250	VOLTS
PEAK PLATE CURRENT MAX.	90	MA.
AVERAGE GRID DISSIPATION (GRIDS G AND G_S) MAX.	0.35	WATTS

TWO TUBES PUSH-PULL

PLATE VOLTAGE	180	180	VOLTS
GRID VOLTAGE	0	0	VOLTS
ZERO-SIGNAL PLATE CURRENT PER TUBE	3	3	MA.
LOAD RESISTANCE PER TUBE	3400	2350	OHMS
EFFECTIVE LOAD RESISTANCE PLATE TO PLATE	13 600	9400	OHMS
POWER OUTPUT (TWO TUBES) APPROX.	2.5	3.5	WATTS

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID TO CATHODE	3.4	μμf
PLATE TO CATHODE	7.5	μμf
CONTROL GRID TO PLATE	0.5	μμf

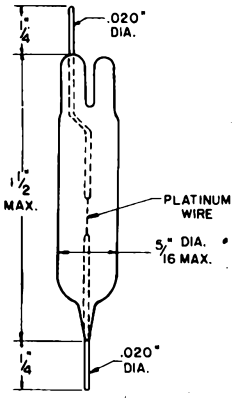
[S] WITH SHIELD

PLATE
213-1

TUNG-SOL

BOLOMETER

HOT WIRE RESISTOR
FOR MEASURING HIGH FREQUENCY CURRENTS



THE BOLOMETER B-100 CONSISTS OF A VERY FINE PLATINUM WIRE MOUNTED IN AN EVACUATED GLASS ENVELOPE. IT IS USED IN THE MEASUREMENT OF SMALL HIGH FREQUENCY CURRENTS.

RATINGS

RESISTANCE[A]	200 (±25%)	OHMS
MAXIMUM CURRENT	1.50	MA.
OPTIMUM BIAS CURRENT	0.5	MA.
SENSITIVITY	4.0	MICRO WATTS PER 1% CHANGE IN RESISTANCE
THERMAL TIME CONSTANT	0.025 APPROX.	SEC.

[A] MEASURED AT A CURRENT OF 0.5 MA. THE INCREASE IN RESISTANCE DUE TO SKIN EFFECT IS LESS THAN 1% FOR FREQUENCIES UP TO 10,000 MEGACYCLES.

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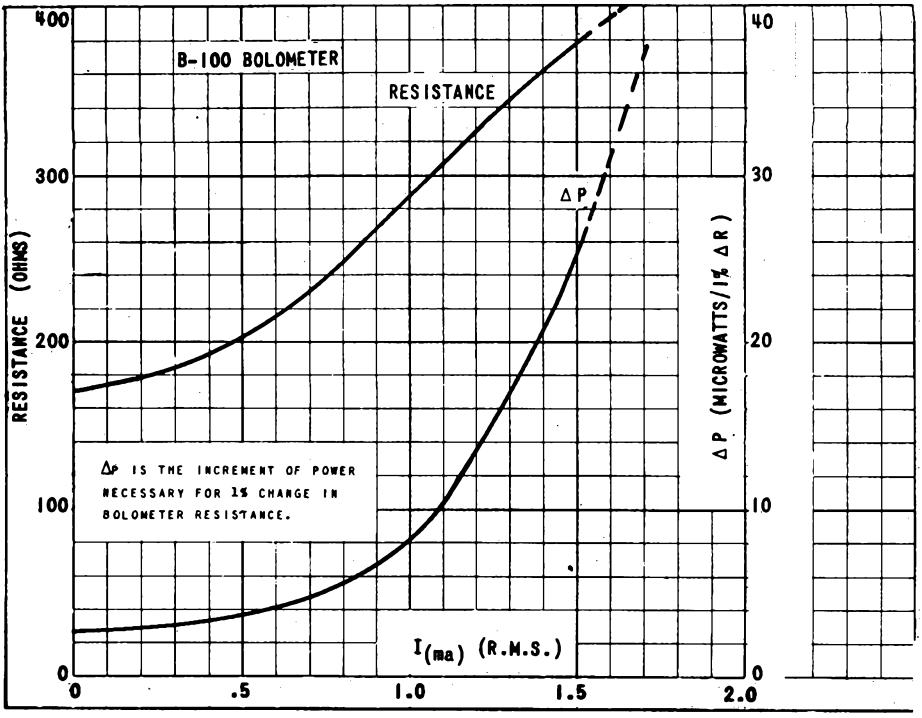
PLATE 1558
JAN. 15 1945

B-100



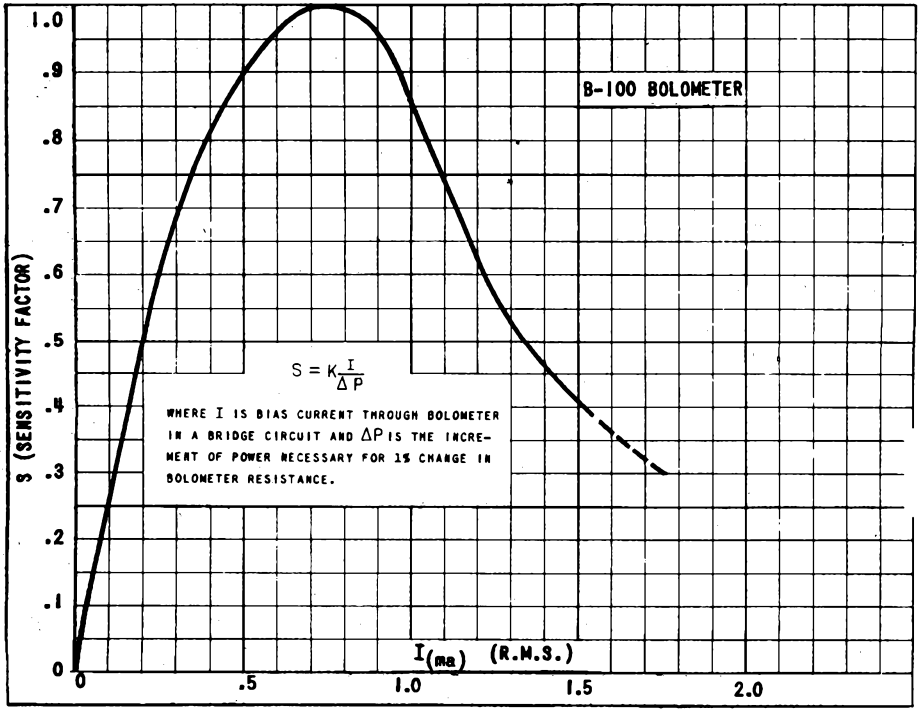
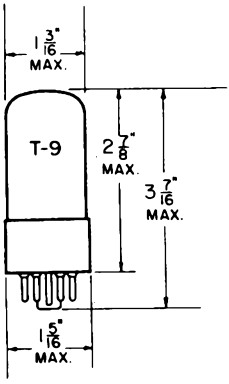


PLATE 1559
JAN. 15 1945

TUNG-SOL

BEAM POWER AMPLIFIER
HALF WAVE RECTIFIER

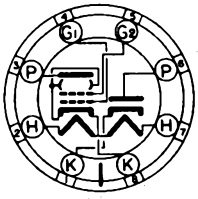


GLASS BULB

COATED UNIPOTENTIAL CATHODES

HEATERS
117 VOLTS 0.09 AMPERE
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
INTERMEDIATE SHELL
8 PIN OCTAL BASE

THE 117L7/M7GT COMBINES A HALF-WAVE RECTIFIER AND A BEAM POWER AMPLIFIER IN THE SAME ENVELOPE. IT IS DESIGNED FOR AC-DC SERVICE FROM A 117 VOLT LINE IN THREE WAY PORTABLE RECEIVERS.

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD M8-210

AMPLIFIER UNIT

MAXIMUM HEATER VOLTAGE	117	VOLTS
MAXIMUM HEATER CURRENT	0.090	AMP.
MAXIMUM PLATE VOLTAGE	117	VOLTS
MAXIMUM SCREEN VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	6.0	WATTS
MAXIMUM SCREEN DISSIPATION	1.0	WATTS

RECTIFIER UNIT

MAXIMUM HEATER VOLTAGE	117	VOLTS
MAXIMUM HEATER CURRENT	0.090	AMP.
MAXIMUM AC PLATE VOLTAGE (RMS)	117	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	350	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT	450	MA.
TUBE VOLTAGE DROP AT 150 MA. PLATE CURRENT	16	VOLTS
MAXIMUM DC HEATER-CATHODE VOLTAGE	175	VOLTS

CONTINUED ON FOLLOWING PAGE

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PLATE 1815
JUNE 2, 1947

→ INDICATES A CHANGE OR ADDITION.

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

AMPLIFIER UNIT

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	105	VOLTS
SCREEN VOLTAGE	105	VOLTS
GRID VOLTAGE	-5.2	VOLTS
PEAK AF GRID VOLTAGE	5.2	VOLTS
ZERO-SIGNAL PLATE CURRENT	43	MA.
ZERO-SIGNAL SCREEN CURRENT	4	MA.
MAXIMUM-SIGNAL PLATE CURRENT	43	MA.
MAXIMUM-SIGNAL SCREEN CURRENT	5.5	MA.
LOAD RESISTANCE	4 000	OHMS
PLATE RESISTANCE (APPROX.)	17 000	OHMS
TRANSCONDUCTANCE	5 300	µMHOS
MAXIMUM-SIGNAL POWER OUTPUT	0.85	WATT
TOTAL HARMONIC DISTORTION	5.0	PERCENT

HALF WAVE RECTIFIER
WITH CONDENSER-INPUT FILTER

AC PLATE VOLTAGE (RMS)	117	VOLTS
DC OUTPUT CURRENT	75	MA.
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE	15	OHMS

SIMILIAR TYPE REFERENCE: *Characteristics for the amplifier unit are identical to 117P7GT, somewhat similiar to 117N7GT. Except for heater ratings somewhat similiar to 70L7GT.*

PLATE 1816
JUNE 2, 1947

→ INDICATES A CHANGE OR ADDITION

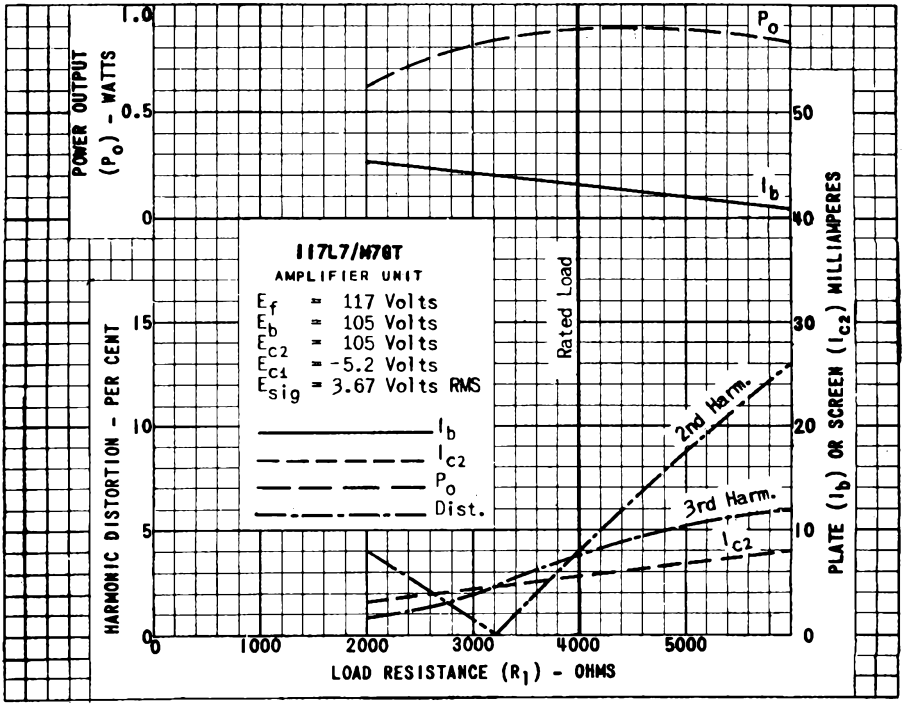

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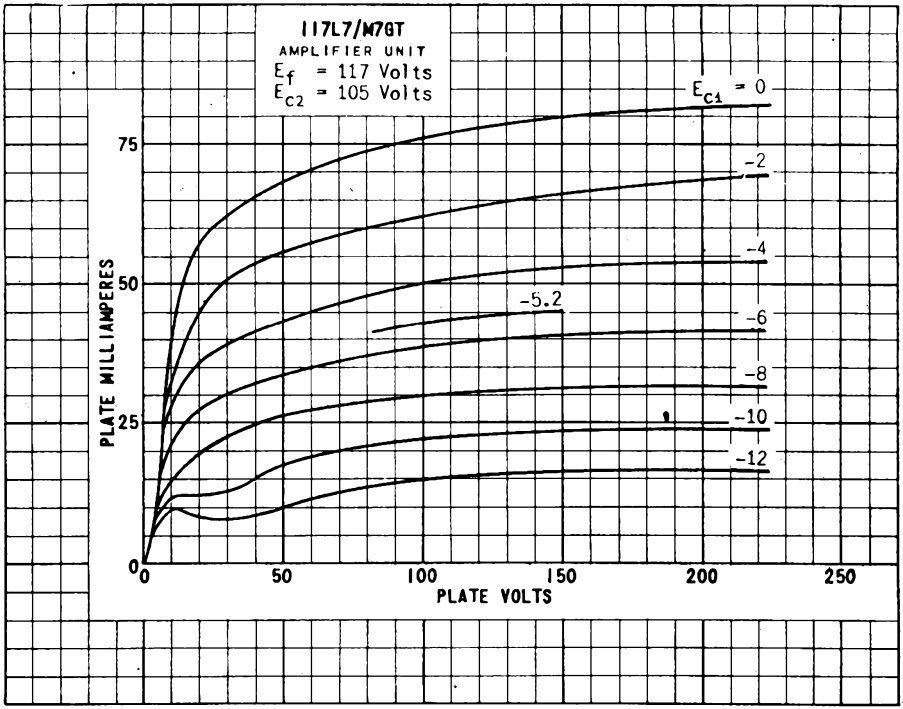
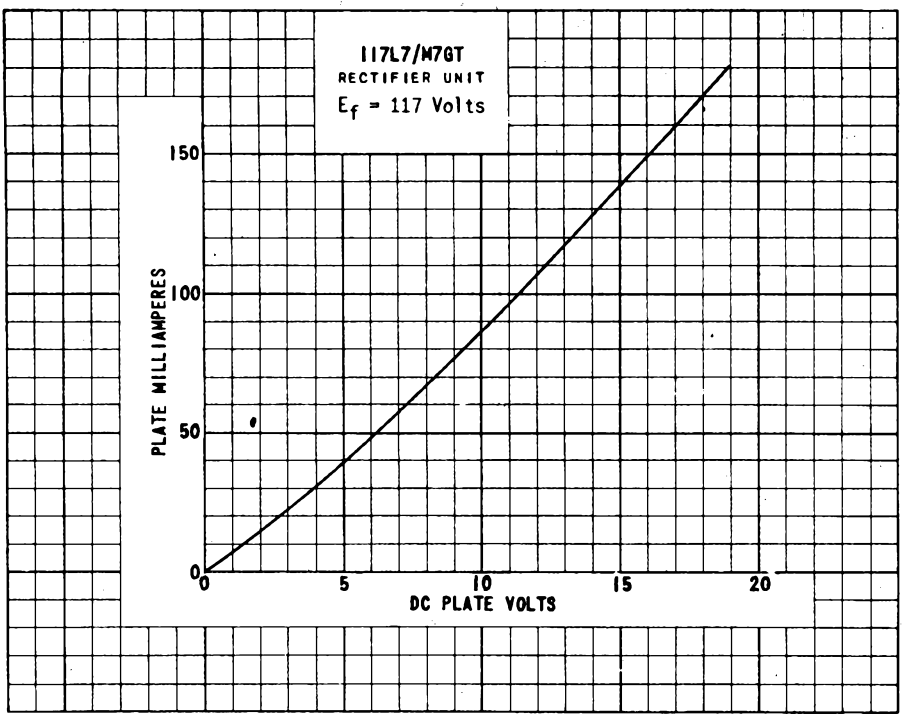
PLATE
1817
JUNE 2,
1947


117L7/M7GT
AMPLIFIER UNIT
E_f = 117 Volts
E_{c2} = 105 Volts
E_{c1} = 0
-2
-4
-5.2
-6
-8
-10
-12
PLATE MILLIAMPERES
75
50
25
0
0
50
100
150
200
250
PLATE VOLTS

117L7/M7GT



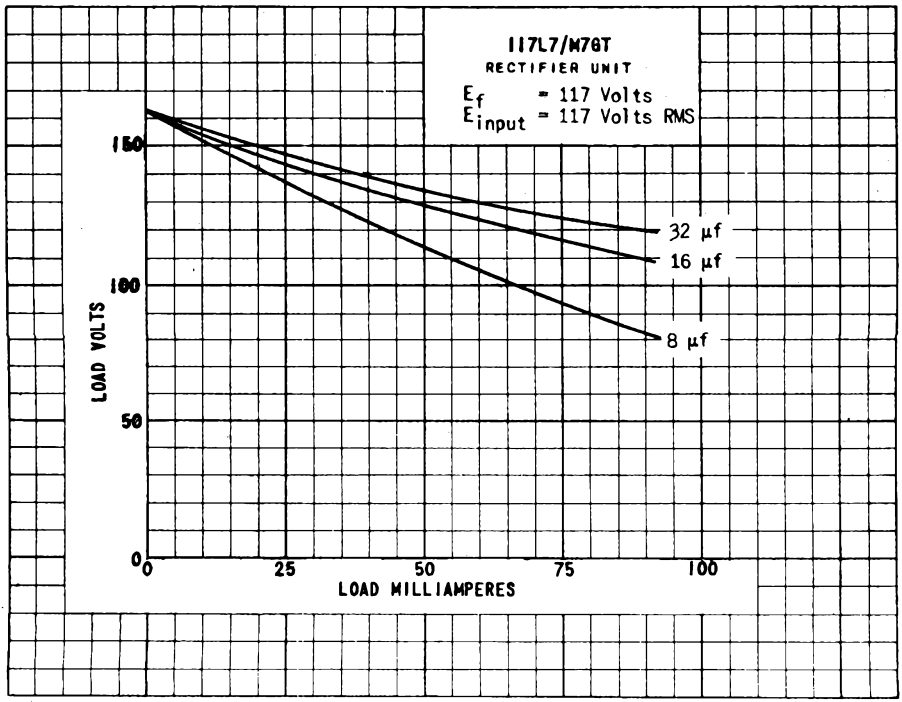
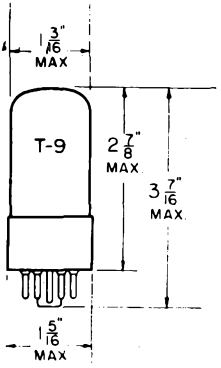


PLATE 1818
JUNE 2, 1947

TUNG-SOL

COMBINED HALF WAVE RECTIFIER AND BEAM POWER AMPLIFIER



GLASS BULB

COATED UNIPOTENTIAL CATHODES

HEATER
117 VOLTS 0.09 AMPERE
AC OR DC

ANY MOUNTING POSITION

BOTTOM VIEW

INTERMEDIATE SHELL
8-PIN OCTAL

THE 117N7GT IS A MULTI-UNIT TUBE CONTAINING A HALF-WAVE RECTIFIER AND A BEAM POWER AMPLIFIER IN THE SAME ENVELOPE. IT IS DESIGNED WITH A HEATER FOR CONNECTION DIRECTLY ACROSS A 117-VOLT SUPPLY LINE.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE (AC OR DC)	117	VOLTS
HEATER CURRENT	0.09	AMP.

RECTIFIER UNIT

MAX. PEAK INVERSE PLATE VOLTAGE	350	VOLTS
MAX. PEAK PLATE CURRENT	450	MA.
MAX. DC HEATER-CATHODE POTENTIAL	175	VOLTS
WITH CONDENSER-INPUT FILTER:		
MAX. AC PLATE VOLTAGE (RMS)	117	VOLTS
MAX. DC OUTPUT CURRENT	75	MA.
MIN. TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE[A]	15	OHMS

[A] WHEN A FILTER-INPUT CONDENSER LARGER THAN 40 μf IS USED, IT MAY BE NECESSARY TO USE ADDITIONAL PLATE-SUPPLY IMPEDANCE TO LIMIT THE PEAK PLATE CURRENT TO RATED VALUE.

CONTINUED ON FOLLOWING PAGE

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PLATE 1615
OCT. 15, 1945

CONTINUED FROM PRECEDING PAGE

AMPLIFIER UNIT

MAX. PLATE VOLTAGE	117	VOLTS
MAX. SCREEN VOLTAGE	117	VOLTS
MAX. PLATE DISSIPATION	5.5	WATTS
MAX. SCREEN DISSIPATION	1	WATT

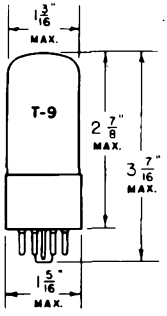
TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	100	VOLTS
SCREEN VOLTAGE	100	VOLTS
GRID VOLTAGE[B]	-6	VOLTS
PEAK AF GRID VOLTAGE	6	VOLTS
ZERO-SIGNAL PLATE CURRENT	51	MA.
ZERO-SIGNAL SCREEN CURRENT	5	MA.
PLATE RESISTANCE (APPROX.)	16 000	OHMS
LOAD RESISTANCE	3000	OHMS
TRANSCONDUCTANCE	7000	μMHOS
TOTAL HARMONIC DISTORTION	6	PER CENT
MAX. SIGNAL POWER OUTPUT	1.2	WATTS

[B] TYPE OF INPUT COUPLING USED SHOULD NOT INTRODUCE TOO MUCH RESISTANCE IN THE GRID CIRCUIT. RESISTANCE SHOULD NOT EXCEED 0.25 MEGOHM WITH FIXED BIAS, NOR 1.0 MEGOHM WITH CATHODE BIAS.

TUNG-SOL



BEAM POWER AMPLIFIER

HALF WAVE RECTIFIER

UNIPOTENTIAL CATHODES

HEATERS
117 VOLTS 0.090 AMPERE
AC OR DC

GLASS BULB

8AV
BOTTOM VIEW

INTERMEDIATE 8 PIN OCTAL BASE

THE TUNG-SOL 117P7GT COMBINES A HALF WAVE RECTIFIER AND A BEAM POWER AMPLIFIER IN THE SAME BULB. IT IS DESIGNED FOR AC – DC SERVICE FROM A 117 VOLT LINE IN THREE WAY PORTABLE RECEIVERS.

RATINGS

BEAM POWER AMPLIFIER UNIT

MAXIMUM PLATE VOLTAGE	117	VOLTS
MAXIMUM SCREEN VOLTAGE	117	VOLTS
MAXIMUM PLATE DISSIPATION	6.0	WATTS
MAXIMUM SCREEN DISSIPATION	1.0	WATT

RATINGS

RECTIFIER UNIT

MAXIMUM AC PLATE VOLTAGE (RMS)	117	VOLTS
MAXIMUM DC HEATER TO CATHODE POTENTIAL	175	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	350	VOLTS
MAXIMUM STEADY STATE PEAK PLATE CURRENT	450	MA.
TUBE VOLTAGE DROP AT 150 MA. PLATE CURRENT	16	VOLTS

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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PLATE 1161-1
NOV. 17 1941

TUNG-SOL

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

BEAM POWER AMPLIFIER UNIT

CLASS A1 AMPLIFIER

PLATE VOLTAGE	105	VOLTS
SCREEN VOLTAGE	105	VOLTS
CONTROL GRID VOLTAGE [A]	-5.2	VOLTS
PEAK AF SIGNAL VOLTAGE	5.2	VOLTS
ZERO SIGNAL PLATE CURRENT	43	MA.
MAXIMUM SIGNAL PLATE CURRENT	43	MA.
ZERO SIGNAL SCREEN CURRENT	4	MA.
MAXIMUM SIGNAL SCREEN CURRENT	5.5	MA.
PLATE RESISTANCE APPROX.	17 000	OHMS
TRANSCONDUCTANCE	5300	μMHOS
LOAD RESISTANCE	4000	OHMS
TOTAL HARMONIC DISTORTION	5.0	PER CENT
MAXIMUM SIGNAL POWER OUTPUT	0.85	WATT

TYPICAL OPERATING CONDITIONS

HALF WAVE RECTIFIER

AC PLATE VOLTAGE (RMS)	117	VOLTS
DC OUTPUT CURRENT	75 MAX.	MA.
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE	15	OHMS

[A] THE DC RESISTANCE IN THE GRID CIRCUIT UNDER MAXIMUM RATED CONDITIONS, SHOULD NOT EXCEED 1.0 MEGOHM FOR FULL SELF BIAS AND SERIES SCREEN RESISTOR OPERATION AND 0.25 MEGOHM FOR FIXED BIAS OPERATION.

PLATE 1162-2

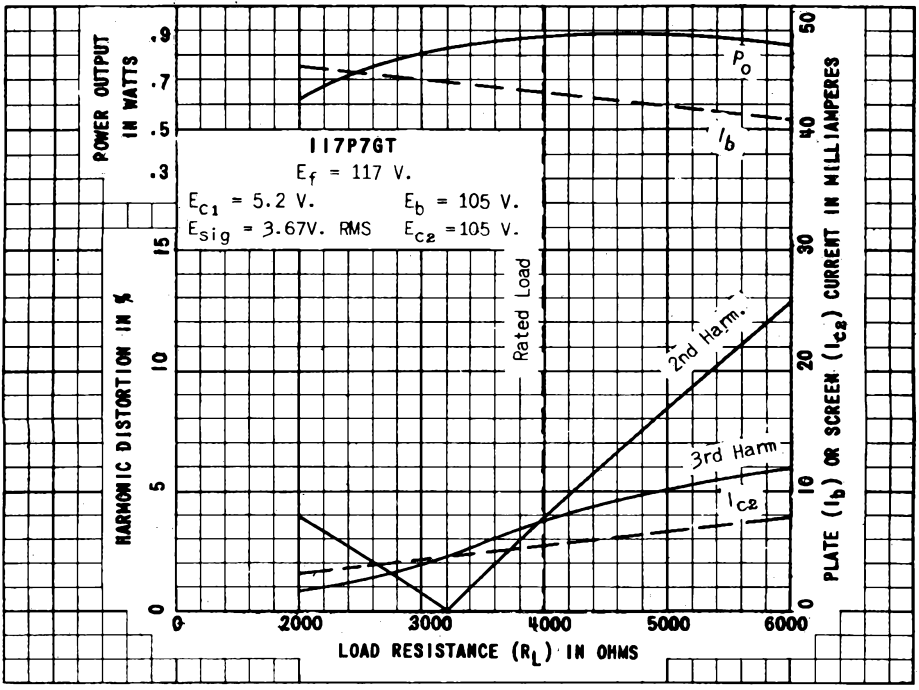

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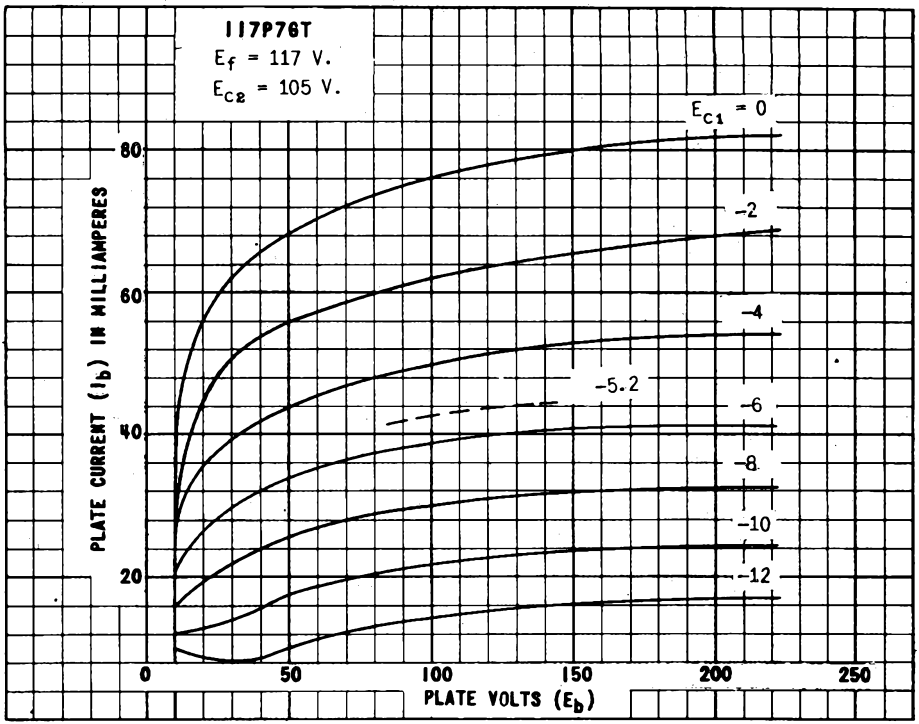
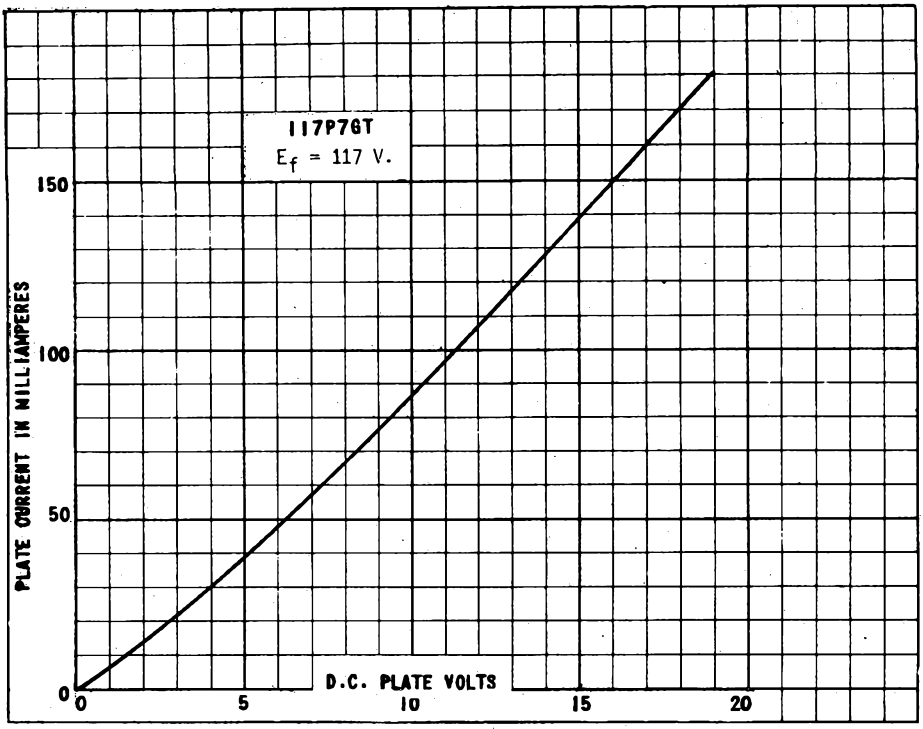
PLATE 1163-1

NOV. 17 1941


117P7GT
E_f = 117 V.
E_{c2} = 105 V.
E_{c1} = 0
-2
-4
-5.2
-6
-8
-10
-12
PLATE CURRENT (I_b) IN MILLIAMPERES
80
60
40
20
0
50
100
150
200
250
PLATE VOLTS (E_b)

117P7GT



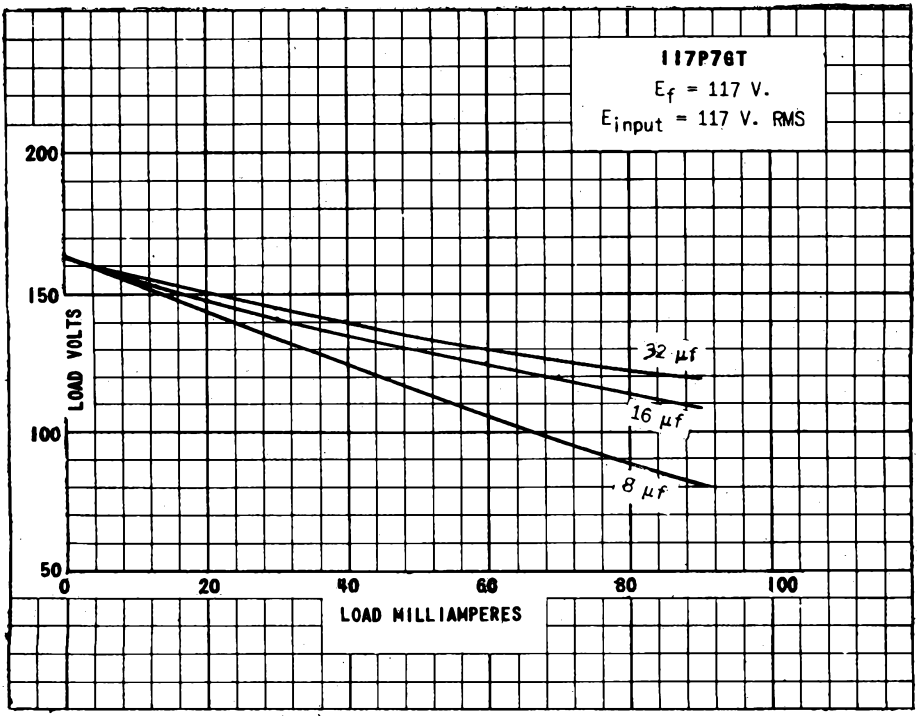


PLATE 1164-1

TUNG-SOL

DIODE

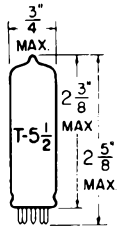
MINIATURE TYPE

COATED UNIPOTENTIAL CATHODE

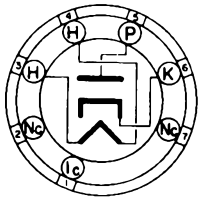
HEATER
117 VOLTS 40 MA.
AC OR DC

ANY MOUNTING POSITION

NOTE: DO NOT USE PIN #1 ON SOCKET AS TIE POST.



GLASS BULB



BOTTOM VIEW
MINIATURE BUTTON
7 PIN BASE

THE 1177Z3 IS A MINIATURE CATHODE-TYPE, CLOSE-SPACED HALF-WAVE RECTIFIER DESIGNED FOR SERVICE IN THREE-WAY PORTABLE RECEIVERS. THE 117 VOLT HEATER PERMITS DIRECT, ACROSS THE LINE, HEATER OPERATION WITHOUT NEED FOR A DROPPING RESISTOR.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE	117	VOLTS
MAXIMUM DC HEATER-CATHODE VOLTAGE		
CATHODE POSITIVE	175	VOLTS
CATHODE NEGATIVE	100	VOLTS
MAXIMUM AC PLATE VOLTAGE [RMS]	117	VOLTS
MAXIMUM PEAK INVERSE VOLTAGE	330	VOLTS
MAXIMUM STEADY-STATE PEAK PLATE CURRENT	540	MA.
MAXIMUM STEADY-STATE DC OUTPUT CURRENT	90	MA.
MAXIMUM TRANSIENT PEAK PLATE CURRENT	2.5	AMP.
TUBE VOLTAGE DROP: MEASURED WITH TUBE CONDUCTING 180 MA. PLATE CURRENT	22.5	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

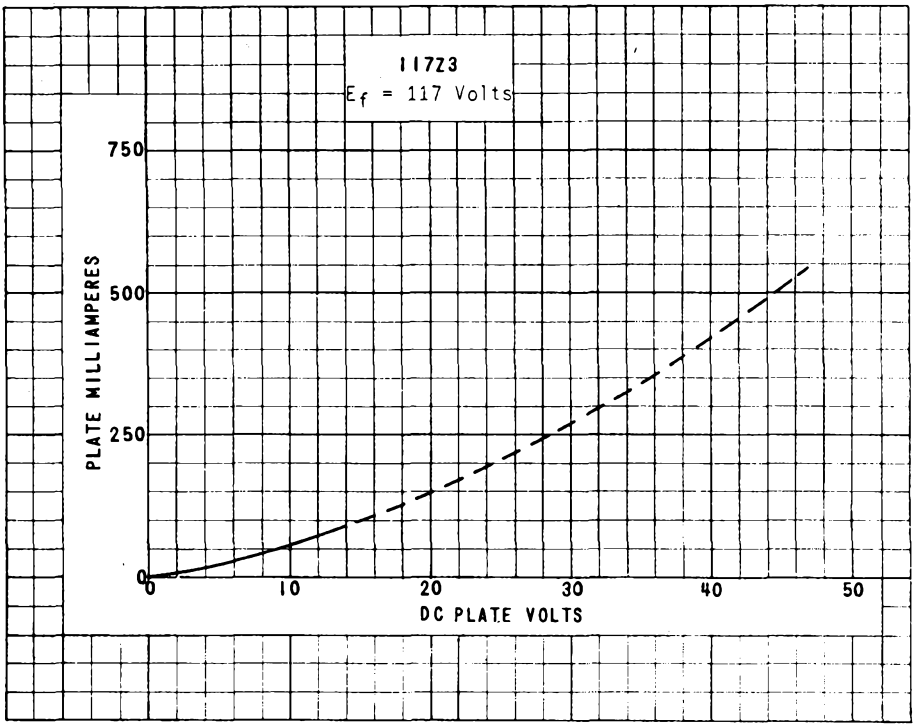
HALF-WAVE RECTIFIER

HEATER VOLTAGE	117	VOLTS
HEATER CURRENT	40	MA.
AC PLATE SUPPLY VOLTAGE (RMS)	117	VOLTS
DC OUTPUT VOLTAGE	110	VOLTS
DC OUTPUT CURRENT	90	MA.
EFFECTIVE PLATE SUPPLY IMPEDANCE	20	OHMS
INPUT CONDENSER	30	µf

SIMILAR TYPE REFERENCE: *Same general characteristics as type 1172GT; somewhat similar to the rectifier unit of type 70L7GT.*

PLATE 2093
OCT. 1, 1948

→ INDICATES A CHANGE OR ADDITION.



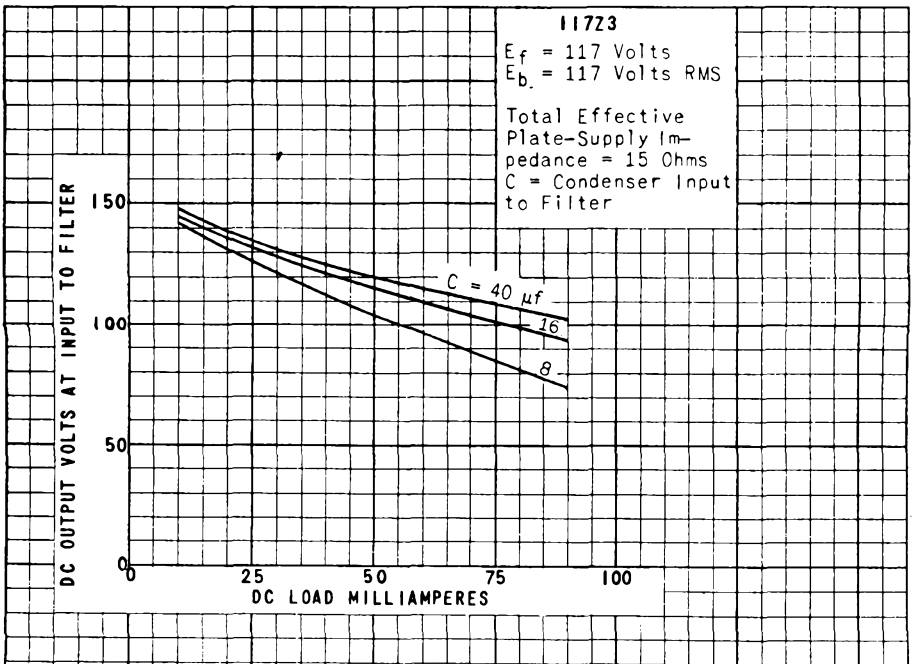


PLATE 2094
OCT. 1, 1948

10 TUBE AC SUPERHETERODYNE RECEIVER

TUNG-SOL

TYPICAL CIRCUIT

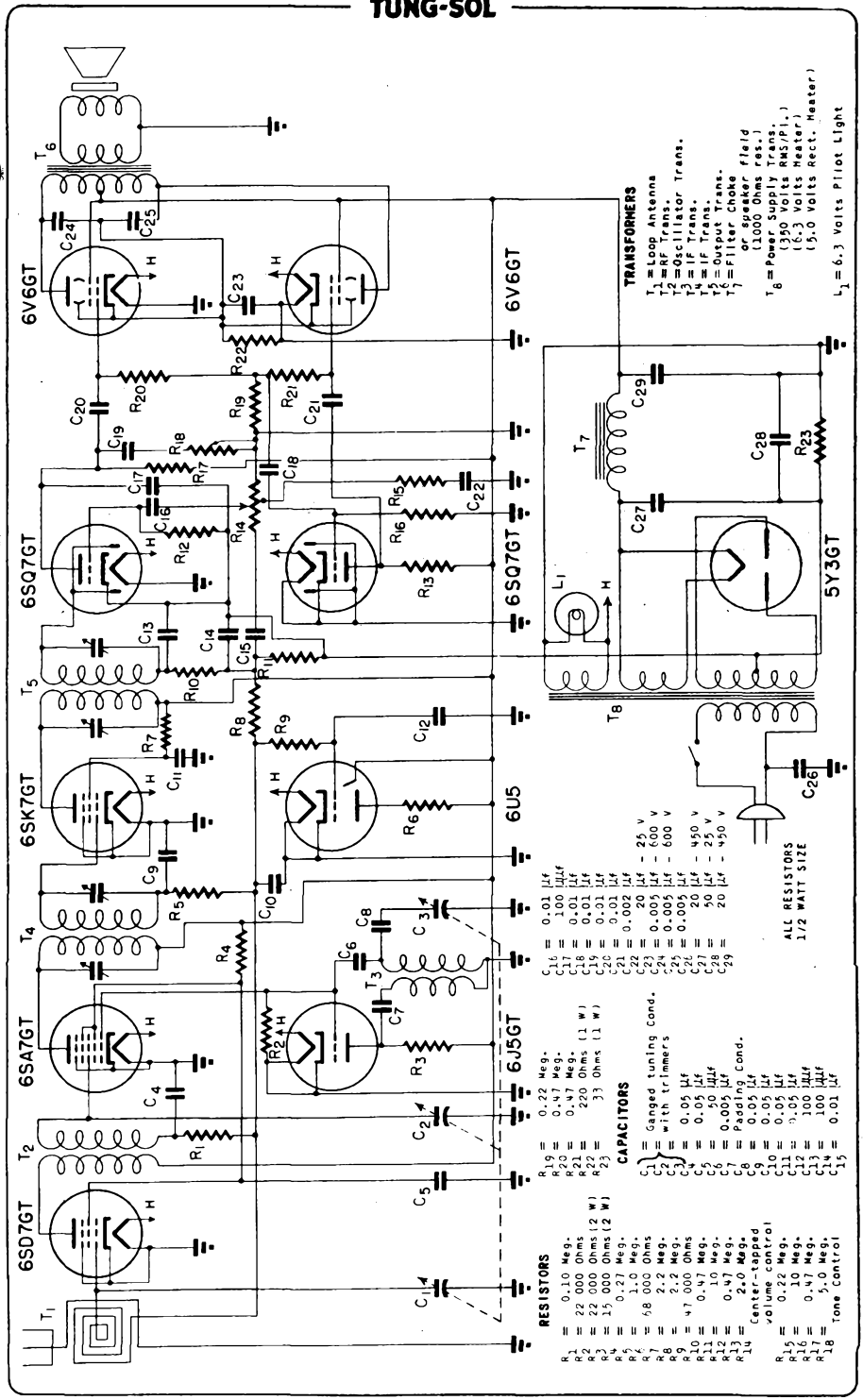


PLATE 1839
JULY 1, 1947

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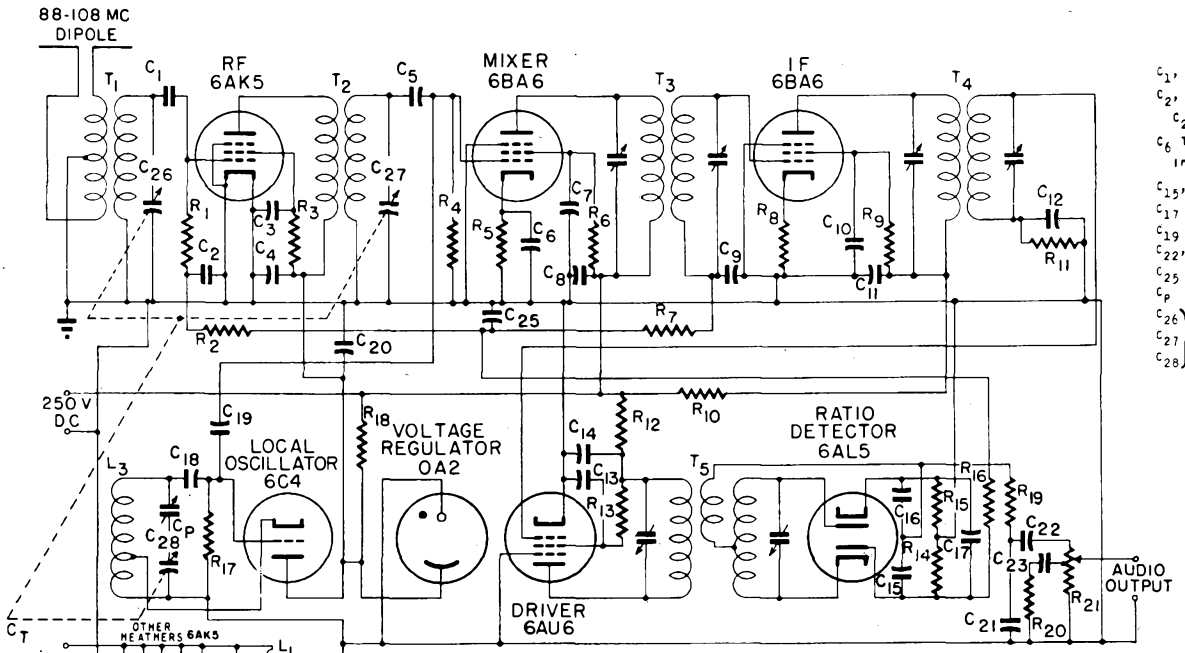
FREQUENCY MODULATION TUNER

TYPICAL CIRCUIT — TUNG-SOL



CAPACITORS

C_1, C_5, C_{18},	=	50 µµF
C_2, C_3, C_4, C_{20}, C_{24}	=	500 µµF
C_6 To C_{14} inclusive, C_{21}	=	0.003 µF
C_{15}, C_{16}	=	250 µµF
C_{17}	=	5 µF 50 v.
C_{19}	=	1 µF
C_{22}, C_{23}	=	0.02 µF
C_{25}	=	0.006 µF
C_P	=	OSCILLATOR PADDER
C_{26}, C_{27}, C_{28}	=	3 GANG TUNING CONDENSER

RESISTORS

R_1, R_4, R_{16},	= 1 Meg.
R_2, R_6, R_7	= 0.12 Meg.
R_3	= 15 000 Ohms (1 Watt)
R_5	= 220 Ohms
R_8	= 68 Ohms
R_9, R_{13}	= 33 000 Ohms (1 Watt)
R_{10}, R_{12}	= 1 000 Ohms (1 Watt)
R_{11}	= 0.47 Meg.

RESISTORS

R_{14}, R_{15}	= 15 000 Ohms
R_{17}	= 22 000 Ohms
R_{18}	= 2 500 Ohms (10 Watt)
R_{19}	= 22 000 Ohms
R_{20}	= 10 000 Ohms
R_{21}	= 0.5 Meg. Volume Control Tapped at 0.2 Meg.

ALL RESISTORS ½ WATT SIZE EXCEPT AS NOTED

TRANSFORMERS

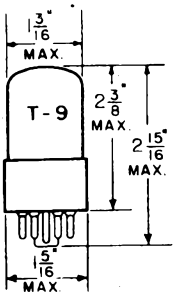
T_1	= Antenna Transformer
T_2	= RF Transformer
T_3, T_4	= 10.7 MC IF Transformer
T_5	= 10.7 MC Ratio Detector Transformer
L_1, L_2	= 100 MC RF Chokes
L_3	= Oscillator Coil

PLATE 2096 OCT. 1, 1948

ELECTRONIC TUBE DIVISION NEWARK, NEW JERSEY, U. S. A.

TUNG-SOL

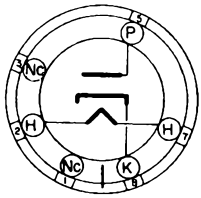
HALF-WAVE RECTIFIER



COATED UNIPOTENTIAL CATHODE

117 VOLTS .040 AMPERE
AC OR DC

ANY MOUNTING POSITION



GLASS BULB

BOTTOM VIEW

INTERMEDIATE SHELL
6-PIN OCTAL

THE 117Z4GT IS A HALF-WAVE RECTIFIER DESIGNED FOR SERVICE IN THREE-WAY PORTABLE RECEIVERS.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER VOLTAGE (AC OR DC)	117	VOLTS
HEATER CURRENT	.040	AMP.
MAX. AC PLATE VOLTAGE	117	VOLTS
MAX. DC HEATER CATHODE POTENTIAL	175	VOLTS
MAX. PEAK INVERSE PLATE VOLTAGE	350	VOLTS
MAX. STEADY STATE PEAK PLATE CURRENT	540	MA.
TUBE VOLTAGE DROP FOR 180 MA. DC	22.5	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

WITH CONDENSER-INPUT FILTER

HALF-WAVE RECTIFIER

AC PLATE VOLTAGE (RMS)	117	VOLTS
DC OUTPUT CURRENT	90	MA.
MIN. TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE[A]	30	OHMS

[A] WHEN FILTER CONDENSERS LARGER THAN 40 μf ARE USED, IT MAY BE NECESSARY TO USE ADDITIONAL PLATE SUPPLY IMPEDANCE.

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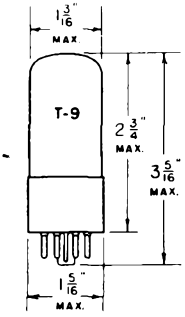
PLATE
1617
OCT. 15.
1945

TUNG-SOL

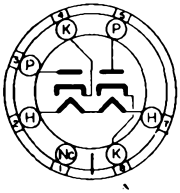


FULL WAVE

HIGH VACUUM RECTIFIER

UNIPOTENTIAL CATHODES

HEATER
117 VOLTS 0.075 AMPERE
AC OR DC



G-7QA
BOTTOM VIEW

GLASS BULB

INTERMEDIATE 7 PIN OCTAL BASE

THE TUNG-SOL 117Z6GT/G IS DESIGNED FOR SERVICE AS A POWER RECTIFIER IN THREE WAY PORTABLE RECEIVERS.

RATINGS

MAX. AC PLATE VOLTAGE PER PLATE (RMS)	235	VOLTS
MAX. PEAK INVERSE VOLTAGE	700	VOLTS
MAX. DC HEATER TO CATHODE POTENTIAL	350	VOLTS
MAX. STEADY-STATE PEAK PLATE CURRENT PER PLATE	360	MA.
TUBE VOLTAGE DROP — AT 120 MA. DC PER PLATE	15.5	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

VOLTAGE DOUBLER

	HALF WAVE	FULL WAVE	
AC PLATE VOLTAGE PER PLATE (RMS) MAX.	117	117	VOLTS
DC OUTPUT CURRENT	60	60	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN. A	30	15	OHMS

HALF WAVE RECTIFIER WITH CONDENSER INPUT TO FILTER

AC PLATE VOLTAGE PER PLATE (RMS)	117	150	235 MAX.	VOLTS
DC OUTPUT CURRENT PER PLATE MAX.	60	60	60	MA.
TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE PER PLATE MIN. A	15	40	100	OHMS

A WHEN FILTER CONDENSER LARGER THAN 40 UFDS ARE USED, IT MAY BE NECESSARY TO ADD ADDITIONAL PLATE SUPPLY IMPEDANCE.

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK.

CONTINUED NEXT PAGE

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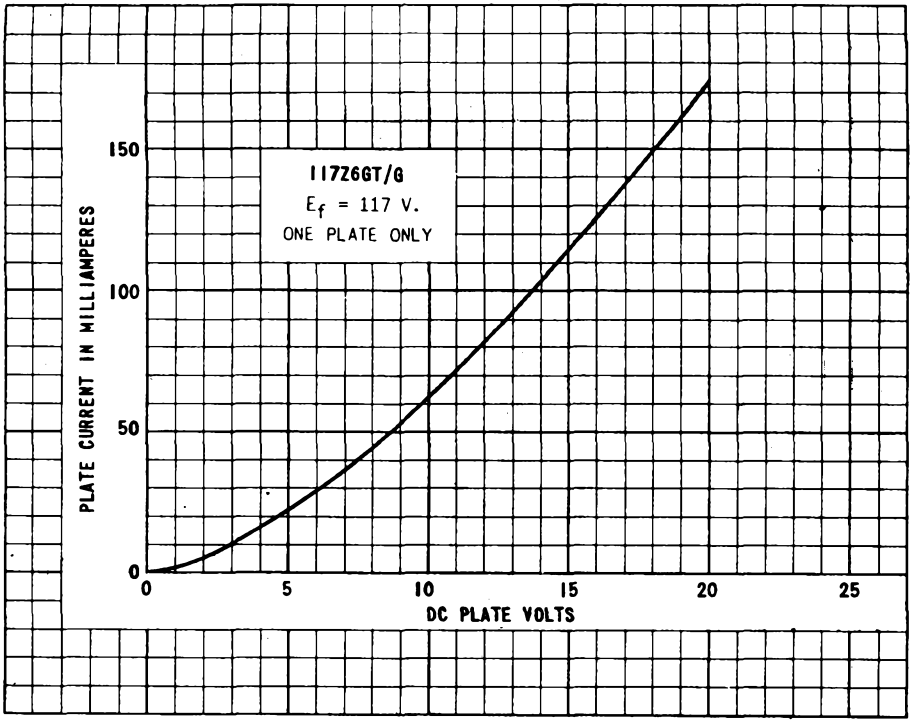
PLATE 1128-2

SEPT. 17 1941

117Z6GT/G



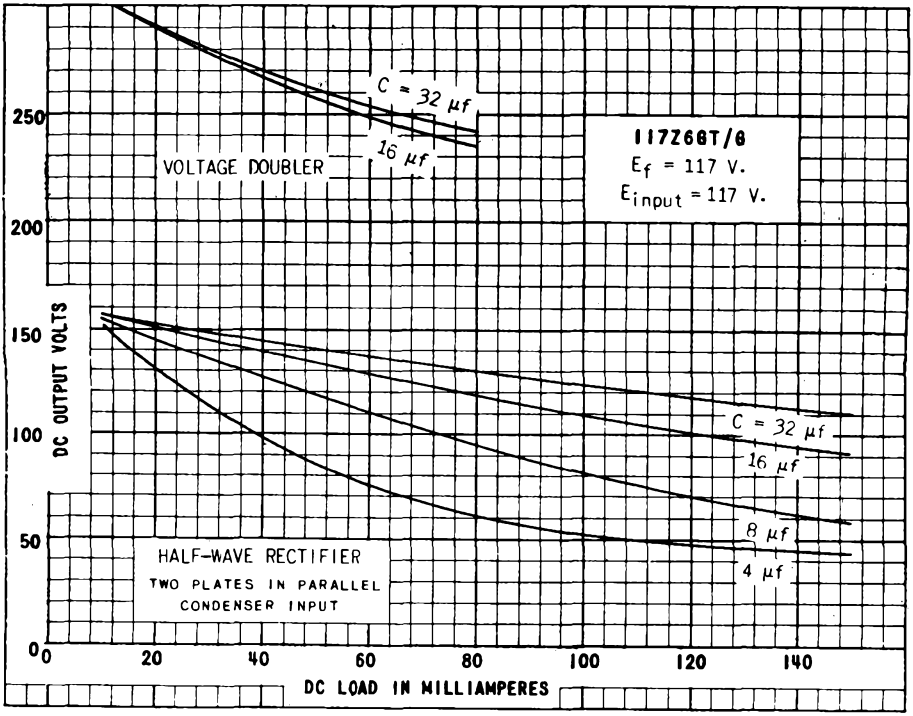
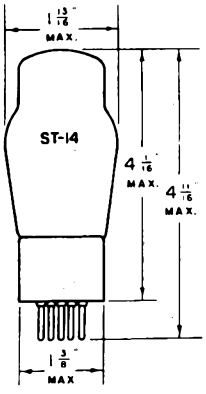


PLATE
1129-1

TUNG-SOL



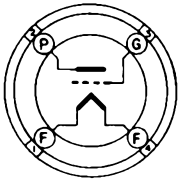
TRIODE POWER AMPLIFIER

COATED FILAMENT

5.0 VOLTS 1.25 AMPERES
AC OR DC

GLASS BULB

MEDIUM 4 PIN BASE



4D

BOTTOM VIEW

THE TUNG-SOL 183 IS A FILAMENT TYPE POWER TRIODE SUITABLE FOR SERVICE IN THE OUTPUT STAGE OF AC OPERATED RECEIVERS.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-60	VOLTS
PLATE CURRENT	25	MA.
PLATE RESISTANCE	1800	OHMS
TRANSCONDUCTANCE	1800	μMHOS
AMPLIFICATION FACTOR	3.2	
LOAD RESISTANCE	4500	OHMS
POWER OUTPUT	2.0	WATTS

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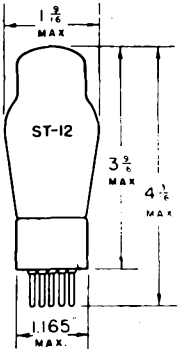
PLATE 657-1

NOV. 20 1939

TUNG-SOL

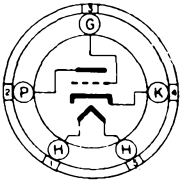


TRIODE AMPLIFIER

UNIPOTENTIAL CATHODE

HEATER
3.0 VOLTS 1.3 AMPERES
AC OR DC

GLASS BULB



5A

BOTTOM VIEW

SMALL 5 PIN BASE

THE TUNG-SOL 485 IS A GENERAL PURPOSE TRIODE DESIGNED FOR SERVICE AS AN OSCILLATOR, DETECTOR OR AMPLIFIER.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	180	VOLTS
GRID VOLTAGE	-9	VOLTS
PLATE CURRENT	6.0	MA.
PLATE RESISTANCE	9300	OHMS
TRANSCONDUCTANCE	1350	µMHOS
AMPLIFICATION FACTOR	12.5	

PLATE
658-1

TUNG-SOL

ULTRA-HIGH FREQUENCY TRANSMITTING TRIODE

THORIATED TUNGSTEN FILAMENT

2.0 VOLTS 3.65 AMPERES

RATINGS

FILAMENT VOLTAGE[A]	2.0 ± 5%	VOLTS
MAXIMUM PLATE VOLTAGE	450	VOLTS
MAXIMUM GRID VOLTAGE	-250	VOLTS
MAXIMUM PLATE DISSIPATION	30	WATTS
MAXIMUM PLATE INPUT POWER	26	WATTS
MAXIMUM PLATE CURRENT	90	MA.
MAXIMUM GRID CURRENT	15	MA.
MAXIMUM FREQUENCY FOR ABOVE RATING	500	MC.
TRANSCONDUCTANCE (I_B = 67 MA)	2400	μMHOS

DIRECT INTERELECTRODE CAPACITANCES

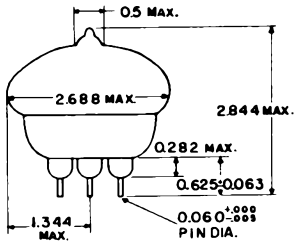
GRID TO PLATE	1.6	μμf
GRID TO FILAMENT	1.2	μμf
PLATE TO FILAMENT	0.8	μμf

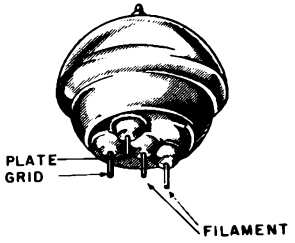
TYPICAL OPERATION CLASS C AMPLIFIER OR OSCILLATOR[B]

PLATE VOLTAGE	450	VOLTS
PLATE CURRENT	80	MA.
MAXIMUM GRID CURRENT	12	MA.
POWER OUTPUT	7.5	WATTS

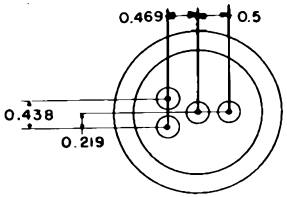
[A] FILAMENT VOLTAGE SHOULD BE ADJUSTED FOR OVER-ALL OPTIMUM OPERATION WITHIN THE 5% FILAMENT VOLTAGE TOLERANCE.

[B] THE ABOVE TYPICAL OPERATING CONDITIONS APPLY AT 500 MC. FOR OPERATION AT HIGHER FREQUENCIES THE MAXIMUM PLATE INPUT POWER SHOULD BE REDUCED. FURTHERMORE, THE PLATE EFFICIENCY WILL DECREASE.





BOTTOM VIEW



TUBE DIMENSIONS

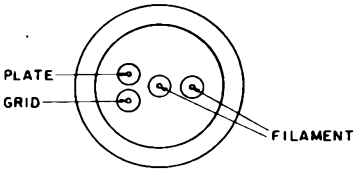


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PLATE 1379-1
DEC. 15 1943

TUNG-SOL

ULTRA-HIGH FREQUENCY TRIODE

THORIATED TUNGSTEN FILAMENT

1.15 VOLTS 4.5 AMPERES

THE TYPE 703A IS ULTRA-HIGH FREQUENCY TRIODE IN A GLASS ENVELOPE WITH SHORT AND DIRECT LEADS TO THE ELEMENTS. CLOSE ELECTRODE SPACING AND LOW CAPACITANCES MAKE THE TUBE SUITABLE FOR OSCILLATOR, AMPLIFIER, OR MIXER SERVICE AT FREQUENCIES AS HIGH AS 1500 MEGACYCLES.

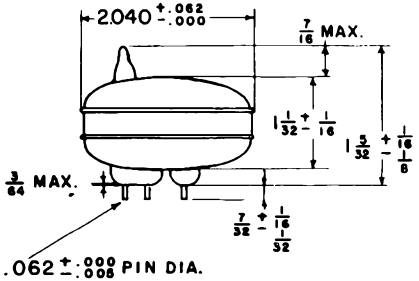
RATINGS

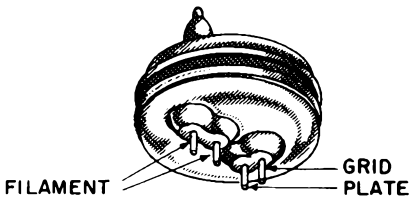
FILAMENT VOLTAGE[1]	1.15 ± 5%	VOLTS
MAXIMUM PLATE VOLTAGE	350	VOLTS
MAXIMUM PLATE DISSIPATION	20	WATTS
TRANSCONDUCTANCE (I_P = 45 MA)	2075	µMHOS

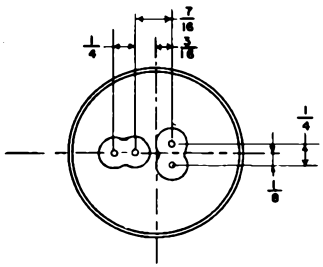
DIRECT ELECTRODE CAPACITANCES

GRID TO PLATE	0.90	µµf
GRID TO FILAMENT	0.85	µµf
PLATE TO FILAMENT	0.60	µµf

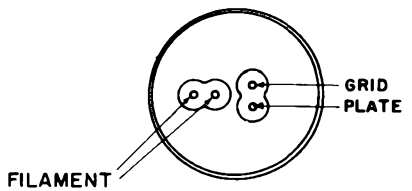
[1] FILAMENT VOLTAGE SHOULD BE ADJUSTED FOR OVER-ALL OPTIMUM OPERATION WITHIN THE 5% FILAMENT VOLTAGE TOLERANCE.







TUBE DIMENSIONS



BOTTOM VIEW

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PLATE 1380-1 DEC. 15 1943

TUNG-SOL

HALF-WAVE HIGH VACUUM RECTIFIER

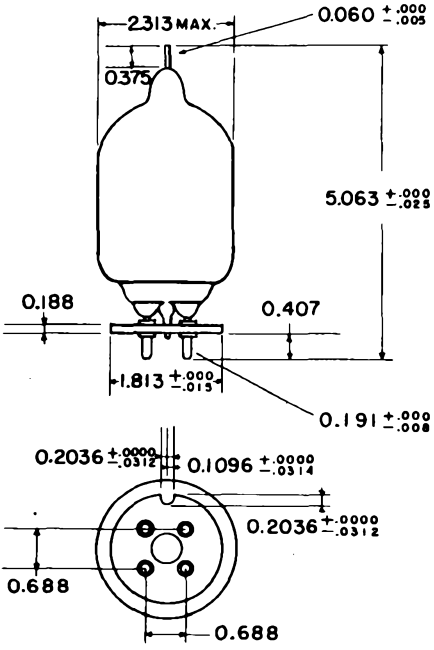
THORIATED TUNGSTEN FILAMENT

5.0 VOLTS 5 AMPERES

RATINGS

FILAMENT VOLTAGE[1]	5.0 ± 5%	VOLTS
MAXIMUM PEAK INVERSE PLATE VOLTAGE	35	KV.
MAXIMUM AVERAGE RECTIFIED PLATE CURRENT	100	MA.
MAXIMUM PEAK PLATE CURRENT	500	MA.
VOLTAGE DROP (Ib = 365 MA)	300	VOLTS

[1] FILAMENT VOLTAGE SHOULD BE ADJUSTED FOR OVER-ALL OPTIMUM OPERATION WITHIN THE 5% FILAMENT VOLTAGE TOLERANCE.



TUBE DIMENSIONS

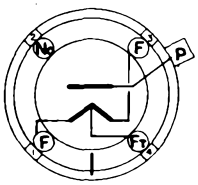


PLATE 1381-1
DEC. 15 1943

TUNG-SOL

HIGH FREQUENCY PENTODE

UNIPOTENTIAL CATHODE

HEATER

6.3 VOLTS 175 MA.

RATINGS

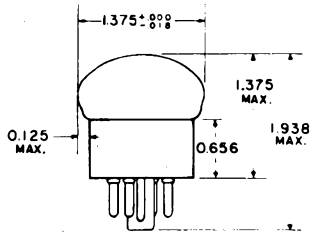
MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM SCREEN VOLTAGE	120	VOLTS
MAXIMUM CATHODE CURRENT	10.1	MA.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	175	MA.
PLATE VOLTAGE	120	VOLTS
SCREEN VOLTAGE	120	VOLTS
GRID VOLTAGE	-2	VOLTS
PLATE CURRENT	7.5	MA.
SCREEN CURRENT	2.5	MA.
MUTUAL CONDUCTANCE	4000	µMHOS
PLATE RESISTANCE	.25	MEGOHMS
GRID VOLTAGE (I_P = 10 µA, APPROX.)	-9	VOLTS

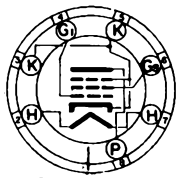
THE 713A AND 717A ARE IDENTICAL WITH THE EXCEPTION OF THE BASES AS SHOWN BELOW.

THE 713A HAS A SEVEN PIN OCTAL BAKELITE BASE AND THE 717A HAS A MICANOL WAFER WITH METAL SHELL AS SHOWN BELOW.

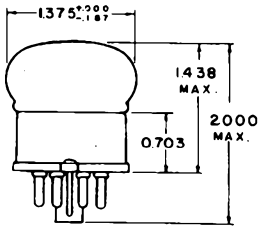


713A

TUBE DIMENSIONS



PIN 3: BASE SHIELD



717A

TUBE DIMENSIONS

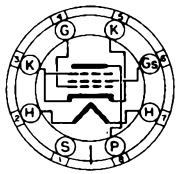


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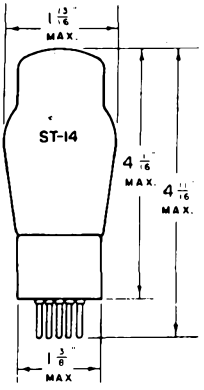
PLATE 1382-1 DEC. 15 1943

TUNG-SOL



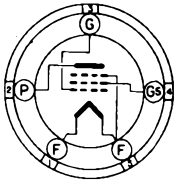
PENTODE POWER AMPLIFIER

COATED FILAMENT

2.0 VOLTS 0.12 AMPERE
DC

GLASS BULB

MEDIUM 5 PIN BASE



5K

BOTTOM VIEW

THE TUNG-SOL 950 IS A FILAMENT TYPE PENTODE POWER AMPLIFIER DESIGNED FOR SERVICE IN THE OUTPUT STAGE OF BATTERY OPERATED RECEIVERS. ITS RATINGS AND CHARACTERISTICS ARE IDENTICAL WITH THOSE OF THE 1J5G.

OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

PLATE VOLTAGE	135	VOLTS
SCREEN VOLTAGE	135	VOLTS
CONTROL GRID VOLTAGE [A]	-16.5	VOLTS
GRID CIRCUIT RESISTANCE WITH FIXED BIAS MAX.	0.5	MEGOHM
PLATE CURRENT	7	MA.
SCREEN CURRENT	2	MA.
TRANSCONDUCTANCE	950	µMHOS
AMPLIFICATION FACTOR	100	
LOAD RESISTANCE	13500	OHMS
POWER OUTPUT	0.45	WATT

[A] RETURN TO NEGATIVE FILAMENT (PIN #5)

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PLATE 578-1

OCT. 20 1939

TUNG-SOL

DETECTOR AMPLIFIER-PENTODE

ACORN TYPE

COATED UNIPOTENTIAL CATHODE [B]

HEATER

6.3 VOLTS [D] 0.15 AMPERE

AC OR DC

RATINGS

RF OR AF AMPLIFIER CLASS A

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN (GRID 2) VOLTAGE	100	VOLTS
MAXIMUM SUPPRESSOR (GRID 3) VOLTAGE	100	VOLTS
MINIMUM CONTROL GRID VOLTAGE (GRID 1)	-3	VOLTS
MAXIMUM PLATE DISSIPATION	0.5	WATT
MAXIMUM SCREEN DISSIPATION	0.1	WATT

DIRECT INTERELECTRODE CAPACITANCES

CONTROL GRID TO CATHODE	3	μμf
PLATE TO CATHODE	3.4	μμf
GRID TO PLATE (WITH SHIELD BAFFLE)	0.007 (MAX.)	μμf

TYPICAL OPERATION AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	6.3	VOLTS
PLATE VOLTAGE	90	250	VOLTS
SCREEN VOLTAGE (GRID 2)	90	100	VOLTS
CONTROL GRID VOLTAGE (GRID 1)	-3	-3	VOLTS
AMPLIFICATION FACTOR	1100	> 2000	
PLATE RESISTANCE	1.0	> 1.5	MEGOHMS
MUTUAL CONDUCTANCE	1100	1400	μMHOS
PLATE CURRENT	1.2	2.0	MA.
SCREEN CURRENT	0.5	0.7	MA.

SUPPRESSOR CONNECTED TO CATHODE AT SOCKET (GRID 3)

RESISTANCE COUPLED A-F VOLTAGE AMPLIFIER

HEATER VOLTAGE	6.3	VOLTS
PLATE-SUPPLY VOLTAGE [A]	250	VOLTS
SCREEN VOLTAGE (GRID 2)	50	VOLTS
CONTROL GRID VOLTAGE (GRID 1) [C]	-2.1	VOLTS
LOAD RESISTANCE	0.25	MEGOHM
PLATE CURRENT	0.5	MA.
VOLTAGE OUTPUT (5% SECOND HAR.)	40 TO 50	VOLTS (RMS)
VOLTAGE AMPLIFICATION (APPROX.)	100	

SUPPRESSOR CONNECTED TO CATHODE AT SOCKET (GRID 3)

(CONTINUED NEXT PAGE)

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PLATE 1351-1 OCT. 25 1943

TUNG-SOL

BIASED DETECTOR

HEATER VOLTAGE	6.3	VOLTS
PLATE-SUPPLY VOLTAGE	250	VOLTS
SCREEN VOLTAGE (GRID 2)	100	VOLTS
CONTROL GRID VOLTAGE (GRID 1) (APPROX.)	-6	VOLTS
LOAD RESISTANCE	0.25	MEGOHM
PLATE CURRENT	ADJUSTED TO 0.1 MA. WITH NO INPUT SIGNAL	
SELF-BIAS RESISTOR	20000 TO 50000	OHMS

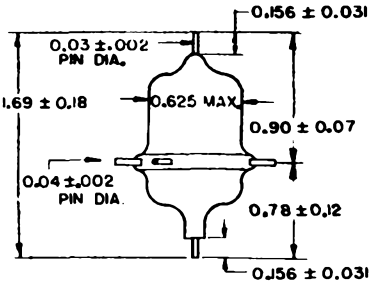
SUPPRESSOR CONNECTED TO CATHODE AT SOCKET (GRID 3)

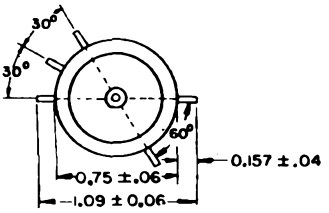
A THIS IS A PLATE-SUPPLY VOLTAGE VALUE. THE VOLTAGE EFFECTIVE AT THE PLATE WILL BE THE PLATE-SUPPLY VOLTAGE MINUS THE VOLTAGE DROP (IN THE LOAD RESISTOR) CAUSED BY THE PLATE CURRENT.

B IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE. IF THE USE OF A LARGE RESISTOR BETWEEN HEATER AND CATHODE IS NECESSARY BECAUSE OF CIRCUIT CONSIDERATIONS, IT IS ESSENTIAL THAT THIS RESISTOR BE BY-PASSED BY A SUITABLE FILTER NETWORK OR OBJECTIONABLE HUM MAY DEVELOP.

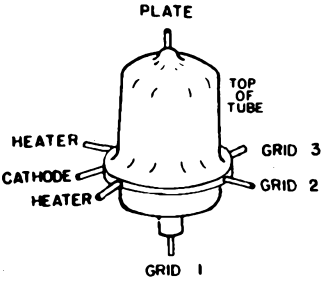
C THE D-C RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 1.0 MEGOHM.

D SHOULD NOT DEVIATE MORE THAN ± 10% FROM RATED VALUE.





ALL LINEAR DIMENSIONS ARE SPECIFIED IN INCHES



954-956

PIN CONNECTIONS

PLATE 1352-1 OCT. 25 1943

TUNG-SOL

DETECTOR, AMPLIFIER, OSCILLATOR

ACORN TYPE

COATED UNIPOTENTIAL CATHODE [B]

HEATER

6.3 VOLTS [E] 0.15 AMPERE

AC OR DC

RATINGS

RF OR AF AMPLIFIER CLASS A

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	1.6	WATTS

DIRECT INTERELECTRODE CAPACITANCES

GRID TO PLATE	1.4	μμf
GRID TO CATHODE	1.0	μμf
PLATE TO CATHODE	0.6	μμf

TYPICAL OPERATION AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

HEATER VOLTAGE	6.3	6.3	6.3	6.3	VOLTS
PLATE VOLTAGE	90	135	180	250	VOLTS
GRID VOLTAGE [A]	-2.5	-3.75	-5	-7	VOLTS
AMPLIFICATION FACTOR	25	25	25	25	
PLATE RESISTANCE	14700	13200	12500	11400	OHMS
TRANSCONDUCTANCE	1700	1900	2000	2200	μMHOS
PLATE CURRENT	2.5	3.5	4.5	6.3	MA.
LOAD RESISTANCE	-	-	20000	-	OHMS
U.P.O. (5% SECOND HAR.)	-	-	135	-	MW

TYPICAL CONDITIONS FOR RESISTANCE COUPLED A-F VOLTAGE AMPLIFIER

HEATER VOLTAGE	6.3	VOLTS
PLATE-SUPPLY VOLTAGE [C]	180	VOLTS
GRID VOLTAGE [A]	-3.5	VOLTS
LOAD RESISTANCE	250000	OHMS
PLATE CURRENT	0.42	MA.
VOLTAGE OUTPUT (5% SECOND HAR.)	45 (RMS)	VOLTS
VOLTAGE AMPLIFICATION (APPROX.)	20	

R-F POWER AMPLIFIER & OSCILLATOR - CLASS C

PLATE MODULATED OR C.W.

MAXIMUM PLATE VOLTAGE	180	VOLTS
MAXIMUM PLATE CURRENT	8	MA.
MAXIMUM GRID CURRENT	2	MA.

TYPICAL OPERATION

HEATER VOLTAGE	6.3	VOLTS
PLATE VOLTAGE	180	VOLTS
GRID VOLTAGE (APPROX.)	-35	VOLTS
PLATE CURRENT	7	MA.
GRID CURRENT (APPROX.)	1.5	MA.
POWER OUTPUT [D] (APPROX.)	0.5	WATT

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PLATE 1353-1 OCT. 25 1943

TUNG-SOL

DETECTOR

TYPICAL OPERATION

	BIASED	GRID LEAK	
HEATER VOLTAGE	6.3	6.3	VOLTS
PLATE-SUPPLY VOLT [C]	180	45	VOLTS
GRID VOLTAGE (APPROX.)	−7	GRID RETURN TO CATHODE	VOLTS
LOAD RESISTANCE	0.25	−	MEGOHM
PLATE CURRENT	ADJUSTED TO 0.2 MA. APPROX. WITH NO INPUT SIGNAL	−	MA.
SELF-BIAS RESISTOR (APPROX.)	50000		OHMS
GRID LEAK	−	1 TO 5	MEGOHMS
GRID CONDENSER	−	0.00025	µf

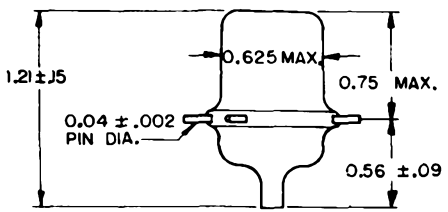
[A] THE D-C RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 1.0 MEGOHM.

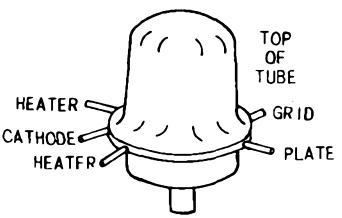
[B] IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE. IF THE USE OF A LARGE RESISTOR BETWEEN HEATER AND CATHODE IS NECESSARY BECAUSE OF CIRCUIT CONSIDERATIONS, IT IS ESSENTIAL THAT THIS RESISTOR BE BY-PASSED BY A SUITABLE FILTER NETWORK OR OBJECTIONABLE HUM MAY DEVELOP.

[C] THIS IS A PLATE-SUPPLY VOLTAGE VALUE. THE VOLTAGE EFFECTIVE AT THE PLATE WILL BE THE PLATE-SUPPLY VOLTAGE MINUS THE VOLTAGE DROP (IN THE LOAD RESISTOR) CAUSED BY THE PLATE CURRENT.

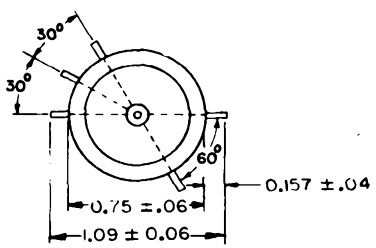
[D] AT 5 METERS. ONLY MODERATE REDUCTION IN THIS VALUE WILL BE FOUND FOR WAVELENGTHS AS LOW AS 1 METER. BELOW 1 METER, THE POWER OUTPUT DECREASES AS THE WAVELENGTH IS DECREASED.

[E] SHOULD NOT DEVIATE MORE THAN ± 10% FROM RATED VALUE.





PIN CONNECTIONS



ALL LINEAR DIMENSIONS ARE SPECIFIED IN INCHES

PLATE 1354-1
OCT. 25 1943

TUNG-SOL

REMOTE CUT-OFF RF AMPLIFIER PENTODE

ACORN TYPE

COATED UNIPOTENTIAL CATHODE [A]

HEATER

6.3 VOLTS [C] 0.15 AMPERE

AC OR DC

RATINGS

RF OR AF AMPLIFIER CLASS A_1

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN (GRID 2) VOLTAGE	100	VOLTS
MAXIMUM PLATE DISSIPATION	1.7	WATTS
MAXIMUM SCREEN DISSIPATION	.3	WATT

TYPICAL OPERATION AND CHARACTERISTICS

HEATER VOLTAGE	6.3	VOLTS
HEATER CURRENT	.15	AMP.
PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE (GRID 2)	100	VOLTS
CONTROL GRID VOLTAGE (GRID 1) [B]	-3	VOLTS
PLATE RESISTANCE (APPROX.)	.70	MEGOHM
TRANSCONDUCTANCE	1800	µMHOS
GRID VOLTAGE FOR GM = 10 µMHOS	-35	VOLTS
PLATE CURRENT	8.7	MA.
SCREEN CURRENT	2.7	MA.

SUPPRESSOR CONNECTED TO CATHODE AT SOCKET (GRID 3)

[A] IN CIRCUITS WHERE THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE. IF THE USE OF A LARGE RESISTOR BETWEEN HEATER AND CATHODE IS NECESSARY BECAUSE OF CIRCUIT CONSIDERATIONS, IT IS ESSENTIAL THAT THIS RESISTOR BE BY-PASSED BY A SUITABLE FILTER NETWORK OR OBJECTIONABLE HUM MAY DEVELOP.

[B] THE D-C RESISTANCE IN THE GRID CIRCUIT SHOULD NOT EXCEED 1.0 MEGOHM.

[C] SHOULD NOT DEVIATE MORE THAN ± 10% FROM RATED VALUE.

SEE OTHER SIDE OF PAGE FOR PIN CONNECTIONS AND BULB DIMENSIONS

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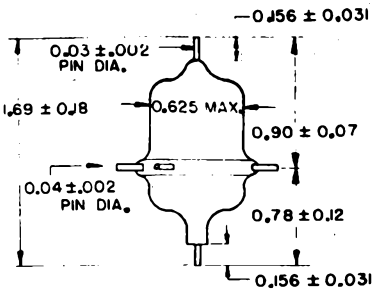
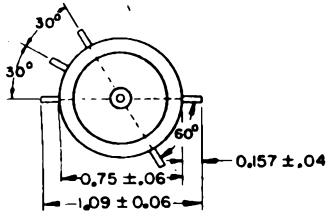
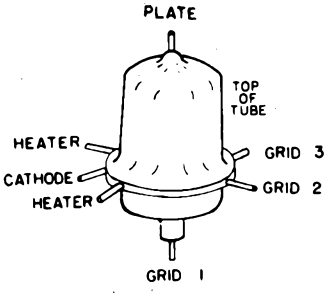
PLATE 1355-1
OCT. 25 1943

TUNG-SOL





ALL LINEAR DIMENSIONS ARE SPECIFIED IN INCHES



954-956

PIN CONNECTIONS

PLATE 1356-1
OCT. 25 1943

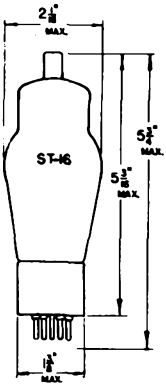
TUNG-SOL

TRANSMITTING BEAM POWER AMPLIFIER 1625

UNIPOTENTIAL CATHODE

HEATER

12.6 VOLTS 0.45 AMPERES



RATINGS

HEATER VOLTAGE (AC/DC)	12.6	VOLTS
MAXIMUM PLATE VOLTAGE	750	VOLTS
MAXIMUM SCREEN VOLTAGE	350	VOLTS
MAXIMUM PLATE DISSIPATION	30	WATTS
MAXIMUM SCREEN DISSIPATION	3.5	WATTS

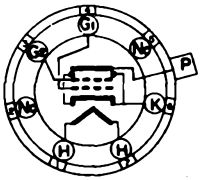
DIRECT INTERELECTRODE CAPACITANCES (WITH EXTERNAL SHIELD)

CONTROL GRID TO CATHODE	11	μμf
PLATE TO CATHODE	7	μμf
MAXIMUM GRID TO PLATE	.2	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

RF CLASS C AMPLIFIER OR OSCILLATOR

HEATER VOLTAGE (AC/DC)	12.6	VOLTS
HEATER CURRENT	0.45	AMP.
PLATE VOLTAGE	600	VOLTS
SCREEN VOLTAGE	200	VOLTS
GRID CURRENT	6.0	MA.
SCREEN CURRENT	10	MA.
PLATE CURRENT	100	MA.
POWER OUTPUT	35	WATTS
GRID RESISTOR	10000	OHMS

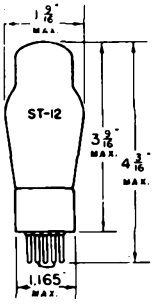


TRANSMITTING TRIODE 1626

UNIPOTENTIAL CATHODE

HEATER

12.6 VOLTS 0.25 AMPERES



RATINGS

HEATER VOLTAGE (AC OR DC)	12.6	VOLTS
MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM GRID VOLTAGE	-150	VOLTS
MAXIMUM PLATE DISSIPATION	5	WATTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HEATER VOLTAGE (AC OR DC)	12.6	VOLTS
HEATER CURRENT	0.25	AMP.
PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-32	VOLTS
PLATE CURRENT	25	MA.
PLATE RESISTANCE	2500	OHMS
MUTUAL CONDUCTANCE	2500	μMHOS

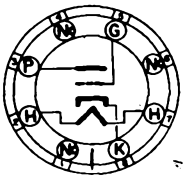


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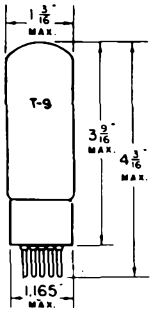
PLATE
1383-2
DEC. 15
1943

1629 (6E5)

TUNG-SOL



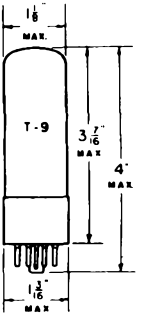
CATHODE RAY TUNING INDICATOR

UNIPOTENTIAL CATHODE

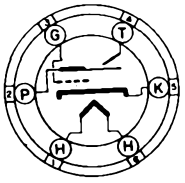
HEATERS

6E5 - 6.3 V., 0.3 AMPERE

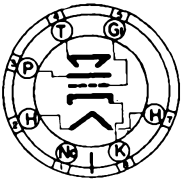
1629 - 12.6 V., .15 AMPERE



6E5



1629



THE 1629 AND 6E5 ARE IDENTICAL WITH THE EXCEPTION OF THE HEATER RATINGS. THIS TUBE IS A CATHODE RAY TUNING INDICATOR WITH A CIRCULAR FLOURESCENT TARGET. THE DEGREE OF SHADOW ANGLE IS VARIED BY THE AVC OR OTHER CONTROLLING GRID VOLTAGE.

RATINGS

MAXIMUM PLATE SUPPLY VOLTAGE	250	VOLTS
MAXIMUM TARGET VOLTAGE	250	VOLTS
MINIMUM TARGET VOLTAGE	100	VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

PLATE AND TARGET SUPPLY VOLTAGE	100	200	250	VOLTS
TRIODE GRID VOLTAGE (0° SHADOW ANGLE)	-3.3	-6.5	-8.0	VOLTS
TRIODE GRID VOLTAGE (90° SHADOW ANGLE)	0	0	0	VOLTS
SERIES TRIODE PLATE RESISTOR	0.5	1	1	MEGOHM
TRIODE PLATE CURRENT (TRIODE GRID V.=0)	0.19	0.19	0.24	MA.
TARGET CURRENT (TRIODE GRID V.=0) [1]	1	3	4	MA.

[1] SUBJECT TO WIDE VARIATIONS

FOR "INTERPRETATION OF RATINGS" REFER TO FRONT OF BOOK

PLATE 1384-1
DEC. 15 1943

TUNG-SOL

HALF-WAVE HIGH-VACUUM RECTIFIER

MINIATURE TYPE

PHYSICAL SPECIFICATIONS

EMITTER COATED FILAMENT	PIN CONNECTIONS	
BASE MINIATURE BUTTON 7-PIN	PIN 1 FILAMENT-	PIN 7 FILAMENT +
CAP ———	PIN 2 IC-DO NOT USE	PIN 8 NONE
BULB T- 5½	PIN 3 IC-DO NOT USE	BULB TERMINAL PLATE
MAX. DIAMETER 3/4"	PIN 4 NO CONNECTION	
MAX. SEATED HEIGHT 2 3/16"	PIN 5 NO CONNECTION	MOUNTING POS. ANY
MAX. OVERALL LENGTH 2 7/16"	PIN 6 IC-DO NOT USE	

RATINGS[A]

INTERPRETED ACCORDING TO RMA STANDARD M8-210

HEATER OR FILAMENT VOLTAGE (AC OR DC)	1.4	VOLTS
HEATER OR FILAMENT CURRENT	0.05	AMP
MAXIMUM PEAK INVERSE PLATE VOLTAGE	7000	VOLTS
MAXIMUM PEAK PLATE CURRENT[B]	6	MA.
MAXIMUM AVERAGE PLATE CURRENT	1	MA.

[A] THESE RATINGS APPLY TO THE 1654 WHEN IT IS OPERATED FROM A POWER SUPPLY HAVING A FREQUENCY UP TO 500 CYCLES PER SECOND.

[B] A PEAK VALUE OF 20 MA. FOR 0.1 SECOND IS PERMITTED UNDER CONDITIONS OF "HOT-SWITCHING", I.E., SWITCHING THE PLATE CIRCUIT "ON" WHILE THE FILAMENT IS HOT.

DIRECT INTERELECTRODE CAPACITANCE (APPROX.)

WITH NO EXTERNAL SHIELD

PLATE TO FILAMENT	1.4	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HALF-WAVE RECTIFIER

AC PLATE-SUPPLY VOLTAGE	2500	VOLTS
FILTER INPUT CONDENSER	0.025	μf
TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE	175 000	OHMS
DC OUTPUT VOLTAGE (APPROX.) - AT INPUT TO FILTER	2350	VOLTS
DC OUTPUT CURRENT	1	MA.

CIRCUIT VALUES

A PLATE-SUPPLY IMPEDANCE OF 175000 OHMS IS REQUIRED SO THAT THE "HOT-SWITCHING" CURRENT WILL NOT EXCEED THE 20 MA. ALLOWABLE UNDER CONDITIONS OF NORMAL LINE-VOLTAGE FLUCTUATIONS.

THE PLATE-SUPPLY IMPEDANCE MAY BE DECREASED FOR PLATE-SUPPLY VOLTAGES LESS THAN 2500 VOLTS IF THE RESULTANT PEAK-CURRENT RATING OF 6 MA. AND THE "HOT-SWITCHING" CURRENT OF 20 MA. ARE NOT EXCEEDED.

NOTE: THE 1654 IS A MINIATURE, HALF-WAVE, HIGH VACUUM TUBE DESIGNED FOR HIGH VOLTAGE, LOW-CURRENT OPERATION WHERE THE POWER-SUPPLY FREQUENCY DOES NOT EXCEED 500 CYCLES PER SECOND. IT IS ESPECIALLY USEFUL IN EQUIPMENT DESIGN WHERE SPACE AND LOW FILAMENT DRAIN ARE HIGHLY SIGNIFICANT FACTORS.

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PLATE 1688
FEB. 15 1946

1654

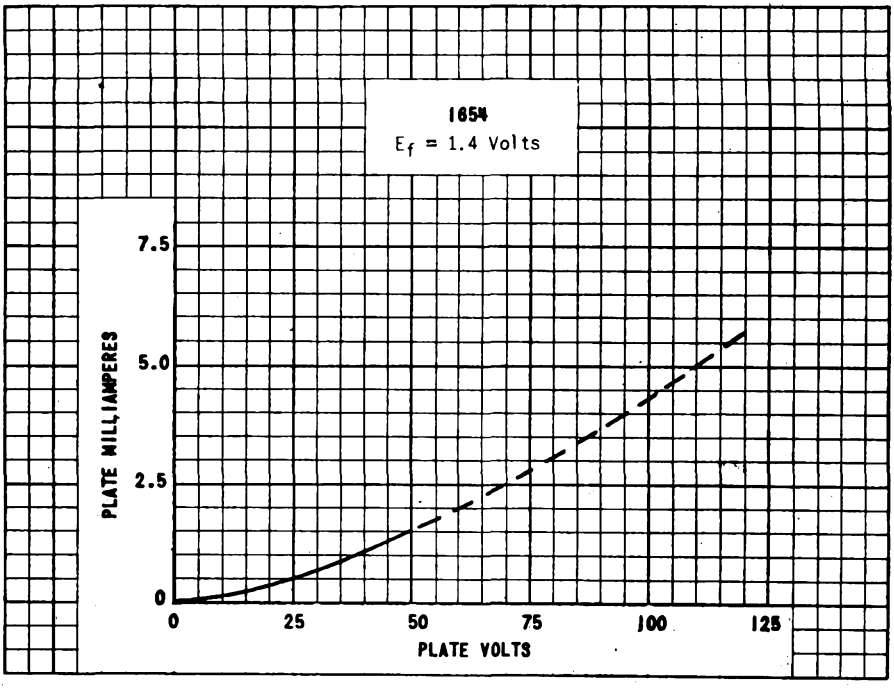
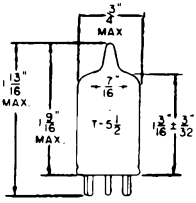


PLATE
1689
FEB. 19
1946

TUNG-SOL

DETECTOR AMPLIFIER PENTODE

MIDGET TYPE



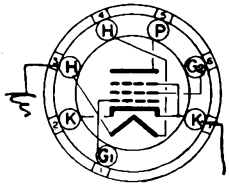
COATED UNIPOTENTIAL CATHODE

HEATER[A]
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB

MINIATURE BUTTON 7 PIN BASE

MOUNTING POSITION – ANY



BOTTOM VIEW

THE 9001 IS A SHARP CUT-OFF MIDGET TYPE PENTODE INTENDED FOR USE AS A DETECTOR AND AMPLIFIER AT ULTRA HIGH FREQUENCIES. ITS CONSTRUCTION, INCLUDING DOUBLE CATHODE LEADS, PERMITS CIRCUITS TO BE DESIGNED WITH EXTREMELY SHORT LEADS AND WITH MINIMUM INTER-CIRCUIT COUPLING. ELECTRICALLY ITS CHARACTERISTICS ARE IDENTICAL WITH TYPE 954.

RATINGS*

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM GRID VOLTAGE	-3	VOLTS
PLATE DISSIPATION	0.5	WATT
SCREEN DISSIPATION	0.1	WATT

*INTERPRETED ACCORDING TO RMA STANDARD M8-210

DIRECT INTERELECTRODE CAPACITANCES

MAXIMUM GRID TO PLATE (WITH EXTERNAL SHIELD)	0.01	μμf
INPUT (WITH NO EXTERNAL SHIELD)	3.6	μμf
OUTPUT (WITH NO EXTERNAL SHIELD)	3.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	90	250	VOLTS
SCREEN VOLTAGE	90	100	VOLTS
GRID VOLTAGE	-3	-3	VOLTS
PLATE RESISTANCE (APPROX.)	1.0	GREATER THAN 1.0 MEGOHM	
TRANSCONDUCTANCE	1100	1400	μMHOS
PLATE CURRENT	1.2	2.0	MA.
SCREEN CURRENT	0.5	0.7	MA.

CONTINUED NEXT PAGE

PRINTED IN U. S. A.
PLATE 1403
MARCH 15 1944

CONTINUED FROM PRECEDING PAGE

MIXER IN SUPERHETERODYNE CIRCUIT

PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE	100	VOLTS
GRID VOLTAGE (APPROX.)[B]	-5	VOLTS
CONVERSION TRANSCONDUCTANCE (APPROX.)	550	μMHOS

[A] WHEN THE CATHODE IS NOT CONNECTED DIRECTLY TO THE HEATER THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE.

[B] VALUES INDICATED ARE OPTIMUM. FOR AN OSCILLATOR PEAK VOLTAGE OF 4 VOLTS, THE GRID BIAS IS MINIMUM.

TO PROVIDE THE SHORTEST POSSIBLE CIRCUIT RETURNS AND TO PREVENT INTER-STAGE COUPLING AT ULTRA HIGH FREQUENCIES, EACH RF AMPLIFIER STAGE MAY REQUIRE RF BY-PASSING AND SHIELDING. THIS CAN BE ACCOMPLISHED BY PLACING SMALL CONDENSERS CLOSE TO THE TUBE TERMINALS. IN ADDITION RF CHOKES MAY BE REQUIRED IN THE SUPPLY OR RETURN LEADS OF THE TUBE ELEMENTS.

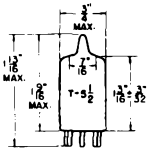
THIS TUBE HAS TWO CATHODE LEADS. IF THE GRID RETURN IS CONNECTED TO ONE CATHODE TERMINAL AND THE PLATE AND SCREEN RETURNS ARE CONNECTED TO THE OTHER CATHODE TERMINAL, THE PLATE AND SCREEN RF CIRCUITS WILL BE COMPLETED WITH A MINIMUM OF INDUCTANCE IN COMMON WITH THE GRID CIRCUIT.

PLATE 1404
MARCH 15 1944

TUNG-SOL

DETECTOR, AMPLIFIER, OSCILLATOR

MIDGET TYPE



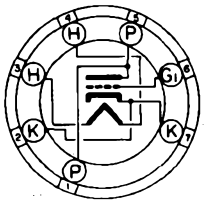
COATED UNIPOTENTIAL CATHODE

HEATER [A]

6.3 VOLTS 0.15 AMPERE

AC OR DC

GLASS BULB



BOTTOM VIEW

MINIATURE BUTTON 7 PIN BASE [B]

TYPE 9002 IS A MIDGET TYPE TRIODE INTENDED FOR USE AS A DETECTOR, AMPLIFIER AND OSCILLATOR AT ULTRA HIGH FREQUENCIES.

RATINGS

INTERPRETED ACCORDING TO RMA STANDARD M8-210

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM PLATE DISSIPATION	1.6	WATTS

DIRECT INTERELECTRODE CAPACITANCES

WITH NO EXTERNAL SHIELD

GRID TO PLATE	1.4	μμf
INPUT	1.2	μμf
OUTPUT	1.1	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	90	135	180	250	VOLTS
GRID VOLTAGE	-2.5	-3.75	-5	-7	VOLTS
AMPLIFICATION FACTOR	25	25	25	25	
PLATE RESISTANCE	14700	13200	12500	11400	OHMS
TRANSCONDUCTANCE	1700	1900	2000	2200	μMHOS
PLATE CURRENT	2.5	3.5	4.5	6.3	MA.

[A] WHEN THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER, THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE. UNDER NO CONDITIONS SHOULD IT EXCEED 100 VOLTS.

[B] THE CENTER HOLE IN SOCKETS DESIGNED FOR THIS BASE PROVIDES FOR THE POSSIBILITY THAT THIS TUBE TYPE MAY BE MANUFACTURED WITH THE EXHAUST-TUBE TIP AT THE BASE END. FOR THIS REASON IT IS RECOMMENDED THAT IN EQUIPMENT EMPLOYING THIS TUBE TYPE, NO MATERIAL BE PERMITTED TO OBSTRUCT THE SOCKET HOLE.

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PLATE 1482

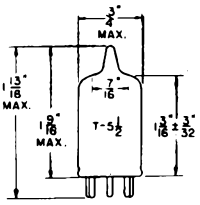
AUG. 31 1944

TUNG-SOL

SUPER CONTROL RF AMPLIFIER PENTODE

MIDGET TYPE

COATED UNIPOTENTIAL CATHODE



HEATER[A]
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB

MINIATURE BUTTON 7 PIN BASE

MOUNTING POSITION – ANY

BOTTOM VIEW

THE 9003 IS A REMOTE CUT-OFF MIDGET TYPE PENTODE INTENDED FOR USE AS AN AMPLIFIER AND MIXER AT ULTRA HIGH FREQUENCIES. ITS CONSTRUCTION, INCLUDING DOUBLE CATHODE LEADS, PERMITS CIRCUITS TO BE DESIGNED WITH EXTREMELY SHORT LEADS AND WITH MINIMUM INTER-CIRCUIT COUPLING. ELECTRICALLY ITS CHARACTERISTICS ARE IDENTICAL WITH TYPE 956.

RATINGS*

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM SCREEN VOLTAGE	100	VOLTS
MINIMUM GRID VOLTAGE	-3	VOLTS
MAXIMUM PLATE DISSIPATION	1.7	WATTS
MAXIMUM SCREEN DISSIPATION	0.3	WATT

*INTERPRETED ACCORDING TO RMA STANDARD M8-210

DIRECT INTERELECTRODE CAPACITANCES

MAXIMUM GRID TO PLATE (WITH EXTERNAL SHIELD)	0.01	μμf
INPUT (WITH NO EXTERNAL SHIELD)	3.4	μμf
OUTPUT (WITH NO EXTERNAL SHIELD)	3.0	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER

PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE	100	VOLTS
GRID VOLTAGE	-3	VOLTS
PLATE RESISTANCE (APPROX.)	0.7	MEGOHM
TRANSCONDUCTANCE	1800	μMHOS
GRID BIAS FOR TRANSCONDUCTANCE OF 15 μMHOS	-35	VOLTS
GRID BIAS FOR TRANSCONDUCTANCE OF 2 μMHOS	-45	VOLTS
PLATE CURRENT	6.7	MA.
SCREEN CURRENT	2.7	MA.

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PLATE
1405
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1944

CONTINUED NEXT PAGE

CONTINUED FROM PRECEDING PAGE

MIXER IN SUPERHETERODYNE CIRCUIT

PLATE VOLTAGE	250	VOLTS
SCREEN VOLTAGE	100	VOLTS
GRID VOLTAGE (APPROX.)[B]	−10	VOLTS
CONVERSION TRANSCONDUCTANCE (APPROX.)	600	μMHOS

[A] WHEN THE CATHODE IS NOT DIRECTLY CONNECTED TO THE HEATER THE POTENTIAL DIFFERENCE BETWEEN HEATER AND CATHODE SHOULD BE KEPT AS LOW AS POSSIBLE.

[B] VALUES INDICATED ARE OPTIMUM. FOR AN OSCILLATOR PEAK VOLTAGE OF 9 VOLTS THE GRID BIAS IS MINIMUM.

TO PROVIDE THE SHORTEST POSSIBLE CIRCUIT RETURNS AND TO PREVENT INTER-STAGE COUPLING AT ULTRA HIGH FREQUENCIES, EACH RF AMPLIFIER STAGE MAY REQUIRE RF BY-PASSING AND SHIELDING. THIS CAN BE ACCOMPLISHED BY PLACING SMALL CONDENSERS CLOSE TO THE TUBE TERMINALS. IN ADDITION RF CHOKES MAY BE REQUIRED IN THE SUPPLY OF RETURN LEADS OF THE TUBE ELEMENTS.

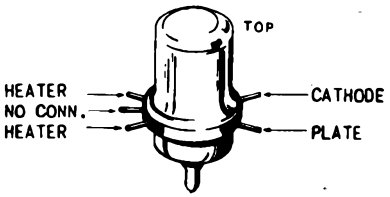
THIS TUBE HAS TWO CATHODE LEADS. IF THE GRID RETURN IS CONNECTED TO ONE CATHODE TERMINAL AND THE PLATE AND SCREEN RETURNS ARE CONNECTED TO THE OTHER CATHODE TERMINAL, THE PLATE AND SCREEN RF CIRCUITS WILL BE COMPLETED WITH A MINIMUM OF INDUCTANCE IN COMMON WITH THE GRID CIRCUITS.

PLATE 1406
MARCH 15 1944

TUNG-SOL

ULTRA HIGH FREQUENCY DIODE

ACORN TYPE



PIN CONNECTIONS

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB

MOUNTING POSITION – ANY

THE 9004 IS AN ACORN TYPE DIODE INTENDED FOR USE AS AN ULTRA HIGH FREQUENCY DETECTOR.

RATINGS*

MAXIMUM AC PLATE VOLTAGE (RMS)	117	VOLTS
MAXIMUM DC OUTPUT CURRENT	5	MA.

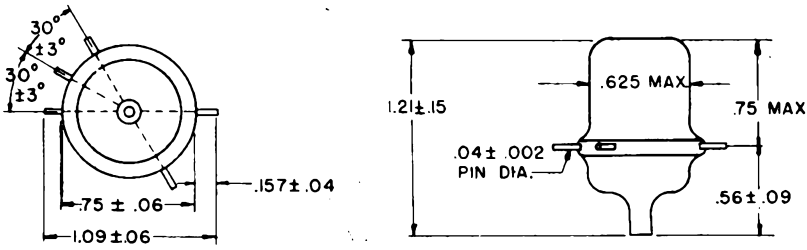
*INTERPRETED ACCORDING TO RMA STANDARD M8-210

DIRECT INTERELECTRODE CAPACITANCES

(WITH NO EXTERNAL SHIELD)

PLATE TO CATHODE	1.3	μμf
PLATE TO HEATER (APPROX.)	0.3	μμf
HEATER TO CATHODE (APPROX.)	2.2	μμf

RESONANT FREQUENCY APPROXIMATELY 850 MC.



TUBE DIMENSIONS

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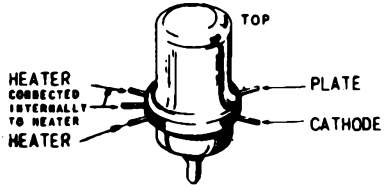
PLATE 1407
MARCH 15 1944

9005

TUNG-SOL

ULTRA HIGH FREQUENCY DIODE

ACORN TYPE



PIN CONNECTIONS

COATED UNIPOTENTIAL CATHODE

HEATER
3.6 VOLTS 0.165 AMPERE
AC OR DC

GLASS BULB

MOUNTING POSITION – ANY

THE 9005 IS AN ACORN TYPE DIODE INTENDED FOR USE AS AN ULTRA HIGH FREQUENCY DETECTOR.

RATINGS*

MAXIMUM AC PLATE VOLTAGE (RMS)	117	VOLTS
MAXIMUM DC OUTPUT CURRENT	1.0	MA.

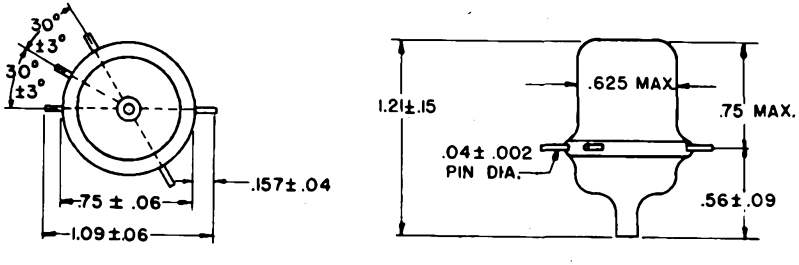
*INTERPRETED ACCORDING TO RMA STANDARD M8-210

DIRECT INTERELECTRODE CAPACITANCES

(WITH NO EXTERNAL SHIELD)

PLATE TO CATHODE	0.8	μμf
PLATE TO HEATER (APPROX.)	0.2	μμf
HEATER TO CATHODE (APPROX.)	1.1	μμf

RESONANT FREQUENCY APPROXIMATELY 1500 MC.



TUBE DIMENSIONS

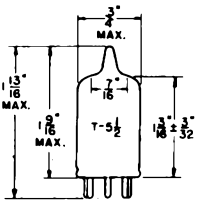
PLATE 1408
MARCH 15 1944

TUNG-SOL

ULTRA HIGH FREQUENCY DIODE

MIDGET TYPE

COATED UNIPOTENTIAL CATHODE

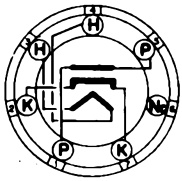


HEATER
6.3 VOLTS 0.15 AMPERE
AC OR DC

GLASS BULB

MINIATURE BUTTON 7 PIN BASE

MOUNTING POSITION – ANY



BOTTOM VIEW

THE 9006 IS A MIDGET TYPE DIODE INTENDED FOR USE AS AN ULTRA HIGH FREQUENCY DETECTOR.

RATINGS*

MAXIMUM PEAK INVERSE PLATE VOLTAGE	750	VOLTS
MAXIMUM PEAK PLATE CURRENT	15	MA.
MAXIMUM DC OUTPUT CURRENT	5	MA.
MAXIMUM DC HEATER CATHODE POTENTIAL	100	VOLTS

*INTERPRETED ACCORDING TO RMA STANDARD M8-210

DIRECT INTERELECTRODE CAPACITANCES

(WITH NO EXTERNAL SHIELD)

PLATE TO CATHODE	1.4	μμf
PLATE TO HEATER	0.2	μμf
CATHODE TO HEATER	2.2	μμf

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

AC PLATE SUPPLY VOLTAGE (RMS)	270	VOLTS
MINIMUM TOTAL EFFECTIVE PLATE SUPPLY IMPEDANCE	100	OHMS
DC OUTPUT CURRENT	5	MA.

RESONANT FREQUENCY APPROXIMATELY 700 MC.

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PLATE 1409
MARCH 15 1944

TUNG-SOL

TWIN TRIODE AMPLIFIER

PHYSICAL SPECIFICATIONS

EMITTER	UNIPOTENTIAL CATHODE	PIN CONNECTIONS		
BASE	LOCKING-IN 8 PIN	PIN 1	HEATER	PIN 7 CATHODE #1
CAP	NONE	PIN 2	CATHODE #2	PIN 8 HEATER
BULB	T-9	PIN 3	PLATE #2	
MAXIMUM DIAMETER	1 3/16"	PIN 4	GRID #2	
MAXIMUM OVERALL LENGTH	2 25/32"	PIN 5	GRID #1	TOP CAP NONE
MAXIMUM SEATED HEIGHT	2 1/4"	PIN 6	PLATE #1	

RATINGS

HEATER OR FILAMENT VOLTAGE (NOMINAL)	14.0	VOLTS
HEATER OR FILAMENT CURRENT (NOMINAL)	0.160	AMP.
MAXIMUM PLATE VOLTAGE		VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

HEATER VOLTAGE	12.6	VOLTS
HEATER CURRENT	0.15	AMPERE
PLATE VOLTAGE	250	VOLTS
CONTROL GRID VOLTAGE	−10	VOLTS
PLATE CURRENT	9.0	MA.
PLATE RESISTANCE	7600	OHMS
TRANSCONDUCTANCE	2100	μMHOS
AMPLIFICATION FACTOR	16	

DIRECT INTERELECTRODE CAPACITANCES[S]

	TRIODE UNIT 1		TRIODE UNIT 2	
GRID TO CATHODE	2.2		2.2	μμf
PLATE TO CATHODE	1.6		1.6	μμf
GRID TO PLATE	2.3		2.3	μμf
GRID #1 TO GRID #2		0.20		μμf
PLATE #1 TO PLATE #2		0.60		μμf
GRID #1 TO PLATE #2		0.06		μμf
GRID #2 TO PLATE #1		0.10		μμf

[S] WITH BASE SHELL GROUNDED.

PLATE 1165-1

NOV. 17 1941

TUNG-SOL

TRIODE AMPLIFIER

PHYSICAL SPECIFICATIONS

EMITTER	UNIPOTENTIAL CATHODE	PIN CONNECTIONS	
BASE	LOCKING-IN 6 PIN	PIN 1 HEATER	PIN 7 CATHODE
CAP	NONE	PIN 2 PLATE	PIN 8 HEATER
BULB	T-9	PIN 3 NO CONN.	
MAXIMUM DIAMETER	1 3/16"	PIN 4 NO CONN.	
MAXIMUM OVERALL LENGTH	2 25/32"	PIN 5 NO CONN.	TOP CAP NONE
MAXIMUM SEATED HEIGHT	2 1/4"	PIN 6 GRID	

RATINGS

HEATER OR FILAMENT VOLTAGE (NOMINAL)	7	VOLTS
HEATER OR FILAMENT CURRENT (NOMINAL)	0.32	AMP.
MAXIMUM PLATE VOLTAGE		VOLTS

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A1 AMPLIFIER

HEATER VOLTAGE	6.3	6.3	VOLTS
HEATER CURRENT	0.3	0.3	AMPERE
PLATE VOLTAGE	100	250	VOLTS
CONTROL GRID VOLTAGE	0	-8	VOLTS
PLATE CURRENT	10.0	8.0	MA.
PLATE RESISTANCE	7000	8700	OHMS
TRANSCONDUCTANCE	3600	2300	μMHOS
AMPLIFICATION FACTOR	25	20	

DIRECT INTERELECTRODE CAPACITANCES[S]

CONTROL GRID TO CATHODE	3.4	μμf
PLATE TO CATHODE	2.6	μμf
GRID TO PLATE	2.0	μμf

[S] WITH BASE SHELL GROUNDED.

PLATE 1166-1
NOV. 17 1941

TUNG-SOL

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PLATE
1331-3
SEPT. 23
1943