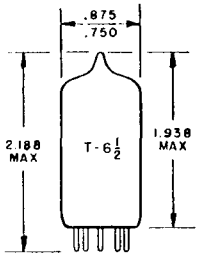
TUNG-SOL

TRIODE PENTODE

MINIATURE TYPE



GLASS BULB
MINIATURE BUTTON
9 PIN BASE E9-1
OUTLINE DRAWING
JEDEC 6-2

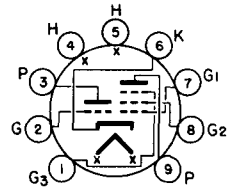
FOR

USE AS A COMBINED OSCILLATOR

AND MIXER TUBE IN T.V. RECEIVERS

COATED UNIPOTENTIAL CATHODE

ANY MOUNTING POSITION



BOTTOM VIEW
BASING DIAGRAM
JEDEC 9AK

THE 6X8 AND 6X8A ARE MULTI-UNIT TUBES USING THE 9 PIN MINIATURE CONSTRUCTION. THEY CONTAIN A MEDIUM-MU TRIODE AND A SHARP-CUTOFF PENTODE IN ONE ENVELOPE. THEY ARE DESIGNED PRIMARILY FOR USE AS COMBINED OSCILLATORS AND MIXER TUBES IN TELEVISION RECEIVERS UTILIZING AN INTERMEDIATE FREQUENCY IN THE ORDER OF 40 MC. THEY ARE ESPECIALLY SUITABLE FOR USE IN AM/FM RECEIVERS. THERMAL CHARACTERISTICS OF THE HEATER OF THE 6X8A ARE CONTROLLED SUCH THAT HEATER VOLTAGE SURGES DURING THE WARM-UP CYCLE ARE MINIMIZED PROVIDED IT IS USED WITH OTHER TYPES WHICH ARE SIMILARLY CONTROLLED.

DIRECT INTERELECTRODE CAPACITANCES

	WITH SHIELD[A]	WITHOUT SHIELD	
PENTODE GRID 1 TO PENTODE PLATE: (PG1 TO PP) MAX.	0.06	0.09	pf
PENTODE INPUT: PG1 TO (H+K+PG2+PG3)	→ 4.8	→ 4.6	pf
PENTODE OUTPUT: PP TO (H+K+PG2+PG3)	→ 1.6	→ 0.9	pf
CATHODE TO HEATER: (K TO H)	→ 6.5[B]	→ 6.5	pf
TRIODE GRID TO TRIODE PLATE: (TG TO TP)	→ 1.5	→ 1.5	pf
TRIODE INPUT: TG TO (H+K)	→ 2.4	→ 2.0	pf
TRIODE OUTPUT: TP TO (H+K)	1.0	0.5	pf
PENTODE GRID 1 TO TRIODE PLATE (PG1 TO TP) MAX.	→ 0.04	→ 0.05	pf
PENTODE PLATE TO TRIODE PLATE: (PP TO TP) MAX.	→ 0.008	→ 0.05	pf

HEATER CHARACTERISTICS AND RATINGS

DESIGN MAXIMUM VALUES - SEE EIA STANDARD RS-239

AVERAGE CHARACTERISTICS	6.3	VOLTS	450	MA.
HEATER WARM-UP TIME[C] (FOR 6X8A ONLY)			11	SECONDS
LIMITS OF APPLIED VOLTAGE			6.3±0.6	VOLTS
LIMITS OF SUPPLIED CURRENT (6X8A ONLY)			600±40	MA.
MAXIMUM HEATER-CATHODE VOLTAGE:				
HEATER NEGATIVE WITH RESPECT TO CATHODE				
TOTAL DC AND PEAK			→ 200	VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE				
DC			→ 100	VOLTS
TOTAL DC AND PEAK			→ 200	VOLTS

CONTINUED FROM PRECEDING PAGE

MAXIMUM RATINGS

→ DESIGN MAXIMUM VALUES - SEE EIA STANDARD RS-239

PENTODE PLATE VOLTAGE	275	VOLTS
TRIODE PLATE VOLTAGE	275	VOLTS
GRID 2 SUPPLY VOLTAGE	275	VOLTS
GRID 2 VOLTAGE	SEE RATING CHART	
PENTODE PLATE DISSIPATION	2.3	WATTS
TRIODE PLATE DISSIPATION	1.7	WATTS
GRID 2 DISSIPATION - UP TO 138 VOLTS	0.45	WATTS
POSITIVE DC GRID 1 VOLTAGE	0	VOLTS
POSITIVE DC TRIODE GRID VOLTAGE	0	VOLTS

→TYPICAL OPERATING CHARACTERISTICS

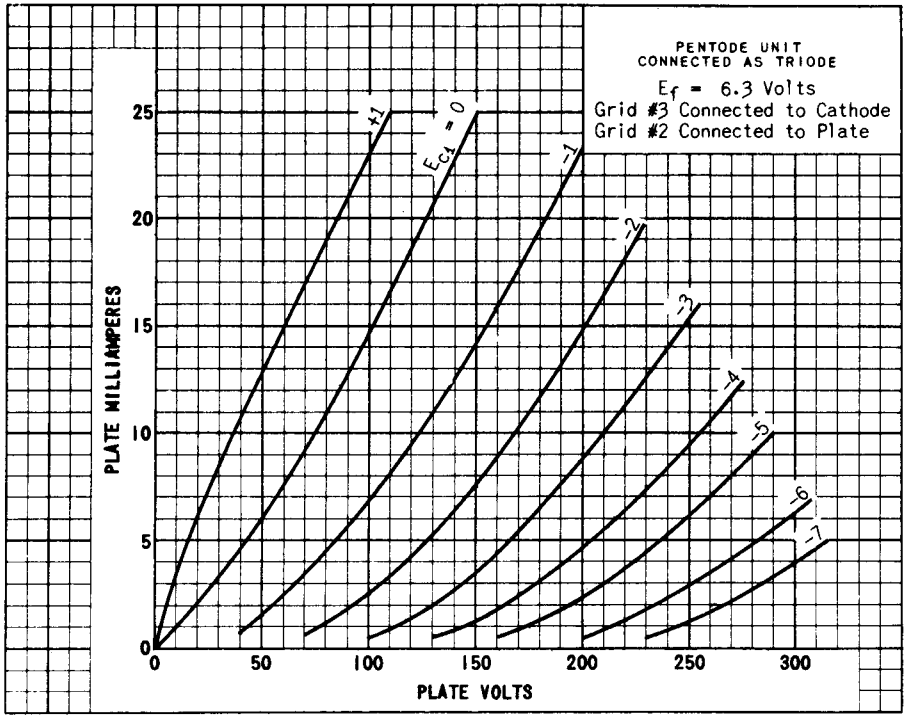
CLASS A1 AMPLIFIER

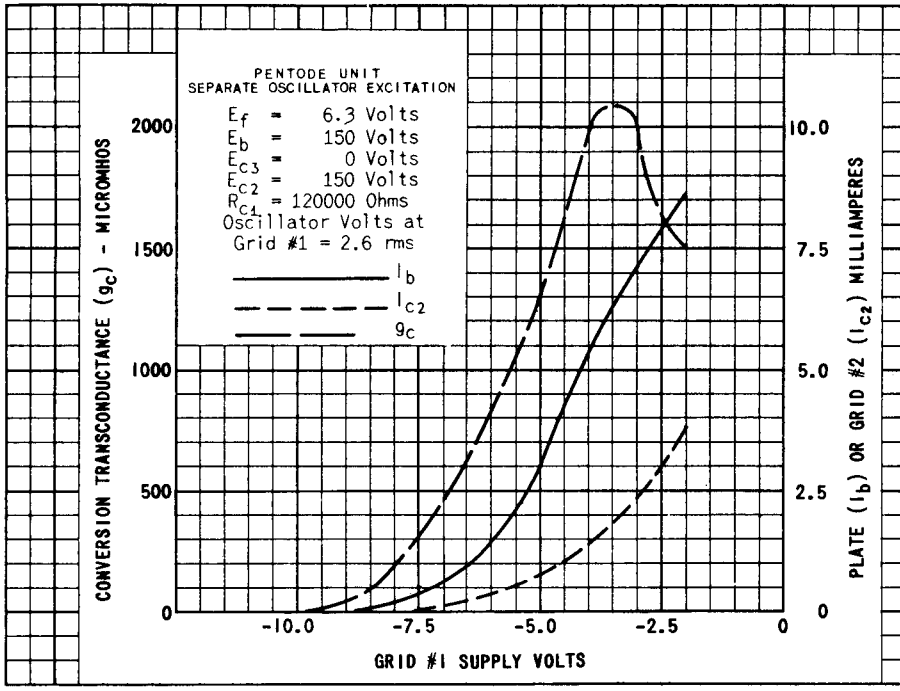
		TRIODE	PENTODE	
PLATE VOLTAGE		125	125	VOLTS
GRID 3 VOLTAGE	CONNECTED TO PIN 6 AT SOCKET			
GRID 2 VOLTAGE		-----	125	VOLTS
GRID 1 VOLTAGE		-1.0	-1.0	VOLTS
PLATE CURRENT		12.0	9.0	MA.
GRID 2 CURRENT		-----	2.2	MA.
TRANSCONDUCTANCE		6,500	5,500	μMHOS
PLATE RESISTANCE	APPROX.	6,000	300,000	OHMS
AMPLIFICATION FACTOR		40	-----	
GRID 1 VOLTAGE APPROX. FOR Ib = 20 μA.		-7	-6.5	VOLTS
ZERO BIAS TRANSCONDUCTANCE WITH Eb = 100 V; Ec2 = 70 V.		-----	5,700	μMHOS

A
EXTERNAL SHIELD 315 CONNECTED TO PIN 6.

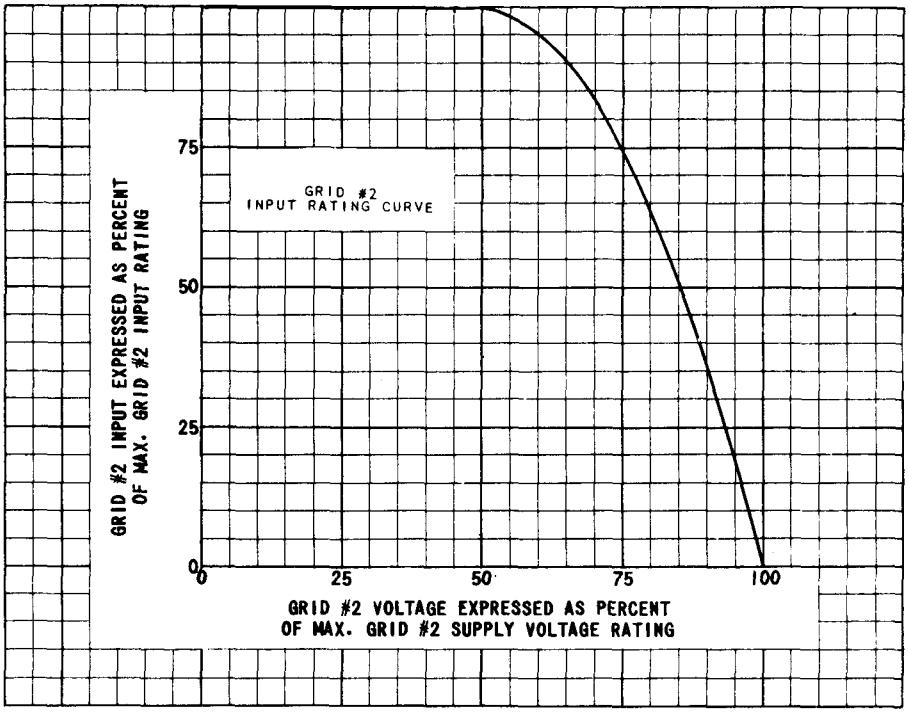
B
EXTERNAL SHIELD 315 CONNECTED TO PIN 9.

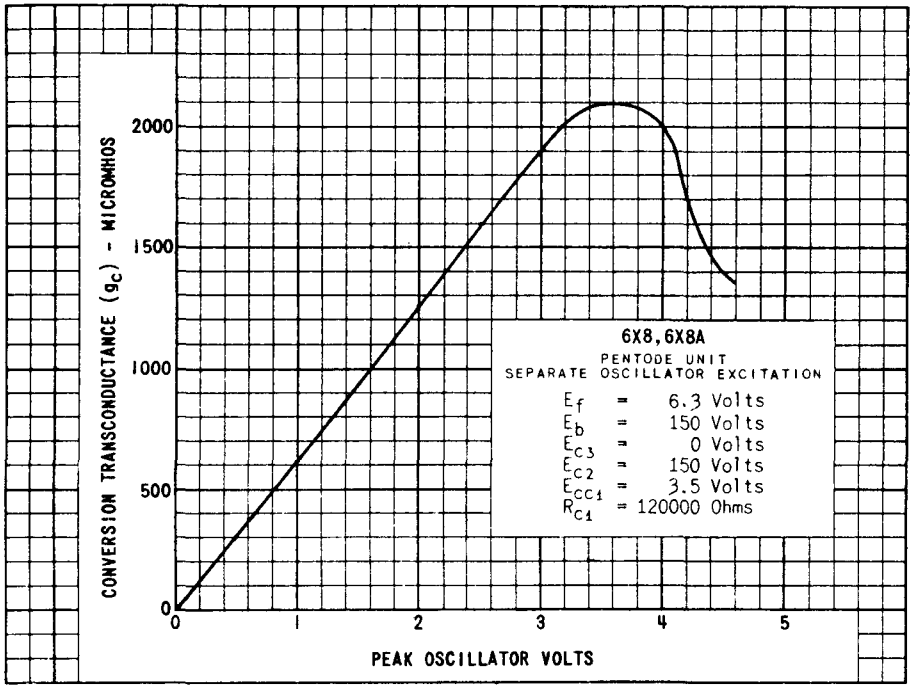
C
HEATER WARM-UP TIME IS DEFINED AS THE TIME REQUIRED FOR THE VOLTAGE ACROSS THE HEATER TO REACH 80% OF ITS RATED VOLTAGE AFTER APPLYING 4 TIMES RATED HEATER VOLTAGE TO A CIRCUIT CONSISTING OF THE TUBE HEATER IN SERIES WITH A RESISTANCE OF VALUE THREE TIMES THE NOMINAL HEATER OPERATING RESISTANCE.

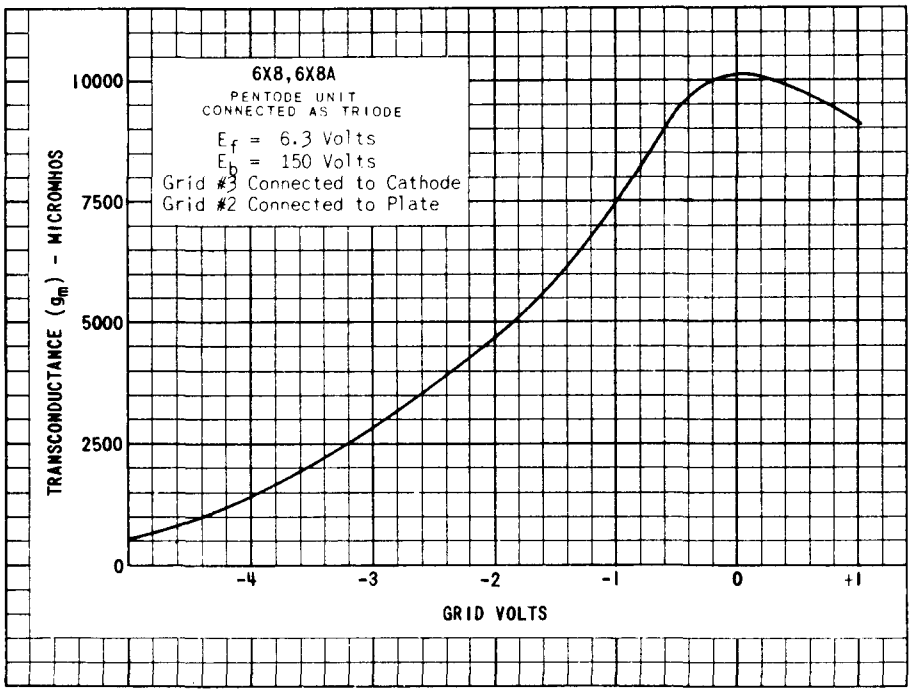

PENTODE UNIT
CONNECTED AS TRIODE
Ef = 6.3 Volts
Grid #3 Connected to Cathode
Grid #2 Connected to Plate
+1
Ec1 = 0
-1
-2
-3
-4
-5
-6
-7
PLATE MILLIAMPERES
PLATE VOLTS
0
5
10
15
20
25
0
50
100
150
200
250
300

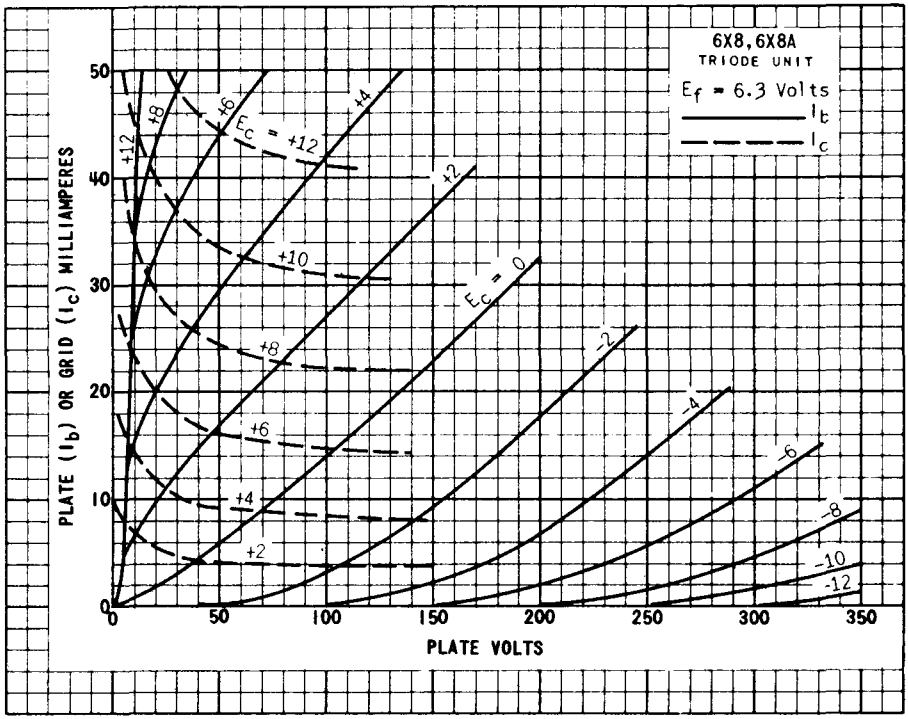

PENTODE UNIT
SEPARATE OSCILLATOR EXCITATION
Ef = 6.3 Volts
Eb = 150 Volts
Ec3 = 0 Volts
Ec2 = 150 Volts
Rc1 = 120000 Ohms
Oscillator Volts at
Grid #1 = 2.6 rms
Ib
Ic2
gc
CONVERSION TRANSCONDUCTANCE (gc) - MICROMHOS
PLATE (Ib) OR GRID #2 (Ic2) MILLIAMPERES
GRID #1 SUPPLY VOLTS
0
500
1000
1500
2000
0
2.5
5.0
7.5
10.0
-10.0
-7.5
-5.0
-2.5
0

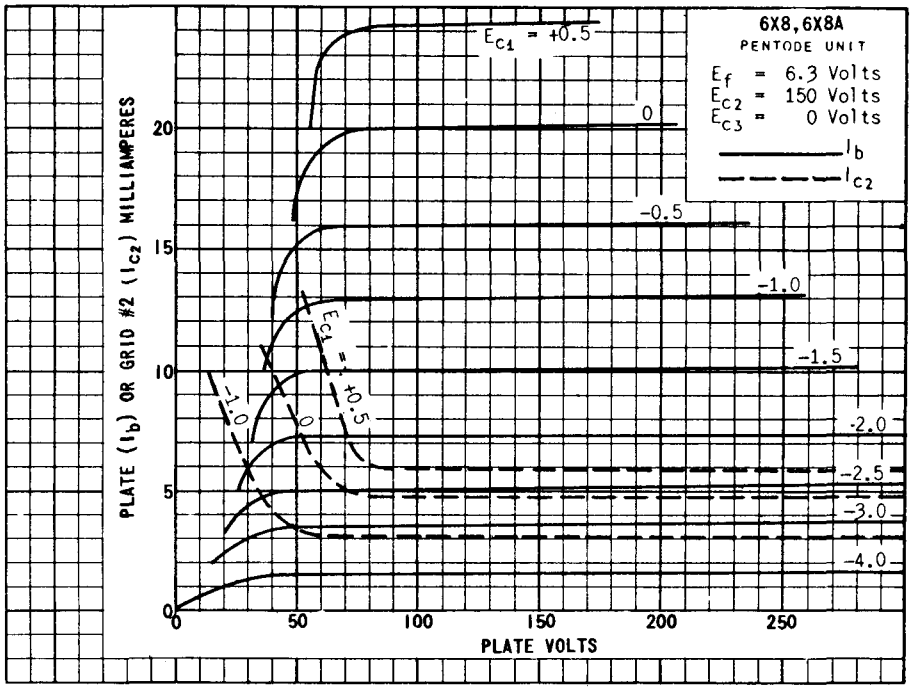
6X8, 6X8A


GRID #2
INPUT RATING CURVE
GRID #2 INPUT EXPRESSED AS PERCENT
OF MAX. GRID #2 INPUT RATING
75
50
25
0
0
25
50
75
100
GRID #2 VOLTAGE EXPRESSED AS PERCENT
OF MAX. GRID #2 SUPPLY VOLTAGE RATING


CONVERSION TRANSCONDUCTANCE (g_c) - MICROMHOS
2000
1500
1000
500
0
0
1
2
3
4
5
PEAK OSCILLATOR VOLTS
6X8,6X8A
PENTODE UNIT
SEPARATE OSCILLATOR EXCITATION
E_f = 6.3 Volts
E_b = 150 Volts
E_{c3} = 0 Volts
E_{c2} = 150 Volts
E_{cc1} = 3.5 Volts
R_{c1} = 120000 Ohms


TRANSCONDUCTANCE (g_m) - MICROMHOS
10000
7500
5000
2500
0
-4
-3
-2
-1
0
+1
GRID VOLTS
6X8,6X8A
PENTODE UNIT
CONNECTED AS TRIODE
E_f = 6.3 Volts
E_b = 150 Volts
Grid #3 Connected to Cathode
Grid #2 Connected to Plate


6X8, 6X8A
TRIODE UNIT
Ef = 6.3 Volts
Ib
Ic
PLATE (Ib) OR GRID (Ic) MILLIAMPERES
PLATE VOLTS
Ec = +12
Ec = 0
+12
+8
+6
+4
+2
+10
-2
-4
-6
-8
-10
-12
0
10
20
30
40
50
0
50
100
150
200
250
300
350


6X8, 6X8A
PENTODE UNIT
Ef = 6.3 Volts
Ec2 = 150 Volts
Ec3 = 0 Volts
Ib
Ic2
PLATE (Ib) OR GRID #2 (Ic2) MILLIAMPERES
PLATE VOLTS
Ec1 = +0.5
0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-4.0
Ec1 = -1.0
0
+0.5
0
5
10
15
20
0
50
100
150
200
250