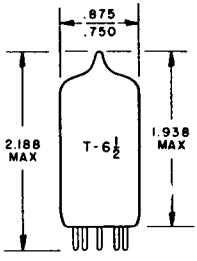
TUNG-SOL

TRIODE PENTODE

MINIATURE TYPE



GLASS BULB

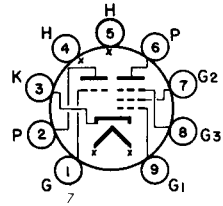
MINIATURE BUTTON
9 PIN BASE E9-1
OUTLINE DRAWING
JEDEC 6-2

FOR

CONVERTER SERVICE

COATED UNIPOTENTIAL CATHODE

ANY MOUNTING POSITION



BOTTOM VIEW

BASING DIAGRAM
JEDEC 9DW

THE 6AT8A IS A MULTI-UNIT TUBE USING THE 9 PIN MINIATURE CONSTRUCTION. IT CONTAINS A MEDIUM-MU TRIODE AND A SHARP CUT-OFF PENTODE WITH A COMMON CATHODE IN ONE ENVELOPE. IT IS DESIGNED PRIMARILY FOR USE IN 600 MA. SERIES HEATER OPERATED TELEVISION RECEIVERS UTILIZING AN INTERMEDIATE FREQUENCY IN THE ORDER OF 40 MC. THERMAL CHARACTERISTICS OF THE HEATER 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 #315	WITHOUT SHIELD	
PENTODE GRID 1 TO PENTODE PLATE:(PG1 TO PP)	MAX.	→ 0.03	→ 0.06	pf
PENTODE INPUT: PG1 TO (H+K+PG2+PG3)		→ 4.8	→ 4.6	pf
PENTODE OUTPUT: PP TO (H+K+PG3+PG2)		1.6	0.9	pf
CATHODE TO HEATER (K TO H)		→ 6.0	→ 6.0	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 [A]			11	SECONDS
LIMITS OF SUPPLIED CURRENT			450 ± 30	MA.

[A] 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.

CONTINUED FROM PRECEDING PAGE

HEATER CHARACTERISTICS AND RATINGS - CONT'D.

DESIGN MAXIMUM VALUES - SEE EIA STANDARD RS-239

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

→ MAXIMUM RATINGS

DESIGN MAXIMUM VALUES - SEE EIA STANDARD RS-239

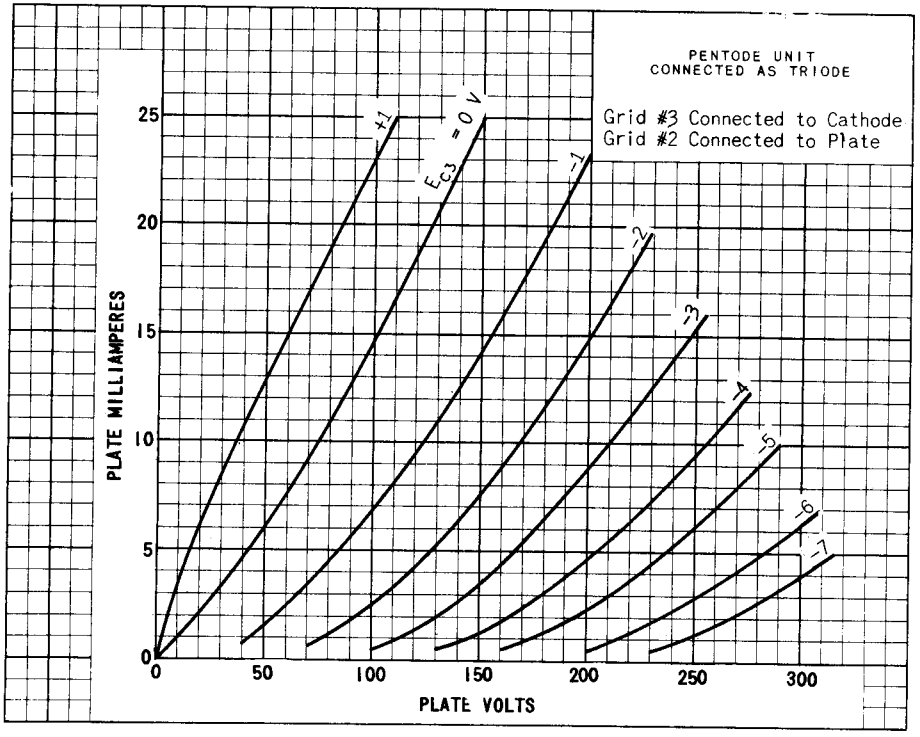
PENTODE PLATE VOLTAGE	275	VOLTS
TRIODE PLATE VOLTAGE	275	VOLTS
GRID 2 SUPPLY VOLTAGE	275	VOLTS
GRID 2 VOLTAGE	See Rating Chart	
PENTODE PLATE DISSIPATION	2.3	WATTS
GRID 2 DISSIPATION	0.45	WATTS
POSITIVE DC GRID 1 VOLTAGE	0	VOLTS
POSITIVE DC TRIODE GRID VOLTAGE	0	VOLTS
TRIODE PLATE DISSIPATION	1.7	VOLTS

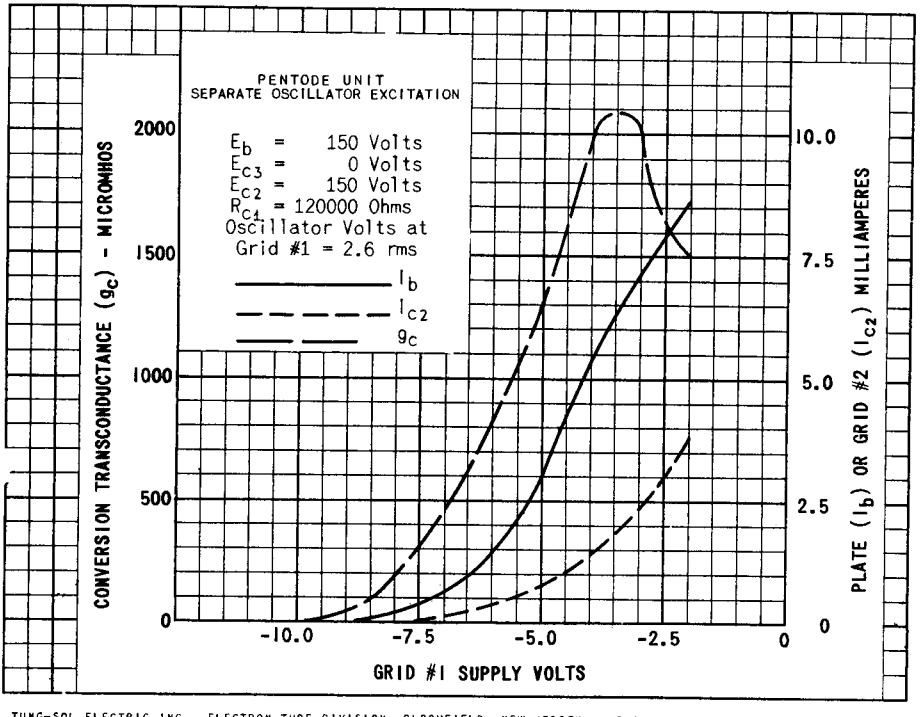
TYPICAL OPERATING CHARACTERISTICS

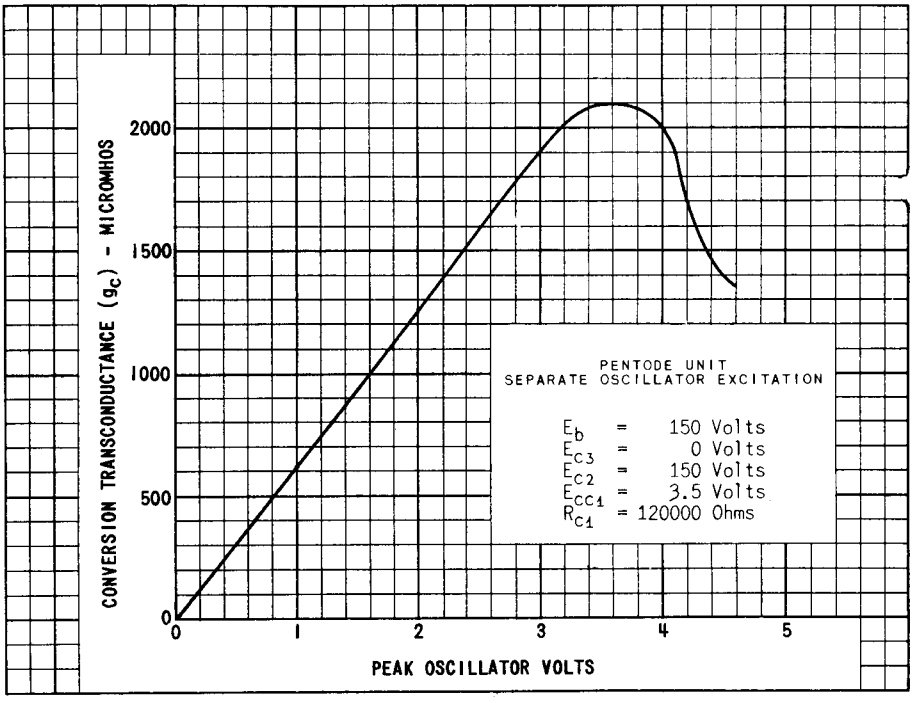
CLASS A1 AMPLIFIER

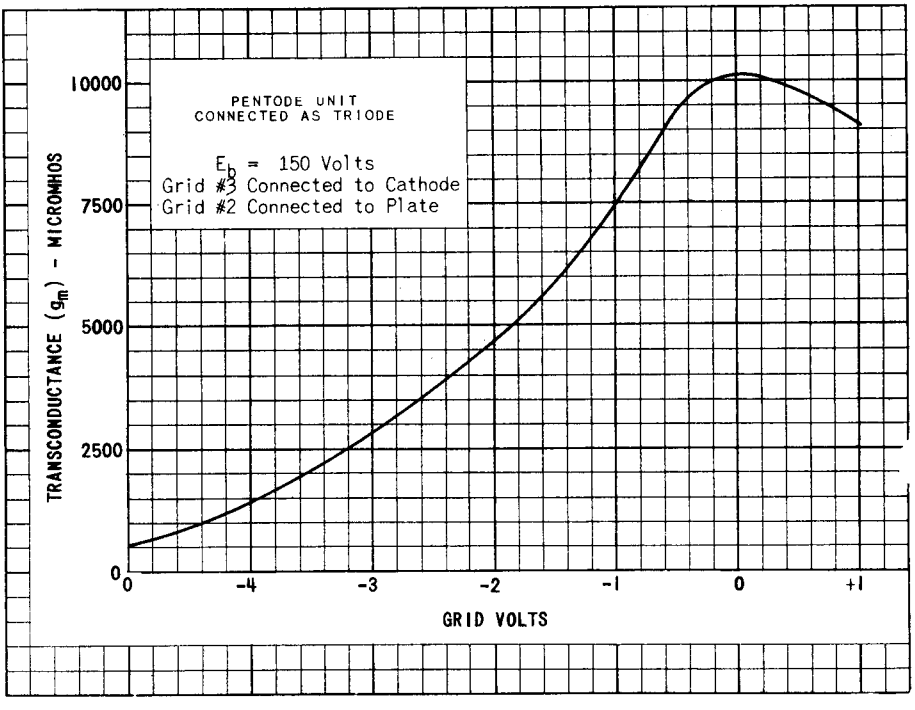
		PENTODE	TRIODE	
PLATE VOLTAGE		125	125	VOLTS
GRID 3 VOLTAGE		Connected to pin 3 at socket		
GRID 2 VOLTAGE		125	-----	
GRID 1 VOLTAGE		-1.0	-1.0	VOLTS
PLATE CURRENT		9.0	12.0	MA.
GRID 2 CURRENT		2.2	-----	MA.
TRANSCONDUCTANCE		5,500	6,500	μMHOS
PLATE RESISTANCE	(APPROX.)	300,000	6,000	OHMS
AMPLIFICATION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

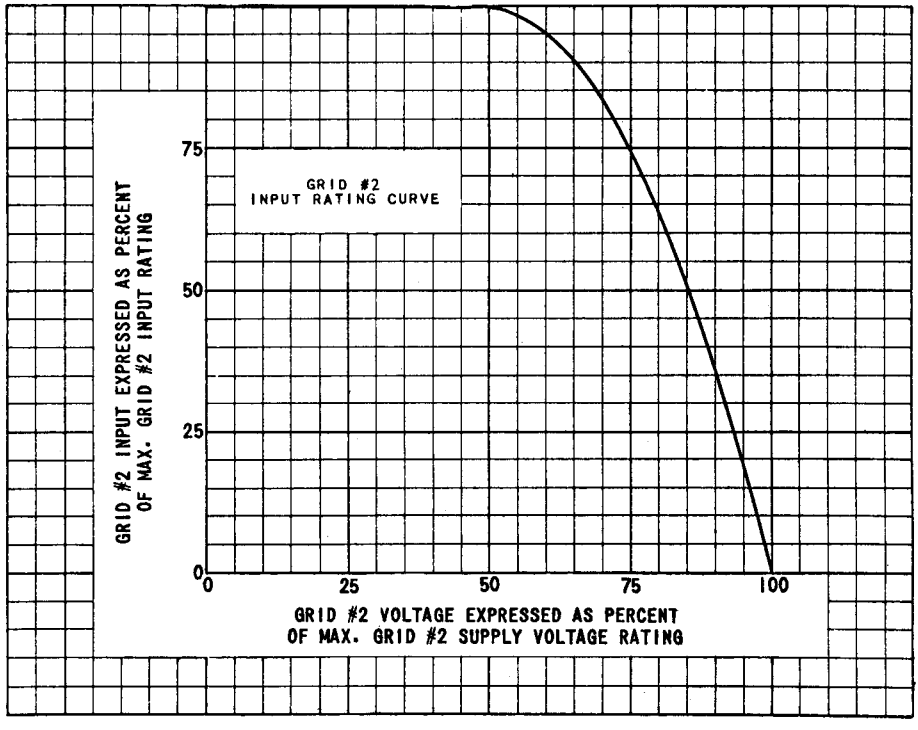
→ INDICATES A CHANGE

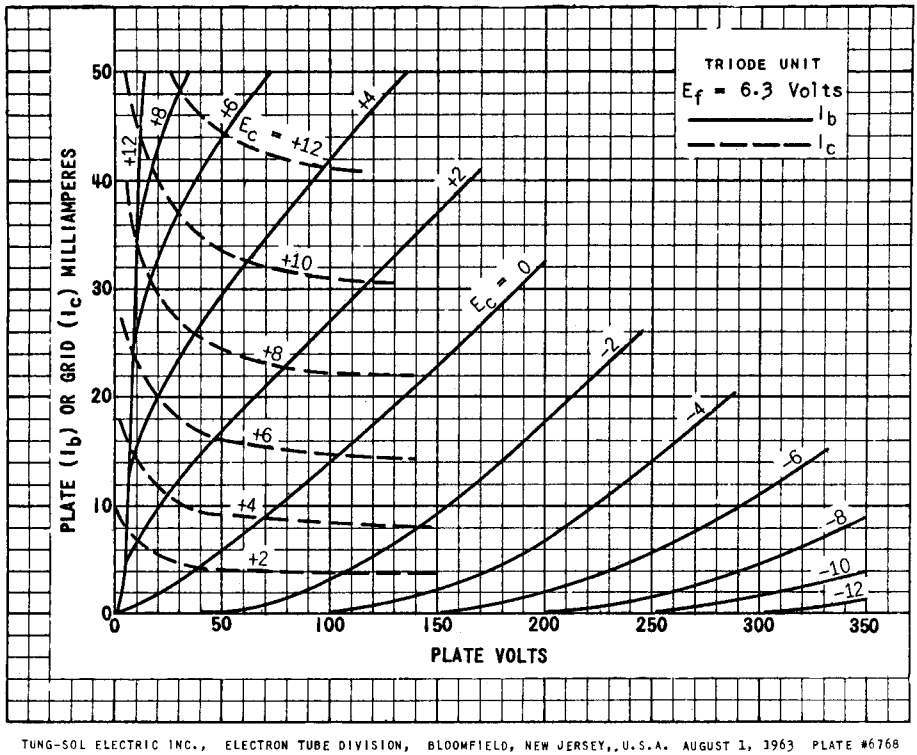

PENTODE UNIT
CONNECTED AS TRIODE
Grid #3 Connected to Cathode
Grid #2 Connected to Plate
E_{c3} = 0 V
+1
-1
-2
-3
-4
-5
-6
-7
PLATE MILLIAMPERES
0
5
10
15
20
25
0
50
100
150
200
250
300
PLATE VOLTS


PENTODE UNIT
SEPARATE OSCILLATOR EXCITATION
E_b = 150 Volts
E_{c3} = 0 Volts
E_{c2} = 150 Volts
R_{c1} = 120000 Ohms
Oscillator Volts at
Grid #1 = 2.6 rms
I_b
I_{c2}
g_c
CONVERSION TRANSCONDUCTANCE (g_c) - MICROMHOS
0
500
1000
1500
2000
PLATE (I_b) OR GRID #2 (I_{c2}) MILLIAMPERES
0
2.5
5.0
7.5
10.0
-10.0
-7.5
-5.0
-2.5
0
GRID #1 SUPPLY VOLTS

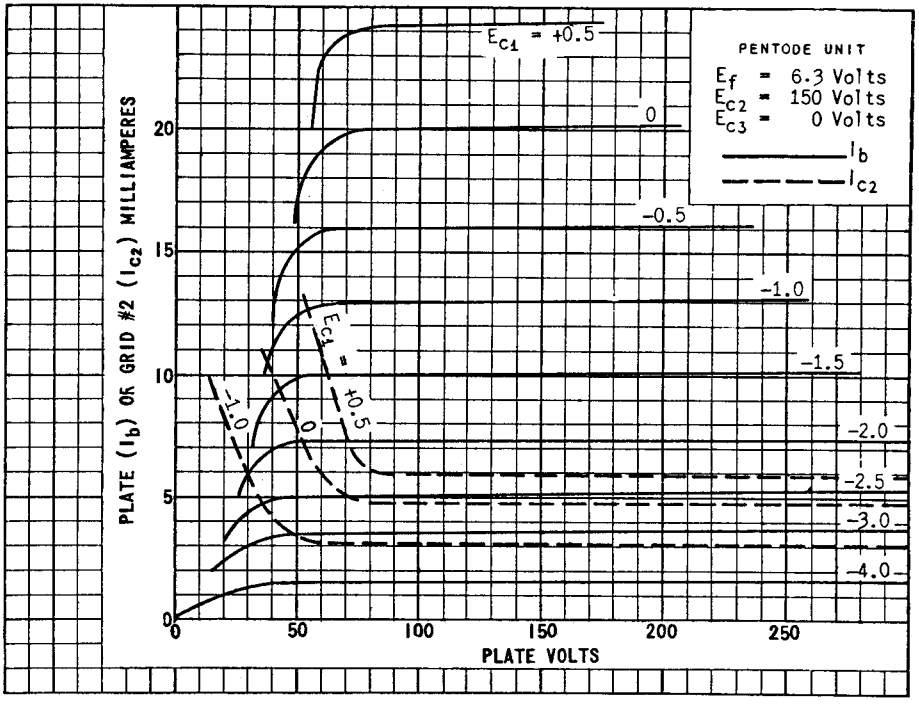

CONVERSION TRANSCONDUCTANCE (g_c) - MICROMHOS
2000
1500
1000
500
0
0
1
2
3
4
5
PEAK OSCILLATOR VOLTS
PENTODE UNIT
SEPARATE OSCILLATOR EXCITATION
E_b = 150 Volts
E_{c3} = 0 Volts
E_{c2} = 150 Volts
E_{cc1} = 3.5 Volts
R_{c1} = 120000 Ohms

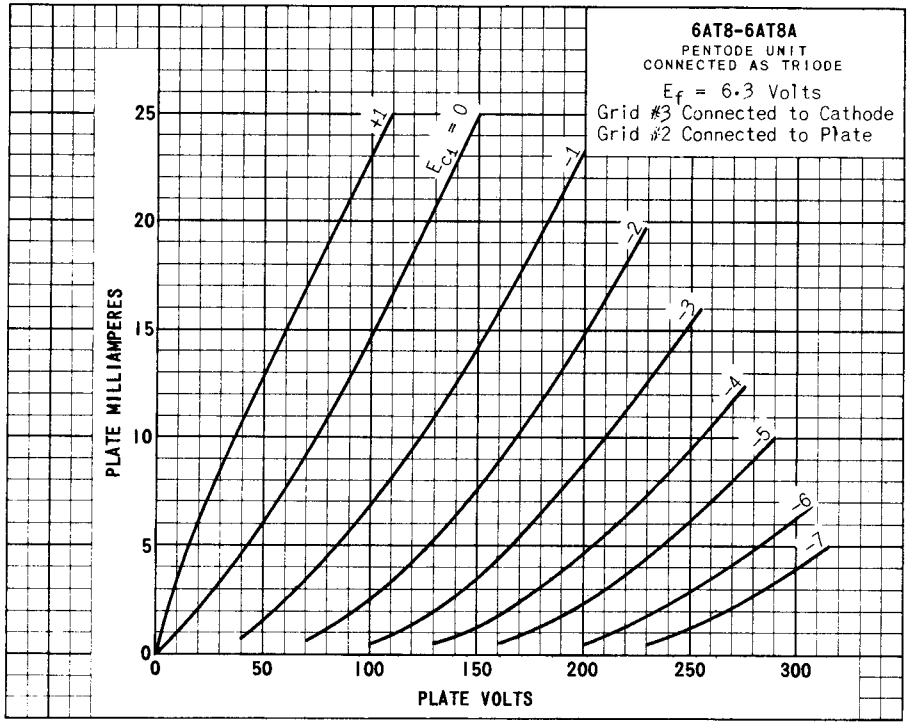

TRANSCONDUCTANCE (g_m) - MICROMHOS
10000
7500
5000
2500
0
0
-4
-3
-2
-1
0
+1
GRID VOLTS
PENTODE UNIT
CONNECTED AS TRIODE
E_b = 150 Volts
Grid #3 Connected to Cathode
Grid #2 Connected to Plate

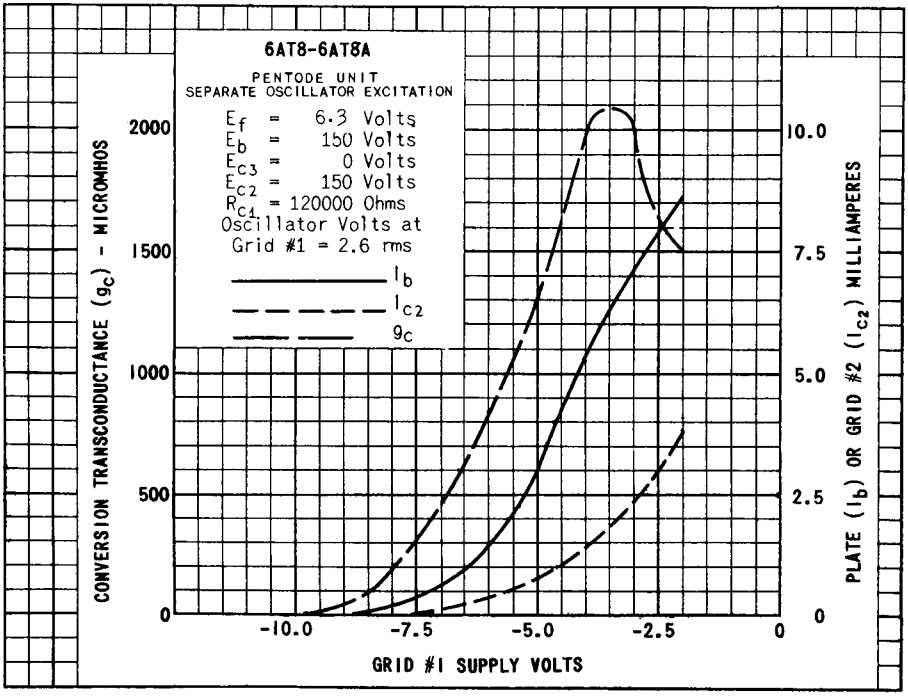


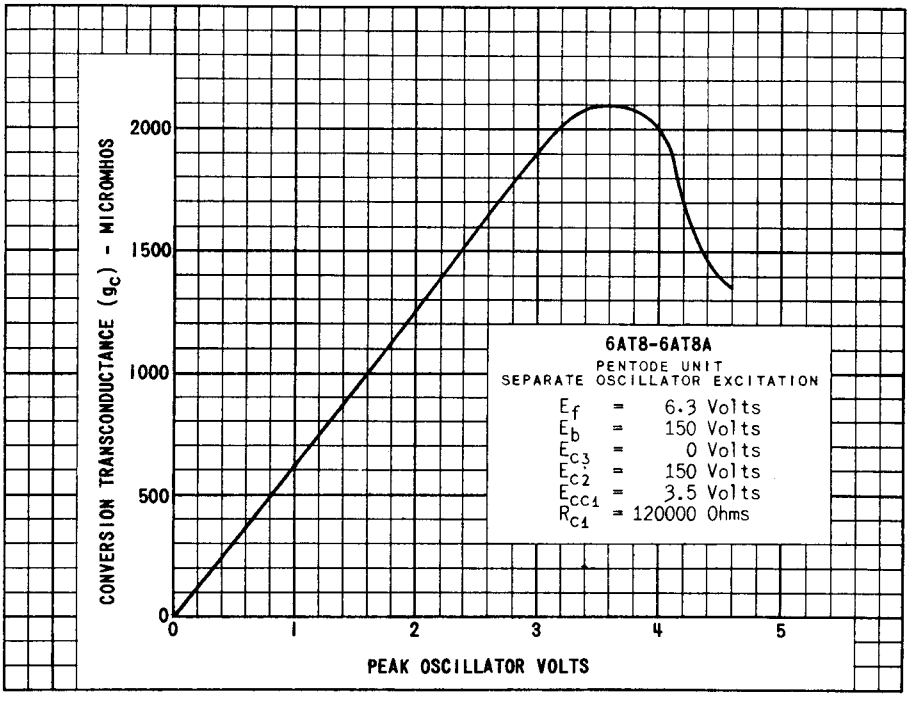


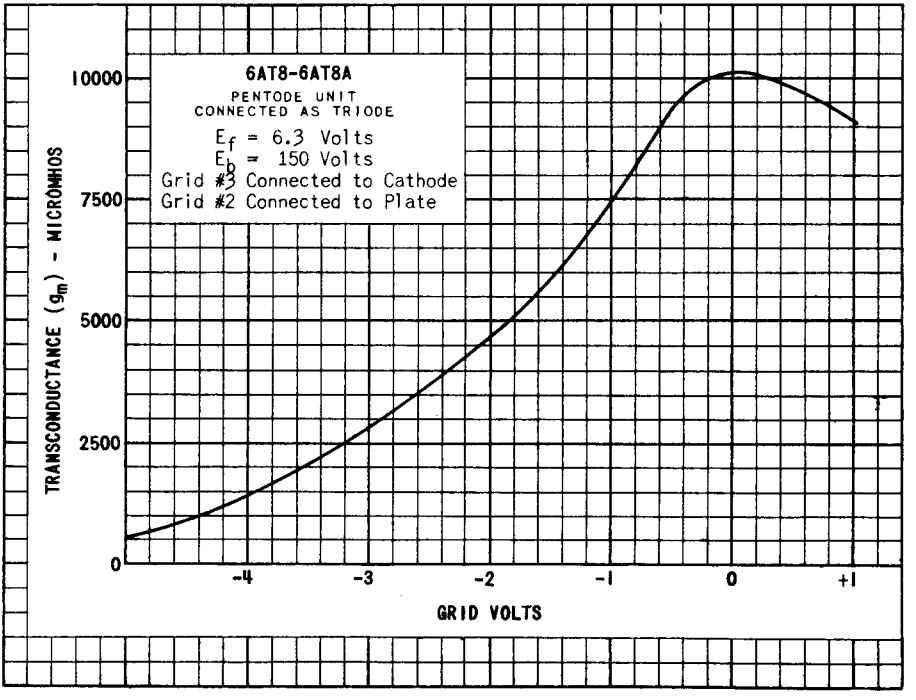
6AT8A


PENTODE UNIT
E_f = 6.3 Volts
E_{c2} = 150 Volts
E_{c3} = 0 Volts
I_b
I_{c2}
E_{c1} = +0.5
0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-4.0
PLATE (I_b) OR GRID #2 (I_{c2}) MILLIAMPERES
PLATE VOLTS
0
5
10
15
20
50
100
150
200
250


6AT8-6AT8A
PENTODE UNIT
CONNECTED AS TRIODE
E_f = 6.3 Volts
Grid #3 Connected to Cathode
Grid #2 Connected to Plate
PLATE MILLIAMPERES
PLATE VOLTS
E_{c1} = 0
+1
-1
-2
-3
-4
-5
-6
-7
0
5
10
15
20
25
0
50
100
150
200
250
300


6AT8-6AT8A
PENTODE UNIT
SEPARATE OSCILLATOR EXCITATION
E_f = 6.3 Volts
E_b = 150 Volts
E_{c3} = 0 Volts
E_{c2} = 150 Volts
R_{c1} = 120000 Ohms
Oscillator Volts at
Grid #1 = 2.6 rms
I_b
I_{c2}
g_c
CONVERSION TRANSCONDUCTANCE (g_c) - MICROMHOS
PLATE (I_b) OR GRID #2 (I_{c2}) MILLIAMPERES
GRID #1 SUPPLY VOLTS
0
500
1000
1500
2000
2.5
5.0
7.5
10.0
-10.0
-7.5
-5.0
-2.5
0


CONVERSION TRANSCONDUCTANCE (g_c) - MICROMHOS
2000
1500
1000
500
0
0
1
2
3
4
5
PEAK OSCILLATOR VOLTS
6AT8-6AT8A
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
6AT8-6AT8A
PENTODE UNIT
CONNECTED AS TRIODE
E_f = 6.3 Volts
E_b = 150 Volts
Grid #3 Connected to Cathode
Grid #2 Connected to Plate