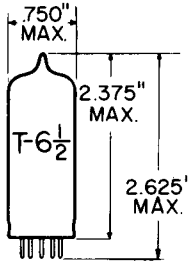
TUNG-SOL

TRIODE-TETRODE

MINIATURE TYPE



GLASS BULB

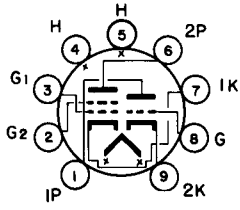
MINIATURE BUTTON
9 PIN BASE E9-1

OUTLINE DRAWING
JEDEC 6-3

COATED UNIPOTENTIAL CATHODE

HEATER
12.6 VOLTS 0.55 AMP.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW

BASING DIAGRAM
JEDEC 9GS

THE 12AL8 IS A COMBINED MEDIUM-MU TRIODE AND SPACE-CHARGE GRID TETRODE WITH INDEPENDENT UNIPOTENTIAL CATHODES IN THE 9-PIN MINIATURE CONSTRUCTION. THE TRIODE SECTION IS INTENDED FOR USE AS DETECTOR OR VOLTAGE AMPLIFIER AND THE TETRODE SECTION IS INTENDED FOR USE AS A POWER AMPLIFIER WHERE THE HEATER, PLATE AND SPACE-CHARGE GRID POTENTIALS ARE OBTAINED DIRECTLY FROM AN AUTOMOTIVE BATTERY.

DIRECT INTERELECTRODE CAPACITANCES

WITHOUT EXTERNAL SHIELD

TRIODE INPUT: (G TO K + H)	1.8	pf
TRIODE OUTPUT: (P TO K + H)	0.4	pf
TRIODE GRID TO PLATE	5.7	pf
TETRODE INPUT: (G_2 TO G_1 +K+H)	→ 12	pf
TETRODE OUTPUT: (P TO G_1 +K+H)	1.6	pf
TETRODE GRID TO PLATE	→ 12	pf
COUPLING: (TETRODE GRID #2 TO TRIODE GRID #1) (MAX.)	0.1	pf

RATINGS

INTERPRETED ACCORDING TO DESIGN CENTER SYSTEM

HEATER VOLTAGE	12.6	VOLTS
MAXIMUM TETRODE PLATE VOLTAGE	30	VOLTS
MAXIMUM POSITIVE TETRODE GRID #1 VOLTAGE	16	VOLTS
MAXIMUM NEGATIVE TETRODE GRID #2 VOLTAGE	20	VOLTS
MAXIMUM TETRODE GRID #2 CIRCUIT RESISTANCE	10	MEGOHMS
MAXIMUM TRIODE PLATE VOLTAGE	30	VOLTS
MAXIMUM TRIODE CATHODE CURRENT	20	MA.
MAXIMUM TRIODE GRID CIRCUIT RESISTANCE	10	MEGOHMS
MAXIMUM HEATER-CATHODE VOLTAGE	±30	VOLTS

*THIS TUBE IS INTENDED TO BE USED IN AUTOMOTIVE SERVICE FROM A NOMINAL 12 VOLT BATTERY SOURCE. THE HEATER IS THEREFORE DESIGNED TO OPERATE OVER THE 10.0 TO 15.9 VOLTAGE RANGE ENCOUNTERED IN THIS SERVICE. THE MAXIMUM RATINGS OF THE TUBE PROVIDE FOR AN ADEQUATE SAFETY FACTOR SUCH THAT THE TUBE WILL WITHSTAND THE WIDE VARIATION IN SUPPLY VOLTAGES.

CONTINUED ON FOLLOWING PAGE

→ INDICATES A CHANGE.

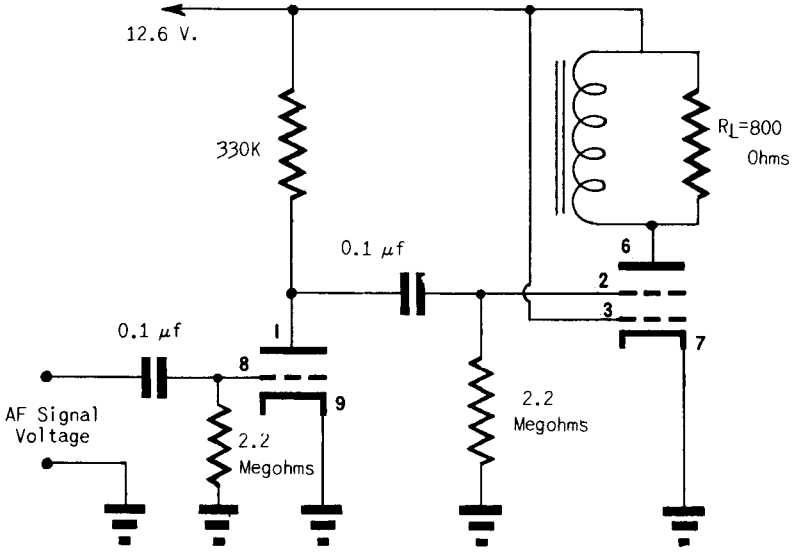
CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS
CLASS A_1 AMPLIFIER – SINGLE TUBE

	TRIODE		TETRODE	
HEATER VOLTAGE		12.6		VOLTS
HEATER CURRENT		0.55		AMP.
PLATE VOLTAGE	12.6		12.6	VOLTS
GRID #1 (SPACE-CHARGE GRID) VOLTAGE	---		12.6	VOLTS
CONTROL GRID VOLTAGE	-0.9[A]		-0.5[A]	VOLTS
PLATE CURRENT	0.5		40	MA.
GRID #1 (SPACE-CHARGE GRID) CURRENT	---		7.5	MA.
PLATE RESISTANCE	13 000		480	OHMS
AMPLIFICATION FACTOR	13		7.2[C]	
TRANSCONDUCTANCE	1 000		15 000[C]	μMHOS

RESISTANCE-COUPLED AMPLIFIER-SINGLE TUBE
(SEE CIRCUIT)

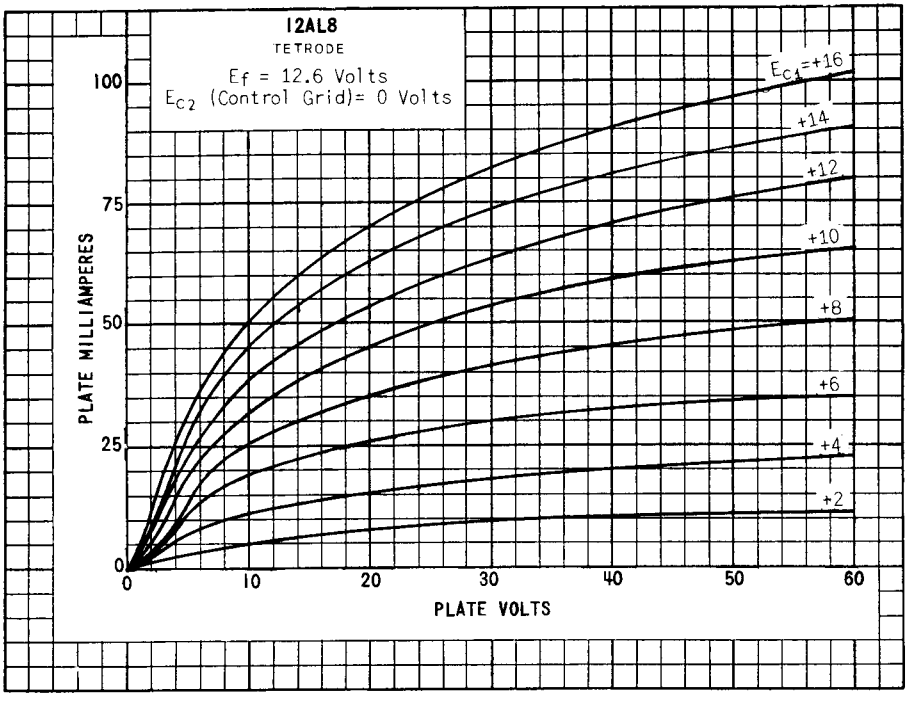
PLATE (SPACE-CHARGE GRID & HEATER) SUPPLY VOLTAGE	12.6	VOLTS
AF SIGNAL VOLTAGE	.18	VOLTS
PLATE CURRENT (TETRODE)	8.0[B]	MA.
GRID #1 (SPACE-CHARGE GRID) CURRENT	75	MA.
LOAD RESISTANCE (TETRODE)	800	OHMS
TOTAL HARMONIC DISTORTION	10	PERCENT
POWER OUTPUT	40	MW.

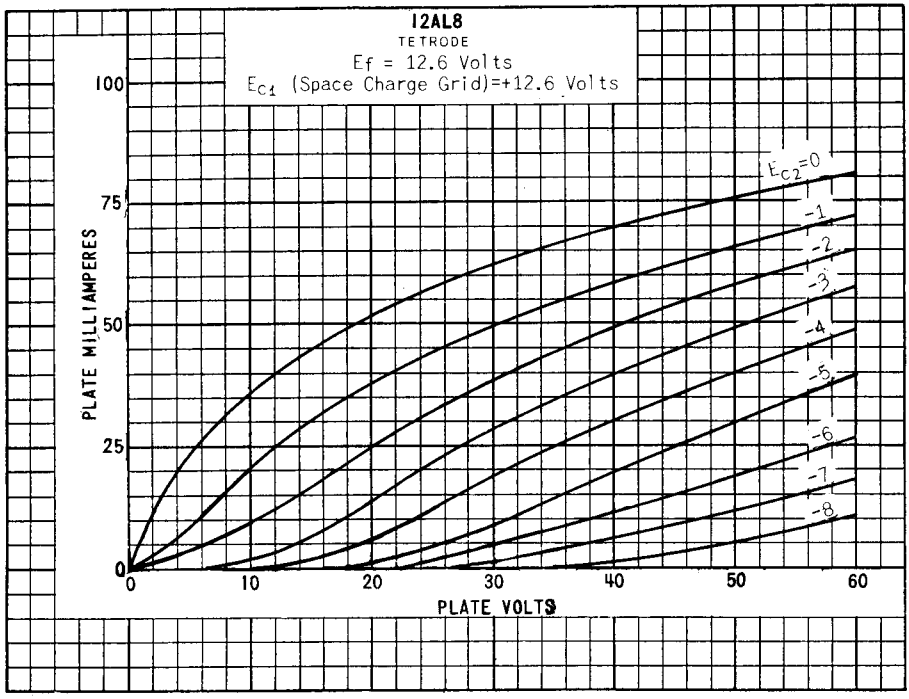


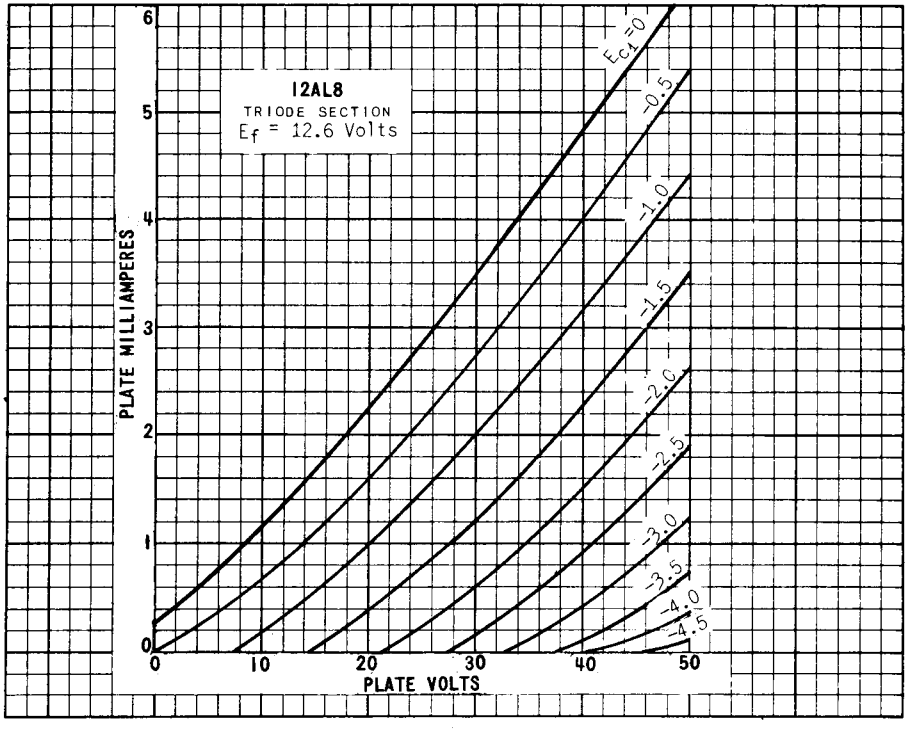
[A] AVERAGE BIAS DEVELOPED ACROSS A 2.2 MEGOHM GRID RESISTOR.

[B] ZERO-SIGNAL PLATE CURRENT IS APPROXIMATELY 40 MA BECAUSE BIAS IS OBTAINED BY GRID #2 RECTIFICATION.

[C] FROM GRID #2 TO PLATE.


12AL8
TETRODE
Ef = 12.6 Volts
Ec2 (Control Grid)= 0 Volts
PLATE MILLIAMPERES
PLATE VOLTS
0
25
50
75
100
0
10
20
30
40
50
60
Ec1=+16
+14
+12
+10
+8
+6
+4
+2


12AL8
TETRODE
Ef = 12.6 Volts
Ec1 (Space Charge Grid)=+12.6 Volts
PLATE MILLIAMPERES
PLATE VOLTS
0
25
50
75
100
0
10
20
30
40
50
60
Ec2=0
-1
-2
-3
-4
-5
-6
-7
-8


12AL8
TRIODE SECTION
E_f = 12.6 Volts
PLATE MILLIAMPERES
PLATE VOLTS
0
1
2
3
4
5
6
0
10
20
30
40
50
E_{c1} = 0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5