

Intended for use up to ultrahigh frequencies. It features low noise, high transconductance, and low inter-electrode capacitances.

The frame grid, described in Section A, with a lateral wire diameter of only .0065 mm provides high broad-band qualities and freedom from microphonics.

COLD CAPACITANCES (without external shield)

Grid No 1 to Plate	max. .05	$\mu\mu\text{F}$
Input	7.0	$\mu\mu\text{F}$
Output	2.5	$\mu\mu\text{F}$

RANGE VALUES FOR CAPACITANCES (external shield connected to cathode)

	MIN	MAX	
Grid No 1 to Plate		.04	$\mu\mu\text{F}$
Input	6.6	7.8	$\mu\mu\text{F}$
Output	2.9	3.4	$\mu\mu\text{F}$

ABSOLUTE MAXIMUM RATINGS

Plate Voltage	200	volts
Grid No 2 Voltage	165	volts
Grid No 1 Voltage, positive value	+ 0	volt
Grid No 1 Voltage, negative value	— 25	volts
Cathode Current	40	ma
Plate Dissipation	3.3	watts
Grid No 2 Dissipation (see Section A)	.85	watt
Heater — Cathode Voltage	55	volts
Bulb Temperature, at hottest point	150	°C
Grid No 1 Circuit Resistance		
with fixed bias	.05	Mohm
with cathode bias	.1	Mohm

MECHANICAL DATA

Base: Small Button Noval 9-pin,
RETMA E9-1

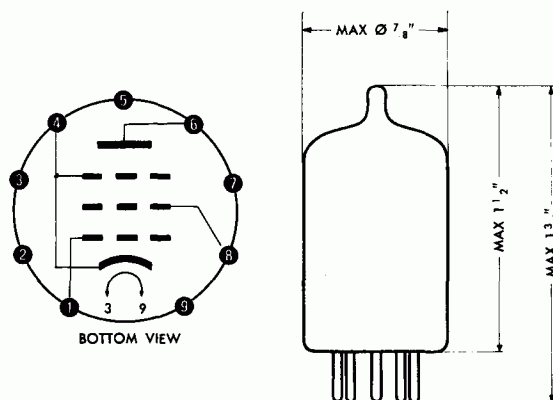
Bulb: EIA T 6½

Mounting Position: Any

PIN NO CONNECTED TO

1. Grid No 1
2. No Connection
3. Heater, Upper Int. Shield*
4. Cathode, Grid No 3, Lower Int. Shield
5. No Connection
6. Plate
7. No Connection
8. Grid No 2
9. Heater

*The internal shield connected to Pin No 3 should be grounded.



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404 A

RF AMPLIFIER PENTODE



TYPICAL OPERATION. CLASS A₁

Heater Voltage	6.3	6.3	volts
Heater Current	.3	.3	amp
Plate Supply Voltage	150	160	volts
Grid No 2 Supply Voltage	150	160	volts
Grid No 1 Supply Voltage		+ 8.5	volts
Cathode Bias Resistor	110	600	ohms
Plate Current	13.5	13.5	ma
Grid No 2 Current	4.0	4.0	ma
Transconductance	13,000	13,000	μmhos
Plate Resistance	.2	.2	megohm
Grid No 1 Voltage for Plate Current = 10 μa	— 4.5	— 4.5	volts
Equivalent Noise Resistance	500	500	ohms
Transit Time Loading at 100 Mc	100	100	μmhos
Input Conductance at 100 Mc	2000	2000	μmhos

FIGURE OF MERIT

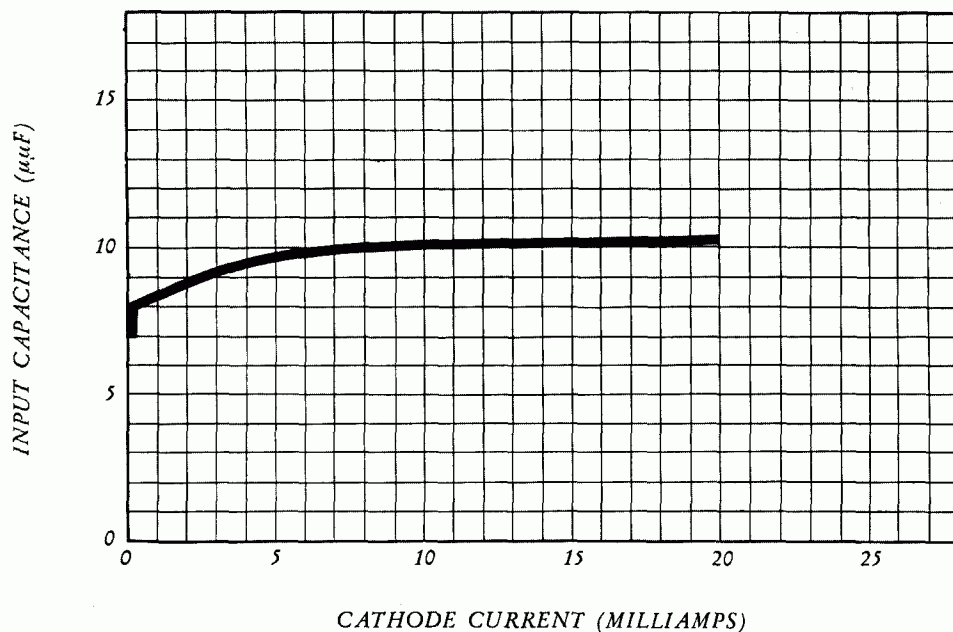
		Tube Cold	Typical operation*
At LF without external shield	$\frac{g_m}{C_{in} + C_{out}}$	1.37	.73
At IF without external shield	$\frac{g_m}{\sqrt{C_{in} \cdot C_{out}}}$	3.1	1.7

* The following additions have been made for tube sockets and wiring capacitances to get total circuit capacitances under typical operating conditions:
 At LF — 5 μμF. At IF — 3 μμF for input circuit and 2 μμF for output circuit.

OPERATION RANGE VALUES

Heater Voltage		6.3		volts
Plate Supply Voltage		150		volts
Grid No 2 Supply Voltage		150		volts
Cathode Bias Resistor		110		ohms
	MIN	AVE	MAX	
Heater Current	280	300	320	ma
Plate Current	9.0	13.5	18.0	ma
Grid No 2 Current		4.0	6.0	ma
Transconductance	10,000	13,000	16,000	μmhos
Transconductance, End of Life Point	8500			μmhos
I _{hk} at E _{hk} = ± 100 volts			20	μa
Grid No 1 Current			— .2	μa
Cutoff Plate Current at E _{c1} = — 10 volts			50	μa
Vibration Output		5		mv
Measured at 2.5 g and 25 cps. E _f = 6.3 v, E _{bb} = 150 v, E _{cc2} = 150 v, R _k = 110 ohms, C _k = 2000 μF, r _p = 2000 ohms.				

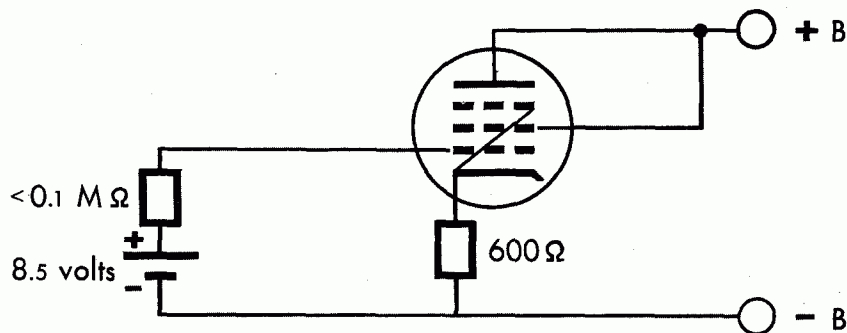
SPECIAL DATA



CAPACITANCES IN OPERATION:

Space-charge effects in electron current flow cause an increase in tube capacitances. Input capacitance as a function of cathode current is shown above.

For best value of figure of merit external shield should be excluded.



BIAS CONSIDERATIONS:

The operating characteristics of high transconductance tubes are sensitive to variations in manufacture. Because of this the use of a 600 ohm cathode resistance, in conjunction with a DC control grid return to a + 8.5 volt supply, is recommended.

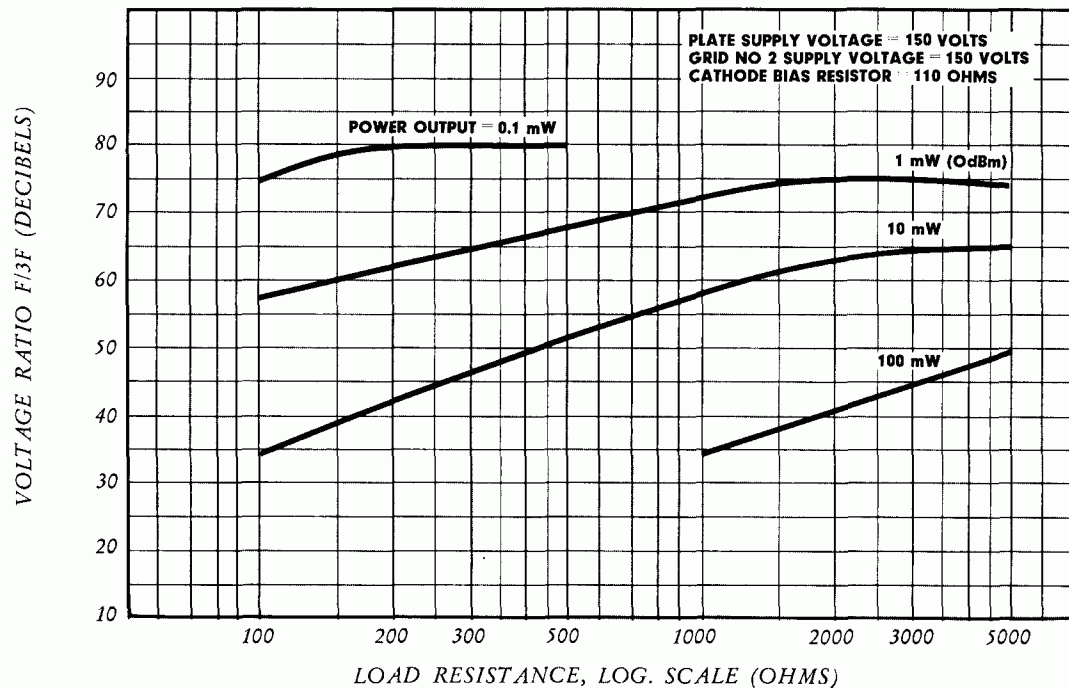
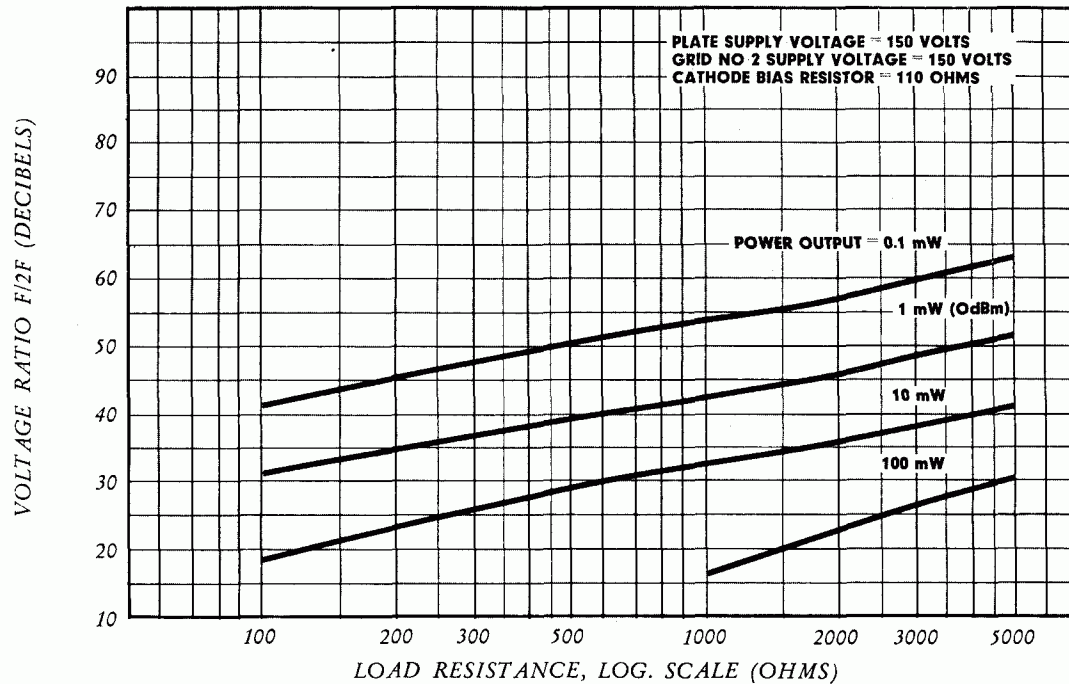
To prevent burning out grid wires by removal of plate voltage when the + 8.5 volt bias is still applied, a limiting resistor of 10,000 ohms in series with the bias supply is suggested. Where the use of such a resistor is not practical, care should be taken to see that the grid bias is not applied before the plate and grid No 2 voltages.

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HARMONIC DISTORTION:

The voltage ratio between fundamental frequency (F), second harmonic (2F) and third harmonic (3F) as a function of the load resistance at different power outputs under typical operating conditions is shown.



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AVERAGE CHARACTERISTICS

