Ericsson

TWIN TRIODE 2C51

396 A

Twin triode with separate cathodes suitable for use in amplifier, mixer, oscillator and multivibrator circuits. Useful frequency range extends from low frequencies to about 800 Mc.

COLD CAPACITANCES (without external shield)

Input, Each Section*	2.2	$\mu\mu$F
Output, Section 1*	1.0	$\mu\mu$F
Output, Section 2*	1.0	$\mu\mu$F
Plate to Grid, Each Section*	1.3	$\mu\mu$F
Plate to Plate, nominal	.05	$\mu\mu$F
Plate to Plate, maximum	.1	$\mu\mu$F

ABSOLUTE MAXIMUM RATINGS (each section)

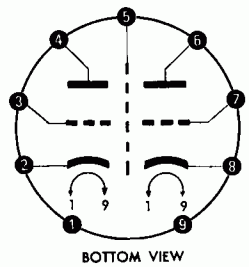
Plate Voltage	330	volts
Grid Voltage, positive value	+ 5	volts
Grid Voltage, negative value	— 50	volts
Cathode Current	20	ma
Plate Dissipation	1.6	watts
Heater — Cathode Voltage	100	volts
Bulb Temperature, at hottest point	160	°C
Grid Circuit Resistance		
with fixed bias	1	Mohm
with cathode bias	2	Mohms

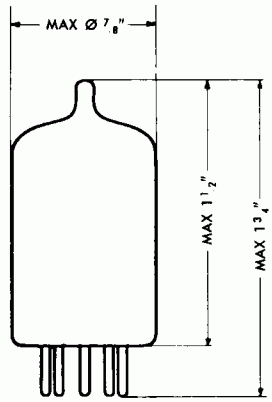
* Measured with internal shield and heater connected to cathode of section. Elements of other section grounded.

MECHANICAL DATA

Base: Small Button Noval 9-pin, RETMA E9-1
Bulb: EIA T 6½
Mounting Position: Any

PIN NO	CONNECTED TO
1.	Heater
2.	Cathode of Section 1
3.	Grid of Section 1
4.	Plate of Section 1
5.	Shield
6.	Plate of Section 2
7.	Grid of Section 2
8.	Cathode of Section 2
9.	Heater





2C51

396 A

TWIN TRIODE

TYPICAL OPERATION. CLASS A1. (each section)

Heater Voltage	6.3	6.3	volts
Heater Current	.3	.3	amp
Plate Supply Voltage	130	150	volts
Cathode Bias Resistor	200	240	ohms
Plate Current	7.6	8.2	ma
Transconductance	5400	5500	μmhos
Amplification Factor	35	35	
Plate Resistance	6500	6400	ohms
Grid Voltage for Plate Current = 10 μa	— 6	— 7	volts
Equivalent Noise Resistance	500	500	ohms
Input Conductance at 100 Mc	130	130	μmhos

TYPICAL OPERATION. CLASS AB1

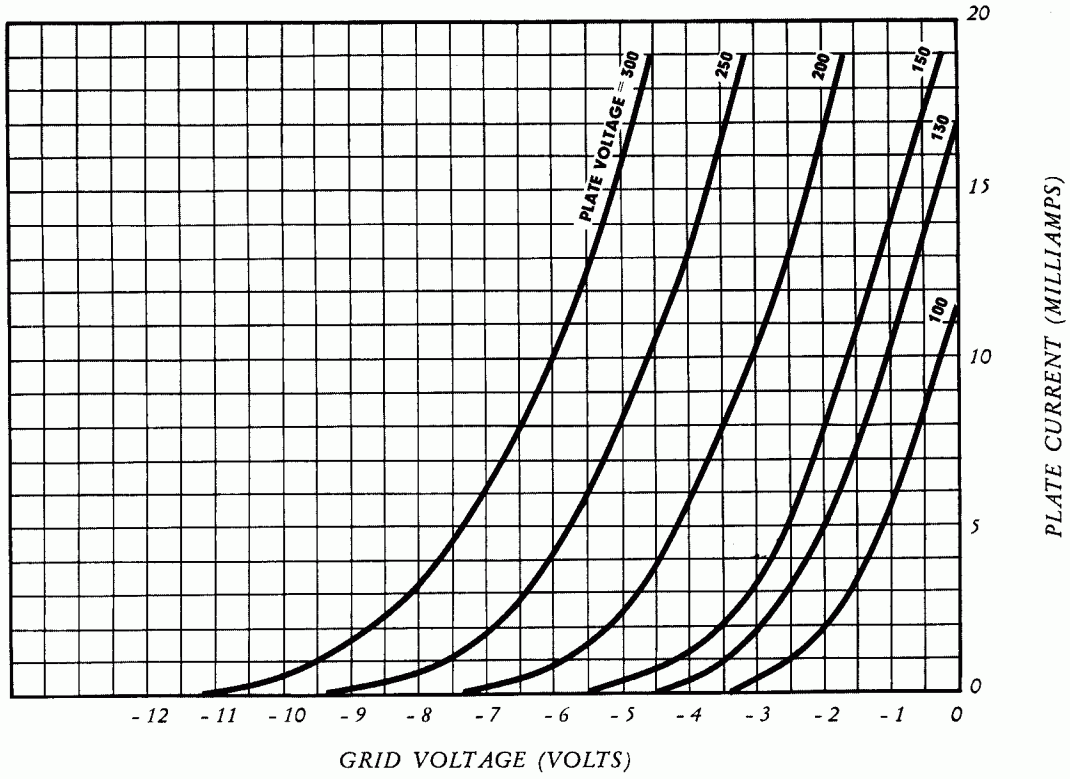
Plate Supply Voltage	300	volts
Cathode Bias Resistor	800	ohms
RMS AF Grid to Grid Voltage	14	volts
Zero Signal Plate Current, Each Section	4.9	ma
Max. Signal Plate Current, Each Section	6.3	ma
Load Impedance, Plate to Plate	40,000	ohms
Total Harmonic Distortion	10	%
Max. Signal Power Output	1.0	watt

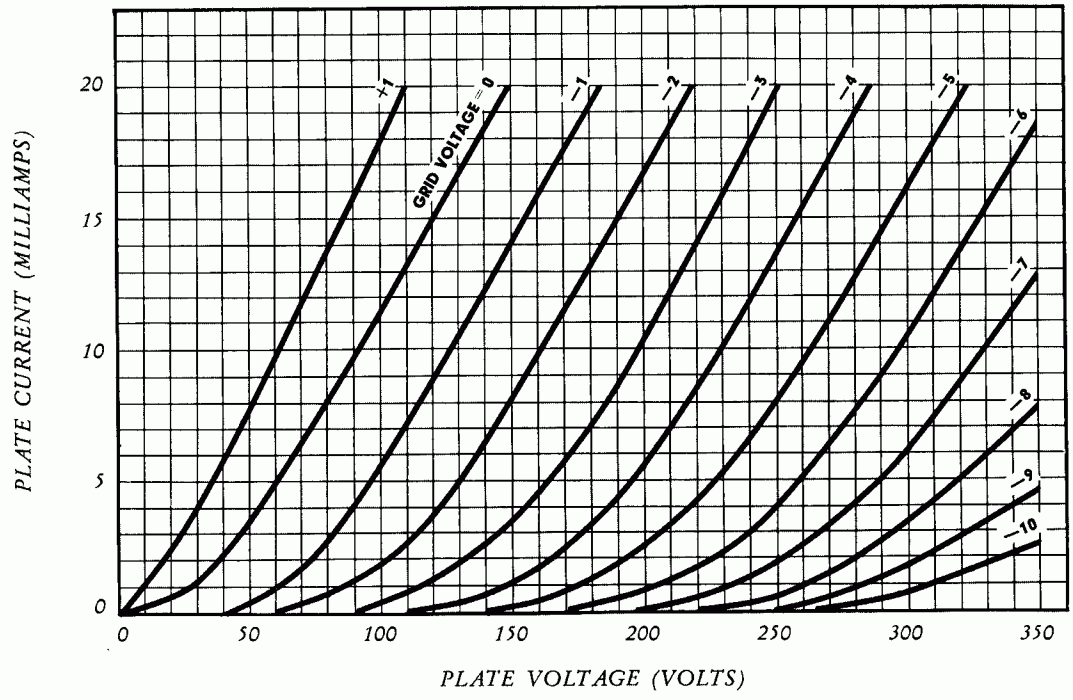
OPERATION RANGE VALUES (each section)

Heater Voltage		6.3		volts
Plate Supply Voltage		130		volts
Cathode Bias Resistor		200		ohms
	MIN	AVE	MAX	
Heater Current	280	300	320	ma
Plate Current	5.2	7.6	10.0	ma
Transconductance	4200	5400	6600	μmhos
Transconductance, End of Life Point	3600			μmhos
I_{hk} at E_{hk} = ± 100 volts			20	μa
Grid Current			— .05	μa
Cutoff Plate Current at E_{c1} = — 10 volts			75	μa
Vibration Output		5		mv
Measured at 2.5 g and 25 cps with both sections in parallel E_f = 6.3 v, E_b = 150 v, E_{c1} = — 3 v, r_p = 2000 ohms.				

Edition 1

AVERAGE CHARACTERISTICS



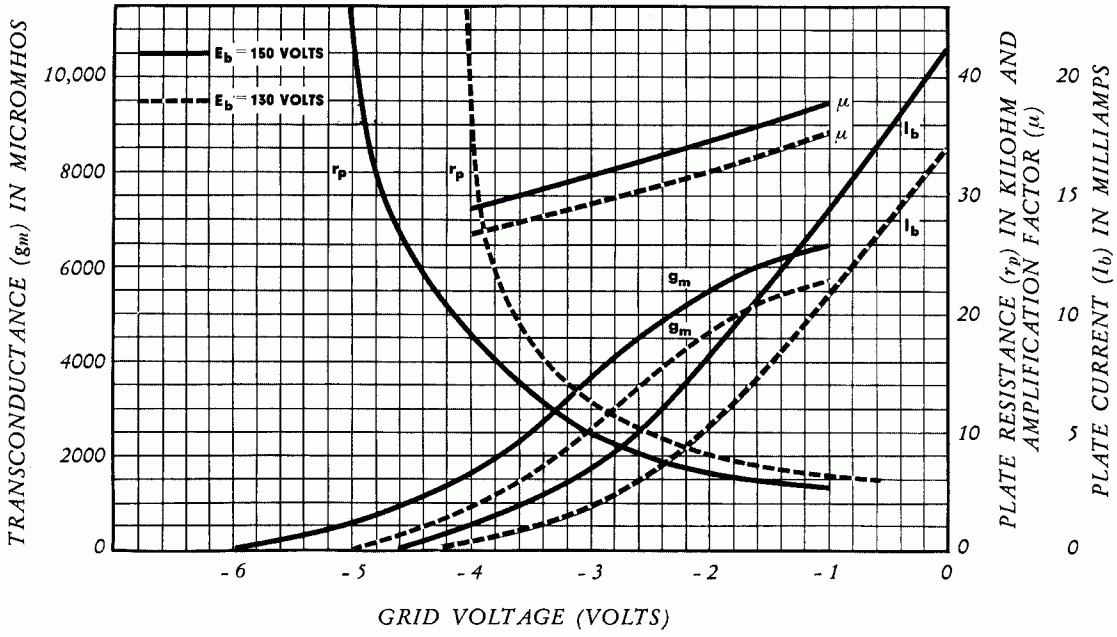


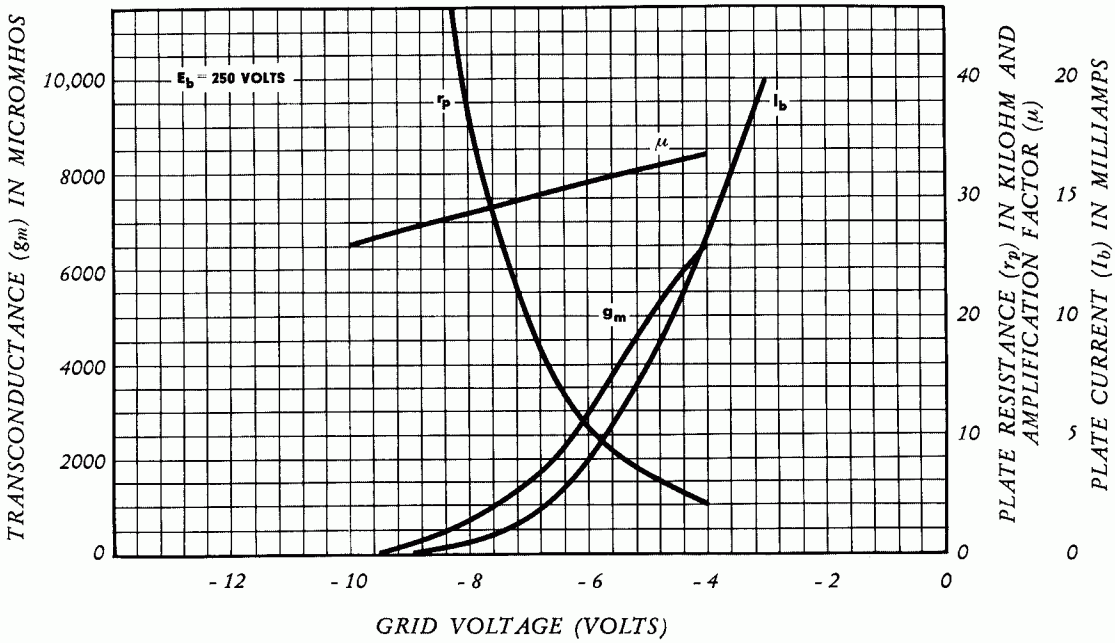
2C51

TWIN TRIODE

396 A

AVERAGE CHARACTERISTICS





RF AMPLIFIER TETRODE

6CY5
CATV

6CY5/CATV is an especially developed longlife version of 6CY5. It is a sharp-cutoff tetrode of 7-pin miniature type, intended for reliable service within the wide range of amplifiers and other equipment used for CATV purposes.

COLD CAPACITANCES (external shield connected to cathode)

Grid No 1 to Plate	0.03	$\mu\mu$F
Input	4.5	$\mu\mu$F
Output	3.0	$\mu\mu$F

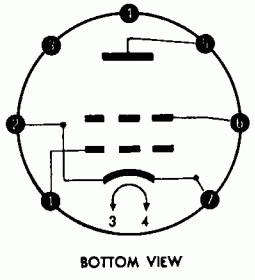
ABSOLUTE MAXIMUM RATINGS

Plate Voltage	200	volts
Grid No 2 Voltage	200	volts
Grid No 1 Voltage, Positive Value	5	volts
Grid No 1 Voltage, Negative Value	50	volts
Plate Dissipation	2.2	watts
Grid No 2 Dissipation (see Section A)	0.55	watt
Cathode Current	22	ma
Heater-Cathode Voltage	100	volts
Grid No 1 Circuit Resistance	0.5	megohm

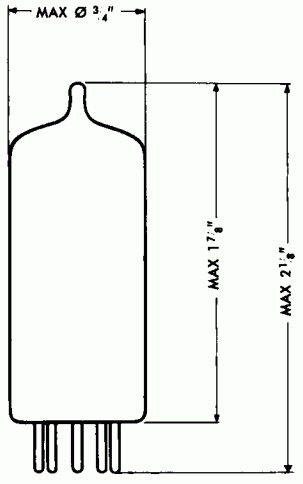
MECHANICAL DATA

Base: Small Button Miniature 7-pin, RETMA E7-1
Bulb: EIA T 5½
Mounting Position: Any

PIN NO. CONNECTED TO
1. Grid No 1
2. Cathode, Int. Shield
3. Heater
4. Heater
5. Plate
6. Grid No 2
7. Cathode, Int. Shield



BOTTOM VIEW



6CY5
CATV

RF AMPLIFIER TETRODE

Ericsson LM

TYPICAL OPERATION

Heater Voltage**	6.3	volts
Heater Current	200	ma
Plate Voltage	125	volts
Grid No 2 Voltage	80	volts
Grid No 1 Voltage	— 1	volt
Plate Current	10	ma
Grid No 2 Current	1.5	ma
Transconductance	8000	μmhos
Plate Resistance	0.1	Mohm
Grid No 1 Voltage for I_b = 20 μA	— 6	volts

OPERATION RANGE VALUES

Heater Voltage		6.3		volts
Plate Supply Voltage		125		volts
Grid No 2 Supply Voltage		80		volts
Grid No 1 Voltage*		— 1		volts
	MIN	AVE	MAX	
Heater Current	185	200	215	ma
Plate Current	6.5	10.0	16.0	ma
Grid No 2 Current		1.5	2.5	ma
Transconductance	6300	8000	10200	μmhos
Transconductance, End of Life Point	5200			μmhos
I_{hk} at E_{hk} = ± 100 volts			20	μa
Grid No 1 Current			— .5	μa
Measured at E_b = 125 V				
E_{c2} = 125 V E_{c1} = — 1,5 V				
R_{g1} = 0,5 Mohms				
Cutoff Plate Current at E_{c1} = — 6 volts			200	μa

Edition 1
Printed in Sweden
GRAFISK REKLAM/RELIEFTRYCK AB STHLM 66

RF AMPLIFIER TETRODE

6EV5 CATV

6EV5/CATV is an especially developed longlife version of 6EV5. It is a sharp-cutoff tetrode of 7-pin miniature type, intended for reliable service within the wide range of amplifiers and other equipment used for CATV purposes.

COLD CAPACITANCES (external shield connected to cathode)

Grid No 1 to Plate	0.025	$\mu\mu$F
Input	4.4	$\mu\mu$F
Output	2.6	$\mu\mu$F

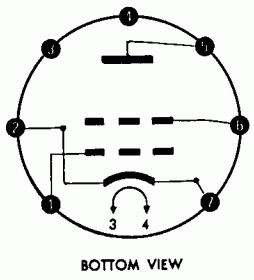
ABSOLUTE MAXIMUM RATINGS

Plate Voltage	300	volts
Grid No 2 Voltage	200	volts
Grid No 1 Voltage, Positive Value	5	volts
Grid No 1 Voltage, Negative Value	50	volts
Plate Dissipation	3.5	watts
Grid No 2 Dissipation (see Section A)	0.25	watt
Cathode Current	22	ma
Heater-Cathode Voltage	100	volts
Grid No 1 Circuit Resistance	0.5	megohm

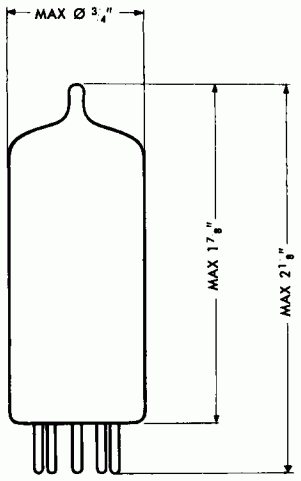
MECHANICAL DATA

Base: Small Button Miniature 7-pin, RETMA E7-1
Bulb: EIA T 5½
Mounting Position: Any

PIN NO.	CONNECTED TO
1.	Grid No 1
2.	Cathode, Int. Shield
3.	Heater
4.	Heater
5.	Plate
6.	Grid No 2
7.	Cathode, Int. Shield



BOTTOM VIEW



6EV5

CATV

RF AMPLIFIER TETRODE

TYPICAL OPERATION

Heater Voltage	6.3	volts
Heater Current	200	ma
Plate Voltage	250	volts
Grid No 2 Voltage	80	volts
Grid No 1 Voltage	— 1	volt
Plate Current	11.5	ma
Grid No 2 Current	0.9	ma
Transconductance	8800	μmhos
Plate Resistance	0.15	Mohm
Grid No 1 Voltage for Gm = 100 μmhos	— 4.5	volts

OPERATION RANGE VALUES

Heater Voltage		6.3		volts
Plate Supply Voltage		250		volts
Grid No 2 Supply Voltage		80		volts
Grid No 1 Voltage		— 1		volts
	MIN	AVE	MAX	
Heater Current	185	200	215	ma
Plate Curren	8.0	11.5	14.0	ma
Grid No 2 Current		0.9	1.8	ma
Transconductance	7000	8800	11000	μmhos
Transconductance, End of Life Point	5750			μmhos
I_{hk} at E_{hk} = ± 100 volts			20	μa
Grid No 1 Current			— .5	μa
Cutoff Plate Current at E_{c1} = — 6 volts			200	μa

Edition 1
Printed in Sweden
GRAFISK REKLAM/RELIEFTRYCK AB, STHLM 67

TWIN TRIODE 407A

Twin triode with separate cathodes suitable for use in amplifier, mixer, oscillator and multivibrator circuits. Useful frequency range extends from low frequencies to about 800 Mc.

COLD CAPACITANCES (without external shield)

Input, Each Section*	2.2	$\mu\mu$F
Output, Section 1*	1.0	$\mu\mu$F
Output, Section 2*	1.0	$\mu\mu$F
Plate to Grid, Each Section*	1.3	$\mu\mu$F
Plate to Plate, nominal	.05	$\mu\mu$F
Plate to Plate, maximum	.1	$\mu\mu$F

ABSOLUTE MAXIMUM RATINGS (each section)

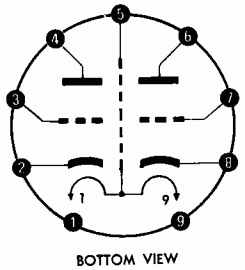
Plate Voltage	330	volts
Grid Voltage, positive value	+ 5	volts
Grid Voltage, negative value	— 50	volts
Cathode Current	20	ma
Plate Dissipation	1.6	watts
Heater — Cathode Voltage	130	volts
Bulb Temperature, at hottest point	160	°C
Grid Circuit Resistance		
with fixed bias	1	Mohm
with cathode bias	2	Mohms

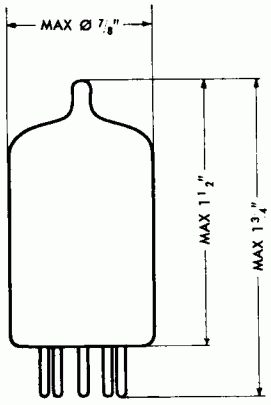
* Measured with internal shield and heater connected to cathode of section. Elements of other section grounded.

MECHANICAL DATA

Base: Small Button Noval 9-pin, RETMA E9-1
Bulb: EIA T 6½
Mounting Position: Any

PIN NO	CONNECTED TO
1.	Heater
2.	Cathode of Section 1
3.	Grid of Section 1
4.	Plate of Section 1
5.	Shield and Heater Tap
6.	Plate of Section 2
7.	Grid of Section 2
8.	Cathode of Section 2
9.	Heater





407A TWIN TRIODE

TYPICAL OPERATION. CLASS A1. (each section)

Heater Voltage (Pins 1 & 9 to Pin 5)	20.0	20.0	volts
Heater Current	.1	.1	amp
Heater Voltage (Pin 1 to Pin 9)	40.0	40.0	volts
Heater Current	.05	.05	amp
Plate Supply Voltage	130	150	volts
Cathode Bias Resistor	200	240	ohms
Plate Current	7.6	8.2	ma
Transconductance	5400	5500	μmhos
Amplification Factor	35	35	
Plate Resistance	6500	6400	ohms
Grid Voltage for Plate Current = 10 μa	— 6	— 7	volts
Equivalent Noise Resistance	500	500	ohms
Input Conductance at 100 Mc	130	130	μmhos

TYPICAL OPERATION. CLASS AB1

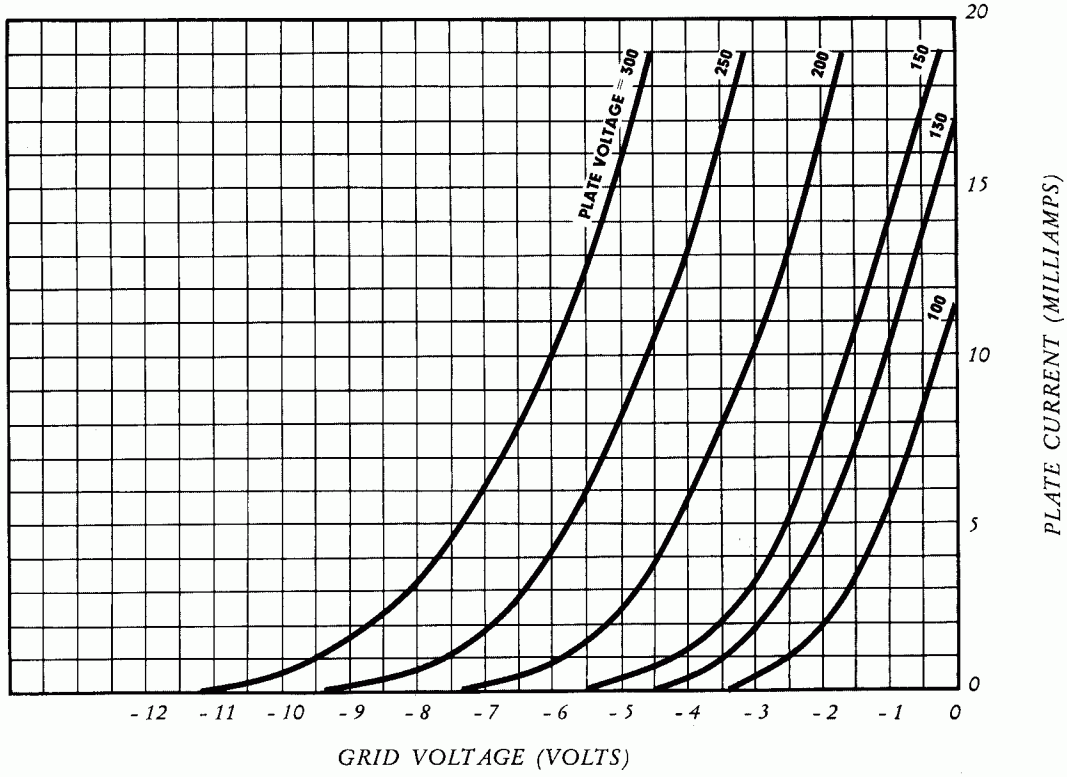
Plate Supply Voltage	300	volts
Cathode Bias Resistor	800	ohms
RMS AF Grid to Grid Voltage	14	volts
Zero Signal Plate Current, Each Section	4.9	ma
Max. Signal Plate Current, Each Section	6.3	ma
Load Impedance, Plate to Plate	40,000	ohms
Total Harmonic Distortion	10	%
Max. Signal Power Output	1.0	watt

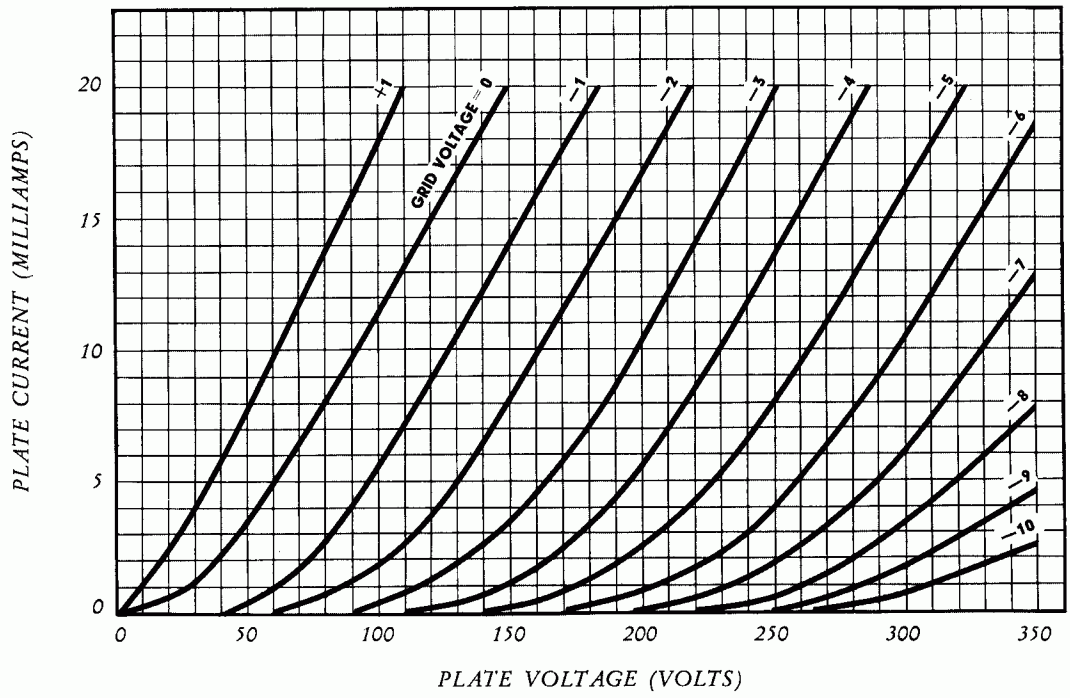
OPERATION RANGE VALUES (each section)

Heater Voltage		20.0		volts
Plate Supply Voltage		150		volts
Cathode Bias Resistor		240		ohms
	MIN	AVE	MAX	
Heater Current	90	100	110	ma
Plate Current	5.9	8.2	10.0	ma
Transconductance	4500	5500	6500	μmhos
Transconductance, End of Life Point	3700			μmhos
I_{hk} at E_{hk} = ± 100 volts			20	μa
Grid Current			−.05	μa
Cutoff Plate Current at E_{c1} = — 10 volts			75	μa
Vibration Output		5		mv
Measured at 2.5 g and 25 cps with both sections in parallel. E_f = 40.0 v, E_b = 150 v, E_{c1} = — 3 v, r_p = 2000 ohms.				

TWIN TRIODE 407A

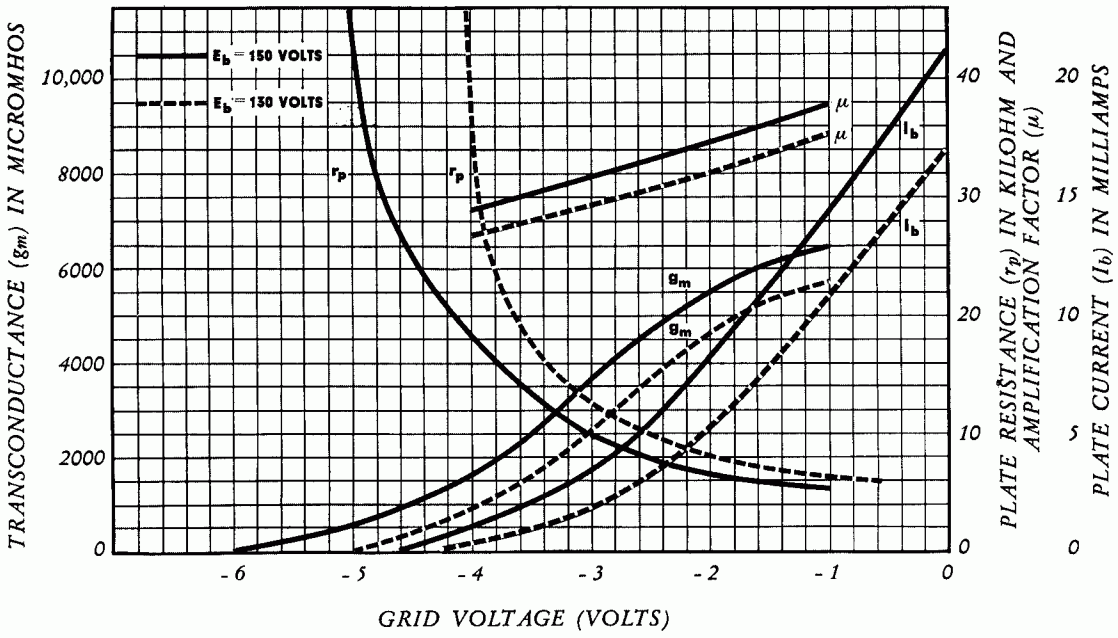
AVERAGE CHARACTERISTICS

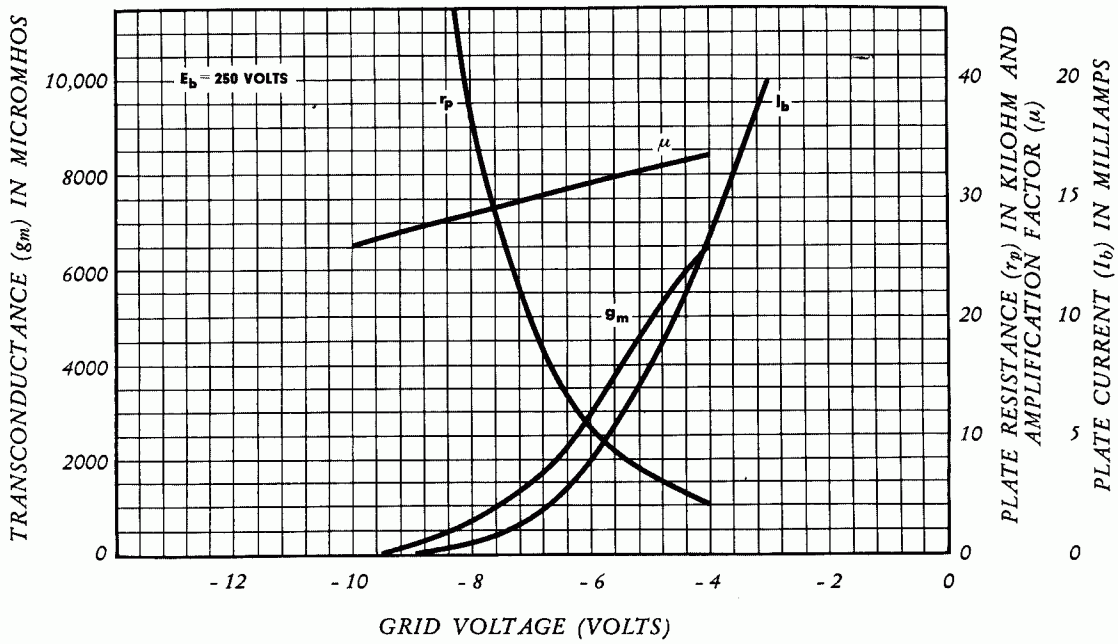




407A TWIN TRIODE

AVERAGE CHARACTERISTICS





MICROWAVE TRIODE 416B

Planar triode for use as microwave amplifier, mixer and oscillator at frequencies of about 4000 Mc. High transconductance gives the tube a superior figure of merit. Exceptionally low noise factor makes it particularly suitable as a pre-amplifier at very high frequencies ranging from 200 Mc to 4000 Mc.
The frame grid, which is similar in principle to that described in Section A, has a lateral wire diameter of only .0065 mm.

CAPACITANCES

Grid to Plate, cold tube	1.5	$\mu\mu$F
Grid to Shell*, cold tube	10	$\mu\mu$F
Grid to Shell*, E_f = 6.1 v, E_{f_1} = O v	9	$\mu\mu$F
Plate to Shell*, cold tube	.02	$\mu\mu$F
Cathode to Shell, cold tube	45	$\mu\mu$F

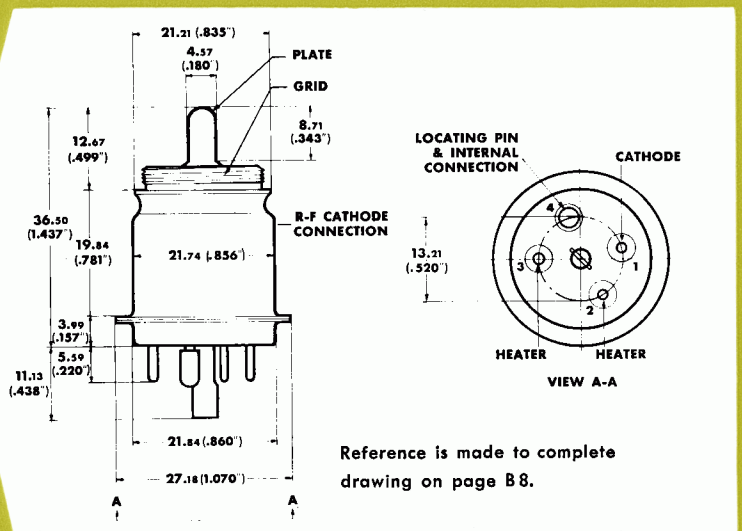
* Cathode connected to Shell through "cathode to shell" capacitance.

ABSOLUTE MAXIMUM RATINGS

Plate Voltage	270	volts
Grid Voltage, positive value	+ 1.5	volts
Grid Voltage, negative value	— 15	volts
Plate Current	33	ma
Grid Current	15	ma
Plate Dissipation	7.5	watts
Heater — Cathode Voltage	45	volts
Plate Seal Temperature	150	°C
Grid Seal Temperature	100	°C

MECHANICAL DATA

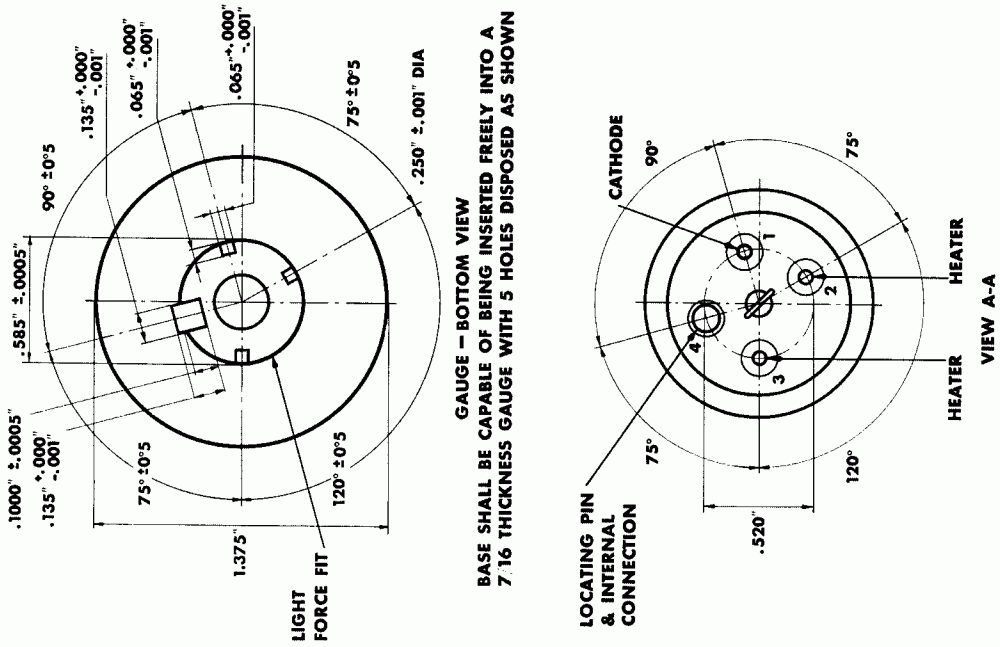
Base: See drawing
Dimensions: See drawing
Mounting Position: Any
Socket: KS 14134

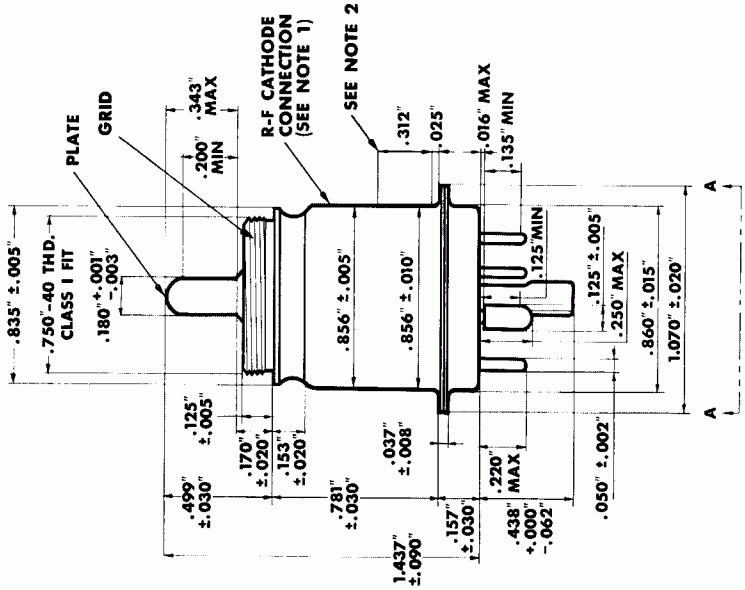


Reference is made to complete drawing on page B 8.

416B MICROWAVE TRIODE

MECHANICAL DATA





NOTE 1: Surfaces of R-F cathode, grid, anode and pin connections are gold plated.

NOTE 2: .856" ± .010" dimension applies only over the .312" length.

MICROWAVE TRIODE 416B

ELECTRICAL DATA

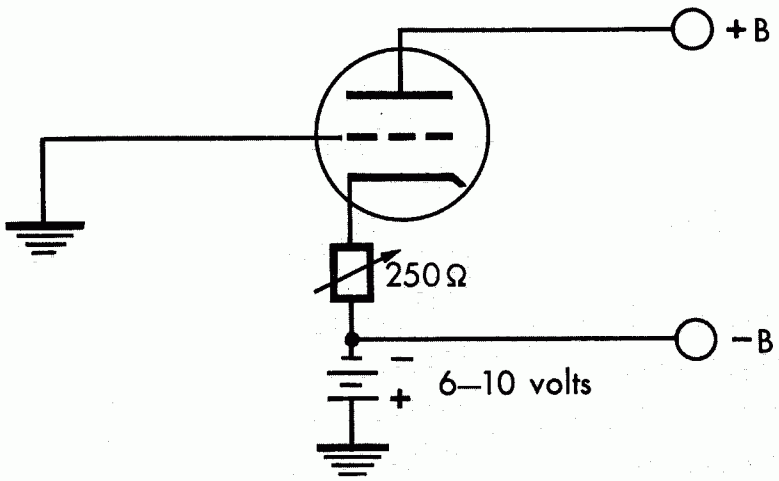
Heater Voltage	6.3	volts
Heater Current	1.18	amps
Amplification Factor	300	
Transconductance at Plate Current = 30 ma	50,000	μmhos
Noise Figure at 500 Mc	below 6	db

TYPICAL OPERATION

Heater Voltage		6.1	volts
Heater Current		1.15	amps
Plate Voltage		200	volts
Bias Circuit — see Diagram			
Frequency		4200	Mc
Gain:	MIN	AVE	
High Level (500 mw Output)	3	6	db
Low Level (50 mw Output)	8	10	db
Band Width (3 dB down)		100	Mc

SPECIAL DATA

RECOMMENDED GRID BIAS



416B MICROWAVE TRIODE

HEATER VOLTAGE

The bogie value of heater voltage is 6.3 volts. For optimum tube life, however, the heater voltage should be kept as close as possible to 6.1 volts and should not under any condition fall below 6.0 or exceed 6.6 volts.

TUBE TEMPERATURE

Sufficient conduction and convection cooling must be provided to limit the grid and plate temperatures under all operating conditions to:

Grid Terminal	max. 100° C
Anode Terminal	max. 150° C

When using the 416B in a closed cavity it is recommended that cooling air be admitted through the tube cavity to the anode terminal. Normal temperature ranges are:

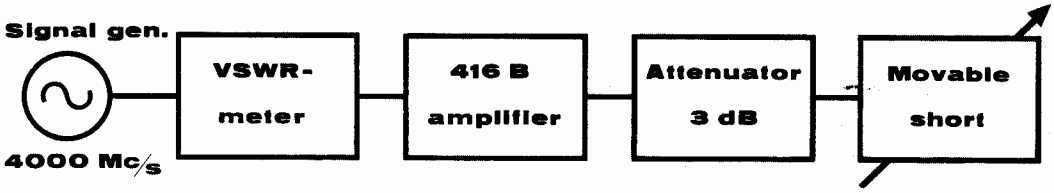
Tube Shell	55 ± 10° C
Grid Terminal	35 ± 10° C
Anode Terminal	85 ± 10° C

TESTING

Owing to the fact that the 416B will start to oscillate at a plate current of 2 ma in test circuits, where high unbypassed resistances can not be used, it is strongly recommended that the tube be tested by inserting it into a properly designed cavity with forced air cooling.

INPUT IMPEDANCE

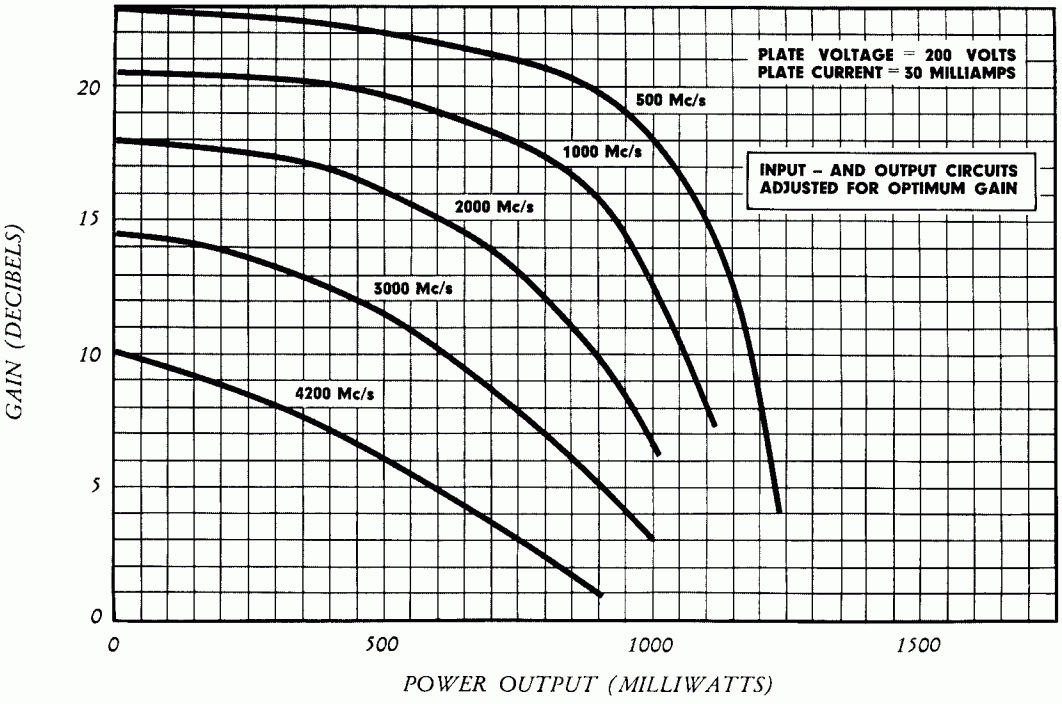
416B has an extremely high amplification factor. This means for example that the isolation is high between the input and output circuit which is an important feature when several RF-amplification stages are used in cascade. In the application shown the maximum input standing wave ratio was measured when the position of a movable short in the output line was varied through all phases. It was found that the maximum voltage standing wave ratio can be expected not to exceed 1.60.

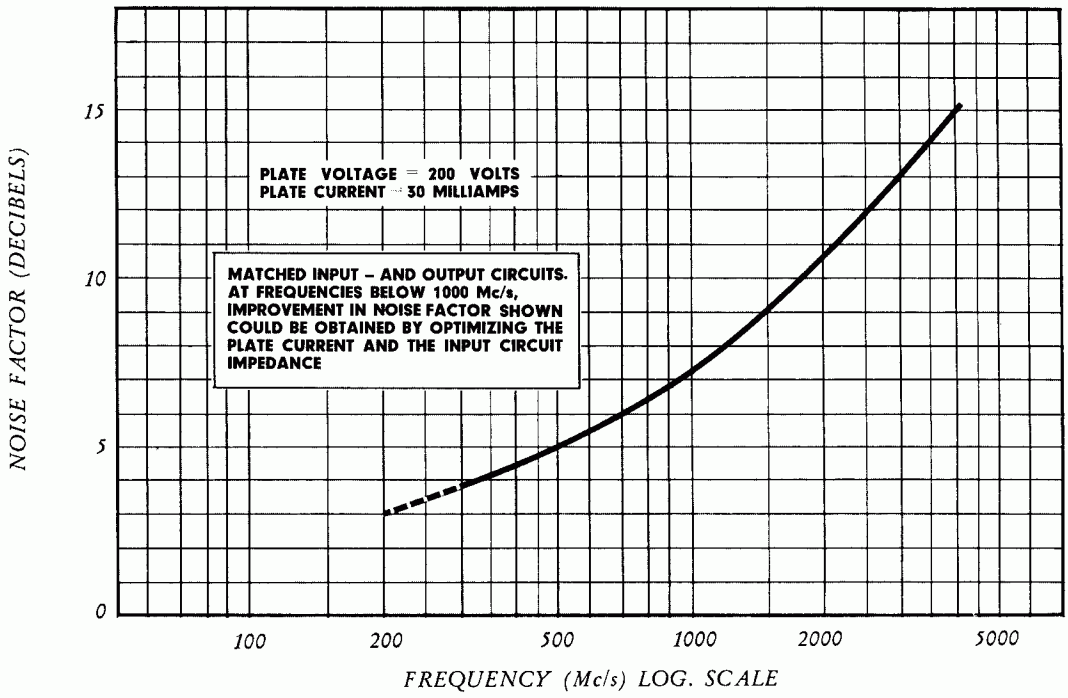


Edition 1

MICROWAVE TRIODE 416B

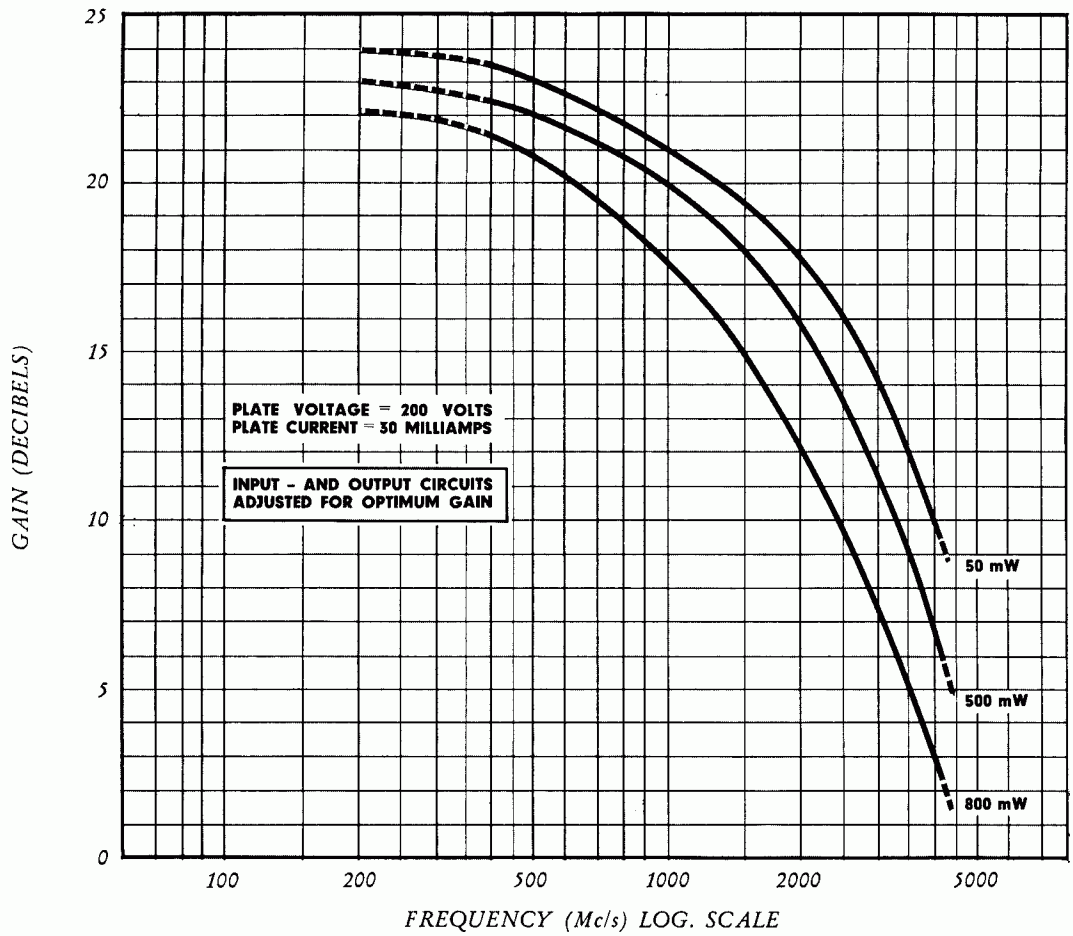
AVERAGE CHARACTERISTICS





416B MICROWAVE TRIODE

AVERAGE CHARACTERISTICS



RF AMPLIFIER PENTODE 5590

401 A

Especially designed for use at low supply voltages. At a Plate and Grid No 2 voltage of only 45 volts the transconductance is 1900 micromhos at a grid bias of approx. —1.5 volt. Operation range extends from low to very high frequencies.

COLD CAPACITANCES (external shield connected to cathode)

Grid No 1 to Plate	max. .02	$\mu\mu$F
Input	3.4	$\mu\mu$F
Output	2.9	$\mu\mu$F

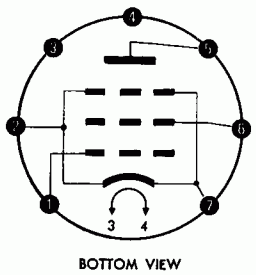
ABSOLUTE MAXIMUM RATINGS

Plate Voltage	200	volts
Grid No 2 Voltage	155	volts
Grid No 1 Voltage, positive value	+ 5	volts
Grid No 1 Voltage, negative value	— 50	volts
Cathode Current	20	ma
Plate Dissipation	1.85	watts
Grid No 2 Dissipation (see Section A)	.55	watt
Heater — Cathode Voltage	100	volts
Bulb Temperature, at hottest point	150	°C
Grid No 1 Circuit Resistance		
with fixed bias	1.0	Mohm
with cathode bias	2.0	Mohms

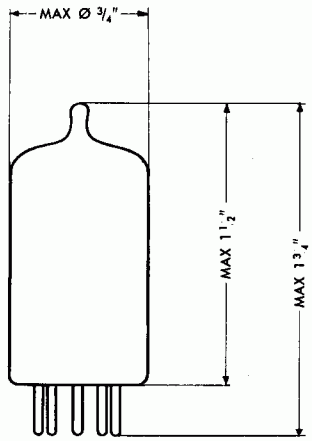
MECHANICAL DATA

Base: Small Button Miniature 7-pin, RETMA E7-1
Bulb: EIA T 5½
Mounting Position: Any

PIN NO.	CONNECTED TO
1.	Grid No 1
2.	Cathode, Grid No 3, Int. Shield
3.	Heater
4.	Heater
5.	Plate
6.	Grid No 2
7.	Cathode, Grid No 3, Int. Shield



BOTTOM VIEW



5590

401 A

RF AMPLIFIER PENTODE

Ericsson

TYPICAL OPERATION. CLASS A1

Heater Voltage	6.3	6.3	6.3	volts
Heater Current	.15	.15	.15	amp
Plate Supply Voltage	45	90	120	volts
Grid No 2 Supply Voltage	45	90	120	volts
Cathode Bias Resistor	390	820	1000	ohms
Plate Current	2.7	3.9	5.0	ma
Grid No 2 Current	.8	1.2	1.5	ma
Transconductance	1900	2000	2200	μmhos
Plate Resistance	.3	.45	.5	Mohm
Grid No 1 Voltage for Plate Current = 10 μa	— 5	— 10	— 14	volts

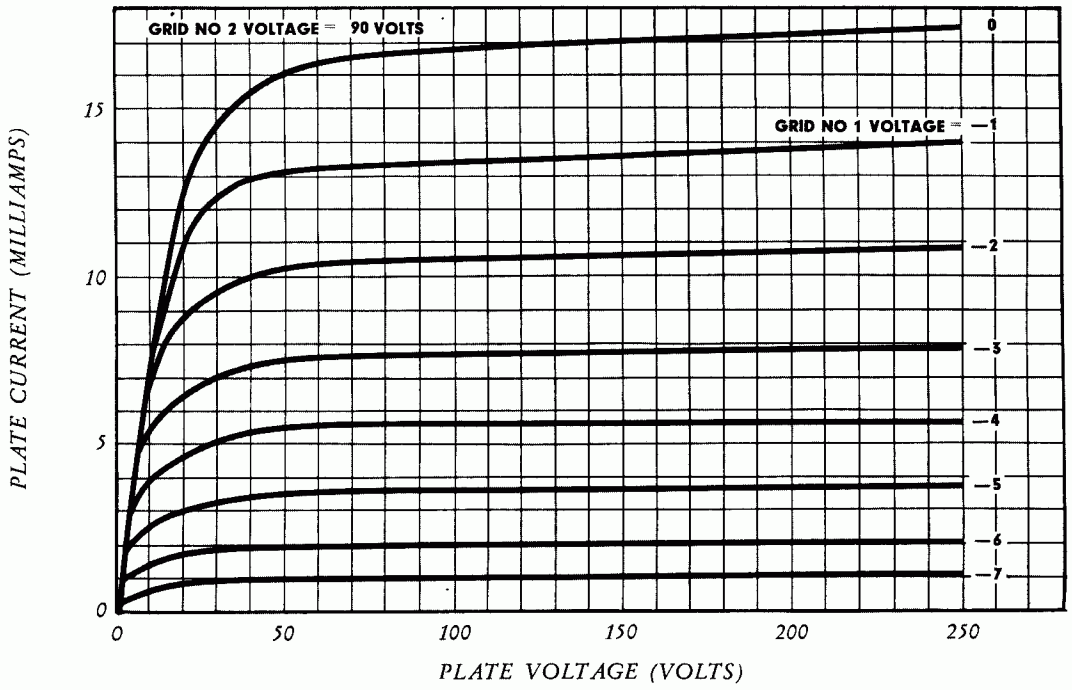
OPERATION RANGE VALUES

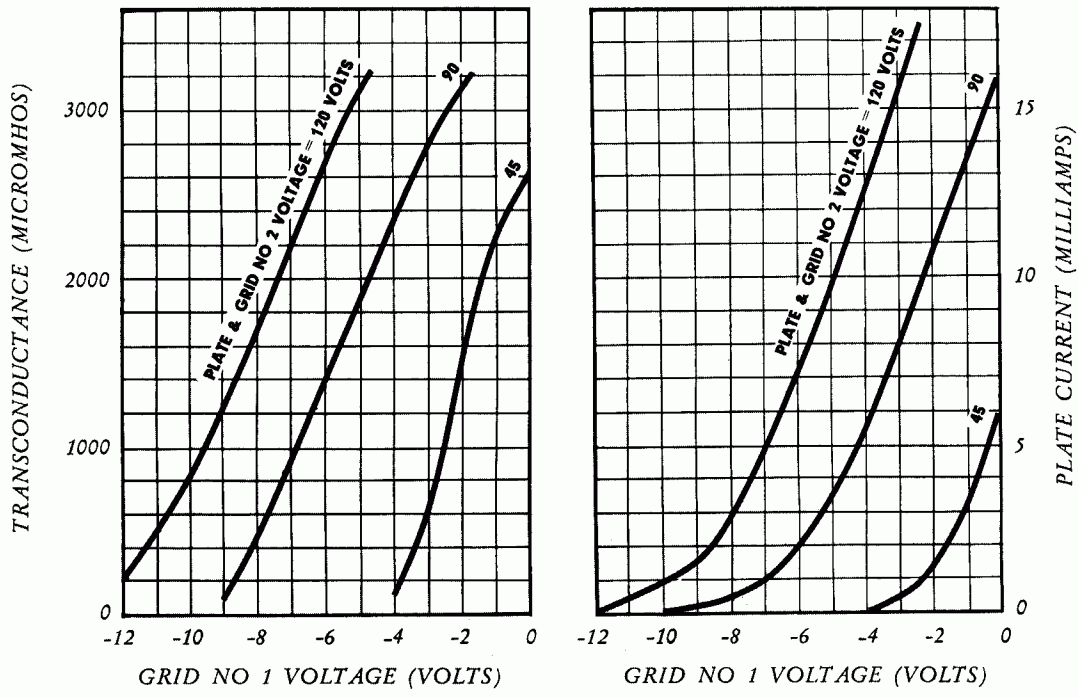
Heater Voltage		6.3		volts
Plate Supply Voltage		90		volts
Grid No 2 Supply Voltage		90		volts
Cathode Bias Resistor		820		ohms
	MIN	AVE	MAX	
Heater Current	135	150	165	ma
Plate Current	2.5	3.9	5.5	ma
Grid No 2 Current		1.2	2.0	ma
Transconductance	1500	2000	2500	μmhos
Transconductance, End of Life Point	1300			μmhos
I_{hk} at E_{hk} = ± 100 volts			20	μa
Grid No 1 Current			–.1	μa
Cutoff Plate Current at E_{c1} = — 15 volts			50	μa
Vibration Output		10		mv
Measured at 2.5 g and 25 cps. E_f = 6.3 v, E_{bb} = 90 v, E_{cc2} = 90 v, R_k = 820 ohms, C_k = 2000 μF, r_p = 2000 ohms.				

RF AMPLIFIER PENTODE 5590

401 A

AVERAGE CHARACTERISTICS





Ericsson

RF AMPLIFIER PENTODE 5591

403 B

For use as RF amplifier and broadband amplifier. Within its ratings the 5591/403B is an excellent longlife replacement for types 5654 and 6AK5.

COLD CAPACITANCES (external shield connected to cathode)

	MIN	AVE	MAX	
Grid No 1 to Plate			.02	$\mu\mu$F
Input	3.4	4.0	4.6	$\mu\mu$F
Output	2.4	2.8	3.2	$\mu\mu$F

ABSOLUTE MAXIMUM RATINGS

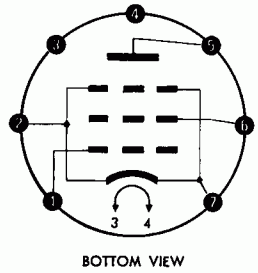
Plate Voltage	200	volts
Grid No 2 Voltage	155	volts
Grid No 1 Voltage, positive value	+ 5	volts
Grid No 1 Voltage, negative value	— 50	volts
Cathode Current	20	ma
Plate Dissipation	1.85	watts
Grid No 2 Dissipation (see Section A)	.55	watt
Heater — Cathode Voltage	100	volts
Bulb Temperature, at hottest point	150	°C
Grid No 1 Circuit Resistance		
with fixed bias	1.0	Mohm
with cathode bias	2.0	Mohms

MECHANICAL DATA

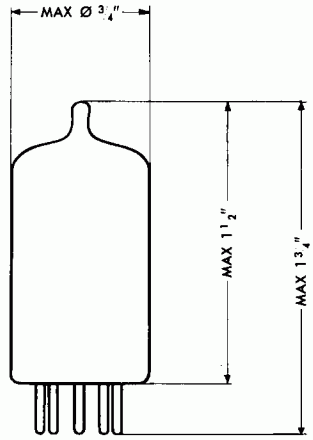
Base: Small Button Miniature 7-pin, RETMA E7-1
Bulb: EIA T 5½
Mounting Position: Any

PIN NO. CONNECTED TO

1. Grid No 1
2. Cathode, Grid No 3, Int. Shield
3. Heater
4. Heater
5. Plate
6. Grid No 2
7. Cathode, Grid No 3, Int. Shield



BOTTOM VIEW



5591
403 B

RF AMPLIFIER PENTODE

Ericsson LM

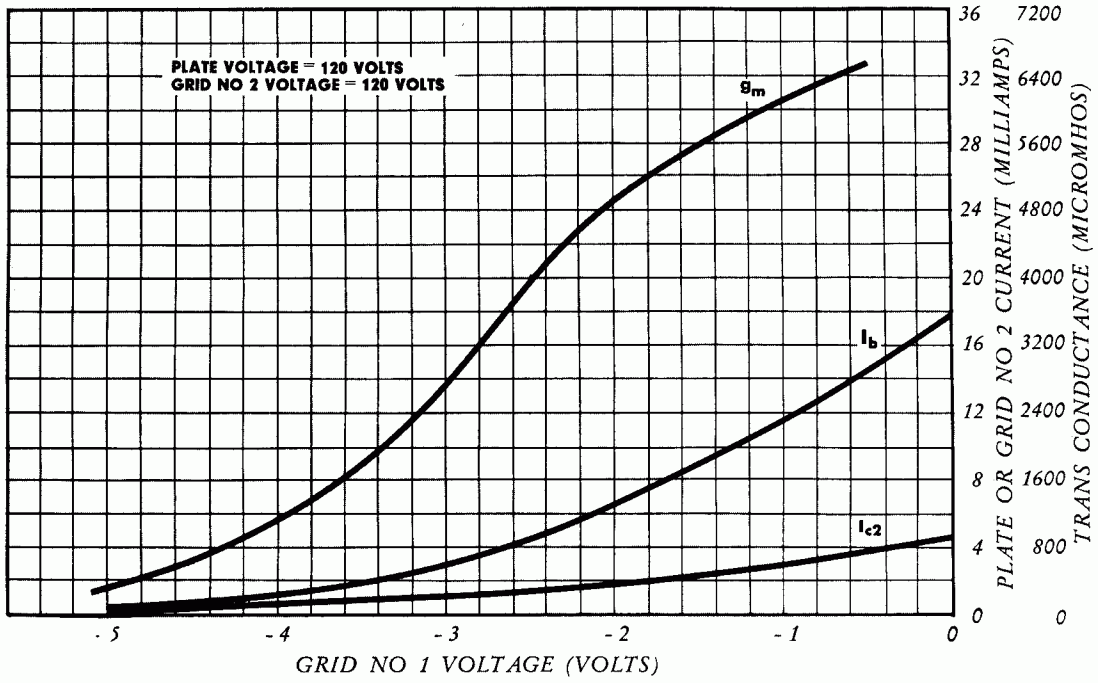
TYPICAL OPERATION. CLASS A1

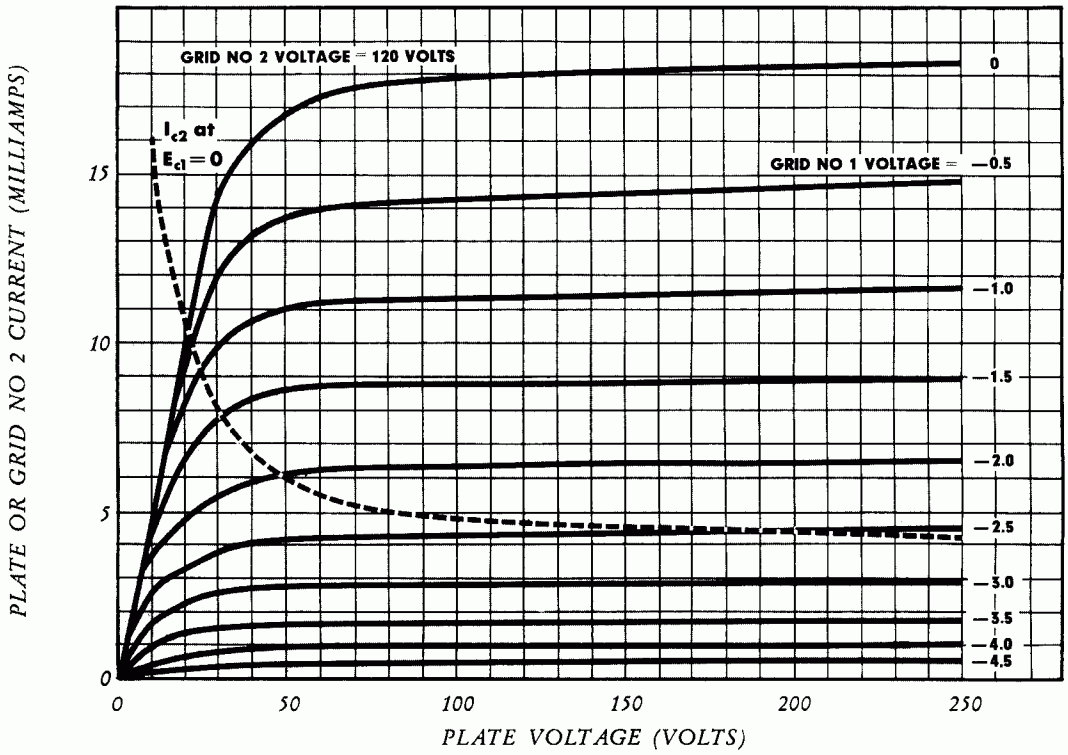
Heater Voltage	6.3	6.3	volts
Heater Current	.15	.15	amp
Plate Supply Voltage	130	180	volts
Grid No 2 Supply Voltage	130	120	volts
Cathode Bias Resistor	200	200	ohms
Plate Current	8.0	7.7	ma
Grid No 2 Current	2.0	1.8	ma
Transconductance	5100	5000	μmhos
Plate Resistance	.35	.5	Mohm
Amplification Factor Grid No 2 to 1	28	28	
Grid No 1 Voltage for Plate Current = 10 μa	— 6.5	— 6.0	volts
Equivalent Noise Resistance	1600	1600	ohms
Transit Time Loading at 100 Mc	40	40	μmhos
Input Conductance at 100 Mc	125	125	μmhos

OPERATION RANGE VALUES

Heater Voltage		6.3		volts
Plate Supply Voltage		130		volts
Grid No 2 Supply Voltage		130		volts
Cathode Bias Resistor		200		ohms
	MIN	AVE	MAX	
Heater Current	130	150	170	ma
Plate Current	5.8	8.0	10.8	ma
Grid No 2 Current	1.3	2.0	2.7	ma
Transconductance	4000	5100	6200	μmhos
Transconductance, End of Life Point	3400			μmhos
I_{hk} at E_{hk} = ± 100 volts			20	μa
Grid No 1 Current			–.1	μa
Cutoff Plate Current at E_{c1} = — 7.5 volts			200	μa
Vibration Output		10		mv
Measured at 2.5 g and 25 cps. E_f = 6.3 v, E_b = 130 v, E_{c2} = 130 v, E_{c1} = — 2 v, r_p = 10,000 ohms.				

AVERAGE CHARACTERISTICS





SINGLE TRIODE 5842 / 417 A

The 5842/417A is specially designed for use at intermediate frequencies where, owing to the absence of negative feed-back, use can be made of triodes, which have the advantage of causing less noise. The frame grid, described in Section A, has a lateral wire diameter of only .0065 mm.

COLD CAPACITANCES (no external shield unless specified)

Grounded Grid		
Plate to Cathode and Heater	max. .55	$\mu\mu$F
Input (Cathode to Grid and Heater)	9.0	$\mu\mu$F
Output (Plate to Grid and Heater)	1.8	$\mu\mu$F
Output. External shield connected to grid pins	2.6	$\mu\mu$F
Grounded Cathode		
Plate to Grid	1.7	$\mu\mu$F
Input (Grid to Cathode and Heater)	5.5	$\mu\mu$F
Output (Plate to Cathode and Heater)	.4	$\mu\mu$F

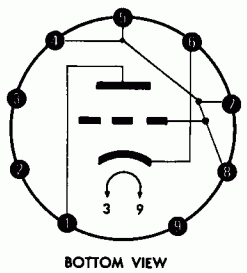
ABSOLUTE MAXIMUM RATINGS

Plate Voltage	200	volts
Grid Voltage, positive value	+ 0	volt
Grid Voltage, negative value	— 25	volts
Cathode Current	38	ma
Plate Dissipation	4.5	watts
Heater — Cathode Voltage	55	volts
Bulb Temperature, at hottest point	160	°C
Grid Circuit Resistance		
with fixed bias	.05	Mohm
with cathode bias	.1	Mohm

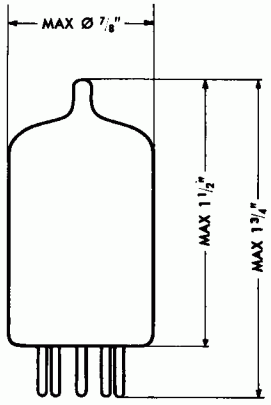
MECHANICAL DATA

Base: Small Button Noval 9-pin, RETMA E9-1
Bulb: EIA T 6½
Mounting Position: Any

PIN NO.	CONNECTED TO
1.	Plate
2.	No Connection
3.	Heater
4.	Grid
5.	Grid
6.	Cathode
7.	Grid
8.	Grid
9.	Heater



BOTTOM VIEW



5842
417 A
SINGLE TRIODE

Ericsson LM

TYPICAL OPERATION. CLASS A1

Heater Voltage	6.3	6.3	volts
Heater Current	.3	.3	amp
Plate Supply Voltage	130	150	volts
Grid Supply Voltage	+ 9	—	volts
Cathode Bias Resistor	360	60	ohms
Plate Current	27	25	ma
Transconductance	27,000	25,000	μmhos
Amplification Factor	44	43	
Plate Resistance approx.	1600	1700	ohms
Grid Voltage for Plate Current = 10 μa	— 5	— 5	volts
Equivalent Noise Resistance	100	100	ohms

FIGURE OF MERIT

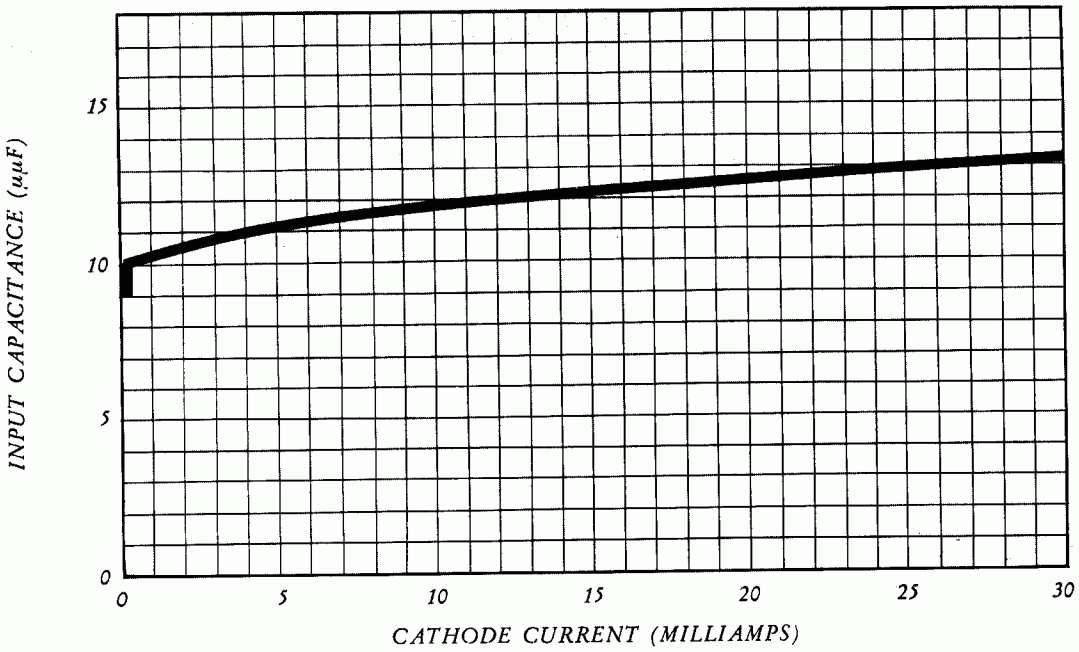
	Tube Cold	*Typical operation**
At IF without external shield $\frac{g_m}{\sqrt{C_{in} \cdot C_{out}}}$	6.2	3.2

* 3 μμF has been added for input circuit and 2 μμF for output circuit in order to get total circuit capacitances under typical operating conditions.

OPERATION RANGE VALUES

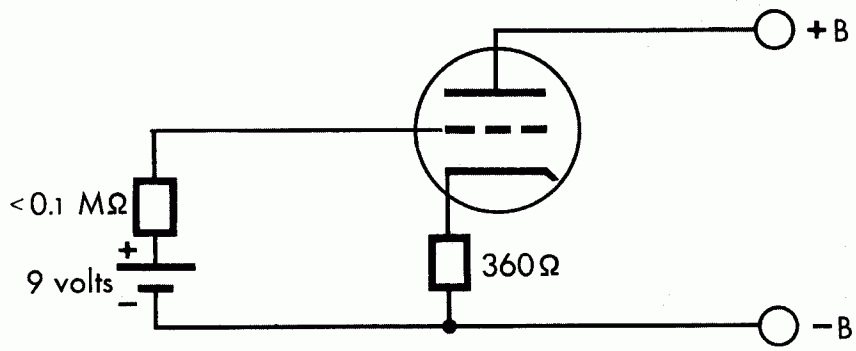
Heater Voltage		6.3		volts
Plate Supply Voltage		150		volts
Cathode Bias Resistor		60		ohms
	MIN	AVE	MAX	
Heater Current	280	300	320	ma
Plate Current	20	25	30	ma
Transconductance	20,000	25,000	30,000	μmhos
Transconductance, End of Life Point	16,000			μmhos
I_{hk} at E_{hk} = ± 100 volts			20	μa
Grid Current			–.5	μa
Cutoff Plate Current at E_{c1} = — 10 volts			100	μa
Vibration Output			100	mv
Measured at 2.5 g and 25 cps. E_f = 6.3 v, E_b = 150 v, E_{c1} = — 2 v, 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 360 ohm cathode resistor, in conjunction with a DC control grid return to a + 9.0 volt supply, is recommended. This circuit is shown below.

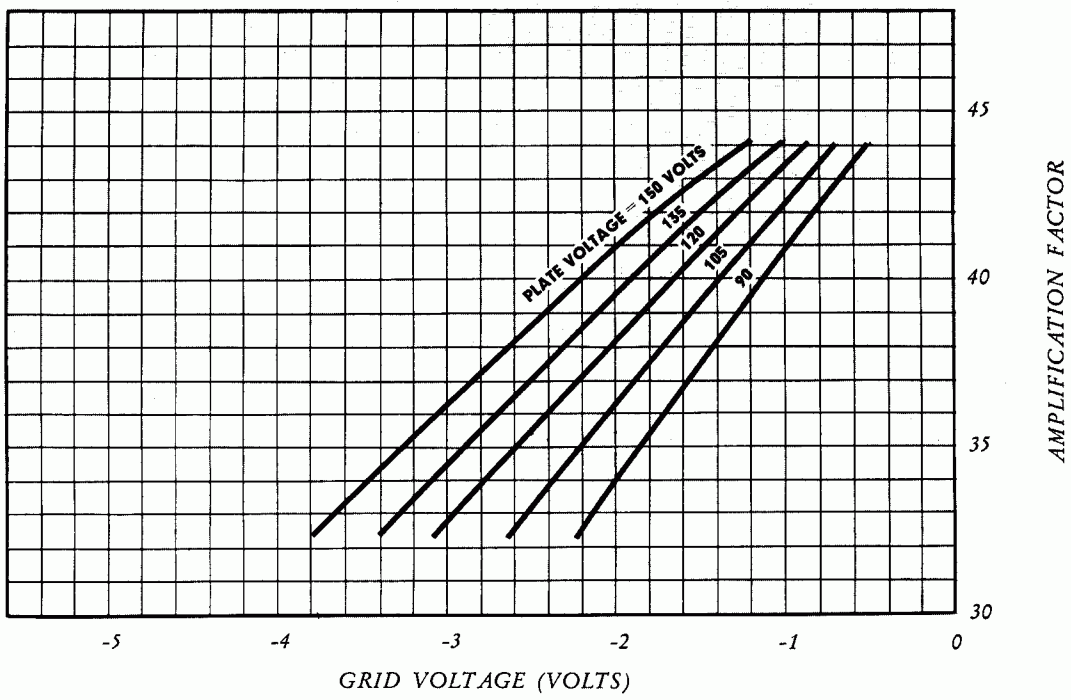
To prevent burning out grid wires by removal of plate voltage when the + 9.0 volt bias is still applied, a limiting resistor of 10,000 ohms in series with the bias supply is suggested. Where the use of such a resistor is not practical, care should be taken to see that the grid bias is not applied before the plate voltage.

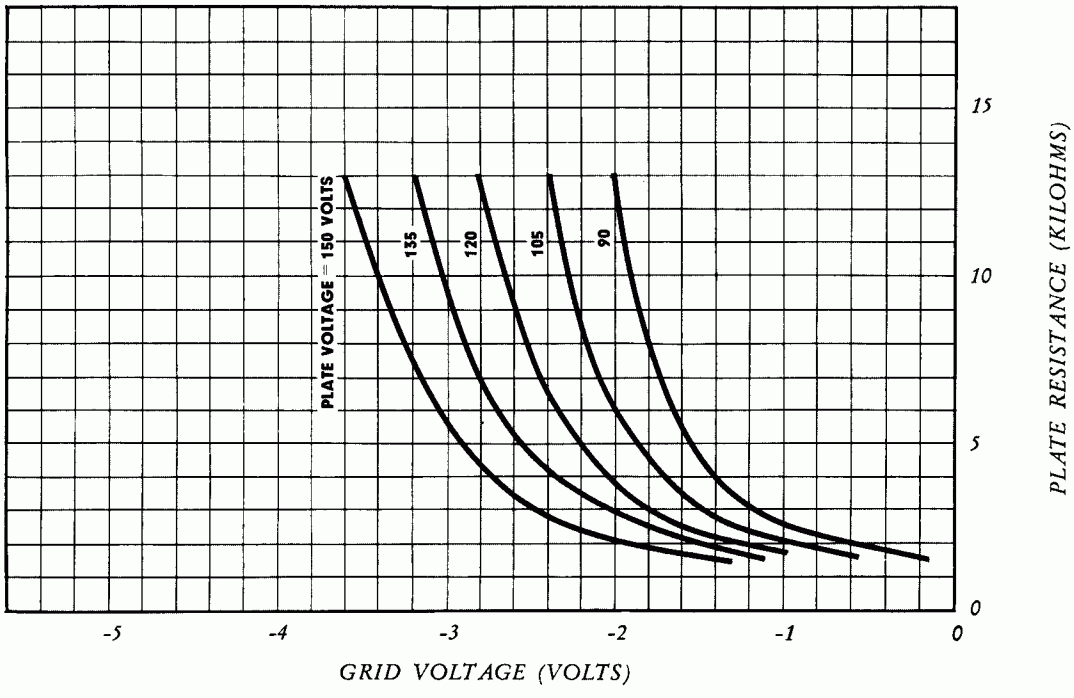
5842

417 A

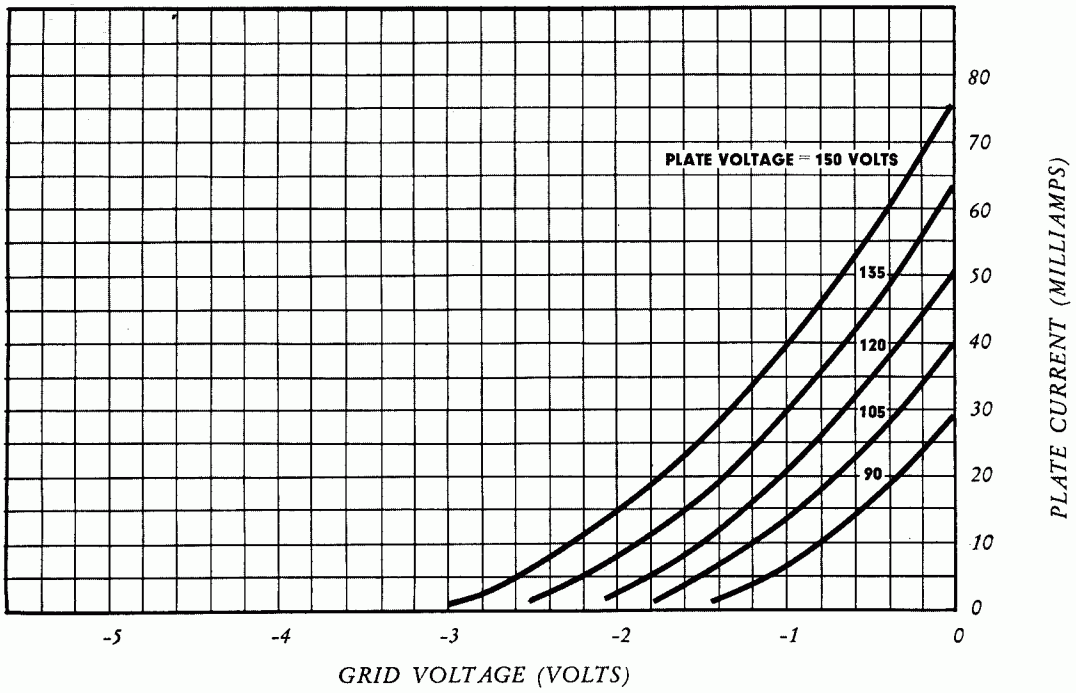
SINGLE TRIODE

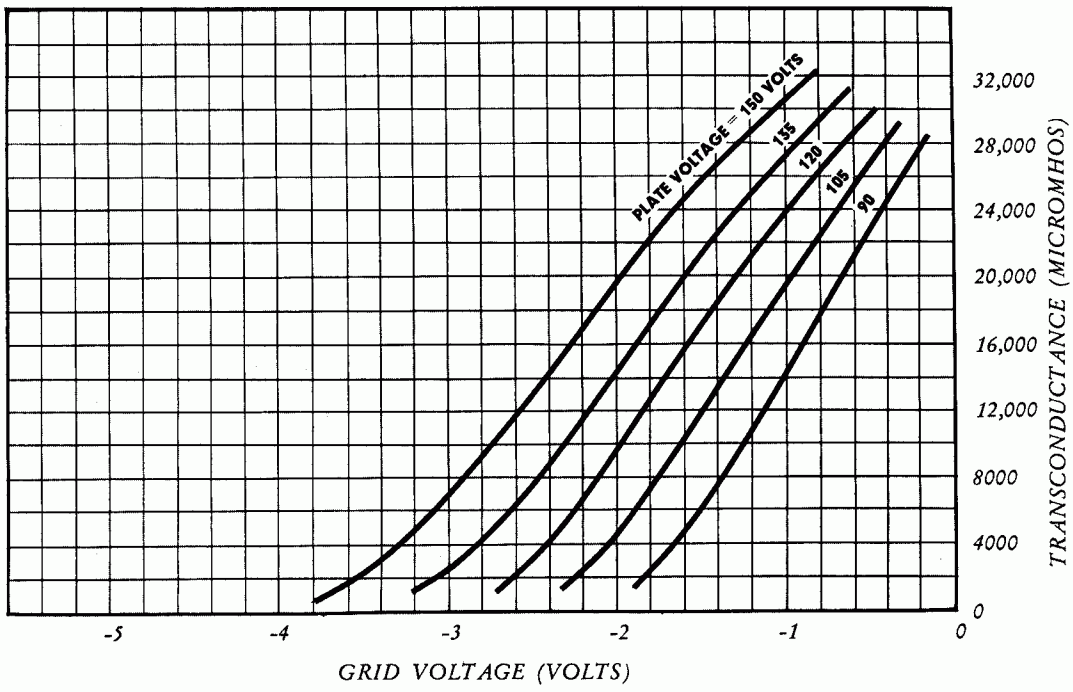
AVERAGE CHARACTERISTICS





AVERAGE CHARACTERISTICS

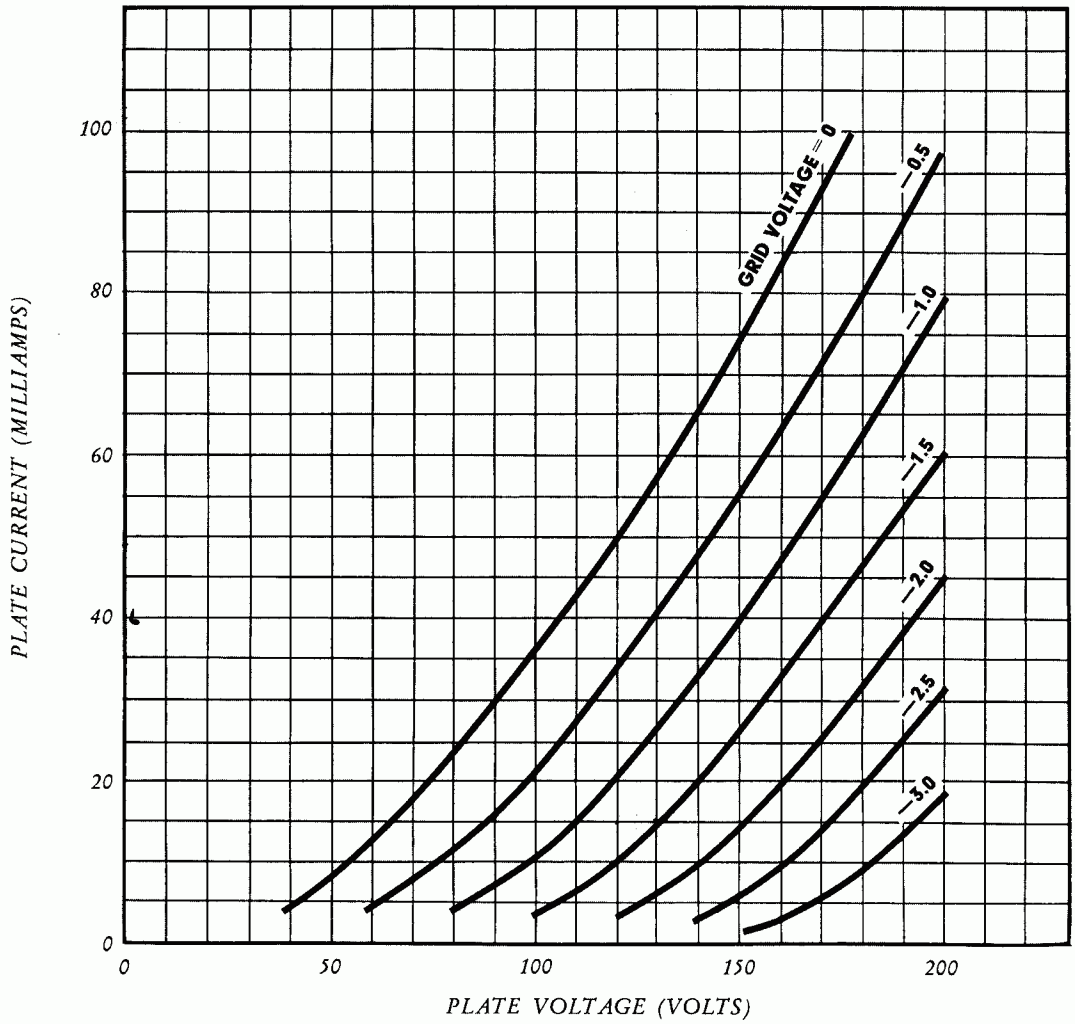




5842
417 A

SINGLE TRIODE

AVERAGE CHARACTERISTICS



Edition 1

RF AMPLIFIER PENTODE 5847 / 404 A

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	$\mu\mu$F
Input	7.0	$\mu\mu$F
Output	2.5	$\mu\mu$F

RANGE VALUES FOR CAPACITANCES (external shield connected to cathode)

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

ABSOLUTE MAXIMUM RATINGS

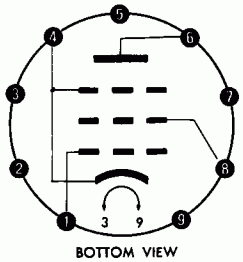
Plate Voltage	200	volts
Grid No 2 Voltage	165	volts
Grid No 1 Voltage, positive value	+ 0	volt
Grid No 1 Voltage, negative value	— 25	volts
Cathode Current	40	ma
Plate Dissipation	3.3	watts
Grid No 2 Dissipation (see Section A)	.85	watt
Heater — Cathode Voltage	55	volts
Bulb Temperature, at hottest point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

MECHANICAL DATA

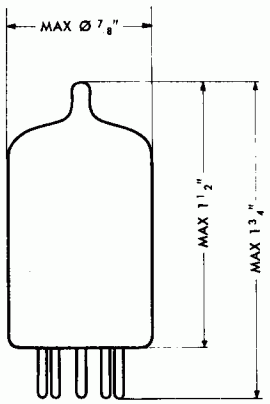
Base: Small Button Noval 9-pin, RETMA E9-1
Bulb: EIA T 6½
Mounting Position: Any

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.



BOTTOM VIEW



5847
404 A
RF AMPLIFIER PENTODE

Ericsson LM

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

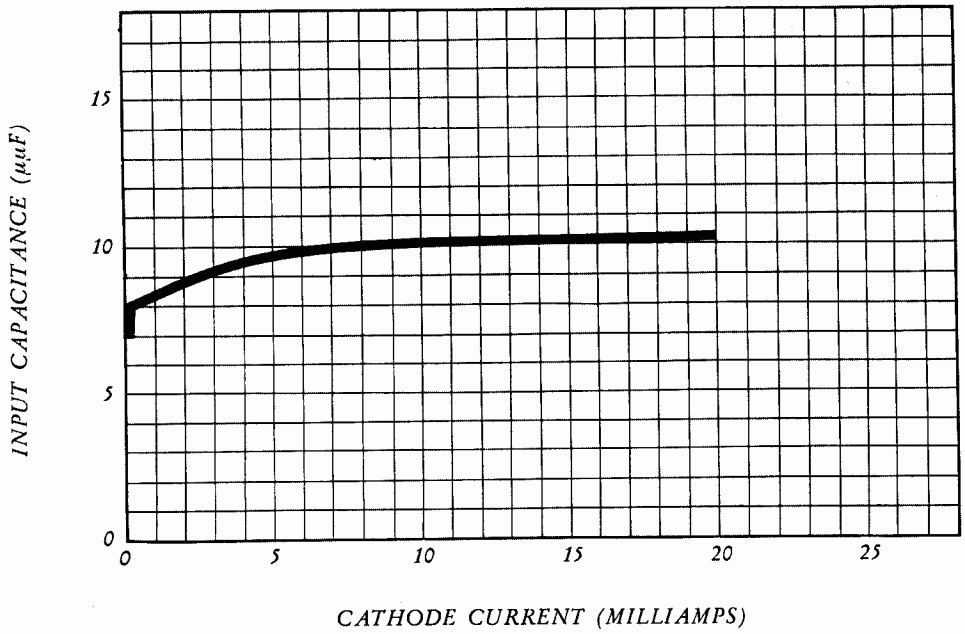
* The following additions have been made for tube sockets and wiring capacitances to get total circuit capacitances under typical operating conditions:
At LF — 5 μμF. At IF — 3 μμF for input circuit and 2 μμF for output circuit.

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.				

Edition 1

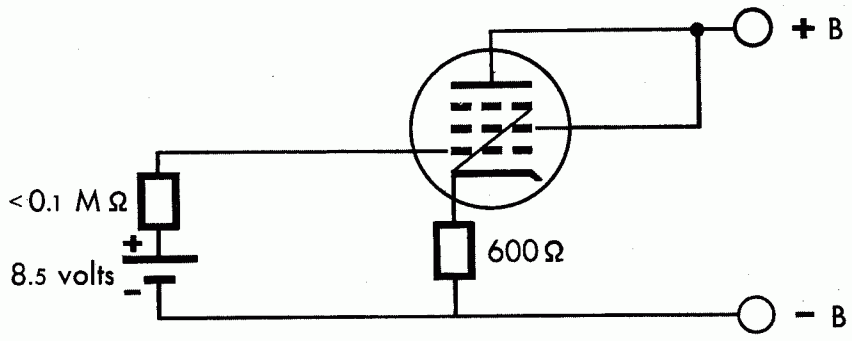
SPECIAL DATA



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.

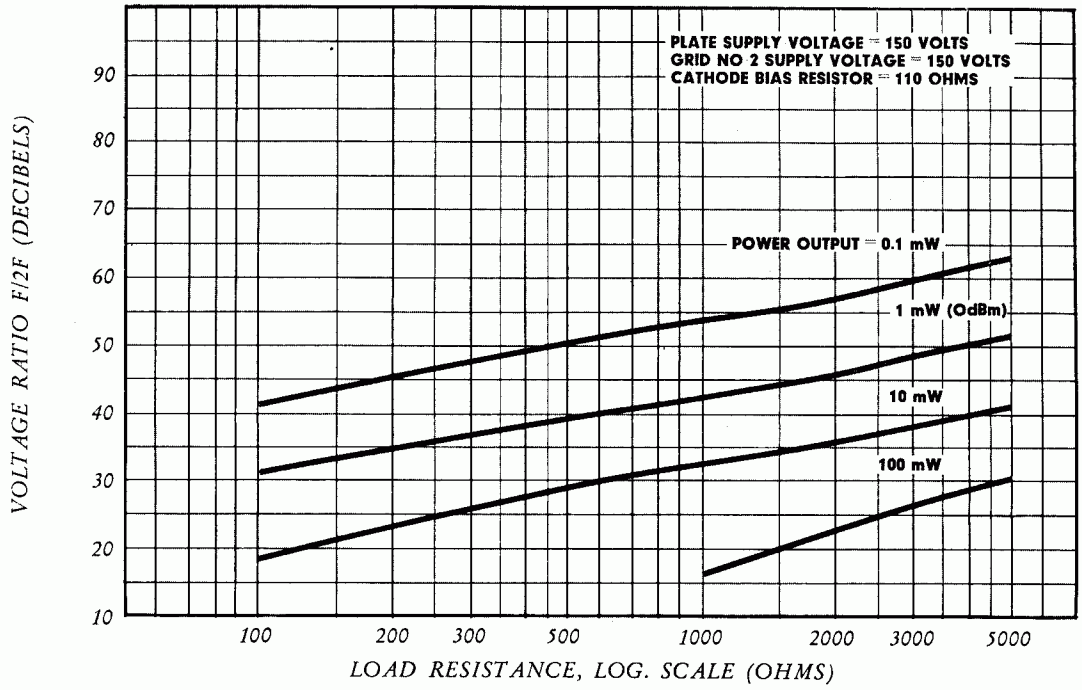


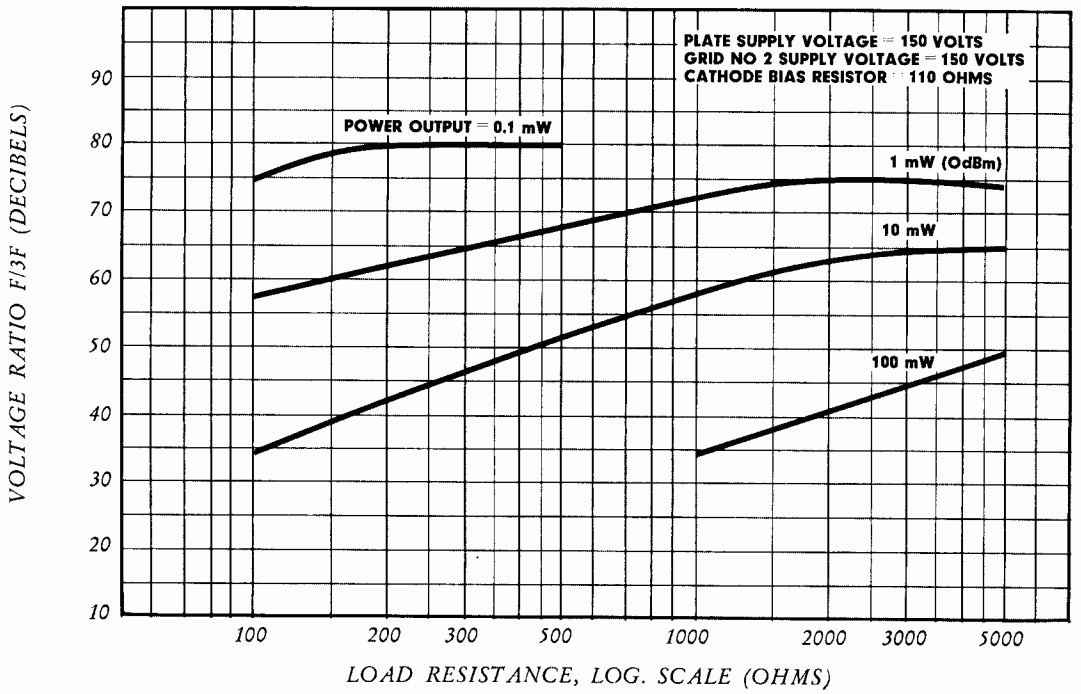
BIAS CONSIDERATIONS:

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.

5847
404 A
RF AMPLIFIER PENTODE

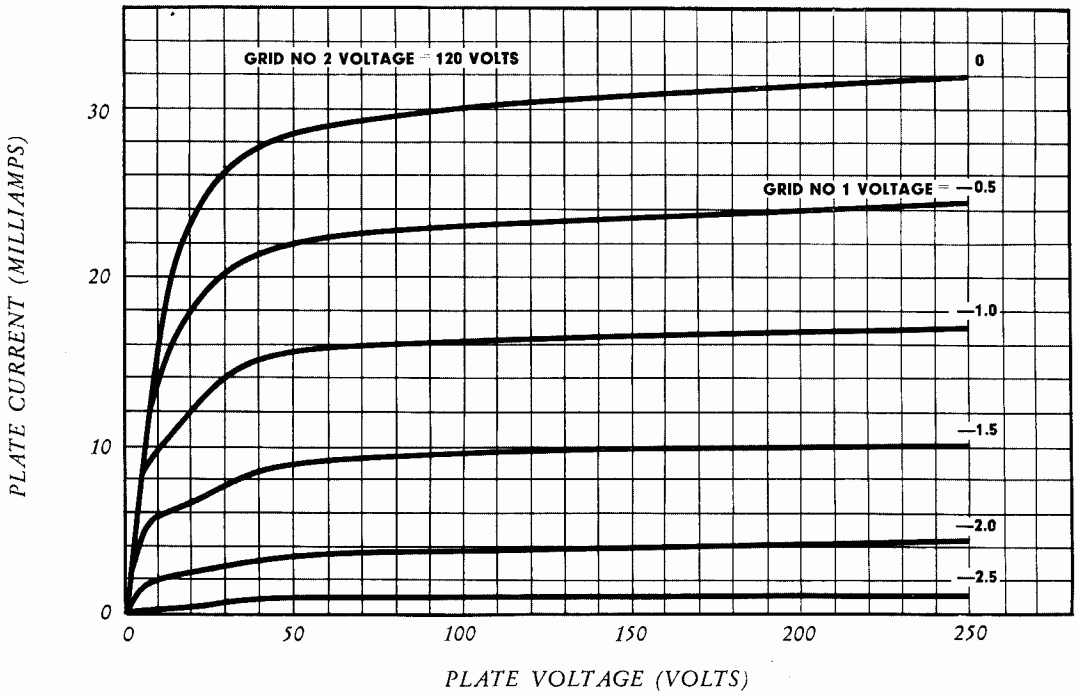


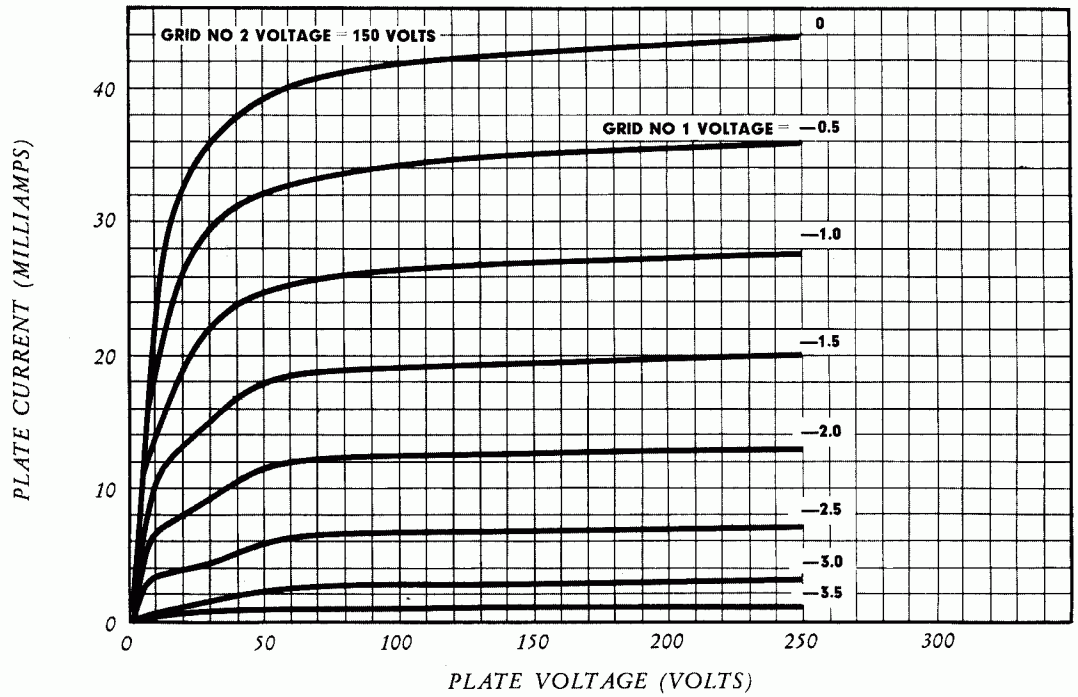


HARMONIC DISTORTION:

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.

AVERAGE CHARACTERISTICS





RF AMPLIFIER PENTODE 6028 / 408 A

6028/408A is particularly suitable for use as RF amplifier and broadband amplifier.

COLD CAPACITANCES (external shield connected to cathode)

	MIN	AVE	MAX	
Grid No 1 to Plate			.02	$\mu\mu$F
Input	3.4	4.0	4.6	$\mu\mu$F
Output	2.4	2.8	3.2	$\mu\mu$F

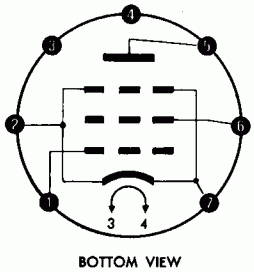
ABSOLUTE MAXIMUM RATINGS

Plate Voltage	200	volts
Grid No 2 Voltage	155	volts
Grid No 1 Voltage, positive value	+ 5	volts
Grid No 1 Voltage, negative value	— 50	volts
Cathode Current	20	ma
Plate Dissipation	1.85	watts
Grid No 2 Dissipation (see Section A)	.55	watt
Heater — Cathode Voltage	130	volts
Bulb Temperature, at hottest point	150	°C
Grid No 1 Circuit Resistance		
with fixed bias	1.0	Mohm
with cathode bias	2.0	Mohms

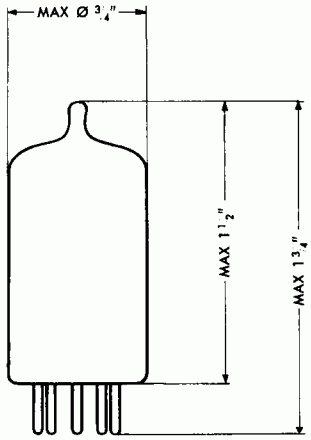
MECHANICAL DATA

Base: Small Button Miniature 7-pin, RETMA E7-1
Bulb: EIA T 5½
Mounting Position: Any

PIN NO.	CONNECTED TO
1.	Grid No 1
2.	Cathode, Grid No 3, Int. Shield
3.	Heater
4.	Heater
5.	Plate
6.	Grid No 2
7.	Cathode, Grid No 3, Int. Shield



BOTTOM VIEW



6028
408 A
RF AMPLIFIER PENTODE

Ericsson LM

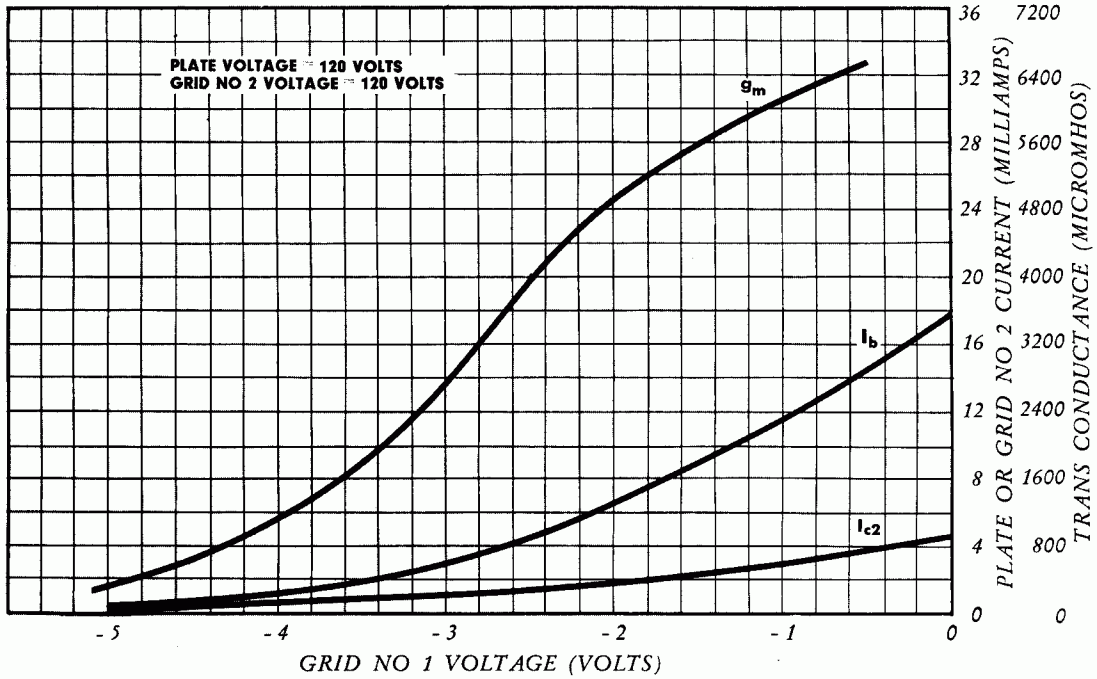
TYPICAL OPERATION. CLASS A1

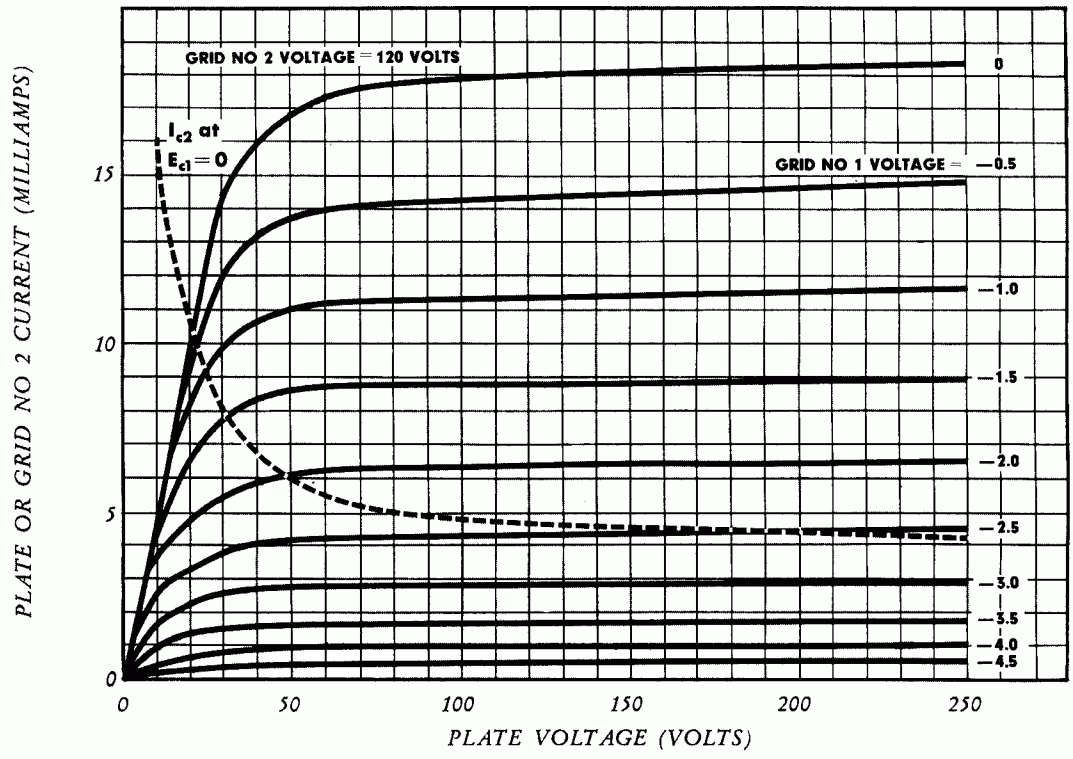
Heater Voltage	20.0	20.0	volts
Heater Current	.05	.05	amp
Plate Supply Voltage	120	120	volts
Grid No 2 Supply Voltage	120	120	volts
Cathode Bias Resistor	200	130	ohms
Peak AF Grid No 1 Voltage	2.0	1.5	volts
Zero Signal Plate Current	7.5	9.4	ma
Max. Signal Plate Current	7.7	9.2	ma
Zero Signal Grid No 2 Current	1.9	2.4	ma
Max. Signal Grid No 2 Current	2.7	3.2	ma
Transconductance	5000	5600	μmhos
Plate Resistance	.3	.25	Mohm
Load Resistance	15,000	15,000	ohms
Power Output	.325	.265	watt
Total Harmonic Distortion	12	5.5	%
Amplification Factor Grid No 2 to 1	24	24	
Grid No 1 Voltage for Plate Current = 10 μa	— 6.5	— 6.5	volts
Equivalent Noise Resistance	1600	1600	ohms
Transit Time Loading at 100 Mc	40	40	μmhos
Input Conductance at 100 Mc	125	125	μmhos

OPERATION RANGE VALUES

Heater Voltage		20.0		volts
Plate Supply Voltage		120		volts
Grid No 2 Supply Voltage		120		volts
Cathode Bias Resistor		200		ohms
	MIN	AVE	MAX	
Heater Current	45	50	55	ma
Plate Current	5	7.5	9	ma
Grid No 2 Current	1.5	1.9	3	ma
Transconductance	3900	5000	6000	μmhos
Transconductance, End of Life Point	3400			μmhos
I_{hk} at E_{hk} = ± 100 volts			20	μa
Grid No 1 Current			–.1	μa
Cutoff Plate Current at E_{c1} = — 10 volts			200	μa
Vibration Output		10		mv
Measured at 2.5 g and 25 cps. E_f = 20.0 v, E_{bb} = 120 v, E_{cc2} = 120 v, R_k = 200 ohms, C_k = 2000 μF, r_p = 10,000 ohms.				

AVERAGE CHARACTERISTICS





POWER AMPLIFIER PENTODE 6761

For use as output tube in telephone equipment and industrial applications, particularly in broadband amplifiers. Within its ratings it is a suitable replacement for type 6216.

COLD CAPACITANCES (without external shield)

Grid No 1 to Plate	.4	$\mu\mu$F
Input	14	$\mu\mu$F
Output	6	$\mu\mu$F

ABSOLUTE MAXIMUM RATINGS

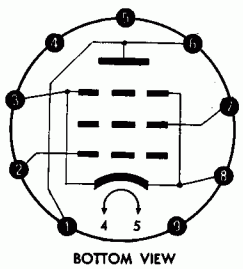
Plate Voltage	275	volts
Grid No 2 Voltage	220	volts
Grid No 1 Voltage, positive value	+ 10	volts
Grid No 1 Voltage, negative value	— 55	volts
Cathode Current	110	ma
Plate Dissipation	11	watts
Grid No 2 Dissipation (see Section A)	1.65	watts
Heater — Cathode Voltage	110	volts
Bulb Temperature, at hottest point	200	°C
Grid No 1 Circuit Resistance		
with fixed bias	.1	Mohm
with cathode bias	.5	Mohm

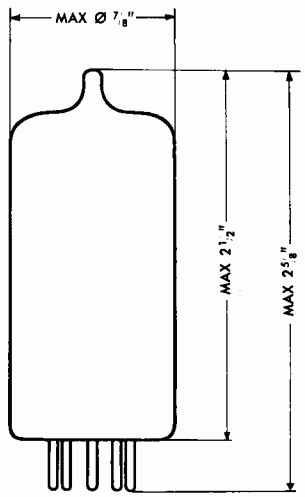
MECHANICAL DATA

Base: Small Button Noval 9-pin, RETMA E9-1
Bulb: EIA T 6½
Mounting Position: Any

PIN NO. CONNECTED TO

1. Plate
2. Grid No 1
3. Cathode, Grid No 3
4. Heater
5. Heater
6. Plate
7. Grid No 2
8. Cathode, Grid No 3
9. No Connection





6761 POWER AMPLIFIER PENTODE

TYPICAL OPERATION. CLASS A1

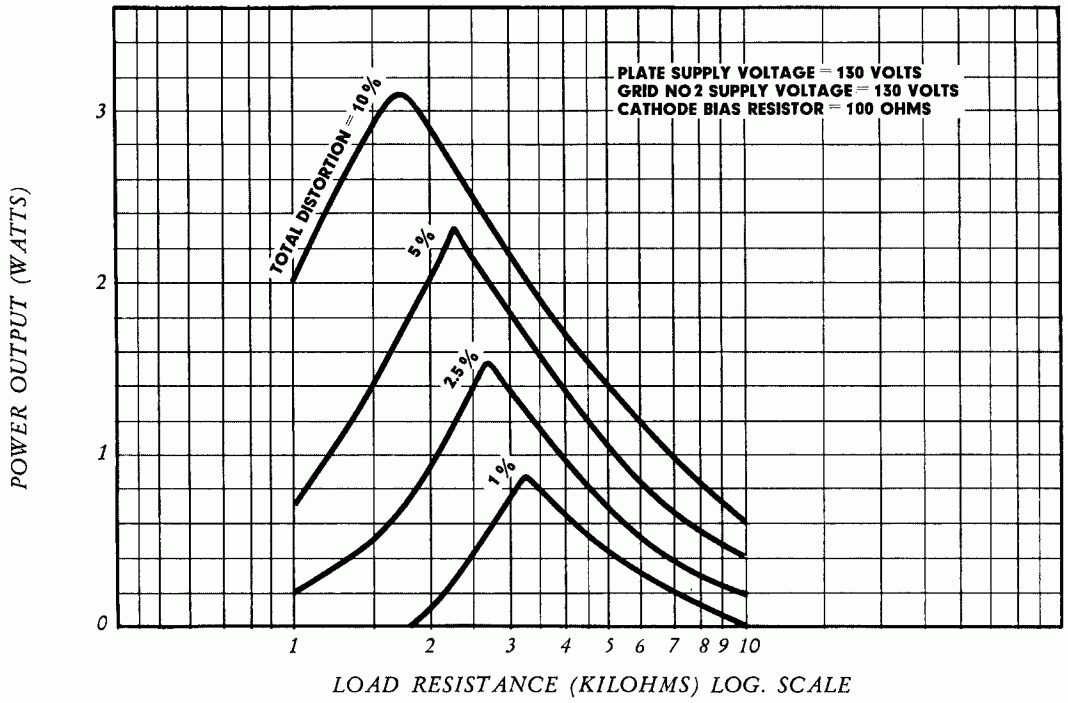
Heater Voltage	6.3	volts
Heater Current	1.0	amp
Plate Supply Voltage	130	volts
Grid No 2 Supply Voltage	130	volts
Cathode Bias Resistor	100	ohms
Plate Current	70	ma
Grid No 2 Current	3.5	ma
Transconductance	13,000	μmhos
Plate Resistance approx.	23,000	ohms
Load Resistance	1500	ohms
Power Output	3.0	watts
Total Harmonic Distortion	10	%
Amplification Factor Grid No 2 to 1	8	
Grid No 1 Voltage for Plate Current = 10 μa	— 25	volts

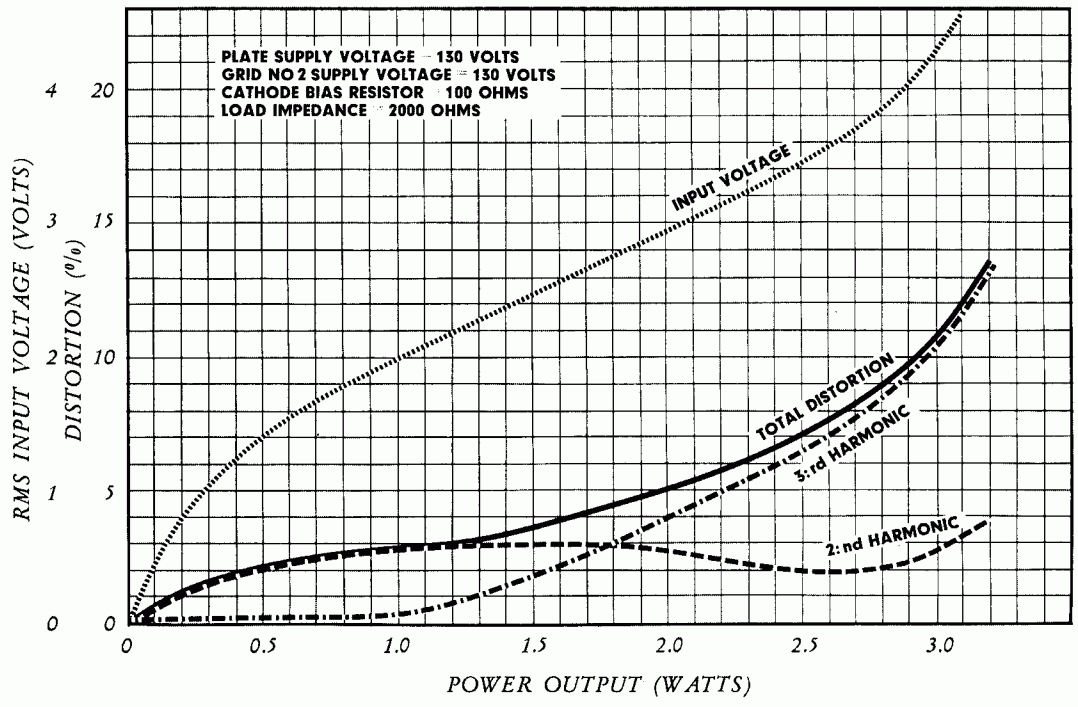
OPERATION RANGE VALUES

Heater Voltage		6.3		volts
Plate Supply Voltage		130		volts
Grid No 2 Supply Voltage		130		volts
Cathode Bias Resistor		100		ohms
	MIN	AVE	MAX	
Heater Current	900	1000	1100	ma
Plate Current	56	70	84	ma
Grid No 2 Current		3.5	7	ma
Transconductance	11,000	13,000	15,000	μmhos
Transconductance, End of Life Point	8500			μmhos
I_{hk} at E_{hk} = ± 100 volts			50	μa
Grid No 1 Current			-1.0	μa
Cutoff Plate Current at E_{c1} = — 25 volts			100	μa

POWER AMPLIFIER PENTODE 6761

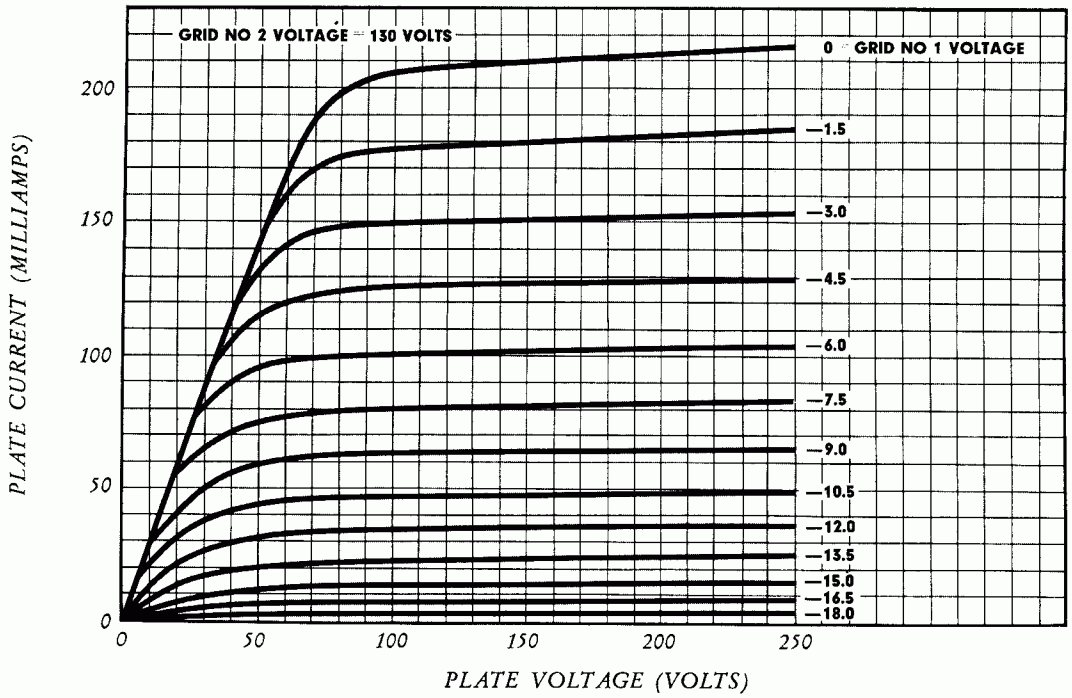
AVERAGE CHARACTERISTICS

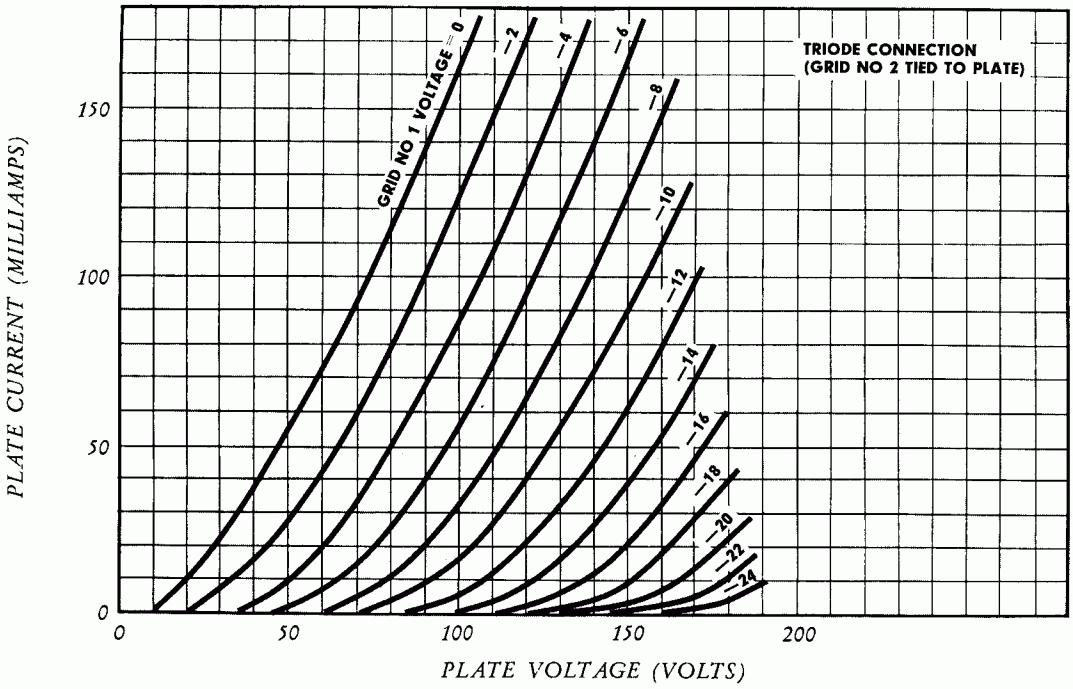




6761 POWER AMPLIFIER PENTODE

AVERAGE CHARACTERISTICS





Edition 1

Ericsson

TWIN TRIODE 6927

6J6L

Twin triode with common cathode for use as high frequency amplifier, oscillator or mixer. With the grids in push-pull and plates connected in parallel the tube may be used as a mixer at frequencies as high as 600 Mc.

COLD CAPACITANCES (without external shield)

Input, Each Section	2.0	$\mu\mu$F
Output, Section 1	.45	$\mu\mu$F
Output, Section 2	.40	$\mu\mu$F
Plate to Grid, Each Section	1.5	$\mu\mu$F

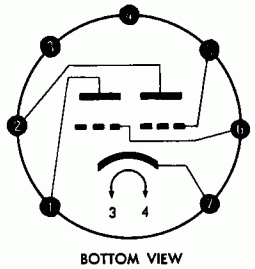
ABSOLUTE MAXIMUM RATINGS (each section)

Plate Voltage	220	volts
Grid Voltage, positive value	+ 5	volts
Cathode Current	17	ma
Plate Dissipation	1.4	watts
Heater — Cathode Voltage	100	volts
Bulb Temperature, at hottest point	160	°C
Grid Circuit Resistance, Cathode Bias	.5	Mohm

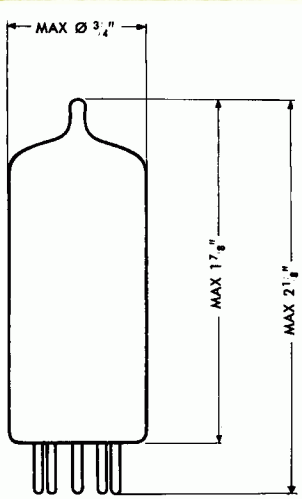
MECHANICAL DATA

Base: Small Button Miniature 7-pin, RETMA E7-1
Bulb: EIA T 5½
Mounting Position: Any

PIN NO.	CONNECTED TO
1.	Plate of Section 2
2.	Plate of Section 1
3.	Heater
4.	Heater
5.	Grid of Section 1
6.	Grid of Section 2
7.	Cathode



BOTTOM VIEW



6927
6J6L
TWIN TRIODE

Ericsson LM

TYPICAL OPERATION. CLASS A1. (each section)

Heater Voltage	6.3	6.3	volts
Heater Current	.33	.33	amp
Plate Supply Voltage	100	130	volts
Cathode Bias Resistor (value is for both sections operating as specified)	68	100	ohms
Plate Current	6.5	7.7	ma
Transconductance	5000	5300	μmhos
Amplification Factor	38	38	
Plate Resistance	7500	7200	ohms
Equivalent Noise Resistance	500	470	ohms

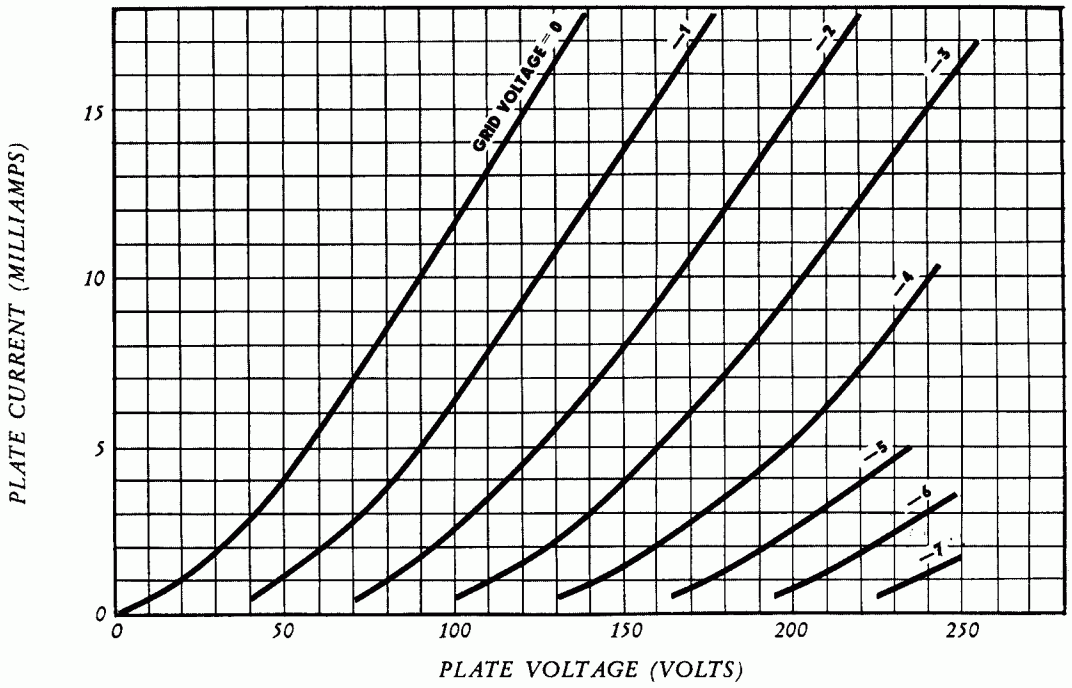
OPERATION RANGE VALUES (each section)

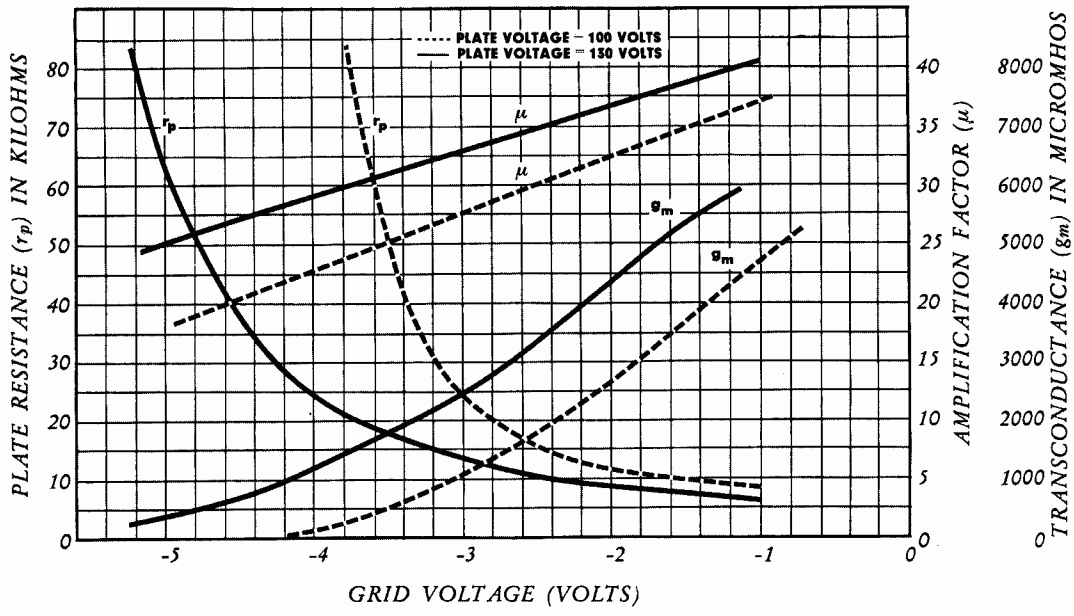
Heater Voltage		6.3		volts
Plate Supply Voltage		130		volts
Cathode Bias Resistor (value is for both sections operating as specified)		100		ohms
	MIN	AVE	MAX	
Heater Current	295	330	365	ma
Plate Current	4.7	7.7	10.7	ma
Transconductance	4200	5300	6400	μmhos
Transconductance, End of Life Point	3600			μmhos
I_{hk} at E_{hk} = ± 100 volts			20	μa
Grid Current			−.5	μa
Cutoff Plate Current at E_{c1} = — 15 volts			200	μa

Ericsson LM

TWIN TRIODE 6927
6J6L

AVERAGE CHARACTERISTICS





POWER AMPLIFIER PENTODE 6928 / 6AQ5L

For medium power applications where very long life and low failure rate is desired. Designed especially for dependable service.

COLD CAPACITANCES (external shield connected to cathode)

	MIN	AVE	MAX	
Grid No 1 to Plate		.35	.5	μμF
Input	6.4	8.0	9.6	μμF
Output	8.8	11.0	13.2	μμF

COLD CAPACITANCES (without external shield)

Grid No 1 to Plate	.6	μμF
Input	7.6	μμF
Output	6.0	μμF

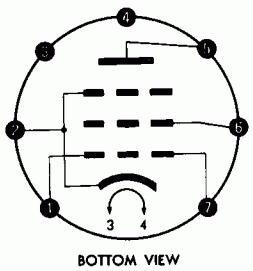
ABSOLUTE MAXIMUM RATINGS

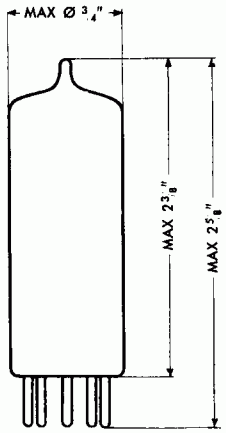
Plate Voltage	220	volts
Grid No 2 Voltage	220	volts
Grid No 1 Voltage, positive value	+ 10	volts
Grid No 1 Voltage, negative value	— 55	volts
Cathode Current	55	ma
Plate Dissipation	9	watts
Grid No 2 Dissipation (see Section A)	1.1	watt
Heater — Cathode Voltage	100	volts
Bulb Temperature, at hottest point	220	°C
Grid No 1 Circuit Resistance		
with fixed bias	.1	Mohm
with cathode bias	.5	Mohm

MECHANICAL DATA

Base: Small Button Miniature 7-pin, RETMA E7-1
Bulb: EIA T 5½
Mounting Position: Any

PIN NO.	CONNECTED TO
1.	Grid No 1
2.	Cathode, Grid No 3
3.	Heater
4.	Heater
5.	Plate
6.	Grid No 2
7.	Grid No 1





6928
6AQ5L

POWER AMPLIFIER PENTODE

Ericsson LM

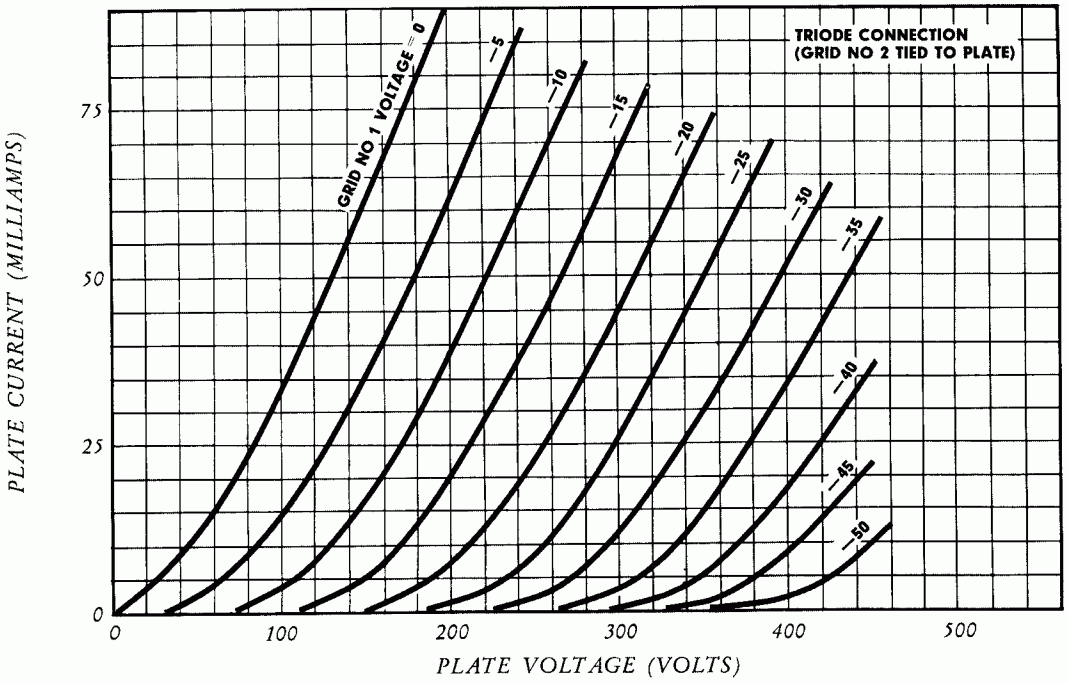
TYPICAL OPERATION. CLASS A1

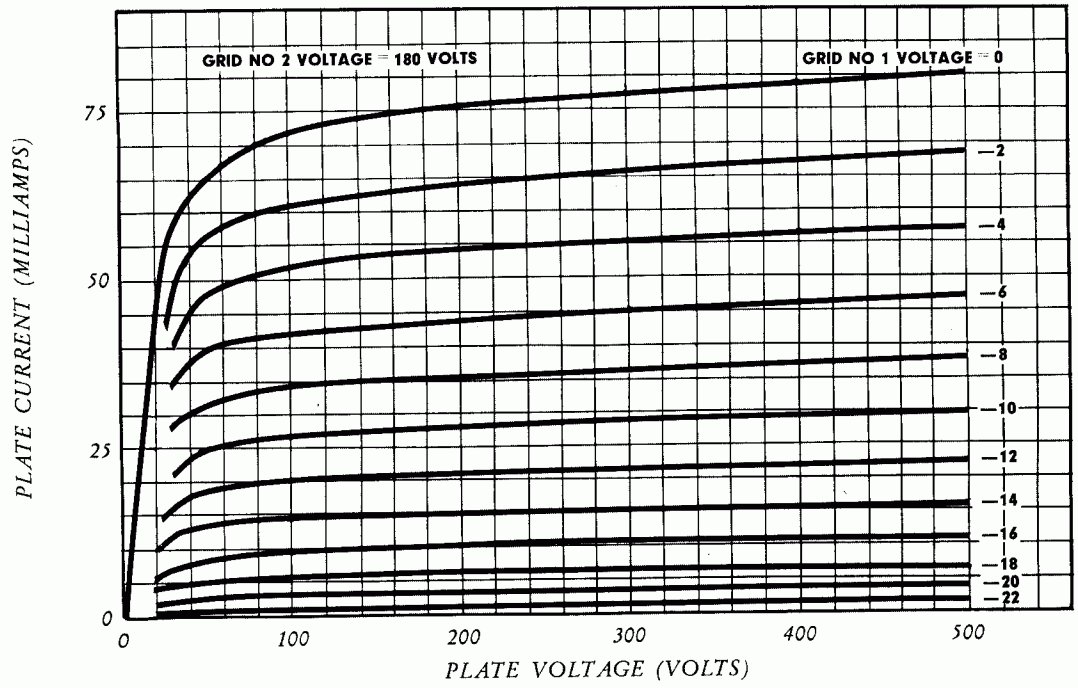
Heater Voltage	6.3	6.3	volts
Heater Current	.36	.36	amp
Plate Supply Voltage	130	180	volts
Grid No 2 Supply Voltage	130	180	volts
Cathode Bias Resistor	200	220	ohms
Plate Current	23	32.5	ma
Grid No 2 Current	2	3	ma
Transconductance	3400	3900	μmhos
Plate Resistance	.08	.08	Mohm
Load Resistance	6000	8000	ohms
Power Output	1.0	2.1	watts
Total Harmonic Distortion	7	8	%
Amplification Factor Grid No 2 to 1	10	10	

OPERATION RANGE VALUES

Heater Voltage		6.3		volts
Plate Supply Voltage		130		volts
Grid No 2 Supply Voltage		130		volts
Cathode Bias Resistor		200		ohms
	MIN	AVE	MAX	
Heater Current	320	360	400	ma
Plate Current	16	23	30	ma
Grid No 2 Current			5.5	ma
Transconductance	2600	3400	4200	μmhos
Transconductance, End of Life Point	2200			μmhos
I_{hk} at E_{hk} = ± 100 volts			50	μa
Grid No 1 Current			−.1	μa
Cutoff Plate Current at E_{c1} = — 40 volts			200	μa

AVERAGE CHARACTERISTICS





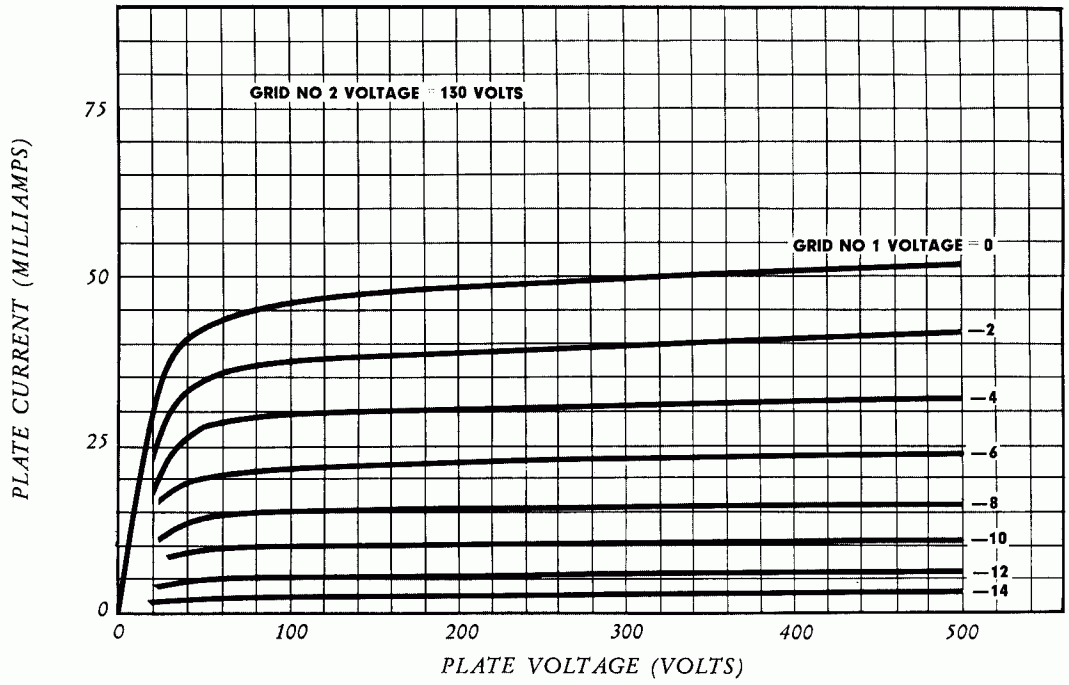
6928

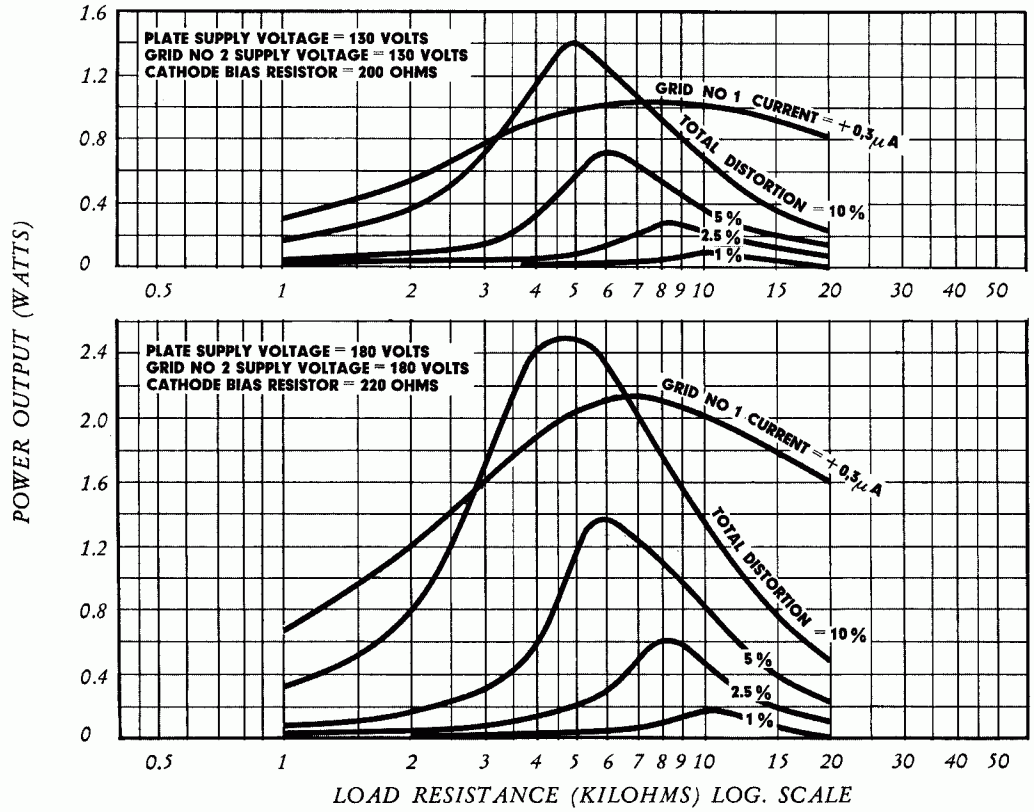
6AQ5L

POWER AMPLIFIER PENTODE

Ericsson LM

AVERAGE CHARACTERISTICS





TETRODE AMPLIFIER 7150

Intended for use in broadband amplifiers from audio frequencies up to about 300 Mc. Pentodelike characteristics render the 7150 very useful in output stages. When triode-connected it is very suitable as a low-noise amplifier in input stages. Low capacitance between plate and cathode make it particularly useful in grounded grid circuits.

The frame grid, described in Section A, with lateral wire diameter of only .0065 mm provides high broadband qualities and freedom from microphonics. The figure of merit is outstanding, especially at intermediate frequencies owing to the low output capacitance.

Compact construction and triple cathode leads provide small transit time loading and low cathode lead inductance. Because of this input conductance is low — approximately 1100 μmhos at 70 Mc.

ABSOLUTE MAXIMUM RATINGS

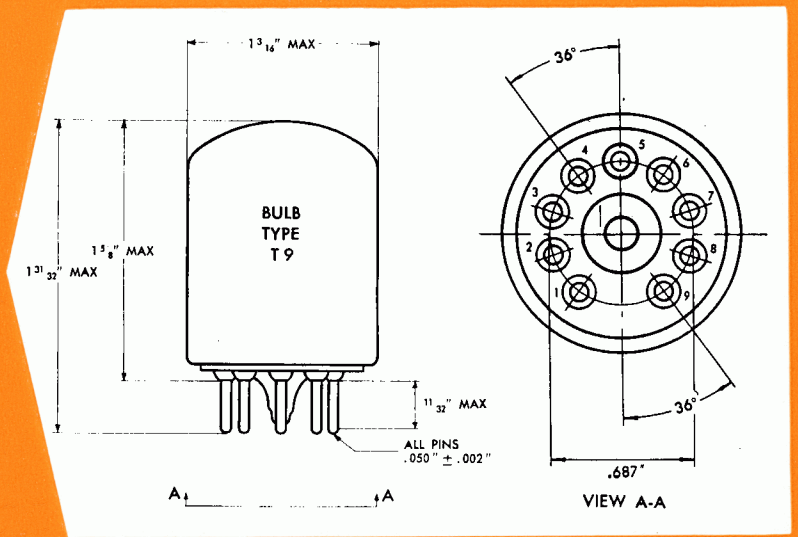
Plate Voltage	165	volts
Grid No 2 Voltage	165	volts
Grid No 1 Voltage, positive value	+ 0	volts
Grid No 1 Voltage, negative value	— 25	volts
Cathode Current	55	ma
Plate Dissipation	4.5	watts
Grid No 2 Dissipation (see Section A)	1.65	watts
[Plate + Grid No 2] Dissipation (Grid No 2 connected to Plate)	5.5	watts
Heater — Cathode Voltage	55	volts
Bulb Temperature, at hottest point	140	°C
Grid No 1 Circuit Resistance		
with fixed bias	.05	Mohm
with cathode bias	.1	Mohm

MECHANICAL DATA

Base: 9-pin, as per drawing
Bulb: EIA T 9
Mounting Position: Any

PIN NO. CONNECTED TO
1. Plate
2. Heater
3. Cathode
4. Grid No 1
5. Heater, Internal Shield*
6. Cathode
7. Cathode
8. No Connection
9. Grid No 2

* The internal shield connected to Pin No 5 should be grounded as there is a direct flow of electrons from the cathode to the shield when the latter is positive in relation to the cathode.



7150 TETRODE AMPLIFIER

TETRODE CHARACTERISTICS

COLD CAPACITANCES (without external shield)

Grid No 1 to Plate	.03	$\mu\mu$F
Input	16	$\mu\mu$F
Output	2	$\mu\mu$F

TYPICAL OPERATION. CLASS A1

Heater Voltage	6.3	6.3	volts
Heater Current	.45	.45	amp
Plate Supply Voltage	135	125	volts
Grid No 2 Supply Voltage	135	125	volts
Grid No 1 Supply Voltage	+ 8		volts
Cathode Bias Resistor	260	45	ohms
Plate Current	27.5	24	ma
Grid No 2 Current	8.5	7.5	ma
Transconductance	35,800	34,000	μmhos
Plate Resistance, approx.	.03	.03	Mohm
Equivalent Noise Resistance	160	160	ohms
Transit Time Loading at 100 Mc	200	200	μmhos
Input Conductance at 100 Mc	2200	2200	μmhos

FIGURE OF MERIT

	Tube Cold	*Typical operation**
At LF without external shield $\frac{g_m}{C_{in} + C_{out}}$	1.9—2.0	1.0—1.1
At IF without external shield $\frac{g_m}{\sqrt{C_{in} \cdot C_{out}}}$	6.0—6.3	2.9—3.0

* The following additions have been made for tube sockets and wiring capacitances to get total circuit capacitances under typical operating conditions:
At LF — 8 $\mu\mu$F. At IF — 5 $\mu\mu$F for input circuit and 3 $\mu\mu$F for output circuit.

OPERATION RANGE VALUES

Heater Voltage		6.3		volts
Plate Supply Voltage		125		volts
Grid No 2 Supply Voltage		125		volts
Cathode Bias Resistor		45		ohms
	MIN	AVE	MAX	
Heater Current	410	450	490	ma
Plate Current	20	24	30	ma
Grid No 2 Current		7.5	13	ma
Transconductance	28,000	34,000	40,000	μmhos
Transconductance, End of Life Point	22,000			μmhos
I_{hk} at $E_{hk} = \pm$ 100 volts			20	μa
Grid No 1 Current			−.2	μa
Cutoff Plate Current at $E_{c1} = -5$ volts			100	μa

TETRODE AMPLIFIER 7150

TRIODE CHARACTERISTICS*
(Grounded Grid Operation)

COLD CAPACITANCES (without external shield)

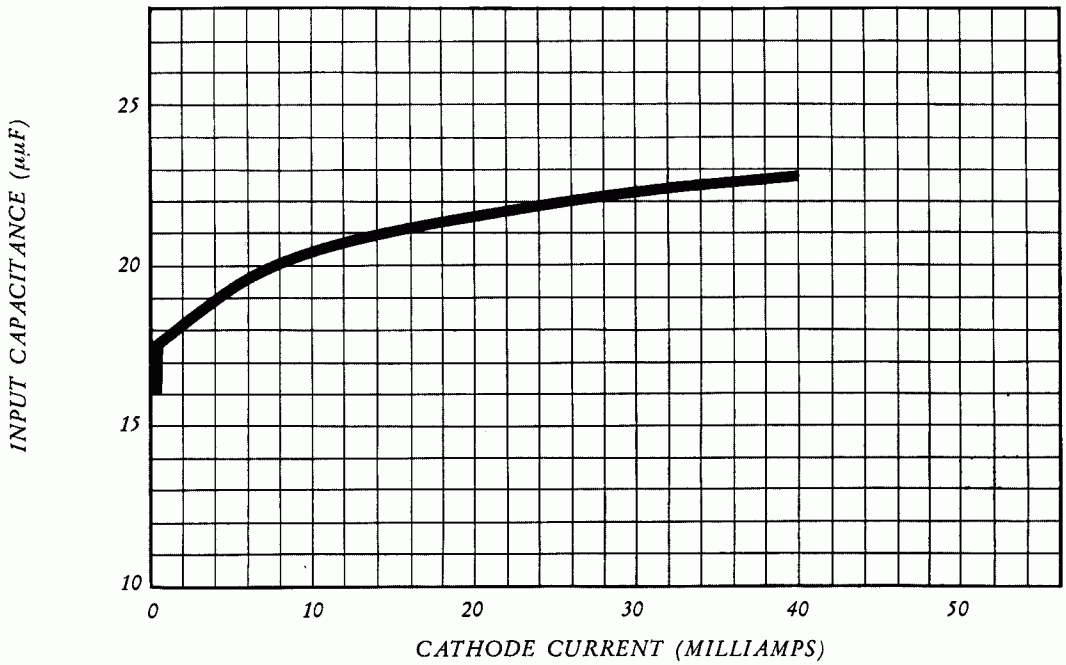
Plate and Grid No 2 to Cathode	.6	$\mu\mu$F
Input (Cathode to Grid, Heater, Int. Shield)	18	$\mu\mu$F
Output (Plate and Grid No 2 to Grid, Heater, Int. Shield)	7	$\mu\mu$F

TYPICAL OPERATION. CLASS A1

Heater Voltage	6.3	volts
Heater Current	.45	amp
Plate Supply Voltage	125	volts
Cathode Bias Resistor	33	ohms
Plate Current	35	ma
Transconductance	47,000	μmhos
Amplification Factor	35	
Equivalent Noise Resistance	60	ohms

* Grid No 2 connected to Plate.

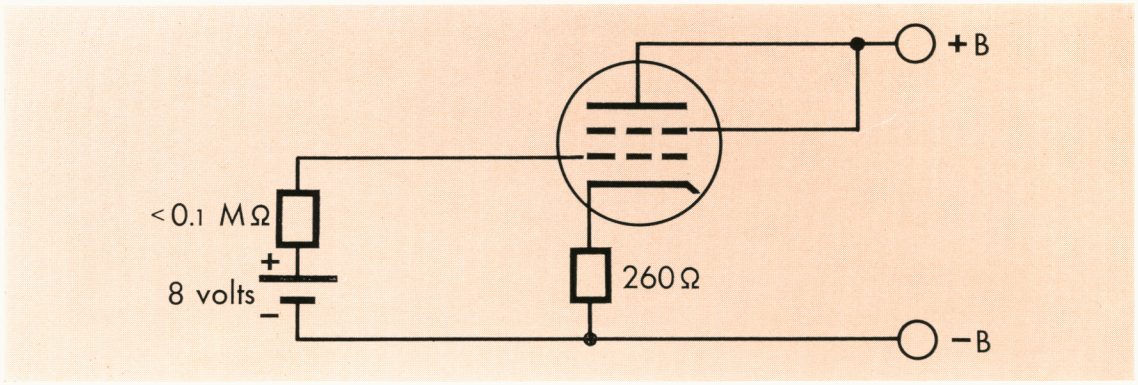
SPECIAL DATA



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.

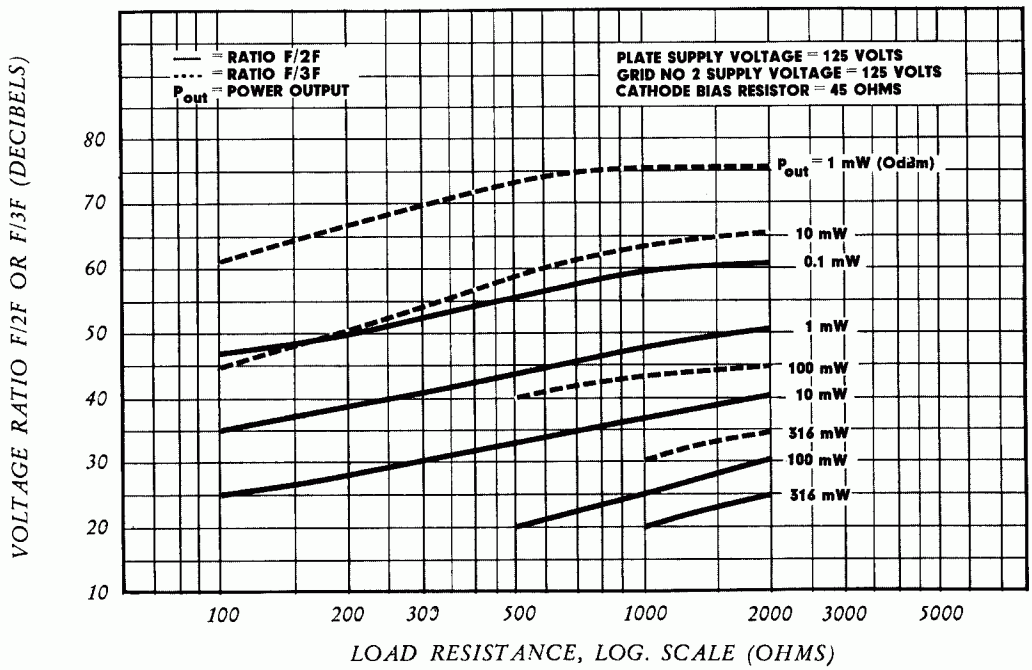
7150 TETRODE AMPLIFIER



BIAS CONSIDERATIONS:

The operating characteristics of high transconductance tubes are sensitive to variations in manufacture. Because of this the use of a 260 ohm cathode resistance, in conjunction with a DC control grid return to a + 8.0 volt supply, is recommended.

To prevent burning out grid wires by removal of plate voltage when the + 8.0 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.

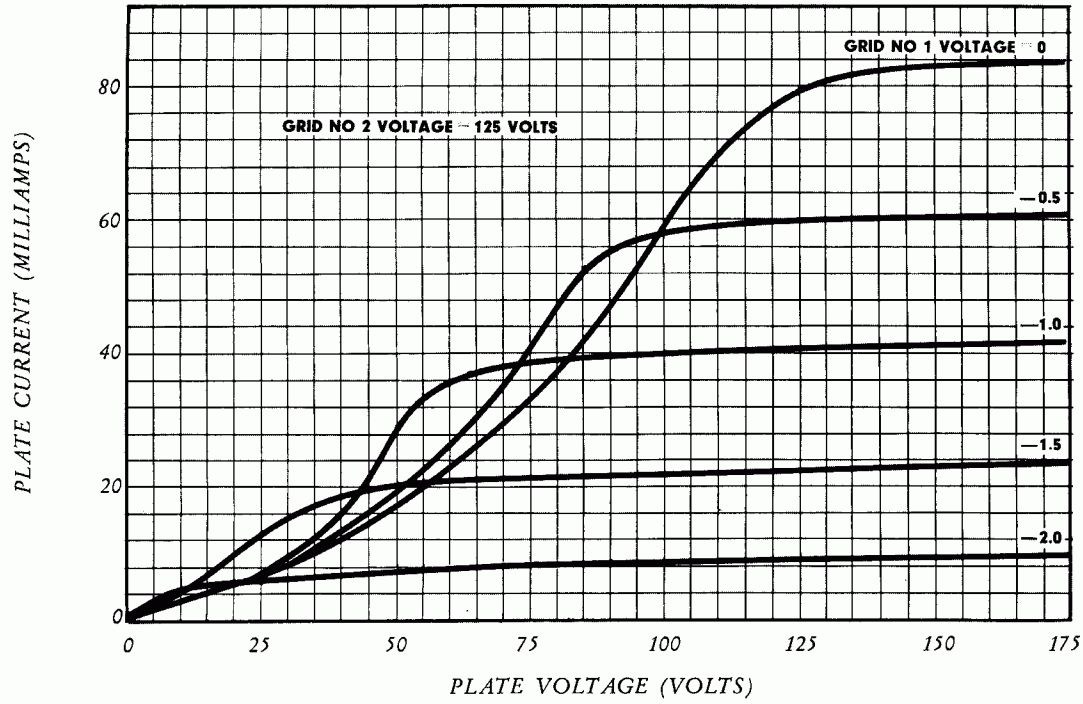


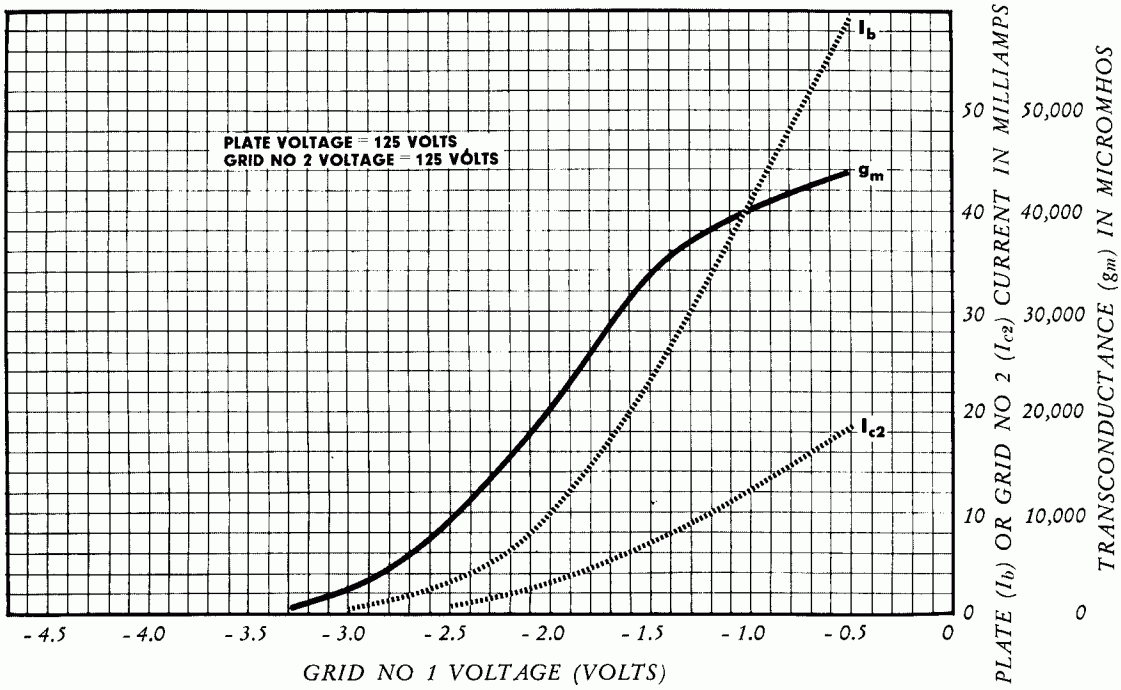
HARMONIC DISTORTION:

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.

TETRODE AMPLIFIER 7150

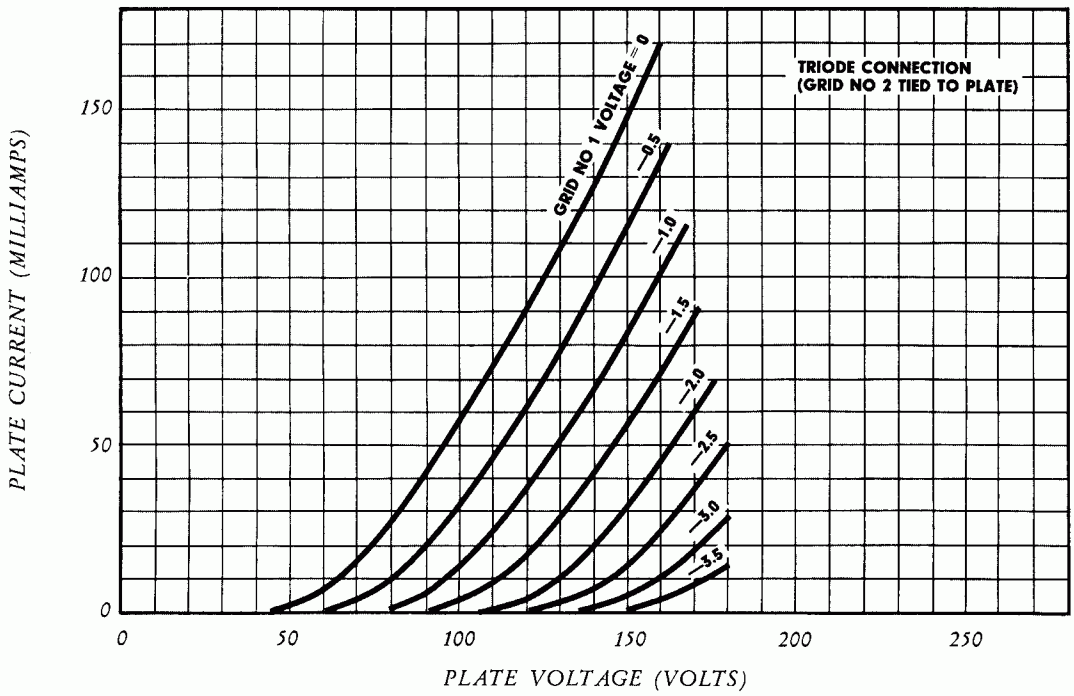
AVERAGE CHARACTERISTICS





7150 TETRODE AMPLIFIER

AVERAGE CHARACTERISTICS



Ericsson LM

BROADBAND PENTODE 7721

D 3 a

Broadband amplifier beam pentode with low noise and extremely high transconductance. The tube features very low input conductance and outstanding gain-bandwidth product.

CAPACITANCES (without external shield)

Grid No 1 to Plate, cold tube	max. .035	$\mu\mu$F
Input, cold tube	10±1	$\mu\mu$F
Input, 28 ma Cathode Current	17	$\mu\mu$F
Output, cold tube	2±.3	$\mu\mu$F

ABSOLUTE MAXIMUM RATINGS

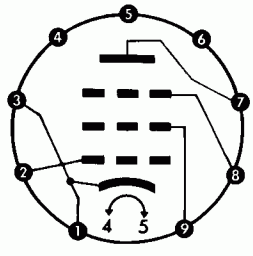
Plate Voltage, peak (intermittent operation)	400	volts
Grid No 2 Voltage, peak (intermittent operation)	400	volts
Plate Voltage, DC	220	volts
Grid No 2 Voltage, DC	180	volts
Beam Plate Voltage, DC	0	volt
Grid No 1 Voltage, positive value	0	volt
Grid No 1 Voltage, negative value	10	volts
Plate Dissipation	4.5	watts
Grid No 2 Dissipation	1.1	watt
Cathode Current	33	ma
Grid No 1 Circuit Resistance, cathode bias	.5	Mohm
Heater — Cathode Voltage	60	volts
Heater — Cathode Resistance, external*	.02	Mohm
Bulb Temperature, at hottest point	170	°C

* The maximum value is recommended in order to avoid influence on the operating conditions by the leakage between heater and cathode.

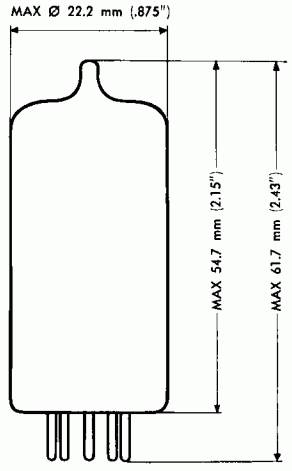
MECHANICAL DATA

Base: Small Button Noval 9-pin, RETMA E9-1
Bulb: EIA T 6½
Mounting Position: Any

PIN NO	CONNECTED TO
1.	Cathode
2.	Grid No 1
3.	Cathode
4.	Heater
5.	Heater
6.	Do not connect
7.	Plate
8.	Beam Plates, Internal Shield
9.	Grid No 2



Bottom view



Pins are goldplated

7721
D3a
BROADBAND PENTODE

TYPICAL OPERATION. CLASS A1

Heater Voltage	6.3	volts
Heater Current	.32	amp
Plate Supply Voltage	190	volts
Beam Plate Voltage	0	volt
Grid No 2 Supply Voltage	160	volts
Grid No 1 Supply Voltage	+ 10	volts
Cathode Bias Resistor	400	ohms
Plate Current	22	ma
Grid No 2 Current	6	ma
Transconductance	35,000	μmhos
Plate Resistance	.12	Mohm
Amplification Factor Grid No 2 to 1	85	
Equivalent Noise Resistance	150	ohms
Input Conductance at 100 Mc	1000	μmhos

GAIN-BANDWIDTH PRODUCT	*Tube Cold*	*Typical operation**	
At LF $\frac{g_m}{2\pi \quad (C_{in}+C_{out})}$	464	232	Mc
At IF $\frac{g_m}{2\pi \sqrt{C_{in} \cdot C_{out}}}$	1246	623	Mc

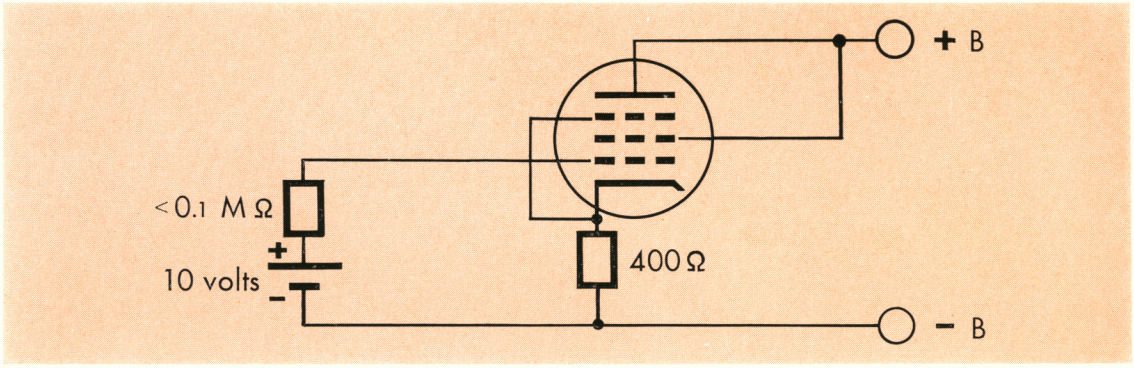
* The following additions have been made for tube sockets and wiring capacitances to get total circuit capacitances under typical operating conditions:
At LF — 5 $\mu\mu$F.
At IF — 3 $\mu\mu$F for input circuit and 2 $\mu\mu$F for output circuit.

OPERATION RANGE VALUES

Heater Voltage		6.3		volts
Plate Supply Voltage		190		volts
Grid No 2 Supply Voltage		160		volts
Grid No 1 Supply Voltage		+ 10		volts
Cathode Bias Resistor		400		ohms
	MIN	AVE	MAX	
Heater Current	300	320	340	ma
Plate Current	21	22	23	ma
Grid No 2 Current	5	6	7	ma
Transconductance	30,000	35,000	40,000	μmhos
Transconductance, End of Life Point	24,000			μmhos
Grid No 1 Current			— .5	μa
I_{hk} at E_{hk} = ± 100 volts			20	μa

Printed in Sweden
GRAFISK REKLAM/RELIEFTRYCK AB STHLM 1963

Tentative Data 3/63 Edition 1

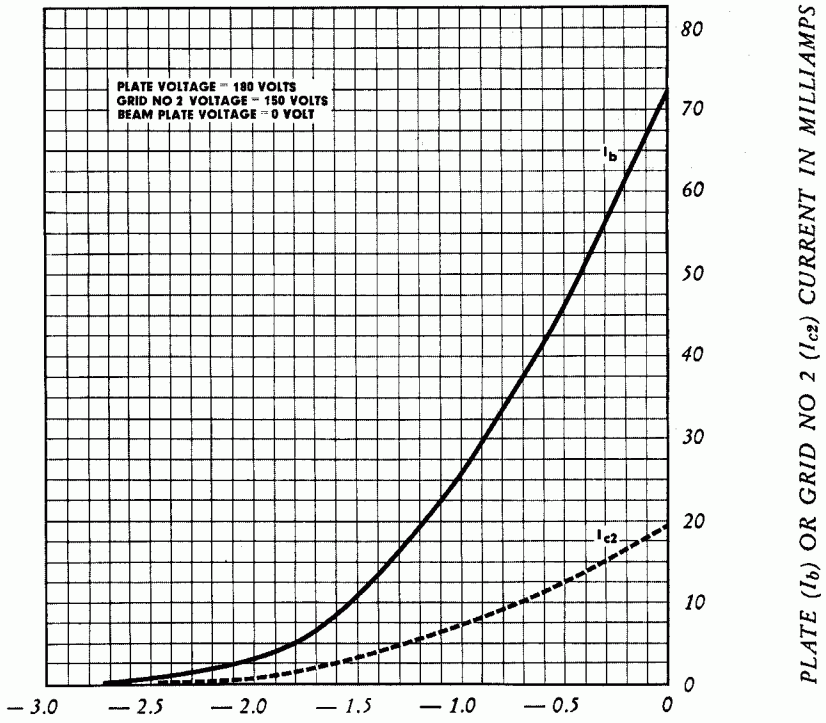


BIAS CONSIDERATIONS:

The use of a 400 ohms cathode resistance, in conjunction with a DC control grid return to a + 10 volt supply is recommended.

To prevent burning out grid wires by removal of plate and/or grid No 2 voltage when the + 10 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 or grid No 2 voltage.

AVERAGE CHARACTERISTICS

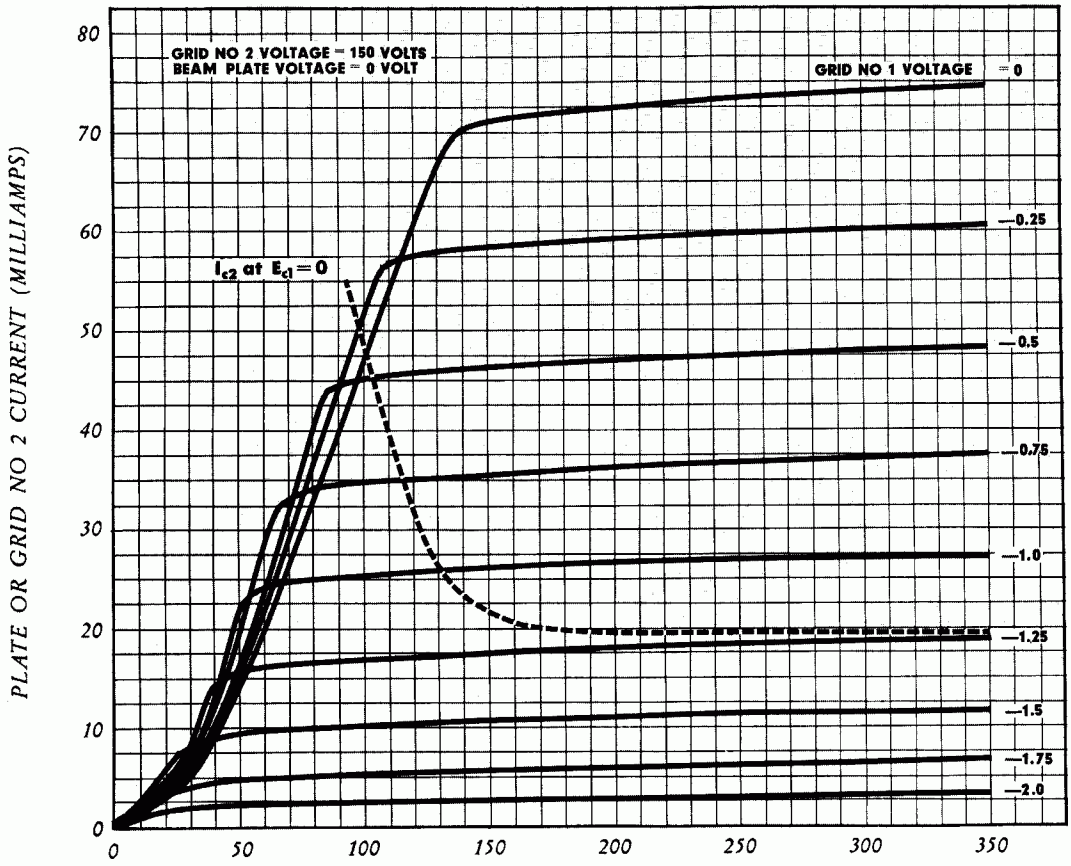


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BROADBAND PENTODE

AVERAGE CHARACTERISTICS



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