

SPECIAL QUALITY V.H.F. POWER TETRODE

M8096

Special quality r.f. beam power tetrode for use at frequencies up to 175Mc/s in equipment where mechanical vibration and shocks are unavoidable and where statistically controlled major electrical characteristics are required.

This data should be read in conjunction with GENERAL NOTES – SPECIAL QUALITY VALVES which precede this section of the handbook, and the index numbers are used to indicate where reference should be made to a specific note.

HEATER

V_h^1	6.0	V
I_h	750	mA

CAPACITANCES² (measured without an external shield)

C_{a-g1}	< 300	mpF
C_{in}	9.5	pF
C_{out}	4.5	pF

CHARACTERISTICS³

V_a	250	V
V_{bp}	0	V
V_{g2}	250	V
V_{g1}	-7.5	V
I_a	45	mA
I_{g2}	4.5	mA
g_m	7.0	mA/V
μ_{g1-g2}	16	
R_k	0	Ω

LIMITING VALUES⁴ (absolute ratings)

f max.	175	Mc/s
$V_{a(b)}$ max.	500	V
V_a max.	300	V
$V_{g2(b)}$ max.	500	V
V_{g2} max.	250	V
$-V_{g1}$ max.	125	V
p_a max.	12	W
p_{g2} max.	2.0	W
I_k max.	60	mA
$i_{k(pk)}$ max.	550	mA
V_{h-k} max.	100	V
Maximum acceleration (continuous operation)	2.5	g
Maximum shock (short duration)	500	g
T_{bulb} max.	250	°C

TEST CONDITIONS (unless otherwise specified)

V_h	V_a	V_{bp}	V_{g2}	V_{g1}	R_k	V_{h-k}
(V)	(V)	(V)	(V)	(V)	(Ω)	(V)
6.0	250	0	250	-7.5	0	0

TESTS

	A.Q.L. ⁵		Individuals ⁶		Lot average ⁷		Lot standard deviation ⁸ Max.
	(%)	(%)	Bogey ⁹	Min.	Max.	Min.	
GROUP A							
Insulation							
a-rest, g_2 -rest measured at -300V	0.25	—	100	—	—	—	M Ω
g_1 -rest measured at -100V	0.25	—	100	—	—	—	M Ω
Reverse grid-current							
R_{g1} max. = 100k Ω	0.25	—	—	2.5	—	—	μ A
GROUP B							
Heater current							
Heater to cathode leakage current	0.65	—	690	810	—	—	mA
V_{h-k} = 100V (cathode negative)	0.65	—	—	—	—	—	μ A
V_{h-k} = 100V (cathode positive)	—	—	—	20	—	—	μ A
†Anode current	0.65	—	45	57	—	—	mA
	—	—	—	—	39	51	mA
Screen-grid current	0.65	—	—	7.0	—	—	mA
Mutual conductance	0.65	—	7.0	5.6	9.0	—	mA/V
	—	—	—	—	6.3	7.7	0.54 mA/V
Group quality level ¹⁰	1.0	—	—	—	—	—	—

When V_{g1} is applied in turn to pins 8 and 9,

†no change in anode current should result.

GROUP C

Anode current. $V_{g1} = -15V$
Change in mutual conductance. $V_h = 5.7V$
Microphonic noise at the anode at 50c/s and
2.5g min. peak acceleration, $V_b = 250V$,
 $R_a = 2.0k\Omega$, $V_g = -15V$.

Amplification factor (μ_{g1-g2})

*Beam plate continuity test. $V_{bp} = 250V$

Group quality level¹⁰

*The anode and screen-grid currents should
change from the values obtained in group B

2.5	—	—	—	—	15	—	—	—	—	mA
2.5	—	—	—	—	15	—	—	—	—	%
2.5	—	—	—	—	250	—	—	—	—	mV (r.m.s.)
2.5	—	—	—	—	13	—	—	—	—	
2.5	—	—	—	—	—	—	—	—	—	
6.5	—	—	—	—	—	—	—	—	—	

GROUP D

Glass strain test^{11A}. No applied voltages

Base strain test¹². No applied voltages

Capacitances (unshielded). No applied voltages

C_{a-g}

C_{in}

C_{out}

Reverse grid current. $V_h = 6.6V$, $V_a = 300V$,
 $V_{g2} = 250V$, $I_a = 40mA$

Power oscillation. $V_{g(b)} = 300V$, $I_a = 50mA$,
 $R_{g1} = 16k\Omega$, $f = 135Mc/s$

Reverse screen-grid current. $V_a = 0V$,

$I_{g2} = 10mA$, $V_{g2} = 170V_{r.m.s.}$

*Peak cathode current. $V_{a(pk)} = V_{g1(pk)}$

$= V_{bp(pk)} = 200V$

6.5	—	—	—	—	—	—	—	—	—	—	—
6.5	—	—	—	—	—	—	—	—	—	—	—
6.5	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	mpF
—	—	—	—	—	—	—	—	—	—	—	pF
—	—	—	—	—	—	—	—	—	—	—	pF
6.5	—	—	—	—	—	—	—	—	—	—	μA
6.5	—	—	—	—	—	—	—	—	—	—	W
6.5	—	—	—	—	—	—	—	—	—	—	μA
6.5	—	—	—	—	—	—	—	—	—	—	A

*The voltage waveform should be a half-sine wave.
P.R.F. = 50p/s., t_p max. = 12.5 μ s.



	A.Q.L. ⁵ (%)	Individuals ⁶		Lot average ⁷		Lot standard deviation ⁸ Max.
		Bogey ⁹	Min.	Max.	Min.	
GROUP E						
<i>Fatigue</i> ¹⁴						
V _h = 6.6V, 1 minute on 3 minutes off. No other voltages applied, 5g min. peak acceleration, f = 170c/s for 33 hours in each of 3 mutually perpendicular planes						
Post fatigue tests						
Heater to cathode leakage current.	2.5	—	—	—	—	—
V _{h-k} = ± 100V				40		μA
Reverse grid current.	2.5	—	—	—	—	μA
R _{g1} max. = 100kΩ				5.0		W
Power oscillation as in group D	2.5	—	1.0	—	—	mV
Microphonic noise as in group C	2.5	—	—	500	—	(r.m.s.)
Shock ¹⁵						
No applied voltages, 500g						
Post shock tests						
Heater to cathode leakage current.	2.5	—	—	—	—	—
V _{h-k} = ± 100V				40		μA
Reverse grid current.	2.5	—	—	—	—	μA
R _{g1} max. = 100kΩ				5.0		W
Power oscillation as in group D	2.5	—	1.0	—	—	mV
Microphonic noise as in group C	2.5	—	—	500	—	(r.m.s.)

GROUP F

Stability life test¹⁴

Running conditions, $R_{g1} = 100k\Omega \pm 20\%$,
 $R_k = 150\Omega \pm 10\%$, $V_{h-k} = 100V$ (cathode
negative), $C_k = 1000\mu F$

Stability life test end points

Change in mutual conductance after 1 hour 1.0 — — 10 — — %

Intermittent life test

Running conditions, $R_{g1} = 100k\Omega \pm 20\%$,
 $R_k = 150\Omega \pm 10\%$, $V_{h-k} = 100V$ (cathode
negative) $C_k = 1000\mu F$

Intermittent life test end points

Sub-group (a)	A.Q.L. ⁵ (%)	Min.	Max.
Inoperatives ¹⁶	2.5	—	—
Heater current	4.0	—	—
Heater to cathode leakage current, $V_{h-k} = \pm 100V$	2.5	640	810
Reverse grid current: $R_{g1} \text{ max.} = 100k\Omega$	4.0	—	—
Mutual conductance	2.5	—	—
Average change in mutual conductance	4.0	4.8	4.0
Sub-group (b)			
Anode current	4.0	28	57
Insulation as in group A	6.5	25	—
Power oscillation as in group D	4.0	50	—
Group quality level ¹⁰	6.5	30	—
	4.0	1.0	—
	6.5	0.8	—
	10	—	—

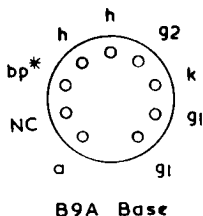
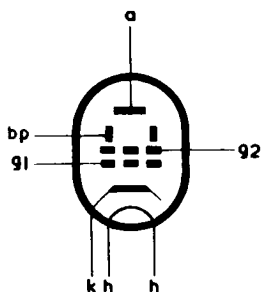


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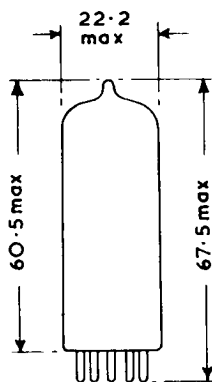
SPECIAL QUALITY V.H.F. POWER TETRODE

GROUP G

	A.Q.L. ⁵ (%)	Min.	Max.
Valves are held for 28 days and retested for Inoperatives ¹⁶	0.5	—	—
Reverse grid current. R_{g1} max. = 100k Ω	0.5	—	2.5 μ A



All dimensions in mm

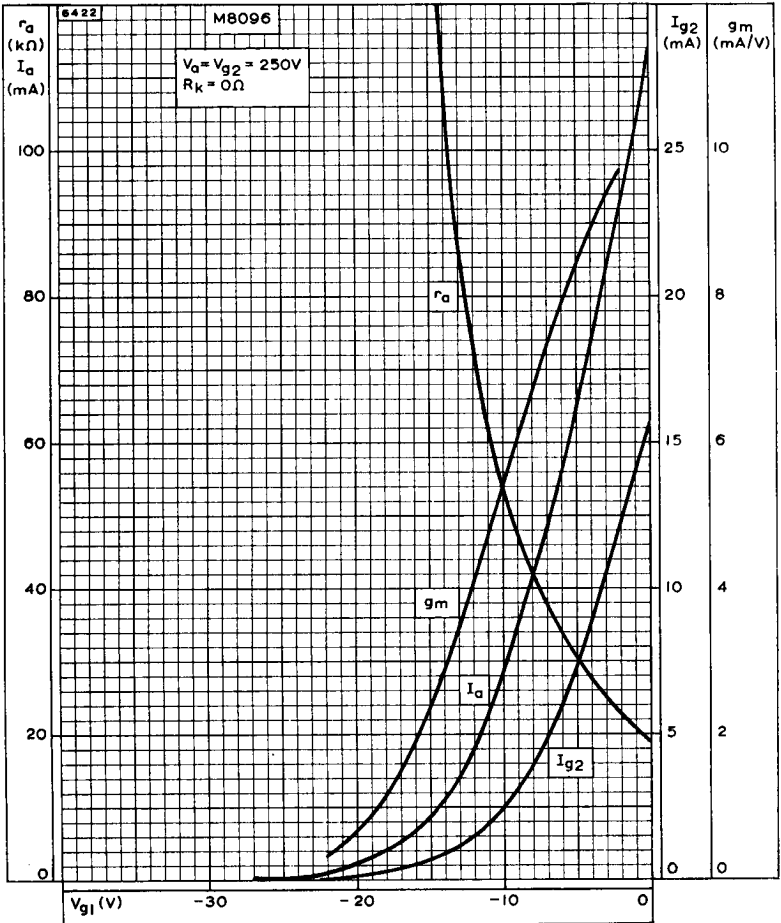


* Connect contact 3 to contact 7 at socket. Contacts 8 and 9 should be connected to external circuit with leads of equal length.

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The bulb and base dimensions of this valve are in accordance with BS448, Section B9A

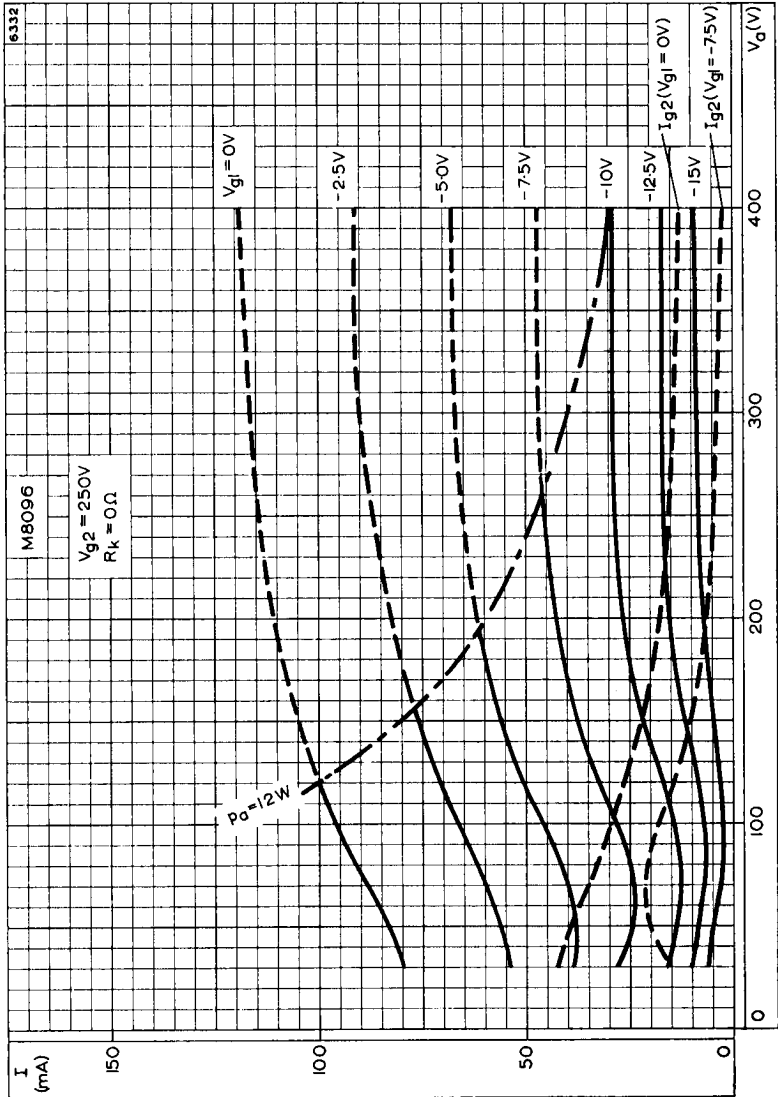




ANODE AND SCREEN-GRID CURRENTS, MUTUAL CONDUCTANCE AND ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE

M8096

SPECIAL QUALITY V.H.F. POWER TETRODE



ANODE AND SCREEN-GRID CURRENTS PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER