SPECIAL QUALITY R.F. PENTODE

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Special quality r.f. pentode for use in equipment where high ambient temperatures, 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]	6.3	V
I_h	150	mA

MOUNTING POSITION

Any

Note – Direct soldered connections to the leads of this valve must be at least 5mm from the seal and any bending of the valve leads must be at least 1.5mm from the seal.

CAPACITANCES[2] (measured with external shield)

c_{a-g1}	<15	mpF
c_{in}	4.2	pF
c_{out}	3.4	pF

CHARACTERISTICS[3]

V_a	100	V
*V_{g3}	0	V
V_{g2}	100	V
V_{g1}	−1.5	V
I_a	7.5	mA
I_{g2}	2.4	mA
g_m	5.0	mA/V
r_a	>175	kΩ
R_k	0	Ω
V_{g1} (I_a < 50μA)	−9.0	V

*The suppressor grid should not be used for control or gating purposes.

LIMITING VALUES[4] (absolute ratings)

V_h max.	6.6	V
V_h min.	6.0	V
$V_{a(b)}$ max.	330	V
V_a max.	165	V
p_a max.	800	mW
V_{g3} max.	22	V
$V_{g2(b)}$ max.	310	V
V_{g2} max.	155	V
p_{g2} max.	350	mW
+V_{g1} max.	0	V
−V_{g1} max.	55	V
I_k max.	16.5	mA
R_{g1-k} max.	1.1	MΩ
V_{h-k} max.	200	V
Maximum acceleration (continuous operation)	2.5	g
Maximum shock (short duration)	500	g
T_{bulb} max.	220	°C

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TEST CONDITIONS (unless otherwise specified)

V_h (V)	V_{a-e} (V)	V_{g3-k} (V)	V_{g2-e} (V)	V_{g1-e} (V)	R_k (Ω)	C_k (μF)	V_{h-k} (V)
6.3	100	0	100	0	150	1000	0

TESTS	A.Q.L.[5] (%)	Individuals[6] Bogey[9]	Individuals[6] Min.	Individuals[6] Max.	Lot average[7] Min.	Lot average[7] Max.	Lot standard deviation[8] Max.	
GROUP A								
Heater current	0.65	150	140	160	—	—	—	mA
	—	—	—	—	144	156	4.2	mA
Heater-to-cathode leakage current $V_{h-k} = \pm 100V$	0.65	—	—	5.0	—	—	—	μA
Reverse grid current $R_{g1} = 1.0M\Omega$	0.65	—	0	0.3	—	—	—	μA
Anode current	0.65	7.5	5.5	9.5	—	—	—	mA
	—	—	—	—	6.7	8.3	0.8	mA
Anode current $V_{g1} = -9.0V$, $R_k = 0\Omega$	0.65	—	—	50	—	—	—	μA
Screen-grid current	0.65	—	1.5	3.3	—	—	—	mA
Mutual conductance	0.65	5.0	4.2	5.8	—	—	—	mA/V
	—	—	—	—	4.7	5.3	0.31	mA/V
Sub-group quality level[10]	1.0	—	—	—	—	—	—	
Inoperatives[16]	0.4	—	—	—	—	—	—	

GROUP B

Insulation								
a-rest, measured at –300V	2.5	—	100	—	—	—	—	MΩ
g_1-rest, measured at –100V	2.5	—	100	—	—	—	—	MΩ
Change in mutual conductance $V_h = 5.7V$	2.5	—	—	10	—	—	—	%
Reverse grid current $V_h = 7.5V$, $V_{g1} = -9.0V$, $R_{g1} = 1.0M\Omega$, $R_k = 0\Omega$. Measured after 5 minutes preheat under standard test conditions, except $V_h = 7.5V$, $R_{g1} = 1.0M\Omega$	2.5	—	0	0.5	—	—	—	μA
†A.F. noise at anode, $V_{g2-e} = 19V$, $R_{g1} = 100k\Omega$ $R_{g2} = 1.0k\Omega$, $R_a = 200k\Omega$	2.5	—	—	70	—	—	—	mV
Anode impedance	6.5	—	175	—	—	—	—	kΩ
Capacitances[2] (shielded) No applied voltages	6.5	—	—	—	—	—	—	
c_{in}	—	—	3.5	4.9	—	—	—	pF
c_{out}	—	—	2.9	3.9	—	—	—	pF
c_{a-g1}	—	—	—	15	—	—	—	mpF
Low pressure voltage breakdown Pressure = 55±5mmHg Voltage = $300V_{r.m.s.}$ No other applied voltages	6.5	—	—	—	—	—	—	
Microphonic noise at the anode at 50c/s, 15g min. peak acceleration, $R_a = 10k\Omega$	—	—	—	60	—	—	—	mV (r.m.s.)

†The valve is tapped with a specified hammer and the output observed on a meter of specified dynamic response.

TESTS	A.Q.L.[5] (%)	Individuals[6] Bogey[9]	Individuals[6] Min.	Individuals[6] Max.	Lot average[7] Min.	Lot average[7] Max.	Lot standard deviation[8] Max.	
GROUP C								
Lead fragility test[13B] 4 arcs	2.5	—	—	—	—	—	—	
Fatigue[14]								
V_h = 6.3V. No other voltages applied. 2.5g min. peak acceleration, fixed frequency f = 25c/s min. 60c/s max. for 32 hours in each of 3 mutually perpendicular planes								
Post fatigue tests								
Heater-to-cathode leakage current V_{h-k} = ±100V	6.5	—	—	20	—	—	—	μA
Change in mutual conductance	6.5	—	—	20	—	—	—	%
Microphonic noise as in group B	6.5	—	—	200	—	—	—	mV (r.m.s.)
Shock[15]								
V_{h-k} = 100V (cathode negative), R_{g1} = 100kΩ, 500g								
Post shock tests								
Heater-to-cathode leakage current V_{h-k} = ±100V	20	—	—	20	—	—	—	μA
Change in mutual conductance	20	—	—	20	—	—	—	%
Microphonic noise as in group B	20	—	—	200	—	—	—	mV (r.m.s.)
Glass strain test[11B]. No applied voltages	6.5	—	—	—	—	—	—	

GROUP D

Heater cycling life test

V_h = 7.0V 1 minute on, 4 minutes off, 2000 switchings. V_{h-k} = 140$V_{r.m.s.}$ (continuous)

No other applied voltages	2.5	—	—	—	—	—	—	

Stability life[14]

Running conditions: R_{g1} = 1.0MΩ, V_{h-k} = 200V (cathode negative), $T_{ambient}$ = Room temperature

Stability life end points

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

Survival rate life test[14]

Running conditions R_{g1}=1.0MΩ, V_{h-k}=200V (cathode negative), $T_{ambient}$=Room temperature

Survival rate life test end points (100 hours)

Inoperatives[16]	0.65	—	—	—	—	—	—	
Mutual conductance	1.0	—	3.75	—	—	—	—	mA/V

Intermittent life test

Running conditions: R_{g1} = 1.0MΩ, V_{h-k}=200V (cathode negative), T_{bulb}min.=220°C

Intermittent life test end points(500 hours)	*A.Q.L.*[5] (%)	*Min.*	*Max.*	
Inoperatives[16]	2.5	—	—	
Heater current	4.0	138	164	mA
Heater-to-cathode leakage current V_{h-k} = ±100V	4.0	—	10	μA
Reverse grid current R_{g1} = 1.0MΩ	2.5	0	0.8	μA
Change in mutual conductance (individuals)	2.5	—	20	%
Change in mutual conductance V_h = 5.7V	4.0	—	15	%
Insulation as in group B	4.0	50	—	MΩ
Average change in mutual conductance	—	—	15	%
Sub-group quality level[10]	10	—	—	

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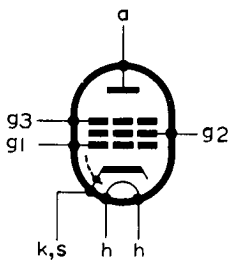
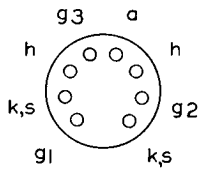
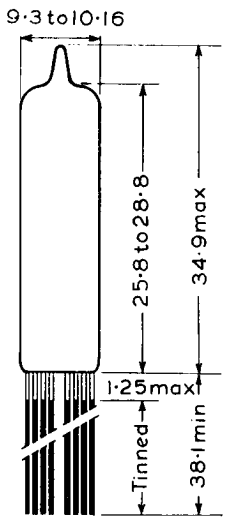




B8D/F Base



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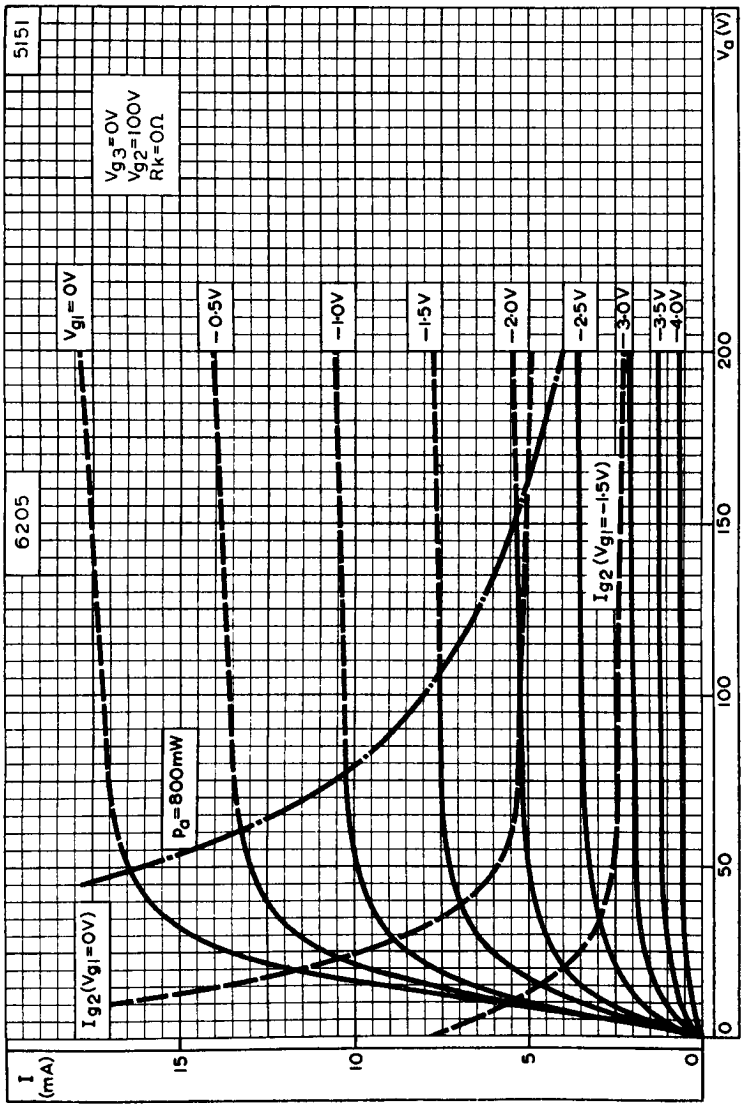
All dimensions in mm

The bulb and base dimensions of this valve are in accordance with BS448, section B8D/F.



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

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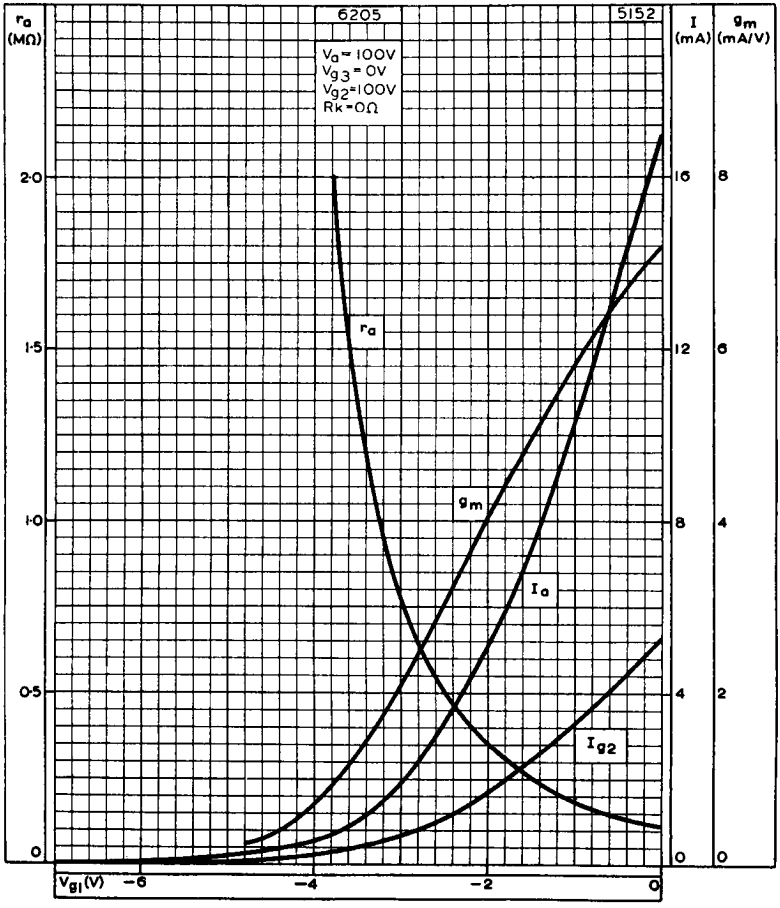

ANODE AND SCREEN-GRID CURRENTS, MUTUAL CONDUCTANCE AND ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE