

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<sup>2</sup>** (measured with external shield)

$C_{a-g1}$	<15	mpF
$C_{1n}$	4.2	pF
$C_{out}$	3.4	pF

**CHARACTERISTICS<sup>3</sup>**

$V_a$	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	k $\Omega$
$R_k$	0	$\Omega$
$V_{g1}$ ( $I_a < 50\mu A$ )	-9.0	V

<sup>3</sup>The suppressor grid should not be used for control or gating purposes.

**LIMITING VALUES<sup>4</sup>** (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 $\leftarrow$
$V_{g2(b)}$ max.	310	V
$V_{g2}$ max.	155	V
$p_{g2}$ max.	350	mW
+ $V_{g1}$ max.	0	V $\leftarrow$
- $V_{g1}$ max.	55	V
$I_k$ max.	16.5	mA
$R_{g1-k}$ max.	1.1	M $\Omega$
$V_{h-k}$ max.	200	V
Maximum acceleration (continuous operation)	2.5	g
Maximum shock (short duration)	500	g
$T_{bulb}$ max.	220	$^{\circ}C$

### TEST CONDITIONS (unless otherwise specified)

$V_h$ (V)	$V_{a-e}$ (V)	$V_{g3-k}$ (V)	$V_{g2-e}$ (V)	$V_{g1-e}$ (V)	$R_k$ ( $\Omega$ )	$C_k$ ( $\mu F$ )	$V_{h-k}$ (V)
6.3	100	0	100	0	150	1000	0

### TESTS

A.Q.L. <sup>5</sup> (%)	Individuals <sup>6</sup>	Lot average <sup>7</sup>	Lot standard deviation <sup>8</sup> Max.
	Min.	Min.	Max.

### GROUP A

Heater current	150	140	160	144	156	—	4.2
Heater-to-cathode leakage current $V_{h-k} = \pm 100V$	—	—	5.0	—	—	—	$\mu A$
Reverse grid current $R_{g1} = 1.0M\Omega$	—	0	0.3	—	—	—	$\mu A$
Anode current	7.5	5.5	9.5	6.7	8.3	—	mA
Anode current $V_{g1} = -9.0V, R_k = 0\Omega$	—	—	—	—	—	—	0.8 mA
Screen-grid current	—	—	50	—	—	—	$\mu A$
Mutual conductance	5.0	4.2	5.8	4.7	5.3	—	mA/V
Sub-group quality level <sup>10</sup>	1.0	—	—	—	—	—	0.31 mA/V
Inoperatives <sup>16</sup>	0.4	—	—	—	—	—	—

## GROUP B

## Insulation

a-rest, measured at -300V  
g<sub>1</sub>-rest, measured at -100V

} 2.5 {

— 100 —

— — —

MΩ  
MΩ

## Change in mutual conductance

V<sub>h</sub> = 5.7V

2.5

— — —

— — —

%

Reverse grid current V<sub>h</sub> = 7.5V, V<sub>g1</sub> = -9.0V,  
R<sub>g1</sub> = 1.0MΩ, R<sub>k</sub> = 0Ω. Measured after 5  
minutes preheat under standard test con-  
ditions, except V<sub>h</sub> = 7.5V, R<sub>g1</sub> = 1.0MΩ

2.5

— 0 0.5 —

— — —

μA

†A.F. noise at anode, V<sub>g2-e</sub> = 19V, R<sub>g1</sub> = 100kΩ

R<sub>g2</sub> = 1.0kΩ, R<sub>a</sub> = 200kΩ

2.5

— — —

— — —

mV

## Anode impedance

6.5

— 175 —

— — —

kΩ

Capacitances<sup>2</sup> (shielded) No applied voltages

6.5

— — —

— — —

pF

C<sub>in</sub>C<sub>out</sub>C<sub>a-g1</sub>

— 3.5 4.9 —

— — —

pF

C<sub>a-g1</sub>

— 2.9 3.9 —

— — —

mpF

## Low pressure voltage breakdown

Pressure = 55 ± 5mmHg

Voltage = 300V<sub>r.m.s.</sub>. No other applied  
voltages

6.5

— — —

— — —

Microphonic noise at the anode at 50c/s, 15g

min. peak acceleration, R<sub>a</sub> = 10kΩ

—

— — —

— — —

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. <sup>5</sup> (%)	Individuals <sup>6</sup>		Lot average <sup>7</sup>		Lot standard deviations <sup>8</sup> Max.
		Bogey <sup>9</sup>	Min.	Max.	Min.	
<b>GROUP C</b>	2.5	—	—	—	—	—
Lead fragility test <sup>13B</sup> 4 arcs		—	—	—	—	—
<b>Fatigue<sup>14</sup></b>		—	—	—	—	—
$V_h = 6.3V$ . 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		—	—	—	—	—
<b>Post fatigue tests</b>		—	—	—	—	—
Heater-to-cathode leakage current		—	—	—	—	—
$V_{h-k} = \pm 100V$	} 6.5	—	—	—	—	—
Change in mutual conductance		—	—	—	—	—
Microphonic noise as in group B		—	—	—	—	—
						$\mu A$ % mV (r.m.s.)
<b>Shock<sup>15</sup></b>		—	—	—	—	—
$V_{h-k} = 100V$ (cathode negative), $R_{g1} = 100k\Omega$ , 500g		—	—	—	—	—
<b>Post shock tests</b>		—	—	—	—	—
Heater-to-cathode leakage current		—	—	—	—	—
$V_{h-k} = \pm 100V$	} 20	—	—	—	—	—
Change in mutual conductance		—	—	—	—	—
Microphonic noise as in group B		—	—	—	—	—
Glass strain test <sup>11B</sup> . No applied voltages	6.5	—	—	—	—	—
						$\mu A$ % mV (r.m.s.)

**GROUP D****Heater cycling life test**

$V_h = 7.0V$  1 minute on, 4 minutes off,  
2000 switchings.  $V_{h-k} = 140V_{r.m.s.}$  (continuous)  
No other applied voltages 2.5

**Stability life<sup>14</sup>**

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

**Stability life end points**

Change in mutual conductance after 1 hour 1.0 10 %

**Survival rate life test<sup>11</sup>**

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

**Survival rate life test end points (100 hours)**

Inoperatives<sup>16</sup> 0.65  
Mutual conductance 1.0 3.75 mA/V

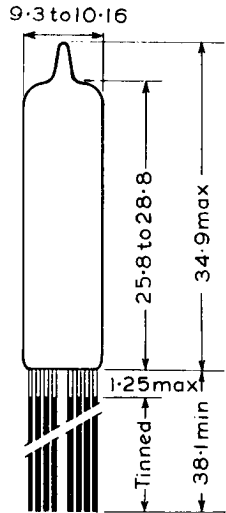
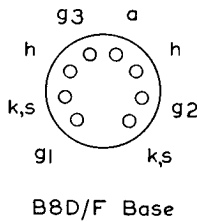
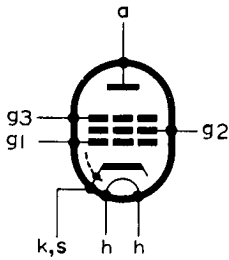
**Intermittent life test**

Running conditions:  $R_{g1} = 1.0M\Omega$ ,  
 $V_{h-k} = 200V$  (cathode negative),  $T_{but.min.} = 220^\circ C$

**Intermittent life test end points(500 hours)**

Inoperatives<sup>16</sup> .. .. .  
Heater current .. .. .  
Heater-to-cathode leakage current  $V_{h-k} = \pm 100V$  .. .. .  
Reverse grid current  $R_{g1} = 1.0M\Omega$  .. .. .  
Change in mutual conductance (individuals) .. .. .  
Change in mutual conductance  $V_h = 5.7V$  .. .. .  
Insulation as in group B .. .. .  
Average change in mutual conductance .. .. .  
Sub-group quality level<sup>10</sup> .. .. .

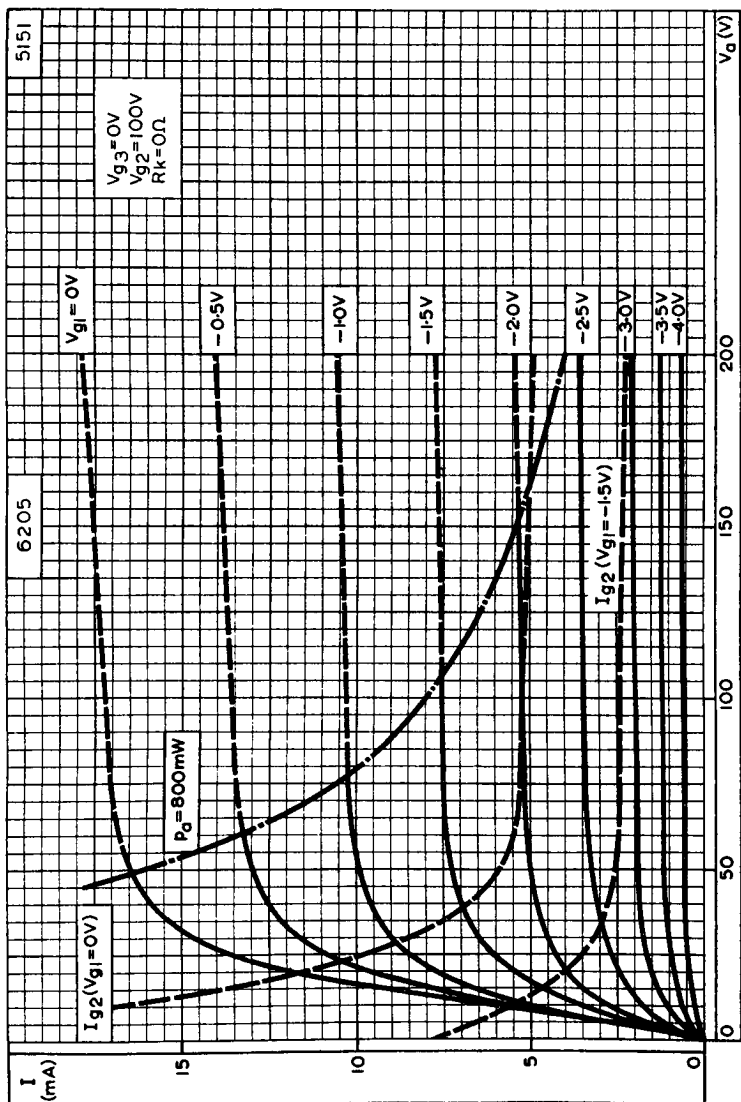
A.Q.L. <sup>5</sup> (%)	Min.	Max.
2.5	138	164
4.0	10	0.8
2.5	0	20
4.0	50	15
10	15	15



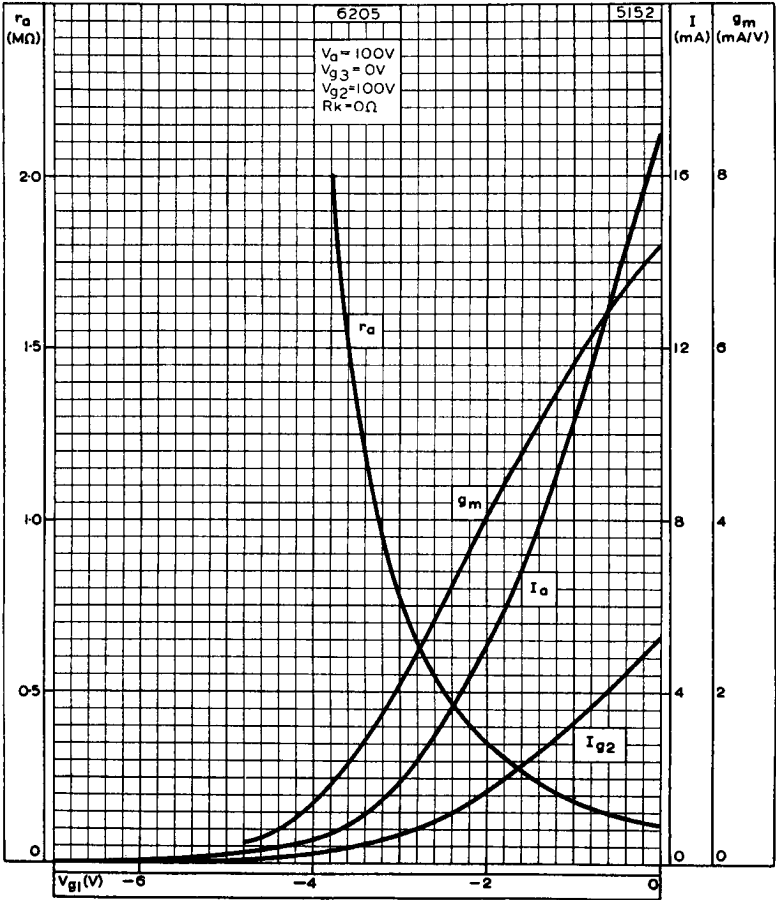
5544

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



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

