

# SPECIAL QUALITY R.F. POWER TRIODE

# M8080

*Special quality power triode for use as an r.f. power amplifier or oscillator 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

|          |     |    |
|----------|-----|----|
| $V_{h1}$ | 6.3 | V  |
| $I_h$    | 150 | mA |

## CAPACITANCES<sup>2</sup> (measured without an external shield)

|           |     |    |
|-----------|-----|----|
| $C_{in}$  | 1.5 | pF |
| $C_{out}$ | 1.2 | pF |
| $C_{a-g}$ | 1.4 | pF |

## CHARACTERISTICS<sup>3</sup>

|       |      |            |
|-------|------|------------|
| $V_a$ | 250  | V          |
| $I_a$ | 10.5 | mA         |
| $V_g$ | -8.5 | V          |
| $g_m$ | 2.2  | mA/V       |
| $\mu$ | 17   |            |
| $r_a$ | 7.7  | k $\Omega$ |
| $R_k$ | 0    | $\Omega$   |

## LIMITING VALUES<sup>4</sup> (absolute ratings)

|                                             |     |              |
|---------------------------------------------|-----|--------------|
| $f$ max.                                    | 150 | Mc/s         |
| $V_{a(b)}$ max.                             | 550 | V            |
| $V_a$ max.                                  | 330 | V            |
| $p_a$ max.                                  | 3.8 | W            |
| $-V_g$ max.                                 | 110 | V            |
| $I_g$ max.                                  | 5.5 | mA           |
| $I_k$ max.                                  | 21  | mA           |
| $R_{g-k}$ max. (cathode bias)               | 1.0 | M $\Omega$   |
| $R_{g-k}$ max. (fixed bias)                 | 250 | k $\Omega$   |
| $V_{h-k}$ max.                              | 150 | V            |
| Maximum acceleration (continuous operation) | 2.5 | g            |
| Maximum shock (short duration)              | 500 | g            |
| $T_{bulb}$ max.                             | 170 | $^{\circ}$ C |

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## TEST CONDITIONS (unless otherwise specified)

|       |       |       |              |           |
|-------|-------|-------|--------------|-----------|
| $V_h$ | $V_a$ | $V_g$ | $R_k$        | $V_{h-k}$ |
| (V)   | (V)   | (V)   | ( $\Omega$ ) | (V)       |
| 6.3   | 250   | -8.5  | 0            | 0         |

## TESTS

A.Q.L.<sup>5</sup>

Individuals<sup>6</sup>

Lot average<sup>7</sup>

Lot standard  
deviation<sup>8</sup>

(%)

Bogey<sup>9</sup>

Min.

Max.

Min.

Max.

Max.

## GROUP A

Insulation

a-rest measured at -300V

0.25

—

100

—

—

—

—

M $\Omega$

g-rest measured at -100V

0.25

—

100

—

—

—

—

M $\Omega$

Reverse grid current,  $R_{g1}$  max. = 500k $\Omega$

0.25

—

—

0.5

—

—

—

$\mu$ A

## GROUP B

Heater current

0.65

—

138

162

—

—

—

mA

Heater cathode leakage current

0.65

—

—

—

—

—

—

$V_{h-k}$  = 100V (cathode negative)

—

—

10

—

—

—

$\mu$ A

$V_{h-k}$  = 100V (cathode positive)

—

—

10

—

3.0

—

$\mu$ A

Anode current

0.65

10.5

6.5

14.5

—

—

1.22

mA

—

—

—

9.0

12

—

mA

Mutual conductance

0.65

—

2.2

1.75

2.65

—

—

—

mA/V

—

—

—

2.0

2.4

0.157

mA/V

Group quality level<sup>10</sup>

1.0

—

—

—

—

—

—

—



GROUP C

|                                                                                                                                                                            |     |   |   |     |   |   |   |                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---|---|-----|---|---|---|----------------|
| Anode current. $V_g = -30V$                                                                                                                                                | 2.5 | — | — | 50  | — | — | — | $\mu A$        |
| Reverse grid current. $V_h = 6.9V$ , $V_{a-e} = 250V$<br>$V_{g-e} = 0V$ , $R_k = 810\Omega$                                                                                | 2.5 | — | — | 1.0 | — | — | — | $\mu A$        |
| Microphonic noise at the anode at 50c/s and<br>2.5g min. peak acceleration, $V_h = 250V$ ,<br>$R_a = 2k\Omega$ , $V_{g-e} = 0V$ , $R_k = 810\Omega$ ,<br>$C_k = 1000\mu F$ | 2.5 | — | — | 7.0 | — | — | — | mV<br>(r.m.s.) |
| Group quality level <sup>10</sup>                                                                                                                                          | 6.5 | — | — | —   | — | — | — |                |

GROUP D

|                                                                             |     |      |      |      |       |       |      |      |
|-----------------------------------------------------------------------------|-----|------|------|------|-------|-------|------|------|
| Glass strain test <sup>11A</sup> . No applied voltages                      | 6.5 | —    | —    | —    | —     | —     | —    |      |
| Base strain test <sup>12</sup> . No applied voltages                        | 6.5 | —    | —    | —    | —     | —     | —    |      |
| Capacitances (unshielded). No applied<br>voltages; pin 2 connected to pin 7 | 6.5 | —    | —    | —    | —     | —     | —    |      |
| $C_{in}$                                                                    | —   | —    | 1.35 | 2.25 | —     | —     | —    | pF   |
| $C_{out}$                                                                   | —   | —    | 0.98 | 1.62 | —     | —     | —    | pF   |
| $C_{a-g}$                                                                   | —   | —    | 1.2  | 2.0  | —     | —     | —    | pF   |
| Mutual conductance. $V_a = 100V$ , $V_g = 0V$                               | 6.5 | 3.25 | 2.5  | 4.0  | —     | —     | —    | mA/V |
|                                                                             | —   | —    | —    | —    | 2.82  | 3.68  | 0.33 | mA/V |
| Change of mutual conductance. $V_a = 100V$ ,<br>$V_g = 0V$ , $V_h = 5.7V$   | 6.5 | —    | —    | 15   | —     | —     | —    | %    |
| Amplification factor                                                        | 6.5 | 17   | 15.5 | 18.5 | —     | —     | —    |      |
|                                                                             | —   | —    | —    | —    | 16.15 | 17.85 | 0.66 |      |
| Power oscillation. $V_a = 300V$ , $R_g = 8.5k\Omega$ ,<br>$f = 150Mc/s$     | 4.0 | —    | 1.8  | —    | —     | —     | —    | W    |

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## TESTS

A.Q.L.<sup>5</sup>

Individuals<sup>6</sup>

Lot average<sup>7</sup>

Lot standard deviation<sup>8</sup>

(%)

Bogey<sup>9</sup>

Min.

Max.

Min.

Max.

Max.

## GROUP E

### Fatigue<sup>14</sup>

$V_h = 6.9V$ , 1 minute on 3 minutes off.  
No other voltages applied, 5g min. peak  
acceleration,  $f = 170 \pm 5c/s$  for 33 hours in  
each of 3 mutually perpendicular planes

### Post fatigue tests

Heater to cathode leakage current

$V_{h-k} = \pm 100V$

2.5

—

—

20

—

—

—

$\mu A$

Reverse grid current

$R_{gmax.} = 500k\Omega$

2.5

—

—

1.0

—

—

—

$\mu A$

Mutual conductance

2.5

—

1.6

2.65

—

—

—

$mA/V$

Microphonic noise as in group C

2.5

—

—

15

—

—

—

$mV$   
(r.m.s.)

### Shock<sup>15</sup>

No applied voltages, 500g

### Post shock tests

Heater to cathode leakage current

$V_{h-k} = \pm 100V$

2.5

—

—

20

—

—

—

$\mu A$

Reverse grid current

$R_{gmax.} = 500k\Omega$

2.5

—

—

1.0

—

—

—

$\mu A$

Mutual conductance

2.5

—

1.6

2.65

—

—

—

$mA/V$

Microphonic noise as in group C

2.5

—

—

15

—

—

—

$mV$   
(r.m.s.)



# TESTS

## GROUP F

### Stability life test<sup>14</sup>

Running conditions.  $V_{a-e} = 250V$ ,  $R_k = 500\Omega$ ,  
 $V_{h-k} = 150V$  (cathode negative)

### Stability life test end point

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

### Intermittent life test

Running conditions.  $V_{a-e} = 250V$ ,  $R_k = 500\Omega$ ,  
 $V_{h-k} = 150V$  (cathode negative)

### Intermittent life test end points

#### Sub-group (a)

Inoperatives<sup>16</sup>

Heater current

Heater to cathode leakage current

$V_{h-k} = \pm 100V$

Reverse grid current.  $R_g$  max. =  $500k\Omega$

Mutual conductance

Average change in mutual conductance

#### Sub-group (b)

Anode current

Insulation as in group A

Group quality level<sup>10</sup>

| A.Q.L. <sup>5</sup><br>(%) | Min. | Max. |            |
|----------------------------|------|------|------------|
| { 500 hours    2.5         | —    | —    |            |
| { 1000 hours    4.0        | —    | —    |            |
| { 500 hours    2.5         | 138  | 162  | mA         |
| { 500 hours    2.5         | —    | 20   | $\mu A$    |
| { 1000 hours    4.0        | —    | 20   | $\mu A$    |
| { 500 hours    2.5         | —    | 0.5  | $\mu A$    |
| { 1000 hours    4.0        | —    | 0.5  | $\mu A$    |
| { 500 hours    2.5         | 1.6  | 2.65 | mA/V       |
| { 1000 hours    4.0        | 1.5  | 2.65 | mA/V       |
| { 500 hours    —           | —    | 15   | %          |
| { 500 hours    4.0         | 5.5  | 14.5 | mA         |
| { 1000 hours    6.5        | 5.0  | 14.5 | mA         |
| { 500 hours    4.0         | 50   | —    | M $\Omega$ |
| { 1000 hours    6.5        | 30   | —    | M $\Omega$ |
| { 500 hours    6.5         | —    | —    |            |
| { 1000 hours    10         | —    | —    |            |

### GROUP G

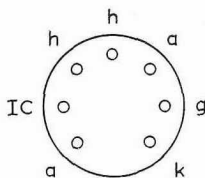
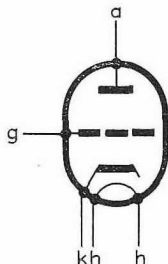
Valves are held for 28 days and retested for

Inoperatives<sup>16</sup>

Reverse grid current.  $R_g$  max. = 500k $\Omega$

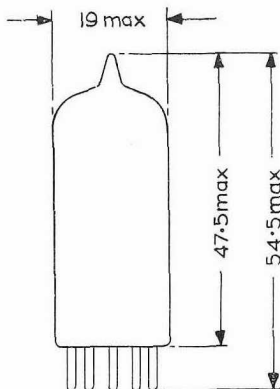
| A.Q.L. <sup>5</sup><br>(%) | Min. | Max.        |
|----------------------------|------|-------------|
| 0.5                        | —    | —           |
| 0.5                        | —    | 0.5 $\mu$ A |

5606



B7G Base

All dimensions in mm



The bulb and base dimensions of this valve are in accordance with BS448 Section B7G.