

## SPECIAL QUALITY DOUBLE TRIODE

# EI80CC

*Special quality double triode, with separate cathodes, for use in computer circuits. This valve will maintain its emission capabilities after long periods of operation under cut-off conditions.*

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

Suitable for series or parallel operation, a.c. or d.c. The heater is centre-tapped and the two sections may be operated in series or in parallel with one another.

Series

$V_h$  applied between pins 4 and 5

Parallel

$V_h$  applied between pin 9 and pins 4 and 5 connected together

|         | Series | Parallel |    |
|---------|--------|----------|----|
| $V_h^1$ | 12.6   | 6.3      | V  |
| $I_h$   | 200    | 400      | mA |

The maximum variation of heater current at  $V_h = 6.3V$  is  $\pm 20mA$  and at  $V_h = 12.6V$  is  $\pm 10mA$ .

In order to achieve a useful valve life with the heater in a series-connected chain, the absolute maximum variation of heater current due to voltage fluctuations and component tolerances should be  $< \pm 1.5\%$ .

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

|               | Minimum | Average | Maximum |     |
|---------------|---------|---------|---------|-----|
| $C_{a'-g'}$   | 1.8     | 2.2     | 2.6     | pF  |
| * $C_{in}$    | 3.0     | 3.5     | 4.0     | pF  |
| $C_{out'}$    | 300     | 500     | 700     | mpF |
| * $C_{h-k}$   | —       | 3.5     | —       | pF  |
| $C_{a''-g''}$ | 1.9     | 2.3     | 2.7     | pF  |
| $C_{out''}$   | 250     | 450     | 650     | mpF |
| $C_{a'-a''}$  | —       | —       | 1.3     | pF  |
| $C_{g'-g''}$  | —       | —       | 60      | mpF |

\*Each section

### CHARACTERISTICS<sup>3</sup> (each section)

|       |      |       |            |
|-------|------|-------|------------|
| $V_a$ | 100  | 150   | V          |
| $V_g$ | -0.8 | -1.85 | V          |
| $I_a$ | 8.5  | 8.5   | mA         |
| $g_m$ | 7.8  | 6.4   | mA/V       |
| $r_a$ | 6.4  | 7.2   | k $\Omega$ |
| $\mu$ | 50   | 46    |            |
| $R_k$ | 0    | 0     | $\Omega$   |

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## CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

|                                         | Average | Initial range | End of life* |         |
|-----------------------------------------|---------|---------------|--------------|---------|
| Anode current (each section)            |         |               |              |         |
| at $V_{a-e} = 150V$ , $R_k = 220\Omega$ | 8.5     | 6.3 to 10.7   | 5.0          | mA      |
| at $V_a = 150V$ , $V_g = -7.5V$         | —       | <150          | 150          | $\mu A$ |
| at $V_a = 100V$ , $V_{g(b)} = 100V$     |         |               |              |         |
| $R_g = 500k\Omega$                      | 17.8    | 13.6 to 22    | 9.5          | mA      |
| Grid current (each section)             |         |               |              |         |
| at $V_{a-e} = 150V$ , $R_k = 220\Omega$ |         |               |              |         |
| $R_g = 100k\Omega$                      | —       | <0.2          | 1.0          | $\mu A$ |
| Mutual conductance (each section)       |         |               |              |         |
| at $V_{a-e} = 150V$ , $R_k = 220\Omega$ | 6.4     | 5.3 to 8.1    | 4.0          | mA/V    |
| Balance ( $V_{g'} \sim V_{g''}$ )       |         |               |              |         |
| at $V_a = 150V$ , $I_a = 150\mu A$      | —       | <2.0          | 2.0          | V       |

## INSULATION

|                                        | Initial range | End of life* |            |
|----------------------------------------|---------------|--------------|------------|
| Between heater and cathode measured at |               |              |            |
| $V_{h-k} = 200V$ (cathode positive)    |               |              |            |
| $R_{jim} = 1.0M\Omega$                 |               |              |            |
| Leakage current                        | <15           | 30           | $\mu A$    |
| Between any two electrodes measured at |               |              |            |
| 275V                                   | >100          | 20           | M $\Omega$ |

\*To allow for valve deterioration during life, circuits should be designed to function with a valve in which one or more of the characteristics have changed to the values stated.

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

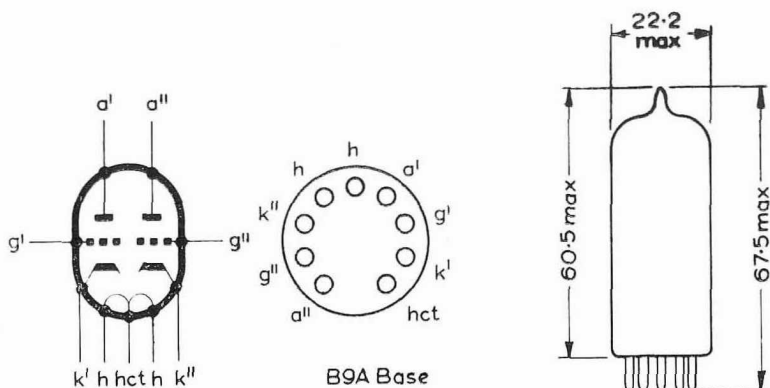
|                                   |     |            |
|-----------------------------------|-----|------------|
| $V_{a(b)}$ max.                   | 600 | V          |
| $V_a$ max.                        | 275 | V          |
| $p_a$ max.                        | 2.0 | W          |
| $+V_g$ max.                       | 1.0 | V          |
| $\dagger -V_{g(pk)}$ max.         | 200 | V          |
| $-V_g$ max.                       | 100 | V          |
| $\dagger i_{g(pk)}$ max.          | 50  | mA         |
| $I_g$ max.                        | 2.0 | mA         |
| $\dagger i_{k(pk)}$ max.          | 200 | mA         |
| $I_k$ max.                        | 20  | mA         |
| $R_{g-k}$ max. (fixed bias)       | 500 | k $\Omega$ |
| $V_{h-k}$ max. (cathode positive) | 200 | V          |
| $V_{h-k}$ max. (cathode negative) | 100 | V          |
| ** $T_{bulb}$ max.                | 170 | °C         |

$\dagger$ Maximum duration = 10 $\mu s$ . Duty cycle = 1%

\*\*In the interests of reliability, the bulb temperature should always be kept as low as possible.

**OPERATING NOTE**

The E180CC will maintain its emission capabilities after long periods under cut-off conditions, but it is not intended to be used in circuits which are critical with regard to hum, microphony or noise.



5033

All dimensions in mm

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

