

## S11E12

## SPECIAL QUALITY BEAM TETRODE

Indirectly heated—for parallel operation

**TENTATIVE****GENERAL**

The S11E12 is a Special Quality Beam Tetrode intended for use as a series or shunt control valve in stabilised power supply units, and has similar characteristics (within ratings) to the 12E1. It is indirectly heated and should be parallel connected to the supply. A special shock resistant construction is employed which gives increased reliability and life expectancy.

Quality tests are performed on electrical characteristics, vibration noise, base strain, glass strain, electrode resonance, vibration fatigue, shock resistance, heater cycling, stability and life.

**RATING**

|                                                           |               |                   |         |
|-----------------------------------------------------------|---------------|-------------------|---------|
| Heater Voltage                                            | (volts)       | $V_h$             | 6.3     |
| Heater Current                                            | (amps)        | $I_h$             | 1.6     |
| Maximum Anode Voltage                                     | (volts)       | $V_a(\max)$       | 800     |
| Maximum Screen Voltage                                    | (volts)       | $V_{g2}(\max)$    | 300     |
| Maximum Control Grid Voltage                              | (volts)       | $V_{g1}(\max)$    | —100    |
| Maximum Voltage between<br>Grids 1 and 2                  | (volts)       | $V_{g1-g2}(\max)$ | 400     |
| Mutual Conductance                                        | (mA/V)        | $g_m$             | 13.5*   |
| Inner Mu                                                  |               | $\mu_{g1-g2}$     | 5.5*    |
| Maximum Anode Dissipation                                 | (watts)       | $P_a(\max)$       | 28      |
| Maximum Screen Dissipation                                | (watts)       | $P_{g2}(\max)$    | 5       |
| Maximum Cathode Current                                   | (mA)          | $I_k(\max)$       | 300     |
| Maximum Heater to Cathode<br>Voltage (DC heater negative) | (volts)       | $V_{h-k}(\max)$   | 350     |
| Maximum Heater to Cathode<br>Voltage (DC heater positive) | (volts)       | $V_{h-k}(\max)$   | 150     |
| Maximum Resistance Grid 1<br>to Cathode—Fixed Bias        | (ohms)        | $R_{g1-k}(\max)$  | 100,000 |
| Maximum Resistance Grid 1 to<br>Cathode—Cathode Follower  | (M $\Omega$ ) | $R_{g1-k}(\max)$  | 1       |

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|                                                    |                        |        |
|----------------------------------------------------|------------------------|--------|
| Maximum Acceleration<br>(continuous operation)     | (g)                    | 2      |
| Maximum Shock (short<br>duration)                  | (g)                    | 500    |
| Maximum Peak Anode Voltage<br>(Scanning Operation) | (volts) $V_{a(pk)max}$ | 1,500† |

\* Measured at  $V_a = V_{g2} = 150$  v ;  $I_a = 200$  mA ;  $I_{g2} = 12$  mA ;  
 $V_{g1} = -8.5$  v.

† For duty cycle of 1/25 and maximum pulse duration 200  
 $\mu$  seconds.

All maximum ratings are Absolute Values not Design  
Centres.

**INTER-ELECTRODE CAPACITANCES (pF)**

|              |            |      |
|--------------|------------|------|
| Anode/Grid 1 | $C_{a-g1}$ | 1.8  |
| Grid 1/Earth | $C_{in}$   | 19.5 |
| Anode/Earth  | $C_{out}$  | 16.5 |

"Earth" denotes the remaining earthy potential electrodes,  
heater and shields connected to cathode.

**DIMENSIONS**

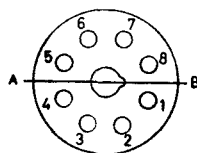
|                           |       |                |
|---------------------------|-------|----------------|
| Maximum Overall Length    | (mm)  | 98             |
| Maximum Diameter          | (mm)  | 44             |
| Maximum Seated Height     | (mm)  | 83             |
| Approximate Nett Weight   | (ozs) | $2\frac{1}{2}$ |
| Approximate Packed Weight | (ozs) | $5\frac{1}{4}$ |

**MOUNTING POSITION**—Vertical. If run horizontally  
then it is recommended that the axis AB be on a horizontal  
plane.

**BULB**—Clear.

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**BASE**—International Octal.



Viewed from free end of pins

**CONNECTIONS**

|       |                     |    |
|-------|---------------------|----|
| Pin 1 | Internal Connection | IC |
| Pin 2 | Heater              | h  |
| Pin 3 | Anode               | a  |
| Pin 4 | Grid 2              | g2 |
| Pin 5 | Grid 1              | g1 |
| Pin 6 | Beam Plates         | bp |
| Pin 7 | Heater              | h  |
| Pin 8 | Cathode             | k  |

Note.—Pins 6 and 8 should be connected together at the valve holder.

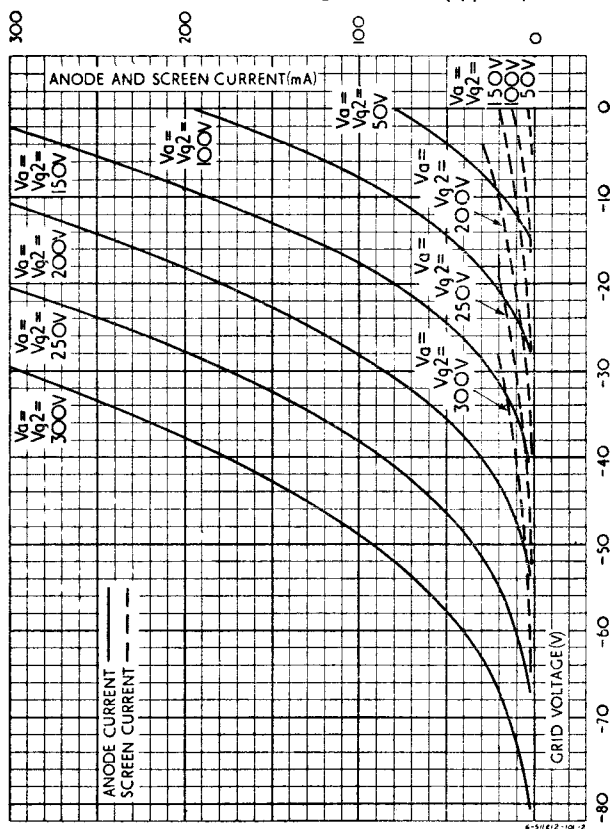
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AVERAGE CHARACTERISTIC CURVES:  $I_a, I_{g2}/V_{g1}$ 

Curves taken with short duration pulse

Pulse Length =  $12\mu\text{sec}$ , Pulse Ratio = 400:1Grid Current starts at  $V_{g1} = -1.0\text{V}$  (approx.)

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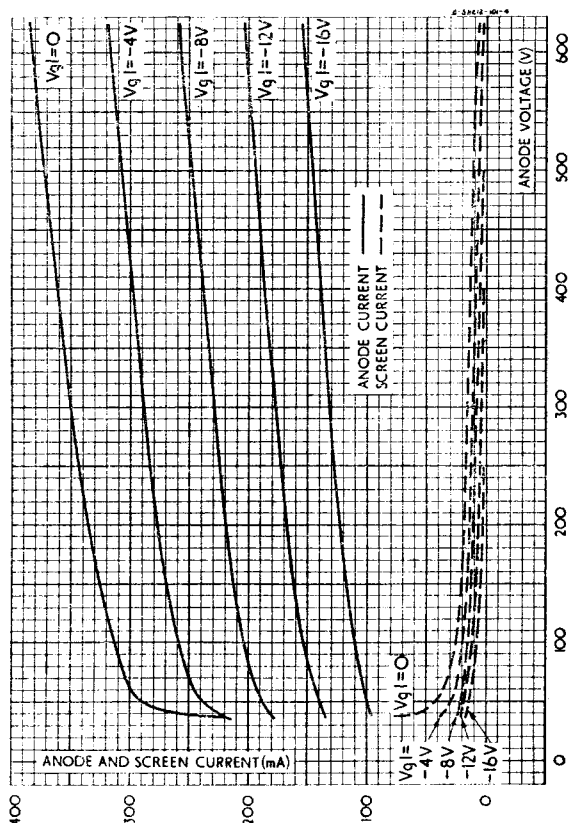
Indirectly heated—for parallel operation

AVERAGE CHARACTERISTIC CURVES:  $I_a$ ,  $I_{g2}/V_a$  $V_{g2} = 150V$ 

Curves taken with short duration pulse

Pulse Length =  $12\mu\text{sec}$ .

Pulse Ratio = 400:1



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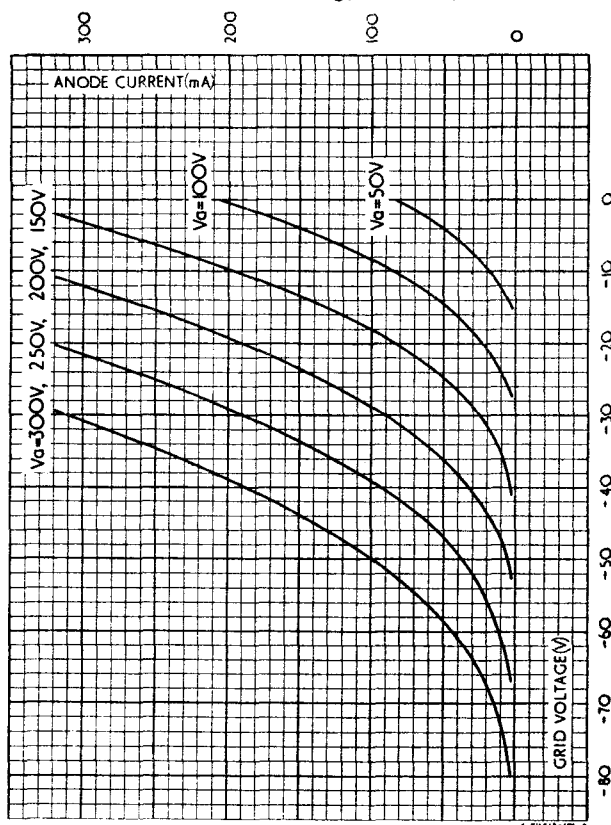
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AVERAGE CHARACTERISTIC CURVES:  $I_a/V_g$   
TRIODE CONNECTED

Curves taken with short duration pulse

Pulse Length =  $12\mu\text{sec}$ .

Pulse Ratio = 400:1

Grid Current starts at  $V_{g1} = -1.0\text{V}$  (approx.)

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AVERAGE CHARACTERISTIC CURVES:  $I_a/V_a$   
TRIODE CONNECTED

Curves taken with short duration pulse  
 Pulse Length =  $12\mu$  sec. Pulse Ratio = 400 : 1  
 Grid Current starts at  $V_{g1} = -1.0$  V (approx)

