SPECIAL VALVES

Beam-Power Amplifiers

Codes: 5B/254G 5B/256M (CV499)
5B/254M (CV428) 5B/257M (CV2220)
5B/255M (CV391) 5B/258M (CV2347)

These valves are indirectly heated, beam-power tetrodes electrically similar to the 5B/250A (807) type, and of reliable construction. The 5B/254G is identical to the 5B/254M but has flexible leads for wiring directly into the circuit.

For applications where the valve is to be used at either high altitudes or under anode modulated conditions, the use of the double-ended versions (5B/254G, 5B/254M and 5B/258M) is to be preferred because of insulation considerations at the valve base.

MECHANICAL DATA
Mounting Position

There are no restrictions on the mounting position of these valves but, as they may reach high temperatures according to the power dissipated, the equipment should be designed so that adequate ventilation is afforded to ensure safe bulb temperature under all conditions of use. Under no circumstances should the temperature of the hottest point of the bulb be allowed to exceed 250°C.

Net weight 40 g
1.4 oz

June 1961

5B/254-8M-1

Standard Telephones and Cables Limited
Registered Office: Connaught House, Aldwych, W.C.2
VALVE DIVISION, FOOTSCRAY, KENT Telephone: Footscray 3333
SPECIAL VALVES

Beam-Power Amplifiers

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ELECTRICAL DATA

CATHODE
Indirectly-heated, oxide-coated

<table>
<thead>
<tr>
<th></th>
<th>5B/254M</th>
<th>5B/254G</th>
<th>5B/255M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater voltage</td>
<td>6.3</td>
<td>6.3</td>
<td>6.3 V</td>
</tr>
<tr>
<td>Heater current (nominal)</td>
<td>0.9</td>
<td>0.9</td>
<td>0.9 A</td>
</tr>
<tr>
<td></td>
<td>5B/256M</td>
<td>5B/257M</td>
<td>5B/258M</td>
</tr>
<tr>
<td>Heater voltage</td>
<td>19</td>
<td>12</td>
<td>19 V</td>
</tr>
<tr>
<td>Heater current (nominal)</td>
<td>0.3</td>
<td>0.47</td>
<td>0.3 A</td>
</tr>
</tbody>
</table>

DIRECT INTERELECTRODE CAPACITANCES

<table>
<thead>
<tr>
<th></th>
<th>5B/254M</th>
<th>5B/254G</th>
<th>5B/255M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>13</td>
<td>10</td>
<td>12 pF</td>
</tr>
<tr>
<td>Output</td>
<td>7</td>
<td>8</td>
<td>8.5 pF</td>
</tr>
<tr>
<td>Anode to Grid 1</td>
<td>0.1</td>
<td>0.12</td>
<td>0.13 pF</td>
</tr>
<tr>
<td></td>
<td>5B/256M</td>
<td>5B/257M</td>
<td>5B/258M</td>
</tr>
<tr>
<td>Input</td>
<td>12</td>
<td>12</td>
<td>13 pF</td>
</tr>
<tr>
<td>Output</td>
<td>8.5</td>
<td>8.5</td>
<td>7 pF</td>
</tr>
<tr>
<td>Anode to Grid 1</td>
<td>0.13</td>
<td>0.13</td>
<td>0.1 pF</td>
</tr>
</tbody>
</table>

CHARACTERISTICS

Mutual conductance \( \mu \) \[ \{ \begin{align*} V_a &= 300V; V_{es} = 250V \\ I_a &= 72 mA \end{align*} \] measured at 6 mA/V

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

AUDIO FREQUENCY

Class AB1, Power Amplifier or Modulator. Triode connected.
(For balanced two-valve operation.)

Maximum Ratings (per valve).

Direct anode voltage 400 V
Direct average anode current 125 mA
Direct anode plus screen dissipation 25 W
Peak heater to cathode voltage, positive or negative 135 V
SPECIAL VALVES

Beam-Power Amplifiers

Codes: 5B/254G 5B/256M (CV499)
      5B/254M (CV428) 5B/257M (CV2220)
      5B/255M (CV391) 5B/258M (CV2347)

Typical Operating Conditions (two valves).

- Direct anode voltage 400 V
- Direct grid voltage -45 V
- Direct anode current, zero signal 64 mA
- Direct anode current, max. signal 140 mA
- Peak a.f. grid to grid voltage 90 V
- Load resistor, anode to anode 3 000 Ω
- Power output, two valves 15 W
- Total harmonic distortion 3 %

Class AB₂, Power Amplifier or Modulator.
(For balanced two-valve operation.)

Maximum Ratings (per valve).

- Direct anode voltage 600 V
- Direct average anode current 120 mA
- Direct anode dissipation 25 W
- Direct screen voltage 300 V
- Direct screen dissipation 4.5 W
- Peak heater to cathode voltage, positive or negative 135 V

Typical Operating Conditions (two valves).

- Direct anode voltage 500 600 V
- Direct screen voltage 300 300 V
- Direct grid voltage -30 -32 V
- Direct anode current, zero signal 60 46 mA
- Direct anode current, max. signal 240 200 mA
- Direct screen current, zero signal 0.9 0.7 mA
- Direct screen current, max. signal 16 12 mA
- Peak a.f. grid to grid voltage 86 90 V
- Load resistor, anode to anode 4 600 6 900 Ω
- Power output, two valves 75 80 W

* The D.C. grid circuit resistance should not exceed 30 000 ohms when a fixed bias source is used. Cathode bias is not recommended.

RADIO FREQUENCY

Class B. Telephony. Modulated carrier applied to the grid.
(Carrier conditions per valve for use with 100% modulation.)

Maximum Ratings.

- Direct anode voltage 600 V
- Direct anode current 80 mA
- Direct anode dissipation 25 W
- Direct screen voltage 300 V
- Direct screen dissipation 4.5 W
- Peak heater to cathode voltage, positive or negative 135 V
- Maximum frequency for above ratings 60 Mc/s
- Maximum anode voltage for 125 Mc/s operation 450 V

June 1961

5B/254–8M–3
SPECIAL VALVES

Beam-Power Amplifiers

Codes: 5B/254G
5B/254M (CV428)
5B/255M (CV391)

5B/256M (CV499)
5B/257M (CV2220)
5B/258M (CV2347)

Typical Operating Conditions.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>5B/254G</th>
<th>5B/256M (CV499)</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct anode voltage</td>
<td>500</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>Direct screen voltage</td>
<td>300</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>*Direct grid voltage</td>
<td>-40</td>
<td>-40</td>
<td>V</td>
</tr>
<tr>
<td>Direct anode current</td>
<td>70</td>
<td>62.5</td>
<td>mA</td>
</tr>
<tr>
<td>Direct screen current</td>
<td>4</td>
<td>4</td>
<td>mA</td>
</tr>
<tr>
<td>Peak r.f. grid voltage</td>
<td>40</td>
<td>36</td>
<td>V</td>
</tr>
<tr>
<td>Direct grid current</td>
<td>0</td>
<td>0</td>
<td>mA</td>
</tr>
<tr>
<td>†Grid driving power (approx.)</td>
<td>0.3</td>
<td>0.2</td>
<td>W</td>
</tr>
<tr>
<td>Power output</td>
<td>11</td>
<td>12.5</td>
<td>W</td>
</tr>
</tbody>
</table>

* The total effective grid circuit resistance should not exceed 30 000 ohms.
† At crest of a.f. cycle with 100% modulation.

Class C. Power Amplifier. Anode subject to modulation.
(Carrier conditions per valve for use with 100% modulation.)

Maximum Ratings.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct anode voltage</td>
<td>475 V</td>
</tr>
<tr>
<td>Direct anode current</td>
<td>83 mA</td>
</tr>
<tr>
<td>Direct anode dissipation</td>
<td>16.5 W</td>
</tr>
<tr>
<td>Direct screen voltage</td>
<td>300 V</td>
</tr>
<tr>
<td>Direct screen dissipation</td>
<td>3 W</td>
</tr>
<tr>
<td>Direct grid current</td>
<td>5 mA</td>
</tr>
<tr>
<td>Peak heater to cathode voltage, positive or negative</td>
<td>135 V</td>
</tr>
<tr>
<td>Maximum frequency for above ratings</td>
<td>60 Mc/s</td>
</tr>
<tr>
<td>Maximum direct anode voltage for 125 Mc/s operation</td>
<td>350 V</td>
</tr>
</tbody>
</table>

Typical Operating Conditions.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct anode voltage</td>
<td>400</td>
</tr>
<tr>
<td>†Direct screen voltage</td>
<td>250</td>
</tr>
<tr>
<td>†Screen series resistor</td>
<td>25 kΩ</td>
</tr>
<tr>
<td>*Direct grid voltage</td>
<td>-75</td>
</tr>
<tr>
<td>Grid series resistor</td>
<td>21.4 kΩ</td>
</tr>
<tr>
<td>Direct anode current</td>
<td>80 mA</td>
</tr>
<tr>
<td>Direct screen current</td>
<td>6 mA</td>
</tr>
<tr>
<td>Peak r.f. grid voltage</td>
<td>95 V</td>
</tr>
<tr>
<td>§Direct grid current</td>
<td>3.5 mA</td>
</tr>
<tr>
<td>Grid drive power, approx.</td>
<td>0.3 W</td>
</tr>
<tr>
<td>Power output</td>
<td>22 W</td>
</tr>
</tbody>
</table>

June 1961
Class C. Power Amplifier or Oscillator. Unmodulated.

**Maximum Ratings.**
- Direct anode voltage: 600 V
- Direct anode current: 100 mA
- Direct anode dissipation: 25 W
- Direct screen voltage: 300 V
- Direct screen dissipation: 4.5 W
- Direct grid current: 5.0 mA
- Peak heater to cathode voltage, positive or negative: 135 V
- Maximum frequency for above ratings: 60 Mc/s
- Maximum direct anode voltage for 125 Mc/s operation: 450 V

**Typical Operating Conditions.**
- Direct anode voltage: 500 V, 600 V
- Direct screen voltage: 250 V, 250 V
- Screen series resistor: 31 kΩ, 44 kΩ
- Direct grid voltage: −45 V, −45 V
- Grid series resistor: 11.2 kΩ, 11.2 kΩ
- Direct anode current: 100 mA, 100 mA
- Direct screen current: 8 mA, 8 mA
- Peak r.f. grid voltage: 65 V, 65 V
- Direct grid current: 4 mA, 4 mA
- Grid drive power, approx.: 0.3 W, 0.3 W
- Power output: 32 W, 40 W

* Obtained from the resistor of value shown, a cathode resistor, fixed supply or a combination of methods.

When the grid is driven positive and the valve operated at maximum ratings the total D.C. grid resistance should not exceed 30 000 ohms. For operation at less than maximum ratings the value may be increased to 100 000 ohms.

† Obtained from the modulated anode supply via a resistor of the value given, from a fixed supply via an a.f. choke, or, preferably, from a fixed supply via a separate winding on the modulation transformer.

§ Subject to wide variation dependent upon the impedance of the load circuit.

© Obtained from a separate source, from the anode voltage supply via a potential divider or through a series resistor of the value shown. A series screen resistor should be used only in a circuit in which the valve is not keyed.
MUTUAL CHARACTERISTIC—TRIODE CONNECTED
CONSTANT VOLTAGE CHARACTERISTIC—TRIODE CONNECTED

![Graph showing constant voltage characteristic for triode connected 5B/254M (CV428) to 5B/258M (CV2347) components.](image-url)
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SPECIAL VALVES

Beam-Power Amplifiers

Code: 5B/254G

BASING
1. HEATER.
2. CATHODE & BEAM PLATES.
3. GRID No. 2.
4. CATHODE & BEAM PLATES.
5. GRID No. 1.
6. CATHODE & BEAM PLATES.
7. CATHODE & BEAM PLATES.
8. HEATER.
T.C. ANODE.

<table>
<thead>
<tr>
<th>DIM.</th>
<th>MILLIMETRES</th>
<th>INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>105.6 MAX.</td>
<td>4.17 MAX.</td>
</tr>
<tr>
<td>B</td>
<td>30.2 MAX.</td>
<td>1.19 MAX.</td>
</tr>
<tr>
<td>C</td>
<td>50.8 MIN.</td>
<td>2.00 MIN.</td>
</tr>
<tr>
<td>D</td>
<td>3.2 NOM.</td>
<td>0.12 NOM.</td>
</tr>
<tr>
<td>L</td>
<td>92.1 MAX.</td>
<td>3.62 MAX.</td>
</tr>
<tr>
<td>M</td>
<td>25.4 MIN.</td>
<td>1.00 MIN.</td>
</tr>
<tr>
<td>N</td>
<td>27.8 MIN.</td>
<td>1.095 MIN.</td>
</tr>
<tr>
<td></td>
<td>29.2 MAX.</td>
<td>1.150 MAX.</td>
</tr>
</tbody>
</table>

© DENOTES: LEADS TINNED OVER THIS PORTION.
NOTE:—BASIC FIGURES ARE INCHES.
SPECIAL VALVES

Beam-Power Amplifiers

Codes: 5B/254M (CV428)
5B/258M (CV2347)

BASING
1. HEATER
2. CATHODE AND BEAM PLATES
3. GRID No. 2
4. CATHODE AND BEAM PLATES
5. GRID No. 1
6. GRID No. 1
7. CATHODE AND BEAM PLATES
8. HEATER
T.C. ANODE

<table>
<thead>
<tr>
<th>DIM.</th>
<th>MILLIMETRES</th>
<th>INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>105.6 MAX.</td>
<td>4(\frac{5}{8}) MAX.</td>
</tr>
<tr>
<td>B</td>
<td>30.15 MAX.</td>
<td>1(\frac{11}{16}) MAX.</td>
</tr>
<tr>
<td>L</td>
<td>92.1 MAX.</td>
<td>3(\frac{3}{8}) MAX.</td>
</tr>
</tbody>
</table>

NOTE—BASIC DIMENSIONS ARE INCHES

June 1961
SPECIAL VALVES

Beam-Power Amplifiers

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5B/256M (CV499)
5B/257M (CV2220)

Basing
1. HEATER
2. ANODE
3. GRID No. 2
4. CATHODE AND BEAM PLATES
5. GRID No. 1
6. GRID No. 1
7. CATHODE AND BEAM PLATES
8. HEATER

<table>
<thead>
<tr>
<th>DIM.</th>
<th>MILLIMETRES</th>
<th>INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>92.9 MAX.</td>
<td>3(\frac{3}{4}) MAX.</td>
</tr>
<tr>
<td>B</td>
<td>30.15 MAX.</td>
<td>1(\frac{1}{2}) MAX.</td>
</tr>
<tr>
<td>L</td>
<td>69.9 MIN. 77.9 MAX.</td>
<td>2(\frac{3}{8}) MIN. 3(\frac{1}{2}) MAX.</td>
</tr>
</tbody>
</table>

NOTE.—BASIC DIMENSIONS ARE INCHES