The 4HA7 is a compactron containing a high-mu triode and a medium-mu triode.

**GENERAL**

**ELECTRICAL**
- Cathode - Coated Unipotential
- Heater Characteristics and Ratings
  - Heater Voltage, AC or DC*: 4.2 Volts
  - Heater Current*: 0.6±0.04 Amperes
  - Heater Warm-up Time, Average†: 11 Seconds
  - Direct Interelectrode Capacitances‡:
    - Section 1: Grid to Plate: 1.4 pf
    - Section 2: Input: g to (h + k + 1.s.): 1.9 pf
    - Output: p to (h + k + 1.s.): 1.9 pf

**MECHANICAL**
- Operating Position - Any
- Envelope - T-9, Glass
- Base - E12-70, Button 12-Pin
- Outline Drawing - EIA 9-56
  - Maximum Diameter: 1.188 Inches
  - Maximum Over-all Length: 1.875 Inches
  - Maximum Seated Height: 1.500 Inches

**MAXIMUM RATINGS**

**DESIGN-MAXIMUM VALUES**
- Plate Voltage
- Positive DC Grid Voltage
- Negative DC Grid Voltage
- Plate Dissipation
- DC Cathode Current
- Heater-Cathode Voltage
  - Heater Positive with Respect to Cathode
    - DC Component
    - Total DC and Peak.
  - Heater Negative with Respect to Cathode
    - Total DC and Peak.

<table>
<thead>
<tr>
<th>Section 1</th>
<th>Section 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>volts</td>
<td>volts</td>
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<tr>
<td>volts</td>
<td>volts</td>
</tr>
<tr>
<td>watts</td>
<td>milliamperes</td>
</tr>
<tr>
<td>volts</td>
<td>volts</td>
</tr>
<tr>
<td>volts</td>
<td>volts</td>
</tr>
</tbody>
</table>

**PHYSICAL DIMENSIONS**

- 1.188" MAX.
- 1.875" MAX.
- 1.500" MAX.

**TERMINAL CONNECTIONS**
- Pin 1 - Heater
- Pin 2 - Plate (Section 2)
- Pin 3 - Cathode (Section 2)
- Pin 4 - Cathode (Section 1)
- Pin 5 - Internal Connection - Do Not Use
- Pin 6 - No Connection
- Pin 7 - No Connection
- Pin 8 - Internal Shield
- Pin 9 - Grid (Section 1)
- Pin 10 - Plate (Section 1)
- Pin 11 - Grid (Section 2)
- Pin 12 - Heater

**BASING DIAGRAM**

The tubes and arrangements disclosed herein may be covered by patents of General Electric Company or others. Neither the disclosure of any information herein nor the sale of tubes by General Electric Company conveys any license under patent claims covering combinations of tubes with other devices or elements. In the absence of an express written agreement to the contrary, General Electric Company assumes no liability for patent infringement arising out of any use of the tubes with other devices or elements by any purchaser of tubes or others.

from JEDEC release #4449, Oct. 7, 1963
MAXIMUM RATINGS (Cont’d)

Design—Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electron tube of a specified type as defined by its published data and should not be exceeded under the worst probable conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making allowance for the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration.

The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all other electron devices in the equipment.

CHARACTERISTICS AND TYPICAL OPERATION

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>Section 1</th>
<th>Section 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Grid Voltage</td>
<td>-8.5</td>
<td>-2.0</td>
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<tr>
<td>Amplification Factor</td>
<td>37</td>
<td>100</td>
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<tr>
<td>Plate Resistance, approximate</td>
<td>7700</td>
<td>62500</td>
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<tr>
<td>Transconductance</td>
<td>2200</td>
<td>1600</td>
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<tr>
<td>Plate Current</td>
<td>10.5</td>
<td>1.2</td>
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<tr>
<td>Grid Voltage, approximate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ia = 10 Microamperes</td>
<td>-24</td>
<td>---</td>
</tr>
</tbody>
</table>

NOTES

* Heater voltage for a bogey tube at If = 0.6 amperes.

† The equipment designer should design the equipment so that heater current is centered at the specified bogey value, with heater supply variations restricted to maintain heater current within the specified tolerance.

§ The time required for the voltage across the heater to reach 80 percent of the bogey value after applying 4 times the bogey heater voltage to a circuit consisting of the tube heater in series with a resistance equal to 3 times the bogey heater voltage divided by the bogey heater current.

¶ Without external shield.