The 12AE10 is a compactron containing a sharp-cutoff, dual-control pentode (Section 2) and a power pentode (Section 1). The dual-control pentode is intended for use as an FM detector and the power pentode as an audio-frequency output amplifier in television receivers.

**GENERAL**

**ELECTRICAL**

Cathode - Coated Unipotential

Heater Characteristics and Ratings

Heater Voltage, AC or DC*: 12.6 Volts

Heater Current+: 0.45±0.03 Amperes

Heater Warm-up Time, Average§: 11 Seconds

Direct Interelectrode Capacitances¶

---

**Section 1**

Grid-Number 1 to Plate:

(lg1 to lp) : 0.2 pf

Input: lg1 to (h + 1k + 2k +

lg2 + b.p. + i.s.) : 9.5 pf

Output: lp to (h + 1k + 2k +

lg2 + b.p. + i.s.) : 10 pf

---

**Section 2**

Grid-Number 1 to Plate:

(2g1 to 2p) : 0.036 pf

Grid-Number 3 to Plate:

(2g3 to 2p) : 3.2 pf

Grid-Number 1 to All Except Plate: 2g1 to (h + 2k +

2g2 + 2g3 + i.s.) : 6.5 pf

---

**Section 2 (Cont'd)**

Grid-Number 3 to All: 2g3 to

(h + 2k + 2g1 + 2g2 + 2p +

i.s.) : 8.0 pf

Grid-Number 1 to Grid-Number 3:

(2g1 to 2g3) : 0.14 pf

**Coupling**

Plate (Section 1) to Plate (Section 2): (lp to 2p) : 0.15 pf

---

**MECHANICAL**

Operating Position - Any

Envelope - T-9, Glass

Base - E12-70, Button 12-Pin

Outline Drawing - EIA 9-59

Maximum Diameter: 1.188 Inches

Minimum Diameter: 1.062 Inches

Maximum Over-all Length: 2.625 Inches

Maximum Seated Height: 2.250 Inches

Minimum Seated Height: 2.000 Inches

---

**PHYSICAL DIMENSIONS**

- 1.188" MAX.
- 1.062" MIN.
- 2.625" MAX.
- 2.250" MAX.
- 2.000" MIN.

---

**TERMINAL CONNECTIONS**

Pin 1 - Heater

Pin 2 - Cathode (Section 2) and Internal Shield

Pin 3 - Grid Number 1 (Section 2)

Pin 4 - No Connection

Pin 5 - Grid Number 3 (Suppressor) (Section 2)

Pin 6 - Grid Number 2 (Screen) (Section 2)

Pin 7 - Plate (Section 2)

Pin 8 - Grid Number 1 (Section 1)

Pin 9 - Cathode and Beam Plates (Section 1)

Pin 10 - Grid Number 2 (Screen) (Section 1)

Pin 11 - Plate (Section 1)

Pin 12 - Heater

---

**BASING DIAGRAM**

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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.
### MAXIMUM RATINGS

#### DESIGN-MAXIMUM VALUES

**Section 1**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>165 V</td>
</tr>
<tr>
<td>Screen Voltage</td>
<td>150 V</td>
</tr>
<tr>
<td>Plate Dissipation</td>
<td>6.0 W</td>
</tr>
<tr>
<td>Screen Dissipation</td>
<td>1.25 W</td>
</tr>
<tr>
<td>DC Cathode Current</td>
<td>60 mA</td>
</tr>
<tr>
<td>Heater-Cathode Voltage</td>
<td></td>
</tr>
<tr>
<td>Heater Positive with Respect to Cathode</td>
<td></td>
</tr>
<tr>
<td>DC Component</td>
<td>100 V</td>
</tr>
<tr>
<td>Total DC and Peak</td>
<td>200 V</td>
</tr>
<tr>
<td>Heater Negative with Respect to Cathode</td>
<td></td>
</tr>
<tr>
<td>Total DC and Peak</td>
<td>200 V</td>
</tr>
<tr>
<td>Grid-Number 1 Circuit Resistance</td>
<td></td>
</tr>
<tr>
<td>With Cathode Bias</td>
<td>1.0 M</td>
</tr>
</tbody>
</table>

**Section 2**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>330 V</td>
</tr>
<tr>
<td>Suppressor Voltage</td>
<td>28 V</td>
</tr>
<tr>
<td>Screen Supply Voltage</td>
<td>330 V</td>
</tr>
<tr>
<td>Screen Voltage - See Screen Rating Chart</td>
<td></td>
</tr>
<tr>
<td>Positive DC Grid-Number 1 Voltage</td>
<td>0 V</td>
</tr>
<tr>
<td>Plate Dissipation</td>
<td>1.7 W</td>
</tr>
<tr>
<td>Screen Dissipation</td>
<td>1.1 W</td>
</tr>
<tr>
<td>Heater-Cathode Voltage</td>
<td></td>
</tr>
<tr>
<td>Heater Positive with Respect to Cathode</td>
<td></td>
</tr>
<tr>
<td>DC Component</td>
<td>100 V</td>
</tr>
<tr>
<td>Total DC and Peak</td>
<td>200 V</td>
</tr>
<tr>
<td>Heater Negative with Respect to Cathode</td>
<td></td>
</tr>
<tr>
<td>Total DC and Peak</td>
<td>200 V</td>
</tr>
</tbody>
</table>

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

#### CLASS A1 AMPLIFIER

**Section 1**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate Voltage</td>
<td>145 V</td>
</tr>
<tr>
<td>Screen Voltage</td>
<td>110 V</td>
</tr>
<tr>
<td>Grid-Number 1 Voltage</td>
<td>-7.0 V</td>
</tr>
<tr>
<td>Peak AF Grid-Number 1 Voltage</td>
<td>7.0 V</td>
</tr>
<tr>
<td>Plate Resistance, approximate</td>
<td>330000 Ohms</td>
</tr>
<tr>
<td>Transconductance</td>
<td>56000 Micromhos</td>
</tr>
<tr>
<td>Zero-Signal Plate Current</td>
<td>34 Milliamperes</td>
</tr>
<tr>
<td>Maximum-Signal Plate Current</td>
<td>39 Milliamperes</td>
</tr>
<tr>
<td>Zero-Signal Screen Current</td>
<td>6.5 Milliamperes</td>
</tr>
<tr>
<td>Maximum-Signal Screen Current</td>
<td>9.3 Milliamperes</td>
</tr>
<tr>
<td>Load Resistance</td>
<td>2500 Ohms</td>
</tr>
<tr>
<td>Total Harmonic Distortion, approximate</td>
<td>12 Percent</td>
</tr>
<tr>
<td>Maximum-Signal Power Output</td>
<td>1.45 W</td>
</tr>
</tbody>
</table>
CHARACTERISTICS AND TYPICAL OPERATION (Cont’d)

AVERAGE CHARACTERISTICS

Section 2
Plate Voltage ........................................... 150 Volts
Suppressor Voltage ..................................... 0 Volts
Screen Voltage .......................................... 100 Volts
Cathode-Bias Resistor .................................. 560 Ohms
Plate Resistance, approximate ....................... 0.15 Megohms
Grid-Number 1 Transconductance ..................... 1000 Micromhos
Grid-Number 3 Transconductance ..................... 400 Micromhos
Plate Current ........................................... 1.3 Milliamperes
Screen Current .......................................... 2.0 Milliamperes
Grid-Number 1 Voltage, approximate
   Ib = 10 Microamperes .............................. -4.5 Volts
Grid-Number 3 Voltage, approximate
   Ib = 10 Microamperes .............................. -4.5 Volts

NOTES

* Heater voltage for a bogey tube at If = 0.45 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.

AVERAGE PLATE CHARACTERISTICS
AVERAGE TRANSFER CHARACTERISTICS

SECTION 2

$E_f = \text{RATED VALUE}$
$E_b = 150 \text{ VOLTS}$
$E_c 2 = 100 \text{ VOLTS}$

SCREEN CURRENT ($i_{c2}$) IN MILLIAMPERES

GRID-NUMBER 3 VOLTAGE IN VOLTS

PLATE CURRENT ($i_{p}$) IN MILLIAMPERES

AVERAGE TRANSFER CHARACTERISTICS

SECTION 2

$E_f = \text{RATED VALUE}$
$E_b = 150 \text{ VOLTS}$
$E_c 3 = 0 \text{ VOLTS}$

SCREEN CURRENT ($i_{c2}$) IN MILLIAMPERES

GRID-NUMBER 1 VOLTAGE IN VOLTS

PLATE CURRENT ($i_{p}$) IN MILLIAMPERES

K-55671-10203-11
APRIL 13, 1965

K-55611-10203-12
APRIL 13, 1965