THE 12AD6 IS A PENTAGRID CONVERGER WITH A UNIPOTENTIAL CATHODE IN THE 7-PIN MINIATURE CONSTRUCTION. IT IS INTENDED AS A COMBINED OSCILLATOR AND MIXER IN SUPERHETERODYNE RECEIVERS WHERE THE HEATER, PLATE AND SCREEN GRID POTENTIALS ARE OBTAINED DIRECTLY FROM AN AUTOMOTIVE BATTERY.

DIRECT INTERELECTRODE CAPACITANCES

<table>
<thead>
<tr>
<th>Capacitance Description</th>
<th>With Shield</th>
<th>Without Shield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixer Grid to Plate: G5 to P maximum</td>
<td>0.26 pf</td>
<td>0.30 pf</td>
</tr>
<tr>
<td>Mixer Grid to Oscillator Grid: G3 to G1 maximum</td>
<td>0.15 pf</td>
<td>0.15 pf</td>
</tr>
<tr>
<td>RF Input: G5 to (H*K+G1+G2 &amp; 4+G5+P)</td>
<td>7.0 pf</td>
<td>7.0 pf</td>
</tr>
<tr>
<td>Oscillator Input: G4 to (H*K+P+G3+G5)</td>
<td>3.2 pf</td>
<td>3.2 pf</td>
</tr>
<tr>
<td>Mixer Output: P to (H*K+G1+G2 &amp; 4+G3+G5)</td>
<td>12 pf</td>
<td>7.0 pf</td>
</tr>
<tr>
<td>Oscillator Output: G2 &amp; 4 to (H*K+G3+P+G5)</td>
<td>11 pf</td>
<td>11 pf</td>
</tr>
<tr>
<td>Oscillator Grid to Oscillator Plate: G1 to G2 and 4</td>
<td>2.2 pf</td>
<td>2.2 pf</td>
</tr>
</tbody>
</table>

HEATER CHARACTERISTICS AND RATINGS

Design maximum values - See ETA standard RS-239

- Average Characteristic: 12.6 Volts 150 Ma.
- Heater Supply Limits: Voltage Operation: 10.0 - 15.9 Volts
- Maximum Heater Cathode Voltage: 16 Volts
- Heater Negative with respect to Cathode Total DC and Peak: 16 Volts
- Heater Positive with respect to Cathode Total DC and Peak: 16 Volts

*External Shield #316 Connected to Cathode.*

Continued on following page.
### MAXIMUM RATINGS

**PLATE VOLTAGE** 10.6 12.6 14.6 VOLTS
**GRID #3 VOLTAGE** 0 0 0 VOLTS
**GRID #2 & #4 VOLTAGE** 4.5 4.5 4.5 VOLTS
**GRID #1 VOLTAGE PEAK TO PEAK** 35000 35000 35000 OHMS
**GRID #3 RESISTANCE** 2.2 2.2 2.2 MEGOHMS
**PLATE RESISTANCE (APPROX.)** 0.50 0.40 0.20 MEGOHMS
**GRID #1 CURRENT (APPROX.)** 60 μA
**CONVERSION TRANSCONDUCTANCE** 320 μMHO
**PLATE CURRENT** 350 μA
**CATHODE CURRENT** 1600 mA
**GRID #3 VOLTAGE FOR GC = 5 μMHO (APPROX.)** -3.0 VOLTS
**GRID #3 VOLTAGE FOR GC = 0.5 μMHO (APPROX.)** -4.0 VOLTS

### TYPICAL OPERATING CHARACTERISTICS - SEPARATE EXCITATION

- **PLATE VOLTAGE**
- **GRID #3 VOLTAGE**
- **GRID #2 & #4 VOLTAGE**
- **GRID #1 VOLTAGE PEAK TO PEAK**
- **GRID #3 RESISTANCE**
- **PLATE RESISTANCE (APPROX.)**
- **GRID #1 CURRENT (APPROX.)**
- **CONVERSION TRANSCONDUCTANCE**
- **PLATE CURRENT**
- **CATHODE CURRENT**
- **GRID #3 VOLTAGE FOR GC = 5 μMHO (APPROX.)**
- **GRID #3 VOLTAGE FOR GC = 0.5 μMHO (APPROX.)**

### OSCILLATOR CHARACTERISTICS - NOT OSCILLATING

- **GRID #3 VOLTAGE** 0 VOLTS
- **GRID #1 VOLTAGE (OSCILLATOR GRID)** 0 VOLTS
- **GRID #2 & #4 CONNECTED TO PLATE** 12.6 VOLTS
- **TRANSCONDUCTANCE BETWEEN GRID #1, #2 & #4 CONNECTED TO PLATE** 3600 μMHO
- **AMPLIFICATION FACTOR BETWEEN GRID #1, #2 AND 4 CONNECTED TO PLATE** 9.4 MA.
- **CATHODE CURRENT** 4.5 MA.
- **GRID #1 VOLTAGE (APPROX.) FOR IB = 10 μA.** -3.7 VOLTS

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A.  **EXTERNAL SHIELD #1A CONNECTED TO CATHODE.**

B.  **THE EQUIPMENT DESIGNER SHALL SO DESIGN THE EQUIPMENT THAT THE FILAMENT VOLTAGE IS CENTERED AT THE SPECIFIED BOGEY VALUE. FILAMENT SUPPLY VARIATIONS SHALL BE RESTRICTED TO MAINTAIN FILAMENT VOLTAGE WITHIN THE SPECIFIED TOLERANCE. FOR LONGEST LIFE IT IS RECOMMENDED THAT THE HEATER BE OPERATED WITHIN THE RANGE OF 21 TO 24 VOLTS.**

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> INDICATES A CHANGE.
I2AD6

- \( E_1 = 12.6 \text{ Volts} \)
- \( E_{C2} = 12.6 \text{ Volts} \)
- \( E_{C4} = 12.6 \text{ Volts} \)
- \( E_f = 12.6 \text{ Volts} \)
- \( R_{g1} = 33,000 \text{ Ohms} \)
- \( R_{g3} = 0 \text{ Ohm} \)
- \( Z_L = 200,000 \text{ Ohms} \)

Gain (Self Excitation)

Ge. (Sep. Excitation)

Conversion Gain

Conversion Transconductance (\( g_c \)) - Micromhos

Grid #3 Volts

0 0 10 50 100 150 200 250 300

-4 -3 -2 -1 0