THE 6SA7 AND 6SA7GT ARE PENTAGRID CONVERTERS DESIGNED TO MINIMIZE FREQUENCY DRIFT. THEY ARE INTENDED FOR SERVICE AS COMBINED OSCILLATORS AND MIXERS IN AC, STORAGE BATTERY, AND AC/DC OPERATED SUPERHETERODYNES.

DIRECT INTERELECTRODE CAPACITANCES

<table>
<thead>
<tr>
<th></th>
<th>6SA7</th>
<th>6SA7GT</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF INPUT: G3 TO (H+K+G1+G2+G4+G5+P)</td>
<td>9.5A</td>
<td>11B</td>
</tr>
<tr>
<td>OSC. INPUT: G4 TO (H+K+G2+G4+G5+P)</td>
<td>7A</td>
<td>8B</td>
</tr>
<tr>
<td>MIXER OUTPUT: P TO (H+K+G2+G4+G5+P)</td>
<td>12A</td>
<td>11B</td>
</tr>
<tr>
<td>GRID #3 TO PLATE: (G3 TO P) MAX.</td>
<td>0.15A</td>
<td>0.6B</td>
</tr>
<tr>
<td>GRID #3 TO GRID #4: (G3 TO G4) MAX.</td>
<td>0.12A</td>
<td>0.4B</td>
</tr>
<tr>
<td>GRID #4 TO PLATE: (G4 TO P) MAX.</td>
<td>0.06A</td>
<td>0.2B</td>
</tr>
<tr>
<td>GRID #4 TO ALL EXCEPT CATHODE: G4 TO (H+G2+G4+G5+P)</td>
<td>4.4</td>
<td>—</td>
</tr>
<tr>
<td>GRID #4 TO ALL EXCEPT CATHODE &amp; GRID #5: G4 TO (H+G2+G4+G5+P)</td>
<td>—</td>
<td>5</td>
</tr>
<tr>
<td>GRID #4 TO CATHODE: (G4 TO K)</td>
<td>2.6</td>
<td>—</td>
</tr>
<tr>
<td>GRID #4 TO CATHODE AND GRID #5: (G4 TO K &amp; G5)</td>
<td>—</td>
<td>3</td>
</tr>
<tr>
<td>CATHODE TO ALL EXCEPT GRID #1: K TO (H+G2+G4+G5+P)</td>
<td>5</td>
<td>—</td>
</tr>
<tr>
<td>CATHODE AND GRID #5 TO ALL EXCEPT GRID #1: K &amp; G5 TO (H+G2+G4+G5+P)</td>
<td>—</td>
<td>14</td>
</tr>
</tbody>
</table>

A with shell connected to cathode.
B with external shield connected to cathode.

CONTINUED ON FOLLOWING PAGE

INDICATES A CHANGE OR ADDITION.
CONTINUED FROM PRECEDING PAGE

RATINGS
INTERPRETED ACCORDING TO RMA STANDARD MB-220

MAXIMUM HEATER VOLTAGE 6.3 VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE 90 VOLTS
MAXIMUM PLATE VOLTAGE 300 VOLTS
MAXIMUM GRIDS #2 & #4 VOLTAGE 100 VOLTS
MAXIMUM GRIDS #2 & #4 SUPPLY VOLTAGE 300 VOLTS
MINIMUM GRID #3 VOLTAGE 0 VOLTS
MAXIMUM PLATE DISSIPATION 1.0 WATT
MAXIMUM GRIDS #2 & #4 DISSIPATION 1.0 WATT
MAXIMUM CATHODE CURRENT 14 MA.

FOR SELF-EXCITED OSCILLATOR.

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CONVERTER SERVICE

<table>
<thead>
<tr>
<th></th>
<th>SELF EXCITATION</th>
<th>SEPARATE EXCITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEATER VOLTAGE</td>
<td>6.3</td>
<td>6.3</td>
</tr>
<tr>
<td>HEATER CURRENT</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>PLATE VOLTAGE</td>
<td>100</td>
<td>250</td>
</tr>
<tr>
<td>GRIDS #2 &amp; #4 VOLTAGE</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>GRID #3 VOLTAGE</td>
<td>0</td>
<td>-2</td>
</tr>
<tr>
<td>GRID #1 RESISTOR</td>
<td>20 000</td>
<td>20 000</td>
</tr>
<tr>
<td>PLATE CURRENT</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>GRIDS #2 &amp; #4 CURRENT</td>
<td>8.5</td>
<td>8.5</td>
</tr>
<tr>
<td>GRID #4 CURRENT</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>TOTAL CATHODE CURRENT</td>
<td>12.3</td>
<td>12.5</td>
</tr>
<tr>
<td>PLATE RESISTANCE (APPROX.)</td>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>CONVERSION TRANSCONDUCTANCE:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WITH E&lt;sub&gt;Q&lt;/sub&gt;=2 VOLTS</td>
<td>425</td>
<td>450</td>
</tr>
<tr>
<td>WITH E&lt;sub&gt;Q&lt;/sub&gt;=6 VOLTS</td>
<td>---</td>
<td>310</td>
</tr>
<tr>
<td>WITH E&lt;sub&gt;Q&lt;/sub&gt;=10 VOLTS</td>
<td>---</td>
<td>75</td>
</tr>
<tr>
<td>WITH E&lt;sub&gt;Q&lt;/sub&gt;=35 VOLTS (APPROX.)</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

D: HARTLEY OSCILLATOR CIRCUIT WITH A FEEDBACK OF APPROXIMATELY 2 VOLTS PEAK IN THE CATHODE CIRCUIT. VALUES ARE APPROXIMATE.

OSCILLATOR TRANSCONDUCTANCE
NOT OSCILLATING

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GRID #3 VOLTAGE</td>
<td>0</td>
</tr>
<tr>
<td>GRID #4 VOLTAGE</td>
<td>0</td>
</tr>
<tr>
<td>GRIDS #2 &amp; 4 CONNECTED TO PLATE</td>
<td>100</td>
</tr>
<tr>
<td>TRANSCONDUCTANCE BETWEEN GRID #4 AND GRIDS #2 &amp; 4 CONNECTED TO PLATE</td>
<td>4 500 µMhos</td>
</tr>
</tbody>
</table>

SIMILAR TYPE REFERENCE: Ratings and characteristics somewhat similar to 7Q7.

--- INDICATES A CHANGE OR ADDITION.

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**6SA7, 6SA7GT**

Conversion of Transconductance ($g_c$) - Micromhos

- $E_k = 0.8$ Volts RMS
- $1.4 = 2$ Volts Peak
- $P = 7\%$
- $E_f = 6.3$ Volts
- $E_{c1} = 250$ Volts
- $E_{c2} \& E_{c4} = 100$ Volts
- $E_{c5} = -1$ Volt
- $R_{g1} = 20,000$ Ohms

P = Percentage Ratio of $E_k$ to $E_k + E_o$ where $E_k$ = Voltage across Oscillator-coil Section between Cathode and Ground. $E_o$ = Oscillator Voltage between Cathode and Grid.

--- $g_c$ for values of $E_k$
--- $g_c$ for values percent P

- $C_o$ = By-Pass Cond.
- $C_{c0}$ = 50 $\mu$uf
- $C_{c1}$ = Padding Cond.
- $C_{c2}$ = Tunning Cond.
- $N_c$ = Total Turns in Osc. Coil
- $N_k$ = Turns in Cathode Section of Oscillator Coil.
- $R_g = 20,000$ Ohms

---

**PLATE 1876**
**SEPT. 2 1947**

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6SA7, 6SA7GT

6SA7

$E_f = 6.3 \text{ Volts}$

$E_b = 250 \text{ Volts}$

$E_{C2} \& E_{C4} = 100 \text{ Volts}$

$R_{g1} = 20,000 \text{ Ohms}$

Oscillator Voltage Adjusted to give Grid #1 Current of 0.5 MA.

PLATE
1877
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1947
**6SA7, 6SA7GT**

**Recommended Min. \( I_{C1} = 0.18 \text{ mA} \).**

\[ E_f = 6.3 \text{ Volts} \]
\[ E_b = 250 \text{ Volts} \]
\[ E_{C2} \& E_{C4} = 100 \text{ Volts} \]
\[ E_{C3} = -2 \text{ Volts} \]
\[ R_{g1} = 20 \, 000 \text{ Ohms} \]

Grid \& Current Varied by Adjustment of Oscillator Voltage

**Conversion Transconductance \( g_C \) - Microamperes**

**Cathode Milliamperes \( I_a \)**

**GRID I (OSCILLATOR-GRID) MILLIAMPERES \( I_{C1} \)**

---

**6SA7**

**SELF-EXCITATION**

\[ E_f = 6.3 \text{ Volts} \]
\[ E_b = 250 \text{ Volts} \]
\[ E_{C2} \& E_{C4} = 100 \text{ Volts} \]
\[ E_{C3} = 0 \text{ Volts} \]
\[ R_{g1} = 20 \, 000 \text{ Ohms} \]
\[ I_{C1} = 0.5 \text{ mA} \]

Conversion Gain =

\[ \frac{\text{IF Output Volts}}{\text{RF Input Volts}} \]

**Conversion Gain**

**Resonant Load Impedance - Megohms**

---

PLATE
1876
SEPT. 2
1947

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