DESCRIPTION:

The 5948 is a unipotential cathode, three element hydrogen filled thyratron designed for network discharge service. In such service, it is suitable for producing pulse outputs of more than 12 megawatts at an average power level of more than 12 Kw.

The special features of the 5948 include an internal hydrogen reservoir capable of producing a wide range of hydrogen pressure and maintaining this pressure at the desired value throughout its useful life. Further features are the high peak voltage and current ratings.

**ELECTRICAL DATA, GENERAL:**

<table>
<thead>
<tr>
<th></th>
<th>Nom.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Voltage</td>
<td>6.3</td>
<td>5.9</td>
<td>6.7</td>
</tr>
<tr>
<td>Heater Current (at 6.3 volts)</td>
<td>25.0</td>
<td>33.0</td>
<td></td>
</tr>
<tr>
<td>Heater (Note 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reservoir Voltage (Note 2)</td>
<td>2.5</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>Reservoir Current at 4.5 Volts</td>
<td>3.0</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>Minimum Heating Time</td>
<td></td>
<td>15 minutes</td>
<td></td>
</tr>
</tbody>
</table>

**MECHANICAL DATA, GENERAL:**

<table>
<thead>
<tr>
<th></th>
<th>Vertical only, base down</th>
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</thead>
<tbody>
<tr>
<td>Mounting Position</td>
<td>Per Outline</td>
</tr>
<tr>
<td>Base</td>
<td>Per Outline</td>
</tr>
<tr>
<td>Anode Cap</td>
<td></td>
</tr>
<tr>
<td>Cooling (Note 3)</td>
<td>4-1/2 Pounds</td>
</tr>
<tr>
<td>Net Weight</td>
<td>Per Outline</td>
</tr>
<tr>
<td>Dimensions</td>
<td></td>
</tr>
</tbody>
</table>

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RATINGS:

Max. Peak Anode Voltage, Forward 25 Kilovolts
Max. Peak Anode Voltage, Inverse (Note 4) 25 Kilovolts
Min. Anode Supply Voltage 5.0 Kilovolts d.c.
Max. Peak Anode Current 1000 Amperes
Max. Average Anode Current 1.0 Amperes
Max. RMS Anode Current (Note 5) 31.8 Amperes a.c.
Max. Epy x 18 x PRR 9.0 x 109
Max. Anode Current Rate of Rise 5000 Amperes/usecond
Peak Trigger Voltage (Note 6)
Max. Peak Inverse Trigger Voltage 650 Volts
Max. Anode Delay Time (Note 7) 1.0 Microsecond
Max. Anode Delay Time Drift 0.25 Microsecond
Max. Time Jitter (Note 8) 0.01 Microsecond (Initial)

Thumb Temperature -55° To 75° Cent.

TYPICAL OPERATION AS PULSE MODULATOR, DC RESONANT CHARGING:

Peak Network Voltage 25.0 15.0 Kilovolts
Pulse Repetition Rate 360 1500 Pulses/second
Pulse Length 2.5 1.25 Microsecond
Pulse Forming Network Impedance 13 15.6 Ohms
Trigger Voltage 800 800 Volts
Peak Power Output (Resistive Load 92% Zn) 11.7 3.6 Megawatt
Peak Anode Current 1000 500 Amperes
Average Anode Current 0.90 0.94 Amperes d.c.

Note 1:
Cathode connected to center of cathode heater.

Note 2:
Reservoir voltage is marked on the base of each 5948.

This is the correct voltage for one typical operating condition but is not
the optimum value for all types of operation. This value may be used
initially in new applications and the optimum value may then be obtained
by exploring the range of voltage on either side of that marked on the
tube. Excess-reservoir voltage will result in a failure of this thyatron
to deionize between pulses (continuous conduction). Insufficient reservoir
voltage will result in excess anode dissipation as indicated by visible
heating of the anode. The optimum reservoir voltage is the midpoint
between these two extremes. In certain applications it may be necessary
to provide a regulated source to assure operation within the permissible
range of reservoir voltages.
Note 3:
Cooling of the anode lead is permissible, but there shall be no air blast directly on the bulb.

Note 4:
During the first 25 microseconds after conduction, the peak inverse anode voltage shall not exceed 5 KV.

Note 5:
The root mean square anode current shall be computed as the square root of the product of peak current and the average current.

Note 6:
The pulse produced by the driver circuit shall have the following characteristics when viewed at the 5948 socket with the tube removed:

A. Amplitude 700-1000 Volts
B. Duration 2 Microseconds (at 70% points)
C. Rate of Rise 1000 Volts/microsecond (min.)
D. Impedance 50-200 Ohms

The limits of anode time delay and anode time jitter are based on the minimum trigger. Using the highest permissible trigger voltage and lowest trigger source impedance will materially reduce these values below the limits specified.

Note 7:
The time of anode delay is measured between the 26 percent point on the rising portion of the unloaded grid voltage pulse and the point at which anode conduction first evidences itself on the loaded grid pulse.

Note 8:
Time jitter is measured at the 50 percent point on the anode current pulse.

Additional information for specific applications can be obtained from the:

Electron Tube Applications Section
ITT Components Division
Post Office Box 412
Clifton, New Jersey