DESCRIPTION:

The 1257 is a unipotential cathode, three element hydrogen filled thyatron designed for a network discharge service. In such service, it is suitable for producing pulse outputs of 33 megawatts at an average power level of more than 40 kw.

The special features of the 1257 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.

ELECTRICAL DATA, GENERAL:

<table>
<thead>
<tr>
<th></th>
<th>Nom.</th>
<th>Min.</th>
<th>Max.</th>
<th>Volts A.C.</th>
<th>AmpereS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Voltage</td>
<td>6.3</td>
<td>6.0</td>
<td>6.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heater Current (At 6.3 Volts)</td>
<td>20.0</td>
<td>40.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heater (Note 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reservoir Voltage (Note 2)</td>
<td>3.5</td>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reservoir Current at 4.5 Volts</td>
<td>3.0</td>
<td>8.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Heating Time</td>
<td></td>
<td></td>
<td>15</td>
<td>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>Base</td>
<td>Per Outline</td>
</tr>
<tr>
<td>Anode Cap</td>
<td>Per Outline</td>
</tr>
<tr>
<td>Cooling (Note 3)</td>
<td></td>
</tr>
<tr>
<td>Net Weight</td>
<td>10 Pounds</td>
</tr>
<tr>
<td>Dimensions</td>
<td>See Outline</td>
</tr>
</tbody>
</table>
RATINGS:

Max. Peak Anode Voltage, Forward 33.0 Kilovolts
Max. Peak Anode Voltage, Inverse (Note 4) 33.0 Kilovolts
Min. Anode Supply Voltage 3.5 Kilovolts d.c.
Max. Peak Anode Current 2000 Amperes
Max. Average Anode Current 2.6 Amperes
Max. RMS Anode Current (Note 5) 60 Amperes a.c.
Max. epY x 1b x prr 20 x 10^9
Max. Anode Current Rate of Rise 10,000 Amperes/μSecond
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 0.10 Microsecond
Max. Time Jitter (Note 8) 0.01 Microsecond
                      0.02 μSecond (end of life)
Ambient Temperature -55° to +75° Cent.

TYPICAL OPERATION AS PULSE MODULATOR, DC RESONANT CHARGING:

Peak Network Voltage 33.0 20.0 Kilovolts
Pulse Repetition Rate 310 1500 Pulses/sec.
Pulse Length 2.5 1.3 Microsecond
Pulse Forming Network Impedance 8.6 15.6 Ohms
Trigger Voltage 1500 1500 Volts
Peak Power Output (Resistive Load 90% Zn) 31 6.2 Megawatt
Peak Anode Current 2000 667 Amperes
Average Anode Current 1.55 1.3 Amperes d.c.

Note 1:
Cathode connected to center of cathode heater.

Note 2:
Reservoir voltage is marked on the base of each VC-1257. 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 the thyratron 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. Consult
manufacturer for starting program if necessary.
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 1257 socket with the tube removed.

A. Amplitude 1300-2500 Volts
B. Duration 2 Microseconds (at 70% points)
C. Time of Rise 0.35 Microseconds (min.)
D. Impedance 10-25 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 materially reduces 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 - P.O. Box 412
Clifton, New Jersey