

ELECTRON TUBE DIVISION
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CERAMIC HYDROGEN THYRATRON



DESCRIPTION

The F-103 is a 4 megawatt ceramic hydrogen thyatron equipped with a plug-in base. This electron tube features an auxiliary electrode which is incorporated to provide a means for reducing anode delay time variation to a negligible amount over all power levels.

| ELECTRICAL DATA, GENERAL | Nom. | Min. | Max. | |
|-------------------------------|------|------|------|----------|
| Heater Voltage | 6.3 | 5.8 | 6.8 | Volts AC |
| Heater Current (at 6.3 volts) | 7 | 6 | 10 | Amperes |
| Reservoir Voltage | 4.4 | | | Volts AC |
| Reservoir Current | 4 | 3 | 5 | Amperes |
| Minimum Heating Time | | 3 | | Minutes |

MECHANICAL DATA, GENERAL

| | |
|-------------------|-------------------|
| Mounting Position | Any |
| Base | Per Outline Drwg. |
| Cooling (Note 3) | |
| Dimensions | Per Outline |

RATINGS

| | | |
|---|--------------------|--------------|
| Max. Peak Anode Voltage, Forward | 16.0 | Kilovolts |
| Max. Peak Anode Voltage, Inverse (Note 4) | 16.0 | Kilovolts |
| Min. Anode Supply Voltage | 1.0 | Kilovolts DC |
| Max. Peak Anode Current | 500 | Amperes |
| Max. Average Anode Current | 500 | Milliamperes |
| Max. RMS Anode Current (Note 5) | 8.0 | Amperes AC |
| Max. $e_{py} \times i_b \times p_{rr}$ | 10.0×10^9 | |
| Max. Anode Current Rate of Rise | 2000 | Amps/u sec. |
| Peak Trigger Voltage (Note 6) | | |
| Max. Anode Delay Time (Note 7) | 0.3 | Microsecond |
| Max. Anode Delay Time Drift | 0.04 | Microsecond |
| Max. Anode Delay Time Variation with Duty | 0.06 | Microsecond |
| Max. Time Jitter (Note 8) | .005 | Microsecond |
| Auxiliary Electrode | | See Note 9 |
| Ambient Temperature | -55° to +125° | C |

NOTE 1 See outline drawing.

NOTE 2 The F-103 is provided with a separate reservoir heater connection so that the user may select the optimum hydrogen pressure for his particular application.

NOTE 3 Cooling of the anode is permissible.

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 tube socket with the tube grid disconnected.

- A. Amplitude 175-600 Volts
- B. Duration 2 Microseconds (at 70% Points) approx.
- C. Time Rise 0.35 Microseconds (Max.)
- D. Impedance 250-500 Ohms

Using the highest permissible trigger voltage, lowest trigger source impedance and minimum rise time provides for optimum delay characteristics.

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.

NOTE 9 The auxiliary electrode provides a means to prime the discharge so as to reduce delay time and delay time variation to a negligible amount. For example, delay variation may be held to less than 50 nanoseconds over a range of average power from 10 to 500 watts. The auxiliary discharge may be produced in many ways including maintaining a simple dc keep-alive glow (20-30 ma, 100-300 v.) between the electrode and the cathode. The auxiliary electrode may also be connected through a current limiting resistor (200-300 ohms) to the grid trigger source. This should preferably be done at a point in the circuit such that the control grid pulse is delayed with respect to the electrode pulse. The usual grid spike protective pi network will normally provide this delay.

