

Hydrogen Thyatron

L3101

The L3101 is a ceramic insulated hydrogen thyatron tetrode capable of switching sub-microsecond peak power levels to 175 MW at average power levels to 35kW. The thyatron is designed for pulsed gas laser applications with high rate of current rise. A large volume titanium hydride reservoir is incorporated to maintain gas pressure for high shot counts. A hollow anode allows for bi-directional current flow.

SPECIFICATIONS

Maximum Ratings	Max	Units
Peak Anode Voltage, forward ¹ (epy)	35	kV
Peak Anode Current, forward ² (ib)	10,000	A
Average Anode Current (Ib)	2.0	ADC
RMS Anode Current ³ (I _p)	45	ARMS
Maximum Pb (epy x ib x prr)	50 x 10 ⁹	VA/PPS
Anode Current Rate of Rise ² (dib/dt)	150,000	A/μs
Anode Delay Time ⁴ (tad)	0.5	μs
Time Jitter ⁴ (tj)	5	ns
Ambient Temp	-55°C to +125°C	



Typical Operation	Nom	Min	Max	Units
Peak Grid Voltage (egy)	-	500	1,500	V
G2 Trigger Voltage Pulse Duration (tp)	2	1	-	μs
G2 Trigger Voltage Rise Time (tr)	-	0.07	0.35	μs
G2 Trigger Source Impedance (Zg)	-	25	400	Ω
G2 Negative Control Grid Bias (Ecc)	-	0	-200	VDC
G1 Auxiliary Grid DC Priming Current ⁵	-	50	100	mADC
G1 Auxiliary Grid DC Unloaded Priming	-	75	250	VDC
Heater Voltage (Ef)	6.3	5.8	6.8	V
Heater Current at 6.3 V (If)	19	-	22	A
Reservoir Voltage (Eres)	6.3	5.8	6.8	V
Reservoir Current at 6.3 V (Ires)	2.5	-	3.0	A
Warm-up time (tk)	-	5	-	Min.

Specification Notes

1. The peak inverse anode voltage should not exceed 20 kV.
2. For sub-microsecond applications a peak current rating of 10,000A and an anode current rate of rise of 150,000 A/μs is achievable. For pulse widths in excess of 2 μs, the peak current should be limited to 2,000A. The anode design allows for reverse current having a peak value up to 40% of the forward peak current.
3. The root mean square anode current shall be computed as the square root of the product of peak current and average current ($\sqrt{Ib \times I_{avg}}$).
4. These values are reduced by using the highest permissible control grid voltage and lowest source impedance. The anode delay time is measured between the 25 percent point on the rising portion of the unloaded control grid voltage pulse and the point at which anode conduction first evidence itself on the loaded control grid pulse. Time jitter is measured at the 50% point of the rising edge of the anode current pulse.
5. The open circuit DC voltage to the auxiliary grid should be 75- 250 VDC. The DC supply should be current limited to 50-100 mADC for a short circuit load. If DC priming is not available, consult Stellant Engineering for permissible alternatives.

