

Hydrogen Filled Thyatron L4904A

High-voltage switch suitable for medical accelerator power supply applications

The L4904A is a ceramic-metal tetrode hydrogen thyatron capable of switching peak power levels to 35 MW at average powers to 25 kW. The thyatron is designed for conventional line-type modulator applications. A large volume, titanium hydride reservoir is incorporated to maintain stable gas pressure. The tube can be mounted in any position by means of the cathode flange. Cooling is achieved by forced air or dielectric fluid immersion.



Maximum Ratings	Symbol	MAX.	UNITS
Peak Anode Voltage, Forward (Note 1)	Epy	35	kV
Peak Anode Current, forward	Ib	1,750	A
Average Anode Current	Ib	3	ADC
RMS Anode Current (Note 3)	Ip	60	A
Anode Current Rate of Rise	Dib/dt	5000	A/μs
Anode Delay Time	tad	0.5	μs
Time Jitter (tj) (Note 4)	tj	.010	μs
Ambient Temp		-50° to +75°	C

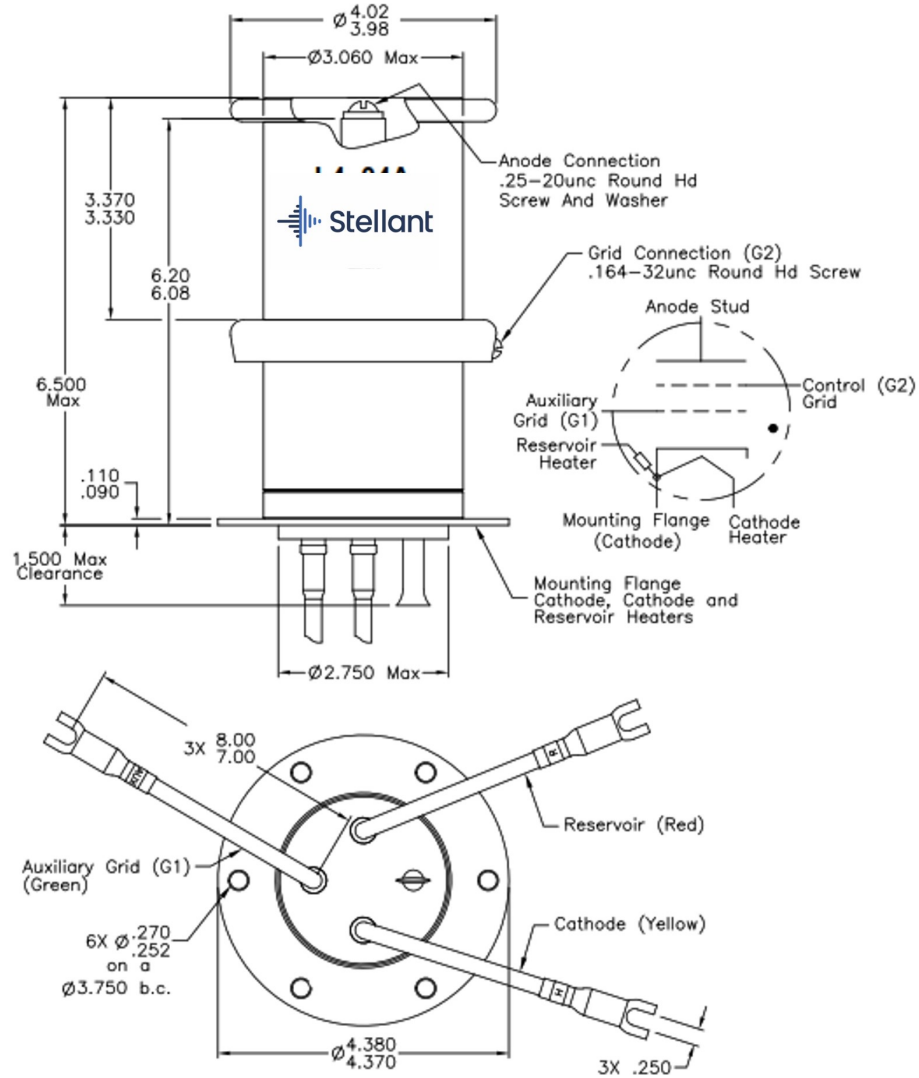
Ancillary Supplies	Symbol	NOM	MIN.	MAX.	UNITS
G2 Peak Trigger Voltage (egy) (Note 2 & 5)	egy2	---	500	2,500	V
G2 Trigger Voltage Pulse duration	tp	2	1	---	μs
G2 trigger voltage rise time	tr	---	0.07	0.35	μs
G2 trigger source impedance	Zg2	---	25	1,000	Ω
G2 Negative Control Grid Bias	Ecc2	-100	0	-150	VDC
G1 open circuit DC voltage	Egy1	---	75	250	VDC
G1 short circuit DC current	Igy1	100	50	150	mADC
Heater Voltage	Ef	6.3	6.0	6.8	VAC/VDC
Heater Current at 6.3 V	If	23	---	27	AAC/ADC
Reservoir Voltage (Note 6)	Eres	5.6	5.0	6.2	VAC/VDC
Reservoir Current at 6.2 V	Ires	---	---	5.3	AAC/ADC
Warm-up Time	tk	---	5	---	Min.

L-4904A Specification Notes:

1. During the first 25 microseconds after conduction, peak inverse anode voltage should be limited to 10 kV in order to obtain maximum tube life.
2. The high dib/dt, a high G2 drive current should be used. The G1 grid can be pre-pulsed 0.5 to 3.0 microseconds before the G2 pulse, with 0.25 microseconds of G1/ G2 pulse-top overlap.
3. The root mean square anode current is computed as the square root of the product of peak current and the average current ($\sqrt{Ib \times I_{avg}}$).
4. Time jitter is measured at the 50% point on the leading edge of the anode current pulse.
5. 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.
6. The recommended reservoir voltage is stamped on the tube and is suitable for most applications. This value can be optimized for a specific application by determining the maximum value that allows normal circuit operation without self-triggering or charging power supply over-current faults. The reservoir voltage should then be reduced by 0.2–0.4 V below this value.
7. During the first 25 microseconds after conduction, peak inverse anode voltage should be limited to 10 kV in order to obtain maximum tube life.”

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L4904A Outline (inches)



Detailed outline drawings are available on request. Specifications and features are subject to change without notice.

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