

Thyratron L-4189

High-voltage switch suited for laser power supply applications

The L-4189 is a ceramic-metal, low-inductance hydrogen thyratron triode designed to switch sub-microsecond peak power levels as great as 350 megawatts. Major applications for this tube are found in high voltage power supplies for medical, lithographic, and industrial marking equipment. The L-4189 can be mounted in any position by means of the grid-mounting flange. Cooling is achieved by natural convection, forced air, or dielectric fluid immersion.



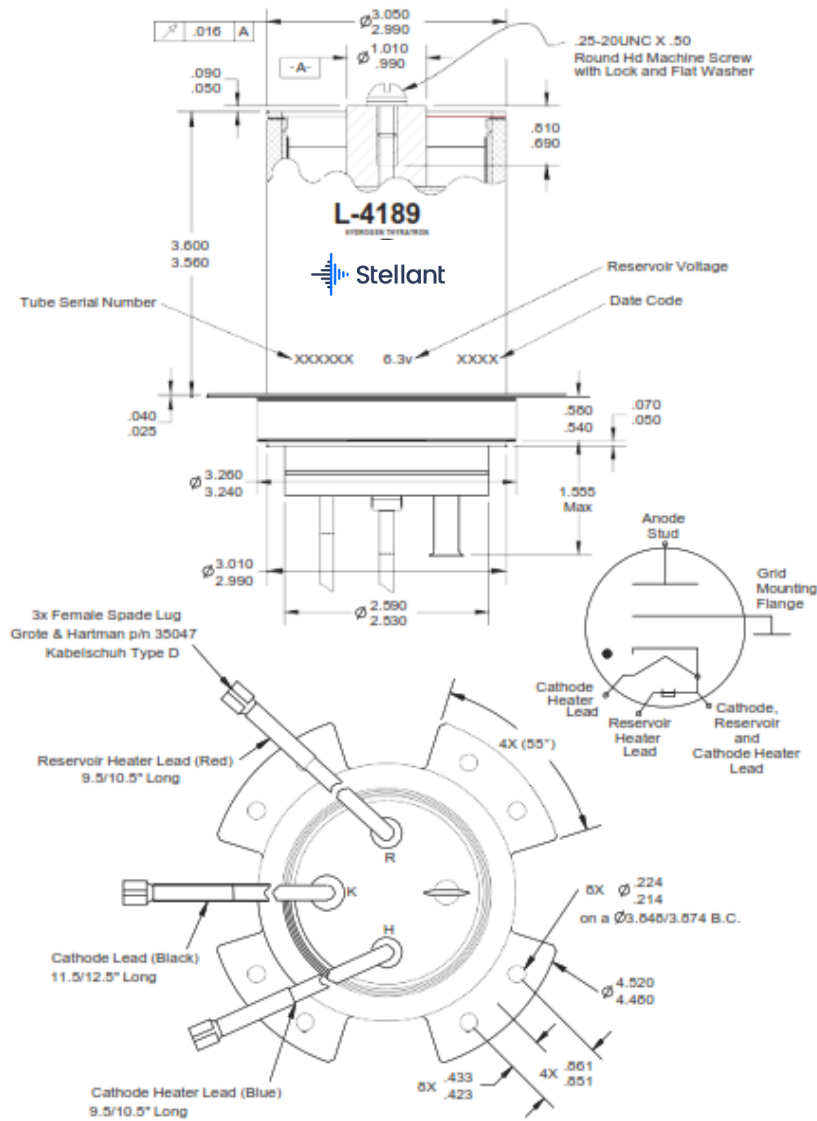
| Maximum Ratings | Symbol | Max. | | | Units |
|--|----------------|--------|------|-------|---------------|
| Maximum peak anode voltage, forward (Note 1) | epy | 35 | | | kV |
| Maximum peak anode current, $t_p = 5 \mu\text{sec}$ | ib | 2,000 | | | A |
| Maximum peak anode current, $t_p < 1 \mu\text{sec}$ (Note 2) | ib | 20,000 | | | A |
| Maximum average anode current | lb | 1.25 | | | ADC |
| Maximum RMS anode current (Note 3) | lp | 40 | | | A |
| Maximum anode delay time (Note 4) | tad | 0.5 | | | μs |
| Maximum time jitter (Note 5) | ti | .005 | | | μs |
| Ambient temperature | -55° to +125°C | | | | |
| Typical Operation | Symbol | Nom. | Min. | Max. | Units |
| Peak trigger voltage (Note 6) | egy | — | 750 | 1,500 | V |
| Trigger voltage pulse duration | tp | 2 | 1 | — | μs |
| Trigger voltage rise time | tr | — | 0.07 | 0.35 | μs |
| Trigger source impedance | Zg | — | 50 | 250 | Ω |
| Short circuit trigger current | igv | 12 | 5 | 25 | A |
| Negative control grid bias | Ecc | -100 | 0 | -150 | VDC |
| Heater voltage | Ef | 6.3 | 5.8 | 6.8 | V |
| Heater current (at 6.3 volts) | If | 19 | 16 | 22 | A |
| Reservoir voltage (Note 7) | Eres | 6.3 | 5.8 | 6.8 | V |
| Reservoir current (at 6.3 volts) | Ires | 2.5 | 2 | 3 | A |
| Warm-up time | tk | — | 5 | — | min. |

L-4189 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 20,000 ampere peak current rating presumes low duty, sub-microsecond pulse application.
3. The root mean square anode current is computed as the square root of the product of peak current and the average current ($\sqrt{Ib \times ib}$).
4. Anode delay time is measured between the 25% point on the rising portion of the unloaded grid voltage pulse and the point at which anode conduction becomes evident on the grid voltage pulse.
5. Time jitter is measured at the 50% point on the leading edge of the anode current pulse.
6. The limits of anode delay time and anode time jitter are based on the minimum trigger. Using the highest permissible trigger voltage and lowest trigger source impedance significantly reduces these values below the limits specified.
7. 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.

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Outline (inches)



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

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www.StellantSystems.com



Headquarters

3100 Lomita Blvd.
Torrance, California 90505
T: 310-517-6000
info@stellantsystems.com
Sales@stellantsystems.com

1035 Westminster Dr.
Williamsport, Pennsylvania 17701
T: 570-326-3561

107 Woodmere Rd.
Folsom, California 95630
T: 916-351-4500

