

# Hydrogen Filled Thyatron

## L4904A

The L4904A is a ceramic-metal tetrode hydrogen thyatron that switches up to 35 MW peak power and 25 kW average power. Designed for line-type modulators, it features a titanium hydride reservoir for stable gas pressure. Mountable in any position via the cathode flange, it is cooled by forced air or dielectric fluid immersion.



### SPECIFICATIONS

| Maximum Ratings                                | Max          | Units |
|--|--------------|-------|
| Peak Anode Voltage, Forward <sup>1</sup> (epy) | 35           | kV    |
| Peak Anode Current, Forward (lb)               | 1750         | A     |
| Average Anode Current (lb)                     | 3            | ADC   |
| RMS Anode Current (lp)                         | 60           | A     |
| Anode Current Rate of Rise (dib/dt)            | 5000         | A/μs  |
| Anode Delay Time (tad)                         | 0.5          | μs    |
| Time Jitter (tj) <sup>4</sup>                  | 0.010        | μs    |
| Ambient Temp                                   | -50° to +75° | C     |

| Ancillary Supplies                         | Symbol | Nom  | Min  | Max   | Units   |
|--|--------|------|------|-------|---------|
| G2 Peak Trigger Voltage <sup>2&amp;5</sup> | 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 6.3V                     | 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.    |

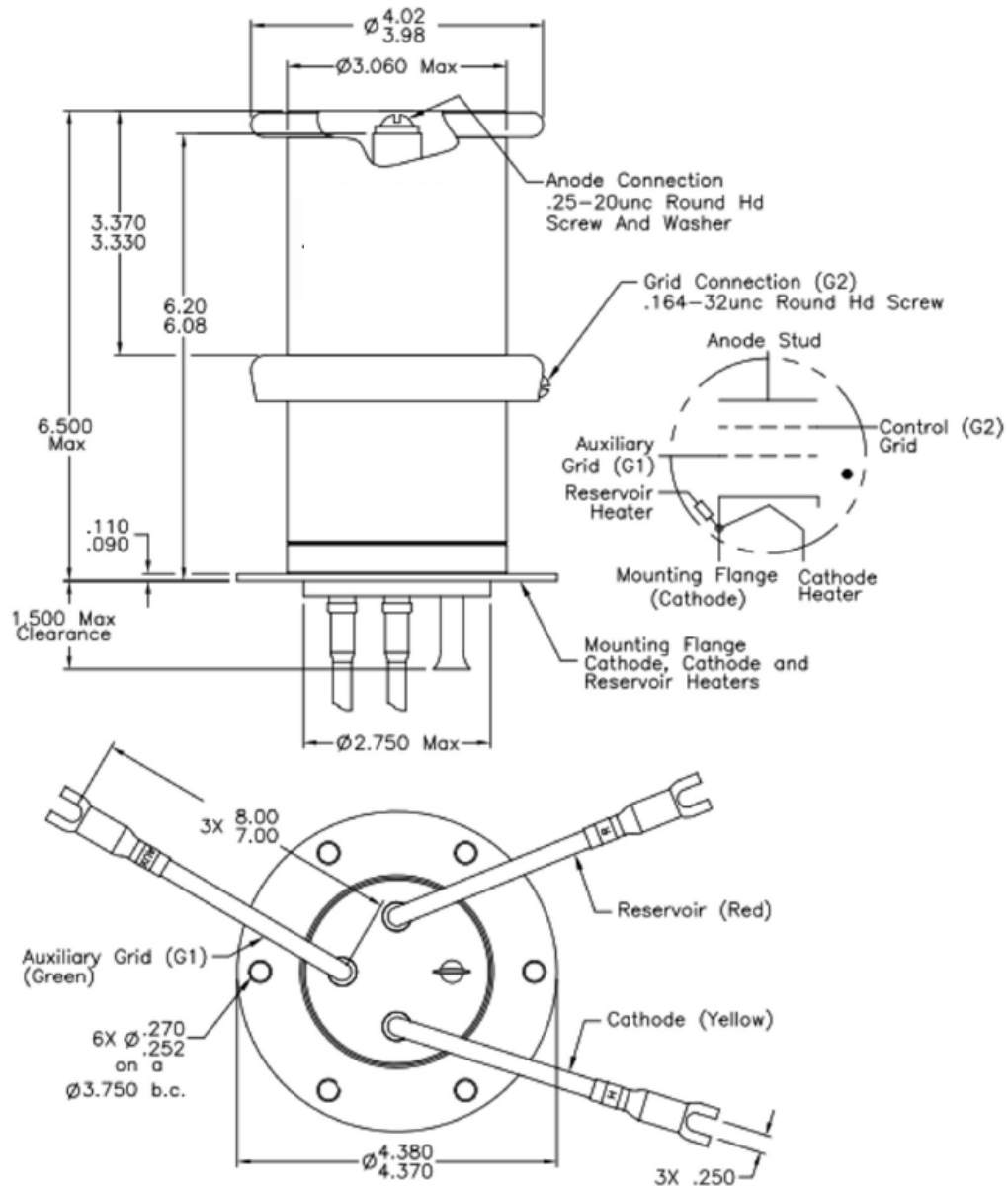
#### L-4904A Specification Notes:

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 ( $\sqrt{I_{pb} I_{avg}}$ ).
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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### Outline Drawing (inches)



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

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