Model 420M3

5mmØ Pyroelectric Laser Detector for UV/Vis/IR

Manufactured under one or more of the following U.S. patents: 3,839,640 - 4,218,620 - 4,326,663 - 4,384,207 - 4,437,003 - 4,441,023 - 4,523,095

Model 420M3 consists of a single lithium tantalate sensing element sealed into a TO-5 transistor housing with an optical filter. See EltecData #101 for filter selection guide.

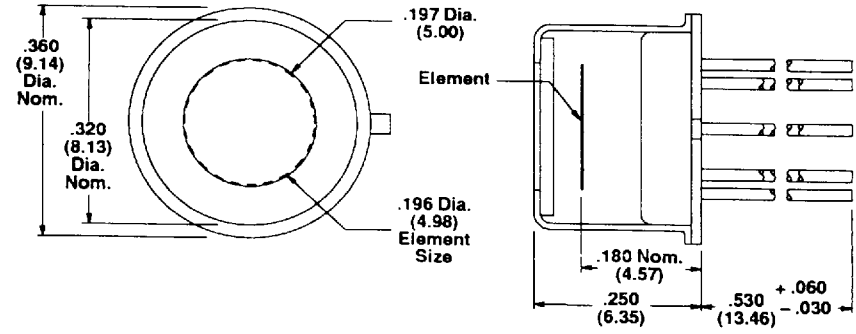
A special element mounting technique is used to heat sink the sensing element, allowing detection at higher power levels.

Because the Model 420M3 is a thermal integrator above the thermal breakpoint, the voltage output falls 20 dB per decade of increasing frequency. Short pulse resolution will be enhanced by using a low value (50Ω to 10 KΩ) load resistor, which will create a differentiator with the crystal capacitance. This will cancel the detector thermal integration, resulting in a flat frequency response up to the RC 3 dB point.

Another way to achieve a uniform frequency response is to connect the detector to a current to voltage converter (current mode operation). As the detector is connected to the virtual ground of the converter, the load resistance is zero, forming an infinite differentiator with the crystal capacitance. The upper frequency limit is determined by resistance and the shunt capacitance of the converter feedback resistor, $1/(2\pi R_F C_S)$. If pulse integration is desired, the detector may be operated in the voltage mode with a high value load resistor ($1X10^6\Omega$ to $1X10^{11}\Omega$) which will preserve the natural integration of the detector. See EltecData # 134 for more information.

Applications

- **Laser Pulse Profile Studies**
- **Pulse Energy Measurements**
- **Useful with Monochromatic, Tunable or Multi-Laser Systems**
- **Laser Power Monitoring (when used with a beamsplitter)**
- **Millimeter Wave Studies**
- **UV Laser Detector**



DIMENSIONS IN INCHES (MM)

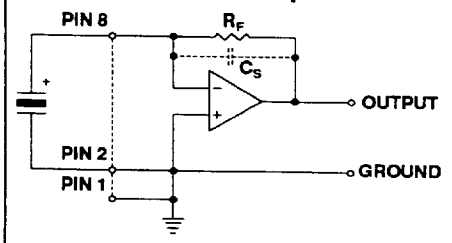
PIN CIRCLE .200 (5.08) LEAD DIA. .020 (.508)

Detector Specifications - - Model 420M3

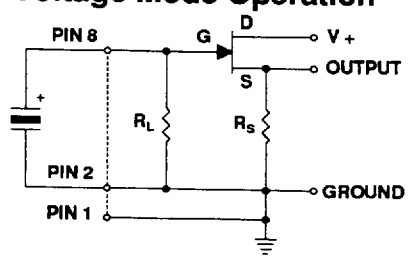
Detector Type:	Single Element
Element Size:	5mmØ
Element Type:	Lithium Tantalate
Optical Bandwidth (Filter Dependent):	0.001 to 1000 µm
Responsivity (Min):	0.25 µA/W, @25°C, 8.3 - 14µm, 10Hz
Thermal Breakpoint (Typ):	5 Hz
Recommended Operating Temperature:	- 55 to + 125 °C
Storage Temperature:	- 55 to + 125 °C
Incident Power Limit (Dependent on pulse width, power & duty cycle):	5 W/cm²
Output Polarity:	Positive for Positive Change
Element Leakage Resistance:	> 5 X $10^{12}\Omega$
Element Capacitance (Min / Max):	76 to 140 pF

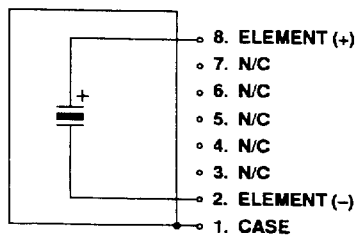
Rise time and frequency response dependent on electronics employed.

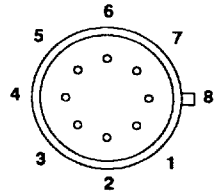
Current Mode Operation



Voltage Mode Operation







BOTTOM VIEW

ELTEC Instruments, Inc. P.O. Box 9610 Daytona Beach, Florida 32120-9610 U.S.A.
Tel (800)874-7780 - - - Fax (904)258-3791

3294041 0000722 T72