Model 479

Twin Channel Optically Isolated Pyroelectric IR Detector with Source Follower

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 479 contains two lithium tantalate sensing elements and two JFET source followers sealed into a standard TO-5 transistor package with two optical filters.

A patented element mounting technique is used to improve the thermal time constant and reduce effects of microphony.

A source resistor is needed to set the drain current and consequently the operating parameters of the JFET. A 47kΩ or greater value is recommended.

Model 479M1

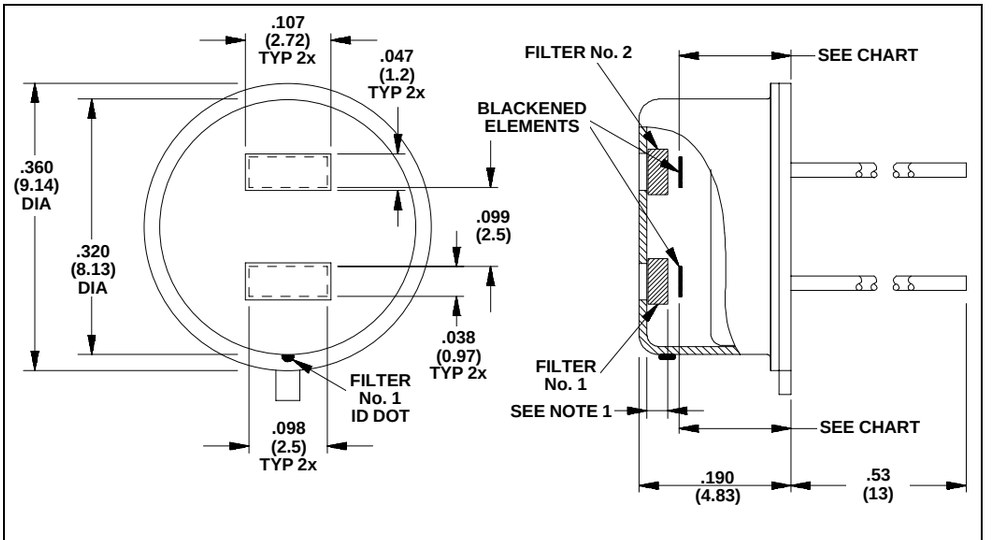
Twin Channel Optically Isolated Pyroelectric IR Detector with High Gain Electronics

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 479M1 is similar to the **Model 479** except that the 479M1 has high gain electronics, a different value load resistor and different specifications. A 100kΩ or greater source resistor is recommended for this Model.

Applications

- **Gas Analysis and Monitoring**
- **ATR (Attenuated Total Reflectance) for Liquids**
- **Medical Monitoring**
- **Flame Monitoring**
- **Increased Instrumentational Discrimination to Resolve Either/Or Situations**
- **2-Color Pyrometers**



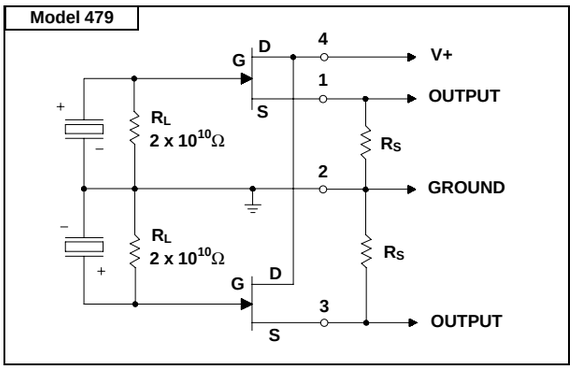
DIMENSIONS IN INCHES (mm) PIN CIRCLE .200 (5.08) LEAD DIA .017 (0.43)

NOTES:

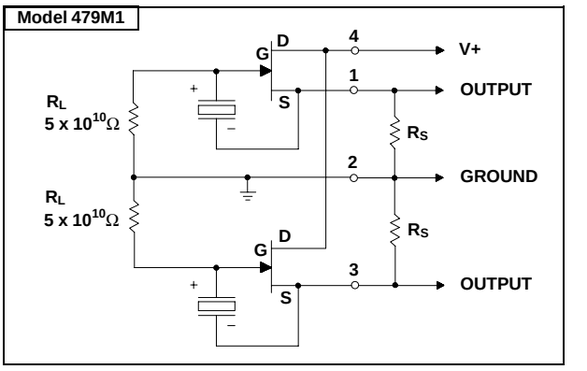
1. **FILTER THICKNESS DEPENDENT ON TYPE. BOTH MODELS ACCOMMODATE FILTERS .010 TO .040 THICK. ELEMENT HEIGHT VARIES DEPENDING ON FILTER USED. SEE CHART.**
2. **IF THE 2 INTERNAL FILTERS ARE THE SAME TYPE, THE ID DOT IS ELIMINATED.**
3. **OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.**

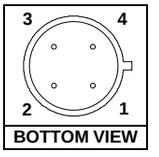
ELEMENT / FILTER CHART	
FILTER THICKNESS	ELEMENT HEIGHT
.010	.155 (NOM)
.020	.145 (NOM)
.030	.135 (NOM)
.040	.125 (NOM)

Model 479



Model 479M1





PIN DESIGNATIONS

PIN # 1. FILTER No. 1 OUTPUT
PIN # 2. GND / CASE
PIN # 3. FILTER No. 2 OUTPUT
PIN # 4. V+

Characteristics	479	Unit	Test Conditions	479M1	Unit	Test Conditions	ELTECdata Reference
Detector Type	Twin Channel			Twin Channel			
Element Size	1.0 x 2.5	mm, each		1.0 x 2.5	mm, each		
Optical Bandwidth	0.1 to 1,000	µm	Various Filters	0.1 to 1,000	µm	Various Filters	101
	3.71 to 3.89	µm	-380 Filter, CWL = 3.80 µm	3.71 to 3.89	µm	-380 Filter, CWL = 3.80 µm	
	3.2575 to 3.4025	µm	-336 Filter, CWL = 3.33 µm	4.183 to 4.353	µm	-113 Filter, CWL = 4.268 µm	
Responsivity (typ)	2,080	V/W	3.80 µm Channel	12,990	V/W	3.80 µm Channel	
(typ)	1,970	V/W	3.33 µm Channel	10,110	V/W	4.268 µm Channel	
Channel Separation (typ)	30	dB		30	dB		
Noise (typ)	1.70	µVrms/$\sqrt{Hz}$	Each Channel	8.70	µVrms/$\sqrt{Hz}$	Each Channel	
NEP (typ)	8.38 x 10^{-10}	W/$\sqrt{Hz}$	Each Channel	7.52 x 10^{-10}	W/$\sqrt{Hz}$	Each Channel	100
D* (typ)	1.85 x 10^{8}	cm$\sqrt{Hz}$/W	Each Channel	2.06 x 10^{8}	cm$\sqrt{Hz}$/W	Each Channel	100
Operating Voltage (min)	3	VDC	V+ to Gnd	5	VDC	V+ to Gnd	104 (4.1.c)
(max)	15			10			
Offset Voltage (min)	0.3	V	Each Channel R_S = 100 kΩ	0.8	V	Each Channel R_S = 100 kΩ	106 Section B
(max)	1.2			3.0			
Operating Current (min)	3.0	µA	Each Channel R_S = 100 kΩ	8.0	µA	Each Channel R_S = 100 kΩ	104 (4.1.c)
(max)	12			30			
Thermal Breakpt. f_T (typ)	0.25	Hz		0.25	Hz		102
Electrical Breakpt. f_e (typ)	0.19	Hz	R_L = 2.0 x $10^{10}\Omega$	0.15	Hz	R_L = 5.0 x $10^{10}\Omega$	102
Recommended Operating Temperature	-40 to +70	^oC	Functional	-40 to +70	^oC	Functional	
Storage Temperature	-55 to +125	^oC	Δ T<50C^o/min	-55 to +125	^oC	Δ T<50C^o/min	
Output Impedance	< R_S	Ω		< R_S	Ω		
Output Protection	Do not exceed a maximum drain current of 50 µA			Do not exceed a maximum drain current of 2 mA			

Characteristics at: Model 479-380/336: **3.80 µm Channel: 3.71 µm to 3.89 µm, 500^{o}K, 2 Hz, 1 Hz BW, R_T = 25^{o}C, R_S = 100 kΩ**
3.33 µm Channel: 3.2575 µm to 3.4025 µm, 500^{o}K, 2 Hz, 1 Hz BW, R_T = 25^{o}C, R_S = 100 kΩ
Model 479M1-380/113: 3.80 µm Channel: 3.71 µm to 3.89 µm, 500^{o}K, 2 Hz, 1 Hz BW, R_T = 25^{o}C, R_S = 100 kΩ
4.268 µm Channel: 4.183 µm to 4.353 µm, 500^{o}K, 2 Hz, 1 Hz BW, R_T = 25^{o}C, R_S = 100 kΩ
For Both Models: Data is established on a sample basis and is believed to be representative.

For best results, the following precautions and recommendations should be observed. (See ELTECdata #101):

Mounting: Avoid mechanical stresses on case and leads.

Soldering: Detectors must be hand soldered to minimize the chance of destroying the internal components. Avoid machine or hot air soldering. Leave a minimum lead length of .250 inch (6.35mm). When soldering to detector leads, use a heat sink between the case and leads. Beware that the new RoHS compliant solders require a higher soldering temperature making heat sinking the detector extremely important.

Static Discharge: Protect detectors from electro-static charges.

Thermal Shock: Temperature changes and rate of change must be kept to a minimum (<50C^{o}/min.) to prevent damage.

Noise: As a resolution or lower information limit, noise is established not only by the detector. Other noise sources are:

- Radiated and conducted RF signals
- Subsequent amplification or signal conditioning stages
- Power supply noise
- Components, such as high value resistors and capacitors (tantalum and aluminum electrolytic)
- Mechanical contacts and weak solder joints
- Shock and vibration excited microphonics
- Outside thermal influences on the detector other than the desired infrared input, i.e. drafts

All of these noise sources should be considered carefully when the information signal is <1mV.

Light Leakage: Slight sensitivity to visible light leaking through the glass-to-metal seal on the base may be observed.

Optical Design: Use of a detector with a filter in an optical system may require consideration of the image displacement toward the filter. This displacement (s) caused by the insertion of a planoparallel plate (filter thickness = t; refractive index = N) is given by s = (t/N)(N-1).