

Model 459

Twin Channel Optically Isolated Pyroelectric IR Detector with Source Follower

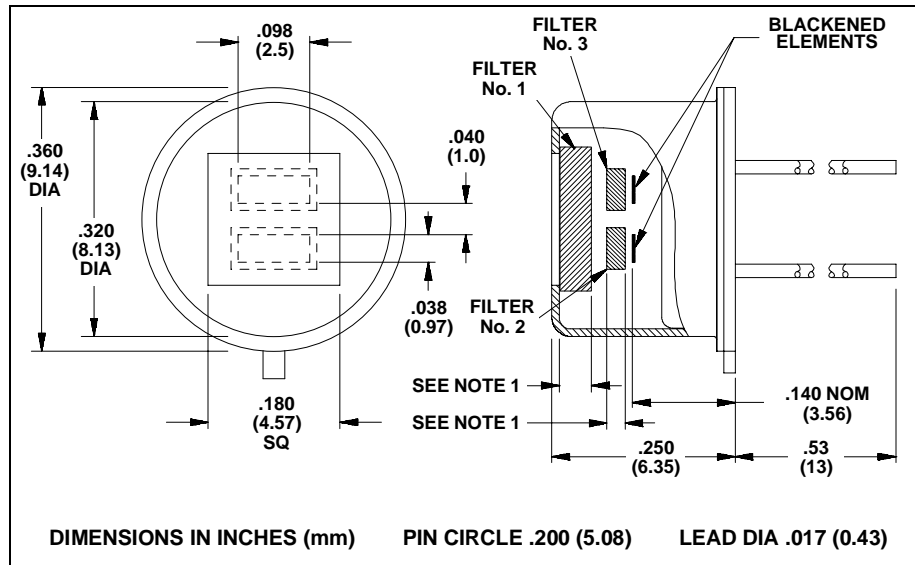


Manufactured under one or more of the following U.S. patents: 3,839,640 - 4,218,620 - 4,326,663 - 4,384,207 - 4,437,003 - 4,441,023 - 4,523,095

Model 459 contains two lithium tantalate sensing elements and two JFET source followers sealed into a standard TO-5 transistor package with two optical filters and a broadband blocking mother window.

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 47k Ω or greater value is recommended.



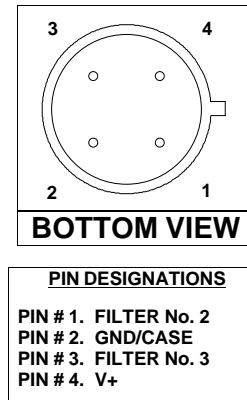
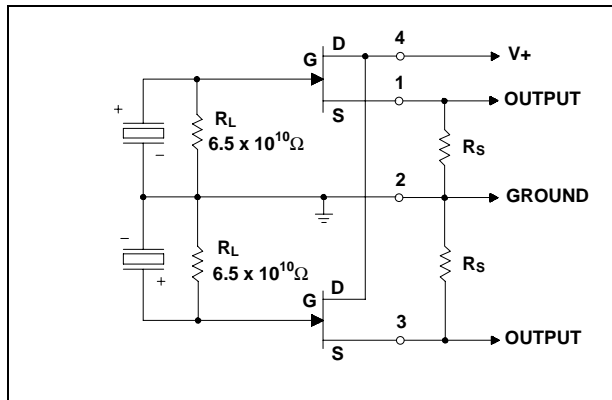
Applications

- 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

NOTES:

1. FILTER THICKNESS DEPENDENT ON TYPE. THIS MODEL ACCOMMODATES COMBINED MAX THICKNESS OF .068 (EITHER FILTER No. 1 PLUS FILTER No. 2 OR FILTER No. 1 PLUS FILTER No. 3). FILTER No. 1 CANNOT EXCEED .043 THICK.
2. OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES.

Characteristics	459	Unit	Test Conditions	ELTECdata Reference
Detector Type	Twin Channel			
Element Size	1.0 x 2.5	mm, each		
Optical Bandwidth	0.1 to 1,000	μm	Various Filters	101
Responsivity (typ)	4,150	V/W	Each Channel	
Channel Separation (typ)	30	dB		
Noise (typ)	2.1	$\mu\text{Vrms}/\sqrt{\text{Hz}}$	Each Channel	
NEP (typ)	5.21×10^{-10}	$\text{W}/\sqrt{\text{Hz}}$	Each Channel	100
D^* (typ)	2.97×10^8	$\text{cm}\sqrt{\text{Hz}/\text{W}}$	Each Channel	100
Operating Voltage (min)	3	VDC	V+ to Gnd	104
Operating Voltage (max)	15			(4.1.c)
Offset Voltage (min)	0.3	V	$R_S = 100 \text{ k}\Omega$	106
Offset Voltage (max)	1.2		Each Channel	Section B
Operating Current (min)	3.0	μA	$R_S = 100 \text{ k}\Omega$	104
Operating Current (max)	12		Each Channel	(4.1.c)
Thermal Breakpt. f_T (typ)	0.25	Hz		102
Electrical Breakpt. f_e (typ)	0.19	Hz	$R_L = 6.5 \times 10^{10} \Omega$	102
Recommended Operating Temperature	-40 to +70	$^\circ\text{C}$	Functional	
Storage Temperature	-55 to +125	$^\circ\text{C}$	$\Delta T < 50^\circ\text{C}/\text{min}$	
Output Impedance	$< R_S$	Ω		
Output Protection	Do not exceed a maximum drain current of 50 μA			
Characteristics at: 1.0 to 6.0 μm, 500$^\circ\text{K}$, 1 Hz, 1 Hz BW, $R_T = 25^\circ\text{C}$, $R_S = 100 \text{ k}\Omega$ 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 (<50C⁰/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 $s = (t/N)(N-1)$.

NOTICE: The information provided herein is believed to be reliable. However, ELTEC Instruments, Inc. assumes no responsibility for inaccuracies or omissions. Due to industry components being incorporated into ELTEC's devices and ELTEC continually striving for product improvement, specifications may change without notice.



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