

# Model 459

## Twin Channel Optically Isolated Pyroelectric IR Detector with Source Follower

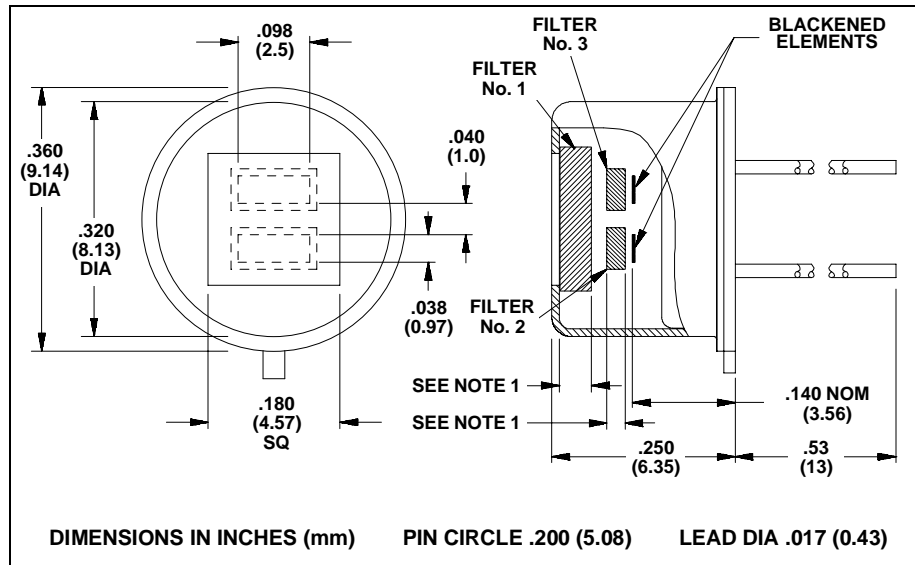


Manufactured under one or more of the following U.S. patents: 3,839,640 - 4,218,620 - 4,326,663 - 4,384,207 - 4,437,003 - 4,441,023 - 4,523,095

**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 $\Omega$  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	$\mu\text{m}$	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)	$5.21 \times 10^{-10}$	$\text{W}/\sqrt{\text{Hz}}$	Each Channel	100
$D^*$ (typ)	$2.97 \times 10^8$	$\text{cm}\sqrt{\text{Hz}/\text{W}}$	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	$\mu\text{A}$	$R_S = 100 \text{ k}\Omega$	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	$< R_S$	$\Omega$		
Output Protection	Do not exceed a maximum drain current of 50 $\mu\text{A}$			
Characteristics at: 1.0 to 6.0 $\mu\text{m}$ , 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.				

