

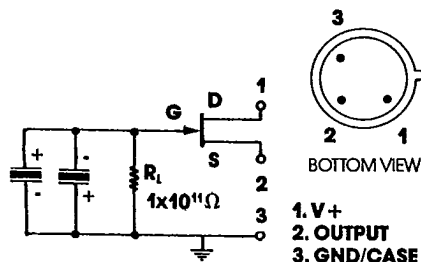
Model 5192 consists of two physically separate lithium tantalate sensing elements and a FET source follower sealed into a standard TO-5 housing with an optical filter.

The sensing elements are connected electrically in a parallel opposed dual (POD) configuration for common mode signal cancellation. Signals from radiation falling on both active areas simultaneously will be cancelled, whereas a defined beam passing from one element to the next will produce two pulses: one positive and one negative.

A source resistor is needed to set the drain current and consequently the operating parameters of the JFET. A 47K Ω or greater value resistor is recommended for connection between output (source) and ground.

Applications

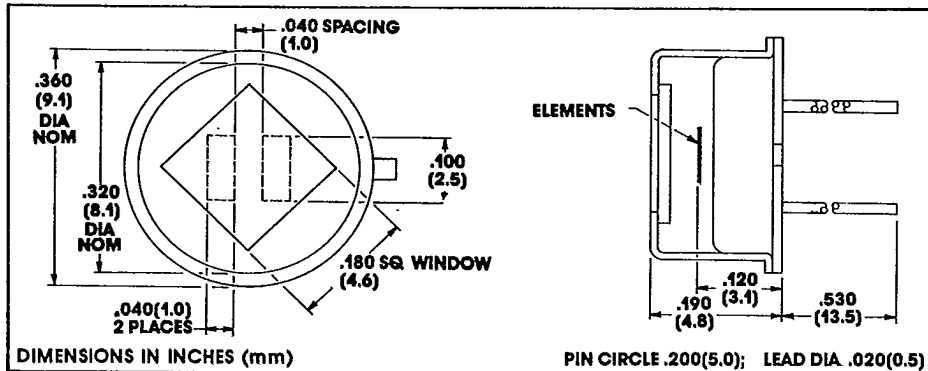
- Intrusion Detection
- Lighting Control
- Robotics
- Motion Sensing
- Automatic Door Control
- Safety Warning



5192

Parallel Opposed Dual 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

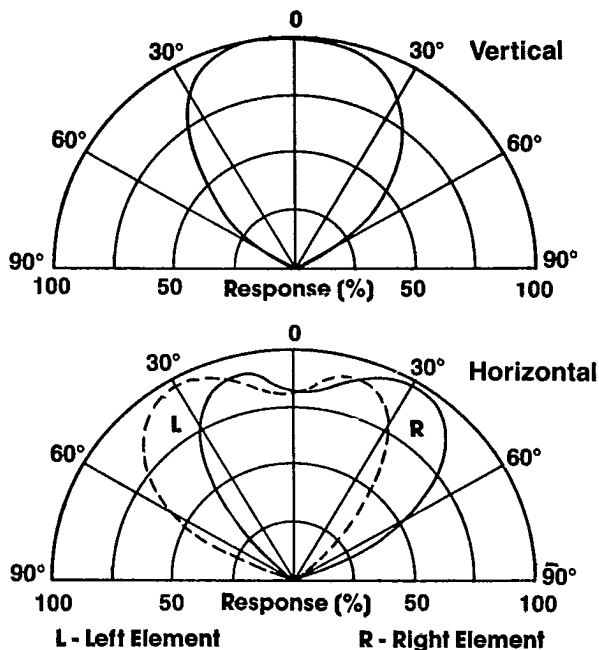


Characteristics	5192	Unit	Test Conditions	ELTEC data Reference
Detector Type	POD	—		
Element Size	1.0 x 2.5	mm	nominal, each	
Element Spacing	1.0	mm	nominal	
Responsivity (Each Element)	min typ max	2000 2700 3500	V/W	8-14 μ m@1Hz
Common Mode Rejection Ratio	min typ	5:1 15:1	—	8-14 μ m@1Hz
Noise	typ max	20.0 54.0	μ V/ $\sqrt{\text{Hz}}$	1.0Hz p-p (1 minute)
NEP	typ max	1.9×10^{-9} 6.8×10^{-9}	W/ $\sqrt{\text{Hz}}$	8-14 μ m @ 1Hz, BW 1Hz
D*	min typ	0.2×10^8 0.7×10^8	cm $\sqrt{\text{Hz}}$ /W	8-14 μ m @ 1Hz, BW 1Hz
Operating Voltage	min max	3 15	VDC	V _b to Gnd
Operating Current Limits ¹	min max	0.1 40	μ A	R _s Dependent
Offset Voltage	min max	0.2 0.8	VDC	R _s = 22K Ω
Offset Voltage	min max	0.3 1.2	VDC	R _s = 100K Ω
Output Impedance		20	K Ω	
Thermal Breakpoint f _r	typ	0.2	Hz	
Electrical Breakpoint f _e	typ	0.05	Hz	R _L = $1 \times 10^{11} \Omega$
Recommended Operating Temp.		-10 + 50	°C	
Responsivity vs. Temperature	max	0.2	%/°C	Unity Gain Circuit
Incident Power Limit	max	0.2	W	
Pressure Sensitivity	max	200	μ V/mbar	Step Response
Microphony	max	50	μ V/g	10-1000Hz
Package Sealing	max	10 ⁻⁸	cm ³ /sec	Helium
Storage Temperature		-55 + 125	°C	$\Delta T < 5^\circ\text{C}/\text{minute}$

Characteristics at 25°C, with -3 Window, V_D = 5 VDC, R_s = 100K Ω unless otherwise stated. Data is established on a sample basis and is believed to be representative.

¹Actual current is given by offset voltage and external circuit.

FIELD OF VIEW



For -3 window only. For other windows, consider refractive index and thickness.

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

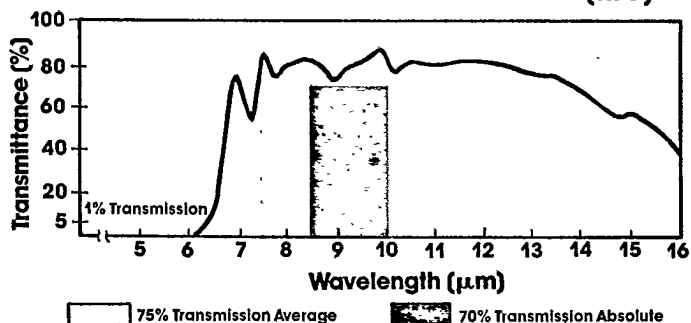
Mounting: Avoid mechanical stresses on case and leads.

Soldering: Use minimum heat and heat sink between case and leads. Leave minimum lead length of .250 inch (6.0mm.) DO NOT MACHINE SOLDER.

Static Discharge: Protect detectors from electrostatic charges.

Thermal Shock: Temperature changes and rate of change must be kept to a minimum ($<5^{\circ}\text{C}/\text{min.}$) to prevent damage.

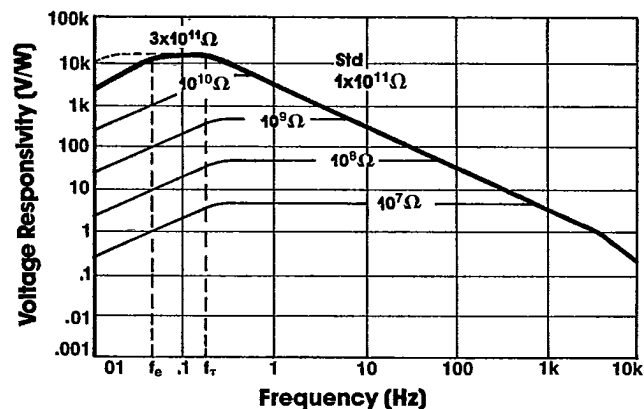
Transmission Characteristics of -3 Window (HP7)



For information on other standard windows available, refer to ELTECdata #101.

FREQUENCY RESPONSE

(Each element)



The voltage response of this detector is dependent on the pulse rate or equivalent frequency of input. The frequency response of the detector can be linearized by using a lower value resistor, but at the expense of lower responsivity and a lower D^* . Load resistor values other than the standard $1 \times 10^{11} \Omega$ can be specified.

Noise: As a resolution or lower information limit, noise is not established only 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 tantalum or electrolytic capacitors
- Mechanical contacts and weak solder joints
- Microphonics or vibration
- Outside thermal influences on the detector other than the desired infrared input, i.e. drafts

All these noise sources should be considered carefully when the information signal is $<1\text{mV}$.

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

Optical Bandwidth: The detector is sensitive in a range from 1.5 to 1000 μm depending on window used. For more information, see ELTECdata #101.

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