Model 5192

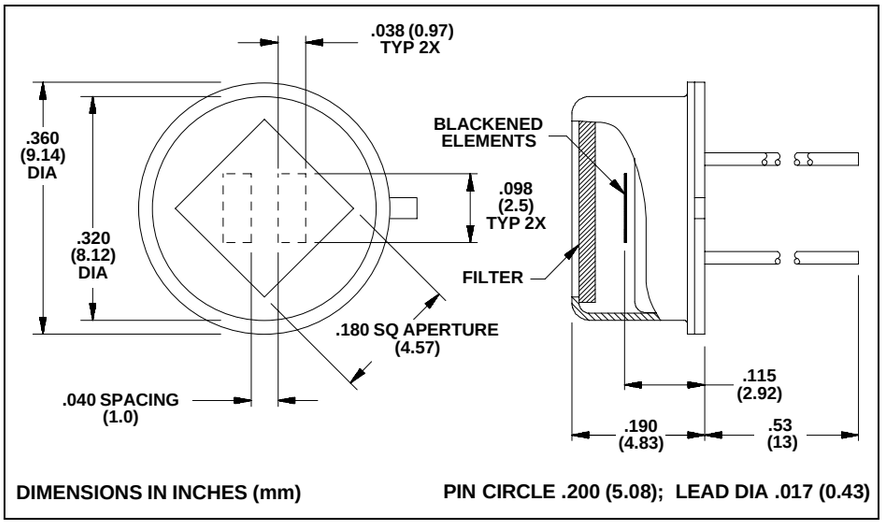
Parallel Opposed Dual Pyroelectric IR Detector with JFET Amplifier

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 5192 consists of two physically separated lithium tantalate sensing elements and a JFET amplifier 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.

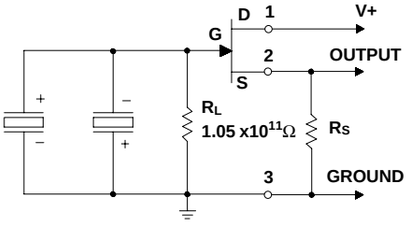
A source resistor, R_S, is needed to set the drain current and consequently the operating parameters of the JFET. A 47kΩ or greater value resistor is recommended.

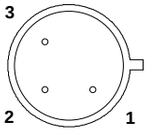


DIMENSIONS IN INCHES (mm) **PIN CIRCLE .200 (5.08); LEAD DIA .017 (0.43)**

Applications

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





BOTTOM VIEW

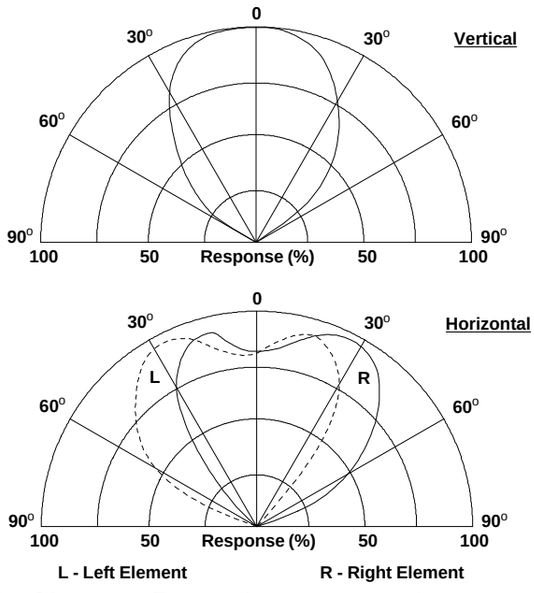
PIN DESIGNATIONS

1. V+
2. OUTPUT
3. GND/CASE

Characteristics		5192	Unit	Test Conditions	ELTECdata Reference
Detector Type		POD			
Element Size		1.0 x 2.5	mm, each		
Element Spacing		1.0	mm	Nominal	
Optical Bandwidth		0.1 to 1,000	µm	Various Filters	101
Responsivity (Each Element)	(min)	2,760	V/W	8 to 14 µm, 1 Hz	
	(typ)	3,850			
Common Mode Rejection Ratio	(min)	5:1		8 to 14 µm, 1 Hz	
	(typ)	15:1			
Noise	(typ)	1.7	µVrms/√Hz	1 Hz, 1 Hz BW	
	(max)	8.51			
NEP	(typ)	$4.5x10^{-10}$	W/√Hz	8 to 14 µm, 1 Hz, 1 Hz BW	100
	(max)	$3.1x10^{-9}$			
D*	(min)	$0.5x10^{8}$	cm/√Hz/W	8 to 14 µm, 1 Hz, 1 Hz BW	100
	(typ)	$3.4x10^{8}$			
Operating Voltage	(min)	3	VDC	V+ to Gnd	104 (4.1.c)
	(max)	15			
Operating Current	(min)	3	µA	R_S = 100kΩ	104 (4.1.c)
	(max)	12			
Offset Voltage	(min)	0.3	V	R_S = 100kΩ	106 Section B
	(max)	1.2			
Output Impedance		< R_S	Ω		
Thermal Breakpoint f_T	(typ)	0.2	Hz		102
Electrical Breakpoint f_e	(typ)	0.05	Hz	R_L= $1.05x10^{11}$Ω	102
Recommended Operating Temperature		-10 to +50	°C	Functional	
Storage Temperature		-55 to +125	°C	ΔT < 50 C°/min	
Output Protection		Do not exceed a maximum drain current of 50 µA			

Characteristics 25°C, with -3 filter, R_S = 100k Ω, V+ = 5 VDC unless otherwise stated.
Data is established on a sample basis and is believed to be representative.

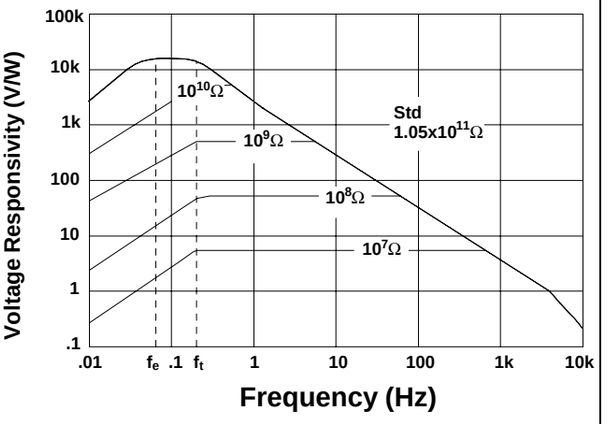
FIELD OF VIEW



L - Left Element **R - Right Element**

For -3 filter only. For other filters, consider refractive index and thickness.

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 $1.05x10^{11}\Omega$ can be specified.

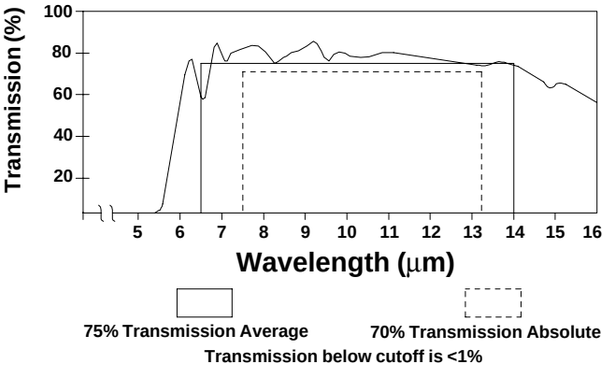
For best results, the following precautions and recommendations should be observed. (See ELTECdata # 101):

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.

Transmission Characteristics of -3 Filter (HP7)



75% Transmission Average **70% Transmission Absolute**

Transmission below cutoff is <1%

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

Thermal Shock: Temperature changes and rate of change must be kept to a minimum (<50C°/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.

ELTEC Instruments, Inc. P.O. Box 9610 Daytona Beach, Florida 32120-9610 U.S.A.
Tel (USA and Canada): (800) 874-7780 Tel (Outside USA): (386) 252-0411 Fax: (386) 258-3791
Web: www.eltecinstruments.com E-Mail: Sales@eltecinstruments.com

©ELTEC INSTRUMENTS, INC. 03/2006 Printed in U.S.A. Form DS5192 (E-07/2009)