Model 408

Single Element Pyroelectric Detector with Current Mode Amplifier

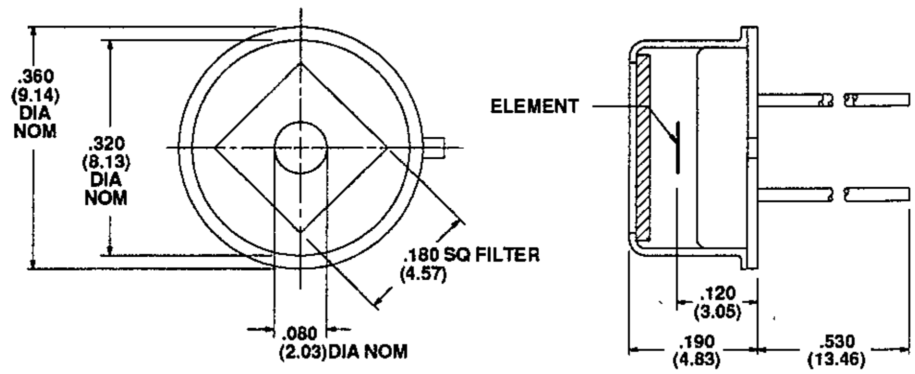
- obsolete -
inquire for alternatives

ELTEC™

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 408 consists of a single lithium tantalate sensing element, a JFET-input op amp and high megohm feedback resistor sealed into a TO-5 transistor housing with optical filter.

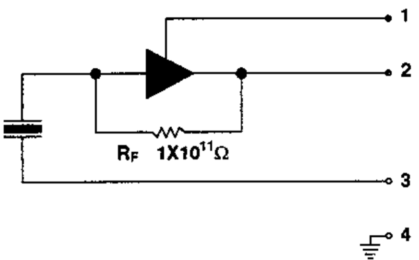
Designed primarily for large input thermal contrasts, additional amplification stages may not be needed as the Model 408 provides substantial gain through its current-to-voltage converter. Although this model incorporates an operational amplifier, only a single power supply is needed. The voltage reference is provided internally.

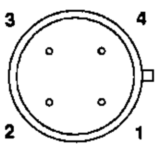


DIMENSIONS IN INCHES (mm) PIN CIRCLE .200 (5.08); LEAD DIA .017 (0.432)

Applications

- Lighting Control
- Intruder Alarms
- People/Object Counting
- Industrial Control
- Robotics
- Heating/AC Control





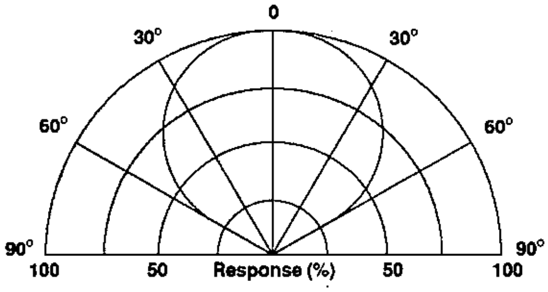
BOTTOM VIEW

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

Characteristics		408	Unit	Test Conditions	ELTECdata Reference
Detector Type:		Single	—		
Element Size:		2.0	mm, DIA	Nominal	
Optical Bandwidth:		1.5 to 1,000	µm	Various filters	101
Responsivity	(Typ):	90,000	V/W	8 - 14 µm,1Hz	
Responsivity	(Typ): (Min):	45,000 33,750	V/W	8 - 14 µm, 10Hz	
Noise	(Typ):	1.0	mV/√Hz	1.0Hz, p-p (1 minute)	
Noise	(Typ):	0.5	mV/√Hz	10.0Hz, p-p (1 minute)	
NEP	(Typ):	$2.5X10^{-9}$	W/√Hz	8 - 14 µm, 1-10Hz, BW 1 Hz	100
D*	(Typ):	$7.0X10^{7}$	cm√Hz/W	8 - 14 µm, 1-10Hz, BW 1 Hz	100
Operating Voltage	(Min): (Max):	5 15	VDC		104 (4.1.c)
Operating Current	(Typ): (Max):	0.8 3.0	mA		104 (4.1.c)
Offset Voltage	(Min): (Typ): (Max):	1.5 2.5 4.0	VDC		104 Fig 4
Output Impedance:		< 100	Ω		
Thermal Breakpoint f_T	(Typ):	0.25	Hz		102
Electrical Breakpoint f_e	(Typ):	6.0	Hz	R_F= $1X10^{11}$Ω	102
Recommended Operating Temperature:		0 +40	^oC		
Package Sealing	(Max):	10^{-8}	cm^3/sec	Helium	
Storage Temperature:		-55 +125	^oC	ΔT < 50 C^o/minute	

Characteristics 25^{o}C, with -3 filter, V_S = +10 VDC
Data established on a sample basis and is believed to be representative.

FIELD OF VIEW



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

Symmetrical crystal gives same FOV in vertical and horizontal planes.

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

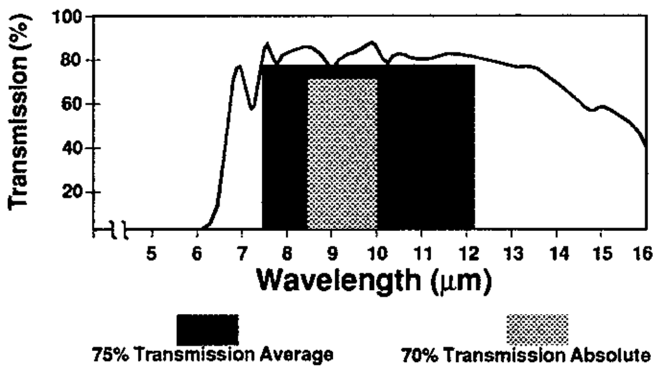
Mounting: Avoid mechanical stresses on case and leads.

Soldering: Use minimum heat and a heat sink between case and leads. Leave minimum lead length of .250 inch (6.35mm). 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 (<50C°/min.) to prevent damage.

Transmission Characteristics of -3 Filter (HP7)



Transmission below cutoff is <1%

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

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
- 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 <20mV.

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

Power Polarity: Carefully note power supply polarity connections to avoid damage to internal op amp.

Output Protection: Output is short circuit protected.

Current Mode Output: Output in the current mode is inverting (negative output for positive temperature change output).

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).