

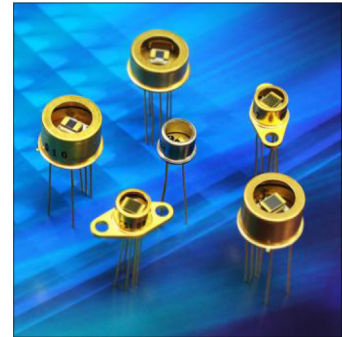
# IR Detectors - A Series

## High Sensitivity Lead Sulfide (PbS) Single Channel UnCooled and Cooled Devices

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### Key Features

- Highest sensitivity in 1-3 micron region
- Provides high signal to noise performance for wide measurement dynamic range
- High durability ensures long operation in the field
- Minimizes maintenance and repair costs
- Multiple flat panel, cooled, and uncooled package options



The A Series single channel infrared detectors integrates PbS technology with proven manufacturing processes to provide the highest sensitivity detectors across the spectral range from one to three microns. In addition, the product line minimizes maintenance costs and provides dependable operation with industry leading quality, durability, and reliability.

Many of today's demanding applications including industrial, environmental, and medical uses require a high level of performance. The A Series IR Detectors provide a higher level of sensitivity in a tighter spectral band meeting the challenge to detect trace elements, gases, fire, flame, and emissions.

Available in a variety of standard configurations, customers can choose from an assortment of options including, element size, cooling alternatives and package size to suit numerous system and application requirements. Cooled units provide additional sensitivity for very low level signal detection and enhanced stability for environments where temperatures are in constant flux.

Opto Diode has been manufacturing and selling high performance PbS and PbSe infrared detectors for over 25 years. Having established a reputation for highly controlled manufacturing processes, customers can rely on consistent, repeatable performance and superior customer service. Opto Diode works with customers from prototype to production to help deliver valuable instruments. Custom requirements can be addressed by contacting the Opto Diode sales team.

### Applications

- Gas analysis
  - Medical
  - Industrial
- Emissions monitoring
- Spectroscopy
- Process control systems
- Thermal imaging
- Flame Monitoring and Detection

## A Series Specifications

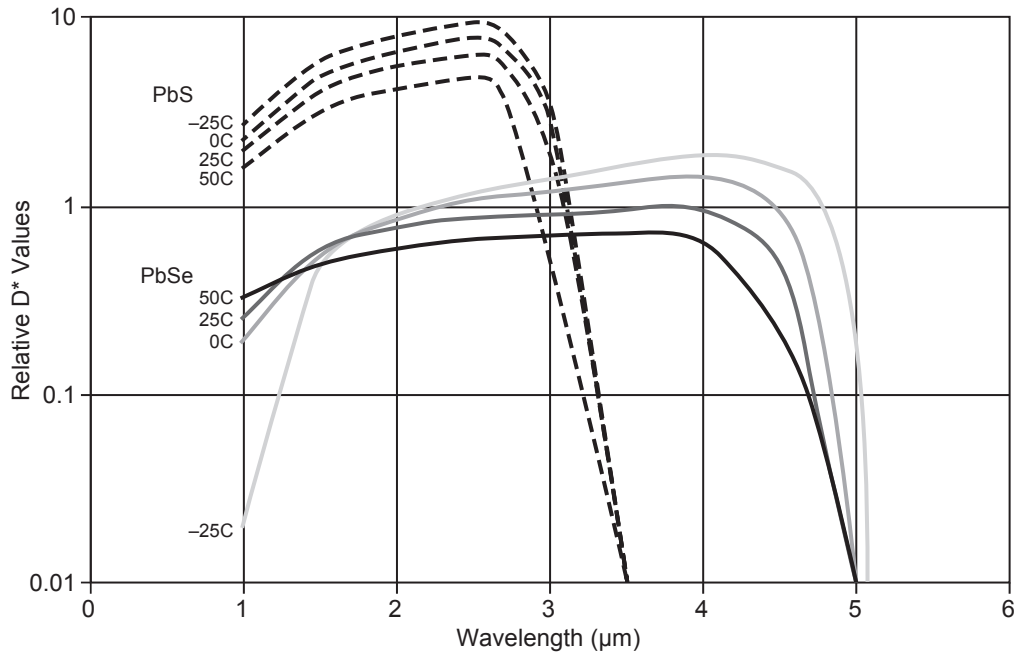
Model #	Part #	Description - Size	Package Type	Active Element Area (mm <sup>2</sup> )	Element Operating Temp. (°C)	Peak Sensitivity Wavelength $\lambda_p$ (μm)		D* $\lambda_p$ , 650Hz, 1Hz (cmHZ <sup>-1</sup> W <sup>-1</sup> )		Responsivity <sup>1</sup> $\lambda_p$ , 650Hz, 25-50V/mm (V/W)		Resistance (MΩ)/Sq	Time Constant (μsec)		Window Type	Absolute Ratings Storage & Operating Temperature (°C) <sup>2,3</sup>	
						min.	typ.	min.	typ.	min.	typ.		range	typ.			max.
<b>AP Series - Uncooled PbS Packaged IR Detectors</b>																	
				typ.	Ambient 23	min.	typ.	min.	typ.	min.	typ.	range	typ.	max.		range	
AP-15G	40725	1mm x 1mm	TO5	1	+23	2.2	2.4	8x10 <sup>10</sup>	1x10 <sup>11</sup>	5.3x10 <sup>5</sup>	8.0x10 <sup>5</sup>	0.5-2.0	200	400		Glass Molded Lens	-40 to +65
AP-25G	40370	2mm x 2mm	TO5	4						2.7x10 <sup>5</sup>	4.0x10 <sup>5</sup>	0.5-2.0				Glass Molded Lens	-40 to +65
AP-35G	40363	3mm x 3mm	TO5	9						1.7x10 <sup>5</sup>	2.6x10 <sup>5</sup>	0.5-2.0				Glass Molded Lens	-40 to +65
AP-10305	40189	1mm x 3mm	TO5	3						2.1x10 <sup>5</sup>	3.1x10 <sup>5</sup>	0.5-2.0				Flat Glass	-40 to +65
AP-20505	40009	2mm x 5mm	TO5	10				8.0x10 <sup>4</sup>	1.2x10 <sup>5</sup>	0.5-2.0	Flat Glass	-40 to +65					
AP-58E	40736	5mm x 5mm	TO8	25				7x10 <sup>10</sup>	-	1.1x10 <sup>5</sup>	1.6x10 <sup>5</sup>	0.5-2.0				Flat Si	-40 to +65
AP-68	40368	6mm x 6mm	TO8	36						9.0x10 <sup>4</sup>	1.4x10 <sup>5</sup>	0.5-2.0				Flat Si	-40 to +65
<b>AF Series - Uncooled Flat Plate IR Detectors</b>																	
				typ.		min.	typ.	min.	typ.	min.	typ.	range	typ.	max.		range	
AF-1E	40188	1mm x 1mm	Flat Plate	1	+23	2.2	2.4	8x10 <sup>10</sup>	1x10 <sup>11</sup>	1.3x10 <sup>5</sup>	4.0x10 <sup>5</sup>	0.5-2.0	200	400		n/a	-40 to +65
AF-2E	40207	2mm x 2mm	Flat Plate	4				5x10 <sup>10</sup>		5.0x10 <sup>5</sup>	6.3x10 <sup>5</sup>	0.5-2.0				n/a	-40 to +65
AF-4E	40204	4mm x 4mm	Flat Plate	16				8x10 <sup>10</sup>		1.3x10 <sup>5</sup>	2.4x10 <sup>5</sup>	0.5-2.0				n/a	-40 to +65
AF-6E	40205	6mm x 6mm	Flat Plate	36						1.0x10 <sup>5</sup>	1.6x10 <sup>5</sup>	0.5-2.0				n/a	-40 to +65
AF-10E	40644	10mm x 10mm	Flat Plate	100						3.0x10 <sup>4</sup>	5.5x10 <sup>4</sup>	0.5-2.0				n/a	-40 to +65
<b>AT1 Series - One Stage Cooled PbS Packaged IR Detectors</b>																	
				typ.	Ambient 25	min.	typ.	min.	typ.	min.	typ.	range	typ.	max.		range	
AT1-27TE	40373	2mm x 2mm	TO37	4	-25	2.4	2.5	1.0x10 <sup>11</sup>	1.5x10 <sup>11</sup>	6.3x10 <sup>5</sup>	9.5x10 <sup>5</sup>	1.5-10.0	800	1600		Flat Sapphire	-40 to +85
AT1-37T	40147	3mm x 3mm	TO37	9						4.2x10 <sup>5</sup>	6.3x10 <sup>5</sup>	1.5-10.0				Flat Sapphire	
<b>AT2 Series - Two Stage Cooled PbS Packaged IR Detectors</b>																	
				typ.	Ambient 25	min.	typ.	min.	typ.	min.	typ.	range	typ.	max.		range	
AT2-28TE	40028	2mm x 2mm	TO8	4	-35	2.5	2.6	1.5x10 <sup>11</sup>	2.5x10 <sup>11</sup>	6.6x10 <sup>5</sup>	1x10 <sup>6</sup>	2.5-15.0	1250	2500		Flat Sapphire	-40 to +85
AT2-37T	40193	3mm x 3mm	TO37	9						4.3x10 <sup>5</sup>	6.4x10 <sup>5</sup>						
AT2S-38T	40029	3mm x 3mm	TO8	9				-45	2.6	2.7	2x10 <sup>11</sup>	3x10 <sup>11</sup>				4.3x10 <sup>5</sup>	

<sup>1</sup> Specifications apply at a bias voltage of 50 V/mm directly across the detector with either a 1MΩ or 0.5 MΩ load resistor in series.

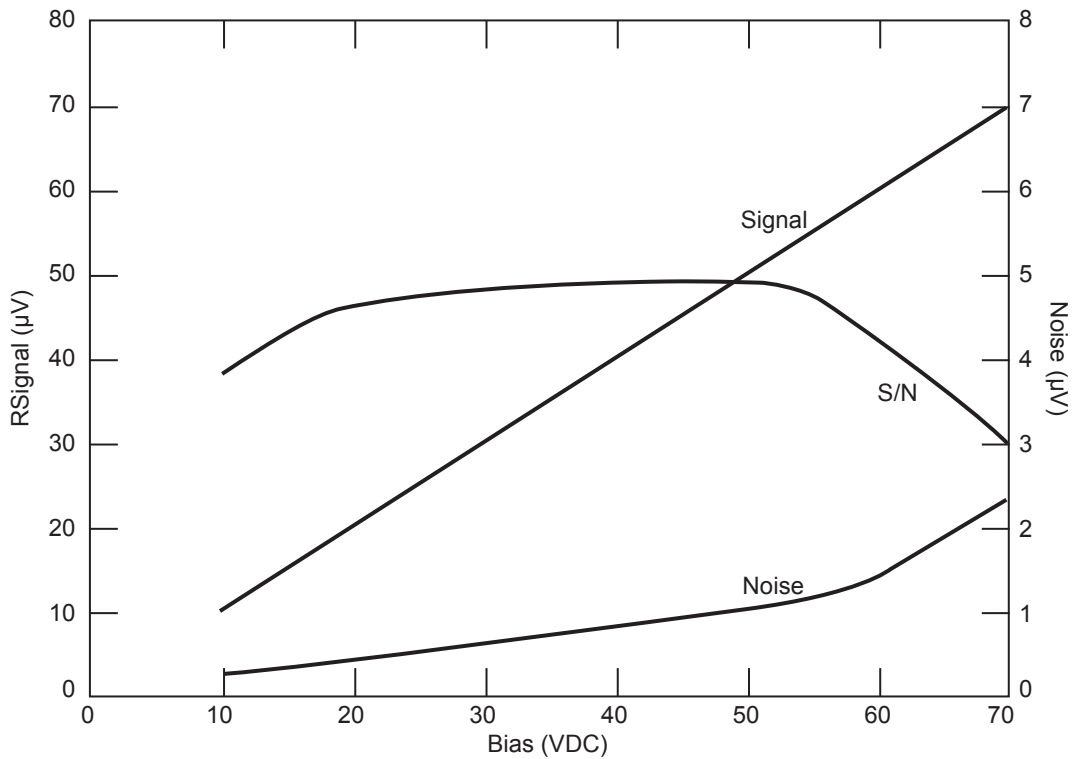
<sup>2</sup> Specifications apply at maximum cooling with a heat sink at +25°C. Typical cooler power at max cooling: AT1 0.8V @ 1.5A, AT2 0.8V @ 1.2A, AT2S 1.9V @ 1.2A.

<sup>3</sup> Max rated element temperature is 65°C.

## Detector Spectral Response



## S/N versus Bias Voltage

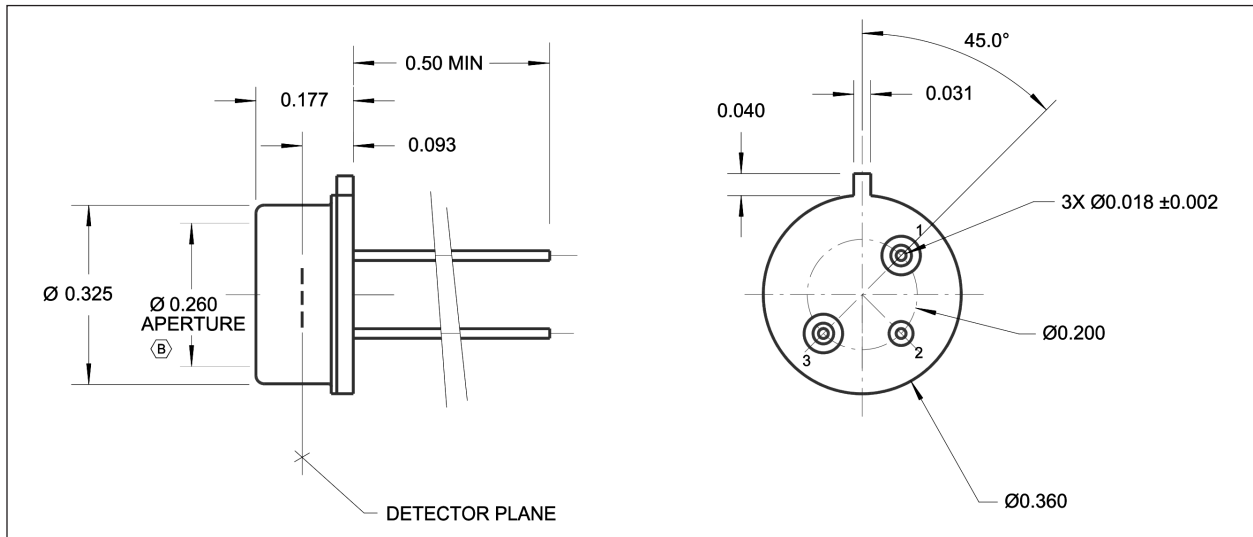


## TO5 Packages

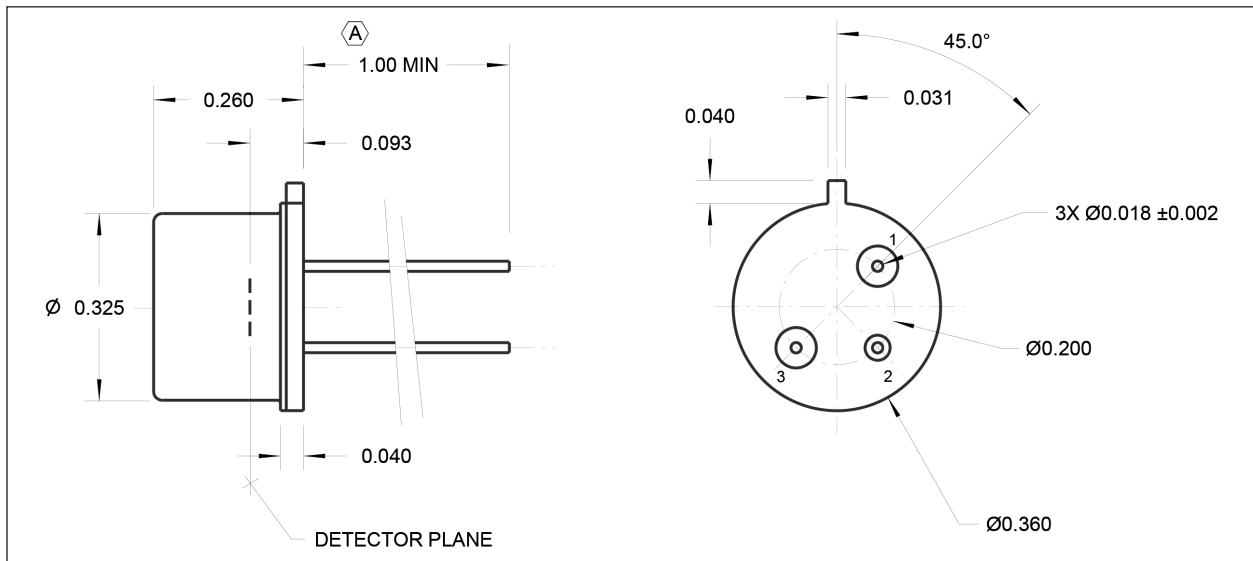
### Package & Pin Out Information

Pin No.	Function	Color
1	Detector	Bare
2	Case Gnd	Bare
3	Detector	Bare

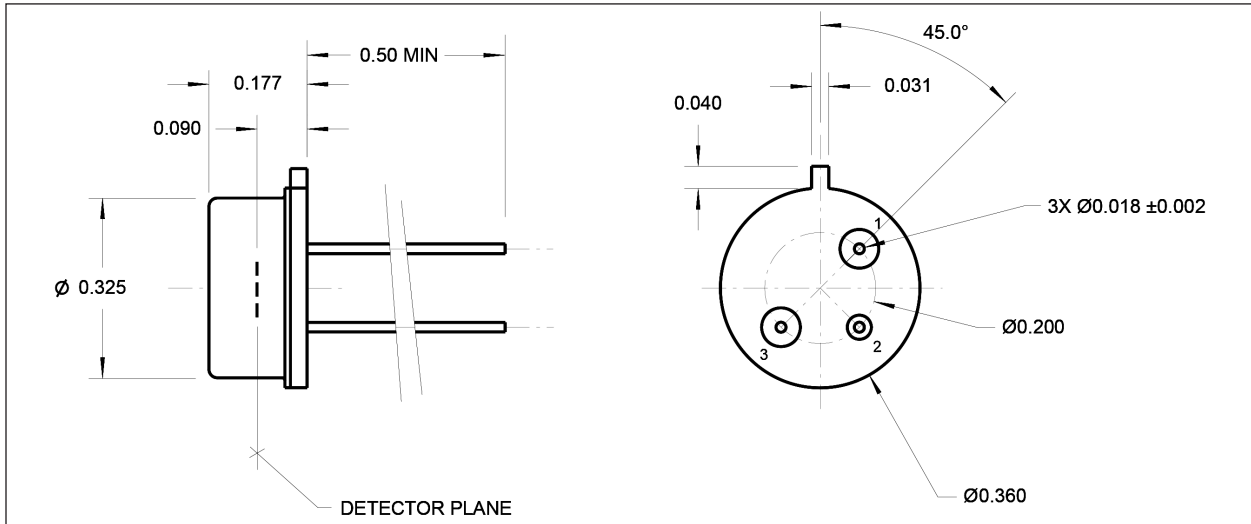
#### 40370



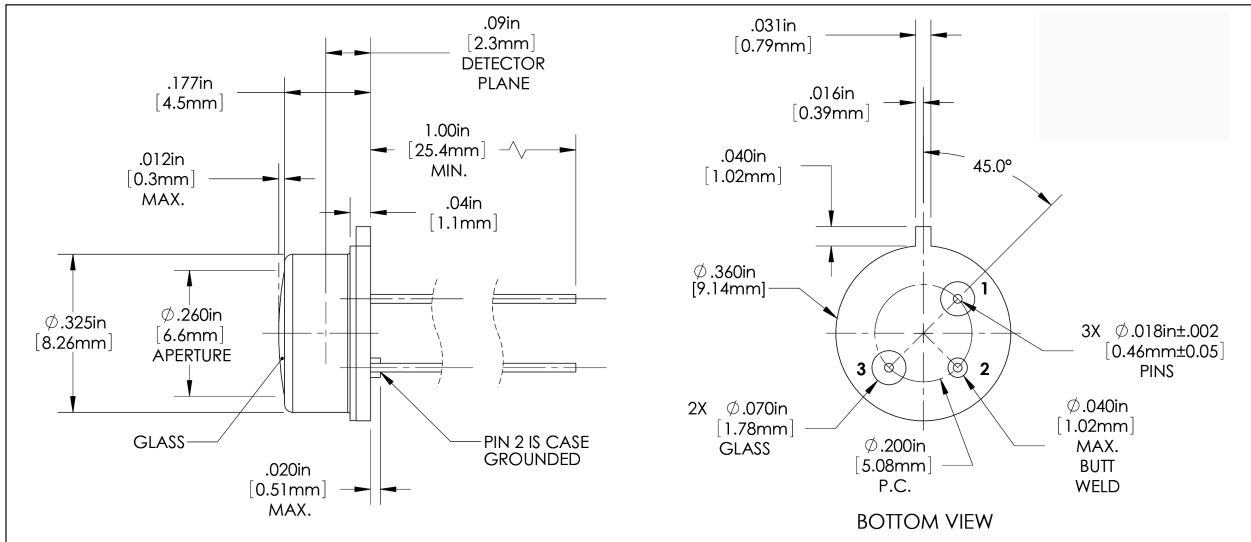
#### 40189, 40363



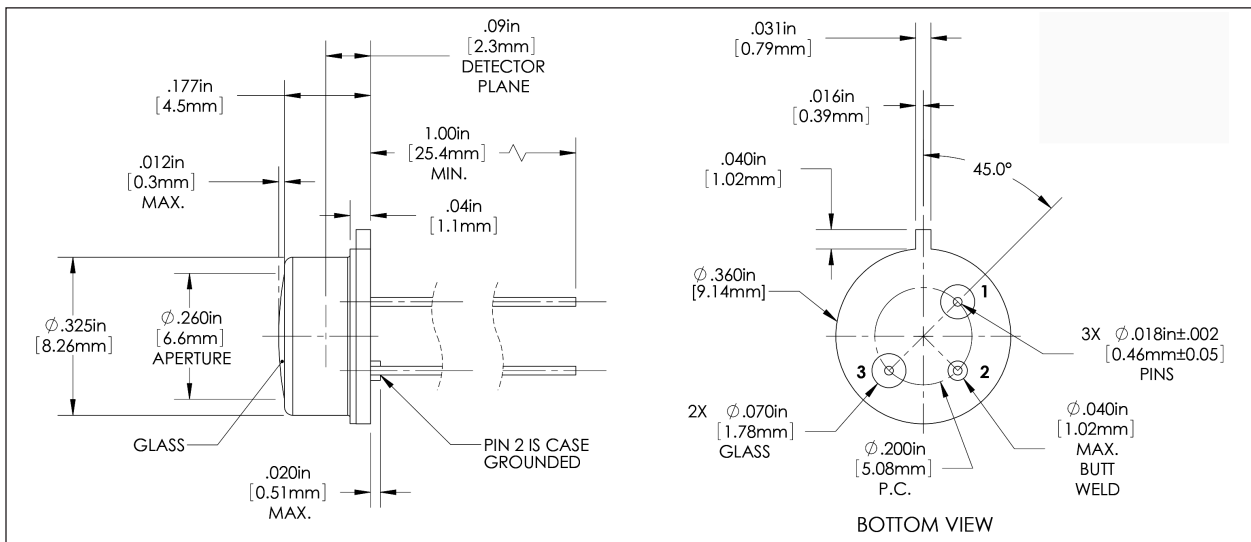
40009



40725



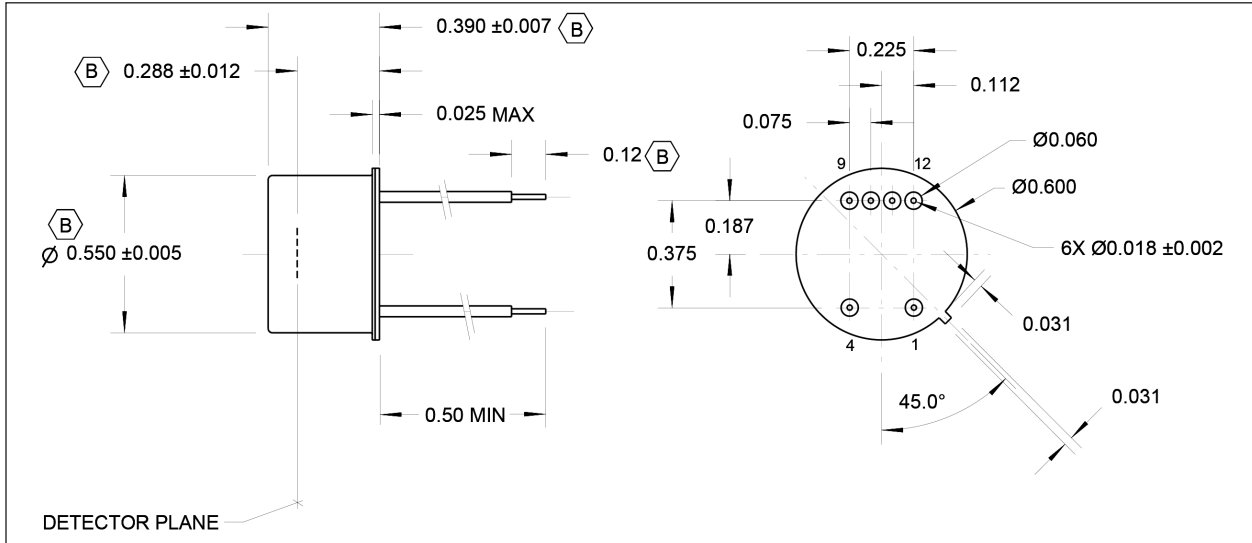
40029



## TO8 Packages

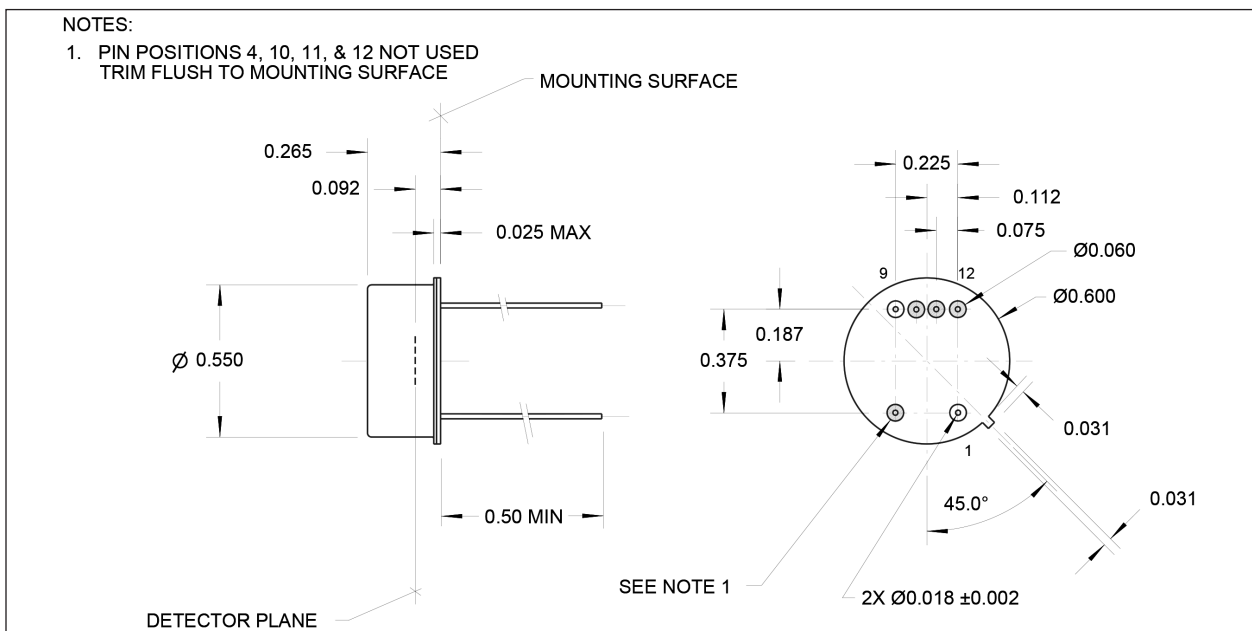
### 40029

Pin No.	Function	Color
1	Cooler (-)	Black
4	Cooler (+)	Red
9	Detector	White
10	Thermistor	Yellow
11	Thermistor	Yellow
12	Detector	White



### 40368

Pin No.	Function	Color
1	Detector	Bare
9	Detector	Bare

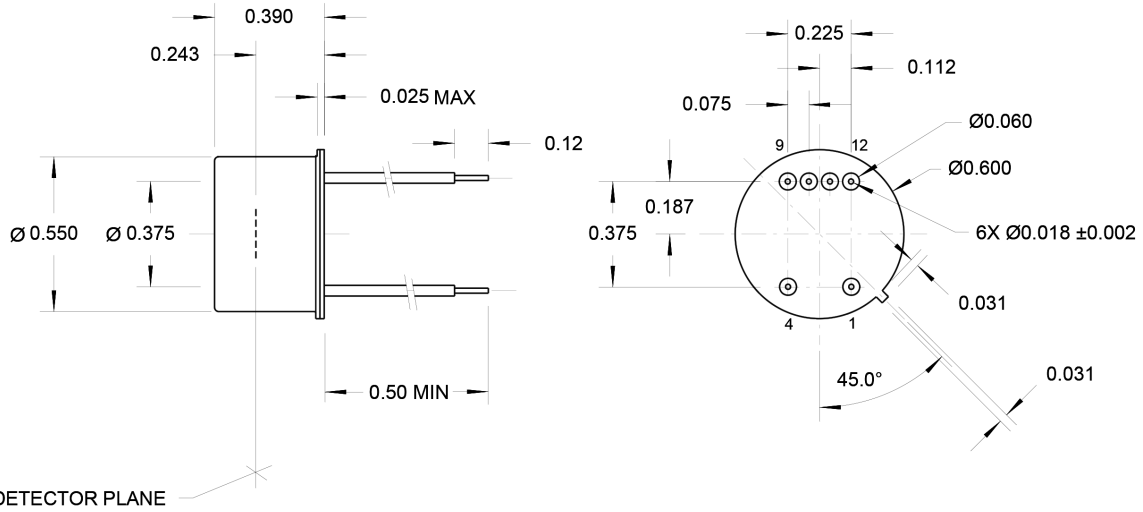


### 40028

Pin No.	Function	Color
1	Cooler (-)	Black
4	Cooler (+)	Red
9	Detector	White
10	Thermistor	Yellow
11	Thermistor	Yellow
12	Detector	White

**NOTES:**

- OPTICAL WINDOW TO BE SOLDER SEALED INTO UNIT.

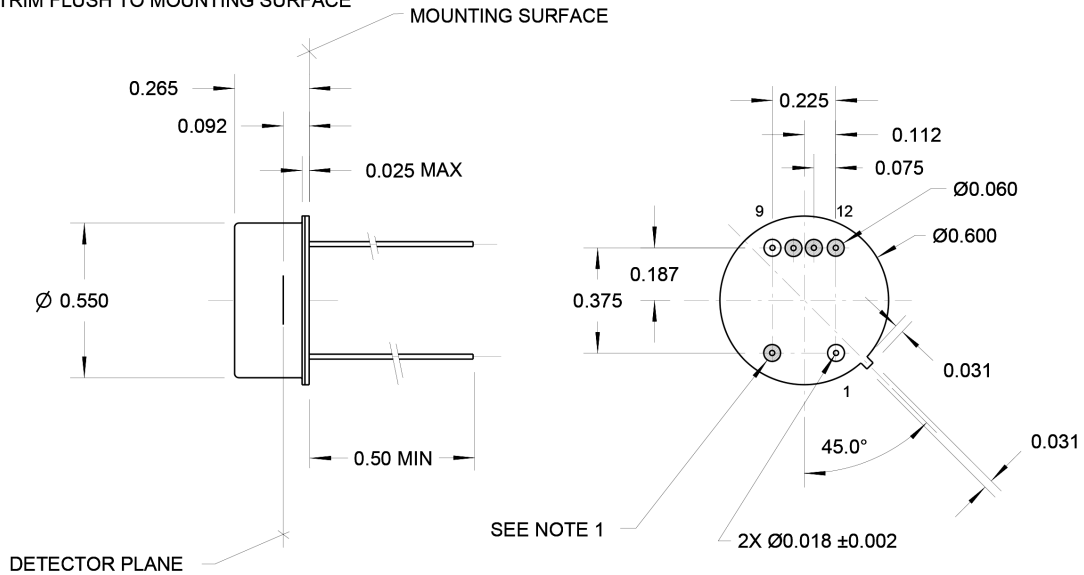


### 40736

Pin No.	Function	Color
1	Detector	Bare
9	Detector	Bare

**NOTES:**

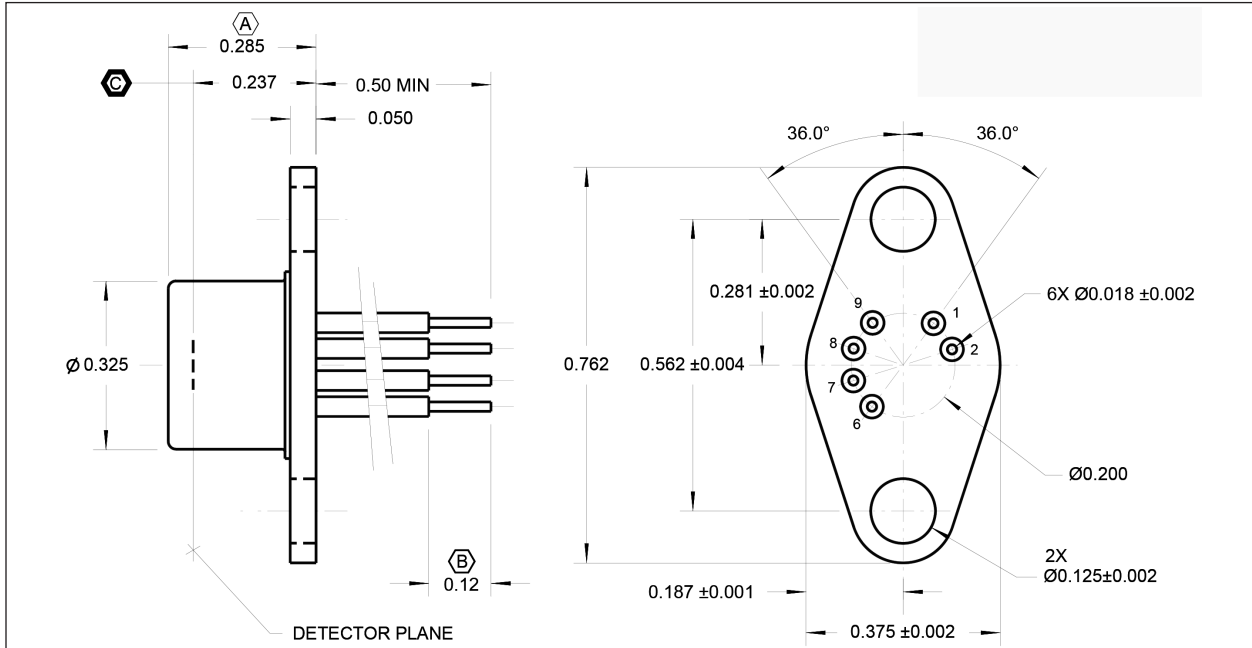
- PIN POSITIONS 4, 10, 11, & 12 NOT USED  
TRIM FLUSH TO MOUNTING SURFACE



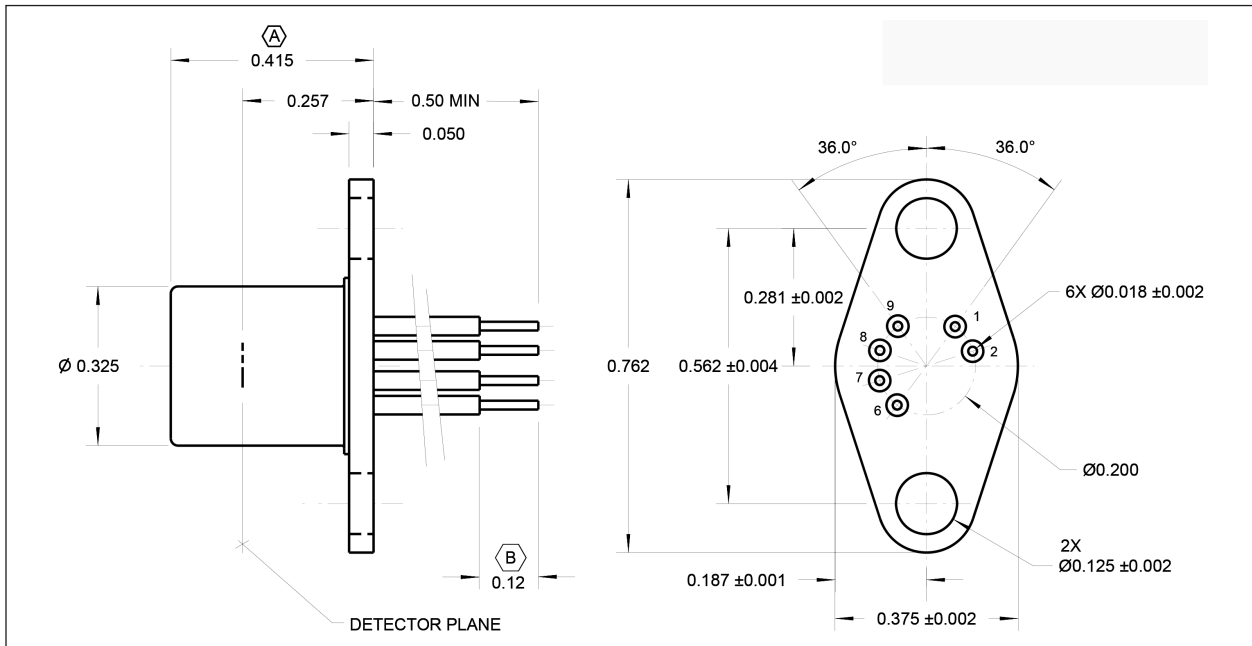
## TO37 Packages

Pin No.	Function	Color
1	Thermistor	Yellow
2	Thermistor	Yellow
6	Detector	White
7	Detector	White
8	Cooler (-)	Black
9	Cooler (+)	Red

### 40147, 40373



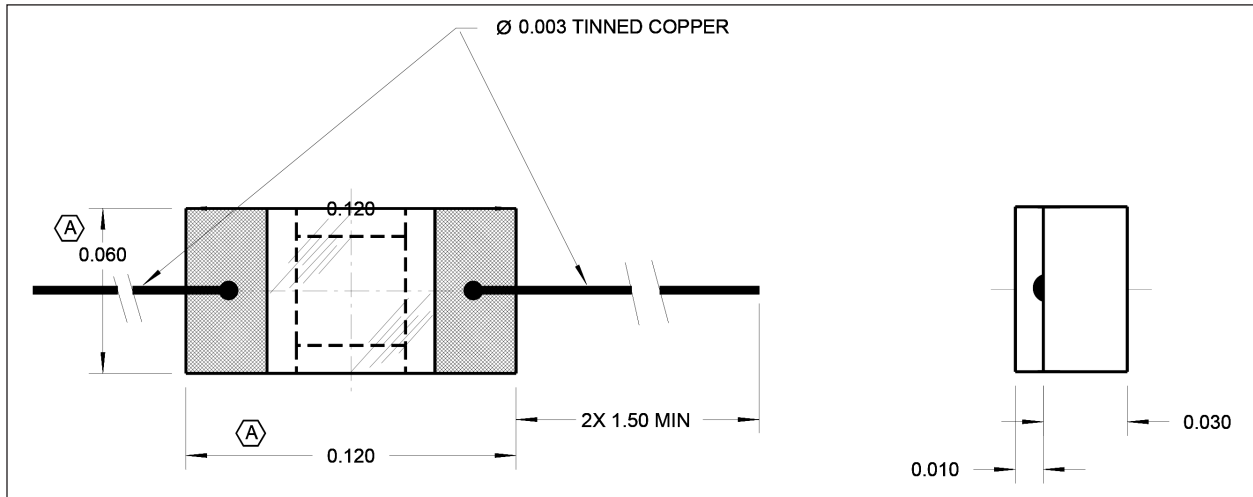
### 40193



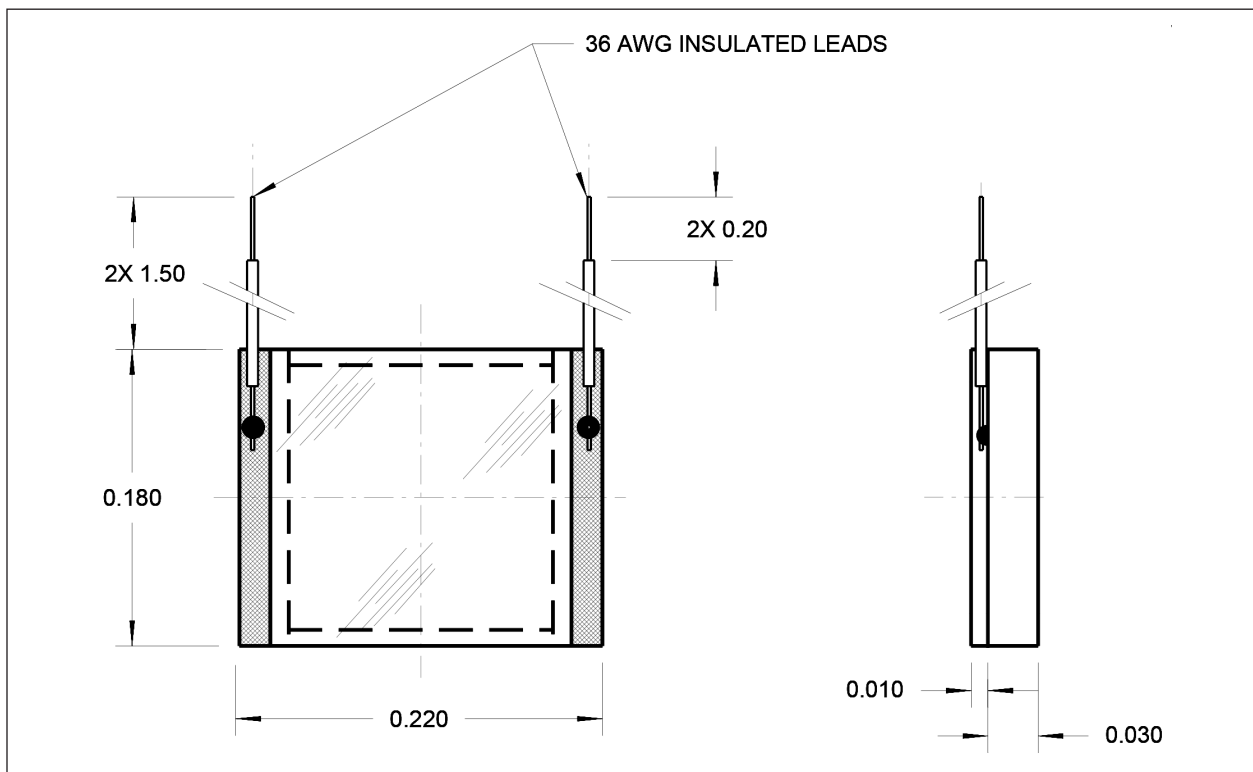


# Flatplate

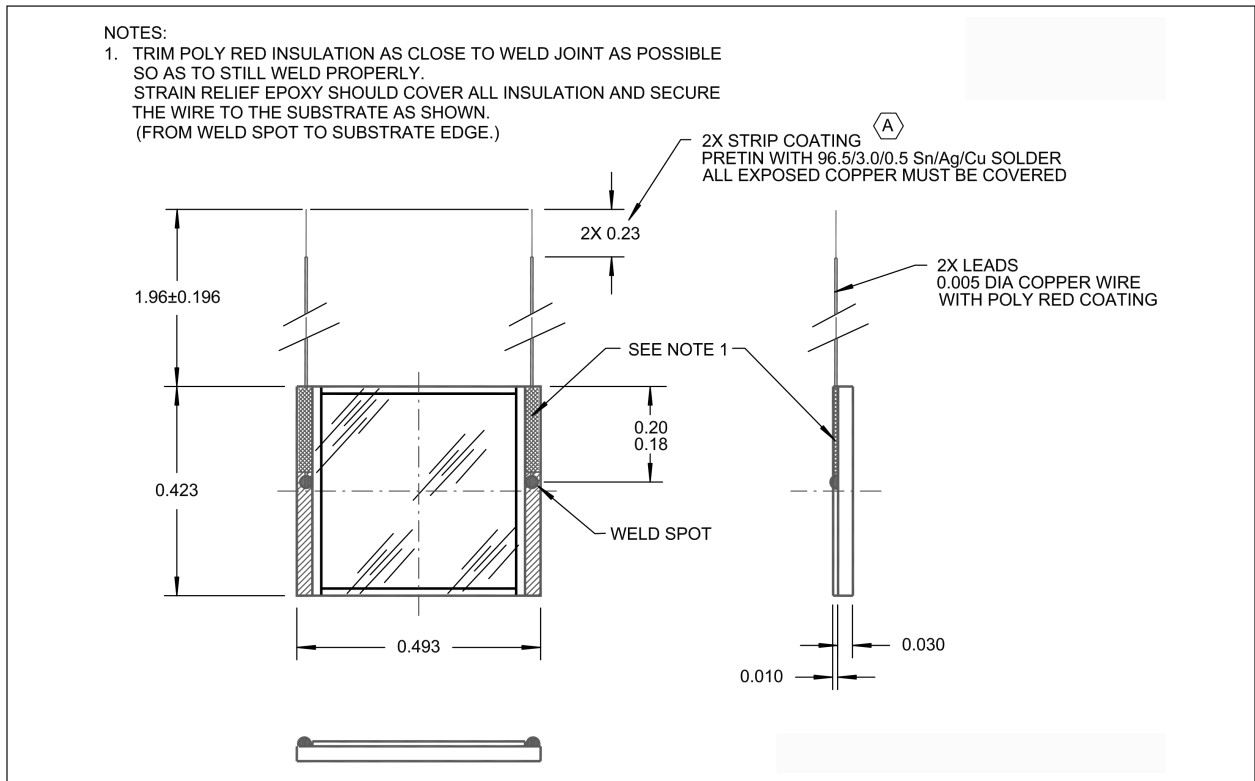
40188



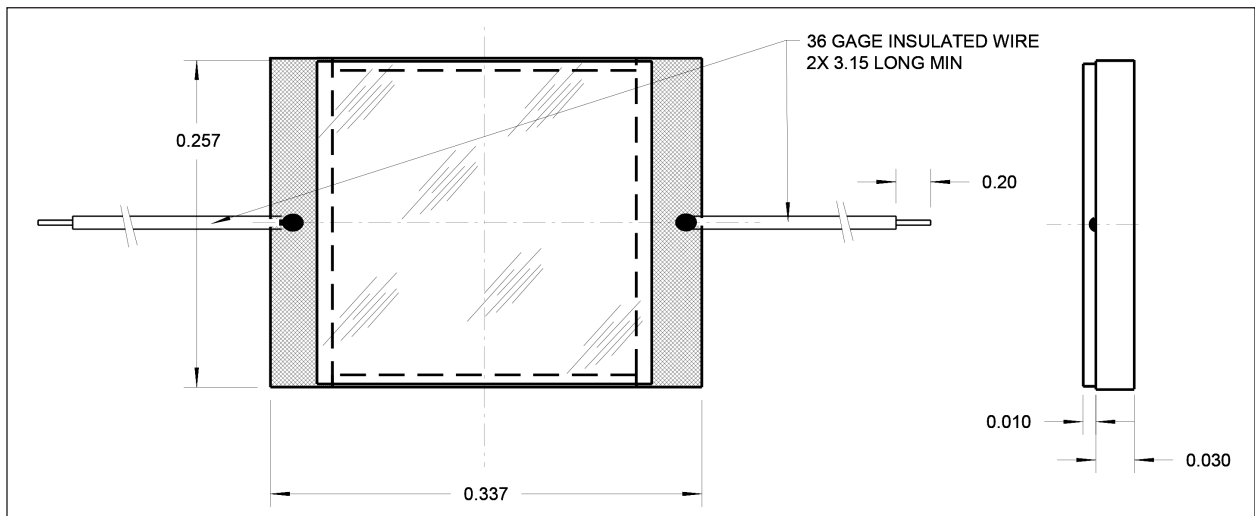
40204



40644



40205



NOTES:

1. STORE IN A CLEAN DRY ENVIRONMENT, SUCH AS A NITROGEN CABINET. DETECTOR DOES NOT HAVE A PASSIVATION COATING OR A PROTECTIVE COVER GLASS. DO NOT EXPOSE TO ACIDS/ALKALINES OR THEIR FUMES AS PERMANENT DAMAGE TO THE DETECTOR WILL OCCUR.

