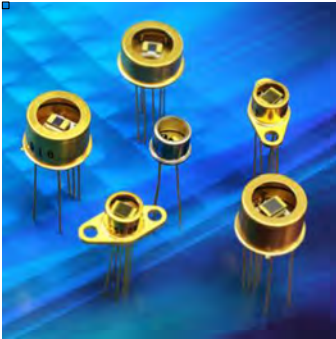


IR Detectors – A Series High Sensitivity Lead Sulfide (PbS) Single Channel Uncooled and Cooled Devices



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

IR Detectors – A Series

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

A Series Specifications

Model #	Part #	Description - Size	Package Type	Active Element Area (mm ²)	Element Operating Temp. (°C)	Peak Sensitivity Wavelength λ_p (μm)		D* λ_p , 650 Hz, 1 Hz (cm Hz ^{1/2} W ⁻¹)		Responsivity ¹ λ_p , 650 Hz, 25-50 V/mm (V/W)	Resistance (MΩ)	Time Constant (μsec)	Window Type		Absolute Ratings Storage & Operating Temperature (°C) ^{2,3}
						Min.	Typ.	Min.	Typ.				Min.	Range	
AP Series - Uncooled PbS Packaged IR Detectors				Typ.	Ambient 23	Min.	Typ.	Min.	Typ.	Min.	Range	Typ.	Max.		Range
AP-15G	40725	1 mm x 1 mm	TO5	1	+23	2.2	2.4	8x10 ¹⁰	1x10 ¹¹	5.3x10 ⁵	0.5-2.0	200	400	Glass Molded Lens ⁴	-40 to +65
AP-25G	40370	2 mm x 2 mm	TO5	4	+23	2.2	2.4	8x10 ¹⁰	1x10 ¹¹	2.7x10 ⁵	0.5-2.0	200	400	Glass Molded Lens ⁴	-40 to +65
AP-35	40363	3 mm x 3 mm	TO5	9	+23	2.2	2.4	8x10 ¹⁰	1x10 ¹¹	1.7x10 ⁵	0.5-2.0	200	400	Glass Molded Lens ⁴	-40 to +65
AP-20505	40009	2 mm x 5 mm	TO5	10	+23	2.2	2.4	7x10 ¹⁰	-	8.0x10 ⁴	0.5-2.0	200	400	Flat Glass ⁴	-40 to +65
AP-58E	40736	5 mm x 5 mm	TO8	25	+23	2.2	2.4	7x10 ¹⁰	-	1.1x10 ⁵	0.5-2.0	200	400	Flat Si	-40 to +65
AP-68	40368	6 mm x 6 mm	TO8	36	+23	2.2	2.4	7x10 ¹⁰	-	9.0x10 ⁴	0.5-2.0	200	400	Flat Si	-40 to +65
AF Series - Uncooled Flat Plate IR Detectors				Typ.	Ambient 23	Min.	Typ.	Min.	Typ.	Min.	Range	Typ.	Max.		Range
AF-1E	40188	1 mm x 1 mm	Flat Plate	1	+23	2.2	2.4	8x10 ¹⁰	1x10 ¹¹	1.3x10 ⁶	0.5-2.0	200	400	Flat Quartz	-40 to +65
AF-2E	40207	2 mm x 2 mm	Flat Plate	4	+23	2.2	2.4	5x10 ¹⁰	1x10 ¹¹	5.0x10 ⁵	0.5-2.0	200	400	Flat Quartz	-40 to +65
AF-4E	40204	4 mm x 4 mm	Flat Plate	16	+23	2.2	2.4	8x10 ¹⁰	1x10 ¹¹	1.3x10 ⁵	0.5-2.0	200	400	Flat Quartz	-40 to +65
AF-6E	40205	6 mm x 6 mm	Flat Plate	36	+23	2.2	2.4	8x10 ¹⁰	1x10 ¹¹	1.0x10 ⁵	0.5-2.0	200	400	Flat Quartz	-40 to +65
AF-10E	40644	10 mm x 10 mm	Flat Plate	100	+23	2.2	2.4	8x10 ¹⁰	1x10 ¹¹	3.0x10 ⁴	0.5-2.0	200	400	Flat Quartz	-40 to +65
AT1 Series - One Stage Cooled PbS Packaged IR Detectors				Typ.	Ambient 25	Min.	Typ.	Min.	Typ.	Min.	Range	Typ.	Max.		Range
AT1-27TE	40373	2 mm x 2 mm	TO37	4	-25	2.4	2.5	1x10 ¹¹	1.5x10 ¹¹	6.3x10 ⁵	1.5-10.0	800	1600	Flat Sapphire	-40 to +85
AT1-37T	40147	3 mm x 3 mm	TO37	9	-25	2.4	2.5	1x10 ¹¹	1.5x10 ¹¹	4.2x10 ⁵	1.5-10.0	800	1600	Flat Sapphire	-40 to +85
AT2 Series - Two Stage Cooled PbS Packaged IR Detectors				Typ.	Ambient 25	Min.	Typ.	Min.	Typ.	Min.	Range	Typ.	Max.		Range
AT2-28TE	40028	2 mm x 2 mm	TO8	4	-35	2.5	2.6	1.5x10 ¹¹	2.5x10 ¹¹	6.6x10 ⁵	2.5-15.0	1250	2500	Flat Sapphire	-40 to +85
AT2-37T	40193	3 mm x 3 mm	TO37	9	-35	2.5	2.6	1.5x10 ¹¹	2.5x10 ¹¹	4.3x10 ⁵	2.5-15.0	1250	2500	Flat Sapphire	-40 to +85
AT2S-38T	40029	3 mm x 3 mm	TO8	9	-45	2.6	2.7	2x10 ¹¹	3x10 ¹¹	4.3x10 ⁵	3.0-20.0	1750	3500	Flat Sapphire	-40 to +85

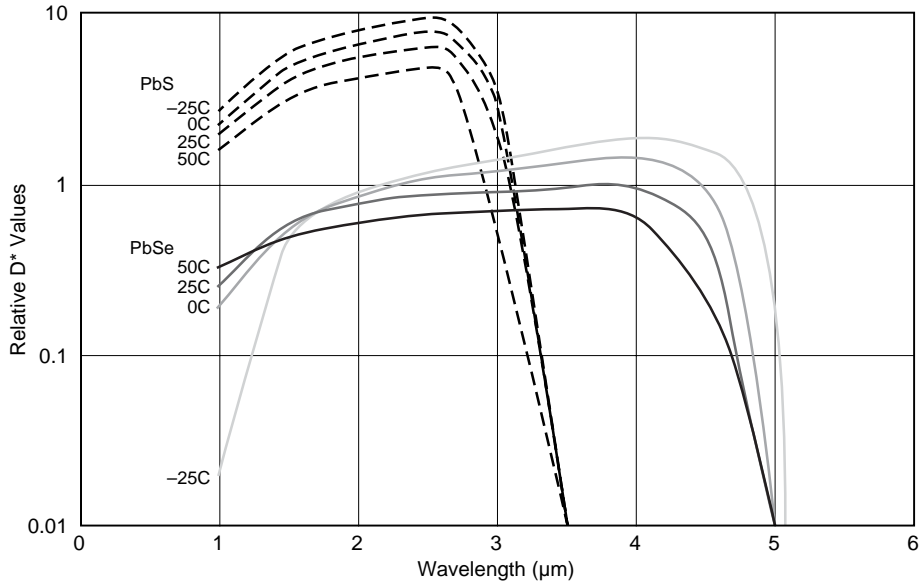
¹ Specifications apply at a bias voltage of 50 V/mm directly across the detector with a 1 MΩ load resistor in series. Except 40009 uses a 0.5 MΩ load.

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

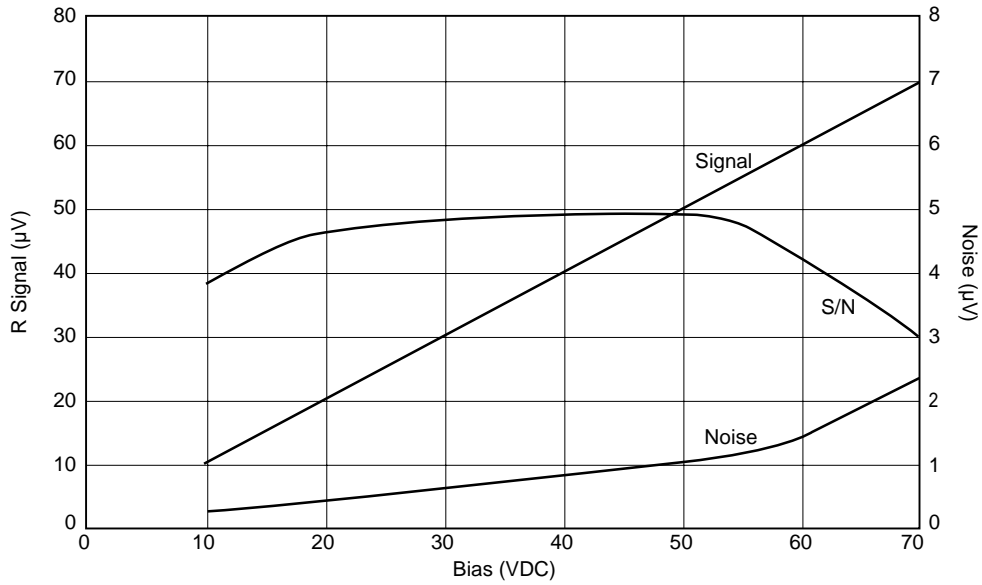
³ Max rated element temperature is 65 °C.

⁴ Borosilicate glass.

Detector Spectral Response



S/N vs Bias Voltage

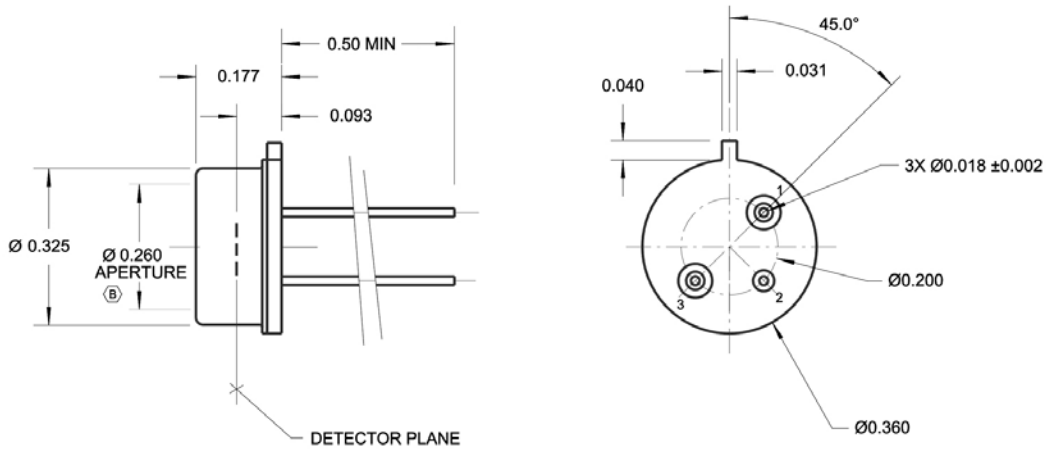


TO5 Packages

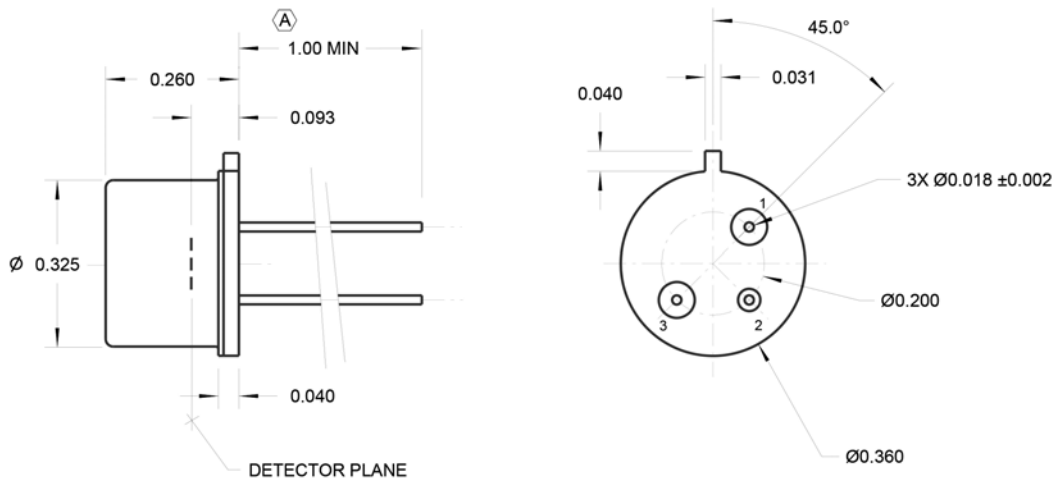
Package and Pin Out Information

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

40370



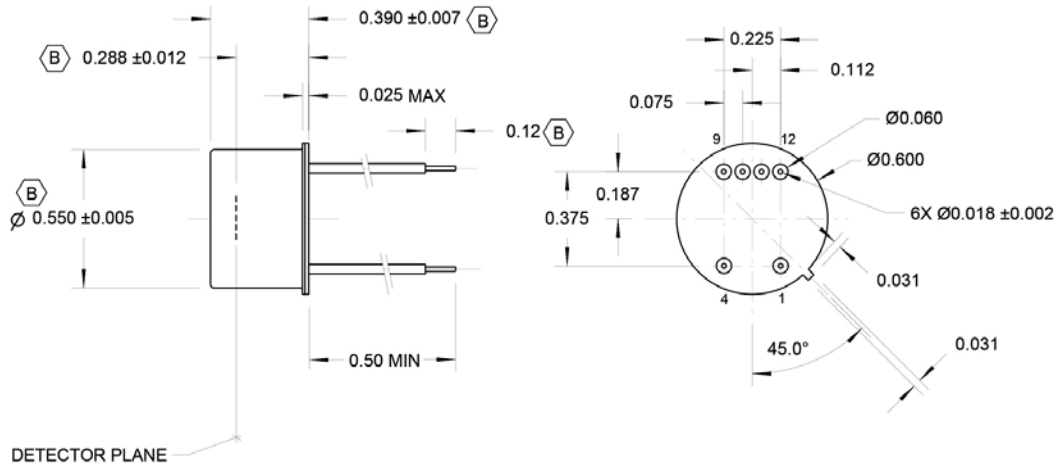
40363



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



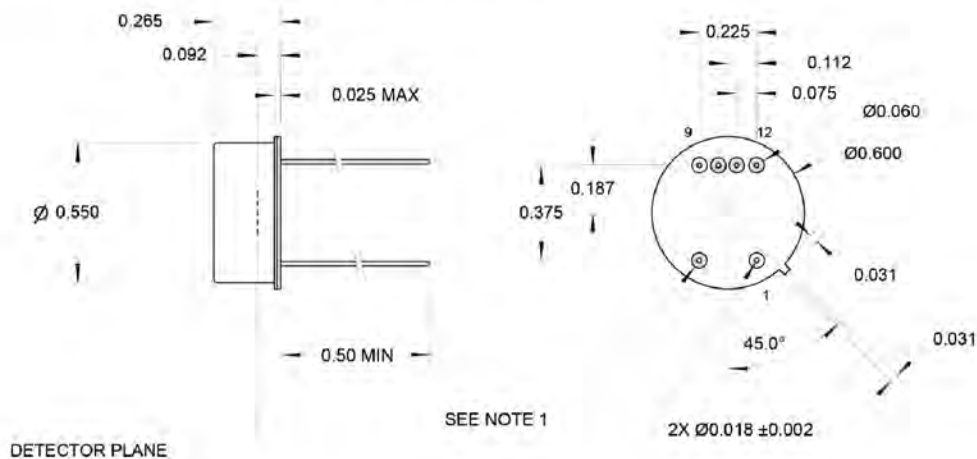
40368

Pin No.	Function	Color
1	Detector	Bare
9	Detector	Bare
12	Gnd (Case)	Bare

NOTES:

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

MOUNTING SURFACE

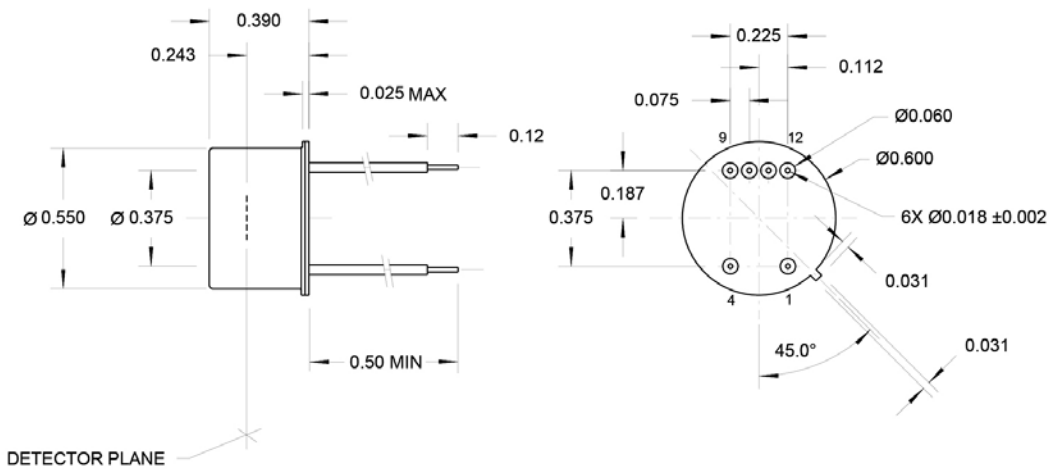


40028

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

NOTES:

1. OPTICAL WINDOW TO BE SOLDER SEALED INTO UNIT.

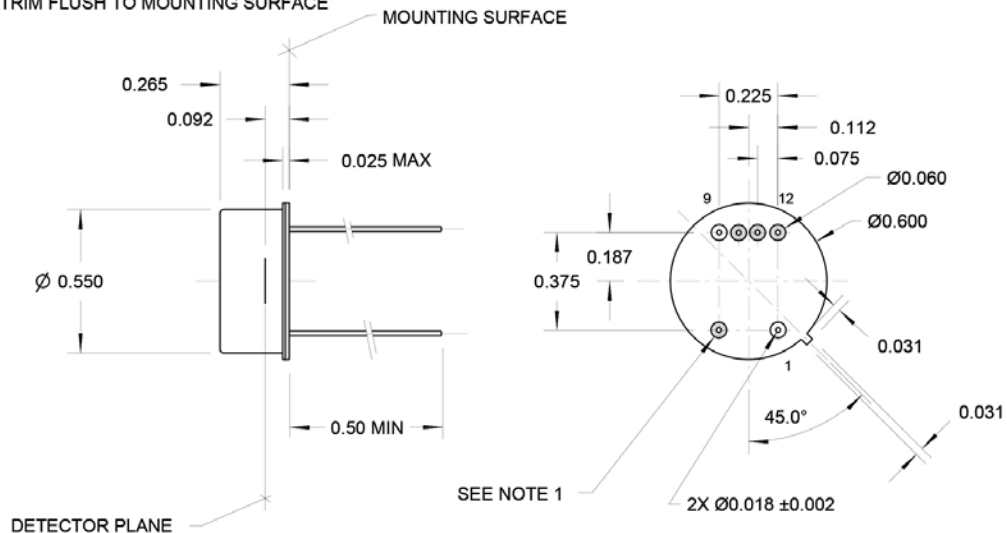


40736

Pin No.	Function	Color
1	Detector	Bare
9	Detector	Bare

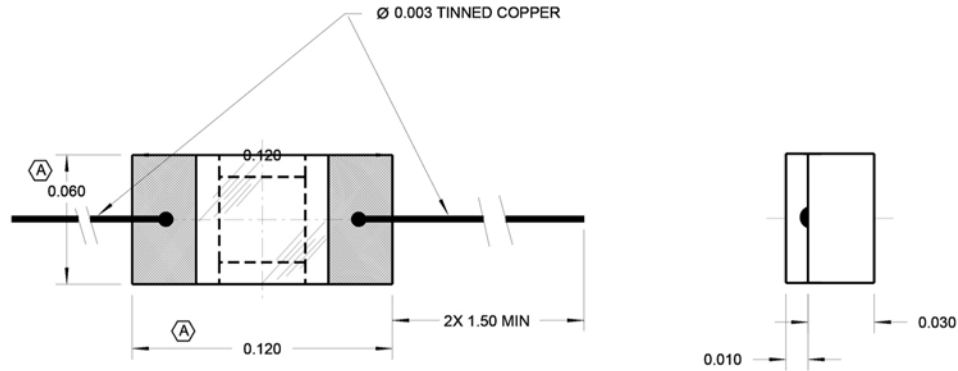
NOTES:

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

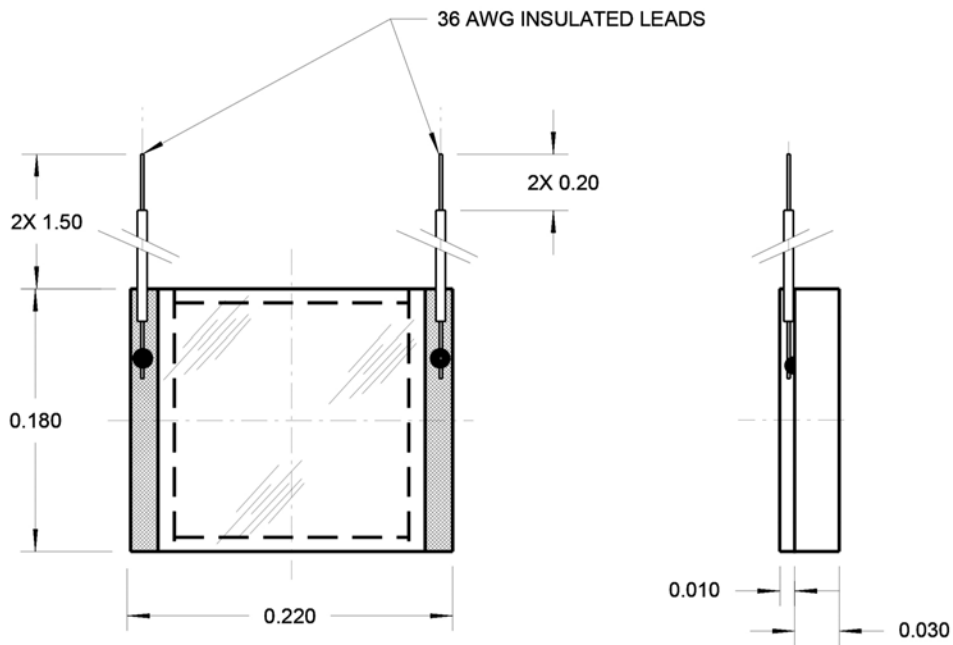


Flatplate

40188



40204

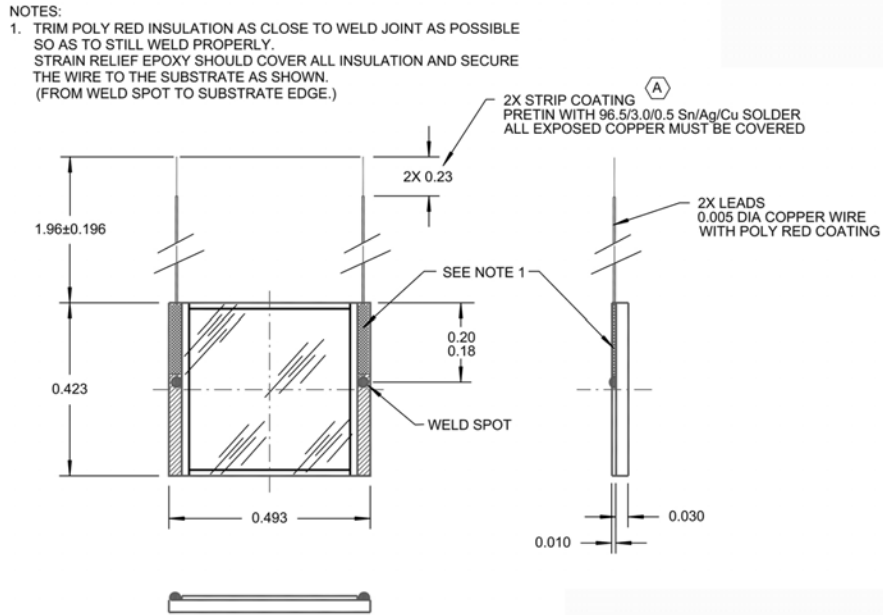


IR Detectors – A Series

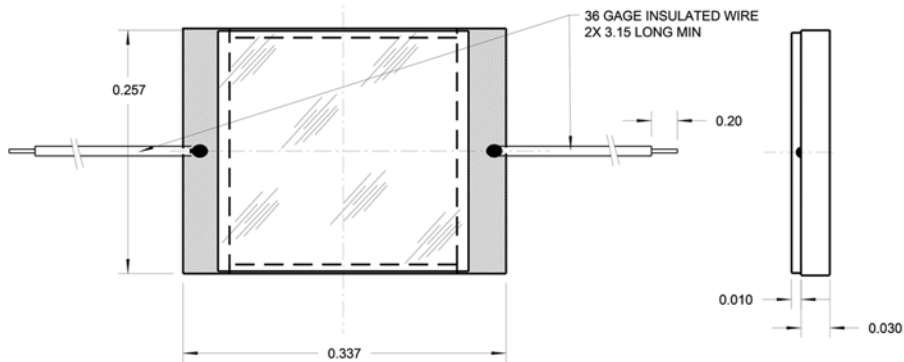
High Sensitivity Lead Sulfide (PbS) Single Channel

Uncooled and Cooled Devices

40644



40205

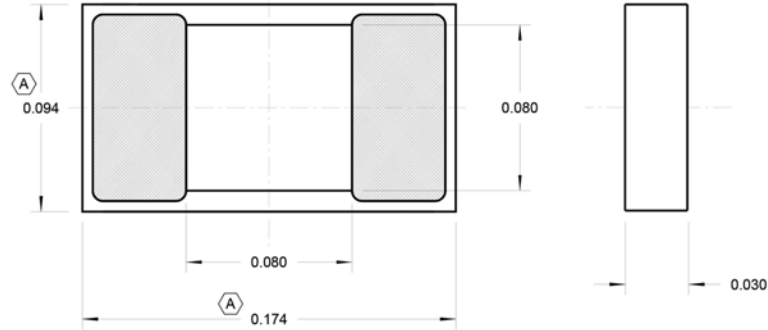


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IR Detectors – A Series High Sensitivity Lead Sulfide (PbS) Single Channel Uncooled and Cooled Devices

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.



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