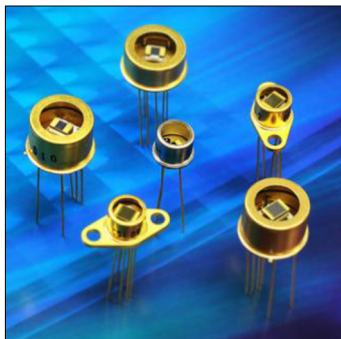


IR Detectors – A Series

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}
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
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.

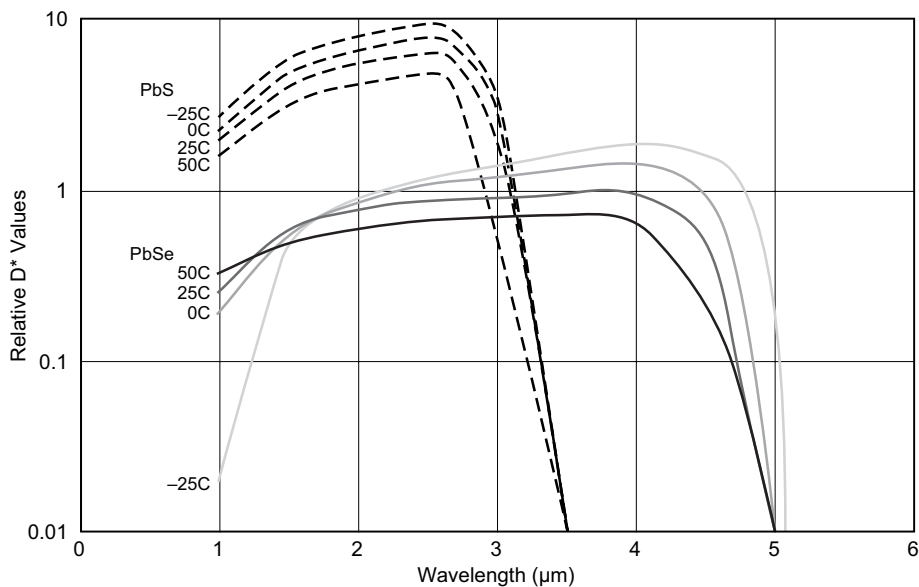
⁴ Borosilicate glass.

IR Detectors – A Series

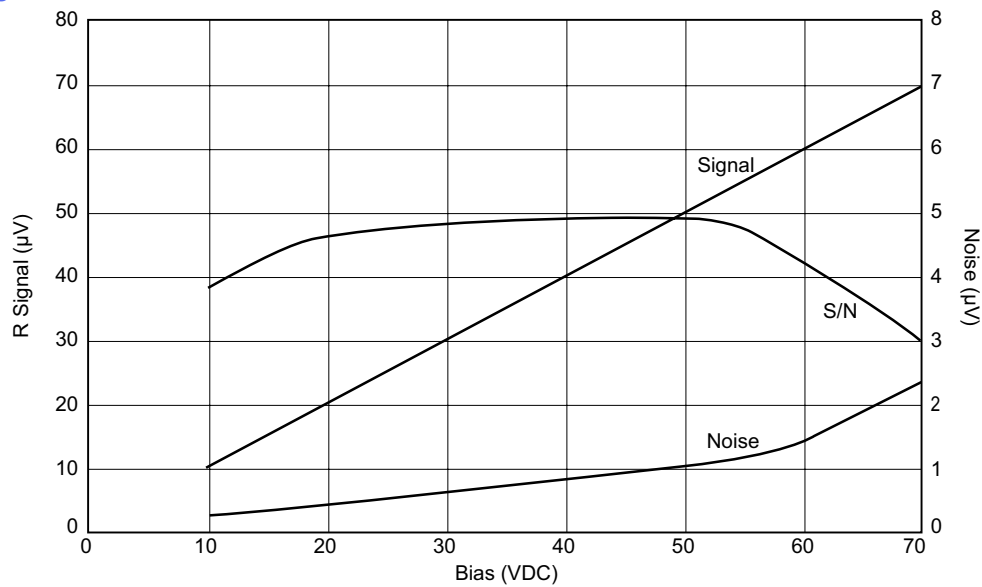
High Sensitivity Lead Sulfide (PbS) Single Channel

Uncooled and Cooled Devices

Detector Spectral Response



S/N vs Bias Voltage



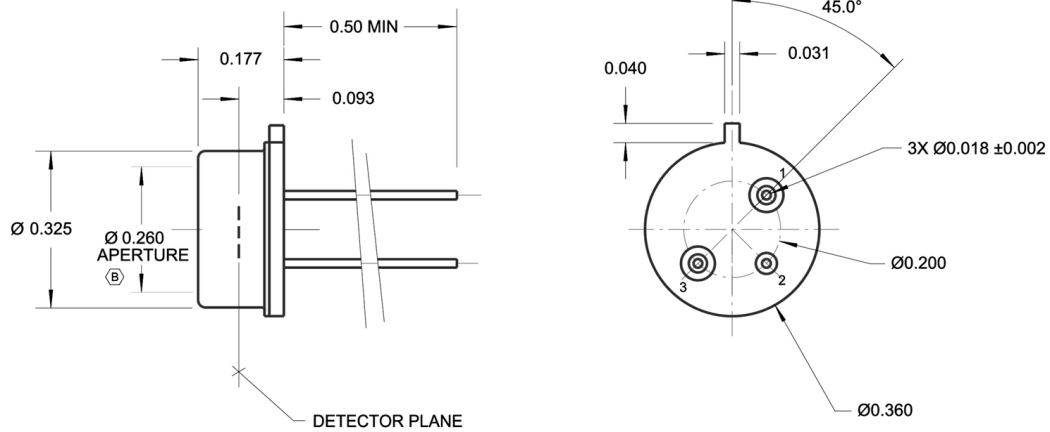
IR Detectors – A Series High Sensitivity Lead Sulfide (PbS) Single Channel Uncooled and Cooled Devices

TO5 Packages

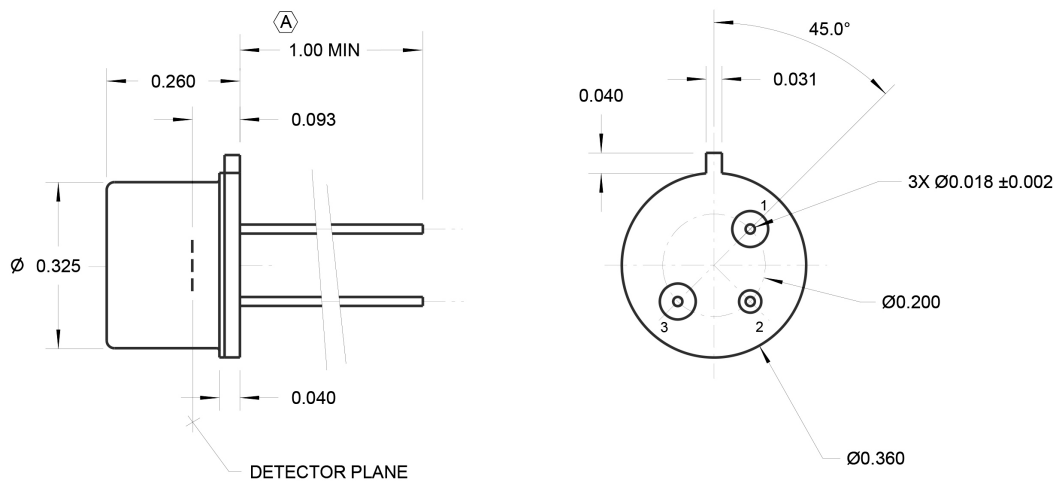
Package and Pin Out Information

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

40370



40363

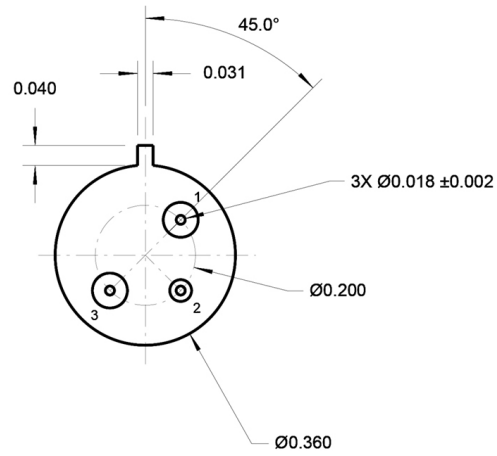
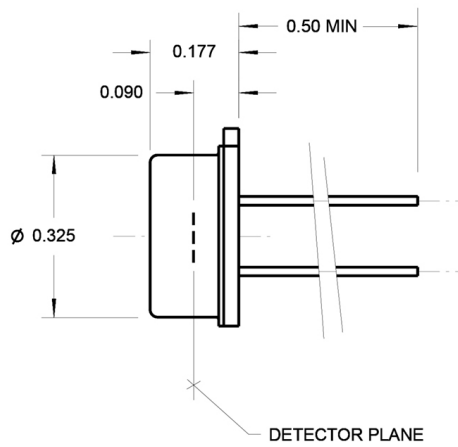


IR Detectors – A Series

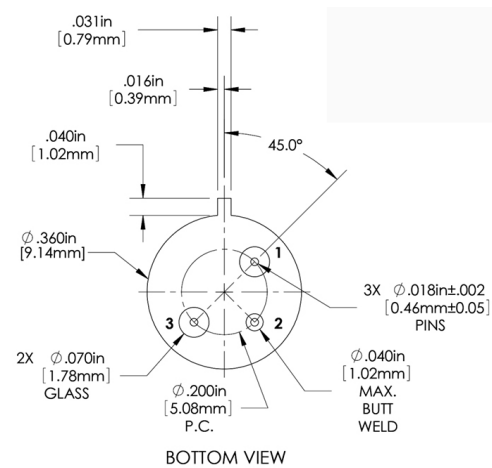
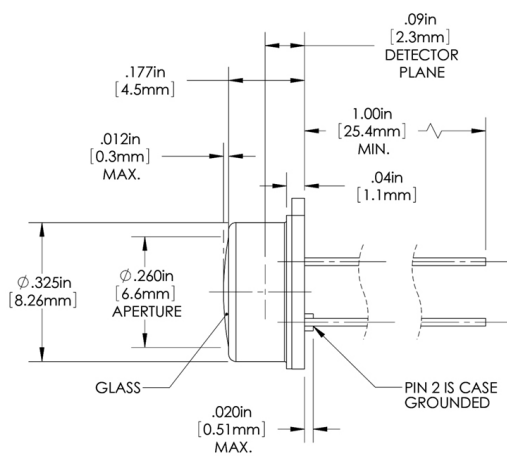
High Sensitivity Lead Sulfide (PbS) Single Channel

Uncooled and Cooled Devices

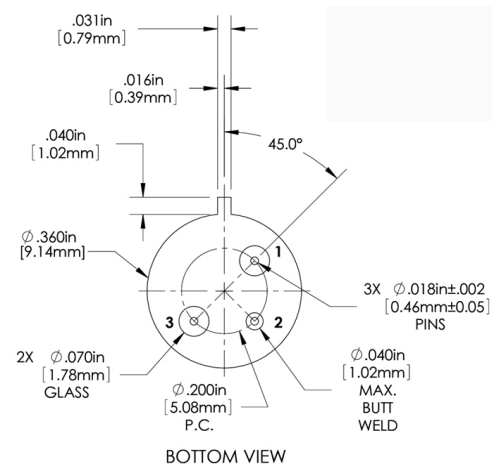
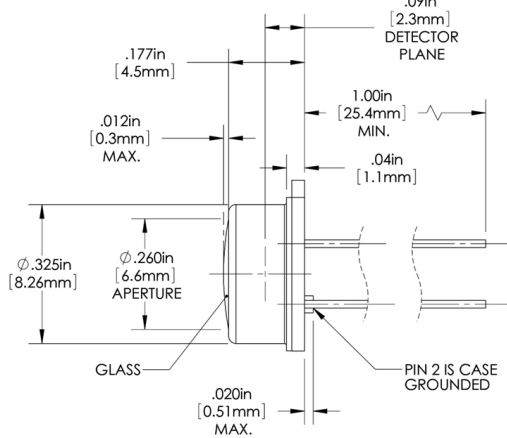
40009



40725

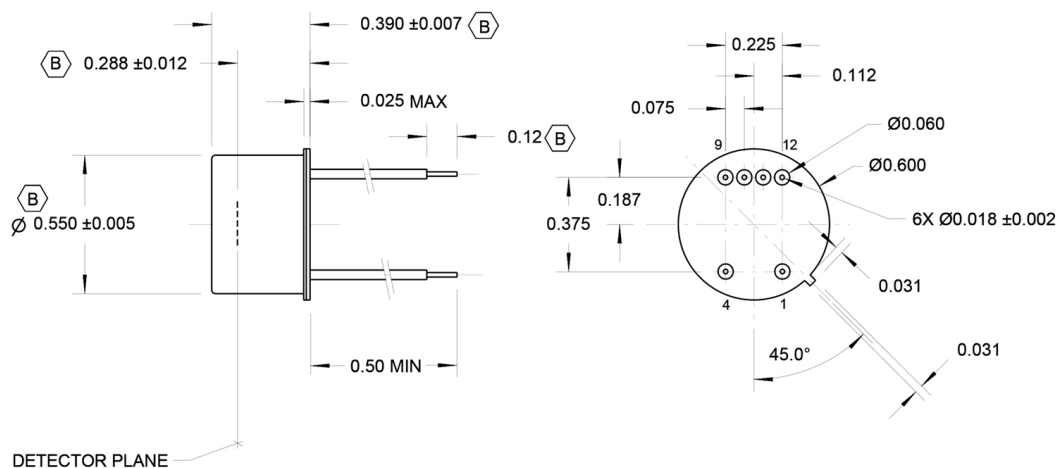


40029



40029

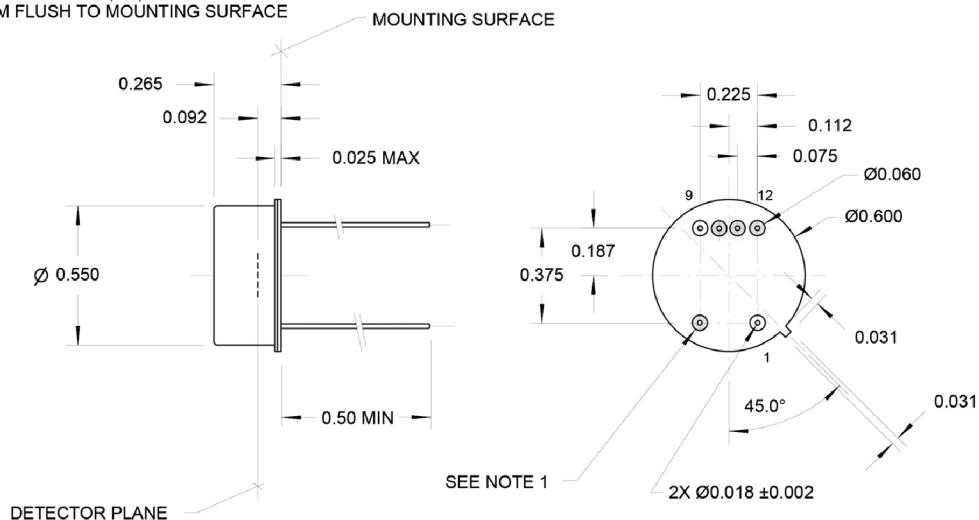
Pin No.	Function	Color
1	Cooler (–)	Black
4	Cooler (+)	Red
9	Detector	White
10	Thermistor	Yellow
11	Thermistor	Yellow
12	Detector	White



40368

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

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



IR Detectors – A Series

High Sensitivity Lead Sulfide (PbS) Single Channel

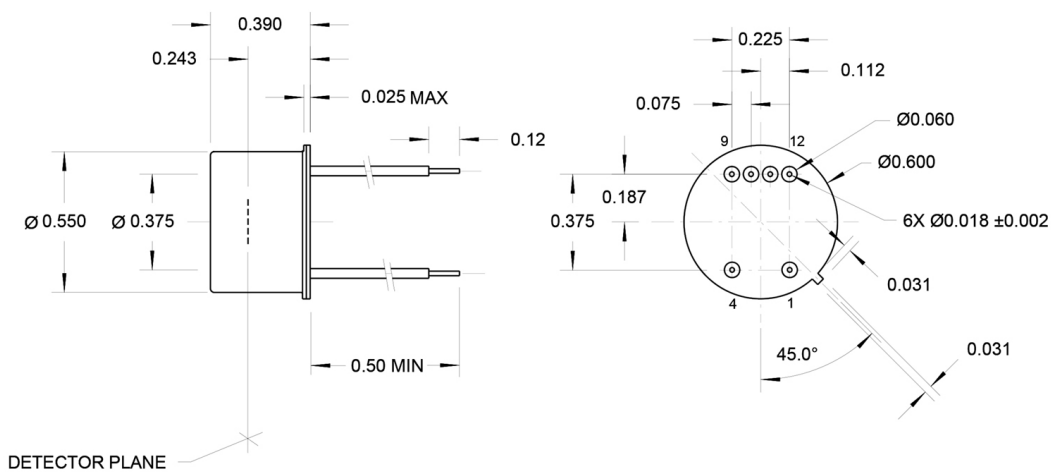
Uncooled and Cooled Devices

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.

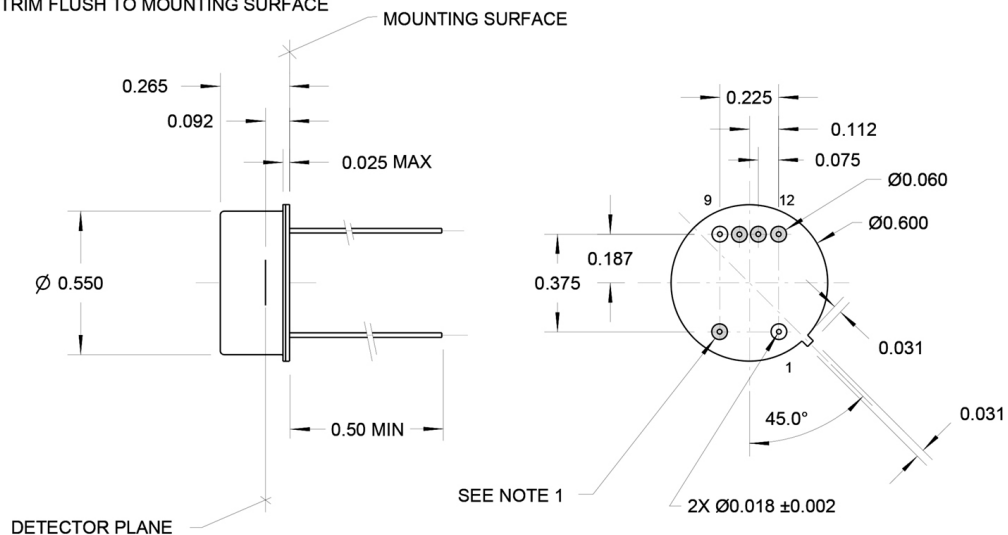


40736

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



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

Technical drawing of a detector assembly, showing side and top views with dimensions and feature callouts.

Side View Dimensions:

- Feature A: 0.285
- Feature C: 0.237
- Distance from Feature C to Feature B: 0.50 MIN
- Feature B: 0.050
- Overall width: $\varnothing 0.325$
- Feature B: 0.12

Top View Dimensions:

- Overall width: 0.762
- Distance from center to top hole: 0.281 ± 0.002
- Distance from center to side holes: 0.562 ± 0.004
- Distance from center to bottom hole: 0.187 ± 0.001
- Distance from center to right edge: 0.375 ± 0.002
- Angle: 36.0°
- Feature 1: $6X \varnothing 0.018 \pm 0.002$
- Feature 2: $\varnothing 0.200$
- Feature 3: $2X \varnothing 0.125 \pm 0.002$

Feature Callouts:

- Feature A: A
- Feature B: B
- Feature C: C
- Feature 1: 1
- Feature 2: 2
- Feature 3: 3
- Feature 4: 4
- Feature 5: 5
- Feature 6: 6
- Feature 7: 7
- Feature 8: 8
- Feature 9: 9

Other Labels:

- DETECTOR PLANE

[illegible]