High Performance Multi-Channel IR Detectors (MCDs) Ideal for Gas Detection Systems

Key Features

- Four discrete high sensitivity optical channels in one package
  - Allow simultaneous measurement of multiple gases/materials
- Suitable for NIR and MWIR sensing across 1-5.5 microns
- Compact, multi-channel, cooled and uncooled packages
  - Ideal for portable instruments where size is critical
  - Hermetically sealed for use in harsh environments
- Available with and without optical filters
  - Filters target CO_2, CO and various hydrocarbon measurements
- Designed for long term reliability in the field

New application demands are driving instrument manufacturers to measure more materials or gases in smaller devices while still maintaining high sensitivity and quality. To meet these challenges, the MCD (multi-channel detector) product family provides four discrete optical channels in compact packages with and without filters or thermoelectric cooling. With exceptional long-life and high-sensitivity, Opto Diode's PbS or PbSe MCDs cover from 1 micron up to 5.5 microns wavelengths for near and mid-infrared applications.

These MCDs are designed in a compact quadrant configuration with four isolated active elements on a single die. The four channels are typically used for air quality monitoring and emissions analysis. Four integrated optical filters have peak wavelengths of 3.34, 4.26 and 4.60 microns to cover hydrocarbon (such as methane), CO_2, and CO testing.

For over 25 years, Opto Diode has been manufacturing and selling high performance PbS and PbSe infrared detectors.

Having established a reputation for highly controlled manufacturing processes, customers can rely on consistent, repeatable performance and superior customer service. Supporting all stages of development, from early prototyping to high volume production, Opto Diode is dedicated to helping customers develop market-leading instruments. Custom requirements can be addressed by contacting the Opto Diodes' sales team.

Applications

- Gas analysis
- Industrial gas analysis
- Auto and aviation emissions monitoring
- Air quality monitoring or analysis
  - Environmental
  - In tunnels
  - Underground

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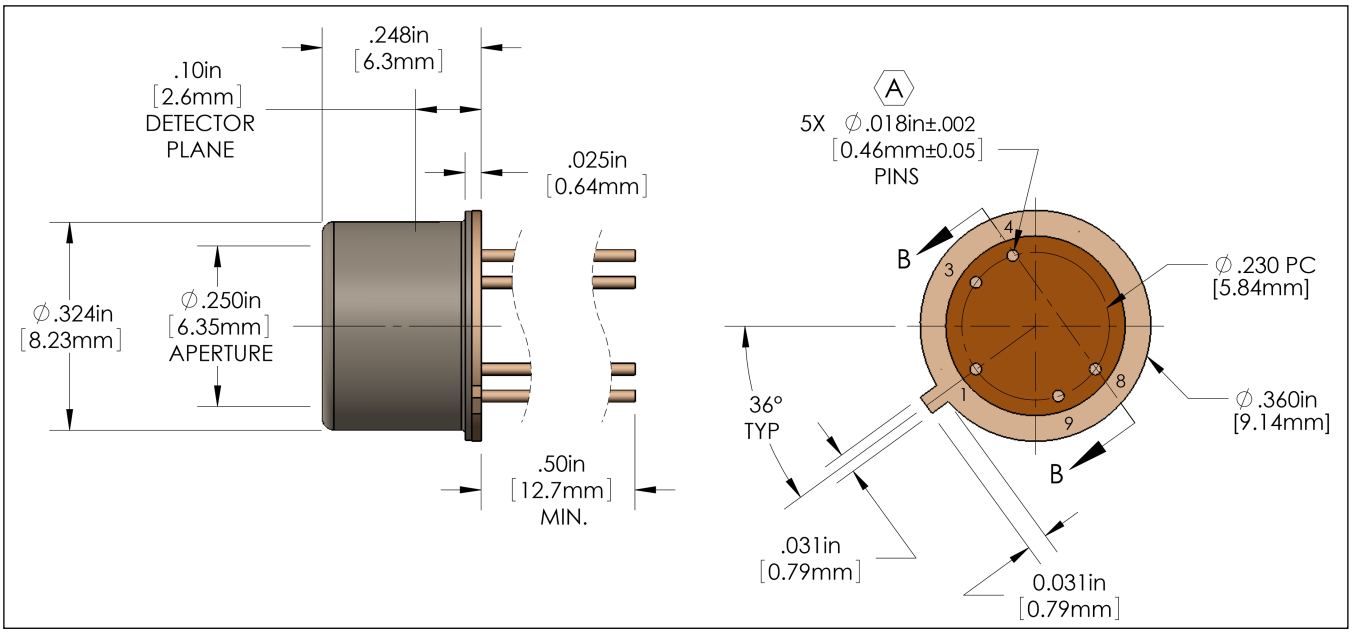
MAP-15-4 Specifications

Description	Model #	Part #	Package Type
PbS uncooled MCD without filters Four 1mm x 1mm Active Elements on Single Die	**MAP-15-4**	**40683**	**TO5**
Feature	**Min.**	**Typ.**	**Max.**
Single Active Element Area (mm^2)	-	1	-
Element Operating Temp. @ Ambient 23 (°C)	-	23	-
Peak Sensitivity Wavelength λ_p (µm)	2.3	2.4	-
D* λ_p, 650Hz, 1Hz ($cmHz^{1/2}W^{-1}$)	$8.0x10^{10}$	$1.0x10^{11}$	-
D* 500K, 650Hz,1Hz ($cmHz^{1/2}W^{-1}$)	$7.5x10^{8}$	$9.4x10^{8}$	-
Responsivity[1,4] λ_p, 650Hz, 25-35V/mm (V/W)	$5.3x10^{5}$	$8.0x10^{5}$	-
Resistance (MΩ)/Sq	0.5		2
Time Constant	-	200	400
Absolute Ratings Storage & Operating Temp. (°C)[3]	-40	-	+65



Pin No.	Function
1	Common
3	Elem 2
4	Elem 3
8	Elem 4
9	Elem 1

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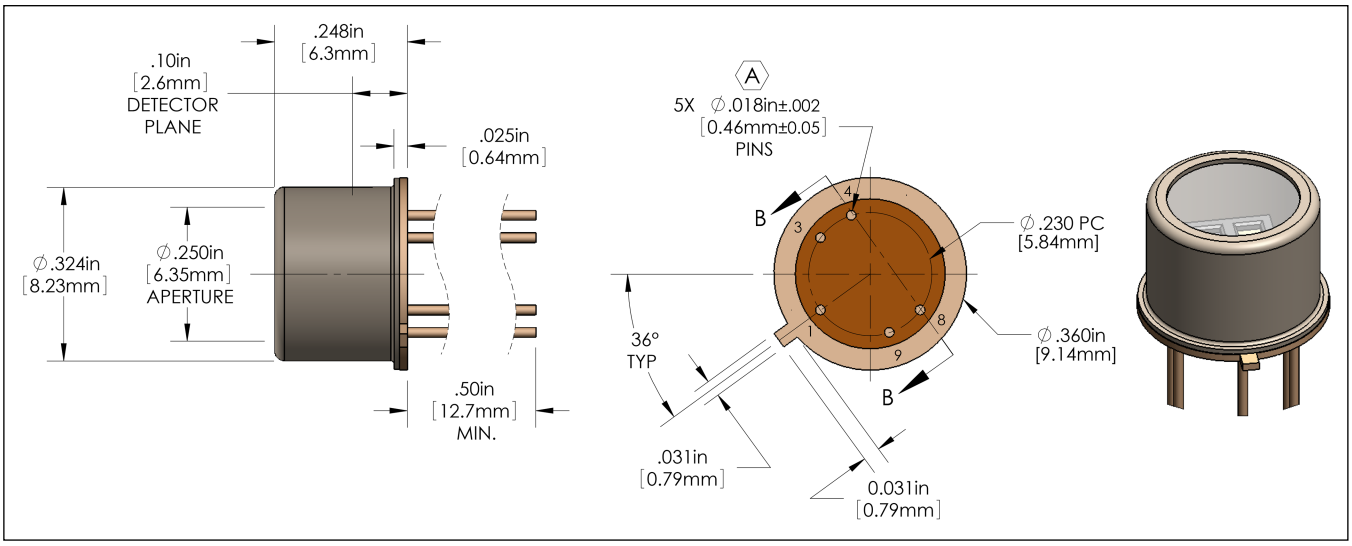
MBXP-15-4 Specifications

Description	Model #	Part #	Package Type
PbSe uncooled MCD with filters Four 1mm x 1mm Active Elements on Single Die	**MBXP-15-4**	**40642**	**TO5**
Feature	**Min.**	**Typ.**	**Max.**
Single Active Element Area (mm^2)	-	1	-
Element Operating Temp. @ Ambient 23 (°C)	-	23	-
Peak Sensitivity Wavelength λ_p (µm)	3.6	3.8	-
D* λ_p, 650Hz, 1Hz ($cmHz^{1/2}W^{-1}$)	$7.0x10^9$	$1.5x10^{10}$	-
D* 500K, 650Hz, 1Hz ($cmHz^{1/2}W^{-1}$)	$1.0x10^8$	$1.5x10^9$	-
Responsivity[1,4] λ_p, 650Hz, 25-35V/mm (V/W)	$1.5x10^4$	$3x10^4$	-
Resistance (MΩ)/Sq	0.1		2.5
Time Constant	-	2	5
Absolute Ratings Storage & Operating Temp. (°C)[3]	-40	-	+85



Pin No.	Function	Filter
1	Common	3.85 µm
3	Elem 2	4.26 µm
4	Elem 3	
8	Elem 4	4.60 µm
9	Elem 1	3.34 µm

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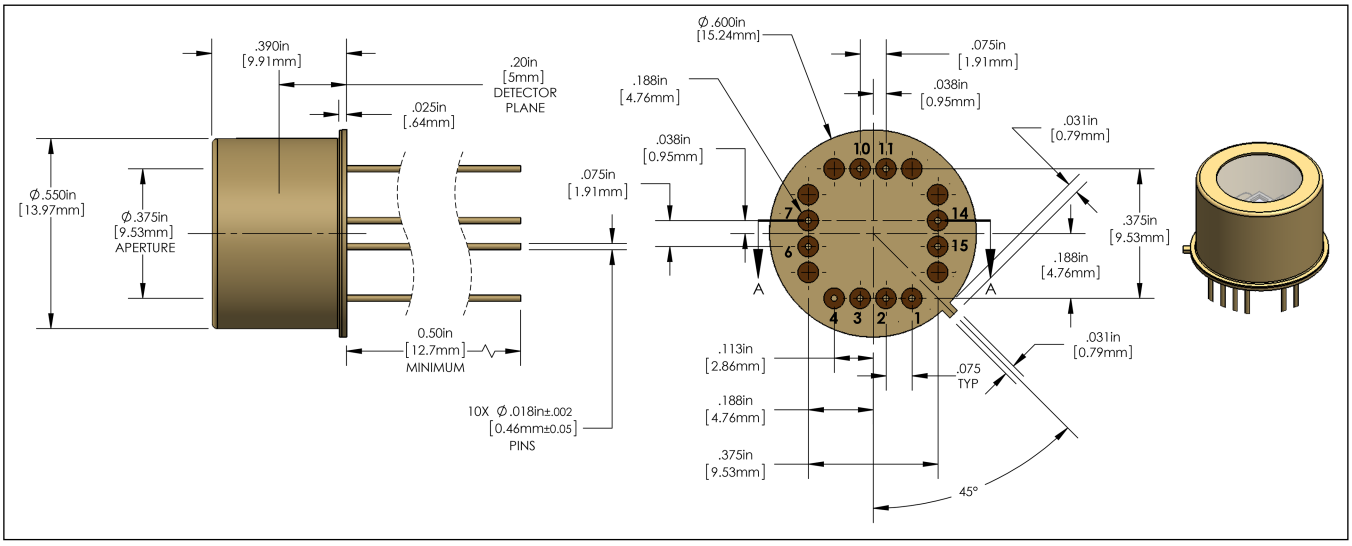
MBXT1S-18T-4 Specifications

Description	Model #	Part #	Package Type
PbSe one stage cooled MCD with filters Four 1mm x 1mm Active Elements on Single Die	**MBXT1S-18T-4**	**40703**	**TO8**
Feature	**Min.**	**Typ.**	**Max.**
Single Active Element Area (mm^2)	-	1	-
Element Operating Temp. @ Ambient 23 (°C)	-	-25	-
Peak Sensitivity Wavelength λ_p (µm)	4.0	4.2	-
D* λ_p, 650Hz, 1Hz ($cmHz^{1/2}W^{-1}$)	$1.4x10^{10}$	$2.8x10^{10}$	-
D* 500K, 650Hz,1Hz ($cmHz^{1/2}W^{-1}$)	$1.9x10^{9}$	$3.9x10^{9}$	-
Responsivity[1,4] λ_p, 650Hz, 25-35V/mm (V/W)	$4.0x10^{4}$	$6.0x10^{4}$	-
Resistance (MΩ)/Sq	0.5		10
Time Constant	-	6	16
Absolute Ratings Storage & Operating Temp. (°C)[2, 3]	-40	-	+85



Pin No.	Function	Filter
1	TE Cooler (–)	
2	Common	
3	Case Ground	
4	TE Cooler (+)	
6	Elem 2	3.85 µm
7	Elem 3	4.26 µm
10	Thermistor	
11	Thermistor	
14	Elem 4	4.60 µm
15	Elem 1	3.34 µm

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Filter Specifications

	CWL (µm)	HBW (µm)	Transmission at CWL (%)	BW at 75% Transmission (µm)
CO	4.60 ± 0.05	± 0.07 ± 0.007	> 85	> 0.75 x HBW
CO_2	4.26 ± 0.04	± 0.07 ± 0.007	> 85	> 0.75 x HBW
Hydrocarbon	3.34 ± 0.03	± 0.07 ± 0.007	> 55	> 0.75 x HBW
Ref	3.85 ± 0.04	± 0.10 ± 0.01	> 85	> 0.75 x HBW

CWL = Center wavelength
NBW = Bandwidth at the half-power point

Notes

[1] Specifications apply at a bias voltage of 35 V/mm or 25V/mm directly across the detector with either a 1MΩ or 0.5 MΩ load resistor in series.

[2] Specifications apply at maximum cooling with a heat sink at +25°C. Typical cooler power at max cooling: T1S 1.9V @ 1.5A.

[3] Max rated element temperature is 65°C for PbS and 85°C for PbSe.

[4] Specifications apply prior to filter attenuation.

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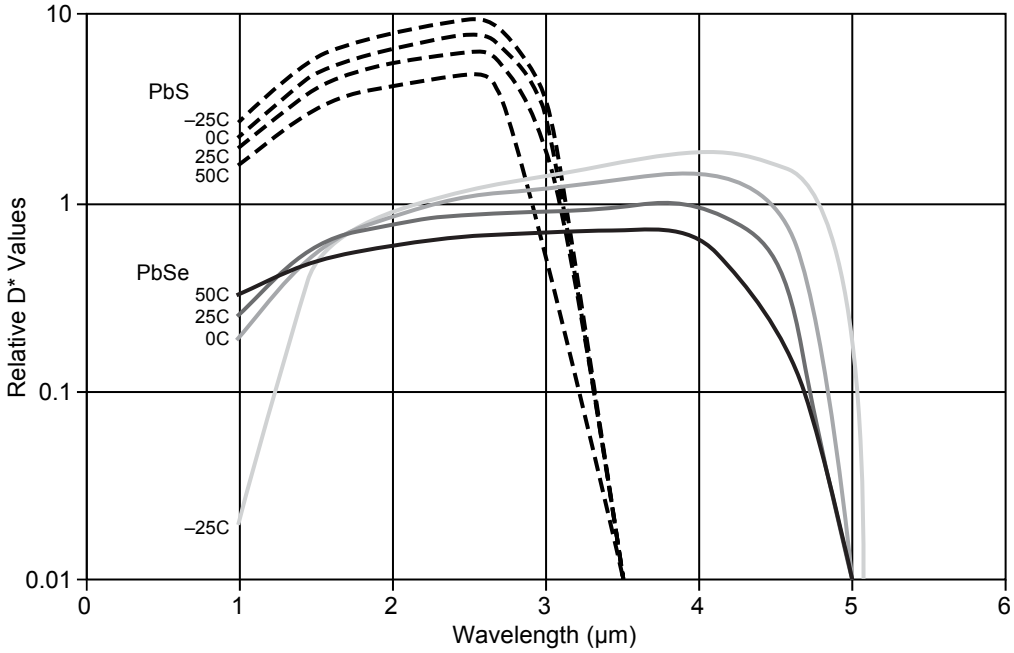
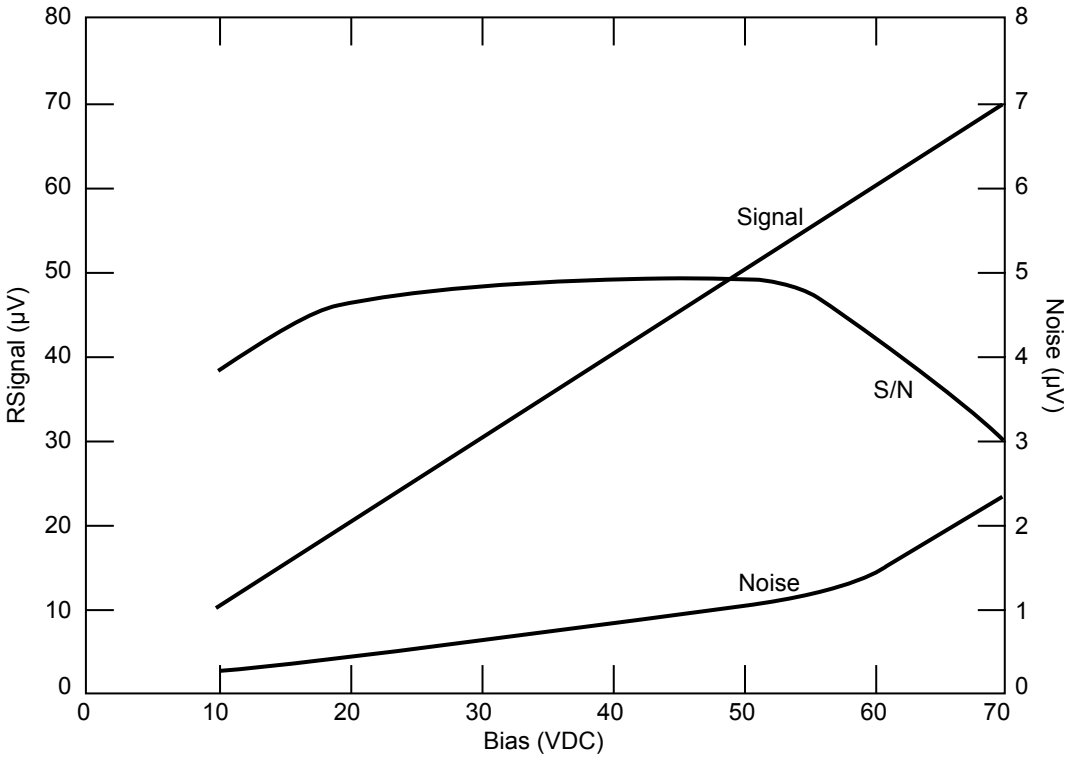
Additional Information

Detector Spectral Response



S/N versus Bias Voltage



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