

Cooled Amplified Detector Extended InGaAs 0.9-2.57 μm

TEC (-10°C), Thermistor, MEMS Chopper Integrated



DATASHEET

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The COAD is designed for low-light-level detection for the 0.9 to 2.57 μm wavelength range. It has an amplified, thermoelectrically cooled (-10°C), switchable-gain, switchable-bandwidth, extended InGaAs PIN photoconductive detector. The detector is mounted on a thermoelectric cooler with a thermistor that provides feedback to maintain a constant temperature of about -10°C via an internal circuitry. This cooling enhances detectivity, resulting in higher gains and lower thermal noise. The gain, response bandwidth, and sensitivity are all interrelated. Two eight-position rotary switches allow for varying the gain in 10 dB steps and selecting bandwidths from 500 Hz to 1 MHz to optimize performance for specific applications. The first two gain steps (0 dB and 10 dB) are biased to -2 V for high-speed performance, while the remaining gain steps are unbiased for high-precision measurements. Integration with a MEMS chopper is an option that further reduces the noise floor. The detector is DC-coupled with a 50 Ω load impedance and an output signal of up to 5 V. The detector is compatible with any SM1-threaded accessory, such as fiber adaptors, light filters, apertures, etc.

Warning: Do not block, limit airflow to, or stop the cooling fan, as this will increase output noise and damage the TEC cooler.

Features

- Low-Light-Level Detection
- Low Noise
- Fiber Coupled
- Power Supplier Operation
- Fast Response

Specifications

Parameter	Min	Typical	Max	Unit
Detector Diameter		1		mm
Wavelength Response	900	2300	2570	nm
Peak Response (@2300nm)		1.3		A/W
Bandwidth	0.5		1000	kHz
Gain	0		70	dB
NEP (measured @uncooled)	1.3		8.3	pW/Hz ^{1/2}
Output Offset		20	45	mV
Output Offset Drift (70dB)			3	mV/°C
Optical Damage Threshold	50			mW
Operating Temperature	0		30	°C
Power Supply (100-240VAC)		30		W
Weight		0.5		lbs
Signal Output	BNC			

Notes:

1. All measurements performed with a 50 Ω load unless stated otherwise. The Detector has a 50 Ω series terminator resistor (i.e., in series with amplifier output). This forms a voltage divider with any load impedance (e.g., 50 Ω load divides signal in half).
2. Saturation of the output voltage may cause damage to the detector element.

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link](#):

Applications

- General Lab Use
- Instruments

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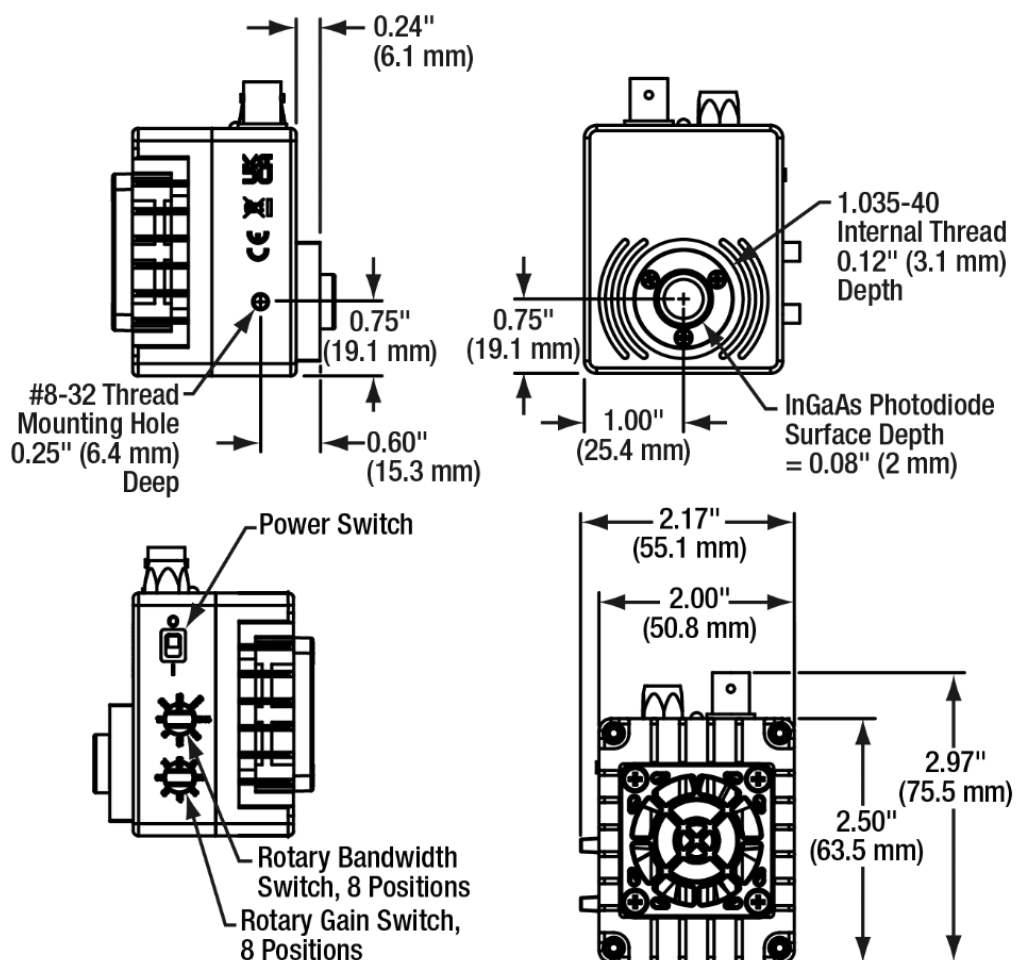
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Mechanical Dimensions (mm)



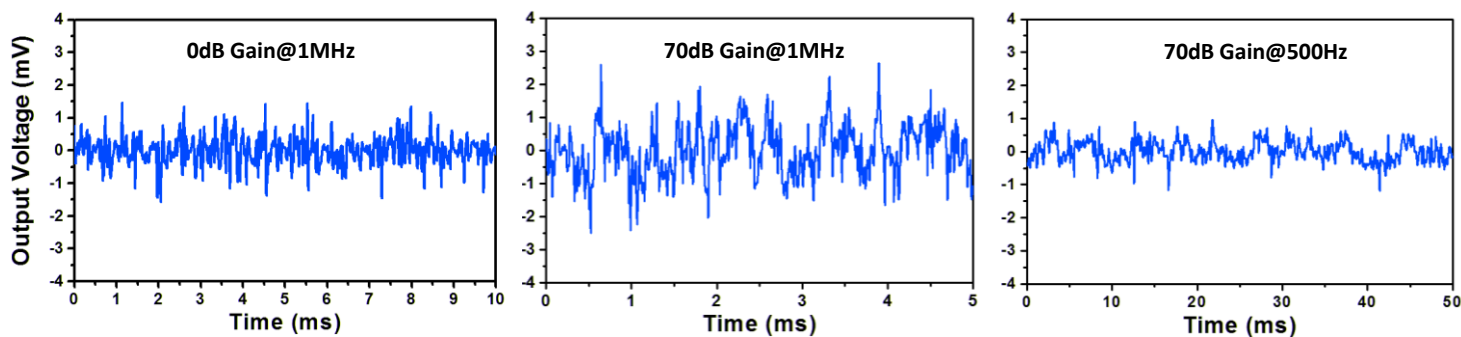
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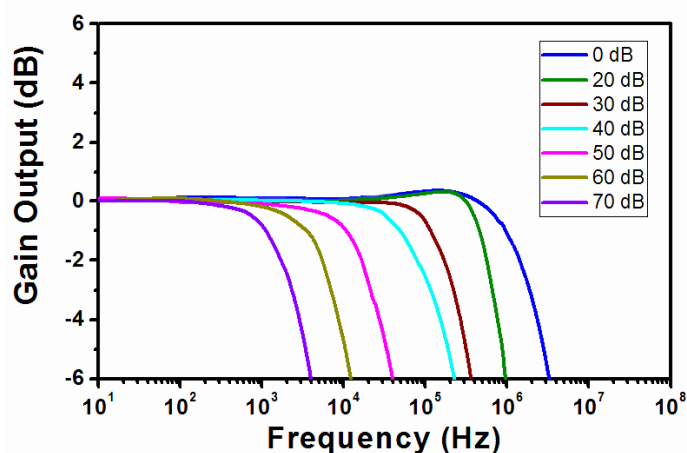
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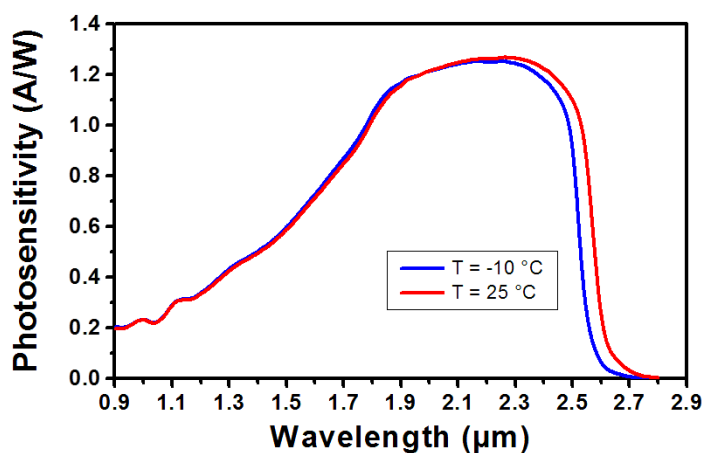
Noise Level



Gain Bandwidth @1MHz (typical)



Spectral Response



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Ordering Information (Part Number) System

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Prefix	Type	Wavelength	Fiber Adaptor	Configure	Package	Cooling	50 ohm	Power Supply
COAD-	Ex-InGaAs = 3	900-2570nm = 1 Special = 0	No = 11 Yes=22	Regular = 1 Special = 0	Regular = 1 Special = 0	Non=N -10°C=1 -20°C=2 -40°C=4	Non = 1 Yes = 2	Yes = 1 None = 2

Accessories

■ 50 ohm Parallel Resistor

\$25

■ Fiber Adaptor

\$98

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Operation Manual

- Connect the accompanying power supply and turn on the Power Toggle Switch; wait for 2 minutes for the TEC temperature to stabilize. Make sure the fan is rotating.
- Connect a readout instrument to the detector output BNC connector with a 50 Ω loads build-in to match the coaxial cable.
- Adjust Gain. Set the Gain Switch to 0dB. Turn on the light source. If the readout saturates, reduce the input light intensity or add a neutral density filter to avoid saturation. Adjust the Gain Switch to make the detector below the saturation level.
- Adjust Bandwidth. Determine the maximum bandwidth required and set the bandwidth switch just above that level.



Troubleshooting

- **There is no signal response** - Verify that the power is switched on and all connections are secure. Verify the proper terminating resistor is installed if using a voltage measurement device. Verify that the optical signal wavelength is within the specified wavelength range. Verify that the optical signal is illuminating the detector active area. Ensure not to block, limit airflow to or stop the cooling fan. It will overheat the device and it will affect its functionality.
- **Output Voltage will not increase.** Check to make sure the detector is not saturated. Add a baffle such as a tube to block any external light sources to see if this improves the response.