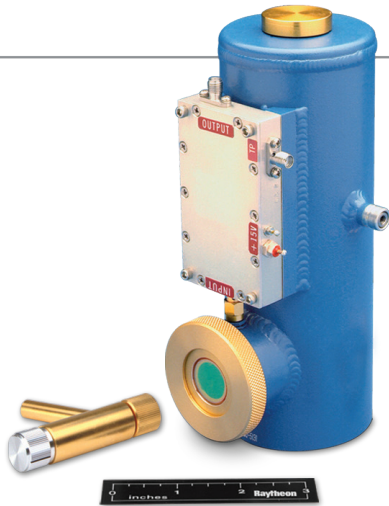




# HgCdTe P-I-N Photodiodes for CO<sub>2</sub> Laser Heterodyne Applications



LN<sub>2</sub>-Cooled Detector/Dewar for high-frequency CO<sub>2</sub> laser applications with integrated bias voltage regulator output plug for current monitor and preamplifier

From Raytheon Vision Systems, custom, high-speed HgCdTe Photodiodes for laboratory applications

## Benefits

- Specifically designed for 10.6 μm CO<sub>2</sub> lasers
- Ready-to-operate
- Unique heterojunction design provides superior quantum efficiency
- Useful bandwidth to 3 GHz
- An electronics package enables a ready-to-operate assembly

Raytheon Vision Systems offers a custom high-speed HgCdTe p-i-n photodiode for detection of IR-laser radiation in either a pulsed or heterodyned mode of operation. These LN<sub>2</sub>-cooled detectors are designed specifically for 10.6 μm CO<sub>2</sub> laser applications, but may also be optimized for use at other IR wavelengths in the 9 to 12 μm range. A unique heterojunction construction with a resonant optical cavity (ROC) provides superior quantum efficiency and useful bandwidth to 3 GHz.

For laboratory applications, detectors are packaged in an LN<sub>2</sub> Dewar, designed for high-frequency operation. The hold time on one filling of LN<sub>2</sub> is in excess of 12 hours. Dewar vacuum life is typically several months. The Dewar can be repumped when necessary, using the ¼-inch valve attached to the top. The standard Dewar window is ZnSe antireflection coated for maximum transmittance at 10.6 μm. Other window materials or coatings can be furnished on special order.

An electronics package is attached to the Dewar, which provides a constant reverse bias voltage necessary for proper operation of the p-i-n photodiode, a current monitor output, and an RF preamplifier with gain and bandwidth customized for the user's specific applications. This provides the customer with a ready-to-operate assembly for the laboratory bench. All that is needed is liquid nitrogen and a ±15 volt DC power source.

## Typical Performance Specifications

### Single-element or Quad Detector Available

Size	0.10 mm
Quantum Efficiency	60%
Responsivity	5 A/W
Heterodyne NEP	$4 \times 10^{-20}$ W/Hz
NEP <sub>H</sub> Bandwidth	3 GHz
D* ( $\lambda_m$ , 1 kHz)	$2 \times 10^{10}$ cm Hz <sup>1/2</sup> /W
Dynamic Resistance dV/dI at 1.0V Reverse Bias	≈1000 ohms
Capacitance	1 pF
Spectral Response $\lambda_p$	10.6 μm
$\lambda_c$	12.0 μm

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Customer Success Is Our Mission