

Features

- High-gain, Low-noise Photodetector: InGaAs APD
- Spectral Response: 950 – 1700 nm
- Noise Equivalent Power (NEP): < 0.5 nW
- Total Dynamic Range: 70 dB
- Low System Power Consumption: 50 mW
- User-programmable Time-variable Threshold & Gain
- Long Lifetime: 85,000 hrs MTBF
- Robust: Qualified to guns and other extreme environments

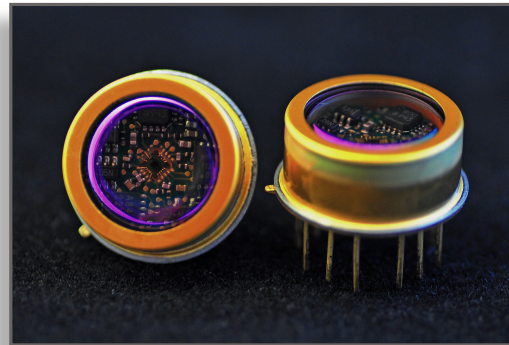
Options

- Fiber Pigtail Designs:
 - » 62.5/125 graded-index
 - » 105/125 step-index multi-mode fibers
- APD Dia.: 75 μm or 200 μm
- Hemispheric Lens: 500 μm

Applications

- Laser Ranging
- Free-Space Optical Communications
- Optical Time Domain Reflectometry
- Optical Coherence Tomography
- Fluorescence Measurements, Spectroscopy, Chromatography and Electrophoresis
- Telecommunications
- 3D Imaging and LADAR

ROX™ Rx Series—Lowest Cost, Best Performance LRF Receivers



Delivering cascading reductions in system size, weight, power draw, and cost

The ROX Rx series of micro-laser rangefinder (μLRF) receiver (Rx) integrates Voxel's proprietary high-performance InGaAs avalanche photodiodes (APDs), custom-designed CMOS application-specific integrated circuits (ASICs), and programmable processing circuits to provide flexible system integration and reliable performance, all in a small TO-8 package.

- **Best-in-class Performance:** Compared to standard photodiode detectors (PIN detectors), Voxel's high-gain, low-noise APD provides half the excess noise and superior avalanche gain—up to $M = 25$ —allowing superior range and low false alarm rate. Noise equivalent power (NEP) of 0.5 nW achieves optimal sensitivity, with linear dynamic range of 25 db, total dynamic range of 70 dB, and 100 mW of overload protection.
- **Flexible Operation and Easy Integration:** The ROX Rx technology integrates custom ASICs and programmable features that allow the APD gain to be stabilized over the -40°C to 80°C temperature range, allowing performance to be optimized without the use of thermoelectric cooling. The multiple user-programmable or factory conditions also allow automatic optimization of APD sensitivity over the wide temperature range, or operation in multiple modes for various concepts of operation. The programmable gain and range-variable threshold features allow for the ROX Rx to be quickly configured for new applications and operating conditions. Time-over-threshold features reduce range walk error.
- **Reliability:** The control capability of the ROX Rx technology includes damage protection of up to 6 MW/cm^2 of peak power. The highly integrated design makes it robust against gun-shock and other harsh operating environments.

Specifications:

Model RVC1-NIAC

| Parameter | Min | Typical | Max | Units |
|---|-------------------|-------------------|-------|--------------------|
| Spectral Response, λ | 950 | 1535 | 1700 | nm |
| Optically Active Diameter | | 200 | | μ m |
| Bandwidth | | 100 | | MHz |
| Low Frequency Cutoff | 100 | 300 | | kHz |
| APD Operating Gain, M | 1 | 10 | 25 | |
| Pulse Pair Resolution | | 70 | 100 | ns |
| Linear Dynamic Range | | 25 | | dB |
| Total Dynamic Range | | 70 | | dB |
| Comparator Threshold Level (V_{COMP}) | 0 | 0.48 - 0.78 | 1.8 | V |
| Optional Comparator Decay Time (V_{HI} to V_{COMP}) | | 3 | | μ s |
| Operational Performance | | | | |
| Small Signal Responsivity ¹ | 890 | 8900 ¹ | 71200 | kV/W |
| Temporal Resolution ^{1,2,3,4} | | 206 | | ps RMS |
| Noise Equivalent Power ^{1,2,4} | 0.3 | 0.5 | 1.0 | nW |
| Signal Sensitivity ^{1,4,5} | 1.2 | 2.0 | 4.0 | nW |
| Maximum Instantaneous Optical Power ⁴ | | | 6 | MW/cm ² |
| Power Requirements | | | | |
| Low Voltage Current Draw Threshold Level | 1.8 V APD supply | | 20 | mA |
| | 5 V APD supply | | 10 | mA |
| High Voltage current Draw Threshold Level | < 63 V APD supply | | 5 | mA |
| Environmental | | | | |
| Operational Temperature Range | -40 | | 80 | °C |

1 2-ns pulse width

2 M =10 gain

3 20-nW signal

4 1535-nm spectral response

5 0.1% false alarm rate