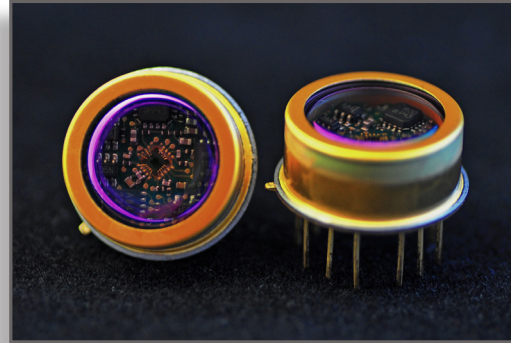


ROX™ Series Lowest Cost, Best Performance LRF Receivers**Features**

- 950 – 1700 nm spectral response
- High gain, low noise APD allows superior range and low false alarm rate
- Noise equivalent power (NEP) of 2 nW for 3.8 ns pulse widths
- 70 dB dynamic range
- 0.3 m range precision over entire dynamic range
- 10 nW sensitivity reduces laser pulse energy requirements
- Temperature-compensated avalanche gain, with no thermoelectric coolers allows lower system power consumption
- Variable threshold with timed decay
- 85,000 hrs MTBF
- Qualified to MIL-PRF-38535, MIL-STD-833, MIL-STD-750, and MIL-STD-202

Applications

- Laser range finding
- Free-space optical communications
- Optical time domain reflectometry
- Optical coherence tomography
- Fluorescence measurements, spectroscopy, chromatography and electrophoresis
- Telecommunications
- LADAR/LIDAR

**Model RVC1-JIAA: 75 μm APD Receiver**

ROX™ performance allows system cost advantages by reducing laser power requirements, which also reduces system size, weight, and power.

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

- **Performance:** Superior to standard photodiode detectors (PIN detectors) by virtue of avalanche gain (M) values up to $M = 2.5$.
- **Avalanche Noise:** At half the excess noise of other commercially available APDs, the ROX LRF receiver provides superior range and false alarm performance than the competition.
- **Automatic Gain Control:** ROX technology automatically adjusts APD bias voltage to optimize performance in multiple use case regimes.
- **Threshold Optimization:** Selectable threshold with APD gain control enables optimized time over threshold and eliminates range walk error.
- **High Dynamic Range:** 70 dB of dynamic range enables 55 dB of linear range, signal detection of 8 nW to 2.5 mW, with additional dynamic range of up to 100 mW of overload protection.
- **Laser Damage Protection:** With control capability of ROX technology, damage protection of up to 6 MW/cm² of peak power is standard.
- **Microprocessor-controlled Gain Compensation:** Allows performance to be optimized over the -40°C to 80°C temperature range, without the use of thermoelectric cooling.
- **Options:** The 75 μm standard standard configuration is designed for ultra low noise. A 200 μm option is designed for large areas. Both have 100MHz of bandwidth. Standard fiber pigtail options for the 75μm receivers include 62.5/125 graded-index and 105/125 step-index multi-mode fibers.

RVC1-JIAA Specifications**100 MHz ROX™ Receiver w/ 75-μm Deschutes BSI™ R-APD in a TO-8 Package**

Parameter	Min	Typical	Max	Units
Signal Input Pulse Width		3.5		ns (Gaussian)
Spectral Response, λ	950	1550	1750	nm
Optically Active Diameter		75		μm
Bandwidth		100		MHz
Low Frequency Cutoff	100	300		kHz
APD Operating Gain, M	1	10	25	
Pulse Pair Resolution		100		ns
Linear Dynamic Range	25			dB
Total Dynamic Range	70			dB
Comparator Threshold level	0.48			V
Operational Performance				
Small Signal Responsivity	890	8900 ¹	71200	kV/W
Temporal Resolution ^{1,2,4}		206		ps RMS
Noise Equivalent Power ^{1,4}	1.1	2	2.4	nW
Signal Sensitivity ^{3,4}	5.5	10.0	12.0	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 M=10 gain

2 20 nW signal

3 0.1% false alarm rate

4 1550 nm spectral response