Preliminary Data Sheet
February 2013

Infrared Optical Receiver

High Sensitivity, Low Noise, Wide Dynamic Range

Description

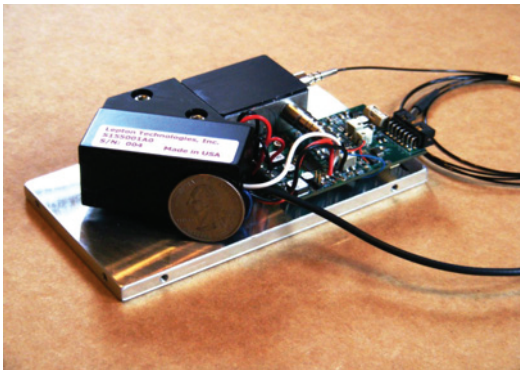
Lepton Technologies offers a photomultiplier-based NIR analog receiver module with exceptional sensitivity and noise performance. The sensor provides performance and reliability typical of blue-sensitive photomultipliers, but at wavelengths in the 1.0 um to 3.4 um range. Current units are configured with a singlemode PM fiber input, to address many applications traditionally served by PIN or APD-based receivers.

Features

- High sensitivity
- Low noise
- Wide optical dynamic range
- High gain-bandwidth product

Applications

- Geophysical
  - Distributed temperature, pressure, and strain sensing
  - Narrowband Spectroscopy
- Defense/Homeland Security
  - Border security
- Seismic monitoring
- Towed arrays



Typical Preliminary Optical/Electrical Performance

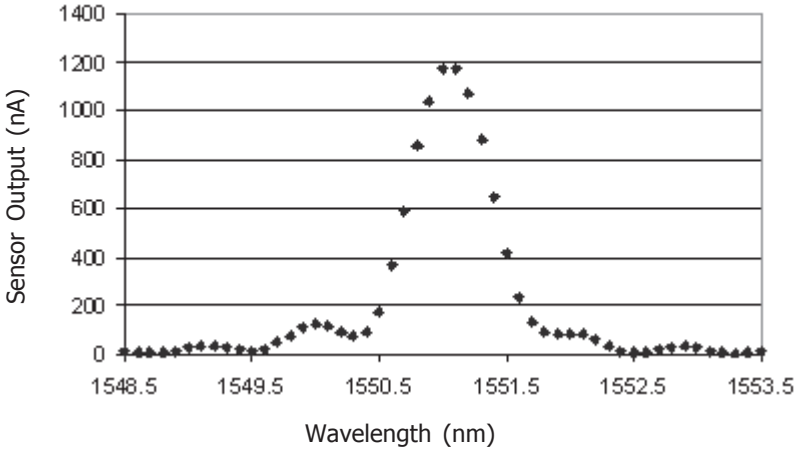
Spectral Response Range[1]	1.0 um - 3.4 um
Sensitivity @ 1550 nm[2]	1000 A/W
Dark Current[3]	2 nA
Equivalent Noise Input[4]	2.5×10^{-14} W
Optical Dynamic Range	> 50 dB
Max. DC Optical Input[5]	100 nW
Bandwidth	450 MHz
Gain-Bandwidth Product	4.5×10^{14} Hz

Notes:

1. The sensor has a sensitivity window of about 0.9 nm FWHM, which may be tuned approximately +/- 10 nm around its design wavelength.
2. Variable gain control is supported.
3. Uncooled. The operating temperature range for the sensor is 25C +/- 30C.
4. Measured at 0.8 V gain control. Also referred to as Noise Equivalent Power (NEP).
5. Based on 100 uA maximum average anode current. Higher amplitude pulses are allowed if the average is met.

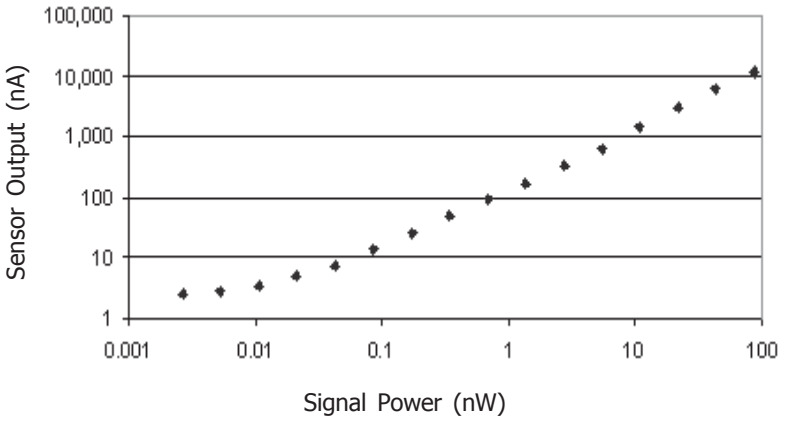
Sensitivity Window, without dynamic tuning.
1550 nm Design

The device has a sensitivity window of about 0.9 nm FWHM around its peak. For applications requiring a narrowband input filter, this feature is provided by design. Signal drift is accomodated by dynamic tuning of the window.



Linearity

The analog output of the sensor is quite linear over nearly five decades of change of input power. Techniques for blocking the DC component of the dark current can be used to extend the range.



Footprint/Interface

The baseplate footprint is 127 mm x 64 mm, and the height of the device is 38 mm. As pictured, the mass of the device is approximately 375 g.

The optical input to the sensor is via a single mode PM fiber with a FC/APC connector. Polarization control over the incoming optical signal is required for optimal performance. A direct 50 ohm output from the photomultiplier anode is delivered over a RG174U cable with a SMA connector. Custom electronic interfacing, e.g. including a TIA or digital interface, is available.

A Molex 87833 RA 14-pin edge connector provides the power interface to the internal PCB. Pins 1, 3, 5, 7, and 11 are tied together at ground; pins 2, 4, and 6 are tied to form a parallel current path from a +5 V rail. The gain control input (0 - +1.0 V) is via pin 8. Pins 9 and 10 are tied together for a +15 V supply rail. Pins 12, 13, and 14 give convenient access to test points on the PCB.