

Infrared Photon Counting Module

High Sensitivity, Low Noise, Wide Dynamic Range

Description

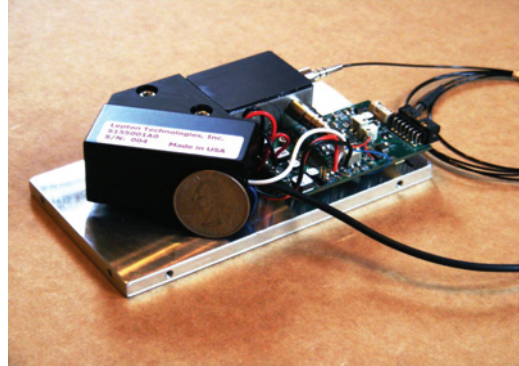
Lepton Technologies offers a photomultiplier-based NIR photon counting module with exceptional sensitivity and noise performance. The sensor provides performance and reliability typical of blue-sensitive photomultipliers, but at wavelengths in the 1.0 μm to 3.4 μm range. Current units are configured with a single-mode PM fiber input, to address many applications traditionally served by PIN/APD-based sensors.

Features

- High quantum efficiency
- Low noise
- Uncooled
- Wide optical dynamic range, with photon number resolution capability

Applications

- Geophysical
 - Distributed temperature, pressure, and strain sensing
- Defense/Homeland Security
 - Bombots
 - Missile Detection
- LIDAR
- Quantum Key Cryptography



Typical Preliminary Optical/Electrical Performance

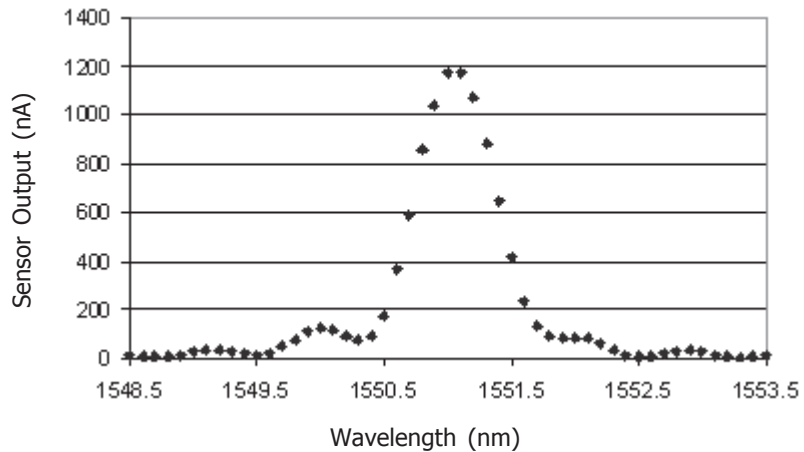
Design Response Range ¹	1.0 μm - 3.4 μm
Sensitivity @ 1550 nm ²	1000 A/W
Dark Count Rate ³	6,000 cps
Dark Count Rate ⁴	1,400 cps
Maximum Count Rate	$10^8/\text{s}$
Optical Dynamic Range	> 100,000
Anode Risetime ⁵	0.78 ns
Operating Temperature	25C +/- 30C

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, integrated over 0.5 photoelectrons to 20 photoelectrons.
4. Uncooled, integrated over 0.5 photoelectrons to 2 photoelectrons.
5. By design.

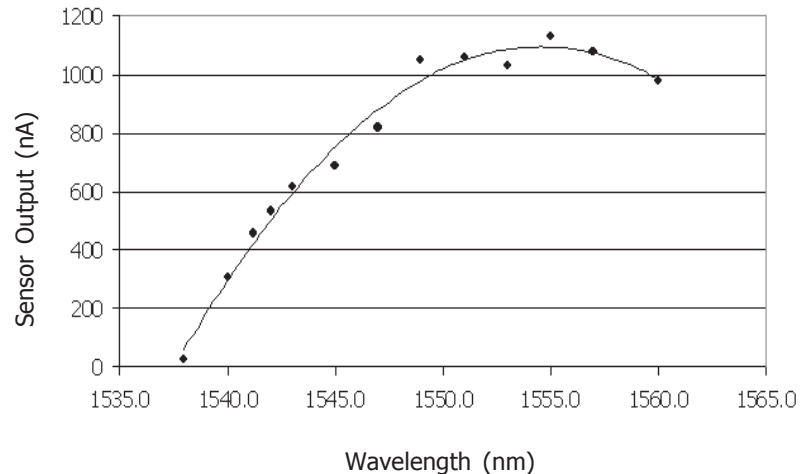
Sensitivity Window, without dynamic tuning. 1550 nm Design

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 accommodated by dynamic tuning of the window (shown in the plot below).



Window Tuning Range & Penalty 1550 nm Design

Dynamic tuning is provided over a range of about +/- 10 nm around the design wavelength. For evaluation devices tuning is accomplished manually by adjusting a potentiometer. Software driven, or active on-the-fly tuning is anticipated for custom OEM interfaces.



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. 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.