SensL MicroSL

PRODUCT BRIEF

A family of detectors based upon SensL's 2nd generation "SL" Silicon Photomultipliers

The MicroSL family of detectors uses the recently released, 2nd generation SL Silicon Photomultiplier (SPM) technology from industry leader SensL. This innovative technology has resulted in a range of high gain, single-photon sensitivity, and highly uniform detectors. The performance of the MicroSL SPM is similar to that of a conventional PMT, while benefitting from the practical advantages of solid-state technology: low operating voltage, robustness, compactness, insensitivity to magnetic fields and light over-exposure, and low cost. The MicroSL family includes detectors in a variety of miniature, cost-effective packages, and three detector sizes (1mm, 3mm and 6mm), to suit a variety of applications.

APPLICATIONS

The MicroSL range of detectors represent a compact, low-voltage alternative to the more conventional PMT detector. They are well suited to a broad range of applications that require the detection of photons over the wavelengths 400-1000nm. Due to the range of MicroSL detectors available, covering different sensitive areas and packages, many differing applications can be addressed.

MicroSL Applications

- Nuclear Medicine
- Hazard and Threat Detection
- LIDAR
- Biophotonics

For links to SensL's application notes, see the Further Information section at the end of this document.

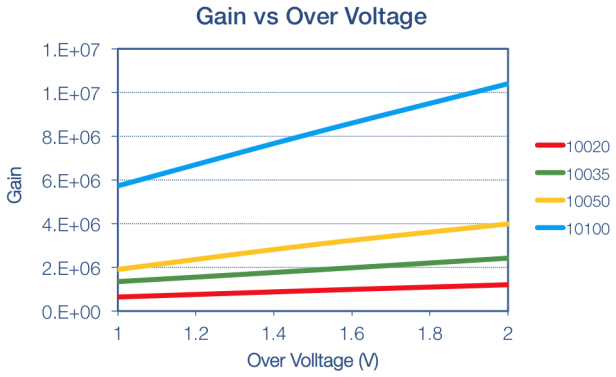
A MicroSL in a low cost, ceramic X13 package is ideal for coupling to scintillators for the various types of radiation detection used in medical imaging, nuclear hazard and threat detection and high energy physics. Its compact size and low power consumption provide a distinct advantage for any system integration. Additional applications such as LIDAR, which cover a wide range of different uses (robotics, aerial surveying, gaming, range finding and transport autonomous navigation) will also benefit from the range of detector formats available.

FEATURES AND BENEFITS

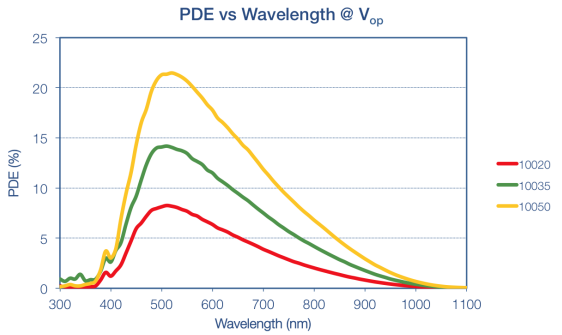
- Spectral Range – 400nm to 1000nm
- Detection Area – 1mm diameter, 9mm^2 and 36mm^2
- Signal to Noise - Superior S/N to standard APDs
- Gain – High Gain of 10^6
- Sensitivity – Single photon-sensitive
- Bandwidth – up to 20MHz.
- Noise – typically at the single photon level, all noise triggers removed with a threshold at the 4-photon level.
- Bias voltage – <30V.
- Packaging – Hermetically Sealed TO-can Package or ceramic submount with epoxy encapsulation.
- Readout Electronics – Availability of the Micro-EVB compact power and preamp module
- Form Factor – Small size, with minimal working distance on all package designs
- Temperature sensitivity – lower temperature dependence than other SPM-based detectors on the market

PERFORMANCE

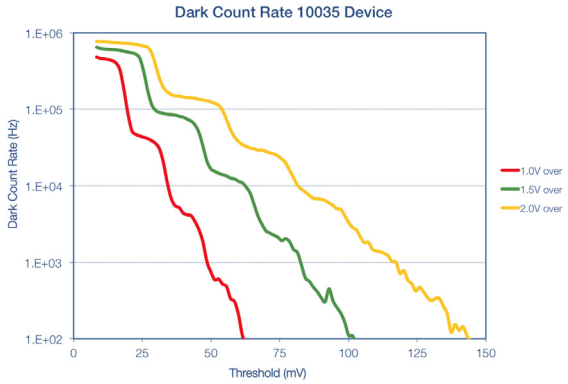
HIGH GAIN: The MicroSL detectors have high gain, of the order of 10^6. The exact value depends upon the detector type (microcell size) and on the bias voltage – gain is linearly dependent on the bias.



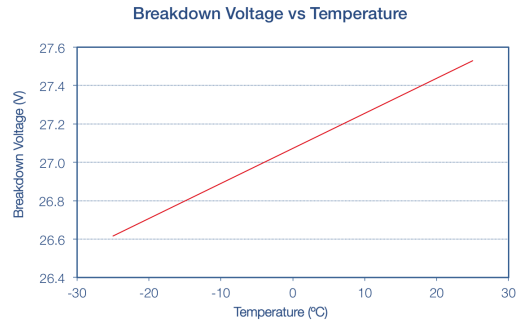
WAVELENGTH RANGE: The MicroSL detectors are sensitive between 400nm and 1000nm and peak around 500nm, making them well matched to many commonly used scintillators and the light from biophotonics.



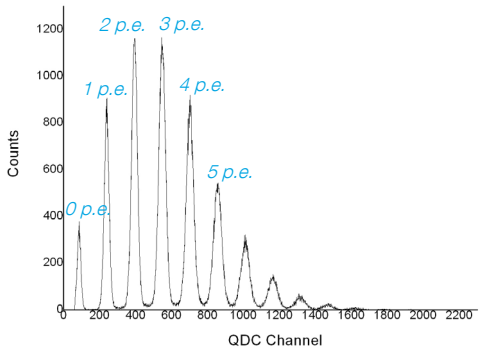
NOISE: The noise of the MicroSL detectors is measured as a count rate, The vast majority of these dark counts are at the single photon level, and so by raising the triggering threshold, these noise counts can be eliminated. At the ~4 photon level, the trigger level from noise is reduced to insignificant levels.



TEMPERATURE SENSITIVITY: The nature of the SPM technology means that the point at which the breakdown occurs is dependent upon the temperature of the device. Fortunately, the relationship between the breakdown voltage and temperature is linear and well known, so can be easily compensated for using the plot below. SensL's MicroSL detectors have a smaller temperature dependence than any other SPM on the market.

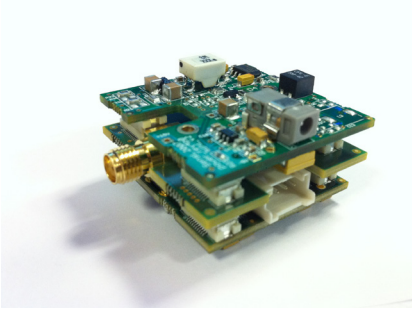


SINGLE PHOTONS: The SPM is sensitive to single photons and can also clearly resolve the signals from multiple photons, as shown in the photoelectron (p.e.) spectrum below. This allows for accurate calibration of photon number and detector gain. The narrow peaks in this plot are indicative of the high degree of uniformity across the sensitive surface of the device.



SUPPORTING PRODUCTS

Micro-EVB: The Micro-EVB is an electronics module that can be used in conjunction with any of the MicroSL detectors (with the exception of the TO8 packages that utilize cooling via a peltier). The module interfaces with the detector and provides the bias supply and preamplificiation to the subsequent signal. The whole module is powered from the mains via an AC adapter. The module is compact 35 x 41 x 23 mm^3 and provides a replacement to the bench-top supplies and other electronics that would otherwise be required to provide bias and amplification to the detector.



FURTHER INFORMATION

- MicroSL Datasheet
- MicroSL User Manual
- Micro-EVB User Manual
- MicroSL Quickstart guide
- Introduction to SPM
- SensL's Application Note Library

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