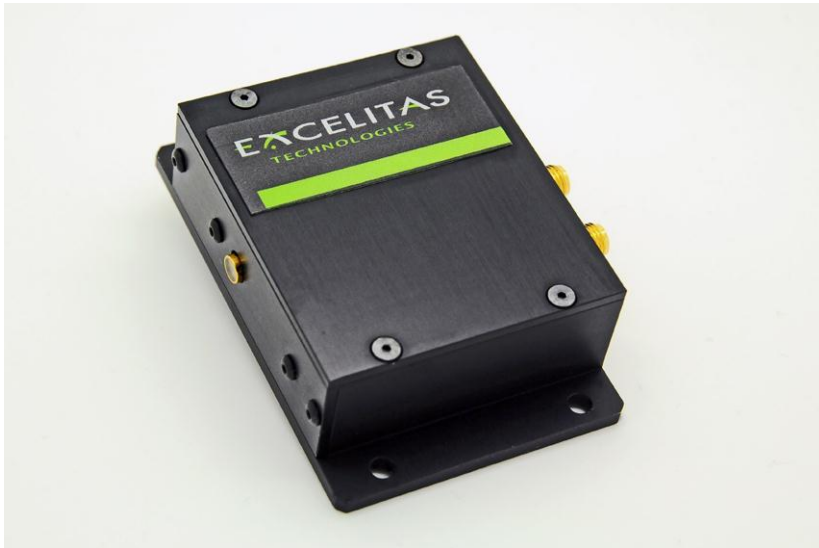


HeliX™ Silicon Avalanche Photodiode Module

HeliX-902-200



Excelitas' HeliX Silicon Avalanche Photodiode Module delivers high responsivity from 300-1100nm, high dynamic range, high linearity and an excellent S/N ratio.

Excelitas' new HeliX Silicon Avalanche Photodiode (APD) Module is a compact, easy-to-use, analogue low-light-level detection (L³D) module employing Excelitas' leading-edge Si APD chips. The detector is in a hermetic TO package, mounted on a practical OEM based PCB which includes high-voltage power supply, temperature compensation, a low-noise transimpedance amplifier, APD bias monitor and micro-controller.

With this compact voltage-output module, the preamplifier gain is optimized to obtain maximum dynamic range and linearity with the APD at gain adjustable operating voltage. It optimises APD operation in key performance parameters such as higher sensitivity, and better signal-to-noise ratio across the 400nm - 1100nm wavelength range.

The HeliX APD module is offered as a standard, commercial-off-the-shelf (COTS) product. It contains a 0.5mm diameter reach-through Si APD.

In addition to our standard, off-the-shelf APD module, Excelitas also offers customized modules tailored to the needs of the customer. Depending upon customer requirements, modifications can include a different APD, a cost effective PCB module, optional calibration, bandwidth optimization, FC-connectorized packaging, and customized testing.

Key Features

- High responsivity: 650KV/W @ 900 nm
- Transimpedance amplifier
- 50Ω SMA output connector
- Temperature compensation to stabilise gain and responsivity
- User controllable gain and responsivity
- Single + 5V operating voltage at input provides HV and LV internal biases for APD and TIA
- Front plate can accommodate various APDs
- User-friendly compact footprint
- ROHS Compliant

Applications

- Fluorescence measurement
- Distributed temperature sensing (DTS), or distributed optical sensing
- Analytical instrumentation
- Flow cytometry
- Confocal laser endomicroscopy
- Laser range finding
- LIDAR
- Laser Scanning Ophthalmology

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Table 1. Electro-optical characteristics

Test conditions: Case temperature = 22°C, $V_{op} = +5V$, $R_L = 100\Omega$ differential DC coupled

Parameter	Minimum	Typical	Maximum	Units
Detector	Silicon reach-through APD C30902EH			
Active area chip diameter		0.5		mm
Peak Wavelength (λ)		900		nm
APD gain		150		
Module Responsivity (differential) at 830 nm at 900 nm		770 650		KV/W
Transimpedance differential output, 100 Ω load single ended, 50 Ω load		20 10		k Ω
-3dB Electrical bandwidth		200		MHz
Low frequency cut-off		1.5		kHz
Noise equivalent power (NEP) Average from 100 kHz to f-3dB, $\Delta f = 1.0$ Hz at 830nm at 900nm Output spectral noise voltage Averaged from 100 kHz to f-3dB		42 50		fW/ \sqrt{Hz}
Output impedance (single ended)		50		Ω
Output voltage swing (differential output)			1	V
Responsivity variation (over operating temp range)		+/-5		%
Positive Supply Voltage	4.5	5.0	5.5	V
Positive Supply Current		105	400	mA
Output offset voltage		0		V
Storage Temperature	-10		+70	°C
Operating Temperature	+5		+60	°C

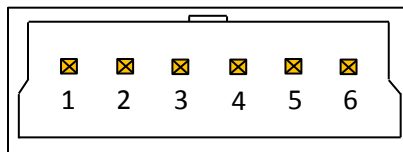
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The physical layout is based around a PCB assembly packaged within a metal box, approximately 50mmx55mm, with lateral mounting brackets.

The design is flexible for customer and application specific requirements.

The communication and power supply connection will be the Molex 0878330631 6 pin 200mm. pitch connector. Pins will be +5V/GND/SDO/SDI/SS/SCK. The module will behave as a slave on the SPI bus.

Power and Communication Connector Pin-out:



Pin	Function
1	Ground (GND)
2	Master IN / Slave OUT (MISO)
3	Slave Select (SS)
4	Clock IN (CLK)
5	Master OUT / Slave IN (MOSI)
6	Supply (+5V)

Preferred bitrate: 1464 bits/sec

Software function

The module's parameters can be changed using simple functions, sent on the SPI bus. The available functions are:

- Set temperature coefficient
- Set APD Bias voltage
- Control temperature compensation
- Set and Save default values for bias and temperature coefficient
- Return to factory default values
- Get temperature

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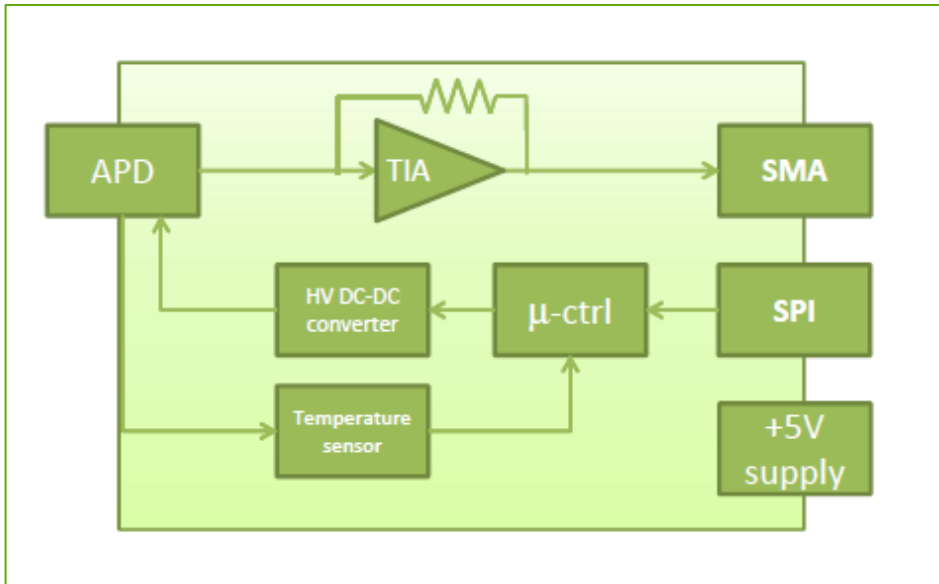


Figure 1 Module Block Diagram

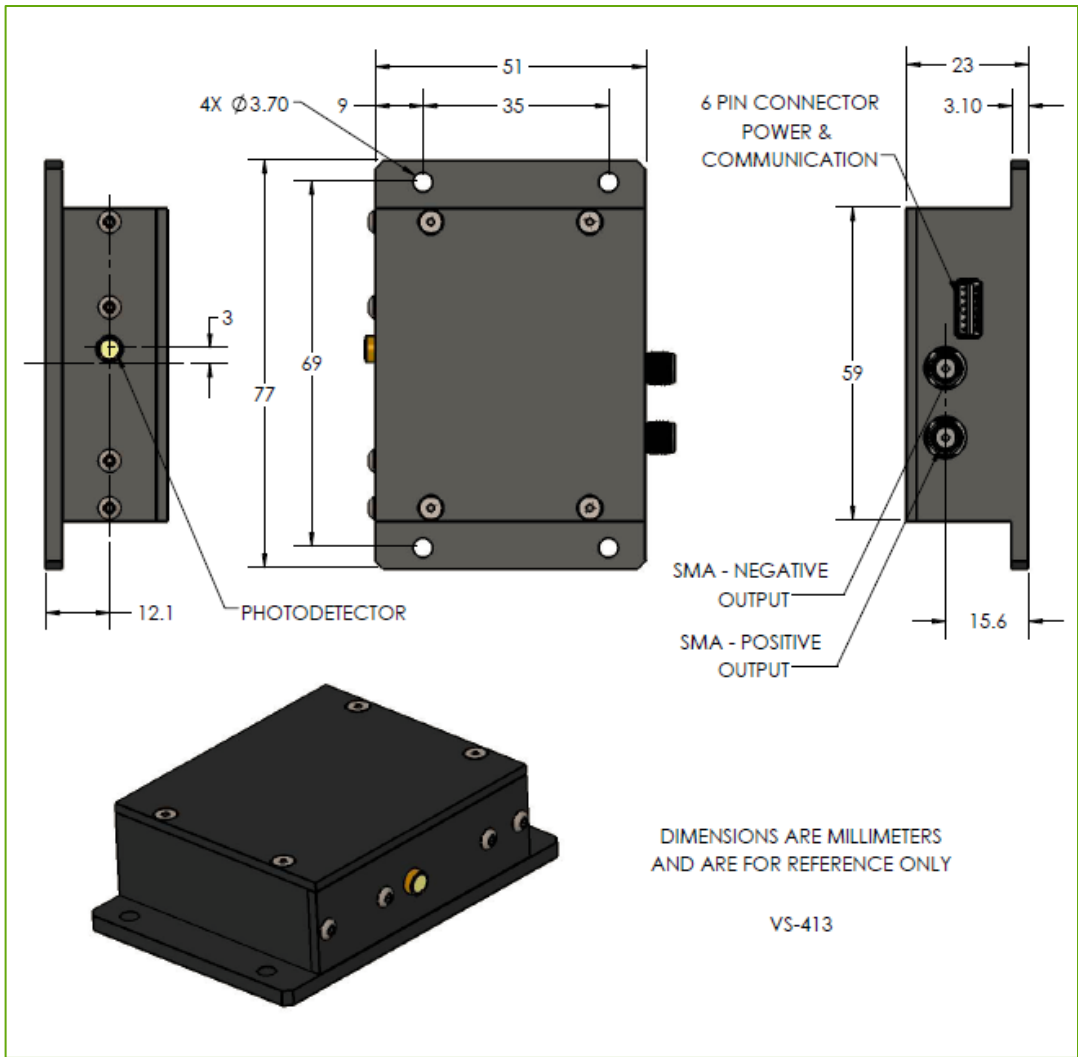


Figure 2 APD Module Dimensions

Helix Silicon Avalanche Photodiode Module

RoHS Compliance

The Helix APD module is designed and built to be fully compliant with the European Union Directive 2011/65/EU – Restriction of the use of certain Hazardous Substances (RoHS) in Electrical and Electronic equipment.



About Excelitas Technologies

Excelitas Technologies is a global technology leader focused on delivering innovative, customized solutions to meet the lighting, detection and other high-performance technology needs of OEM customers.

Excelitas has a long and rich history of serving our OEM customer base with optoelectronic sensors and modules for more than 45 years beginning with PerkinElmer, EG&G, and RCA. The constant throughout has been our innovation and commitment to delivering the highest quality solutions to our customers worldwide.

From aerospace and defense to analytical instrumentation, clinical diagnostics, medical, industrial, and safety and security applications, Excelitas Technologies is committed to enabling our customers' success in their specialty end-markets. Excelitas Technologies has approximately 5,000 employees in North America, Europe and Asia, serving customers across the world.

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