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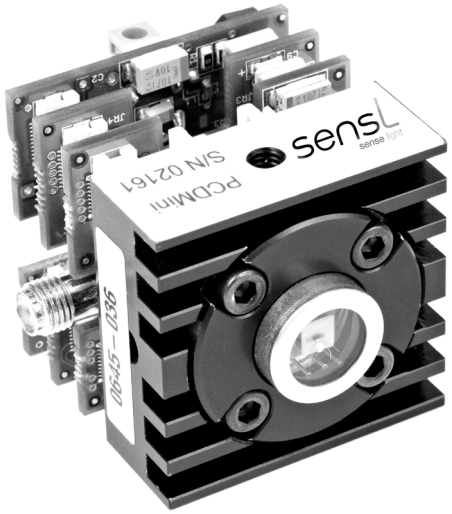
PCDMini Photon Counting Modules

DATASHEET

Photon Counting Modules

SensL's photon counting detector modules offer state of the art performance. Sensitive to single photons, they offer precise photon counting (up to 8MHz) and time-stamping (~200ps accuracy).

SensL's photon counting detector (PCD) technology is available as a complete photon counting module (PCDMini). The PCDMini is mains powered and has an integrated active quench giving a fast TTL output. In addition, it has USB connectivity for system monitoring and use with SensL's Integrated Environment software that performs counting and correlation. The module also provides sensor cooling that allows for exceptionally low dark count rates, for the most demanding of applications.



PERFORMANCE PARAMETERS (All values are typical) [a]

	00020	00100
Sensor active area (Approx.)	20μm x 20μm	100μm x 100μm
Breakdown voltage	27.4V	
Operating voltage (V_{op})	30V	
Dark count rate (@ V_{op})	100Hz	1400Hz
Dead time	125ns	
Peak sensitivity (I_p)	500nm	
Spectral range	400 - 1000nm	
Photon detection probability (@ V_{op} and I_p) [b]	28%	18%
Maximum count rate	8MHz	
Jitter FWHM [c]	200ps	600ps
Afterpulsing	8%	9%

[a] *All values are for cooled operation.*

[b] *Includes after-pulsing.*

[c] *Jitter measurement achieved using the TTL output signal.*

GENERAL PARAMETERS

	Min.	Typical	Max.
Module dimensions (H x W x L)	45 x 35 x 40 mm^3		
Module Weight	70g		
Recommended operating temperature range	10°C - +30°C		
Recommended storage temperature range	-40°C - +60°C		
Power requirements	+4.9V	+5V	+5.1V
AC Mains adapter supply voltage	100V		240V
AC Mains adapter supply frequency	47Hz		63Hz
Current (typical) (at start up)	200mA 700mA		
Cooling time	10 sec		
Output pulse (TTL) [d]	2.2V	2.4V	2.9V
Output pulse width [d]	54ns	57ns	60ns
Output connector	SMA		
Power adapter input jack	Lumburg, 0.65mm LV socket		

[d] *50Ω load.*

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PCDMini MODULE ELECTRONICS

The PCDMini module comes equipped with a number of electronics boards that together provide a simple 'plug-and-play' detection solution, eliminating the need for separate bench-top supplies and other electronics.

Quenching

The new quenching architecture enables state-of-the-art timing-jitter performance that makes it ideal for applications where timing resolution is important. The quench board has an SMA connector that provides a TTL pulse output that can be used for external measurements. It is advisable to use this signal for the best possible timing jitter performance.

Power Supply

The power supply board simplifies the input power requirements of the PCDMini module. Instead of supplying a number of separate voltages (for cooling, quench, bias and USB), the in-built power supply generates all required voltages from a single +5V input. An input jack socket enables power to be supplied from a 5VDC mains adapter (included) or bench supply. The bias voltage for the detector is optimally set during production, however details of how to adjust the bias voltage via an on-board potentiometer are available upon request.

Cooling Control

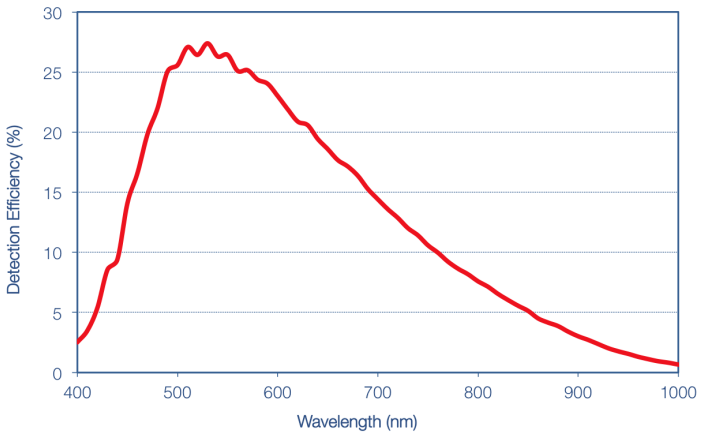
The PCDMini module's cooling electronics ensure the attainment of the stated dark count values up to an ambient temperature of +30°C. Cooling is achieved with a single-stage TEC Peltier cooler controlled by the cooling board within the module. A pulse width modulator is used to maintain a stabilized temperature to within 0.1°C based upon feedback from a thermistor situated beside the PCD sensor in the hermetically sealed TO8 can. The module features current soft-start for controlled start-up to prevent high current in-rush and an output slew rate limiter to reduce system noise.

USB Connectivity

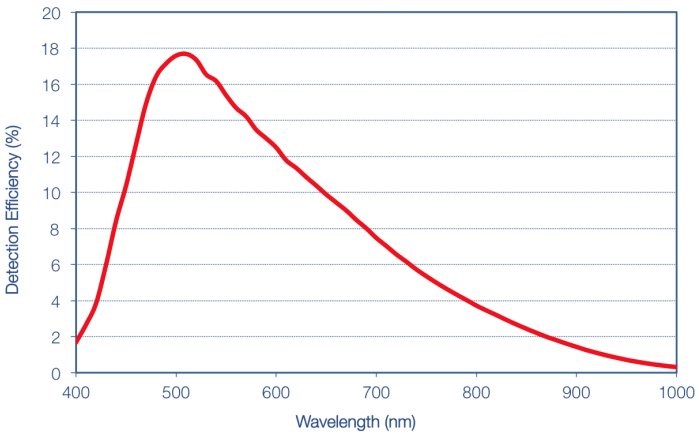
The USB interface board serves to simplify the task of integrating the PCDMini into the measurement system. It allows both full system monitoring and also has integrated counter functionality which allows the user to record data without a separate data acquisition system. The SensL Integrated Environment software facilitates all of this with ease, and alongside the DLLs and LabVIEW drivers provides a large amount of flexibility for the user. The on-board unique identifier chip allows multiple devices to be deployed and managed in large-scale systems.

PERFORMANCE GRAPHS

Detection Probability for the 20um PCDMini



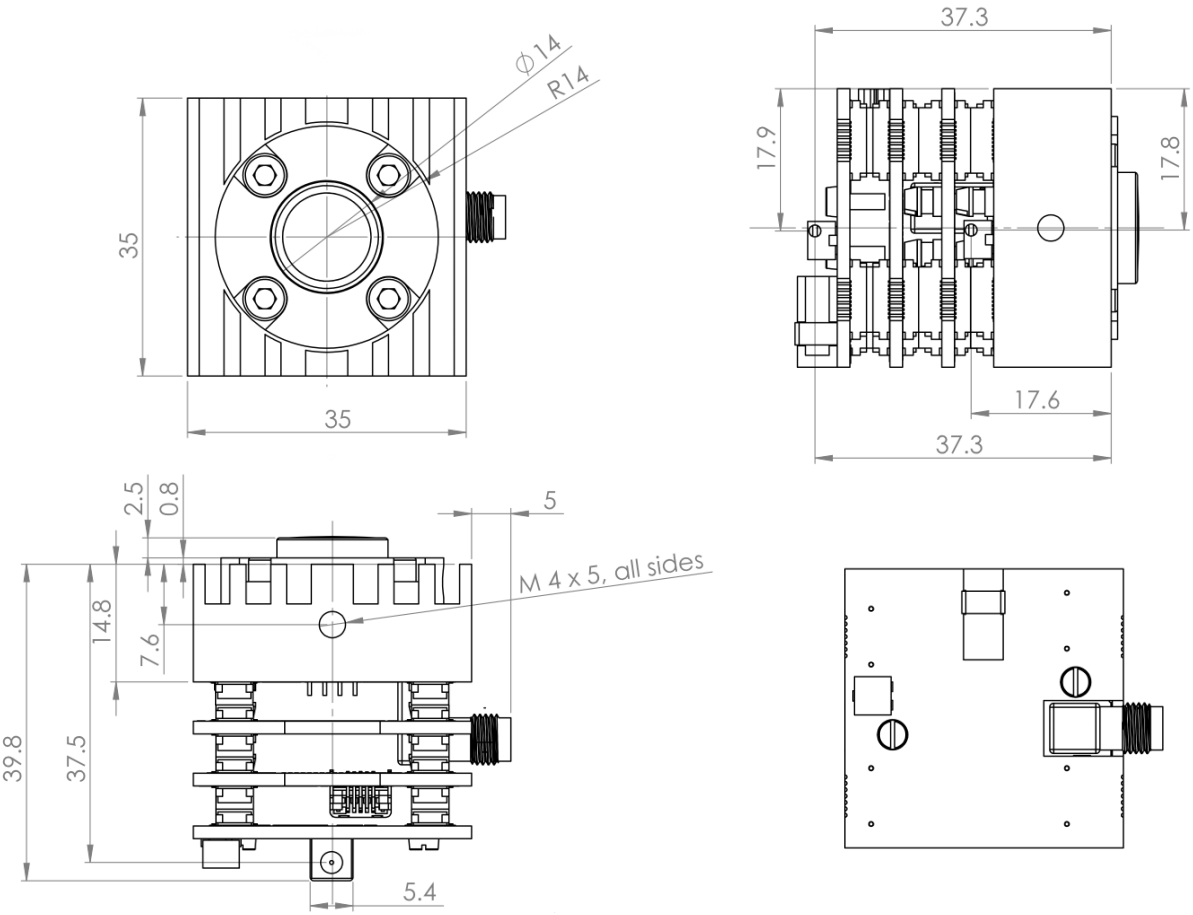
Detection Probability for the 100um PCDMini



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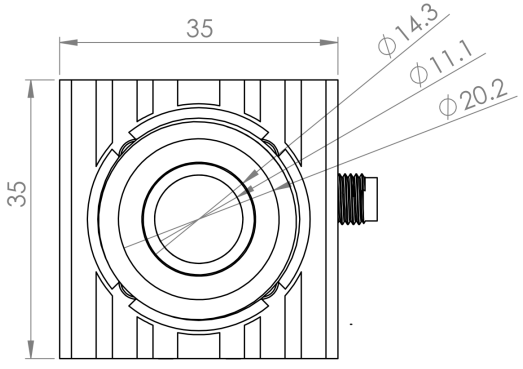
SCHEMATICS (All Dimensions in mm)

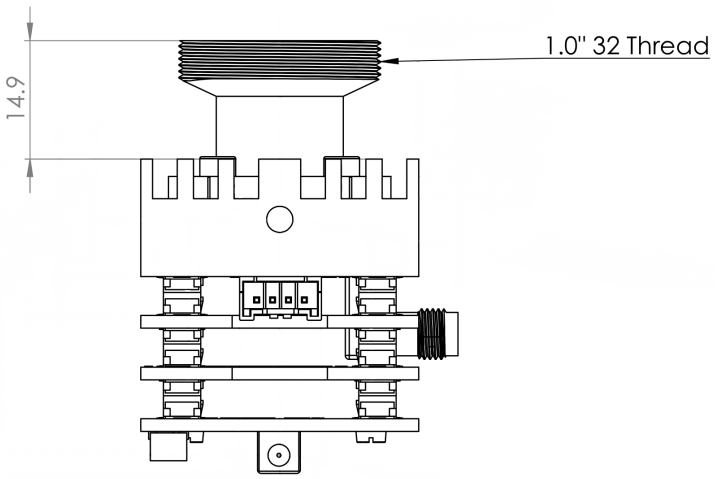


OPTIONS

C-Mount Adapter

A male-threaded C-mount adapter option is available, which attaches to the collar around the T08 can. This facilitates the attachment of various standard C-mount fittings, including filters and light collection lenses.





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ORDERING INFORMATION

Product Code	Sensor active area	Description
PCDMini-00020	20µm x 20µm	Photon counting sensor, quenching circuit, Peltier Cooling, Heat Sink, Power Supply Board and USB Interface Board, Sensl Integrated Environment software, DLLs and Labview Drivers
PCDMini-00100	100µm x 100µm	Photon counting sensor, quenching circuit, Peltier Cooling, Heat Sink, Power Supply Board and USB Interface Board, Sensl Integrated Environment software, DLLs and Labview Drivers
Options		
Mini-Opt-CMountM	C-Mount Adapter (male) Option	

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All specifications are subject to change without notice

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