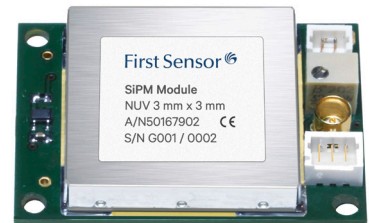


## SiPM Module

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The SiPM Module integrates a stable voltage supply, signal amplification, interfaces and the SiPM detector in a compact plug and play unit. Included software allows optimization of the operating point of the detector to the respective application by the precise and individual setting and storage of the supply voltage. The new SiPM Module is used for test set-ups in research and development and is ideally suited for photon counting applications.



### Features

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- Light detection from 350 to 900 nm
- Ultra compact
- Very light weight
- Different SiPM sizes, 1x1, 3x3, 4x4 mm
- Voltage supply with low ripple
- Control software
- Setup board for voltage setting
- Non cooled, analog output
- Built-in SiPM optimized for NUV (420nm) or RGB (550nm) light detection
- Optional version with LYSO scintillation crystal

### Applications

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- Ultra-low-level light measurement
- Single photon counting
- Scientific applications
- Scintillator readout
- Gamma counting

### Certificates

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- RoHS compliant (2011/65/EU)

## SiPM Module

### Absolute maximum ratings <sup>(1)</sup>

Parameter	Min.	Max.	Unit
Operating temperature ( $T_{op}$ )	-10	+40	°C
Storage temperature ( $T_s$ )	-20	+60	°C
Supply voltage ( $V_s$ )		typ. 5	V
Output voltage ( $V_{out}$ )		typ. 1.2	V @ 50 $\Omega$

### Electro-optical characteristics <sup>(1)</sup>

Parameter	NUV type			RGB type			Unit
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Active area		1×1, 3×3, 4×4			1×1, 3×3, 4×4		mm
Recharge time constant		70			50		ns
Peak responsivity		420			550		nm
Breakdown voltage (BV)	24	26	28	25	27	29	V
Recommended overvoltage range (OV)	2		6	2		4	V
Dark count rate	<50 @ 2 V OV, <100 @ 6 V OV			<100 @ 2 V OV, <200 @ 4 V OV			kHz/mm <sup>2</sup>
Gain		3.6×10 <sup>6</sup>			2.7×10 <sup>6</sup>		

### Characteristics for module

Parameter	Min.	Typ.	Max.	Unit
Bandwidth		25		MHz
Voltage ripple			5	mV

#### Specification notes

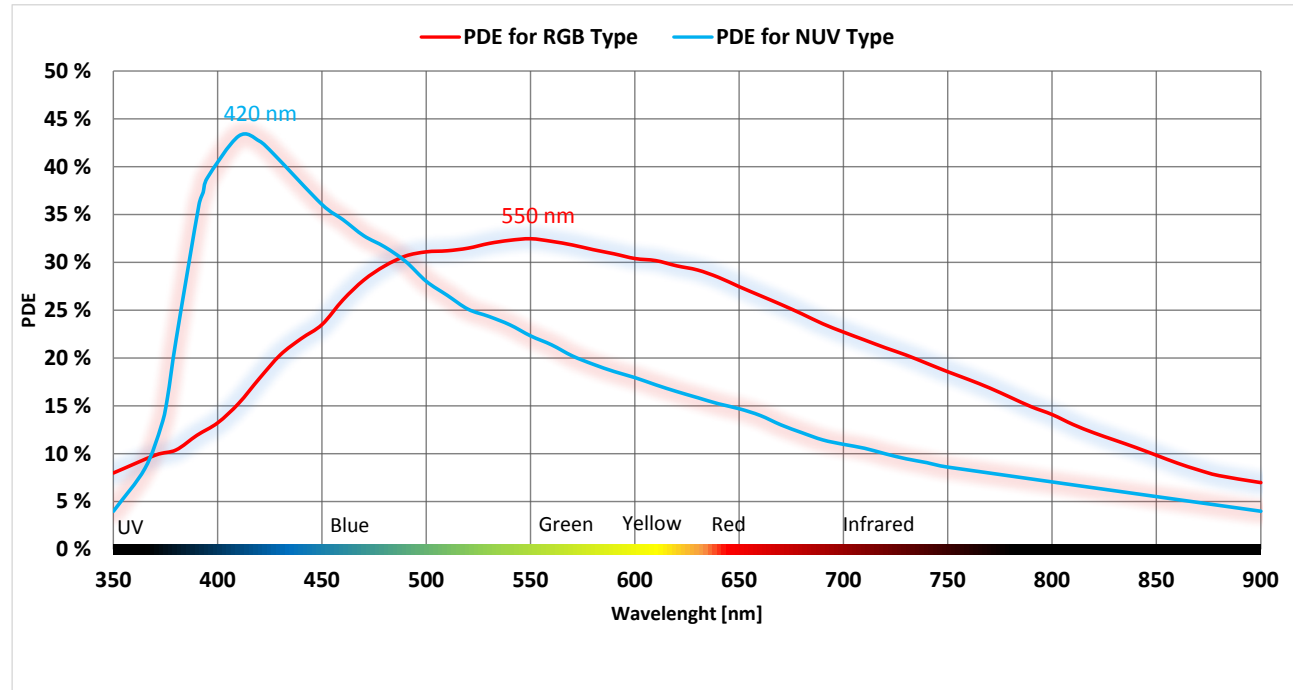
(1) For further technical information, see SiPM datasheets.

## SiPM Module

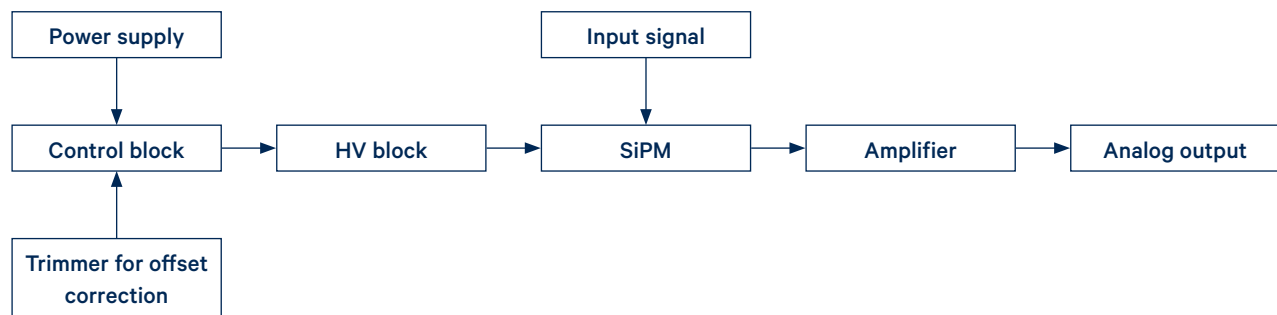
### Device characteristics

#### Photon detection efficiency (PDE) as fct of wavelength

(crosstalk and afterpuls not included)



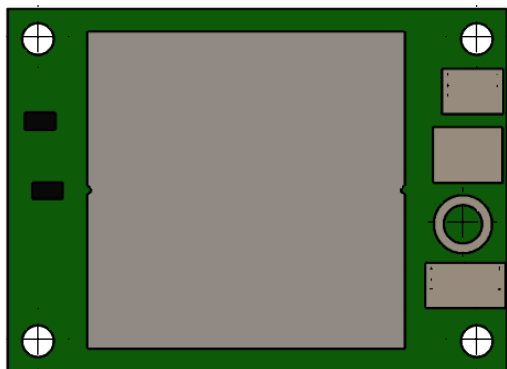
### Schematic



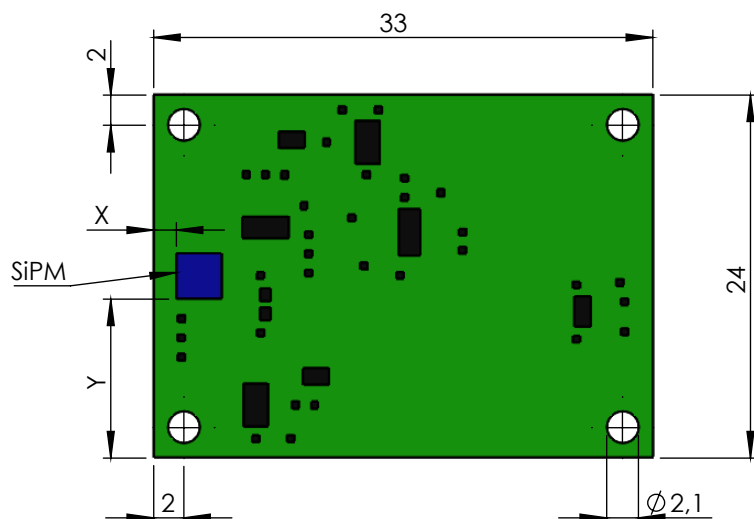
## SiPM Module

### Physical dimensions

#### HV/connecter side



#### Detector side



#### SiPM position

SiPM position depends on size of SiPM and is centred to board edges. Distance can vary due to manual processing.

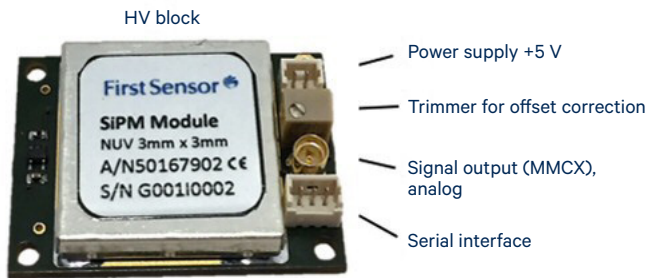
Chip size	Width	Y (distance to edge)
1x1 mm	2.03 mm	typ. 10.98 mm
3x3 mm	3.48 mm	typ. 10.26 mm
4x4 mm	4.48 mm	typ. 9.76 mm

dimensions in mm

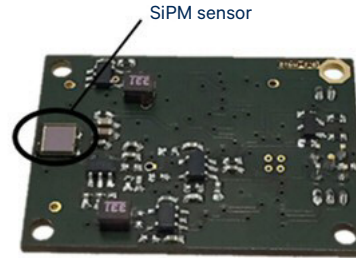
## SiPM Module

### Module components

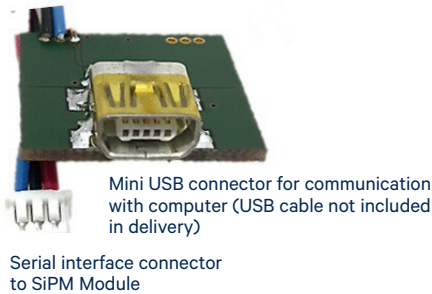
#### HV/conector side



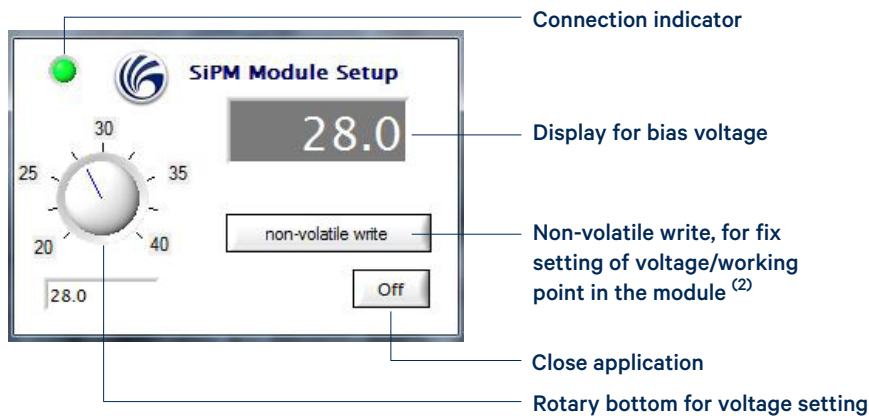
#### Detector side



### Setup board for voltage setting



### Software for working point setting of the SiPM



#### Specification notes

(2) Voltage which was set non-volatile will also be applied to the SiPM after reset/restart/power off of the module

### Workflow

1. Download software from [www.first-sensor.com](http://www.first-sensor.com)
2. Module can run without software, basic setting with 5 V supply voltage. Vbr is @ 50  $\Omega$  (e.g. oscilloscope) 1 PE approx. 10 mV, Vbr can be changed with the software
3. Install the software
4. Install driver
5. Settings for Vbr are possible due to keyboard or the rotary bottom
6. If you want to set the value of Vbr for the next start of the module you have to click on the "non volatile" button

## SiPM Module

### Ordering information

Type	Chip size	Cell count	Description <sup>(1)</sup>	Part #
NUV	1x1 mm	625	SiPM Module, NUV, 1x1 mm	3001477
	3x3 mm	5520	SiPM Module, NUV, 3x3 mm	3001478
	4x4 mm	9340	SiPM Module, NUV, 4x4 mm	3001479
RGB	1x1 mm	625	SiPM Module, RGB, 1x1 mm	3001473
	3x3 mm	5520	SiPM Module, RGB, 3x3 mm	3001475
	4x4 mm	9340	SiPM Module, RGB, 4x4 mm	3001476
NUV+LYSO	3x3 mm	5520	SiPM Module, NUV, 3x3 mm, with LYSO scintillation crystal	3001481

Accessories	Description		Part #
Setup board	Setup board for voltage setting	not included in delivery	3001304
Software	Software for voltage setting	free download	-
Cable MMCX to BNC	Connection cable for signal output	not included in delivery	3001306
Cable power supply	Cable with flying leads	included in delivery	-

### Specification notes

(1) For further technical information, see SiPM datasheets.

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