



C16533-050GD

## Fiber coupling type 1 ch SPAD module (for VIS to NIR region)

The C16533-050GD is a fiber coupling type photon counting module that can detect low-level light. It consists of a thermoelectric cooled single photon avalanche diode (SPAD), an amplifier, a comparator, a SPAD bias circuit, and a temperature controller. The module operates by simply connecting to an external power supply ( $\pm 5$  V).

### Features

- Fiber coupling type
- Single photon counting is possible.
- High sensitivity in the long wavelength range
- Low dark count

### Applications

- Low-light-level measurement
- Particle diameter measurement
- Fluorescence measurement
- Analytical instruments

### Absolute maximum ratings

Parameter	Symbol	Condition	Value	Unit
Supply voltage	Vs		$\pm 6$	V
Operating temperature	Topr	No dew condensation*1	-10 to +40	°C
Storage temperature	Tstg	No dew condensation*1	-20 to +70	°C
Maximum incident light level	-	$\lambda=630$ nm	50	$\mu$ W

\*1: When there is a temperature difference between a product and the surrounding area in high humidity environments, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

### Electrical and optical characteristics (Ta=25 °C, $\lambda=630$ nm, Vs= $\pm 5$ V, unless otherwise noted)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	
Spectral response range	$\lambda$			400 to 1000		nm	
Peak sensitivity wavelength	$\lambda_p$		-	630	-	nm	
Fiber connector*2	-			FC type		-	
Chip temperature (setting temperature)*3 *4	Tchip		-	-20	-	°C	
Photon detection efficiency	PDE		35	45	-	%	
Dark count	CD		-	20	60	cps	
Afterpulse probability	-	100 ns to 500 ns	-	0.1	-	%	
Comparator output	-			TTL compatible		-	
Current consumption	Positive power supply	Ic	Vs=+5 V	-	+200	+1000	mA
	Negative power supply		Vs=-5 V	-	-20	-40	

\*2: Recommended fiber: GI 50/125 multimode fiber

\*3: When the chip temperature strays from the setting temperature by 5 °C, cooling automatically stops, and signals are no longer output.

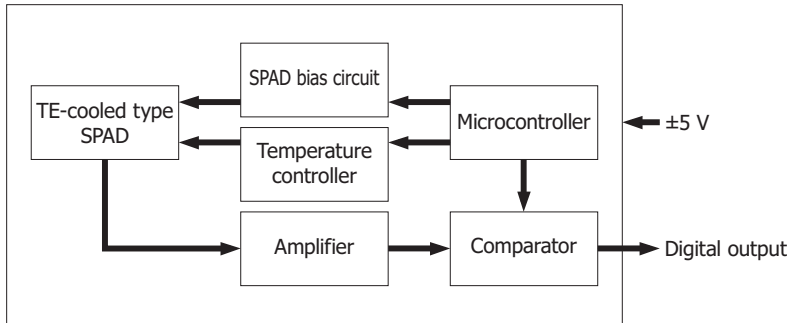
\*4: The setting temperature cannot be changed.

**Recommended operating conditions**

Parameter		Symbol	Min.	Typ.	Max.	Unit
Supply voltage*5	Positive power supply	Vs	+4.75	+5	+5.25	V
	Negative power supply		-4.75	-5	-5.25	

\*5: A power supply with 1.5 A or higher output must be used.

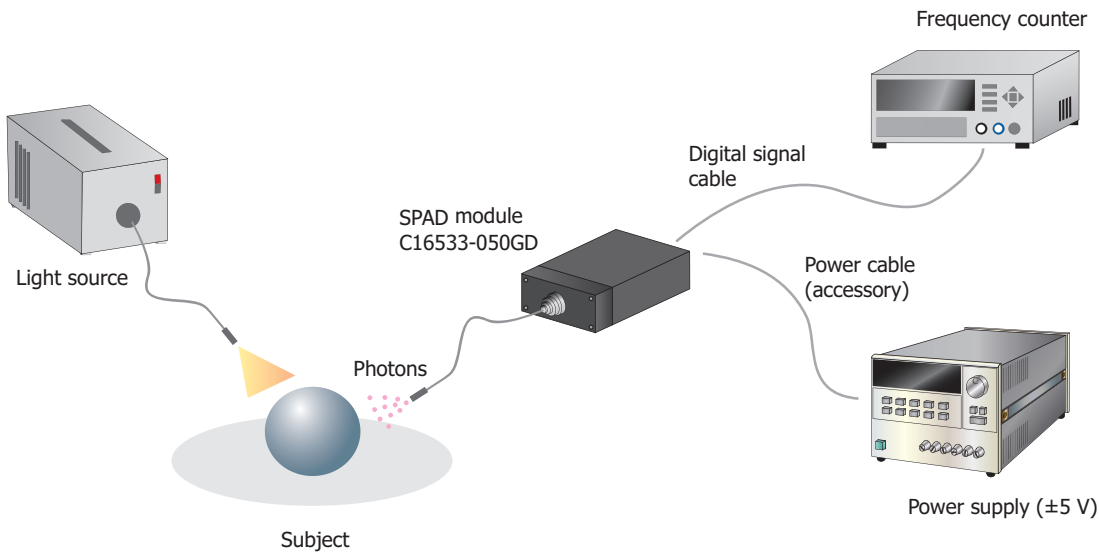
**Block diagram**



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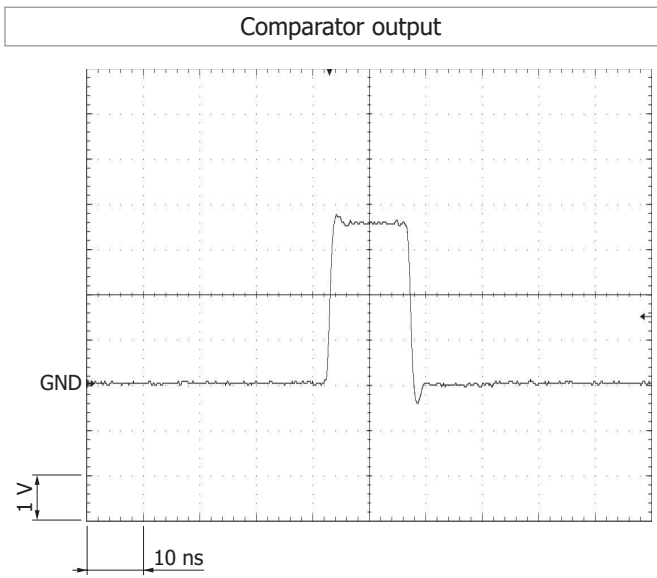
**Connection example**

Using the supplied power cable, connect the SPAD module to a power supply. You can count output pulses by connecting the SPAD module to a frequency counter.

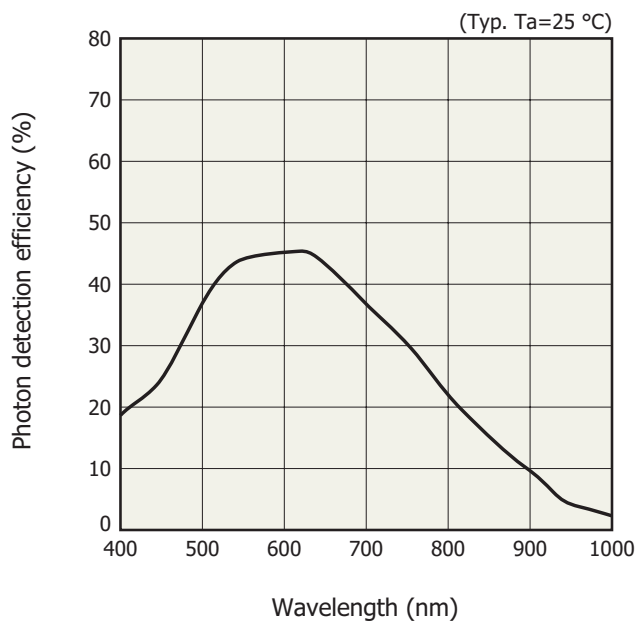


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Measurement example

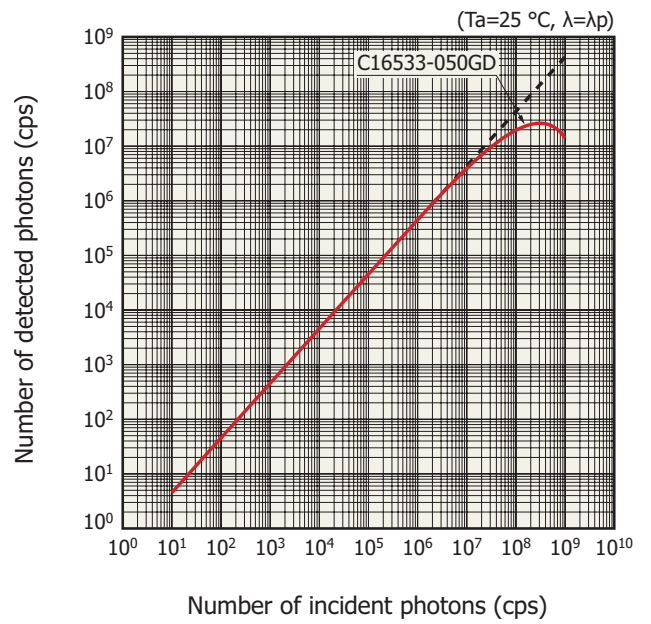


Photon detection efficiency vs. wavelength



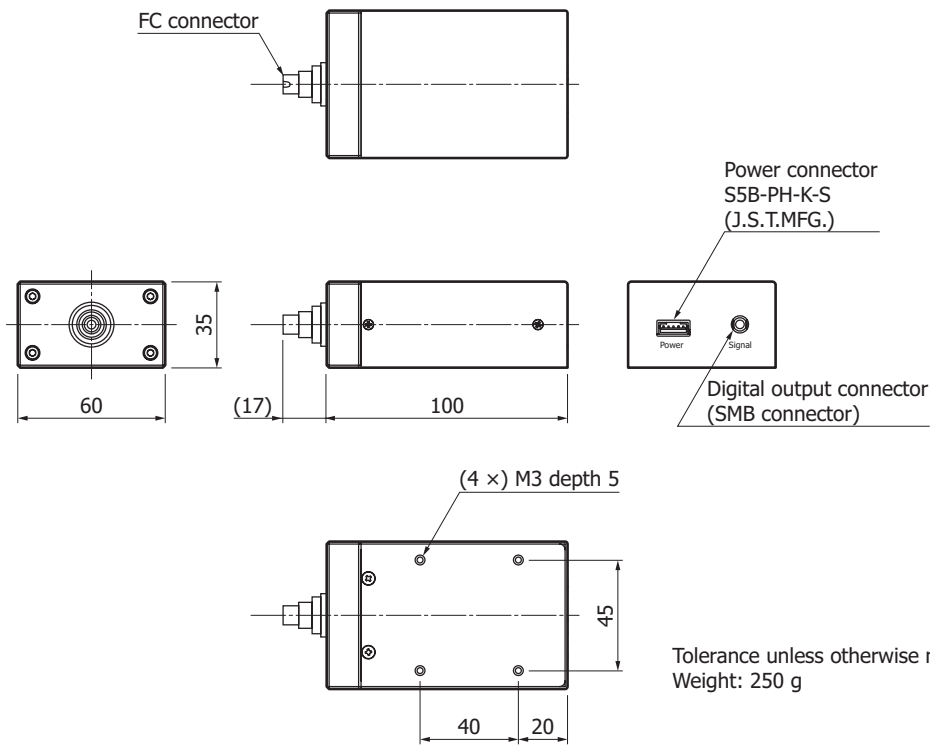
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Linearity (typical example)



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**Dimensional outline (unit: mm)**



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**Accessories**

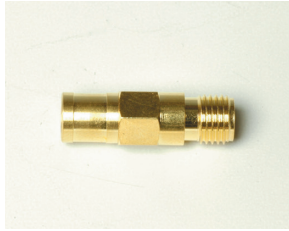
- Power cable
- Instruction manual

### Options (sold separately)

#### Coaxial conversion adapter A10613 series



A10613-01 (SMB-BNC)



A10613-02 (SMB-SMA)

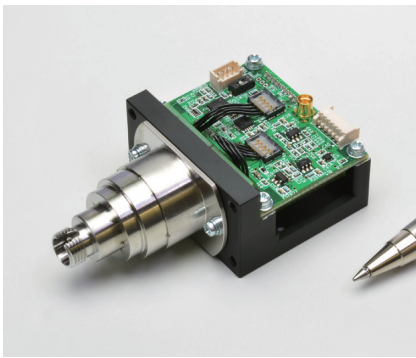
These are coaxial conversion adapters for converting the SMB coaxial connector for extracting photon counting module signals into a BNC coaxial connector or an SMA coaxial connector. These adapters make connection to a BNC cable or SMA cable possible.

### Precautions

- Use the product by referring to the supplied instruction manual.

### Related products

#### SPAD module C16534-050GD



C16534-050GD is an optical measurement module that can detect low-level light. It contains a thermoelectric cooled single photon avalanche diode (SPAD). The C16534-050GD has nearly the same functions as the C16533-050GD. Since this product is compact and lightweight, it is suitable for integration into equipment. The C16534-050GD requires heat dissipation.

### Related information

[www.hamamatsu.com/sp/ssd/doc\\_en.html](http://www.hamamatsu.com/sp/ssd/doc_en.html)

#### Precautions

- Disclaimer

Information described in this material is current as of November 2023.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.

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