



C11202 series

## 1 ch SPAD module (for VIS region)

The C11202 series is a 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 photosensitive area is available in two sizes of  $\phi 50 \mu\text{m}$  and  $\phi 100 \mu\text{m}$ , and such small photosensitive areas offer a low dark count. Modules operate by simply connecting to an external power supply ( $\pm 5 \text{ V}$ ).

### Features

- High sensitivity in the short wavelength range
- Low dark count
- Low afterpulse

### Applications

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

### Structure

Parameter	Symbol	C11202-050	C11202-100	Unit
Internal photodetector	-	SPAD		-
Photoinsensitive area size	-	$\phi 50$	$\phi 100$	$\mu\text{m}$

### Absolute maximum ratings

Parameter	Symbol	Condition	C11202-050	C11202-100	Unit
Supply voltage	$V_s$		$\pm 6$		V
Operating temperature	$T_{opr}$	No condensation*1	-10 to +40		$^{\circ}\text{C}$
Storage temperature	$T_{stg}$	No condensation*1	-20 to +70		$^{\circ}\text{C}$

\*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 (Typ. $T_a=25 \text{ }^{\circ}\text{C}$ , $\lambda=\lambda_p$ , $V_s=\pm 5 \text{ V}$ , unless otherwise noted)

Parameter	Symbol	Condition	C11202-050			C11202-100			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	$\lambda$		320 to 900			320 to 900			nm
Peak sensitivity wavelength	$\lambda_p$		-	450	-	-	450	-	nm
Chip temperature (setting temperature)*2 *3	$T_{chip}$		-	-20	-	-	-20	-	$^{\circ}\text{C}$
Photon detection efficiency	PDE		60	70	-	60	70	-	%
Dark count	-		-	7	25	-	30	100	cps
Afterpulse probability	-	100 ns to 500 ns	-	0.1	-	-	0.1	-	%
Comparator output	-		TTL compatible			TTL compatible			-
Maximum count rate	-		-	30	-	-	20	-	Mcps
Current consumption	Positive power supply	$V_s=+5 \text{ V}$	-	+200	+1000	-	+200	+1000	mA
	Negative power supply	$V_s=-5 \text{ V}$	-	-20	-40	-	-20	-40	

\*2: When the chip temperature strays from the setting temperature by  $5 \text{ }^{\circ}\text{C}$ , cooling automatically stops, and signals are no longer output.

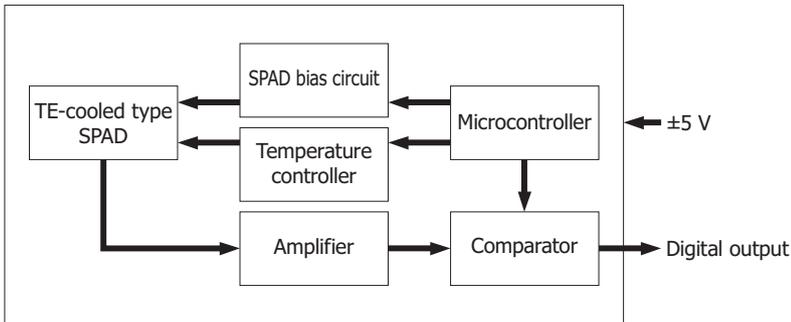
\*3: The setting temperature cannot be changed.

**Recommended operating conditions**

Parameter		Symbol	Min.	Typ.	Max.	Unit
Supply voltage*4	Positive power supply	Vs	+4.75	+5	+5.25	V
	Negative power supply		-4.75	-5	-5.25	

\*4: A power supply with 1.5 A or higher output must be used.

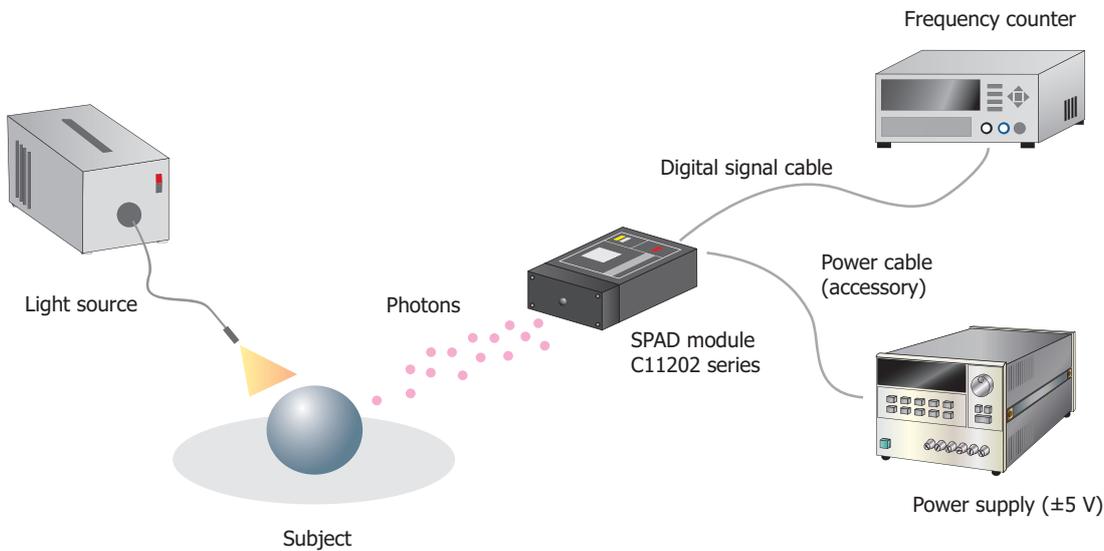
**Block diagram**



KACCC1167EA

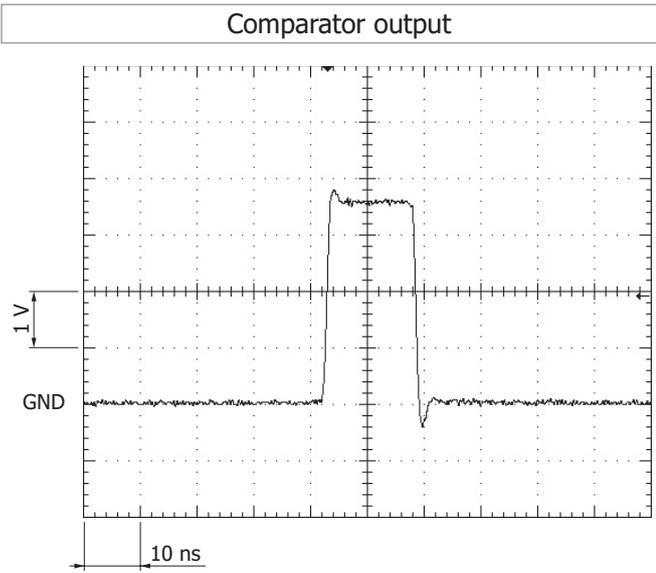
**Connection example**

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.

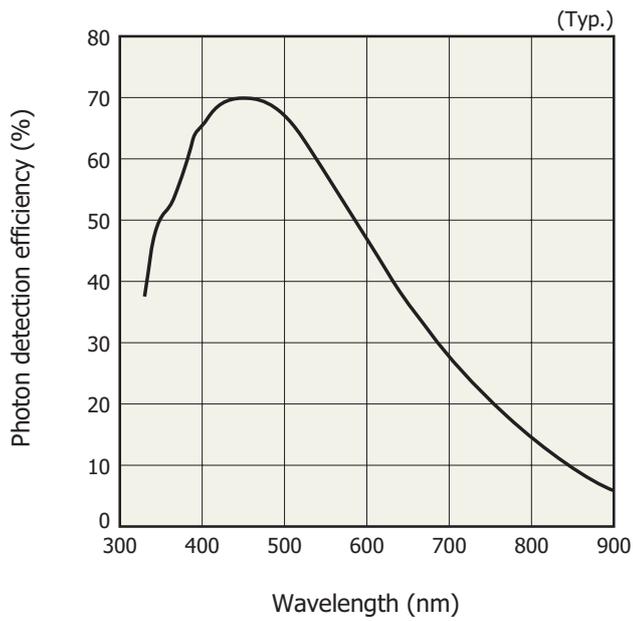


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Measurement example

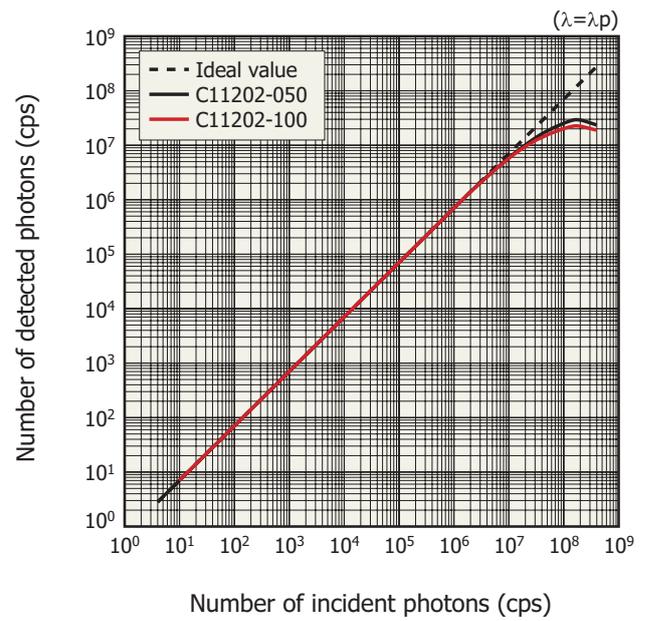


Photon detection efficiency vs. wavelength



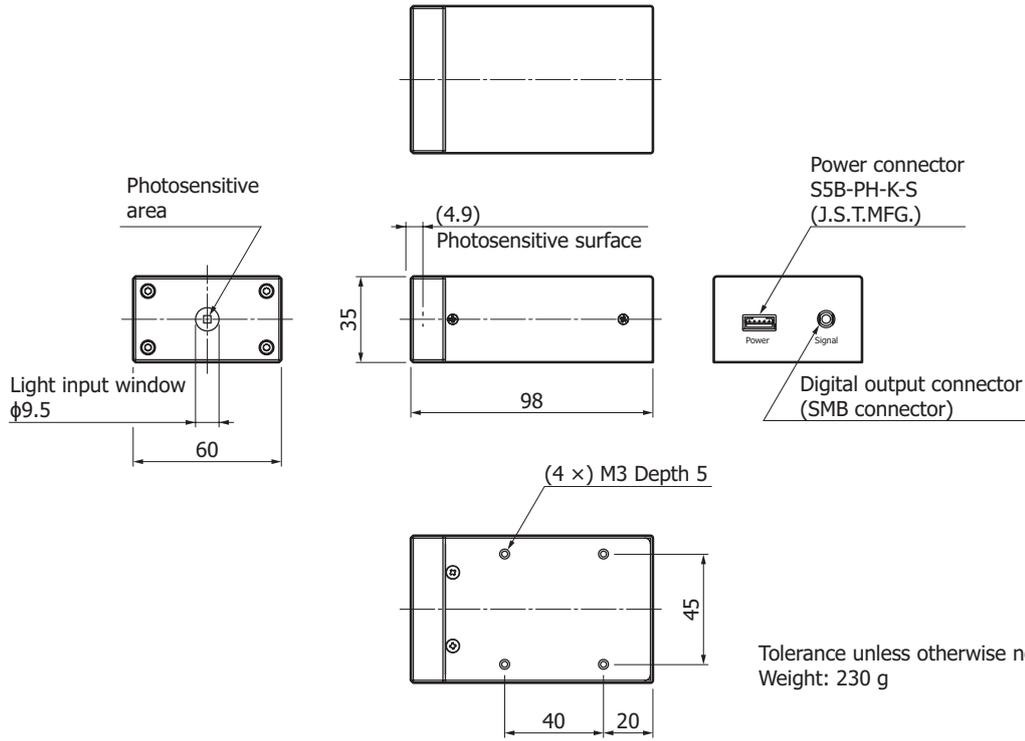
KACCB0296EA

Linearity (typical example)



KACCB0297EA

**Dimensional outline (unit: mm)**



KACCA0317EC

**Accessories**

- Power cable
- Instruction manual

### Options (sold separately)

#### Coaxial converter adapter A10613 series



A10613-01 (SMB-BNC)



A10613-02 (SMB-SMA)

The A10613 series is a coaxial adapter that converts the SMB coaxial connector for signal-output on the photon counting module to a BNC or SMA coaxial connector. This adapter allows connecting a BNC or SMA cable to the photon counting module.

### Precautions

- For cleaning the product, wipe using a clean, soft, dry cloth. Do not use organic solvents such as thinner and acetone.
- Do not cover the unit with a dark cloth or something similar while the product is running. Covering the product can cause the internal temperature to rise and prevent it from operating normally.

### Related information

[http://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 September 2022.

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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