



[ **GD type** ]

C13366 series

**Photon counting module for  
low-level-light detection, Digital output**

The C13366 series (GD type) are photon counting modules capable of detecting low level light. These modules consist of a thermoelectrically cooled MPPC, an amplifier, a comparator circuit, a high-voltage power supply circuit, and a temperature control circuit. The photosensitive area is available in two sizes of 1.3 × 1.3 mm and 3 × 3 mm, and the signal output is digital. Modules operate just by connecting them to an external power supply (±5 V).

**Features**

- **Built-in TE-cooled MPPC**  
[MPPC for precision measurement (new product)]
- **High sensitivity in the short wavelength range**
- **Built-in temperature control function**
- **Low dark count**
- **Low afterpulse**
- **Digital output**

**Applications**

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

**Structure**

Parameter	Symbol	C13366-1350GD	C13366-3050GD	Unit
Internal MPPC	-	S13362-1350DG	S13362-3050DG	-
Photosensitive area size	-	1.3 × 1.3	3 × 3	mm
Pixel pitch	-	50		µm
Number of pixels	-	667	3600	-

**Absolute maximum ratings**

Parameter	Symbol	Condition	Value	Unit
Supply voltage	Vs		±6	V
Operating temperature	Topr	No dew condensation*1	-10 to +40	°C
Storage temperature	Tstg	No dew condensation*1	-20 to +70	°C

\*1: When there is a temperature difference between a product and the surrounding area in high humidity environment, 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. Ta=25 °C, λ=λp, Vs=±5 V, unless otherwise noted)**

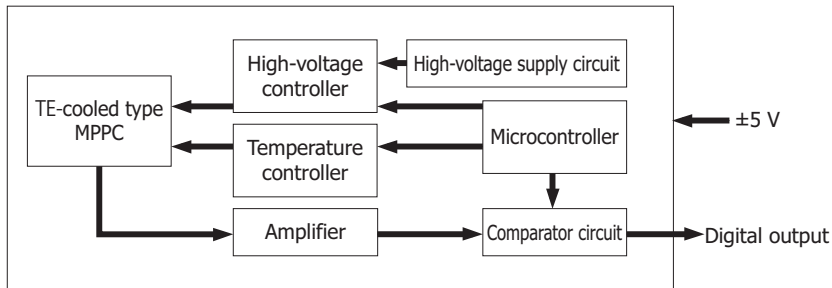
Parameter	Symbol	Condition	C13366-1350GD			C13366-3050GD			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	λ		320 to 900			320 to 900			nm
Peak sensitivity wavelength	λp		-	450	-	-	450	-	nm
Element temperature (setting temperature)	Td		-	-20	-	-	-20	-	°C
Photon detection efficiency	PDE	Threshold: 0.5 p.e.	-	40	-	-	40	-	%
Dark count	CD	Threshold: 0.5 p.e.	-	2.5	7	-	12	36	kcps
Comparator output	-		TTL compatible						-
Afterpulse probability	-	100 ns to 500 ns	-	0.1	-	-	0.1	-	%
Crosstalk probability	-		-	1	-	-	3	-	%
Comparator threshold level	-		adjustable in 9 steps from 0.5 to 8.5						p.e.

## Electrical characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage*2	+Vs		+4.75	+5	+5.25	V
	-Vs		-4.75	-5	-5.25	
Current consumption	Ic	+Vs	-	+200	+1000	mA
		-Vs	-	-20	-40	

\*2: A power supply with 1 A or higher output must be used.

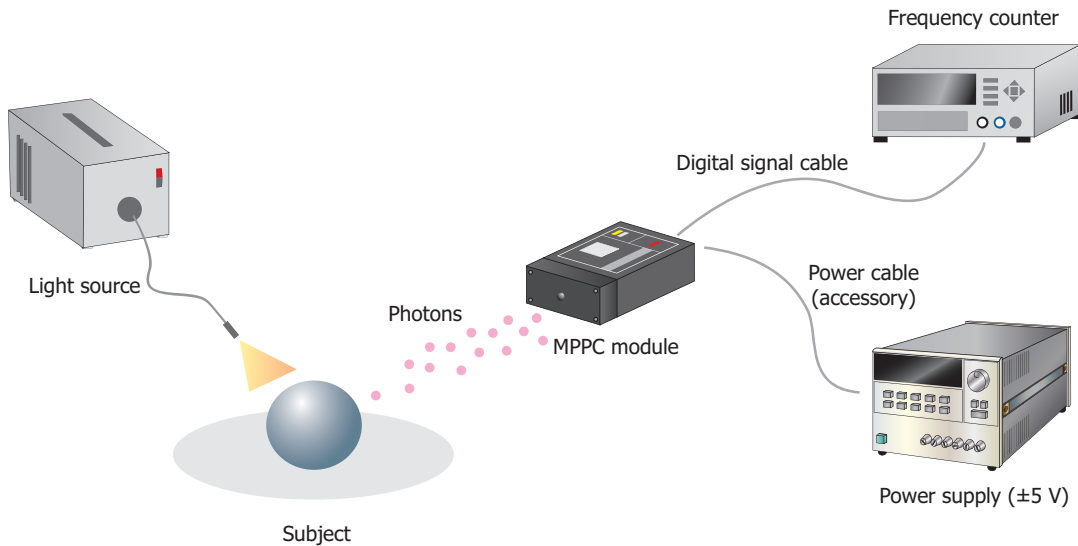
## Block diagram



KACCC0679EA

## Connection example

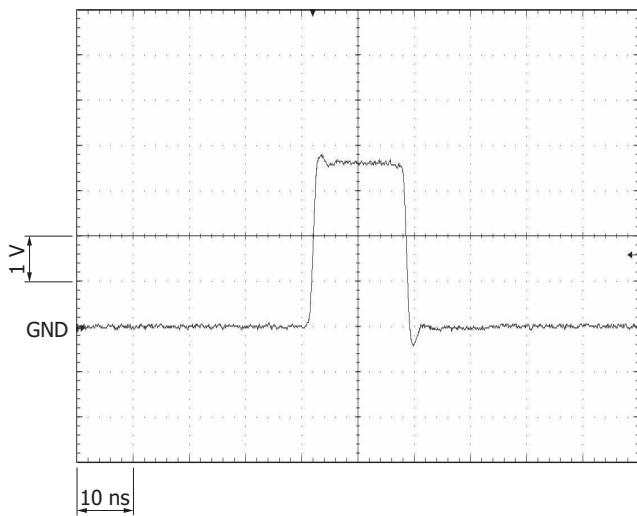
Using the included power cable, connect the MPPC module to a power supply. You can count output pulses by connecting the MPPC module to a frequency counter.



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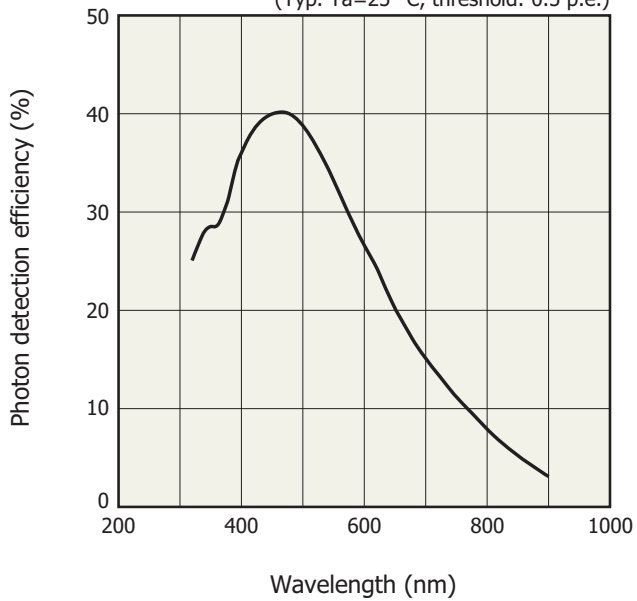
Measurement example

Digital output



Photon detection efficiency vs. wavelength

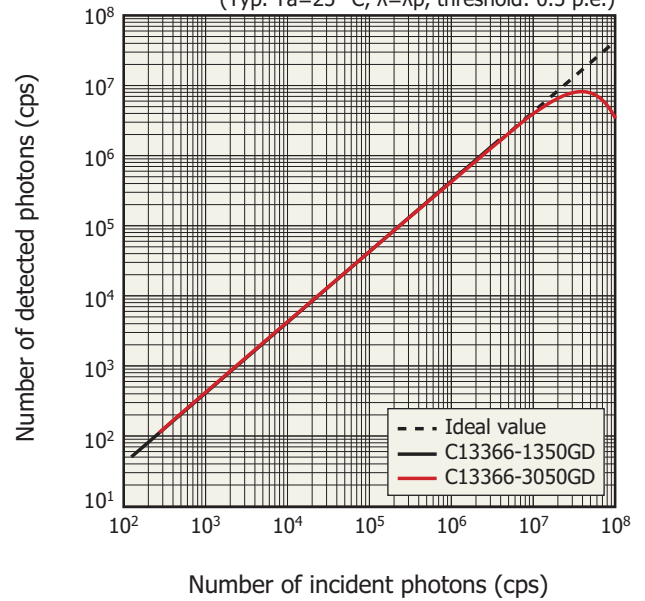
(Typ. Ta=25 °C, threshold: 0.5 p.e.)



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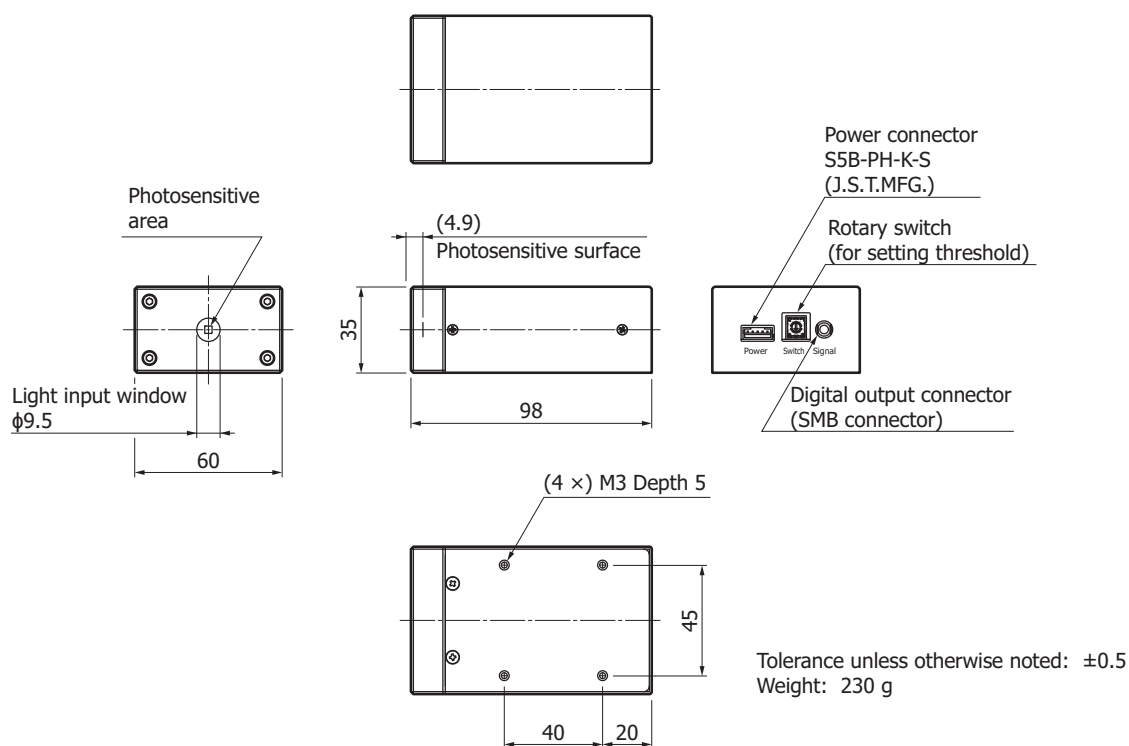
Linearity

(Typ. Ta=25 °C,  $\lambda=\lambda_p$ , threshold: 0.5 p.e.)



KACC80397EA

### Dimensional outline (unit: mm)



KACCA0313EC

### Accessories

- Power cable
- Instruction manual

### Options (sold separately)

#### Coaxial converter adapter A10613 series

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



A10613-01 (SMB-BNC)



A10613-02 (SMB-SMA)

### 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 product with a dark cloth or something similar while the product is running. Covering the product can cause the internal temperature to rise and cause abnormal operation.

## Lineup of MPPC modules

Type no.	Output	Effective photosensitive area (mm)	Pixel pitch (μm)	Cooling		
C13365-1350SA	Analog	1.3 × 1.3	50	Non-cooled		
C13365-3050SA		3 × 3				
C13366-1350GA	Analog	1.3 × 1.3		50	TE-cooled	
C13366-3050GA		3 × 3				
C13366-1350GD	Digital	1.3 × 1.3			50	TE-cooled
C13366-3050GD		3 × 3				

## Related information

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

- Precautions
- Disclaimer

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Information described in this material is current as of March 2020.

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