

# MPPC® modules

[ GD type ]

C14455 series



## Optical measurement modules for very-low-level light detection, digital output

The C14455 series (GD type) are optical measurement modules capable of detecting low-level light using its built-in TE-cooled MPPC for the visible to near infrared region. It consists of a TE-cooled MPPC, signal processing circuit, high-voltage power supply circuit, and temperature controller. The photosensitive area is available in two sizes of  $\phi 1.5$  mm and  $\phi 3$  mm, and the signal output is digital. The modules operate just by connecting them to an external power supply ( $\pm 5$  V).

### Features

- Built-in TE-cooled MPPC
- For the visible to near infrared region
- Built-in temperature control function
- Low dark count
- Digital output
- Available in two photosensitive area types

### Applications

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

### Structure

Parameter	Symbol	C14455-1550GD	C14455-3050GD	Unit
Built-in MPPC	-	TE-cooled type MPPC		-
Effective photosensitive area	-	$\phi 1.5$	$\phi 3$	mm
Pixel pitch	-	50		$\mu\text{m}$
Number of pixels	-	724	2836	-

### Absolute maximum ratings

Parameter	Symbol	Condition	Value	Unit
Supply voltage	Vs		$\pm 6$	V
Operating temperature	Topr	No dew condensation*1	-10 to +40	$^{\circ}\text{C}$
Storage temperature	Tstg	No dew 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 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 (Ta=25 $^{\circ}\text{C}$ , $\lambda=\lambda_p$ , Vs= $\pm 5$ V, unless otherwise noted)

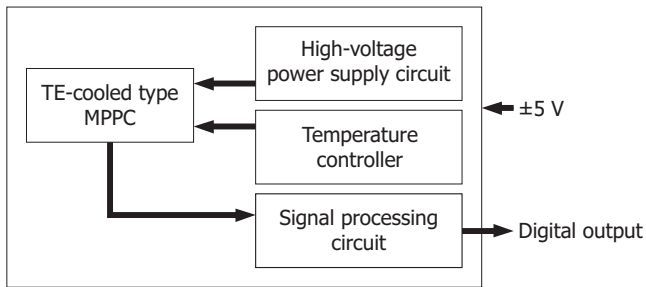
Parameter	Symbol	Condition	C14455-1550GD			C14455-3050GD			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	$\lambda$		350 to 1000			350 to 1000			nm
Peak sensitivity wavelength	$\lambda_p$		-	600	-	-	600	-	nm
Element temperature (setting temperature)	Td		-	-20	-	-	-20	-	$^{\circ}\text{C}$
Photon detection efficiency	PDE	Threshold: 0.5 p.e.	-	40	-	-	40	-	%
Dark count	CD	Threshold: 0.5 p.e.	-	15	40	-	60	150	kcps
Comparator output	-		TTL compatible						-
Afterpulse probability	-	100 ns to 500 ns	-	0.1	-	-	0.1	-	%
Crosstalk probability	-		-	5	-	-	5	-	%
Comparator threshold level	-		9 adjustable levels: 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.

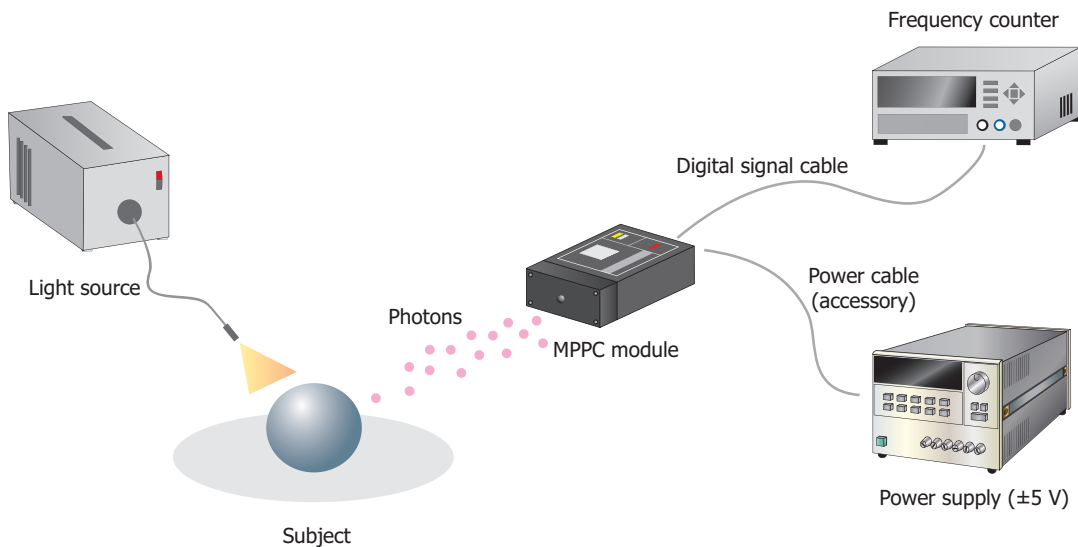
## Block diagram



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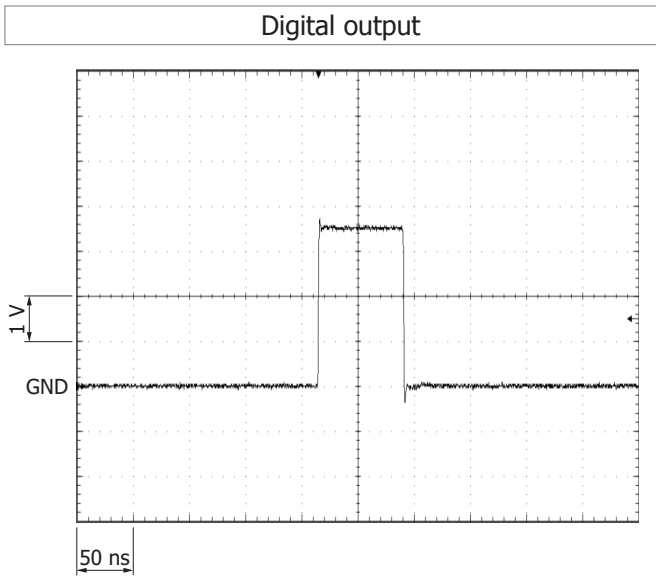
## Connection example

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

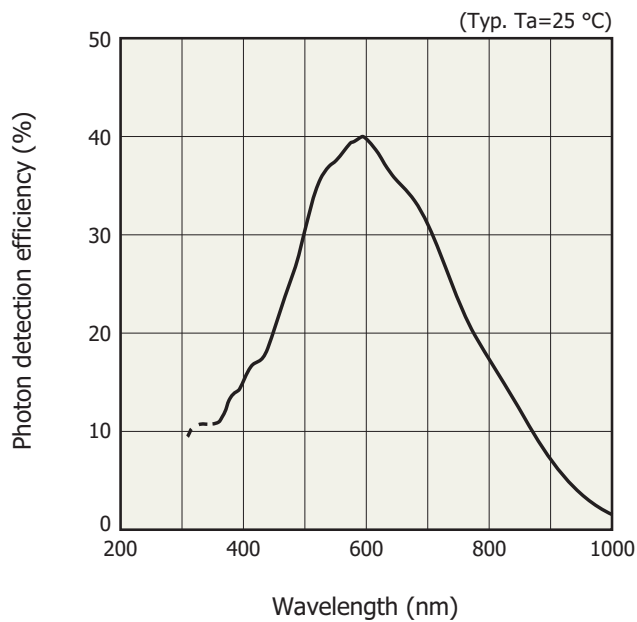


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Measurement example

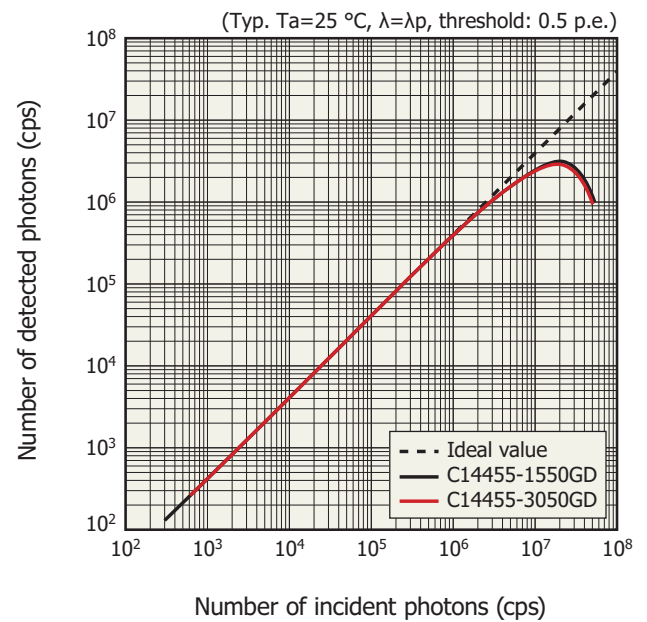


Photon detection efficiency vs. wavelength



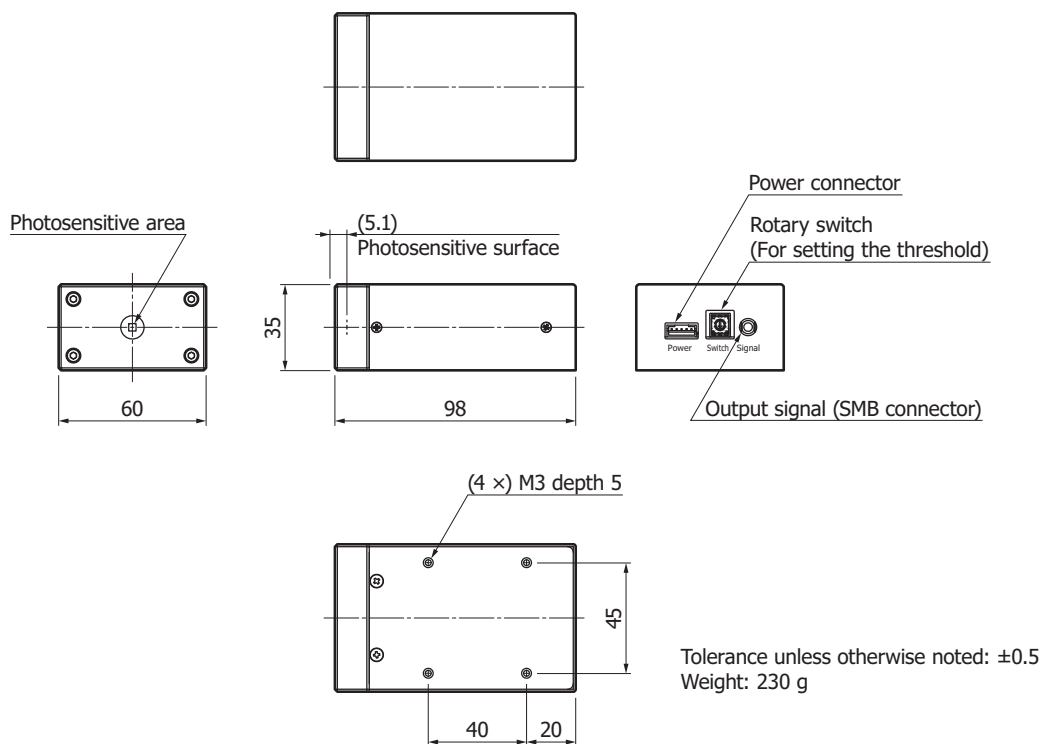
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Linearity



KACCB0577EA

### Dimensional outline (unit: mm)



KACCA0438EA

### Accessories

- Power cable
- Instruction manual

### Options (sold separately)

#### Coaxial conversion adapter A10613 series

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



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 it can cause the internal temperature to rise and cause abnormal operation.

## MPPC module lineup

Type no.	Output format	Photosensitive area (mm)	Pixel pitch (μm)	Cooling		
C14452-1550GA	Analog	φ1.5	50	Non-cooled		
C14452-3050GA		φ3.0				
C14455-1550GA	Analog	φ1.5		50	TE-cooled	
C14455-3050GA		φ3.0				
C14455-1550GD	Digital	φ1.5			50	TE-cooled
C14455-3050GD		φ3.0				

## 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 October 2019.

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