

MPPC[®] modules

[GD type]

C14456 series



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

The C14456 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. These modules consist of a TE-cooled MPPC, amplifier, comparator 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 by supplying an external power supply (± 5 V). As this product is compact and lightweight, it is suitable for integration into devices.

Features

- Built-in TE-cooled MPPC
- For 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
- Fluorescence measurement

Structure

Parameter	Symbol	C14456-1550GD	C14456-3050GD	Unit
Built-in MPPC	-	S14422-1550DG	S14422-3050DG	-
Effective photosensitive area	-	$\phi 1.5$	$\phi 3$	mm
Pixel pitch	-	50		μm
Number of pixels	-	724	2836	-

Absolute maximum ratings

Parameter	Symbol	Condition	Value	Unit
Supply voltage	Vs		± 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.

Recommended operating conditions

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage*2	+Vs	Positive power supply	+4.75	+5	+5.25	V
	-Vs	Negative power supply	-4.75	-5	-5.25	

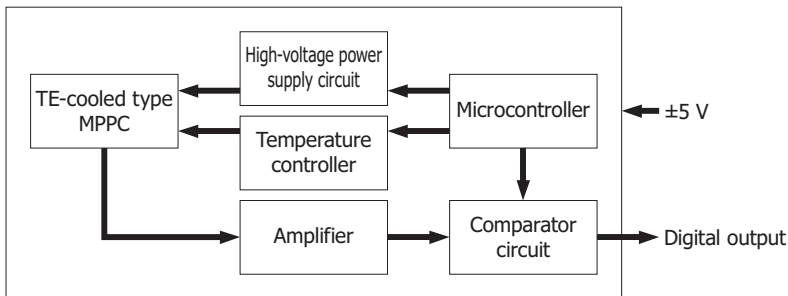
*2: A power supply with 2 A or higher output must be used.

Electrical and optical characteristics (Ta=25 °C, λ=λp, Vs=±5 V, unless otherwise noted)

Parameter	Symbol	Condition	C14456-1550GD			C14456-3050GD			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	λ		350 to 1000			350 to 1000			nm
Peak sensitivity wavelength	λp		-	600	-	-	600	-	nm
Chip temperature (setting temperature)*3 *4	Tchip		-	-20	-	-	-20	-	°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						-
Comparator threshold level	-		0.5			0.5			p.e.
Current consumption	Ic	+5 V	-	+200	+1500	-	+200	+1500	mA
		-5 V	-	-20	-40	-	-20	-40	

*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.

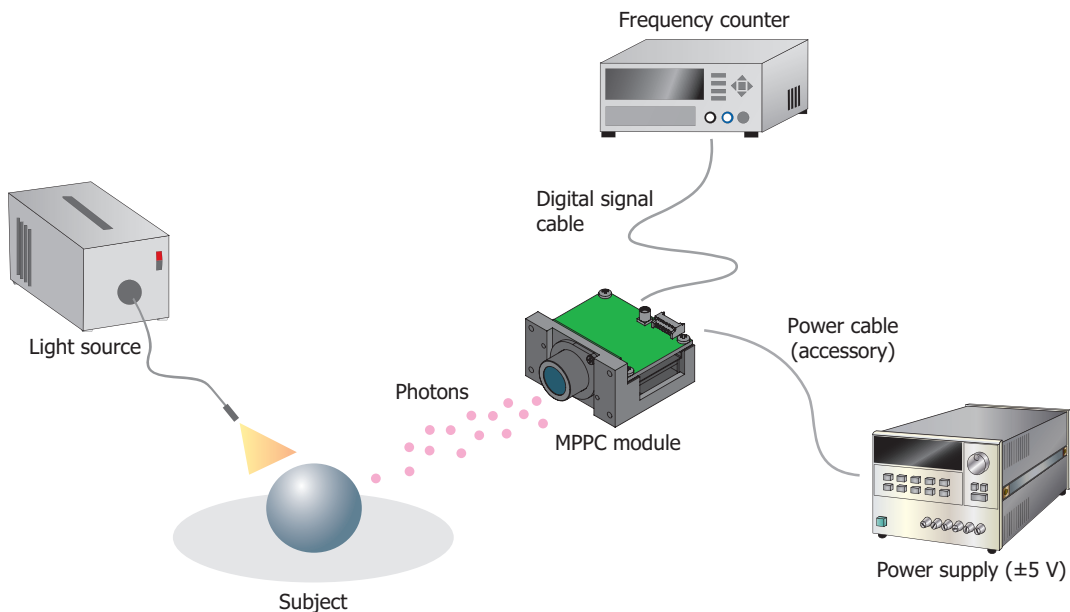
Block diagram



KACCC0933EA

Connection example

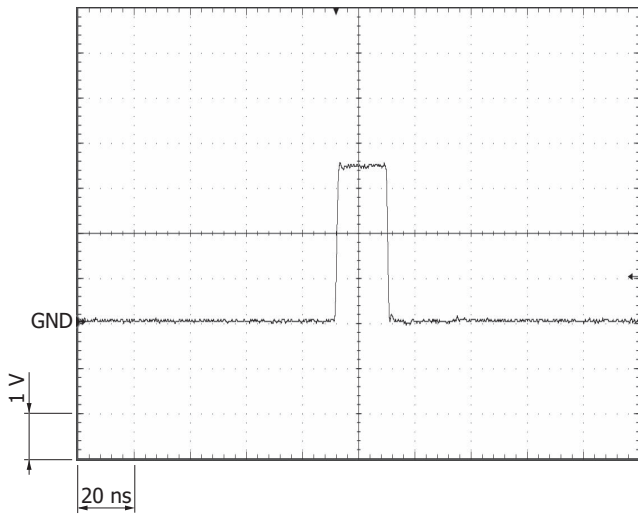
Using the supplied power cable, connect the MPPC module to a power supply. You can count output pulses by connecting the MPPC module to a frequency counter.



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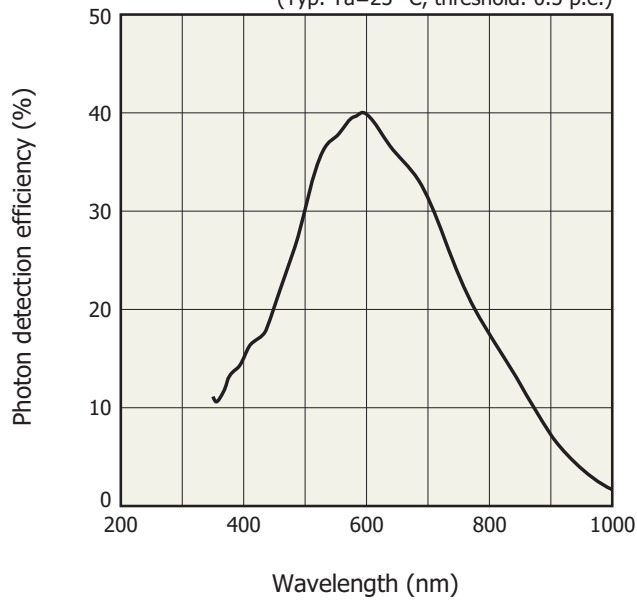
Measurement example

Digital output



Photon detection efficiency vs. wavelength

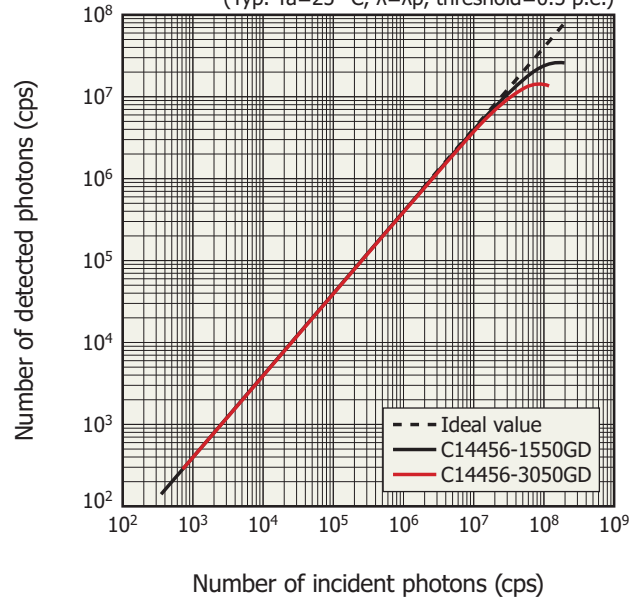
(Typ. $T_a=25\text{ }^\circ\text{C}$, threshold: 0.5 p.e.)



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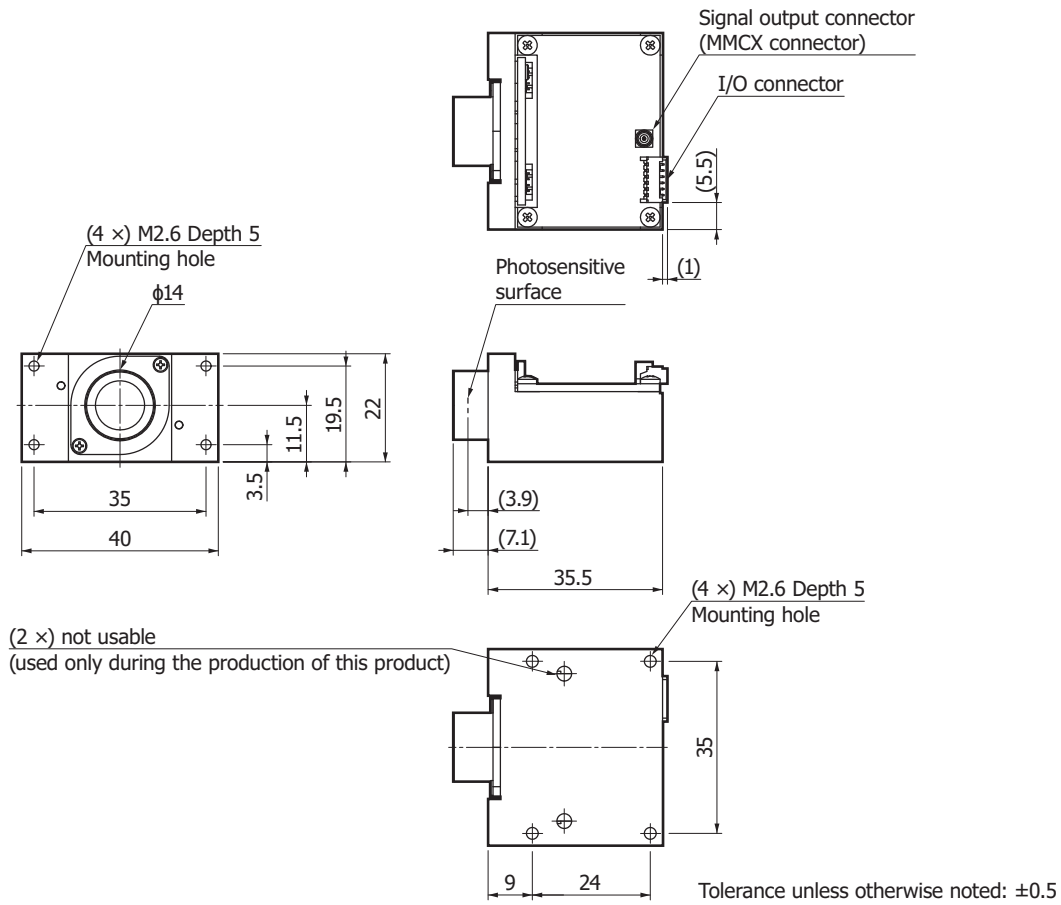
Linearity

(Typ. $T_a=25\text{ }^\circ\text{C}$, $\lambda=\lambda_p$, threshold=0.5 p.e.)



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Dimensional outline (unit: mm)



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Note: When using this product, provide heat dissipation measures by using a heatsink or through thermal coupling with the enclosure that you will use. Keep the thermal resistance to 3 °C/W or less.

Accessories

- Power cable
- Instruction manual

Precautions

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

Related products

MPPC modules C14455 series (GD type)

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. These modules consist of a thermoelectrically cooled MPPC, a signal processing circuit, a high-voltage power supply circuit, and a 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 by supplying an external power supply (± 5 V).



Related information

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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