

[GA type]

C14456 series



Optical measurement modules for low-level light detection, analog output

The C14456 series (GA 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, an amplifier, 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 analog.

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
- Low noise equivalent power
- Built-in temperature control function
- Analog output
- Available in two photosensitive area types

Applications

- Low-light-level measurement
- Flow cytometry
- Fluorescence measurement
- Laser scan microscope

Structure

Parameter	Symbol	C14456-1550GA	C14456-3050GA	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	

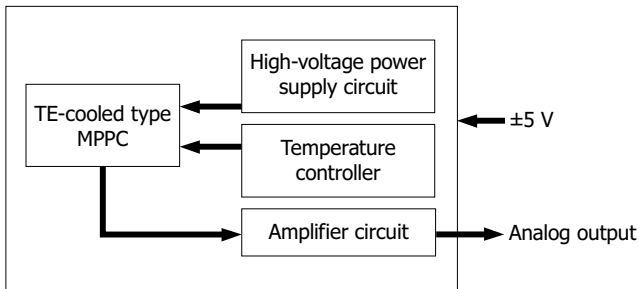
*2: A power supply with 2 A or higher output must be used.

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

Parameter	Symbol	Condition	C14456-1550GA			C14456-3050GA			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	
Photoelectric conversion sensitivity	-		0.7×10^9	1.0×10^9	1.3×10^9	0.7×10^9	1.0×10^9	1.3×10^9	V/W	
Cutoff frequency	High band	fc	-3 dB, sine wave	1.4	2	-	1.4	2	-	MHz
	Low band			DC			DC			-
Noise equivalent power	NEP	Dark state	-	0.2	0.4	-	0.4	0.8	fW/Hz ^{1/2}	
Minimum detection limit	-	Dark state	-	0.3	0.6	-	0.6	1.2	pW rms	
Maximum output voltage	-		-	4.7	-	-	4.7	-	V	
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.

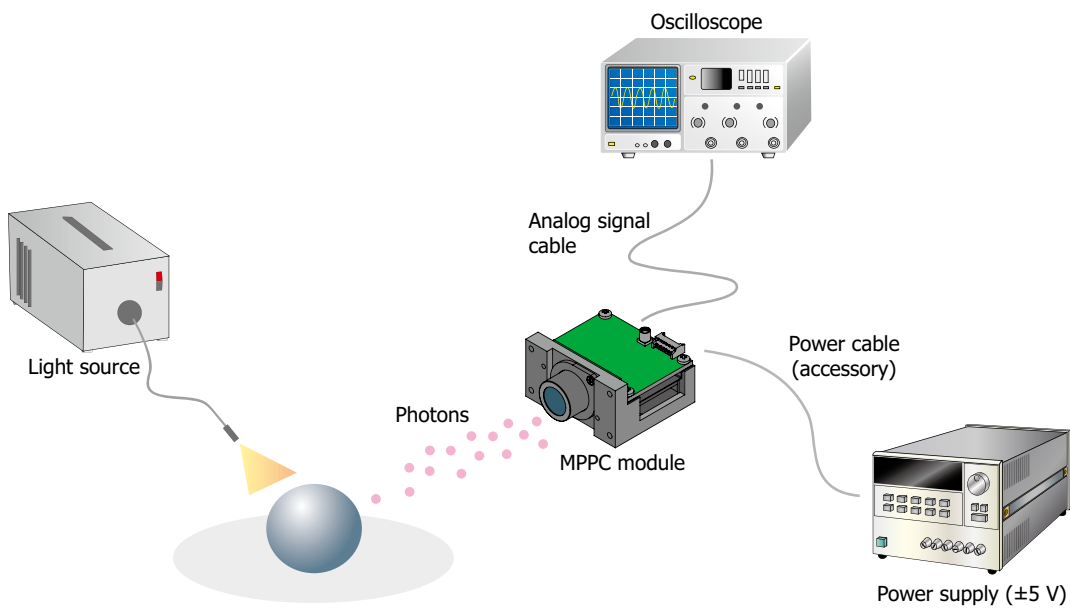
Block diagram



KACCC0926EA

Connection example

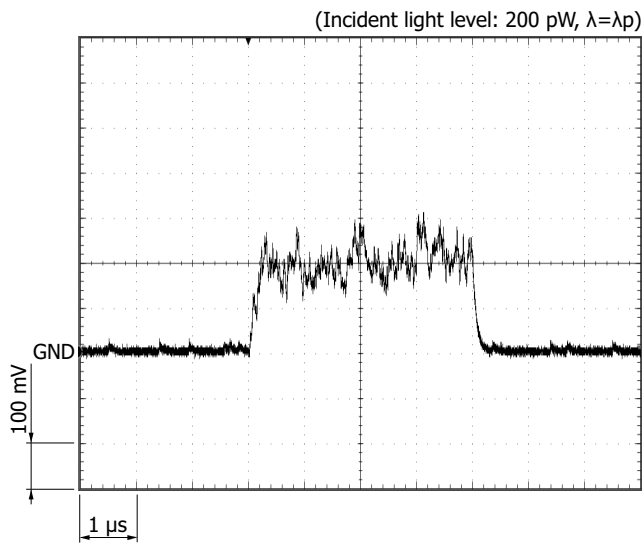
Using the supplied power cable, connect the MPPC module to a power supply. You can observe the MPPC module's output waveform by connecting the module to an oscilloscope.



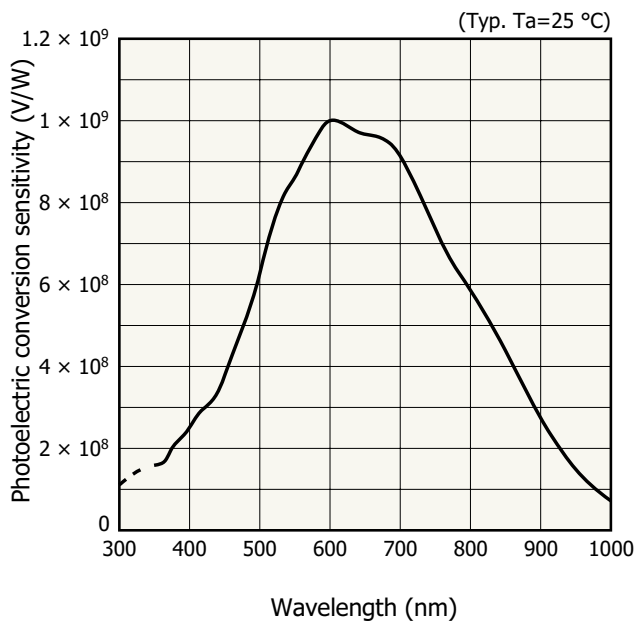
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Measurement example

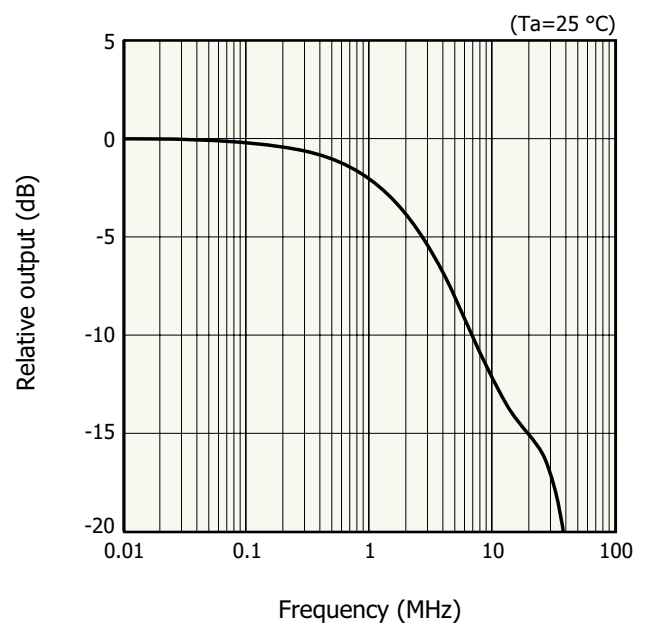
Analog output



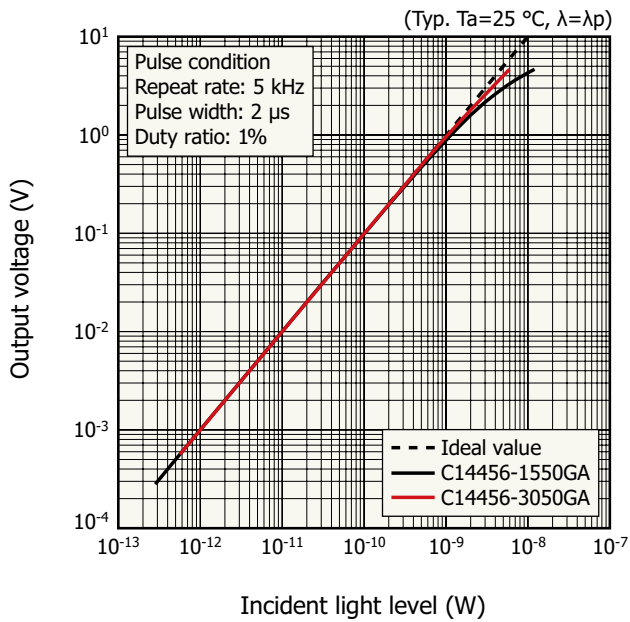
Photoelectric conversion sensitivity vs. wavelength



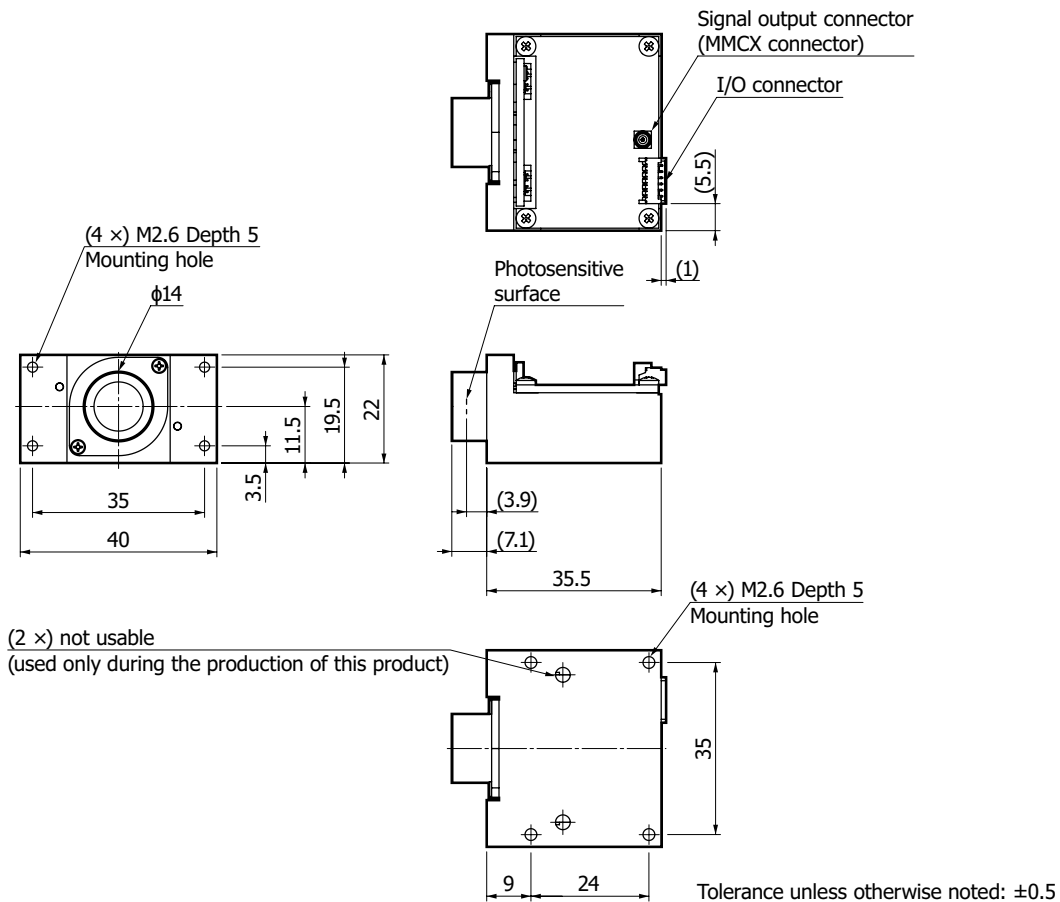
Frequency characteristics (typical example)



▣ Linearity



▣ Dimensional outline (unit: mm)



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 $^\circ\text{C}/\text{W}$ or less.

Accessories

- Power cable
- Instruction manual

Precautions

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

Related products

MPPC modules C14455 series (GA type)

The C14455 series (GA type) is a module for evaluating thermoelectrically cooled MPPCs for the visible to near infrared region. These modules consist of a thermoelectrically cooled MPPC, an amplifier, 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 analog. 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 May 2022.

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