

[GA type]

C13852 series

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

The C13852 series (GA type) are optical measurement modules with built-in TE-cooled type MPPCs, capable of detecting low-level light. These modules consist of a thermoelectrically cooled MPPC, an amplifier, 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 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

- High sensitivity in the short wavelength range
- Low noise equivalent power
- Built-in temperature control function
- Analog output

Applications

- Low-level light measurement
- Flow cytometry
- Fluorescence measurement
- Analytical instruments

Structure

Parameter	Symbol	C13852-1350GA	C13852-3050GA	Unit
Built-in MPPC	-	S13362-1350DG	S13362-3050DG	-
Effective photosensitive area	-	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	T _{opr}	No dew condensation*1	-10 to +40	°C
Storage temperature	T _{stg}	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.

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.

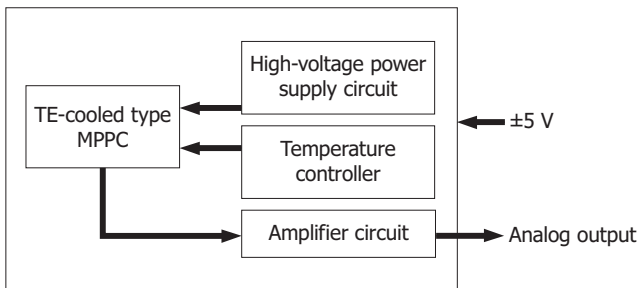
Electrical and optical characteristics (Ta=25 °C, λ=λp, Vs=±5 V, unless otherwise noted)

Parameter	Symbol	Condition	C13852-1350GA			C13852-3050GA			Unit	
			Min.	Typ.	Max.	Min.	Typ.	Max.		
Spectral response range	λ		320 to 900			320 to 900			nm	
Peak sensitivity wavelength	λp		-	500	-	-	500	-	nm	
Chip temperature (setting temperature) ^{*3 *4}	Tchip		-	-20	-	-	-20	-	°C	
Photoelectric 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	3	4	-	3	4	-	MHz
	Low band			DC			DC			-
Rise time	tr	10% to 90%, 1 p.e.	-	5	-	-	9	-	ns	
Noise equivalent power	NEP	Dark state	-	0.1	0.2	-	0.15	0.3	fW/Hz ^{1/2}	
Minimum detection limit	-	Dark state	-	0.25	0.5	-	0.35	0.7	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.

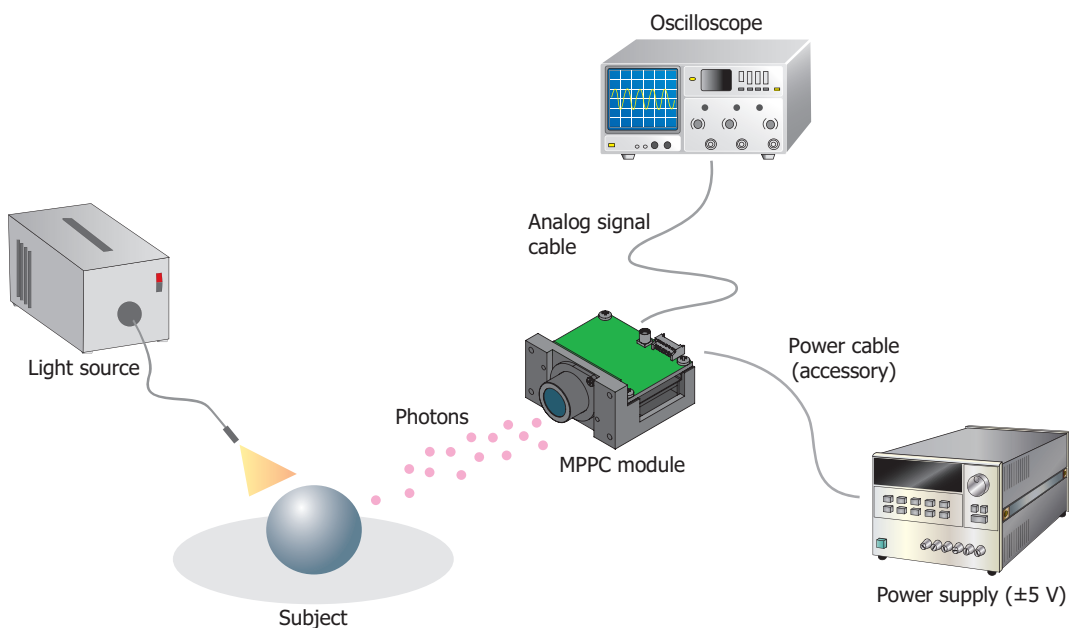
Block diagram



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Connection example

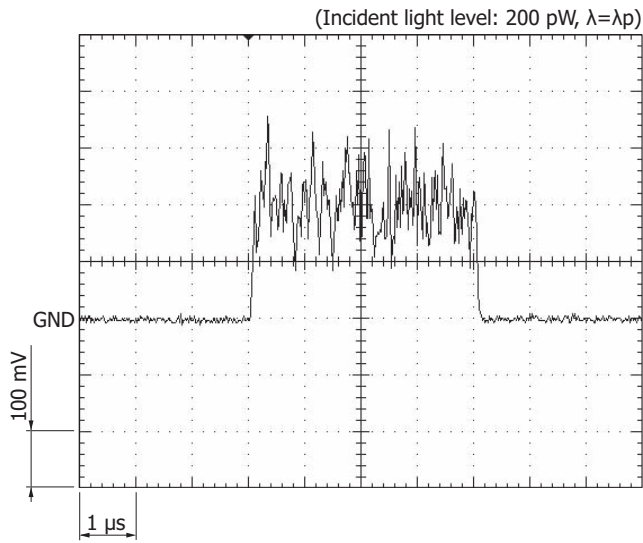
Using the supplied power cable, connect the MPPC module to a power supply. You can observe the MPPC module's output waveform by connecting the module to an oscilloscope.



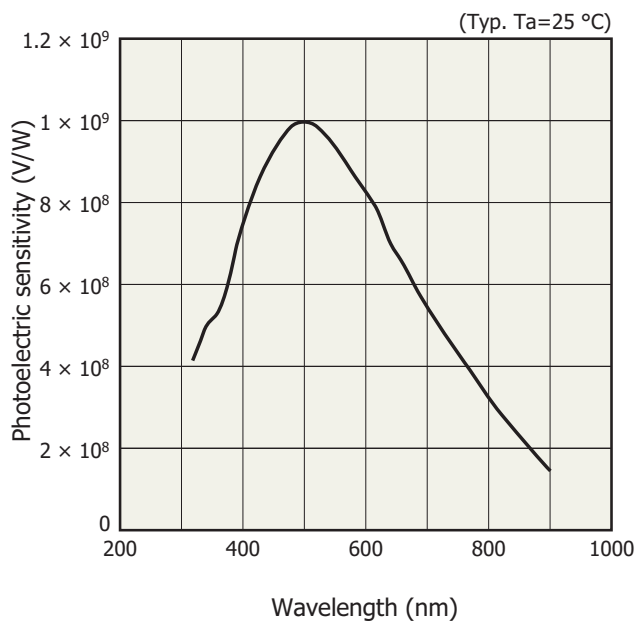
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Measurement example

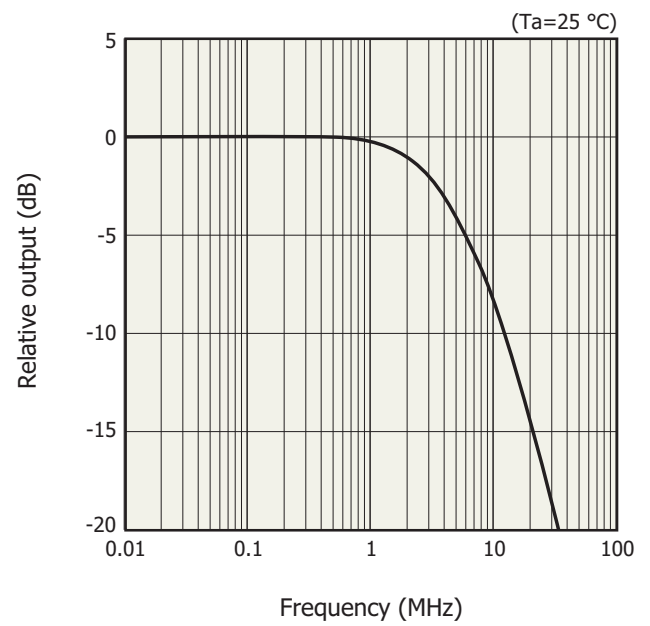
Analog output



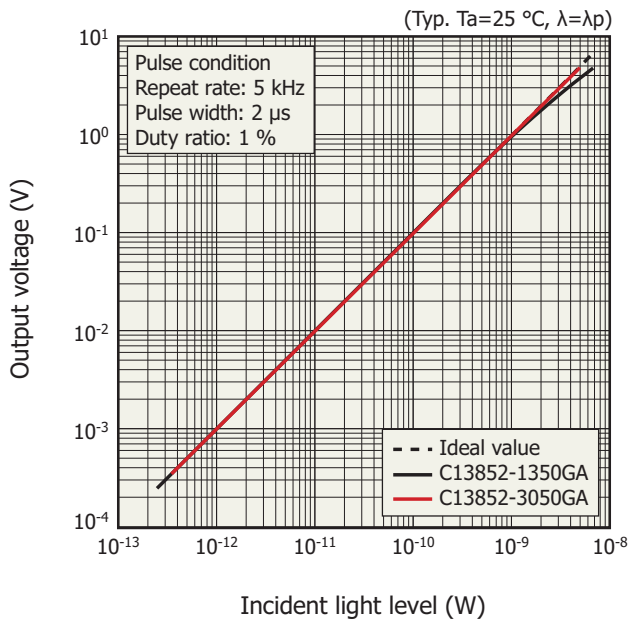
Photoelectric sensitivity vs. wavelength



Frequency characteristics (typical example)

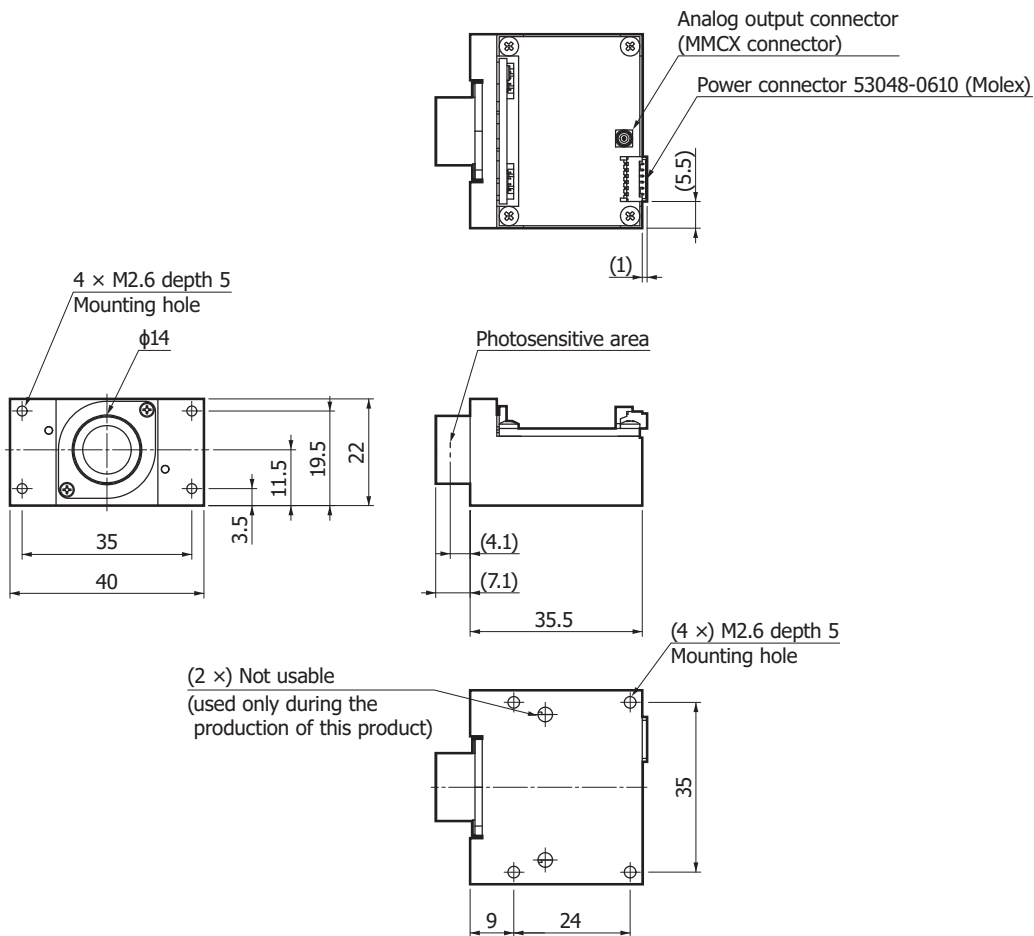


▣ Linearity



KACCB0548EA

▣ Dimensional outline (unit: mm)



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Note: When using this product, provide heat dissipation measures by using heatsinks or through thermal coupling with the enclosure that you will use. Keep the thermal resistance to 3 $^\circ\text{C}/\text{W}$ or less.

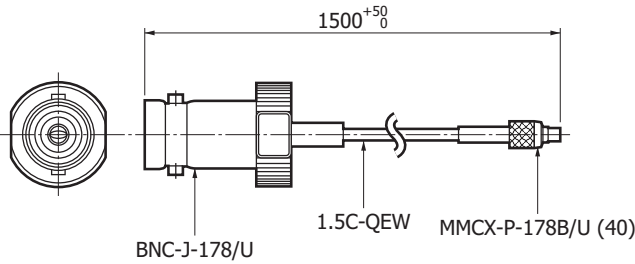
Accessories

- Power cable
- Instruction manual

Options (sold separately)

MMCX-BNC cable A12763

Dimensional outline (unit: mm)



Precautions

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

Related products

MPPC modules C13366 series (GA type)

The C13366 series (GA type) is a module for evaluating thermoelectrically cooled MPPCs. These modules consist of a thermoelectrically cooled MPPC, an amplifier, 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 analog. The modules operate by supplying an external power supply (±5 V). The C13366 series has nearly the same functions as the C13852 series. The C13366 series does not require heat dissipation measures.



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 March 2020.

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