

MPPC[®] modules

[GA type]

C14455 series



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

The C14455 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. It consists of a TE-cooled MPPC, amplifier, 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 analog. The modules operate just by connecting them to an external power supply (± 5 V).

Features

- Built-in TE-cooled MPPC
- For the 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	C14455-1550GA	C14455-3050GA	Unit
Built-in MPPC	-	TE-cooled type MPPC		-
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.

Electrical and optical characteristics (Ta=25 $^{\circ}\text{C}$, $\lambda=\lambda_p$, Vs= ± 5 V, unless otherwise noted)

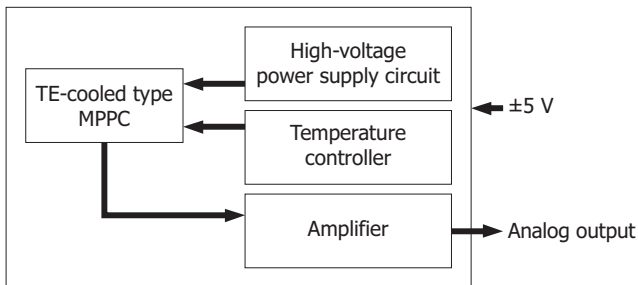
Parameter	Symbol	Condition	C14455-1550GA			C14455-3050GA			Unit
			Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range	λ		350 to 1000			350 to 1000			nm
Peak sensitivity wavelength	λ_p		-	600	-	-	600	-	nm
Element temperature (setting temperature)	Td		-	-20	-	-	-20	-	$^{\circ}\text{C}$
Photoelectric 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	-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

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.

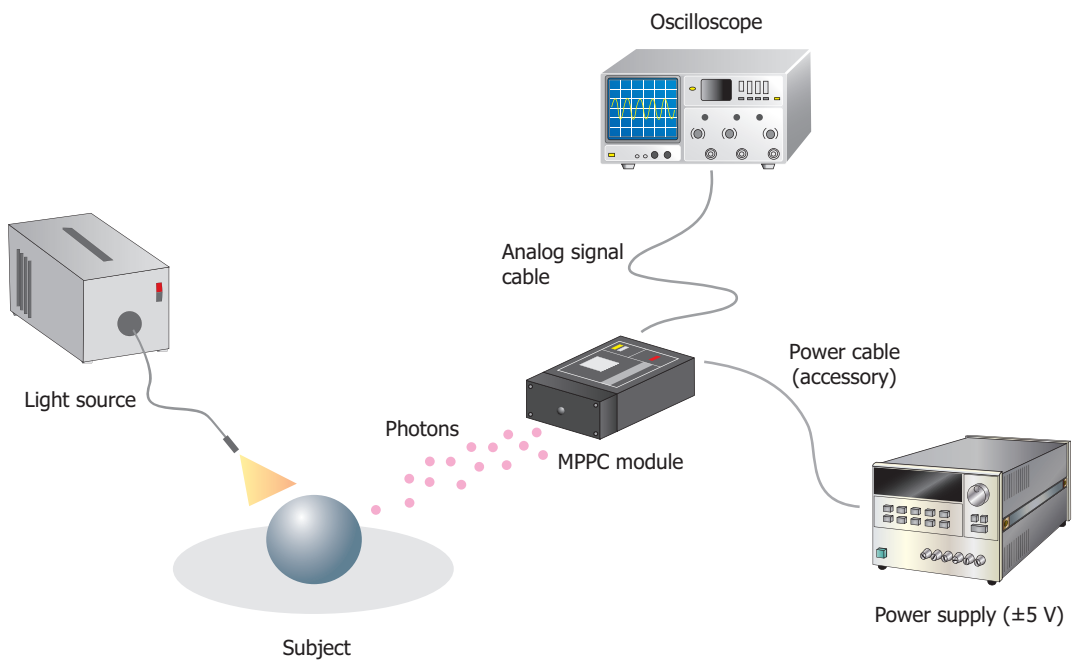
Block diagram



KACCC0982EA

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.

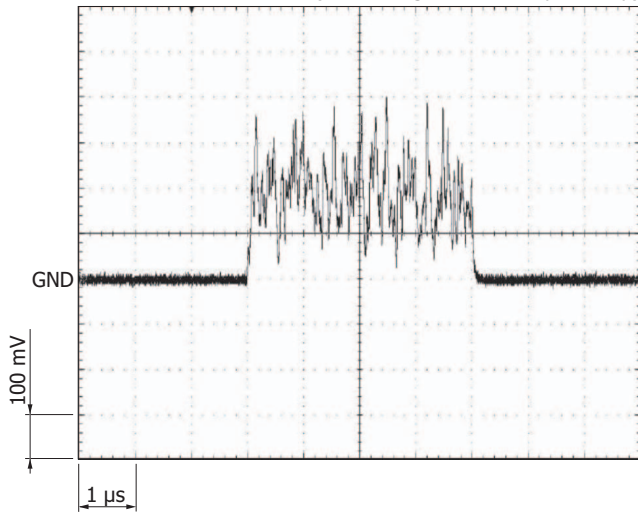


KACCC0684EA

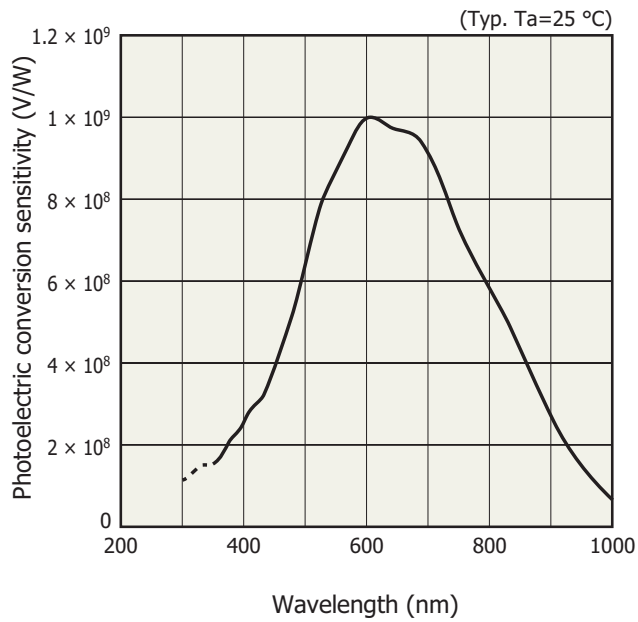
Measurement example

Analog output

(Incident light level: 200 pW, $\lambda = \lambda_p$)

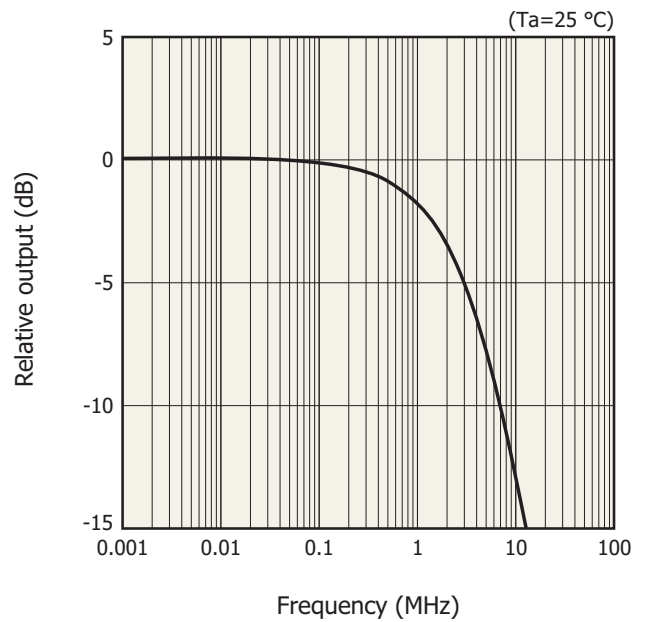


Photoelectric conversion sensitivity vs. wavelength



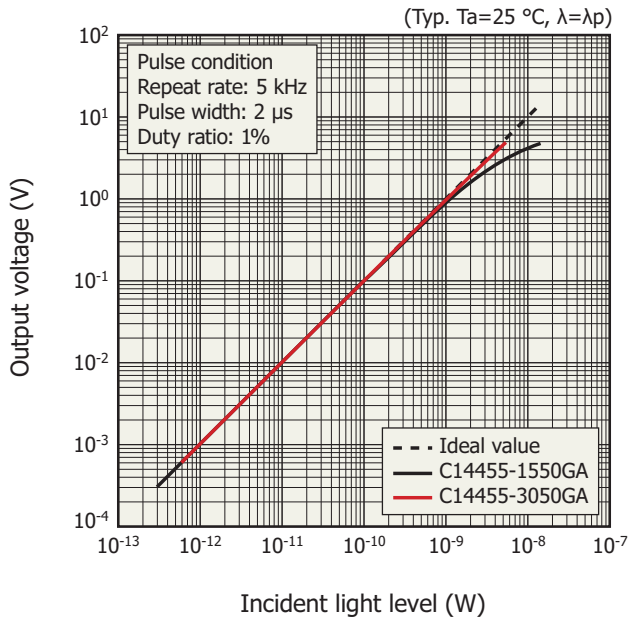
KACCB0573EA

Frequency characteristics (typical example)



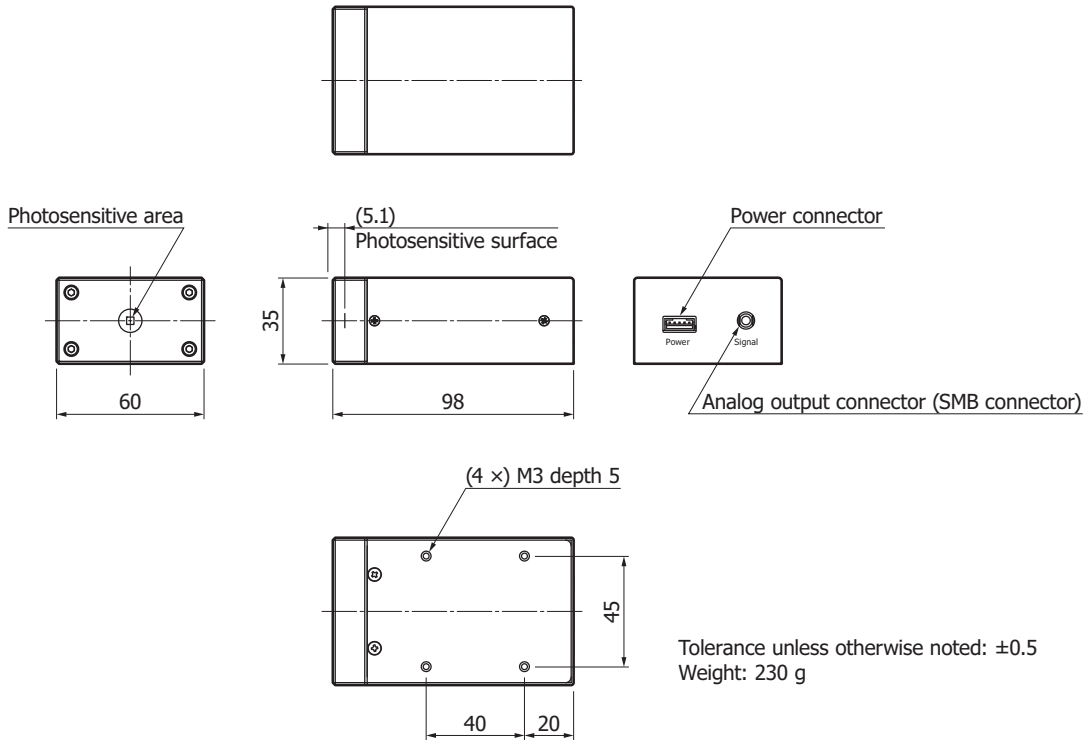
KACCB0574EA

▣ Linearity



KACCB0575EA

▣ Dimensional outline (unit: mm)



KACCA0437EA

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

- Precautions
- Disclaimer

MPPC is a registered trademark of Hamamatsu Photonics K.K.

Information described in this material is current as of October 2019.

Product specifications are subject to change without prior notice due to improvements or other reasons. This document has been carefully prepared and the information contained is believed to be accurate. In rare cases, however, there may be inaccuracies such as text errors. Before using these products, always contact us for the delivery specification sheet to check the latest specifications.

The product warranty is valid for one year after delivery and is limited to product repair or replacement for defects discovered and reported to us within that one year period. However, even if within the warranty period we accept absolutely no liability for any loss caused by natural disasters or improper product use. Copying or reprinting the contents described in this material in whole or in part is prohibited without our prior permission.

HAMAMATSU

www.hamamatsu.com

HAMAMATSU PHOTONICS K.K., Solid State Division

1126-1 Ichino-cho, Higashi-ku, Hamamatsu City, 435-8558 Japan, Telephone: (81)53-434-3311, Fax: (81)53-434-5184

U.S.A.: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, N.J. 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218, E-mail: usa@hamamatsu.com

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8, E-mail: info@hamamatsu.de

France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10, E-mail: infos@hamamatsu.fr

United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, United Kingdom, Telephone: (44)1707-294888, Fax: (44)1707-325777, E-mail: info@hamamatsu.co.uk

North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46)8-509 031 00, Fax: (46)8-509 031 01, E-mail: info@hamamatsu.se

Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6, 20020 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41, E-mail: info@hamamatsu.it

China: Hamamatsu Photonics (China) Co., Ltd.: B1201, Jiaming Center, No.27 Dongsanhuan Beilu, Chaoyang District, 100020 Beijing, P.R.China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866, E-mail: hpc@hamamatsu.com.cn

Taiwan: Hamamatsu Photonics Taiwan Co., Ltd.: 8F-3, No. 158, Section2, Gongdao 5th Road, East District, Hsinchu, 300, Taiwan R.O.C. Telephone: (886)3-659-0080, Fax: (886)3-659-0081, E-mail: info@hamamatsu.com.tw