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NEW

# MPPC® modules



## C13366 series
## (GA type)

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

The C13366 series (GA type) are optical measurement modules capable of detecting low level light. These modules consist of a thermoelectrically cooled MPPC, a signal amplifier circuit, 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. Modules operate just by connecting them to an external power supply (±5 V).

### Features

- **Built-in TE-cooled MPPC [MPPC for precision measurement (new product)]**
- **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 instrument**

### Structure

| Parameter | Symbol | C13366-1350GA | C13366-3050GA | Unit |
|---|---|---|---|---|
| Internal MPPC | - | TE-cooled MPPC | | - |
| 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 | Topr | No dew condensation*1 | -10 to +40 | °C |
| Storage temperature | Tstg | 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.

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

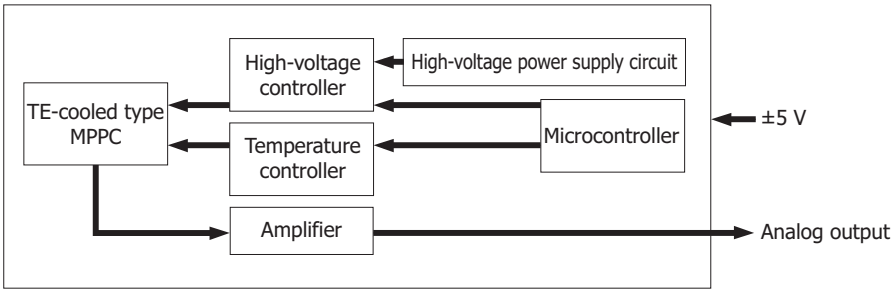
| Parameter | | Symbol | Condition | C13366-1350GA | | | C13366-3050GA | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| Spectral response range | | λ | | 270 to 900 | | | 270 to 900 | | | nm |
| Peak sensitivity wavelength | | λp | | - | 500 | - | - | 500 | - | nm |
| Element temperature (setting temperature) | | Td | | - | -20 | - | - | -20 | - | °C |
| Photoelectric sensitivity | | - | | $0.7 \times 10^9$ | $1.0 \times 10^9$ | $1.3 \times 10^9$ | $0.7 \times 10^9$ | $1.0 \times 10^9$ | $1.3 \times 10^9$ | 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 |

## 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.

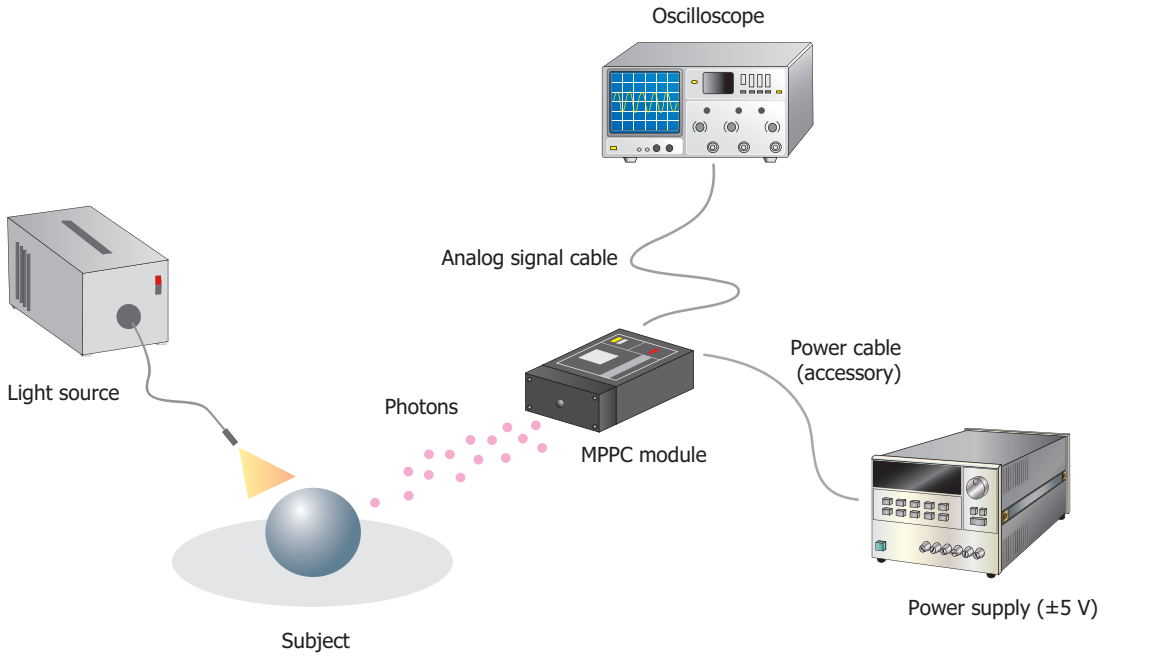
## Block diagram




KACCC0680EA

## Connection example

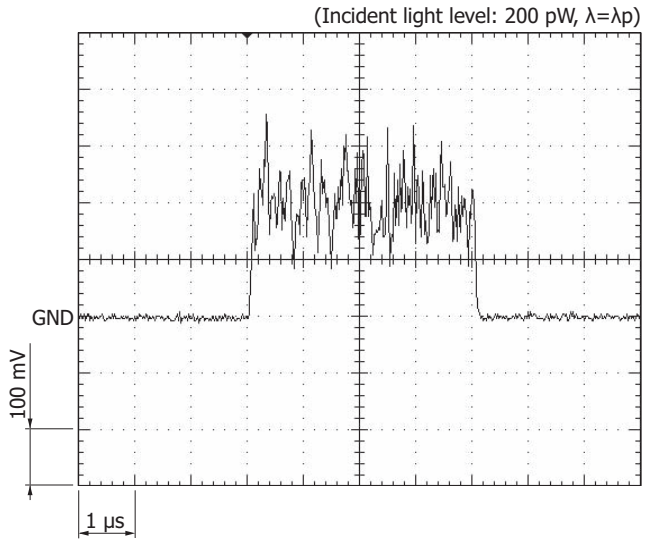
Using the supplied power cable, connect the MPPC module to a power supply. You can monitor the output waveform by connecting the MPPC module to an oscilloscope.



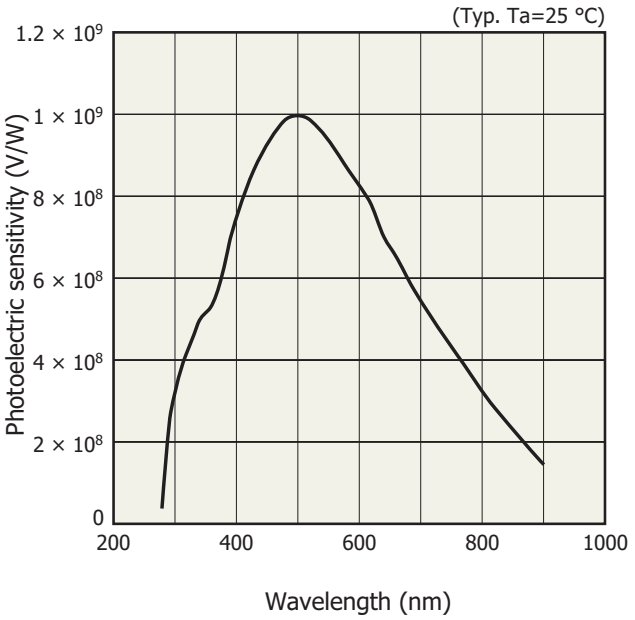

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## Measurement example

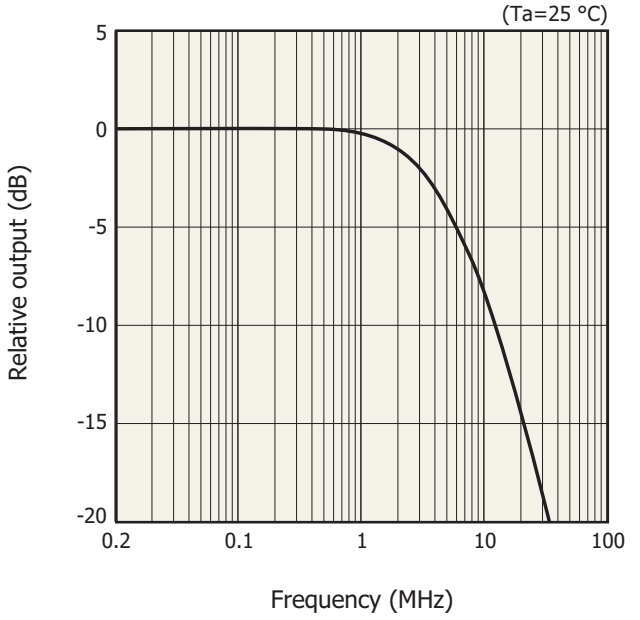
Analog output



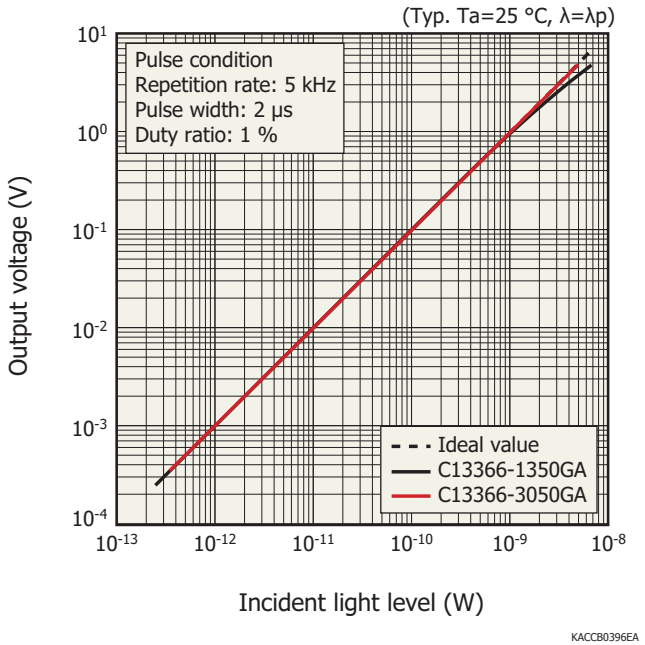

## Photoelectric sensitivity vs. wavelength



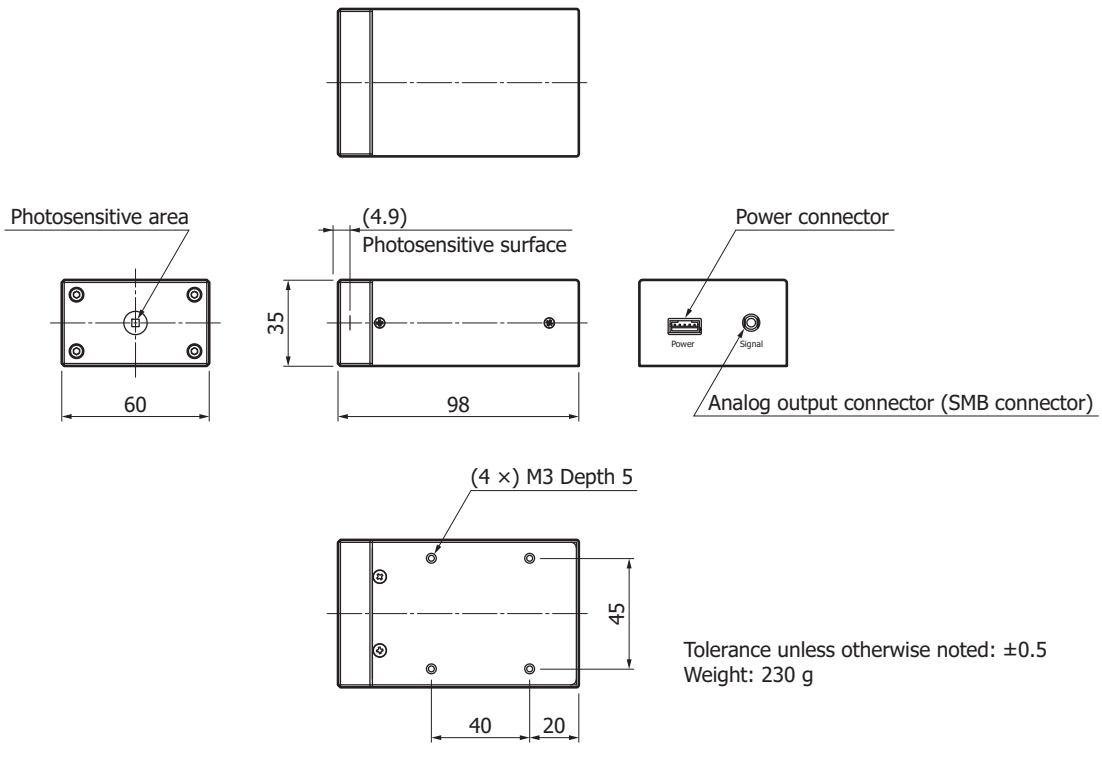

## Frequency response (typical example)



## Linearity




## Dimensional outline (unit: mm)



## Accessories

· Power cable
· Instruction manual

## Options (sold separately)

Coaxial converter adapter A10613 series

The A10613 series is a coaxial adapter that converts the SMB coaxial connector for signal-output on the MPPC module to a BNC or SMA coaxial connector. This adapter allows connecting a BNC or SMA cable to the MPPC module.



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.

## Lineup of MPPC modules

| Type no. | Output | Effective photosensitive area (mm) | Pixel pitch (µm) | Cooling |
|---|---|---|---|---|
| C13365-1350SA | Analog | 1.3 × 1.3 | 50 | Non-cooled |
| C13365-3050SA | | 3.0 × 3.0 | | |
| C13366-1350GA | Digital | 1.3 × 1.3 | | TE-cooled |
| C13366-3050GA | | 3.0 × 3.0 | | |
| C13366-1350GD | Digital | 1.3 × 1.3 | | TE-cooled |
| C13366-3050GD | | 3.0 × 3.0 | | |

## Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions
· Disclaimer

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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.
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