



C14450

Simple evaluation driver circuit for non-cooled MPPC

The C14450 is a driver circuit for simple evaluation of non-cooled visible/near-infrared MPPC and power supply C11204-01 for MPPC. MPPC evaluation is possible by mounting an MPPC in the socket of the sensor board. Various types of MPPCs can be evaluated. MPPC with flexible cable (for evaluating surface mount type MPPC) can also be connected by using the FFC connector of the power supply board. The PZC (pole-zero cancellation) circuit is built-in to reduce the falling edge decay time of MPPC.

The power supply board is equipped with the power supply C11204-01 that provides the operating voltage for MPPC. It operates just by connecting to an external power supply (± 5 V). It is also equipped with a USB interface that can be used to set the MPPC supply voltage and temperature compensation coefficient from a PC running the supplied sample software.

Features

- Enables the evaluation of non-cooled visible/near-infrared MPPC
- Sensor board with a socket for mounting an MPPC with leads
- Connection possible to MPPC with flexible cable
- Equipped with high-accuracy power supply C11204-01
- MPPC supply voltage and temperature compensation coefficient can be set from PC.
- Selectable amplifier usage (default setting: used)
- Selectable load resistance 50 Ω or 1 k Ω
- Built-in PZC circuit (default setting: PZC constant is set to S14420-3050MG)
- Analog output

Note: MPPC is sold separately.

Applications

- Simple initial evaluation of MPPC

Compatible MPPCs

| Type no. | Number of channels (ch) | Effective photosensitive area (mm) | Pixel pitch (μm) | Number of pixels |
|---------------|-------------------------|------------------------------------|-------------------------------|------------------|
| S14420-1525MG | 1 | $\phi 1.5$ | 25 | 2876 |
| S14420-1550MG | | | 50 | 724 |
| S14420-3025MG | | $\phi 3.0$ | 25 | 11344 |
| S14420-3050MG | | | 50 | 2836 |

Absolute maximum ratings

| Parameter | Symbol | Condition | Specification | Unit |
|-----------------------|-----------|-----------------------|---------------|--------------------|
| Supply voltage | V_s | | ± 5.8 | V |
| Operating temperature | T_{opr} | No dew condensation*1 | -20 to +60 | $^{\circ}\text{C}$ |
| Storage temperature | T_{stg} | No dew condensation*1 | -20 to +80 | $^{\circ}\text{C}$ |

*1: When there is a temperature difference between a product and the surrounding area in high humidity environments, 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 (Ta=25 °C, unless otherwise noted)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-------------------|--------|----------------------------|-------|-----------|-------|------|
| Supply voltage*2 | Vs | | ±4.75 | ±5 | ±5.25 | V |
| Load resistance*3 | RL | When amplifier is not used | - | 50 or 1 k | - | Ω |

*2: Use a power supply with 300 mA or higher output.

*3: The default setting is 50 Ω. When using an amplifier, set the load resistance to 50 Ω.

➤ Electrical characteristics (Ta=25 °C, Vs=±5 V, unless otherwise noted)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit | |
|------------------------------|--------|---------------------------------------------------|---------------------------------|----------|------|------|----|
| Current consumption | Is | Vo=72 V, no load, when communicating with a PC | +5 V | +36 | +48 | +60 | mA |
| | | | -5 V | -10 | -15 | -20 | |
| MPPC supply voltage range*4 | Vo | No load | - | 20 to 80 | - | V | |
| Setting voltage resolution*5 | - | | - | 10 | - | mV | |
| Setting voltage error | - | Vo=72 V, no load | - | ±10 | ±40 | mV | |
| Voltage monitor error | - | Vo=72 V, no load | - | ±10 | - | mV | |
| Current monitor error | - | Vo=72 V, Io=1.0 mA | - | ±0.05 | - | mA | |
| Cutoff frequency | High | When amplifier (gain: 20) is used, RL=50 Ω, -3 dB | - | 40 | - | MHz | |
| | Low | | - | DC | - | | |
| PZC constant*6 | - | | Set for S14420-3050MG | | | - | |
| Mounted temperature sensor | - | | LM94021BIMG (Texas Instruments) | | | - | |
| Interface*7 | - | | USB 2.0 (Full Speed) | | | - | |

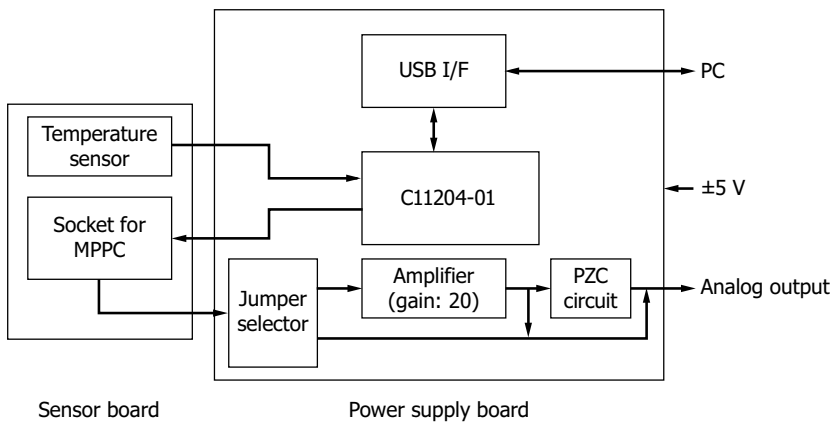
*4: The MPPC operating voltage varies depending on the product. Refer to the value provided with the product.

*5: When the sample software is used

*6: The default setting is "Amplifier → PZC circuit" jumper.

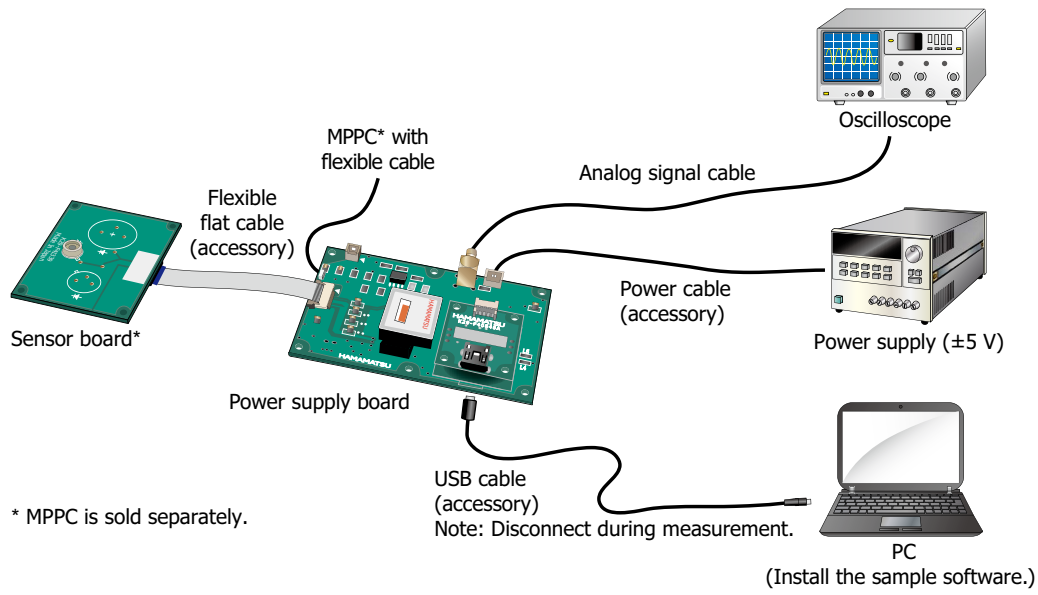
*7: After you set the operating voltage, remove the USB cable from the power supply board to eliminate any noise effects from the PC.

➤ Block diagram



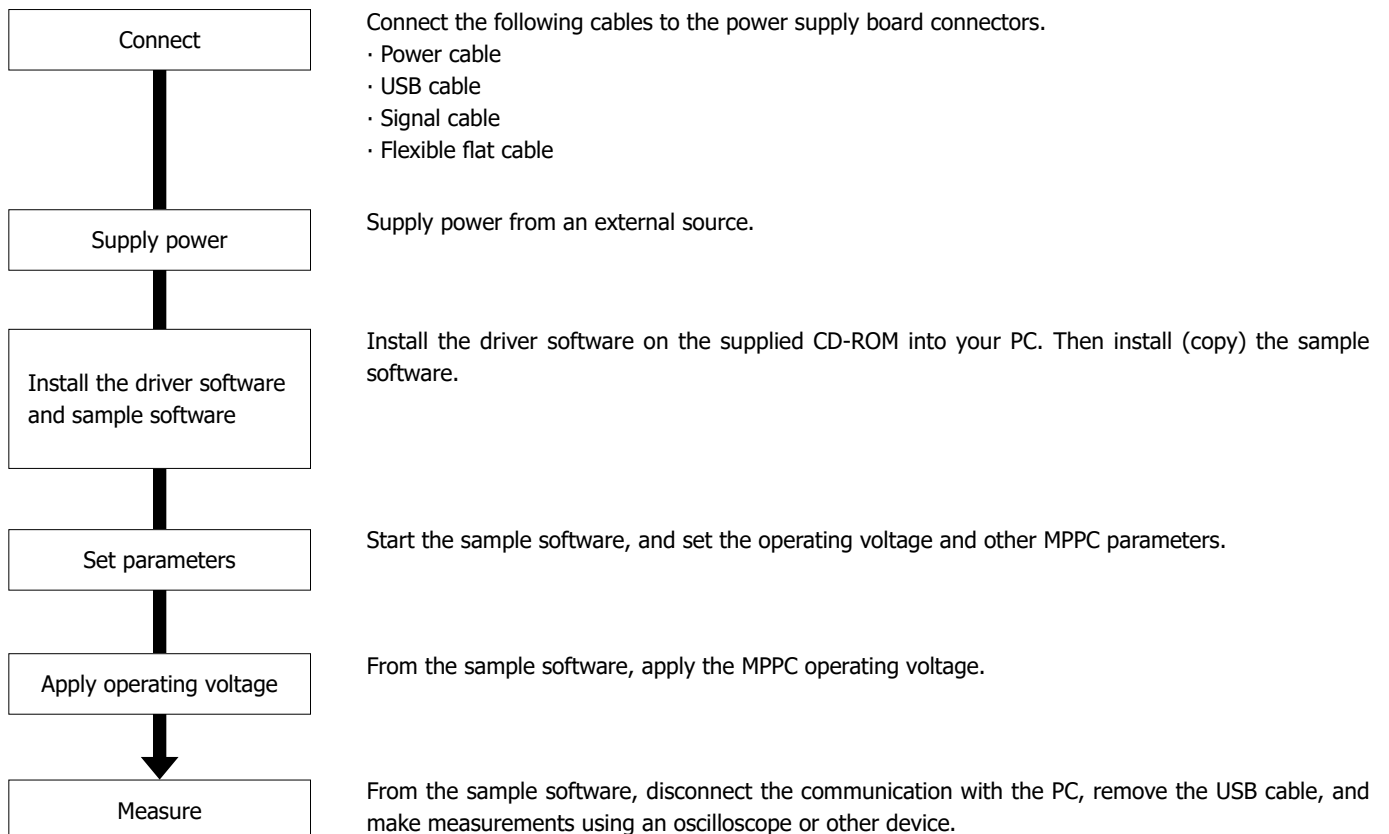
KACCC0986EA

Connection example



KACCC0989EB

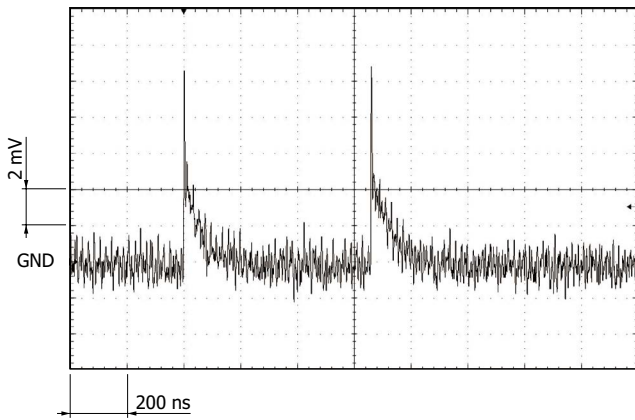
Procedure



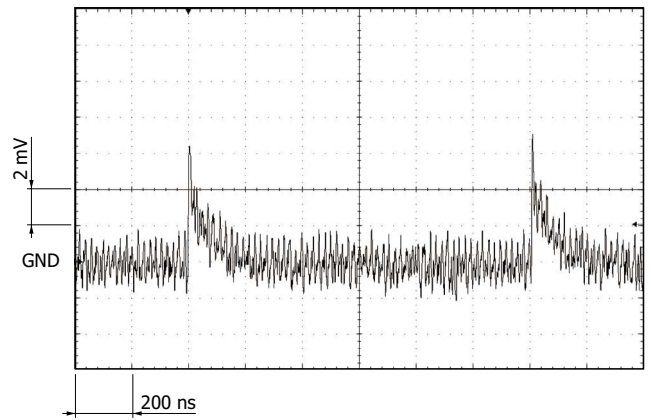
■ Measurement examples [using amplifier, gain: approx. 20x (default setting), $R_L=50 \Omega$]

Dark state

■ S14420-1550MG

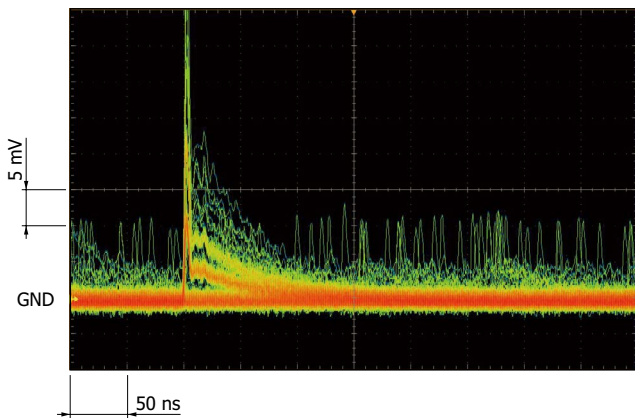


■ S14420-3050MG

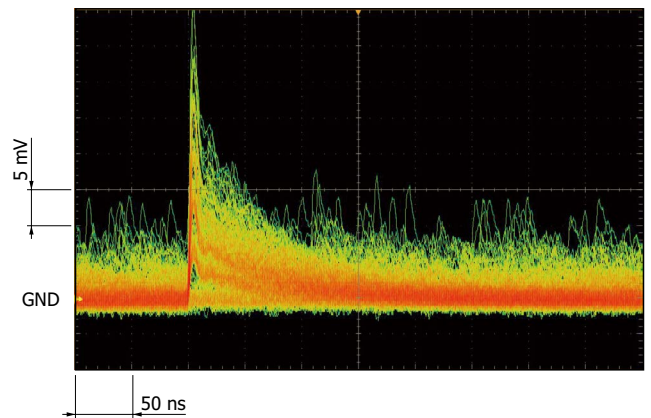


Impulse light (wavelength: 650 nm)

■ S14420-1550MG

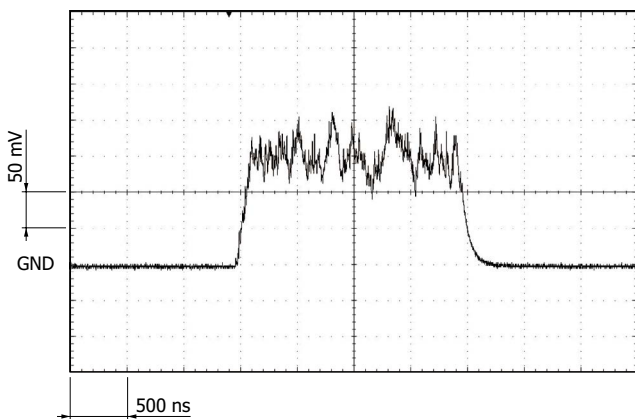


■ S14420-3050MG

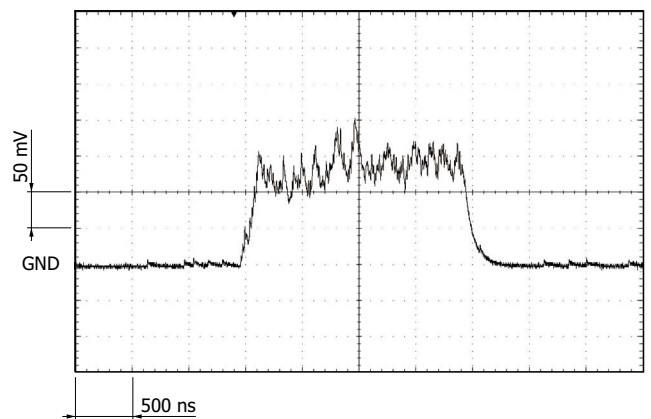


Pulse light (wavelength: 650 nm, pulse width: 2 μ s)

■ S14420-1550MG

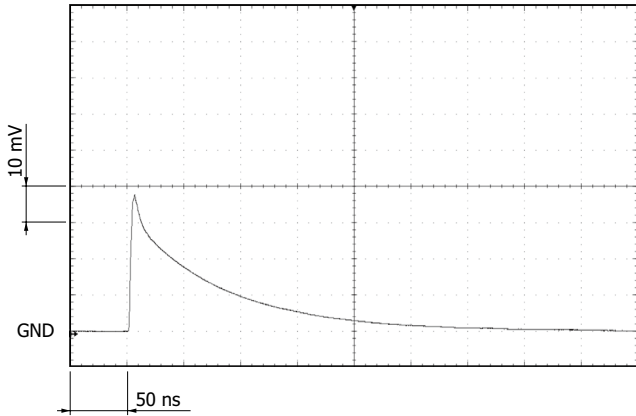


■ S14420-3050MG

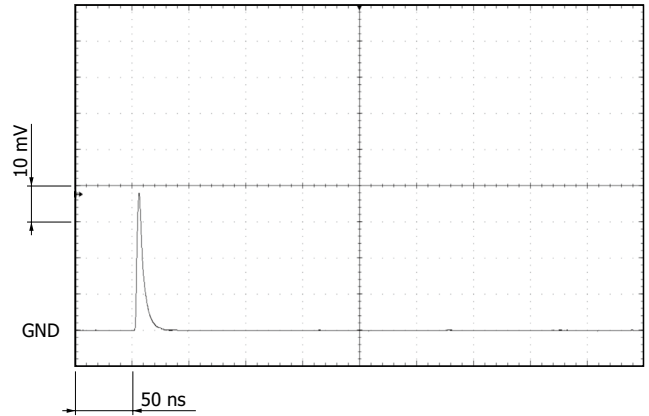


Reduction of falling time by PZC circuit

■ S14420-3050MG (amplifier only)



■ S14420-3050MG (amplifier → PZC circuit)



■ Sample software (included)

The sample software*8 is designed to simplify the MPPC evaluation. You can use the sample software to set the operating voltage and temperature compensation coefficient. The sample software has been confirmed to work with Microsoft .NET Framework 3.5 and later. The sample software was created on Microsoft® Visual Basic® 2008 Express Edition SP1.

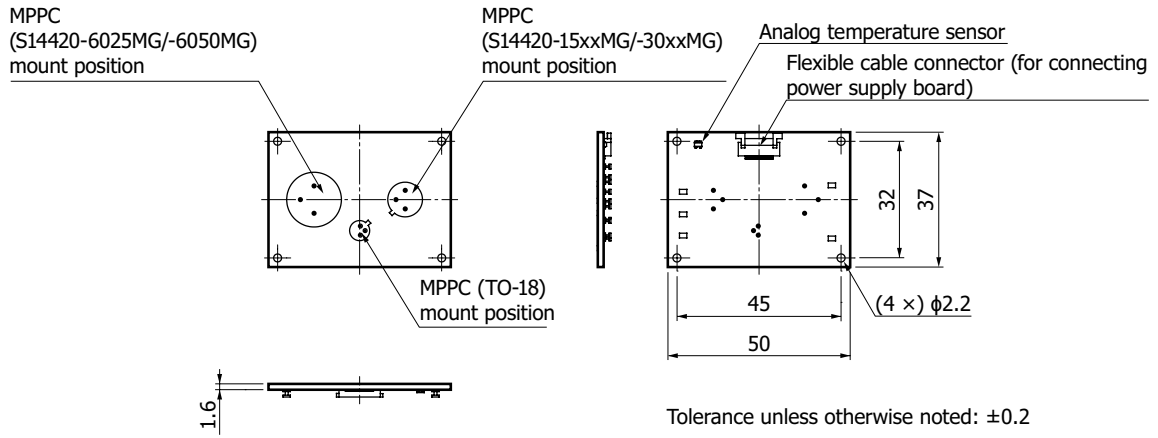
*8: Compatible OS

Microsoft® Windows® 10 (32-bit, 64-bit)

Note: Microsoft, Windows, Visual Studio, and Visual Basic are registered trademarks of Microsoft Corporation in the United States and/or other countries.

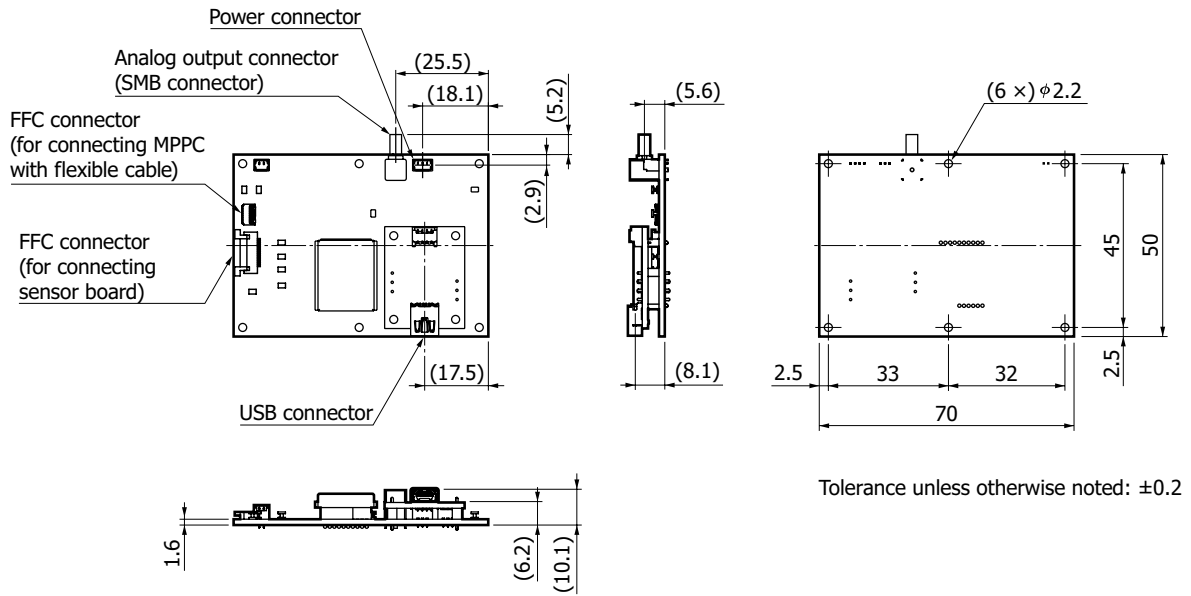
Dimensional outlines (unit: mm)

Sensor board



KACCA0439EA

Power supply board



KACCA0363EA

Accessories

- Power cable
- Operating voltage check cable
- USB cable
- Flexible flat cable (50 mm)
- CD-ROM (instruction manual, driver software, sample software, etc.)
- Quick start guide

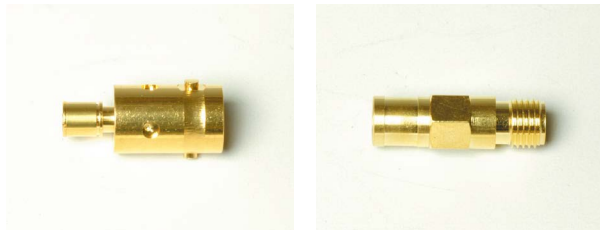
Precautions

- For cleaning the product, wipe using a clean, soft, dry cloth. Do not use organic solvents such as thinner and acetone.
- If the product and the PC are connected with a USB cable, do not remove the USB cable while the sample software is communicating.
- This product is a simple MPPC evaluation circuit. Do not integrate this product in your device.

Options (sold separately)

Coaxial conversion adapter A10613 series

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)

Related information

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

- Precautions
- Disclaimer

Information described in this material is current as of February 2023.

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.

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