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Driver circuit for MPPC®

C14191

Simple evaluation driver circuit for non-cooled near infrared MPPC

The C14191 is a driver circuit for simple evaluation of non-cooled MPPC (S13720-1325CS). MPPC evaluation is possible by mounting the MPPC in the socket of the sensor board. The PZC (pole-zero cancellation) circuit is built-in to reduce the falling edge decay time of MPPC.

The power supply circuit board is equipped with the C11204-01 power supply for MPPC 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 operating voltage and temperature compensation coefficient from a PC running the supplied sample software.

Features

- **Enables the evaluation of non-cooled near infrared MPPC (S13720-1325CS)**
- **Sensor circuit board with a socket for mounting an MPPC with leads**
- **Equipped with high-accuracy power supply C11204-01 for MPPC**
- **MPPC supply voltage and temperature compensation coefficient can be set on a PC.**
- **Selectable amplifier usage (initial condition: not used)**
- **Built-in PZC circuit (initial condition: PZC constant is set to S13720-1325CS.)**
- **Analog output**

Note: MPPC is sold separately.

Applications

- **Simple initial evaluation of MPPC**

Compatible MPPC

Type no.	Number of channels (ch)	Effective photosensitive area (mm)	Pixel pitch (µm)	Number of pixels
S13720-1325CS	1	1.3 × 1.3	25	2668

Absolute maximum ratings

Parameter	Symbol	Condition	Specification	Unit
Supply voltage	Vs		±5.8	V
Operating temperature	Topr	No dew condensation[1]	-20 to +60	°C
Storage temperature	Tstg	No dew condensation[1]	-20 to +80	°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 initial setting is 50 Ω. When using an amplifier, set the load resistance to 50 Ω.

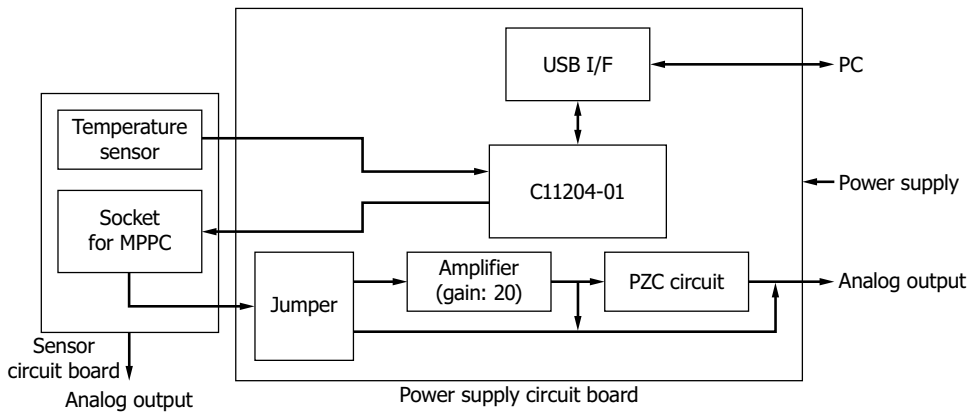## Electrical characteristics (Typ. Ta=25 °C, Vs=±5 V, unless otherwise noted)

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 band	fc	When amplifier (gain: 20) is used RL=50 Ω, -3dB		-	40	-	MHz
	Low band				-	DC	-	
Mounted temperature sensor		-			LM94021BIMG (Texas Instruments)			-
Interface*6		-			USB 2.0 (Full Speed)			-

*4: The MPPC operating voltage varies depending on the product. Refer to the value provided with the product.
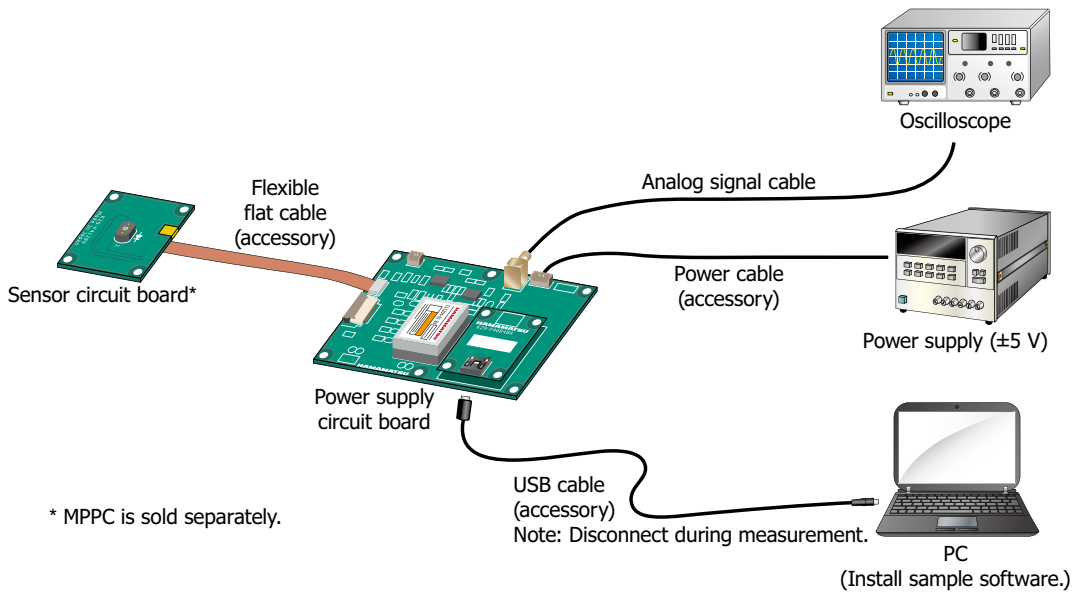*5: When using sample software
*6: After you set the operating voltage, remove the USB cable from the driver circuit for MPPC to eliminate any noise effects from the PC.
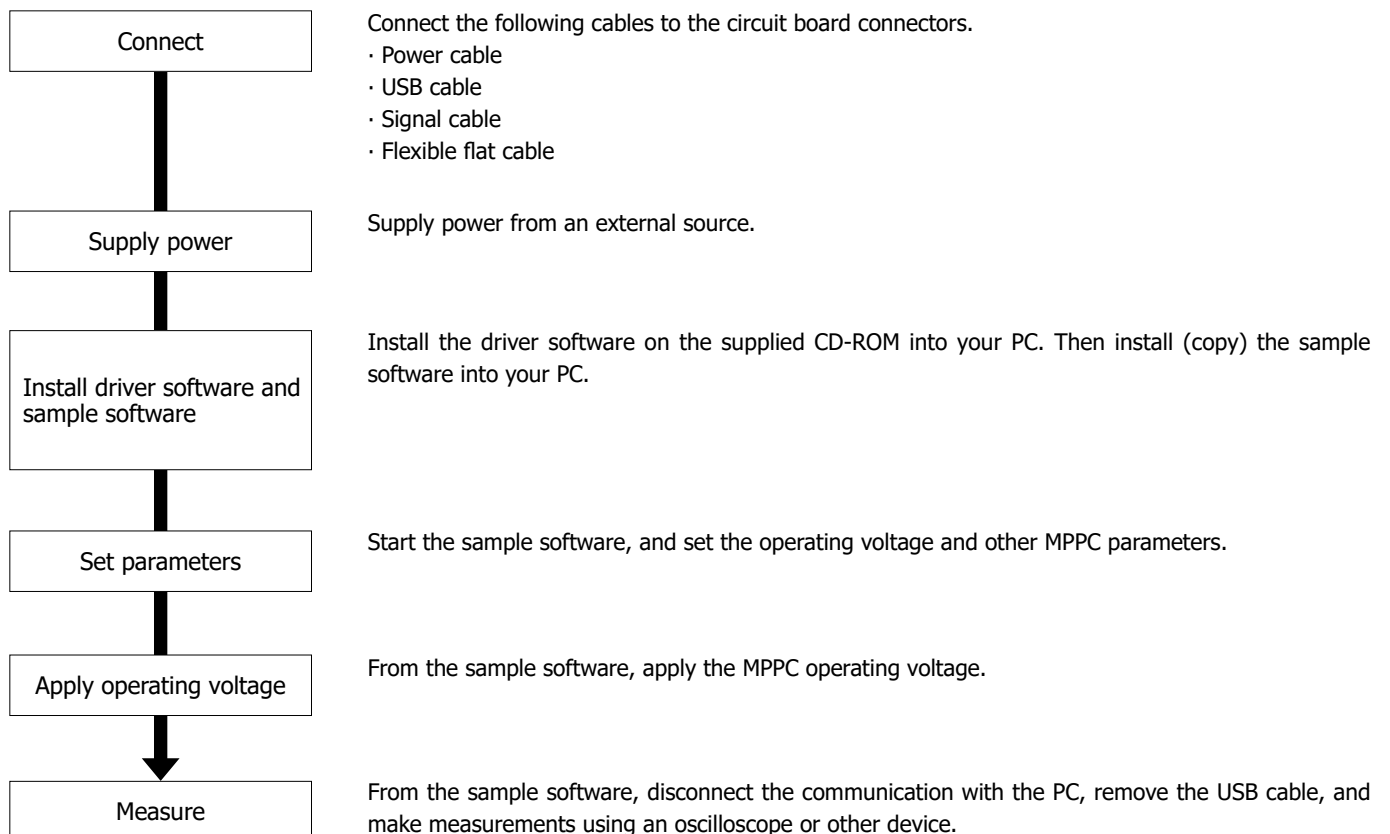
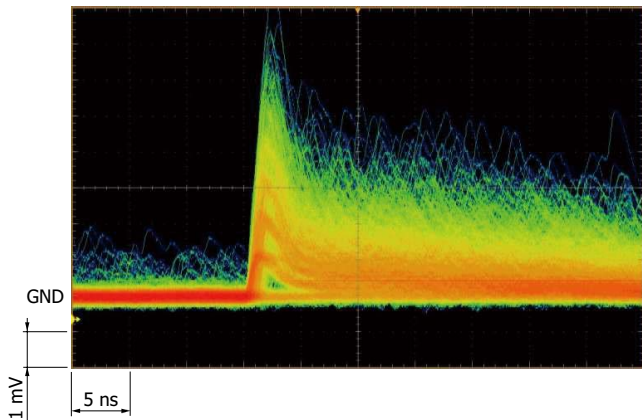## Block diagram

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Connection example

Oscilloscope

Analog signal cable

Flexible flat cable (accessory)

Power cable (accessory)

Power supply (±5 V)

Sensor circuit board*

Power supply circuit board

USB cable (accessory)
Note: Disconnect during measurement.

* MPPC is sold separately.

PC (Install sample software.)

KACCC0962EA

Procedure

Connect	Connect the following cables to the circuit board connectors. · Power cable · USB cable · Signal cable · Flexible flat cable
Supply power	Supply power from an external source.
Install driver software and sample software	Install the driver software on the supplied CD-ROM into your PC. Then install (copy) the sample software into your PC.
Set parameters	Start the sample software, and set the operating voltage and other MPPC parameters.
Apply operating voltage	From the sample software, apply the MPPC operating voltage.
Measure	From the sample software, disconnect the communication with the PC, remove the USB cable, and make measurements using an oscilloscope or other device.

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Measurement examples (when amplifier is not used, output from sensor circuit board, R_L=50 Ω)

Impulse light (wavelength: 655 nm)	Output rising waveform

GND

1 mV | 5 ns

GND

1 ns
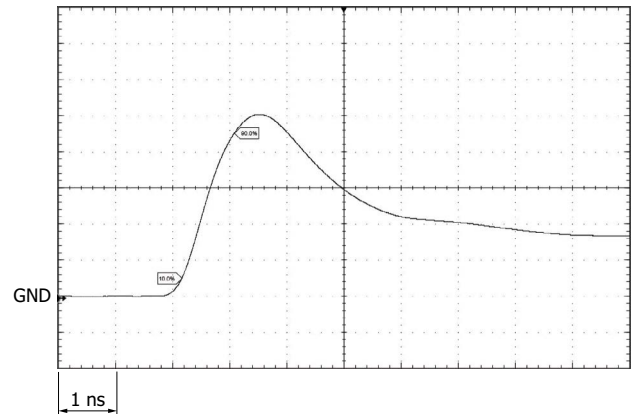
Sample software (included)

The sample software[7] 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.

*7: 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 circuit board

MPPC (S13720-1325CS)
mount position

Flexible cable connector

Signal connector
(MMCX connector)

25

30

(4 ×) φ2.2

25

30

1.6
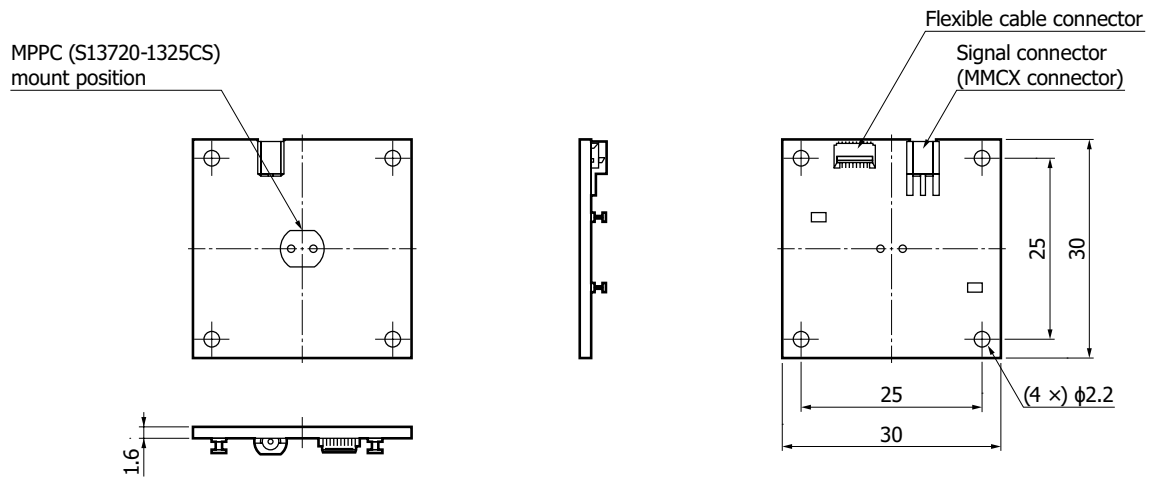
Tolerance unless otherwise noted: ±0.2

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Power supply circuit board

Power connector 53047- 0310
(Molex)

Analog output connector
(SMB connector)

FFC connector
(for connecting a sensor board)

(25.5)

(18.1)

(5.5)

(2.9)

(5.6)

(6 ×) φ2.2

45

50

USB connector

(17.5)

(8.1)

2.5

33

32

2.5

70

1.6

(6.2)

(10.2)

Tolerance unless otherwise noted: ±0.2

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5
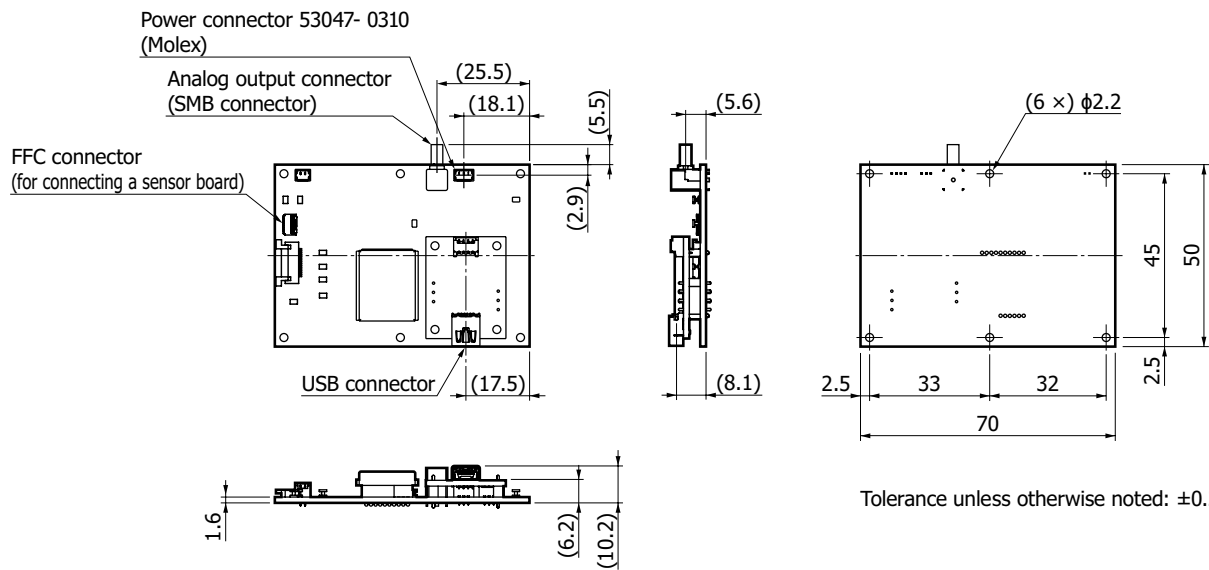
Accessories

· 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

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)

Related information

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

■ Precautions
· Disclaimer

The content of this document is current as of December 2021.

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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