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MPPC® modules

C15522 series

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

The C15522 series are optical measurement modules capable of detecting low level light using its built-in MPPC that features wide dynamic range. These modules consist of an MPPC, a signal amplifier circuit, a high-voltage power supply circuit, and a temperature compensation 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 wide dynamic range type MPPC**
- **High sensitivity in the short wavelength range**
- **Low noise equivalent power**
- **Built-in temperature compensation circuit**
- **Compact and lightweight**
- **Analog output**

Applications

- **Flow cytometry**
- **Low-level-light measurement**
- **Fluorescence measurement**
- **Analytical instrument**

Structure

Parameter	Symbol	C15522-1310SA	C15522-1315SA	C15522-3010SA	C15522-3015SA	Unit
Effective photosensitive area	-	1.3 × 1.3		3 × 3		mm
Pixel pitch	-	10	15	10	15	μm
Number of pixels	-	16663	7284	89984	39984	-

Absolute maximum ratings

Parameter	Symbol	Condition	Value	Unit
Supply voltage	Vs		±6	V
Operating temperature	Topr	No dew condensation*1	-10 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 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)

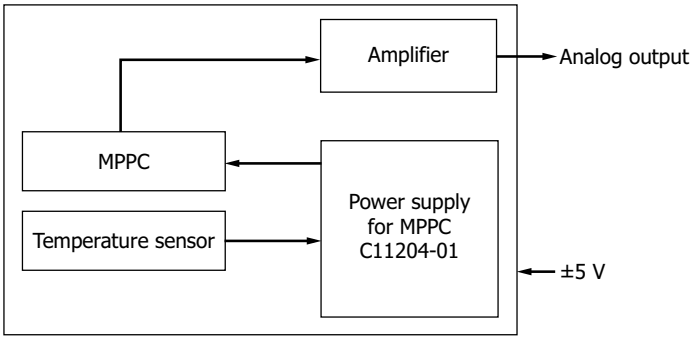
Parameter		Symbol	Condition	C15522-1310SA			C15522-1315SA			C15522-3010SA			C15522-3015SA			Unit
				Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Spectral response range		λ		290 to 900			290 to 900			290 to 900			290 to 900			nm
Peak sensitivity wavelength		λp		-	500	-	-	500	-	-	500	-	-	500	-	nm
Temperature stability of output voltage		-	Ta=25 ± 10 °C	-	-	±5	-	-	±5	-	-	±5	-	-	±5	%
Photoelectric sensitivity		-	λ=λp	0.3 × 10^8	0.4 × 10^8	0.5 × 10^8	0.7 × 10^8	1.0 × 10^8	1.3 × 10^8	0.3 × 10^8	0.4 × 10^8	0.5 × 10^8	0.7 × 10^8	1.0 × 10^8	1.3 × 10^8	V/W
Cutoff frequency	High band	fc	-3 dB, sine wave	10	15	-	7	10	-	10	15	-	7	10	-	MHz
	Low band			DC			DC			DC			DC			-
Noise equivalent power		NEP	Dark state	-	1.2	2.4	-	0.8	1.6	-	2.7	5.4	-	1.8	3.6	fW/Hz$^{1/2}$
Minimum detection limit		-		-	5.4	10.8	-	2.5	5.0	-	10	20	-	5.7	11.4	pW rms
Maximum output voltage		-		-	4.7	-	-	4.7	-	-	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	-	+50	+250	mA
		-Vs	-	-20	-40	

*2: A power supply with 300 mA or higher output must be used.

Block diagram



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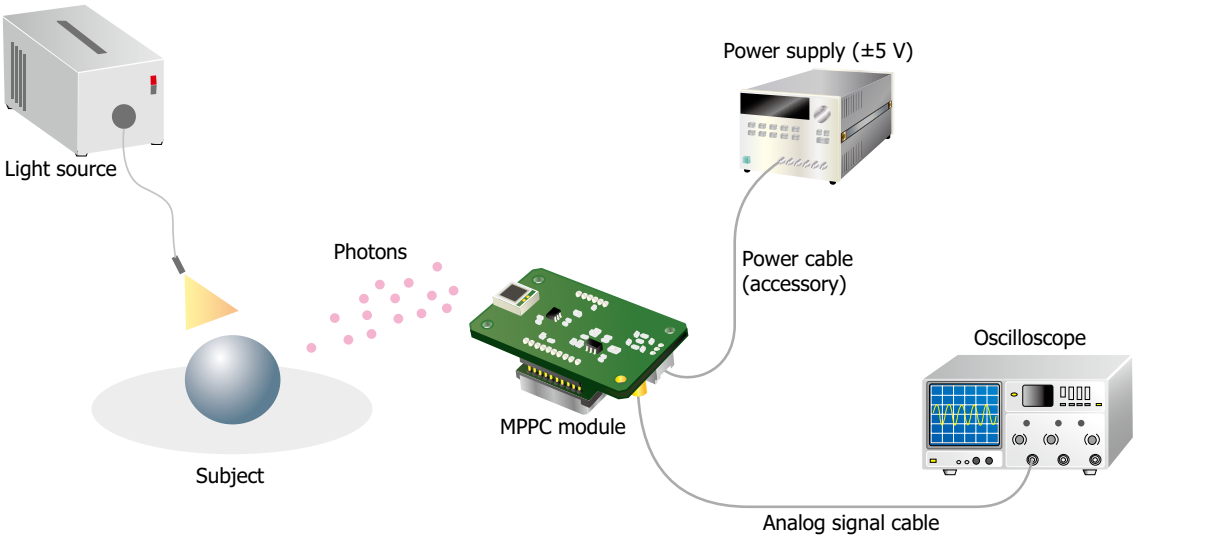
Connection example

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 osilloscope.



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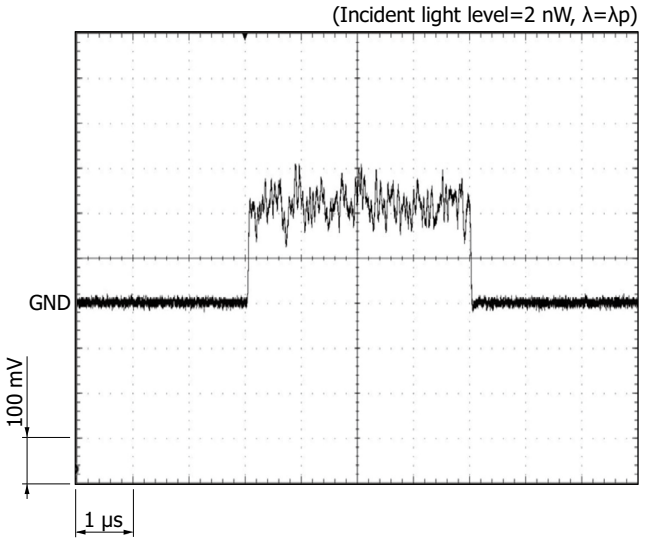
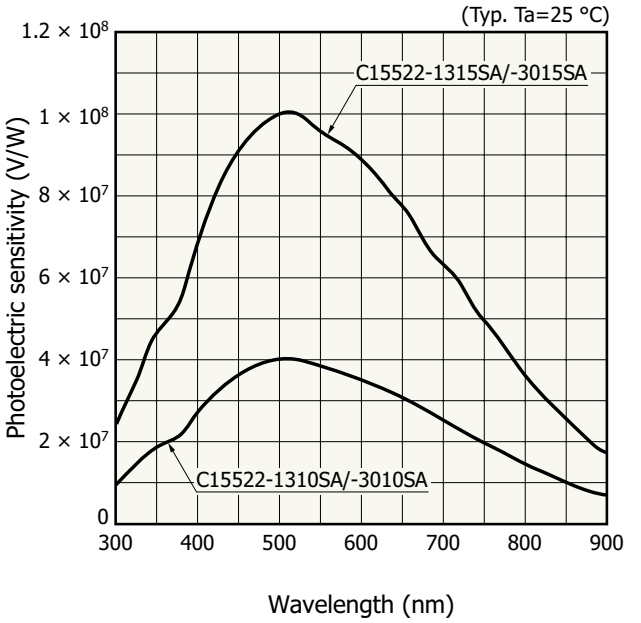
Measurement example

Analog output



Photoelectric conversion sensitivity vs. wavelength



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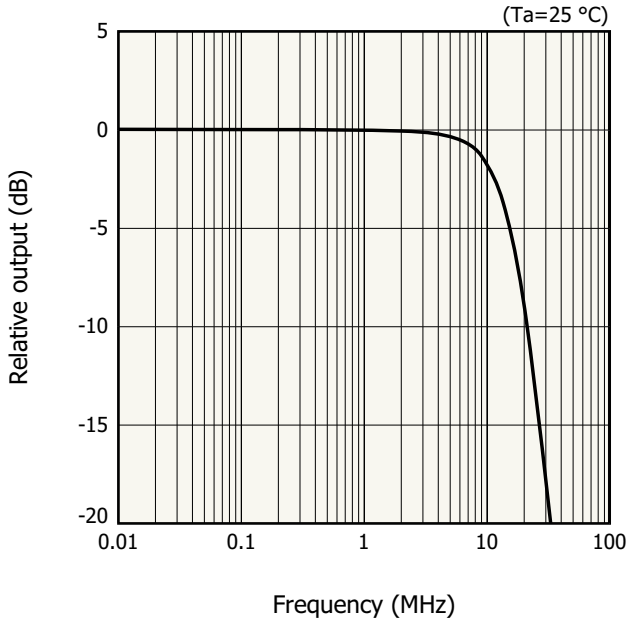
Frequency response (typical example)



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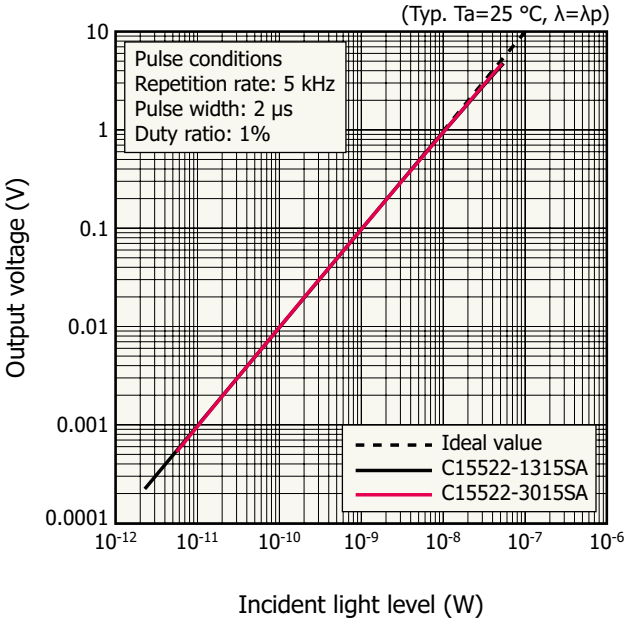
Linearity



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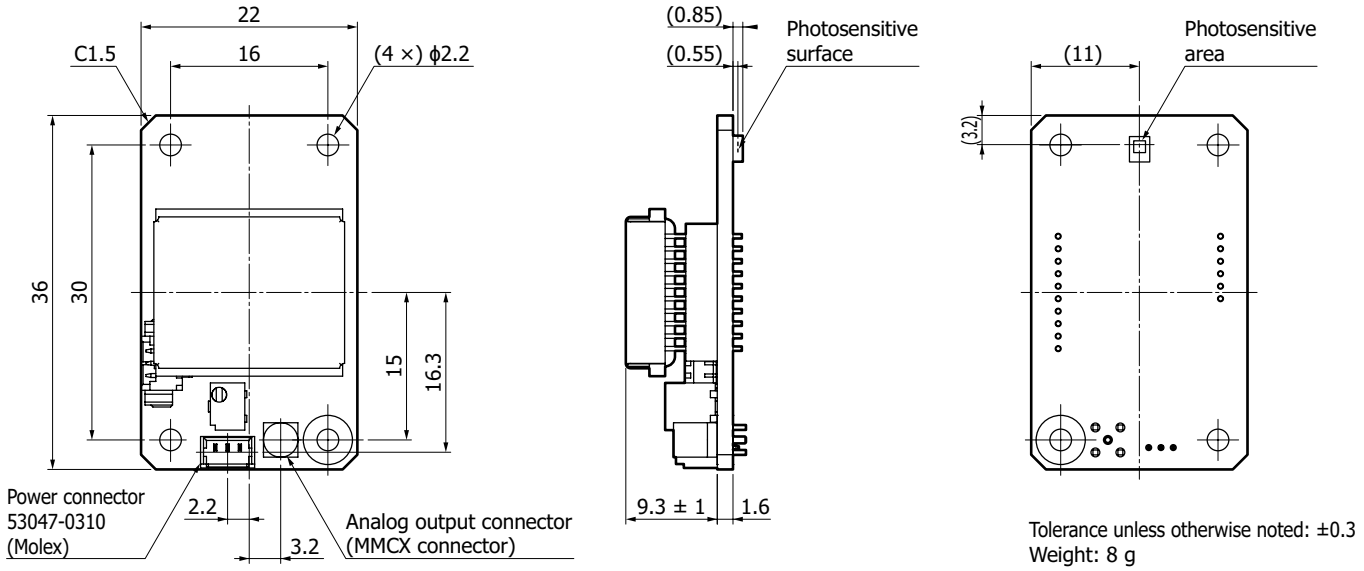
Dimensional outlines (unit: mm)

C15522-1310SA/-1315SA



Tolerance unless otherwise noted: ±0.3
Weight: 8 g

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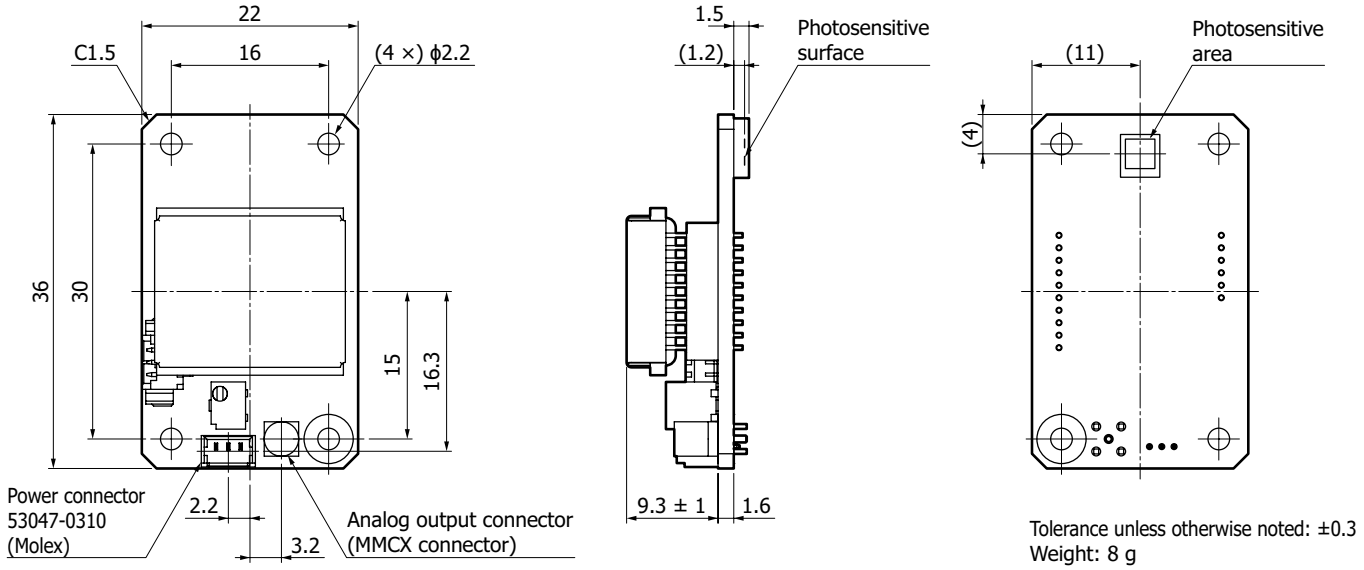
C15522-3010SA/-3015SA



Tolerance unless otherwise noted: ±0.3
Weight: 8 g

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Accessories

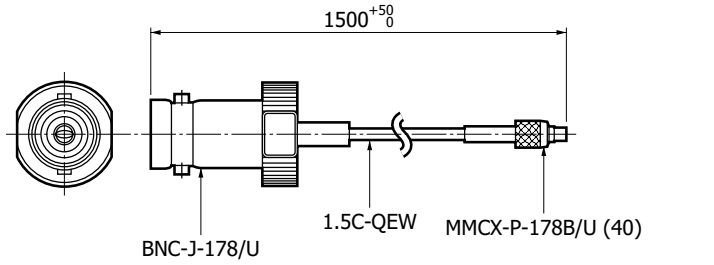
· Power cable

· Instruction manual

Options (sold separately)

MMCX-BNC cable A12763

■ Dimensional outline (unit: mm)



Related products

MPPC modules C15524 series

The C15524 series are optical measurement modules with a wide dynamic range type MPPC that can detect low-level light. These modules consist of an MPPC, an amplifier, a high-voltage power supply circuit, and a temperature compensation circuit. The signal output is analog. The MPPC of the C15524 series has a flexible cable, but that of the C15522 series is mounted on the circuit board.

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 May 2022.
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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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