

# Photosensor amplifier



C9051

## Small on-board type current-to-voltage conversion amp

The C9051 is a current-to-voltage conversion amplifier specifically designed for low-light-level measurement using a photodiode (sold separately).

### Features

- Small on-board type for easy assembly
- Usable with photodiodes having large terminal capacitance
- Conversion impedance:  $1.0 \times 10^8$  V/A
- Single +12 V supply voltage operation
- Small board size: 50 (W) × 50 (D) × 19 (H) mm

### Applications

- Low-light-level detection
- Low-light-level optical power meters
- DC light monitors

### Absolute maximum ratings (Ta=25 °C unless otherwise noted)

Parameter	Symbol	Value	Unit
Maximum voltage	Vs max	+16	V
Operating temperature*1	Topr	0 to +50	°C
Storage temperature*1	Tstg	-10 to +60	°C

\*1: No dew condensation

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 °C, Vs=+12 V)**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	
Conversion impedance	Zt		-	1 × 10 <sup>8</sup>	-	V/A	
Cutoff frequency	fc	C9051 board, -3 dB	Lower	-	DC	-	Hz
			Upper	-	16	-	
Input photocurrent	Ip	*2	0	-	40	nA	
Maximum output amplitude voltage	Vfs	RL=1 kΩ	4	5	-	V	
Output offset voltage	Vos	C9051 board	-5	-	5	mV	
Noise equivalent current	-	Without photodiode, f=1 Hz	-	-	5 × 10 <sup>-13</sup>	A/Hz <sup>1/2</sup>	
Output noise voltage	Vn	Without photodiode, full bandwidth	-	-	0.5	mVp-p	
Output resistance	Ro		-	100	-	Ω	
Input capacitance	CIN		-	-	15	nF	
Capacitive load	CL		-	-	1000	pF	
Current consumption	Is	Without photodiode	-	-	20	mA	
Operating supply voltage	Vs	*3	+9	+12	+15	V	
Power supply ripple voltage		*4	-	-	200	mVp-p	

\*2: The connection method of the photodiode to the C9051 is anode grounding and cathode connection. Photocurrent input from the photodiode is negative with respect to the amplifier.

\*3: If not using the AC adapter that comes with the C9051, set the power supply voltage within this range. A DC plug is required for power input to the C9051. Set the center of the plug to the positive power supply.

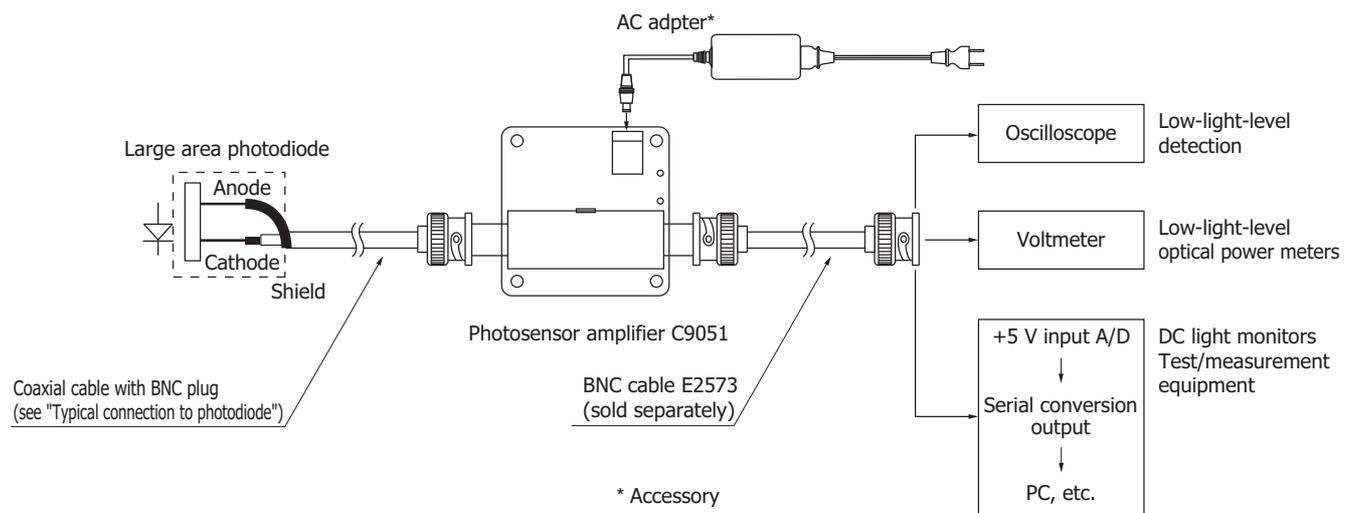
\*4: This is the maximum ripple allowed for the power supply when operated with all loads listed on the power supply specification sheet, excluding switching noise that might appear superimposed on the ripple. When not using the AC adapter that comes with the C9051, always make sure the power supply output does not contain excessive ripple and noise.

**Usable photodiodes**

Any single-element photodiode with a terminal capacitance below 15 nF can be used. In photometric applications requiring high accuracy, we recommend using metal package or ceramic package photodiodes. For detailed information refer to datasheets for our photodiodes.

Note: The C9051 cannot be used with multi-element photodiodes, photodiodes with preamplifier, APD (avalanche photodiodes), photo IC diodes and reverse-biased photodiodes.

**Connection example**

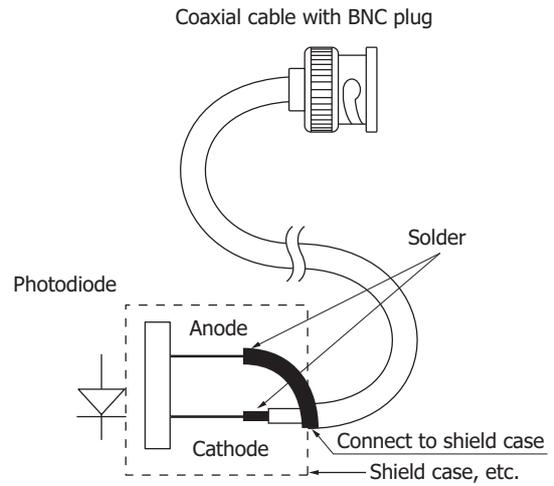


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**Typical connection to photodiode**

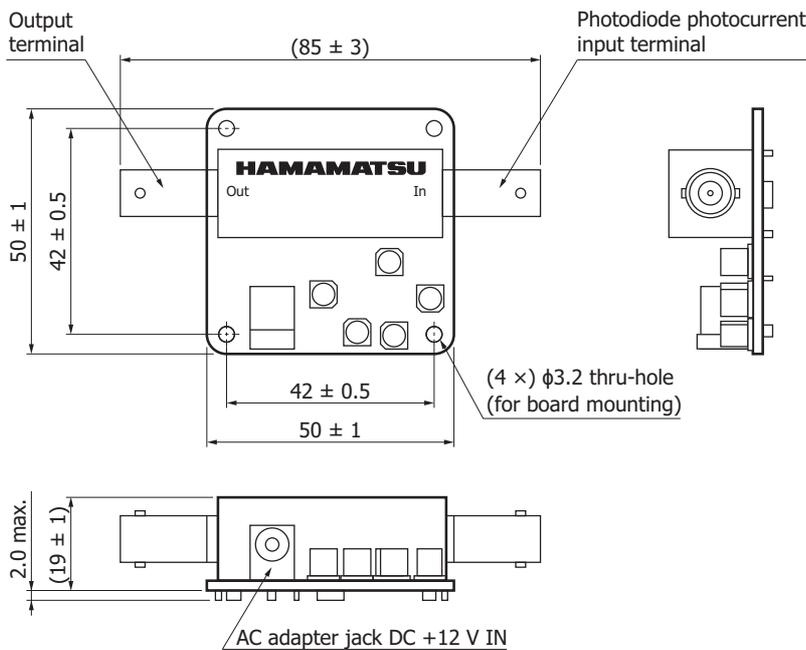
- To connect a photodiode to the C9051, use a coaxial cable terminated with a BNC plug. (Keep the capacitance including the cable capacitance and photodiode’s terminal capacitance from exceeding 15 nF.)
- Solder the photodiode leads to connect the tip of the cable wire. (See the drawing on the right.)  
 Anode: Connect to the shield wire of the cable. (Make electrical connection with the shield.)  
 Cathode: Connect to the core wire of the cable.
- To improve measurement accuracy, provide a shield around the photodiode. Do not use a cable any longer than necessary. (Keep the cable as short as possible.)

Note: When using a photodiode whose cathode is internally connected to its metal package, secure the photodiode with an insulating material when shielding. Otherwise, signal current cannot be drawn when the photodiode package is grounded.



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**Dimensional outline (unit: mm)**



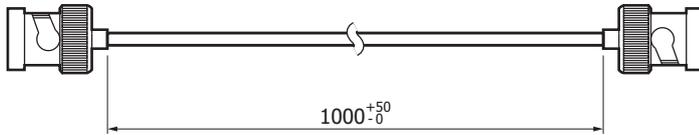
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**Accessories**

- Instruction manual
- AC adapter

### Options (sold separately, unit: mm)

- BNC cable E2573
- Cable: 1.5D-QEV



KACCC0334EA

### Related information

[www.hamamatsu.com/sp/ssd/doc\\_en.html](http://www.hamamatsu.com/sp/ssd/doc_en.html)

#### Precautions

- Disclaimer

Information described in this material is current as of August 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.

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