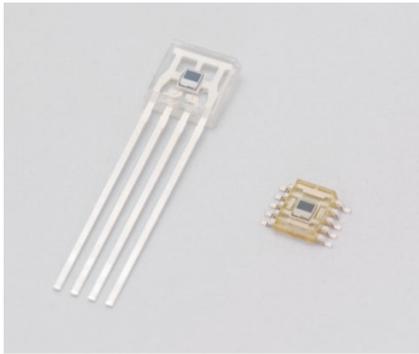


# Photo IC for optical switch

S11049 series



## Analog output photo IC for optical switch

The S11049 series photo ICs are designed for optical switches and provides an analog waveform output proportional to the intensity of incident pulsed light.

### Features

- Large allowable background light level: 4000 lx Min.
- High linearity
- Low noise: 1.8 mV rms Max.

### Applications

- Optical switch
- Optical receivers in various sensor devices

### Absolute maximum ratings (Ta=25 °C)

Parameter	Symbol	S11049-202SB	S11049-203DT	Unit
Supply voltage	Vcc	-0.5 to +7		V
Power dissipation*1	P	250	300	mW
Output voltage	Vout	-0.5 to +7		V
Operating temperature*2	Topr	-25 to +85		°C
Storage temperature*2	Tstg	-40 to +100	-30 to +85	°C

\*1: Power dissipation decreases at a rate of 3.3 mW/°C on the S11049-202SB and 4 mW/°C on the S11049-203DT at Ta=25 °C and above.

\*2: No condensation

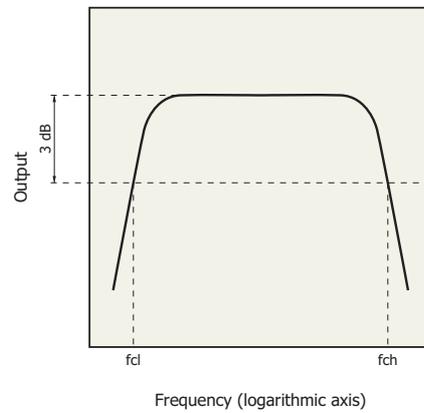
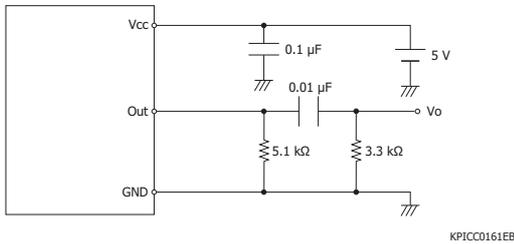
Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

**Electrical and optical characteristics (Ta=25 °C, Vcc=5.0 V)**

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	Vcc		4.5	-	5.5	V
Current consumption	Icc		-	-	2.2	mA
Spectral response range	$\lambda$		-	380 to 1120	-	nm
Peak sensitivity wavelength	$\lambda_p$		-	760	-	nm
Photo sensitivity	A	$\lambda=950\text{ nm}^{*3}$ Input signal=100 kHz Including diffused reflection inside package	120	200	300	V/mW
AC photoelectric sensitivity linearity	Alin	Input pulse signal 0.01 $\mu\text{W}$ to 4.0 $\mu\text{W}^{*3}$	-10	-	+10	%
		Input pulse signal 4.0 $\mu\text{W}$ to 7.5 $\mu\text{W}^{*3}$	-50	-	+50	
Cut-off frequency <sup>*4</sup>	Low band	fcl	*3	-	-	kHz
	High band	fch		1250	1450	
Allowable background light level <sup>*5</sup>	Pdc	Input pulse signal 2.5 $\mu\text{W}^{*3}$	4000	6000	-	$\text{l}x$
Output noise voltage (with no input)	VON	*3	-	-	2.8	mV rms

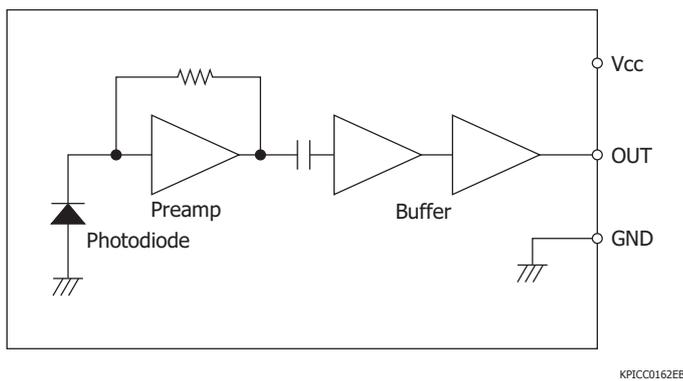
\*3: Measurement circuit (Waveform at terminal Vo is measured.)

\*4: Cutoff frequency definition

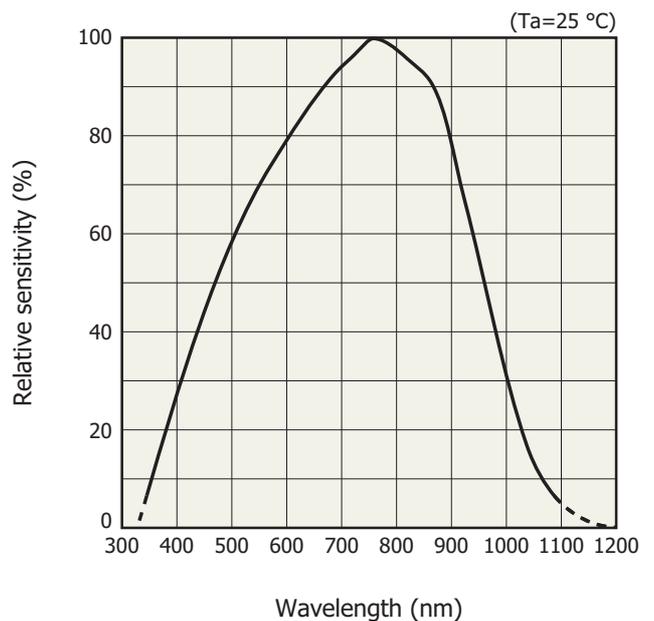


\*5: This is defined as the background light level in the active area at which the photo IC sensitivity drops by 20%

**Block diagram**

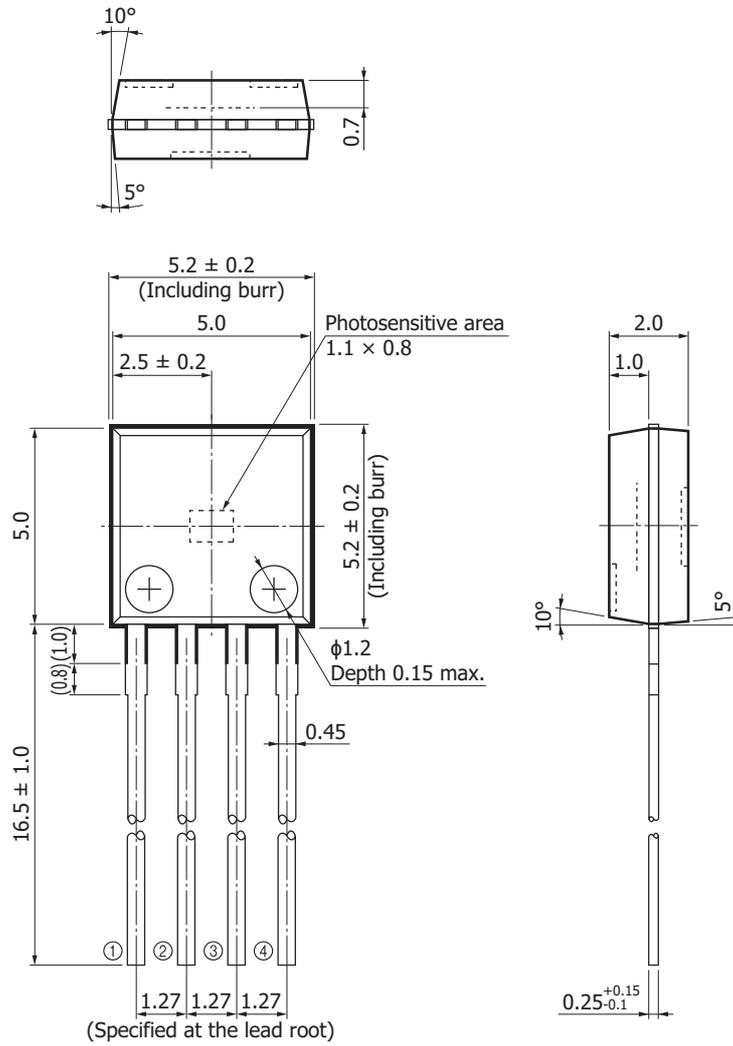


**Spectral response (typical example)**



Dimensional outlines (unit: mm)

S11049-202SB

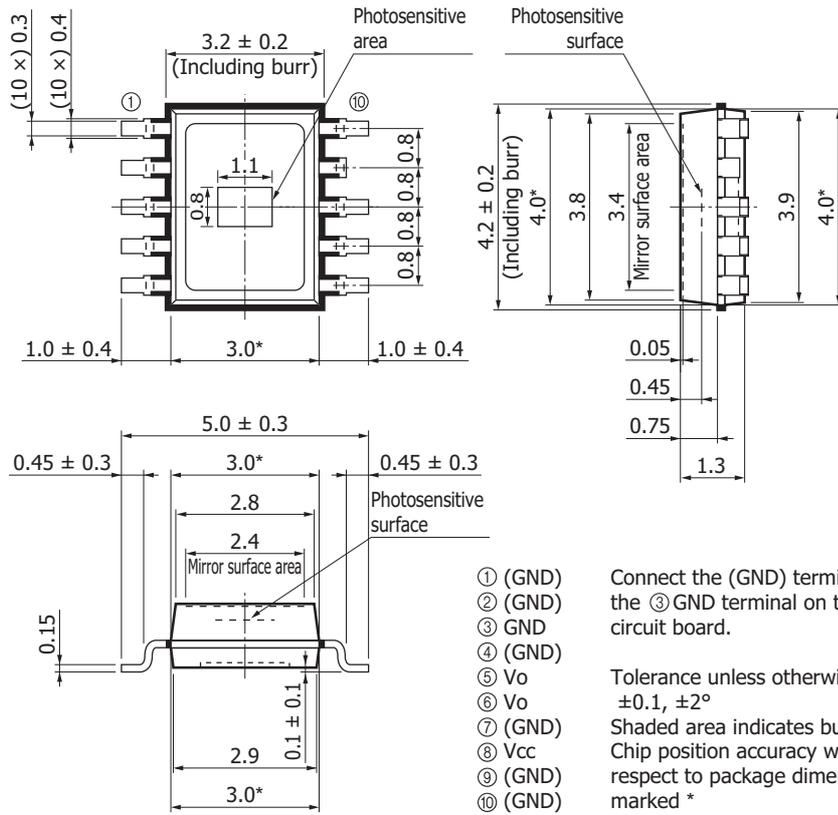


- ① GND
- ② Vout
- ③ Vcc
- ④ GND

Tolerance unless otherwise noted:  $\pm 0.1$ ,  $\pm 2^\circ$   
 Shaded area indicates burr.  
 Values in parentheses are not guaranteed, but for reference.  
 Lead surface finish: silver plating  
 Packing: polyethylene pack [anti-static type]  
 (200 pcs/pack)

KPICA0083EA

S11049-203DT



- ① (GND)
- ② (GND)
- ③ GND
- ④ (GND)
- ⑤ Vo
- ⑥ Vo
- ⑦ (GND)
- ⑧ Vcc
- ⑨ (GND)
- ⑩ (GND)

Connect the (GND) terminal to the ③ GND terminal on the circuit board.

Tolerance unless otherwise noted:  $\pm 0.1, \pm 2^\circ$

Shaded area indicates burr.  
Chip position accuracy with respect to package dimensions marked \*  
 $X, Y \leq \pm 0.2, \theta \leq \pm 2^\circ$

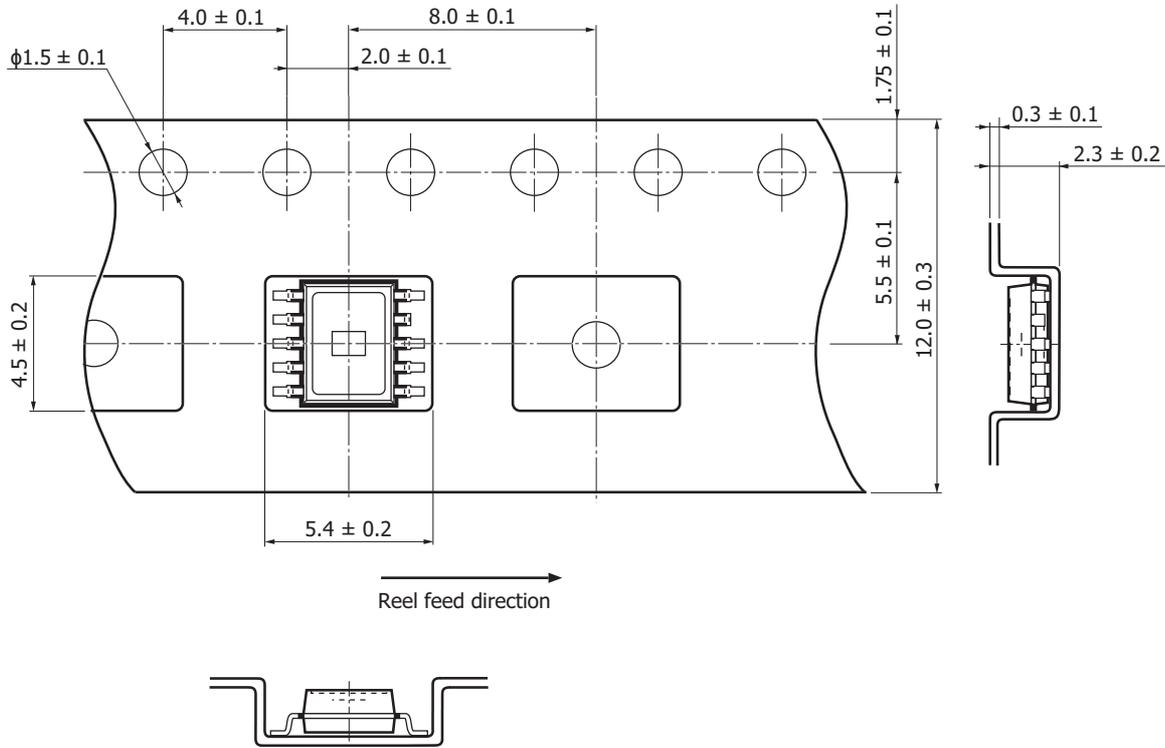
KPICA0092EA

■ Standard packing specifications (S11049-203DT)

■ Reel (conforms to JEITA ET-7200)

Dimensions	Hub diameter	Tape width	Material	Electrostatic characteristics
254 mm	100 mm	12 mm	PS	Antistatic treatment

■ Embossed tape (unit: mm, material: PS, electrically conductive)



KP1CC0238EB

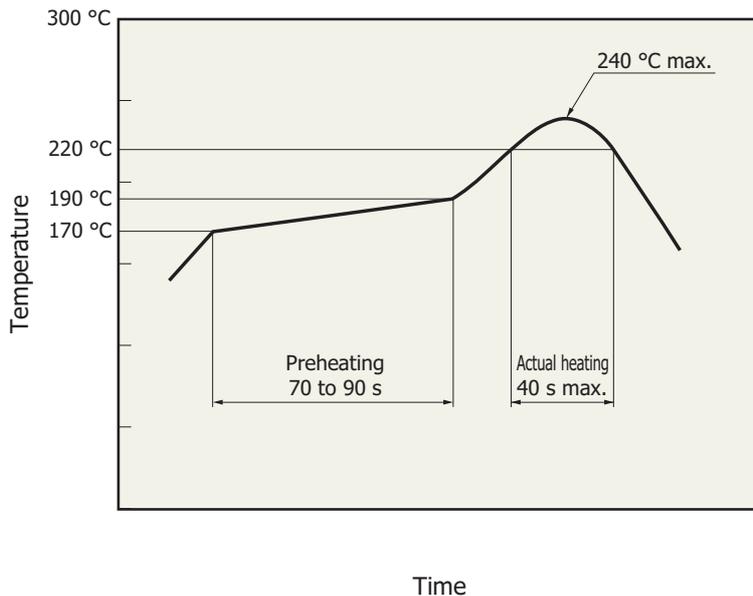
■ Packing quantity

2000 pcs/reel

■ Packing type

Reel and desiccant in moisture-proof packaging (vacuum-sealed)

### Measured example of temperature profile with our hot-air reflow oven for product testing (S11049-203DT)



KPICB0171EA

- These products support lead-free soldering. After unpacking, store them in an environment at a temperature of 30 °C or less and a humidity of 60% or less, and perform soldering within 24 hours.
- The effect that the product receives during reflow soldering varies depending on the circuit board and reflow oven that are used. When setting the reflow soldering conditions, check for any problems by testing out the reflow soldering methods in advance.

### Related information

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

#### Precautions

- Notice
- Metal, ceramic, plastic package products
- Surface mount type products

Information described in this material is current as of August, 2014.

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.

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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