

Photo IC diode assemblies



S10108, S10109

For flame eye, using photo IC diode instead of CdS cell

The S10108 and S10109 sensors are designed specifically for flame detection (flame eye) in oil-fired hot water boilers and heaters. These sensors incorporate a photo IC diode instead of CdS cells and are available with 2 types of incident light direction (head-on type S10108: and side-on type: S10109). Each sensor is assembled in an easy-to-install package along with the cable.

Features

- Spectral response suitable for detecting oil burner
- Easy-to-install assembly with cable
- Little variation in output current and good linearity (in comparison with conventional types using phototransistors and CdS cells)

Applications

- Flame detection in oil boilers and heaters
- Safety devices and alarms for heat generating devices
- Photorelay control devices

Absolute maximum ratings (Ta=25 °C)

Parameter	Symbol	Value	Unit
Maximum reverse voltage	VR max.	-0.5 to +12	V
Photocurrent	IL	5	mA
Forward current	IF	5	mA
Power dissipation*1	P	250	mW
Operating temperature	Topr	-30 to +80	°C
Storage temperature	Tstg	-40 to +85	°C

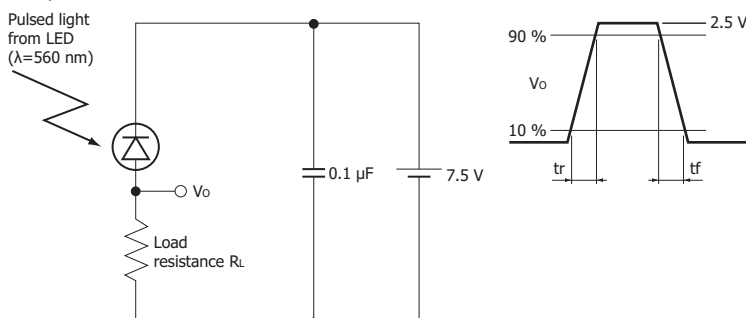
*1: Power dissipation decreases at a rate of 3.3 mW/°C above Ta=25 °C

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)

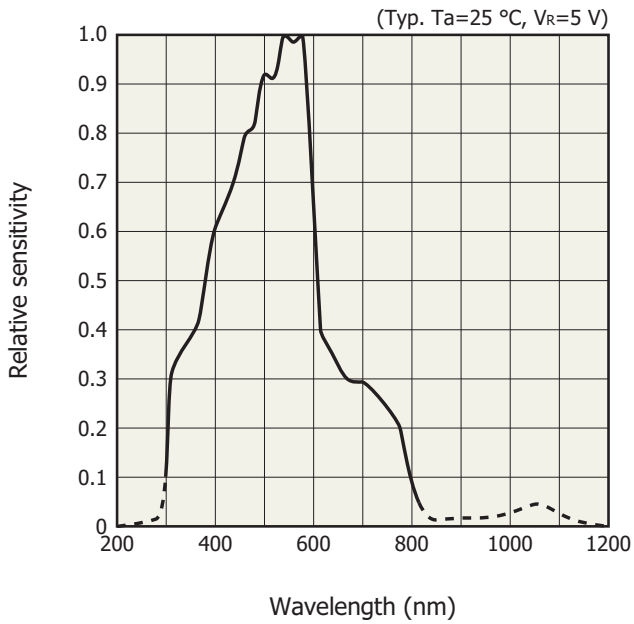
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	λ		300 to 820			nm
Peak sensitivity wavelength	λ_p		-	560	-	nm
Dark current	ID	VR=5 V	-	1.0	50	nA
Photocurrent	S10108	VR=5 V, 100 lx	0.16	0.26	0.36	mA
	S10109		0.17	0.27	0.37	
Rise time*2	tr	10 to 90%, VR=7.5 V RL=10 k Ω , λ =560 nm	-	6.0	-	ms
Fall time*2	tf	10 to 90%, VR=7.5 V RL=10 k Ω , λ =560 nm	-	2.5	-	ms

*2: Rise/fall time measurement method



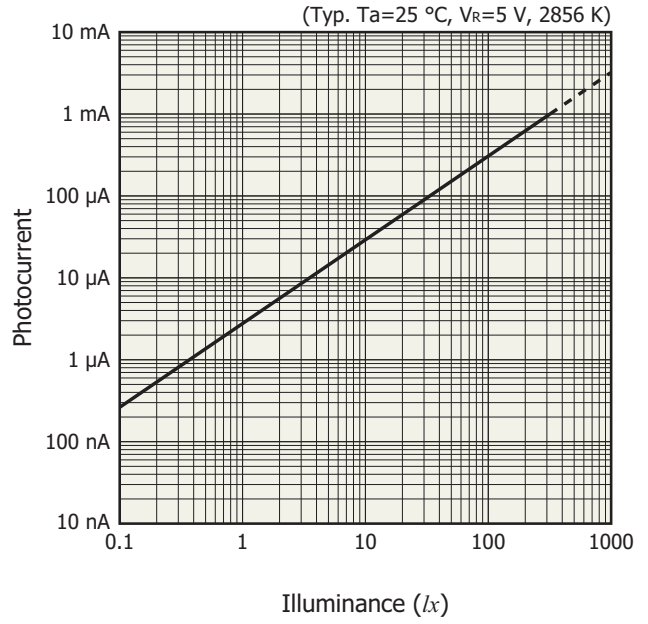
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Spectral response



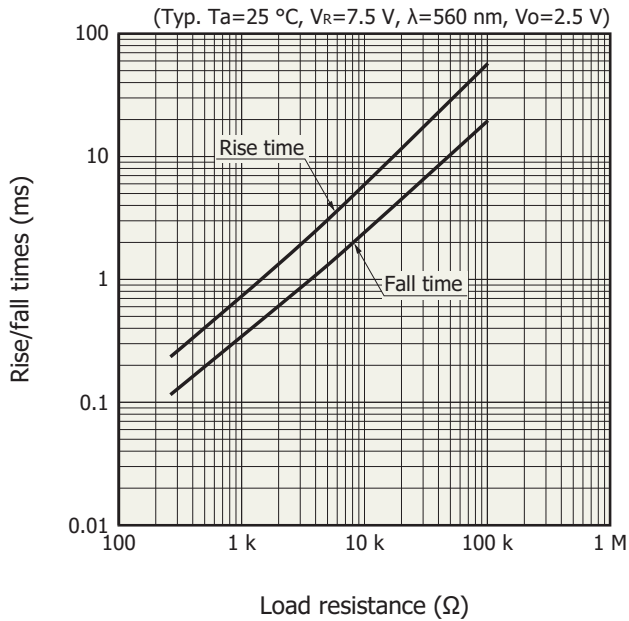
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Linearity



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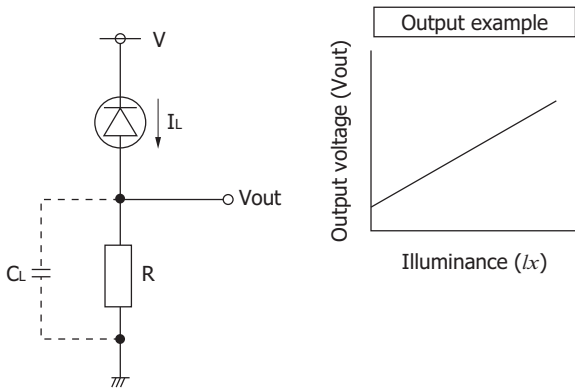
Rise/fall times vs. load resistance



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Operating circuit examples

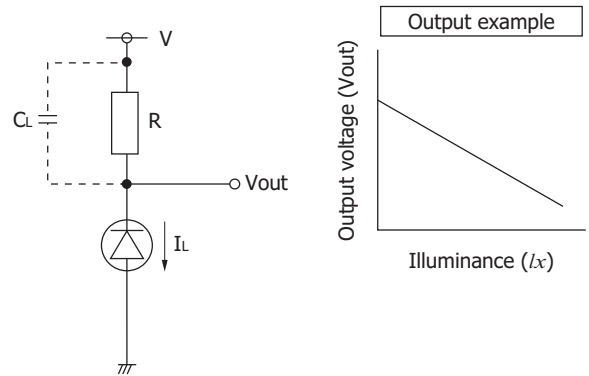
Example 1



$$V_{out} = I_L \times R$$

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Example 2



$$V_{out} = V - (I_L \times R)$$

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Note:

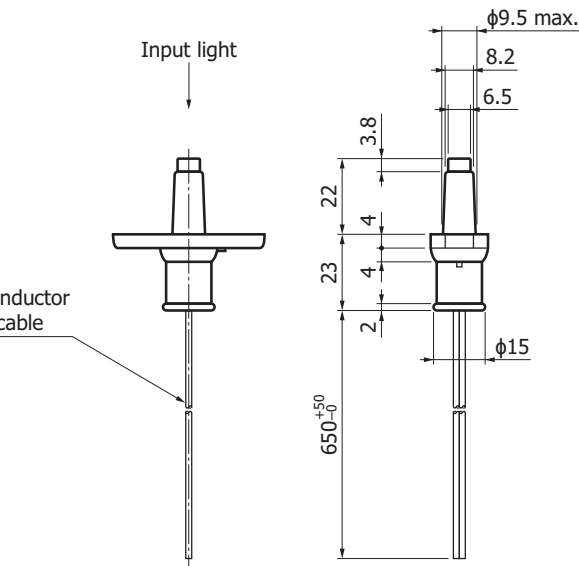
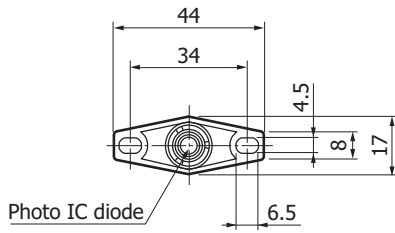
- The photo IC diode has a specific polarity (anode/cathode). Be careful to make the correct connection.
- The photo IC diode must be reverse-biased so that a positive potential is applied to the cathode.
- Set load resistance R by taking the latter circuit into account.
- To eliminate high-frequency components, we recommend placing a load capacitance CL in parallel with load resistance RL as a low-pass filter.

$$\text{Cut-off frequency } f_c \cong \frac{1}{2\pi C_L R_L}$$

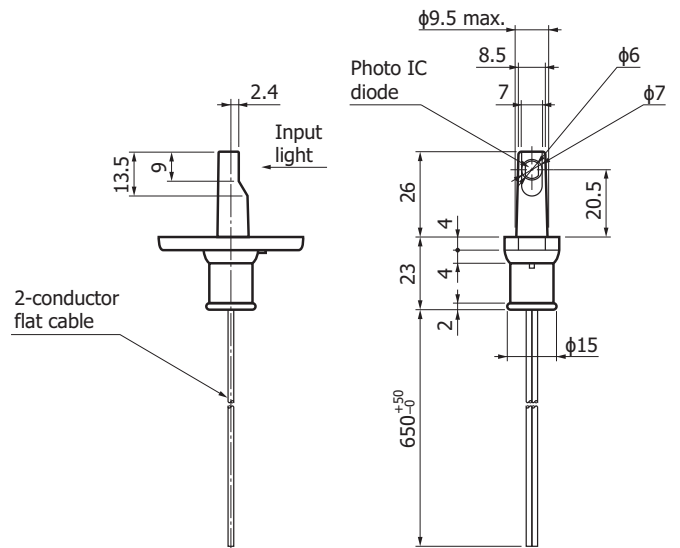
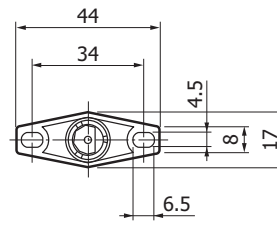
- Before using, check whether noise is present in the location where this product is used. Take measures to prevent noise as needed, for example, by shielding the cable or adding a capacitor (about 0.1 μF between the anode and cathode of the photo IC diode).

Dimensional outlines (unit: mm)

S10108 (head-on type)



S10109 (side-on type)



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2-conductor flat cable

Color	Conductor cross-section area	Dimension	Pin connection
White	0.3 mm ²	φ1.6 mm	Anode
With red line	0.3 mm ²	φ1.6 mm	Cathode

Note (use in flame detection):

These products have a shape designed for specific use in flame detection applications. Before using, however, please test these products in actual equipment to ensure their characteristics and reliability.

Information described in this material is current as of March, 2015.

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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