Photo IC diode
S7183, S7184

Linear current amplification of photodiode output

S7183 and S7184 consist of a photodiode and a signal processing circuit for amplifying the photocurrent generated from the photodiode up to 1300 times. Despite a small active area, these photo ICs provide an output nearly equal to that from photodiodes with a 20 × 20 mm active area. Both S7183 and S7184 can be used the same way as a reverse-biased photodiode, and in most cases, they deliver a sufficient output voltage by just connecting a load resistor.

Features

- Clear plastic package
- Operation just as easy as using photodiodes
- Large output current rivaling that of a phototransistor
- Good linearity

Applications

- Energy saving sensors for TV brightness controls, etc.
- Light dimmers for liquid crystal panels
- Various types of light level measurement

■ Absolute maximum ratings (Ta=25 °C)

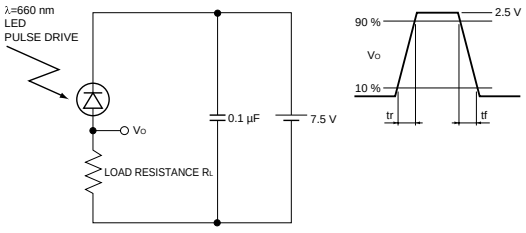
Parameter	Symbol	Value		Unit
Reverse voltage	V_R	-0.5 to 16		V
Photocurrent	I_L	10		mA
Forward current	I_F	10		mA
Power dissipation *1	P	250		mW
Operating temperature	Topr	-30 to +80		°C
Storage temperature	Tstg	-40 to +85		°C
Soldering	-	S7183	260 °C, 3 s, at least 2.5 mm away from package surface	-
		S7184	230 °C, 5 s,	

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

■ Electrical and optical characteristics (Ta=25 °C)

Parameter	Symbol	Condition		Min.	Typ.	Max.	Unit
Spectral response range	λ			-	300 to 1000	-	nm
Peak sensitivity wavelength	λp			-	650	-	nm
Operating reverse voltage	V_R			3	-	12	V
Dark current	I_D	V_R=5 V		-	0.5	10	nA
Photocurrent	I_L	V_R=5 V, 2856 K	S7183, 100 lx	0.75	1.0	1.25	mA
			S7184, 1000 lx	1.4	1.8	2.2	
Rise/fall time	tr, tf	10 to 90 %, *2 V_R=5 V, R_L=10 kΩ λ=660 nm		-	0.6	-	ms

*2: Rise/fall time measurement method



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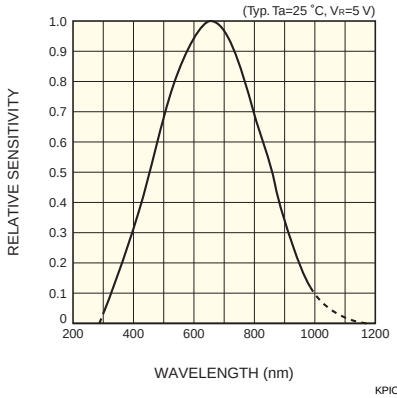
■ Spectral response



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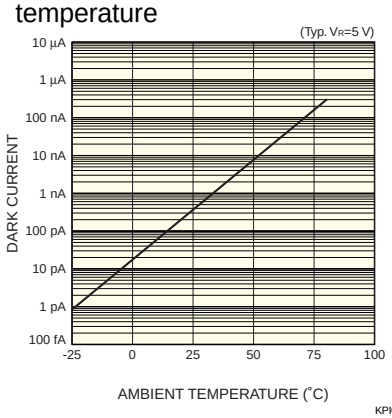
■ Dark current vs. ambient temperature



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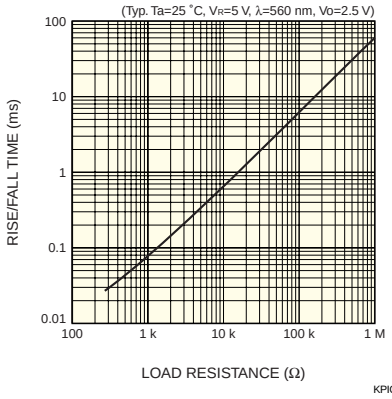
■ Rise/fall time vs. load resistance



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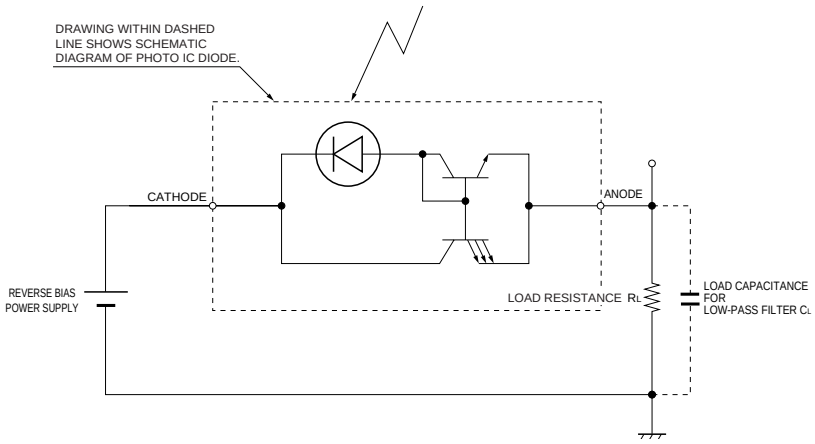
■ Operating circuit example



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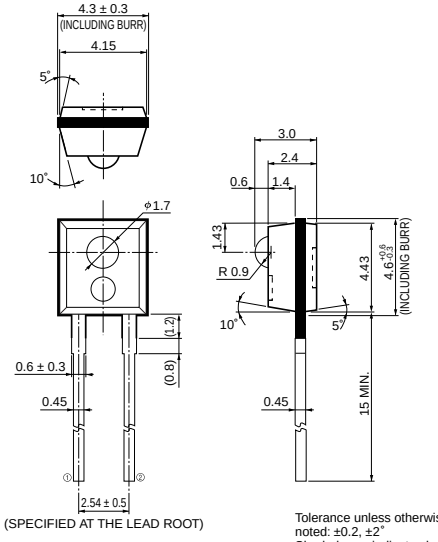
The photodiode must be reverse-biased so that a positive potential is applied to the cathode. To eliminate high-frequency components, we recommend placing a load capacitance C_L in parallel with load resistance R_L as a low-pass filter.

$$\text{Cut-off frequency } fc \fallingdotseq \frac{1}{2\pi C_L R_L}$$

■ Dimensional outlines (unit: mm)

S7183



(SPECIFIED AT THE LEAD ROOT)

① CATHODE
② ANODE

Tolerance unless otherwise noted: ±0.2, ±2°
Shaded area indicates burr.
Values in parentheses are not guaranteed, but for reference.

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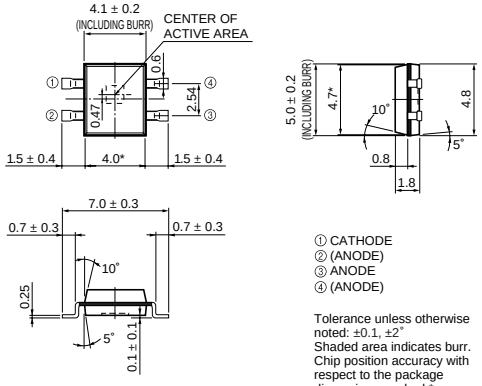
S7184



① CATHODE
② (ANODE)
③ ANODE
④ (ANODE)

Tolerance unless otherwise noted: ±0.1, ±2°
Shaded area indicates burr.
Chip position accuracy with respect to the package dimensions marked *
X≤±0.25, Y≤±0.25, θ≤±2°

Pins ② and ④ must be connected to ③ on the PC board.

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