

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 ($T_a=25^\circ\text{C}$)

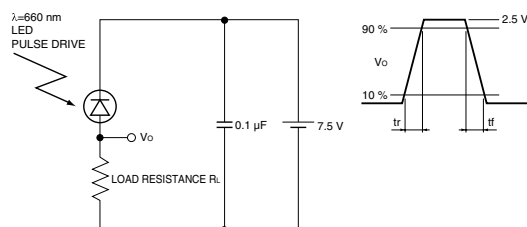
Parameter	Symbol	Value	Unit
Reverse voltage	V_R	-0.5 to 16	V
Photocurrent	I_L	10	mA
Forward current	I_F	10	mA
Power dissipation *1	P	250	mW
Operating temperature	T_{opr}	-30 to +80	$^\circ\text{C}$
Storage temperature	T_{stg}	-40 to +85	$^\circ\text{C}$
Soldering	-	S7183 260 $^\circ\text{C}$, 3 s, at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

*1: Derate power dissipation at a rate of 3.3 mW/ $^\circ\text{C}$ above $T_a=25^\circ\text{C}$

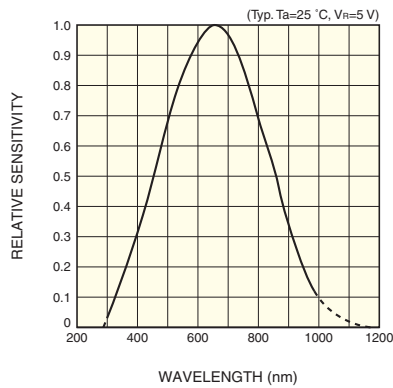
■ Electrical and optical characteristics ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	λ		-	300 to 1000	-	nm
Peak sensitivity wavelength	λ_p		-	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	t_r, t_f	10 to 90 %, *2 $V_R=5$ V, $R_L=10$ k Ω $\lambda=660$ nm	-	0.6	-	ms

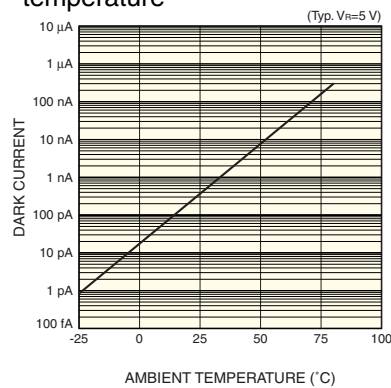
*2: Rise/fall time measurement method



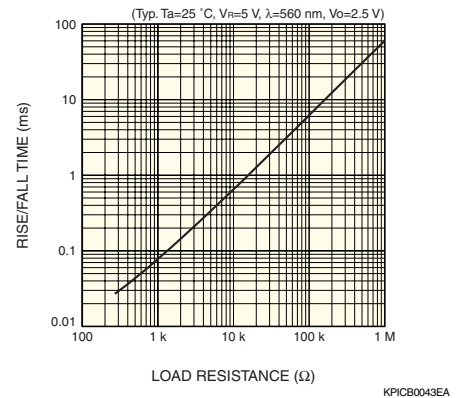
Spectral response



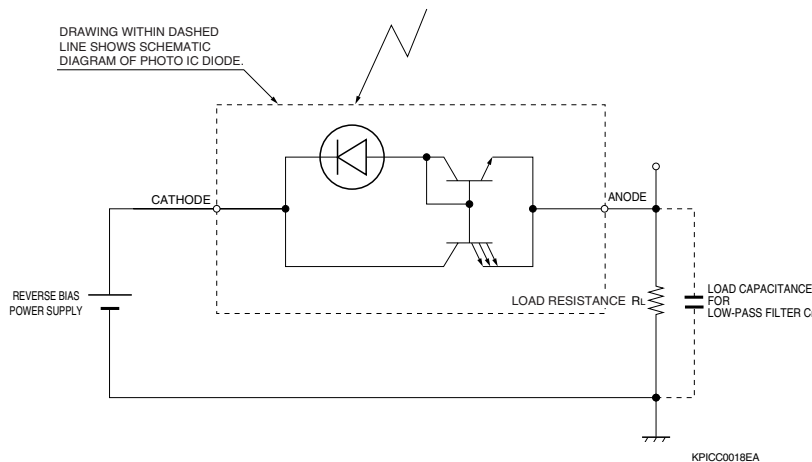
Dark current vs. ambient temperature



Rise/fall time vs. load resistance



Operating circuit example

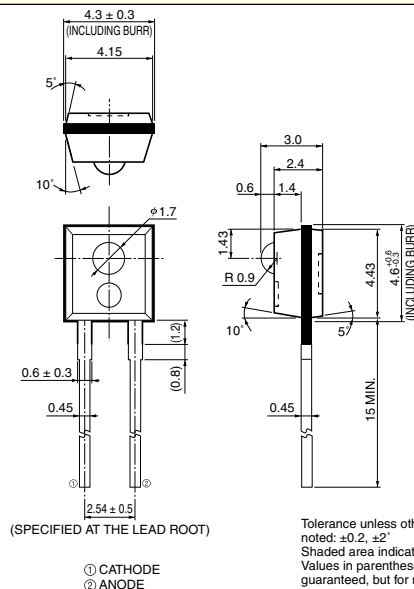


The photodiode must be reverse-biased so that a positive potential is applied to the cathode. To eliminate high-frequency components, we recommend placing a load capacitance C_L in parallel with load resistance R_L as a low-pass filter.

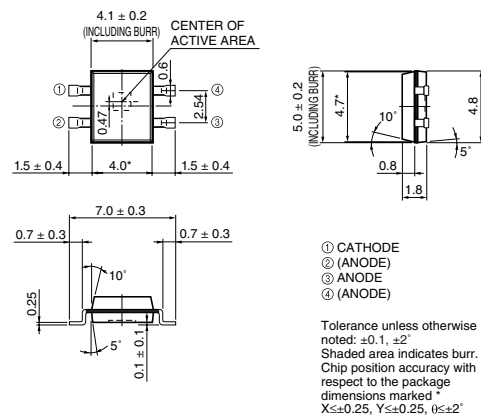
$$\text{Cut-off frequency } f_c \doteq \frac{1}{2\pi C_L R_L}$$

Dimensional outlines (unit: mm)

S7183



S7184



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

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