Photo IC diode
S7815

Linear current amplification type photo IC with subminiature package

S7815 consists of a photodiode and a signal processing circuit for amplifying the photocurrent generated from the photodiode up to 1400 times. Despite a small active area, S7815 provides an output nearly equal to that from photodiodes with a 20 × 20 mm active area. S7815 can be used the same way as a reverse-biased photodiode, and in most cases, it delivers a sufficient output voltage by just connecting a load resistor.

Features

- Subminiature, 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

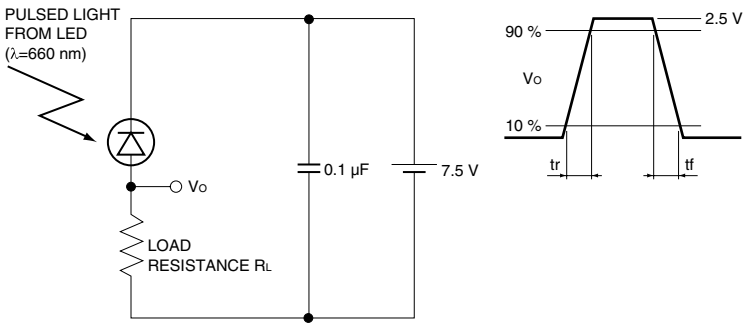
■ Absolute maximum ratings (Ta=25 °C)

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	P	150	mW
Operating temperature	Topr	-30 to +80	°C
Storage temperature	Tstg	-40 to +85	°C
Soldering	-	260 °C, 3 s, at least 2.5 mm away from package surface	-

■ 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	-	0.3	10	nA
Photocurrent	I_L	V_R=5 V, 2856 K, 100 lx	0.16	0.23	0.30	mA
Rise time	tr	10 to 90 %, V_R=5 V R_L=10 kΩ, λ=660 nm	-	0.2	-	ms
Fall time	tf	90 to 10 %, V_R=5 V R_L=10 kΩ, λ=660 nm	-	0.3	-	ms

■ Rise/fall time measurement method



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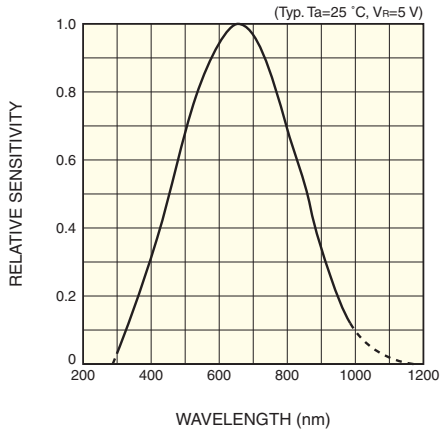
■ Spectral response



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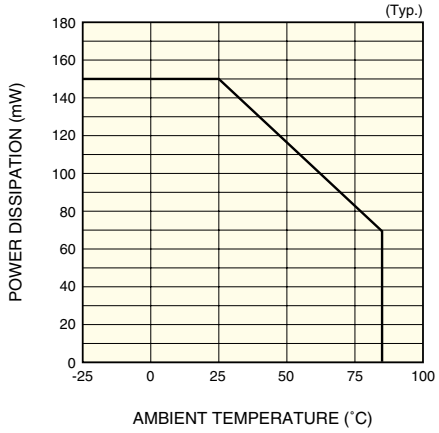
■ Power dissipation vs. ambient temperature



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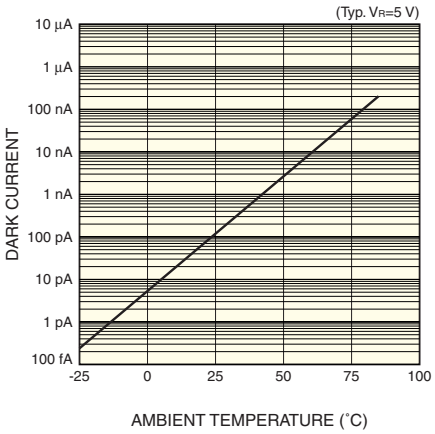
■ Dark current vs. ambient temperature



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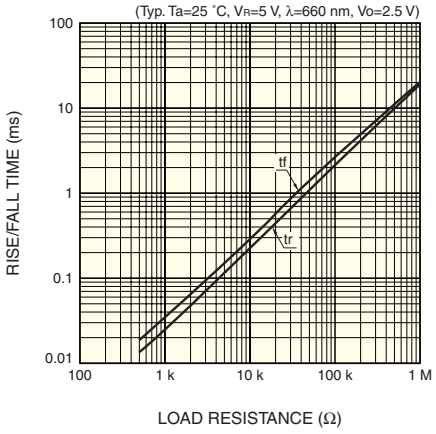
■ Rise/fall time vs. load resistance



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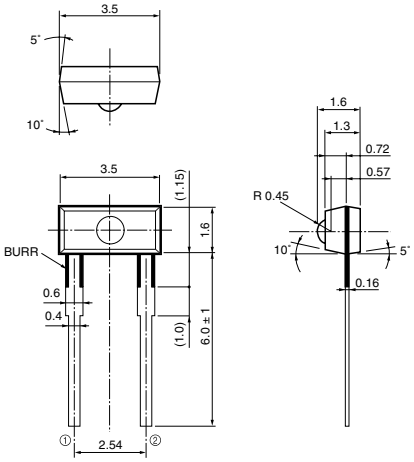
■ Dimensional outline (unit: mm)



①ANODE
②CATHODE
Shaded area indicates burr.
Tolerance unless otherwise noted: ±0.2, ±2˚
Values in parentheses are not guaranteed, but for reference.

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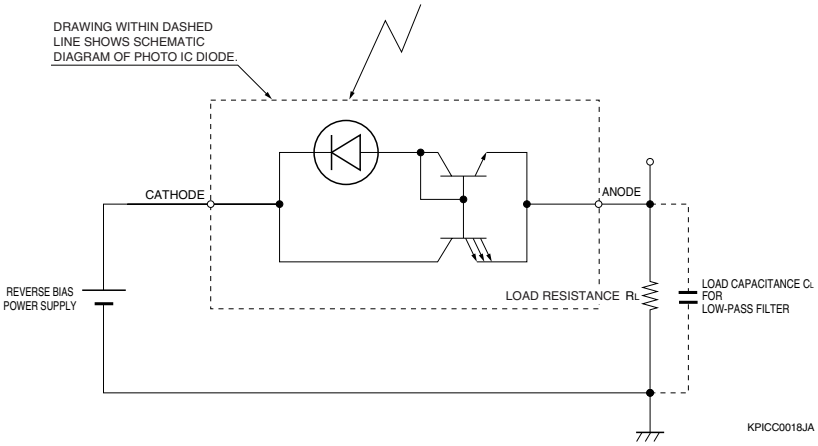
■ Operating circuit example



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The photo IC diode 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.

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

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Cat. No. KPIC1032E01
Mar. 2001 DN