

# Photo IC diode

## E7815

Linear current amplification type photo IC with subminiature package



E7815 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, E7815 provides an output nearly equal to that from photodiodes with a  $20 \times 20$  mm active area. E7815 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

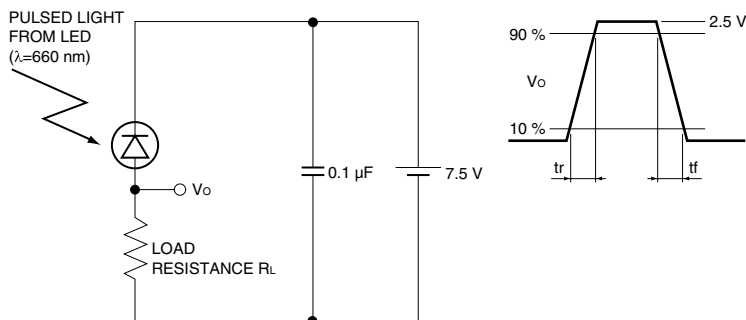
### ■ Absolute maximum ratings ( $T_a=25^\circ\text{C}$ )

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	$P$	150	mW
Operating temperature	$T_{opr}$	-30 to +80	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-40 to +85	$^\circ\text{C}$
Soldering	-	260 $^\circ\text{C}$ , 3 s, at least 2.5 mm away from package surface	-

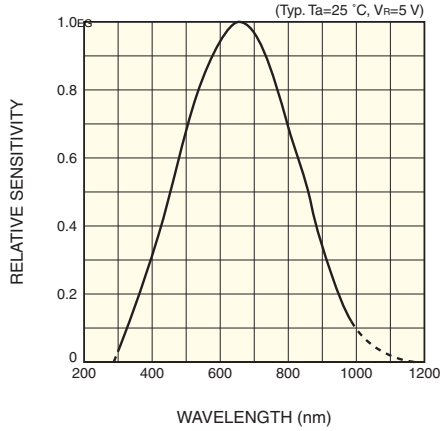
### ■ Electrical and optical characteristics ( $T_a=25^\circ\text{C}$ )

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Spectral response range	$\lambda$		-	300 to 1000	-	nm
Peak sensitivity wavelength	$\lambda_p$		-	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	$t_r$	10 to 90 %, $V_R=5$ V $R_L=10$ k $\Omega$ , $\lambda=660$ nm	-	0.2	-	ms
Fall time	$t_f$	90 to 10 %, $V_R=5$ V $R_L=10$ k $\Omega$ , $\lambda=660$ nm	-	0.3	-	ms

### ■ Rise/fall time measurement method

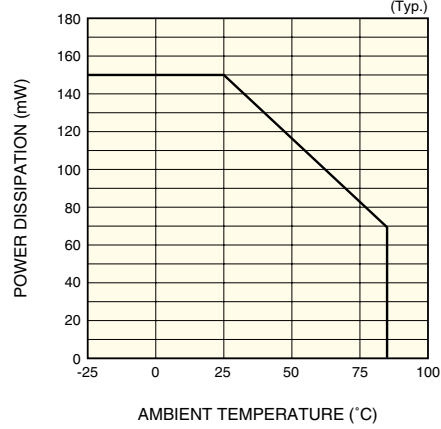


■ Spectral response



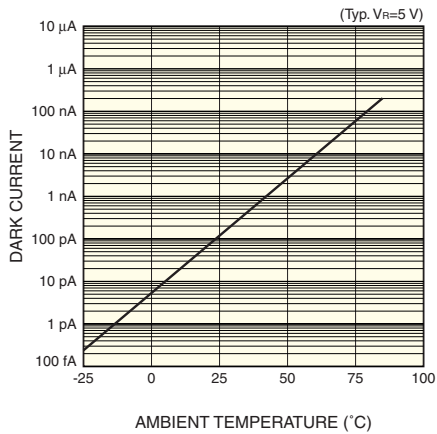
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■ Power dissipation vs. ambient temperature



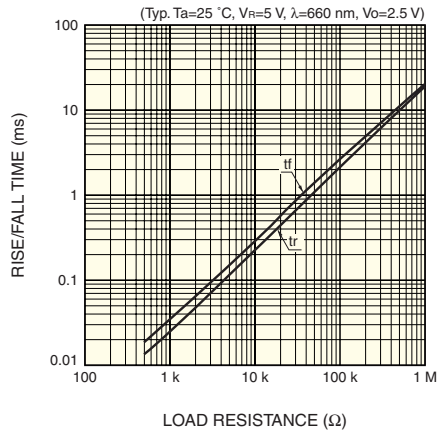
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■ Dark current vs. ambient temperature



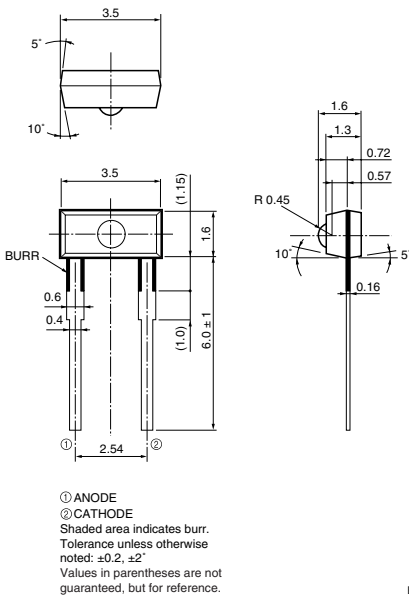
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■ Rise/fall time vs. load resistance



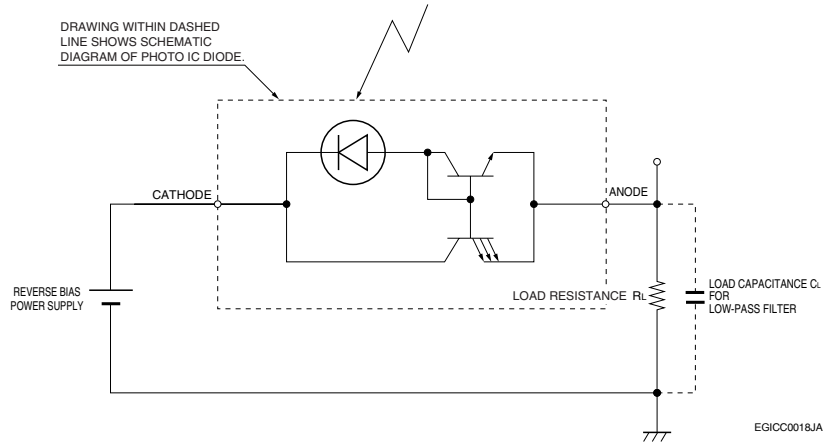
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■ Dimensional outline (unit: mm)



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■ Operating circuit example



EGICC0018JA

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 CL in parallel with load resistance RL as a low-pass filter.

$$\text{Cut-off frequency } (f_c) \cong \frac{1}{2\pi CLRL}$$

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