

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

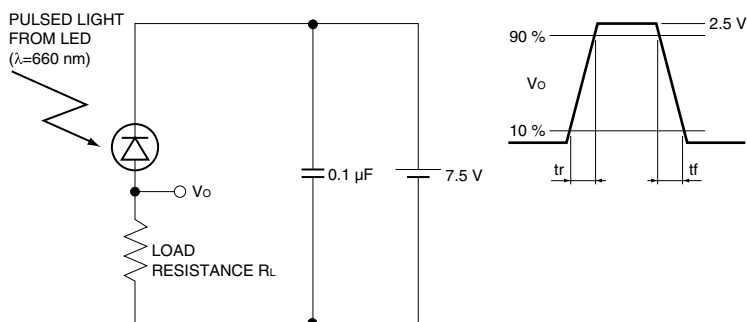
Absolute maximum ratings ($T_a=25^\circ\text{C}$)

Parameter	Symbol	Value	Unit
Reverse voltage	VR	-0.5 to +16	V
Photocurrent	IL	10	mA
Forward current	IF	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 ($T_a=25^\circ\text{C}$)

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	-	0.3	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 Ω , $\lambda=660$ nm	-	0.2	-	ms
Fall time	t_f	90 to 10 %, $V_R=5$ V $R_L=10$ k Ω , $\lambda=660$ nm	-	0.3	-	ms

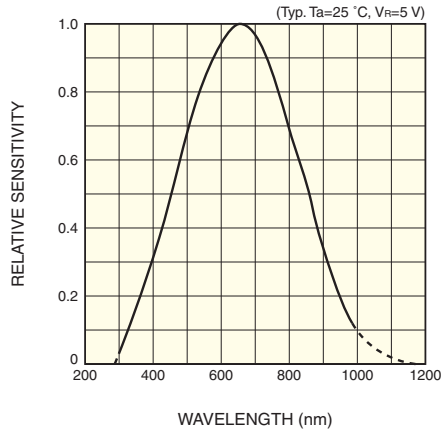
Rise/fall time measurement method



KPIC0051EA

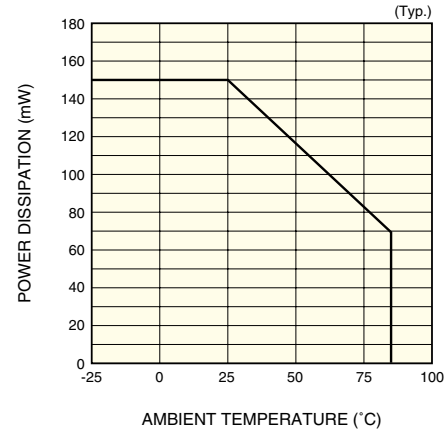
SOLID
STATE DIVISION

■ Spectral response



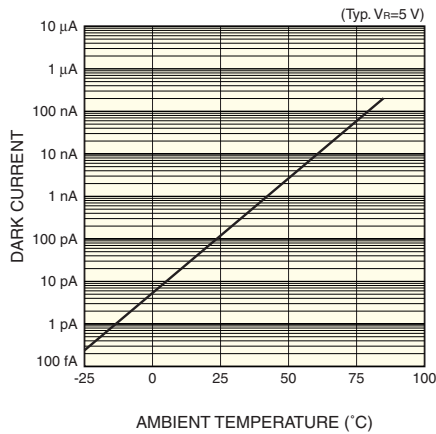
KPICB0036EA

■ Power dissipation vs. ambient temperature



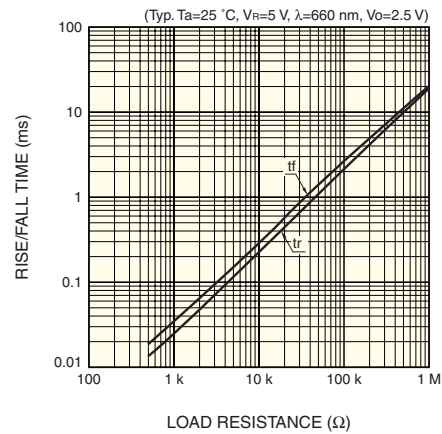
KPICB0007EA

■ Dark current vs. ambient temperature



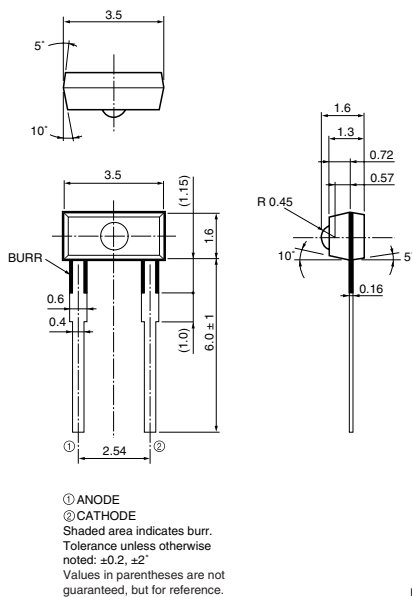
KPICB0037EA

■ Rise/fall time vs. load resistance



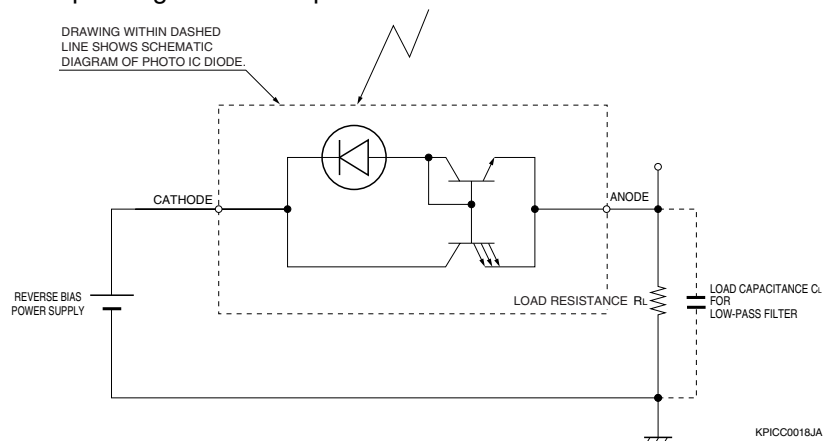
KPICB0038JA

■ Dimensional outline (unit: mm)



KPICA0026EA

■ Operating circuit example



KPICC0018JA

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.

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

HAMAMATSU

HAMAMATSU PHOTONICS K.K., Solid State Division

1126-1 Ichino-cho, Hamamatsu City, 435-8558 Japan, Telephone: (81) 053-434-3311, Fax: (81) 053-434-5184, <http://www.hamamatsu.com>

U.S.A.: Hamamatsu Corporation: 360 Foothill Road, P.O.Box 6910, Bridgewater, N.J. 08807-0910, U.S.A., Telephone: (1) 908-231-0960, Fax: (1) 908-231-1218

Germany: Hamamatsu Photonics Deutschland GmbH: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49) 08152-3750, Fax: (49) 08152-2658

France: Hamamatsu Photonics France S.A.R.L.: 8, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: 33-(1) 69 53 71 00, Fax: 33-(1) 69 53 71 10

United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, United Kingdom, Telephone: (44) 1707-294888, Fax: (44) 1707-325777

North Europe: Hamamatsu Photonics Norden AB: Smidesvägen 12, SE-171 41 Solna, Sweden, Telephone: (46) 8-509-031-00, Fax: (46) 8-509-031-01

Italy: Hamamatsu Photonics Italia S.R.L.: Strada della Moia, 1/E, 20020 Arese, (Milano), Italy, Telephone: (39) 02-935-81-733, Fax: (39) 02-935-81-741

Information furnished by HAMAMATSU is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omissions. Specifications are subject to change without notice. No patent rights are granted to any of the circuits described herein. ©2001 Hamamatsu Photonics K.K.

Cat. No. KPIC1032E01
Mar. 2001 DN