

## PHOTOTRANSISTOR

PH109 is a small type high sensitivity Darlington phototransistor molded with resin.

Since the device is housed in a small package with a lens, when it is used along with an infrared LED SE308 in the same shape, a small type photointerrupter can be formed.

## FEATURES

- Small package (4.0 × 2.8 × 2.5 mm)
- High sensitivity  
( $I_L = 10 \text{ mA MIN. at } V_{CE} = 2 \text{ V, } L = 100 \text{ lx}$ )

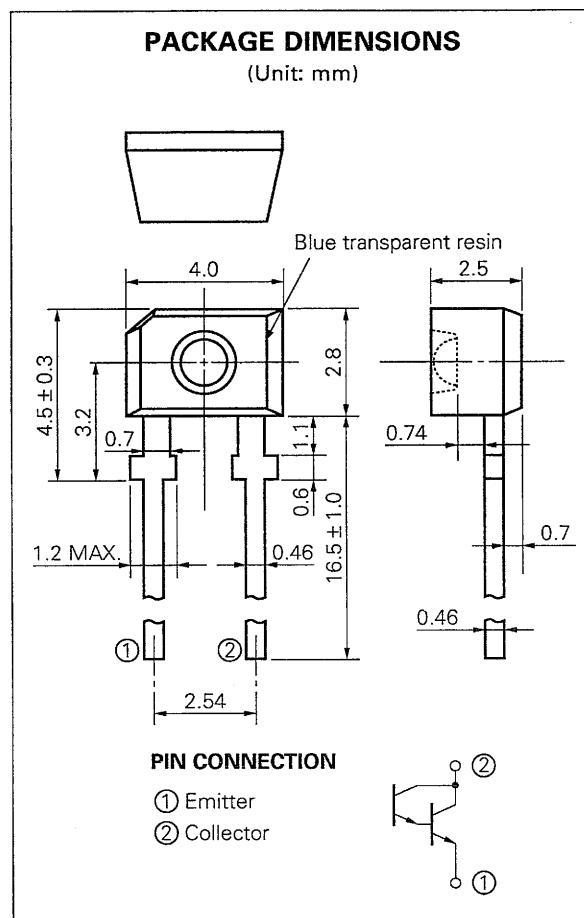
## QUALITY GRADE

Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

## APPLICATIONS

- Light receiving blocks of photo interrupters
- Various photo sensors



**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub> = 25 °C)**

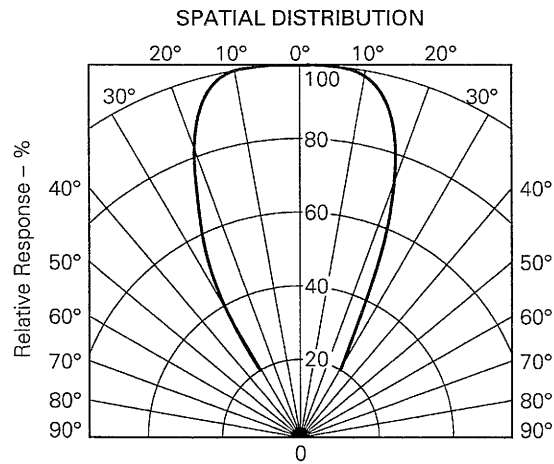
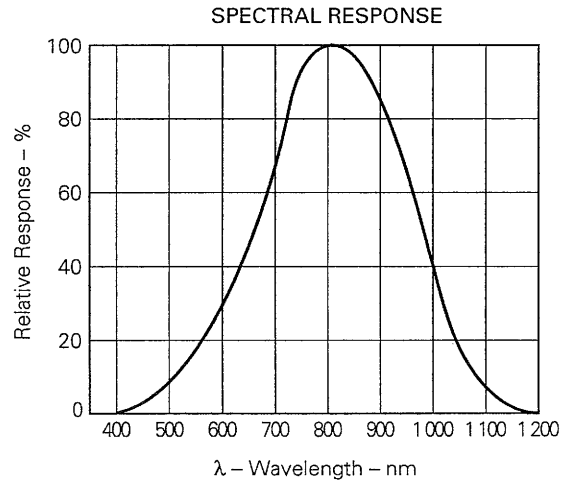
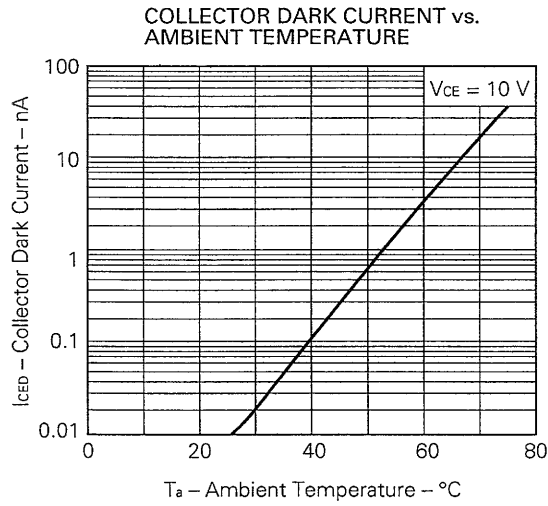
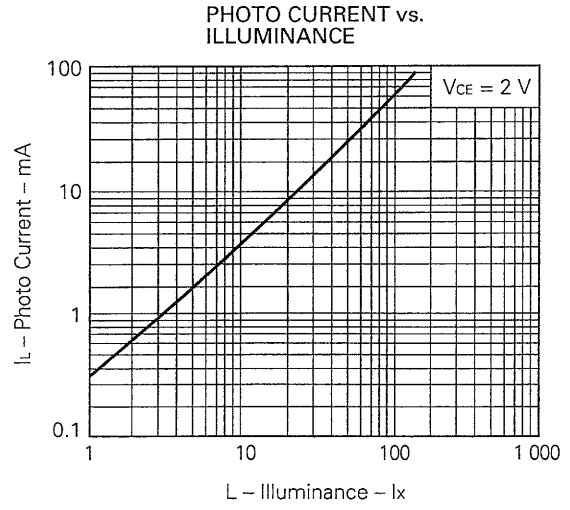
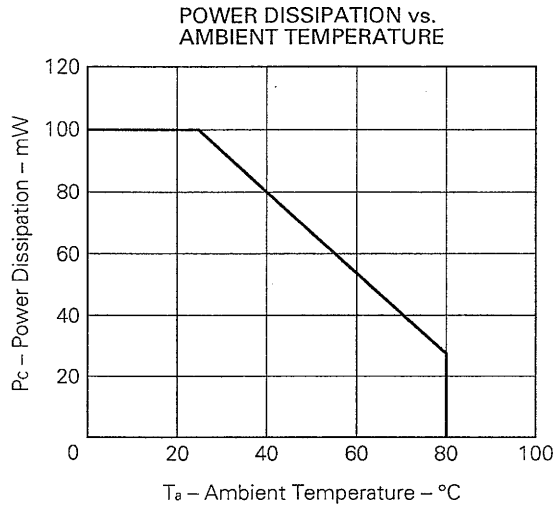
Collector to Emitter Voltage	V <sub>CEO</sub>	30	V
Collector Current	I <sub>c</sub>	50	mA
Collector Dissipation	P <sub>c</sub>	100	mW
Junction Temperature	T <sub>j</sub>	100	°C
Operating Temperature	T <sub>opt</sub>	-20 to +80	°C
Storage Temperature	T <sub>stg</sub>	-40 to +100	°C

**ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)**

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Dark Current	I <sub>CEO</sub>			400	nA	V <sub>CE</sub> = 10 V, L = 0 lx*
Collector Saturation Voltage	V <sub>CE (sat)</sub>		0.8	1.2	V	I <sub>c</sub> = 10 mA, L = 1 000 lx*
Photo Current	I <sub>L</sub>	10			mA	V <sub>CE</sub> = 2 V, L = 100 lx*
Rise Time Fall Time	t <sub>r</sub> t <sub>f</sub>		200		μs	V <sub>CC</sub> = 5 V, I <sub>L</sub> = 2 mA R <sub>L</sub> = 100 Ω

\* Color temperature of light source: 2 854 K

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



**HANDLING PRECAUTIONS:****• Soldering**

The full resin-molded PH109 has generally a little mechanical and thermal strength than other resin-molded semiconductor devices as they have less additives. Therefore please note on the following points.

- (a) Soldering of leads should be made at the point 2 mm or more from the root of the case at 260 °C and within 5 s.
- (b) Please keep the package temperature less than 100 °C.
- (c) If the temperature of the molded portion rises in addition to the residual stress between the leads, the possibility that open or short circuit occurs due to the deformation or destruction of the resin will increase.

**• On cleaning the device:**

- (a) Cleaning with unsuitable solvent may impair the resin of the package and the following solvents should be used at the temperature of less than 45 °C and for less than 3 minutes of immersion time.  
Ethanol, Methanol, Isopropyl-alcohol
- (b) Ultrasonic cleaning will add some stress on devices. The degree of the stress differs depending on the oscillation output power, the size of the PCB and the mounting methods of the devices, therefore it should be confirmed by making an experiment at actual conditions that the cleaning does not have any problem on the devices.

[MEMO]

[MEMO]

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.

NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.

The devices listed in this document are not suitable for use in aerospace equipment, submarine cables, nuclear reactor control systems and life support systems. If customers intend to use NEC devices for above applications or they intend to use "Standard" quality grade NEC devices for applications not intended by NEC, please contact our sales people in advance.

Application examples recommended by NEC Corporation.

Standard: Computer, Office equipment, Communication equipment, Test and Measurement equipment, Machine tools, Industrial robots, Audio and Visual equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Traffic control systems, Antidisaster systems, Anticrime systems, etc.