DATA SHEET

NEC
ELECTRON DEVICE

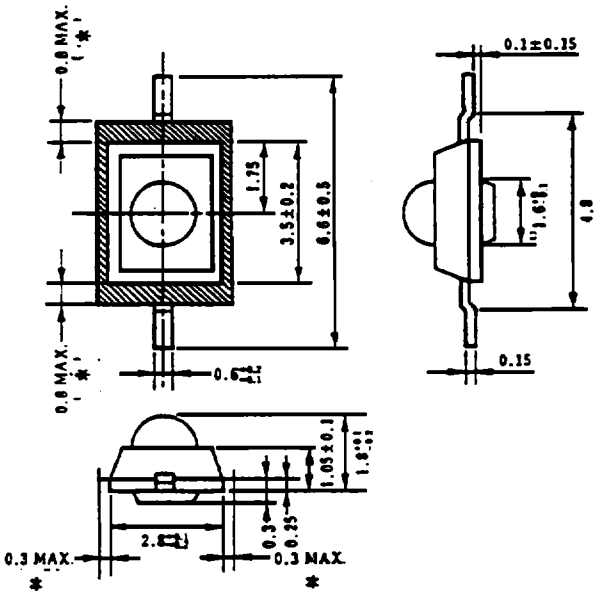
# PHOTO TRANSISTOR
# PH116 (L)

## SMALL PACKAGE TYPE
## PHOTO TRANSISTOR

PH116(L) is a small type hige sensitivity photo transistor molded with black resin. By using resin with a property of visible light cutting filter, the light receiving sensitivity of the device becomes active from a wavelength of approximately 820nm, and the device is not affected by an external light source as a fluorescent lanp.

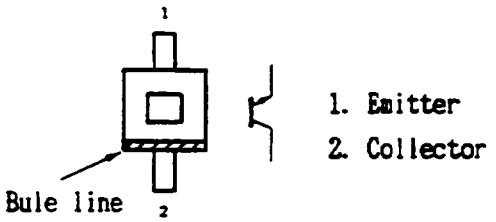
PACKAGE DIMENSIONS

(Unit : mm)




*)Residue after molding

PIN CONNECTIONS




1. Emitter
2. Collector

FEATURES

- Surface mount type
- High sensitivity
  ($I_L$:40$\mu$A, min. @ $V_{CE}$=5V, H=100$\mu$W/cm$^2$)
- High spectral sensitivty
  (sensitivity active wavelength : 820nm, typ.)
- High-speed switching
  (tr=4$\mu$s, tf=6$\mu$s typ. @$R_L$=100$\Omega$)

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

- Various photo sensors
- Portable terminal

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HANDLING PRECAUTIONS:

● Soldering

The full resin-molded PH1116(L) have 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 of leads, which is mounted on board (See figure 1) at 260 ℃ and within 5 s.

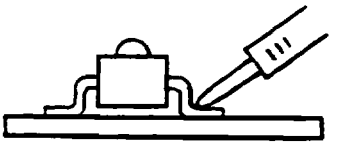


figure 1

(b) 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:

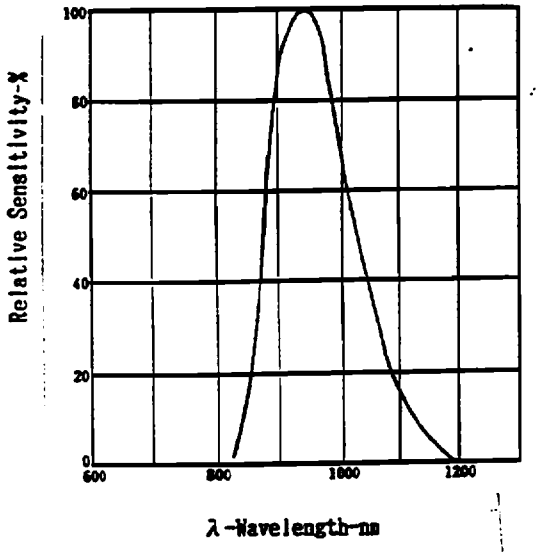
(a) Cleaning with unsuitable solvent may impair the resin of the package and the following solvents should be used at the temperature of less than 45℃ and for less than 30 seconds minutes of immersion time.

Ethanol, Methanol

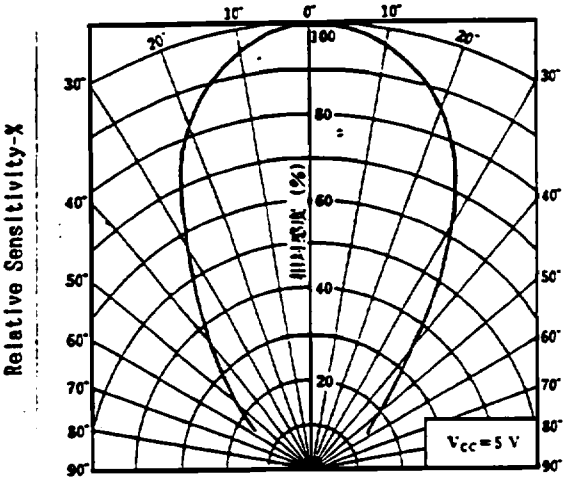
Isopropyl-alcohol

(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 coditions that the cleaning does not have any problem on the devices.

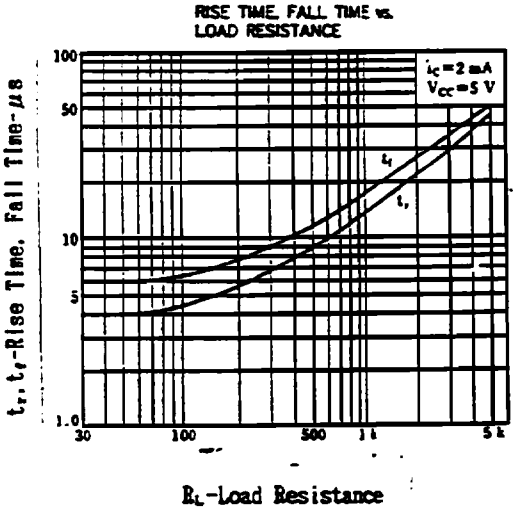
SPECTRAL RESPONSE



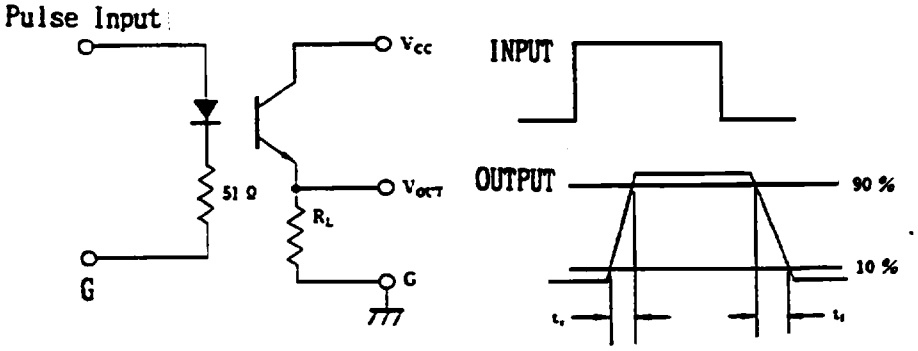

SPATIAL DISTRIBUTION




RISE TIME, FALL TIME vs. LOAD RESISTANCE

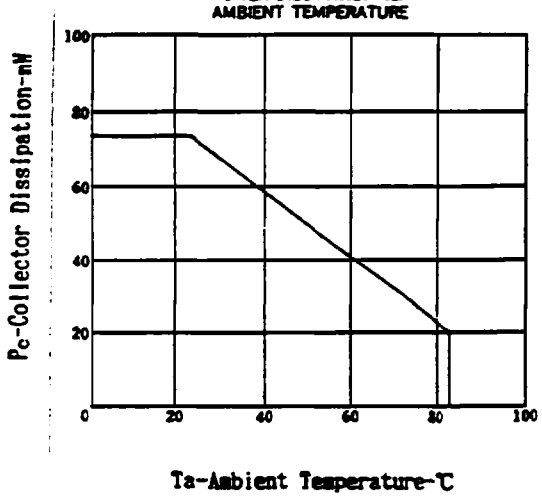



Test Circuit for Switching Time



## TYPICAL CHARACTERISTICS(Ta=25℃)

POWER DISSIPATION vs. AMBIENT TEMPERATURE




COLLECTOR DARK CURRENT vs. AMBIENT TEMPERATURE

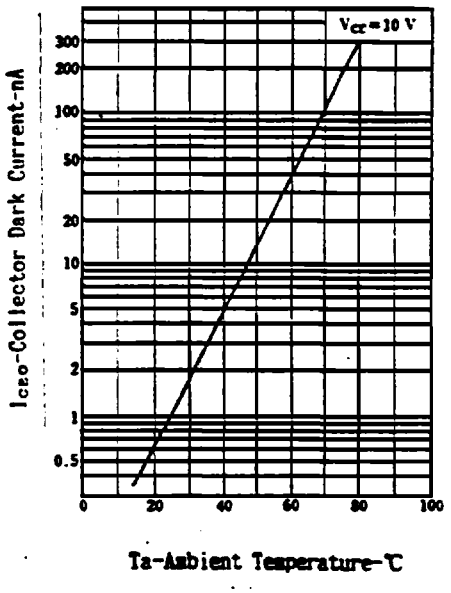
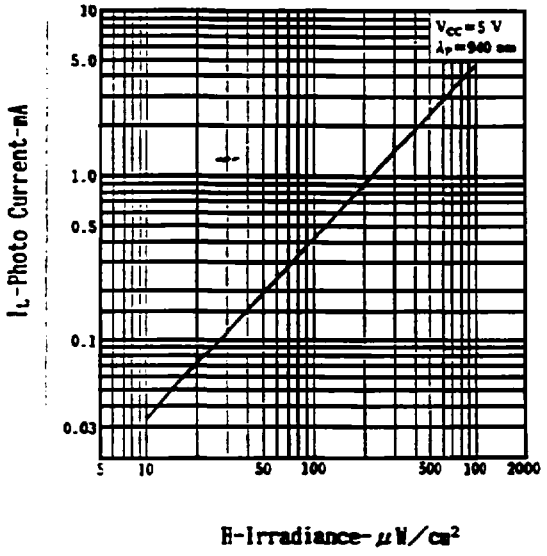
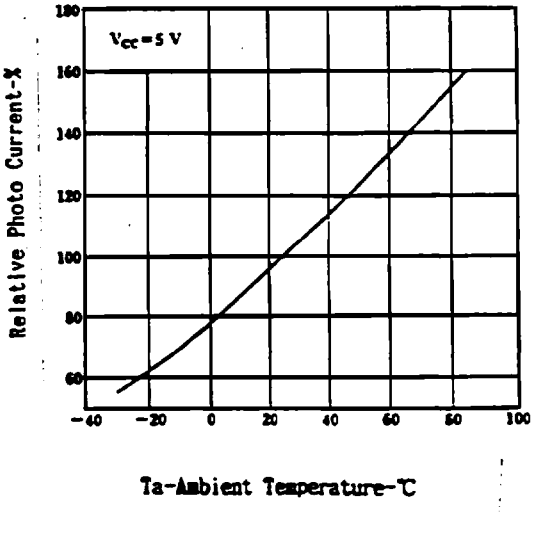



PHOTO CURRENT vs. IRRADIANCE




RELATIVE PHOTO CURRENT vs. AMBIENT TEMPERATURE



ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

| | | | |
|---|---|---|---|
| Collector to Emitter Voltage | $V_{CEO}$ | 30 | V |
| Collector Current | $I_C$ | 25 | mA |
| Collector Dissipation | $P_C$ | 75 | mW |
| Junction Temperature | $T_j$ | 100 | ℃ |
| Operating Temperature | Topt | -30 to +85 | ℃ |
| Storage Temperature | Tstg | -40 to +100 | ℃ |

ELECTRO-OPTICAL CHARACTERISTICS (Ta=25℃)

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| Collector Dark Current | $I_{CEO}$ | | | 100 | nA | $V_{CE}$=10V, H=0 |
| Collector Saturation Voltage | $V_{CE(sat)}$ | | | 0.4 | V | $I_C$=40μA, H=100μW/cm²* |
| Photo Current | $I_L$ | 40 | 200 | | μA | $V_{CE}$=5V, H=50μW/cm²* |
| Rise Time | $t_r$ | | 4 | | μs | Vcc=5V, $I_C$=2mA |
| Fall Time | $t_f$ | | 6 | | μs | $R_L$=100Ω |

* With infrared ray of peak light emitting wavelength λ=940nm