

IC BUILT-IN PHOTO DIODE

— NEPOC SERIES —

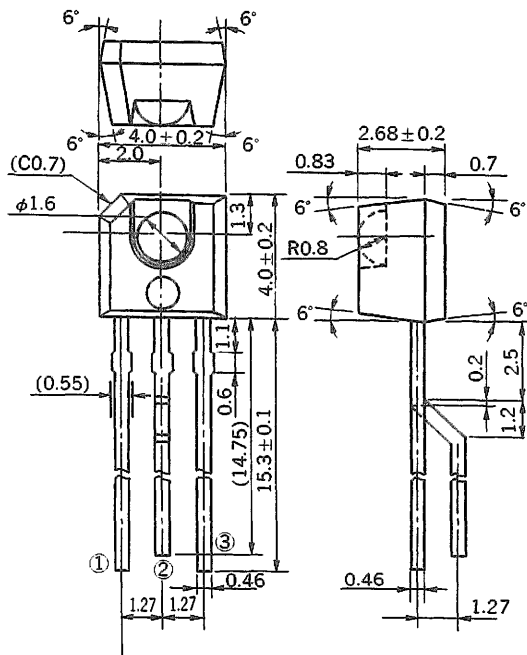
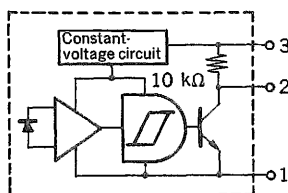
The PH502HC is a digital-output light receiving IC integrating a photo diode and signal processing circuit in a chip. And the direct connection with an IC without using a processing circuit simplifies the circuit configuration. It is the most suitable as various sensors in OA and AV equipment.

The combination with the small infrared LED SE308 allows the digital-output photo interrupter to be composed of. In addition, the PH502HC is ideally suited for the application for the light-receiving module internal elements of a simplified optical transmission link.

At the time of receiving-light shielding, the output is set at the low level.

OUTLINE DIMENSIONS

(Unit : mm)


TERMINAL CONNECTION


1. GND
2. V_O
3. V_{CC}

FEATURES

- Schmitt trigger circuit incorporated
- Low threshold irradiance
(H_{LH} = 50 μW/cm² MAX.)
- Direct connection with TTL, LSTTL and CMOS allowed
- Wide-range operating source voltage (V_{CC} = 4.5 to 17 V)
- High-speed response
(t_{PLH}, t_{PHL} = 3.3 μs TYP.)
(t_r = 100 ns, t_f = 50 ns TYP. @ R_L = 280 Ω)
- Active high type
- Open collector output

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

- Sensors for PPCs, FAXs, printers, electronic typewriters, FDDs and OA equipment
- Sensors for VTRs, VDs, CDs, and AVs
- Hook sensor for telephones

ABSOLUTE MAXIMUM RATINGS ($T_a = 25\text{ }^\circ\text{C}$)

Source Voltage	V_{CC}	17	V
Low Level Output Current	I_{OL}	50	mA
Power Consumption	P_D	250	mW
Operating Temperature	T_{opt}	-30 to +85	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to +100	$^\circ\text{C}$

RECOMMENDED OPERATING CONDITIONS

ITEMS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating temperature	T_{opt}	-10		+60	$^\circ\text{C}$
Source voltage	V_{CC}	4.5	5	12	V
Irradiance	H	50			$\mu\text{W}/\text{cm}^2$

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

ITEMS	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Operating source voltage	V_{CC}	4.5		17	V	
Low level output voltage	V_{OL}		0.15	0.4	V	$I_{OL} = 16\text{ mA}, V_{CC} = 5\text{ V}$
High level output voltage	V_{OH}	4.9			V	$V_{CC} = 5\text{ V}, H = 50\text{ } \mu\text{W}/\text{cm}^2$
Low level supply current	I_{CCL}		2.5	5	mA	$V_{CC} = 5\text{ V}, H = 0$
High level supply current	I_{CCH}		1	3	mA	$V_{CC} = 5\text{ V}, H = 50\text{ } \mu\text{W}/\text{cm}^2$
Threshold irradiance	H_{LH}		24	50	$\mu\text{W}/\text{cm}^2$	$V_{CC} = 5\text{ V}, \lambda = 940\text{ nm}, R_L = 280\text{ } \Omega$
Hysteresis	H_{HL}/H_{LH}		0.7			$V_{CC} = 5\text{ V}, \lambda = 940\text{ nm}, R_L = 280\text{ } \Omega$
Transmission delay time	t_{PLH}		3.3	9	μs	$V_{CC} = 5\text{ V}$ $H = 50\text{ } \mu\text{W}/\text{cm}^2$ $R_L = 280\text{ } \Omega$
	t_{PHL}		3.3	9	μs	
Rise time	t_r		100	300	ns	
Fall time	t_f		50	150	ns	

PH502 SERIES

TYPE NUMBER	FEATURES	FUNCTION	ELECTRICAL CHARACTERISTICS	
			THRESHOLD IRRADIANCE	RESPONSE
PH502HR	Schmidt trigger circuit incorporated (IC output type) Small-sized type	Active high type, Pull-up resistance incorporated	$H_{LH} = 50 \mu W/cm^2$ (MAX.) ($\lambda = 940$ nm)	$t_{PHL}, t_{PLH} = 3.3 \mu s$ (TYP.)
PH502HC		Active high type, Open-collector output		
PH502LR		Active low type, Pull-up resistance incorporated	$H_{HL} = 50 \mu W/cm^2$ (MAX.) ($\lambda = 940$ nm)	$t_r = 100 \mu s$ (TYP.) $t_f = 50 \mu s$ (TYP.) @ $R_L = 280 \Omega$
PH502LC		Active low type, Open-collector output		

[MEMO]

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Application examples recommended by NEC Corporation

Standard: Data processing and office equipment, Communication equipment (terminal, mobile), Test and Measurement equipment, Audio and Video equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Communication equipment (trunk line), Train and Traffic control devices, industrial robots, Burning control systems, antidisaster systems, anticrime systems etc.