

IC BUILT-IN PHOTO DIODE

—NEPOC SERIES—

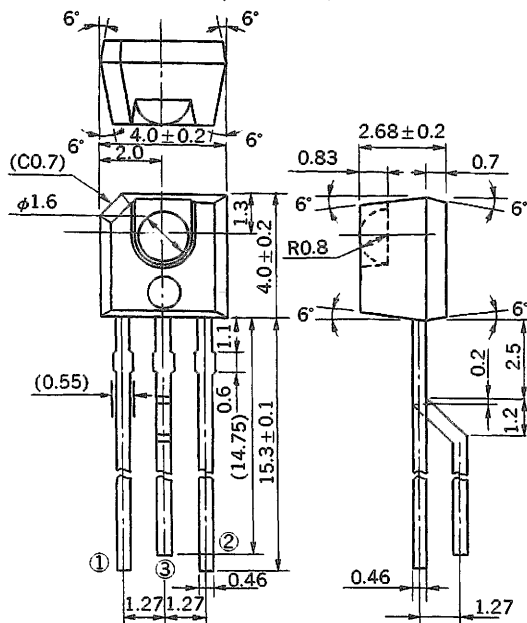
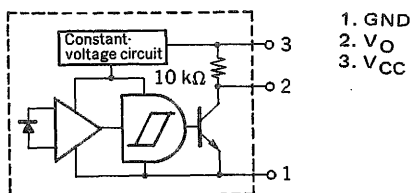
The PH502HR is a digital-output light receiving IC integrating a photo diode and a signal processing circuit in one chip. And the direct connection with an IC without using a processing circuit simplifies the circuit configuration. It is the most suitable as various sensors in OA and AV equipment.

The combination with the small infrared LED SE308 allows the digital-output photo interrupter to be composed of. In addition, the PH502HR 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

- Schmidt trigger circuit incorporated
- Low threshold irradiance
($H_{LH} = 50 \mu W/cm^2$ max.)
- Direct connection with TTL, LSTTL and CMOS allowed
- Wide-range operating source voltage ($V_{CC} = 4.5$ to 17 V)
- High-speed response
($t_{PLH}, t_{PHL} = 3.3 \mu s$ TYP.)
($t_r = 100$ ns. $t_f = 50$ ns TYP. @ $R_L = 280 \Omega$)
- Active high type

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 °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	°C
Storage Temperature	T _{stg}	-40 to +100	°C

RECOMMENDED OPERATING CONDITIONS

ITEMS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating temperature	T _{opt}	-10		+60	°C
Source voltage	V _{CC}	4.5	5	12	V
Irradiance	H	50			μW/cm ²

ELECTRICAL CHARACTERISTICS (T_a = 25 °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 mA, V _{CC} = 5 V
High level output voltage	V _{OH}	4.9			V	V _{CC} = 5 V, H = 50 μW/cm ²
Low level supply current	I _{CCL}		2.5	5	mA	V _{CC} = 5 V, H = 0
High level supply current	I _{CCH}		1	3	mA	V _{CC} = 5 V, H = 50 μW/cm ²
Threshold irradiance	H _{LT}		24	50	μW/cm ²	V _{CC} = 5 V, λ = 940 nm
Hysteresis	H _{HL} /H _{LH}		0.7			V _{CC} = 5 V, λ = 940 nm
Transmission delay time	t _{PLH}		3.3	9	μs	V _{CC} = 5 V H = 50 μW/cm ² R _L = 280 Ω
	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.) ($\lambda = 940 \text{ nm}$)	$t_{PHL}, t_{PLH} = 3.3 \mu s$ (TYP.)
PH502HC		Active high type, Open-collector output		
PH502LR		Active low type, Pull-up resistance incorporated	$H_{HL} = 50 \mu W/cm^2$ (MAX.) ($\lambda = 940 \text{ nm}$)	$t_r = 100 \mu s$ (TYP.) $t_f = 50 \mu s$ (TYP.) $@R_L = 280 \Omega$
PH502LC		Active low type, Open-collector output		

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The devices listed in this document are not suitable for use in the field where very high reliability is required including, but not limited to, aerospace equipment, submarine cables, unclear reactor control systems and life support systems. If customers intend to use NEC devices for above applications or those inted to use "Standard", or "Special" quality grade NEC devices for the applications not intended by NEC, please contact our sales people in advance.

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.