

# PT501/PT510

## TO-18 Type Narrow Acceptance Phototransistor

### ■ Features

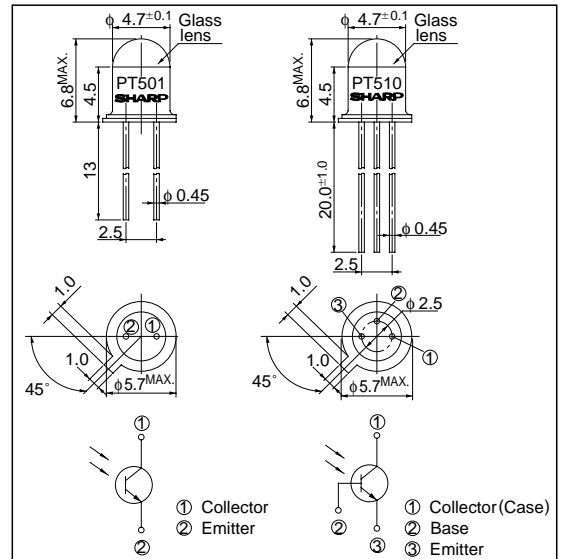
1. Narrow acceptance ( $\Delta\theta$  : TYP.  $\pm 6^\circ$ )
2. TO -18 type standard package
3. With base terminal : **PT510**

### ■ Applications

1. Optoelectronic switches, optoelectronic counters
2. Smoke detectors
3. Infrared applied systems

### ■ Outline Dimensions

(Unit : mm)



### ■ Absolute Maximum Ratings

(Ta = 25°C)

Parameter	Symbol	PT501	PT510	Unit
Collector-emitter voltage	$V_{CEO}$	45	35	V
Emitter-collector voltage	$V_{ECO}$	6	6	V
Collector-base voltage	$V_{CBO}$	-	35	V
Emitter-base voltage	$V_{EBO}$	-	6	V
Collector power dissipation	$P_C$	75	75	mW
Operating temperature	$T_{opr}$	- 25 to + 125	- 25 to + 125	°C
Storage temperature	$T_{stg}$	- 55 to + 150	- 55 to + 150	°C
*1 Soldering temperature	$T_{sol}$	260	260	°C

\*1 For 10 seconds at the position of 1.3mm from the bottom face of can package

### ■ Electro-optical Characteristics

(Ta = 25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit		
*2 Collector current		$I_C$	$V_{CE} = 5V, E_e = 10mW/cm^2$	2.5	<b>PT501</b>	10	-	mA	
					<b>PT510</b>	20			
Collector dark current		$I_{CEO}$	$V_{CE} = 30V, E_e = 0$	-	$2 \times 10^{-9}$	$10^{-7}$	A		
*2 Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 1mA, E_e = 10mW/cm^2$	-	0.2	-	V		
Peak sensitivity wavelength		$\lambda_P$		-	800	-	nm		
Response time	Rise time	$t_r$	$V_{CE} = 2V, I_C = 2mA, R_L = 100\Omega$ ( <b>PT501</b> : 1k $\Omega$ )	-	<b>PT501</b>	10	-	$\mu s$	
					<b>PT510</b>	2			
	Fall time	$t_f$			<b>PT501</b>	10		-	$\mu s$
					<b>PT510</b>	3			

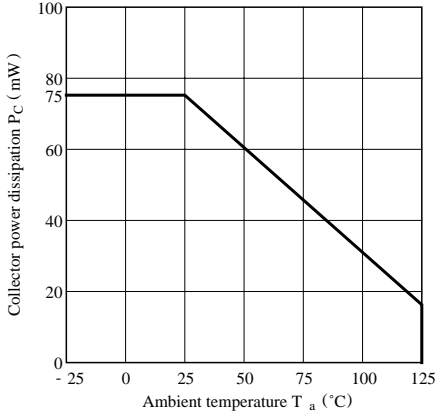
\*2  $E_e$  : Irradiance by CIE standard light source A (tungsten lamp)

\*2 Classification Table of Collector Current( $I_C$ )

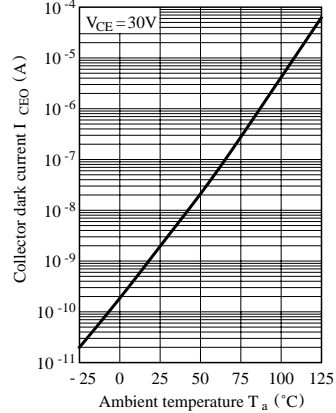
Model No.	$I_C$ (mA)
<b>PT501A</b>	20 to 80
<b>PT501B</b>	10 to 25
<b>PT501C</b>	2.5 to 15

at  $V_{CE} = 5V, E_e = 10mW/cm^2, T_a = 25^\circ C$

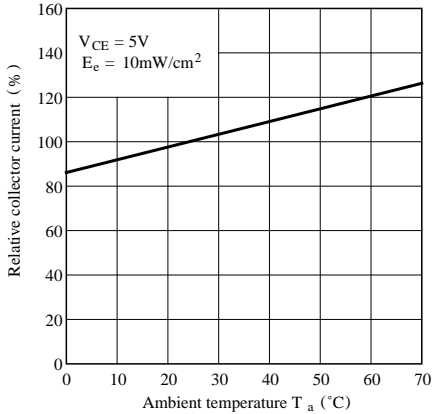
**Fig. 1 Collector Power Dissipation vs. Ambient Temperature**



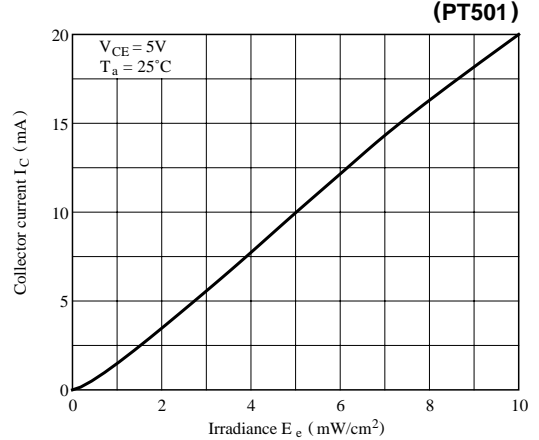
**Fig. 2 Collector Dark Current vs. Ambient Temperature**



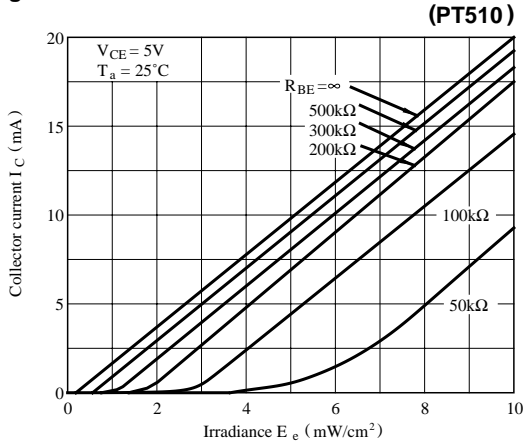
**Fig. 3 Relative Collector Current vs. Ambient Temperature**



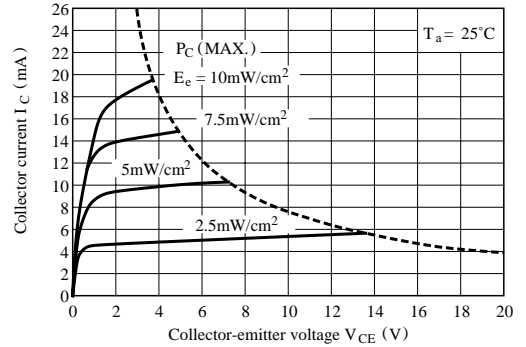
**Fig.4-a Collector Current vs. Irradiance (PT501)**



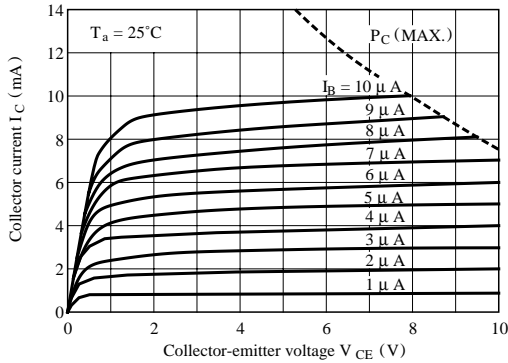
**Fig.4-b Collector Current vs. Irradiance**



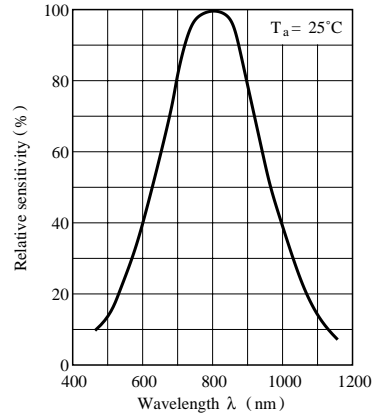
**Fig.5-a Collector Current vs. Collector-emitter Voltage**



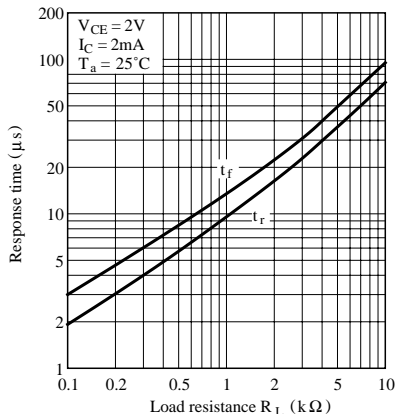
**Fig.5-b Collector Current vs. Collector-emitter Voltage**



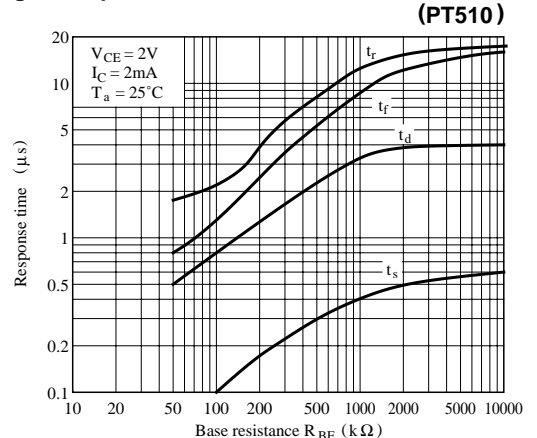
**Fig. 6 Spectral Sensitivity**



**Fig. 7 Response Time vs. Load Resistance**



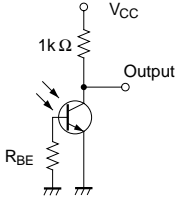
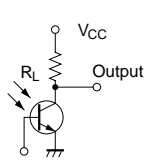
**Fig. 8 Response Time vs. Base Resistance**



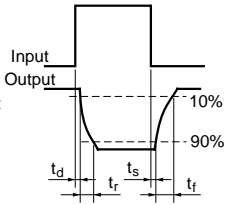
**Test Circuit for Response Time**

Correspond to Fig. 7

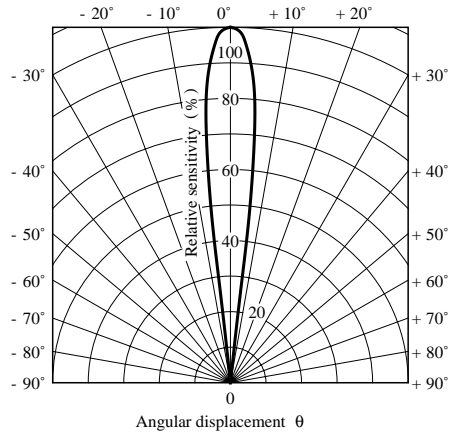
Correspond to Fig. 8



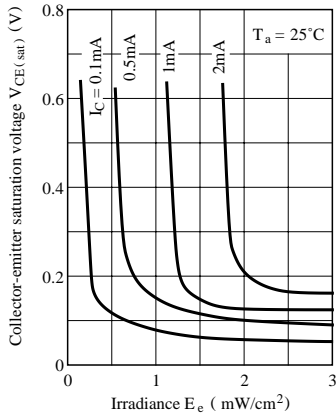
(PT501 has no base terminal.)



**Fig. 9 Sensitivity Diagram** ( $T_a = 25^\circ\text{C}$ )





**Fig.10 Collector-emitter Saturation Voltage vs. Irradiance**









● Please refer to the chapter “Precautions for Use.”

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