

# PNZ108CL (PN108CL)

## Silicon NPN Phototransistor

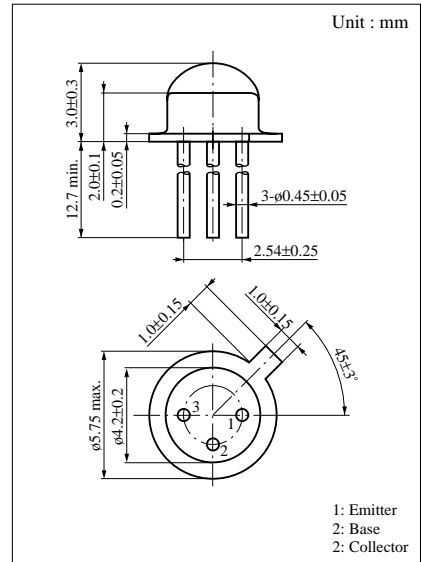
For optical control systems

### ■ Features

- High sensitivity :  $I_{CE(L)} = 3.5 \text{ mA (min.)}$  (at  $L = 500 \text{ lx}$ )
- Wide directional sensitivity for easy use
- Fast response :  $t_r = 5 \mu\text{s (typ.)}$
- Signal mixing capability using base pin
- Small size (low in height) package

### ■ Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Ratings	Unit
Collector to emitter voltage	$V_{CEO}$	20	V
Collector to base voltage	$V_{CBO}$	30	V
Emitter to collector voltage	$V_{ECO}$	3	V
Emitter to base voltage	$V_{EBO}$	5	V
Collector current	$I_C$	20	mA
Collector power dissipation	$P_C$	100	mW
Operating ambient temperature	$T_{opr}$	-25 to +85	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-30 to +100	$^\circ\text{C}$



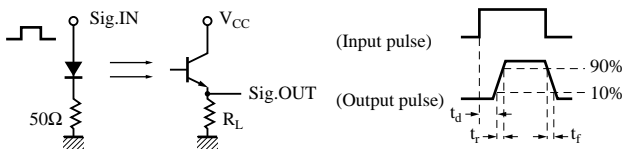
1: Emitter  
2: Base  
2: Collector

### ■ Electro-Optical Characteristics ( $T_a = 25^\circ\text{C}$ )

Parameter	Symbol	Conditions	min	typ	max	Unit
Dark current	$I_{CEO}$	$V_{CE} = 10\text{V}$		0.05	2	$\mu\text{A}$
Collector photo current	$I_{CE(L)}^{*3}$	$V_{CE} = 10\text{V}, L = 500 \text{ lx}^{*1}$	3.5	6		mA
Peak sensitivity wavelength	$\lambda_p$	$V_{CE} = 10\text{V}$		900		nm
Acceptance half angle	$\theta$	Measured from the optical axis to the half power point		80		deg.
Rise time	$t_r^{*2}$	$V_{CC} = 10\text{V}, I_{CE(L)} = 5\text{mA}$		5		$\mu\text{s}$
Fall time	$t_f^{*2}$	$R_L = 100\Omega$		6		$\mu\text{s}$
Collector saturation voltage	$V_{CE(sat)}$	$I_{CE(L)} = 1\text{mA}, L = 1000 \text{ lx}^{*1}$		0.3	0.6	V

\*1 Measurements were made using a tungsten lamp (color temperature  $T = 2856\text{K}$ ) as a light source.

\*2 Switching time measurement circuit



$t_d$ : Delay time

$t_r$ : Rise time (Time required for the collector photo current to increase from 10% to 90% of its final value)

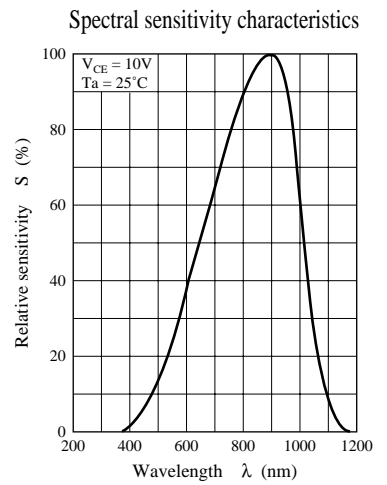
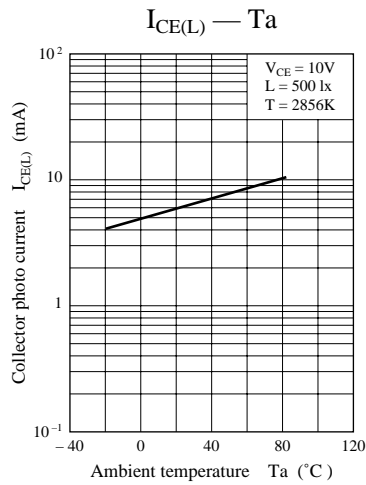
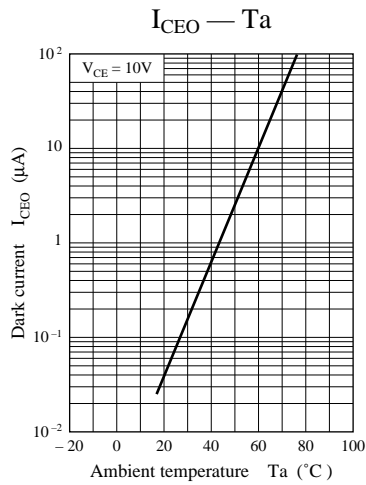
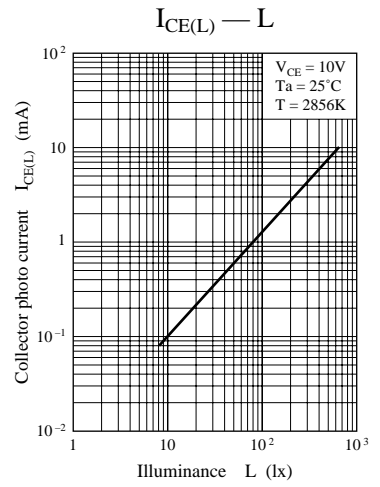
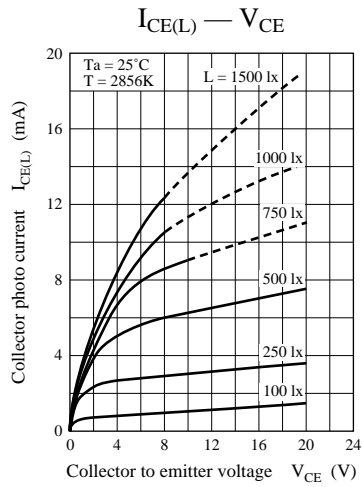
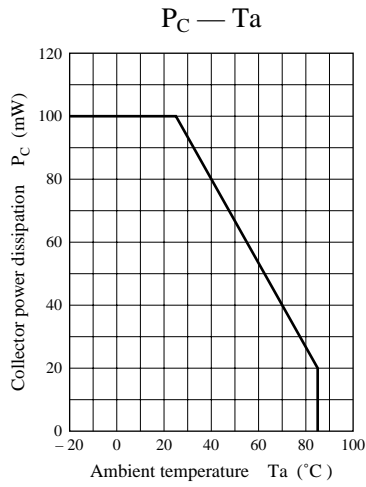
$t_f$ : Fall time (Time required for the collector photo current to decrease from 90% to 10% of its initial value)

\*3  $I_{CE(L)}$  Classifications

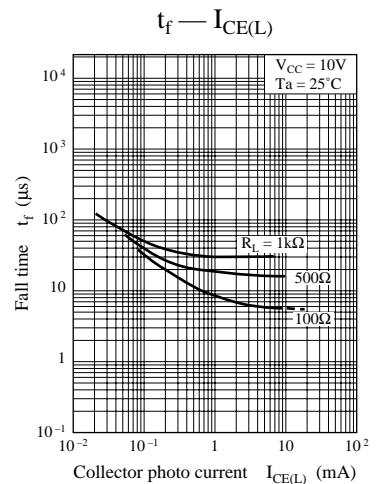
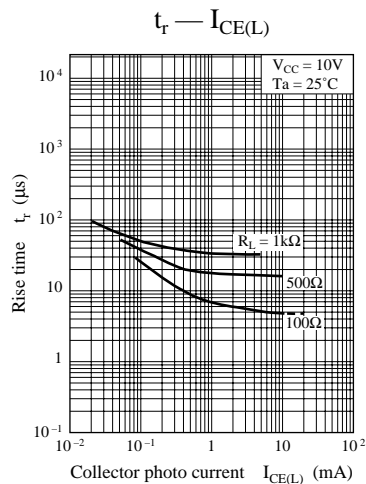
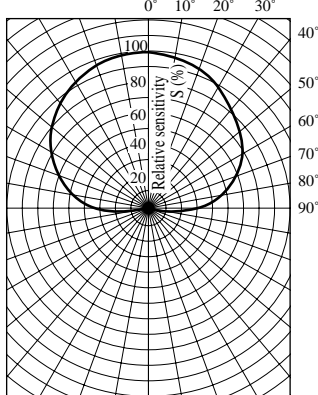
Class	Q	R	S
$I_{CE(L)}$ (mA)	3.5 to 6.0	5.0 to 9.1	> 7.5

Note) Difficult to guarantee compliance with moisture resistance standard (MIL-STD-202D).

Note) The part number in the parenthesis shows conventional part number.



**Directivity characteristics**



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