

PNZ109CL

Silicon NPN Phototransistor

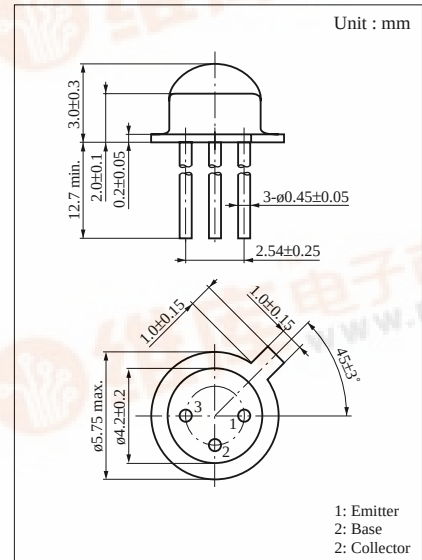
For optical control systems

Features

- High sensitivity : $I_{CE(L)} = 2 \text{ mA (min.) (at } L = 500 \text{ lx)}$
- 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
- Resin to cutoff visible light is used

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	$^\circ\text{C}$

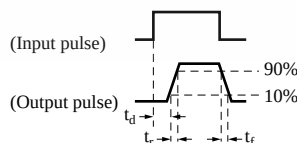


Electro-Optical Characteristics ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	min	typ	max	Unit
Dark current	I_{CEO}	$V_{CE} = 10\text{V}$		0.05	2	μA
Collector photo current	$I_{CE(L)}$	$V_{CE} = 10\text{V}, L = 500 \text{ lx}^1$	2.5	4		mA
Peak sensitivity wave length	λ_p	$V_{CE} = 10\text{V}$		900		nm
Acceptance half angle	θ	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		μs
Fall time	t_f^2	$R_L = 100\Omega$		6		μs
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

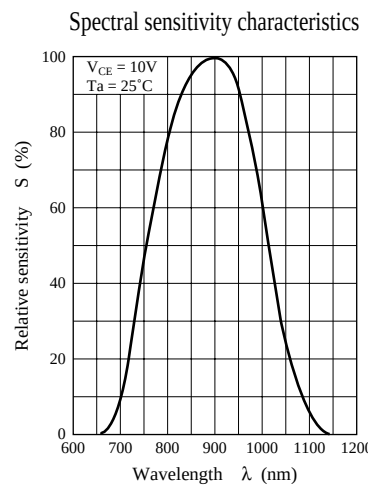
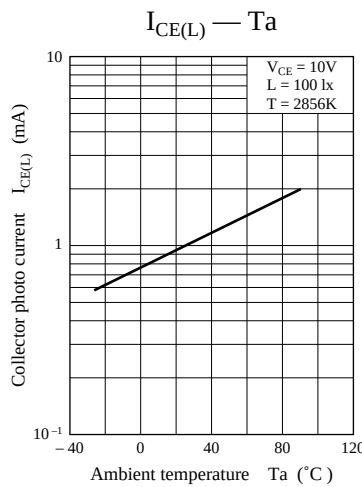
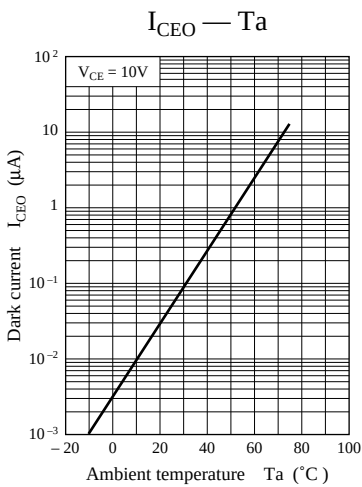
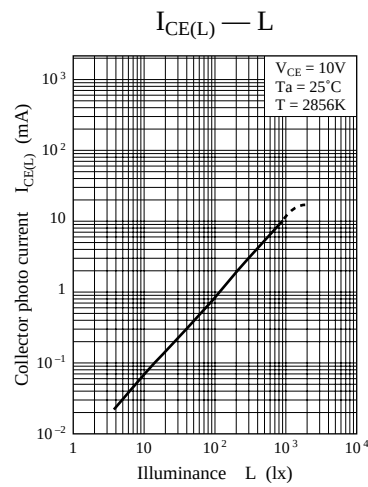
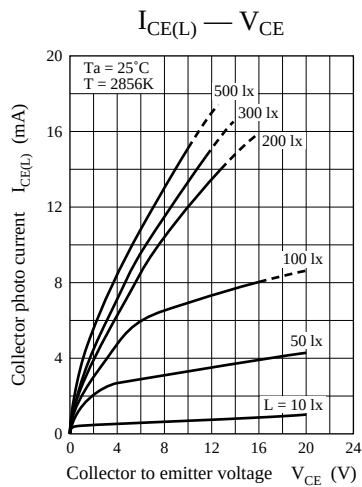
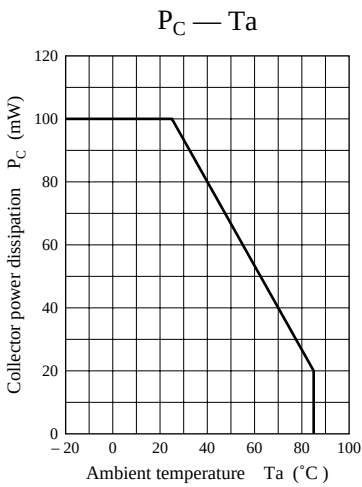


t_d : Delay time

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)





Directivity characteristics

