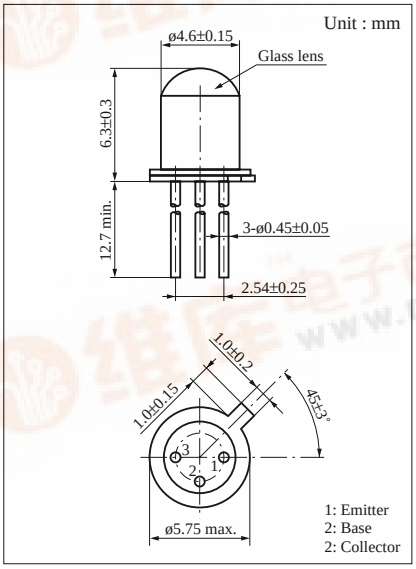
PNZ109L (PN109L)

Silicon NPN Phototransistor

For optical control systems



Features

- High sensitivity : $I_{CE(L)}$ = 3.5 mA (min.) (at L = 100 lx)
- Built-in filter to cutoff visible light for reducing ambient light noise
- Peak sensitivity wavelength matched with infrared light emitting devices : λ_p = 900 nm (typ.)
- Fast response : t_r = 5 µs (typ.)
- Long lifetime, high reliability

Absolute Maximum Ratings (Ta = 25˚C)

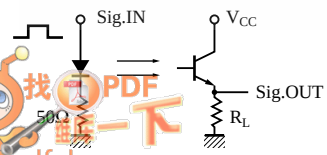
Parameter	Symbol	Ratings	Unit
Collector to emitter voltage	V_{CEO}	20	V
Collector to base voltage	V_{CBO}	30	V
Emitter to collector voltage	V_{ECO}	3	V
Emitter to base voltage	V_{EBO}	5	V
Collector current	I_C	30	mA
Collector power dissipation	P_C	150	mW
Operating ambient temperature	T_{opr}	–25 to +85	˚C
Storage temperature	T_{stg}	–30 to +100	˚C

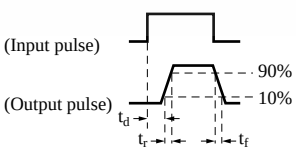
Electro-Optical Characteristics (Ta = 25˚C)

Parameter	Symbol	Conditions	min	typ	max	Unit
Dark current	I_{CEO}	V_{CE} = 10V		0.05	2	µA
Collector photo current	$I_{CE(L)}$	V_{CE} = 10V, L = 100 lx*1	3.5			mA
Peak sensitivity wavelength	λ_P	V_{CE} = 10V		900		nm
Acceptance half angle	θ	Measured from the optical axis to the half power point		10		deg.
Rise time	t_r*2	V_{CC} = 10V, $I_{CE(L)}$ = 5mA		5		µs
Fall time	t_f*2	R_L = 100Ω		6		µs
Collector saturation voltage	$V_{CE(sat)}$	$I_{CE(L)}$ = 1mA, L = 500 lx*1		0.3	0.6	V

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

*2 Switching time measurement circuit





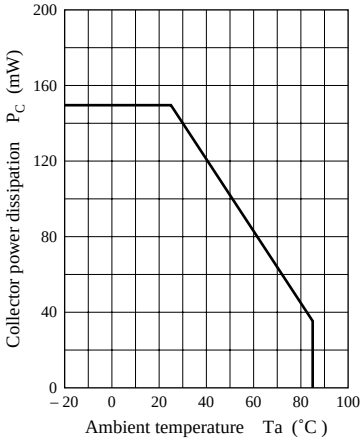
t_d : Delay time

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

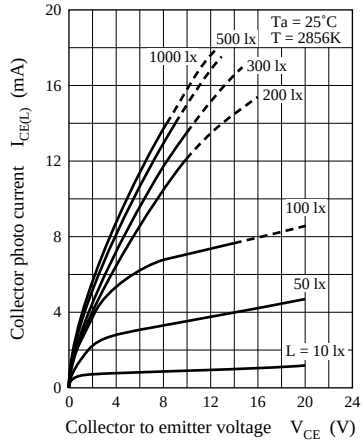
t_f : Fall time (Time required for the collector photo current to decrease from 90% to 10% of its initial value)

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

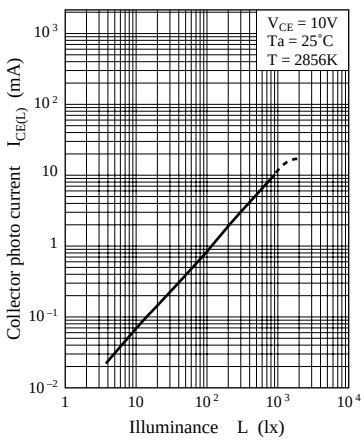
P_C — Ta



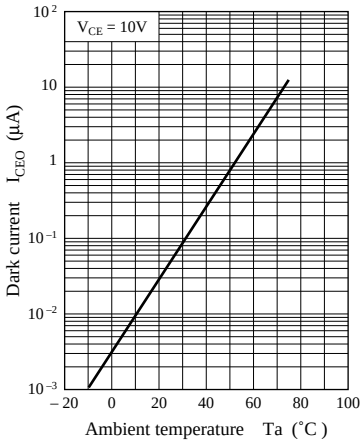
$I_{CE(L)}$ — V_{CE}



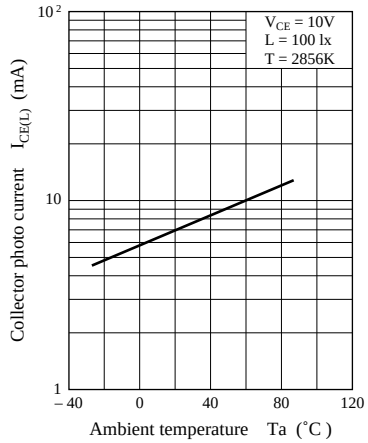
$I_{CE(L)}$ — L



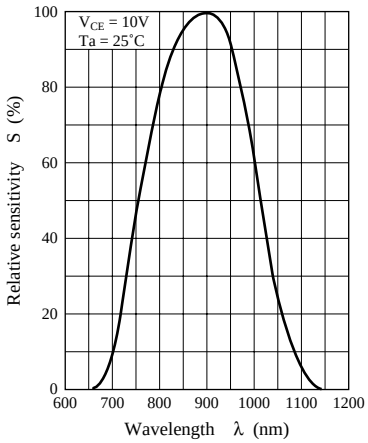
I_{CEO} — Ta



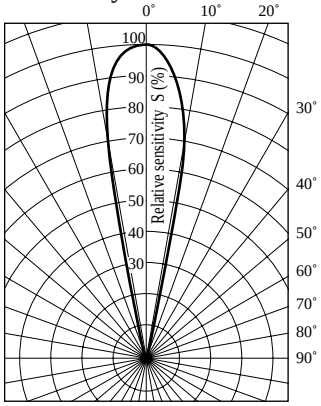
$I_{CE(L)}$ — Ta



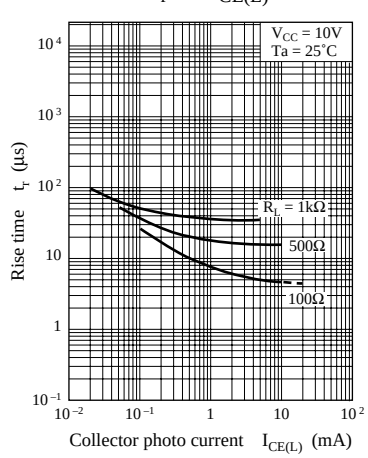
Spectral sensitivity characteristics



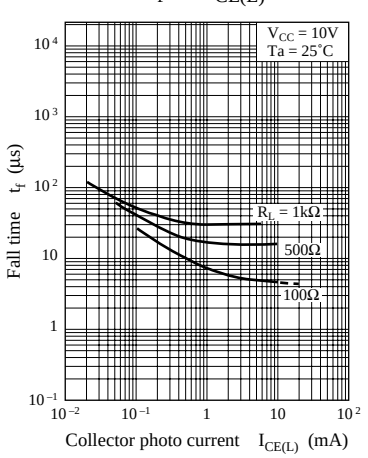
Directivity characteristics



t_r — $I_{CE(L)}$



t_f — $I_{CE(L)}$



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