

# PNZ109F

## Silicon NPN Phototransistor

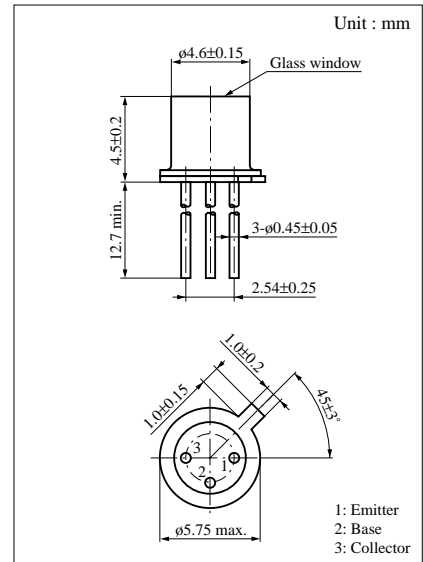
For optical control systems

### ■ Features

- Flat window design which is suited to optical systems
- Built-in filter to cutoff visible light for reducing ambient light noise
- Peak sensitivity wavelength matched with infrared light emitting devices :  $\lambda_p = 900 \text{ nm}$  (typ.)
- Fast response :  $t_r = 8 \mu\text{s}$  (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

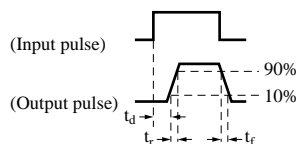
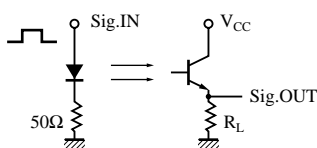


### ■ Electro-Optical Characteristics (Ta = 25°C)

Parameter	Symbol	Conditions	min	typ	max	Unit
Dark current	$I_{CEO}$	$V_{CE} = 10V$		0.05	2	$\mu\text{A}$
Collector photo current	$I_{CE(L)}$	$V_{CE} = 10V, L = 100 \text{ lx}^{*1}$	0.3			mA
Peak sensitivity wave length	$\lambda_p$	$V_{CE} = 10V$		900		nm
Acceptance half angle	$\theta$	Measured from the optical axis to the half power point		40		deg.
Rise time	$t_r^{*2}$	$V_{CC} = 10V, I_{CE(L)} = 1mA$		8		$\mu\text{s}$
Fall time	$t_f^{*2}$	$R_L = 100\Omega$		9		$\mu\text{s}$
Collector saturation voltage	$V_{CE(sat)}$	$I_{CE(L)} = 1mA, L = 1000 \text{ lx}^{*1}$		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)

