

# CNZ1109 (ON1109)

## Photo Interrupter

For contactless SW, object detection

### Overview

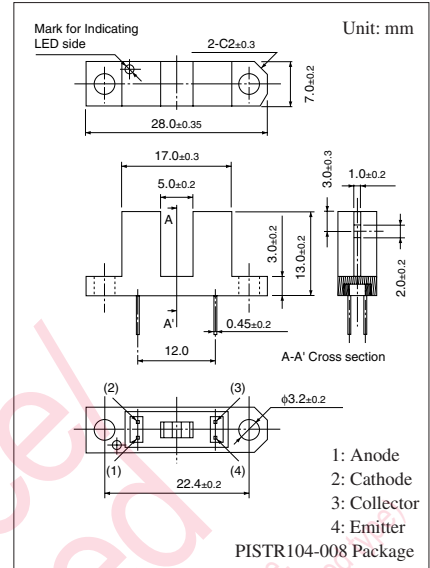
CNZ1109 is a photocoupler in which a high efficiency GaAs infrared light emitting diode is used as the light emitting element, and a high sensitivity phototransistor is used as the light detecting element. The two elements are arranged so as to face each other, and objects passing between them are detected.

### Features

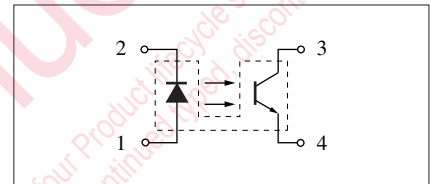
- Highly precise position detection: 0.7 mm
- Fast response  $t_r$ ,  $t_f = 6 \mu s$  (typ.)
- Small output current variation against change in temperature
- Deep and wide gap between emitting and detecting elements

### Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter	Symbol	Rating	Unit
Input (Light emitting diode)	Reverse voltage	$V_R$	3 V
	Forward current	$I_F$	50 mA
	Power dissipation *1	$P_D$	75 mW
Output (Photo transistor)	Collector-emitter voltage (Base open)	$V_{CEO}$	30 V
	Emitter-collector voltage (Base open)	$V_{ECO}$	5 V
	Collector current	$I_C$	20 mA
	Collector power dissipation *2	$P_C$	100 mW
	Temperature		
Operating ambient temperature	$T_{opr}$	-25 to +85	$^\circ C$
Storage temperature	$T_{stg}$	-30 to +100	$^\circ C$



### Internal Connection



Note) \*1: Input power derating ratio is 1.0 mW/ $^\circ C$  at  $T_a \geq 25^\circ C$ .

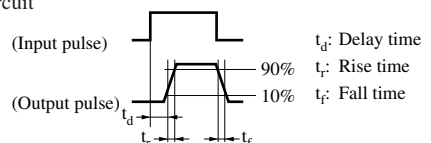
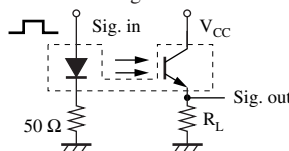
\*2: Output power derating ratio is 1.34 mW/ $^\circ C$  at  $T_a \geq 25^\circ C$ .

### Electrical-Optical Characteristics $T_a = 25^\circ C \pm 3^\circ C$

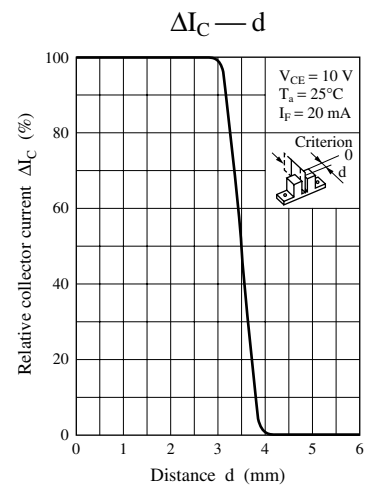
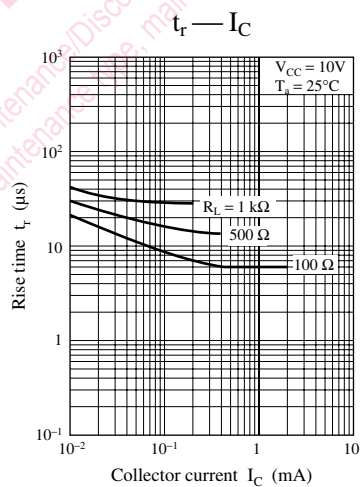
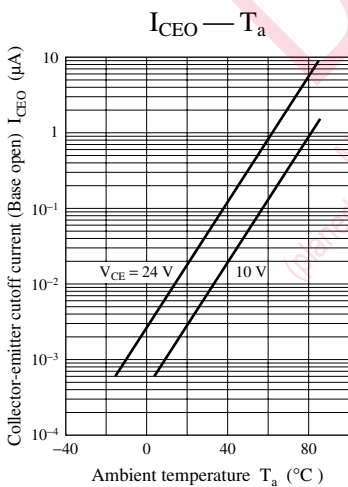
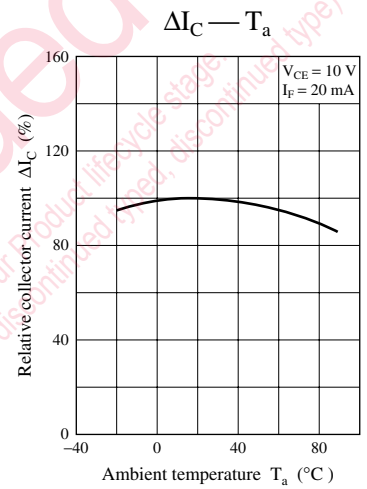
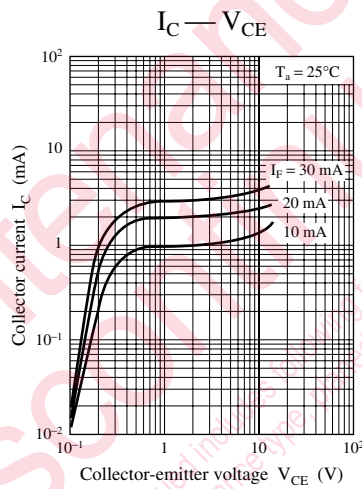
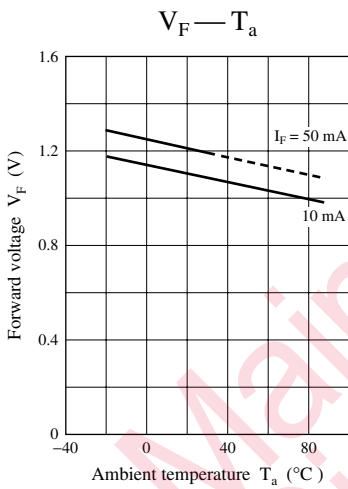
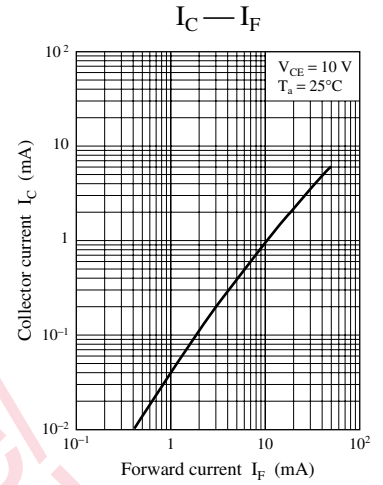
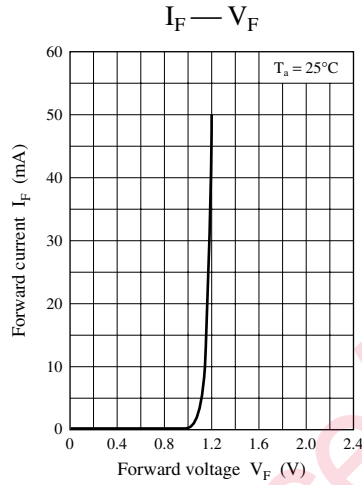
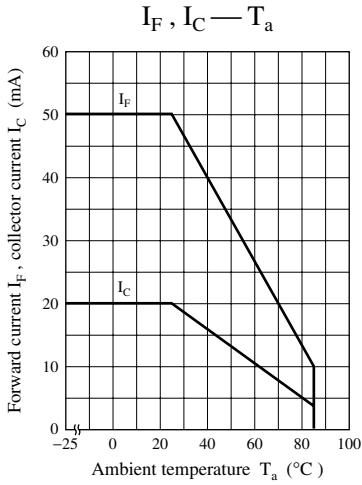
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Input characteristics	Forward voltage	$V_F$ $I_F = 50 \text{ mA}$		1.2	1.5	V
	Reverse current	$I_R$ $V_R = 3 \text{ V}$			10	$\mu A$
Output characteristics	Collector-emitter cutoff current (Base open)	$I_{CEO}$ $V_{CE} = 10 \text{ V}$			200	nA
	Collector-emitter capacitance	$C_C$ $V_{CE} = 10 \text{ V}, f = 1 \text{ MHz}$		5		pF
Transfer characteristics	Collector current	$I_C$ $I_F = 50 \text{ mA}, I_C = 0.1 \text{ mA}$	0.3			mA
	Collector-emitter saturation voltage	$V_{CE(sat)}$ $I_F = 50 \text{ mA}, I_C = 1 \text{ mA}$			0.3	V
	Rise time *	$t_r$ $V_{CC} = 10 \text{ V}, I_C = 1 \text{ mA}, R_L = 100 \Omega$		6.0		$\mu s$
	Fall time *	$t_f$ $V_{CC} = 10 \text{ V}, I_C = 1 \text{ mA}, R_L = 100 \Omega$		6.0		$\mu s$

- Note) 1. Input and output are practiced by electricity.  
 2. This device is designed be disregarded radiation.

3. \*: Switching time measurement circuit



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



# Caution for Safety

 **DANGER**

## ■ This product contains Gallium Arsenide (GaAs).

GaAs powder and vapor are hazardous to human health if inhaled or ingested. Do not burn, destroy, cut, cleave off, or chemically dissolve the product. Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.

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