CNZ1109 (ON1109)

Photo Interrupter

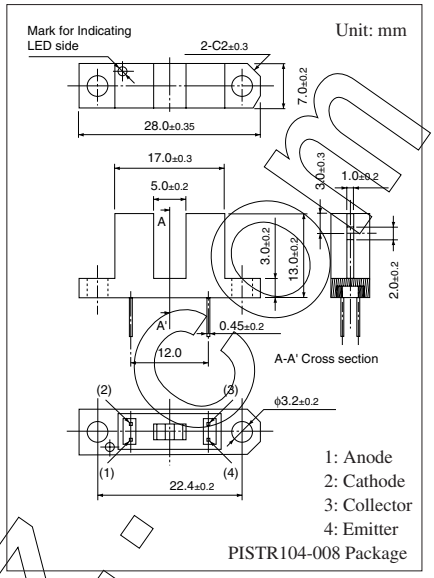
For contactless SW, object detection

■ 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

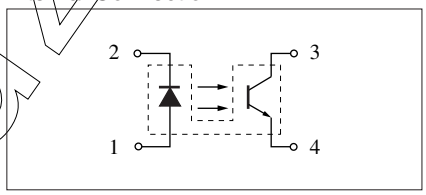
- Highly precise position detection: 0.7 mm
- Fast response t_r , t_f = 6 µs (typ.)
- Small output current variation against change in temperature
- Deep and wide gap between emitting and detecting elements



■ Absolute Maximum Ratings T_a = 25°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	°C
	Storage temperature	T_{stg}	−30 to +100	°C

Internal Connection

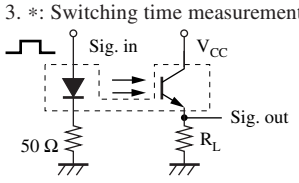


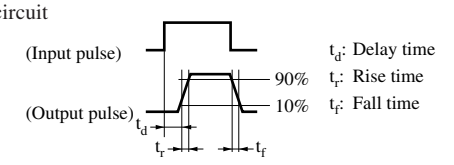
Note) ∗1: Input power derating ratio is 1.0 mW/°C at $T_a \geq 25°C$.
∗2: Output power derating ratio is 1.34 mW/°C at $T_a \geq 25°C$.

■ Electrical-Optical Characteristics T_a = 25°C ± 3°C

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

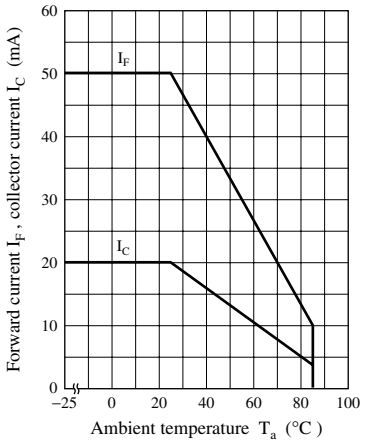
Note) 1. Input and output are practiced by electricity.
2. This device is designed be disregarded radiation.
3. ∗: Switching time measurement circuit



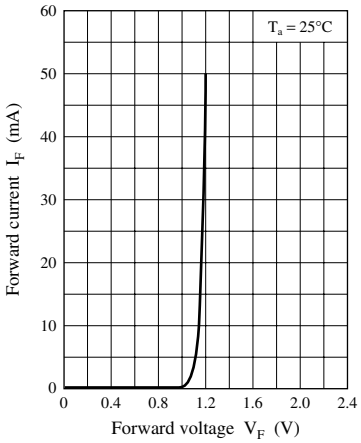


Note) The part number in the parenthesis shows conventional part number.

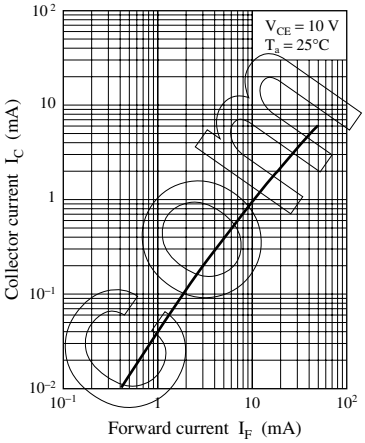
I_F , I_C — T_a



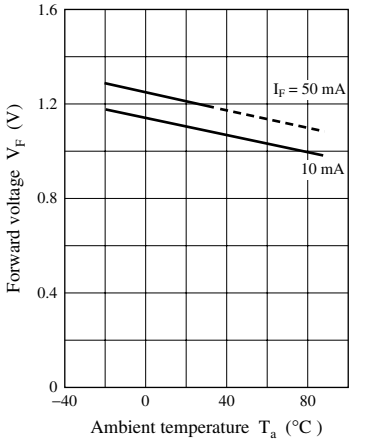
I_F — V_F



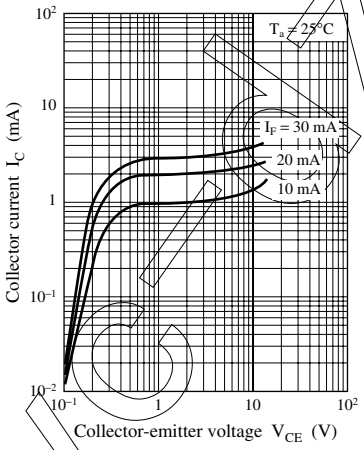
I_C — I_F



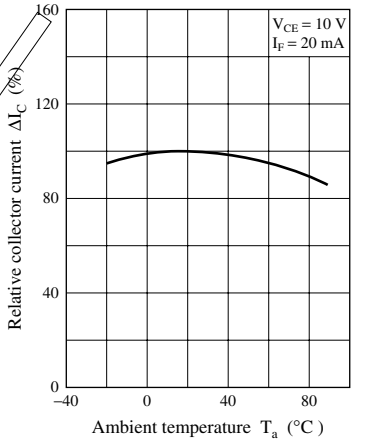
V_F — T_a



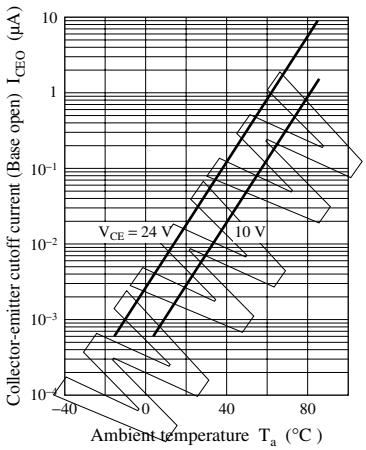
I_C — V_{CE}



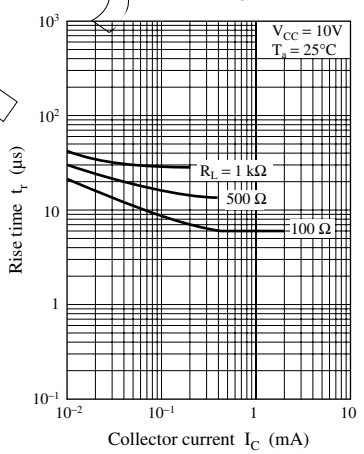
ΔI_C — T_a



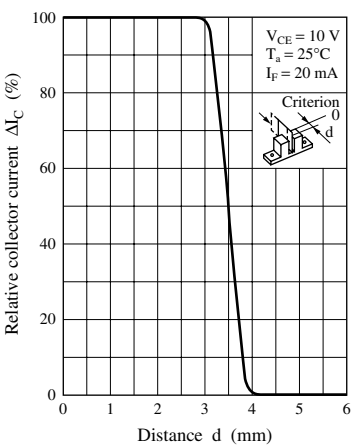
I_{CEO} — T_a



t_r — I_C



ΔI_C — d



⚠ 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 form general industrial waste or household garbage.

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