

# CNZ1111, CNZ1112

## Photo Interrupters

For contactless SW, object detection

### Overview

CNZ1111 and CNZ1112 are 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

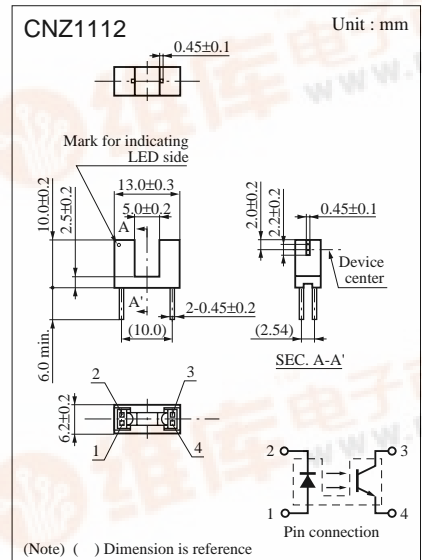
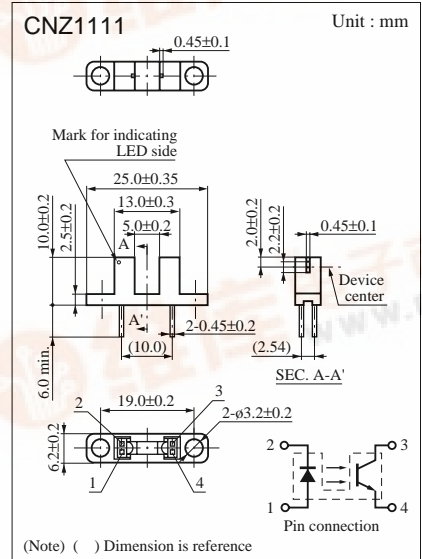
- Highly precise position detection : 0.3 mm
- Wide gap between emitting and detecting elements, suitable for thick plate detection
- Fast response :  $t_r, t_f = 6 \mu s$  (typ.)
- Small output current variation against change in temperature

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

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

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

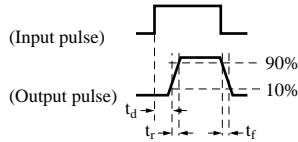
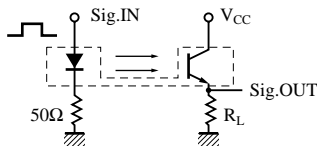
\*2 Output power derating ratio is 1.33 mW/ $^\circ C$  at  $T_a \geq 25^\circ C$ .



■ Electrical Characteristics (Ta = 25°C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Input characteristics	Forward voltage (DC)	$V_F$	$I_F = 50\text{mA}$		1.2	1.5	V
	Reverse current (DC)	$I_R$	$V_R = 3\text{V}$			10	$\mu\text{A}$
Output characteristics	Collector cutoff current	$I_{CEO}$	$V_{CE} = 10\text{V}$			200	nA
	Collector to emitter capacitance	$C_C$	$V_{CE} = 10\text{V}, f = 1\text{MHz}$		5		pF
Transfer characteristics	Collector current	$I_C$	$V_{CE} = 10\text{V}, I_F = 20\text{mA}$	0.3			mA
	Response time	$t_r, t_f^*$	$V_{CC} = 10\text{V}, I_C = 1\text{mA}, R_L = 100\Omega$		6		$\mu\text{s}$
	Collector to emitter saturation voltage	$V_{CE(sat)}$	$I_F = 50\text{mA}, I_C = 0.1\text{mA}$			0.3	V

\* Switching time measurement circuit



$t_d$ : Delay time  
 $t_r$ : Rise time (Time required for the collector current to increase from 10% to 90% of its final value)  
 $t_f$ : Fall time (Time required for the collector current to decrease from 90% to 10% of its initial value)

