

# CNZ1021, CNZ1022, CNZ1023, CNA1009

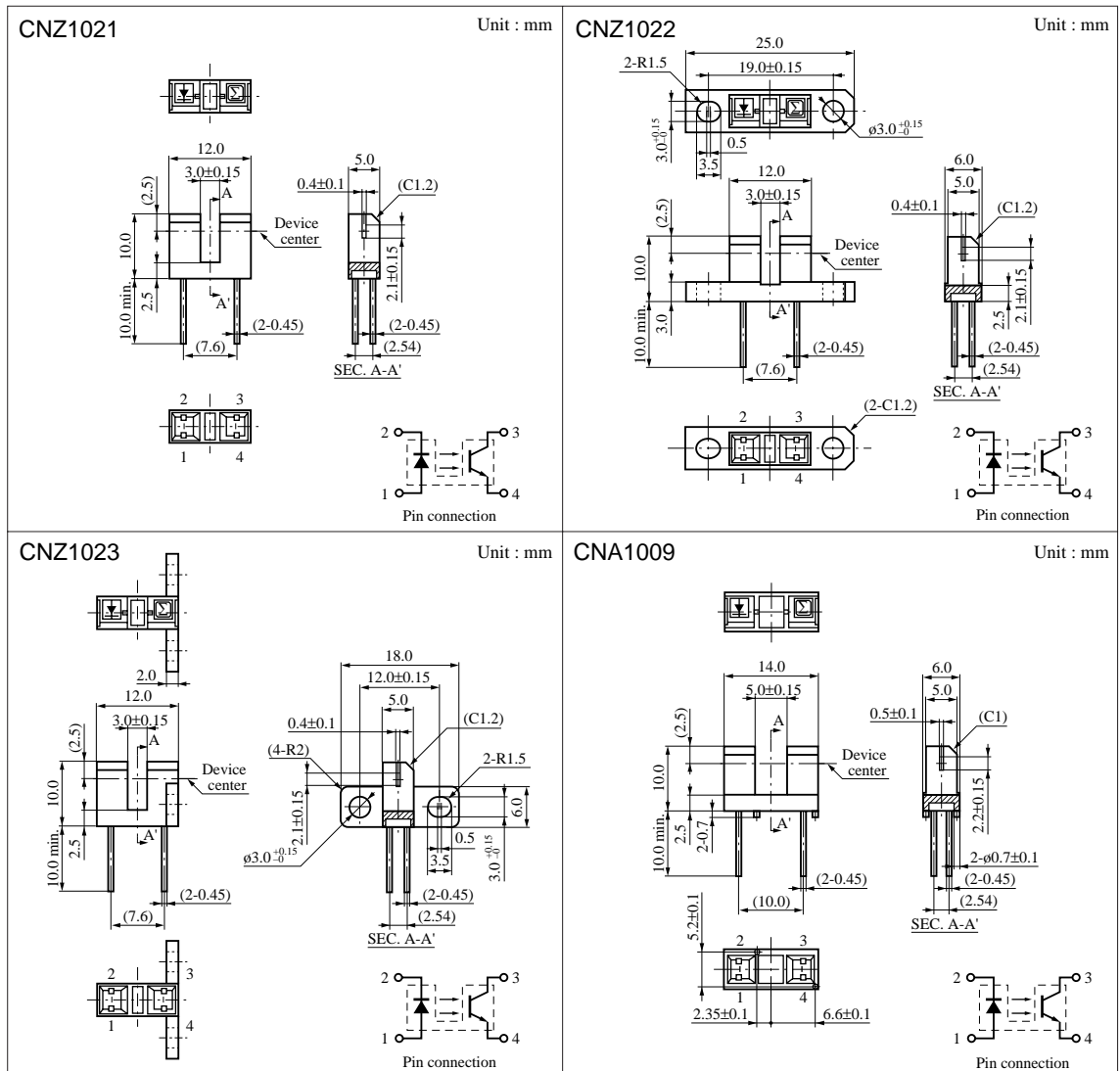
## Photo Interrupters

### Overview

CNZ1021 series is a transmissive photosensor series 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

- Position detection accuracy : 0.25 mm
- Gap width : 3 mm (CNZ1021, CNZ1022, CNZ1023)  
5 mm (CNA1009)
- The type directly attached to PCB ..... CNZ1021  
Screw-fastened type (both sides) ..... CNZ1022  
Screw-fastened type (one side) ..... CNZ1023  
The type directly attached to PCB ..... CNA1009  
(with a positioning pins)



(Note) 1. Tolerance unless otherwise specified is  $\pm 0.3$ .  
2. ( ) Dimension is reference.

■ Absolute Maximum Ratings (Ta = 25°C)

| Parameter                    |                               | Symbol     | Ratings     | Unit |
|------------------------------|-------------------------------|------------|-------------|------|
| Input (Light emitting diode) | Reverse voltage (DC)          | $V_R$      | 5           | 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  | °C   |
|                              | Storage temperature           | $T_{stg}$  | -40 to +100 | °C   |

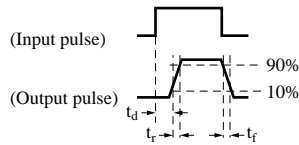
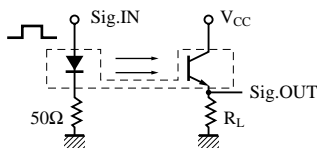
\*1 Input power derating ratio is 1.0 mW/°C at Ta ≥ 25°C.

\*2 Output power derating ratio is 1.33 mW/°C at Ta ≥ 25°C.

■ Electrical Characteristics (Ta = 25°C)

| Parameter                |   | Symbol        | Conditions   | min | typ  | max | Unit |
|--------------------------|---|---------------|--|-----|------|-----|------|
| Input characteristics    | Forward voltage (DC)                    | $V_F$         | $I_F = 20\text{mA}$                                      |     | 1.25 | 1.4 | V    |
|                          | Reverse current (DC)                    | $I_R$         | $V_R = 3\text{V}$  |     |      | 10  | μA   |
| Output characteristics   | Collector cutoff current                | $I_{CEO}$     | $V_{CE} = 10\text{V}$                                    |     | 10   | 200 | nA   |
| Transfer characteristics | Collector current                       | $I_C$         | $V_{CC} = 5\text{V}, I_F = 20\text{mA}, R_L = 100\Omega$ | 0.5 |      | 15  | mA   |
|                          | Collector to emitter saturation voltage | $V_{CE(sat)}$ | $I_F = 40\text{mA}, I_C = 1\text{mA}$                    |     |      | 0.4 | V    |
|                          | Response time                           | $t_r, t_f^*$  | $V_{CC} = 5\text{V}, I_C = 1\text{mA}, R_L = 100\Omega$  |     | 5    |     | μs   |

\* 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)

