

# CNZ1179

## Photo Interrupter

For contactless SW, object detection

### Overview

CNZ1179 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 : 0.3 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

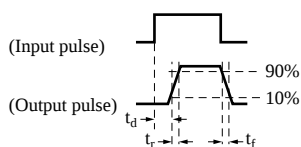
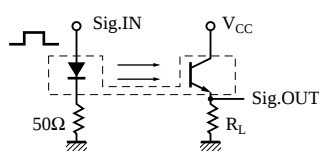
### Absolute Maximum Ratings (Ta = 25°C)

|                              | 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  | °C   |
|                              | Storage temperature           | $T_{stg}$  | -30 to +100 | °C   |

### Electrical Characteristics (Ta = 25°C)

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

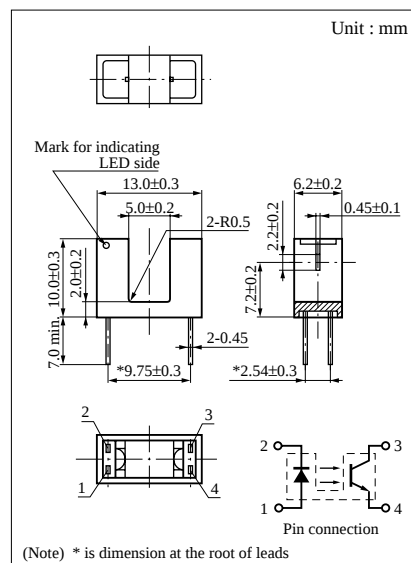
\* Switching time measurement circuit



$t_d$ : 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)



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

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

