

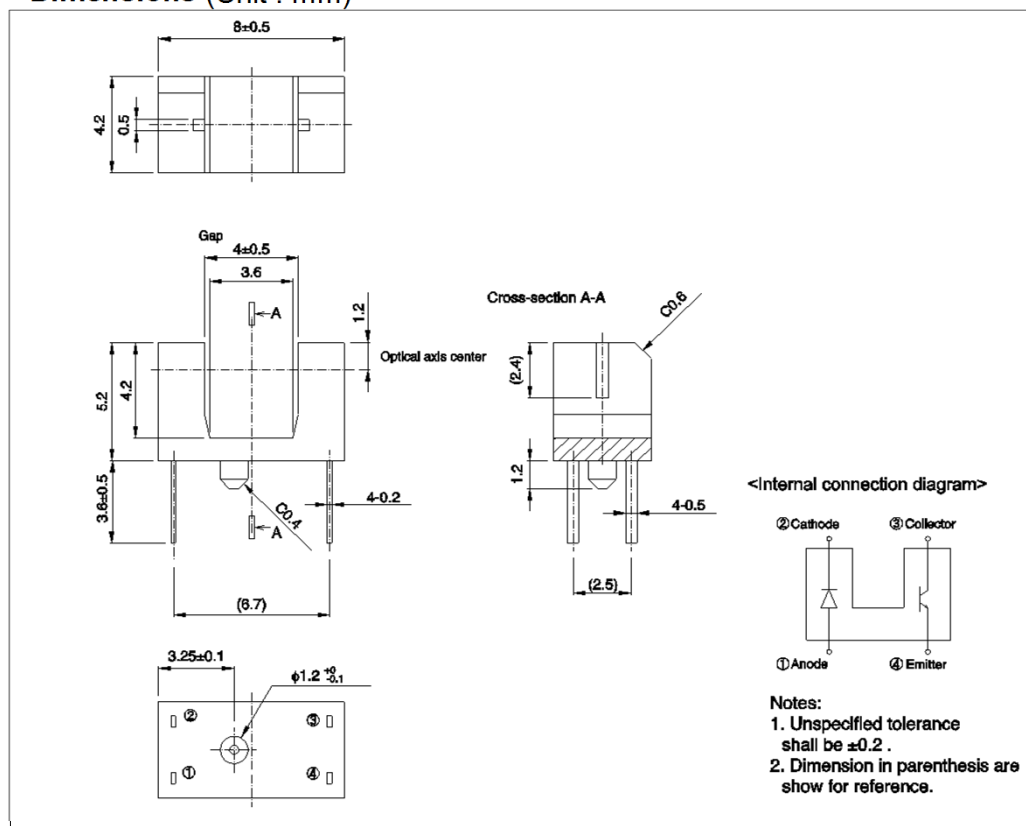
### ●Applications

- Optical control equipment
- Printers
- Amusement

### ●Features

- 1) Compact with a 4mm gap.
- 2) High precision position detection (slit width of 0.5mm).
- 3) Minimal influence from stray light.
- 4) Low collector-emitter saturation voltage.

### ●Dimensions (Unit : mm)



### ●Outline



### ●Absolute maximum ratings (T<sub>a</sub> = 25°C)

| Parameter                 |                             | Symbol           | Value      | Unit |
|---------------------------|-----------------------------|------------------|------------|------|
| Input (LED)               | Forward current             | I <sub>F</sub>   | 50         | mA   |
|                           | Reverse voltage             | V <sub>R</sub>   | 5          | V    |
|                           | Power dissipation           | P <sub>D</sub>   | 80         | mW   |
| Output (photo-transistor) | Collector-emitter voltage   | V <sub>CEO</sub> | 30         | V    |
|                           | Emitter-collector voltage   | V <sub>ECO</sub> | 4.5        | V    |
|                           | Collector current           | I <sub>C</sub>   | 30         | mA   |
|                           | Collector power dissipation | P <sub>C</sub>   | 80         | mW   |
| Operating temperature     |                             | T <sub>opr</sub> | -25 to +85 | °C   |
| Storage temperature       |                             | T <sub>stg</sub> | -30 to +85 | °C   |

**●Electrical and optical characteristics** ( $T_a = 25^\circ\text{C}$ )

| Parameter                    |                                      | Symbol        | Conditions                                                                                                                                   | Values |      |      | Unit          |
|------------------------------|--------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------|------|------|---------------|
|                              |                                      |               |                                                                                                                                              | Min.   | Typ. | Max. |               |
| Input characteristics        | Forward voltage                      | $V_F$         | $I_F = 50\text{mA}$                                                                                                                          | -      | 1.3  | 1.6  | V             |
|                              | Reverse current                      | $I_R$         | $V_R = 5\text{V}$                                                                                                                            | -      | -    | 10   | $\mu\text{A}$ |
| Output characteristics       | Dark current                         | $I_{CEO}$     | $V_{CE} = 10\text{V}$                                                                                                                        | -      | -    | 0.5  | $\mu\text{A}$ |
|                              | Peak sensitivity wavelength          | $\lambda_p$   | -                                                                                                                                            | -      | 800  | -    | nm            |
| Transfer characteristics     | Collector current                    | $I_C$         | $V_{CE} = 5\text{V}$ , $I_F = 20\text{mA}$                                                                                                   | 0.2    | 0.55 | -    | mA            |
|                              | Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_F = 20\text{mA}$ , $I_C = 0.1\text{mA}$                                                                                                   | -      | -    | 0.4  | V             |
|                              | Response time                        | $tr \cdot tf$ | $V_{CC} = 5\text{V}$ , $I_F = 20\text{mA}$ , $R_L = 100\Omega$                                                                               | -      | 10   | -    | $\mu\text{s}$ |
| Infrared light emitter diode | Cut-off frequency                    | $f_C$         | $I_F = 50\text{mA}$                                                                                                                          | -      | 1    | -    | MHz           |
|                              | Peak light emitting wavelength       | $\lambda_p$   | * Non-coherent Infrared light emitting diode used.                                                                                           | -      | 950  | -    | nm            |
| Photo transistor             | Response time                        | $tr \cdot tf$ | $V_{CC} = 5\text{V}$ , $I_C = 1\text{mA}$ , $R_L = 100\Omega$<br>*This product is not designed to be protected against electromagnetic wave. | -      | 10   | -    | $\mu\text{s}$ |
|                              | Maximum sensitivity wavelength       | $\lambda_p$   | -                                                                                                                                            | -      | 800  | -    | nm            |

●Electrical and optical characteristics curves

Fig.1 Relative Output Current vs.Distance (I)

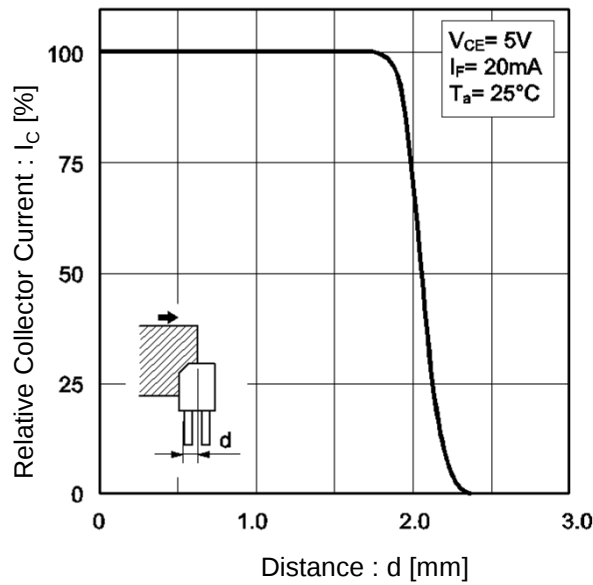


Fig.2 Relative Output Current vs.Distance (II)

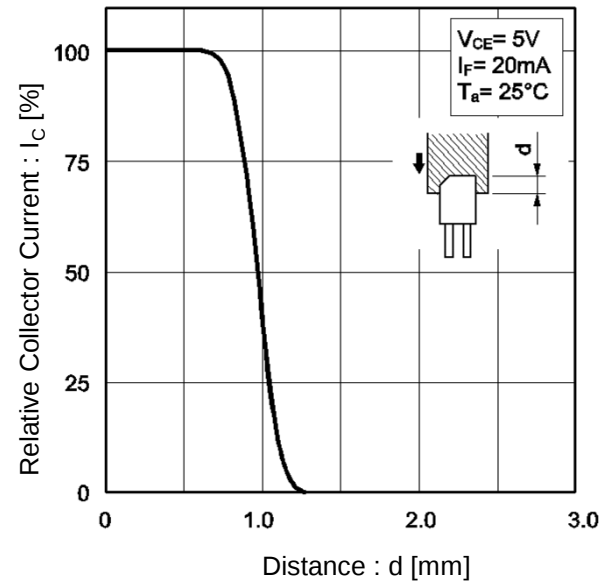


Fig.3 Forward Current Falloff

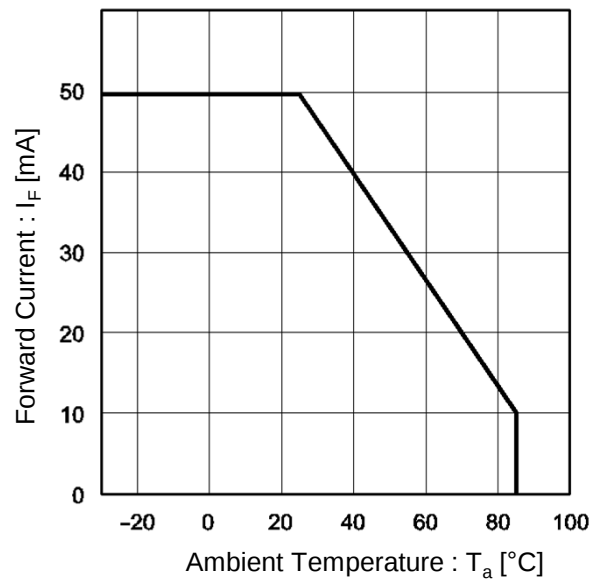
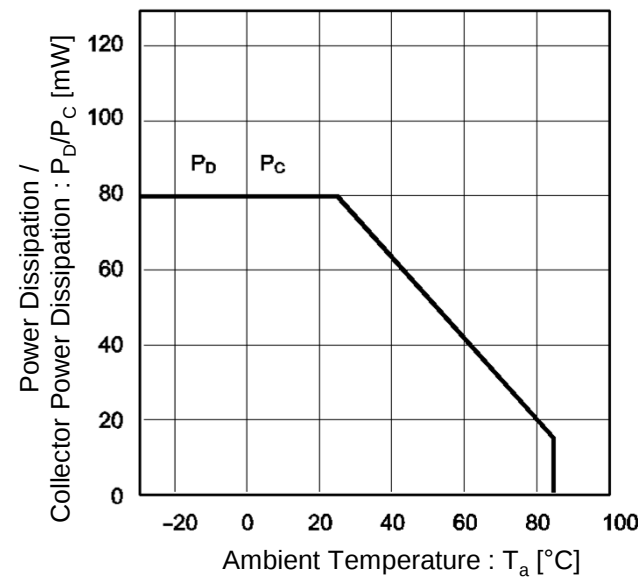


Fig.4 Power Dissipation / Collector Power Dissipation vs. Ambient Temperature



●Electrical and optical characteristics curves

Fig.5 Forward Current vs. Forward Voltage

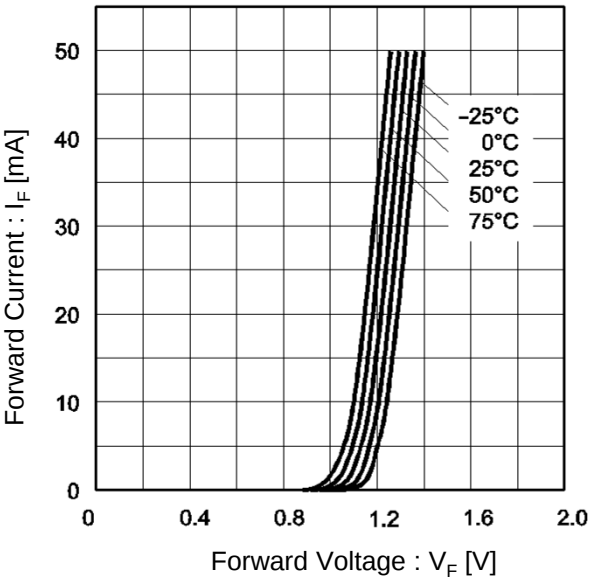


Fig.6 Collector Current vs. Forward Current

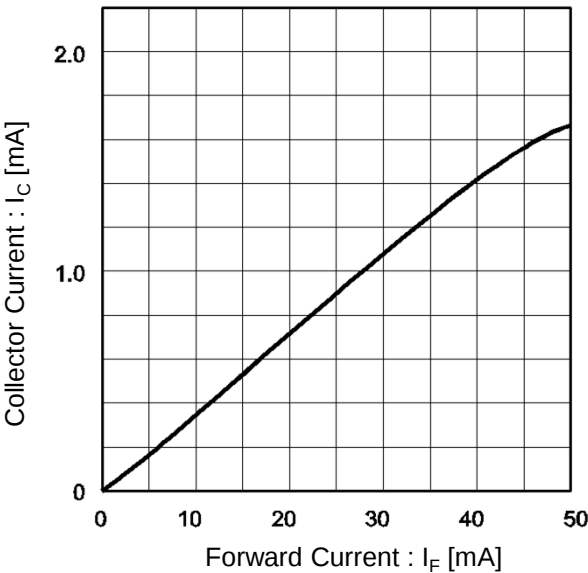


Fig.7 Relative Output vs. Ambient Temperature

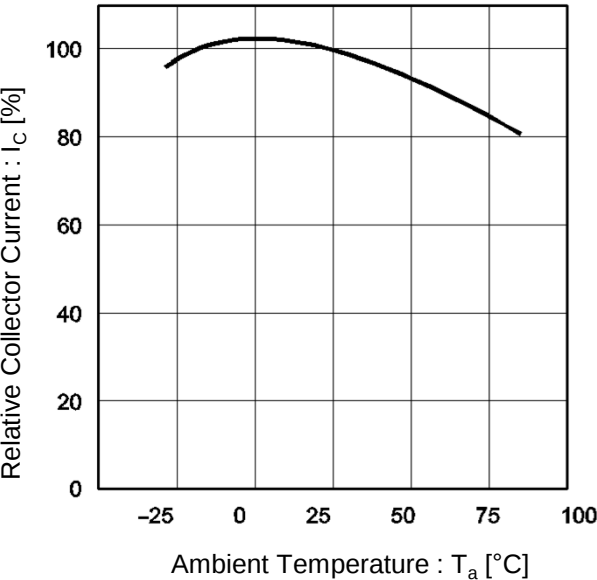
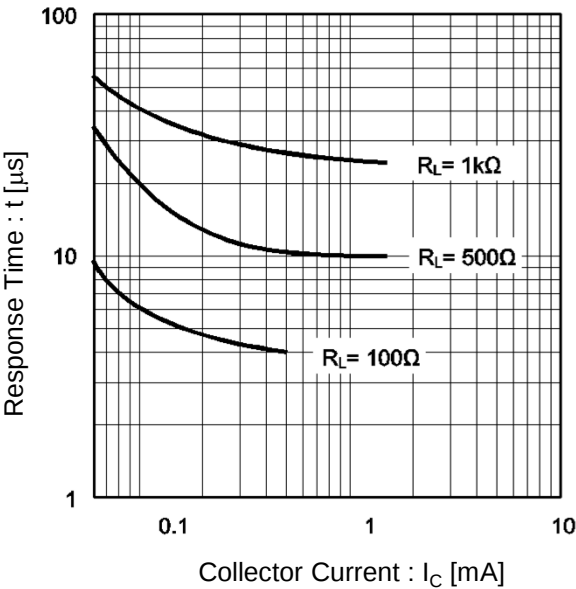


Fig.8 Response Time vs. Collector Current



## ●Electrical and optical characteristics curves

Fig.9 Dark Current vs. Ambient Temperature

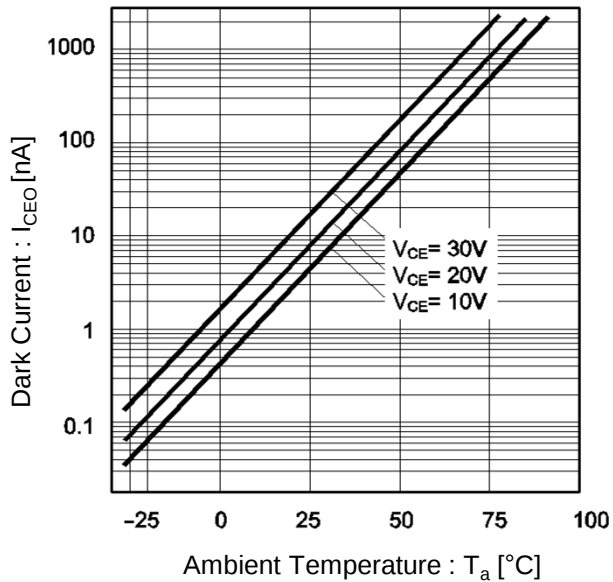


Fig.10 Output Characteristics

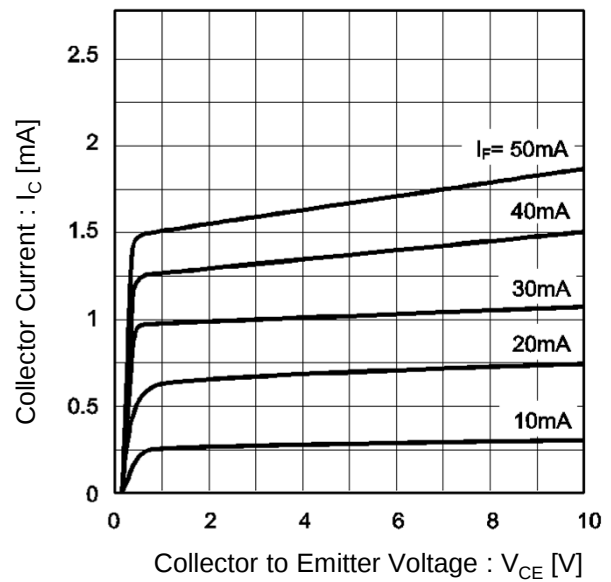
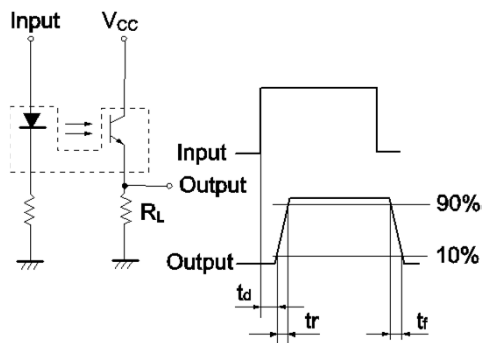


Fig.11 Response Time Measurement Circuit



$t_d$  : Delay time

$t_r$  : Rise time (time for output current to rise from 10% to 90% of peak current)

$t_f$  : Fall time (time for output current to fall from 90% to 10% of peak current)

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