

EVERLIGHT

## Technical Data Sheet

### Opto Interrupter

#### ITR8307/TR8

#### Features

- Fast response time
- High sensitivity
- Cut-Off visible wavelength
- Thin
- Compact
- Pb free
- The product itself will remain within RoHS compliant version.

#### Descriptions

**ITR8307/TR8** is a light reflection switch which includes a GaAs IR-LED transmitter and a NPN photo-transistor with a high photosensitive receiver for short distance, operating in the infrared range. Both components are mounted side- by- side in a plastic package.

#### Applications

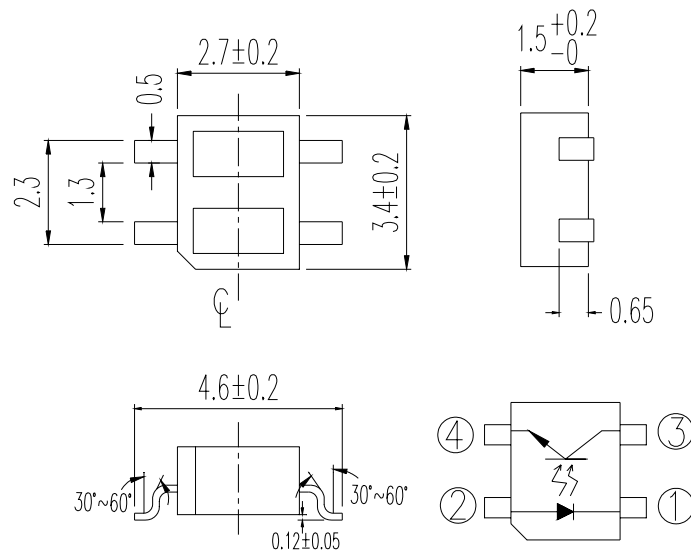
- Camera
- VCR
- Floppy disk driver
- Cassette type recorder
- Various microcomputer control equipment

#### Device Selection Guide

| Device No. | Chip Material |
|------------|---------------|
| IR         | GaAs          |
| PT         | Silicon       |



**Package Dimensions**



① :CATHODE

③ :COLLECTOR

② :ANODE

④ :EMITTER

**Notes:** 1.All dimensions are in millimeters  
2.Tolerances unless dimensions  $\pm 0.15$ mm

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

| Parameter                       |                                                                  | Symbol             | Ratings | Unit |
|---------------------------------|------------------------------------------------------------------|--------------------|---------|------|
| Input                           | Power Dissipation at(or below) 25°C Free Air Temperature         | Pd                 | 75      | mW   |
|                                 | Reverse Voltage                                                  | V <sub>R</sub>     | 5       | V    |
|                                 | Forward Current                                                  | I <sub>F</sub>     | 50      | mA   |
|                                 | Peak Forward Current (*1)<br>Pulse width ≤ 100 μs, Duty cycle=1% | I <sub>FP</sub>    | 1       | A    |
| Output                          | Collector Power Dissipation                                      | P <sub>C</sub>     | 75      | mW   |
|                                 | Collector Current                                                | I <sub>C</sub>     | 50      | mA   |
|                                 | Collector-Emitter Voltage                                        | B V <sub>CEO</sub> | 30      | V    |
|                                 | Emitter-Collector Voltage                                        | B V <sub>ECO</sub> | 5       | V    |
| Operating Temperature           |                                                                  | T <sub>opr</sub>   | -25~+85 | °C   |
| Storage Temperature             |                                                                  | T <sub>stg</sub>   | -30~+90 | °C   |
| Lead Soldering Temperature (*2) |                                                                  | T <sub>sol</sub>   | 260     | °C   |

(\*1)  $t_w=100 \mu \text{ sec.}$ ,  $T=10 \text{ msec.}$       (\*2)  $t=5 \text{ Sec}$

**Electro-Optical Characteristics (Ta=25°C)**

| Parameter                |                        | Symbol               | Min. | Typ. | Max. | Unit | Conditions                                    |
|--------------------------|------------------------|----------------------|------|------|------|------|-----------------------------------------------|
| Input                    | Forward Voltage        | V <sub>F</sub>       | ---  | 1.2  | 1.6  | V    | I <sub>F</sub> =20mA                          |
|                          | Reverse Current        | I <sub>R</sub>       | ---  | ---  | 10   | μA   | V <sub>R</sub> =5V                            |
|                          | Peak Wavelength        | λ <sub>p</sub>       | ---  | 940  | ---  | nm   | ---                                           |
| Output                   | Dark Current           | I <sub>CEO</sub>     | ---  | ---  | 100  | nA   | V <sub>CE</sub> =10V                          |
|                          | C-E Saturation Voltage | V <sub>CE(sat)</sub> | ---  | ---  | 0.4  | V    | I <sub>C</sub> =2mA<br>Ee=1mW/cm <sup>2</sup> |
| Transfer Characteristics | Light Current          | I <sub>C(ON)</sub>   | 0.1  | ---  | ---  | mA   | V <sub>CE</sub> =5V                           |
|                          | Leakage Current        | I <sub>CEOD</sub>    | ---  | ---  | 1    | μA   | I <sub>F</sub> =20mA                          |
|                          | Rise time              | t <sub>r</sub>       | ---  | 20   | ---  | μsec | V <sub>CE</sub> =2V                           |
|                          | Fall time              | t <sub>f</sub>       | ---  | 20   | ---  | μsec | I <sub>C</sub> =100 μA<br>R <sub>L</sub> =1KΩ |

**Typical Electrical/Optical/Characteristics Curves for IR**

Fig. 1 Forward Current vs. Ambient Temperature

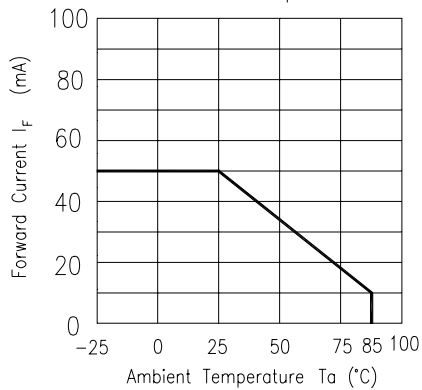


Fig. 2 Spectral Distribution

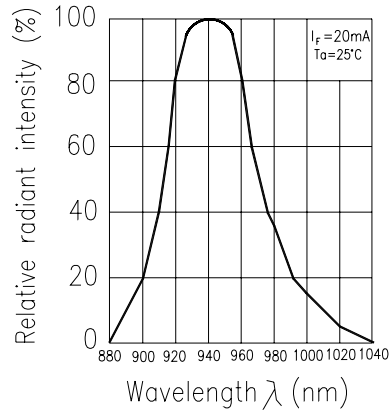


Fig. 3 Peak Emission Wavelength vs. Ambient Temperature

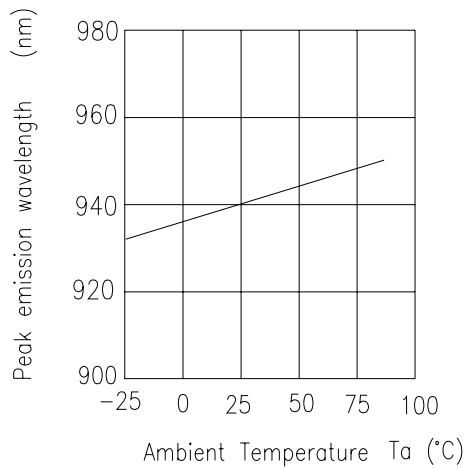


Fig. 4 Forward Current vs. Forward Voltage

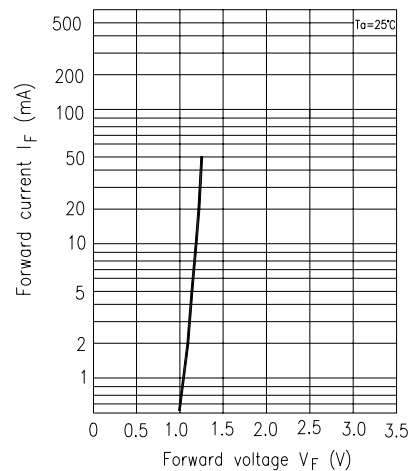


Fig. 5 Forward Voltage vs. Ambient Temperature

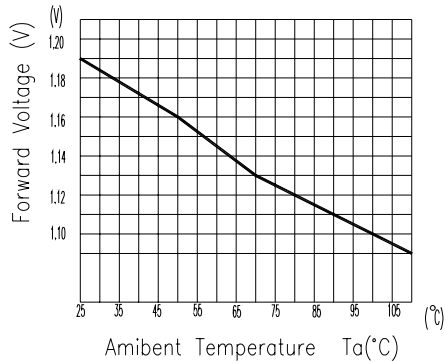
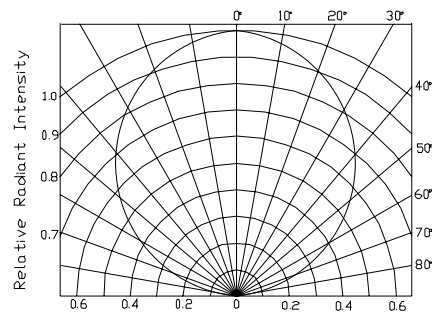


Fig. 6 Relative Radiant Intensity vs. Angular Displacement



# Typical Electro/Optical/Characteristics Curves for PT

Fig.1 Collector Power Dissipation vs. Ambient Temperature

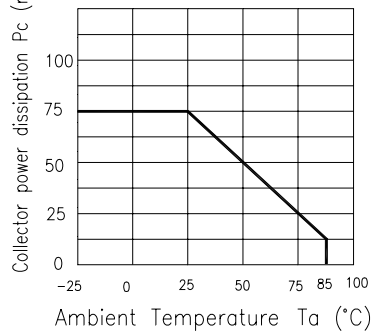


Fig.2 Collector Dark Current vs. Ambient Temperature

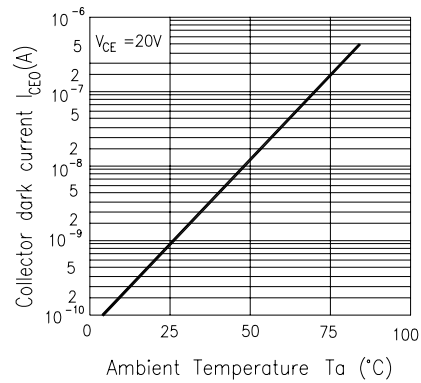


Fig. 3 Relative Collector Current vs. Ambient Temperature

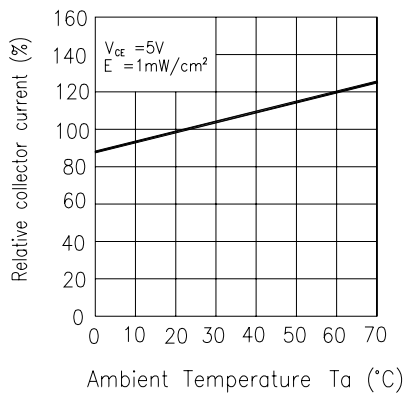


Fig.4 Collector Current vs. Irradiance

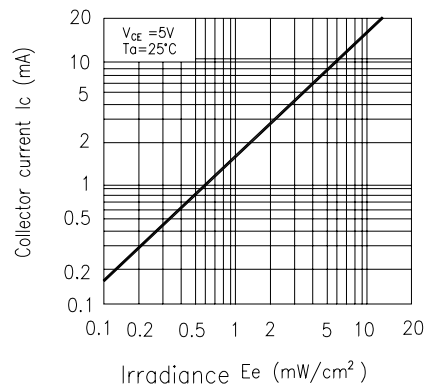


Fig.5 Spectral Sensitivity

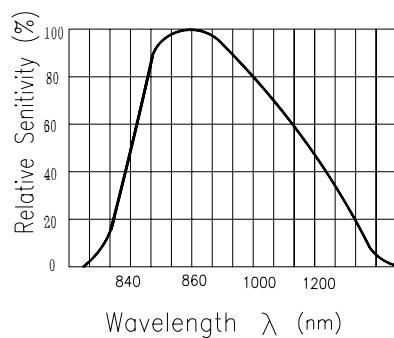
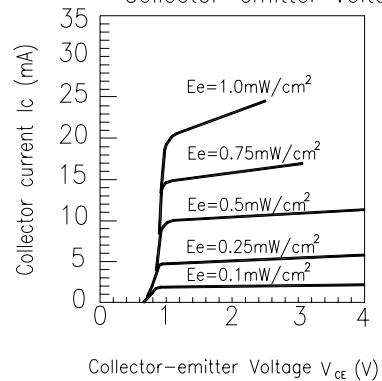


Fig.6 Collector Current vs. Collector-emitter Voltage



**Typical Electrical/Optical/Characteristics Curves For ITR**

Fig.1 Relative Collector Current vs. Distance between Sensor and Al Evaporation Galss

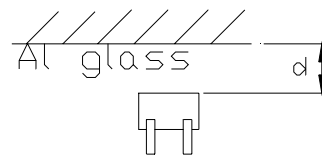
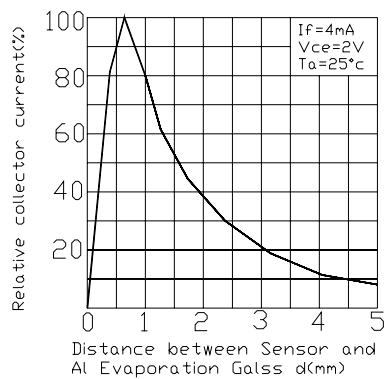


Fig.2 Relative Collector Current vs. Card Moving Distance (l)

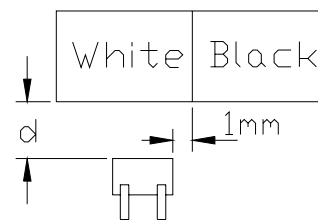
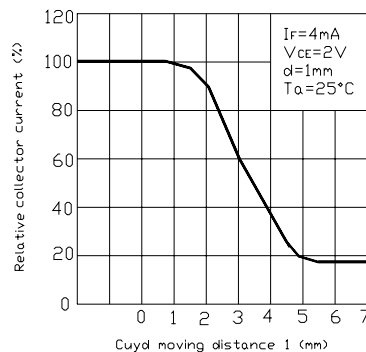
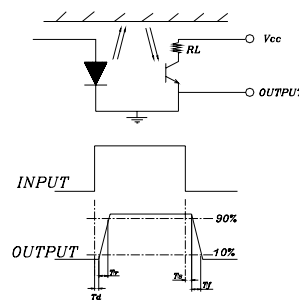
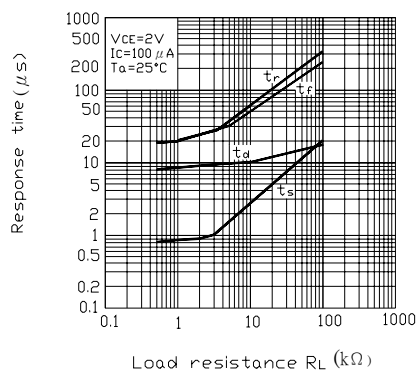
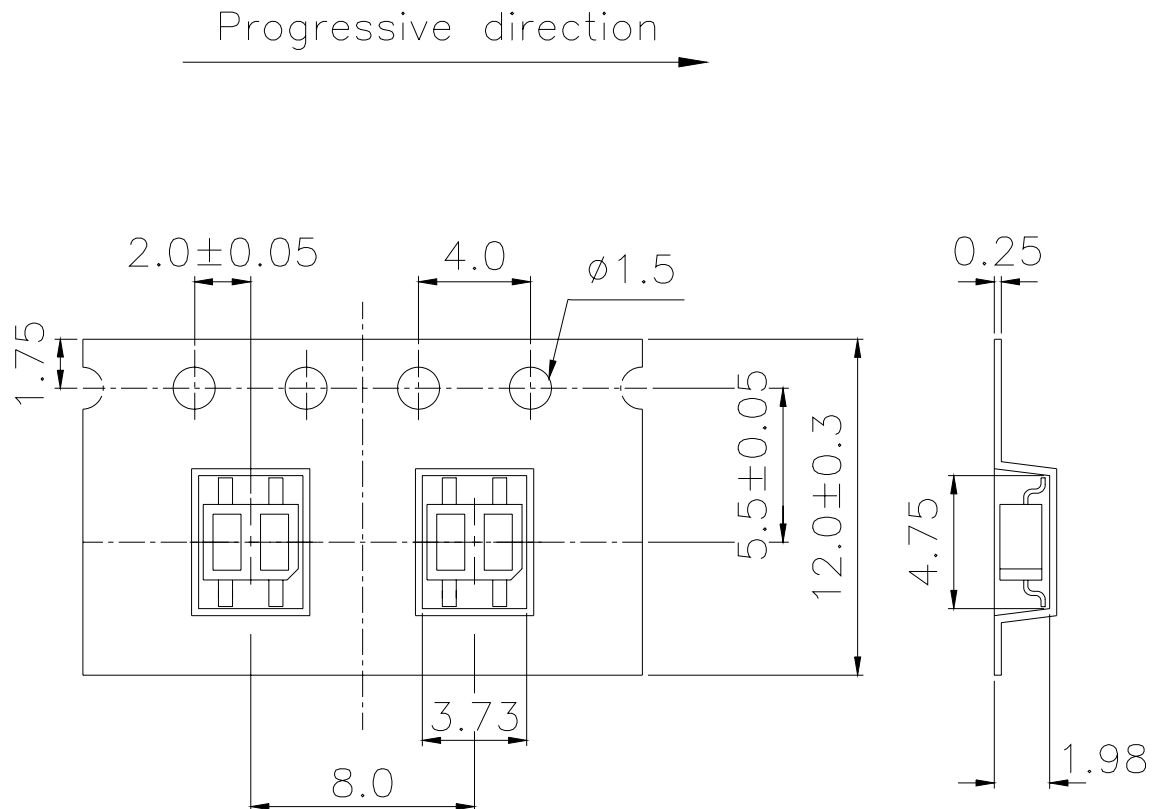


Fig.3 Response Time vs. Load Resistance



## ■ Taping Dimension



## Packing Quantity

1. 1000 Pcs/ 1Roll
2. 15roll /1 Box
3. 2 Box/ 1 Carton

### ■ Reliability Test Item And Condition

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%

LTPD : 10%

| NO. | Item                               | Test Conditions                                                                              | Test Hours/<br>Cycles | Sample<br>Sizes | Failure<br>Judgement<br>Criteria                                                                                                                                  | Ac/Re |
|-----|------------------------------------|----------------------------------------------------------------------------------------------|-----------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1   | Solder Heat                        | TEMP. : $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$                                          | 10secs                | 22pcs           | $I_R \geq U \times 2$<br>$E_e \leq L \times 0.8$<br>$V_F \geq U \times 1.2$<br><br>U : Upper<br>Specification<br><br>Limit<br>L : Lower<br>Specification<br>Limit | 0/1   |
| 2   | Temperature Cycle                  | H : $+85^{\circ}\text{C}$ 30mins<br>$\updownarrow$ 5mins<br>L : $-55^{\circ}\text{C}$ 30mins | 50Cycles              | 22pcs           |                                                                                                                                                                   | 0/1   |
| 3   | Thermal Shock                      | H : $+100^{\circ}\text{C}$ 5mins<br>$\updownarrow$ 10secs<br>L : $-10^{\circ}\text{C}$ 5mins | 50Cycles              | 22pcs           |                                                                                                                                                                   | 0/1   |
| 4   | High Temperature Storage           | TEMP. : $+100^{\circ}\text{C}$                                                               | 1000hrs               | 22pcs           |                                                                                                                                                                   | 0/1   |
| 5   | Low Temperature Storage            | TEMP. : $-55^{\circ}\text{C}$                                                                | 1000hrs               | 22pcs           |                                                                                                                                                                   | 0/1   |
| 6   | DC Operating Life                  | $I_F = 20\text{mA}$                                                                          | 1000hrs               | 22pcs           |                                                                                                                                                                   | 0/1   |
| 7   | High Temperature/<br>High Humidity | $85^{\circ}\text{C}$ / 85% R.H                                                               | 1000hrs               | 22pcs           |                                                                                                                                                                   | 0/1   |

## **Recommended Method of Storage**

The following are general recommendations for moisture sensitive level (MSL) 4 storage and use:

- Shelf life in sealed bag: 12 months at  $< 40^{\circ}\text{C}$  and  $< 90\%$  relative humidity (RH)
- After bag is opened, devices that will be subjected to reflow solder or other high temperature process must
  - a) Mounted within 72 hours of factory conditions  $< 30^{\circ}\text{C}/60\%\text{RH}$ , or
  - b) Stored at  $< 20\%$  RH
    - Devices require bake, before mounting, if:  
Humidity Indicator Card is  $> 20\%$  when read at  $23 \pm 5^{\circ}\text{C}$
- If baking is required, devices may be baked:
  - a) 192 hours at  $40^{\circ}\text{C}$ , and  $< 5\%$  RH (dry air/nitrogen) or
  - b) 96 hours at  $60^{\circ}\text{C}$ , and  $< 5\%$  RH for all device containers
  - c) 24 hours at  $125^{\circ}\text{C}$

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