

# Technical Data Sheet

## OPTO INTERRUPTER ITR

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**ITR20005**

### ■ Features

- Wide gap between lighter and detector (3.8mm)
- High sensing accuracy
- PWB mounting type package
- Pb free
- The product itself will remain within RoHS compliant version.



### ■ Descriptions

The ITR20005(Slot Optical switch) is a gallium arsenide infrared emitting diode which is coupled with a silicon photo transistor in a plastic housing. The package system is designed to optimize the mechanical resolution, coupling efficiency, and insulates ambient light. The ITR is useful in the application of interrupting the signal with printer, scanner, copier, or other opaque material, switching the output from an “ON” to “OFF” state.

### ■ Applications

- Mouse
- Opto-electronic switches
- 

### ■ Device Selection Guide

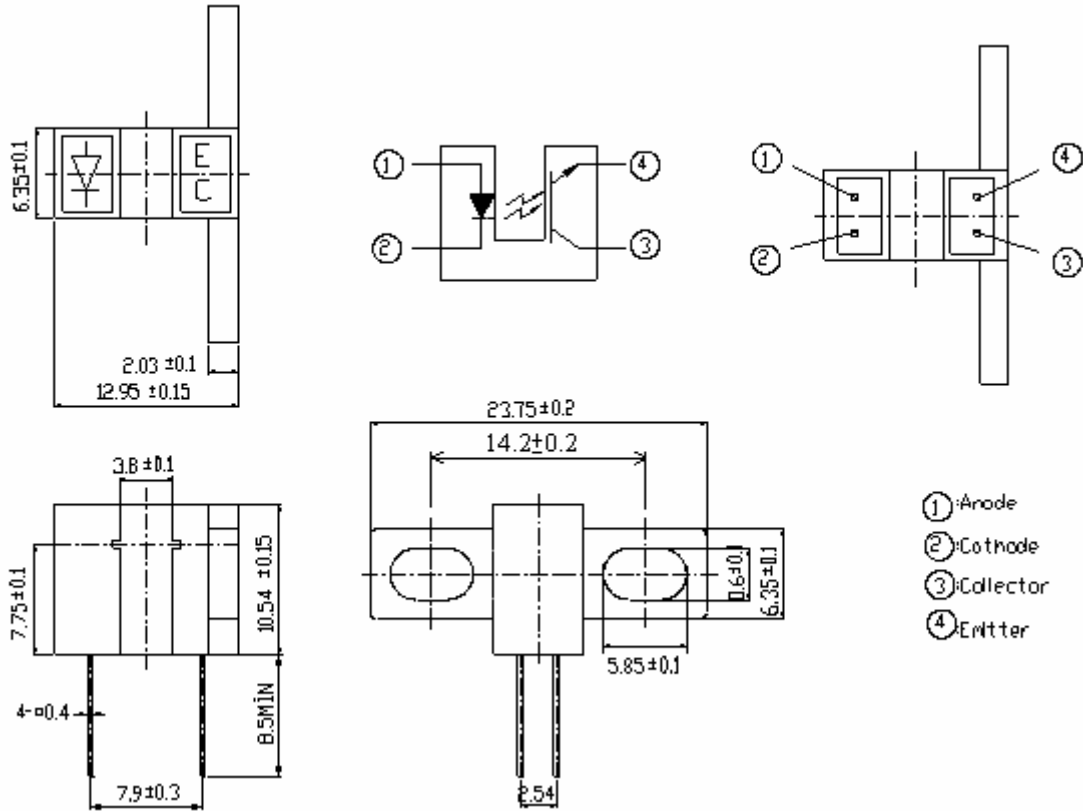
| Device No. | Chip Material | Len Color |
|------------|---------------|-----------|
| IR         | GaAs,GaAlAs   | CLEAR     |
| PT         | Silicon       | CLEAR     |

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### Package Dimensions



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

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### 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    |
|                                 | Collector Power Dissipation                                      | P <sub>C</sub>     | 75      | mW   |
| Output                          | Collector Current  | I <sub>C</sub>     | 20      | mA   |
|                                 | Collector-Emitter Voltage  | B V <sub>CEO</sub> | 30      | V    |
|                                 | Emitter-Collector Voltage  | B V <sub>ECO</sub> | 5       | V    |
|                                 | Operating Temperature  | Topr               | -25~+85 | °C   |
| Storage Temperature             | Tstg   | -40~+85            | °C      |      |
| Lead Soldering Temperature (*2) | Tsol   | 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 | Condition                                      |
|-------------------------|------------------------|----------------------|------|------|------|------|--|
| 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   | I <sub>F</sub> =20mA                           |
|                         | View Angle             | 2□1/2                | -    | 60   | -    | Deg  | I <sub>F</sub> =20mA                           |
| Output                  | Collector Dark Current | I <sub>CEO</sub>     | -    | -    | 100  | nA   | V <sub>CE</sub> =10V<br>Ee=0mW/cm <sup>2</sup> |
| Transfer Characteristic | C-E Saturation Voltage | V <sub>CE(sat)</sub> | -    | -    | 0.4  | V    | I <sub>C</sub> =2mA<br>Ee=1mW/cm <sup>2</sup>  |
|                         | Collector Current      | I <sub>C(ON)</sub>   | 0.5  | -    | -    | mA   | V <sub>CE</sub> =5V<br>I <sub>F</sub> =20mA    |
|                         | Rise time              | t <sub>r</sub>       | -    | 20   | -    | μsec | V <sub>CE</sub> =5V                            |
|                         | Fall time              | t <sub>f</sub>       | -    | 20   | -    | μsec | I <sub>C</sub> =1mA<br>R <sub>L</sub> =1KΩ     |

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

Fig. 1 Forward Current vs. Ambient Temperature

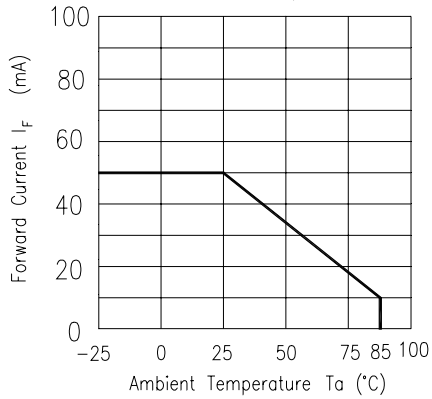


Fig. 2 Spectral Distribution

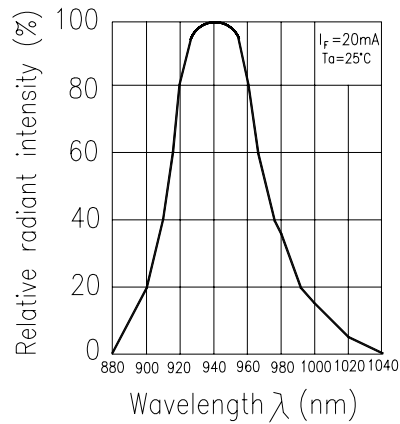


Fig. 3 Peak Emission Wavelength vs. Ambient Temperature

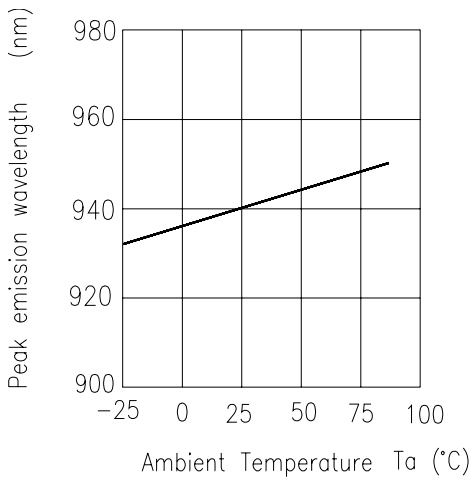


Fig. 4 Forward Current vs. Forward Voltage

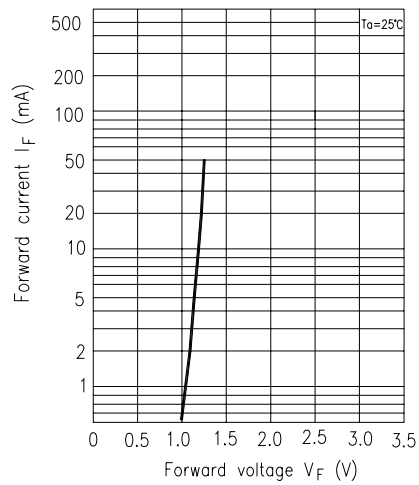


Fig. 5 Forward Voltage vs. Ambient Temperature

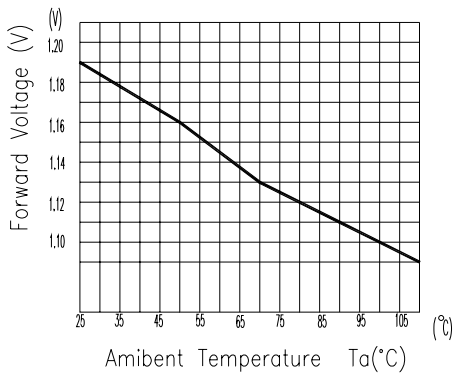
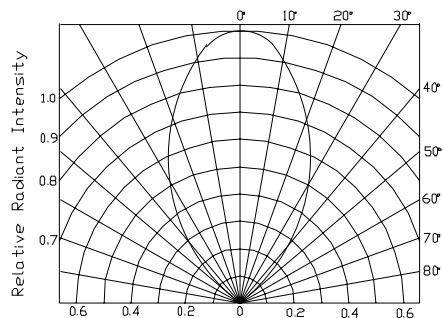


Fig. 6 Relative Radiant Intensity vs. Angular Displacement



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### Typical Electrical/Optical/Characteristics Curves for PT

Fig.1 Collector Power Dissipation vs. Ambient Temperature

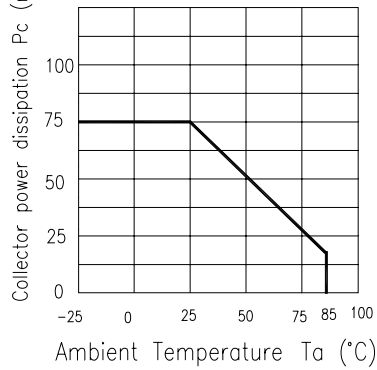


Fig.2 Collector Dark Current vs. Ambient Temperature

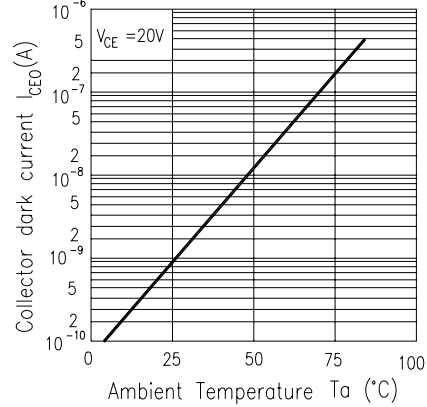


Fig.3 Spectral Sensitivity

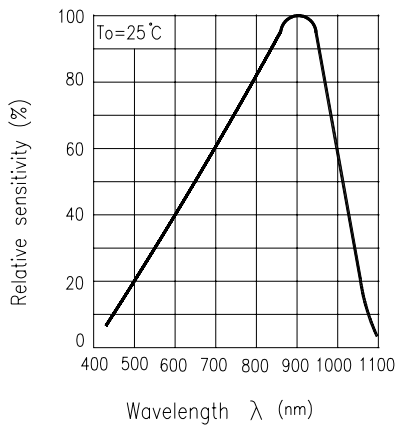
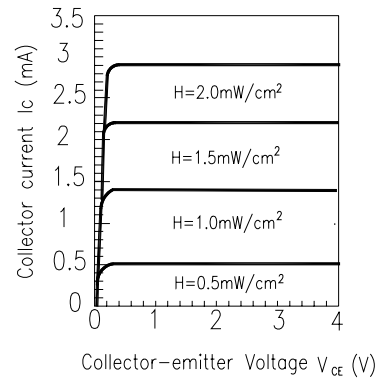


Fig.4 Collector Current vs. Collector-emitter Voltage



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

Fig.1 Relative Collector Current vs. Shield Distance(1)

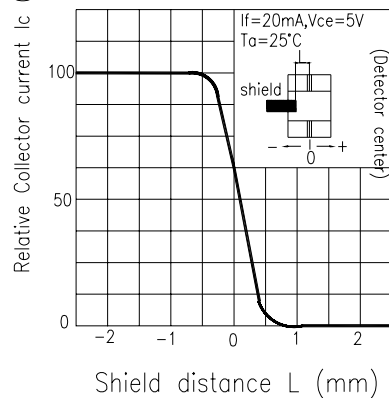
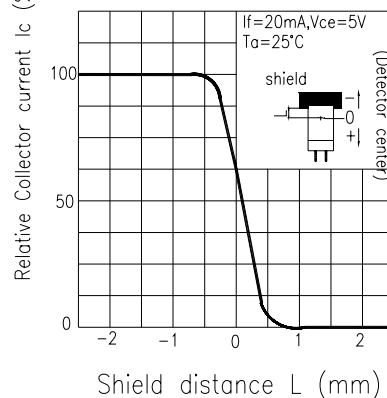


Fig.2 Relative Collector Current vs. Shield Distance(2)



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### 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 Resistance                  | Ta = 260 ±3°C   | 10 ± 1 sec            | 22pcs           |  | 0/1   |
| 2   | Temperature Cycle                  | H : +85°C      30 mins<br>↕ 5 mins<br>L : -55°C      30mins | 50Cycles              | 22pcs           | I <sub>R</sub> ≥ U×2<br>Ee ≤ L×0.8<br>V <sub>F</sub> ≥ U×1.2 | 0/1   |
| 3   | Thermal Shock                      | H : +100°C      5mins<br>↕ 10secs<br>L : -10°C      5mins   | 50Cycles              | 22pcs           | U : Upper<br>Specification                                   | 0/1   |
| 4   | High Temperature<br>Storage        | TEMP. : +100°C  | 1000hrs               | 22pcs           | Limit<br>L : Lower   | 0/1   |
| 5   | Low Temperature<br>Storage         | TEMP. : -55°C   | 1000hrs               | 22pcs           | Specification<br>Limit                                       | 0/1   |
| 6   | DC Operating Life                  | V <sub>CE</sub> =5V   | 1000hrs               | 22pcs           |  | 0/1   |
| 7   | High Temperature/<br>High Humidity | 85°C / 85% R.H  | 1000hrs               | 22pcs           |  | 0/1   |

