

## **Excellent Integrated System Limited**

Stocking Distributor

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[Everlight Electronics Co Ltd](#)  
[ITR20004](#)

For any questions, you can email us directly:

[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)



# Technical Data Sheet

## Opto Interrupter ITR

**ITR20004**

### Features

- Fast response time
- High sensitivity
- Cut-Off visible wavelength
- Thin
- Compact
- Pb free

### Descriptions

ITR20004 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

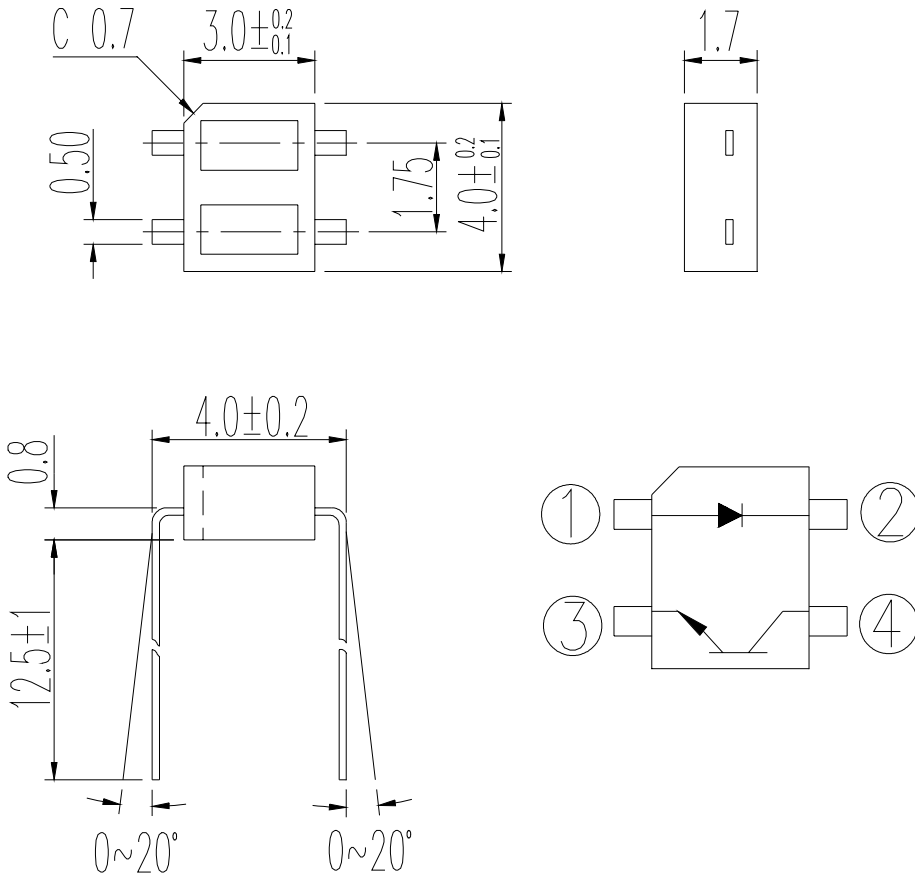
### Device Selection Guide

Device No.	Chip Material
IR	GaAs
PT	Silicon



**ITR20004**

**Package Dimensions**



- ①: Anode      ③: Emitter
- ②: Cathode    ④: Collector

General tolerance: ±0.15mm  
 UNIT:mm

- Notes:** 1.All dimensions are in millimeters  
 2.Tolerances unless dimensions ±0.25mm



## ITR20004

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

Parameter		Symbol	Ratings	Unit
Input	Power Dissipation at(or below) 25 °C Free Air Temperature	Pd	130	mW
	Reverse Voltage	V <sub>R</sub>	5	V
	Forward Current	I <sub>F</sub>	50	mA
	Peak Forward Current (*1) 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>	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	
Storage Temperature	T <sub>stg</sub>	-30~+85		
Lead Soldering Temperature (*2)	T <sub>sol</sub>	260		

(\* 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	P	-	940	-	nm	-	
Output	Dark Current	I <sub>CEO</sub>	-	-	0.1	μA	V <sub>CE</sub> =20V,	
Transfer Characteristics	Collector Current	I <sub>C(ON)</sub>	B	34	-	71	uA	V <sub>CE</sub> =2V, I <sub>F</sub> =4mA
			C	20	-	90		
	Leakage Current	I <sub>CEOD</sub>	-	-	1	μA	V <sub>CE</sub> =5V, I <sub>F</sub> =10mA	
	Rise time	t <sub>r</sub>	-	20	-	μs	V <sub>CE</sub> =2V I <sub>C</sub> =100uA R <sub>L</sub> =1000Ω	
	Fall time	t <sub>f</sub>	-	20	-	μs		



**ITR20004**

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

Fig. 1 Forward Current vs. Ambient Temperature

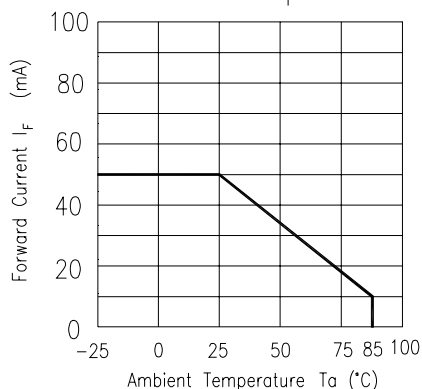


Fig. 2 Spectral Distribution

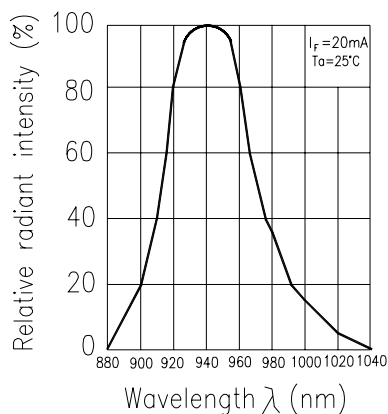


Fig. 3 Peak Emission Wavelength vs. Ambient Temperature

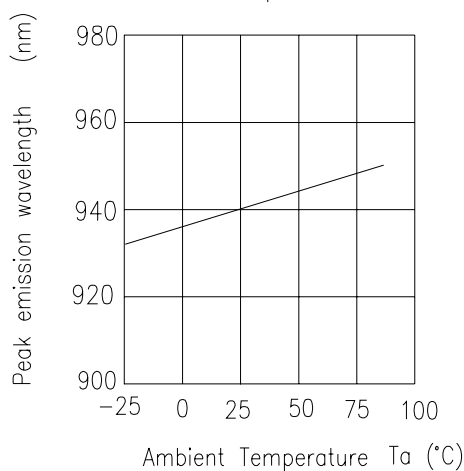


Fig. 4 Forward Current vs. Forward Voltage

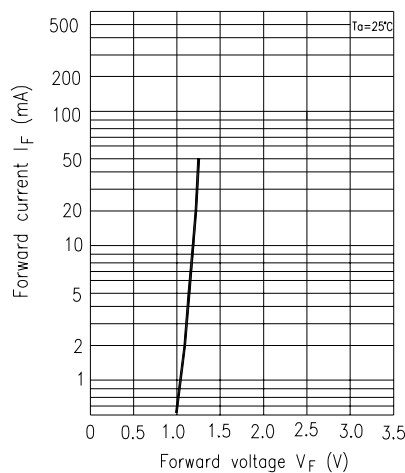


Fig. 5 Forward Voltage vs. Ambient Temperature

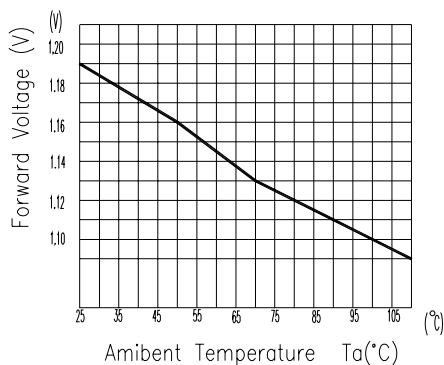
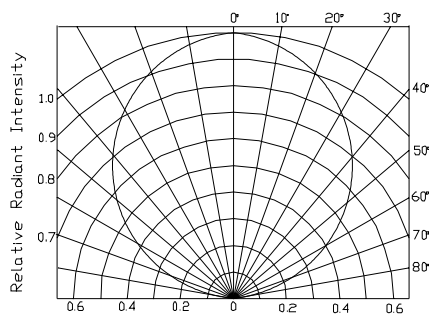


Fig. 6 Relative Radiant Intensity vs. Angular Displacement





**ITR20004**

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

Fig.1 Collector Power Dissipation vs. Ambient Temperature

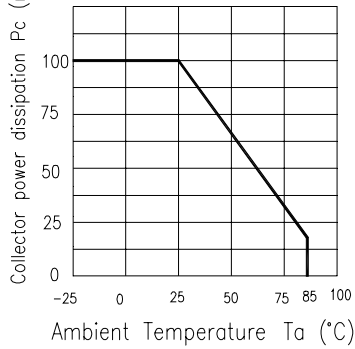


Fig.2 Collector Dark Current vs. Ambient Temperature

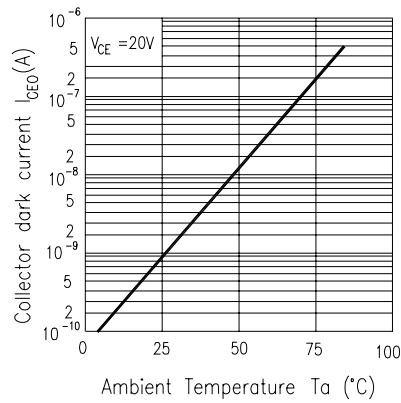


Fig. 3 Relative Collector Current vs. Ambient Temperature

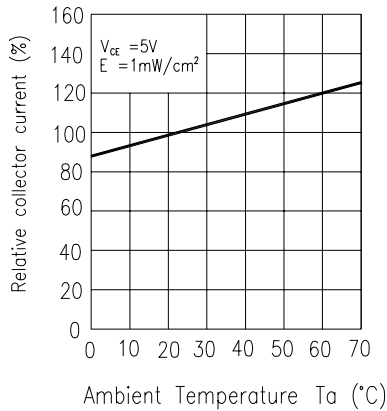


Fig.4 Collector Current vs. Irradiance

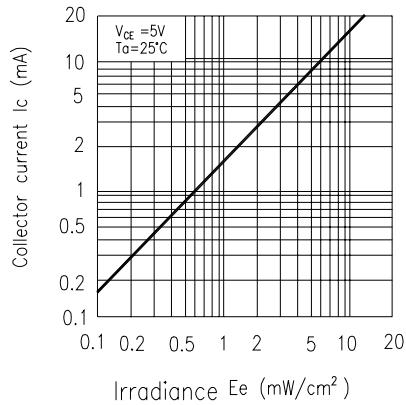


Fig.5 Spectral Sensitivity

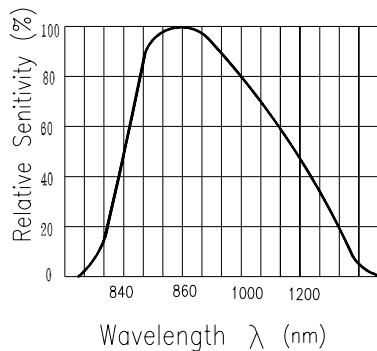
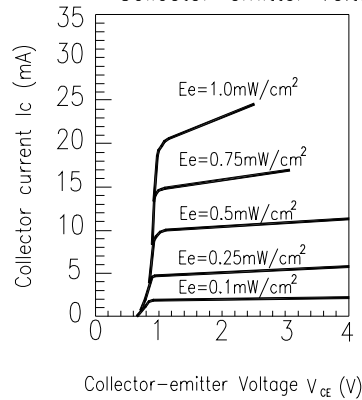


Fig.6 Collector Current vs. Collector-emitter Voltage





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

Fig.7 Relative Collector Current vs. Distance between Sensor and Al Evaporation Galss

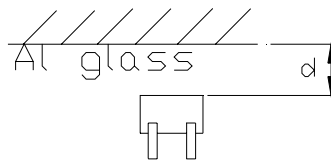
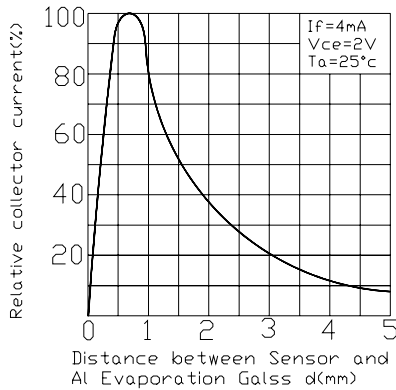


Fig.8 Relative Collector Current vs. Card Moving Distance (l)

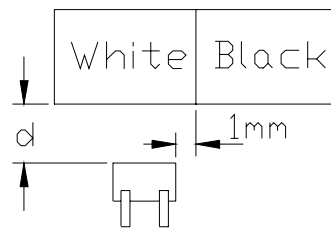
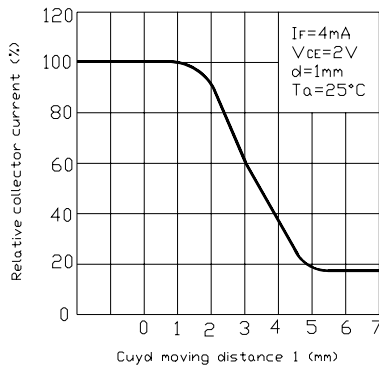
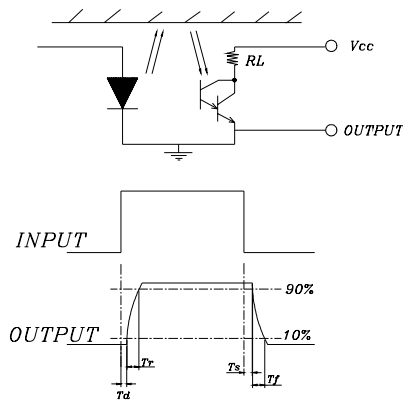
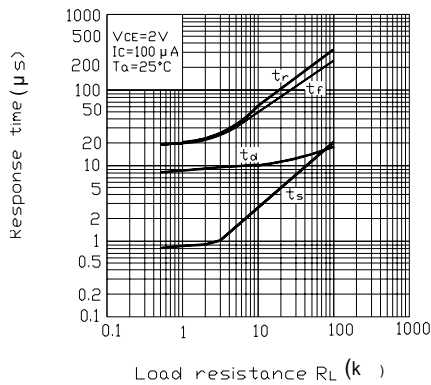


Fig.9 Response Time vs. Load Resistance





## ITR20004

### 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/ Cycles	Sample Sizes	Failure Judgement Criteria	Ac/Re
1	Solderability	TEMP. : 230 ±5	5secs	22pcs	More than 90% of lead to be covered by soldering	0/1
2	Temperature Cycle	H : +85      30mins ↑          5mins ↓          30mins L : -55	50Cycles	22pcs	$I_R \quad U \times 2$ $E_e \quad L \times 0.8$ $V_F \quad U \times 1.2$  U : Upper Specification  Limit L : Lower Specification Limit	0/1
3	Thermal Shock	H : +100      5mins ↑          10secs ↓          5mins L : -10	50Cycles	22pcs		0/1
4	High Temperature Storage	TEMP. : +100	1000hrs	22pcs		0/1
5	Low Temperature Storage	TEMP. : -55	1000hrs	22pcs		0/1
6	DC Operating Life	$I_F=20mA \quad V_{ce}=5V$	1000hrs	22pcs		0/1
7	High Temperature/ High Humidity	85 / 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 °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 °C/60%RH, or
  - b) Stored at <20% RH
    - Devices require bake, before mounting, if:  
Humidity Indicator Card is > 20% when read at 23 ± 5 °C
- If baking is required, devices may be baked:
  - a) 192 hours at 40 °C, and <5% RH(dry air/nitrogen) or
  - b) 96 hours at 60 °C, and <5% RH for all device containers
  - c) 24 hours at 125 °C



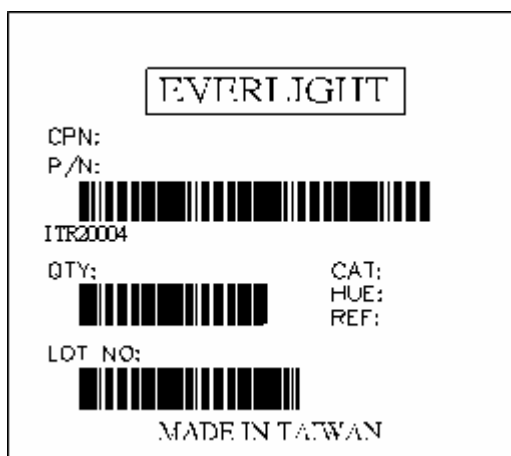


**ITR20004**

**Packing Specifications**

1. 100 Pcs/1 Tube
2. 44 Tube /1 Box
3. 6 Box/ 1 Carton

**Label Form Specification**



- CPN: Customer's Production Number
- P/N : Production Number
- QTY: Packing Quantity
- CAT: None
- HUE: None
- REF: Reference
- LOT No: Lot Number
- MADE IN TAIWAN: Production Place

**Notes**

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
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