# IS487/IS488

## Built-in Amp.Type OPIC Light Detector

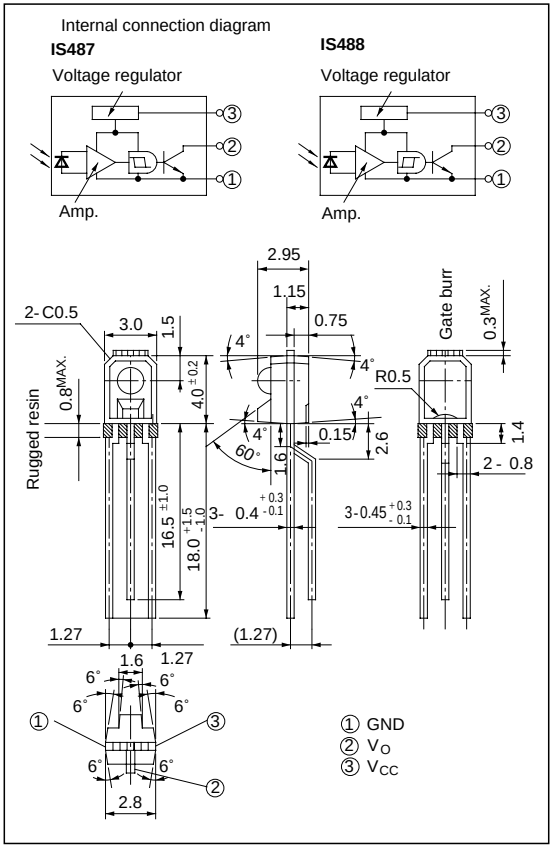
### ■ Features

1. Compact type
2. Built-in schmidt trigger circuit
3. LSTTL and TTL compatible output
4. Open collector output
5. Low level output under incident light (IS487)
   High level output under incident light (IS488)
6. A wide range of operating supply voltage ($V_{CC}$ : 4.5 to 17v)

### ■ Applications

1. Floppy disk drive Units
2. Copiers, printers, facsimiles
3. VCRs
4. Automatic vending machines

### ■ Outline Dimensions (Unit : mm)




*" OPIC " (Optical IC) is a trademark of the SHARP Corporation.
An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

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

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Supply voltage | $V_{CC}$ | - 0.5 to + 35 | V |
| Output voltage | $V_O$ | - 0.5 to + 40 | V |
| Output current | $I_O$ | 50 | mA |
| Power dissipation | P | 175 | mW |
| Operating temperature | $T_{opr}$ | - 25 to +85 | °C |
| Storage temperature | $T_{stg}$ | - 40 to +100 | °C |
| *1 Soldering temperature | $T_{sol}$ | 260 | °C |

*1 For 5 seconds at the position of 1.4mm from the bottom face of resin package

## ■ Electro-optical Characteristics

(Unless otherwise specified, Ta= 0 to 70˚C, $V_{CC}$= 5V)

| Parameter | | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|---|---|
| Low level output voltage | | | $V_{OL}$ | *2 $I_{OL}$ = 16mA | - | 0.15 | 0.4 | V |
| High level output current | | | $I_{OH}$ | *3 $V_{CC}$ = 20V, $V_O$= 30V | - | - | 100 | μA |
| Low level supply current | | | $I_{CCL}$ | *2 | - | 1.3 | 3.4 | mA |
| High level supply current | | | $I_{CCH}$ | *3 | - | 0.7 | 2.2 | mA |
| *4 "High→Low" Threshold illuminance | | IS487 | $E_{VHL}$ | $T_a$ = 25˚C, $R_L$= 280Ω | - | 15 | 35 | lx |
| | | | | $R_L$ = 280Ω | - | - | 50 | |
| | | IS488 | | $T_a$ = 25˚C, $R_L$= 280Ω | 1.5 | 10 | - | |
| | | | | $R_L$ = 280Ω | 1 | - | - | |
| *5 "Low→High" Threshold illuminance | | IS487 | $E_{VLH}$ | $T_a$ = 25˚C, $R_L$= 280Ω | 1.5 | 10 | - | lx |
| | | | | $R_L$ = 280Ω | 1 | - | - | |
| | | IS488 | | $T_a$ = 25˚C, $R_L$= 280Ω | - | 15 | 35 | |
| | | | | $R_L$ = 280Ω | - | - | 50 | |
| *6 Hysteresis | | IS487 | $E_{VLH}/E_{VHL}$ | $T_a$= 25˚C, $R_L$= 280Ω | 0.50 | 0.65 | 0.90 | - |
| | | IS488 | $E_{VHL}/E_{VLH}$ | | | | | |
| Response time | "Low→High" Propagation time | IS487 | $t_{PLH}$ | $T_a$= 25˚C<br>$E_V$= 50lx<br>$R_L$= 280Ω | - | 5 | 15 | μs |
| | | IS488 | | | - | 3 | 9 | |
| | "High→Low" Propagation time | IS487 | $t_{PHL}$ | | - | 3 | 9 | |
| | | IS488 | | | - | 5 | 15 | |
| | Rise time | | $t_r$ | | - | 0.1 | 0.5 | |
| | Fall time | | $t_f$ | | - | 0.05 | 0.5 | |

*2 Defines $E_V$ = 50lx (**IS487**) and $E_V$ = 0 (**IS488**).
*3 Defines $E_V$ = 0 (**IS487**) and $E_V$ = 50lx (**IS488**).
*4 $E_{VHL}$ represents illuminance by CIE standerd light source A (tungsten lamp) when output changes from high to low.
*5 $E_{VLH}$ represents illuminance by CIE standerd light source A (tungsten lamp) when output changes from low to high.
*6 Hysteresis stands for $E_{VLH}/E_{VHL}$ (**IS487**) and $E_{VHL}/E_{VLH}$ (**IS488**).

## ■ Recommended Operating Conditions

| Parameter | Symbol | MIN. | MAX. | Unit |
|---|---|---|---|---|
| Supply voltage | $V_{CC}$ | 4.5 | 17 | V |
| Output current | $I_{OL}$ | - | 16 | mA |

In order to stabilize power supply line, connect a by-pass capacitor of 0.01μF or more between $V_{CC}$ and GND near the device.

**Fig. 1 Low Level Output Current vs. Ambient Temperature**

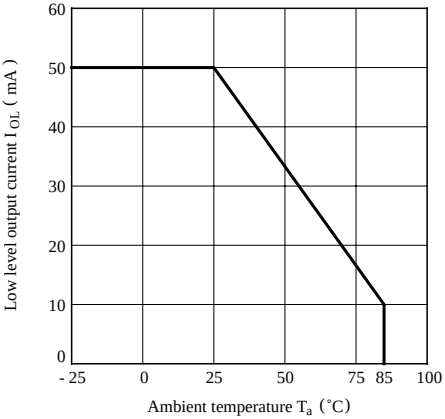



**Fig. 2 Power Dissipation vs. Ambient Temperature**

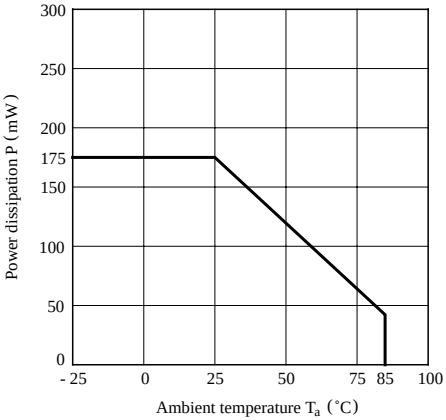



**Fig. 3 Relative Threshold Illuminance vs. Supply Voltage**

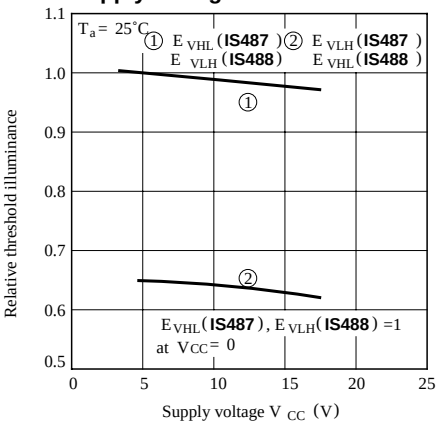



**Fig. 4 Low Level Output Voltage vs. Ambient Temperature**

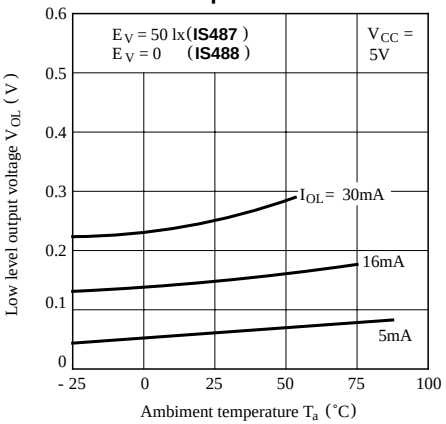



**Fig. 5 Supply Current vs. Ambient Temperature**

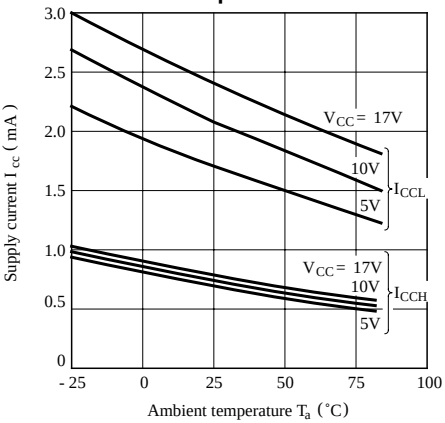


**Fig. 6 Propagation Delay Time vs. Illuminance**

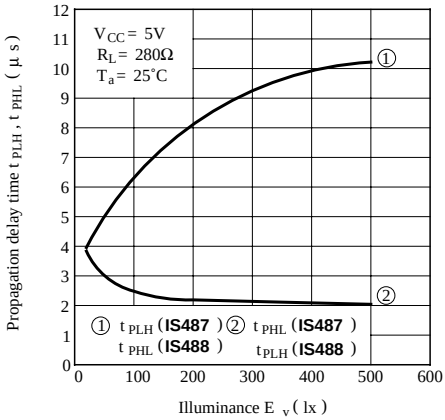
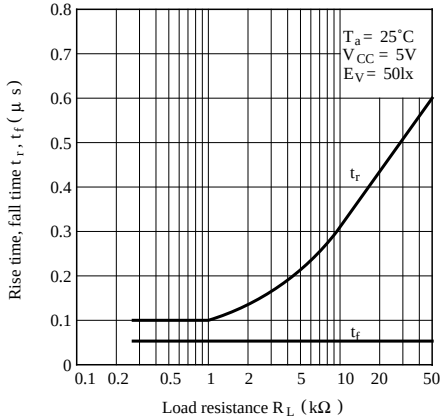
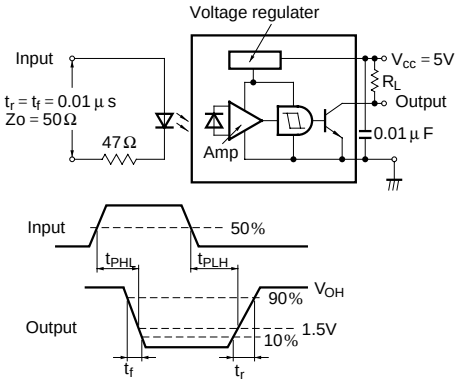



**Fig. 7 Rise Time, Fall Time vs. Load Resistance**




**Test Circuit for Response Time (IS487)**




**Test Circuit for Response Time (IS488)**

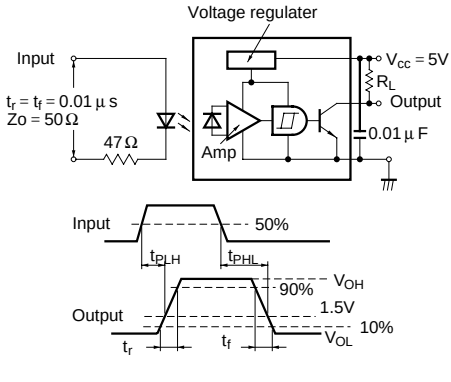



**Fig. 8 Sensitivity Diagram**

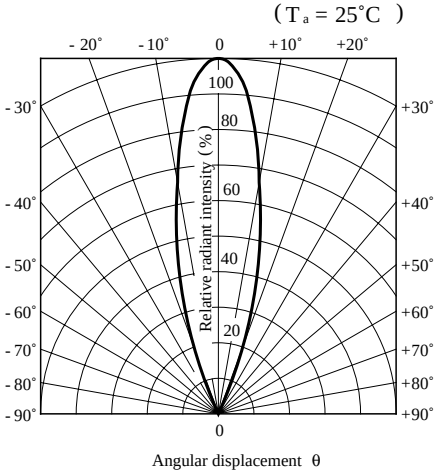
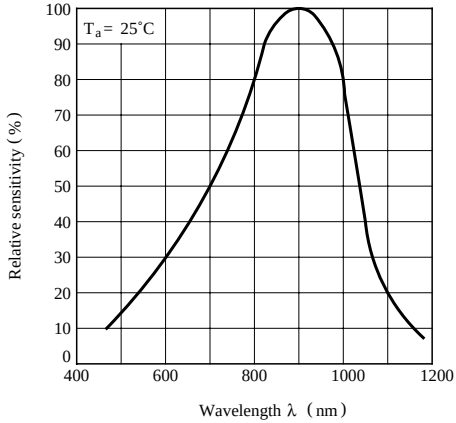



**Fig. 9 Spectral Sensitivity**




● Please refer to the chapter "Precautions for Use."

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