

# IS489

## Low Voltage Operating Type High Sensitivity OPIC Light Detector

### ■ Features

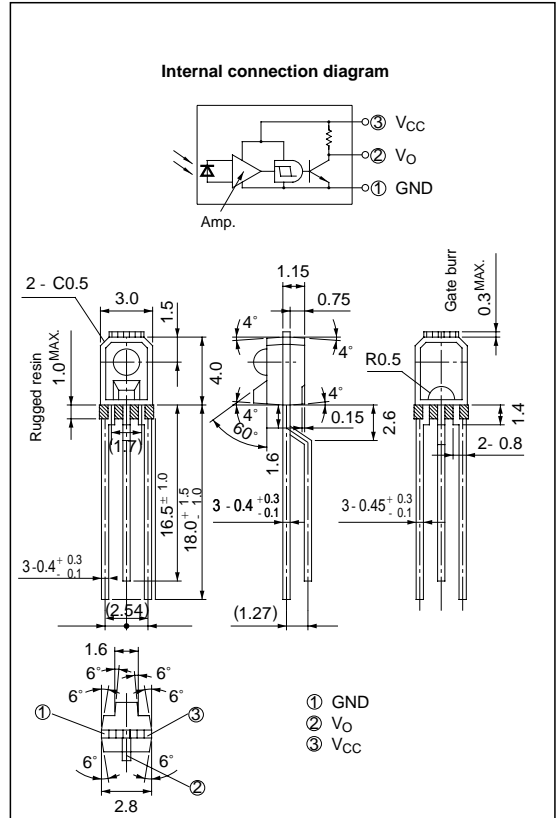
1. Low voltage operating type ( $V_{CC}$  : 1.4 to 7.0V)
2. High sensitivity type ( $E_{VHL}$  : TYP. 5 lx)
3. Built-in Schmidt trigger circuit
4. Low level output under incident light

### ■ Applications

1. Amusement equipment
2. Battery-driven portable equipment

### ■ 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 + 8	V
<sup>*1</sup> Output current	$I_o$	2	mA
<sup>*2</sup> Total power dissipation	P	80	mW
Operating temperature	$T_{opr}$	- 25 to + 85	°C
Storage temperature	$T_{stg}$	- 40 to + 100	°C
<sup>*3</sup> Soldering temperature	$T_{sol}$	260	°C

<sup>\*1</sup> Output current vs. ambient temperature : Per Fig. 1

<sup>\*2</sup> Total power dissipation vs. ambient temperature : Per Fig. 2

<sup>\*3</sup> For 5 seconds at the position of 1.4 mm from the resin edge

## Electro-optical Characteristics

(Ta=0 to 70°C, V<sub>CC</sub>=3V unless otherwise specified)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Low level output voltage		V <sub>OL</sub>	I <sub>OL</sub> = 1mA, E <sub>V</sub> = 50 lx	-	0.1	0.4	V
High level output voltage		V <sub>OH</sub>	E <sub>V</sub> = 0 lx	2.9	-	-	V
Low level supply current		I <sub>CCL</sub>	E <sub>V</sub> = 50 lx	-	0.6	1.2	mA
High level supply current		I <sub>CCH</sub>	E <sub>V</sub> = 0 lx	-	0.4	0.5	mA
*1 "High →Low" threshold illuminance		E <sub>VHL</sub>	Ta = 25°C	-	4.8	15	lx
			-	-	-	22	
*2 "Low→High" threshold illuminance		E <sub>VLH</sub>	Ta = 25°C	0.6	3.7	-	lx
			-	0.4	-	-	
*3 Hysteresis		E <sub>VLH</sub> / E <sub>VHL</sub>	Ta = 25°C	0.55	0.75	0.95	-
Response time	"High→Low" propagation delay time	t <sub>PHL</sub>	E <sub>V</sub> = 125 lx or equivalent R <sub>L</sub> = 3kΩ Ta = 25°C	-	1.3	15	μs
	"Low →High" propagation delay time	t <sub>PLH</sub>		-	8.5	30	
	Rise time	t <sub>r</sub>		-	0.1	3.0	
	Fall time	t <sub>f</sub>		-	0.06	1.0	
Peak sensitivity wavelength		λ <sub>P</sub>	-	-	900	-	nm

\*1 E<sub>VHL</sub> represents illuminance by CIE standard light source A (tungsten lamp) when output changes from "high" to "low".

\*2 E<sub>VLH</sub> represents illuminance by CIE standard light source A (tungsten lamp) when output changes from "low" to "high".

\*3 Hysteresis standards for E<sub>VLH</sub>/E<sub>VHL</sub>.

## Recommended Operating Conditions

(Ta=25°C)

Parameter	Symbol	MIN.	MAX.	Unit
Supply voltage	V <sub>CC</sub>	1.4	7.0	V
Output current	I <sub>OL</sub>	-	1.0	mA

Fig. 1 Output Current vs. Ambient Temperature

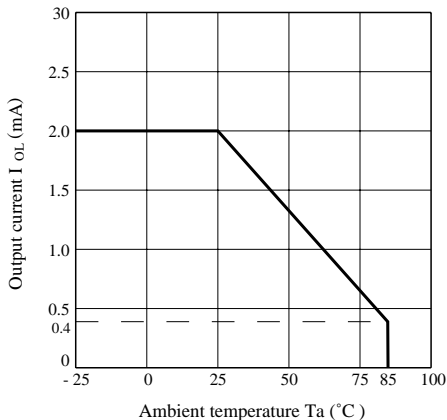
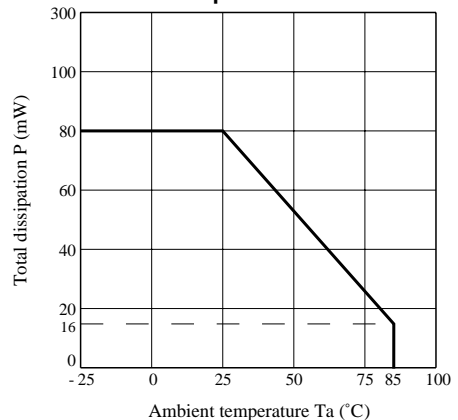
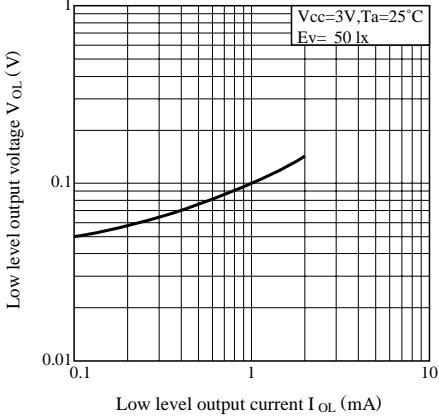


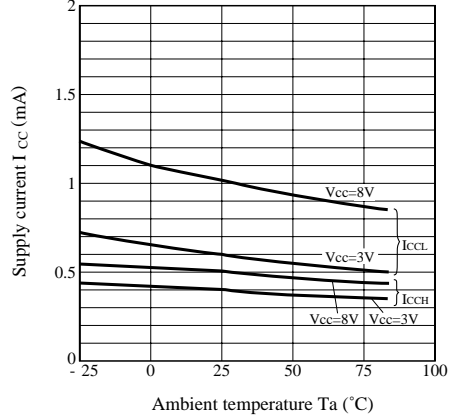
Fig. 2 Output Power Dissipation vs. Ambient Temperature



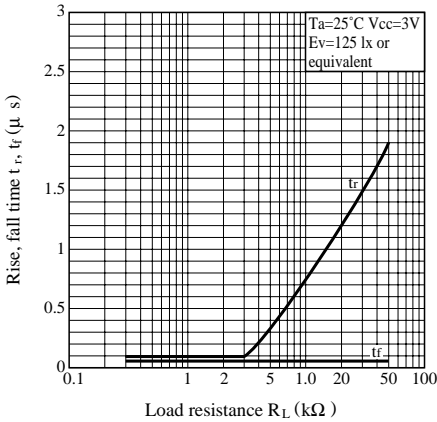
**Fig. 3 Low Level Output Voltage vs. Low Level Output Current**



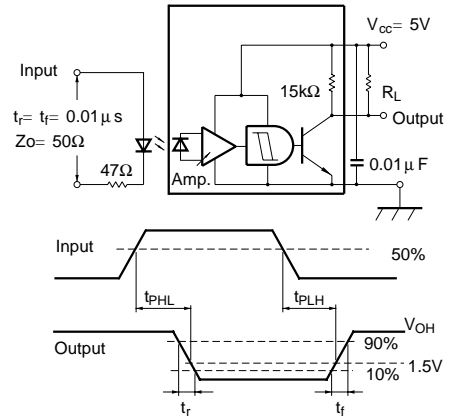
**Fig. 4 Supply Current vs. Ambient Temperature**



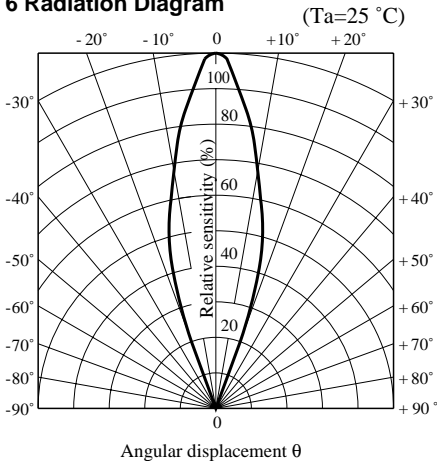
**Fig. 5 Rise, Fall Time vs. Load Resistance**



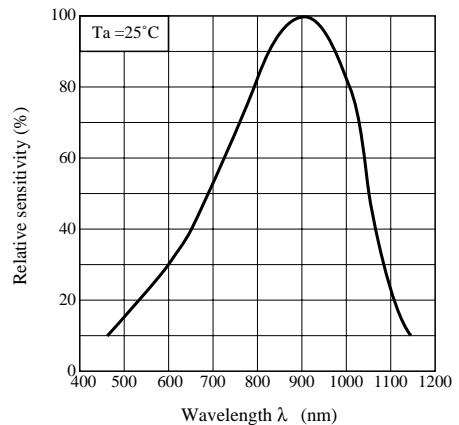
**Test Circuit for Response Time**



**Fig. 6 Radiation Diagram**



**Fig. 7 Spectral Sensitivity**



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