

# IS456

## High Speed Response Type OPIC Light Detector

### ■ Features

1. High speed response ( $t_{PHL}$  : TYP.230ns)
2. Uses a pattern to allow for possible positional deviation of the semiconductor laser spot.
3. Compact, mini-flat package

### ■ Applications

1. Laser beam printers

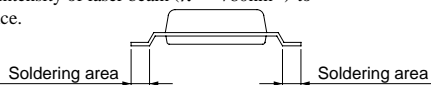
### ■ Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Rating	Unit
*1 Supply voltage	V <sub>CC</sub>	-0.5 to +7	V
High level output voltage	V <sub>OH</sub>	7	V
Low level output current	I <sub>OL</sub>	20	mA
Operating temperature	T <sub>opr</sub>	-25 to +80	°C
Storage temperature	T <sub>stg</sub>	-40 to +85	°C
*2 Soldering temperature	T <sub>sol</sub>	260	°C
Power dissipation	P	150	mW
R <sub>o</sub> terminal power dissipation	P <sub>RO</sub>	24	mW
*3 Incident light intensity	P <sub>I</sub>	5	mW
*3 Radiant intensity	E <sub>e</sub>	60	WB

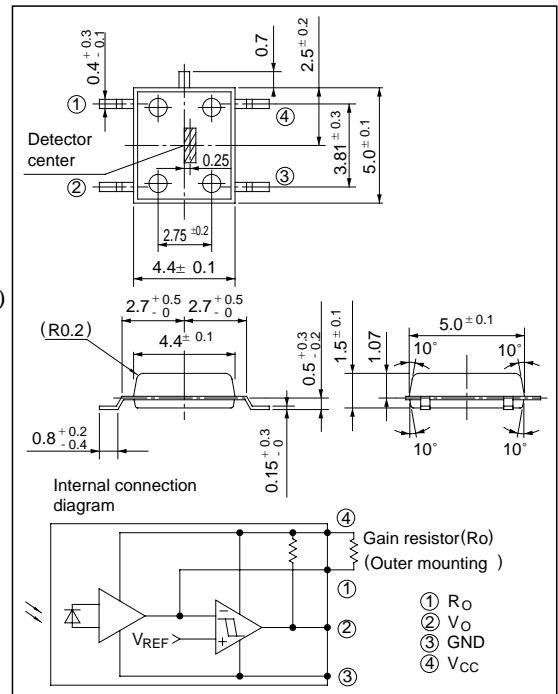
\*1 For 1 minute

\*2 For 3 seconds at the position shown in the following drawing.

\*3 Maximum allowable incident light intensity and radiant intensity of laser beam ( $\lambda = 780\text{nm}$ ) to the device.

### ■ Outline Dimensions

(Unit : mm)



\*4 "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.

### ■ Electro-optical Characteristics

(V<sub>CC</sub> = 5V, Ta= 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
High level output voltage	V <sub>OH</sub>	R <sub>O</sub> =51kΩ, E <sub>v</sub> =0	4.9	-	-	V	
Low level output voltage	V <sub>OL</sub>	I <sub>OL</sub> =10mA, E <sub>v</sub> =1 000lx	-	0.4	0.6	V	
High level supply current	I <sub>CCH</sub>	R <sub>O</sub> =51kΩ, E <sub>v</sub> =0	-	2.6	4.5	mA	
Low level supply current	I <sub>CCL</sub>	R <sub>O</sub> =51kΩ, E <sub>v</sub> =1 000lx	-	3.8	6.6	mA	
*4 "High→Low" threshold illuminance 1	E <sub>VHL1</sub>	R <sub>O</sub> =51kΩ	330	470	600	lx	
*4 "High→Low" threshold illuminance 2	E <sub>VHL2</sub>	R <sub>O</sub> =5.1kΩ	-	5 800	-	lx	
"High→Low" threshold incident light intensity	P <sub>IHL</sub>	R <sub>O</sub> =5.1kΩ, λ =780nm	-	100	-	μW	
Response time	"High→Low" propagation delay time	t <sub>PHL</sub>	-	230	400	ns	
	"Low→High" propagation delay time	t <sub>PLH</sub>	-	230	400	ns	
	Rise time	t <sub>r</sub>	C <sub>L</sub> =15pF, Duty=1: 1 P <sub>I</sub> =0.2mW, λ =780nm	-	60	200	ns
	Fall time	t <sub>f</sub>	R <sub>O</sub> =5.1kΩ, R <sub>L</sub> =510Ω	-	20	100	ns

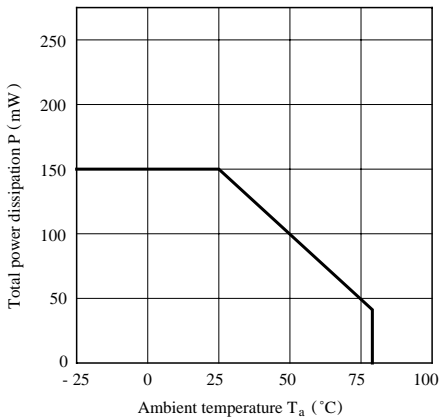
\*4 E<sub>VHL1</sub>, E<sub>VHL2</sub> represent illuminance by CIE standard light source A (tungsten lamp) when output goes from high to low.

**■ Recommended Operating Conditions**

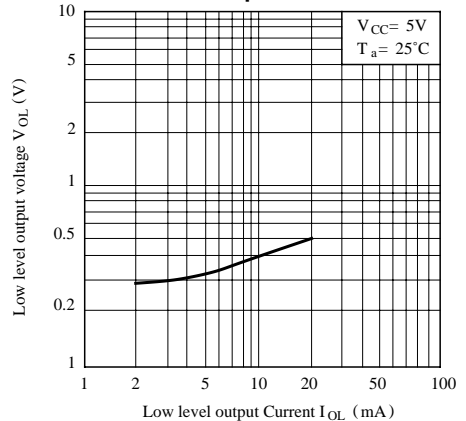
Parameter	Symbol	MIN.	MAX.	Unit
Operating supply voltage	$V_{cc}$	4.5	5.5	V
Operating temperature	$T_{opr}$	0	60	°C
Incident light intensity ( $\lambda = 780nm$ )	$P_I$	-	2.5	mW

In order to stabilize power supply line, connect a by-pass capacitor of 0.1 $\mu$ F between Vcc and GND near the device.

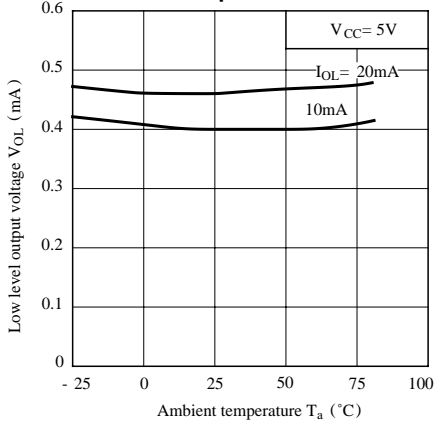
**Fig. 1 Total Power Dissipation vs. Ambient Temperature**



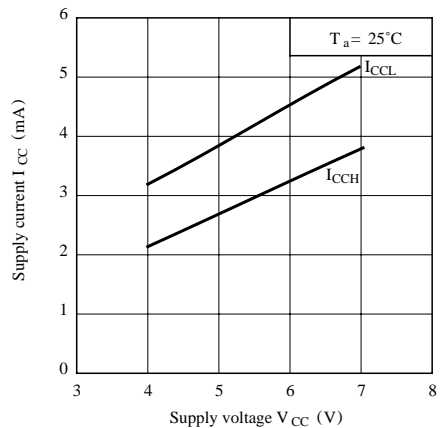
**Fig. 2 Low Level Output Voltage vs. Low Level Output Current**



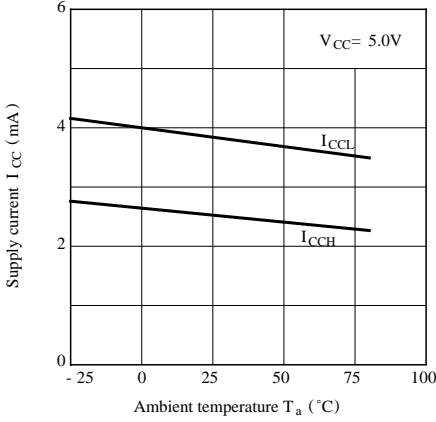
**Fig. 3 Low Level Output Voltage vs. Ambient Temperature**



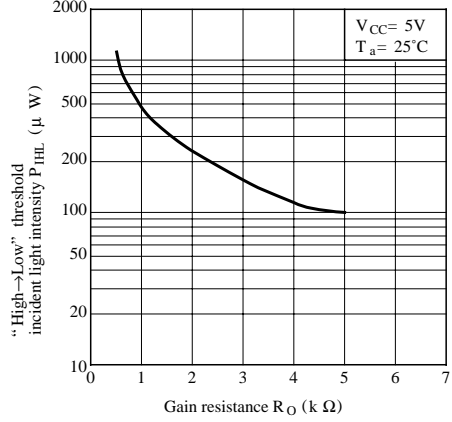
**Fig. 4 Supply Current vs. Supply Voltage**



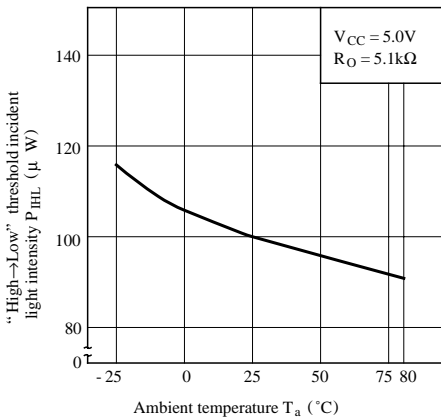
**Fig. 5 Supply Current vs. Ambient Temperature**



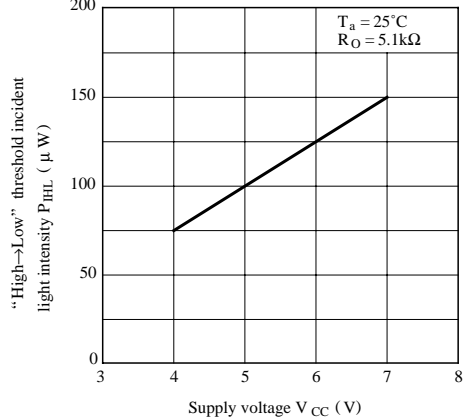
**Fig. 6 “High →Low” Threshold Incident Light Intensity vs. Gain Resistance**



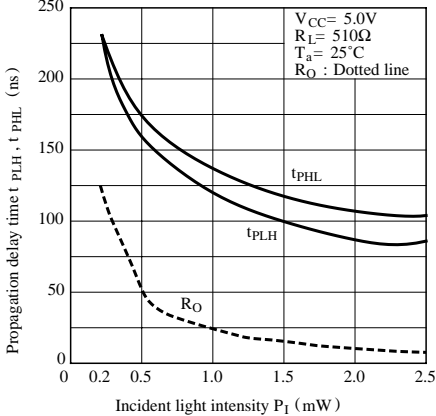
**Fig. 7 “High →Low” Threshold Incident Light Intensity vs. Ambient Temperature**



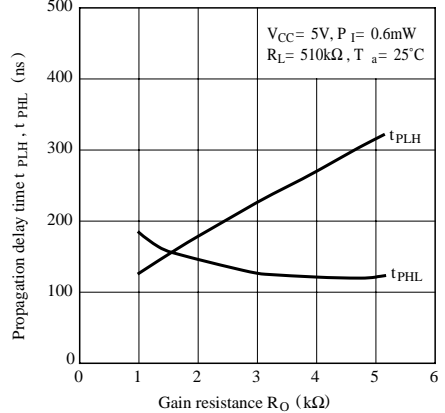
**Fig. 8 “High →Low” Threshold Incident Light Intensity vs. Supply Voltage**



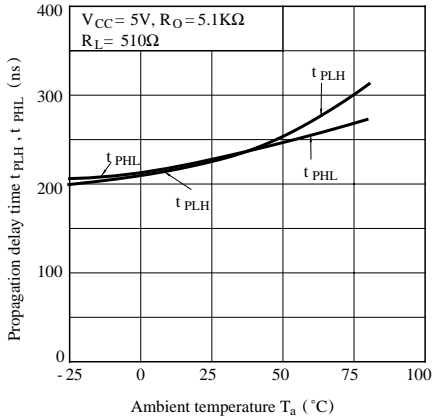
**Fig. 9 Propagation Delay Time vs. Incident Light Intensity**



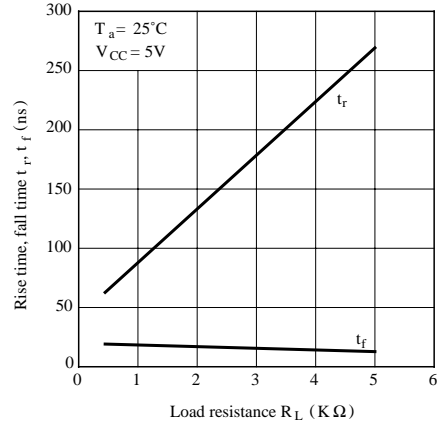
**Fig.10 Propagation Delay Time vs. Gain Resistance**



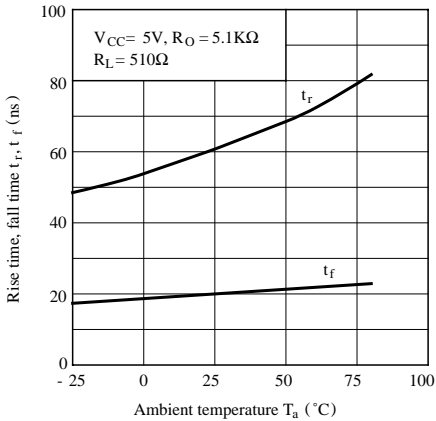
**Fig.11 Propagation Delay Time vs. Ambient Temperature**



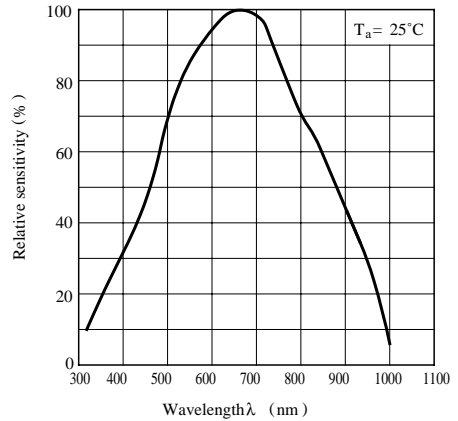
**Fig.12 Rise Time, Fall Time vs. Load Resistance**



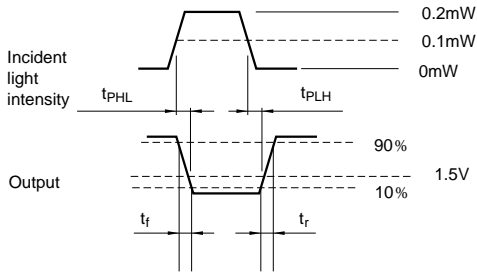
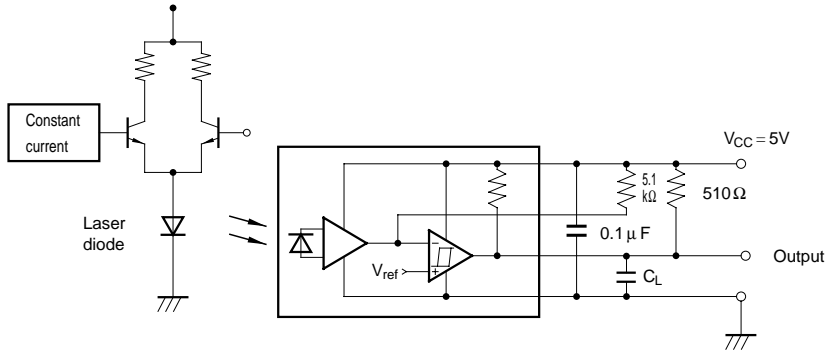
**Fig.13 Rise Time, Fall Time vs. Ambient Temperature**



**Fig.14 Spectral Sensitivity**



Test Circuit for Response Time



● Please refer to the chapter “Precautions for Use.”