

IS457

High Speed Response Type OPIC Light Detector

■ Features

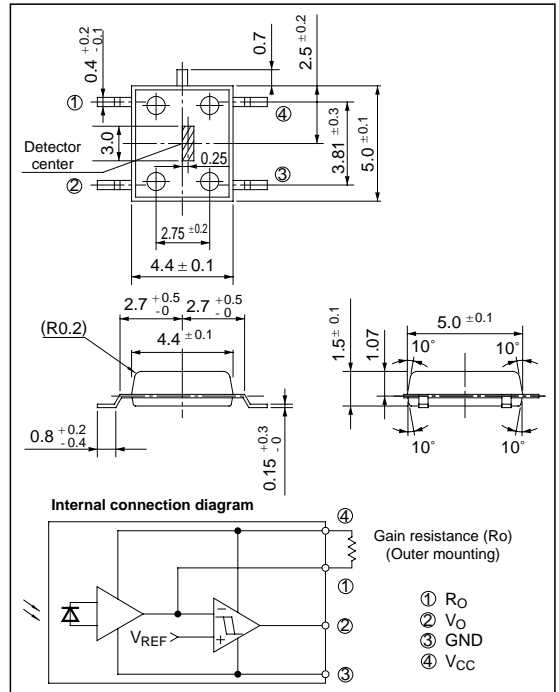
1. High speed response type (t_{PHL} : TYP. 300ns)
2. Pattern with semiconductor laser spot positional deviation taken into consideration (Detector size : 0.5mm x 3.0mm)
3. Open collector output
4. Angle adjustment by means of outer mounting resistance

■ Applications

1. Laser beam printers

■ 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

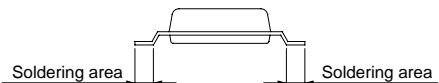
(T_a=25°C)

Parameter	Symbol	Rating	Unit
*1 Supply voltage	V _{CC}	-0.5 to +7	V
High level output voltage	V _{OH}	7	V
Low level output voltage	I _{OL}	40	mA
Operating temperature	T _{opr}	-25 to +80	°C
Storage temperature	T _{stg}	-40 to +85	°C
*2 Soldering temperature	T _{sol}	260	°C
Total power dissipation	P	150	mW
R _o terminal dissipation	P _{RO}	24	mW
*3 Incident light intensity	P _I	5	mW
*3 Radiant intensity	E _e	60	W/cm ²

*1 For 1 minute

*2 For 3 seconds at the position shown in the right drawing

*3 Max. allowable incident light intensity and radiant intensity of laser beams ($\lambda = 780$ nm) to the detector



Electro-optical Characteristics

(V_{cc} = 5V, T_a = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
High level output voltage	I _{OH}	R _O =51kΩ, E _V =0 lx	-	-	100	μA	
Low level output voltage	V _{OL}	I _{OL} =40mA, E _V =1 000 lx	-	0.35	0.52	V	
High level supply current	I _{CCH}	R _O =51kΩ, E _V =0 lx	-	3.0	6.5	mA	
Low level supply current	I _{CCL}	R _O =51kΩ, E _V =1 000 lx	-	5.8	8.6	mA	
Ro terminal offset voltage	I _{OSRO}	R _O =5.1kΩ	-	8	15	μA	
*4 "High →Low" threshold illuminance 1	E _{VHL1}	R _O =51kΩ	250	360	470	lx	
*4 "High →Low" threshold illuminance 2	E _{VHL2}	R _O =5.1kΩ	-	4 500	-	lx	
"High→Low" threshold incident light intensity	P _{IHL}	R _O =5.1kΩ, λ =780nm	-	100	-	μW	
Response time	"High→Low" propagation delay time	t _{PHL}	C _L =15pF, Duty ratio=1:1 P _I =0.2mW, λ =780nm R _O =5.1kΩ, R _L =510Ω	-	300	500	ns
	"Low →High" propagation delay time	t _{PLH}		-	300	500	ns
	Rise time	t _r		-	100	500	ns
	Fall time	t _f		-	50	200	ns

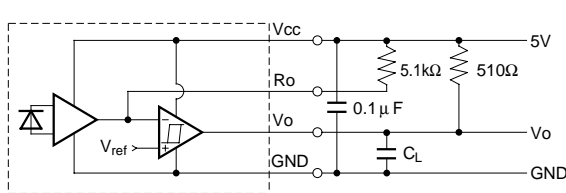
*4 E_{VHL1}, E_{VHL2} : Illuminance by CIE standard light source A (tungsten lamp) to bring about change from "High" to "Low"

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 (λ=780 nm)	P _I	-	2.5	mW
Gain resistance	R _O	0.39	5.1	kΩ

In order to stabilize power supply line, connect a by-pass capacitor of 0.1 μF between V_{cc} and GND at a position within 1 cm from the lead.

Test Circuit for Response Time



- Notes
1. C_L includes the probe-to-line capacitance.
 2. Add a by-pass capacitor of 0.1μF at a position within 1 cm from the V_{cc}-GND terminal.

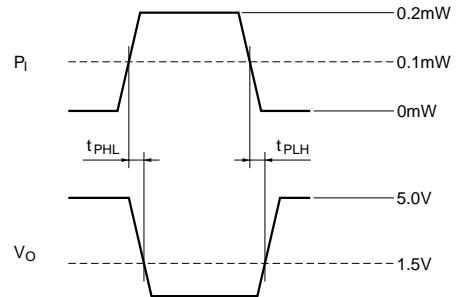


Fig. 1 Total Power Dissipation vs. Ambient Temperature

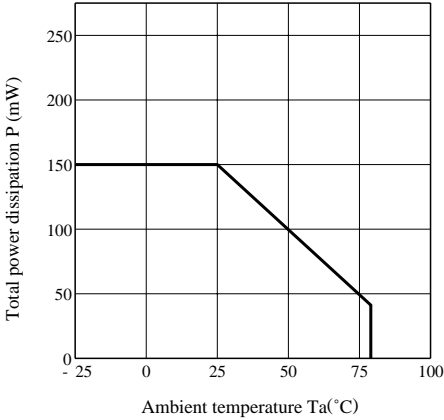


Fig. 2 Low Level Output Voltage vs. Low Level Output Current

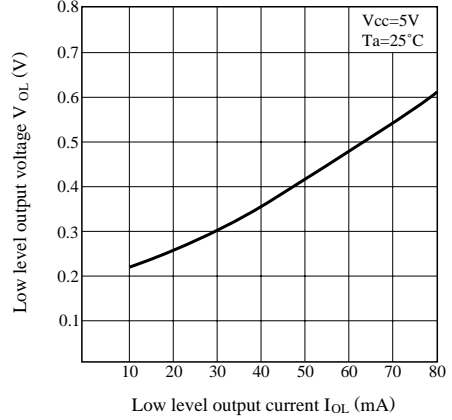


Fig. 3 Low Level Output Voltage vs. Ambient Temperature

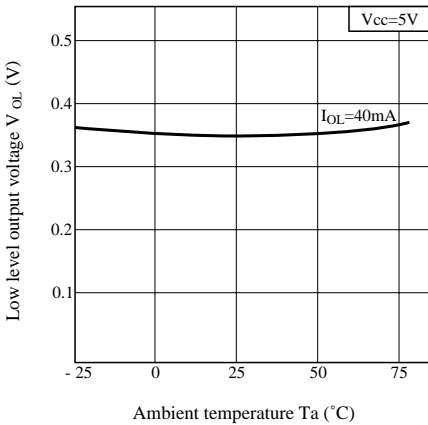


Fig. 4 Supply Current vs. Supply Voltage

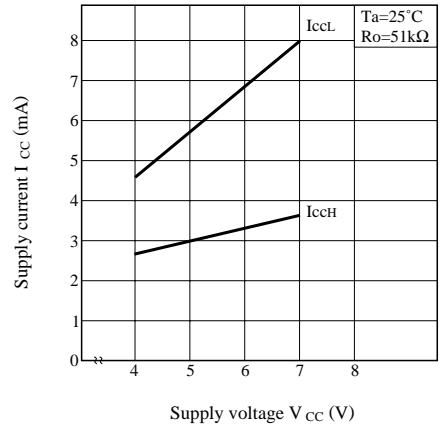


Fig. 5 Supply Current vs. Ambient Temperature

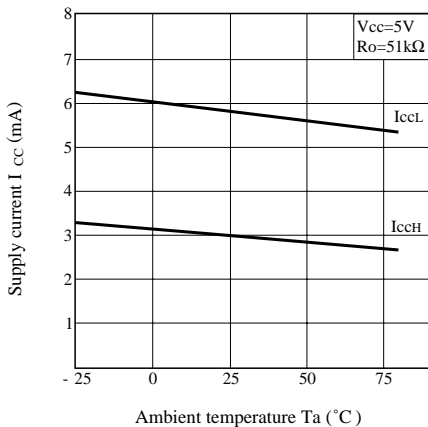


Fig. 6 "High→Low" Threshold Incident Light Intensity vs. Supply Voltage

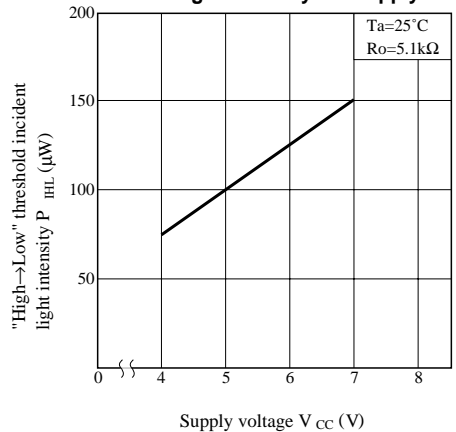


Fig. 7 Propagation Delay Time vs. Ambient Temperature

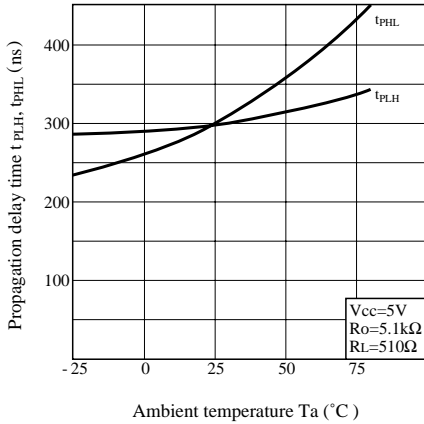


Fig. 8 Rise, Fall Time vs. Ambient Temperature

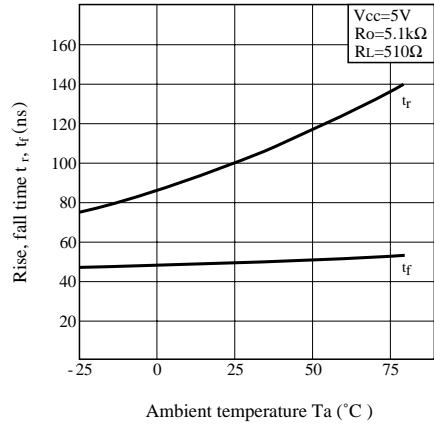
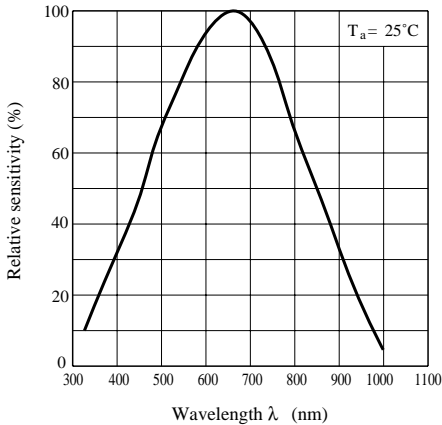


Fig. 9 Spectral Sensitivity



● Please refer to the chapter "Precautions for Use". (Page 78 to 93)