IS457

High Speed Response Type OPIC Light Detector

■ Features

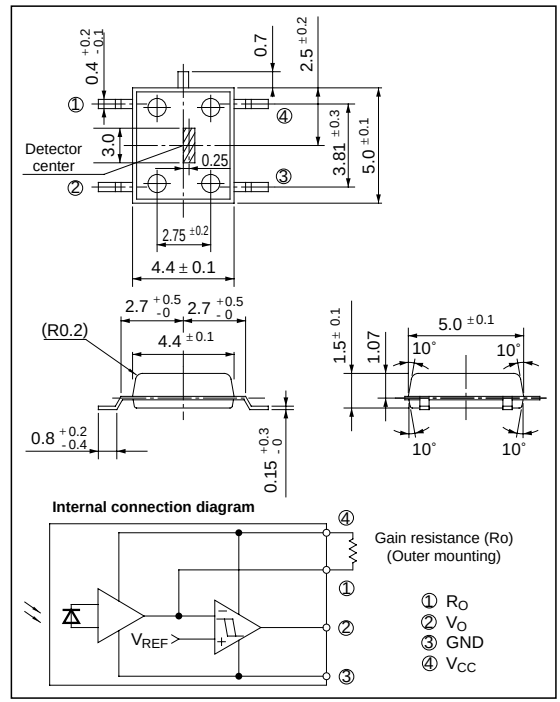
1. High speed response type (t_{PHL}: TYP. 300ns)
2. Pattern with semiconductor laser spot positional deviation taken into consideration (Detector size : 0.5mm x 3.0mm)
3. Open collector output
4. Angle adjustment by means of outer mounting resistance

■ Applications

1. Laser beam printers

■ Outline Dimensions

(Unit : mm)

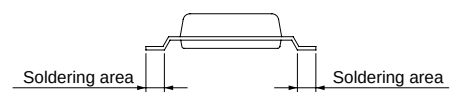


* OPIC (Optical IC) is a trademark of the SHARP Corporation. An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

■ Absolute Maximum Ratings

(Ta=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
Ro 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 (λ =780 nm) to the detector

■ Electro-optical Characteristics

(V_{CC} = 5V, Ta = 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

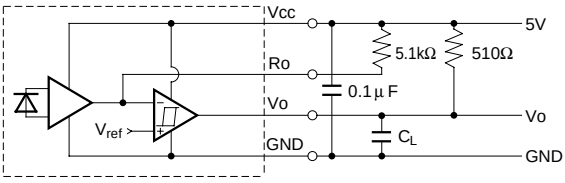
*4 E_{VHL1}, E_{VHL2} : Illuminance by CIE standard light source A (tungsten lamp) to bring about change from "High" to "Low"

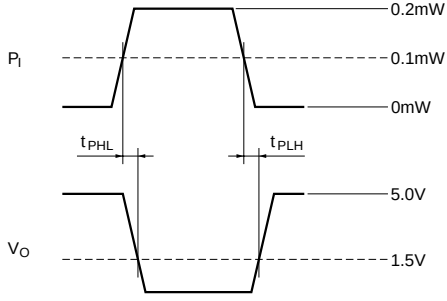
■ Recommended Operating Conditions

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 Vcc 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 Vcc-GND terminal.

Fig. 1 Total Power Dissipation vs. Ambient Temperature

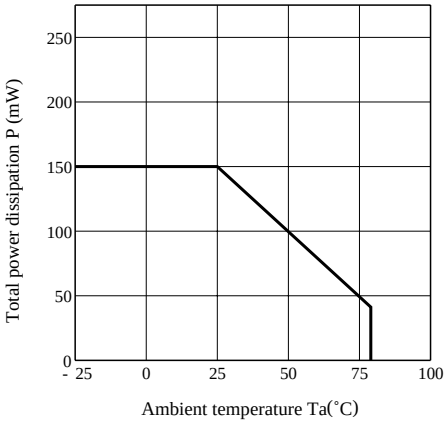


Fig. 2 Low Level Output Voltage vs. Low Level Output Current

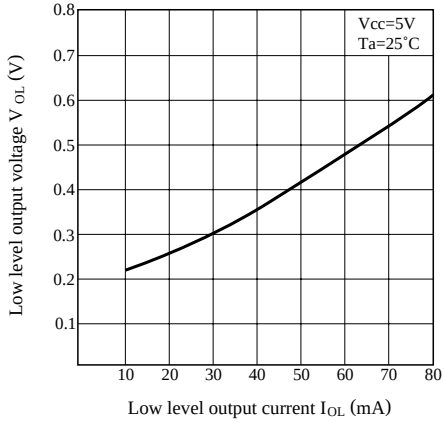


Fig. 3 Low Level Output Voltage vs. Ambient Temperature

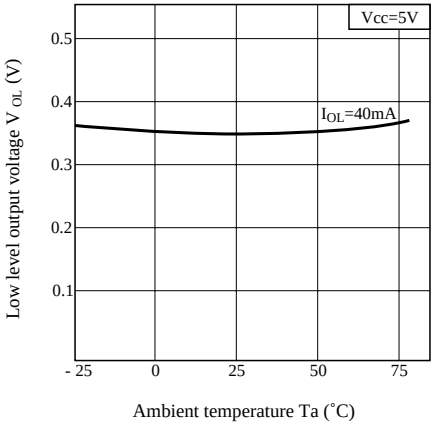


Fig. 4 Supply Current vs. Supply Voltage

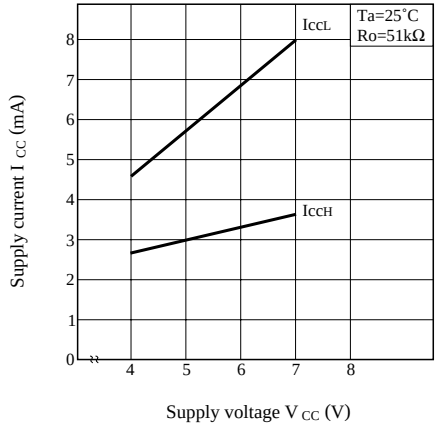


Fig. 5 Supply Current vs. Ambient Temperature

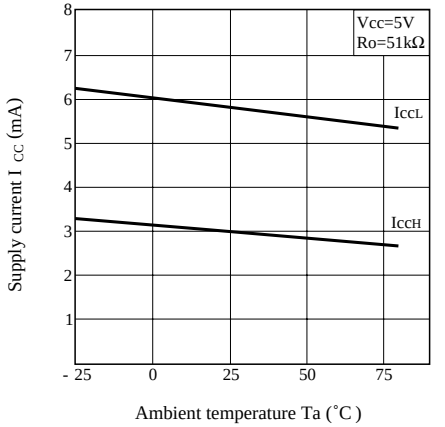


Fig. 6 "High→Low" Threshold Incident Light Intensity vs. Supply Voltage

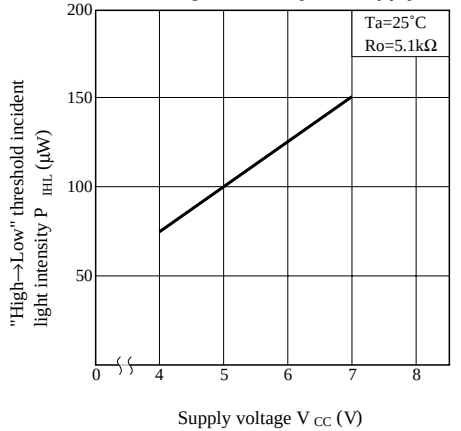


Fig. 7 Propagation Delay Time vs. Ambient Temperature

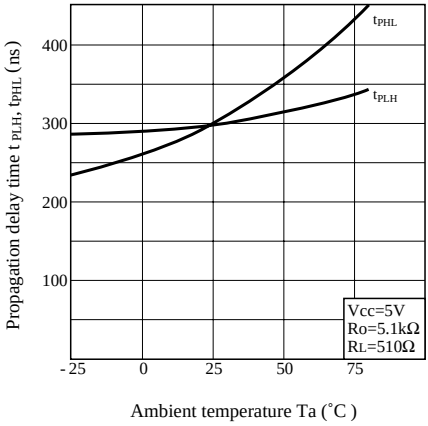


Fig. 8 Rise, Fall Time vs. Ambient Temperature

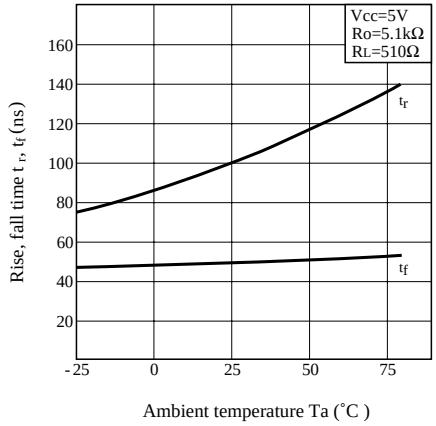
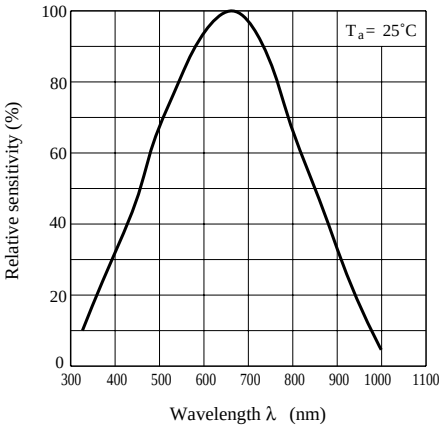


Fig. 9 Spectral Sensitivity



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