

IS487/IS488

Built-in Amp.Type OPIC Light Detector

■ Features

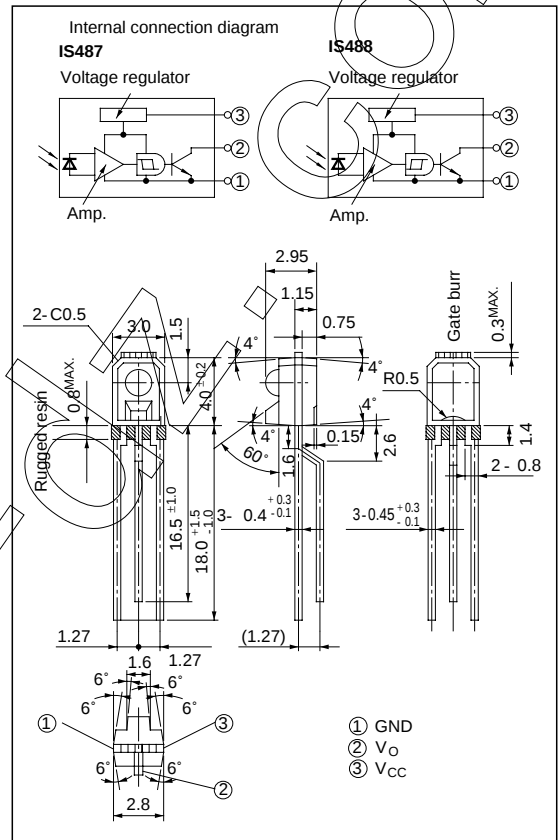
1. Compact type
2. Built-in schmidt trigger circuit
3. LSTTL and TTL compatible output
4. Open collector output
5. Low level output under incident light (IS487)
High level output under incident light (IS488)
6. A wide range of operating supply voltage
(V_{CC} : 4.5 to 17v)

■ 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

($T_a = 25^\circ\text{C}$)

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	$^\circ\text{C}$
Storage temperature	T_{stg}	- 40 to + 100	$^\circ\text{C}$
*1 Soldering temperature	T_{sol}	260	$^\circ\text{C}$

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

■ Electro-optical Characteristics

(Unless otherwise specified, $T_a = 0$ to 70°C , $V_{CC} = 5\text{V}$)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Low level output voltage		V _{OL}	*2I _{OL} = 16mA	-	0.15	0.4	V	
High level output current		I _{OH}	*3V _{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} E _{VHL} /E _{VLH}	T _a = 25°C, R _L = 280Ω	0.50	0.65	0.90	-
		IS488						
Response time	“Low→High” Propagation time	IS487	T _a = 25°C E _V = 50lx R _L = 280Ω	-	5	15	μs	
		IS488		-	3	9		
	“High→Low” Propagation time	IS487		-	3	9		
		IS488		-	5	15		
	Rise time			t _r	-	0.1		0.5
	Fall time			t _f	-	0.05		0.5

*2 Defines $E_V = 50\text{lx}$ (IS487) and $E_V = 0$ (IS488).

*3 Defines $E_V = 0$ (IS487) and $E_V = 50\text{lx}$ (IS488).

*4 E_{VHL} represents illuminance by CIE standard light source A (tungsten lamp) when output changes from high to low.

*5 E_{VLH} represents illuminance by CIE standard 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 $0.01\mu\text{F}$ or more between V_{CC} and GND near the device.

Fig. 1 Low Level Output Current vs. Ambient Temperature

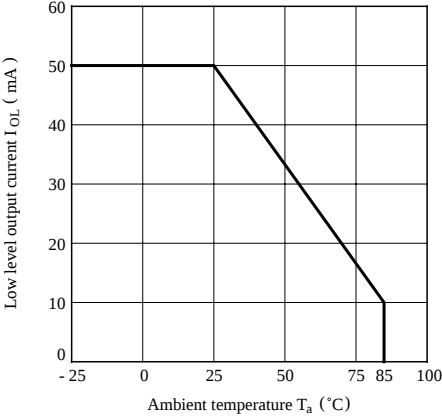


Fig. 2 Power Dissipation vs. Ambient Temperature

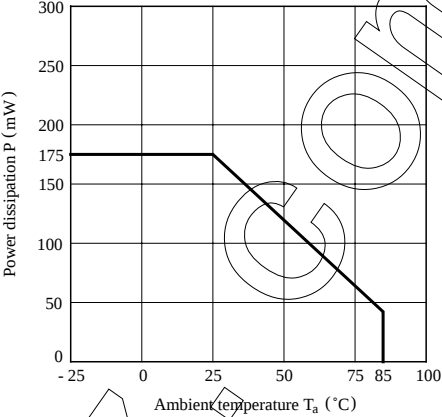


Fig. 3 Relative Threshold Illuminance vs. Supply Voltage

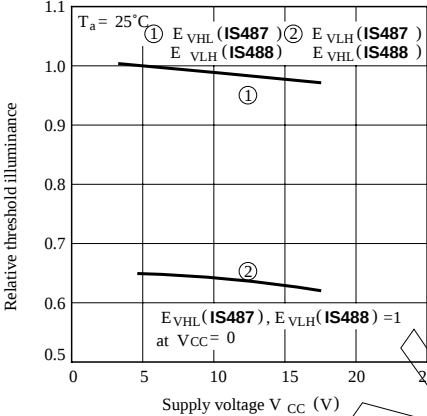


Fig. 4 Low Level Output Voltage vs. Ambient Temperature

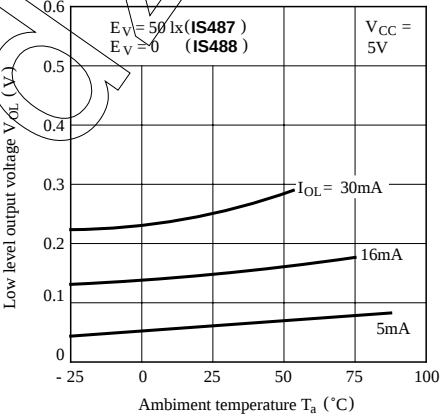


Fig. 5 Supply Current vs. Ambient Temperature

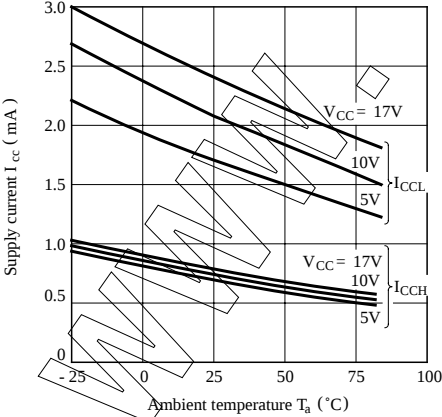
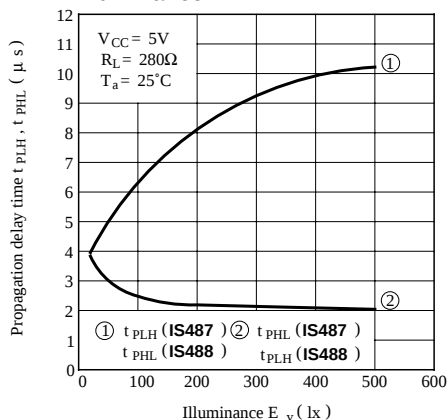


Fig. 6 Propagation Delay Time vs. Illuminance



Test Circuit for Response Time (IS487)

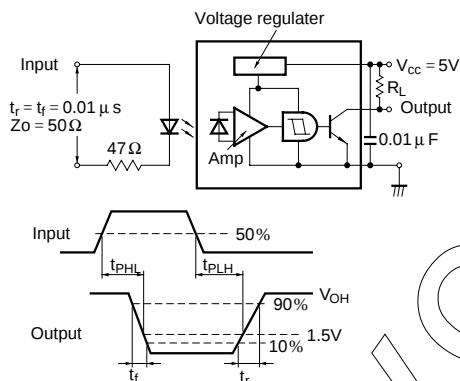


Fig. 8 Sensitivity Diagram

($T_a = 25^\circ C$)

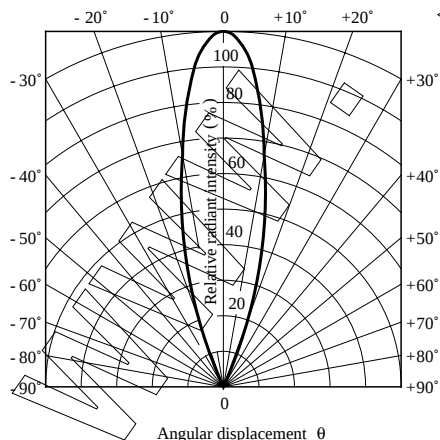
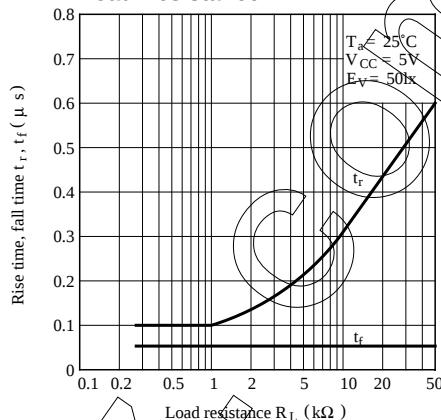


Fig. 7 Rise Time, Fall Time vs. Load Resistance



Test Circuit for Response Time (IS488)

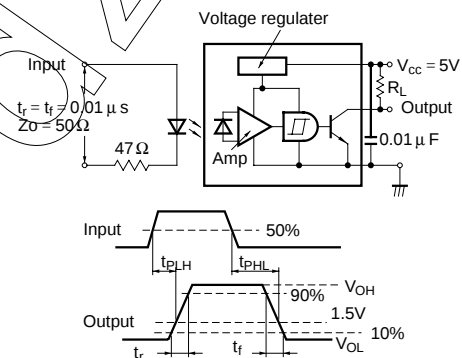
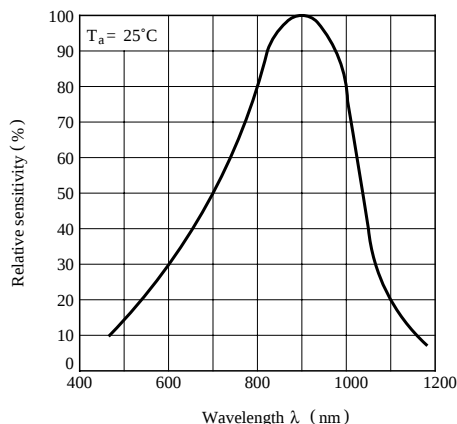


Fig. 9 Spectral Sensitivity



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