

IS487/IS488

Built-in Amp.Type OPIC Light Detector

■ Features

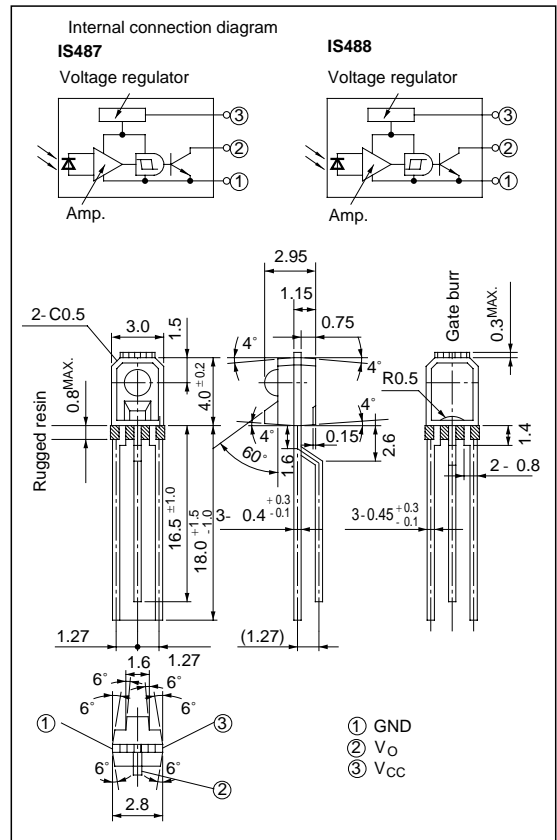
1. Compact type
2. Built-in schmidt trigger circuit
3. LSTTL and TTL compatible output
4. Open collector output
5. Low level output under incident light (IS487)
High level output under incident light (IS488)
6. A wide range of operating supply voltage
(V_{CC} : 4.5 to 17V)

■ Applications

1. Floppy disk drive Units
2. Copiers, printers, facsimiles
3. VCRs
4. Automatic vending machines

■ Outline Dimensions

(Unit : mm)



*44 "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 +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	°C
Storage temperature	T_{stg}	-40 to +100	°C
*1 Soldering temperature	T_{sol}	260	°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}	$^*2 I_{OL} = 16\text{mA}$	-	0.15	0.4	V	
High level output current		I_{OH}	$^*3 V_{CC} = 20\text{V}$, $V_O = 30\text{V}$	-	-	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}	$T_a = 25^\circ\text{C}$, $R_L = 280\Omega$	-	15	35	lx	
			$R_L = 280\Omega$	-	-	50		
	IS488		$T_a = 25^\circ\text{C}$, $R_L = 280\Omega$	1.5	10	-		
			$R_L = 280\Omega$	1	-	-		
*5 “Low→High” Threshold illuminance	IS487	E_{VLH}	$T_a = 25^\circ\text{C}$, $R_L = 280\Omega$	1.5	10	-	lx	
			$R_L = 280\Omega$	1	-	-		
	IS488		$T_a = 25^\circ\text{C}$, $R_L = 280\Omega$	-	15	35		
			$R_L = 280\Omega$	-	-	50		
*6 Hysteresis	IS487	E_{VLH}/E_{VHL}	$T_a = 25^\circ\text{C}$, $R_L = 280\Omega$	0.50	0.65	0.90	-	
	IS488	E_{VHL}/E_{VLH}						
Response time	“Low→High” Propagation time	t_{PLH}	$T_a = 25^\circ\text{C}$ $E_V = 50\text{lx}$ $R_L = 280\Omega$	-	5	15	μs	
				IS487	-	3		9
	IS488	t_{PHL}		-	3	9		
				-	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

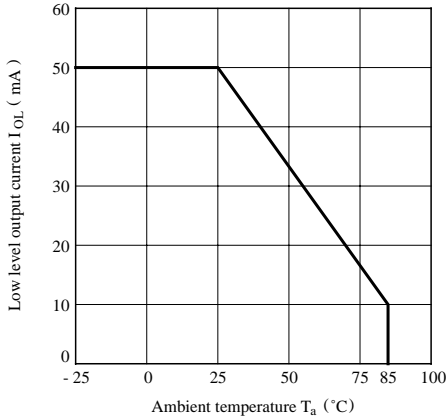


Fig. 2 Power Dissipation P (mW) vs. Ambient Temperature

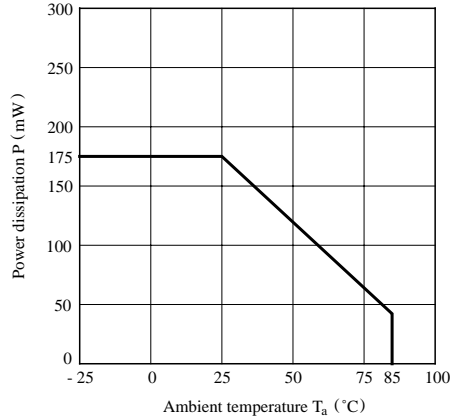


Fig. 3 Relative Threshold Illuminance vs. Supply Voltage

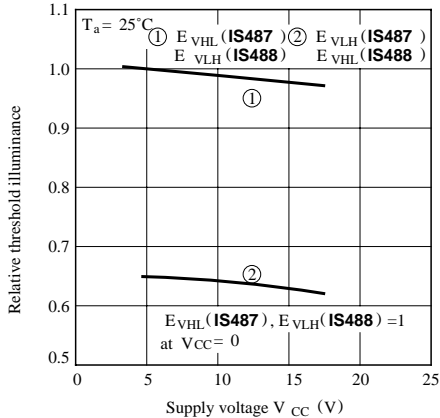


Fig. 4 Low Level Output Voltage vs. Ambient Temperature

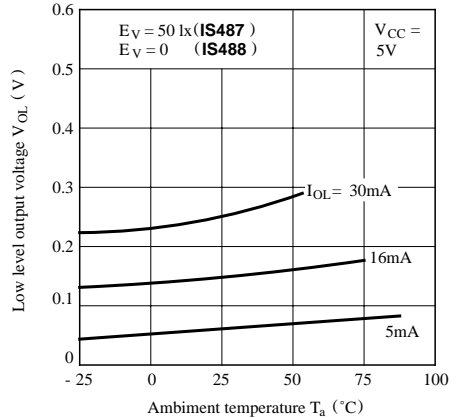


Fig. 5 Supply Current vs. Ambient Temperature

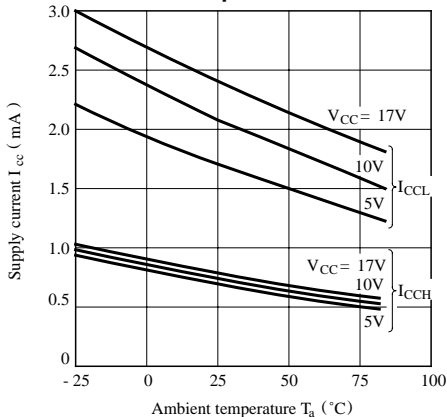


Fig. 6 Propagation Delay Time vs. Illuminance

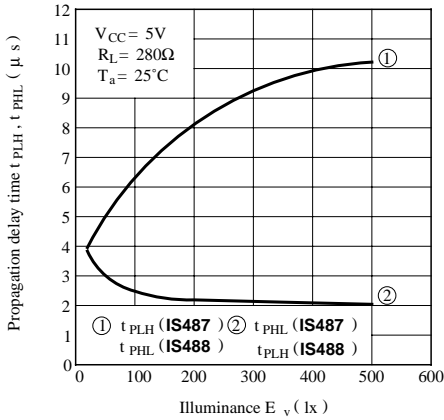
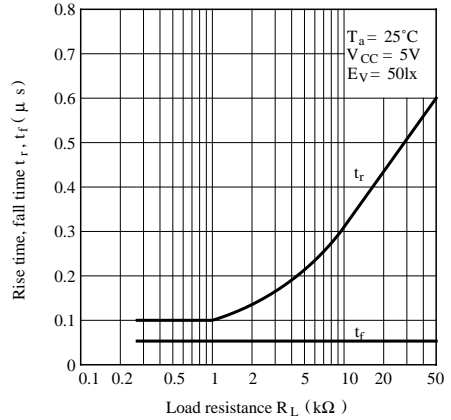
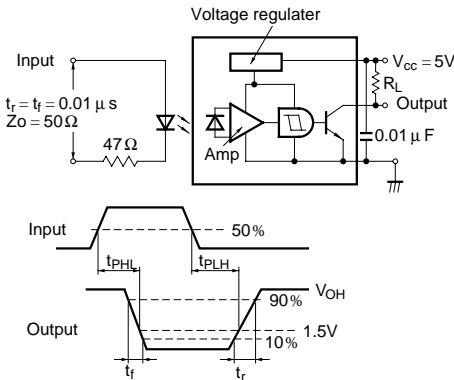


Fig. 7 Rise Time, Fall Time vs. Load Resistance



Test Circuit for Response Time (IS487)



Test Circuit for Response Time (IS488)

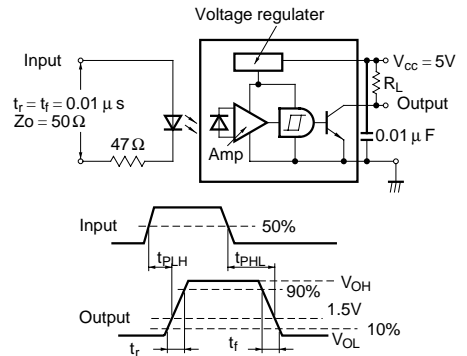


Fig. 8 Sensitivity Diagram

($T_a = 25^\circ C$)

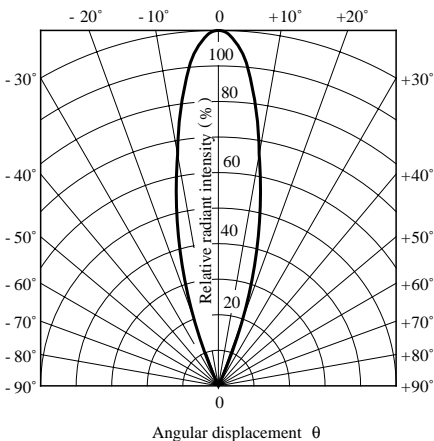
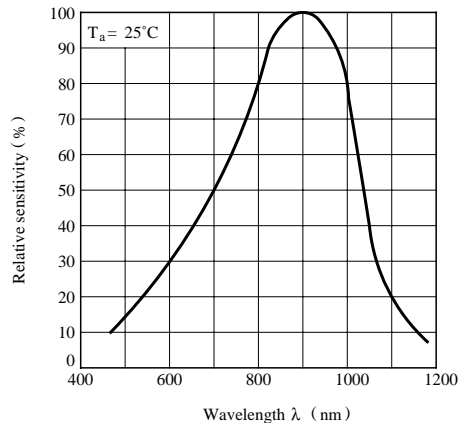


Fig. 9 Spectral Sensitivity



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