

# IS485/IS486

## Built-in Amp. Type OPIC Light Detector

### ■ Features

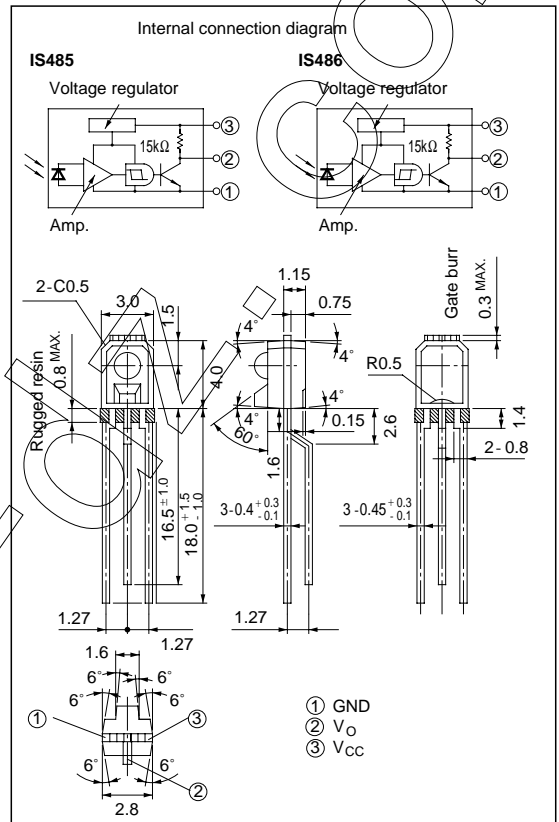
1. Built-in schmidt trigger circuit
2. High sensitivity( $E_v$  : MAX. 35 lx at  $T_a=25^\circ\text{C}$ )
3. A wide range of operating supply voltage ( $V_{CC}$ : 4.5 to 17V)
4. LSTTL and TTL compatible output
5. Low level output under incident light (IS485)  
High level output under incident light (IS486)
6. Compact package

### ■ Applications

1. Floppy disk drive units
2. Copiers, printers, facsimiles
3. VCRs, cassette decks
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.

\* Unspecified tolerance shall be  $\pm 0.2\text{mm}$ .

### ■ Absolute Maximum Ratings

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

Parameter	Symbol	Rating	Unit
Supply voltage	$V_{CC}$	-0.5 to + 17	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 package.

## ■ Electro-optical Characteristics

(Unless otherwise specified Ta= 0 to 70°C, V<sub>CC</sub>= 5V)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Low level output voltage		V <sub>OL</sub>	I <sub>OL</sub> = 16mA, *2	-	0.15	0.4	V	
High level output voltage		V <sub>OH</sub>	*3	3.5	-	-	V	
Low level supply current		I <sub>CCL</sub>	*2	-	1.7	3.8	mA	
High level supply current		I <sub>CCH</sub>	*3	-	0.7	2.2	mA	
*4 “High”→ “Low” threshold illuminance	<b>IS485</b>	E <sub>VHL</sub>	Ta = 25°C	-	15	35	lx	
			-	-	-	50		
	<b>IS486</b>		Ta = 25°C	1.5	10	-		
			-	1	-	-		
*5 “Low”→ “High” threshold illuminance	<b>IS485</b>	E <sub>VLH</sub>	Ta = 25°C	1.5	10	-	lx	
			-	1	-	-		
	<b>IS486</b>		Ta = 25°C	-	15	35		
			-	-	-	50		
*6 Hysteresis	<b>IS485</b>	E <sub>VLH</sub> / E <sub>VHL</sub>	Ta = 25°C	0.50	0.65	0.90	-	
	<b>IS486</b>	E <sub>VHL</sub> / E <sub>VLH</sub>						
Response time	“High”→ “Low” propagation delay time	t <sub>PHL</sub>	Ta = 25°C E <sub>V</sub> = 50lx R <sub>L</sub> = 280Ω	-	3	9	μs	
				<b>IS485</b>	-	5		15
	“Low”→ “High” propagation delay time	t <sub>PLH</sub>		<b>IS485</b>	-	5		15
				<b>IS486</b>	-	3		9
	Rise time	t <sub>r</sub>		-	0.1	0.5		
Fall time	t <sub>f</sub>	-	0.05	0.5				

\*2 Defines E<sub>V</sub>= 50lx (**IS485**) and E<sub>V</sub>= 0 (**IS486**).

\*3 Defines E<sub>V</sub>= 0 (**IS485**) and E<sub>V</sub>= 50lx (**IS486**).

\*4 E<sub>VHL</sub> represents illuminance by CIE standard light source A (tungsten lamp) when output changes from high to low.

\*5 E<sub>VLH</sub> represents illuminance by CIE standard light source A (tungsten lamp) when output changes from low to high.

\*6 Hysteresis stands for E<sub>VLH</sub>/E<sub>VHL</sub> (**IS485**) and E<sub>VHL</sub>/E<sub>VLH</sub> (**IS486**).

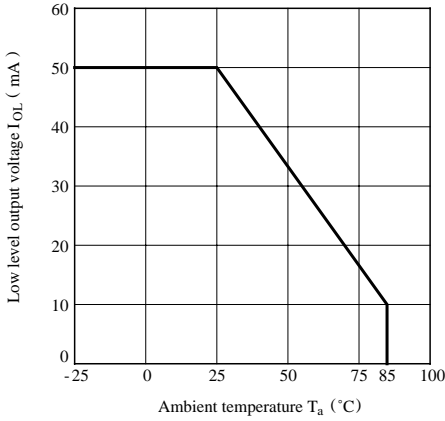
## ■ Recommended Operating Conditions (Ta= 0 to 70°C)

Parameter	Symbol	MIN.	MAX.	Unit
Supply voltage	V <sub>CC</sub>	4.5	17	V
Low level output current	I <sub>OL</sub>	-	16	mA

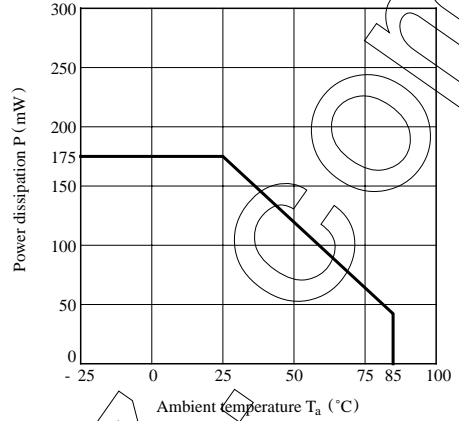
In order to stabilize power supply line, connect a by-pass capacitor of 0.01μ F or more between V<sub>CC</sub> and GND near the device.

WWW

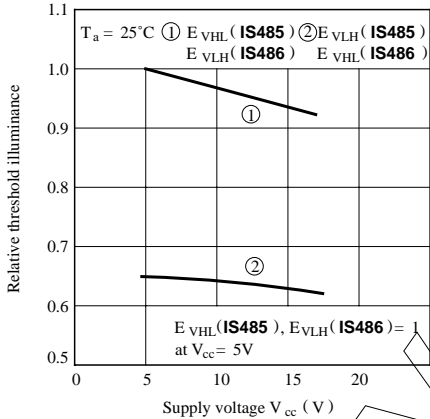
**Fig. 1 Low Level Output Current vs. Ambient Temperature**



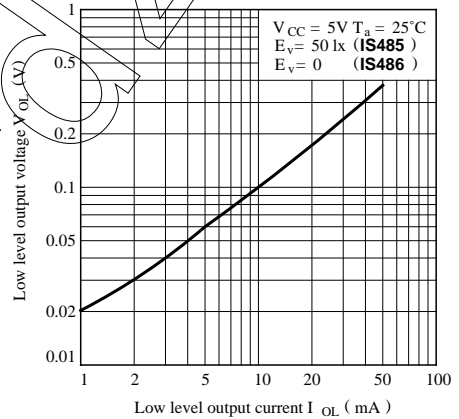
**Fig. 2 Power Dissipation vs. Ambient Temperature**



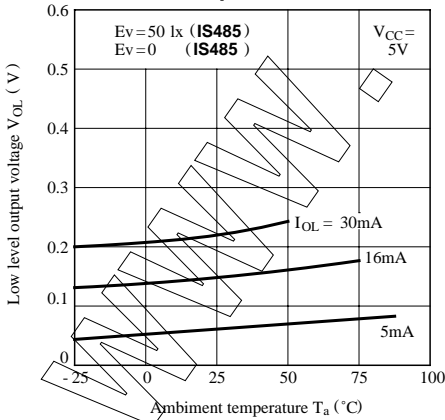
**Fig. 3 Relative Threshold Illuminance vs. Supply Voltage**



**Fig. 4 Low Level Output Voltage vs. Low Level Output Current**



**Fig. 5 Low Level Output Voltage vs. Ambient Temperature**



**Fig. 6 Supply Current vs. Ambient Temperature**

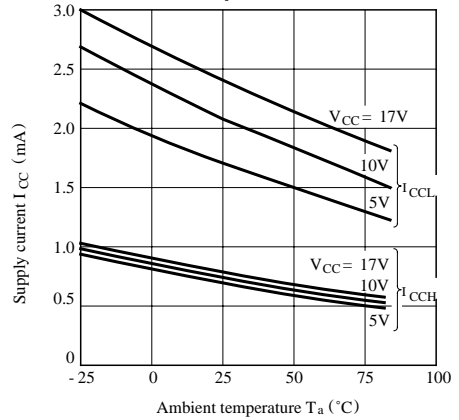


Fig. 7 Propagation Delay Time vs. Illuminance

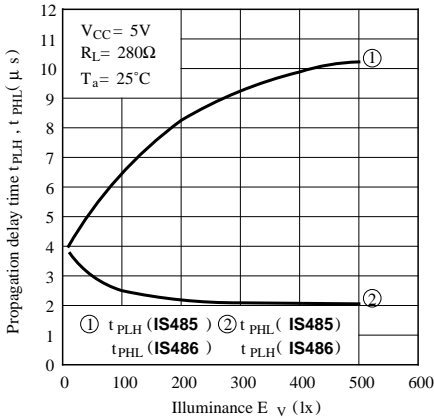
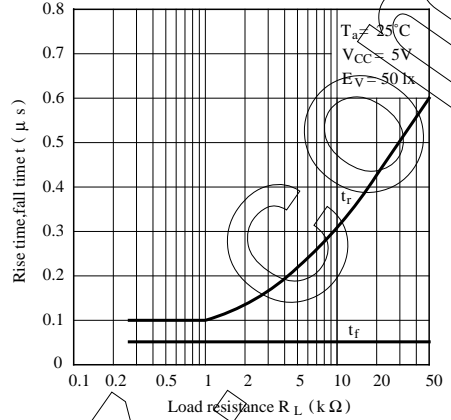
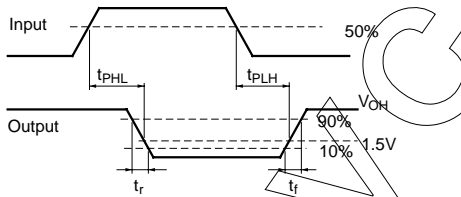
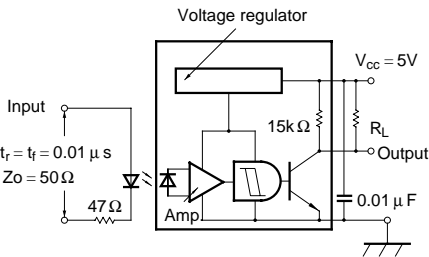


Fig. 8 Rise Time, Fall Time vs. Load Resistance



Test Circuit for Response Time (IS485)



Test Circuit for Response Time (IS486)

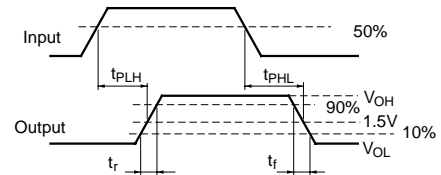
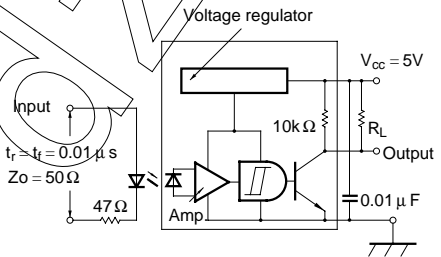


Fig. 9 Sensitivity Diagram

( $T_a = 25^\circ C$ )

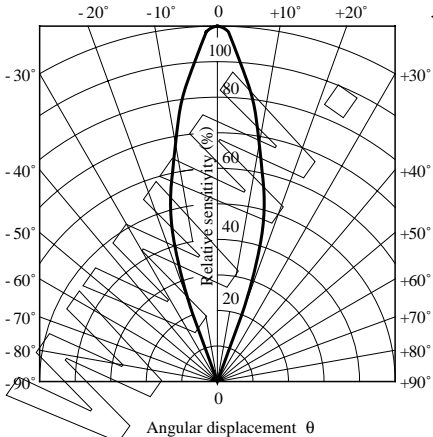


Fig.10 Spectral Sensitivity

