

# IS431/IS432 Totem Pole Output Type OPIC Light Detector

## ■ Features

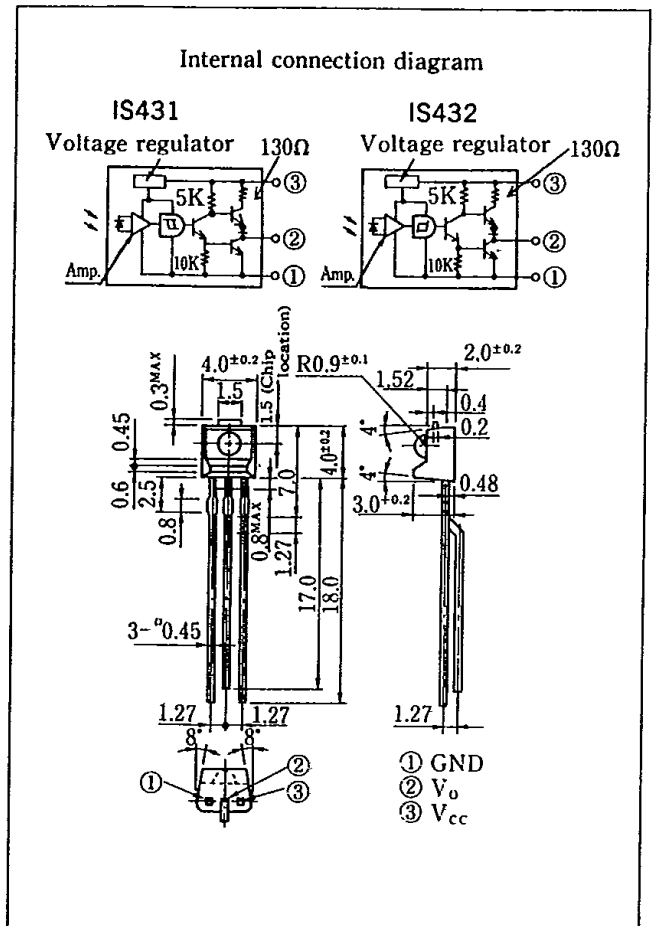
1. Totem pole output type (Fanout : 10 gates)
2. Built-in Schmidt trigger circuit
3. High sensitivity ( $E_v$  : MAX.  $.35 \ell x$  at  $T_a = 25^\circ C$ )
4. Low level output under incident light (IS431)  
High level output under incident light (IS432)

## ■ Applications

1. Floppy disk drives
2. Copiers, printers, facsimiles
3. VCRs, cassette decks
4. Automatic vending machines

## ■ Outline Dimensions

(Unit : mm)



\*OPIC is a registered trademark of Sharp and stands for Optical IC. It has a light detecting element and signal processing circuitry integrated onto a single chip.

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## ■ Absolute Maximum Ratings

(Ta = 25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	$V_{cc}$	-0.5 ~ +7	V
Power dissipation	P	250	mW
Operating temperature	$T_{opr}$	-25 ~ +85	°C
Storage temperature	$T_{stg}$	-40 ~ +100	°C
*1 Soldering temperature	$T_{sol}$	260	°C

\*1 For 5 seconds at the position of 2.5mm from the bottom face of package.

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## Electro-optical Characteristics

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

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Low level output voltage		$V_{OL}$	$V_{CC}=4.5\text{V}$ , $I_{OL}=16\text{mA}^{*2}$	—	0.15	0.4	V
High level output voltage		$V_{OH}$	$V_{CC}=4.5\text{V}$ , $I_{OH}=-400\mu\text{A}^{*3}$	2.4	—	—	V
Low level supply current		$I_{CCL}$	*2	—	2.3	5.0	mA
High level supply current		$I_{CCH}$	*3	—	1.3	3.5	mA
Output short circuit current		$I_{OS}$	$T\leq 1\text{ sec.}$ , *3	6	17	35	mA
*4 "High"→"Low" threshold illuminance	IS431	$E_{VHL}$	$T_a=25^\circ\text{C}$	—	15	35	$\ell_x$
	IS432		$T_a=25^\circ\text{C}$	—	—	50	
*5 "Low"→"High" threshold illuminance	IS431	$E_{VLH}$	$T_a=25^\circ\text{C}$	1.5	10	—	$\ell_x$
	IS432		$T_a=25^\circ\text{C}$	—	15	35	
*6 Hysteresis	IS431	$E_{VLH}/E_{VHL}$	$T_a=25^\circ\text{C}$ , $R_L=280\Omega$	0.50	0.65	0.90	—
	IS432	$E_{VHL}/E_{VLH}$					
Response time	"High"→"Low" propagation time	IS431	$T_a=25^\circ\text{C}$ $E_v=50\ell_x$ $R_L=280\Omega$	—	3	9	$\mu\text{s}$
		IS432		—	5	15	
	"Low"→"High" propagation time	IS431		—	5	15	
		IS432		—	3	9	
	Rise time	$t_r$		—	0.1	0.5	
Fall time	$t_f$	—	0.05	0.5			

\*2 Defines  $E_v=50\ell_x$  (IS431) and  $E_v=0$  (IS432).\*3 Defines  $E_v=0$  (IS431) and  $E_v=50\ell_x$  (IS432).\*4  $E_{VHL}$  represents illuminance by CIE standard light source A (tungsten lamp) when output goes from high to low.\*5  $E_{VLH}$  represents illuminance by CIE standard light source A (tungsten lamp) when output goes from low to high.\*6 Hysteresis stands for  $E_{VLH}/E_{VHL}$  (IS431) and  $E_{VHL}/E_{VLH}$  (IS432).

## Recommended Operating Conditions ( $T_a=0\sim +70^\circ\text{C}$ )

Parameter	Symbol	MIN.	MAX.	Unit
Supply voltage	$V_{CC}$	4.5	5.5	V
Low level output current	$I_{OL}$	—	16	mA
High level output current	$I_{OH}$	—	-400	$\mu\text{A}$

Fig. 1 Power Dissipation vs. Ambient Temperature

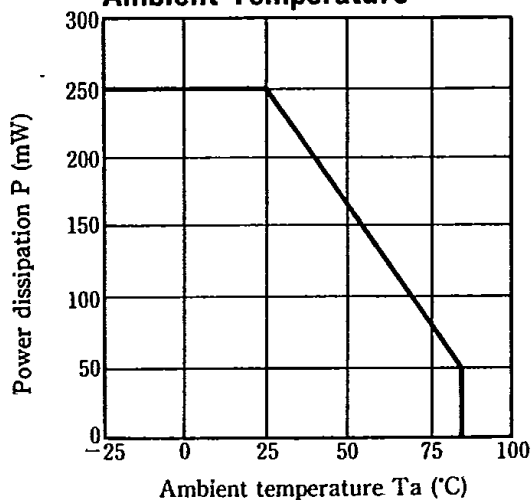
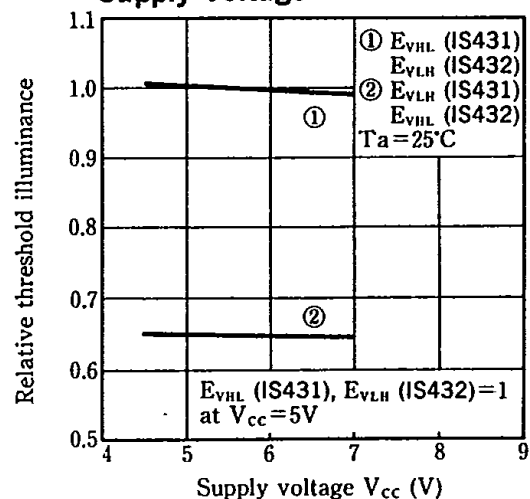
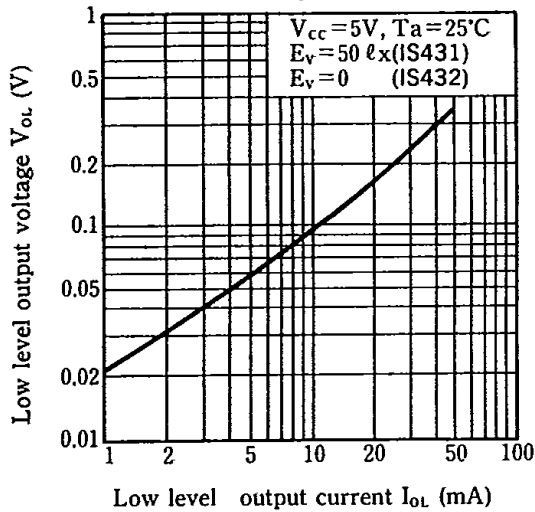


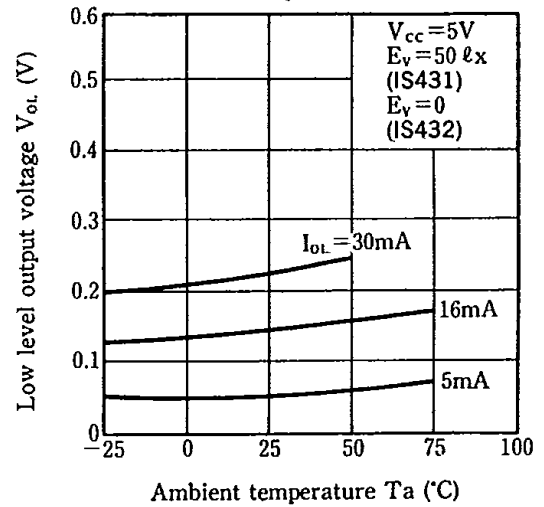
Fig. 2 Relative Threshold Illuminance vs. Supply Voltage



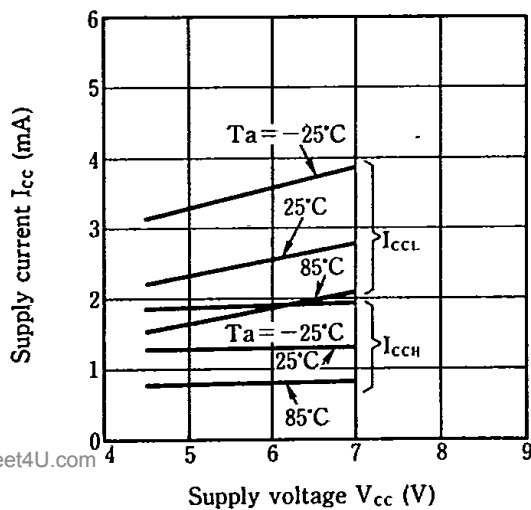
**Fig. 3 Low Level Output Voltage vs. Low Level Output Current**



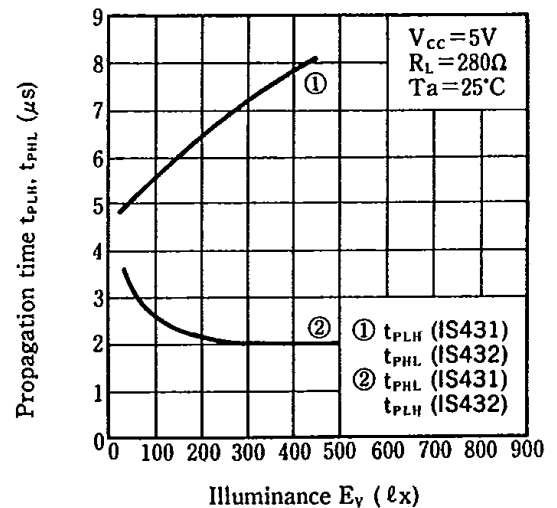
**Fig. 4 Low Level Output Voltage vs. Ambient Temperature**



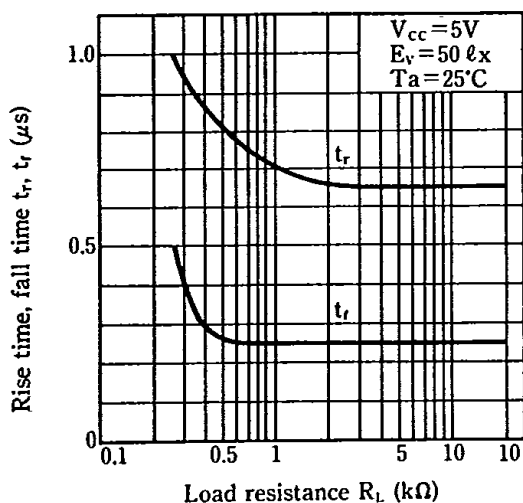
**Fig. 5 Supply Current vs. Supply Voltage**



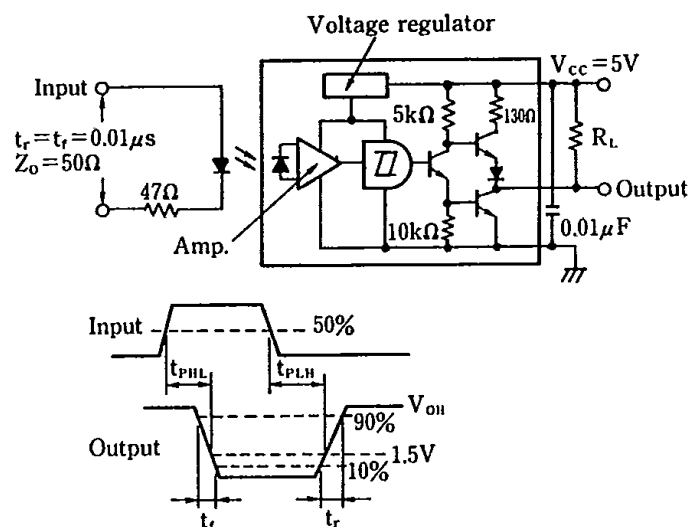
**Fig. 6 Propagation Time vs. Illuminance**



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



**Test Circuit for Response Time (IS431)**



Test Circuit for Response Time (IS432)

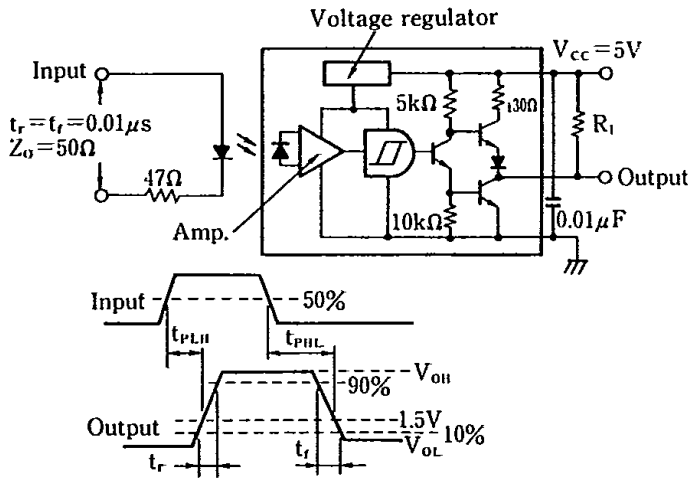


Fig. 8 Sensitivity Diagram ( $T_a = 25^\circ C$ )

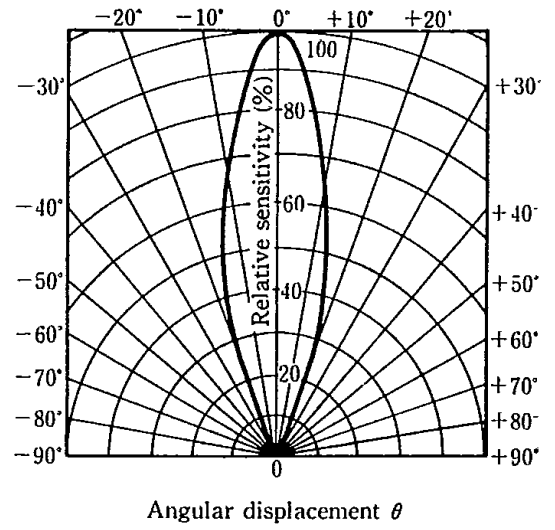


Fig. 9 Spectral Sensitivity

