IS437/IS438 Built-in Amp. Type Opic Light Detector

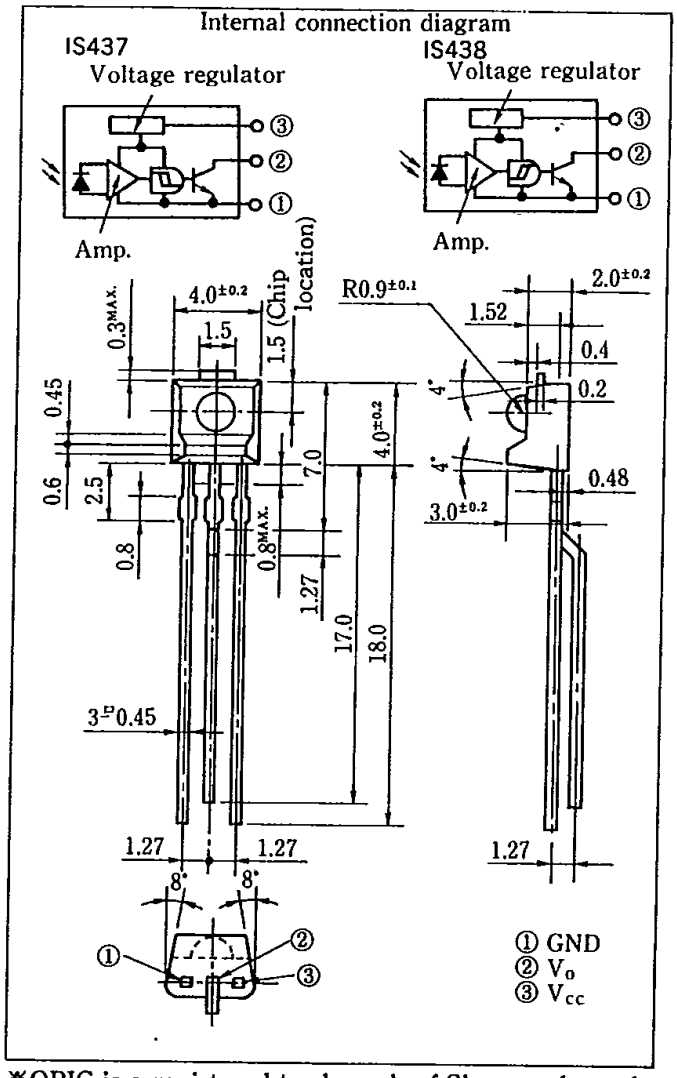
■ Features

1. Built-in Schmidt trigger circuit
2. High sensitivity (E_V: MAX. 35 ℓx at Ta=25℃)
3. LSTTL and TTL compatible output.
4. Open collector output
5. Low level output at light incident light (IS437)
   High level output at incident light (IS438)

■ Applications

1. Floppy disk drives
2. Copiers, printers, facsimiles
3. VCRs, cassette tape recorder
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.

■ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	−0.5~+35	V
Output voltage	V_O	−0.5~+40	V
Output current	I_O	50	mA
Power dissipation	P	250	mW
Operating temperature	T_{opr}	−25~+85	°C
Storage temperature	T_{stg}	−40~+100	°C
*1Soldering temperature	T_{sol}	260	°C

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

■ Electro-optical Characteristics

(Unless otherwise specified, Ta=0~70°C, V_{CC}=5V)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Operating supply voltage			V_{CC}	Ta=25°C	4.5	—	35	V
Low level output voltage			V_{OL}	I_{OL}=16mA*2	—	0.15	0.4	V
Low level output current			I_{OH}	V_{CC}=20V, V_O=30V*3	—	—	100	μA
Low level supply current			I_{CCL}	*2	—	2.0	4.5	mA
High level supply current			I_{CCH}	*3	—	1.0	3.0	mA
*4"High"→"Low" threshold illuminance		IS437	E_{VHL}	Ta=25°C, R_L=280Ω	—	15	35	ℓx
				R_L=280Ω	—	—	50	
		IS438		Ta=25°C, R_L=280Ω	1.5	10	—	
				R_L=280Ω	1	—	—	
*5"Low"→"High" threshold illuminance		IS437	E_{VLH}	Ta=25°C, R_L=280Ω	1.5	10	—	ℓx
				R_L=280Ω	1	—	—	
		IS438		Ta=25°C, R_L=280Ω	—	15	35	
				R_L=280Ω	—	—	50	
*6Hysteresis		IS437	E_{VLH}/E_{VHL}	Ta=25°C, R_L=280Ω	0.50	0.65	0.90	—
		IS438	E_{VHL}/E_{VLH}					
Response time	"Low"→"High" propagation time	IS437	t_{PLH}	Ta=25°C, E_V=50 ℓx, R_L=280Ω	—	5	15	μs
		IS438			—	3	9	
	"High"→"Low" propagation time	IS437	t_{PHL}		—	3	9	
		IS438			—	5	15	
	Rise time		t_r		—	0.1	0.5	
	Fall time		t_f		—	0.05	0.5	

*2 Defines E_V=50 ℓx (IS437) and E_V=0 (IS438).
*3 Defines E_V=0 (IS437) and E_V=50 ℓx (IS438).
*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} (IS437) and E_{VHL}/E_{VLH} (IS438).

■ Recommended Operating Conditions

Parameter	Symbol	MIN.	MAX.	Unit
Supply voltage	V_{CC}	4.5	20	V
Output voltage	V_O	0	30	V
Output current	I_O	—	16	mA

Fig. 1 Power Dissipation vs. Ambient Temperature

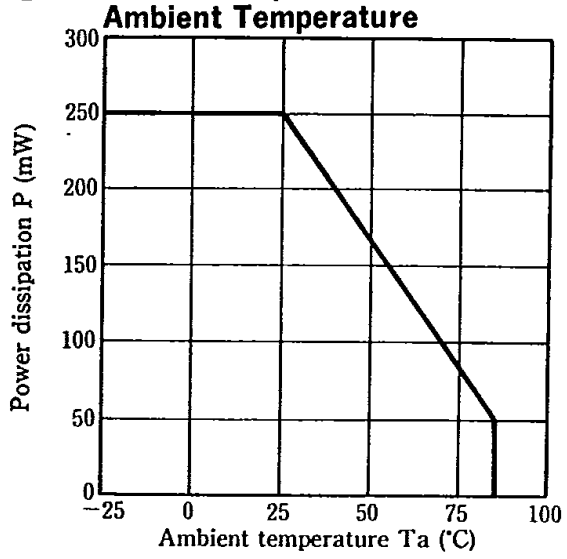


Fig. 2 Relative Threshold Illuminance vs. Supply Voltage

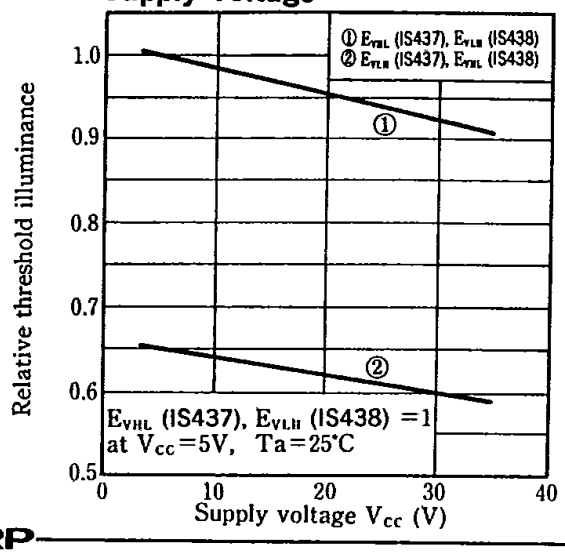


Fig. 3 Low Level Output Voltage vs. Low Level Output Current

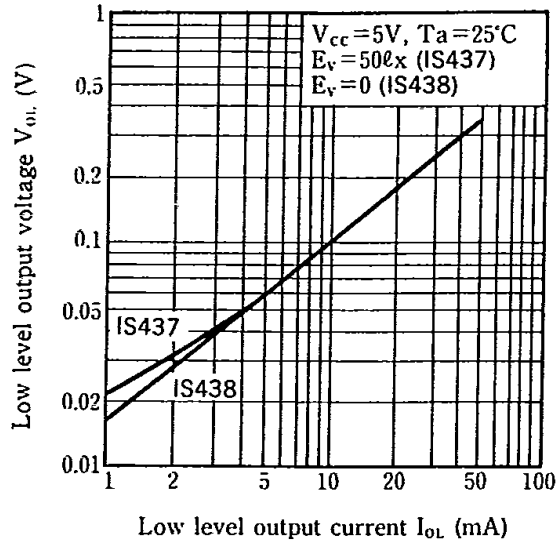


Fig. 4 Low Level Output Voltage vs. Ambient Temperature

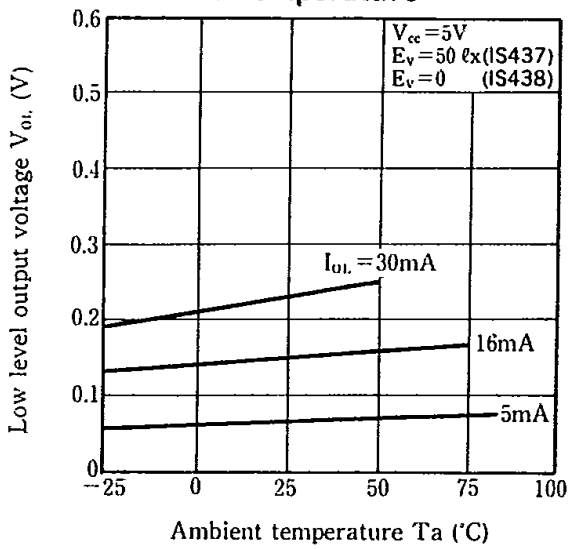


Fig. 5 Supply Current vs. Ambient Temperature

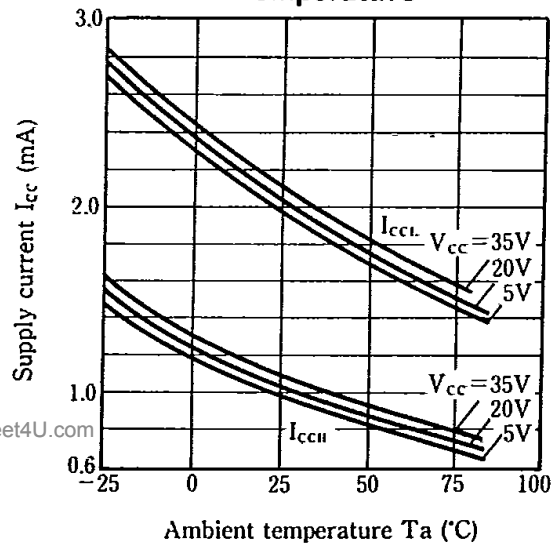


Fig. 6 Propagation Time vs. Illuminance

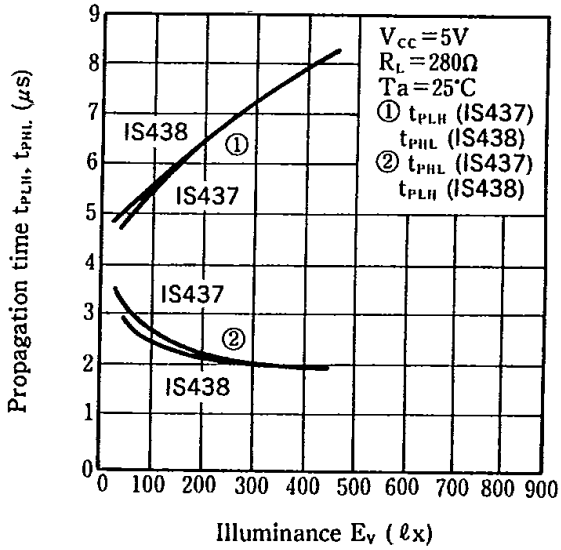
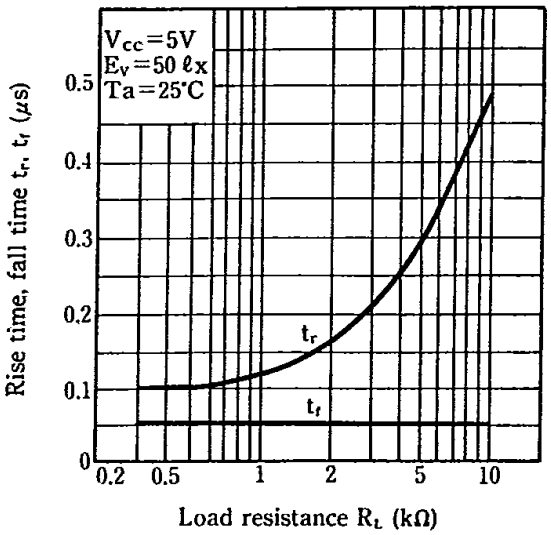
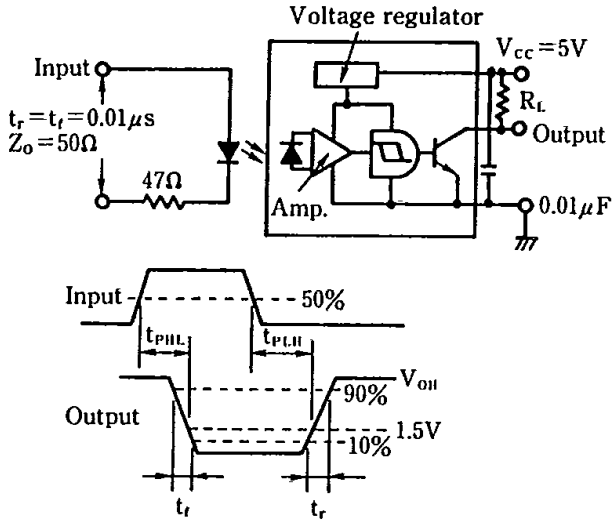


Fig. 7 Rise Time, Fall Time vs. Load Resistance



Test Circuit for Response Time (IS437)



Test Circuit for Resesponse Time (IS438)

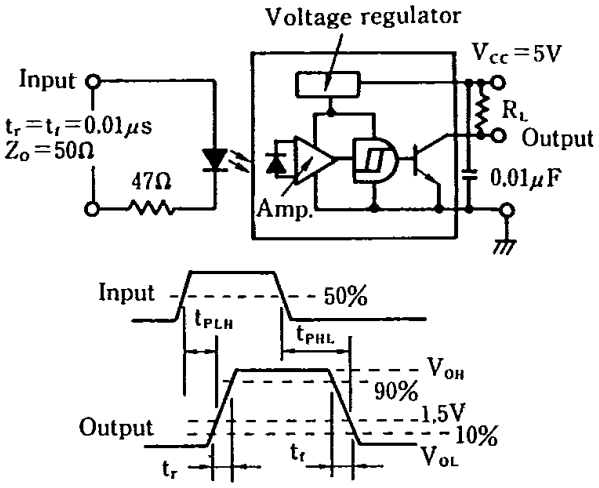
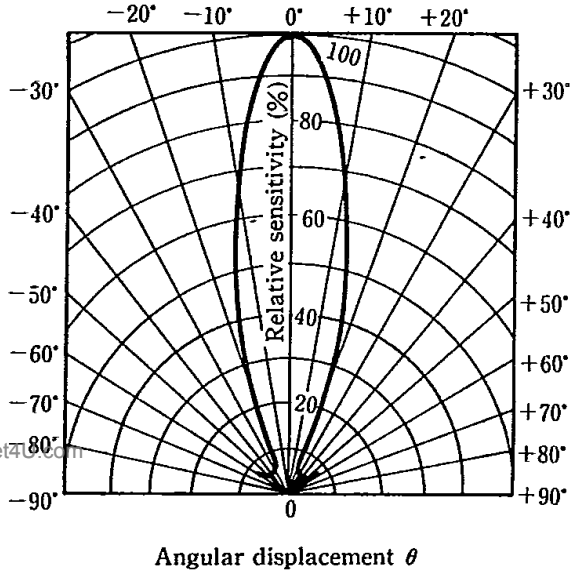
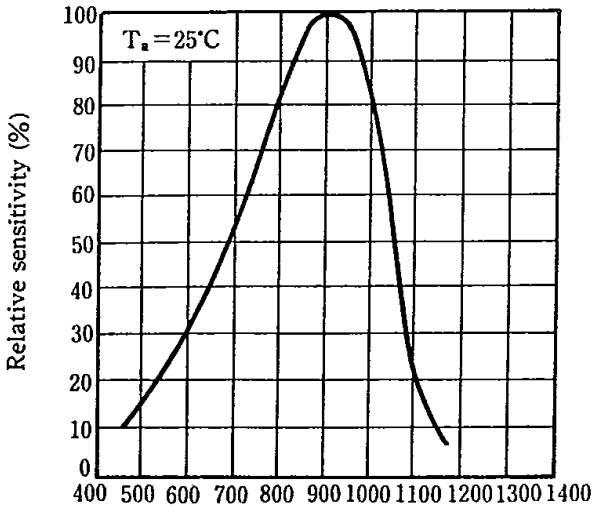


Fig. 8 Sensitivity Diagram (Ta=25°C)



Angular displacement θ

Fig. 9 Spectral Sensitivity



Wavelength λ (nm)