

T-41-69

IS437/IS438

Built-in Amp. Type Opic Light Detector

■ Features

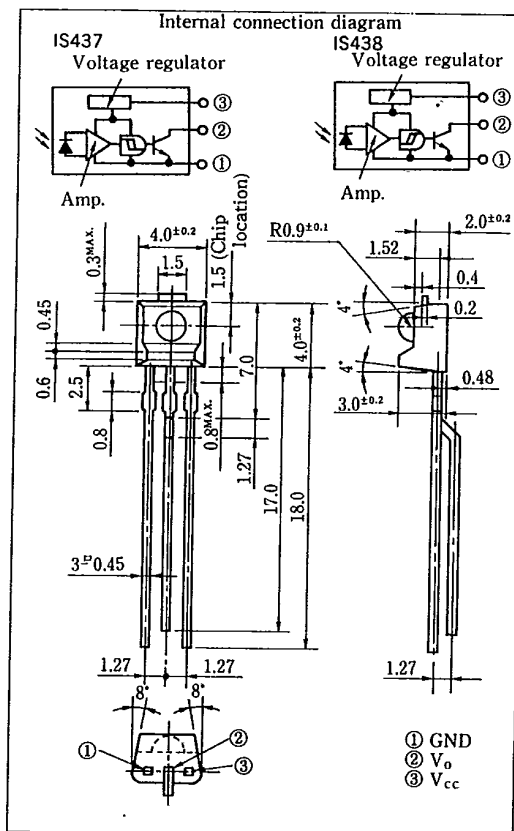
1. Built-in Schmidt trigger circuit
2. High sensitivity (E_v : MAX. 35 lx at $T_a=25^\circ\text{C}$)
3. LSTTL and TTL compatible output.
4. Open collector output
5. Low level output at light incident light (IS437)
High level output at incident light (IS438)

■ 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
*Soldering temperature	T_{sol}	260	°C

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

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■ Electro-optical Characteristics

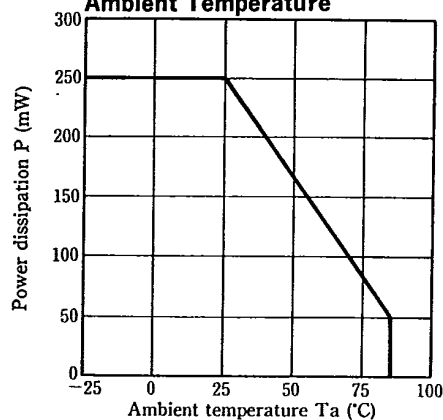
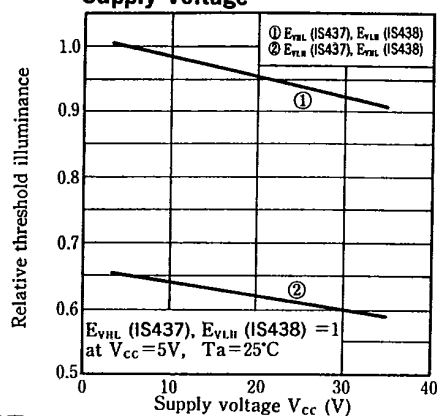
(Unless otherwise specified, $T_a=0\sim70^\circ\text{C}$, $V_{cc}=5\text{V}$)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Operating supply voltage	V_{cc}	$T_a=25^\circ\text{C}$	4.5	—	35	V
Low level output voltage	V_{OL}	$I_{OL}=16\text{mA}^{*2}$	—	0.15	0.4	V
Low level output current	I_{OH}	$V_{cc}=20\text{V}$, $V_o=30\text{V}^{*3}$	—	—	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
**"High"→"Low" threshold illuminance	IS437	E_{VHL}	$T_a=25^\circ\text{C}$, $R_L=280\Omega$	—	15	ℓ_x
			$R_L=280\Omega$	—	—	
			$T_a=25^\circ\text{C}$, $R_L=280\Omega$	1.5	10	
			$R_L=280\Omega$	1	—	
**"Low"→"High" threshold illuminance	IS437	E_{VLH}	$T_a=25^\circ\text{C}$, $R_L=280\Omega$	1.5	10	ℓ_x
			$R_L=280\Omega$	1	—	
			$T_a=25^\circ\text{C}$, $R_L=280\Omega$	—	15	
			$R_L=280\Omega$	—	—	
*6 Hysteresis	IS437	E_{VLH}/E_{VHL}	$T_a=25^\circ\text{C}$, $R_L=280\Omega$	0.50	0.65	—
	IS438	E_{VHL}/E_{VLH}				
Response time	"Low"→"High" propagation time	IS437	$T_a=25^\circ\text{C}$ $E_v=50\ell_x$ $R_L=280\Omega$	—	5	μs
		IS438		—	3	
	"High"→"Low" propagation time	IS437		—	3	
		IS438		—	5	
	Rise time	t_r		—	0.1	
	Fall time	t_f		—	0.05	

*2 Defines $E_v=50\ell_x$ (IS437) and $E_v=0$ (IS438).*3 Defines $E_v=0$ (IS437) and $E_v=50\ell_x$ (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 TemperatureFig. 2 Relative Threshold Illuminance vs.
Supply Voltage

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

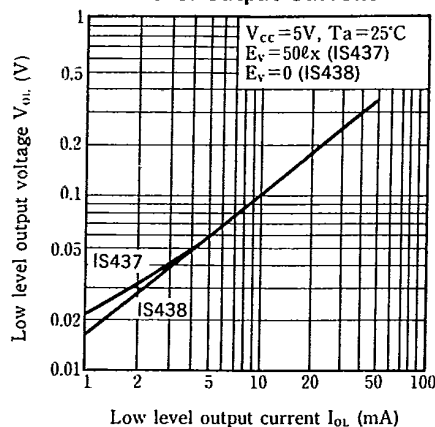


Fig. 4 Low Level Output Voltage vs. Ambient Temperature

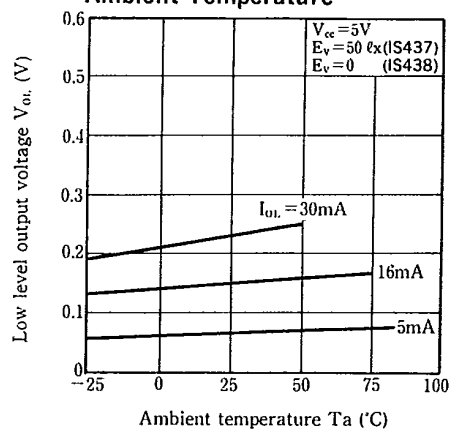


Fig. 5 Supply Current vs. Ambient Temperature

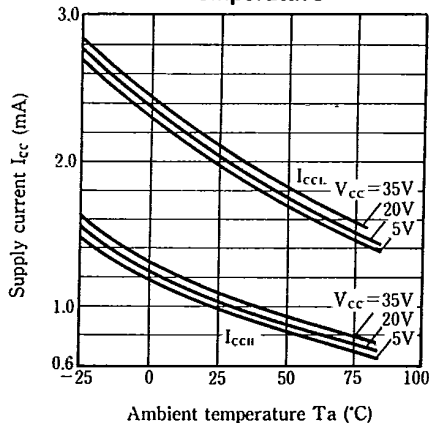


Fig. 6 Propagation Time vs. Illuminance

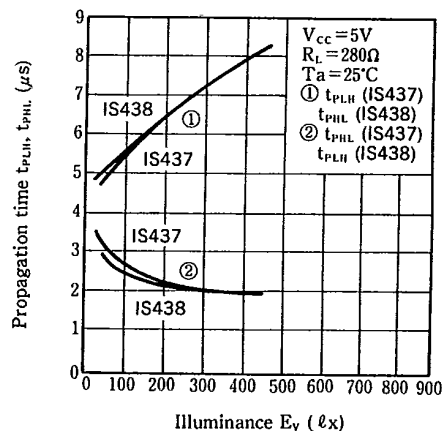
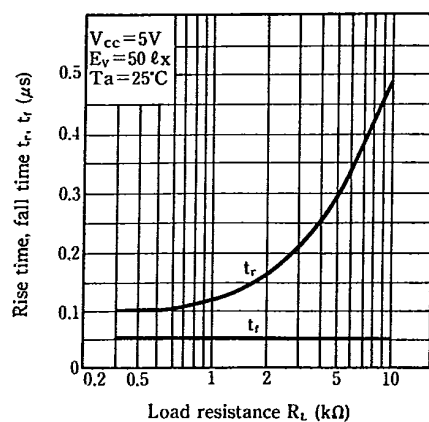
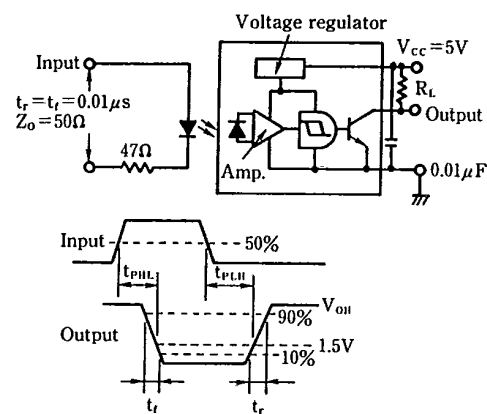


Fig. 7 Rise Time, Fall Time vs. Load Resistance



Test Circuit for Response Time (IS437)



Test Circuit for Reseponse Time (IS438)

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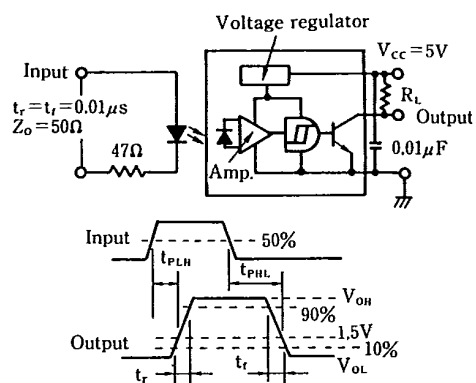


Fig. 8 Sensitivity Diagram ($T_a = 25^\circ C$)

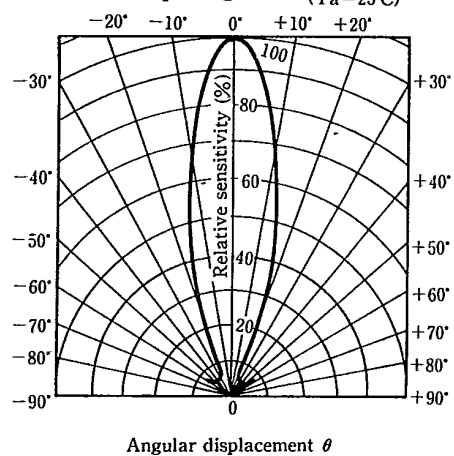
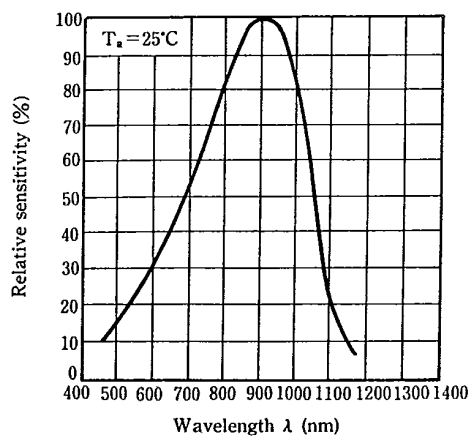


Fig. 9 Spectral Sensitivity



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