

PC901V

Digital Output Type OPIC Photocoupler

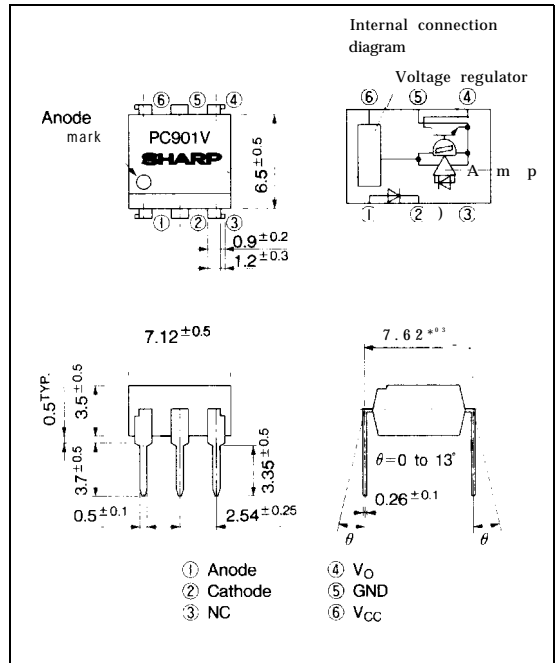
■ Features

1. Normal-ON operation, open collector output
2. Operating supply voltage (V_{CC} : 3 to 15V)
3. TTL and LSTTL compatible output
4. High isolation voltage between input and output (V_{iso} : 5 000V_{rms})
5. High sensitivity (I_{FLH} : MAX. 2.0mA at $T_a=25^\circ\text{C}$)
6. Recognized by UL, file No. 64380

■ Applications

1. Isolation between logic circuits
2. Logic level shifters
3. Line receivers
4. Replacements for relays and pulse transformers
5. Noise reduction

■ 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.

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

■ Absolute Maximum Ratings

	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	*1 Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	v
	Power dissipation	P	70	mW
output	Supply voltage	V_{CC}	16	V
	High level output voltage	V_{OH}	16	v
	Low level output current	I_{OL}	50	mA
	Power dissipation	P_O	150	mW
	Total power dissipation	P_{tot}	170	mW
	*7 Isolation voltage	V_{iso}	5000	V _{rms}
	Operating temperature	T_{opr}	-25 to +85	°C
	Storage temperature	T_{stg}	-40 to +125	°C
	Soldering temperature	T_{sol}	260	°C

*1 Pulse width $\leq 100 \mu\text{s}$, Duty ratio = 0.001

*2 40 to 60% RH, AC for 1 minute

*3 For 10 seconds

Electro-optical Characteristics

(Ta = 0 to + 70°C unless otherwise specified)

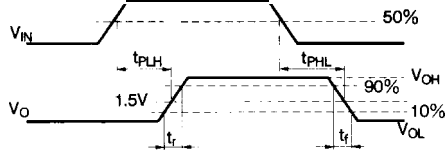
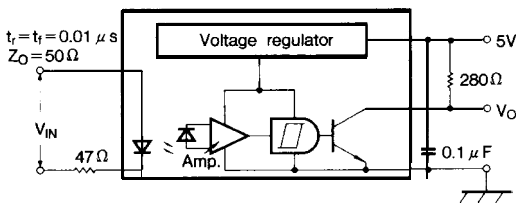
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Input	Forward voltage	V _F	I _F =4mA	—	1.1	1.4	V	
			I _F =0.3mA	0.7	Lo	—		
	Reverse current	I _R	Ta=25°C, V _R =4V	—	—	10	μA	
	Terminal capacitance	C _t	Ta=25°C, V≅0, f=1kHz	—	30	250	pF	
output	Operating supply voltage	V _{CC}		3		15	V	
	Low level output voltage	V _{OL}	I _{OL} =16mA, V _{CC} =5V, I _F =4mA	—	0.2	0.4	V	
	High level output current	I _{OH}	V _O =V _{CC} =15V, I _F =0	—	—	100	μA	
	Low level supply current	I _{CCL}	V _{CC} =5V, I _F =0	—	2.5	5.0	mA	
	High level supply current	I _{CCH}	V _{CC} =5V, I _F =4mA	—	2.7	5.5	mA	
Transfer characteristics	*4 "L→H" threshold input current	I _{F_{LH}}	Ta=25°C, V _{CC} =5V, R _L =280Ω V _{CC} =5V, R _L =280Ω	—	1.1	2.0	mA	
	*5 "H→L" threshold input current	I _{F_{HL}}	Ta=25°C, V _{CC} =5V, R _L =280Ω V _{CC} =5V, R _L =280Ω	0.4	0.8	0		
	*6 Hysteresis	I _{F_{HL}} /I _{F_{LH}}	V _{CC} =5V, R _L =280Ω	0.5	0.7	0.9	—	
	Isolation resistance	R _{ISO}	Ta=25°C, DC500V, 40 to 60% RH	5 × 10 ¹⁰	10 ¹¹	—	Ω	
	*7 Response time	"L→H" propagation delay time	t _{PLH}	Ta=25°C V _{CC} =5V, I _F =4mA R _L =280Ω	—	1	3	μs
		"H→L" propagation delay time	t _{PHL}		—	2	6	
Rise time		t _r	—		0.1	0.5		
Fall time		t _f	—		0.05	0.5		
*8 Instantaneous common mode rejection voltage (High level output)	CM _H	V _{CM} =600V(peak), V _O (MIN.)=2V I _F =4mA, R _L =280Ω, Ta=25°C	—	-2000	—	V/μs		
*8 Instantaneous common mode rejection voltage (Low level output)	CM _L	V _{CM} =600V(peak), V _O (MAX.)=0.8V I _F =0, R _L =280Ω, Ta=25°C	I	2000	—	V/μs		

- *4 I_{F_{LH}} represents forward current when output goes from low to high.
- *5 I_{F_{HL}} represents forward current when output goes from high to low.
- *6 Hysteresis stands for I_{F_{HL}}/I_{F_{LH}}
- *7 Test circuit for response time is shown below.

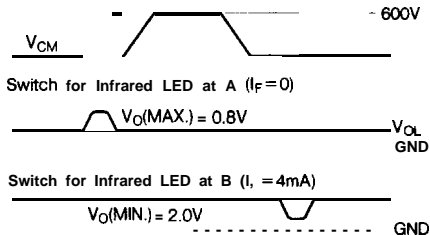
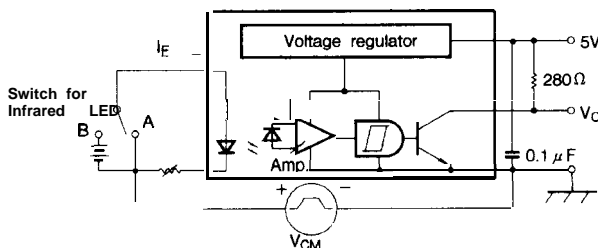
<Precautions for Use>

Connect a capacitor of more than 0.1 μF between V_{CC} and GND.

Test Circuit for Response Time



***8 Test Circuit for CM_H, CM_L**



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Fig. 1 Forward Current vs. Ambient Temperature

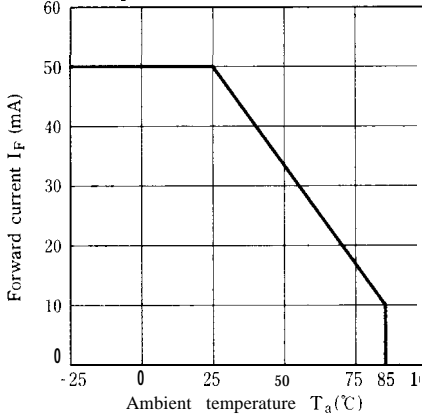


Fig. 2 Power Dissipation vs. Ambient Temperature

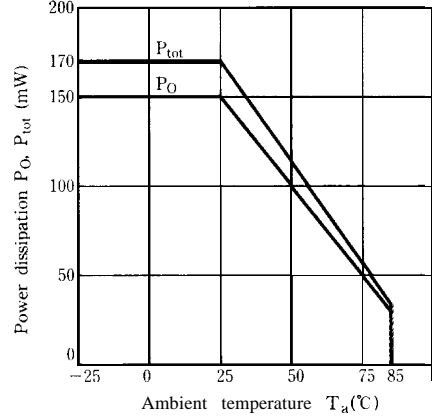


Fig. 3 Forward Current vs. Forward Voltage

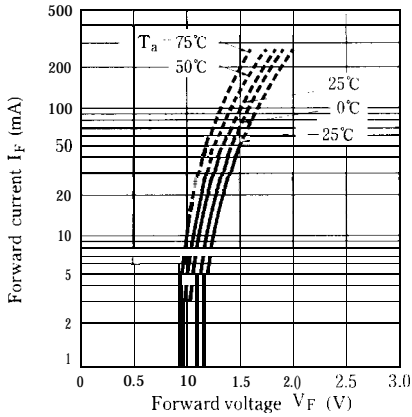


Fig. 4 Relative Threshold Input Current vs. Supply Voltage

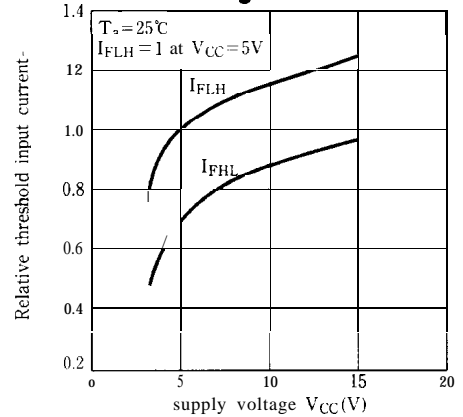


Fig. 5 Relative Threshold Input Current vs. Ambient Temperature

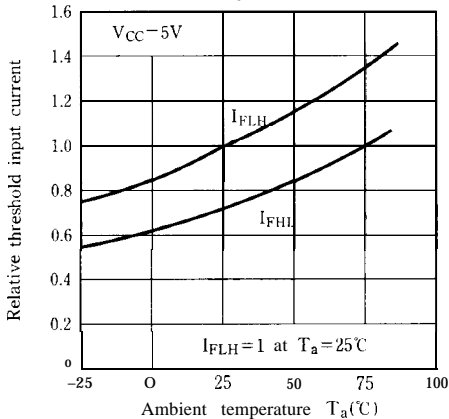


Fig. 6 Low Level Output Voltage vs. Low Level output current

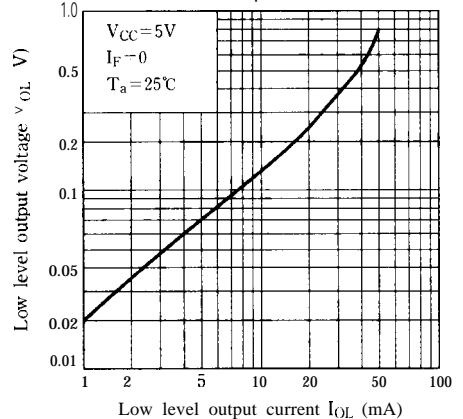


Fig. 7 Low Level output Voltage vs. Ambient Temperature

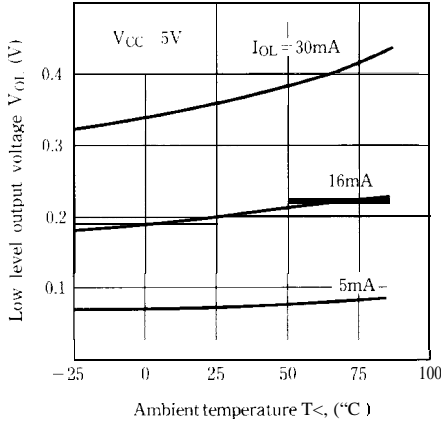


Fig. 8 High Level Output Current vs. Forward Current

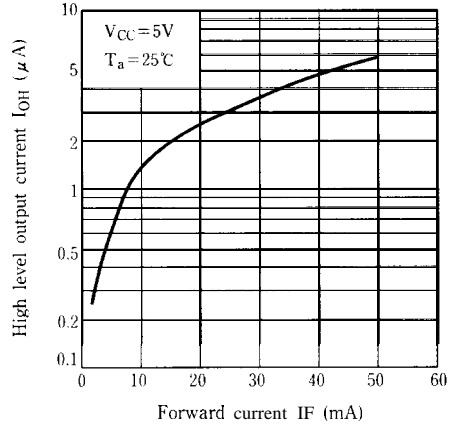


Fig. 9 High Level Output Current vs. Ambient Temperature

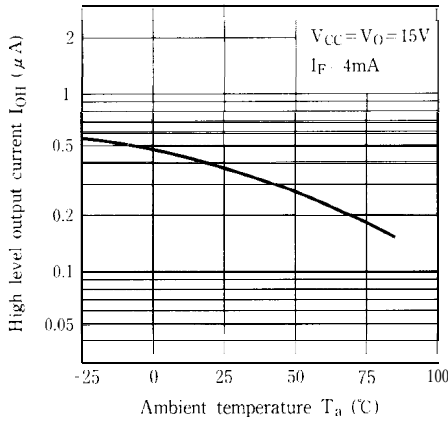


Fig.10 Supply Current vs. Supply Voltage

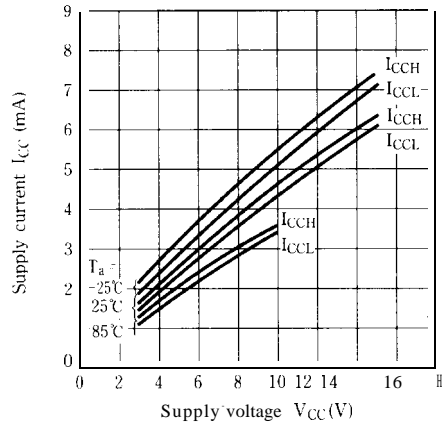


Fig.11 Propagation Delay Time vs. Forward Current

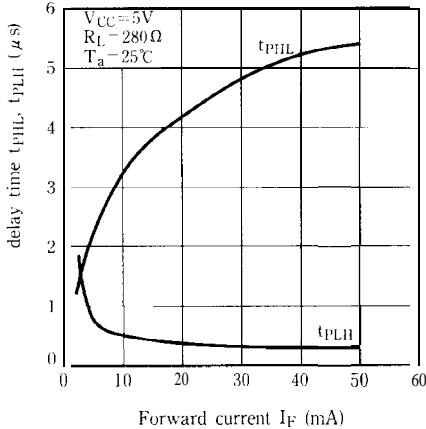
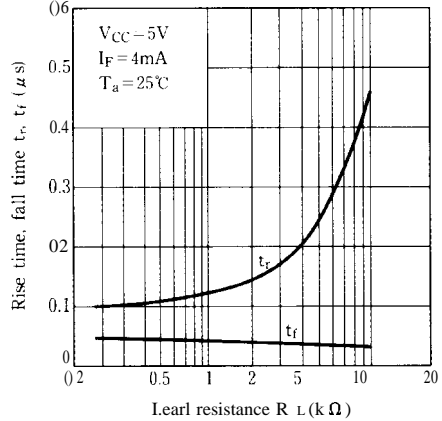


Fig.12 Rise Time, Fall Time vs. Load Resistance



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■ Precautions for Use

- (1) It is recommended that a by-pass capacitor of more than $0.01 \mu\text{F}$ is added between V_{CC} and GND near the device in order to stabilize power supply line.
- (2) Handle this product the same as with other integrated circuits against static electricity.
- (3) As for other general cautions, please refer to the chapter "Precautions for Use"
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