PC901V

Digital Output Type OPIC Photocoupler

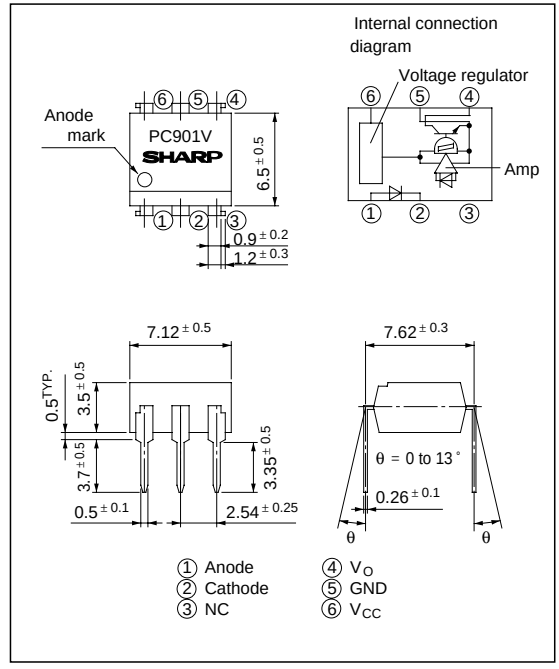
■ Features

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 Ta= 25˚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.

■ Absolute Maximum Ratings (Ta= 25˚C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	*1Peak 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
*2Isolation voltage		V_{iso}	5 000	V_{rms}
Operating temperature		T_{opr}	- 25 to + 85	˚C
Storage temperature		T_{stg}	- 40 to + 125	˚C
*3Soldering temperature		T_{sol}	260	˚C

*1 Pulse width <= 100μs, Duty ratio : 0.001
*2 40 to 60% RH, AC for 1 minute
*3 For 10 seconds

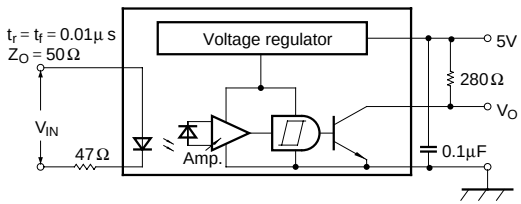
■ Electro-optical Characteristics

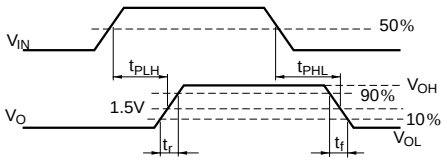
(Ta = 0 to + 70˚C unless otherwise specified)

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	1.0	-	
	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_{FLH}	Ta = 25˚C, V_{CC} = 5V, R_L = 280Ω	-	1.1	2.0	mA
				V_{CC} = 5V, R_L = 280Ω	-	-	4.0	
	*5 "H→L" threshold input current		I_{FHL}	Ta = 25˚C, V_{CC} = 5V, R_L = 280Ω	0.4	0.8	-	mA
				V_{CC} = 5V, R_L = 280Ω	0.3	-	-	
	*6 Hysteresis		I_{FHL} /I_{FLH}	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	-	2000	-	V/μs

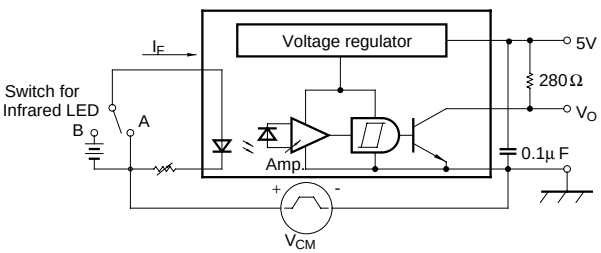
*4 I_{FLH} represents forward current when output goes from low to high.
*5 I_{FHL} represents forward current when output goes from high to low.
*6 Hysterisis stands for I_{FHL} /I_{FLH}
*7 Test circuit for response time is shown below.
*8 Test circuit for CM_H,CM_L shown below.

Test Circuit for Response Time





Test Circuit for CM_H, CM_L



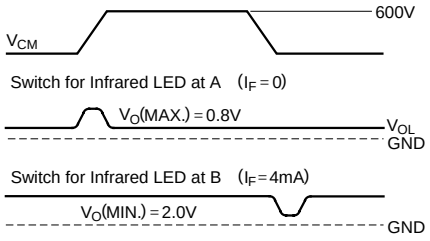


Fig. 1 Forward Current vs. Ambient Temperature

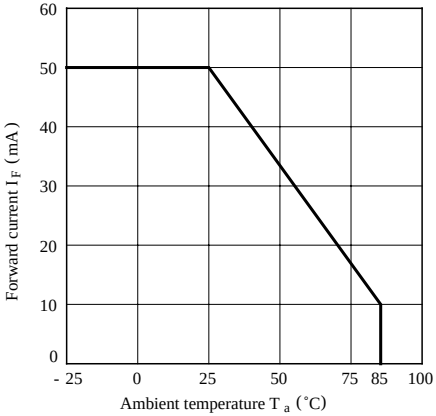


Fig. 2 Power Dissipation vs. Ambient Temperature

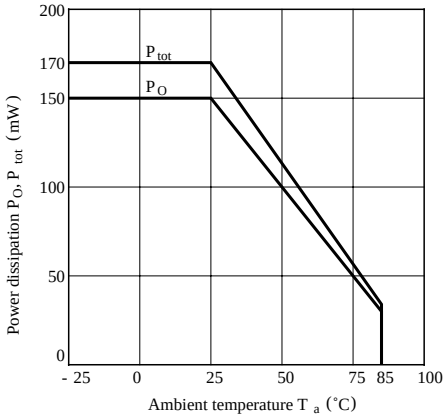


Fig. 3 Forward Current vs. Forward Voltage

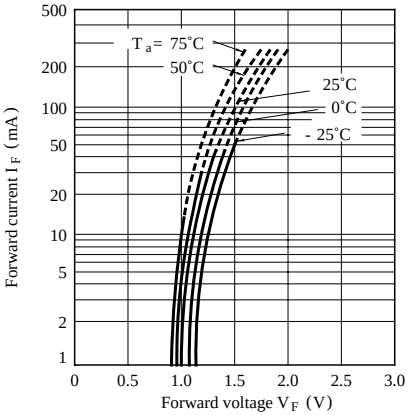


Fig. 4 Relative Threshold Input Current vs. Supply Voltage

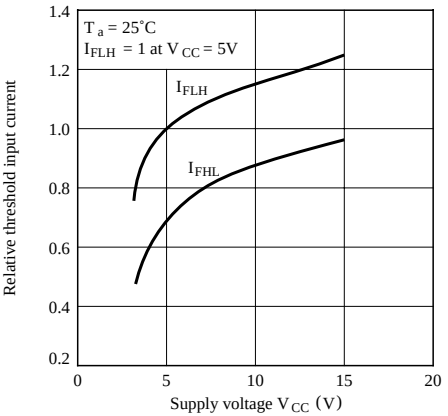


Fig. 5 Relative Threshold Input Current vs. Ambient Temperature

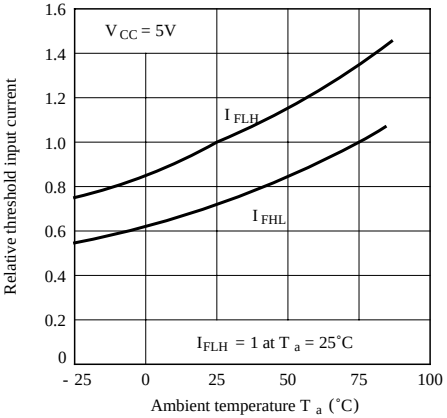


Fig. 6 Low Level Output Voltage vs. Low Level Output Current

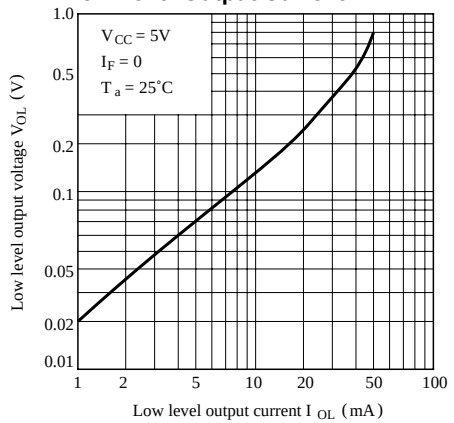


Fig. 7 Low Level Output Voltage vs. Ambient Temperature

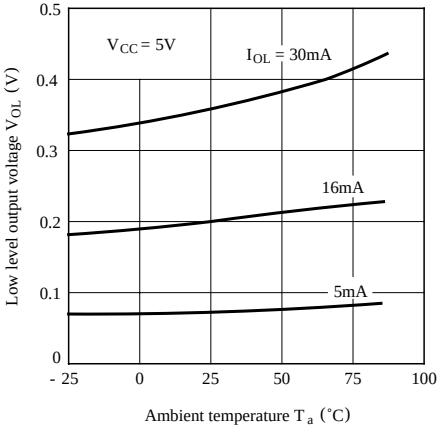


Fig. 8 High Level Output Current vs. Forward Current

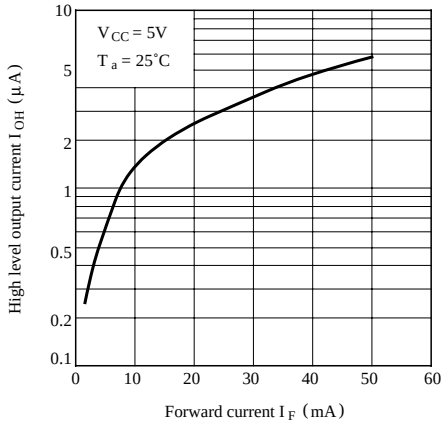


Fig. 9 High Level Output Current vs. Ambient Temperature

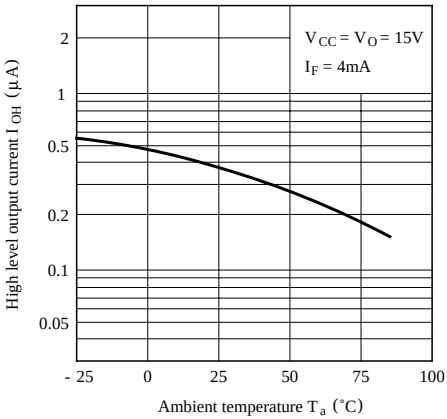


Fig.10 Supply Current vs. Supply Voltage

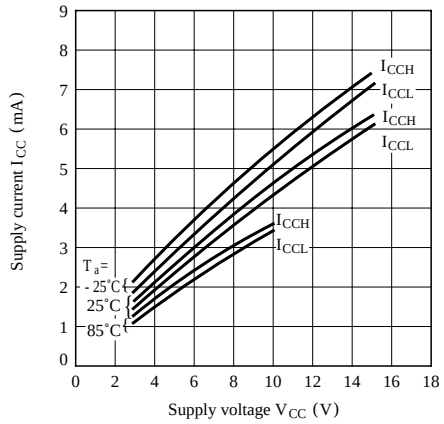


Fig.11 Propagation Delay Time vs. Forward Current

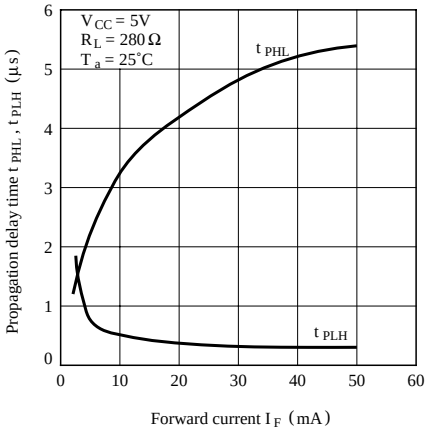


Fig.12 Rise Time, Fall Time vs. Load Resistance