

PC902

AC Input Type OPIC Photocoupler

■ Features

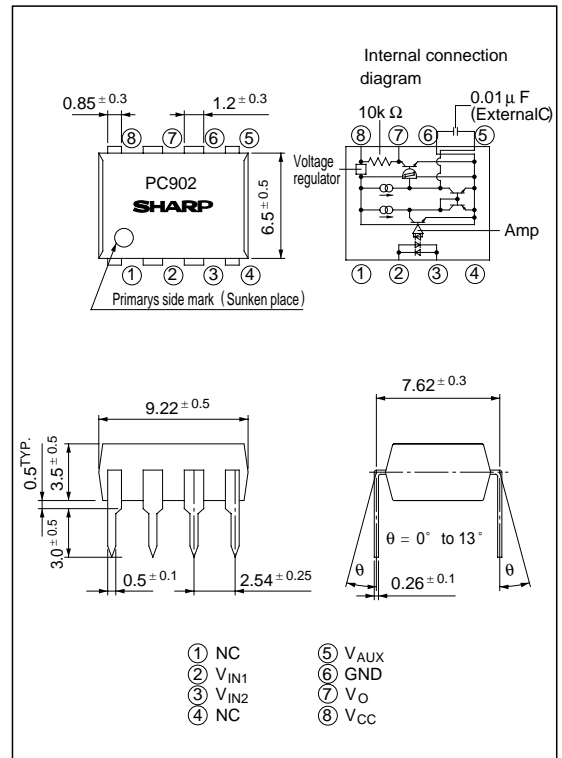
1. Capable of forming an integration circuit in conjunction with an external capacitor
2. AC input
3. High sensitivity
(I_{FHL} : MAX. 2mA)
4. High isolation voltage between input and output
(V_{iso} : 5 000V_{rms})
5. Standard dual-in-line package
6. Recognized by UL, file No. E64380

■ Applications

1. Programmable controllers
2. Telephone sets
3. AC line monitors

■ 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

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

	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	± 20	mA
	*1 Peak forward current	I_{FM}	± 1	A
	Power dissipation	P	30	mW
Output	Supply voltage	V_{CC}	15	V
	Output voltage	V_O	15	V
	Output current	I_O	16	mA
	Power dissipation	P_O	150	mW
	Total power dissipation	P_{tot}	170	mW
	*2 Isolation voltage	V_{iso}	5 000	V _{rms}
	Operating temperature	T_{opr}	- 25 to + 85	$^\circ\text{C}$
	Storage temperature	T_{stg}	- 55 to + 125	$^\circ\text{C}$
	*3 Soldering temperature	T_{sol}	260	$^\circ\text{C}$

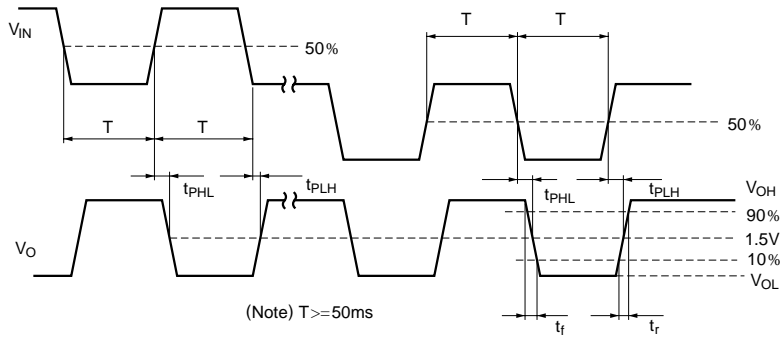
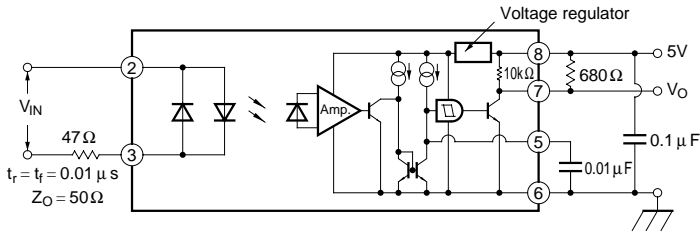
- *1 Pulse width $\leq 100 \mu\text{s}$,
Duty ratio : 0.001
- *2 40 to 60% RH, AC for
1 minute
- *3 For 10 seconds

■ 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 = ± 20mA	-	-	1.5	V	
			I _F = ± 0.1mA	0.55	0.95	-	V	
	Terminal capacitance	C _t	V _F = 0, f = 1kHz	-	30	250	pF	
Output	Operating supply voltage	V _{CC}		4.5	-	15	V	
	Low level output voltage	V _{OL}	I _{OL} = 8.0mA, V _{CC} = 5V, I _F = ± 2mA	-	0.1	0.4	V	
	High level output voltage	V _{OH}	V _{CC} = 5V, I _F = 0	3.5	-	-	V	
	Low level supply current	I _{CCL}	I _F = ± 2mA, V _{CC} = 5V	-	1.7	4.0	mA	
	High level supply current	I _{CCH}	V _{CC} = 5V, I _F = 0	-	1.5	3.5	mA	
	AUX source current	I _{AUX1}	Ta = 25°C, I _F = ± 2mA, V _{CC} = 5V, V _{AUX} = 1.3V	- 2	- 3	- 5	μA	
	AUX sink current	I _{AUX2}	Ta = 25°C, I _F = 0, V _{CC} = 5V, V _{AUX} = 1.3V	1.0	1.5	2.5	μA	
	AUX terminal voltage 1	V _{AUX1}	Ta = 25°C, I _F = 0, V _{CC} = 5V	-	-	0.2	V	
	AUX terminal voltage 2	V _{AUX2}	Ta = 25°C, I _F = ± 2mA, V _{CC} = 5V	2.3	-	2.8	V	
	“High→Low” threshold AUX voltage	V _{AUXHL}	Ta = 25°C, I _F = 0, V _{CC} = 5V	2.05	-	2.55	V	
	“Low→High” threshold AUX voltage	V _{AUXLH}	Ta = 25°C, I _F = 0, V _{CC} = 5V	0.75	-	1.10	V	
Transfer characteristics	“High→Low” threshold input current 1	I _{FHL1}	Ta = 25°C, V _{CC} = 5V, R _L = 680Ω	-	0.7	1.5	mA	
			V _{CC} = 5V, R _L = 680Ω	0.1	-	2.0	mA	
	“High→Low” threshold input current 2	I _{FHL2}	Ta = 25°C, V _{CC} = 5V, R _L = 680Ω	-	-0.7	- 1.5	mA	
			V _{CC} = 5V, R _L = 680Ω	- 0.1	-	- 2.0	mA	
	Isolation resistance	R _{ISO}	Ta = 25°C, DC500V, 40 to 60% RH	5 x 10 ¹⁰	10 ¹¹	-	Ω	
	Floating capacitance	C _f	Ta = 25°C, V = 0, f = 1MHz	-	0.6	5	pF	
	*4)Response time	“High→Low” propagation delay time	t _{PHL}	Ta = 25°C I _F = ± 2mA, V _{CC} = 5V C _{AUX} = 0.01 μF R _L = 680Ω	4.5	7.0	10	ms
		“Low→High” propagation delay time	t _{PLH}		6.5	10.5	15	ms
		Fall time	t _f		-	0.05	0.5	μs
		Rise time	t _r		-	0.1	0.5	μs
*5)Instantaneous common mode rejection voltage “Output : High level”	CM _H	Ta = 25°C, I _F = 0, V _{CM} = 600V (peak) V _{O(MIN)} = 2V, R _L = 680Ω, C _{AUX} = 0.01 μF	-	2 000	-	V/μs		
*5)Instantaneous common mode rejection voltage “Output : Low level”	CM _L	Ta = 25°C, I _F = ± 2mA, V _{CM} = 600V (peak) V _{O(MAX)} = 0.8V, R _L = 680Ω, C _{AUX} = 0.01 μF	-	- 2 000	-	V/μs		

※ 4 Test Circuit for Response Time



※ 5 Test Circuit for Instantaneous Common Mode Rejection Voltage

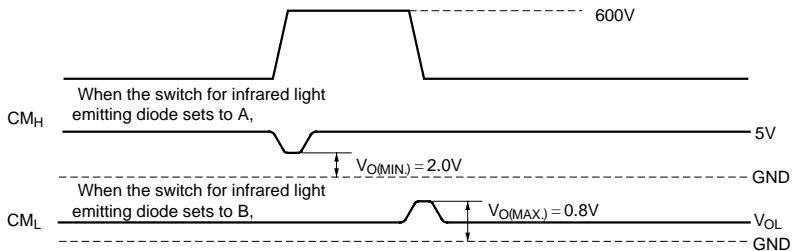
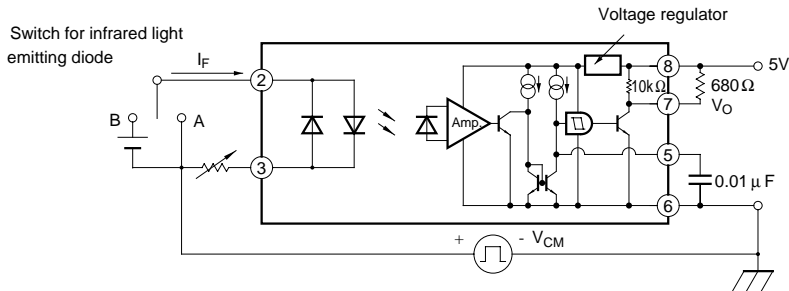


Fig. 1 Forward Current vs. Ambient Temperature

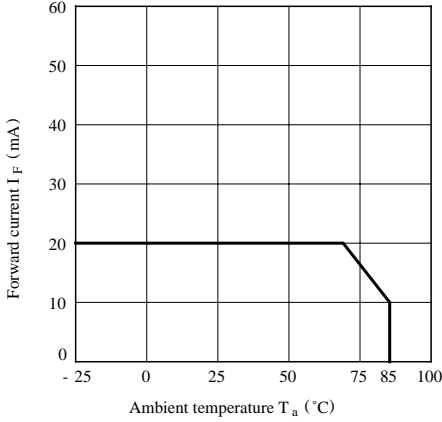


Fig. 2 Power Dissipation vs. Ambient Temperature

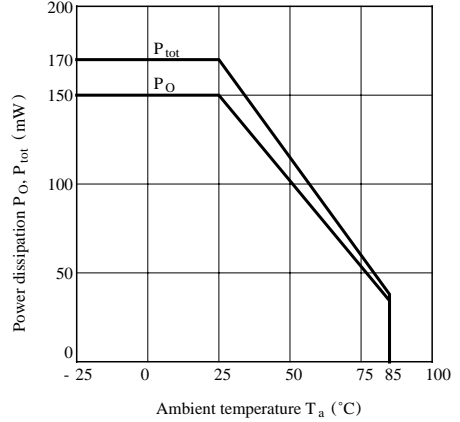


Fig. 3 Forward Current vs. Forward Voltage

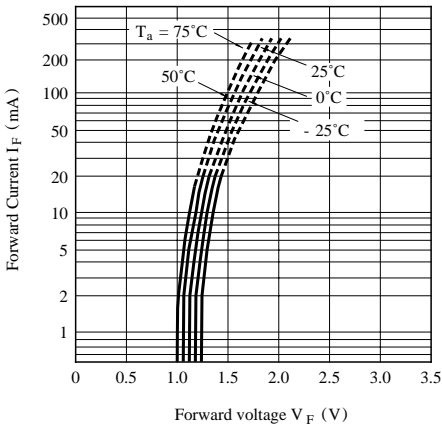
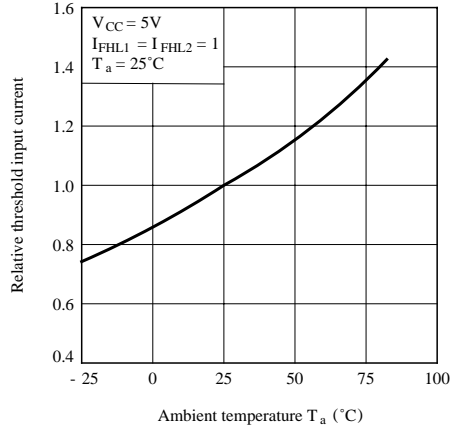
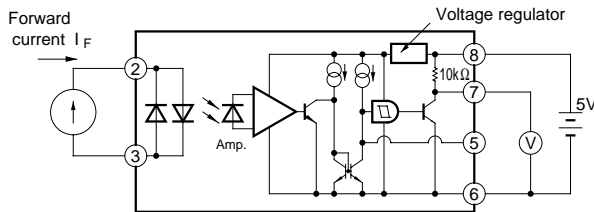


Fig. 4 Relative Threshold Input Current vs. Ambient Temperature



Test Circuit For Threshold Input Current vs. Ambient Temperature



I_{FHL1} , I_{FHL2} represents forward current when output goes from high to low. I_{FHL1} is a forward current flowing into pin ② while I_{FHL2} is one flowing out of pin ②.

Fig. 5 Low Level Output Voltage vs. Low Level Output Current

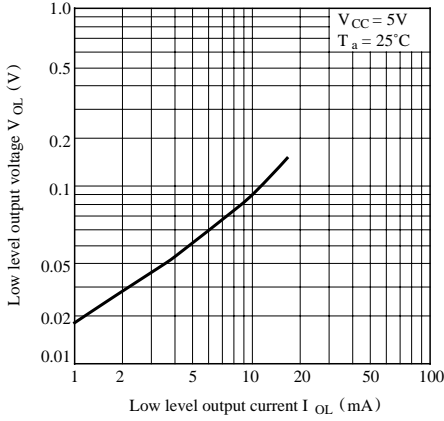


Fig. 6 Low Level Output Voltage vs. Ambient Temperature

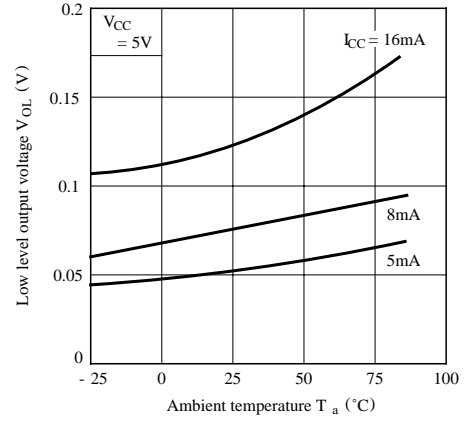


Fig. 7 Supply Current vs. Supply Voltage

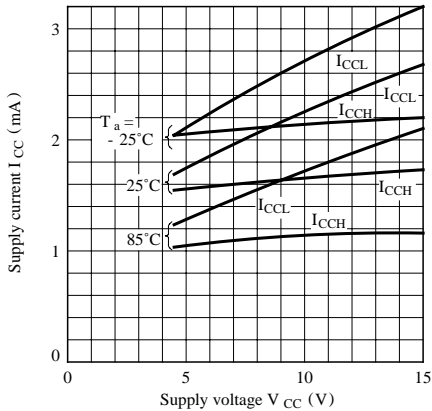


Fig. 8 AUX Current vs. Forward Current

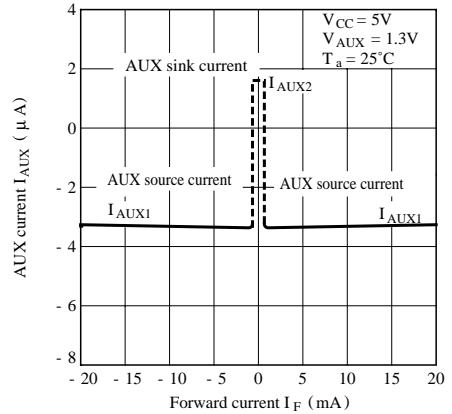
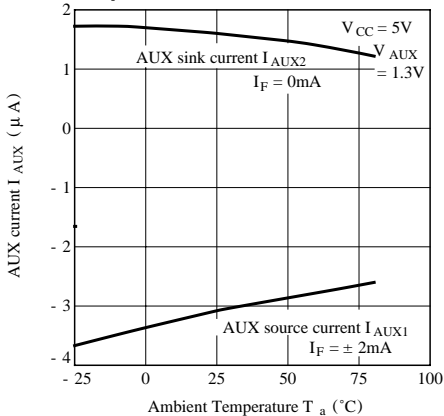
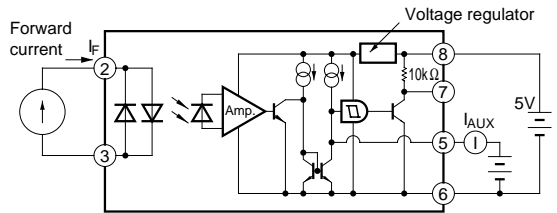


Fig. 9 AUX Current vs. Ambient Temperature



Test Circuit for AUX



+: Current flowed from ② terminal
-: Current flowed out to ② terminal

Fig.10 AUX Terminal Voltage vs. Ambient Temperature

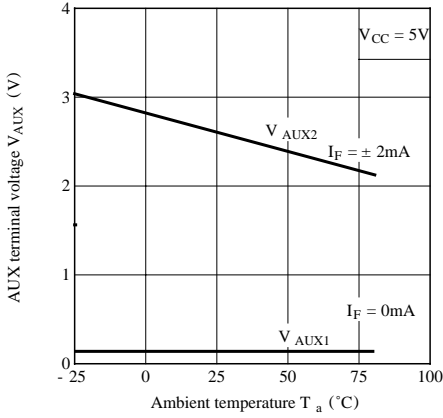


Fig.10 Threshold AUX Voltage vs. Ambient Temperature

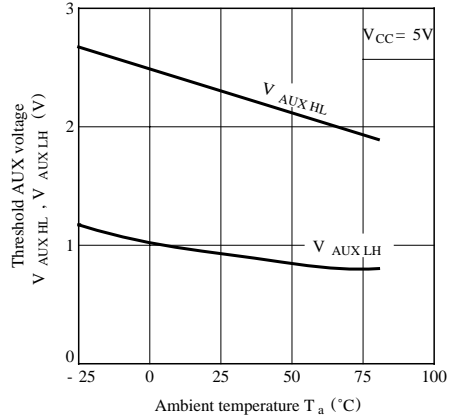


Fig.12 Propagation Delay Time vs. Forward Current

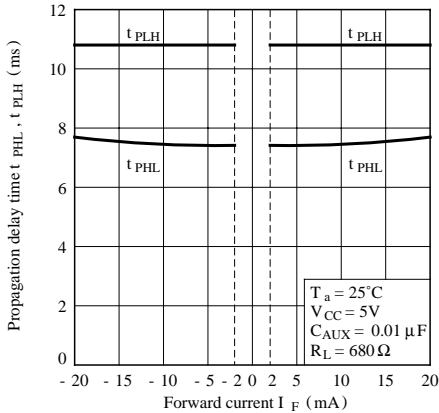
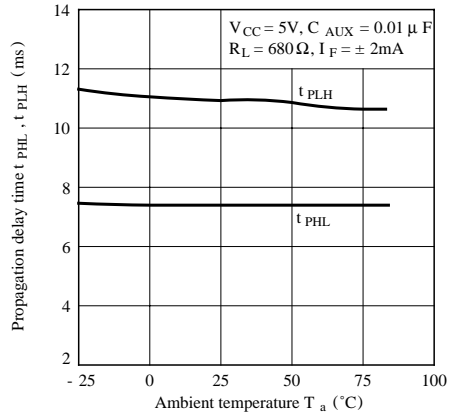
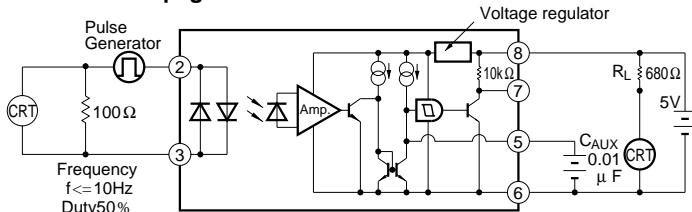


Fig.13 Propagation Delay Time vs. Ambient Temperature



Test Circuit for Propagation Time



■ Precautions for Use

- (1) It is recommended that a by-pass capacitor of more than 0.01 μ 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”