PC902

AC Input Type OPIC Photocoupler

■ Features

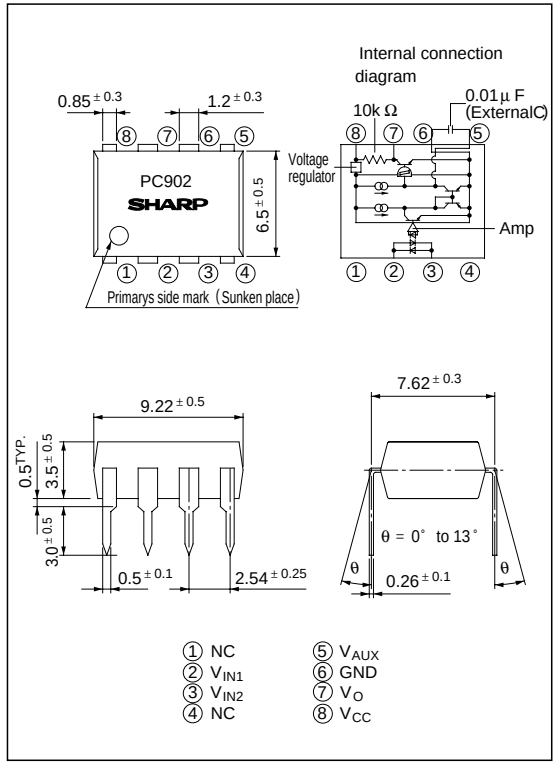
1. Capable of forming an integration circuit in conjunction with an external capacitor
2. AC input
3. High sensitivity
   (I_{FHL} : MAX. 2mA)
4. High isolation voltage between input and output
   (V_{iso} : 5 000V $_{rms}$)
5. Standard dual-in-line package
6. Recognized by UL, file No. E64380

■ 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

(Ta= 25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	± 20	mA
	*1Peak 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
*2Isolation voltage		V_{iso}	5 000	V_{rms}
Operating temperature		T_{opr}	- 25 to + 85	°C
Storage temperature		T_{stg}	- 55 to + 125	°C
*3Soldering temperature		T_{sol}	260	°C

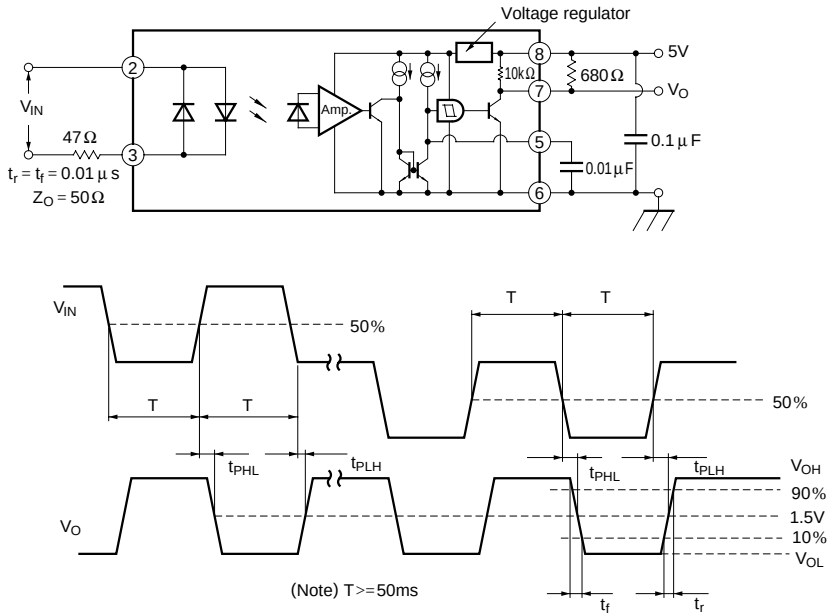
*1 Pulse width<=100 μ s, Duty ratio : 0.001
*2 40 to 60% RH, AC for 1 minute
*3 For 10 seconds

■ 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
	*4Response 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
	*4Response time "Low→High" propagation delay time	t_{PLH}		6.5	10.5	15	ms
	*4Response time Fall time	t_f		-	0.05	0.5	µs
	*4Response time Rise time	t_r		-	0.1	0.5	µs
	*5Instantaneous 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
	*5PInstantaneous 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

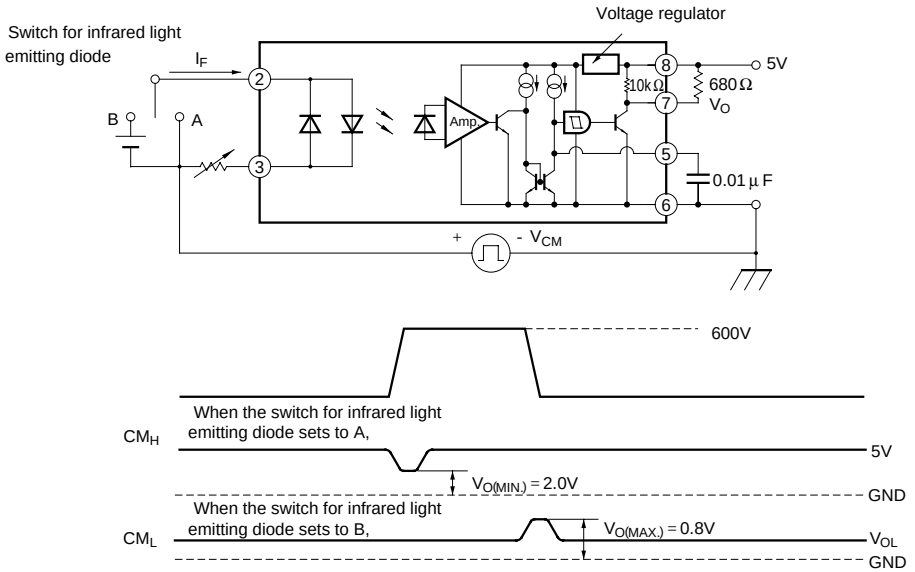


Fig. 1 Forward Current vs. Ambient Temperature

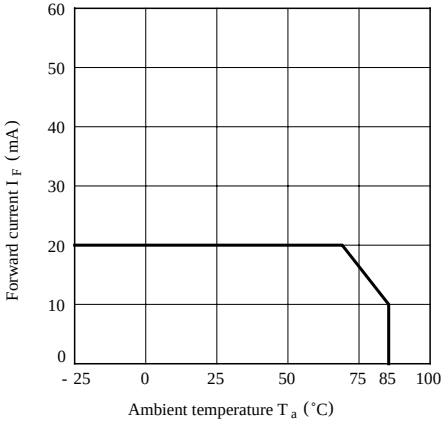


Fig. 2 Power Dissipation vs. Ambient Temperature

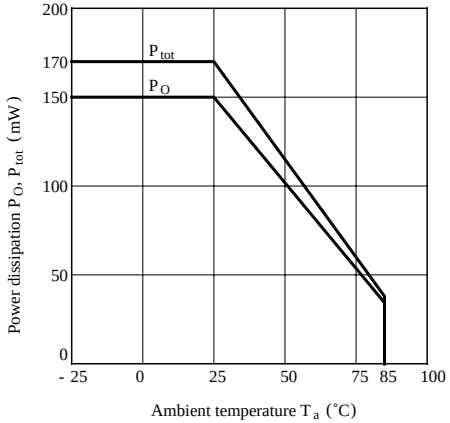


Fig. 3 Forward Current vs. Forward Voltage

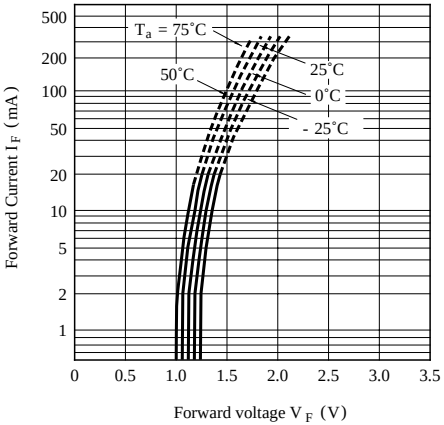
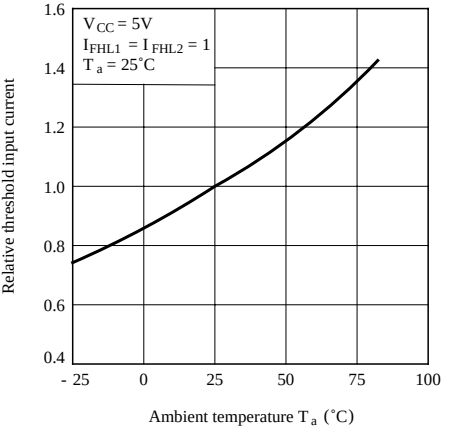
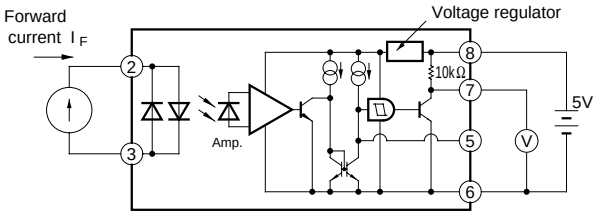


Fig. 4 Relative Threshold Input Current vs. Ambient Temperature



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

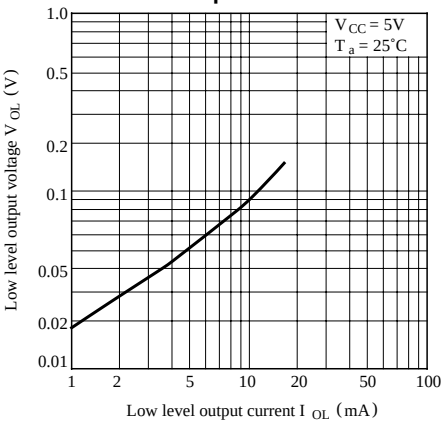


Fig. 6 Low Level Output Voltage vs. Ambient Temperature

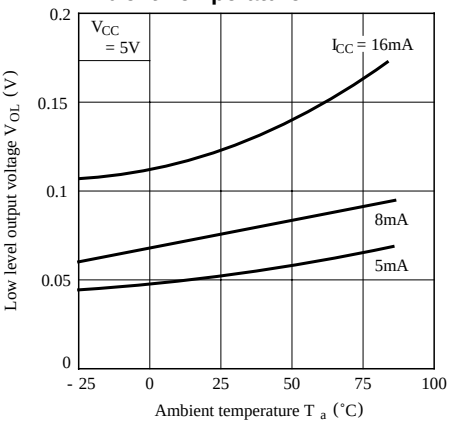


Fig. 7 Supply Current vs. Supply Voltage

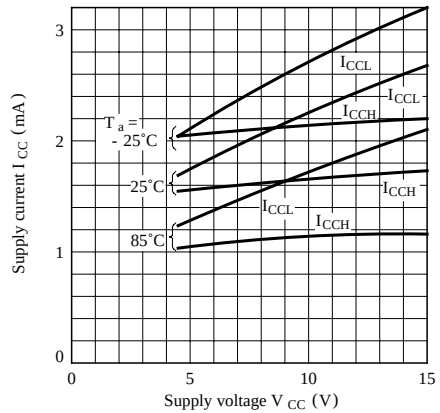


Fig. 8 AUX Current vs. Forward Current

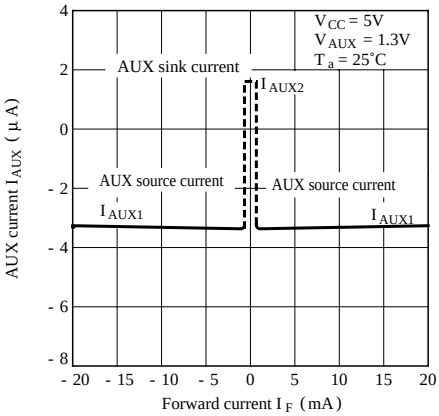
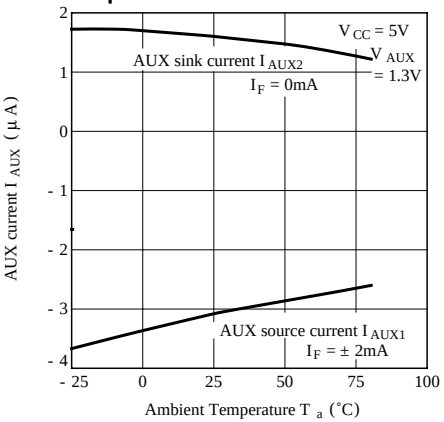
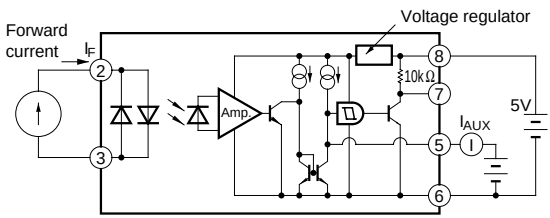


Fig. 9 AUX Current vs. Ambient Temperature



Test Circuit for AUX



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

Fig.10 AUX Terminal Voltage vs. Ambient Temperature

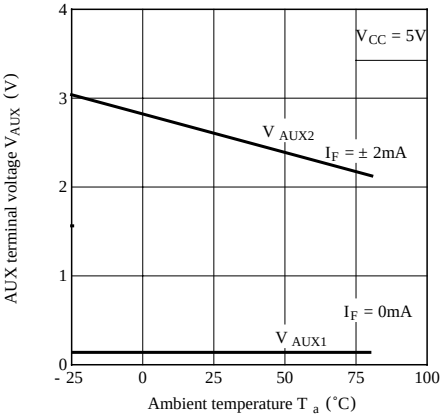


Fig.10 Threshold AUX Voltage vs. Ambient Temperature

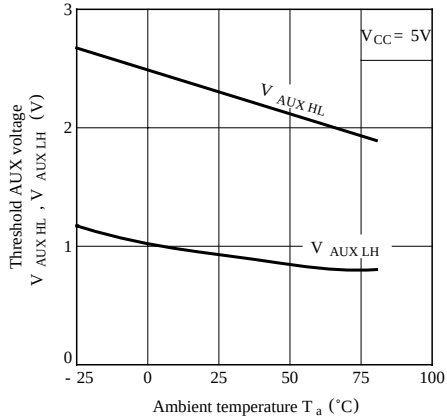


Fig.12 Propagation Delay Time vs. Forward Current

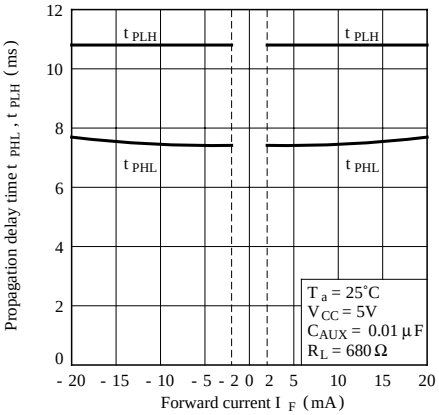
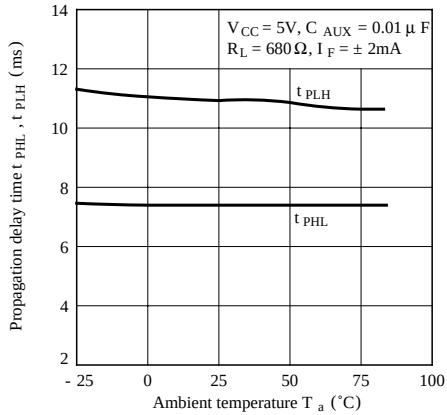
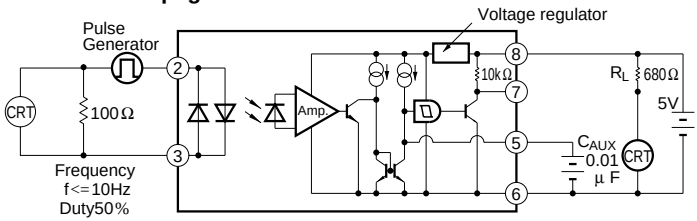


Fig.13 Propagation Delay Time vs. Ambient Temperature



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"