PC902

AC Input Type **OPIC** **Photocoupler**

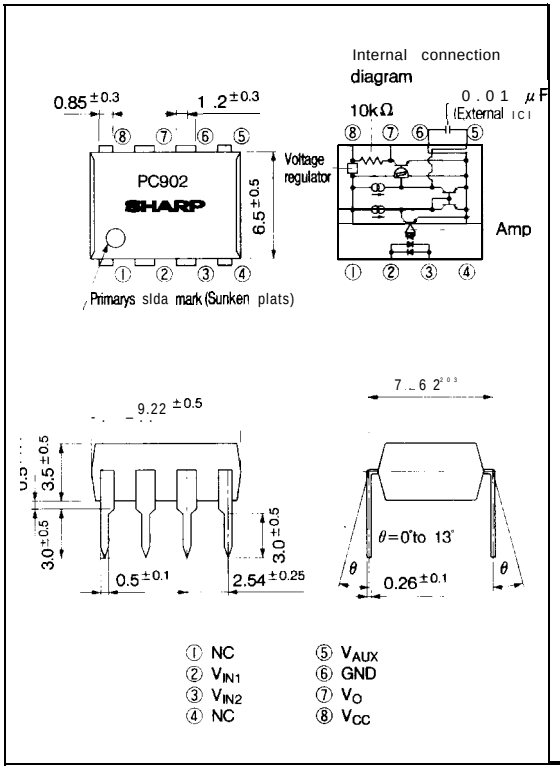
■ Features

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 Coloration An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

■ Absolute Maximum Ratings (Ta=25℃)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	±20	mA
	"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}	5000	V_{rms}
Operating temperature		T_{opr}	−25 to +85	℃
Storage temperature		T_{stg}	−55 to +125	℃
*3 Soldering temperature		T_{sol}	260	℃

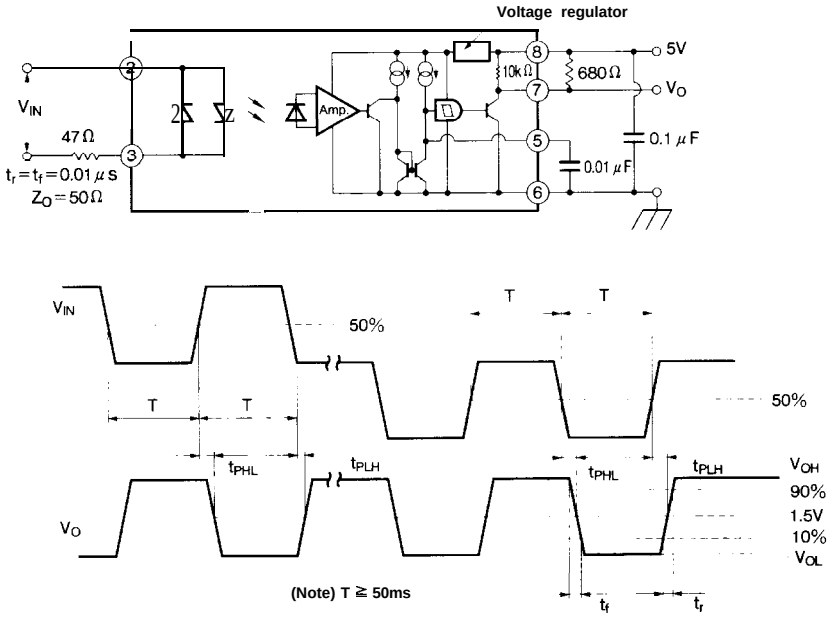
*1 Pulse width ≦ 100 μs, Duty ratio =0.001
*2 40 to 60%RH, AC for 1 minute
*3 For 10 seconds

■ Electro-optical Characteristics

(Ta= O to + 70℃ unless otherwise specified)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	$I_F = \pm 20mA$			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}	$I_F = \pm 2mA$, 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℃, I_F=±2mA, V_{CC}=5V, V_{AUX}=1.3V	–2	–3	–5	μA
	AUX sink current	I_{AUX2}	Ta=25℃, 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℃, I_F=0, V_{CC}=5V	–	–	0.2	v
	AUX terminal voltage 2	V_{AUX2}	Ta=25℃, I_F=±2mA, V_{CC}=5V	2.3		2.8	v
	"High+ Low" threshold AUX voltage	V_{AUXHL}	Ta=25℃, I_F=0, V_{CC}=5V	2.05	–	2.55	v
	"Low→High" threshold AUX voltage	V_{AUXLH}	Ta=25℃, I_F=0, VCC=5V	0.75	–	1,10	v
Transfer characteristics	"High→ Low" threshold input current 1	I_{FHL1}	Ta=25℃, V_{CC}=5V, R_L=680Ω		0.7	1.5	mA
			V_{CC}=5V, R_L=680Ω	0.1		2.o	mA
	"High-, Low" threshold input current 2	I_{FHL2}	Ta=25℃, 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℃, DC500V, 40 to 60%RH	5×10^{10}	10^{11}	–	Ω
	Flo ting capacitance	C_f	Ta=25℃, V=O, f=1MHz	–	0.6	5	pF
	*1Response time "High→Low" propagation delay time	t_{PHL}	Ta=25°C, I_F=±2mA, V_{CC}=5V, C_{AUX}=0.01μF, 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
	*2 Instantaneous common mode rejection voltage "Output High level"	CMH	Ta=25℃, I_F=0, V_{CM}=600V(peak), V_{OMIN}=2V, R_L=680Ω, C_{AUX}=0.01μF		2000	–	V/μs
	*3 Instantaneous common mode rejection voltage "Output : Low level"	CML	Ta=25℃, I_F=±2mA, V_{CM}=600V (peak), V_{OMAX}=0.8V, R_L=680Ω, C_{AUX}=0.01μF		– 2000	–	V/μs

※ 4 Test **Circuit** for Response **Time**



※ 5 Test **Circuit** for Instantaneous Common Mode **Rejection** Voltage

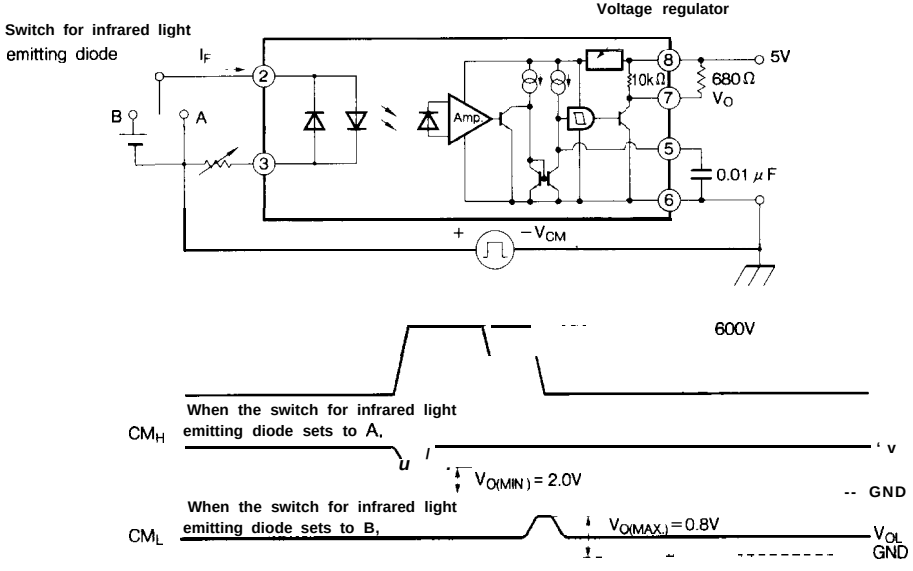


Fig. 1 Forward Current vs. Ambient Temperature

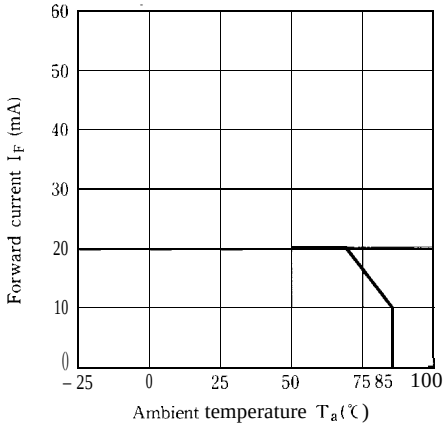


Fig. 2 Power Dissipation vs. Ambient Temperature

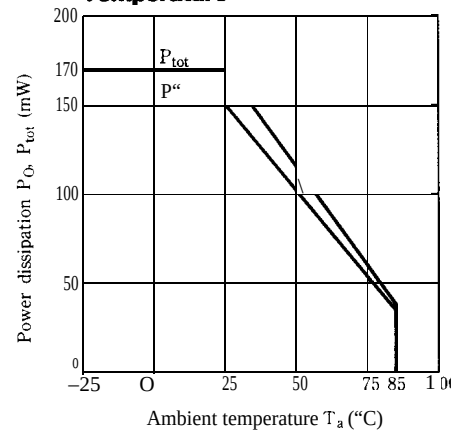


Fig. 3 Forward Currant vs. Forward Voltage

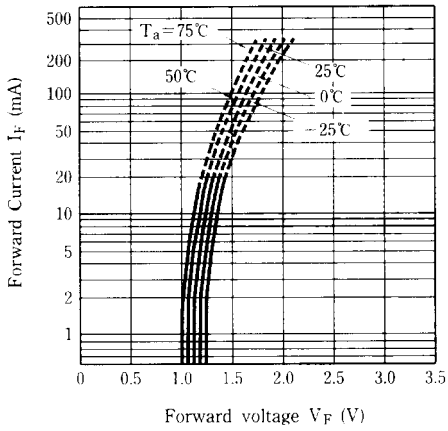
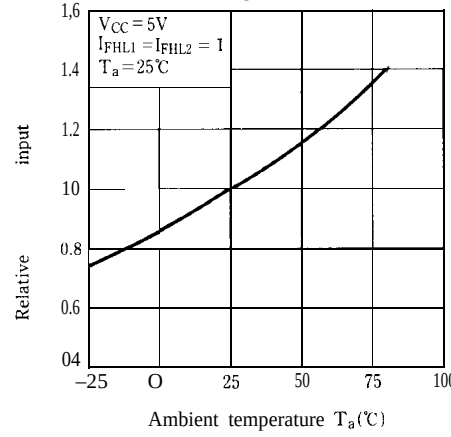
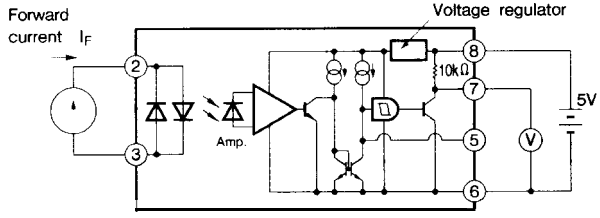


Fig. 4 Relative Threshold Input Current vs. Ambient Temperature



Test Circuit For Threshold Input Current vs. Ambient Temperature



IFHI., IFHL2 represents forward current when output goes from high to low. IFHI is a forward current flowing into pin② while IFHI 2 is one flowing out of pin②.

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

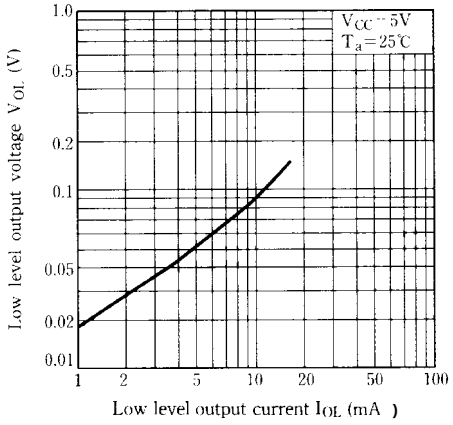


Fig. 6 Low Level Output Voltage vs. Ambient Temperature

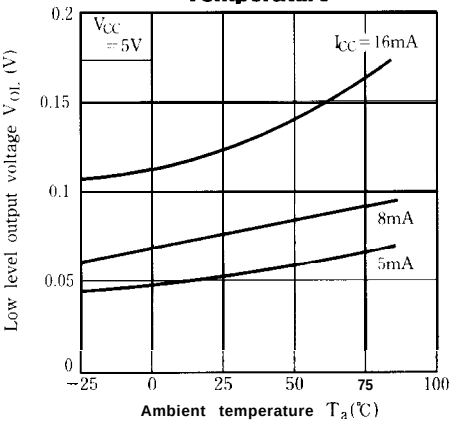


Fig. **7 Supply Current** vs. supply **Voltage**

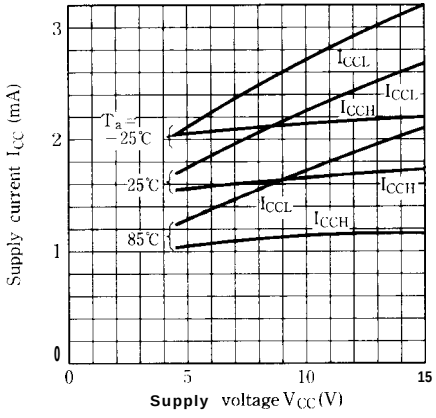


Fig. 8 AUX Current vs. Forward Current

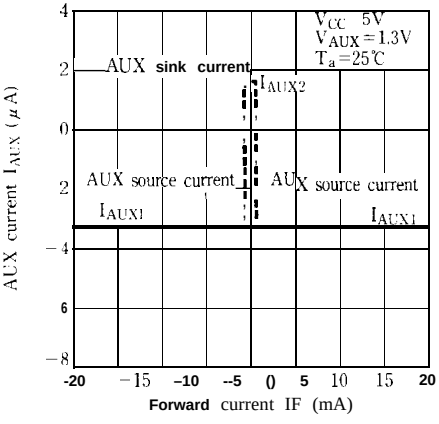
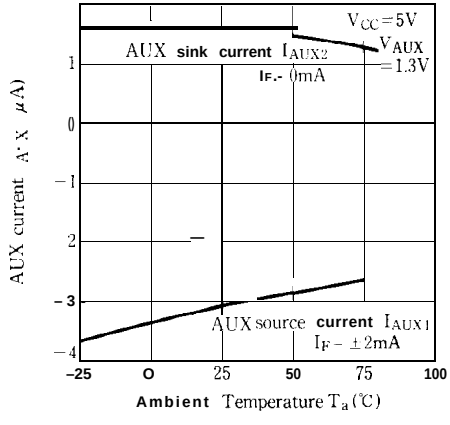
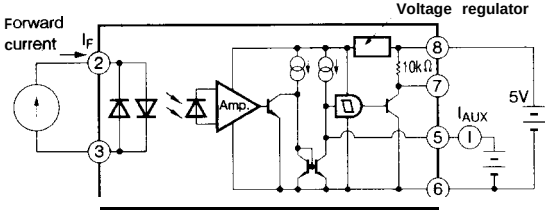


Fig. **9** AUX **Current** vs. **Ambient Temperature**



Test Circuit **for** AUX



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

Fig.10 AUX Terminal Voltage vs. Ambient Temperature

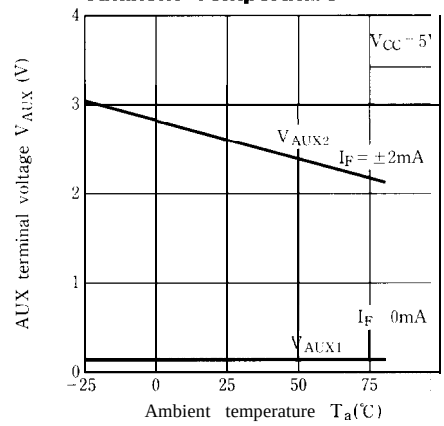


Fig.10 Threshold AUX Voltage vs. Ambient Temperature

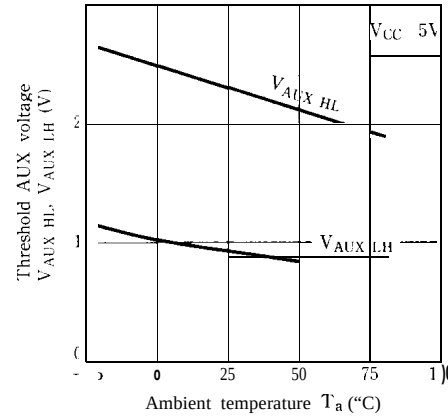


Fig.12 Propagation Delay Time vs. Forward Currant

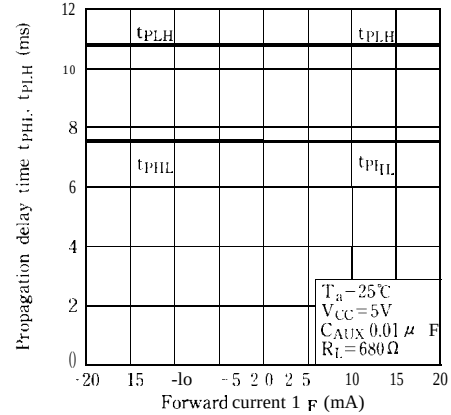
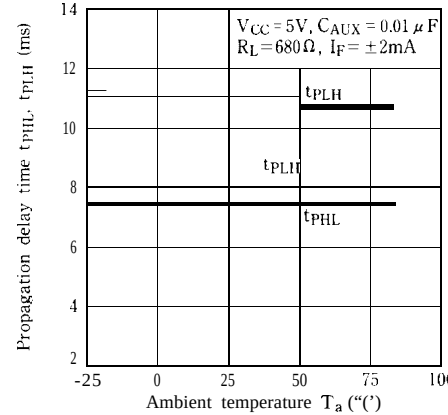
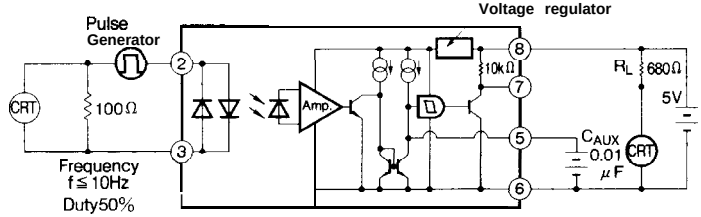


Fig.13 Propagation Delay Time vs. Ambient Temperature



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" (Page 78 to 93)