PC906

DC Input Type OPIC Photocoupler with Built-in ON/OFF Delay Circuit

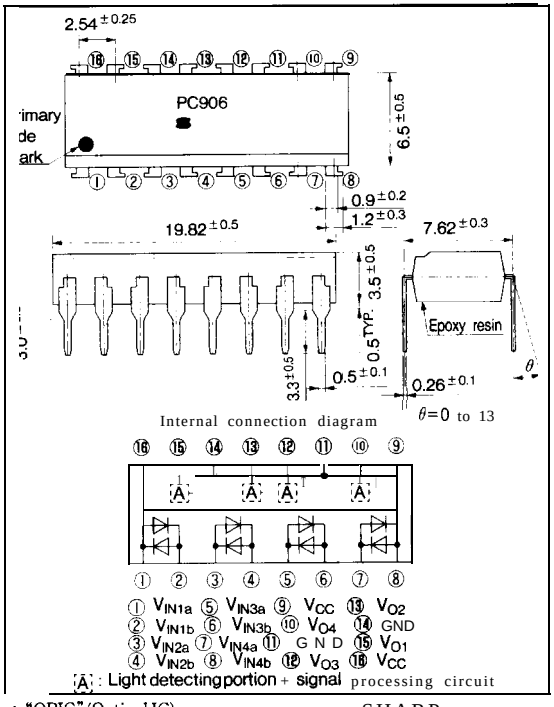
■ Featurea

1. Propagation delay time
   (t_{PHL}, t_{PLH}: TYP. 0.75ms)
2. High noise resistance type
   (CM_H, CM_L : TYP. 2kV/ μ s)
3. High sensitivity
   (I_{FLH} : MAX. 1.5 mA)
4. Bi-directional input, 4-channel type

■ Applications

1. Programmable controllers

■ 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.

■ Absoulte Maximum Ratings (Ta=25℃)

Parameter		Symbol	Ratings	Unit
Input	*1 Forward current	I_F	±26	mA
	*1*2 peak for-ward current	I_{FM}	±1	A
	*1 Power dissipation	P	40	mW
output	Supply voltage	V_{CC}	7	V
	*1, 'Output voltage	Vo	7	V
	*1 output current	10	4	mA
	*3 Power dissipation	Po	200	mW
*5 Isolation voltage		V_{iso}	4000	V_{rms}
Operating temperature		T_{opr}	–25 to +85	℃
Storage temperature		T_{stg}	–55 to + 125	℃
*6 Soldering temperature		T_{sol}	260	℃

*1 Each channel
*2 Pulse width ≦ 100 μ s, Duty ratio :0.001
*3 All channel
*4 Shall not exceed from supply voltage (V_{CC}).
*5 40 to 60%RH, AC for 1min.
*6 For 10 seconds

■ Electro-optical Characteristics

(Shows characteristics value 1ch. at Vcc=5V, Ta=25℃, unless otherwise specified)

	Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Fig.
Input	Forward voltage		V_F	$I_F = \pm 10mA$	–	1.2	14	V	·
	Terminal capacitance		C_t	$V_F = 0$, f=1MHz		30	250	pF	
output	Operating supply voltage		V_{cc}		4.5		5.5	V	
	Low level output voltage		V_{OL}	I_F = OmA, I_{OL} = 1.6mA	–	0.1	0.4	V	1
	High level output voltage		V_{OH}	IF= ±4mA	3.5	–	–	V	2
	Output short-circuit current		10s	$I_F = \pm 4mA$	–0.75	–0.45	–0.25	mA	3
	*7 Low level supply current		I_{CCL}	IF= 0mA		18	30	mA	4
	*7 High level supply current		I_{CCH}	IF= ±4mA	–	16	28	mA	
	*8 Power supply noise induction "Output high level"		$PSNI_1$	$R_L = 4.0\Omega$, $I_F = \pm 4mA$, $f_{AC} = 100kHz$	0.5	–		Vp–p	5
	*Power supply noise induction "Output low level"		$PSNI_1$	$R_L = 4.0\Omega$, $I_F = 0mA$, $f_{AC} = 100kHz$	0.5	–	–	Vp–p	
	"Low→High" threshold input current 1		I_{FLH1}	$R_L = 4.0\Omega$	–	0.7	1.5	mA	6
	"Low→High" threshold input current 2		I_{FLH2}		–	–0.7	–1.5	mA	
	*isolation resistance		R_{ISO}	DC500V, 40 to 60%RH	5×10^{10}	1×10^{11}	–	Ω	–
Transfer characterisics	Response time	"Low→High" propagation time	t_{PLH}	$I_F = \pm 4mA$, $R_L = 4.0k\Omega$	–	0.75	1.35	ms	7
		"High→Low" propagation time	t_{PHL}			0.75	1.35	ms	
		Rise time	t_r		–	0.3	0.7	μs	
		Fall time	tf		–	0.05	0.4	μs	
	Instantaneous common mode rejection voltage (High level output)		CM_H	$R_L = 4.0k\Omega$, $I_F = \pm 4mA$, V_{CM} = 600V (peak), V_O (MIN.)= 2.0V	–	– 2 000	–	V/μs	8
	Instantaneous common mode rejection voltage (Low level output)		CM_L	$R_L = 4.0k\Omega$, $I_F = 0mA$, V_{CM} =600V (peak), V_O (MAX.)= 0.8V	–	2 000	–	V/μs	
	*10 Input terminal noise-proof		SNIF	$R_L = 4k\Omega$	10	–	–	mA	9

*7 All channel
*8 Maximum "Peak to peak" voltage of sine wave to keep Vo≥3.5V when it is superposed 100kHz sine wave to Vcc.
*9 Maximum "Peak to peak" voltage of sine wave to keep Vo ≦4.0V when it is superposed 100kHz sine wave to Vcc.
*10 Maximum value which V_O can keep 0.4V MAX. when it inputs the pulse, I_F (1 cycle : 1ms and pulse width : 1μs).

■ Test circuit

Fig. 1

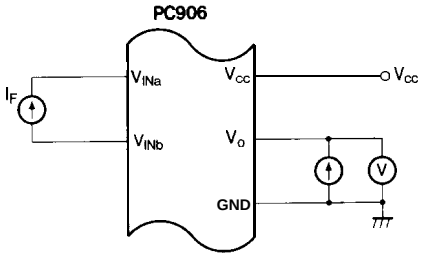


Fig. 2

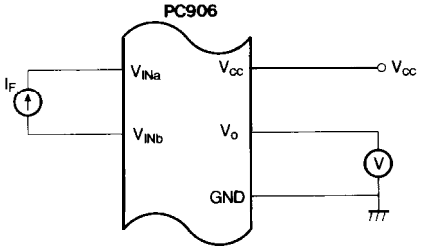


Fig. 3

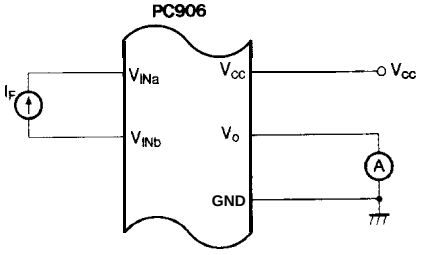


Fig. 4

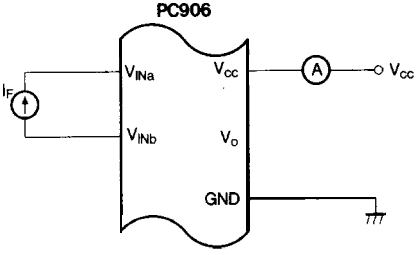


Fig. 5

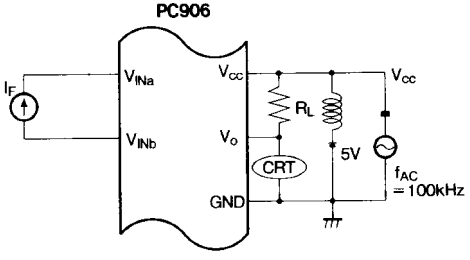
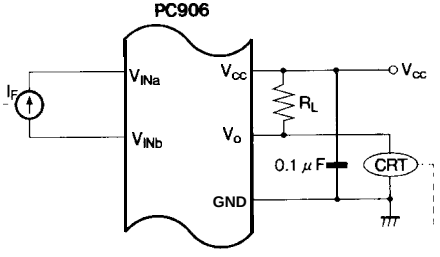
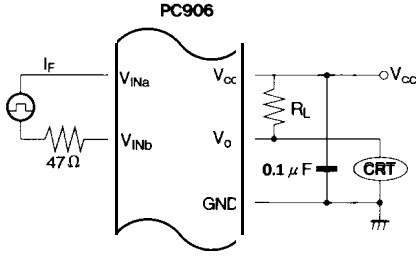


Fig. 6



It measures the I_F when output changes from "Low level" to "High level"

Fig. 7



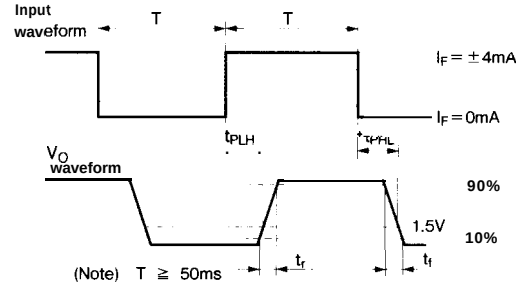
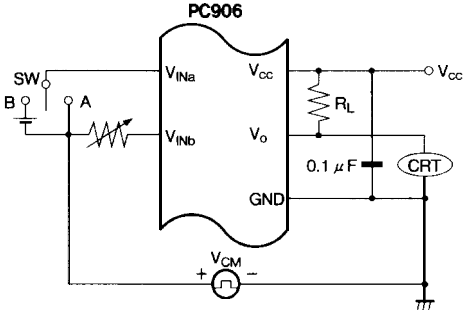


Fig. 8



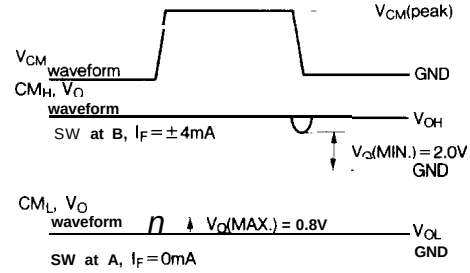
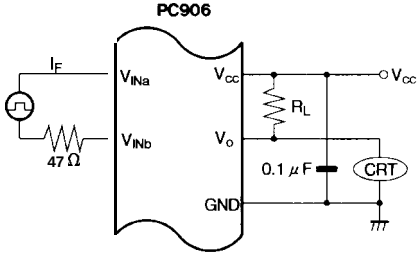
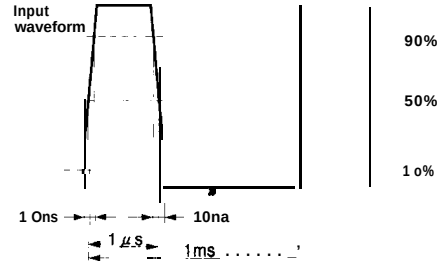


Fig. 9





■ Internal Equivalent Circuit Diagram (1 ch.)

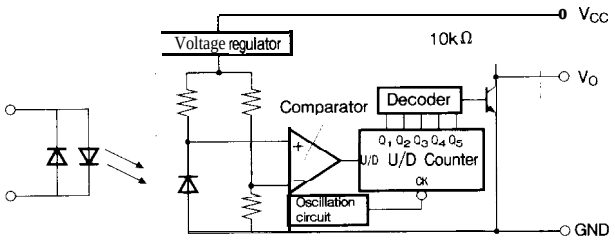


Fig. 1 Forward Current vs. Ambient Temperature

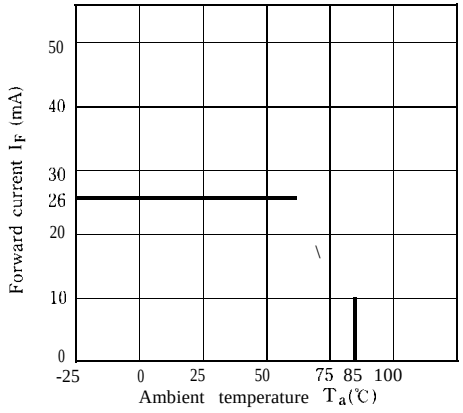


Fig. 2 **Supply Current vs. Ambient Temperature**

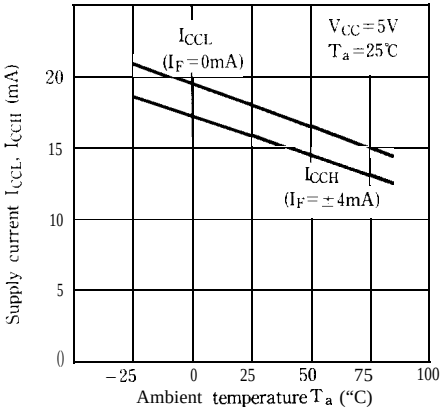


Fig. 3 Low Level Output Voltage - Ambient Temperature

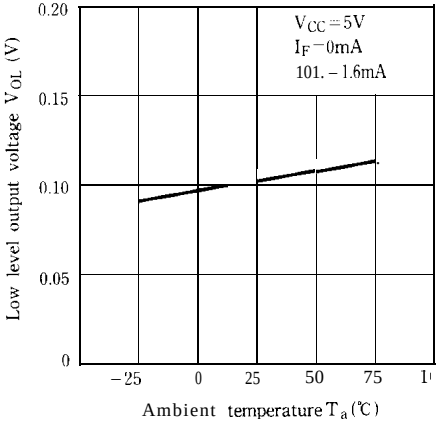


Fig. 4 **Relative Threshold Input Current vs. Ambient Temperature**

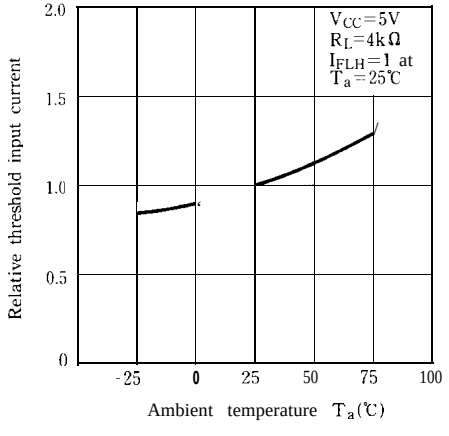


Fig. 5 Propagation Delay Time vs. Forward Current

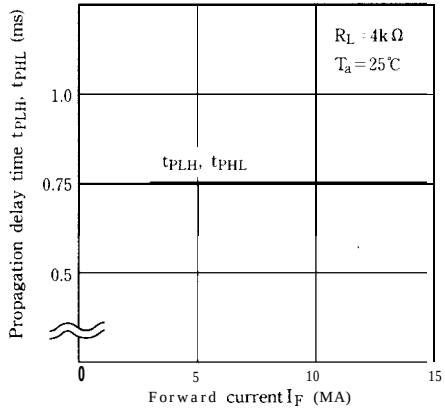


Fig. 6 Propagation Delay Time vs. Ambient Temperature

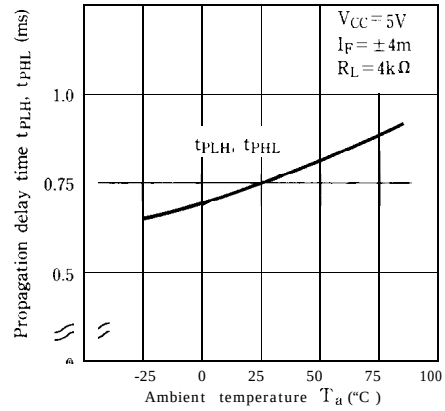


Fig. 7 Output Short-circuit Current vs. Ambient Temperature

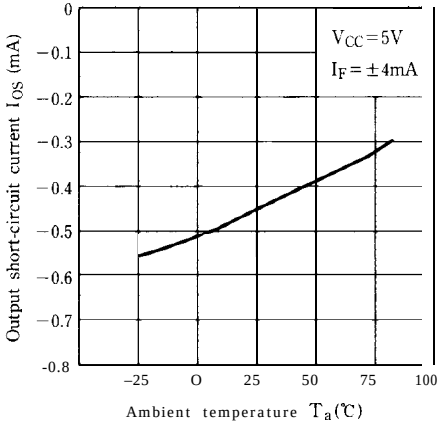


Fig. 8 Rise Time, Fall Time vs. Load Resistance

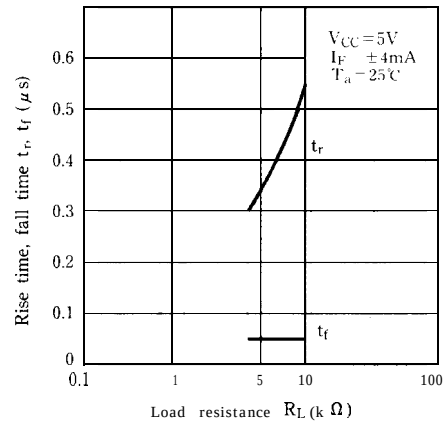


Fig. 9-a Supply Voltage /Output voltage **vs. Time** (1]

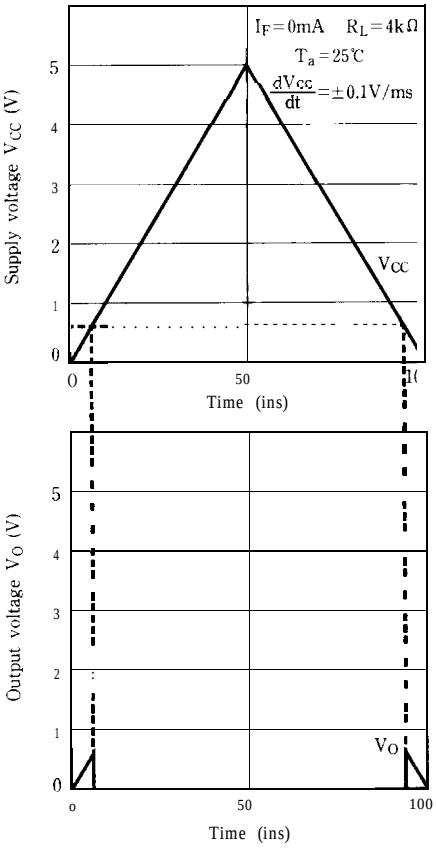
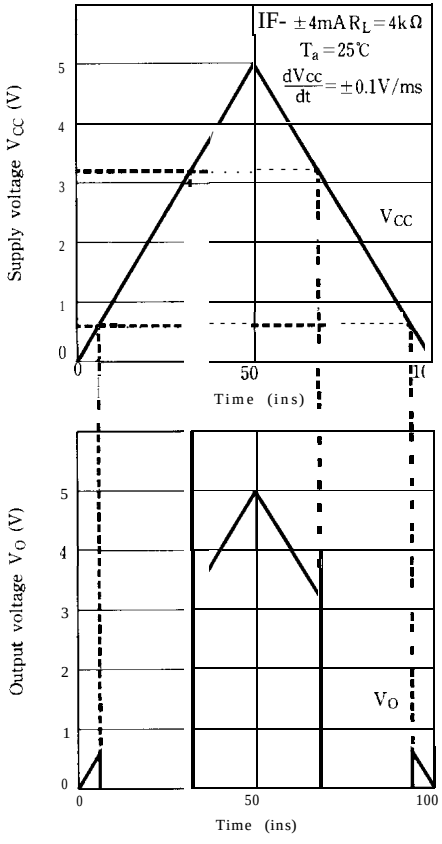


Fig. 9-b Supply Voltage /Output voltage **vs.** Time (2)



● Please refer to the chapter "Precautions for Use" (Page 78 to 93).