PC906

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

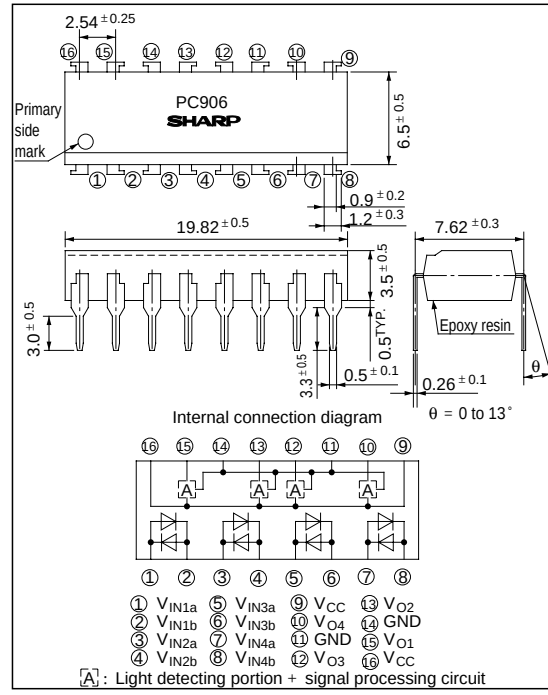
■ Features

1. Propagation delay time
   (t_{PHL} , t_{PLH} : TYP. 0.75ms)
2. High noise resistance type
   (CM_H, CM_L : TYP. 2kV/μs)
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°C)

Parameter		Symbol	Ratings	Unit
Input	*1 Forward current	I_F	± 26	mA
	*1, *2 Peak forward current	I_{FM}	± 1	A
	*1 Power dissipation	P	40	mW
Output	Supply voltage	V_{CC}	7	V
	*1, *4 Output voltage	V_O	7	V
	*1 Output current	I_O	4	mA
	*3 Power dissipation	P_O	200	mW
*5 Isolation voltage		V_{iso}	4 000	V_{rms}
Operating temperature		T_{opr}	- 25 to + 85	°C
Storage temperature		T_{stg}	- 55 to + 125	°C
*6 Soldering temperature		T_{sol}	260	°C

*1 Each channel
*2 Pulse width<=100μs, 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˚C, unless otherwise specified)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Fig.
Input	Forward voltage		V_F	I_F = ± 10mA	-	1.2	1.4	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 = 0mA, I_{OL} = 1.6mA	-	0.1	0.4	V	1
	High level output voltage		V_{OH}	I_F = ± 4mA	3.5	-	-	V	2
	Output short-circuit current		I_{OS}	I_F = ± 4mA	- 0.75	- 0.45	- 0.25	mA	3
	*7 Low level supply current		I_{CCL}	I_F = 0mA	-	18	30	mA	4
	*7 High level supply current		I_{CCH}	I_F = ± 4mA	-	16	28	mA	
	*8 Power supply noise induction "Output high level"		$PSNI_H$	R_L = 4.0kΩ, I_F = ± 4mA f_{AC} = 100kHz	0.5	-	-	Vp - p	5
	*9 Power supply noise induction "Output low level"		$PSNI_L$	R_L = 4.0kΩ, I_F = 0mA f_{AC} = 100kHz	0.5	-	-	Vp - p	
Transfer charact-erisics	"Low→High" threshold input current 1		I_{FLH1}	R_L = 4.0kΩ	-	0.7	1.5	mA	6
	"Low→High" threshold input current 2		I_{FLH2}		-	- 0.7	- 1.5	mA	
	*7 Isolation resistance		R_{ISO}	DC500V, 40 to 60% RH	5 x 10^{10}	1 x 10^{11}	-	Ω	-
	Response time	"Low→High" propagation time	t_{PLH}	I_F = ± 4mA R_L = 4.0kΩ	-	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	t_f		-	0.05	0.4	μs	
	Instantaneous common mode rejection voltage (High level output)		CM_H	R_L = 4.0kΩ, I_F = ± 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 = 4.0kΩ, I_F = 0mA V_{CM} = 600V (peak) V_O (MAX.) = 0.8V	-	2 000	-	V/μs	
	*10 Input terminal noise-proof		SNI_F	R_L = 4kΩ	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 Vo can keep 0.4V MAX. when it inputs the pulse, I_F (1 cycle : 1ms and pulse width : 1μs).

■ Test circuit

Fig. 1

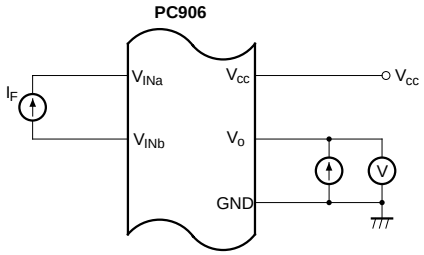


Fig. 2

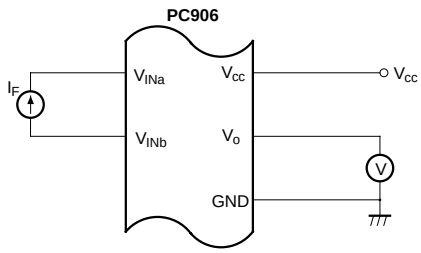


Fig. 3

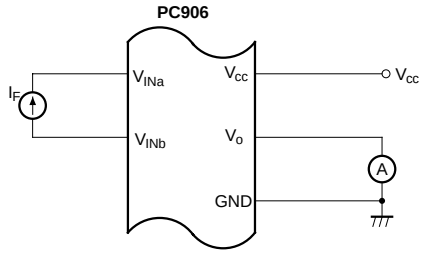


Fig. 4

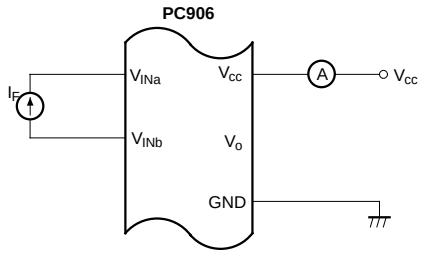


Fig. 5

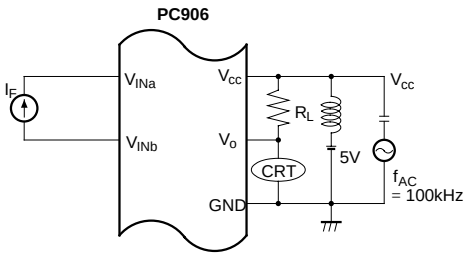
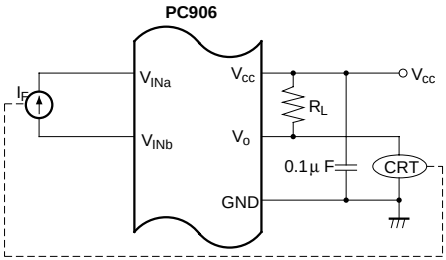
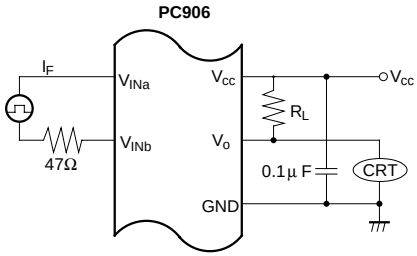


Fig. 6



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

Fig. 7



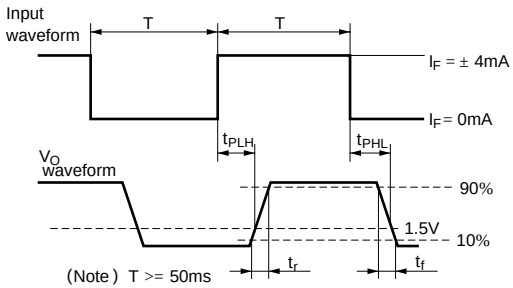
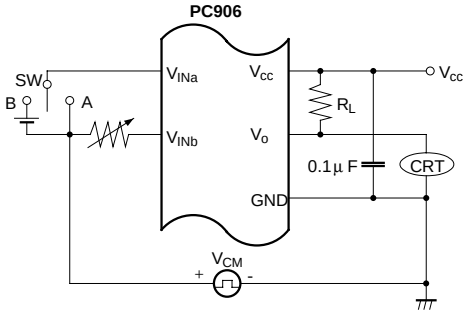


Fig. 8



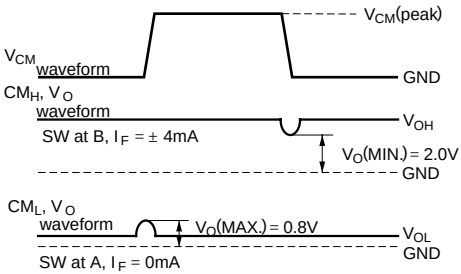
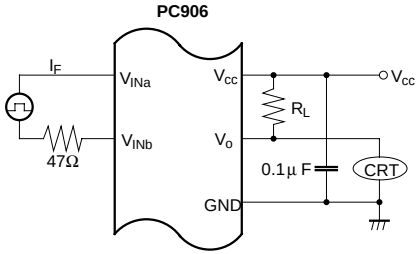
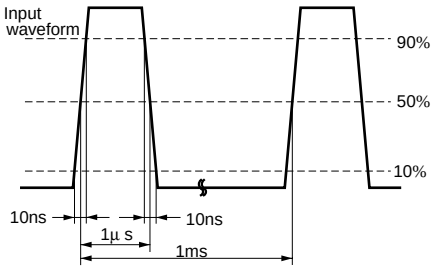


Fig. 9





■ Internal Equivalent Circuit Diagram （1ch.）

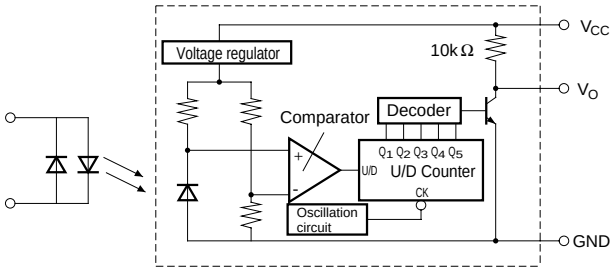


Fig. 1 Forward Current vs. Ambient Temperature

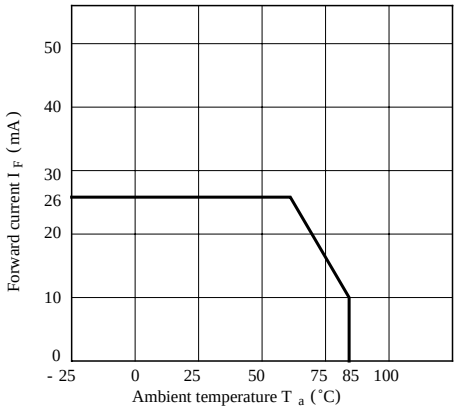


Fig. 2 Supply Current vs. Ambient Temperature

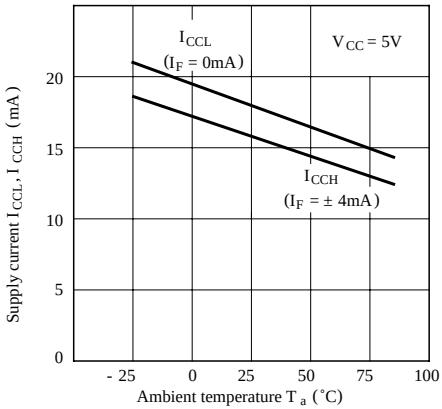


Fig. 3 Low Level Output Voltage vs. Ambient Temperature

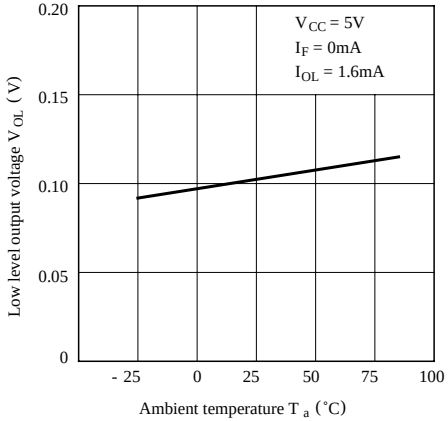


Fig. 4 Relative Threshold Input Current vs. Ambient Temperature

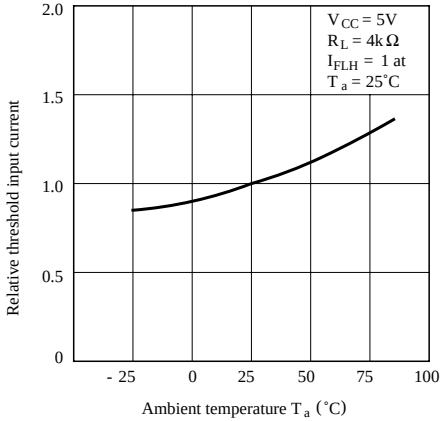


Fig. 5 Propagation Delay Time vs. Forward Current

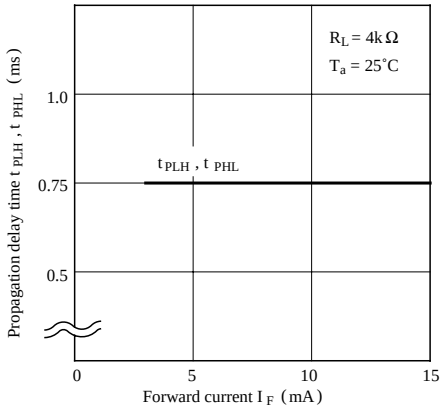


Fig. 6 Propagation Delay Time vs. Ambient Temperature

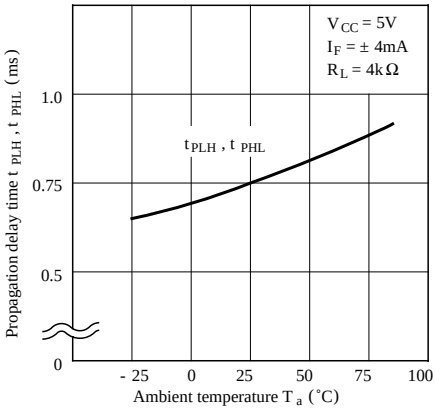


Fig. 7 Output Short-circuit Current vs. Ambient Temperature

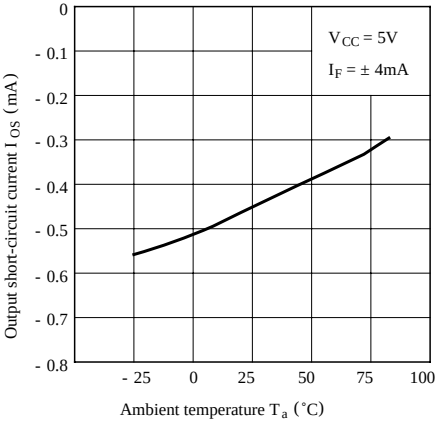


Fig. 8 Rise Time, Fall Time vs. Load Resistance

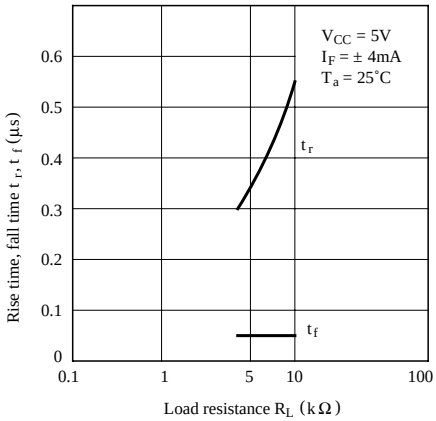


Fig. 9-a Supply Voltage/Output Voltage vs. Time (1)

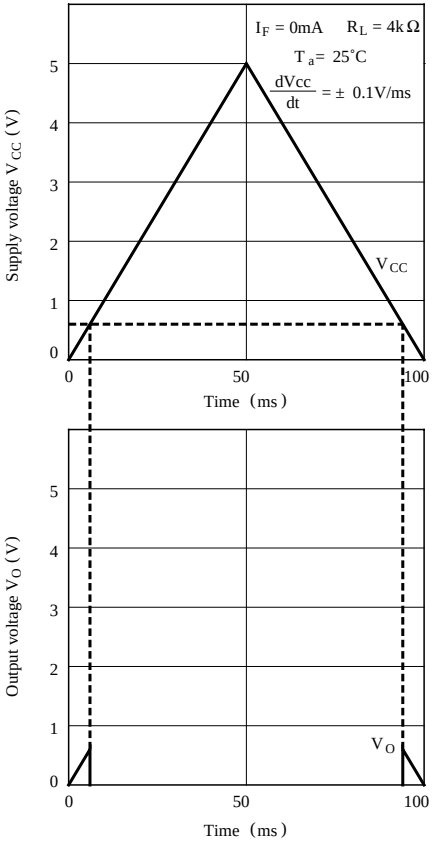
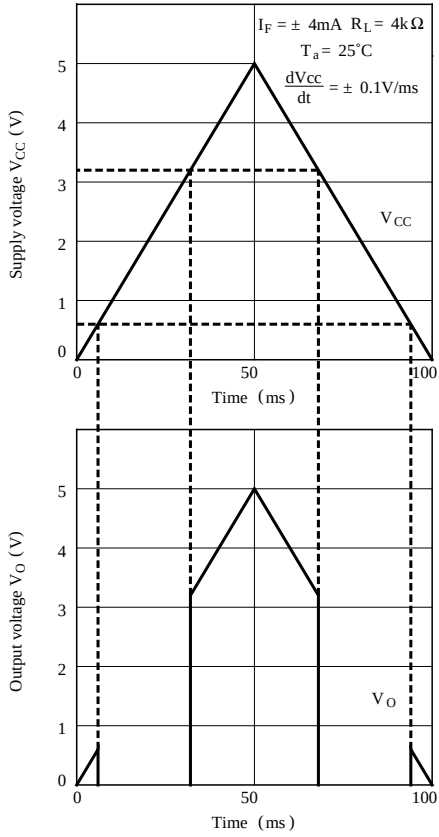


Fig. 9-b Supply Voltage/Output Voltage vs. Time (2)



● Please refer to the chapter "Precautions for Use".