PC922

High Power OPIC Photocoupler

※ Lead forming type (I type) and taping reel type (P type) are also available. (**PC922I/PC922P**) (Page 656)

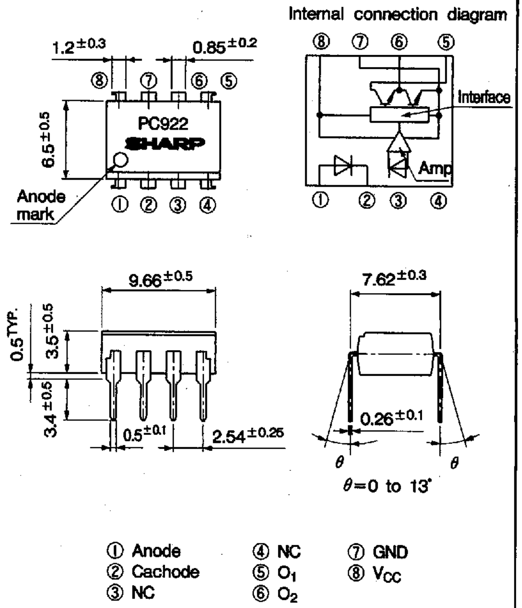
■ Features

1. Built-in base amplifier for inverter drive
2. High power (I_{O1} : MAX. 0.5A(DC))
   (I_{O2P} : MAX. 2.0A(pulse))
3. High isolation voltage between input and output (V_{iso} : 5 000V_{rms})
4. High noise reduction type
5. High speed response (t_{PHL}, t_{PLH} : MAX. 5 μs)
6. High sensitivity (I_{FLH} : MAX. 3mA)
7. Recognized by UL, file No. E64380

■ Applications

1. Inverter controlled air conditioners
2. Small capacitance general purpose inverters

■ 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=T_{opr} unless otherwise specified)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	25	mA
	*1Reverse voltage	V_R	6	V
Output	Supply voltage	V_{CC}	18	V
	O_1 output current	I_{O1}	0.5	A
	*2O_1 peak output current	I_{O1P}	1.0	A
	O_2 output current	I_{O2}	0.6	A
	*2O_2 peak output current	I_{O2P}	2.0	A
	O_1 output voltage	V_{O1}	18	V
	Power dissipation	P_O	500	mW
Total power dissipation		P_{tot}	550	mW
*3Isolation voltage		V_{iso}	5 000	V_{rms}
Operating temperature		T_{opr}	−20 to +80	℃
Storage temperature		T_{stg}	−55 to +125	℃
*4Soldering temperature		T_{sol}	260	℃

*1 Ta=25℃
*2 Pulse width≦5 μs, Duty ratio=0.01
*3 40 to 60%RH, AC for 1 minute, Ta=25℃
*4 For 10 seconds

■ Electro-optical Characteristics

($Ta=T_{opr}$ unless otherwise specified)

	Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit	Fig.
Input	Forward voltage		V_{F1}	$T_a=25°C$, $I_F=5mA$	–	1.1	1.4	V	–
			V_{F2}	$T_a=25°C$, $I_F=0.2mA$	0.6	0.9	–	V	–
	Reverse current		I_R	$T_a=25°C$, $V_R=3V$	–	–	10	μA	–
	Terminal capacitance		C_t	$T_a=25°C$, V=0, f=1kHz	–	30	250	pF	–
Output	Operating supply voltage		V_{CC}		5.4	–	13	V	–
	O_1 low level output voltage		V_{O1L}	$V_{CC}=6V$, $I_{O1}=0.4A$, $R_{L2}=10\Omega$, $I_F=5mA$	–	0.2	0.4	V	1
	O_2 high level output voltage		V_{O2H}	$V_{CC}=6V$, $I_{O2}=-0.4A$, $I_F=5mA$	4.5	5.0	–	V	2
	O_2 low level output voltage		V_{O2L}	$V_{CC}=6V$, $I_{O2}=0.5A$, $I_F=0$	–	0.2	0.4	V	–
	O_1 leak current		I_{O1L}	$V_{CC}=13V$, $I_F=0$	–	–	200	μA	3
	O_2 leak current		I_{O2L}	$V_{CC}=13V$, $I_F=5mA$	–	–	200	μA	4
	High level supply current		I_{CCH}	$T_a=25°C$, $V_{CC}=6V$, $I_F=5mA$	–	9	13	mA	–
				$V_{CC}=6V$, $I_F=5mA$	–	–	17	mA	–
	Low level supply current		I_{CCL}	$T_a=25°C$, $V_{CC}=6V$, $I_F=0$	–	11	15	mA	–
				$V_{CC}=6V$, $I_F=0$	–	–	20	mA	–
Transfer characteristics	*5 "Low→High" threshold input current		I_{FLH}	$T_a=25°C$, $V_{CC}=6V$, $R_{L1}=5\Omega$, $R_{L2}=10\Omega$	0.3	1.5	3.0	mA	5
				$V_{CC}=6V$, $R_{L1}=5\Omega$, $R_{L2}=10\Omega$	0.2	–	5.0	mA	5
	Isolation resistance		R_{ISO}	Ta=25°C, DC=500V 40 to 60%RH	5×10^{10}	10^{11}	–	Ω	–
	Response time	"Low→High" propagation delay time	t_{PLH}	$T_a=25°C$, $V_{CC}=6V$, $I_F=5mA$, $R_{L1}=5\Omega$, $R_{L2}=10\Omega$	–	2	5	μs	6
		"High→Low" propagation delay time	t_{PHL}		–	2	5	μs	
		Rise time	t_r		–	0.2	1	μs	
		Fall time	t_f		–	0.1	1	μs	
	Instantaneous common mode rejection voltage "Output : High level"		CM_H	$T_a=25°C$, $V_{CM}=600V_{(peak)}$, $I_F=5mA$, $R_{L1}=470\Omega$, $R_{L2}=1k\Omega$, $\Delta V_{O2H}=0.5V$	−1 500	–	–	V/μs	7
	Instantaneous common mode rejection voltage "Output : Low level"		CM_L	$T_a=25°C$, $V_{CM}=600V_{(peak)}$, $I_F=0$, $R_{L1}=470\Omega$, $R_{L2}=1k\Omega$, $\Delta V_{O2L}=0.5V$	1 500	–	–	V/μs	7

*5 I_{FLH} represents forward current when output goes from low to high.

■ Truth Table

Input	O_2 Output	Tr. 1	Tr. 2
ON	High level	ON	OFF
OFF	Low level	OFF	ON

■ Test Circuit

Fig. 1

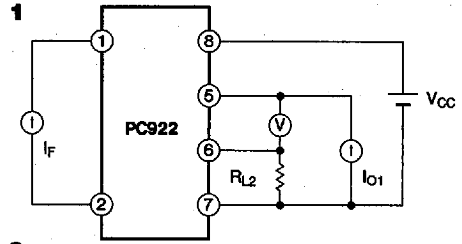


Fig. 2

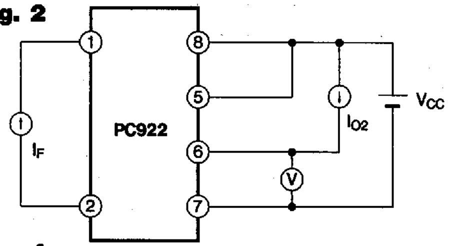


Fig. 3

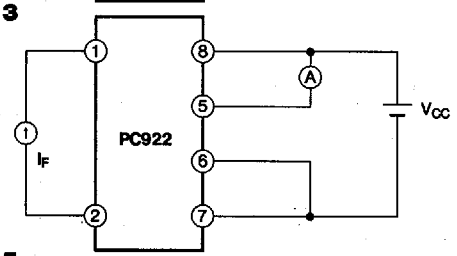


Fig. 4

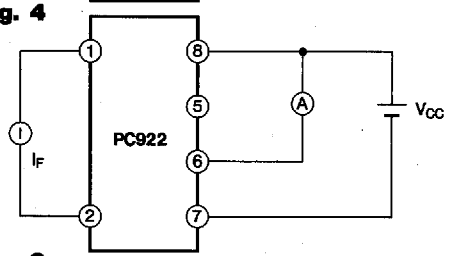


Fig. 5

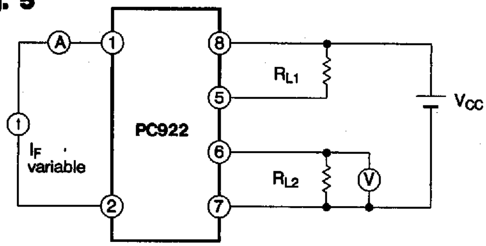


Fig. 6

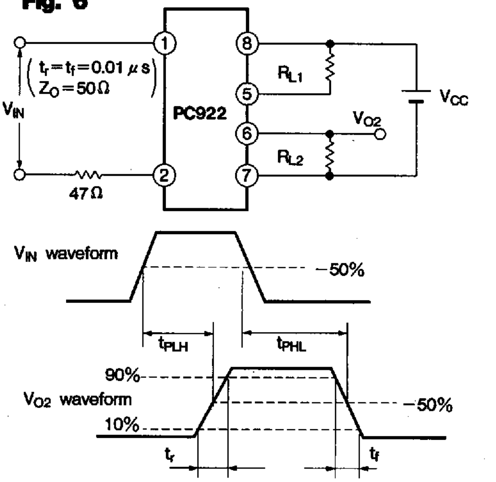


Fig. 7

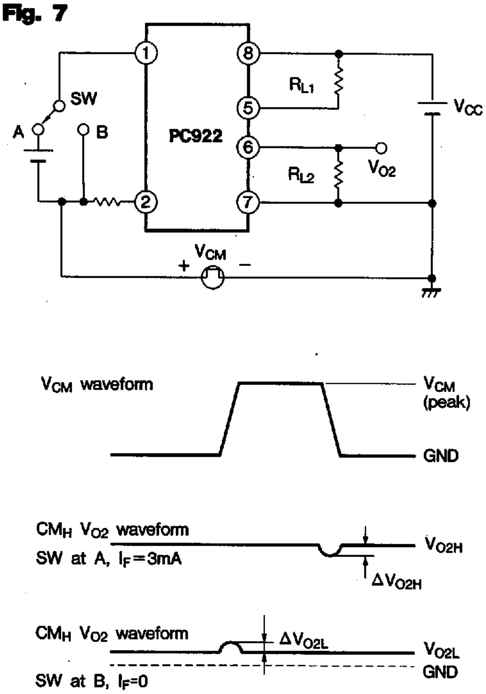


Fig. 8 Forward Current vs. Ambient Temperature

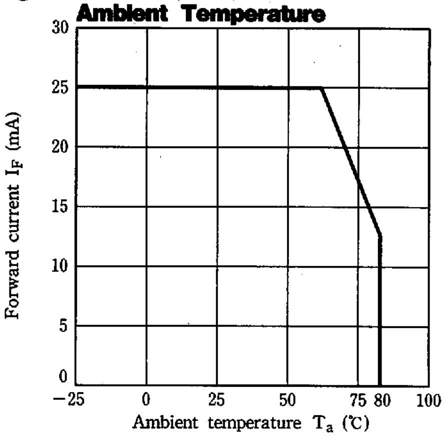


Fig. 9-a Power Dissipation vs. Ambient Temperature

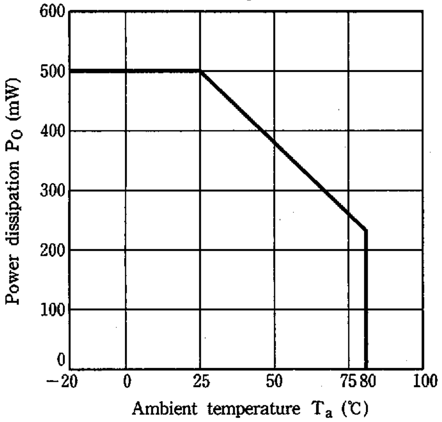


Fig. 9-b Power Dissipation vs. Ambient Temperature

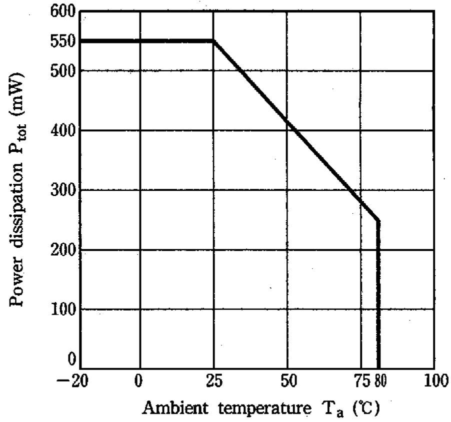


Fig. 10 Forward Current vs. Forward Voltage

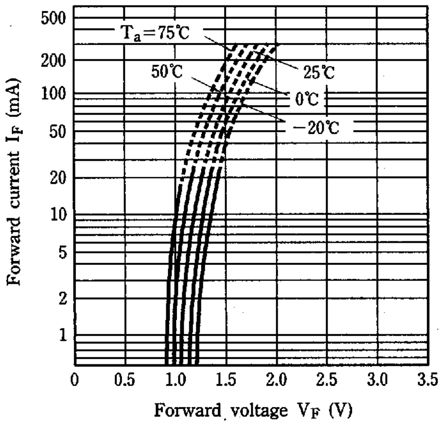


Fig.11 "Low→High" Relative Threshold Input Current vs. Supply Voltage

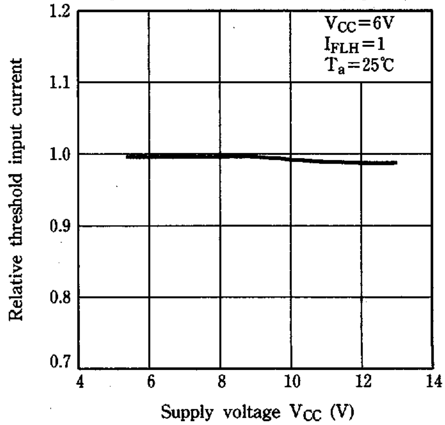


Fig.12 "Low→High" Relative Threshold Input Current vs. Ambient Temperature

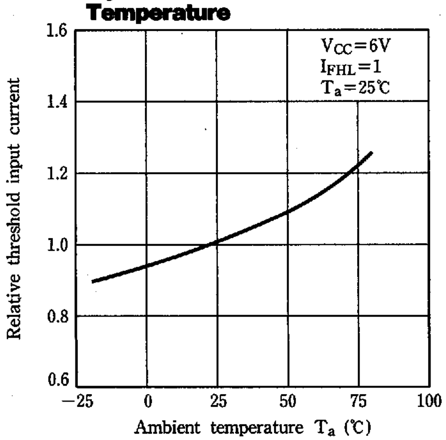


Fig.13 O_1 Low Level Output Voltage vs. O_1 Output Current

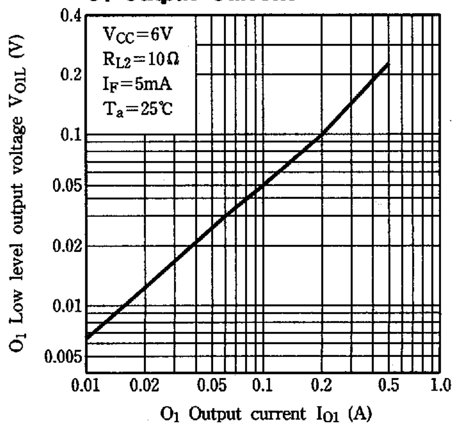


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Fig.14 O_1 Low Level Output Voltage vs. Ambient Temperature

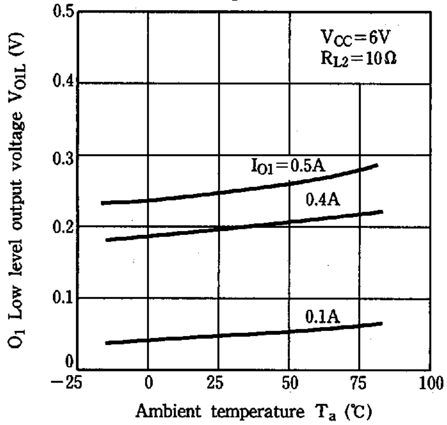


Fig.15 O_2 High Level Output Voltage vs. O_2 Output Current

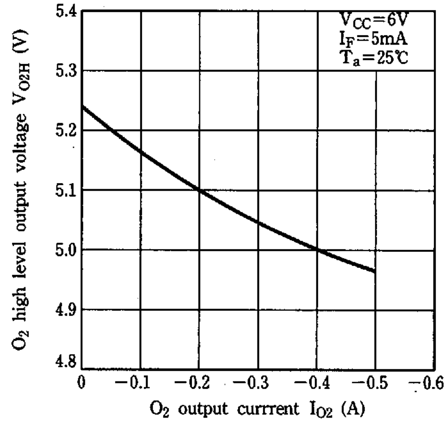


Fig.16 O_2 High Level Output Voltage vs. Ambient Temperature

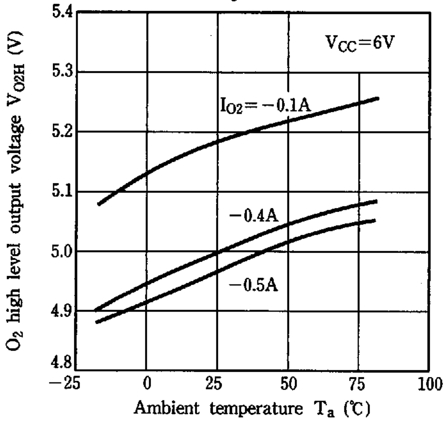


Fig.17 O_2 Low Level Output Voltage vs. O_2 Output Current

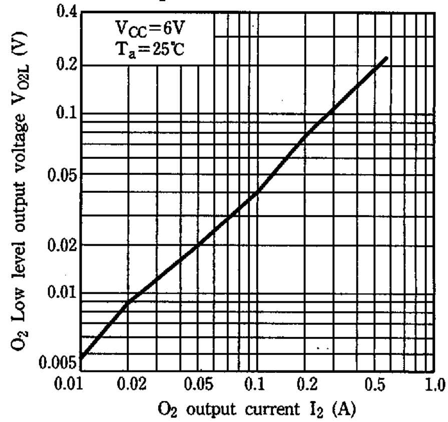


Fig.18 O_2 Low Level Output Voltage vs. Ambient Temperature

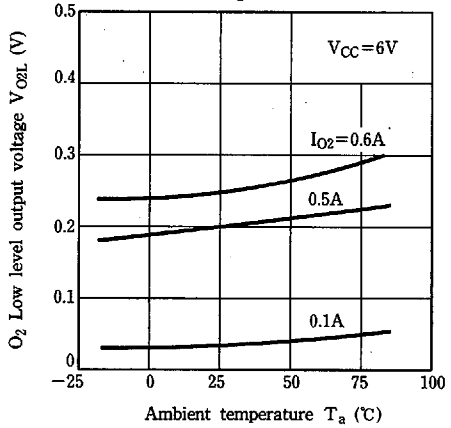


Fig.19 High Level Supply Current vs. Supply Voltage

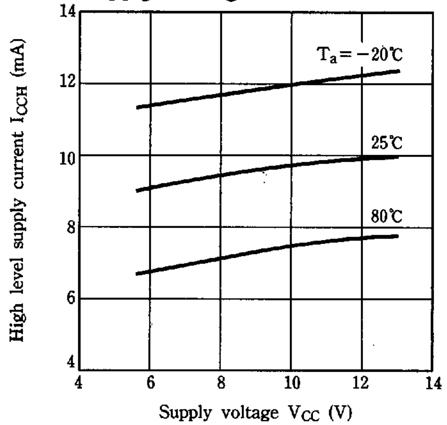


Fig.20 Low Level Supply Current vs. Supply Voltage

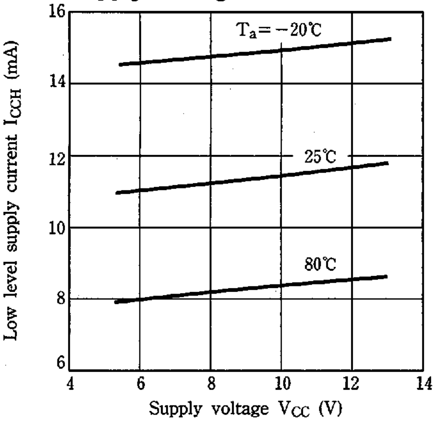


Fig.21 Propagation Delay Time vs. Forward Current

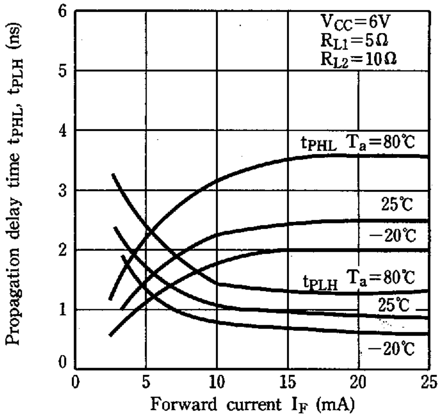


Fig.22 Propagation Delay Time vs. Ambient Temperature

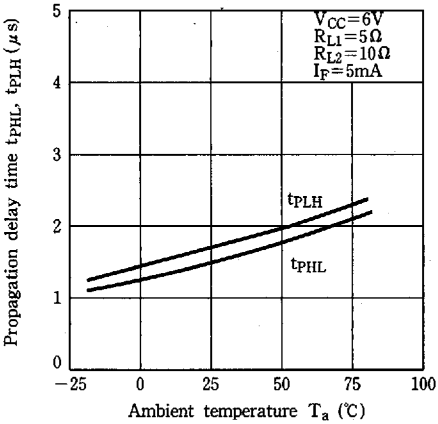
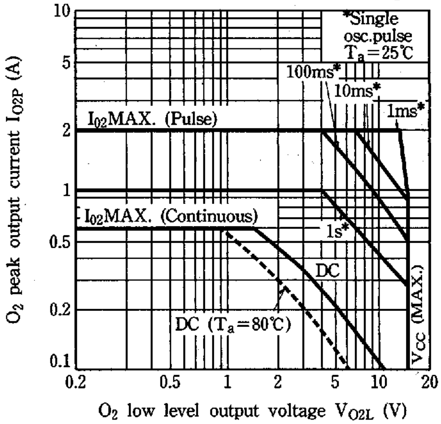
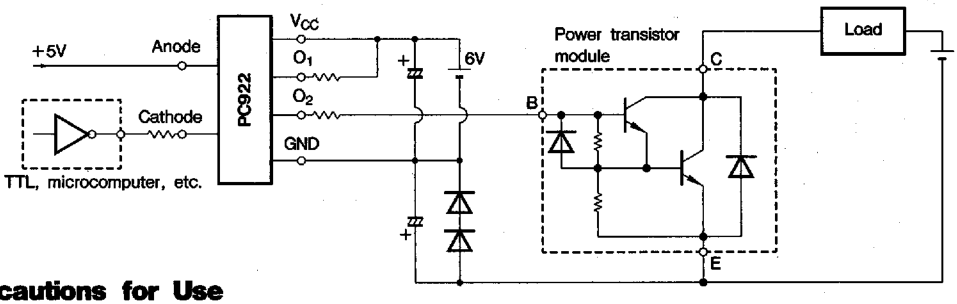


Fig.23 O_2 Peak Output Current vs. O_2 Low Level Output Voltage



■ Application Circuit



■ Precautions for Use

(1) It is recommended that a by-pass capacitor of more than 0.01 μF 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, refer to the chapter "Precautions for Use" .(Page 78 to 93)