

PC924X

OPIC Photocoupler

OPIC Photocoupler for IGBT Drive of Inverter

■ Features

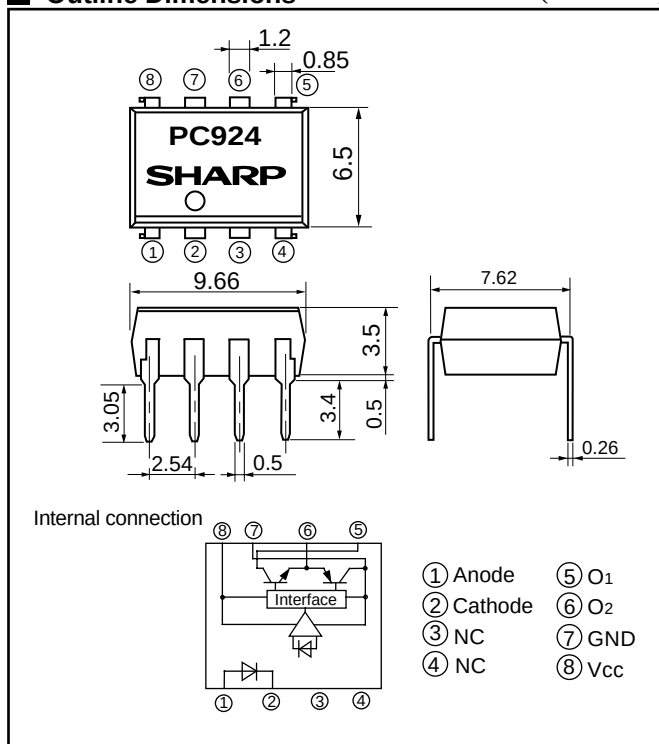
- (1) Built-in direct drive circuit for IGBT drive
(I_{O1P}, I_{O2P} : 0.4 A)
- (2) High speed response
(t_{PHL}, t_{PLH} : MAX. 2.0 μ s)
- (3) Wide operating supply voltage range
(V_{CC} : 15 to 30 V, T_a = -10 to 60 °C)
- (4) High noise reduction type
(CM_H = MIN. -1 500 V/ μ s)
(CM_L = MIN. 1 500 V/ μ s)
- (5) High isolation voltage ($V_{iso(rms)}$: 5 kV)

■ Applications

- (1) IGBT drive for inverter control

■ 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

(Unless specified, $T_a = T_{opr}$)

Parameter	Symbol	Ratings	Unit
Input			
Forward current	I_F	25	mA
*1 Reverse voltage	V_R	6	V
Supply voltage	V_{CC}	35	V
Output			
O1 Output current	I_{O1}	0.1	A
*2 O1 Peak output current	I_{O1P}	0.4	A
O2 Output current	I_{O2}	0.1	A
*2 O2 Peak output current	I_{O2P}	0.4	A
O1 Output voltage	V_{O1}	35	V
Power dissipation	P_O	500	mW
Total power dissipation	P_{tot}	550	mW
*3 Isolation voltage	$V_{iso(rms)}$	5.0	kV
Operating temperature	T_{opr}	-20 to +80	°C
Storage temperature	T_{sg}	-55 to +125	°C
*4 Soldering temperature	T_{sol}	260	°C

*1 $T_a = 25^\circ\text{C}$

*2 Pulse width $\leq 0.15 \mu\text{s}$, duty ratio = 0.01

*3 40 to 60%RH, AC for 1 minute, $T_a = 25^\circ\text{C}$

*4 For 10s

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Electro-optical Characteristics

(Unless specified, Ta=Topr)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V _{F1}	T _a = 25 °C, I _F =20 mA	—	1.2	1.4	V
			V _{F2}	T _a = 25 °C, I _F = 0.2 mA	0.6	0.9	—	V
	Reverse current		I _R	T _a = 25 °C, V _R = 4 V	—	—	10	μA
	Terminal capacitance		C _t	T _a =25 °C, V= 0, f= 1 kHz	—	30	250	pF
Output	Operation temperature supply voltage		V _{CC}	T _a = -10 to 60 °C	15	—	30	V
				—	15	—	24	V
	O ₁ low level output voltage		V _{O1L}	V _{CC1} =12 V, V _{CC2} = -12 V, I _{O1} = 0.1 A, I _F = 10 mA	—	0.2	0.4	V
	O ₂ high level output voltage		V _{O2H}	V _{CC} =V _{O1} = 24 V, I _{O2} = -0.1 A, I _F = 10 mA	18	21	—	V
	O ₂ low level output voltage		V _{O2L}	V _{CC} = 24 V, I _{O2} = 0.1 A, I _F = 0	—	1.2	2.0	V
	O ₁ leak current		I _{O1L}	T _a = 25 °C,V _{CC} =V _{O1} = 35 V, I _F =0 mA	—	—	500	μA
	O ₂ leak current		I _{O2L}	T _a = 25 °C,V _{CC} =V _{O2} = 35 V, I _F =10 mA	—	—	500	μA
	High level supply current		I _{CCH}	T _a =25 °C, V _{CC} = 24 V, I _F = 10 mA	—	6	10	mA
				V _{CC} = 24 V, I _F = 10 mA	—	—	14	mA
	Low level supply current		I _{CCL}	T _a =25 °C, V _{CC} = 24 V, I _F = 0 mA	—	8	13	mA
V _{CC} = 24 V, I _F = 0 mA				—	—	17	mA	
Transfer characteristics	"Low→High" thresh hold input current *5		I _{FLH}	T _a =25°C, V _{CC} = 24 V	1.0	4.0	7.0	mA
				V _{CC} = 24 V	0.6	—	10.0	mA
	Isolation resistance		R _{ISO}	T _a = 25 °C, DC= 500 V 40 to 60 %RH	5 x 10 ¹⁰	1 x 10 ¹¹	—	Ω
	Response time	"Low→High"transfer time	t _{PLH}	T _a = 25 °C, V _{CC} = 24 V,I _F = 10 mA, R _G = 47 Ω, C _G = 3000 pF	—	1.0	2.0	μs
		"High→Low"transfer time	t _{PHL}		—	1.0	2.0	
		Rise time	t _r		—	0.2	0.5	
		Fall time	t _f		—	0.2	0.5	
	Instantaneous common mode rejection voltage "Output:High level"		CM _H	T _a =25 °C, V _{CM} =600 V _(peak) , I _F =10 mA V _{CC} = 24 V, ΔV _{O2H} = 2.0 V	-1 500	—	—	V/μs
	Instantaneous common mode rejection voltage "Output: Low level"		CM _L	T _a =25 °C, V _{CM} =600 V _(peak) , I _F = 0 mA V _{CC} = 24 V, ΔV _{O2L} = 2.0 V	1 500	—	—	V/μs

*5 I_{FLH} is forward current when output become "Low" to "High"

*6 When measuring output and transfer characteristics, connect a by-pass capacitor(0.01μF or more) between V_{CC} and GND near the device.

Truth Table

Input	O ₂ output	Tr. 1	Tr. 2
ON	High level	ON	OFF
OFF	Low level	OFF	ON

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