SHARP

PC923X

OPIC Photocoupler

High Speed OPIC Photocoupler for MOS-FET/IGBT Drive

Features

(1) Built-in direct drive circuit for MOS-FET/IGBT drive

(Io_{1P}, Io_{2P}: 0.4 A)
(2) High speed response

(tphl,tplh : MAX. 0.5 μs)

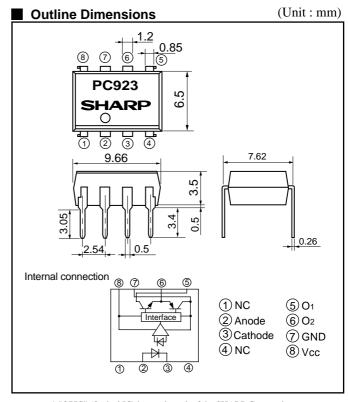
(3) Wide operating supply voltage range ($Vcc: 15 \text{ to } 30 \text{ V}, Ta=-10 \text{ to } 60 ^{\circ}\text{C}$)

(4) High noise reduction type (CMH=MIN. -1 500 V/μs) (CML=MIN. 1 500 V/μs)

(5) High isolation voltage (Viso(rms): 5 kV)

Applications

(1) Inverter controlled air conditioners



^{* &}quot;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, Ta=Topr)

	Parameter		Symbol	Ratings	Unit
T	Forward curr	ent	IF	20	mA
Input	*1 Reverse volta	ige	VR	6	V
Output	Supply voltag	ge	Vcc	35	V
	O1 Output curren	nt	Ioı	0.1	A
	*2 O1 Peak output of	urrent	Іоір	0.4	A
	O2 Output currer	nt	Io2	0.1	A
	*2 O ₂ Peak output of	urrent	I _{O2P}	0.4	A
	O1 Output voltag	ge	Voi	35	V
	Power dissipa	ation	Po	500	mW
	Total power	dissipation	Ptot	550	mW
	*3 Isolation volt	age	V _{iso(rms)}	5.0	kV
	Operating ter	nperature	Topr	-20 to +80	°C
	Storage temp	erature	Tstg	-55 to +125	°C
	*4 Soldering ten	nperature	Tsol	260	°C

- *1 Ta=25°C
- *2 Pulse width $\leq 0.15 \,\mu s$, duty ratio= 0.01
- *3 40 to 60% RH, AC for 1 minute, Ta=25°C
- *4 For 10s

(Notice) • In the absence of device specification sheets, SHARP takes no responsibility for any defects that may occur in equipment using any SHARP device shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device.

• Specifications are subject to change without notice for improvement.

(Internet) • Data for SHARP's optoelectronic/power device is provided for internet. (Address http://www.sharp.co.jp/ecg/)



SHARP

PC923X

OPIC Photocoupler

■ Electro-optical Characteristics

(Unless specified, Ta=Topr)

	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
	F 1 1/2	V_{F1}	T _a = 25 °C, I _F =10 mA	-	1.6	1.75	V
Input	Forward voltage	V_{F2}	T _a = 25 °C, I _F = 0.2 mA	1.2	1.5	-	V
	Reverse current	IR	T _a = 25 °C, V _R = 5 V	_	_	10	μΑ
	Terminal capacitance	Ct	T _a =25 °C, V= 0, f= 1 kHz	-	30	250	pF
		Vcc	T _a = -10 to 60 °C	15	_	30	V
	Operation temperature supply voltage		-	15	_	24	V
	O1 low level output voltage	Voil	V _{CC1} =12 V, V _{CC2} = -12 V, I _{O1} = 0.1 A, I _F = 5 mA	-	0.2	0.4	V
	O2 high level output voltage	V _{O2H}	Vcc=Vo1= 24 V, Io2= -0.1 A, IF= 5 mA	18	21	-	V
Output	O2 low level output voltage	V _{O2L}	Vcc= 24 V, Io2= 0.1 A, I _F = 0	_	1.2	2.0	V
_	O1 leak current	Ioil	Ta= 25 °C,Vcc=Voi= 35 V, IF=0 mA	_	_	500	μΑ
	O2 leak current	IO2L	Ta= 25 °C,Vcc=Vo2= 35 V, I _F =5 mA	_	_	500	μΑ
	TT: 1 1 1 1	Іссн	T _a =25 °C, V _{CC} = 24 V, I _F = 5 mA	_	6	10	mA
	High level supply current		Vcc= 24 V, I _F = 5 mA	_	_	14	mA
	Low level supply current	Iccl	T _a =25 °C, V _{CC} = 24 V, I _F = 0 mA	_	8	13	mA
	Low level supply current		Vcc= 24 V, I _F = 0 mA	_	_	17	mA
Transfer	"Low→High" thresh hold	IFLH	T _a =25°C, V _{CC} = 24 V	0.3	1.5	3.0	mA
	input current *5		Vcc= 24 V	0.2	-	5.0	mA
	Isolation resistance	Riso	T _a = 25 °C, DC= 500 V 40 to 60 %RH	5 x 10 ¹⁰	1 x 10 ¹¹	-	Ω
	≝ "Low→High"transfer time	tplh		-	0.3	0.5	μs
_	"High→Low"transfer time	t PHL	$T_a = 25 ^{\circ}\text{C}$, $V_{CC} = 24 \text{V}$, $I_F = 5 \text{mA}$,	-	0.3	0.5	
	"Low→High"transfer time "High→Low"transfer time Rise time Fall time	tr	$R_G=47 \Omega$, $C_G=3000 pF$	_	0.2	0.5	
	වූ Fall time	tr		_	0.2	0.5	
	Instantaneous common mode rejection voltage "Output:High level"	СМн	Ta=25 °C, Vcm=600 V(peak), IF=5 mA Vcc= 24 V, ΔVo2H= 2.0 V	-1 500	_	_	V/µs
	Instantaneous common mode rejection voltage "Output: Low level"	CML	Ta=25 °C, V _{CM} =600 V _(peak) , I _F = 0 mA V _{CC} = 24 V, ΔV _{O2} L= 2.0 V	1 500	-	_	V/µs

^{*5} Iflh is forward current when output O_2 become "Low" to "High"

Truth Table

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

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

NOTICE

- •The circuit application examples in this publication are provided to explain representative applications of SHARP devices and are not intended to guarantee any circuit design or license any intellectual property rights. SHARP takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of SHARP's devices.
- •Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device. SHARP reserves the right to make changes in the specifications, characteristics, data, materials, structure, and other contents described herein at any time without notice in order to improve design or reliability. Manufacturing locations are also subject to change without notice.
- Observe the following points when using any devices in this publication. SHARP takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions:
 - (i) The devices in this publication are designed for use in general electronic equipment designs such as:
 - Personal computers
 - Office automation equipment
 - Telecommunication equipment [terminal]
 - Test and measurement equipment
 - Industrial control
 - Audio visual equipment
 - Consumer electronics
 - (ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:
 - Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
 - Traffic signals
 - Gas leakage sensor breakers
 - Alarm equipment
 - Various safety devices, etc.
 - (iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:
 - Space applications
 - Telecommunication equipment [trunk lines]
 - Nuclear power control equipment
 - Medical and other life support equipment (e.g., scuba).
- •Contact a SHARP representative in advance when intending to use SHARP devices for any "specific" applications other than those recommended by SHARP or when it is unclear which category mentioned above controls the intended use.
- •If the SHARP devices listed in this publication fall within the scope of strategic products described in the Foreign Exchange and Foreign Trade Control Law of Japan, it is necessary to obtain approval to export such SHARP devices.
- •This publication is the proprietary product of SHARP and is copyrighted, with all rights reserved. Under the copyright laws, no part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, in whole or in part, without the express written permission of SHARP. Express written permission is also required before any use of this publication may be made by a third party.
- Contact and consult with a SHARP representative if there are any questions about the contents of this
 publication.