PC911

Ultra-high Speed Response and High CMR OPIC Photocoupler

❋ Lead forming type（I type ）and taping reel type （P type ）are also available. （**PC911I/PC911P** ）

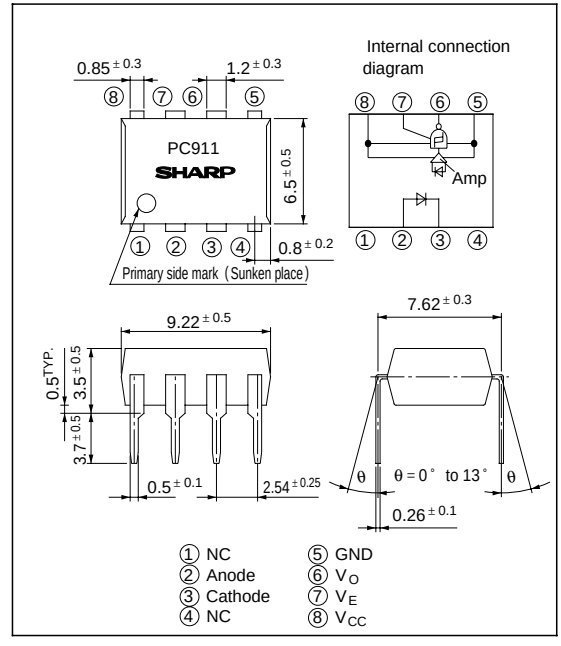
■ Features

1. Ultra-high speed response
（t_{PHL} , t_{PLH} : TYP. 50ns ）
2. High instantaneous common mode rejection voltage（CM_H : TYP. 10kV/μs）
3. High isolation voltage
（V_{iso} : 4 000V_{rms}）
4. Recognized by UL, file No. E64380

■ Applications

1. High speed interfaces for computer peripherals and microcomputer systems
2. High speed line receivers
3. Interfaces with various data transmission equipment

■ 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= 25˚C）

Parameter		Symbol	Rating	Unit
Input	*1Forward current	I_F	20	mA
	Reverse voltage	V_R	5	V
	*1Power dissipation	P	40	mW
Output	Supply voltage	V_{CC}	7	V
	*2Enable voltage	V_E	7	V
	High level output current	V_{OH}	- 8	mA
	Low level output current	I_{OL}	25	mA
	*1 *3Power dissipation	P	40	mW
*4Isolation voltage		V_{iso}	4 000	V_{rms}
Operating temperature		T_{opr}	0 to + 70	˚C
Storage temperature		T_{stg}	- 55 to + 125	˚C
*5Soldering temperature		T_{sol}	260	˚C

*1 Ta= 0 to 70˚C
*2 Shall not exceed 500mV from supply voltage(Vcc).
*3 Applicable to output terminal(V_o)
*4 AC for 1 minute, 40 to 60% RH
*5 For 10 seconds at the position of 2mm or more from root of lead pins.

" In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that occur in equipment using any of SHARP's devices, shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest version of the device specification sheets before using any SHARP's device. "

■ Electro-optical Characteristics

(Ta= 0 to 70˚C unless specified)

Parameter			Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage		V_F	Ta= 25˚C, I_F = 10mA	-	1.6	1.9	V
	Reverse current		I_R	Ta= 25˚C, V_R = 5V	-	-	10	μA
	Terminal capacitance		C_t	Ta= 25˚C, V= 0, f= 1MHz	-	60	120	pF
Output	High level output voltage		V_{OH}	V_{CC} = 4.5V, I_{OH} = - 2mA, I_F = 0.25mA, V_E = 0.2V	2.4	-	-	V
	Low level output voltage		V_{OL}	V_{CC} = 4.5V, V_E = 2.0V, I_F = 5mA, I_{OL} = 13mA	-	0.3	0.6	V
	High level enable voltage		V_{EH}	V_{CC} = 5.5V	2.0	-	-	V
	Low level enable voltage		V_{EL}	V_{CC} = 5.5V	-	-	0.8	V
	High level enable current		I_{EH}	V_{CC} = 5.5V, V_E = 5.5V	-	-	100	μA
	Low level enable current		I_{EL}	V_{CC} = 5.5V, V_E = 0.5V	-	- 0.2	- 0.4	mA
	High level supply current		I_{CCH}	V_{CC} = 5.5V, I_F = 0, V_E = 2.0V	-	13	23	mA
	Low level supply current		I_{CCL}	V_{CC} = 5.5V, I_F = 10mA, V_E = 2.0V	-	15	25	mA
	High impedance supply current		I_{CCZ}	V_{CC} = 5.5V, V_E = 0	-	16	26	mA
	Output leak current		I_{OH}	V_{CC} = 5.5V, V_E = 2.0V, V_O = 5.5V, I_F = 0.25mA	-	-	100	μA
	High impedance output current		I_{OZH}	V_{CC} = 5.5V, V_E = 0.4V	-	-	100	μA
	Output short-circuit current		I_{OS}	V_{CC} = 5.5V, V_O = 0, I_F = 0, within 10ms.	- 10	-	- 50	mA
Transfer charac-teristics	"High→Low" threshold input current		I_{FHL}	V_{CC} = 5V, V_E = 2.0V	-	2.5	5	mA
	"Low→High" threshold input current		I_{FLH}	V_{CC} = 5V, V_E = 2.0V	0.5	1.9	-	mA
	Hysteresis		I_{FLH} /I_{FHL}	V_{CC} = 5V, V_E = 2.0V	0.55	-	0.95	-
	Isolation resistance		R_{ISO}	Ta= 25˚C, DC500V, 40 to 60% RH	5 x 10^{10}	10^{11}	-	Ω
	Floating capacitance		C_f	Ta= 25˚C, V= 0, f= 1MHz	-	0.6	5	pF
	Rsponse characteristics	"High→Low" propagation delay time	t_{PHL}	Ta= 25˚C, V_{CC}= 5V, C_L= 15pF, I_F = 7.5mA, Fig. 1	-	50	75	ns
		"Low→High" propagation delay time	t_{PLH}		-	50	75	ns
		*6 Pulse width distortion	ΔT_W		-	-	35	ns
		Rise time, Fall time	t_r , t_f		-	15	30	ns
		"High→Low" enable propagation delay time	t_{EHL}	Ta= 25˚C, V_{CC}= 5V, R_L = 350Ω, C_L = 15pF, I_F = 7.5mA, V_{EH} = 3V, V_{EL} = 0, Fig. 2	-	40	70	ns
		"Low→High" enable propagation delay time	t_{ELH}		-	40	70	ns
	CMR	Instantaneous common mode rejection voltage "output : High level"	CM_H	Ta= 25˚C, V_{CC}= 5V, V_{CM}= 50V, I_F = 0mA, $V_{O(MIN.)}$= 2V, Fig. 3	3 000	10 000	-	V/μs
		Instantaneous common mode rejection voltage "output : Low level"	CM_L	Ta= 25˚C, V_{CC}= 5V, V_{CM}= 50V, I_F = 5mA, $V_{O(MAX.)}$= 0.8V, Fig. 3	- 3 000	- 10 000	-	V/μs

*6 $\Delta T_W = t_{PHL} - t_{PLH}$

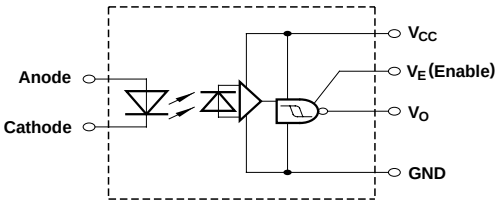
All typical values : at Ta= 25˚C, V_{cc}= 5V

■ Recommended Operating Conditions

Parameter	Symbol	MIN.	MAX.	Unit
Low level input current	I_{FL}	0	250	μA
High level input current	I_{FH}	7	15	mA
High level enable voltage	V_{EH}	2.0	V_{CC}	V
Low level enable voltage	V_{EL}	0	0.8	V
Supply voltage	V_{CC}	4.5	5.5	V
Fanout (TTL load)	N	-	8	-
Operating temperature	T_{opr}	0	70	˚C

1. When the enable input is not used, please connect to V_{CC}.
2. In order to stabilize power supply line, connect a by-pass ceramic capacitor (0.01 to 0.1μF) between V_{CC} and GND at the position within 1cm from pin.

Block Diagram

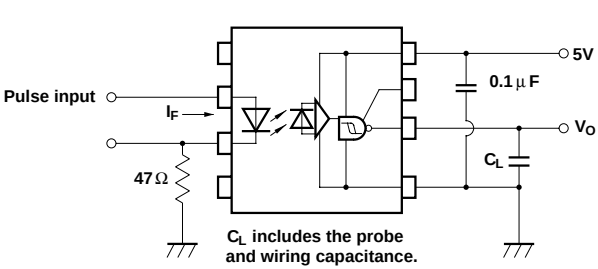


Truth table

Input	Enable	Output
H	H	L
L	H	H
H	L	Z
L	L	Z

L : Logic (0)
H : Logic (1)
Z : High impedance

Fig. 1 Test Circuit for t_{PHL}, t_{PLH}, t_r and t_f



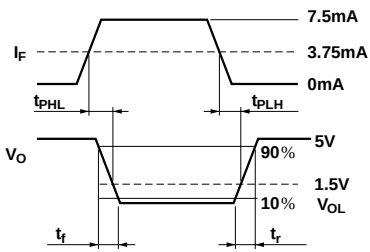
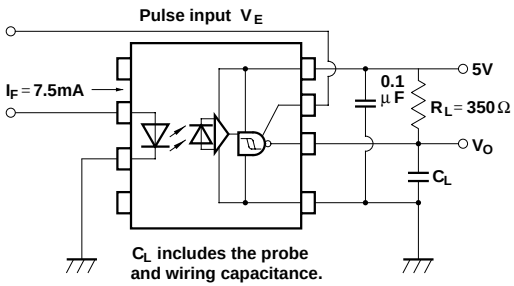


Fig. 2 Test Circuit for t_{EHL} and t_{ELH}



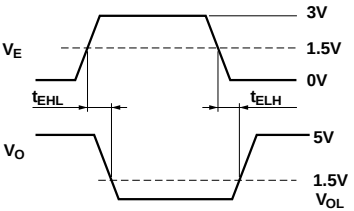


Fig. 3 Test Circuit for CM_H and CM_L

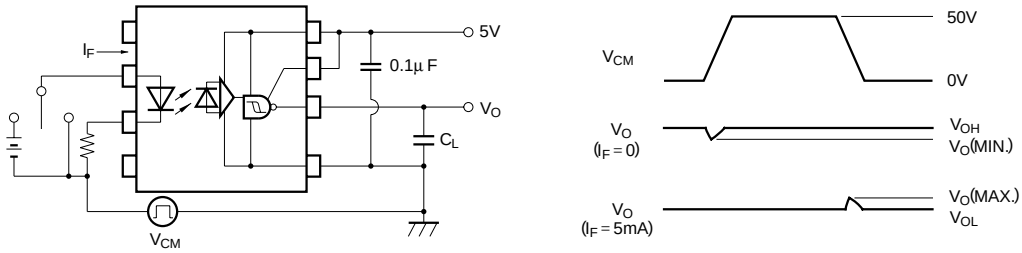


Fig. 4 Forward Current vs. Forward Voltage

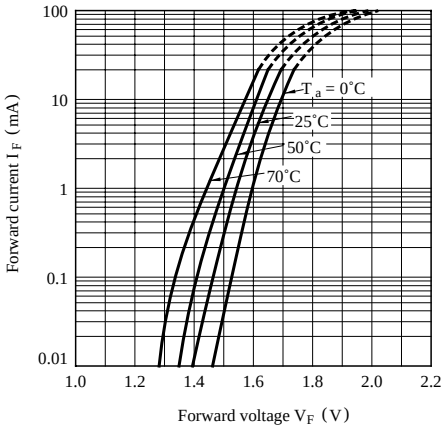


Fig. 5 Low Level Output Voltage vs. Low Level Output Current

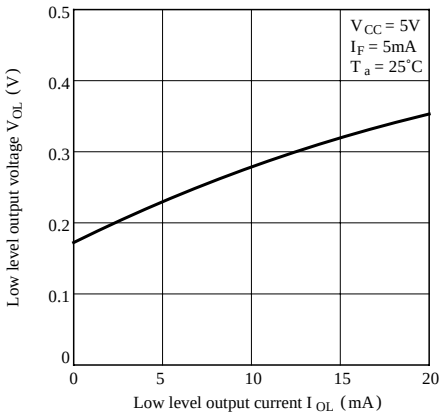


Fig. 6 High Level Output Voltage vs. High Level Output Current

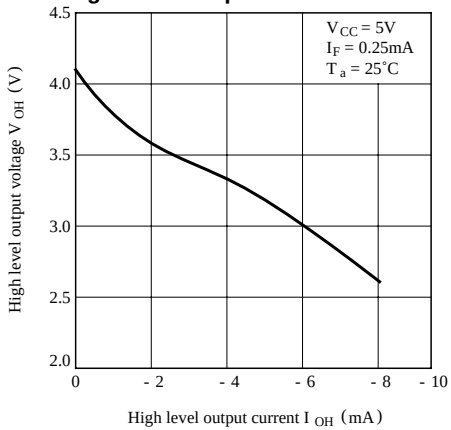


Fig. 7 Propagation Delay Time vs. Ambient Temperature

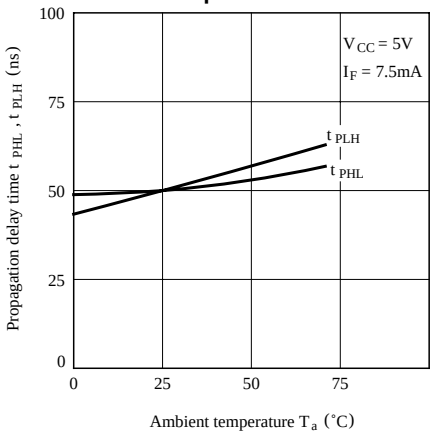
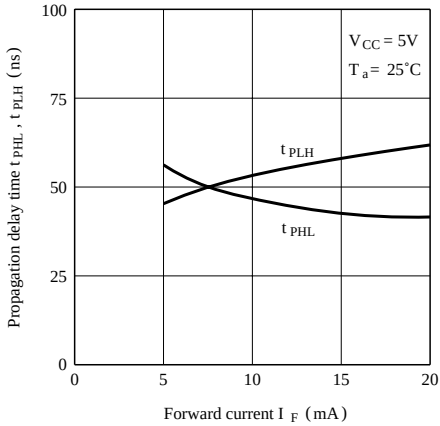


Fig. 8 Propagation Delay Time vs. Forward Current



● Please refer to the chapter "Precautions for Use"