

PC410

Compact, Surface Mount Ultra-high Speed Response OPIC Photocoupler

■ Features

1. Mini-flat package
2. Ultra-high speed response
(t_{PLH} , t_{PHL} : TYP. 50ns at $R_L = 350\Omega$)
3. Isolation voltage between input and output
(V_{ISO} : 2 500 V_{rms})
4. Instantaneous common mode rejection
voltage CM_H : TYP. 500V/ μs
5. Recognized by UL(No.64380)

■ Applications

1. Hybrid substrate which requires high density mounting
2. Personal computers, office computers and peripheral equipment
3. Electronic musical instruments
4. Audio equipment

■ Package Specifications

Model No.	Package specifications	Diameter of reel	Tape width
PC410	Taping package (Net: 3 000pcs.)	370 mm	12 mm
PC410T	Taping package (Net: 750pcs.)	180 mm	12 mm
PC410Z	Sleeve package (Net: 100pcs.)	-	-

■ Absolute Maximum Ratings

($T_a = 25^\circ C$)

Parameter		Symbol	Rating	Unit
Input	*1 Forward current	I_F	20	mA
	Reverse voltage	V_R	5	V
	Power dissipation	P	40	mW
Output	*2 Supply voltage	V_{CC}	7	V
	High level output voltage	V_{OH}	7	V
	Low level output current	I_{OL}	50	mA
	Output collector power dissipation	P_O	85	mW
*3 Isolation voltage		V_{iso}	2 500	V_{rms}
Operating temperature		T_{opr}	0 to + 70	$^\circ C$
Storage temperature		T_{stg}	- 40 to + 125	$^\circ C$
*4 Soldering temperature		T_{sol}	260	$^\circ C$

*1 $T_a = 0$ to + $70^\circ C$

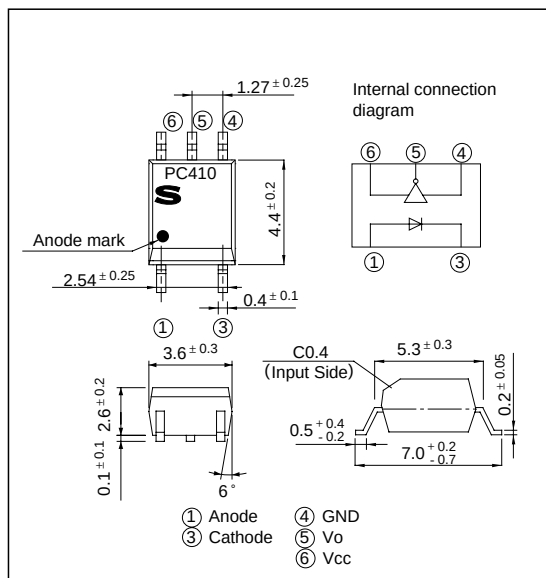
*2 For 1 minute MAX.

*3 AC for 1 minute, 40 to 60% RH. Apply the specified voltage between the whole of the electrode pins on the input side and the whole of the electrode pins on the output side.

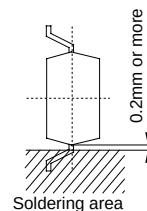
*4 For 10 seconds.

■ 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.



■ Electro-optical Characteristics

(Ta = 0 to + 70°C unless otherwise 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	μ A		
	Terminal capacitance	C _t	Ta = 25°C, V = 0, f = 1MH z		-	60	150	pF		
Output	Low level output voltage	V _{OL}	I _{OL} = 13mA, V _{CC} = 5.5V, I _F = 5mA		-	0.4	0.6	V		
	High level output current	I _{OH}	V _{CC} = V _O = 5.5V, I _F = 250m A		-	2	250	μ A		
	Low level supply current	I _{CCL}	V _{CC} = 5.5V, I _F = 10mA		-	13	18	mA		
	High level supply current	I _{CCH}	V _{CC} = 5.5V, I _F = 0		-	7	15	mA		
Transfer characteristics	“H→L” threshold input current		I _{FHL}	V _{CC} = 5V, V _O = 0.8V, R _L = 350Ω		-	2.5	5	mA	
	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	-	pF	
	Response time	“H→L” propagation delay time		t _{PHL}	Ta = 25°C		-	50	120	ns
		“L→H” propagation delay time		t _{PLH}	V _{CC} = 5V, I _F = 7.5mA		-	50	120	
		Fall time		t _f	R _L = 350Ω , C _L = 15pF		-	30	60	
		Rise time		t _r	Fig. 1		-	30	60	
	CMR	Instantaneous common mode rejection voltage “ High level output ”		CM _H	I _F = 0 V _O (MIN.) = 2V	Ta = 25°C V _{CC} = 5V V _{CM} = 10V(Peak) R _L = 350Ω Fig. 2	100	500	-	V/ μ s
		Instantaneous common mode rejection voltage “ Low level output ”		CM _L	I _F = 5mA V _O (MAX.) = 0.8V		- 100	- 500	-	

Note) All typical values : at Ta = 25°C, V_{CC} = 5V
Each characteristics shall be measured under opaque condition.

■ Recommended Operation Conditions

Parameter	Symbol	MIN.	MAX.	Unit
Low level input current	I _{FL}	0	250	μ A
High level input current	I _{FH}	7	15	mA
Supply voltage	V _{CC}	4.5	5.5	V
Fanout (TTL load)	N	-	8	-
Operating temperature	T _{opr}	0	70	°C

Connect a by-pass ceramic capacitor (0.01 to 0.1μ F) between V_{CC} and GND at the position within 1cm from lead pin.

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

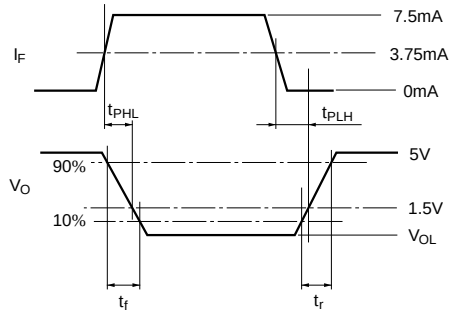
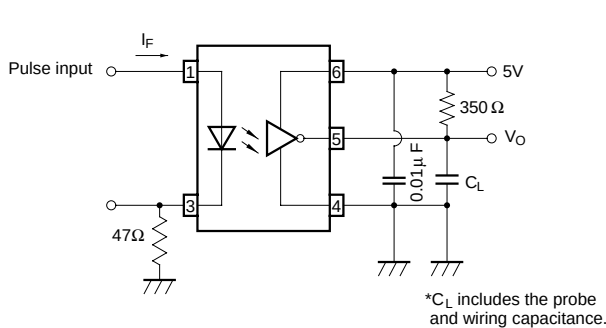


Fig. 2 Test Circuit for Instantaneous Common Mode Rejection Voltage

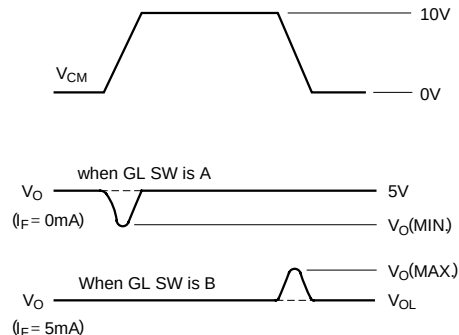
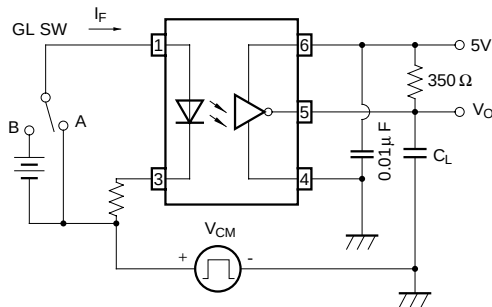


Fig. 3 Collector Power Dissipation vs. Ambient Temperature

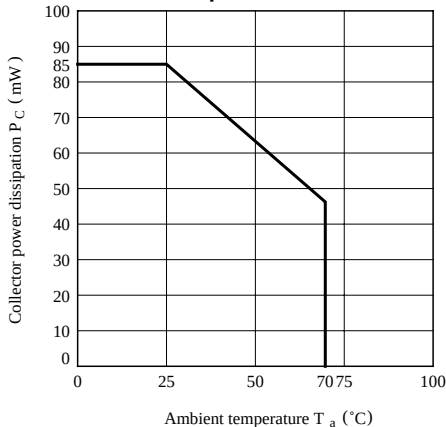


Fig. 4 Forward Current vs. Forward Voltage

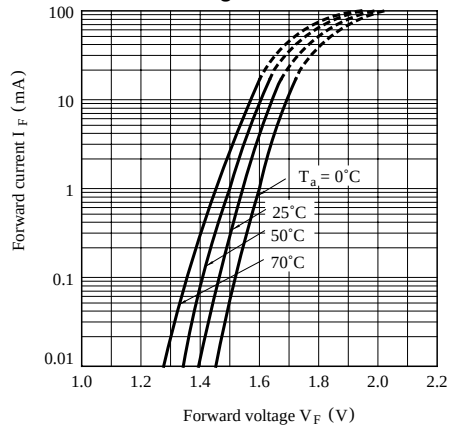


Fig. 5 High Level Output Current vs. Ambient Temperature

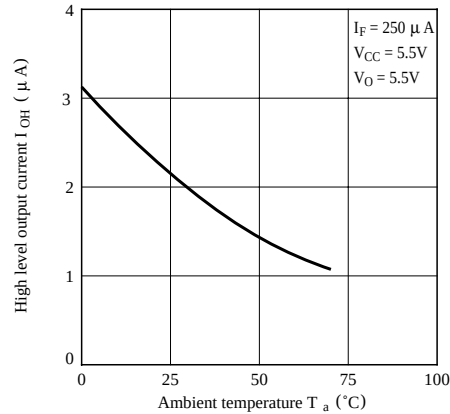


Fig. 6 Low Level Output Voltage vs. Ambient Temperature

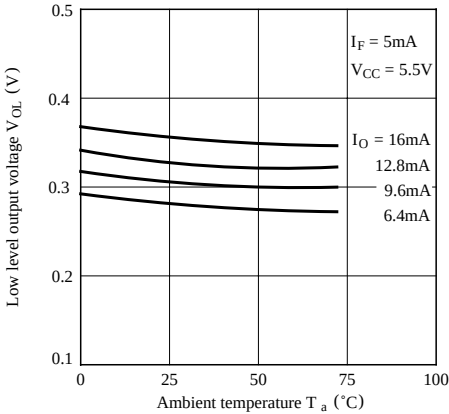


Fig. 7-a Output Voltage vs. Forward Current

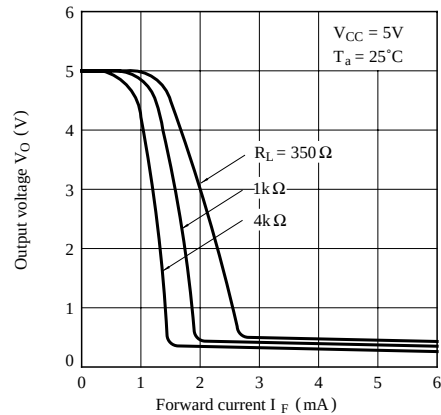


Fig. 7-b Output Voltage vs. Forward Current (Ambient Temp. Characteristics)

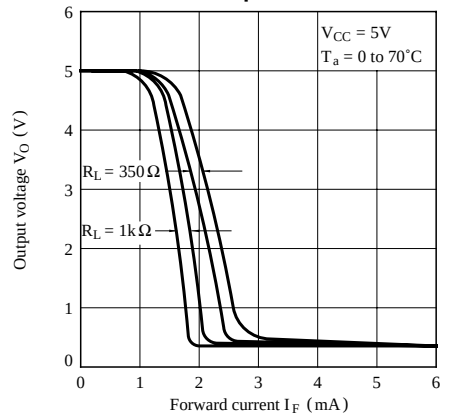


Fig. 8 Propagation Delay Time vs. Forward Current

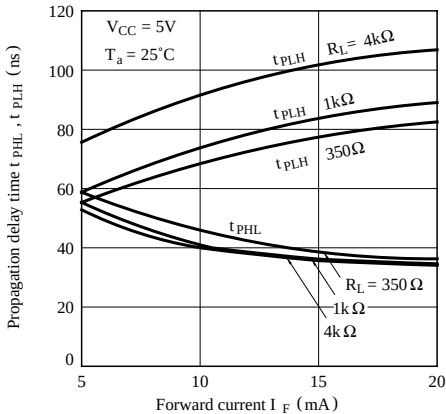
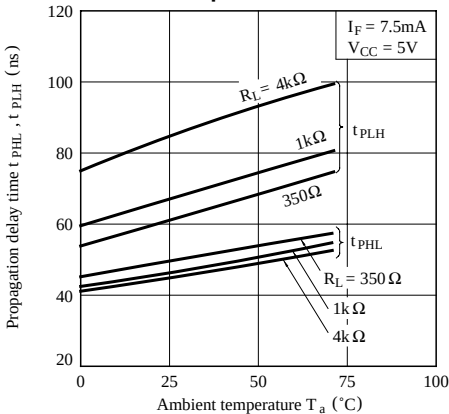
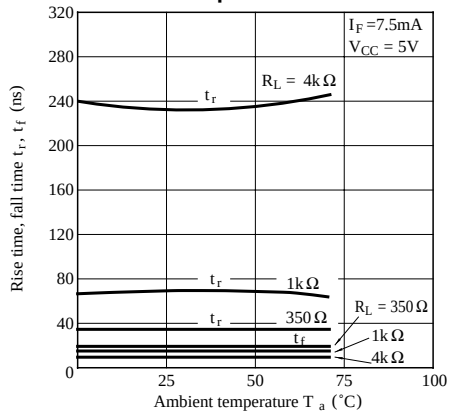


Fig. 9 Propagation Delay Time vs. Ambient Temperature



**Fig.10 Rise Time,Fall Time vs.
Ambient Temperature**



■ Precautions for Use

- (1) Handle this product the same as with other integrated circuits against static electricity.
- (2) As for other general cautions, refer to the chapter "Precautions for Use."