PC410

Compact, Surface Mount Ultra-high Speed Response OPIC Photocoupler

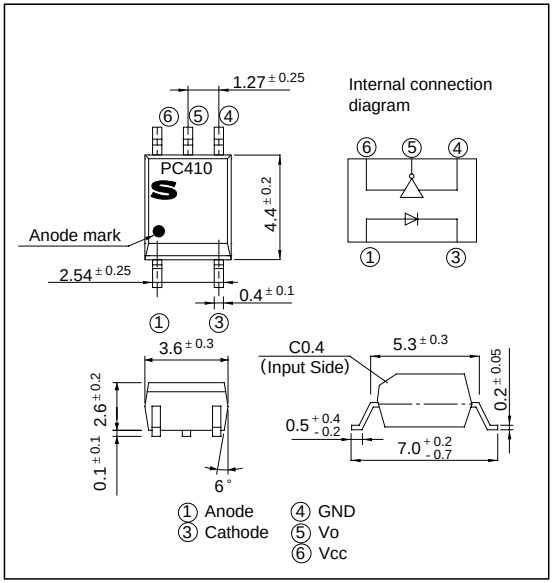
■ Features

1. Mini-flat package
2. Ultra-high speed response
   (t_{PLH} , t_{PHL} : TYP. 50ns at R_L = 350Ω)
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

■ Outline Dimensions (Unit : mm)



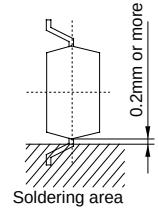
* " OPIC " (Optical IC) is a trademark of the SHARP Corporation. An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

■ 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 (Ta= 25˚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 voltege	V_{OH}	7	V
	Low level output current	I_{OL}	50	mA
	Output collector power dissipation	P_O	85	mW
*3 Isolation voltege		V_{iso}	2 500	V_{rms}
Operating temperature		T_{opr}	0 to + 70	˚C
Storage temperature		T_{stg}	- 40 to + 125	˚C
*4 Soldering temperature		T_{sol}	260	˚C



*1 Ta= 0 to + 70˚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.

■ 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	μA
	Terminal capacitance		C_t	Ta = 25˚C, V = 0, f = 1MHz		-	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 = 250mA		-	2	250	μA
	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		5×10^{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 V_{CC} = 5V, I_F = 7.5mA R_L = 350Ω, C_L = 15pF Fig. 1		-	50	120	ns
		"L→H" propagation delay time	t_{PLH}			-	50	120	
		Fall time	t_f			-	30	60	
		Rise time	t_r			-	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/μs
		Instantaneous common mode rejection voltage "Low level output"	CM_L	I_F = 5mA V_O(MAX.) = 0.8V		- 100	- 500	-	

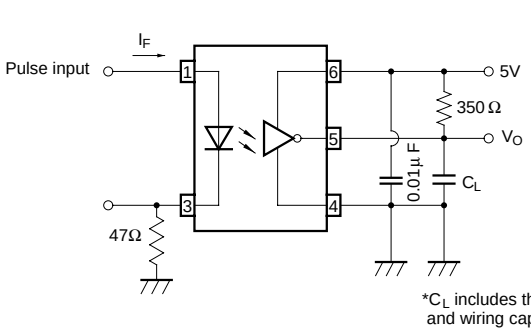
Note) All typical values : at Ta = 25˚C, V_{CC} = 5V
Each characteristics shall be measured under opaque condition.

■ Recommended Operation Conditions

Parameter	Symbol	MIN.	MAX.	Unit
Low level input current	I_{FL}	0	250	μA
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 0.1μF) 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



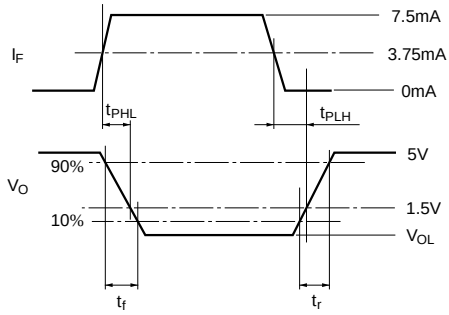
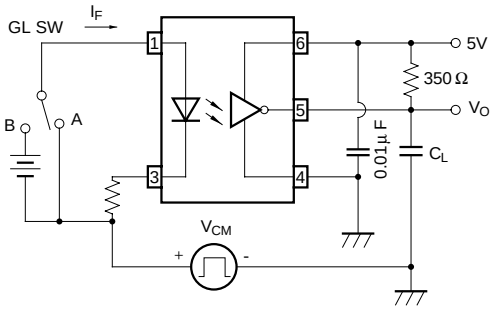


Fig. 2 Test Circuit for Instantaeus Common Mode Rejection Voltage



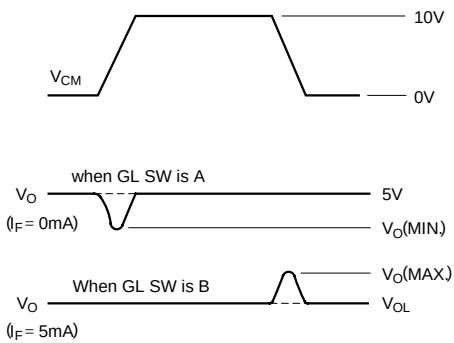


Fig. 3 Collector Power Dissipation vs. Ambient Temperature

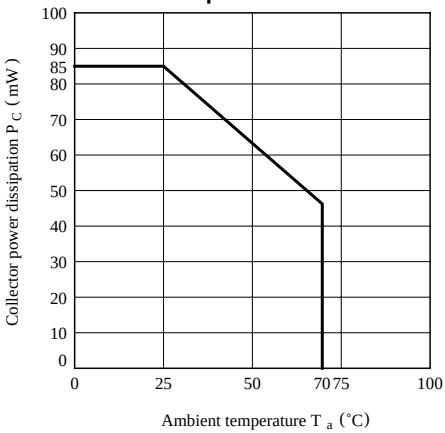


Fig. 4 Forward Current vs. Forward Voltage

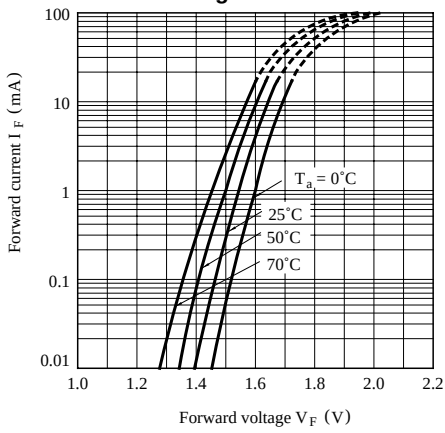


Fig. 5 High Level Output Current vs. Ambient Temperature

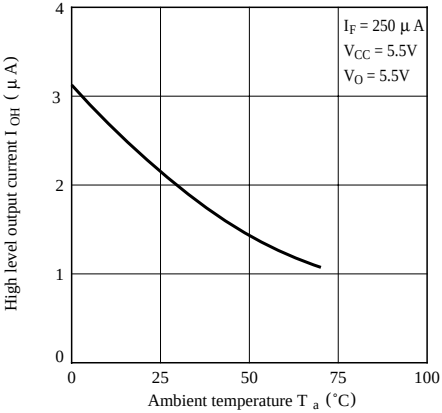


Fig. 6 Low Level Output Voltage vs. Ambient Temperature

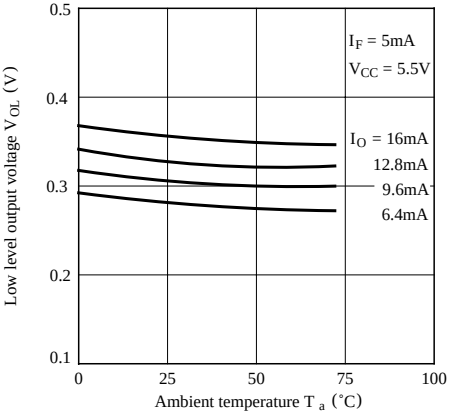


Fig. 7-a Output Voltage vs. Forward Current

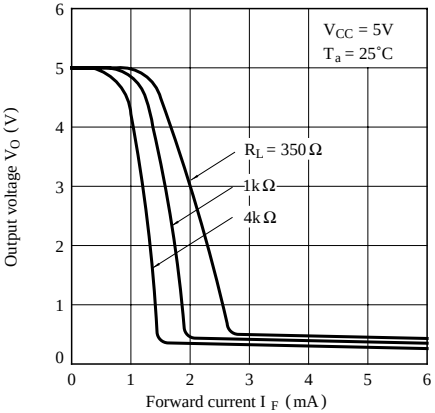


Fig. 7-b Output Voltage vs. Forward Current (Ambient Temp. Characteristics)

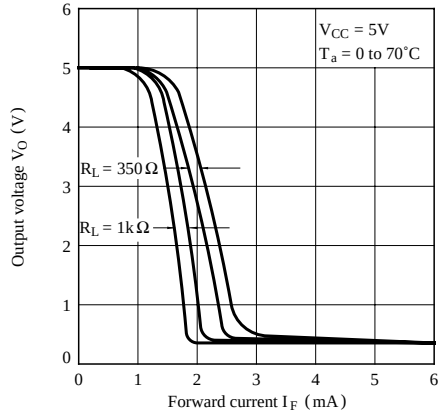


Fig. 8 Propagation Delay Time vs. Forward Current

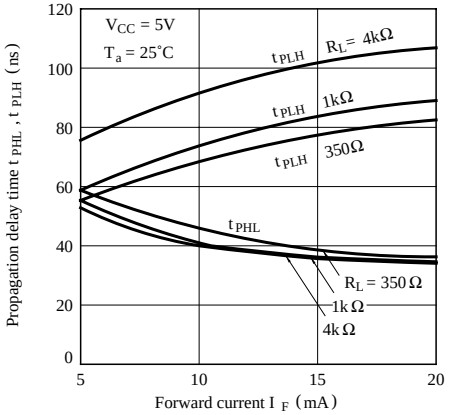


Fig. 9 Propagation Delay Time vs. Ambient Temperature

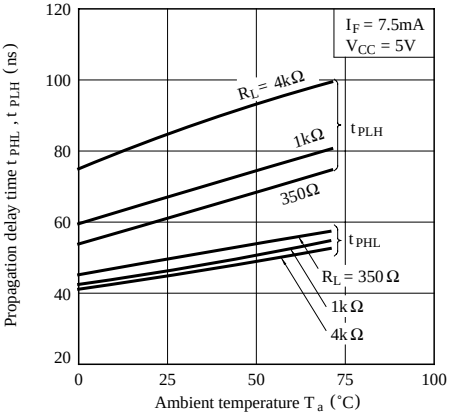
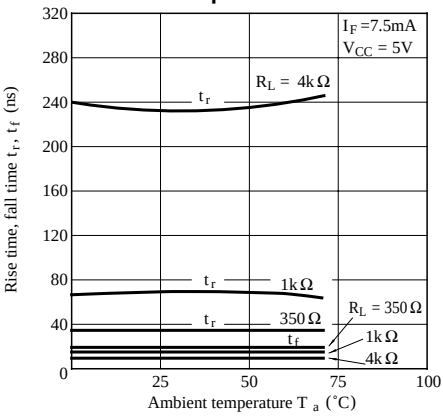


Fig.10 Rise Time,Fall Time vs. Ambient Temperature



■ 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."

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