PC410H0NIP

High Speed Response, High CMR OPIC Photocoupler

■ Features

1. High resistance to noise due to high common rejection voltage (CMR:MIN. 10kV/μs)
2. High speed response (t_{pLH}, t_{pHL}:MAX. 75us)
3. Isolation voltage between input and output (Viso (rms):2.5kV)
4. Mini-flat package

■ Applications

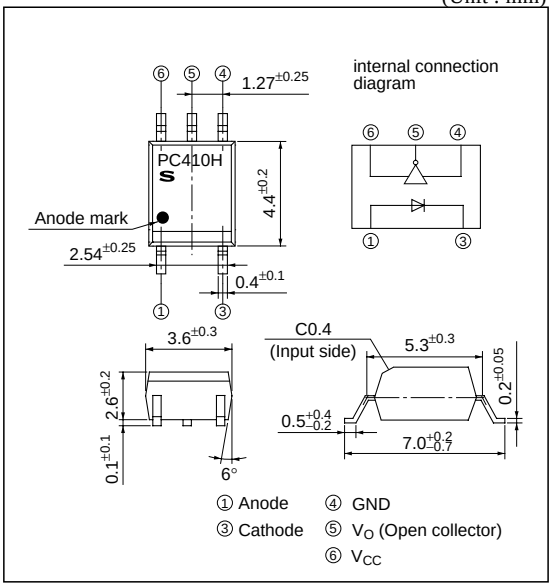
1. Programmable controllers
2. Inverters

■ Absolute Maximum Ratings (Ta=25°C)

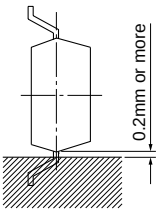
Parameter		Symbol	Rating	Unit
Input	*1 Forward current	I_F	20	mA
	Reverse voltage	V_R	5	V
	Power dissipation	P	40	mW
Output	Supply voltage	V_{CC}	7	V
	High level output voltage	V_{OH}	7	V
	Low level output current	I_{OL}	50	mA
	*2 Collector power dissipation	P_C	85	mW
*3 Isolation voltage		$V_{iso\ (rms)}$	2.5	kV
Operating temperature		T_{opr}	–40 to +85	°C
Storage temperature		T_{stg}	–40 to +125	°C
*4 Soldering temperature		T_{sol}	260	°C

*1 Refer to Fig.3
*2 Refer to Fig.4
*3 40 to 60%RH, AC for 1 min
*4 For 10 s

■ 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.



Soldering area

■ Electro-optical Characteristics

(Unless otherwise spesified, Ta=–40 to 85°C)

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=0V, 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=250μA	–	0.02	100	μA
		Low level supply current	I_{CCL}	V_{CC}=5.5V, I_F=10mA	–	7	13	mA
		High level supply current	I_{CCH}	V_{CC}=5.5V, I_F=0mA	–	5	10	mA
		"High→Low" 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, DC=500V, 40 to 60%RH	5×10^{10}	1×10^{11}	–	Ω
		Floating capacitance	C_f	Ta=25˚C, V=0V, f=1MHz	–	0.6	–	pF
Transfer characteristics	Response time	"High→Low" propagation delay time	t_{pHL}	Fig.1 Ta=25˚C V_{CC}=5V, I_F=7.5mA R_L=350Ω, C_L=15pF	25	48	75	ns
		"Low→High" propagation delay time	t_{pLH}		25	50	75	ns
		Rise time	t_r		–	10	–	ns
		Fall time	t_f		–	20	–	ns
		*5Pulse width distortion	Δ tw		–	–	35	ns
	CMR	Instantaneous common mode rejection voltage "Output : High level"	CM_H	Fig.2 Ta=25˚C, V_{CC}=5V $V_{CM(P-P)}$=1kV, R_L=350Ω I_F=0mA, V_O(Min)=2V	10	20	–	kV/μs
	CMR	Instantaneous common mode rejection voltage "Output : Low level"	CM_L	Fig.2 Ta=25˚C, V_{CC}=5V $V_{CM(P-P)}$=1kV, R_L=350Ω I_F=5mA, V_O(Max)=0.8V	–10	–20	–	kV/μs

Note) All typical values:at Ta=25°C , V_{CC}=5V

Each characteristics shall be measured under opaque condition.

*5 Pulse width distortion $\Delta tw = |t_{pHL} - t_{pLH}|$

Fig.1 Block Diagram

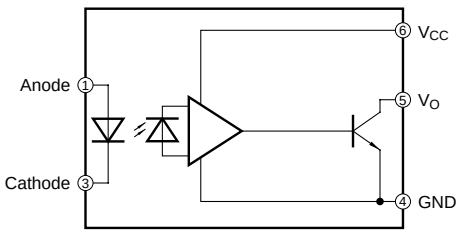
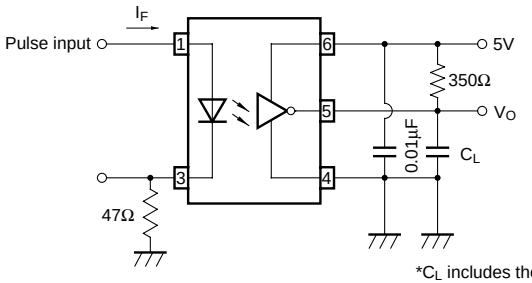


Fig.2 Test Circuit for t_{pHL}, t_{pLH}, t_r and t_f



*C_L includes the probe and wiring capacitance.

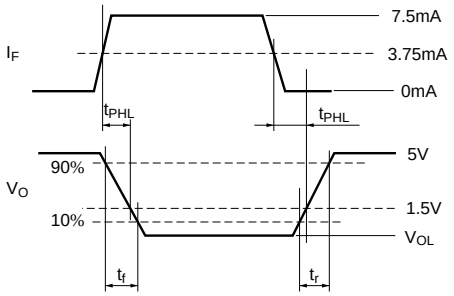
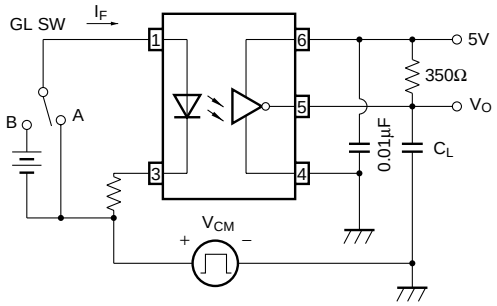
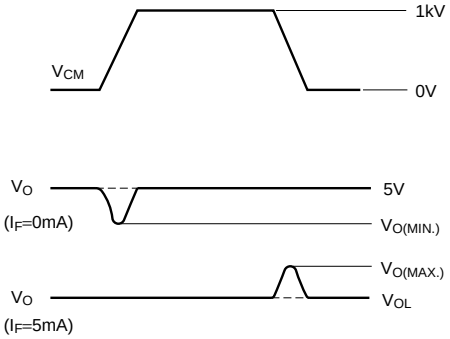


Fig.3 Test Circuit for Common Mode Rejection Voltage





When the switch for infrared light emitting diode sets to A.

When the switch for infrared light emitting diode sets to B.

Fig.4 Forward Current vs. Ambient Temperature

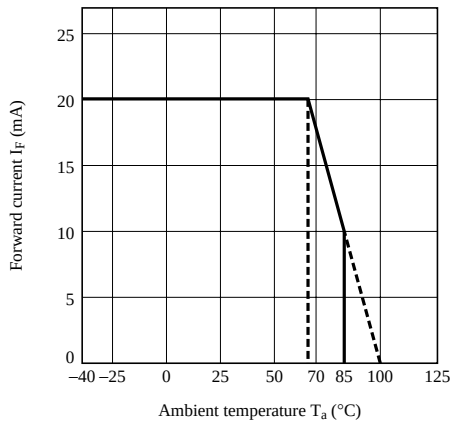
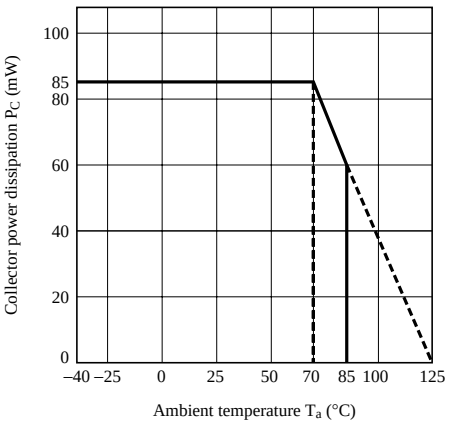


Fig.5 Collector Power Dissipation vs. Ambient Temperature



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