PC401

Compact, Surface Mount Type OPIC Photocoupler

■ Features

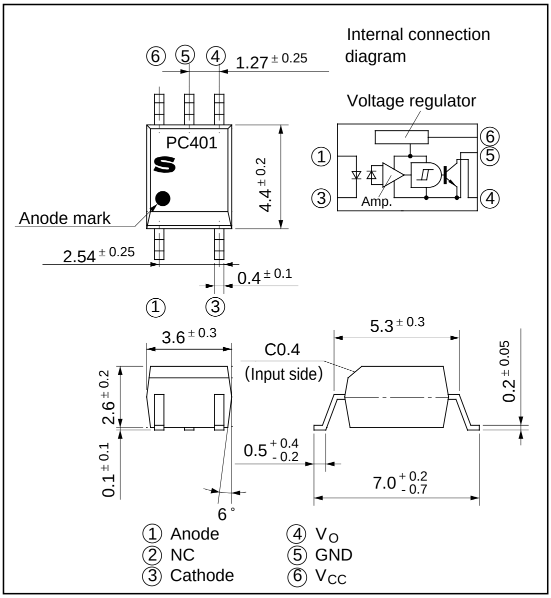
1. Mini-flat package
2. " High " output during light emission
3. Isolation voltage between input and output
   (V_{iso} : 3 750V $_{rms}$)
4. TTL and LSTTL compatible output
5. Recognized by UL(No.64380)

■ Applications

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

■ 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

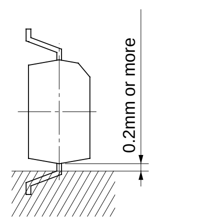
Model No.	Package specifications	Diameter of reel	Tape width
PC401	Taping package (Net : 3 000pcs.)	370mm	12mm
PC401T	Taping package (Net : 750pcs.)	178mm	12mm
PC401Z	Sleeve package (Net : 100pcs.)	-	-

■ Absolute Maximum Ratings

(Ta= 25˚C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Reverse voltage	V_R	6	V
	Power dissipation	P	70	mW
Output	Supply voltage	V_{CC}	16	V
	High level output voltage	V_{OH}	16	V
	Low level output current	I_{OL}	50	mA
	Power dissipation	P_O	130	mW
Total power dissipation		P_{tot}	150	mW
*1 Isolation voltage		V_{iso}	3 750	V_{rms}
Operating temperature		T_{opr}	- 25 to + 85	˚C
Storage temperature		T_{stg}	- 40 to + 125	˚C
*2 Soldering temperature		T_{sol}	260	˚C

*1 AC for 1 minute, 40 to 60% RH
*2 For 10 seconds



Soldering area

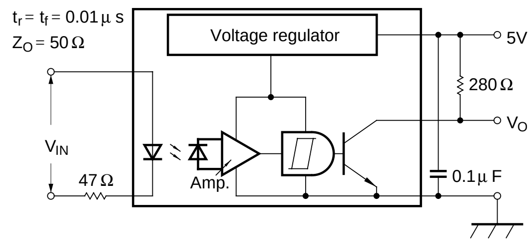
■ Electro-optical Characteristics

(Ta= 0 to + 70˚C unless otherwise specified.)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	I_F = 4mA	-	1.1	1.4	V
			I_F = 0.3mA	0.7	1.0	-	
	Reverse current	I_R	Ta= 25˚C, V_R = 3V	-	-	10	μA
	Terminal capacitance	C_t	Ta= 25˚C,V= 0,f= 1kHz	-	30	250	pF
Output	Operating supply voltage	V_{CC}		3	-	15	V
	Low level output voltage	V_{OL}	I_F = 0, V_{CC} = 5V, I_{OL} = 16mA	-	0.2	0.4	V
	High level output current	I_{OH}	I_F = 4mA, V_{CC} = V_O = 15V	-	-	100	μA
	Low level supply current	I_{CCL}	I_F = 0, V_{CC} = 5V	-	2.5	5.0	mA
	High level supply current	I_{CCH}	I_F = 4mA, V_{CC} = 5V	-	2.7	5.5	mA
Transfer charac-teristics	*3 "H→L" threshold input current	I_{FHL}	Ta= 25˚C, V_{CC} = 5V, R_L = 280Ω	0.4	0.8	-	mA
			V_{CC} = 5V, R_L = 280Ω	0.3	-	-	
	*4 "L→H" threshold input current	I_{FLH}	Ta= 25˚C, V_{CC} = 5V, R_L = 280Ω	-	1.1	2.0	mA
			V_{CC} = 5V, R_L = 280Ω	-	-	4.0	
	*5Hysteresis	I_{FHL}/I_{FLH}	V_{CC} = 5V, R_L = 280Ω	0.5	0.7	0.9	
	Isolation resistance	R_{ISO}	Ta= 25˚C,DC500V,40 to 60% RH	5×10^{10}	10^{11}	-	Ω
	*6 Response time: "H→L" propagation delay time	t_{PHL}	Ta= 25˚C, V_{CC} = 5V, R_L = 280Ω, I_F = 4mA	-	2	6	μs
	*6 Response time: "L→H" propagation delay time	t_{PLH}		-	1	3	
	*6 Response time: Fall time	t_f		-	0.05	0.5	
	*6 Response time: Rise time	t_r		-	0.1	0.5	

*3 I_{FHL} represents forward current when output gose from high to low.
*4 I_{FLH} represents forward current when output goes from low to high.
*5 Hysteresis stands for I_{FHL}/I_{FLH} .
*6 Test circuit for response time is shown below.

Test Circuit for Response Time



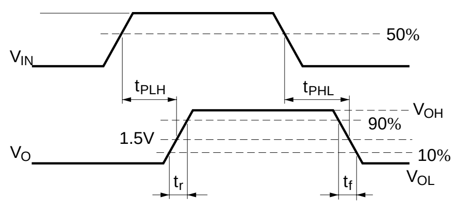


Fig. 1 Forward Current vs. Ambient Temperature

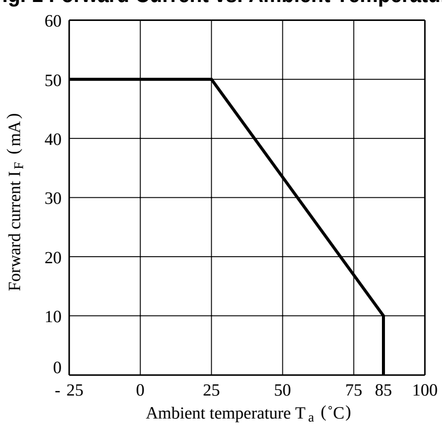


Fig. 2 Power Dissipation vs. Ambient Temperature

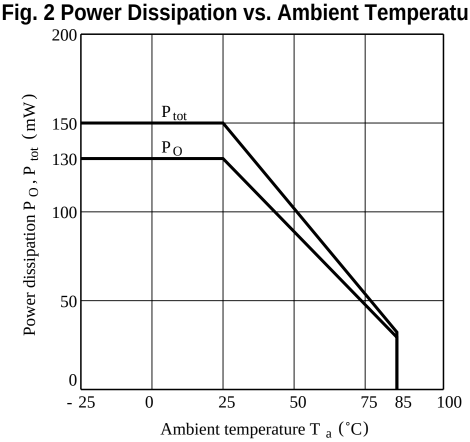


Fig. 3 Forward Current vs. Forward Voltage

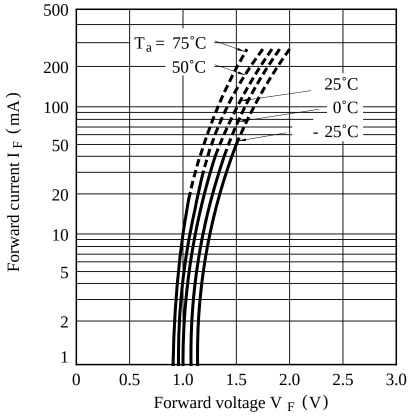


Fig. 4 Relative Threshold Input Current vs. Supply Voltage

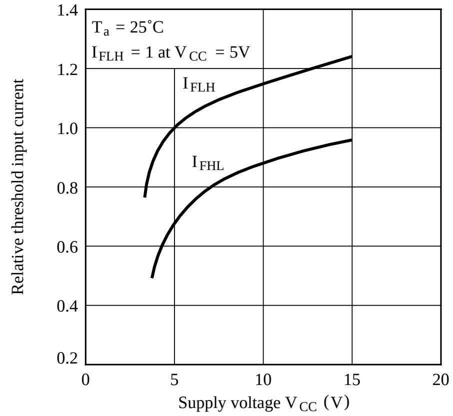


Fig. 5 Relative Threshold Input Current vs. Ambient Temperature

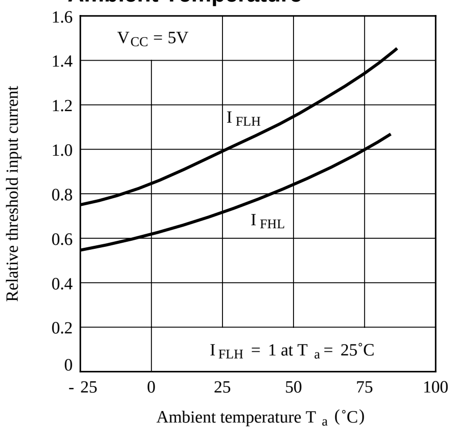


Fig. 6 Low Level Output Voltage vs. Low Level Output Current

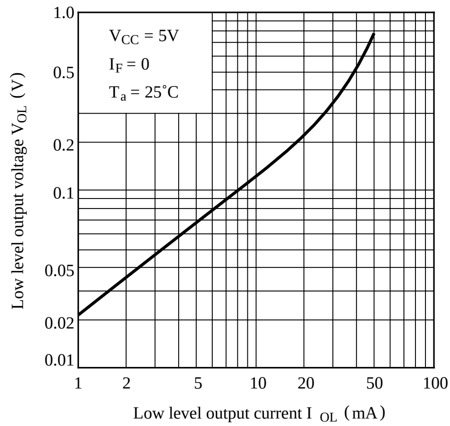


Fig. 7 Low Level Output Voltage vs. Ambient Temperature

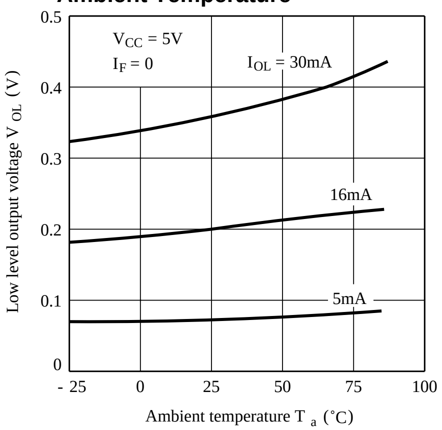


Fig. 8 High Level Output Current vs. Forward Current

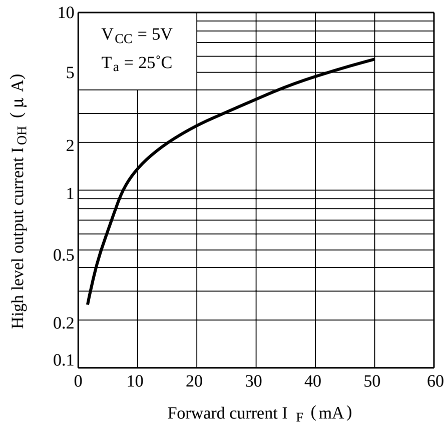


Fig. 9 High Level Output Current vs. Ambient Temperature

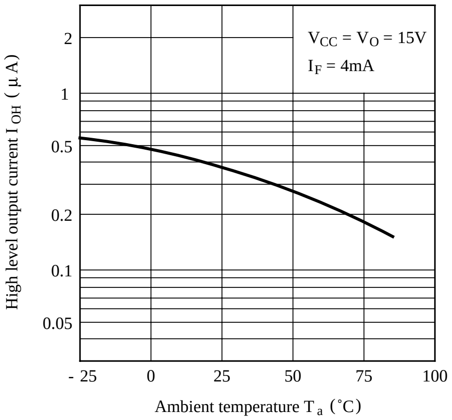


Fig.10 Supply Current vs. Supply Voltage

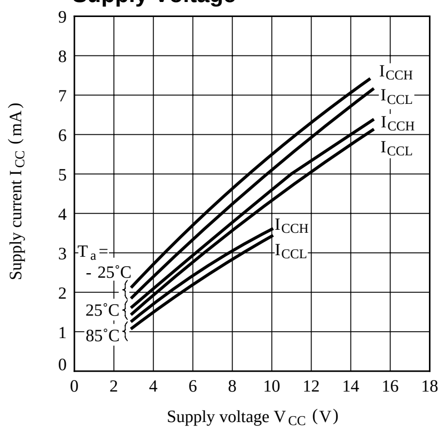


Fig.11 Propagation Delay Time vs. Forward Current

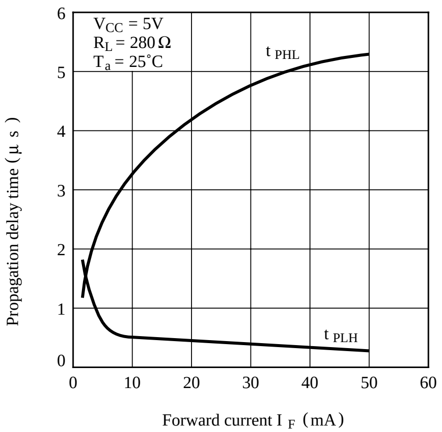
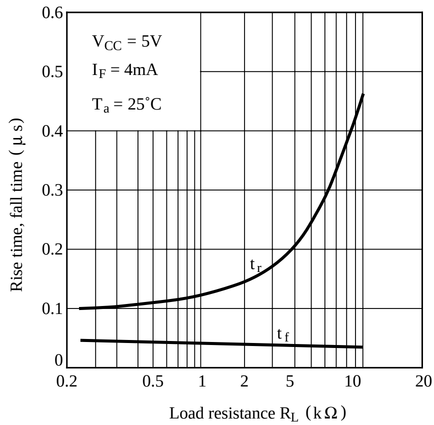


Fig.12 Rise Time, Fall Time vs. Load Resistance



■ Preautions for Use

(1) It is recommended that a by-pass capacitor of more than 0.01μ F is added between V_{cc} and GND near the device in order to stabilize power supply line.
(2) Handle this product the same as with other integrated circuits against static electricity.
(3) As for other general cautions, refer to the chapter "Precautions for Use"

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  — 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.

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  — Telecommunication equipment [trunk lines]
  — Nuclear power control equipment
  — Medical and other life support equipment (e.g., scuba).

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