# PC401

## Compact, Surface Mount Type OPIC Photocoupler

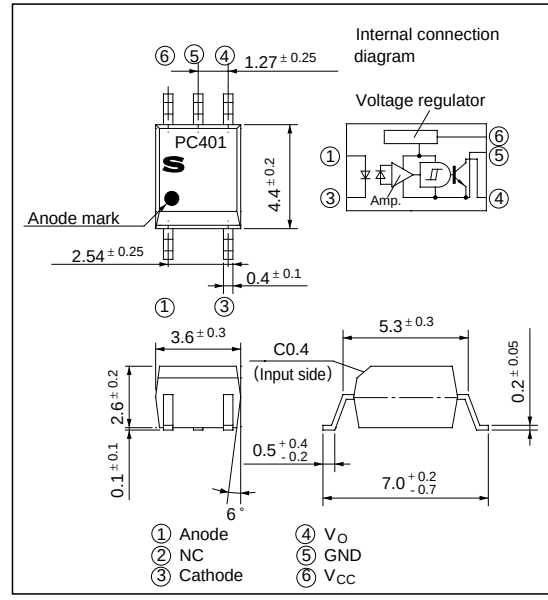
### ■ Features

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)



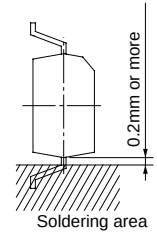

* " OPIC " ( Optical IC ) is a trademark of the SHARP Corporation. An OPIC consists of a light-detecting element and signal-processing circuit integrated onto a single chip.

### ■ 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

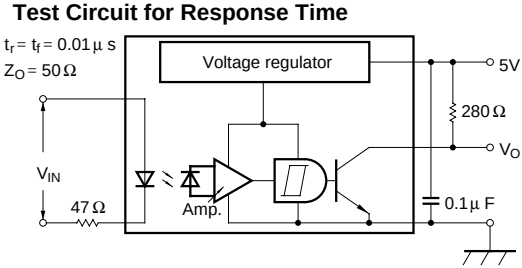
## ■ Electro-optical Characteristics

( 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 characteristics | *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 x $10^{10}$ | $10^{11}$ | - | 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 |
| | | "L→H" propagation delay time | $t_{PLH}$ | | - | 1 | 3 | |
| | | Fall time | $t_f$ | | - | 0.05 | 0.5 | |
| | | 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



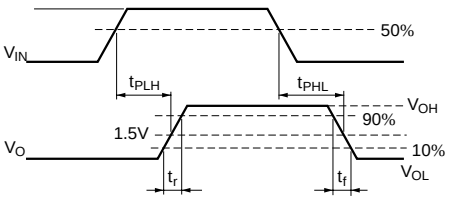




**Fig. 1 Forward Current vs. Ambient Temperature**

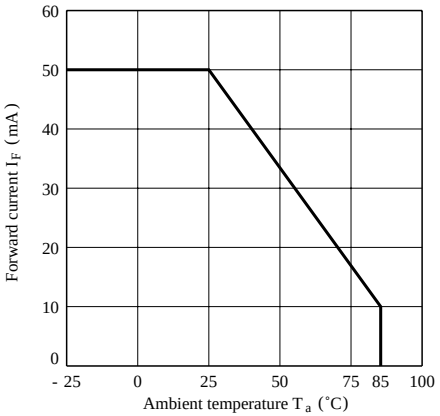



**Fig. 2 Power Dissipation vs. Ambient Temperature**

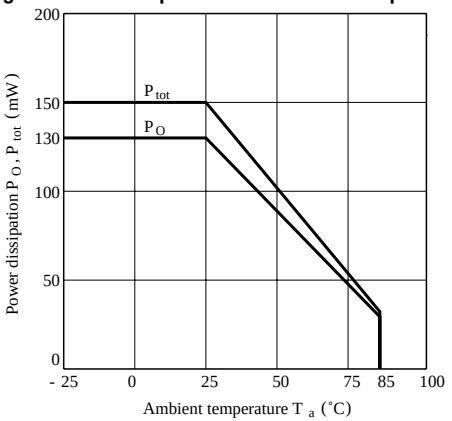


**Fig. 3 Forward Current vs. Forward Voltage**

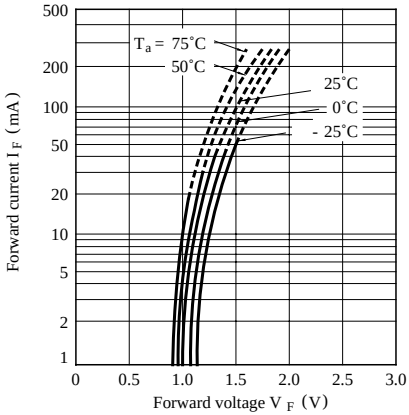



**Fig. 4 Relative Threshold Input Current vs. Supply Voltage**

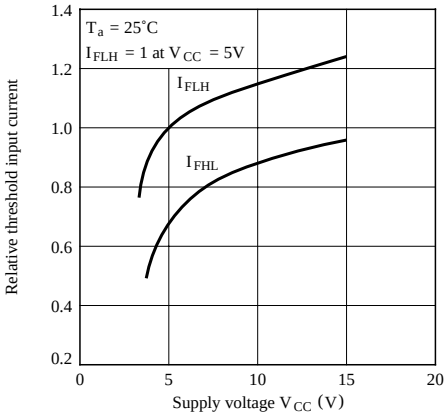



**Fig. 5 Relative Threshold Input Current vs. Ambient Temperature**

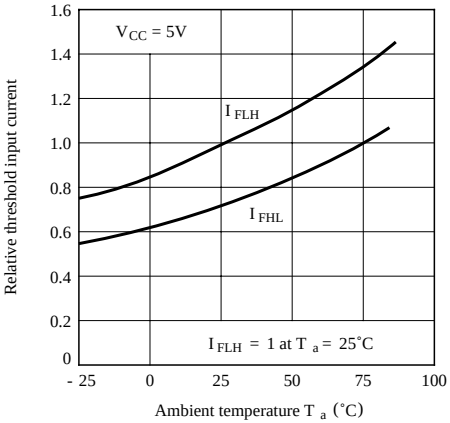



**Fig. 6 Low Level Output Voltage vs. Low Level Output Current**

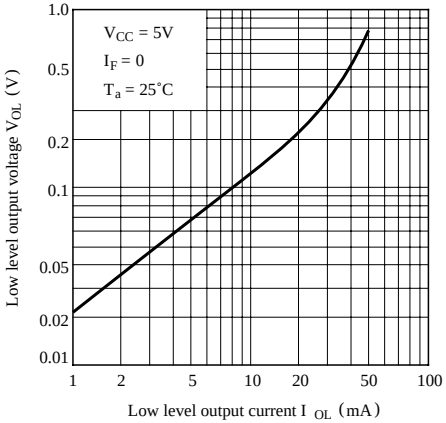



**Fig. 7 Low Level Output Voltage vs. Ambient Temperature**

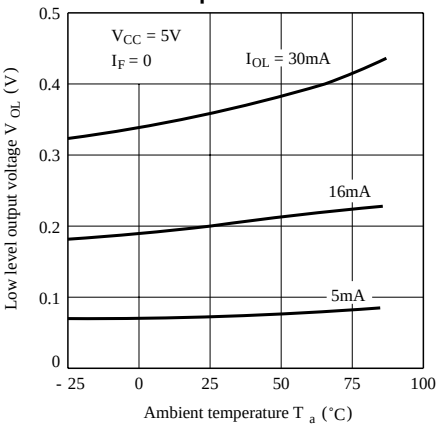



**Fig. 8 High Level Output Current vs. Forward Current**

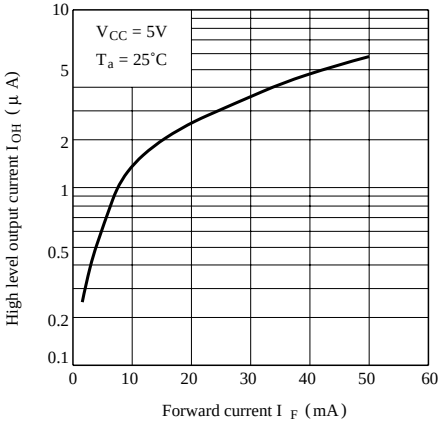


**Fig. 9 High Level Output Current vs. Ambient Temperature**

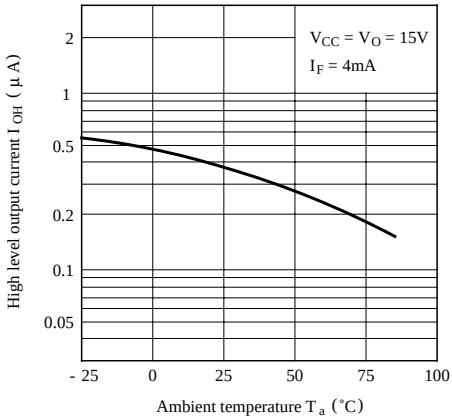



**Fig.10 Supply Current vs. Supply Voltage**

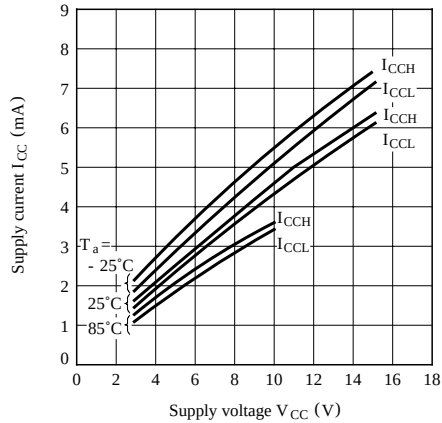



**Fig.11 Propagation Delay Time vs. Forward Current**

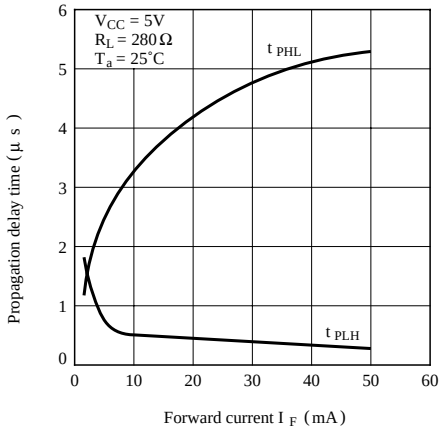
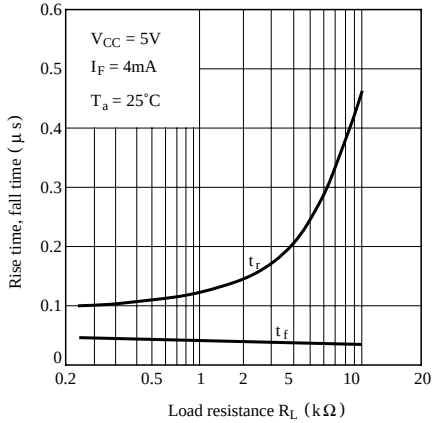



**Fig.12 Rise Time, Fall Time vs. Load Resistance**




## ■ 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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