# PC900V/PC900VQ

## Digital Output Type OPIC Photocoupler

❊ Lead forming type（I type ）and taping reel type（P type ）are also available.（**PC900VI/PC900VP** ）
❊❊ TÜV（DIN-VDE0884 ）approved type is also available as an option.

## ■ Features

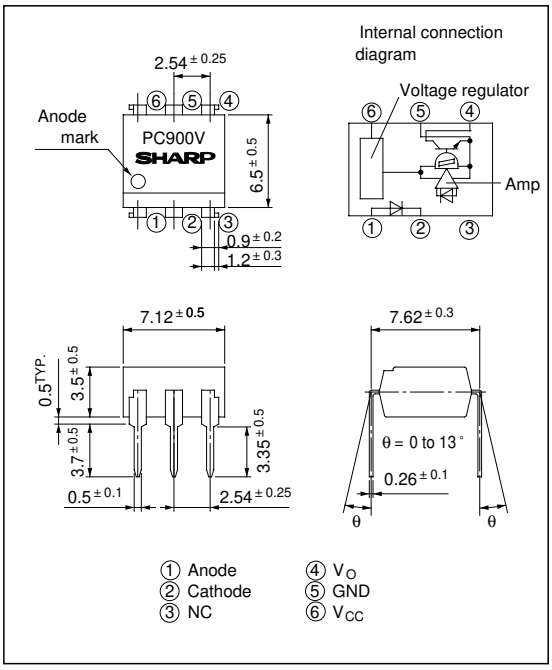
1. High reliability type（**PC900VQ**）
2. Normal OFF operation, open collector output
3. TTL and LSTTL compatible output
4. Operating supply voltage $V_{CC}$ : 3 to 15V
5. High isolation voltage between input and output（$V_{iso}$ : 5 000$V_{rms}$ ）
6. Recognized by UL, file No. E64380

## ■ Applications

1. Isolation between logic circuits
2. Logic level shifters
3. Line receivers
4. Replacements for relays and pulse transformers
5. Noise reduction

## ■ 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.

## ■ Absolute Maximum Ratings

（Ta= 25˚C）

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input | Forward current | $I_F$ | 50 | mA |
| | *1Peak forward current | $I_{FM}$ | 1 | A |
| | 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 | $P_O$ | 150 | mW |
| Total power dissipation | | $P_{tot}$ | 170 | mW |
| *2Isolation voltage | | $V_{iso}$ | 5 000 | $V_{rms}$ |
| Operating temperature | | $T_{opr}$ | - 25 to + 85 | ˚C |
| Storage temperature | | $T_{stg}$ | - 40 to + 125 | ˚C |
| *3Soldering temperature | | $T_{sol}$ | 260 | ˚C |

*1 Pulse width<=100μs, Duty ratio : 0.001
*2 40 to 60% RH, AC for 1 minute
*3 For 10 seconds

" In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that occur in equipment using any of SHARP's devices, shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest version of the device specification sheets before using any SHARP's device."

## ■ Electro-optical Characteristics

( Ta= 0 to + 70˚C unless 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 | | $V_{OL}$ | $I_{OL}$ = 16mA, $V_{CC}$ = 5V, $I_F$ = 4mA | - | 0.2 | 0.4 | V |
| | High level output current | | $I_{OH}$ | $V_O$ = $V_{CC}$ = 15V, $I_F$ = 0 | - | - | 100 | μA |
| | Low level supply current | | $I_{CCL}$ | $V_{CC}$ = 5V, $I_F$ = 4mA | - | 2.5 | 5.0 | mA |
| | High level supply current | | $I_{CCH}$ | $V_{CC}$ = 5V, $I_F$ = 0 | - | 1.0 | 5.0 | mA |
| Transfer characteristics | *4 "High→Low" threshold input current | | $I_{FHL}$ | Ta= 25˚C, $V_{CC}$ = 5V, $R_L$ = 280Ω | - | 1.1 | 2.0 | mA |
| | | | | $V_{CC}$ = 5V, $R_L$ = 280Ω | - | - | 4.0 | |
| | *5 "Low→High" threshold input current | | $I_{FLH}$ | Ta= 25˚C, $V_{CC}$ = 5V, $R_L$ = 280Ω | 0.4 | 0.8 | - | mA |
| | | | | $V_{CC}$ = 5V, $R_L$ = 280Ω | 0.3 | - | - | |
| | *6Hysteresis | | $I_{FLH}$ /$I_{FHL}$ | $V_{CC}$ = 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 |
| | *7 Response time | "High→Low" propagation delay time | $t_{PHL}$ | Ta= 25˚C<br>$V_{CC}$ = 5V, $I_F$ = 4mA<br>$R_L$ = 280Ω | – | 1 | 3 | μs |
| | | "Low→High" propagation delay time | $t_{PLH}$ | | - | 2 | 6 | |
| | | Fall time | $t_f$ | | - | 0.05 | 0.5 | |
| | | Rise time | $t_r$ | | - | 0.1 | 0.5 | |

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

### <Precautions for Use>

Connect a capacitior of more than 0.1 μF between $V_{CC}$ and GND.

## Test Circuit for Response Time

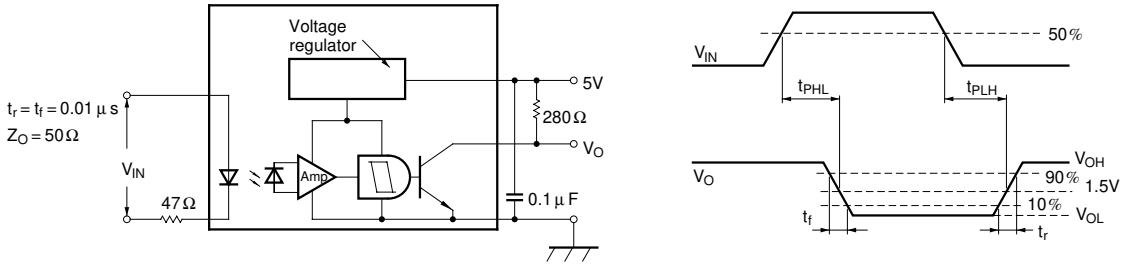


**Fig. 1 Forward Current vs. Ambient Temperature**

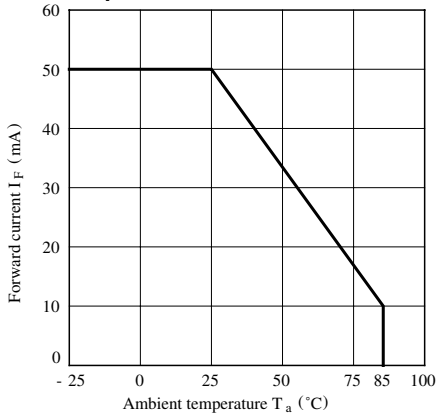



**Fig. 2 Power Dissipation vs. Ambient Temperature**

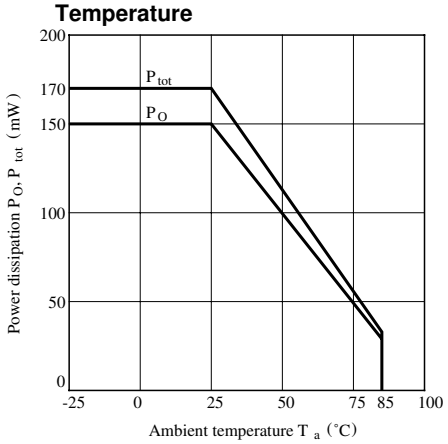



**Fig. 3 Forward Current vs. Forward Voltage**

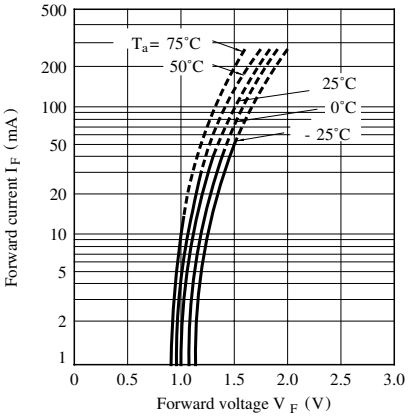



**Fig. 4 Relative Threshold Input Current vs. Supply Voltage**

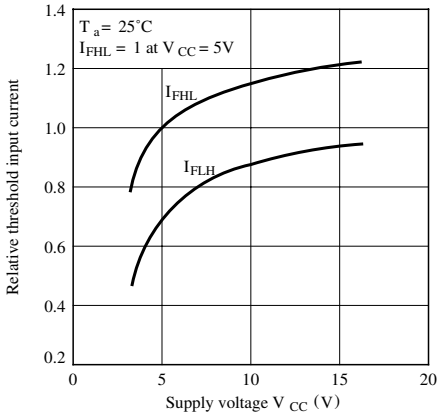



**Fig. 5 Relative Threshold Input Current vs. Ambient Temperature**

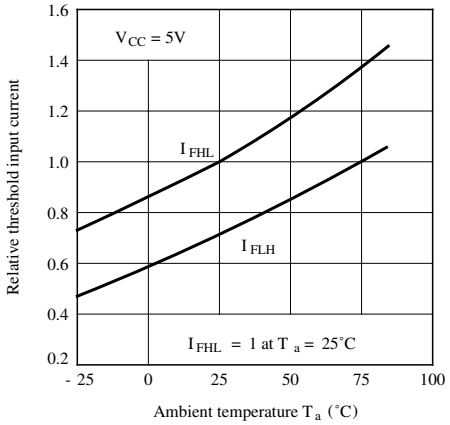



**Fig. 6 Low Level Output Voltage vs. Low Level Output Current**

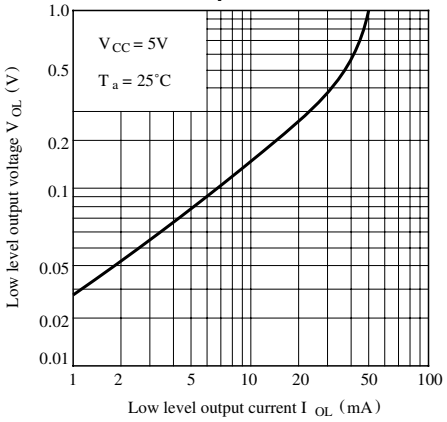


**Fig. 7 Low Level Output Voltage vs. Ambient Temperature**

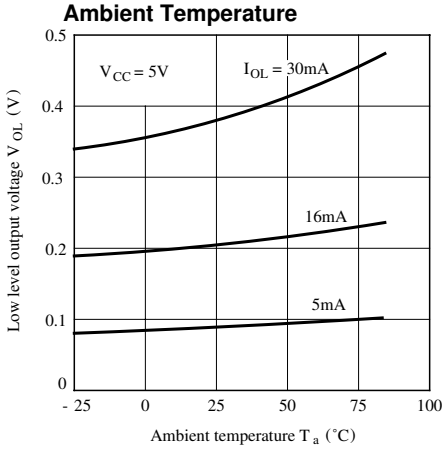



**Fig. 8 Supply Current vs. Supply Voltage**

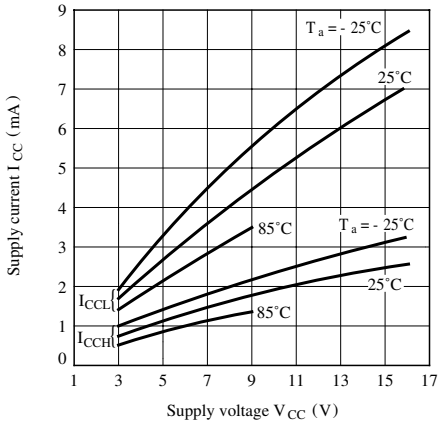



**Fig. 9 Propagation Delay Time vs. Forward Current**

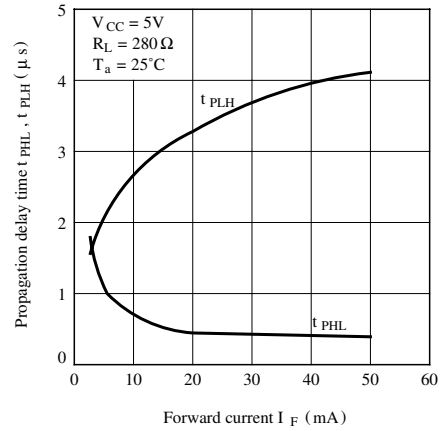
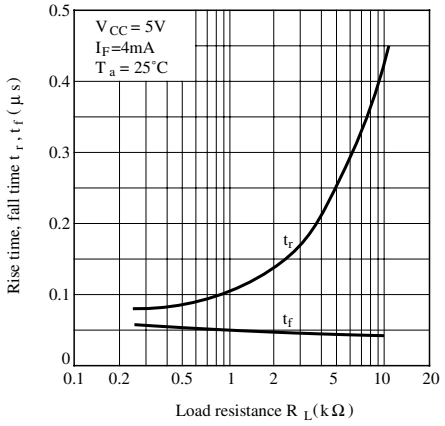



**Fig.10 Rise Time, Fall Time vs. Load Resistance**




## ■ Precautions for Use

(1) It is recommended that a by-pass capacitor of more than 0.01μF 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.

- Please refrain from soldering under preheating and refrain from soldering by reflow.

● Please refer to the chapter "Precautions for Use."