# 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

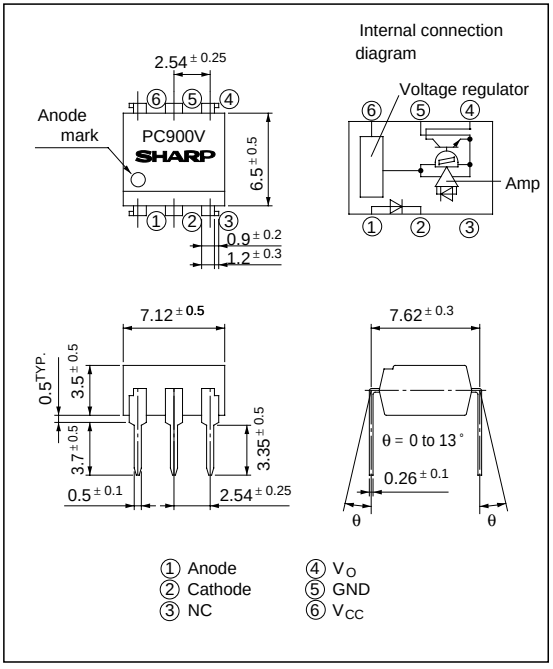
1. High reliability type (**PC900VQ**)
2. Normal OFF operation, open collector output
3. TTL and LSTTL compatible output
4. Operating supply voltage $V_{CC}$: 3 to 15V
5. High isolation voltage between input and output ($V_{iso}$: 5 000$V_{rms}$)
6. Recognized by UL, file No. E64380

## ■ 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

## ■ 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 | - | - | |
| | *6 Hysteresis | | $I_{FLH}/I_{FHL}$ | $V_{CC}$ = 5V, $R_L$ = 280Ω | 0.5 | 0.7 | 0.9 | - |
| | Isolation resistance | | $R_{ISO}$ | Ta = 25˚C, DC500V, 40 to 60% RH | $5 \times 10^{10}$ | $10^{11}$ | - | 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

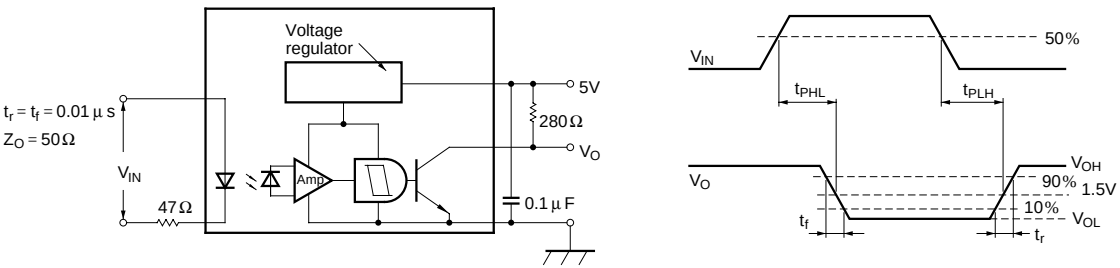


**Fig. 1 Forward Current vs. Ambient Temperature**

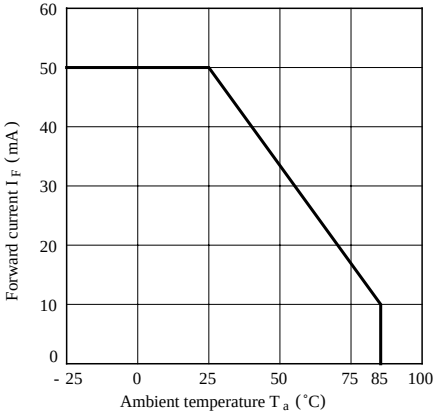



**Fig. 2 Power Dissipation vs. Ambient Temperature**

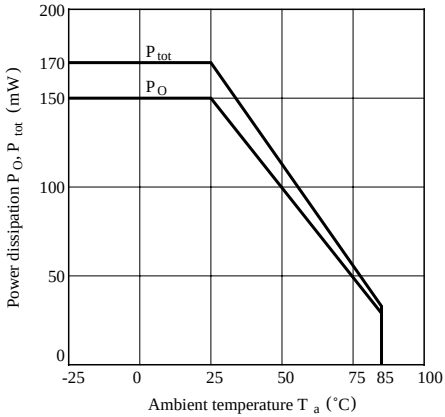



**Fig. 3 Forward Current vs. Forward Voltage**

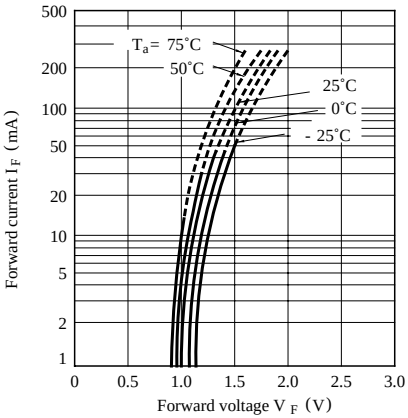



**Fig. 4 Relative Threshold Input Current vs. Supply Voltage**

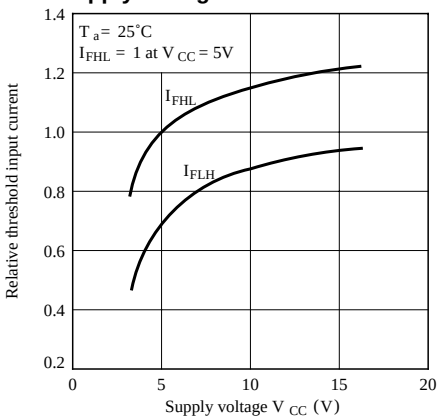



**Fig. 5 Relative Threshold Input Current vs. Ambient Temperature**

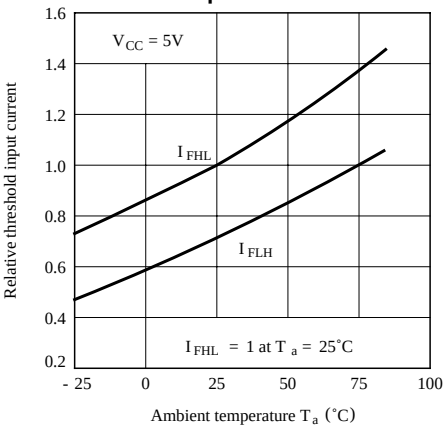



**Fig. 6 Low Level Output Voltage vs. Low Level Output Current**

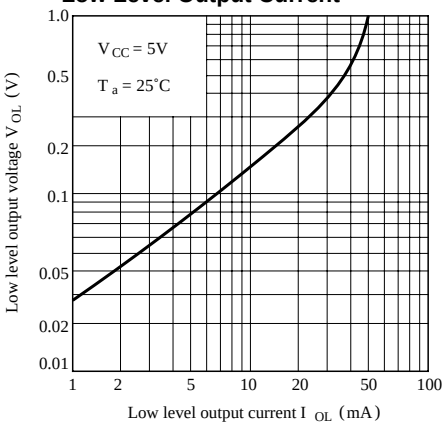


**Fig. 7 Low Level Output Voltage vs. Ambient Temperature**

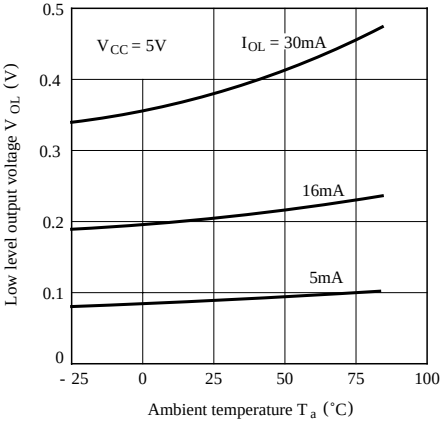



**Fig. 8 Supply Current vs. Supply Voltage**

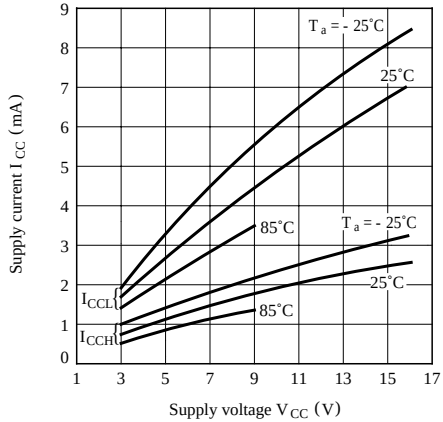



**Fig. 9 Propagation Delay Time vs. Forward Current**

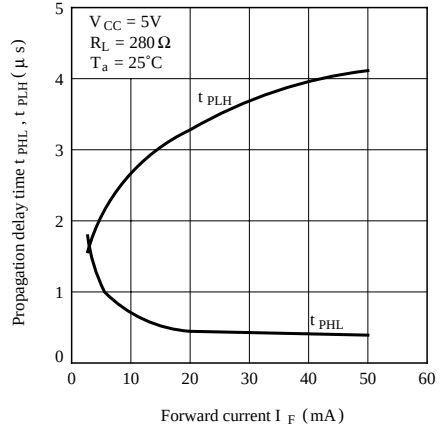
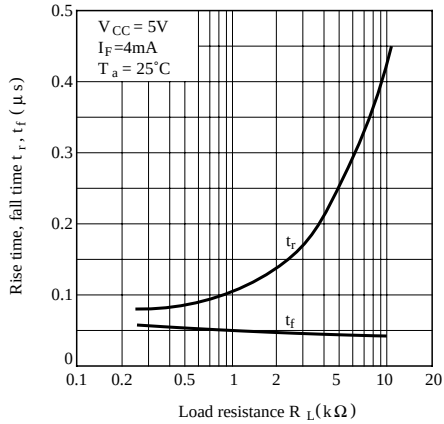



**Fig.10 Rise Time, Fall Time vs. Load Resistance**




## ■ 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."