# PC901V0NSZX

## Digital Output Type OPIC Photocoupler

## ■ Features

1. Normal ON operation, open collector output
2. TTL and LSTTL compatible output
3. Operating supply voltage ($V_{CC}$:3 to 15V)
4. Isolation voltage (Viso (rms):5kV)
5. High sensitivity
   ($I_{FLH}$:MAX. 2.0mA at Ta=25°C)
6. Under preparation for UL standard
7. 6-pin DIP package

## ■ Applications

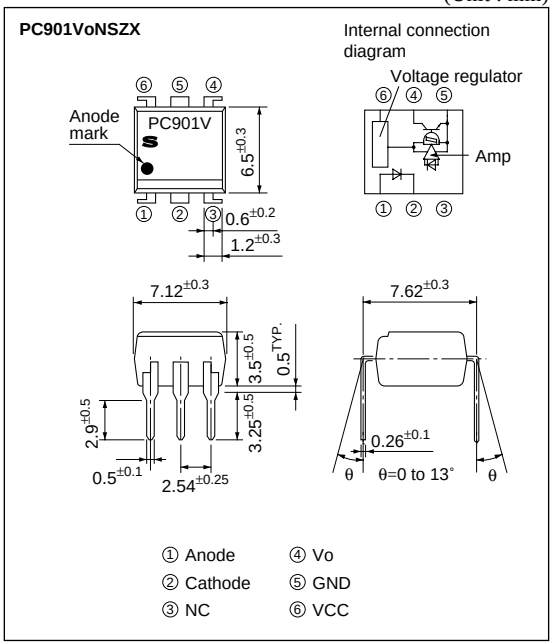
1. Programmable controllers
2. PC peripherals
3. Electronic musical instruments

## ■ Absolute Maximum Ratings (Ta=25°C)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input | Forward current | $I_F$ | 50 | mA |
| | *1 Peak 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 |
| *2 Isolation voltage | | $V_{iso\ (rms)}$ | 5 | kV |
| Operating temperature | | $T_{opr}$ | −25 to +85 | °C |
| Storage temperature | | $T_{stg}$ | −40 to +125 | °C |
| *3 Soldering temperature | | $T_{sol}$ | 260 | °C |

*1 Pulse width≤100μs, Duty ratio=0.001
*2 40 to 60%RH, AC for 1 min
*3 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.

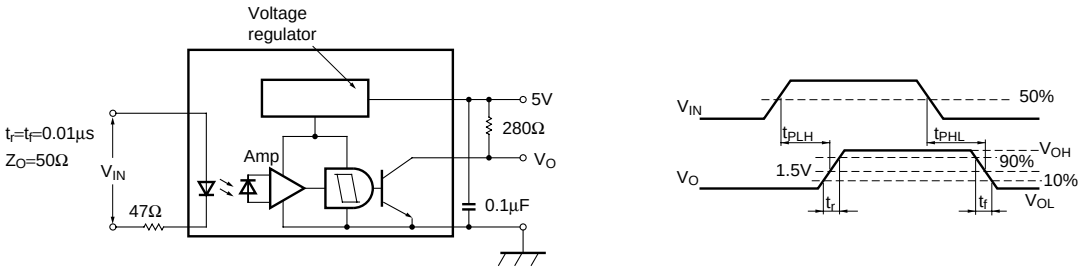
## ■ Electro-optical Characteristics

(Ta=0 to +70°C unless otherwise spesified)

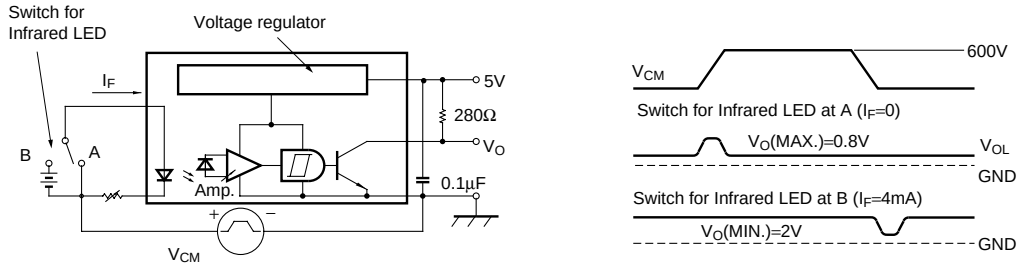
| Parameter | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|---|
| Input | Forward voltage | $V_F$ | $I_F$=4mA | – | 1.1 | 1.4 | V |
| | | | $I_F$=0.3mA | 0.7 | 1.0 | – | |
| | Reverse current | $I_R$ | Ta=25˚C, $V_R$=4V | – | – | 10 | μA |
| | Terminal capacitance | $C_t$ | 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, $I_F$=0 | – | 2.5 | 5.0 | mA |
| | High level supply current | $I_{CCH}$ | $V_{CC}$=5V, $I_F$=4mA | – | 2.7 | 5.5 | mA |
| | *4 "Low→High" 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 | |
| | *5 "High→Low" 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 | – | – | |
| | *6 Hysteresis | $I_{FHL}/I_{FLH}$ | $V_{CC}$=5V, $R_L$=280Ω | 0.5 | 0.7 | 0.9 | – |
| | Isolation resistance | $R_{ISO}$ | Ta=25˚C, DC=500V, 40 to 60%RH | $5\times10^{10}$ | $10^{11}$ | – | Ω |
| Transfer characteristics | *7 Response time "Low→High" propagation delay time | $t_{PLH}$ | Ta=25˚C, $V_{CC}$=5V, $I_F$=4mA, $R_L$=280Ω | – | 1 | 3 | μs |
| | *7 Response time "High→Low" propagation delay time | $t_{PHL}$ | | – | 2 | 6 | |
| | *7 Response time Rise time | $t_r$ | | – | 0.1 | 0.5 | |
| | *7 Response time Fall time | $t_f$ | | – | 0.05 | 0.5 | |
| | *8 Instantaneous common mode rejection voltage "Output : High level" | $CM_H$ | $V_{CM}$=600V(peak), $V_O$(MIN.)=2V, $I_F$=4mA, $R_L$=280Ω, Ta=25˚C | – | –2 000 | – | V/μs |
| | *8 Instantaneous common mode rejection voltage "Output : Low level" | $CM_L$ | $V_{CM}$=600V(peak), $V_O$(MAX.)=0.8V, $I_F$=0, $R_L$=280Ω, Ta=25˚C | – | 2 000 | – | V/μs |

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

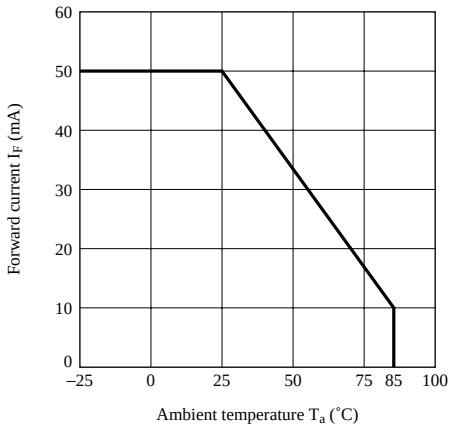
## Fig.1 Test Circuit for Response Time



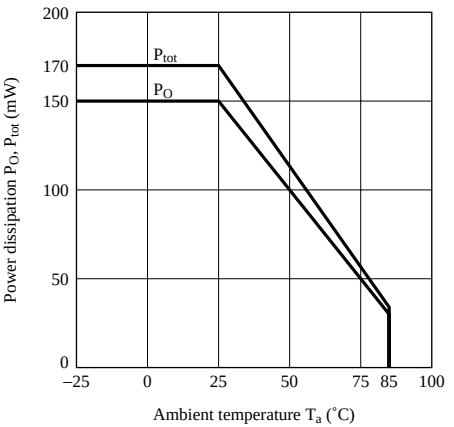
## Fig.2 Test Circuit for $CM_H$ and $CM_L$



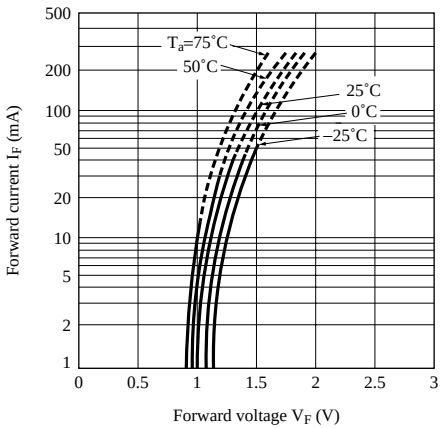

## Fig.3 Forward Current vs. Ambient Temperature



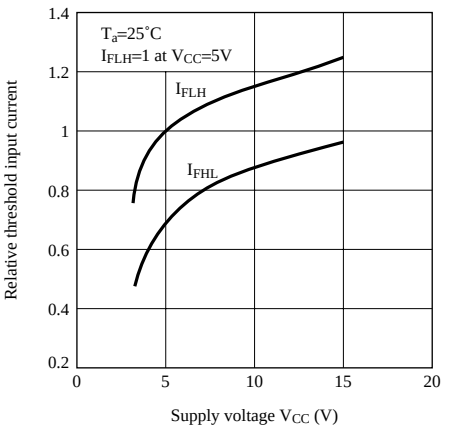

## Fig.4 Power Dissipation vs. Ambient Temperature



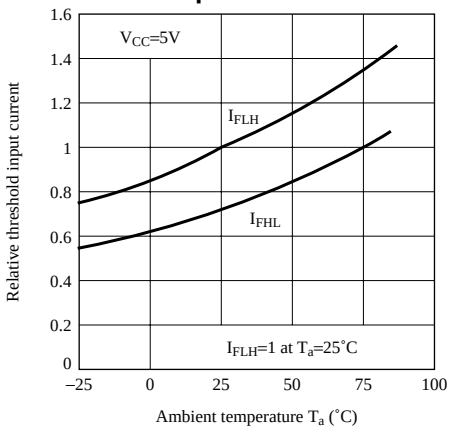

## Fig.5 Forward Current vs. Forward Voltage



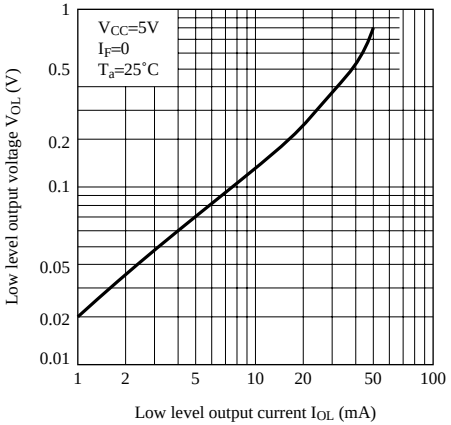

## Fig.6 Relative Threshold Input Current vs. Supply Voltage



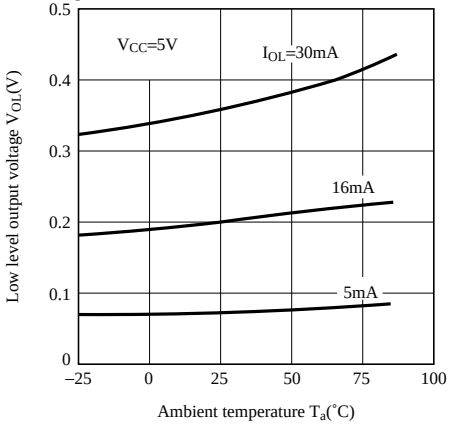
## Fig.7 Relative Threshold Input Current vs. Ambient Temperature



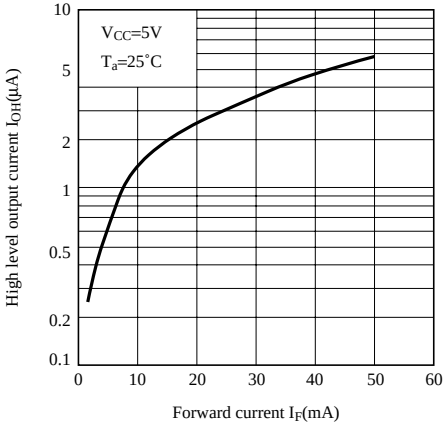

## Fig.8 Low Level Output Voltage vs. Low Level Output Current



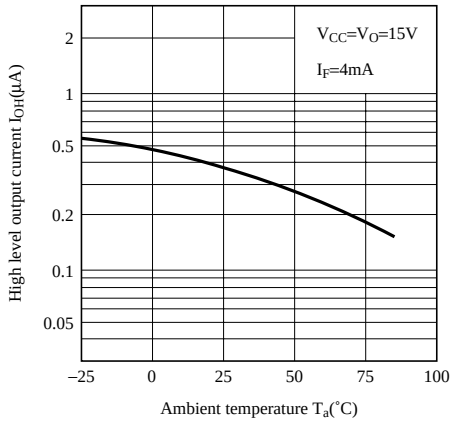

## Fig.9 Low Level Output Current vs. Ambient Temperature




## Fig.10 High Level Output Current vs. Forward Current




## Fig.11 High Level Output Current vs. Ambient Temperature




## Fig.12 Supply Current vs. Supply Voltage

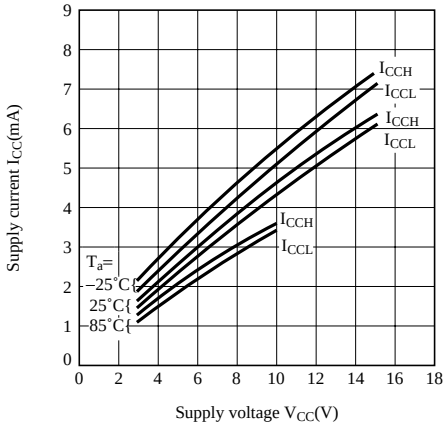


**Fig.13 Propagation Delay Time vs. Forward Current**

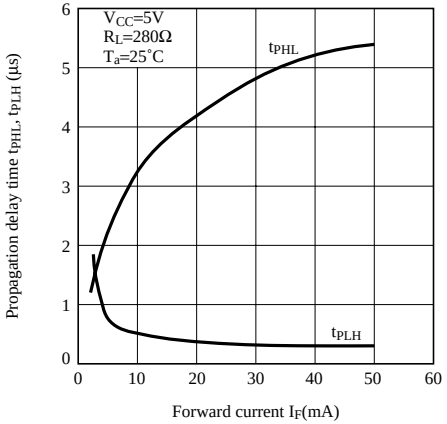
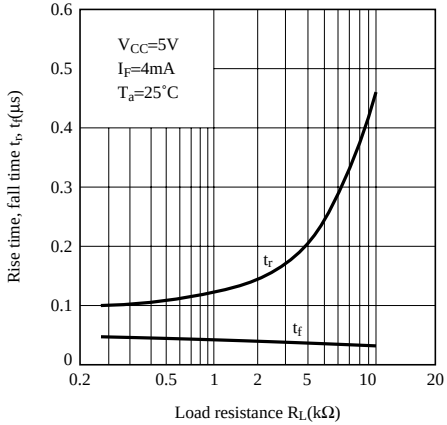



**Fig.14 Rise Time, Fall Time vs. Load Resistance**




## ■ 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.
3. As for other general cautions, please refer to the chapter "Precautions for Use".

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