# PC900V0NSZX/ PC900V0YSZX

## Digital Output Type OPIC Photocoupler

## ■ Features

1. Normal OFF 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. Recognized by UL, file No.E64380
   Approved by TÜV (VDE0884) (**PC900V0YSZX**)
6. 6-pin DIP package

## ■ Applications

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

## ■ Model Line-up

| Model No. | * Safty Standard Approval | | Package | Packing |
|---|---|---|---|---|
| | UL | TÜV (VDE0884) | | |
| **PC900V0NSZX** | ○ | – | DIP | Sleeve |
| **PC900V0YSZX** | ○ | ○ | | |

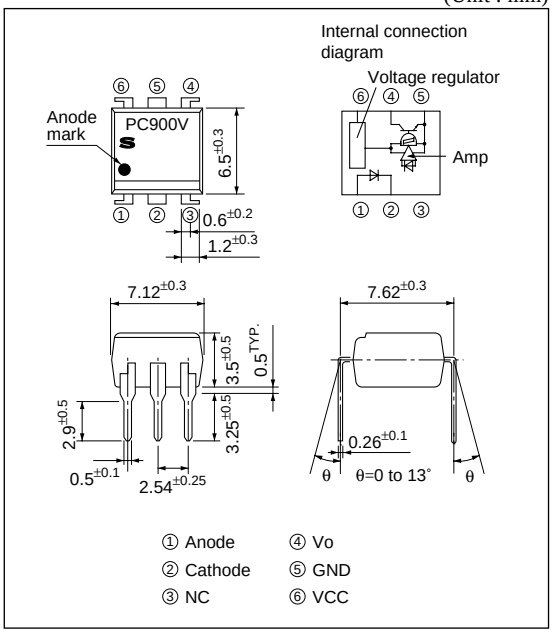
* Application Model No. PC900V

## ■ 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.

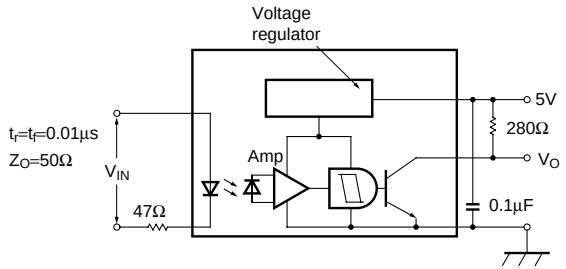
## ■ Electro-optical Characteristics

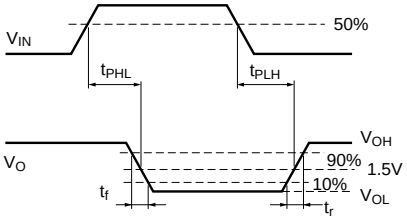
(Ta=0 to 70°C unless spesified)

| 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, $V_R$=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, $I_F$=250µA | – | – | 100 | µA |
| | Low level supply current | | $I_{CCL}$ | $V_{CC}$=5.5V, $I_F$=0 | – | 2.5 | 5.0 | mA |
| | High level supply current | | $I_{CCH}$ | $V_{CC}$=5V, $I_F$=0 | – | 1.0 | 5.0 | mA |
| | *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, DC=500V, 40 to 60%RH | $5\times10^{10}$ | $10^{11}$ | – | Ω |
| Transfer characteristics | 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 | |

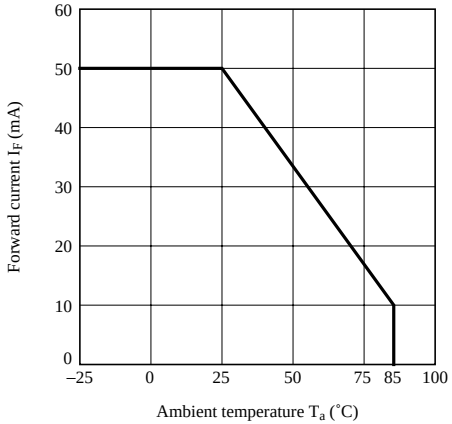
*4 $I_{FHL}$ represents forward current when output goes from high to low.
*5 $I_{FLH}$ represents forward current when output goes from low to high.
*6 Hysteresis stands for $I_{FLH}/I_{FHL}$.
*7 Test circuit for response time is shown below.

## Fig.1 Test Circuit for Response Time

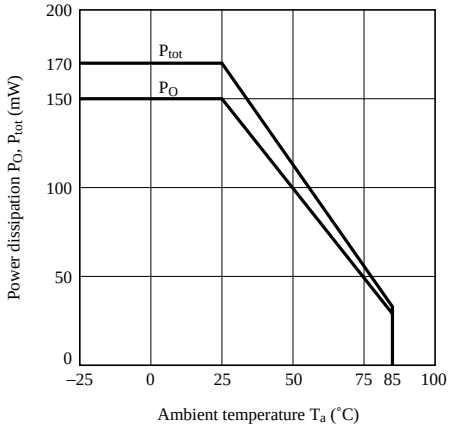


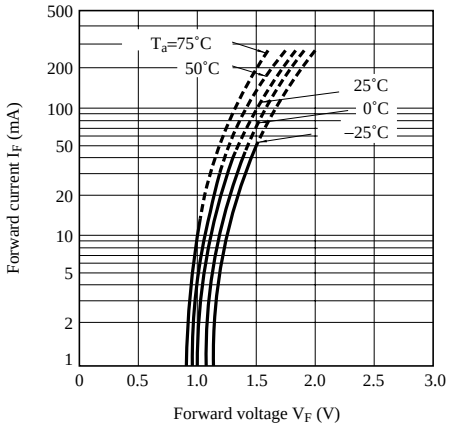
## Fig.2 Forward Current vs. Ambient Temperature



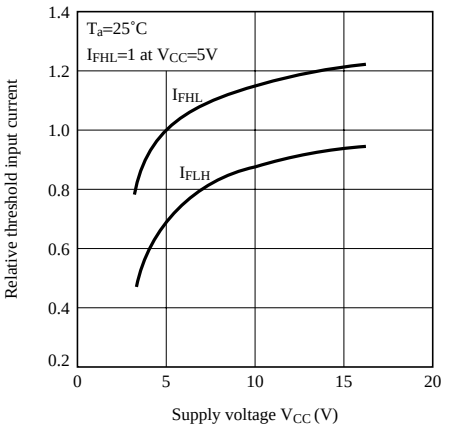

## Fig.3 Power Dissipation vs. Ambient Temperature



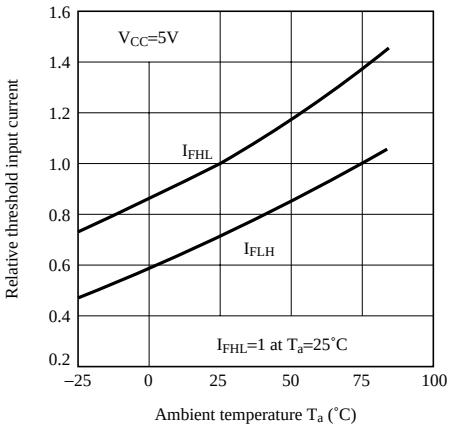

## Fig.4 Forward Current vs. Forward Voltage




## Fig.5 Relative Threshold Input Current vs. Supply Voltage




## Fig.6 Relative Threshold Input Current vs. Ambient Temperature




## Fig.7 Low Level Output Voltage vs. Low Level Output Current

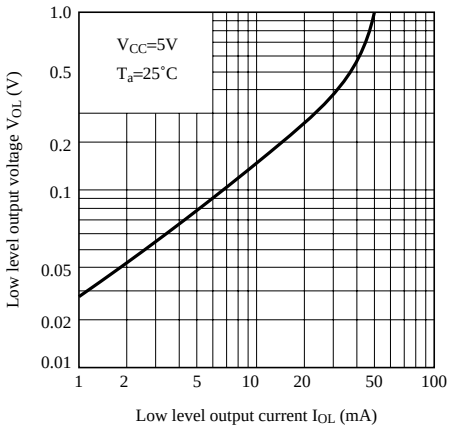


**Fig.8 Low Level Output Voltage vs. Ambient Temperature**

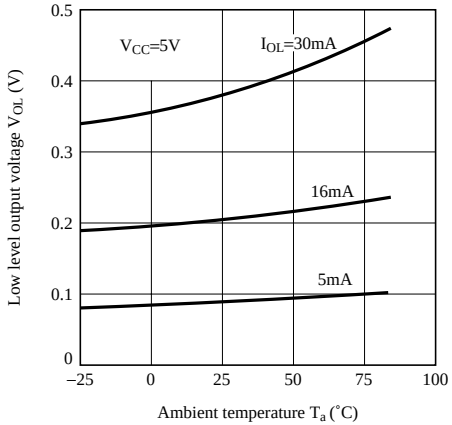



**Fig.9 Supply Current vs. Supply Voltage**

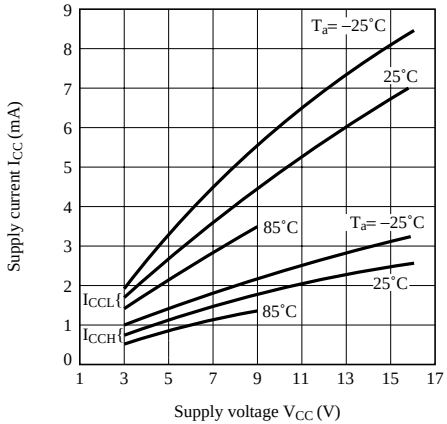



**Fig.10 Propagation Delay Time vs. Forward Current**

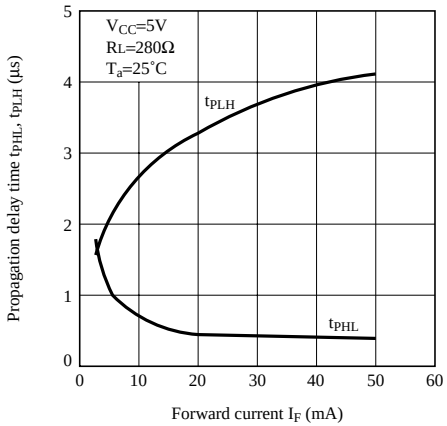
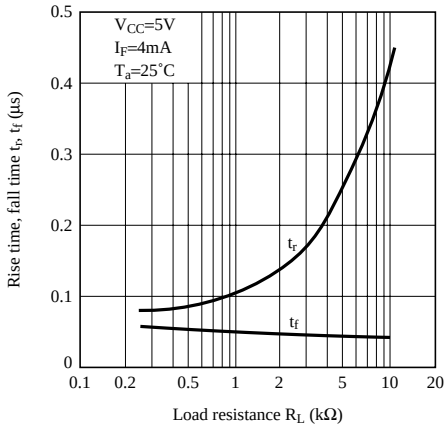



**Fig.11 Rise Time, Fall Time vs. Load Resistance**




## ■ 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.

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(i) The devices in this publication are designed for use in general electronic equipment designs such as:
— 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.

(iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:
— Space applications
— Telecommunication equipment [trunk lines]
— Nuclear power control equipment
— Medical and other life support equipment (e.g., scuba).

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# PC900V0NIZX/ PC900V0NIPX

## Digital Output Type OPIC Photocoupler

## ■ Features

1. Normal OFF 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. Recognized by UL, file No.E64380
6. 6-pin DIP package (Lead forming type)

## ■ Applications

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

## ■ Model Line-up

| Model No. | * Safty Standard Approval | | Package | Packing |
|---|---|---|---|---|
| | UL | TÜV (VDE0884) | | |
| **PC900V0NIZX** | ○ | – | Surface Mount | Sleeve |
| **PC900V0NIPX** | ○ | – | | Taping |

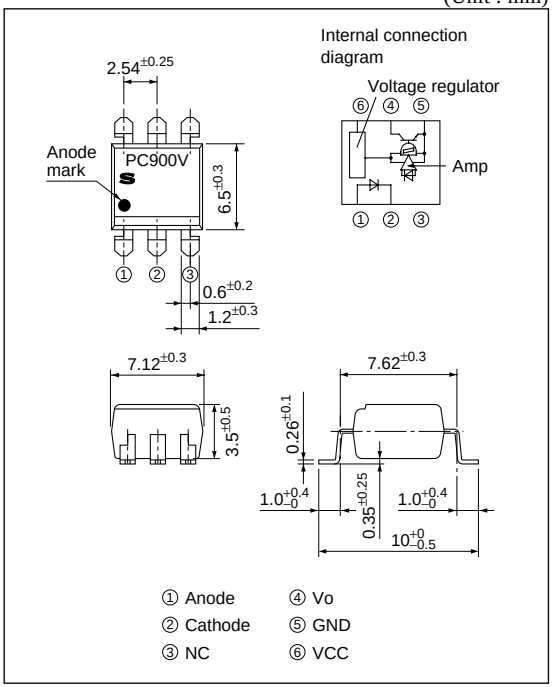
* Application Model No. PC900V

## ■ 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)

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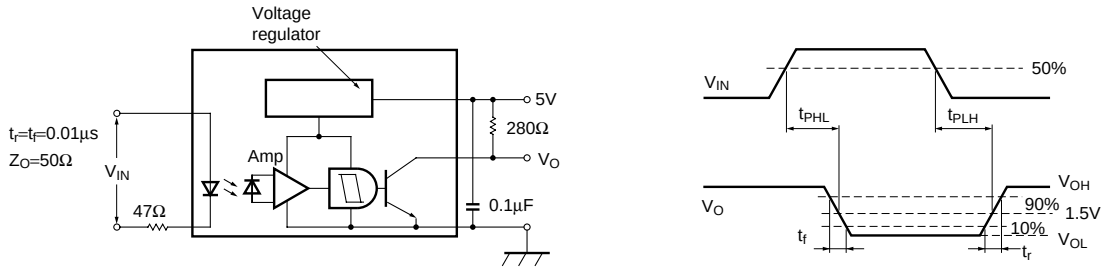
## ■ Electro-optical Characteristics

(Ta=0 to 70°C unless spesified)

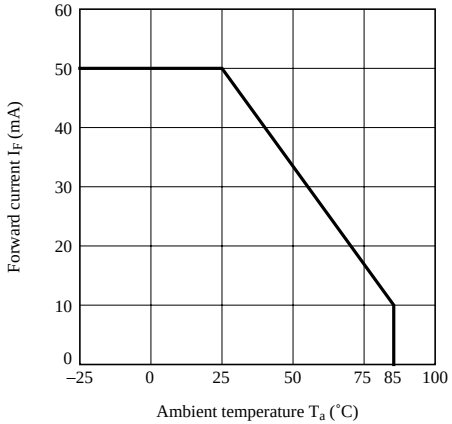
| Parameter | | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|---|---|
| Input | Forward voltage | | $V_F$ | $I_F$=4mA | – | 1.1 | 1.4 | V |
| | | | | $I_F$=0.3mA | 0.7 | 1.0 | – | |
| | Reverse current | | $I_R$ | Ta=25˚C, $V_R$=3V | – | – | 10 | μA |
| | Terminal 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, $I_F$=250μA | – | – | 100 | μA |
| | Low level supply current | | $I_{CCL}$ | $V_{CC}$=5.5V, $I_F$=0 | – | 2.5 | 5.0 | mA |
| | High level supply current | | $I_{CCH}$ | $V_{CC}$=5V, $I_F$=0 | – | 1.0 | 5.0 | mA |
| | *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, DC=500V, 40 to 60%RH | $5\times10^{10}$ | $10^{11}$ | – | Ω |
| Transfer characteristics | *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.

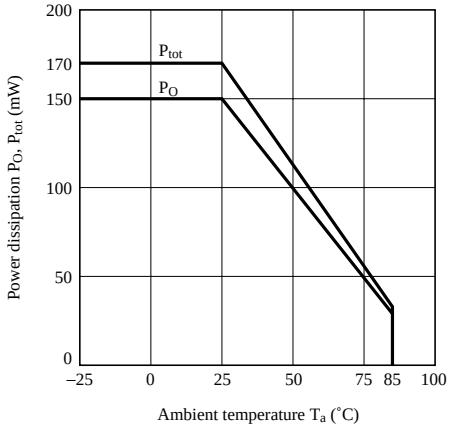
## Fig.1 Test Circuit for Response Time



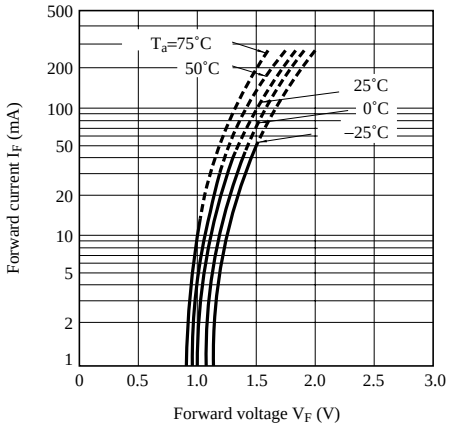
## Fig.2 Forward Current vs. Ambient Temperature



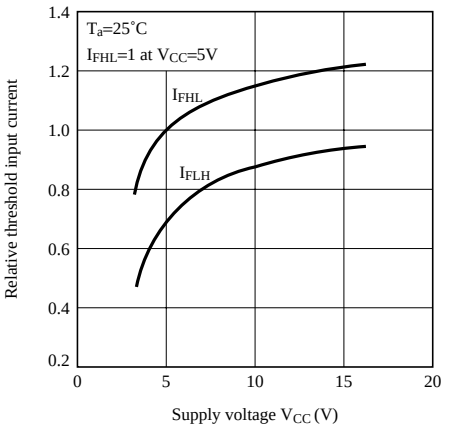

## Fig.3 Power Dissipation vs. Ambient Temperature



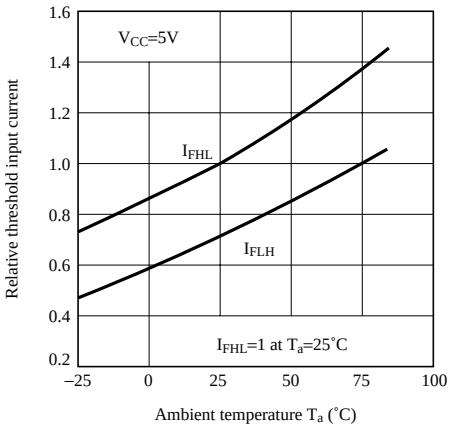

## Fig.4 Forward Current vs. Forward Voltage




## Fig.5 Relative Threshold Input Current vs. Supply Voltage




## Fig.6 Relative Threshold Input Current vs. Ambient Temperature




## Fig.7 Low Level Output Voltage vs. Low Level Output Current

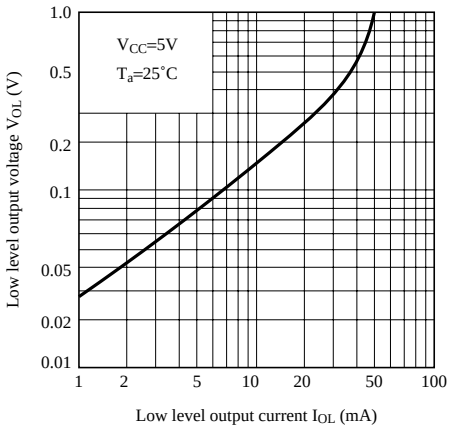


**Fig.8 Low Level Output Voltage vs. Ambient Temperature**

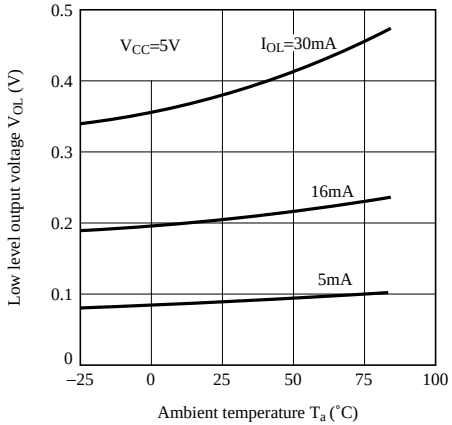



**Fig.9 Supply Current vs. Supply Voltage**

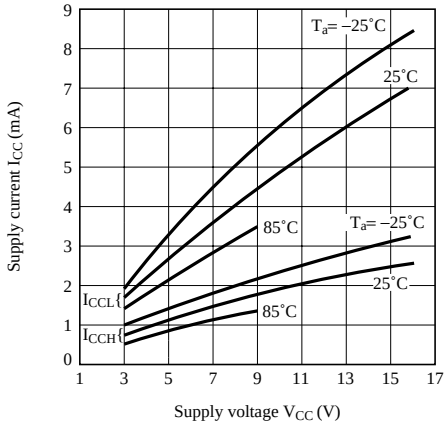



**Fig.10 Propagation Delay Time vs. Forward Current**

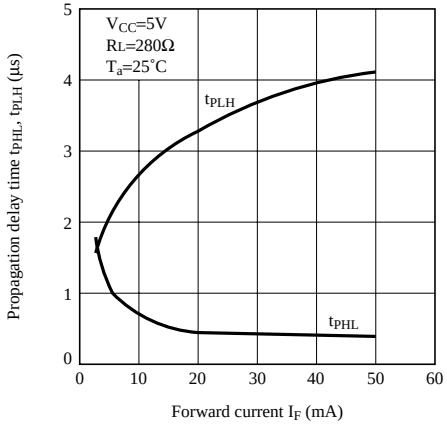
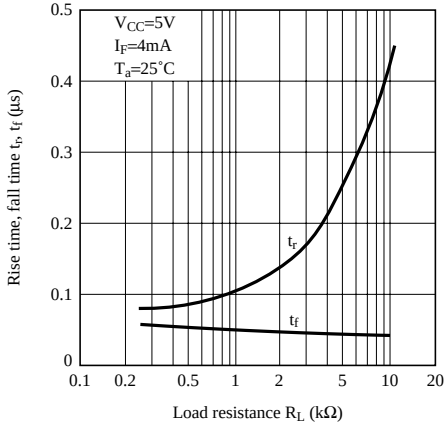



**Fig.11 Rise Time, Fall Time vs. Load Resistance**

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