# PC920 Power OPIC Photocoupler

T-41-83

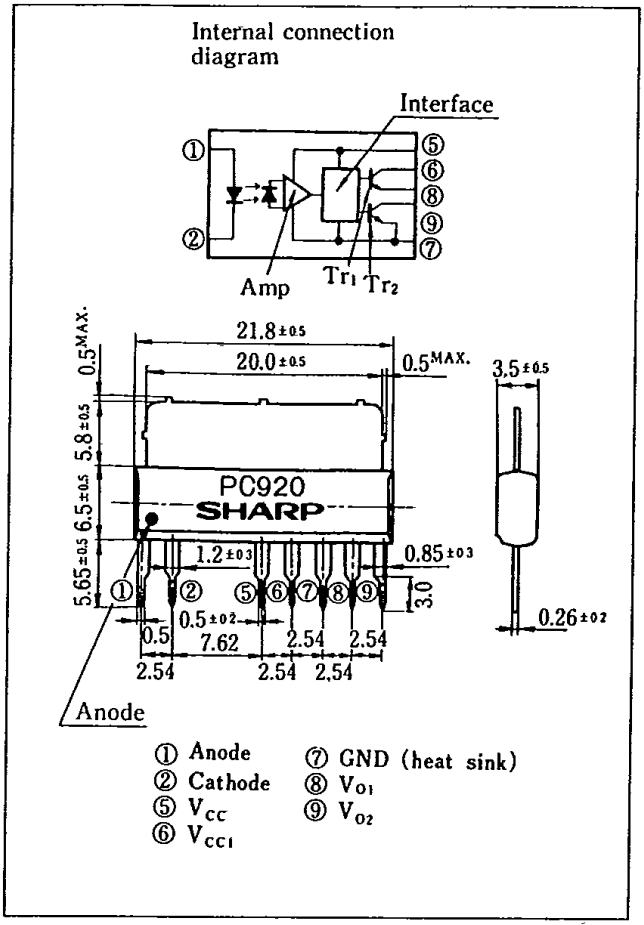
## ■ Features

1. High power
   ($I_{O1}$ : MAX. −0.8A (DC))
   ($I_{O2}$ : MAX. 1.6A (Pulse))
2. Low input current drive
   ($I_{FLH}$ : MAX. 2mA at Ta=$T_{opr}$)
3. Operating supply voltage $V_{CC}$ : 5.4~15V
4. Compact single-in-line package (With heat sink)
5. UL recognized, file No. E64380

## ■ Applications

1. Inverter controlled air conditioners

## ■ Outline Dimensions (Unit : mm)




※ OPIC is a registered trademark of Sharp and stands for Optical IC. It has a light detecting element and signal processing circuitry integrated onto a single chip.

## ■ 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 |
| | $V_{O1}$ output current | $I_{O1}$ | −0.8 | A |
| | *1$V_{O2}$ output current | $I_{O2P}$ | 1.6 | A |
| Total power dissipation | | $P_{tot}$ | 1,200 | mW |
| *2Isolation voltage | | $V_{iso}$ | 1,500 | Vrms |
| Operating temperature | | $T_{opr}$ | −20~+80 | °C |
| Storage temperature | | $T_{stg}$ | −55~+125 | °C |
| *3Soldering temperature | | $T_{sol}$ | 260 | °C |

*1 Pulse width≦10μs, Duty ratio=0.02
*2 RH=40~60%, AC for 1 minute
*3 For 10 seconds



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## ■ Electro-optical Characteristics

(Ta=25°C unless specified)

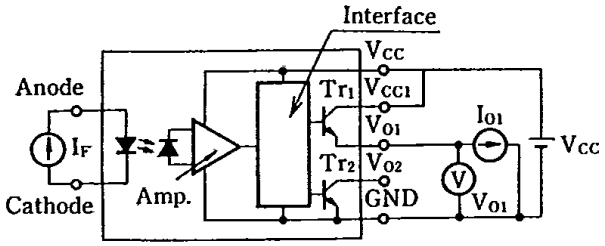
| Parameter | | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|---|---|
| Input | Forward voltage | | $V_F$ | $I_F$=2mA | — | 1.1 | 1.4 | V |
| | | | | $I_F$=0.1mA | 0.6 | 0.95 | — | |
| | Reverse current | | $I_R$ | $V_R$=3V | — | — | 10 | μA |
| | Terminal capacitance | | $C_t$ | V=0, f=1kHz | — | 30 | 80 | pF |
| Output | Operating supply voltage | | $V_{CC}$ | | 5.4 | 6.0 | 15 | V |
| | $V_{O1}$ output voltage | | $V_{O1}$ | $V_{CC}$=$V_{CC1}$=6V, $I_{O1}$=−0.3A, $I_F$=2mA | 4.5 | 5.2 | — | V |
| | $V_{O2}$ output voltage | | $V_{O2}$ | $V_{CC}$=$V_{CC1}$=6V, $I_{O2P}$=1A, $I_F$=0 | — | 0.3 | 2.0 | V |
| | $V_{O1}$ leak current | | $I_{OL1}$ | $V_{CC}$=$V_{CC1}$=6V, $V_{O1}$=GND, $I_F$=0 | — | — | 200 | μA |
| | $V_{O2}$ leak current | | $I_{OL2}$ | $V_{CC}$=$V_{CC1}$=$V_{O2}$=6V, $I_F$=2mA | — | — | 200 | μA |
| | High level supply current | | $I_{CCH}$ | $V_{CC}$=$V_{CC1}$=6V, $I_F$=2mA | — | 5 | 10 | mA |
| | Low level supply current | | $I_{CCL}$ | $V_{CC}$=$V_{CC1}$=6V, $I_F$=0 | — | 12 | 20 | mA |
| Transfer characteristics | *4"Low→High" threshold input current | | $I_{FLH}$ | $V_{CC}$=$V_{CC1}$=6V, $R_{L1}$=15Ω | — | 0.5 | 1.0 | mA |
| | | | | Ta=$T_{opr}$, $V_{CC}$=$V_{CC1}$=6V, $R_{L1}$=15Ω | 0.1 | — | 2.0 | mA |
| | Isolation resistance | | $R_{ISO}$ | DC=500V, RH=40~60% | $5\times10^{10}$ | $10^{11}$ | — | Ω |
| | Response time | "Low→High" propagation time | $t_{PLH}$ | $V_{CC}$=$V_{CC1}$=6V | — | 3 | 10 | μs |
| | | "High→Low" propagation time | $t_{PHL}$ | $I_F$=2mA | — | 3 | 10 | |
| | | Rise time | $t_r$ | $R_{L1}$=15Ω | — | 0.2 | 2 | |
| | | Fall time | $t_f$ | $R_{L2}$=18Ω | — | 0.2 | 2 | |

*4 $I_{FLH}$ represents forward current when output goes from "low" to "high".

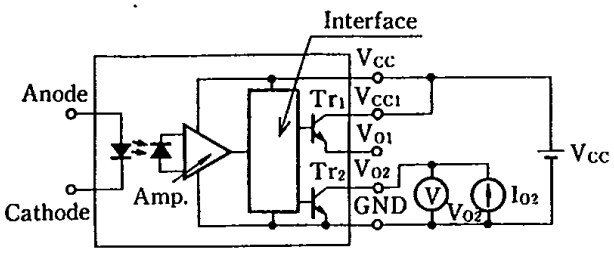
## ■ Truth Table

| Input | Output | $Tr_1$ | $Tr_2$ |
|---|---|---|---|
| ON | High level | ON | OFF |
| OFF | Low level | OFF | ON |

### Test Circuit for $V_{O1}$




### Test Circuit for $V_{O2}$



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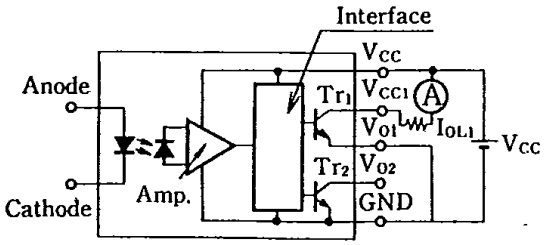
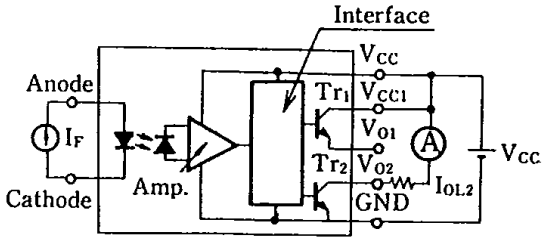
Test Circuit for $I_{OL1}$




Test Circuit for $I_{OL2}$




Test Circuit for Response Time

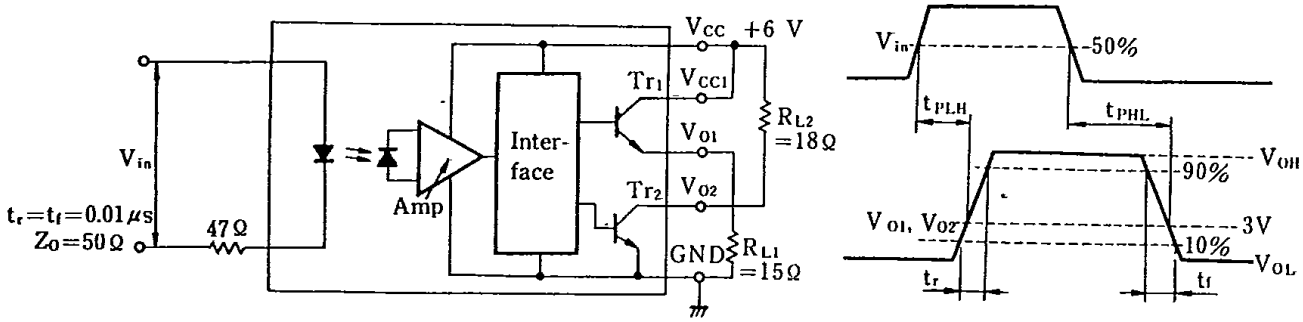



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**Fig. 1 Forward Current vs. Ambient Temperature**

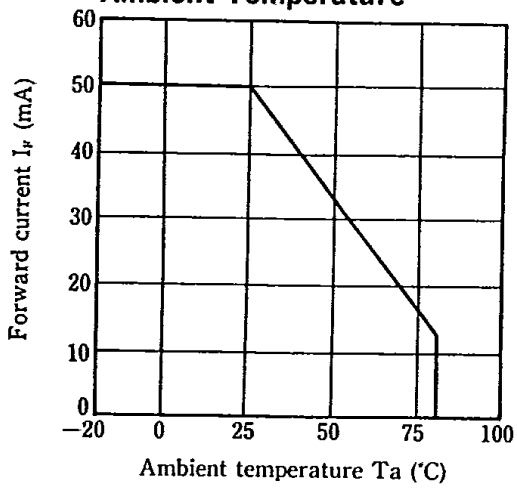


**Fig. 2 Total Power Dissipation vs. Ambient Temperfture**

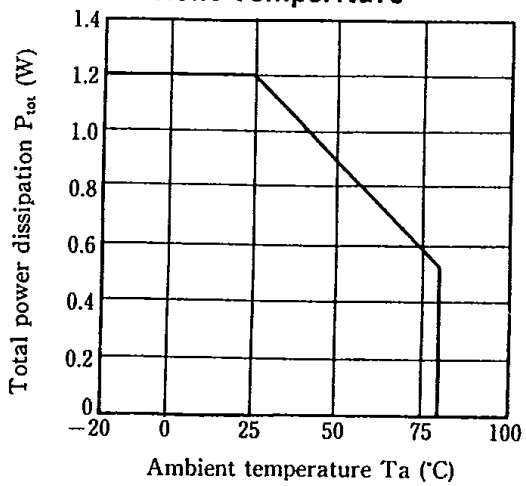




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**Fig. 3 Forward Current vs. Forward Voltage**

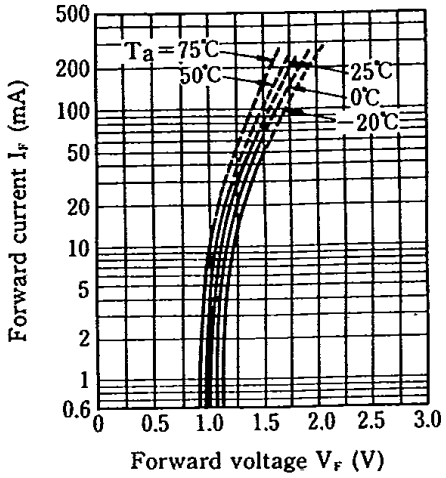


**Fig. 4 Relative Threshold Input Current vs. Supply Voltage**

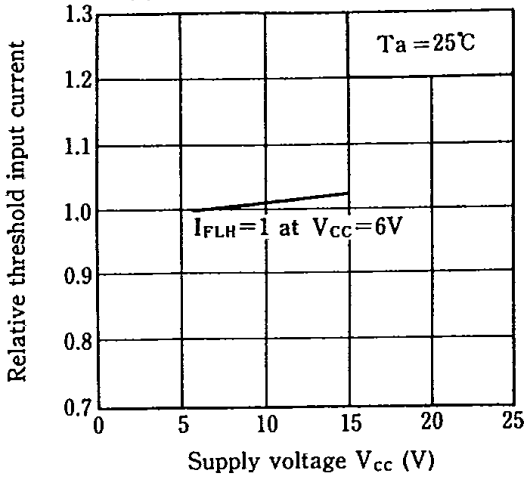


**Fig. 5 Relative Threshold Input Current vs. Ambient Temperature**

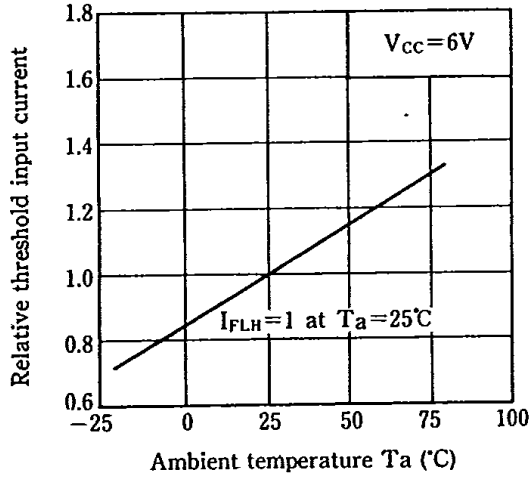


**Fig. 6 Output Voltage vs. Output Current ($Tr_1$)**

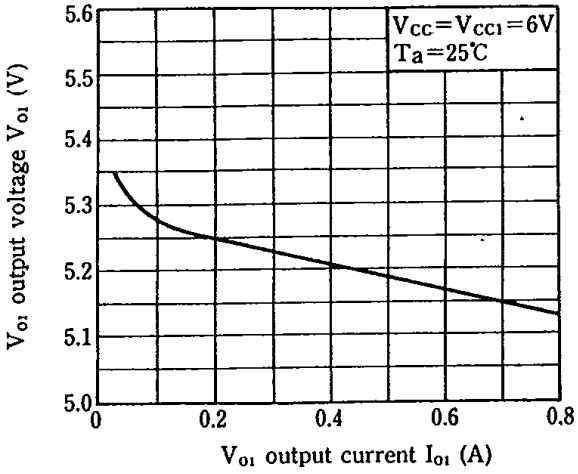


**Fig. 7 Output Voltage vs. Output Current ($Tr_2$)**

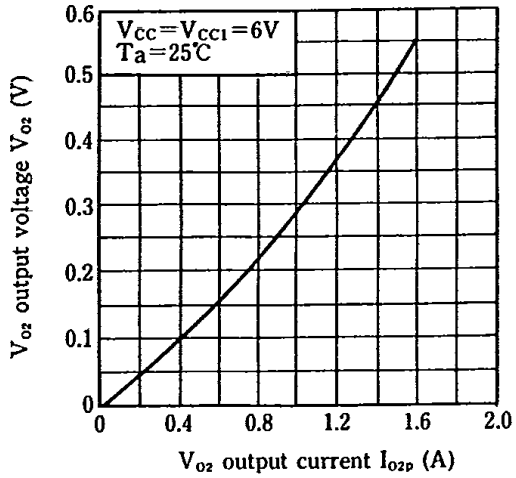


**Fig. 8 Output Voltage vs. Ambient Temperature ($Tr_1$)**

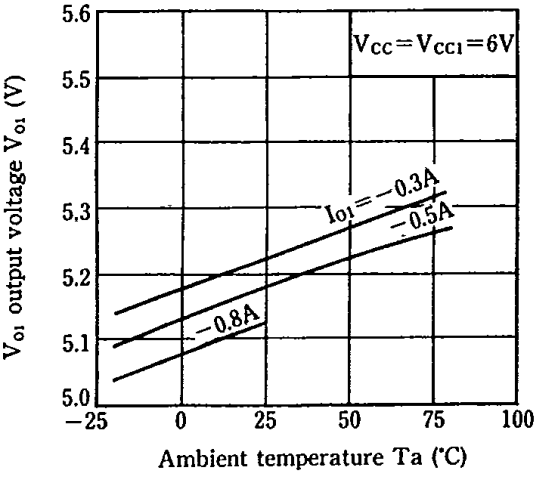




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**Fig. 9 Output Voltage vs. Ambient Temperature ($Tr_2$)**

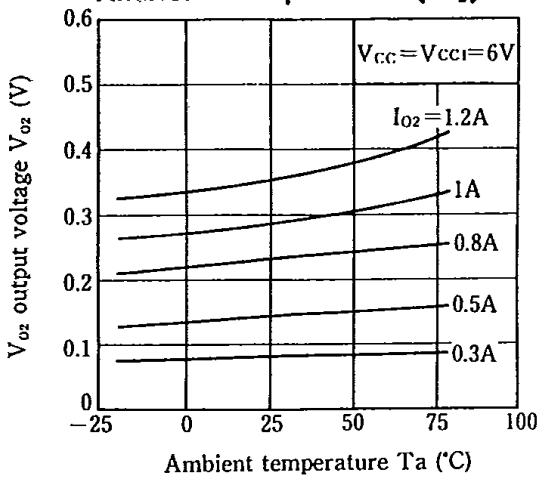



**Fig. 10 Supply Current vs. Supply Voltage**

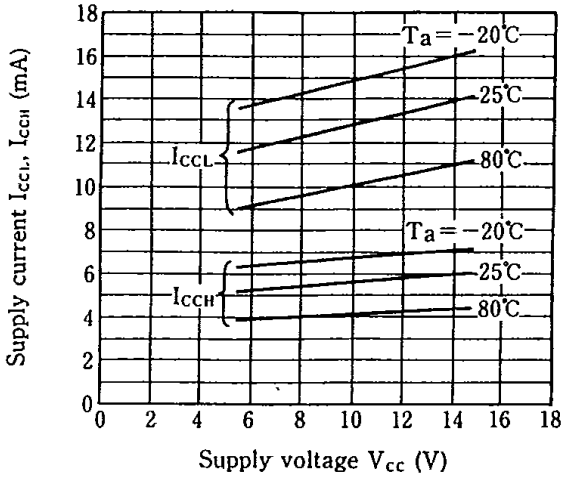



**Fig. 11 Propagation Time vs. Forward Current**

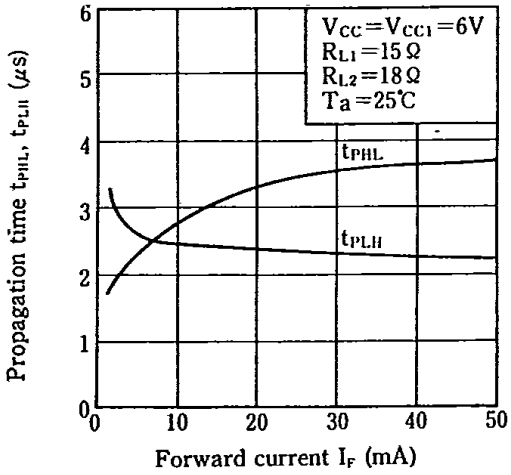
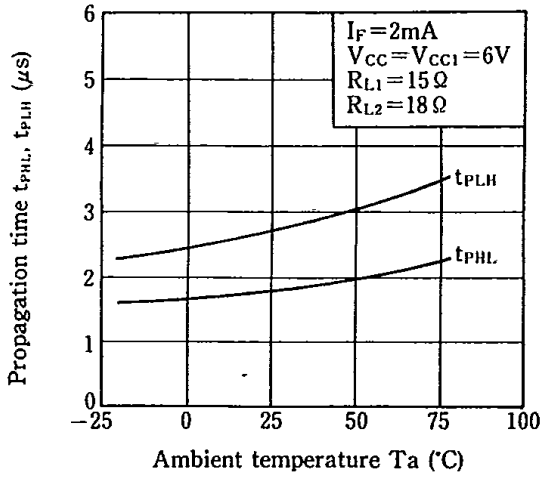
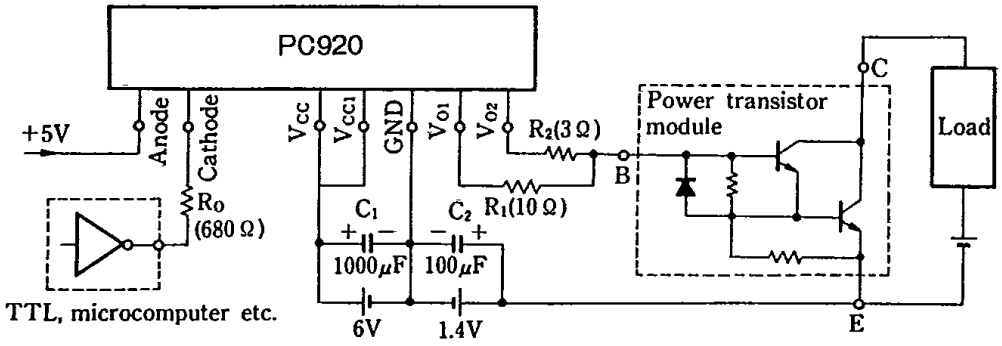



**Fig. 12 Propagation Time vs. Ambient Temperature**




## ■ Application Circuit Example

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