# PC957

## High Speed and High CMR OPIC Photocoupler

## ■ Features

1. High resistance to noise (CMR:MIN. 15kV/μs)
2. High speed response
   ($t_{PHL}$:MAX. 0.8μs, $t_{PLH}$:MAX. 0.8μs)
3. Standard DIP type
4. Isolation voltage (Viso (rms)=2.5kV)
5. Recognized by UL, file No. E64380

## ■ Applications

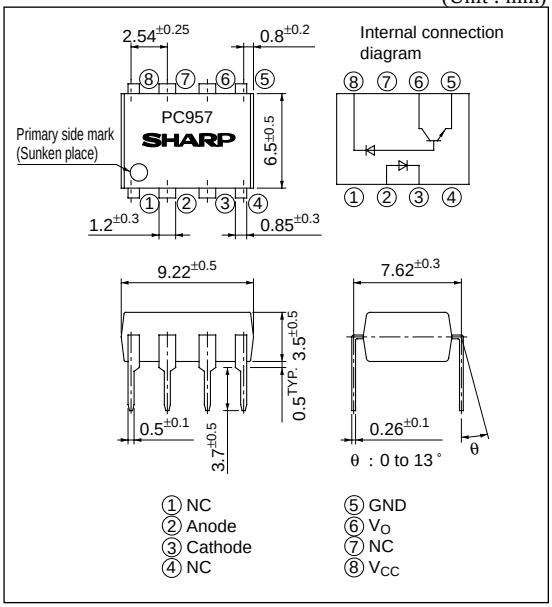
1. Programmable controller
2. Inverter

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

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input | *1 Forward current | $I_F$ | 25 | mA |
| | Reverse voltage | $V_R$ | 5 | V |
| | *2 Power dissipation | P | 45 | mW |
| Output | Output current | $I_O$ | 8 | mA |
| | Supply voltage | $V_{CC}$ | −0.5 to +30 | V |
| | Output voltage | $V_O$ | −0.5 to +20 | V |
| | *3 Power dissipation | $P_O$ | 100 | mW |
| *4 Isolation voltage | | $V_{iso\ (rms)}$ | 2.5 | kV |
| Operating temperature | | $T_{opr}$ | −55 to +100 | °C |
| Storage temperature | | $T_{stg}$ | −55 to +125 | °C |
| *5 Soldering temperature | | $T_{sol}$ | 260 | °C |

*1 When ambient temperature goes above 70°C, the power dissipation goes down at 0.45mA/°C.
*2 When ambient temperature goes above 70°C, the power dissipation goes down at 0.8mA/°C.
*3 When ambient temperature goes above 70°C, the power dissipation goes down at 1.8mA/°C.
*4 40 to 60%RH, AC for 1 min
*5 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.

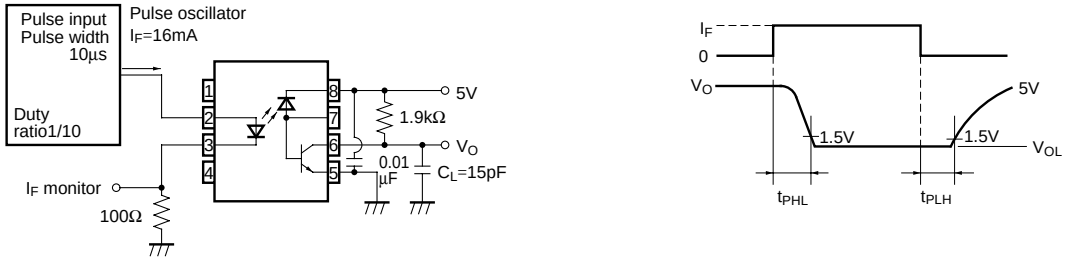
## ■ Electro-optical Characteristics *6

(Unless otherwise specified Ta=0 to +70˚C)

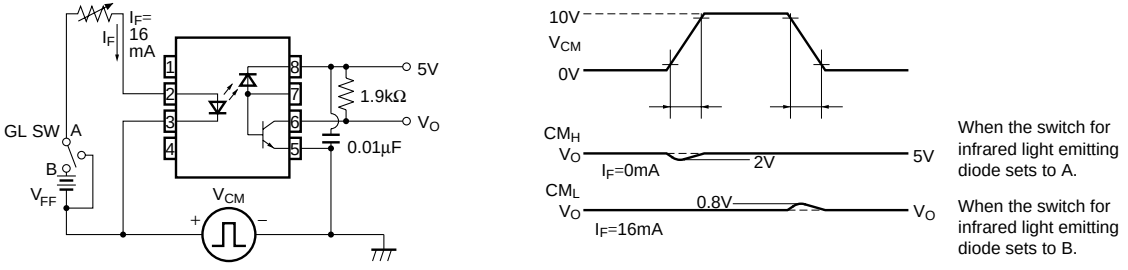
| Parameter | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|---|
| Input | Forward voltage | $V_F$ | Ta=25˚C, $I_F$=16mA | – | 1.7 | 1.95 | V |
| | Reverse current | $I_R$ | Ta=25˚C, $V_R$=5V | – | – | 10 | μA |
| | Terminal capacitance | $C_t$ | Ta=25˚C, $V_F$=0V, f=1MHz | – | 60 | 250 | pF |
| Output | High level output current (1) | $I_{OH\ (1)}$ | Ta=25˚C, $I_F$=0, $V_{CC}$=$V_O$=5.5V | – | 3 | 500 | nA |
| | High level output current (2) | $I_{OH\ (2)}$ | Ta=25˚C, $I_F$=0, $V_{CC}$=$V_O$=15V | – | 0.01 | 1 | μA |
| | High level output current (3) | $I_{OH\ (3)}$ | $I_F$=0, $V_{CC}$=$V_O$=15V | – | – | 50 | μA |
| | Low level output voltage | $V_{OL}$ | $I_F$=16mA, $V_{CC}$=4.5V, $I_O$=2.4mA | – | 0.1 | 0.4 | V |
| | Low level supply current | $I_{CCL}$ | $I_F$=16mA, $V_{CC}$=15V, $V_O$=open | – | 120 | – | μA |
| | High level supply current (1) | $I_{CCH\ (1)}$ | Ta=25˚C, $I_F$=0, $V_{CC}$=15V, $V_O$=open | – | 0.02 | 1 | μA |
| | High level supply current (2) | $I_{CCH\ (2)}$ | $I_F$=0, $V_{CC}$=15V, $V_O$=open | – | – | 2 | μA |
| Transfer characteristics | Current transfer ratio (1) | CTR (1) | Ta=25˚C, $I_F$=16mA, $V_{CC}$=4.5V, $V_O$=0.4V | 19 | 30 | – | % |
| | Current transfer ratio (2) | CTR (2) | $I_F$=16mA, $V_{CC}$=4.5V, $V_O$=0.4V | 15 | – | – | % |
| | Isolation resistance | $R_{ISO}$ | Ta=25˚C, DC=500V, 40 to 60%RH | $5\times10^{10}$ | $1\times10^{11}$ | – | Ω |
| | Floating capacitance | $C_f$ | Ta=25˚C, V=0V, f=1MHz | – | 0.6 | 1 | pF |
| | *7 "High→Low" propagation delay time | $t_{pHL}$ | Ta=25˚C, $V_{CC}$=5V, $I_F$=16mA, $R_L$=1.9Ω | – | 0.2 | 0.8 | μs |
| | *7 "Low→High" propagation delay time | $t_{pLH}$ | | – | 0.6 | 0.8 | μs |
| | *8 Instantaneous common mode rejection voltage "Output : High level" | $CM_H$ | Ta=25˚C, $I_F$=0, $V_{CM\ (p-p)}$=1.0kV, $R_L$=1.9kΩ | 15 | 30 | – | kV/μs |
| | *8 Instantaneous common mode rejection voltage "Output : Low level" | $CM_L$ | Ta=25˚C, $I_F$=16mA, $V_{CM\ (p-p)}$=1.0kV, $R_L$=1.9kΩ | −15 | −30 | – | kV/μs |

*6 When measuring output and transfer characteristics, connect a by-pass capacitor (0.01μF or more) between $V_{CC}$ ⑧ and GND ⑤ near the **PC957**.
*7 Refer to Fig.1
*8 Refer to Fig.2

## Fig.1 Test Circuit for Propagation Delay Time



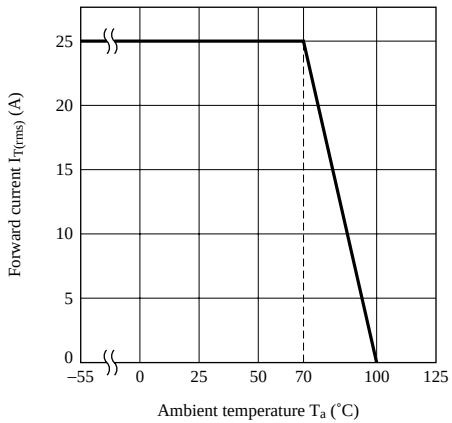

## Fig.2 Test Circuit for Instantaneous Common Mode Rejection Voltage



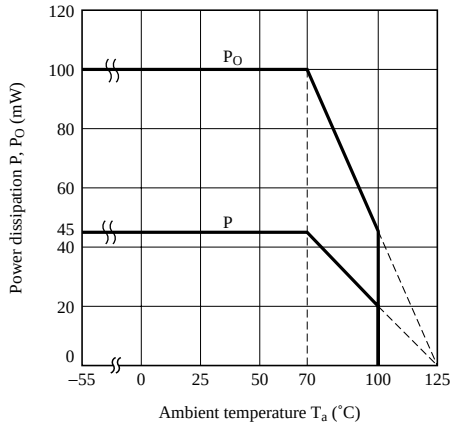

When the switch for infrared light emitting diode sets to A.

When the switch for infrared light emitting diode sets to B.

## Fig.3 Forward Current vs. Ambient Temperature




## Fig.4 Power Dissipation vs. Ambient Temperature



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— Various safety devices, etc.

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