

# PC3H71x NIP Series PC3Q71x NIP Series

## ■ Features

1. Low input current type ( $I_F=0.5\text{mA}$ )
2. High resistance to noise due to high common rejection voltage (CMR:MIN.  $10\text{kV}/\mu\text{s}$ )
3. Mini-flat package
4. Isolation voltage (Viso): $2.5\text{kVrms}$
5. Recognized by UL, file No. E64380

## ■ Applications

1. Programmable controllers
2. Facsimiles
3. Telephones

## ■ Rank Table

| Model No.  | Rank mark       | Ic (mA)     | Conditions   |
|------------|-----------------|-------------|--|
| PC3H710NIP | A, B or no mark | 0.5 to 3.5  | $I_F=0.5\text{mA}$<br>$V_{CE}=5\text{V}$<br>$T_a=25^\circ\text{C}$ |
| PC3H711NIP | A               | 0.7 to 1.75 |  |
| PC3H712NIP | B               | 1.0 to 2.5  |  |
| PC3H715NIP | A or B          | 0.7 to 2.5  |  |
| Model No.  | Rank mark       | Ic (mA)     | Conditions   |
| PC3Q710NIP | A or no mark    | 0.5 to 3.0  | $I_F=0.5\text{mA}$<br>$V_{CE}=5\text{V}$<br>$T_a=25^\circ\text{C}$ |
| PC3Q711NIP | A               | 1.0 to 2.5  |  |

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

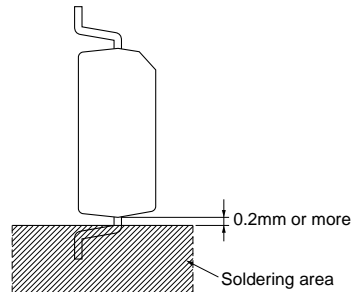
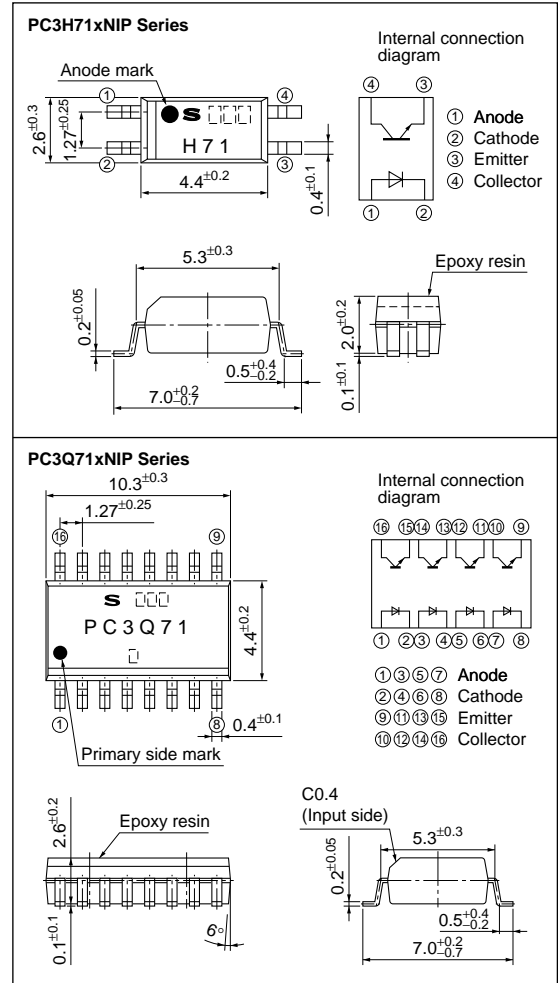
|        | Parameter                   | Symbol    | Rating      | Unit              |
|--------|-----------------------------|-----------|-------------|-------------------|
| Input  | Forward current             | $I_F$     | 10          | mA                |
|        | *1 Peak forward current     | $I_{FM}$  | 200         | mA                |
|        | Reverse voltage             | $V_R$     | 6           | V                 |
|        | Power dissipation           | P         | 15          | mW                |
| Output | Collector-emitter voltage   | $V_{CEO}$ | 70          | V                 |
|        | Emitter-collector voltage   | $V_{ECO}$ | 6           | V                 |
|        | Collector current           | $I_C$     | 50          | mA                |
|        | Collector power dissipation | $P_C$     | 150         | mW                |
|        | Total power dissipation     | $P_{tot}$ | 170         | mW                |
|        | Operating temperature       | $T_{opr}$ | -30 to +100 | °C                |
|        | Storage temperature         | $T_{stg}$ | -40 to +125 | °C                |
|        | *2 Isolation voltage        | $V_{iso}$ | 2.5         | kV <sub>rms</sub> |
|        | *3 Soldering temperature    | $T_{sol}$ | 260         | °C                |

\*1 Pulse width  $\leq 100\mu\text{s}$ , Duty ratio=0.001  
 \*2 40 to 60%RH, AC for 1 minute,  $f=60\text{Hz}$   
 \*3 For 10s

## Low Input Current Type Photocoupler

## ■ Outline Dimensions

(Unit : mm)



■ Electro-optical Characteristics

(Ta=25°C)

| Parameter                        |                                      | Symbol            | Conditions   | MIN.  | TYP.               | MAX. | Unit              |               |
|----------------------------------|--------------------------------------|-------------------|--|---|--------------------|------|-------------------|---------------|
| Input                            | Forward voltage                      | $V_F$             | $I_F=10\text{mA}$  | —   | 1.2                | 1.4  | V                 |               |
|                                  | Reverse current                      | $I_R$             | $V_R=4\text{V}$  | —   | —                  | 10   | $\mu\text{A}$     |               |
|                                  | Terminal capacitance                 | $C_t$             | $V=0, f=1\text{kHz}$   | —   | 30                 | 250  | pF                |               |
| Output                           | Collector dark current               | $I_{CEO}$         | $V_{CE}=50\text{V}, I_F=0$   | —   | —                  | 100  | nA                |               |
|                                  | Collector-emitter breakdown voltage  | $BV_{CEO}$        | $I_C=0.1\text{mA}, I_F=0$  | 70  | —                  | —    | V                 |               |
|                                  | Emitter-collector breakdown voltage  | $BV_{ECO}$        | $I_E=10\mu\text{A}, I_F=0$   | 6   | —                  | —    | V                 |               |
| Transfer characteristics         | Collector current                    | PC3H71xNIP Series | $I_F=0.5\text{mA}, V_{CE}=5\text{V}$   | 0.5   | —                  | 3.5  | mA                |               |
|                                  |                                      | PC3Q71xNIP Series |  |   |                    | 3.0  |                   |               |
|                                  | Collector-emitter saturation voltage | $V_{CE(sat)}$     | $I_F=10\text{mA}, I_C=1\text{mA}$  | —   | —                  | 0.2  | V                 |               |
|                                  | Isolation resistance                 | $R_{ISO}$         | DC500V 40 to 60%RH   | $5 \times 10^{10}$                                | $1 \times 10^{11}$ | —    | $\Omega$          |               |
|                                  | Floating capacitance                 | $C_f$             | $V=0, f=1\text{MHz}$   | —   | 0.6                | 1.0  | pF                |               |
|                                  | Response time                        | Rise time         | $t_r$  | $V_{CE}=2\text{V}, I_C=2\text{mA}, R_L=100\Omega$ | —                  | 4    | 18                | $\mu\text{s}$ |
|                                  |                                      | Fall time         | $t_f$  |   | —                  | 3    | 18                | $\mu\text{s}$ |
| *1 Common mode rejection voltage |                                      | CMR               | $T_a=25^\circ\text{C}, R_L=470\Omega, V_{CM}=1.5\text{kV (peak)}, I_F=0\text{mA}, V_{CC}=9\text{V}, V_{np}=100\text{mV}$ | 10  | —                  | —    | kV/ $\mu\text{s}$ |               |

\*1 Refer to Fig.1.

Fig.1 Test Circuit for Common Mode Rejection Voltage

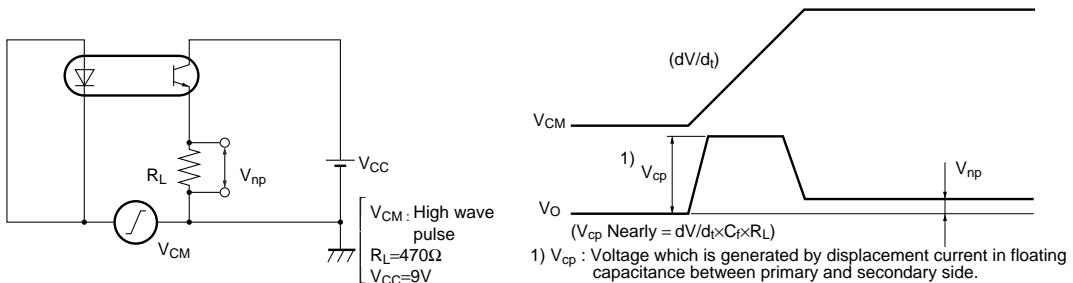


Fig.2 Forward Current vs. Ambient Temperature

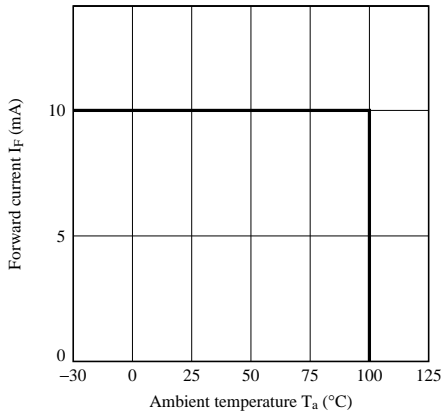
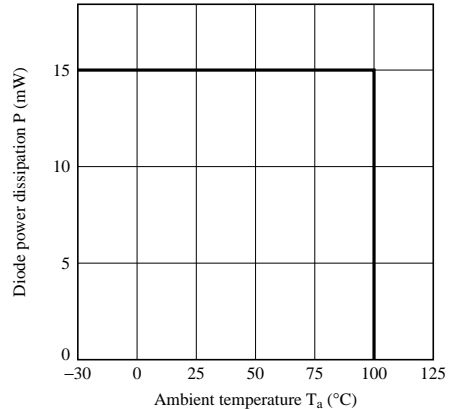
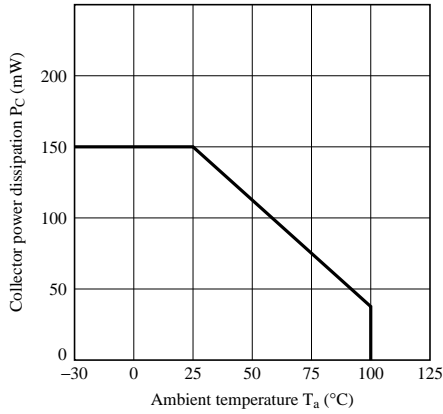


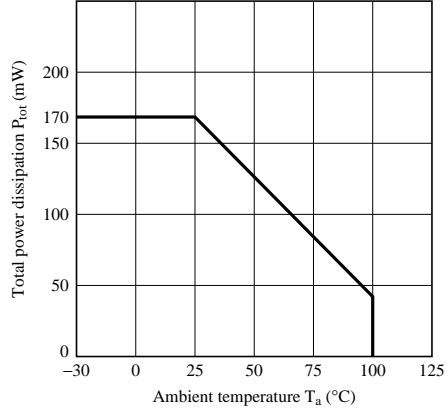
Fig.3 Diode Power Dissipation vs. Ambient Temperature



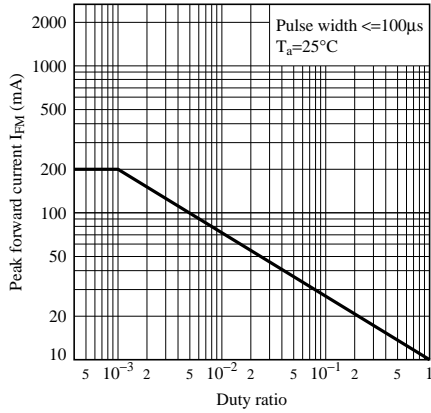
**Fig.4 Collector Power Dissipation vs. Ambient Temperature**



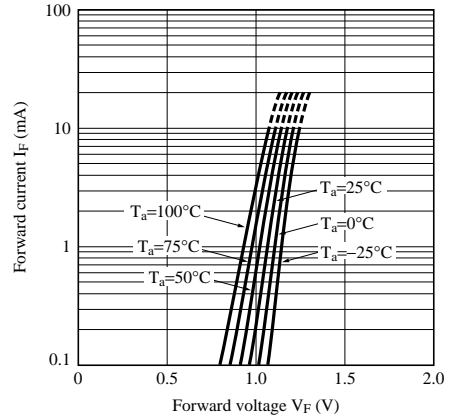
**Fig.5 Total Power Dissipation vs. Ambient Temperature**



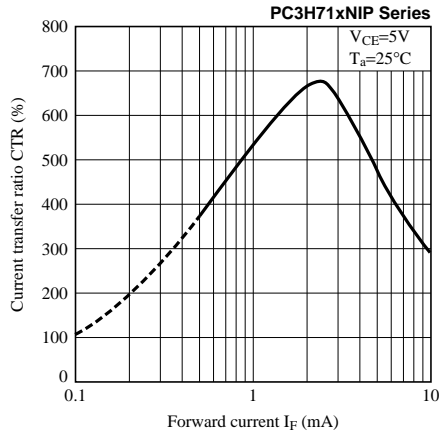
**Fig.6 Peak Forward Current vs. Duty Ratio**



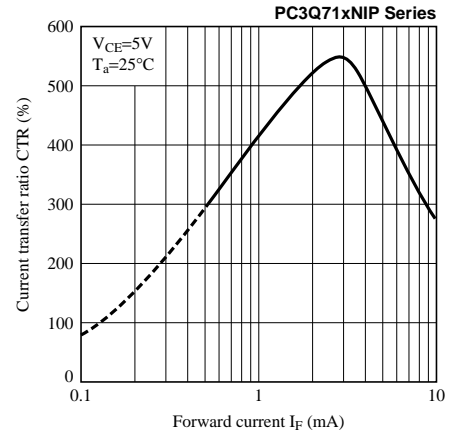
**Fig.7 Forward Current vs. Forward Voltage**



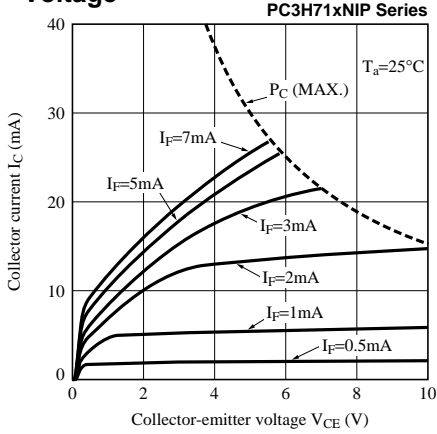
**Fig.8 Current Transfer Ratio vs. Forward Current**



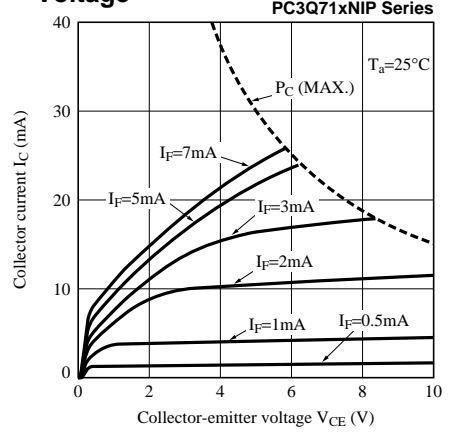
**Fig.9 Current Transfer Ratio vs. Forward Current**



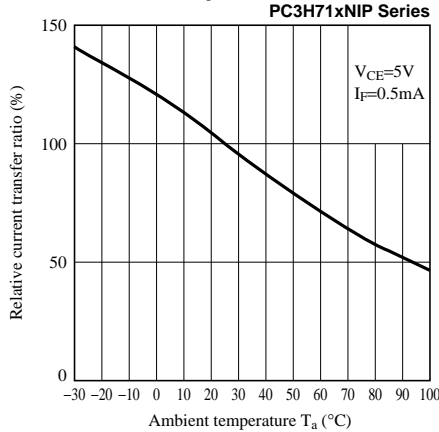
**Fig.10 Collector Current vs. Collector-emitter Voltage**



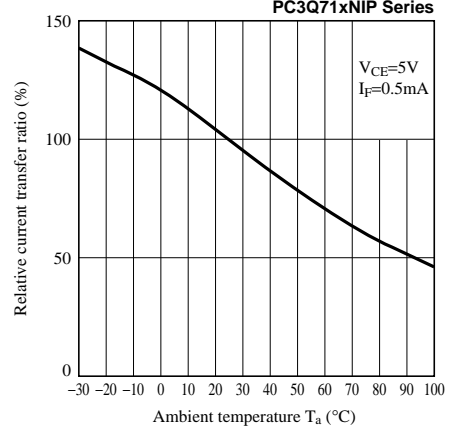
**Fig.11 Collector Current vs. Collector-emitter Voltage**



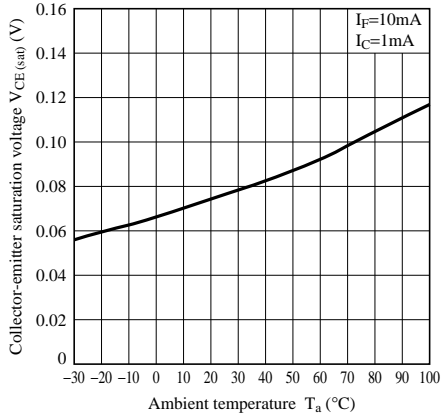
**Fig.12 Relative Current Transfer Ratio vs. Ambient Temperature**



**Fig.13 Relative Current Transfer Ratio vs. Ambient Temperature**



**Fig.14 Collector - emitter Saturation Voltage vs. Ambient Temperature**



**Fig.15 Collector Dark Current vs. Ambient Temperature**

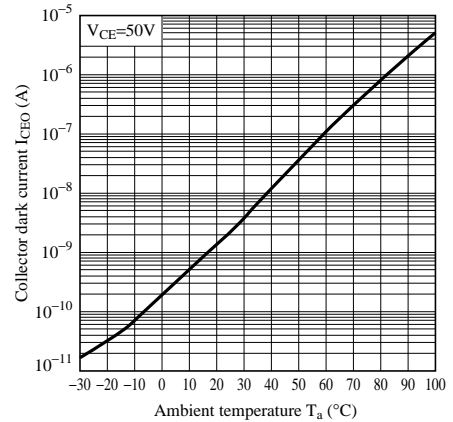


Fig.16 Response Time vs. Load Resistance

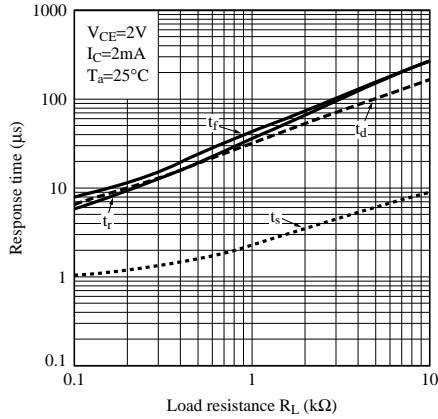


Fig.18 Test Circuit for Response Time

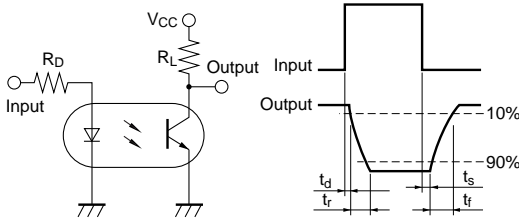


Fig.20 Collector-emitter Saturation Voltage vs. Forward Current

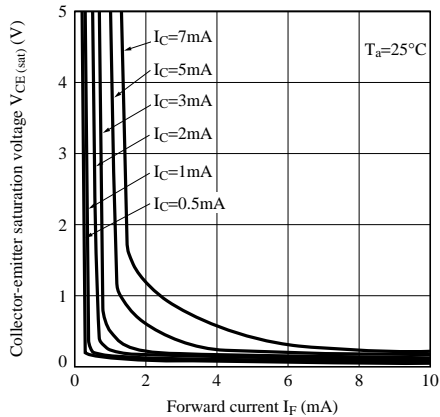


Fig.17 Response Time vs. Load Resistance (Saturation)

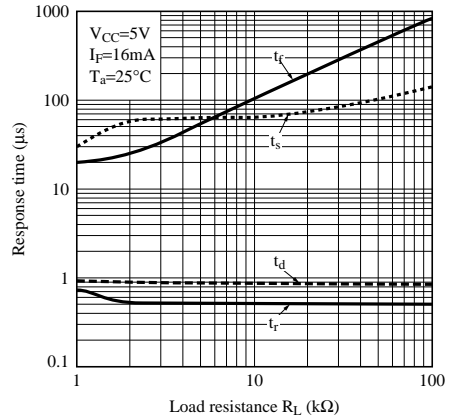


Fig.19 Voltage Gain vs Frequency

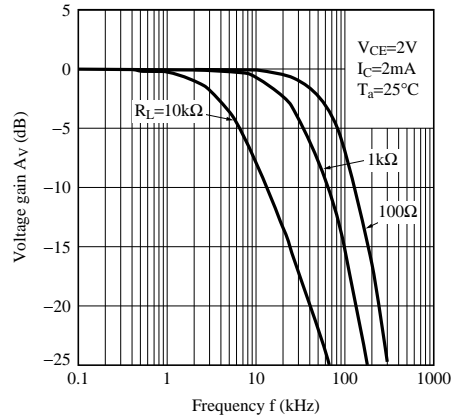


Fig.21 Reflow Soldering

Only one time soldering is recommended within the temperature profile shown below.

