

# PC814X

## AC Input Photocoupler

※ Lead forming type (I type) and taping reel type (P type) are also available. (PC814XI/PC814XP)

### ■ Features

1. AC input
2. High isolation voltage between input and output ( $V_{iso(rms)}$ :5kV)
3. Compact dual-in-line package
4. Current transfer ratio  
CTR:MIN. 20% at  $I_F=\pm 1\text{mA}$ ,  $V_{CE}=5\text{V}$
5. Recognized by UL, file No. E64380 (model No **PC814**)

### ■ Applications

1. Programmable controllers
2. Telephones
3. Facsimiles

### ■ Absolute Maximum Ratings ( $T_a=25^\circ\text{C}$ )

|        | Parameter                   | Symbol         | Rating      | Unit             |
|--------|-----------------------------|----------------|-------------|------------------|
| Input  | Forward current             | $I_F$          | $\pm 50$    | mA               |
|        | *1 Peak forward current     | $I_{FM}$       | $\pm 1$     | A                |
|        | Power dissipation           | P              | 70          | mW               |
| Output | Collector-emitter voltage   | $V_{CEO}$      | 35          | V                |
|        | Emitter-collector voltage   | $V_{ECO}$      | 6           | V                |
|        | Collector current           | $I_C$          | 50          | mA               |
|        | Collector power dissipation | $P_C$          | 150         | mW               |
|        | Total power dissipation     | $P_{tot}$      | 200         | mW               |
|        | *2 Isolation voltage        | $V_{iso(rms)}$ | 5           | kV               |
|        | Operating temperature       | $T_{opr}$      | -30 to +100 | $^\circ\text{C}$ |
|        | Storage temperature         | $T_{stg}$      | -55 to +125 | $^\circ\text{C}$ |
|        | *3 Soldering temperature    | $T_{sol}$      | 260         | $^\circ\text{C}$ |

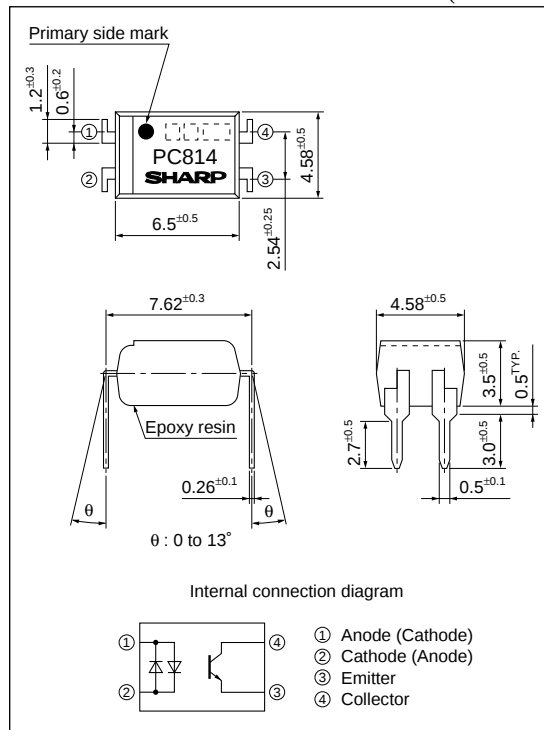
\*1 Pulse widths $\leq 100\mu\text{s}$ , Duty ratio:0.001

\*2 40 to 60%RH, AC for 1 minute

\*3 For 10s

### ■ Outline Dimensions

(Unit : mm)



Electro-optical Characteristics

(T<sub>a</sub>=25°C)

| Parameter                |                                      | Symbol                | Conditions                                                           | MIN.                                                           | TYP.             | MAX. | Unit |
|--------------------------|--------------------------------------|-----------------------|----------------------------------------------------------------------|----------------------------------------------------------------|------------------|------|------|
| Input                    | Forward voltage                      | V <sub>F</sub>        | I <sub>F</sub> =±20mA                                                | —                                                              | 1.2              | 1.4  | V    |
|                          | Peak forward voltage                 | V <sub>FM</sub>       | I <sub>FM</sub> =±0.5V                                               | —                                                              | —                | 3.0  | V    |
|                          | Terminal capacitance                 | C <sub>t</sub>        | V=0, f=1kHz                                                          | —                                                              | 50               | 250  | pF   |
| Output                   | Collector dark current               | I <sub>CEO</sub>      | V <sub>CE</sub> =20V, I <sub>F</sub> =0                              | —                                                              | —                | 100  | nA   |
| Transfer characteristics | Collector current                    | I <sub>C</sub>        | I <sub>F</sub> =±1mA, V <sub>CE</sub> =5V                            | 0.2                                                            | —                | 3.0  | mA   |
|                          | Collector-emitter saturation voltage | V <sub>CE (sat)</sub> | I <sub>F</sub> =±20mA, I <sub>C</sub> =1mA                           | —                                                              | 0.1              | 0.2  | V    |
|                          | Isolation resistance                 | R <sub>ISO</sub>      | DC500V, 40 to 60%RH                                                  | 5×10 <sup>10</sup>                                             | 10 <sup>11</sup> | —    | Ω    |
|                          | Floating capacitance                 | C <sub>f</sub>        | V=0, f=1MHz                                                          | —                                                              | 0.6              | 1.0  | pF   |
|                          | Cut-off frequency                    | f <sub>c</sub>        | V <sub>CE</sub> =5V, I <sub>C</sub> =2mA, R <sub>L</sub> =100Ω, −3dB | 15                                                             | 80               | —    | kHz  |
|                          | Response time                        | Rise time             | t <sub>r</sub>                                                       | V <sub>CE</sub> =2V, I <sub>C</sub> =2mA, R <sub>L</sub> =100Ω | —                | 4    | 18   |
| Fall time                |                                      | t <sub>f</sub>        | —                                                                    |                                                                | 3                | 18   | μs   |

Rank Table

(I<sub>F</sub>=±1mA, V<sub>CE</sub>=5V, T<sub>a</sub>=25°C)

| Model No. | Rank mark    | I <sub>C</sub> (mA) |
|-----------|--------------|---------------------|
| PC814X    | A or no mark | 0.2 to 3.0          |
| PC814X1   | A            | 0.5 to 1.5          |

Fig.1 Forward Current vs. Ambient Temperature

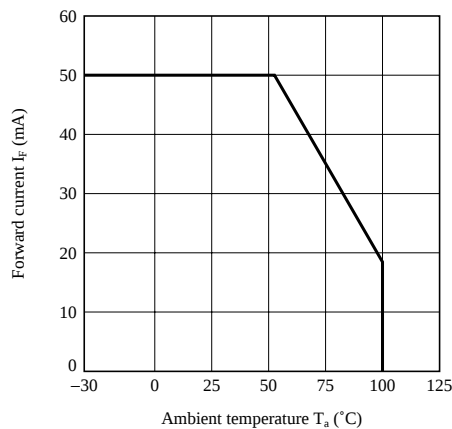


Fig.2 Collector Power Dissipation vs. Ambient Temperature

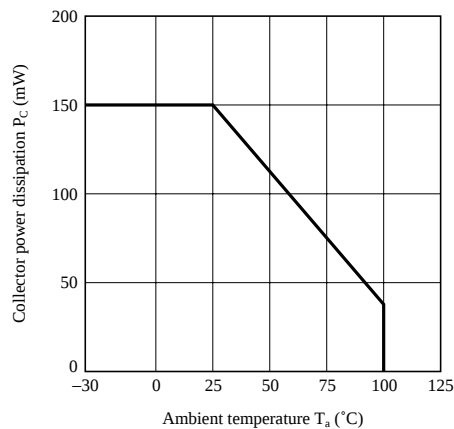


Fig.3 Peak Forward Current vs. Duty Ratio

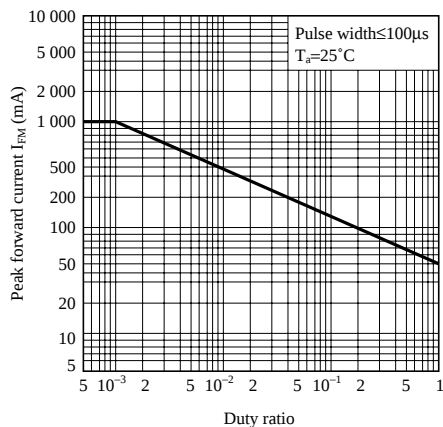


Fig.4 Forward Current vs. Forward Voltage

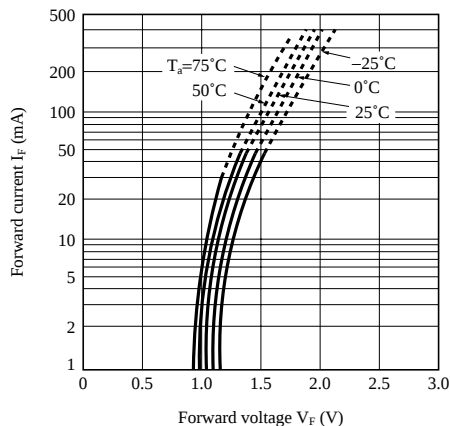


Fig.5 Current Transfer Ratio vs. Forward Current

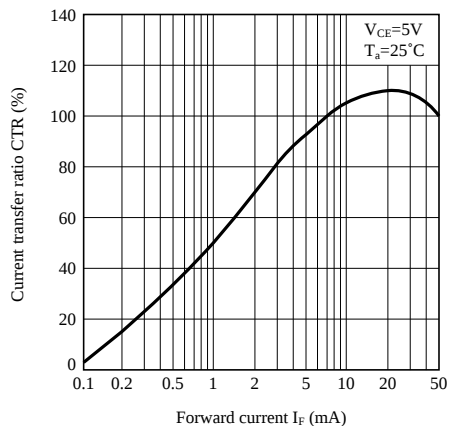


Fig.6 Collector Current vs. Collector-emitter Voltage

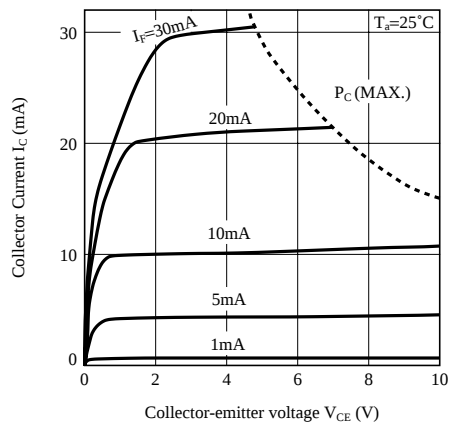


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

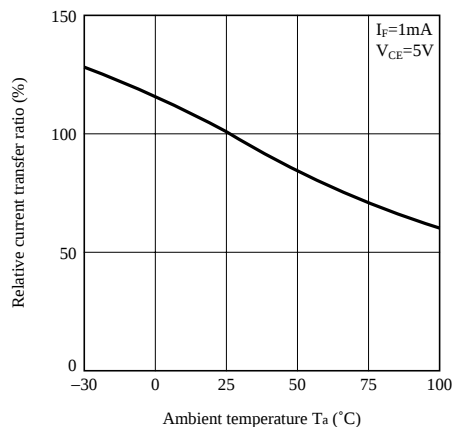
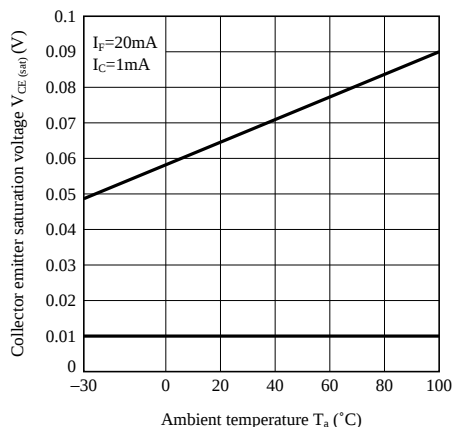
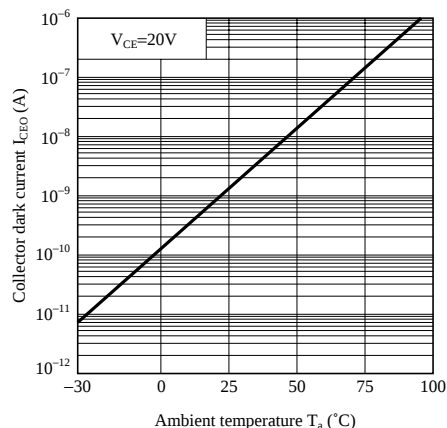
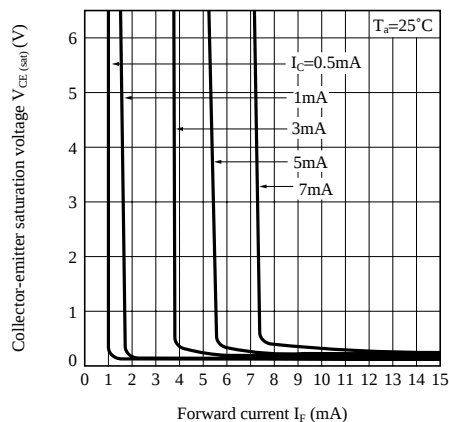
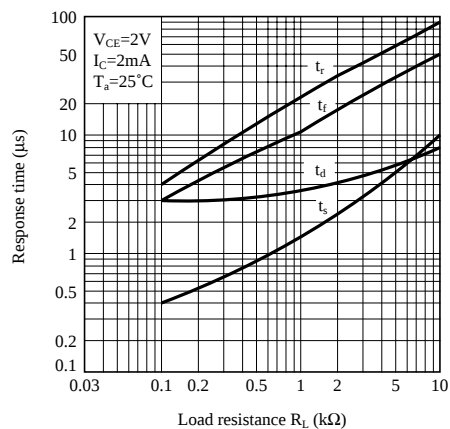
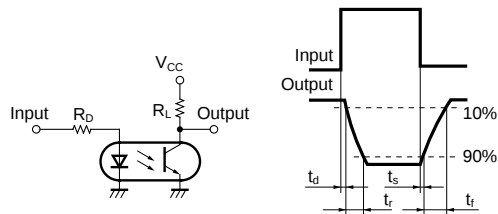
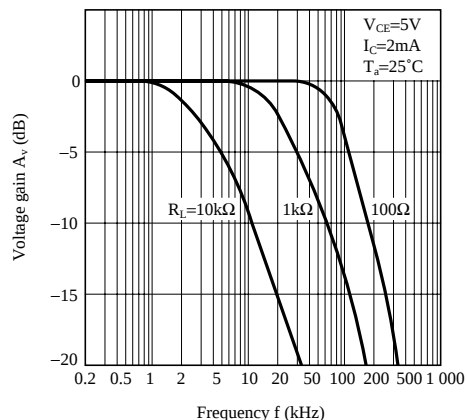


Fig.8 Collector - emitter Saturation Voltage vs. Ambient Temperature



**Fig.9 Collector Dark Current vs. Ambient Temperature**

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

**Fig.11 Response Time vs. Load Resistance**

**Test Circuit for Response Time**

**Fig.12 Frequency Response**

**Test Circuit for Frequency Response**
