# PC812

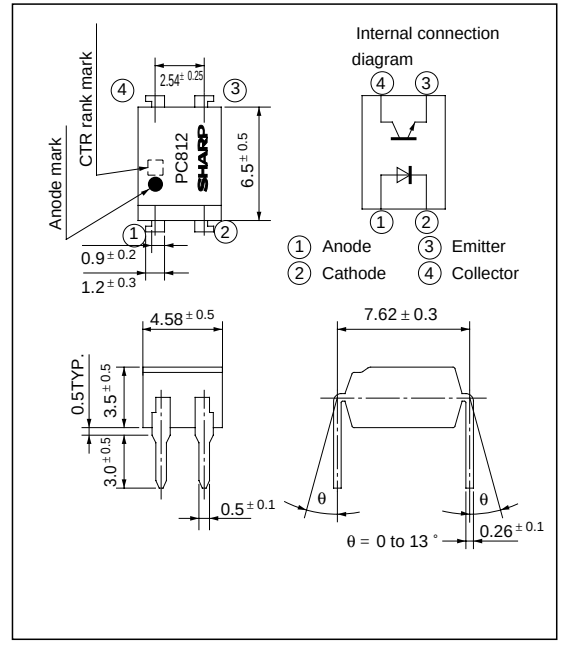
## High Noise Resistance Type Photocoupler

### ■ Features

1. High noise reduction
   (Common mode rejection voltage
   $V_{CM}$ : TYP. 1.5kV at dv/dt = 2kV/μs,
   $R_L$ = 470Ω, $V_{np}$ = 100mV )
2. High current transfer ratio
   (CTR : MIN. 90% at $I_F$ = 5mA, $V_{CE}$ = 5V)
3. High isolation voltage between input and output ( $V_{iso}$ : 5 000V $_{rms}$ )
4. Compact dual-in-line package

### ■ Outline Dimensions

( Unit : mm)




### ■ Applications

1. Motor-control circuits
2. Computer terminals
3. System appliances, measuring instruments
4. Signal transmission between circuits of different potentials and impedances

### ■ Absolute Maximum Ratings

($T_a$= 25°C)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input | Forward current | $I_F$ | 50 | mA |
| | *1Peak forward current | $I_{FM}$ | 1 | A |
| | Reverse voltage | $V_R$ | 6 | V |
| | 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 |
| *2Isolation voltage | | $V_{iso}$ | 5 000 | $V_{rms}$ |
| Operating temperature | | $T_{opr}$ | - 30 to + 100 | °C |
| Storage temperature | | $T_{stg}$ | - 55 to + 125 | °C |
| *3Soldering temperature | | $T_{sol}$ | 260 | °C |

*1 Pulse width <=100μs, Duty ratio : 0.001
*2 40 to 60% RH, AC for 1 minute
*3 For 10 seconds

## ■ Electro-optical Characteristics

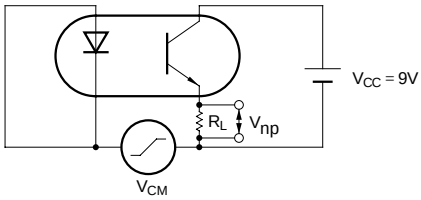
(Ta= 25˚C)

| Parameter | | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|---|---|
| Input | Forward voltage | | $V_F$ | $I_F$ = 20mA | - | 1.2 | 1.4 | V |
| | Peak forward voltage | | $V_{FM}$ | $I_{FM}$ = 0.5A | - | - | 3.0 | V |
| | Reverse current | | $I_R$ | $V_R$ = 4V | - | - | 10 | μA |
| | Terminal capacitance | | $C_t$ | V = 0, f = 1kHz | - | 30 | 200 | pF |
| Output | Collector dark current | | $I_{CEO}$ | $V_{CE}$ = 20V, $I_F$ = 0 | - | - | $10^{-7}$ | A |
| Transfer characteristics | *4 Current transfer ratio | | CTR | $I_F$ = 5mA, $V_{CE}$ = 5V | 90 | - | 480 | % |
| | Collector-emitter saturation voltage | | $V_{CE(sat)}$ | $I_F$ = 20mA, $I_C$ = 1mA | - | 0.1 | 0.2 | V |
| | Isolation resistance | | $R_{ISO}$ | DC500V, 40 to 60% RH | $5 \times 10^{10}$ | $10^{11}$ | - | Ω |
| | Floating capacitance | | $C_f$ | V = 0, f = 1MHz | - | 0.6 | 1.0 | pF |
| | Cut-off frequency | | $f_c$ | $V_{CE}$ = 5V, $I_C$ = 2mA, $R_L$ = 100Ω, - 3dB | 15 | 80 | - | kHz |
| | *4 Response time | Rise time | $t_r$ | $V_{CE}$ = 2V, $I_C$ = 2mA, $R_L$ = 100Ω | - | 4 | 18 | μs |
| | | Fall time | $t_f$ | | - | 5 | 20 | μs |
| | *5 Common mode rejection voltage | | $V_{CM}$ | dV/dt = 2kV/μs, $R_L$ = 470Ω, $V_{np}$ = 100mV, $I_F$ = 0 | - | 1.5 | - | kV |

*4 Classification table of current transfer ratio is shown below.

| Model No. | Rank mark | CTR (%) | $t_r$(μs) | | $t_f$(μs) | |
|---|---|---|---|---|---|---|
| | | | TYP. | MAX. | TYP. | MAX. |
| **PC812A** | A | 90 to 180 | 3 | 14 | 4 | 16 |
| **PC812B** | B | 150 to 180 | 4 | 16 | 5 | 18 |
| **PC812C** | C | 240 to 480 | 5 | 18 | 7 | 20 |
| **PC812** | A, B or C | 90 to 480 | 4 | 18 | 5 | 20 |
| Measurement conditions | | I = 5mA<br>$V_{CE}$ = 5V<br>$T_a$ = 25˚C | $V_{CE}$ = 2V<br>$I_C$ = 2mA<br>$R_L$ = 100Ω<br>$T_a$ = 25˚C | | | |

*5 Test Circuit for $V_{CM}$




$V_{CM}$ : Common mode rejection voltage (higher value of pulse wave)

dv/dt : Rising factor of voltage

Test condition
$V_{np}$ = 100mV, $R_L$ = 470Ω
dv/dt = 2kV/μs, $I_F$ = 0

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

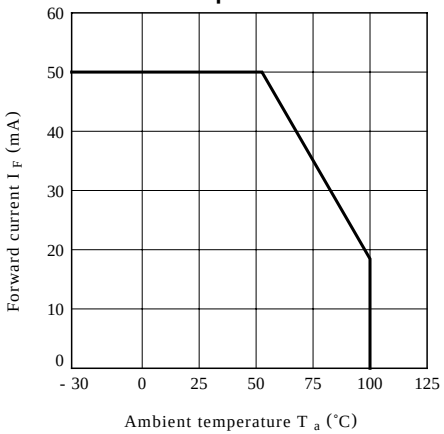



**Fig. 2 Collector Power Dissipation vs. Ambient Temperature**

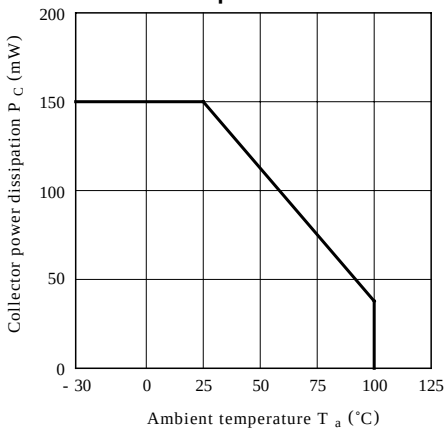


**Fig. 3 Peak Forward Current vs. Duty Ratio**

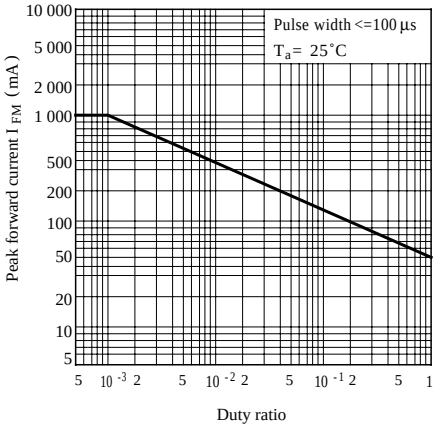



**Fig. 4 Forward Current vs. Forward Voltage**

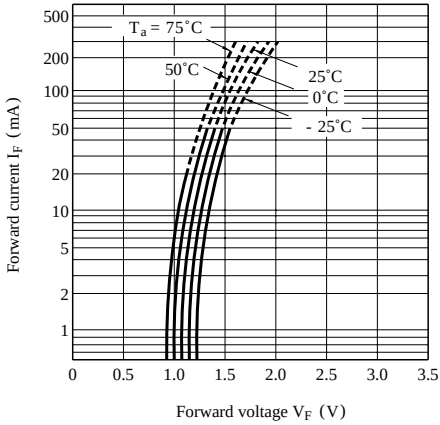



**Fig. 5 Current Transfer Ratio vs. Forward Current**

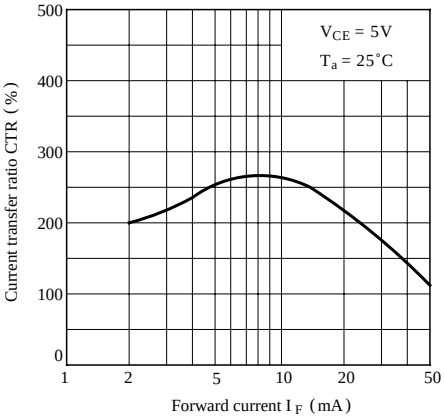



**Fig. 6 Collector Current vs. Collector-emitter Voltage**

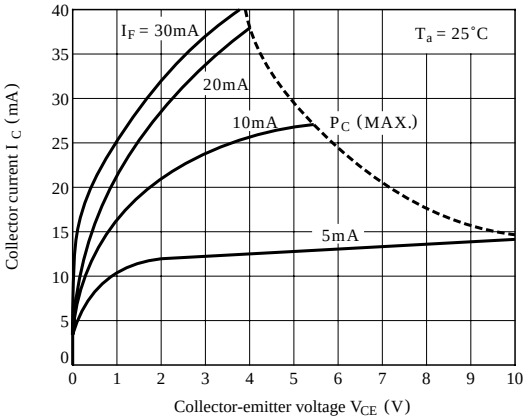



**Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature**

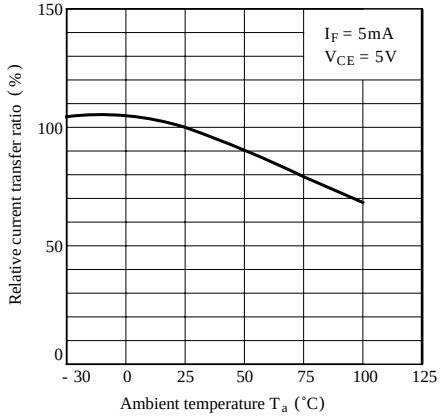



**Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature**

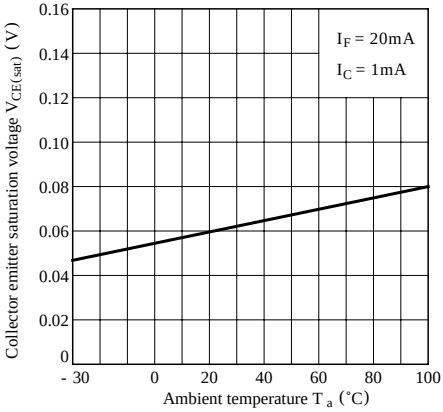


**Fig. 9 Collector Dark Current vs. Ambient Temperature**

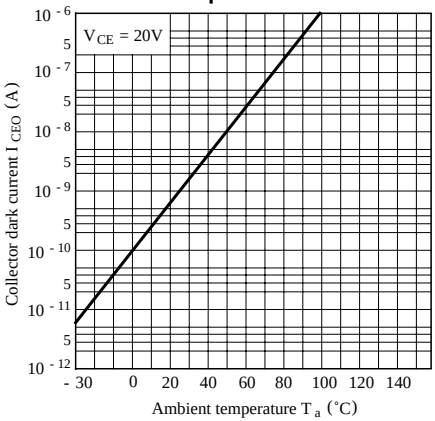



**Fig.10 Response Time vs. Load Resistance**

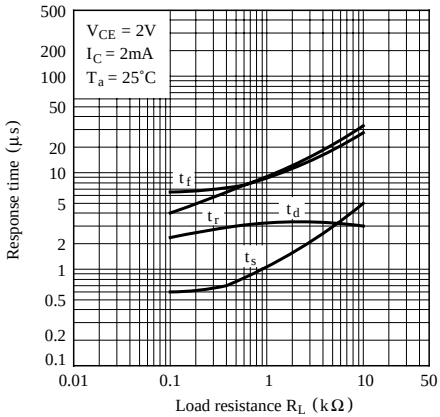
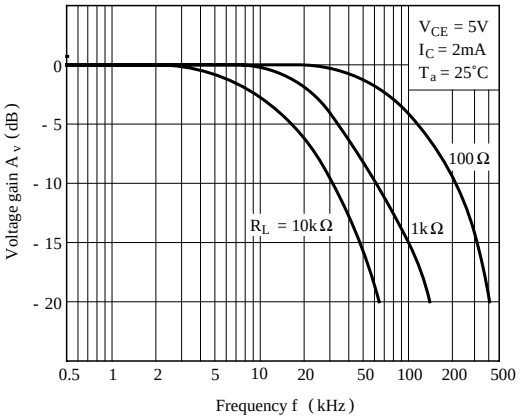



**Fig.11 Frequency Response**




**Test Circuit for Response Time**

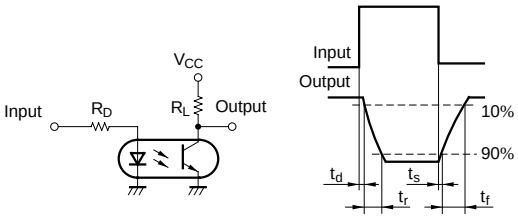
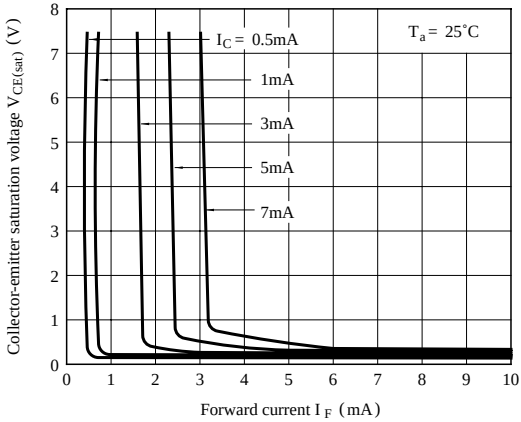
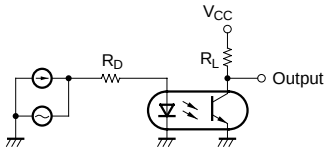



**Fig.12 Collector-emitter Saturation Voltage vs. Forward Current**




**Test Circuit for Frepuency Response**




● Please refer to the chapter "Precautions for Use"