# PC812

## High Noise Resistance Type Photocoupler

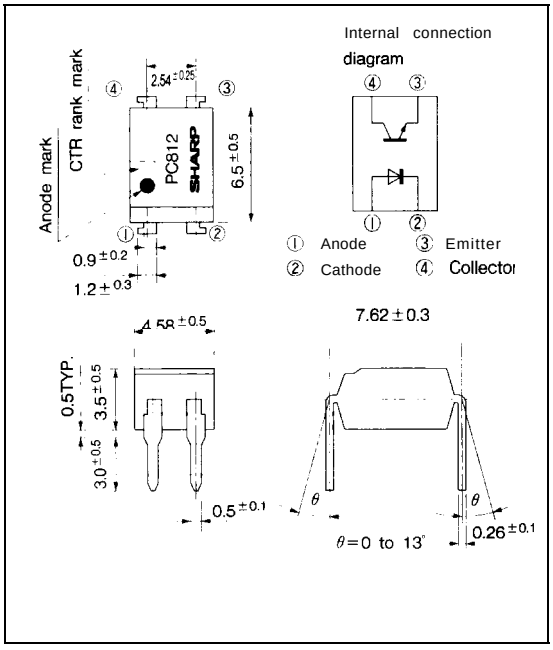
### ■ Features

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

### ■ Applications

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

### ■ Outline Dimensions (Unit : mm)




### ■ Absolute Maximum Ratings ($T_a$=25℃)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input | Forward current | $I_F$ | 50 | mA |
| | *1 Peak 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 |
| *isolation voltage | | $V_{iso}$ | 5 000 | $V_{rms}$ |
| Operating temperature | | $T_{opr}$ | -30 to +100 | ℃ |
| Storage temperature | | $T_{stg}$ | -55 to +125 | ℃ |
| *3Soldering temperature | | $T_{sol}$ | 260 | ℃ |

*1 Pulse width ≦100 μs, Duty ratio= 0.001
*2 40 to 60YOR11, AC for 1minute
*3 For 10 seconds

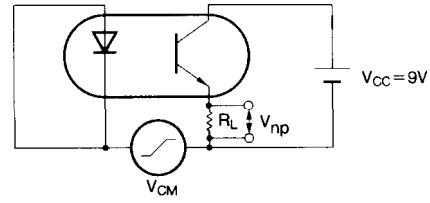
## ■ Electro-optical Characteristics (Ta=25℃)

| Parameter | | | Symbol | Conditions | MIN. | TYP. | MAX | Unit |
|---|---|---|---|---|---|---|---|---|
| Input | Forward voltage | | $V_F$ | $I_F$=20mA | | 1.2 | 1.4 | V |
| | Peak forward voltage | | $V_{FM}$ | $I_{FM}$=().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 charac teristics | *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 | $5\times10^{10}$ | $10^{11}$ | − | Ω |
| | Floating capacitance | | $C_f$ | V=O, 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 |
| | 'Response time | Rise time | $t_r$ | $V_{CE}$=2V, $I_C$=2mA, $R_L$=100Ω | | 4 | 18 | μs |
| | | Fall time | tf | | | 5 | 20 | μs |
| | *5Common 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) TYP. | $t_r$ (μs) MAX. | $t_f$ (μs) TYP. | $t_f$ (μs) MAX. |
|---|---|---|---|---|---|---|
| PC812A | A | 90 to 180 | 3 | 14 | 4 | 16 |
| PC812B | B | 150 to 300 | 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 $V_{CE}$=5V $T_a$=25℃ | $V_{CE}$=2V $I_C$=2mA $R_L$=100Ω $T_a$=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**

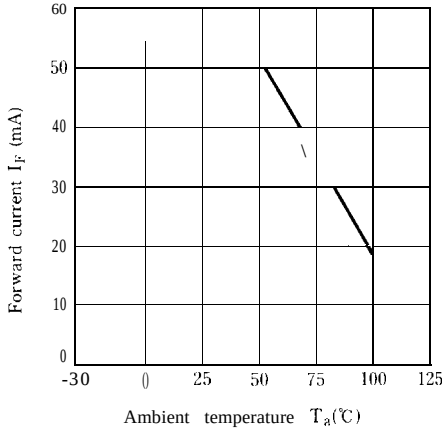



**Fig. 2 Collector Power Dissipation vs. Ambient Temperature**

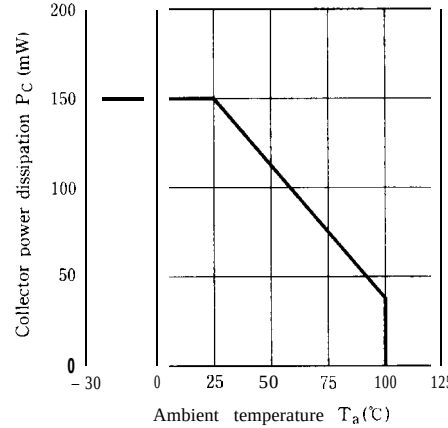


**Fig. 3 Peak Forward Current vs. Duty Ratio**

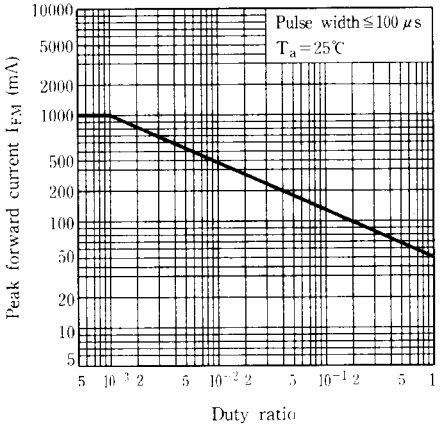



**Fig. 4 Forward Current vs. Forward Voltage**

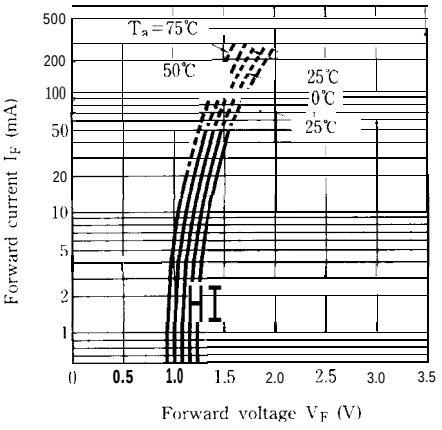



**Fig. 5 Current Transfer Ratio vs. Forward Current**

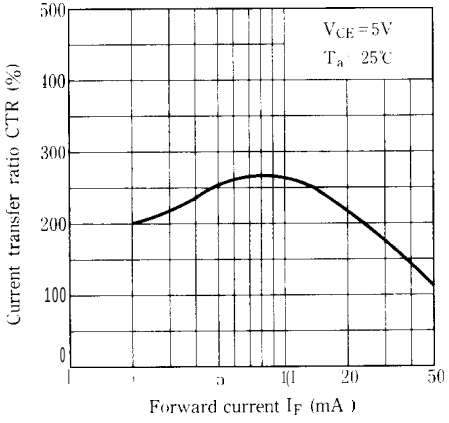



**Fig. 6 Collector Current vs. Collector-emitter Voltage**

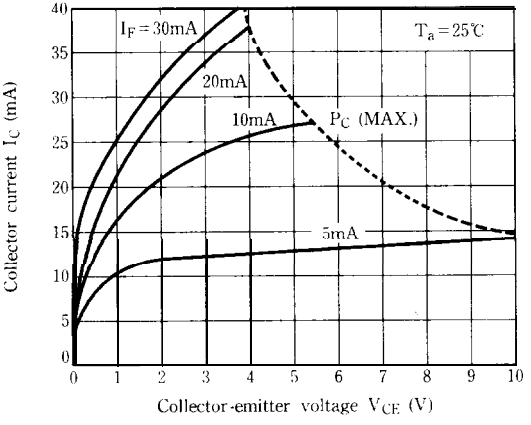



**Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature**

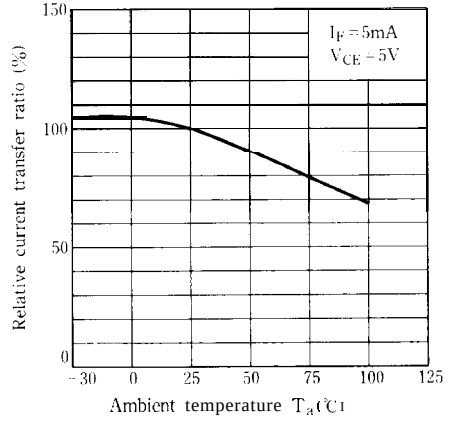



**Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature**

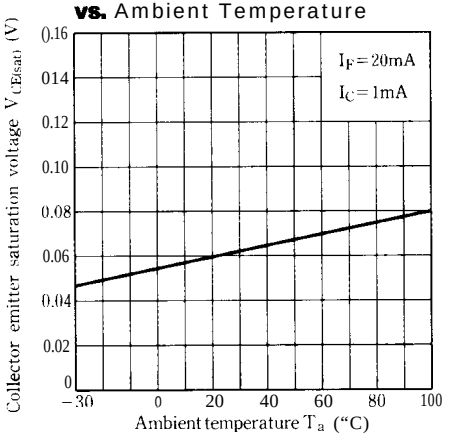



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**Fig. 9 Collector Dark Current vs. Ambient Temperature**

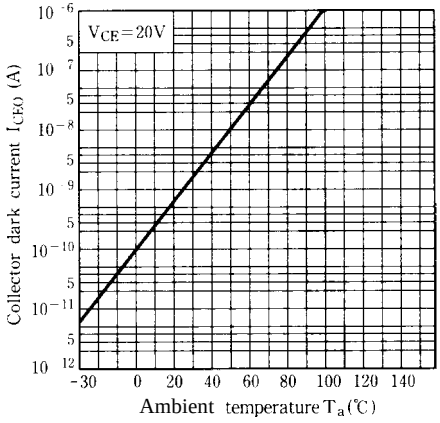



**Fig.10 Response Time vs. Load Resistance**

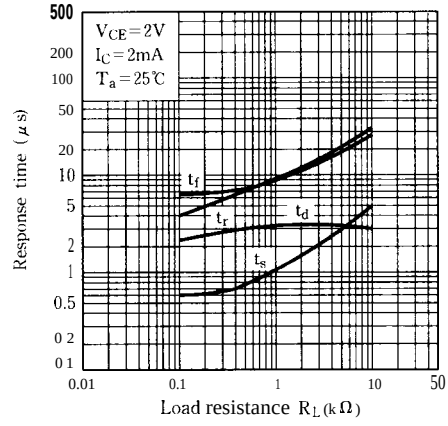
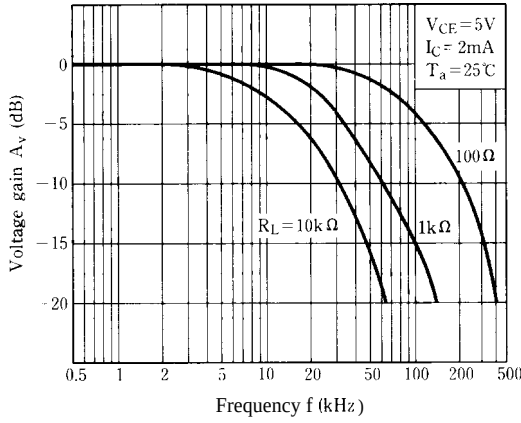



Fig.11 **Frequency Response**




**Test Circuit for Response Time**

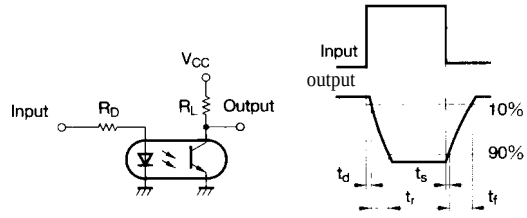
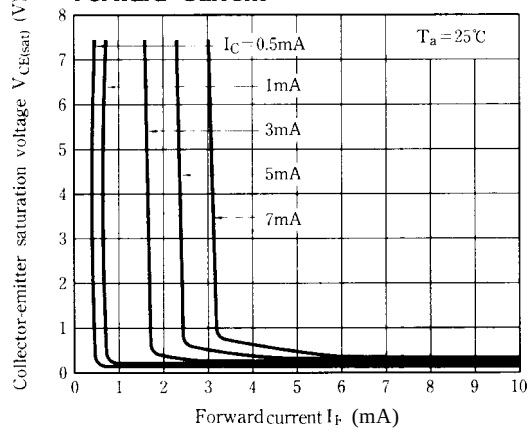
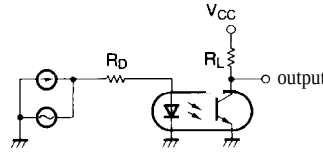



**Fig.12 Collector-emitter Saturation Voltage vs. Forward Current**




**Test Circuit for Frepuency Response**




. Please refer to the chapter "Precautions for Use" (Page 78 to 93)