# PC813 Series

## AC Input Response & Nigh Noise Reduction Type Photocoupler

### ■ Features

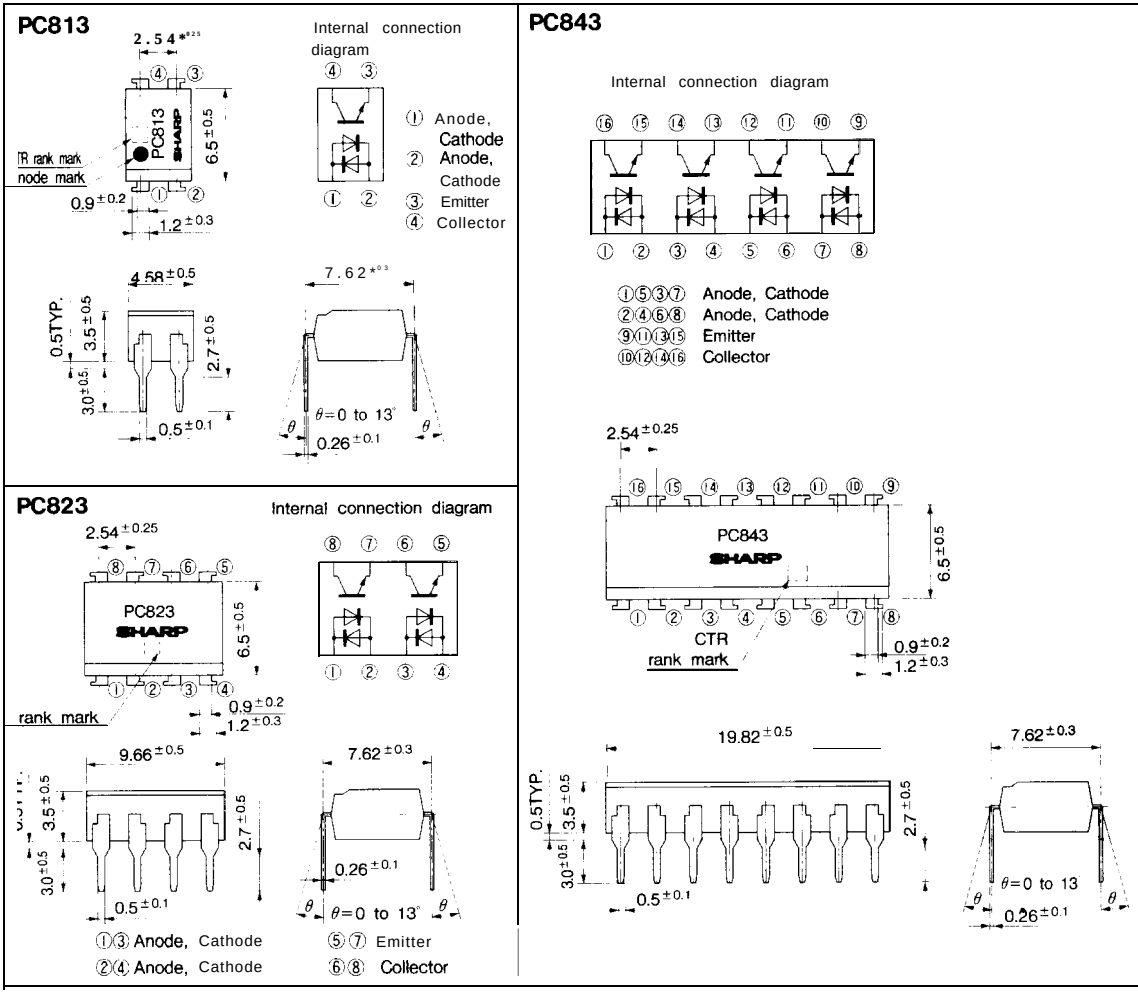
1. High instantaneous common mode rejection voltage ($CM_H$ : TYP.2kV/$\mu$s)
2. AC input response
3. Compact dual-in-line package
   **PC813** (1ch), **PC823** (2ch), **PC843** (4ch)
4. High isolation voltage between input and output ($V_{iso}$ : 5 000 $V_{rms}$)
5. Recognized by UL, file No. E64380

### ■ Applications

1. Telephones (PC813)
2. Programmable controllers
   (**PC823**/**PC843**)
3. System appliances, measuring instruments
4. Signal transmission between circuits of different potentials and impedances

### ■ Outline Dimensions

(Unit : mm)



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

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input | Forward current | $I_F$ | ±50 | mA |
| | *1 Peak forward current | $I_{FM}$ | ±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 | | Plot | 200 | mW |
| *2 Isolation voltage | | $V_{iso}$ | 5 000 | $V_{rms}$ |
| Operating temperature | | $T_{opr}$ | -30 to + 100 | °C |
| Storage temperature | | $T_{stg}$ | −55 to +125 | °C |
| *3 Soldering temperature | | $T_{sol}$ | 260 | °C |

*1 Pulse width ≦ 100" μs, 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 | | $V_F$ | IF= ±20mA | − | 1,2 | 1.4 | v |
| | Peak forward voltage | | $V_{FM}$ | $I_{FM}$ = ±0.5A | – | – | 3.0 | V |
| | Terminal capacitance | | $C_t$ | V=0, f=1kHz | – | 50 | 250 | pF |
| output | Collector dark current | | $I_{CEO}$ | $V_{CE}$=20V, $I_F$=0 | | − | $10^{-7}$ | A |
| Transfer characteristics | *4 Current transfer ratio | | CTR | $I_F$=±1mA, $V_{CE}$=5V | 20 | | 200 | % |
| | Collector -emitter saturation voltage | | $V_{CE(sat)}$ | $I_F$=±20mA, $I_C$=1mA | | 0.1 | 0.2 | V |
| | Isolation voltage | | $R_{ISO}$ | DC500V, 40 to 60%RH | 5x $10^{10}$ | $10^{11}$ | − | 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 | 15 | _80 | | kHz |
| | Response time | Rise time | $t_r$ | $V_{CE}$=2V, $I_C$=2mA | | 4 | 18 | μs |
| | | Fall time | $t_f$ | $R_L$=100Ω | − | 5 | 20 | μs |
| | *5 Instantaneous common mode rejection voltage "Output high level" | | $CM_H$ | $V_{CM}$=600V, $I_F$=0 VO=2V, $R_L$=1.9kΩ | | 2 | − | kV/μs |
| | *5 Instantaneous common mode rejection voltage "Output low level" | | CM] | $V_{CM}$=600V, $I_F$=16mA $V_O$=0.8V, | | ^ | | .... |

※4 Classification table of current transfer ratio is shown below

| Model No. | Rank Mark | CTR (%) |
|---|---|---|
| PC813A | A | 50 to 150% |
| **PC823A** | | |
| **PC843A** | | |
| **PC813** | A or no mark | 20 to 200% |
| **PC823** | | |
| **PC843** | | |

***5 Test Circuit for instantaneous common mode rejection voltage**

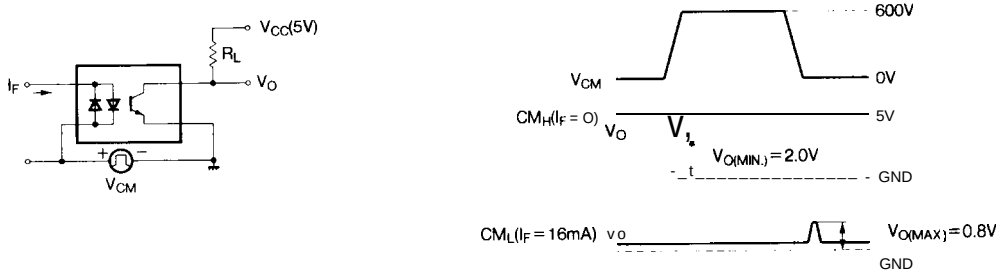



**Fig. 1 Forward Current vs. Ambient Temperature**

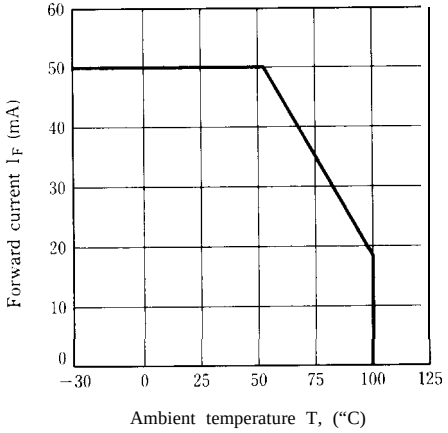



**Fig. 2 Collector Power Dissipation vs. Ambient Temperature**

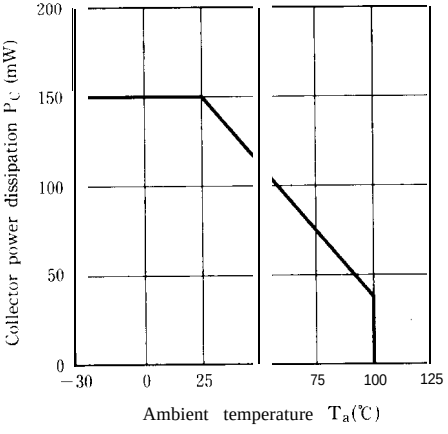



**Fig. 3 Peak Forward Current vs. Duty Ratio**

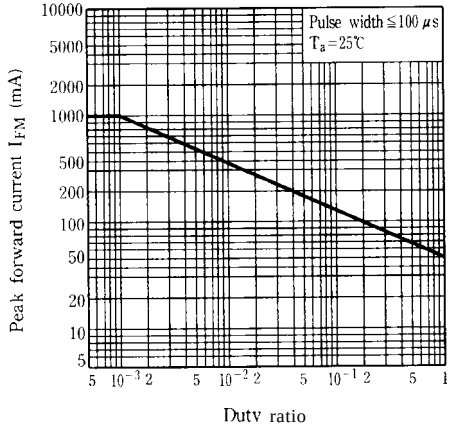



Fig. 4 Forward **Current vs. Forward Voltage**

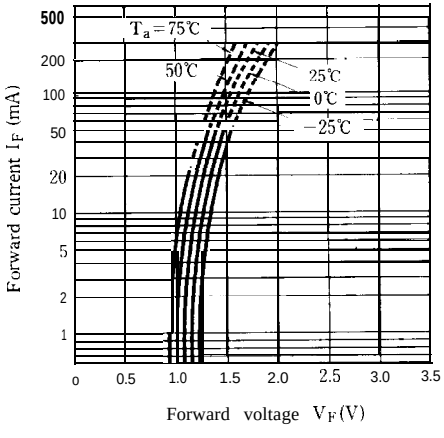


**Fig. 5 currant Transfer Ratio vs. Forward Current**

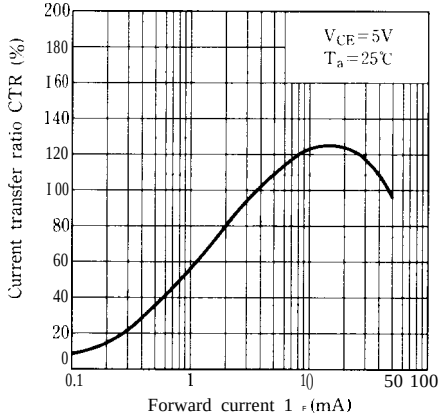



**Fig. 6 Collector Current vs. Collector-emitter Voltage**

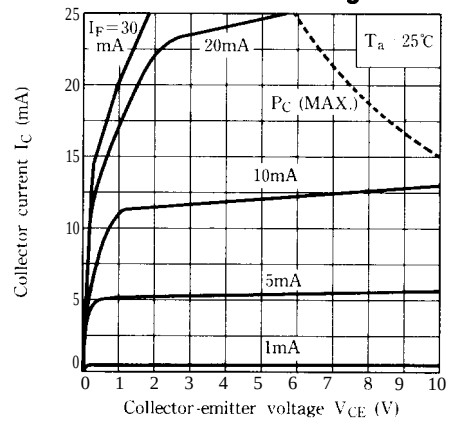



**Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature**

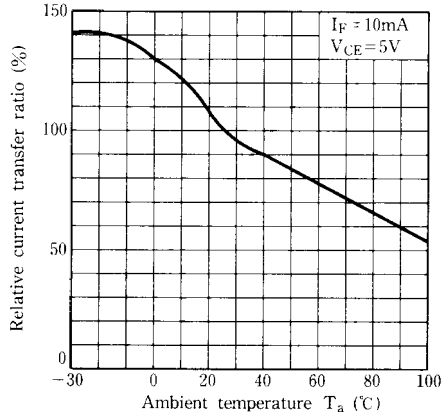



**Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature**

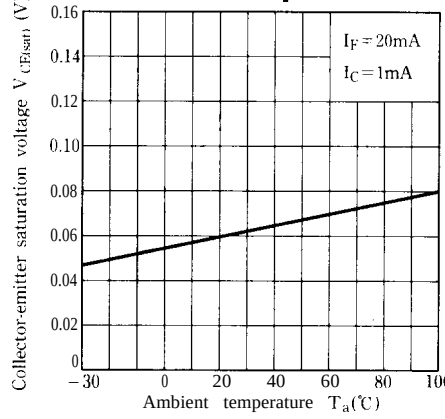



**Fig. 9 Collector Dark Current vs. Ambient Temperature**

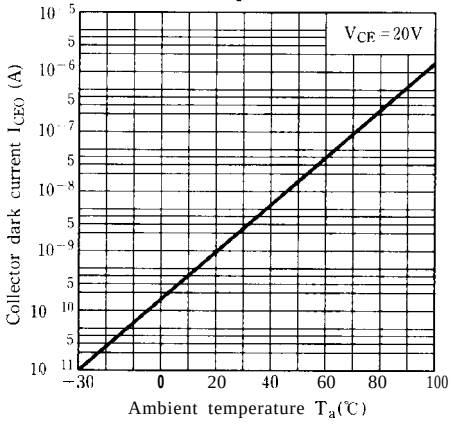



**Fig.10 Response Time vs. Load Resistance**

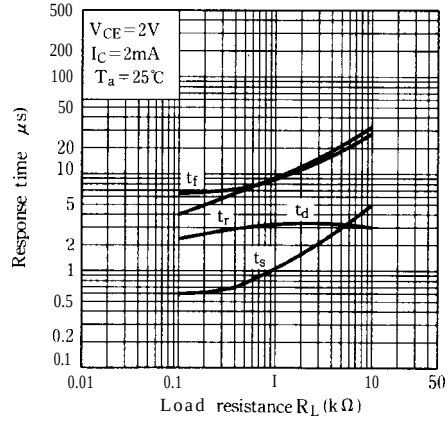
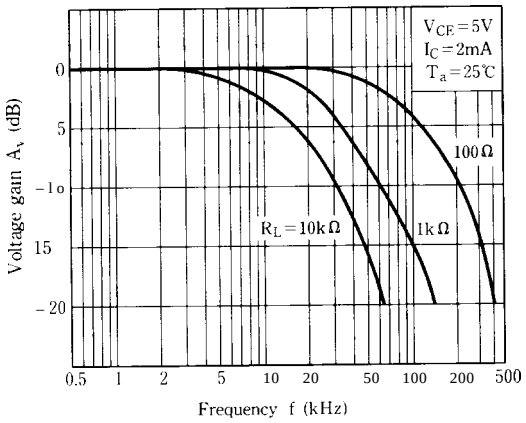


**Fig.11 Frequency Response**




**Test Circuit for Response Time**

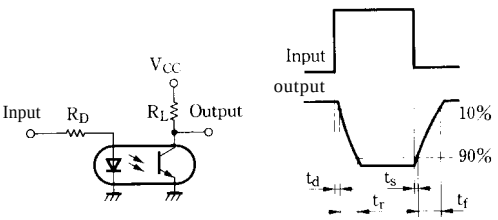
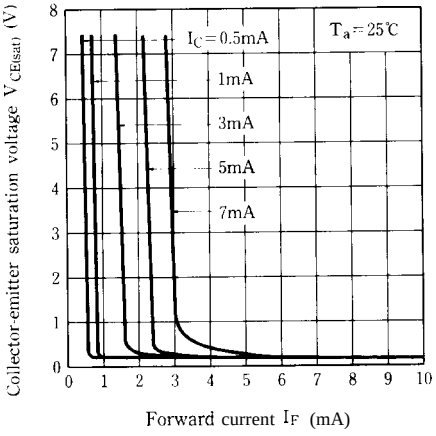
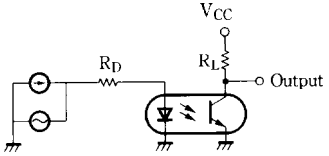



**Fig.12 Collector-emitter Saturation Voltage vs. Forward Current**




**Test Circuit for Frepuency Response**




● Please refer to the chapter “Precautions for Use” (Page 78 to 93)