

# PC812

## High Noise Resistance Type Photocoupler

### ■ Features

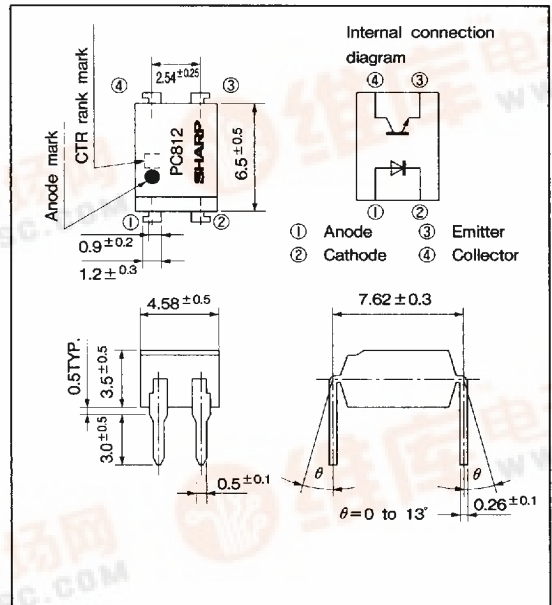
- High noise reduction  
(Common mode rejection voltage  
 $V_{CM}$ : TYP. 1.5kV at  $dV/dt=2kV/\mu s$ ,  
 $R_L=470\Omega$ ,  $V_{np}=100mW$ )
- High current transfer ratio  
(CTR: MIN. 90% at  $I_F=5mA$ ,  $V_{CE}=5V$ )
- High isolation voltage between input and output ( $V_{iso}$ : 5 000V<sub>rms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

### ■ Applications

- Motor-control circuits
- Computer terminals
- System appliances, measuring instruments
- Signal transmission between circuits of different potentials and impedances

### ■ Outline Dimensions

(Unit : mm)



### ■ Absolute Maximum Ratings

(T<sub>a</sub> = 25°C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I <sub>F</sub>	50	mA
	*1 Peak forward current	I <sub>FM</sub>	1	A
	Reverse voltage	V <sub>R</sub>	6	V
	Power dissipation	P	70	mW
Output	Collector-emitter voltage	V <sub>CEO</sub>	35	V
	Emitter-collector voltage	V <sub>ECO</sub>	6	V
	Collector current	I <sub>C</sub>	50	mA
	Collector power dissipation	P <sub>C</sub>	150	mW
	Total power dissipation	P <sub>tot</sub>	200	mW
	*2 Isolation voltage	V <sub>iso</sub>	5 000	V <sub>rms</sub>
	Operating temperature	T <sub>opr</sub>	-30 to +100	°C
	Storage temperature	T <sub>stg</sub>	-55 to +125	°C
	*3 Soldering temperature	T <sub>sol</sub>	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

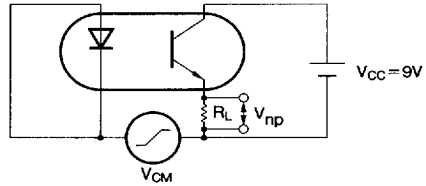
(Ta = 25°C)

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

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

Model No.	Rank mark	CTR (%)	$t_r (\mu\text{s})$		$t_f (\mu\text{s})$	
			TYP.	MAX.	TYP.	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	$I = 5\text{mA}$ $V_{CE} = 5\text{V}$ $T_a = 25^\circ\text{C}$		$V_{CE} = 2\text{V}$ $I_C = 2\text{mA}$ $R_L = 100\Omega$ $T_a = 25^\circ\text{C}$			

\*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  
 $V_{np} = 100\text{mV}, R_L = 470\Omega$   
 $dV/dt = 2\text{kv}/\mu\text{s}, I_F = 0$ ]

Fig. 1 Forward Current vs. Ambient Temperature

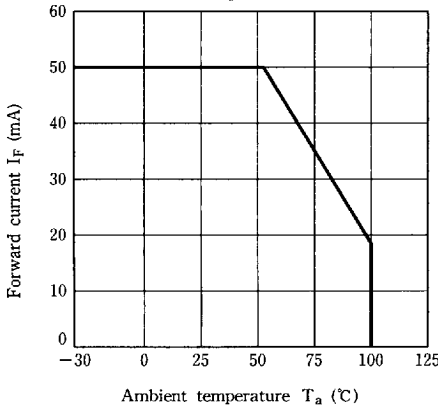
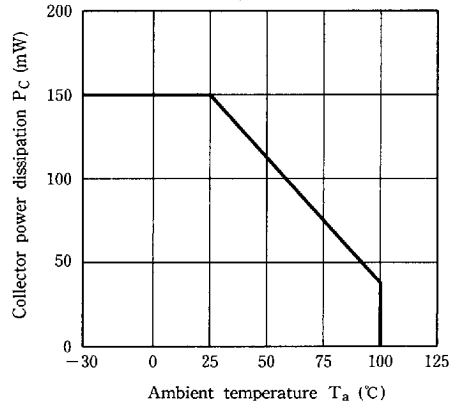
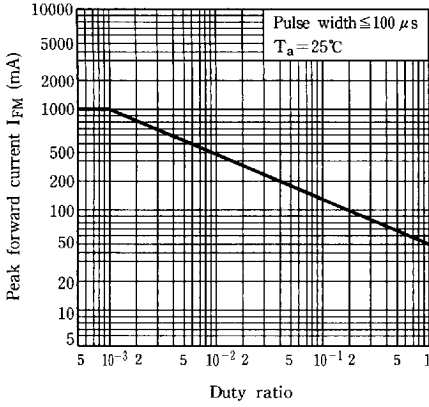


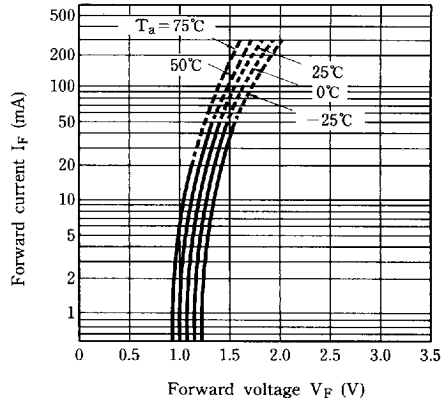
Fig. 2 Collector Power Dissipation vs. Ambient Temperature



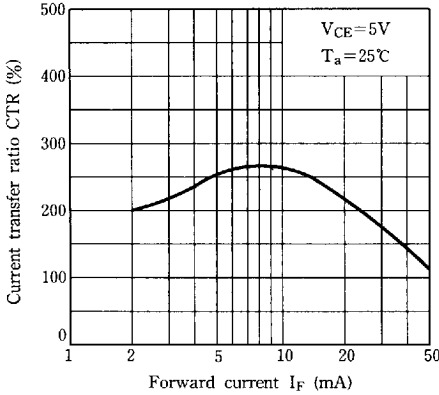
**Fig. 3 Peak Forward Current vs. Duty Ratio**



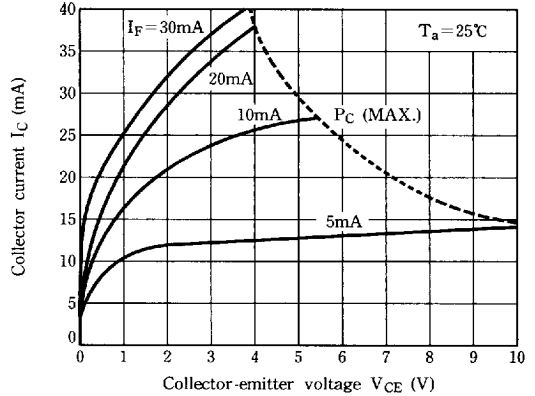
**Fig. 4 Forward Current vs. Forward Voltage**



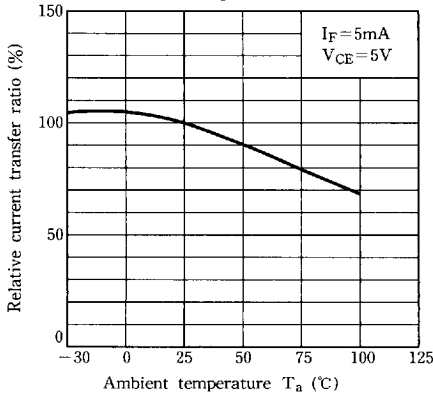
**Fig. 5 Current Transfer Ratio vs. Forward Current**



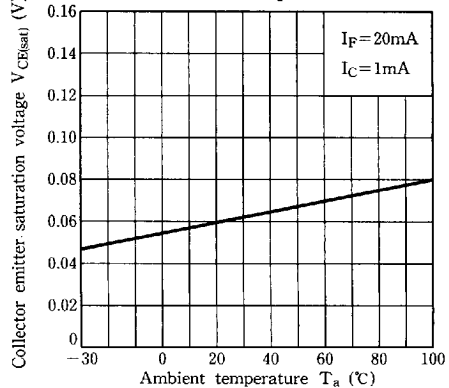
**Fig. 6 Collector Current vs. Collector-emitter Voltage**



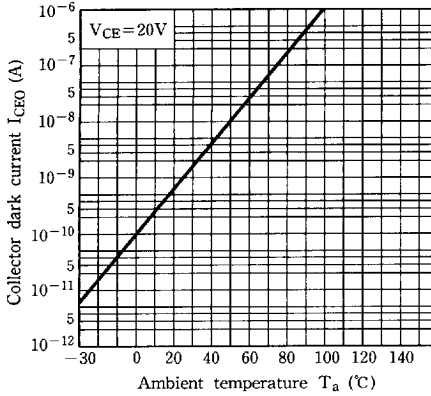
**Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature**



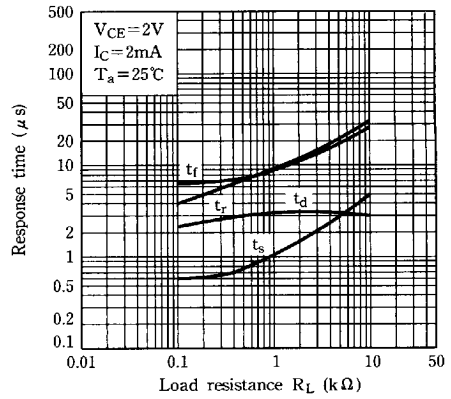
**Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature**



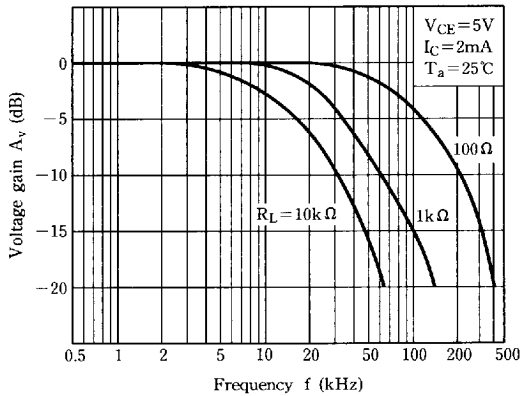
**Fig. 9 Collector Dark Current vs. Ambient Temperature**



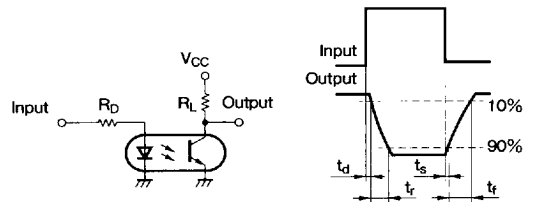
**Fig.10 Response Time vs. Load Resistance**



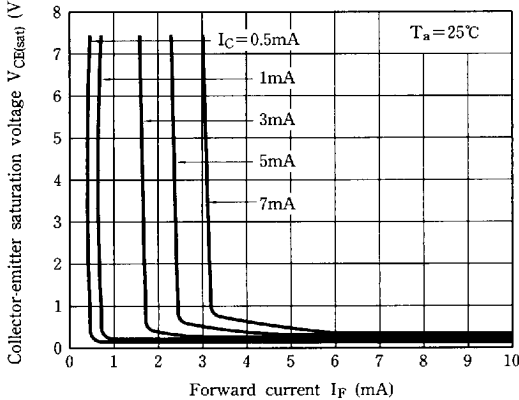
**Fig.11 Frequency Response**



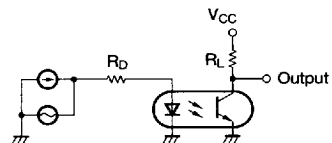
**Test Circuit for Response Time**



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



**Test Circuit for Frequency Response**



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