

PC1231xNSZ Series

Low Input Current Type Long Creepage Distance Photocoupler

■ Features

1. Low input current type ($I_F=0.5\text{mA}$)
2. High resistance to noise due to high common mode rejection voltage (CMR:MIN. $10\text{kV}/\mu\text{s}$)
3. Long creepage distance type
4. Standard 4-pin dual-in-line package
5. Isolation voltage (Viso : 5kVrms)

■ Applications

1. Home appliances
2. Programmable controllers

■ Rank Table

Model No.	Rank mark	I_C (mA)	Conditions
PC12310NSZ	A or no mark	0.25 to 2.0	$I_F=0.5\text{mA}$ $V_{CE}=5\text{V}$ $T_a=25^\circ\text{C}$
PC12311NSZ	A	0.5 to 1.25	

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

	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	10	mA
	*1 Peak forward current	I_{FM}	200	mA
	Reverse voltage	V_R	6	V
	Power dissipation	P	15	mW
Output	Collector-emitter voltage	V_{CEO}	70	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}	170	mW
	Operating temperature	T_{opr}	-30 to $+100$	$^\circ\text{C}$
	Storage temperature	T_{stg}	-55 to $+125$	$^\circ\text{C}$
	*2 Isolation voltage	V_{iso}	5	kV_{rms}
	*3 Soldering temperature	T_{sol}	260	$^\circ\text{C}$

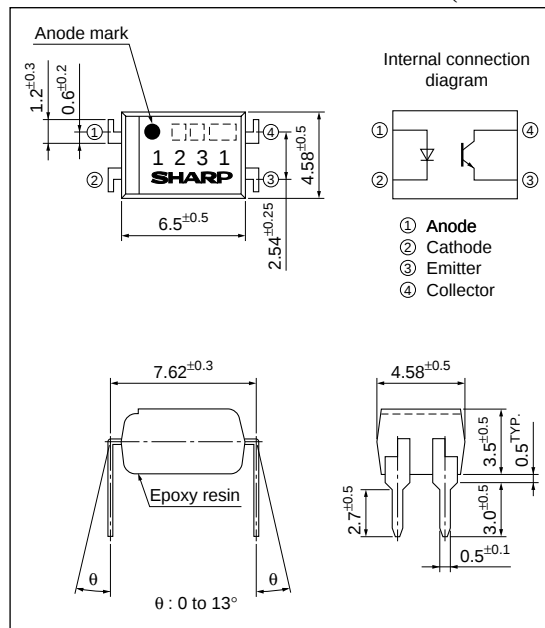
*1 Pulse width $\leq 100\mu\text{s}$, Duty ratio = 0.001

*2 40 to 60%RH, AC for 1 minute, $f=60\text{Hz}$

*3 For 10s

■ Outline Dimensions

(Unit : mm)



■ Electro-optical Characteristics

(Ta=25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	$I_F=10\text{mA}$	—	1.2	1.4	V
	Reverse current	I_R	$V_R=4\text{V}$	—	—	10	μA
	Terminal capacitance	C_t	$V=0, f=1\text{kHz}$	—	30	250	pF
Output	Collector dark current	I_{CEO}	$V_{CE}=50\text{V}, I_F=0$	—	—	100	nA
	Collector-emitter breakdown voltage	BV_{CEO}	$I_C=0.1\text{mA}, I_F=0$	70	—	—	V
	Emitter-collector breakdown voltage	BV_{ECO}	$I_E=10\mu\text{A}, I_F=0$	6	—	—	V
Transfer characteristics	Collector current	I_C	$I_F=0.5\text{mA}, V_{CE}=5\text{V}$	0.25	—	2.0	mA
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F=10\text{mA}, I_C=1\text{mA}$	—	—	0.2	V
	Isolation resistance	R_{ISO}	DC500V, 40 to 60%RH	5×10^{10}	10^{11}	—	Ω
	Floating capacitance	C_f	$V=0, f=1\text{MHz}$	—	0.6	1.0	pF
	Response time	Rise time	$V_{CE}=2\text{V}, I_C=2\text{mA}, R_L=100\Omega$	—	4	18	μs
		Fall time		—	3	18	μs
	*1 Common mode rejection voltage	CMR	$T_a=25^\circ\text{C}, R_L=470\Omega, V_{CM}=1.5\text{kV (peak)}, I_F=0\text{mA}, V_{CC}=9\text{V}, V_{np}=100\text{mV}$	10	—	—	kV/ μs

*1 Refer to Fig. 1

Fig.1 Test Circuit for Common Mode Rejection Voltage

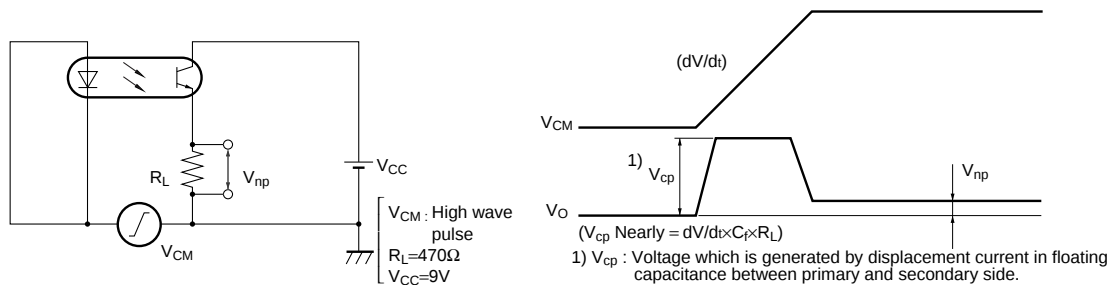


Fig.2 Forward Current vs. Ambient Temperature

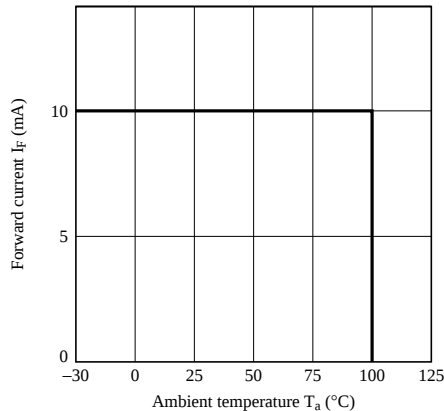


Fig.3 Diode Power Dissipation vs. Ambient Temperature

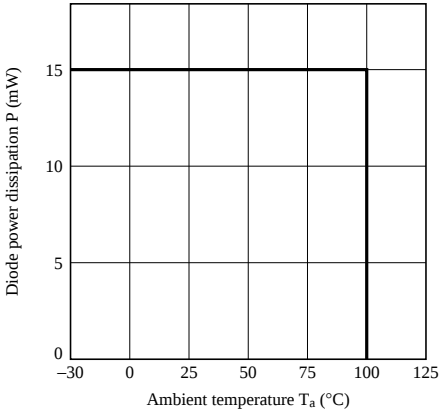


Fig.4 Collector Power Dissipation vs. Ambient Temperature

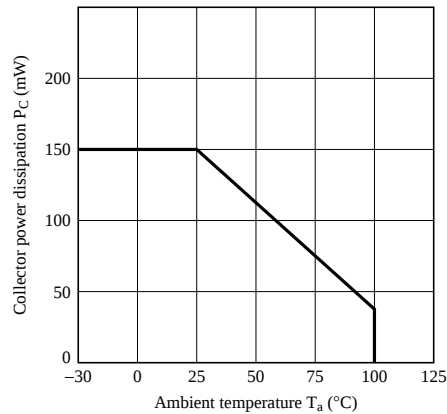


Fig.6 Peak Forward Current vs. Duty Ratio

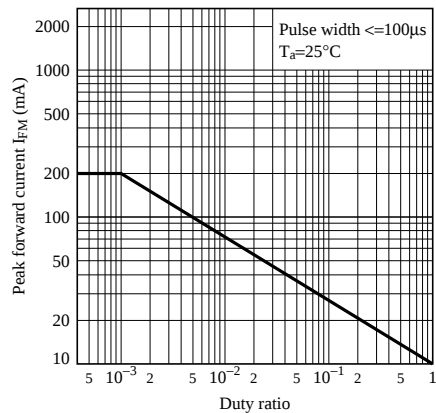


Fig.8 Current Transfer Ratio vs. Forward Current

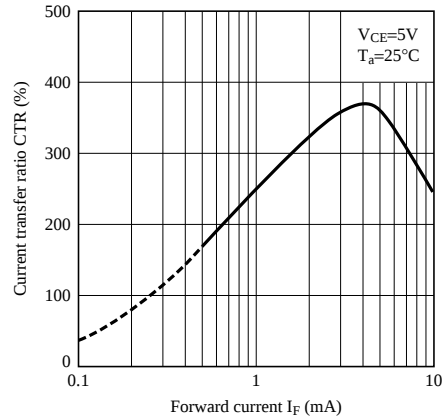


Fig.5 Total Power Dissipation vs. Ambient Temperature

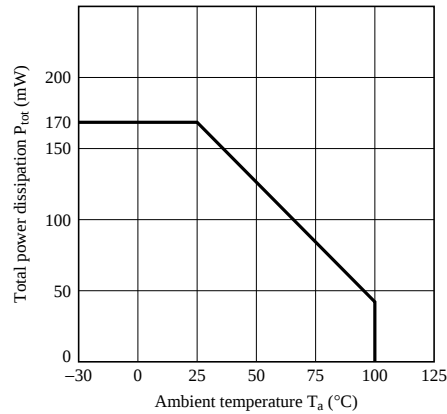


Fig.7 Forward Current vs. Forward Voltage

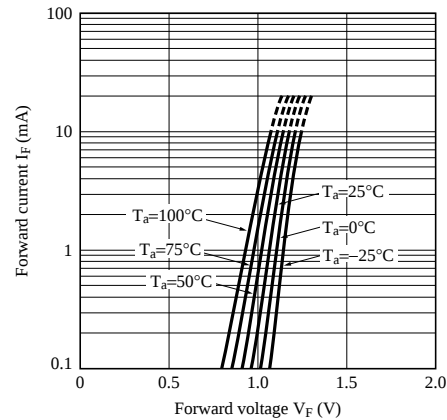


Fig.9 Collector Current vs. Collector-emitter Voltage

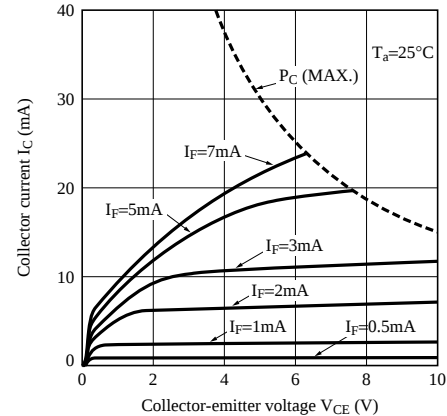


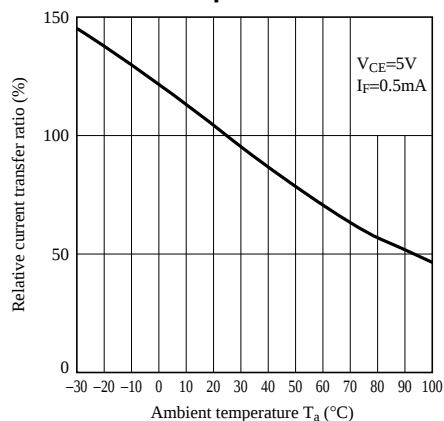
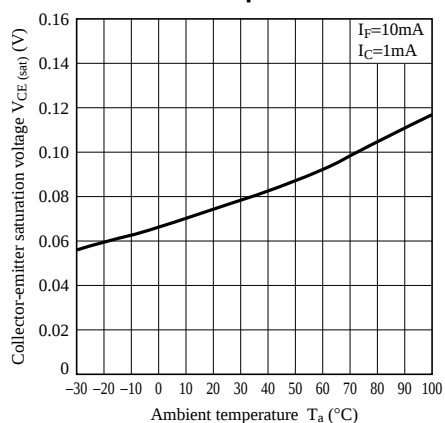
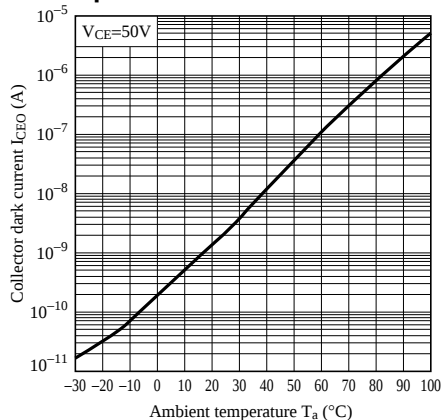
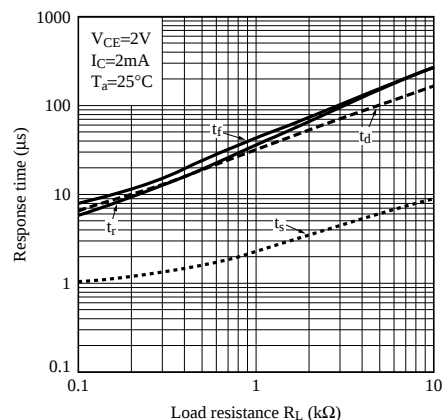
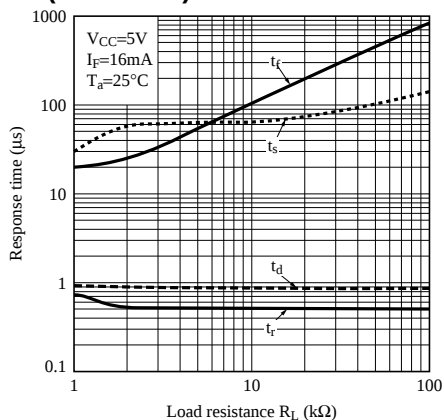
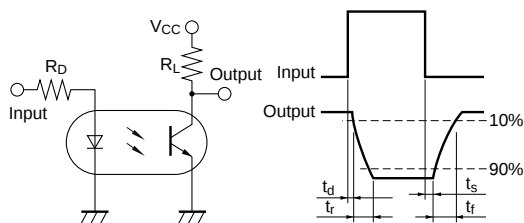
Fig.10 Relative Current Transfer Ratio vs. Ambient Temperature**Fig.11 Collector - emitter Saturation Voltage vs. Ambient Temperature****Fig.12 Collector Dark Current vs. Ambient Temperature****Fig.13 Response Time vs. Load Resistance****Fig.14 Response Time vs. Load Resistance (Saturation)****Fig.15 Test Circuit for Response Time**

Fig.16 Voltage gain vs Frequency

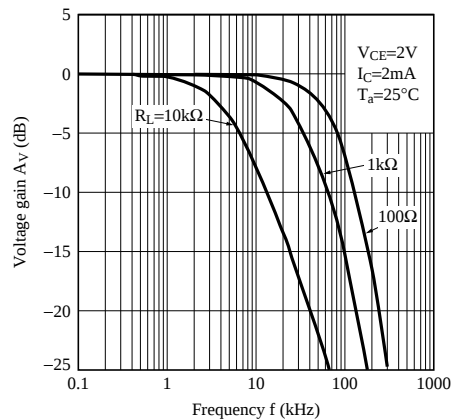


Fig.17 Collector-emitter Saturation Voltage vs. Forward Current

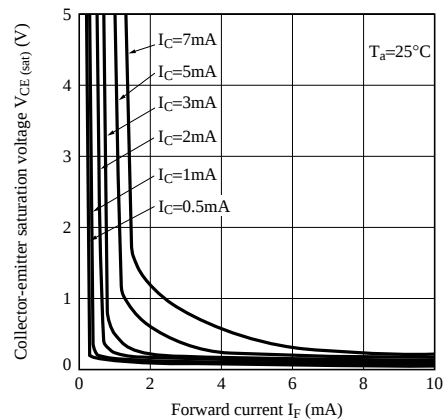


Fig.18 Reflow Soldering

Only one time soldering is recommended within the temperature profile shown below.

