

光电耦合器 Photocoupler

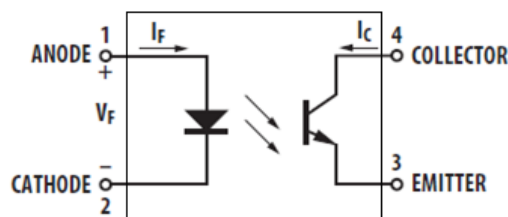
一、概述 Description

PC357 产品由一个红外发光二极管和一个光电晶体管组成；光耦器件可实现不同电路之间的电气隔离和信号传输，产品广泛应用于电源设备上，例如手机充电器，家电产品电源供应器等。

PC357 photocoupler consist of an infrared light-emitting diode and a phototransistor. The devices can realize electrical isolation and signal transmission between different circuits. The products are widely used in power supply equipment, such as mobile phone charger, home appliance product power supply device, etc.



Schematic



引脚排列 Pin Configuration

1. 正极 Anode
2. 负极 Cathode
3. 发射极 Emitter
4. 集电极 Collector

二、特性 Features

✧ 电流转换比(CTR: 50%-600% @ $I_F=5\text{mA}$, $V_{CE}=5\text{V}$)

Current transfer ratio (CTR: 50%-600% @ $I_F=5\text{mA}$, $V_{CE}=5\text{V}$)

✧ 输入-输出隔离电压: ($V_{ISO}=3,750\text{Vrms}$)

High isolation voltage between input and output($V_{ISO}=3,750\text{Vrms}$)

✧ 工作温度最高可达+ 110℃

Operating temperature up to +110℃

✧ 集电极-发射极击穿电压 $BV_{CEO} \geq 80\text{V}$

Collector-Emitter voltage $BV_{CEO} \geq 80\text{V}$

✧ 产品符合RoHS、REACH及HF等环保法规要求；

The products comply with RoHS, REACH and HF;

三、电性参数 Electrical Characteristics

✧最大绝对额定值 (常温=25℃)

Absolute Maximum Ratings (Temperature=25℃)

参数名称 Parameter		符号 Symbol	数值 Rating	单位 Unit
输入 Input	正向电流 Forward Current	I_F	50	mA
	反向电压 Reverse Voltage	V_R	6	V
	功耗 Power Dissipation	P_D	70	mW
输出 Output	集电极-发射极电压 Collector-Emitter voltage	V_{CEO}	80	V
	发射极-集电极电压 Emitter-Collector voltage	V_{ECO}	6	
	集电极电流 Collector current	I_C	50	mA
	功耗 Power Dissipation	P_C	180	mW
总功率消耗 Total Power Dissipation		P_{tot}	200	mW
*1 隔离电压 *1 Isolation Voltage		V_{iso}	3,750	Vrms
工作温度 Operating Temperature		T_{opr}	-55 to + 110	℃
存贮温度 Storage Temperature		T_{stg}	-55 to + 125	
*2 焊锡温度 *2 Soldering Temperature		T_{sol}	260	

* 注:

*1.交流测试, 时间 1 分钟, 湿度. =40~60%;

*1.AC For 1 Minute, R.H. = 40 ~ 60%;

隔离电压测试的方法如下:

Isolation voltage shall be measured using the following method:

(1) 将产品的两端短路;

(1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side;

(2) 测试隔离电压时无电流通过;

(2) The isolation voltage tester with zero-cross circuit shall be used;

(3) 测试时加正弦波形电压。

(3) The waveform of applied voltage shall be a sine wave.

*2.锡焊时间为 10 秒

*2. Soldering time is 10 seconds

✧ 电性参数 (温度=25 ℃)

Electrical Characteristics (Temperature=25°C)

参数名称 Parameter	符号 Symbol	条件 Condition	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
输入 Input	正向电压 Forward Voltage	$I_F=20\text{mA}$	---	1.2	1.4	V
	反向电流 Reverse Current	$V_R=4\text{V}$	---	---	10	μA
	终端电容 Terminal Capacitance	$V=0, f=1\text{MHz}$	---	30	250	pF
输出 Output	集电极暗电流 Collector dark current	$V_{CE}=20\text{V}, I_F=0$	---	---	100	nA
	集电极-发射极击穿电压 Collector-Emitter breakdown voltage	$I_C=0.1\text{mA}$ $I_F=0\text{mA}$	80	---	---	V
	发射极-集电极击穿电压 Emitter-Collector breakdown voltage	$I_E=0.01\text{mA}$ $I_F=0\text{mA}$	6	---	---	V
传输特性 transfer characteristic	集电极电流 Collector Current	$I_F=5\text{mA}$	2.5	---	30	mA
	*1 电流转换比 *1 Current conversion ratio	$V_{CE}=5\text{V}$	50	---	600	%
	集电极-发射极饱和电压 Collector-Emitter Saturation Voltage	$I_F=20\text{mA}$ $I_C=1\text{mA}$	---	0.1	0.2	V
	绝缘电阻 Isolation resistance	DC500V 40~60%R.H.	1×10^{10}	---	---	Ω
	隔离电容 Floating Capacitance	$V=0, f=1\text{MHz}$	---	0.6	1	pF
	转换频率 Cut-off Frequency	$V_{CE}=5\text{V}, I_C=2\text{mA}$ $R_L=100\Omega, -3\text{dB}$	---	80	---	kHz
	上升时间 Rise time	$V_{CE}=2\text{V}, I_C=2\text{mA}$	---	4	18	μs
	下降时间 Fall time	$R_L=100\Omega$	---	3	18	μs

注：*1 电流转换比= $I_C / I_F \times 100\%$ ，公差 $\pm 3\%$ 。

*1 Current Conversion Ratio = $I_C / I_F \times 100\%$, Tolerance: $\pm 3\%$.

✧ 电流转换比等级表(温度=25 ℃)

Rank Table of Current Transfer Ratio(Temperature=25°C)

等级标识 Grade Sign	最小.Min (%)	最大.Max (%)
A	80	160
B	130	260
C	200	400
D	300	600
A or B or C or D	50	600

四、特性曲线 Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

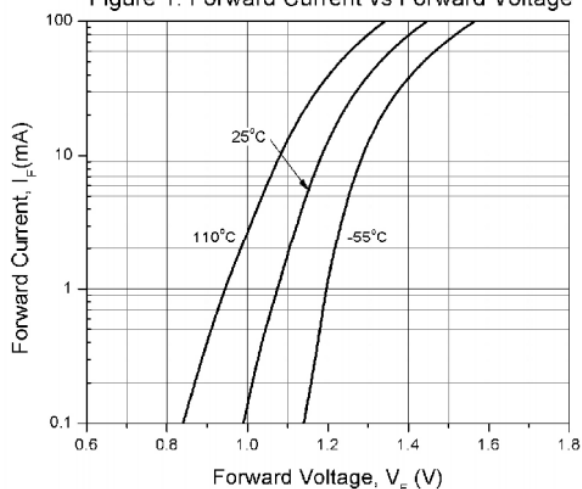


Figure 2. Normalized Collector Current vs Forward Current

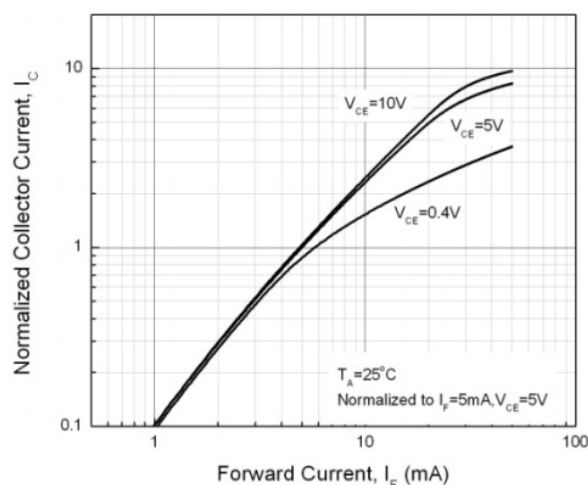


Figure 3. Normalized Current Transfer Ratio vs Forward Current

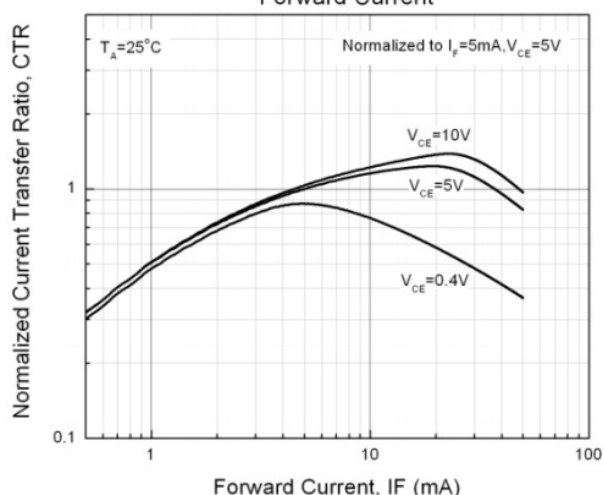


Figure 4. Normalized Collector Current vs Ambient Temperature

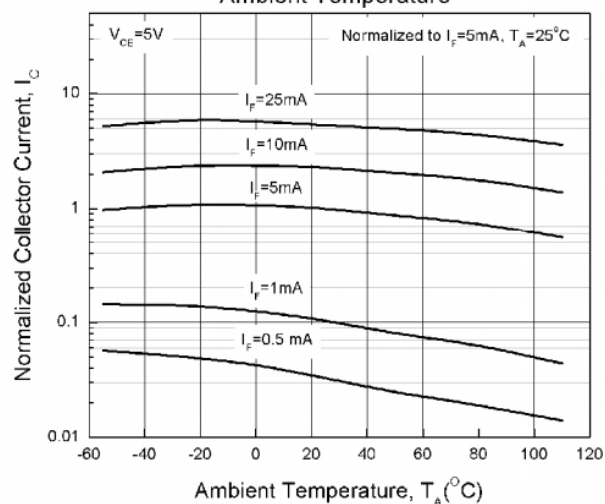


Figure 5. Collector Current vs Collector-Emitter Voltage

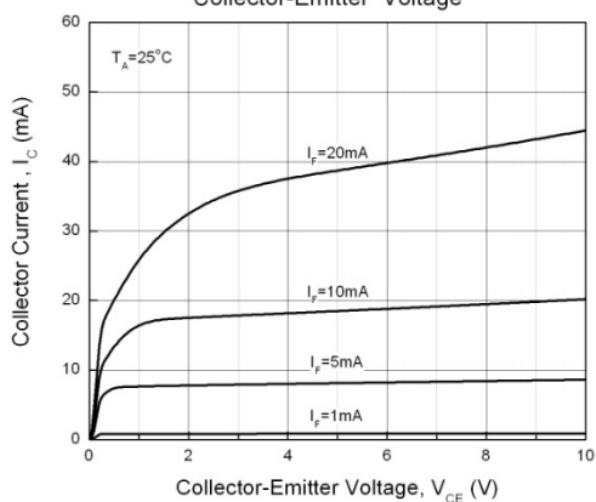


Figure 6. Collector Current vs Collector-Emitter Voltage

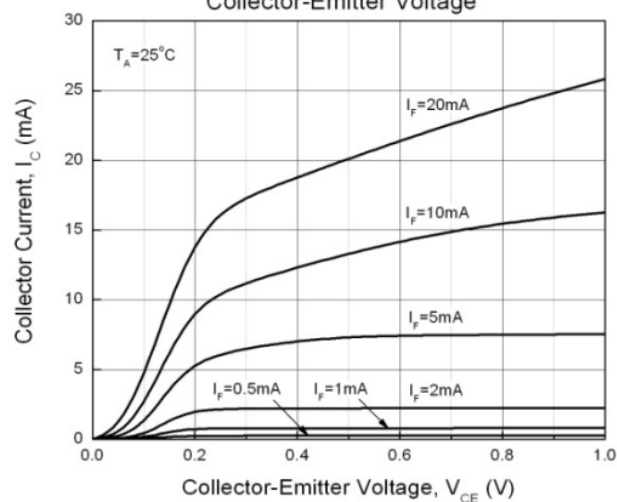


Figure 7. Collector Dark Current vs Ambient Temperature

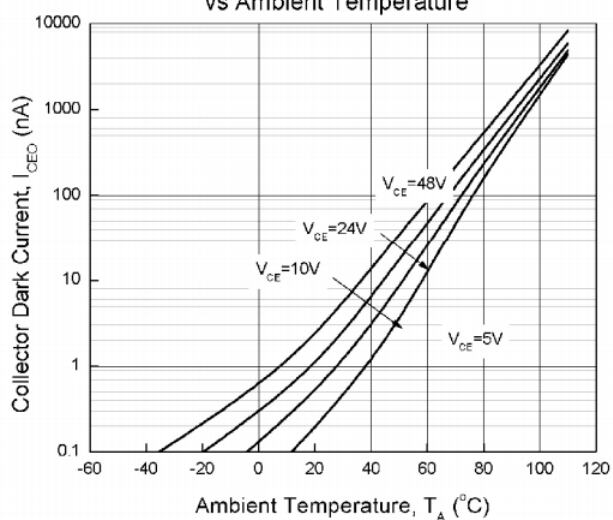


Figure 8. Switching Time vs Load Resistance

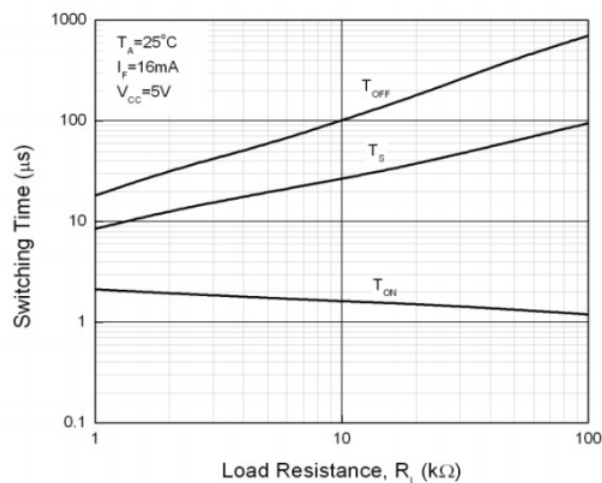


Figure 9. Collector-Emitter Saturation Voltage vs Ambient Temperature

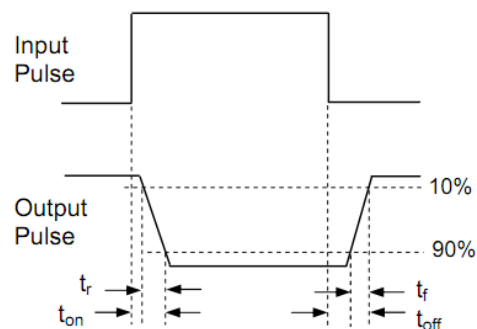
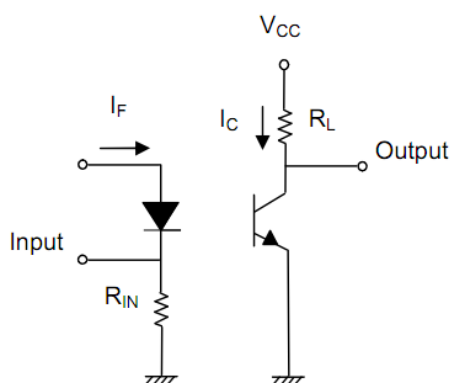
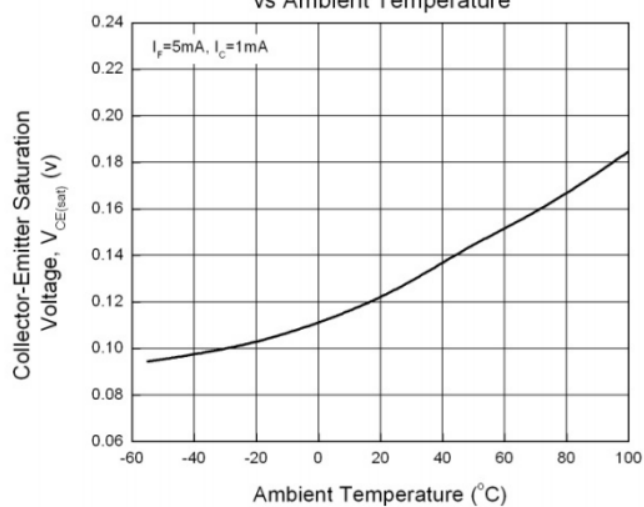
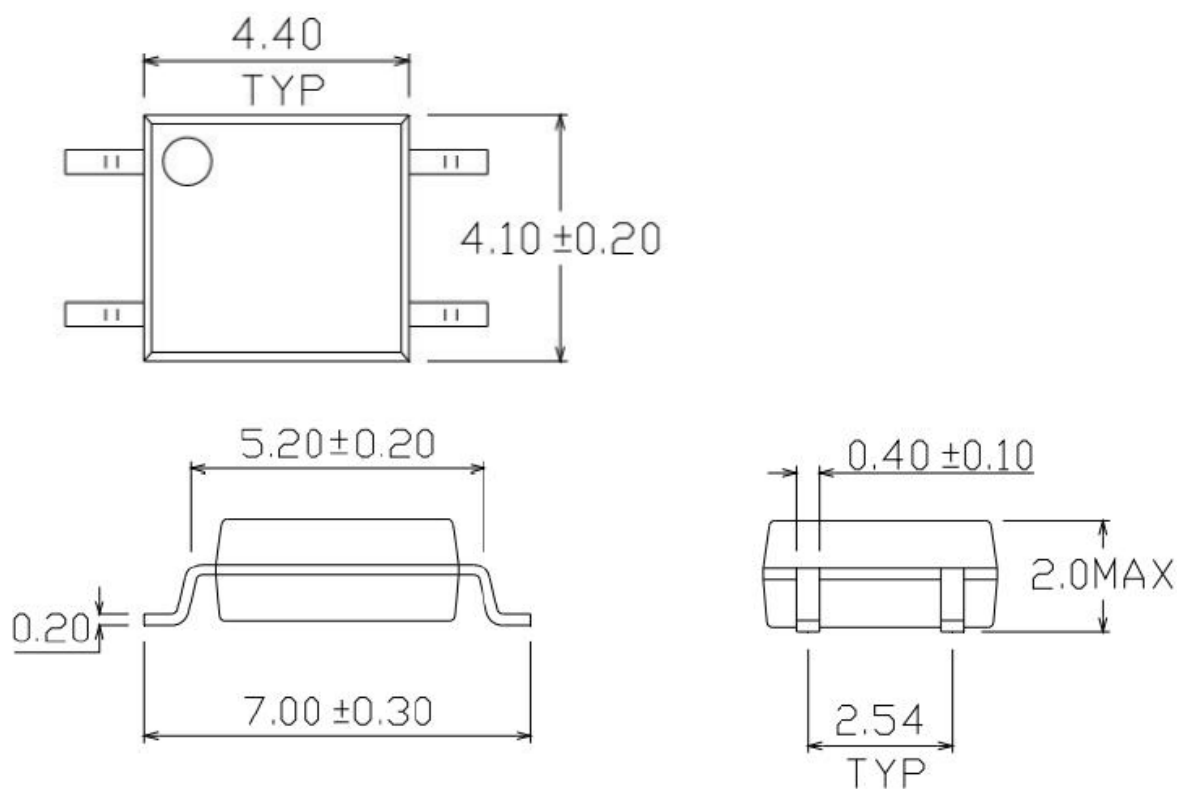


Figure 10. Switching Time Test Circuit & Waveforms

五、外形尺寸（单位：mm） Package Dimension (Unit: mm)



未注公差：±0.1mm

The Tolerances Unless Mentioned is : ±0.1mm

六、使用注意事项 Precautions for Use

✧ 1.手工焊接条件 Hand soldering Condition

用电烙铁一次性手工性焊接条件:

Hand soldering by soldering iron, One time soldering is recommended:

温度 Temperature: $380 \pm 5 / -5^{\circ}\text{C}$

时间 Time: 3 sec max

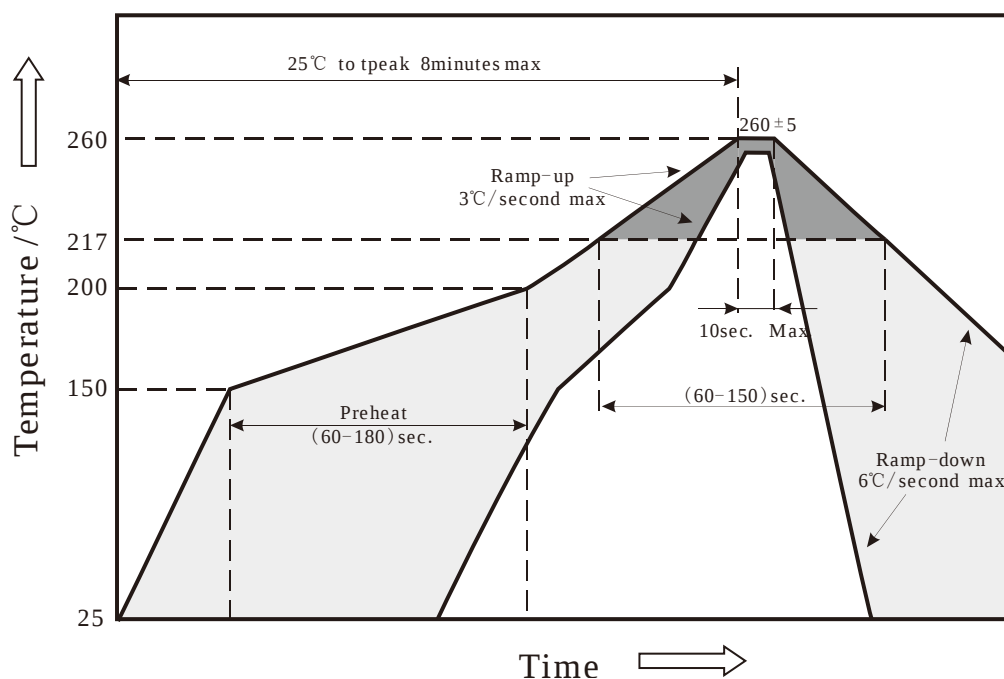
✧ 2.回流焊接: Reflow Soldering

在回流焊接升温过程中, 请不要对器件施加任何压力。

Stress on the product should be avoided during heating in soldering process.

在焊接完成后, 待产品温度下降到室温之后, 再进行其他处理。

After soldering, do not deal with the product before its temperature drop down to room temperature.



七、免责声明 Precautions for Use

1、我司保留随时更改其产品和规格的权利, 恕不另行通知;

1、We reserves the right to make changes to its products and specifications at any time without notice;

2、规格书中所示的图表仅表示典型数据, 而非保证值;

2、The graphs shown in this datasheet are representing typical data only and do not show guaranteed values;

3、在最终设计、购买或使用之前, 客户应获取并确认最新的产品信息和规格;

3、Customers should obtain and confirm the latest product information and specifications before final design, purchase or use;