晶体管光耦
Photo Transistor

PC357

DDF

PC357

Photo Transistor

概述 Description

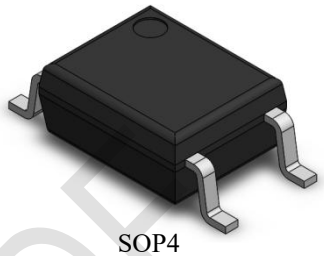
PC357 系列有一个发光二极管，通过红外光与硅基光电晶体管耦合并合封在四脚小型扁平封装中。该产品的小尺寸封装可显著节省安装空间。

The PC357X series has a infrared emitting diode,which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a 4-pin mini-flat package. The small dimension of this product allows significant space saving.

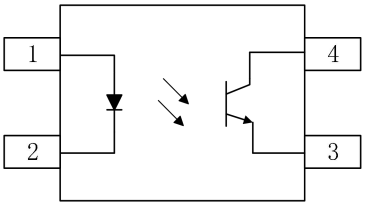
特性 Features

- 电流转换比(CTR)范围：80%-600% (I_F=5mA, V_{CE}=5V, Ta=25℃)
  Current transfer ratio: 80%-600% (I_F=5mA, V_{CE}=5V, Ta=25℃)
- 输入-输出隔离电压 (V_{ISO}=3750 Vrms)
  High isolation voltage between input and output(V_{ISO}=3750 Vrms)
- 集电极-发射极击穿电压 BV_{CEO}≥80V
  Collector - emitter breakdown voltage BV_{CEO}≥80V
- 工作温度：-55℃~110℃
  Operating Temperature: -55℃~110℃

封装和原理图 Package and Schematic Diagram



SOP4



Pin Configuration

1. Anode

2. Cathode

3. Emitter

4. Collector

PC357

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产品型号名 Order Code

PC 357 X - UN Y - W

① ② ③ ④ ⑤ ⑥

① 公司代码 **Company Code**（PC：**PC**）

② 产品系列 **Product Series**（357：**357**）

③ CTR 档位 **Classification**（代码 **Code: A ,B ,C,D**）

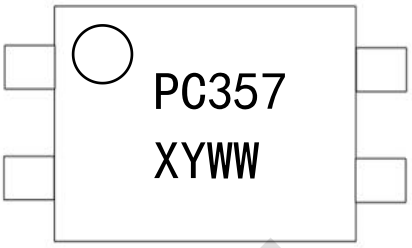
④ 框架类型 **Lead Frame**（Cu：铜架 **Copper**）

⑤ 树脂类型 **Epoxy Type**（H：无卤 **Halogen-free**）

⑥ 封装形式 **Package**（S**: SOP**）

印字 Marking Information

- 印字中**“PC”**为品牌 **LOGO**
  “PC”denotes LOGO
- 印字中“357”代表产品系列
  “357”denotes Product Series
- 印字中的**“X”**代表产品分档：**A**、**B**、**C**、**D**
  “X”denotes the classification：**A**、**B**、**C**、**D**
- 印字中“Y”代表年份；A(2018),B(2019),C(2020)….
  “Y”denotes YEAR：**A(2018),B(2019),C(2020)…**
- 印字中“WW”代表周号
  “WW”denotes Week’s number



应用 Applications

- 开关电源，智能电表
  Switching power supply, intelligent meter
- 工业控制，测量仪器
  Industrial control, measuring instruments
- 家用电器，比如空调、风扇、热水器等
  Household appliances: such as air conditioners, fans, water heaters, etc.

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绝缘和安规 Insulation and Safety related specifications

项目 Item	符号 Symbol	数值 Value	单位 Unit	备注 Remark
爬电距离 Creepage Distance	L	＞5.0	mm	从输入端到输出端，沿本体最短距离路径 Measured from input terminals to output terminals, shortest distance path along body
电气间隙 Clearance Distance	L	＞5.0	mm	从输入端到输出端，通过空气的最短距离 Measured from input terminals to output terminals, shortest distance through air
绝缘距离 Insulation Thickness	DTI	＞0.4	mm	发射器和探测器之间的绝缘厚度 Insulation thickness between emitter and detector
峰值隔离电压 Peak Isolation Voltage	V_{IORM}	600	V_{peak}	DIN/EN/IEC EN60747-5-5
瞬态隔离电压 Transient isolation voltage	V_{IOTM}	5000	V_{peak}	DIN/EN/IEC EN60747-5-5
隔离电压 Isolation Voltage	Viso	＞3750	Vrms	For 1 min

极限参数 Absolute Maximum Ratings (Ta=25℃)

参数 Parameter		符号 Symbol	额定值 Rating	单位 Unit
发射端 Input	正向电流 Forward Current	I_F	50	mA
	功耗 Power Dissipation	P_D	70	mW
	额定值降低因子(在 Ta = 90° C 以上) Power dissipation Derating factor (above Ta = 90°C)	P_{DD}	2.9	mW/° C
接收端 output	集电极功耗 Collector Power Dissipation	P_C	150	mW
	集电极电流 Collector Current	I_C	50	mA
	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}	7	V
总功耗 Total Power Dissipation		Ptot	200	mW
隔离电压 Isolation Voltage		Viso	3750	Vrms
工作温度 Operating Temperature		T_{opr}	-55~+110	℃
存储温度 Storage Temperature		T_{stg}	-55~+125	℃
焊接温度 Soldering Temperature		T_{sol}	260	℃

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特性参数 Electro-optical Characteristics (Ta=25℃)

参数 Parameter		符号 Symbol	条件 Condition	最小 Min.	典型 Typ.	最大 Max.	单位 Unit
发射端 Input	正向电压 Forward Voltage	V_F	I_F=10mA	-	1.2	1.4	V
	输入电容 Terminal Capacitance	C_t	V=0V, F=1KHz	-	30	250	pF
接收端 Output	集电极暗电流 Collector Dark Current	I_{CEO}	V_{CE}=20V, I_F=0mA	-	-	100	nA
	集电极-发射极击穿电压 Collector-Emitter Breakdown Voltage	BV_{CEO}	I_C=0.1mA, I_F=0mA	80	-	-	V
	发射极-集电极电压 Emitter-Collector Voltage	BV_{ECO}	I_E=10uA, I_F=0mA	7	-	-	V
传输特性 Transfer Characteristics	电流传输比 Current Transfer Ratio	CTR*	I_F=5mA , V_{CE}=5V	80	-	600	%
	集电极-发射极饱和压降 Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_F=20mA, I_C=1mA	-	0.1	0.2	V
	隔离电阻 Isolation Resistance	R_{ISO}	DC500V, 40~60%R.H.	$5x10^{10}$	$1x10^{11}$	-	Ω
	隔离电容 Isolation capacitance	C_{ISO}	V=0, f=1MHz	-	0.6	1.0	pF
	截止频率 Cut-off Frequency	Fc	V_{CE}=5V, I_C=2mA, R_L=100Ω , -3dB	-	80	-	kHz
	上升时间 Rise Time	T_r	V_{CE}=2V, I_C=2mA, R_L=100Ω	-	-	18	μs
	下降时间 Fall Time	T_f	V_{CE}=2V, I_C=2mA, R_L=100Ω	-	-	18	μs

注*：电流传输比=I_C/I_F x 100%。

Note*: CTR=I_C/I_F x 100%.

电流传输比分档表 CTR Classification Table (I_F=5mA, V_{CE}=5V, Ta=25℃)

代码 Code	最小值 Min.	最大值 Max.
A	80	160
B	130	260
C	200	400
D	300	600

典型光电特性曲线 Typical Electro-Optical Characteristics Curves

Fig.1 归一化电流转换比与正向电流曲线图
Relative Current Transfer Ratio vs. Forward Current

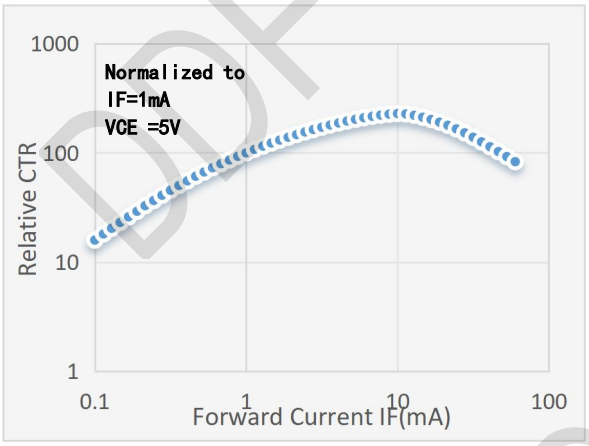


Fig.2 正向电流与正向电压曲线图
Forward Current vs. Forward Voltage

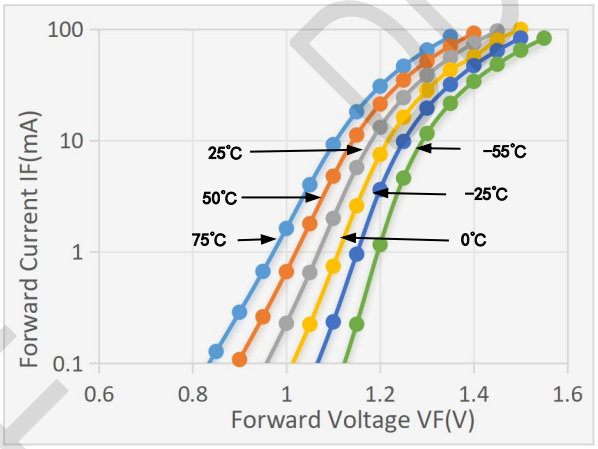


Fig.3 集电极电流与集电极-发射极电压曲线图
Collector Current vs. Collector-emitter Voltage

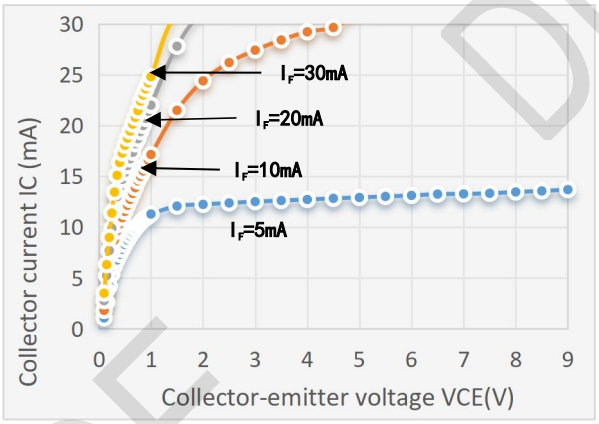


Fig.4 相对电流转换比与环境温度曲线图
Relative Current Transfer Ratio vs.Ambient Temperature

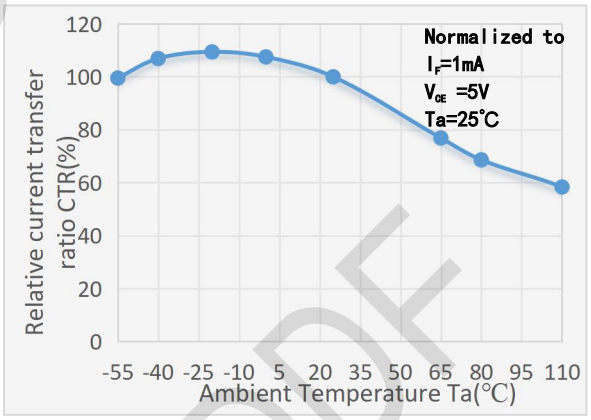


Fig.5 饱和压降与环境温度曲线图
Collector-emitter Saturation Voltage vs. Ambient Temperature

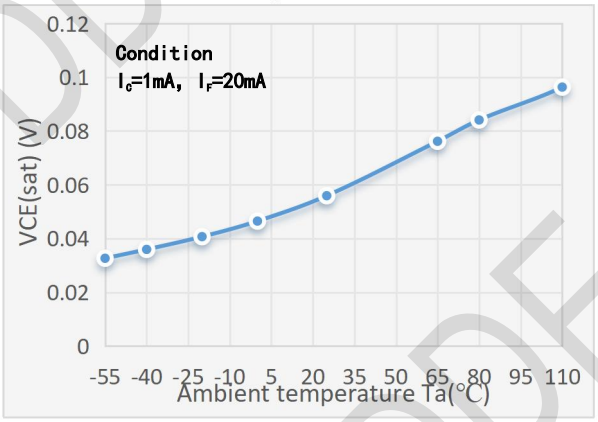
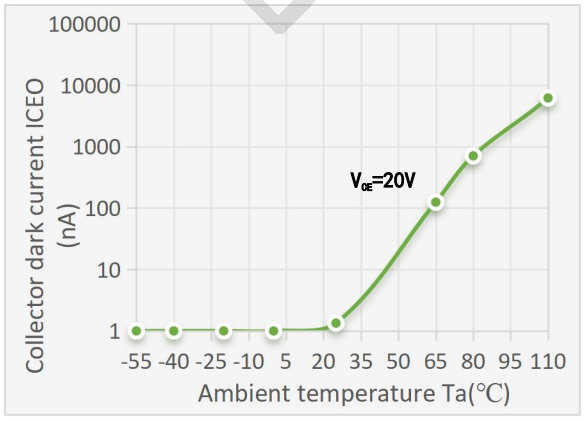


Fig.6 集电极暗电流与环境温度曲线图
Collector Dark Current vs Ambient Temperature



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Fig.7 **响应时间与负载电阻曲线图**
Response Time vs. Load Resistance

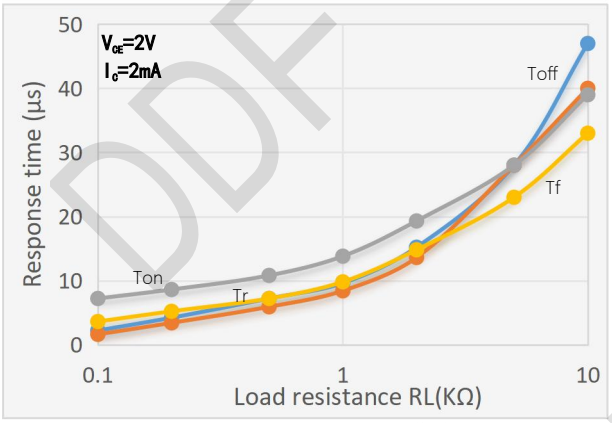


Fig.8 **截止频率曲线图**
Frequency Response

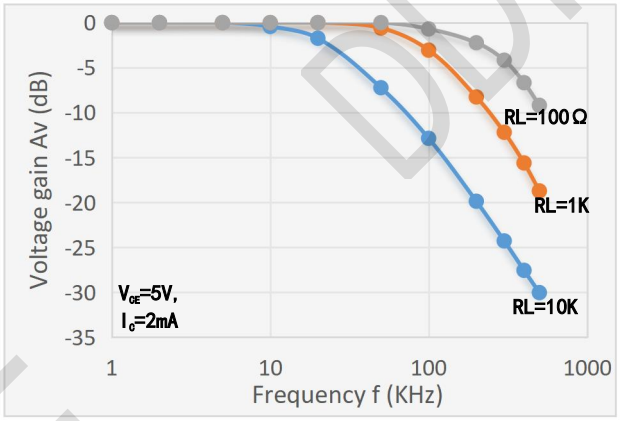


Fig.9 **饱和压降与正向电流曲线图**
Collector-emitter Saturation Voltage vs Forward Current

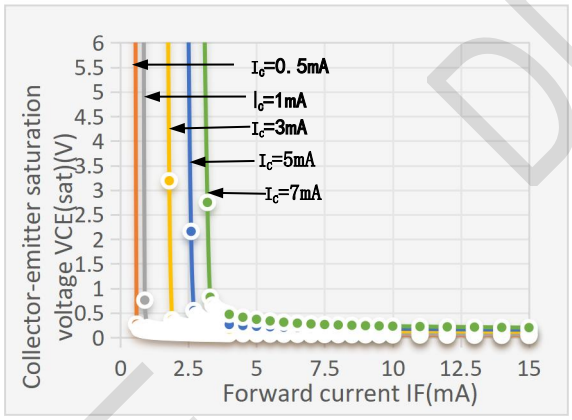
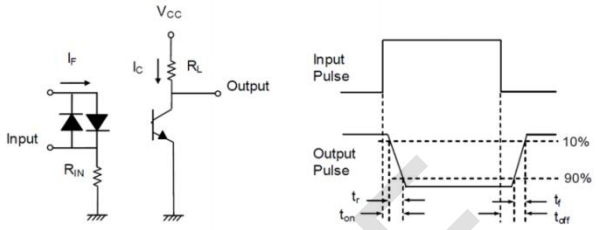
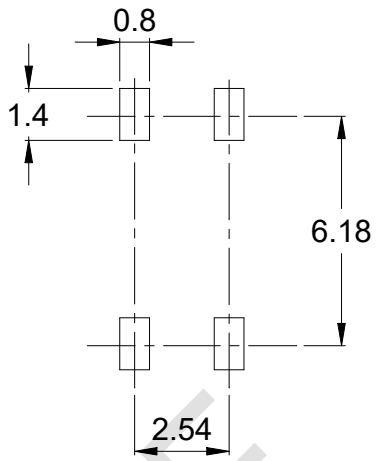


Fig.10 **响应时间测试电路**
Switching Time Test CiPCuit & Waveforms



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建议焊盘布局 **Recommended Pad Layout**

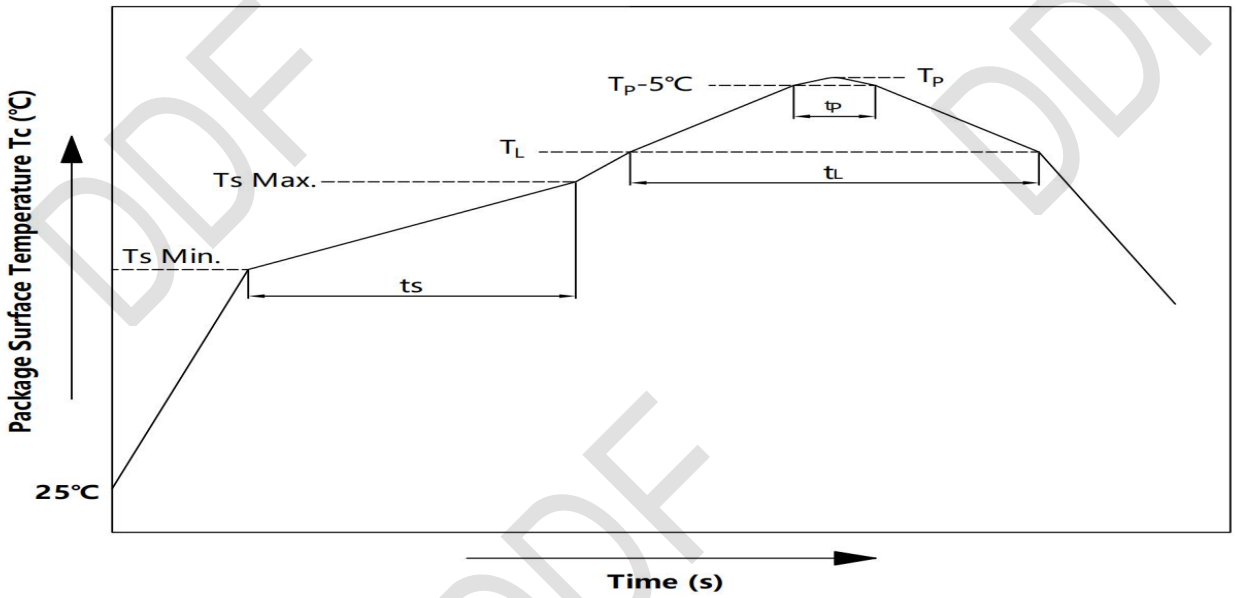


单位 **Unit: mm**

注：上图为产品正视图

Note：**The picture above is the front view of the product.**

回流焊温度曲线图 **Solder Reflow Profile**



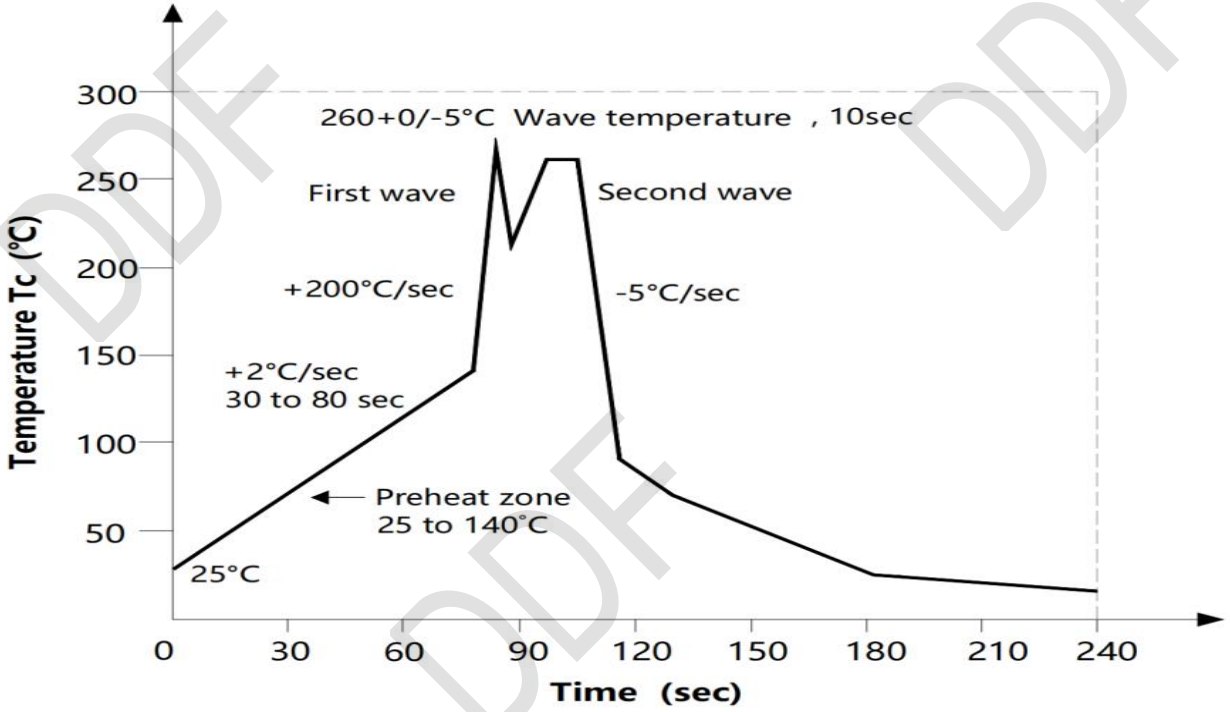
项目 **Item**	符号 **Symbol**	最小值 **Min.**	最大值 **Max.**	单位 **Unit**
预热温度 **Preheat Temperature**	Ts	150	200	℃
预热时间 **Preheat Time**	ts	60	120	s
升温速率 **Ramp-Up Rate (T_L to T_P)**	-	-	3	℃/s
液相线温度 **Liquidus Temperature**	T_L		217	℃
时间高于 T_L **Time Above T_L**	t_L	60	150	s
峰值温度 **Peak Temperature**	T_P	-	260	℃
Tc 在(T_P-5)和 T_P之间的时间 **Time During Which Tc Is Between (T_P-5) and T_P**	t_P	-	30	s
降温速率 **Ramp-down Rate(T_P to T_L)**	-	-	6	℃/s

注 Note：

建议在所示的温度和时间条件下进行回流焊，最多不能超过三次；

Reflow soldering is recommended at the temperatures and times shown, no more than three times;

波峰焊温度曲线图 **Wave Soldering Profile**



手工烙铁焊接 **Soldering with hand soldering iron**

A. 手工烙铁焊仅用于产品返修或样品测试；

Hand soldering iron is only used for product rework or sample testing;

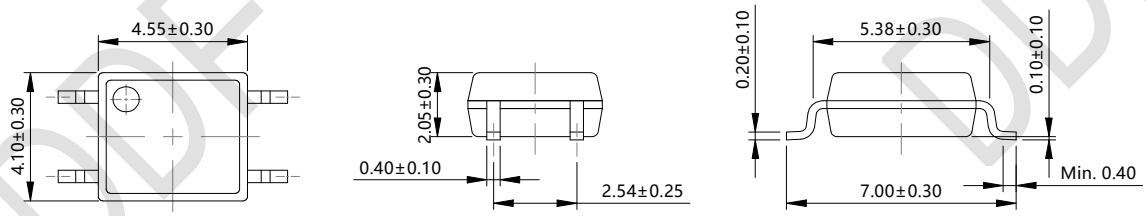
B. 手工烙铁焊要求：温度 360℃ ± 5℃，时间≤3s。

Hand soldering iron requirements: **Temperature**: **360**℃ **± 5**℃**, within 3s.**

Photo Transistor

外形尺寸 Outline Dimensions

SOP4



单位 **Unit: mm**

包装 Packing

■ 汇总表 Summary table

封装形式	包装方式	盘数量	盒数量	箱数量	静电袋规格	盒规格	箱(双瓦楞)规格	备注
SOP4	卷盘 (ϕ330mm 蓝盘)	3000 只/盘	2 盘/盒	10 盒/箱	450*390*0.1mm	353*340*60mm	650*375*365mm	首端各空 50 个空格，末端空 100
Package Type	**Packing Form**	**Quantity per Reel**	**Quantity per Box**	**Quantity per Carton**	**Antistatic Bag Specification**	**Box Specification**	**Carton Specification**	**Note**
SOP4	**Reel (ϕ330mm Blue)**	**3000 pcs/reel**	**2 reels/box**	**10 boxes/ctn**	**450*390*0.1mm**	**353*340*60mm**	**650*375*365mm**	**Leave 50 Spaces at the beginning and 100 Spaces at the end**

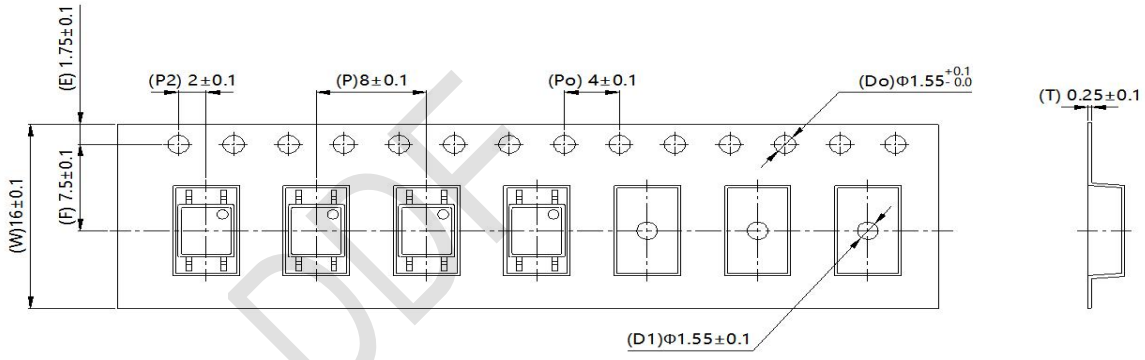
■ 编带包装 Tape & Reel

1) 每卷数量：3000 只。
Qty/reel: **3000 pcs.**

2) 每箱数量：60000 只。
Qty/ctn: **60000 pcs.**

3) 内包装：每盒 2 盘。
Inner packing: **2 reels/box.**

4) 示意图 **Schematic**:



单位 **Unit**: **mm**

注意 Attention

- 请遵守产品规格书使用，PC 不对使用时不符合产品规格书条件而导致的质量问题负责。
  Please use in accordance with the product specification. PC is not responsible for the quality problems caused by non-compliance with the product specifications.
- 对于需要特殊需求的产品，请联系我们的销售人员。
  For Special products, please contact our sales representatives.
- PC 持续不断改进质量、可靠性、功能或设计，保留此文件更改的权利恕不另行通知。
  PC continuously improve quality, reliability, function and design. We reserve the right to change this document without prior notice.
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