



# 光电耦合器

## OPTOCOUPLER

产品规格书  
Product Data Sheet

# Si-R17X 系列

## Si-17X Series

Si DCC  
Release

贵州硅耐光电有限公司

GuiZhou Silicon Nice Optoelectronic Co., Ltd.

## 描述 Description

Si-R17X 是由红外发光二极管和光电发生器、MOSFET 组成的光继电器。

The Si-R17X is a photo-relay composed of infrared light-emitting diodes, photoelectric generators and MOSFETs.

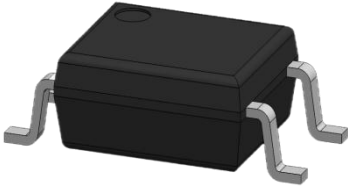
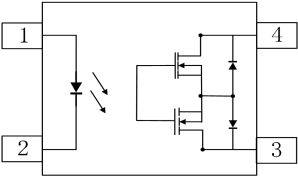
## 典型应用 Typical Applications

- 计算机外围设备  
Computer peripheral interface
- 工业自动化设备  
Industrial automation equipment
- 测量设备  
Testing equipment
- 电话设备  
Telephone equipment

## 特性 Features

- 常开，单刀单执  
Normally Open, Single Pole Single Throw
- 60~600V 输出耐压  
60~600V Output withstand voltage
- 低导通电阻  
Low on resistance
- 输入-输出隔离电压最小 5000  $V_{RMS}$   
Input-output Isolation Voltage 5000  $V_{RMS}(\min)$

## 封装与功能图 Package and Functional Diagram

封装 Package	内部连接图 Internal Connection Diagram	引脚分配 Pin Assignment
<div style="text-align: center;">   SOP         </div>	<div style="text-align: center;">  </div>	<div style="display: flex; justify-content: space-between;"> <div style="text-align: left;">           1: Anode 2: Cathode         </div> <div style="text-align: right;">           3: Terminal 1 4: Terminal 2         </div> </div>

## 安规与绝缘参数 Safety and Insulation Ratings

参数 Parameter		符号 Symbol	数值 Value	单位 Unit
最大额定隔离电压 Maximum Rated Withstanding Isolation Voltage	According to UL1577, t = 1 min	V <sub>ISO</sub>	3750	V <sub>RMS</sub>
最大瞬态隔离电压 Maximum Transient Isolation Voltage	According to DIN EN 60747-5-5	V <sub>IOTM</sub>	5000	V <sub>peak</sub>
最大峰值重复隔离电压 Maximum Repetitive Peak Isolation Voltage	According to DIN EN 60747-5-5	V <sub>IORM</sub>	600	V <sub>peak</sub>
爬电距离 Creepage Distance	/	L	>5.0	mm

## 极限参数 Absolute Maximum Ratings (T<sub>amb</sub>=25°C)

参数 Parameter		符号 Symbol	极限值 Rating	单位 Unit
输入端 Input	正向电流 Forward Current	I <sub>F</sub>	50	mA
	反向电压 Reverse Voltage	V <sub>R</sub>	6	V
	功耗 Power Dissipation	P	75	mW
	峰值电流 Peak Forward Current (1us, pulse)	I <sub>FP</sub>	1	A
负载电压 Load Voltage	Si-R170	V <sub>L</sub>	60	V
	Si-R1702		60	
	Si-R171		100	
	Si-R172		200	
	Si-R174		400	
	Si-R176		600	
输出端 Output	持续负载电流 Continuous Load Current	I <sub>L</sub>	550	mA
	Si-R170		2000	
	Si-R1702		1250	
	Si-R171		180	
	Si-R172		120	
	Si-R174		50	
峰值负载电流 Peak Load Current	Si-R170	I <sub>PEAK</sub>	1.5	A
	Si-R1702		6	
	Si-R171		3.5	
	Si-R172		0.5	
	Si-R174		0.3	
	Si-R176		0.15	
输出功耗 Out Power Dissipation		P <sub>O</sub>	500	mW
总功耗 Total Power Dissipation		P <sub>tot</sub>	550	mW
工作温度 Operating Temperature		T <sub>amb</sub>	-40~85	°C
存储温度 Storage Temperature		T <sub>stg</sub>	-40~100	°C
焊接温度 Soldering Temperature		T <sub>sld</sub>	260	°C

## 特性参数 Electro-optical Characteristics ( $T_{amb}=25^{\circ}C$ )

参数 Parameter		测试条件 Test Conditions	符号 Symbol	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Units			
输入端 Input	正向电压 Forward Voltage	$I_F=10mA$	$V_F$	-	1.3	1.5	V			
	反向电流 Reverse current	$V_R=4V$	$I_R$	-	-	10	$\mu A$			
	输入端电容 Input capacitance	$V=0, f=1MHz$	$C_{IN}$	-	60	250	pF			
输出端 Output	关断漏电 Off State Leakage Current	$I_F = 0mA$ $V_L=Rated VL MAX$	$I_{LEAK}$	-	-	100	$1\mu A$			
	导通电阻 On State Resistance	Si-R170	$I_F = 5mA,$ $I_L=Rated I_L MAX,$ $t = 1s$	$R_{ON}$	-	0.8	2.0	$\Omega$		
		Si-R1702			-	0.1	0.2			
		Si-R171			-	0.25	0.4			
		Si-R172			-	2.5	5			
		Si-R174			-	16	40			
Si-R176	-	35	80							
传输特性 Transfer Characteristics	LED 开启电流 LED Operate Current	Si-R170	$I_L=Rated I_L MAX$	$I_{FON}$	-	0.4	3	mA		
		Si-R1702			-	0.5	3			
		Si-R171			-	0.4	3			
		Si-R172			-	0.6	3			
		Si-R174			-	0.29	3			
		Si-R176			-	0.3	3			
	LED 关断电流 LED Turn Off Current	Si-R170		$I_{FOFF}$	0.05	0.3	-			
		Si-R1702			0.05	0.4	-			
		Si-R171			0.05	0.2	-			
		Si-R172			0.05	0.5	-			
		Si-R174			0.05	0.28	-			
		Si-R176			0.05	0.25	-			
	上升时间 Rise Time			$I_F=10mA,$ $I_L=Rated I_L MAX$	$t_r$	-	-		1.8	ms
	下降时间 Fall Time				$t_f$	-	-		1.2	
隔离电阻 Isolation Resistance		$V_{L-O} = 500V DC$	$R_{ISO}$	1000	-	-	$M\Omega$			
隔离电容 Isolation Capacitance		$f = 1 MHz, V_B = 0V$	$C_{ISO}$	-	-	1.5	pF			

## 典型特性曲线 Typical Characteristics Curves

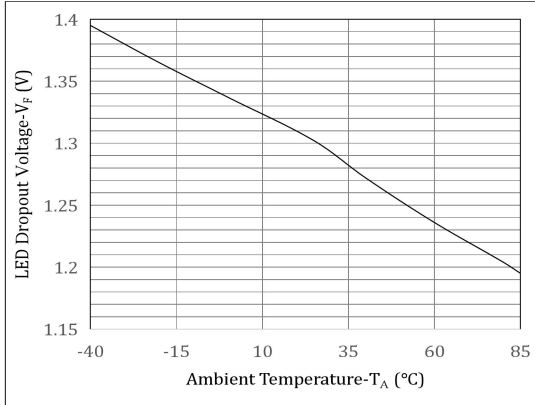


Fig.1 LED Dropout Voltage vs. Ambient Temperature

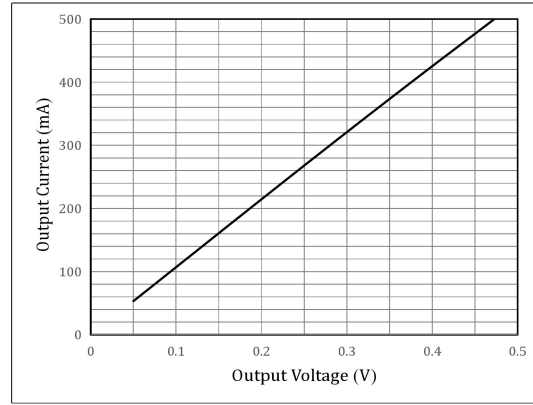


Fig.2 Output Current vs. Output Voltage

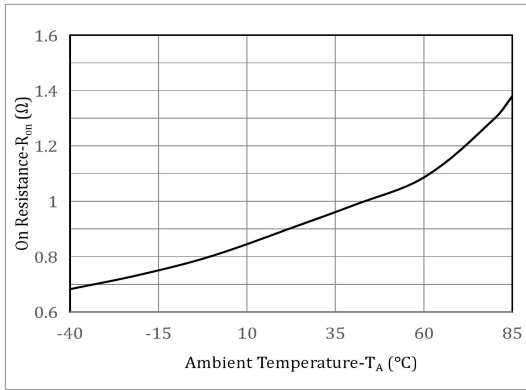


Fig.3 On Resistance vs. Ambient Temperature

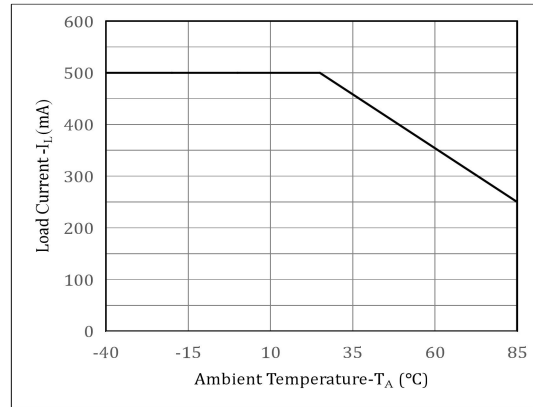


Fig.4 Load Current vs. Ambient Temperature

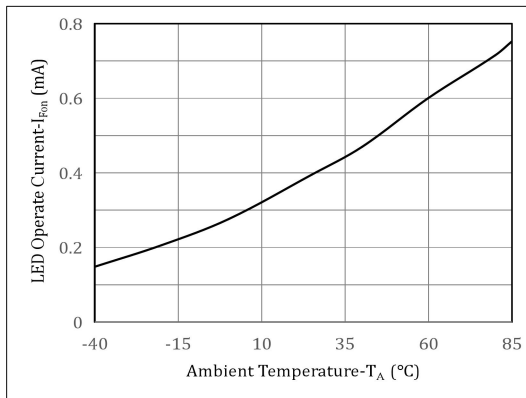


Fig.5 LED Operate Current vs. Ambient Temperature

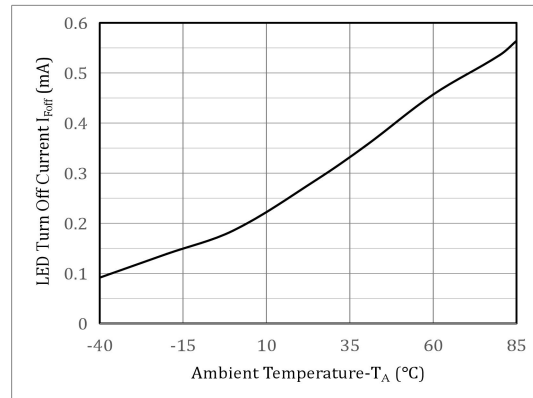
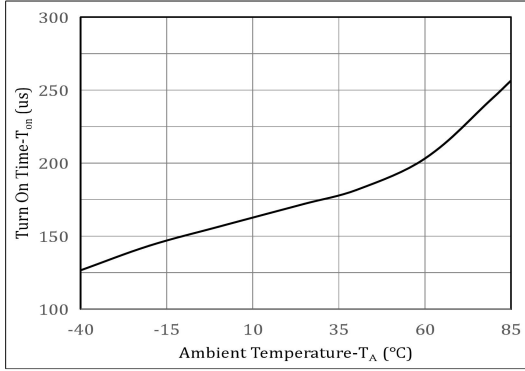
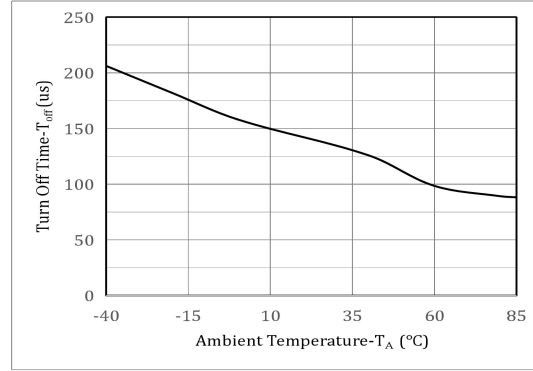


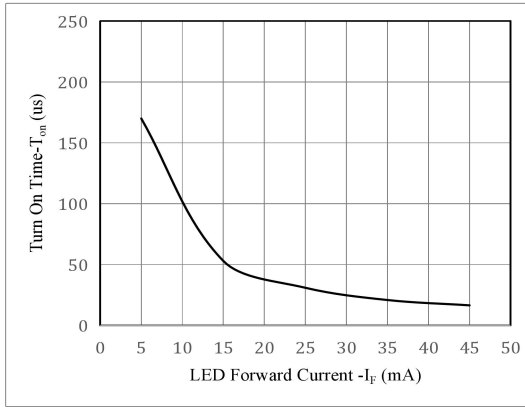
Fig.6 LED Turn Off Current vs. Ambient Temperature



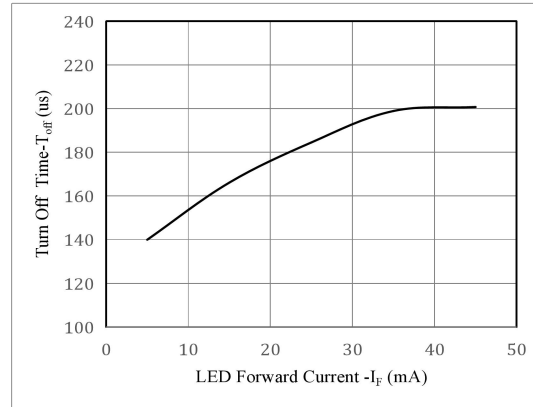
**Fig.7 Turn On Time vs. Ambient Temperature**



**Fig.8 Turn Off Time vs. Ambient Temperature**



**Fig.9 Turn On Time vs. LED Forward Current**



**Fig.10 Turn Off Time vs. LED Forward Current**

## 印字信息 Marking Information



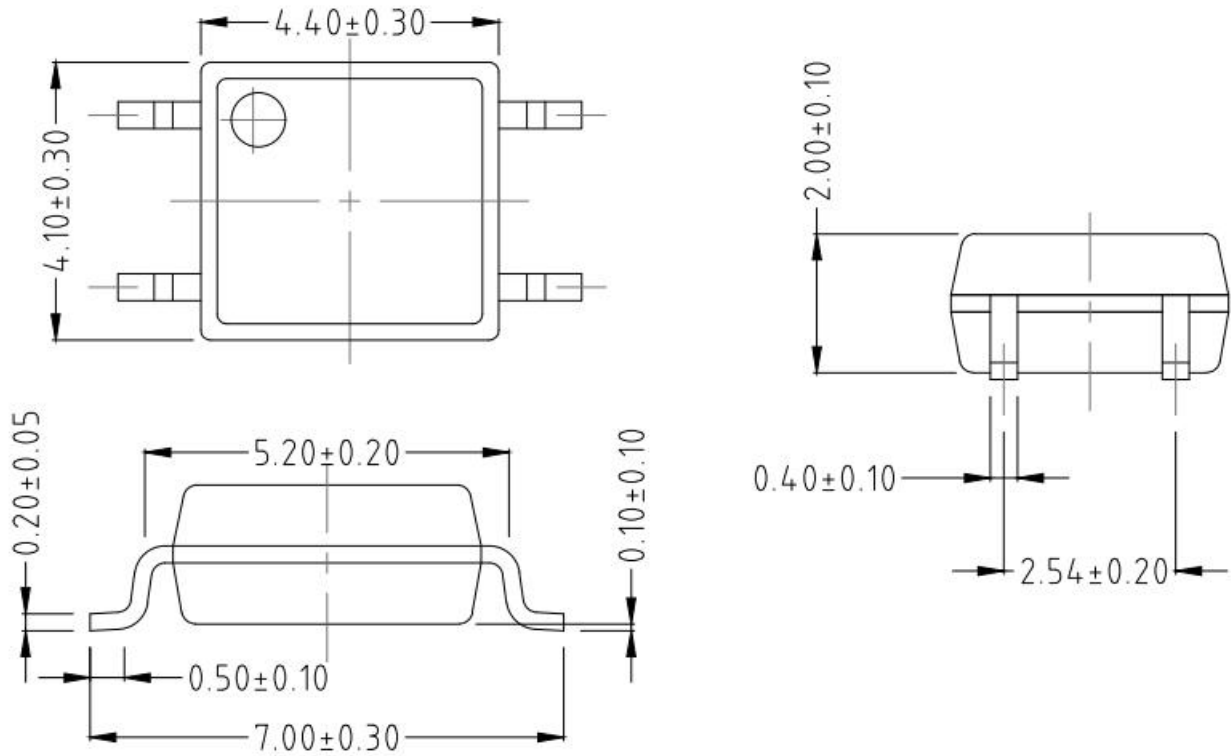
- ◆ Si: 生产商代码 Manufacturer's Code Marking
- ◆ X: 持续负载电压代码 V<sub>L</sub> Rank Code
- ◆ Y: 年代码 Last Digit of Year (ex: 4=2024,5=2025)
- ◆ WW: 周号代码 Week Code (01 to 53)
- ◆ N: 特殊代码或无 Special code or None

## 命名规则 Naming Rule

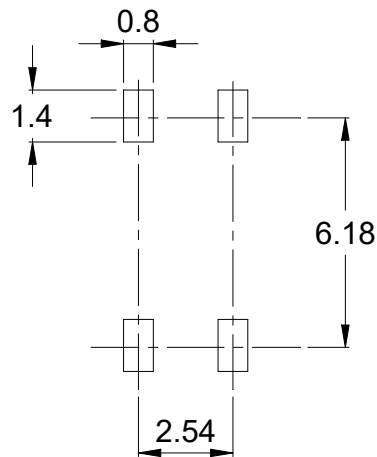
# Si-R17X-WY-ZTT

- ◆ Si: 生产商代码 Manufacturer's Code Marking
- ◆ R17X: 器件型号代码 (X: 持续负载电压代码) Device Part Number (X: V<sub>L</sub> Rank Code)
- ◆ W: 框架材质 (C=铜)
- ◆ Y: G/None (G=环保, None=非环保)
- ◆ Z: 封装 (S: SOP4)
- ◆ TT: 补充码 A~Z or 0~9 or None

## 封装外形尺寸 Package Outline Dimensions



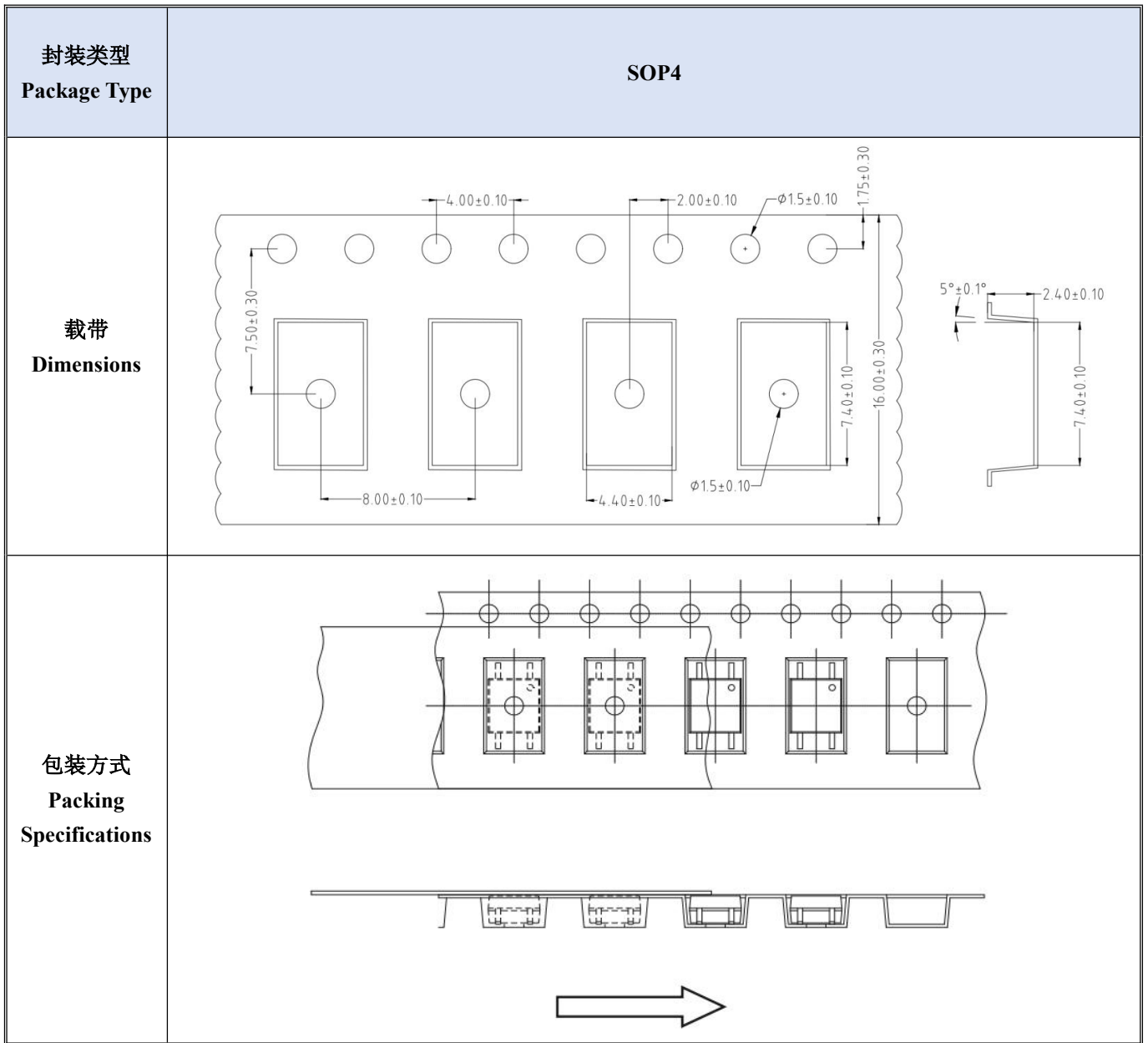
## 推荐焊盘尺寸 Recommended Footprint Patterns



## 包装 Packing

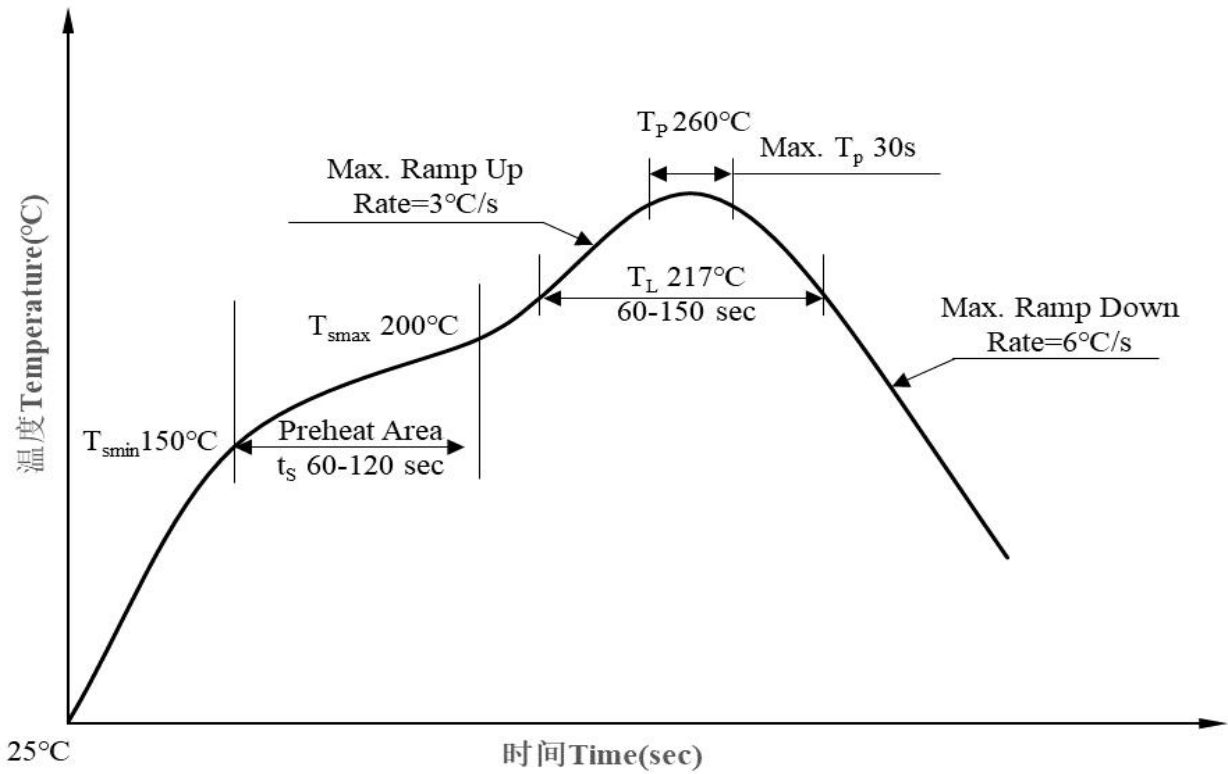
封装类型 Package Type	每盘数量 Quantity per Reel	内盒数量 Quantity per Inner Box	外箱数量 Quantity per Carton	内盒尺寸 Inner Box Dimensions	外箱尺寸 Carton Dimensions
SOP4	3000 pcs/reel	6000 pcs/inner box	60,000 pcs/carton	353*340*60mm	650*375*365mm

## 载带与卷盘 Tape and Reel



单位: mm

## 回流焊温度曲线 Solder Reflow Temperature Profile



曲线项目 Profile Item		符号 Symbol	数值 Value	单位 Unit
预热区 Preheat Area	最低温度 Temperature Min.	$T_{smin}$	150	°C
	最高温度 Temperature Max.	$T_{smax}$	200	°C
	时间 Time (min. to max.)	$t_s$	60~120	sec
焊接区 Soldering Area	温度 Temperature	$T_L$	217	°C
	时间 Time	$t_L$	60~150	sec
峰值温度 Peak Temperature		$T_P$	260	°C
峰值温度 $T_P$ 至 $T_P-5^\circ\text{C}$ 之间的时间 Time within 5 °C of Peak Temperature: $T_P - 5^\circ\text{C}$		$t_p$	30	sec max.
上升速率 Ramp-up rate		/	3	°C / sec max.
下降速率 Ramp-down rate		/	6	°C / sec max.

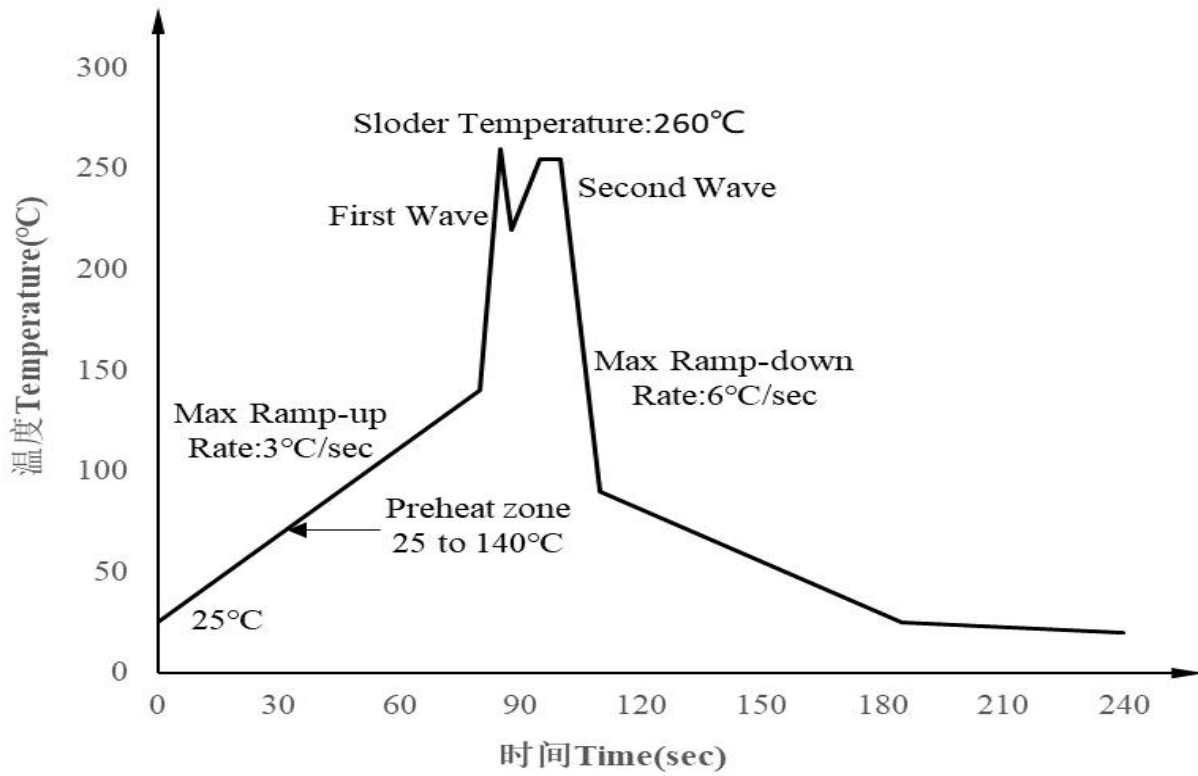
注：参考 IPC/JEDEC J-STD-020D 标准。

Note: Reference: IPC/JEDEC J-STD-020D.

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。

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

## 波峰焊温度曲线 Wave soldering Temperature Profile



详情请参考 JEDEC 标准 JESD22-A111

For more details, please refer to the JESD22-A111 of JEDEC standards.

## 手工烙铁焊接 Hand soldering by soldering iron

(1) 建议一次完成焊接。

One time soldering is recommended.

(2) 温度  $360^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ，时间  $\leq 3\text{s}$ 。

Temperature:  $360^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , within 3s.

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