



厦门华联电子股份有限公司

Xiamen Hualian Electronics Corp., Ltd.

产品规格书

SPECIFICATION

产品名称：光敏双向晶闸管输出型光耦合器
DESCRIPTION: Photo-triac Output Opto-coupler
产品型号：HPC3083-×
PART NO.: HPC3083-×

拟制 Prepared	审核 Verified	批准 Approved

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1 概述 General

产品 HPC3083-× 由砷化铝镓红外发光二极管和零交叉光敏双向晶闸管芯片耦合封装构成。产品可实现低压电路同高压线路间的逻辑隔离,可为大电流晶闸管提供随机相位控制。产品具有很高的静态 dV/dT , 以确保感性负载下仍有可靠的开关性能。产品图见图 1。

The HPC3083-× consist of a AlGaAs infrared emitting diode optically coupled to a zero-crossing silicon bilateral AC switch (triac). These devices isolate low voltage logic from high voltage AC lines to provide random phase control of high current triacs or thyristors. These devices feature greatly enhanced static dv/dt capability to ensure stable switching performance of inductive loads. Products shown in Figure 1.



图 1 产品 Figure 1-Product

2 特点 Features

- 输出端为过零双向晶闸管输出。Zero-crossing Triac Output.
- 输入、输出间绝缘电压高。The isolation voltage between input and output is high: $V_{ISO} \geq 5000V_{rms}$.
- 双列直插式 6L 塑料封装。6L DIP plastic package.
- 安规认证: UL 安全认证
VDE 安全认证

3 应用 Applications

- 螺线管/阀门控制 Solenoid/valve controls
- 灯整流器 Lamp ballasts
- 静态交流电源开关 Static AC power switch
- 微处理器同 115Vac、240Vac 接口 Interfacing microprocessors to 115 and 240 Vac peripherals
- 白炽灯调光器 Incandescent lamp dimmers
- 温度控制 Temperature controls
- 马达控制 Motor controls

4 极限参数 Absolute Maximum Ratings

表 1 极限参数

Table 1-Absolute Maximum Ratings

参数名称 Characteristic		符号 Symbol	额定值 Rating	单位 Unit
输入端 Input	正向电流 Forward Current	I_F	60	mA
	反向电压 Reverse Voltage	V_R	6	V
	耗散功率 Power Dissipation	P_M	100	mW
输出端 output	断态重复峰值电压 Off-state repetitive peak voltage	V_{DRM}	800	V
	通态电流 On-state current	$I_{T(RMS)}$	100	mA
	峰值浪涌电流 Peak repetitive surge current	I_{TSM}	1	A
	耗散功率 Power dissipation	P_C	300	mW
工作温度 Operating temp.		T_{aop}	-40 ~ +100	°C

贮存温度 Storage temp.	T_{stg}	-55 ~ +125	°C
焊接温度 (10 秒) Soldering Temperature (10 Sec.)	T_{sol}	260	°C
总耗散功率 Total power dissipation	P_T	400	mW
绝缘电压 Isolation voltage (RH≤60%,交流 1 分钟) (RH≤60%, AC 1min.)	V_{ISO}	5000	V_{rms}

5 光电参数 Opto-Electrical Characteristics

表 2 光电参数

Table 2-Opto-Electrical Characteristics

$T_a=25^{\circ}C$

参数名称 Characteristic	符号 Symbol	测试条件 Test conditions	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
正向电压 Forward voltage	V_F	$I_F=10mA$	-	1.24	1.4	V
反向电流 Reverse current	I_R	$V_R=6V$	-	-	10	uA
断态重复峰值电流 Off-state repeated peak current	I_{DRM}	$V_{DRM}=800V^a$	-	-	500	nA
断态电压临界上升率 Off-state voltage critical rise	dv/dt^b	$V_{DRM}=800V_{AC}$ $dv/dt=0.63V_{DRM}/\tau$	1000	-	-	V/us
LED 触发电流 LED triggering current	I_{FT}^c	$V_T=3V$	-	-	5	mA
维持电流 Holding current	I_H		-	237	-	uA
峰值通态电压 On-state peak voltage	V_{TM}	$I_{TM}=100mA$	-	1.59	2.5	V
禁止电压 Inhibit Voltage	V_{INH}	$I_F=I_{FT}$			20	V
禁止态漏电流 Leakage in Inhibited State	I_{DRM2}	$I_F=I_{FT}$ $V_{DRM}=800V, \text{ off state}$	10		500	uA
绝缘电压 Isolation voltage	V_{ISO}	$I_{off}\leq 0.3mA,$ AC, 60s	5000	-	-	V

^a 外加测试电压须在 dv/dt 额定值内。The additional test voltage should be within dv/dt rated value.

^b 这是静态 dv/dt , 转换 dv/dt 只随负载驱动闸流管变化。This is static dv/dt , dv/dt is converted with changes of loading for the driven thyristor.

^c 保证所有器件在 I_F 值小于或等于最大的 I_{FT} 时触发。It is guaranteed that all devices trigger when I_F value is less than or equal to the maximum value of I_{FT} .

6 特性曲线 Performance Curves

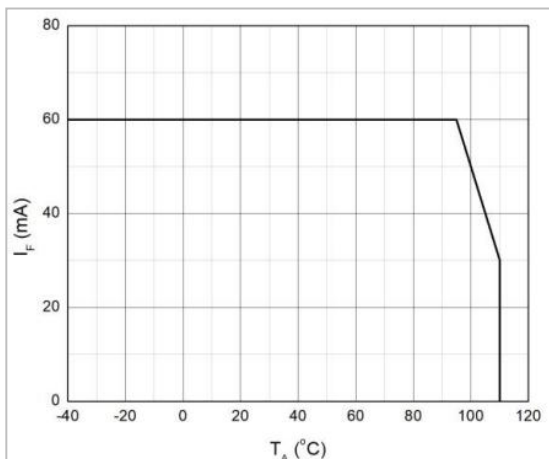


图 2 T_A - I_F 特性曲线

Figure 2- Forward Current vs. Ambient Temperature

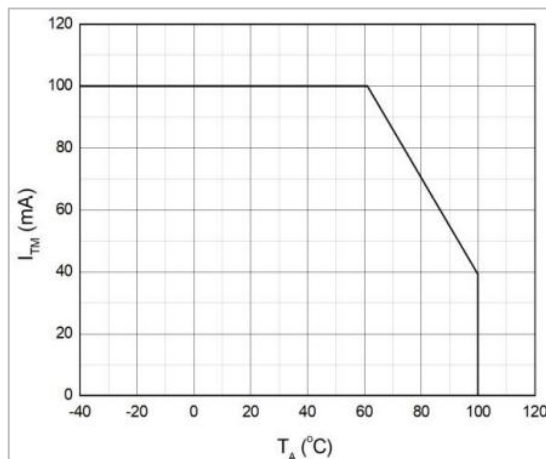


图 3 T_A - I_{TM} 特性曲线

Figure 3- On-state Terminal Current vs. Ambient Temperature

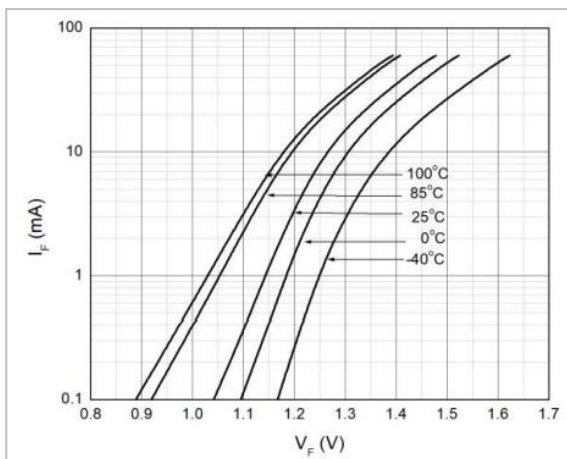


图 4 V_F - I_F 特性曲线

Figure 4- Forward Current vs. Forward Voltage

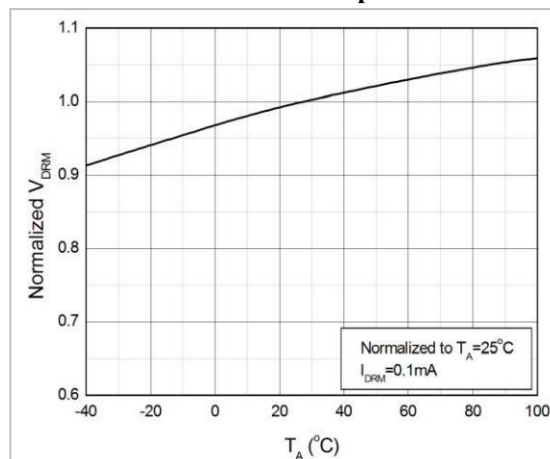


图 5 T_A -Normalized V_{DRM} 特性曲线

Figure 5- Normalized Off-state Voltage vs. Ambient Temperature

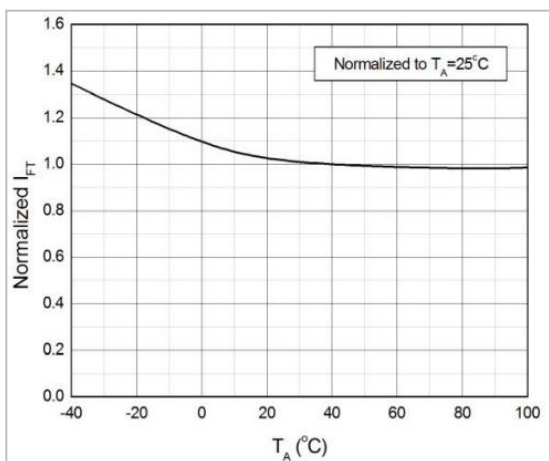


图 6 T_A -Normalized I_{FT} 特性曲线

Figure 6- Normalized Trigger Current vs. Ambient Temperature

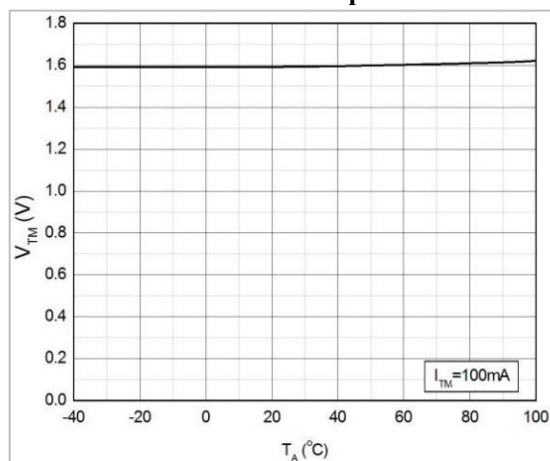


图 7 T_A - V_{TM} 特性曲线

Figure 7- On-state Terminal Voltage vs. Ambient Temperature

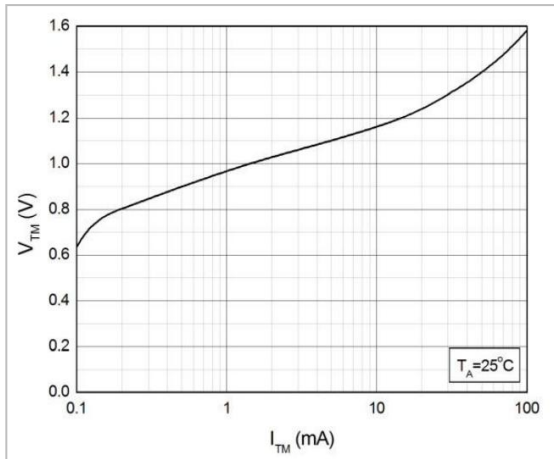


图 8 I_{TM} - V_{TM} 特性曲线

Figure 8- On-state Terminal Voltage vs. On-state Terminal Current

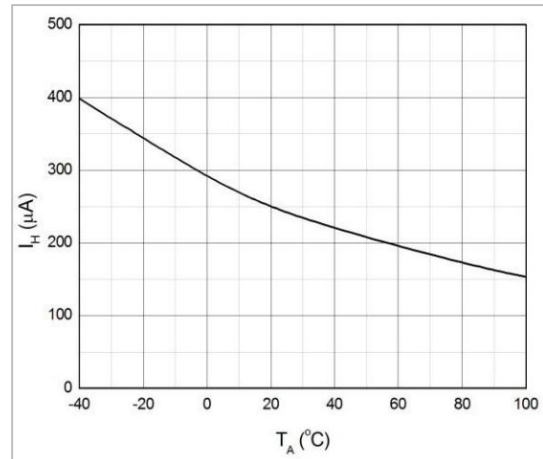


图 9 T_A - I_H 特性曲线

Figure 9- Holding Current vs. Ambient Temperature

7 电原理图 Schematic Diagram

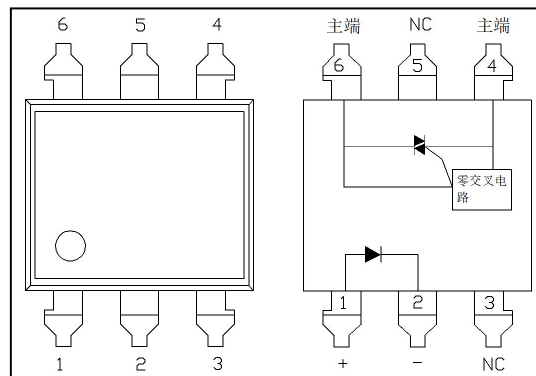


图 10 电原理图

Figure 10- Circuit Diagram

8 外形尺寸图 Dimensions Diagram

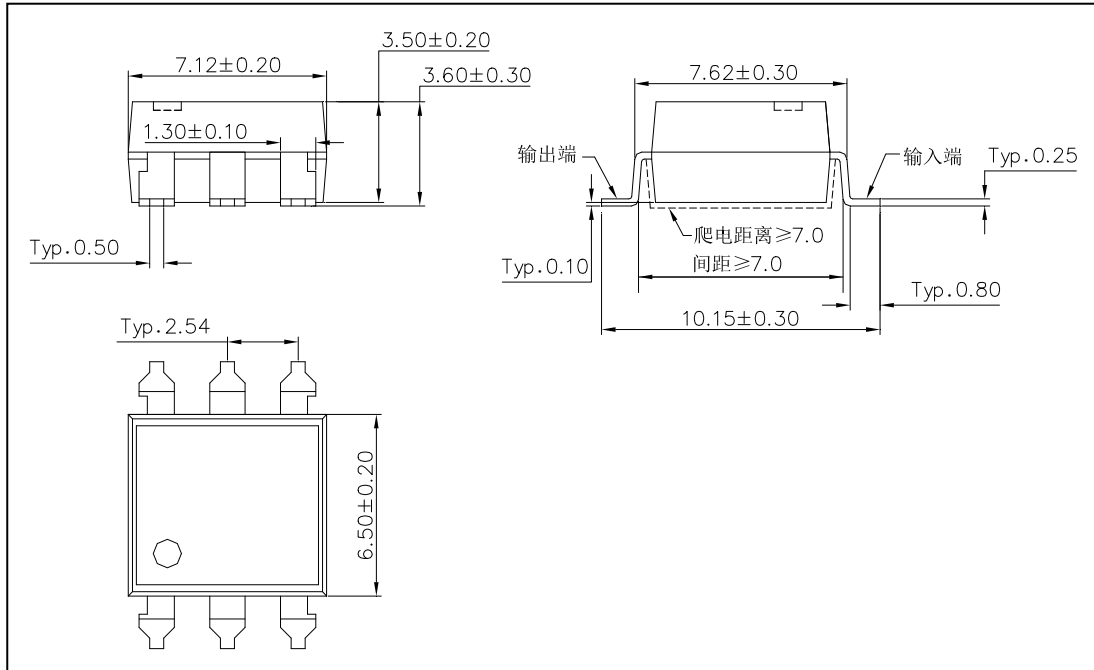


图 11 HPC3083-2 外形尺寸
Figure 11- The dimension of HPC3083-2

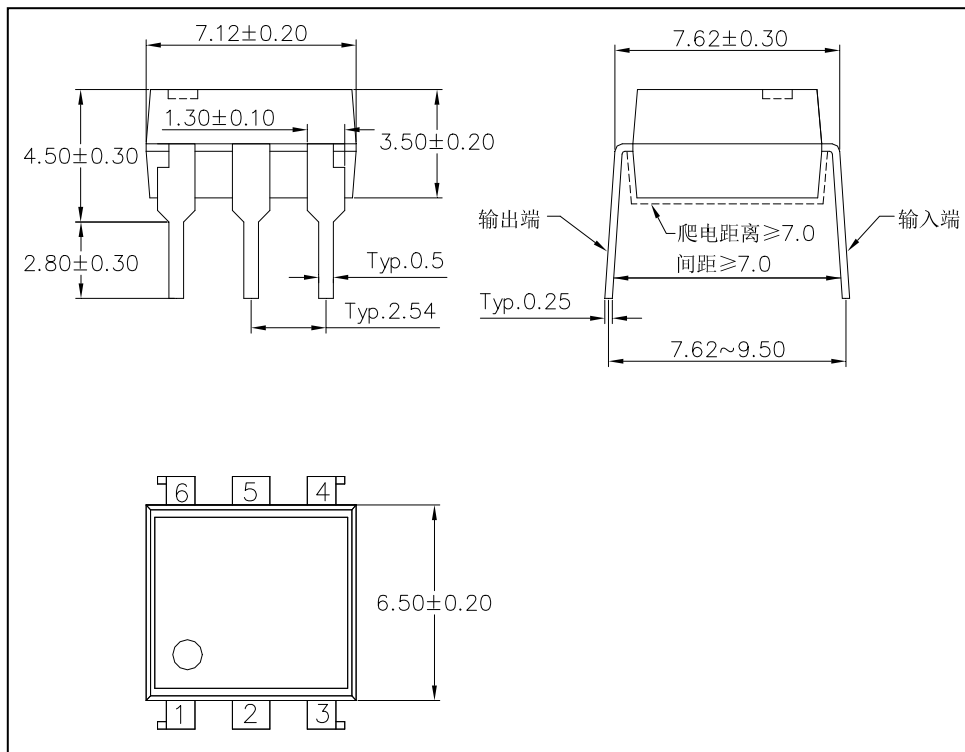


图 12 HPC3083-3 外形尺寸
Figure 12- The dimension of HPC3083-3

6 标志 Mark

产品上应有型号、公司商标、生产日期代码、引出端识别标记。例如：HPC3083-×产品印章如图 13。

Print type characters ,trade mark and Lot.No.on the Photo Coupler.For example the marking of product HPC3083-× is shown as figure 13.

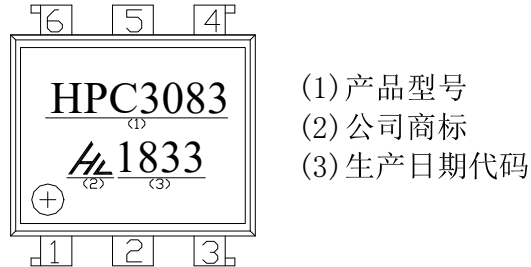


图 13 产品印章 Figure 13- Marking

10 包装方式 Packing

10.1 条管包装 (Tube) : 适用于 For HPC3083-3。

10.1.1 每箱数量 (Qty/ctn) : 16000 只 (pcs) 。

10.1.2 内包装 (Inner packing) :

每条管 50 只, 采用防静电条管, 条管上有商标、防静电标志。

50pcs/tube, antistatic tube, indication of trade mark and antistatic.

每纸匣 1600 只, 贴合格证 (型号、生产日期代号、检验员代号) 。

1600pcs/bundle, certificate on one end (model, code of product date, Inspector's code) .

10.1.3 外包装(Outter packing):

公司名称、地址、商标、产品型号、数量等标志。

Indication of company name, address, trade mark, model and quantity.

10.1.4 示意图 (Schematic) :

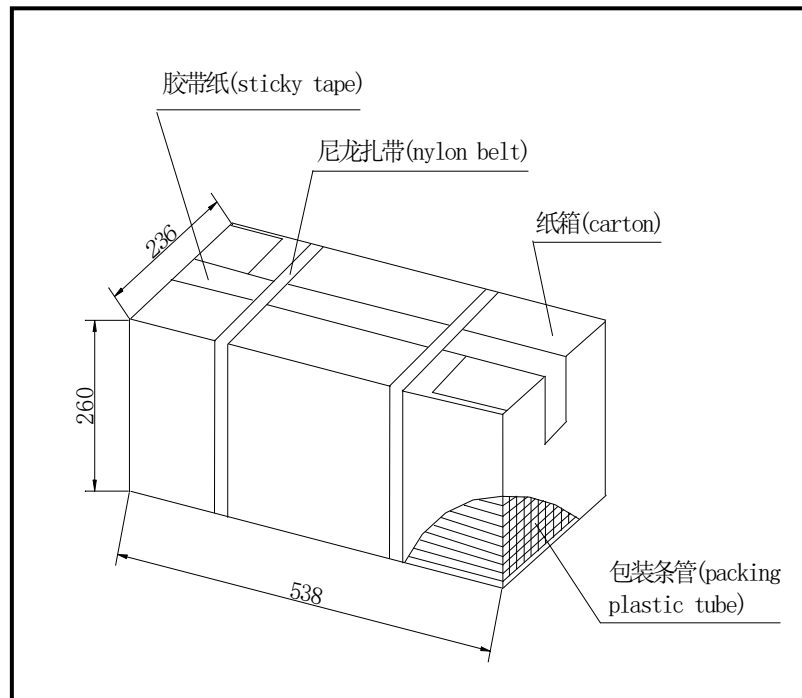


图 14 条管外包装

Figure 14- Outter packing for Tube

10.2 编带包装 (Tape and reel) : 适用于 For HPC3083-2。

10.2.1 每卷数量 (Qty/reel) : 1000 只 (pcs)。每箱数量 (Qty/ctn) : 15000 只 (pcs)。

10.2.2 内包装 (Inner packing) :

每卷盘 1000 只, 贴合格证 (型号、生产日期代号、检验员代号)。

1000pcs/reel, certificate on reel (model, code of product date, Inspector's code)

10.2.3 外包装(Outer packing):

公司名称、地址、商标、产品型号、数量等标志。

Indication of company name, address, trade mark, model and quantity.

10.2.4 示意图 (Schematic) :

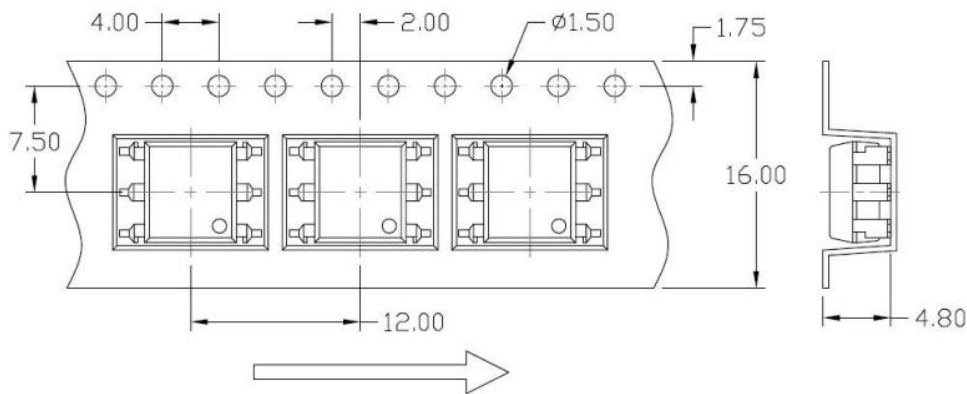


图 15 编带包装示意图

Figure 15- Taping Packing Schematic

11 注意事项 Note

11.1.1 推荐贮存温度 Recommend storage Temp.: 0~40°C;

推荐贮存湿度 Recommend storage humidity: <70%;

贮存有效期半年 Storage life: Half of a year.

11.1.2 湿气敏感度等级 1 级。MSL level: MSL1.

11.2 引脚镀锡厚度: 大于等于 3 μ m。

Thickness of Sn which plated on lead frame: $\geq 3 \mu\text{m}$.

11.3 推荐焊接条件 Recommended soldering conditions

11.4 施加在环氧树脂上的温度不要超过最高贮存温度。

Not to apply high temperature exceeding the maximum storage temperature to the epoxy resin.

11.5 在高温下不要对环氧树脂施加压力。

Not to apply any force to the epoxy resin at high temperature.

11.6 焊接过程 Soldering process

1. 在焊接过程中不要对器件施加任何压力。

Not to apply any stress to the component during the soldering process.

2、回流焊 Reflow soldering

1) 推荐锡膏规格 Recommend tin glue specifications:

a) 熔点 Melting temperature: 217°C

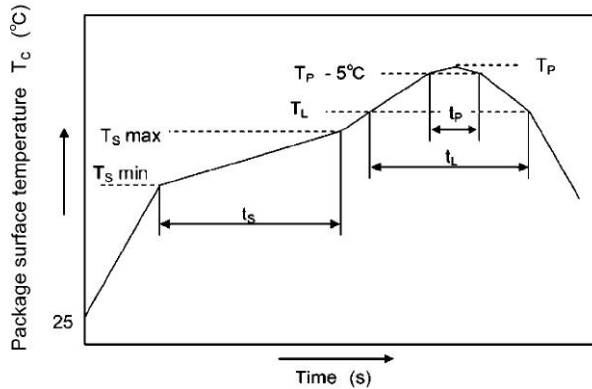
b) 组分 Contains: SnAg3Cu0.5

2) 回流焊工序必须在器件冷却至室温后进行。

Never take next process until the component is cooled down to room temperature after reflow.

3) 推荐无铅回流焊接参数，如下图所示：

The recommended Lead-free reflow soldering profile is following:



	Symbol	Min	Max	Unit
Preheat temperature	T_S	150	200	$^{\circ}\text{C}$
Preheat time	t_S	60	120	s
Ramp-up rate (T_L to T_P)			3	$^{\circ}\text{C/s}$
Liquidus temperature	T_L	217		$^{\circ}\text{C}$
Time above T_L	t_L	60	150	s
Peak temperature	T_P		260	$^{\circ}\text{C}$
Time during which T_c is between ($T_P - 5$) and T_P	t_P		30	s
Ramp-down rate (T_P to T_L)			6	$^{\circ}\text{C/s}$

图 16 回流焊参数

Figure 16-Recommended reflow soldering profile