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：可控硅输出型光耦合器
DESCRIPTION: Triac Output Opto-coupler
产品型号：HSCR-×××××
PART NO.：HSCR-×××××

拟制 Prepared	审核 Verified	批准 Approved

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1　概述 General

HSCR-××××× 由砷化铝镓红外发光二极管，零交叉或非零交叉的光敏双向晶闸管及功率可控硅芯片组合封装构成。产品可实现低压电路同高压线路间的逻辑隔离，可为交流负载提供过零或非过零控制。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。产品示意图见图 1。

The HSCR-××××× consist of a AlGaAs infrared emitting diode, a Zero-cross or Non zero-crossing silicon bilateral AC switch and a power triac. These devices isolate low voltage logic from high voltage AC lines to provide Zero-cross or Non zero-cross control of AC load. These devices feature greatly enhanced static dV/dt capability to ensure stable switching performance of inductive loads. Products shown in Figure 1.

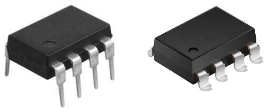


图 1　产品 Figure 1-Product

2　特点 Features

- DIP 封装，理想的交流负载控制。 DIP type; Ideal for AC load control.
- 双列直插式/贴片式 8L 塑料封装。8L DIP/SMD plastic package.
- 支持 0.3A～1.2 A 通态最大有效电流。Supports 0.3A～1.2 A ON-state RMS currents.
- 可以支持 110V 和 220V 交流负载。 Supports both 110 and 220 V AC loads.
- 高介电强度(5000V AC)(输入端和输出端之间)
  High dielectric strength: 5,000 V AC(between input and output).
- 非零交叉或零交叉 Non-zero-cross or Zero-cross type.
- 产品符合 RoHS。Component in accordance to RoHS.
- VDE 安全认证文件号 VDE Licence No.:40004708.
- CQC 安全认证文件号 CQC Licence No.:17001172576.
- UL 安全认证文件号 UL File No. : E178703.

3　应用 Applications

- 家电。Home appliances.
  微波炉、洗衣机、个人卫生系统，冰箱、风扇加热器、感应加热锅，热水器，等等。
  microwave ovens, washing machines, personal hygiene systems, refrigerators, fan heaters, inductive heating cookers, and water heaters, etc.
- 工业设备市场。Industrial equipment market.

4　产品类型 Types

表 1　可控硅输出型光耦合器产品类型

Table 1-Triac Output Opto-coupler Types

类型 Type	额定输出参数 Output rating		触发类型 Type of trigger	型号 Models	
	断态峰值电压 Peak OFF-state voltage	通态有效电流 ON-state RMS current		直插式 (DIP)	表贴式 (SMD)
AC	600V	0.3A	过零型 Zero-cross	HSCR-0213D	HSCR-0213S
		0.6A		HSCR-1213D	HSCR-1213S
		0.9A		HSCR-2213D	HSCR-2213S
		1.2A		HSCR-3213D	HSCR-3213S
		0.3A	非过零型 Non-zero-cross	HSCR-0223D	HSCR-0223S
		0.6A		HSCR-1223D	HSCR-1223S
		0.9A		HSCR-2223D	HSCR-2223S
		1.2A		HSCR-3223D	HSCR-3223S

5 极限参数 Absolute Maximum Ratings

表 2 极限参数

Table 2-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		50	mA
	反向电压 Reverse Voltage	V_R		6	V
	峰值正向电流 Peak forward current (f = 100 Hz, Duty Ratio = 0.1%)	I_{FP}		1	A
输出端 output	断态重复峰值电压 Off-state repetitive peak voltage	V_{DRM}		600	V
	通态有效电流 On-state RMS current	$I_{T(RMS)}$	HSCR-02×3×	0.3	A
			HSCR-12×3×	0.6	
			HSCR-22×3×	0.9	
			HSCR-32×3×	1.2	
	峰值浪涌电流 Peak repetitive surge current (50Hz 1cycle)	I_{TSM}	HSCR-02×3×	3	A
			HSCR-12×3×	6	
			HSCR-22×3×	9	
			HSCR-32×3×	12	
工作温度 Operating temp.		T_{aop}		-30 ~ +85	°C
贮存温度 Storage temp.		T_{stg}		-40 ~ +125	°C
焊接温度 Soldering Temperature	手工焊 Hand Soldering (5 Sec.)	T_{sld}		350	°C
	波峰焊 Wave Soldering (10 Sec.)			270	
	回流焊 Reflow Soldering (10 Sec.)			260	
绝缘电压 Isolation voltage （RH≤60%,交流 1 分钟）(RH≤60%, AC 1min.)		V_{ISO}		5000	V_{rms}

6 光电参数 Opto-Electrical Characteristics

表 3 光电参数

Table 3-Opto-Electrical Characteristics **T_a=25℃**

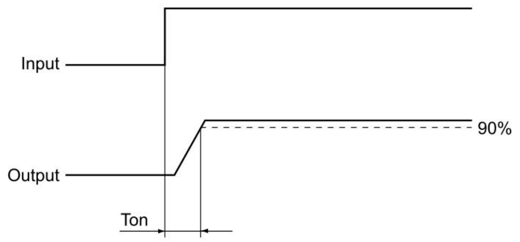
参数名称 Characteristic		符号 Symbol	测试条件 Test conditions		最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
输入端 Input	正向电压 Forward voltage	V_F	I_F=10mA		-	1.16	1.3	V
	反向电流 Reverse current	I_R	V_R=6V		-	-	10	uA
输出端 Output	断态重复峰值电流 Off-state repeated peak current	I_{DRM}	I_F=0mA V_{DRM}=600V		-	-	100	uA
	峰值通态压降 Peak ON-state voltage	V_{TM}	HSCR-0213× HSCR-0223×	I_F = 10 mA I_{TM} = 0.3A	-	-	2.5	V
			HSCR-1213× HSCR-1223×	I_F = 10 mA I_{TM} = 0.6A				
			HSCR-2213× HSCR-2223×	I_F = 10 mA I_{TM} = 0.9A				

	峰值通态压降 Peak ON-state voltage	V_{TM}	HSCR-3213× HSCR-3223× I_F = 10 mA I_{TM} = 1.2A	-	-	2.5	V
	维持电流 [a] Holding current	I_H	-	-	-	25	mA
	断态电压临界上升率 Off-state voltage critical rise	dv/dt [b]	V_{DRM} = 600 V ×1/$\sqrt{2}$	200	-	-	V/us
传输特性 Transfer charac-teristics	LED 触发电流 [a] LED triggering current	I_{FT}	V_D=6V，R_L=100Ω	-	-	10	mA
	过零电压 [b] Zero-cross voltage	V_{ZC}	I_F = 10 mA			50	V
	动作时间 [c] Turn on time	T_{ON}	I_F = 20 mA V_D = 6 V R_L = 100 Ω	-	-	100	μS
	绝缘电阻 Isolation resistance	R_{ISO}	V=500V	-	5×10^{11}	-	Ω
	绝缘电压 Isolation voltage	V_{ISO}	I_{off}≤0.3mA, AC, 60s	5000	-	-	V

[a] 应用中推荐 LED 触发电流为 20mA。Recommended LED current I_{FT}: 20mA.

[b] 零交叉电压仅针对 Applicable part No.:HSCR-0213，HSCR-1213，HSCR-2213，HSCR-3213。

[c] 开通时间测试波形 Turn on time：



7 外形尺寸 Dimensions

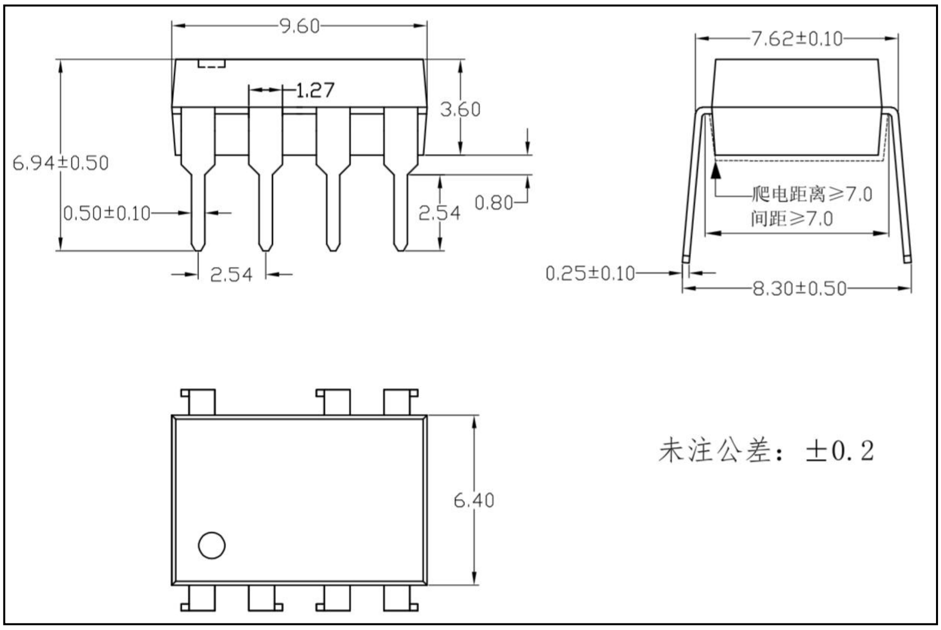


图 2 HSCR-××××D 外形尺寸

Figure 2- The dimensions of HSCR-××××D

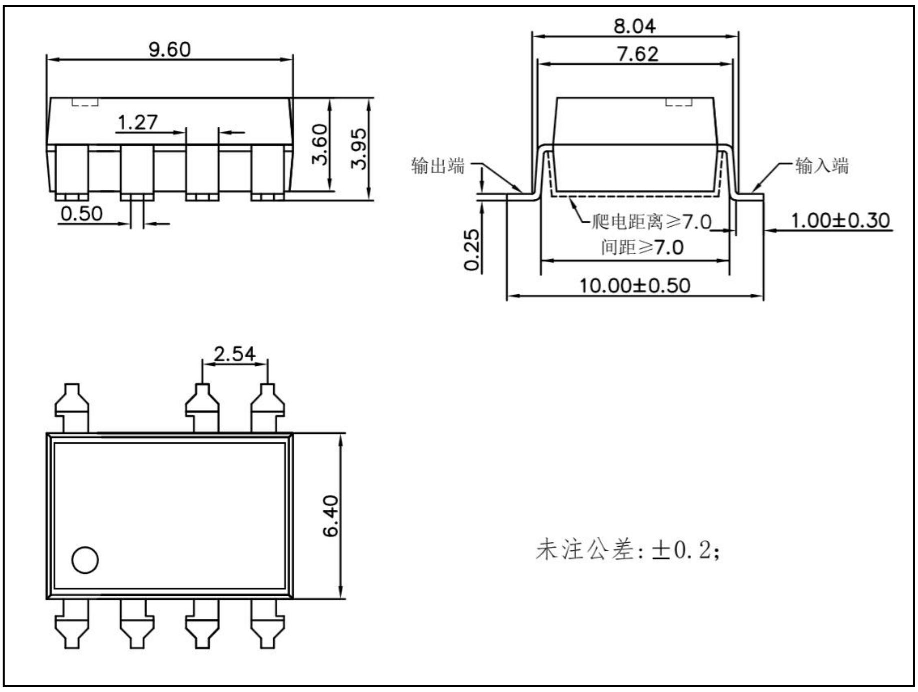


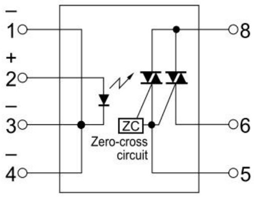
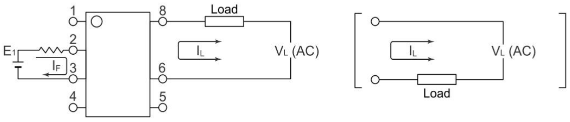
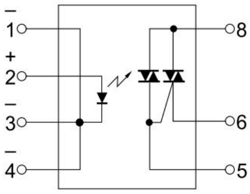
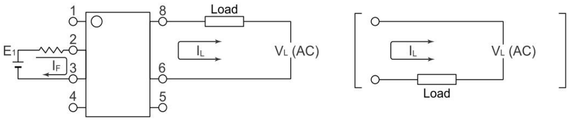
图 3 HSCR-××××S 外形尺寸

Figure 3- The dimensions of HSCR-××××S

8 电原理图及布线图 Circuit Diagram and Wiring Diagram

表 4 电原理图及布线方式

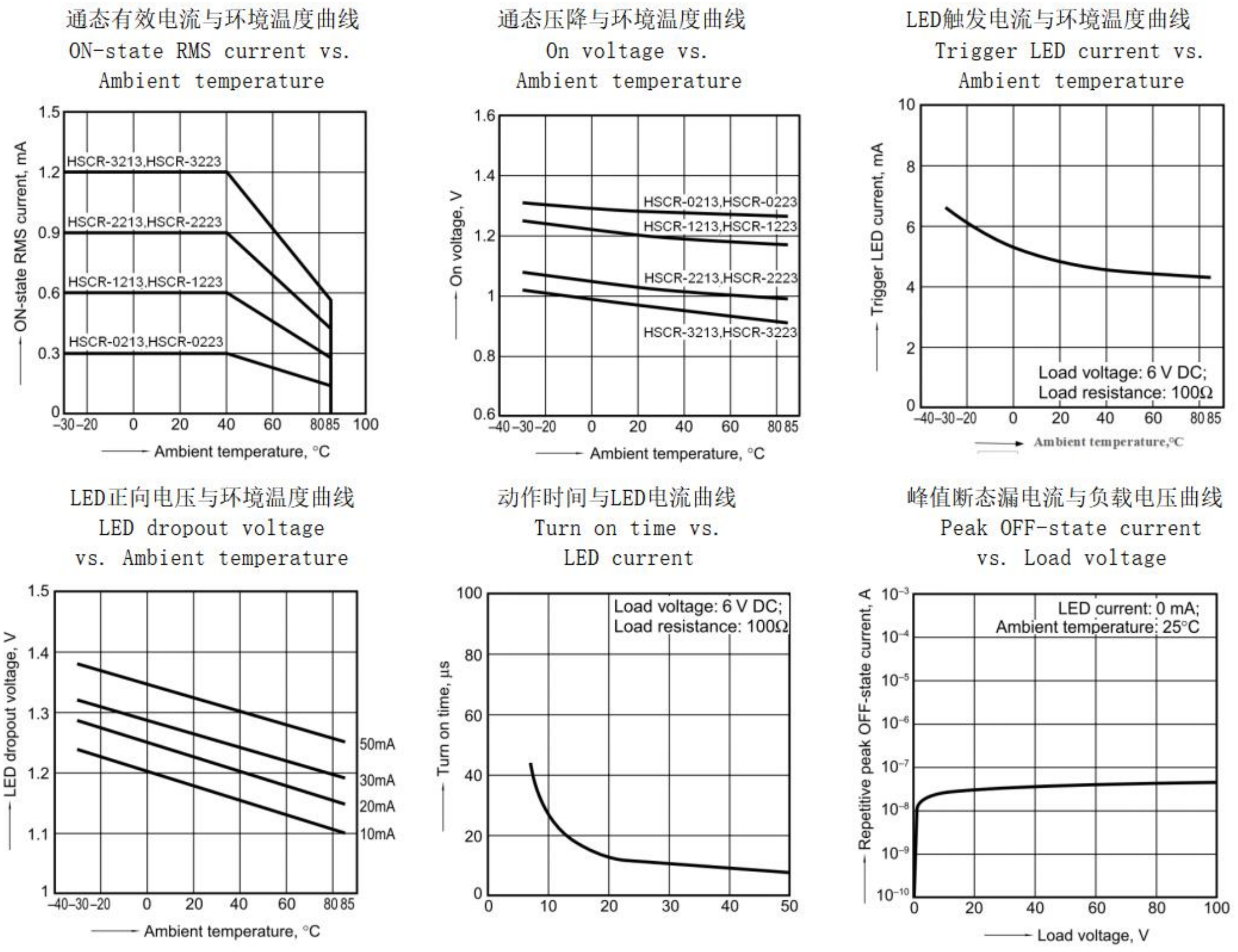
Table 4-Circuit Diagram and Wiring Diagram

型号 Models	触发类型 Type of trigger	电原理图 Output configuration	布线图 Wiring diagram
HSCR-0213×	过零型 Zero-cross		
HSCR-1213×			
HSCR-2213×			
HSCR-3213×			
HSCR-0223×	非过零型 Non-zero-cross		
HSCR-1223×			
HSCR-2223×			
HSCR-3223×			

注释 Notes:

E_1：输出端电源 Power source at input side; I_F：LED 触发电流 Trigger LED forward current;
V_L：负载电压 Load voltage; I_L：负载电流 Load current。

9 特性曲线 Characteristics Curve


通态有效电流与环境温度曲线
ON-state RMS current vs. Ambient temperature

通态压降与环境温度曲线
On voltage vs. Ambient temperature

LED触发电流与环境温度曲线
Trigger LED current vs. Ambient temperature

LED正向电压与环境温度曲线
LED dropout voltage vs. Ambient temperature

动作时间与LED电流曲线
Turn on time vs. LED current

峰值断态漏电流与负载电压曲线
Peak OFF-state current vs. Load voltage

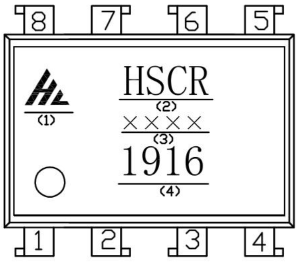
图 4 特性曲线

Figure 4- Characteristics Curve

10 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，见图 5。

Print type characters ,trade mark and Lot.No.on the Photo Coupler.For example the marking of product ， as figure 5.



(1)公司标志 logo of company
(2)可控硅输出型光耦合器简称
Triac Output Opto-coupler
(3)型号 Model
(4)生产年周信息代码 Production Date code

图 5 产品印章

Figure 5- Marking

11 包装方式 Packing

11.1 条管包装（Tape）：适用于 For HSCR-××××D

11.1.1 每箱数量（Qty/ctn）：20000 只（pcs）。

11.1.2 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 1000 只，一端贴合格证（型号、生产日期代号、检验员代号）。

1000pcs/bundle，certificate on one end（model，code of product date，Inspector’s code）.

11.1.3 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.

11.1.4 示意图（Schematic）：

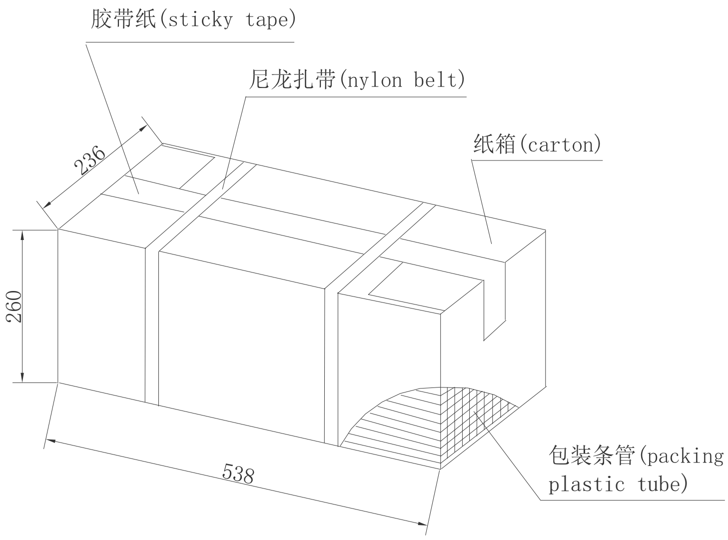


图 6 条管外包装

Figure 6- Outter packing for Tube

11.2 编带包装（Tape and reel）：适用于 For HSCR-××××S

11.2.1 每卷数量（Qty/reel）：1000 只（pcs）。每箱数量（Qty/ctn）：10000 只（pcs）。

11.2.2 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）

11.2.3 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.

11.2.4 示意图（Schematic）：

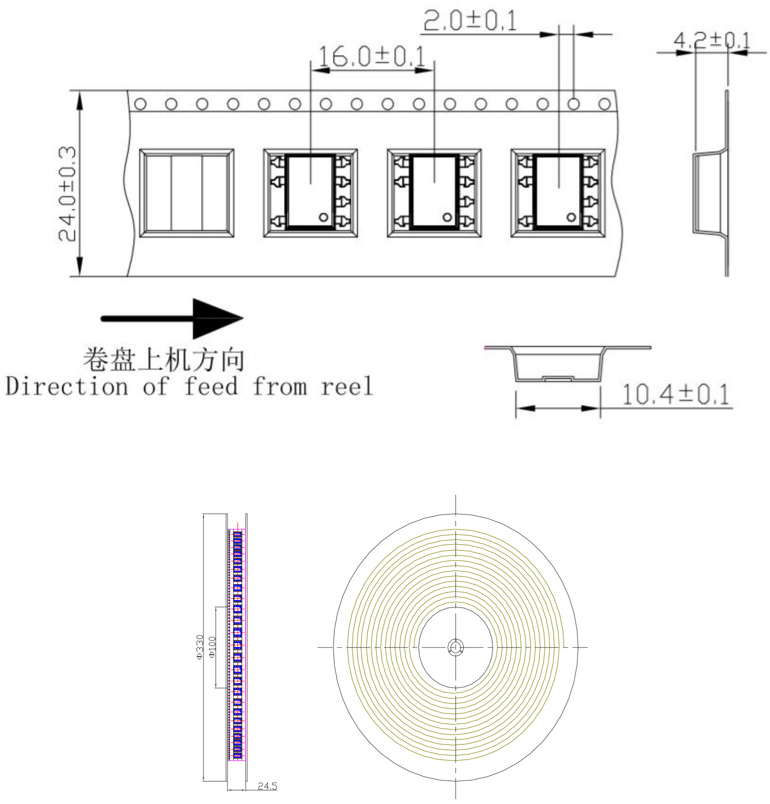


图 7 编带包装示意图

Figure 7- Taping Packing Schematic

11.3 标识 Label

厦门华联电子股份有限公司
XIAMEN HUALIAN ELECTRONICS CORP.,LTD
型号：XXXXXXXXXXXX
客户专用号：XXXXXXXXXXXX
批号：XXXXXX
数量：XXXX
分档：

图 8 标识

Figure 8-Label

11.4 注意事项 Note

11.4.1 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.

11.4.2 湿气敏感度等级 3 级。MSL level: MSL 3.

11.5 引脚镀锡厚度：大于等于 5μm，平均 8μm ~10μm。

Thickness of Sn which plated on lead frame: ≥5 μm, average 8μm ~10 μm.

11.6 推荐焊接条件 Recommended soldering conditions

11.6.1 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.

11.6.2 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.

11.6.3 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℃

b) 组分 Contains: SnAg3Cu0.5

2) 回流焊之后的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) 推荐回流焊接参数，如下图所示： The recommended reflow soldering profile is following:

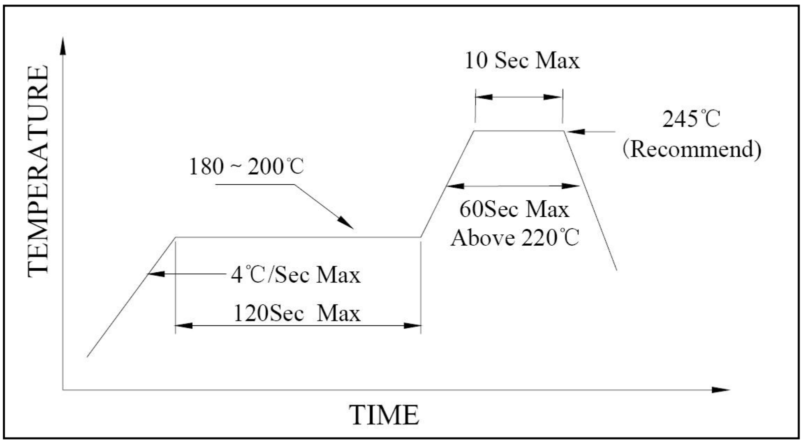


图9 回流焊参数

Figure 9-Recommended reflow soldering profile

12 产地 Production Place

12.1 产地 Production Place：中国厦门 Xiamen China；

12.2 工厂名称 Production NO.：厦门华联电子股份有限公司；Xiamen Hualian Electronics Corp. , Ltd.;

12.3 工厂地址 Production Add.：中国厦门市翔安区舫阳南路 189 号 No.189, Fangyang South Road, Xiangan District, Xiamen China.