厦 门 华 联 半 导 体 科 技 有 限 公 司

Xiamen Hualian Semiconductor Technology Co., Ltd.

产品规格书
SPECIFICATION

产品名称：**高速逻辑门输出型光耦合器**

DESCRIPTION: High Speed Logic Gate Opto-coupler

产品型号：**HPL6L135×**

PART NO.：HPL6L135×

拟制 Prepared	审核 Verified	批准 Approved

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1 概述 General

光耦产品 HPL6L135×由砷化铝镓红外发光二极管与高速逻辑门光敏芯片耦合封装构成，数据传输速率可达到 1 Mbit/s。正常工作温度可达-40°C to +110°C，产品具有很强的共模抑制能力。

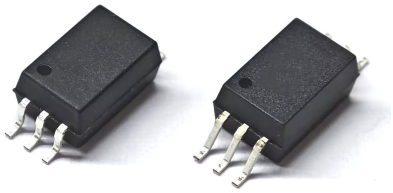


图 1 产品 Figure 1-Product

The HPL6L135 × optocouplers consist of an AlGaAS LED, optically coupled to a very high speed integrated photo-detector logic gate with a strobable output, and the data transmission rate can reach 1 Mbit/s.The coupled parameters are guaranteed over the temperature range of -40°C to +110°C.Products have strong common mode rejection capability.

2 特点 Features

- 数据传输速率。Data transfer rate:1 Mbit/s .
- 逻辑门输出。Logic gate output.
- 双列贴片式 6L 塑料封装 LSOP 6L Long Plastic Package.
- TTL/LSTTL 兼容。TTL/LSTTL Compatible:5V supply
- 产品符合 UL、VDE、CQC 安规认证。The products comply with UL,VDE,CQC safety certification.
  UL 证书编号：E178703；VDE 证书编号：40004708；CQC 证书编号：CQC22001340048
  UL Certificate No.E178703; VED Certificate No.40004708; CQC Certificate No.CQC22001340048
- 符合 RoHS 指令最新要求及 REACH 法规最新要求。
  Compliance with the latest requirements of the RoHS Directive and the latest REACH requirements.

3 应用 Applications

- 线接收器。Line receivers.
- 数据传输。Data transmission.
- 计算机外围接口。Computer-peripheral interface.
- 替代脉冲变压器。Pulse transformer replacement.
- 开关电源。Switching power supply.

4 真值表及电原理图 Truth Table and Schematic

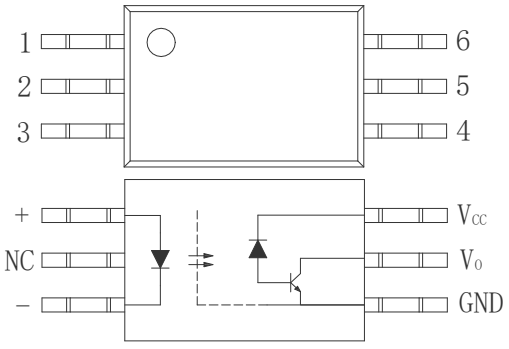


图 2 电原理图

Figure 2-Schematic

表 1 真值表

Table 1-Truth Table

Input	LED	Output
H	ON	L
L	OFF	H

5 极限参数 Absolute Maximum Ratings

表 1 极限参数

Table 1-Absolute Maximum Ratings Ta=(25±5)℃，RH=30~75%

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	25	mA
	正向脉冲电流 Pulse Forward Current (1ms Pulse Width, 50% Duty Cycle)	I_{FP}	50	mA
	反向电压 Reverse Voltage	V_R	5	V
	耗散功率 Power Dissipation	P_M	45	mW
输出端 Output	输出电流 Output Current	I_O	8	mA
	输出峰值电流 Peak Output Current	I_{OP}	16	mA
	电源电压 Supply Voltage	V_{CC}	-0.5~30	V
	输出电压 Output Voltage	V_O	-0.5~20	V
	输出端功耗 Output Power Dissipation	Po	100	mW
工作温度 Operating temp.		T_{aop}	-40～+110	℃
贮存温度 Storage temp.		T_{stg}	-55～+125	℃
焊接温度 Soldering Temperature	手工焊 Hand Soldering (3 Sec.)	T_{sld}	360	℃
	回流焊 Reflow Soldering (5 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 电参数 Electrical Parameters

表 2 光电参数

Table 2-Opto-Electrical Characteristics Ta=(25±5)℃，RH=30~75%

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=16mA	-	1.35	1.7	V
	二极管温度系数 Diode Temperature Coefficient	$\Delta V_F/\Delta T_A$	IF = 16 mA	-	-1.2	-	mV/°C
	反向电流 Reverse Current	I_R	V_R =5V	-	-	5	μA

	输入端子电容 Input Capacitance	C_{IN}	V=0V F=1MHz	-	45	-	pF
输出端 Output	高电平输出电流 Logic High Output Current	I_{OH}	V_O=V_{CC}=5.5V I_F=0 mA	-	3	500	nA
			V_O=V_{CC}=15V I_F=0 mA	-		50	μA
	低电平供给电流 Logic Low Supply Current	I_{CCL}	V_O=Open,V_{CC}=15V I_F=16 mA	-	0.5	0.8	mA
	高电平供给电流 Logic High Supply Current	I_{CCH}	V_O=Open,V_{CC}=15V I_F=0mA	-	0.01	2	μA
耦合 Coupler	电流传输比 Current Transfer Ratio	CTR	I_F=16mA,V_{CC}=4.5V V_O=0.4V	8	-	-	%
	低电平输出电压 Logic Low Output Voltage	V_{OL}	I_F=16mA,V_{CC}=4.5V I_O=2.4mA	-	0.18	0.4	V
开关 Switching	输出端逻辑由高到低的传输延迟 Propagation Delay Time to Logic Low at Output	t_{pHL}	V_{CC}=5V, R_L=1.9kΩ I_F=16mA	-	0.2	1.0	μs
	输出端逻辑由低到高的传输延迟 Propagation Delay Time to Logic High at Output	t_{pLH}	V_{CC}=5V, R_L=1.9kΩ I_F=16mA	-	0.5	1.0	μs
	输出端为高电平时的共模抑制比 Common Mode Transient Immunity at Logic High Level Output	CM_H	R_L=1.9kΩ,I_F=0mA, V_{CM}=1.0kV_{P-P}	10000	-	-	V/μs
	输出端为低电平时的共模抑制比 Common Mode Transient Immunity at Logic High Level Output	CM_L	R_L=1.9kΩ,I_F=16mA, V_{CM}=1.0kV_{P-P}	-10000	-	-	V/μs
隔离 Isolation	绝缘电压 Isolation voltage	V_{ISO}	I_{off}≤0.30mA, AC, 60s	5000	-	-	V
	常温绝缘电阻 Isolation Resistance between Input and Output	R_{I-O}	V_{I-O}=500V DC	10^{12}	-	-	Ω
	输入-输出电容 Capacitance (Input to Output)	C_{I-O} *	f = 1MHz	-	0.6	-	pF

＊C_{I-O} 测试是将 PIN1,2,3 短接在一起，PIN4,5,6 短接在一起。
* Device considered a two-terminal device: Pins 1,2and 3 shorted together, and Pins 4 ,5 and 6 shorted together.

7 特性曲线图 Characteristic Curve

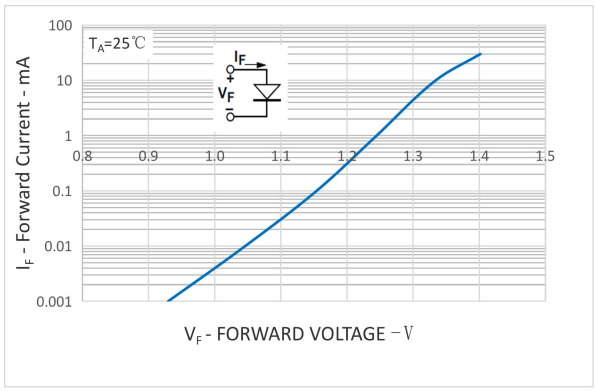


图 3 V_F-I_F 特性曲线

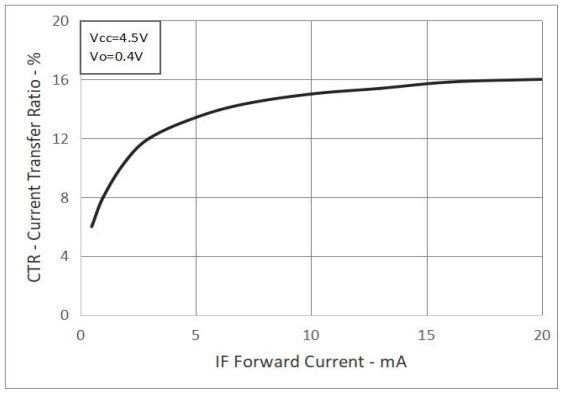


图 4 CTR-I_F 特性曲线

Figure 3-Typical input diode forward characteristic Figure 4 Current Transfer Ratio vs. Forward Current

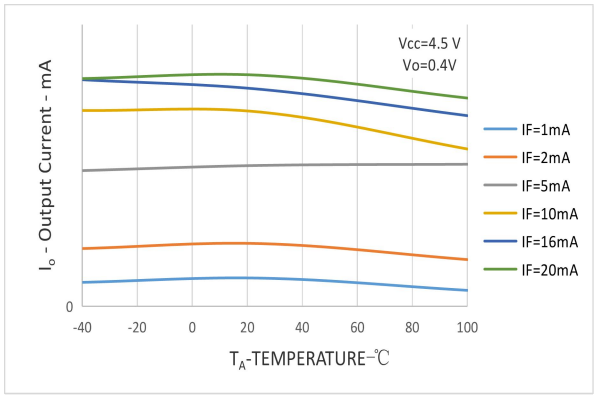


图 5 Io-T_A 特性曲线

Figure 5-Output Current vs. Temperature

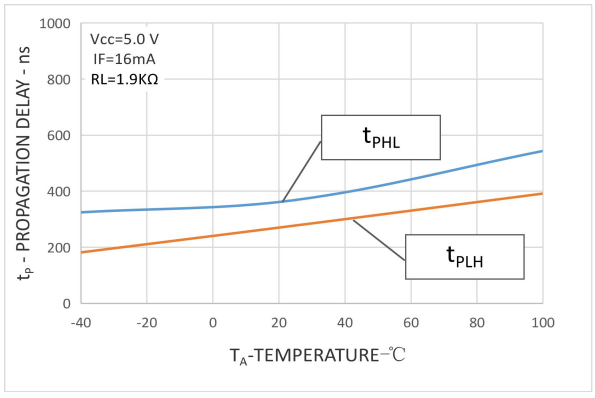


图 6 t_P-T_A 特性曲线

Figure 6-Propagation Delay vs. Temperature

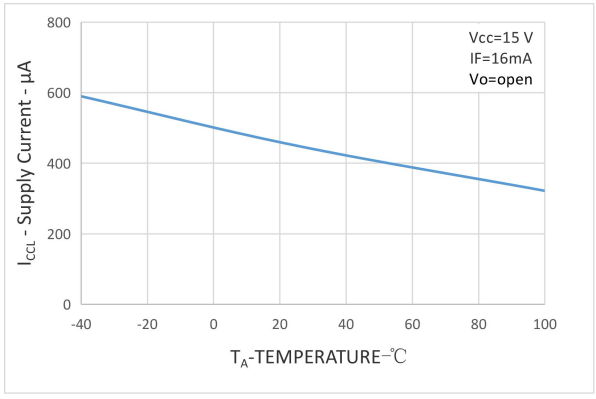


图 7 I_{CCL}-T_A 特性曲线

Figure 7-Supply Current vs. Temperature

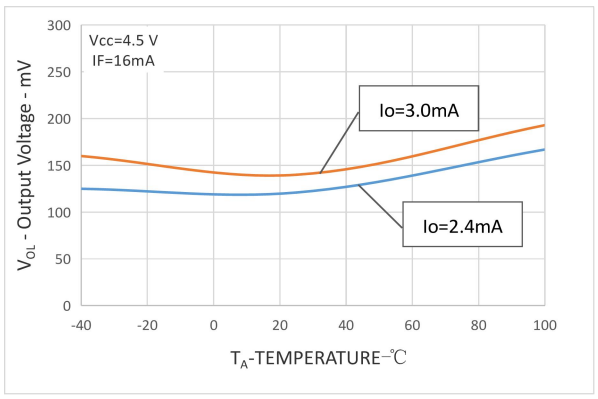


图 8 V_{OL}-T_A 特性曲线

Figure 8-Logic Low Output Voltage vs. Temperature

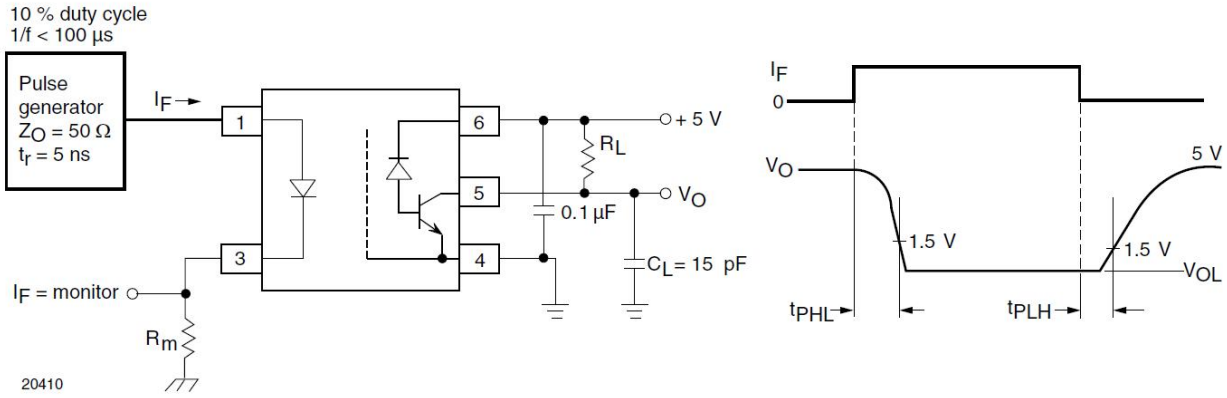


图 9 t_{PHL}、t_{PLH} 测试电路

Figure 9- The test method of t_{PHL}、t_{PLH}

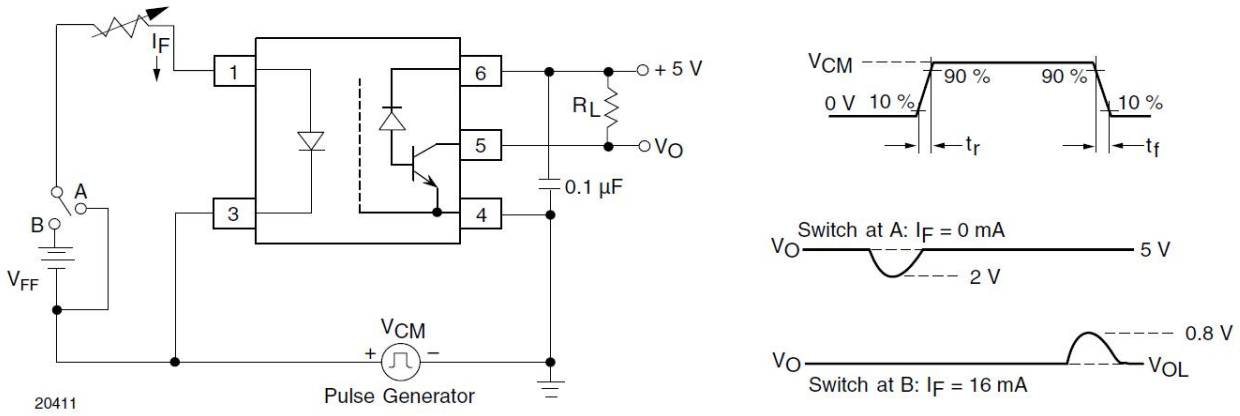


图 10 CMR 测试电路

Figure 10- Test Circuit for Transient Immunity and Typical Waveforms

7 外形尺寸图 Dimensions Diagram

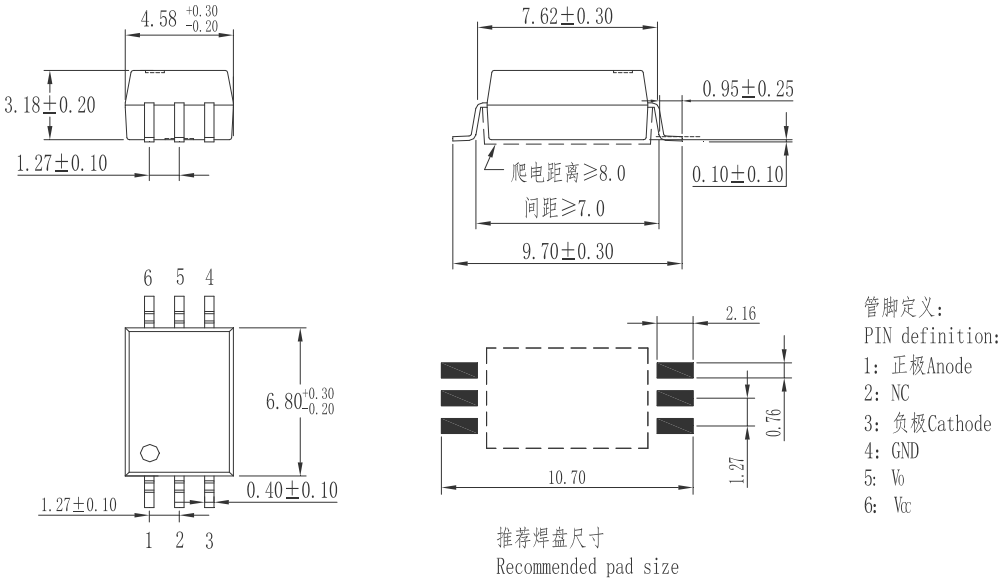


图 11 HPL6L135P 外形尺寸

Figure 11- The dimensions of HPL6L135P

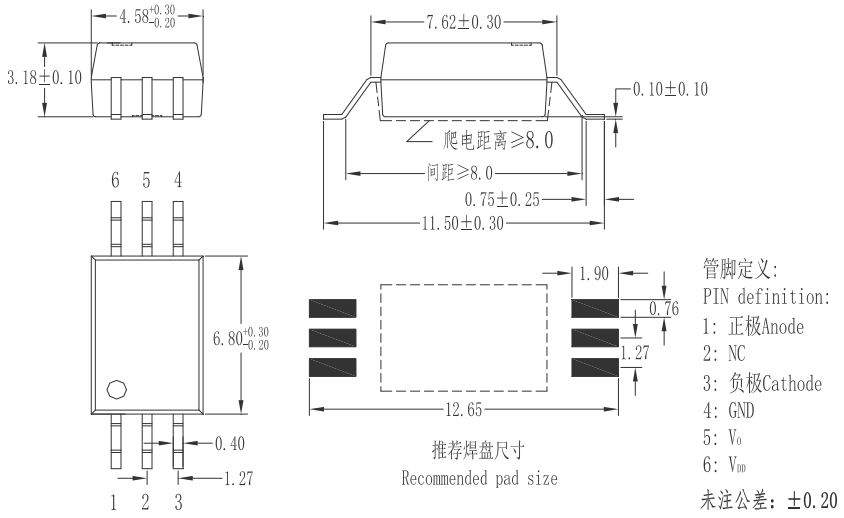


图 12 HPL6L135W 外形尺寸

Figure 12- The dimensions of HPL6L135W

8 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：HPL6L135×产品印章如图 13。

Print type characters, trade mark and Lot. No. on the Photo-transistor Coupler. For example the marking of product HPL6L135× is shown as figure 13.

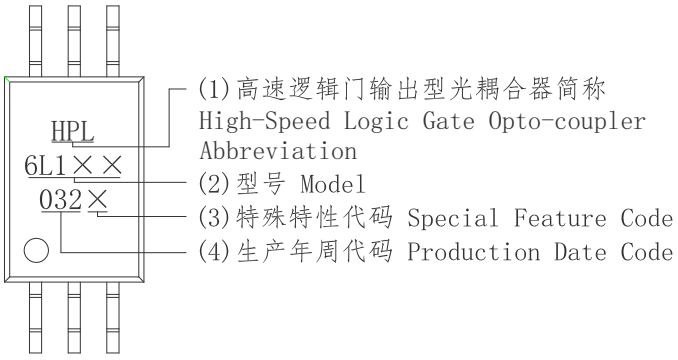


图 13 产品印章

Figure 13- Marking

9 包装方式 Packing

9.1 编带包装（Tape and reel）：适用于 For HPL6L135P

9.1.1 每卷数量（Qty/reel）：1200 只（pcs）。每箱数量（Qty/ctn）：24000 只（pcs）。

9.1.2 内包装（Inner packing）：

每卷盘 1200 只，贴合格证（型号、生产日期代号、检验员代号）。

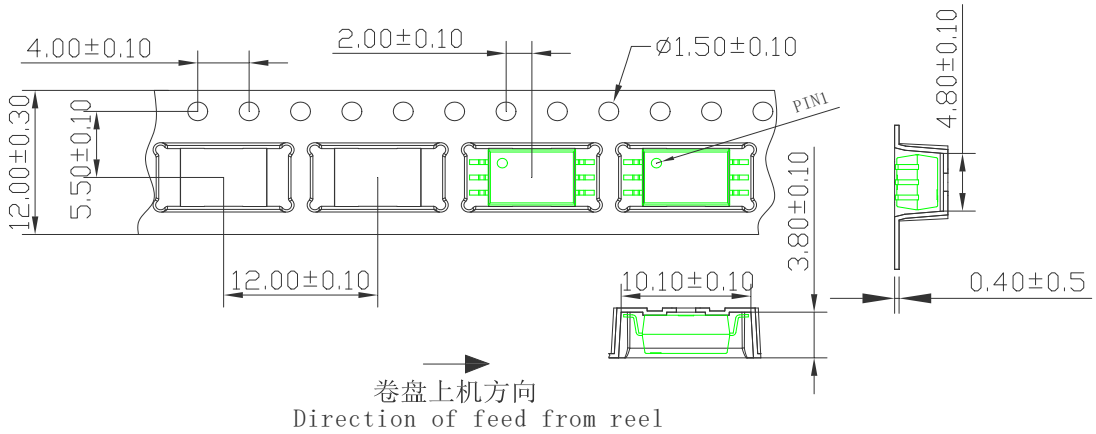
1200pcs/reel，certificate on reel（model，code of product date，Inspector’s code）

9.1.3 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.

9.1.4 示意图（Schematic）：



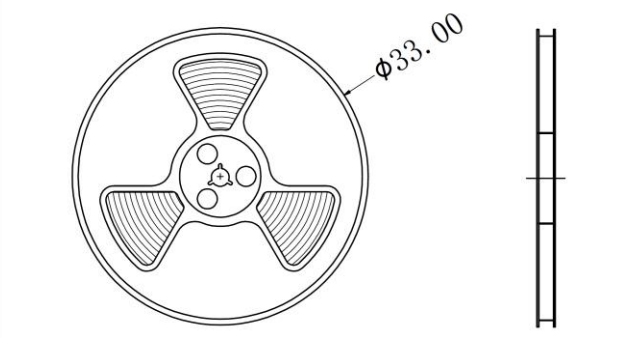


图 14 编带包装示意图

Figure 14- Taping Packing Schematic

9.2 编带包装（Tape and reel）：适用于 For HPL6L135W

9.2.1 每卷数量（Qty/reel）：1000 只（pcs）。每箱数量（Qty/ctn）：20000 只（pcs）。

9.2.2 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）

9.2.3 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.

9.2.4 示意图（Schematic）：

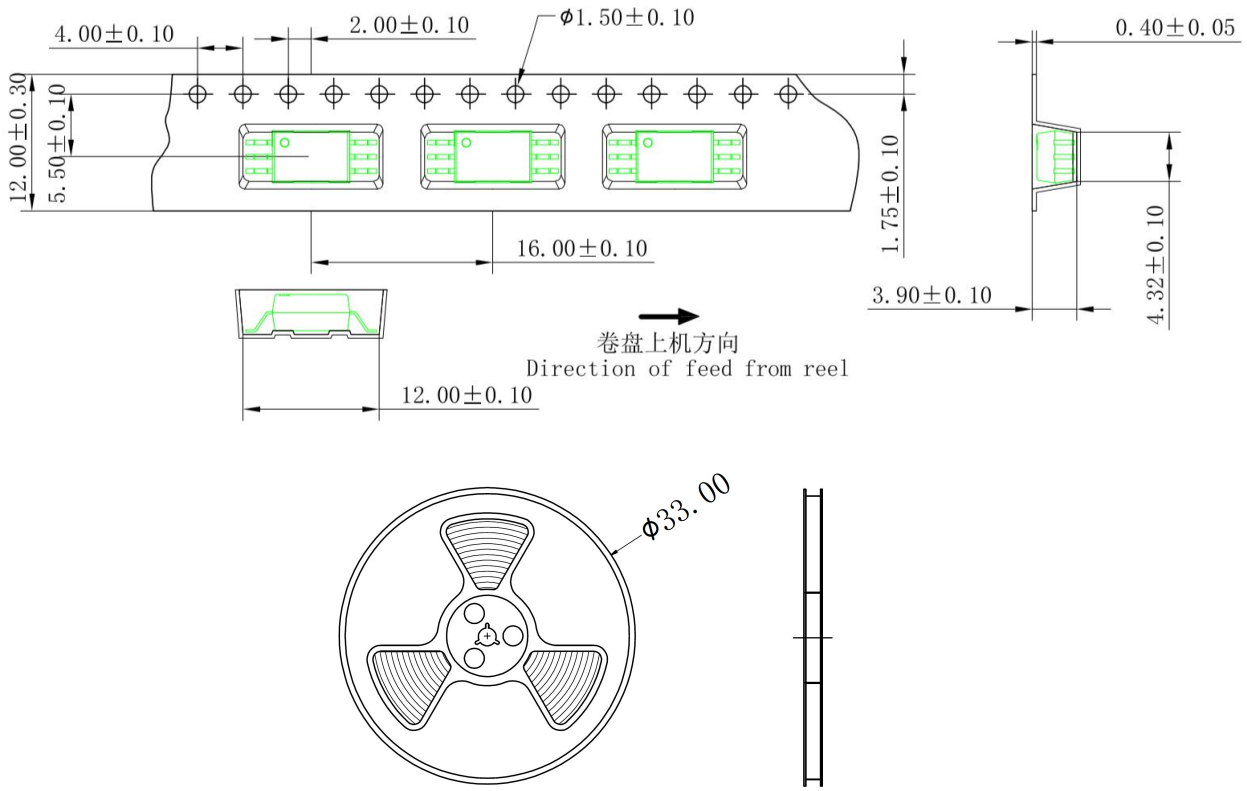


图 15 编带包装示意图

Figure 15- Taping Packing Schematic

10 注意事项 Note

10.1 推荐贮存温度 Recommend storage Temp.: 0~40°C;
推荐贮存湿度 Recommend storage humidity: <60%;

10.2 湿气敏感度等级 1 级。MSL level: MSL 1.

10.3 引脚镀锡厚度：大于等于 3μm，平均 3μm ~8μm。
Thickness of Sn which plated on lead frame: ≥3μm, average 3μm ~ 8 μm.

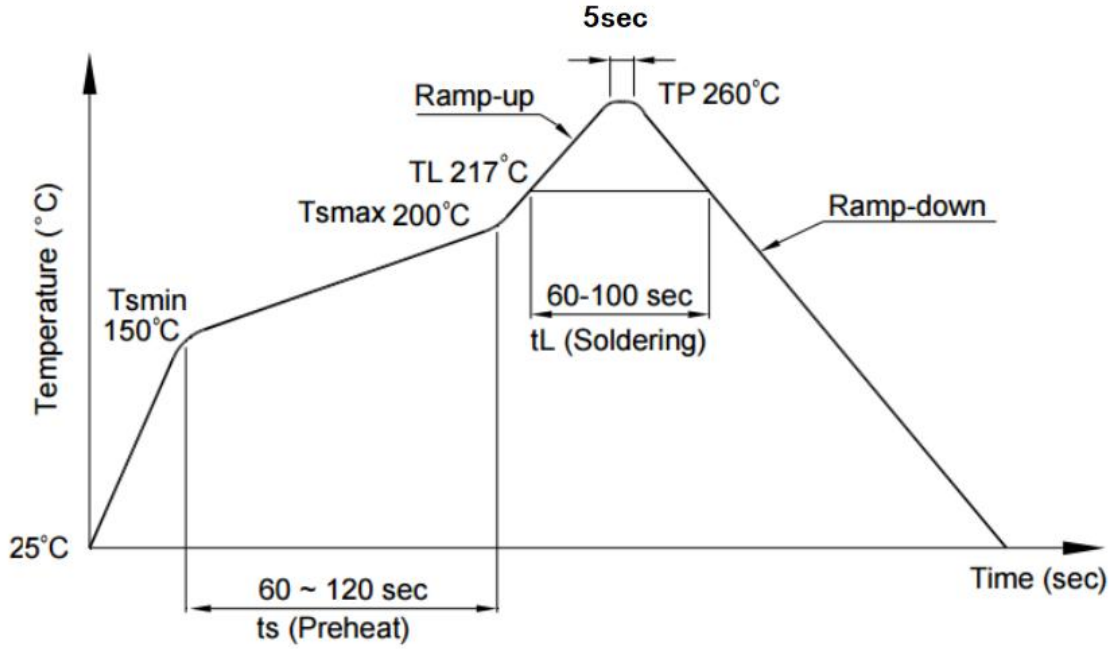
10.4 推荐焊接条件 Recommended soldering conditions

10.4.1 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.

10.4.2 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.

10.4.3 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:



项目 Items		条件 Conditions
预热 Preheat	Temperature Min (T_{Smin})	150°C
	Temperature Max (T_{Smax})	200°C
	Time (min to max) (t_s)	90±30 sec
焊接区 Soldering zone	Temperature (T_L)	217°C
	Time (t_L)	60 ~100 sec
最高温度 Peak Temperature (T_P)		260°C
升温速率 Ramp-up rate		3°C / sec max.
降温速率 Ramp-down rate		3~6°C / sec

图 16 回流焊参数

Figure 16-Recommended reflow soldering profile

4) 建议在所示的温度和时间条件下进行一次回流焊，最多不能不超过三次。One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

10.4.4 手工烙铁焊 Manual soldering

1) 手工烙铁焊仅用于产品返修或样品测试。Manual soldering is only applicable to product repair.

2) 手工烙铁焊要求：温度360℃±5℃，时间≤3s，返修次数≤2次。Manual soldering requirements: temperature ≤(360℃±5℃), time ≤3s, repair times ≤2 times.

11 产地 Production Place

11.1 产地 Production Place：中国厦门 Xiamen China；

11.2 工厂名称 Production NO.：厦门华联半导体科技有限公司；Xiamen Hualian Semiconductor Technology Co., Ltd.;

11.3 工厂地址 Production Add.：厦门市翔安区舫阳南路 189 号 No.189, Fangyang South Road, Xiang'an District, Xiamen China.

更改记录表

Engineering Change Notice-Record

版次 Edition	更改日期 Date	主要更改内容 Main Content	拟 制 Prepared	确 认 Checked
2.0	2023-04-20	版本升级	张强龙	黄发宝
2.1	2023-10-08	1. 新增安规认证说明以及证书编号	张强龙	黄发宝
2.2	2023-11-02	1、公司名称变更； 2、表 2 CTR 参数下限由 20%调整为 8%； 3、更新图 4 CTR-IF 曲线； 4、推荐贮存湿度由<70%调整为<60%。	姚彭彭	黄发宝