



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：HPL6M235

PART NO.: HPL6M235

拟制 Prepared	审核 Verified	批准 Approved

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1 概述 General

光耦产品 HPL6M235 由 850nm 砷化铝镓红外发光二极管同高速光敏晶体管耦合封装构成。输出端光电二极管单独连接至输出晶体管基极-集电极端子，具有独立的偏置电压；通过减小基极-集电极电容，将速度提高到传统光电晶体管耦合器的一百倍。产品输出端为集电极开路输出，具有很强的共模抑制能力，正常工作温度可达-40°C ~ +110°C。



图 1 产品 Figure 1-Product

The HPL6M235 optocouplers consist of a 850 nm AlGaAS LED, optically coupled to a high speed integrated photo-transistor with a strobable output. Separate connections for the photo-diode bias and output-transistor collector increase the speed up to a hundred times that of a conventional photo-transistor coupler by reducing the base-collector capacitance. This output features an open collector and have strong common mode rejection capability. The coupled parameters are guaranteed over the temperature range of -40°C to +110°C.

2 特点 Features

- 数据传输速率快。High speed:1Mbit/s .
- 集电极开路输出。Open-collector output.
- 输入、输出间绝缘电压高。The isolation voltage between input and output is high: VISO \geq 3750Vrms.
- 双列贴片式 8L 塑料封装。8L SOP plastic package.
- 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.
- TTL/LSTTL 双路兼容。TTL/LSTTL Compatible:3.3V/5V dual supply.
- 产品符合 UL/cUL、VDE、CQC 安规认证。The products comply with UL/cUL,VDE,CQC safety certification.
UL/cUL 证书编号: E178703; VDE 证书编号: 40004708; CQC 证书编号: CQC23001413665。
UL/cUL Certificate No. E178703; VDE Certificate No. 40004708;CQC Certificate No. CQC23001413665.

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

表 1 真值表

Table 1-Truth Table

LED	OUTPUT
ON	L
OFF	H

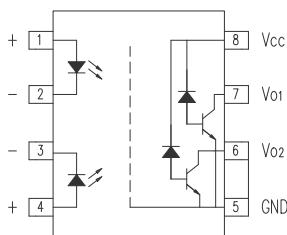


图 2 电原理图

Figure 2-Schematic

5 极限参数 Absolute Maximum Ratings

表 2 极限参数

Table 2-Absolute Maximum Ratings

(Ta=25°C, 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	20	mA
	正向脉冲电流 Pulse Forward Current (t=1ms, 50% duty cycle)	I _{FP}	40	mA
	反向电压 Reverse Voltage	V _R	5	V
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 (1min Max)	V _{CC}	-0.5~15	V
	输出电压 Output Voltage	V _O	-0.5~15	V
	输出端功耗 Output Power Dissipation	P _c	120	mW
工作温度 Operating temp.		T _{aop}	-40 ~ +110	°C
贮存温度 Storage temp.		T _{stg}	-55 ~ +125	°C
焊接温度 Soldering Temperature	手工焊 Hand Soldering (5 Sec.)	T _{sld}	350	°C
	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}	3750	V _{rms}

6 光电参数 Opto-Electrical Characteristics

表 3 光电参数

Table 3-Opto-Electrical Characteristics

T_a=25°C

参数 Parameters		符号 Symb.	测试条件 Test Conditions	最小 值 Min.	特征 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
	输入端反向击穿电压 Input Reverse Breakdown Voltage	BV _R	I _R =10μA	5			V
输出端 Output	高电平电源电流 High Level Supply Current	I _{CCH}	V _{CC} =3.3V V _O =Open I _F =0 mA			10	uA
	低电平电源电流 Low Level Supply Current	I _{CCL}	V _{CC} =3.3V V _O =Open I _F =16 mA			400	uA
耦合 Coupler	高电平输出电流 High Level Output Current	I _{OH}	I _F =0 mA V _O =V _{CC} =3.3V		0.01	1	μA
			I _F =0 mA V _O =V _{CC} =15V			50	μA

	低电平输出电压 Low Level Output Voltage	V_{OL}	$I_F=16mA$ $V_{CC}=3.3V$			0.4	V
	电流传输比 Current Transfer Ratio	CTR	$I_F=16mA$ $V_{CC}=4.5V$ $V_O=0.4V$	7			%
开关 Switching	输出端逻辑由低到高的传输延迟 时间 Propagation Delay Time to Logic Low at Output	t_{PHL}	$R_L=1.9K\Omega$ $C_L=1.5pF$ $I_F=16mA$		0.2	1.5	ns
	输出端逻辑由高到低的传输延迟 时间 Propagation Delay Time to Logic High at Output	t_{PLH}	$R_L=1.9K\Omega$ $C_L=1.5pF$ $I_F=16mA$		0.5	1.5	ns
	输出端为高电平时的共模抑制能 力 Common Mode Transient Immunity at Logic High Level Output	$ CM_H $	$R_L=1.9K\Omega$ $I_F=0mA$ $ V_{CM} =1000V_{P-P}$	10000			V/ μs
	输出端为低电平时的共模抑制能 力 Common Mode Transient Immunity at Logic High Level Output	$ CM_L $	$R_L=1.9K\Omega$ $I_F=0mA$ $ V_{CM} =1000V_{P-P}$	-10000			V/ μs
隔离 Isolation	绝缘电压 Isolation voltage	V_{ISO}	$I_{off}\leq 0.3mA,$ AC, 60s	3750			V
	输入-输出电容 Capacitance (Input to Output)	C_{I-O}^a	$f = 1MHz$		0.6		pF

^a C_{I-O} 测试是将PIN1,2,3,4短接在一起, PIN5,6,7,8短接在一起。Device considered a two-terminal device: Pins 1, 2, 3 and 4 shorted together, and Pins 5, 6, 7 and 8 shorted together.

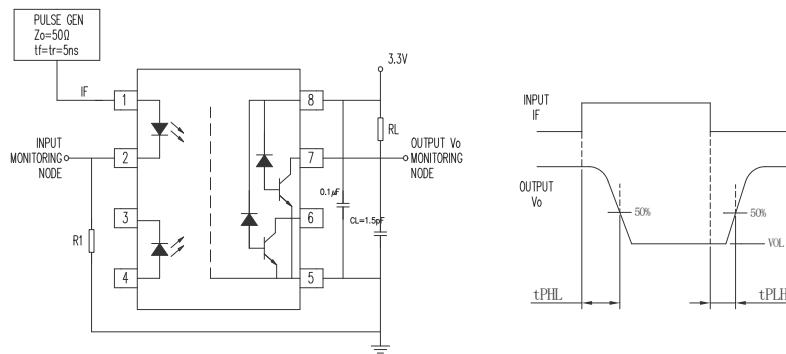


图3 t_{PHL}, t_{PLH} 测试方法
Figure 3- The test method of t_{PHL}, t_{PLH}

7 外形尺寸 Dimensions

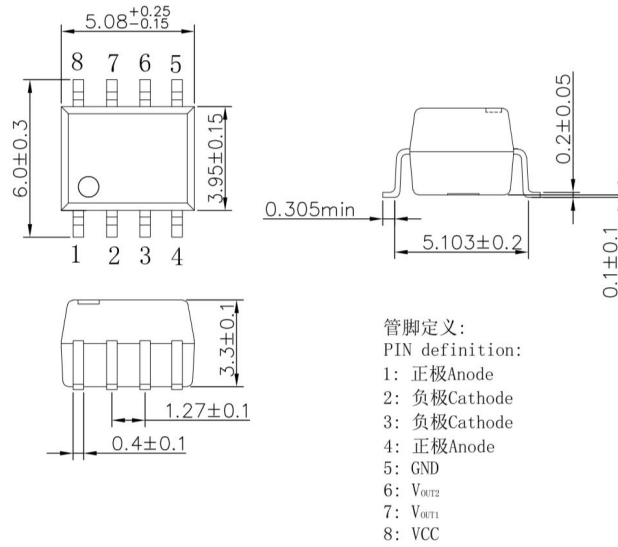


图 4 HPL6M235 外形尺寸
Figure 4- The dimensions of HPL6M235

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：**HPL6M235** 产品印章如图 5。

Print type characters ,trade mark and Lot.No.on the Photo Coupler.For example the marking of product **HPL6M235** is shown as Figure 5.

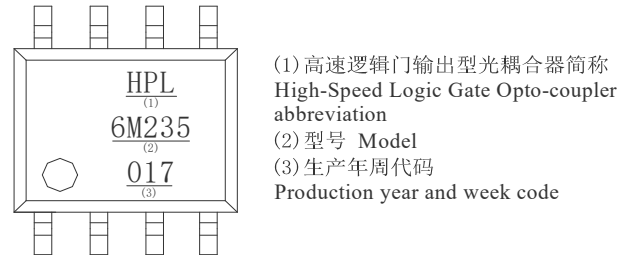


图 5 产品印章
Figure 5- Marking

9 包装方式 Packing

9.1 编带包装 (Tape and reel) : 适用于 For HPL6M235

9.1.1 每卷数量 (Qty/reel) : 2000 只 (pcs)。每箱数量 (Qty/ctn) : 40000 只 (pcs)。

9.1.2 内包装 (Inner packing) :

每卷盘 2000 只, 贴合格证 (型号、生产日期代号、检验员代号)。

2000pcs/reel, certificate on reel (model, code of product date, Inspector's code)

9.1.3 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.

9.1.4 示意图 (Schematic) :

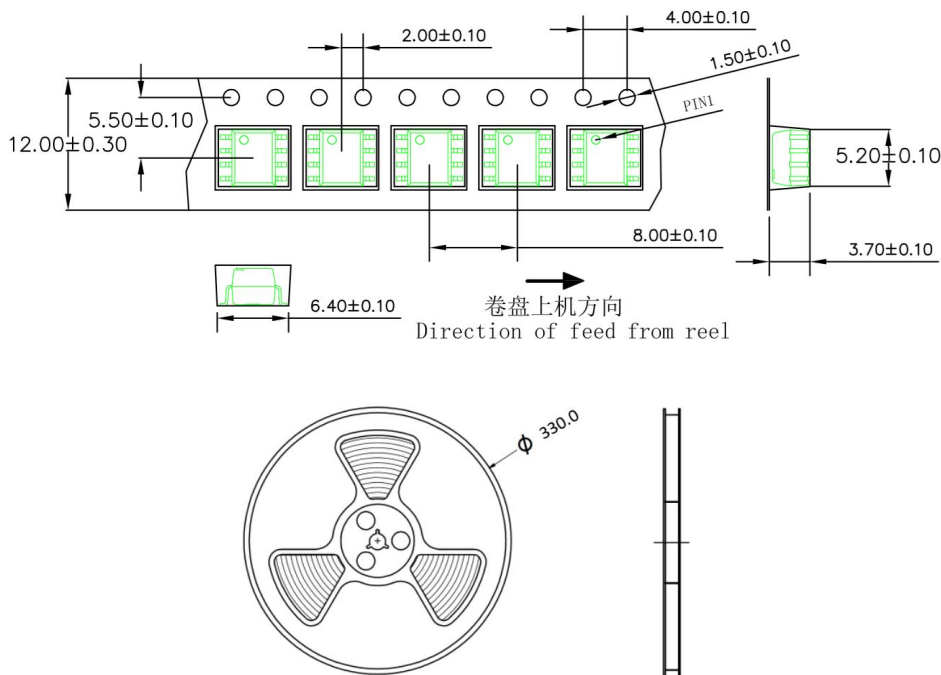


图 6 编带包装示意图

Figure 6- 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 3 μ m, 平均 5 μ m ~8 μ m。

Thickness of Sn which plated on lead frame: $\geq 3 \mu\text{m}$, average 5 μm ~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 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

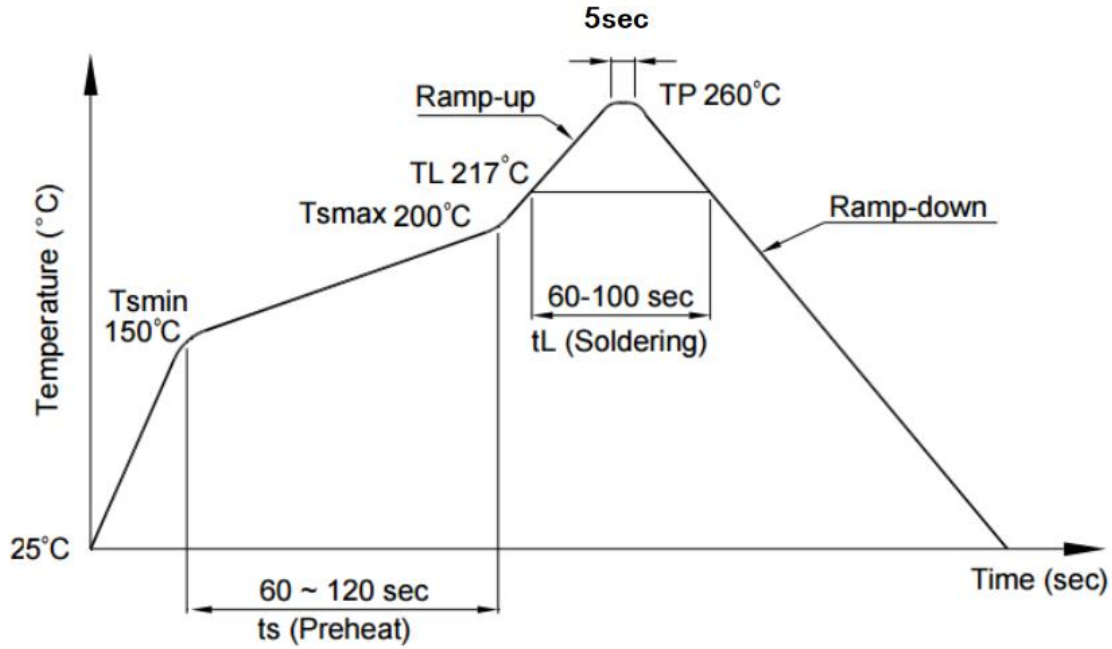
1) 推荐锡膏规格 Recommend tin glue specifications:

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:



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7 回流焊参数

Figure 7-Recommended reflow soldering profile

10.5 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 $360^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ，时间 $\leq 3\text{s}$ ，返修次数 ≤ 2 次。Manual soldering requirements: temperature $\leq (360^{\circ}\text{C} \pm 5^{\circ}\text{C})$, time $\leq 3\text{s}$, repair times ≤ 2 times.

10.6 本说明书所展示的产品是为一般电子应用而设计的，如办公自动化设备、通讯设备、视听设备、电气应用和仪器仪表等。对于需要高可靠性或安全性的设备，如空间应用、核动力控制设备、医疗设备等，请与我们的销售代表联系。The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation. For equipment/devices where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc, please contact our sales representatives.

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.

