



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: 光敏达林顿晶体管输出型光耦合器

DESCRIPTION: Photo Darlington Optocouplers

产品型号: HPC952×-MS

PART NO.: HPC952×-MS

拟制 Prepared	审核 Verified	批准 Approved

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概述 General

光敏达林顿晶体管输出型光耦合器是将红外 LED 芯片和光敏达林顿晶体管芯片封装在一起，以实现电-光-电转换。产品见图 1。

Photo Darlington Optocouplers which is infrared LED chip and photo Darlington transistor chip are assembled on lead frame, in order to change the electricity-light-electricity. Products shown in Figure 1.



图 1 产品 Figure 1-Product

1 特点 Features

- 达林顿晶体管输出 Darlington transistor output
- 输入、输出端之间绝缘电压高 $V_{ISO} \geq 3750V_{rms}$
The isolation voltage between input and output is high $V_{ISO} \geq 3750V_{rms}$
- 双列贴片式 4L 塑料封装 SOP 4L Plastic Package
- VDE 安全认证文件号 VDE License No.:40004708
- UL 安全认证文件号 UL File No.: E178703
- 符合 RoHS 指令最新要求及 REACH 法规最新要求。

Comply with the latest requirements of the RoHS directive and the latest requirements of REACH regulations.

2 应用 Applications

- 数据逻辑转换 Transmission and conversion of digital logic
- 功率控制转换开关 Power control and switch
- 在电路系统中进行电气绝缘和阻抗变换 Electric insulation and impedance conversion between circuits systems

3 极限参数 Absolute Maximum Ratings

表 1 极限参数

Table 1-Absolute Maximum Ratings

$T_a = (25 \pm 5)^\circ C$, 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	50	mA
	反向电压 Reverse Voltage	V_R	5	V
	耗散功率 (单个通道) Power Dissipation (Single channel)	P_M	75	mW
输出端 output	集电极-发射极反向击穿电压 Collector- Emitter Reverse Breakdown Voltage	$V_{(BR)CEO}$	300	V
	集电极-发射极反向击穿电压 Emitter-Collector Reverse Breakdown Voltage	$V_{(BR)ECO}$	0.3	V
	集电极直流电流 Collector Current	I_{CM}	150	mA
	集电极耗散功率 Collector Power Dissipation	P_c	150	mW
结温 Junction Temperature		T_j	100	$^\circ C$

工作温度 Operating temp.		T_{aop}	-40 ~ +85	°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
	波峰焊 Wave Soldering (10 Sec.)		270	
功率 Power Dissipation		P_t	250	mW
绝缘电压 Isolation voltage (RH≤60%,交流 1 分钟) (RH≤60%, AC 1min.)		V_{ISO}	3750	V_{rms}

4 光电参数 Opto-Electrical Characteristics

表 2 光电参数

Table 2-Opto-Electrical Characteristics

$T_a=(25\pm 5)^\circ\text{C}$, RH=30~75%

参数 Parameters	符号 symbol	测试条件 Test condition	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
输入 Input	正向电压 Forward Voltage	V_F	$I_F=10\text{mA}$		1.3	V
	反向电流 Reverse Current	I_R	$V_R=5\text{V}$		10	μA
输出 Out-put	集电极-发射极反向击穿电压 Collector-Emitter Reverse Breakdown Voltage	$V_{(BR)CEO}$	$I_C=0.1\text{mA}$	300		V
	发射极-集电极反向击穿电压 Emitter-Collector Reverse Breakdown Voltage	$V_{(BR)ECO}$	$I_E=0.1\text{mA}$	0.3		V
	集电极-发射极反向电流 Collector-Emitter Reverse Current	I_{CEO}	$V_{CE}=200\text{V}$		200	nA
耦合特性 Transfer Features	电流传输比 Current Transfer Ratio	CTR	具体见表 3 See table 3			
	饱和压降 Saturation voltage	$V_{CE(sat)}$	$I_F=1\text{mA}$ $I_C=10\text{mA}$		1.0	V
	绝缘电压 Isolation Voltage between Input and Output	V_{ISO}	$I_{OFF}<0.3\text{mA}$, AC, 60S	3750		V_{rms}
绝缘特性 Isolation Features	常温绝缘电阻 Isolation Resistance between Input and Output	R_{ISO}	$V=500\text{V}$	10^{12}		Ω
	输入-输出端电容 Capacitance (input to output)	C_S	$V_S=0\text{V}$ $f=1\text{MHz}$		0.8	pF
开关特性 On-Off Features	上升时间 Rise Time	t_r	$V_{CE}=10\text{V}$		40	μs
	下降时间 Fall Time	t_f	$R_L=100\Omega$ $I_C=10\text{mA}$		15	μs
	开启时间 Turn-on Time	t_{on}	$V_{CE}=10\text{V}$ $R_L=100\Omega$		50	μs

关断时间 Turn-off Time	t_{off}	$I_C=10mA$	15	μs
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*CTR 代码: HPC952×-MS, “×” 为 CTR 代码, 具体见下表:

*CTR code: HPC952×-MS, the “×”was CTR code as below:

表 3 CTR 分档表 Table 3-Binning table of CTR

代码Code	测试条件Test Condition	最小值Min.	典型值Typ.	最大值Max.
J	$I_F=1mA, V_{CE}=2V$	600		7500
J ₁	$I_F=1mA, V_{CE}=2V$	1000		—
J ₂	$I_F=1mA, V_{CE}=1V$	1000	4000	—
J ₆	$I_F=0.9mA, V_{CE}=2V$	3500		—

5 特性曲线 Performance Curves

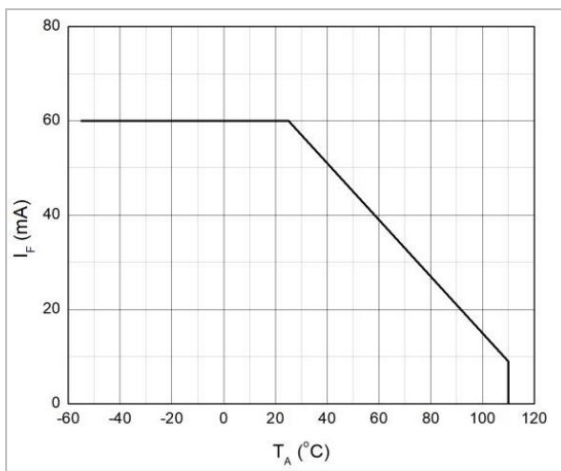


图 2 I_F-T_A 特性曲线

Figure 2- Forward Current vs. Ambient Temperature

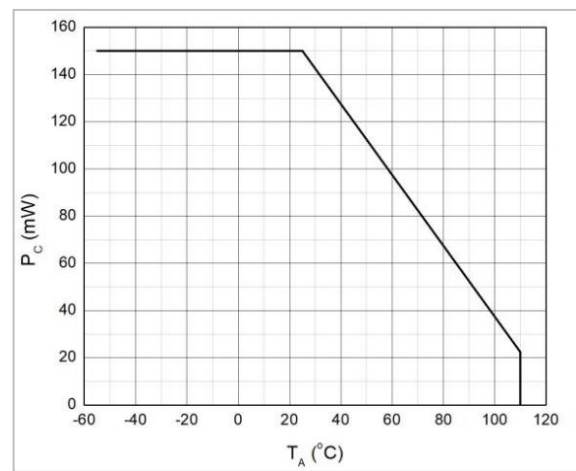


图 3 P_C-T_A 特性曲线

Figure 3-Collector Power Dissipation vs. Ambient Temperature

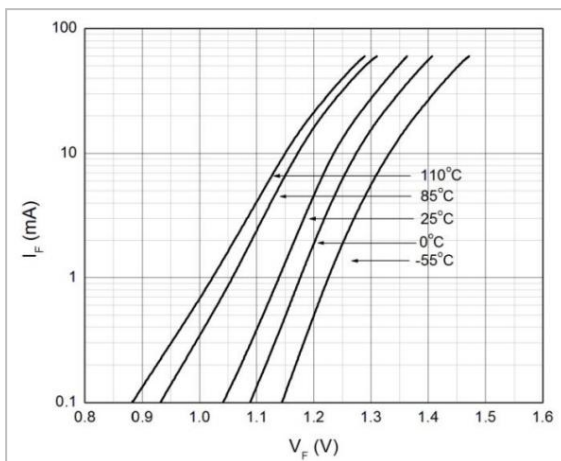


图 4 I_F-V_F 特性曲线

Figure 4- Forward Current vs. Forward Voltage

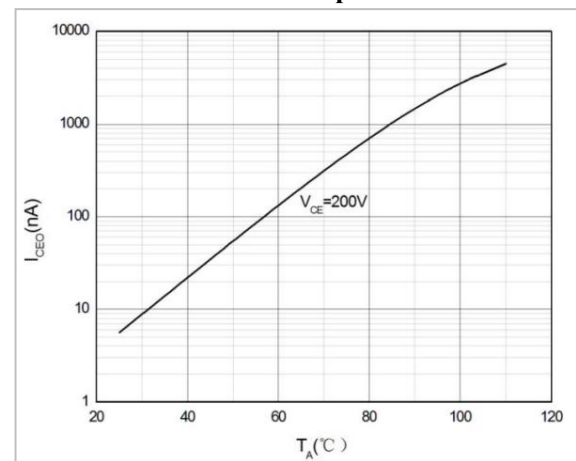


图 5 $I_{CE0}-T_A$ 特性曲线

Figure 5-Collector Dark Current vs. Ambient Temperature

6 电原理图 Schematic Diagram

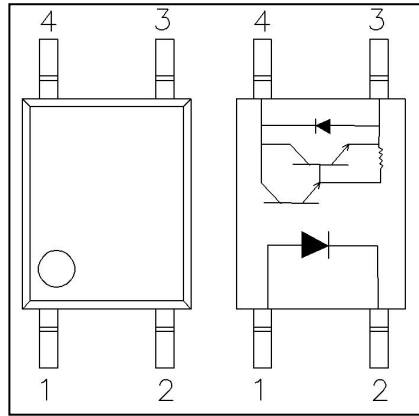


图 6 电原理图 Figure 6-Schematic

7 外形尺寸图 Dimensions Diagram

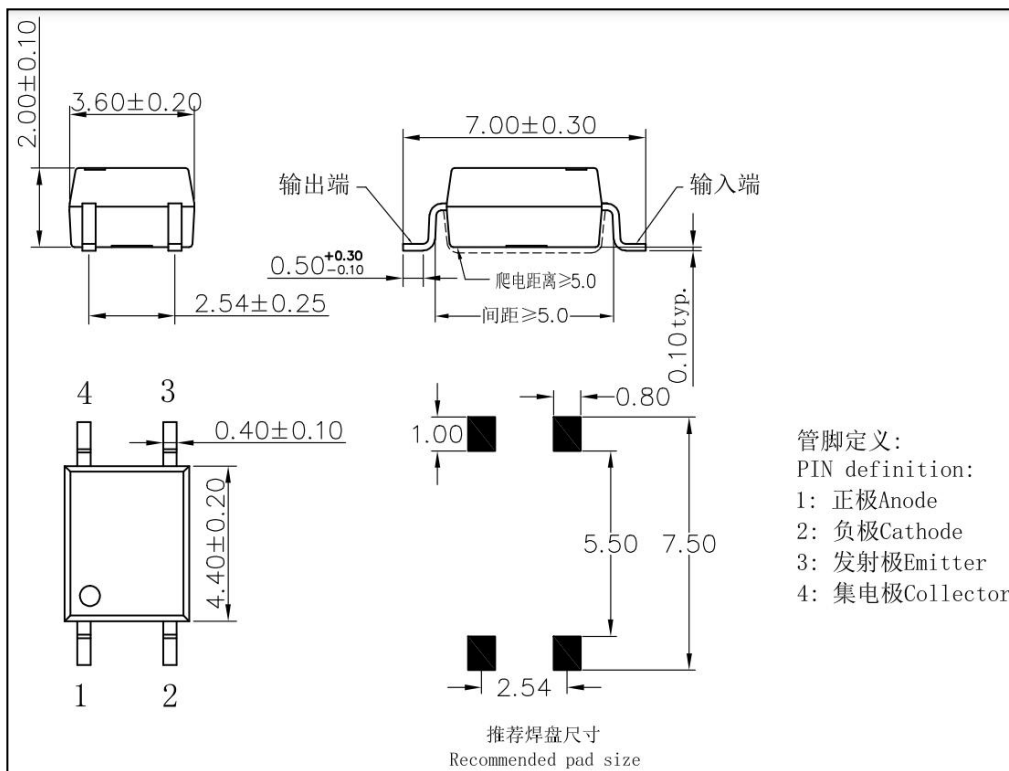


图 7 HPC952×-MS 外形尺寸

Figure 7- The dimensions of HPC952×-MS

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：HPC952×-MS 产品印章如图 8。 Print type characters, trade mark and Lot.No.on the Photo Coupler. For example the marking of product HPC952×-MS is shown as figure 8.

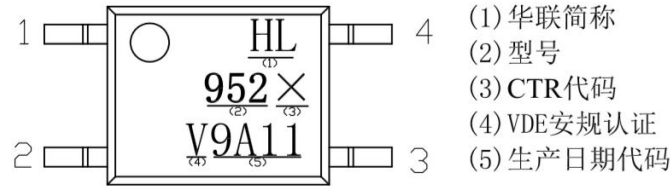


图 8 产品印章
Figure 8- Marking

9 包装方式 Packing

9.1 编带包装 (Tape and reel): 适用于 For HPC952×-MS。

9.1.1 每卷数量 (Qty/reel): 3000 只 (pcs)。每箱数量 (Qty/ctn): 45000 只 (pcs)。

9.1.2 内包装 (Inner packing):

每卷盘 3000 只, 贴合格证 (型号、生产日期代号、检验员代号)。

3000pcs/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):

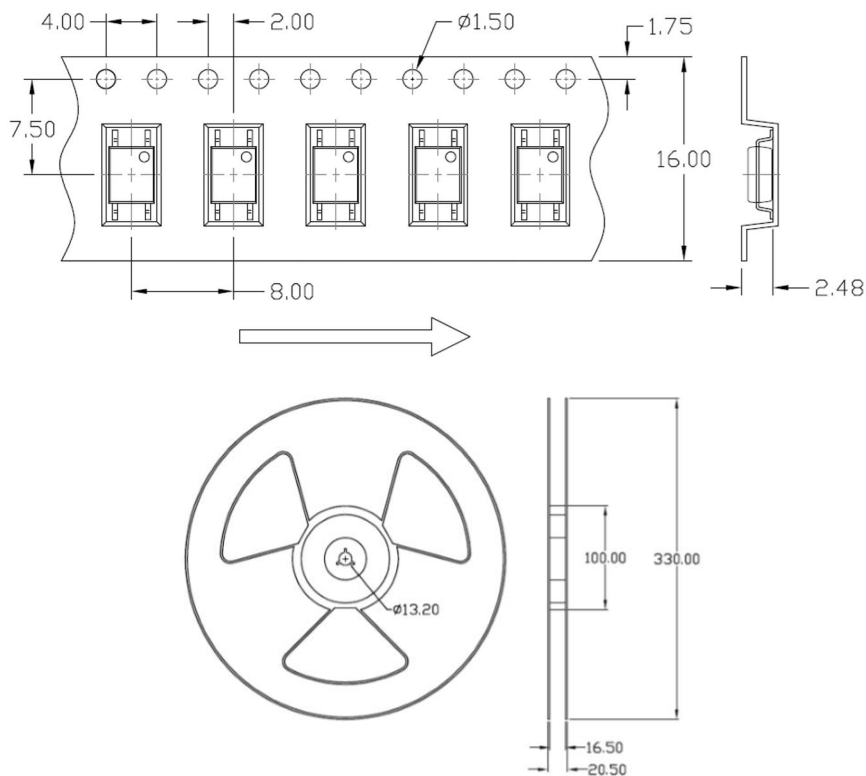


图 9 编带包装示意图
Figure 9- Taping Packing Schematic

9.2 标识 Label



图 10 标识

Figure 10-Label

10 使用注意事项 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%;

湿气敏感度等级 1 级。MSL level: MSL 1.

10.2 静电防护等级（人体模式） ESD(HBM): $\geq 2kV$.

10.3 引脚镀锡厚度: 大于等于 $3\mu m$ 。

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

10.4 推荐焊接条件 Recommended Soldering Conditions

10.4.1 请勿使用超过最高贮存温度的物体直接接触环氧本体。

Do not contact the epoxy body directly with objects exceeding the maximum storage temperature.

10.4.2 在高温下不要对环氧本体施加压力，特殊情况下施加的力不应超过 2.5N。

Do not apply pressure to the epoxy at high temperatures, and in special cases do not apply more than 2.5N.

10.4.3 回流焊 Reflow soldering

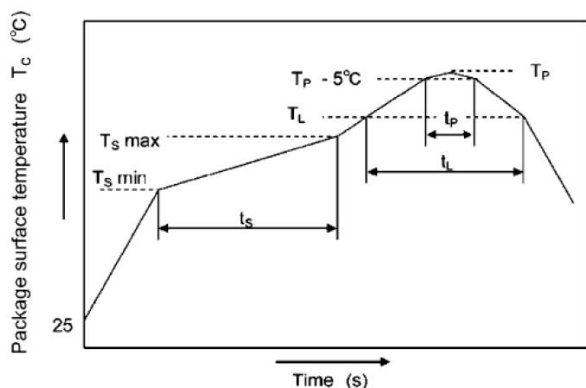
1) 推荐锡膏规格 Recommend tin glue specifications:

a) 熔点 Melting temperature: 217°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) 推荐回流焊接参数，如下图所示： The recommended reflow soldering profile is following:



	Symbol	Min	Max	Unit
Preheat temperature	T_s	150	200	°C
Preheat time	t_s	60	120	s
Ramp-up rate (T_L to T_P)			3	°C/s
Liquidus temperature	T_L	217		°C
Time above T_L	t_L	60	150	s
Peak temperature	T_P		260	°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	°C/s

图 11 回流焊参数

Figure 11-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 $360^{\circ}\text{C}\pm 5^{\circ}\text{C}$ ，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.

10.5 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.;

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