



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：HPC3053-MS
PART NO.: HPC3053-MS

拟制 Prepared	审核 Verified	批准 Approved

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1 概述 General

产品 HPC3053-MS 由砷化铝镓红外发光二极管同非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。



图 1 产品 Figure 1-Product

The HPC3053-MS consist of a AlGaAs infrared emitting diode optically coupled to a non-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.

2 特点 Features

- 输出端为非过零双向晶闸管输出。Random Phase Triac Output.
- 输入、输出间绝缘电压高。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
- 安规认证：UL 安全认证文件号(UL File No.): E178703
VDE 安全认证文件号(VDE Licence No.):40004708

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	50	mA
	反向电压 Reverse Voltage	V_R	5	V
	耗散功率 Power Dissipation	P_M	75	mW
输出端 output	断态重复峰值电压 Off-state repetitive peak voltage	V_{DRM}	600	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 ~ +85	°C

贮存温度 Storage temp.		T_{stg}	-40 ~ +150	°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	°C
总耗散功率 Total power dissipation		P_T	330	mW
绝缘电压 Isolation voltage (RH≤60%,交流 1 分钟) (RH≤60%, AC 1min.)		V_{ISO}	3750	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	$I_F=10mA$	-	1.2	1.3	V
反向电流 Reverse current	I_R	$V_R=5V$	-	-	10	uA
断态重复峰值电流 Off-state repeated peak current	I_{DRM}	$V_{DRM}=600V^a$			500	nA
断态电压临界上升率 Off-state voltage critical rise	dv/dt^b	$V_{DRM}=600V_{AC}$ $dv/dt=$ $0.63V_{DRM}/\tau$		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			300		uA
峰值通态电压 On-state peak voltage	V_{TM}	$I_{TM}=100mA$	-	1.7	3	V
绝缘电压 Isolation voltage	V_{ISO}	$I_{off}\leq 0.3mA,$ AC, 60s	3750			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 外形尺寸、电原理图 Dimensions and Circuit Diagram

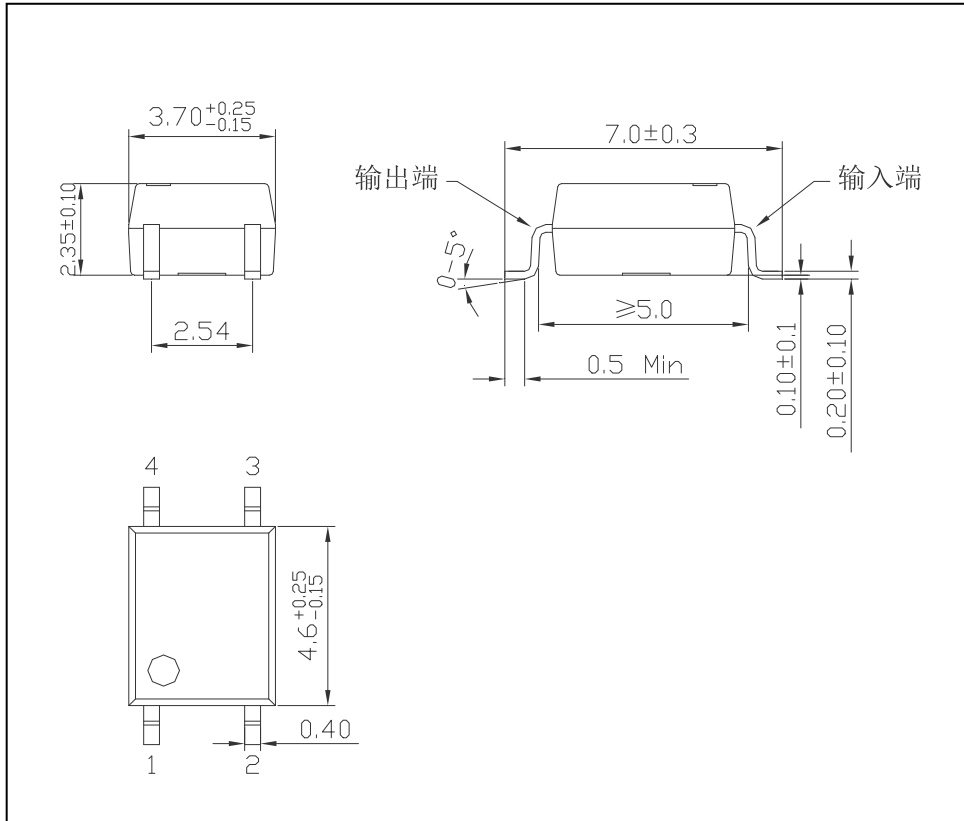


图 2 外形尺寸

Figure 2- The dimensions

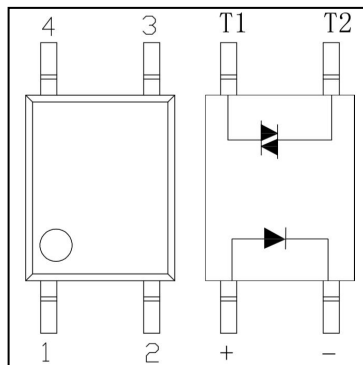


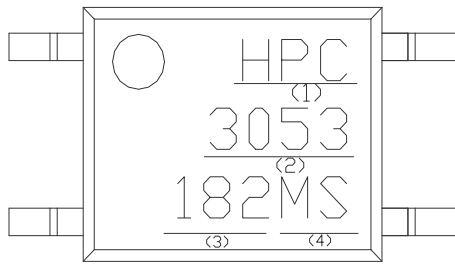
图 3 电原理图

Figure 3- Circuit Diagram

7 标志 Marking

产品上应有型号、生产日期代码、封装及引脚、引出端识别标记。例如：HPC3053-MS 产品印章如图 4。

Print type characters ,trade mark and Lot.No.on the Photo Coupler.For example the marking of product HPC3053-MS is shown as figure 4.



- (1) 晶体管输出型光耦合器简称
Photo-transistor Output Opto-coupler
- (2) 型号 Part NO.
- (3) 生产年周信息代码 Production Date Code
- (4) 封装及引脚

图 4 产品印章 Figure 4- Marking

8 包装方式 Packing

8.1 编带包装 (Tape and reel) : 适用于 For HPC3053-MS。

8.1.1 每卷数量 (Qty/reel) : 3000 只 (pcs)。每箱数量 (Qty/ctn) : 60000 只 (pcs)。

8.1.2 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)

8.1.3 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.

8.1.4 示意图 (Schematic) :

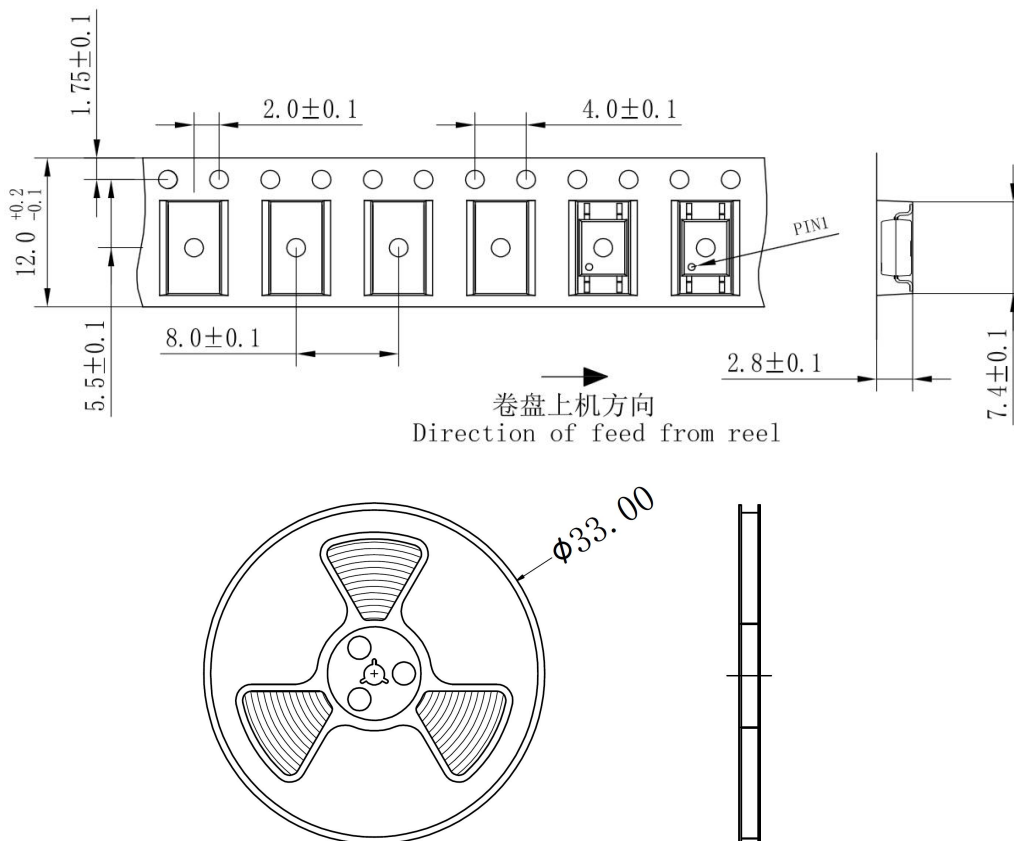


图 5 编带包装示意图

Figure 5- Taping Packing Schematic

9 标识 Label



图 6 标识
Figure 6-Label

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%;

贮存有效期一年 Storage life: A year.

10.2 引脚镀锡厚度: 大于等于 3μm。

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

10.3 推荐焊接条件 Recommended soldering conditions

10.3.1 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.

10.3.2 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.

10.3.3 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.

10.3.4 回流焊 Reflow soldering

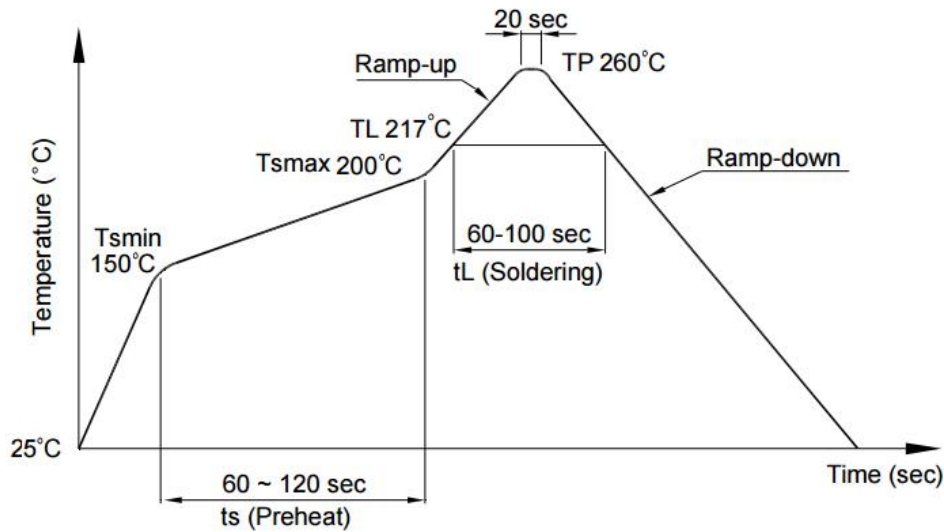
1) 推荐锡膏规格 Recommend tin glue specifications:

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:



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

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.

10.3.5 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.

10.4 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.: 厦门华联电子股份有限公司; Xiamen Hualian Electronics Corp., Ltd.;

11.3 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.

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
1.0	2020-02-19	新版发行 New edition	张子扬	段果
1.1	2023-02-10	1、规格书封面及第 11 项中厂址更新	张子扬	段果