



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：线性光耦合器

DESCRIPTION: Linear Opto-coupler

产品型号：HPC301-×

PART NO.: HPC301-×

拟制 Prepared	审核 Verified	批准 Approved

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1 概述 General

线性光耦合器 HPC301-× 是由砷化铝镓红外 LED 与两个光敏二极管形成的光耦合。一个光电二极管用于生成 LED 反馈机制用的控制信号驱动电流,从而为 LED 的非线性时间和温度给予补偿。另一个光电二极管用于提供输入及输出电路间的电流隔离,从而具备优良的线性。

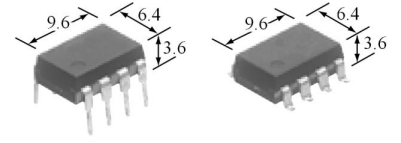


图1 产品 Figure 1-Product

The Linear Opto-coupler HPC301-× formed by the two photosensitive diode with the AlGaAs infrared LED coupling. One photodiode is used to generate a control signal that provides a servomechanism to the LED drive current, thus compensating for the LED's nonlinear time and temperature characteristics. The other photodiode is used to current's provide isolation between the input and output circuit, which possess excellent linear.

2 特点 Features

- 0.01%反馈线性 0.01% Servo Linearity
- 宽的带宽(>200kHz) Wide Bandwidth
- 稳定的高增益 High Gain Stability
- 低功耗 Low Power Consumption
- 直插式塑料封装 DIP8L Plastic Package
- 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.

3 应用 Applications

- 数字逻辑的传输及变换 Transmission and conversion of digital logic;
- 没有插入损耗的现代变压器 Modem Transformer Replacement With No Insertion Loss;
- 数字电话隔离 Digital Telephone Isolation;
- 医疗感应传输设备 Medical induction transmission equipment;
- 电路与电路之间、系统与系统之间的电气隔离 Electric insulation between circuits systems.

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_{FM}	100	mA
	反向电压 Reverse Voltage	V_R	5	V
	耗散功率 Power Dissipation	P_M	75	mW
工作温度 Operating Temperature Range		T_{OPR}	-55~85	°C
贮存温度 Storage Temperature Range		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.)		245	
	波峰焊 Wave Soldering (10 Sec.)		270	
总耗散功率 Total Power Dissipation		P_T	500	mW
输入-输出间绝缘电压 Isolation voltage between input and output (AC, 60Seconds, RH<60%)		V_{ISO}	3750	Vrms

5 电参数 Electrical Parameters

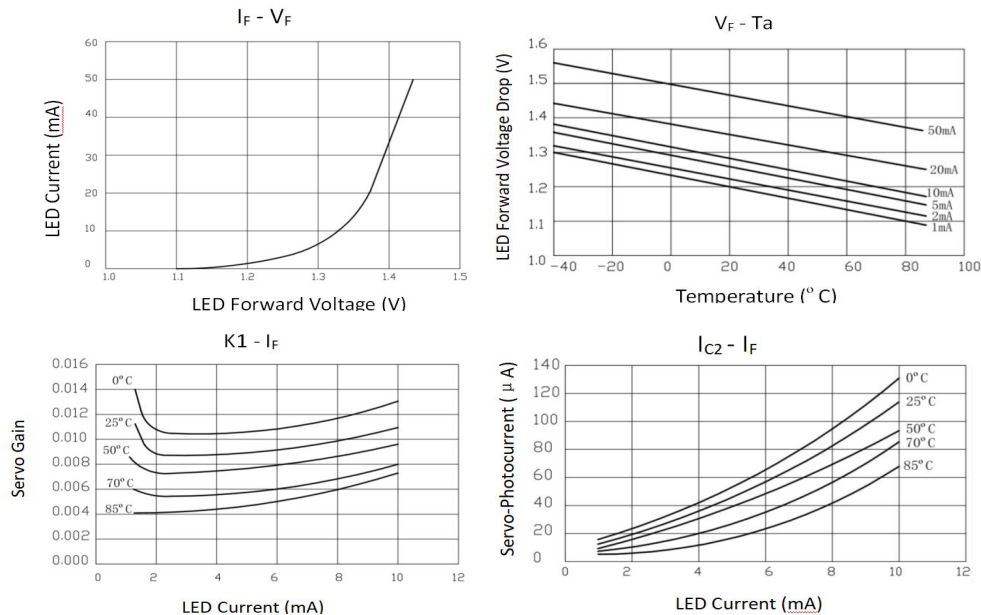
表 2 光电参数

Table 2-Opto-Electrical Characteristics

Ta=(25±5)°C, RH=45~75%

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	$I_F=10\text{mA}$	1.0	1.2	1.5	V
	反向电流 Reverse Current	I_R	$V_R=5\text{V}$			10	μA
耦合特性 Coupler Features	暗电流 Dark Current	I_D	$I_F=0\text{mA}$, $V_{C1-A1}=V_{C2-A2}=15\text{V}$		1	25	nA
	反馈增益 Servo Gain (I_{C1}/I_F)	K1	$I_F=2\text{-}10\text{mA}$, $V_{C1-A1}=V_{C2-A2}=15\text{V}$	0.005		0.020	-
	正向增益 Forward Gain (I_{C2}/I_F)	K2		0.005		0.020	-
	传输增益 Transfer Gain ($K2/K1=I_{C2}/I_{C1}$)	K3		0.95	1.000	1.05	-
	传输增益线性度 Transfer Gain Linearity	$\Delta K3$	$I_F=2\text{-}10\text{mA}$			1	%
	传输增益温度系数 Temperature Coefficient of Transfer Gain	$\Delta K3/\Delta T$	$I_F=2\text{-}10\text{mA}$, $V_{C1-A1}=V_{C2-A2}=15\text{V}$		0.005		$\%/^{\circ}\text{C}$
	共模抑制比 Common-Mode Rejection Ratio	CMRR	$f_0=350\text{Hz}$, 0dBm		130		dB
	输入/输出电容 Input/Output Capacitance	$C_{I/O}$			3		pF

6 特性曲线 Performance Curves



7 电原理图 Schematic Diagram

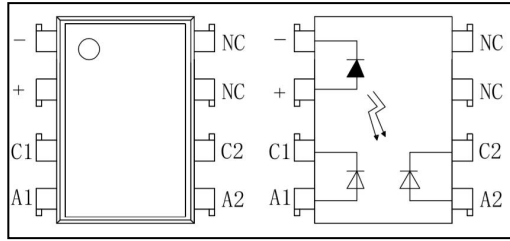


图 2 电原理图 Figure 2-Schematic

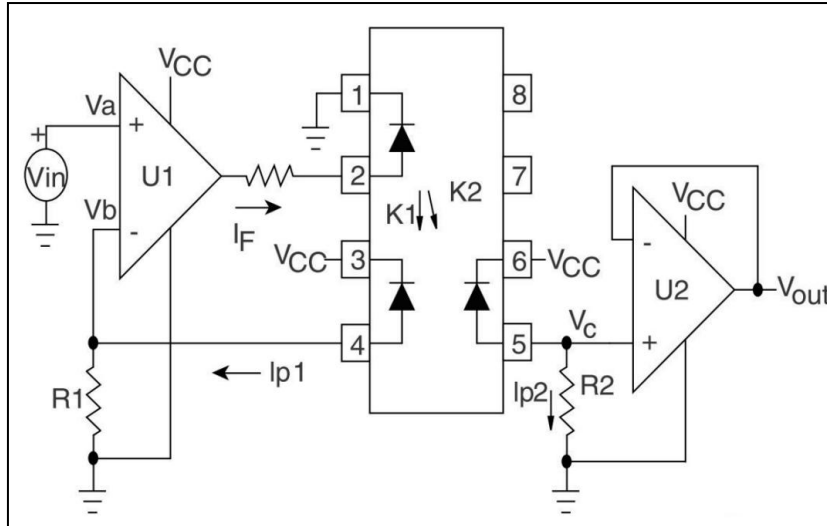


图 3 推荐布线图 Figure 3-Recommended wiring diagram

8 外形尺寸图 Dimensions Diagram

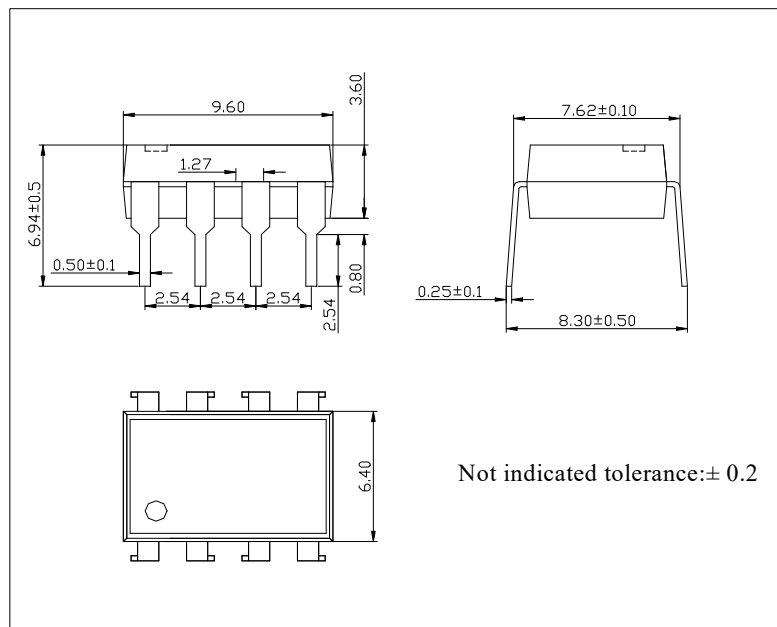


图 4 HPC301 外形尺寸
Figure 4- The dimensions of HPC301

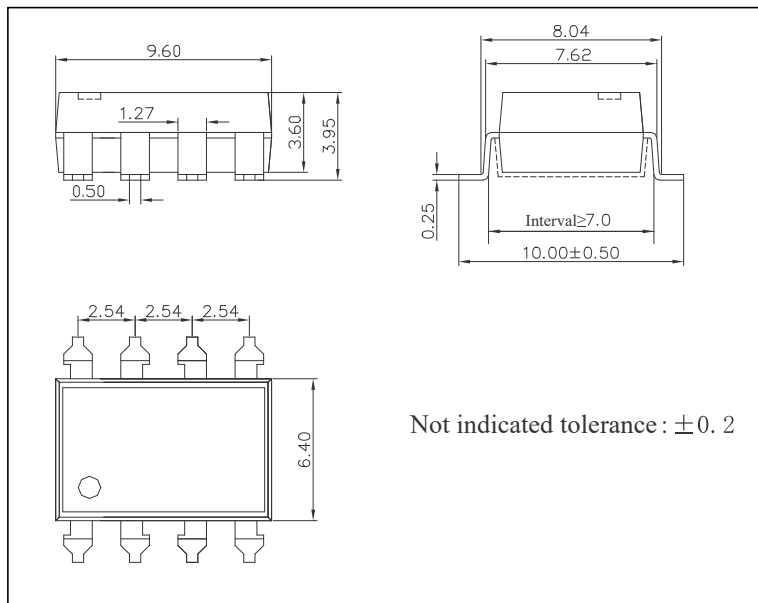


图 5 HPC301-2 外形尺寸
Figure 5- The dimensions of HPC301-2

9 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：HPC301-×产品印章如图 6。

Print type characters, trade mark and Lot. No. on the Photo-transistor Coupler. For example the marking of product HPC301-× is shown as figure 6.

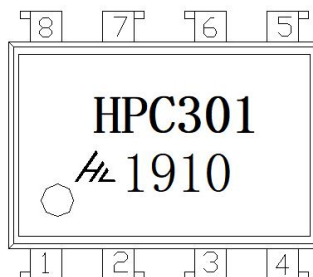


图 6 产品印章
Figure 6- Marking

10 包装方式 Packing

10.1 条管包装：适用于 HPC301

10.1.1 每箱数量 (Qty/ctn)：20000 只 (pcs)。

10.1.2 内包装 (Inner packing)：

① 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, anti-static tube, indication of trade mark and anti-static.

② 每纸匣 1000 只，一端贴合格证 (型号、生产日期代号、检验员代号)，另一端贴 UL、VDE 安全认证标志。

1000pcs/bundle, certificate on one end (model, code of product date, Inspector's code), UL、VDE certificate on the other end.

10.1.3 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.

10.1.4 示意图 (Schematic) :

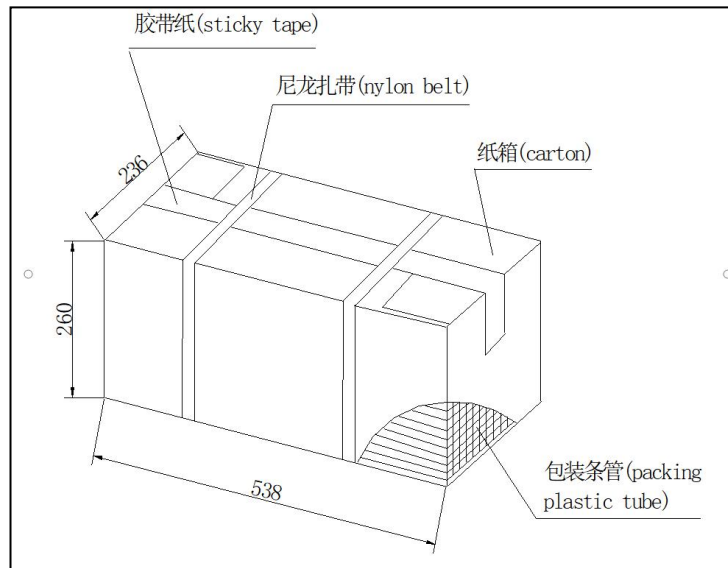


图 7 条管外包装

Figure 7- Outer packing for Tube

10.2 编带包装 (Tape and reel) : 适用于 For HPC301-2。

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

10.2.2 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)

10.2.3 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.

10.2.4 示意图 (Schematic) :

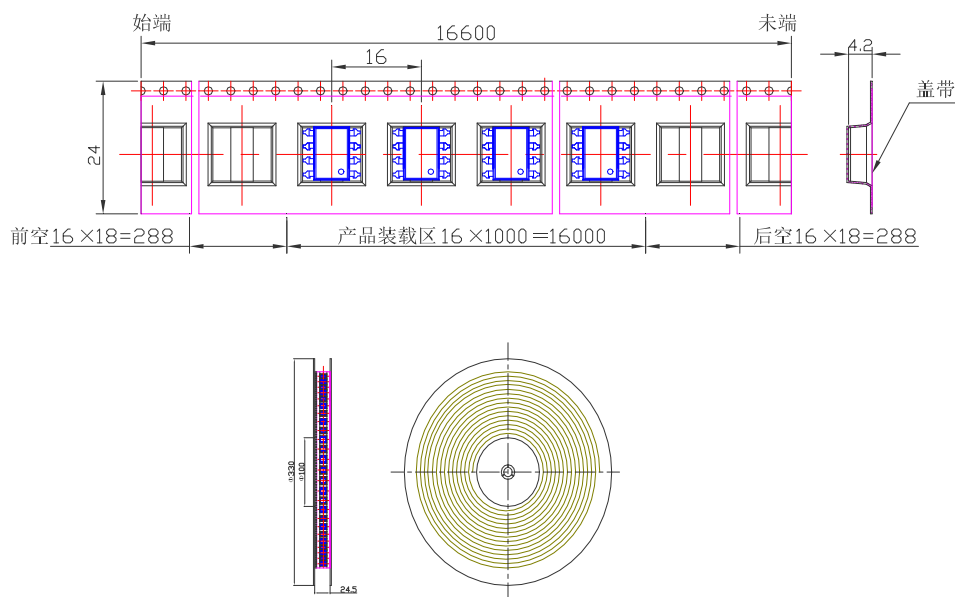


图 8 编带包装示意图

Figure 8- Taping Packing Schematic

10.3 标识 Label



图 9 标识

Figure 9-Label

10.4 注意事项 Note

10.4.1 推荐贮存温度 Recommend storage Temp.: 0~40°C;

推荐贮存湿度 Recommend storage humidity: <70%;

10.4.2 湿气敏感度等级 3 级。MSL level: MSL 3.

10.5 引脚镀锡厚度: 大于等于 5μm, 平均 8μm ~10μm。

Thickness of Sn which plated on lead frame: $\geq 5 \mu\text{m}$, average $8 \mu\text{m} \sim 10 \mu\text{m}$.

10.6 推荐焊接条件 Recommended Soldering Conditions

10.6.1 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.

10.6.2 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.

10.6.3 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°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:

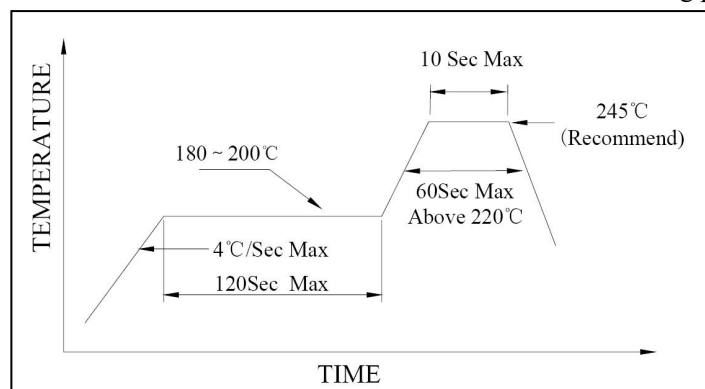


图 10 回流焊参数

Figure 10-Recommended reflow soldering profile

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, Xiangan District, Xiamen China.

更改记录表

版本	更改日期	主要更改内容	拟制	确认
V1.0	2023.06.01	新版发布	张子扬	王梓建