



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 MOS 固态继电器
DESCRIPTION: Photo MOSFET Solid State Relay
产品型号：HSSR-41A02-×
PART NO.: HSSR-41A02-×

| 拟制 Prepared | 审核 Verified | 批准 Approved |
|----------------|----------------|----------------|
| | | |

电话 Tel: 86-0592-2950777
传真 Fax: 86-0592-6037471
网址 Web: www.xmhl.com
地址: 厦门市翔安区舂阳南路 189 号
Add: No.189,Fangyang South Road,Xiang'an District,Xiamen China

1 概述 General

产品 HSSR-41A02-×由砷化铝镓红外发光二极管作为输入级耦合到高电压输出光探测电路。光探测电路由高速光电二极管阵列和驱动电路构成，用以开启/关断两个独立的高压金属氧化物半导体场效应管(MOSFET)。一个最小 3mA 的电流流经输入级红外发光二极管可确保继电器动作。当加在输入级红外发光二极管的正向压降为 0.8V 或更小值时，继电器可确保复位。产品见图 1。

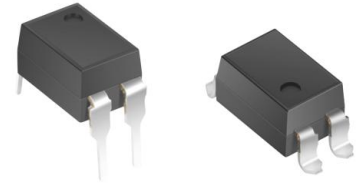


图 1 产品 Figure 1-Product

The HSSR-41A02-× consists of a AlGaAs infrared emitting diode input stage optically coupled to a high-voltage output detector circuit. The detector consists of a high-speed photovoltaic diode array and driver circuitry to switch on/off two discrete high voltage MOSFETs. The relay action with a minimum input current of 3mA through the input LED. The relay reset with an input voltage of 0.8V or less. Products (DIP) shown in Figure 1.

2 特点 Features

- 单通道常开型单刀单掷继电器。Single Channel Normally on Single-Pole-Single-Throw (SPST) Relay.
- 400V 输出耐压产品。400V Output Withstand Voltage.
- 180mA 额定电流产品。180mA Current Rating.
- 低输入电流，CMOS 兼容。Low Input Current: CMOS Compatibility.
- 15 Ω 低通态电阻。15 Ω Low On-Resistance.
- 非常高的断开阻抗：典型值 10 兆欧。

Very High Output Off -state Impedance: 10 Teraohms Typical.

- 非常快的开关速度：典型值 0.5ms (Ton), 0.1ms (Toff)。

High Speed Switching: 0.5ms (Ton), 0.1ms (Toff) Typical

- 高输入输出绝缘耐压：5000 Vrms for 1 min.

High Input-to-Output Insulation Voltage: 5000 Vrms for 1 min.

3 应用 Applications

- 电信切换。Telecommunication Switching.
- 数据通讯。Data Communications.
- 电池管理。Battery management.
- 工业控制。Industrial Controls.
- 医疗设备。Medical equipment.
- EMR/机械继电器替代。EMR / Reed Relay Replacement.

4 电原理图 Schematic Diagram

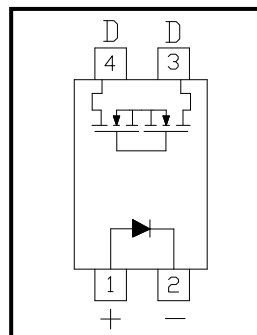


图 2 电原理图 Figure 2-Schematic

5 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 (Single channel) | P_M | 75 | mW |
| 输出端 output | 开关电压 Switching Voltage | $V_{O(MAX)}$ | 0 to ± 400 | V (DC or AC peak) |
| | 连续通态电流 Continuous load current | $I_{O(MAX)}$ | 180 | mA |
| | 耗散功率 Power dissipation (Single channel) | P_C | 360 | 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 (5Sec.) | | 260 | |
| | 波峰焊 Wave Soldering (10 Sec.) | | 270 | |
| 绝缘电压 Isolation voltage (RH≤60%,交流 1 分钟) (RH≤60%, AC 1min.) | | V_{ISO} | 5000 | V_{rms} |

6 光电参数 Opto-Electrical Characteristics

表 2 光电参数

Table 2-Opto-Electrical Characteristics

$T_a=25^\circ\text{C}$

| 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 | |
|------------------------|---------------------------------------|-------------------------|------------------------------------------------------------|-------------|-------------|------------|----------|
| 输入端 Input | 正向电压 Forward voltage | V_F | $I_F=10\text{mA}$ | - | 1.35 | 1.7 | V |
| | 反向电流 Reverse current | I_R | $V_R=5\text{V}$ | - | - | 10 | uA |
| | 动作电流 Action Current | $I_{F(ON)}^a$ | $I_O=180\text{mA}$ | - | 1.5 | 3 | mA |
| | 复位电流 Reset Current | $I_{F(OFF)}$ | $I_O=180\text{mA}$ | - | 0.5 | - | mA |
| 输出端 Output | 断态漏电流 OFF-State Leakage Current | I_{OFF} | $V_O=400\text{V}$ | - | - | 100 | nA |
| | 导通电阻 ON Resistance | R_{ON} | $I_O=180\text{mA}$ $I_F=10\text{mA}$ | - | 8 | 15 | Ω |
| | 输出电容 Output Capacitance | C_O | $I_F=0\text{mA}$, $V_O=25\text{V}$, $f_o=1\text{MHz}$ | - | 200 | - | pF |

| | | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------|----------------------------------|------|-----|-----|----|
| 传输 Xfer | 动作时间 Action Time | T_{ON} | $I_F=10mA, I_O=180mA$ | - | 0.5 | 1.0 | ms |
| | 复位时间 Reset Time | T_{OFF} | $I_F=10mA, I_O=180mA$ | - | 0.1 | 0.5 | ms |
| | 耦合电容 Coupled Capacitance | $C_{I/O}$ | | - | 1 | - | pF |
| 隔离 Isolation | 绝缘电压 Isolation voltage | V_{ISO} | $I_{off} \leq 0.3mA,$ AC, 60s | 5000 | - | - | V |
| ^a 保证所有器件在 I_F 值小于或等于最大的 $I_{F(ON)}$ 时动作。 It is guaranteed that all devices active when I_F value is less than or equal to the maximum value of $I_{F(ON)}$. | | | | | | | |

7 外形尺寸及电原理图 Dimensions and Circuit Diagram

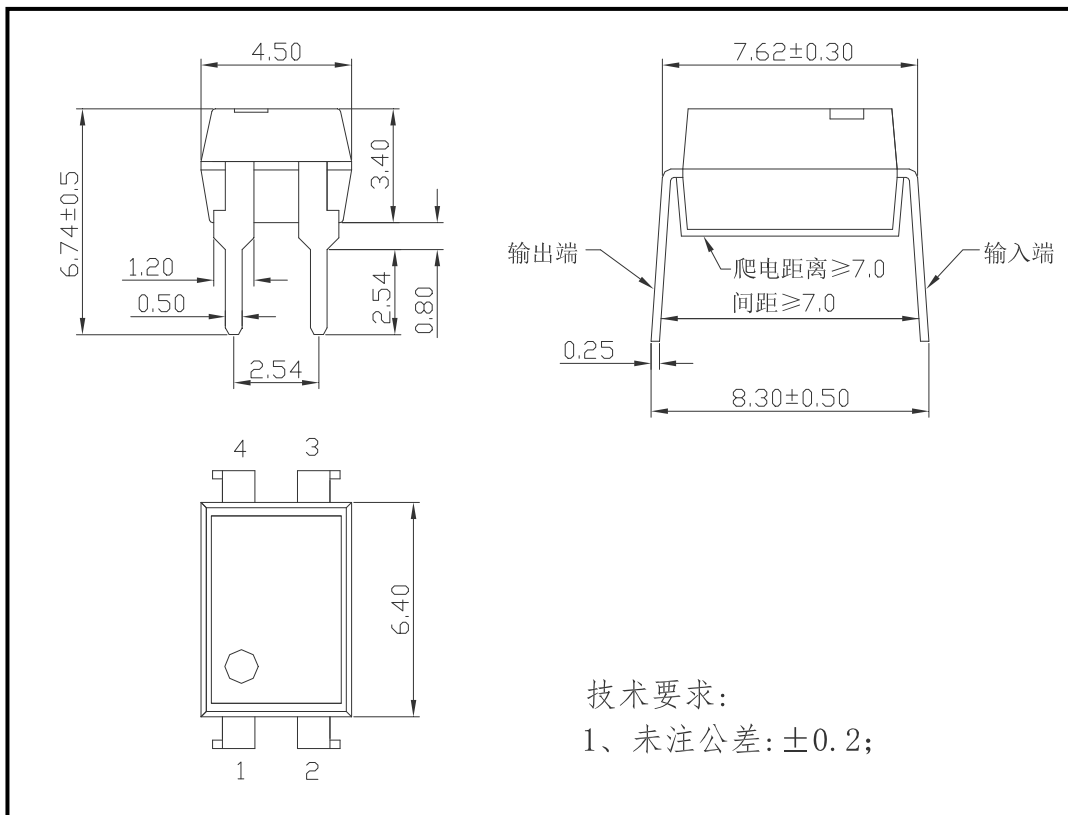


图 3 HSSR-41A02 外形尺寸
Figure 3- The dimensions of HSSR-41A02

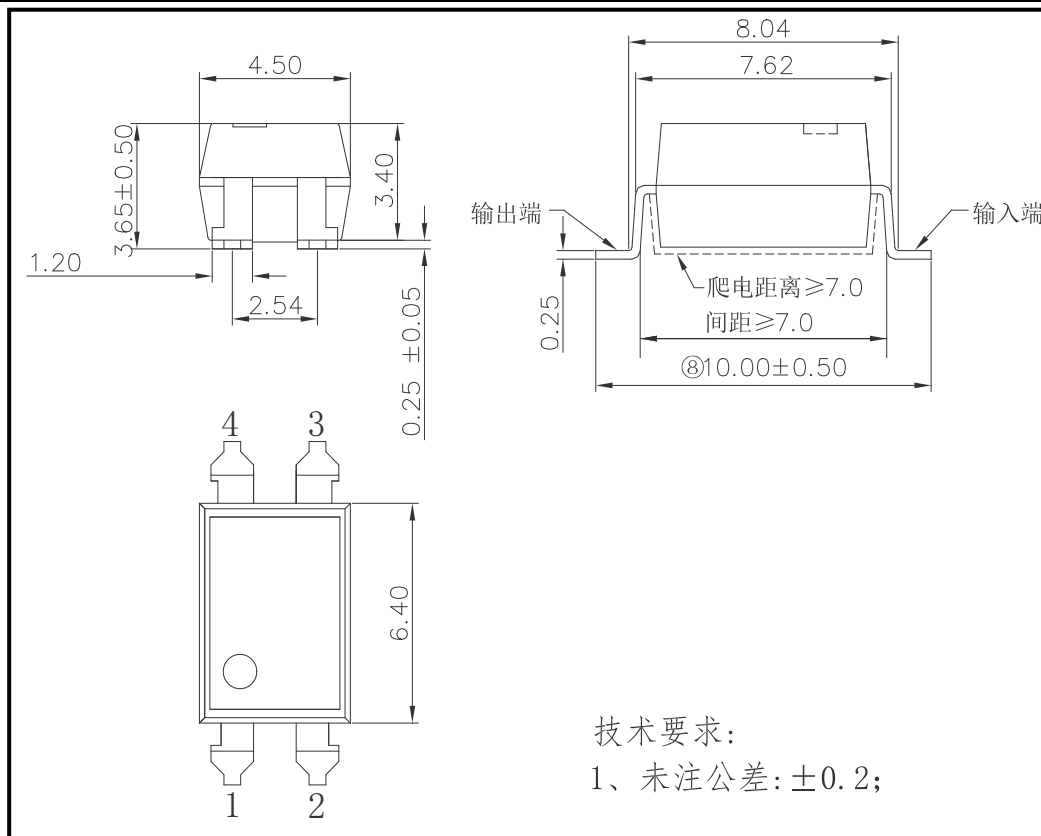


图 4 HSSR-41A02-2 外形尺寸

Figure 4- The dimensions of HSSR-41A02-2

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：HSSR-41A××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 HSSR-41A×× is shown as figure 5.



图 5 产品印章

Figure 5- Marking

9 包装方式 Packing

9.1 条管包装 (Tube)：适用于 For HSSR-41A02。

9.1.1 每箱数量 (Qty/ctn)：40000 只 (pcs)。

9.1.2 内包装 (Inner packing)：

每条管 100 只，采用防静电条管，条管上有商标、防静电标志。

100pcs/tube, antistatic tube, indication of trade mark and antistatic.

每纸匣 2000 只，贴合格证 (型号、生产日期代号、检验员代号)。

2000pcs/bundle, certificate on one end (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) :

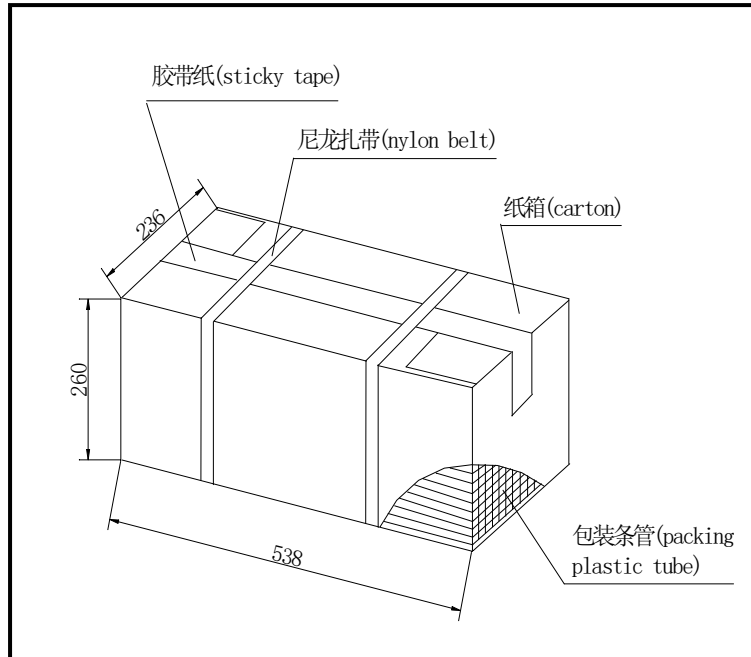


图 6 条管外包装

Figure 6- Outer packing for Tube

9.2 编带包装 (Tape and reel) : 适用于 For HSSR-41A02-2。

9.2.1 每卷数量 (Qty/reel) : 2000 只 (pcs) 。每箱数量 (Qty/ctn) : 20000 只 (pcs) 。

9.2.2 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) 。

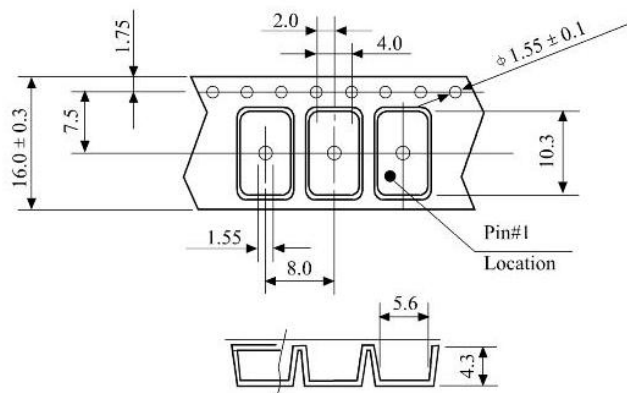
2000pcs/reel, certificate on reel (model, code of product date, Inspector's code)

9.2.3 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) :



卷盘外形图 Reel's Dimensions

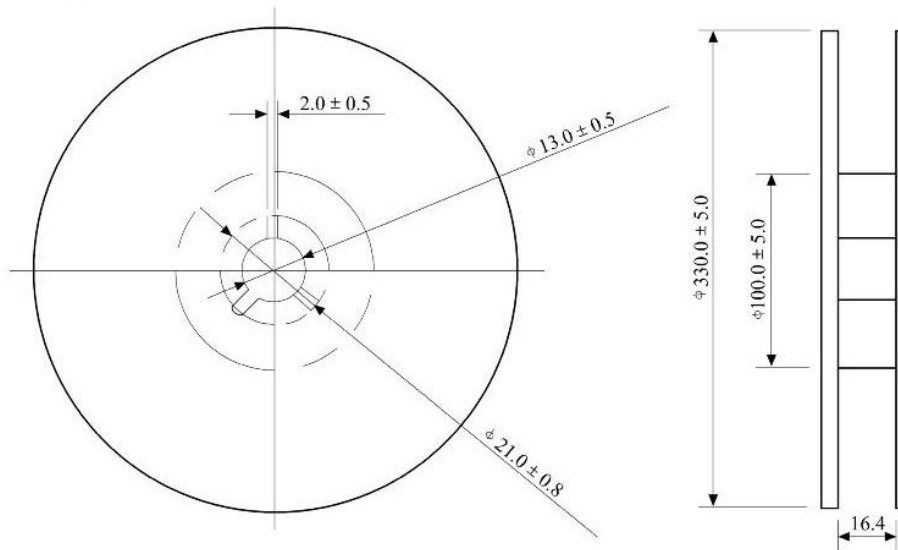


图 7 编带包装示意图

Figure 7- Taping Packing Schematic

9.3 注意事项 Note

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

推荐贮存湿度 Recommend storage humidity: <60%;

9.3.2 湿气敏感度等级 1 级。MSL level: MSL 1.

9.4 引脚镀锡厚度: 大于等于 5 μ m, 平均 8 μ m ~10 μ m。

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

9.5 推荐焊接条件 Recommended Soldering Conditions

9.5.1 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.

9.5.2 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.

9.5.3 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

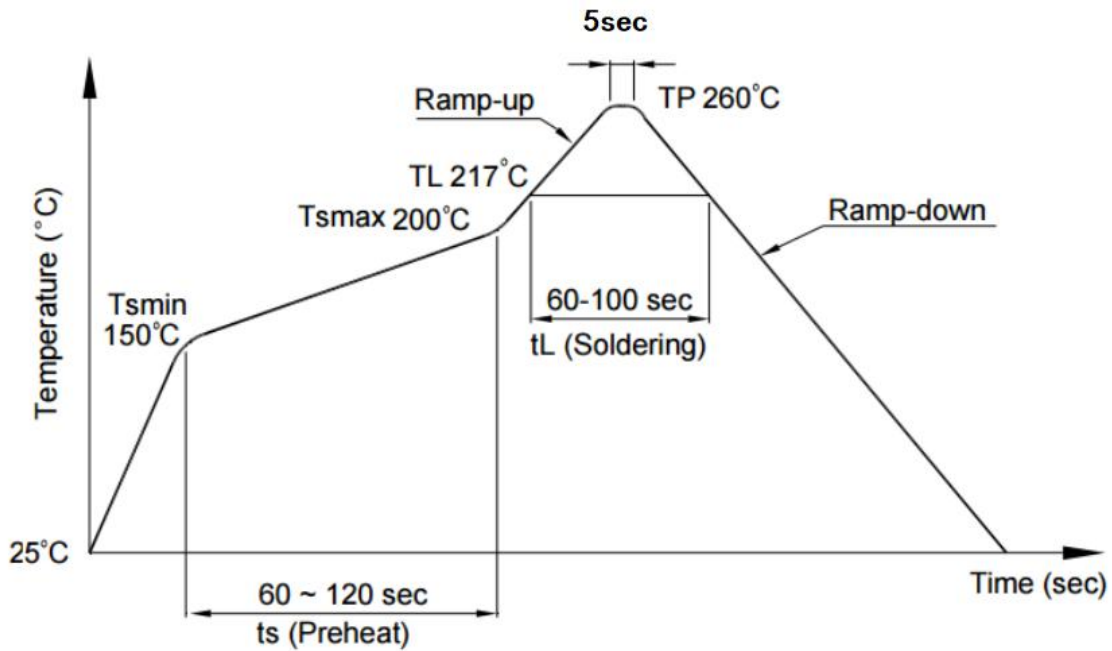
1) 推荐锡膏规格 Recommend tin glue specifications:

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:



| 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 8 回流焊参数

Figure 8-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.

9.5.4 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.

9.6 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.

10 产地 Production Place

10.1 产地 Production Place: 中国厦门 Xiamen China;

10.2 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.;

10.3 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 | 2023-02-23 | 版本升级 Version Upgrade | 郑清清 | 黄发宝 |
| 2.1 | 2023-11-07 | 公司名称变更 | 姚彭彭 | 黄发宝 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |