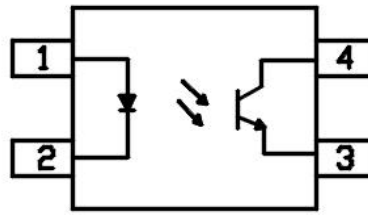
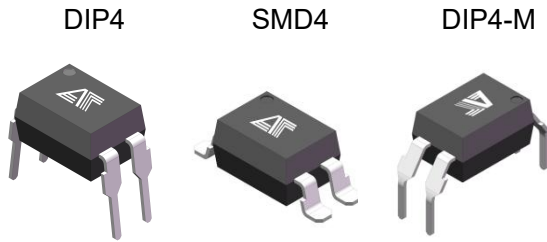


# 晶体管光耦 Photo Transistor

## EL851S

Product Data Sheet

AOTE DCC  
RELEASE



**Pin Configuration**  
 1. Anode  
 2. Cathode  
 3. Emitter  
 4. Collector

## ◆ 封装逻辑原理图 Encapsulation logic schematic

EL851S 光耦采用高效光电转换技术，结合先进封装工艺，提供输入输出间的可靠隔离，支持DIP4、DIP4-M及SMD4三款封装形式，适配多样化场景需求。

The EL851S optocoupler adopts high-efficiency photoelectric conversion technology and advanced packaging processes, providing reliable input-output isolation. It supports three package types (DIP4, DIP4-M, SMD4) to meet diverse application requirements.

## ◆ 产品特征Product features

- 输入-输出隔离电压 $V_{ios}=5000V_{rms}$   
Input output isolation voltage:  $V_{ios}=5000 V_{rms}$
- 电流传输比CTR:50-600% Current Transfer Ratio: CTR:50-600%
- 峰值击穿电压:BVCEO=350V; Peak breakdown voltage:BVCEO=350V
- 爬电距离>7.0mm ; Creepage distance > 7.0mm;
- 输入-输出绝缘距离 >0.4mm ; Input-Output insulation Thickness > 0.4mm
- 防潮等级 class1; MSL class1
- 产品符合 ROHS、REACH 及 HF 等环保法规要求;  
The products comply with ROHS, REACH and HF;

## ◆ 应用领域 Applications

- 工业控制 Industrial control  
工业自动化设备 (PLC模块、传感器接口) Industrial automation equipment (PLC module, sensor interface)  
测量仪器信号隔离 Measurement instrument signal isolation
- 电源系统 Power Systems:  
智能电表、开关电源设计应用 Design and application of smart meters and switching power supplies  
光伏逆变器、储能系统应用 Photovoltaic inverters, energy storage system applications
- 消费电子 Consumer Electronics:  
家用电器主控电路 (空调、冰箱、热水器) Main control circuit for household appliances (air conditioning, refrigerator, water heater);  
办公设备 (复印机) Office equipment (copier)



**◆ 极限参数 Absolute Maximum Ratings (Ta = 25°C)**

| 参数<br>Parameter                  |                                                                                 | 符号<br>Symbol | 额定值<br>Rating | 单位<br>Unit |
|----------------------------------|---------------------------------------------------------------------------------|--------------|---------------|------------|
| 发射端<br>Input                     | 正向电流<br>Forward Current                                                         | IF           | 50            | mA         |
|                                  | 反向电压<br>Reverse Voltage                                                         | VR           | 6             | V          |
|                                  | 峰值正向电流(1us , 脉冲)<br>Peak forward current (1us, pulse)                           | IFP          | 1000          | mA         |
|                                  | 额定值降低因子(在 Ta = 100°C 以上)<br>Power dissipationDerating factor (above Ta = 100°C) | PDD          | 2.9           | mW/°C      |
| 接收端<br>Output                    | 集电极功耗<br>Collector Power Dissipation                                            | PC           | 150           | mW         |
|                                  | 集电极电流<br>Collector Current                                                      | IC           | 50            | mA         |
|                                  | 集电极-发射极电压<br>Collector-Emitter Voltage                                          | VCEO         | 350           | V          |
|                                  | 发射极-集电极电压<br>Emitter-Collector Voltage                                          | VECO         | 7             | V          |
| 总功率消耗<br>Total Power Dissipation |                                                                                 | Ptot         | 200           | mW         |
| 隔离电压<br>Isolation Voltage        |                                                                                 | Viso         | 5000          | Vrms       |
| 工作温度<br>Operating Temperature    |                                                                                 | Topr         | -55 ~ +110    | °C         |
| 存储温度<br>Storage Temperature      |                                                                                 | Tstg         | -55 ~ +125    | °C         |
| 焊接温度<br>Soldering Temperature    |                                                                                 | Tsol         | 260           | °C         |

**◆ 推荐操作条件 Recommended Operating Conditions**

| 参数<br>Parameter                        | 符号<br>Symbol | 最小值<br>Min | 最大值<br>Max. | 单位<br>Unit |
|----------------------------------------|--------------|------------|-------------|------------|
| 正向电流<br>Forward Current                | IF           | 5          | 15          | mA         |
| 集电极-发射极电压<br>Collector-Emitter Voltage | VCEO         | 5          | 350         | V          |
| 集电极电流<br>Collector Current             | IC           | 5          | 35          | mA         |

**◆ 产品特性参数Product characteristic parameters (Ta =25℃)**

| 参数<br>Parameter                     |                                                        | 符号<br>Symbol | 条件<br>Condition                   | 最小<br>Min          | 典型<br>Typ | 最大<br>Max | 单位<br>Unit |
|-------------------------------------|--------------------------------------------------------|--------------|-----------------------------------|--------------------|-----------|-----------|------------|
| 发射端<br>Input                        | 正向电压<br>Forward Voltage                                | VF           | IF=10mA                           | -                  | 1.2       | 1.4       | V          |
|                                     | 反向电流<br>Reverse Current                                | IR           | VR =4V                            | -                  | -         | 10        | uA         |
|                                     | 输入电容<br>Terminal Capacitance                           | Ct           | V=0V,<br>F =1KHz                  | -                  | 30        | 250       | pF         |
| 接收端<br>Output                       | 集电极暗电流<br>Collector Dark Current                       | ICEO         | VCE=20V,<br>IF =0mA               | -                  | -         | 100       | nA         |
|                                     | 集电极-发射极击穿电压<br>Collector-Emitter<br>Breakdown Voltage  | BVCEO        | IC =0.1mA,<br>IF =0mA             | 350                | -         | -         | V          |
|                                     | 发射极-集电极电压<br>Emitter-Collector<br>Voltage              | BVECO        | IE =10uA,<br>IF =0mA              | 7                  | -         | -         | V          |
| 传输特性<br>Transfer<br>Characteristics | 电流传输比<br>Current Transfer Ratio                        | CTR*         | IF=1mA ,<br>VCE=5V                | 50                 | -         | 600       | %          |
|                                     | 集电极-发射极饱和压降<br>Collector-Emitter<br>Saturation Voltage | VCE(sat)     | IF=±20mA,<br>IC =1mA              | -                  | -         | 0.4       | V          |
|                                     | 隔离电阻<br>Isolation Resistance                           | RISO         | DC500V,40<br>~60%R.H.             | 1x10 <sup>12</sup> | -         | -         | Ω          |
|                                     | 隔离电容<br>Isolation capacitance                          | CISO         | V=0,f=1MHz                        | -                  | 0.6       | -         | pF         |
|                                     | 截止频率<br>Cut-off Frequency                              | Fc           | VCE=5V, IC =2mA,<br>RL =100Ω,-3dB | -                  | 80        | -         | kHz        |
|                                     | 上升时间<br>Rise Time                                      | Tr           | VCE=2V, IC =2mA,<br>RL =100Ω      | -                  | 4         | 18        | μs         |
|                                     | 下降时间<br>Fall Time                                      | Tf           | VCE=2V, IC =2mA,<br>RL =100Ω      | -                  | 5         | 18        | μs         |

注 电流传输比= $I_C/I_F \times 100\%$ 。

Note\*: CTR= $I_C/I_F \times 100\%$ 。

◆ 电性特性曲线 Electrical characteristic curve ( $T_a = 25^\circ\text{C}$ )

Fig.1 Relative Current Transfer Ratio vs. Forward Current

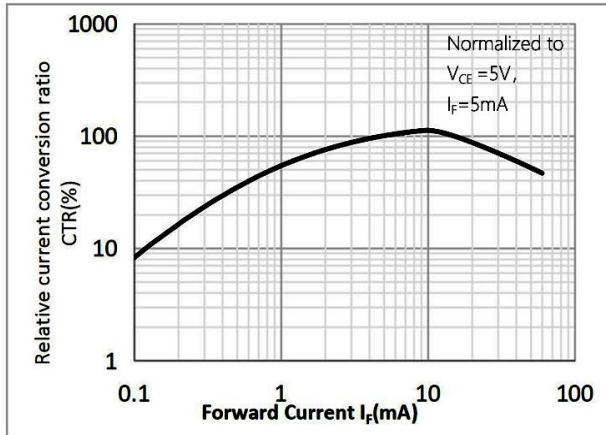


Fig.2 Forward Current vs. Forward Voltage

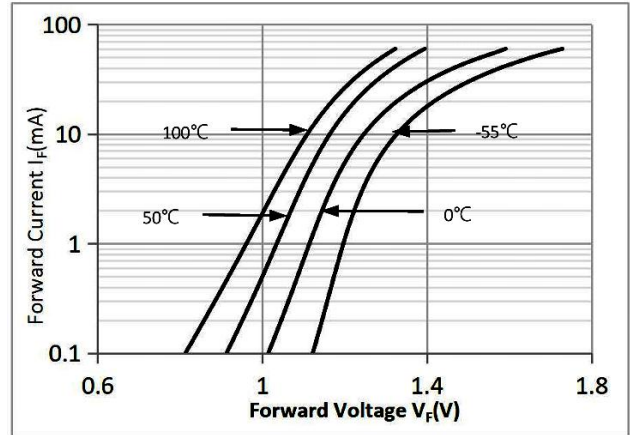


Fig.3 Collector Current vs. Collector-emitter Voltage

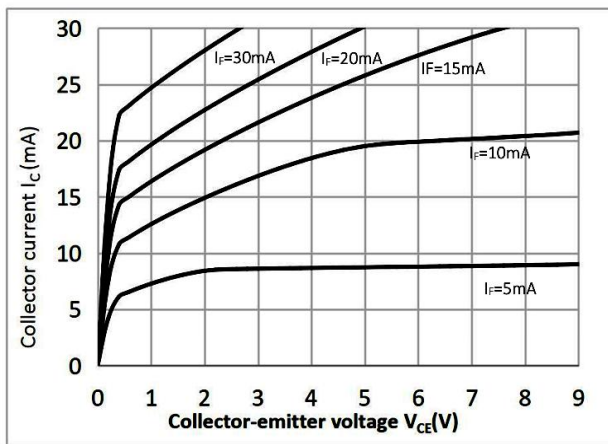


Fig.4 Relative Current Transfer Ratio vs. Ambient Temperature

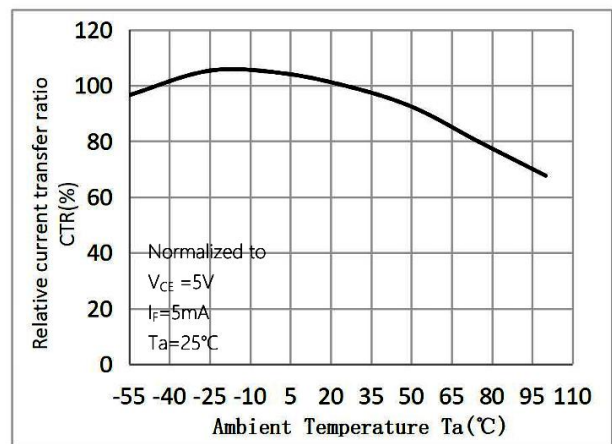


Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature

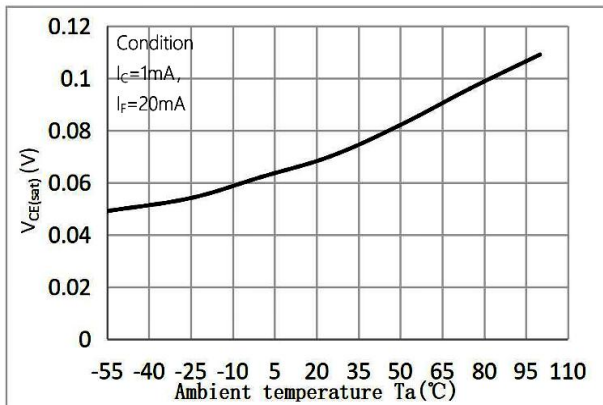


Fig.6 Collector Dark Current vs Ambient Temperature

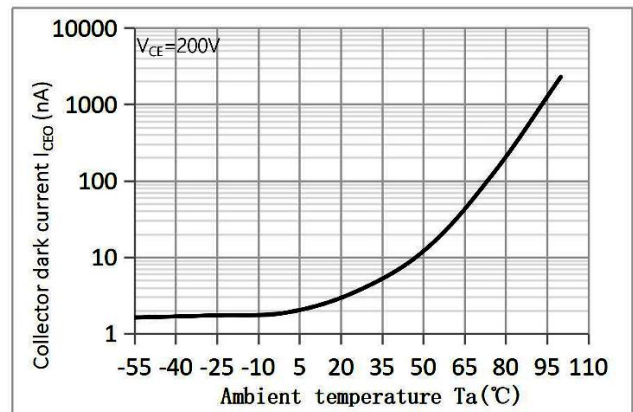


Fig.7 Response Time vs. Ambient Temperature

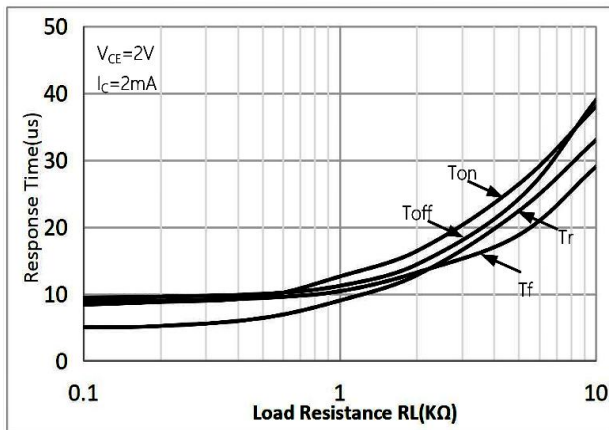
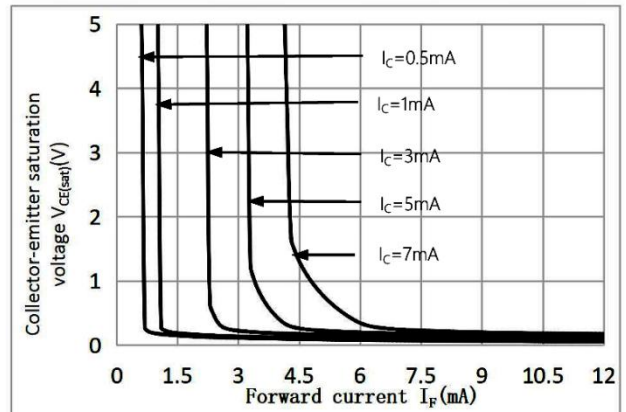
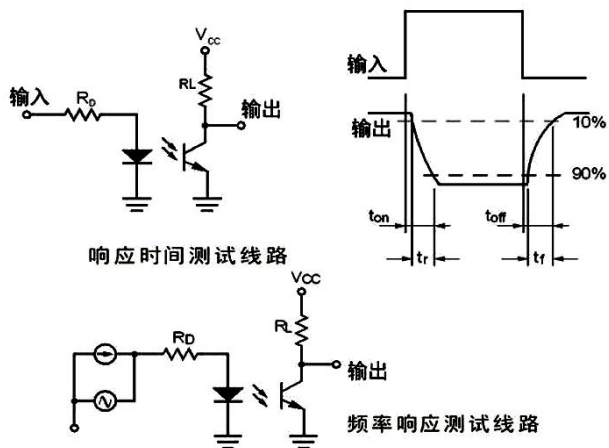


Fig.8 Collector-emitter Saturation Voltage vs Forward Current

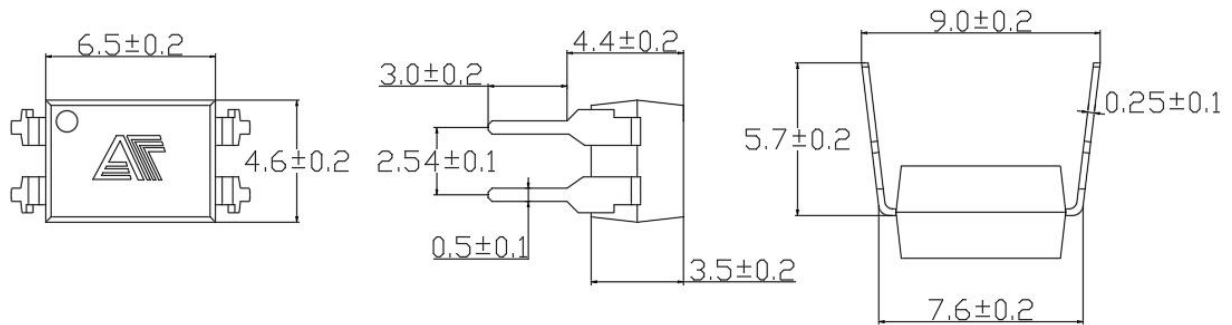


Switching Time Test Circuit & Wave forms

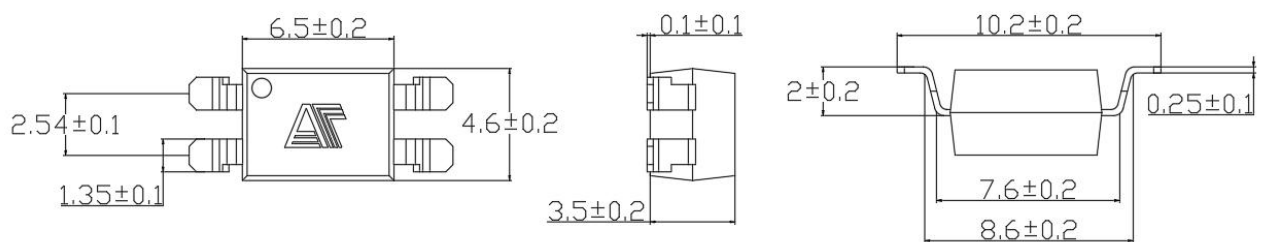


◆ 外形尺寸Overall dimension

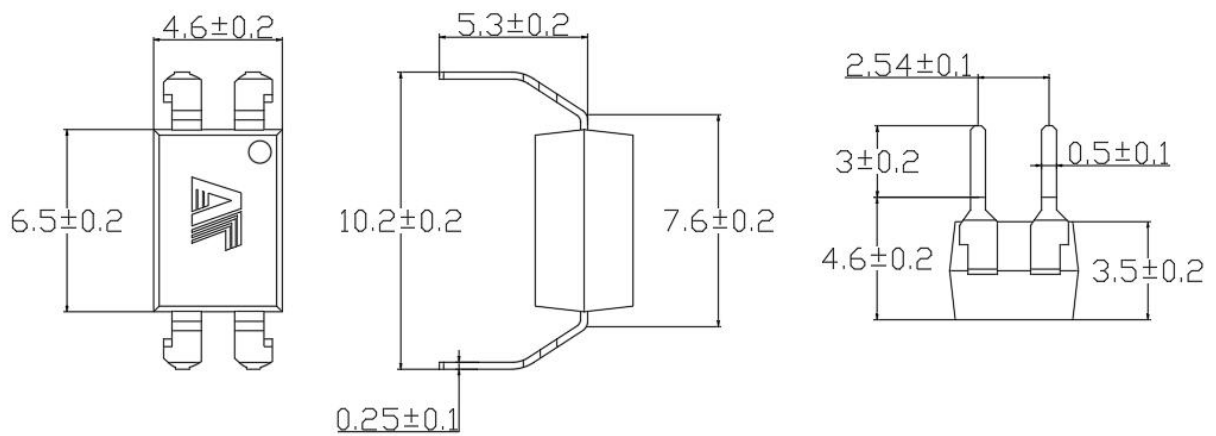
DIP4



SMD4

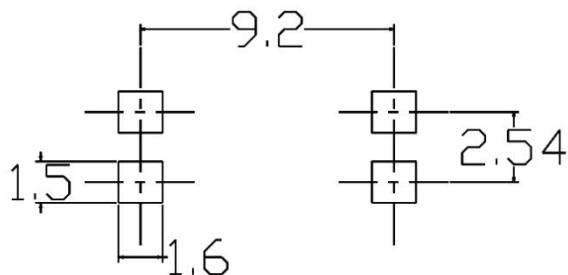


DIP4-M



推荐焊盘:

Recommended



单位: mm

## ◆ 印字信息 Marking Information

- 印字中 “  ” 为奥特品牌LOGO  
“  ” denotes LOGO
- 印字中 “Y” 代表年份； A(2018),B(2019),C(2020) ... ..  
“Y” denotes YEAR: A(2018), B(2019), C(2020) ... ..
- 印字中 “WW” 代表周号  
“WW” denotes Week' s number
- 印字中 “ E” 代表内部代码  
“E” denotes Internal code
- 印字中的 “H” 代表无卤  
“H” denotes Halogen-free



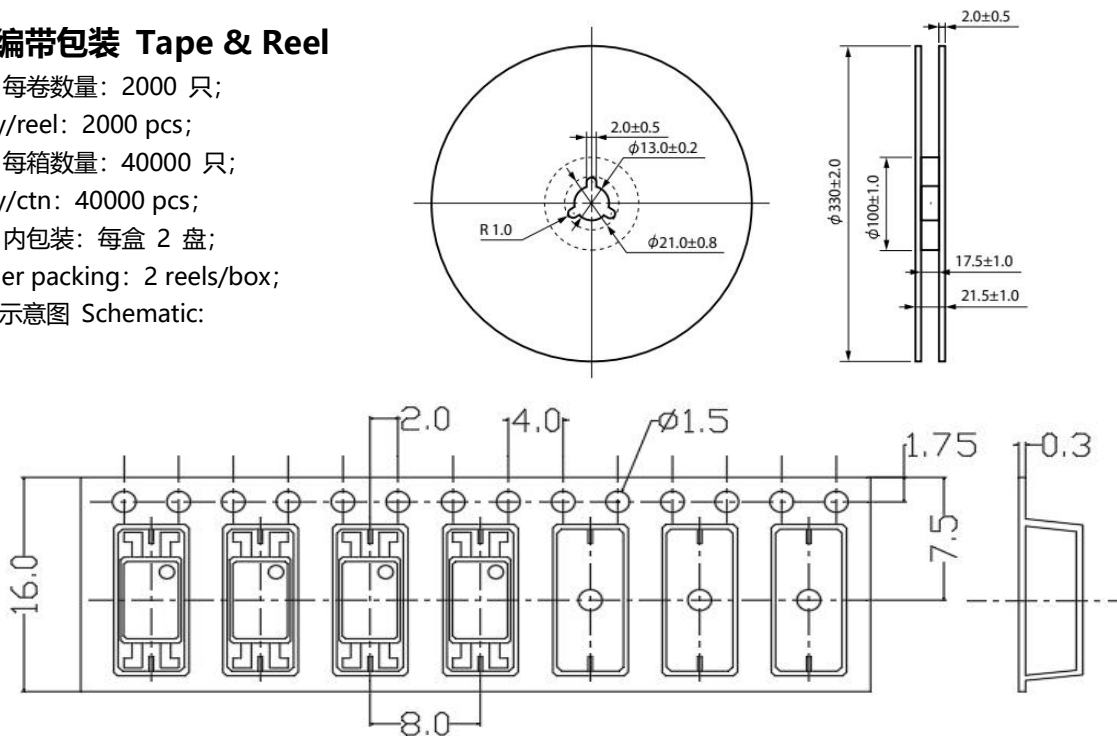


### ◆ 包装packing

| 封装形式         | 包装方式                          | 盘数量               | 盒数量              | 箱数量                 | 静电袋规格                        | 盒规格               | 箱(双瓦楞)规格             | 备注                                                                  |
|--------------|-------------------------------|-------------------|------------------|---------------------|------------------------------|-------------------|----------------------|---------------------------------------------------------------------|
| SMD4         | 卷盘<br>( $\phi 330$ mm蓝盘)      | 2000 只/盘          | 2 盘/盒            | 10 盒/箱              | 450*390*0.1mm                | 340*60*340mm      | 620*360*365mm        | 首尾端空至少200mm                                                         |
| DIP4         | 管装<br>(500*12*11mm)           | 100 只/管           | 50 管/盒           | 10 盒/箱              | 不适用                          | 525*128*56mm      | 535*275*300mm        | 每管使用蓝白胶塞，方向须一致                                                      |
| DIP4-M       | 管装<br>(500*13*11mm)           | 100 只/管           | 50 管/盒           | 10 盒/箱              | 不适用                          | 525*136*58mm      | 535*295*310mm        |                                                                     |
| Package Type | Packing Form                  | Quantity per Reel | Quantity per Box | Quantity per Carton | Antistatic Bag Specification | Box Specification | Carton Specification | Note                                                                |
| SMD4         | Reel<br>( $\phi 330$ mm Blue) | 2000 pcs/reel     | 2 reels/box      | 10 boxes/ctn        | 450*390*0.1mm                | 340*60*340mm      | 620*360*365mm        | Leave at least 200mm of blank space at both ends                    |
| DIP4         | Tube<br>(500*12*11mm)         | 100 pcs/tube      | 50 tubes/box     | 10 boxes/ctn        | NA                           | 525*128*56mm      | 535*275*300mm        | Use blue and white rubber plugs for each tube in the same direction |
| DIP4-M       | Tube<br>(500*13*11mm)         | 100 pcs/tube      | 50 tubes/box     | 10 boxes/ctn        | NA                           | 525*136*58mm      | 535*295*310mm        |                                                                     |

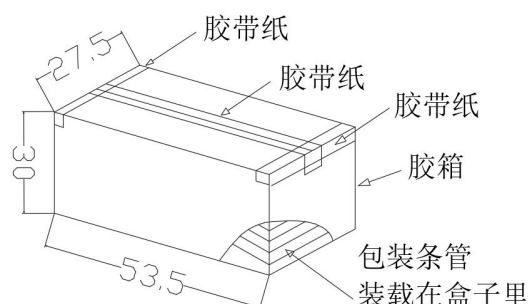
### • 编带包装 Tape & Reel

- 1) 每卷数量: 2000 只;  
Qty/reel: 2000 pcs;
- 2) 每箱数量: 40000 只;  
Qty/ctn: 40000 pcs;
- 3) 内包装: 每盒 2 盘;  
Inner packing: 2 reels/box;
- 4) 示意图 Schematic:



### • 管条包装Tape&Tube

- 1) 每管数量: 100 只。  
Qty/Tube : 100 pcs.
- 2) 每箱数量: DIP4/DIP-M 50000/4500 只。  
Qty/ctn: DIP4/DIP-M50000 /4500pcs.
- 3) 内包装: 每盒 50 管。  
Inner packing: 50 Tube/box.
- 4) 示意图 Schematic

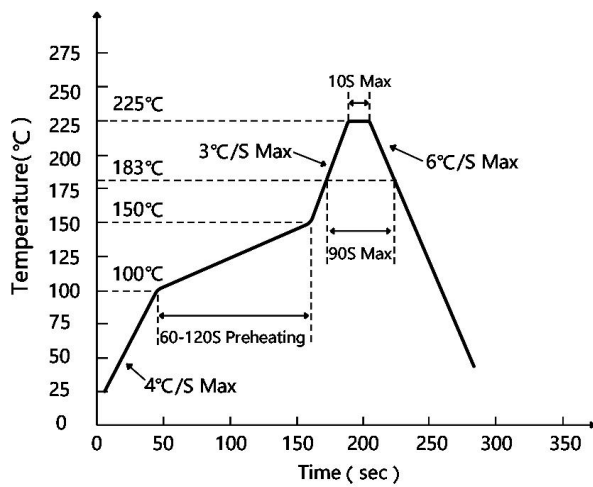


单位: mm

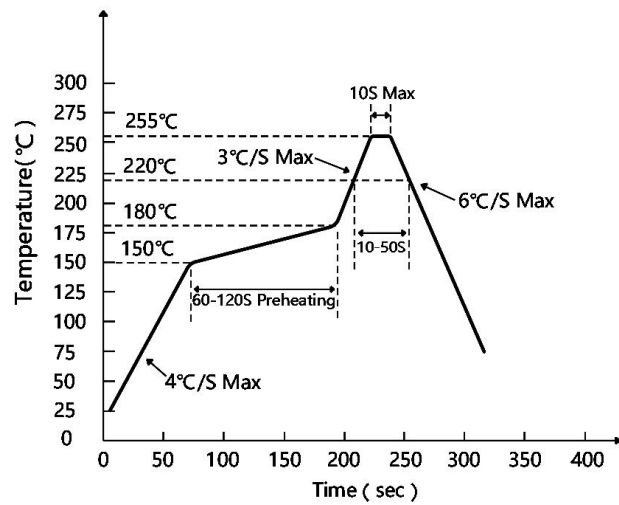
**◆ 可靠性测试 Reliability Test Items And Conditions**

| 实验项目<br>Test Items                                          | 参考标准<br>Reference | 实验条件<br>Test Conditions               | 时间<br>Time             | 样品数<br>Quantity | 判据<br>Criterion |
|-------------------------------------------------------------|-------------------|---------------------------------------|------------------------|-----------------|-----------------|
| 可焊性<br>Solderability                                        | JESD22-B102       | Tsol= (245±5) °C,<br>t=5s;            | 1 次1 times             | 22              | 0/22            |
| 耐焊接热Resistance to<br>Soldering Heat                         | JESD22-A106       | Tsol= (260±5) °C,<br>t=10s            | 3 次3 times             | 22              | 0/22            |
| 静电放电<br>ESD-HBM                                             | JESD22-A114       | Ta=25°C, HBM<br>(2000V)               | 正反各 3 次<br>P&N 3 times | 10              | 0/10            |
| 高温贮存High<br>emperature Storage                              | JESD22-A103       | Ta=125°C                              | 1000h                  | 22              | 0/22            |
| 低温贮存<br>Low Temperature<br>Storage                          | JESD22-A119       | Ta= -55°C                             | 1000h                  | 22              | 0/22            |
| 冷热冲击<br>Thermal Shock                                       | JESD22-A104       | -55°C(15min)↔<br>125°C(15min)         | 循环 300 次<br>300 cycles | 22              | 0/22            |
| 常温寿命试验<br>Lifespan Test                                     | JESD22-A108       | Ta=25°C, IF=50mA ,<br>Vcc=5V          | 1000h                  | 22              | 0/22            |
| 高温寿命试验<br>DC Operating Life                                 | JESD22-A108       | Ta=110°C, IF=20mA ,<br>Vcc=5V         | 1000h                  | 76              | 0/76            |
| 高温高湿偏压<br>High Temperature<br>High Humidity<br>bias Voltage | JESD22-A101       | Ta =85°C , RH=85%<br>IF=0mA , VCE=64V | 1000h                  | 22              | 0/22            |
| 高温偏压<br>High Temperature<br>bias Voltage                    | JESD22-A108       | Ta =110°C , IF=0mA ,<br>VCE=80V       | 1000h                  | 22              | 0/22            |
| 高压蒸汽试验<br>High pressure steam<br>test                       | JESD22-A102       | P=15PSIG , 121°C,<br>100%RH           | 96h                    | 22              | 0/22            |

### ◆ 回流焊温度曲线图 Solder Reflow Profile

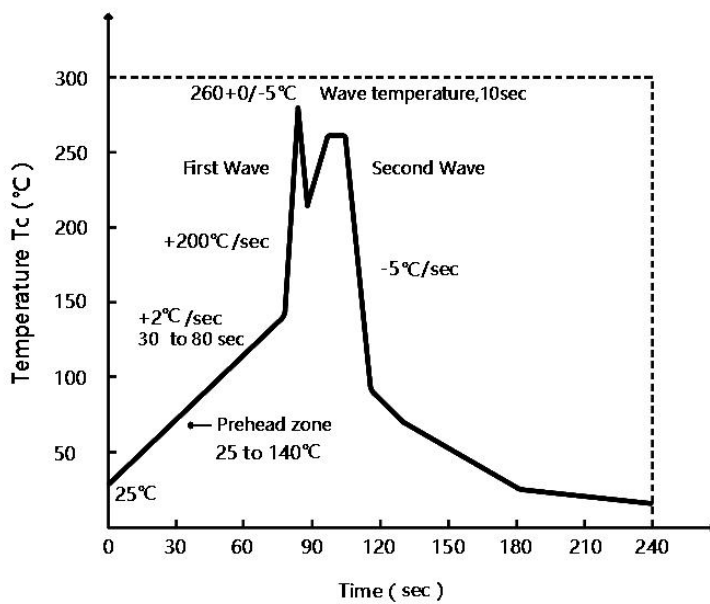


有铅制程 Lead Process



无铅制程 Lead Process

### ◆ 波峰焊温度曲线图 Wave Soldering Profile



### ◆ 手工烙铁焊接 Soldering with hand soldering iron

A. 手工烙铁焊仅用于产品返修或样品测试;

Hand soldering iron is only used for product rework or sample testing;

B. 手工烙铁焊要求: 温度 350°C ± 5°C, 时间 ≤ 3s.

Hand soldering iron requirements: Temperature: 350°C ± 5°C, within 3s.

#### ◆ 注意 Attention

- 奥特半导体实施动态技术迭代机制，产品规格可能随工艺升级调整，最新技术参数以官网发布版本为准。

AOTE implements dynamic technical updates. Specifications are subject to change. Refer to the official website for the latest version.

- 用户需严格遵循本规格书限定的操作条件，因超范围使用（包括但不限于过载、高温、非兼容电路设计）导致的器件失效，不在质量保证范围内。

Users must strictly adhere to specified conditions. Failures caused by misuse (overload, high temperature, incompatible circuits) are excluded from warranty.

- 医疗设备、工业控制等关键场景应用前，需联系技术支持获取定制化验证方案。

Contact technical support for customized validation in critical applications (medical devices, industrial control).

- 本文档有效期至2025年12月31日，后续更新将通过官网公告推送。

This document is valid until Dec 31, 2025. Updates will be notified on the official website.

- 如需对技术参数或应用方案进行进一步确认，欢迎通过以下渠道获取官方支持：

For further clarification on technical specifications or application solutions, please contact us through official channels: