

晶体管光耦
Photo Transistor

AT817X

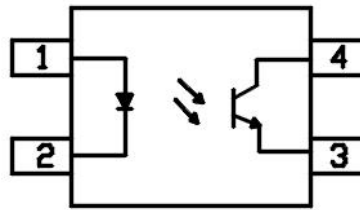
Product Data Sheet

AOTE DCC
RELEASE

DIP4

SMD4

DIP4-M



Pin Configuration

- 1. Anode
- 2. Cathode
- 3. Emitter
- 4. Collector

◆ 封装逻辑原理图 Encapsulation logic schematic

AT817X 系列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。

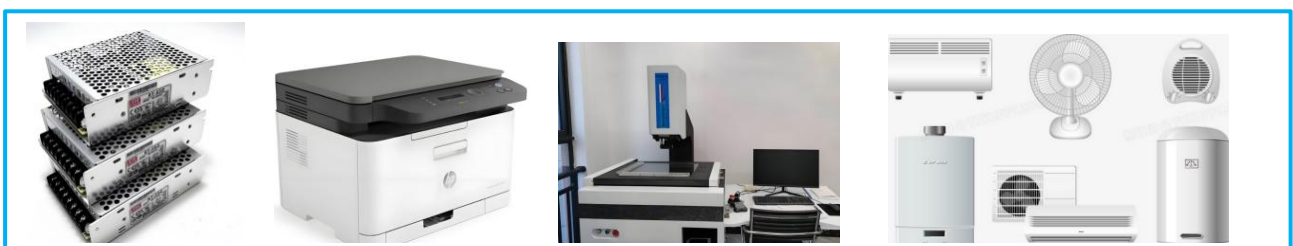
The AT817X series optocoupler adopts high-efficiency photoelectric conversion technology and advanced packaging processes, providing reliable input-output isolation. It supports three package types (DIP4, DIP4-M, SMD4) to meet diverse application requirements.

◆ 产品特征 Product features

- 输入-输出隔离电压 $V_{ios}=5000V_{rms}$
Input output isolation voltage: $V_{ios}=5000V_{rms}$
- 电流传输比CTR:80-600%范围: Current transmission ratio CTR: 80-600% range
- 集电极-发射极峰值击穿电压: $BV_{CEO}=80V$; Collector emitter peak breakdown voltage $BV_{CEO}=80V$
- 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 Parameter | | 符号 Symbol | 额定值 Rating | 单位 Unit |
|-------------------------------|---|--------------|---------------|------------|
| 发射端 Input | 正向电流 Forward Current | IF | 50 | mA |
| | 反向电压 Reverse Voltage | VR | 6 | V |
| | 峰值正向电流(1us , 脉冲) Peak forward current (1us, pulse) | IFP | 1000 | mA |
| | 功耗 Power Dissipation | PD | 70 | mW |
| 接收端 Output | 集电极功耗 Collector Power Dissipation | PC | 150 | mW |
| | 集电极电流 Collector Current | IC | 50 | mA |
| | 集电极-发射极电压 Collector-Emitter Voltage | VCEO | 80 | V |
| | 发射极-集电极电压 Emitter-Collector Voltage | VECO | 6 | V |
| 隔离电压 Isolation Voltage | | Viso | 5000 | Vrms |
| 工作温度 Operating Temperature | | Topr | -55 ~+110 | °C |
| 存储温度 Storage Temperature | | Tstg | -55 ~+125 | °C |
| 焊接温度 Soldering Temperature | | Tsol | 260 | °C |

◆ 推荐操作条件 Recommended Operating Conditions

| 参数 Parameter | 符号 Symbol | 最小值 Min | 最大值 Max. | 单位 Unit |
|--|--------------|------------|-------------|------------|
| 正向电流 Forward Current | IF | 5 | 15 | mA |
| 集电极-发射极电压 Collector-Emitter Voltage | VCEO | 5 | 80 | V |
| 集电极电流 Collector Current | IC | 5 | 35 | mA |

◆ 产品特性参数 Product characteristic parameters (Ta =25°C)

| 参数 Parameter | | 符号 Symbol | 条件 Condition | 最小 Min | 典型 Typ | 最大 Max | 单位 Unit |
|-------------------------------------|--|--------------|-----------------------------------|--------------------|-----------|-----------|------------|
| 发射端 Input | 正向电压 Forward Voltage | VF | IF=20mA | - | 1.2 | 1.4 | V |
| | 反向电流 Reverse Current | IR | VR =4V | - | - | 10 | uA |
| | 输入电容 Terminal Capacitance | Ct | V=0V, F =1KHz | - | 10 | - | pF |
| 接收端 Output | 集电极暗电流 Collector Dark Current | ICEO | VCE=20V, IF =0mA | - | - | 100 | nA |
| | 集电极-发射极击穿电压 Collector-Emitter Breakdown Voltage | BVCEO | IC =0.1mA, IF =0mA | 80 | - | - | V |
| | 发射极-集电极电压 Emitter-Collector Voltage | BVECO | IE =10uA, IF =0mA | 6 | - | - | V |
| 传输特性 Transfer Characteristics | 电流传输比 Current Transfer Ratio | CTR* | IF=1mA , VCE=5V | 80 | - | 600 | % |
| | 集电极-发射极饱和压降 Collector-Emitter Saturation Voltage | VCE(sat) | IF=20mA, IC =1mA | - | 0.1 | 0.2 | V |
| | 隔离电阻 Isolation Resistance | RISO | DC500V, 40 ~60%R.H. | 1x10 ¹² | - | - | Ω |
| | 隔离电容 Isolation capacitance | CISO | V=0,f=1MHz | - | 0.6 | - | pF |
| | 截止频率 Cut-off Frequency | Fc | VCE=5V, IC =2mA, RL =100Ω,-3dB | - | 80 | - | kHz |
| | 上升时间 Rise Time | Tr | VCE=2V, IC =2mA, RL =100Ω | - | 4 | - | μs |
| | 下降时间 Fall Time | Tf | VCE=2V, IC =2mA, RL =100Ω | - | 3 | - | μs |

注 电流传输比= $I_c/I_f \times 100\%$ 。

Note*: $CTR=I_c/I_f \times 100\%$ 。

• 电流传输比分档表 CTR Classification Table (IF = 1mA, VCE=5V, Ta =25°C)

| 代码Code | 最小值min | 最大值max |
|--------|--------|--------|
| A | 80 | 160 |
| B | 130 | 260 |
| C | 200 | 400 |
| D | 300 | 600 |

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

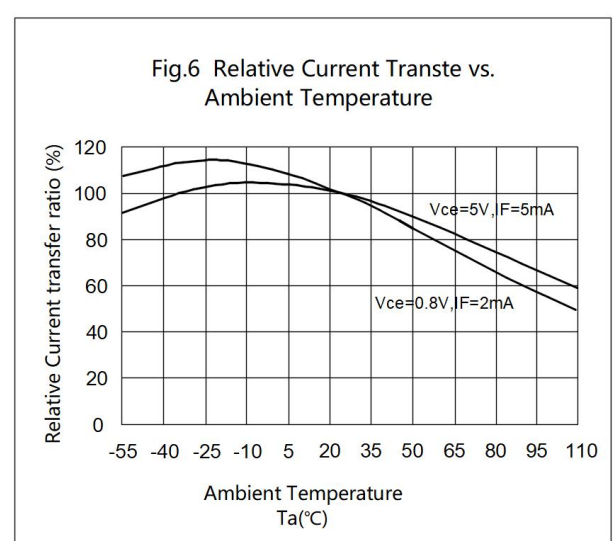
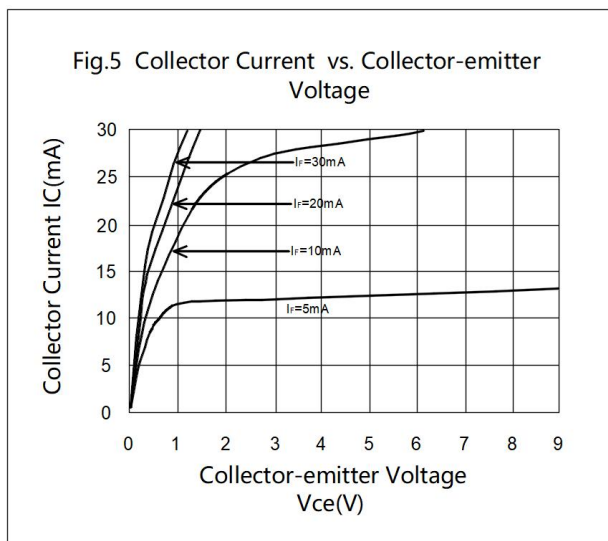
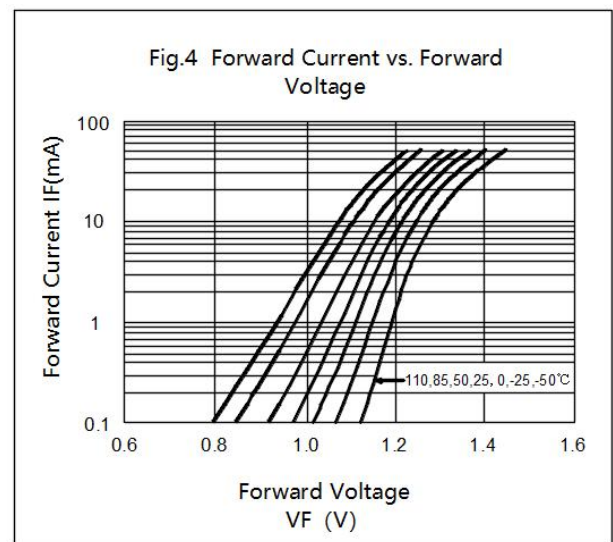
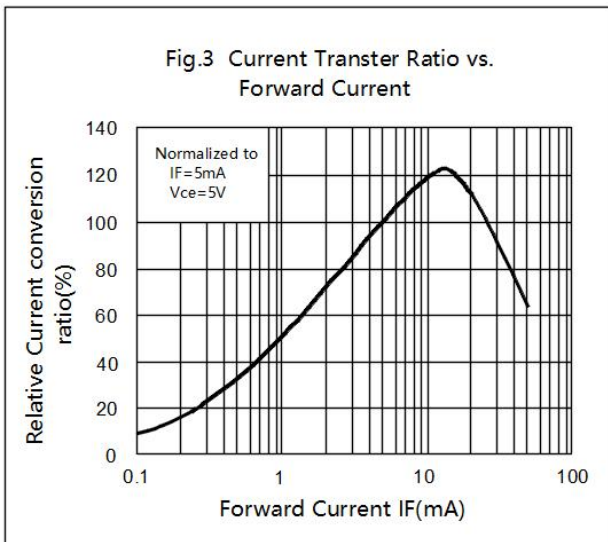
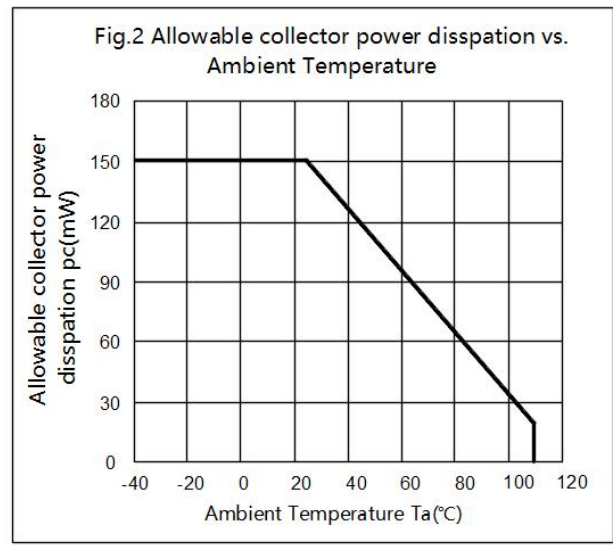
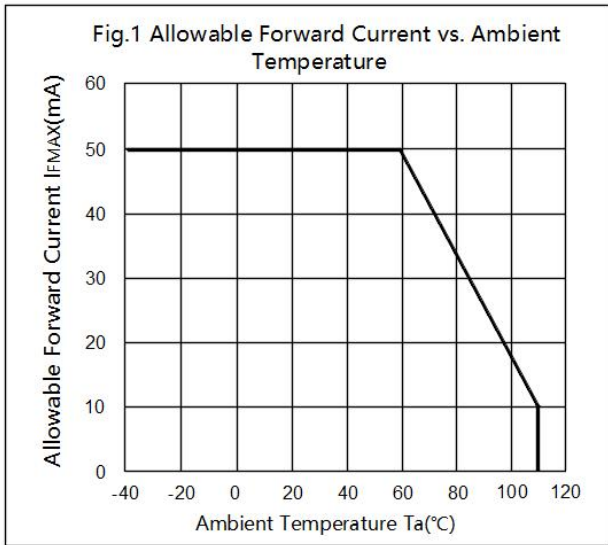


Fig.7 Collector-emitter Saturation Voltage vs. Ambient Temperature

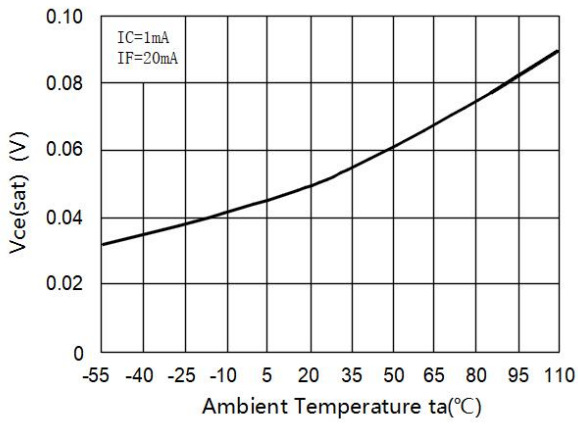


Fig.8 Collector Dark Current vs. Ambient Temperature

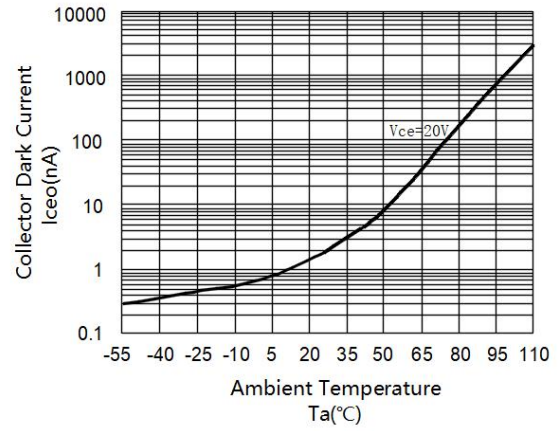


Fig.9 Response Time vs. Load Resistance

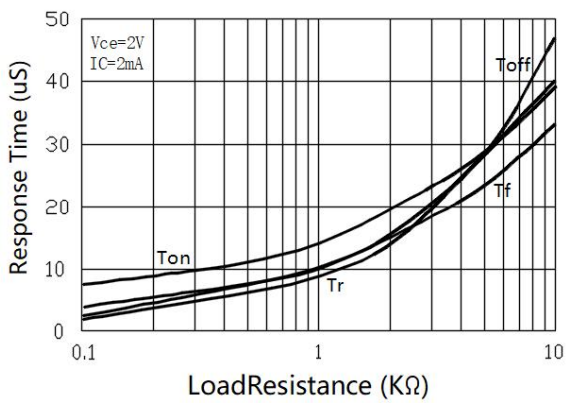


Fig.10 Frequency Response

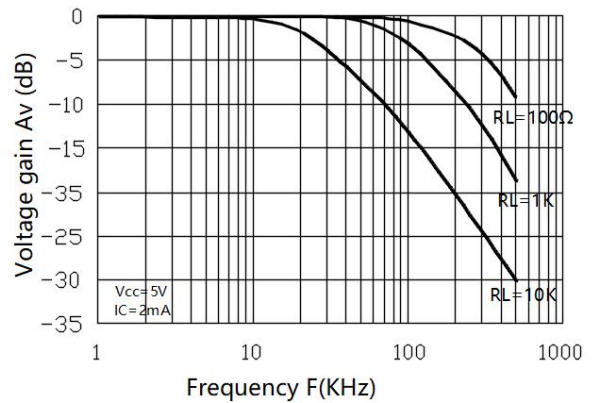


Fig.11 Collect-emitter Saturation Voltage vs. Forward Current

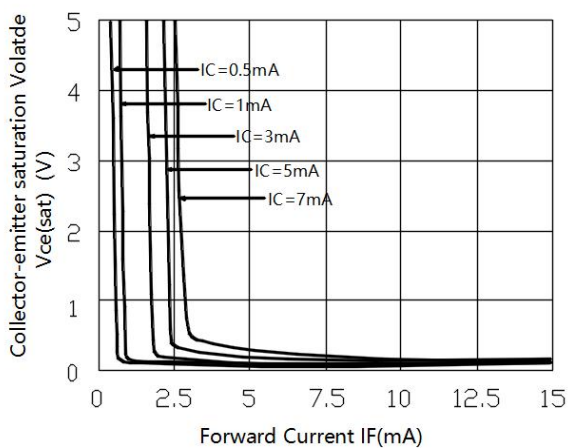
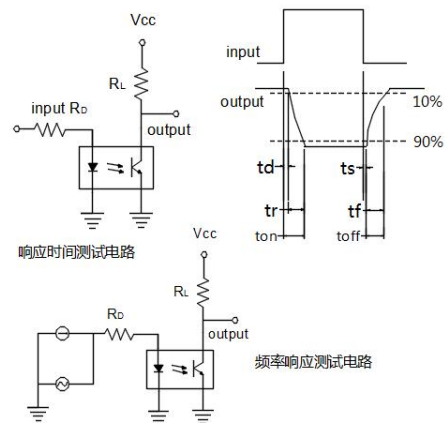
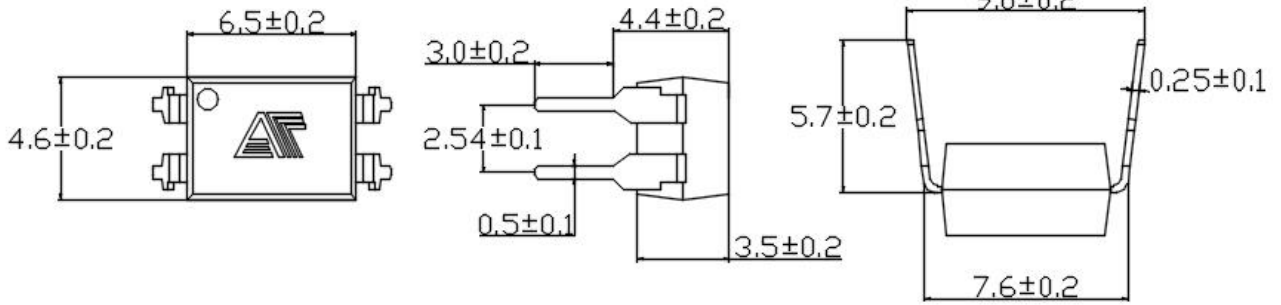


Fig.12 Switching Time Test Circuit & Waveforms

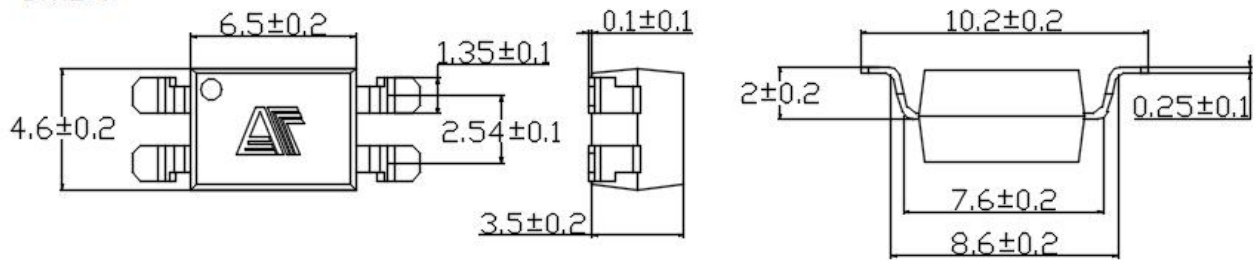


◆ 外形尺寸Overall dimension

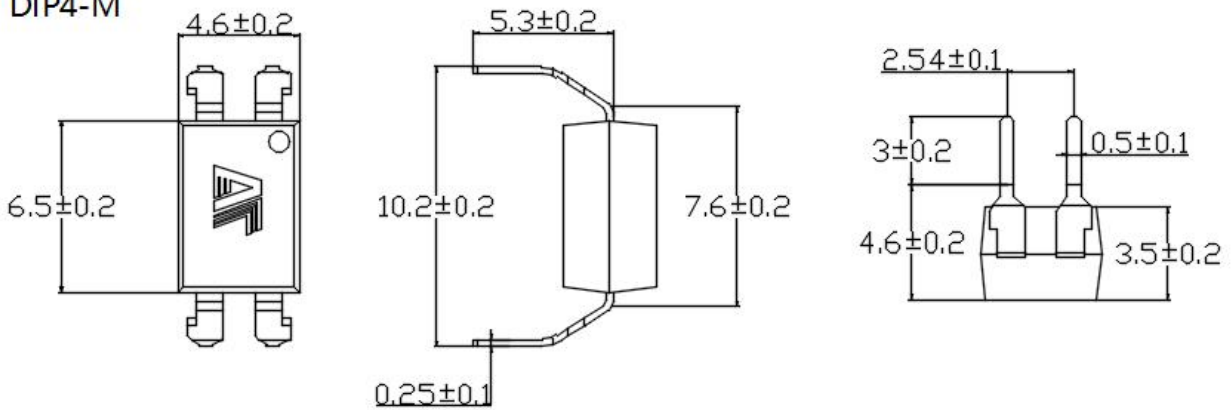
DIP4



SMD4

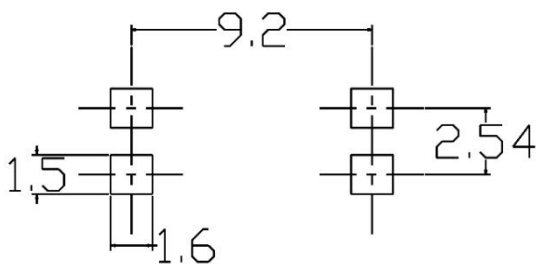


DIP4-M



推荐焊盘:

Recommended





单位: mm

◆ 产品型号命名规则 Order code
AT 817 X - UN Y - W (V) (ZZ)

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① 公司代码 Company Code (AT: 奥特 Aote)
- ② 产品系列 Product Series (817X)
- ③ CTR 档位 Classification (代码 Code: A, B, C, D or None)
- ④ 框架类型 Lead Frame (Cu: 铜框架 Copper, Fe: 铁框架 Ferrum)
- ⑤ 树脂类型 Epoxy Type (H: 无卤 Halogen-free)
- ⑥ 封装形式 Package (D:DIP, S:SMD, M:DIP-M)
- ⑦ 器件工作温度范围 Device Operating Temperature Range (特殊范围需填或者空白 Special Range need to be filled in or left blank)
- ⑧ 内部补充代码 Internal Supplementary Code (数字或者空白 Number or None)

◆ 印字信息 Marking Information

- 印字中 “” 为奥特品牌LOGO
“” denotes LOGO
- 印字中的 “X” 代表产品分档： A、 B 、 C、 D或空白
“X” denotes the classification： A、 B 、 C、 D or None
- 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

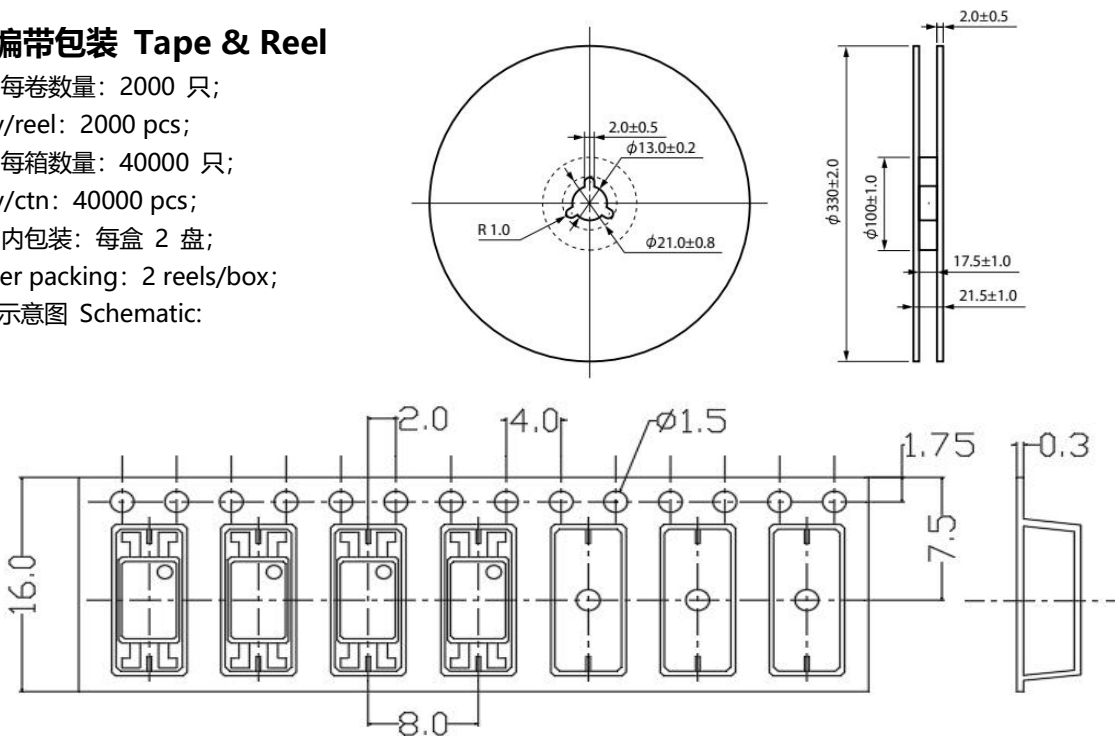


◆ **包装packing**

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

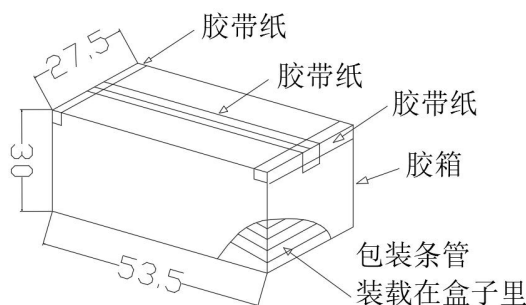
• **编带包装 Tape & Reel**

- 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: 50000 只。
Qty/ctn: 50000 pcs.
- 3) 内包装: 每盒 50 管。
Inner packing: 50 Tube/box.
- 4) 示意图 Schematic

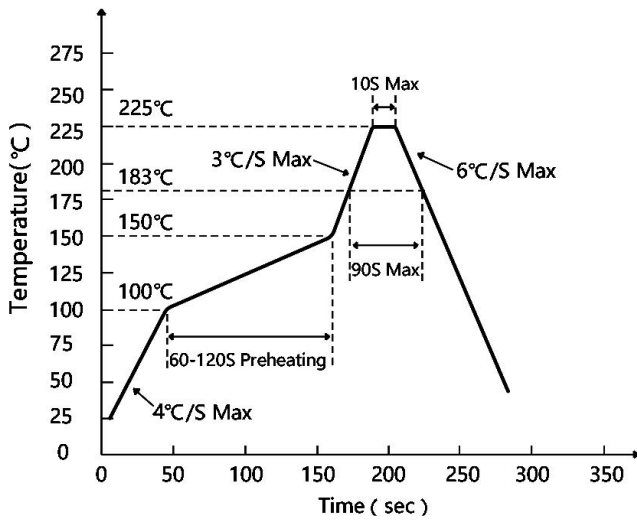


单位: mm

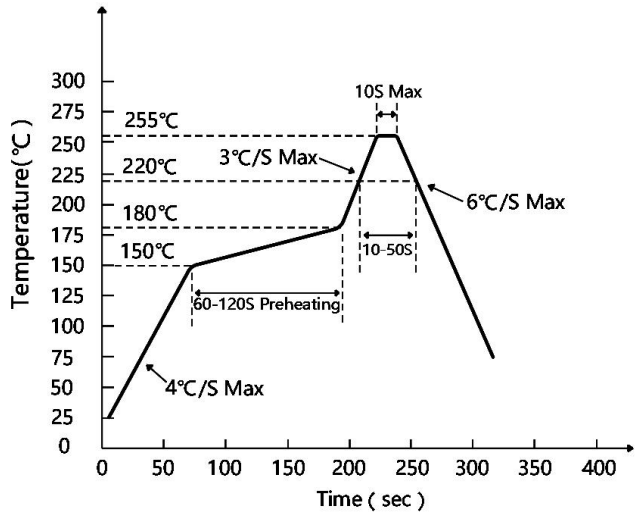
◆ 可靠性测试 Reliability Test Items And Conditions

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

◆ **回流焊温度曲线图 Solder Reflow Profile**

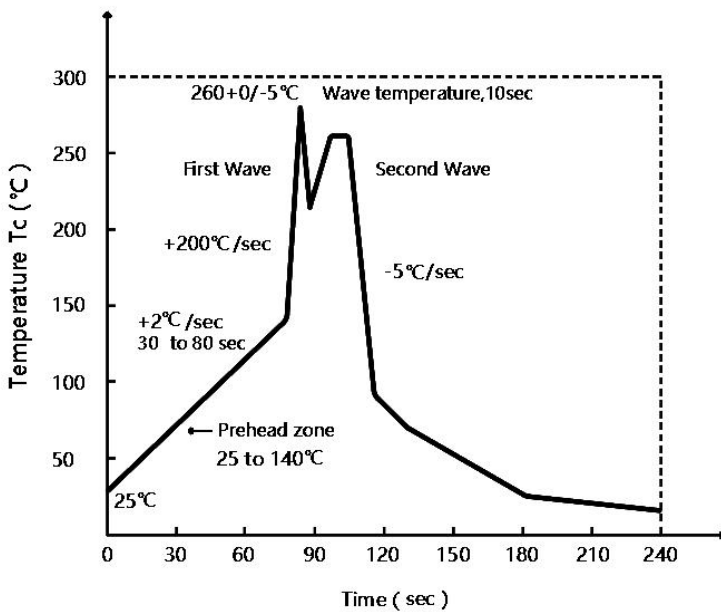


有铅制程 Lead Process



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 $350^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 时间 $\leq 3\text{s}$ 。

Hand soldering iron requirements: Temperature: $350^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 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: