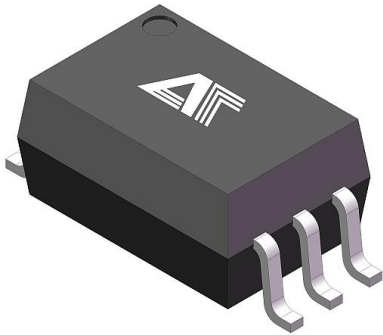


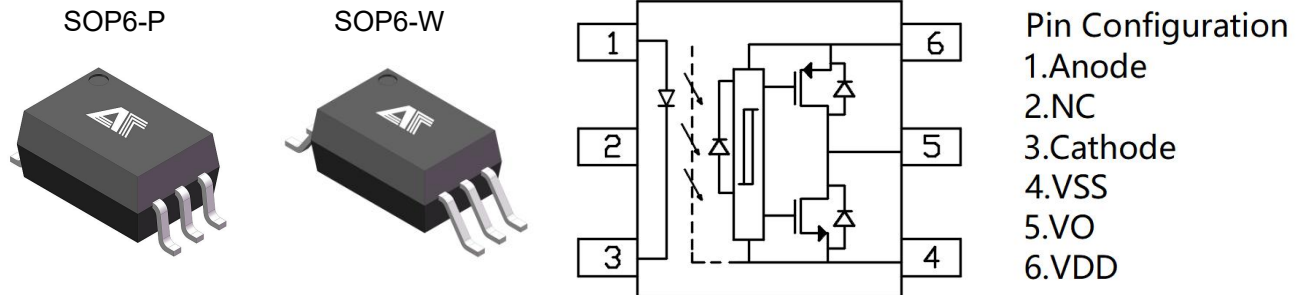


**栅极驱动光耦**  
**Gate driven optocoupler**

**AT314-CuH-P**

**Product Data Sheet**

**AOTE DCC**  
**RELEASE**



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

AT314 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SOP6-P、SOP6-W 封装形式, 适配多样化场景需求。

The AT314 optocoupler adopts high-efficiency photoelectric conversion technology and advanced packaging processes, providing reliable input-output isolation. It supports package types SOP6-P、SOP6-W to meet diverse application requirements.

## ◆ 主要特征 Main features

- 输入-输出隔离电压 $V_{ios}=5000V_{rms}$   
Input output isolation voltage:  $V_{ios}=5000V_{rms}$
- 25 kV/ $\mu s$ 最小共模抑制; 25 kV/ $\mu s$  minimum Common Mode Rejection
- 10V 至 30V 宽工作电压范围; 10V ~ 30V Wide operating VCC Range
- 最大峰值输出电流0.6A ; Maximum peak output current 0.6A
- 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

- 工业自动化和电子电力: Industrial automation and electronic power; 用于变频器、伺服驱动器等设备的栅极隔离驱动; Gate isolation drive for devices such as frequency converters and servo drives;
- 新能源与电力系统: New Energy and Power Systems车载充电桩(OBC)、电机控制器驱动功率器件; Vehicle mounted charging station (OBC), motor controller drives power devices;
- 电力控制与保护装置: Power control and protection device 固态继电器(SSR)、断路器驱动电路中隔离控制端与功率端; Solid state relay (SSR), isolation control terminal and power terminal in circuit breaker drive circuit
- 噪声环境设备和精密医疗仪器: Noise environment equipment and precision medical instruments适用于电磁干扰严重的工业场景 (如电焊机、电磁炉) ; Suitable for industrial scenarios with severe electromagnetic interference, such as welding machines and induction cookers



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

| 参数<br>Parameter               |                                                                                      | 符号<br>Symbol | 最小值<br>Min. | 最大值<br>Max. | 单位<br>Unit |
|-------------------------------|--------------------------------------------------------------------------------------|--------------|-------------|-------------|------------|
| 发射端<br>Input                  | 平均输入电流<br>Average Current Input                                                      | IF(AVG)      | -           | 25          | mA         |
|                               | 峰值瞬态输入电流 (<1 us pulse, 300pps)<br>Peak Transient Input Current (<1 us Pulse, 300pps) | IF(TRAN)     | -           | 1.0         | A          |
|                               | 反向电压<br>Reverse Voltage                                                              | VR           | -           | 5           | V          |
|                               | 输入功耗<br>Power Dissipation                                                            | PI           | -           | 45          | mW         |
| 接收端<br>Output                 | 高峰值输出电流<br>High Peak Output Current                                                  | IOH(PEAK)    | -           | 0.6         | A          |
|                               | 低峰值输出电流<br>Low Peak Output Current                                                   | IOL(PEAK)    | -           | 0.6         | A          |
|                               | 电源电压<br>Supply Voltage                                                               | VCC-VEE      | -0.5        | 35          | V          |
|                               | 峰值输出电压<br>Peak Output Voltage                                                        | VO(PECK)     | 0.5         | VCC         | V          |
|                               | 输出功耗<br>Power Dissipation                                                            | PO           | -           | 250         | 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 |
|------------------------------|--------------|------------|-------------|------------|
| 电源电压<br>Power Supply Voltage | VCC-VEE      | 10         | 30          | V          |
| 开启电流<br>Input Current (ON)   | IF(ON)       | 8          | 12          | mA         |
| 关断电压<br>Input Voltage (OFF)  | VF(OFF)      | -3.6       | 0.8         | V          |

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

除非另有规定, 适用于所有的推荐条件, 典型值在  $T_A = 25^\circ\text{C}$  下测量 Unless otherwise specified, as appropriate for all recommended conditions, typical values are measured at  $T_A = 25^\circ\text{C}$

| 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        | 1.5        | 1.8        | V          |
|                 | 反向电压<br>Reverse Voltage                                       | BVR                     | IR =10uA           | 5          | -          | -          | V          |
|                 | 阈值电流从低到高<br>Threshold Input Current Low to High               | IFLH                    | Io =0mA,<br>VO >5V | -          | -          | 7          | mA         |
|                 | 阈值电压从高到低<br>Threshold Input Voltage High to Low               | VFHL                    | Io =0mA,<br>VO <5V | 0.8        | -          | -          | V          |
|                 | 输入正向电压的温度系数<br>Temperature Coefcient Of Input Forward Voltage | $\Delta VF / \Delta TA$ | IF = 10mA          | -          | -1.6       | -          | mV/°C      |
|                 | 输入电容<br>Input Capacitance                                     | C-in                    | V=0, F=1kHz        | -          | 60         | -          | pF         |
| 接收端<br>Output   | 高电平输出电流<br>High Level Output Current                          | IOH                     | VO =VCC-4V         | 0.2        | -          | -          | A          |
|                 |                                                               |                         | VO =VCC-10V        | 0.4        | 0.5        | -          |            |
|                 | 低电平输出电流<br>Low Level Output Current                           | IOL                     | VO =VEE+2.5V       | 0.2        | 0.4        | -          |            |
|                 |                                                               |                         | VO =VEE+10V        | 0.4        | 0.5        | -          |            |
|                 | 高电平输出电压<br>High Level Output Voltage                          | VOH                     | Io = -100mA        | VCC-0.3    | VCC-0.1    | -          | V          |
|                 | 低电平输出电压<br>Low Level Output Voltage                           | VOL                     | Io = 100mA         | -          | 0.4        | 1          | V          |
|                 | 高电平电源电流<br>High Level Power Supply Current                    | ICCH                    | IF =10mA           | -          | 0.7        | 3          | mA         |
|                 | 低电平电源电流<br>Low Level Power Supply Current                     | ICCL                    | IF =0mA            | -          | 1.2        | 3          |            |

| 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 |
|-------------------------------------|------------------------------------------------------------------|--------------|-------------------------------------------------------------------------|------------------|------------|------------|------------|
| 传输特性<br>Transfer<br>Characteristics | 低电平传输延迟<br>Propagation Delay Time to<br>Low Output Level         | TPHL         | VCC=30V<br>IF =8mA<br>Rg =47Ω<br>Cg =3nF<br>f =10 kHz<br>Duty Cycle=50% | 0.1              | 0.3        | 0.7        | us         |
|                                     | 高电平传输延迟<br>Propagation Delay Time to<br>High Output Level        | TPLH         |                                                                         | 0.1              | 0.2        | 0.7        | us         |
|                                     | 传输延迟差<br>Propagation Delay Diference<br>Between Any Two Parts    | PDD          |                                                                         | -0.5             | -          | 0.5        | us         |
|                                     | 上升时间(10% ~90%)<br>Rise Time (10% To 90%)                         | TR           |                                                                         | -                | 50         | -          | ns         |
|                                     | 下降时间(90% ~10%)<br>Fall Time (90% ~10%)                           | TF           |                                                                         | -                | 50         | -          | ns         |
|                                     | 输出高电平共模抑制<br>Output High Level Common<br>Mode Transient Immunity | CMH          | TA =25℃,<br>VCM=1500V                                                   | 25               | -          | -          | kV/μs      |
|                                     | 输出低电平共模抑制<br>Output Low Level Common<br>Mode Transient Immunity  | CML          |                                                                         | 25               | -          | -          | kV/μs      |
|                                     | 隔离电阻<br>Isolation Resistance                                     | RISO         | VI-O≤ 500V                                                              | 10 <sup>12</sup> | -          | -          | Ω          |
|                                     | 隔离电容<br>Isolation Capacitance                                    | CISO         | VI-O =0V<br>f=1.0MHz                                                    | -                | 0.6        | -          | PF         |

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

Fig.1 High Level Output Voltage vs Ambient Temperature

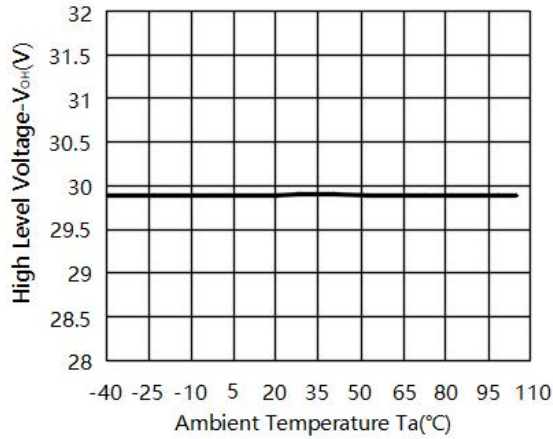


Fig.2 High Level Output Current vs Ambient temperature

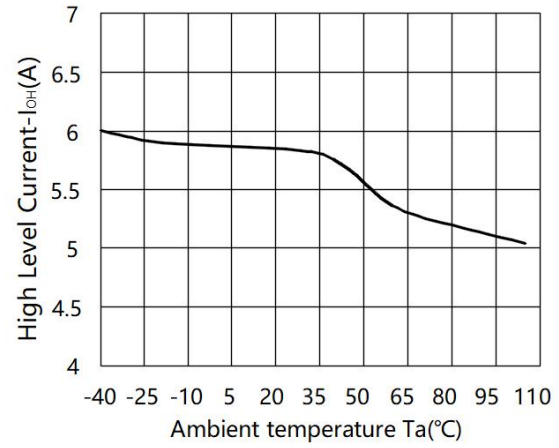


Fig.3 High Level Output Voltage vs High Level Output Current

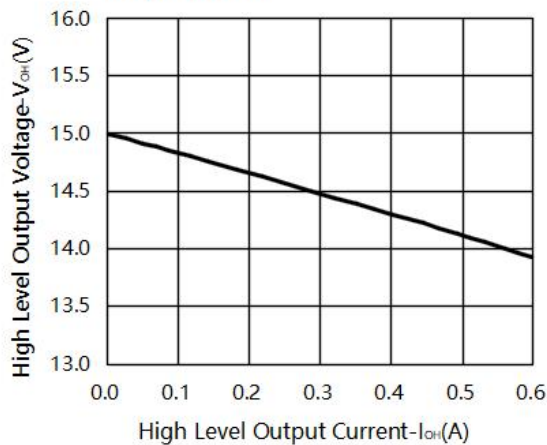


Fig.4 Low Level Output Voltage vs Ambient temperature  $T_a$ (°C)

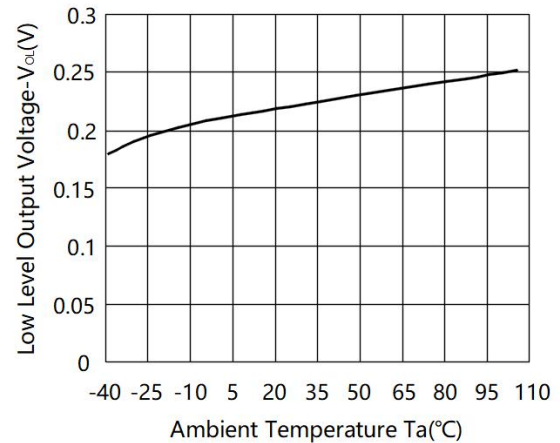


Fig.5 Low Level Output Current vs Ambient Temperature  $T_a$ (°C)

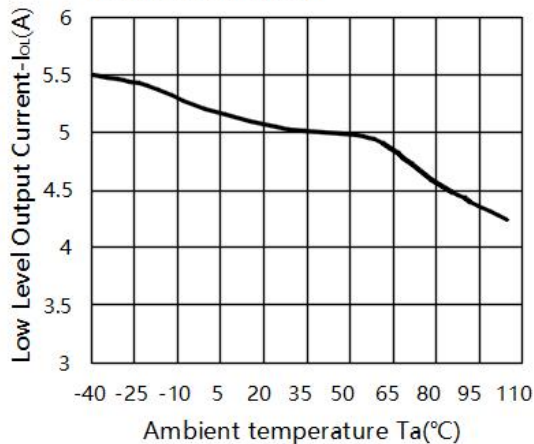


Fig.6 Low Level Output Voltage vs Low Level Output Current

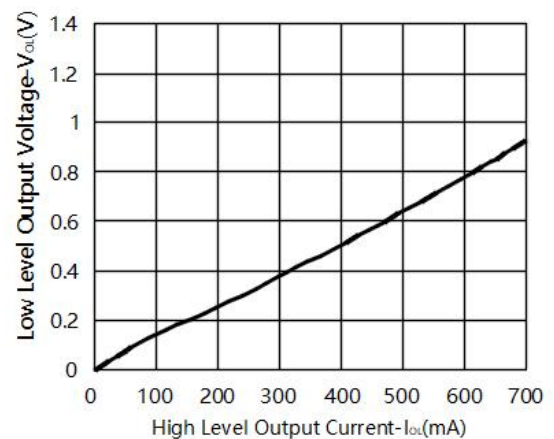


Fig.7 Supply Current vs Ambient Temperature

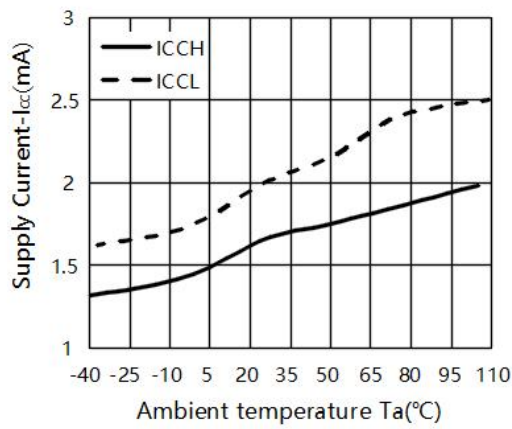


Fig.8 Supply Current vs Supply Voltage

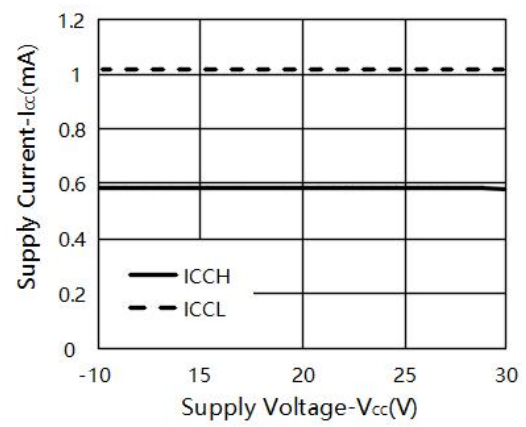


Fig.9 Threshold Input Current Low to High vs Ambient Temperature

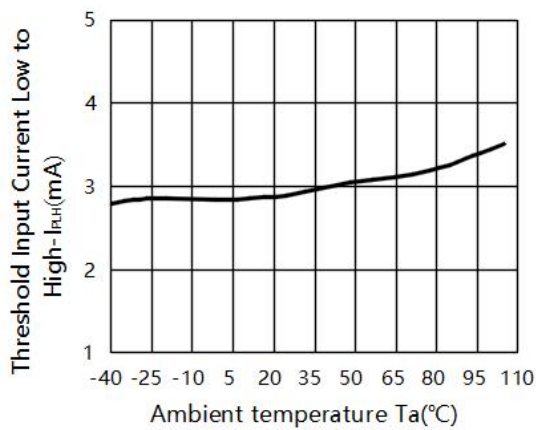


Fig.10 Propagation Delay vs. VCC

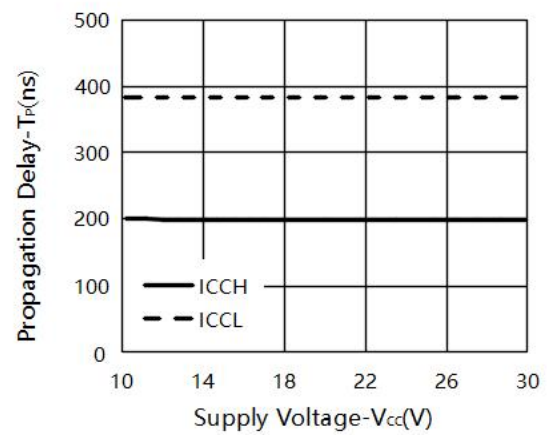


Fig.11 Propagation Delay vs Input Forward Current

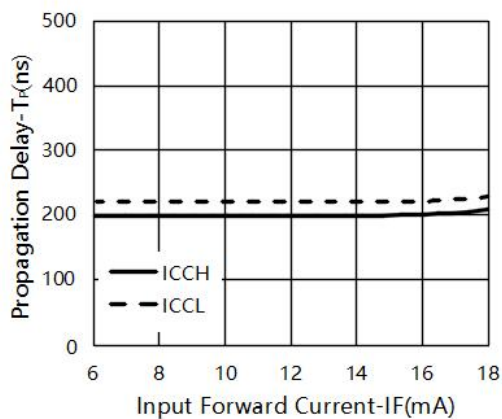


Fig.12 Propagation Delay vs Ambient Temperature

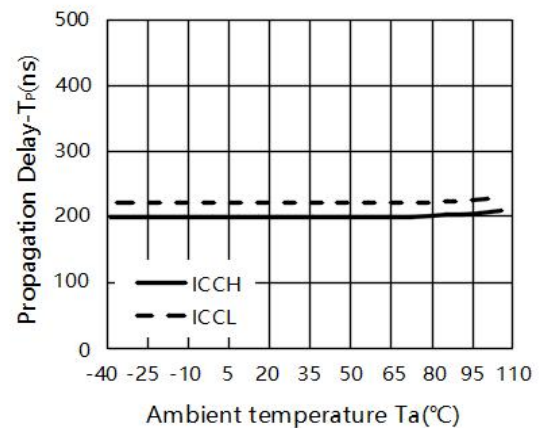


Fig.13 Propagation Delay vs Load Resistance

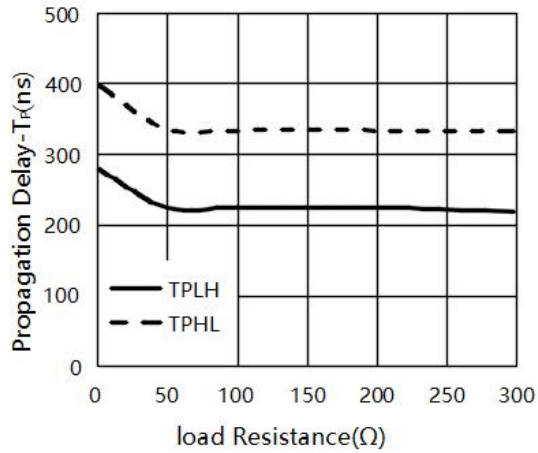


Fig.14 Propagation Delay vs Load Capacitance

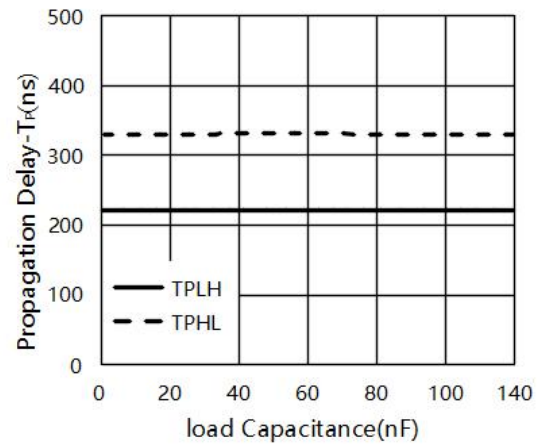


Fig.15 Output Voltage vs Forward Current

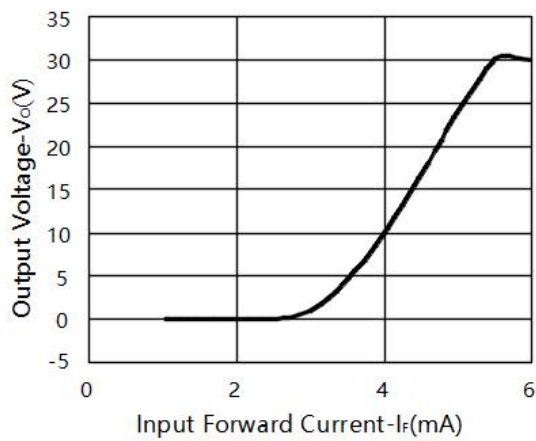
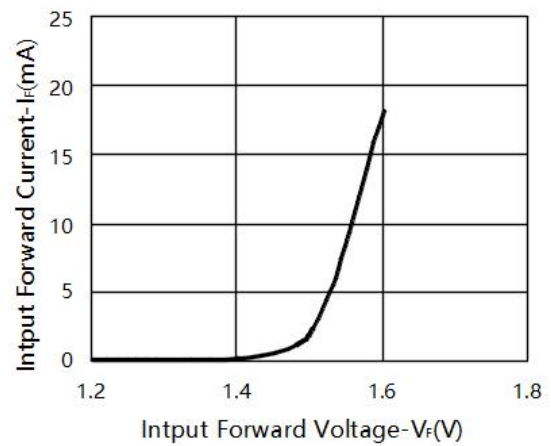


Fig.16 Input Forward Current vs Forward Voltage



◆ 测试电路 Test Circuits:

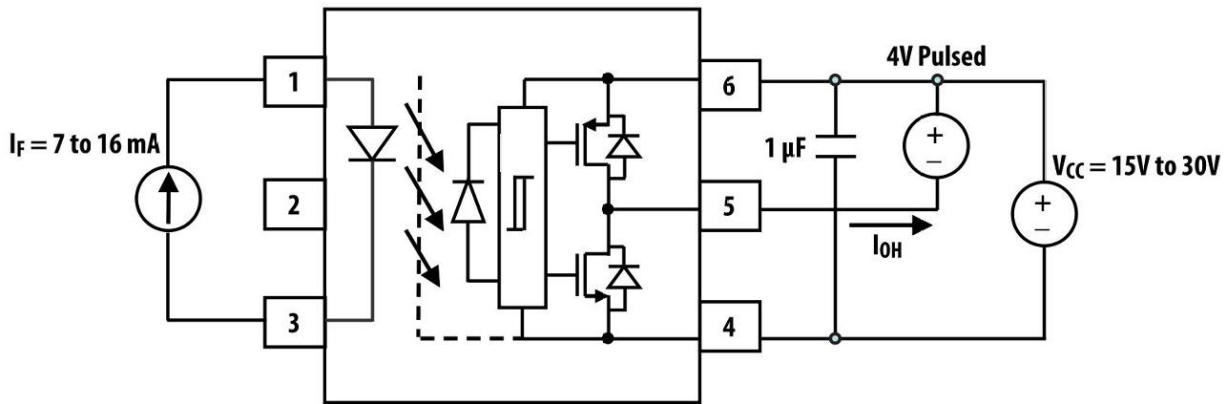


Fig17.  $I_{OH}$  Pulsed Test Circuit

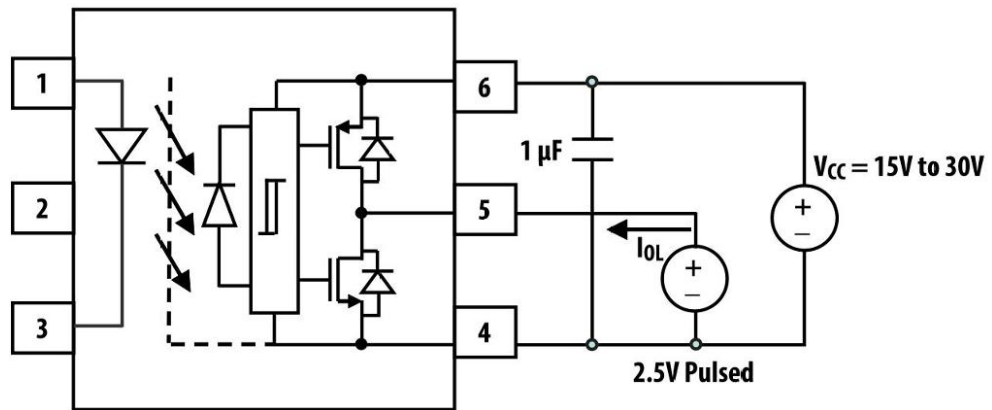


Fig18.  $I_{OHL}$  Pulsed Test Circuit

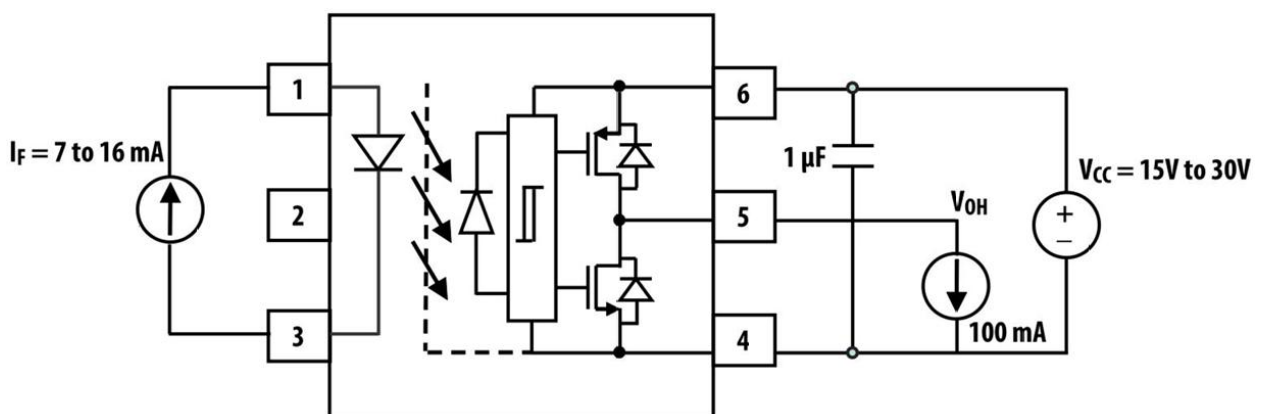


Fig19.  $V_{OH}$  Pulsed Test Circuit

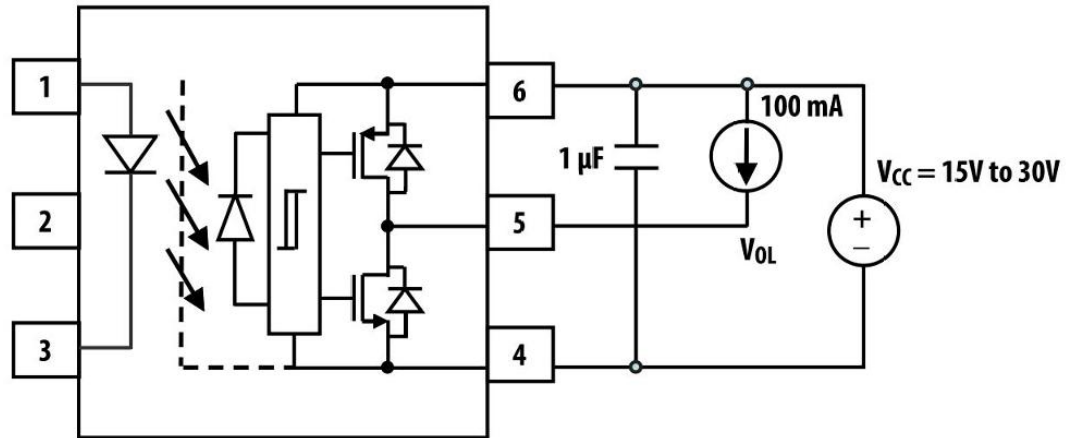


Fig20.  $V_{OL}$  Pulsed Test Circuit

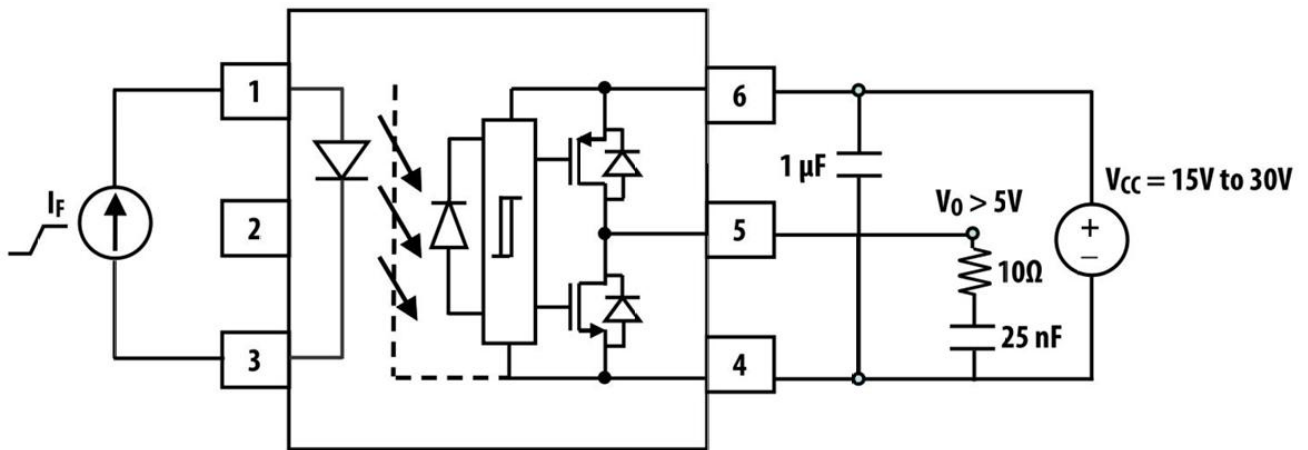


Fig21.  $I_{FLH}$  Pulsed Test Circuit

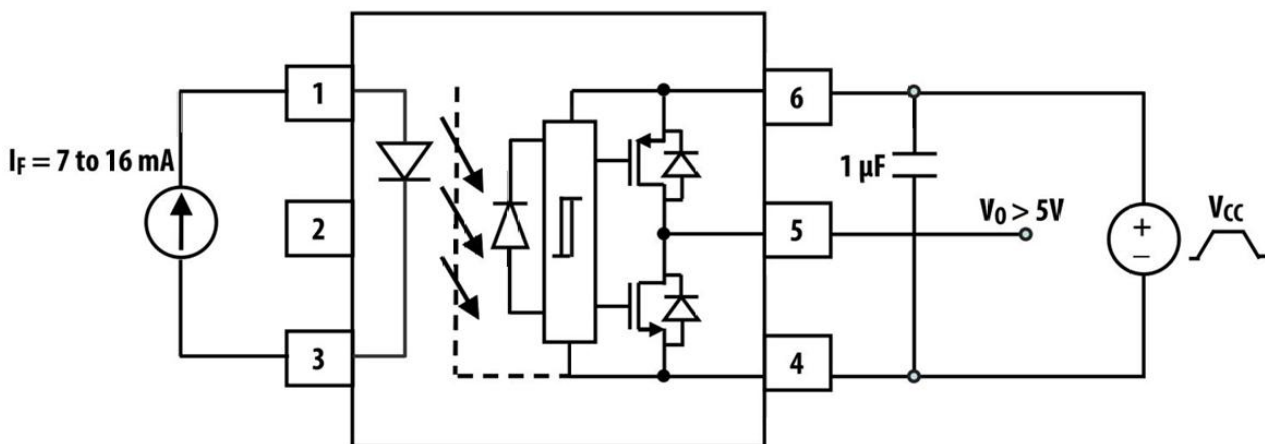


Fig22. UVLO Test Circuit

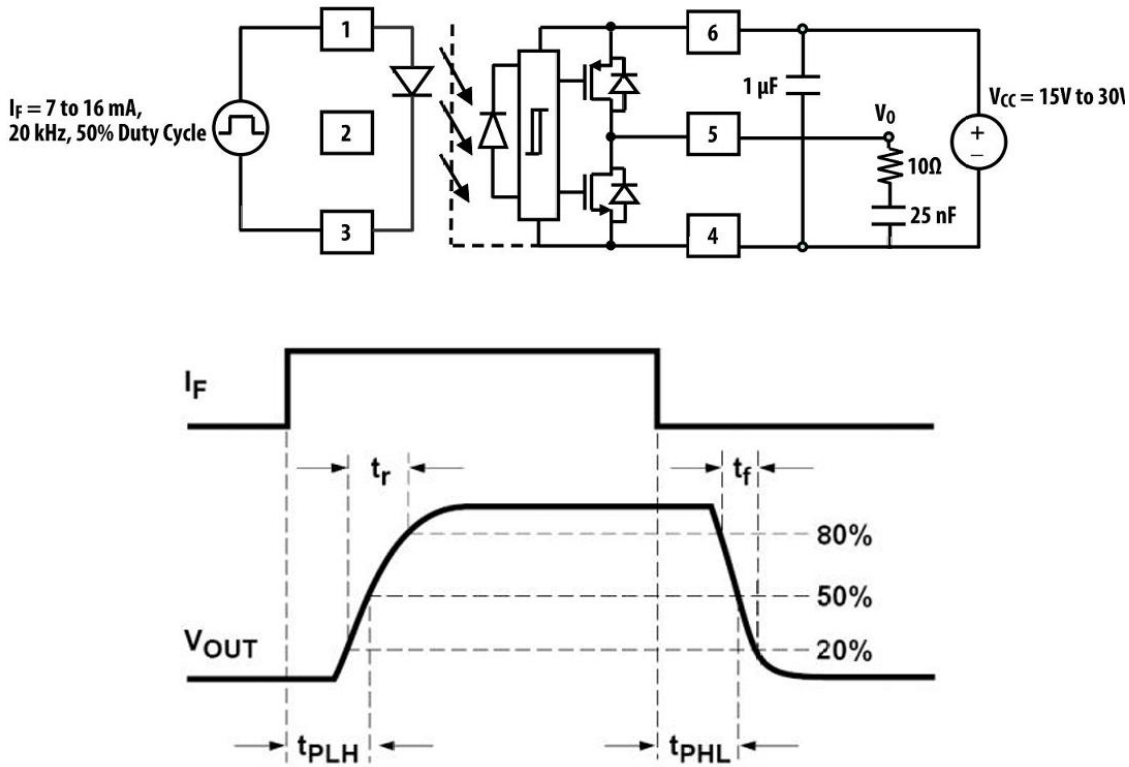


Fig23. TPHL、TPLH、TR、TF Test Circuit

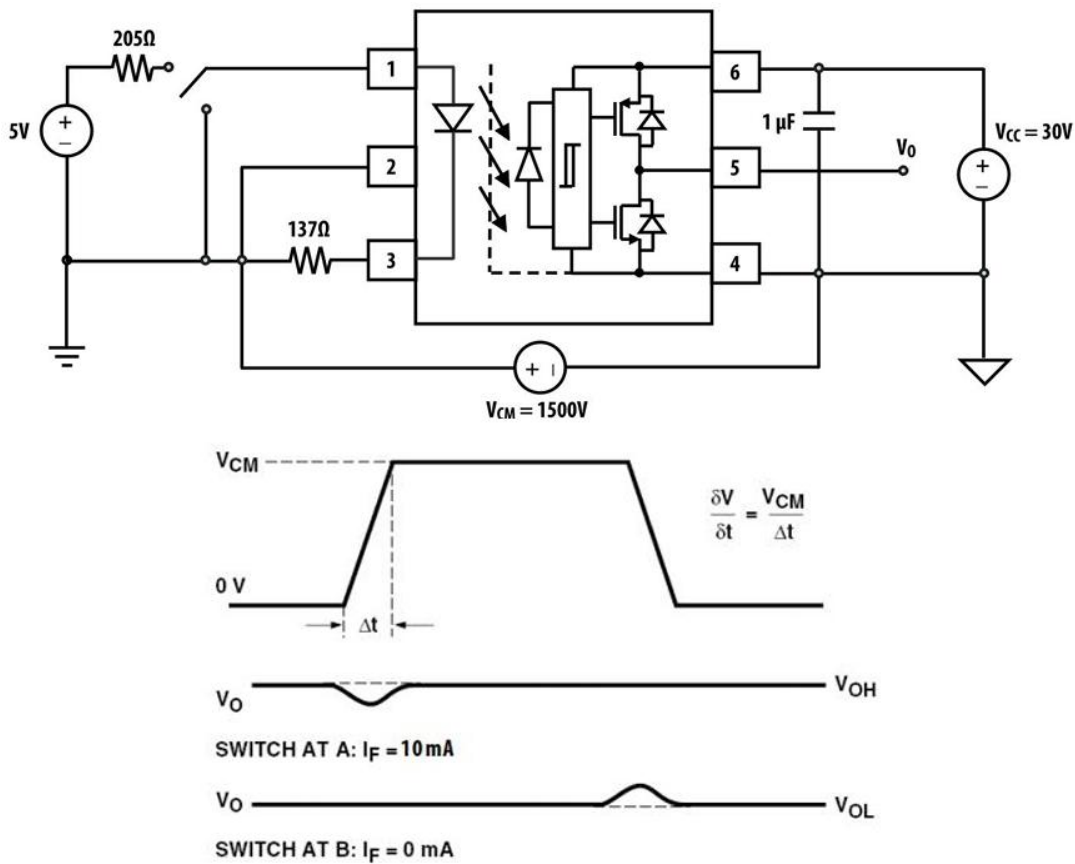
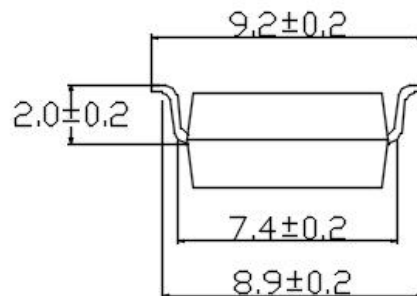
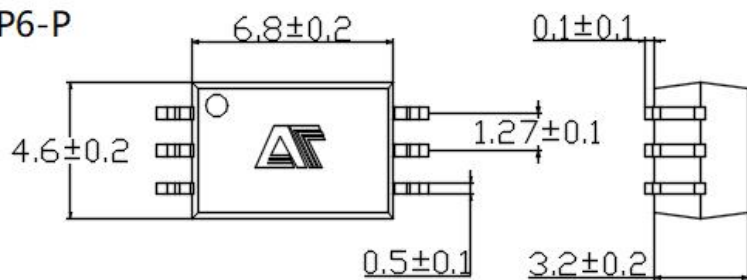


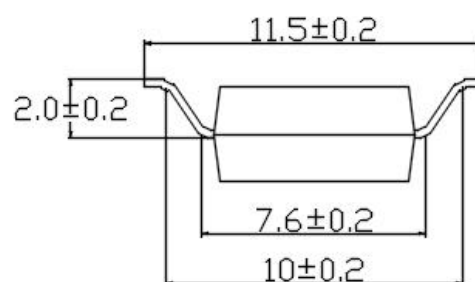
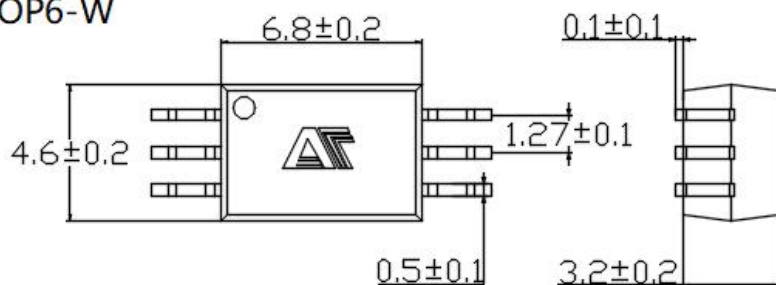
Fig24. CMR Test Circuit

◆ 外形尺寸Overall dimension

SOP6-P

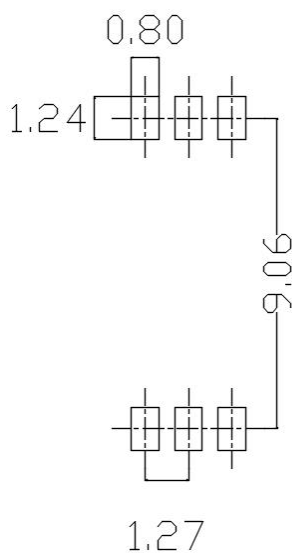


SOP6-W

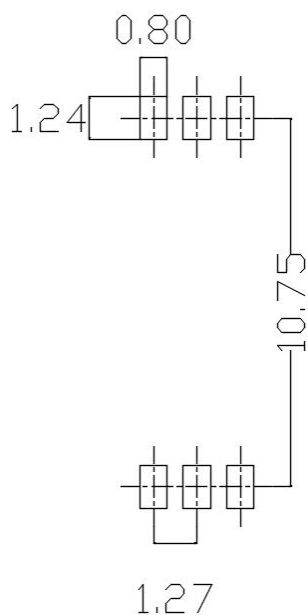


推荐焊盘:

Recommended



Sop6-p



sop6-w

单位: mm

## ◆ 产品型号命名规则 Order code

AT 314 - UN Y - W (V) (ZZ)

①      ②      ③      ④      ⑤      ⑥      ⑦

- ① 公司代码 Company Code (AT: 奥特 Aote)
- ② 产品系列 Product Series (314)
- ③ 框架类型 Lead Frame (Cu: 铜框架 Copper)
- ④ 树脂类型 Epoxy Type (H: 无卤 Halogen-free)
- ⑤ 封装形式 Package (S: SOP)
- ⑥ 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)
- ⑦ 内部补充代码 Internal Supplementary Code (数字或者空白 Number or Non)

## ◆ 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

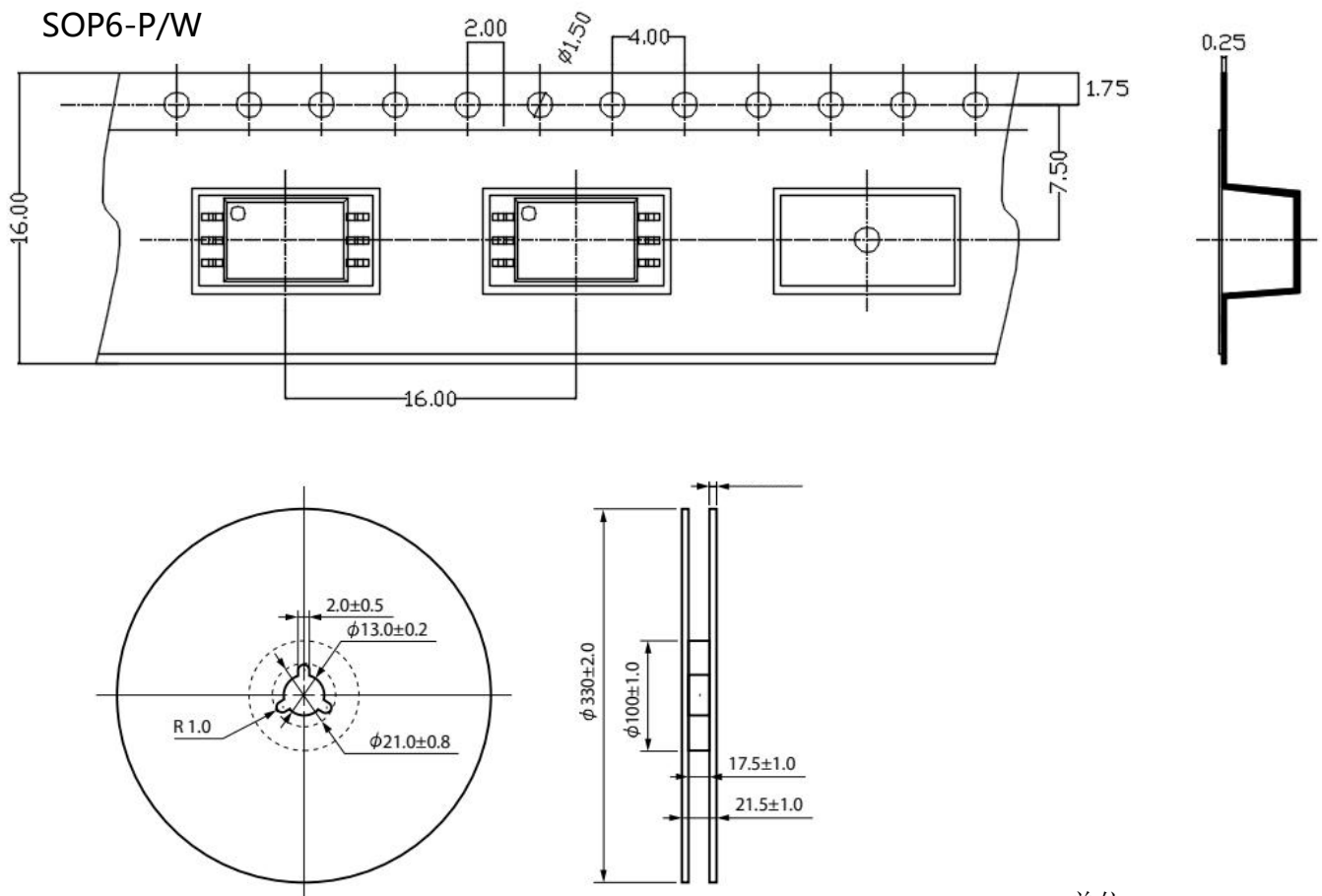


◆ 包装packing

| 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                                               |
|--------------|-------------------------------|-------------------|------------------|---------------------|------------------------------|-------------------|----------------------|--------------------------------------------------|
| SOP6         | 卷盘<br>( $\phi 330$ mm 蓝盘)     | 1000<br>只/盘       | 2 盘/盒            | 10 盒/箱              | 380*380mm                    | 340*60*340<br>mm  | 620*360*365mm        | 首尾端空至少 200mm                                     |
| Package Type | Packing Form                  | Quantity per Reel | Quantity per Box | Quantity per Carton | Antistatic Bag Specification | Box Specification | Carton Specification | Note                                             |
| SOP6         | Reel<br>( $\phi 330$ mm Blue) | 1k<br>pcs/reel    | 2Reel/box        | 10box/ctn           | 380*380mm                    | 340*60*340<br>mm  | 620*360*365mm        | Leave at least 200mm of blank space at both ends |

• 编带包装 Tape & Reel

- 1) 每卷数量: 1000 只; Qty/reel: 1000 pcs;
- 2) 每箱数量: 20000 只; Qty/ctn: 20000 pcs;
- 3) 内包装: 每盒 2 盘; Inner packing: 2 reels/box;
- 4) 示意图 Schematic:

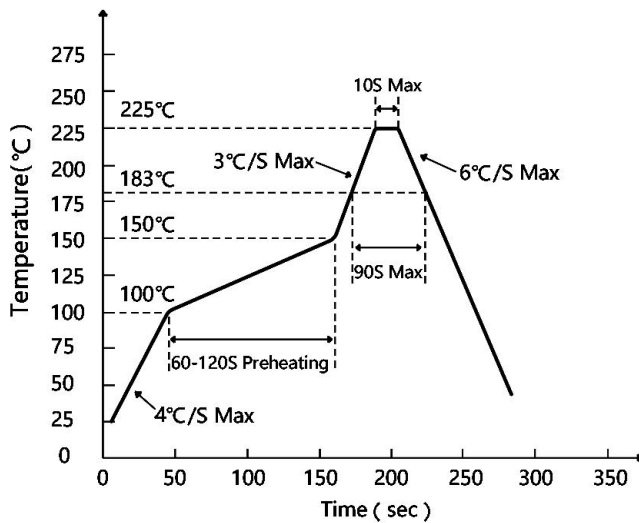


单位: mm

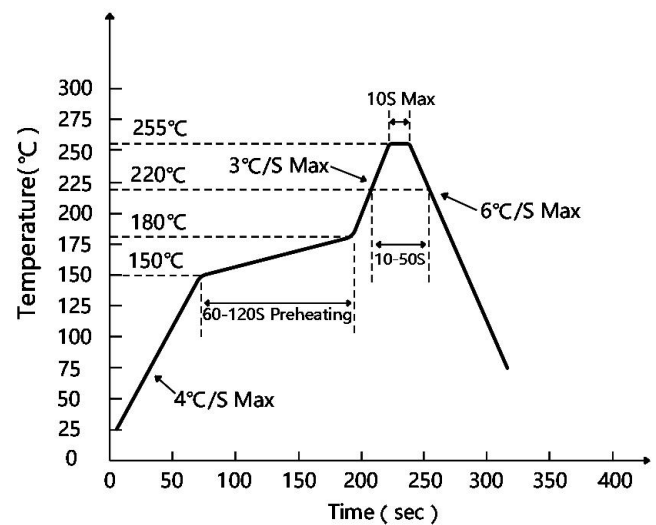
# ◆ 可靠性测试 Reliability Test Items And Conditions

| 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<br>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<br>High emperature<br>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

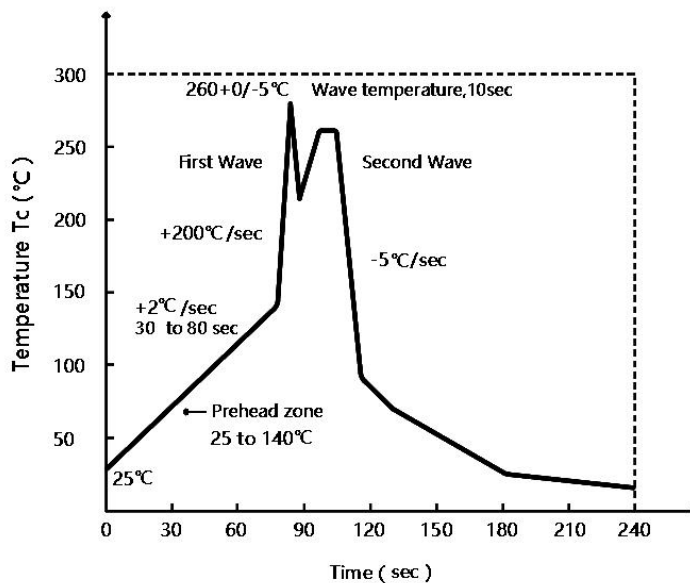


有铅制程 Lead Process



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  $350^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , 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: