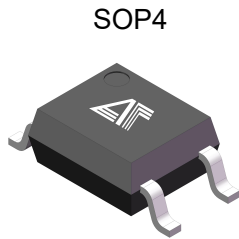


光继电器光耦 Photo Transistor

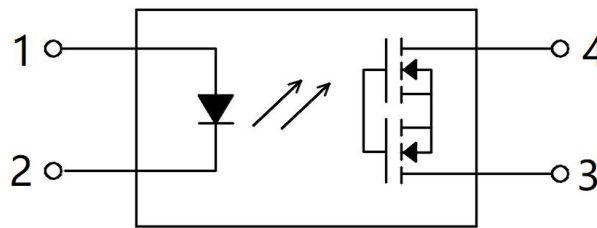
AT176

Product Data Sheet

AOTE DCC
RELEASE



SOP4



Pin Configuration

- 1.Anode
- 2.Cathode
- 3.Drain1
- 4.Drain2

◆ 封装逻辑原理图 Encapsulation logic schematic

AT176 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SOP4封装形式，适配多样化场景需求。

The AT176 optocoupler adopts high-efficiency photoelectric conversion technology and advanced packaging processes, providing reliable input-output isolation. It supports package types SOP4 to meet diverse application requirements.

◆ 主要特征 Main features

- 输入-输出隔离电压 $V_{ios}=3750V_{rms}$
Input output isolation voltage: $V_{ios}=3750V_{rms}$
- 负载电压 (AC峰值) VL: 600V; Load Voltage (PeakAC): 600V;
- 持续负载电流IL: 0.04A ; Continuous Load Current: 0.04A ;
- 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：用于控制电机、传感器、加热器及机器人动作; Industrial Automation Used to control motors, sensors, heaters, and robot movements;
- 家用电器：应用于空调、洗衣机、智能家居等设备; Household Electric Appliances Applied to devices such as air conditioning, washing machines, smart homes, etc
- 通信与安防：在通信基站、交换机中切换信号，并用于监控摄像头、门禁系统的电源控制; Communication and Security: Switching signals in communication base stations and switches, and used for power control of monitoring cameras and access control systems
- 医疗设备：用于医疗器械（如复印机、自动消毒设备）的电源管理和信号处理; medical equipment: Used for power management and signal processing of medical devices such as copiers and automatic disinfection equipment



◆ 极限参数 Absolute Maximum Ratings (Ta =25℃)

参数 Parameter		符号 Symbol	额定值 Rating	单位 Unit
发射端 Input	LED 正向电流 LED Forward Current	IF	50	mA
	LED 反向电压 LED Reverse Voltage	VR	5	V
	峰值正向电流 Peak Forward Current	IFP	1	A
	输入功率 Power Dissipation	Pin	70	mW
接收端 Output	负载电压(AC 峰值) Load Voltage (Peak AC)	VL	600	V
	持续负载电流 Continuous Load Current	IL	0.04	A
	峰值负载电流 Peak Load Current	Ipeak	0.15	A
	输出功率 Power Dissipation	Pout	300	mW
隔离电压 Isolation Voltage		Viso	3750	Vrms
工作温度 Operating Temperature		Topr	-55 ~+110	℃
存储温度 Storage Temperature		Tstg	-55 ~+125	℃
焊接温度 Soldering Temperature		Tsol	260	℃

◆ 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
负载电压(AC 峰值) Load Voltage (Peak AC)	VL	-	600	V
持续负载电流 Continuous Load Current	IL	-	0.04	A

◆ 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	LED 开启电流 LED Operate Current	IFon	IL = 0.04A	-	0.3	3	mA
	LED 关断电流 LED Turn Off Current	IFoff	IL = 0.04A	0.05	0.25	-	mA
	LED 正向压降 LED Dropout Voltage	VF	IF =5mA	1	1.3	1.4	V
接收端 Output	导通电阻 On Resistance	Ron	IF = 5mA , IL = 0.04A. Within 1s on time	-	36	120	Ω
	关断漏电 Off State Leakage Current	ILeak	IF = 0 mA VL = 600V	-	-	1000	nA
传输特性 Transfer Characteristics	开启时间 Turn On Time	Ton	IF = 5mA IL = 0.04A.	0.02	0.06	2	ms
	关断时间 Turn Off Time	Toff	IF = 5mA IL = 0.04A	0.01	0.33	1	ms
	I/O 电容 I/O Capacitance	CISO	f = 1 MHz VB =0V	-	0.8	1.5	pF
	初始 I/O 隔离电阻 Initial I/O Isolation Resistance	RISO	500 V DC	1000	-	-	MΩ

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

Fig.1 LED Dropout Voltage vs Ambient temperature

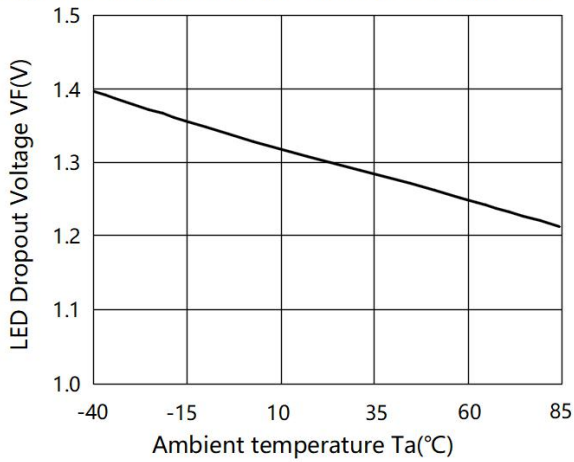


Fig.2 Output Current vs Output Voltage

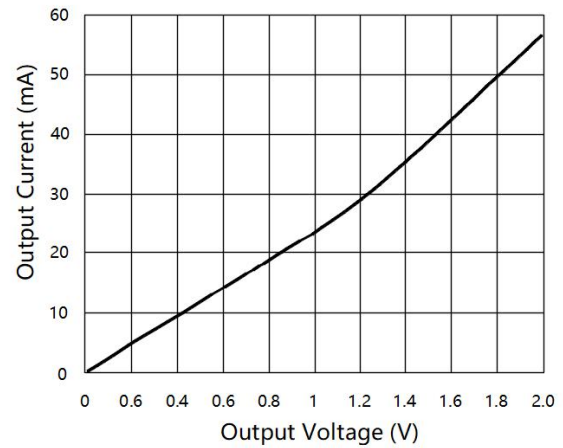


Fig.3 On Resistance vs Ambient temperature

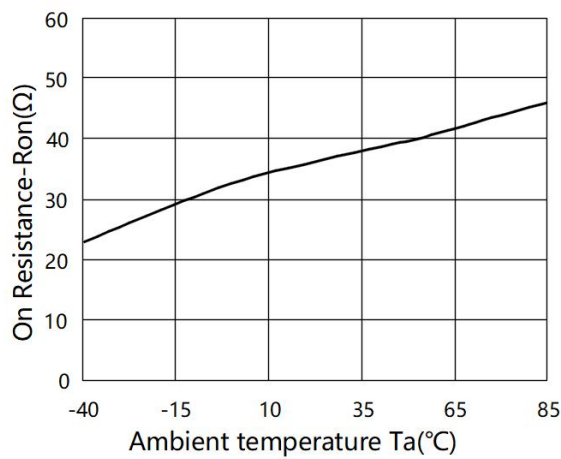


Fig.4 Load Current vs Ambient temperature

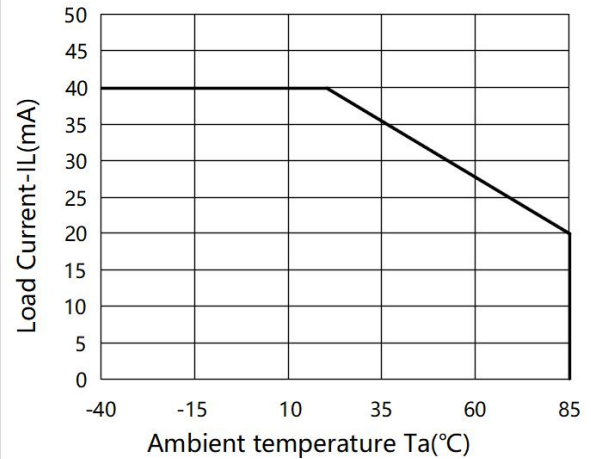


Fig.5 LED Operate Current vs Ambient temperature

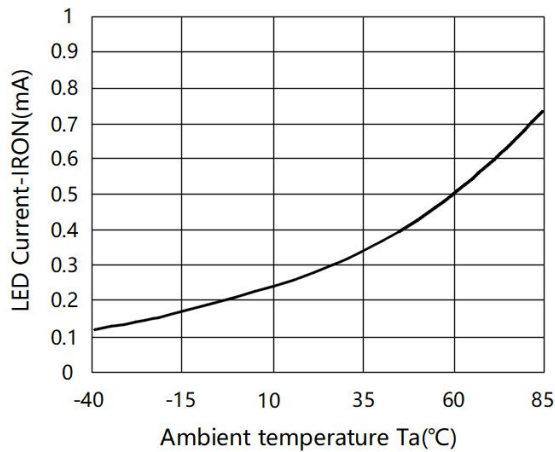


Fig.6 LED Turn Off Current vs Ambient Temperature

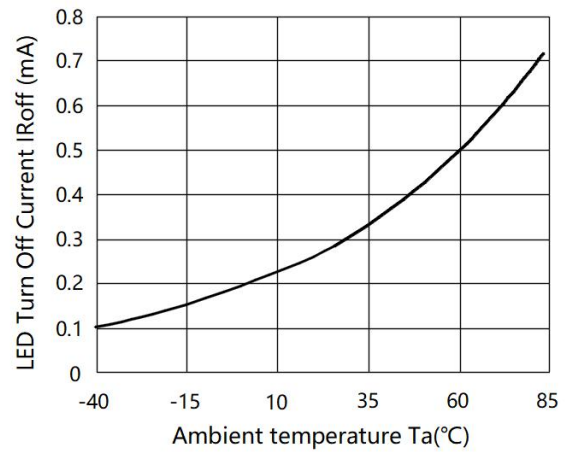


Fig.7 Turn On Time vs Ambient Temperature

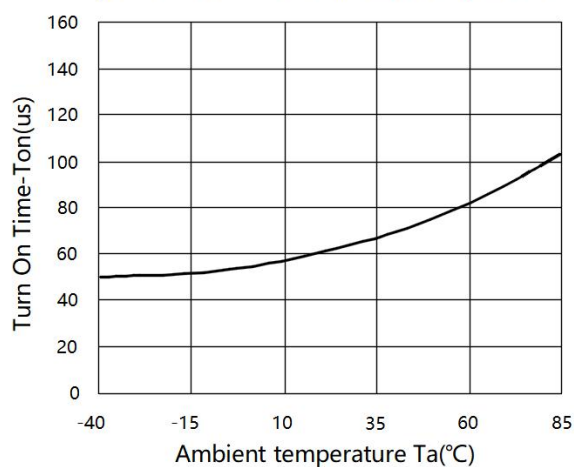


Fig.8 Turn Off Time vs Ambient Temperature

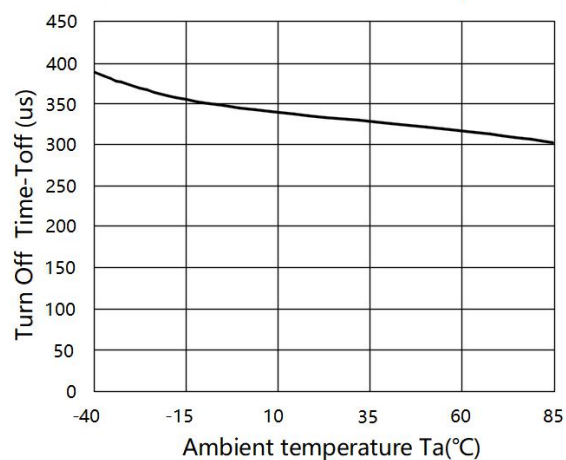


Fig.9 Turn On Time vs LED Forward Current

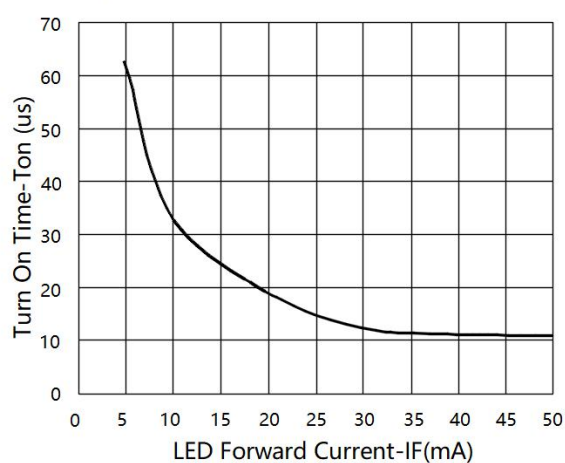
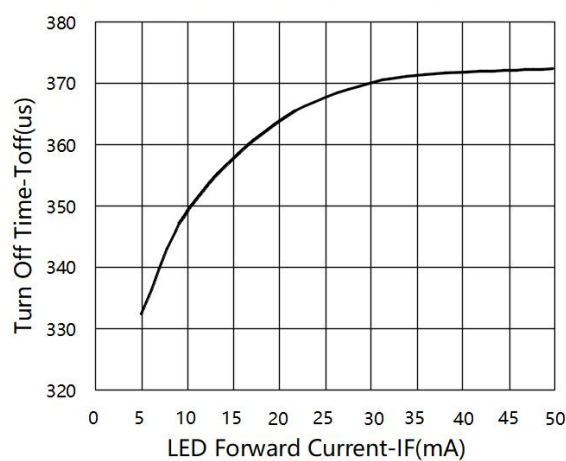
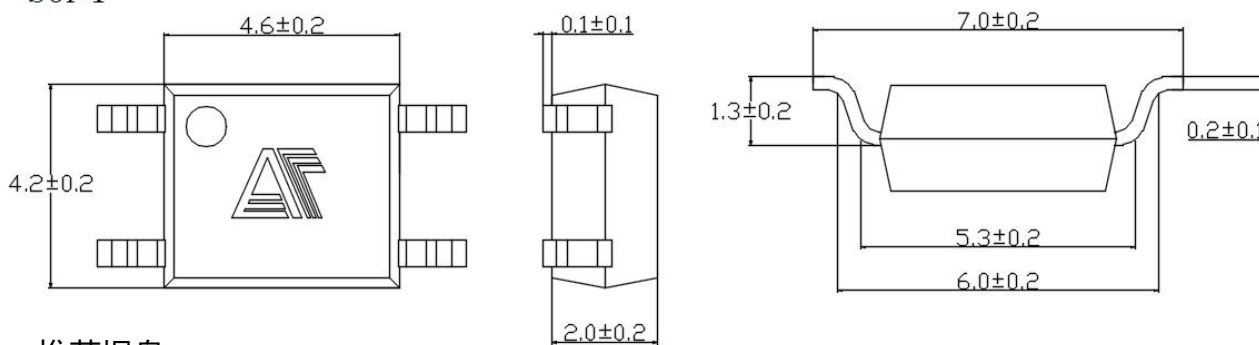


Fig.10 Turn Off Time vs LED Forward Current



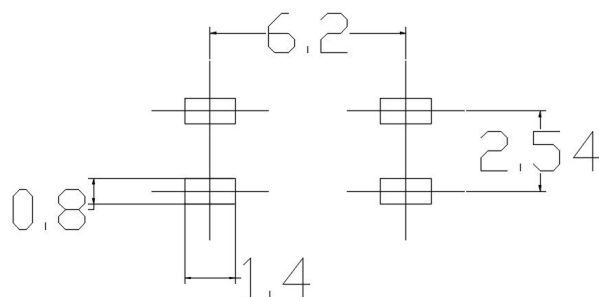
◆ 外形尺寸Overall dimension

SOP4



推荐焊盘:

Recommended



单位: mm

◆ 产品型号命名规则 Order code

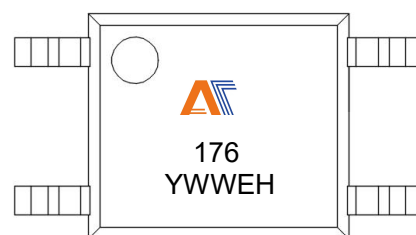
AT 176 - UN Y - W (V) (ZZ)

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 (176)
- 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

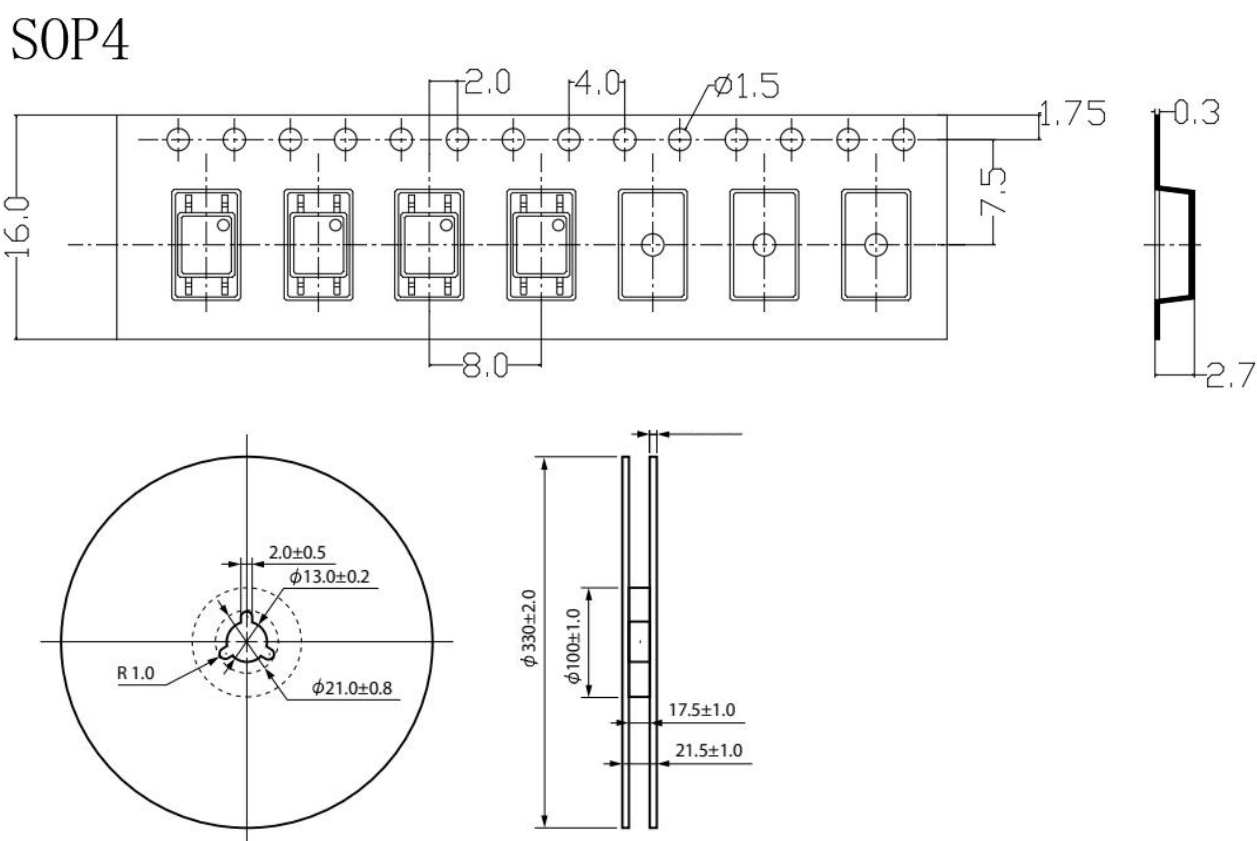


◆ **包装packing**

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
SOP4	卷盘 ($\phi 330$ mm蓝盘)	3000 只/盘	2 盘/盒	10 盒/箱	450*390*0.1mm	34*6*34cm	62*36*36.5cm	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
SOP4	Reel ($\phi 330$ mm Blue)	3000 pcs /reel	2 reels /box	10 boxes /ctn	450*390*0.1mm	34*6*34cm	62*36*36.5cm	Leave at least 200mm of blank space at both ends

• **编带包装 Tape & Reel**

- 1) 每卷数量: 3000 只; Qty/reel: 3000 pcs;
- 2) 每箱数量: 60000 只; Qty/ctn: 60000 pcs;
- 3) 内包装: 每盒 2 盘; Inner packing: 2 reels/box;
- 4) 示意图 Schematic:

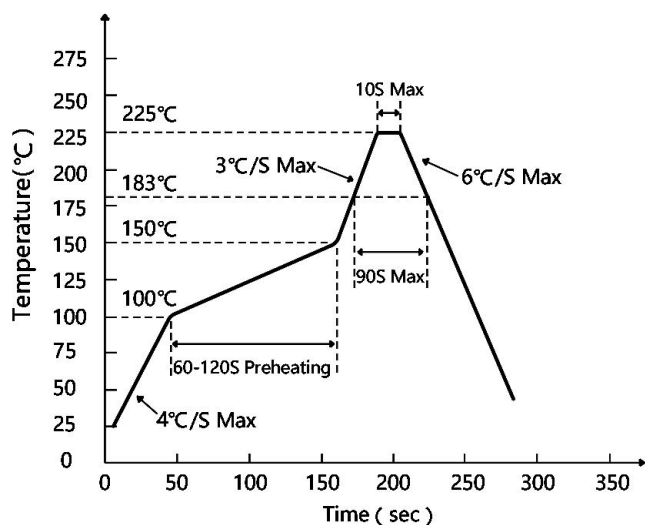


单位: mm

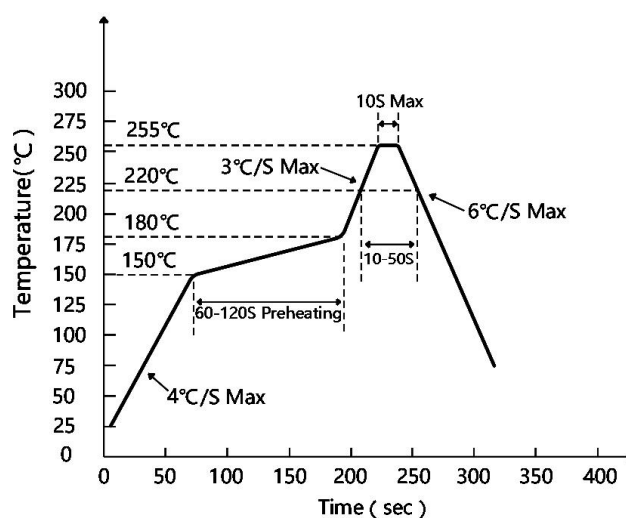
◆ 可靠性测试 Reliability Test Items And Conditions

实验项目 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

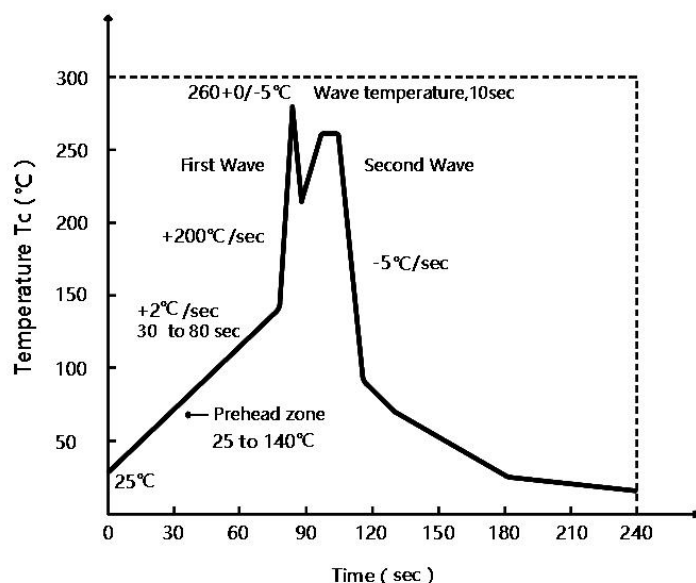


有铅制程 Lead Process



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: