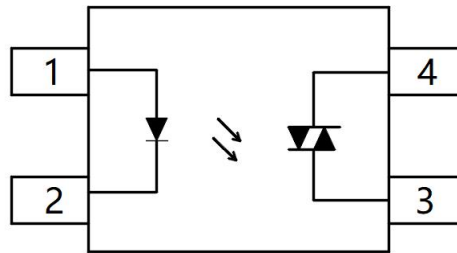


可控硅光耦
Thyristor optocoupler

ELM30VX(AT)

Product Data Sheet

AOTE DCC
RELEASE



Pin Configuration
 1. Anode
 2. Cathode
 3. Terminal
 4. Terminal

◆ 封装逻辑原理图 Encapsulation logic schematic

ELM301X, ELM302X, ELM305X, ELM307X series optocoupler adopts high-efficiency photoelectric conversion technology, combined with advanced packaging process, providing reliable input-output isolation, supporting SOP4 packaging form, adapting diversified scene requirements.

The ELM301X, ELM302X, ELM305X, ELM307X series 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.

◆ 产品特征 Product features

- 输入-输出隔离电压 $V_{ios}=5000V_{rms}$
Input output isolation voltage: $V_{ios}=5000 V_{rms}$
- 断态输出端电压 $V_{DRM}=800,600,400,250$; Off-state output terminal voltage $V_{DRM}=800,600,400,250$;
- 峰值重复浪涌电流 $I_{TSM}=1A$; Peak repetitive surge current $I_{TSM}=1A$
- 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

- 工业自动化与控制 Industrial Automation and Control;
PLC与变频器, 伺服驱动系统, 工业机器人 PLC and frequency converter, servo drive system, industrial robot 过零型产品用于交流调压 Zero crossing products are used for AC voltage regulation
- 家用电器与消费电子: Household appliances and consumer electronics 电机正反转、加热控制、调速等 Motor forward and reverse heating control, speed regulation, etc 智能照明系统中用于调光控制 Used for dimming control in lighting systems
- 电力系统与能源管理: Power System and Energy Management 用于整流、变压器保护和电网监测 Used for rectification, transformer protection, and power grid monitoring 应用于不间断电源 (UPS) 和电源保护设备 Applied to uninterruptible power supply (UPS) and power protection equipment
- 医疗与特殊场景: Medical and Special Scenarios 用于心率监测仪、X光机等设备隔离与电路保护 Used for isolation and circuit protection of devices such as heart rate monitors and X-ray machines



◆ 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	60	mA
	反向电压 Backward Voltage	VR	6	V
	功耗 Power Dissipation	PD	70	mW
	额定值降低因子(在 Ta = 90°C 以上) Power dissipation Derating factor (above Ta = 90°C)	PDD	3.8	mW/°C
接收端 Output	断态输出端电压 Off-state output terminal voltage	ELM301X	250	V
		ELM302X	400	
		ELM305X	600	
		ELM307X	800	
	峰值重复浪涌电流 (pw=100 μs, 120pps) Peak repetitive surge current (pw=100μs, 120pps)	ITSM	1	A
	开启态电流 (均方根值) On-state current (root mean square value)	IT(RMS)	100	mA
	功耗 Power Dissipation	PC	300	mW
	额定值降低因子(在 Ta = 85°C 以上) Power dissipation Derating factor (above Ta = 90°C)		7.4	mW/°C
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

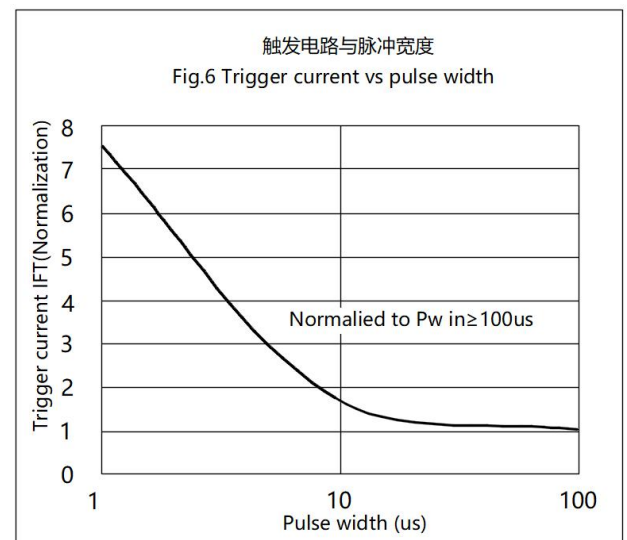
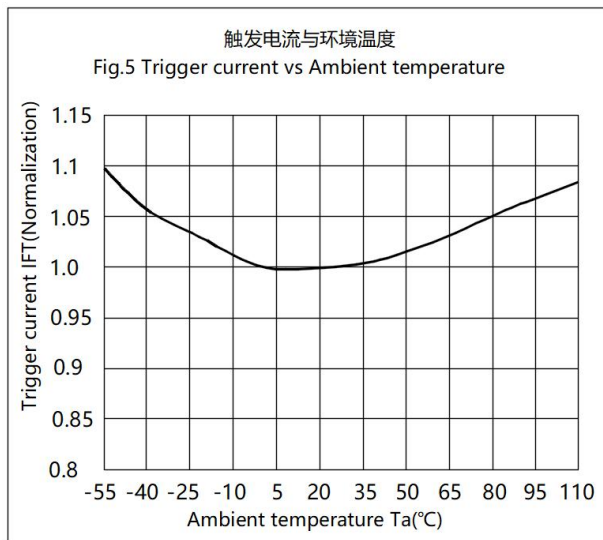
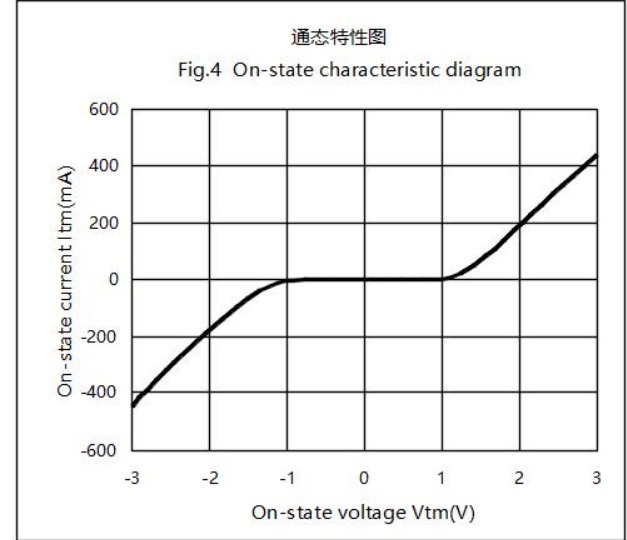
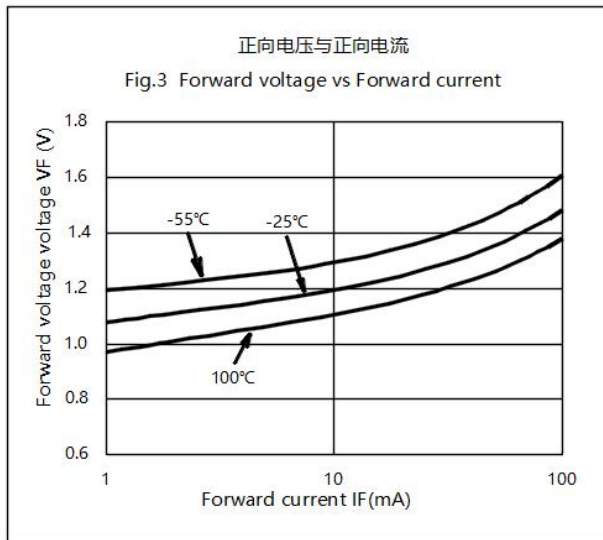
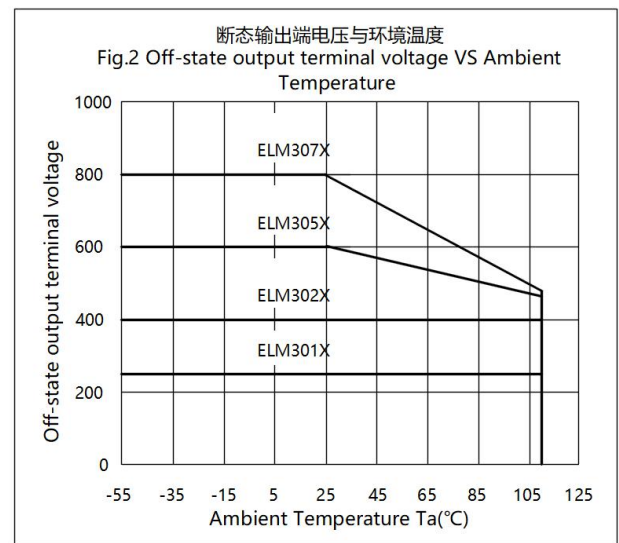
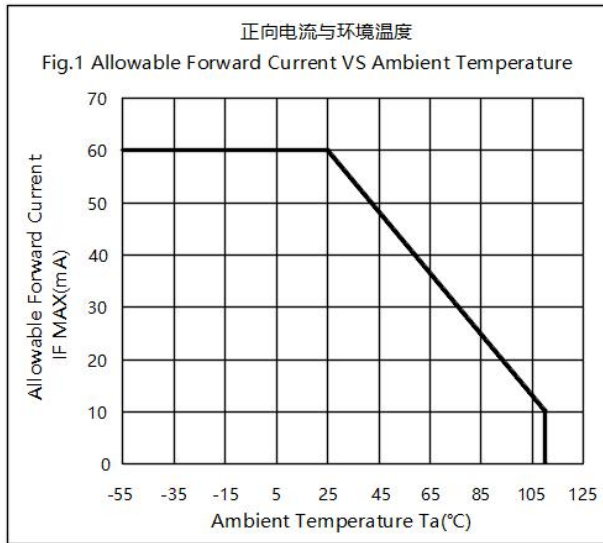
◆ 推荐操作条件 Recommended Operating Conditions

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
峰值重复浪涌电流 (pw=100 μs, 120pps) Peak repetitive surge current (pw=100μs, 120pps)	ITSM	-	1	A
开启态电流 (均方根值) On-state current (root mean square value)	IT(RMS)	-	100	mA

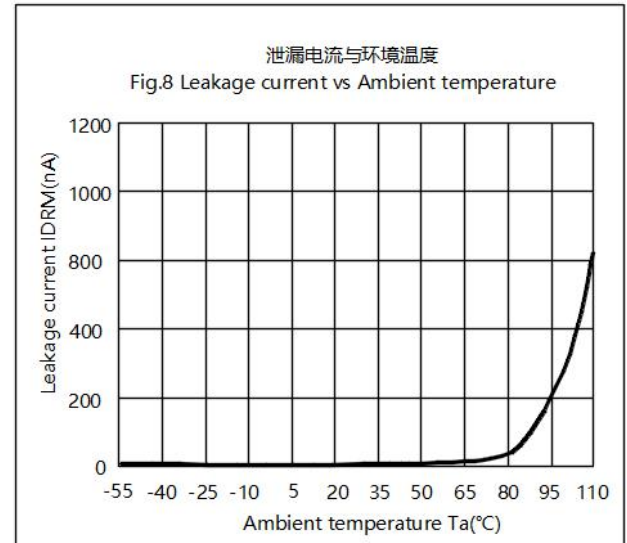
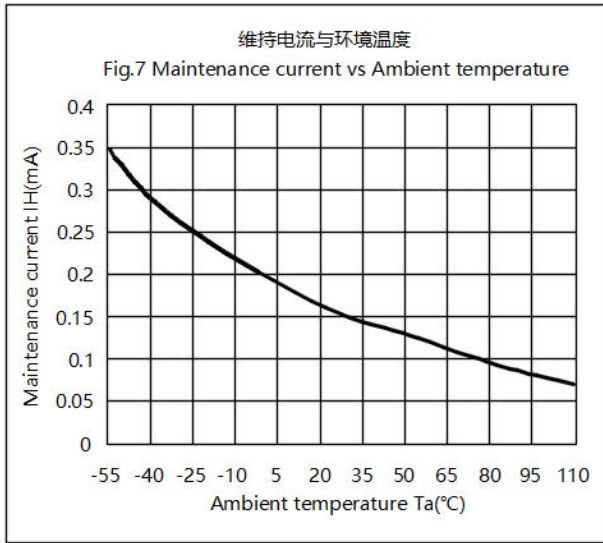
◆ 产品特性参数Product characteristic parameters (Ta =25°C)

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	-	1.23	1.5	V
	反向电流 Back current	IR	VR=6V	-	-	10	uA
接收端 Output	断态峰值电流 Off-state peak current	IDRM	VDRM=Rated VDRM IF= 0mA	-	-	100	nA
	通态峰值电压 On-state peak voltage	VTM	ITM=100mA peak IF=Rated IFT	-	-	2.5	V
	断态电压临界上升率 Critical rise rate of off-state voltage	ELM301X	VPEAK=Rated VDRM IF=0	-	100	-	V/μs
		ELM302X		-	-	-	
		ELM305X	VPEAK=400V, IF =0	1000	-	-	
		ELM307X		-	-	-	
传输特性 Transfer Characteristics	LED 触发电流 LED trigger current	ELM3020	主端电压 Main terminal Voltage =3V	-	-	30	mA
		ELM3011		-	-	15	
		ELM3021		-	-	10	
		ELM3051		-	-	5	
		ELM3071		-	-	5	
		ELM3012		-	-	10	
		ELM3022		-	-	5	
		ELM3052		-	-	5	
		ELM3072		-	-	5	
		ELM3013		-	-	5	
		ELM3023		-	-	5	
		ELM3053		-	-	5	
		ELM3073		-	-	5	
	维持电流 Maintain current	IH	-	-	250	-	uA

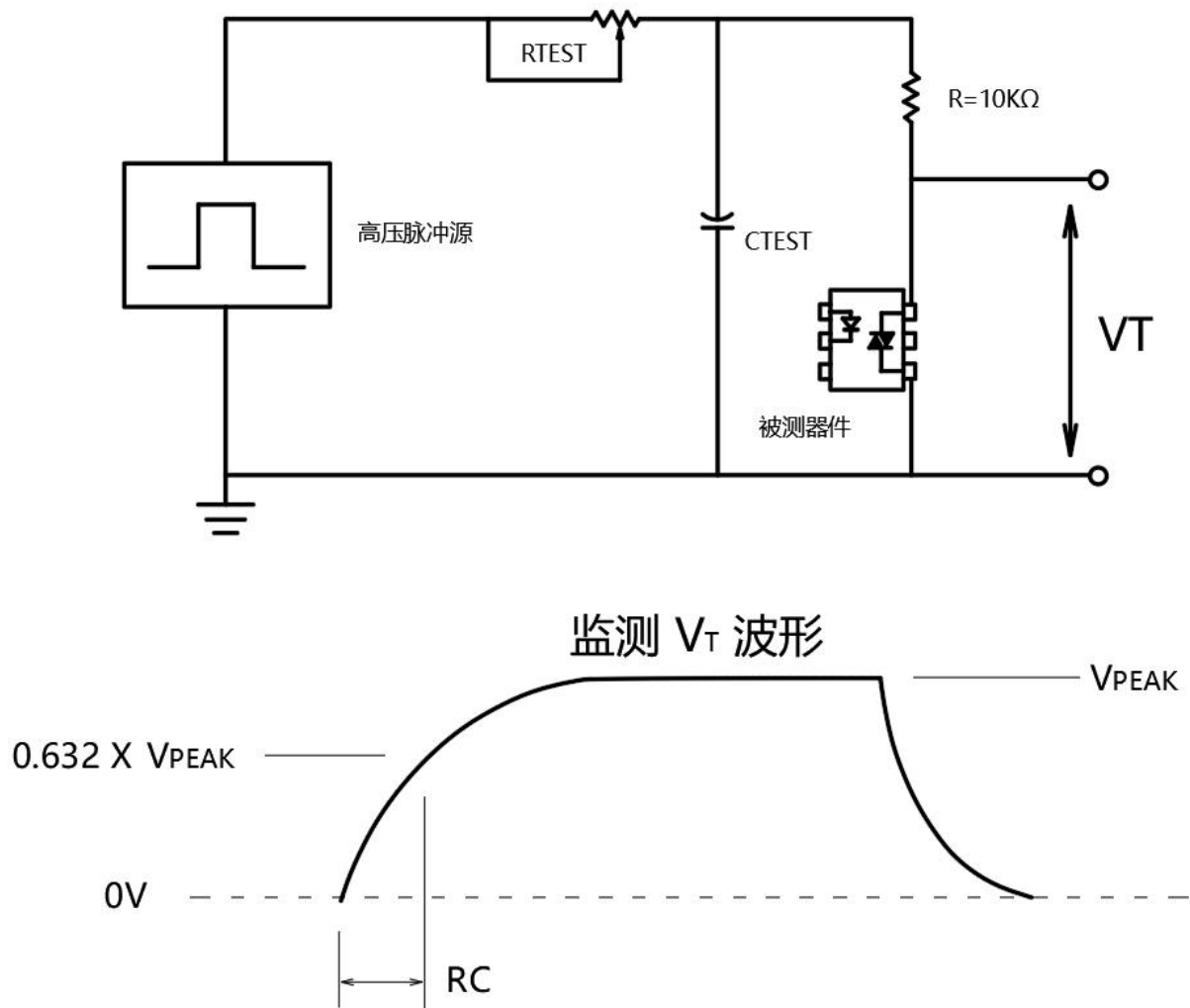
◆ 电性特性曲线 Electrical characteristic curve ($T_a = 25^\circ\text{C}$)



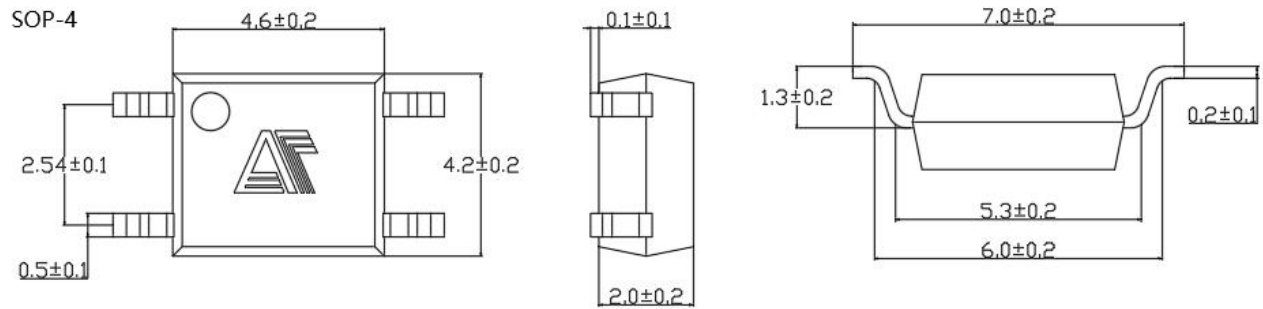
◆ 电性特性曲线Electrical characteristic curve($T_a = 25^\circ\text{C}$)



◆ 静态 dv/dt 测试电路和波形 Static dv/dt test circuit and waveform

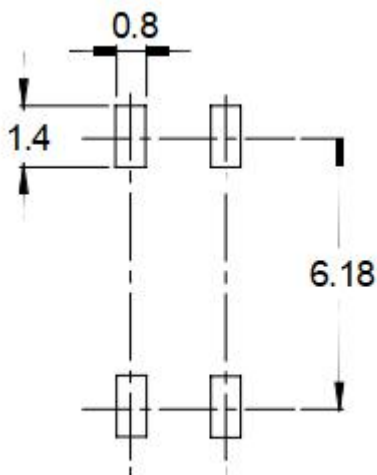


◆ 外形尺寸Overall dimension



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



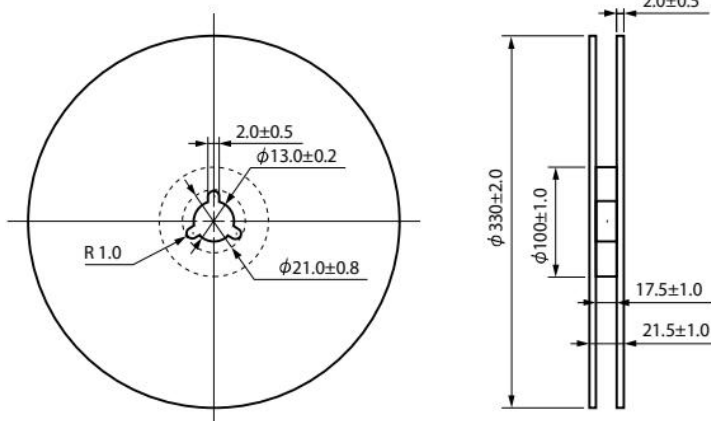
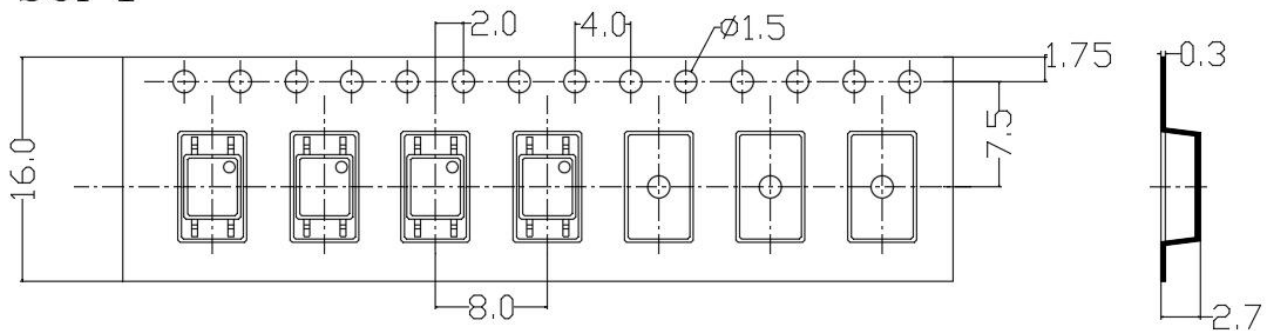
◆ 包装packing

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
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:

SOP4

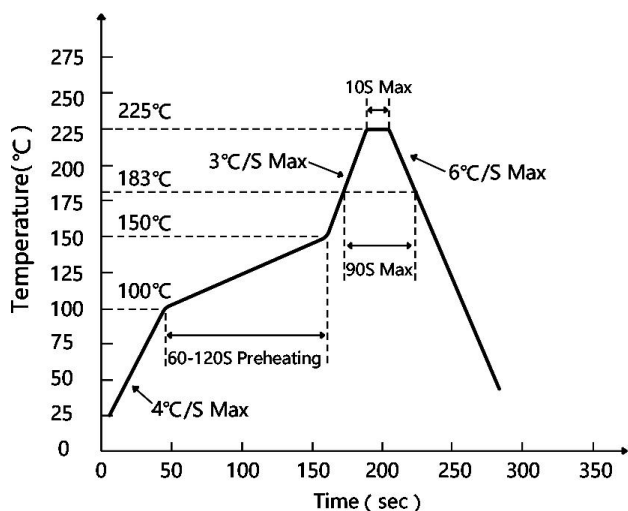


单位: mm

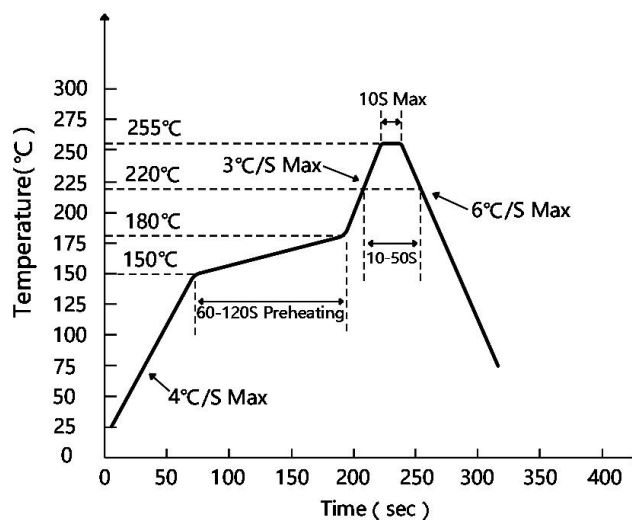
◆ 可靠性测试 Reliability Test Items And Conditions

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

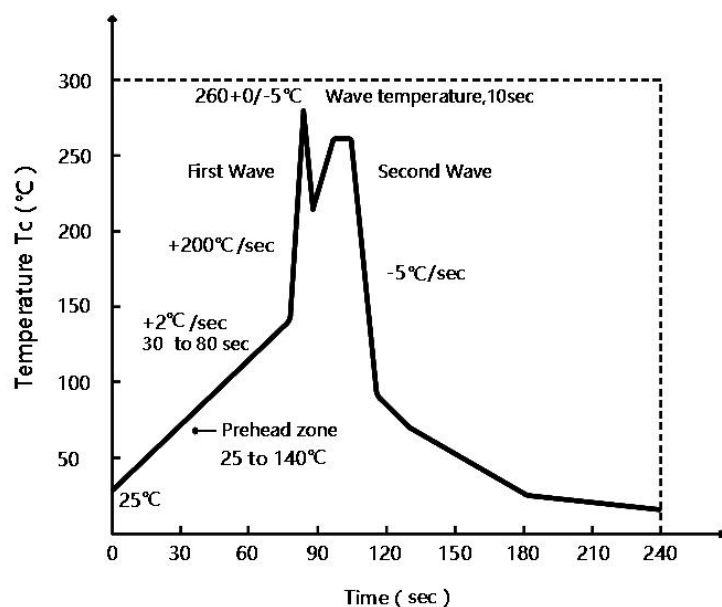


有铅制程 Lead Process



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: