AOTE
SEMICONDUCTOR

光继电器
Photo Relay

AT226

Product Data Sheet

AOTE DCC
RELEASE

台湾奥特半导体科技有限公司

TAIWAN AOTE SEMICONDUCTOR TECHNOLOGY CO.,LTD

www.aotesemi.com

概述 Description

AT226 光继电器由红外发光二极管和光电发生器、 MOSFET 组成。
The AT226 Photo relay consist of a photo MOSFET、 Photovoltage generator、 infrared LED.

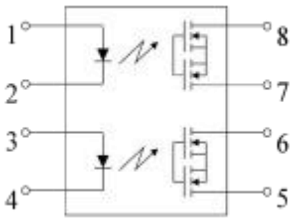
特性 Features

- 紧凑型固态双向信号开关
  Compact solid-state bidirectional signal switch
- 输入-输出隔离电压 (V_{ISO}=5000 V_{rms})
  High isolation voltage between input and output(V_{ISO}=5000 V_{rms})
- 工作温度： -40℃ ~+125℃
  Operating Temperature: -40℃ ~+125℃
- 低关断漏电流
  Low off state leakage current
- 符合加强绝缘标准
  Meet reinforced insulation standards
- 符合 AEC-Q101 车规标准
  Meet AEC-Q101 vehicle regulation level standard
- 安全和监管批准
  Safety and regulatory approvals
  —CQC 认证： GB 4943.1-2022（编号： CQC20001274614)
  CQC approved： GB 4943.1-2022（NO: CQC20001274614)
  —UL 认证： UL1577(编号： UL-US-L509768-31-42019102-3)
  UL approved: UL1577（NO: UL-US-L509768-31-42019102-3)
  —VDE 认证： DIN EN IEC 60747-5-5 (VDE 0884-5):2021-10; EN IEC 60747-5-5:2020（编号： 40051490)
  VDE approved: DIN EN IEC 60747-5-5 (VDE 0884-5):2021-10; EN IEC 60747-5-5:2020（NO： 40051490)

应用 Applications

- 通讯产品(个人电脑,笔记本电脑)
  Communications products (Personal computers, Laptops)
- 调制解调器/传感器
  Modem/Sensor
- 移动电话 /安全设备
  Mobile phones/Security equipment
- 测量和测试设备
  Measuring and Testing equipment
- 工厂自动化设备
  Plant automation equipment
- 高速检验机器
  High-speed inspection machines

封装和原理图 Package and Schematic Diagram



Pin Configuration
1.3. AN
2.4. CA
5.6.7.8 Drain

产品型号命名规则 Order Code

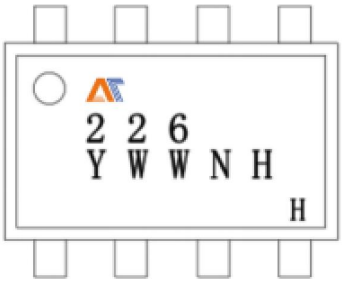
AT 226 - UN Y - W (V) (ZZ)

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（226: 226)
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: SMD)
⑥ 器件工作温度范围 Device Operating Temperature Range（特殊范围需填写或者空白 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 None)

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“N”代表星期几
  “N” denotes the day of the week
- 第二行印字中的“H”代表无卤， 而当产品有卤/无铅时， 此处空白
  In the second line, “H” denotes Halogen-free, when the product has halogen/lead-free, leave this blank.
- 第三行印字中的“H”代表可应用在 125℃产品
  In the third line, “H” denotes the product can be used in high temperature applications (operating temperature 125℃)



绝缘和安规信息 Insulation and Safety related specifications

项目 Item	符号 Symbol	数值 Value	单位 Unit	备注 Note
爬电距离 Creepage Distance	L	7.0	mm	从输入端到输出端， 沿本体最短距离路径 Measured from input terminals to output terminals, shortest distance path along body.
电气间隙 Clearance Distance	L	7.0	mm	从输入端到输出端， 通过空气的最短距离 Measured from input terminals to output terminals, shortest distance through air.
绝缘距离 Insulation Thickness	DTI	0.4	mm	发射器和探测器之间的绝缘厚度 Insulation thickness between emitter and detector.
峰值隔离电压 Peak Isolation Voltage	V_{IORM}	1500	V_{peak}	DIN/EN/IEC EN60747-5-5.
瞬态隔离电压 Transient Isolation Voltage	V_{IOTM}	7000	V_{peak}	DIN/EN/IEC EN60747-5-5.
隔离电压 Isolation Voltage	V_{ISO}	5000	V_{rms}	RH ≤ 50%, t_m = 1 minute, T_A = 25°C.

极限参数 Absolute Maximum Ratings (T_A = 25℃)

参数 Parameter		符号 Symbol	最小 Min	最大 Max	单位 Unit	备注 Note
发射端 Input	LED 正向电流 LED Forward Current	I_F	-	50	mA	T_A = –40°C to +125°C
	LED 反向电压 LED Reverse Voltage	V_R	-	5	V	T_A = –40°C to +125°C
	峰值正向电流 Peak Forward Current	I_{FP}	-	1	A	f = 100 Hz, duty cycle = 0.1%
	输入功率 Power Dissipation	P_{in}	-	75	mW	
接收端 Output	持续负载电流 Continuous Load Current	I_L	-	0.04	A	
	峰值负载电流 Peak Load Current	I_{peak}	-	0.12	A	t_m = 1 min, duty cycle = 0.1%, cumulative of 5minutes over lifetime
	输出功率 Power Dissipation	P_{out}	-	800	mW	
总功耗 Total Power Dissipation		P_{tot}	-	850	mW	
输入输出瞬时耐受电压 Isolation Voltage		V_{ISO}	5000	-	V_{rms}	RH ≤ 50%, t_m = 1 minute
工作温度 Operating Temperature		T_{opr}	-40	+125	℃	
存储温度 Storage Temperature		T_{stg}	-55	+150	℃	

推荐的操作条件 Recommended Operating Conditions

参数 Parameter	符号 Symbol	最小 Min	最大 Max	单位 Unit	备注 Note
电源电压 Supply Voltage	V_{DD}	-	600	V	
输入电流 (ON) Input Current (ON)	$I_{F(ON)}$	5	10	mA	
输入电压 (OFF) Input Voltage (OFF)	$V_{F(OFF)}$	-5	0.4	V	
工作温度 Operating Temperature	T_{opr}	-40	+125	℃	
负载电流 Load Current	I_O	-40	40	mA	

产品特性参数 Electro-optical Characteristics (T_A =25℃)

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	I_{Fon}	I_L = Max.	-	0.6	3	mA
	LED 关断电流 LED Turn Off Current	I_{Foff}	I_L = Max	0.2	0.5	-	mA
	反向电流 Reverse Current	I_R	V_R = 5 V	-	-	10	uA
	LED 正向压降 LED Dropout Voltage	V_F	I_F=5mA	-	1.32	1.5	V
接收端 Output	负载电压（AC 峰值) Load Voltage (Peak AC)	V_L	I_{OFF}=10uA	600	-	-	V
	导通电阻 On Resistance	R_{on}	I_F = 5mA I_L = Max. Within 1s on time T_A = 25℃	-	35	120	Ω
			I_F = 5mA I_L = Max. Within 1s on time T_A = 125℃	-	55	120	
	关断漏电 Off State Leakage Current	I_{Leak}	I_F = 0mA ； V_L = 600 V	-	-	1	uA
	输出电容 Output Capacitance	C_{OUT}	V_B = 0V, f = 1 MHz	-	35	-	pF
传输特性 Transfer Characteristics	开启时间 Turn On Time	T_{on}	I_F = 5mA ； I_L = 40mA T_A =25 ℃	-	0.2	2.0	ms
	关断时间 Turn Off Time	T_{off}	I_F = 5mA ； I_L = 40mA T_A =25 ℃	-	0.35	1.0	ms
	I/O 电容 I/O Capacitance	C_{ISO}	f = 1 MHz ； V_B =0 V	-	1.3	3	pF
	初始 I/O 隔离电阻 Initial I/O Isolation Resistance	R_{ISO}	500 V DC	10^9	-	-	Ω

典型光电特性曲线 Typical Electro-Optical Characteristics Curves

Fig.1 LED Dropout Voltage vs. Ambient Temperature

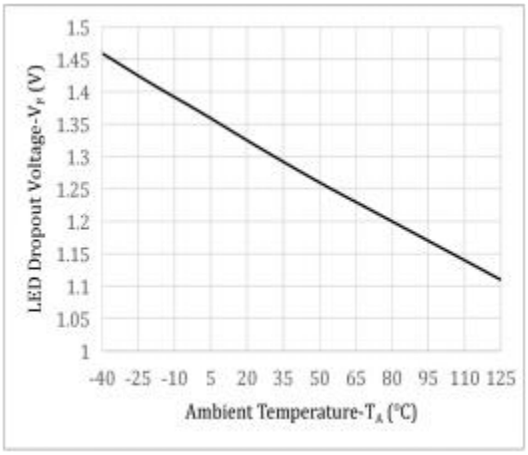


Fig.2 Output Current vs. Output Voltage

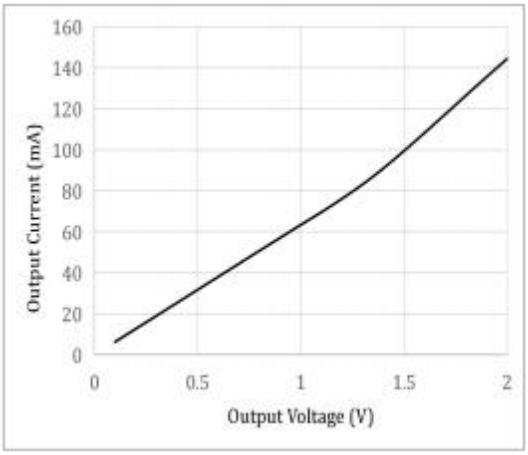


Fig.3 On Resistance vs. Ambient Temperature

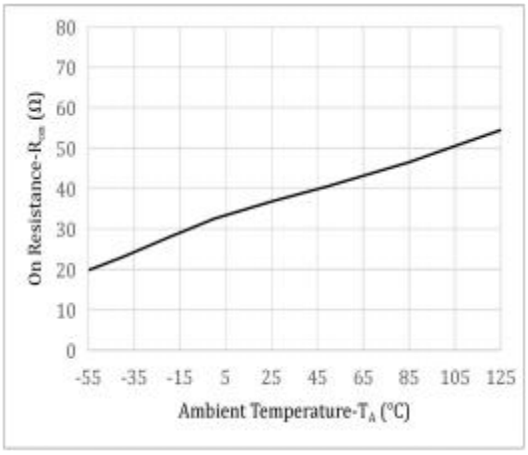


Fig.4 Load Current vs. Ambient Temperature

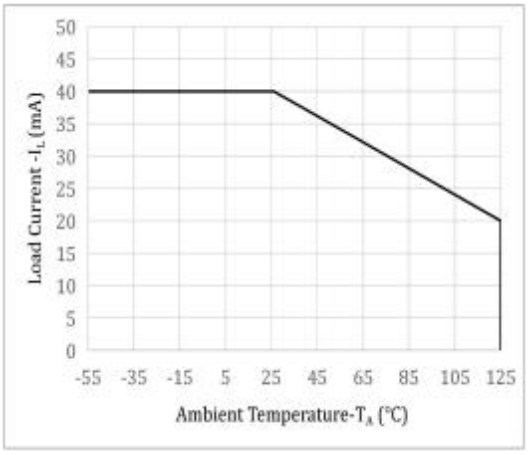


Fig.5 LED Operate Current vs. Ambient Temperature

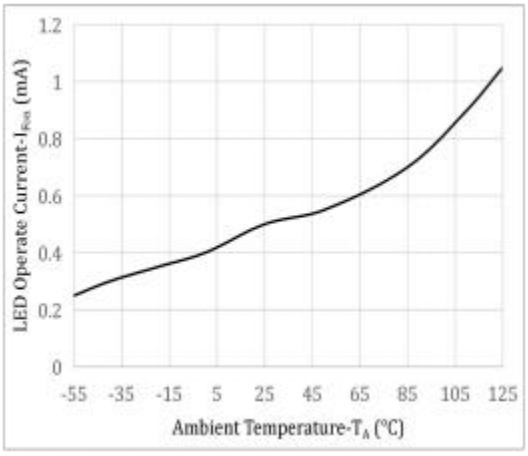


Fig.6 LED Turn Off Current vs. Ambient Temperature

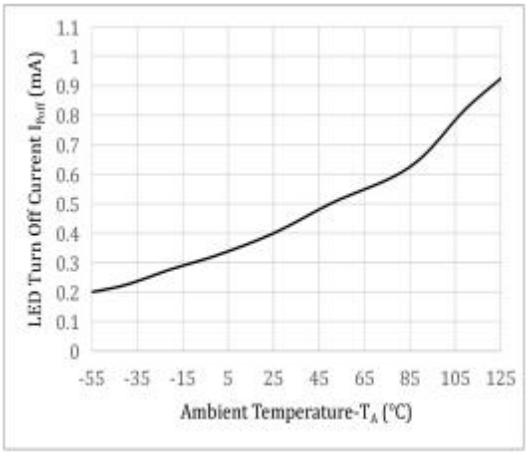


Fig.7 Turn On Time vs. Ambient Temperature

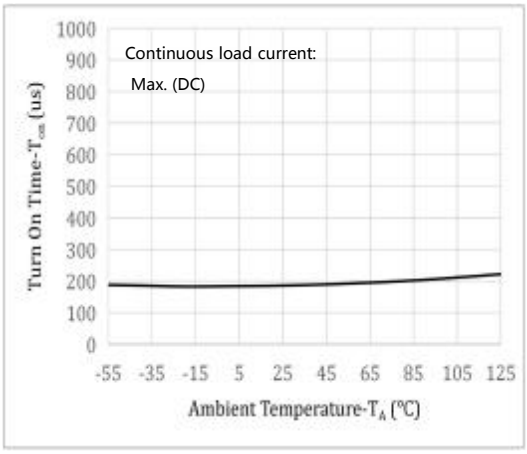


Fig.8 Turn Off Time vs. Ambient Temperature

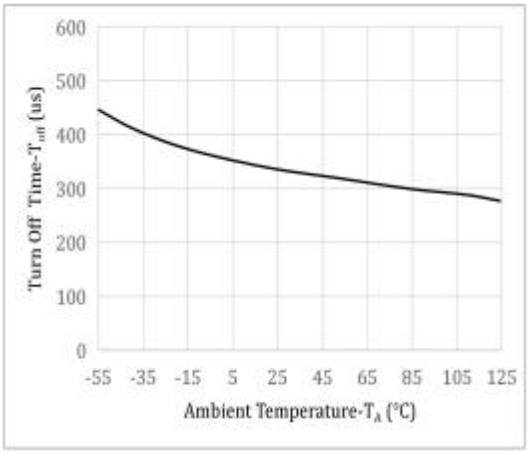


Fig.9 Turn On Time vs. LED Forward Current

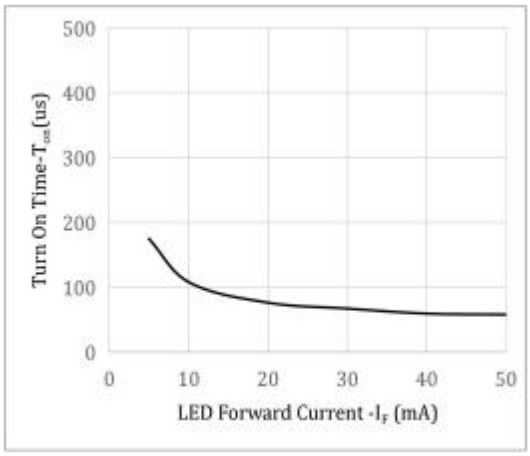


Fig.10 Turn Off Time vs. LED Forward Current

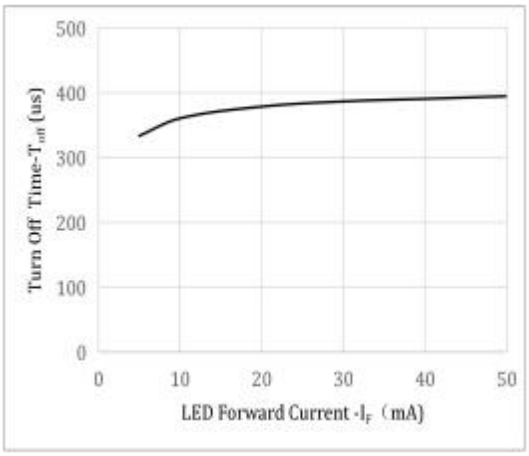


Fig.11 Off State Leakage Current vs Load Voltage

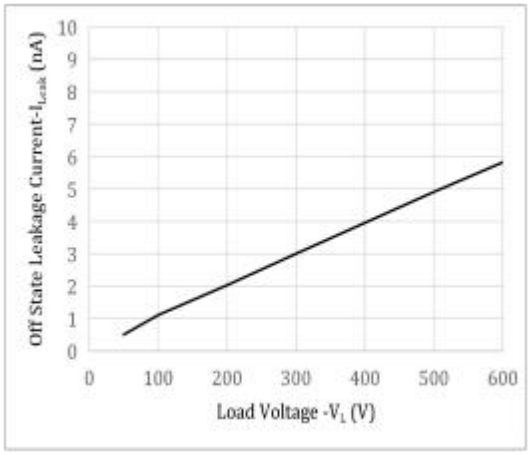
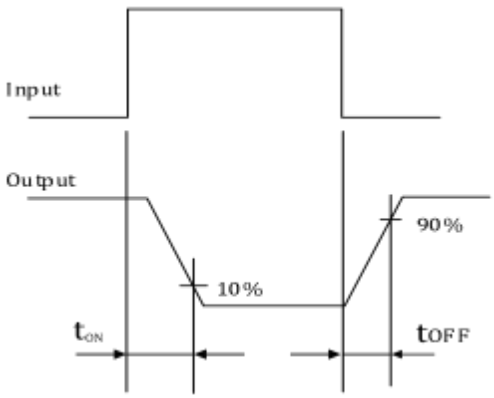


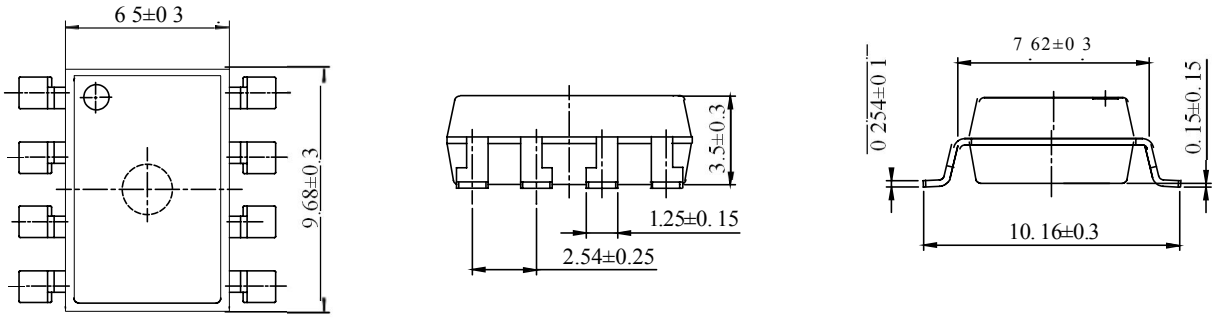
Fig.12 Turn On/Off Time



注意： 光电特性曲线测试样品容量为 5 颗。
Note: The test sample capacity of the typical performance curves is 5pcs.

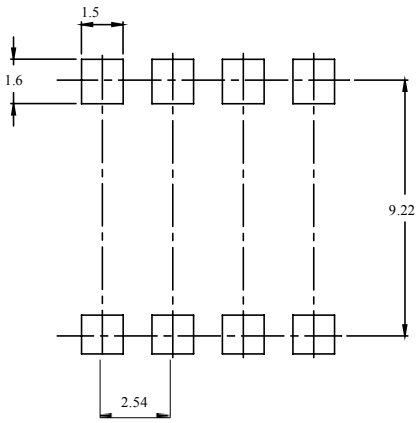
外形尺寸 Outline Dimensions

SMD8



单位 Unit: mm

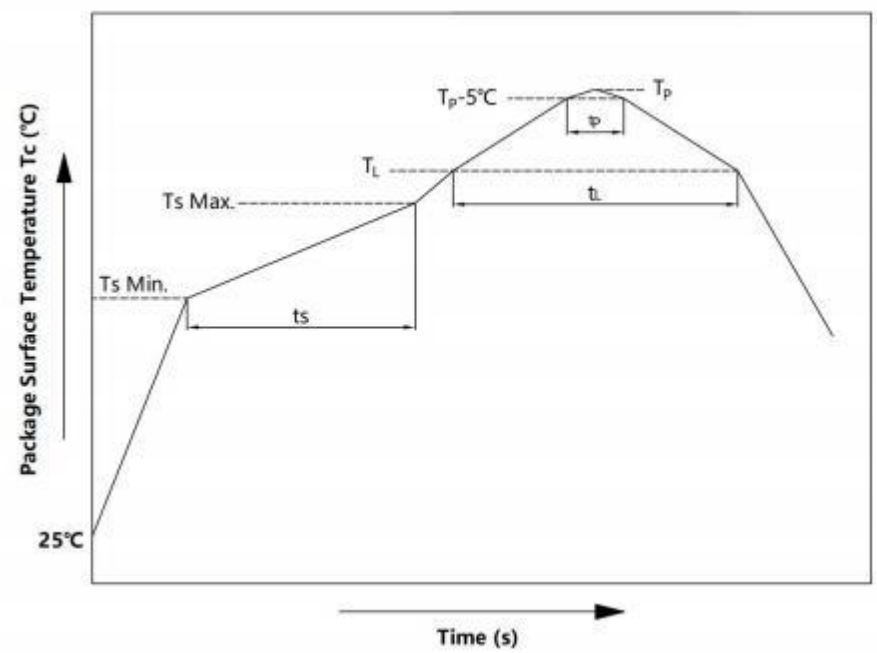
建议焊盘布局 Recommended Pad Layout



单位 Unit: mm

注： 上图为产品正视图。
Note： The picture above is the front view of the product.

回流焊温度曲线图 Solder Reflow Profile

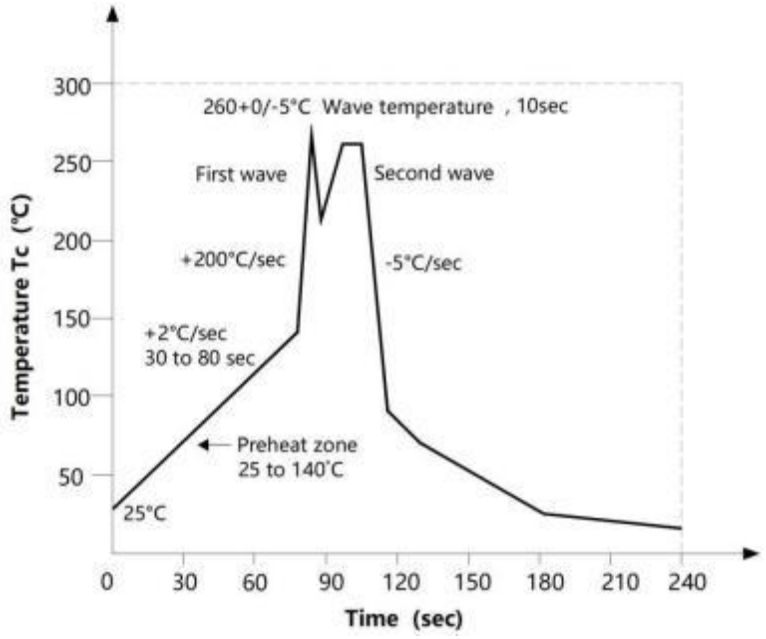


项目 Item	符号 Symbol	最小值 Min.	最大值 Max.	单位 Unit
预热温度 Preheat Temperature	T_s	150	200	℃
预热时间 Preheat Time	t_s	60	120	s
升温速率 Ramp-Up Rate (T_L to T_P)	-	-	3	℃/s
液相线温度 Liquidus Temperature	T_L	217		℃
时间高于 T_L Time Above T_L	t_L	60	150	s
峰值温度 Peak Temperature	T_P	-	260	℃
T_C在(T_P-5)和 T_P之间的时间 Time During Which T_C Is Between (T_P-5) and T_P	t_p	-	30	s
降温速率 Ramp-down Rate (T_P to T_L)	-	-	6	℃/s

注： 建议在所示的温度和时间条件下进行回流焊， 最多不能超过三次。

Note: Reflow soldering is recommended at the temperatures and times shown, no more than three times.

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 360℃ ± 5℃， 时间≤3s。
Manual soldering method Temperature: 360℃ ± 5℃, within 3s.

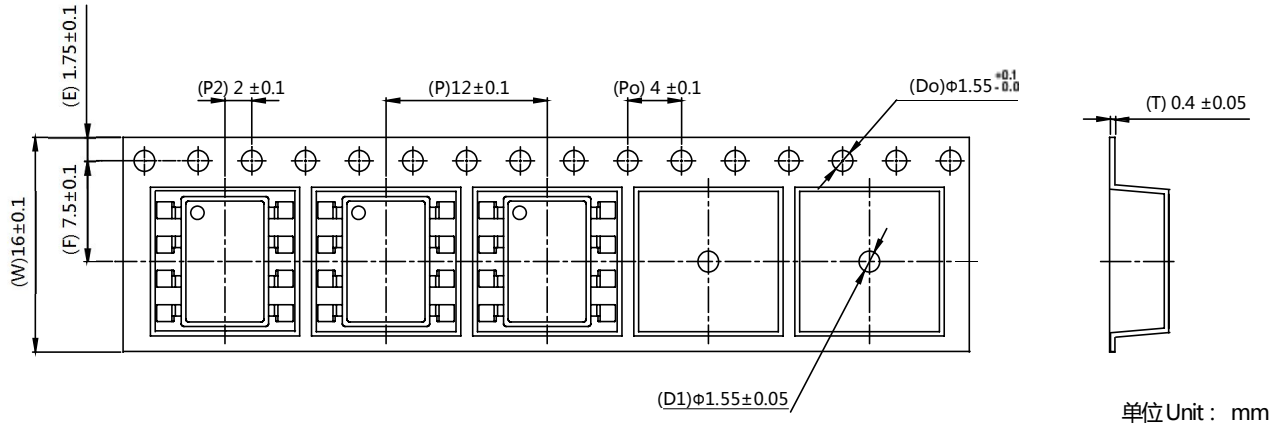
包装 Packing

■ 汇总表 Summary table

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
SMD8	卷盘 (ϕ330mm 蓝盘)	1000 只/盘	2 盘/盒	10 盒/箱	450*390*0.1mm	34*6*34cm	38*36*36.5cm	首端各空 50 个空格，末端空 100
Package Type	**Packing Form**	**Quantity per Reel**	**Quantity per Box**	**Quantity per Carton**	**Antistatic Bag Specification**	**Box Specification**	**Carton Specification**	**Note**
SMD8	Reel (ϕ330mm Blue)	1000 pcs /reel	2 reels /box	10 boxes /ctn	450*390*0.1mm	34*6*34cm	38*36*36.5cm	Leave 50 Spaces at the beginning and 100 Spaces at the end

■ 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Unit： mm

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