AOTE
SEMICONDUCTOR

可控硅光耦
Photo Triac

AT MOC3043SM

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

• MOC3043SM 系列器件是由一个 GaAs 红外发光二极管和一个单晶硅芯片的过零 相位光电双向晶闸管组成的光电耦合器。

The MOC3043SM series devices are optical couplers composed of GaAs infrared light emitting diodes and zero-crossing phase photoelectric bidirectional thyristor of single crystal silicon chip.

特性 Features

- 峰值击穿电压
  Peak breakdown voltage
  400V：MOC3043SM；
- 输入-输出隔离电压 (V_{ISO}=5000 Vrms)
  High isolation voltage between input and output(V_{ISO}=5000 Vrms)
- 工作温度： -55℃ ~110℃
  Operating Temperature: -55℃ ~110℃
- 符合加强绝缘标准
  Meet reinforced insulation standards
- 符合安规标准： UL 1577， VDE DIN EN60747-5-5 (VDE 0884-5) ， CQC11-471543-2022
  Safety standard approval: UL 1577, VDE DIN EN60747-5-5 (VDE 0884-5) ， CQC11-471543-2022

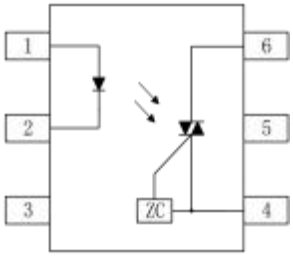
应用 Applications

- 开关电源， 智能电表
  Switching power supply, intelligent meter
- 工业控制， 测量仪器
  Industrial control, measuring instruments
- 办公设备， 比如复印机
  Office equipment such as copiers
- 家用电器， 比如空调、风扇、热水器等
  Household appliances: such as air conditioners, fans, water heaters, etc.

封装和原理图 Package and Schematic Diagram

DIP6

SMD6



Pin Configuration

1. Anode
2. Cathode
3.NC
4. GND
5.NC
6. VCC

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印字信息 Marking Information

- 印字中“ ”为奥特品牌 LOGO
  “ ” denotes LOGO
- 印字中的“V”代表 V_{DRM}分档： 3、4、 6、 8
  “V” denotes the VDRM digissr： 3、4、 6、8
- 印字中的“X”代表 IFT 分档： 0、1、2、 3
  “X” denotes the IFT digissr： 0、1、2、3
- 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

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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 Remark
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	Viso	>5000	Vrms	For 1 min

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	正向电流 Forward Current		I_F	60	mA
	反向电压 Backward Voltage		V_R	6	V
	功耗 Power Dissipation		P_D	100	mW
	额定值降低因子(在 Ta = 90°C 以上) Power dissipation Derating factor (above Ta = 90°C)		P_{DD}	3.8	mW/°C
接收端 output	断态输出端电压 Off-state output terminal voltage	MOC303X	V_{DRM}	250	V
		MOC304X		400	
		MOC306X		600	
		MOC308X		800	
	峰值重复浪涌电流(pw=100μs,120pps) Peak repetitive surge current (pw=100μs,120pps)		I_{TSM}	1	A
	开启态电流 (均方根值) On-state current (root mean square value)		$I_{T(RMS)}$	100	mA
	功耗 Power Dissipation		P_C	300	mW
	额定值降低因子(在 Ta = 90°C 以上) Power dissipation Derating factor (above Ta = 90°C)			7.6	mW/°C
总功耗 Total Power Dissipation			P_{tot}	330	mW
隔离电压 Isolation Voltage			Viso	5000	V

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参数 Parameter	符号 Symbol	额定值 Rating	单位 Unit
工作温度 Operating Temperature	T_{opr}	-55—110	℃
存储温度 Storage Temperature	T_{stg}	-55—125	℃
焊接温度 Soldering Temperature	T_{sol}	260	℃

* 在相对湿度 40% ~ 60%下的进行交流电测试， 此时 1、2 和 3 脚短接， 4、。
* Conduct AC test at 40% ~60% relative humidity. At this time, pins 1, 2 and 3 are short-circuited, and pins 4, 5 and 6 are short-circuited.

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产品特性参数 Electro-optical Characteristics (Ta =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	正向电压 Forward Voltage		V_F	I_F=20mA	-	1.23	1.5	V
	反向电流 Back current		I_R	V_R=6V	-	-	10	uA
接收端 Output	断态峰值电流 Off-state peak current	MOC303X	I_{DRM1}	V_{DRM} =Rated V_{DRM} I_F = 0mA	-	-	100	nA
		MOC304X						
		MOC306X			-	-	500	
		MOC308X						
	通态峰值电压 On-state peak voltage		V_{TM}	I_{TM}=100mA peak I_F = Rated I_{FT}	-	-	3	V
	断态电压临界上升率 Critical rise rate of off-state voltage	MOC303X	dv/dt	V_{PEAK} =Rated V_{DRM} , I_F =0	1000	-	-	V/μs
		MOC304X						
		MOC306X						
		MOC308X			600	-	-	
	抑制电压（MT1-MT2 高于多少电压不会触发) Suppression voltage (MT1-MT2 will not be triggered if it is higher than this voltage)		V_{Inh}	I_F = Rated I_{FT}	-	-	20	V
	抑制状态的漏电流 Leakage current in suppression state		I_{DRM2}	I_F = Rated I_{FT} , V_{DRM}=Rated V_{DRM} , Off state	-	-	500	uA
传输特性 Transfer Characteristics	LED 触发电流 LED trigger current	MOC3031	I_{FT}	主端电压 Main terminal Voltage =3V	-	-	15	mA
		MOC3041						
		MOC3061						
		MOC3081						
		MOC3032			-	-	10	
		MOC3042						
		MOC3062						
		MOC3082						
		MOC3033			-	-	5	
		MOC3043						
		MOC3063						
		MOC3083						
	维持电流 Maintain current		I_H	-	-	280	-	uA

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

Fig.1 LED forward current vs Forward voltage

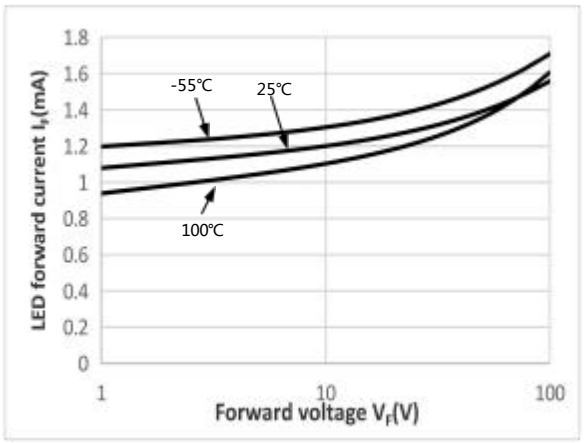

Fig.2 On-state characteristic diagram

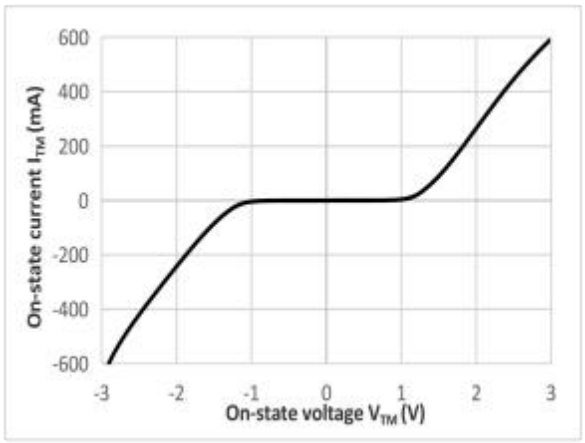

Fig.3 Trigger current vs Ambient temperature

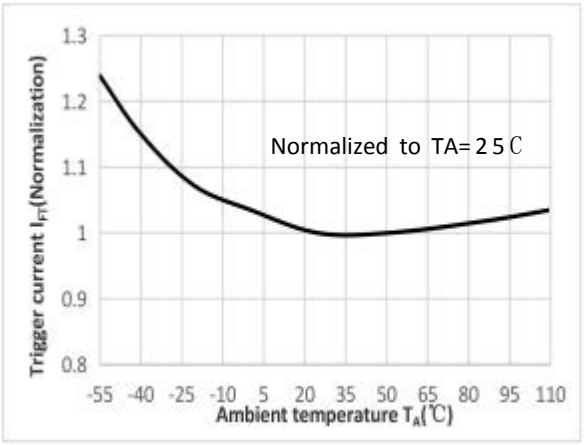

Fig.4 Trigger current vs LED pulse width

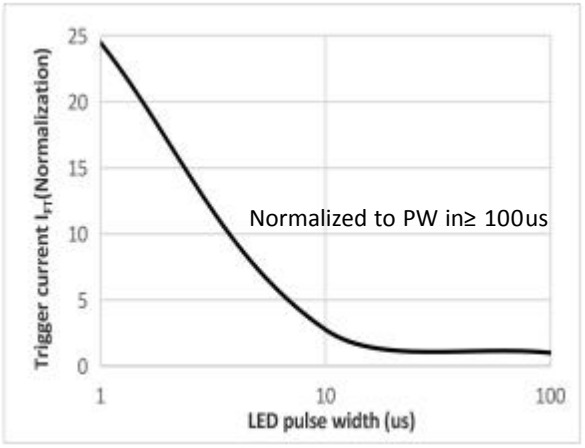

Fig.5 Maintenance current vs Ambient temperature

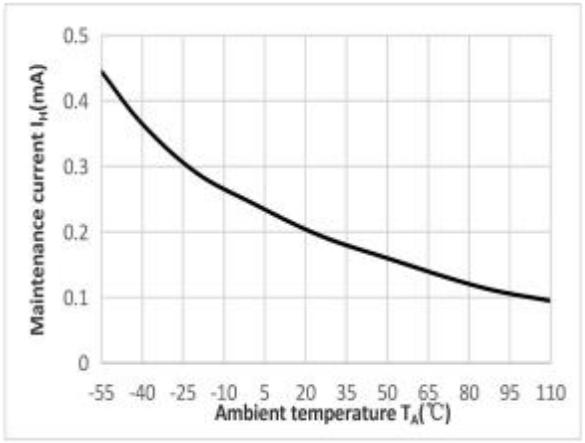

Fig.6 Leakage current vs Ambient temperature

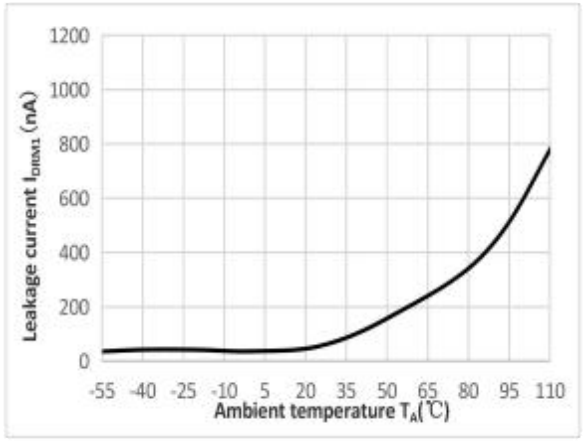

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Fig.7 Suppressed state leakage current vs Ambient temperature

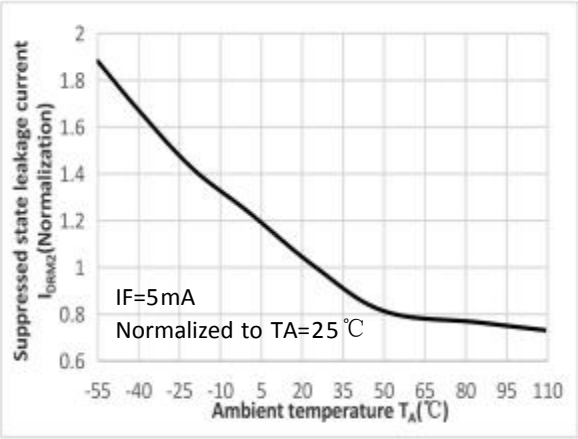


Fig.8 Suppression voltage vs Ambient temperature

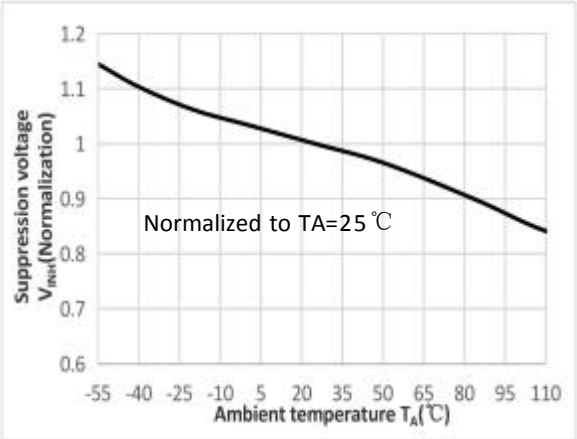
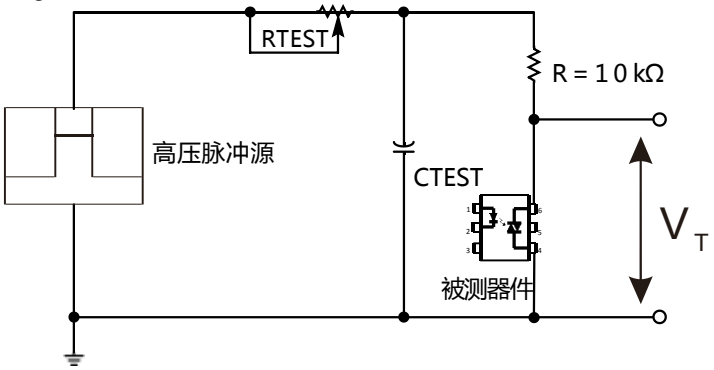
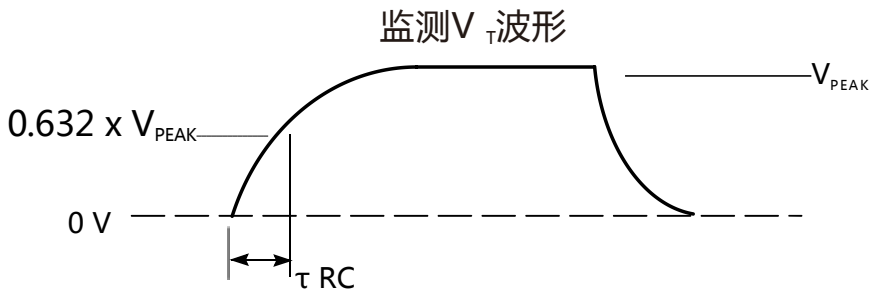


Fig.9 静态 dv/dt 测试电路和波形 Static dv/dt test circuit and waveform





通过 RC 电路施加于被测器件的输出端的高电压脉冲设置到所需的 V_{PEAK} 值上。LED 电流无需加上。波形 V_T 使用 X100 探头监测。通过调节 R_{TEST} 值， dv/dt (斜度) 增加， 直到被测器件观察到被触发 (波形崩溃) 。dv/dt 然后下降， 直到被测器件停止被触发。此时， 记录 τ_{RC} 值并可计算 dv/dt 了。

The high voltage pulse applied to the output end of the device under test through the RC circuit is set to the desired V_{PEAK} value. LED current does not need to be added. Waveform V_T is monitored with X100 probe. By adjusting the R_{TEST} value, dv/dt (slope) increases until the device under test is observed to be triggered (waveform collapse). Dv/dt then drops until the device under test stops being triggered. At this time, dv/dt can be calculated by recording the value of τRC.

$$dv/dt = \frac{0.632 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

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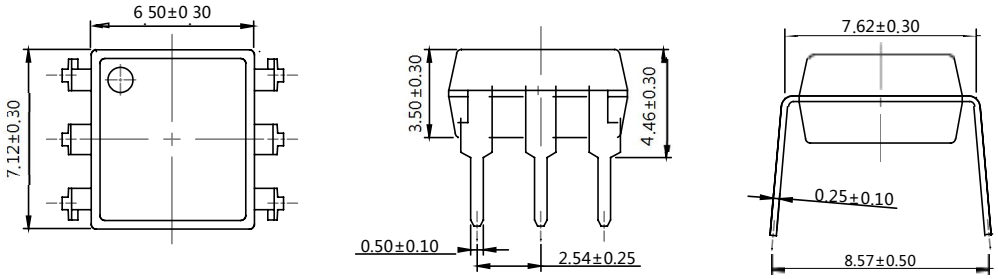
例如， AT304X 系列的电压峰值 V_{PEAK} = 400V。 dv/dt 值的计算方式如下：

For example, the voltage peak of AT304X series V_{PEAK}=400V. Then the dv/dt value can be calculated as follows：

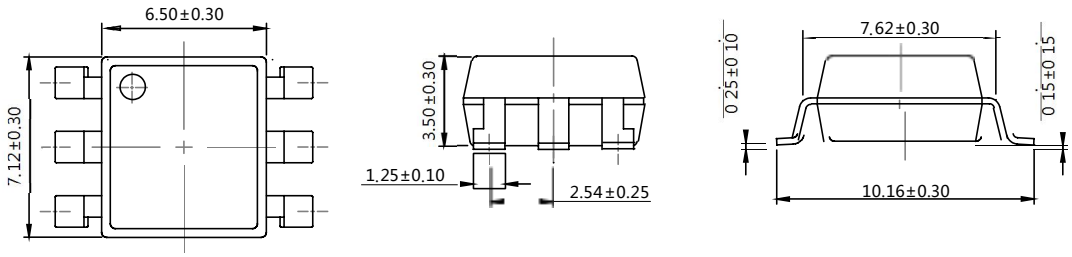
$$dv/dt = \frac{0.632 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

外形尺寸 Outline Dimensions

DIP6

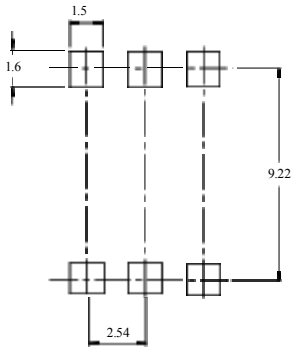


SMD6



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.

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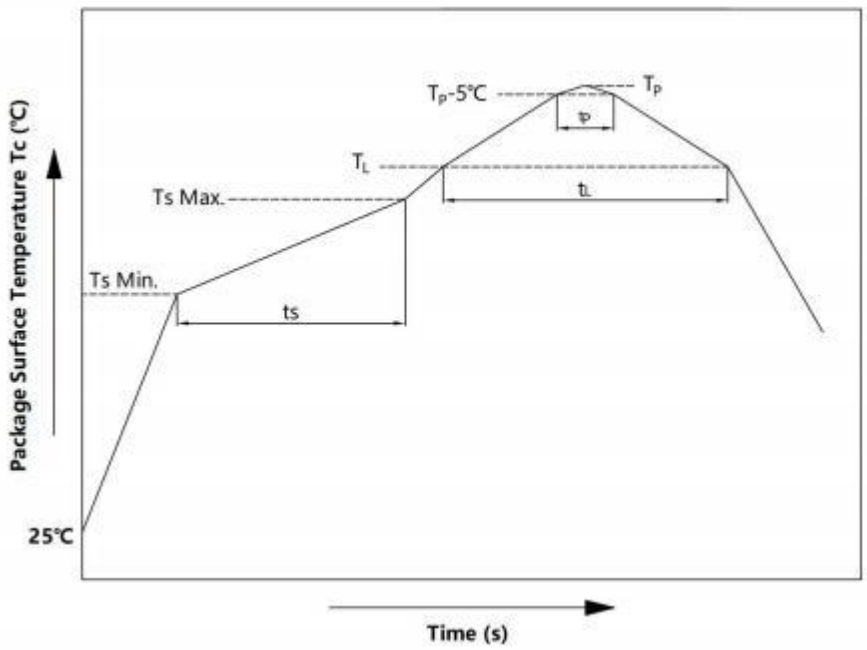
回流焊温度曲线图 Solder Reflow Profile



项目 Item	符号 Symbol	最小值 Min.	最大值 Max.	单位 Unit
预热温度 Preheat Temperature	Ts	150	200	℃
预热时间 Preheat Time	ts	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	℃
Tc 在(T_P-5)和 T_P 之间的时间 Time During Which Tc 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 Note：

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；

Reflow soldering is recommended at the temperatures and times shown, no more than three times;

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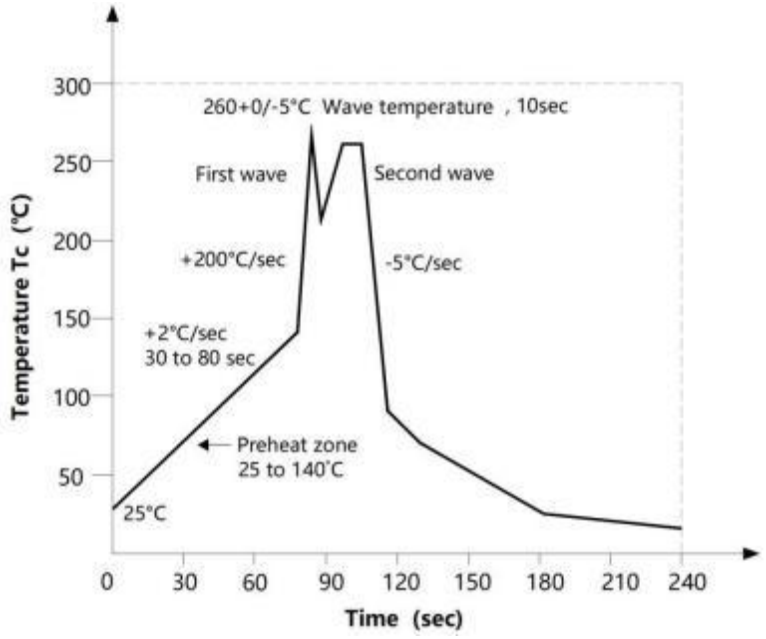
波峰焊温度曲线图 Wave Soldering Profile



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。
Hand soldering iron requirements： Temperature： 360℃ ± 5 ℃, within 3s

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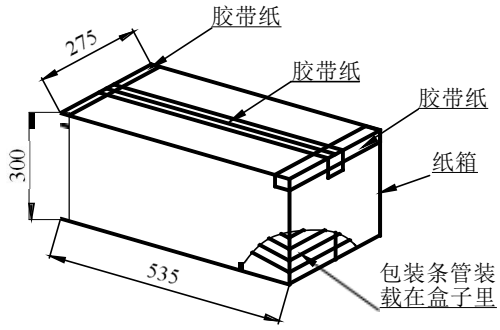
包装 Packing

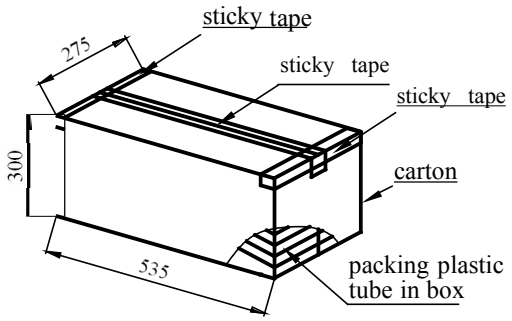
■ 汇总表 Summary table

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
DIP6	管装 (500*12*11mm)	65 只/管	50 管/盒	10 盒/箱	不适用	525*128*56mm	535*275*300mm	每管使用蓝白胶塞，方向须一致
SMD6	卷盘 (ϕ330mm 蓝盘)	1000/盘	2 盘/盒	10 盒/箱	450*390*0.1mm	340*60*340mm	380*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**
DIP6	Tube (500*12*11mm)	65 pcs /Tube	50 Tubes /box	10 boxes /ctn	Not applicable	525*128*56mm	535*275*300mm	Use blue and white rubber stoppers for each tube, with the same direction
SMD6	Reel (ϕ330mm Blue)	1k pcs/reel	2 reels /box	10 boxes /ctn	450*390*0.1mm	340*60*340mm	380*360*365mm	Leave at least 200mm of blank space at both ends

■ 管条包装 Tape & Tube

1) 每管数量： 65 只。
   Qty/Tube： 65 pcs.
2) 每箱数量： 32500 只。
   Qty/ctn： 32500 pcs.
3) 内包装： 每盒 50 管。
   Inner packing： 50 Tube/box.
4) 示意图 Schematic：





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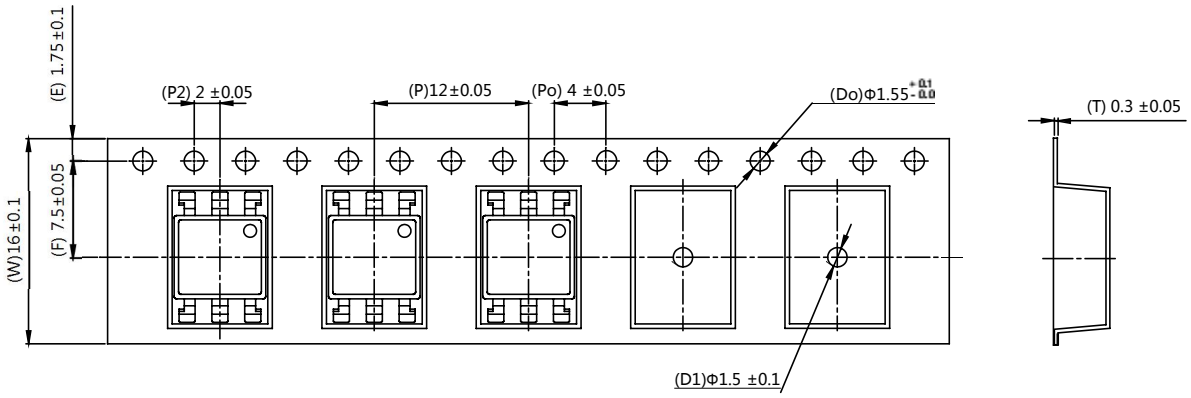
■ 编带包装 Tape & Reel

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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