



光继电器 Photo Relay

AT252A

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

AT252A光继电器由光电MOSFET和光电压发生器组成，它们通过红外LED光学耦合。AT252A实现了低导通电阻。

The AT252A PhotoRelay consist of a photo MOSFET、Photovoltage generator optically coupled to an infrared LED. The AT252A achieves low on-resistance.

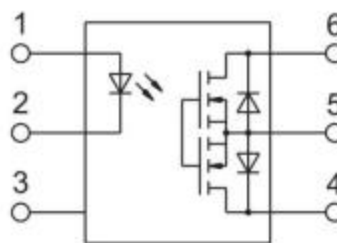
特性 Features

- 负载电压：60V
Load voltage：60V
- 持续负载电流:最大2A
Continuous load current: Max. 2A
- 低导通电阻
Low on-resistance

应用 Applications

- 工业机械和设备
Industrial machinery and equipment
- 防盗，防灾市场
Anti-theft, disaster prevention market
- 空调控制
Air conditioning control
- 娱乐市场
Entertainment market

封装和原理图 Package and Schematic Diagram



Pin Configuration

- 1.Anode
- 2.Cathode
- 3.N/CO
- 4.Drain1
- 5.Source
- 6.Drain2

产品型号命名规则 Order Code

AT 252A - 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 (252A: 252A)
- 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 (D:DIP 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 “E” 代表内部代码
“E” denotes Internal code
- 印字中的 “H” 代表无卤
“H” denotes Halogen-free



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	LED 正向电流 LED Forward Current	I_F	50	mA
	LED 反向电压 LED Reverse Voltage	V_R	5	V
	峰值正向电流 Peak Forward Current	I_{FP}	1	A
	输入功率 Power Dissipation	P_{in}	75	mW
接收端 Output	负载电压(AC 峰值) Load Voltage (Peak AC)	V_L	60	V
	持续负载电流 Continuous Load Current	I_L	A	A
		B	3	
		C	4	
	峰值负载电流 Peak Load Current	I_{peak}	6	A
	输出功率 Power Dissipation	P_{out}	600	mW
总功耗 Total Power Dissipation		P_{tot}	650	mW
隔离电压 Input Output Isolation Voltage		V_{iso}	5000	V_{rms}
工作温度 Operating Temperature		T_{opr}	-40 ~ +85	°C
存储温度 Storage Temperature		T_{stg}	-40 ~ +100	°C

Note: A connection: Peak AC, DC; B, C connection: DC.

产品特性参数 Electro-optical Characteristics ($T_A = 25^{\circ}\text{C}$)

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	I_{Fon}	$I_L = 0.1\text{A}$	-	0.6	3	mA
	LED 关断电流 LED Turn Off Current	I_{Foff}	$I_L = 0.1\text{A}$	0.2	0.5	-	mA
	LED 正向压降 LED Dropout Voltage	V_F	$I_F = 50\text{mA}$	-	1.29	134	V
接收端 Output	导通电阻 On Resistance	R_{on} A	$I_F = 5\text{ mA}$ $I_L = \text{Max.}$ Within 1s on time	-	0.26	0.6	Ω
		R_{on} B	$I_F = 5\text{ mA}$ $I_L = \text{Max.}$ Within 1s on time	-	0.23	0.6	Ω
		R_{on} B	$I_F = 5\text{ mA}$ $I_L = \text{Max.}$ Within 1s on time	-	0.13	0.6	Ω
	关断漏电 Off State Leakage Current	I_{Leak}	$I_F = 0\text{ mA}$ $V_L = \text{Max}$	-	-	1	μA
传输特性 Transfer Characteristics	开启时间 Turn On Time	T_{on}	$I_F = 5\text{mA}$, $V_L = 10\text{V}$ $I_L = 100\text{mA}$	-	1.8	5	μs
	关断时间 Turn Off Time	T_{off}	$I_F = 5\text{mA}$, $V_L = 10\text{V}$ $I_L = 100\text{mA}$	-	0.15	0.5	μs
	I/O 电容 I/O Capacitance	C_{iso}	$f = 1\text{ MHz}$ $V_B = 0\text{V}$	-	0.8	1.5	pF
	初始 I/O 隔离电阻 Initial I/O Isolation Resistance	R_{iso}	500 V DC	1000	-	-	M Ω
	最大工作频率 Max. Operating frequency	-	$I_F = 5\text{ mA}$ $I_L = \text{Max, duty}=50\%$, $V_L = \text{Max}$	-	-	2.5	cps

建议操作条件 Recommended operating conditions ($T_A = 25^{\circ}\text{C}$)

请在推荐的操作条件下使用，以获得预期的特性。

Please use under recommended operating conditions to obtain expected characteristics

项目 Item	符号 Symbol	最小 Min.	最大 Max.	单位 Unit
引导电流 LED Current	I_F	5	30	mA
负载电压 (交流电峰值) Load voltage(Peak AC)	V_L	-	48	V
连续负载电流 (连接) Continuous load current (A connection)	I_L	-	3.3	A

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

Fig.1 Load current vs. ambient temperature characteristics

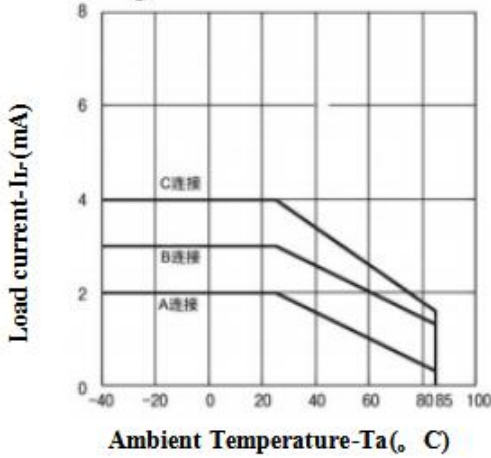


Fig.2 On resistance vs. ambient temperature characteristics (DC)

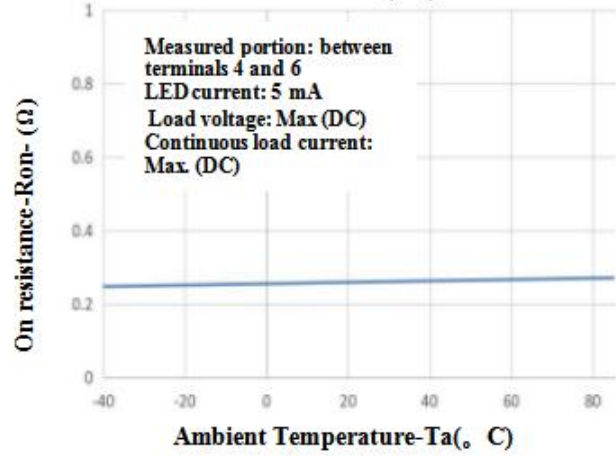


Fig.3 Turn on time vs. ambient temperature characteristics

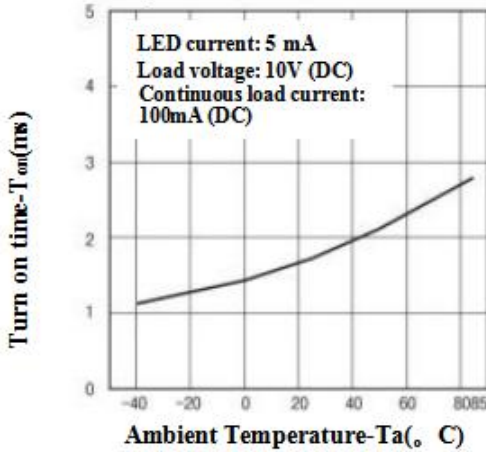


Fig.4 Turn off time vs. ambient temperature characteristics

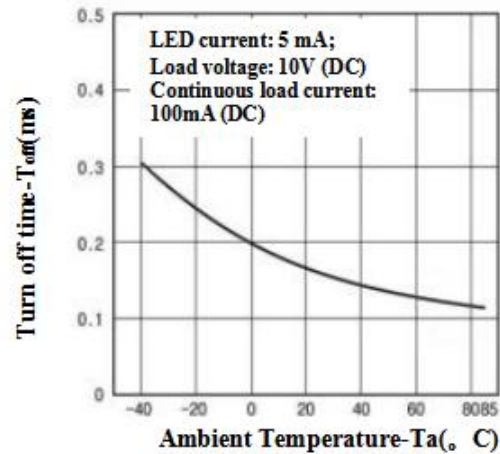


Fig.5 LED operate current vs. ambient temperature characteristics

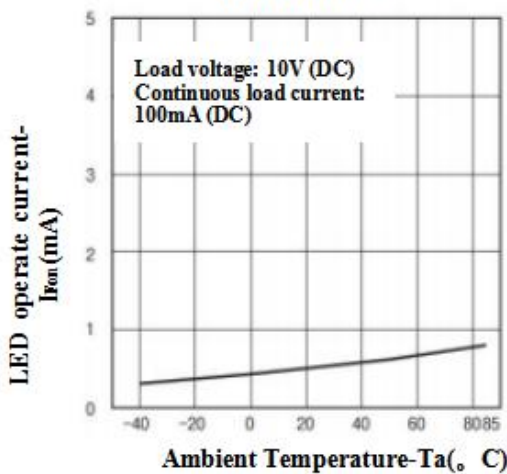


Fig.6 LED turn off current vs. ambient temperature characteristics

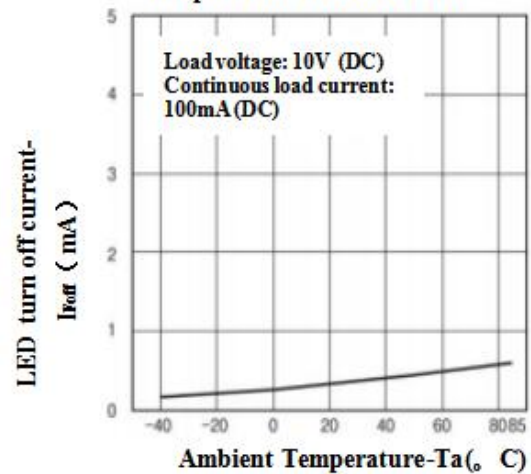


Fig.7 LED dropout voltage vs. ambient temperature characteristics

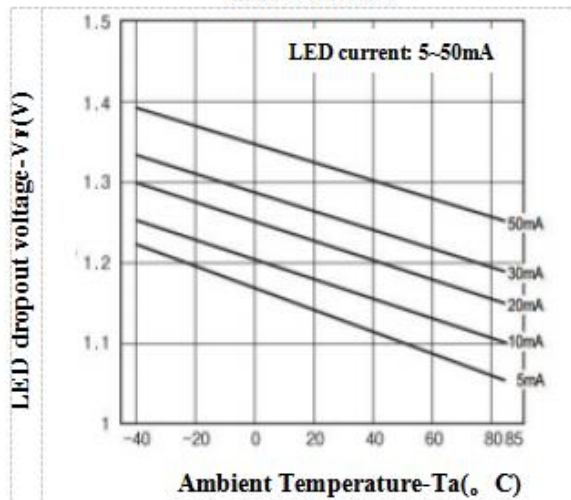


Fig.8 Current vs. voltage characteristics of output at MOS portion

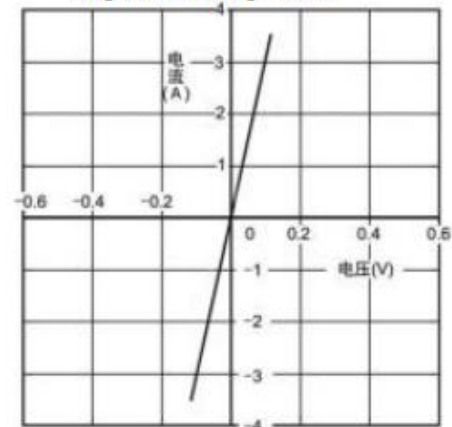


Fig.9 Off state leakage current vs. load voltage characteristics

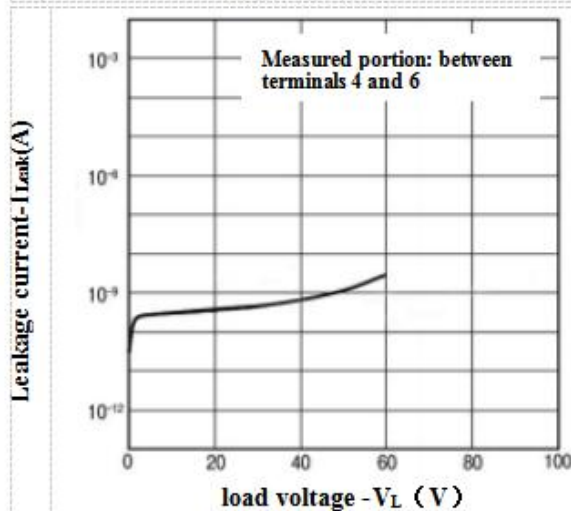


Fig.10 Turn on time vs. LED forward current characteristics

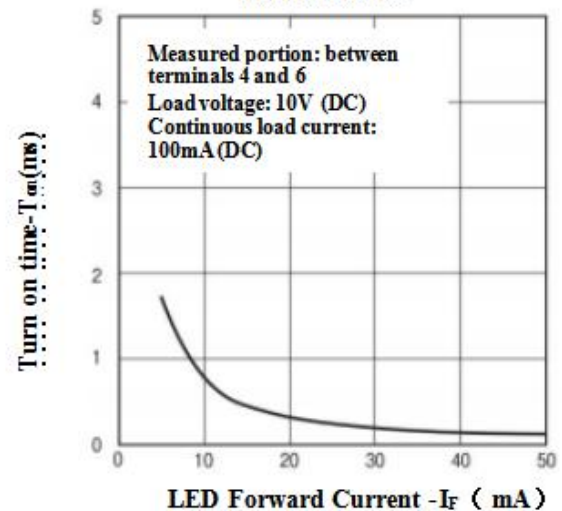


Fig.11 Output capacitance vs. applied voltage characteristics

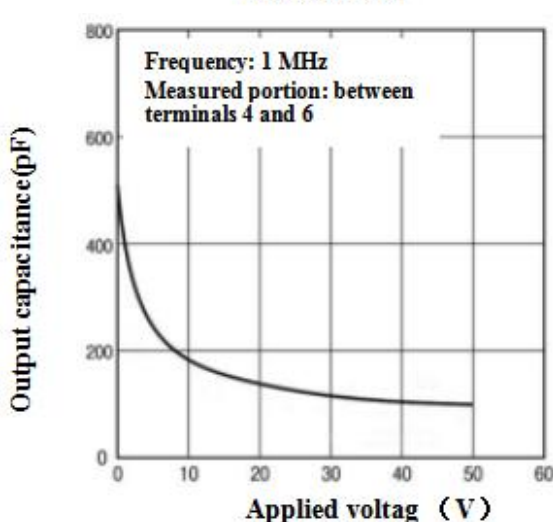


Fig.12 Max. operating frequency vs. load voltage and load current characteristics

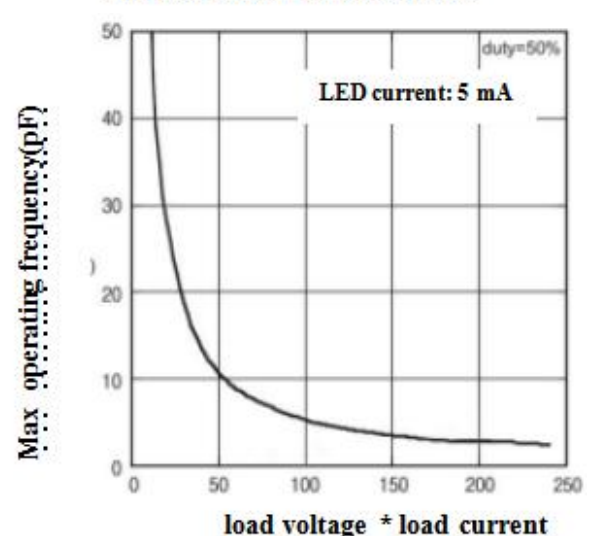
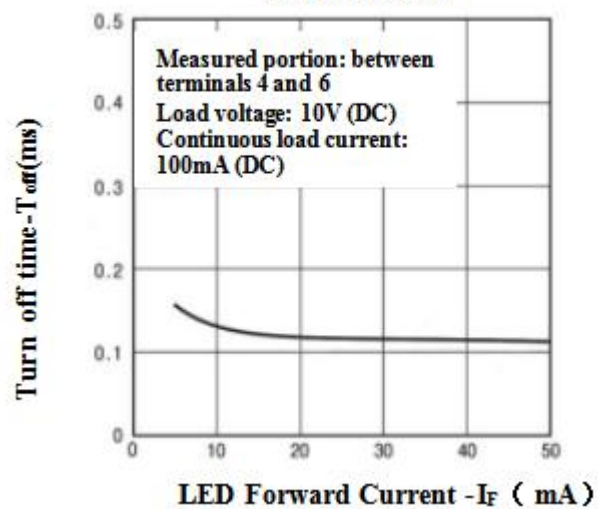
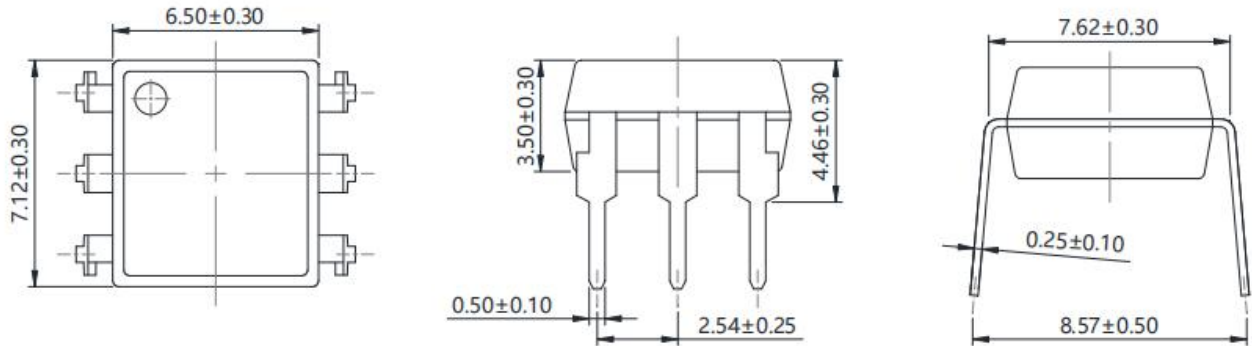


Fig.13 Turn off time vs. LED forward current characteristics

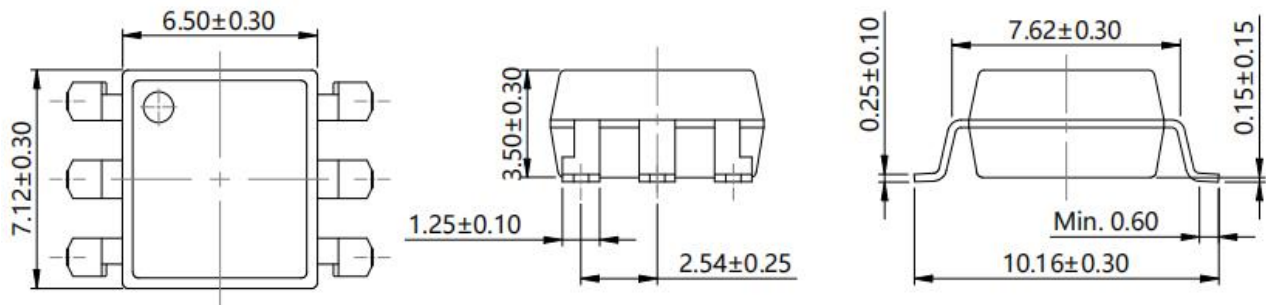


外形尺寸 Outline Dimensions

DIP6

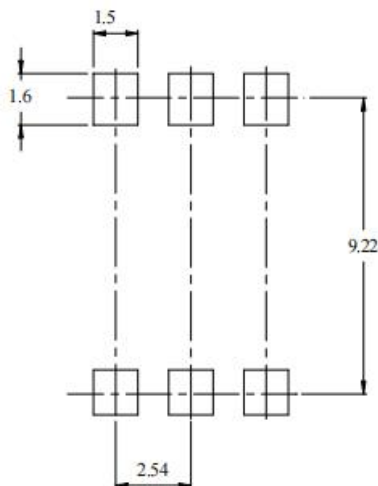


SMD6



单位 Unit: mm

建议焊盘布局 Recommended Pad Layout

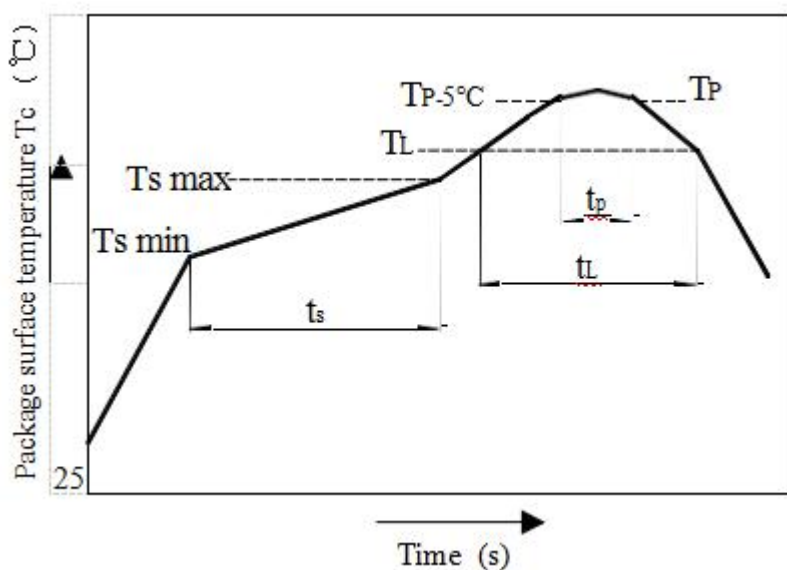


单位 Unit: mm

注：上图为产品正视图。

Note: The picture above is the front view of the product.

回流焊温度曲线图 Solder Reflow Profile

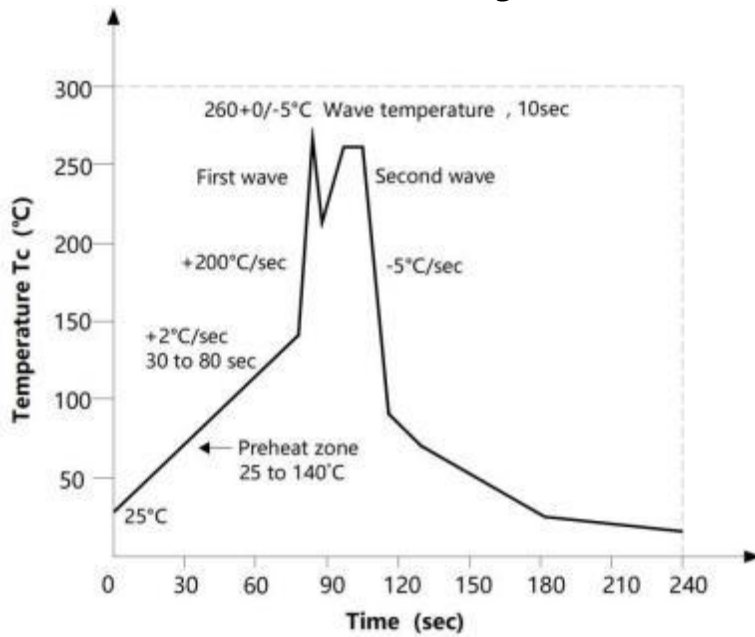


项目 Item	符号 Symbol	最小值 Min.	最大值 Max.	单位 Unit
预热温度 Preheat Temperature	T_s	150	200	°C
预热时间 Preheat Time	t_s	60	120	s
升温速率 Ramp-Up Rate (T_L to T_P)	-	-	3	°C/s
液相线温度 Liquidus Temperature	T_L	217		°C
时间高于 T_L Time Above T_L	t_L	60	150	s
峰值温度 Peak Temperature	T_P	-	260	°C
T_C 在 (T_P-5) 和 T_P 之间的时间 Time During 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	°C/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 $360^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ，时间 $\leq 3\text{s}$ 。
Manual soldering method Temperature: $360^{\circ}\text{C} \pm 5^{\circ}\text{C}$, within 3s.

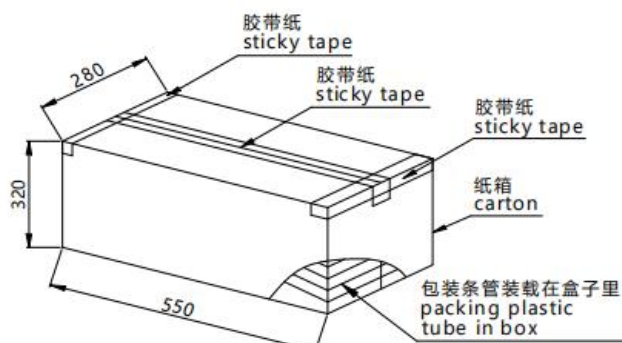
包装 Packing

■ 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
SMD6	卷盘 ($\phi 330\text{mm}$ 蓝盘)	1k 只/盘	2 盘/盒	10 盒/箱	450*400*0.075m m	340*340*60mm	620*360*365mm	首端空 50 个空格， 末端空 100 个空格
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
Package Type	Packing Form	Quantity per Reel	Quantity per Box	Quantity per Carton	Antistatic Bag Specification	Box Specification	Carton Specification	Note
SMD6	Reel ($\phi 330\text{mm}$ Blue)	1k pcs/reel	2 reels/box	10 boxes/ctn	450*400*0.075m m	340*340*60mm	620*360*365mm	Leave 50 Spaces at the beginning and 100 Spaces at the end
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

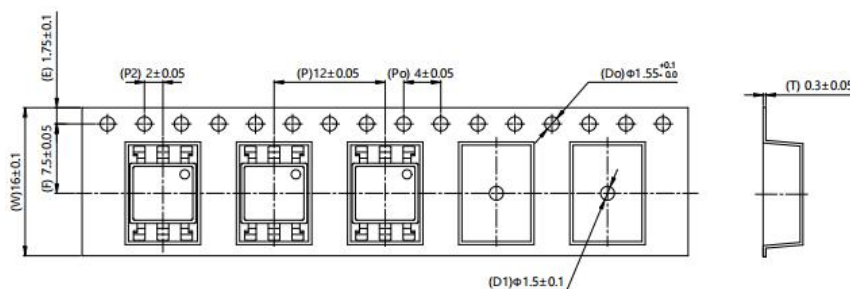
■ DIP6 条管包装 Tube

- 1) 每管数量：65只。
Qty/reel：65 pcs.
- 2) 每箱数量：32500 只。
Qty/ctn：32500 pcs.
- 3) 内包装：每盒 50 管。
Inner packing：50 tubes/box.



■ SMD6 编带包装 Tape & Reel

- 4) 每卷数量：1000 只。
Qty/reel：1000 pcs.
- 5) 每箱数量：20000 只。
Qty/ctn：20000 pcs.
- 6) 内包装：每盒 2 盘。
Inner packing：2 reels/box.
- 7) 示意图 Schematic：



单位 Unit：mm

注意 Attention

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