



**达林顿光耦**  
**Darling Optocoupler**  
**AT852**

**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 . aote se mi . co m](http://www.aotese mi .co m)

## 概述 Description

AT852 是一款由发光二极管和达林顿晶体管组成的高耐压( $V_{CEO} \geq 350V$ )光电耦合器。四引脚封装 ( DIP4、SMD4、DIP4-M )。

The AT852 is a photoelectric coupler composed of light-emitting diode and darlington transistor. It is packaged in a 4-pin package at DIP、DIP-M、SMD.

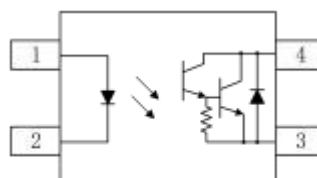
## 特性 Features

- 电流转换比(CTR)范围:  $CTR \geq 1000\%$  ( $I_F = 1mA, V_{CE} = 2V, T_a = 25^\circ C$ )  
Current transfer ratio:  $CTR \geq 1000\%$  ( $I_F = 1mA, V_{CE} = 2V, T_a = 25^\circ C$ )
- 输入-输出隔离电压 ( $V_{ISO} = 5000 V_{rms}$ )  
High isolation voltage between input and output( $V_{ISO} = 5000 V_{rms}$ )
- 集电极-发射极击穿电压  $BV_{CEO} \geq 350V$   
Collector-emitter breakdown voltage  $BV_{CEO} \geq 350V$
- 爬电距离  $\geq 7mm$   
Creepage distance  $\geq 7mm$
- 外部电气间隙  $\geq 7mm$   
External electrical clearance  $\geq 7m$
- $DIT \geq 0.4mm$

## 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



Pin Configuration



1. Anode
2. Cathode
3. Emitter
4. Collector

**产品型号命名规则 Order Code**
**AT 852 - UNY - WV (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 ( 852 )
- ③ 框架类型 Lead Frame ( Cu: 铜框架 Copper )
- ④ 树脂类型 Epoxy ( H: 无卤 Halogen-free )
- ⑤ 封装形式 Package ( D:DIP,S:SMD,M:DIP-M )
- 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 or None )
- 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



**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	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	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 <sub>IORM</sub>	1500	V <sub>peak</sub>	DIN/EN/DIN EN60747-5-5
瞬态隔离电压 Transient isolation voltage	V <sub>IOTM</sub>	7000	V <sub>peak</sub>	DIN/EN/DIN EN60747-5-5
隔离电压 Isolation Voltage	V <sub>iso</sub>	>5000	V <sub>rms</sub>	For 1 min, RH < 60%

**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	I <sub>F</sub>	60	mA
	反向电压 Reverse Voltage	V <sub>R</sub>	6	V
	峰值正向电流(1us, 脉冲) Peak forward current (1us, pulse)	I <sub>FP</sub>	1000	mA
	功耗 Power Dissipation	P <sub>D</sub>	100	mW
接收端 output	集电极功耗 Collector Power Dissipation	P <sub>C</sub>	300	mW
	集电极电流 Collector Current	I <sub>C</sub>	150	mA
	集电极-发射极电压 Collector-Emitter Voltage	V <sub>CEO</sub>	350	V
	发射极-集电极电压 Emitter-Collector Voltage	V <sub>ECO</sub>	0.1	V
总功耗 Total Power Dissipation	P <sub>tot</sub>	320	mW	
隔离电压 Isolation Voltage	V <sub>iso</sub>	5000	V <sub>rms</sub>	
工作温度 Operating Temperature	T <sub>opr</sub>	-55~+100	°C	
存储温度 Storage Temperature	T <sub>stg</sub>	-55~+125	°C	
焊接温度 Soldering Temperature	T <sub>sol</sub>	260	°C	

**产品特性参数 Electro-optical Characteristics (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	$V_F$	$I_F = 10\text{mA}$	-	1.2	1.4	V
	反向电流 Reverse Current	$I_R$	$V_R = 4\text{V}$	-	-	10	$\mu\text{A}$
	输入电容 Terminal Capacitance	$C_t$	$V=0, F=1\text{KHz}$	-	30	250	pF
接收端 Output	集电极暗电流 Collector Dark Current	$I_{CEO}$	$V_{CE} = 200\text{V}$	-	-	200	nA
	集电极-基极击穿电压 Collector-Base Breakdown Voltage	$BV_{CEO}$	$I_C = 0.1\text{mA}, I_F = 0$	350	-	-	V
	集电极-发射极击穿电压 Collector-Emitter Breakdown Voltage	$BV_{ECO}$	$I_E = 0.01\text{mA}, I_F = 0$	0.1	-	-	V
传输特性 Transfer Characteristics	电流传输比 Current Transfer Ratio	$CTR^*$	$I_F = 1\text{mA}, V_{CE} = 2\text{V}$	1000	-	-	%
	集电极-发射极饱和压降 Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 20\text{mA}, I_C = 100\text{mA}$	-	1.2	1.5	V
	隔离电阻 Isolation Resistance	$R_{ISO}$	DC=500V 40~60%R.H.	$5 \times 10^{10}$	$1 \times 10^{11}$	-	$\Omega$
	隔离电容 Isolation capacitance	$C_{ISO}$	$V=0, F=1\text{MHz}$	-	0.6	1	pF
	截止频率 Cut-off frequency	$F_C$	$V_{CE} = 5\text{V}, I_C = 2\text{mA},$ $R_L = 100\Omega, -3\text{dB}$	-	7	-	KHz
	上升时间 Rise Time	$T_r$	$V_{CE} = 2\text{V}, I_C = 10\text{mA},$ $R_L = 100\Omega$	-	-	300	$\mu\text{s}$
下降时间 Fall Time	$T_f$	-		-	100	$\mu\text{s}$	

注\* : 电流传输比= $I_C/I_F \times 100\%$ 。

Note\* :  $CTR = I_C/I_F \times 100\%$ 。

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

Fig.1 Relative Current Transfer Ratio vs. Forward Current

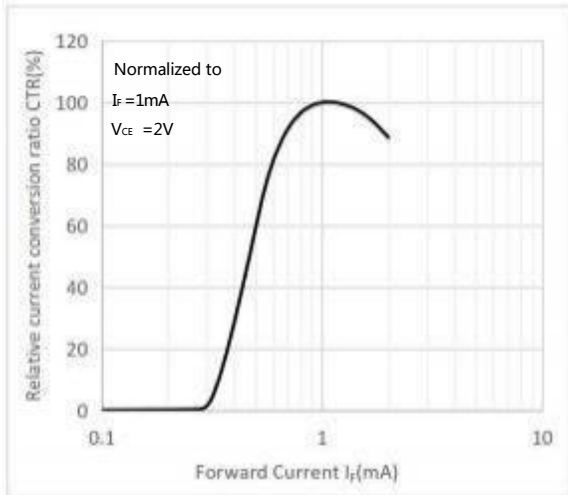


Fig.2 Forward Current vs. Forward Voltage

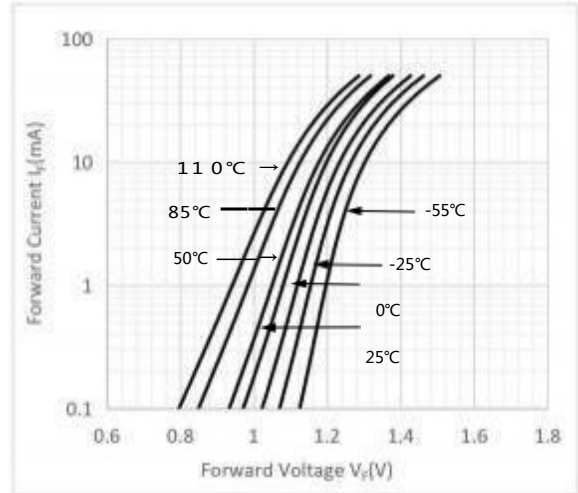


Fig.3 Collector Current vs. Collector-emitter Voltage

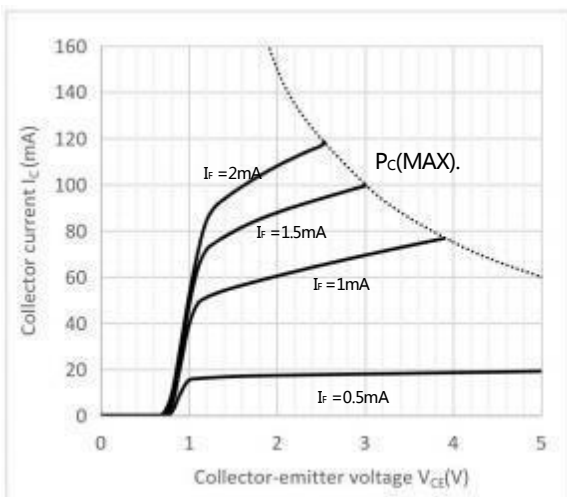


Fig.4 Relative Current Transfer Ratio vs. Ambient Temperature

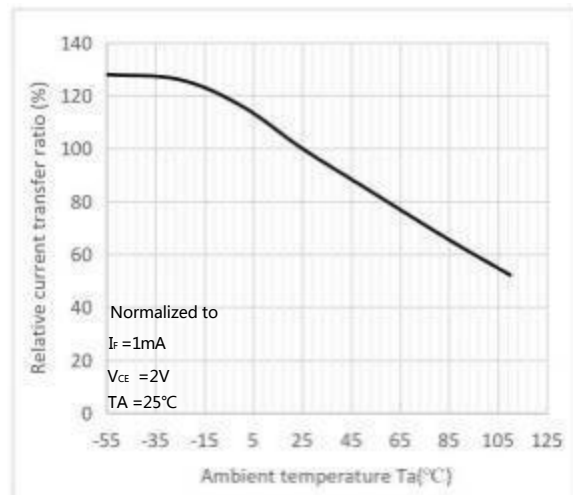


Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature

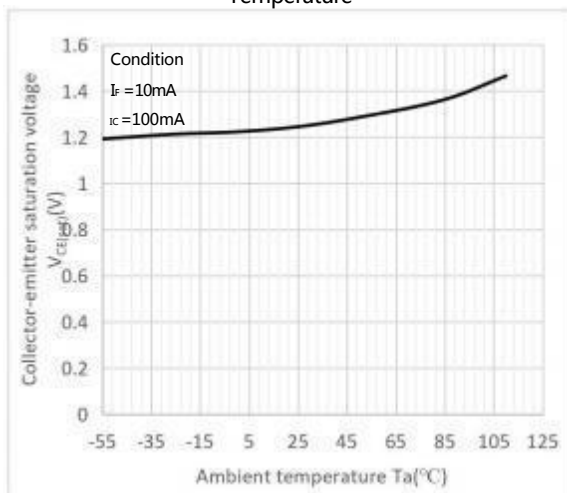


Fig.6 Collector Dark Current vs Ambient Temperature

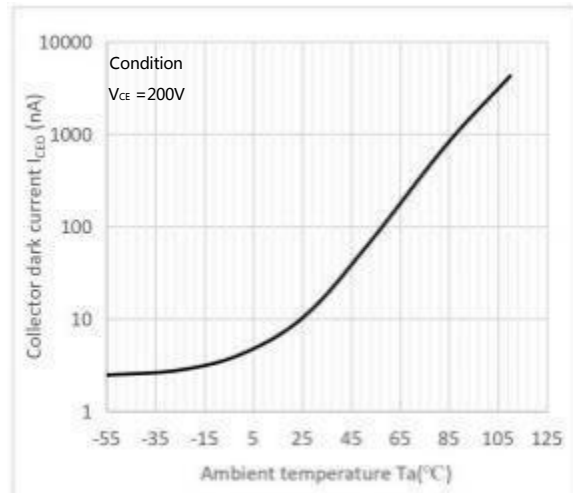


Fig.7 Response Time vs. Load Resistance

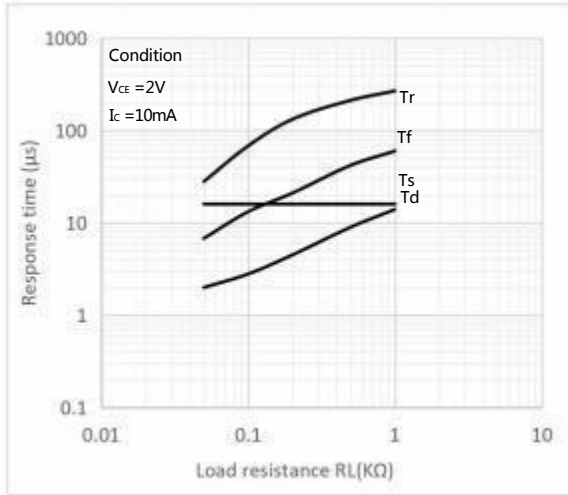


Fig.8 Frequency Response

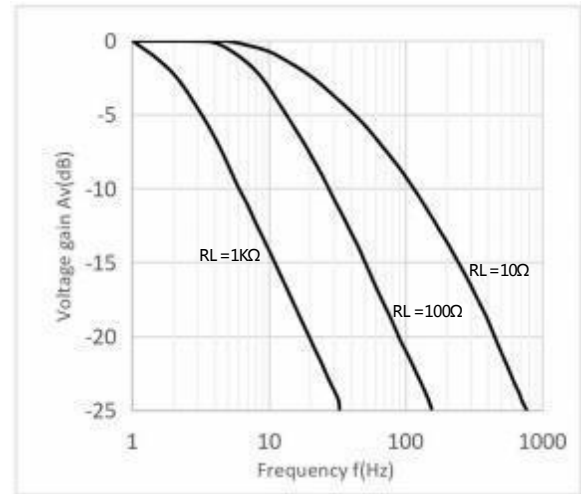


Fig.9 Collector-emitter Saturation Voltage vs Forward Current

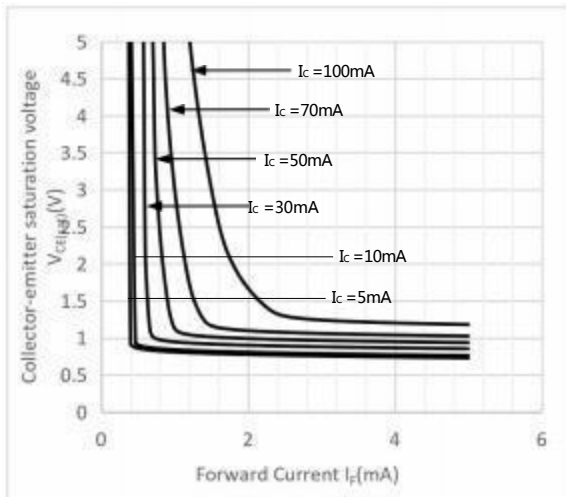
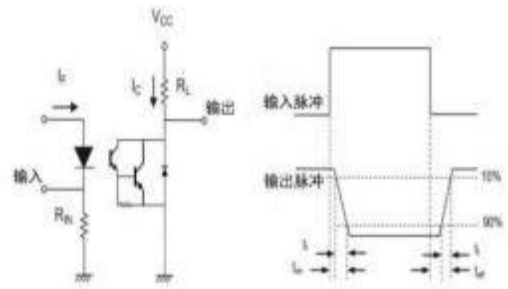
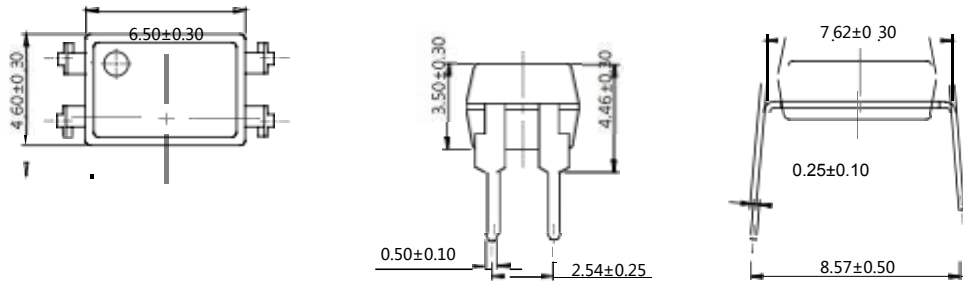


Fig.10 Switching Time Test Circuit & Waveforms

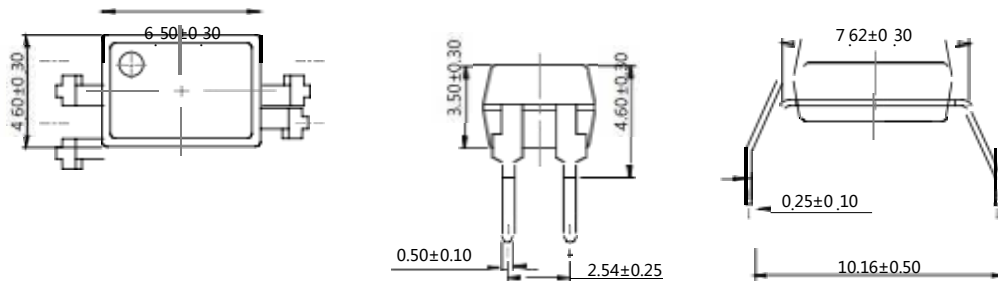


## 外形尺寸 Outline Dimensions

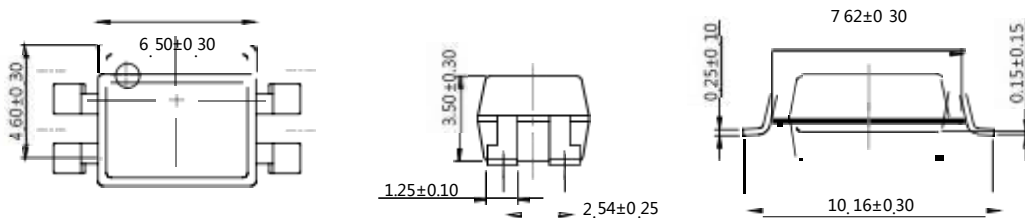
DIP4



DIP4-M



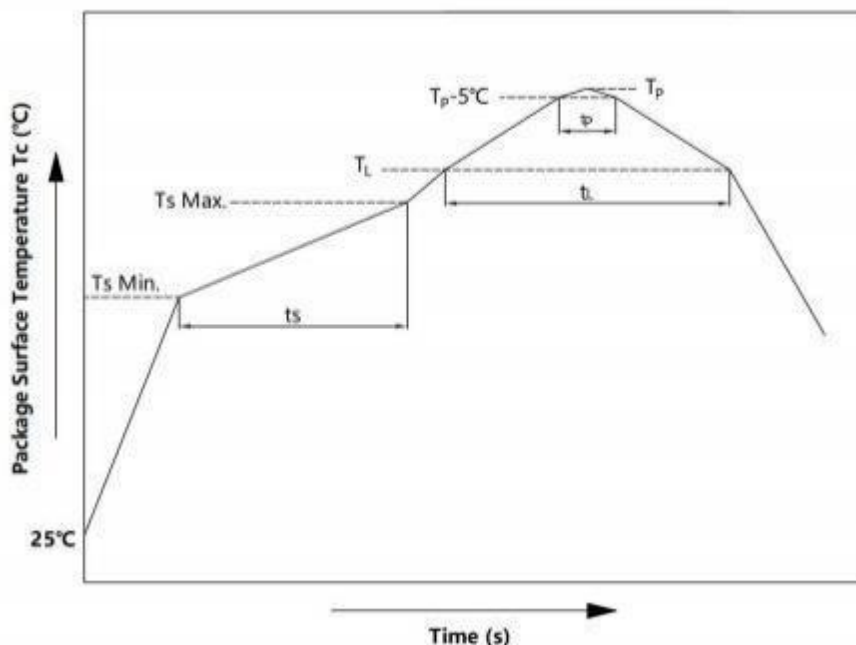
SMD



单位 Unit: mm



### 回流焊温度曲线图 Solder Reflow Profile



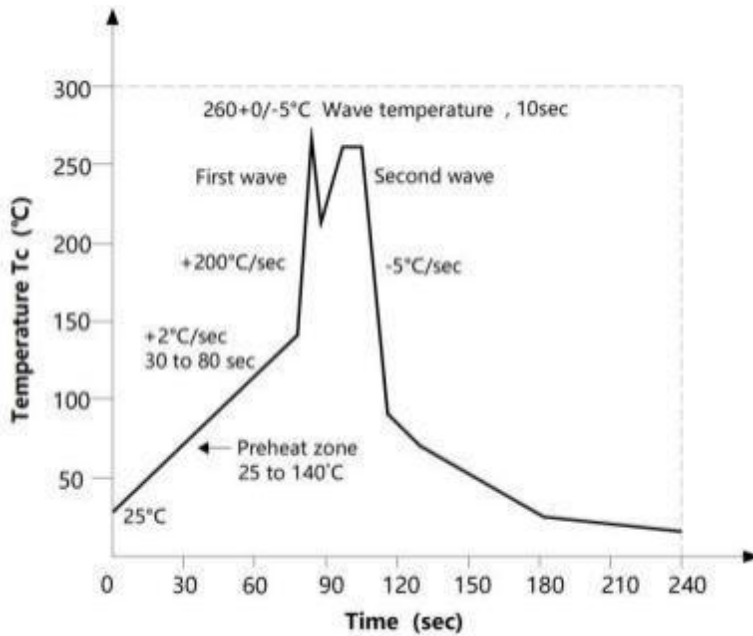
项目 Item	符号 Symbol	最小值 Min.	最大值 Max	单位 Unit
预热温度 Preheat Temperature	Ts	150	200	°C
预热时间 Preheat Time	ts	60	120	s
升温速率 Ramp-Up Rate (T <sub>L</sub> to T <sub>P</sub> )	-	-	3	°C/s
液相线温度 Liquidus Temperature	T <sub>L</sub>	217		°C
时间高于 T <sub>L</sub> Time Above T <sub>L</sub>	t <sub>L</sub>	60	150	s
峰值温度 Peak Temperature	T <sub>P</sub>	-	260	°C
T <sub>c</sub> 在(T <sub>P</sub> -5)和 T <sub>P</sub> 之间的时间 Time During Which T <sub>c</sub> Is Between (T <sub>P</sub> -5) and T <sub>P</sub>	t <sub>p</sub>	-	30	s
降温速率 Ramp-down Rate(T <sub>P</sub> to T <sub>L</sub> )	-	-	6	°C/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;

## 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.

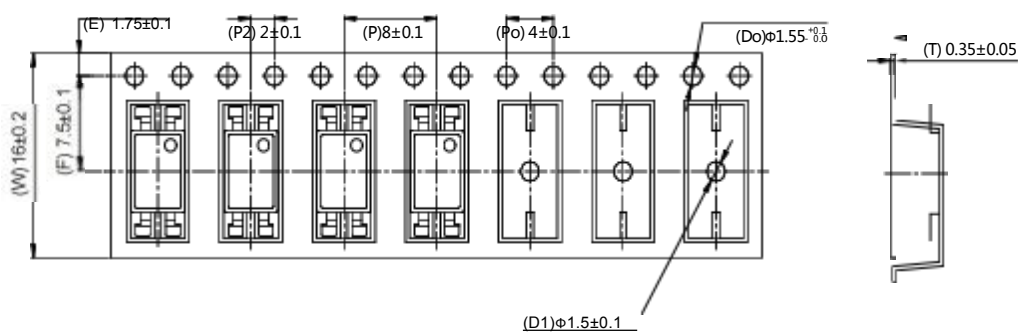
## 包装 Packing

### ■ 汇总表summaytable

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
SMD4	卷盘 ( $\phi$ 330mm蓝盘)	2000只/盘	2盘/盒	10盒/箱	450*390*0.1mm	340*60*34mm	620*360*365mm	首尾端空至少200mm
DIP4	管装 (500*12*11mm)	100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
DIP4-M	管装 (500*13*11mm)	100只/管	45管/盒	10盒/箱	不适用	525*136*58mm	535*295*310mm	
Package Type	Packing Form	Quantity per Reel	Quantity per Box	Quantity per Carton	Antistatic Bag Specification	Box Specification	Carton Specification	Note
SMD4	Reel ( $\phi$ 330mm Blue)	2000 pcs/reel	2 reels/box	10 boxes/ctn	450*390*0.1mm	340*60*34mm	620*360*365mm	Guard band 200mm min.
DIP4	Tube (500*12*11mm)	100 pcs/tube	50 tubes/box	10 boxes/ctn	NA	525*128*56mm	535*275*300mm	Endplug (blue) and Endplug (white) keep the direction
DIP4-M	Tube (500*13*11mm)	100 pcs/tube	45 tubes/box	10 boxes/ctn	NA	525*136*58mm	535*295*310mm	

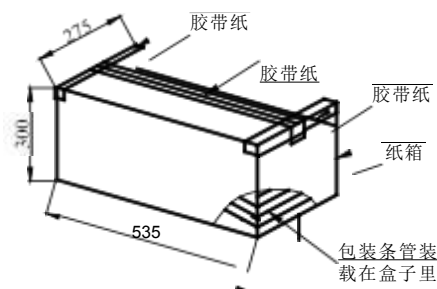
### ■ 编带包装Tape&Reel

- 1) 每卷数量：2000只。  
Qty/reel：2000 pcs.
- 2) 每箱数量：40000只。  
Qty/ctn：40000 pcs.
- 3) 内包装：每盒2盘。  
Inner packing：2 reels/box.
- 4) 示意图 Schematic：



### ■ 管条包装Tape&Tube

- 1) 每管数量：100只。  
Qty/Tube：100 pcs.
- 2) 每箱数量 DIP4/DIP4-M：50000/45000只。  
Qty/ctn DIP4/DIP4-M：50000/45000 pcs.
- 3) 内包装 DIP4/DIP4-M：每盒50/45管。  
Inner packing DIP4/DIP4-M：50/45 Tube/box.
- 4) 示意图 Schematic：



单位/Unit：mm

## 注意 Attention

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