



抑制浪涌电流用贴片热敏电阻器

Inrush current limiting SMD thermistor

编 号/Number	TRX-3-082	制定日期/Date	2023-12-06
版 本/Edition	A0	页 码/Page	Page I of IV

# 规格承认书

## Specification for approval

客户名称/CUSTOMER: XX

系列型号/SERIES TYPE: TN

物料名称/MATERIAL NAME: 抑制浪涌电流用贴片热敏电阻器

规格型号/MODEL NO.: 详见清单

产品环保要求 Product environmental protection requirements	ROHS 要求 ROHS requirements	REACH 要求 REACH requirements	卤素要求 Halogen requirements
	■	■	■

制作/prepare	客户确认（签署）/ customer to confirm (signed)     （签认后，敬请惠还壹份） (signed subscription, please also one copy)
Xu Guihai	
审核/check	
Tang Jialin	
批准/approve	
SUNNY	



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## 变更履历表/E.C.LIST

物料名称 Material name	抑制浪涌电流用贴片热敏电阻器 inrush current limiting SMD thermistor		日期 Date	2023-12-06
规格型号 Model NO.	详见清单 See list		版本 Edition	A0
版本 Edition	日期 Date	主要变更内容 Main update item	备注 Remarks	
A0	2023-12-06	新版 New Version		
修改 Modify	Zeng Lu	审核 Check	Tang Jialin	批准 Approve SUNNY



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附页 1/ attached sheet I:

## 承认规格/ Recognized specifications

料号/规格型号 Model NO.	零功率电阻值 Zero Power Resistance 25°C	最大稳态电流 Max. Current 25°C	最大通流时的残余电阻 Residual Resistance I <sub>max</sub>	耗散系数约 Dissipation Factor	热时间常数约 Thermal Time Constant	热敏指数 Thermal Sensitivity	工作温度 Operating Temperature Range
	R <sub>25</sub> (Ω)	I <sub>max</sub> (A)	R <sub>I<sub>max</sub></sub> (W)	δ(mW/°C)	τ(sec.)	B(K)	T <sub>L</sub> ~T <sub>U</sub> (°C)
TNG1R5M2	1.5	2	0.150	6	22	2500	-40~+170
TNG1R5M4		4	0.093	11	35	2600	-40~+170
TNG1R5M5		5	0.073	13	43	2600	-40~+170
TNG1R5M1	2.5	1	0.250	10	20	2600	-40~+170
TNG1R5M2		2	0.190	10	20	2600	-40~+170
TNG1R5M4		4	0.113	11	35	2600	-40~+170
TNG1R5M5		5	0.095	13	43	2600	-40~+170
TNG03M1	3	1	0.290	6	20	2500	-40~+170
TNG03M2		2	0.218	10	30	2600	-40~+170
TNG03M3		3	0.120	11	35	2600	-40~+170
TNG03M4		4	0.108	13	43	2600	-40~+170
TNG05M1	5	1	0.353	6	20	2500	-40~+170
TNG05M2		2	0.283	10	30	2600	-40~+170
TNG05M3		3	0.210	11	34	2600	-40~+170
TNG10M1	10	1	0.616	9	27	2600	-40~+170
TNG10M2		2	0.458	11	32	2800	-40~+170

注：若非特别指出，R25 的允许偏差为±20%

Note: Unless otherwise specified, the allowable deviation for R25 is ± 20%



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## 1.品名/Product Name

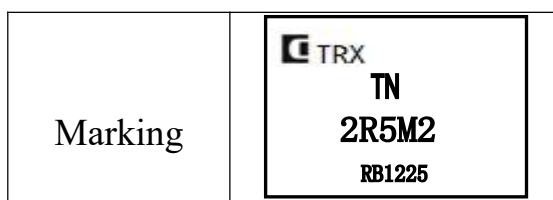
TN      G      2R5      M      2  
 ①      ②      ③      ④      ⑤

No.	代码 Code	说明 Explain
①	TN	TRX NTC 系列 TRX NTC series
②	G	封装尺寸 molding size G: 6.0*5.6mm
③	2R5	零功率电阻 (25°C) / R <sub>25</sub> zero-power resistance 1R5: 1.5Ω; 05: 5Ω ; 10: 10Ω
④	M	零功率电阻公差: M: ±20% Zero power resistance tolerance: M: ±20%
⑤	2	最大稳态电流: 2A Maximum steady state current: 2A

以上提到的各种代码为本公司规定标准应用!

Various code mentioned above for the company standard application!

## 2.产品印标/Product marking



日期代码/Date code: **RB1225**

R: 2023 年(按 TRX 制造日期代码);  
2023(By TRX manufacturing date code);

B: 高温锡膏;

High temperature solder paste;

12: 12 月 (01-12)

January(01-12)

25: 25 日 (01-31)

25th(01-31)

说明/Explanation	
	公司注册商标/品牌 registered trademark / brand
TN	系列 series
2R5M2	详见品名介绍 Please refer to the product name introduction for details
RB1225	日期代码 Date code



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### 3. 日期代码/Date code

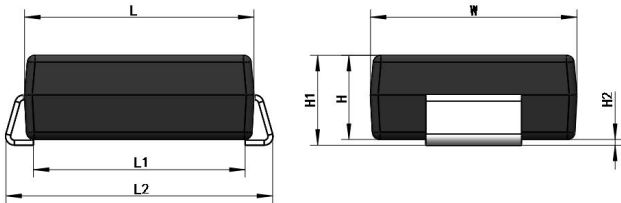
年代码 code of year		月代码 code of month		日代码 code of day					
year	code	year	code	month	code	day	code	day	code
↓	↓	2020	M	1	01	1	01	16	16
↓	↓	2021	N	2	02	2	02	17	17
2010	A	2022	P	3	03	3	03	18	18
2011	B	2023	R	4	04	4	04	19	19
2012	C	2024	S	5	05	5	05	20	20
2013	D	2025	T	6	06	6	06	21	21
2014	E	2026	U	7	07	7	07	22	22
2015	F	2027	V	8	08	8	08	23	23
2016	H	2028	W	9	09	9	09	24	24
2017	J	2029	X	10	10	10	10	25	25
2018	K	↓	↓	11	11	11	11	26	26
2019	L	↓	↓	12	12	12	12	27	27
						13	13	28	28
						14	14	29	29
						15	15	30	30
								31	31

注：年份代码每 20 年为一周期重复一次。

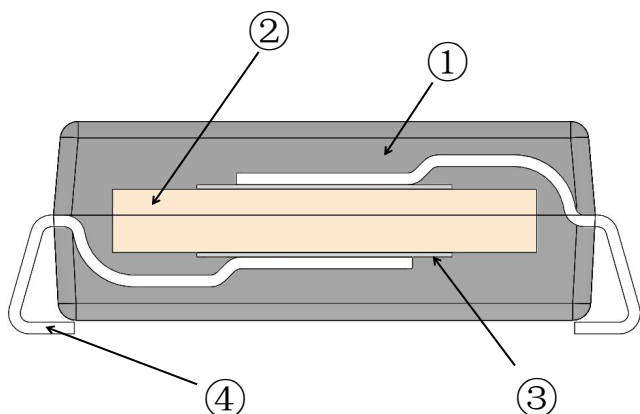
Note: the year code repeats once every 20 years for a one-week period.

## 4. 产品结构/ Product structure

### 4.1 产品尺寸/Product size

工程图 Drawing	产品尺寸 Product Dimension (mm)	封装编码: G Molding NO.: G	封装尺寸: 6.0*5.6(mm) Molding size: 6.0*5.6(mm)	
	L	6.0±0.5	W	5.6±0.5
	L1	5.5±0.5	H	2.2±0.3
	L2	7.0±0.5	H1	2.3±0.3
	H2	0.1 <sup>+0.3</sup> <sub>-0.1</sub>		

### 4.2 产品构造/Product structure

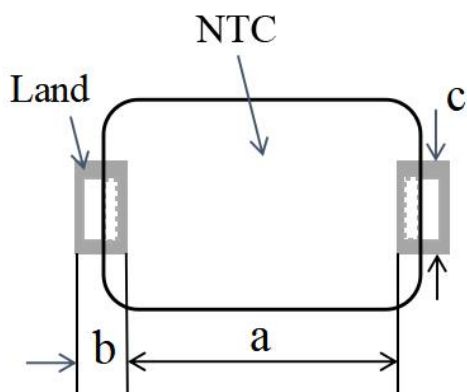


No.	名称 Part name	材料 Material
①	包封层 Coating	环氧树脂(UL94V-0) Epoxy molding compound (UL94V-0)
②	芯片 Chip	陶瓷芯片 Ceramic chip
③	焊料 Solder	Sn-Pb-Ag 焊料 Sn-Pb-Ag Solder
④	引脚 Lead Pin	铜合金 Copper alloy
		镀锡层 Tin coating

### 4.3 推荐焊盘/Solder Pad dimension

下面是回流焊的推荐焊接尺寸。

The recommendable land dimensions for reflow soldering are follows.



封装尺寸(mm) Molding Dimension	a(mm)	b(mm)	c(mm)
6.0×5.6	5.5max	2.2±0.1	3.6±0.1

## 5. 推荐焊接条件/ Recommended soldering condition

### 5.1 回流焊/Reflow Soldering

焊接 NTC 时，应在以下条件下进行。  
When soldering NTC, it should be performed in following conditions.

焊接温度：最大  $260 \pm 5^\circ\text{C}$

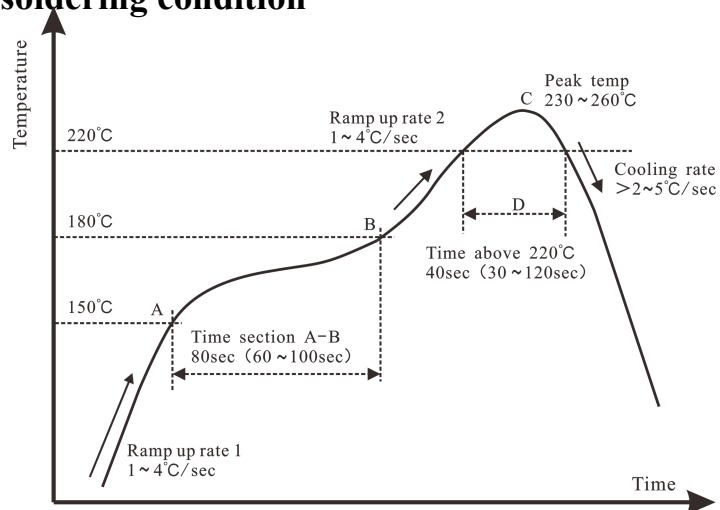
Soldering temperature:  $260 \pm 5^\circ\text{C}$

焊接时间：最大 120 秒。

Soldering time: 120s max.

预热温度：最大  $150^\circ\text{C}$ 。

Preheating temperature:  $150^\circ\text{C}$  max.



推荐回流焊曲线  
Recommended reflow soldering curve

### 5.2 波峰焊/Wave Soldering

焊接 NTC 时，应在以下条件下进行。  
When soldering NTC, it should be performed in following conditions.

焊接温度：最大  $260 \pm 5^\circ\text{C}$

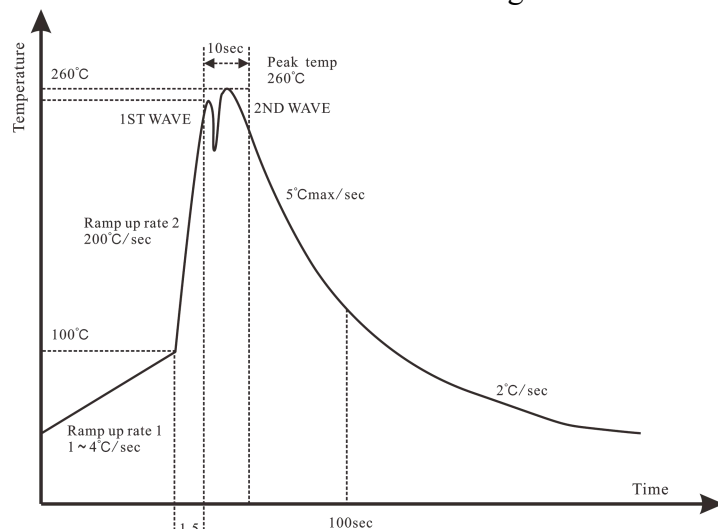
Soldering temperature:  $260 \pm 5^\circ\text{C}$

焊接时间：最大 10 秒。

Soldering time: 10s max.

预热温度：最大  $100^\circ\text{C}$ 。

Preheating temperature:  $100^\circ\text{C}$  max.



推荐波峰焊曲线  
Recommended Wave Soldering curve

### 5.3 烙铁焊/Soldering Iron

将本产品焊接至 PCB/PWB 时，不得超过 NTC 的最高耐热性。将本产品过度加热可能会融化内部连接焊料，并可能导致热冲击，从而导致陶瓷元件开裂。

When welding this product to PCB/PWB, the maximum heat resistance of NTC must not be exceeded. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.

用烙铁焊接 NTC 时，应在下列条件下进行。

When soldering NTC with a soldering iron, it should be performed in following conditions.

烙铁尖温度：最大  $400^\circ\text{C}$ 。

Temperature of iron-tip:  $400^\circ\text{C}$  max.

烙铁瓦数：最大 50 瓦。

Soldering iron wattage: 50W max.

焊接时间：最大 5 秒。

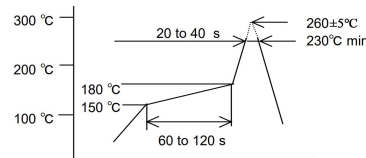
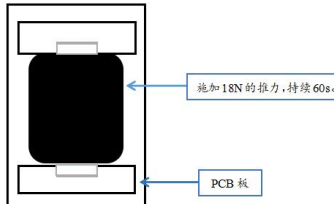
Soldering time: 5s max.



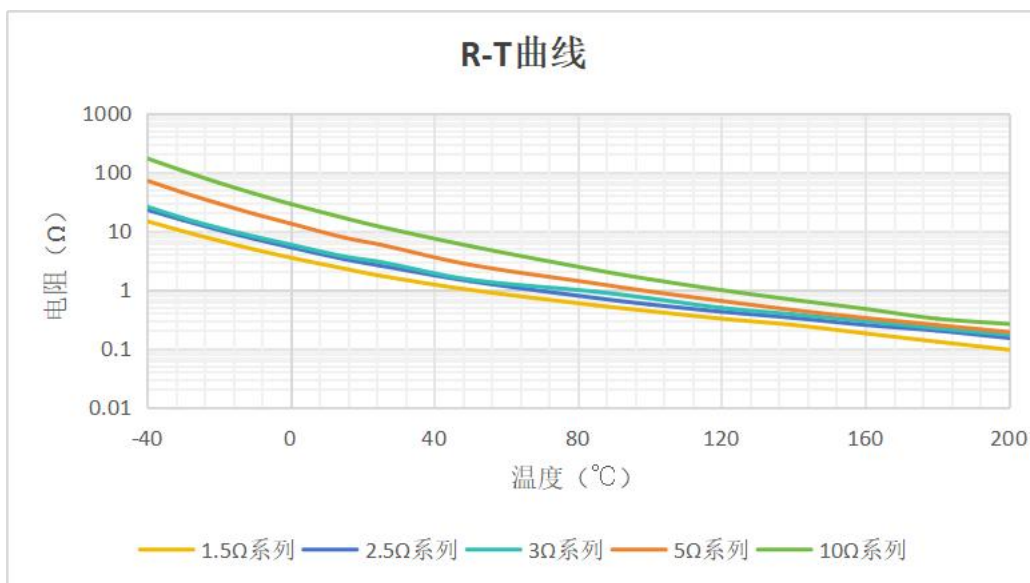


## 6.性能和测试方法/ Performance and test methods

NO	项目 Item	规范 Specification	测试方法 test method															
1	外观 Appearance	无可见损伤 No visible damage 标记清晰 Legible marking 引脚无氧化、表面无杂物 Lead pin is not oxidation and its surface is without sundries.	肉眼或放大镜 unaided eye or magnifier															
2	尺寸 Dimensions	详见 4.1 See 4.1 for details	使用卡尺和千分尺 Using calipers and micrometers															
3	高温储存 High Temperature Storage	外观无损伤 No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$	试验温度/Test Temperature: Tu (最高工作环境温度) $\pm 5^{\circ}\text{C}$ 试验时间/Test Time: 1000 $\pm$ 24H															
4	温度快速变化 Rapid change of temperature	外观无损伤 No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$	温度急变按下表条件循环 5 个周期 The conditions shown below shall be repeated 5 cycles <table border="1" data-bbox="1157 1182 1455 1352"> <thead> <tr> <th>Step</th> <th>Temperature(<math>^{\circ}\text{C}</math>)</th> <th>Period(minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>T_L \pm 5</math></td> <td>30<math>\pm</math>3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>5<math>\pm</math>3</td> </tr> <tr> <td>3</td> <td><math>T_H \pm 5</math></td> <td>30<math>\pm</math>3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>5<math>\pm</math>3</td> </tr> </tbody> </table>	Step	Temperature( $^{\circ}\text{C}$ )	Period(minutes)	1	$T_L \pm 5$	30 $\pm$ 3	2	Room temperature	5 $\pm$ 3	3	$T_H \pm 5$	30 $\pm$ 3	4	Room temperature	5 $\pm$ 3
Step	Temperature( $^{\circ}\text{C}$ )	Period(minutes)																
1	$T_L \pm 5$	30 $\pm$ 3																
2	Room temperature	5 $\pm$ 3																
3	$T_H \pm 5$	30 $\pm$ 3																
4	Room temperature	5 $\pm$ 3																
5	稳态湿热 Damp Heat Steady State	外观无损伤 No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$	试验温度 Test Temperature: 40 $\pm$ 2 $^{\circ}\text{C}$ 试验湿度 Test Humidity : 90~95%RH 试验时间 Test Hours: 1000 $\pm$ 24H															
6	最大电流耐久性 Life	外观无损伤 No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$	试验环境温度为 25 $\pm$ 5 $^{\circ}\text{C}$ ，将成品施加 1000 $\pm$ 24 小时最大稳态电流 Ambient temperature at 25 $\pm$ 5 $^{\circ}\text{C}$ , 1000 $\pm$ 24h, I <sub>max</sub>															
7	电循环耐久性 Electric Cycle	外观无损伤 No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$	试验环境温度为 25 $\pm$ 5 $^{\circ}\text{C}$ ，施加最大稳态电流，通/断：60S/300S，1000 次循环 Ambient temperature at 25 $\pm$ 5 $^{\circ}\text{C}$ , ON/OFF:60S/300S,1000times at I <sub>max</sub> 。															

NO	项目 Item	规范 Specification	测试方法 test method
8	耐焊接热 Resistance to soldering heat	外观无损伤 No visible damage $ \Delta R_{25}/R_{25}  \leq 20\%$	回流峰值 Reflow(peak): $260 \pm 5^\circ\text{C}$ 焊接区 Solder zone: $230^\circ\text{C min}$ , 20-40s 
9	可焊性 Solderability	包锡良好(上锡率 90%以上), 在 3 秒内流合。 Good tin coating (tin rate above 90%), within 3s of convergence.	将 NTC 浸入乙醇(JIS K 8101)和松香(JIS K 5902)溶液中(松香重量比例为 25%)。(参考) Immerse the NTC in the solution of ethanol (JIS K 8101) and rosin (JIS K 5902) (25% rosin in weight proportion). (Reference) 在焊料溶液中浸泡 $2 \pm 0.5\text{s}$ 。 Immerse in solder solution for $2 \pm 0.5\text{s}$ . 焊料温度 Temp. of solder: $245 \pm 10^\circ\text{C}$
10	终端粘合强度 Adhesive strength of termination	$ \Delta R_{25}/R_{25}  \leq 20\%$	如图所示, 将 NTC 焊接到 PCB 上, 然后沿 箭头方向施加 18N 的力, 持续时间 60s。 As shown in the figure, solder the NTC onto the PCB and apply a force of 18N in the direction of the arrow for 60 seconds. 
11	抗振性 Vibration resistance	$ \Delta R_{25}/R_{25}  \leq 20\%$	频率范围 Frequency ranges: $10 \rightarrow 55 \rightarrow 10\text{Hz}$ 振幅/swing: $0.75\text{mm}$ 总时间为 6 小时 The total duration shall be 6 hours 在 X, Y, Z 曝光时间为 2 小时 duration of exposure at X,Y,Z: 2hours

## 7.电阻温度特征曲线 (R—T Characteristic Curve)



## 8.有毒有害物质含量控制要求/Content of toxic and harmful substances control requirements

RoHS2.0 2011/65/EU

Halogen 卤素

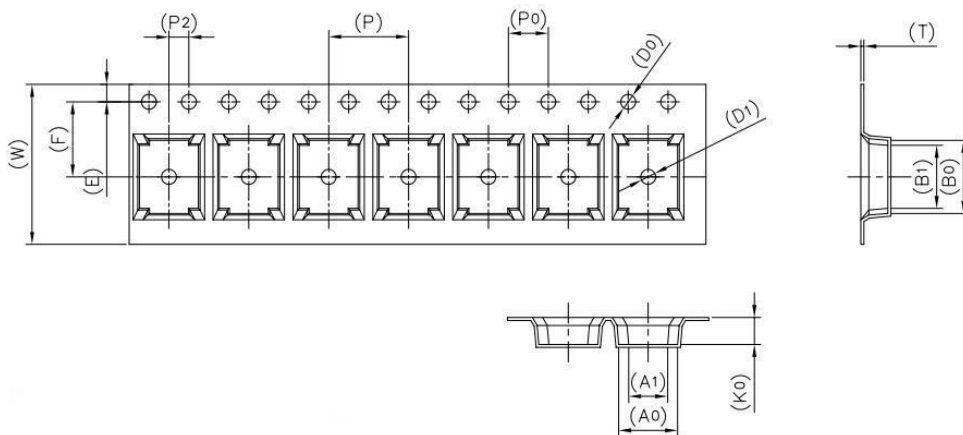
REACH No190 7/2006

**RoHS H.F.  
REACH**

物质名称 Substances	含量 concentration (unit: ppm)
镉及镉化合物/Cadmium and cadmium compounds	<100
铅及铅化合物/Lead and lead compounds	<1000
汞及汞化合物/Mercury and mercury compounds	<1000
铬及铬化合物/Hexavalent chromium compounds	<1000
多溴联苯 PBBS/Polubrominated biphenyls	<1000
多溴联苯醚 PBDES/Polubrominated diphenylethers	<1000
镉+铅+汞+六价铬/Cd+Pb+ Hg + Cr+6(packing materials)	<100
氯/Cl	<900
溴/Br	<900
氯+溴/Cl+Br	<1500
REACH 高度关注物质 SVHC Substances of Very High Concern (SVHC) of REACH	以 TRX 最新 REACH 报告为准 The latest reach report of TRX shall prevail

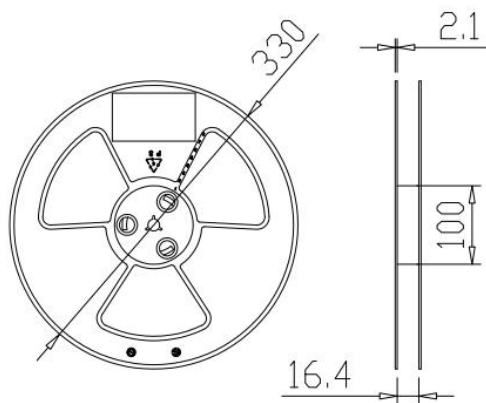
## 9. 产品包装/Product packaging

### 9.1 载带尺寸/Dimension of tape



ITEM	W	A0	B0	K0	E	F	P	P0	P2	D0	D1	T	A1	B1
DIM	16.0	5.90	7.30	2.70	1.75	7.50	8.00	4.00	2.00	1.50	1.50	0.30	3.00	6.30
TOLE	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05	±0.10	±0.10

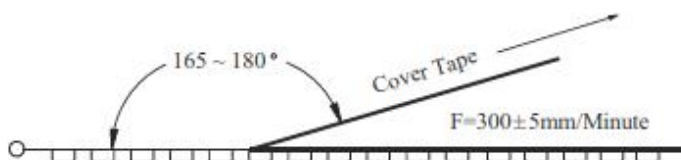
### 9.2 卷盘/REEL



REEL	REEL SIZE
3000pcs	13inch

### 9.3 剥离强度/Peeling Strength






Item	Data	Remark
Cover tape adhesion	10 ~ 100g	Carrier tape and cover tape open angle 165 ~ 180° F=300±5mm/minute



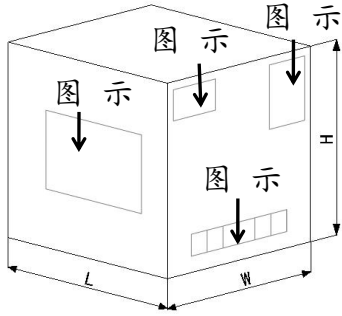



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## 9.4 包装数据表/Product Packaging Scheme

## 内包装/inner-packaging:

 <p>卷盘尺寸/Reel Size: 13inch 3.0KPCS/Reel</p>		 <p>TRX 特锐祥 TNG2R5M2</p> <p>TRX 料号 内盘标签/Inner disc label</p>	项目/Item	
		TRX.Des	物料描述	
		P/N	客户料号	
		Mfr	特锐祥料号	
		D/C	生产日期	
		Lot.No	生产批号	
		Q~TY	数量	
 <p>产品信息标签 /Product information label</p>		 <p>密封袋上的标签 /Label on Sealed bag</p>		 <p>湿敏标签 /Humidity sensitive label</p>

## 外包装/Outer-packaging:

	 <p>TRX 特锐祥 专注电阻器</p>		
图示 1/Figure 1	图示 2/Figure 2	图示 3/Figure 3	
尺寸(mm) Dimension			数量 Quantity
L	W	H	外箱重量 Out Box Weight
365	358	304	≈15KG

## 包装示意图/Package sketch:

 <p>外箱/Out Box</p>	 <p>13 卷盘/盒/13 Reel/Box</p>	 <p>托盘尺寸(长/宽/高) Pallet Size(L/W/H) 1100*1100*90mm</p>	 <p>堆放体积(长/宽/高) Stacking volume(L/W/H) 1100*1100*1600mm</p>
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备注: 1. 包装箱上的“5”是堆叠层数不能超过 5 层; 2. PALLET 包装& 远距离运输时 WRAPPING; 3. 50cm 以上高度不可抛落下; 4. 常温/常湿保管。

**Remark:** 1. The 5 on the packing is stacked layers can't more than 5 layers; 2. Pallets packaging & long-distance transport should be warpping; 3. 50 cm above the height of the parcel do not drop; 4. Normal temperature / humidity keeping.





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## 10. 储存条件/Storage conditions

①. 绝缘环氧树脂模制 NTC 未形成完美的密封；因此，不要在腐蚀性的环境中使用或储存 NTC，尤其是氯化物气体、硫化物气体、酸、碱、盐或类似物质都存在的环境，还要避免暴露在潮湿的环境中。为了避免水分的吸收，NTC 应包装在防潮的密封袋里。

The insulating Epoxy molded NTC does not form a perfect seal; therefore, do not use or store NTC in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. And avoid exposure to moisture. So, in order to avoid the absorption of moisture, NTC are packed in moisture-proof envelope.

②. NTC 应在以下条件中储存。

Store the NTC in the following conditions at all times.

温度/Temperature: 10 ~ 30°C

湿度/Humidity: 60%max.

③. 在打开防潮包装后 168 小时内焊接 NTC。打开后，将 NTC 储存在装有干燥剂和湿敏卡的防潮包装中，并保持上述状态。

Solder the enclosed NTC within 168 hours after opening the moisture-proof package. After opening, store the NTC in moisture-proof package with a desiccant and HIC card and keep the above condition.

④. 如果储存期超过 12 个月或打开包装后封闭湿敏卡的指示颜色发生变化，则在焊接前进行烘烤（60°C×168）小时。

In case the storage period has been exceeded 12 months or the indicator color of a enclosed HIC card has changed when the package has been opened, perform baking (60°Cx168hr) before soldering.

## 11. 注意事项/Application notes

①. 用户进行的重复通流试验可能损坏 NTC，故试验后的 NTC 不可以当合格品再使用。

Attention is drawn to the fact that repetition of the through-flow test by the user may damage the NTC.

②. NTC 在 PCB 板上安装时要求 PCB 板焊盘需与 NTC 引脚贴焊点吻合，相反可能会导致 NTC 与 PCB 板焊接不良，NTC 引脚变形或本体破坏而损坏 NTC。

NTC mounted on a printed circuit board (PCB) requirements of PCB board welding disc required and NTC pin paste solder joint agreement, the opposite may cause the NTC and the PCB board to bad welding and NTC tube deform the feet or body destruction and damage the NTC.

③. 避免任何挤压，弯折，外部撞击。

Avoid any compressive, tensile or flexural stress.

④. 焊接于 PCB 板的 NTC 不可用力移动或将本体用力倾斜。

Do not move the NTC after it has been soldered to the board.

⑤. 不可用焊接于 PCB 板后的 NTC 将板提取，可能会导致 NTC 焊接和包封层破损。

Do not pick up the PC board by the soldered NTC.