

■ NTC 温度传感器 NTC TEMPERATURE SENSOR

NTC 热敏电阻是一种负温度系数电阻器，其阻值随环境温度的升高而降低，这种热敏电阻是由 2 种或 4 种铁、镍、钴、锰或铜的金属氧化物经过成型并在高温下烧结而制得。

NTC thermistor sensor is a Negative Temperature Coefficient Resistor whose resistance changes with ambient temperature changes. Thermistor comprises 2 or 4 kinds of metal oxides of iron, nickel, cobalt, manganese and copper, being shaped and sintered at high temperature.



◆ 特性 Feature

- *高精度、高稳定 High precision and high stability
- *反应速度快 Fast reaction time
- *优良的搞热冲击 Resistant to heat shock
- *耐湿性优良 Moisture resistant

◆ 应用领域 Application

*家电类，主要用于空调、冰箱、洗衣机、小家电等家电类产品，芯片主要用小方片（环氧型）、轴向玻封电阻、单端玻封电阻；

Household appliances category, mainly used in products such as air conditioners, refrigerators, washing machines, and small household appliances. The chips mainly include small square chips (Epoxy type), axial glass-sealed resistors, and single-ended glass-sealed resistors.

*工控类，主要用于逆变器、UPS 电源、电机模块等产品，芯片主要用小方片（环氧型）和单端玻封电阻；

Industrial control category, mainly used in products such as inverters, UPS power supplies, and motor modules. The chips mainly include small square chips (Epoxy type) and single-ended glass-sealed resistors.

*储能与新能源类，主要用于 BMS、CCS、储能电柜等产品，芯片主要用小方片（环氧型）；

Energy storage and new energy category, mainly used in products such as BMS, CCS, and energy storage cabinets. The chips mainly include small square chips (Epoxy type).

*医疗类，主要用于额温枪、电子温度计、其它各类医疗设备等，芯片主要用小方片（环氧型）、单端玻封电阻；

Medical category, mainly used in products such as forehead thermometers, electronic thermometers, and other medical devices. The chips mainly include small square chips (Epoxy type) and single-ended glass-sealed resistors.

*车规类，主要用于汽车控制类产品，包含电池、电机、冷却系统等产品，芯片主要用小方片（环氧型和单端玻封电阻）。

Automotive category, mainly used in automotive control products, including batteries, motors, and cooling systems. The chips mainly include small square chips (Epoxy type) and single-ended glass-sealed resistors.

◆ 型号表示法 Part Number

*产品规格型号说明 Product specification and Model description

FH-CWF	59E	103	F	3950	F	L100	U	B	XH
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

编号 (NO.)	符号 (Symbol)	含义 (Mean)
①	FH-CWF	风华传感器 (Feng Hua Sensor)

②	59F	59F 型 (59F Type)
③	103	零功率阻值 10K Ω (Rated Zero Power Resistance:10K Ω)
④	F	阻值精度误差: $\pm 1\%$ (Resistance Tol: $\pm 1\%$)
⑤	3950	B 值: $R_{25/50}=3950K$ (B Value: $R_{25/50}=3950K$)
⑥	F	B 值精度误差为 $\pm 1\%$ (B Value Tol: $\pm 1\%$)
⑦	L100	总长: 100mm (Total length: 100mm)
⑧	U	U: 普通线 (U: Regular Wire) T: 铁氟龙线 (T: Teflon Wire)
⑨	B	B: 黑色导线 (B: Black Wire) W: 白色导线 (W: white wire)
⑩	XH	端子型号: XH (Terminal Model: XH)

*常用技术参数 Common technical parameters

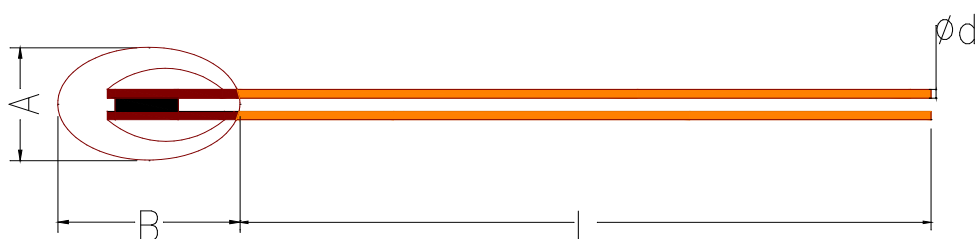
型号(Type)	25°C标称阻值 (Rated Zero Power Resistance@25°C)	阻值精度 (Resistance Tol.)	B 值 (25/50) (B Value (25/50))	B 值精度(B Value To)
10K3380	10 K Ω	$\pm 1\%$ $\pm 2\%$ $\pm 3\%$ $\pm 5\%$	3380	$\pm 1\%$ $\pm 2\%$ $\pm 3\%$ $\pm 5\%$
10K3950	10 K Ω		3950	
5K3470	5 K Ω		3470	
100K3950	100 K Ω		3950	
100K4200	100 K Ω		4200	

注: 以上仅为常用技术参数, 可根据客户需求定制参数。

Note: The above are only common technical parameters, can be customized according to customer requirements.

◆结构及尺寸Structure And Dimensions

*FH-CWF51



A	B	L	ϕd
± 0.2	± 0.5	± 1	± 0.05
1.25/1.7	2.0/3.0	32/66	0.2

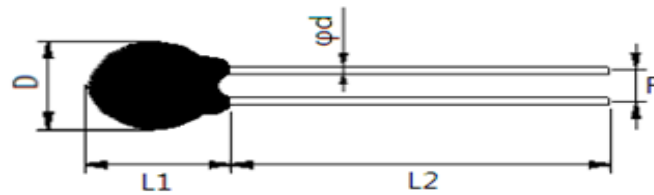
封装: 1.25mm (小头) 或 1.7mm (大头) 玻璃封装 (杜美丝焊接)

Encapsulation: 1.25mm (small head) or 1.7mm (big head) glass encapsulation (Dumas soldering)

引线: 0.2mm 带引出端杜美丝线。

Lead: 0.2 mm tape lead-out end Dumé wire.

*FH-CWF52A



D	L1	L2	φ d	F
max	max	min	± 0.05	± 0.5
4.0	5.0	25	0.35/0.5	2.5

包封：环氧树脂

Envelope: epoxy

引线：0.35mm 或 0.5mm 镀锡铜包钢线。

Lead wire: 0.35 mm or 0.5 mm tinned copper clad steel wire.

*FH-CWF52B



A	B	C	E	L
max	max	± 3/5	± 1	MIN
2.5/3.0/3.5	6.0/10.0	10/15	3	25

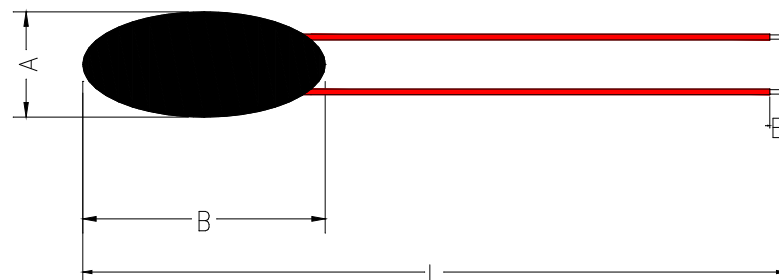
包封：环氧树脂

Envelope: epoxy

引线：32#/30#/28#/26#AWG 双并线或单线。

Lead: 32 #/30 #/28 #/26 # AWG double or single wire.

*FH-CWF52C



A	B	L	E	φ d
max	max	min	± 1	± 0.05

1.5/1.2	4.0	25	3	0.28/0.17
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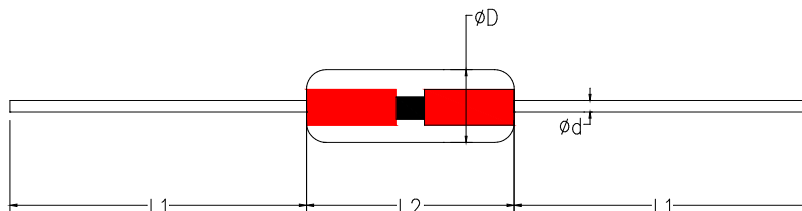
包封：环氧树脂

Envelope: epoxy

引线：0.28mm 或 0.17mm 漆包线。

Lead Wire: 0.28 mm or 0.17 mm enameled wire.

*FH-CWF58



L1	L2	D	d 2
± 2	± 0.2	± 0.2	± 0.05
28	3.8	1.8	0.5

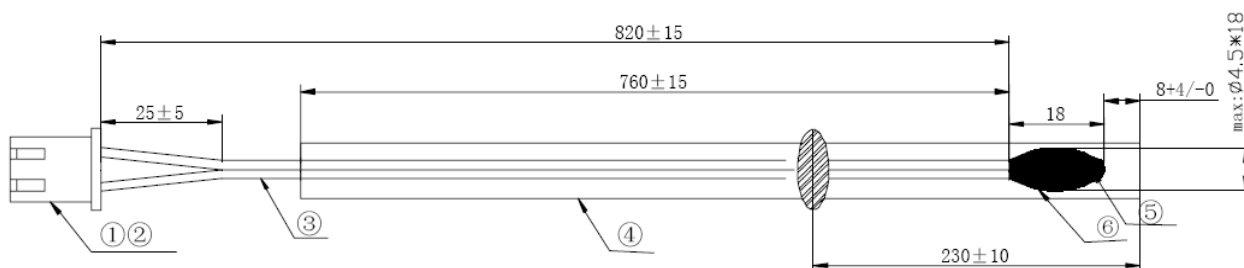
包封：玻璃封装（杜美丝压接）

Encapsulation: glass encapsulation (Dumas crimping)

引线：0.47mm 带引出端杜美丝线

Lead Wire: 0.47 mm tape lead-out end Dumé wire

*FH-CWF59A



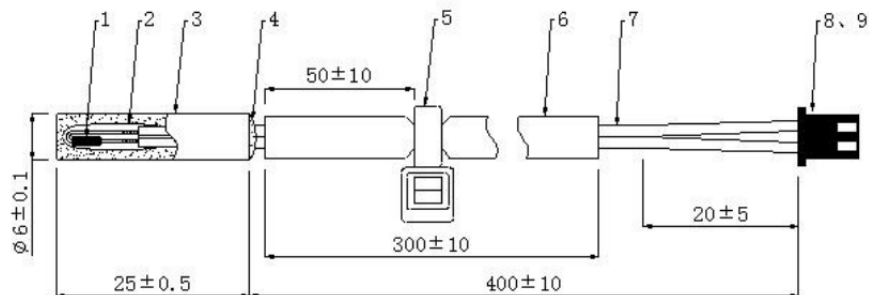
编号 (NO.)	项目 (Project)	要求 (Requirement)	特征 (Features)
1	端子 (Terminal)	XH-TE 或根据客户需求 (XH-TE or according to customer requirements)	
2	连接器 (Connectors)	XHS-2Y 或根据客户需求 (XH-2Y or according to customer requirements)	白色/红色/黄色等 (white/red/yellow, etc.)
3	引线 (Lead wire)	1、AWG24#/26#/28# 2、105℃/125℃/150℃ 3、UL2651/UL4413/UL****等	黑色/白色/红色等 (Black/white/red, etc.)
4	热缩套管 (Heat shrinkable sleeve)	$\phi 4.0$ 套管 ($\phi 4.0$ TUBE)	透明/黄色/黑色等 (Transparent/yellow/black, etc.)

5	热敏电阻 (Thermistor)	R=2~470K、B=3000~4500	
6	封装胶 (Encapsulation glue)	环氧胶 (Epoxy adhesive)	黑色 (Black)

注：①②可选择剥线沾锡；④可以选择不加套管或者用热缩管，套管可以选择超声波压接或扎带。

Note: ①② Wire stripping and soldering are optional; ④ No sleeve or heat shrink tube may be used, with sleeve options including ultrasonic crimping or ribbon binding.

*FH-CWF59B/C



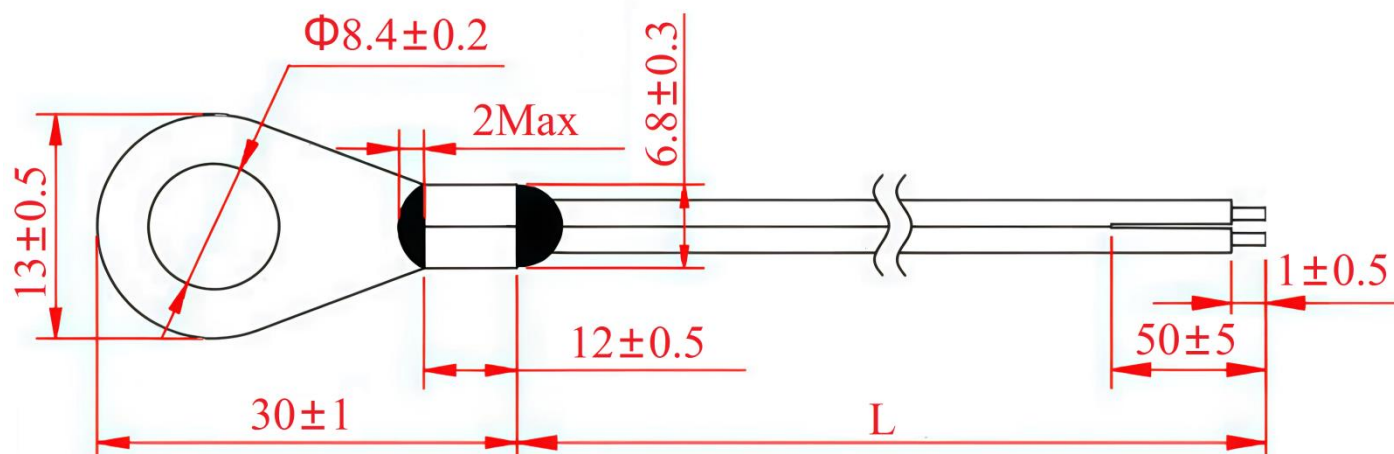
编号 (NO.)	项目 (Project)	规格 (Specifications)	特征 (Features)
1	热敏电阻 (Thermistor)	R25=2~470K Ω 、B25/50=3000~4500K	
2	封装胶 (Encapsulation glue)	环氧胶 (Epoxy adhesive)	黑色 (Black)
3	外壳 (The shell)	59B: 塑胶管 (59B: Plastic) 59C: 紫铜管 (59C: copper tube)	白色 (White) 紫铜色 (Copper)
4	灌封胶 (Filling sealant)	环氧胶 (Epoxy adhesive)	黑色 (Black)
5	尼龙扎带 (Nylon ties)	尼龙扎带或热熔压接 (Nylon tie-in or hot melt crimping)	
6	套管(TUBE)	UL 热缩套管、玻纤套管或 PVC 套管 (UL heat shrinkable sleeve, glass fiber sleeve or PVC sleeve)	透明/黄色/黑色等 (Transparent/yellow/black , etc.)
7	线材(Wire)	1、AWG24#/26#/28# 2、105℃/125℃/150℃ 3、UL2651/UL4411/UL4413 等	黑色/白色/红色等 (Black/white/red, etc.)
8	端子(Terminal)	XH-T 或根据客户需求 (XH-T or according to customer requirements)	
9	连接器(Connectors)	XH-2Y 或根据客户需求 (XH-2Y or according to customer requirements)	白色/红色/黄色等 (White/red/yellow, etc.)

注：⑥⑦可选择剥线沾锡；④可以选择不加套管。各尺寸也可按客户要求定制。

若需要不锈钢感温头，选择 FH-CWF59D，其感温头尺寸根据客户需求定制，其它可参照以上参数。

Note: ⑥⑦may choose to strip and Dip Tin; ④ may choose not to add casing. All sizes can also be customized according to customer requirements. If need stainless steel temperature sensor head, choose FH-CWF59D, its temperature sensor head size according to customer demand customization, other can refer to the above parameters.

*FH-CWF59F

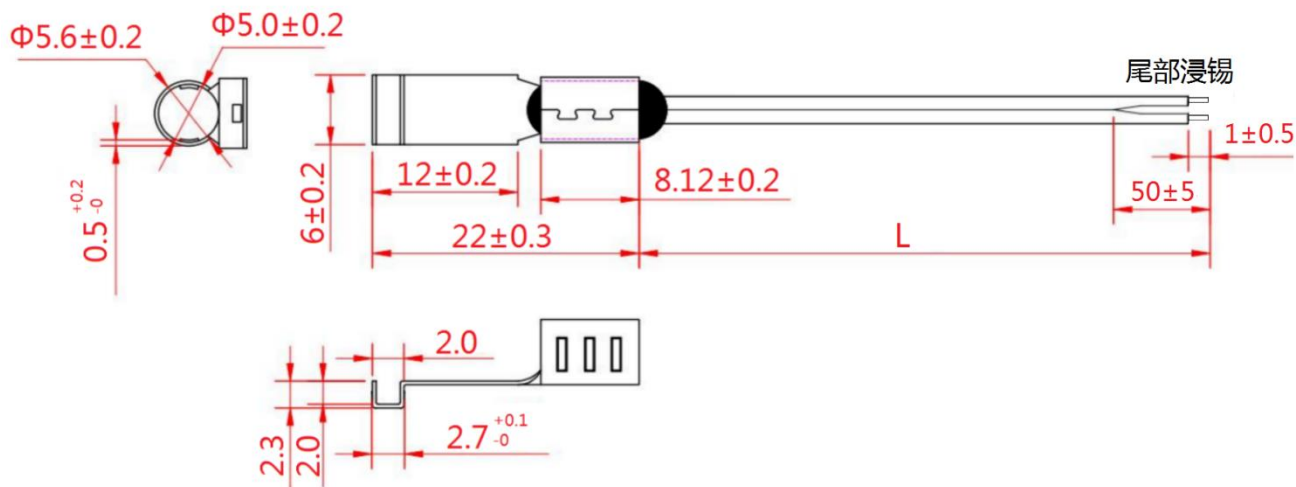


编号 (NO.)	项目 (Project)	规格 (Specifications)	特征 (Features)
1	外壳 (The shell)	1、 A 可选 7~15mm 2、 B 安装孔可选 M3/M4/M5 等螺孔 59E:外壳方型; 59F:外壳圆型 (1、 The A choose 7~15mm 2、 The B installation hole is available in M3/M4/M5 screw holes. 59E: Square housing; 59F: Round housing)	
2	热敏电阻 (Thermistor)	R25=2~470KΩ、B25/50=3000~4500K	
3	封装胶 (The Sealant)	环氧树脂(Epoxy)	黑色 (Black)
4	线材(Wire)	1、 AWG24#/26#/28# 2、 105℃/125℃/150℃ 3、 UL2651/UL4413/UL****等	黑色/白色/红色等 (Black/white/red, etc.)
5	端子(Terminal)	XH-T 或根据客户需求 (XH-T or according to customer requirements)	
6	连接器(Connectors)	XH-2Y 或根据客户需求 (XH-2Y or according to customer requirements)	白色/红色/黄色等 (White/red/yellow, etc.)

注：⑤⑥可选择剥线沾锡；①可以选管径 4mm/5mm/6mm；②阻值可根据客户需求定制。各尺寸也可按客户要求定制。

Note: ⑤⑥can choose to strip and Dip Tin; ① can choose diameter of 4mm/5mm/6mm; ②resistance value can be customized according to customer needs. All sizes can also be customized according to customer requirements.

*FH-CWF59E/F



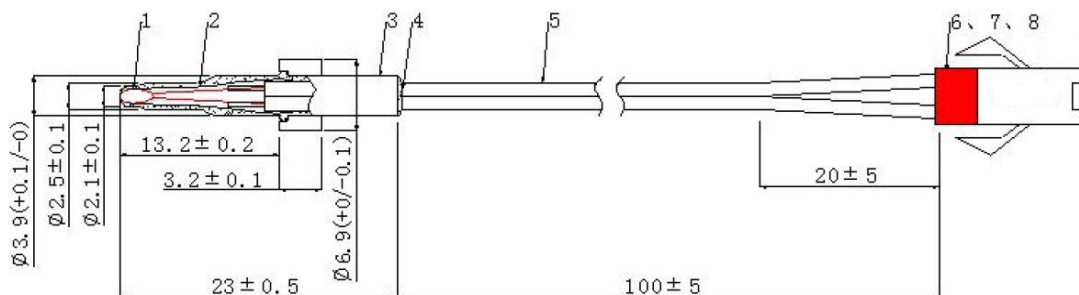
编号 (NO.)	项目 (Project)	规格 (Specifications)	特征 (Features)
1	外壳 (The shell)	可选: 1、6x12+Φ5.6x8.12x22x0.3t(H2.3,W2.7) 温度采集 U 形纯镍端子 (Option: 1、 6x12+Φ5.6x8.12x22x0.3t(H2.3,W2.7) U-shaped pure nickel terminal for temperature measurement) 2、6x12+5.6x12x25.9x0.3t(H2.0,W2.7) 温度 采集 U 形纯镍端子 (6x12+5.6x12x25.9x0.3t (H2.0, W2.7) U-shaped pure nickel terminal for temperature measurement) 3、6x10.3+5.6x8.12x20x0.3t(H1.5,W2.1)温度 采集 U 形纯镍端子 (6x10.3+5.6x8.12x20x0.3t (H1.5, W2.1) U-shaped pure nickel terminal for temperature measurement) 4、7x10.3+5.6x8.12x20x0.3t(H1.5,W2.1)温度 采集 U 形纯镍端子 (7x10.3+5.6x8.12x20x0.3t (H1.5, W2.1) U-shaped pure nickel terminal for temperature measurement) 5、8x13.7+5.6x8.12x23.7x0.3t(H2.0,W2.7)温 度采集 U 形纯镍端子 等 (8x13.7+5.6x8.12x23.7x0.3t(H2.0, W2.7) U-shaped pure nickel terminal for temperature measurement, etc)	纯镍 (Pure Nickel)
2	热敏电阻 (Thermistor)	R25=2~470KΩ、B25/50=3000~4500K	
3	封装胶 (The Sealant)	环氧树脂 (Epoxy)	黑色 (Black)
4	线材 (Wire)	1、AWG24#/26#/28# 2、105°C/125°C/150°C 3、UL2651/UL4413/UL****等 (UL2651/UL4413/UL****, etc.)	黑色/白色/红色等 (Black/white/red, etc.)

5	端子(Terminal)	XH-T 或根据客户需求 (XH-T or according to customer requirements)	
6	连接器(Connectors)	XH-2Y 或根据客户需求 (XH-2Y or according to customer requirements)	白色/红色/黄色等 (White/red/yellow, etc.)

注：⑤⑥可选择剥线沾锡；①可以选不同规格的宽度外壳；②阻值可根据客户需求定制。各尺寸也可按客户要求定制。

Note: ⑤⑥can choose to strip and Dip Tin; ① can choose different widths of the shell in various specifications.; ②resistance value can be customized according to customer needs. All sizes can also be customized according to customer requirements.

*FH-CWF59G



编号(NO.)	项目(Project)	规格 (Specifications)	特征(Features)
1	热敏电阻 (Thermistor)	R25=2~470KΩ、B25/50=3000~4500K	
2/4	包封 (Encapsulation)	环氧树脂(Epoxy)	黑色 (Black)
3	外壳 (The shell)	可根据客户的需求定制(Can be customized according to customer need)	
5	导线(Wire)	1、AWG24#/26#/28# 2、105℃/125℃/150℃ 3、UL2651/UL4413/UL****等 (UL2651/UL4413/UL****, etc.)	黑色/白色/红色等 (Black/white/red, etc.)
6、7、8	端子与连接器(Terminal and Connectors)	根据客户的安装需求 (Can be customized according to customer needs)	白色/红色/黄色等 (White/red/yellow, etc.)

注：⑥⑦⑧可选择剥线沾锡；各尺寸也可按客户要求定制。

Note: ⑥⑦⑧ can choose to strip and Dip Tin; all sizes can also be customized according to customer requirements.

◆电气性能 Performance Specification

项目 (Project)	性能要求 (Specification request)
1.标称零功率电阻值(25℃) (Rated Zero Power Resistance@25℃)	10KΩ ± 1%
2.B 值 (25/50) (B Value (25/50))	3950K ± 1%
3.耗散系数 (Thermal Dissipation Constant)	2mW / °C
4.热时间常数(Thermal Time Constant)	12S
5.工作温度(Operation Range)	-40℃~+125℃
6.耐电压(Withstand voltage)	> 1800VAC 5mA 10S

◆可靠性试验 Reliability Data

项目(Project)	试验条件(Test conditions)	性能要求(Specification request)
1. 引线端子的抗拉强度(Tensile Strength of Lead Wire Terminal)	固定热敏电阻本体，并沿轴向向每个端子逐渐施加10N负载，将该负载保持 10 ± 1 秒。 (Secure the thermistor body and gradually apply a 10N load to each terminal axially, holding the load for 10 ± 1 seconds.)	无可见损伤 电阻变化率： $\pm 2\%$ (No break out and damage Resistance change: within $\pm 2\%$)
2. 引线端子的弯曲强度(Bending Strength of Lead Wire Terminal)	将热敏电阻垂直于引线固定，在引线上沿轴向悬挂下列负载。(Thermistor is held so that it is perpendicular to the lead wire with the following lead hanging in the axial direction of the lead wire.) 将引线慢慢弯曲到 90° 并复原。(The lead wire is slowly bent to 90° and returned.) 然后再慢慢朝相反方向弯曲，并恢复到原始状态。(Then it is slowly bent in the opposite direction and returned to original state.)	引线不断 电阻变化率： $\pm 2\%$ (Lead wire does not come off Resistance change: within $\pm 2\%$)
3. 振动(vibration)	频率：10~55 Hz 振幅：0.75mm 方向和时间：X、Y及Z轴各2小时 (Frequency: 10~55 Hz Amplitude modulation: 0.75 mm Direction and time: X、Y and Z direction for 2hrs each)	无机械损伤 电阻变化率： $\pm 2\%$ (No substantial damage Resistance change: within $\pm 2\%$)
4. 可焊性(Solderability)	焊锡槽 温度： $245 \pm 5^\circ\text{C}$ 时间： 3 ± 0.5 s (Solder tank Temperature: $245 \pm 5^\circ\text{C}$ Time: 3 ± 0.5 s)	涂布面积： $\geq 95\%$ (Covered termination: $\geq 95\%$)
5. 耐焊接热(Solder ability)	把引线浸入 $260 \pm 5^\circ\text{C}$ 的焊锡6mm深，持续 5 ± 1 秒时间，静置24小时后测试。 (The lead wires shall be dipped in a molten solder of $260 \pm 5^\circ\text{C}$ for ≤ 5 seconds up to the point ≥ 6 mm. after the specimen shall be left at room ambient temperature for 24 hours, the resistance shall be measured.)	电阻变化率： $\pm 2\%$ (Resistance change: within $\pm 2\%$)
6. 高温放置 (高温保存)(Dry heat (high temperature storage))	在 $125 \pm 2^\circ\text{C}$ 中放置1000+48小时，静置2小时后测试 (Specimen shall be subjected to an ambient of $125 \pm 2^\circ\text{C}$ for 1000+48 hours. the specimen shall be left at room ambient for 1 to 2 hours, the resistance shall be measured)	电阻变化率： $\pm 2\%$ (Resistance change: within $\pm 2\%$)

7. 低温放置 (低温保存) (Cold(low temperature storage))	在 $-40\pm 3^{\circ}\text{C}$ 中放置 1000+48 小时, 静置 2 小时后测试 (Specimen shall be subjected to an ambient of $-40\pm 3^{\circ}\text{C}$ For 1000+48 hours.and after the specimen shall be left at room ambient for 1 to 2 hours,the resistance shall be measured)	电阻变化率: $\pm 2\%$ (Resistance change:within $\pm 2\%$)
8. 稳态湿热(humidity test)	$40\pm 2^{\circ}\text{C}$ 90~95%RH,1000 hrs ($40\pm 2^{\circ}\text{C}$ 90~95%RH,1000 hrs)	电阻变化率: $\pm 2\%$ (Resistance change:within $\pm 2\%$)
9. 温度快速变化(Temp Cycle test)	$-40^{\circ}\text{C}/30' \rightarrow 25^{\circ}\text{C}/5' \rightarrow +125^{\circ}\text{C}/30' \rightarrow 25^{\circ}\text{C}/5'$ 循环五个周期 (5 cycles)	电阻变化率: $\pm 2\%$ (Resistance change:within $\pm 2\%$)

◆环保情况说明 Environmental Protection Statement

我司提供的所有热敏电阻物料均符合最新欧盟 ROHS 指令及 Reach 法规要求, 请贵司放心使用。

We provide all materials conform to the requirements of the latest eu ROHS directive and the Reach regulation, please rest assured to use.

◆贮存方法 Storage Methods

元器件必须储存在清洁、通风、无腐蚀性气体的仓库内; 除另有规定外, 仓库的温度和相对湿度必须满足如下要求: a.温度: $5\sim 30^{\circ}\text{C}$; b 相对湿度: 20%~75%; 储存期限:1 年。

Components must be stored in a clean, ventilated, non-corrosive gases warehouse; Unless otherwise specified, the warehouse temperature and relative humidity must meet the following requirements: a.Temperature: $5\sim 30^{\circ}\text{C}$;b. Relative humidity: 20% ~ 75%; Period of Storage : 1 year.

◆使用注意事项 Precautions For Use

1、工作环境温度应该在技术条件规定的范围以内。

1、Working environment temperature should be within the prescribed scope of technical conditions.

2、不应该靠近发热或可燃元器件安装, 最好有大于 3 毫米的间隔, 以免损坏元器件。

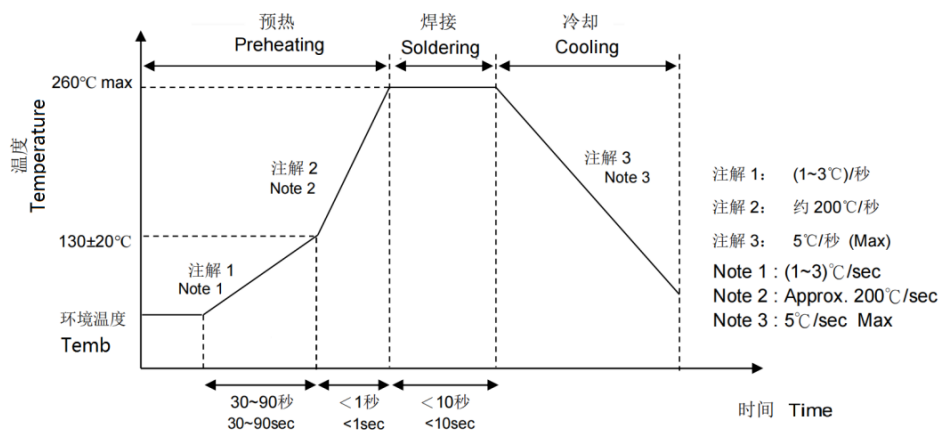
2、Near a fever or flammable components should not be installed, it is better to have more than 3 mm intervals, so as not to damage the components.

3、接触引脚时请先佩戴手套。

3、 Please wear gloves when the contact pin.

◆推荐焊接条件 Soldering Recommendation

*波峰焊曲线 Wave soldering curve:



*手工烙铁焊接工作条件 Manual soldering iron welding working conditions:

项 目(Project)	条 件(Condition)
烙铁头温度 (Iron tip temperature)	360°C (max)
焊接时间 (Weldtime)	1Sec (max)
距离热敏头长度 (Distance to thermal head length)	7mm(min)
注意: 烙铁头不要触碰到热敏电阻头部 (Note: Do not let the tip of the soldering iron touch the head of the thermal resistor)	

◆修订履历 Revise Resume

版本 (Version)	日期 (Date)	修订内容 (Revision Content)	修订人 (Reviser)
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