编码(Coding)：JK/JXC260808006

# 南京时恒电子科技有限公司

Nanjing Shiheng Electronics Co.,Ltd.

## 产品承认书

APPROVAL SHEET

| | |
|---|---|
| 客户名称 CUSTOMER： | |
| 产品名称 PART NAME： | MF11 补偿型 NTC 热敏电阻器<br>MF11 Compensation NTC Thermistor |
| 产品型号 PART NUMBER： | MF11 502K |
| 版次 REV.NO： | C0 |
| 日期 DATE： | 2026-8-8 |

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# 变更登记表

## REVISED RECORD SHEET

| 版次 REV. NO | 变更日期 REV.DATE | 变更内容 CHANGE CONTENT | 申请人 APPLICANT | 批准人 APPROVED |
|---|---|---|---|---|
| A0 | 2015/10/11 | 版本制定。<br>Version formulation | 鞠晓丽 | 李少媛 |
| B0 | 2022/4/1 | 更新规格书版本格式，增加版次管控，细化规格纸。<br>Update for version form of data sheet, add to management and control for number of edition, refine to PN and draw. | 吴迎丽 | 李少媛 |
| C0 | 2025/12/01 | 更新规格书版本格式，去掉：产品图纸此一页的变更履历表<br>Update for version form of data sheet, Remove: Change history table on this page of the product drawing | 刘星月 | 李少媛 |
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## 1、产品型号说明 Product model specification

MF11 502 K

① ② ③ ④

① ：时恒品牌

② MF11：补偿型 NTC 热敏电阻

③ 502：25℃的零功率电阻值 5kΩ

④ K：阻值精度代码 J-±5% K-±10% M-±20%

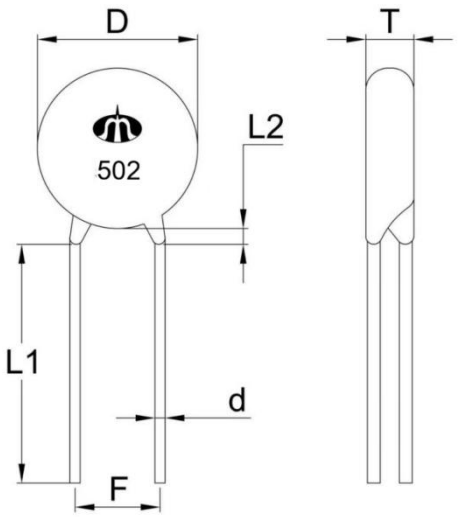
## 2、电气性能 Electrical Characteristics

| No. | 项目 Item | 符号 Symbol | 测试条件 Test conditions | 单位 Unit | 性能要求 Requirements |
|---|---|---|---|---|---|
| 2.1 | 25℃的零功率电阻值 Zero Power Resistance at 25℃ | $R_{25}$ | Ta=25±0.5℃ (测试功率≤0.1mW 空气中测试) (Test Power≤0.1mW，in air) | kΩ | 5KΩ±10% |
| 2.2 | B 值 B-value | $B_{25/50}$ | B=[(Ta×Tb)/(Tb-Ta)]×ln(Ra/Rb) Ta=25±0.01℃ Tb=50±0.01℃ | K | 3950±10% |
| 2.3 | 耗散系数 Thermal dissipation Coefficient | δ | 静止空气中 In still air | mW/℃ | 约 4.5 |
| 2.4 | 时间常数 Thermal time constant | τ | 静止空气中 In still air | sec | 约 20 |
| 2.5 | 绝缘电阻 Insulation resistance | / | 1000V/DC 1min | MΩ | ≥500 |
| 2.6 | 工作温度范围 Operating temperature range | / | / | ℃ | -30 ~ 125 |
| 2.7 | 最大额定功率 Maximum rated power | Pmax | / | mW | 450 |

## 3、产品图纸 Product drawing

| 产品图纸 Product drawing | | 客户确认 Customer confirm | 客户名称 Customer： | | | |
|---|---|---|---|---|---|---|
| | | | 确认 Confirm | | 日期 DATE | |
| 产品型号 MODEL NO. | MF11 502K | | 审核 Approve: | | 日期 DATE | |

**尺寸 Dimensions：** （Unit：mm）




| D | L1 | L2 | F | T | d |
|---|---|---|---|---|---|
| Max6 | Min25 | Max2.5 | 2.5±0.5 | Max4.0 | 0.45±0.05 |

**技术要求 Technical requirements：**

1) 零功率阻值：$R_{25}$：5kΩ±10% (Zero Power Resistance: $R_{25}$：5kΩ±10%)；
2) $B_{25/50}$ 数值：3950K±10% (B-value:$B_{25/50}$: 3950K±10%)；
3) 线材：镀锡铜包钢线 (Tinned copper clad steel wire)；
4) 封装：绿色环氧树脂 (Green Epoxy resin)；
5) 符合 RoHS 环保要求 (Meet environmental protection requirements:RoHS)。

## 4、可靠性 Reliability

| No. | 项目 Test Item | 试验标准 Test Standard | 试验条件及方法 Test Conditions / Methods | 性能要求 Acceptance Criteria |
|---|---|---|---|---|
| 4.1 | 引出端强度 Terminal strength | IEC60068-2-21 | 线径 lead diameter(mm) 拉力（N） Pull strength(N)<br>0.35<d≤0.5 5<br>0.5<d≤0.8 10<br>时间：10±1 秒 time: 10±1 sec | 无可见性损伤 No obvious damage<br>$\|\Delta R_{25}/R_{25}\| \leq 3\%$ |
| 4.2 | 可焊性 Solder ability | IEC60068-2-20 | 温度 245℃±5℃ 时间 2-3 秒 temperature: 245℃±5℃ for 2-3 sec | 着锡面积≥95% Coverage area ≥ 95%. |
| 4.3 | 耐焊接热 Withstand weiling temp | IEC60068-2-20 | 锡锅温度:260℃±5℃，浸入深度距电阻体 6mm，时间 10±1 秒 Temperature of tin pot: 260℃±5℃, insert deepth from body of resistance 6mm, time 10±1 senconds | 无可见性损伤 No obvious damage<br>$\|\Delta R_{25}/R_{25}\| \leq 3\%$ |
| 4.4 | 稳态湿热 Steady humidity and heat | IEC60068-2-78 | 温度:40℃±2℃，湿度:93%RH±2%RH，时间：1000 小时 Temp: 40℃±2℃, humidity: 93%RH±2%RH, Time: 1000 hrs | 无可见性损伤 No obvious damage<br>$\|\Delta R_{25}/R_{25}\| \leq 3\%$ |
| 4.5 | 温度快速变化 Rapid changes in temperature | IEC60068-2-14 | -30℃ 30min→25℃ 5min→125℃ 30min→25℃ 5min, 5 cycles | 无可见性损伤 No obvious damage<br>$\|\Delta R_{25}/R_{25}\| \leq 3\%$ |
| 4.6 | 高温储存 High temperature storage | IEC60068-2-2 | 温度：125℃±2℃<br>时间：1000 小时<br>Temp: 125℃±5℃, Time: 1000 hrs | 无可见性损伤 No obvious damage<br>$\|\Delta R_{25}/R_{25}\| \leq 3\%$ |
| 4.7 | 低温储存 Low temperature storage | IEC60539-1 | 温度：-30℃±5℃<br>时间：1000 小时<br>Temp: -30℃±5℃, Time: 1000 hrs | 无可见性损伤 No obvious damage<br>$\|\Delta R_{25}/R_{25}\| \leq 3\%$ |

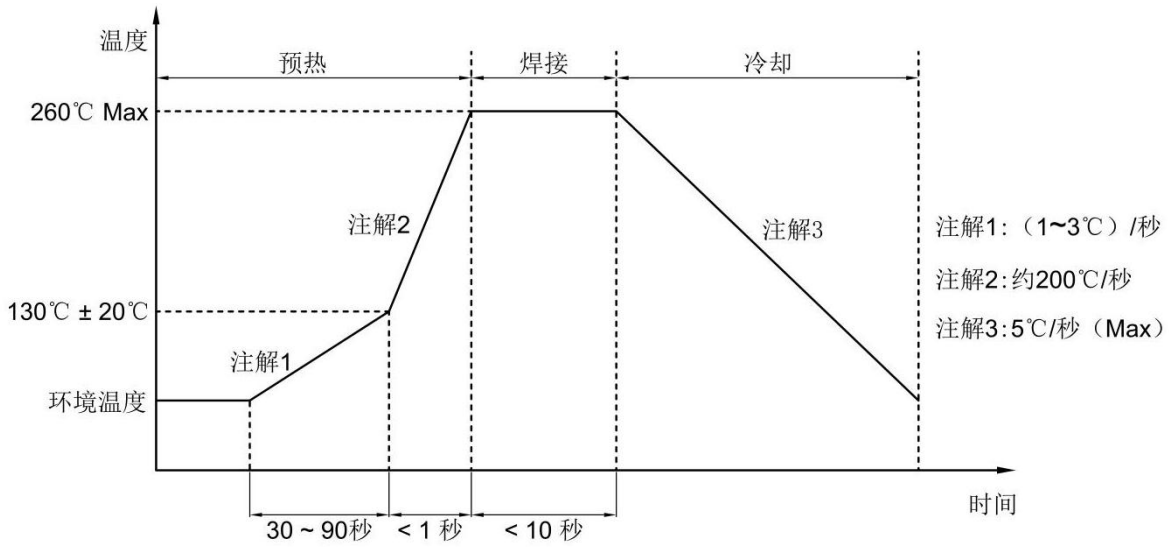
▲注：1）稳态湿热及温度快速变化试验结束后，样品需在常温环境下静置 2 小时后再做性能测试；

▲Note：1) After the test of steady-state humid heat and rapid temperature change, the sample should be kept for 2 hours at room temperature before performance test；

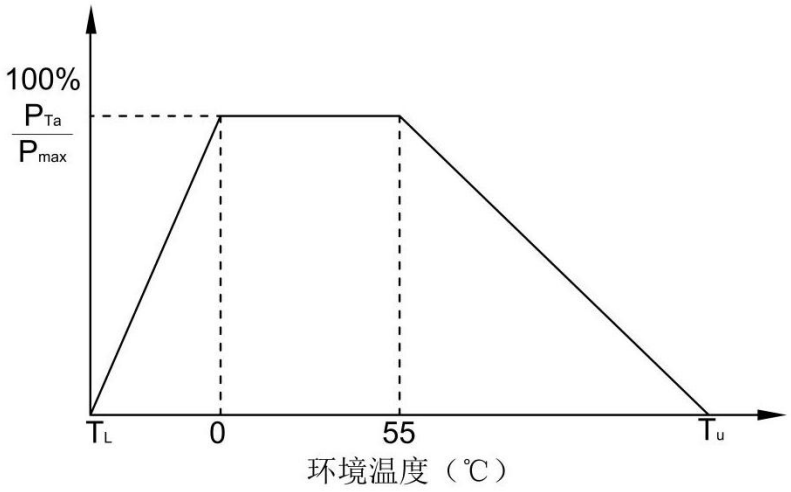
2）高温存储结束后，需随测试环境自然恢复至常温，再取出做性能测试。

2) After the test of high-temperature storage is complete, and then take it out for performance test when the test environment naturally regain to normal temperature.

## 5、推荐波峰焊曲线 Recommended wave soldering profile




## 6、降功耗曲线 Power Derating Curve




例如：
环境温度（$T_a$）= 65℃
最高工作温度（$T_u$）= 125℃
Example:
Ambient temperature (Ta) = 65℃
Maximum operating temperature (Tu) = 125℃

$$P_{Ta} = \frac{T_u - T_a}{T_u - 55} \times P_{max} = 85.7\% P_{max}$$

## 7、产品包装 Product packaging

### 7.1 包装方式 Packing Type

☑ 散装方式 Bulk Type　　☐ 编编带方式 Reel Type

### 7.2 包装规格 Packing specification

| No. | 包装规格<br>Packing specification | 包装材料、尺寸<br>Packing material, size | 产品数量<br>Quantity |
|---|---|---|---|
| 1 | 包装袋<br>Packing bag | 自封口袋 (self sealing bag)<br>W×H=11cm×12cm 或 15cm×23cm | |
| 2 | 编编带包装盒<br>reel packing box | 包装盒 packing box<br>W×G×H=335mm×240mm×50mm | |

## 8、安装&使用注意事项 Installation & Use precautions

8.1 本产品的用途：抑制浪涌电流；
purpose of product: current limitation；
8.2 烙铁焊接时，焊接处距包封头部距离至少 2mm，焊接温度应低于 360℃，焊接时间＜3ses；
When welded by soldering iron, weld spot should be 2mm at least from head, weld temperature should be under 360℃, time＜3ses；
8.3 储存温度：-10℃ ～ 40℃；储存湿度：≤75% RH；
storage temp: -10℃ ～ 40℃; storage humidity: ≤75% RH；
8.4 避免存放在具有腐蚀性气体及光照的环境下；
To avoid of leaving with such environment as corrosive gases and illumination；
8.5 包装打开后需重新密封保存，贮存期 1 年，超过贮存期，可按本标准规定的项目重新检验，如符合要求仍可使用。
The packing need to be resealed since opened, storage period 1 year once valid, it should be retest according to regulated of criterion and can be still used if meet the requirement.

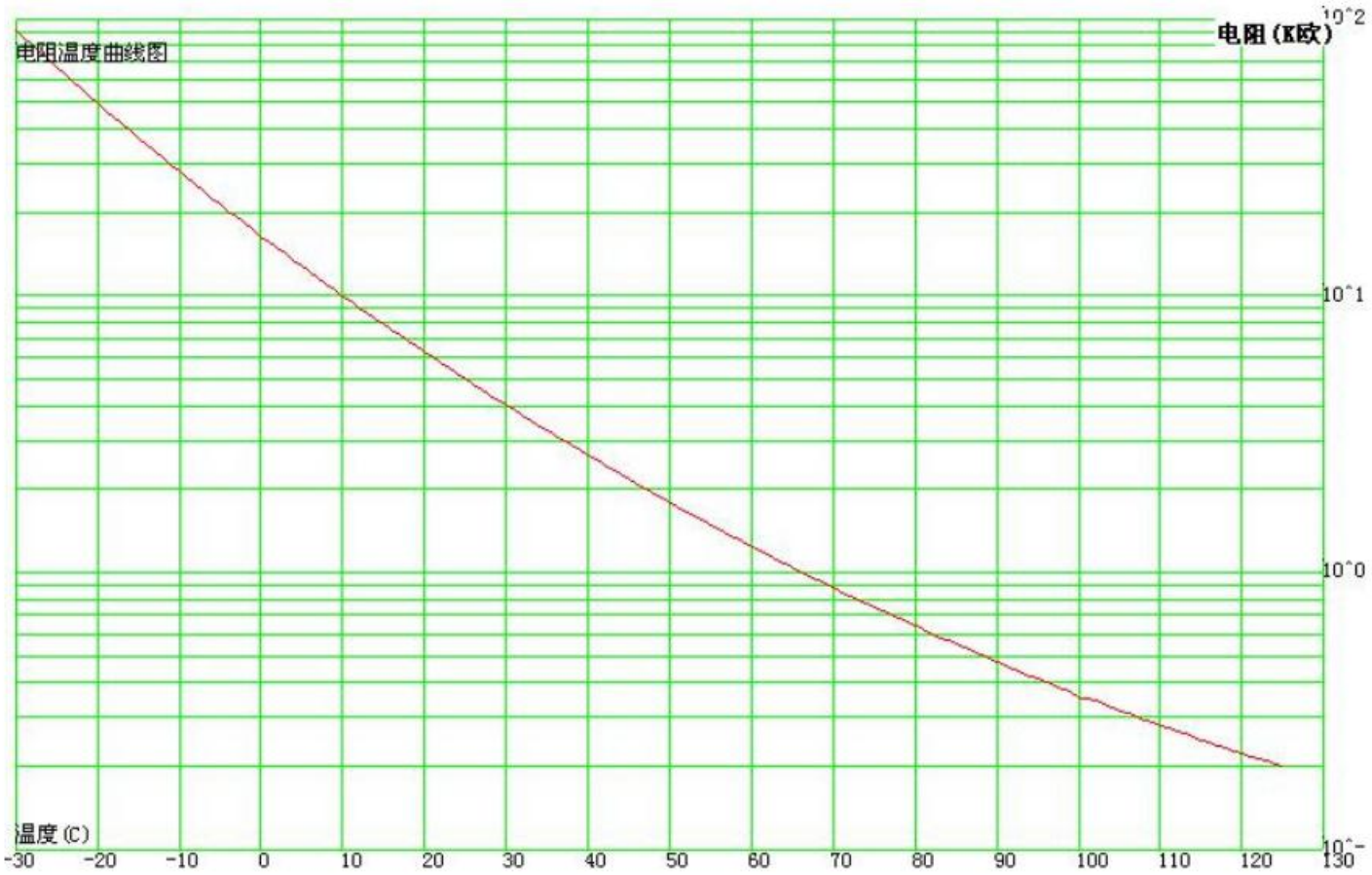
## 9、产品认证 Product certification

| No. | 项目<br>Projects | 产品认证<br>Product certification |
|---|---|---|
| 9.1 | 质量管理体系认证<br>Quality Management System Certification | ISO9001:2015 |
| | | IATF16949：2016 |
| 9.2 | 环境管理体系认证<br>Environmental Management System Certification | ISO14001:2015 |
| 9.3 | 知识产权管理体系认证<br>Intellectual Property Management System Certification | GB/T29490-2013 |
| 9.4 | 环保检测报告<br>Environmental test report | RoHS 2.0 |
| 9.5 | CQC 认证（CQC07001019009）<br>CQC certificate（CQC07001019009） | |
| 9.6 | TUV 认证（R50245892）<br>TUV certificate（R50245892） | |
| 9.7 | UL/cUL 认证（E240991）<br>UL/cUL certificate（E240991） | |

时恒电子(电阻温度表)

$R_{25}$=5KΩ $B_{25/50}$=3950K

| T | R | T | R | T | R | T | R | T | R | T | R |
|---|---|---|---|---|---|---|---|---|---|---|---|
| -30 | 91.2 | -4 | 20.348 | 22 | 5.717 | 48 | 1.933 | 74 | 0.772 | 100 | 0.35 |
| -29 | 85.642 | -3 | 19.304 | 23 | 5.465 | 49 | 1.86 | 75 | 0.748 | 101 | 0.352 |
| -28 | 80.46 | -2 | 18.32 | 24 | 5.227 | 50 | 1.791 | 76 | 0.724 | 102 | 0.343 |
| -27 | 75.626 | -1 | 17.391 | 25 | 5 | 51 | 1.724 | 77 | 0.702 | 103 | 0.334 |
| -26 | 71.113 | 0 | 16.45 | 26 | 4.784 | 52 | 1.661 | 78 | 0.68 | 104 | 0.325 |
| -25 | 66.9 | 1 | 15.688 | 27 | 4.578 | 53 | 1.6 | 79 | 0.659 | 105 | 0.317 |
| -24 | 62.963 | 2 | 14.907 | 28 | 4.383 | 54 | 1.542 | 80 | 0.639 | 106 | 0.309 |
| -23 | 59.283 | 3 | 14.17 | 29 | 4.197 | 55 | 1.486 | 81 | 0.62 | 107 | 0.302 |
| -22 | 55.842 | 4 | 13.473 | 30 | 4.02 | 56 | 1.433 | 82 | 0.601 | 108 | 0.294 |
| -21 | 52.623 | 5 | 12.814 | 31 | 3.851 | 57 | 1.382 | 83 | 0.583 | 109 | 0.287 |
| -20 | 49.61 | 6 | 12.192 | 32 | 3.691 | 58 | 1.333 | 84 | 0.566 | 110 | 0.28 |
| -19 | 46.789 | 7 | 11.603 | 33 | 3.538 | 59 | 1.286 | 85 | 0.55 | 111 | 0.274 |
| -18 | 44.146 | 8 | 11.046 | 34 | 3.392 | 60 | 1.241 | 86 | 0.533 | 112 | 0.267 |
| -17 | 41.668 | 9 | 10.518 | 35 | 3.253 | 61 | 1.197 | 87 | 0.518 | 113 | 0.261 |
| -16 | 39.346 | 10 | 9.95 | 36 | 3.121 | 62 | 1.156 | 88 | 0.503 | 114 | 0.255 |
| -15 | 37.167 | 11 | 9.547 | 37 | 2.994 | 63 | 1.116 | 89 | 0.489 | 115 | 0.249 |
| -14 | 35.122 | 12 | 9.099 | 38 | 2.874 | 64 | 1.078 | 90 | 0.475 | 116 | 0.243 |
| -13 | 33.202 | 13 | 8.675 | 39 | 2.759 | 65 | 1.042 | 91 | 0.462 | 117 | 0.238 |
| -12 | 31.399 | 14 | 8.273 | 40 | 2.65 | 66 | 1.007 | 92 | 0.449 | 118 | 0.232 |
| -11 | 29.705 | 15 | 7.892 | 41 | 2.545 | 67 | 0.973 | 93 | 0.436 | 119 | 0.227 |
| -10 | 28.112 | 16 | 7.53 | 42 | 2.445 | 68 | 0.941 | 94 | 0.424 | 120 | 0.222 |
| -9 | 26.615 | 17 | 7.187 | 43 | 2.35 | 69 | 0.91 | 95 | 0.413 | 121 | 0.217 |
| -8 | 25.206 | 18 | 6.862 | 44 | 2.259 | 70 | 0.88 | 96 | 0.402 | 122 | 0.213 |
| -7 | 23.881 | 19 | 6.553 | 45 | 2.172 | 71 | 0.852 | 97 | 0.391 | 123 | 0.208 |
| -6 | 22.631 | 20 | 6.26 | 46 | 2.088 | 72 | 0.824 | 98 | 0.381 | 124 | 0.204 |
| -5 | 21.456 | 21 | 5.981 | 47 | 2.009 | 73 | 0.798 | 99 | 0.371 | 125 | 0.2 |


电阻温度曲线图
电阻 (KΩ)
10^2
10^1
10^0
10^-
温度 (C)
-30
-20
-10
0
10
20
30
40
50
60
70
80
90
100
110
120
130