



南京时恒电子科技有限公司

## 规格承认书

### APPROVAL SHEET

客户名称:

CUSTOMER \_\_\_\_\_

产品名称:

PART NAME MF58 玻壳测温型 NTC 热敏电阻器

产品规格:

PART NUMBER MF58-502 J3470(UL:E240991)

日期:

DATE 2017年07月20日

确 认

CONFIRM

客户

品保部:

制造部:

工程部:

供货商/制造商

规格书制作: 鞠晓丽

技术部审核:

品质部审核:

生产部审核:

南京时恒电子科技有限公司

地址: 南京市江宁区湖熟镇金阳路 18 号

TEL: 025-52121868

Http: //www.shiheng.com.cn

邮编: 211121

FAX: 025-52122373

[E-MAIL:sales@shiheng.com.cn](mailto:sales@shiheng.com.cn)





南京时恒电子科技有限公司

# MF58 玻壳测温型 NTC 热敏电阻器

型号: MF58-502J3470

本规格书提供了南京时恒电子科技有限公司生产的 MF58 系列 NTC 热敏电阻的结构尺寸、产品性能、试验条件、使用要求的描述, 敬请贵司确认。  
对本规格书产生疑义时, 请速与我们联系 (025-52121868), 若无疑义请确认回传, 若无回传, 我司将视为默认。  
贵公司改变使用用途, 作用方法时, 请与我们联系。

|       |     |     |
|-------|-----|-----|
| 客户名称: |     |     |
| 客户确认  | 确认: | 时间: |
|       | 审核: | 时间: |

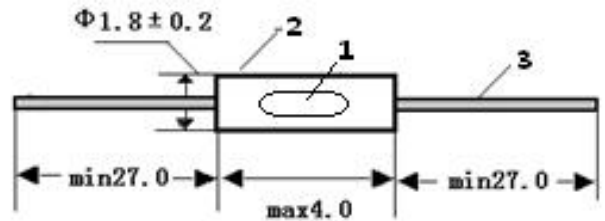
## 1. 电气性能

| 项目   | 符号               | 测试条件  | 单位                         | 性能要求                      |
|------|------------------|---|----------------------------|---------------------------|
| 1.1  | $R_{25}$         | $T_a=25\pm 0.05^\circ\text{C}$ 测试功率 $\leq 0.1\text{mw}$   | $\text{K}\Omega$           | $5\text{K}\Omega \pm 5\%$ |
| 1.2  | $B_{25/50}$      | $B=[(T_a \times T_b)/(T_b - T_a)] \times \ln(R_a/R_b)$<br>$T_b=50^\circ\text{C} \pm 0.05^\circ\text{C}$ | K                          | $3470 \pm 1\%$            |
| 1.3  | $\delta$         | 静止空气中   | $\text{mW}/^\circ\text{C}$ | $\geq 2$                  |
| 1.4  | $\tau$           | 静止空气中   | sec                        | $\leq 20$                 |
| 1.5  | /                | 1500V/AC 1min   | /                          | 无击穿或飞弧                    |
| 1.6  | /                | 500V/DC 1min  | $\text{M}\Omega$           | $\geq 500$                |
| 1.7  | /                | /   | $^\circ\text{C}$           | -55~250                   |
| 1.8  | $P_{\text{max}}$ | /   | mW                         | 50                        |
| 1.9  | /                | /   | /                          | 见附表 1                     |
| 1.10 | /                | /   | /                          | 见附表 2                     |

## 2. 可靠性

| 项目         | 测试条件及方法  | 技术要求                                       |
|------------|--|--|
| 2.1 引出端强度  | 固定电阻端, 拉力: $10 \pm 1\text{N}$ , 时间: $10 \pm 1$ 秒   | 无可见性损伤<br>$R_{25} \Delta R/R \leq \pm 2\%$ |
| 2.2 可焊性    | 温度 $245 \pm 5^\circ\text{C}$ 时间 2-3 秒  | 着锡面积 $\geq 95\%$                           |
| 2.3 耐焊接热   | 锡锅温度: $260 \pm 5^\circ\text{C}$ , 浸入深度距电阻体 6mm, 时间 $5 \pm 1$ 秒   | $R_{25} \Delta R/R \leq \pm 2\%$           |
| 2.4 稳态湿热   | 温度: $40^\circ\text{C} \pm 2^\circ\text{C}$ , 湿度: 93 $\pm 2\%$ , 时间: 500 小时   | $R_{25} \Delta R/R \leq \pm 2\%$           |
| 2.5 温度快速变化 | $-55^\circ\text{C} 30\text{min} \rightarrow 25^\circ\text{C} 5\text{min} \rightarrow 250^\circ\text{C} 30\text{min} \rightarrow 25^\circ\text{C} 5\text{min}$ , 反复 5 次 | $R_{25} \Delta R/R \leq \pm 2\%$           |
| 2.6 高温储存   | 温度: $250^\circ\text{C} \pm 5^\circ\text{C}$ , 时间: 1000 小时  | $R_{25} \Delta R/R \leq \pm 2\%$           |
| 2.7 低温储存   | 温度: $-55^\circ\text{C} \pm 5^\circ\text{C}$ , 时间: 1000 小时  | $R_{25} \Delta R/R \leq \pm 2\%$           |

## 4. 外形尺寸: (单位: mm)



| 序号 | 名称 | 材料规格                     | 数量 | 备注 |
|----|----|--------------------------|----|----|
| 1  | 元件 | NTC 热敏电阻                 | 1  |    |
| 2  | 外壳 | 玻璃                       | 1  |    |
| 3  | 导线 | $\Phi 0.5 \pm 0.05$ 镀锡钢线 | 2  |    |

## 5. 产品型号说明

MF58 502 J 3470

① ② ③ ④

- ① MF58: 玻壳测温型 NTC 热敏电阻
- ② 502:  $25^\circ\text{C}$  的零功率电阻值  $5\text{K}\Omega$
- ③ J: 阻值精度代码 F- $\pm 1\%$  G- $\pm 2\%$  H- $\pm 3\%$  J- $\pm 5\%$
- ④ 3470:  $B_{25/50}$  值 3470K

## 6. 认证

- 6.1 质量管理体系认证 ISO9001:2008 (01115Q20270R5M)  
ISO/TS16949: 2009 (0192416)
- 6.2 环境管理体系认证 ISO14001:2004 (01113E20060R2M)
- 6.3 环保检测报告 ROHS
- 6.4 产品 CQC 认证 (CQC09001033986)
- 6.5 江苏省高新技术产品认证 (150115G0377N)
- 6.6 安规认证 UL 1434 认证 (File # E240991)

## 3. 使用注意事项

- 3.1 本产品的用途: 温度测量与控制;
- 3.2 避免流过热敏电阻芯片的电流引起元件自身发热而产生测量误差;
- 3.3 烙铁焊接时, 焊接处距玻壳端距离至少 2mm, 焊接温度应低于  $360^\circ\text{C}$ , 焊接时间  $< 3\text{ses}$ ;
- 3.4 若引线弯曲时, 弯曲点应距玻壳端 2mm 以上, 以免造成玻壳损伤;
- 3.5 储存温度:  $-10^\circ\text{C} \sim 40^\circ\text{C}$ ; 储存湿度:  $\leq 75\% \text{RH}$ ;
- 3.6 避免存放在具有腐蚀性气体及光照的环境下;
- 3.7 包装打开后需重新密封保存。

电话: 025-52121868

传真: 025-52122373

邮编: 211121

地址: 南京市江宁区湖熟镇金阳路 18 号

邮箱: sales@shiheng.com.cn

网址: Http://www.shiheng.com.cn



附表:1

## 南京时恒阻温特性表

R25=5K $\Omega$  精度: $\pm 5\%$  B25/50=3470K B25/85=3530K 精度: $\pm 1\%$ (SH-27A)

| 温度( $^{\circ}\text{C}$ ) | 电阻(K $\Omega$ ) |          |          | 电阻精度(%)    |             | 温度精度( $^{\circ}\text{C}$ ) |             |
|--------------------------|-----------------|----------|----------|------------|-------------|----------------------------|-------------|
|                          | 最小值             | 中心值      | 最大值      | $\Delta R$ | $-\Delta R$ | $\Delta T$                 | $-\Delta T$ |
| -55                      | 1446.920        | 1613.660 | 1795.100 | 11.240     | -10.330     | 1.139                      | -1.046      |
| -54                      | 950.072         | 1055.050 | 1168.710 | 10.770     | -9.950      | 1.168                      | -1.079      |
| -53                      | 659.791         | 730.006  | 805.674  | 10.360     | -9.618      | 1.197                      | -1.111      |
| -52                      | 480.943         | 530.429  | 583.543  | 10.010     | -9.329      | 1.226                      | -1.142      |
| -51                      | 365.531         | 402.026  | 441.058  | 9.708      | -9.077      | 1.253                      | -1.171      |
| -50                      | 287.982         | 315.972  | 345.816  | 9.445      | -8.858      | 1.278                      | -1.199      |
| -49                      | 233.993         | 256.198  | 279.809  | 9.215      | -8.667      | 1.302                      | -1.224      |
| -48                      | 195.213         | 213.347  | 232.582  | 9.016      | -8.499      | 1.324                      | -1.248      |
| -47                      | 166.572         | 181.754  | 197.824  | 8.841      | -8.352      | 1.343                      | -1.269      |
| -46                      | 144.885         | 157.867  | 171.583  | 8.688      | -8.223      | 1.361                      | -1.288      |
| -45                      | 128.087         | 139.391  | 151.313  | 8.553      | -8.109      | 1.376                      | -1.305      |
| -44                      | 114.804         | 124.798  | 135.322  | 8.433      | -8.007      | 1.390                      | -1.319      |
| -43                      | 104.095         | 113.045  | 122.457  | 8.325      | -7.916      | 1.401                      | -1.332      |
| -42                      | 95.305          | 103.407  | 111.917  | 8.229      | -7.834      | 1.411                      | -1.343      |
| -41                      | 87.966          | 95.366   | 103.131  | 8.141      | -7.759      | 1.419                      | -1.352      |
| -40                      | 81.739          | 88.550   | 95.688   | 8.061      | -7.691      | 1.425                      | -1.360      |
| -39                      | 76.374          | 82.682   | 89.286   | 7.987      | -7.628      | 1.430                      | -1.366      |
| -38                      | 71.688          | 77.558   | 83.700   | 7.918      | -7.569      | 1.435                      | -1.371      |
| -37                      | 67.539          | 73.025   | 78.761   | 7.853      | -7.513      | 1.438                      | -1.376      |
| -36                      | 63.821          | 68.966   | 74.340   | 7.791      | -7.460      | 1.440                      | -1.379      |
| -35                      | 60.453          | 65.291   | 70.340   | 7.732      | -7.409      | 1.442                      | -1.382      |
| -34                      | 57.373          | 61.932   | 66.686   | 7.675      | -7.360      | 1.443                      | -1.384      |
| -33                      | 54.533          | 58.836   | 63.319   | 7.620      | -7.313      | 1.444                      | -1.385      |
| -32                      | 51.894          | 55.960   | 60.195   | 7.566      | -7.266      | 1.444                      | -1.387      |
| -31                      | 49.427          | 53.274   | 57.277   | 7.513      | -7.221      | 1.444                      | -1.388      |
| -30                      | 47.110          | 50.753   | 54.540   | 7.461      | -7.176      | 1.444                      | -1.388      |
| -29                      | 44.925          | 48.376   | 51.960   | 7.410      | -7.131      | 1.443                      | -1.389      |
| -28                      | 42.858          | 46.128   | 49.523   | 7.359      | -7.087      | 1.443                      | -1.390      |
| -27                      | 40.898          | 43.997   | 47.213   | 7.308      | -7.043      | 1.442                      | -1.390      |
| -26                      | 39.035          | 41.974   | 45.020   | 7.257      | -6.999      | 1.442                      | -1.390      |
| -25                      | 37.264          | 40.050   | 42.936   | 7.207      | -6.956      | 1.441                      | -1.391      |
| -24                      | 35.576          | 38.218   | 40.954   | 7.157      | -6.912      | 1.440                      | -1.391      |
| -23                      | 33.969          | 36.474   | 39.067   | 7.107      | -6.869      | 1.440                      | -1.392      |
| -22                      | 32.437          | 34.813   | 37.270   | 7.057      | -6.825      | 1.439                      | -1.392      |
| -21                      | 30.977          | 33.231   | 35.559   | 7.007      | -6.782      | 1.439                      | -1.393      |
| -20                      | 29.585          | 31.723   | 33.930   | 6.958      | -6.739      | 1.438                      | -1.393      |
| -19                      | 28.259          | 30.287   | 32.380   | 6.908      | -6.695      | 1.438                      | -1.394      |
| -18                      | 26.996          | 28.920   | 30.904   | 6.859      | -6.652      | 1.438                      | -1.394      |
| -17                      | 25.793          | 27.618   | 29.499   | 6.809      | -6.609      | 1.437                      | -1.395      |

|     |        |        |        |       |        |       |        |
|-----|--------|--------|--------|-------|--------|-------|--------|
| -16 | 24.647 | 26.380 | 28.163 | 6.760 | -6.566 | 1.437 | -1.396 |
| -15 | 23.557 | 25.201 | 26.892 | 6.712 | -6.524 | 1.437 | -1.396 |
| -14 | 22.519 | 24.080 | 25.684 | 6.663 | -6.481 | 1.436 | -1.397 |
| -13 | 21.532 | 23.013 | 24.536 | 6.615 | -6.439 | 1.436 | -1.398 |
| -12 | 20.592 | 22.000 | 23.444 | 6.567 | -6.397 | 1.436 | -1.399 |
| -11 | 19.699 | 21.036 | 22.407 | 6.519 | -6.355 | 1.436 | -1.400 |
| -10 | 18.849 | 20.120 | 21.422 | 6.472 | -6.313 | 1.436 | -1.400 |
| -9  | 18.041 | 19.249 | 20.485 | 6.425 | -6.272 | 1.435 | -1.401 |
| -8  | 17.273 | 18.421 | 19.596 | 6.378 | -6.230 | 1.435 | -1.402 |
| -7  | 16.542 | 17.633 | 18.750 | 6.331 | -6.189 | 1.435 | -1.402 |
| -6  | 15.847 | 16.885 | 17.947 | 6.285 | -6.149 | 1.434 | -1.403 |
| -5  | 15.186 | 16.174 | 17.183 | 6.239 | -6.108 | 1.434 | -1.403 |
| -4  | 14.556 | 15.497 | 16.457 | 6.194 | -6.068 | 1.433 | -1.404 |
| -3  | 13.958 | 14.853 | 15.767 | 6.149 | -6.028 | 1.432 | -1.404 |
| -2  | 13.388 | 14.240 | 15.110 | 6.104 | -5.989 | 1.432 | -1.405 |
| -1  | 12.845 | 13.657 | 14.485 | 6.060 | -5.949 | 1.431 | -1.405 |
| 0   | 12.476 | 13.262 | 14.061 | 6.029 | -5.922 | 1.415 | -1.390 |
| 1   | 11.835 | 12.573 | 13.324 | 5.972 | -5.872 | 1.429 | -1.405 |
| 2   | 11.365 | 12.069 | 12.785 | 5.929 | -5.833 | 1.428 | -1.405 |
| 3   | 10.917 | 11.589 | 12.271 | 5.886 | -5.795 | 1.426 | -1.404 |
| 4   | 10.490 | 11.131 | 11.781 | 5.843 | -5.757 | 1.425 | -1.404 |
| 5   | 10.082 | 10.693 | 11.314 | 5.801 | -5.719 | 1.423 | -1.403 |
| 6   | 9.692  | 10.276 | 10.868 | 5.759 | -5.681 | 1.422 | -1.403 |
| 7   | 9.320  | 9.878  | 10.442 | 5.717 | -5.644 | 1.420 | -1.402 |
| 8   | 8.964  | 9.497  | 10.036 | 5.675 | -5.607 | 1.418 | -1.401 |
| 9   | 8.624  | 9.133  | 9.647  | 5.634 | -5.570 | 1.416 | -1.400 |
| 10  | 8.474  | 8.973  | 9.476  | 5.615 | -5.553 | 1.368 | -1.352 |
| 11  | 7.987  | 8.451  | 8.921  | 5.552 | -5.497 | 1.411 | -1.397 |
| 12  | 7.688  | 8.132  | 8.581  | 5.512 | -5.461 | 1.408 | -1.395 |
| 13  | 7.402  | 7.827  | 8.255  | 5.471 | -5.424 | 1.405 | -1.393 |
| 14  | 7.128  | 7.534  | 7.944  | 5.431 | -5.388 | 1.403 | -1.392 |
| 15  | 6.866  | 7.254  | 7.645  | 5.391 | -5.352 | 1.400 | -1.390 |
| 16  | 6.614  | 6.985  | 7.359  | 5.351 | -5.317 | 1.396 | -1.387 |
| 17  | 6.372  | 6.727  | 7.084  | 5.312 | -5.281 | 1.393 | -1.385 |
| 18  | 6.140  | 6.480  | 6.821  | 5.272 | -5.246 | 1.390 | -1.383 |
| 19  | 5.917  | 6.242  | 6.569  | 5.233 | -5.210 | 1.386 | -1.380 |
| 20  | 5.702  | 6.014  | 6.326  | 5.194 | -5.175 | 1.382 | -1.377 |
| 21  | 5.497  | 5.794  | 6.093  | 5.155 | -5.140 | 1.378 | -1.374 |
| 22  | 5.299  | 5.584  | 5.869  | 5.116 | -5.104 | 1.374 | -1.371 |
| 23  | 5.108  | 5.381  | 5.655  | 5.077 | -5.069 | 1.370 | -1.368 |
| 24  | 4.926  | 5.187  | 5.448  | 5.038 | -5.034 | 1.366 | -1.365 |
| 25  | 4.750  | 5.000  | 5.250  | 5.000 | -5.000 | 1.365 | -1.365 |
| 26  | 4.577  | 4.819  | 5.062  | 5.038 | -5.034 | 1.378 | -1.377 |
| 27  | 4.411  | 4.646  | 4.882  | 5.076 | -5.069 | 1.395 | -1.393 |
| 28  | 4.251  | 4.480  | 4.709  | 5.115 | -5.104 | 1.411 | -1.408 |

|    |       |       |       |       |        |       |        |
|----|-------|-------|-------|-------|--------|-------|--------|
| 29 | 4.097 | 4.319 | 4.542 | 5.153 | -5.138 | 1.428 | -1.424 |
| 30 | 3.949 | 4.165 | 4.381 | 5.191 | -5.173 | 1.445 | -1.440 |
| 31 | 3.807 | 4.016 | 4.226 | 5.230 | -5.207 | 1.462 | -1.455 |
| 32 | 3.670 | 3.873 | 4.077 | 5.268 | -5.242 | 1.478 | -1.471 |
| 33 | 3.538 | 3.735 | 3.934 | 5.306 | -5.276 | 1.495 | -1.487 |
| 34 | 3.411 | 3.603 | 3.795 | 5.344 | -5.310 | 1.512 | -1.503 |
| 35 | 3.289 | 3.475 | 3.662 | 5.382 | -5.344 | 1.529 | -1.519 |
| 36 | 3.172 | 3.352 | 3.534 | 5.420 | -5.378 | 1.546 | -1.534 |
| 37 | 3.059 | 3.234 | 3.410 | 5.458 | -5.412 | 1.564 | -1.550 |
| 38 | 2.950 | 3.120 | 3.291 | 5.496 | -5.446 | 1.581 | -1.567 |
| 39 | 2.845 | 3.010 | 3.176 | 5.534 | -5.480 | 1.598 | -1.583 |
| 40 | 2.744 | 2.904 | 3.066 | 5.571 | -5.514 | 1.616 | -1.599 |
| 41 | 2.647 | 2.802 | 2.959 | 5.609 | -5.548 | 1.633 | -1.615 |
| 42 | 2.553 | 2.704 | 2.857 | 5.647 | -5.582 | 1.651 | -1.632 |
| 43 | 2.463 | 2.609 | 2.758 | 5.684 | -5.615 | 1.668 | -1.648 |
| 44 | 2.376 | 2.518 | 2.662 | 5.722 | -5.649 | 1.686 | -1.665 |
| 45 | 2.292 | 2.431 | 2.571 | 5.759 | -5.682 | 1.704 | -1.681 |
| 46 | 2.212 | 2.346 | 2.482 | 5.797 | -5.715 | 1.722 | -1.698 |
| 47 | 2.135 | 2.265 | 2.397 | 5.834 | -5.749 | 1.740 | -1.715 |
| 48 | 2.060 | 2.187 | 2.315 | 5.871 | -5.782 | 1.759 | -1.732 |
| 49 | 1.988 | 2.111 | 2.236 | 5.908 | -5.815 | 1.777 | -1.749 |
| 50 | 1.919 | 2.039 | 2.160 | 5.946 | -5.848 | 1.796 | -1.766 |
| 51 | 1.853 | 1.969 | 2.086 | 5.983 | -5.881 | 1.814 | -1.783 |
| 52 | 1.789 | 1.901 | 2.016 | 6.019 | -5.913 | 1.833 | -1.801 |
| 53 | 1.727 | 1.836 | 1.948 | 6.056 | -5.946 | 1.852 | -1.818 |
| 54 | 1.668 | 1.774 | 1.882 | 6.093 | -5.979 | 1.871 | -1.836 |
| 55 | 1.611 | 1.714 | 1.819 | 6.129 | -6.011 | 1.890 | -1.854 |
| 56 | 1.556 | 1.656 | 1.758 | 6.166 | -6.043 | 1.910 | -1.872 |
| 57 | 1.503 | 1.600 | 1.700 | 6.202 | -6.075 | 1.929 | -1.890 |
| 58 | 1.452 | 1.547 | 1.643 | 6.238 | -6.107 | 1.949 | -1.908 |
| 59 | 1.403 | 1.495 | 1.589 | 6.274 | -6.139 | 1.969 | -1.926 |
| 60 | 1.356 | 1.445 | 1.537 | 6.310 | -6.171 | 1.989 | -1.945 |
| 61 | 1.311 | 1.397 | 1.486 | 6.346 | -6.203 | 2.009 | -1.963 |
| 62 | 1.267 | 1.351 | 1.438 | 6.382 | -6.234 | 2.029 | -1.982 |
| 63 | 1.225 | 1.307 | 1.391 | 6.417 | -6.265 | 2.049 | -2.001 |
| 64 | 1.185 | 1.264 | 1.346 | 6.453 | -6.296 | 2.070 | -2.020 |
| 65 | 1.146 | 1.223 | 1.303 | 6.488 | -6.327 | 2.091 | -2.039 |
| 66 | 1.108 | 1.184 | 1.261 | 6.523 | -6.358 | 2.112 | -2.058 |
| 67 | 1.072 | 1.145 | 1.221 | 6.558 | -6.389 | 2.133 | -2.078 |
| 68 | 1.038 | 1.109 | 1.182 | 6.592 | -6.419 | 2.154 | -2.097 |
| 69 | 1.004 | 1.073 | 1.145 | 6.627 | -6.450 | 2.175 | -2.117 |
| 70 | 0.972 | 1.039 | 1.109 | 6.661 | -6.480 | 2.197 | -2.137 |
| 71 | 0.941 | 1.007 | 1.074 | 6.695 | -6.510 | 2.218 | -2.157 |
| 72 | 0.911 | 0.975 | 1.041 | 6.729 | -6.539 | 2.240 | -2.177 |
| 73 | 0.883 | 0.945 | 1.009 | 6.763 | -6.569 | 2.262 | -2.197 |

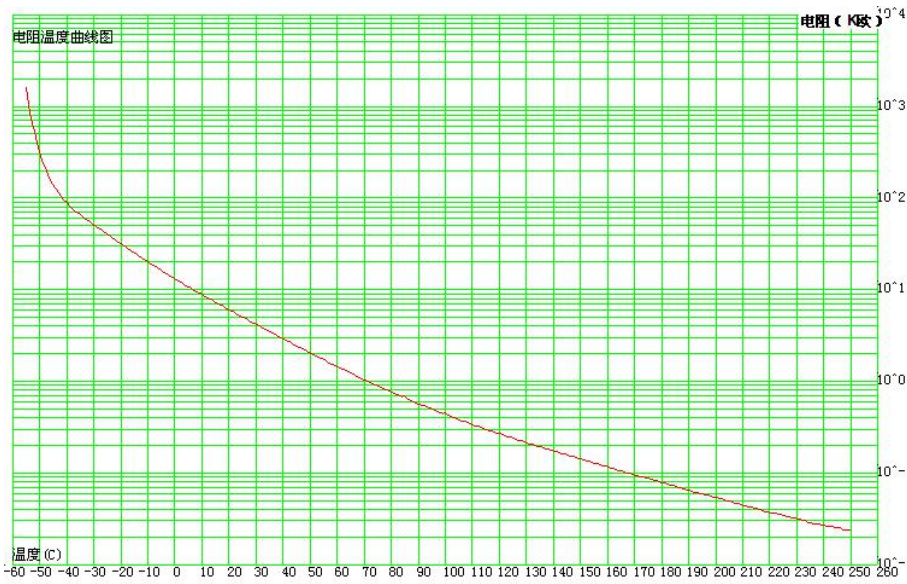
|     |       |       |       |       |        |       |        |
|-----|-------|-------|-------|-------|--------|-------|--------|
| 74  | 0.855 | 0.915 | 0.978 | 6.797 | -6.598 | 2.284 | -2.218 |
| 75  | 0.828 | 0.887 | 0.948 | 6.830 | -6.627 | 2.307 | -2.238 |
| 76  | 0.803 | 0.860 | 0.919 | 6.863 | -6.656 | 2.329 | -2.259 |
| 77  | 0.778 | 0.834 | 0.892 | 6.896 | -6.685 | 2.352 | -2.280 |
| 78  | 0.754 | 0.809 | 0.865 | 6.929 | -6.714 | 2.375 | -2.301 |
| 79  | 0.732 | 0.784 | 0.839 | 6.962 | -6.742 | 2.398 | -2.322 |
| 80  | 0.710 | 0.761 | 0.814 | 6.994 | -6.771 | 2.421 | -2.344 |
| 81  | 0.688 | 0.739 | 0.790 | 7.026 | -6.799 | 2.444 | -2.365 |
| 82  | 0.668 | 0.717 | 0.767 | 7.058 | -6.826 | 2.468 | -2.387 |
| 83  | 0.648 | 0.696 | 0.745 | 7.090 | -6.854 | 2.491 | -2.408 |
| 84  | 0.629 | 0.676 | 0.724 | 7.122 | -6.881 | 2.515 | -2.430 |
| 85  | 0.640 | 0.688 | 0.736 | 7.103 | -6.865 | 2.581 | -2.494 |
| 86  | 0.593 | 0.637 | 0.683 | 7.184 | -6.936 | 2.563 | -2.475 |
| 87  | 0.576 | 0.619 | 0.664 | 7.215 | -6.962 | 2.588 | -2.497 |
| 88  | 0.560 | 0.602 | 0.645 | 7.246 | -6.989 | 2.612 | -2.520 |
| 89  | 0.544 | 0.585 | 0.627 | 7.276 | -7.015 | 2.637 | -2.542 |
| 90  | 0.529 | 0.569 | 0.610 | 7.306 | -7.042 | 2.661 | -2.565 |
| 91  | 0.514 | 0.553 | 0.593 | 7.336 | -7.068 | 2.686 | -2.588 |
| 92  | 0.500 | 0.538 | 0.577 | 7.366 | -7.094 | 2.711 | -2.611 |
| 93  | 0.486 | 0.523 | 0.562 | 7.396 | -7.119 | 2.737 | -2.634 |
| 94  | 0.473 | 0.509 | 0.547 | 7.425 | -7.145 | 2.762 | -2.658 |
| 95  | 0.460 | 0.495 | 0.532 | 7.454 | -7.170 | 2.788 | -2.681 |
| 96  | 0.447 | 0.482 | 0.518 | 7.483 | -7.195 | 2.813 | -2.705 |
| 97  | 0.435 | 0.469 | 0.505 | 7.512 | -7.220 | 2.839 | -2.729 |
| 98  | 0.424 | 0.457 | 0.492 | 7.541 | -7.244 | 2.865 | -2.753 |
| 99  | 0.413 | 0.445 | 0.479 | 7.569 | -7.269 | 2.891 | -2.777 |
| 100 | 0.422 | 0.456 | 0.490 | 7.544 | -7.247 | 2.957 | -2.841 |
| 101 | 0.392 | 0.423 | 0.455 | 7.625 | -7.317 | 2.944 | -2.825 |
| 102 | 0.382 | 0.412 | 0.443 | 7.653 | -7.341 | 2.971 | -2.850 |
| 103 | 0.372 | 0.401 | 0.432 | 7.680 | -7.365 | 2.998 | -2.874 |
| 104 | 0.362 | 0.391 | 0.421 | 7.708 | -7.388 | 3.024 | -2.899 |
| 105 | 0.353 | 0.382 | 0.411 | 7.735 | -7.411 | 3.051 | -2.924 |
| 106 | 0.344 | 0.372 | 0.401 | 7.762 | -7.435 | 3.079 | -2.949 |
| 107 | 0.336 | 0.363 | 0.391 | 7.789 | -7.458 | 3.106 | -2.974 |
| 108 | 0.328 | 0.354 | 0.382 | 7.815 | -7.480 | 3.133 | -2.999 |
| 109 | 0.320 | 0.346 | 0.373 | 7.841 | -7.503 | 3.161 | -3.024 |
| 110 | 0.312 | 0.337 | 0.364 | 7.868 | -7.526 | 3.189 | -3.050 |
| 111 | 0.304 | 0.329 | 0.355 | 7.894 | -7.548 | 3.216 | -3.076 |
| 112 | 0.297 | 0.321 | 0.347 | 7.920 | -7.570 | 3.244 | -3.101 |
| 113 | 0.290 | 0.314 | 0.339 | 7.945 | -7.592 | 3.273 | -3.127 |
| 114 | 0.283 | 0.306 | 0.331 | 7.971 | -7.614 | 3.301 | -3.153 |
| 115 | 0.276 | 0.299 | 0.323 | 7.996 | -7.636 | 3.329 | -3.179 |
| 116 | 0.270 | 0.292 | 0.316 | 8.021 | -7.657 | 3.358 | -3.205 |
| 117 | 0.264 | 0.286 | 0.309 | 8.046 | -7.678 | 3.386 | -3.231 |
| 118 | 0.258 | 0.279 | 0.302 | 8.071 | -7.700 | 3.415 | -3.258 |

|     |       |       |       |       |        |       |        |
|-----|-------|-------|-------|-------|--------|-------|--------|
| 119 | 0.252 | 0.273 | 0.295 | 8.096 | -7.721 | 3.444 | -3.284 |
| 120 | 0.246 | 0.267 | 0.288 | 8.121 | -7.742 | 3.473 | -3.311 |
| 121 | 0.240 | 0.261 | 0.282 | 8.145 | -7.763 | 3.502 | -3.337 |
| 122 | 0.235 | 0.255 | 0.276 | 8.169 | -7.783 | 3.531 | -3.364 |
| 123 | 0.230 | 0.249 | 0.270 | 8.193 | -7.804 | 3.560 | -3.391 |
| 124 | 0.225 | 0.244 | 0.264 | 8.217 | -7.824 | 3.590 | -3.418 |
| 125 | 0.220 | 0.239 | 0.258 | 8.241 | -7.845 | 3.619 | -3.445 |
| 126 | 0.215 | 0.233 | 0.253 | 8.265 | -7.865 | 3.649 | -3.472 |
| 127 | 0.210 | 0.228 | 0.247 | 8.289 | -7.885 | 3.678 | -3.499 |
| 128 | 0.206 | 0.223 | 0.242 | 8.312 | -7.905 | 3.708 | -3.527 |
| 129 | 0.201 | 0.219 | 0.237 | 8.336 | -7.925 | 3.738 | -3.554 |
| 130 | 0.197 | 0.214 | 0.232 | 8.359 | -7.945 | 3.768 | -3.581 |
| 131 | 0.193 | 0.209 | 0.227 | 8.382 | -7.964 | 3.798 | -3.609 |
| 132 | 0.189 | 0.205 | 0.222 | 8.405 | -7.984 | 3.828 | -3.637 |
| 133 | 0.185 | 0.201 | 0.218 | 8.428 | -8.003 | 3.859 | -3.664 |
| 134 | 0.181 | 0.196 | 0.213 | 8.451 | -8.023 | 3.889 | -3.692 |
| 135 | 0.177 | 0.192 | 0.209 | 8.474 | -8.042 | 3.920 | -3.720 |
| 136 | 0.173 | 0.188 | 0.204 | 8.496 | -8.061 | 3.950 | -3.748 |
| 137 | 0.170 | 0.184 | 0.200 | 8.519 | -8.081 | 3.981 | -3.776 |
| 138 | 0.166 | 0.181 | 0.196 | 8.542 | -8.100 | 4.012 | -3.804 |
| 139 | 0.163 | 0.177 | 0.192 | 8.564 | -8.119 | 4.042 | -3.832 |
| 140 | 0.159 | 0.173 | 0.188 | 8.586 | -8.138 | 4.073 | -3.860 |
| 141 | 0.156 | 0.170 | 0.184 | 8.609 | -8.156 | 4.104 | -3.889 |
| 142 | 0.153 | 0.166 | 0.181 | 8.631 | -8.175 | 4.135 | -3.917 |
| 143 | 0.150 | 0.163 | 0.177 | 8.653 | -8.194 | 4.166 | -3.945 |
| 144 | 0.147 | 0.160 | 0.174 | 8.675 | -8.213 | 4.198 | -3.974 |
| 145 | 0.144 | 0.157 | 0.170 | 8.697 | -8.231 | 4.229 | -4.002 |
| 146 | 0.141 | 0.153 | 0.167 | 8.719 | -8.250 | 4.260 | -4.031 |
| 147 | 0.138 | 0.150 | 0.163 | 8.741 | -8.268 | 4.292 | -4.060 |
| 148 | 0.135 | 0.147 | 0.160 | 8.763 | -8.287 | 4.323 | -4.088 |
| 149 | 0.132 | 0.144 | 0.157 | 8.785 | -8.305 | 4.355 | -4.117 |
| 150 | 0.130 | 0.142 | 0.154 | 8.806 | -8.323 | 4.387 | -4.146 |
| 151 | 0.127 | 0.139 | 0.151 | 8.828 | -8.342 | 4.418 | -4.175 |
| 152 | 0.125 | 0.136 | 0.148 | 8.850 | -8.360 | 4.450 | -4.204 |
| 153 | 0.122 | 0.133 | 0.145 | 8.871 | -8.378 | 4.482 | -4.233 |
| 154 | 0.120 | 0.131 | 0.142 | 8.893 | -8.396 | 4.514 | -4.262 |
| 155 | 0.117 | 0.128 | 0.140 | 8.914 | -8.414 | 4.546 | -4.291 |
| 156 | 0.115 | 0.126 | 0.137 | 8.936 | -8.432 | 4.578 | -4.320 |
| 157 | 0.113 | 0.123 | 0.134 | 8.957 | -8.450 | 4.610 | -4.349 |
| 158 | 0.110 | 0.121 | 0.132 | 8.979 | -8.468 | 4.642 | -4.378 |
| 159 | 0.108 | 0.118 | 0.129 | 9.000 | -8.486 | 4.674 | -4.408 |
| 160 | 0.106 | 0.116 | 0.127 | 9.022 | -8.504 | 4.707 | -4.437 |
| 161 | 0.104 | 0.114 | 0.124 | 9.043 | -8.522 | 4.739 | -4.466 |
| 162 | 0.102 | 0.112 | 0.122 | 9.064 | -8.540 | 4.772 | -4.496 |
| 163 | 0.100 | 0.109 | 0.119 | 9.086 | -8.558 | 4.804 | -4.525 |

|     |       |       |       |        |        |       |        |
|-----|-------|-------|-------|--------|--------|-------|--------|
| 164 | 0.098 | 0.107 | 0.117 | 9.107  | -8.576 | 4.837 | -4.554 |
| 165 | 0.096 | 0.105 | 0.115 | 9.128  | -8.594 | 4.869 | -4.584 |
| 166 | 0.094 | 0.103 | 0.113 | 9.150  | -8.612 | 4.902 | -4.614 |
| 167 | 0.092 | 0.101 | 0.110 | 9.171  | -8.629 | 4.935 | -4.643 |
| 168 | 0.091 | 0.099 | 0.108 | 9.192  | -8.647 | 4.967 | -4.673 |
| 169 | 0.089 | 0.097 | 0.106 | 9.213  | -8.665 | 5.000 | -4.702 |
| 170 | 0.087 | 0.095 | 0.104 | 9.235  | -8.683 | 5.033 | -4.732 |
| 171 | 0.085 | 0.094 | 0.102 | 9.256  | -8.700 | 5.066 | -4.762 |
| 172 | 0.084 | 0.092 | 0.100 | 9.277  | -8.718 | 5.099 | -4.792 |
| 173 | 0.082 | 0.090 | 0.098 | 9.298  | -8.736 | 5.132 | -4.822 |
| 174 | 0.080 | 0.088 | 0.096 | 9.319  | -8.753 | 5.165 | -4.852 |
| 175 | 0.079 | 0.087 | 0.095 | 9.340  | -8.771 | 5.198 | -4.881 |
| 176 | 0.077 | 0.085 | 0.093 | 9.361  | -8.789 | 5.232 | -4.911 |
| 177 | 0.076 | 0.083 | 0.091 | 9.383  | -8.806 | 5.265 | -4.941 |
| 178 | 0.074 | 0.082 | 0.089 | 9.404  | -8.824 | 5.298 | -4.972 |
| 179 | 0.073 | 0.080 | 0.088 | 9.425  | -8.841 | 5.332 | -5.002 |
| 180 | 0.072 | 0.079 | 0.086 | 9.446  | -8.859 | 5.365 | -5.032 |
| 181 | 0.070 | 0.077 | 0.084 | 9.467  | -8.877 | 5.399 | -5.062 |
| 182 | 0.069 | 0.076 | 0.083 | 9.488  | -8.894 | 5.432 | -5.092 |
| 183 | 0.067 | 0.074 | 0.081 | 9.509  | -8.912 | 5.466 | -5.123 |
| 184 | 0.066 | 0.073 | 0.080 | 9.530  | -8.929 | 5.500 | -5.153 |
| 185 | 0.065 | 0.071 | 0.078 | 9.551  | -8.947 | 5.534 | -5.183 |
| 186 | 0.064 | 0.070 | 0.077 | 9.572  | -8.964 | 5.567 | -5.214 |
| 187 | 0.062 | 0.069 | 0.075 | 9.593  | -8.981 | 5.601 | -5.244 |
| 188 | 0.061 | 0.067 | 0.074 | 9.614  | -8.999 | 5.635 | -5.275 |
| 189 | 0.060 | 0.066 | 0.072 | 9.635  | -9.016 | 5.669 | -5.305 |
| 190 | 0.059 | 0.065 | 0.071 | 9.656  | -9.034 | 5.704 | -5.336 |
| 191 | 0.058 | 0.064 | 0.070 | 9.677  | -9.051 | 5.738 | -5.367 |
| 192 | 0.057 | 0.062 | 0.068 | 9.698  | -9.068 | 5.772 | -5.397 |
| 193 | 0.056 | 0.061 | 0.067 | 9.718  | -9.085 | 5.806 | -5.428 |
| 194 | 0.054 | 0.060 | 0.066 | 9.739  | -9.103 | 5.841 | -5.459 |
| 195 | 0.053 | 0.059 | 0.065 | 9.760  | -9.120 | 5.875 | -5.490 |
| 196 | 0.052 | 0.058 | 0.063 | 9.781  | -9.137 | 5.910 | -5.521 |
| 197 | 0.051 | 0.057 | 0.062 | 9.802  | -9.154 | 5.945 | -5.552 |
| 198 | 0.050 | 0.056 | 0.061 | 9.822  | -9.171 | 5.979 | -5.583 |
| 199 | 0.049 | 0.055 | 0.060 | 9.843  | -9.188 | 6.014 | -5.614 |
| 200 | 0.049 | 0.054 | 0.059 | 9.863  | -9.205 | 6.049 | -5.645 |
| 201 | 0.048 | 0.052 | 0.058 | 9.884  | -9.222 | 6.084 | -5.677 |
| 202 | 0.047 | 0.052 | 0.057 | 9.904  | -9.239 | 6.119 | -5.708 |
| 203 | 0.046 | 0.051 | 0.056 | 9.925  | -9.256 | 6.154 | -5.740 |
| 204 | 0.045 | 0.050 | 0.055 | 9.945  | -9.273 | 6.190 | -5.771 |
| 205 | 0.044 | 0.049 | 0.054 | 9.966  | -9.290 | 6.225 | -5.803 |
| 206 | 0.043 | 0.048 | 0.053 | 9.986  | -9.307 | 6.260 | -5.834 |
| 207 | 0.043 | 0.047 | 0.052 | 10.000 | -9.323 | 6.296 | -5.866 |
| 208 | 0.042 | 0.046 | 0.051 | 10.020 | -9.340 | 6.332 | -5.898 |



|     |       |       |       |        |        |       |        |
|-----|-------|-------|-------|--------|--------|-------|--------|
| 209 | 0.041 | 0.045 | 0.050 | 10.040 | -9.356 | 6.367 | -5.930 |
| 210 | 0.040 | 0.044 | 0.049 | 10.060 | -9.373 | 6.403 | -5.962 |
| 211 | 0.039 | 0.044 | 0.048 | 10.080 | -9.389 | 6.439 | -5.994 |
| 212 | 0.039 | 0.043 | 0.047 | 10.100 | -9.406 | 6.475 | -6.026 |
| 213 | 0.038 | 0.042 | 0.046 | 10.120 | -9.422 | 6.511 | -6.059 |
| 214 | 0.037 | 0.041 | 0.046 | 10.140 | -9.438 | 6.548 | -6.091 |
| 215 | 0.037 | 0.041 | 0.045 | 10.160 | -9.454 | 6.584 | -6.123 |
| 216 | 0.036 | 0.040 | 0.044 | 10.180 | -9.470 | 6.621 | -6.156 |
| 217 | 0.035 | 0.039 | 0.043 | 10.200 | -9.486 | 6.657 | -6.189 |
| 218 | 0.035 | 0.038 | 0.042 | 10.220 | -9.502 | 6.694 | -6.222 |
| 219 | 0.034 | 0.038 | 0.042 | 10.240 | -9.518 | 6.731 | -6.254 |
| 220 | 0.034 | 0.037 | 0.041 | 10.260 | -9.534 | 6.768 | -6.288 |
| 221 | 0.033 | 0.036 | 0.040 | 10.280 | -9.549 | 6.805 | -6.321 |
| 222 | 0.032 | 0.036 | 0.040 | 10.300 | -9.565 | 6.842 | -6.354 |
| 223 | 0.032 | 0.035 | 0.039 | 10.310 | -9.580 | 6.880 | -6.387 |
| 224 | 0.031 | 0.035 | 0.038 | 10.330 | -9.595 | 6.917 | -6.421 |
| 225 | 0.031 | 0.034 | 0.038 | 10.350 | -9.611 | 6.955 | -6.454 |
| 226 | 0.030 | 0.033 | 0.037 | 10.370 | -9.626 | 6.993 | -6.488 |
| 227 | 0.030 | 0.033 | 0.036 | 10.390 | -9.641 | 7.031 | -6.522 |
| 228 | 0.029 | 0.032 | 0.036 | 10.410 | -9.655 | 7.069 | -6.556 |
| 229 | 0.029 | 0.032 | 0.035 | 10.420 | -9.670 | 7.107 | -6.590 |
| 230 | 0.028 | 0.031 | 0.035 | 10.440 | -9.685 | 7.146 | -6.625 |
| 231 | 0.028 | 0.031 | 0.034 | 10.460 | -9.699 | 7.184 | -6.659 |
| 232 | 0.027 | 0.030 | 0.034 | 10.480 | -9.713 | 7.223 | -6.694 |
| 233 | 0.027 | 0.030 | 0.033 | 10.490 | -9.727 | 7.262 | -6.728 |
| 234 | 0.026 | 0.029 | 0.033 | 10.510 | -9.741 | 7.301 | -6.763 |
| 235 | 0.026 | 0.029 | 0.032 | 10.530 | -9.755 | 7.340 | -6.798 |
| 236 | 0.026 | 0.028 | 0.032 | 10.550 | -9.769 | 7.380 | -6.834 |
| 237 | 0.025 | 0.028 | 0.031 | 10.560 | -9.783 | 7.419 | -6.869 |
| 238 | 0.025 | 0.028 | 0.031 | 10.580 | -9.796 | 7.459 | -6.905 |
| 239 | 0.024 | 0.027 | 0.030 | 10.590 | -9.809 | 7.499 | -6.940 |
| 240 | 0.024 | 0.027 | 0.030 | 10.610 | -9.822 | 7.539 | -6.976 |
| 241 | 0.024 | 0.026 | 0.029 | 10.630 | -9.835 | 7.580 | -7.012 |
| 242 | 0.023 | 0.026 | 0.029 | 10.640 | -9.848 | 7.620 | -7.049 |
| 243 | 0.023 | 0.026 | 0.028 | 10.660 | -9.860 | 7.661 | -7.085 |
| 244 | 0.023 | 0.025 | 0.028 | 10.670 | -9.873 | 7.702 | -7.122 |
| 245 | 0.022 | 0.025 | 0.028 | 10.690 | -9.885 | 7.743 | -7.159 |
| 246 | 0.022 | 0.025 | 0.027 | 10.700 | -9.897 | 7.784 | -7.196 |
| 247 | 0.022 | 0.024 | 0.027 | 10.720 | -9.908 | 7.826 | -7.233 |
| 248 | 0.022 | 0.024 | 0.027 | 10.730 | -9.920 | 7.868 | -7.270 |
| 249 | 0.021 | 0.024 | 0.026 | 10.740 | -9.931 | 7.910 | -7.308 |
| 250 | 0.021 | 0.023 | 0.026 | 10.760 | -9.942 | 7.952 | -7.346 |



附表:2

南京时恒电阻误差曲线图

