

## ■ C 系列压敏电阻器

### C Series Varistor

氧化锌压敏电阻器是以氧化锌为主要材料制造的半导体无极性电子陶瓷元件。当施加在压敏电阻器两端的电压达到某一阈值时，压敏电阻器的电阻值迅猛变小，从而在电子（电力）线路上起降压作用，达到保护其它元器件的目的。

Zinc Oxide Varistor are non-linear resistors utilizing semiconductor ceramic element which mainly composed of zinc oxide. When the applied voltage on both termination reach the surge value, the voltage of electronic circuit would be reduced to protect the other components.



### ◆特性 FEATURES

|                       |   |
|-----------------------|---|
| *电压范围宽（270V~1100KV）   | Widely voltage range 270 V~1100V                              |
| *响应速度快                | Fast response to the rapidly increase Voltage                 |
| *非线性指数大               | Excellent non-linearity coefficient                           |
| *无极性                  | Symmetric V-I characteristics                                 |
| *通流容量大                | Great withstanding surge current                              |
| *寿命长                  | Long life   |
| *符合 ROHS、REACH、无卤环保要求 | Meet ROHS, REACH, HF requirements of environmental protection |
| *工作温度 -40~105℃        | Operating Temperature -40~105℃                                |
| *存储温度 -40~125℃        | Storage Temperature -40~125℃                                  |

### ◆应用 APPLICATIONS

家电、通讯、各类电源、新能源、电表、照明、工业设备

Household Appliance、Communication、All kinds of power supply、New energy、Electric meter、Lighting Power、Industrial equipment

### ◆安规认证 Safety certification

| 序号<br>NO | 安规认证<br>Safety certification |        | 安规标准<br>Standards                              | 证书编号<br>Certification Number |
|----------|------------------------------|--------|--|------------------------------|
| 1        | 中国 China                     | CQC    | GB/T10193<br>GB/T10194<br>GB 4943.1<br>GB 8898 | 10C: CQC14001111568          |
|          |                              |        |  | 14C: CQC14001111589          |
|          |                              |        |  | 20C: CQC14001111567          |
| 2        | 美国 American、加拿大 Canada       | UL、CUL | UL1449   | E325462                      |
| 3        | 德国 Germany                   | VDE    | IEC61051                                       | 40008242                     |

**◆型号表示法 Part Number**

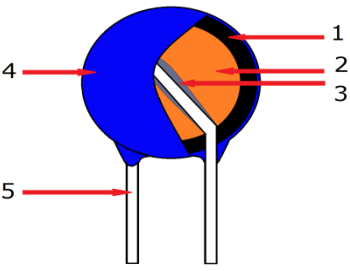
|     |    |   |     |   |   |   |   |    |   |   |   |   |    |
|-----|----|---|-----|---|---|---|---|----|---|---|---|---|----|
| FNR | 14 | C | 621 | K | A | 2 | S | 20 | P | E | 1 | B | NN |
| ①   | ②  | ③ | ④   | ⑤ | ⑥ | ⑦ | ⑧ | ⑨  | ⑩ | ⑪ | ⑫ | ⑬ | ⑭  |

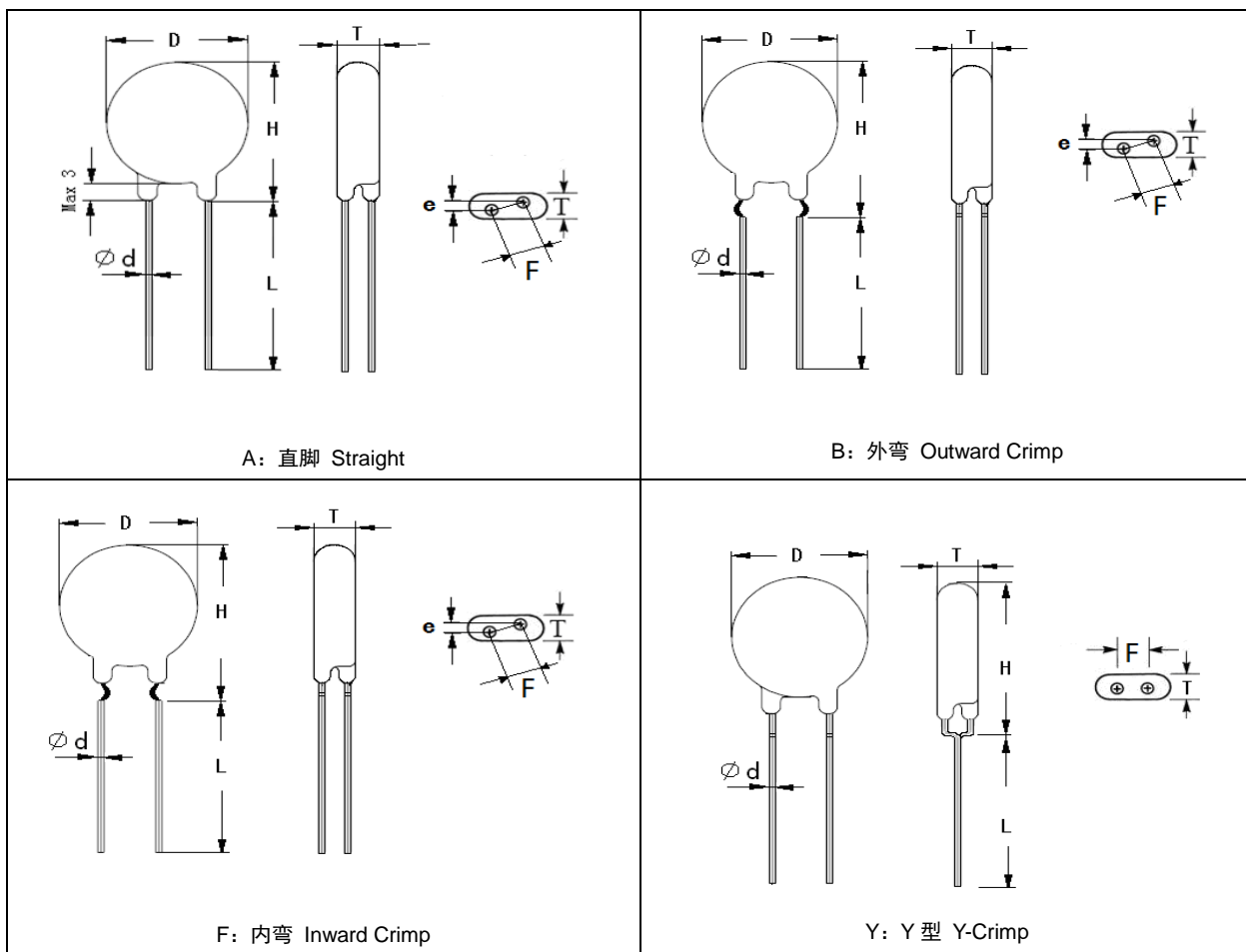
**代码说明 Part Number Code Description**

| 序号<br>NO | 表 示 说 明 Description   |   |                                |                                       |  |
|----------|---|---|--------------------------------|---------------------------------------|--|
| ①        | 风华压敏电阻<br>FenghuaNonlinearResistor                                  |   |                                |                                       |  |
| ②        | 芯片标称直径<br>Diameter of Element                                       | 10: 10mm  | 14: 14mm                       | 20: 20mm                              |  |
| ③        | 系列型号 Series Type  | C 系列<br>C Series  |                                |                                       |  |
| ④        | 压敏电压<br>Varistor Voltage  | 271 : 27×10 <sup>1</sup> =270V  | 621 : 62×10 <sup>1</sup> =620V | 112 : 11×10 <sup>2</sup> =1100V       |  |
| ⑤        | 压敏电压公差 Tolerance  | K: ±10%   |                                |                                       |  |
| ⑥        | 引脚形状 Lead Style   | A: 直脚 Straight<br>B: 外弯 Outward-Crimp   |                                | F: 内弯 Inward--Crimp<br>Y: Y 型 Y-Crimp |  |
| ⑦        | 引脚间距和线径<br>Pin spacing and Wire diameter                            | 1: 脚距&线径: Spacing and Wire diameter: 5.0mm & φ0.6mm<br>2: 脚距&线径: Spacing and Wire diameter: 7.5mm & φ0.8mm<br>3: 脚距&线径: Spacing and Wire diameter: 10.0mm & φ1.0mm<br>4: 脚距&线径: Spacing and Wire diameter: 7.5mm & φ0.7mm<br>5: 脚距&线径: Spacing and Wire diameter: 10.0mm & φ0.8mm<br>6: 脚距&线径: Spacing and Wire diameter: 7.5mm & φ1.0mm<br>7: 脚距&线径: Spacing and Wire diameter: 7.5mm & φ0.6mm<br>X: 特殊要求参照承认书 Special requirements Refer to Structure & Dimension |                                |                                       |  |
| ⑧        | 包装方式-长/短脚/编带/步距<br>Packaging-Long lead/Short lead/Taping /pitch-row | S: 散装&长脚 Bulk& long lead<br>C: 散装&短脚 Bulk&short lead<br>T: 编带&孔距 12.7mmTaping &Pitch-row 12.7mm<br>V: 编带&孔距 15.0mmTaping& Pitch-row 15.0mm  |                                |                                       |  |
| ⑨        | 编带 H <sub>0</sub> 值/引脚长度<br>Taping H <sub>0</sub> /Lead length      | 16: 编带 H <sub>0</sub> 值: TapingH <sub>0</sub> :16.0mm<br>19: 编带 H <sub>0</sub> 值: TapingH <sub>0</sub> :19.0mm<br>20: 长脚 Longlead (20mm Min.)<br>30: 短脚 Short-Lead length 3.0mm<br>35: 短脚 Short-Lead length 3.5mm   |                                |                                       |  |
| ⑩        | 引脚材料<br>Lead Material   | U: 铜线 Tin-Plate Copper wire   |                                | P: 镀锡铜包钢线 Tin plating steel wire      |  |
| ⑪        | 产品等级<br>Product level   | N: 常规 Standard  |                                | E: 高能 High Energy                     |  |
| ⑫        | 产品配置<br>Product Configuration                                       | 1: 常规, 无护套无外壳 Conventional,no-jacket andno-explosion-proof<br>2: 透明套管 Lucency jacket<br>3: 黑色套管 Black jacket<br>M: 立式防爆 Vertical explosion-proof<br>W: 卧式防爆 Horizontal explosion-proof  |                                |                                       |  |
| ⑬        | 本体外观颜色/封装材<br>Body Color / Coating Material                         | B: 蓝色环氧树脂 Blue Epoxy resin<br>Y: 黄色环氧树脂 Yellow Epoxy resin  |                                |                                       |  |
| ⑭        | 内部控制码<br>Internal code  |   |                                |                                       |  |

## ◆结构及尺寸 Structure And Dimensions

\*产品结构和主要材料 Construction and main materials of products

|  |                         |  |
|---|-------------------------|--|
| NO  | 主要结构 The main structure | 物质成分 Material composition                                    |
| 1   | 瓷体 Ceramic disc         | 氧化锌 ZnO  |
| 2   | 电极 Electrodes           | 金属 Metal   |
| 3   | 焊点 Solder               | 锡 Sn、银 Ag、铜 Cu   |
| 4   | 包封层 Coating             | 环氧树脂 Epoxy resin   |
| 5   | 引线 Leads                | 镀锡铜包钢线或镀锡铜线<br>Tin-Plate steel wire or Tin-Plate Copper wire |

**\*散装产品结构及尺寸 Bull Structure And Dimensions**


| 单位（Unit）：mm       |                  |             |           |                  |             |                               |                        |                  |  |           |
|-------------------|------------------|-------------|-----------|------------------|-------------|-------------------------------|------------------------|------------------|--|-----------|
| 规格<br>Part<br>NO. | D <sub>max</sub> | Φd<br>±0.08 | F<br>±1.0 | H <sub>max</sub> |             | L<br>±1.0                     | L<br>±0.5              | L <sub>min</sub> | T <sub>max</sub>   | e<br>±1.0 |
|                   |                  |             |           | 直脚<br>Straight   | 弯脚<br>Crimp | 短直脚<br>Straight<br>Short-Lead | 短弯脚<br>CrimpShort-Lead | 长脚<br>Long-Lead  |  |           |
| 10C               | 12.5             | 0.8         | 7.5       | 16.0             | 18.0        | 3.5                           | 3.5                    | 20               | 请参考电性能<br>参数表<br><br>Please refer to<br>the Electrical<br>Characteristics<br>Table |           |
| 14C               | 17.0             | 0.8         | 7.5       | 19.0             | 22.0        | 3.5                           | 3.5                    | 20               |  |           |
| 20C               | 23.0             | 1.0         | 10.0      | 26.0             | 28.0        | 3.5                           | 3.5                    | 20               |  |           |

### \*编带产品结构及尺寸 Taping Structure And Dimensions

图式 Drawing

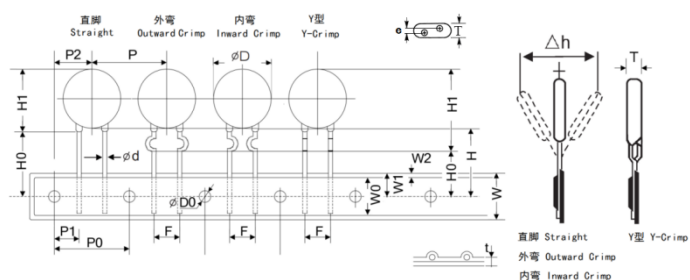


图 A Fig A

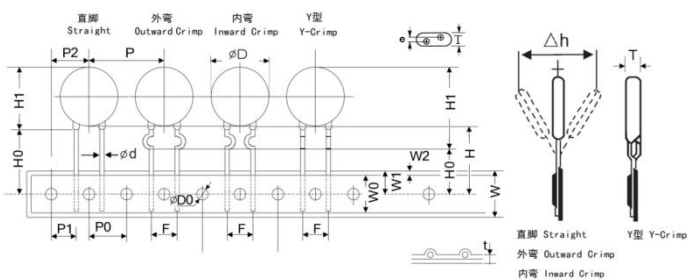


图 B Fig B

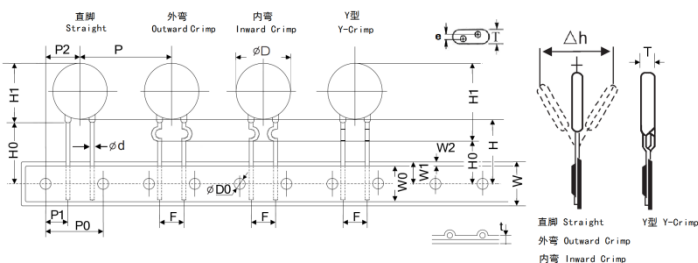


图 CFig C

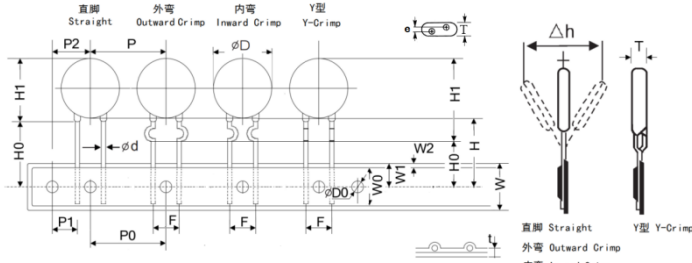


图 D Fig D

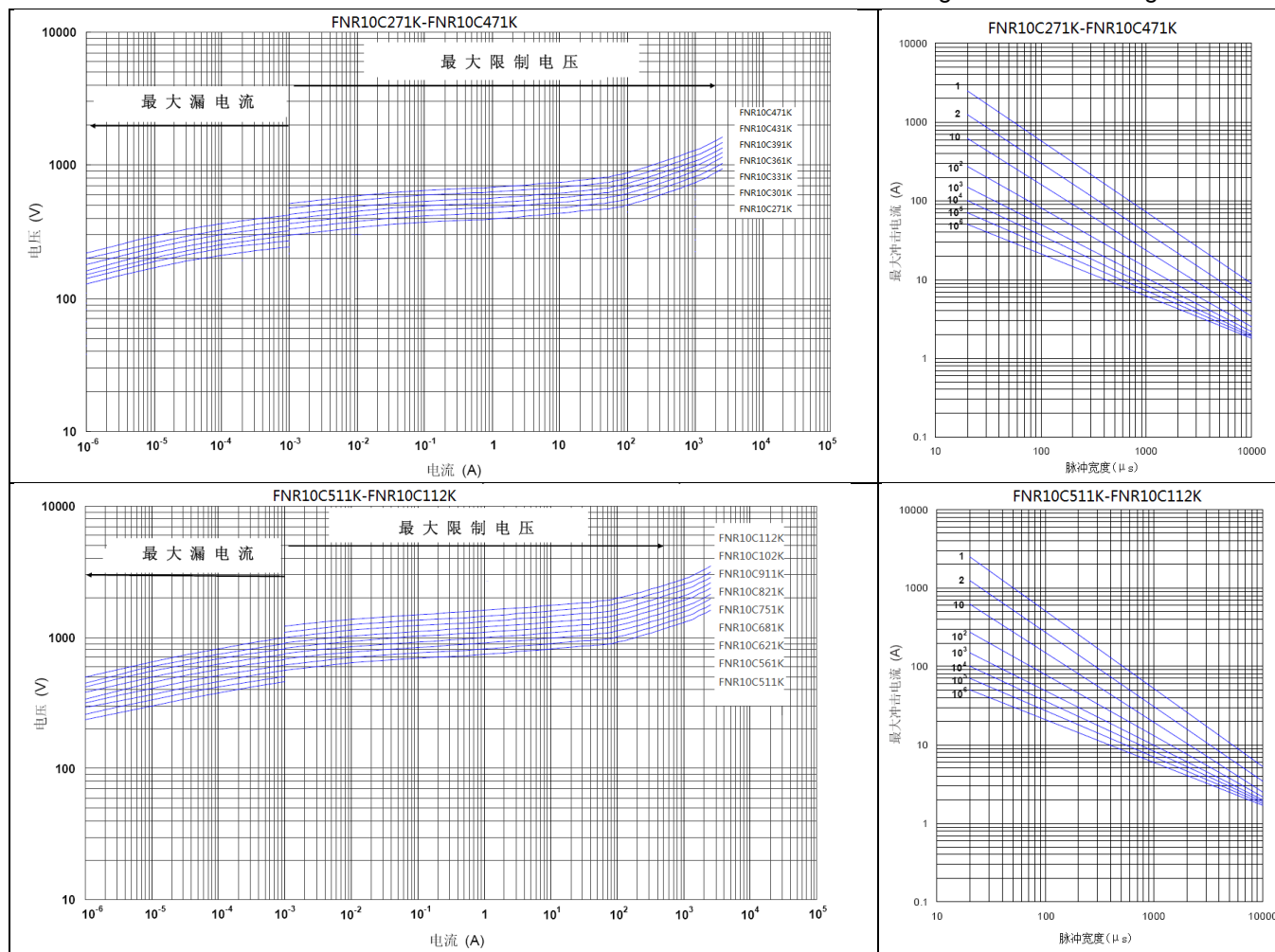
| 图号<br>Fig NO. | 规格<br>Part<br>NO. | 代号&公差    Symbol & Tolerance    单位 (Unit) : mm |       |      |                |                |                |                 |      |                |                |                |                |                |      |      |      |
|---------------|-------------------|---|-------|------|----------------|----------------|----------------|-----------------|------|----------------|----------------|----------------|----------------|----------------|------|------|------|
|               |                   | ΦD  | Φd    | P    | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | ΦD <sub>0</sub> | W    | W <sub>0</sub> | W <sub>1</sub> | W <sub>2</sub> | H <sub>0</sub> | H <sub>1</sub> | △h   | t    | F    |
|               |                   | max   | ±0.08 | ±1.0 | ±1.0           | ±0.7           | ±1.3           | ±0.2            | ±1.0 | min            | ±1.0           | max            | ±1.0           | max            | ±2.0 | ±0.3 | ±1.0 |
| B             | 10C               | 12.5  | 0.8   | 25.4 | 12.7           | 8.95           | 12.7           | 4.0             | 18.0 | 9.8            | 9.0            | 3.0            | 16.0           | 18.0           | 0.0  | 0.6  | 7.5  |
| D             | 10C               | 12.5  | 0.8   | 12.7 | 12.7           | 8.95           | 12.7           | 4.0             | 18.0 | 9.8            | 9.0            | 3.0            | 16.0           | 18.0           | 0.0  | 0.6  | 7.5  |
| A             | 10C               | 12.5  | 0.8   | 15.0 | 15.0           | 3.75           | 7.5            | 4.0             | 18.0 | 9.8            | 9.0            | 3.0            | 16.0           | 18.0           | 0.0  | 0.6  | 7.5  |
| B             | 14C               | 17.0  | 0.8   | 25.4 | 12.7           | 8.95           | 12.7           | 4.0             | 18.0 | 9.8            | 9.0            | 3.0            | 16.0           | 22.0           | 0.0  | 0.6  | 7.5  |
| C             | 14C               | 17.0  | 0.8   | 30.0 | 15.0           | 3.75           | 7.5            | 4.0             | 18.0 | 9.8            | 9.0            | 3.0            | 16.0           | 22.0           | 0.0  | 0.6  | 7.5  |
| B             | 20C               | 23.0  | 1.0   | 25.4 | 12.7           | 7.7            | 12.7           | 4.0             | 18.0 | 9.8            | 9.0            | 3.0            | 16.0           | 28.0           | 0.0  | 0.6  | 10.0 |

备注: 产品厚度尺寸 T 请参考电性能参数表 Notes: Thickness T Please refer to the Electrical Characteristics Table.

**◆电气性能 Performance Specification**
**\*10C 系列电气性能 10C Series Performance Specification**

| 10C 系列<br>10C Series | 压敏电压<br>Varistor Voltage<br>(@1mA DC) | 最大连续工作<br>压 Max.<br>Allowable Voltage |           | 最大限制电压<br>Max. Clamping<br>Voltage<br>(8/20μs) |           | 最大<br>冲击电流<br>Max. Impulse Current<br>(8/20μs) |      | 能量<br>耐量<br>Energy<br>(2mS) |     | 能量<br>耐量<br>Energy<br>(10/1000 μs) |     | 额定<br>功率<br>Rated<br>Wattage | 静态电容量<br>(参考值)<br>Typical<br>Capacitance | 产品尺寸<br>Dimensions |           |
|----------------------|---------------------------------------|---------------------------------------|-----------|--|-----------|--|------|-----------------------------|-----|------------------------------------|-----|------------------------------|--|--------------------|-----------|
|                      |                                       |                                       |           |  |           |  |      |                             |     |                                    |     |                              |  |                    |           |
| 规格型号<br>Part Number  | V1mA<br>(V)                           | Ac<br>(V)                             | Dc<br>(V) | Vc<br>(V)                                      | Ip<br>(A) | 1 Times<br>(A)                                 |      | W max<br>(J)                |     | W max<br>(J)                       |     | P<br>(W)                     | Cp<br>(PF)                               | T<br>Max           | e<br>±1.0 |
| FNR-10C271K          | 270 (243~297)                         | 175                                   | 225       | 455  | 25        | 2500   | 3500 | 40                          | 41  | 40                                 | 49  | 0.4                          | 350                                      | 4.8                | 1.7       |
| FNR-10C301K          | 300 (270~330)                         | 195                                   | 250       | 500  | 25        | 2500   | 3500 | 35                          | 45  | 40                                 | 53  | 0.4                          | 325                                      | 5.0                | 1.8       |
| FNR-10C331K          | 330 (297~363)                         | 210                                   | 275       | 550  | 25        | 2500   | 3500 | 39                          | 49  | 43                                 | 58  | 0.4                          | 325                                      | 5.2                | 2.0       |
| FNR-10C361K          | 360 (324~396)                         | 230                                   | 300       | 595  | 25        | 2500   | 3500 | 45                          | 53  | 47                                 | 65  | 0.4                          | 300                                      | 5.3                | 2.1       |
| FNR-10C391K          | 390 (351~429)                         | 250                                   | 320       | 650  | 25        | 2500   | 3500 | 52                          | 58  | 60                                 | 70  | 0.4                          | 270                                      | 5.6                | 2.2       |
| FNR-10C431K          | 430 (387~473)                         | 275                                   | 350       | 710  | 25        | 2500   | 3500 | 58                          | 63  | 65                                 | 80  | 0.4                          | 250                                      | 5.7                | 2.4       |
| FNR-10C471K          | 470 (423~517)                         | 300                                   | 385       | 775  | 25        | 2500   | 3500 | 58                          | 69  | 70                                 | 85  | 0.4                          | 230                                      | 6.1                | 2.5       |
| FNR-10C511K          | 510 (459~561)                         | 320                                   | 410       | 840  | 25        | 2500   | 3500 | 58                          | 69  | 70                                 | 92  | 0.4                          | 200                                      | 6.3                | 2.7       |
| FNR-10C561K          | 560 (504~616)                         | 350                                   | 455       | 925  | 25        | 2500   | 3500 | 58                          | 69  | 70                                 | 92  | 0.4                          | 180                                      | 6.6                | 2.9       |
| FNR-10C621K          | 620 (604~682)                         | 385                                   | 505       | 1025   | 25        | 2500   | 3500 | 58                          | 69  | 70                                 | 95  | 0.4                          | 130                                      | 6.9                | 3.2       |
| FNR-10C681K          | 680 (612~748)                         | 420                                   | 560       | 1120   | 25        | 2500   | 3500 | 60                          | 74  | 72                                 | 98  | 0.4                          | 130                                      | 7.3                | 3.4       |
| FNR-10C751K          | 750 (675~825)                         | 460                                   | 615       | 1240   | 25        | 2500   | 3500 | 65                          | 81  | 75                                 | 100 | 0.4                          | 120                                      | 7.7                | 3.7       |
| FNR-10C781K          | 780 (702~858)                         | 485                                   | 640       | 1290   | 25        | 2500   | 3500 | 65                          | 85  | 75                                 | 100 | 0.4                          | 120                                      | 7.8                | 3.8       |
| FNR-10C821K          | 820 (738~902)                         | 510                                   | 670       | 1355   | 25        | 2500   | 3500 | 71                          | 99  | 85                                 | 110 | 0.4                          | 110                                      | 8.1                | 4.0       |
| FNR-10C911K          | 910 (819~1001)                        | 550                                   | 745       | 1500   | 25        | 2500   | 3500 | 78                          | 109 | 93                                 | 130 | 0.4                          | 100                                      | 8.7                | 4.3       |
| FNR-10C102K          | 1000 (900~1100)                       | 625                                   | 825       | 1650   | 25        | 2500   | 3500 | 84                          | 117 | 102                                | 140 | 0.4                          | 90                                       | 9.5                | 4.7       |
| FNR-10C112K          | 1100 (990~1210)                       | 680                                   | 895       | 1815   | 25        | 2500   | 3500 | 91                          | 127 | 115                                | 155 | 0.4                          | 80                                       | 10.2               | 5.0       |

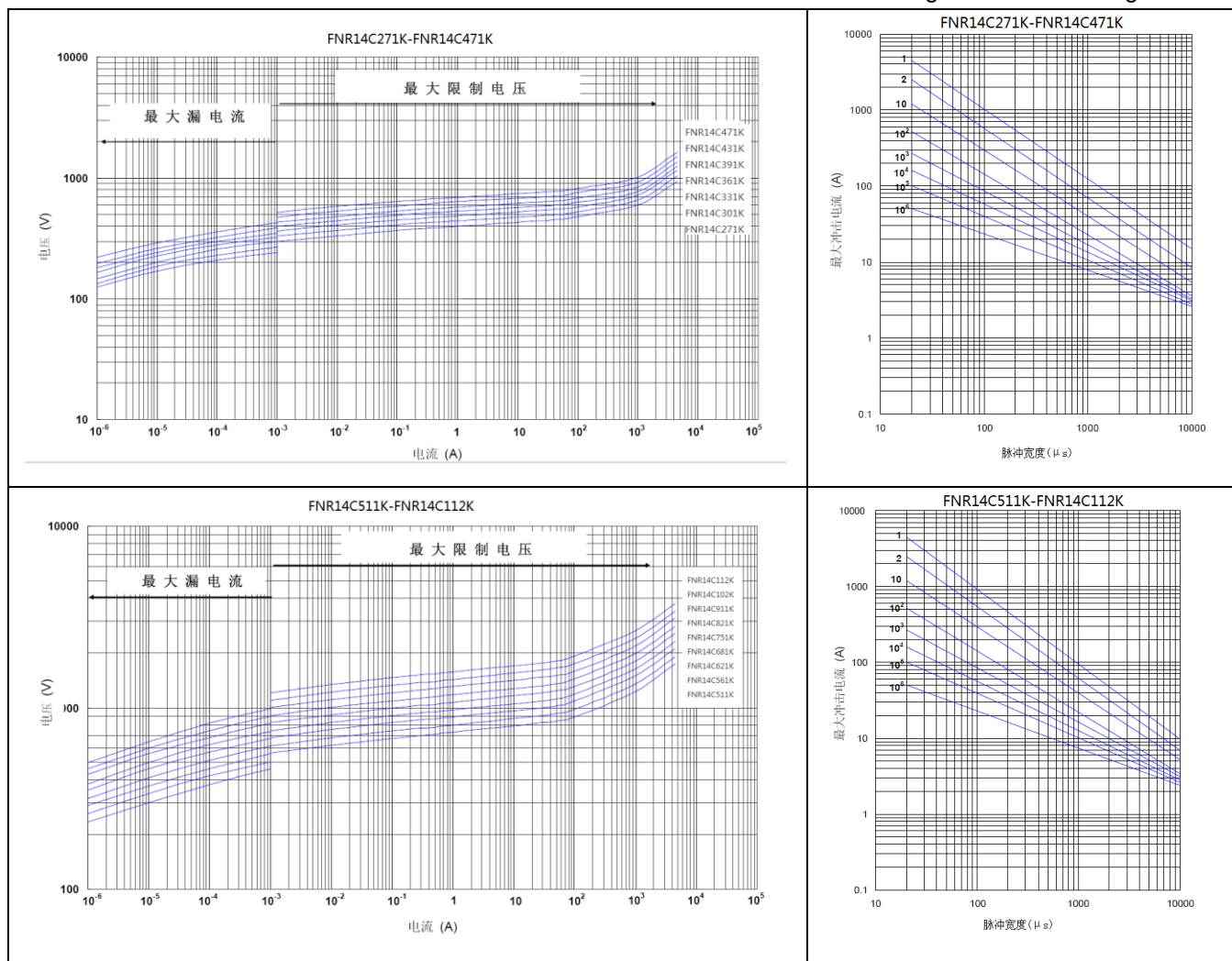
**\*10C 系列 V-I 特性曲线和最大浪涌电流降额曲线 10C Series V-I Curve and Max. Surge Current Derating Curves**



**\*14C 系列电气性能 14C Series Performance Specification**

| 14C 系列<br>14C Series | 压敏电压<br>Varistor Voltage<br>(@1mA DC) | 最大连续工作<br>压 Max.<br>Allowable Voltage |           | 最大限制电压<br>Max. Clamping<br>Voltage<br>(8/20 $\mu$ s) |           | 最大<br>冲击电流<br>Max. Impulse Current<br>(8/20 $\mu$ s) |      | 能量<br>耐量<br>Energy<br>(2mS) |     | 能量<br>耐量<br>Energy<br>(10/1000 $\mu$ s) |     | 额定<br>功率<br>Rated<br>Wattage | 静态电容量<br>(参考值)<br>Typical<br>Capacitance | 产品尺寸<br>Dimensions |                |
|----------------------|---------------------------------------|---------------------------------------|-----------|--|-----------|--|------|-----------------------------|-----|---|-----|------------------------------|--|--------------------|----------------|
|                      |                                       |                                       |           |  |           |  |      |                             |     |   |     |                              |  |                    |                |
| 规格型号<br>Part Number  | V1mA<br>(V)                           | Ac<br>(V)                             | Dc<br>(V) | Vc<br>(V)  | Ip<br>(A) | 1 Times<br>(A)                                       |      | W max<br>(J)                |     | W max<br>(J)                            |     | P<br>(W)                     | Cp<br>(PF)                               | T<br>Max           | e<br>$\pm 1.0$ |
| FNR-14C271K          | 270 (243~297)                         | 175                                   | 225       | 455  | 50        | 4500   | 6000 | 65                          | 81  | 70                                      | 112 | 0.6                          | 750                                      | 5.0                | 1.7            |
| FNR-14C301K          | 300 (270~330)                         | 195                                   | 250       | 500  | 50        | 4500   | 6000 | 71                          | 90  | 78                                      | 123 | 0.6                          | 650                                      | 5.2                | 1.9            |
| FNR-14C331K          | 330 (297~363)                         | 210                                   | 275       | 550  | 50        | 4500   | 6000 | 78                          | 99  | 85                                      | 133 | 0.6                          | 650                                      | 5.4                | 2.0            |
| FNR-14C361K          | 360 (324~396)                         | 230                                   | 300       | 595  | 50        | 4500   | 6000 | 84                          | 107 | 93                                      | 147 | 0.6                          | 550                                      | 5.5                | 2.2            |
| FNR-14C391K          | 390 (351~429)                         | 250                                   | 320       | 650  | 50        | 4500   | 6000 | 91                          | 117 | 100                                     | 161 | 0.6                          | 500                                      | 5.8                | 2.3            |
| FNR-14C431K          | 430 (387~473)                         | 275                                   | 350       | 710  | 50        | 4500   | 6000 | 97                          | 127 | 115                                     | 182 | 0.6                          | 450                                      | 5.9                | 2.4            |
| FNR-14C471K          | 470 (423~517)                         | 300                                   | 385       | 775  | 50        | 4500   | 6000 | 104                         | 140 | 125                                     | 196 | 0.6                          | 440                                      | 6.3                | 2.5            |
| FNR-14C511K          | 510 (459~561)                         | 320                                   | 410       | 840  | 50        | 4500   | 6000 | 104                         | 150 | 125                                     | 210 | 0.6                          | 380                                      | 6.5                | 2.7            |
| FNR-14C561K          | 560 (504~616)                         | 350                                   | 455       | 925  | 50        | 4500   | 6000 | 104                         | 165 | 125                                     | 231 | 0.6                          | 345                                      | 6.8                | 2.6            |
| FNR-14C621K          | 620 (558~682)                         | 385                                   | 505       | 1025   | 50        | 4500   | 6000 | 110                         | 180 | 130                                     | 252 | 0.6                          | 250                                      | 7.1                | 2.8            |
| FNR-14C681K          | 680 (612~748)                         | 420                                   | 560       | 1120   | 50        | 4500   | 6000 | 117                         | 190 | 136                                     | 266 | 0.6                          | 250                                      | 7.5                | 3.0            |
| FNR-14C751K          | 750 (675~825)                         | 460                                   | 615       | 1240   | 50        | 4500   | 6000 | 130                         | 200 | 143                                     | 280 | 0.6                          | 230                                      | 7.9                | 3.3            |
| FNR-14C781K          | 780 (702~858)                         | 485                                   | 640       | 1290   | 50        | 4500   | 6000 | 136                         | 200 | 150                                     | 280 | 0.6                          | 230                                      | 8.0                | 3.4            |
| FNR-14C821K          | 820 (738~902)                         | 510                                   | 670       | 1355   | 50        | 4500   | 6000 | 143                         | 203 | 157                                     | 285 | 0.6                          | 200                                      | 8.3                | 3.5            |
| FNR-14C911K          | 910 (819~1001)                        | 550                                   | 745       | 1500   | 50        | 4500   | 6000 | 156                         | 220 | 175                                     | 308 | 0.6                          | 180                                      | 8.9                | 3.9            |
| FNR-14C102K          | 1000 (900~1100)                       | 625                                   | 825       | 1650   | 50        | 4500   | 6000 | 169                         | 240 | 190                                     | 336 | 0.6                          | 150                                      | 9.7                | 4.1            |
| FNR-14C112K          | 1100 (990~1210)                       | 680                                   | 895       | 1815   | 50        | 4500   | 6000 | 182                         | 260 | 213                                     | 364 | 0.6                          | 150                                      | 10.5               | 4.5            |

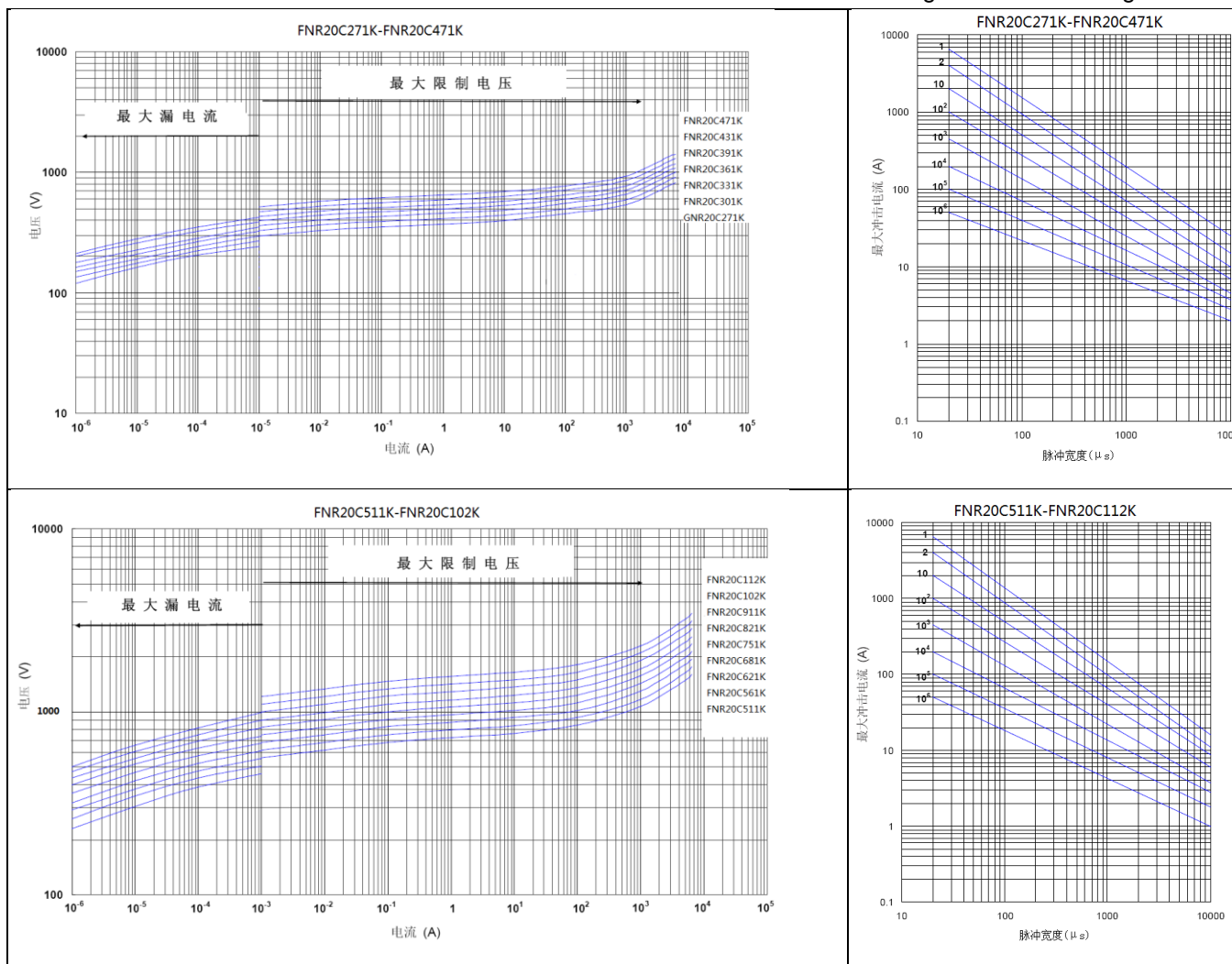
**\*14C 系列 V-I 特性曲线和最大浪涌电流降额曲线 14C Series V-I Curve and Max. Surge Current Derating Curves**



**\*20C 系列电气性能 20C Series Performance Specification**

| 20C 系列<br>20C Series | 压敏电压<br>Varistor Voltage<br>(@1mA DC) | 最大连续工作<br>压 Max.<br>Allowable Voltage |           | 最大限制电压<br>Max. Clamping<br>Voltage<br>(8/20μs) |           | 最大<br>冲击电流<br>Max. Impulse Current<br>(8/20μs) |       | 能量<br>耐量<br>Energy<br>(2mS) |     | 能量<br>耐量<br>Energy<br>(10/1000 μs) |     | 额定<br>功率<br>Rated<br>Wattage | 静态电容量<br>(参考值)<br>Typical<br>Capacitance | 产品尺寸<br>Dimensions |           |
|----------------------|---------------------------------------|---------------------------------------|-----------|--|-----------|--|-------|-----------------------------|-----|------------------------------------|-----|------------------------------|--|--------------------|-----------|
|                      |                                       |                                       |           |  |           |  |       |                             |     |                                    |     |                              |  |                    |           |
| 规格型号<br>Part Number  | V1mA<br>(V)                           | Ac<br>(V)                             | Dc<br>(V) | Vc<br>(V)                                      | Ip<br>(A) | 1 Times<br>(A)                                 |       | W max<br>(J)                |     | W max<br>(J)                       |     | P<br>(W)                     | Cp<br>(PF)                               | T<br>Max           | e<br>±1.0 |
| FNR-20C271K          | 270 (243~297)                         | 175                                   | 225       | 455  | 100       | 6500   | 10000 | 117                         | 136 | 127                                | 191 | 1.0                          | 1600                                     | 5.2                | 2.0       |
| FNR-20C361K          | 360 (324~396)                         | 230                                   | 300       | 595  | 100       | 6500   | 10000 | 156                         | 178 | 163                                | 249 | 1.0                          | 1200                                     | 5.9                | 2.4       |
| FNR-20C391K          | 390 (351~429)                         | 250                                   | 320       | 650  | 100       | 6500   | 10000 | 169                         | 195 | 180                                | 273 | 1.0                          | 1000                                     | 6.0                | 2.5       |
| FNR-20C431K          | 430 (387~473)                         | 275                                   | 350       | 710  | 100       | 6500   | 10000 | 182                         | 213 | 190                                | 298 | 1.0                          | 900                                      | 6.1                | 2.6       |
| FNR-20C471K          | 470 (423~517)                         | 300                                   | 385       | 775  | 100       | 6500   | 10000 | 195                         | 232 | 220                                | 325 | 1.0                          | 900                                      | 6.5                | 2.8       |
| FNR-20C511K          | 510 (459~561)                         | 320                                   | 410       | 840  | 100       | 6500   | 10000 | 195                         | 232 | 220                                | 325 | 1.0                          | 800                                      | 6.7                | 3.0       |
| FNR-20C561K          | 560 (504~616)                         | 350                                   | 455       | 925  | 100       | 6500   | 10000 | 195                         | 232 | 220                                | 325 | 1.0                          | 700                                      | 6.9                | 2.8       |
| FNR-20C621K          | 620 (558~682)                         | 385                                   | 505       | 1025   | 100       | 6500   | 10000 | 195                         | 246 | 220                                | 344 | 1.0                          | 500                                      | 7.3                | 3.0       |
| FNR-20C681K          | 680 (612~748)                         | 420                                   | 560       | 1120   | 100       | 6500   | 10000 | 208                         | 268 | 230                                | 376 | 1.0                          | 460                                      | 7.7                | 3.2       |
| FNR-20C751K          | 750 (675~825)                         | 460                                   | 615       | 1240   | 100       | 6500   | 10000 | 227                         | 297 | 255                                | 416 | 1.0                          | 420                                      | 8.0                | 3.5       |
| FNR-20C781K          | 780 (702~858)                         | 485                                   | 640       | 1290   | 100       | 6500   | 10000 | 234                         | 309 | 265                                | 433 | 1.0                          | 420                                      | 8.2                | 3.6       |
| FNR-20C821K          | 820 (738~902)                         | 510                                   | 670       | 1355   | 100       | 6500   | 10000 | 247                         | 325 | 282                                | 455 | 1.0                          | 400                                      | 8.5                | 3.8       |
| FNR-20C911K          | 910 (819~1001)                        | 550                                   | 745       | 1500   | 100       | 6500   | 10000 | 280                         | 360 | 310                                | 504 | 1.0                          | 350                                      | 9.1                | 4.0       |
| FNR-20C102K          | 1000 (900~1100)                       | 625                                   | 825       | 1650   | 100       | 6500   | 10000 | 299                         | 396 | 340                                | 554 | 1.0                          | 320                                      | 9.9                | 4.4       |
| FNR-20C112K          | 1100 (990~1210)                       | 680                                   | 895       | 1815   | 100       | 6500   | 10000 | 325                         | 435 | 383                                | 609 | 1.0                          | 300                                      | 11.0               | 4.8       |

**\*20C 系列 V-I 特性曲线和最大浪涌电流降额曲线 20C Series V-I Curve and Max. Surge Current Derating Curves**



**◆电气性能 Electrical Performance Test**

| 序号<br>NO | 项目<br>Item  | 测试标准<br>Standard                  | 测试方法<br>Test method  | 特性<br>Performance   |
|----------|---|-----------------------------------|--|---|
| 1        | 压敏电压<br>Varistor Voltage  | 规格标准<br>Specification<br>Standard | 在规定电流条件下 (DC <sub>1mA</sub> ) 的两端电压值。<br>The voltage between two terminals with the specified measuring current (DC <sub>1mA</sub> ).  | 参见电气性能<br>To meet Performance<br>Specification                      |
| 2        | 漏电流<br>Leakage current  | 规格标准<br>Specification<br>Standard | 在标准测试条件下, 施加 83%压敏电压时流过压敏电阻器的电流值。<br>The direct current flowing from the Varistor at 0.83V <sub>V</sub> .<br>V <sub>V</sub> : 压敏电压 (DC <sub>1mA</sub> )<br>V <sub>V</sub> : Varistor Voltage (DC <sub>1mA</sub> ).   | 在 25℃ 时:<br>≥82V IR≤20μA<br><82V IR≤40μA<br>(V <sub>V</sub> of 83%) |
| 3        | 限制电压<br>Clamping Voltage  | 规格标准<br>Specification<br>Standard | 在 8/20us 波形下, 施加规定电流后压敏电阻器两端的电压峰值。<br>The maximum voltage between two terminals with the specified standard impulse current (8/20us) applied.  | 参见电气性能<br>To meet Performance<br>Specification                      |
| 4        | 最大冲击电流<br>Maximum<br>Impulse Current<br>(withstanding surge<br>current) | 规格标准<br>Specification<br>Standard | 在环境温度 25℃ 下, 施加 1 次 8/20us 的标准冲击电流后, 压敏电阻电压变化率在±10%内。<br>The maximum current within the varistor voltage change of ±10% with the standard impulse applied by the specified condition.  | 参见电气性能<br>To meet Performance<br>Specification<br> ΔV/V ≤10%        |
| 5        | 能量耐量<br>Maximum energy  | 规格标准<br>Specification<br>Standard | 在环境温度 25℃ 下, 施加 1 次 2ms 或 10/1000uS 的标准冲击电流后, 压敏电阻电压变化率在±10%内。<br>The maximum energy (2ms or 10/1000uS wave) within the Varistor Voltage change of ±10% when the specified impulse is applied.   | 参见电气性能<br>To meet Performance<br>Specification<br> ΔV/V ≤10%        |
| 6        | 电压温度系数<br>Temperature<br>coefficient of<br>varistor Voltage             | 规格标准<br>Specification<br>Standard | 在规定温度下显示压敏电压的变化值。<br>Coefficient indicating dependency of Varistor Voltage on Specified temperature.<br>$\frac{V_{1mA@105^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{60} \times 100\% \text{ (}/^{\circ}\text{C)}$<br>$\frac{V_{1mA@-40^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{65} \times 100\% \text{ (}/^{\circ}\text{C)}$ | -0.05≤Tc≤0.05(%/°C)   |
| 7        | 静态电容量<br>Capacitance  | 规格标准<br>Specification<br>Standard | 在环境温度为 25±2℃, 测试频率为 1KHz±10%, 1Vrms (max) 下所测得的介电损失。<br>Dielectric loss tangent shall be measured at 1KHz±10%, 1Vrms max bias and 25±2℃.   | 参见电气性能<br>To meet Performance<br>Specification                      |

**◆可靠性试验项目 Reliability Testing Item**

| 序号<br>NO                      | 项目<br>Item                              | 测试标准<br>Standard | 测试方法<br>Test method  | 特性<br>Performance   |                |           |    |            |    |        |    |   |
|-------------------------------|---|------------------|--|---|----------------|-----------|----|------------|----|--------|----|---|
| 1                             | 端子抗拉强度<br>Tensile Strength of Terminals | IEC60068-2-21    | <div>逐渐施加规定的力，并保持装置固定 10±1 秒。<br/>Gradually applying the force specified and keepingthe unit fixed for 10±1 sec.</div> <table><tr><td>引线直径<br/>Terminal diameter(mm)</td><td>拉力<br/>Force(N)</td></tr><tr><td>0.5&lt;d≤0.8</td><td>10</td></tr><tr><td>0.8&lt;d≤1.25</td><td>20</td></tr><tr><td>1.25&lt;d</td><td>40</td></tr></table>  | 引线直径<br>Terminal diameter(mm)   | 拉力<br>Force(N) | 0.5<d≤0.8 | 10 | 0.8<d≤1.25 | 20 | 1.25<d | 40 | <div>无可见损伤。<br/>压敏电压变化率在±5%内。<br/>Novisibledamage.<br/>  Δ V/V   ≤5%.</div> |
| 引线直径<br>Terminal diameter(mm) | 拉力<br>Force(N)                          |                  |  |   |                |           |    |            |    |        |    |   |
| 0.5<d≤0.8                     | 10                                      |                  |  |   |                |           |    |            |    |        |    |   |
| 0.8<d≤1.25                    | 20                                      |                  |  |   |                |           |    |            |    |        |    |   |
| 1.25<d                        | 40                                      |                  |  |   |                |           |    |            |    |        |    |   |
| 2                             | 引线弯折试验<br>Bending Strength of Terminals | IEC 60068-2-21   | <div>固定试样，并将以下规定的力施加到每个引脚上。将样品弯曲至 90°，然后回到原样位置。在相反的方向上重复此步骤。<br/>Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction.</div> <table><tr><td>引线直径<br/>Terminal diameter(mm)</td><td>拉力<br/>Force(N)</td></tr><tr><td>0.5&lt;d≤0.8</td><td>5</td></tr><tr><td>0.8&lt;d≤1.25</td><td>10</td></tr><tr><td>1.25&lt;d</td><td>20</td></tr></table> | 引线直径<br>Terminal diameter(mm)   | 拉力<br>Force(N) | 0.5<d≤0.8 | 5  | 0.8<d≤1.25 | 10 | 1.25<d | 20 | <div>无可见损伤。<br/>压敏电压变化率在±5%内。<br/>Novisibledamage.<br/>  Δ V/V   ≤5%.</div> |
| 引线直径<br>Terminal diameter(mm) | 拉力<br>Force(N)                          |                  |  |   |                |           |    |            |    |        |    |   |
| 0.5<d≤0.8                     | 5                                       |                  |  |   |                |           |    |            |    |        |    |   |
| 0.8<d≤1.25                    | 10                                      |                  |  |   |                |           |    |            |    |        |    |   |
| 1.25<d                        | 20                                      |                  |  |   |                |           |    |            |    |        |    |   |
| 3                             | 振动试验<br>Resistance Vibration            | IEC 60068-2-6    | <div>振动频率：10 ~ 55 Hz<br/>振幅：0.75mm 或 98 m/s<sup>2</sup><br/>3 方向，持续时间：6 小时(3 x 2 小时)<br/>Frequency range:10Hz-55Hz,<br/>Amplitude: 0.75mm or 98m/s<sup>2</sup>,three direction,Totalduration: 6h.</div>  | <div>无可见损伤。<br/>压敏电压变化率在±5%内。<br/>Novisibledamage.<br/>  Δ V/V   ≤5%.</div>           |                |           |    |            |    |        |    |   |
| 4                             | 碰撞<br>Bump                              | IEC 60068-2-29   | <div>400m/S<sup>2</sup>，6ms，三个方向，共 4000 次。<br/>Acceleration: 400m/S<sup>2</sup>，6ms，three direction，umber of bumps: 4000。</div>  | <div>无可见损伤。<br/>压敏电压变化率在±5%内。<br/>Novisibledamage.<br/>  Δ V/V   ≤5%.</div>           |                |           |    |            |    |        |    |   |
| 5                             | 耐溶剂性<br>Permanency of marking           | IEC 60068-2-45   | <div>溶剂：丙酮溶液<br/>温度：23±5℃<br/>浸入时间：1 分钟。<br/>Class of reagent :acetone solution<br/>Test temperature:23±5℃<br/>Immersing time:1min</div>   | <div>无损伤、标志清楚，容易辨认。<br/>Novisibledamage and legibly marking.<br/>  Δ V/V   ≤5%.</div> |                |           |    |            |    |        |    |   |
| 6                             | 可焊性<br>Solderability                    | IEC 60068-2-20   | <div>槽焊法 245±3℃，3±0.3 秒<br/>Solder bath method245±5℃,3±0.3ses.</div>   | <div>着锡面积≧95%<br/>At least 95% of terminal electrode is covered by new solder.</div>  |                |           |    |            |    |        |    |   |

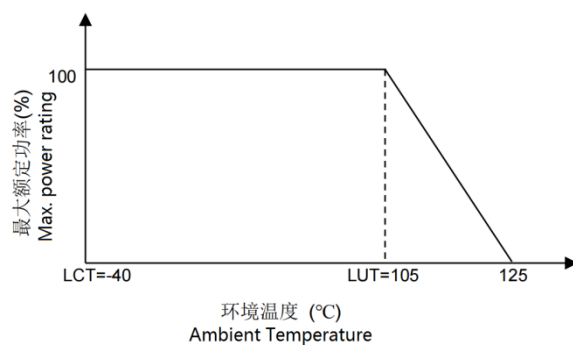
|         |  |                           |  |   |                |           |   |        |       |   |                        |       |   |         |       |   |                        |       |   |
|---------|--|---------------------------|--|---|----------------|-----------|---|--------|-------|---|------------------------|-------|---|---------|-------|---|------------------------|-------|---|
| 7       | 耐焊接热<br>Resistance to soldering heat           | IEC<br>60068-2-20         | 槽焊法<br>260±5℃,10±1 秒,深度: 至引线根部 2.0~2.5mm 浸入速度: 25±2.5mm/sec<br>Solder bath method<br>260±5℃, 10±1ses.Depth of immersion: up to 2.0~2.5mm from the root of the lead wire covered with thermal screen.<br>Speed of immersion:25±2.5mm/sec.   | 无可见损伤。<br>压敏电压变化率在±5%内。<br>Novisibledamage.<br>  Δ V/V   ≤5%.   |                |           |   |        |       |   |                        |       |   |         |       |   |                        |       |   |
| 8       | 稳态湿热<br>Resistance to damp heat (steady state) | IEC<br>60068-2-78         | 试验分 a、b 两组:<br>a. 40±2℃, 90 ~ 95 % RH, 1344 小时<br>b. 40±2℃, 90 ~ 95 % RH, 10% VDC, 1344 小时<br>Group: a、b<br>a. 40±2℃, 90 ~ 95 % RH, 1344 hrs<br>b. 40±2℃, 90 ~ 95 % RH, 10% VDC, 1344 hrs  | 无可见损伤。<br>压敏电压变化率在±10%内。<br>绝缘电阻≥100MΩ。<br>No visible damage.<br> Δ V/V ≤10%<br>Insulation resistance≥100MΩ |                |           |   |        |       |   |                        |       |   |         |       |   |                        |       |   |
| 9       | 上限类别温度耐久性<br>High temperature load             | MIL-STD-202<br>Method 108 | 施加电压: 最大连续交流电压。<br>试验温度: 105±2℃<br>试验时间: 1000h<br>at V <sub>AC</sub> (Max. Operating Voltage)<br>105 ± 2 °C, 1000 ± 24 hrs.  | 外观无可见损伤。<br>压敏电压变化率在±10%内。<br>No visible damage.<br> Δ V/V ≤10%   |                |           |   |        |       |   |                        |       |   |         |       |   |                        |       |   |
| 10      | 高温贮存试验<br>Shelf life test                      | IEC 60068-2-2             | 在 125±2℃环境下无负荷贮 1000h。<br>The Zinc oxide varistor are then stored with no voltage applied at a temperature of 125±2℃ for 1000h.  | 外观无可见损伤。<br>压敏电压变化率在±5%内。<br>No visible damage.<br> Δ V/V ≤5%   |                |           |   |        |       |   |                        |       |   |         |       |   |                        |       |   |
| 11      | 温度快速变化<br>Temperature cycling                  | IEC60068-2-14             | 温度循环应重复 5 次, 并在室温和湿度下保存 1 至 2 小时。<br>The conditions shown below shall be repeated 5 cycles. <table><tr><td>步骤 Step</td><td>温度 Temperature</td><td>时间 Period</td></tr><tr><td>1</td><td>-40±3℃</td><td>30min</td></tr><tr><td>2</td><td>室温<br/>Room temperature</td><td>15min</td></tr><tr><td>3</td><td>+105±2℃</td><td>30min</td></tr><tr><td>4</td><td>室温<br/>Room temperature</td><td>15min</td></tr></table> | 步骤 Step   | 温度 Temperature | 时间 Period | 1 | -40±3℃ | 30min | 2 | 室温<br>Room temperature | 15min | 3 | +105±2℃ | 30min | 4 | 室温<br>Room temperature | 15min | 外观无可见损伤。<br>压敏电压变化率在±5%内。<br>No visible damage.<br> Δ V/V ≤5% |
| 步骤 Step | 温度 Temperature                                 | 时间 Period                 |  |   |                |           |   |        |       |   |                        |       |   |         |       |   |                        |       |   |
| 1       | -40±3℃   | 30min                     |  |   |                |           |   |        |       |   |                        |       |   |         |       |   |                        |       |   |
| 2       | 室温<br>Room temperature                         | 15min                     |  |   |                |           |   |        |       |   |                        |       |   |         |       |   |                        |       |   |
| 3       | +105±2℃  | 30min                     |  |   |                |           |   |        |       |   |                        |       |   |         |       |   |                        |       |   |
| 4       | 室温<br>Room temperature                         | 15min                     |  |   |                |           |   |        |       |   |                        |       |   |         |       |   |                        |       |   |
| 12      | 脉冲寿命<br>Impulse life                           | IEC 61051-1               | 固定冲击电流用 8/20μS 标准波冲击 10000 次,时间间隔 10S, 恢复时间室温 1~2 小时。<br>@8/20μS,10000 times,the interval 10 seconds.<br>The specimen shall be stored at room temperature and humidity for 1 to 2 hours.   | 外观无可见损伤。<br>压敏电压变化率在±10%内。<br>No visible damage.<br> Δ V/V ≤10%   |                |           |   |        |       |   |                        |       |   |         |       |   |                        |       |   |

|    |                       |                |   |   |
|----|-----------------------|----------------|---|---|
| 13 | 耐压试验<br>Voltage Proof | IEC 61051-1    | 金属球法, 2500 V <sub>AC</sub> 1 分钟<br>Metal balls method, 2500 V <sub>AC</sub> 1 min | 外观无可见损伤。<br>No visible damage.  |
| 14 | 阻燃性试验<br>Fire hazard  | IEC 60695-11-5 | 针焰测试<br>施加火焰时间: 10 秒<br>needle flame test<br>Severity: vertical 10 s              | 不燃烧或残焰不超过 30s; 滴落物不引燃垫纸。<br>Flames or glowing of the specimen and the layer below extinguish in 30s, there has been no ignition of the specified layer. |

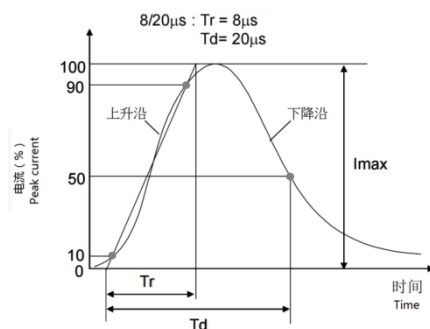
### ◆功率降额曲线 Power Derating Curve

在室温下操作超过 105℃功率会按下图降额。

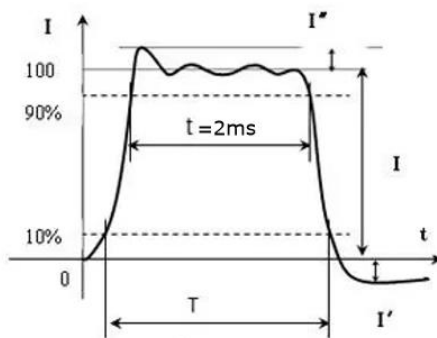
For operation at ambient temperature in excess of 105℃, the power should be derated in accordance with below figure.



### ◆8/20 μs 标准脉冲波形 8/20 μs Peak Pulse Current Test Waveform



### ◆2ms 标准脉冲波形 2ms Peak Pulse Current Test Waveform

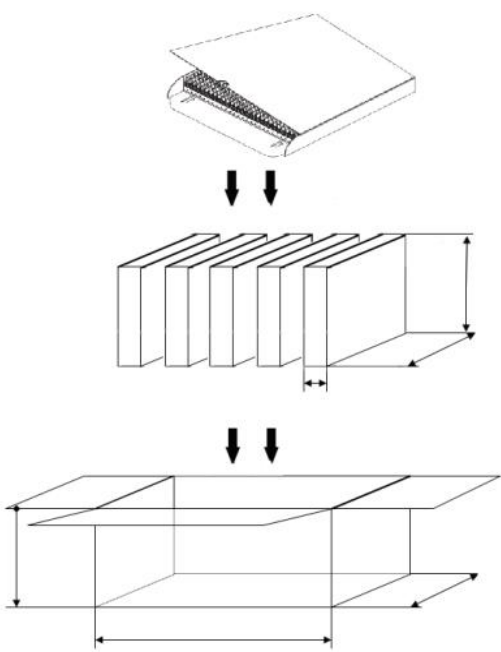
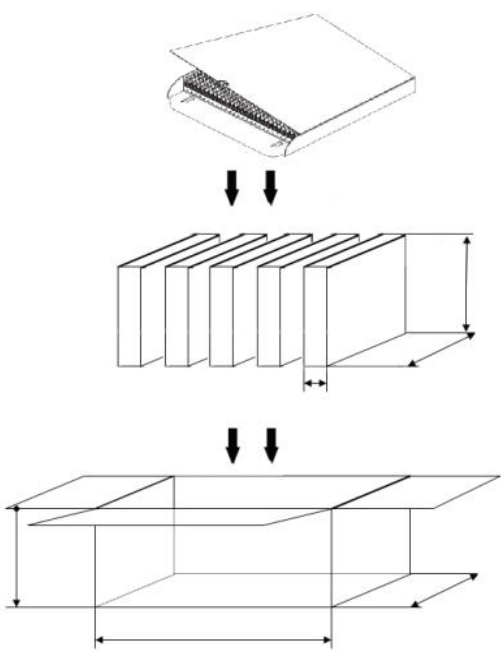


## ◆包装 Packaging

### \*1. 散装 Bulk

| 长脚 Long-Lead |   |  | 短脚 Short-Lead |   |  |  |
|--------------|---|--|---------------|---|--|---|
| 规格<br>Series | 适用<br>电压范围<br>Varistor<br>Voltage Range | 包装<br>数量<br>(支 / 袋)<br>Quantity<br>PCS/bag | 规格<br>Series  | 适用<br>电压范围<br>Varistor Voltage<br>Range | 包装<br>数量<br>(支 / 袋)<br>Quantity<br>PCS/bag |   |
| 07C          | 271-681                                 | 1000                                       | 07C           | 271-681                                 | 1500                                       |   |
| 10C          | 271-331                                 | 1000                                       | 10C           | 271-112                                 | 500  |   |
|              | 361-112                                 | 500  |               |   |  |   |
| 14C          | 271-621                                 | 500  | 14C           | 271-112                                 | 500  |   |
|              | 681-112                                 | 250  |               |   |  |   |
| 20C          | 271-361                                 | 250  | 20C           | 271-911                                 | 400  |   |
|              | 391-112                                 | 200  |               | 102-112                                 | 150  |   |

### \*2. 编带 Tape & Box

| 规格<br>Series | 适用电压范围<br>Varistor Voltage Range | 包装数量 (支 / 盒)<br>Quantity PCS/box |  |
|--------------|----------------------------------|----------------------------------|--|
| 07C          | 201-271                          | 2000                             |  |
|              | 331-681                          | 1500                             |  |
| 10C          | 271-471                          | 1000                             |  |
|              | 511-911                          | 800                              |  |
|              | 102                              | 400                              |  |
|              | 112                              | 200                              |  |
| 14C          | 271-431                          | 1000                             |  |
|              | 471-621                          | 800                              |  |
|              | 681-112                          | 600                              |  |
| 20C          | 201-271                          | 500                              |  |
|              | 301-621                          | 400                              |  |
|              | 681-102                          | 300                              |  |
|              | 112                              | 200                              |  |

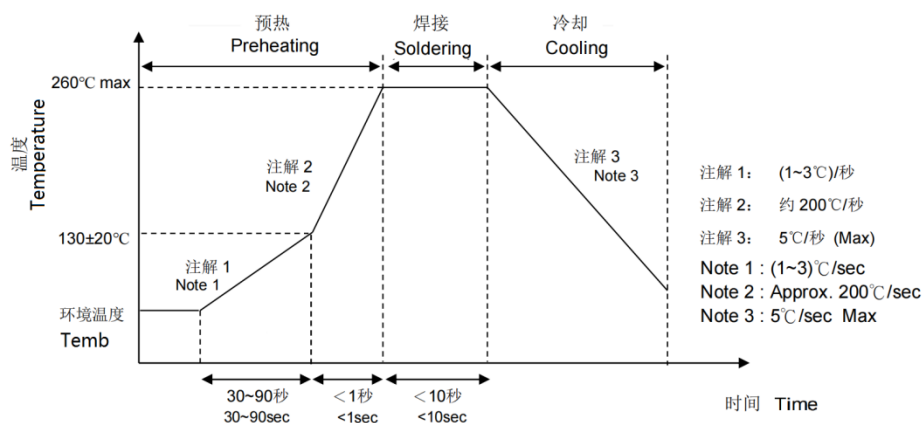
## ◆环保情况说明 Environmental Protection Statement

我司提供的所有压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 varistor materials conform to the requirements of the latest EU ROHS directive and the Reach regulation, please rest assured to use.

## ◆推荐焊接条件 Soldering Recommendation

\*波峰焊曲线 Wave soldering profile



\*手工焊接 Iron soldering

| 项目 Item                                    | 条件 Conditions |
|--|---------------|
| 烙铁头温度<br>Temperature of soldering Iron-tip | 360°C (max.)  |
| 焊接时间 Soldering Time                        | 3s (max.)     |
| 焊接位置与涂装层距离<br>Distance from Varistor       | 2mm ( min.)   |

## ◆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：5~30℃；b.相对湿度：20%~75%；存储期限：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 ~ 30 °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。

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。

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。Please wear gloves when the contact pin.

## ◆修订履历 Update history

| 版本 Version | 日期 Date | 修订内容 Revision Content | 修订人 Reviser |
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