

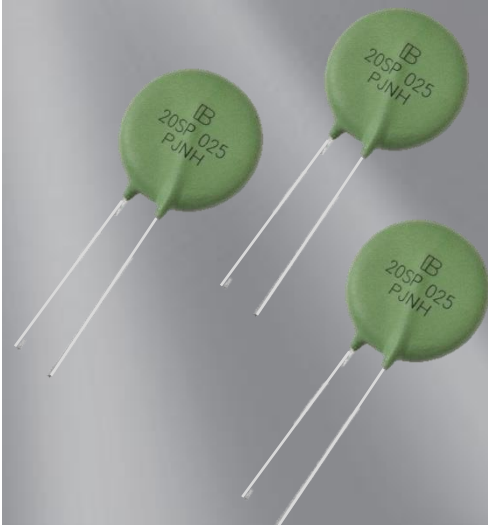
# DATA SHEET

## NTC THERMISTOR INRUSH CURRENT LIMITER SP SERIES

RoHS compliant & Halogen free



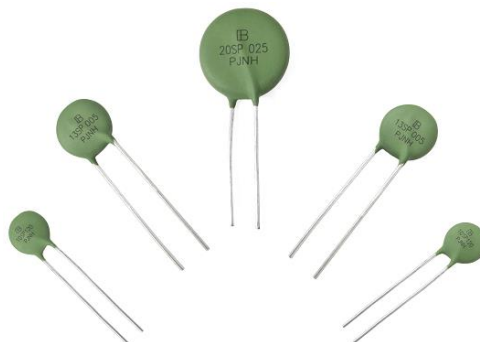
Product specification— October 26, 2020 V.0



## NTC Thermistor SP series Data Sheet

### Features

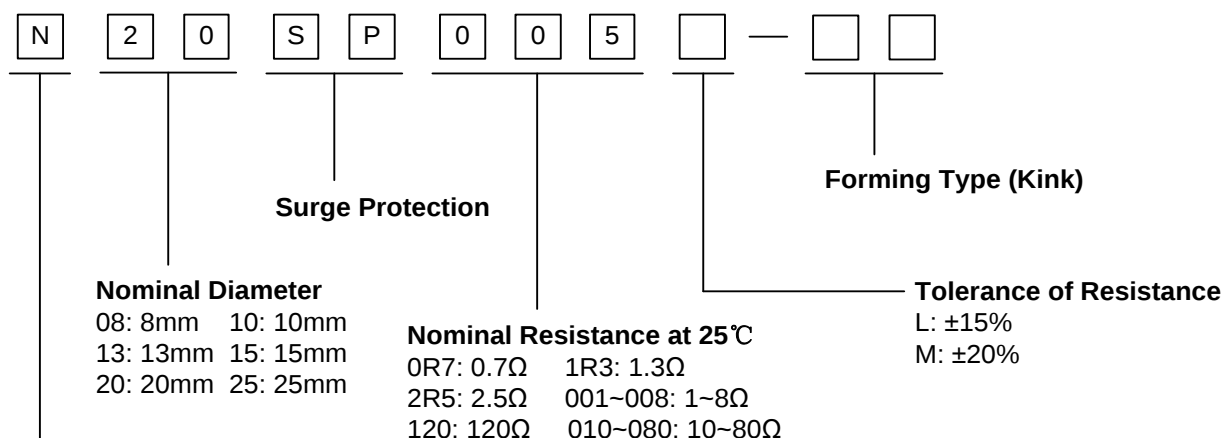
- Effectively restrain surge.
- Low power loss under the stable state.
- Over-current wide control range and fast response.
- Thermal and electrical characteristics with high stability.
- Wide range of electrical specifications.
- RoHS& Halogen Free (HF) compliant.
- Safety certification-UL / TUV



### Applications

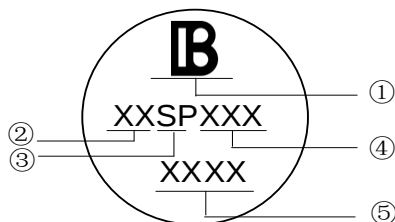
- Monitor, Sps, Fax, Telecom, Adaptor etc.
- Power supply, Communications equipment etc.

### Part Number Code



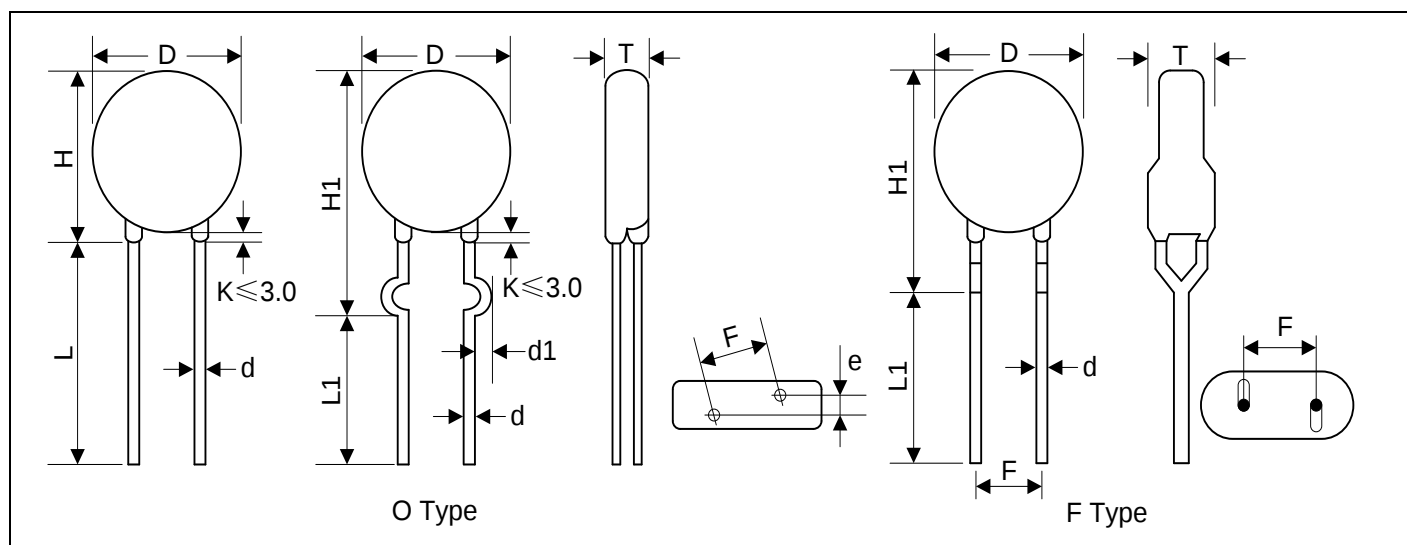
NTC. (Negative Temperature Coefficient)

### Marking



- ① Brightking Logo
- ② Disk Size
- ③ SP SERIES
- ④ Zero Power Resistance at 25°C
- ⑤ Internal control code

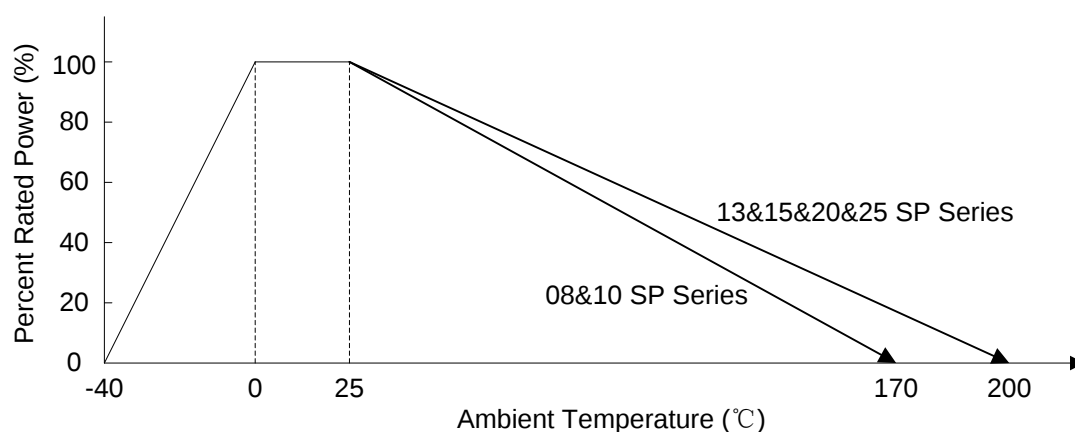
## Dimensions (Unit: mm)



| Disc<br>Φ | D<br>(max.) | H<br>(max.) | H1<br>(max.) | L<br>(Min.) | L1<br>(Min.) | d<br>(±0.02) | d1<br>(±0.4) | T<br>(max.) | F<br>(±0.8) | e<br>(±0.5) |
|-----------|-------------|-------------|--------------|-------------|--------------|--------------|--------------|-------------|-------------|-------------|
| 08        | 11.0        | 13.5        | 14.0         | 20.0        | 15           | 0.80         | 1.4          | 6.0         | 5.0         | 2.0         |
| 10        | 13.5        | 16.0        | 18.0         | 20.0        | 15           | 0.80         | 1.4          | 6.0         | 5.0         | 2.1         |
| 13        | 16.0        | 19.0        | 22.0         | 20.0        | 15           | 1.00         | 1.6          | 6.0         | 7.5         | 2.9         |
| 15        | 18.0        | 21.0        | 25.0         | 20.0        | 15           | 1.00         | 1.6          | 6.5         | 7.5         | 3.1         |
| 20        | 24.0        | 28.0        | 33.0         | 20.0        | 15           | 1.00         | 1.6          | 7.5         | 7.5         | 3.6         |
| 25        | 29.0        | 32.5        | 38.0         | 20.0        | 15           | 1.00         | 1.6          | 7.5         | 7.5         | 3.6         |

Remarks: Straight lead shape is the default lead shape for normal SP series product.

## Maximum Power Rating (Pmax)



## Specifications

| Nominal Diameter (mm) | Part Number | Zero Power Resistance at 25℃ | Maximum Steady State Current at 25℃ | Residual Resistance at 25℃ I <sub>max</sub> R <sub>I<sub>max</sub></sub> | Typical value         |                              | Recommend Capacitance 240Vac | Maximum Steady Power | Operating Temperature Range | U <sub>L</sub> | T <sub>UV</sub> |
|-----------------------|-------------|------------------------------|-------------------------------------|--------------------------------------------------------------------------|-----------------------|------------------------------|------------------------------|----------------------|-----------------------------|----------------|-----------------|
|                       |             | (Ω)                          | (A)                                 | (Ω)                                                                      | Thermal Time Constant | Thermal Dissipation Constant | (μF)                         | (W)                  | (℃)                         |                |                 |
| 08                    | N08SP003□   | 3                            | 3                                   | 0.230                                                                    | 48                    | 12                           | 120                          | 2.0                  | -40~+170                    | V              | V               |
|                       | N08SP004□   | 4                            | 3                                   | 0.237                                                                    | 45                    | 12                           | 120                          | 2.0                  | -40~+170                    | V              | V               |
|                       | N08SP005□   | 5                            | 3                                   | 0.237                                                                    | 48                    | 9                            | 120                          | 2.0                  | -40~+170                    | V              | V               |
|                       | N08SP006□   | 6                            | 3                                   | 0.237                                                                    | 45                    | 9                            | 120                          | 2.0                  | -40~+170                    | V              | V               |
|                       | N08SP008□   | 8                            | 3                                   | 0.250                                                                    | 45                    | 9                            | 120                          | 2.0                  | -40~+170                    | V              | V               |
|                       | N08SP010□   | 10                           | 3                                   | 0.260                                                                    | 45                    | 9                            | 120                          | 2.0                  | -40~+170                    | V              | V               |
|                       | N08SP015□   | 15                           | 2                                   | 0.530                                                                    | 45                    | 12                           | 60                           | 2.0                  | -40~+170                    | V              | V               |
|                       | N08SP020□   | 20                           | 2                                   | 0.555                                                                    | 45                    | 12                           | 60                           | 2.0                  | -40~+170                    | V              | V               |
|                       | N08SP022□   | 22                           | 2                                   | 0.590                                                                    | 45                    | 12                           | 60                           | 2.0                  | -40~+170                    | V              | V               |
|                       | N08SP033□   | 33                           | 1.5                                 | 0.530                                                                    | 45                    | 12                           | 60                           | 2.0                  | -40~+170                    | V              | V               |
| 10                    | N10SP001□   | 1                            | 5                                   | 0.090                                                                    | 65                    | 17                           | 330                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP1R3□   | 1.3                          | 5                                   | 0.090                                                                    | 63                    | 17                           | 330                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP1R5□   | 1.5                          | 5                                   | 0.095                                                                    | 60                    | 15                           | 330                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP002□   | 2                            | 5                                   | 0.099                                                                    | 55                    | 12                           | 330                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP2R5□   | 2.5                          | 5                                   | 0.102                                                                    | 58                    | 11                           | 330                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP003□   | 3                            | 5                                   | 0.106                                                                    | 60                    | 11                           | 330                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP004□   | 4                            | 4                                   | 0.163                                                                    | 62                    | 10                           | 330                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP005□   | 5                            | 4                                   | 0.168                                                                    | 58                    | 10                           | 330                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP006□   | 6                            | 3                                   | 0.250                                                                    | 59                    | 10                           | 220                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP007□   | 7                            | 3                                   | 0.262                                                                    | 60                    | 13                           | 220                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP008□   | 8                            | 3                                   | 0.265                                                                    | 59                    | 12                           | 220                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP010□   | 10                           | 3                                   | 0.273                                                                    | 56                    | 12                           | 220                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP012□   | 12                           | 2                                   | 0.504                                                                    | 58                    | 11                           | 220                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP015□   | 15                           | 2                                   | 0.500                                                                    | 62                    | 11                           | 220                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP016□   | 16                           | 2                                   | 0.501                                                                    | 62                    | 11                           | 220                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP020□   | 20                           | 2                                   | 0.557                                                                    | 60                    | 12                           | 220                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP025□   | 25                           | 2                                   | 0.555                                                                    | 56                    | 12                           | 220                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP050□   | 50                           | 2                                   | 0.723                                                                    | 58                    | 10                           | 220                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP080□   | 80                           | 1                                   | 1.742                                                                    | 55                    | 10                           | 150                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP120□   | 120                          | 1                                   | 2.355                                                                    | 60                    | 10                           | 150                          | 2.5                  | -40~+170                    | V              | V               |
|                       | N10SP150□   | 150                          | 1                                   | 2.500                                                                    | 55                    | 10                           | 150                          | 2.5                  | -40~+170                    | V              | V               |

## NTC Inrush Current Limiter

SP series

| Nominal Diameter (mm) | Part Number | Zero Power Resistance at 25°C | Maximum Steady State Current at 25°C | Residual Resistance at 25°C I <sub>max</sub> R <sub>imax</sub> | Typical value         |                              | Recommend Capacitance 240Vac | Maximum Steady Power | Operating Temperature Range | U <sub>L</sub> | T <sub>UV</sub> |
|-----------------------|-------------|-------------------------------|--------------------------------------|----------------------------------------------------------------|-----------------------|------------------------------|------------------------------|----------------------|-----------------------------|----------------|-----------------|
|                       |             |                               |                                      |                                                                | Thermal Time Constant | Thermal Dissipation Constant |                              |                      |                             |                |                 |
|                       |             | (Ω)                           | (A)                                  | (Ω)                                                            | (s)                   | (mW/°C)                      | (μF)                         | (W)                  | (°C)                        |                |                 |
| 13                    | N13SP1R3□   | 1.3                           | 7                                    | 0.065                                                          | 91                    | 15                           | 430                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP1R5□   | 1.5                           | 7                                    | 0.083                                                          | 90                    | 15                           | 430                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP2R5□   | 2.5                           | 6                                    | 0.094                                                          | 85                    | 16                           | 430                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP003□   | 3                             | 5                                    | 0.131                                                          | 93                    | 16                           | 430                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP004□   | 4                             | 5                                    | 0.139                                                          | 91                    | 16                           | 430                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP005□   | 5                             | 5                                    | 0.150                                                          | 93                    | 17                           | 430                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP006□   | 6                             | 5                                    | 0.250                                                          | 92                    | 16                           | 430                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP007□   | 7                             | 5                                    | 0.262                                                          | 91                    | 16                           | 430                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP008□   | 8                             | 4                                    | 0.207                                                          | 91                    | 15                           | 430                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP010□   | 10                            | 4                                    | 0.211                                                          | 87                    | 14                           | 430                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP012□   | 12                            | 4                                    | 0.227                                                          | 82                    | 18                           | 330                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP016□   | 16                            | 3                                    | 0.367                                                          | 87                    | 15                           | 330                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP018□   | 18                            | 3                                    | 0.391                                                          | 90                    | 17                           | 330                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP020□   | 20                            | 3                                    | 0.430                                                          | 93                    | 17                           | 330                          | 3.0                  | -40~+200                    | V              | V               |
|                       | N13SP025□   | 25                            | 3                                    | 0.430                                                          | 93                    | 17                           | 330                          | 3.0                  | -40~+200                    | V              | V               |
| 15                    | N15SP1R3□   | 1.3                           | 8                                    | 0.059                                                          | 107                   | 20                           | 640                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP1R5□   | 1.5                           | 8                                    | 0.064                                                          | 107                   | 19                           | 640                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP2R5□   | 2.5                           | 8                                    | 0.070                                                          | 104                   | 20                           | 640                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP003□   | 3                             | 7                                    | 0.089                                                          | 105                   | 20                           | 640                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP004□   | 4                             | 6                                    | 0.115                                                          | 104                   | 18                           | 640                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP005□   | 5                             | 6                                    | 0.122                                                          | 110                   | 20                           | 640                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP006□   | 6                             | 5                                    | 0.160                                                          | 102                   | 20                           | 640                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP007□   | 7                             | 5                                    | 0.188                                                          | 99                    | 21                           | 640                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP008□   | 8                             | 5                                    | 0.186                                                          | 103                   | 15                           | 640                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP010□   | 10                            | 5                                    | 0.182                                                          | 103                   | 19                           | 640                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP012□   | 12                            | 4                                    | 0.252                                                          | 102                   | 21                           | 560                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP015□   | 15                            | 4                                    | 0.260                                                          | 101                   | 17                           | 560                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP016□   | 16                            | 4                                    | 0.285                                                          | 102                   | 22                           | 560                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP020□   | 20                            | 4                                    | 0.292                                                          | 101                   | 20                           | 560                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP022□   | 22                            | 4                                    | 0.302                                                          | 101                   | 20                           | 560                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP025□   | 25                            | 3                                    | 0.482                                                          | 100                   | 21                           | 560                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP033□   | 33                            | 3                                    | 0.490                                                          | 100                   | 21                           | 560                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP040□   | 40                            | 3                                    | 0.496                                                          | 101                   | 20                           | 560                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP047□   | 47                            | 3                                    | 0.517                                                          | 102                   | 21                           | 560                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP055□   | 55                            | 3                                    | 0.534                                                          | 102                   | 21                           | 560                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP080□   | 80                            | 2.5                                  | 0.748                                                          | 102                   | 22                           | 560                          | 4.0                  | -40~+200                    | V              | V               |
|                       | N15SP120□   | 120                           | 2                                    | 1.159                                                          | 104                   | 20                           | 560                          | 4.0                  | -40~+200                    | V              | V               |

## NTC Inrush Current Limiter

SP series

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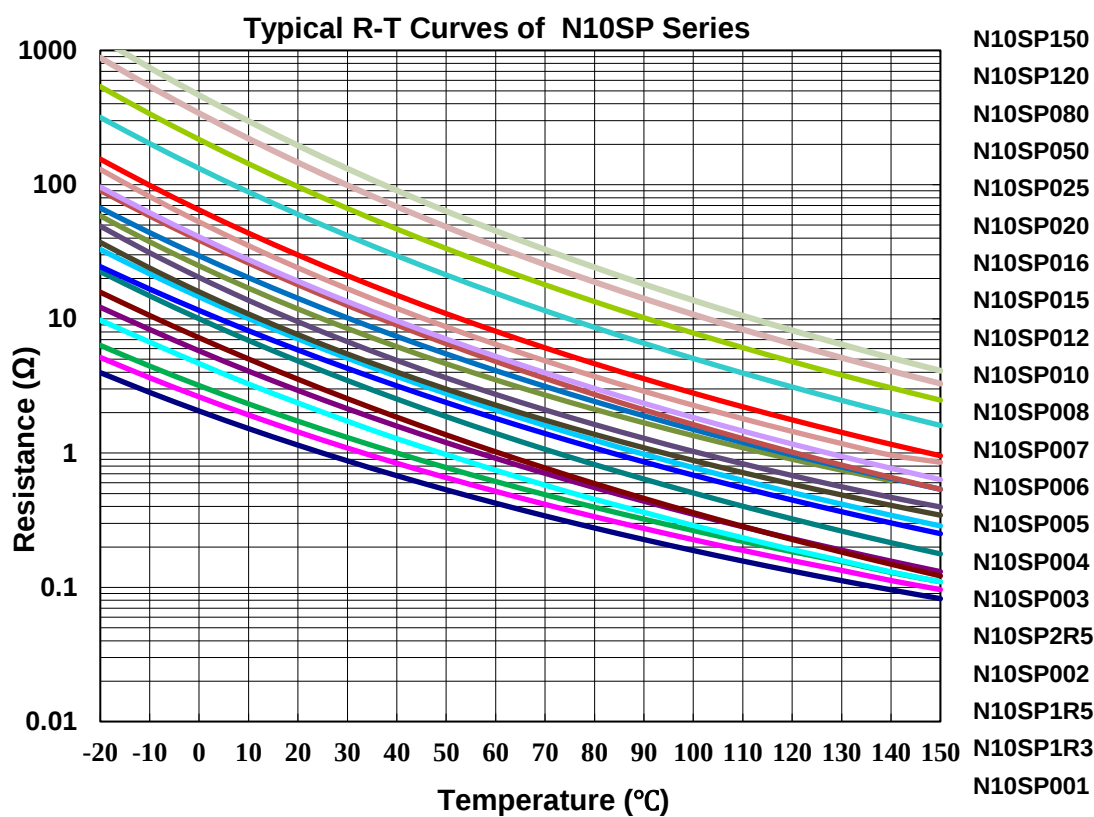
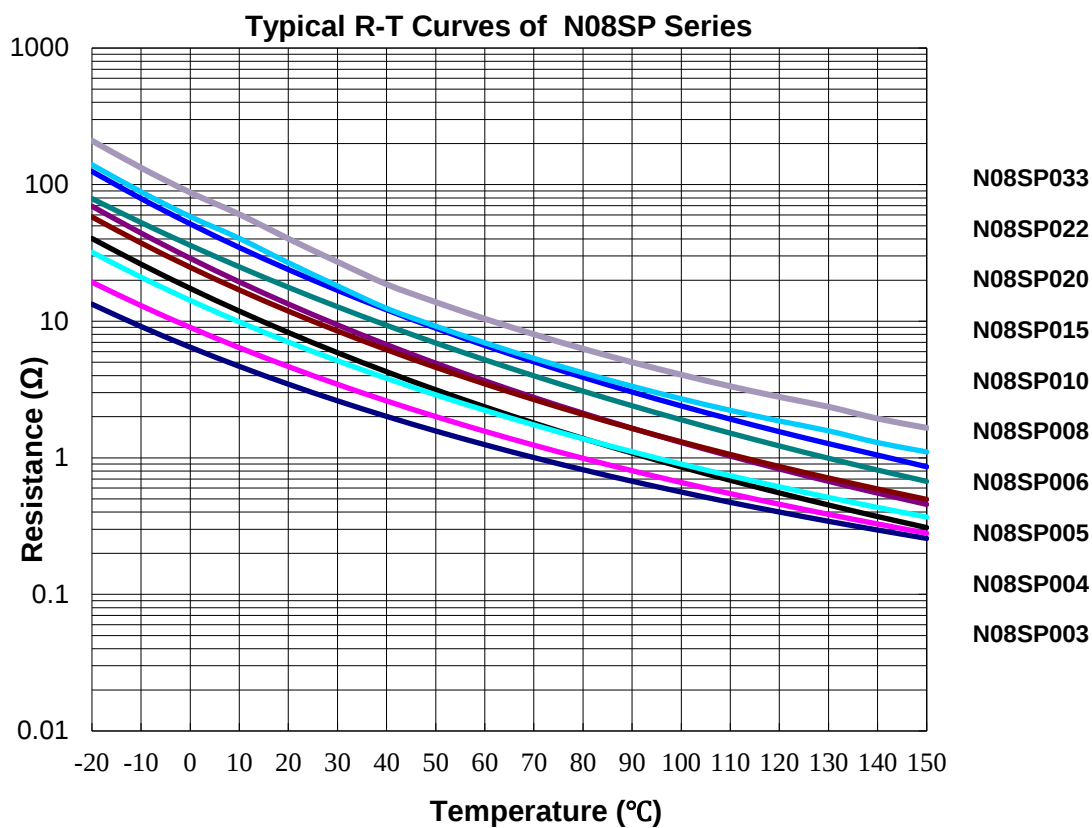
| Nominal Diameter (mm) | Part Number | Zero Power Resistance at 25°C | Maximum Steady State Current at 25°C | Residual Resistance at 25°C I <sub>max</sub> R <sub>Imax</sub> | Typical value         |                              | Recommend Capacitance 240Vac | Maximum Steady Power | Operating Temperature Range | UL | TUV |
|-----------------------|-------------|-------------------------------|--------------------------------------|----------------------------------------------------------------|-----------------------|------------------------------|------------------------------|----------------------|-----------------------------|----|-----|
|                       |             |                               |                                      |                                                                | Thermal Time Constant | Thermal Dissipation Constant |                              |                      |                             |    |     |
|                       |             | (Ω)                           | (A)                                  | (Ω)                                                            | (s)                   | (mW/°C)                      | (μF)                         | (W)                  | (°C)                        |    |     |
| 20                    | N20SP0R7□   | 0.7                           | 12                                   | 0.039                                                          | 145                   | 25                           | 820                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP001□   | 1                             | 10                                   | 0.051                                                          | 135                   | 25                           | 820                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP1R3□   | 1.3                           | 8                                    | 0.064                                                          | 144                   | 24                           | 820                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP002□   | 2                             | 8                                    | 0.072                                                          | 140                   | 21                           | 820                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP2R5□   | 2.5                           | 8                                    | 0.073                                                          | 120                   | 23                           | 820                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP004□   | 4                             | 8                                    | 0.087                                                          | 135                   | 25                           | 820                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP005□   | 5                             | 7                                    | 0.107                                                          | 144                   | 24                           | 820                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP006□   | 6                             | 6                                    | 0.156                                                          | 136                   | 24                           | 820                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP007□   | 7                             | 6                                    | 0.156                                                          | 132                   | 24                           | 820                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP008□   | 8                             | 6                                    | 0.157                                                          | 135                   | 24                           | 820                          | 5.0                  | -40~+200                    | V  |     |
|                       | N20SP010□   | 10                            | 6                                    | 0.158                                                          | 135                   | 23                           | 820                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP012□   | 12                            | 5                                    | 0.205                                                          | 132                   | 25                           | 820                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP020□   | 20                            | 6                                    | 0.197                                                          | 127                   | 22                           | 740                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP025□   | 25                            | 6                                    | 0.197                                                          | 127                   | 22                           | 740                          | 5.0                  | -40~+200                    | V  | V   |
|                       | N20SP120□   | 120                           | 2                                    | 1.222                                                          | 142                   | 24                           | 740                          | 5.0                  | -40~+200                    | V  | V   |
| 25                    | N25SP001□   | 1                             | 15                                   | 0.037                                                          | 150                   | 30                           | 1240                         | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP1R5□   | 1.5                           | 15                                   | 0.036                                                          | 150                   | 30                           | 1240                         | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP002□   | 2                             | 15                                   | 0.049                                                          | 150                   | 30                           | 1240                         | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP2R5□   | 2.5                           | 15                                   | 0.051                                                          | 150                   | 30                           | 1240                         | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP003□   | 3                             | 15                                   | 0.059                                                          | 150                   | 30                           | 1240                         | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP004□   | 4                             | 14                                   | 0.054                                                          | 150                   | 30                           | 1240                         | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP4R7□   | 4.7                           | 13                                   | 0.043                                                          | 150                   | 30                           | 1240                         | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP005□   | 5                             | 12                                   | 0.066                                                          | 150                   | 30                           | 1240                         | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP6R8□   | 6.8                           | 10.5                                 | 0.073                                                          | 150                   | 30                           | 820                          | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP007□   | 7                             | 10                                   | 0.079                                                          | 150                   | 30                           | 820                          | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP008□   | 8                             | 9                                    | 0.095                                                          | 150                   | 30                           | 820                          | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP010□   | 10                            | 8                                    | 0.118                                                          | 150                   | 30                           | 820                          | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP012□   | 12                            | 7.5                                  | 0.132                                                          | 150                   | 30                           | 820                          | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP015□   | 15                            | 6.5                                  | 0.186                                                          | 150                   | 30                           | 740                          | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP018□   | 18                            | 5.5                                  | 0.237                                                          | 150                   | 30                           | 740                          | 6.5                  | -40~+200                    | V  | V   |
|                       | N25SP020□   | 20                            | 5                                    | 0.237                                                          | 150                   | 30                           | 740                          | 6.5                  | -40~+200                    | V  | V   |

□ means tolerance of R25 , L: ± 15%, M: ± 20%,

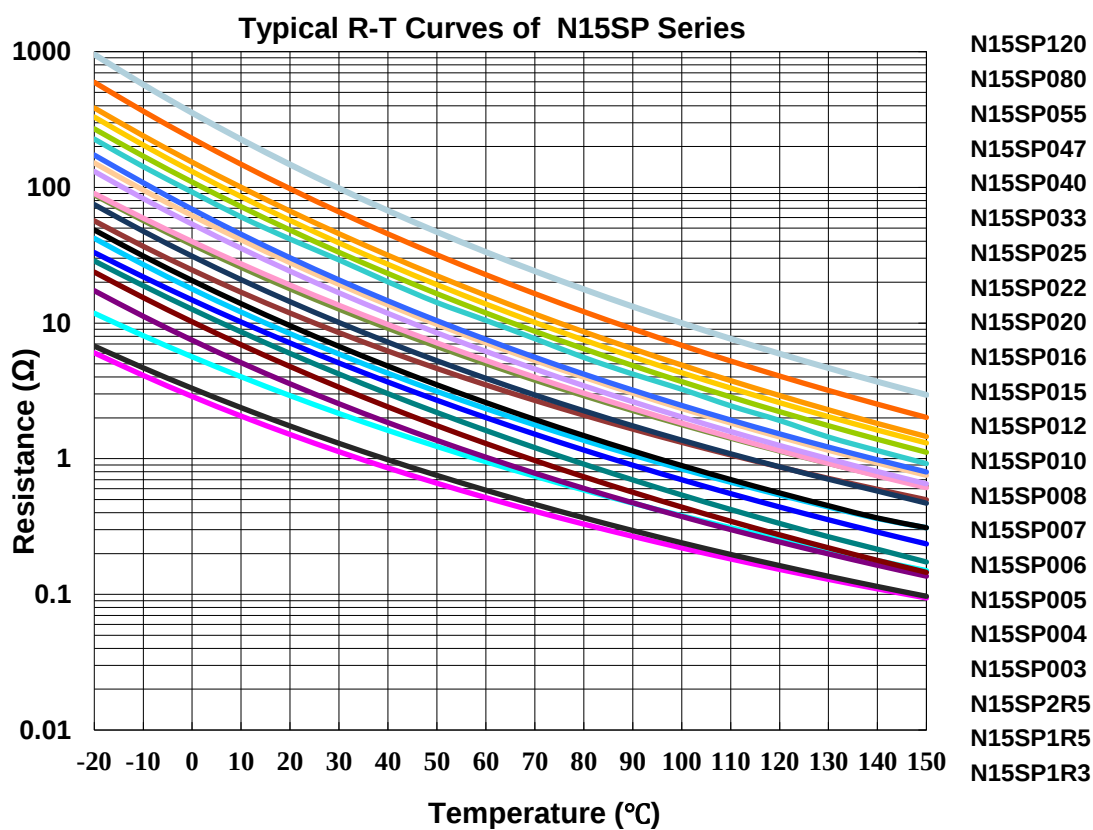
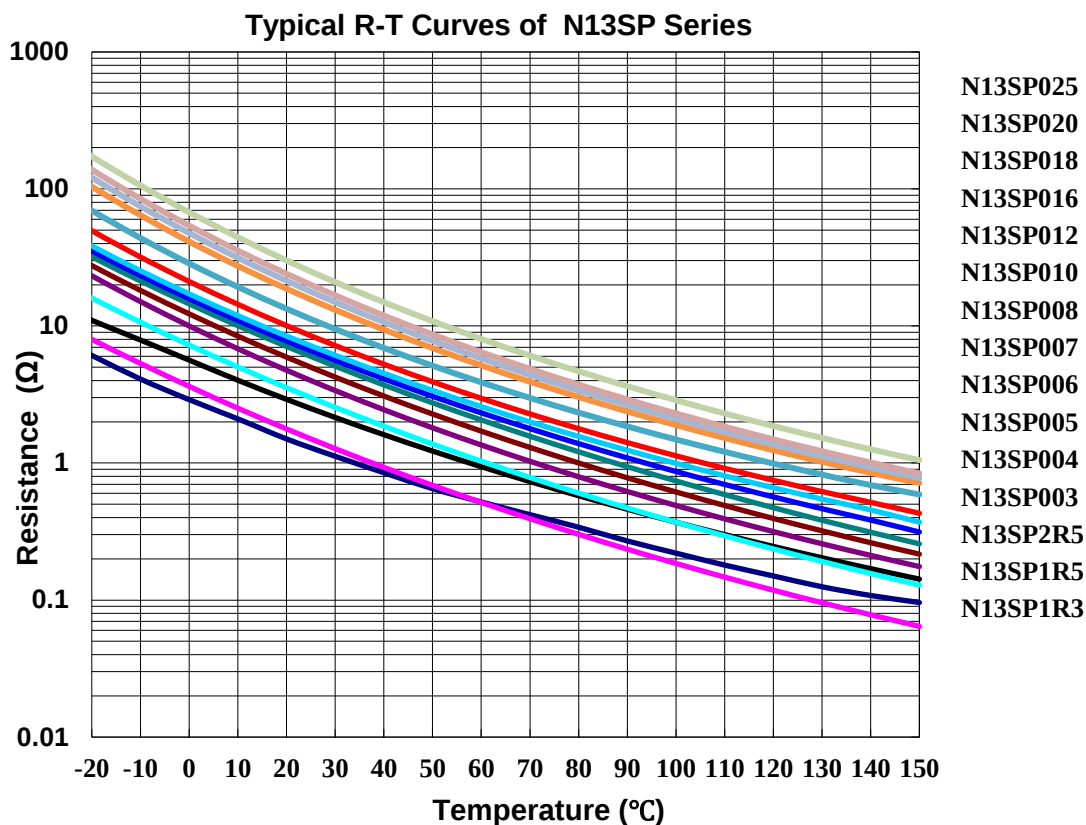
## Reliability Test Requirements

| Test items<br>Reference standard                | Test conditions                                                                                                                                                                                          |                                  |               | Criterion                                                     |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------|---------------------------------------------------------------|
| High Temperature Storage IEC<br>60068-2-2       | $T_U \pm 5^\circ\text{C}$ ,<br>1000 $\pm$ 24hrs                                                                                                                                                          |                                  |               | No visible damage<br>  $\Delta R_{25}/R_{25}$   $\leq 20\%$   |
| Damp Heat, Steady State<br>IEC 60068-2-78       | 40 $\pm$ 2 $^\circ\text{C}$ , 90~95%RH ,<br>1000 $\pm$ 24hrs                                                                                                                                             |                                  |               | No visible damage<br>  $\Delta R_{25}/R_{25}$   $\leq 20\%$   |
| Endurance<br>IEC 60539-1                        | 25 $\pm$ 5 $^\circ\text{C}$ ,<br>I <sub>max</sub> .1000 $\pm$ 24hrs                                                                                                                                      |                                  |               | No visible damage<br>  $\Delta R_{25}/R_{25}$   $\leq 20\%$   |
| Rapid Change of Temperature IEC<br>60068-2-14   | Step                                                                                                                                                                                                     | Temperature ( $^\circ\text{C}$ ) | Period (min.) | No visible damage<br>  $\Delta R_{25}/R_{25}$   $\leq 20\%$   |
|                                                 | 1                                                                                                                                                                                                        | $T_L \pm 5$                      | 30 $\pm$ 3    |                                                               |
|                                                 | 2                                                                                                                                                                                                        | Room                             | 5 $\pm$ 3     |                                                               |
|                                                 | 3                                                                                                                                                                                                        | $T_U \pm 5$                      | 30 $\pm$ 3    |                                                               |
|                                                 | 4                                                                                                                                                                                                        | Room                             | 5 $\pm$ 3     |                                                               |
| 5 Cycles                                        |                                                                                                                                                                                                          |                                  |               |                                                               |
| Capacitance test<br>standard specifications     | 25 $\pm$ 5 $^\circ\text{C}$ , C <sub>th</sub> , interval 2mins, , Number of cycles:<br>1000, C <sub>th</sub> =Capacitance at 340 VDC                                                                     |                                  |               | No visible damage<br>  $\Delta R_{25}/R_{25}$   $\leq 20\%$   |
| Cyclic endurance<br>IEC 60539-1                 | 25 $\pm$ 5 $^\circ\text{C}$ , I <sub>max</sub> .1min ON/5min OFF*1000cycles;                                                                                                                             |                                  |               | No visible damage<br>  $\Delta R_{25}/R_{25}$   $\leq 20\%$   |
| Insulation Test<br>MIL-STD-202F-Method 302      | 1000 VDC, 1min                                                                                                                                                                                           |                                  |               | No visible damage                                             |
| Tensile Strength of Terminals<br>IEC 60068-2-21 | Gradually applying the force specified and keeping the<br>unit fixed for 10 $\pm$ 1 sec.                                                                                                                 |                                  |               | No visible damage<br>  $\Delta R_{25}/R_{25}$   $\leq 10\%$   |
|                                                 | Terminal diameter (mm)                                                                                                                                                                                   |                                  | Force (kg)    |                                                               |
|                                                 | 0.5<d $\leq$ 0.8                                                                                                                                                                                         |                                  | 1.0           |                                                               |
|                                                 | 0.8<d $\leq$ 1.25                                                                                                                                                                                        |                                  | 2.0           |                                                               |
| Bending Strength of Terminals<br>IEC60068-2-21  | Follow spec:<br>Hold specimen and apply the force specified below to<br>each lead. Bend the specimen to 90°, then return to the<br>original position. Repeat the procedure in the opposite<br>direction. |                                  |               | No visible damage<br>  $\Delta V/V_{1\text{mA}}$   $\leq 5\%$ |
|                                                 | Terminal diameter (mm)                                                                                                                                                                                   |                                  | Force (kg)    |                                                               |
|                                                 | 0.5<d $\leq$ 0.8                                                                                                                                                                                         |                                  | 0.5           |                                                               |
|                                                 | 0.8<d $\leq$ 1.25                                                                                                                                                                                        |                                  | 1.0           |                                                               |
|                                                 | 1.25<d                                                                                                                                                                                                   |                                  | 2.0           |                                                               |
| Solderability<br>IEC 60068-2-20                 | 245 $\pm$ 3 $^\circ\text{C}$ , 3 $\pm$ 0.3 sec                                                                                                                                                           |                                  |               | $\geq 95\%$                                                   |
| Resistance to Soldering Heat<br>IEC 60068-2-20  | 260 $\pm$ 3 $^\circ\text{C}$ , 10 $\pm$ 1 sec                                                                                                                                                            |                                  |               | $\Delta R/R$   $\leq 5\%$                                     |

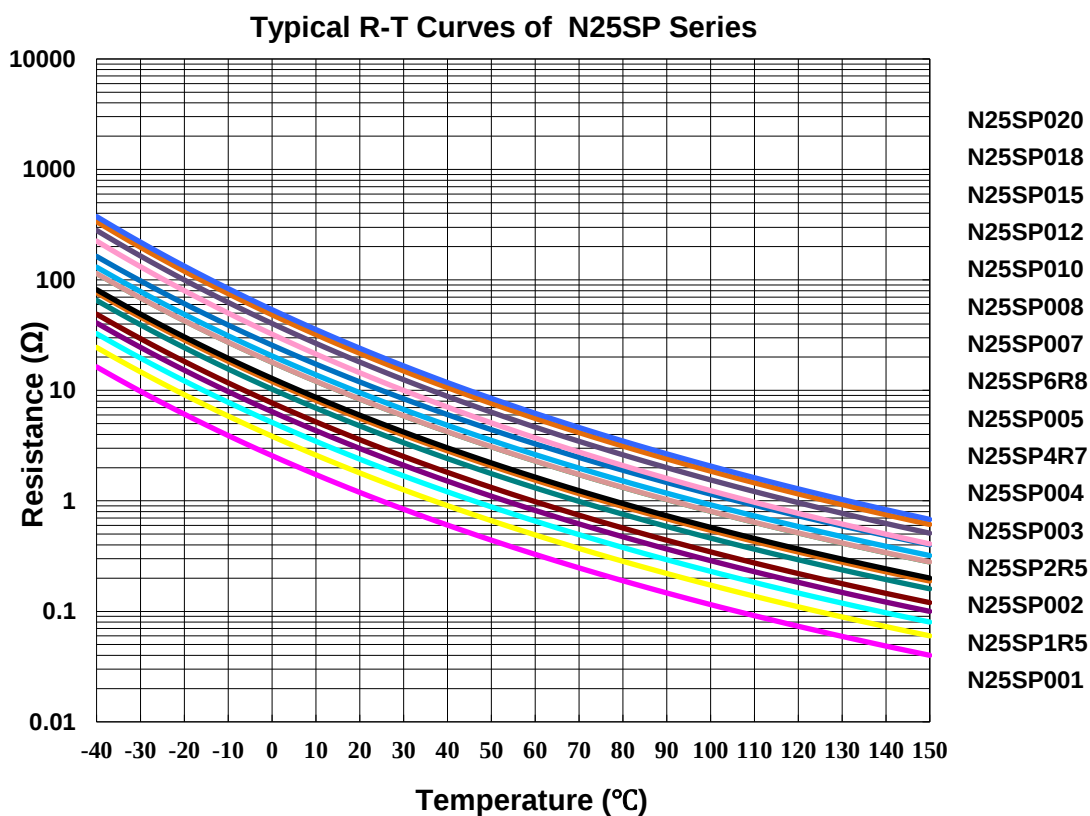
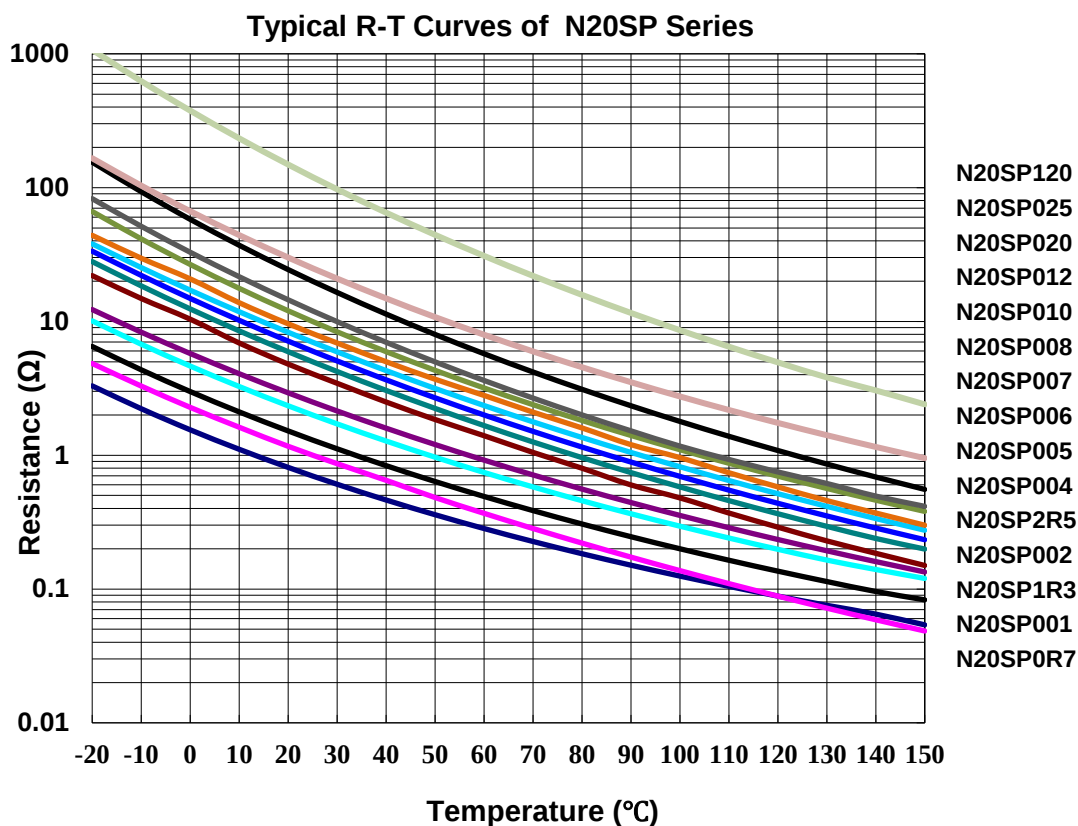
## Resistance–Temperature Characteristic Curves



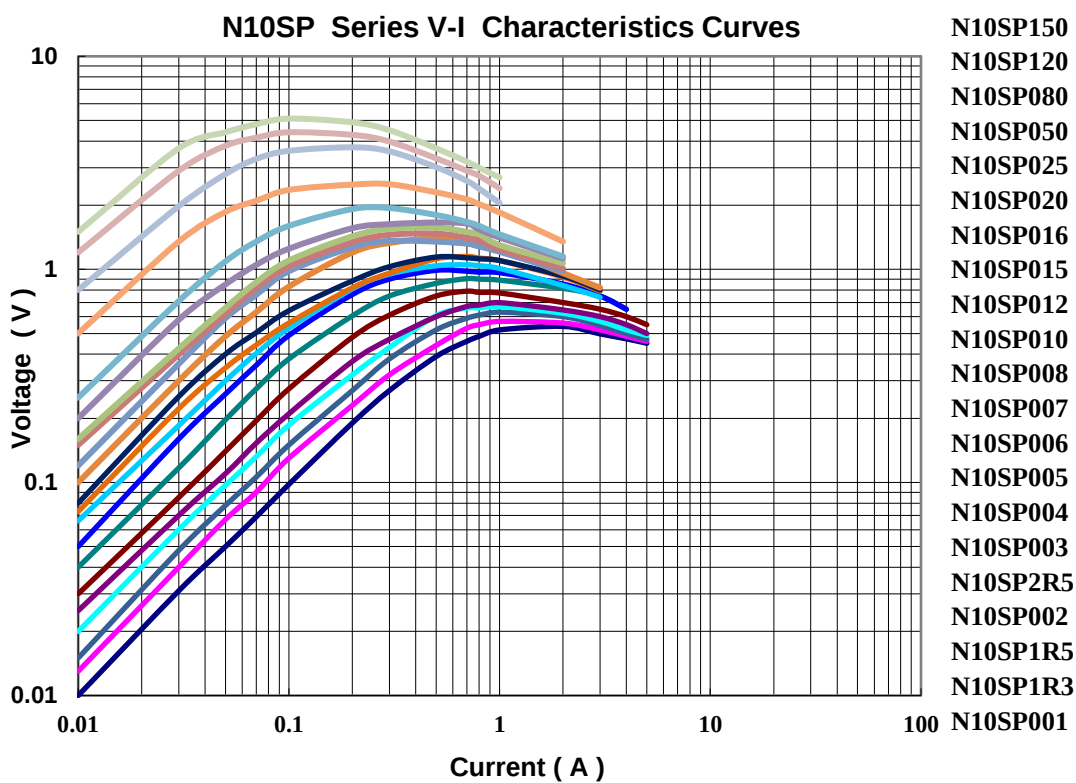
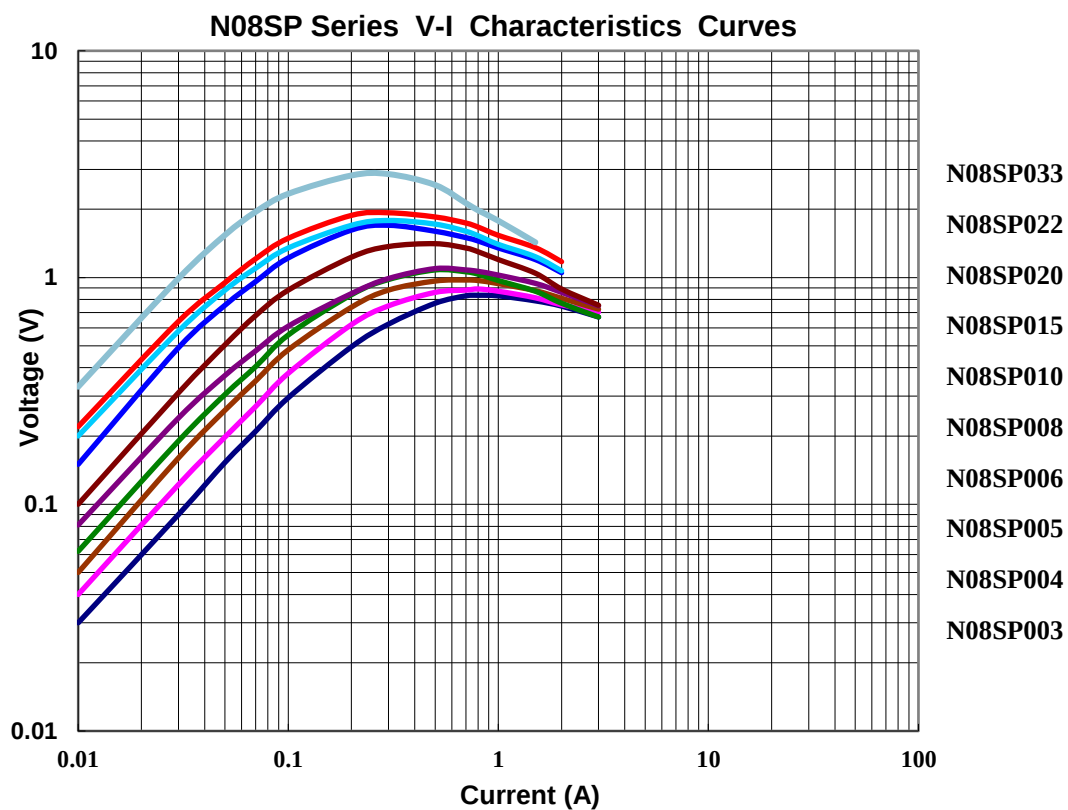
## Resistance–Temperature Characteristic Curves



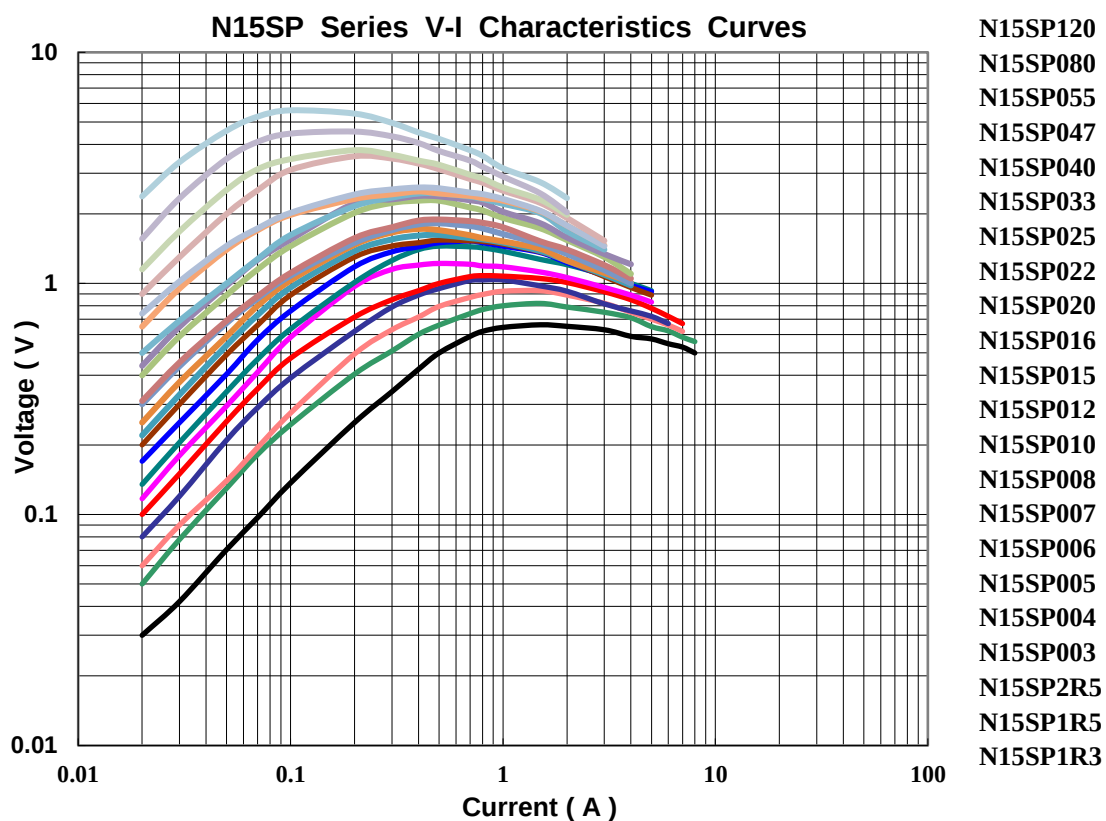
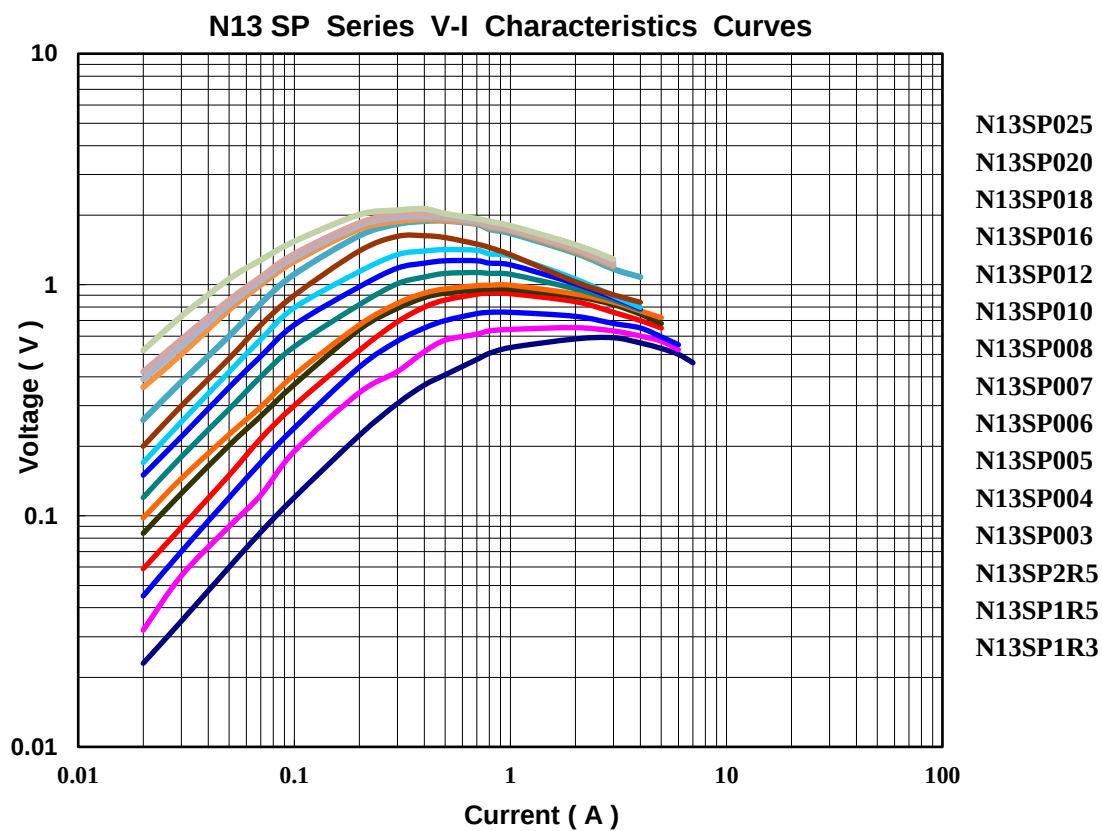
## Resistance–Temperature Characteristic Curves



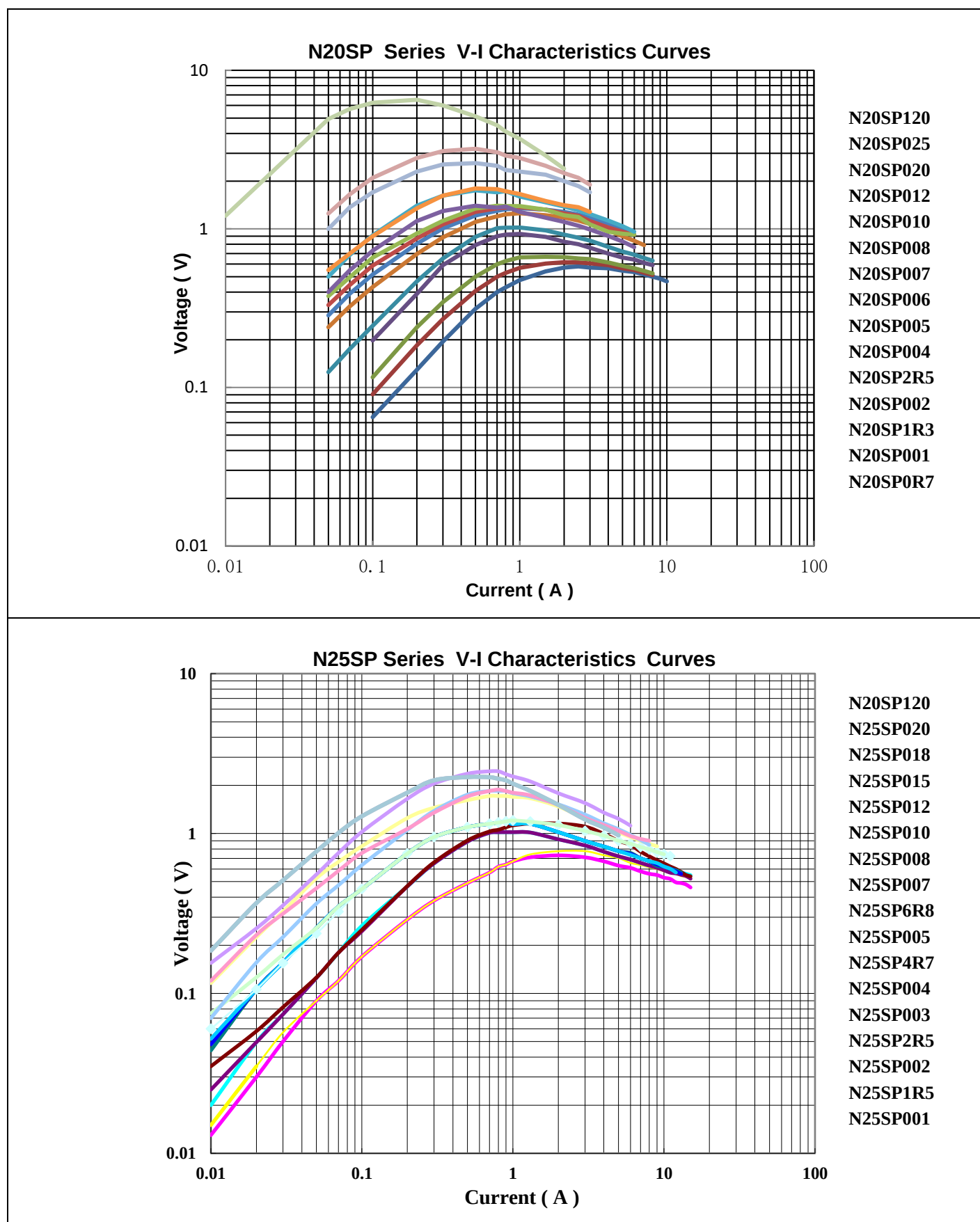
## V-I Characteristic Curves



## V-I Characteristic Curves

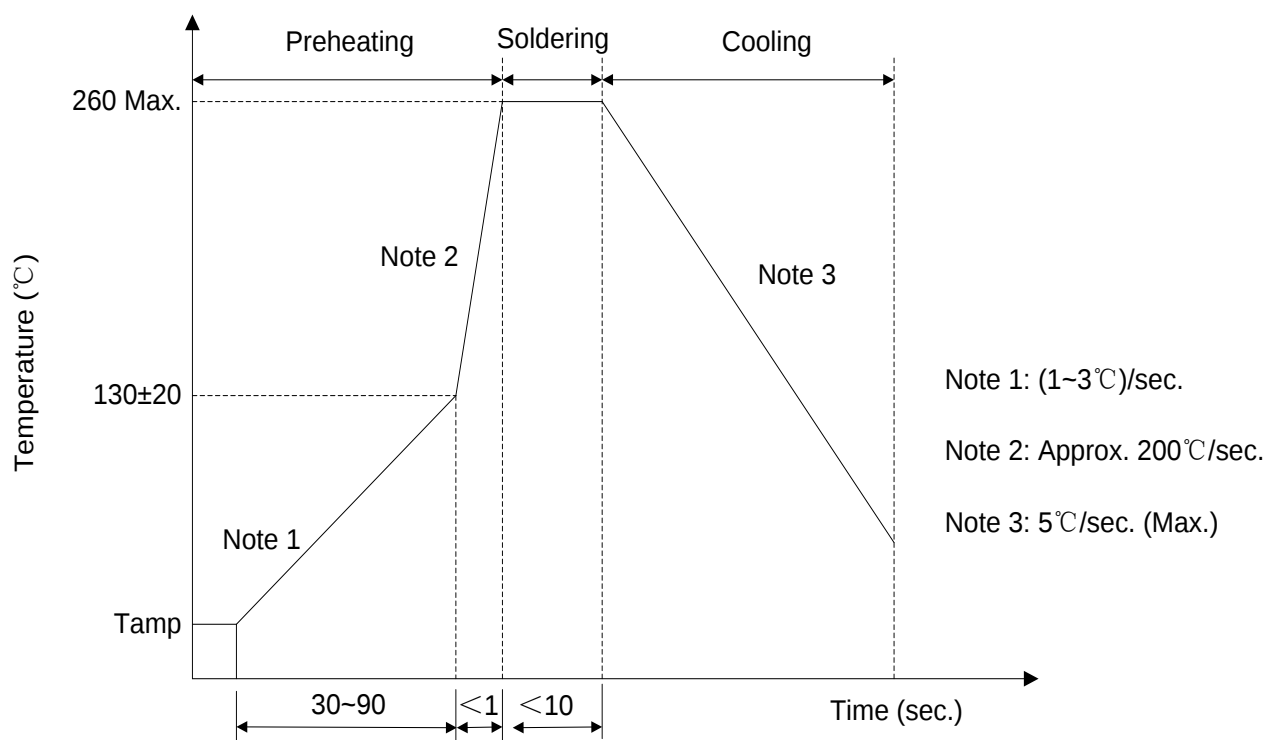


## V-I Characteristic Curves



## Soldering Recommendation

### Wave Soldering Recommendation



### Recommended Reworking Conditions with Soldering Iron

| Item                              | Conditions      |
|-----------------------------------|-----------------|
| Temperature of Soldering Iron-tip | 360°C(max.)     |
| Soldering Time                    | 3 seconds(max.) |
| Distance from Thermistor          | 2mm (min.)      |

## Packaging

### ■ Taping Packing

Taping & Reeling

Tape & Box

Tape & Reel

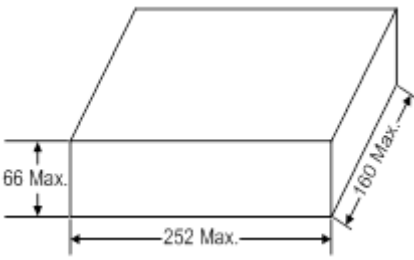
Default Straight

O-type

Y-type

| Dimensions | W            | W0           | W1              | W2          | H0           | H2           | D0          | t                 | l             |
|------------|--------------|--------------|-----------------|-------------|--------------|--------------|-------------|-------------------|---------------|
| (Unit: mm) | 18.0<br>±1.0 | 10.0<br>±1.0 | 9.0<br>+0.5/-0  | Max<br>3.0  | 16.0<br>±1.0 | 20.0<br>±2.0 | 4.0<br>±0.2 | 0.6<br>±0.1       | Max<br>2      |
| Disc<br>Φ  | P0           | P1<br>(±0.7) | P2<br>(+1.3/-0) | P<br>(+1.0) | H<br>(±1.0)  | B<br>(Max)   |             | SPQ<br>P0: 12.7mm |               |
|            |              |              |                 |             |              |              |             | Taping & Box      | Taping & Reel |
| 8          | 12.7±0.3     | 3.85         | 6.35            | 12.7        | 0±2          | 33           |             | 1500pcs/Box       | 1500pcs/Box   |
| 10         | 12.7±0.3     | 3.85         | 6.35            | 25.4        | 0±2          | 36           |             | 500pcs/Box        | 600pcs/Box    |
| 13         | 12.7±1.0     | 8.95         | 12.7            | 25.4        | 0±4          | 40           |             | 500pcs/Box        | 600pcs/Box    |
| 15         | 12.7±1.0     | 8.95         | 12.7            | 25.4        | 0±4          | 42           |             | 500pcs/Box        | 600pcs/Box    |
| 20         | /            | /            | /               | /           | /            | /            |             | /                 | /             |
| 25         | /            | /            | /               | /           | /            | /            |             | /                 | /             |

## ■ Bulk Packing

| Bulk (Unit: mm)                                                                   | Disc<br>Φ | SPQ<br>(pcs / Bag) | Quantity     |             |
|-----------------------------------------------------------------------------------|-----------|--------------------|--------------|-------------|
|                                                                                   |           |                    | (Bags / Box) | (pcs / Box) |
|  | Φ08       | 500                | 2            | 1000        |
|                                                                                   | Φ10       | 500                | 2            | 1000        |
|                                                                                   | Φ13       | 300                | 2            | 600         |
|                                                                                   | Φ15       | 125                | 4            | 500         |
|                                                                                   | Φ20       | 75                 | 4            | 300         |
|                                                                                   | Φ25       | 25                 | 4            | 100         |

## Warehouse Storage Conditions

- Storage temperature: -10℃~+40℃.
- Relative humidity: ≤80%RH.
- Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year.

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