

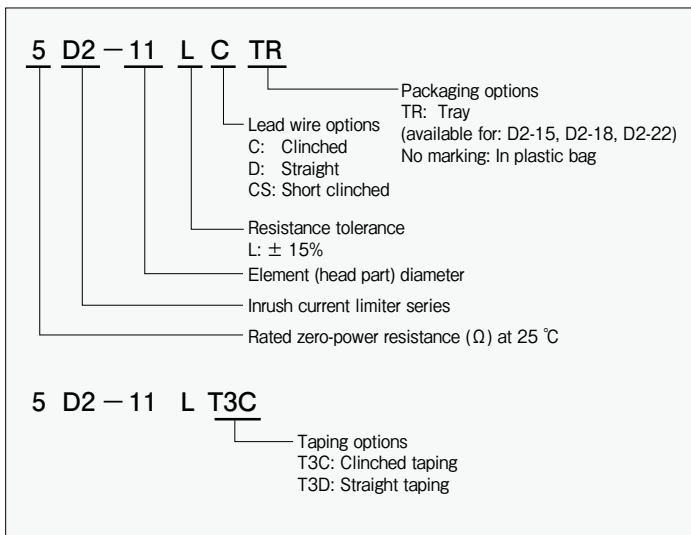
■ Inrush current limiter

# Power Thermistor

Power thermistors utilize the self heating characteristic of NTC thermistors which causes a significant decrease in resistance in a short time. Power thermistors can be used instead of inrush current limiting resistors. Power thermistors have the advantage that their resistance decreases through self heating which reduces power loss and results in energy savings.  
UL1434 File No. E92669 (1D2-22 excluded) certified.



■ Product number explanation



■ Applications

Switching power supplies, adapters, LCD TVs, plasma TVs, air conditioners, DVD players, audio equipment, LCD projectors, copiers, PCs, printers, office automation equipment, gaming machine power supplies

■ Dimensions



(1): Do not apply force to the lead wire legs from the side as this may damage the power thermistor.

|       | D         | T                      | H         | H0        | d       | Lead wire diameter |
|-------|-----------|------------------------|-----------|-----------|---------|--------------------|
| D2-05 | 8.5 max.  | 7.0 max.               | 11.5 max. | 15.5 max. | 5.0 ± 1 | Φ 0.8              |
| D2-07 | 11.0 max. | 9.0 max.               | 13.0 max. | 16.0 max. |         |                    |
| D2-08 | 10.0 max. | 7.0 max.               | 13.0 max. | 17.0 max. |         |                    |
| D2-10 | 13.0 max. | 9.0 max.               | 17.0 max. | 19.5 max. |         |                    |
| D2-11 | 11.5 max. | 8.0 max.               | 15.0 max. | 18.5 max. | 7.5 ± 1 | Φ 1.0<br>(Φ 0.8)   |
| D2-13 | 14.5 max. | 8.0 max.               | 18.0 max. | 21.5 max. |         |                    |
| D2-14 | 17.0 max. | 9.0 max.               | 21.0 max. | 22.5 max. |         |                    |
| D2-15 | 16.5 max. | 8.0 max.               | 20.0 max. | 23.0 max. |         |                    |
| D2-18 | 19.5 max. | 8.0 max.               | 23.0 max. | 26.0 max. | 10 ± 1  | Φ 1.0<br>(Φ 0.8)   |
| D2-22 | 23.0 max. | 8.5 max.<br>(8.0 max.) | 26.5 max. | 29.5 max. |         |                    |

1: D2-22

Unit: mm

■ Taping dimensions



|       | P          | P0         | P1         | W                     | W0        | W1      | W2         | H1           | H2       | L | F1        | Φ D0      | t         | t1       | Δh      |  |
|-------|------------|------------|------------|-----------------------|-----------|---------|------------|--------------|----------|---|-----------|-----------|-----------|----------|---------|--|
| D2-05 | 15.0 ± 1.0 | 15.0 ± 0.3 | 5.0 ± 0.7  | 17.5 to 19.0 min. 5.0 | 9.0 ± 0.5 | max.3.0 | 16.0 ± 0.5 | 19.0 to 21.5 | max. 1.0 |   | 5.0 ± 0.5 | 4.0 ± 0.2 | 0.6 ± 0.3 | max. 1.5 | 0 ± 2.0 |  |
| D2-07 |            |            |            |                       |           |         |            |              |          |   |           |           |           |          |         |  |
| D2-08 |            |            |            |                       |           |         |            |              |          |   |           |           |           |          |         |  |
| D2-10 |            |            |            |                       |           |         |            |              |          |   |           |           |           |          |         |  |
| D2-11 | 30.0 ± 1.0 |            | 3.75 ± 0.7 |                       |           |         |            |              |          |   | 7.5 ± 0.5 |           |           |          |         |  |
| D2-13 |            |            |            |                       |           |         |            |              |          |   |           |           |           |          |         |  |
| D2-14 |            |            |            |                       |           |         |            |              |          |   |           |           |           |          |         |  |

• MOQ: 1000 pcs.

Unit: mm

## Specifications

| Product number | Zero-power resistance at 25 °C<br>(± 15%) | B value <sup>1</sup> | Max. current<br>at 25 °C | Residual resistance<br>(Ω) | Thermal time constant <sup>2</sup><br>(s) | Dissipation factor<br>(mW / °C) | Operating temp. range<br>(°C) | Max. capacitance |       |       |       | Energy surge capacity<br>(J) |
|----------------|---|----------------------|--------------------------|----------------------------|---|---------------------------------|-------------------------------|------------------|-------|-------|-------|------------------------------|
|                |   | B <sub>25/85</sub>   |                          |                            |   |                                 |                               | AC               |       |       |       |                              |
|                |   | (± 5%)               |                          |                            |   |                                 |                               | 100 V            | 120 V | 220 V | 240 V |                              |
| (Ω)            | (K)                                       | (A)                  | (Ω)                      | (s)                        | (mW / °C)                                 | (°C)                            | 100 V                         | 120 V            | 220 V | 240 V | (J)   |                              |
| 5D2-05         | 5.0                                       | 2650                 | 2.0                      | 0.48                       | 20  | 15                              | - 50 to 150                   | 860              | 600   | 170   | 150   | 4.3                          |
| 10D2-05        | 10.0                                      | 2700                 | 1.0                      | 0.91                       | 20  | 7                               | - 50 to 150                   | 860              | 600   | 170   | 150   | 4.3                          |
| 20D2-05        | 20.0                                      | 2800                 | 0.3                      | 1.66                       | 20  | 1                               | - 50 to 150                   | 860              | 600   | 170   | 150   | 4.3                          |
| 5D2-07         | 5.0                                       | 2800                 | 3.0                      | 0.36                       | 35  | 30                              | - 40 to 160                   | 400              | 260   | 80    | 60    | 1.9                          |
| 8D2-07         | 8.0                                       | 2800                 | 2.0                      | 0.58                       | 41  | 30                              | - 40 to 160                   | 560              | 360   | 110   | 90    | 2.6                          |
| 10D2-07        | 10.0                                      | 2800                 | 2.0                      | 0.72                       | 45  | 30                              | - 40 to 160                   | 680              | 470   | 140   | 110   | 3.3                          |
| 12D2-07        | 12.0                                      | 2900                 | 1.7                      | 0.78                       | 41  | 30                              | - 40 to 160                   | 380              | 260   | 80    | 60    | 1.9                          |
| 16D2-07        | 16.0                                      | 2900                 | 2.0                      | 1.04                       | 45  | 30                              | - 40 to 160                   | 800              | 530   | 160   | 130   | 3.8                          |
| 22D2-07        | 22.0                                      | 2900                 | 1.0                      | 1.43                       | 50  | 30                              | - 40 to 160                   | 960              | 630   | 190   | 150   | 4.5                          |
| 5D2-08         | 5.0                                       | 2700                 | 3.0                      | 0.35                       | 35  | 22                              | - 50 to 170                   | 1260             | 880   | 260   | 220   | 6.3                          |
| 10D2-08        | 10.0                                      | 2800                 | 2.0                      | 0.63                       | 35  | 17                              | - 50 to 170                   | 1260             | 880   | 260   | 220   | 6.3                          |
| 15D2-08        | 15.0                                      | 2800                 | 2.0                      | 0.94                       | 35  | 26                              | - 50 to 170                   | 2880             | 2000  | 590   | 500   | 14.0                         |
| 20D2-08        | 20.0                                      | 2900                 | 1.0                      | 1.13                       | 35  | 8                               | - 50 to 170                   | 2880             | 2000  | 590   | 500   | 14.0                         |
| 2D2-10         | 2.0                                       | 2800                 | 5.0                      | 0.15                       | 50  | 32                              | - 40 to 160                   | 640              | 1100  | 330   | 270   | 7.9                          |
| 3D2-10         | 3.0                                       | 2800                 | 4.0                      | 0.22                       | 53  | 32                              | - 40 to 160                   | 720              | 1170  | 350   | 290   | 8.4                          |
| 5D2-10         | 5.0                                       | 2900                 | 4.0                      | 0.33                       | 53  | 32                              | - 40 to 160                   | 440              | 970   | 290   | 240   | 7.0                          |
| 8D2-10         | 8.0                                       | 2900                 | 3.0                      | 0.52                       | 70  | 32                              | - 40 to 160                   | 560              | 1070  | 320   | 260   | 7.7                          |
| 10D2-10        | 10.0                                      | 2900                 | 3.0                      | 0.65                       | 75  | 32                              | - 40 to 160                   | 1640             | 1100  | 330   | 270   | 7.9                          |
| 12D2-10        | 12.0                                      | 3000                 | 1.8                      | 0.71                       | 53  | 32                              | - 40 to 160                   | 830              | 580   | 170   | 140   | 4.1                          |
| 16D2-10        | 16.0                                      | 3000                 | 1.6                      | 0.94                       | 70  | 32                              | - 40 to 160                   | 830              | 580   | 170   | 140   | 4.1                          |
| 2D2-11         | 2.0                                       | 2650                 | 5.0                      | 0.15                       | 40  | 26                              | - 50 to 170                   | 2700             | 1880  | 550   | 470   | 13.0                         |
| 3D2-11         | 3.0                                       | 2650                 | 4.0                      | 0.22                       | 40  | 24                              | - 50 to 170                   | 4830             | 3360  | 990   | 840   | 24.0                         |
| 4D2-11         | 4.0                                       | 2700                 | 4.0                      | 0.28                       | 40  | 31                              | - 50 to 170                   | 2880             | 2000  | 590   | 500   | 14.0                         |
| 5D2-11         | 5.0                                       | 2700                 | 4.0                      | 0.35                       | 40  | 39                              | - 50 to 170                   | 2700             | 1880  | 550   | 470   | 13.0                         |
| 8D2-11         | 8.0                                       | 2800                 | 3.0                      | 0.50                       | 40  | 31                              | - 50 to 170                   | 2700             | 1880  | 550   | 470   | 13.0                         |
| 10D2-11        | 10.0                                      | 2800                 | 3.1                      | 0.63                       | 40  | 42                              | - 50 to 170                   | 2880             | 2000  | 590   | 500   | 14.0                         |
| 12D2-11        | 12.0                                      | 2800                 | 2.0                      | 0.75                       | 40  | 21                              | - 50 to 170                   | 4030             | 2800  | 830   | 700   | 20.0                         |
| 15D2-11        | 15.0                                      | 2950                 | 2.5                      | 0.80                       | 40  | 34                              | - 50 to 170                   | 2880             | 2000  | 590   | 500   | 14.0                         |
| 16D2-11        | 16.0                                      | 2950                 | 2.5                      | 0.86                       | 40  | 37                              | - 50 to 170                   | 2880             | 2000  | 590   | 500   | 14.0                         |
| 20D2-11        | 20.0                                      | 3000                 | 2.0                      | 1.02                       | 40  | 28                              | - 50 to 170                   | 2880             | 2000  | 590   | 500   | 14.0                         |
| 1D2-13         | 1.0                                       | 2650                 | 6.0                      | 0.06                       | 55  | 12                              | - 50 to 200                   | 860              | 600   | 170   | 150   | 4.3                          |
| 2D2-13         | 2.0                                       | 2700                 | 6.0                      | 0.10                       | 55  | 21                              | - 50 to 200                   | 860              | 600   | 170   | 150   | 4.3                          |
| 4D2-13         | 4.0                                       | 2800                 | 5.0                      | 0.18                       | 55  | 24                              | - 50 to 200                   | 860              | 600   | 170   | 150   | 4.3                          |
| 4.7D2-13       | 4.7                                       | 2900                 | 5.0                      | 0.18                       | 55  | 26                              | - 50 to 200                   | 2700             | 1880  | 550   | 470   | 13.0                         |
| 5D2-13         | 5.0                                       | 2900                 | 5.0                      | 0.19                       | 55  | 27                              | - 50 to 200                   | 2700             | 1880  | 550   | 470   | 13.0                         |
| 8D2-13         | 8.0                                       | 3000                 | 4.0                      | 0.27                       | 25  | 25                              | - 50 to 200                   | 2880             | 2000  | 590   | 500   | 14.0                         |
| 10D2-13        | 10.0                                      | 3050                 | 4.0                      | 0.32                       | 55  | 29                              | - 50 to 200                   | 2880             | 2000  | 590   | 500   | 14.0                         |
| 12D2-13        | 12.0                                      | 3000                 | 4.0                      | 0.41                       | 55  | 37                              | - 50 to 200                   | 4830             | 3360  | 990   | 840   | 24.0                         |
| 15D2-13        | 15.0                                      | 3050                 | 3.0                      | 0.48                       | 55  | 25                              | - 50 to 200                   | 4830             | 3360  | 990   | 840   | 24.0                         |
| 16D2-13        | 16.0                                      | 3050                 | 3.0                      | 0.51                       | 55  | 26                              | - 50 to 200                   | 4830             | 3360  | 990   | 840   | 24.0                         |
| 2D2-14         | 2.0                                       | 2800                 | 5.0                      | 0.15                       | 90  | 36                              | - 40 to 160                   | 4200             | 2890  | 860   | 720   | 20.8                         |
| 3D2-14         | 3.0                                       | 2900                 | 5.0                      | 0.20                       | 80  | 36                              | - 40 to 160                   | 3080             | 2110  | 630   | 520   | 15.2                         |
| 4D2-14         | 4.0                                       | 2900                 | 5.0                      | 0.26                       | 95  | 36                              | - 40 to 160                   | 3400             | 2350  | 700   | 580   | 16.9                         |
| 5D2-14         | 5.0                                       | 2900                 | 4.0                      | 0.33                       | 110                                       | 36                              | - 40 to 160                   | 3600             | 2480  | 740   | 620   | 17.9                         |
| 8D2-14         | 8.0                                       | 3000                 | 2.5                      | 0.47                       | 80  | 36                              | - 40 to 160                   | 1390             | 970   | 280   | 240   | 6.9                          |
| 10D2-14        | 10.0                                      | 3000                 | 2.2                      | 0.59                       | 95  | 36                              | - 40 to 160                   | 1790             | 1240  | 370   | 310   | 8.9                          |
| 12D2-14        | 12.0                                      | 3000                 | 2.0                      | 0.71                       | 105                                       | 36                              | - 40 to 160                   | 2190             | 1520  | 450   | 380   | 10.9                         |
| 16D2-14        | 16.0                                      | 3000                 | 1.8                      | 0.94                       | 115                                       | 36                              | - 40 to 160                   | 2790             | 1940  | 570   | 480   | 13.9                         |
| 1D2-15         | 1.0                                       | 2650                 | 8.0                      | 0.06                       | 70  | 22                              | - 50 to 200                   | 6910             | 4800  | 1420  | 1200  | 34.0                         |
| 1.5D2-15       | 1.5                                       | 2650                 | 8.0                      | 0.08                       | 70  | 29                              | - 50 to 200                   | 6910             | 4800  | 1420  | 1200  | 34.0                         |
| 2D2-15         | 2.0                                       | 2700                 | 8.0                      | 0.10                       | 70  | 37                              | - 50 to 200                   | 6910             | 4800  | 1420  | 1200  | 34.0                         |
| 3D2-15         | 3.0                                       | 2800                 | 7.0                      | 0.13                       | 70  | 36                              | - 50 to 200                   | 4030             | 2800  | 830   | 700   | 20.0                         |
| 4D2-15         | 4.0                                       | 2800                 | 7.0                      | 0.18                       | 70  | 48                              | - 50 to 200                   | 4030             | 2800  | 830   | 700   | 20.0                         |
| 4.7D2-15       | 4.7                                       | 2900                 | 6.0                      | 0.18                       | 70  | 37                              | - 50 to 200                   | 4030             | 2800  | 830   | 700   | 20.0                         |
| 5D2-15         | 5.0                                       | 2900                 | 6.0                      | 0.19                       | 70  | 39                              | - 50 to 200                   | 4030             | 2800  | 830   | 700   | 20.0                         |
| 8D2-15         | 8.0                                       | 3000                 | 5.0                      | 0.27                       | 70  | 39                              | - 50 to 200                   | 4030             | 2800  | 830   | 700   | 20.0                         |
| 10D2-15        | 10.0                                      | 3000                 | 5.0                      | 0.34                       | 70  | 49                              | - 50 to 200                   | 5760             | 4000  | 1190  | 1000  | 28.0                         |
| 12D2-15        | 12.0                                      | 3050                 | 5.0                      | 0.39                       | 70  | 54                              | - 50 to 200                   | 5760             | 4000  | 1190  | 1000  | 28.0                         |
| 15D2-15        | 15.0                                      | 3100                 | 4.0                      | 0.45                       | 70  | 41                              | - 50 to 200                   | 5760             | 4000  | 1190  | 1000  | 28.0                         |
| 16D2-15        | 16.0                                      | 3100                 | 4.0                      | 0.48                       | 70  | 44                              | - 50 to 200                   | 5760             | 4000  | 1190  | 1000  | 28.0                         |
| 4D2-18         | 4.0                                       | 2900                 | 8.0                      | 0.16                       | 90  | 59                              | - 50 to 200                   | 6910             | 4800  | 1420  | 1200  | 34.0                         |
| 5D2-18         | 5.0                                       | 2950                 | 8.0                      | 0.18                       | 90  | 66                              | - 50 to 200                   | 6910             | 4800  | 1420  | 1200  | 34.0                         |
| 8D2-18         | 8.0                                       | 3050                 | 6.0                      | 0.26                       | 90  | 53                              | - 50 to 200                   | 6910             | 4800  | 1420  | 1200  | 34.0                         |
| 10D2-18        | 10.0                                      | 3100                 | 6.0                      | 0.30                       | 90  | 62                              | - 50 to 200                   | 6910             | 4800  | 1420  | 1200  | 34.0                         |
| 47D2-18        | 47.0                                      | 3450                 | 2.0                      | 0.94                       | 90  | 21                              | - 50 to 200                   | 6910             | 4800  | 1420  | 1200  | 34.0                         |
| 1D2-22         | 1.0                                       | 2900                 | 12.0                     | 0.04                       | 125                                       | 32                              | - 50 to 200                   | 8200             | -     | 1700  | -     | 41.0                         |
| 3D2-22         | 3.0                                       | 2800                 | 8.0                      | 0.13                       | 130                                       | 48                              | - 50 to 200                   | 12600            | 8800  | 2610  | 2200  | 63.0                         |
| 4D2-22         | 4.0                                       | 2900                 | 8.0                      | 0.16                       | 130                                       | 59                              | - 50 to 200                   | 12600            | 8800  | 2610  | 2200  | 63.0                         |
| 6D2-22         | 6.0                                       | 3000                 | 6.0                      | 0.21                       | 130                                       | 43                              | - 50 to 200                   | 12600            | 8800  | 2610  | 2200  | 63.0                         |

<sup>1</sup>: In part reference values <sup>2</sup>: Reference values

## Reliability data

| Item                              | Test conditions  | Criteria               |
|-----------------------------------|--|------------------------|
| Resistance to soldering heat      | 10 s at 260 °C<br>5 s at 350 °C  | ΔR ± 15%               |
| Solderability                     | 3 s at 245 °C<br>Flux material: Rosin 25%, ethyl alcohol 75%   | More than 95% soldered |
| Tensile strength (lead wire)      | A load of 10 N is applied to the wire terminations in vertical direction for 10 s.   | ΔR ± 15%               |
| Voltage proof                     | 1000 V AC for one minute   | Less than 1 mA         |
| Insulation resistance             | 500 V DC   | Over 100 MΩ            |
| Dry heat                          | 1000 hours at max. operating temperature for each product number   | ΔR ± 20%               |
| Damp heat                         | 1000 hours at 40 °C and 90% humidity   |                        |
| Temperature cycle (thermal shock) | 10 cycles as below:<br>1. - 40 °C for 30 minutes<br>2. Room temperature for 5 minutes<br>3. 160 °C for 30 minutes<br>4. Room temperature for 5 minutes | ΔR ± 15%               |
| Electrical load                   | Max. current for 1000 h at 25 °C room temperature  | ΔR ± 20%               |

## Caution

- When force is applied to the lead wire the leg connections may break or chipping may occur.
- May get hot during use. When designing the environment around the power thermistor be especially careful with lead wire connections, materials used in the direct vicinity and the layout of other electrical components.
- Do not use two or more power thermistors in a row.