

## SMD 0603, Glass Protected NTC Thermistors



### FEATURES

- TCR ranging from - 7 %/K at - 40 °C to - 2 %/K at 150 °C
- Tolerance on  $R_{25}$  down to 1 %, and on  $B_{25/85}$  down to 1 %
- Suitable for wave or reflow soldering
- NiSn terminations
- Fully glass coated and protected
- Old part number was 2322 615 3...
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC


**RoHS**  
COMPLIANT

### QUICK REFERENCE DATA

| PARAMETER                                 | VALUE   |
|---|---|
| Resistance value at 25 °C                 | 2.2 k $\Omega$ to 100 k $\Omega$                  |
| Tolerance on $R_{25}$ - value             | $\pm 1 \%$ ; $\pm 2 \%$ ; $\pm 3 \%$ ; $\pm 5 \%$ |
| $B_{25/85}$ value                         | 3420K to 4100K                                    |
| Tolerance on $B_{25/85}$ - value          | $\pm 1 \%$  |
| Maximum dissipation at 25 °C              | 125 mW  |
| Thermal time constant $\tau$              | $\approx 8$ s                                     |
| Dissipation factor D                      | 3.0 mW/K  |
| Operating temperature range at zero power | - 40 °C to + 150 °C                               |
| R/T values                                | See tables  |
| Climatic category                         | 40/125/56   |
| Weight                                    | $\approx 0.006$ g                                 |

### APPLICATIONS

- Temperature sensing, protection and compensation in automotive, industrial, telecom and consumer applications. Examples are:
  - Battery chargers
  - Power suppliers
  - Office equipment
  - LCD compensation
  - In-car entertainment

### DESCRIPTION

Size 0603 chip thermistors with a negative temperature coefficient. The device has no marking.

### PACKAGING

Available in 8 mm punched paper tape on reel package of 4000 units.

### DESIGN-IN SUPPORT

For complete Curve Computation, visit:

[www.vishay.com/thermistors/curve-computation-list/](http://www.vishay.com/thermistors/curve-computation-list/)

### ELECTRICAL DATA AND ORDERING INFORMATION

| $R_{25}$ - VALUE (k $\Omega$ ) | $B_{25/85}$ - VALUE (K) | TOLERANCE ON $B_{25/85}$ (%) | 12 NC ORDERING CODE 2381 615 3... <sup>(1)</sup> | SAP MATERIAL NO. NTCS0603E3... <sup>(2)</sup> |
|--------------------------------|-------------------------|------------------------------|--|---|
| 2.0                            | 3420                    | $\pm 1$                      | *202   | 202*LT  |
| 2.2                            | 3520                    | $\pm 1$                      | *222   | 222*MT  |
| 2.7                            | 3600                    | $\pm 1$                      | *272   | 272*MT  |
| 4.7                            | 3830                    | $\pm 1$                      | *472   | 472*HT  |
| 10                             | 3610                    | $\pm 1$                      | *103   | 103*MT  |
| 15                             | 3600                    | $\pm 1$                      | *153   | 153*MT  |
| 22                             | 3730                    | $\pm 1$                      | *223   | 223*MT  |
| 33                             | 3860                    | $\pm 1$                      | *333   | 333*HT  |
| 47                             | 3960                    | $\pm 1$                      | *473   | 473*HT  |
| 68                             | 3985                    | $\pm 1$                      | *683   | 683*HT  |
| 100                            | 4100                    | $\pm 1$                      | *104   | 104*XT  |

#### Notes

<sup>(1)</sup> Replace \* in 12 NC by 3 for  $\pm 5 \%$ , 6 for  $\pm 3 \%$ , 4 for  $\pm 2 \%$ , 5 for  $\pm 1 \%$  tolerance on  $R_{25}$

<sup>(2)</sup> Replace \* in SAP by J for  $\pm 5 \%$ , H for  $\pm 3 \%$ , G for  $\pm 2 \%$ , F for  $\pm 1 \%$  tolerance on  $R_{25}$

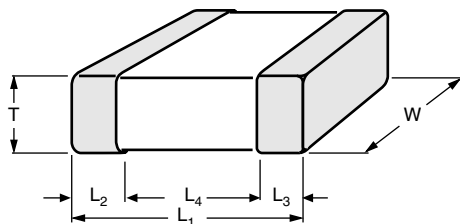
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## DIMENSIONS in millimeters



| L <sub>1</sub> | W          | T          | L <sub>2</sub> and L <sub>3</sub> MIN. | L <sub>4</sub> MIN. |
|----------------|------------|------------|--|---------------------|
| 1.6 ± 0.15     | 0.8 ± 0.15 | 0.8 ± 0.15 | 0.2                                    | 0.4                 |

For complete Curve Computation, visit: [www.vishay.com/thermistors/curve-computation-list/](http://www.vishay.com/thermistors/curve-computation-list/)

| RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R <sub>25</sub> AT 2.0, 2.2 AND 2.7 kΩ |  |           |  |           |  |           |                                    |
|--|--|-----------|--|-----------|--|-----------|------------------------------------|
| T <sub>OPER</sub> [°C]   | PART NUMBER<br>2381 615 3*202/<br>NTCS0603E3202*MT |           | PART NUMBER<br>2381 615 3*222/<br>NTCS0603E3222*MT |           | PART NUMBER<br>2381 615 3*272/<br>NTCS0603E3272*MT |           | ΔR/R DUE TO B <sub>tol</sub> [± %] |
|  | R <sub>T</sub> [Ω]                                 | TCR [%/K] | R <sub>T</sub> [Ω]                                 | TCR [%/K] | R <sub>T</sub> [Ω]                                 | TCR [%/K] |                                    |
| -40  | 44 297   | -5.93     | 53 503   | -6.11     | 65 247   | -6.26     | 7.58                               |
| -35  | 33 114   | -5.71     | 39 637   | -5.89     | 48 436   | -6.03     | 6.83                               |
| -30  | 25 010   | -5.51     | 29 680   | -5.68     | 36 340   | -5.82     | 6.13                               |
| -25  | 19 076   | -5.32     | 22 451   | -5.48     | 27 539   | -5.61     | 5.45                               |
| -20  | 14 687   | -5.14     | 17 149   | -5.29     | 21 069   | -5.42     | 4.80                               |
| -15  | 11 410   | -4.96     | 13 221   | -5.11     | 16 265   | -5.23     | 4.18                               |
| -10  | 8940.4   | -4.80     | 10 283   | -4.94     | 12 664   | -5.06     | 3.58                               |
| -5   | 7062.8   | -4.64     | 8066.2   | -4.77     | 9940.1   | -4.89     | 3.01                               |
| 0  | 5623.4   | -4.48     | 6378.5   | -4.62     | 7862.7   | -4.72     | 2.46                               |
| 5  | 4510.9   | -4.34     | 5083.1   | -4.47     | 6265.2   | -4.57     | 1.93                               |
| 10   | 3644.4   | -4.20     | 4080.7   | -4.32     | 5027.3   | -4.42     | 1.42                               |
| 15   | 2964.6   | -4.06     | 3299.2   | -4.18     | 4060.9   | -4.28     | 0.93                               |
| 20   | 2427.4   | -3.94     | 2685.5   | -4.05     | 3301.2   | -4.14     | 0.46                               |
| 25   | 2000.0   | -3.81     | 2200.0   | -3.93     | 2700.0   | -4.02     | 0.00                               |
| 30   | 1657.7   | -3.70     | 1813.5   | -3.80     | 2221.1   | -3.89     | 0.22                               |
| 35   | 1382.0   | -3.58     | 1503.7   | -3.69     | 1837.3   | -3.77     | 0.43                               |
| 40   | 1158.4   | -3.48     | 1253.9   | -3.58     | 1528.0   | -3.66     | 0.64                               |
| 45   | 976.12   | -3.37     | 1051.3   | -3.47     | 1277.2   | -3.55     | 0.84                               |
| 50   | 826.68   | -3.27     | 886.05   | -3.37     | 1072.8   | -3.45     | 1.03                               |
| 55   | 703.51   | -3.18     | 750.49   | -3.27     | 905.29   | -3.35     | 1.22                               |
| 60   | 601.48   | -3.09     | 638.72   | -3.18     | 767.40   | -3.25     | 1.40                               |
| 65   | 516.53   | -3.00     | 546.09   | -3.09     | 653.33   | -3.16     | 1.58                               |
| 70   | 445.49   | -2.92     | 468.95   | -3.00     | 558.52   | -3.07     | 1.75                               |
| 75   | 385.79   | -2.84     | 404.41   | -2.92     | 479.37   | -2.99     | 1.92                               |
| 80   | 335.42   | -2.76     | 350.18   | -2.84     | 413.02   | -2.90     | 2.08                               |
| 85   | 292.73   | -2.69     | 304.40   | -2.76     | 357.17   | -2.83     | 2.23                               |
| 90   | 256.40   | -2.61     | 265.61   | -2.69     | 309.97   | -2.75     | 2.54                               |
| 95   | 225.37   | -2.55     | 232.60   | -2.62     | 269.92   | -2.68     | 2.85                               |
| 100  | 198.77   | -2.48     | 204.39   | -2.55     | 235.83   | -2.61     | 3.14                               |
| 105  | 175.88   | -2.42     | 180.22   | -2.49     | 206.70   | -2.54     | 3.43                               |
| 110  | 156.11   | -2.35     | 159.41   | -2.42     | 181.72   | -2.48     | 3.71                               |
| 115  | 138.98   | -2.29     | 141.44   | -2.36     | 160.24   | -2.41     | 3.98                               |
| 120  | 124.09   | -2.24     | 125.88   | -2.30     | 141.70   | -2.35     | 4.24                               |
| 125  | 111.11   | -2.18     | 112.35   | -2.25     | 125.65   | -2.30     | 4.50                               |
| 130  | 99.757   | -2.13     | 100.55   | -2.19     | 111.72   | -2.24     | 4.76                               |
| 135  | 89.796   | -2.08     | 90.239   | -2.14     | 99.589   | -2.19     | 5.00                               |
| 140  | 81.033   | -2.03     | 81.192   | -2.09     | 88.997   | -2.13     | 5.25                               |
| 145  | 73.304   | -1.98     | 73.235   | -2.04     | 79.724   | -2.08     | 5.48                               |
| 150  | 66.468   | -1.94     | 66.218   | -2.04     | 71.585   | -2.04     | 5.71                               |



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| RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R <sub>25</sub> AT 4.7, 10 AND 15 kΩ |  |              |  |              |  |              |                                       |
|--|--|--------------|--|--------------|--|--------------|---------------------------------------|
| T <sub>OPER</sub><br>[°C]  | PART NUMBER<br>2381 615 3*472/<br>NTCS0603E3472*HT |              | PART NUMBER<br>2381 615 3*103/<br>NTCS0603E3103*MT |              | PART NUMBER<br>2381 615 3*153/<br>NTCS0603E3153*MT |              | ΔR/R DUE TO B <sub>tol</sub><br>[± %] |
|  | R <sub>T</sub><br>[Ω]                              | TCR<br>[%/K] | R <sub>T</sub><br>[Ω]                              | TCR<br>[%/K] | R <sub>T</sub><br>[Ω]                              | TCR<br>[%/K] |                                       |
| -40  | 152 832  | - 6.66       | 243 448  | - 6.06       | 362 484  | - 6.07       | 7.58                                  |
| -35  | 110 192  | - 6.43       | 180 772  | - 5.85       | 269 089  | - 5.85       | 6.83                                  |
| -30  | 80 369   | - 6.20       | 135 623  | - 5.65       | 201 888  | - 5.64       | 6.13                                  |
| -25  | 59 267   | - 5.98       | 102 751  | - 5.46       | 152 997  | - 5.45       | 5.45                                  |
| -20  | 44 170   | - 5.78       | 78 576   | - 5.28       | 117 051  | - 5.26       | 4.80                                  |
| -15  | 33 252   | - 5.58       | 60 623   | - 5.10       | 90 361   | - 5.09       | 4.18                                  |
| -10  | 25 276   | - 5.39       | 47 168   | - 4.94       | 70 354   | - 4.92       | 3.58                                  |
| -5   | 19 392   | - 5.21       | 36 995   | - 4.78       | 55 223   | - 4.76       | 3.01                                  |
| 0  | 15 009   | - 5.04       | 29 240   | - 4.63       | 43 682   | - 4.61       | 2.46                                  |
| 5  | 11 716   | - 4.87       | 23 280   | - 4.49       | 34 807   | - 4.47       | 1.93                                  |
| 10   | 9219.5   | - 4.71       | 18 664   | - 4.35       | 27 929   | - 4.33       | 1.42                                  |
| 15   | 7311.4   | - 4.56       | 15 064   | - 4.22       | 22 561   | - 4.20       | 0.93                                  |
| 20   | 5841.3   | - 4.42       | 12 236   | - 4.10       | 18 340   | - 4.08       | 0.46                                  |
| 25   | 4700.0   | - 4.28       | 10 000   | - 3.98       | 15 000   | - 3.96       | 0.00                                  |
| 30   | 3807.5   | - 4.15       | 8220.3   | - 3.86       | 12 340   | - 3.85       | 0.22                                  |
| 35   | 3104.5   | - 4.02       | 6795.2   | - 3.75       | 10 207   | - 3.74       | 0.43                                  |
| 40   | 2547.2   | - 3.90       | 5647.3   | - 3.65       | 8488.7   | - 3.64       | 0.64                                  |
| 45   | 2102.4   | - 3.78       | 4717.5   | - 3.55       | 7095.4   | - 3.54       | 0.84                                  |
| 50   | 1745.3   | - 3.67       | 3960.3   | - 3.45       | 5959.8   | - 3.44       | 1.03                                  |
| 55   | 1456.8   | - 3.56       | 3340.4   | - 3.36       | 5029.4   | - 3.35       | 1.22                                  |
| 60   | 1222.4   | - 3.46       | 2830.3   | - 3.27       | 4263.3   | - 3.26       | 1.40                                  |
| 65   | 1030.9   | - 3.36       | 2408.6   | - 3.18       | 3629.6   | - 3.18       | 1.58                                  |
| 70   | 873.61   | - 3.26       | 2058.4   | - 3.10       | 3102.9   | - 3.10       | 1.75                                  |
| 75   | 743.79   | - 3.17       | 1766.2   | - 3.02       | 2663.2   | - 3.02       | 1.92                                  |
| 80   | 636.11   | - 3.08       | 1521.4   | - 2.95       | 2294.6   | - 2.94       | 2.08                                  |
| 85   | 546.36   | - 3.00       | 1315.4   | - 2.87       | 1984.3   | - 2.87       | 2.23                                  |
| 90   | 471.22   | - 2.92       | 1141.4   | - 2.80       | 1722.0   | - 2.80       | 2.54                                  |
| 95   | 408.03   | - 2.84       | 993.91   | - 2.73       | 1499.6   | - 2.73       | 2.85                                  |
| 100  | 354.67   | - 2.77       | 868.35   | - 2.67       | 1310.2   | - 2.67       | 3.14                                  |
| 105  | 309.43   | - 2.69       | 761.11   | - 2.61       | 1148.3   | - 2.61       | 3.43                                  |
| 110  | 270.91   | - 2.62       | 669.19   | - 2.54       | 1009.6   | - 2.55       | 3.71                                  |
| 115  | 238.01   | - 2.56       | 590.14   | - 2.48       | 890.23   | - 2.49       | 3.98                                  |
| 120  | 209.79   | - 2.49       | 521.94   | - 2.43       | 787.23   | - 2.43       | 4.24                                  |
| 125  | 185.50   | - 2.43       | 462.92   | - 2.37       | 698.07   | - 2.38       | 4.50                                  |
| 130  | 164.53   | - 2.37       | 411.68   | - 2.32       | 620.67   | - 2.32       | 4.76                                  |
| 135  | 146.36   | - 2.31       | 367.08   | - 2.27       | 553.27   | - 2.27       | 5.00                                  |
| 140  | 130.57   | - 2.26       | 328.14   | - 2.22       | 494.43   | - 2.22       | 5.25                                  |
| 145  | 116.80   | - 2.20       | 294.05   | - 2.17       | 442.91   | - 2.18       | 5.48                                  |
| 150  | 104.76   | - 2.15       | 264.12   | - 2.12       | 397.69   | - 2.13       | 5.71                                  |

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| <b>RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH <math>R_{25}</math> AT 22, 33 AND 47 k<math>\Omega</math></b> |  |              |  |              |  |              |  |
|--|--|--------------|--|--------------|--|--------------|--|
| $T_{OPER}$<br>[°C]   | PART NUMBER<br>2381 615 3*223/<br>NTCS0603E3223*MT |              | PART NUMBER<br>2381 615 3*333/<br>NTCS0603E3333*HT |              | PART NUMBER<br>2381 615 3*473/<br>NTCS0603E3473*HT |              | $\Delta R/R$ DUE TO $B_{tol}$<br>[± %] |
|  | $R_T$<br>[ $\Omega$ ]                              | TCR<br>[%/K] | $R_T$<br>[ $\Omega$ ]                              | TCR<br>[%/K] | $R_T$<br>[ $\Omega$ ]                              | TCR<br>[%/K] |  |
| - 40   | 603 212  | - 6.28       | 1 061 183  | - 6.70       | 1 643 693  | - 6.85       | 7.58                                   |
| - 35   | 443 043  | - 6.06       | 764 125  | - 6.44       | 1 174 859  | - 6.59       | 6.83                                   |
| - 30   | 328 858  | - 5.86       | 557 158  | - 6.20       | 850 461  | - 6.34       | 6.13                                   |
| - 25   | 246 572  | - 5.66       | 411 058  | - 5.97       | 623 018  | - 6.11       | 5.45                                   |
| - 20   | 186 661  | - 5.47       | 306 646  | - 5.75       | 461 557  | - 5.89       | 4.80                                   |
| - 15   | 142 608  | - 5.29       | 231 157  | - 5.55       | 345 583  | - 5.69       | 4.18                                   |
| - 10   | 109 910  | - 5.12       | 175 977  | - 5.36       | 261 354  | - 5.49       | 3.58                                   |
| - 5  | 85 420   | - 4.96       | 135 223  | - 5.18       | 199 536  | - 5.31       | 3.01                                   |
| 0  | 66 919   | - 4.80       | 104 827  | - 5.01       | 153 714  | - 5.13       | 2.46                                   |
| 5  | 52 827   | - 4.66       | 81 946   | - 4.84       | 119 427  | - 4.97       | 1.93                                   |
| 10   | 42 007   | - 4.51       | 64 569   | - 4.69       | 93 541   | - 4.81       | 1.42                                   |
| 15   | 33 638   | - 4.38       | 51 262   | - 4.54       | 73 832   | - 4.66       | 0.93                                   |
| 20   | 27 117   | - 4.25       | 40 989   | - 4.40       | 58 703   | - 4.52       | 0.46                                   |
| 25   | 22 000   | - 4.12       | 33 000   | - 4.27       | 47 000   | - 4.38       | 0.00                                   |
| 30   | 17 958   | - 4.00       | 26 741   | - 4.14       | 37 881   | - 4.25       | 0.22                                   |
| 35   | 14 746   | - 3.89       | 21 804   | - 4.02       | 30 726   | - 4.13       | 0.43                                   |
| 40   | 12 176   | - 3.77       | 17 884   | - 3.91       | 25 073   | - 4.01       | 0.64                                   |
| 45   | 10 109   | - 3.67       | 14 751   | - 3.80       | 20 579   | - 3.89       | 0.84                                   |
| 50   | 8435.9   | - 3.57       | 12 234   | - 3.69       | 16 984   | - 3.79       | 1.03                                   |
| 55   | 7075.0   | - 3.47       | 10 198   | - 3.59       | 14 092   | - 3.68       | 1.22                                   |
| 60   | 5962.1   | - 3.38       | 8543.9   | - 3.49       | 11 751   | - 3.58       | 1.40                                   |
| 65   | 5047.4   | - 3.29       | 7191.9   | - 3.40       | 9847.6   | - 3.49       | 1.58                                   |
| 70   | 4292.0   | - 3.20       | 6081.4   | - 3.31       | 8290.7   | - 3.40       | 1.75                                   |
| 75   | 3665.1   | - 3.12       | 5164.9   | - 3.22       | 7011.4   | - 3.31       | 1.92                                   |
| 80   | 3142.6   | - 3.04       | 4405.0   | - 3.14       | 5955.0   | - 3.22       | 2.08                                   |
| 85   | 2705.2   | - 2.96       | 3772.0   | - 3.06       | 5078.7   | - 3.14       | 2.23                                   |
| 90   | 2337.6   | - 2.88       | 3242.6   | - 2.99       | 4348.7   | - 3.07       | 2.54                                   |
| 95   | 2027.3   | - 2.81       | 2797.8   | - 2.91       | 3737.8   | - 2.99       | 2.85                                   |
| 100  | 1764.3   | - 2.74       | 2422.8   | - 2.84       | 3224.6   | - 2.92       | 3.14                                   |
| 105  | 1540.7   | - 2.68       | 2105.3   | - 2.78       | 2791.8   | - 2.85       | 3.43                                   |
| 110  | 1349.9   | - 2.61       | 1835.5   | - 2.71       | 2425.3   | - 2.87       | 3.71                                   |
| 115  | 1186.4   | - 2.55       | 1605.4   | - 2.65       | 2113.9   | - 2.72       | 3.98                                   |
| 120  | 1045.9   | - 2.49       | 1408.5   | - 2.59       | 1848.4   | - 2.65       | 4.24                                   |
| 125  | 924.73   | - 2.43       | 1239.5   | - 2.53       | 1621.2   | - 2.59       | 4.50                                   |
| 130  | 819.95   | - 2.38       | 1093.9   | - 2.47       | 1426.1   | - 2.54       | 4.76                                   |
| 135  | 729.04   | - 2.32       | 968.07   | - 2.42       | 1258.1   | - 2.48       | 5.00                                   |
| 140  | 649.93   | - 2.27       | 859.04   | - 2.36       | 1112.9   | - 2.42       | 5.25                                   |
| 145  | 580.89   | - 2.22       | 764.28   | - 2.31       | 987.19   | - 2.37       | 5.48                                   |
| 150  | 520.48   | - 2.17       | 681.69   | - 2.26       | 877.91   | - 2.32       | 5.71                                   |



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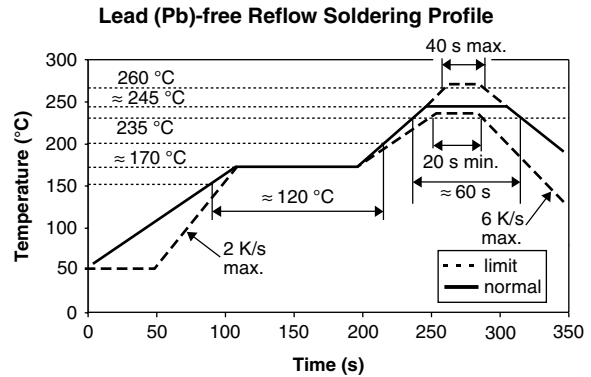
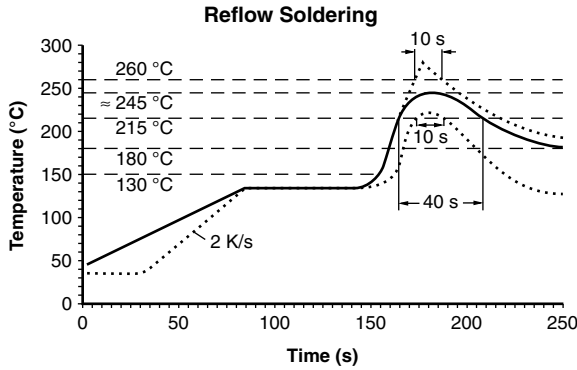
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| <b>RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH <math>R_{25}</math> AT 68 AND 100 k<math>\Omega</math></b> |  |              |  |              |  |
|---|--|--------------|--|--------------|--|
| $T_{OPER}$<br>[°C]  | PART NUMBER<br>2381 615 3*683/<br>NTCS0603E3683*HT |              | PART NUMBER<br>2381 615 3*104/<br>NTCS0603E3104*XT |              | $\Delta R/R$ DUE TO $B_{tot}$<br>[± %] |
|   | $R_T$<br>[ $\Omega$ ]                              | TCR<br>[%/K] | $R_T$<br>[ $\Omega$ ]                              | TCR<br>[%/K] |  |
| -40   | 2 324 376  | -6.77        | 3 921 252  | -7.03        | 7.58                                   |
| -35   | 1 667 529  | -6.52        | 2 774 565  | -6.77        | 6.83                                   |
| -30   | 1 211 148  | -6.28        | 1 988 706  | -6.52        | 6.13                                   |
| -25   | 889 917  | -6.05        | 1 442 861  | -6.28        | 5.45                                   |
| -20   | 661 047  | -5.84        | 1 058 901  | -6.06        | 4.80                                   |
| -15   | 496 103  | -5.64        | 785 573  | -5.85        | 4.18                                   |
| -10   | 375 941  | -5.45        | 588 793  | -5.65        | 3.58                                   |
| -5  | 287 504  | -5.28        | 445 602  | -5.47        | 3.01                                   |
| 0   | 221 786  | -5.11        | 340 346  | -5.29        | 2.46                                   |
| 5   | 172 502  | -4.95        | 262 229  | -5.12        | 1.93                                   |
| 10  | 135 221  | -4.79        | 203 723  | -4.96        | 1.42                                   |
| 15  | 106 786  | -4.65        | 159 522  | -4.80        | 0.93                                   |
| 20  | 84 928   | -4.51        | 125 851  | -4.66        | 0.46                                   |
| 25  | 68 000   | -4.38        | 100 000  | -4.52        | 0.00                                   |
| 30  | 54 796   | -4.26        | 80 003   | -4.39        | 0.22                                   |
| 35  | 44 427   | -4.14        | 64 422   | -4.26        | 0.43                                   |
| 40  | 36 232   | -4.02        | 52 200   | -4.14        | 0.64                                   |
| 45  | 29 714   | -3.91        | 42 548   | -4.02        | 0.84                                   |
| 50  | 24 499   | -3.81        | 34 879   | -3.91        | 1.03                                   |
| 55  | 20 304   | -3.71        | 28 749   | -3.80        | 1.22                                   |
| 60  | 16 909   | -3.61        | 23 820   | -3.70        | 1.40                                   |
| 65  | 14 149   | -3.52        | 19 835   | -3.60        | 1.58                                   |
| 70  | 11 893   | -3.43        | 16 597   | -3.51        | 1.75                                   |
| 75  | 10 041   | -3.34        | 13 951   | -3.42        | 1.92                                   |
| 80  | 8512.2   | -3.26        | 11 780   | -3.33        | 2.08                                   |
| 85  | 7245.5   | -3.18        | 9988.4   | -3.25        | 2.23                                   |
| 90  | 6191.1   | -3.11        | 8504.3   | -3.17        | 2.54                                   |
| 95  | 5310.0   | -3.03        | 7269.4   | -3.09        | 2.85                                   |
| 100   | 4570.7   | -2.96        | 6237.5   | -3.02        | 3.14                                   |
| 105   | 3948.0   | -2.90        | 5371.7   | -2.95        | 3.43                                   |
| 110   | 3421.5   | -2.83        | 4642.5   | -2.88        | 3.71                                   |
| 115   | 2974.8   | -2.77        | 4025.9   | -2.81        | 3.98                                   |
| 120   | 2594.5   | -2.71        | 3502.7   | -2.75        | 4.24                                   |
| 125   | 2269.6   | -2.65        | 3057.1   | -2.68        | 4.50                                   |
| 130   | 1991.2   | -2.59        | 2676.4   | -2.62        | 4.76                                   |
| 135   | 1751.9   | -2.53        | 2350.1   | -2.57        | 5.00                                   |
| 140   | 1545.5   | -2.48        | 2069.5   | -2.51        | 5.25                                   |
| 145   | 1367.1   | -2.43        | 1827.4   | -2.46        | 5.48                                   |
| 150   | 1212.3   | -2.38        | 1617.9   | -2.40        | 5.71                                   |

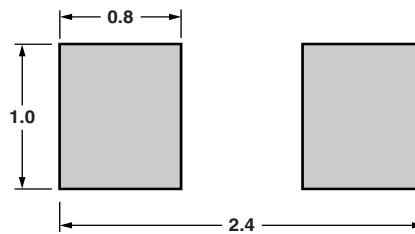
**SOLDERING CONDITIONS**

This SMD thermistor is only suitable for wave or reflow soldering, in accordance with "CECC 00802". The maximum temperature of 260 °C during 40 s should not be exceeded.

Typical examples of a soldering processes that will provide reliable joints without damage, are shown below.



Dimensions of the solder lands



**TESTS AND REQUIREMENTS**

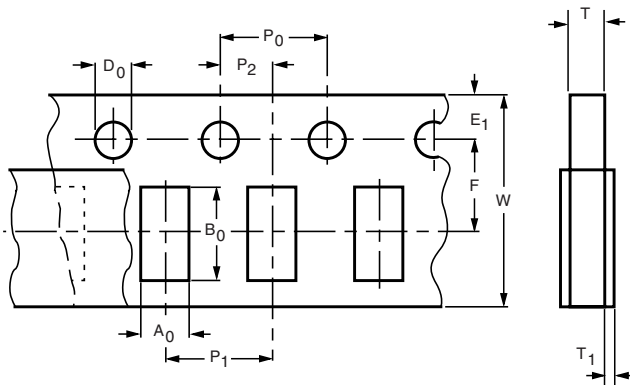
| SOLDERABILITY AND RESISTANCE TO SOLDERING HEAT |                |                              |                |                             |
|--|----------------|------------------------------|----------------|-----------------------------|
| IEC 60068-2-58                                 | TEST METHOD    | TEST                         | PROCEDURE      | REQUIREMENTS                |
| 6  | T <sub>C</sub> | Solderability                | 2 s at 235 °C  | Min. 95 % of surface wetted |
|  |                | Resistance to soldering heat | 10 s at 260 °C | $\Delta R/R < 5 \%$         |

**PACKAGING**

**TAPE SPECIFICATIONS**

All tape specifications are in accordance with "IEC 60286-3". Basic dimensions are given below. Carrier tape material is paper.

**PAPER TAPE**



| DIMENSIONS OF PAPER TAPE in millimeters |           |           |
|---|-----------|-----------|
| PARAMETER                               | DIMENSION | TOLERANCE |
| A <sub>0</sub> <sup>(1)</sup>           | 1.15      | ± 0.1     |
| B <sub>0</sub> <sup>(1)</sup>           | 1.9       | ± 0.1     |
| W                                       | 8.0       | ± 0.2     |
| E <sub>1</sub>                          | 1.75      | ± 0.1     |
| F                                       | 3.5       | ± 0.05    |
| D <sub>0</sub>                          | 1.55      | ± 0.05    |
| P <sub>0</sub> <sup>(2)</sup>           | 4.0       | ± 0.1     |
| P <sub>1</sub>                          | 4.0       | ± 0.1     |
| P <sub>2</sub>                          | 2.0       | ± 0.05    |
| T tape thickness                        | 1.1       | max.      |
| T <sub>1</sub> cover tape               | < 0.1     | -         |

**Notes**

- (1) Measured 0.3 mm above base pocket
- (2) P<sub>0</sub> pitch cumulative error over any 10 pitches ± 0.2 mm



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