

Surface Mount, NTC Thermistors



FEATURES

- TCR from 6 to 2 %/K even at high temperatures
- Tolerance on $B_{25/85}$ down to 3 %
- Suitable for wave or reflow soldering
- NiSn terminations
- Fully glass coated
- Old part number was 2322 615 4....
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

APPLICATIONS

- Temperature compensation, sensing and protection in, for example:
 - Battery chargers
 - Consumer equipment
 - Office equipment

DESCRIPTION

Size 0402 chip thermistors with a negative temperature coefficient. The device has no marking.

PACKAGING

Available in 8 mm punched paper tape on reel package of 10 000 units.

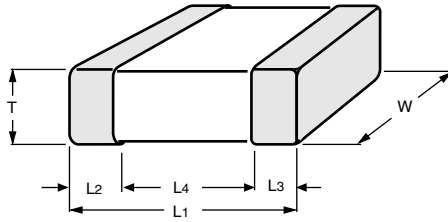
| QUICK REFERENCE DATA | |
|----------------------------------|---|
| PARAMETER | VALUE |
| Resistance value at 25 °C | 4.7 k Ω to 100 k Ω |
| Tolerance on R_{25} - value | ± 1 %; ± 2 %; ± 3 %; ± 5 %; ± 10 % |
| Tolerance on $B_{25/85}$ - value | see Table below |
| Maximum dissipation at 25 °C | 125 mW |
| Thermal time constant τ | ≈ 8 s |
| Operating temperature range | - 40 to + 150 °C |
| R/T values | see Tables |
| Climatic category | 40/125/56 |
| Mass | ≈ 0.002 g |

| ELECTRICAL DATA AND ORDERING INFORMATION | | | | |
|--|----------------------------|------------------------------------|---|---|
| R_{25} - VALUE (k Ω) | $B_{25/85}$ - VALUE (K) | TOLERANCE ON $B_{25/85}$ (%) | 12NC ORDERING CODE 2381 615 4... ¹⁾ | SAP MATERIAL NO. NTCS0402E3... ²⁾ |
| 4.7 | 3595 | ± 3 | *472 | 472*MT |
| 10 | 3490 | ± 3 | *103 | 103*LT |
| 15 | 3600 | ± 3 | *153 | 153*HT |
| 22 | 3590 | ± 3 | *223 | 223*MT |
| 33 | 3670 | ± 3 | *333 | 333*MT |
| 47 | 4075 | ± 3 | *473 | 473*XT |
| 68 | 3910 | ± 3 | *683 | 683*HT |
| 100 | 3950 | ± 3 | *104 | 104*HT |

Note

1. replace digit * by 5 for tol. on R_{25} °C = 1 %, by 4 for 2 %, 6 for 3 %, by 3 for 5 % and by 2 for 10 %
2. replace digit * by J for 5 %, H for 3 %, G for 2 %, F for 1 % tolerance on R_{25} °C

DIMENSIONS in millimeters



| L ₁ | W | T | L ₂ and L ₃ MIN. | L ₄ MIN. |
|----------------|------------|------------|--|---------------------|
| 1.0 ± 0.15 | 0.5 ± 0.15 | 0.5 ± 0.15 | 0.1 | 0.3 |

| RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R ₂₅ AT 4.7 kΩ | | | |
|---|---|-----------|-----------------------------|
| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X472 OR SAP NO. NTCS0402E3472YMT | | |
| | R _T (Ω) | TCR (%/K) | ΔR/R DUE TO B-TOLERANCE (%) |
| -40 | 117 851.65 | -6.08 | 11.22 |
| -35 | 87 377.07 | -5.89 | 10.14 |
| -30 | 65 414.86 | -5.69 | 9.10 |
| -25 | 49 435.13 | -5.51 | 8.11 |
| -20 | 37 699.56 | -5.33 | 7.15 |
| -15 | 29 002.73 | -5.16 | 6.24 |
| -10 | 22 501.16 | -4.99 | 5.35 |
| -5 | 17 599.41 | -4.83 | 4.50 |
| 0 | 13 873.45 | -4.68 | 3.68 |
| 5 | 11 018.80 | -4.53 | 2.89 |
| 10 | 8814.97 | -4.39 | 2.13 |
| 15 | 7101.03 | -4.26 | 1.40 |
| 20 | 5758.62 | -4.13 | 0.69 |
| 25 | 4700.00 | -4.00 | 0.00 |
| 30 | 3859.67 | -3.88 | 0.66 |
| 35 | 3188.38 | -3.76 | 1.31 |
| 40 | 2648.86 | -3.65 | 1.93 |
| 45 | 2212.67 | -3.55 | 2.53 |
| 50 | 1858.03 | -3.44 | 3.11 |
| 55 | 1568.12 | -3.34 | 3.68 |
| 60 | 1329.87 | -3.25 | 4.23 |
| 65 | 1133.09 | -3.16 | 4.76 |
| 70 | 969.76 | -3.07 | 5.28 |
| 75 | 833.56 | -2.98 | 5.78 |
| 80 | 719.47 | -2.90 | 6.27 |
| 85 | 623.48 | -2.83 | 6.74 |
| 90 | 542.38 | -2.75 | 7.20 |
| 95 | 473.58 | -2.68 | 7.65 |
| 100 | 414.98 | -2.61 | 8.09 |
| 105 | 364.89 | -2.54 | 8.51 |
| 110 | 321.91 | -2.47 | 8.93 |
| 115 | 284.90 | -2.41 | 9.33 |
| 120 | 252.92 | -2.35 | 9.73 |
| 125 | 225.20 | -2.29 | 10.11 |
| 130 | 201.09 | -2.24 | 10.48 |
| 135 | 180.07 | -2.18 | 10.85 |
| 140 | 161.67 | -2.13 | 11.20 |
| 145 | 145.53 | -2.08 | 11.55 |
| 150 | 131.33 | -2.03 | 11.89 |

**RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 10 k Ω**

| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X103 OR SAP NO. NTCS0402E3103YLT | | |
|---------------------------|---|--------------|--|
| | R _T (Ω) | TCR (%/K) | $\Delta R/R$ DUE TO B-TOLERANCE (%) |
| - 40 | 214 063.67 | - 5.72 | 11.22 |
| - 35 | 161 527.01 | - 5.55 | 10.14 |
| - 30 | 122 938.33 | - 5.38 | 9.10 |
| - 25 | 94 353.48 | - 5.21 | 8.11 |
| - 20 | 73 003.30 | - 5.05 | 7.15 |
| - 15 | 56 927.91 | - 4.90 | 6.24 |
| - 10 | 44 729.13 | - 4.75 | 5.35 |
| - 5 | 35 401.63 | - 4.61 | 4.50 |
| 0 | 28 217.00 | - 4.47 | 3.68 |
| 5 | 22 643.44 | - 4.33 | 2.89 |
| 10 | 18 289.86 | - 4.21 | 2.13 |
| 15 | 14 866.53 | - 4.08 | 1.40 |
| 20 | 12 157.35 | - 3.96 | 0.69 |
| 25 | 10 000.00 | - 3.85 | 0.00 |
| 30 | 8271.77 | - 3.74 | 0.66 |
| 35 | 6879.27 | - 3.63 | 1.31 |
| 40 | 5751.02 | - 3.53 | 1.93 |
| 45 | 4831.94 | - 3.43 | 2.53 |
| 50 | 4079.35 | - 3.34 | 3.11 |
| 55 | 3459.99 | - 3.25 | 3.68 |
| 60 | 2947.82 | - 3.16 | 4.23 |
| 65 | 2522.30 | - 3.08 | 4.76 |
| 70 | 2167.17 | - 2.99 | 5.28 |
| 75 | 1869.50 | - 2.92 | 5.78 |
| 80 | 1618.94 | - 2.84 | 6.27 |
| 85 | 1407.18 | - 2.77 | 6.74 |
| 90 | 1227.51 | - 2.70 | 7.20 |
| 95 | 1074.48 | - 2.63 | 7.65 |
| 100 | 943.67 | - 2.56 | 8.09 |
| 105 | 831.46 | - 2.50 | 8.51 |
| 110 | 734.86 | - 2.44 | 8.93 |
| 115 | 651.44 | - 2.38 | 9.33 |
| 120 | 579.17 | - 2.32 | 9.73 |
| 125 | 516.36 | - 2.27 | 10.11 |
| 130 | 461.60 | - 2.22 | 10.48 |
| 135 | 413.73 | - 2.16 | 10.85 |
| 140 | 371.77 | - 2.11 | 11.20 |
| 145 | 334.88 | - 2.07 | 11.55 |
| 150 | 302.36 | - 2.02 | 11.89 |

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 15 k Ω

| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X153 OR SAP NO. NTCS0402E3153YHT | | |
|---------------------------|---|--------------|--|
| | R _T (Ω) | TCR (%/K) | $\Delta R/R$ DUE TO B-TOLERANCE (%) |
| - 40 | 347 696.43 | - 5.86 | 11.22 |
| - 35 | 260 574.24 | - 5.68 | 10.14 |
| - 30 | 197 003.50 | - 5.51 | 9.10 |
| - 25 | 150 213.26 | - 5.34 | 8.11 |
| - 20 | 115 481.81 | - 5.18 | 7.15 |
| - 15 | 89 488.82 | - 5.02 | 6.24 |
| - 10 | 69 880.15 | - 4.87 | 5.35 |
| - 5 | 54 973.10 | - 4.73 | 4.50 |
| 0 | 43 555.42 | - 4.59 | 3.68 |

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 15 kΩ

| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X153 OR SAP NO. NTCS0402E3153YHT | | |
|---------------------------|---|--------------|--------------------------------|
| | R _T (Ω) | TCR (%/K) | ΔR/R DUE TO B-TOLERANCE (%) |
| 5 | 34 746.94 | - 4.45 | 2.89 |
| 10 | 27 903.80 | - 4.32 | 2.13 |
| 15 | 22 551.53 | - 4.20 | 1.40 |
| 20 | 18 338.00 | - 4.08 | 0.69 |
| 25 | 15 000.00 | - 3.96 | 0.00 |
| 30 | 12 339.53 | - 3.85 | 0.66 |
| 35 | 10 206.62 | - 3.74 | 1.31 |
| 40 | 8486.97 | - 3.64 | 1.93 |
| 45 | 7092.93 | - 3.54 | 2.53 |
| 50 | 5956.89 | - 3.44 | 3.11 |
| 55 | 5026.40 | - 3.35 | 3.68 |
| 60 | 4260.51 | - 3.26 | 4.23 |
| 65 | 3627.13 | - 3.18 | 4.76 |
| 70 | 3100.93 | - 3.09 | 5.28 |
| 75 | 2661.84 | - 3.01 | 5.78 |
| 80 | 2293.88 | - 3.94 | 6.27 |
| 85 | 1984.26 | - 3.86 | 6.74 |
| 90 | 1722.68 | - 2.79 | 7.20 |
| 95 | 1500.85 | - 2.72 | 7.65 |
| 100 | 1312.03 | - 2.66 | 8.09 |
| 105 | 1150.72 | - 2.59 | 8.51 |
| 110 | 1012.43 | - 2.53 | 8.93 |
| 115 | 893.49 | - 2.47 | 9.33 |
| 120 | 790.85 | - 2.41 | 9.73 |
| 125 | 702.01 | - 2.36 | 10.11 |
| 130 | 624.86 | - 2.30 | 10.48 |
| 135 | 557.68 | - 2.25 | 10.85 |
| 140 | 499.00 | - 2.20 | 11.20 |
| 145 | 447.62 | - 2.15 | 11.55 |
| 150 | 402.49 | - 2.10 | 11.89 |

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 22 kΩ

| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X223 OR SAP NO. NTCS0402E3223YMT | | |
|---------------------------|---|--------------|--------------------------------|
| | R _T (Ω) | TCR (%/K) | ΔR/R DUE TO B-TOLERANCE (%) |
| - 40 | 501 411.70 | - 5.84 | 11.22 |
| - 35 | 376 174.12 | - 5.66 | 10.14 |
| - 30 | 284 753.94 | - 5.48 | 9.10 |
| - 25 | 217 416.83 | - 5.31 | 8.11 |
| - 20 | 167 385.72 | - 5.15 | 7.15 |
| - 15 | 129 899.74 | - 4.99 | 6.24 |
| - 10 | 101 585.03 | - 4.84 | 5.35 |
| - 5 | 80 030.20 | - 4.70 | 4.50 |
| 0 | 63 497.49 | - 4.56 | 3.68 |
| 5 | 50 724.55 | - 4.43 | 2.89 |
| 10 | 40 787.18 | - 4.30 | 2.13 |
| 15 | 33 003.71 | - 4.17 | 1.40 |
| 20 | 26 867.64 | - 4.06 | 0.69 |
| 25 | 22 000.00 | - 3.94 | 0.00 |
| 30 | 18 115.28 | - 3.83 | 0.66 |
| 35 | 14 996.99 | - 3.73 | 1.31 |
| 40 | 12 479.89 | - 3.62 | 1.93 |
| 45 | 10 437.10 | - 3.53 | 2.53 |
| 50 | 8770.63 | - 3.43 | 3.11 |

**RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 22 k Ω**

| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X223 OR SAP NO. NTCS0402E3223YMT | | |
|---------------------------|---|--------------|--|
| | R _T (Ω) | TCR (%/K) | $\Delta R/R$ DUE TO B-TOLERANCE (%) |
| 55 | 7404.33 | - 3.34 | 3.68 |
| 60 | 6278.71 | - 3.25 | 4.23 |
| 65 | 5347.05 | - 3.17 | 4.76 |
| 70 | 4572.46 | - 3.09 | 5.28 |
| 75 | 3925.65 | - 3.01 | 5.78 |
| 80 | 3383.28 | - 2.94 | 6.27 |
| 85 | 2926.64 | - 2.86 | 6.74 |
| 90 | 2540.69 | - 2.79 | 7.20 |
| 95 | 2213.23 | - 2.73 | 7.65 |
| 100 | 1934.40 | - 2.66 | 8.09 |
| 105 | 1696.12 | - 2.60 | 8.51 |
| 110 | 1491.82 | - 2.54 | 8.93 |
| 115 | 1316.06 | - 2.48 | 9.33 |
| 120 | 1164.37 | - 2.42 | 9.73 |
| 125 | 1033.06 | - 2.37 | 10.11 |
| 130 | 919.03 | - 2.31 | 10.48 |
| 135 | 819.74 | - 2.26 | 10.85 |
| 140 | 733.03 | - 2.21 | 11.20 |
| 145 | 657.10 | - 2.16 | 11.55 |
| 150 | 590.44 | - 2.12 | 11.89 |

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 33 k Ω

| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X333 OR SAP NO. NTCS0402E3333YMT | | |
|---------------------------|---|--------------|--|
| | R _T (Ω) | TCR (%/K) | $\Delta R/R$ DUE TO B-TOLERANCE (%) |
| - 40 | 831 938.59 | - 6.14 | 11.22 |
| - 35 | 615 448.56 | - 5.92 | 10.14 |
| - 30 | 460 193.66 | - 5.71 | 9.10 |
| - 25 | 347 596.17 | - 5.51 | 8.11 |
| - 20 | 265 065.49 | - 5.33 | 7.15 |
| - 15 | 20 3963.61 | - 5.15 | 6.24 |
| - 10 | 158 295.25 | - 4.99 | 5.35 |
| - 5 | 123 853.56 | - 4.83 | 4.50 |
| 0 | 97 655.81 | - 4.68 | 3.68 |
| 5 | 77 566.21 | - 4.54 | 2.89 |
| 10 | 62 041.07 | - 4.40 | 2.13 |
| 15 | 49 954.62 | - 4.27 | 1.40 |
| 20 | 40 478.91 | - 4.15 | 0.69 |
| 25 | 33 000.00 | - 3.03 | 0.00 |
| 30 | 27 059.17 | - 3.91 | 0.66 |
| 35 | 22 311.10 | - 3.81 | 1.31 |
| 40 | 18 493.97 | - 3.70 | 1.93 |
| 45 | 15 407.98 | - 3.60 | 2.53 |
| 50 | 12 899.59 | - 3.51 | 3.11 |
| 55 | 10 850.13 | - 3.41 | 3.68 |
| 60 | 9167.30 | - 3.33 | 4.23 |
| 65 | 7778.91 | - 3.24 | 4.76 |
| 70 | 6628.18 | - 3.16 | 5.28 |
| 75 | 5670.21 | - 3.08 | 5.78 |
| 80 | 4869.32 | - 3.01 | 6.27 |
| 85 | 4197.00 | - 2.94 | 6.74 |
| 90 | 3630.40 | - 2.87 | 7.20 |
| 95 | 3151.06 | - 2.80 | 7.65 |
| 100 | 2744.06 | - 2.73 | 8.09 |

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 33 kΩ

| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X333 OR SAP NO. NTCS0402E3333YMT | | |
|---------------------------|---|--------------|--------------------------------|
| | R _T (Ω) | TCR (%/K) | ΔR/R DUE TO B-TOLERANCE (%) |
| 105 | 2397.26 | - 2.67 | 8.51 |
| 110 | 2100.74 | - 2.61 | 8.93 |
| 115 | 1846.38 | - 2.55 | 9.33 |
| 120 | 1627.48 | - 2.50 | 9.73 |
| 125 | 1438.51 | - 2.44 | 10.11 |
| 130 | 1274.91 | - 2.39 | 10.48 |
| 135 | 1132.84 | - 2.34 | 10.85 |
| 140 | 1009.14 | - 2.29 | 11.20 |
| 145 | 901.13 | - 2.24 | 11.55 |
| 150 | 806.58 | - 2.19 | 11.89 |

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 47 kΩ

| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X473 OR SAP NO. NTCS0402E3473YXT | | |
|---------------------------|---|--------------|--------------------------------|
| | R _T (Ω) | TCR (%/K) | ΔR/R DUE TO B-TOLERANCE (%) |
| - 40 | 1 514 773.04 | - 6.19 | 11.22 |
| - 35 | 1 114 828.57 | - 6.07 | 10.14 |
| - 30 | 825 416.78 | - 5.95 | 9.10 |
| - 25 | 615 030.13 | - 5.82 | 8.11 |
| - 20 | 461 300.34 | - 5.69 | 7.15 |
| - 15 | 348 340.37 | - 5.55 | 6.24 |
| - 10 | 264 846.40 | - 5.41 | 5.35 |
| - 5 | 202 753.02 | - 5.27 | 4.50 |
| 0 | 156 284.67 | - 5.14 | 3.68 |
| 5 | 121 288.05 | - 5.00 | 2.89 |
| 10 | 94 762.48 | - 4.87 | 2.13 |
| 15 | 74 529.09 | - 4.74 | 1.40 |
| 20 | 58 997.38 | - 4.61 | 0.69 |
| 25 | 47 000.00 | - 4.48 | 0.00 |
| 30 | 37 675.36 | - 4.36 | 0.66 |
| 35 | 30 383.98 | - 4.24 | 1.31 |
| 40 | 24 648.51 | - 4.13 | 1.93 |
| 45 | 20 110.62 | - 4.01 | 2.53 |
| 50 | 16 499.77 | - 3.90 | 3.11 |
| 55 | 13 610.61 | - 3.80 | 3.68 |
| 60 | 11 286.36 | - 3.69 | 4.23 |
| 65 | 9406.70 | - 3.59 | 4.76 |
| 70 | 7878.79 | - 3.50 | 5.28 |
| 75 | 6630.61 | - 3.40 | 5.78 |
| 80 | 5605.99 | - 3.31 | 6.27 |
| 85 | 4760.94 | - 3.22 | 6.74 |
| 90 | 4060.80 | - 3.14 | 7.20 |
| 95 | 3478.15 | - 3.06 | 7.65 |
| 100 | 2991.19 | - 2.98 | 8.09 |
| 105 | 2582.50 | - 2.90 | 8.51 |
| 110 | 2238.12 | - 2.83 | 8.93 |
| 115 | 1946.79 | - 2.75 | 9.33 |
| 120 | 1699.40 | - 2.68 | 9.73 |
| 125 | 1488.54 | - 2.62 | 10.11 |
| 130 | 1308.18 | - 2.55 | 10.48 |
| 135 | 1153.38 | - 2.49 | 10.85 |
| 140 | 1020.05 | - 2.43 | 11.20 |
| 145 | 904.86 | - 2.37 | 11.55 |
| 150 | 805.02 | - 2.31 | 11.89 |

**RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 68 k Ω**

| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X683 OR SAP NO. NTCS0402E3683YHT | | |
|---------------------------|---|--------------|--|
| | R _T (Ω) | TCR (%/K) | $\Delta R/R$ DUE TO B-TOLERANCE (%) |
| -40 | 2 179 611.50 | - 6.65 | 11.22 |
| -35 | 1 573 199.63 | - 6.40 | 10.14 |
| -30 | 1 149 311.24 | - 6.16 | 9.10 |
| -25 | 849 224.01 | - 5.94 | 8.11 |
| -20 | 634 230.72 | - 5.74 | 7.15 |
| -15 | 478 461.46 | - 5.54 | 6.24 |
| -10 | 364 399.28 | - 5.35 | 5.35 |
| -5 | 280 036.50 | - 5.18 | 4.50 |
| 0 | 217 045.88 | - 5.01 | 3.68 |
| 5 | 169 588.77 | - 4.86 | 2.89 |
| 10 | 133 528.58 | - 4.71 | 2.13 |
| 15 | 105 905.55 | - 4.56 | 1.40 |
| 20 | 84 581.95 | - 4.43 | 0.69 |
| 25 | 68 000.00 | - 4.30 | 0.00 |
| 30 | 55 014.80 | - 4.18 | 0.66 |
| 35 | 44 778.07 | - 4.06 | 1.31 |
| 40 | 36 656.44 | - 3.95 | 1.93 |
| 45 | 30 173.47 | - 3.84 | 2.53 |
| 50 | 24 968.25 | - 3.74 | 3.11 |
| 55 | 20 765.51 | - 3.64 | 3.68 |
| 60 | 17 353.94 | - 3.54 | 4.23 |
| 65 | 14 570.33 | - 3.45 | 4.76 |
| 70 | 12 287.85 | - 3.36 | 5.28 |
| 75 | 10 407.39 | - 3.28 | 5.78 |
| 80 | 8851.06 | - 3.20 | 6.27 |
| 85 | 7557.32 | - 3.12 | 6.74 |
| 90 | 6477.32 | - 3.05 | 7.20 |
| 95 | 5572.07 | - 2.98 | 7.65 |
| 100 | 4810.32 | - 2.91 | 8.09 |
| 105 | 4166.88 | - 2.84 | 8.51 |
| 110 | 3621.41 | - 2.77 | 8.93 |
| 115 | 3157.34 | - 2.71 | 9.33 |
| 120 | 2761.19 | - 2.65 | 9.73 |
| 125 | 2421.90 | - 2.59 | 10.11 |
| 130 | 2130.39 | - 2.54 | 10.48 |
| 135 | 1879.16 | - 2.48 | 10.85 |
| 140 | 1662.00 | - 2.43 | 11.20 |
| 145 | 1473.74 | - 2.38 | 11.55 |
| 150 | 1310.08 | - 2.33 | 11.89 |

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 100 k Ω

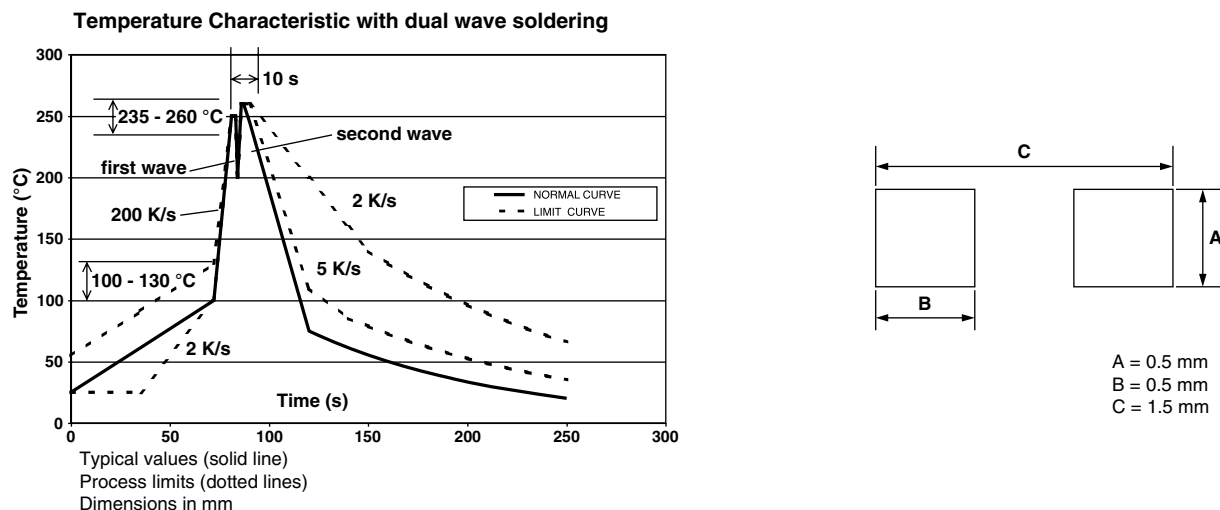
| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X104 OR SAP NO. NTCS0402E3104YHT | | |
|---------------------------|---|--------------|--|
| | R _T (Ω) | TCR (%/K) | $\Delta R/R$ DUE TO B-TOLERANCE (%) |
| -40 | 3 238 142.11 | - 6.57 | 11.22 |
| -35 | 2 344 881.64 | - 6.35 | 10.14 |
| -30 | 1 716 473.25 | - 6.13 | 9.10 |
| -25 | 1 269 492.61 | - 5.93 | 8.11 |
| -20 | 948 194.33 | - 5.74 | 7.15 |
| -15 | 714 901.46 | - 5.56 | 6.24 |
| -10 | 543 869.12 | - 5.38 | 5.35 |
| -5 | 417 320.14 | - 5.21 | 4.50 |
| 0 | 322 854.97 | - 5.05 | 3.68 |
| 5 | 251 740.95 | - 4.90 | 2.89 |
| 10 | 197 770.62 | - 4.75 | 2.13 |

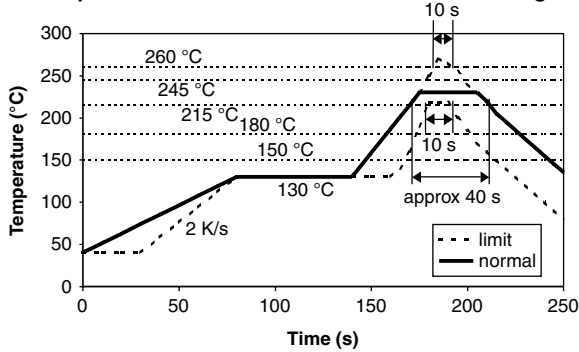
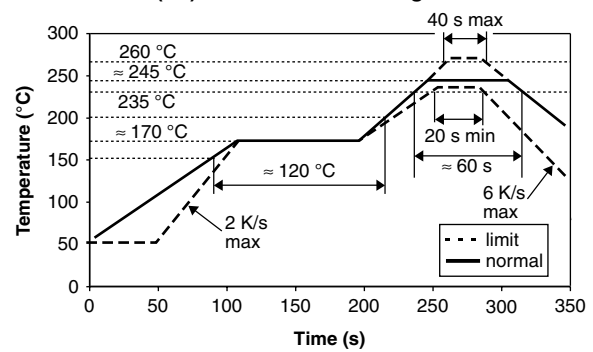
| RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R ₂₅ AT 100 kΩ | | | |
|---|---|--------------|--------------------------------|
| T _{OPER} (°C) | CATALOG NUMBER 2381 615 4X104 OR SAP NO. NTCS0402E3104YHT | | |
| | R _T (Ω) | TCR (%/K) | ΔR/R DUE TO B-TOLERANCE (%) |
| 15 | 156 492.00 | - 4.61 | 1.40 |
| 20 | 124 684.71 | - 4.48 | 0.69 |
| 25 | 100 000.00 | - 4.35 | 0.00 |
| 30 | 80 711.25 | - 4.22 | 0.66 |
| 35 | 65 539.50 | - 4.11 | 1.31 |
| 40 | 53 530.39 | - 3.99 | 1.93 |
| 45 | 43 966.79 | - 3.88 | 2.53 |
| 50 | 36 306.14 | - 3.78 | 3.11 |
| 55 | 30 135.26 | - 3.68 | 3.68 |
| 60 | 25 137.53 | - 3.58 | 4.23 |
| 65 | 21 068.83 | - 3.48 | 4.76 |
| 70 | 17 739.85 | - 3.39 | 5.28 |
| 75 | 15 002.94 | - 3.31 | 5.78 |
| 80 | 12 742.32 | - 3.22 | 6.27 |
| 85 | 10 866.72 | - 3.14 | 6.74 |
| 90 | 9303.84 | - 3.07 | 7.20 |
| 95 | 7996.08 | - 2.99 | 7.65 |
| 100 | 6897.40 | - 2.92 | 8.09 |
| 105 | 5970.77 | - 2.85 | 8.51 |
| 110 | 5186.31 | - 2.78 | 8.93 |
| 115 | 4519.80 | - 2.72 | 9.33 |
| 120 | 3951.51 | - 2.66 | 9.73 |
| 125 | 3465.32 | - 2.60 | 10.11 |
| 130 | 3048.01 | - 2.54 | 10.48 |
| 135 | 2688.67 | - 2.48 | 10.85 |
| 140 | 2378.30 | - 2.43 | 11.20 |
| 145 | 2109.44 | - 2.37 | 11.55 |
| 150 | 1875.84 | - 2.32 | 11.89 |

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.



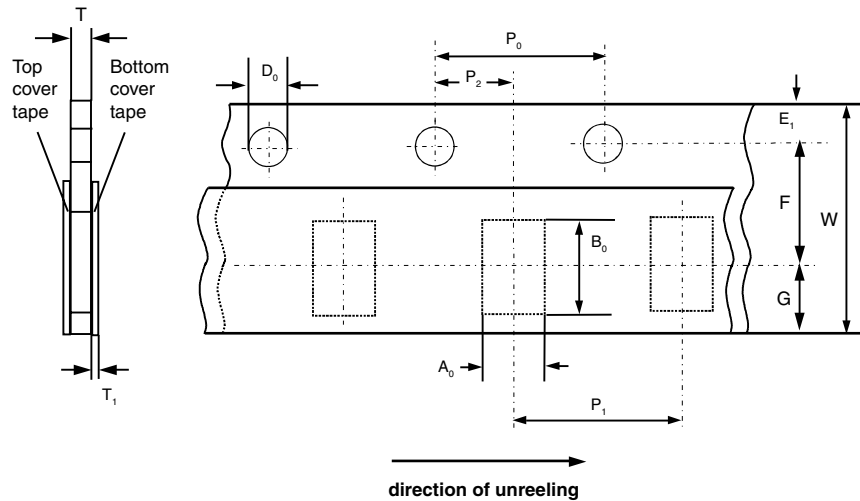
Temperature Characteristic with infrared soldering

Lead (Pb)-free Reflow Soldering Profile


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

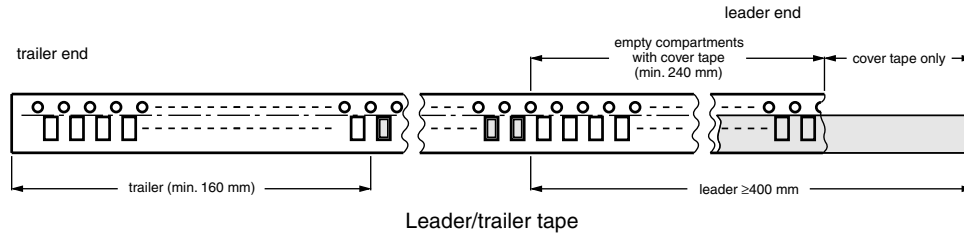

DIMENSIONS OF PAPER TAPE in millimeters

| PARAMETER | DIMENSION | TOLERANCE |
|------------------------------------|-----------|------------|
| $A_0^{1)}$ | 0.65 | ± 0.1 |
| $B_0^{1)}$ | 1.15 | ± 0.1 |
| D_0 | 1.55 | ± 0.05 |
| $P_0^{2)}$ | 2.00 | ± 0.10 |
| E_1 | 1.75 | ± 0.10 |
| CUMULATIVE PITCH OVER 10 POSITIONS | 0.00 | ± 0.1 |
| P_2 | 1.00 | ± 0.05 |
| | 3.5 | ± 0.05 |
| T_1 | < 0.1 | - |
| W | 8 | ± 0.2 |
| T | 0.8 max | - |

Notes

1. Measured 0.3 mm above base pocket
2. P_0 pitch tolerance over any 10 pitches is ± 1 mm

LEADER/TRAILER TAPE SPECIFICATION



TAPING PACKAGE REQUIREMENTS

Component is free and not sticking to top and/or bottom tape.
Component should be easy to remove from carrier tape.

TESTS AND REQUIREMENTS

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



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