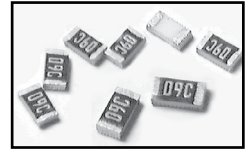


## FEATURES

- PRECISE TOLERANCE AND TEMPERATURE COEFFICIENT
- EIA STANDARD CASE SIZES (0201 ~ 2512)
- LOW NOISE, THIN FILM (NiCr) CONSTRUCTION
- REFLOW SOLDERABLE (Pb FREE TERMINATION FINISH)

**RoHS**  
**Compliant**  
includes all homogeneous materials

\*See Part Number System for Details



| Type  | EIA Size | Power Rating at 70°C | Max.*1 Working Voltage | Max.*2 Overload Voltage | Resistance Tolerance (Code)                                      | Temperature Coefficient (ppm/°C) | Resistance Range (Ω) | Resistance Values  |
|-------|----------|----------------------|------------------------|-------------------------|------------------------------------------------------------------|----------------------------------|----------------------|--------------------|
| NTR02 | 0201     | 1/32 (0.032)W        | 15V                    | 30V                     | ±0.5% (D), ±1.0% (F)                                             | ±25 (C)                          | 49.9 ~ 4.99KΩ        | E-24, E-96 & E-192 |
|       |          |                      |                        |                         | ±0.5% (D), ±1.0% (F)                                             | ±50 (D)                          | 49.9 ~ 33KΩ          |                    |
| NTR04 | 0402     | 1/16 (0.063)W        | 25V                    | 50V                     | ±0.01% (T), ±0.05% (A), ±0.1% (B), ±0.25 (C), ±0.5% (D), ±1% (F) | ±5 (S)                           | 49.9 ~ 4.99KΩ        |                    |
|       |          |                      |                        |                         |                                                                  | ±10 (B)                          | 49.9 ~ 12KΩ          |                    |
|       |          |                      |                        |                         | ±0.01% (T), ±0.05% (A)                                           | ±15 (N)                          | 49.9 ~ 12KΩ          |                    |
|       |          |                      |                        |                         | ±0.1% (B), 0.25 (C), ±0.5% (D), ±1% (F)                          | ±15 (N)                          | 49.9 ~ 69.8KΩ        |                    |
|       |          |                      |                        |                         | ±0.05% (A)                                                       | ±25(C), ±50(D)                   | 49.9 ~ 12KΩ          |                    |
|       |          |                      |                        |                         | ±0.1% (B), ±0.25% (C), ±0.5% (D), ±1% (F)                        | ±25 (C)                          | 10 ~ 255KΩ           |                    |
|       |          |                      |                        |                         | ±0.1% (B), ±0.25% (C)                                            | ±50 (D)                          | 10 ~ 255KΩ           |                    |
| NTR06 | 0603     | 1/16 (0.063)W        | 50V                    | 100V                    | ±0.5% (D), ±1% (F)                                               | ±50 (D)                          | 1.0 ~ 255KΩ          |                    |
|       |          |                      |                        |                         | ±0.01% (T), ±0.05% (A), ±0.1% (B), ±0.25 (C), ±0.5% (D), ±1% (F) | ±5 (S)                           | 24.9 ~ 15KΩ          |                    |
|       |          |                      |                        |                         | ±0.01% (T)                                                       | ±10(B), ±15(N)                   | 24.9 ~ 100KΩ         |                    |
|       |          |                      |                        |                         | ±0.05% (A), ±0.1% (B), ±0.25 (C), ±0.5% (D), ±1% (F)             | ±10(B), ±15(N)                   | 4.7 ~ 332KΩ          |                    |
|       |          |                      |                        |                         | ±0.05% (A)                                                       | ±25(C), ±50(D)                   | 4.7 ~ 332KΩ          |                    |
|       |          |                      |                        |                         | ±0.1% (B)                                                        | ±25(C), ±50(D)                   | 4.7 ~ 1MΩ            |                    |
|       |          |                      |                        |                         | ±0.25 (C), ±0.5 (D), ±1% (F)                                     | ±25(C)                           | 2.0 ~ 1MΩ            |                    |
| NTR10 | 0805     | 1/10 (0.10) W        | 100V                   | 200V                    | ±0.25 (C), ±0.5 (D), ±1% (F)                                     | ±50(D)                           | 1.0 ~ 1MΩ            |                    |
|       |          |                      |                        |                         | ±0.01% (T), ±0.05% (A), ±0.1% (B), ±0.25 (C), ±0.5% (D), ±1% (F) | ±5 (S)                           | 24.9 ~ 30KΩ          |                    |
|       |          |                      |                        |                         | ±0.01% (T)                                                       | ±10(B), ±15(N)                   | 24.9 ~ 200KΩ         |                    |
|       |          |                      |                        |                         | ±0.05% (A), ±0.1% (B), ±0.25 (C), ±0.5% (D), ±1% (F)             | ±10(B)                           | 4.7 ~ 511KΩ          |                    |
|       |          |                      |                        |                         | ±0.05 (A)                                                        | ±15(N)                           | 4.7 ~ 1MΩ            |                    |
|       |          |                      |                        |                         | ±0.25 (C), ±0.5 (D), ±1% (F)                                     | ±25(C), ±50(D)                   | 4.7 ~ 511KΩ          |                    |
|       |          |                      |                        |                         | ±0.1% (B)                                                        | ±25(C), ±50(D)                   | 4.7 ~ 2MΩ            |                    |
| NTR12 | 1206     | 1/8 (0.125) W        | 150V                   | 300V                    | ±0.25 (C), ±0.5 (D), ±1% (F)                                     | ±25(C), ±50(D)                   | 1.0 ~ 2MΩ            |                    |
|       |          |                      |                        |                         | ±0.01% (T), ±0.05% (A), ±0.1% (B), ±0.25 (C), ±0.5% (D), ±1% (F) | ±5 (S)                           | 24.9 ~ 49.9KΩ        |                    |
|       |          |                      |                        |                         | ±0.01% (T)                                                       | ±10(B), ±15(N)                   | 24.9 ~ 499KΩ         |                    |
|       |          |                      |                        |                         | ±0.05% (A), ±0.1% (B), ±0.25 (C), ±0.5% (D), ±1% (F)             | ±10(B), ±15(N)                   | 4.7 ~ 1MΩ            |                    |
|       |          |                      |                        |                         | ±0.05% (A)                                                       | ±25(C), ±50(D)                   | 4.7 ~ 1MΩ            |                    |
|       |          |                      |                        |                         | ±0.1% (B)                                                        | ±25(C), ±50(D)                   | 4.7 ~ 2.49MΩ         |                    |
|       |          |                      |                        |                         | ±0.25% (C), ±0.5% (D), ±1% (F)                                   | ±25(C), ±50(D)                   | 1.0 ~ 2.49MΩ         |                    |
| NTR20 | 1210     | 1/5 (0.20) W         | 150V                   | 300V                    | ±0.25% (C), ±0.5% (D), ±1% (F)                                   | ±25(C), ±50(D)                   | 1.0 ~ 2.49MΩ         |                    |
|       |          |                      |                        |                         | ±0.01% (T), ±0.05% (A), ±0.1% (B), ±0.25 (C), ±0.5% (D), ±1% (F) | ±5 (S)                           | 24.9 ~ 49.9KΩ        |                    |
|       |          |                      |                        |                         | ±0.01% (T)                                                       | ±10(B), ±15(N)                   | 24.9 ~ 499KΩ         |                    |
|       |          |                      |                        |                         | ±0.05% (A), ±0.1% (B), ±0.25 (C), ±0.5% (D), ±1% (F)             | ±10(B), ±15(N)                   | 4.7 ~ 1MΩ            |                    |
|       |          |                      |                        |                         | ±0.05% (A)                                                       | ±25, ±50                         | 4.7 ~ 1MΩ            |                    |
|       |          |                      |                        |                         | ±0.1% (B)                                                        | ±25(C), ±50(D)                   | 4.7 ~ 2.49MΩ         |                    |
|       |          |                      |                        |                         | ±0.25% (C), ±0.5% (D), ±1% (F)                                   | ±25(C), ±50(D)                   | 1.0 ~ 2.49MΩ         |                    |

For 2010 and 2512 case sizes see page 2

Note \*1 - Maximum allowable continuous Working Voltage for all resistors is the lower of the two values:  
"Maximum Working Voltage" as specified above  
or

$$\sqrt{\text{Power rating (Watts)} \times \text{Resistance (Ohms)}}$$

Note \*2 - Maximum Overload Voltage for all resistors is the lower of the two values:  
"Maximum Overload Voltage" as specified above  
or

$$2 \times \sqrt{\text{Power rating (Watts)} \times \text{Resistance (Ohms)}}$$



| Type  | EIA Size | Power Rating at 70°C | Max.*1 Working Voltage | Max.*2 Overload Voltage | Resistance Tolerance (Code)                                         | Temperature Coefficient (ppm/°C) | Resistance Range (Ω) | Resistance Values  |
|-------|----------|----------------------|------------------------|-------------------------|---------------------------------------------------------------------|----------------------------------|----------------------|--------------------|
| NTR25 | 2010     | 1/4 (0.25) W         | 150V                   | 300V                    | ±0.01% (T), ±0.05% (A), ±0.1% (B),<br>±0.25 (C), ±0.5% (D), ±1% (F) | ±5 (S)                           | 24.9 ~ 100KΩ         | E-24, E-96 & E-192 |
|       |          |                      |                        |                         | ±0.01% (T)                                                          | ±10(B), ±15(N)                   | 24.9 ~ 499KΩ         |                    |
|       |          |                      |                        |                         | ±0.05% (A), ±0.1% (B),<br>±0.25 (C), ±0.5% (D), ±1% (F)             | ±10(B), ±15(N)                   | 4.7 ~ 1MΩ            |                    |
|       |          |                      |                        |                         | ±0.05% (A)                                                          | ±25(C), ±50(D)                   | 4.7 ~ 1MΩ            |                    |
|       |          |                      |                        |                         | ±0.1% (B)                                                           | ±25(C), ±50(D)                   | 4.7 ~ 3MΩ            |                    |
| NTR50 | 2512     | 1/2 (0.50) W         | 150V                   | 300V                    | ±0.25% (C), ±0.5% (D), ±1% (F)                                      | ±25(C), ±50(D)                   | 1.0 ~ 3MΩ            |                    |
|       |          |                      |                        |                         | ±0.01% (T), ±0.05% (A), ±0.1% (B),<br>±0.25 (C), ±0.5% (D), ±1% (F) | ±5 (S)                           | 24.9 ~ 100KΩ         |                    |
|       |          |                      |                        |                         | ±0.01% (T)                                                          | ±10(B), ±15(N)                   | 24.9 ~ 499KΩ         |                    |
|       |          |                      |                        |                         | ±0.05% (A), ±0.1% (B),<br>±0.25 (C), ±0.5% (D), ±1% (F)             | ±10(B), ±15(N)                   | 4.7 ~ 1MΩ            |                    |
|       |          |                      |                        |                         | ±0.05% (A)                                                          | ±25(C), ±50(D)                   | 4.7 ~ 1MΩ            |                    |
|       |          |                      |                        |                         | ±0.1% (B)                                                           | ±25(C), ±50(D)                   | 4.7 ~ 3MΩ            |                    |
|       |          |                      |                        |                         | ±0.25% (C), ±0.5% (D), ±1% (F)                                      | ±25(C), ±50(D)                   | 1.0 ~ 3MΩ            |                    |
|       |          |                      |                        |                         |                                                                     |                                  |                      |                    |

Note \*1 - Maximum allowable continuous Working Voltage for all resistors is the lower of the two values:

"Maximum Working Voltage" as specified above  
or

$$\sqrt{\text{Power rating (Watts)} \times \text{Resistance (Ohms)}}$$

Note \*2 - Maximum Overload Voltage for all resistors is the lower of the two values:

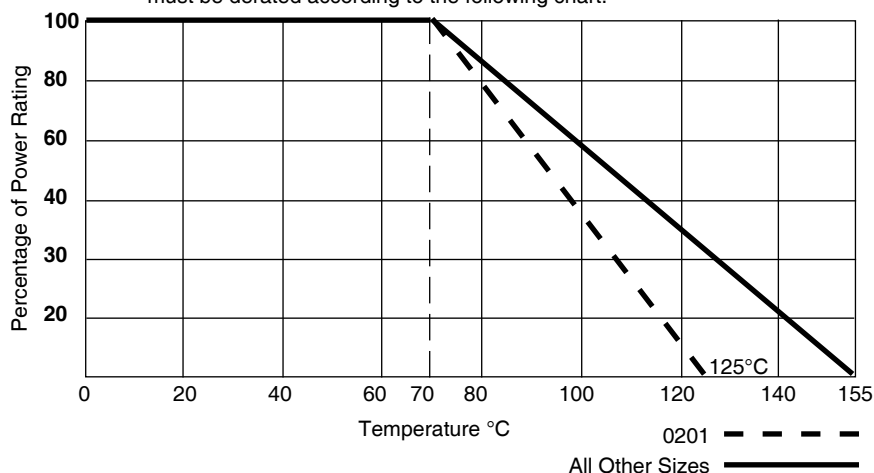
"Maximum Overload Voltage" as specified above  
or

$$2 \times \sqrt{\text{Power rating (Watts)} \times \text{Resistance (Ohms)}}$$

#### TYPICAL NOISE CHARACTERISTICS

| Resistance Value (Ω) | Case Size |        |        |
|----------------------|-----------|--------|--------|
|                      | 0603      | 0805   | 1206   |
| 1 ~ 9                | -95dB     | -95dB  | -95dB  |
| 10 ~ 49              | -85dB     | -85dB  | -85dB  |
| 50 ~ 99              | -85dB     | -85dB  | -85dB  |
| 100 ~ 4.99K          | -100dB    | -100dB | -105dB |
| 5K ~ 19.9K           | -100dB    | -100dB | -100dB |
| 20K ~ 1M             | -90dB     | -100dB | -100dB |

**Power Derating Curve:** For operation above 70°C, power rating must be derated according to the following chart:



## ENVIRONMENTAL CHARACTERISTICS

| Item                                                                    | Specification        |                 | Typical      |         |         | Test Method*                                                                                                        |
|-------------------------------------------------------------------------|----------------------|-----------------|--------------|---------|---------|---------------------------------------------------------------------------------------------------------------------|
|                                                                         | Tol.<br>≤ 0.05%      | Tol.<br>> 0.05% | Tol. > 0.05% |         |         |                                                                                                                     |
|                                                                         |                      |                 | 0402         | 0603    | 0805    |                                                                                                                     |
| Standard Temperature Range: -55°C ~ +155°C (power derating above +70°C) |                      |                 |              |         |         |                                                                                                                     |
| Temperature Coefficient of Resistance                                   | As specified         | As specified    | -            | -       | -       | +25/-55/+25/+125/+25                                                                                                |
| Short Time Overload                                                     | ΔR ±0.05%            | ΔR ±0.2%        | -0.001%      | -0.002% | -0.005% | RCWV x 2.5 or Max Overloading Voltage for 5 Seconds                                                                 |
| Dielectric Withstanding Voltage                                         | As specified         |                 | 265V         | 298V    | 415V    | MIL-STD-202F Method 301<br>Apply Max. Overload Voltage for 1 minute                                                 |
| Insulation Resistance                                                   | >1000MΩ              |                 | >10GΩ        |         |         | MIL-STD-202F Method 302<br>Apply 100Vdc for 1 minute                                                                |
| Thermal Shock (N/A 0201 Size)                                           | ΔR ±0.05%            | ΔR ±0.25%       | 0.001%       | -0.02%  | 0.002%  | MIL-STD-202F Method 107G<br>-55°C ~ +150°C, 100 cycles                                                              |
| Load Life                                                               | ΔR ±0.05%            | ΔR ±0.2%        | no change    |         |         | MIL-STD-202F Method 108A<br>RCWV +70°C, 1.5 hours ON, 0.5 hours OFF<br>Total time 1,000 ~ 1,048 hours               |
|                                                                         | >7KΩ ΔR ±0.5%        |                 | 0.02%        | 0.03%   | 0.06%   |                                                                                                                     |
| Humidity (Steady State)                                                 | ΔR ±0.05%            | ΔR ±0.3%        | 0.003%       | 0.005%  | 0.007%  | MIL-STD-202F Method 103B<br>+40°C, 90% ~ 95% RH, RCWV 1.5 hours ON, 0.5 hours OFF<br>Total time 1,000 ~ 1,048 hours |
| Resistance to Dry Heat (N/A 0201 Size)                                  | ΔR ±0.05%            | ΔR ±0.5%        | 0.07%        | 0.02%   | 0.025%  | MIL-STD-202 Method 108<br>+125°C, 1000 hours                                                                        |
| Low Temperature Operation (N/A 0201 Size)                               | ΔR ±0.05%            | ΔR ±0.2%        | 0.006%       | 0.008%  | 0.001%  | JIS-C-502-7.1<br>1 hour @ -65°C followed by 45 minutes of RCWV                                                      |
| Bending Strength                                                        | ΔR ±0.05%            | ΔR ±0.2%        | 0.001%       | -0.010% | 0.002%  | JIS-C-5202-6.1.4<br>Bending Amplitude 3mm for 10 seconds                                                            |
| Solderability                                                           | 95% Minimum Coverage |                 | >95%         |         |         | MIL-STD-202F Method 208H<br>245°C ±5°C, 5 ±0.5 seconds                                                              |
| Resistance to Soldering Heat                                            | ΔR ±0.05%            | ΔR ±0.2%        | 0.001%       | -0.02%  | 0.006%  | MIL-STD-202F Method 210E<br>260°C ±5°C for 10 ±1 seconds                                                            |

\*0201 testing per IEC 60115 - 1

## STANDARD E-24, E-96 AND E-192 VALUES AND 0603 RESISTANCE CODES

| E-24  | E-96  |      |       |      |       |      |       |      | E-192* |       |       |       |       |       |
|-------|-------|------|-------|------|-------|------|-------|------|--------|-------|-------|-------|-------|-------|
| Value | Value | Code | Value | Code | Value | Code | Value | Code | Value  | Value | Value | Value | Value | Value |
| 100   | 100   | 01   | 102   | 02   | 105   | 03   | 107   | 04   | 100    | 147   | 215   | 316   | 464   | 681   |
| 110   | 110   | 05   | 113   | 06   | 115   | 07   | 118   | 08   | 101    | 149   | 218   | 320   | 470   | 690   |
| 120   | 121   | 09   | 124   | 10   | 127   | 11   | 130   | 12   | 102    | 150   | 221   | 324   | 475   | 698   |
| 130   | 133   | 13   | 137   | 14   | 140   | 15   | 143   | 16   | 104    | 152   | 223   | 328   | 481   | 706   |
| 150   | 147   | 17   | 150   | 18   | 154   | 19   | 158   | 20   | 105    | 154   | 226   | 332   | 487   | 715   |
| 160   | 162   | 21   | 165   | 22   | 169   | 23   | 174   | 24   | 106    | 156   | 229   | 336   | 493   | 723   |
| 180   | 178   | 25   | 182   | 26   | 187   | 27   | 191   | 28   | 107    | 158   | 232   | 340   | 499   | 732   |
| 200   | 196   | 29   | 200   | 30   | 205   | 31   | 210   | 32   | 109    | 160   | 234   | 344   | 505   | 741   |
| 220   | 215   | 33   | 221   | 34   | 226   | 35   | 232   | 36   | 110    | 162   | 237   | 348   | 511   | 750   |
| 240   | 237   | 37   | 243   | 38   | 249   | 39   | 255   | 40   | 111    | 164   | 240   | 352   | 517   | 759   |
| 270   | 261   | 41   | 267   | 42   | 274   | 43   | 280   | 44   | 113    | 165   | 243   | 357   | 523   | 768   |
| 300   | 287   | 45   | 294   | 46   | 301   | 47   | 309   | 48   | 114    | 167   | 246   | 361   | 530   | 777   |
| 330   | 316   | 49   | 324   | 50   | 332   | 51   | 340   | 52   | 115    | 169   | 249   | 365   | 536   | 787   |
| 360   | 348   | 53   | 357   | 54   | 365   | 55   | 374   | 56   | 117    | 172   | 252   | 370   | 542   | 796   |
| 390   | 383   | 57   | 392   | 58   | 402   | 59   | 412   | 60   | 118    | 174   | 255   | 374   | 549   | 806   |
| 430   | 422   | 61   | 432   | 62   | 442   | 63   | 453   | 64   | 120    | 176   | 258   | 379   | 556   | 816   |
| 470   | 464   | 65   | 475   | 66   | 487   | 67   | 499   | 68   | 121    | 178   | 261   | 383   | 562   | 825   |
| 510   | 511   | 69   | 523   | 70   | 536   | 71   | 549   | 72   | 123    | 180   | 264   | 388   | 569   | 835   |
| 560   | 562   | 73   | 576   | 74   | 590   | 75   | 604   | 76   | 124    | 182   | 267   | 392   | 576   | 845   |
| 620   | 619   | 77   | 634   | 78   | 649   | 79   | 665   | 80   | 126    | 184   | 271   | 397   | 583   | 856   |
| 680   | 681   | 81   | 698   | 82   | 715   | 83   | 732   | 84   | 127    | 187   | 274   | 402   | 590   | 866   |
| 750   | 750   | 85   | 768   | 86   | 787   | 87   | 806   | 88   | 129    | 189   | 270   | 407   | 597   | 876   |
| 820   | 825   | 89   | 845   | 90   | 866   | 91   | 887   | 92   | 130    | 191   | 280   | 412   | 604   | 887   |
| 910   | 909   | 93   | 931   | 94   | 953   | 95   | 976   | 96   | 132    | 193   | 284   | 417   | 612   | 898   |
|       |       |      |       |      |       |      |       |      | 133    | 196   | 287   | 422   | 619   | 909   |
|       |       |      |       |      |       |      |       |      | 135    | 198   | 291   | 427   | 626   | 920   |
|       |       |      |       |      |       |      |       |      | 137    | 200   | 294   | 432   | 634   | 931   |
|       |       |      |       |      |       |      |       |      | 138    | 203   | 298   | 437   | 642   | 942   |
|       |       |      |       |      |       |      |       |      | 140    | 205   | 301   | 442   | 649   | 953   |
|       |       |      |       |      |       |      |       |      | 142    | 208   | 305   | 448   | 657   | 965   |
|       |       |      |       |      |       |      |       |      | 143    | 210   | 309   | 453   | 665   | 976   |
|       |       |      |       |      |       |      |       |      | 145    | 213   | 312   | 459   | 673   | 988   |

\* Special E192 resistance values are supported on all case sizes of NTR series. Please review your E192 value requirements with NIC, as special terms apply, and E192 values are supplied without component resistance value marking.

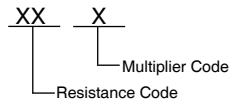
## MULTIPLIER CODE

| Code       | A               | B, b            | C               | D, d            | E               | F               | G               | H               | X                | Y                | Z                |
|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
| Multiplier | 10 <sup>0</sup> | 10 <sup>1</sup> | 10 <sup>2</sup> | 10 <sup>3</sup> | 10 <sup>4</sup> | 10 <sup>5</sup> | 10 <sup>6</sup> | 10 <sup>7</sup> | 10 <sup>-1</sup> | 10 <sup>-2</sup> | 10 <sup>-3</sup> |

## PART MARKING

- No marking on 0402 case size.
- Marking for 0603 case size:  
E-24 values and E-96 values:  $\pm 1\%$  (F),  $\pm 0.5\%$  (D),  $\pm 0.25\%$  (C),  $\pm 0.1\%$  (B) tolerances  
E-192 values:  $\pm 0.1\%$  (B) tolerance (No Marking)

## CODING FORMULA



Example:  $10.2k\Omega = \frac{102}{02} \times \frac{10^2}{C} \Omega = 02C$   
 $33.2 \Omega = \frac{332}{51} \times \frac{10^{-1}}{X} = 51X$

## MARKING EXAMPLES

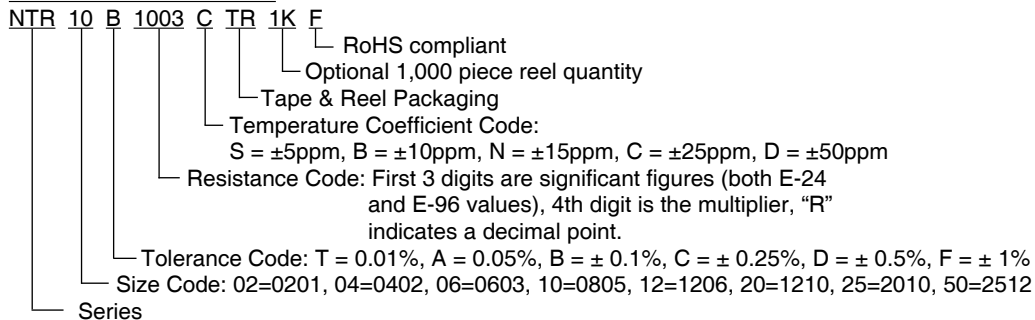
$10\Omega = 01X$   
 $7.5k\Omega = 85B$   
 $150k\Omega = 18D$   
 $1 \text{ Meg}\Omega = 01E$

- Marking for 0805, 1206, 2010 and 2512 case sizes:  
E-24 and E-96 values -  $\pm 1\%$  (F),  $\pm 0.5\%$  (D),  $\pm 0.25\%$  (C),  $\pm 0.1\%$  (B) tolerances  
E-192 values:  $\pm 0.1\%$  (B) tolerance (No Marking)

4 DIGIT MARKING SYSTEM - First 3 digits are the significant figures, the 4th digit is the multiplier. "R" = decimal point.

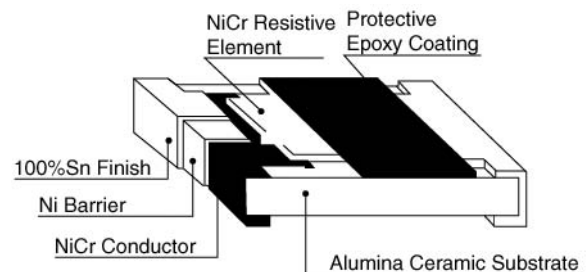
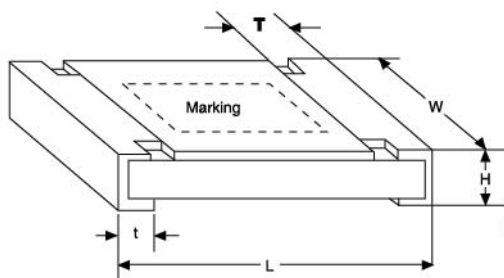
Examples: 0R10 = 0.10 ohms, 1R00 = 1.0 ohms, 22R1 = 22.1 ohms, 3320 = 332 ohms, 4751 = 4.75K ohms,  
 1132 = 11.3K ohms, 6493 = 649K ohms

## PART NUMBER SYSTEM



## DIMENSIONS (mm)

| Type  | Power Rating | EIA Size | L               | W               | H               | T               | t               |
|-------|--------------|----------|-----------------|-----------------|-----------------|-----------------|-----------------|
| NTR02 | 1/20W        | 0201     | $0.58 \pm 0.05$ | $0.29 \pm 0.05$ | $0.23 \pm 0.03$ | $0.12 \pm 0.05$ | $0.15 \pm 0.05$ |
| NTR04 | 1/16W        | 0402     | $1.00 \pm 0.05$ | $0.50 \pm 0.05$ | $0.30 \pm 0.05$ | $0.20 \pm 0.10$ | $0.20 \pm 0.10$ |
| NTR06 | 1/16W        | 0603     | $1.55 \pm 0.10$ | $0.80 \pm 0.10$ | $0.45 \pm 0.10$ | $0.30 \pm 0.20$ | $0.30 \pm 0.20$ |
| NTR10 | 1/10W        | 0805     | $2.00 \pm 0.15$ | $1.25 \pm 0.15$ | $0.55 \pm 0.10$ | $0.30 \pm 0.20$ | $0.40 \pm 0.25$ |
| NTR12 | 1/8W         | 1206     | $3.05 \pm 0.10$ | $1.55 \pm 0.10$ | $0.55 \pm 0.10$ | $0.42 \pm 0.20$ | $0.35 \pm 0.25$ |
| NTR20 | 1/5W         | 1210     | $3.05 \pm 0.10$ | $2.60 \pm 0.15$ | $0.55 \pm 0.10$ | $0.50 \pm 0.30$ | $0.50 \pm 0.25$ |
| NTR25 | 1/4W         | 2010     | $4.90 \pm 0.15$ | $2.40 \pm 0.15$ | $0.55 \pm 0.10$ | $0.60 \pm 0.30$ | $0.50 \pm 0.25$ |
| NTR50 | 1/2W         | 2512     | $6.30 \pm 0.15$ | $3.10 \pm 0.15$ | $0.55 \pm 0.10$ | $0.60 \pm 0.30$ | $0.50 \pm 0.25$ |



**TAPING SPECIFICATIONS****(1) Availability**

| Type  | Power Rating | EIA Size | Carrier Tape |          |            | Qty per Reel (pcs) |          |
|-------|--------------|----------|--------------|----------|------------|--------------------|----------|
|       |              |          | Fig.         | Material | Width (mm) | Standard           | Optional |
| NTR02 | 1/32W        | 0201     | A            | Paper    | 8          | 10,000             | 1,000    |
| NTR04 | 1/16W        | 0402     | A            |          |            | 10,000             | 1,000    |
| NTR06 | 1/16W        | 0603     | A            |          |            | 5,000              | 1,000    |
| NTR10 | 1/10W        | 0805     | A            |          |            |                    |          |
| NTR12 | 1/8W         | 1206     | A            |          |            |                    |          |
| NTR25 | 1/4W         | 2010     | B            | Plastic  | 12         | 4,000              | 1,000    |
| NTR50 | 1/2W         | 2512     | B            |          |            |                    |          |

**(2) PAPER TAPE DIMENSIONS (mm)**

FIG. A

| Type  | EIA Size | A           | B           | D           | E           | F           | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | W         | T           |
|-------|----------|-------------|-------------|-------------|-------------|-------------|----------------|----------------|----------------|-----------|-------------|
| NTR02 | 0201     | 0.38 ± 0.03 | 0.68 ± 0.03 | 1.55 ± 0.05 | 1.75 ± 0.10 | 3.50 ± 0.05 | 4.0 ± 0.10     | 2.0 ± 0.05     | 2.0 ± 0.05     | 8.0 ± 0.1 | 0.31 ± 0.02 |
| NTR04 | 0402     | 0.67 ± 0.03 | 1.15 ± 0.03 |             |             |             |                | 0.40 ± 0.03    |                |           |             |
| NTR06 | 0603     | 1.10 ± 0.05 | 1.90 ± 0.05 |             |             |             |                | 0.60 ± 0.03    |                |           |             |
| NTR10 | 0805     | 1.60 ± 0.05 | 2.37 ± 0.05 |             |             |             |                | 0.75 ± 0.05    |                |           |             |
| NTR12 | 1206     | 2.00 ± 0.05 | 3.55 ± 0.05 |             |             |             |                |                |                |           |             |

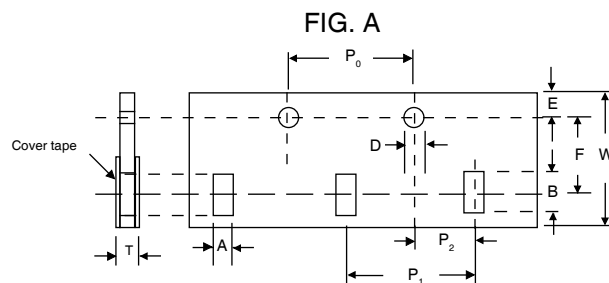
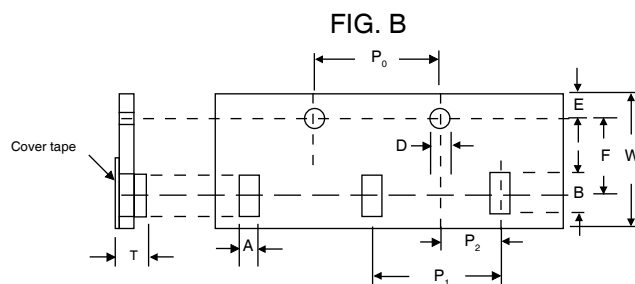
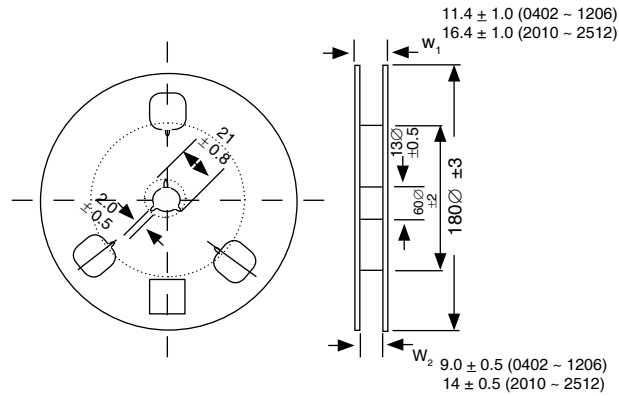
**(3) PLASTIC EMBOSSED TAPE DIMENSIONS (mm)**

FIG. B

| Type  | EIA Size | A           | B           | D           | E           | F           | P <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | W          | T           |
|-------|----------|-------------|-------------|-------------|-------------|-------------|----------------|----------------|----------------|------------|-------------|
| NTR25 | 2010     | 2.85 ± 0.10 | 5.45 ± 0.10 | 1.50 ± 0.10 | 1.75 ± 0.10 | 5.50 ± 0.05 | 4.0 ± 0.10     | 4.0 ± 0.05     | 2.0 ± 0.05     | 12.0 ± 0.1 | 0.85 ± 0.10 |
| NTR50 | 2512     | 3.40 ± 0.10 | 6.65 ± 0.10 |             |             |             |                |                |                |            |             |

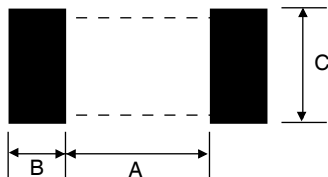


### REEL DIMENSIONS (mm)



### LAND PATTERN DIMENSIONS (mm)

| Type  | EIA Size | A    | B    | C          |
|-------|----------|------|------|------------|
| NTR02 | 0201     | 0.28 | 0.20 | 0.34       |
| NTR04 | 0402     | 0.50 | 0.50 | 0.60 ± 0.2 |
| NTR06 | 0603     | 0.80 | 0.70 | 0.90 ± 0.2 |
| NTR10 | 0805     | 1.00 | 1.00 | 1.35 ± 0.2 |
| NTR12 | 1206     | 2.00 | 1.15 | 1.70 ± 0.2 |
| NTR25 | 2010     | 3.60 | 1.40 | 2.40 ± 0.2 |
| NTR50 | 2512     | 4.90 | 1.60 | 3.00 ± 0.2 |



### PEAK REFLOW SOLDERING CONDITIONS

