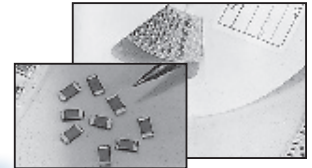


### FEATURES

- CLASS II DIELECTRIC, TEMPERATURE STABLE
- EXCELLENT FREQUENCY CHARACTERISTICS, NON-LINEAR CAPACITANCE CHANGE
- HIGHER CAPACITANCE THAN NPO
- NICKEL BARRIER TERMINATIONS AND EXCELLENT MECHANICAL STRENGTH

**RoHS  
Compliant**

Includes all homogeneous materials

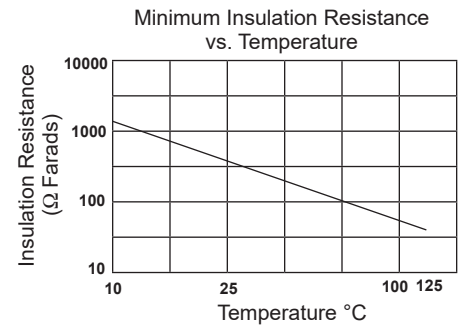
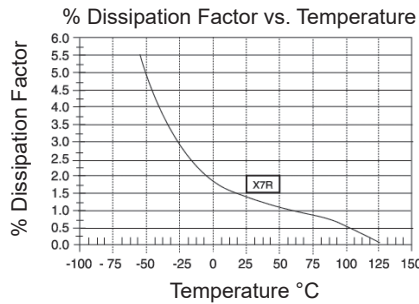
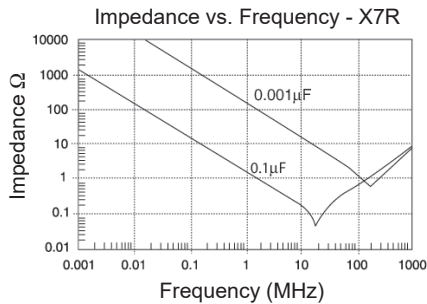
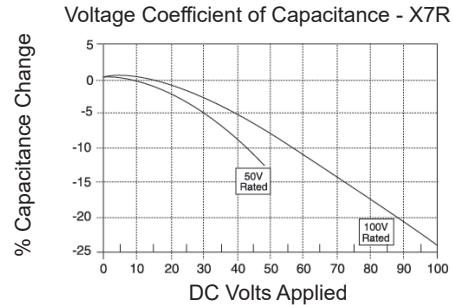
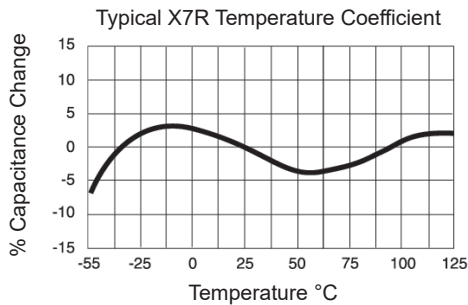


\*See Part Number System for Details

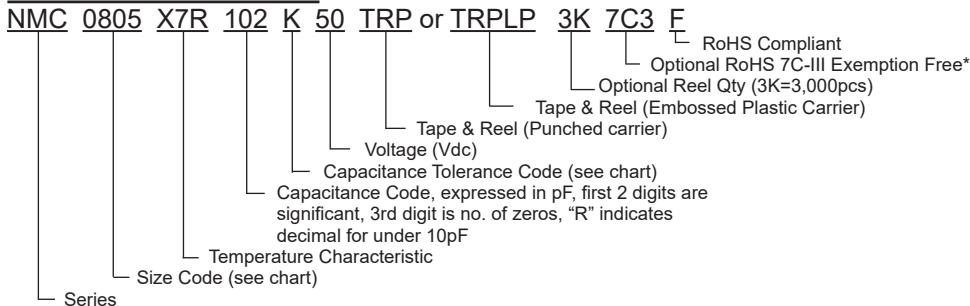
### SPECIFICATIONS

|                                 |   |
|---------------------------------|---|
| Capacitance Range               | 47pF ~ 0.82μF (see high CV datasheet for higher capacitance values)                           |
| Capacitance Tolerance           | ±5% (J), ±10% (K), ±20% (M)   |
| Operating Temperature Range     | -55°C ~ +125°C  |
| Temperature Characteristics     | ±15%Δ max. over temperature range (with 0 Vdc applied)  |
| Rated Voltages                  | 10Vdc, 16Vdc, 25Vdc, 35Vdc, 50Vdc (see NMC-H Series for higher voltages)                      |
| Dissipation Factor              | 2.5% max. (50Vdc, 100Vdc); 3.5% max. (16Vdc, 25Vdc) 5% max. (10Vdc) @ 1.0Vrms and 1KHz, +25°C |
| Insulation Resistance           | 10,000Megohms min. or 500Megohm/μF min. whichever is less @ +25°C                             |
| Dielectric Withstanding Voltage | 250% of Rated Voltage for 1 ~ 5 seconds, 50mA maximum current                                 |
| Test Conditions (EIA-198-2E)    | 1KHz, 1.0V ±0.2Vrms   |

Note: Reflow soldering allowed for all case sizes. Contact NIC for wave soldering restrictions.



### PART NUMBER SYSTEM



\* - Part Number Level Identification of X7R MLCCs that do not take RoHS exemption 7C-III



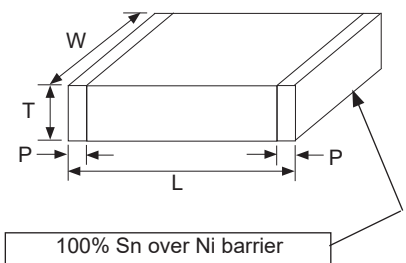
### X7R CAPACITOR SIZE CHART (mm)

| EIA Case Size         | 0201                  |    |    | 0402     |    |    | 0603        |    |    |    | 0805        |     |    |    |    |    |     |
|-----------------------|-----------------------|----|----|----------|----|----|-------------|----|----|----|-------------|-----|----|----|----|----|-----|
| Length (L)            | 0.6±0.03              |    |    | 1.0±0.05 |    |    | 1.6±0.15    |    |    |    | 2.0±0.2     |     |    |    |    |    |     |
| Width (W)             | 0.3±0.03              |    |    | 0.5±0.05 |    |    | 0.8±0.15    |    |    |    | 1.25±0.2    |     |    |    |    |    |     |
| Thickness max. (T)    | 0.33                  |    |    | 0.6      |    |    | 1.0         |    |    |    | 1.35        |     |    |    |    |    |     |
| Termination Width (P) | 0.15±0.05             |    |    | 0.2±0.1  |    |    | 0.12 ~ 0.51 |    |    |    | 0.25 ~ 0.71 |     |    |    |    |    |     |
| Capacitance           | Working Voltage (Vdc) |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
|                       | 16                    | 25 | 50 | 10       | 16 | 25 | 50          | 10 | 16 | 25 | 50          | 100 | 10 | 16 | 25 | 50 | 100 |
| 47pF ~ 91pF           |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 100pF ~ 470pF         |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 510pF                 |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 560pF                 |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 620pF                 |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 680pF                 |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 750pF                 |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 820pF                 |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 910pF                 |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.001µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0012µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0015µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0018µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0022µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0022µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0027µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0030µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0033µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0039µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0047µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0056µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0068µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0075µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.0082µF              |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.01µF                |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.012µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.015µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.018µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.022µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.027µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.033µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.039µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.047µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.056µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.068µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.082µF               |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    |     |
| 0.1µF                 |                       |    |    |          |    |    |             |    |    |    |             |     |    |    |    |    | *   |
| 0.15µF                |                       |    |    |          |    |    |             |    |    |    |             |     |    | *  | *  | *  |     |
| 0.18µF                |                       |    |    |          |    |    |             |    |    |    |             |     |    | *  | *  | *  |     |
| 0.22µF                |                       |    |    |          |    |    |             |    |    |    |             |     |    | *  | *  | *  |     |
| 0.27µF                |                       |    |    |          |    |    |             |    |    |    |             |     |    | *  | *  | *  |     |
| 0.33µF                |                       |    |    |          |    |    |             |    |    |    |             |     |    | *  | *  | *  |     |
| 0.39µF                |                       |    |    |          |    |    |             |    |    |    |             |     |    | *  | *  | *  |     |
| 0.47µF                |                       |    |    |          |    |    |             |    |    |    |             |     |    | *  | *  | *  |     |
| 0.56µF                |                       |    |    |          |    |    |             |    |    |    |             |     |    | *  | *  | *  |     |
| 0.68µF                |                       |    |    |          |    |    |             |    |    |    |             |     |    | *  | *  | *  |     |
| 0.82µF                |                       |    |    |          |    |    |             |    |    |    |             |     |    | *  | *  | *  |     |

(CONSULT FACTORY FOR CAPACITANCE VALUES NOT LISTED)

\*1.45mm maximum thickness

See NMC High CV series for values above 0.82µF

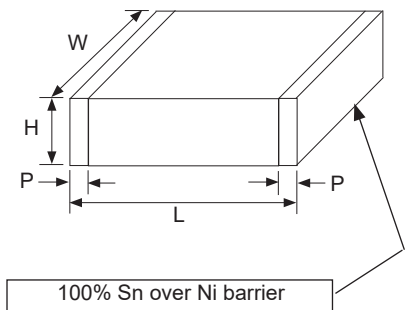


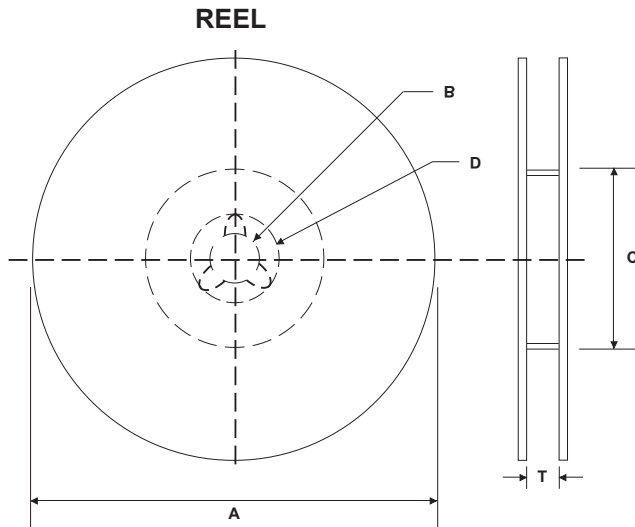
## X7R CAPACITOR SIZE CHART (mm)

| EIA Case Size         | 1206                  |    |    |    |     | 1210      |    |    |    |    | 1812        |    |    |    |    | 2225        |    |    |     |
|-----------------------|-----------------------|----|----|----|-----|-----------|----|----|----|----|-------------|----|----|----|----|-------------|----|----|-----|
| Length (L)            | 3.2±0.2               |    |    |    |     | 3.2±0.2   |    |    |    |    | 4.5±0.3     |    |    |    |    | 5.7±0.4     |    |    |     |
| Width (W)             | 1.6±0.2               |    |    |    |     | 2.5±0.2   |    |    |    |    | 3.2±0.25    |    |    |    |    | 6.35±0.25   |    |    |     |
| Thickness max. (T)    | 1.80                  |    |    |    |     | 1.80      |    |    |    |    | 1.8         |    |    |    |    | 1.80        |    |    |     |
| Termination Width (P) | 0.25 ~ 0.71           |    |    |    |     | 0.25~0.75 |    |    |    |    | 0.25 ~ 0.75 |    |    |    |    | 0.25 ~ 1.02 |    |    |     |
| Capacitance           | Working Voltage (Vdc) |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
|                       | 10                    | 16 | 25 | 50 | 100 | 10        | 16 | 25 | 35 | 50 | 100         | 10 | 16 | 25 | 50 | 100         | 25 | 50 | 100 |
| 150pF ~ 910pF         |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.001                 |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0012µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0015µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0018µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0022µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0027µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0033µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0036µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0039µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0043µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0047µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0056µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0068µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0075µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.0082µF              |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.01µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.012µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.015µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.018µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.022µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.027µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.033µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.036µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.039µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.043µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.047µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.056µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.068µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.082µF               |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.1µF                 |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.12µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.15µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.18µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.22µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.27µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.33µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.39µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.47µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.56µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.68µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    |    |     |
| 0.82µF                |                       |    |    |    |     |           |    |    |    |    |             |    |    |    |    |             |    | *  | *   |

\* 2.20mm maximum thickness

See NMC High CV series for values above 0.82µF





### REEL DIMENSIONS (mm)

| Reel Diameter (A) | B        | C         | D        | T max.  |
|-------------------|----------|-----------|----------|---|
| 7" (178 ± 2.0)    | 13 ± 0.5 | 50 min.   | 21 ± 1.0 | 8.4 +1.0/-0<br>(1812 case size<br>12.4 +2.0/-0) |
| 10" (250 ± 2.0)   |          | 100 ± 1.0 |          |   |
| 13" (330 ± 2.0)   |          | 100 ± 1.0 |          |   |

### 7 INCH REEL QUANTITIES\*

| Size              | 01005  | 0201   | 0402   | 0603  | 0805  | 1206  | 1210  | 1812  |
|-------------------|--------|--------|--------|-------|-------|-------|-------|-------|
| Tape Size         | 8mm    | 8mm    | 8mm    | 8mm   | 8mm   | 8mm   | 8mm   | 12mm  |
| Min. Qty Per Reel | 20,000 | 15,000 | 10,000 | 4,000 | 4,000 | 4,000 | 2,000 | 1,000 |
| Max. Qty Per Reel | 20,000 | 15,000 | 10,000 | 4,000 | 5,000 | 5,000 | 5,000 | 2,000 |

\*Quantity dependent on chip thickness. Contact NIC for reel quantities on larger diameter reels.

### CARRIER TAPE MATERIAL

Parts with a thickness of  $\geq 1\text{mm}$  will be taped on embossed plastic carrier. Parts with a thickness of less than 1mm will be taped on paper carrier

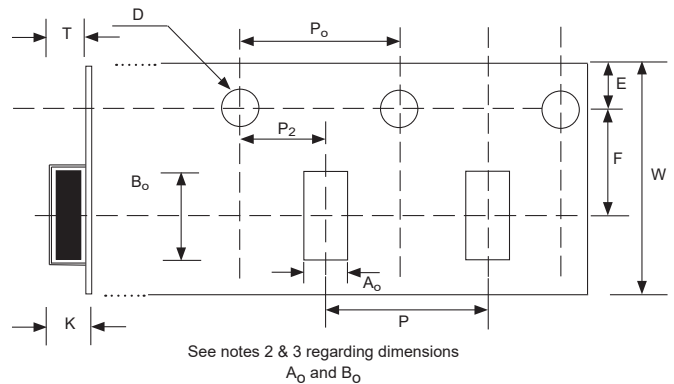
### EMBOSSED PLASTIC CARRIER TAPE DIMENSIONS (mm)

| Tape Size | W         | F          | E           | P <sub>0</sub> | P <sub>2</sub> | D                                   | K max. | T max. | P         |
|-----------|-----------|------------|-------------|----------------|----------------|-------------------------------------|--------|--------|-----------|
| 8mm       | 8.0 ± 0.2 | 3.5 ± 0.05 | 1.75 ± 0.10 | 4.0 ± 0.1      | 2.0 ± 0.5      | 1.5 <sup>+0.1</sup> <sub>-0.0</sub> | 3.0    | 2.0    | 4.0 ± 0.1 |
| 12mm      | 12 ± 0.2  | 5.5 ± 0.05 |             |                |                |                                     |        | 4.5    | 8.0 ± 0.1 |

#### Notes:

- Specifications are in compliance with EIA RS481-1-A "Taping of surface Mount Components for Automatic Placement"
- Dimensions A<sub>0</sub> (max.) equals component width dimension plus 0.5mm
- Dimension B<sub>0</sub> (max.) equals component length dimension plus 0.5mm

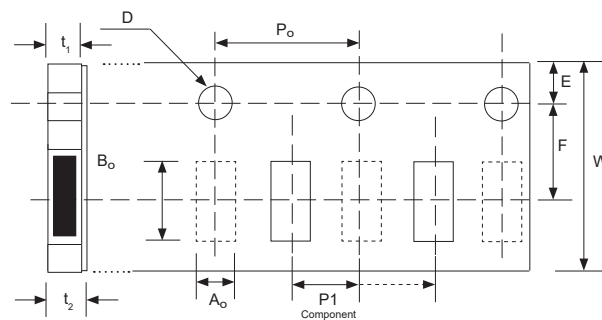
### EMBOSSED PLASTIC CARRIER TAPE



### PUNCHED CARRIER TAPE DIMENSIONS (mm)

| Type  | A <sub>0</sub> | B <sub>0</sub> | W         | F          | E          | P1         | P0        | D0                                  | T1 max. | T2 max. | Mounting Hole      |
|-------|----------------|----------------|-----------|------------|------------|------------|-----------|-------------------------------------|---------|---------|--------------------|
| 01005 | 0.25 ± 0.04    | 0.45 ± 0.04    | 8.0 ± 0.3 | 3.5 ± 0.05 | 1.75 ± 0.1 | 2.0 ± 0.05 | 4.0 ± 0.1 | 1.5 <sup>+0.1</sup> <sub>-0.0</sub> | 0.27    | 0.36    | Angular Punch Hole |
| 0201  | 0.37 ± 0.03    | 0.67 ± 0.05    |           |            |            |            |           |                                     | 0.45    | 0.80    |                    |
| 0402  | 0.65 ± 0.05    | 1.15 ± 0.05    |           |            |            | 4.0 ± 0.10 |           |                                     | 1.1     | 1.4     |                    |
| 0603  | 1.1 ± 0.2      | 1.9 ± 0.2      |           |            |            |            |           |                                     |         |         |                    |
| 0805  | 1.65 ± 0.2     | 2.4 ± 0.2      |           |            |            |            |           |                                     |         |         |                    |
| 1206  | 2.0 ± 0.2      | 3.6 ± 0.2      |           |            |            |            |           |                                     |         |         |                    |

### PUNCHED CARRIER TAPE



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[NACE221M16V6.3X8TR13F](#) [NRSS332M50V18X35.5F](#) [NDTM106K25F1TRF](#) [NACZ221M50V10X10.5TR13F](#) [NCM15X7R103K50F](#)  
[NRSS682M25V18X35.5F](#) [NEXC224Z5.5V10.5X8.5TRF](#) [NRLRW221M450V30X35SF](#) [NDTM225K50F2TRF](#) [NEXT105Z5.5V21.5X13F](#)  
[NRSZ471M50V12.5X20F](#) [NTCL106K35TRDF](#) [NRWA331M25V10X12.5F](#) [NRSY472M25V16X31.5F](#) [NEXS105Z5.5V28.5X14F](#)  
[NRLR181M400V25X30SF](#) [NRSZ102M25V12.5X20F](#) [NUVA33T385TRF](#) [NUVA33V405TRF](#) [NRLMW331M250V30X25F](#)  
[NRLF103M25V35X20F](#) [NDTM106K35F](#) [NRLMW102M200V35X35F](#) [NPIS43LS220MTRF](#) [NACZ101M25V6.3X8TR13F](#) [NTC-](#)  
[T475K50TRDF](#) [NCD222M1KVZ5UKF](#) [NRLR472M63V25X40SF](#) [NTP157M10TRD\(40\)F](#) [NPIM74C3R3MTRF](#) [NPI104C100MTRF](#)  
[NRLM102M100V25X25F](#) [NRLM223M50V 35X50F](#) [NAZT221M50V10X10.5LBF](#) [NACK102M10V 10X10.5TR13F](#)  
[NACZ221M35V8X10.5TR13F](#) [NRWA101M10V5X11F](#) [NTC-T336K16TRCF](#) [NRWP102M16V10X12.5F](#) [NRLM822M50V30X35F](#)  
[NACE470M63V8X10.5TR13F](#) [NCD4R7C1KVNPOF](#) [NRSZ152M35V 16X25F](#) [NRSH222M63V18X40F](#) [NRLM123M16V25X25F](#)