

# NMC NPO Series

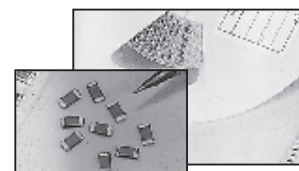
## Surface Mount High Capacitance Ceramic Capacitors



### FEATURES

- CLASS I DIELECTRIC, TEMPERATURE COMPENSATING
- HIGH STABILITY OVER TIME, VOLTAGE AND TEMPERATURE CHANGES
- LOW DIELECTRIC LOSS
- NICKEL BARRIER TERMINATIONS AND EXCELLENT MECHANICAL STRENGTH

**Expanded  
Value Range  
Up to 0.1 $\mu$ F**

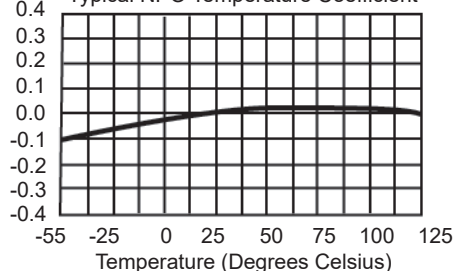


### SPECIFICATIONS

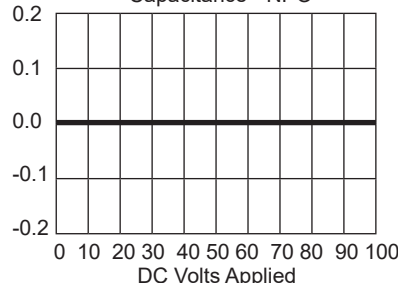
|                                 |                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capacitance Range               | 0.3pF to 0.1 $\mu$ F                                                                                                                                                               |
| Capacitance Tolerance           | <5pF: $\pm 0.1$ pF(B), $\pm 0.25$ pF(C)<br>$\geq 5$ pF to <10pF: $\pm 0.1$ pF(B), $\pm 0.25$ pF(C), $\pm 0.5$ pF(D)<br>10pF and above: $\pm 1\%$ (F), $\pm 2\%$ (G), $\pm 5\%$ (J) |
| Operating Temperature Range     | -55°C ~ +125°C                                                                                                                                                                     |
| Temperature Characteristics     | 0 $\pm$ 30ppm/°C                                                                                                                                                                   |
| Rated Voltages                  | 10Vdc, 16Vdc, 25Vdc, 35Vdc, 50Vdc, 100Vdc (see NMC-H Series for higher voltages)                                                                                                   |
| Dissipation Factor              | For values >30pF 0.1% @ 25°C; For values $\leq$ 30pF $Q=400+20 \times C$ (C in pF)                                                                                                 |
| Insulation Resistance           | 10,000Megohms min. or 500Megohm/ $\mu$ F (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)    | $\leq 1000$ pF; 1MHz, 1.2Vrms max. or >1000pF; 1KHz, 1.2Vrms max.                                                                                                                  |

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

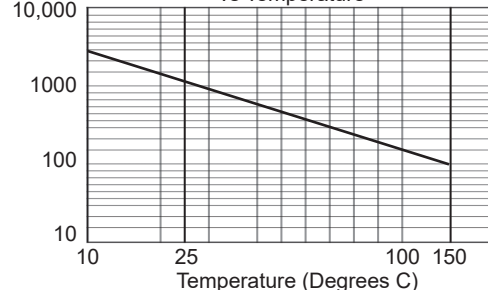
Typical NPO Temperature Coefficient



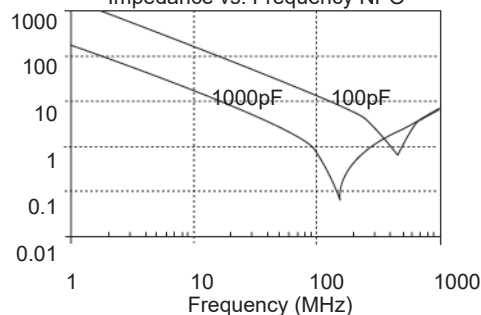
Voltage Coefficient of Capacitance - NPO



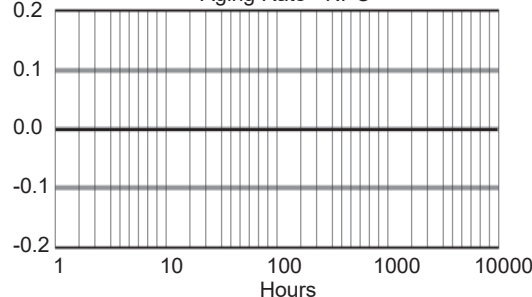
Minimum Insulation Resistance vs Temperature



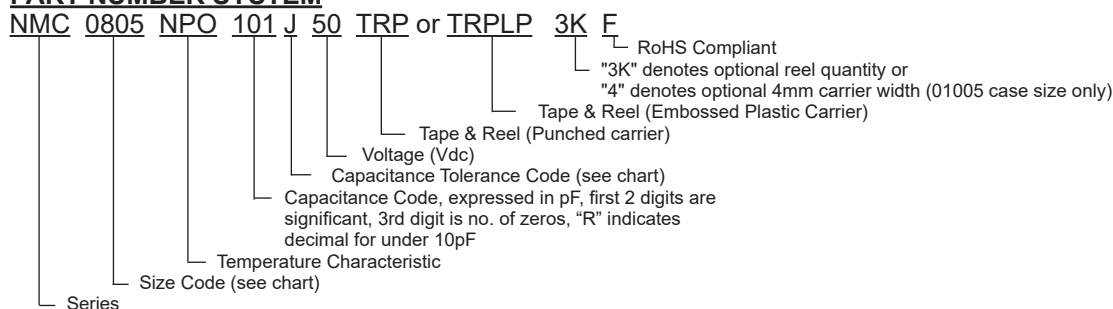
Impedance vs. Frequency NPO



Aging Rate - NPO



### PART NUMBER SYSTEM



# NMC NPO Series

## Surface Mount High Capacitance Ceramic Capacitors



| EIA Case Size         | 01005                       |
|-----------------------|-----------------------------|
| Length (L)            | 0.4±0.02                    |
| Width (W)             | 0.2±0.02                    |
| Thickness max. (T)    | 0.22                        |
| Termination Width (P) | 0.10 +0.04/-0.03            |
| Capacitance           | Working Voltage (Vdc)<br>16 |
| 0.5pF                 |                             |
| 0.6pF                 |                             |
| 0.7pF                 |                             |
| 0.8pF                 |                             |
| 0.9pF                 |                             |
| 1.0pF                 |                             |
| 1.1pF                 |                             |
| 1.2pF                 |                             |
| 1.3pF                 |                             |
| 1.5pF                 |                             |
| 1.6pF                 |                             |
| 1.8pF                 |                             |
| 2.0pF                 |                             |
| 2.2pF                 |                             |
| 2.4pF                 |                             |
| 2.5pF                 |                             |
| 2.7pF                 |                             |
| 3.0pF                 |                             |
| 3.3pF                 |                             |
| 3.6pF                 |                             |
| 3.9pF                 |                             |
| 4.0pF                 |                             |
| 4.7pF                 |                             |
| 5.0pF                 |                             |
| 5.6pF                 |                             |
| 6.0pF                 |                             |
| 6.2pF                 |                             |
| 6.8pF                 |                             |
| 7.0pF                 |                             |
| 7.5pF                 |                             |
| 8.0pF                 |                             |
| 8.2pF                 |                             |
| 9.0pF                 |                             |
| 9.1pF                 |                             |
| 10pF                  |                             |
| 12pF                  |                             |
| 15pF                  |                             |
| 18pF                  |                             |
| 22pF                  |                             |
| 27pF                  |                             |
| 33pF                  |                             |
| 39pF                  |                             |
| 47pF                  |                             |
| 56pF                  |                             |
| 68pF                  |                             |
| 82pF                  |                             |
| 100pF                 |                             |

Highlighted values available on 4mm carrier,  
40K pieces per reel.

(CONSULT FACTORY  
FOR CAPACITANCE  
VALUES NOT LISTED)

| 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) |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
|                       | 10                    | 16 | 25 | 50 | 16       | 25 | 50 | 100 | 16          | 25 | 50 | 100 | 16          | 25 | 50 | 100 |
| 0.3pF & 0.4pF         |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 0.47pF ~ 22pF         |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 24pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 27pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 30pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 33pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 36pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 39pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 43pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 47pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 51pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 56pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 62pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 68pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 75pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 82pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 91pF                  |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 100pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 110pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 120pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 130pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 150pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 160pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 180pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 200pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 220pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 240pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 270pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 300pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 330pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 360pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 390pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 430pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 470pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 510pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 560pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 620pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 680pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 750pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 820pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 910pF                 |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 0.001μF               |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 0.0012μF              |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 0.0015μF              |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 0.0018μF              |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 0.0022μF              |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    |     |
| 0.0027μF              |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    | *   |
| 0.0033μF              |                       |    |    |    |          |    |    |     |             |    |    |     |             |    |    | *   |
| 0.0039μF              |                       |    |    |    |          |    |    |     |             |    |    |     |             |    | *  | *   |
| 0.0047μF              |                       |    |    |    |          |    |    |     |             |    |    |     |             |    | *  | *   |
| 0.0056μF              |                       |    |    |    |          |    |    |     |             |    |    |     |             |    | *  | *   |
| 0.0068μF              |                       |    |    |    |          |    |    |     |             |    |    |     |             |    | *  | *   |
| 0.0082μF              |                       |    |    |    |          |    |    |     |             |    |    |     |             |    | *  | *   |
| 0.01uF                |                       |    |    |    |          |    |    |     |             |    |    |     |             | *  | *  | *   |

\*1.45mm maximum thickness

### Performance Passives By Design

NIC Components Corp.  
100 Baylis Road. Melville, NY 11747

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www.niccomp.com

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## Surface Mount High Capacitance Ceramic Capacitors

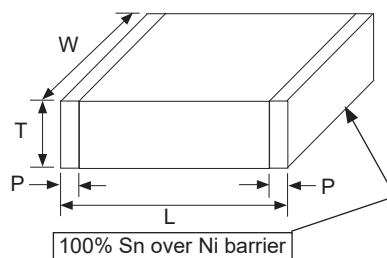


| EIA Case Size         | 0805                     |    |    |     | 1206        |    |    |    | 1210        |    |    |    | 1812        |     |    |     | 2225        |    |     |  |
|-----------------------|--------------------------|----|----|-----|-------------|----|----|----|-------------|----|----|----|-------------|-----|----|-----|-------------|----|-----|--|
| Length (L)            | 2.0±0.2                  |    |    |     | 3.2±0.4     |    |    |    | 3.2±0.2     |    |    |    | 4.5±0.3     |     |    |     | 5.70±0.4    |    |     |  |
| Width (W)             | 1.25±0.2                 |    |    |     | 1.6±0.3     |    |    |    | 2.5±0.2     |    |    |    | 3.2±0.25    |     |    |     | 6.35±0.25   |    |     |  |
| Thickness max. (T)    | 1.45                     |    |    |     | 1.80        |    |    |    | 1.80        |    |    |    | 1.80        |     |    |     | 1.80        |    |     |  |
| Termination Width (P) | 0.25 ~ 0.71              |    |    |     | 0.25 ~ 0.71 |    |    |    | 0.25 ~ 0.71 |    |    |    | 0.25 ~ 0.76 |     |    |     | 0.25 ~ 1.02 |    |     |  |
| Capacitance           | Working Voltage (Vdc)    |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
|                       | 16                       | 25 | 50 | 100 | 10          | 16 | 25 | 50 | 100         | 10 | 16 | 25 | 50          | 100 | 25 | 50  | 100         | 50 | 100 |  |
| 0.47pF ~ 9.1pF        | See the<br>previous page |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 10pF ~ 22pF           |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 24pF ~ 0.001μF        |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0012μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0015μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0018μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0022μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0027μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0033μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0039μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0047μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0056μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0068μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0075μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0082μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 0.0091μF              |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    |     |             |    |     |  |
| 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                 |                          |    |    |     |             |    |    |    |             |    |    |    |             |     |    | *** |             |    |     |  |

See the previous page

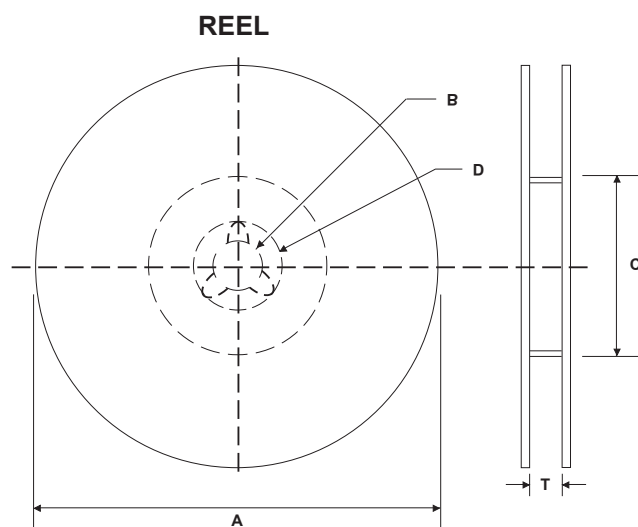
\*1.90mm maximum thickness, \*\*2.60mm maximum thickness,  
\*\*\*4.5mm ± 0.40 x 3.2mm ± 0.40 x 2.80mm maximum thickness

**See NMC High Capacitance datasheet for higher capacitance values  
or NMC-H High Voltage datasheet for higher voltage ratings**



# NMC NPO Series

## Surface Mount High Capacitance Ceramic Capacitors



### REEL DIMENSIONS (mm)

| Reel Diameter (A) | B          | C         | D          | T max.                   |
|-------------------|------------|-----------|------------|--------------------------|
| 7" (178 ± 2.0)    | 13.0 ± 0.5 | 50 min.   | 21.0 ± 1.0 | 4mm Carrier: 5.0 ± 1.5   |
| 10" (250 ± 2.0)   |            | 100 ± 1.0 |            | 8mm Carrier: 8.4 ± 1.0   |
| 13" (330 ± 2.0)   |            | 100 ± 1.0 |            | 12mm Carrier: 12.8 ± 0.5 |

### 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

### 7 INCH REEL QUANTITIES\*

| Size              | 01005  |        | 0201   | 0402   | 0603  | 0805  | 1206  | 1210  | 1812  | 2225  |
|-------------------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|
| Tape Size         | 4mm    | 8mm    | 8mm    | 8mm    | 8mm   | 8mm   | 8mm   | 8mm   | 12mm  | 12mm  |
| Min. Qty Per Reel | 40,000 | 20,000 | 15,000 | 10,000 | 4,000 | 4,000 | 4,000 | 2,000 | 1,000 | 400   |
| Max. Qty Per Reel | 40,000 | 20,000 | 15,000 | 10,000 | 4,000 | 5,000 | 5,000 | 5,000 | 2,000 | 1,000 |

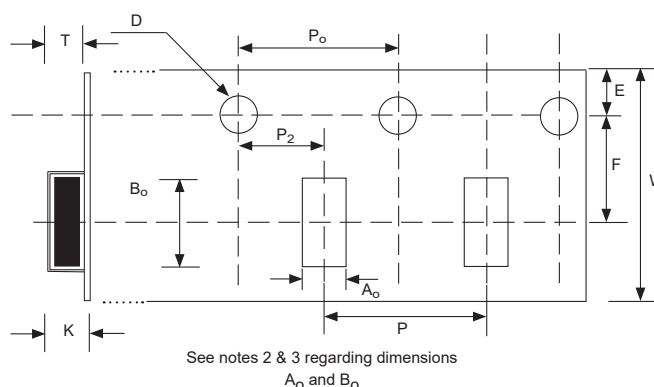
\*Quantity dependent on chip thickness. Contact NIC for reel quantities on larger diameter reels.

### 8MM & 12MM EMBOSSED PLASTIC CARRIER TAPE DIMENSIONS (mm)

| Carrier Width | 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



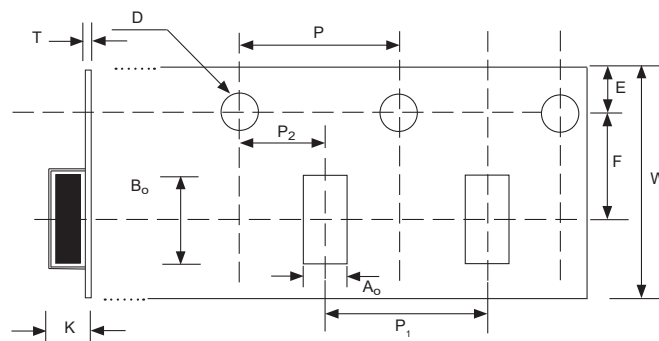
# NMC NPO Series

## Surface Mount High Capacitance Ceramic Capacitors



### 4MM (01005 CASE SIZE) EMBOSSED PLASTIC CARRIER TAPE DIMENSIONS (mm)

| Carrier Width | A <sub>0</sub> | B <sub>0</sub> | W          | F          | E           | P          | P <sub>1</sub> | P <sub>2</sub> | D                                   | K max. | T max.      |
|---------------|----------------|----------------|------------|------------|-------------|------------|----------------|----------------|-------------------------------------|--------|-------------|
| 4mm           | 0.23 ± 0.02    | 0.43 ± 0.02    | 4.0 ± 0.05 | 1.8 ± 0.02 | 0.90 ± 0.05 | 2.0 ± 0.04 | 1.0 ± 0.02     | 1.0 ± 0.02     | 1.5 <sup>+0.1</sup> <sub>-0.0</sub> | 0.50   | 0.15 ~ 0.40 |



### 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<br>+0.1/-0.0 | 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

