

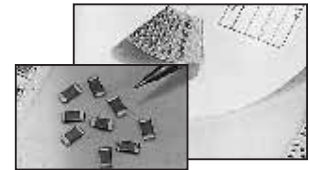
### FEATURES

- X7R, X5R AND Y5V DIELECTRICS
- HIGH CAPACITANCE DENSITY
- ULTRA LOW ESR & ESL
- EXCELLENT MECHANICAL STRENGTH
- NICKEL BARRIER TERMINATIONS
- RoHS COMPLIANT
- SAC SOLDER COMPATIBLE\*

### RoHS Compliant

Includes all homogeneous materials

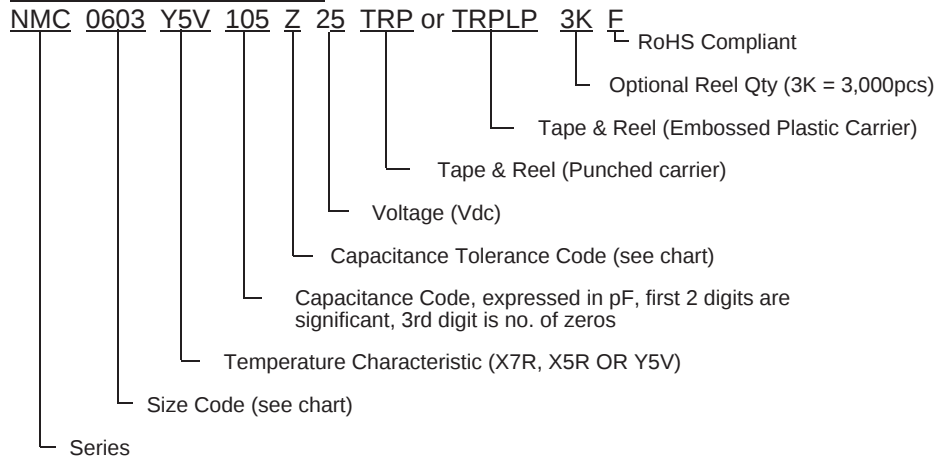
\*See Part Number System for Details



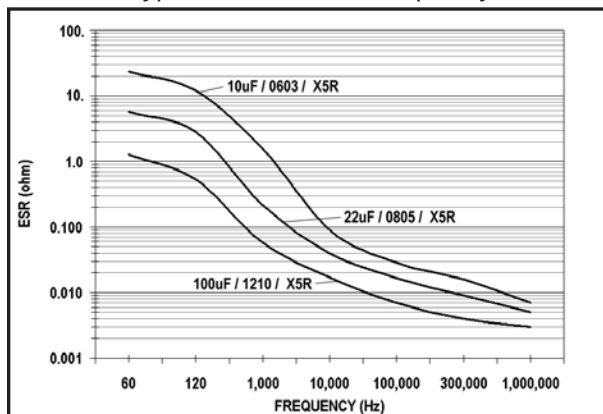
| Temperature Coefficient         | X7R                                                                                                        | X5R                       | Y5V                                                 |
|---------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------|
| Capacitance Range               | 1.0 $\mu$ F ~ 10 $\mu$ F                                                                                   | 1.0 $\mu$ F ~ 100 $\mu$ F | 1.0 $\mu$ F ~ 100 $\mu$ F                           |
| Capacitance Tolerance           | 10% (K) & 20% (M)                                                                                          | 10% (K) & 20% (M)         | +80%/-20% (Z)                                       |
| Operating Temperature Range     | -55°C ~ +125°C                                                                                             | -55°C ~ +85°C             | -30°C ~ +85°C                                       |
| Temperature Characteristics     | $\pm 15\%$ $\Delta$ Cap.                                                                                   | $\pm 15\%$ $\Delta$ Cap.  | +22%, -82% $\Delta$ Cap.                            |
| Rated Voltages                  | 4Vdc, 6.3Vdc, 16Vdc, 25Vdc, 50Vdc & 100Vdc                                                                 |                           |                                                     |
| Dissipation Factor              | See Sizes & Values Tables                                                                                  |                           |                                                     |
| Insulation Resistance           | 100Megohm/ $\mu$ F minimum @ +25°C                                                                         |                           |                                                     |
| Dielectric Withstanding Voltage | 250% of Rated Voltage for 5 $\pm$ 1 sec., 50mA max.                                                        |                           | 150% of Rated Voltage for 5 $\pm$ 1 sec., 50mA max. |
| Test Conditions (EIA-198-2E)    | C $\leq$ 10 $\mu$ F 1KHz, 1.0V $\pm$ 0.2Vrms (ALC on)<br>C > 10 $\mu$ F 120Hz, 0.5V $\pm$ 0.2Vrms (ALC on) |                           | 1KHz, 1.0V $\pm$ 0.1Vrms (ALC on)                   |

\*Reflow soldering is recommended. Contact NIC regarding the use of other soldering methods.

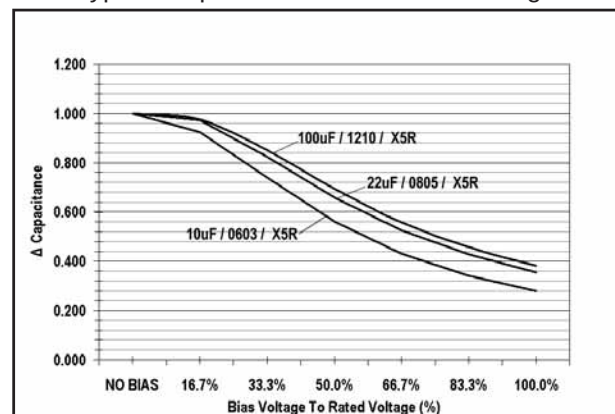
### PART NUMBER SYSTEM



Typical ESR versus Frequency



Typical Capacitance versus Bias Voltage



### X7R HIGH CV CAPACITOR VALUES AND SIZES (mm)

| EIA Case Size                                          | 0603                  |    |    | 0805        |     |      |    | 1206        |    |        |      |    |    |
|--------------------------------------------------------|-----------------------|----|----|-------------|-----|------|----|-------------|----|--------|------|----|----|
| Length (L)                                             | 1.6 ± 0.15            |    |    | 2.0 ± 0.2   |     |      |    | 3.2±0.2     |    |        |      |    |    |
| Width (W)                                              | 0.8 ± 0.15            |    |    | 1.25 ± 0.2  |     |      |    | 1.6±0.2     |    |        |      |    |    |
| Thickness max. (T)                                     | 1.0                   |    |    | 1.35        |     |      |    | 1.90        |    |        |      |    |    |
| Termination Width (P)                                  | 0.1 ~ 0.65            |    |    | 0.25 ~ 0.75 |     |      |    | 0.25 ~ 0.85 |    |        |      |    |    |
| Capacitance                                            | Working Voltage (Vdc) |    |    |             |     |      |    |             |    |        |      |    |    |
|                                                        | 6.3V                  | 10 | 16 | 6.3         | 10  | 16   | 25 | 6.3         | 10 | 16     | 25   | 35 | 50 |
| 1.0μF                                                  |                       | 5% | 5% |             | 5%  | 3.5% | 5% |             | 5% | 5%     | 3.5% |    | 3% |
| 1.5μF                                                  |                       |    |    |             |     |      |    |             |    |        |      |    |    |
| 2.2μF                                                  | 10%                   |    |    | 10%*        | 5%* | 5%*  |    |             | 5% | 5%     | 3.5% |    |    |
| 3.3μF                                                  |                       |    |    | 10%*        |     |      |    |             | 5% | 5%     | 3.5% |    |    |
| 4.7μF                                                  |                       |    |    | 10%*        |     |      |    |             | 5% | 5%     | 3.5% |    |    |
| 10μF                                                   |                       |    |    | 15%*        |     |      |    | 10%         | 5% | 3.5%** |      |    |    |
| * 1.45mm maximum thickness, **2.20mm maximum thickness |                       |    |    |             |     |      |    |             |    |        |      |    |    |

\* 1.45mm maximum thickness, \*\*2.20mm maximum thickness

Percentages in the table represent the dissipation factor for that value.

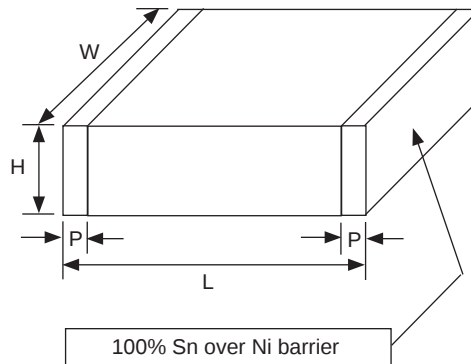
### X7R HIGH CV CAPACITOR VALUES AND SIZES (mm)

| EIA Case Size                                         | 1210                  |      |      |        |      |        | 1812       |      |      |       |       | 2225        |      |      |
|-------------------------------------------------------|-----------------------|------|------|--------|------|--------|------------|------|------|-------|-------|-------------|------|------|
| Length (L)                                            | 3.2±0.2               |      |      |        |      |        | 4.5±0.4    |      |      |       |       | 5.7±0.4     |      |      |
| Width (W)                                             | 2.5±0.2               |      |      |        |      |        | 3.2±0.3    |      |      |       |       | 6.35±0.25   |      |      |
| Thickness max. (T)                                    | 2.20                  |      |      |        |      |        | 1.8        |      |      |       |       | 2.20        |      |      |
| Termination Width (P)                                 | 0.25 ~ 1.00           |      |      |        |      |        | 0.25 ~ 1.5 |      |      |       |       | 0.25 ~ 1.02 |      |      |
| Capacitance                                           | Working Voltage (Vdc) |      |      |        |      |        |            |      |      |       |       |             |      |      |
|                                                       | 10                    | 16   | 25   | 35     | 50   | 100    | 10         | 16   | 25   | 50    | 100   | 25          | 50   | 100  |
| 1.0μF                                                 | 5%                    | 3.5% | 3.5% |        | 3.5% | 2.5%** | 5%         | 3.5% | 3.5% | 2.5%* | 2.5%* | 2.5%        | 2.5% | 2.5% |
| 1.5μF                                                 |                       |      |      |        |      |        |            |      |      |       |       | 2.5%        |      |      |
| 2.2μF                                                 |                       |      | 3.5% |        |      |        |            |      |      |       |       | 2.5%        |      |      |
| 3.3μF                                                 |                       |      | 3.5% |        |      |        |            |      |      |       |       |             |      |      |
| 4.7μF                                                 |                       | 3.5% | 5%   | 2.5%** |      |        |            |      |      |       |       |             |      |      |
| 10μF                                                  | 5%                    | 3.5% | 5%** |        |      |        |            |      |      |       |       |             |      |      |
| *2.20mm maximum thickness, **2.80mm maximum thickness |                       |      |      |        |      |        |            |      |      |       |       |             |      |      |

\*2.20mm maximum thickness, \*\*2.80mm maximum thickness

Percentages in the table represent the dissipation factor for that value.

(CONSULT FACTORY  
FOR CAPACITANCE  
VALUES NOT LISTED)



### X5R HIGH CV CAPACITOR VALUES AND SIZES (mm)

| EIA Case Size         | 0402                  |        |     |     | 0603       |     |     |      |    | 0805        |     |      |    |     |
|-----------------------|-----------------------|--------|-----|-----|------------|-----|-----|------|----|-------------|-----|------|----|-----|
| Length (L)            | 1.0 ± 0.05            |        |     |     | 1.6 ± 0.15 |     |     |      |    | 2.0 ± 0.2   |     |      |    |     |
| Width (W)             | 0.5 ± 0.05            |        |     |     | 0.8 ± 0.15 |     |     |      |    | 1.25 ± 0.2  |     |      |    |     |
| Thickness max. (T)    | 0.6                   |        |     |     | 1.0        |     |     |      |    | 1.45        |     |      |    |     |
| Termination Width (P) | 0.1 ~ 0.3             |        |     |     | 0.1 ~ 0.65 |     |     |      |    | 0.20 ~ 0.75 |     |      |    |     |
| Capacitance           | Working Voltage (Vdc) |        |     |     |            |     |     |      |    |             |     |      |    |     |
|                       | 4                     | 6.3    | 10  | 16  | 4          | 6.3 | 10  | 16   | 25 | 4           | 6.3 | 10   | 16 | 25  |
| 1.0μF                 |                       | 10%    | 15% | 10% |            | 10% | 10% | 5%   | 5% |             | 10% | 7.5% | 5% | 5%  |
| 1.5μF                 |                       |        |     |     |            |     |     |      |    |             |     |      |    |     |
| 2.2μF                 | 10%                   | 10%    |     |     |            | 10% | 10% | 3.5% |    |             | 10% | 10%  | 5% | 5%  |
| 3.3μF                 |                       |        |     |     |            | 10% |     |      |    |             | 10% | 10%  |    |     |
| 4.7μF                 | 10%                   | 12.5%* |     |     |            | 10% | 5%  |      |    |             | 10% | 10%  | 5% | 10% |
| 6.8μF                 |                       |        |     |     |            |     |     |      |    |             |     |      |    |     |
| 10μF                  |                       |        |     |     | 10%        | 10% |     |      |    |             | 10% | 10%  | 5% |     |
| 22μF                  |                       |        |     |     | 12.5%      |     |     |      |    |             | 15% |      |    |     |
| 47μF                  |                       |        |     |     |            |     |     |      |    | 10%         |     |      |    |     |

\*T max. 0.65mm, L & W tolerance -0/+0.15mm

Percentages in the table represent the dissipation factor for that value.

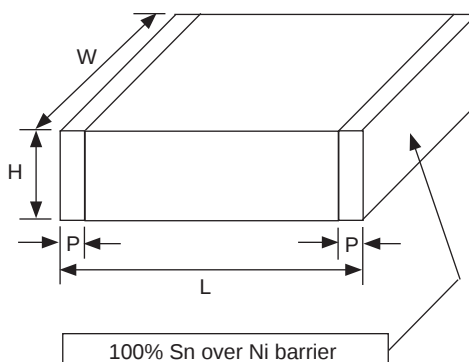
### X5R HIGH CV CAPACITOR VALUES AND SIZES (mm)

| EIA Case Size                                  | 1206                  |     |      |      |      | 1210       |      |      |       |      |
|------------------------------------------------|-----------------------|-----|------|------|------|------------|------|------|-------|------|
| Length (L)                                     | 3.2±0.2               |     |      |      |      | 3.2±0.3    |      |      |       |      |
| Width (W)                                      | 1.6±0.2               |     |      |      |      | 2.5±0.2    |      |      |       |      |
| Thickness max. (T)                             | 1.90                  |     |      |      |      | 2.2        |      |      |       |      |
| Termination Width (P)                          | 0.25 ~ 0.85           |     |      |      |      | 0.25 ~ 1.0 |      |      |       |      |
| Capacitance                                    | Working Voltage (Vdc) |     |      |      |      |            |      |      |       |      |
|                                                | 4                     | 6.3 | 10   | 16   | 25   | 6.3        | 10   | 16   | 25    | 35   |
| 1.0μF                                          |                       |     |      |      |      |            |      |      |       |      |
| 1.5μF                                          |                       |     |      | 5%   |      |            |      |      |       |      |
| 2.2μF                                          |                       | 10% | 7.5% | 5%   | 3.5% |            |      |      |       | 3.5% |
| 3.3μF                                          |                       | 10% | 7.5% | 5%   | 3.5% |            |      |      |       |      |
| 4.7μF                                          |                       | 10% | 7.5% | 5%   | 5%   | 10%        | 5%   | 3.5% | 3.5%* |      |
| 6.8μF                                          |                       | 10% |      |      |      |            |      |      |       |      |
| 10μF                                           |                       | 10% | 10%  | 5%   | 5%   | 10%        | 5%   | 5%   | 5%*   | 10%  |
| 22μF                                           |                       | 10% | 10%  | 3.5% |      | 10%*       | 10%* | 5%*  | 2.5%* |      |
| 47μF                                           | 10%                   | 10% |      |      |      | 10%*       | 10%* |      |       |      |
| 100μF                                          |                       |     |      |      |      | 15%*       |      |      |       |      |
| *Length 3.2mm ± 0.4mm. 2.8mm maximum thickness |                       |     |      |      |      |            |      |      |       |      |

\*Length 3.2mm ± 0.4mm, 2.8mm maximum thickness

Percentages in the table represent the dissipation factor for that value.

(CONSULT FACTORY  
FOR CAPACITANCE  
VALUES NOT LISTED)



### Y5V HIGH CV CAPACITOR VALUES AND SIZES (mm)

| EIA Case Size            | 0402                  |     | 0603       |       |     |    | 0805       |             |       |    |    |  |
|--------------------------|-----------------------|-----|------------|-------|-----|----|------------|-------------|-------|----|----|--|
| Length (L)               | 1.0 ± 0.05            |     | 1.6 ± 0.15 |       |     |    | 2.0 ± 0.2  |             |       |    |    |  |
| Width (W)                | 0.5 ± 0.05            |     | 0.8 ± 0.15 |       |     |    | 1.25 ± 0.2 |             |       |    |    |  |
| Thickness max. (T)       | 0.6                   |     | 1.0        |       |     |    | 1.45       |             |       |    |    |  |
| Termination Width (P)    | 0.1 ~ 0.3             |     | 0.1 ~ 0.65 |       |     |    |            | 0.25 ~ 0.75 |       |    |    |  |
| Capacitance              | Working Voltage (Vdc) |     |            |       |     |    |            |             |       |    |    |  |
|                          | 6.3                   | 10  | 6.3        | 10    | 16  | 25 | 6.3        | 10          | 16    | 25 | 50 |  |
|                          | 1.0μF                 | 20% | 12.5%      | 16%   | 16% | 9% | 16%        | 12.5%       | 9%    | 9% | 9% |  |
|                          | 1.5μF                 |     |            |       |     |    | 16%        | 12.5%       | 9%    |    |    |  |
|                          | 2.2μF                 |     | 20%        | 16%   | 16% |    | 16%        | 12.5%       | 9%    | 9% |    |  |
|                          | 3.3μF                 |     |            |       |     |    | 16%        | 12.5%       | 9%    |    |    |  |
|                          | 4.7μF                 |     | 20%        | 12.5% |     |    | 16%        | 12.5%       | 12.5% |    |    |  |
|                          | 6.8μF                 |     |            |       |     |    |            | 16%         |       |    |    |  |
|                          | 10μF                  |     |            |       |     |    | 20%        | 30%         |       |    |    |  |
|                          | 22μF                  |     |            |       |     |    | 20%        |             |       |    |    |  |
| *2.5mm maximum thickness |                       |     |            |       |     |    |            |             |       |    |    |  |

\*2.5mm maximum thickness

Percentages in the table represent the dissipation factor for that value.

### Y5V HIGH CV CAPACITOR VALUES AND SIZES (mm)

| EIA Case Size            | 1206                  |       |       |    |    |    | 1210       |       |       |    |    |    | 1812       |       |    |    |    |
|--------------------------|-----------------------|-------|-------|----|----|----|------------|-------|-------|----|----|----|------------|-------|----|----|----|
| Length (L)               | 3.2±0.2               |       |       |    |    |    | 3.2±0.2    |       |       |    |    |    | 4.5±0.4    |       |    |    |    |
| Width (W)                | 1.6±0.2               |       |       |    |    |    | 2.5±0.2    |       |       |    |    |    | 3.2±0.3    |       |    |    |    |
| Thickness max. (T)       | 1.90                  |       |       |    |    |    | 2.2        |       |       |    |    |    | 2.8        |       |    |    |    |
| Termination Width (P)    | 0.25 ~ 0.85           |       |       |    |    |    | 0.25 ~ 1.0 |       |       |    |    |    | 0.25 ~ 1.5 |       |    |    |    |
| Capacitance              | Working Voltage (Vdc) |       |       |    |    |    |            |       |       |    |    |    |            |       |    |    |    |
|                          | 6.3                   | 10    | 16    | 25 | 35 | 50 | 6.3        | 10    | 16    | 25 | 35 | 50 | 6.3        | 10    | 16 | 25 | 50 |
| 1.0μF                    |                       | 12.5% | 12.5% | 7% |    | 7% |            | 12.5% | 12.5% | 9% |    | 7% |            | 12.5% | 9% | 5% | 5% |
| 1.5μF                    |                       | 12.5% | 12.5% | 9% |    |    |            | 12.5% | 12.5% | 9% |    |    |            | 12.5% | 9% | 5% | 5% |
| 2.2μF                    |                       | 12.5% | 12.5% | 9% |    | 9% |            | 12.5% | 12.5% | 9% |    | 7% |            | 12.5% | 9% | 5% | 5% |
| 3.3μF                    |                       | 12.5% | 12.5% | 9% |    |    |            | 12.5% | 12.5% | 9% |    |    |            | 12.5% | 9% | 5% | 5% |
| 4.7μF                    |                       | 12.5% | 12.5% | 9% | 7% |    | 20%        | 12.5% | 12.5% | 9% |    | 7% |            | 12.5% | 9% | 5% | 5% |
| 6.8μF                    |                       | 16%   | 12.5% |    |    |    |            | 12.5% | 12.5% | 9% |    |    |            | 12.5% | 9% | 5% | 5% |
| 10μF                     | 20%                   | 16%   | 12.5% | 9% | 9% |    |            | 16%   | 12.5% | 9% | 7% |    |            | 12.5% | 9% | 5% | 5% |
| 22μF                     | 20%                   | 16%   |       |    |    |    | 20%        | 16%   | 16%   |    |    |    |            |       |    | 5% |    |
| 33μF                     |                       |       |       |    |    |    |            |       |       |    |    |    |            |       |    |    |    |
| 47μF                     |                       |       |       |    |    |    | 20%        | 16%   |       |    |    |    |            | 16%   | 9% |    |    |
| 100μF                    |                       |       |       |    |    |    | 20%*       |       |       |    |    |    | 20%        | 16%   |    |    |    |
| *2.8mm maximum thickness |                       |       |       |    |    |    |            |       |       |    |    |    |            |       |    |    |    |

\*2.8mm maximum thickness

Percentages in the table represent the dissipation factor for that value.

(CONSULT FACTORY  
FOR CAPACITANCE  
VALUES NOT LISTED)

