

# DATA SHEET

## SURFACE-MOUNT CERAMIC MULTILAYER CAPACITORS

01005

NPO/X5R/X7R

4 V TO 25 V

0.5 pF to 470 nF

RoHS compliant & Halogen Free



SCOPE

This specification describes 01005 NP0/X5R series chip capacitors with lead-free terminations.

APPLICATIONS

- Mobile
- Module

FEATURES

- Supplied in tape on reel
- Nickel-barrier end termination
- RoHS compliant
- Halogen Free compliant

ORDERING INFORMATION - GLOBAL PART NUMBER, PHYCOMP

CTC & I2NC

All part numbers are identified by the series, size, tolerance, TC material, packing style, voltage, process code, termination and capacitance value.

**YAGEO BRAND ordering code**

**GLOBAL PART NUMBER (PREFERRED)**

**CC** xxxx x x xxx x **B** x xxx  
 (1) (2) (3) (4) (5) (6) (7)

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**(1) SIZE – INCH BASED (METRIC)**

0100(0402)

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**(2) TOLERANCE**

- B = ±0.1pF
- C = ±0.25pF
- D = ±0.5pF
- J = ±5%
- K = ±10%
- M = ±20%

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**(3) PACKING STYLE**

R = Paper/PE taping reel; Reel 7 inch

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**(4) TC MATERIAL**

- NPO
- X5R
- X7R

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**(5) RATED VOLTAGE**

- 4 = 4 V
- 5 = 6.3V
- 6 = 10 V
- 7 = 16 V
- 8 = 25 V

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**(6) PROCESS**

- N = NPO
- B = Class 2 MLCC

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**(7) CAPACITANCE VALUE**

2 significant digits+number of zeros  
 The 3rd digit signifies the multiplying factor, and letter R is decimal point  
 Example: 121 = 12 × 10<sup>1</sup> = 120 pF

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**CONSTRUCTION**

The capacitor consists of a rectangular block of ceramic dielectric in which a number of interleaved metal electrodes are contained. This structure gives rise to a high capacitance per unit volume.

The inner electrodes are connected to the two end terminations and finally covered with a layer of plated tin (NiSn). The terminations are lead-free. A cross section of the structure is shown in Fig.1.

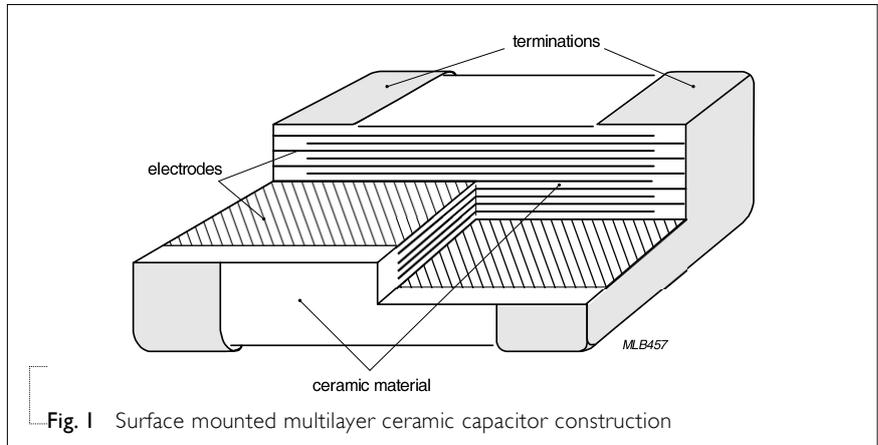


Fig. 1 Surface mounted multilayer ceramic capacitor construction

**DIMENSION**

Table I For outlines see fig. 2

| TYPE  | L <sub>1</sub> (mm) | W (mm)    | T (mm)    | L <sub>2</sub> / L <sub>3</sub> (mm) |      | L <sub>4</sub> (mm) |
|-------|---------------------|-----------|-----------|--------------------------------------|------|---------------------|
|       |                     |           |           | min.                                 | max. | min.                |
| 01005 | 0.4 ±0.02           | 0.2 ±0.02 | 0.2 ±0.02 | 0.07                                 | 0.14 | 0.13                |

**OUTLINES**

For dimension see Table I

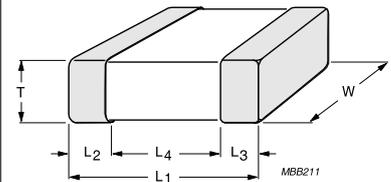


Fig. 2 Surface mounted multilayer ceramic capacitor dimension

**CAPACITANCE RANGE & THICKNESS**

Table 2 01005 Sizes

| CAP.       |          | NP0         | CAP.       |          |          | X5R      | CAP.       |            |          | X7R  |
|------------|----------|-------------|------------|----------|----------|----------|------------|------------|----------|------|
|            |          | 16 V / 25 V |            | 4V       | 6.3V     | 10V      |            | 6.3V / 10V | 16V      |      |
| 0.5 pF     | 0.2±0.02 |             | 100 pF     | 0.2±0.02 | 0.2±0.02 | 0.2±0.02 | 100 pF     | 0.2±0.02   | 0.2±0.02 |      |
| 0.6 pF     | 0.2±0.02 |             | 150 pF     | 0.2±0.02 | 0.2±0.02 | 0.2±0.02 | 150 pF     | 0.2±0.02   | 0.2±0.02 |      |
| 0.7 pF     | 0.2±0.02 |             | 220 pF     | 0.2±0.02 | 0.2±0.02 | 0.2±0.02 | 220 pF     | 0.2±0.02   | 0.2±0.02 |      |
| 0.75 pF    | 0.2±0.02 |             | 330 pF     | 0.2±0.02 | 0.2±0.02 | 0.2±0.02 | 330 pF     | 0.2±0.02   | 0.2±0.02 |      |
| 0.8 pF     | 0.2±0.02 |             | 470 pF     | 0.2±0.02 | 0.2±0.02 | 0.2±0.02 | 470 pF     | 0.2±0.02   | 0.2±0.02 |      |
| 0.9 pF     | 0.2±0.02 |             | 680 pF     | 0.2±0.02 | 0.2±0.02 | 0.2±0.02 | 680 pF     | 0.2±0.02   | 0.2±0.02 |      |
| 1.0 pF     | 0.2±0.02 |             | 1 000 pF   | 0.2±0.02 | 0.2±0.02 | 0.2±0.02 | 1 000 pF   | 0.2±0.02   | 0.2±0.02 |      |
| 1.2 pF     | 0.2±0.02 |             | 2.2 nF     | 0.2±0.02 | 0.2±0.02 | 0.2±0.02 | 2.2 nF     |            |          |      |
| 1.5 pF     | 0.2±0.02 |             | 4.7 nF     | 0.2±0.02 | 0.2±0.02 | 0.2±0.02 | 4.7 nF     |            |          |      |
| 1.8 pF     | 0.2±0.02 |             | 10 nF      | 0.2±0.02 | 0.2±0.02 | 0.2±0.02 | 10 nF      |            |          |      |
| 2.2 pF     | 0.2±0.02 |             | 22nF       | 0.2±0.02 | 0.2±0.02 |          | 22nF       |            |          |      |
| 2.7 pF     | 0.2±0.02 |             | 47 nF      | 0.2±0.02 | 0.2±0.02 |          | 47 nF      |            |          |      |
| 3.3 pF     | 0.2±0.02 |             | 100 nF     | 0.2±0.02 | 0.2±0.02 | 0.2±0.02 | 100 nF     |            |          |      |
| 3.9 pF     | 0.2±0.02 |             | 220 nF     | 0.2±0.02 | 0.2±0.02 |          | 220 nF     |            |          |      |
| 4.7 pF     | 0.2±0.02 |             | 470 nF     | 0.2±0.02 | 0.2±0.02 |          |            |            |          |      |
| 5.6 pF     | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 6.8 pF     | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 8.2 pF     | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 10 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 12 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 15 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 18 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 22 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 27 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 33 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 39 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 47 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 56 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 68 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 82 pF      | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| 100 pF     | 0.2±0.02 |             |            |          |          |          |            |            |          |      |
| Tape width |          | 8 mm        | Tape width |          |          | 8 mm     | Tape width |            |          | 8 mm |

THICKNESS CLASSES AND PACKING QUANTITY

Table 3

| SIZE CODE | THICKNESS CLASSIFICATION | TAPE WIDTH QUANTITY PER REEL | Ø180 MM / 7 INCH |         | Ø330 MM / 13 INCH |         | QUANTITY PER BULK CASE |
|-----------|--------------------------|------------------------------|------------------|---------|-------------------|---------|------------------------|
|           |                          |                              | Paper/PE         | Blister | Paper/            | Blister |                        |
| 01005     | 0.2 ±0.02 mm             | 8 mm                         | 20,000           | ---     | ---               | ---     | ---                    |

ELECTRICAL CHARACTERISTICS

**NP0/X5R DIELECTRIC CAPACITORS; NISN TERMINATIONS**

Unless otherwise specified, all test and measurements shall be made under standard atmospheric conditions for testing as given in 5.3 of IEC 60068-1:

- Temperature: 15 °C to 35 °C
- Relative humidity: 25% to 75%
- Air pressure: 86 kPa to 106 kPa

Before the measurements are made, the capacitor shall be stored at the measuring temperature for a time sufficient to allow the entire capacitor to reach this temperature.

The period as prescribed for recovery at the end of a test is normally sufficient for this purpose.

Table 4

| DESCRIPTION   | VALUE  |
|---|--|
| Capacitance range   | 0.5 pF to 470 nF   |
| Capacitance tolerance   |  |
| C < 10 pF   | ±0.1pF, ±0.25pF, ±0.5pF  |
| NP0      C ≥ 10 pF  | ±5%, ±10%  |
| X5R / X7R   | ±10%, ±20%   |
| Dissipation factor (D.F.)   |  |
| NP0      C < 30 pF  | ≤ 1 / ( 400 + 20C )  |
| C ≥ 30 pF   | ≤ 0.1 %  |
| X5R / X7R   | ≤ 10 %   |
| Insulation resistance after 1 minute at U <sub>r</sub> (DC)                                       | R <sub>ins</sub> ≥ 10 GΩ or R <sub>ins</sub> × C ≥ 500Ω · F whichever is less<br>X5R/X7R > 10nF:<br>R <sub>ins</sub> × C ≥ 50Ω · F |
| Maximum capacitance change as a function of temperature (temperature characteristic/coefficient): |  |
| NP0   | ±30 ppm/°C   |
| X5R / X7R   | ±15%   |
| Operating temperature range:  |  |
| NP0   | -55 °C to +125 °C  |
| X5R   | -55 °C to +85 °C   |
| X7R   | -55 °C to +125 °C  |

**SOLDERING RECOMMENDATION**

Table 5

| SOLDERING METHOD | SIZE         |
|------------------|--------------|
|                  | <b>01005</b> |
| Reflow           | Reflow only  |
| Reflow/Wave      | ---          |

**TESTS AND REQUIREMENTS**

Table 6 Test procedures and requirements

| TEST                                  | TEST METHOD         | PROCEDURE  | REQUIREMENTS                     |
|---------------------------------------|---------------------|--|----------------------------------|
| Mounting                              | IEC 60384-21/22 4.3 | The capacitors may be mounted on printed-circuit boards or ceramic substrates  | No visible damage                |
| Visual Inspection and Dimension Check | 4.4                 | Any applicable method using × 10 magnification   | In accordance with specification |
| Capacitance                           | 4.5.1               | <p>Class 1:<br/> <math>f = 1 \text{ MHz}</math> for <math>C \leq 1 \text{ nF}</math>, measuring at voltage <math>1 V_{\text{rms}}</math> at <math>20 \text{ }^\circ\text{C}</math><br/> <math>f = 1 \text{ KHz}</math> for <math>C &gt; 1 \text{ nF}</math>, measuring at voltage <math>1 V_{\text{rms}}</math> at <math>20 \text{ }^\circ\text{C}</math></p> <p>Class 2:<br/> <math>C \leq 1 \text{ nF}</math><br/> <math>f = 1 \text{ KHz}</math>, measuring at voltage <math>1 V_{\text{rms}}</math> at <math>20 \text{ }^\circ\text{C}</math></p> <p><math>C &gt; 1 \text{ nF}</math><br/> <math>f = 1 \text{ KHz}</math>, rated voltage <math>\leq 6.3 \text{ V}</math>, measuring at voltage <math>0.5 V_{\text{rms}}</math> at <math>20 \text{ }^\circ\text{C}</math><br/> <math>f = 1 \text{ KHz}</math>, rated voltage <math>&gt; 10 \text{ V}</math>, measuring at voltage <math>1 V_{\text{rms}}</math> at <math>20 \text{ }^\circ\text{C}</math></p>   | Within specified tolerance       |
| Dissipation Factor (D.F.)             | 4.5.2               | <p>Class 1:<br/> <math>f = 1 \text{ MHz}</math> for <math>C \leq 1 \text{ nF}</math>, measuring at voltage <math>1 V_{\text{rms}}</math> at <math>20 \text{ }^\circ\text{C}</math><br/> <math>f = 1 \text{ KHz}</math> for <math>C &gt; 1 \text{ nF}</math>, measuring at voltage <math>1 V_{\text{rms}}</math> at <math>20 \text{ }^\circ\text{C}</math></p> <p>Class 2:<br/> <math>C \leq 1 \text{ nF}</math><br/> <math>f = 1 \text{ KHz}</math>, measuring at voltage <math>1 V_{\text{rms}}</math> at <math>20 \text{ }^\circ\text{C}</math></p> <p><math>C &gt; 1 \text{ nF}</math><br/> <math>f = 1 \text{ KHz}</math>, rated voltage <math>\leq 6.3 \text{ V}</math>,<br/>                     measuring at voltage <math>0.5 V_{\text{rms}}</math> at <math>20 \text{ }^\circ\text{C}</math><br/> <math>f = 1 \text{ KHz}</math>, rated voltage <math>&gt; 10 \text{ V}</math>,<br/>                     measuring at voltage <math>1 V_{\text{rms}}</math> at <math>20 \text{ }^\circ\text{C}</math></p> | In accordance with specification |
| Insulation Resistance                 | 4.5.3               | At $U_r$ (DC) for 1 minute   | In accordance with specification |

| TEST                    | TEST METHOD           | PROCEDURE   | REQUIREMENTS   |      |                 |   |      |   |                       |   |      |   |
|-------------------------|-----------------------|---|--|------|-----------------|---|------|---|-----------------------|---|------|---|
| Temperature coefficient | 4.6                   | Capacitance shall be measured by the steps shown in the following table.<br>The capacitance change should be measured after 5 min at each specified temperature stage.  | $\Delta C/C$<br>Class I (NP0):<br>$\pm 30\text{ppm}$<br><br>Class 2: (X7R/X5R):<br>$\pm 15\%$<br><br>In case of applying voltage, the capacitance change should be measured after 1 more min. with applying voltage in equilibration of each temp. stage.<br><br>CC0100MRX5R4(5)BB104(224):<br>$0.2V \pm 0.1V_{rms}$ |      |                 |   |      |   |                       |   |      |   |
|                         |                       | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> </tr> </thead> <tbody> <tr> <td>a</td> <td>25±2</td> </tr> <tr> <td>b</td> <td>Lower temperature±3°C</td> </tr> <tr> <td>c</td> <td>25±2</td> </tr> <tr> <td>d</td> <td>Upper Temperature±2°C</td> </tr> <tr> <td>e</td> <td>25±2</td> </tr> </tbody> </table> <p>(1) Class I<br/>Temperature Coefficient shall be calculated from the formula as below<br/> <math display="block">\text{Temp. Coefficient} = \frac{C2 - C1}{C1 \times \Delta T} \times 10^6 \text{ [ppm/°C]}</math>                     C1: Capacitance at step c<br/>                     C2: Capacitance at 125°C<br/> <math>\Delta T: 100\text{°C}(=125\text{°C}-25\text{°C})</math><br/>                     Measuring Voltage: 0.5 to 5 Vrms</p> <p>(2) Class II<br/>Capacitance Change shall be calculated from the formula as below<br/> <math display="block">\Delta C = \frac{C2 - C1}{C1} \times 100\%</math>                     C1: Capacitance at step c<br/>                     C2: Capacitance at step b or d</p> |  | Step | Temperature(°C) | a | 25±2 | b | Lower temperature±3°C | c | 25±2 | d |
| Step                    | Temperature(°C)       |   |  |      |                 |   |      |   |                       |   |      |   |
| a                       | 25±2                  |   |  |      |                 |   |      |   |                       |   |      |   |
| b                       | Lower temperature±3°C |   |  |      |                 |   |      |   |                       |   |      |   |
| c                       | 25±2                  |   |  |      |                 |   |      |   |                       |   |      |   |
| d                       | Upper Temperature±2°C |   |  |      |                 |   |      |   |                       |   |      |   |
| e                       | 25±2                  |   |  |      |                 |   |      |   |                       |   |      |   |
| Adhesion                | IEC 60384-21/22       | 4.7 A force applied for 10 seconds to the line joining the terminations and in a plane parallel to the substrate  | Force size 01005 : 1N  |      |                 |   |      |   |                       |   |      |   |
| Bending Strength        |                       | 4.8 Mounting in accordance with IEC 60384-22 paragraph 4.3<br><br>Conditions: bending 1 mm at a rate of 1 mm/s, radius jig 5 mm   | No visible damage<br><br><hr/> $\Delta C/C$<br>Class I (NP0):<br>within $\pm 1\%$ or 0.5 pF, whichever is greater<br><br>Class2 (X5R/X7R):<br>$\pm 10\%$   |      |                 |   |      |   |                       |   |      |   |

| TEST                         | TEST METHOD          | PROCEDURE   | REQUIREMENTS  |
|------------------------------|----------------------|---|---|
| Resistance to Soldering Heat | 4.9                  | <p>Precondition: 150 +0/-10 °C for 1 hour, then keep for 24 ±1 hours at room temperature</p> <p>Preheating: 120 °C to 150 °C for 1 minute and 170 °C to 200 °C for 1 minute.</p> <p>Solder bath temperature: 260 ±5 °C</p> <p>Dipping time: 10 ±0.5 seconds</p> <p>Recovery time: 24 ±2 hours</p> | <p>Dissolution of the end face plating shall not exceed 25% of the length of the edge concerned</p> <hr/> <p><math>\Delta C/C</math></p> <p>Class I (NP0):<br/>within ±0.5% or 0.5 pF, whichever is greater</p> <p>Class2 (X5R/X7R):<br/>±10%</p> <hr/> <p>D.F. within initial specified value</p> <p><math>R_{ins}</math> within initial specified value</p> |
| Solderability                | 4.10                 | <p>Preheated the temperature of 80 °C to 140 °C and maintained for 30 seconds to 60 seconds.</p> <p>Test conditions for leadfree containing solder alloy</p> <p>Temperature: 245 ±5 °C</p> <p>Dipping time: 3 ±0.3 seconds</p> <p>Depth of immersion: 10 mm</p>                                   | <p>The solder should cover over 95% of the critical area of each termination</p>  |
| Rapid Change of Temperature  | IEC 60384-21/22 4.11 | <p>Preconditioning; 150 +0/-10 °C for 1 hour, then keep for 24 ±1 hours at room temperature</p> <p>5 cycles with following detail:<br/>30 minutes at lower category temperature<br/>30 minutes at upper category temperature</p> <p>Recovery time 24 ±2 hours</p>                                 | <p>No visual damage</p> <hr/> <p><math>\Delta C/C</math></p> <p>Class I (NP0):<br/>within ±2.5% or 0.25 pF, whichever is greater</p> <p>Class2 (X5R/X7R):<br/>±15%</p> <hr/> <p>D.F. meet initial specified value</p> <p><math>R_{ins}</math> meet initial specified value</p>  |



| TEST      | TEST METHOD     | PROCEDURE  | REQUIREMENTS   |
|-----------|-----------------|--|--|
| Damp Heat | with<br>Ur load | 4.13<br>1. Preconditioning, class 2 only:<br>150 +0/-10 °C /1 hour, then keep for<br>24 ± 1 hour at room temp<br>2. Initial measure:<br>Spec: refer initial spec C, D, IR<br>3. Damp heat test:<br>500 ± 12 hours at 40 ± 2 °C;<br>90 to 95% R.H; 1.0 Ur applied.<br>4. Recovery:<br>Class 1: 6 to 24 hours<br>Class 2: 24 ± 2 hours<br>5. Final measure: C, D, IR<br><br>P.S. If the capacitance value is less than the<br>minimum value permitted, then after the other<br>measurements have been made the capacitor shall<br>be precondition according to "IEC 60384 4.1" and<br>then the requirement shall be met. | No visual damage after recovery<br><br><hr/> Class 1 (NP0):<br>$\Delta C/C$<br>within ±7.5% or 0.75 pF, whichever is greater<br>D.F.<br>$\leq 2 \times$ specified value<br>I.R.<br>$\geq 2,500 \text{ M}\Omega$ or $R_{ins} \times Cr \geq 25\Omega \cdot F$ whichever<br>is less<br><br>Class2 (X5R/X7R):<br>$C \leq 1nF$<br>$\Delta C/C$<br>$\pm 15\%$<br>D.F.<br>$\leq 10\%$<br>I.R.<br>$\geq 500 \text{ M}\Omega$<br><br>$10nF \geq C > 1nF$<br>$\Delta C/C$<br>$\pm 20\%$<br>D.F.<br>$\leq 10\%$<br>I.R.<br>$\geq 500 \text{ M}\Omega$<br><br>$C > 10nF$<br>$\Delta C/C$<br>$\pm 25\%$<br>D.F.<br>$\leq 20\%$<br>I.R.<br>$R_{ins} \times Cr \geq 5\Omega \cdot F$ |

| TEST      | TEST METHOD     | PROCEDURE   | REQUIREMENTS  |
|-----------|-----------------|---|---|
| Endurance | IEC 60384-21/22 | 4.14<br>1. Preconditioning, class 2 only:<br>150 +0/-10 °C /1 hour, then keep for<br>24 ±1 hour at room temp<br>2. Initial measure:<br>Spec: refer initial spec C, D, IR<br>3. Endurance test:<br>Temperature: NP0: 125 °C<br>Specified stress voltage applied for 1,000 hours:<br>Applied 2.0 × U <sub>r</sub> for general product<br>Temperature: X5R: 85°C, X7R: 125°C<br>Specified stress voltage applied for 1,000 hours:<br>Applied 1.5 × U <sub>r</sub> for general product<br>4. Recovery time: 24 ±2 hours<br>5. Final measure: C, D, IR<br><br>P.S. If the capacitance value is less than the<br>minimum value permitted, then after the other<br>measurements have been made the capacitor shall<br>be precondition according to "IEC 60384 4.1" and<br>then the requirement shall be met. | No visual damage<br><br>Class 1 (NP0):<br>$\Delta C/C$<br>within ±3% or 0.3 pF, whichever is greater<br>D.F.<br>$\leq 2 \times$ specified value<br>I.R.<br>$\geq 4,000 \text{ M}\Omega$ or $R_{\text{ins}} \times Cr \geq 40\Omega \cdot F$ whichever<br>is less<br><br>Class2 (X5R/X7R):<br>$C \leq 1\text{nF}$<br>$\Delta C/C$<br>$\pm 15\%$<br>D.F.<br>$\leq 10\%$<br>I.R.<br>$\geq 1G\Omega$<br><br>$10\text{nF} \geq C > 1\text{nF}$<br>$\Delta C/C$<br>$\pm 15\%$<br>D.F.<br>$\leq 10\%$<br>I.R.<br>$\geq 1G\Omega$<br><br>$C > 10\text{nF}$<br>$\Delta C/C$<br>$\pm 25\%$<br>D.F.<br>$\leq 20\%$<br>I.R.<br>$R_{\text{ins}} \times Cr \geq 10\Omega \cdot F$ |
|           |                 |   | Voltage Proof IEC 60384-1 4.5.4 Specified stress voltage applied for 1~5 seconds<br>$U_r \leq 100 \text{ V}$ : series applied 2.5 U <sub>r</sub><br>Charge/Discharge current is less than 50 mA   |

REVISION HISTORY

| REVISION   | DATE          | CHANGE NOTIFICATION | DESCRIPTION   |
|------------|---------------|---------------------|---|
| Version 10 | May 5, 2017   | -                   | - Rated voltage of NPO series extend to 25 V<br>- Add X5R, 470nF, 4V to 6.3V and 100nF, 10V |
| Version 9  | Jan. 17, 2017 | -                   | - Test condition updated  |
| Version 8  | Jan. 12, 2016 | -                   | - Capacitance range & thickness update  |
| Version 7  | Oct. 31, 2015 | -                   | - Capacitance range & thickness update  |
| Version 6  | Jun. 29, 2015 | -                   | - Test procedures and requirements  |
| Version 5  | Jun. 06, 2013 | -                   | - Test procedures and requirements  |
| Version 4  | Mar. 27, 2013 | -                   | - Change Tolerance  |
| Version 3  | Jan. 15, 2013 | -                   | - Change Range  |
| Version 2  | Oct. 23, 2012 | -                   | - Change Range  |
| Version 1  | July 03, 2012 | -                   | - Change Range  |
| Version 0  | Apr 16, 2012  | -                   | - New   |

## X-ON Electronics

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[NMC0603NPO201J50TRPF](#) [NMC0603NPO330G50TRPF](#) [NMC0603NPO331F50TRPF](#) [NMC0603X5R475M6.3TRPF](#)  
[NMC0805NPO220J100TRPF](#) [NMC0805NPO270J50TRPF](#) [NMC0805NPO681F50TRPF](#) [NMC0805NPO820J50TRPF](#)  
[NMC0805X7R224K16TRPLPF](#) [NMC1206X7R102K50TRPF](#) [NMC1206X7R106K10TRPLPF](#) [NMC1206X7R475K10TRPLPF](#) [NMC-](#)  
[H0805X7R472K250TRPF](#) [C1608C0G2A221J](#) [C1608X7R1E334K](#) [C2012C0G2A472J](#) [2220J2K00562KXT](#) [CCR06CG153FSV](#)  
[CDR31BX103AKWR](#) [CDR33BX683AKUS](#) [CGA3E1X7R1C684K](#) [CL05B183KO5NNNC](#) [CL10C0R8BB8ANNC](#) [M39014/01-1535V](#)  
[M55342H06B20G0R-T/R](#) [C1005X5R0G225M](#) [C2012X7R2E223K](#) [C3216C0G2J272J](#) [D55342E07B35E7R-T/R](#) [CDR34BX563BKWS](#)  
[NMC0402NPO220F50TRPF](#) [NMC0402X7R562J25TRPF](#) [NMC0603NPO102J25TRPF](#) [NMC1206X7R332K50TRPF](#) [NMC-](#)  
[P1206X7R104K250TRPLPF](#) [726632-1](#) [CGA6M3X7R1H225K](#) [CGA5L2X7R2A105K](#) [CGA3E2X8R1H223K](#)