



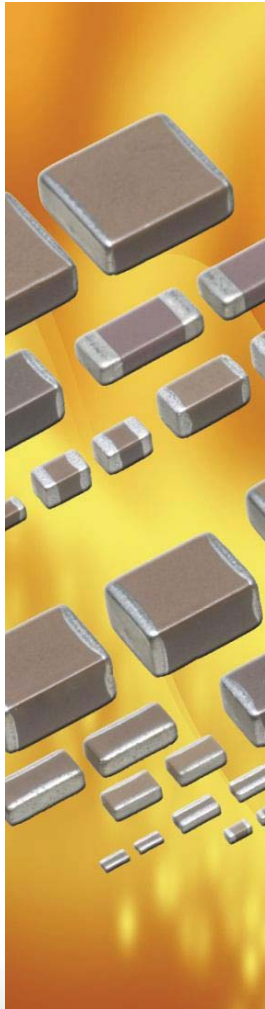
## MULTILAYER CERAMIC CHIP CAPACITORS

### **C Series Commercial Grade High Temperature Application**

Type:

C1005 [EIA CC0402]  
C1608 [EIA CC0603]  
C2012 [EIA CC0805]  
C3216 [EIA CC1206]  
C3225 [EIA CC1210]  
C4532 [EIA CC1812]  
C5750 [EIA CC2220]

Issue date:  
Jun 2015



## REMINDERS

Please read before using this product

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(Example)

| Catalog Issued date    | Catalog Number      | Item Description (On Delivery Label) |
|------------------------|---------------------|--------------------------------------|
| Prior to January 2013  | C1608C0G1E103J      | C1608C0G1E103JT000N                  |
| January 2013 and Later | C1608C0G1E103J080AA | C1608C0G1E103JT000N                  |



## C Series High Temperature Application

Type: C1005 [EIA CC0402], C1608 [EIA CC0603], C2012 [EIA CC0805],  
C3216 [EIA CC1206], C3225 [EIA CC1210], C4532 [EIA CC1812], C5750 [EIA CC2220]



### Features



- With a maximum temperature of 150°C and a capacitance change within ±15%, the series is suited for devices that operate in high-temperature environments.
- Excellent DC bias properties.

| Parameters            | Specifications  |
|-----------------------|---|
| Temperature           | -55 to 150°C  |
| Characteristics       | ΔC/C: ±15% or 0 ± 30ppm   |
| Operating Temperature | -55 to +150°C   |
| Dissipation Factor    | 5% maximum  |
| Insulation Resistance | 10 GΩ or 500 MΩ • μF minimum  |
| Voltage Proof         | 2.5 • Rated Voltage or 3 • Rated Voltage for 1 to 5 seconds<br>Charge/Discharge ≤ 50 mA |

### Applications



- Automotive applications (engine rooms)
- Measurement instruments used at high temperature environments
- LCD display
- Sensor Module
- Smoothing and decoupling applications for other devices that operate at high temperature

### Shape & Dimensions



|   |                  |
|---|------------------|
| L | Body Length      |
| W | Body Width       |
| T | Body Height      |
| B | Terminal Width   |
| G | Terminal Spacing |



### Catalog Number Construction

**C • 3225 • X8R • 1C • 106 • K • 250 • A • B**

#### Series Name

#### Dimensions L x W (mm)

| Code  | Length      | Width       | Terminal  |
|-------|-------------|-------------|-----------|
| C1005 | 1.00 ± 0.05 | 0.50 ± 0.05 | 0.10 min. |
| C1608 | 1.60 ± 0.10 | 0.80 ± 0.10 | 0.20 min. |
| C2012 | 2.00 ± 0.20 | 1.25 ± 0.20 | 0.20 min. |
| C3216 | 3.20 ± 0.20 | 1.60 ± 0.20 | 0.20 min. |
| C3225 | 3.20 ± 0.40 | 2.50 ± 0.30 | 0.20 min. |
| C4532 | 4.50 ± 0.40 | 3.20 ± 0.40 | 0.20 min. |
| C5750 | 5.70 ± 0.40 | 5.00 ± 0.40 | 0.20 min. |

\*Dimensional tolerances are typical values.

#### Temperature Characteristics

| Temperature Characteristics | Temperature Coefficient or Capacitance Change | Temperature Range |
|-----------------------------|---|-------------------|
| NP0                         | 0 ± 30ppm/°C                                  | -55 to +150°C     |
| X8R                         | ±15%  | -55 to +150°C     |

#### Rated Voltage (DC)

| Code | Voltage (DC) | Code | Voltage (DC) |
|------|--------------|------|--------------|
| 1C   | 16V          | 2A   | 100V         |
| 1E   | 25V          | 2E   | 250V         |
| 1H   | 50V          | 2W   | 450V         |
|      |              | 2J   | 630V         |

#### Nominal Capacitance (pF)

The capacitance is expressed in three digit codes and in units of pico Farads (pF). The first and second digits identify the first and second significant figures of the capacitance. The third digit identifies the multiplier. R designates a decimal point.

Ex. 0R2 = 0.2pF; 103 = 10,000pF; 105 = 1,000,000pF = 1,000nF

#### Capacitance Tolerance

| Code | Tolerance |
|------|-----------|
| C    | ± 0.25pF  |
| D    | ± 0.50pF  |
| J    | ± 5%      |
| K    | ± 10%     |
| M    | ± 20%     |

#### Nominal Thickness

| Code | Thickness | Code | Thickness |
|------|-----------|------|-----------|
| 050  | 0.50 mm   | 230  | 2.30 mm   |
| 060  | 0.60 mm   | 250  | 2.50 mm   |
| 080  | 0.80 mm   | 280  | 2.80 mm   |
| 085  | 0.85 mm   | 320  | 3.20 mm   |
| 115  | 1.15 mm   |      |           |
| 125  | 1.25 mm   |      |           |
| 160  | 1.60 mm   |      |           |
| 200  | 2.00 mm   |      |           |

#### Packaging Style

| Code | Style                   |
|------|-------------------------|
| A    | 178 mm Reel, 4 mm Pitch |
| B    | 178 mm Reel, 2 mm Pitch |
| K    | 178 mm Reel, 8 mm Pitch |

#### Special Reserved Code

| Code | Description       |
|------|-------------------|
| A, B | TDK Internal Code |



## Capacitance Range Chart

## EIA CC0402 [C1005]

### Capacitance Range Chart

Temperature Characteristics: NP0 ( $0 \pm 30\text{ppm}/^\circ\text{C}$ ), X8R ( $\pm 15\%$ )  
 Rated Voltage: 100V (2A), 50V (1H), 25V (1E), 16V (1C)

| Capacitance (pF) | Code | Tolerance              | NP0       |          | X8R       |          |          |          |
|------------------|------|------------------------|-----------|----------|-----------|----------|----------|----------|
|                  |      |                        | 2A (100V) | 1H (50V) | 2A (100V) | 1H (50V) | 1E (25V) | 1C (16V) |
| 1                | 010  | C: $\pm 0.25\text{pF}$ |           |          |           |          |          |          |
| 1.5              | 1R5  | D: $\pm 0.50\text{pF}$ |           |          |           |          |          |          |
| 2                | 020  | J: $\pm 5\%$           |           |          |           |          |          |          |
| 2.2              | 2R2  | K: $\pm 10\%$          |           |          |           |          |          |          |
| 3                | 030  | M: $\pm 20\%$          |           |          |           |          |          |          |
| 3.3              | 3R3  |                        |           |          |           |          |          |          |
| 4                | 040  |                        |           |          |           |          |          |          |
| 4.7              | 4R7  |                        |           |          |           |          |          |          |
| 5                | 050  |                        |           |          |           |          |          |          |
| 6                | 060  |                        |           |          |           |          |          |          |
| 6.8              | 6R8  |                        |           |          |           |          |          |          |
| 7                | 070  |                        |           |          |           |          |          |          |
| 8                | 080  |                        |           |          |           |          |          |          |
| 9                | 090  |                        |           |          |           |          |          |          |
| 10               | 100  |                        |           |          |           |          |          |          |
| 12               | 120  |                        |           |          |           |          |          |          |
| 15               | 150  |                        |           |          |           |          |          |          |
| 18               | 180  |                        |           |          |           |          |          |          |
| 22               | 220  |                        |           |          |           |          |          |          |
| 27               | 270  |                        |           |          |           |          |          |          |
| 33               | 330  |                        |           |          |           |          |          |          |
| 39               | 390  |                        |           |          |           |          |          |          |
| 47               | 470  |                        |           |          |           |          |          |          |
| 56               | 560  |                        |           |          |           |          |          |          |
| 68               | 680  |                        |           |          |           |          |          |          |
| 82               | 820  |                        |           |          |           |          |          |          |
| 100              | 101  |                        |           |          |           |          |          |          |
| 120              | 121  |                        |           |          |           |          |          |          |
| 150              | 151  |                        |           |          |           |          |          |          |
| 180              | 181  |                        |           |          |           |          |          |          |
| 220              | 221  |                        |           |          |           |          |          |          |
| 270              | 271  |                        |           |          |           |          |          |          |
| 330              | 331  |                        |           |          |           |          |          |          |
| 390              | 391  |                        |           |          |           |          |          |          |
| 470              | 471  |                        |           |          |           |          |          |          |
| 560              | 561  |                        |           |          |           |          |          |          |
| 680              | 681  |                        |           |          |           |          |          |          |
| 820              | 821  |                        |           |          |           |          |          |          |
| 1,000            | 102  |                        |           |          |           |          |          |          |
| 1,500            | 152  |                        |           |          |           |          |          |          |
| 2,200            | 222  |                        |           |          |           |          |          |          |
| 3,300            | 332  |                        |           |          |           |          |          |          |
| 4,700            | 472  |                        |           |          |           |          |          |          |
| 6,800            | 682  |                        |           |          |           |          |          |          |
| 10,000           | 103  |                        |           |          |           |          |          |          |
| 15,000           | 153  |                        |           |          |           |          |          |          |
| 22,000           | 223  |                        |           |          |           |          |          |          |
| 33,000           | 333  |                        |           |          |           |          |          |          |
| 47,000           | 473  |                        |           |          |           |          |          |          |

Standard Thickness  
 0.50 mm



## Capacitance Range Chart

## EIA CC0603 [C1608]

### Capacitance Range Chart

Temperature Characteristics: NPO ( $0 \pm 30\text{ppm}/^\circ\text{C}$ ), X8R ( $\pm 15\%$ )  
 Rated Voltage: 250V (2E), 100V (2A), 50V (1H), 25V (1E), 16V (1C)

| Capacitance (pF) | Code | Tolerance  | NPO       |           |          |
|------------------|------|--|-----------|-----------|----------|
|                  |      |  | 2E (250V) | 2A (100V) | 1H (50V) |
| 1                | 010  | C: $\pm 0.25\text{pF}$<br>D: $\pm 0.50\text{pF}$<br>J: $\pm 5\%$ |           |           |          |
| 2                | 1R5  |  |           |           |          |
| 2                | 020  |  |           |           |          |
| 2                | 2R2  |  |           |           |          |
| 3                | 030  |  |           |           |          |
| 3                | 3R3  |  |           |           |          |
| 4                | 040  |  |           |           |          |
| 5                | 4R7  |  |           |           |          |
| 5                | 050  |  |           |           |          |
| 6                | 060  |  |           |           |          |
| 7                | 6R8  |  |           |           |          |
| 7                | 070  |  |           |           |          |
| 8                | 080  |  |           |           |          |
| 9                | 090  |  |           |           |          |
| 10               | 100  |  |           |           |          |
| 12               | 120  |  |           |           |          |
| 15               | 150  |  |           |           |          |
| 18               | 180  |  |           |           |          |
| 22               | 220  |  |           |           |          |
| 27               | 270  |  |           |           |          |
| 33               | 330  |  |           |           |          |
| 39               | 390  |  |           |           |          |
| 47               | 470  |  |           |           |          |
| 56               | 560  |  |           |           |          |
| 68               | 680  |  |           |           |          |
| 82               | 820  |  |           |           |          |
| 100              | 101  |  |           |           |          |
| 120              | 121  |  |           |           |          |
| 150              | 151  |  |           |           |          |
| 180              | 181  |  |           |           |          |
| 220              | 221  |  |           |           |          |
| 270              | 271  |  |           |           |          |
| 330              | 331  |  |           |           |          |
| 390              | 391  |  |           |           |          |
| 470              | 471  |  |           |           |          |
| 560              | 561  |  |           |           |          |
| 680              | 681  |  |           |           |          |
| 820              | 821  |  |           |           |          |
| 1,000            | 102  |  |           |           |          |
| 1,200            | 122  |  |           |           |          |
| 1,500            | 152  |  |           |           |          |
| 1,800            | 182  |  |           |           |          |
| 2,200            | 222  |  |           |           |          |
| 2,700            | 272  |  |           |           |          |
| 3,300            | 332  |  |           |           |          |
| 3,900            | 392  |  |           |           |          |
| 4,700            | 472  |  |           |           |          |
| 5,600            | 562  |  |           |           |          |
| 6,800            | 682  |  |           |           |          |
| 8,200            | 822  |  |           |           |          |
| 10,000           | 103  |  |           |           |          |

| Capacitance (pF) | Code | Tolerance                      | X8R       |          |          |          |
|------------------|------|--------------------------------|-----------|----------|----------|----------|
|                  |      |                                | 2A (100V) | 1H (50V) | 1E (25V) | 1C (16V) |
| 1,000            | 102  | K: $\pm 10\%$<br>M: $\pm 20\%$ |           |          |          |          |
| 1,500            | 152  |                                |           |          |          |          |
| 2,200            | 222  |                                |           |          |          |          |
| 3,300            | 332  |                                |           |          |          |          |
| 4,700            | 472  |                                |           |          |          |          |
| 6,800            | 682  |                                |           |          |          |          |
| 10,000           | 103  |                                |           |          |          |          |
| 15,000           | 153  |                                |           |          |          |          |
| 22,000           | 223  |                                |           |          |          |          |
| 33,000           | 333  |                                |           |          |          |          |
| 47,000           | 473  |                                |           |          |          |          |
| 68,000           | 683  |                                |           |          |          |          |
| 100,000          | 104  |                                |           |          |          |          |
| 150,000          | 154  |                                |           |          |          |          |
| 220,000          | 224  |                                |           |          |          |          |
| 330,000          | 334  |                                |           |          |          |          |
| 470,000          | 474  |                                |           |          |          |          |

Standard Thickness  
 0.80 mm



## Capacitance Range Chart

## EIA CC0805 [C2012]

### Capacitance Range Chart

Temperature Characteristics: NP0 ( $0 \pm 30\text{ppm}/^\circ\text{C}$ ), X8R ( $\pm 15\%$ )

Rated Voltage: 450V(2W), 250V(2E), 100V(2A), 50V(1H), 25V(1E), 16V(1C)

| Capacitance (pF) | Code | Tolerance     | NP0       |           |           |          | X8R       |          |          |          |  |
|------------------|------|---------------|-----------|-----------|-----------|----------|-----------|----------|----------|----------|--|
|                  |      |               | 2W (450V) | 2E (250V) | 2A (100V) | 1H (50V) | 2A (100V) | 1H (50V) | 1E (25V) | 1C (16V) |  |
| 100              | 101  | J: $\pm 5\%$  | █         |           |           |          |           |          |          |          |  |
| 120              | 121  | K: $\pm 10\%$ | █         |           |           |          |           |          |          |          |  |
| 150              | 151  | M: $\pm 20\%$ | █         |           |           |          |           |          |          |          |  |
| 180              | 181  |               | █         |           |           |          |           |          |          |          |  |
| 220              | 221  |               | █         |           |           |          |           |          |          |          |  |
| 270              | 271  |               | █         |           |           |          |           |          |          |          |  |
| 330              | 331  |               | █         |           |           |          |           |          |          |          |  |
| 390              | 391  |               | █         |           |           |          |           |          |          |          |  |
| 470              | 471  |               | █         |           |           |          |           |          |          |          |  |
| 560              | 561  |               | █         |           |           |          |           |          |          |          |  |
| 680              | 681  |               | █         |           |           |          |           |          |          |          |  |
| 820              | 821  |               | █         |           |           |          |           |          |          |          |  |
| 1,000            | 102  |               | █         |           | █         |          |           |          |          |          |  |
| 1,200            | 122  |               | █         |           | █         |          |           |          |          |          |  |
| 1,500            | 152  |               | █         |           | █         |          |           |          |          |          |  |
| 1,800            | 182  |               | █         |           | █         |          |           |          |          |          |  |
| 2,200            | 222  |               | █         |           | █         |          |           |          |          |          |  |
| 2,700            | 272  |               | █         |           | █         |          |           |          |          |          |  |
| 3,300            | 332  |               | █         | █         | █         | █        |           |          |          |          |  |
| 3,900            | 392  |               | █         | █         | █         | █        |           |          |          |          |  |
| 4,700            | 472  |               | █         | █         | █         | █        |           |          |          |          |  |
| 5,600            | 562  |               | █         | █         | █         | █        |           |          |          |          |  |
| 6,800            | 682  |               | █         | █         | █         | █        |           |          |          |          |  |
| 8,200            | 822  |               | █         | █         | █         | █        |           |          |          |          |  |
| 10,000           | 103  |               | █         | █         | █         | █        |           |          |          |          |  |
| 15,000           | 153  |               | █         | █         | █         | █        | █         |          |          |          |  |
| 22,000           | 223  |               | █         | █         | █         | █        | █         |          |          |          |  |
| 33,000           | 333  |               | █         | █         | █         | █        | █         |          |          |          |  |
| 47,000           | 473  |               | █         | █         | █         | █        | █         |          |          |          |  |
| 68,000           | 683  |               | █         | █         | █         | █        | █         |          |          |          |  |
| 100,000          | 104  |               | █         | █         | █         | █        | █         |          |          |          |  |
| 150,000          | 154  |               | █         | █         | █         | █        | █         | █        |          |          |  |
| 220,000          | 224  |               | █         | █         | █         | █        | █         | █        |          |          |  |
| 330,000          | 334  |               | █         | █         | █         | █        | █         | █        |          |          |  |
| 470,000          | 474  |               | █         | █         | █         | █        | █         | █        |          |          |  |
| 680,000          | 684  |               | █         | █         | █         | █        | █         | █        | █        |          |  |
| 1,000,000        | 105  |               | █         | █         | █         | █        | █         | █        | █        | █        |  |

Standard Thickness

- █ 0.60 mm
- █ 0.85 mm
- █ 1.25 mm



## Capacitance Range Chart

## EIA CC1206 [C3216]

### Capacitance Range Chart

Temperature Characteristics: NP0 (0 ± 30ppm/°C), X8R (±15%)  
 Rated Voltage: 630V(2J), 450V(2W), 250V(2E), 100V (2A), 50V (1H), 25V (1E), 16V (1C)

| Capacitance (pF) | Code | Tolerance | NP0       |           |           |           |          | X8R       |          |          |          |   |
|------------------|------|-----------|-----------|-----------|-----------|-----------|----------|-----------|----------|----------|----------|---|
|                  |      |           | 2J (630V) | 2W (450V) | 2E (250V) | 2A (100V) | 1H (50V) | 2A (100V) | 1H (50V) | 1E (25V) | 1C (16V) |   |
| 3,900            | 392  | J: ± 5%   | █         |           |           | █         |          |           |          |          |          |   |
| 4,700            | 472  | K: ± 10%  | █         |           |           | █         | █        |           |          |          |          |   |
| 5,600            | 562  | M: ± 20%  | █         |           |           | █         | █        |           |          |          |          |   |
| 6,800            | 682  |           | █         | █         |           | █         | █        |           |          |          |          |   |
| 8,200            | 822  |           | █         | █         |           | █         | █        |           |          |          |          |   |
| 10,000           | 103  |           | █         |           |           | █         | █        |           |          |          |          |   |
| 15,000           | 153  |           |           | █         |           | █         | █        |           |          |          |          |   |
| 22,000           | 223  |           |           | █         |           | █         | █        |           |          |          |          |   |
| 33,000           | 333  |           |           |           | █         | █         | █        |           |          |          |          |   |
| 47,000           | 473  |           |           |           |           | █         | █        | █         |          |          |          |   |
| 68,000           | 683  |           |           |           |           |           | █        | █         |          |          |          |   |
| 100,000          | 104  |           |           |           |           |           |          | █         | █        |          |          |   |
| 150,000          | 154  |           |           |           |           |           |          |           | █        | █        |          |   |
| 220,000          | 224  |           |           |           |           |           |          |           |          | █        | █        |   |
| 330,000          | 334  |           |           |           |           |           |          |           |          |          | █        | █ |
| 470,000          | 474  |           |           |           |           |           |          |           |          |          |          | █ |
| 680,000          | 684  |           |           |           |           |           |          |           |          |          |          | █ |
| 1,000,000        | 105  |           |           |           |           |           |          |           |          |          |          | █ |
| 1,500,000        | 155  |           |           |           |           |           |          |           |          |          |          | █ |
| 2,200,000        | 225  |           |           |           |           |           |          |           |          |          |          | █ |
| 3,300,000        | 335  |           |           |           |           |           |          |           |          |          |          | █ |
| 4,700,000        | 475  |           |           |           |           |           |          |           |          |          |          | █ |

Standard Thickness

- 0.60 mm
- 0.85 mm
- 1.15 mm
- 1.60 mm



## Capacitance Range Chart

## EIA CC1210 [C3225]

### Capacitance Range Chart

Temperature Characteristics: NP0 (0 ± 30ppm/°C), X8R (±15%)  
 Rated Voltage: 630V(2J), 450V(2W), 250V(2E), 100V (2A), 50V (1H), 25V (1E), 16V (1C)

| Capacitance (pF) | Code | Tolerance | NP0       |           |           |           |          | X8R       |          |          |   |   |
|------------------|------|-----------|-----------|-----------|-----------|-----------|----------|-----------|----------|----------|---|---|
|                  |      |           | 2J (630V) | 2W (450V) | 2E (250V) | 2A (100V) | 1H (50V) | 2A (100V) | 1E (25V) | 1C (16V) |   |   |
| 8,200            | 822  | J: ± 5%   | █         |           |           |           |          |           |          |          |   |   |
| 10,000           | 103  | K: ± 10%  | █         |           |           |           |          |           |          |          |   |   |
| 15,000           | 153  | M: ± 20%  | █         |           |           |           |          |           |          |          |   |   |
| 22,000           | 223  |           | █         | █         |           |           |          |           |          |          |   |   |
| 33,000           | 333  |           | █         | █         |           |           |          |           |          |          |   |   |
| 47,000           | 473  |           | █         | █         |           |           |          |           |          |          |   |   |
| 68,000           | 683  |           |           |           | █         | █         |          |           |          |          |   |   |
| 100,000          | 104  |           |           |           |           | █         | █        |           |          |          |   |   |
| 470,000          | 474  |           |           |           |           |           | █        | █         |          |          |   |   |
| 680,000          | 684  |           |           |           |           |           |          | █         | █        |          |   |   |
| 1,500,000        | 155  |           |           |           |           |           |          |           | █        | █        |   |   |
| 2,200,000        | 225  |           |           |           |           |           |          |           |          | █        | █ |   |
| 3,300,000        | 335  |           |           |           |           |           |          |           |          |          | █ | █ |
| 4,700,000        | 475  |           |           |           |           |           |          |           |          |          |   | █ |
| 6,800,000        | 685  |           |           |           |           |           |          |           |          |          |   | █ |
| 10,000,000       | 106  |           |           |           |           |           |          |           |          |          |   | █ |

Standard Thickness

- 1.25 mm
- 1.60 mm
- 2.00 mm
- 2.30 mm
- 2.50 mm



## Capacitance Range Chart

## EIA CC1812 [C4532]

### Capacitance Range Chart

Temperature Characteristics: NP0 (0 ± 30ppm/°C)  
 Rated Voltage: 630V(2J), 450V(2W), 250V(2E), 100V (2A), 50V (1H)

| Capacitance (pF) | Code | Tolerance | NP0       |           |           |           |          |
|------------------|------|-----------|-----------|-----------|-----------|-----------|----------|
|                  |      |           | 2J (630V) | 2W (450V) | 2E (250V) | 2A (100V) | 1H (50V) |
| 33,000           | 333  | J: ± 5%   |           |           |           |           |          |
| 47,000           | 473  |           |           |           |           |           |          |
| 68,000           | 683  |           |           |           |           |           |          |
| 100,000          | 104  |           |           |           |           |           |          |
| 150,000          | 154  |           |           |           |           |           |          |
| 220,000          | 224  |           |           |           |           |           |          |

Standard Thickness

- 1.60 mm
- 2.00 mm
- 2.30 mm
- 2.50 mm
- 3.20 mm



## Capacitance Range Chart

## EIA CC2220 [C5750]

### Capacitance Range Chart

Temperature Characteristics: NP0 (0 ± 30ppm/°C)  
 Rated Voltage: 450V(2W), 250V(2E), 100V (2A)

| Capacitance (pF) | Code | Tolerance | NP0       |           |           |
|------------------|------|-----------|-----------|-----------|-----------|
|                  |      |           | 2W (450V) | 2E (250V) | 2A (100V) |
| 100,000          | 104  | J: ± 5%   |           |           |           |
| 150,000          | 154  |           |           |           |           |

Standard Thickness

- 2.30 mm
- 2.80 mm





## Capacitance Range Table

### Class 1 (Temperature Compensating)

Temperature Characteristics: NP0 (-55 to +150°C, 0±30 ppm/°C)

| Capacitance | Size | Thickness (mm) | Capacitance Tolerance | Catalog Number          |                         |                         |                         |                        |
|-------------|------|----------------|-----------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|
|             |      |                |                       | Rated Voltage Edc: 630V | Rated Voltage Edc: 450V | Rated Voltage Edc: 250V | Rated Voltage Edc: 100V | Rated Voltage Edc: 50V |
| 1 pF        | 1005 | 0.50 ± 0.05    | ± 0.25pF              |                         |                         |                         |                         | C1005NP01H010C050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.25pF              |                         |                         |                         | C1608NP02A010C080AA     | C1608NP01H010C080AA    |
| 1.5 pF      | 1005 | 0.50 ± 0.05    | ± 0.25pF              |                         |                         |                         |                         | C1005NP01H1R5C050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.25pF              |                         |                         | C1608NP02A1R5C080AA     | C1608NP01H1R5C080AA     |                        |
| 2 pF        | 1005 | 0.50 ± 0.05    | ± 0.25pF              |                         |                         |                         |                         | C1005NP01H020C050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.25pF              |                         |                         | C1608NP02A020C080AA     | C1608NP01H020C080AA     |                        |
| 2.2 pF      | 1005 | 0.50 ± 0.05    | ± 0.25pF              |                         |                         |                         |                         | C1005NP01H2R2C050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.25pF              |                         |                         | C1608NP02A2R2C080AA     | C1608NP01H2R2C080AA     |                        |
| 3 pF        | 1005 | 0.50 ± 0.05    | ± 0.25pF              |                         |                         |                         |                         | C1005NP01H030C050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.25pF              |                         |                         | C1608NP02A030C080AA     | C1608NP01H030C080AA     |                        |
| 3.3 pF      | 1005 | 0.50 ± 0.05    | ± 0.25pF              |                         |                         |                         |                         | C1005NP01H3R3C050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.25pF              |                         |                         | C1608NP02A3R3C080AA     | C1608NP01H3R3C080AA     |                        |
| 4 pF        | 1005 | 0.50 ± 0.05    | ± 0.25pF              |                         |                         |                         |                         | C1005NP01H040C050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.25pF              |                         |                         | C1608NP02A040C080AA     | C1608NP01H040C080AA     |                        |
| 4.7 pF      | 1005 | 0.50 ± 0.05    | ± 0.25pF              |                         |                         |                         |                         | C1005NP01H4R7C050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.25pF              |                         |                         | C1608NP02A4R7C080AA     | C1608NP01H4R7C080AA     |                        |
| 5 pF        | 1005 | 0.50 ± 0.05    | ± 0.25pF              |                         |                         |                         |                         | C1005NP01H050C050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.25pF              |                         |                         | C1608NP02A050C080AA     | C1608NP01H050C080AA     |                        |
| 6 pF        | 1005 | 0.50 ± 0.05    | ± 0.50pF              |                         |                         |                         |                         | C1005NP01H060D050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.50pF              |                         |                         | C1608NP02A060D080AA     | C1608NP01H060D080AA     |                        |
| 6.8 pF      | 1005 | 0.50 ± 0.05    | ± 0.50pF              |                         |                         |                         |                         | C1005NP01H6R8D050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.50pF              |                         |                         | C1608NP02A6R8D080AA     | C1608NP01H6R8D080AA     |                        |
| 7 pF        | 1005 | 0.50 ± 0.05    | ± 0.50pF              |                         |                         |                         |                         | C1005NP01H070D050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.50pF              |                         |                         | C1608NP02A070D080AA     | C1608NP01H070D080AA     |                        |
| 8 pF        | 1005 | 0.50 ± 0.05    | ± 0.50pF              |                         |                         |                         |                         | C1005NP01H080D050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.50pF              |                         |                         | C1608NP02A080D080AA     | C1608NP01H080D080AA     |                        |
| 9 pF        | 1005 | 0.50 ± 0.05    | ± 0.50pF              |                         |                         |                         |                         | C1005NP01H090D050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.50pF              |                         |                         | C1608NP02A090D080AA     | C1608NP01H090D080AA     |                        |
| 10 pF       | 1005 | 0.50 ± 0.05    | ± 0.50pF              |                         |                         |                         |                         | C1005NP01H100D050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 0.50pF              |                         |                         | C1608NP02A100D080AA     | C1608NP01H100D080AA     |                        |
| 12 pF       | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP01H120J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A120J080AA     | C1608NP01H120J080AA     |                        |
| 15 pF       | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP01H150J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A150J080AA     | C1608NP01H150J080AA     |                        |
| 18 pF       | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP01H180J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A180J080AA     | C1608NP01H180J080AA     |                        |
| 22 pF       | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP01H220J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A220J080AA     | C1608NP01H220J080AA     |                        |
| 27 pF       | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP01H270J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A270J080AA     | C1608NP01H270J080AA     |                        |
| 33 pF       | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP01H330J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A330J080AA     | C1608NP01H330J080AA     |                        |
| 39 pF       | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP01H390J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A390J080AA     | C1608NP01H390J080AA     |                        |
| 47 pF       | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP01H470J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A470J080AA     | C1608NP01H470J080AA     |                        |
| 56 pF       | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP01H560J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A560J080AA     | C1608NP01H560J080AA     |                        |
| 68 pF       | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP01H680J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A680J080AA     | C1608NP01H680J080AA     |                        |
| 82 pF       | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP01H820J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A820J080AA     | C1608NP01H820J080AA     |                        |
| 100 pF      | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP02A101J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A101J080AA     | C1608NP01H101J080AA     |                        |
|             | 2012 | 0.60 ± 0.15    | ± 5%                  |                         | C2012NP02W101J060AA     |                         |                         |                        |
| 120 pF      | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP02A121J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A121J080AA     | C1608NP01H121J080AA     |                        |
|             | 2012 | 0.60 ± 0.15    | ± 5%                  |                         | C2012NP02W121J060AA     |                         |                         |                        |
| 150 pF      | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP02A151J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A151J080AA     | C1608NP01H151J080AA     |                        |
|             | 2012 | 0.60 ± 0.15    | ± 5%                  |                         | C2012NP02W151J060AA     |                         |                         |                        |
| 180 pF      | 1005 | 0.50 ± 0.05    | ± 5%                  |                         |                         |                         |                         | C1005NP02A181J050BA    |
|             | 1608 | 0.80 ± 0.10    | ± 5%                  |                         |                         | C1608NP02A181J080AA     | C1608NP01H181J080AA     |                        |
|             | 2012 | 0.60 ± 0.15    | ± 5%                  |                         | C2012NP02W181J060AA     |                         |                         |                        |



## Capacitance Range Table

### Class 1 (Temperature Compensating)

Temperature Characteristics: NP0 (-55 to +150°C, 0±30 ppm/°C)

| Capacitance | Size | Thickness (mm)   | Capacitance Tolerance | Catalog Number          |                         |                         |                         |                        |
|-------------|------|------------------|-----------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|
|             |      |                  |                       | Rated Voltage Edc: 630V | Rated Voltage Edc: 450V | Rated Voltage Edc: 250V | Rated Voltage Edc: 100V | Rated Voltage Edc: 50V |
| 220 pF      | 1005 | 0.50 ± 0.05      | ± 5%                  |                         |                         |                         | C1005NP02A221J050BA     | C1005NP01H221J050BA    |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         | C1608NP02A221J080AA     | C1608NP01H221J080AA    |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP02W221J060AA     |                         |                         |                         |                        |
| 270 pF      | 1005 | 0.50 ± 0.05      | ± 5%                  |                         |                         |                         | C1005NP02A271J050BA     | C1005NP01H271J050BA    |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         | C1608NP02A271J080AA     | C1608NP01H271J080AA    |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP02W271J060AA     |                         |                         |                         |                        |
| 330 pF      | 1005 | 0.50 ± 0.05      | ± 5%                  |                         |                         |                         | C1005NP02A331J050BA     | C1005NP01H331J050BA    |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         | C1608NP02A331J080AA     | C1608NP01H331J080AA    |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP02W331J060AA     |                         |                         |                         |                        |
| 390 pF      | 1005 | 0.50 ± 0.05      | ± 5%                  |                         |                         |                         | C1005NP02A391J050BA     | C1005NP01H391J050BA    |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         | C1608NP02A391J080AA     | C1608NP01H391J080AA    |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP02W391J060AA     |                         |                         |                         |                        |
| 470 pF      | 1005 | 0.50 ± 0.05      | ± 5%                  |                         |                         |                         | C1005NP02A471J050BA     | C1005NP01H471J050BA    |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         | C1608NP02A471J080AA     | C1608NP01H471J080AA    |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP02W471J060AA     |                         |                         |                         |                        |
| 560 pF      | 1005 | 0.50 ± 0.05      | ± 5%                  |                         |                         |                         |                         | C1005NP01H561J050BA    |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         | C1608NP02A561J080AA     | C1608NP01H561J080AA    |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP02W561J060AA     |                         |                         |                         |                        |
| 680 pF      | 1005 | 0.50 ± 0.05      | ± 5%                  |                         |                         |                         |                         | C1005NP01H681J050BA    |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         | C1608NP02A681J080AA     | C1608NP01H681J080AA    |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP02W681J060AA     |                         |                         |                         |                        |
| 820 pF      | 1005 | 0.50 ± 0.05      | ± 5%                  |                         |                         |                         |                         | C1005NP01H821J050BA    |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         | C1608NP02E821J080AA     | C1608NP02A821J080AA     | C1608NP01H821J080AA     |                        |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP02W821J060AA     |                         |                         |                         |                        |
| 1 nF        | 1005 | 0.50 ± 0.05      | ± 5%                  |                         |                         |                         |                         | C1005NP01H102J050BA    |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         | C1608NP02E102J080AA     | C1608NP02A102J080AA     | C1608NP01H102J080AA     |                        |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP02W102J060AA     |                         |                         |                         |                        |
| 1.2 nF      | 1608 | 0.80 ± 0.10      | ± 5%                  |                         | C1608NP02E122J080AA     | C1608NP02A122J080AA     | C1608NP01H122J080AA     |                        |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP02W122J060AA     |                         |                         |                         |                        |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         | C1608NP02E152J080AA     | C1608NP02A152J080AA     | C1608NP01H152J080AA     |                        |
| 1.5 nF      | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP02W152J060AA     |                         |                         |                         |                        |
|             |      | 0.85 ± 0.15      | ± 5%                  | C2012NP02W152J085AA     |                         |                         |                         |                        |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         | C1608NP02E182J080AA     | C1608NP02A182J080AA     | C1608NP01H182J080AA     |                        |
| 1.8 nF      | 2012 | 0.85 ± 0.15      | ± 5%                  | C2012NP02W182J085AA     |                         |                         |                         |                        |
|             | 1608 | 0.80 ± 0.10      | ± 5%                  |                         | C1608NP02E222J080AA     | C1608NP02A222J080AA     | C1608NP01H222J080AA     |                        |
|             | 2012 | 0.85 ± 0.15      | ± 5%                  | C2012NP02W222J085AA     |                         |                         |                         |                        |
| 2.7 nF      | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         |                         | C1608NP01H272J080AA    |
|             |      | 0.80±0.15/-0.1   | ± 5%                  |                         |                         |                         | C1608NP02A272J080AA     |                        |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP01H272J060AA     |                         |                         |                         |                        |
|             |      | 1.25 ± 0.20      | ± 5%                  | C2012NP02W272J125AA     |                         |                         |                         |                        |
|             |      |                  |                       | C2012NP02A272J125AA     |                         |                         |                         |                        |
| 3.3 nF      | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         |                         | C1608NP01H332J080AA    |
|             |      | 0.80 + 0.15/-0.1 | ± 5%                  |                         |                         |                         | C1608NP02A332J080AA     |                        |
|             | 2012 | 0.60 ± 0.15      | ± 5%                  | C2012NP01H332J060AA     |                         |                         |                         |                        |
|             |      | 0.85 ± 0.15      | ± 5%                  | C2012NP02E332J085AA     |                         |                         |                         |                        |
|             |      | 1.25 ± 0.20      | ± 5%                  | C2012NP02W332J125AA     |                         |                         |                         |                        |
|             |      |                  |                       | C2012NP02A332J125AA     |                         |                         |                         |                        |
| 3.9 nF      | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         |                         | C1608NP01H392J080AA    |
|             |      | 0.60 ± 0.15      | ± 5%                  |                         |                         |                         |                         | C2012NP01H392J060AA    |
|             | 2012 | 1.25 ± 0.20      | ± 5%                  | C2012NP02W392J125AA     |                         |                         |                         |                        |
|             |      | 0.60 ± 0.15      | ± 5%                  | C2012NP02E392J125AA     | C2012NP02A392J125AA     | C2012NP02A392J125AA     |                         |                        |
|             | 3216 | 0.85 ± 0.15      | ± 5%                  | C3216NP02J392J085AA     |                         |                         |                         |                        |
| 4.7 nF      | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         |                         | C1608NP01H472J080AA    |
|             |      | 0.60 ± 0.15      | ± 5%                  |                         |                         |                         |                         | C2012NP01H472J060AA    |
|             | 2012 | 1.25 ± 0.20      | ± 5%                  | C2012NP02W472J125AA     |                         |                         |                         |                        |
|             |      | 0.60 ± 0.15      | ± 5%                  | C2012NP02E472J125AA     | C2012NP02A472J125AA     | C2012NP02A472J125AA     |                         |                        |
|             | 3216 | 0.85 ± 0.15      | ± 5%                  | C3216NP01H472J060AA     |                         |                         |                         |                        |
|             |      | 0.85 ± 0.15      | ± 5%                  | C3216NP02J472J085AA     |                         |                         |                         |                        |
|             |      |                  |                       | C3216NP02A472J085AA     |                         |                         |                         |                        |
| 5.6 nF      | 1608 | 0.80 ± 0.10      | ± 5%                  |                         |                         |                         |                         | C1608NP01H562J080AA    |
|             |      | 0.60 ± 0.15      | ± 5%                  |                         |                         |                         |                         | C2012NP01H562J060AA    |
|             | 2012 | 1.25 ± 0.20      | ± 5%                  | C2012NP02W562J125AA     |                         |                         |                         |                        |
|             |      | 0.60 ± 0.15      | ± 5%                  | C2012NP02E562J125AA     | C2012NP02A562J125AA     | C2012NP02A562J125AA     |                         |                        |
|             | 3216 | 0.85 ± 0.15      | ± 5%                  | C3216NP01H562J060AA     |                         |                         |                         |                        |
|             |      | 1.15 ± 0.15      | ± 5%                  | C3216NP02J562J115AA     |                         |                         |                         |                        |
|             |      |                  |                       | C3216NP02A562J085AA     |                         |                         |                         |                        |



## Capacitance Range Table

### Class 1 (Temperature Compensating)

Temperature Characteristics: NP0 (-55 to +150°C, 0±30 ppm/°C)

| Capacitance | Size        | Thickness (mm) | Capacitance Tolerance | Catalog Number          |                         |                         |                         |                        |
|-------------|-------------|----------------|-----------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|
|             |             |                |                       | Rated Voltage Edc: 630V | Rated Voltage Edc: 450V | Rated Voltage Edc: 250V | Rated Voltage Edc: 100V | Rated Voltage Edc: 50V |
| 6.8 nF      | 1608        | 0.80 ± 0.10    | ± 5%                  |                         |                         |                         |                         | C1608NP01H682J080AA    |
|             |             | 0.60 ± 0.15    | ± 5%                  |                         |                         |                         |                         | C2012NP01H682J060AA    |
|             | 2012        | 1.25 ± 0.20    | ± 5%                  |                         |                         | C2012NP02E682J125AA     | C2012NP02A682J125AA     |                        |
|             |             | 0.60 ± 0.15    | ± 5%                  |                         |                         |                         |                         | C3216NP01H682J060AA    |
| 3216        | 1.15 ± 0.15 | ± 5%           | C3216NP02J682J115AA   | C3216NP02W682J115AA     |                         | C3216NP02A682J115AA     |                         |                        |
|             | 0.80 ± 0.10 | ± 5%           |                       |                         |                         |                         | C1608NP01H822J080AA     |                        |
| 8.2 nF      | 1608        | 0.60 ± 0.15    | ± 5%                  |                         |                         |                         |                         | C2012NP01H822J060AA    |
|             |             | 1.25 ± 0.20    | ± 5%                  |                         |                         | C2012NP02E822J125AA     | C2012NP02A822J125AA     |                        |
|             | 2012        | 0.60 ± 0.15    | ± 5%                  |                         |                         |                         |                         | C3216NP01H822J060AA    |
|             |             | 1.15 ± 0.15    | ± 5%                  |                         | C3216NP02W822J115AA     |                         | C3216NP02A822J115AA     |                        |
| 3216        | 1.60 ± 0.20 | ± 5%           | C3216NP02J822J160AA   |                         |                         |                         |                         |                        |
|             | 1.25 ± 0.20 | ± 5%           | C3225NP02J822J125AA   |                         |                         |                         |                         |                        |
| 10 nF       | 1608        | 0.80 ± 0.10    | ± 5%                  |                         |                         |                         |                         | C1608NP01H103J080AA    |
|             |             | 0.60 ± 0.15    | ± 5%                  |                         |                         |                         |                         | C2012NP01H103J060AA    |
|             | 2012        | 1.25 ± 0.20    | ± 5%                  |                         |                         | C2012NP02E103J125AA     | C2012NP02A103J125AA     |                        |
|             |             | 0.60 ± 0.15    | ± 5%                  |                         |                         |                         |                         | C3216NP01H103J060AA    |
| 3216        | 1.15 ± 0.15 | ± 5%           |                       |                         | C3216NP02E103J115AA     | C3216NP02A103J115AA     |                         |                        |
|             | 1.60 ± 0.20 | ± 5%           | C3216NP02J103J160AA   | C3216NP02W103J160AA     |                         |                         |                         |                        |
| 3225        | 1.25 ± 0.20 | ± 5%           | C3225NP02J103J125AA   |                         |                         |                         |                         |                        |
|             | 0.85 ± 0.15 | ± 5%           |                       |                         |                         |                         | C2012NP01H153J085AA     |                        |
| 15 nF       | 2012        | 0.60 ± 0.15    | ± 5%                  |                         |                         |                         |                         | C3216NP01H153J060AA    |
|             |             | 1.15 ± 0.15    | ± 5%                  |                         |                         |                         | C3216NP02A153J115AA     |                        |
|             | 3216        | 1.60 ± 0.20    | ± 5%                  |                         | C3216NP02W153J160AA     | C3216NP02E153J160AA     |                         |                        |
|             |             | 1.25 ± 0.20    | ± 5%                  |                         |                         |                         | C3225NP02A153J125AA     |                        |
| 3225        | 1.60 ± 0.20 | ± 5%           | C3225NP02J153J160AA   |                         |                         |                         |                         |                        |
|             | 1.25 ± 0.20 | ± 5%           |                       |                         |                         |                         | C2012NP01H223J125AA     |                        |
| 22 nF       | 2012        | 0.60 ± 0.15    | ± 5%                  |                         |                         |                         |                         | C3216NP01H223J060AA    |
|             |             | 1.60 ± 0.20    | ± 5%                  |                         |                         | C3216NP02E223J160AA     | C3216NP02A223J160AA     |                        |
|             | 3216        | 1.25 ± 0.20    | ± 5%                  |                         |                         |                         |                         | C3225NP01H223J125AA    |
|             |             | 1.60 ± 0.20    | ± 5%                  |                         | C3225NP02E223J160AA     | C3225NP02A223J160AA     |                         |                        |
| 3225        | 2.30 ± 0.20 | ± 5%           | C3225NP02J223J230AA   | C3225NP02W223J230AA     |                         |                         |                         |                        |
|             | 1.25 ± 0.20 | ± 5%           |                       |                         |                         |                         | C2012NP01H333J125AA     |                        |
| 33 nF       | 2012        | 0.85 ± 0.15    | ± 5%                  |                         |                         |                         |                         | C3216NP01H333J085AA    |
|             |             | 1.60 ± 0.20    | ± 5%                  |                         |                         |                         | C3216NP02A333J160AA     |                        |
|             | 3216        | 1.60 ± 0.20    | ± 5%                  |                         |                         |                         |                         | C3225NP01H333J160AA    |
|             |             | 2.00 ± 0.20    | ± 5%                  |                         |                         |                         | C3225NP02A333J200AA     |                        |
| 3225        | 2.30 ± 0.20 | ± 5%           |                       |                         | C3225NP02E333J230AA     |                         |                         |                        |
|             | 2.50 ± 0.30 | ± 5%           | C3225NP02J333J250AA   | C3225NP02W333J250AA     |                         |                         |                         |                        |
| 4532        | 2.00 ± 0.20 | ± 5%           | C4532NP02J333J200KA   |                         |                         |                         |                         |                        |
|             | 1.15 ± 0.15 | ± 5%           |                       |                         |                         |                         | C3216NP01H473J115AA     |                        |
| 47 nF       | 3216        | 2.00 ± 0.20    | ± 5%                  |                         |                         |                         |                         | C3225NP01H473J200AA    |
|             |             | 2.30 ± 0.20    | ± 5%                  |                         |                         |                         | C3225NP02A473J230AA     |                        |
|             | 3225        | 2.50 ± 0.30    | ± 5%                  |                         |                         | C3225NP02E473J250AA     |                         |                        |
|             |             | 1.60 ± 0.20    | ± 5%                  |                         |                         |                         |                         | C4532NP01H473J160KA    |
| 4532        | 2.00 ± 0.20 | ± 5%           |                       |                         |                         |                         | C4532NP02A473J200KA     |                        |
|             | 2.30 ± 0.20 | ± 5%           |                       | C4532NP02W473J230KA     |                         |                         |                         |                        |
| 3216        | 3.20 ± 0.30 | ± 5%           | C4532NP02J473J320KA   |                         |                         |                         |                         |                        |
|             | 1.60 ± 0.20 | ± 5%           |                       |                         |                         |                         | C3216NP01H683J160AA     |                        |
| 68 nF       | 3225        | 2.00 ± 0.20    | ± 5%                  |                         |                         |                         |                         | C3225NP01H683J200AA    |
|             |             | 2.30 ± 0.20    | ± 5%                  |                         |                         |                         | C3225NP02A683J230AA     |                        |
|             | 4532        | 1.60 ± 0.20    | ± 5%                  |                         |                         |                         |                         | C4532NP01H683J160KA    |
|             |             | 2.30 ± 0.20    | ± 5%                  |                         | C4532NP02E683J230KN     |                         |                         |                        |
| 4532        | 2.50 ± 0.30 | ± 5%           |                       |                         |                         | C4532NP02A683J250KA     |                         |                        |
|             | 3.20 ± 0.30 | ± 5%           |                       | C4532NP02W683J320KA     |                         |                         |                         |                        |
| 100 nF      | 3216        | 1.60 ± 0.20    | ± 5%                  |                         |                         |                         |                         | C3216NP01H104J160AA    |
|             |             | 2.50 ± 0.30    | ± 5%                  |                         |                         |                         |                         | C3225NP01H104J250AA    |
|             | 3225        | 2.00 ± 0.20    | ± 5%                  |                         |                         |                         |                         | C4532NP01H104J200KA    |
|             |             | 3.20 ± 0.30    | ± 5%                  |                         |                         | C4532NP02E104J320KN     | C4532NP02A104J320KA     |                        |
| 5750        | 2.80 ± 0.30 | ± 5%           |                       | C5750NP02W104J280KA     |                         |                         |                         |                        |
|             | 2.50 ± 0.30 | ± 5%           |                       |                         |                         |                         | C4532NP01H154J250KA     |                        |
| 150 nF      | 5750        | 2.30 ± 0.20    | ± 5%                  |                         |                         | C5750NP02E154J230KN     | C5750NP02A154J230KA     |                        |
|             |             | 3.20 ± 0.30    | ± 5%                  |                         |                         |                         |                         | C4532NP01H224J320KA    |





## Capacitance Range Table

### Class 2 (Temperature Stable)

Temperature Characteristics: X8R (-55 to +150°C, ±15%)

| Capacitance | Size        | Thickness (mm) | Capacitance Tolerance | Catalog Number          |                        |                        |                        |
|-------------|-------------|----------------|-----------------------|-------------------------|------------------------|------------------------|------------------------|
|             |             |                |                       | Rated Voltage Edc: 100V | Rated Voltage Edc: 50V | Rated Voltage Edc: 25V | Rated Voltage Edc: 16V |
| 150 pF      | 1005        | 0.50 ± 0.05    | ± 10%                 | C1005X8R2A151K050BA     | C1005X8R1H151K050BA    |                        |                        |
|             |             |                | ± 20%                 | C1005X8R2A151M050BA     | C1005X8R1H151M050BA    |                        |                        |
| 220 pF      | 1005        | 0.50 ± 0.05    | ± 10%                 | C1005X8R2A221K050BA     | C1005X8R1H221K050BA    |                        |                        |
|             |             |                | ± 20%                 | C1005X8R2A221M050BA     | C1005X8R1H221M050BA    |                        |                        |
| 330 pF      | 1005        | 0.50 ± 0.05    | ± 10%                 | C1005X8R2A331K050BA     | C1005X8R1H331K050BA    |                        |                        |
|             |             |                | ± 20%                 | C1005X8R2A331M050BA     | C1005X8R1H331M050BA    |                        |                        |
| 470 pF      | 1005        | 0.50 ± 0.05    | ± 10%                 | C1005X8R2A471K050BA     | C1005X8R1H471K050BA    |                        |                        |
|             |             |                | ± 20%                 | C1005X8R2A471M050BA     | C1005X8R1H471M050BA    |                        |                        |
| 680 pF      | 1005        | 0.50 ± 0.05    | ± 10%                 | C1005X8R2A681K050BA     | C1005X8R1H681K050BA    |                        |                        |
|             |             |                | ± 20%                 | C1005X8R2A681M050BA     | C1005X8R1H681M050BA    |                        |                        |
| 1 nF        | 1005        | 0.50 ± 0.05    | ± 10%                 | C1005X8R2A102K050BA     | C1005X8R1H102K050BA    |                        |                        |
|             |             |                | ± 20%                 | C1005X8R2A102M050BA     | C1005X8R1H102M050BA    |                        |                        |
|             | 1608        | 0.80 ± 0.10    | ± 10%                 | C1608X8R2A102K080AA     | C1608X8R1H102K080AA    |                        |                        |
|             |             |                | ± 20%                 | C1608X8R2A102M080AA     | C1608X8R1H102M080AA    |                        |                        |
| 1.5 nF      | 1005        | 0.50 ± 0.05    | ± 10%                 | C1005X8R2A152K050BA     | C1005X8R1H152K050BA    |                        |                        |
|             |             |                | ± 20%                 | C1005X8R2A152M050BA     | C1005X8R1H152M050BA    |                        |                        |
|             | 1608        | 0.80 ± 0.10    | ± 10%                 | C1608X8R2A152K080AA     | C1608X8R1H152K080AA    |                        |                        |
|             |             |                | ± 20%                 | C1608X8R2A152M080AA     | C1608X8R1H152M080AA    |                        |                        |
| 2.2 nF      | 1005        | 0.50 ± 0.05    | ± 10%                 | C1005X8R2A222K050BA     | C1005X8R1H222K050BA    |                        |                        |
|             |             |                | ± 20%                 | C1005X8R2A222M050BA     | C1005X8R1H222M050BA    |                        |                        |
|             | 1608        | 0.80 ± 0.10    | ± 10%                 | C1608X8R2A222K080AA     | C1608X8R1H222K080AA    |                        |                        |
|             |             |                | ± 20%                 | C1608X8R2A222M080AA     | C1608X8R1H222M080AA    |                        |                        |
| 3.3 nF      | 1005        | 0.50 ± 0.05    | ± 10%                 | C1005X8R2A332K050BB     | C1005X8R1H332K050BA    |                        |                        |
|             |             |                | ± 20%                 | C1005X8R2A332M050BB     | C1005X8R1H332M050BA    |                        |                        |
|             | 1608        | 0.80 ± 0.10    | ± 10%                 | C1608X8R2A332K080AA     | C1608X8R1H332K080AA    |                        |                        |
|             |             |                | ± 20%                 | C1608X8R2A332M080AA     | C1608X8R1H332M080AA    |                        |                        |
| 4.7 nF      | 1005        | 0.50 ± 0.05    | ± 10%                 |                         | C1005X8R1H472K050BA    |                        |                        |
|             |             |                | ± 20%                 |                         | C1005X8R1H472M050BA    |                        |                        |
|             | 1608        | 0.80 ± 0.10    | ± 10%                 | C1608X8R2A472K080AA     | C1608X8R1H472K080AA    |                        |                        |
|             |             |                | ± 20%                 | C1608X8R2A472M080AA     | C1608X8R1H472M080AA    |                        |                        |
| 6.8 nF      | 1005        | 0.50 ± 0.05    | ± 10%                 |                         | C1005X8R1H682K050BB    | C1005X8R1E682K050BA    |                        |
|             |             |                | ± 20%                 |                         | C1005X8R1H682M050BB    | C1005X8R1E682M050BA    |                        |
|             | 1608        | 0.80 ± 0.10    | ± 10%                 | C1608X8R2A682K080AA     | C1608X8R1H682K080AA    |                        |                        |
|             |             |                | ± 20%                 | C1608X8R2A682M080AA     | C1608X8R1H682M080AA    |                        |                        |
| 10 nF       | 1005        | 0.50 ± 0.05    | ± 10%                 |                         | C1005X8R1H103K050BB    | C1005X8R1E103K050BA    |                        |
|             |             |                | ± 20%                 |                         | C1005X8R1H103M050BB    | C1005X8R1E103M050BA    |                        |
|             | 1608        | 0.80 ± 0.10    | ± 10%                 | C1608X8R2A103K080AA     | C1608X8R1H103K080AA    |                        |                        |
|             |             |                | ± 20%                 | C1608X8R2A103M080AA     | C1608X8R1H103M080AA    |                        |                        |
| 15 nF       | 1005        | 0.50 ± 0.05    | ± 10%                 |                         |                        | C1005X8R1E153K050BB    |                        |
|             |             |                | ± 20%                 |                         |                        | C1005X8R1E153M050BB    |                        |
|             | 1608        | 0.80 ± 0.10    | ± 10%                 | C1608X8R2A153K080AA     | C1608X8R1H153K080AA    |                        |                        |
|             |             |                | ± 20%                 | C1608X8R2A153M080AA     | C1608X8R1H153M080AA    |                        |                        |
| 22 nF       | 1005        | 0.50 ± 0.05    | ± 10%                 |                         |                        | C1005X8R1E223K050BB    |                        |
|             |             |                | ± 20%                 |                         |                        | C1005X8R1E223M050BB    |                        |
|             | 1608        | 0.80 ± 0.10    | ± 10%                 | C1608X8R2A223K080AB     | C1608X8R1H223K080AA    |                        |                        |
|             |             |                | ± 20%                 | C1608X8R2A223M080AB     | C1608X8R1H223M080AA    |                        |                        |
| 2012        | 1.25 ± 0.20 | ± 10%          | C2012X8R2A223K125AA   |                         |                        |                        |                        |
|             |             | ± 20%          | C2012X8R2A223M125AA   |                         |                        |                        |                        |
| 33 nF       | 1005        | 0.50 ± 0.05    | ± 10%                 |                         |                        |                        | C1005X8R1C333K050BB    |
|             |             |                | ± 20%                 |                         |                        |                        | C1005X8R1C333M050BB    |
|             | 1608        | 0.80 ± 0.10    | ± 10%                 | C1608X8R2A333K080AB     | C1608X8R1H333K080AA    |                        |                        |
|             |             |                | ± 20%                 | C1608X8R2A333M080AB     | C1608X8R1H333M080AA    |                        |                        |
|             | 2012        | 1.25 ± 0.20    | ± 10%                 | C2012X8R2A333K125AB     |                        |                        |                        |
|             |             |                | ± 20%                 | C2012X8R2A333M125AB     |                        |                        |                        |
| 3216        | 0.85 ± 0.15 | ± 10%          | C3216X8R2A333K085AA   |                         |                        |                        |                        |
|             |             | ± 20%          | C3216X8R2A333M085AA   |                         |                        |                        |                        |



## Capacitance Range Table

### Class 2 (Temperature Stable)

Temperature Characteristics: X8R (-55 to +150°C, ±15%)

| Capacitance | Size        | Thickness (mm) | Capacitance Tolerance | Catalog Number          |                        |                        |                        |
|-------------|-------------|----------------|-----------------------|-------------------------|------------------------|------------------------|------------------------|
|             |             |                |                       | Rated Voltage Edc: 100V | Rated Voltage Edc: 50V | Rated Voltage Edc: 25V | Rated Voltage Edc: 16V |
| 47 nF       | 1005        | 0.50 ± 0.05    | ± 10%                 |                         |                        |                        | C1005X8R1C473K050BB    |
|             |             |                | ± 20%                 |                         |                        |                        | C1005X8R1C473M050BB    |
|             | 1608        | 0.80 ± 0.10    | ± 10%                 |                         | C1608X8R1H473K080AA    |                        |                        |
|             |             |                | ± 20%                 |                         | C1608X8R1H473M080AA    |                        |                        |
| 2012        | 1.25 ± 0.20 | ± 10%          | C2012X8R2A473K125AB   |                         |                        |                        |                        |
|             |             | ± 20%          | C2012X8R2A473M125AB   |                         |                        |                        |                        |
| 3216        | 0.85 ± 0.15 | ± 10%          | C3216X8R2A473K085AA   |                         |                        |                        |                        |
|             |             | ± 20%          | C3216X8R2A473M085AA   |                         |                        |                        |                        |
| 68 nF       | 1608        | 0.80 ± 0.10    | ± 10%                 |                         | C1608X8R1H683K080AB    | C1608X8R1E683K080AA    |                        |
|             |             |                | ± 20%                 |                         | C1608X8R1H683M080AB    | C1608X8R1E683M080AA    |                        |
|             | 2012        | 1.25 ± 0.20    | ± 10%                 | C2012X8R2A683K125AB     | C2012X8R1H683K125AA    |                        |                        |
|             |             |                | ± 20%                 | C2012X8R2A683M125AB     | C2012X8R1H683M125AA    |                        |                        |
| 3216        | 1.15 ± 0.15 | ± 10%          | C3216X8R2A683K115AA   |                         |                        |                        |                        |
|             |             | ± 20%          | C3216X8R2A683M115AA   |                         |                        |                        |                        |
| 100 nF      | 1608        | 0.80 ± 0.10    | ± 10%                 |                         | C1608X8R1H104K080AB    | C1608X8R1E104K080AA    |                        |
|             |             |                | ± 20%                 |                         | C1608X8R1H104M080AB    | C1608X8R1E104M080AA    |                        |
|             | 2012        | 1.25 ± 0.20    | ± 10%                 |                         | C2012X8R1H104K125AA    |                        |                        |
|             |             |                | ± 20%                 |                         | C2012X8R1H104M125AA    |                        |                        |
| 3216        | 1.15 ± 0.15 | ± 10%          | C3216X8R2A104K115AA   |                         |                        |                        |                        |
|             |             | ± 20%          | C3216X8R2A104M115AA   |                         |                        |                        |                        |
| 150 nF      | 1608        | 0.80 ± 0.10    | ± 10%                 |                         |                        | C1608X8R1E154K080AB    |                        |
|             |             |                | ± 20%                 |                         |                        | C1608X8R1E154M080AB    |                        |
|             | 2012        | 0.85 ± 0.15    | ± 10%                 |                         |                        | C2012X8R1E154K085AA    |                        |
|             |             |                | ± 20%                 |                         |                        | C2012X8R1E154M085AA    |                        |
|             | 3216        | 0.85 ± 0.15    | ± 10%                 |                         | C3216X8R1H154K125AB    |                        |                        |
|             |             |                | ± 20%                 |                         | C3216X8R1H154M125AB    |                        |                        |
| 3216        | 1.60 ± 0.20 | ± 10%          | C3216X8R2A154K160AA   |                         |                        |                        |                        |
|             |             | ± 20%          | C3216X8R2A154M160AA   |                         |                        |                        |                        |
| 220 nF      | 1608        | 0.80 ± 0.10    | ± 10%                 |                         |                        | C1608X8R1E224K080AB    |                        |
|             |             |                | ± 20%                 |                         |                        | C1608X8R1E224M080AB    |                        |
|             | 2012        | 1.25 ± 0.20    | ± 10%                 |                         | C2012X8R1H224K125AB    | C2012X8R1E224K125AA    |                        |
|             |             |                | ± 20%                 |                         | C2012X8R1H224M125AB    | C2012X8R1E224M125AA    |                        |
|             | 3216        | 1.15 ± 0.15    | ± 10%                 |                         | C3216X8R1H224K115AA    |                        |                        |
|             |             |                | ± 20%                 |                         | C3216X8R1H224M115AA    |                        |                        |
| 3216        | 1.60 ± 0.20 | ± 10%          | C3216X8R2A224K160AB   |                         |                        |                        |                        |
|             |             | ± 20%          | C3216X8R2A224M160AB   |                         |                        |                        |                        |
| 330 nF      | 1608        | 0.80 ± 0.10    | ± 10%                 |                         |                        |                        | C1608X8R1C334K080AB    |
|             |             |                | ± 20%                 |                         |                        |                        | C1608X8R1C334M080AB    |
|             | 2012        | 1.25 ± 0.20    | ± 10%                 |                         |                        | C2012X8R1E334K125AA    |                        |
|             |             |                | ± 20%                 |                         |                        | C2012X8R1E334M125AA    |                        |
| 3216        | 0.85 ± 0.15 | ± 10%          |                       |                         | C3216X8R1E334K085AA    |                        |                        |
|             |             | ± 20%          |                       |                         | C3216X8R1E334M085AA    |                        |                        |
| 470 nF      | 1608        | 0.80 ± 0.10    | ± 10%                 |                         |                        |                        | C1608X8R1C474K080AB    |
|             |             |                | ± 20%                 |                         |                        |                        | C1608X8R1C474M080AB    |
|             | 2012        | 1.25 ± 0.20    | ± 10%                 |                         |                        | C2012X8R1E474K125AB    |                        |
|             |             |                | ± 20%                 |                         |                        | C2012X8R1E474M125AB    |                        |
|             | 3216        | 0.85 ± 0.15    | ± 10%                 |                         |                        | C3216X8R1E474K085AA    |                        |
|             |             |                | ± 20%                 |                         |                        | C3216X8R1E474M085AA    |                        |
| 3216        | 1.60 ± 0.20 | ± 10%          |                       | C3216X8R1H474K160AA     |                        |                        |                        |
|             |             | ± 20%          |                       | C3216X8R1H474M160AA     |                        |                        |                        |
| 3225        | 2.00 ± 0.20 | ± 10%          | C3225X8R2A474K200AB   |                         |                        |                        |                        |
|             |             | ± 20%          | C3225X8R2A474M200AB   |                         |                        |                        |                        |



## Capacitance Range Table

### Class 2 (Temperature Stable)

Temperature Characteristics: X8R (-55 to +150°C, ±15%)

| Capacitance | Size        | Thickness (mm) | Capacitance Tolerance | Catalog Number          |                        |                        |                        |
|-------------|-------------|----------------|-----------------------|-------------------------|------------------------|------------------------|------------------------|
|             |             |                |                       | Rated Voltage Edc: 100V | Rated Voltage Edc: 50V | Rated Voltage Edc: 25V | Rated Voltage Edc: 16V |
| 680 nF      | 2012        | 1.25 ± 0.20    | ± 10%                 |                         |                        |                        | C2012X8R1C684K125AB    |
|             |             |                | ± 20%                 |                         |                        |                        | C2012X8R1C684M125AB    |
|             | 3216        | 1.15 ± 0.15    | ± 10%                 |                         |                        | C3216X8R1E684K115AA    |                        |
|             |             |                | ± 20%                 |                         |                        | C3216X8R1E684M115AA    |                        |
|             | 3216        | 1.60 ± 0.20    | ± 10%                 |                         | C3216X8R1H684K160AB    |                        |                        |
|             |             |                | ± 20%                 |                         | C3216X8R1H684M160AB    |                        |                        |
| 3225        | 2.50 ± 0.30 | ± 10%          | C3225X8R2A684K250AB   |                         |                        |                        |                        |
|             |             | ± 20%          | C3225X8R2A684M250AB   |                         |                        |                        |                        |
| 1 µF        | 2012        | 1.25 ± 0.20    | ± 10%                 |                         |                        |                        | C2012X8R1C105K125AB    |
|             |             |                | ± 20%                 |                         |                        |                        | C2012X8R1C105M125AB    |
| 3216        | 1.60 ± 0.20 | ± 10%          |                       | C3216X8R1H105K160AB     | C3216X8R1E105K160AA    |                        |                        |
|             |             | ± 20%          |                       | C3216X8R1H105M160AB     | C3216X8R1E105M160AA    |                        |                        |
| 1.5 µF      | 3216        | 1.60 ± 0.20    | ± 10%                 |                         |                        | C3216X8R1E155K160AB    |                        |
|             |             |                | ± 20%                 |                         |                        | C3216X8R1E155M160AB    |                        |
| 3225        | 1.60 ± 0.20 | ± 10%          |                       |                         | C3225X8R1E155K160AA    |                        |                        |
|             |             | ± 20%          |                       |                         | C3225X8R1E155M160AA    |                        |                        |
| 2.2 µF      | 3216        | 1.60 ± 0.20    | ± 10%                 |                         |                        | C3216X8R1E225K160AB    |                        |
|             |             |                | ± 20%                 |                         |                        | C3216X8R1E225M160AB    |                        |
| 3225        | 2.00 ± 0.20 | ± 10%          |                       |                         | C3225X8R1E225K200AA    |                        |                        |
|             |             | ± 20%          |                       |                         | C3225X8R1E225M200AA    |                        |                        |
| 3.3 µF      | 3216        | 1.60 ± 0.20    | ± 10%                 |                         |                        |                        | C3216X8R1C335K160AB    |
|             |             |                | ± 20%                 |                         |                        |                        | C3216X8R1C335M160AB    |
| 3225        | 2.50 ± 0.30 | ± 10%          |                       |                         | C3225X8R1E335K250AA    |                        |                        |
|             |             | ± 20%          |                       |                         | C3225X8R1E335M250AA    |                        |                        |
| 4.7 µF      | 3216        | 1.60 ± 0.20    | ± 10%                 |                         |                        |                        | C3216X8R1C475K160AB    |
|             |             |                | ± 20%                 |                         |                        |                        | C3216X8R1C475M160AB    |
| 3225        | 2.50 ± 0.30 | ± 10%          |                       |                         | C3225X8R1E475K250AB    |                        |                        |
|             |             | ± 20%          |                       |                         | C3225X8R1E475M250AB    |                        |                        |
| 6.8 µF      | 3225        | 2.00 ± 0.20    | ± 10%                 |                         |                        |                        | C3225X8R1C685K200AB    |
|             |             |                | ± 20%                 |                         |                        |                        | C3225X8R1C685M200AB    |
| 10 µF       | 3225        | 2.50 ± 0.30    | ± 10%                 |                         |                        |                        | C3225X8R1C106K250AB    |
|             |             |                | ± 20%                 |                         |                        |                        | C3225X8R1C106M250AB    |