

**CONTENT (MLCC)**

**E STANDARD NUMBER..... 3**

**STRUCTURE ..... 4**

**ORDERING CODE ..... 4**

**AUTOMOTIVE APPLICATION (AEC-Q200 COMPLIANT) ..... 5**

    CLASS I: TEMPERATURE COMPENSATING TYPE ..... 6

*NPO\_A Series* ..... 6

*X8G\_A Series* ..... 13

*NPO\_B Series* ..... 14

*NPO\_H Series* ..... 15

    CLASS II: HIGH DIELECTRIC CONSTANT TYPE ..... 18

*X7R\_A Series*..... 18

*X6S\_A Series*..... 24

*X7S\_A Series*..... 24

*X8R\_A Series*..... 25

    TEST SPEC. .... 26

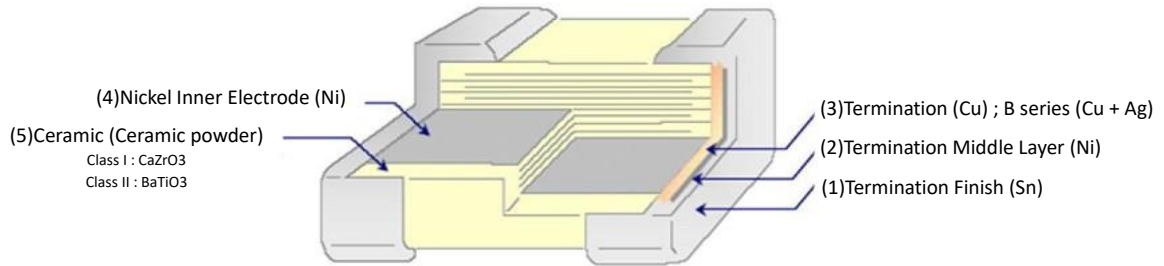
**PACKAGE ..... 34**

**OTHERS ..... 38**

**E Standard Number**

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| E3  | 1.0 |     |     |     | 2.2 |     |     |     | 4.7 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| E6  | 1.0 |     | 1.5 |     | 2.2 |     | 3.3 |     | 4.7 |     | 6.8 |     |     |     |     |     |     |     |     |     |     |     |     |     |
| E12 | 1.0 | 1.2 | 1.5 | 1.8 | 2.2 | 2.7 | 3.3 | 3.9 | 4.7 | 5.6 | 6.8 | 8.2 |     |     |     |     |     |     |     |     |     |     |     |     |
| E24 | 1.0 | 1.1 | 1.2 | 1.3 | 1.5 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.3 | 4.7 | 5.1 | 5.6 | 6.2 | 6.8 | 7.5 | 8.2 | 9.1 |

## Structure



## Ordering Code

**C 2012 NP0 100 J G T A  $\Delta$**

### PRODUCT CODE

C = MLCC

### SIZE in mm (EIA CODE, in inch)

0402(01005)    0603(0201)    1005 (0402)    1608 (0603)    2012 (0805)  
 3216 (1206)    3225(1210)    4520 (1808)    4532 (1812)

### T. C.

|  |   |
|--|---|
| X8G: $0 \pm 30\text{ppm}/^\circ\text{C}$ ; X8R: $\pm 15\%$ | -55 $^\circ\text{C}$ to +150 $^\circ\text{C}$ |
| NP0: $0 \pm 30\text{ppm}/^\circ\text{C}$ ; X7R: $\pm 15\%$ | -55 $^\circ\text{C}$ to +125 $^\circ\text{C}$ |
| X6S: $\pm 22\%$  | -55 $^\circ\text{C}$ to +105 $^\circ\text{C}$ |

### CAPACITANCE CODE

Expressed in pico-farads and identified by a three-digit number.  
 First two digits represent significant figures.  
 Last digit specifies the number of zeros.  
 (Use 9 for 1.0 through 9.9pF ; Use 8 for 0.20 through 0.99pF)

Example:

|          |      |     |     |      |
|----------|------|-----|-----|------|
| Code     | 478  | 229 | 101 | 102  |
| Cap (pF) | 0.47 | 2.2 | 100 | 1000 |

### TOLERANCE CODE

A:  $\pm 0.05\text{pF}$     B:  $\pm 0.1\text{pF}$     C:  $\pm 0.25\text{pF}$     D:  $\pm 0.5\text{pF}$     F:  $\pm 1\%$     G:  $\pm 2\%$   
 J:  $\pm 5\%$     K:  $\pm 10\%$     M:  $\pm 20\%$     Z:  $+80/-20\%$

### VOLTAGE CODE

B: 4V    C: 6.3V    D: 10V    E: 16V    F: 25V    N: 35V    G: 50V    H: 100V  
 J: 200V    K: 250V    L: 500V    M: 630V    P: 1KV    Q: 2KV    R: 3KV    S: 4KV

### PACKAGING CODE

T: Paper tape reel  $\varnothing 180\text{mm}$  (7")    P: Embossed tape reel  $\varnothing 180\text{mm}$  (7")  
 A: Paper tape reel  $\varnothing 330\text{mm}$  (13")    E: Embossed tape reel  $\varnothing 330\text{mm}$  (13")  
 W: Special Packing

### Application Code

A: Automotive with AEC-Q200    B: Soft termination with AEC-Q200  
 H: Microwave with AEC-Q200

### Thickness Code

| Code    | Thick (mm)     | Code | Thick(mm) | Code | Thick (mm) | Code | Thick (mm) |
|---------|----------------|------|-----------|------|------------|------|------------|
| (blank) | Standard Thick | M    | 0.70      | G    | 1.25       | S    | 1.90       |
| Z       | 0.20           | D    | 0.80      | H    | 1.50       | --   | --         |
| A       | 0.30           | E    | 0.85      | L    | 1.60       | --   | --         |
| Q       | 0.45           | I    | 0.95      | N    | 2.00       | --   | --         |
| B       | 0.50           | J    | 1.00      | P    | 2.50       | --   | --         |
| C       | 0.60           | F    | 1.15      | R    | 3.20       | --   | --         |

## Automotive Application (AEC-Q200 compliant)

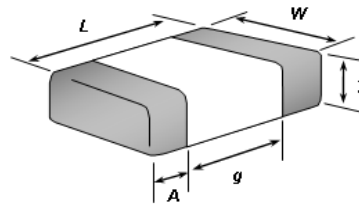
■ **Feature**

1. Monolithic structure ensures high reliability and mechanical strength.
2. RoHS compliant
3. AEC-Q200 compliant
4. Halogen Free

■ **Application**

1. Automotive comfort & infotainment systems
2. Bluetooth & wireless communication systems
3. Navigation & audio systems
4. Automotive after-market electronics

■ **Standard External Dimensions**



| TYPE   | Dimension (mm) |           |              |         |             |
|--|----------------|-----------|--------------|---------|-------------|
| Size (EIA Size)                                  | L (Length)     | W (Width) | T(Thickness) | g (Min) | A (Min/Max) |
| C0603 (0201)                                     | 0.6±△          | 0.3±△     | △            | 0.15    | 0.10 / 0.25 |
| C1005 (0402)                                     | 1.0±△          | 0.5±△     |              | 0.30    | 0.15 / 0.35 |
| C1608 (0603)                                     | 1.6±△          | 0.8±△     |              | 0.50    | 0.25 / 0.65 |
| C2012 (0805)                                     | 2.0±△          | 1.25±△    |              | 0.70    | 0.25 / 0.75 |
| C3216 (1206)                                     | 3.2±△          | 1.6±△     |              | 1.50    | 0.25 / 0.75 |
| C3225 (1210)                                     | 3.5±△          | 2.5±△     |              | 1.50    | 0.3 / 0.90  |
| △:Please refer to “Part Number & Characteristic” |                |           |              |         |             |

● **Class I: Temperature Compensating Type**

- **Part Number & Characteristic**
- **NP0\_A Series**
- **C0603NP0\_A Series (EIA0201)**

| RV              | DARFON P/N      | Measuring Condition | Capacitance |                 | Available Tolerance      | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|-----------------|--------------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                 |                     | Value       | Unit            |                          |             | L/W           | Thick. |           |                  |           |
| 100V            | C0603NP0208□HTA | 1V, 1MHz            | 0.2         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.25%     | Paper, 15Kpcs    | (I)       |
|                 | C0603NP0308□HTA | 1V, 1MHz            | 0.3         | pF              | ±0.25pF, ±0.1pF, ±0.05pF | 0.3         | ±0.03         | ±0.03  | 0.25%     |                  | (I)       |
|                 | C0603NP0408□HTA | 1V, 1MHz            | 0.4         | pF              | ±0.25pF, ±0.1pF, ±0.05pF | 0.3         | ±0.03         | ±0.03  | 0.25%     |                  | (I)       |
|                 | C0603NP0508□HTA | 1V, 1MHz            | 0.5         | pF              | ±0.25pF, ±0.1pF, ±0.05pF | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0608□HTA | 1V, 1MHz            | 0.6         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0708□HTA | 1V, 1MHz            | 0.7         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0808□HTA | 1V, 1MHz            | 0.8         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0908□HTA | 1V, 1MHz            | 0.9         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0109□HTA | 1V, 1MHz            | 1.0         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0119□HTA | 1V, 1MHz            | 1.1         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0129□HTA | 1V, 1MHz            | 1.2         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0139□HTA | 1V, 1MHz            | 1.3         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.23%     |                  | (I)       |
|                 | C0603NP0159□HTA | 1V, 1MHz            | 1.5         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.23%     |                  | (I)       |
|                 | C0603NP0169□HTA | 1V, 1MHz            | 1.6         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.23%     |                  | (I)       |
|                 | C0603NP0189□HTA | 1V, 1MHz            | 1.8         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.23%     |                  | (I)       |
|                 | C0603NP0209□HTA | 1V, 1MHz            | 2.0         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.23%     |                  | (I)       |
|                 | C0603NP0229□HTA | 1V, 1MHz            | 2.2         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.23%     |                  | (I)       |
|                 | C0603NP0249□HTA | 1V, 1MHz            | 2.4         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.22%     |                  | (I)       |
|                 | C0603NP0279□HTA | 1V, 1MHz            | 2.7         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.22%     |                  | (I)       |
|                 | C0603NP0309□HTA | 1V, 1MHz            | 3.0         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.22%     |                  | (I)       |
|                 | C0603NP0339□HTA | 1V, 1MHz            | 3.3         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.21%     |                  | (I)       |
|                 | C0603NP0369□HTA | 1V, 1MHz            | 3.6         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.21%     |                  | (I)       |
|                 | C0603NP0399□HTA | 1V, 1MHz            | 3.9         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.21%     |                  | (I)       |
|                 | C0603NP0439□HTA | 1V, 1MHz            | 4.3         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.21%     |                  | (I)       |
|                 | C0603NP0479□HTA | 1V, 1MHz            | 4.7         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.20%     |                  | (I)       |
|                 | C0603NP0519□HTA | 1V, 1MHz            | 5.1         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.20%     |                  | (I)       |
| C0603NP0569□HTA | 1V, 1MHz        | 5.6                 | pF          | ±0.25pF, ±0.1pF | 0.3                      | ±0.03       | ±0.03         | 0.20%  | (I)       |                  |           |
| C0603NP0689□HTA | 1V, 1MHz        | 6.8                 | pF          | ±0.25pF, ±0.1pF | 0.3                      | ±0.03       | ±0.03         | 0.19%  | (I)       |                  |           |
| C0603NP0829□HTA | 1V, 1MHz        | 8.2                 | pF          | ±0.25pF, ±0.1pF | 0.3                      | ±0.03       | ±0.03         | 0.18%  | (I)       |                  |           |
| C0603NP0100□HTA | 1V, 1MHz        | 10                  | pF          | ±5%, ±2%        | 0.3                      | ±0.03       | ±0.03         | 0.17%  | (I)       |                  |           |
| C0603NP0120□HTA | 1V, 1MHz        | 12                  | pF          | ±5%, ±2%        | 0.3                      | ±0.03       | ±0.03         | 0.16%  | (I)       |                  |           |
| C0603NP0150□HTA | 1V, 1MHz        | 15                  | pF          | ±5%, ±2%        | 0.3                      | ±0.03       | ±0.03         | 0.14%  | (I)       |                  |           |
| C0603NP0180□HTA | 1V, 1MHz        | 18                  | pF          | ±5%, ±2%        | 0.3                      | ±0.03       | ±0.03         | 0.13%  | (I)       |                  |           |
| C0603NP0200□HTA | 1V, 1MHz        | 20                  | pF          | ±5%, ±2%        | 0.3                      | ±0.03       | ±0.03         | 0.13%  | (I)       |                  |           |
| 50V             | C0603NP0508CGTA | 1V, 1MHz            | 0.50        | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.24%     | Paper, 15Kpcs    | (I)       |
|                 | C0603NP0608CGTA | 1V, 1MHz            | 0.60        | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0708CGTA | 1V, 1MHz            | 0.70        | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0758CGTA | 1V, 1MHz            | 0.75        | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0808CGTA | 1V, 1MHz            | 0.80        | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0908CGTA | 1V, 1MHz            | 0.90        | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0109CGTA | 1V, 1MHz            | 1.0         | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0129CGTA | 1V, 1MHz            | 1.2         | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.24%     |                  | (I)       |
|                 | C0603NP0159CGTA | 1V, 1MHz            | 1.5         | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.23%     |                  | (I)       |
|                 | C0603NP0189CGTA | 1V, 1MHz            | 1.8         | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.23%     |                  | (I)       |
|                 | C0603NP0229CGTA | 1V, 1MHz            | 2.2         | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.23%     |                  | (I)       |
|                 | C0603NP0249□GTA | 1V, 1MHz            | 2.4         | pF              | ±0.25pF, ±0.1pF          | 0.3         | ±0.03         | ±0.03  | 0.22%     |                  | (I)       |
|                 | C0603NP0279CGTA | 1V, 1MHz            | 2.7         | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.22%     |                  | (I)       |
|                 | C0603NP0339CGTA | 1V, 1MHz            | 3.3         | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.21%     |                  | (I)       |
|                 | C0603NP0399CGTA | 1V, 1MHz            | 3.9         | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.21%     |                  | (I)       |
|                 | C0603NP0479CGTA | 1V, 1MHz            | 4.7         | pF              | ±0.25pF                  | 0.3         | ±0.03         | ±0.03  | 0.20%     |                  | (I)       |
|                 | C0603NP0569DGTA | 1V, 1MHz            | 5.6         | pF              | ±0.5pF                   | 0.3         | ±0.03         | ±0.03  | 0.20%     |                  | (I)       |
|                 | C0603NP0689DGTA | 1V, 1MHz            | 6.8         | pF              | ±0.5pF                   | 0.3         | ±0.03         | ±0.03  | 0.19%     |                  | (I)       |
| C0603NP0829DGTA | 1V, 1MHz        | 8.2                 | pF          | ±0.5pF          | 0.3                      | ±0.03       | ±0.03         | 0.18%  | (I)       |                  |           |
| C0603NP0100JGTA | 1V, 1MHz        | 10                  | pF          | ±5%             | 0.3                      | ±0.03       | ±0.03         | 0.17%  | (I)       |                  |           |

| RV              | DARFON P/N       | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|------------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                  |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 50V             | C0603NP0120JGTA  | 1V, 1MHz            | 12          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.16%     | Paper, 15Kpcs    | (I)       |
|                 | C0603NP0150JGTA  | 1V, 1MHz            | 15          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.14%     |                  | (I)       |
|                 | C0603NP0180JGTA  | 1V, 1MHz            | 18          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.13%     |                  | (I)       |
|                 | C0603NP0220JGTA  | 1V, 1MHz            | 22          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.12%     |                  | (I)       |
|                 | C0603NP0270JGTA  | 1V, 1MHz            | 27          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.11%     |                  | (I)       |
|                 | C0603NP0330JGTA  | 1V, 1MHz            | 33          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
|                 | C0603NP0390JGTA  | 1V, 1MHz            | 39          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
|                 | C0603NP0470JGTA  | 1V, 1MHz            | 47          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
|                 | C0603NP0560JGTA  | 1V, 1MHz            | 56          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
|                 | C0603NP0680JGTA  | 1V, 1MHz            | 68          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
|                 | C0603NP0820JGTA  | 1V, 1MHz            | 82          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
|                 | C0603NP0101JGTA  | 1V, 1MHz            | 100         | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
|                 | C0603NP0121JGTA  | 1V, 1MHz            | 120         | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
|                 | C0603NP0151JGTA  | 1V, 1MHz            | 150         | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
| C0603NP0181JGTA | 1V, 1MHz         | 180                 | pF          | ±5%  | 0.3                 | ±0.03       | ±0.03         | 0.10%  | (I)       |                  |           |
| C0603NP0221JGTA | 1V, 1MHz         | 220                 | pF          | ±5%  | 0.3                 | ±0.03       | ±0.03         | 0.10%  | (I)       |                  |           |
| 25V             | C0603NP0249□JFTA | 1V, 1MHz            | 2.4         | pF   | ±0.25pF, ±0.1pF     | 0.3         | ±0.03         | ±0.03  | 0.22%     | Paper, 15Kpcs    | (I)       |
|                 | C0603NP0330JFTA  | 1V, 1MHz            | 33          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
|                 | C0603NP0470JFTA  | 1V, 1MHz            | 47          | pF   | ±5%                 | 0.3         | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
|                 | C0603NP0560JFTA  | 1V, 1MHz            | 56          | pF   | ±5%                 | 0.30        | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
|                 | C0603NP0101JFTA  | 1V, 1MHz            | 100         | pF   | ±5%                 | 0.30        | ±0.03         | ±0.03  | 0.10%     |                  | (I)       |
| 10V             | C0603NP0221JDTA  | 1V, 1MHz            | 220         | pF   | ±5%                 | 0.30        | ±0.03         | ±0.03  | 0.10%     | Paper, 15Kpcs    | (I)       |

□ Tolerance Code: A=±0.05pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

● C1005NP0\_A Series (EIA0402)

| RV              | DARFON P/N      | Measuring Condition | Capacitance |                 | Available Tolerance      | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|-----------------|--------------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                 |                     | Value       | Unit            |                          |             | L/W           | Thick. |           |                  |           |
| 200V            | C1005NP0221JJTA | 1V, 1MHz            | 220         | pF              | ±5%                      | 0.50        | ±0.05         | ±0.05  | 0.10%     | Paper, 10Kpcs    | (I)       |
|                 | C1005NP0271JJTA | 1V, 1MHz            | 270         | pF              | ±5%                      | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005NP0331JJTA | 1V, 1MHz            | 330         | pF              | ±5%                      | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005NP0391JJTA | 1V, 1MHz            | 390         | pF              | ±5%                      | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
| 100V            | C1005NP0208□HTA | 1V, 1MHz            | 0.2         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.25%     | Paper, 10Kpcs    | (I)       |
|                 | C1005NP0308□HTA | 1V, 1MHz            | 0.3         | pF              | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 0.25%     |                  | (I)       |
|                 | C1005NP0408□HTA | 1V, 1MHz            | 0.4         | pF              | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 0.25%     |                  | (I)       |
|                 | C1005NP0508□HTA | 1V, 1MHz            | 0.5         | pF              | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0608□HTA | 1V, 1MHz            | 0.6         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0708□HTA | 1V, 1MHz            | 0.7         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0808□HTA | 1V, 1MHz            | 0.8         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0908□HTA | 1V, 1MHz            | 0.9         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0109□HTA | 1V, 1MHz            | 1.0         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0119□HTA | 1V, 1MHz            | 1.1         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0129□HTA | 1V, 1MHz            | 1.2         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0139□HTA | 1V, 1MHz            | 1.3         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.23%     |                  | (I)       |
|                 | C1005NP0159□HTA | 1V, 1MHz            | 1.5         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.23%     |                  | (I)       |
|                 | C1005NP0169□HTA | 1V, 1MHz            | 1.6         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.23%     |                  | (I)       |
|                 | C1005NP0189□HTA | 1V, 1MHz            | 1.8         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.23%     |                  | (I)       |
|                 | C1005NP0209□HTA | 1V, 1MHz            | 2.0         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.23%     |                  | (I)       |
|                 | C1005NP0229□HTA | 1V, 1MHz            | 2.2         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.23%     |                  | (I)       |
|                 | C1005NP0249□HTA | 1V, 1MHz            | 2.4         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.22%     |                  | (I)       |
|                 | C1005NP0279□HTA | 1V, 1MHz            | 2.7         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.22%     |                  | (I)       |
|                 | C1005NP0309□HTA | 1V, 1MHz            | 3.0         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.22%     |                  | (I)       |
|                 | C1005NP0339□HTA | 1V, 1MHz            | 3.3         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.21%     |                  | (I)       |
|                 | C1005NP0369□HTA | 1V, 1MHz            | 3.6         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.21%     |                  | (I)       |
|                 | C1005NP0399□HTA | 1V, 1MHz            | 3.9         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.21%     |                  | (I)       |
|                 | C1005NP0439□HTA | 1V, 1MHz            | 4.3         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.21%     |                  | (I)       |
|                 | C1005NP0479□HTA | 1V, 1MHz            | 4.7         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.20%     |                  | (I)       |
|                 | C1005NP0519□HTA | 1V, 1MHz            | 5.1         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.20%     |                  | (I)       |
|                 | C1005NP0569□HTA | 1V, 1MHz            | 5.6         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.20%     |                  | (I)       |
|                 | C1005NP0689□HTA | 1V, 1MHz            | 6.8         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.19%     |                  | (I)       |
|                 | C1005NP0829□HTA | 1V, 1MHz            | 8.2         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.18%     |                  | (I)       |
|                 | C1005NP0100□HTA | 1V, 1MHz            | 10          | pF              | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 0.17%     |                  | (I)       |
|                 | C1005NP0120□HTA | 1V, 1MHz            | 12          | pF              | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 0.16%     |                  | (I)       |
|                 | C1005NP0150□HTA | 1V, 1MHz            | 15          | pF              | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 0.14%     |                  | (I)       |
|                 | C1005NP0180□HTA | 1V, 1MHz            | 18          | pF              | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 0.13%     |                  | (I)       |
|                 | C1005NP0220□HTA | 1V, 1MHz            | 22          | pF              | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 0.12%     |                  | (I)       |
|                 | C1005NP0270□HTA | 1V, 1MHz            | 27          | pF              | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 0.11%     |                  | (I)       |
|                 | C1005NP0300□HTA | 1V, 1MHz            | 30          | pF              | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
| C1005NP0330□HTA | 1V, 1MHz        | 33                  | pF          | ±5%, ±2%        | 0.50                     | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0390□HTA | 1V, 1MHz        | 39                  | pF          | ±5%, ±2%        | 0.50                     | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0470□HTA | 1V, 1MHz        | 47                  | pF          | ±5%, ±2%        | 0.50                     | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0560□HTA | 1V, 1MHz        | 56                  | pF          | ±5%, ±2%        | 0.50                     | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0680□HTA | 1V, 1MHz        | 68                  | pF          | ±5%, ±2%        | 0.50                     | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0820□HTA | 1V, 1MHz        | 82                  | pF          | ±5%, ±2%        | 0.50                     | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0101□HTA | 1V, 1MHz        | 100                 | pF          | ±5%, ±2%        | 0.50                     | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| 50V             | C1005NP0508□GTA | 1V, 1MHz            | 0.50        | pF              | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 0.24%     | Paper, 10Kpcs    | (I)       |
|                 | C1005NP0608□GTA | 1V, 1MHz            | 0.60        | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0688□GTA | 1V, 1MHz            | 0.68        | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0708□GTA | 1V, 1MHz            | 0.70        | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0758□GTA | 1V, 1MHz            | 0.75        | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0808□GTA | 1V, 1MHz            | 0.80        | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0828□GTA | 1V, 1MHz            | 0.82        | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0908□GTA | 1V, 1MHz            | 0.90        | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0109□GTA | 1V, 1MHz            | 1.0         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
|                 | C1005NP0119□GTA | 1V, 1MHz            | 1.1         | pF              | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 0.24%     |                  | (I)       |
| C1005NP0129□GTA | 1V, 1MHz        | 1.2                 | pF          | ±0.25pF, ±0.1pF | 0.50                     | ±0.05       | ±0.05         | 0.24%  | (I)       |                  |           |

| RV              | DARFON P/N      | Measuring Condition | Capacitance |         | Available Tolerance   | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|---------|-----------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                 |                     | Value       | Unit    |                       |             | L/W           | Thick. |           |                  |           |
| 50V             | C1005NP0139□GTA | 1V, 1MHz            | 1.3         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.23%     | Paper, 10Kpcs    | (I)       |
|                 | C1005NP0149□GTA | 1V, 1MHz            | 1.4         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.23%     |                  | (I)       |
|                 | C1005NP0159□GTA | 1V, 1MHz            | 1.5         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.23%     |                  | (I)       |
|                 | C1005NP0189□GTA | 1V, 1MHz            | 1.8         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.23%     |                  | (I)       |
|                 | C1005NP0209□GTA | 1V, 1MHz            | 2.0         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.23%     |                  | (I)       |
|                 | C1005NP0229□GTA | 1V, 1MHz            | 2.2         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.23%     |                  | (I)       |
|                 | C1005NP0249□GTA | 1V, 1MHz            | 2.4         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.22%     |                  | (I)       |
|                 | C1005NP0279□GTA | 1V, 1MHz            | 2.7         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.22%     |                  | (I)       |
|                 | C1005NP0309□GTA | 1V, 1MHz            | 3.0         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.22%     |                  | (I)       |
|                 | C1005NP0339□GTA | 1V, 1MHz            | 3.3         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.21%     |                  | (I)       |
|                 | C1005NP0399□GTA | 1V, 1MHz            | 3.9         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.21%     |                  | (I)       |
|                 | C1005NP0409□GTA | 1V, 1MHz            | 4.0         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.21%     |                  | (I)       |
|                 | C1005NP0479□GTA | 1V, 1MHz            | 4.7         | pF      | ±0.25pF,±0.1pF        | 0.50        | ±0.05         | ±0.05  | 0.20%     |                  | (I)       |
|                 | C1005NP0509□GTA | 1V, 1MHz            | 5.0         | pF      | ±0.5pF,±0.25pF        | 0.50        | ±0.05         | ±0.05  | 0.20%     |                  | (I)       |
|                 | C1005NP0569□GTA | 1V, 1MHz            | 5.6         | pF      | ±0.5pF,±0.25pF        | 0.50        | ±0.05         | ±0.05  | 0.20%     |                  | (I)       |
|                 | C1005NP0609□GTA | 1V, 1MHz            | 6.0         | pF      | ±0.5pF,±0.25pF        | 0.50        | ±0.05         | ±0.05  | 0.19%     |                  | (I)       |
|                 | C1005NP0629□GTA | 1V, 1MHz            | 6.2         | pF      | ±0.5pF,±0.25pF,±0.1pF | 0.50        | ±0.05         | ±0.05  | 0.19%     |                  | (I)       |
|                 | C1005NP0689□GTA | 1V, 1MHz            | 6.8         | pF      | ±0.5pF,±0.25pF,±0.1pF | 0.50        | ±0.05         | ±0.05  | 0.19%     |                  | (I)       |
|                 | C1005NP0709□GTA | 1V, 1MHz            | 7.0         | pF      | ±0.5pF,±0.25pF        | 0.50        | ±0.05         | ±0.05  | 0.19%     |                  | (I)       |
|                 | C1005NP0759□GTA | 1V, 1MHz            | 7.5         | pF      | ±0.5pF,±0.25pF        | 0.50        | ±0.05         | ±0.05  | 0.18%     |                  | (I)       |
|                 | C1005NP0809□GTA | 1V, 1MHz            | 8.0         | pF      | ±0.5pF,±0.25pF        | 0.50        | ±0.05         | ±0.05  | 0.18%     |                  | (I)       |
|                 | C1005NP0829□GTA | 1V, 1MHz            | 8.2         | pF      | ±0.5pF,±0.25pF        | 0.50        | ±0.05         | ±0.05  | 0.18%     |                  | (I)       |
|                 | C1005NP0909□GTA | 1V, 1MHz            | 9.0         | pF      | ±0.5pF,±0.25pF        | 0.50        | ±0.05         | ±0.05  | 0.17%     |                  | (I)       |
|                 | C1005NP0919□GTA | 1V, 1MHz            | 9.1         | pF      | ±0.5pF,±0.25pF        | 0.50        | ±0.05         | ±0.05  | 0.17%     |                  | (I)       |
|                 | C1005NP0100□GTA | 1V, 1MHz            | 10          | pF      | ±5%,±2%               | 0.50        | ±0.05         | ±0.05  | 0.17%     |                  | (I)       |
|                 | C1005NP0120□GTA | 1V, 1MHz            | 12          | pF      | ±5%,±2%,±1%           | 0.50        | ±0.05         | ±0.05  | 0.16%     |                  | (I)       |
|                 | C1005NP0130JGTA | 1V, 1MHz            | 13          | pF      | ±5%                   | 0.50        | ±0.05         | ±0.05  | 0.15%     |                  | (I)       |
|                 | C1005NP0140JGTA | 1V, 1MHz            | 14          | pF      | ±5%                   | 0.50        | ±0.05         | ±0.05  | 0.15%     |                  | (I)       |
|                 | C1005NP0150□GTA | 1V, 1MHz            | 15          | pF      | ±5%,±2%,±1%           | 0.50        | ±0.05         | ±0.05  | 0.14%     |                  | (I)       |
|                 | C1005NP0160□GTA | 1V, 1MHz            | 16          | pF      | ±5%,±2%               | 0.50        | ±0.05         | ±0.05  | 0.14%     |                  | (I)       |
|                 | C1005NP0180□GTA | 1V, 1MHz            | 18          | pF      | ±5%,±2%               | 0.50        | ±0.05         | ±0.05  | 0.13%     |                  | (I)       |
|                 | C1005NP0200□GTA | 1V, 1MHz            | 20          | pF      | ±5%,±2%               | 0.50        | ±0.05         | ±0.05  | 0.13%     |                  | (I)       |
|                 | C1005NP0220□GTA | 1V, 1MHz            | 22          | pF      | ±5%,±2%,±1%           | 0.50        | ±0.05         | ±0.05  | 0.12%     |                  | (I)       |
|                 | C1005NP0240□GTA | 1V, 1MHz            | 24          | pF      | ±5%,±2%               | 0.50        | ±0.05         | ±0.05  | 0.11%     |                  | (I)       |
|                 | C1005NP0270□GTA | 1V, 1MHz            | 27          | pF      | ±5%,±2%,±1%           | 0.50        | ±0.05         | ±0.05  | 0.11%     |                  | (I)       |
|                 | C1005NP0330□GTA | 1V, 1MHz            | 33          | pF      | ±5%,±2%               | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005NP0360□GTA | 1V, 1MHz            | 36          | pF      | ±5%,±2%               | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005NP0390□GTA | 1V, 1MHz            | 39          | pF      | ±5%,±2%               | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005NP0430□GTA | 1V, 1MHz            | 43          | pF      | ±5%,±2%               | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005NP0470□GTA | 1V, 1MHz            | 47          | pF      | ±5%,±2%               | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
| C1005NP0560□GTA | 1V, 1MHz        | 56                  | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0680□GTA | 1V, 1MHz        | 68                  | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0750□GTA | 1V, 1MHz        | 75                  | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0820□GTA | 1V, 1MHz        | 82                  | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0101□GTA | 1V, 1MHz        | 100                 | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0121□GTA | 1V, 1MHz        | 120                 | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0151□GTA | 1V, 1MHz        | 150                 | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0181□GTA | 1V, 1MHz        | 180                 | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0221□GTA | 1V, 1MHz        | 220                 | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0271JGTA | 1V, 1MHz        | 270                 | pF          | ±5%     | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0331□GTA | 1V, 1MHz        | 330                 | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0391□GTA | 1V, 1MHz        | 390                 | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0471□GTA | 1V, 1MHz        | 470                 | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0681□GTA | 1V, 1MHz        | 680                 | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0821□GTA | 1V, 1MHz        | 820                 | pF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0102□GTA | 1V, 1MHz        | 1.0                 | nF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005NP0152□GTA | 1V, 1kHz        | 1.5                 | nF          | ±5%,±2% | 0.50                  | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| 16V             | C1005NP0680JETA | 1V, 1MHz            | 68          | pF      | ±5%                   | 0.50        | ±0.05         | ±0.05  | 0.10%     | Paper, 10Kpcs    | (I)       |

□ Tolerance Code: A=±0.05pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

● C1608NP0\_A Series (EIA0603)

| RV              | DARFON P/N      | Measuring Condition | Capacitance |         | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|---------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                 |                     | Value       | Unit    |                     |             | L/W           | Thick. |           |                  |           |
| 100V            | C1608NP0508□HTA | 1V, 1MHz            | 0.50        | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.24%     | Paper, 4Kpcs     | (I)       |
|                 | C1608NP0758□HTA | 1V, 1MHz            | 0.75        | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.24%     |                  | (I)       |
|                 | C1608NP0109□HTA | 1V, 1MHz            | 1.0         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.24%     |                  | (I)       |
|                 | C1608NP0129□HTA | 1V, 1MHz            | 1.2         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.24%     |                  | (I)       |
|                 | C1608NP0159□HTA | 1V, 1MHz            | 1.5         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.23%     |                  | (I)       |
|                 | C1608NP0189□HTA | 1V, 1MHz            | 1.8         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.23%     |                  | (I)       |
|                 | C1608NP0209□HTA | 1V, 1MHz            | 2.0         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.23%     |                  | (I)       |
|                 | C1608NP0229□HTA | 1V, 1MHz            | 2.2         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.23%     |                  | (I)       |
|                 | C1608NP0249□HTA | 1V, 1MHz            | 2.4         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.22%     |                  | (I)       |
|                 | C1608NP0279□HTA | 1V, 1MHz            | 2.7         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.22%     |                  | (I)       |
|                 | C1608NP0309□HTA | 1V, 1MHz            | 3.0         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.22%     |                  | (I)       |
|                 | C1608NP0339□HTA | 1V, 1MHz            | 3.3         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.21%     |                  | (I)       |
|                 | C1608NP0399□HTA | 1V, 1MHz            | 3.9         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.21%     |                  | (I)       |
|                 | C1608NP0409□HTA | 1V, 1MHz            | 4.0         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.21%     |                  | (I)       |
|                 | C1608NP0479□HTA | 1V, 1MHz            | 4.7         | pF      | ±0.25pF,±0.1pF      | 0.80        | ±0.10         | ±0.10  | 0.20%     |                  | (I)       |
|                 | C1608NP0509□HTA | 1V, 1MHz            | 5.0         | pF      | ±0.5pF,±0.25pF      | 0.80        | ±0.10         | ±0.10  | 0.20%     |                  | (I)       |
|                 | C1608NP0569□HTA | 1V, 1MHz            | 5.6         | pF      | ±0.5pF,±0.25pF      | 0.80        | ±0.10         | ±0.10  | 0.20%     |                  | (I)       |
|                 | C1608NP0609□HTA | 1V, 1MHz            | 6.0         | pF      | ±0.5pF,±0.25pF      | 0.80        | ±0.10         | ±0.10  | 0.19%     |                  | (I)       |
|                 | C1608NP0629□HTA | 1V, 1MHz            | 6.2         | pF      | ±0.5pF,±0.25pF      | 0.80        | ±0.10         | ±0.10  | 0.19%     |                  | (I)       |
|                 | C1608NP0689□HTA | 1V, 1MHz            | 6.8         | pF      | ±0.5pF,±0.25pF      | 0.80        | ±0.10         | ±0.10  | 0.19%     |                  | (I)       |
|                 | C1608NP0709□HTA | 1V, 1MHz            | 7.0         | pF      | ±0.5pF,±0.25pF      | 0.80        | ±0.10         | ±0.10  | 0.19%     |                  | (I)       |
|                 | C1608NP0829□HTA | 1V, 1MHz            | 8.2         | pF      | ±0.5pF,±0.25pF      | 0.80        | ±0.10         | ±0.10  | 0.18%     |                  | (I)       |
|                 | C1608NP0909□HTA | 1V, 1MHz            | 9.0         | pF      | ±0.5pF,±0.25pF      | 0.80        | ±0.10         | ±0.10  | 0.17%     |                  | (I)       |
|                 | C1608NP0100□HTA | 1V, 1MHz            | 10          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.17%     |                  | (I)       |
|                 | C1608NP0110□HTA | 1V, 1MHz            | 11          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.16%     |                  | (I)       |
|                 | C1608NP0120□HTA | 1V, 1MHz            | 12          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.16%     |                  | (I)       |
|                 | C1608NP0150□HTA | 1V, 1MHz            | 15          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.14%     |                  | (I)       |
|                 | C1608NP0180□HTA | 1V, 1MHz            | 18          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.13%     |                  | (I)       |
|                 | C1608NP0200□HTA | 1V, 1MHz            | 20          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.13%     |                  | (I)       |
|                 | C1608NP0220□HTA | 1V, 1MHz            | 22          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.12%     |                  | (I)       |
|                 | C1608NP0240□HTA | 1V, 1MHz            | 24          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.11%     |                  | (I)       |
|                 | C1608NP0270□HTA | 1V, 1MHz            | 27          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.11%     |                  | (I)       |
|                 | C1608NP0300□HTA | 1V, 1MHz            | 30          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0330□HTA | 1V, 1MHz            | 33          | pF      | ±5%,±2%,±1%         | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0360□HTA | 1V, 1MHz            | 36          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0390□HTA | 1V, 1MHz            | 39          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0430□HTA | 1V, 1MHz            | 43          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0470□HTA | 1V, 1MHz            | 47          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0560□HTA | 1V, 1MHz            | 56          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0620□HTA | 1V, 1MHz            | 62          | pF      | ±5%,±2%             | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
| C1608NP0680□HTA | 1V, 1MHz        | 68                  | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0750□HTA | 1V, 1MHz        | 75                  | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0820□HTA | 1V, 1MHz        | 82                  | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0910□HTA | 1V, 1MHz        | 91                  | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0101□HTA | 1V, 1MHz        | 100                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0121□HTA | 1V, 1MHz        | 120                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0151□HTA | 1V, 1MHz        | 150                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0181□HTA | 1V, 1MHz        | 180                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0201□HTA | 1V, 1MHz        | 200                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0221□HTA | 1V, 1MHz        | 220                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0271□HTA | 1V, 1MHz        | 270                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0331□HTA | 1V, 1MHz        | 330                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0391□HTA | 1V, 1MHz        | 390                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0471□HTA | 1V, 1MHz        | 470                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0561□HTA | 1V, 1MHz        | 560                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0681□HTA | 1V, 1MHz        | 680                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0821□HTA | 1V, 1MHz        | 820                 | pF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0102□HTA | 1V, 1MHz        | 1.0                 | nF          | ±5%,±2% | 0.80                | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |

□ Tolerance Code: A=±0.05pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.



| RV              | DARFON P/N      | Measuring Condition | Capacitance |          | Available Tolerance     | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|----------|-------------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                 |                     | Value       | Unit     |                         |             | L/W           | Thick. |           |                  |           |
| 50V             | C1608NP0508□GTA | 1V, 1MHz            | 0.50        | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.24%     | Paper, 4Kpcs     | (I)       |
|                 | C1608NP0758□GTA | 1V, 1MHz            | 0.75        | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.24%     |                  | (I)       |
|                 | C1608NP0109□GTA | 1V, 1MHz            | 1.0         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.24%     |                  | (I)       |
|                 | C1608NP0129□GTA | 1V, 1MHz            | 1.2         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.24%     |                  | (I)       |
|                 | C1608NP0159□GTA | 1V, 1MHz            | 1.5         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.23%     |                  | (I)       |
|                 | C1608NP0189□GTA | 1V, 1MHz            | 1.8         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.23%     |                  | (I)       |
|                 | C1608NP0209□GTA | 1V, 1MHz            | 2.0         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.23%     |                  | (I)       |
|                 | C1608NP0229□GTA | 1V, 1MHz            | 2.2         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.23%     |                  | (I)       |
|                 | C1608NP0249□GTA | 1V, 1MHz            | 2.4         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.22%     |                  | (I)       |
|                 | C1608NP0279□GTA | 1V, 1MHz            | 2.7         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.22%     |                  | (I)       |
|                 | C1608NP0309□GTA | 1V, 1MHz            | 3.0         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.22%     |                  | (I)       |
|                 | C1608NP0339□GTA | 1V, 1MHz            | 3.3         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.21%     |                  | (I)       |
|                 | C1608NP0399□GTA | 1V, 1MHz            | 3.9         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.21%     |                  | (I)       |
|                 | C1608NP0409□GTA | 1V, 1MHz            | 4.0         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.21%     |                  | (I)       |
|                 | C1608NP0479□GTA | 1V, 1MHz            | 4.7         | pF       | ±0.25pF, ±0.1pF         | 0.80        | ±0.10         | ±0.10  | 0.20%     |                  | (I)       |
|                 | C1608NP0509□GTA | 1V, 1MHz            | 5.0         | pF       | ±0.5pF, ±0.25pF         | 0.80        | ±0.10         | ±0.10  | 0.20%     |                  | (I)       |
|                 | C1608NP0569□GTA | 1V, 1MHz            | 5.6         | pF       | ±0.5pF, ±0.25pF         | 0.80        | ±0.10         | ±0.10  | 0.20%     |                  | (I)       |
|                 | C1608NP0609□GTA | 1V, 1MHz            | 6.0         | pF       | ±0.5pF, ±0.25pF, ±0.1pF | 0.80        | ±0.10         | ±0.10  | 0.19%     |                  | (I)       |
|                 | C1608NP0629□GTA | 1V, 1MHz            | 6.2         | pF       | ±0.5pF, ±0.25pF         | 0.80        | ±0.10         | ±0.10  | 0.19%     |                  | (I)       |
|                 | C1608NP0689□GTA | 1V, 1MHz            | 6.8         | pF       | ±0.5pF, ±0.25pF         | 0.80        | ±0.10         | ±0.10  | 0.19%     |                  | (I)       |
|                 | C1608NP0709□GTA | 1V, 1MHz            | 7.0         | pF       | ±0.5pF, ±0.25pF         | 0.80        | ±0.10         | ±0.10  | 0.19%     |                  | (I)       |
|                 | C1608NP0809□GTA | 1V, 1MHz            | 8.0         | pF       | ±0.5pF, ±0.25pF, ±0.1pF | 0.80        | ±0.10         | ±0.10  | 0.18%     |                  | (I)       |
|                 | C1608NP0829□GTA | 1V, 1MHz            | 8.2         | pF       | ±0.5pF, ±0.25pF         | 0.80        | ±0.10         | ±0.10  | 0.18%     |                  | (I)       |
|                 | C1608NP0909□GTA | 1V, 1MHz            | 9.0         | pF       | ±0.5pF, ±0.25pF         | 0.80        | ±0.10         | ±0.10  | 0.17%     |                  | (I)       |
|                 | C1608NP0100□GTA | 1V, 1MHz            | 10          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.17%     |                  | (I)       |
|                 | C1608NP0110□GTA | 1V, 1MHz            | 11          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.16%     |                  | (I)       |
|                 | C1608NP0120□GTA | 1V, 1MHz            | 12          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.16%     |                  | (I)       |
|                 | C1608NP0150□GTA | 1V, 1MHz            | 15          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.14%     |                  | (I)       |
|                 | C1608NP0180□GTA | 1V, 1MHz            | 18          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.13%     |                  | (I)       |
|                 | C1608NP0200□GTA | 1V, 1MHz            | 20          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.13%     |                  | (I)       |
|                 | C1608NP0220□GTA | 1V, 1MHz            | 22          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.12%     |                  | (I)       |
|                 | C1608NP0270□GTA | 1V, 1MHz            | 27          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.11%     |                  | (I)       |
|                 | C1608NP0330□GTA | 1V, 1MHz            | 33          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0390□GTA | 1V, 1MHz            | 39          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0470□GTA | 1V, 1MHz            | 47          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0560□GTA | 1V, 1MHz            | 56          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0620□GTA | 1V, 1MHz            | 62          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0680□GTA | 1V, 1MHz            | 68          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0820□GTA | 1V, 1MHz            | 82          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C1608NP0101□GTA | 1V, 1MHz            | 100         | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |
| C1608NP0121□GTA | 1V, 1MHz        | 120                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0151□GTA | 1V, 1MHz        | 150                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0181□GTA | 1V, 1MHz        | 180                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0201□GTA | 1V, 1MHz        | 200                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0221□GTA | 1V, 1MHz        | 220                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0271□GTA | 1V, 1MHz        | 270                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0331□GTA | 1V, 1MHz        | 330                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0391□GTA | 1V, 1MHz        | 390                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0471□GTA | 1V, 1MHz        | 470                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0561□GTA | 1V, 1MHz        | 560                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0681□GTA | 1V, 1MHz        | 680                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0821□GTA | 1V, 1MHz        | 820                 | pF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0102□GTA | 1V, 1MHz        | 1.0                 | nF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0152□GTA | 1V, 1kHz        | 1.5                 | nF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0222□GTA | 1V, 1kHz        | 2.2                 | nF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0332□GTA | 1V, 1kHz        | 3.3                 | nF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0472□GTA | 1V, 1kHz        | 4.7                 | nF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0682□GTA | 1V, 1kHz        | 6.8                 | nF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| C1608NP0103□GTA | 1V, 1kHz        | 10                  | nF          | ±5%, ±2% | 0.80                    | ±0.10       | ±0.10         | 0.10%  | (I)       |                  |           |
| 25V             | C1608NP0150JFTA | 1V, 1MHz            | 15          | pF       | ±5%                     | 0.80        | ±0.10         | ±0.10  | 0.14%     | Paper, 4Kpcs     | (I)       |
|                 | C1608NP0680□FTA | 1V, 1MHz            | 68          | pF       | ±5%, ±2%                | 0.80        | ±0.10         | ±0.10  | 0.10%     |                  | (I)       |

□ Tolerance Code: A=±0.05pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

● C2012NP0\_A Series (EIA0805)

| RV              | DARFON P/N      | Measuring Condition | Capacitance |              | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|--------------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                 |                     | Value       | Unit         |                     |             | L/W           | Thick. |           |                  |           |
| 200V            | C2012NP0101□JTA | 1V, 1MHz            | 100         | pF           | ±5%,±2%             | 0.85        | ±0.20         | ±0.10  | 0.10%     | Paper, 4Kpcs     | (I)       |
|                 | C2012NP0100□HTA | 1V, 1MHz            | 10          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.17%     |                  | (I)       |
|                 | C2012NP0120□HTA | 1V, 1MHz            | 12          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.16%     |                  | (I)       |
|                 | C2012NP0150□HTA | 1V, 1MHz            | 15          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.14%     |                  | (I)       |
|                 | C2012NP0180□HTA | 1V, 1MHz            | 18          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.13%     |                  | (I)       |
|                 | C2012NP0220□HTA | 1V, 1MHz            | 22          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.12%     |                  | (I)       |
|                 | C2012NP0240□HTA | 1V, 1MHz            | 24          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.11%     |                  | (I)       |
|                 | C2012NP0270□HTA | 1V, 1MHz            | 27          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.11%     |                  | (I)       |
|                 | C2012NP0300□HTA | 1V, 1MHz            | 30          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0330□HTA | 1V, 1MHz            | 33          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0390□HTA | 1V, 1MHz            | 39          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0430□HTA | 1V, 1MHz            | 43          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0470□HTA | 1V, 1MHz            | 47          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0560□HTA | 1V, 1MHz            | 56          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0620□HTA | 1V, 1MHz            | 62          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0680□HTA | 1V, 1MHz            | 68          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0750□HTA | 1V, 1MHz            | 75          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0820□HTA | 1V, 1MHz            | 82          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0101□HTA | 1V, 1MHz            | 100         | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0121□HTA | 1V, 1MHz            | 120         | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
| C2012NP0151□HTA | 1V, 1MHz        | 150                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0181□HTA | 1V, 1MHz        | 180                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0221□HTA | 1V, 1MHz        | 220                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0271□HTA | 1V, 1MHz        | 270                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0331□HTA | 1V, 1MHz        | 330                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0391□HTA | 1V, 1MHz        | 390                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0471□HTA | 1V, 1MHz        | 470                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0561□HTA | 1V, 1MHz        | 560                 | pF          | ±5%,±2%      | 0.85                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0681□HTA | 1V, 1MHz        | 680                 | pF          | ±5%,±2%      | 0.85                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0821□HTA | 1V, 1MHz        | 820                 | pF          | ±5%,±2%      | 0.85                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0102□HTA | 1V, 1MHz        | 1.0                 | nF          | ±10%,±5%,±2% | 0.85                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| 100V            | C2012NP0100□GTA | 1V, 1MHz            | 10          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.17%     | Paper, 4Kpcs     | (I)       |
|                 | C2012NP0120□GTA | 1V, 1MHz            | 12          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.16%     |                  | (I)       |
|                 | C2012NP0150□GTA | 1V, 1MHz            | 15          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.14%     |                  | (I)       |
|                 | C2012NP0180□GTA | 1V, 1MHz            | 18          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.13%     |                  | (I)       |
|                 | C2012NP0220□GTA | 1V, 1MHz            | 22          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.12%     |                  | (I)       |
|                 | C2012NP0240□GTA | 1V, 1MHz            | 24          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.11%     |                  | (I)       |
|                 | C2012NP0270□GTA | 1V, 1MHz            | 27          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.11%     |                  | (I)       |
|                 | C2012NP0330□GTA | 1V, 1MHz            | 33          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0360□GTA | 1V, 1MHz            | 36          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0390□GTA | 1V, 1MHz            | 39          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0430□GTA | 1V, 1MHz            | 43          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0470□GTA | 1V, 1MHz            | 47          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0560□GTA | 1V, 1MHz            | 56          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0680□GTA | 1V, 1MHz            | 68          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0750□GTA | 1V, 1MHz            | 75          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0820□GTA | 1V, 1MHz            | 82          | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0101□GTA | 1V, 1MHz            | 100         | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0121□GTA | 1V, 1MHz            | 120         | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0151□GTA | 1V, 1MHz            | 150         | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
|                 | C2012NP0181□GTA | 1V, 1MHz            | 180         | pF           | ±5%,±2%             | 0.60        | ±0.20         | ±0.10  | 0.10%     |                  | (I)       |
| C2012NP0221□GTA | 1V, 1MHz        | 220                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0271□GTA | 1V, 1MHz        | 270                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0331□GTA | 1V, 1MHz        | 330                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0391□GTA | 1V, 1MHz        | 390                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0471□GTA | 1V, 1MHz        | 470                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0561□GTA | 1V, 1MHz        | 560                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0681□GTA | 1V, 1MHz        | 680                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0821□GTA | 1V, 1MHz        | 820                 | pF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |
| C2012NP0102□GTA | 1V, 1MHz        | 1.0                 | nF          | ±5%,±2%      | 0.60                | ±0.20       | ±0.10         | 0.10%  | (I)       |                  |           |

□ Tolerance Code: A=±0.05pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

- X8G\_A Series
- C1005X8G\_A Series (EIA0402)

| RV              | DARFON P/N      | Measuring Condition | Capacitance |         | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|---------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                 |                     | Value       | Unit    |                     |             | L/W           | Thick. |           |                  |           |
| 50V             | C1005X8G101□GTA | 1V, 1MHz            | 100         | pF      | ±5%,±2%             | 0.50        | ±0.05         | ±0.05  | 0.10%     | Paper, 10Kpcs    | (I)       |
|                 | C1005X8G121□GTA | 1V, 1MHz            | 120         | pF      | ±5%,±2%             | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005X8G151□GTA | 1V, 1MHz            | 150         | pF      | ±5%,±2%             | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005X8G181□GTA | 1V, 1MHz            | 180         | pF      | ±5%,±2%             | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005X8G201□GTA | 1V, 1MHz            | 200         | pF      | ±5%,±2%             | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005X8G221□GTA | 1V, 1MHz            | 220         | pF      | ±5%,±2%             | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005X8G271□GTA | 1V, 1MHz            | 270         | pF      | ±5%,±2%             | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005X8G331□GTA | 1V, 1MHz            | 330         | pF      | ±5%,±2%             | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005X8G391□GTA | 1V, 1MHz            | 390         | pF      | ±5%,±2%             | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005X8G471□GTA | 1V, 1MHz            | 470         | pF      | ±5%,±2%             | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
|                 | C1005X8G681□GTA | 1V, 1MHz            | 680         | pF      | ±5%,±2%             | 0.50        | ±0.05         | ±0.05  | 0.10%     |                  | (I)       |
| C1005X8G821□GTA | 1V, 1MHz        | 820                 | pF          | ±5%,±2% | 0.50                | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |
| C1005X8G102□GTA | 1V, 1MHz        | 1.0                 | nF          | ±5%,±2% | 0.50                | ±0.05       | ±0.05         | 0.10%  | (I)       |                  |           |

- NP0\_B Series
- C1608NP0\_B Series (EIA0603)

| RV  | DARFON P/N      | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec. |
|-----|-----------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|------------|
|     |                 |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |            |
| 50V | C1608NP0101JGTB | 1V,1MHz             | 100         | pF   | ±5%                 | 0.80        | ±0.20         | ±0.20  | 0.10%     | Paper, 4Kpcs     | (I)        |

- NP0\_H Series
- C0603NP0\_H Series (EIA0201)

| RV  | DARFON P/N      | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | Testing Freq | ESR mΩ (max.) | Q (min.) | Standard Packing | Test Spec |
|-----|-----------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|--------------|---------------|----------|------------------|-----------|
|     |                 |                     | Value       | Unit |                     |             | L/W           | Thick. |              |               |          |                  |           |
| 50V | C0603NP0208□GTH | 1V, 1MHz            | 0.2         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 1895          | 420      | Paper, 15Kpcs    | (I)       |
|     | C0603NP0308□GTH | 1V, 1MHz            | 0.3         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 1263          | 420      |                  | (I)       |
|     | C0603NP0408□GTH | 1V, 1MHz            | 0.4         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 947           | 420      |                  | (I)       |
|     | C0603NP0508□GTH | 1V, 1MHz            | 0.5         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 758           | 420      |                  | (I)       |
|     | C0603NP0608□GTH | 1V, 1MHz            | 0.6         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 632           | 420      |                  | (I)       |
|     | C0603NP0708□GTH | 1V, 1MHz            | 0.7         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 541           | 420      |                  | (I)       |
|     | C0603NP0808□GTH | 1V, 1MHz            | 0.8         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 474           | 420      |                  | (I)       |
|     | C0603NP0908□GTH | 1V, 1MHz            | 0.9         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 421           | 420      |                  | (I)       |
|     | C0603NP0109□GTH | 1V, 1MHz            | 1.0         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 379           | 420      |                  | (I)       |
|     | C0603NP0119□GTH | 1V, 1MHz            | 1.1         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 413           | 350      |                  | (I)       |
|     | C0603NP0129□GTH | 1V, 1MHz            | 1.2         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 379           | 350      |                  | (I)       |
|     | C0603NP0139□GTH | 1V, 1MHz            | 1.3         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 350           | 350      |                  | (I)       |
|     | C0603NP0149□GTH | 1V, 1MHz            | 1.4         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 325           | 350      |                  | (I)       |
|     | C0603NP0159□GTH | 1V, 1MHz            | 1.5         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 303           | 350      |                  | (I)       |
|     | C0603NP0169□GTH | 1V, 1MHz            | 1.6         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 284           | 350      |                  | (I)       |
|     | C0603NP0189□GTH | 1V, 1MHz            | 1.8         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 253           | 350      |                  | (I)       |
|     | C0603NP0209□GTH | 1V, 1MHz            | 2.0         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 265           | 300      |                  | (I)       |
|     | C0603NP0229□GTH | 1V, 1MHz            | 2.2         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 241           | 300      |                  | (I)       |
|     | C0603NP0249□GTH | 1V, 1MHz            | 2.4         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 221           | 300      |                  | (I)       |
|     | C0603NP0279□GTH | 1V, 1MHz            | 2.7         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 196           | 300      |                  | (I)       |
|     | C0603NP0309□GTH | 1V, 1MHz            | 3.0         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 221           | 240      |                  | (I)       |
|     | C0603NP0339□GTH | 1V, 1MHz            | 3.3         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 201           | 240      |                  | (I)       |
|     | C0603NP0369□GTH | 1V, 1MHz            | 3.6         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 184           | 240      |                  | (I)       |
|     | C0603NP0399□GTH | 1V, 1MHz            | 3.9         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 170           | 240      |                  | (I)       |
|     | C0603NP0439□GTH | 1V, 1MHz            | 4.3         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 154           | 240      |                  | (I)       |
|     | C0603NP0479□GTH | 1V, 1MHz            | 4.7         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 141           | 240      |                  | (I)       |
|     | C0603NP0519□GTH | 1V, 1MHz            | 5.1         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 144           | 216      |                  | (I)       |
|     | C0603NP0569□GTH | 1V, 1MHz            | 5.6         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 132           | 216      |                  | (I)       |
|     | C0603NP0629□GTH | 1V, 1MHz            | 6.2         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 119           | 216      |                  | (I)       |
|     | C0603NP0689□GTH | 1V, 1MHz            | 6.8         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 108           | 216      |                  | (I)       |
|     | C0603NP0759□GTH | 1V, 1MHz            | 7.5         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 147           | 144      |                  | (I)       |
|     | C0603NP0829□GTH | 1V, 1MHz            | 8.2         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 135           | 144      |                  | (I)       |
|     | C0603NP0919□GTH | 1V, 1MHz            | 9.1         | pF   | ±0.25pF, ±0.1pF     | 0.30        | ±0.03         | ±0.03  | 1GHz         | 121           | 144      |                  | (I)       |
|     | C0603NP0100□GTH | 1V, 1MHz            | 10          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 1GHz         | 111           | 144      |                  | (I)       |
|     | C0603NP0110□GTH | 1V, 1MHz            | 11          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 1GHz         | 115           | 126      |                  | (I)       |
|     | C0603NP0120□GTH | 1V, 1MHz            | 12          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 1GHz         | 123           | 108      |                  | (I)       |
|     | C0603NP0130□GTH | 1V, 1MHz            | 13          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 1GHz         | 128           | 96       |                  | (I)       |
|     | C0603NP0150□GTH | 1V, 1MHz            | 15          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 1GHz         | 126           | 84       |                  | (I)       |
|     | C0603NP0160□GTH | 1V, 1MHz            | 16          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 1GHz         | 138           | 72       |                  | (I)       |
|     | C0603NP0180□GTH | 1V, 1MHz            | 18          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 1GHz         | 123           | 72       |                  | (I)       |
|     | C0603NP0200□GTH | 1V, 1MHz            | 20          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 1GHz         | 159           | 50       |                  | (I)       |
|     | C0603NP0220□GTH | 1V, 1MHz            | 22          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 1GHz         | 181           | 40       |                  | (I)       |
|     | C0603NP0240□GTH | 1V, 1MHz            | 24          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 500MHz       | 166           | 40       |                  | (I)       |
|     | C0603NP0270□GTH | 1V, 1MHz            | 27          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 500MHz       | 196           | 30       |                  | (I)       |
|     | C0603NP0300□GTH | 1V, 1MHz            | 30          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 500MHz       | 212           | 25       |                  | (I)       |
|     | C0603NP0330□GTH | 1V, 1MHz            | 33          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 500MHz       | 241           | 20       |                  | (I)       |
|     | C0603NP0560□GTH | 1V, 1MHz            | 56          | pF   | ±5%, ±2%            | 0.30        | ±0.03         | ±0.03  | 500MHz       | 237           | 12       |                  | (I)       |

□ Tolerance Code: A=±0.05 pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

● C1005NP0\_H Series (EIA0402)

| RV               | DARFON P/N       | Measuring Condition | Capacitance |          | Available Tolerance      | Thick. (mm) | Tolerance(mm) |        | Testing Freq | ESR mΩ (max.) | Q (min.) | Standard Packing | Test Spec |
|------------------|------------------|---------------------|-------------|----------|--------------------------|-------------|---------------|--------|--------------|---------------|----------|------------------|-----------|
|                  |                  |                     | Value       | Unit     |                          |             | L/W           | Thick. |              |               |          |                  |           |
| 100V             | C1005NP0208□HHTH | 1V, 1MHz            | 0.2         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 2411          | 330      | Paper, 10Kpcs    | (I)       |
|                  | C1005NP0308□HHTH | 1V, 1MHz            | 0.3         | pF       | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 1GHz         | 1608          | 330      |                  | (I)       |
|                  | C1005NP0408□HHTH | 1V, 1MHz            | 0.4         | pF       | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 1GHz         | 1206          | 330      |                  | (I)       |
|                  | C1005NP0508□HHTH | 1V, 1MHz            | 0.5         | pF       | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 1GHz         | 965           | 330      |                  | (I)       |
|                  | C1005NP0608□HHTH | 1V, 1MHz            | 0.6         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 804           | 330      |                  | (I)       |
|                  | C1005NP0708□HHTH | 1V, 1MHz            | 0.7         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 689           | 330      |                  | (I)       |
|                  | C1005NP0808□HHTH | 1V, 1MHz            | 0.8         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 603           | 330      |                  | (I)       |
|                  | C1005NP0908□HHTH | 1V, 1MHz            | 0.9         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 536           | 330      |                  | (I)       |
|                  | C1005NP0109□HHTH | 1V, 1MHz            | 1.0         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 482           | 330      |                  | (I)       |
|                  | C1005NP0119□HHTH | 1V, 1MHz            | 1.1         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 526           | 275      |                  | (I)       |
|                  | C1005NP0129□HHTH | 1V, 1MHz            | 1.2         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 482           | 275      |                  | (I)       |
|                  | C1005NP0139□HHTH | 1V, 1MHz            | 1.3         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 445           | 275      |                  | (I)       |
|                  | C1005NP0159□HHTH | 1V, 1MHz            | 1.5         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 386           | 275      |                  | (I)       |
|                  | C1005NP0169□HHTH | 1V, 1MHz            | 1.6         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 362           | 275      |                  | (I)       |
|                  | C1005NP0189□HHTH | 1V, 1MHz            | 1.8         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 322           | 275      |                  | (I)       |
|                  | C1005NP0209□HHTH | 1V, 1MHz            | 2.0         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 362           | 220      |                  | (I)       |
|                  | C1005NP0229□HHTH | 1V, 1MHz            | 2.2         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 329           | 220      |                  | (I)       |
|                  | C1005NP0249□HHTH | 1V, 1MHz            | 2.4         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 301           | 220      |                  | (I)       |
|                  | C1005NP0279□HHTH | 1V, 1MHz            | 2.7         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 268           | 220      |                  | (I)       |
|                  | C1005NP0309□HHTH | 1V, 1MHz            | 3.0         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 241           | 220      |                  | (I)       |
|                  | C1005NP0339□HHTH | 1V, 1MHz            | 3.3         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 219           | 220      |                  | (I)       |
|                  | C1005NP0369□HHTH | 1V, 1MHz            | 3.6         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 223           | 198      |                  | (I)       |
|                  | C1005NP0399□HHTH | 1V, 1MHz            | 3.9         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 206           | 198      |                  | (I)       |
|                  | C1005NP0439□HHTH | 1V, 1MHz            | 4.3         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 187           | 198      |                  | (I)       |
|                  | C1005NP0479□HHTH | 1V, 1MHz            | 4.7         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 171           | 198      |                  | (I)       |
|                  | C1005NP0519□HHTH | 1V, 1MHz            | 5.1         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 189           | 165      |                  | (I)       |
|                  | C1005NP0569□HHTH | 1V, 1MHz            | 5.6         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 172           | 165      |                  | (I)       |
|                  | C1005NP0689□HHTH | 1V, 1MHz            | 6.8         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 142           | 165      |                  | (I)       |
|                  | C1005NP0829□HHTH | 1V, 1MHz            | 8.2         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 176           | 110      |                  | (I)       |
|                  | C1005NP0100□HHTH | 1V, 1MHz            | 10          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 1GHz         | 181           | 88       |                  | (I)       |
|                  | C1005NP0120□HHTH | 1V, 1MHz            | 12          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 1GHz         | 201           | 66       |                  | (I)       |
|                  | C1005NP0150□HHTH | 1V, 1MHz            | 15          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 1GHz         | 241           | 44       |                  | (I)       |
|                  | C1005NP0180□HHTH | 1V, 1MHz            | 18          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 1GHz         | 268           | 33       |                  | (I)       |
|                  | C1005NP0220□HHTH | 1V, 1MHz            | 22          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 1GHz         | 301           | 24       |                  | (I)       |
|                  | C1005NP0270□HHTH | 1V, 1MHz            | 27          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 500MHz       | 246           | 24       |                  | (I)       |
| C1005NP0330□HHTH | 1V, 1MHz         | 33                  | pF          | ±5%, ±2% | 0.50                     | ±0.05       | ±0.05         | 500MHz | 254          | 19            | (I)      |                  |           |
| C1005NP0390□HHTH | 1V, 1MHz         | 39                  | pF          | ±5%, ±2% | 0.50                     | ±0.05       | ±0.05         | 500MHz | 255          | 16            | (I)      |                  |           |
| C1005NP0470□HHTH | 1V, 1MHz         | 47                  | pF          | ±5%, ±2% | 0.50                     | ±0.05       | ±0.05         | 500MHz | 242          | 14            | (I)      |                  |           |
| C1005NP0560□HHTH | 1V, 1MHz         | 56                  | pF          | ±5%, ±2% | 0.50                     | ±0.05       | ±0.05         | 500MHz | 258          | 11            | (I)      |                  |           |
| C1005NP0680□HHTH | 1V, 1MHz         | 68                  | pF          | ±5%, ±2% | 0.50                     | ±0.05       | ±0.05         | 500MHz | 260          | 9             | (I)      |                  |           |
| C1005NP0820□HHTH | 1V, 1MHz         | 82                  | pF          | ±5%, ±2% | 0.50                     | ±0.05       | ±0.05         | 500MHz | 243          | 8             | (I)      |                  |           |
| C1005NP0101□HHTH | 1V, 1MHz         | 100                 | pF          | ±5%, ±2% | 0.50                     | ±0.05       | ±0.05         | 500MHz | 265          | 6             | (I)      |                  |           |

□ Tolerance Code: A=±0.05 pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

| RV              | DARFON P/N      | Measuring Condition | Capacitance |          | Available Tolerance      | Thick. (mm) | Tolerance(mm) |        | Testing Freq | ESR mΩ (max.) | Q (min.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|----------|--------------------------|-------------|---------------|--------|--------------|---------------|----------|------------------|-----------|
|                 |                 |                     | Value       | Unit     |                          |             | L/W           | Thick. |              |               |          |                  |           |
| 50V             | C1005NP0208□GTH | 1V, 1MHz            | 0.2         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 2411          | 330      | Paper, 10Kpcs    | (I)       |
|                 | C1005NP0308□GTH | 1V, 1MHz            | 0.3         | pF       | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 1GHz         | 1608          | 330      |                  | (I)       |
|                 | C1005NP0408□GTH | 1V, 1MHz            | 0.4         | pF       | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 1GHz         | 1206          | 330      |                  | (I)       |
|                 | C1005NP0508□GTH | 1V, 1MHz            | 0.5         | pF       | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 1GHz         | 965           | 330      |                  | (I)       |
|                 | C1005NP0608□GTH | 1V, 1MHz            | 0.6         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 804           | 330      |                  | (I)       |
|                 | C1005NP0708□GTH | 1V, 1MHz            | 0.7         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 689           | 330      |                  | (I)       |
|                 | C1005NP0808□GTH | 1V, 1MHz            | 0.8         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 603           | 330      |                  | (I)       |
|                 | C1005NP0828□GTH | 1V, 1MHz            | 0.82        | pF       | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 1GHz         | 588           | 330      |                  | (I)       |
|                 | C1005NP0908□GTH | 1V, 1MHz            | 0.9         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 536           | 330      |                  | (I)       |
|                 | C1005NP0109□GTH | 1V, 1MHz            | 1.0         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 482           | 330      |                  | (I)       |
|                 | C1005NP0119□GTH | 1V, 1MHz            | 1.1         | pF       | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 1GHz         | 526           | 275      |                  | (I)       |
|                 | C1005NP0129□GTH | 1V, 1MHz            | 1.2         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 482           | 275      |                  | (I)       |
|                 | C1005NP0139□GTH | 1V, 1MHz            | 1.3         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 445           | 275      |                  | (I)       |
|                 | C1005NP0159□GTH | 1V, 1MHz            | 1.5         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 386           | 275      |                  | (I)       |
|                 | C1005NP0169□GTH | 1V, 1MHz            | 1.6         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 362           | 275      |                  | (I)       |
|                 | C1005NP0189□GTH | 1V, 1MHz            | 1.8         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 322           | 275      |                  | (I)       |
|                 | C1005NP0209□GTH | 1V, 1MHz            | 2.0         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 362           | 220      |                  | (I)       |
|                 | C1005NP0229□GTH | 1V, 1MHz            | 2.2         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 329           | 220      |                  | (I)       |
|                 | C1005NP0249□GTH | 1V, 1MHz            | 2.4         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 301           | 220      |                  | (I)       |
|                 | C1005NP0259□GTH | 1V, 1MHz            | 2.5         | pF       | ±0.25pF, ±0.1pF, ±0.05pF | 0.50        | ±0.05         | ±0.05  | 1GHz         | 289           | 220      |                  | (I)       |
|                 | C1005NP0279□GTH | 1V, 1MHz            | 2.7         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 268           | 220      |                  | (I)       |
|                 | C1005NP0309□GTH | 1V, 1MHz            | 3.0         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 241           | 220      |                  | (I)       |
|                 | C1005NP0339□GTH | 1V, 1MHz            | 3.3         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 219           | 220      |                  | (I)       |
|                 | C1005NP0369□GTH | 1V, 1MHz            | 3.6         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 223           | 198      |                  | (I)       |
|                 | C1005NP0399□GTH | 1V, 1MHz            | 3.9         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 206           | 198      |                  | (I)       |
|                 | C1005NP0439□GTH | 1V, 1MHz            | 4.3         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 187           | 198      |                  | (I)       |
|                 | C1005NP0479□GTH | 1V, 1MHz            | 4.7         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 171           | 198      |                  | (I)       |
|                 | C1005NP0519□GTH | 1V, 1MHz            | 5.1         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 189           | 165      |                  | (I)       |
|                 | C1005NP0569□GTH | 1V, 1MHz            | 5.6         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 172           | 165      |                  | (I)       |
|                 | C1005NP0689□GTH | 1V, 1MHz            | 6.8         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 142           | 165      |                  | (I)       |
|                 | C1005NP0829□GTH | 1V, 1MHz            | 8.2         | pF       | ±0.25pF, ±0.1pF          | 0.50        | ±0.05         | ±0.05  | 1GHz         | 176           | 110      |                  | (I)       |
|                 | C1005NP0100□GTH | 1V, 1MHz            | 10          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 1GHz         | 181           | 88       |                  | (I)       |
|                 | C1005NP0120□GTH | 1V, 1MHz            | 12          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 1GHz         | 201           | 66       |                  | (I)       |
|                 | C1005NP0150□GTH | 1V, 1MHz            | 15          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 1GHz         | 241           | 44       |                  | (I)       |
|                 | C1005NP0180□GTH | 1V, 1MHz            | 18          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 1GHz         | 268           | 33       |                  | (I)       |
|                 | C1005NP0220□GTH | 1V, 1MHz            | 22          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 1GHz         | 301           | 24       |                  | (I)       |
|                 | C1005NP0270□GTH | 1V, 1MHz            | 27          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 500MHz       | 246           | 24       |                  | (I)       |
|                 | C1005NP0330□GTH | 1V, 1MHz            | 33          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 500MHz       | 254           | 19       |                  | (I)       |
|                 | C1005NP0390□GTH | 1V, 1MHz            | 39          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 500MHz       | 255           | 16       |                  | (I)       |
|                 | C1005NP0470□GTH | 1V, 1MHz            | 47          | pF       | ±5%, ±2%                 | 0.50        | ±0.05         | ±0.05  | 500MHz       | 242           | 14       |                  | (I)       |
| C1005NP0560□GTH | 1V, 1MHz        | 56                  | pF          | ±5%, ±2% | 0.50                     | ±0.05       | ±0.05         | 500MHz | 258          | 11            | (I)      |                  |           |
| C1005NP0680□GTH | 1V, 1MHz        | 68                  | pF          | ±5%, ±2% | 0.50                     | ±0.05       | ±0.05         | 500MHz | 260          | 9             | (I)      |                  |           |
| C1005NP0820□GTH | 1V, 1MHz        | 82                  | pF          | ±5%, ±2% | 0.50                     | ±0.05       | ±0.05         | 500MHz | 243          | 8             | (I)      |                  |           |
| C1005NP0101□GTH | 1V, 1MHz        | 100                 | pF          | ±5%, ±2% | 0.50                     | ±0.05       | ±0.05         | 500MHz | 265          | 6             | (I)      |                  |           |

□ Tolerance Code: A=±0.05 pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.



● **Class II: High Dielectric Constant Type**

■ X7R\_A Series

● C0603X7R\_A Series (EIA0201)

| RV   | DARFON P/N      | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|------|-----------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|      |                 |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 25V  | C0603X7R222KFTA | 1V, 1kHz            | 2.2         | nF   | ±10%                | 0.30        | ± 0.03        | ± 0.03 | 3.5%      | Paper, 15Kpcs    | (I)       |
| 16V  | C0603X7R472KETA | 1V, 1kHz            | 4.7         | nF   | ±10%                | 0.30        | ± 0.03        | ± 0.03 | 5.0%      | Paper, 15Kpcs    | (I)       |
| 10V  | C0603X7R222KDTA | 1V, 1kHz            | 2.2         | nF   | ±10%                | 0.30        | ± 0.03        | ± 0.03 | 5.0%      | Paper, 15Kpcs    | (I)       |
|      | C0603X7R472KDTA | 1V, 1kHz            | 4.7         | nF   | ±10%                | 0.30        | ± 0.03        | ± 0.03 | 5.0%      |                  | (I)       |
|      | C0603X7R103KDTA | 1V, 1kHz            | 10          | nF   | ±10%                | 0.30        | ± 0.03        | ± 0.03 | 5.0%      |                  | (I)       |
| 6.3V | C0603X7R104KCTA | 1V, 1kHz            | 100         | nF   | ±10%                | 0.30        | ± 0.05        | ± 0.05 | 10.0%     | Paper, 15Kpcs    | (II)      |

● C1005X7R\_A Series (EIA0402)

| RV              | DARFON P/N      | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                 |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 50V             | C1005X7R101KGTA | 1V, 1kHz            | 100         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      | Paper, 10Kpcs    | (I)       |
|                 | C1005X7R151KGTA | 1V, 1kHz            | 150         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R221KGTA | 1V, 1kHz            | 220         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R271KGTA | 1V, 1kHz            | 270         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R331KGTA | 1V, 1kHz            | 330         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R391KGTA | 1V, 1kHz            | 390         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R471KGTA | 1V, 1kHz            | 470         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R561KGTA | 1V, 1kHz            | 560         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R681KGTA | 1V, 1kHz            | 680         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R751KGTA | 1V, 1kHz            | 750         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R821KGTA | 1V, 1kHz            | 820         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R102KGTA | 1V, 1kHz            | 1.0         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R122KGTA | 1V, 1kHz            | 1.2         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R152KGTA | 1V, 1kHz            | 1.5         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R182KGTA | 1V, 1kHz            | 1.8         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R222KGTA | 1V, 1kHz            | 2.2         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R272KGTA | 1V, 1kHz            | 2.7         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R332□GTA | 1V, 1kHz            | 3.3         | nF   | ±5%, ±10%           | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R392KGTA | 1V, 1kHz            | 3.9         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R472KGTA | 1V, 1kHz            | 4.7         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R562KGTA | 1V, 1kHz            | 5.6         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R682KGTA | 1V, 1kHz            | 6.8         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R822KGTA | 1V, 1kHz            | 8.2         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R103KGTA | 1V, 1kHz            | 10          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
| C1005X7R153KGTA | 1V, 1kHz        | 15                  | nF          | ±10% | 0.50                | ±0.05       | ±0.05         | 5.0%   | (I)       |                  |           |
| C1005X7R223KGTA | 1V, 1kHz        | 22                  | nF          | ±10% | 0.50                | ±0.05       | ±0.05         | 5.0%   | (I)       |                  |           |
| C1005X7R333KGTA | 1V, 1kHz        | 33                  | nF          | ±10% | 0.50                | ±0.05       | ±0.05         | 5.0%   | (II)      |                  |           |
| C1005X7R473KGTA | 1V, 1kHz        | 47                  | nF          | ±10% | 0.50                | ±0.10       | ±0.10         | 10.0%  | (II)      |                  |           |
| C1005X7R683KGTA | 1V, 1kHz        | 68                  | nF          | ±10% | 0.50                | ±0.10       | ±0.10         | 10.0%  | (II)      |                  |           |
| C1005X7R104KGTA | 1V, 1kHz        | 100                 | nF          | ±10% | 0.50                | ±0.10       | ±0.10         | 10.0%  | (II)      |                  |           |
| 25V             | C1005X7R221KFTA | 1V, 1kHz            | 220         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      | Paper, 10Kpcs    | (I)       |
|                 | C1005X7R271KFTA | 1V, 1kHz            | 270         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R331KFTA | 1V, 1kHz            | 330         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R391KFTA | 1V, 1kHz            | 390         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R471KFTA | 1V, 1kHz            | 470         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R561KFTA | 1V, 1kHz            | 560         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R681KFTA | 1V, 1kHz            | 680         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R821KFTA | 1V, 1kHz            | 820         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R102KFTA | 1V, 1kHz            | 1.0         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R122KFTA | 1V, 1kHz            | 1.2         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R152KFTA | 1V, 1kHz            | 1.5         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R182KFTA | 1V, 1kHz            | 1.8         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R222KFTA | 1V, 1kHz            | 2.2         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R272KFTA | 1V, 1kHz            | 2.7         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R332KFTA | 1V, 1kHz            | 3.3         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R392KFTA | 1V, 1kHz            | 3.9         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R472KFTA | 1V, 1kHz            | 4.7         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R562KFTA | 1V, 1kHz            | 5.6         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R682□FTA | 1V, 1kHz            | 6.8         | nF   | ±5%, ±10%           | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
|                 | C1005X7R822KFTA | 1V, 1kHz            | 8.2         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.0%      |                  | (I)       |
| C1005X7R103KFTA | 1V, 1kHz        | 10                  | nF          | ±10% | 0.50                | ±0.05       | ±0.05         | 3.0%   | (I)       |                  |           |



| RV              | DARFON P/N      | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                 |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 25V             | C1005X7R123KFTA | 1V , 1kHz           | 12          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      | Paper, 10Kpcs    | (I)       |
|                 | C1005X7R153KFTA | 1V , 1kHz           | 15          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R183KFTA | 1V , 1kHz           | 18          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R223KFTA | 1V , 1kHz           | 22          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R273KFTA | 1V , 1kHz           | 27          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R333KFTA | 1V , 1kHz           | 33          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R473KFTA | 1V , 1kHz           | 47          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R104KFTA | 1V , 1kHz           | 100         | nF   | ±10%                | 0.50        | ±0.10         | ±0.10  | 10.0%     |                  | (II)      |
| 16V             | C1005X7R221KETA | 1V , 1kHz           | 220         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      | Paper, 10Kpcs    | (I)       |
|                 | C1005X7R271KETA | 1V , 1kHz           | 270         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R331KETA | 1V , 1kHz           | 330         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R391KETA | 1V , 1kHz           | 390         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R471KETA | 1V , 1kHz           | 470         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R561KETA | 1V , 1kHz           | 560         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R681KETA | 1V , 1kHz           | 680         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R821KETA | 1V , 1kHz           | 820         | pF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R102KETA | 1V , 1kHz           | 1.0         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R122KETA | 1V , 1kHz           | 1.2         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R152KETA | 1V , 1kHz           | 1.5         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R182KETA | 1V , 1kHz           | 1.8         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R222KETA | 1V , 1kHz           | 2.2         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R272KETA | 1V , 1kHz           | 2.7         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R332KETA | 1V , 1kHz           | 3.3         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R392KETA | 1V , 1kHz           | 3.9         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R472KETA | 1V , 1kHz           | 4.7         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R562KETA | 1V , 1kHz           | 5.6         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R682KETA | 1V , 1kHz           | 6.8         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R822KETA | 1V , 1kHz           | 8.2         | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R103KETA | 1V , 1kHz           | 10          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R123KETA | 1V , 1kHz           | 12          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R153KETA | 1V , 1kHz           | 15          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
|                 | C1005X7R183KETA | 1V , 1kHz           | 18          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      |                  | (I)       |
| C1005X7R223KETA | 1V , 1kHz       | 22                  | nF          | ±10% | 0.50                | ±0.05       | ±0.05         | 3.5%   | (I)       |                  |           |
| C1005X7R273KETA | 1V , 1kHz       | 27                  | nF          | ±10% | 0.50                | ±0.05       | ±0.05         | 5.0%   | (I)       |                  |           |
| C1005X7R333KETA | 1V , 1kHz       | 33                  | nF          | ±10% | 0.50                | ±0.05       | ±0.05         | 5.0%   | (I)       |                  |           |
| C1005X7R473KETA | 1V , 1kHz       | 47                  | nF          | ±10% | 0.50                | ±0.05       | ±0.05         | 5.0%   | (I)       |                  |           |
| C1005X7R563KETA | 1V , 1kHz       | 56                  | nF          | ±10% | 0.50                | ±0.05       | ±0.05         | 5.0%   | (I)       |                  |           |
| C1005X7R683KETA | 1V , 1kHz       | 68                  | nF          | ±10% | 0.50                | ±0.05       | ±0.05         | 5.0%   | (I)       |                  |           |
| C1005X7R823KETA | 1V , 1kHz       | 82                  | nF          | ±10% | 0.50                | ±0.05       | ±0.05         | 5.0%   | (I)       |                  |           |
| C1005X7R104KETA | 1V , 1kHz       | 100                 | nF          | ±10% | 0.50                | ±0.10       | ±0.10         | 5.0%   | (I)       |                  |           |
|                 | C1005X7R224KETA | 1V , 1kHz           | 220         | nF   | ±10%                | 0.50        | ±0.10         | ±0.10  | 10.0%     |                  | (II)      |
| 10V             | C1005X7R103KDTA | 1V , 1kHz           | 10          | nF   | ±10%                | 0.50        | ±0.05         | ±0.05  | 3.5%      | Paper, 10Kpcs    | (I)       |
|                 | C1005X7R104KDTA | 1V , 1kHz           | 100         | nF   | ±10%                | 0.50        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1005X7R224KDTA | 1V , 1kHz           | 220         | nF   | ±10%                | 0.50        | ±0.10         | ±0.10  | 10%       |                  | (II)      |
| 6.3V            | C1005X7R105KCTA | 1V , 1kHz           | 1           | uF   | ±10%                | 0.5         | ±0.10         | ±0.10  | 10%       | Paper, 10Kpcs    | (II)      |

□ Tolerance Code: A=±0.05pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

● C1608X7R\_A Series (EIA0603)

| RV              | DARFON P/N      | Measuring Condition | Capacitance |          | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|----------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                 |                     | Value       | Unit     |                     |             | L/W           | Thick. |           |                  |           |
| 100V            | C1608X7R102□HTA | 1V, 1kHz            | 1.0         | nF       | ±5%,±10%            | 0.80        | ±0.10         | ±0.10  | 3.0%      | Paper, 4Kpcs     | (I)       |
|                 | C1608X7R122KHTA | 1V, 1kHz            | 1.2         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R152KHTA | 1V, 1kHz            | 1.5         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R182KHTA | 1V, 1kHz            | 1.8         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R222KHTA | 1V, 1kHz            | 2.2         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R272KHTA | 1V, 1kHz            | 2.7         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R332KHTA | 1V, 1kHz            | 3.3         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R392KHTA | 1V, 1kHz            | 3.9         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R472□HTA | 1V, 1kHz            | 4.7         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R562KHTA | 1V, 1kHz            | 5.6         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R682KHTA | 1V, 1kHz            | 6.8         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R822KHTA | 1V, 1kHz            | 8.2         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R103□HTA | 1V, 1kHz            | 10          | nF       | ±5%,±10%            | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R153KHTA | 1V, 1kHz            | 15          | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
| C1608X7R223KHTA | 1V, 1kHz        | 22                  | nF          | ±10%     | 0.80                | ±0.10       | ±0.10         | 5.0%   | (I)       |                  |           |
| C1608X7R473KHTA | 1V, 1kHz        | 47                  | nF          | ±10%     | 0.80                | ±0.15       | ±0.15         | 5.0%   | (I)       |                  |           |
| C1608X7R104KHTA | 1V, 1kHz        | 100                 | nF          | ±10%     | 0.80                | ±0.15       | ±0.15         | 10.0%  | (I)       |                  |           |
| 50V             | C1608X7R101KGTA | 1V, 1kHz            | 100         | pF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      | Paper, 4Kpcs     | (I)       |
|                 | C1608X7R221KGTA | 1V, 1kHz            | 220         | pF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R331KGTA | 1V, 1kHz            | 330         | pF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R471KGTA | 1V, 1kHz            | 470         | pF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R102□GTA | 1V, 1kHz            | 1.0         | nF       | ±5%,±10%            | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R122KGTA | 1V, 1kHz            | 1.2         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R152KGTA | 1V, 1kHz            | 1.5         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R182KGTA | 1V, 1kHz            | 1.8         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R222KGTA | 1V, 1kHz            | 2.2         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R272KGTA | 1V, 1kHz            | 2.7         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R332KGTA | 1V, 1kHz            | 3.3         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R392KGTA | 1V, 1kHz            | 3.9         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R472□GTA | 1V, 1kHz            | 4.7         | nF       | ±5%,±10%            | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R562KGTA | 1V, 1kHz            | 5.6         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R682KGTA | 1V, 1kHz            | 6.8         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R822□GTA | 1V, 1kHz            | 8.2         | nF       | ±5%,±10%            | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R103□GTA | 1V, 1kHz            | 10          | nF       | ±5%,±10%            | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R153KGTA | 1V, 1kHz            | 15          | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R223KGTA | 1V, 1kHz            | 22          | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R273KGTA | 1V, 1kHz            | 27          | nF       | ±10%                | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (I)       |
| C1608X7R333KGTA | 1V, 1kHz        | 33                  | nF          | ±10%     | 0.80                | ±0.15       | ±0.15         | 3.5%   | (I)       |                  |           |
| C1608X7R393KGTA | 1V, 1kHz        | 39                  | nF          | ±10%     | 0.80                | ±0.15       | ±0.15         | 3.5%   | (I)       |                  |           |
| C1608X7R473KGTA | 1V, 1kHz        | 47                  | nF          | ±10%     | 0.80                | ±0.15       | ±0.15         | 3.5%   | (I)       |                  |           |
| C1608X7R563KGTA | 1V, 1kHz        | 56                  | nF          | ±10%     | 0.80                | ±0.15       | ±0.15         | 3.5%   | (I)       |                  |           |
| C1608X7R683KGTA | 1V, 1kHz        | 68                  | nF          | ±10%     | 0.80                | ±0.15       | ±0.15         | 3.5%   | (I)       |                  |           |
| C1608X7R823KGTA | 1V, 1kHz        | 82                  | nF          | ±10%     | 0.80                | ±0.15       | ±0.15         | 3.5%   | (I)       |                  |           |
| C1608X7R104□GTA | 1V, 1kHz        | 100                 | nF          | ±5%,±10% | 0.80                | ±0.15       | ±0.15         | 3.5%   | (I)       |                  |           |
| C1608X7R224KGTA | 1V, 1kHz        | 220                 | nF          | ±10%     | 0.80                | ±0.15       | ±0.15         | 3.5%   | (II)      |                  |           |
| 25V             | C1608X7R102KFTA | 1V, 1kHz            | 1.0         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      | Paper, 4Kpcs     | (I)       |
|                 | C1608X7R152KFTA | 1V, 1kHz            | 1.5         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R682KFTA | 1V, 1kHz            | 6.8         | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R103KFTA | 1V, 1kHz            | 10          | nF       | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.0%      |                  | (I)       |
|                 | C1608X7R273□FTA | 1V, 1kHz            | 27          | nF       | ±5%,±10%            | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (I)       |
|                 | C1608X7R393KFTA | 1V, 1kHz            | 39          | nF       | ±10%                | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (I)       |
|                 | C1608X7R473KFTA | 1V, 1kHz            | 47          | nF       | ±10%                | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (I)       |
|                 | C1608X7R104KFTA | 1V, 1kHz            | 100         | nF       | ±10%                | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (I)       |
|                 | C1608X7R224KFTA | 1V, 1kHz            | 220         | nF       | ±10%                | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (II)      |
| C1608X7R474KFTA | 1V, 1kHz        | 470                 | nF          | ±10%     | 0.80                | ±0.20       | ±0.20         | 10.0%  | (II)      |                  |           |
| C1608X7R105KFTA | 1V, 1kHz        | 1.0                 | uF          | ±10%     | 0.80                | ±0.20       | ±0.20         | 10.0%  | (II)      |                  |           |

| RV              | DARFON P/N      | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----------------|-----------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|                 |                 |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 16V             | C1608X7R101KETA | 1V , 1kHz           | 100         | pF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      | Paper, 4Kpcs     | (I)       |
|                 | C1608X7R221KETA | 1V , 1kHz           | 220         | pF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R471KETA | 1V , 1kHz           | 470         | pF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R102KETA | 1V , 1kHz           | 1.0         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R122KETA | 1V , 1kHz           | 1.2         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R152KETA | 1V , 1kHz           | 1.5         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R182KETA | 1V , 1kHz           | 1.8         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R222KETA | 1V , 1kHz           | 2.2         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R272KETA | 1V , 1kHz           | 2.7         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R332KETA | 1V , 1kHz           | 3.3         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R392KETA | 1V , 1kHz           | 3.9         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R472KETA | 1V , 1kHz           | 4.7         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R562KETA | 1V , 1kHz           | 5.6         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R682KETA | 1V , 1kHz           | 6.8         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R822KETA | 1V , 1kHz           | 8.2         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R103KETA | 1V , 1kHz           | 10          | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R223KETA | 1V , 1kHz           | 22          | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 3.5%      |                  | (I)       |
|                 | C1608X7R273KETA | 1V , 1kHz           | 27          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (I)       |
|                 | C1608X7R393KETA | 1V , 1kHz           | 39          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (I)       |
|                 | C1608X7R473KETA | 1V , 1kHz           | 47          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (I)       |
|                 | C1608X7R563KETA | 1V , 1kHz           | 56          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (I)       |
|                 | C1608X7R683KETA | 1V , 1kHz           | 68          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (I)       |
|                 | C1608X7R823KETA | 1V , 1kHz           | 82          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 3.5%      |                  | (I)       |
| C1608X7R104KETA | 1V , 1kHz       | 100                 | nF          | ±10% | 0.80                | ±0.15       | ±0.15         | 3.5%   | (I)       |                  |           |
| C1608X7R154KETA | 1V , 1kHz       | 150                 | nF          | ±10% | 0.80                | ±0.15       | ±0.15         | 3.5%   | (I)       |                  |           |
| C1608X7R224KETA | 1V , 1kHz       | 220                 | nF          | ±10% | 0.80                | ±0.15       | ±0.15         | 3.5%   | (I)       |                  |           |
| C1608X7R474KETA | 1V , 1kHz       | 470                 | nF          | ±10% | 0.80                | ±0.15       | ±0.15         | 10.0%  | (II)      |                  |           |
| C1608X7R105KETA | 1V , 1kHz       | 1.0                 | uF          | ±10% | 0.80                | ±0.20       | ±0.20         | 10.0%  | (II)      |                  |           |
| 10V             | C1608X7R102KDTA | 1V , 1kHz           | 1.0         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      | Paper, 4Kpcs     | (I)       |
|                 | C1608X7R122KDTA | 1V , 1kHz           | 1.2         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R152KDTA | 1V , 1kHz           | 1.5         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R182KDTA | 1V , 1kHz           | 1.8         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R222KDTA | 1V , 1kHz           | 2.2         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R272KDTA | 1V , 1kHz           | 2.7         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R332KDTA | 1V , 1kHz           | 3.3         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R392KDTA | 1V , 1kHz           | 3.9         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R472KDTA | 1V , 1kHz           | 4.7         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R562KDTA | 1V , 1kHz           | 5.6         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R682KDTA | 1V , 1kHz           | 6.8         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R822KDTA | 1V , 1kHz           | 8.2         | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R103KDTA | 1V , 1kHz           | 10          | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R223KDTA | 1V , 1kHz           | 22          | nF   | ±10%                | 0.80        | ±0.10         | ±0.10  | 5.0%      |                  | (I)       |
|                 | C1608X7R273KDTA | 1V , 1kHz           | 27          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 5.0%      |                  | (I)       |
|                 | C1608X7R393KDTA | 1V , 1kHz           | 39          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 5.0%      |                  | (I)       |
|                 | C1608X7R473KDTA | 1V , 1kHz           | 47          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 5.0%      |                  | (I)       |
|                 | C1608X7R563KDTA | 1V , 1kHz           | 56          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 5.0%      |                  | (I)       |
|                 | C1608X7R683KDTA | 1V , 1kHz           | 68          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 5.0%      |                  | (I)       |
|                 | C1608X7R823KDTA | 1V , 1kHz           | 82          | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 5.0%      |                  | (I)       |
| C1608X7R104KDTA | 1V , 1kHz       | 100                 | nF          | ±10% | 0.80                | ±0.15       | ±0.15         | 5.0%   | (I)       |                  |           |
| C1608X7R154KDTA | 1V , 1kHz       | 150                 | nF          | ±10% | 0.80                | ±0.15       | ±0.15         | 5.0%   | (I)       |                  |           |
| C1608X7R184KDTA | 1V , 1kHz       | 180                 | nF          | ±10% | 0.80                | ±0.15       | ±0.15         | 5.0%   | (I)       |                  |           |
| C1608X7R224KDTA | 1V , 1kHz       | 220                 | nF          | ±10% | 0.80                | ±0.15       | ±0.15         | 5.0%   | (I)       |                  |           |
| 6.3V            | C1608X7R105KCTA | 1V , 1kHz           | 1.0         | uF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 10.0%     | Paper, 4Kpcs     | (II)      |
|                 | C1608X7R225KCTA | 1V , 1kHz           | 2.2         | uF   | ±10%                | 0.80        | ±0.20         | ±0.20  | 10.0%     |                  | (II)      |

□ Tolerance Code: A=±0.05pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

● C2012X7R\_A Series (EIA0805)

| RV               | DARFON P/N       | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.)       | Standard Packing | Test Spec       |
|------------------|------------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------------|------------------|-----------------|
|                  |                  |                     | Value       | Unit |                     |             | L/W           | Thick. |                 |                  |                 |
| 100V             | C2012X7R102KHTAE | 1V, 1kHz            | 1.0         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            | Paper, 4Kpcs     | (I)             |
|                  | C2012X7R122KHTAE | 1V, 1kHz            | 1.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R152KHTAE | 1V, 1kHz            | 1.5         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R182KHTAE | 1V, 1kHz            | 1.8         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R222KHTAE | 1V, 1kHz            | 2.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R272KHTAE | 1V, 1kHz            | 2.7         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R332KHTAE | 1V, 1kHz            | 3.3         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R392KHTAE | 1V, 1kHz            | 3.9         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R472KHTAE | 1V, 1kHz            | 4.7         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R562KHTAE | 1V, 1kHz            | 5.6         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R682KHTAE | 1V, 1kHz            | 6.8         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R822KHTAE | 1V, 1kHz            | 8.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R103KHTAE | 1V, 1kHz            | 10          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R123KHTAE | 1V, 1kHz            | 12          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R153KHTAE | 1V, 1kHz            | 15          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            | (I)              |                 |
|                  | C2012X7R183KHTAE | 1V, 1kHz            | 18          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            | (I)              |                 |
|                  | C2012X7R223KHTAE | 1V, 1kHz            | 22          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            | (I)              |                 |
|                  | C2012X7R333KHPAG | 1V, 1kHz            | 33          | nF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 2.5%            | Embossed, 3Kpcs  | (I)             |
|                  | C2012X7R473KHPAG | 1V, 1kHz            | 47          | nF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 2.5%            |                  | (I)             |
|                  | C2012X7R563KHPAG | 1V, 1kHz            | 56          | nF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 2.5%            |                  | (I)             |
| C2012X7R683KHPAG | 1V, 1kHz         | 68                  | nF          | ±10% | 1.25                | ±0.20       | ±0.20         | 2.5%   | (I)             |                  |                 |
| C2012X7R823KHPAG | 1V, 1kHz         | 82                  | nF          | ±10% | 1.25                | ±0.20       | ±0.20         | 2.5%   | (I)             |                  |                 |
| C2012X7R104KHPAG | 1V, 1kHz         | 100                 | nF          | ±10% | 1.25                | ±0.20       | ±0.20         | 5.0%   | (I)             |                  |                 |
| 50V              | C2012X7R102□GTAE | 1V, 1kHz            | 1.0         | nF   | ±5%, ±10%           | 0.85        | ±0.20         | ±0.10  | 3.0%            | Paper, 4Kpcs     | (I)             |
|                  | C2012X7R122KGTAE | 1V, 1kHz            | 1.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R152KGTAE | 1V, 1kHz            | 1.5         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R182KGTAE | 1V, 1kHz            | 1.8         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R222KGTAE | 1V, 1kHz            | 2.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R272KGTAE | 1V, 1kHz            | 2.7         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R332KGTAE | 1V, 1kHz            | 3.3         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R392KGTAE | 1V, 1kHz            | 3.9         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R472KGTAE | 1V, 1kHz            | 4.7         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R562KGTAE | 1V, 1kHz            | 5.6         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R682KGTAE | 1V, 1kHz            | 6.8         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R822KGTAE | 1V, 1kHz            | 8.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R103KGTAE | 1V, 1kHz            | 10          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R123KGTAE | 1V, 1kHz            | 12          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R153KGTAE | 1V, 1kHz            | 15          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R183KGTAE | 1V, 1kHz            | 18          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R223KGTAE | 1V, 1kHz            | 22          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R273KGTAE | 1V, 1kHz            | 27          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R333KGTAE | 1V, 1kHz            | 33          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R393KGTAE | 1V, 1kHz            | 39          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R473KGTAE | 1V, 1kHz            | 47          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R563KGTAE | 1V, 1kHz            | 56          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R683KGTAE | 1V, 1kHz            | 68          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)             |
|                  | C2012X7R683KGPAG | 1V, 1kHz            | 68          | nF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 3.0%            |                  | Embossed, 3Kpcs |
|                  | C2012X7R823KGTAE | 1V, 1kHz            | 82          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            | Paper, 4Kpcs     | (I)             |
|                  | C2012X7R823KGPAG | 1V, 1kHz            | 82          | nF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 3.0%            | Embossed, 3Kpcs  | (I)             |
|                  | C2012X7R104KGTAE | 1V, 1kHz            | 100         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            | Paper, 4Kpcs     | (I)             |
|                  | C2012X7R104KGPAG | 1V, 1kHz            | 100         | nF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 3.0%            | Embossed, 3Kpcs  | (I)             |
|                  | C2012X7R154KGTAE | 1V, 1kHz            | 150         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            | Paper, 4Kpcs     | (I)             |
|                  | C2012X7R224KGPAG | 1V, 1kHz            | 220         | nF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 3.5%            | (I)              |                 |
| C2012X7R474KGPAG | 1V, 1kHz         | 470                 | nF          | ±10% | 1.25                | ±0.20       | ±0.20         | 5.0%   | Embossed, 3Kpcs | (II)             |                 |
| C2012X7R105KGPAG | 1V, 1kHz         | 1                   | uF          | ±10% | 1.25                | ±0.20       | ±0.20         | 5.0%   |                 | (II)             |                 |

□ Tolerance Code: A=±0.05pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.

| RV               | DARFON P/N       | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.)       | Standard Packing | Test Spec |
|------------------|------------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------------|------------------|-----------|
|                  |                  |                     | Value       | Unit |                     |             | L/W           | Thick. |                 |                  |           |
| 25V              | C2012X7R102KFTAE | 1V, 1kHz            | 1.0         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            | Paper, 4Kpcs     | (I)       |
|                  | C2012X7R122KFTAE | 1V, 1kHz            | 1.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R152KFTAE | 1V, 1kHz            | 1.5         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R182KFTAE | 1V, 1kHz            | 1.8         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R222KFTAE | 1V, 1kHz            | 2.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R272KFTAE | 1V, 1kHz            | 2.7         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R332KFTAE | 1V, 1kHz            | 3.3         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R392KFTAE | 1V, 1kHz            | 3.9         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R472KFTAE | 1V, 1kHz            | 4.7         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R562KFTAE | 1V, 1kHz            | 5.6         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R682KFTAE | 1V, 1kHz            | 6.8         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R822KFTAE | 1V, 1kHz            | 8.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R103KFTAE | 1V, 1kHz            | 10          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R123KFTAE | 1V, 1kHz            | 12          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R153KFTAE | 1V, 1kHz            | 15          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R183KFTAE | 1V, 1kHz            | 18          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R223KFTAE | 1V, 1kHz            | 22          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 3.0%            |                  | (I)       |
|                  | C2012X7R273KFTAE | 1V, 1kHz            | 27          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 2.5%            |                  | (I)       |
|                  | C2012X7R333KFTAE | 1V, 1kHz            | 33          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 2.5%            |                  | (I)       |
|                  | C2012X7R393KFTAE | 1V, 1kHz            | 39          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 2.5%            |                  | (I)       |
|                  | C2012X7R473KFTAE | 1V, 1kHz            | 47          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 2.5%            |                  | (I)       |
|                  | C2012X7R563KFTAE | 1V, 1kHz            | 56          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 2.5%            |                  | (I)       |
|                  | C2012X7R683KFTAE | 1V, 1kHz            | 68          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 2.5%            |                  | (I)       |
|                  | C2012X7R823KFTAE | 1V, 1kHz            | 82          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 2.5%            |                  | (I)       |
|                  | C2012X7R104KFTAE | 1V, 1kHz            | 100         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 2.5%            |                  | (I)       |
| C2012X7R124KFTAE | 1V, 1kHz         | 120                 | nF          | ±10% | 0.85                | ±0.20       | ±0.10         | 2.5%   | (I)             |                  |           |
| C2012X7R154KFTAE | 1V, 1kHz         | 150                 | nF          | ±10% | 0.85                | ±0.20       | ±0.10         | 2.5%   | (I)             |                  |           |
| C2012X7R184KFTAE | 1V, 1kHz         | 180                 | nF          | ±10% | 0.85                | ±0.20       | ±0.10         | 3.0%   | (I)             |                  |           |
| C2012X7R224KFTAE | 1V, 1kHz         | 220                 | nF          | ±10% | 0.85                | ±0.20       | ±0.10         | 3.5%   | (I)             |                  |           |
| C2012X7R334KFPAG | 1V, 1kHz         | 330                 | nF          | ±10% | 1.25                | ±0.20       | ±0.20         | 5.0%   | Embossed, 3Kpcs | (I)              |           |
| C2012X7R474KFPAG | 1V, 1kHz         | 470                 | nF          | ±10% | 1.25                | ±0.20       | ±0.20         | 5.0%   |                 | (I)              |           |
| C2012X7R105KFPAG | 1V, 1kHz         | 1.0                 | uF          | ±10% | 1.25                | ±0.20       | ±0.20         | 5.0%   |                 | (II)             |           |
| 16V              | C2012X7R105KEPAG | 1V, 1kHz            | 1.0         | uF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 5.0%            | Embossed, 3Kpcs  | (II)      |
|                  | C2012X7R225KEPAG | 1V, 1kHz            | 2.2         | uF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 10.0%           |                  | (III)     |
|                  | C2012X7R475KEPAG | 1V, 1kHz            | 4.7         | uF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 10.0%           |                  | (III)     |
| 10V              | C2012X7R102KDTAE | 1V, 1kHz            | 1.0         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            | Paper, 4Kpcs     | (I)       |
|                  | C2012X7R122KDTAE | 1V, 1kHz            | 1.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R152KDTAE | 1V, 1kHz            | 1.5         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R182KDTAE | 1V, 1kHz            | 1.8         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R222KDTAE | 1V, 1kHz            | 2.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R272KDTAE | 1V, 1kHz            | 2.7         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R332KDTAE | 1V, 1kHz            | 3.3         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R392KDTAE | 1V, 1kHz            | 3.9         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R472KDTAE | 1V, 1kHz            | 4.7         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R562KDTAE | 1V, 1kHz            | 5.6         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R682KDTAE | 1V, 1kHz            | 6.8         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R822KDTAE | 1V, 1kHz            | 8.2         | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R103KDTAE | 1V, 1kHz            | 10          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R123KDTAE | 1V, 1kHz            | 12          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R153KDTAE | 1V, 1kHz            | 15          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R183KDTAE | 1V, 1kHz            | 18          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R223KDTAE | 1V, 1kHz            | 22          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R273KDTAE | 1V, 1kHz            | 27          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R333KDTAE | 1V, 1kHz            | 33          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R393KDTAE | 1V, 1kHz            | 39          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R473KDTAE | 1V, 1kHz            | 47          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
|                  | C2012X7R563KDTAE | 1V, 1kHz            | 56          | nF   | ±10%                | 0.85        | ±0.20         | ±0.10  | 5.0%            |                  | (I)       |
| C2012X7R683KDTAE | 1V, 1kHz         | 68                  | nF          | ±10% | 0.85                | ±0.20       | ±0.10         | 5.0%   | (I)             |                  |           |
| C2012X7R823KDTAE | 1V, 1kHz         | 82                  | nF          | ±10% | 0.85                | ±0.20       | ±0.10         | 5.0%   | (I)             |                  |           |
| C2012X7R104KDTAE | 1V, 1kHz         | 100                 | nF          | ±10% | 0.85                | ±0.20       | ±0.10         | 5.0%   | (I)             |                  |           |
| C2012X7R124KDTAE | 1V, 1kHz         | 120                 | nF          | ±10% | 0.85                | ±0.20       | ±0.10         | 5.0%   | (I)             |                  |           |
| C2012X7R154KDTAE | 1V, 1kHz         | 150                 | nF          | ±10% | 0.85                | ±0.20       | ±0.10         | 5.0%   | (I)             |                  |           |
| C2012X7R184KDTAE | 1V, 1kHz         | 180                 | nF          | ±10% | 0.85                | ±0.20       | ±0.10         | 5.0%   | (I)             |                  |           |
| C2012X7R224KDTAE | 1V, 1kHz         | 220                 | nF          | ±10% | 0.85                | ±0.20       | ±0.10         | 5.0%   | (I)             |                  |           |

| RV  | DARFON P/N       | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----|------------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|     |                  |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 10V | C2012X7R334KDPAG | 1V , 1kHz           | 330         | nF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 5.0%      | Embossed, 3Kpcs  | (I)       |
|     | C2012X7R474KDPAG | 1V , 1kHz           | 470         | nF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 5.0%      |                  | (I)       |
|     | C2012X7R105KDPAG | 1V , 1kHz           | 1.0         | uF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 5.0%      |                  | (II)      |
|     | C2012X7R475KDPAG | 1V , 1kHz           | 4.7         | uF   | ±10%                | 1.25        | ±0.20         | ±0.20  | 10.0%     |                  | (II)      |

● C3216X7R\_A Series (EIA1206)

| RV  | DARFON P/N       | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----|------------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|     |                  |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 50V | C3216X7R104KGTAE | 1V , 1kHz           | 100         | nF   | ±10%                | 0.85        | ±0.15         | ±0.10  | 3.5%      | Paper, 4Kpcs     | (I)       |
| 25V | C3216X7R105KFPAL | 1V , 1kHz           | 1.0         | uF   | ±10%                | 1.6         | ±0.30         | ±0.30  | 10.0%     | Embossed, 2Kpcs  | (II)      |

● C3225X7R\_A Series (EIA1210)

| RV  | DARFON P/N       | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----|------------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|     |                  |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 50V | C3225X7R105KGPAG | 1V , 1kHz           | 1.0         | uF   | ±10%                | 1.25        | ±0.3/±0.2     | ±0.20  | 2.5%      | Embossed, 3Kpcs  | (I)       |
|     | C3225X7R225KGPAP | 1V , 1kHz           | 2.2         | uF   | ±10%                | 2.5         | ±0.3/±0.2     | ±0.20  | 5.0%      | Embossed, 1Kpcs  | (II)      |
|     | C3225X7R475KGPAP | 1V , 1kHz           | 4.7         | uF   | ±10%                | 2.5         | ±0.30         | ±0.30  | 10.0%     |                  | (II)      |
| 25V | C3225X7R105KFPAG | 1V , 1kHz           | 1.0         | uF   | ±10%                | 1.25        | ±0.3/±0.2     | ±0.20  | 2.5%      | Embossed, 3Kpcs  | (I)       |
|     | C3225X7R106KFPAP | 1V , 1kHz           | 10          | uF   | ±10%                | 2.5         | ±0.30         | ±0.30  | 10.0%     | Embossed, 1Kpcs  | (II)      |
| 16V | C3225X7R226□EPAP | 0.5V , 120Hz        | 22          | uF   | ±10%, ±20%          | 2.5         | ±0.30         | ±0.30  | 15.0%     | Embossed, 1Kpcs  | (II)      |
| 10V | C3225X7R226□DPAP | 0.5V , 120Hz        | 22          | uF   | ±10%, ±20%          | 2.5         | ±0.30         | ±0.30  | 15.0%     | Embossed, 1Kpcs  | (II)      |

■ X6S\_A Series

● C1005X6S\_A Series (EIA0402)

| RV   | DARFON P/N      | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|------|-----------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|      |                 |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 6.3V | C1005X6S225KCTA | 1V , 1kHz           | 2.2         | uF   | ±10%, ±20%          | 0.50        | ±0.20         | ±0.20  | 10.0%     | Paper, 10Kpcs    | (II)      |

■ X7S\_A Series

● C0603X7S\_A Series (EIA0201)

| RV   | DARFON P/N      | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|------|-----------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|      |                 |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 6.3V | C0603X7S104KCTA | 1V , 1kHz           | 100         | nF   | ±10%                | 0.30        | ± 0.05        | ± 0.05 | 10.0%     | Paper, 15Kpcs    | (II)      |

□ Tolerance Code: A=±0.05pF, B=±0.1pF, C=±0.25pF, D=±0.5pF, F=±1%, G=±2%, J=±5%; Special tolerance on the request.



■ X8R\_A Series

● C1005X8R\_A Series (EIA0402)

| RV  | DARFON P/N      | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----|-----------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|     |                 |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 50V | C1005X8R472KGTA | 1V , 1kHz           | 4.7         | nF   | ±10%                | 0.50        | ±0.10         | ±0.10  | 7.5%      | Paper, 10Kpcs    | (I)       |

● C1608X8R\_A Series (EIA0603)

| RV  | DARFON P/N      | Measuring Condition | Capacitance |      | Available Tolerance | Thick. (mm) | Tolerance(mm) |        | DF (max.) | Standard Packing | Test Spec |
|-----|-----------------|---------------------|-------------|------|---------------------|-------------|---------------|--------|-----------|------------------|-----------|
|     |                 |                     | Value       | Unit |                     |             | L/W           | Thick. |           |                  |           |
| 50V | C1608X8R104KGTA | 1V , 1kHz           | 100         | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 7.5%      | Paper, 4Kpcs     | (I)       |
| 25V | C1608X8R104KFTA | 1V , 1kHz           | 100         | nF   | ±10%                | 0.80        | ±0.15         | ±0.15  | 7.5%      | Paper, 4Kpcs     | (I)       |

- Test Spec.
- Test Spec (I)

| No | AEC-Q200 Test Item                   | Specification               |  | AEC-Q200 Test Method                                   |  |  |
|----|--------------------------------------|-----------------------------|--|--|--|--|
|    |                                      | Temp. compensation type     | High dielectric constant type  |  |  |  |
| 1  | Pre- and Post-Stress Electrical Test | ---                         |  | ---  |  |  |
| 2  | High Temperature Exposure (Storage)  | Appearance                  | No marking defects   |  | Set the capacitor at max. operating temperature for 1000±12 hours, let sit for 24±2 hours at room temperature, then measure.   |  |
|    |                                      | Cap. Change                 | NP0/X8G within ±2.5% or 0.25pF ( whichever is larger )   | X7R/X8R/X6S within ±10.0%                              |  |  |
|    |                                      | Q/D.F.                      | If C ≤ 30pF, DF ≤ 1/(400+20C)<br>If C > 30pF, DF ≤ 0.1%  | X7R/X8R/X6S:<br>To satisfy the specified initial spec. |  |  |
|    |                                      | I.R.                        | I.R. ≥ 10,000MΩ or R <sub>C</sub> R ≥ 500Ω-F.<br>(whichever is smaller)                            |  |  |  |
| 3  | Temperature Cycle (Thermal shock)    | Appearance                  | No marking defects   |  | Solder the capacitor to supporting jig (Glass epoxy board) and perform 1000 cycles according to the four heat treatments listed in the following table. Let sit for 24±2hrs at room temperature, then measure.<br>Step 1: Minimum operating temperature 15±3min<br>Step 2: Room temperature 1 min<br>Step 3: Maximum operating temperature 15±3min<br>Step 4: Room temperature 1 min<br>*High dielectric constant type:<br>Initial measurement: perform a heat treatment at 150±10°C for one hour and then let sit for 24±2 hours at room temp. Perform the initial measurement. |  |
|    |                                      | Cap. Change                 | NP0/X8G within ±2.5% or 0.25pF ( whichever is larger )   | X7R/X8R/X6S within ±10.0%                              |  |  |
|    |                                      | Q/D.F.                      | If C ≤ 30pF, DF ≤ 1/(400+20C)<br>If C > 30pF, DF ≤ 0.1%  | X7R/X8R/X6S:<br>To satisfy the specified initial spec  |  |  |
|    |                                      | I.R.                        | I.R. ≥ 10,000MΩ or R <sub>C</sub> R ≥ 500Ω-F.<br>(whichever is smaller)                            |  |  |  |
| 4  | Destructive Physical Analysis        | No defects or abnormalities |  | Per EIA-469  |  |  |
| 5  | Moisture Resistance                  | Appearance                  | No marking defects   |  | Perform 10 cycles of the 24-hour heat (25 to 65°C) and humidity (80 to 98%) treatments as shown below. Let sit for 24±2hrs at room temperature, then measure.<br><br>Temperature (°C)<br><br>Initial measurement: perform a heat treatment at 150±10°C for one hour and then let sit for 24±2 hours at room temp. Perform the initial measurement.   |  |
|    |                                      | Cap. Change                 | NP0/X8G within ±3.0% or 0.30pF ( whichever is larger )   | X7R/X8R/X6S within ±12.5%                              |  |  |
|    |                                      | Q/D.F.                      | If C < 10pF, DF ≤ 1/(200+10C)<br>If 10pF ≤ C ≤ 30pF, DF ≤ 1/(275+5C/2)<br>If C > 30pF, DF ≤ 0.285% | X7R/X8R/X6S:<br>To satisfy the specified initial spec  |  |  |
|    |                                      | I.R.                        | I.R. ≥ 10,000MΩ or R <sub>C</sub> R ≥ 500Ω-F.<br>(whichever is smaller)                            |  |  |  |
| 6  | Biased Humidity                      | Appearance                  | No marking defects   |  | Apply 100% of the rated voltage and at 85±3°C and 80 to 85% humidity for 1000±12 hours. The charge / discharge current is less than 50mA.<br><br>[Temperature compensation type]<br>Remove and let sit for 24±2 hours at room temperature, then measure.<br><br>[High dielectric constant type]<br>*Initial measurement<br>Perform a heat treatment at 150+0/-10°C for one hour and then let sit for 24±2 hours at room temperature.<br>Perform the initial measurement.   |  |
|    |                                      | Cap. Change                 | NP0/X8G within ±3.0% or 0.30pF ( whichever is larger )   | X7R/X8R/X6S within ±12.5%                              |  |  |
|    |                                      | Q/D.F.                      | If C ≤ 30pF, DF ≤ 1/(100+10C/3)<br>If C > 30pF, DF ≤ 0.5%  | X7R/X8R/X6S:<br>200% max of initial spec.              |  |  |
|    |                                      | I.R.                        | I.R. ≥ 500MΩ or R <sub>C</sub> R ≥ 25Ω-F.<br>(whichever is smaller)                                |  |  |  |

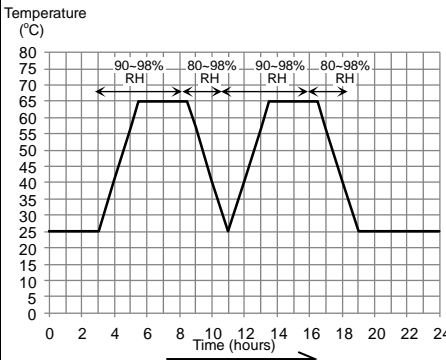


| AEC-Q200<br>Test Item |                              | Specification                   |   | Test Method   |   |
|-----------------------|------------------------------|---------------------------------|---|---|---|
|                       |                              | Temp. compensation type         | High dielectric constant type   |   |   |
| 7                     | Operational Life             | Appearance                      | No marking defects  |   | Apply 100% of the rated voltage for 1000±12 hours at the maximum operating temperature ± 3 °C. The charge / discharge current is less than 50mA.<br><br>[Temperature compensation type]<br>Remove and let sit for 24±2 hours at room temperature, then measure.   |
|                       |                              | Cap. Change                     | NP0/X8G within ±3.0% or 0.30pF ( whichever is larger )  | X7R/X8R/X6S within ±12.5%                             |   |
|                       |                              | Q/D.F.                          | If C<10pF, DF ≤ 1/(200+10C)<br>If 10pF ≤ C ≤ 30pF, DF ≤ 1/(275+5C/2)<br>If C >30pF, DF ≤ 0.285% | X7R/X8R/X6S:<br>200% max of initial spec.             |   |
|                       |                              | I.R.                            | I.R. ≥ 1,000MΩ or R <sub>C</sub> R ≥ 50Ω-F.<br>(whichever is smaller)                           |   |   |
| 8                     | External Visual              | No defects or abnormalities     |   | Visual inspection                                     |   |
| 9                     | Physical Dimension           | Within the specified dimensions |   | Using calipers  |   |
| 10                    | Resistance to Solvents       | Appearance                      | No marking defects  |   | Per MIL-STD-202 Method 215<br>Solvent 1: 1 part (by volume) of isopropyl alcohol<br>3 parts (by volume) of mineral spirits<br>Solvent 2: Terpene defluxer<br>Solvent 3: 42 parts (by volume) of water<br>1 part (by volume) of propylene glycol monomethylether<br>1 part (by volume) of monoethanolamine   |
|                       |                              | Cap. Change                     | Within the specified tolerance  |   |   |
|                       |                              | Q/D.F.                          | If C ≤ 30pF, DF ≤ 1/(400+20C)<br>If C >30pF, DF ≤ 0.1%  | X7R/X8R/X6S:<br>To satisfy the specified initial spec |   |
|                       |                              | I.R.                            | I.R. ≥ 10,000MΩ or R <sub>C</sub> R ≥ 500Ω-F.<br>(whichever is smaller)                         |   |   |
| 11                    | Mechanical Shock             | Appearance                      | No marking defects  |   | Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks).<br>The specified test pulse should be Half-sine and should have a duration: 0.5ms, peak value: 1500g and velocity change: 4.7m/s.  |
|                       |                              | Cap. Change                     | Within the specified tolerance  |   |   |
|                       |                              | Q/D.F.                          | If C ≤ 30pF, DF ≤ 1/(400+20C)<br>If C >30pF, DF ≤ 0.1%  | X7R/X8R/X6S:<br>To satisfy the specified initial spec |   |
|                       |                              | I.R.                            | I.R. ≥ 10,000MΩ or R <sub>C</sub> R ≥ 500Ω-F.<br>(whichever is smaller)                         |   |   |
| 12                    | Vibration                    | Appearance                      | No marking defects  |   | Solder the capacitor to supporting jig (Glass epoxy board). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 2000Hz. The frequency range, from 10 to 2000Hz and return to 10Hz, should be traversed in approximately 20 minutes. This motion should be applied for 12 items in each 3 mutually perpendicular directions (total 36 times). |
|                       |                              | Cap. Change                     | Within the specified tolerance  |   |   |
|                       |                              | Q/D.F.                          | If C ≤ 30pF, DF ≤ 1/(400+20C)<br>If C >30pF, DF ≤ 0.1%  | X7R/X8R/X6S:<br>To satisfy the specified initial spec |   |
|                       |                              | I.R.                            | I.R. ≥ 10,000MΩ or R <sub>C</sub> R ≥ 500Ω-F.<br>(whichever is smaller)                         |   |   |
| 13                    | Resistance to Soldering Heat | Appearance                      | No marking defects  |   | Solder the capacitor to supporting jig (FR4) with below profile 3 times: Peak temperature 250±5 °C and peak temperature period 30±5 seconds (1 ~ 4 °C/sec, time above 183 °C, 90s ~ 120s).<br>Let sit at room temperature for 24±2 hours, then measure.<br>Initial measurement: perform a heat treatment at 150+0/-10 °C for one hour and then let sit for 24±2 hours at room temperature, then measure.  |
|                       |                              | Cap. Change                     | NP0/X8G within ±3.0% or 0.30pF ( whichever is larger )  | X7R/X8R/X6S within ±12.5%                             |   |
|                       |                              | Q/D.F.                          | If C ≤ 30pF, DF ≤ 1/(400+20C)<br>If C >30pF, DF ≤ 0.1%  | X7R/X8R/X6S:<br>To satisfy the specified initial spec |   |
|                       |                              | I.R.                            | I.R. ≥ 10,000MΩ or R <sub>C</sub> R ≥ 500Ω-F.<br>(whichever is smaller)                         |   |   |

| AEC-Q200 Test Item |                              | Specification   |   | Test Method  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|--------------------|------------------------------|---|---|--|---|------|---|---|---|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|
|                    |                              | Temp. compensation type   | High dielectric constant type   |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
| 14                 | ESD                          | Appearance  | No marking defects  |  | Per AEC-Q200-002  |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|                    |                              | Cap. Change   | Within the specified tolerance  |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|                    |                              | Q/D.F.  | If $C \leq 30\text{pF}$ , $DF \leq 1/(400+20C)$<br>If $C > 30\text{pF}$ , $DF \leq 0.1\%$         | X7R/X8R/X6S:<br>To satisfy the specified initial spec  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|                    |                              | I.R.  | I.R. $\geq 10,000\text{M}\Omega$ or $R_C C_R \geq 500\Omega\text{-F}$ .<br>(whichever is smaller) |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
| 15                 | Solderability of Termination | 95% of the terminations are to be soldered evenly and continuously. |   | (a) Electrical Test not required. Magnification 50 X. Method B1:<br>Should be placed into 155°C dry bake for 4 hours±15 minutes. After preheating, immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in SAC305 solder solution for 5+0/-0.5 seconds at 245±5°C<br><br>(b) Electrical Test not required. Magnification 50 X. Test D:<br>Should be placed into 155°C dry bake for 4 hours±15 minutes. After preheating, immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in SAC305 solder solution for 30+0/-0.5 seconds at 260±5°C |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|                    |                              |   |   |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
| 16                 | Electrical Characterization  | Appearance  | No marking defects  |  | The capacitance / D.F. shall be measured at 25°C at the frequency and voltage shown in the table of "Part Number & Characteristic".   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|                    |                              | Cap. Change   | Within the specified tolerance  |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|                    |                              | Q/D.F.  | If $C \leq 30\text{pF}$ , $DF \leq 1/(400+20C)$<br>If $C > 30\text{pF}$ , $DF \leq 0.1\%$         | X7R/X8R/X6S:<br>To satisfy the specified initial spec  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|                    |                              | I.R. 25°C   | I.R. $\geq 10,000\text{M}\Omega$ or $R_C C_R \geq 500\Omega\text{-F}$ .<br>(whichever is smaller) | I.R. $\geq 10,000\text{M}\Omega$ or $R_C C_R \geq 500\Omega\text{-F}$ .<br>(whichever is smaller)  | The insulation resistance shall be measured with a DC voltage not exceeding the rated voltage at 25°C and 125°C, within 1 minute of charging.   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|                    |                              | Dielectric Strength   | No failure  |  | No failure shall be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds. The charge and discharge current is less than 50mA.   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
| 17                 | Board Flex                   | Appearance  | No marking defects  |  | Solder the capacitor to the test jig (glass epoxy boards) shown in Fig.a using a SAC305(Sn96.5Ag3.0Cu0.5) solder (then let sit for 24±2 hours for X7R).   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|                    |                              | Cap. Change   | NPO within ±5.0% or 0.5pF (whichever is larger)   | X7R/X8R/X6S within ±10.0%  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|                    |                              | Q/D.F.  | If $C \leq 30\text{pF}$ , $DF \leq 1/(400+20C)$<br>If $C > 30\text{pF}$ , $DF \leq 0.1\%$         | X7R/X8R/X6S:<br>To satisfy the specified initial spec  | Then apply a force in the direction shown in Fig.b for 60±1sec. The soldering shall be done with the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock.  |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
|                    |                              | I.R.  | I.R. $\geq 10,000\text{M}\Omega$ or $R_C C_R \geq 500\Omega\text{-F}$ .<br>(whichever is smaller) |  | <table border="1" data-bbox="758 1332 981 1489"> <thead> <tr> <th>Size</th> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>0603</td> <td>0.3</td> <td>0.9</td> <td>0.3</td> </tr> <tr> <td>1005</td> <td>0.5</td> <td>1.5</td> <td>0.6</td> </tr> <tr> <td>1608</td> <td>0.6</td> <td>2.2</td> <td>0.9</td> </tr> <tr> <td>2012</td> <td>0.8</td> <td>3.0</td> <td>1.3</td> </tr> <tr> <td>3216</td> <td>2.0</td> <td>4.4</td> <td>1.7</td> </tr> <tr> <td>3225</td> <td>2.0</td> <td>4.4</td> <td>2.6</td> </tr> </tbody> </table> <p>(Unit in mm)</p> | Size | a | b | c | 0603 | 0.3 | 0.9 | 0.3 | 1005 | 0.5 | 1.5 | 0.6 | 1608 | 0.6 | 2.2 | 0.9 | 2012 | 0.8 | 3.0 | 1.3 | 3216 | 2.0 | 4.4 | 1.7 | 3225 | 2.0 |
| Size               | a                            | b   | c   |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
| 0603               | 0.3                          | 0.9   | 0.3   |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
| 1005               | 0.5                          | 1.5   | 0.6   |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
| 1608               | 0.6                          | 2.2   | 0.9   |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
| 2012               | 0.8                          | 3.0   | 1.3   |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
| 3216               | 2.0                          | 4.4   | 1.7   |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |
| 3225               | 2.0                          | 4.4   | 2.6   |  |   |      |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |     |      |     |

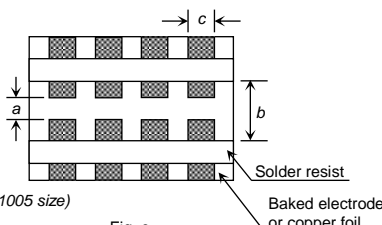
| AEC-Q200 Test Item |   | Specification  |  | Test Method   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
|--------------------|---|--|--|---|---|---|---|---|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|------|------|-----|-----|-----|------|-----|-----|-----|
|                    |   | Temp. compensation type  | High dielectric constant type  |   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 18                 | Terminal Strength                       | Appearance   | No marking defects   |   | Solder the capacitor to the test jig (glass epoxy boards) shown in Fig.c using a SAC305(Sn96.5Ag3.0Cu0.5) solder (then let sit for 24±2 hours for X7R).<br><br>Then apply *18N force in the direction parallel to the testing jig for 60sec. The soldering shall be done with the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock.<br><br>*2N for 0603 & 1005 size |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
|                    |   | Cap. Change  | Within the specified tolerance   |   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
|                    |   | Q/D.F.   | If $C \leq 30\text{pF}$ , $DF \leq 1/(400+20C)$<br>If $C > 30\text{pF}$ , $DF \leq 0.1\%$                    | X7R/X8R/X6S:<br>To satisfy the specified initial spec   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
|                    |   | I.R.   | $I.R. \geq 10,000\text{M}\Omega$ or $R_{CR} \geq 500\text{M}\Omega\cdot\text{F}$ .<br>(whichever is smaller) |   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
|                    |   |  |  | <table border="1"> <thead> <tr> <th>Size</th> <th>a</th> <th>b</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>0603</td> <td>0.3</td> <td>0.9</td> <td>0.3</td> </tr> <tr> <td>1005</td> <td>0.4</td> <td>1.5</td> <td>0.5</td> </tr> <tr> <td>1608</td> <td>1.0</td> <td>3.0</td> <td>1.2</td> </tr> <tr> <td>2012</td> <td>1.2</td> <td>4.0</td> <td>1.65</td> </tr> <tr> <td>3216</td> <td>2.2</td> <td>5.0</td> <td>2.0</td> </tr> <tr> <td>3225</td> <td>2.2</td> <td>5.0</td> <td>2.9</td> </tr> </tbody> </table> (Unit in mm) | Size  | a | b | C | 0603 | 0.3 | 0.9 | 0.3 | 1005 | 0.4 | 1.5 | 0.5 | 1608 | 1.0 | 3.0 | 1.2 | 2012 | 1.2 | 4.0 | 1.65 | 3216 | 2.2 | 5.0 | 2.0 | 3225 | 2.2 | 5.0 | 2.9 |
| Size               | a                                       | b  | C  |   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 0603               | 0.3                                     | 0.9  | 0.3  |   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 1005               | 0.4                                     | 1.5  | 0.5  |   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 1608               | 1.0                                     | 3.0  | 1.2  |   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 2012               | 1.2                                     | 4.0  | 1.65   |   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 3216               | 2.2                                     | 5.0  | 2.0  |   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 3225               | 2.2                                     | 5.0  | 2.9  |   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 19                 | Capacitance Temperature Characteristics | Capacitance change<br>NP0/X8G within $0 \pm 30\text{ppm}/^\circ\text{C}$<br>under operating temperature range. | Capacitance change<br>X7R/X8R/X6S within $\pm 15\%$  | 1. Temperature compensation type:<br>The capacitance value at $25^\circ\text{C}$ and $85^\circ\text{C}$ shall be measured and calculated from the formula given below.<br>$T.C. = (C_{85} - C_{25}) / C_{25} \cdot \Delta T \cdot 10^6 (\text{PPM}/^\circ\text{C})$<br><br>2. High dielectric constant type:<br>The ranges of capacitance change compared with the $25^\circ\text{C}$ value over the temperature ranges shall be within the specified ranges.   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
|                    |   |  |  |   |   |   |   |   |      |     |     |     |      |     |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |

## ● Test Spec (II)

| ●      | AEC-Q200 Test Item                   |                       | Specification   | AEC-Q200 Test Method   |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|--------|--------------------------------------|-----------------------|---|--|--------|-----------|-----------------------|-----|-----------------------------|--------------|-----|---------------------------|-----|----------------------------|-----|----------------------------|-------------|-----|
|        |                                      |                       | High dielectric constant type   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| 1      | Pre- and Post-Stress Electrical Test |                       | ---   | ---  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| 2      | High Temperature Exposure (Storage)  | Appearance            | No marking defects  | Set the capacitor at max. operating temperature for 1000±12 hours, let sit for 24±2 hours at room temperature, then measure.   |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | Cap. Change           | within ±10.0%   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | Q/D.F.                | To satisfy the specified initial spec.  |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | I.R.                  | R <sub>i</sub> C <sub>R</sub> ≥ 50Ω-F.<br><table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="3">RiCR ≥ 20Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table>  |  | Series | Cap Range | Insulation Resistance | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF   | RiCR ≥ 20Ω-F | X7S | 1608 ≥ 47uF; 2012 ≥ 100uF | X7T | 3216 ≥ 100uF; 3225 ≥ 100uF |     |                            |             |     |
| Series | Cap Range                            | Insulation Resistance |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7R    | 0603 ≥ 2.2uF; 1005 ≥ 22uF            | RiCR ≥ 20Ω-F          |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7S    | 1608 ≥ 47uF; 2012 ≥ 100uF            |                       |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7T    | 3216 ≥ 100uF; 3225 ≥ 100uF           |                       |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| 3      | Temperature Cycle (Thermal shock)    | Appearance            | No marking defects  | Solder the capacitor to supporting jig (Glass epoxy board) and perform 1000 cycles according to the four heat treatments listed in the following table. Let sit for 24±2hrs at room temperature, then measure.<br>Step 1: Minimum operating temperature 15±3min<br>Step 2: Room temperature 1 min<br>Step 3: Maximum operating temperature 15±3min<br>Step 4: Room temperature 1 min<br>*High dielectric constant type:<br>Initial measurement: perform a heat treatment at 150±10°C for one hour and then let sit for 24±2 hours at room temp. Perform the initial measurement. |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | Cap. Change           | within ±10.0%   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | Q/D.F.                | To satisfy the specified initial spec   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | I.R.                  | R <sub>i</sub> C <sub>R</sub> ≥ 50Ω-F.<br><table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="3">RiCR ≥ 20Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table>  |  | Series | Cap Range | Insulation Resistance | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF   | RiCR ≥ 20Ω-F | X7S | 1608 ≥ 47uF; 2012 ≥ 100uF | X7T | 3216 ≥ 100uF; 3225 ≥ 100uF |     |                            |             |     |
| Series | Cap Range                            | Insulation Resistance |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7R    | 0603 ≥ 2.2uF; 1005 ≥ 22uF            | RiCR ≥ 20Ω-F          |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7S    | 1608 ≥ 47uF; 2012 ≥ 100uF            |                       |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7T    | 3216 ≥ 100uF; 3225 ≥ 100uF           |                       |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| 4      | Destructive Physical Analysis        |                       | No defects or abnormalities   | Per EIA-469  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| 5      | Moisture Resistance                  | Appearance            | No marking defects  | Perform 10 cycles of the 24-hour heat (25 to 65°C) and humidity (80 to 98%) treatments as shown below. Let sit for 24±2hrs at room temperature, then measure.<br>Temperature (°C)<br><br>Initial measurement: perform a heat treatment at 150±10°C for one hour and then let sit for 24±2 hours at room temp. Perform the initial measurement.   |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | Cap. Change           | within ±12.5%   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | Q/D.F.                | To satisfy the specified initial spec   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | I.R.                  | R <sub>i</sub> C <sub>R</sub> ≥ 50Ω-F..<br><table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="4">RiCR ≥ 20Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> <tr> <td>X6S</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table>   |  | Series | Cap Range | Insulation Resistance | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF   | RiCR ≥ 20Ω-F | X7S | 1608 ≥ 47uF; 2012 ≥ 100uF | X7T | 3216 ≥ 100uF; 3225 ≥ 100uF | X6S | 3216 ≥ 100uF; 3225 ≥ 100uF |             |     |
| Series | Cap Range                            | Insulation Resistance |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7R    | 0603 ≥ 2.2uF; 1005 ≥ 22uF            | RiCR ≥ 20Ω-F          |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7S    | 1608 ≥ 47uF; 2012 ≥ 100uF            |                       |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7T    | 3216 ≥ 100uF; 3225 ≥ 100uF           |                       |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X6S    | 3216 ≥ 100uF; 3225 ≥ 100uF           |                       |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| 6      | Biased Humidity                      | Appearance            | No marking defects  | Apply 100% of the rated voltage at 85±3°C and 80 to 85% humidity for 1000±12 hours. The charge / discharge current is less than 50mA.<br>[Temperature compensation type]<br>Remove and let sit for 24±2 hours at room temperature, then measure.<br>[High dielectric constant type]<br>*Initial measurement<br>Perform a heat treatment at 150+0/-10°C for one hour and then let sit for 24±2 hours at room temperature.<br>Perform the initial measurement.   |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | Cap. Change           | within ±12.5%   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | Q/D.F.                | 200% max of initial spec.   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
|        |                                      | I.R.                  | R <sub>i</sub> C <sub>R</sub> ≥ 12.5Ω-F.<br>High cap:<br><table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 0.1uF; 1005 ≥ 0.47uF</td> <td rowspan="3">RiCR ≥ 5Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 1uF; 2012 ≥ 2.2uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 4.7uF; 3225 ≥ 10uF</td> </tr> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="3">RiCR ≥ 1Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table> |  | Series | Cap Range | Insulation Resistance | X7R | 0603 ≥ 0.1uF; 1005 ≥ 0.47uF | RiCR ≥ 5Ω-F  | X7S | 1608 ≥ 1uF; 2012 ≥ 2.2uF  | X7T | 3216 ≥ 4.7uF; 3225 ≥ 10uF  | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF  | RiCR ≥ 1Ω-F | X7S |
| Series | Cap Range                            | Insulation Resistance |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7R    | 0603 ≥ 0.1uF; 1005 ≥ 0.47uF          | RiCR ≥ 5Ω-F           |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7S    | 1608 ≥ 1uF; 2012 ≥ 2.2uF             |                       |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7T    | 3216 ≥ 4.7uF; 3225 ≥ 10uF            |                       |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7R    | 0603 ≥ 2.2uF; 1005 ≥ 22uF            | RiCR ≥ 1Ω-F           |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7S    | 1608 ≥ 47uF; 2012 ≥ 100uF            |                       |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |
| X7T    | 3216 ≥ 100uF; 3225 ≥ 100uF           |                       |   |  |        |           |                       |     |                             |              |     |                           |     |                            |     |                            |             |     |

| AEC-Q200 Test Item |                              | Specification                 |  | Test Method   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|--------------------|------------------------------|-------------------------------|--|---|--------|-----------|-----------------------|-----|-----------------------------|--------------|-----|---------------------------|-----|----------------------------|-----|---------------------------|-------------|-----|
|                    |                              | High dielectric constant type |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| 7                  | Operational Life             | Appearance                    | No marking defects   | Apply 100% of the rated voltage for 1000±12 hours at the maximum operating temperature ± 3 °C. The charge / discharge current is less than 50mA.<br><br><b>[Temperature compensation type]</b><br>Remove and let sit for 24±2 hours at room temperature, then measure.  |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | Cap. Change                   | within ±12.5%  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | Q/D.F.                        | 200% max of initial spec.  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | I.R.                          | $R_i C_i \geq 25\Omega\text{-F}$<br><br>High cap:<br><table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 0.1uF; 1005 ≥ 0.47uF</td> <td rowspan="3">RiCR ≥ 10Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 1uF; 2012 ≥ 2.2uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 4.7uF; 3225 ≥ 10uF</td> </tr> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="3">RiCR ≥ 2Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table> |   | Series | Cap Range | Insulation Resistance | X7R | 0603 ≥ 0.1uF; 1005 ≥ 0.47uF | RiCR ≥ 10Ω-F | X7S | 1608 ≥ 1uF; 2012 ≥ 2.2uF  | X7T | 3216 ≥ 4.7uF; 3225 ≥ 10uF  | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF | RiCR ≥ 2Ω-F | X7S |
| Series             | Cap Range                    | Insulation Resistance         |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7R                | 0603 ≥ 0.1uF; 1005 ≥ 0.47uF  | RiCR ≥ 10Ω-F                  |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7S                | 1608 ≥ 1uF; 2012 ≥ 2.2uF     |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7T                | 3216 ≥ 4.7uF; 3225 ≥ 10uF    |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7R                | 0603 ≥ 2.2uF; 1005 ≥ 22uF    | RiCR ≥ 2Ω-F                   |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7S                | 1608 ≥ 47uF; 2012 ≥ 100uF    |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7T                | 3216 ≥ 100uF; 3225 ≥ 100uF   |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| 8                  |                              | External Visual               | No defects or abnormalities  | Visual inspection   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| 9                  |                              | Physical Dimension            | Within the specified dimensions  | Using callipers   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| 10                 | Resistance to Solvents       | Appearance                    | No marking defects   | Per MIL-STD-202 Method 215<br>Solvent 1: 1 part (by volume) of isopropyl alcohol<br>3 parts (by volume) of mineral spirits<br>Solvent 2: Terpene defluxer<br>Solvent 3: 42 parts (by volume) of water<br>1 part (by volume) of propylene glycol monomethylether<br>1 part (by volume) of monoethanolamine   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | Cap. Change                   | Within the specified tolerance   |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | Q/D.F.                        | To satisfy the specified initial spec  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | I.R.                          | $R_i C_i \geq 50\Omega\text{-F}$ ..<br><br><table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="3">RiCR ≥ 20Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table>  |   | Series | Cap Range | Insulation Resistance | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF   | RiCR ≥ 20Ω-F | X7S | 1608 ≥ 47uF; 2012 ≥ 100uF | X7T | 3216 ≥ 100uF; 3225 ≥ 100uF |     |                           |             |     |
| Series             | Cap Range                    | Insulation Resistance         |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7R                | 0603 ≥ 2.2uF; 1005 ≥ 22uF    | RiCR ≥ 20Ω-F                  |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7S                | 1608 ≥ 47uF; 2012 ≥ 100uF    |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7T                | 3216 ≥ 100uF; 3225 ≥ 100uF   |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| 11                 | Mechanical Shock             | Appearance                    | No marking defects   | Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks).<br>The specified test pulse should be Half-sine and should have a duration: 0.5ms, peak value: 1500g and velocity change: 4.7m/s.  |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | Cap. Change                   | Within the specified tolerance   |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | Q/D.F.                        | To satisfy the specified initial spec  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | I.R.                          | $R_i C_i \geq 50\Omega\text{-F}$ ..<br><br><table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="3">RiCR ≥ 20Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table>  |   | Series | Cap Range | Insulation Resistance | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF   | RiCR ≥ 20Ω-F | X7S | 1608 ≥ 47uF; 2012 ≥ 100uF | X7T | 3216 ≥ 100uF; 3225 ≥ 100uF |     |                           |             |     |
| Series             | Cap Range                    | Insulation Resistance         |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7R                | 0603 ≥ 2.2uF; 1005 ≥ 22uF    | RiCR ≥ 20Ω-F                  |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7S                | 1608 ≥ 47uF; 2012 ≥ 100uF    |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7T                | 3216 ≥ 100uF; 3225 ≥ 100uF   |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| 12                 | Vibration                    | Appearance                    | No marking defects   | Solder the capacitor to supporting jig (Glass epoxy board). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 2000Hz. The frequency range, from 10 to 2000Hz and return to 10Hz, should be traversed in approximately 20 minutes. This motion should be applied for 12 items in each 3 mutually perpendicular directions (total 36 times). |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | Cap. Change                   | Within the specified tolerance   |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | Q/D.F.                        | To satisfy the specified initial spec  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | I.R.                          | $R_i C_i \geq 50\Omega\text{-F}$ ..<br><br><table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="3">RiCR ≥ 20Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table>  |   | Series | Cap Range | Insulation Resistance | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF   | RiCR ≥ 20Ω-F | X7S | 1608 ≥ 47uF; 2012 ≥ 100uF | X7T | 3216 ≥ 100uF; 3225 ≥ 100uF |     |                           |             |     |
| Series             | Cap Range                    | Insulation Resistance         |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7R                | 0603 ≥ 2.2uF; 1005 ≥ 22uF    | RiCR ≥ 20Ω-F                  |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7S                | 1608 ≥ 47uF; 2012 ≥ 100uF    |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7T                | 3216 ≥ 100uF; 3225 ≥ 100uF   |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| 13                 | Resistance to Soldering Heat | Appearance                    | No marking defects   | Solder the capacitor to supporting jig (FR4) with below profile 3 times: Peak temperature 250±5 °C and peak temperature period 30±5 seconds (1 ~ 4 °C/sec, time above 183 °C, 90s ~ 120s).<br>Let sit at room temperature for 24±2 hours, then measure.<br><br>Initial measurement: perform a heat treatment at 150+0/-10 °C for one hour and then let sit for 24±2 hours at room temperature, then measure.  |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | Cap. Change                   | within ±12.5%  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | Q/D.F.                        | To satisfy the specified initial spec  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
|                    |                              | I.R.                          | $R_i C_i \geq 50\Omega\text{-F}$ ..<br><br><table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="3">RiCR ≥ 20Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table>  |   | Series | Cap Range | Insulation Resistance | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF   | RiCR ≥ 20Ω-F | X7S | 1608 ≥ 47uF; 2012 ≥ 100uF | X7T | 3216 ≥ 100uF; 3225 ≥ 100uF |     |                           |             |     |
| Series             | Cap Range                    | Insulation Resistance         |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7R                | 0603 ≥ 2.2uF; 1005 ≥ 22uF    | RiCR ≥ 20Ω-F                  |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7S                | 1608 ≥ 47uF; 2012 ≥ 100uF    |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |
| X7T                | 3216 ≥ 100uF; 3225 ≥ 100uF   |                               |  |   |        |           |                       |     |                             |              |     |                           |     |                            |     |                           |             |     |

| AEC-Q200 Test Item |                              | Specification   |  | Test Method  |   |                       |     |                           |              |     |                           |     |                            |  |
|--------------------|------------------------------|---|--|--|---|-----------------------|-----|---------------------------|--------------|-----|---------------------------|-----|----------------------------|--|
|                    |                              | Temp. compensation type   | High dielectric constant type  |  |   |                       |     |                           |              |     |                           |     |                            |  |
| 14                 | ESD                          | Appearance  | No marking defects   |  | Per AEC-Q200-002  |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              | Cap. Change   | Within the specified tolerance   |  |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              | Q/D.F.  | To satisfy the specified initial spec  |  |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              | I.R.  | R,C <sub>R</sub> ≥ 50Ω-F.  |  |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              |   | <table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="3">RiCR ≥ 20Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table> | Series   | Cap Range   | Insulation Resistance | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF | RiCR ≥ 20Ω-F | X7S | 1608 ≥ 47uF; 2012 ≥ 100uF | X7T | 3216 ≥ 100uF; 3225 ≥ 100uF |  |
| Series             | Cap Range                    | Insulation Resistance   |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
| X7R                | 0603 ≥ 2.2uF; 1005 ≥ 22uF    | RiCR ≥ 20Ω-F  |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
| X7S                | 1608 ≥ 47uF; 2012 ≥ 100uF    |   |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
| X7T                | 3216 ≥ 100uF; 3225 ≥ 100uF   |   |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
| 15                 | Solderability of Termination | 95% of the terminations are to be soldered evenly and continuously. |  | (a) Electrical Test not required. Magnification 50 X. Method B1: Should be placed into 155°C dry bake for 4 hours±15 minutes. After preheating, immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in SAC305 solder solution for 5+0/-0.5 seconds at 245±5°C |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              |   |  | (b) Electrical Test not required. Magnification 50 X. Test D: Should be placed into 155°C dry bake for 4 hours±15 minutes. After preheating, immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in SAC305 solder solution for 30+0/-0.5 seconds at 260±5°C   |   |                       |     |                           |              |     |                           |     |                            |  |
| 16                 | Electrical Characterization  | Appearance  | No marking defects   |  | The capacitance / D.F. shall be measured at 25°C at the frequency and voltage shown in the table of "Part Number & Characteristic".   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              | Cap. Change   | Within the specified tolerance   |  |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              | Q/D.F.  | To satisfy the specified initial spec  |  |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              | I.R. 25°C   | R,C <sub>R</sub> ≥ 50Ω-F.  |  | The insulation resistance shall be measured with a DC voltage not exceeding the rated voltage at 25°C and 125°C, within 1 minute of charging.   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              |   | <table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="3">RiCR ≥ 20Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table> | Series   | Cap Range   | Insulation Resistance | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF | RiCR ≥ 20Ω-F | X7S | 1608 ≥ 47uF; 2012 ≥ 100uF | X7T | 3216 ≥ 100uF; 3225 ≥ 100uF |  |
| Series             | Cap Range                    | Insulation Resistance   |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
| X7R                | 0603 ≥ 2.2uF; 1005 ≥ 22uF    | RiCR ≥ 20Ω-F  |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
| X7S                | 1608 ≥ 47uF; 2012 ≥ 100uF    |   |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
| X7T                | 3216 ≥ 100uF; 3225 ≥ 100uF   |   |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              | Dielectric Strength   | No failure   |  | No failure shall be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds. The charge and discharge current is less than 50mA.   |                       |     |                           |              |     |                           |     |                            |  |
| 17                 | Board Flex                   | Appearance  | No marking defects   |  | Solder the capacitor to the test jig (glass epoxy boards) shown in Fig.a using a SAC305(Sn96.5Ag3.0Cu0.5) solder (then let sit for 24±2 hours for X7R).<br><br>Then apply a force in the direction shown in Fig.b for 60±1sec. The soldering shall be done with the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock. |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              | Cap. Change   | within ±10.0%  |  |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              | Q/D.F.  | To satisfy the specified initial spec  |  |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              | I.R.  | R,C <sub>R</sub> ≥ 50Ω-F.  |  |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              |   | <table border="1"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 ≥ 2.2uF; 1005 ≥ 22uF</td> <td rowspan="3">RiCR ≥ 20Ω-F</td> </tr> <tr> <td>X7S</td> <td>1608 ≥ 47uF; 2012 ≥ 100uF</td> </tr> <tr> <td>X7T</td> <td>3216 ≥ 100uF; 3225 ≥ 100uF</td> </tr> </tbody> </table> | Series   | Cap Range   | Insulation Resistance | X7R | 0603 ≥ 2.2uF; 1005 ≥ 22uF | RiCR ≥ 20Ω-F | X7S | 1608 ≥ 47uF; 2012 ≥ 100uF | X7T | 3216 ≥ 100uF; 3225 ≥ 100uF |  |
| Series             | Cap Range                    | Insulation Resistance   |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
| X7R                | 0603 ≥ 2.2uF; 1005 ≥ 22uF    | RiCR ≥ 20Ω-F  |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
| X7S                | 1608 ≥ 47uF; 2012 ≥ 100uF    |   |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
| X7T                | 3216 ≥ 100uF; 3225 ≥ 100uF   |   |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              |   |  |  |   |                       |     |                           |              |     |                           |     |                            |  |
|                    |                              |   |  | <p>Pressurizing speed: 1mm/sec.<br/>Pressurize</p> <p>Flexure: 2mm (min) for High Dielectric Constant Type<br/>Flexure: 3mm (min) for Temperature Compensation Type<br/>Flexure: 5mm (min) For B Series type</p>   |   |                       |     |                           |              |     |                           |     |                            |  |

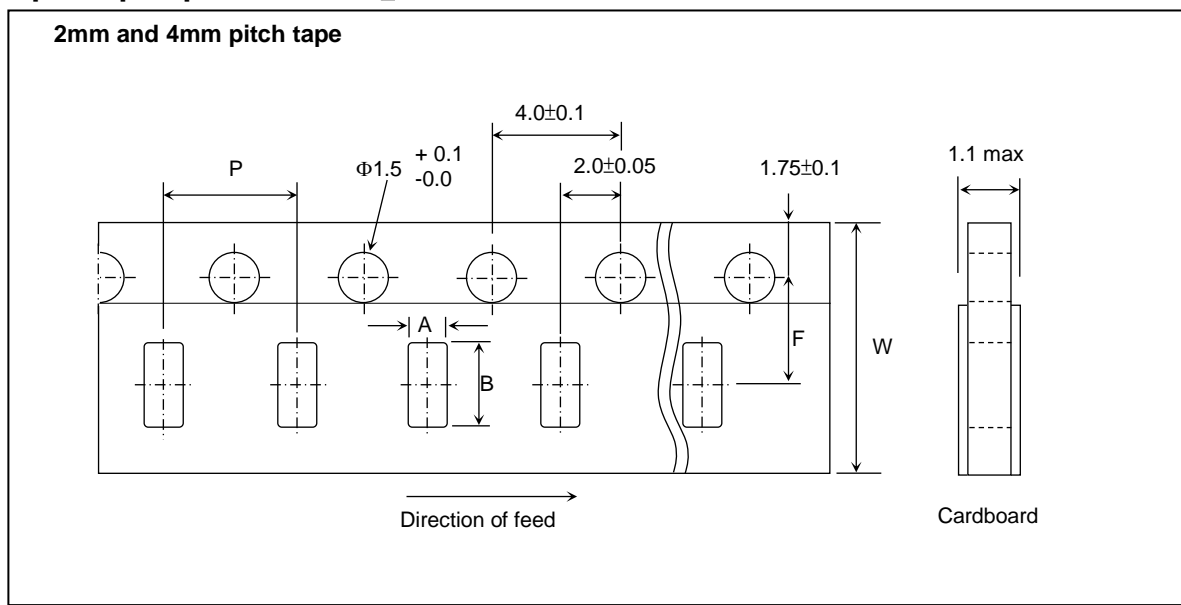
| AEC-Q200<br>Test Item |   | Specification  |  | Test Method |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
|-----------------------|---|--|--|-------------|---|-----------------------|-----|--|---------------------------------|-----|--|------|---|-----|-----|------|-----|-----|-----|------|-----|-----|------|------|-----|-----|-----|------|-----|-----|-----|
|                       |   | Temp. compensation type  | High dielectric constant type  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 18                    | Terminal Strength                           | Appearance   | No marking defects   |             | Solder the capacitor to the test jig (glass epoxy boards) shown in Fig.c using a SAC305(Sn96.5Ag3.0Cu0.5) solder (then let sit for 24±2 hours for X7R).<br><br>Then apply *18N force in the direction parallel to the testing jig for 60sec. The soldering shall be done with the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock.<br><br>*2N for 0603 & 1005 size |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
|                       |   | Cap. Change  | Within the specified tolerance   |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| Q/D.F.                | To satisfy the specified initial spec       |  |  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
|                       | I.R.  | $R_i C_R \geq 50\Omega \cdot F.$ <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Series</th> <th>Cap Range</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>X7R</td> <td>0603 <math>\geq 2.2\mu F</math>; 1005 <math>\geq 22\mu F</math></td> <td rowspan="3"><math>R_i C_R \geq 20\Omega \cdot F</math></td> </tr> <tr> <td>X7S</td> <td>1608 <math>\geq 47\mu F</math>; 2012 <math>\geq 100\mu F</math></td> </tr> <tr> <td>X7T</td> <td>3216 <math>\geq 100\mu F</math>; 3225 <math>\geq 100\mu F</math></td> </tr> </tbody> </table>  |  | Series      | Cap Range   | Insulation Resistance | X7R | 0603 $\geq 2.2\mu F$ ; 1005 $\geq 22\mu F$ | $R_i C_R \geq 20\Omega \cdot F$ | X7S | 1608 $\geq 47\mu F$ ; 2012 $\geq 100\mu F$ | X7T  | 3216 $\geq 100\mu F$ ; 3225 $\geq 100\mu F$ |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| Series                | Cap Range                                   | Insulation Resistance  |  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| X7R                   | 0603 $\geq 2.2\mu F$ ; 1005 $\geq 22\mu F$  | $R_i C_R \geq 20\Omega \cdot F$  |  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| X7S                   | 1608 $\geq 47\mu F$ ; 2012 $\geq 100\mu F$  |  |  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| X7T                   | 3216 $\geq 100\mu F$ ; 3225 $\geq 100\mu F$ |  |  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
|                       |   |  <p>T: 1.6mm<br/>(0.8 mm for 0603 &amp; 1005 size)</p> <p>Fig. c.</p> <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Size</th> <th>a</th> <th>b</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>0603</td> <td>0.3</td> <td>0.9</td> <td>0.3</td> </tr> <tr> <td>1005</td> <td>0.4</td> <td>1.5</td> <td>0.5</td> </tr> <tr> <td>1608</td> <td>1.0</td> <td>3.0</td> <td>1.2</td> </tr> <tr> <td>2012</td> <td>1.2</td> <td>4.0</td> <td>1.65</td> </tr> <tr> <td>3216</td> <td>2.2</td> <td>5.0</td> <td>2.0</td> </tr> <tr> <td>3225</td> <td>2.2</td> <td>5.0</td> <td>2.9</td> </tr> </tbody> </table> <p>(Unit in mm)</p> |  | Size        | a   | b                     | C   | 0603                                       | 0.3                             | 0.9 | 0.3  | 1005 | 0.4   | 1.5 | 0.5 | 1608 | 1.0 | 3.0 | 1.2 | 2012 | 1.2 | 4.0 | 1.65 | 3216 | 2.2 | 5.0 | 2.0 | 3225 | 2.2 | 5.0 | 2.9 |
| Size                  | a   | b  | C  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 0603                  | 0.3   | 0.9  | 0.3  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 1005                  | 0.4   | 1.5  | 0.5  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 1608                  | 1.0   | 3.0  | 1.2  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 2012                  | 1.2   | 4.0  | 1.65   |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 3216                  | 2.2   | 5.0  | 2.0  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 3225                  | 2.2   | 5.0  | 2.9  |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |
| 19                    | Capacitance Temperature Characteristics     | Capacitance change within ±15%   | 1. Temperature compensation type:<br>The capacitance value at 25°C and 85°C shall be measured and calculated from the formula given below.<br>$T.C. = (C_{85} - C_{25}) / C_{25} \cdot \Delta T \cdot 10^6 (PPM/^\circ C)$<br><br>2. High dielectric constant type:<br>The ranges of capacitance change compared with the 25°C value over the temperature ranges shall be within the specified ranges. |             |   |                       |     |  |                                 |     |  |      |   |     |     |      |     |     |     |      |     |     |      |      |     |     |     |      |     |     |     |

## Package

- Tape and reel packaging**

Tape and reel packaging is currently the most promising system for high-speed production. A typical 180mm (7 inch) diameter reel contains 1,500 to 15,000 capacitors, 250mm (10 inch) contains 10,000 capacitors, and 330mm (13 inch) contains 10,000 to 50,000 capacitors. Three standard sizes are available in taped and reeled package either with paper carrier tapes or embossed tapes.

### 【Paper tape specifications】



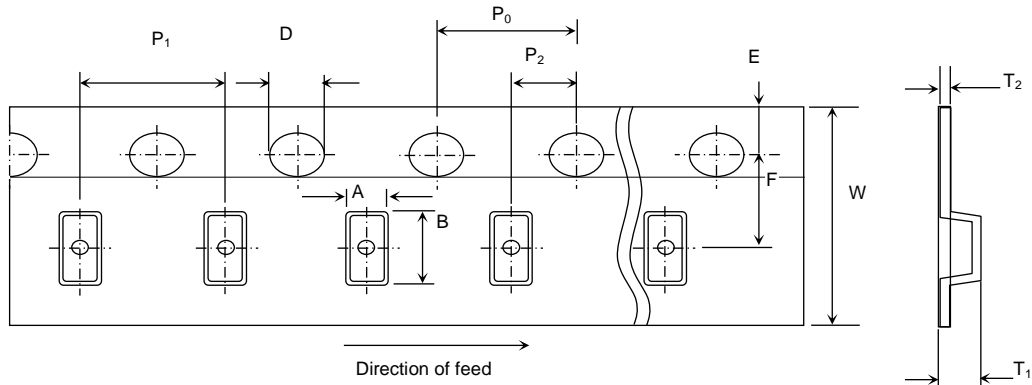
| SYMBOL | PRODUCT SIZE CODE |        |                                      |        |                                      |        |                                      |        |                                      |        |                                      | UNIT   |      |
|--------|-------------------|--------|--------------------------------------|--------|--------------------------------------|--------|--------------------------------------|--------|--------------------------------------|--------|--------------------------------------|--------|------|
|        | C0603(0201)       |        | C1005(0402)<br>Dim. Tol. :<br>± 0.05 |        | C1005(0402)<br>Dim. Tol. :<br>± 0.10 |        | C1005(0402)<br>Dim. Tol. :<br>± 0.15 |        | C1005(0402)<br>Dim. Tol. :<br>± 0.20 |        | C1005(0402)<br>Dim. Tol. :<br>± 0.30 |        |      |
|        | SIZE              | TOL.   | SIZE                                 | TOL.   | SIZE                                 | TOL.   | SIZE                                 | TOL.   | SIZE                                 | TOL.   | SIZE                                 |        | TOL. |
| A      | 0.38              | ± 0.04 | 0.65                                 | ± 0.10 | 0.70                                 | ± 0.10 | 0.72                                 | ± 0.10 | 0.80                                 | ± 0.10 | 0.90                                 | ± 0.10 | mm   |
| B      | 0.68              | ± 0.04 | 1.15                                 | ± 0.10 | 1.19                                 | ± 0.10 | 1.25                                 | ± 0.10 | 1.35                                 | ± 0.10 | 1.45                                 | ± 0.10 | mm   |
| F      | 3.5               | ± 0.05 | 3.5                                  | ± 0.05 | 3.5                                  | ± 0.05 | 3.5                                  | ± 0.05 | 3.5                                  | ± 0.05 | 3.5                                  | ± 0.05 | mm   |
| P      | 2                 | ± 0.10 | 2                                    | ± 0.10 | 2                                    | ± 0.10 | 2                                    | ± 0.10 | 2                                    | ± 0.10 | 2                                    | ± 0.10 | mm   |
| W      | 8                 | ± 0.20 | 8                                    | ± 0.20 | 8                                    | ± 0.20 | 8                                    | ± 0.20 | 8                                    | ± 0.20 | 8                                    | ± 0.20 | mm   |

| SYMBOL | PRODUCT SIZE CODE                           |       |  |       |              |       |              |       | UNIT |
|--------|---|-------|--|-------|--------------|-------|--------------|-------|------|
|        | C1608(0603)<br>Dim. Tol. :<br>± 0.10/± 0.15 |       | C1608 (0603)<br>Dim. Tol. :<br>± 0.20/± 0.25 |       | C2012 (0805) |       | C3216 (1206) |       |      |
|        | SIZE  | TOL.  | SIZE   | TOL.  | SIZE         | TOL.  | SIZE         | TOL.  |      |
| A      | 1.0   | ±0.2  | 1.1  | ±0.2  | 1.5          | ±0.2  | 1.9          | ±0.2  | mm   |
| B      | 1.8   | ±0.2  | 1.9  | ±0.2  | 2.3          | ±0.2  | 3.6          | ±0.2  | mm   |
| F      | 3.5   | ±0.05 | 3.5  | ±0.05 | 3.5          | ±0.05 | 3.5          | ±0.05 | mm   |
| P      | 4   | ±0.1  | 4  | ±0.1  | 4            | ±0.1  | 4            | ±0.1  | mm   |
| W      | 8   | ±0.2  | 8  | ±0.2  | 8            | ±0.2  | 8            | ±0.2  | mm   |



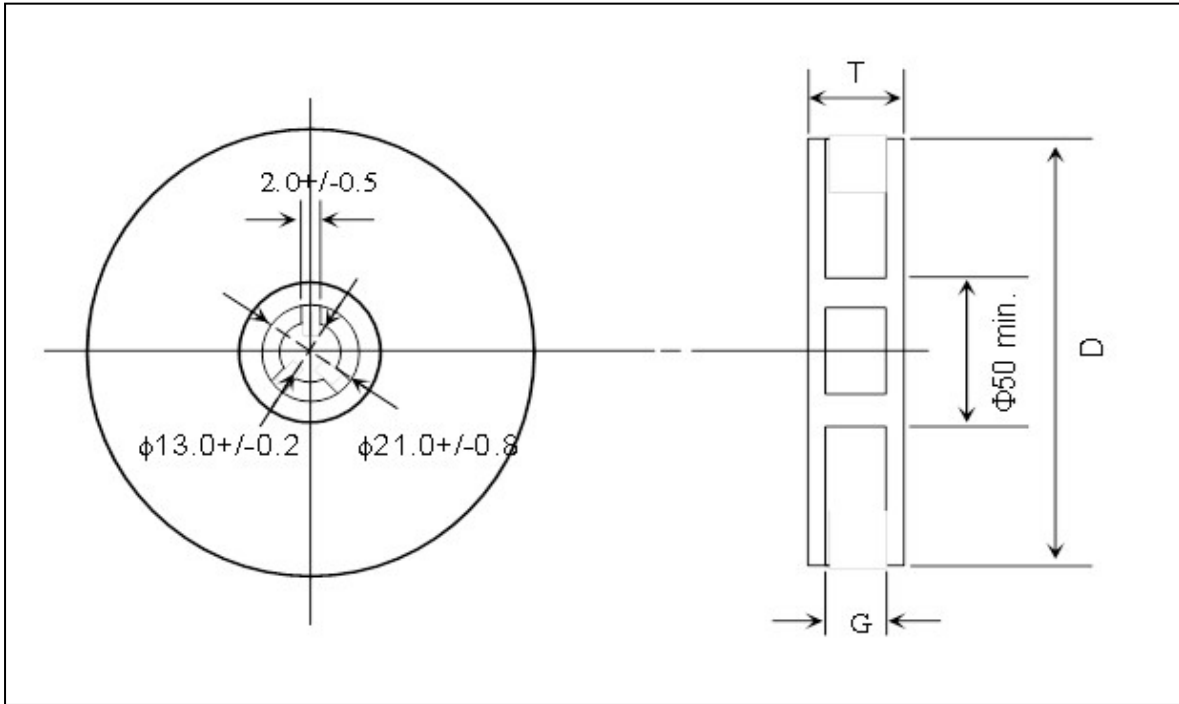
**【 Embossed tape specifications 】**

1mm and 4mm and 8mm pitch tape



| DIMENSION<br>(mm) | PRODUCT SIZE CODE  |                    |                    |                    |                    |                    |
|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                   | 1608<br>(0603)     | 2012<br>(0805)     | 3216<br>(1206)     | 3225<br>(1210)     | 4520<br>(1808)     | 4532<br>(1812)     |
| $P_1$             | 4±0.1              | 4±0.1              | 4±0.1              | 4±0.1              | 4±0.1              | 8±0.1              |
| $P_0$             | 4±0.1              | 4±0.1              | 4±0.1              | 4±0.1              | 4±0.1              | 4±0.1              |
| $P_2$             | 2±0.05             | 2±0.05             | 2±0.05             | 2±0.05             | 2±0.05             | 2±0.05             |
| $A$               | 1.2±0.2            | 1.45±0.2           | 1.9±0.2            | 2.8±0.2            | 2.3±0.2            | 3.6±0.2            |
| $B$               | 2.0±0.2            | 2.3±0.2            | 3.5±0.2            | 3.6±0.2            | 4.9±0.2            | 4.9±0.2            |
| $W$               | 8±0.3              | 8±0.2              | 8±0.2              | 8±0.2              | 12±0.2             | 12±0.2             |
| $E$               | 1.75±0.1           | 1.75±0.1           | 1.75±0.1           | 1.75±0.1           | 1.75±0.1           | 1.75±0.1           |
| $F$               | 3.5±0.05           | 3.5±0.05           | 3.5±0.05           | 3.5±0.05           | 5.5±0.05           | 5.5±0.05           |
| $D$               | 1.5<br>(+0.1/-0.0) | 1.5<br>(+0.1/-0.0) | 1.5<br>(+0.1/-0.0) | 1.5<br>(+0.1/-0.0) | 1.5<br>(+0.1/-0.0) | 1.5<br>(+0.1/-0.0) |
| $T_1$             | 1.4 max.           | 2.0 max.           | 2.2 max.           | 3.0 max.           | 2.5 max.           | 4.5 max.           |
| $T_2$             | 0.25±0.1           | 0.30±0.1           | 0.30±0.1           | 0.30±0.1           | 0.30±0.1           | 0.30±0.1           |

**【Reel specifications】**



| TAPE WIDTH (mm) | G (mm)         | T max. (mm) | D (mm) |
|-----------------|----------------|-------------|--------|
| 4               | $5.0 \pm 1.5$  | 8.0         | 180    |
| 8               | $10.0 \pm 1.5$ | 14.5        | 180    |
| 8               | $10.0 \pm 1.5$ | 14.5        | 250    |
| 8               | $10.0 \pm 1.5$ | 14.5        | 330    |
| 12              | $14.0 \pm 1.5$ | 18.5        | 180    |

### 【Thickness and Packing Amount】

| Thickness |           |              | Amount per reel |                   |              |          |
|-----------|-----------|--------------|-----------------|-------------------|--------------|----------|
| Code      | Spec.(mm) | Size (EIA)   | 180 mm (7")     |                   | 330 mm (13") |          |
|           |           |              | Paper           | Embossed          | Paper        | Embossed |
| Z         | 0.20      | 0402 (01005) | 20K             | 40K <sup>#1</sup> |              |          |
| A         | 0.30      | 0603 (0201)  | 15K             |                   | 50K          |          |
|           |           | 1005 (0402)  | 15K             |                   | 50K          |          |
| B         | 0.50      | 1005 (0402)  | 10K             |                   | 50K          |          |
| Q         | 0.45      | 1005 (0402)  | 10K             |                   | 50K          |          |
|           |           | 1608 (0603)  | 4K              |                   | 15K          |          |
| C         | 0.60      | 2012 (0805)  | 4K              |                   | 15K          |          |
|           |           | 3216 (1206)  | 4K              |                   | 15K          |          |
| D         | 0.80      | 1608 (0603)  | 4K              | 4K                | 15K          |          |
|           |           | 2012 (0805)  | 4K              |                   | 15K          |          |
|           |           | 3216 (1206)  | 4K              |                   | 15K          |          |
| E         | 0.85      | 2012 (0805)  | 4K              |                   | 15K          |          |
|           |           | 3216 (1206)  | 4K              |                   | 15K          |          |
|           |           | 3225 (1210)  |                 | 3K                |              | 10K      |
| I         | 0.95      | 4532 (1812)  |                 | 1K                |              |          |
|           |           | 2012 (0805)  |                 | 3K                |              |          |
| F         | 1.15      | 3216 (1206)  |                 | 3K                |              |          |
|           |           | 4520 (1808)  |                 | 3K                |              | 10K      |
| G         | 1.25      | 3216 (1206)  |                 | 3K                |              | 10K      |
|           |           | 4520 (1808)  |                 | 2K/3K             |              | 10K      |
|           |           | 4532 (1812)  |                 | 1K                |              |          |
|           |           | 3225 (1210)  |                 | 3K                |              |          |
|           |           | 3216 (1206)  |                 | 2K                |              |          |
|           |           | 3225 (1210)  |                 | 2K                |              |          |
| L         | 1.60      | 4520 (1808)  |                 | 2K                |              |          |
|           |           | 4532 (1812)  |                 | 1K                |              |          |
|           |           | 3216 (1206)  |                 | 2K/3K             |              |          |
| N         | 2.00      | 3225 (1210)  |                 | 1K/2K             |              |          |
|           |           | 4520 (1808)  |                 | 1K/2K             |              |          |
|           |           | 4532 (1812)  |                 | 1K                |              |          |
| P         | 2.50      | 3225 (1210)  |                 | 500pcs/1K         |              |          |

#1: 4mm width 1mm pitch Embossed Taping

### 【Packing Rule】

| EIA SIZE     | Tape type    | Reel Size | Max Reels/Box |
|--------------|--------------|-----------|---------------|
| 0402 (01005) | Emboss       | 7"        | 16            |
| 0402 (01005) | Paper        | 7"        | 10            |
| 0603 (0201)  | Paper        | 7"        | 10            |
| 1005 (0402)  | Paper        | 7"        | 10            |
| 1608 (0603)  | Paper/Emboss | 7"        | 10            |
| 2012 (0805)  | Paper/Emboss | 7"        | 10            |
| 3216 (1206)  | Paper/Emboss | 7"        | 10            |
| 3225 (1210)  | Emboss       | 7"        | 10            |

\*Maximum 60 reels in one carton.

## Others

### 【Storage】

1. The chip capacitors shall be packaged in carrier tapes or bulk cases.
2. Too high temperatures or humidity may deteriorate the quality of the product rapidly. Recommended products storage with temperatures from +5°C to +35°C, humidity from 45 to 70% RH.
3. The storage atmosphere must be free of gas containing sulfur and chlorine. Also, avoid exposing the product to saline moisture. If the product is exposed to such atmospheres, the terminations will oxidize and solderability will be affected.
4. In consideration of solderability, an allowable storage period should be within 12 months from the outgoing date of delivery. As for products in storage over 12 months, please check solderability before use.

### 【Circuit Design】

1. Once application and assembly environments have been checked, the capacitor may be used in conformance with the rating and performance, which are provided in both the catalog and the specifications. Exceeding the specifications listed may result in inferior performance. It may also cause a short, open, smoking, or flaming to occur, etc.
2. Please use the capacitors in conformance with the operating temperature provided in both the catalog and the specifications. Be especially cautious not to exceed the maximum temperature. In the situation the maximum temperature set forth in both the catalog and specifications is exceeded, the capacitor's insulation resistance may deteriorate, power may suddenly surge and short-circuit may occur. The loss of capacitance will occur, and may self-heat due to equivalent series resistance when alternating electric current is passed through. As this effect becomes critical in high frequency circuits, please exercise with caution. When using the capacitor in a (self-heating) circuit, please make sure the surface of the capacitor remains under the maximum temperature for usage. Also, please make certain temperature rise remain below 20°C.
3. Please keep voltage under the rated voltage, which is applied to the capacitor. Also, please make certain the peak voltage remains below the rated voltage when AC voltage is super-imposed to the DC voltage. In the situation where AC or pulse voltage is employed, ensure average peak voltage does not exceed the rated voltage. Exceeding the rated voltage provided in both catalog and specifications may lead to defective withstanding voltage or, in worse case situations, may cause the capacitor to burn out.
4. It's is a common phenomenon of high-dielectric products to have a deteriorated amount of static electricity due to the application of DC voltage.

**【Handling】**

Chip capacitors should be handled with care to avoid contamination or damage. The use of vacuum pick-up or plastic tweezers is recommended for manual placement. Tape and reeled packages are suitable for automatic pick and placement machine.

**【Flux】**

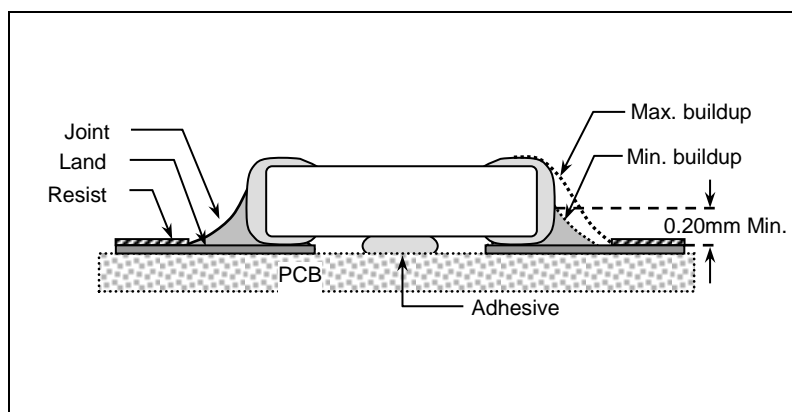
1. An excessive amount of flux or too rapid temperature rise can causes solvent burst, solder can generate a large quantity of gas. The gas can spreads small solder particles to cause solder balling effect or bridging problem.
2. Flux containing too high of a percentage of halide may cause corrosion of termination unless sufficient cleaning is applied.
3. Use rosin-type flux. Highly acidic flux (halide content less than 0.2wt%) is not recommended.
4. The water soluble flux causes deteriorated insulation resistance between outer terminations unless sufficiently cleaned.

**【Component Spacing】**

For wave soldering components, the spacing must be sufficient far apart to prevent bridging or shadowing. This is not so important for reflow process but enough space for rework should be considered. The suggested spacing for reflow soldering and wave soldering is 0.5mm and 1.0mm, respectively.

**【Solder Fillet】**

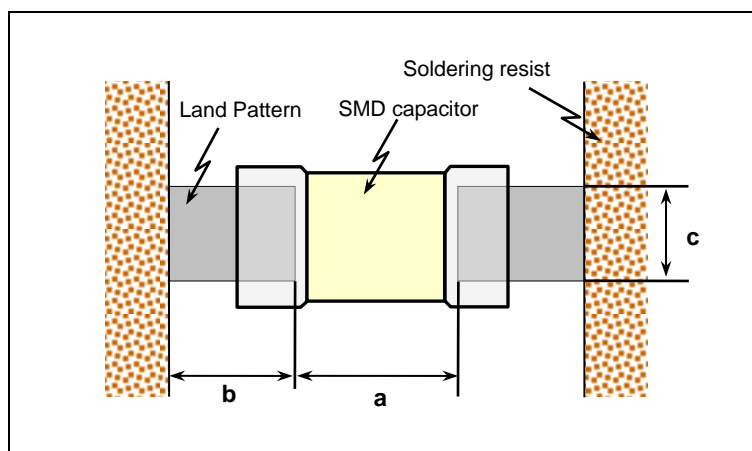
Too much solder amount may increase solder stress and cause crack risk. Insufficient solder amount may reduce adhesive Strength and cause parts falling off PCB. When soldering, confirm that the solder is placed over 0.2mm of the surface of the terminations.



## 【Recommended Land Pattern Dimensions】

When mounting the capacitor to substrate, it's important to consider that the amount of solder (size of fillet) used has a direct effect upon the capacitor once it's mounted.

1. The greater the amount of solder, the greater the stress to the elements, as this may cause the substrate to break or crack.
2. In the situation where two or more devices are mounted onto a common land, separate the device into exclusive pads by using soldering resist.
3. Land width equal to or less than component. It is permissible to reduce land width to 80% of component width.



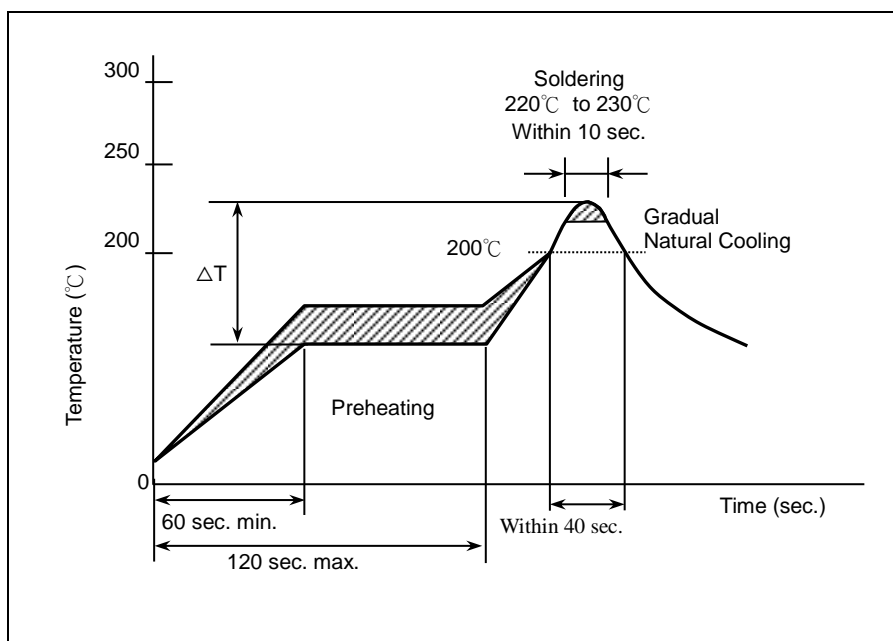
| Size mm (EIA) | L x W (mm)<br>(Dimension tolerance) | a (mm)      | b (mm)       | c (mm)      |
|---------------|-------------------------------------|-------------|--------------|-------------|
| 0603 (0201)   | 0.6*0.3<br>(within±0.03)            | 0.2 to 0.35 | 0.2 to 0.3   | 0.2 to 0.4  |
|               | 0.6*0.3<br>(±0.05/±0.09)            | 0.2 to 0.35 | 0.2 to 0.35  | 0.25 to 0.4 |
| 1005 (0402)   | 1.0*0.5<br>(within±0.10)            | 0.3 to 0.5  | 0.35 to 0.45 | 0.4 to 0.6  |
|               | 1.0*0.5<br>(±0.15/±0.20)            | 0.4 to 0.6  | 0.4 to 0.5   | 0.5 to 0.7  |
| 1608 (0603)   | 1.6*0.8<br>(within±0.10)            | 0.7 to 1.0  | 0.6 to 0.8   | 0.7 to 0.8  |
|               | 1.6*0.8<br>(±0.15/±0.20/±0.25)      | 0.8 to 1.1  | 0.7 to 0.8   | 0.8 to 1.0  |
| 2012 (0805)   | 2.0*1.25                            | 1.0 to 1.4  | 0.7 to 0.9   | 1.2 to 1.4  |
| 3216 (1206)   | 3.2*1.6<br>(within±0.20)            | 1.8 to 2.4  | 0.9 to 1.2   | 1.5 to 1.9  |
|               | 3.2*1.6<br>(within±0.30)            | 1.9 to 2.5  | 1.0 to 1.3   | 1.7 to 2.0  |
| 3225 (1210)   | 3.2*2.5                             | 1.8 to 2.5  | 1.0 to 1.2   | 2.0 to 2.5  |
| 4520 (1808)   | 4.5*2.0                             | 3.2 to 3.8  | 1.2 to 1.4   | 1.7 to 2.0  |
| 4532 (1812)   | 4.5*3.2                             | 3.0 to 3.5  | 1.4 to 1.6   | 2.7 to 3.5  |

## 【Resin Mold】

If a large amount of resin is used for molding the chip, cracks may occur due to contraction stress during curing. To avoid such cracks, use a low shrinkage resin. The insulation resistance of the chip will degrade due to moisture absorption. Use a low moisture absorption resin. Check carefully that the resin does not generate a decomposition gas or reaction gas during the curing process or during normal storage. Such gases may crack the chip capacitor or damage the device itself.

## 【Soldering Profile for SMT Process with SnPb Solder Paste】

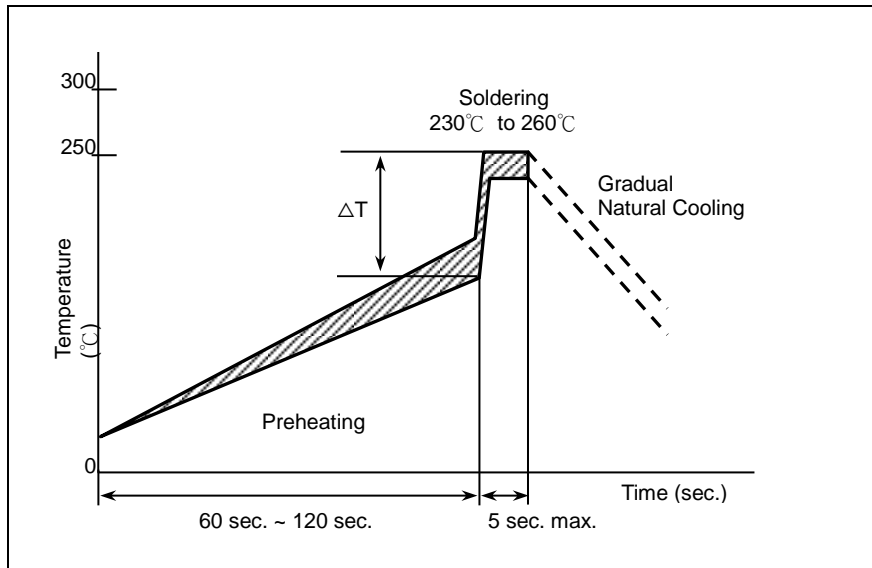
### Reflow Soldering



The difference between solder and chip surface should be controlled as following table. The rate of preheat should not exceed 4°C/sec and a target of 2°C/sec is preferred.

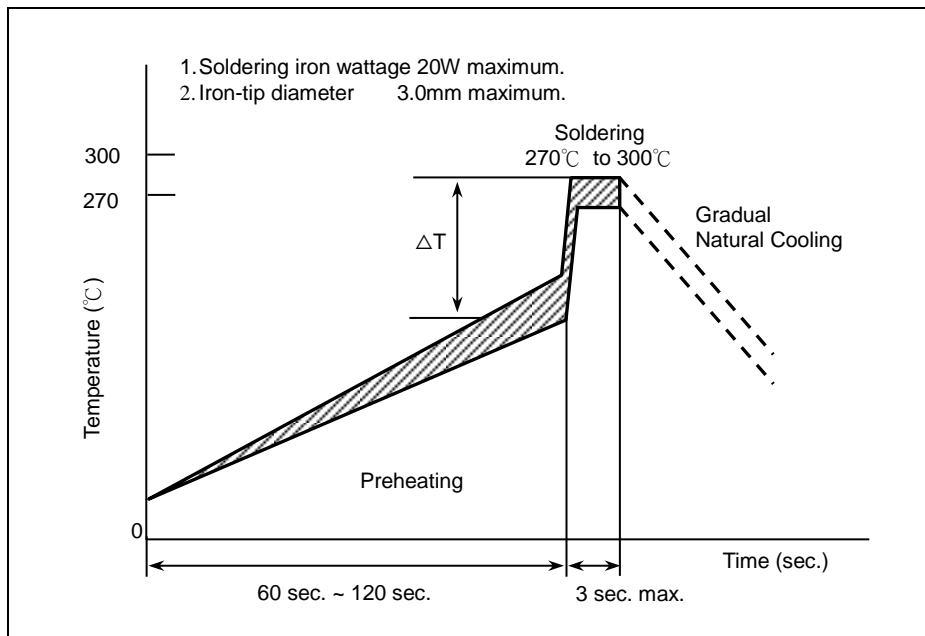
| Chip Size  | 3216 and smaller                  | 3225 and above                    |
|------------|-----------------------------------|-----------------------------------|
| Preheating | $\Delta T \leq 150^\circ\text{C}$ | $\Delta T \leq 130^\circ\text{C}$ |

## Wave Soldering



| Chip Size  | 1608/2012/3216                    | 3225 and above |
|------------|-----------------------------------|----------------|
| Preheating | $\Delta T \leq 150^\circ\text{C}$ | -              |

## Soldering Iron

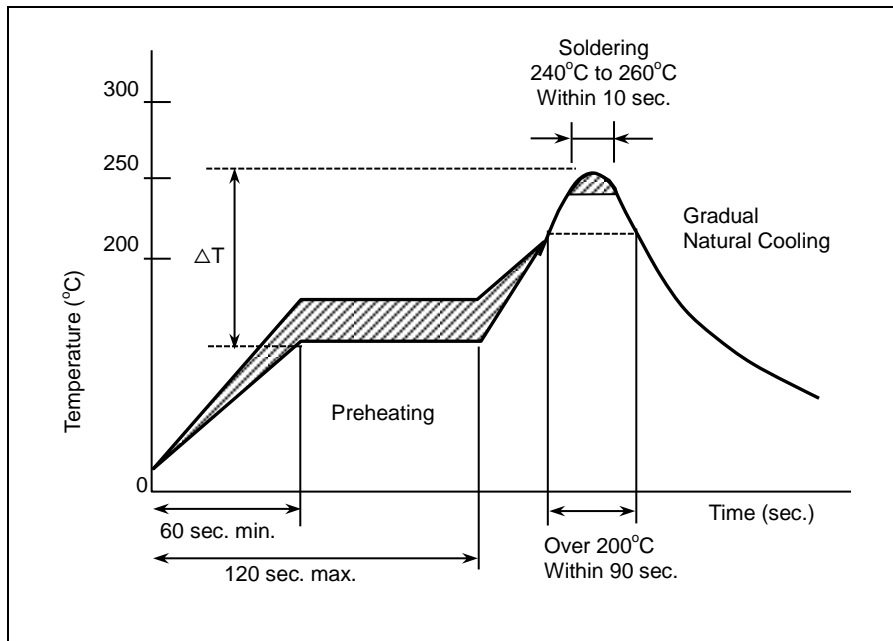


| Chip Size  | 3216 and smaller                  | 3225 and above                    |
|------------|-----------------------------------|-----------------------------------|
| Preheating | $\Delta T \leq 190^\circ\text{C}$ | $\Delta T \leq 130^\circ\text{C}$ |



**[Soldering]**

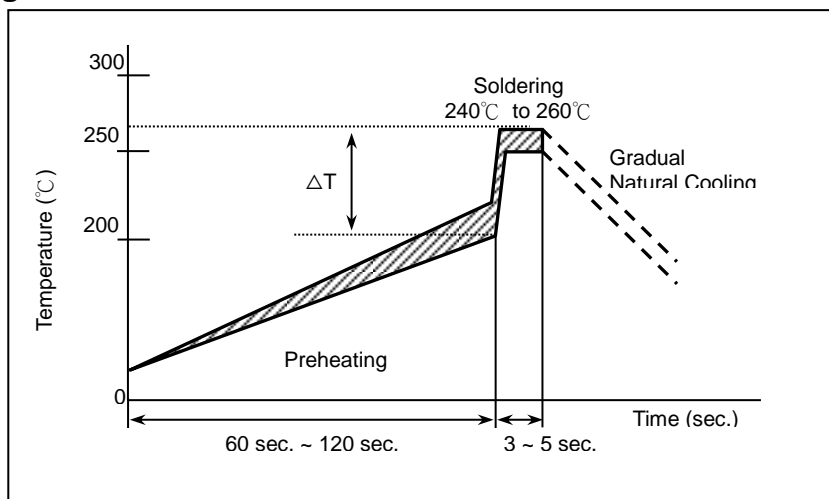
**Reflow Soldering for Lead free Termination**



The difference between solder and chip surface should be controlled as following table. The rate of preheat should not exceed 4°C/sec and a target of 2°C/sec is preferred.

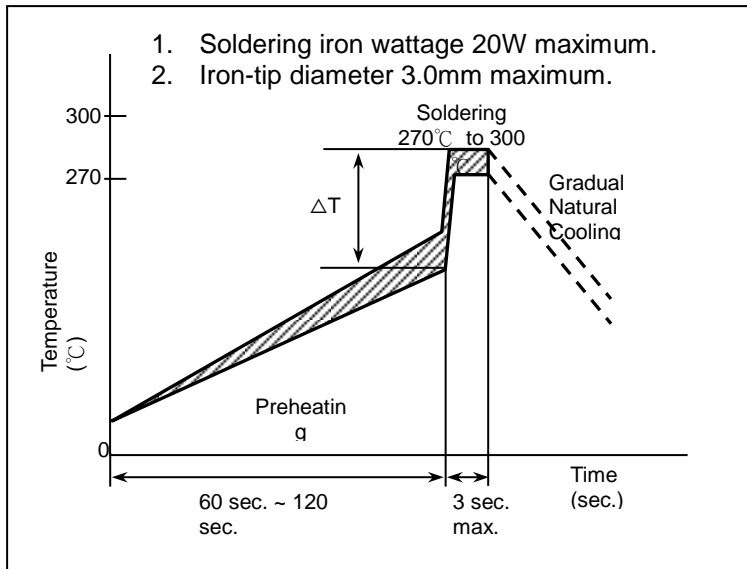
| Chip Size  | 3216 and smaller                  | 3225 and above                    |
|------------|-----------------------------------|-----------------------------------|
| Preheating | $\Delta T \leq 150^\circ\text{C}$ | $\Delta T \leq 130^\circ\text{C}$ |

**Wave Soldering for Lead free Termination**



| Chip Size  | 1608/2012/3216                    | 3225 and above |
|------------|-----------------------------------|----------------|
| Preheating | $\Delta T \leq 150^\circ\text{C}$ | -              |

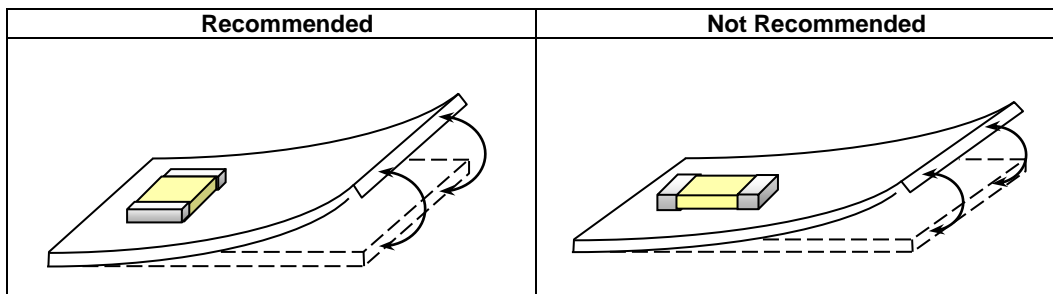
**Soldering Iron**



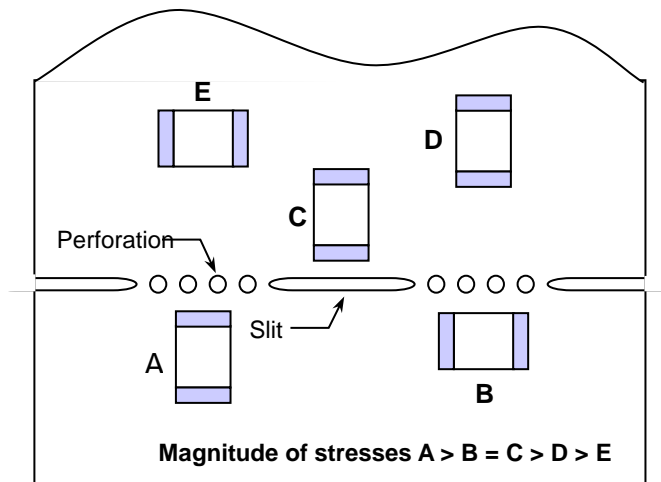
| Chip Size  | 3216 and smaller                    | 3225 and above                      |
|------------|-------------------------------------|-------------------------------------|
| Preheating | $\Delta T \leq 190^{\circ}\text{C}$ | $\Delta T \leq 130^{\circ}\text{C}$ |

**[Chip Layout and Breaking PCB]**

- To layout the SMD capacitors for reducing bend stress from board deflection of PCB. The following are examples of Hood and bad layout.

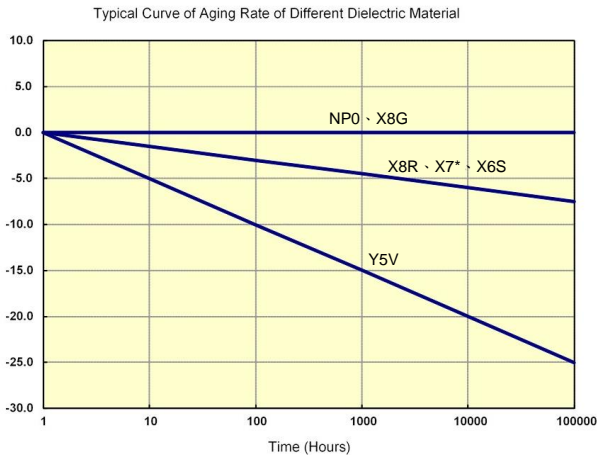


- When breaking PCB, the layout should be noted that the mechanical stresses are depending on the position of capacitors. The following example shows recommendation for better design.



## 【Aging Rate】

The capacitance and dissipation factor of class 2 capacitors decreases with time. It is known as 'aging' that follows a logarithmic law and expressed in terms of an aging constant. Aging is caused by a gradual re-alignment of the crystalline structure of the ceramic. The aging constant is defined as the percentage loss of capacitance at a 'time decade'. The law of capacitance aging is expressed as following equation:



$$C_{t_2} = C_{t_1} \times (1 - k \times \log_{10}(t_2/t_1))$$

$C_{t_1}$ : Capacitance after  $t_1$  hours of start aging.

$C_{t_2}$ : Capacitance after  $t_2$  hours of start aging.

$k$ : aging constant (capacitance decrease per decade)

$t_1, t_2$ : time in hours from start of aging.

A typical curve of aging rate is shown in following figure.

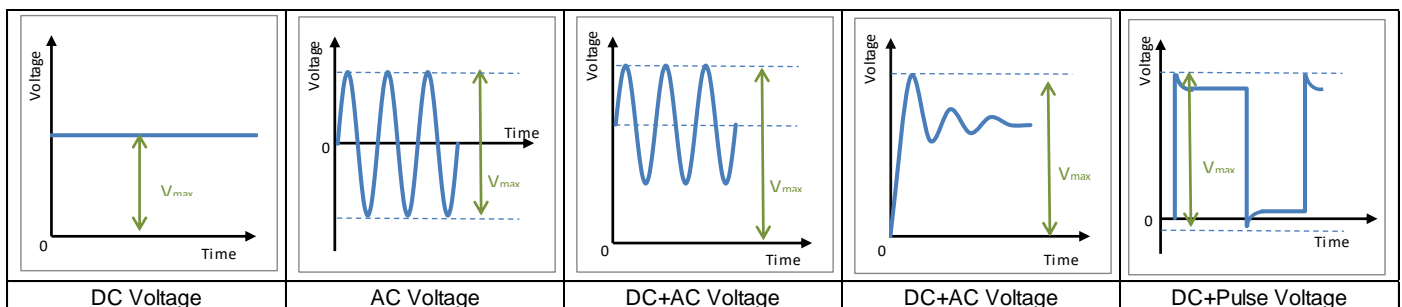
For reference only

When heating the capacitors above Curie temperature ( $130^{\circ}\text{C} \sim 150^{\circ}\text{C}$ ) the capacitance can be re-new. So capacitance of class 2 capacitors will be complete de-aged by soldering process; subsequently a new aging process begins.

Because of aging, it is specified an age for measurement to meet the prescribed tolerance for class 2 capacitors. Normally, 1000 hours ( $t_2=1000$  hrs) is defined.

## 【Applied Voltage】

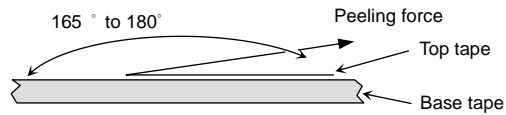
Cautions by types of voltage applied to MLCC · For DC voltage or DC+AC voltage, DC voltage or the maximum value of DC + AC voltage should not exceed the rated voltage of MLCC. · For AC voltage or pulse voltage, the peak-to-peak value of AC voltage or pulse voltage should not exceed the rated voltage of MLCC. · Abnormal voltage such as surge voltage, static electricity should not exceed the rated voltage of MLCC.



**【Peeling Off Force】**

Peeling off force: 0.1N to 1.0 N\* in the direction shown as below.

The peeling speed: 300±10 mm/min



1. The taped tape on reel is wound clockwise. The sprocket holes are to the right as the tape is pulled toward the user.
2. There are minimum 150 mm as the leader and minimum 40 mm empty tape as the tail is attached to the end of the tape.