

## Data Sheet

**Customer:****Product:** Multilayer Ceramic Chip Capacitor**Sizes.:** 01005/0201/0402/0603/0805/1206/1210/1808/1812**Issued Date:** 07-Aug-23**Edition:** REV.B4

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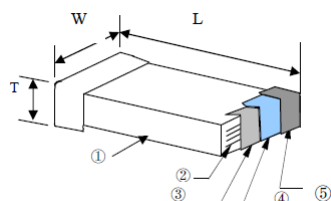
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|---------------------|-----------------|---------------------|------------------------|---------------------------|
| 07-Aug-23           | 07-Aug-23       | 07-Aug-23           | 07-Aug-23              |                           |
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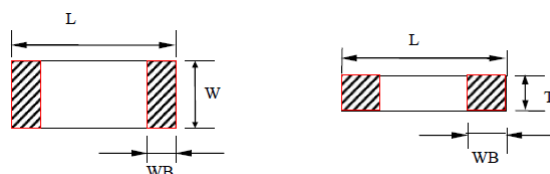
**Multilayer Ceramic Chip Capacitor**  
**Multilayer Ceramic Chip Capacitor**

■ **Construction**



|   |                      |   |               |
|---|----------------------|---|---------------|
| ① | Ceramic Dielectric   | ④ | Nickel Layer: |
| ② | Inner Electrodes     | ⑤ | Tin Layer     |
| ③ | Substrate Electrodes |   |               |

■ **Dimensions**



Capacitance  $\leq 50V$

Unit: mm

| Type | Size (Inch) | L         | W         | T/Symbol  |   | WB        |
|------|-------------|-----------|-----------|-----------|---|-----------|
| E5   | 01005       | 0.40±0.02 | 0.20±0.02 | 0.20±0.02 | V | 0.10±0.03 |
| 01   | 0201        | 0.60±0.03 | 0.30±0.03 | 0.30±0.03 | C | 0.15±0.05 |
|      |             | 0.60±0.05 | 0.30±0.05 | 0.30±0.05 | D |           |
| 02   | 0402        | 1.00±0.05 | 0.50±0.05 | 0.50±0.05 | E | 0.25±0.05 |
|      |             | 1.00±0.15 | 0.50±0.15 | 0.50±0.15 | F |           |
|      |             | 1.00±0.20 | 0.50±0.20 | 0.50±0.20 | N |           |
| 03   | 0603        | 1.60±0.10 | 0.80±0.10 | 0.80±0.10 | H | 0.35±0.20 |
|      |             | 1.60±0.20 | 0.80±0.20 | 0.80±0.20 | B |           |
| 05   | 0805        | 2.00±0.20 | 1.25±0.20 | 0.80±0.20 | B | 0.50±0.20 |
|      |             |           |           | 1.25±0.20 | J |           |
| 06   | 1206        | 3.20±0.30 | 1.60±0.30 | 0.80±0.20 | B | 0.60±0.30 |
|      |             |           |           | 1.00±0.20 | I |           |
|      |             |           |           | 1.25±0.20 | J |           |
|      |             |           |           | 1.60±0.30 | L |           |
| 10   | 1210        | 3.20±0.30 | 2.50±0.30 | 1.25±0.20 | J | 0.60±0.30 |
|      |             |           |           | 1.60±0.30 | L |           |
|      |             |           |           | 2         | R |           |
|      |             |           |           | 2.5       | O |           |
| 08   | 1808        | 4.50±0.40 | 2.00±0.20 | 1.60±0.30 | L | 0.60±0.30 |
| 12   | 1812        | 4.50±0.40 | 3.20±0.30 | 1.25±0.20 | J | 0.60±0.30 |
|      |             |           |           | 1.60±0.30 | L |           |
|      |             |           |           | 2.5       | O |           |

## Multilayer Ceramic Chip Capacitor

Capacitance > 50V

Distributeur : JBG-METAFIX

| Type | Size (Inch) | L         | W         | T/Symbol  |   | WB        |
|------|-------------|-----------|-----------|-----------|---|-----------|
| 02   | 0402        | 1.00±0.05 | 0.50±0.05 | 0.50±0.05 | E | 0.25±0.05 |
| 03   | 0603        | 1.60±0.10 | 0.80±0.10 | 0.80±0.10 | H | 0.35±0.20 |
| 05   | 0805        | 2.00±0.20 | 1.25±0.20 | 0.80±0.20 | B | 0.50±0.20 |
|      |             |           |           | 1.00±0.20 | I |           |
|      |             |           |           | 1.25±0.20 | J |           |
| 06   | 1206        | 3.20±0.30 | 1.60±0.30 | 0.80±0.20 | B | 0.60±0.30 |
|      |             |           |           | 1.00±0.20 | I |           |
|      |             |           |           | 1.25±0.20 | J |           |
|      |             |           |           | 1.60±0.30 | L |           |
| 10   | 1210        | 3.20±0.30 | 2.50±0.30 | 1.25±0.20 | J | 0.60±0.30 |
|      |             |           |           | 1.60±0.30 | L |           |
| 08   | 1808        | 4.50±0.40 | 2.00±0.20 | 1.25±0.20 | J | 0.60±0.30 |
|      |             |           |           | 1.60±0.30 | L |           |
| 12   | 1812        | 4.50±0.40 | 3.20±0.30 | 1.25±0.20 | J | 0.60±0.30 |
|      |             |           |           | 1.60±0.30 | L |           |
|      |             |           |           | 2         | R |           |

### Part Numbering

| MCF          | 03                                                                                                        | J                                                                                                                                                                 | T                                    | N                                | 250                                                                                                 | 3R9                                                              |
|--------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Product Type | Dimensions (L×W)                                                                                          | Capacitance Tolerance                                                                                                                                             | Packaging                            | Dielectric                       | Voltage (VDCW)                                                                                      | Capacitance                                                      |
|              | E5: 01005<br>01: 0201<br>02: 0402<br>03: 0603<br>05: 0805<br>06: 1206<br>10: 1210<br>08: 1808<br>12: 1812 | A: ±0.05pF (Cap≤10pF)<br>B: ±0.1pF (Cap≤10pF)<br>C: ±0.25pF (Cap≤10pF)<br>D: ±0.5pF (Cap≤10pF)<br>F: ±1%<br>G: ±2%<br>J: ±5%<br>K: ±10%<br>M: ±20%<br>Z: +80/-20% | T: Taping Reel<br>W: 13" Taping Reel | N: NPO (COG)<br>B: X7R<br>X: X5R | 4V0: 4V<br>6V3: 6.3V<br>250: 25V<br>500: 50V<br>101: 100V<br>102: 1000V<br>202: 2000V<br>302: 3000V | 3R9: 3.9pF<br>150: 15pF<br>181: 180pF<br>225: 2.2μF<br>106: 10μF |

### Temperature Coefficient /Characteristics

| Dielectric | Reference Temperature Point | Temperature Coefficient | Operation Temperature Range |
|------------|-----------------------------|-------------------------|-----------------------------|
| NOP(COG)   | 20℃                         | 0±30ppm/℃               | -55~125℃                    |
| X7R        | 20℃                         | ±15%                    | -55~125℃                    |
| X5R        | 20℃                         | ±15%                    | -55~85℃                     |

Note : Nominal temperature coefficient and allowed tolerance of class I are decided by the changing of the capacitance between 20℃ and 85℃. Nominal temperature coefficient of class II are decided by the temperature of 20℃.

### Measurement method of dielectric withstanding Voltage for High Voltage MLCC

| Rated Voltage Range | Measuring Method                                                          |
|---------------------|---------------------------------------------------------------------------|
| 100V≤Vr<500V        | Force 200% Rated Voltage for 5 second. Max.Current should not exceed 50mA |
| 500V≤Vr≤1000V       | Force 150% Rated Voltage for 5 second. Max.Current should not exceed 50mA |
| 1000V<Vr≤2000V      | Force 120% Rated Voltage for 5 second. Max.Current should not exceed 50mA |
| 2000V<Vr≤5000V      | Force 120% Rated Voltage for 5 second. Max.Current should not exceed 10mA |

## ■ General Capacitance & Voltage

Capacitance &amp; Voltage (NPO 6.3V~100V)

| Dielectric |        | NPO  |     |     |     |     |      |      |     |     |     |      |     |     |     |      |      |      |      |      |      |      |      |  |  |
|------------|--------|------|-----|-----|-----|-----|------|------|-----|-----|-----|------|-----|-----|-----|------|------|------|------|------|------|------|------|--|--|
| EIA        | Size   | 0402 |     |     |     |     |      | 0603 |     |     |     | 0805 |     |     |     | 1206 |      | 1210 |      | 1808 |      | 1812 |      |  |  |
| Code       | VDCV   | 6.3V | 10V | 16V | 25V | 50V | 100V | 10V  | 16V | 25V | 50V | 100V | 10V | 16V | 25V | 50V  | 100V | 50V  | 100V | 50V  | 100V | 50V  | 100V |  |  |
| 0R1        | 0.1pF  |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    |      | B    |      |      |      |      |  |  |
| 0R2        | 0.2    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    |      | B    |      |      |      |      |  |  |
| 0R3        | 0.3    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      |      |      |      |  |  |
| 0R4        | 0.4    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      |      |      |      |  |  |
| 0R5        | 0.5    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      |      |      |      |  |  |
| 0R6        | 0.6    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      |      |      |      |  |  |
| 0R7        | 0.7    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      |      |      |      |  |  |
| 0R8        | 0.8    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      |      |      |      |  |  |
| 0R9        | 0.9    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      |      |      |      |  |  |
| 1R0        | 1.0    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      |      |  |  |
| 1R2        | 1.2    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      |      |  |  |
| 1R5        | 1.5    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      |      |  |  |
| 1R8        | 1.8    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      |      |  |  |
| 2R0        | 2.0    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 2R2        | 2.2    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 2R7        | 2.7    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 3R0        | 3.0    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 3R3        | 3.3    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 3R9        | 3.9    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 4R7        | 4.7    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 5R0        | 5.0    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 5R6        | 5.6    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 6R8        | 6.8    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 8R2        | 8.2    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 9R0        | 9.0    |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    |      | J    |      | L    |  |  |
| 100        | 10pF   |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 120        | 12     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 150        | 15     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 180        | 18     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 200        | 20     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 220        | 22     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 270        | 27     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 300        | 30     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 330        | 33     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 390        | 39     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 470        | 47     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 560        | 56     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 680        | 68     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 750        | 75     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 820        | 82     |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 101        | 100pF  |      |     |     | E   | E   | E    |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 121        | 120    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 151        | 150    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 181        | 180    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 201        | 200    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 221        | 220    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 271        | 270    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 301        | 300    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 331        | 330    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 361        | 360    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 391        | 390    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 471        | 470    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 561        | 560    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 681        | 680    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 751        | 750    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 821        | 820    |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 102        | 1000pF |      |     |     | E   | E   |      |      |     | H   | H   | H    |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 122        | 1200   |      | E   | E   | E   |     |      |      |     | H   | H   |      |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 152        | 1500   |      | E   | E   |     |     |      |      |     | H   | H   |      |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 182        | 1800   |      | E   | E   |     |     |      |      |     | H   | H   |      |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 202        | 2000   |      | E   | E   |     |     |      |      |     | H   | H   |      |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 222        | 2200   |      | E   | E   |     |     |      |      |     | H   | H   |      |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 272        | 2700   |      | E   | E   |     |     |      |      |     | H   | H   |      |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 332        | 3300   | E    |     |     |     |     |      |      |     | H   | H   |      |     |     |     | B    | B    | B    | B    | J    | J    | L    | L    |  |  |
| 392        | 3900   | E    |     |     |     |     |      |      |     | H   | H   |      |     |     |     | B    |      | B    |      | J    | J    | L    | L    |  |  |
| 472        | 4700   | E    |     |     |     |     |      |      |     | H   | H   |      |     |     |     | B    |      | B    |      | J    | J    | L    | L    |  |  |
| 562        | 5600   |      |     |     |     |     |      |      |     | H   | H   |      |     |     |     | B    |      | B    |      | J    | J    | L    | L    |  |  |
| 682        | 6800   |      |     |     |     |     |      |      |     | H   | H   |      |     |     |     | B    |      | B    |      | J    | J    | L    | L    |  |  |
| 822        | 8200   |      |     |     |     |     |      | H    |     |     |     |      |     |     |     | B    |      | B    |      | J    |      | L    | L    |  |  |
| 103        | 0.01uF |      |     |     |     |     |      | H    |     |     |     |      | J   | J   | J   | J    |      |      |      | J    |      | L    | L    |  |  |
| 123        | 0.012  |      |     |     |     |     |      | H    |     |     |     |      | J   | J   | J   | J    |      |      |      | J    |      | L    | L    |  |  |
| 153        | 0.015  |      |     |     |     |     |      | H    |     |     |     |      | J   | J   | J   | J    |      |      |      | J    |      | L    | L    |  |  |
| 183        | 0.018  |      |     |     |     |     |      | H    |     |     |     |      | J   | J   | J   | J    |      |      |      | J    |      | L    | L    |  |  |
| 223        | 0.022  |      |     |     |     |     |      | H    |     |     |     |      | J   | J   | J   | J    |      |      |      | J    |      | L    | L    |  |  |
| 273        | 0.027  |      |     |     |     |     |      |      |     |     |     |      | J   | J   | J   | J    |      |      |      | J    |      | L    | L    |  |  |
| 333        | 0.033  |      |     |     |     |     |      |      |     |     |     |      | J   | J   |     |      |      |      |      | J    |      | L    | L    |  |  |
| 473        | 0.047  |      |     |     |     |     |      |      |     |     |     |      | J   |     |     |      |      |      |      | J    |      | L    | L    |  |  |
| 563        | 0.056  |      |     |     |     |     |      |      |     |     |     |      | J   |     |     |      |      |      |      | J    |      | L    | L    |  |  |
| 683        | 0.068  |      |     |     |     |     |      |      |     |     |     |      | J   |     |     |      |      |      |      | J    |      | L    | L    |  |  |
| 823        | 0.083  |      |     |     |     |     |      |      |     |     |     |      | J   |     |     |      |      |      |      | J    |      | L    | L    |  |  |
| 104        | 0.100  |      |     |     |     |     |      |      |     |     |     |      | J   |     |     |      |      |      |      | J    |      | L    | L    |  |  |

■ The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (X7R 6.3V~100V)

| Dielectric |        | X7R  |     |     |     |     |      |      |     |     |     |     |      |      |     |     |     |     |      |
|------------|--------|------|-----|-----|-----|-----|------|------|-----|-----|-----|-----|------|------|-----|-----|-----|-----|------|
| EIA        | Size   | 0402 |     |     |     |     |      | 0603 |     |     |     |     |      | 0805 |     |     |     |     |      |
| Code       | VDCW   | 6.3V | 10V | 16V | 25V | 50V | 100V | 6.3V | 10V | 16V | 25V | 50V | 100V | 6.3V | 10V | 16V | 25V | 50V | 100V |
| 101        | 100pF  | E    | E   | E   | E   | E   |      |      |     |     |     |     | H    |      |     |     |     |     | B    |
| 121        | 120    | E    | E   | E   | E   | E   |      |      |     |     |     |     | H    |      |     |     |     |     | B    |
| 151        | 150    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 181        | 180    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 201        | 200    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 221        | 220    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 241        | 240    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 271        | 270    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 301        | 300    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 331        | 330    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 361        | 360    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 391        | 390    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 471        | 470    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 501        | 500    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 511        | 510    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 561        | 560    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 621        | 620    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 681        | 680    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 751        | 750    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 821        | 820    | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 102        | 1000pF | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 122        | 1200   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 152        | 1500   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 182        | 1800   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 202        | 2000   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 222        | 2200   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 242        | 2400   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 272        | 2700   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 302        | 3000   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 332        | 3300   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 362        | 3600   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 392        | 3900   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 472        | 4700   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 502        | 5000   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 512        | 5100   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 562        | 5600   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 682        | 6800   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 822        | 8200   | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 103        | 0.01μF | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 123        | 0.012  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 153        | 0.015  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 183        | 0.018  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 203        | 0.020  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 223        | 0.022  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 273        | 0.027  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 303        | 0.030  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 333        | 0.033  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 393        | 0.039  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 473        | 0.047  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 513        | 0.051  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 563        | 0.056  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | B    |
| 683        | 0.068  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | J    |
| 823        | 0.082  | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | J    |
| 104        | 0.10μF | E    | E   | E   | E   | E   | E    | H    | H   | H   | H   | H   | H    | B    | B   | B   | B   | B   | J    |
| 124        | 0.12   | E    | E   | E   | E   | E   |      | H    | H   | H   | H   | H   |      | B    | B   | B   | B   | B   | J    |
| 154        | 0.15   | E    | E   | E   | E   |     |      | H    | H   | H   | H   | H   |      | B    | B   | B   | B   | B   | J    |
| 184        | 0.18   | E    | E   | E   | E   |     |      | H    | H   | H   | H   | H   |      | B    | B   | B   | B   | B   | J    |
| 224        | 0.22   | E    | E   | E   | E   |     |      | H    | H   | H   | H   | H   |      | B    | B   | B   | B   | B   | J    |
| 274        | 0.27   | E    | E   | E   |     |     |      | H    | H   | H   | H   | H   |      | B    | B   | B   | B   | B   | J    |
| 334        | 0.33   | E    | E   | E   |     |     |      | H    | H   | H   | H   | H   |      | B    | B   | B   | B   | B   | J    |
| 394        | 0.39   | E    | E   |     |     |     |      | H    | H   | H   | H   | H   |      | B    | B   | B   | B   | B   | J    |
| 474        | 0.47   | E    | E   |     |     |     |      | H    | H   | H   | H   | H   |      | B    | B   | B   | B   | B   | J    |
| 564        | 0.56   |      |     |     |     |     |      | H    | H   | H   | H   | H   |      | J    | J   | J   | J   | J   | J    |
| 684        | 0.68   |      |     |     |     |     |      | H    | H   | H   | H   | H   |      | J    | J   | J   | J   | J   | J    |
| 824        | 0.82   |      |     |     |     |     |      | H    | H   | H   | H   | H   |      | J    | J   | J   | J   | J   | J    |
| 105        | 1.0μF  |      |     |     |     |     |      | H    | H   | H   | H   | H   |      | J    | J   | J   | J   | J   | J    |
| 155        | 1.5    |      |     |     |     |     |      | H    | H   | H   |     |     |      | J    | J   | J   | J   | J   |      |
| 225        | 2.2    |      |     |     |     |     |      | H    | H   | H   |     |     |      | J    | J   | J   | J   | J   |      |
| 335        | 3.3    |      |     |     |     |     |      | H    |     |     |     |     |      | J    | J   | J   | J   |     |      |
| 475        | 4.7    |      |     |     |     |     |      | H    |     |     |     |     |      | J    | J   | J   | J   | J   |      |
| 685        | 6.8    |      |     |     |     |     |      |      |     |     |     |     |      | J    | J   | J   |     |     |      |
| 106        | 10μF   |      |     |     |     |     |      |      |     |     |     |     |      | J    | J   | J   |     |     |      |

■The letter in cell is expressed the symbol of product thickness

| Dielectric |         | X7R  |     |     |     |     |      |      |     |     |     |     |      |      |     |     |     |     |      |      |     |     |      |
|------------|---------|------|-----|-----|-----|-----|------|------|-----|-----|-----|-----|------|------|-----|-----|-----|-----|------|------|-----|-----|------|
| EIA        | Size    | 1206 |     |     |     |     |      | 1210 |     |     |     |     |      | 1808 |     |     |     |     |      | 1812 |     |     |      |
| Code       | VDCW    | 6.3V | 10V | 16V | 25V | 50V | 100V | 6.3V | 10V | 16V | 25V | 50V | 100V | 6.3V | 10V | 16V | 25V | 50V | 100V | 16V  | 25V | 50V | 100V |
| R47        | 0.47 pF |      |     |     |     |     |      |      |     |     |     |     |      |      |     |     |     |     |      | L    | L   | L   |      |
| 151        | 150     |      |     |     |     |     | B    |      |     |     |     |     | J    |      |     |     |     |     |      | L    | L   | L   |      |
| 181        | 180     |      |     |     |     |     | B    |      |     |     |     |     | J    |      |     |     |     |     |      | L    | L   | L   |      |
| 201        | 200     | B    | B   | B   | B   | B   | B    |      |     |     |     |     | J    |      |     |     |     |     |      | L    | L   | L   |      |
| 221        | 220     | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | L    | L   | L   |      |
| 271        | 270     | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L    |
| 331        | 330     | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L    |
| 391        | 390     | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L    |
| 471        | 470     | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L    |
| 561        | 560     | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L    |
| 681        | 680     | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L    |
| 751        | 750     | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L    |
| 821        | 820     | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L    |
| 102        | 1000pF  | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L    |
| 122        | 1200    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | O    | O   | O   | L    |
| 152        | 1500    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | O    | O   | O   | L    |
| 182        | 1800    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | O    | O   | O   | L    |
| 202        | 2000    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | O    | O   | O   | L    |
| 222        | 2200    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | O    | O   | O   | L    |
| 272        | 2700    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | O    | O   | O   | L    |
| 332        | 3300    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | O    | O   | O   | L    |
| 392        | 3900    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | O    | O   | O   | L    |
| 472        | 4700    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | O    | O   | O   | L    |
| 562        | 5600    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | O    |     |     | L    |
| 682        | 6800    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    | O    |     |     | L    |
| 822        | 8200    | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 103        | 0.01μF  | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 123        | 0.012   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 153        | 0.015   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 183        | 0.018   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 203        | 0.020   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 223        | 0.022   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 273        | 0.027   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 333        | 0.033   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 393        | 0.039   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 473        | 0.047   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 563        | 0.056   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 683        | 0.068   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 823        | 0.082   | B    | B   | B   | B   | B   | B    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 104        | 0.10μF  | B    | B   | B   | B   | B   | J    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 124        | 0.12    | B    | B   | B   | B   | B   | J    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 154        | 0.15    | B    | B   | B   | B   | B   | J    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 184        | 0.18    | B    | B   | B   | B   | B   | J    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 224        | 0.22    | B    | B   | B   | B   | B   | J    | J    | J   | J   | J   | J   | J    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 274        | 0.27    | B    | B   | B   | B   | B   | J    | J    | J   | J   | J   | J   |      | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 334        | 0.33    | B    | B   | B   | B   | B   | J    | J    | J   | J   | J   | J   | L    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 394        | 0.39    |      |     |     |     |     |      | J    | J   | J   | J   | J   | L    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 474        | 0.47    | J    | J   | J   | J   | J   | L    | J    | J   | J   | J   | J   | L    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 564        | 0.56    | J    | J   | J   | J   | J   | L    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    |      |     |     | L    |
| 684        | 0.68    | J    | J   | J   | J   | J   | L    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    |      |     |     | R    |
| 824        | 0.82    | J    | J   | J   | J   | J   | L    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    |      |     |     | R    |
| 105        | 1.0μF   | J    | J   | J   | J   | J   | L    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    |      |     |     | R    |
| 125        | 1.2     | J    | J   | J   | J   | J   |      | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    |      |     |     | R    |
| 155        | 1.5     | J    | J   | J   | J   | J   |      | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    |      |     |     | R    |
| 225        | 2.2     | L    | L   | L   | L   | L   |      | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    |      |     |     | R    |
| 335        | 3.3     | L    | L   | L   | L   | L   |      | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    |      |     |     |      |
| 475        | 4.7     | L    | L   | L   | L   | L   |      | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    |      |     |     |      |
| 685        | 6.8     | L    | L   | L   | L   | L   |      | L    | L   | L   | L   | L   |      |      |     |     |     |     |      |      |     |     |      |
| 106        | 10      | L    | L   | L   | L   | L   |      | L    | L   | L   | L   | L   |      |      |     |     |     |     |      |      |     |     |      |
| 226        | 22      | L    | L   | L   | L   |     |      | L    | L   | L   | L   |     |      |      |     |     |     |     |      |      |     |     |      |
| 476        | 47      |      |     |     |     |     |      | L    | L   |     |     |     |      |      |     |     |     |     |      |      |     |     |      |

■ The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (X5R 4V~50V)

| Dielectric |         | X5R  |      |     |     |     |     |      |      |     |     |     |     |      |      |     |     |     |     |
|------------|---------|------|------|-----|-----|-----|-----|------|------|-----|-----|-----|-----|------|------|-----|-----|-----|-----|
| EIA        | Size    | 0402 |      |     |     |     |     | 0603 |      |     |     |     |     | 0805 |      |     |     |     |     |
| Code       | VDCW    | 4V   | 6.3V | 10V | 16V | 25V | 50V | 4V   | 6.3V | 10V | 16V | 25V | 50V | 4V   | 6.3V | 10V | 16V | 25V | 50V |
| 473        | 0.047μF |      |      |     |     |     | E   |      |      |     |     |     |     |      |      |     |     |     |     |
| 563        | 0.056   |      |      |     |     |     | E   |      |      |     |     |     |     |      |      |     |     |     |     |
| 683        | 0.068   |      |      |     |     |     | E   |      |      |     |     |     |     |      |      |     |     |     |     |
| 823        | 0.082   |      |      |     |     |     | E   |      |      |     |     |     |     |      |      |     |     |     |     |
| 104        | 0.10μF  | E    | E    | E   | E   | E   | E   |      |      |     |     |     |     |      |      |     |     |     |     |
| 124        | 0.12    | E    | E    | E   | E   | E   | E   |      |      |     |     |     |     |      |      |     |     |     |     |
| 154        | 0.15    | E    | E    | E   | E   | E   | E   |      |      |     |     |     |     |      |      |     |     |     |     |
| 184        | 0.18    | E    | E    | E   | E   | E   | E   |      |      |     |     |     |     |      |      |     |     |     |     |
| 224        | 0.22    | E    | E    | E   | E   | E   | E   |      |      |     |     |     |     |      |      |     |     |     |     |
| 334        | 0.33    | E    | E    | E   | E   | E   | E   |      |      |     |     |     |     |      |      |     |     |     |     |
| 474        | 0.47    | E    | E    | E   | E   | E   | E   | H    | H    | H   | H   | H   | H   |      |      |     |     |     |     |
| 564        | 0.56    | E    | E    | E   | E   | E   | E   | H    | H    | H   | H   | H   | H   |      |      |     |     |     |     |
| 684        | 0.68    | E    | E    | E   | E   | E   | E   | H    | H    | H   | H   | H   | H   |      |      |     |     |     |     |
| 105        | 1.0μF   | F    | F    | F   | F   | F   | F   | H    | H    | H   | H   | H   | H   | J    | J    | J   | J   | J   | J   |
| 155        | 1.5     | F    | F    | F   | F   | F   |     | H    | H    | H   | H   | H   | H   | J    | J    | J   | J   | J   | J   |
| 225        | 2.2     | F    | F    | F   | F   | F   |     | H    | H    | H   | H   | H   | H   | J    | J    | J   | J   | J   | J   |
| 335        | 3.3     | F    | F    | F   | F   |     |     | H    | H    | H   | H   | H   |     | J    | J    | J   | J   | J   | J   |
| 475        | 4.7     | F    | F    | F   | F   |     |     | H    | H    | H   | H   | H   |     | J    | J    | J   | J   | J   | J   |
| 685        | 6.8     | F    | F    | F   |     |     |     | H    | H    | H   | H   | H   |     | J    | J    | J   | J   | J   |     |
| 106        | 10μF    | N    | N    | N   |     |     |     | B    | B    | B   | B   | B   |     | J    | J    | J   | J   | J   |     |
| 156        | 15      | N    | N    |     |     |     |     | B    | B    | B   |     |     |     | J    | J    | J   | J   | J   |     |
| 226        | 22      | N    | N    |     |     |     |     | B    | B    | B   |     |     |     | J    | J    | J   | J   | J   |     |
| 476        | 47      |      |      |     |     |     |     | B    | B    |     |     |     |     | J    | J    | J   |     |     |     |

| Dielectric |       | X5R  |      |     |     |     |     |      |      |     |     |     |     |      |     |     |     |      |     |     |     |
|------------|-------|------|------|-----|-----|-----|-----|------|------|-----|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|
| EIA        | Size  | 1206 |      |     |     |     |     | 1210 |      |     |     |     |     | 1808 |     |     |     | 1812 |     |     |     |
| Code       | VDCW  | 4V   | 6.3V | 10V | 16V | 25V | 50V | 4V   | 6.3V | 10V | 16V | 25V | 50V | 6.3V | 10V | 16V | 25V | 6.3V | 10V | 16V | 25V |
| 104        | 0.1μF | B    |      |     |     |     |     |      |      |     |     |     |     |      |     |     |     |      |     |     |     |
| 155        | 1.5   | B    |      |     |     |     |     |      |      |     |     |     |     |      |     |     |     |      |     |     |     |
| 225        | 2.2   | L    | L    | L   | L   | L   | L   |      |      |     |     |     |     |      |     |     |     |      |     |     |     |
| 335        | 3.3   | L    | L    | L   | L   | L   | L   |      |      |     |     |     |     |      |     |     |     |      |     |     |     |
| 475        | 4.7   | L    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    | L   | L   | L   |      |     | O   | O   |
| 685        | 6.8   | L    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    | L   | L   | L   |      |     | O   | O   |
| 106        | 10μF  | L    | L    | L   | L   | L   | L   | L    | L    | L   | L   | L   | L   | L    | L   | L   | L   | O    | O   | O   | O   |
| 126        | 12    | L    | L    | L   | L   | L   |     | O    | O    | O   | O   | O   |     | L    | L   | L   |     | O    | O   | O   |     |
| 156        | 15    | L    | L    | L   | L   | L   |     | O    | O    | O   | O   | O   |     | L    | L   | L   |     | O    | O   | O   |     |
| 226        | 22    | L    | L    | L   | L   | L   |     | O    | O    | O   | O   | O   |     | L    | L   | L   |     | O    | O   | O   |     |
| 336        | 33    | L    | L    | L   | L   |     |     | O    | O    | O   | O   | O   |     | L    | L   |     |     | O    | O   |     |     |
| 476        | 47    | L    | L    | L   | L   |     |     | O    | O    | O   | O   | O   |     | L    | L   |     |     | O    | O   |     |     |
| 686        | 68    | L    | L    |     |     |     |     | O    | O    | O   | O   |     |     | L    |     |     |     | O    |     |     |     |
| 107        | 100μF | L    | L    |     |     |     |     | O    | O    | O   | O   |     |     | L    |     |     |     | O    |     |     |     |
| 337        | 330   |      |      |     |     |     |     | O    | O    |     |     |     |     |      |     |     |     |      |     |     |     |

■ The letter in cell is expressed the symbol of product thickness

**■ Middle and High Voltage**

Capacitance & Voltage (NPO 200V~2KV)

| Dielectric |        | NPO  |      |              |              |       |              |              |       |       |              |              |       |       |              |              |       |       |              |              |       |       |  |
|------------|--------|------|------|--------------|--------------|-------|--------------|--------------|-------|-------|--------------|--------------|-------|-------|--------------|--------------|-------|-------|--------------|--------------|-------|-------|--|
| EIA        | Size   | 0603 |      | 0805         |              |       | 1206         |              |       |       | 1210         |              |       |       | 1808         |              |       |       | 1812         |              |       |       |  |
| Code       | VDCW   | 200V | 250V | 200V<br>250V | 500V<br>630V | 1000V | 200V<br>250V | 500V<br>630V | 1000V | 2000V | 200V<br>250V | 500V<br>630V | 1000V | 2000V | 200V<br>250V | 500V<br>630V | 1000V | 2000V | 200V<br>250V | 500V<br>630V | 1000V | 2000V |  |
| 0R1        | 0.1pF  | H    | H    | B            | B            | J     | B            | B            | I     | I     |              |              |       |       |              |              |       |       |              |              |       |       |  |
| 0R5        | 0.5    | H    | H    | B            | B            | J     | B            | B            | I     | I     |              |              |       |       |              |              |       |       |              |              |       |       |  |
| 0R6        | 0.6    | H    | H    | B            | B            | J     | B            | B            | I     | I     |              |              |       |       |              |              |       |       |              |              |       |       |  |
| 0R7        | 0.7    | H    | H    | B            | B            | J     | B            | B            | I     | I     |              |              |       |       |              |              |       |       |              |              |       |       |  |
| 0R8        | 0.8    | H    | H    | B            | B            | J     | B            | B            | I     | I     |              |              |       |       |              |              |       |       |              |              |       |       |  |
| 0R9        | 0.9    | H    | H    | B            | B            | J     | B            | B            | I     | I     |              |              |       |       |              |              |       |       |              |              |       |       |  |
| 1R0        | 1.0    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     |              |              |       |       |              |              |       |       |  |
| 1R2        | 1.2    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     |              |              |       |       |              |              |       |       |  |
| 1R5        | 1.5    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     |              |              |       |       |              |              |       |       |  |
| 1R8        | 1.8    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     |              |              |       |       |              |              |       |       |  |
| 2R0        | 2.0    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     |              |              |       |       |  |
| 2R2        | 2.2    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     |              |              |       |       |  |
| 2R7        | 2.7    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     |              |              |       |       |  |
| 3R0        | 3.0    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 3R3        | 3.3    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 3R9        | 3.9    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 4R7        | 4.7    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 5R0        | 5.0    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 5R6        | 5.6    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 6R8        | 6.8    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 8R2        | 8.2    | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 100        | 10pF   | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 110        | 11     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 120        | 12     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 150        | 15     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 180        | 18     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 220        | 22     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 270        | 27     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 300        | 30     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 330        | 33     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 390        | 39     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 470        | 47     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 560        | 56     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 680        | 68     | H    | H    | B            | B            | J     | B            | B            | I     | I     | J            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 820        | 82     | H    | H    | B            | B            | J     | B            | B            | I     | I     | L            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 101        | 100pF  | H    | H    | B            | B            | J     | B            | B            | I     | I     | L            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 121        | 120    | H    | H    | B            | B            |       | B            | B            | I     | I     | L            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 151        | 150    | H    | H    | B            | B            |       | B            | B            | I     | J     | L            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 181        | 180    | H    | H    | B            | B            |       | B            | B            | I     | J     | L            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 221        | 220    | H    | H    | B            | B            |       | B            | B            | I     | J     | L            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 271        | 270    | H    | H    | B            | B            |       | B            | B            | I     | J     | L            | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 301        | 300    | H    | H    | B            | B            |       | B            | B            | I     | J     |              | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 331        | 330    | H    | H    | B            | B            |       | B            | B            | I     | J     |              | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 391        | 390    | H    | H    | B            |              |       | B            | B            | I     | J     |              | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 471        | 470    | H    | H    | B            | J            |       | B            | B            | I     | J     |              | J            | J     | J     | L            | L            | L     | L     | J            | J            | L     | L     |  |
| 561        | 560    |      |      | B            | J            |       | B            | J            | J     |       | J            | J            | J     |       | L            | L            | L     |       | J            | J            | L     | L     |  |
| 681        | 680    |      |      | B            |              |       | B            | J            | J     |       | J            | J            | J     |       | L            | L            | L     |       | J            | J            | L     | L     |  |
| 751        | 750    |      |      | B            |              |       | B            | J            | J     |       | J            | J            |       |       | L            | L            | L     |       | J            | J            | L     | L     |  |
| 821        | 820    |      |      | B            |              |       | B            | J            | J     |       | J            | J            | L     |       | L            | L            | L     |       | J            | J            | L     | L     |  |
| 102        | 1000pF |      |      | B            |              |       | B            | J            | J     |       | J            | J            | L     |       | L            | L            | L     |       | J            | J            | L     | L     |  |
| 122        | 1200   |      |      | J            |              |       | B            | J            |       |       | J            | J            | L     |       | L            | L            |       |       | J            | L            | L     |       |  |
| 152        | 1500   |      |      | J            |              |       | B            | J            |       |       | J            | L            |       |       | L            | L            |       |       | J            | L            |       |       |  |
| 182        | 1800   |      |      |              |              |       | B            |              |       |       | J            | L            |       |       | L            | L            |       |       | J            | L            |       |       |  |
| 202        | 2000   |      |      |              |              |       | J            |              |       |       | J            | L            |       |       | L            | L            |       |       | J            | L            |       |       |  |
| 222        | 2200   |      |      |              |              |       | J            |              |       |       | J            | L            |       |       | L            | L            |       |       | J            | L            |       |       |  |
| 272        | 2700   |      |      |              |              |       | J            |              |       |       | J            |              |       |       | L            | L            |       |       | J            | L            |       |       |  |
| 332        | 3300   |      |      |              |              |       |              |              |       |       | J            |              |       |       | L            |              |       |       | J            | L            |       |       |  |
| 392        | 3900   |      |      |              |              |       |              |              |       |       |              |              |       |       | L            |              |       |       | J            | L            |       |       |  |
| 472        | 4700   |      |      |              |              |       |              |              |       |       |              |              |       |       |              |              |       |       | J            | L            |       |       |  |
| 562        | 5600   |      |      |              |              |       |              |              |       |       |              |              |       |       |              |              |       |       | J            |              |       |       |  |
| 682        | 6800   |      |      |              |              |       |              |              |       |       |              |              |       |       |              |              |       |       | J            |              |       |       |  |

■ The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (NPO 3KV~5KV)

| Dielectric |        | NPO   |       |       |       |       |       |
|------------|--------|-------|-------|-------|-------|-------|-------|
| EIA        | Size   | 1808  |       |       | 1812  |       |       |
| Code       | VDCW   | 3000V | 4000V | 5000V | 3000V | 4000V | 5000V |
| 0R1        | 0.1pF  |       |       |       |       |       |       |
| 0R5        | 0.5    |       |       |       |       |       |       |
| 0R6        | 0.6    |       |       |       |       |       |       |
| 0R7        | 0.7    |       |       |       |       |       |       |
| 0R8        | 0.8    |       |       |       |       |       |       |
| 0R9        | 0.9    |       |       |       |       |       |       |
| 1R0        | 1.0    |       |       |       |       |       |       |
| 1R2        | 1.2    |       |       |       |       |       |       |
| 1R5        | 1.5    |       |       |       |       |       |       |
| 1R8        | 1.8    |       |       |       |       |       |       |
| 2R0        | 2.0    | L     | L     | L     |       |       |       |
| 2R2        | 2.2    | L     | L     | L     |       |       |       |
| 2R7        | 2.7    | L     | L     | L     |       |       |       |
| 3R0        | 3.0    | L     | L     | L     | L     | L     | L     |
| 3R3        | 3.3    | L     | L     | L     | L     | L     | L     |
| 3R9        | 3.9    | L     | L     | L     | L     | L     | L     |
| 4R7        | 4.7    | L     | L     | L     | L     | L     | L     |
| 5R0        | 5.0    | L     | L     | L     | L     | L     | L     |
| 5R6        | 5.6    | L     | L     | L     | L     | L     | L     |
| 6R8        | 6.8    | L     | L     | L     | L     | L     | L     |
| 8R2        | 8.2    | L     | L     | L     | L     | L     | L     |
| 100        | 10pF   | L     | L     | L     | L     | L     | L     |
| 110        | 11     | L     | L     | L     | L     | L     | L     |
| 120        | 12     | L     | L     | L     | L     | L     | L     |
| 150        | 15     | L     | L     | L     | L     | L     | L     |
| 180        | 18     | L     | L     | L     | L     | L     | L     |
| 220        | 22     | L     | L     | L     | L     | L     | L     |
| 270        | 27     | L     | L     | L     | L     | L     | L     |
| 330        | 33     | L     | L     | L     | L     | L     | L     |
| 390        | 39     | L     |       |       | L     | L     | L     |
| 470        | 47     | L     |       |       | L     | L     | L     |
| 560        | 56     | L     |       |       | L     | L     | L     |
| 680        | 68     | L     |       |       | L     | L     | L     |
| 820        | 82     | L     |       |       | L     | L     |       |
| 101        | 100pF  | L     |       |       | L     | L     |       |
| 121        | 120    | L     |       |       | L     | L     |       |
| 151        | 150    | L     |       |       | L     | L     |       |
| 181        | 180    | L     |       |       | L     | L     |       |
| 221        | 220    | L     |       |       | L     | L     |       |
| 271        | 270    | L     |       |       | L     |       |       |
| 301        | 300    | L     |       |       | L     |       |       |
| 331        | 330    | L     |       |       | L     |       |       |
| 391        | 390    |       |       |       | L     |       |       |
| 471        | 470    |       |       |       | L     |       |       |
| 561        | 560    |       |       |       | L     |       |       |
| 681        | 680    |       |       |       |       |       |       |
| 751        | 750    |       |       |       |       |       |       |
| 821        | 820    |       |       |       |       |       |       |
| 102        | 1000pF |       |       |       |       |       |       |
| 122        | 1200   |       |       |       |       |       |       |
| 152        | 1500   |       |       |       |       |       |       |
| 182        | 1800   |       |       |       |       |       |       |
| 222        | 2200   |       |       |       |       |       |       |
| 272        | 2700   |       |       |       |       |       |       |
| 332        | 3300   |       |       |       |       |       |       |
| 392        | 3900   |       |       |       |       |       |       |
| 472        | 4700   |       |       |       |       |       |       |
| 562        | 5600   |       |       |       |       |       |       |
| 682        | 6800   |       |       |       |       |       |       |

■ The letter in cell is expressed the symbol of product thickness

Capacitance & Voltage (X7R 200V~4KV)

| Dielectric |         | X7R          |              |              |              |              |       |       |              |              |       |       |              |              |       |       |       |       |              |              |       |       |       |       |  |
|------------|---------|--------------|--------------|--------------|--------------|--------------|-------|-------|--------------|--------------|-------|-------|--------------|--------------|-------|-------|-------|-------|--------------|--------------|-------|-------|-------|-------|--|
| EIA        | Size    | 0603         | 0805         |              | 1206         |              |       | 1210  |              |              |       | 1808  |              |              |       |       |       |       | 1812         |              |       |       |       |       |  |
| Code       | VDCW    | 200V<br>250V | 200V<br>250V | 500V<br>630V | 200V<br>250V | 500V<br>630V | 1000V | 2000V | 200V<br>250V | 500V<br>630V | 1000V | 2000V | 200V<br>250V | 500V<br>630V | 1000V | 2000V | 3000V | 4000V | 200V<br>250V | 500V<br>630V | 1000V | 2000V | 3000V | 4000V |  |
| 101        | 100pF   |              | B            |              |              |              |       |       |              |              |       |       |              |              |       |       |       |       |              |              |       |       |       |       |  |
| 121        | 120     |              | B            |              |              |              |       |       |              |              |       |       |              |              |       |       |       |       |              |              |       |       |       |       |  |
| 151        | 150     | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     |              |              | L     | L     | L     | L     |              |              |       |       |       |       |  |
| 181        | 180     | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     |              |              | L     | L     | L     | L     |              |              |       |       |       |       |  |
| 221        | 220     | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     |              |              |       |       |       |       |  |
| 271        | 270     | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 331        | 330     | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 391        | 390     | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 471        | 470     | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 561        | 560     | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 681        | 680     | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 751        | 750     | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 821        | 820     | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 102        | 1000pF  | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 112        | 1100    | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 122        | 1200    | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 152        | 1500    | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 182        | 1800    | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 222        | 2200    | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     | L            | L            | L     | L     | L     | L     |  |
| 272        | 2700    | H            | B            | B            | B            | B            | B     | J     | J            | J            | J     | J     | L            | L            | L     | L     | L     | L     |              | L            | L     | L     | L     | L     |  |
| 332        | 3300    | H            | B            | B            | B            | B            | J     | J     |              | J            | J     | J     | L            | L            | L     | L     | L     | L     |              | L            | L     | L     | L     | L     |  |
| 392        | 3900    | H            | B            | B            | B            | B            | J     | J     |              | J            | J     | J     | L            | L            | L     | L     | L     | L     |              | L            | L     | L     | L     | L     |  |
| 472        | 4700    | H            | B            | B            | B            | B            | J     | J     |              | J            | J     | L     | L            | L            | L     | L     | L     |       |              | L            | L     | L     | L     | L     |  |
| 562        | 5600    | H            | B            | B            | B            | B            | J     | J     |              | J            | J     | L     | L            | L            | L     | L     | L     |       |              | L            | L     | L     | L     | L     |  |
| 682        | 6800    | H            | B            | J            | B            | J            | J     |       |              | J            | J     | L     | L            | L            | L     | L     | L     |       |              | L            | L     | L     | L     |       |  |
| 822        | 8200    | H            | B            | J            | B            | J            | J     |       |              | J            | J     | L     | L            | L            | L     | L     | L     |       |              | L            | L     | L     | L     |       |  |
| 103        | 0.010μF | H            | B            | J            | B            | J            | J     |       |              | J            | J     | L     | L            | L            | L     | L     | L     |       |              | L            | L     | L     | L     |       |  |
| 123        | 0.012   |              | B            |              | B            | J            | J     |       |              | J            | J     | L     |              | L            | L     | L     |       |       |              | L            | L     | L     | L     |       |  |
| 153        | 0.015   |              | B            |              | B            | J            |       |       |              | J            | J     | L     |              | L            | L     | L     |       |       |              | L            | L     | L     |       |       |  |
| 183        | 0.018   |              | B            |              | B            | J            |       |       |              | J            | J     | L     |              | L            | L     | L     |       |       |              | L            | L     | L     |       |       |  |
| 203        | 0.020   |              | J            |              | B            | J            |       |       |              | J            | J     | L     |              | L            | L     | L     |       |       |              | L            | L     | L     |       |       |  |
| 223        | 0.022   |              | J            |              | B            | J            |       |       |              | J            | J     | L     |              | L            | L     | L     |       |       |              | L            | L     | L     |       |       |  |
| 273        | 0.027   |              |              |              | B            | J            |       |       |              | J            | J     |       |              | L            | L     | L     |       |       |              | L            | L     | L     |       |       |  |
| 333        | 0.033   |              |              |              | J            | J            |       |       |              | J            | J     |       |              | L            | L     | L     |       |       |              | L            | L     | L     |       |       |  |
| 393        | 0.039   |              |              |              | J            |              |       |       |              | J            | J     |       |              | L            | L     |       |       |       |              | L            | L     | L     |       |       |  |
| 473        | 0.047   |              |              |              | J            |              |       |       |              | J            | J     |       |              | L            | L     |       |       |       |              | L            | L     | L     |       |       |  |
| 563        | 0.056   |              |              |              | J            |              |       |       |              | J            | J     |       |              | L            | L     |       |       |       |              | L            | L     |       |       |       |  |
| 683        | 0.068   |              |              |              | J            |              |       |       |              | J            | L     |       |              | L            | L     |       |       |       |              | L            | L     |       |       |       |  |
| 823        | 0.082   |              |              |              | J            |              |       |       |              | J            | L     |       |              | L            |       |       |       |       |              | L            | L     |       |       |       |  |
| 104        | 0.10μF  |              |              |              | J            |              |       |       |              | J            | L     |       |              | L            |       |       |       |       |              | L            | L     |       |       |       |  |
| 124        | 0.12    |              |              |              | J            |              |       |       |              | J            |       |       |              | L            |       |       |       |       |              | L            | R     |       |       |       |  |
| 154        | 0.15    |              |              |              | J            |              |       |       |              | J            |       |       |              | L            |       |       |       |       |              | L            | R     |       |       |       |  |
| 184        | 0.18    |              |              |              | L            |              |       |       |              | L            |       |       |              | L            |       |       |       |       |              | L            | R     |       |       |       |  |
| 224        | 0.22    |              |              |              | L            |              |       |       |              | L            |       |       |              | L            |       |       |       |       |              | L            | R     |       |       |       |  |
| 274        | 0.27    |              |              |              |              |              |       |       |              |              |       |       |              |              |       |       |       |       |              |              |       |       |       |       |  |
| 334        | 0.33    |              |              |              |              |              |       |       |              |              |       |       |              |              |       |       |       |       |              | R            |       |       |       |       |  |
| 394        | 0.39    |              |              |              |              |              |       |       |              |              |       |       |              |              |       |       |       |       |              | R            |       |       |       |       |  |
| 474        | 0.47    |              |              |              |              |              |       |       |              |              |       |       |              |              |       |       |       |       |              | R            |       |       |       |       |  |
| 564        | 0.56    |              |              |              |              |              |       |       |              |              |       |       |              |              |       |       |       |       |              | R            |       |       |       |       |  |
| 105        | 1.0μF   |              |              |              |              |              |       |       |              |              |       |       |              |              |       |       |       |       |              | R            |       |       |       |       |  |

■ The letter in cell is expressed the symbol of product thickness

**■ Ultra-small 01005 & 0201 Capacitors**

Capacitance & Voltage

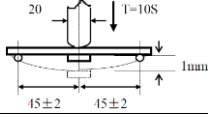
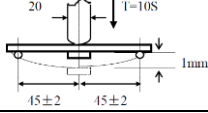
| Dielectric |        | NPO   |            |      |     |  |
|------------|--------|-------|------------|------|-----|--|
| EIA        | Size   | 01005 |            | 0201 |     |  |
| Code       | VDCW   | 10V   | 16V<br>25V | 25V  | 50V |  |
| 0R1        | 0.1pF  | V     | V          | C    | C   |  |
| 0R2        | 0.2    | V     | V          | C    | C   |  |
| 0R3        | 0.3    | V     | V          | C    | C   |  |
| 0R4        | 0.4    | V     | V          | C    | C   |  |
| 0R5        | 0.5    | V     | V          | C    | C   |  |
| 0R6        | 0.6    | V     | V          | C    | C   |  |
| 0R7        | 0.7    | V     | V          | C    | C   |  |
| 0R8        | 0.8    | V     | V          | C    | C   |  |
| 0R9        | 0.9    | V     | V          | C    | C   |  |
| 1R0        | 1.0    | V     | V          | C    | C   |  |
| 1R1        | 1.1    | V     | V          | C    | C   |  |
| 1R2        | 1.2    | V     | V          | C    | C   |  |
| 1R3        | 1.3    | V     | V          | C    | C   |  |
| 1R4        | 1.4    | V     | V          | C    | C   |  |
| 1R5        | 1.5    | V     | V          | C    | C   |  |
| 1R6        | 1.6    | V     | V          | C    | C   |  |
| 1R7        | 1.7    | V     | V          | C    | C   |  |
| 1R8        | 1.8    | V     | V          | C    | C   |  |
| 2R0        | 2.0    | V     | V          | C    | C   |  |
| 2R2        | 2.2    | V     | V          | C    | C   |  |
| 2R4        | 2.4    | V     | V          | C    | C   |  |
| 2R5        | 2.5    | V     | V          | C    | C   |  |
| 2R7        | 2.7    | V     | V          | C    | C   |  |
| 3R0        | 3.0    | V     | V          | C    | C   |  |
| 3R3        | 3.3    | V     | V          | C    | C   |  |
| 3R6        | 3.6    | V     | V          | C    | C   |  |
| 3R7        | 3.7    | V     | V          | C    | C   |  |
| 3R9        | 3.9    | V     | V          | C    | C   |  |
| 4R0        | 4.0    | V     | V          | C    | C   |  |
| 4R3        | 4.3    | V     | V          | C    | C   |  |
| 4R7        | 4.7    | V     | V          | C    | C   |  |
| 5R0        | 5.0    | V     | V          | C    | C   |  |
| 5R1        | 5.1    | V     | V          | C    | C   |  |
| 5R6        | 5.6    | V     | V          | C    | C   |  |
| 6R0        | 6.0    | V     | V          | C    | C   |  |
| 6R2        | 6.2    | V     | V          | C    | C   |  |
| 6R5        | 6.5    | V     | V          | C    | C   |  |
| 6R8        | 6.8    | V     | V          | C    | C   |  |
| 7R0        | 7.0    | V     | V          | C    | C   |  |
| 7R5        | 7.5    | V     | V          | C    | C   |  |
| 8R0        | 8.0    | V     | V          | C    | C   |  |
| 8R2        | 8.2    | V     | V          | C    | C   |  |
| 9R0        | 9.0    | V     | V          | C    | C   |  |
| 9R1        | 9.1    | V     | V          | C    | C   |  |
| 9R5        | 9.5    | V     | V          | C    | C   |  |
| 100        | 10pF   | V     | V          | C    | C   |  |
| 110        | 11     | V     |            | C    | C   |  |
| 120        | 12     | V     |            | C    | C   |  |
| 130        | 13     | V     |            | C    | C   |  |
| 140        | 14     | V     |            | C    | C   |  |
| 150        | 15     | V     |            | C    | C   |  |
| 160        | 16     | V     |            | C    | C   |  |
| 180        | 18     | V     |            | C    | C   |  |
| 200        | 20     | V     |            | C    | C   |  |
| 220        | 22     | V     |            | C    | C   |  |
| 240        | 24     |       |            | C    | C   |  |
| 270        | 27     |       |            | C    | C   |  |
| 300        | 30     |       |            | C    | C   |  |
| 330        | 33     |       |            | C    | C   |  |
| 360        | 36     |       |            | C    | C   |  |
| 390        | 39     |       |            | C    | C   |  |
| 430        | 43     |       |            | C    | C   |  |
| 470        | 47     |       |            | C    | C   |  |
| 510        | 51     |       |            | C    | C   |  |
| 560        | 56     |       |            | C    | C   |  |
| 620        | 62     |       |            | C    | C   |  |
| 680        | 68     |       |            | C    | C   |  |
| 750        | 75     |       |            | C    | C   |  |
| 820        | 82     |       |            | C    | C   |  |
| 101        | 100pF  |       |            | C    | C   |  |
| 221        | 220    |       |            | C    | C   |  |
| 102        | 1000pF |       |            | C    |     |  |

| Dielectric |         | X7R        |            |     |     |  | X5R        |            |            |     |     |     |     |
|------------|---------|------------|------------|-----|-----|--|------------|------------|------------|-----|-----|-----|-----|
| EIA        | Size    | 01005      | 0201       |     |     |  | 01005      |            | 0201       |     |     |     |     |
| Code       | VDCW    | 10V<br>16V | 10V<br>16V | 25V | 50V |  | 4V<br>6.3V | 10V<br>16V | 4V<br>6.3V | 10V | 16V | 25V | 50V |
| 101        | 100pF   | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 121        | 120     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 151        | 150     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 181        | 180     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 201        | 200     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 221        | 220     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 271        | 270     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 331        | 330     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 391        | 390     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 471        | 470     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 561        | 560     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 681        | 680     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 821        | 820     | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 102        | 1000pF  | V          | C          | C   | C   |  | V          | V          |            |     |     |     |     |
| 122        | 1200    |            | C          | C   |     |  | V          | V          |            |     |     |     |     |
| 152        | 1500    |            | C          | C   |     |  | V          | V          |            |     |     |     |     |
| 182        | 1800    |            | C          | C   |     |  | V          | V          |            |     |     |     |     |
| 222        | 2200    |            | C          | C   |     |  | V          | V          |            |     |     |     |     |
| 272        | 2700    |            | C          | C   |     |  | V          | V          |            |     |     |     |     |
| 332        | 3300    |            | C          | C   |     |  | V          | V          |            |     |     |     |     |
| 392        | 3900    |            | C          | C   |     |  | V          | V          |            |     |     |     |     |
| 472        | 4700    |            | C          | C   |     |  | V          | V          |            |     |     |     | C   |
| 562        | 5600    |            | C          | C   |     |  | V          | V          |            |     |     |     | C   |
| 682        | 6800    |            | C          | C   |     |  | V          | V          |            |     |     |     | C   |
| 822        | 8200    |            | C          | C   |     |  | V          | V          |            |     |     |     | C   |
| 103        | 0.010μF |            | C          | C   |     |  | V          | V          |            |     |     |     | C   |
| 123        | 0.012   |            |            |     |     |  | V          | V          |            |     |     |     |     |
| 153        | 0.015   |            | C          |     |     |  | V          | V          | C          | C   | C   | C   |     |
| 183        | 0.018   |            | C          |     |     |  | V          | V          | C          | C   | C   | C   |     |
| 203        | 0.020   |            |            |     |     |  | V          | V          |            |     |     |     |     |
| 223        | 0.022   |            | C          |     |     |  | V          | V          | C          | C   | C   | C   |     |
| 273        | 0.027   |            |            |     |     |  | V          | V          | C          | C   | C   | C   |     |
| 333        | 0.033   |            |            |     |     |  | V          | V          | C          | C   | C   | C   |     |
| 393        | 0.039   |            |            |     |     |  | V          | V          | C          | C   | C   | C   |     |
| 473        | 0.047   |            |            |     |     |  | V          | V          | C          | C   | C   | C   |     |
| 563        | 0.056   |            |            |     |     |  | V          | V          | C          | C   | C   | C   |     |
| 683        | 0.068   |            |            |     |     |  | V          | V          | C          | C   | C   | C   |     |
| 823        | 0.082   |            |            |     |     |  | V          | V          | C          | C   | C   | C   |     |
| 104        | 0.100μF |            |            |     |     |  | V          | V          | C          | C   | C   | C   |     |
| 124        | 0.120   |            |            |     |     |  |            |            | C          | C   | C   |     |     |
| 154        | 0.150   |            |            |     |     |  |            |            | C          | C   | C   |     |     |
| 224        | 0.220   |            |            |     |     |  |            |            | D          | D   | D   |     |     |
| 334        | 0.330   |            |            |     |     |  |            |            | D          | D   |     |     |     |
| 474        | 0.470   |            |            |     |     |  |            |            | D          | D   |     |     |     |
| 684        | 0.680   |            |            |     |     |  |            |            | D          | D   |     |     |     |
| 105        | 1.0μF   |            |            |     |     |  |            |            | D          | D   |     |     |     |
| 225        | 2.2     |            |            |     |     |  |            |            | D          | D   |     |     |     |

■ The letter in cell is expressed the symbol of product thickness

**■Environmental Characteristics**

| Item                                                             | Requirement                              |                                  |       |         |        |         |                                                                  | Test Method                                                                                                                                                                                                        |                                                                     |                      |
|------------------------------------------------------------------|------------------------------------------|----------------------------------|-------|---------|--------|---------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------|
| Capacitance                                                      | Should be within the specified tolerance |                                  |       |         |        |         |                                                                  | NPO: (Class I)<br>Cap≤ 1000pF 1.0±0.2Vrms, 1MHz±10%<br>Cap>1000pF 1.0±0.2Vrms, 1KHz±10%<br>X7R, X5R: (Class II)<br>Test Temperature:25℃±3℃<br>Cap≤ 10uF 1.0±0.2Vrms, 1KHz±10%<br>Cap>10uF 0.5±0.1Vrms, 120Hz±24 Hz |                                                                     |                      |
| (DF, tanδ)<br>Dissipation<br>Factor<br>(For 01005<br>Size)       | NPO<br>(Class I )                        | ≤0.25%                           |       |         |        |         | Test Temperature:25℃±3℃<br>Test Frequency: 1.0±0.2Vrms, 1MHz±10% |                                                                                                                                                                                                                    |                                                                     |                      |
|                                                                  | X7R, X5R:<br>(Class II)                  | ≤10%                             |       |         |        |         | Test Temperature:25℃±3℃<br>Test Frequency: 1.0±0.2Vrms, 1KHz±10% |                                                                                                                                                                                                                    |                                                                     |                      |
| (DF, tanδ)<br>Dissipation<br>Factor<br>(For 0402-<br>1812 Sizes) | NPO<br>(Class I )                        | DF                               |       |         |        |         |                                                                  | Capacitance                                                                                                                                                                                                        | Measuring<br>Frequency                                              | Measuring<br>Voltage |
|                                                                  |                                          | ≤0.56%                           |       |         |        |         |                                                                  | Cr < 5 pF                                                                                                                                                                                                          | 1MHZ±10%                                                            | 1.0±0.2Vrms          |
|                                                                  |                                          | 1.5[(150/Cr)+7]×10 <sup>-4</sup> |       |         |        |         |                                                                  | 5pF≤Cr<50 pF                                                                                                                                                                                                       |                                                                     |                      |
|                                                                  |                                          | ≤0.15%                           |       |         |        |         |                                                                  | 50pF≤Cr≤1000 pF                                                                                                                                                                                                    |                                                                     |                      |
|                                                                  |                                          | ≤0.15%                           |       |         |        |         |                                                                  | > 1000 pF                                                                                                                                                                                                          | 1KHZ±10%                                                            |                      |
|                                                                  | X7R, X5R:<br>(Class II)                  | Voltage                          | DF    | 0201    | 0402   | 0603    | 0805                                                             | ≥1206                                                                                                                                                                                                              | Cap≤ 10uF 1.0±0.2Vrms, 1KHz±10%<br>Cap>10uF 0.5±0.1Vrms, 120Hz±24Hz |                      |
|                                                                  |                                          | 50V                              | ≤250  | ≤3.3nF  | ≤10nF  | ≤100 nF | ≤330 nF                                                          | ≤680 nF                                                                                                                                                                                                            |                                                                     |                      |
|                                                                  |                                          |                                  | ≤350  | ≤10nF   | -      | -       | -                                                                | ≤1μF                                                                                                                                                                                                               |                                                                     |                      |
|                                                                  |                                          |                                  | ≤500  | -       | -      | -       | ≤680 nF                                                          | -                                                                                                                                                                                                                  |                                                                     |                      |
|                                                                  |                                          |                                  | ≤1000 | -       | ≤1μF   | ≤2.2μF  | ≤4.7μF                                                           | ≤10μF                                                                                                                                                                                                              |                                                                     |                      |
|                                                                  |                                          | 25V                              | ≤250  | ≤3.3nF  | ≤10nF  | ≤150nF  | ≤330nF                                                           | ≤680 nF                                                                                                                                                                                                            |                                                                     |                      |
|                                                                  |                                          |                                  | ≤350  | ≤10nF   | ≤100nF | ≤330nF  | -                                                                | ≤2.2μF                                                                                                                                                                                                             |                                                                     |                      |
|                                                                  |                                          |                                  | ≤500  | -       | -      | -       | ≤1μF                                                             | -                                                                                                                                                                                                                  |                                                                     |                      |
|                                                                  |                                          |                                  | ≤750  | -       | -      | -       | ≤2.2μF                                                           | ≤4.7μF                                                                                                                                                                                                             |                                                                     |                      |
|                                                                  |                                          | 16V                              | ≤1000 | ≤100nF  | ≤2.2μF | ≤10μF   | ≤22μF                                                            | ≤22μF                                                                                                                                                                                                              |                                                                     |                      |
|                                                                  |                                          |                                  | ≤250  | ≤3.3nF  | ≤10nF  | ≤150nF  | ≤330nF                                                           | ≤680 nF                                                                                                                                                                                                            |                                                                     |                      |
|                                                                  |                                          |                                  | ≤350  | ≤15nF   | ≤100nF | ≤330nF  | -                                                                | ≤2.2μF                                                                                                                                                                                                             |                                                                     |                      |
|                                                                  |                                          |                                  | ≤500  | ≤47nF   | ≤220nF | ≤680nF  | ≤2.2μF                                                           | -                                                                                                                                                                                                                  |                                                                     |                      |
|                                                                  |                                          | 10V                              | ≤750  | -       | -      | -       | ≤4.7μF                                                           | ≤4.7μF                                                                                                                                                                                                             |                                                                     |                      |
|                                                                  |                                          |                                  | ≤1000 | ≤100nF  | ≤4.7μF | ≤10μF   | ≤22μF                                                            | ≤47μF                                                                                                                                                                                                              |                                                                     |                      |
|                                                                  |                                          |                                  | ≤250  | ≤3.3 nF | ≤10nF  | ≤150nF  | ≤330nF                                                           | ≤680 nF                                                                                                                                                                                                            |                                                                     |                      |
|                                                                  |                                          |                                  | ≤350  | ≤15nF   | ≤100nF | ≤330nF  | -                                                                | ≤2.2μF                                                                                                                                                                                                             |                                                                     |                      |
|                                                                  |                                          | ≤6.3V                            | ≤500  | ≤47nF   | -      | ≤680nF  | ≤2.2μF                                                           | -                                                                                                                                                                                                                  |                                                                     |                      |
|                                                                  |                                          |                                  | ≤750  | -       | ≤1μF   | ≤2.2μF  | ≤4.7μF                                                           | ≤10μF                                                                                                                                                                                                              |                                                                     |                      |
|                                                                  |                                          |                                  | ≤1000 | ≤2.2μF  | ≤10μF  | ≤22μF   | ≤47μF                                                            | ≤100μF                                                                                                                                                                                                             |                                                                     |                      |
|                                                                  |                                          |                                  | ≤250  | ≤3.3nF  | -      | ≤150nF  | -                                                                | ≤680nF                                                                                                                                                                                                             |                                                                     |                      |
|                                                                  |                                          |                                  | ≤350  | ≤15nF   | ≤100nF | ≤330nF  | -                                                                | ≤2.2μF                                                                                                                                                                                                             |                                                                     |                      |
|                                                                  |                                          |                                  | ≤500  | ≤47nF   | ≤220nF | ≤680nF  | -                                                                | -                                                                                                                                                                                                                  |                                                                     |                      |
|                                                                  |                                          |                                  | ≤750  | -       | ≤1μF   | -       | 10μF~22μF                                                        | ≤10μF                                                                                                                                                                                                              |                                                                     |                      |
|                                                                  |                                          |                                  | ≤1000 | ≤4.7μF  | ≤22μF  | ≤47μF   | ≤47μF                                                            | ≤100μF                                                                                                                                                                                                             |                                                                     |                      |

| Item                                                            | Requirement                                                                                               |                                                 |           | Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------|---------------------------------------------------------------|------------|---|-----------------------------------------|----|---|--------------------|-----|---|--------------------------------------------------|----|---|--------------------|-----|
| Dielectric Withstanding Voltage(DW V)                           | No breakdown or damage.                                                                                   |                                                 |           | Measuring Voltage:<br>Class I :300% Rated voltage<br>Class II :250% Rated voltage<br>Duration: 1 ~ 5s<br>Charge/ Discharge Current: 50mA max.<br>(This method excludes high-voltage MLCC)                                                                                                                                                                                                                                                                                                                                                               |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
| Solderability                                                   | At least 95% of the terminal electrode is covered by new solder.<br>Visual Appearance: No visible damage. |                                                 |           | Preheating conditions:80 to 120℃ ; 10~30s.<br><table><tr><td>Solder Temperature:<br/>235±5℃ (Sn/Pb:63/37)<br/>Duration: 2±0.5s</td><td>Solder Temperature:<br/>245±5℃ (Lead-free)<br/>Duration: 2±0.5s</td></tr></table>                                                                                                                                                                                                                                                                                                                                |  | Solder Temperature:<br>235±5℃ (Sn/Pb:63/37)<br>Duration: 2±0.5s | Solder Temperature:<br>245±5℃ (Lead-free)<br>Duration: 2±0.5s |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
| Solder Temperature:<br>235±5℃ (Sn/Pb:63/37)<br>Duration: 2±0.5s | Solder Temperature:<br>245±5℃ (Lead-free)<br>Duration: 2±0.5s                                             |                                                 |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
| Resistance to Flexure of Substrate (Bending Strength)           | 0201~1812 Sizes:<br>Appearance: No visible damage<br>ΔC/C: ≤±10%                                          |                                                 |           | Test Board: Al2O3 or PCB<br>Warp: 1mm<br>Speed: 1 mm/sec.<br>Unit: mm<br>The measurement should be made with the board in the bending position.<br>                                                                                                                                                                                                                                                                                                                  |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
|                                                                 | 01005 Size:<br>Appearance: No visible damage                                                              |                                                 |           | Test Board: Al2O3 or PCB<br>Warp: 1mm<br>Speed: 0.5 mm/sec.<br>Unit: mm<br>The measurement should be made with the board in the bending position.<br>                                                                                                                                                                                                                                                                                                               |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
| Insulation Resistance                                           | NPO (Class I )                                                                                            | C≤10 nF, Ri≥50000MΩ<br>C > 10 nF, Ri• CR≥500S   |           | Measuring Voltage: Rated Voltage(Max 500V )<br>Duration: 60±5s<br>Test Humidity: ≤75%<br>Test Temperature: 25℃±3℃<br>Test Current: ≤50mA                                                                                                                                                                                                                                                                                                                                                                                                                |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
|                                                                 | X7R, X5R: (Class II)                                                                                      | C≤25 nF, Ri≥10000MΩ<br>C > 25 nF, Ri• CR > 100S |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
| Resistance to Soldering Heat                                    | Item                                                                                                      | NPO                                             | X7R / X5R | Preheating conditions: 100 to 200℃ ; 10±2min.<br>Solder Temperature: 265±5℃<br>Duration: 10±1s<br>Clean the capacitor with solvent and examine it with a 10X(min.) microscope.<br>Recovery Time: 24±2h<br>Recovery condition: Room temperature                                                                                                                                                                                                                                                                                                          |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
|                                                                 | ΔC/C                                                                                                      | ≤±0.5% or ±0.5pF whichever is larger            | -5~+10%   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
|                                                                 | DF                                                                                                        | Same to initial value                           |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
|                                                                 | IR                                                                                                        | Same to initial value                           |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
|                                                                 | Appearance : No visible damage.<br>At least 95% of the terminal electrode is covered by new solder.       |                                                 |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
| Termination Adhesion (For 0201~1812 Sizes:)                     | No visible damage                                                                                         |                                                 |           | Applied Force: 5N<br>Duration: 10±1S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
| Temperature Cycle                                               | NPO: ΔC/C:≤±1% or ±1pF, whichever is larger.<br>X7R/X5R: ΔC/C: ≤±10%                                      |                                                 |           | Preheating conditions: up-category temperature, 1h<br>Recovery time: 24±1h<br>Initial Measurement<br>Cycling Times: 5 times, 1 cycle, 4 steps: <table><tr><th>Step</th><th>Temp.(℃)</th><th>Time (min)</th></tr><tr><td>1</td><td>Low- category temp<br/>NPO/X7R/X5R : -55</td><td>30</td></tr><tr><td>2</td><td>Normal temp. (+20)</td><td>2-3</td></tr><tr><td>3</td><td>Up- category temp<br/>NPO/X7R/ : +125<br/>X5R: +85</td><td>30</td></tr><tr><td>4</td><td>Normal temp. (+20)</td><td>2-3</td></tr></table><br>Recovery time after test: 24±2h |  | Step                                                            | Temp.(℃)                                                      | Time (min) | 1 | Low- category temp<br>NPO/X7R/X5R : -55 | 30 | 2 | Normal temp. (+20) | 2-3 | 3 | Up- category temp<br>NPO/X7R/ : +125<br>X5R: +85 | 30 | 4 | Normal temp. (+20) | 2-3 |
| Step                                                            | Temp.(℃)                                                                                                  | Time (min)                                      |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
| 1                                                               | Low- category temp<br>NPO/X7R/X5R : -55                                                                   | 30                                              |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
| 2                                                               | Normal temp. (+20)                                                                                        | 2-3                                             |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
| 3                                                               | Up- category temp<br>NPO/X7R/ : +125<br>X5R: +85                                                          | 30                                              |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |
| 4                                                               | Normal temp. (+20)                                                                                        | 2-3                                             |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                 |                                                               |            |   |                                         |    |   |                    |     |   |                                                  |    |   |                    |     |

| Item                           | Requirement                                                                                                                                                                                                                                                                        | Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |              |  |  |  |             |              |             |              |               |       |              |        |                |               |       |       |       |      |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--|--|--|-------------|--------------|-------------|--------------|---------------|-------|--------------|--------|----------------|---------------|-------|-------|-------|------|
| Humidity Load                  | NPO:<br>ΔC/C :±7.5% or ±0.75pF, whichever is larger.<br>X7R/X5R:<br>ΔC/C: ≤±12.5%<br>DF: Not more than twice of initial value.<br>IR:<br>NPO: Ri≥5000MΩ或 Ri• CR≥ 50S whichever is smaller<br>X7R/X5R: Ri≥1000MΩ或 Ri• CR≥10S whichever is smaller.<br>Appearance: No visible damage | Temperature : 40±2℃<br>Humidity : 90~95%RH<br>Voltage: Rated Voltage<br>Duration : 500h<br>Recovery conditions : Room temperature<br>Recovery Time : 24h (Class1) or 48h (Class2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |  |  |  |             |              |             |              |               |       |              |        |                |               |       |       |       |      |
| Life Test                      | NPO:<br>ΔC/C :≤±2% or ±1pF,whichever is larger.<br>X7R/X5R<br>ΔC/C ≤±20%<br>DF: Not more than twice of initial value.<br>IR:<br>NPO: Ri≥4000MΩ或 Ri• CR≥40S whichever is smaller<br>X7R/X5R: Ri≥2000MΩ或 Ri• CR≥50S whichever is smaller.<br>Visual Appearance: No visible damage    | Low-Voltage ( ≤100V )<br>Applied Voltage: 2*Ur, except the table 1<br>Duration: 1000h<br>Temperature : 125℃( NPO, X7R ) 85℃( X5R )<br>Charge/ Discharge Current: 50mA max.<br>Recovery Conditions: Room Temperature<br>Recovery Time: 24h (Class 1), or 48h (Class2)<br><table><tr><th colspan="4">Table 1</th></tr><tr><th>Capacitance</th><th>Test Voltage</th><th>Capacitance</th><th>Test Voltage</th></tr><tr><td>0201≥<br/>47nF</td><td rowspan="4">1.5Ur</td><td>0805≥<br/>1uF</td><td rowspan="4">1.5 Ur</td></tr><tr><td>0402≥<br/>330nF</td><td>1206≥<br/>10uF</td></tr><tr><td>0603≥</td><td>1210≥</td></tr><tr><td>470nF</td><td>10uF</td></tr></table> | Table 1      |  |  |  | Capacitance | Test Voltage | Capacitance | Test Voltage | 0201≥<br>47nF | 1.5Ur | 0805≥<br>1uF | 1.5 Ur | 0402≥<br>330nF | 1206≥<br>10uF | 0603≥ | 1210≥ | 470nF | 10uF |
| Table 1                        |                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |              |  |  |  |             |              |             |              |               |       |              |        |                |               |       |       |       |      |
| Capacitance                    | Test Voltage                                                                                                                                                                                                                                                                       | Capacitance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Test Voltage |  |  |  |             |              |             |              |               |       |              |        |                |               |       |       |       |      |
| 0201≥<br>47nF                  | 1.5Ur                                                                                                                                                                                                                                                                              | 0805≥<br>1uF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1.5 Ur       |  |  |  |             |              |             |              |               |       |              |        |                |               |       |       |       |      |
| 0402≥<br>330nF                 |                                                                                                                                                                                                                                                                                    | 1206≥<br>10uF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |  |  |  |             |              |             |              |               |       |              |        |                |               |       |       |       |      |
| 0603≥                          |                                                                                                                                                                                                                                                                                    | 1210≥                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |              |  |  |  |             |              |             |              |               |       |              |        |                |               |       |       |       |      |
| 470nF                          |                                                                                                                                                                                                                                                                                    | 10uF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |  |  |  |             |              |             |              |               |       |              |        |                |               |       |       |       |      |
| Middle &high voltage Life Test | NPO:<br>ΔC/C :≤±2% or ±1pF,whichever is larger.<br>X7R/X5R<br>ΔC/C ≤±20%<br>DF: Not more than twice of initial value.<br>IR:<br>NPO: Ri≥4000MΩ或 Ri• CR≥40S whichever is smaller<br>X7R/X5R: Ri≥2000MΩ或 Ri• CR≥50S whichever is smaller.<br>Visual Appearance: No visible damage    | Applied Voltage:<br>100V≤Rated Voltage≤ 200V : 1.5 Multiple<br>200V<Rated Voltage≤500V : 1.3 Multiple<br>500V< Rated Voltage : 1.2 Multiple<br>Duration: 1000h<br>Charge/ Discharge Current: 50mA max.<br>Temperature : 125℃ ( NPO X7R ) ; 85℃( X5R )<br>Recovery Conditions: Room Temperature<br>Recovery Time: 24h (Class 1), or 48h (Class2)                                                                                                                                                                                                                                                                                                                     |              |  |  |  |             |              |             |              |               |       |              |        |                |               |       |       |       |      |

■ Pretreatment ( only for class 2 capacitor) is a method to treat the capacitor before measurement. First, place the capacitor in the up-category temperature or other specified higher temperature environment for 1 hour. Then recovery the capacitor at standard pressure conditions for  $24 \pm 1$  hours.

■ Storage Temperature:  $5 \sim 40^\circ\text{C}$ ; Relative Humidity 20 ~70 %RH

**■ Packaging**

Packaging Quantity

| Type  | Dielectric | Voltage     | Capacitance | Thickness / Symbol | Packaging (7" Reel) |              | Packaging (13" Reel) |              |
|-------|------------|-------------|-------------|--------------------|---------------------|--------------|----------------------|--------------|
|       |            |             |             |                    | Paper tape          | Plastic tape | Paper tape           | Plastic tape |
| 01005 | NPO        | 10V         | 0R1-220     | 0.20±0.02          | V                   | 20K          | -                    | -            |
|       |            | 16V / 25V   | 0R1-100     | 0.20±0.02          | V                   | 20K          | -                    | -            |
| 0201  | NPO        | 25V         | 0R1-102     | 0.30±0.03          | C                   | 15K          | -                    | 70K          |
|       |            | 50V         | 0R1-221     | 0.30±0.03          | C                   | 15K          | -                    | 70K          |
| 0402  | NPO        | 6.3V        | 332-472     | 0.50±0.05          | E                   | 10K          | -                    | 50K          |
|       |            | 10V / 16V   | 122-272     | 0.50±0.05          | E                   | 10K          | -                    | 50K          |
|       |            | 25V         | 0R1-122     | 0.50±0.05          | E                   | 10K          | -                    | 50K          |
|       |            | 50V         | 0R1-102     | 0.50±0.05          | E                   | 10K          | -                    | 50K          |
|       |            | 100V        | 0R1-101     | 0.50±0.05          | E                   | 10K          | -                    | 50K          |
|       |            | 10V         | 123-223     | 0.80±0.10          | H                   | 4K           | -                    | 15K          |
| 0603  | NPO        | 16V         | 822-103     | 0.80±0.10          | H                   | 4K           | -                    | 15K          |
|       |            | 25V / 50V   | 0R1-682     | 0.80±0.10          | H                   | 4K           | -                    | 15K          |
|       |            | 100V        | 0R1-102     | 0.80±0.10          | H                   | 4K           | -                    | 15K          |
|       |            | 200V / 250V | 0R1-471     | 0.80±0.10          | H                   | 4K           | -                    | 15K          |
| 0805  | NPO        | 10V         | 103-104     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            | 16V         | 103-333     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            | 25V         | 103-273     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            | 50V         | 0R1-822     | 0.80±0.20          | B                   | 4K           | -                    | 15K          |
|       |            |             | 103-223     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            | 100V        | 0R1-332     | 0.80±0.20          | B                   | 4K           | -                    | 15K          |
|       |            | 200V / 250V | 0R1-102     | 0.80±0.20          | B                   | 4K           | -                    | 15K          |
|       |            |             | 122-152     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            | 500V / 630V | 0R1-331     | 0.80±0.20          | B                   | 4K           | -                    | 15K          |
|       |            |             | 471-561     | 1.25±0.20          | J                   | -            | 2K                   | -            |
| 1206  | NPO        | 1KV         | 0R1-101     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            | 50V         | 0R3-822     | 0.80±0.20          | B                   | 4K           | -                    | 15K          |
|       |            |             | 103-104     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 100V        | 0R1-332     | 0.80±0.20          | B                   | 4K           | -                    | 15K          |
|       |            | 200V / 250V | 0R1-182     | 0.80±0.20          | B                   | 4K           | -                    | 15K          |
|       |            |             | 202-272     | 1.25±0.20          | J                   | -            | 3K                   | -            |
|       |            | 500V / 630V | 0R1-100     | 0.80±0.20          | B                   | 4K           | -                    | 15K          |
|       |            |             | 110-471     | 1.00±0.20          | I                   | -            | 3K                   | -            |
|       |            |             | 561-152     | 1.25±0.20          | J                   | -            | 3K                   | -            |
|       |            | 1KV         | 0R1-121     | 1.00±0.20          | I                   | -            | 3K                   | -            |
|       |            |             | 151-102     | 1.25±0.20          | J                   | -            | 3K                   | -            |
|       |            | 2KV         | 0R1-390     | 1.00±0.20          | I                   | -            | 3K                   | -            |
| 1210  | NPO        |             | 470-680     | 1.25±0.20          | J                   | -            | 3K                   | -            |
|       |            |             | 820-271     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 50V         | 100-104     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            |             | 100-104     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            | 100V        | 1R0-682     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            | 200V / 250V | 1R0-332     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            | 500V / 630V | 1R0-122     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            |             | 152-222     | 1.60±0.30          | L                   | -            | 2K                   | -            |
| 1808  | NPO        | 1KV         | 1R0-681     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            |             | 821-122     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 2KV         | 1R0-271     | 1.25±0.20          | J                   | -            | 2K                   | -            |
|       |            |             | 301-471     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 50V         | 100-104     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 100V        | 2R0-472     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 200V / 250V | 2R0-392     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 500V / 630V | 2R0-272     | 1.60±0.30          | L                   | -            | 2K                   | -            |
| 1812  | NPO        | 1KV         | 2R0-102     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 2KV         | 2R0-471     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 3KV         | 2R0-331     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 4KV         | 2R0-330     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 5KV         | 2R0-330     | 1.60±0.30          | L                   | -            | 2K                   | -            |
|       |            | 50V         | 100-104     | 1.25±0.20          | J                   | -            | 1K                   | -            |
|       |            | 100V        | 3R0-103     | 1.25±0.20          | J                   | -            | 1K                   | -            |
|       |            | 200V / 250V | 3R0-682     | 1.25±0.20          | J                   | -            | 1K                   | -            |
|       | NPO        | 500V / 630V | 3R0-102     | 1.25±0.20          | J                   | -            | 1K                   | -            |
|       |            |             | 122-472     | 1.60±0.30          | L                   | -            | 1K                   | -            |
|       |            | 1KV         | 3R0-122     | 1.60±0.30          | L                   | -            | 1K                   | -            |
|       |            | 2KV         | 3R0-102     | 1.60±0.30          | L                   | -            | 1K                   | -            |
|       |            | 3KV         | 3R0-561     | 1.60±0.30          | L                   | -            | 1K                   | -            |
|       |            | 4KV         | 3R0-221     | 1.60±0.30          | L                   | -            | 1K                   | -            |
|       |            | 5KV         | 3R0-680     | 1.60±0.30          | L                   | -            | 1K                   | -            |

Packaging Quantity

| Type  | Dielectric | Voltage                | Capacitance | Thickness / Symbol |   | Packaging (7" Reel) |              | Packaging (13" Reel) |              |
|-------|------------|------------------------|-------------|--------------------|---|---------------------|--------------|----------------------|--------------|
|       |            |                        |             |                    |   | Paper tape          | Plastic tape | Paper tape           | Plastic tape |
| 01005 | X7R        | 10V / 16V              | 101-102     | 0.20±0.02          | V | 20K                 | -            | -                    | -            |
| 0201  | X7R        | 10V / 16V              | 101-223     | 0.30±0.03          | C | 15K                 | -            | 70K                  | -            |
|       |            | 25V                    | 101-103     | 0.30±0.03          | C | 15K                 | -            | 70K                  | -            |
|       |            | 50V                    | 101-102     | 0.30±0.03          | C | 15K                 | -            | 70K                  | -            |
| 0402  | X7R        | 6.3V / 10V             | 101-474     | 0.50±0.05          | E | 10K                 | -            | 50K                  | -            |
|       |            | 16V / 25V              | 101-224     | 0.50±0.05          | E | 10K                 | -            | 50K                  | -            |
|       |            | 50V                    | 101-104     | 0.50±0.05          | E | 10K                 | -            | 50K                  | -            |
|       |            | 100V                   | 151-472     | 0.50±0.05          | E | 10K                 | -            | 50K                  | -            |
| 0603  | X7R        | 6.3V                   | 151-475     | 0.80±0.10          | H | 4K                  | -            | 15K                  | -            |
|       |            | 10V / 16V              | 151-225     | 0.80±0.10          | H | 4K                  | -            | 15K                  | -            |
|       |            | 25V / 50V              | 151-105     | 0.80±0.10          | H | 4K                  | -            | 15K                  | -            |
|       |            | 100V                   | 101-104     | 0.80±0.10          | H | 4K                  | -            | 15K                  | -            |
|       |            | 200V / 250V            | 151-103     | 0.80±0.10          | H | 4K                  | -            | 15K                  | -            |
| 0805  | X7R        | 6.3V / 10V / 16V       | 151-474     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 564-106     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            | 25V                    | 151-474     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 564-475     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            | 50V                    | 151-474     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 564-225     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            |                        | 475         | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            | 100V                   | 101-563     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 683-105     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            | 200V / 250V            | 101-183     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 203-223     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            | 500V / 630V            | 151-562     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 682-103     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
| 1206  | X7R        | 6.3V / 10V / 16V / 25V | 201-334     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 474-155     | 1.25±0.20          | J | -                   | 3K           | -                    | -            |
|       |            |                        | 225-226     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 50V                    | 201-334     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 474-824     | 1.25±0.20          | J | -                   | 3K           | -                    | -            |
|       |            |                        | 105         | 1.25±0.20          | J | 4K                  | -            | -                    | -            |
|       |            |                        | 125-155     | 1.25±0.20          | J | -                   | 3K           | -                    | -            |
|       |            |                        | 225-106     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 100V                   | 151-563     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 683-334     | 1.25±0.20          | J | -                   | 3K           | -                    | -            |
|       |            |                        | 474-105     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 200V / 250V            | 151-273     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 333-154     | 1.25±0.20          | J | -                   | 3K           | -                    | -            |
|       |            |                        | 184-224     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 500V / 630V            | 151-272     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 332-333     | 1.25±0.20          | J | -                   | 3K           | -                    | -            |
|       |            | 1KV                    | 151-102     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                        | 112-123     | 1.25±0.20          | J | -                   | 3K           | -                    | -            |
|       |            | 2KV                    | 151-272     | 1.25±0.20          | J | -                   | 3K           | -                    | -            |
| 1210  | X7R        | 6.3V / 10V             | 221-474     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            |                        | 564-476     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 16V / 25V              | 221-474     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            |                        | 564-226     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 50V                    | 221-474     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            |                        | 564-106     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 100V                   | 151-224     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            |                        | 334-475     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 200V / 250V            | 151-154     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            |                        | 184-224     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 500V / 630V            | 151-563     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            |                        | 683-104     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 1KV                    | 151-392     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            |                        | 472-223     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 2KV                    | 151-272     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            |                        | 332-103     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |

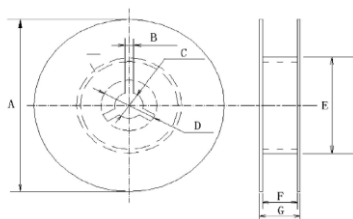
Packaging Quantity

| Type  | Dielectric | Voltage                      | Capacitance | Thickness / Symbol |   | Packaging (7" Reel) |              | Packaging (13" Reel) |              |
|-------|------------|------------------------------|-------------|--------------------|---|---------------------|--------------|----------------------|--------------|
|       |            |                              |             |                    |   | Paper tape          | Plastic tape | Paper tape           | Plastic tape |
| 1808  | X7R        | 6.3V / 10V / 16V / 25V / 50V | 221-475     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 100V                         | 221-225     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 200V / 250V                  | 221-224     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 500V / 630V                  | 221-683     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 1KV                          | 151-223     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 2KV                          | 151-103     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 3KV                          | 151-472     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 4KV                          | 151-222     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
| 1812  | X7R        | 16V                          | R47-102     | 1.60±0.30          | L | -                   | 1K           | -                    | -            |
|       |            |                              | 122-682     | 2.5                | O | -                   | 0.5K         | -                    | -            |
|       |            | 25V / 50V                    | R47-102     | 1.60±0.30          | L | -                   | 1K           | -                    | -            |
|       |            |                              | 122-472     | 2.5                | O | -                   | 0.5K         | -                    | -            |
|       |            | 100V                         | 271-564     | 1.60±0.30          | L | -                   | 1K           | -                    | -            |
|       |            |                              | 684-225     | 2                  | R | -                   | 0.5K         | -                    | -            |
|       |            | 200V / 250V                  | 271-224     | 1.60±0.30          | L | -                   | 1K           | -                    | -            |
|       |            |                              | 334-105     | 2                  | R | -                   | 0.5K         | -                    | -            |
|       |            | 500V / 630V                  | 271-104     | 1.60±0.30          | L | -                   | 1K           | -                    | -            |
|       |            |                              | 124-224     | 2                  | R | -                   | 0.5K         | -                    | -            |
|       |            | 1K                           | 271-473     | 1.60±0.30          | L | -                   | 1K           | -                    | -            |
|       |            |                              | 563         | 2                  | R | -                   | 0.5K         | -                    | -            |
|       |            | 2K                           | 271-123     | 1.60±0.30          | L | -                   | 1K           | -                    | -            |
|       |            | 3K                           | 271-472     | 1.60±0.30          | L | -                   | 1K           | -                    | -            |
|       |            | 4K                           | 271-332     | 1.60±0.30          | L | -                   | 1K           | -                    | -            |
| 01005 | X5R        | 4V / 6.3V / 10V / 16V        | 101-104     | 0.20±0.02          | V | 20K                 | -            | -                    | -            |
| 0201  | X5R        | 4V / 6.3V / 10V              | 153-154     | 0.30±0.03          | C | 15K                 | -            | 70K                  | -            |
|       |            |                              | 224-225     | 0.30±0.05          | D | 15K                 | -            | 70K                  | -            |
|       |            | 16V                          | 153-154     | 0.30±0.03          | C | 15K                 | -            | 70K                  | -            |
|       |            |                              | 224         | 0.30±0.05          | D | 15K                 | -            | 70K                  | -            |
|       |            | 25V                          | 153-104     | 0.30±0.03          | C | 15K                 | -            | 70K                  | -            |
|       |            | 50V                          | 472-103     | 0.30±0.03          | C | 15K                 | -            | 70K                  | -            |
| 0402  | X5R        | 4V / 6.3V                    | 104-684     | 0.50±0.05          | E | 10K                 | -            | 50K                  | -            |
|       |            |                              | 105-685     | 0.50±0.15          | F | 10K                 | -            | 50K                  | -            |
|       |            |                              | 106-226     | 0.50±0.20          | N | 10K                 | -            | 50K                  | -            |
|       |            | 10V                          | 104-684     | 0.50±0.05          | E | 10K                 | -            | 50K                  | -            |
|       |            |                              | 105-685     | 0.50±0.15          | F | 10K                 | -            | 50K                  | -            |
|       |            |                              | 106         | 0.50±0.20          | N | 10K                 | -            | 50K                  | -            |
|       |            | 16V                          | 104-684     | 0.50±0.05          | E | 10K                 | -            | 50K                  | -            |
|       |            |                              | 105-475     | 0.50±0.15          | F | 10K                 | -            | 50K                  | -            |
|       |            | 25V                          | 104-684     | 0.50±0.05          | E | 10K                 | -            | 50K                  | -            |
|       |            |                              | 105-225     | 0.50±0.15          | F | 10K                 | -            | 50K                  | -            |
|       |            | 50V                          | 473-684     | 0.50±0.05          | E | 10K                 | -            | 50K                  | -            |
|       |            |                              | 105         | 0.50±0.15          | F | 10K                 | -            | 50K                  | -            |
| 0603  | X5R        | 4V / 6.3V                    | 474-685     | 0.80±0.10          | H | 4K                  | -            | 15K                  | -            |
|       |            |                              | 106-476     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            | 10V                          | 474-685     | 0.80±0.10          | H | 4K                  | -            | 15K                  | -            |
|       |            |                              | 106-226     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            | 16V / 25V                    | 474-685     | 0.80±0.10          | H | 4K                  | -            | 15K                  | -            |
|       |            |                              | 106         | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            | 50V                          | 474-225     | 0.80±0.10          | H | 4K                  | -            | 15K                  | -            |
| 0805  | X5R        | 4V / 6.3V / 10V              | 105-476     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            | 16V / 25V                    | 105-226     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
|       |            | 50V                          | 105-475     | 1.25±0.20          | J | -                   | 2K           | -                    | -            |
| 1206  | X5R        | 4V                           | 104-155     | 0.80±0.20          | B | 4K                  | -            | 15K                  | -            |
|       |            |                              | 225-107     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 6.3V                         | 225-107     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 10V / 16V                    | 225-476     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 25V                          | 225-226     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |
|       |            | 50V                          | 225-106     | 1.60±0.30          | L | -                   | 2K           | -                    | -            |

Packaging Quantity

| Type | Dielectric | Voltage   | Capacitance | Thickness / Symbol | Packaging (7" Reel) |              | Packaging (13" Reel) |              |
|------|------------|-----------|-------------|--------------------|---------------------|--------------|----------------------|--------------|
|      |            |           |             |                    | Paper tape          | Plastic tape | Paper tape           | Plastic tape |
| 1210 | X5R        | 4V / 6.3V | 475-106     | 1.60±0.30 L        | -                   | 2K           | -                    | -            |
|      |            |           | 126-337     | 2.50 O             | -                   | 1K           | -                    | -            |
|      |            | 10V / 16V | 475-106     | 1.60±0.30 L        | -                   | 2K           | -                    | -            |
|      |            |           | 126-107     | 2.50 O             | -                   | 1K           | -                    | -            |
|      |            | 25V       | 475-106     | 1.60±0.30 L        | -                   | 2K           | -                    | -            |
|      |            |           | 126-476     | 2.50 O             | -                   | 1K           | -                    | -            |
| 1808 | X5R        | 6.3V      | 475-107     | 1.60±0.30 L        | -                   | 2K           | -                    | -            |
|      |            | 10V       | 475-476     | 1.60±0.30 L        | -                   | 2K           | -                    | -            |
|      |            | 16V       | 475-226     | 1.60±0.30 L        | -                   | 2K           | -                    | -            |
|      |            | 25V       | 475-106     | 1.60±0.30 L        | -                   | 2K           | -                    | -            |
| 1812 | X5R        | 6.3V      | 106-107     | 2.50 O             | -                   | 0.5K         | -                    | -            |
|      |            | 10V       | 106-476     | 2.50 O             | -                   | 0.5K         | -                    | -            |
|      |            | 16V       | 475-226     | 2.50 O             | -                   | 0.5K         | -                    | -            |
|      |            | 25V       | 475-106     | 2.50 O             | -                   | 0.5K         | -                    | -            |

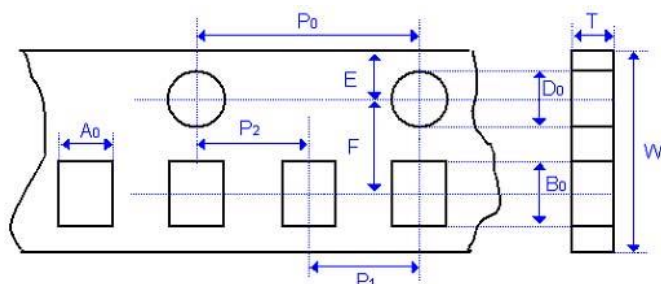
Tape and Reel



Unit: mm

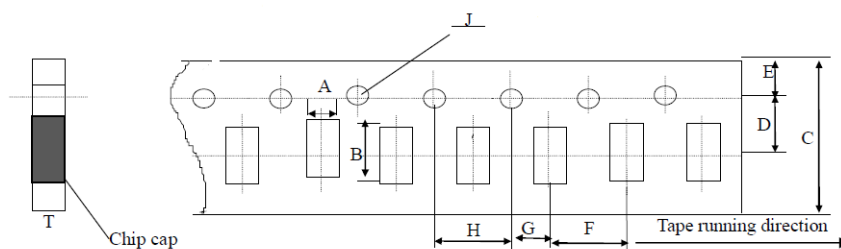
| Type      | 01005 / 0201 / 0402 / 0603 / 0805 / 1206 / 1210 |            | 1808 / 1812 |
|-----------|-------------------------------------------------|------------|-------------|
| Reel Size | 7"                                              | 13"        | 7"          |
| A         | 178±2.0                                         | 330±2.0    | 178±2.0     |
| B         | 3.0                                             | 3.0        | 3.0         |
| C         | 13.0±0.5                                        | 13.0±0.5   | 13.0±0.5    |
| D         | 21.0±0.8                                        | 21.0±0.8   | 21.0±0.8    |
| E         | 50 or more                                      | 50 or more | 50 or more  |
| F         | 10.0±1.5                                        | 10.0±1.5   | 10.0±1.5    |
| G         | 12 max                                          | 12 max     | 12 max      |

Paper Tape Size Specification



Unit: mm

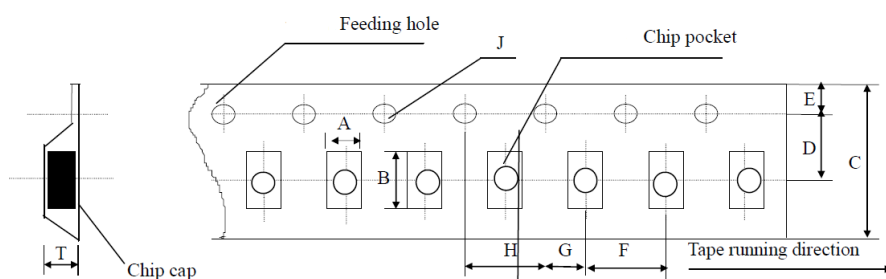
| Type  | A0        | B0        | T          | W         | P0        | P1        | P2        | D0          | E         | F         |
|-------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-------------|-----------|-----------|
| 01005 | 0.24±0.20 | 0.45±0.02 | 0.30 Below | 8.00±0.10 | 4.00±0.10 | 2.00±0.05 | 2.00±0.05 | 1.5-0/+0.10 | 1.75±0.10 | 3.50±0.05 |
| 0201  | 0.37±0.10 | 0.67±0.10 | 0.80 Below | 8.00±0.10 | 4.00±0.10 | 2.00±0.05 | 2.00±0.05 | 1.5-0/+0.10 | 1.75±0.10 | 3.50±0.05 |
| 0402  | 0.65±0.10 | 1.15±0.10 | 0.80 Below | 8.00±0.10 | 4.00±0.10 | 2.00±0.05 | 2.00±0.05 | 1.5-0/+0.10 | 1.75±0.10 | 3.50±0.05 |



Unit: mm

| Type | A         | B         | C         | D         | E         | F         | G         | H         | J           | T        |
|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|----------|
| 0603 | 1.10±0.10 | 1.90±0.10 | 8.00±0.10 | 3.50±0.05 | 1.75±0.10 | 4.00±0.10 | 2.00±0.10 | 4.00±0.10 | 1.5-0/+0.10 | 1.10 Max |
| 0805 | 1.45±0.15 | 2.30±0.15 | 8.00±0.15 | 3.50±0.05 | 1.75±0.10 | 4.00±0.10 | 2.00±0.10 | 4.00±0.10 | 1.5-0/+0.10 | 1.10 Max |
| 1206 | 1.80±0.20 | 3.40±0.20 | 8.00±0.20 | 3.50±0.05 | 1.75±0.10 | 4.00±0.10 | 2.00±0.10 | 4.00±0.10 | 1.5-0/+0.10 | 1.10 Max |

Plastic Tape Size Specification



Unit: mm

| Type | A         | B         | C          | D         | E         | F         | G         | H         | J            | T        |
|------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|--------------|----------|
| 0805 | 1.55±0.20 | 2.35±0.20 | 8.00±0.20  | 3.50±0.05 | 1.75±0.10 | 4.00±0.10 | 2.00±0.10 | 4.00±0.10 | 1.50-0/+0.10 | 1.50 Max |
| 1206 | 1.95±0.20 | 3.60±0.20 | 8.00±0.20  | 3.50±0.05 | 1.75±0.10 | 4.00±0.10 | 2.00±0.10 | 4.00±0.10 | 1.50-0/+0.10 | 1.85 Max |
| 1210 | 2.70±0.10 | 3.42±0.10 | 8.00±0.10  | 3.50±0.05 | 1.75±0.10 | 4.00±0.10 | 2.00±0.05 | 4.00±0.10 | 1.55-0/+0.10 | 3.20 Max |
| 1808 | 2.20±0.10 | 4.95±0.10 | 12.00±0.10 | 5.50±0.05 | 1.75±0.10 | 4.00±0.10 | 2.00±0.05 | 4.00±0.10 | 1.50-0/+0.10 | 3.00 Max |
| 1812 | 3.66±0.10 | 4.95±0.10 | 12.00±0.10 | 5.50±0.05 | 1.75±0.10 | 8.00±0.10 | 2.00±0.05 | 4.00±0.10 | 1.55-0/+0.10 | 4.00 Max |

## Recommended Soldering Method

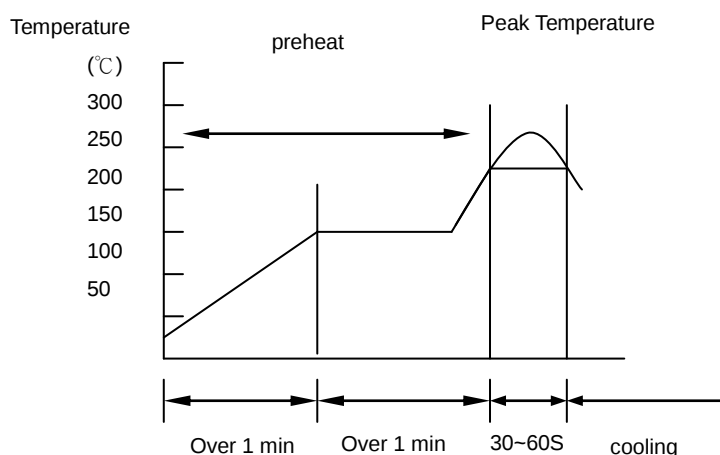
| Type        | Dielectric   | Capacitance       | Soldering Method |
|-------------|--------------|-------------------|------------------|
| 01005       | NPO/ X7R/X5R | /                 | R                |
| 0201        | NPO          | /                 | R                |
|             | X7R/X5R      | /                 | R                |
|             | Y5V          | /                 | R                |
| 0402        | NPO          | /                 | R                |
|             | X7R/X5R      | /                 | R                |
|             | Y5V          | /                 | R                |
| 0603        | NPO          | /                 | R/W              |
|             | X7R/X5R      | $C \geq 1\mu F$   | R                |
|             |              | $C < 1\mu F$      | R/W              |
|             | Y5V          | $C \geq 1\mu F$   | R                |
|             |              | $C < 1\mu F$      | R/W              |
| 0805        | NPO          | /                 | R/W              |
|             | X7R/X5R      | $C \geq 4.7\mu F$ | R                |
|             |              | $C < 4.7\mu F$    | R/W              |
|             | Y5V          | $C \geq 1\mu F$   | R                |
|             |              | $C < 1\mu F$      | R/W              |
| 1206        | NPO          | /                 | R/W              |
|             | X7R/X5R      | $C \geq 10\mu F$  | R                |
|             |              | $C < 10\mu F$     | R/W              |
|             | Y5V          | $C \geq 10\mu F$  | R                |
|             |              | $C < 10\mu F$     | R/W              |
| $\geq 1210$ | NPO          | /                 | R                |
|             | X7R/X5R      | /                 | R                |
|             | Y5V          | /                 | R                |

Soldering method : R - Reflow Soldering

W - Wave Soldering

## The temperature profile for soldering

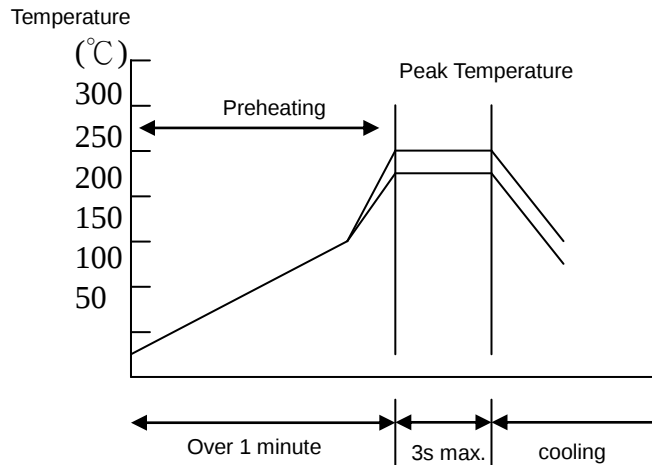
### Re-flow soldering



|                  | Pb-Sn soldering | Lead-free soldering |
|------------------|-----------------|---------------------|
| Peak temperature | 230°C ~ 250°C   | 240°C ~ 260°C       |

While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as:  $T \leq 150^\circ C$ .

**Wave soldering**



|                  | Pb-Sn soldering | Lead-free soldering |
|------------------|-----------------|---------------------|
| Peak temperature | 230°C ~ 260°C   | 240°C ~ 270°C       |

While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as:  $T \leq 150^{\circ}\text{C}$ .