

# RF/Microwave Capacitors

## RF/Microwave C0G (NP0) Capacitors

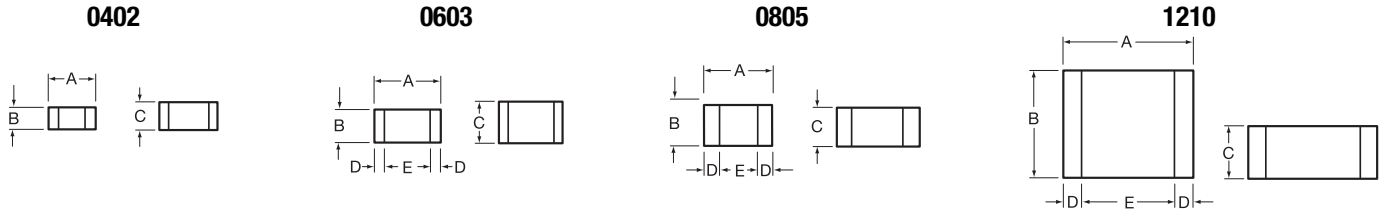
### Ultra Low ESR "U" Series, C0G (NP0) Capacitors (RoHS)



#### GENERAL INFORMATION

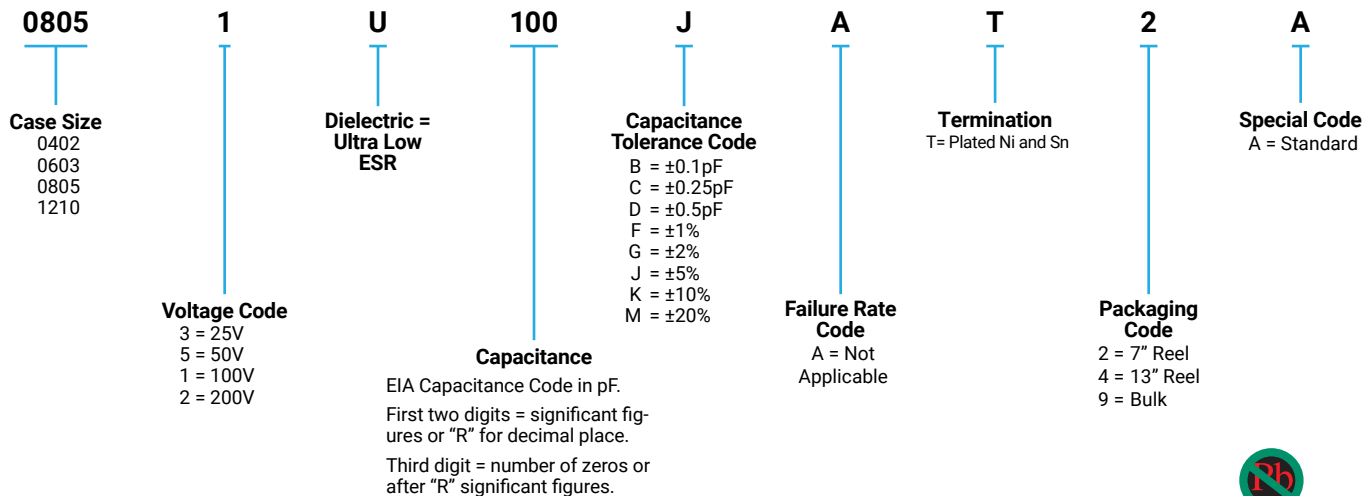
"U" Series capacitors are C0G (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the communications market. Max ESR and effective capacitance are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0603, 0805, and 1210.

#### DIMENSIONS: inches (millimeters)



| Size | A                       | B                       | C                  | D                             | E                |
|------|-------------------------|-------------------------|--------------------|-------------------------------|------------------|
| 0402 | 0.039±0.004 (1.00±0.1)  | 0.020±0.004 (0.50±0.1)  | 0.024 (0.6) max    | 0.010 ± 0.006 (0.25 ± 0.15)   | 0.014 (0.36) min |
| 0603 | 0.060±0.010 (1.52±0.25) | 0.030±0.010 (0.76±0.25) | 0.036 (0.91) max   | 0.010 ± 0.005 (0.25 ± 0.13)   | 0.030 (0.76) min |
| 0805 | 0.079±0.008 (2.01±0.2)  | 0.049±0.008 (1.25±0.2)  | 0.045 (1.15mm) max | 0.020 ± 0.010 (0.51 ± 0.254)  | 0.020 (0.51) min |
| 1210 | 0.126±0.008 (3.2±0.2)   | 0.098±0.008 (2.49±0.2)  | 0.055 (1.40mm) max | 0.025 ± 0.015 (0.635 ± 0.381) | 0.040 (1.02) min |

#### HOW TO ORDER



#### ELECTRICAL CHARACTERISTICS

##### Capacitance Values and Tolerances:

Size 0402 - 0.2 pF to 22 pF @ 1 MHz  
Size 0603 - 1.0 pF to 100 pF @ 1 MHz  
Size 0805 - 1.6 pF to 160 pF @ 1 MHz  
Size 1210 - 2.4 pF to 1000 pF @ 1 MHz

##### Temperature Coefficient of Capacitance (TC):

0±30 ppm/°C (-55° to +125°C)

##### Insulation Resistance (IR):

10<sup>12</sup> Ω min. @ 25°C and rated WVDC  
10<sup>11</sup> Ω min. @ 125°C and rated WVDC

##### Working Voltage (WVDC):

Size Working Voltage  
0402 - 50, 25 WVDC  
0603 - 200, 100, 50 WVDC  
0805 - 200, 100 WVDC  
1210 - 200, 100 WVDC

##### Dielectric Working Voltage (DWV):

250% of rated WVDC

##### Equivalent Series Resistance Typical (ESR):

0402 - See Performance Curve, page 300  
0603 - See Performance Curve, page 300  
0805 - See Performance Curve, page 300  
1210 - See Performance Curve, page 300

##### Marking

Laser marking EIA J marking standard (except 0603) (capacitance code and tolerance upon request).



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CAPACITANCE RANGE

| Cap (pF) | Available Tolerance | Size |      |      |      |
|----------|---------------------|------|------|------|------|
|          |                     | 0402 | 0603 | 0805 | 1210 |
| 0.2      | B,C                 | 50V  | N/A  | N/A  | N/A  |
| 0.3      | ↓                   |      |      |      |      |
| 0.4      | B,C                 |      |      |      |      |
| 0.5      | ↓                   |      |      |      |      |
| 0.6      | B,C,D               |      |      |      |      |
| 0.7      | ↓                   |      |      |      |      |
| 0.8      | B,C,D               |      |      |      |      |
| 0.9      | ↓                   |      |      |      |      |

| Cap (pF) | Available Tolerance | Size |      |      |      |
|----------|---------------------|------|------|------|------|
|          |                     | 0402 | 0603 | 0805 | 1210 |
| 1.0      | B,C,D               | 50V  | 200V | 200V | 200V |
| 1.1      | ↓                   |      |      |      |      |
| 1.2      | ↓                   |      |      |      |      |
| 1.3      | ↓                   |      |      |      |      |
| 1.4      | ↓                   |      |      |      |      |
| 1.5      | ↓                   |      |      |      |      |
| 1.6      | ↓                   |      |      |      |      |
| 1.7      | ↓                   |      |      |      |      |
| 1.8      | ↓                   |      |      |      |      |
| 1.9      | ↓                   |      |      |      |      |
| 2.0      | ↓                   |      |      |      |      |
| 2.1      | ↓                   |      |      |      |      |
| 2.2      | ↓                   |      |      |      |      |
| 2.4      | ↓                   |      |      |      |      |
| 2.7      | ↓                   |      |      |      |      |
| 3.0      | ↓                   |      |      |      |      |
| 3.3      | ↓                   |      |      |      |      |
| 3.6      | ↓                   |      |      |      |      |
| 3.9      | ↓                   |      |      |      |      |
| 4.3      | ↓                   |      |      |      |      |
| 4.7      | ↓                   |      |      |      |      |
| 5.1      | ↓                   |      |      |      |      |
| 5.6      | ↓                   |      |      |      |      |
| 6.2      | B,C,D               |      |      |      |      |
| 6.8      | B,C,J,K,M           |      |      |      |      |

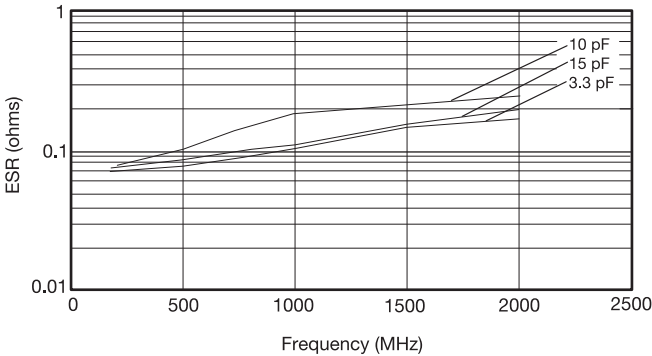
| Cap (pF) | Available Tolerance | Size |      |      |      |
|----------|---------------------|------|------|------|------|
|          |                     | 0402 | 0603 | 0805 | 1210 |
| 7.5      | B,C,J,K,M           | 50V  | 200V | 200V | 200V |
| 8.2      | ↓                   |      |      |      |      |
| 9.1      | B,C,J,K,M           |      |      |      |      |
| 10       | F,G,J,K,M           |      |      |      |      |
| 11       | ↓                   |      |      |      |      |
| 12       | ↓                   |      |      |      |      |
| 13       | ↓                   |      |      |      |      |
| 15       | ↓                   |      |      |      |      |
| 18       | ↓                   |      |      |      |      |
| 20       | ↓                   |      |      |      |      |
| 22       | ↓                   |      |      |      |      |
| 24       | ↓                   |      |      |      |      |
| 27       | ↓                   |      |      |      |      |
| 30       | ↓                   |      |      |      |      |
| 33       | ↓                   |      |      |      |      |
| 36       | ↓                   |      |      |      |      |
| 39       | ↓                   |      |      |      |      |
| 43       | ↓                   |      |      |      |      |
| 47       | ↓                   |      |      |      |      |
| 51       | ↓                   |      |      |      |      |
| 56       | ↓                   |      |      |      |      |
| 68       | ↓                   |      |      |      |      |
| 75       | ↓                   |      |      |      |      |
| 82       | ↓                   |      |      |      |      |
| 91       | ↓                   |      |      |      |      |

| Cap (pF) | Available Tolerance | Size |      |      |           |
|----------|---------------------|------|------|------|-----------|
|          |                     | 0402 | 0603 | 0805 | 1210      |
| 100      | F,G,J,K,M           | N/A  | 100V | 200V | 200V      |
| 110      | ↓                   |      | 50V  | ↓    |           |
| 120      | ↓                   |      | 50V  | 100V |           |
| 130      | ↓                   |      | N/A  | ↓    |           |
| 140      | ↓                   |      |      | 100V |           |
| 150      | ↓                   |      |      | ↓    |           |
| 160      | ↓                   |      |      | 100V |           |
| 180      | ↓                   |      |      | N/A  |           |
| 200      | ↓                   |      |      | ↓    |           |
| 220      | ↓                   |      |      | ↓    |           |
| 270      | ↓                   |      |      | ↓    |           |
| 300      | ↓                   |      |      | ↓    |           |
| 330      | ↓                   |      |      | ↓    |           |
| 360      | ↓                   |      |      | ↓    |           |
| 390      | ↓                   |      |      | ↓    |           |
| 430      | ↓                   |      |      | ↓    |           |
| 470      | ↓                   |      |      | ↓    |           |
| 510      | ↓                   |      |      | ↓    |           |
| 560      | ↓                   |      |      | ↓    |           |
| 620      | ↓                   |      |      | ↓    |           |
| 680      | ↓                   |      |      | ↓    |           |
| 750      | ↓                   |      |      | ↓    |           |
| 820      | ↓                   |      |      | ↓    |           |
| 910      | ↓                   |      |      | ↓    |           |
| 1000     | F,G,J,K,M           |      |      | ↓    | 200V 100V |

ULTRA LOW ESR, “U” SERIES

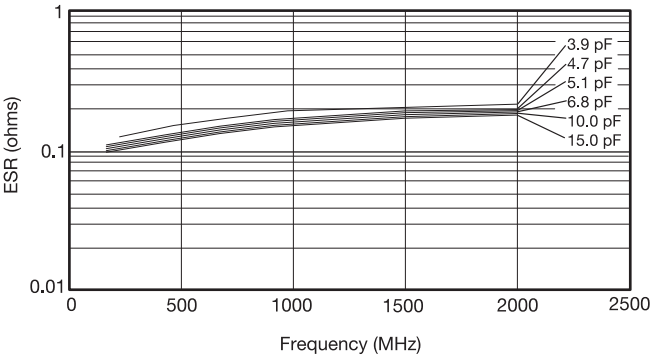
TYPICAL ESR vs. FREQUENCY

0402 “U” SERIES



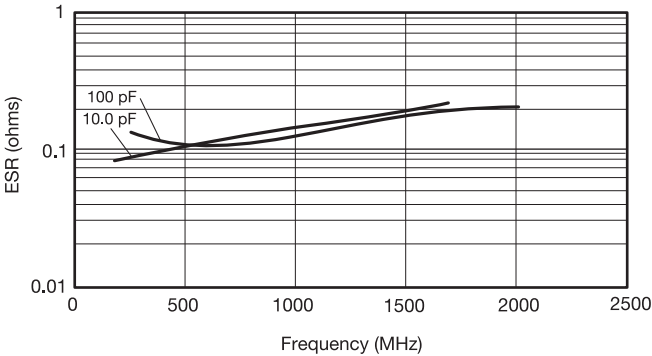
TYPICAL ESR vs. FREQUENCY

0603 “U” SERIES



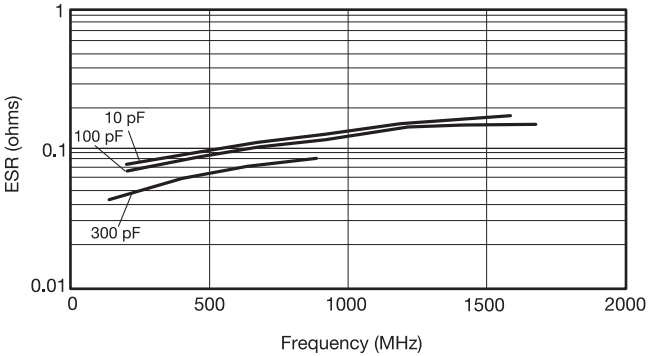
TYPICAL ESR vs. FREQUENCY

0805 “U” SERIES



TYPICAL ESR vs. FREQUENCY

1210 “U” SERIES



ESR Measured on the Boonton 34A

TYPICAL  
SERIES RESONANT FREQUENCY  
"U" SERIES CHIP

