

# RF/Microwave COG (NP0) Capacitors (RoHS)



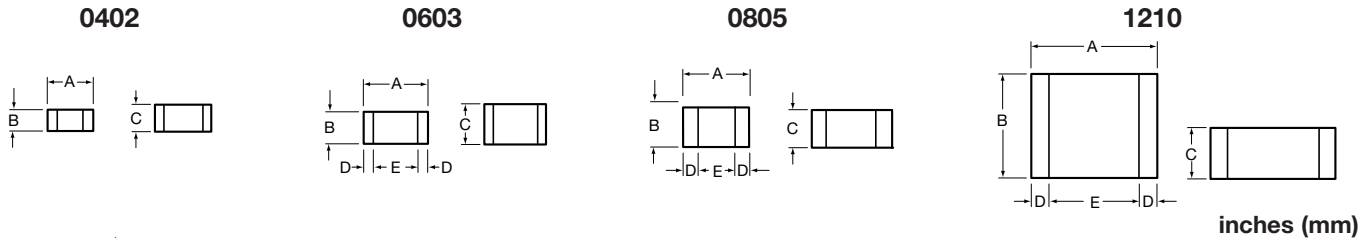
## Ultra Low ESR, "U" Series, COG (NP0) Chip Capacitors

### GENERAL INFORMATION

"U" Series capacitors are COG (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the communications market. Max ESR and effective capacitance

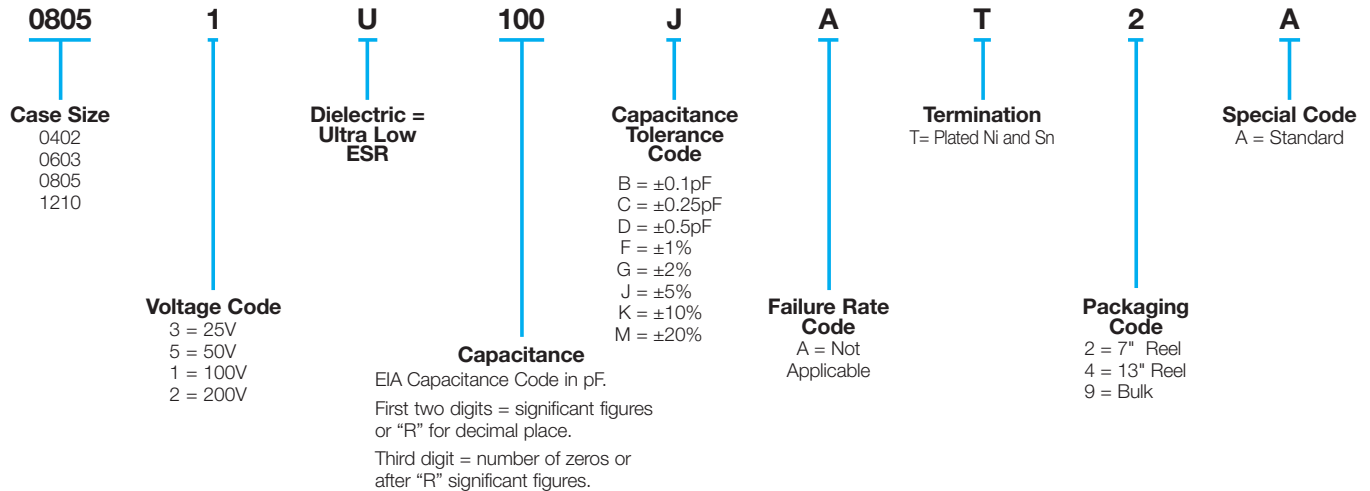
are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0603, 0805, and 1210.

### 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          | N/A                       | N/A              |
| 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)  | 0.040±0.005 (1.02±0.127) | 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)  | 0.050±0.005 (1.27±0.127) | 0.025±0.015 (0.635±0.381) | 0.040 (1.02) min |

### HOW TO ORDER



## 7 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 127
- 0603 - See Performance Curve, page 127
- 0805 - See Performance Curve, page 127
- 1210 - See Performance Curve, page 127

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

### MILITARY SPECIFICATIONS

Meets or exceeds the requirements of MIL-C-55681



# RF/Microwave COG (NP0) Capacitors (RoHS)



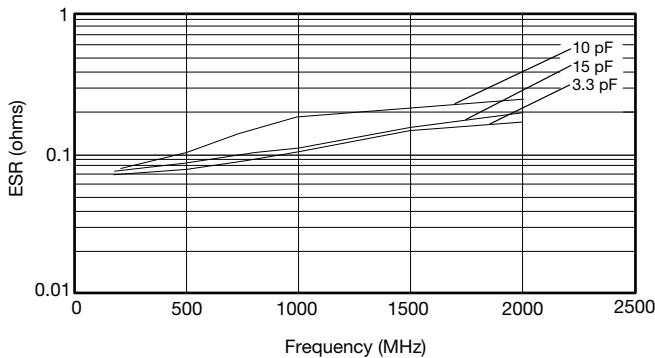
## Ultra Low ESR, "U" Series, COG (NP0) Chip Capacitors

### CAPACITANCE RANGE

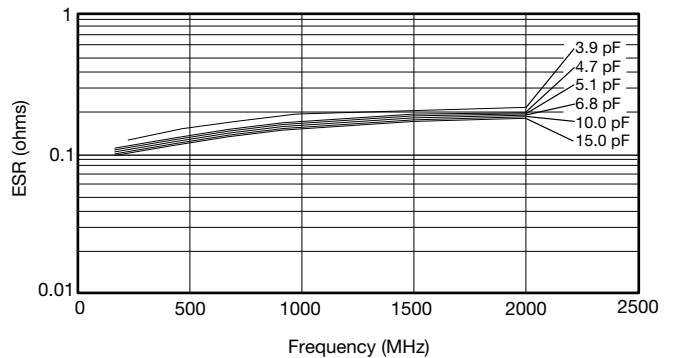
| Cap (pF) | Available Tolerance | Size |      |      |      | Cap (pF) | Available Tolerance | Size |      |      |      | Cap (pF) | Available Tolerance | Size |      |      |      | Cap (pF) | Available Tolerance | Size |      |      |      |  |  |
|----------|---------------------|------|------|------|------|----------|---------------------|------|------|------|------|----------|---------------------|------|------|------|------|----------|---------------------|------|------|------|------|--|--|
|          |                     | 0402 | 0603 | 0805 | 1210 |          |                     | 0402 | 0603 | 0805 | 1210 |          |                     | 0402 | 0603 | 0805 | 1210 |          |                     | 0402 | 0603 | 0805 | 1210 |  |  |
| 0.2      | B,C                 | 50V  | N/A  | N/A  | N/A  | 1.0      | B,C,D               | 50V  | 200V | 200V | 200V | 7.5      | B,C,J,K,M           | 50V  | 200V | 200V | 200V | 100      | F,G,J,K,M           | N/A  | 100V | 200V | 200V |  |  |
| 0.3      |                     |      |      |      |      | 1.1      |                     |      |      |      |      | 8.2      |                     |      |      |      |      | 110      |                     |      | 50V  | 200V | 200V |  |  |
| 0.4      |                     |      |      |      |      | 1.2      |                     |      |      |      |      | 9.1      | B,C,J,K,M           |      |      |      |      | 120      |                     |      | 50V  | 200V | 200V |  |  |
| 0.5      | B,C                 |      |      |      |      | 1.3      |                     |      |      |      |      | 10       | F,G,J,K,M           |      |      |      |      | 130      |                     |      | N/A  | 200V | 200V |  |  |
| 0.6      | B,C,D               |      |      |      |      | 1.4      |                     |      |      |      |      | 11       |                     |      |      |      |      | 140      |                     |      |      | 100V | 200V |  |  |
| 0.7      |                     |      |      |      |      | 1.5      |                     |      |      |      |      | 12       |                     |      |      |      |      | 150      |                     |      |      | 100V | 200V |  |  |
| 0.8      |                     |      |      |      |      | 1.6      |                     |      |      |      |      | 13       |                     |      |      |      |      | 160      |                     |      |      | 100V | 200V |  |  |
| 0.9      | B,C,D               |      |      |      |      | 1.7      |                     |      |      |      |      | 15       |                     |      |      |      |      | 180      |                     |      |      | N/A  | 200V |  |  |
|          |                     |      |      |      |      | 1.8      |                     |      |      |      |      | 18       |                     |      |      |      |      | 200      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 1.9      |                     |      |      |      |      | 20       |                     |      |      |      |      | 220      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 2.0      |                     |      |      |      |      | 22       |                     |      |      |      |      | 270      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 2.1      |                     |      |      |      |      | 24       |                     |      |      |      |      | 300      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 2.2      |                     |      |      |      |      | 27       |                     |      |      |      |      | 330      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 2.4      |                     |      |      |      |      | 30       |                     |      |      |      |      | 360      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 2.7      |                     |      |      |      |      | 33       |                     |      |      |      |      | 390      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 3.0      |                     |      |      |      |      | 36       |                     |      |      |      |      | 430      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 3.3      |                     |      |      |      |      | 39       |                     |      |      |      |      | 470      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 3.6      |                     |      |      |      |      | 43       |                     |      |      |      |      | 510      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 3.9      |                     |      |      |      |      | 47       |                     |      |      |      |      | 560      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 4.3      |                     |      |      |      |      | 51       |                     |      |      |      |      | 620      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 4.7      |                     |      |      |      |      | 56       |                     |      |      |      |      | 680      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 5.1      |                     |      |      |      |      | 68       |                     |      |      |      |      | 750      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 5.6      |                     |      |      |      |      | 75       |                     |      |      |      |      | 820      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 6.2      | B,C,D               |      |      |      |      | 82       |                     |      |      |      |      | 910      |                     |      |      |      |      |  |  |
|          |                     |      |      |      |      | 6.8      | B,C,J,K,M           |      |      |      |      | 91       |                     |      |      |      |      | 1000     | F,G,J,K,M           |      |      |      |      |  |  |

### ULTRA LOW ESR, "U" SERIES

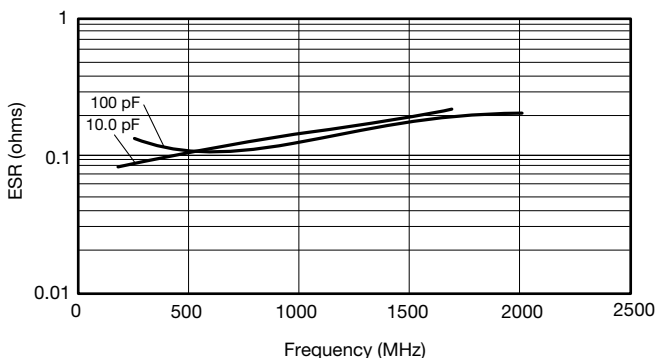
TYPICAL ESR vs. FREQUENCY  
0402 "U" SERIES



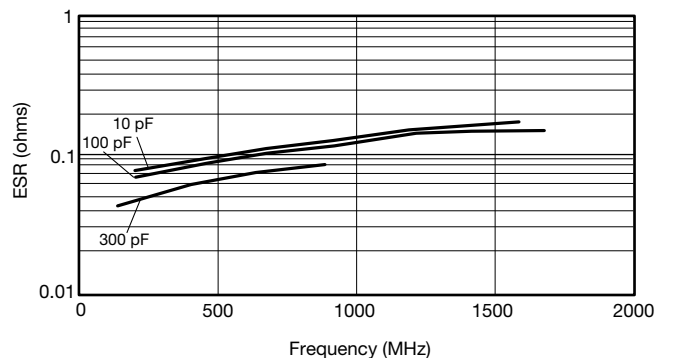
TYPICAL ESR vs. FREQUENCY  
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
1210 "U" SERIES



ESR Measured on the Boonton 34A

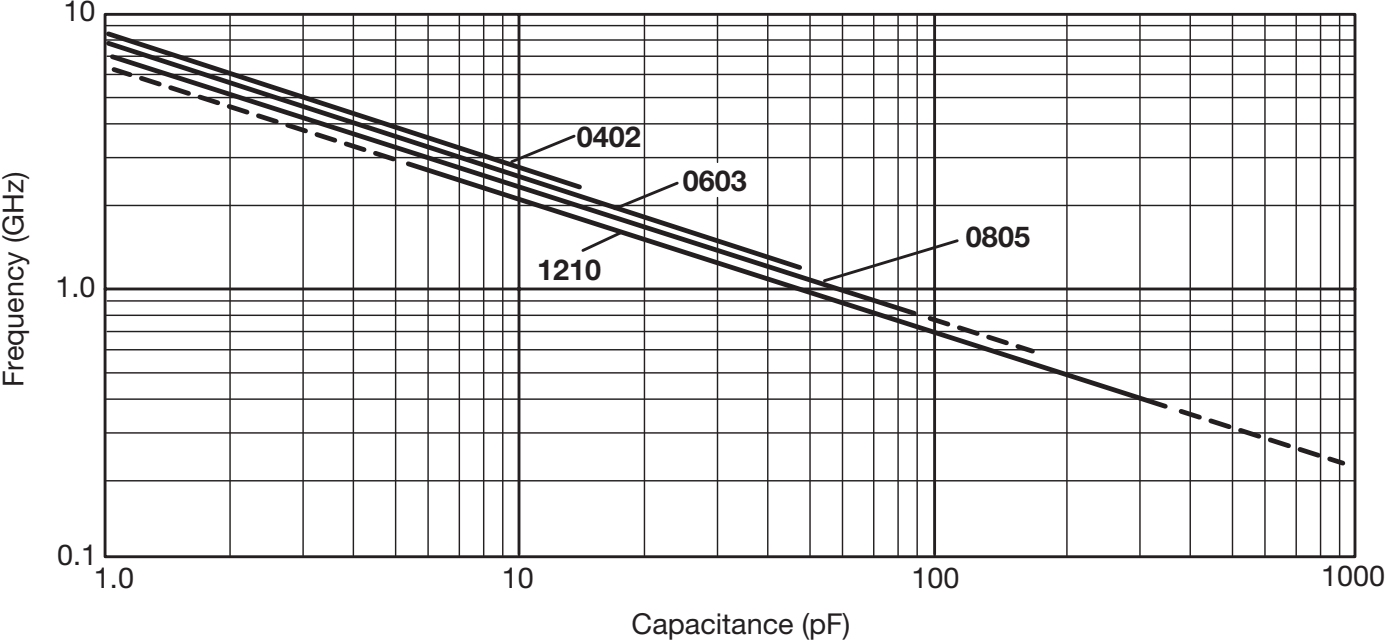


# RF/Microwave C0G (NP0) Capacitors (RoHS)



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

TYPICAL  
SERIES RESONANT FREQUENCY  
"U" SERIES CHIP



7



# RF/Microwave C0G (NP0) Capacitors (Sn/Pb)



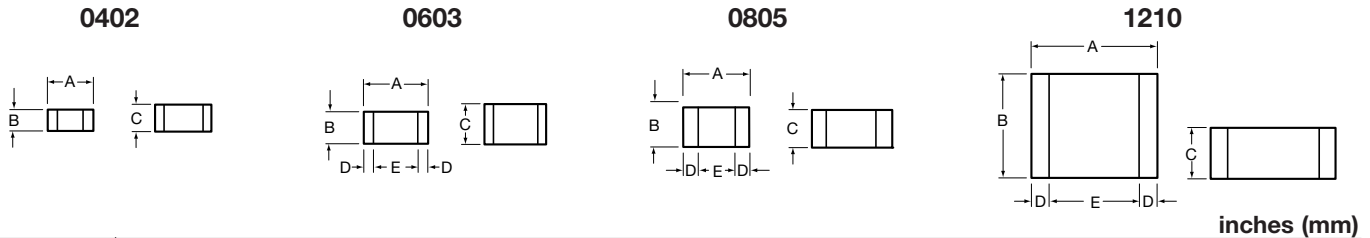
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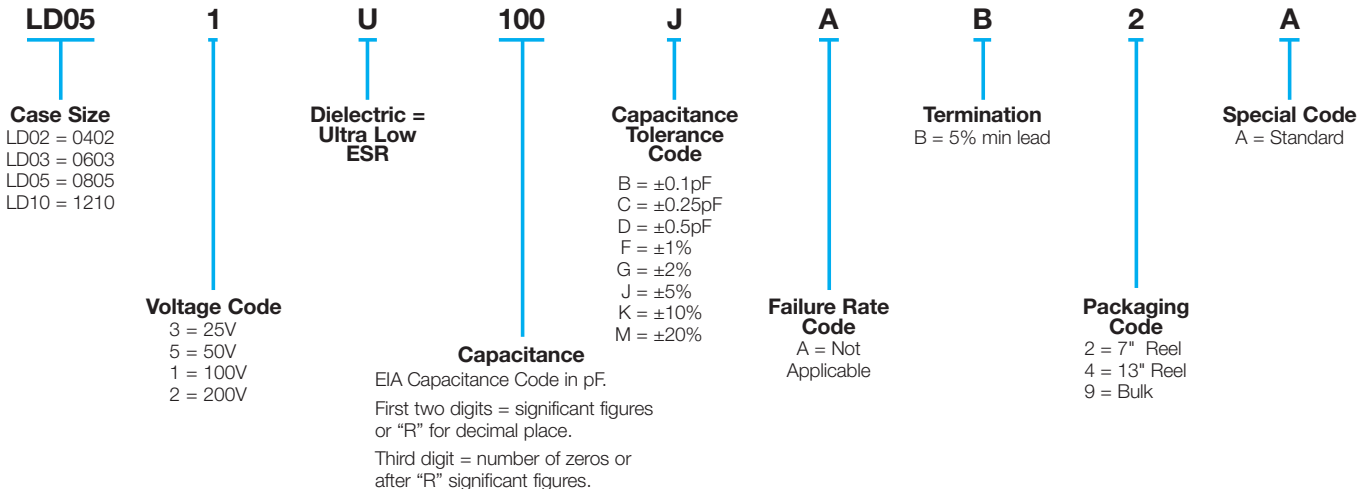
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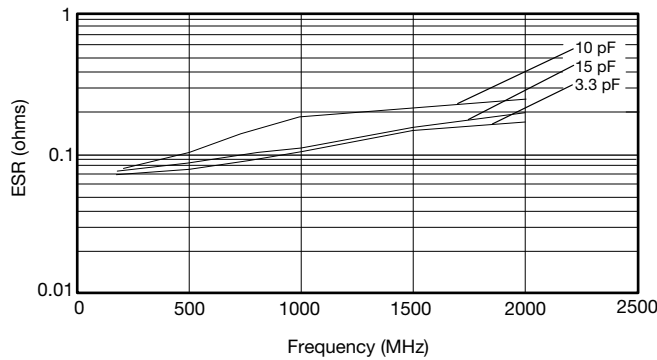
## Ultra Low ESR, "U" Series, C0G (NP0) Chip Capacitors

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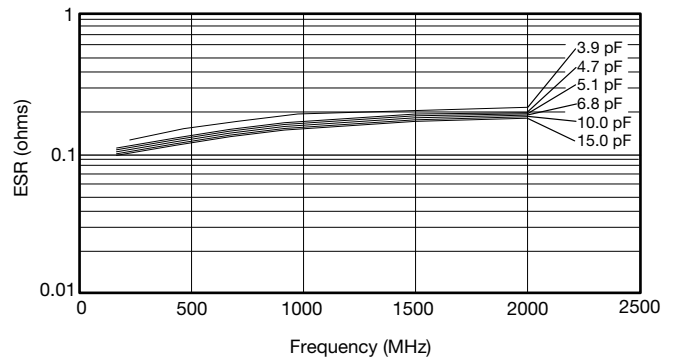
| Cap (pF) | Available Tolerance | Size |      |      |      | Cap (pF) | Available Tolerance | Size |      |      |      | Cap (pF) | Available Tolerance | Size |      |      |      | Cap (pF) | Available Tolerance | Size |      |      |      |     |  |     |     |      |      |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |      |  |  |  |  |
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|          |                     | LD02 | LD03 | LD05 | LD10 |          |                     | LD02 | LD03 | LD05 | LD10 |          |                     | LD02 | LD03 | LD05 | LD10 |          |                     | LD02 | LD03 | LD05 | LD10 |     |  |     |     |      |      |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |     |  |  |  |  |      |  |  |  |  |
| 0.2      | B,C                 | 50V  | N/A  | N/A  | N/A  | 1.0      | B,C,D               | 50V  | 200V | 200V | 200V | 7.5      | B,C,J,K,M           | 50V  | 200V | 200V | 200V | 100      | F,G,J,K,M           | N/A  | 100V | 200V | 200V | 110 |  | N/A | 50V | 200V | 200V | 120 |  |  |  |  | 130 |  |  |  |  | 140 |  |  |  |  | 150 |  |  |  |  | 160 |  |  |  |  | 170 |  |  |  |  | 180 |  |  |  |  | 190 |  |  |  |  | 200 |  |  |  |  | 210 |  |  |  |  | 220 |  |  |  |  | 230 |  |  |  |  | 240 |  |  |  |  | 250 |  |  |  |  | 260 |  |  |  |  | 270 |  |  |  |  | 280 |  |  |  |  | 290 |  |  |  |  | 300 |  |  |  |  | 310 |  |  |  |  | 320 |  |  |  |  | 330 |  |  |  |  | 340 |  |  |  |  | 350 |  |  |  |  | 360 |  |  |  |  | 370 |  |  |  |  | 380 |  |  |  |  | 390 |  |  |  |  | 400 |  |  |  |  | 410 |  |  |  |  | 420 |  |  |  |  | 430 |  |  |  |  | 440 |  |  |  |  | 450 |  |  |  |  | 460 |  |  |  |  | 470 |  |  |  |  | 480 |  |  |  |  | 490 |  |  |  |  | 500 |  |  |  |  | 510 |  |  |  |  | 520 |  |  |  |  | 530 |  |  |  |  | 540 |  |  |  |  | 550 |  |  |  |  | 560 |  |  |  |  | 570 |  |  |  |  | 580 |  |  |  |  | 590 |  |  |  |  | 600 |  |  |  |  | 610 |  |  |  |  | 620 |  |  |  |  | 630 |  |  |  |  | 640 |  |  |  |  | 650 |  |  |  |  | 660 |  |  |  |  | 670 |  |  |  |  | 680 |  |  |  |  | 690 |  |  |  |  | 700 |  |  |  |  | 710 |  |  |  |  | 720 |  |  |  |  | 730 |  |  |  |  | 740 |  |  |  |  | 750 |  |  |  |  | 760 |  |  |  |  | 770 |  |  |  |  | 780 |  |  |  |  | 790 |  |  |  |  | 800 |  |  |  |  | 810 |  |  |  |  | 820 |  |  |  |  | 830 |  |  |  |  | 840 |  |  |  |  | 850 |  |  |  |  | 860 |  |  |  |  | 870 |  |  |  |  | 880 |  |  |  |  | 890 |  |  |  |  | 900 |  |  |  |  | 910 |  |  |  |  | 920 |  |  |  |  | 930 |  |  |  |  | 940 |  |  |  |  | 950 |  |  |  |  | 960 |  |  |  |  | 970 |  |  |  |  | 980 |  |  |  |  | 990 |  |  |  |  | 1000 |  |  |  |  |

### ULTRA LOW ESR, "U" SERIES

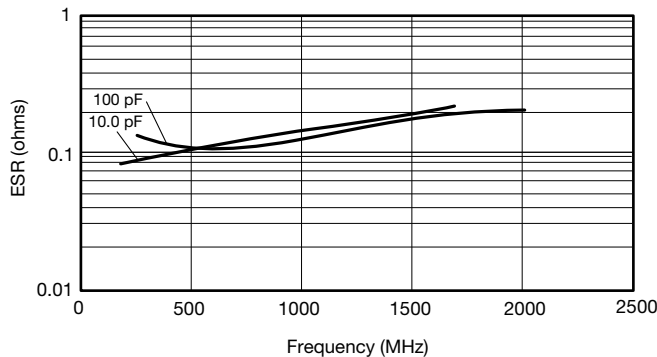
TYPICAL ESR vs. FREQUENCY  
0402 "U" SERIES



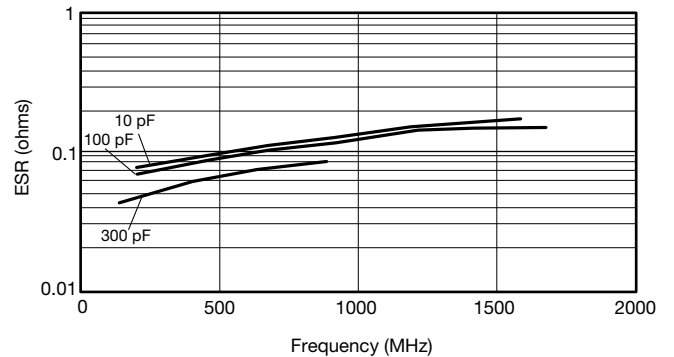
TYPICAL ESR vs. FREQUENCY  
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
1210 "U" SERIES



ESR Measured on the Boonton 34A

7

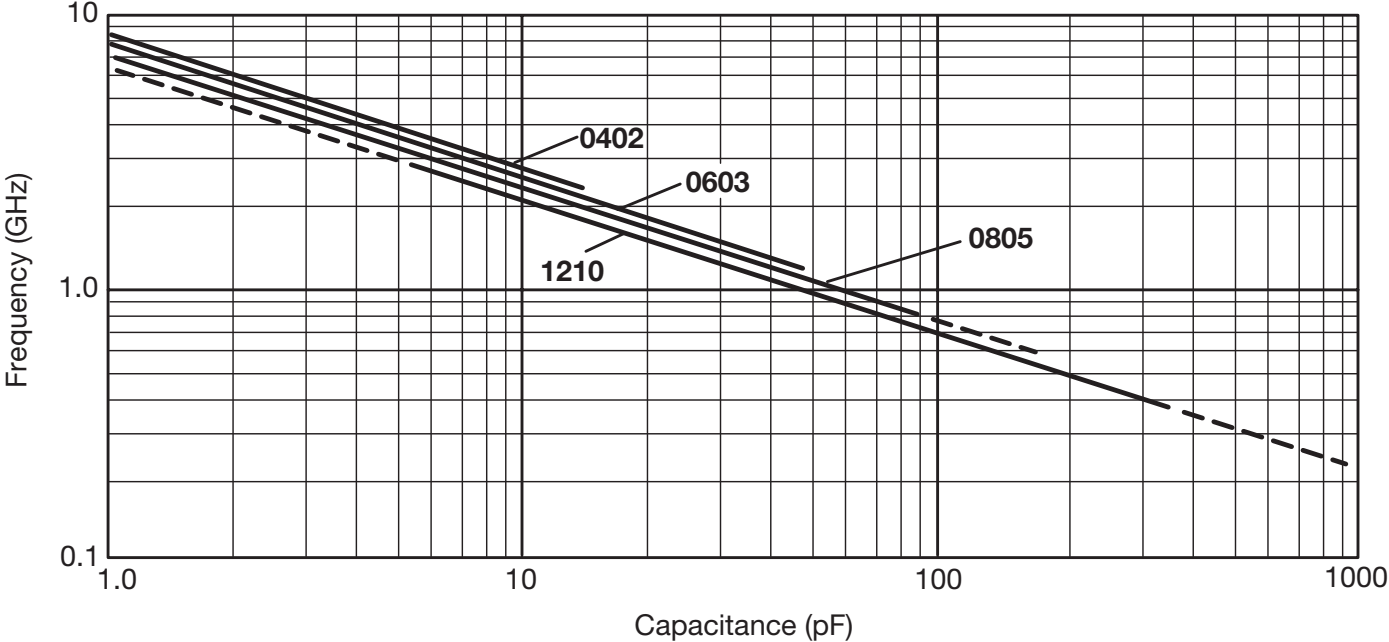


# RF/Microwave C0G (NP0) Capacitors (Sn/Pb)



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

TYPICAL  
SERIES RESONANT FREQUENCY  
"U" SERIES CHIP



**AVX RF**  
**RF/Microwave**  
“U” Series  
Designer Kits

## “U” Dielectric Kits

### 0402

| Kit 5000 UZ   |                          |               |                          |
|---------------|--------------------------|---------------|--------------------------|
| Cap. Value pF | Tolerance                | Cap. Value pF | Tolerance                |
| 0.5           | B ( $\pm 0.1\text{pF}$ ) | 4.7           | B ( $\pm 0.1\text{pF}$ ) |
| 1.0           |                          | 5.6           |                          |
| 1.5           |                          | 6.8           |                          |
| 1.8           |                          | 8.2           |                          |
| 2.2           |                          | 10.0          |                          |
| 2.4           |                          | 12.0          |                          |
| 3.0           | J ( $\pm 5\%$ )          | 15.0          | J ( $\pm 5\%$ )          |
| 3.6           |                          |               |                          |

\*\*\*25 each of 15 values

### 0603

| Kit 4000 UZ   |                          |                 |                          |                 |
|---------------|--------------------------|-----------------|--------------------------|-----------------|
| Cap. Value pF | Tolerance                | Cap. Value pF   | Tolerance                |                 |
| 1.0           | B ( $\pm 0.1\text{pF}$ ) | 6.8             | B ( $\pm 0.1\text{pF}$ ) |                 |
| 1.2           |                          | 7.5             |                          |                 |
| 1.5           |                          | 8.2             |                          |                 |
| 1.8           |                          | J ( $\pm 5\%$ ) | 10.0                     | J ( $\pm 5\%$ ) |
| 2.0           |                          |                 | 12.0                     |                 |
| 2.4           |                          |                 | 15.0                     |                 |
| 2.7           |                          |                 | 18.0                     |                 |
| 3.0           |                          |                 | 22.0                     |                 |
| 3.3           |                          |                 | 27.0                     |                 |
| 3.9           |                          |                 | 33.0                     |                 |
| 4.7           |                          |                 | 39.0                     |                 |
| 5.6           |                          |                 | 47.0                     |                 |

\*\*\*25 each of 24 values

### 0805

| Kit 3000 UZ   |                          |                 |                 |
|---------------|--------------------------|-----------------|-----------------|
| Cap. Value pF | Tolerance                | Cap. Value pF   | Tolerance       |
| 1.0           | B ( $\pm 0.1\text{pF}$ ) | 15.0            | J ( $\pm 5\%$ ) |
| 1.5           |                          | 18.0            |                 |
| 2.2           |                          | 22.0            |                 |
| 2.4           |                          | 24.0            |                 |
| 2.7           |                          | 27.0            |                 |
| 3.0           |                          | 33.0            |                 |
| 3.3           |                          | 36.0            |                 |
| 3.9           |                          | 39.0            |                 |
| 4.7           |                          | 47.0            |                 |
| 5.6           |                          | 56.0            |                 |
| 7.5           |                          | 68.0            |                 |
| 8.2           |                          | 82.0            |                 |
| 9.1           |                          | 100.0           |                 |
| 10.0          |                          | J ( $\pm 5\%$ ) |                 |
| 12.0          | 160.0                    |                 |                 |

\*\*\*25 each of 30 values

### 1210

| Kit 3500 UZ   |                          |                 |                 |       |
|---------------|--------------------------|-----------------|-----------------|-------|
| Cap. Value pF | Tolerance                | Cap. Value pF   | Tolerance       |       |
| 2.2           | B ( $\pm 0.1\text{pF}$ ) | 36.0            | J ( $\pm 5\%$ ) |       |
| 2.7           |                          | 39.0            |                 |       |
| 4.7           |                          | 47.0            |                 |       |
| 5.1           |                          | 51.0            |                 |       |
| 6.8           |                          | 56.0            |                 |       |
| 8.2           |                          | 68.0            |                 |       |
| 9.1           |                          | 82.0            |                 |       |
| 10.0          |                          | J ( $\pm 5\%$ ) |                 | 100.0 |
| 13.0          | 120.0                    |                 |                 |       |
| 15.0          | 130.0                    |                 |                 |       |
| 18.0          | 240.0                    |                 |                 |       |
| 20.0          | 300.0                    |                 |                 |       |
| 24.0          | 390.0                    |                 |                 |       |
| 27.0          | 470.0                    |                 |                 |       |
| 30.0          | 680.0                    |                 |                 |       |

\*\*\*25 each of 30 values