

RF/Microwave COG (NP0) Capacitors (RoHS)



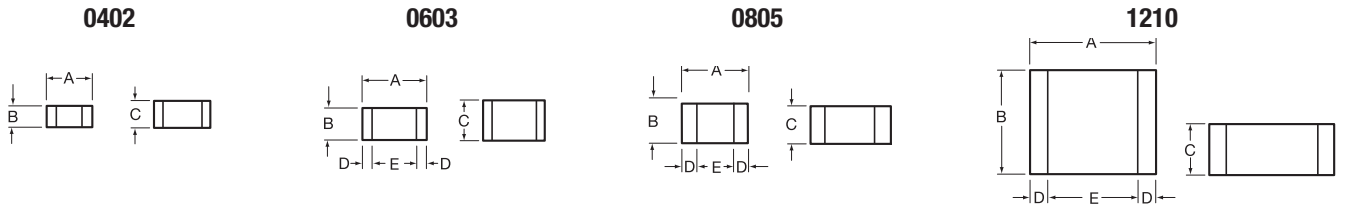
Ultra Low ESR, "U" Series, COG (NP0) Chip Capacitors

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

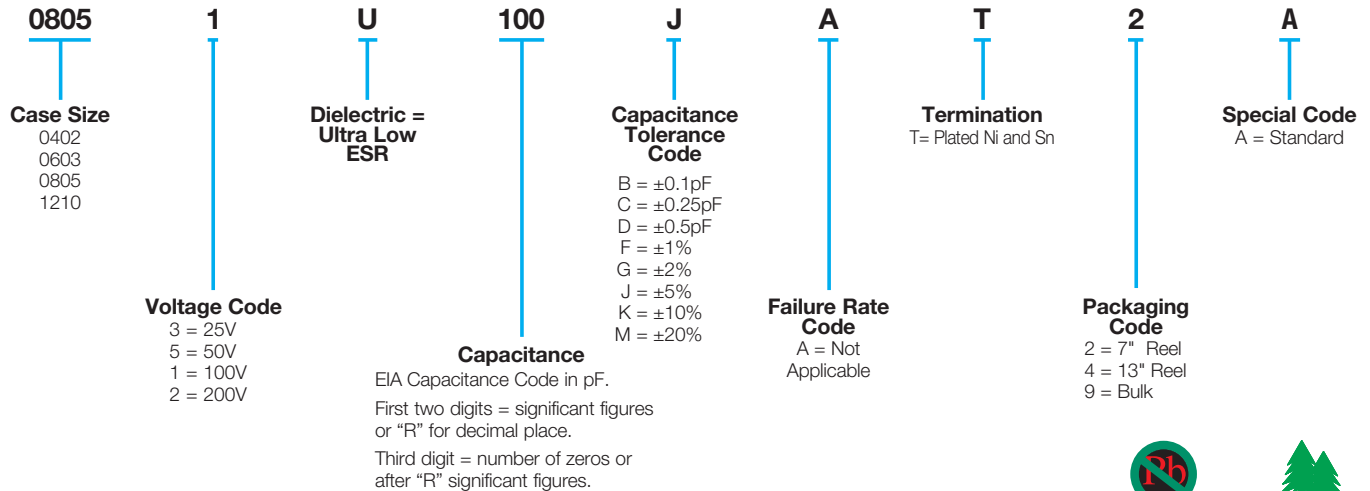
are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0603, 0805, and 1210.

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



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):

- 10¹² Ω min. @ 25°C and rated WVDC
- 10¹¹ 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).

MILITARY SPECIFICATIONS

Meets or exceeds the requirements of MIL-C-55681

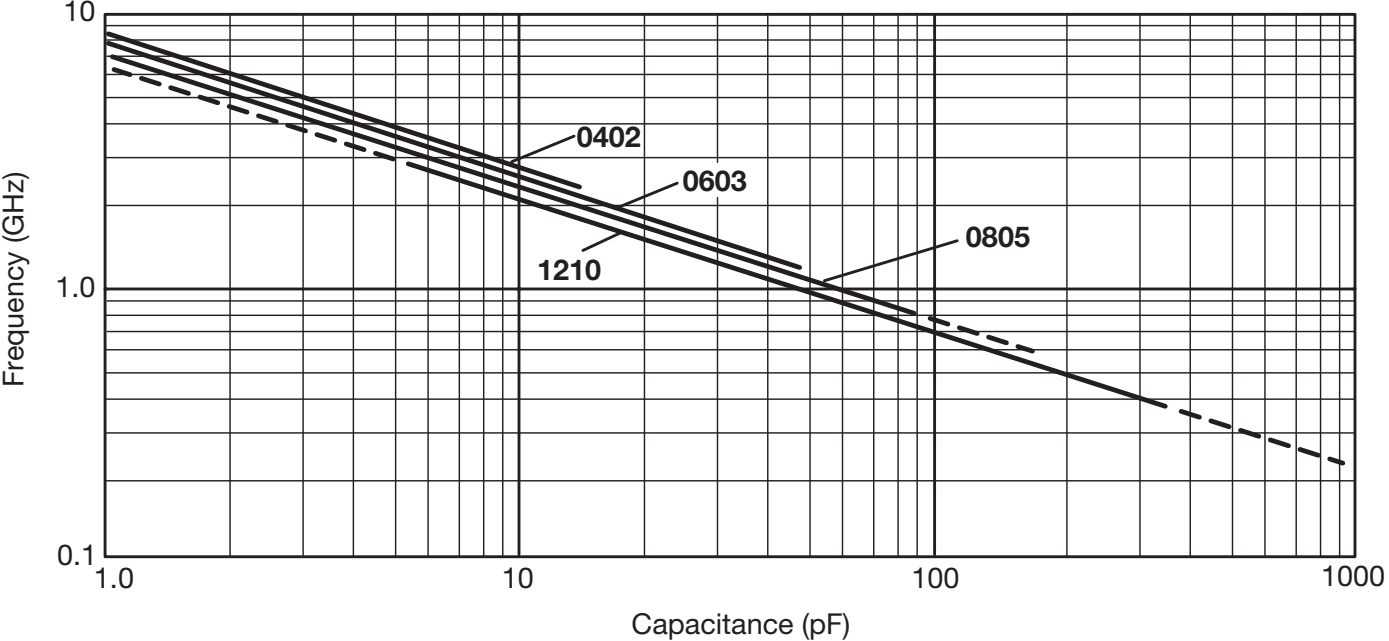


RF/Microwave C0G (NP0) Capacitors (RoHS)



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

TYPICAL
SERIES RESONANT FREQUENCY
"U" SERIES CHIP



RF/Microwave Automotive C0G (NP0) Capacitors (RoHS), AEC Q200 Qualified



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

GENERAL INFORMATION

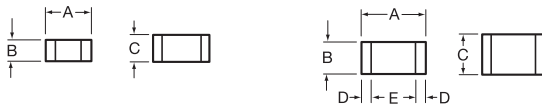
Automotive "U" Series capacitors are C0G (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the automotive market. Max ESR and effective capacitance

are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0402 and 0603.

DIMENSIONS: inches (millimeters)

0402

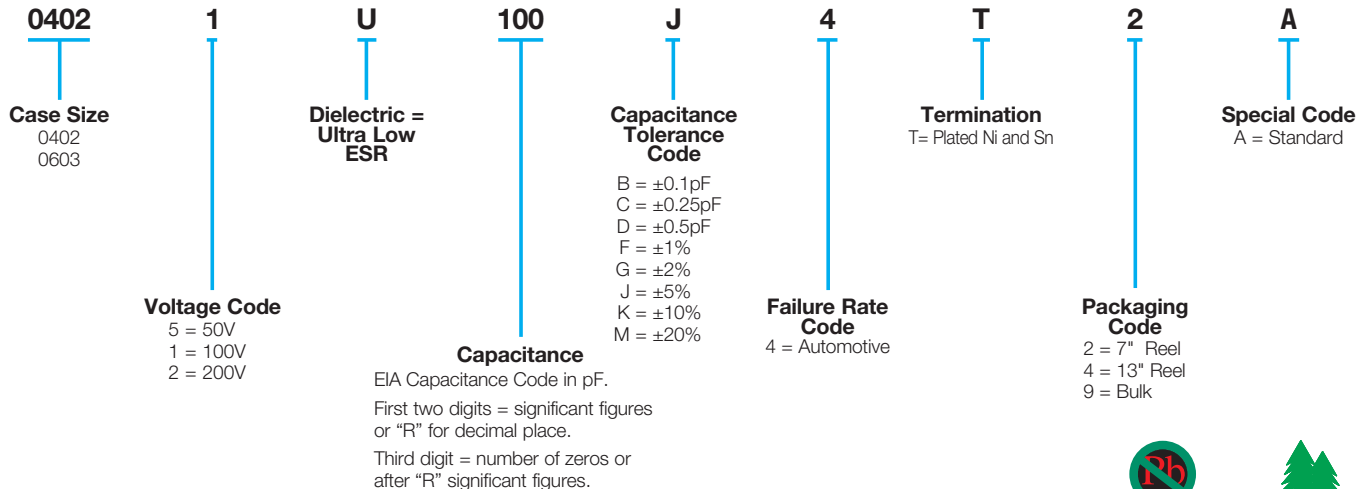
0603



| 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 |

inches (mm)

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

Temperature Coefficient of Capacitance (TC):

0±30 ppm/°C (-55° to +125°C)

Insulation Resistance (IR):

10¹² Ω min. @ 25°C and rated WVDC
10¹¹ Ω min. @ 125°C and rated WVDC

Working Voltage (WVDC):

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

Dielectric Working Voltage (DWV):

250% of rated WVDC

Equivalent Series Resistance Typical (ESR):

0402 - See Performance Curve, page 303
0603 - See Performance Curve, page 303

Automotive Specifications

Meets or exceeds the requirements of AEC Q200



RF/Microwave Automotive C0G (NP0) Capacitors (RoHS), AEC Q200 Qualified



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

CAPACITANCE RANGE

| Cap (pF) | Available Tolerance | Size | |
|----------|---------------------|------|------|
| | | 0402 | 0603 |
| 0.2 | B,C | 100V | N/A |
| 0.3 | ↓ B,C | ↓ | ↓ |
| 0.4 | | | |
| 0.5 | B,C | ↓ | ↓ |
| 0.6 | B,C,D | ↓ | ↓ |
| 0.7 | ↓ B,C,D | ↓ | ↓ |
| 0.8 | | | |
| 0.9 | | | |

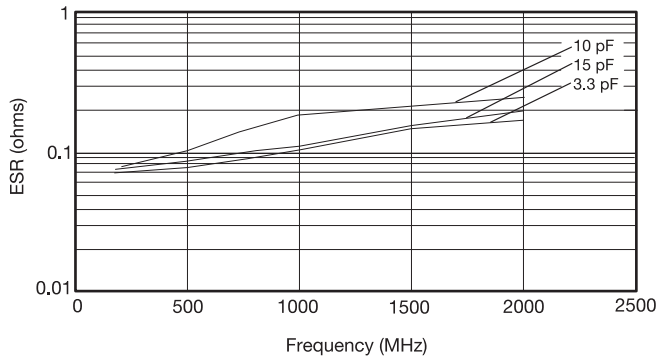
| Cap (pF) | Available Tolerance | Size | |
|----------|---------------------|------|------|
| | | 0402 | 0603 |
| 1.0 | B,C,D | 100V | 200V |
| 1.1 | ↓ | ↓ | ↓ |
| 1.2 | | | |
| 1.3 | ↓ | ↓ | ↓ |
| 1.4 | | | |
| 1.5 | ↓ | ↓ | ↓ |
| 1.6 | | | |
| 1.7 | ↓ | ↓ | ↓ |
| 1.8 | | | |
| 1.9 | ↓ | ↓ | ↓ |
| 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 |
| 7.5 | B,C,J,K,M | 100V | 200V |
| 8.2 | ↓ | ↓ | ↓ |
| 9.1 | | | |
| 10 | B,C,J,K,M | 100V | 200V |
| 11 | ↓ | ↓ | ↓ |
| 12 | | | |
| 13 | ↓ | ↓ | ↓ |
| 15 | | | |
| 18 | ↓ | ↓ | ↓ |
| 20 | | | |
| 22 | ↓ | ↓ | ↓ |
| 24 | | | |
| 27 | ↓ | ↓ | ↓ |
| 30 | | | |
| 33 | ↓ | ↓ | ↓ |
| 36 | | | |
| 39 | ↓ | ↓ | ↓ |
| 43 | | | |
| 47 | ↓ | ↓ | ↓ |
| 51 | | | |
| 56 | ↓ | ↓ | ↓ |
| 68 | | | |
| 75 | ↓ | ↓ | ↓ |
| 82 | | | |
| 91 | ↓ | ↓ | ↓ |

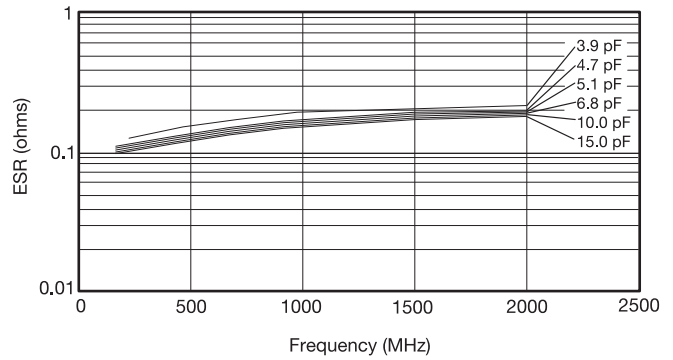
| Cap (pF) | Available Tolerance | Size | |
|----------|---------------------|------|------|
| | | 0402 | 0603 |
| 100 | F,G,J,K,M | N/A | 100V |
| 110 | ↓ | ↓ | ↓ |
| 120 | | | |
| 130 | ↓ | ↓ | ↓ |
| 140 | | | |
| 150 | ↓ | ↓ | ↓ |
| 160 | | | |
| 180 | ↓ | ↓ | ↓ |
| 200 | | | |
| 220 | ↓ | ↓ | ↓ |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

ULTRA LOW ESR, “U” SERIES

TYPICAL ESR vs. FREQUENCY
0402 “U” SERIES



TYPICAL ESR vs. FREQUENCY
0603 “U” SERIES

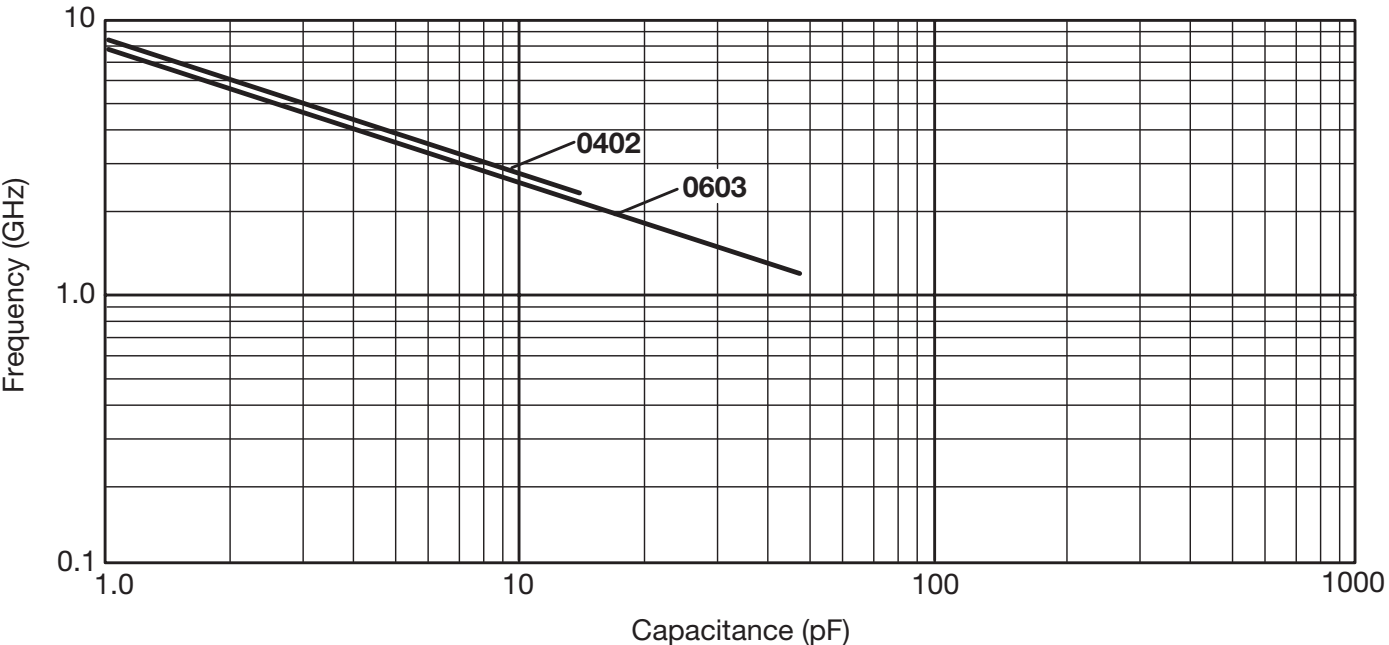


RF/Microwave Automotive C0G (NP0) Capacitors (RoHS), AEC Q200 Qualified



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

TYPICAL
SERIES RESONANT FREQUENCY
"U" SERIES CHIP



RF/Microwave COG (NP0) Capacitors (Sn/Pb)



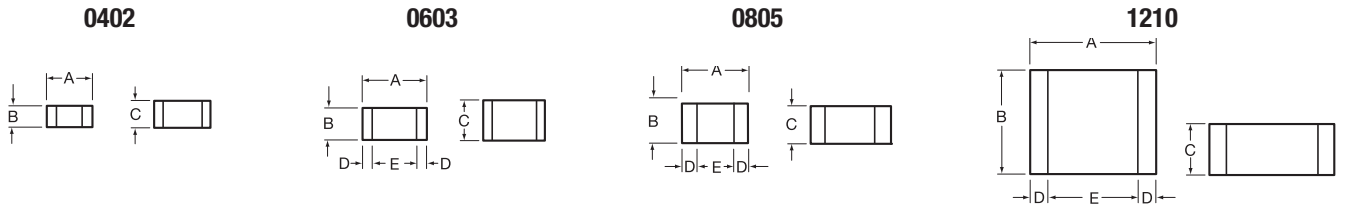
Ultra Low ESR, "U" Series, COG (NP0) Chip Capacitors

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

LD05 | **1** | **U** | **100** | **J** | **A** | **B** | **2** | **A**

Case Size
LD02 = 0402
LD03 = 0603
LD05 = 0805
LD10 = 1210

Voltage Code
3 = 25V
5 = 50V
1 = 100V
2 = 200V

Dielectric = Ultra Low ESR

Capacitance
EIA Capacitance Code in pF.
First two digits = significant figures or "R" for decimal place.
Third digit = number of zeros or after "R" significant figures.

Capacitance Tolerance Code
B = ±0.1pF
C = ±0.25pF
D = ±0.5pF
F = ±1%
G = ±2%
J = ±5%
K = ±10%
M = ±20%

Failure Rate Code
A = Not Applicable

Termination
B = 5% min lead

Packaging Code
2 = 7" Reel
4 = 13" Reel
9 = Bulk

Special Code
A = Standard

Not RoHS Compliant

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):

- 10¹² Ω min. @ 25°C and rated WVDC
- 10¹¹ 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 306
- 0603 - See Performance Curve, page 306
- 0805 - See Performance Curve, page 306
- 1210 - See Performance Curve, page 306

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 C0G (NP0) Capacitors (Sn/Pb)



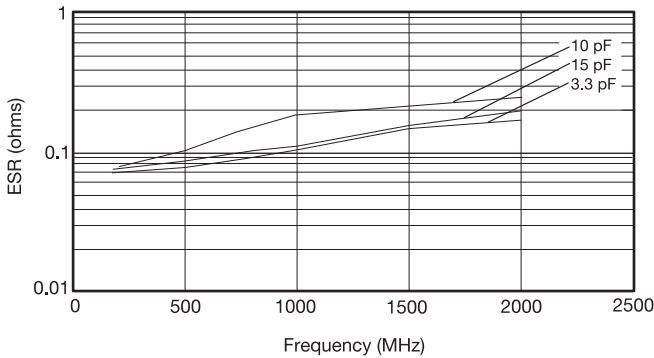
Ultra Low ESR, "U" Series, C0G (NP0) Chip Capacitors

CAPACITANCE RANGE

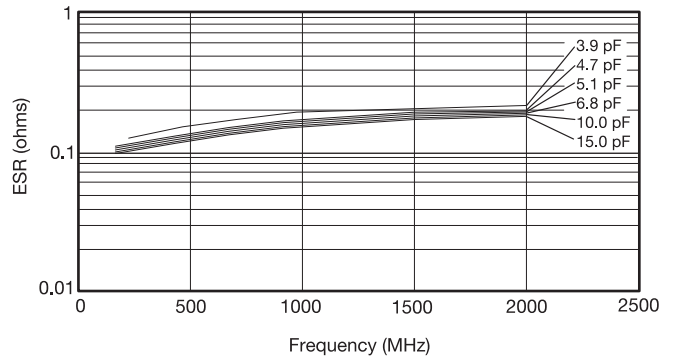
| Cap (pF) | Available Tolerance | Size | | | | Cap (pF) | Available Tolerance | Size | | | | Cap (pF) | Available Tolerance | Size | | | |
|----------|---------------------|------|------|------|------|----------|---------------------|------|------|------|------|----------|---------------------|------|------|------|------|
| | | 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 | 100 | F,G,J,K,M | N/A | 100V | 200V | 200V |
| 0.3 | | | | | | 1.1 | | | | | | 110 | | | | | |
| 0.4 | | | | | | 1.2 | | | | | | 120 | | | | | |
| 0.5 | B,C | | | | | 1.3 | | | | | | 130 | | | | | |
| 0.6 | B,C,D | | | | | 1.4 | | | | | | 140 | | | | | |
| 0.7 | | | | | | 1.5 | | | | | | 150 | | | | | |
| 0.8 | | | | | | 1.6 | | | | | | 160 | | | | | |
| 0.9 | B,C,D | | | | | 1.7 | | | | | | 180 | | | | | |
| | | | | | | 1.8 | | | | | | 200 | | | | | |
| | | | | | | 1.9 | | | | | | 220 | | | | | |
| | | | | | | 2.0 | | | | | | 270 | | | | | |
| | | | | | | 2.1 | | | | | | 300 | | | | | |
| | | | | | | 2.2 | | | | | | 330 | | | | | |
| | | | | | | 2.4 | | | | | | 360 | | | | | |
| | | | | | | 2.7 | | | | | | 390 | | | | | |
| | | | | | | 3.0 | | | | | | 430 | | | | | |
| | | | | | | 3.3 | | | | | | 470 | | | | | |
| | | | | | | 3.6 | | | | | | 510 | | | | | |
| | | | | | | 3.9 | | | | | | 560 | | | | | |
| | | | | | | 4.3 | | | | | | 620 | | | | | |
| | | | | | | 4.7 | | | | | | 680 | | | | | |
| | | | | | | 5.1 | | | | | | 750 | | | | | |
| | | | | | | 5.6 | | | | | | 820 | | | | | |
| | | | | | | 6.2 | B,C,D | | | | | 910 | | | | | |
| | | | | | | 6.8 | B,C,J,K,M | | | | | 1000 | F,G,J,K,M | | | | |
| | | | | | | | | | | | | | | | | | |

ULTRA LOW ESR, "U" SERIES

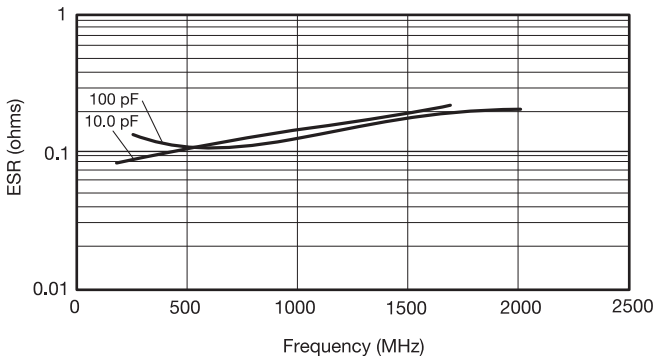
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



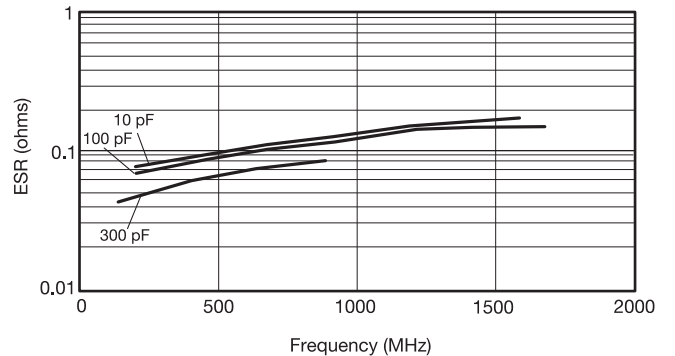
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



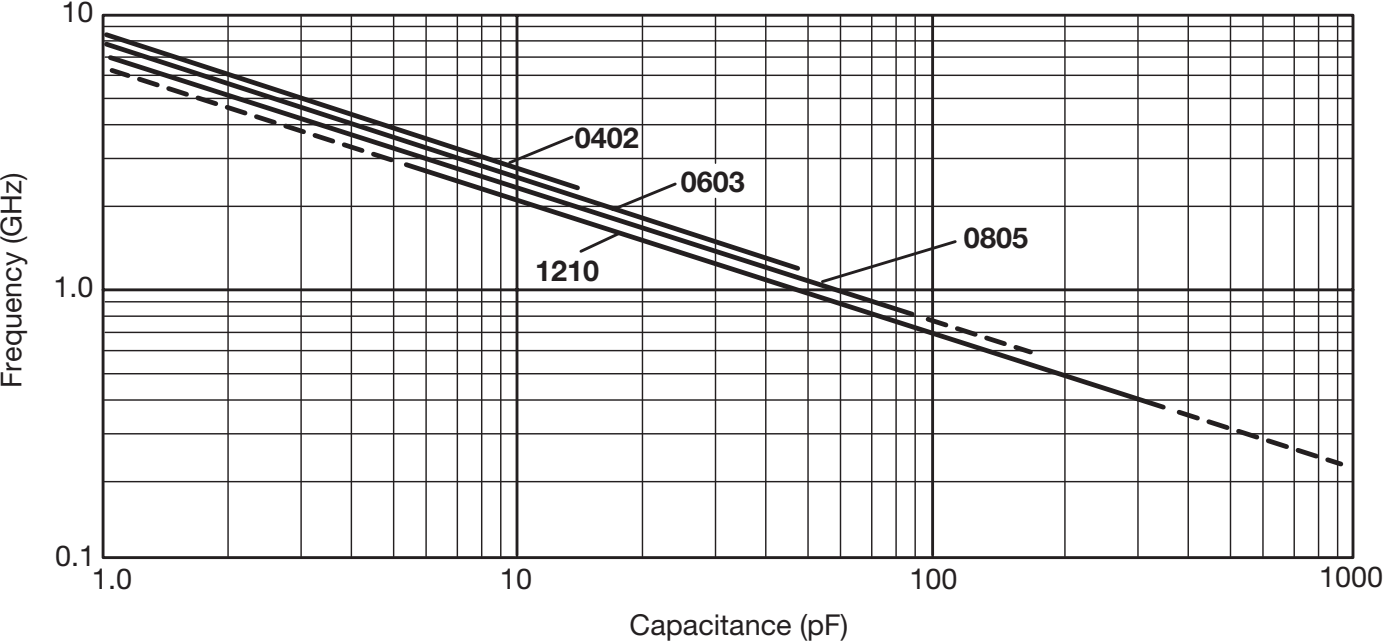
ESR Measured on the Boonton 34A

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



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

TYPICAL
SERIES RESONANT FREQUENCY
"U" SERIES CHIP



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 | | 15.0 | |
| 3.6 | | | J ($\pm 5\%$) |

***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 | | 10.0 | |
| 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 | | 130.0 | |
| 12.0 | | J ($\pm 5\%$) | |

***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 | | 100.0 | |
| 13.0 | | 120.0 | |
| 15.0 | 130.0 | | |
| 18.0 | 240.0 | | |
| 20.0 | J ($\pm 5\%$) | 300.0 | |
| 24.0 | | 390.0 | |
| 27.0 | | 470.0 | |
| 30.0 | | 680.0 | |

***25 each of 30 values