

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



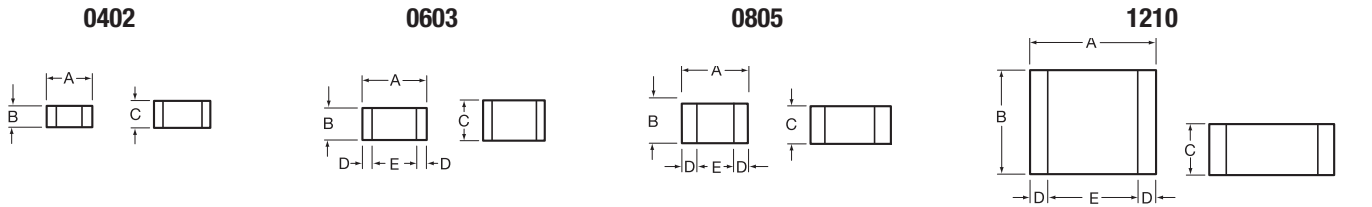
## Ultra Low ESR, "U" Series, COG (NP0) Chip Capacitors

### 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

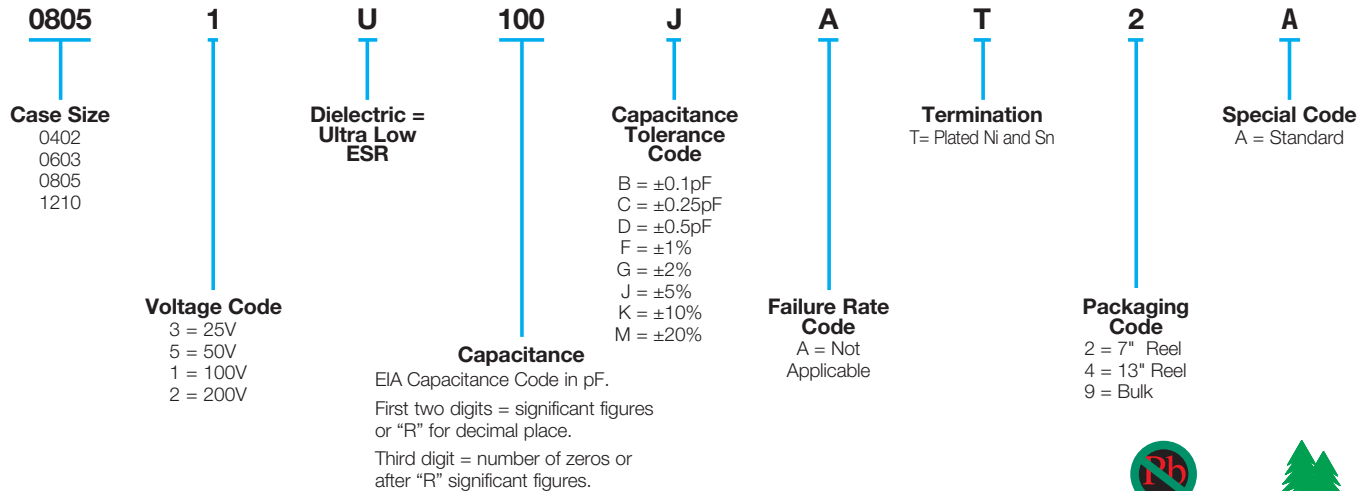
are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0603, 0805, and 1210.

### 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):

- 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).

#### MILITARY SPECIFICATIONS

Meets or exceeds the requirements of MIL-C-55681



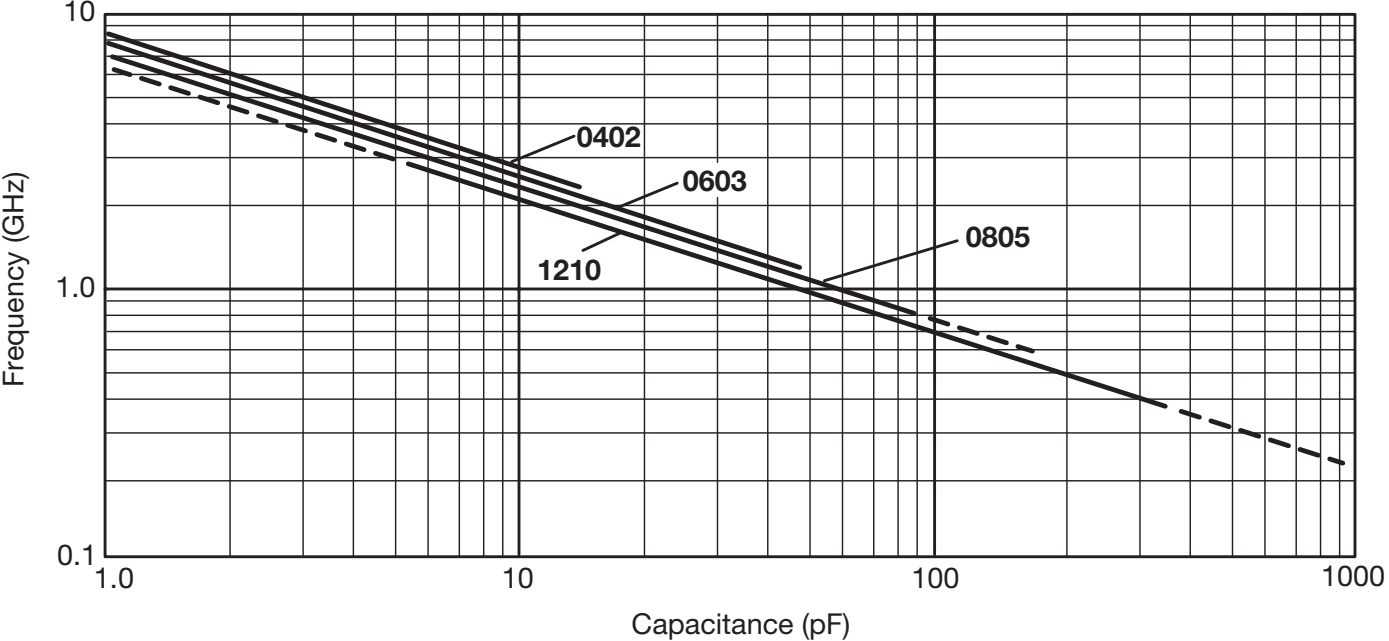


# RF/Microwave C0G (NP0) Capacitors (RoHS)



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

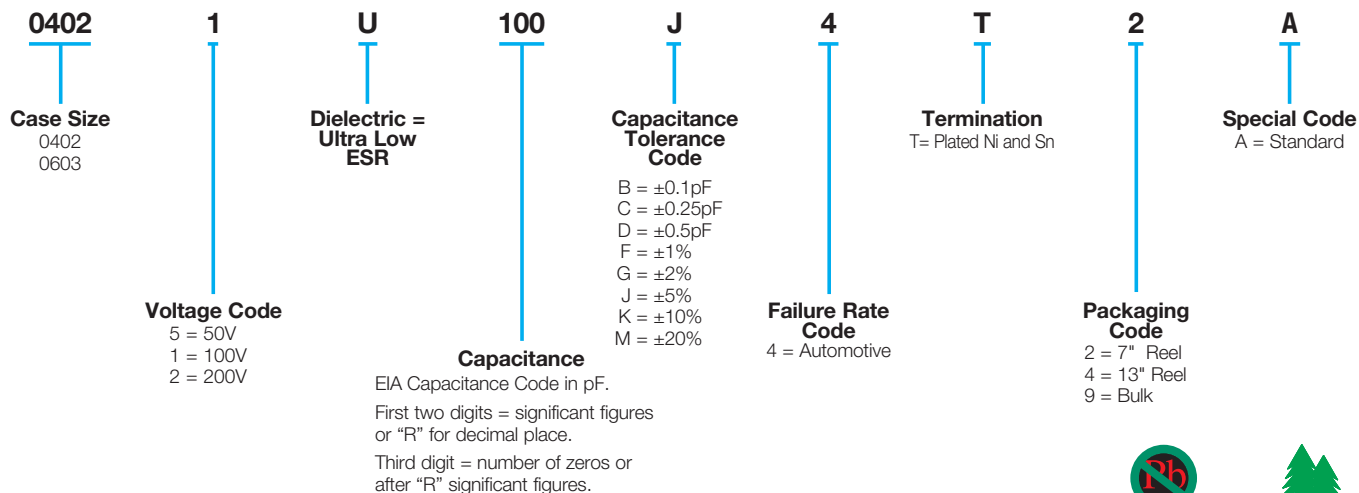
0603



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):

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 - 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	B,C,D	↓	↓

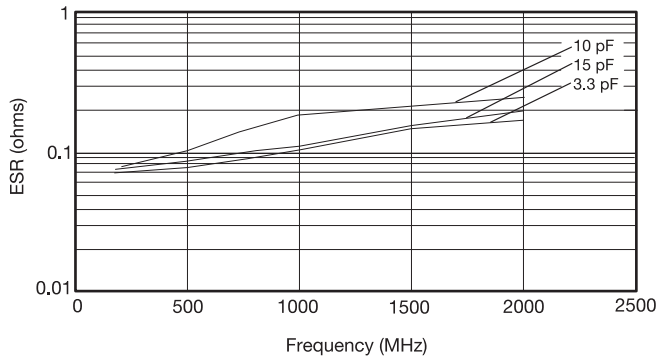
Cap (pF)	Available Tolerance	Size	
		0402	0603
1.0	B,C,D	100V	200V
1.1	↓	↓	↓
1.2			
1.3	↓	↓	↓
1.4			
1.5	↓	↓	↓
1.6			
1.7	↓	↓	↓
1.8			
1.9	↓	↓	↓
2.0			
2.1	↓	↓	↓
2.2			
2.4	↓	↓	↓
2.7			
3.0	↓	↓	↓
3.3			
3.6	↓	↓	↓
3.9			
4.3	↓	↓	↓
4.7			
5.1	↓	↓	↓
5.6			
6.2	B,C,D	↓	↓
6.8	B,C,J,K,M	↓	↓

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	↓	↓	↓

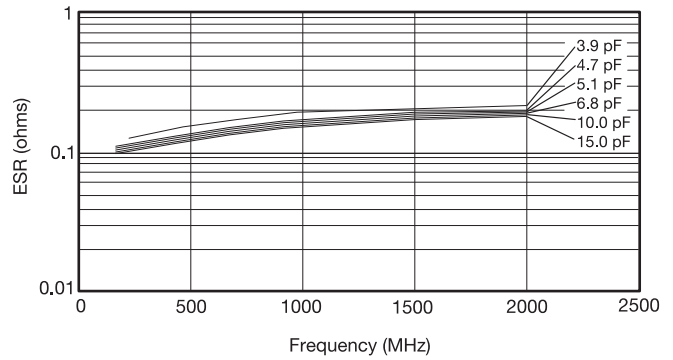
Cap (pF)	Available Tolerance	Size	
		0402	0603
100	F,G,J,K,M	N/A	100V
110	↓	↓	↓
120			
130	↓	↓	↓
140			
150	↓	↓	↓
160			
180	↓	↓	↓
200			
220	↓	↓	↓
270			
300	↓	↓	↓
330			
360	↓	↓	↓
390			
430	↓	↓	↓
470			
510	↓	↓	↓
560			
620	↓	↓	↓
680			
750	↓	↓	↓
820			
910	↓	↓	↓
1000			

### ULTRA LOW ESR, “U” SERIES

TYPICAL ESR vs. FREQUENCY  
0402 “U” SERIES



TYPICAL ESR vs. FREQUENCY  
0603 “U” SERIES

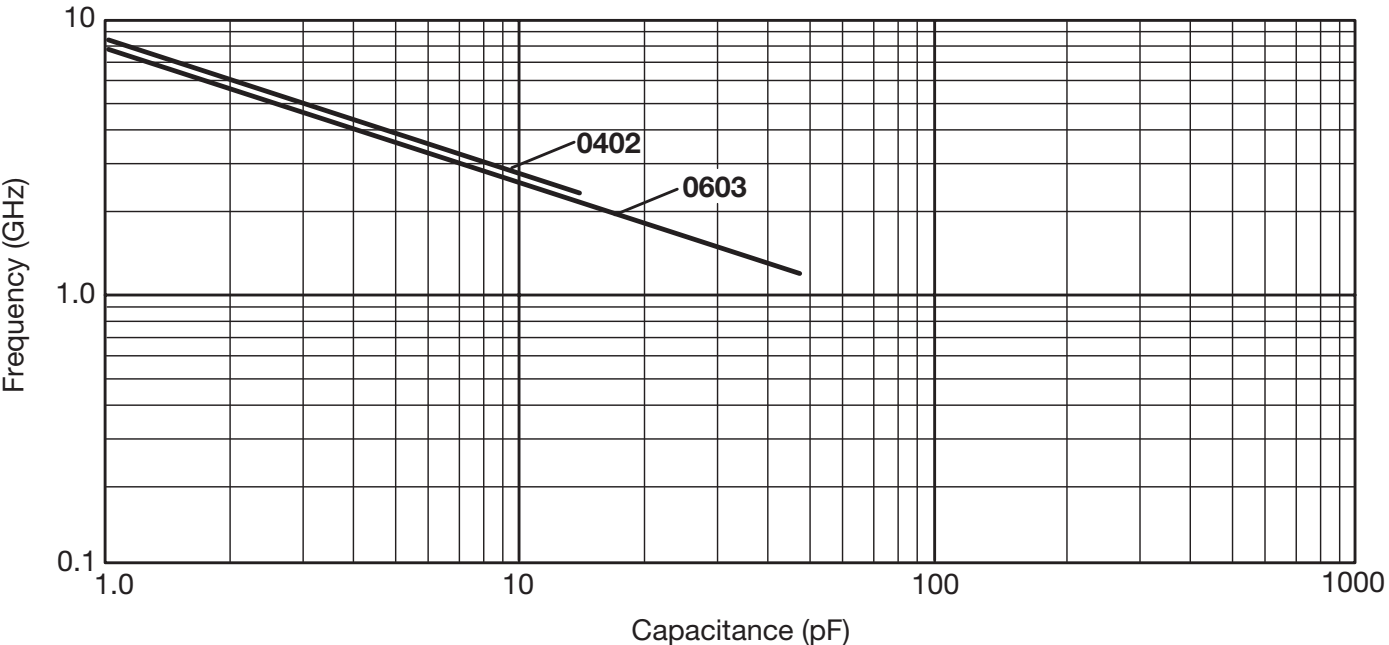


# RF/Microwave Automotive C0G (NP0) Capacitors (RoHS), AEC Q200 Qualified



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

TYPICAL  
SERIES RESONANT FREQUENCY  
"U" SERIES CHIP



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



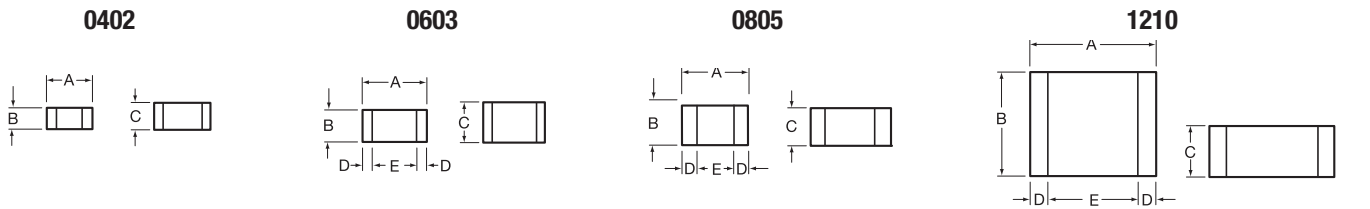
## Ultra Low ESR, "U" Series, COG (NP0) Chip Capacitors

### 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):

- 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 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)



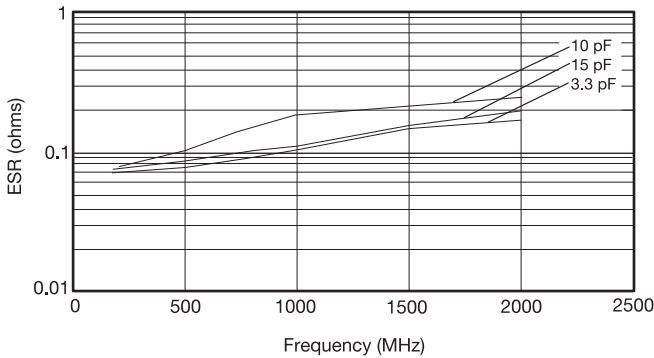
## Ultra Low ESR, "U" Series, C0G (NP0) Chip Capacitors

### CAPACITANCE RANGE

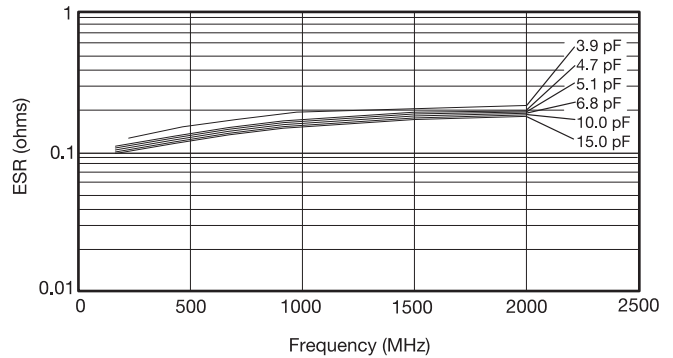
Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10			LD02	LD03	LD05	LD10			LD02	LD03	LD05	LD10
0.2	B,C	50V	N/A	N/A	N/A	1.0	B,C,D	50V	200V	200V	200V	100	F,G,J,K,M	N/A	100V	200V	200V
0.3						1.1						110					
0.4						1.2						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

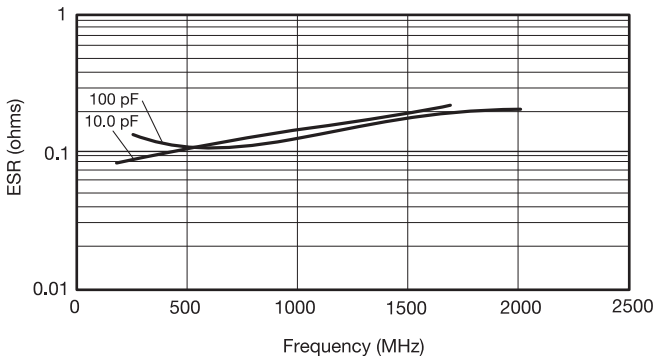
TYPICAL ESR vs. FREQUENCY  
0402 "U" SERIES



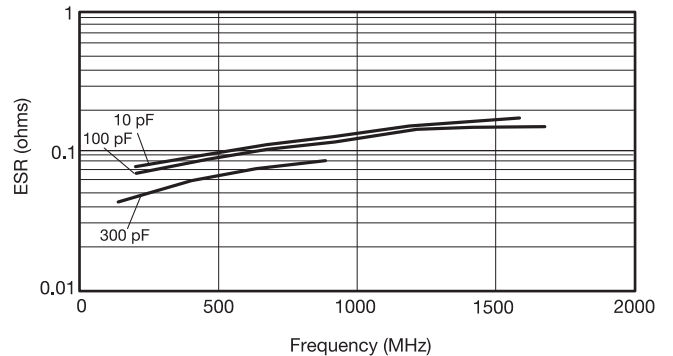
TYPICAL ESR vs. FREQUENCY  
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
1210 "U" SERIES



ESR Measured on the Boonton 34A

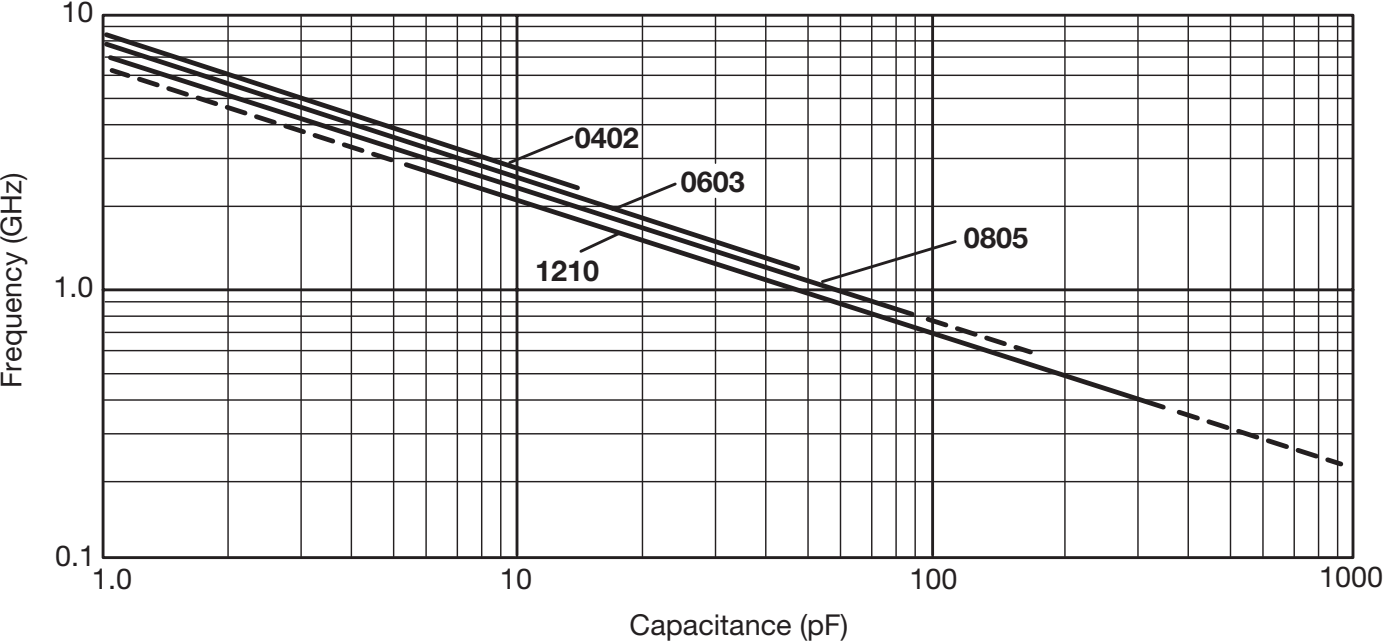


# RF/Microwave C0G (NP0) Capacitors (Sn/Pb)



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

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[06032U6R8BAT2A](#) [06032U8R2BAT2A](#) [06032U8R2CAT2A](#) [06035U200GAT2A](#) [06035U3R3BAT2A](#)  
[08051U100CAT2A](#) [08051U100JAT2A](#) [08051U1R0BAT2A](#) [08051U1R0BATME](#) [08051U1R2BAT2A](#)  
[08051U1R5CAT2A](#) [08051U270JAT2A](#) [08051U2R4BAT2A](#) [08051U3R0BAT2A](#) [08051U470GAT2A](#) [08051U910FAT2A](#)  
[08053A101JAT4A](#) [08052U150GAT2A](#) [04023U200JAT2A](#) [06031U470FAT2A](#) [06031U220FAT2A](#) [08052U270GAT2A](#)  
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[08051U101GAT2A](#) [08051U101KAT2A](#) [08052U510GAT2A](#) [08051U151KAT2A](#) [04025U1R8BAT2A](#) [08051U150JAT2A](#)  
[08052U820GAT2A](#) [04023U5R6BAT2A](#) [06032U3R3CAT2A](#) [08051U2R7BAT2A](#) [08052U180GAT2A](#)  
[06035U100FAT2A](#) [06035U2R0BAT2A](#) [06032U4R7CAT2A](#) [06035U100JAT2A](#) [08051U151GAT2A](#) [08055U130GAT2A](#)  
[06031U3R6DAT9A](#) [08051U620FAT2A](#) [08051U150FAT2A](#) [08051U120FAT2A](#) [08051U820FAT2A](#) [12102U560JAT2A](#)  
[08051U470FAT2A](#) [08051U510FAT2A](#) [08051U9R1BAT2A](#) [04023U2R0BAT2A](#) [06035U820JAT2A](#)  
[04025U3R9BAT2A](#) [08052U390GAT2A](#) [08051U151FAT2A](#) [06031U360GAT9A](#) [06031U300GAT9A](#) [06031U270GAT9A](#)  
[06031U220GAT9A](#) [06031U470GAT9A](#) [08052U750GAT2A](#) [04023U0R3BAT2A](#) [04023U0R4BAT2A](#)  
[04023U0R7BAT2A](#) [04023U100FAT2A](#) [04023U110FAT2A](#) [04023U1R1BAT2A](#) [04023U1R1CAT2A](#) [04023U1R3BAT2A](#)  
[04023U1R3CAT2A](#) [04023U1R4BAT2A](#) [04023U1R7BAT2A](#) [04023U1R8CAT2A](#) [04023U1R9BAT2A](#)  
[04023U2R1BAT2A](#) [04023U2R4BAT2A](#) [04023U3R6CAT2A](#) [04025U0R6BAT2A](#) [04025U0R8BAT2A](#)  
[04025U0R9BAT2A](#) [04025U100JAT2A](#) [04025U110FAT2A](#) [04025U110JAT2A](#) [04025U120JAT2A](#) [04025U150GAT2A](#)  
[04025U150JAT2A](#)