

# RF/Microwave Capacitors

## RF/Microwave C0G (NP0) Capacitors

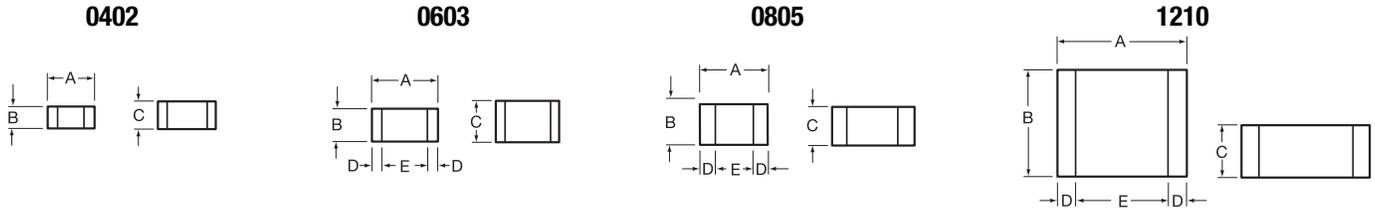
### Ultra Low ESR "U" Series, C0G (NP0) Capacitors (RoHS)



#### GENERAL INFORMATION

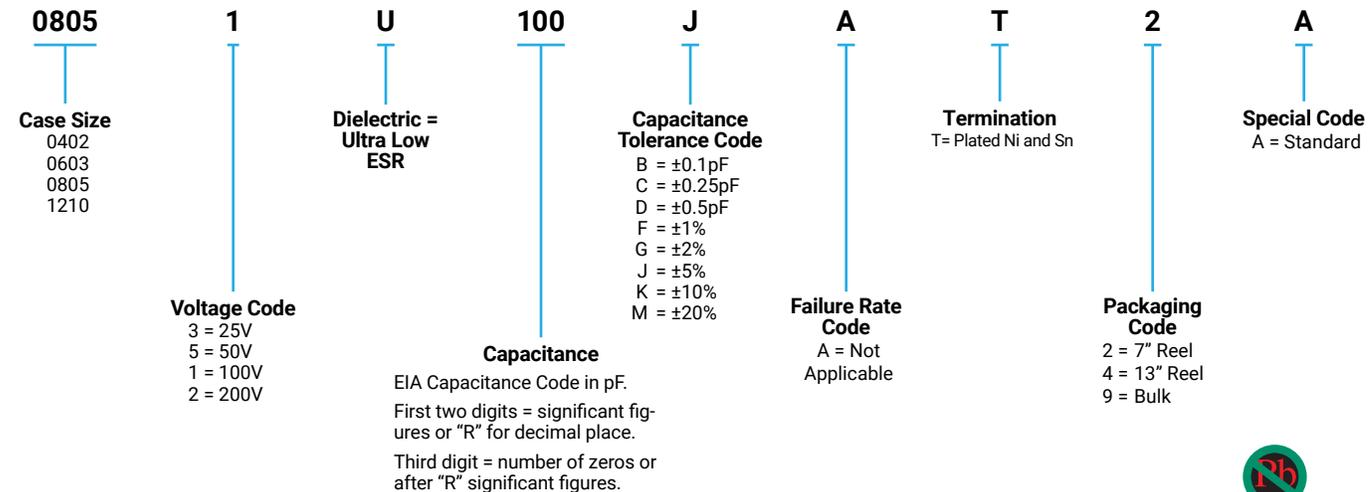
"U" Series capacitors are C0G (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the communications market. Max ESR and effective capacitance are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0603, 0805, and 1210.

#### 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).

##### MILITARY SPECIFICATIONS

Meets or exceeds the requirements of MIL-C-55681





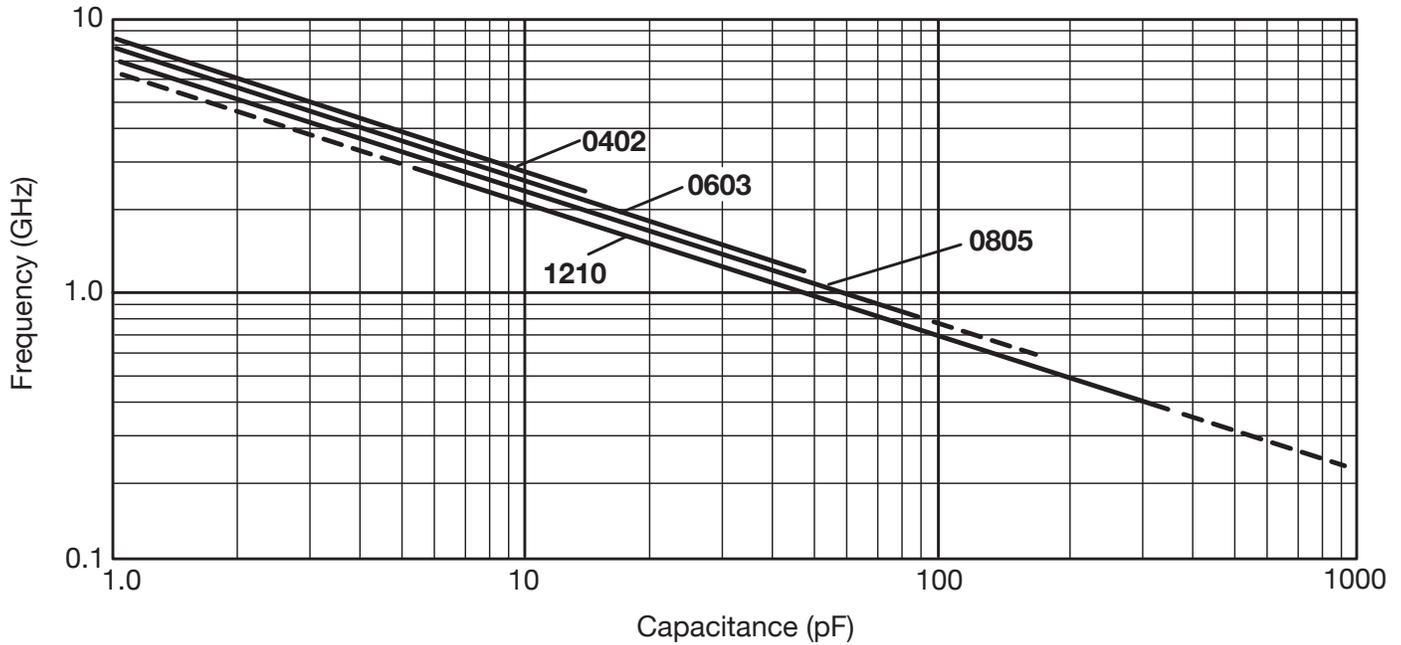
# RF/Microwave Capacitors

## RF/Microwave C0G (NP0) Capacitors

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



#### TYPICAL SERIES RESONANT FREQUENCY "U" SERIES CHIP



# RF/Microwave Capacitors

## RF/Microwave C0G (NP0) Capacitors

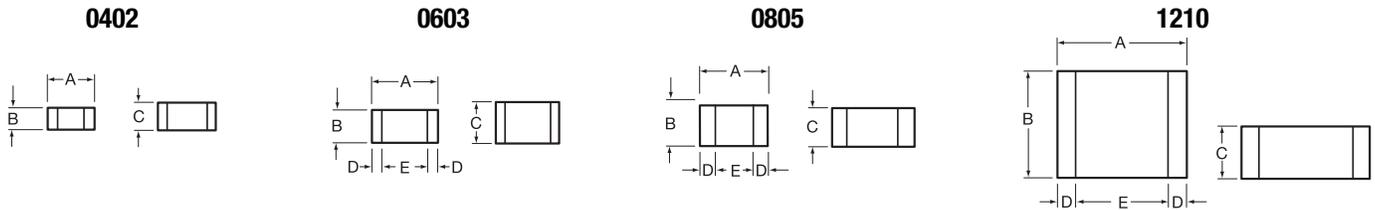
### Ultra Low ESR "U" Series, C0G (NP0) Capacitors (Sn/Pb)



#### GENERAL INFORMATION

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Size	A	B	C	D	E
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#### HOW TO ORDER

<p><b>LD05</b></p> <p>Case Size LD02 = 0402 LD03 = 0603 LD05 = 0805 LD10 = 1210</p>	<p><b>1</b></p> <p>Voltage Code 3 = 25V 5 = 50V 1 = 100V 2 = 200V</p>	<p><b>U</b></p> <p>Dielectric = Ultra Low ESR</p>	<p><b>100</b></p> <p>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.</p>	<p><b>J</b></p> <p>Capacitance Tolerance Code B = ±0.1pF C = ±0.25pF D = ±0.5pF F = ±1% G = ±2% J = ±5% K = ±10% M = ±20%</p>	<p><b>A</b></p> <p>Failure Rate Code A = Not Applicable</p>	<p><b>B</b></p> <p>Termination B = 5% min lead</p>	<p><b>2</b></p> <p>Packaging Code 2 = 7" Reel 4 = 13" Reel 9 = Bulk</p>	<p><b>A</b></p> <p>Special Code A = Standard</p>
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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):

040 - 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



The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at [www.avx.com/disclaimer/](http://www.avx.com/disclaimer/) by reference and should be reviewed in full before placing any order.

# RF/Microwave Capacitors

## RF/Microwave C0G (NP0) Capacitors

### Ultra Low ESR "U" Series, C0G (NP0) Capacitors (Sn/Pb)



#### CAPACITANCE RANGE

Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
0.2	B,C	50V	N/A	N/A	N/A
0.3	↓	50V	N/A	N/A	N/A
0.4					
0.5	B,C	50V	N/A	N/A	N/A
0.6	B,C,D				
0.7	↓				
0.8					
0.9	B,C,D				

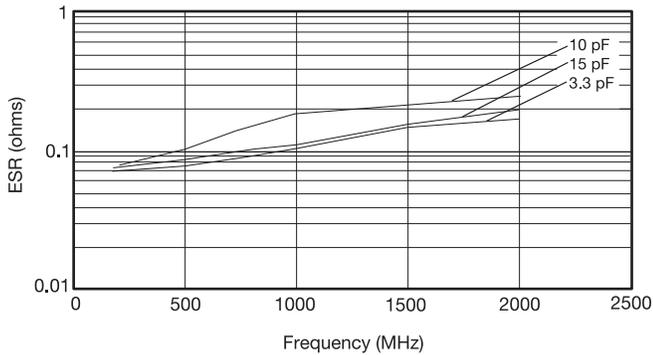
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
1.0	B,C,D	50V	200V	200V	200V
1.1	↓	50V	200V	200V	200V
1.2					
1.3					
1.4					
1.5					
1.6					
1.7					
1.8					
1.9					
2.0					
2.1					
2.2					
2.4					
2.7					
3.0					
3.3					
3.6					
3.9					
4.3					
4.7					
5.1					
5.6					
6.2					
6.8					
7.5					
8.2					
9.1					
10					
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			
		LD02	LD03	LD05	LD10
7.5	B,C,J,K,M	50V	200V	200V	200V
8.2	↓	50V	200V	200V	200V
9.1					
10					
11					
12					
13					
15					
18					
20					
22					
24					
27					
30					
33					
36					
39					
43					
47					
51					
56					
68					
75					
82					
91					

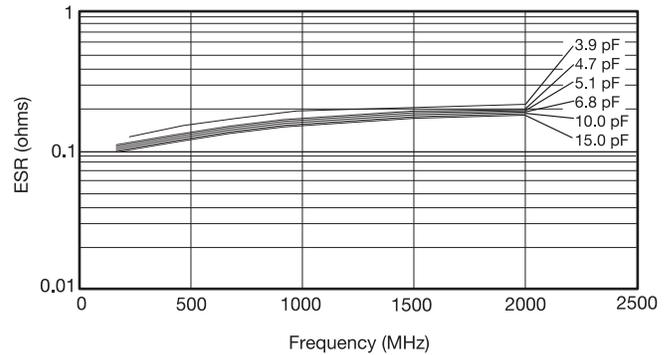
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
100	F,G,J,K,M	N/A	100V	200V	200V
110	↓	N/A	100V	200V	200V
120					
130					
140					
150					
160					
180					
200					
220					
270					
300					
330					
360					
390					
430					
470					
510					
560					
620					
680					
750					
820					
910					
1000					

#### ULTRA LOW ESR, "U" SERIES

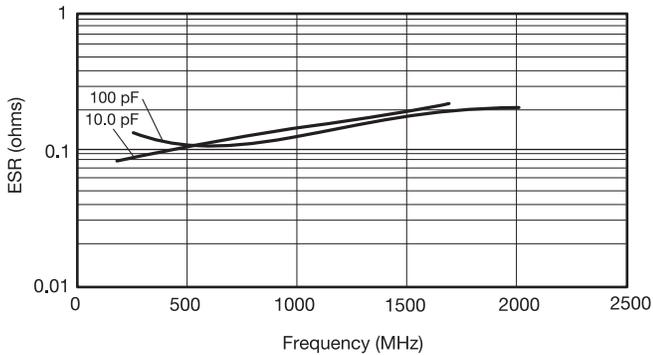
TYPICAL ESR vs. FREQUENCY  
0402 "U" SERIES



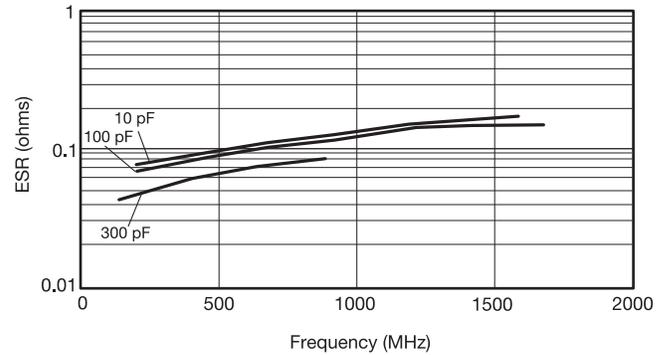
TYPICAL ESR vs. FREQUENCY  
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
1210 "U" SERIES



ESR Measured on the Boonton 34A

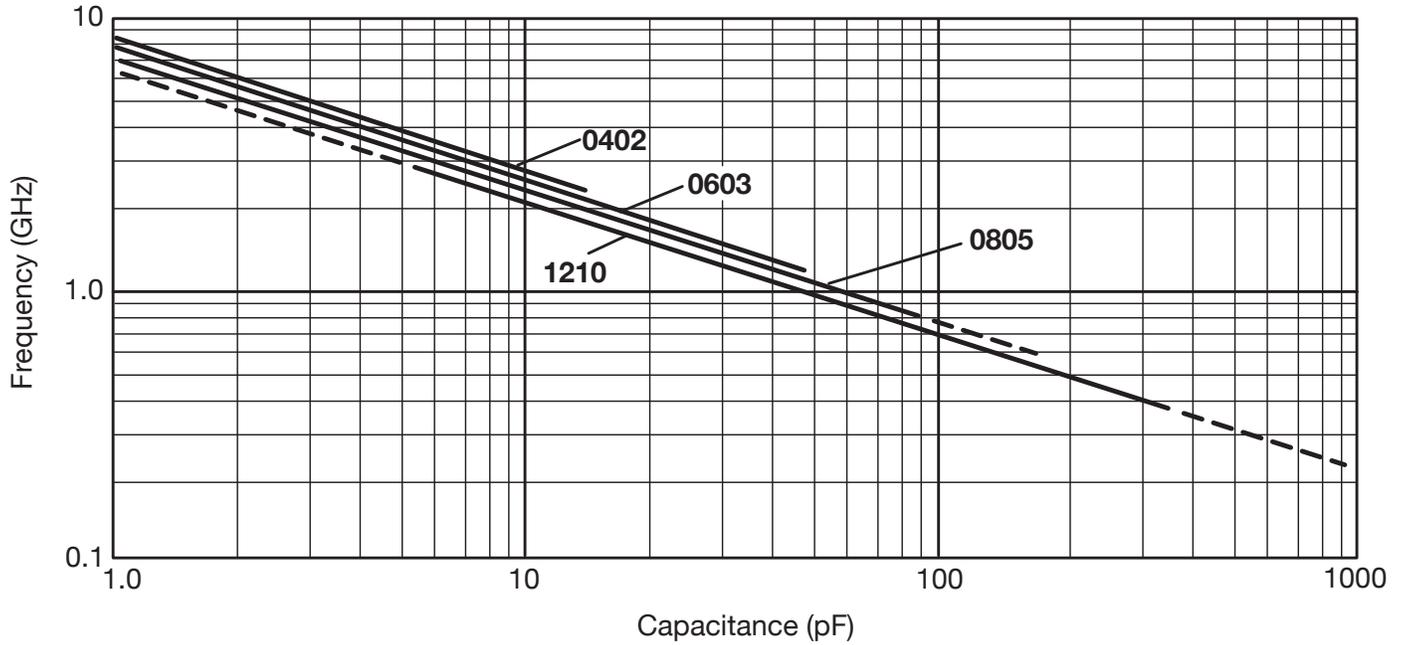
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## RF/Microwave C0G (NP0) Capacitors

### Ultra Low ESR "U" Series, C0G (NP0) Capacitors (Sn/Pb)



#### TYPICAL SERIES RESONANT FREQUENCY "U" SERIES CHIP



# RF/Microwave Capacitors

## RF/Microwave C0G (NP0) Capacitors

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

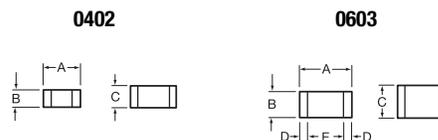
#### Automotive, AEC Q200 Qualified



#### GENERAL INFORMATION

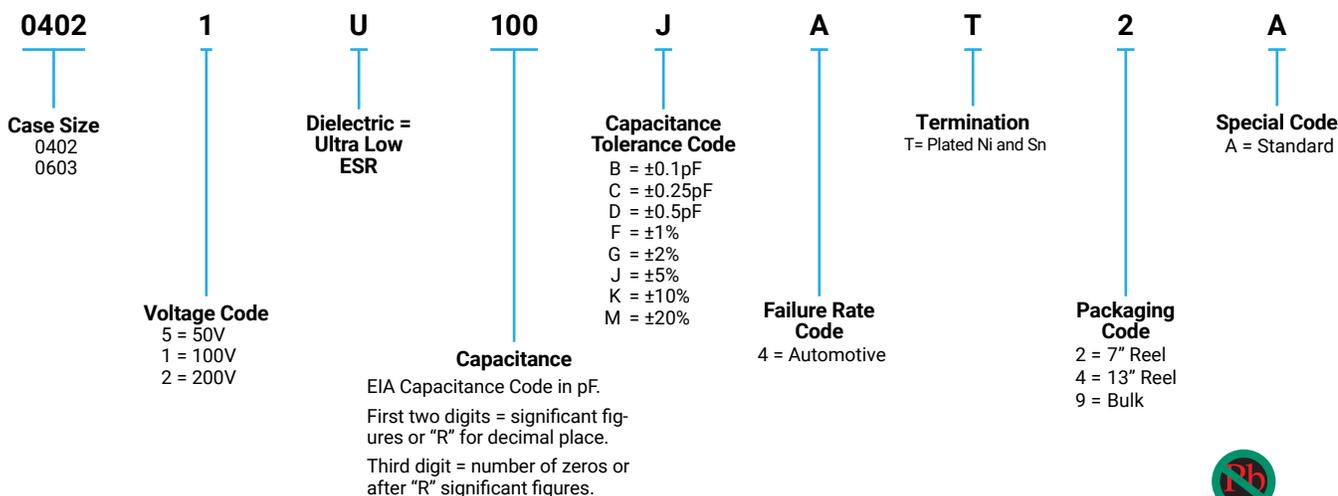
Automotive "U" Series capacitors are C0G (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the automotive market. Max ESR and effective capacitance are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0402 and 0603.

#### DIMENSIONS: inches (millimeters)



inches (mm)					
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 max (0.6)	N/A	N/A
0603	0.060±0.010 (1.52±0.25)	0.030±0.010 (0.76±0.25)	0.036 max (0.91)	0.010±0.005 (0.25±0.13)	0.030 min (0.76)

#### 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



LEAD-FREE  
LEAD-FREE COMPATIBLE  
COMPONENT



RoHS  
COMPLIANT

# RF/Microwave Capacitors

## RF/Microwave C0G (NP0) Capacitors

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

#### Automotive, AEC Q200 Qualified



#### CAPACITANCE RANGE

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

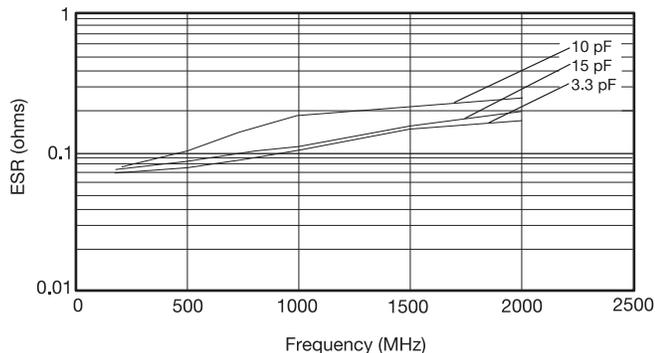
Cap (pF)	Available Tolerance	Size 0402	Size 0603
1.0	B,C,D	50V	200V
1.1			
1.2			
1.3			
1.4			
1.5			
1.6			
1.7			
1.8			
1.9			
2.0			
2.1			
2.2			
2.4			
2.7			
3.0			
3.3			
3.6			
3.9			
4.3			
4.7			
5.1			
5.6			
6.2	B,C,D		
6.8	B,C,J,K,M		

Cap (pF)	Available Tolerance	Size 0402	Size 0603
7.5	B,C,J,K,M	50V	200V
8.2			
9.1	B,C,J,K,M		
10	FG,J,K,M		
11			
12			
13			
15			
18			
20			200V
22			100V
24			
27			
30		50V	
33		N/A	
36			
39			
43			
47			
51			
56			
68			
75			
82			
91			

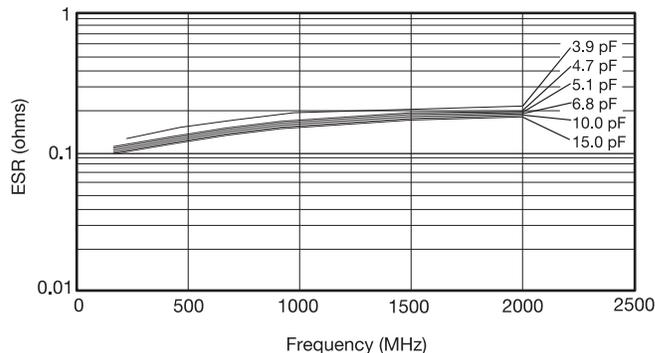
Cap (pF)	Available Tolerance	Size 0402	Size 0603
100	FG,J,K,M	N/A	100V
110			50V
120			50V
130			N/A
140			
150			
160			
180			
200			
220			
270			
300			
330			
360			
390			
430			
470			
510			
560			
620			
680			
750			
820			
910			
1000	FG,J,K,M		

#### ULTRA LOW ESR, "U" SERIES

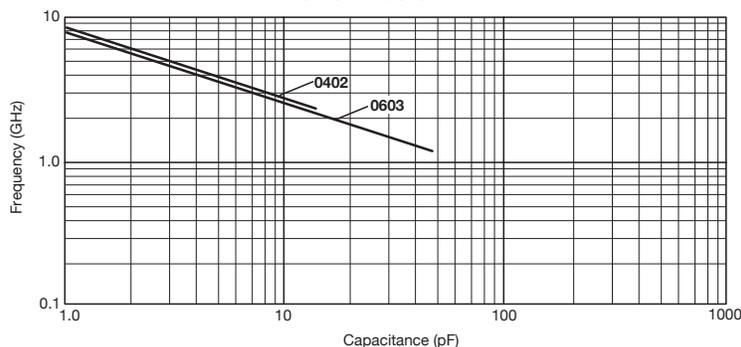
TYPICAL ESR vs. FREQUENCY  
0402 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
0603 "U" SERIES



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	J ( $\pm 5\%$ )
2.4		12.0	
3.0		15.0	
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		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	
10.0		100.0	
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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[NMC0402NPO220J50TRPF](#) [NMC0402X5R105K6.3TRPF](#) [NMC0402X5R224K6.3TRPF](#) [NMC0402X7R103J25TRPF](#)  
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[L0402NPO7R0C50TRPF](#) [NMC-L0603NPO2R2B50TRPF](#) [NMC-Q0402NPO8R2D200TRPF](#) [C1206C101J1GAC](#) [C1608C0G2A221J](#)  
[C1608X7R1E334K](#) [C2012C0G2A472J](#) [2220J2K00562KXT](#) [KHC201E225M76N0T00](#) [1812J2K00332KXT](#) [CCR06CG153FSV](#)  
[CDR14BP471CJUR](#) [CDR31BX103AKWR](#) [CDR33BX683AKUS](#) [CGA2B2C0G1H010C](#) [CGA2B2C0G1H040C](#) [CGA2B2C0G1H050C](#)  
[CGA2B2C0G1H060D](#) [CGA2B2C0G1H070D](#) [CGA2B2C0G1H120J](#) [CGA2B2C0G1H151J](#) [CGA2B2C0G1H1R5C](#) [CGA2B2C0G1H2R2C](#)  
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