

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

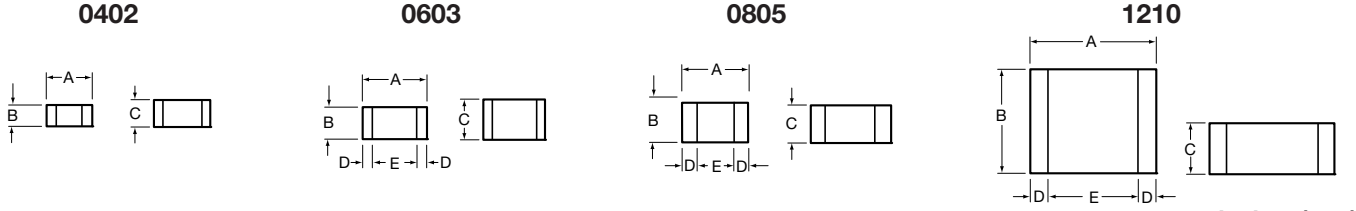
## Ultra Low ESR, "U" Series, COG (NP0) Chip Capacitors

### 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

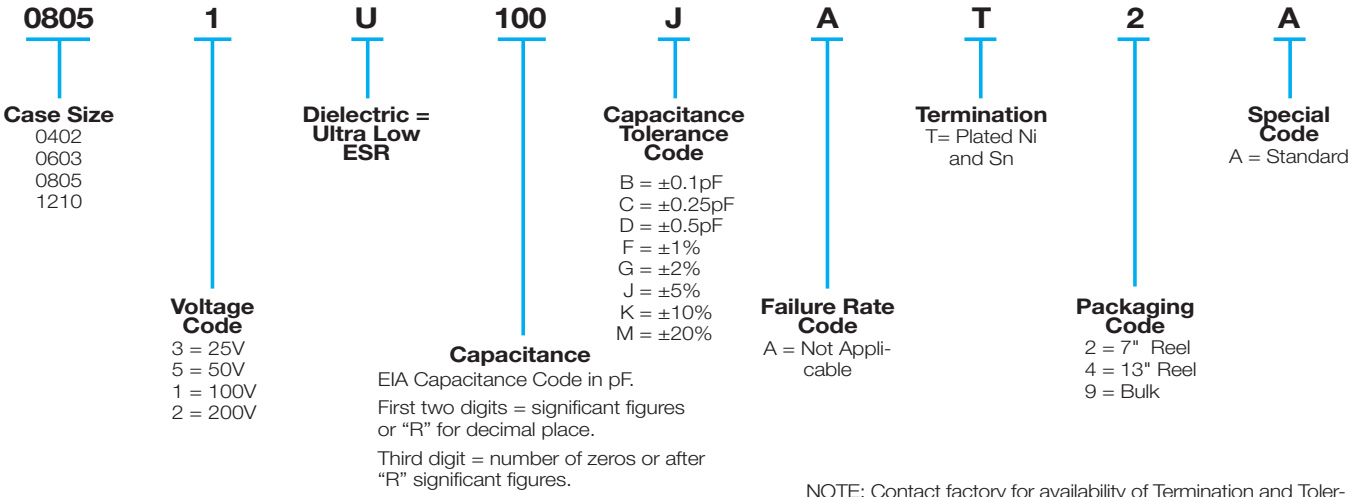
are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0603, 0805, and 1210.

### 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±0.255)	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



NOTE: Contact factory for availability of Termination and Tolerance Options for Specific Part Numbers.

### 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 9
0603	- See Performance Curve, page 9
0805	- See Performance Curve, page 9
1210	- See Performance Curve, page 9

**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)



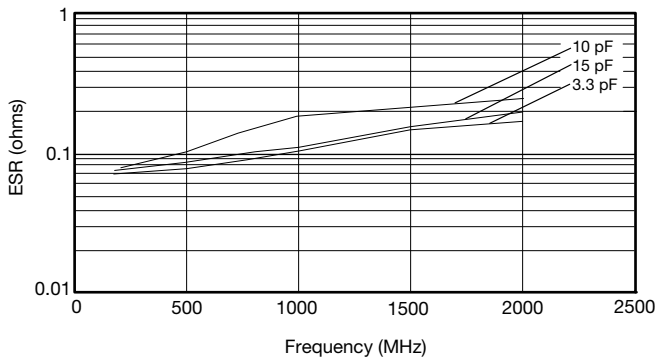
## Ultra Low ESR, "U" Series, C0G (NP0) Chip Capacitors

### CAPACITANCE RANGE

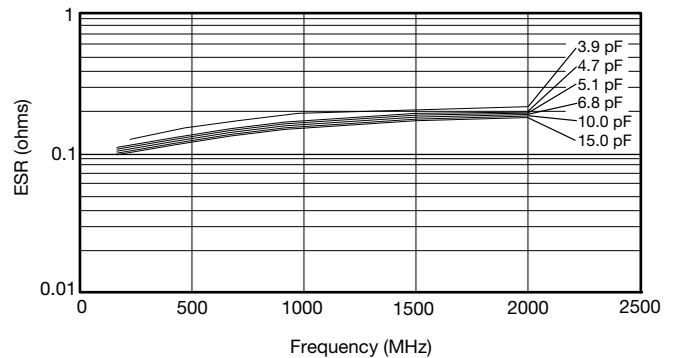
Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size			
		0402	0603	0805	1210			0402	0603	0805	1210			0402	0603	0805	1210
0.2	B,C	50V	N/A	N/A	N/A	1.0	B,C,D	50V	200V	200V	200V	100	F,G,J,K,M	N/A	100V	200V	200V
0.3						1.1						110			50V	200V	200V
0.4	B,C					1.2						120			50V	200V	200V
0.5	B,C					1.3						130			N/A	200V	200V
0.6	B,C,D					1.4						140				100V	200V
0.7						1.5						150				100V	200V
0.8	B,C,D					1.6						160				100V	200V
0.9						1.7						180				N/A	200V
						1.8						200					200V
						1.9						220					200V
						2.0						270					200V
						2.1						300					200V
						2.2						330					200V
						2.4						390					200V
						2.7						430					200V
						3.0						470					200V
						3.3						510					200V
						3.6						560					200V
						3.9						620					200V
						4.3						680					200V
						4.7						750					200V
						5.1						820					200V
						5.6						910					200V
						6.2	B,C,D					1000	F,G,J,K,M				200V
						6.8	B,C,J,K,M										200V

### ULTRA LOW ESR, "U" SERIES

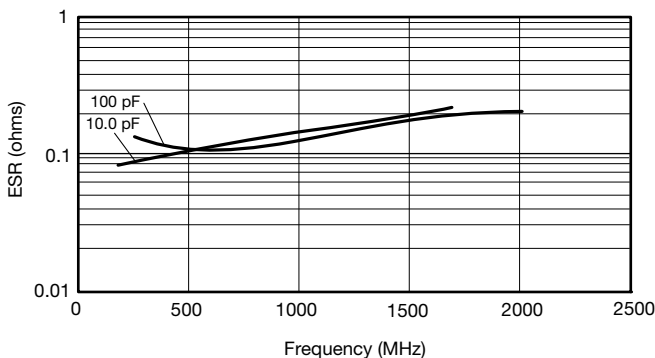
TYPICAL ESR vs. FREQUENCY  
0402 "U" SERIES



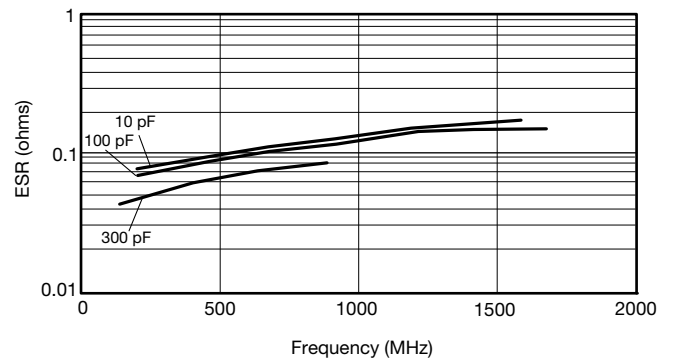
TYPICAL ESR vs. FREQUENCY  
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
1210 "U" SERIES



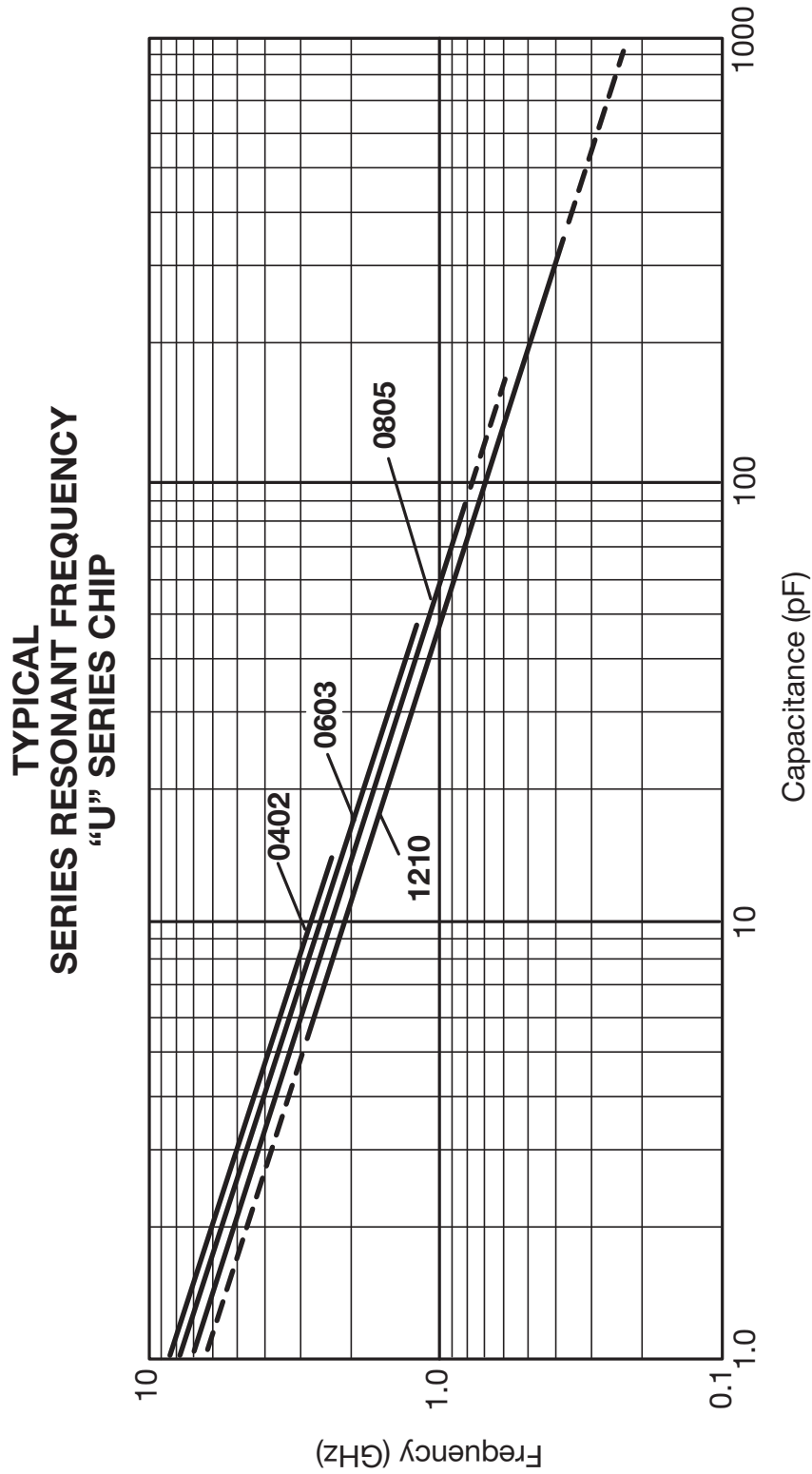
ESR Measured on the Boonton 34A



# RF/Microwave C0G (NP0) Capacitors



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



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

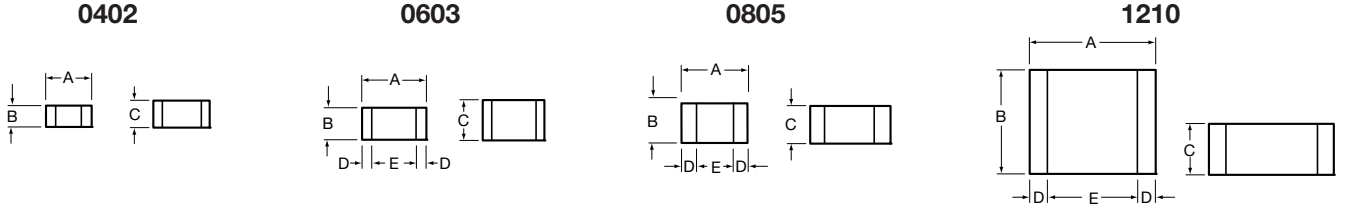
## Ultra Low ESR, "U" Series, C0G (NP0) Chip Capacitors

### 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)



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 (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

<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>
---	---	---	---	---	---	--	---	--

### 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 12
- 0603 - See Performance Curve, page 12
- 0805 - See Performance Curve, page 12
- 1210 - See Performance Curve, page 12

**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)



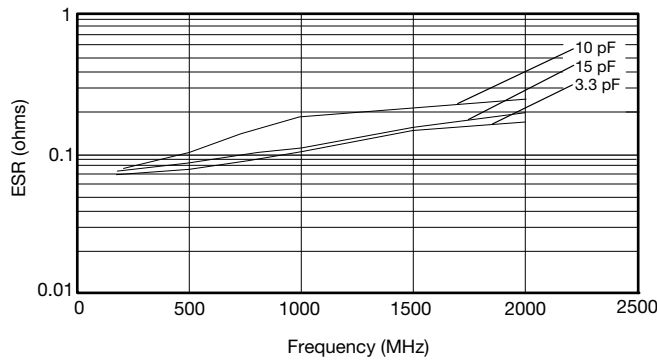
## Ultra Low ESR, "U" Series, C0G (NP0) Chip Capacitors

### CAPACITANCE RANGE

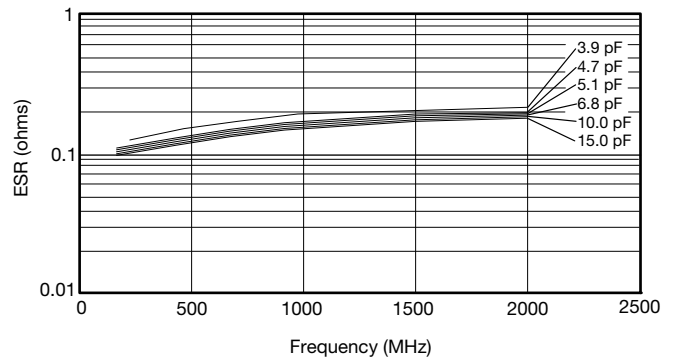
Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size																																																																																																																																																												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

### ULTRA LOW ESR, "U" SERIES

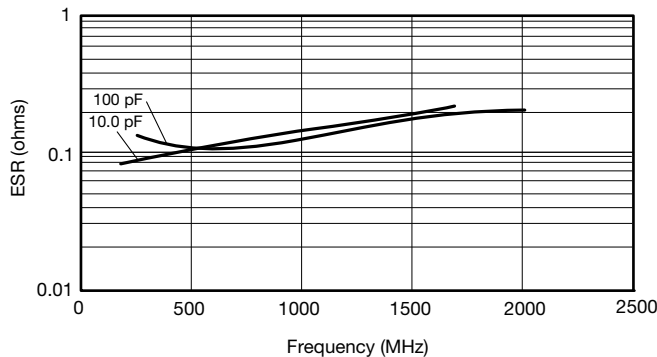
TYPICAL ESR vs. FREQUENCY  
0402 "U" SERIES



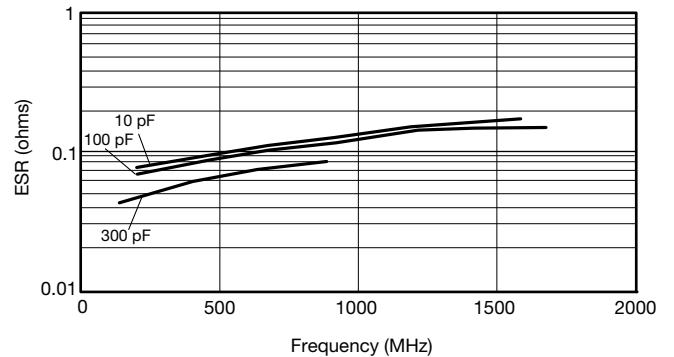
TYPICAL ESR vs. FREQUENCY  
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY  
1210 "U" SERIES



ESR Measured on the Boonton 34A



### “U” SERIES 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	J ( $\pm 5\%$ )	12.0	J ( $\pm 5\%$ )
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	
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	J ( $\pm 5\%$ )	39.0	J ( $\pm 5\%$ )
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 ( $\pm 5\%$ )		130.0	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 ( $\pm 5\%$ )	
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