

RF/Microwave C0G (NP0) Capacitors (RoHS)

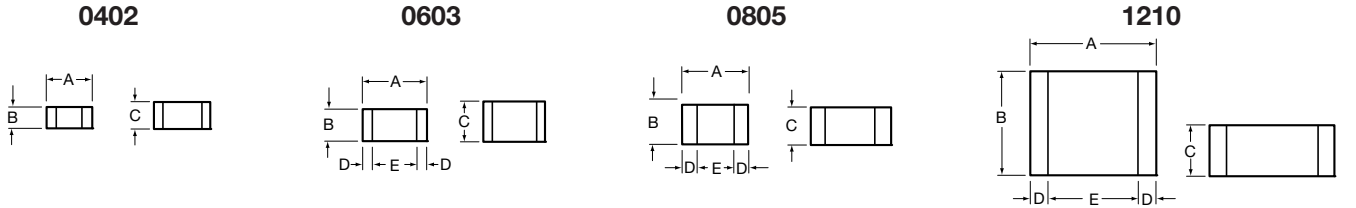
Ultra Low ESR, “U” Series, C0G (NP0) Chip Capacitors

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

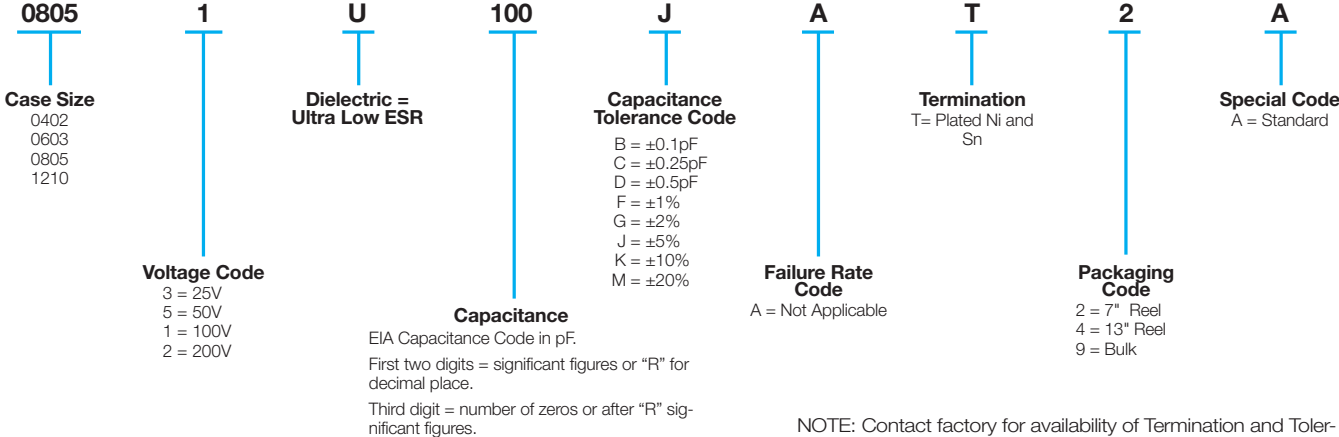
are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0402, 0603, 0805, and 1210.

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):

- 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 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	Size			
	Tolerance	0402	0603	0805	1210
0.2	B, C	50V	N/A	N/A	N/A
0.3	B, C	50V	N/A	N/A	N/A
0.4	B, C	50V	N/A	N/A	N/A
0.5	B, C	50V	N/A	N/A	N/A
0.6	B, C, D	50V	N/A	N/A	N/A
0.7	B, C, D	50V	N/A	N/A	N/A
0.8	B, C, D	50V	N/A	N/A	N/A
0.9	B, C, D	50V	N/A	N/A	N/A

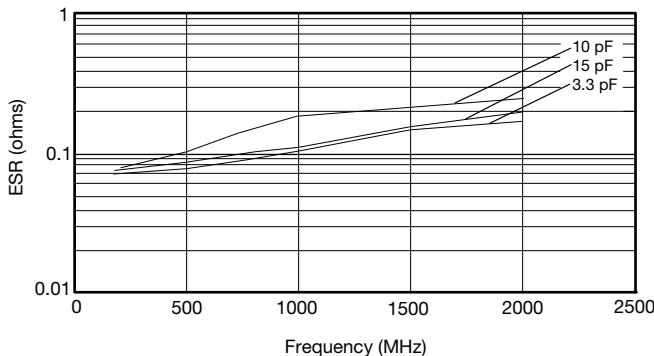
Cap (pF)	Available	Size			
	Tolerance	0402	0603	0805	1210
1.0	B, C, D	50V	200V	200V	200V
1.1	B, C, D	50V	200V	200V	200V
1.2	B, C, D	50V	200V	200V	200V
1.3	B, C, D	50V	200V	200V	200V
1.4	B, C, D	50V	200V	200V	200V
1.5	B, C, D	50V	200V	200V	200V
1.6	B, C, D	50V	200V	200V	200V
1.7	B, C, D	50V	200V	200V	200V
1.8	B, C, D	50V	200V	200V	200V
1.9	B, C, D	50V	200V	200V	200V
2.0	B, C, D	50V	200V	200V	200V
2.1	B, C, D	50V	200V	200V	200V
2.2	B, C, D	50V	200V	200V	200V
2.4	B, C, D	50V	200V	200V	200V
2.7	B, C, D	50V	200V	200V	200V
3.0	B, C, D	50V	200V	200V	200V
3.3	B, C, D	50V	200V	200V	200V
3.6	B, C, D	50V	200V	200V	200V
3.9	B, C, D	50V	200V	200V	200V
4.3	B, C, D	50V	200V	200V	200V
4.7	B, C, D	50V	200V	200V	200V
5.1	B, C, D	50V	200V	200V	200V
5.6	B, C, D	50V	200V	200V	200V
6.2	B, C, D	50V	200V	200V	200V
6.8	B, C, D	50V	200V	200V	200V

Cap (pF)	Available	Size			
	Tolerance	0402	0603	0805	1210
7.5	B, C, J, K, M	50V	200V	200V	200V
8.2	B, C, J, K, M	50V	200V	200V	200V
9.1	B, C, J, K, M	50V	200V	200V	200V
10	B, C, J, K, M	50V	200V	200V	200V
11	B, C, J, K, M	50V	200V	200V	200V
12	B, C, J, K, M	50V	200V	200V	200V
13	B, C, J, K, M	50V	200V	200V	200V
15	B, C, J, K, M	50V	200V	200V	200V
18	B, C, J, K, M	50V	200V	200V	200V
20	B, C, J, K, M	50V	200V	200V	200V
22	B, C, J, K, M	50V	200V	200V	200V
24	B, C, J, K, M	50V	200V	200V	200V
27	B, C, J, K, M	50V	200V	200V	200V
30	B, C, J, K, M	50V	200V	200V	200V
33	B, C, J, K, M	50V	200V	200V	200V
36	B, C, J, K, M	50V	200V	200V	200V
39	B, C, J, K, M	50V	200V	200V	200V
43	B, C, J, K, M	50V	200V	200V	200V
47	B, C, J, K, M	50V	200V	200V	200V
51	B, C, J, K, M	50V	200V	200V	200V
56	B, C, J, K, M	50V	200V	200V	200V
68	B, C, J, K, M	50V	200V	200V	200V
75	B, C, J, K, M	50V	200V	200V	200V
82	B, C, J, K, M	50V	200V	200V	200V
91	B, C, J, K, M	50V	200V	200V	200V

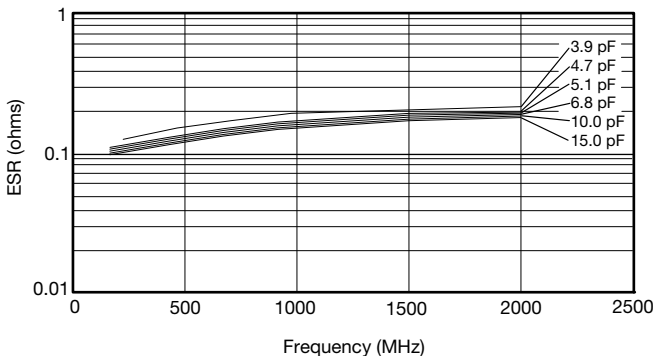
Cap (pF)	Available	Size			
	Tolerance	0402	0603	0805	1210
100	F, G, J, K, M	N/A	100V	200V	200V
110	F, G, J, K, M	N/A	100V	200V	200V
120	F, G, J, K, M	N/A	100V	200V	200V
130	F, G, J, K, M	N/A	100V	200V	200V
140	F, G, J, K, M	N/A	100V	200V	200V
150	F, G, J, K, M	N/A	100V	200V	200V
160	F, G, J, K, M	N/A	100V	200V	200V
180	F, G, J, K, M	N/A	100V	200V	200V
200	F, G, J, K, M	N/A	100V	200V	200V
220	F, G, J, K, M	N/A	100V	200V	200V
270	F, G, J, K, M	N/A	100V	200V	200V
300	F, G, J, K, M	N/A	100V	200V	200V
330	F, G, J, K, M	N/A	100V	200V	200V
360	F, G, J, K, M	N/A	100V	200V	200V
390	F, G, J, K, M	N/A	100V	200V	200V
430	F, G, J, K, M	N/A	100V	200V	200V
470	F, G, J, K, M	N/A	100V	200V	200V
510	F, G, J, K, M	N/A	100V	200V	200V
560	F, G, J, K, M	N/A	100V	200V	200V
620	F, G, J, K, M	N/A	100V	200V	200V
680	F, G, J, K, M	N/A	100V	200V	200V
750	F, G, J, K, M	N/A	100V	200V	200V
820	F, G, J, K, M	N/A	100V	200V	200V
910	F, G, J, K, M	N/A	100V	200V	200V
1000	F, G, J, K, M	N/A	100V	200V	200V

ULTRA LOW ESR, “U” SERIES

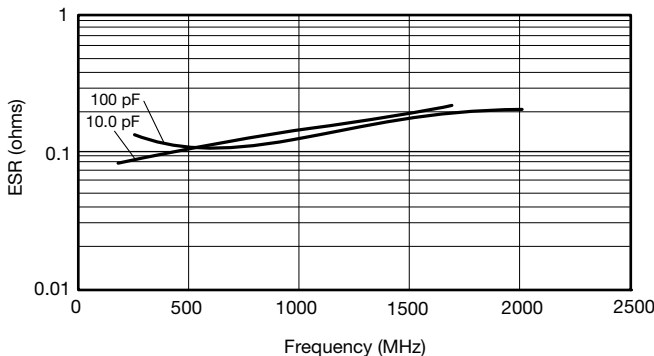
TYPICAL ESR vs. FREQUENCY
0402 “U” SERIES



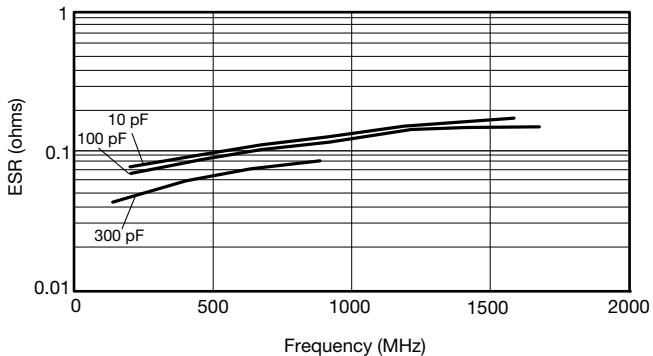
TYPICAL ESR vs. FREQUENCY
0603 “U” SERIES



TYPICAL ESR vs. FREQUENCY
0805 “U” SERIES



TYPICAL ESR vs. FREQUENCY
1210 “U” SERIES



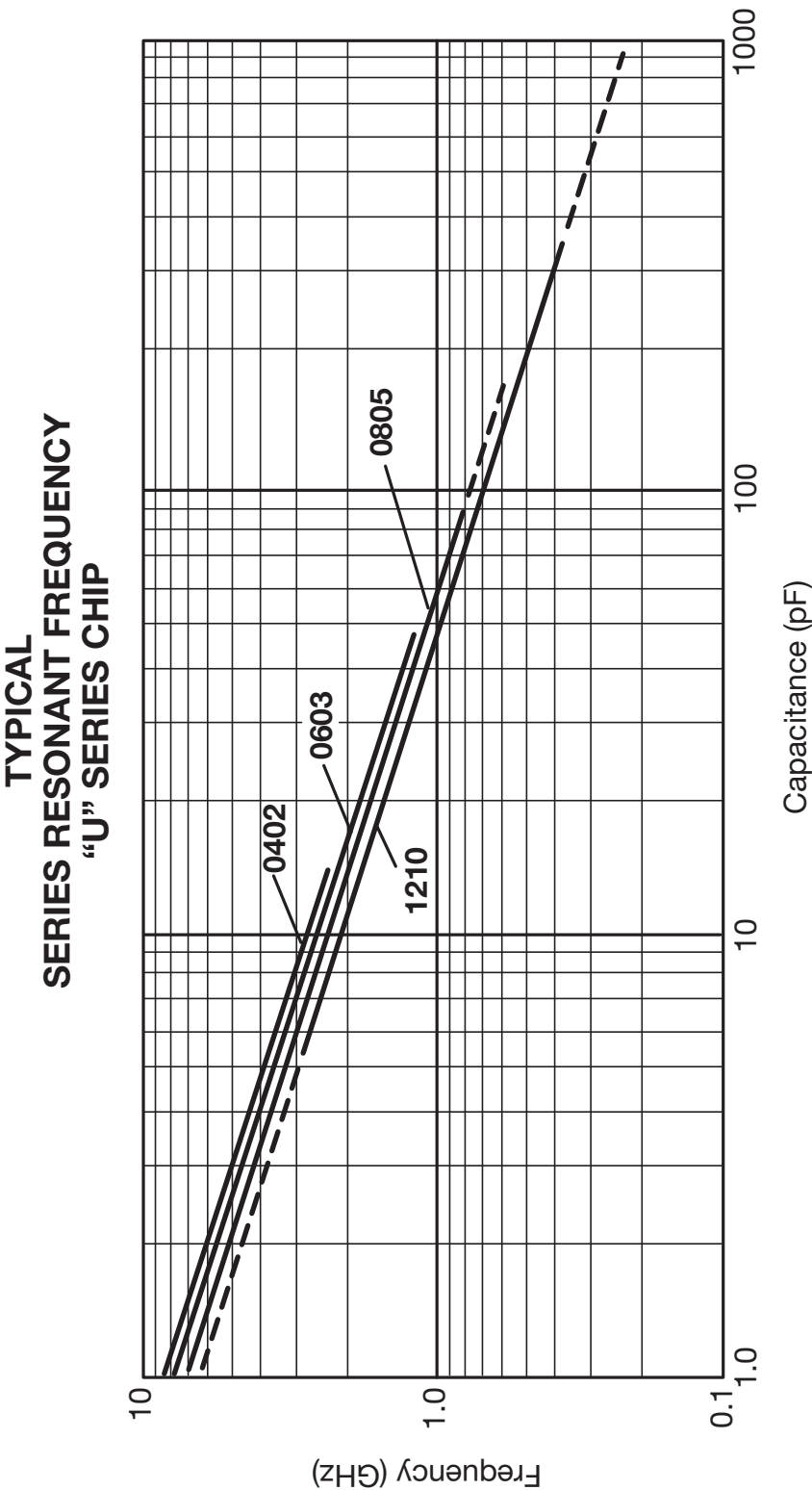
ESR Measured on the Boonton 34A



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

Not RoHS Compliant

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



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

CAPACITANCE RANGE

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

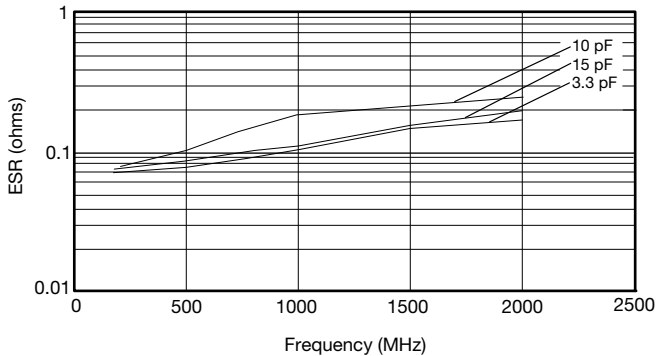
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
1.0	B,C,D	50V	200V	200V	200V
1.1					
1.2					
1.3					
1.4					
1.5					
1.6					
1.7					
1.8					
1.9					
2.0					
2.1					
2.2					
2.4					
2.7					
3.0					
3.3					
3.6					
3.9					
4.3					
4.7					
5.1					
5.6					
6.2	B,C,D				
6.8	B,C,J,K,M				

Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
7.5	B,C,J,K,M	50V	200V	200V	200V
8.2					
9.1	B,C,J,K,M				
10	F,G,J,K,M				
11					
12					
13					
15					
18					
20					
22					
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51					
56					
68					
75					
82					
91					

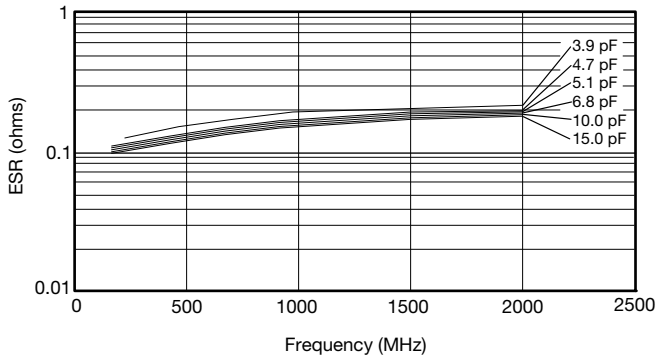
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
100	F,G,J,K,M	N/A	100V	200V	200V
110			50V		
120			50V		
130			N/A		
140					
150					
160					
180					
200					
220					
270					
300					
330					
360					
390					
430					
470					
510					
560					
620					
680					
750					
820					
910					
1000	F,G,J,K,M				

ULTRA LOW ESR, "U" SERIES

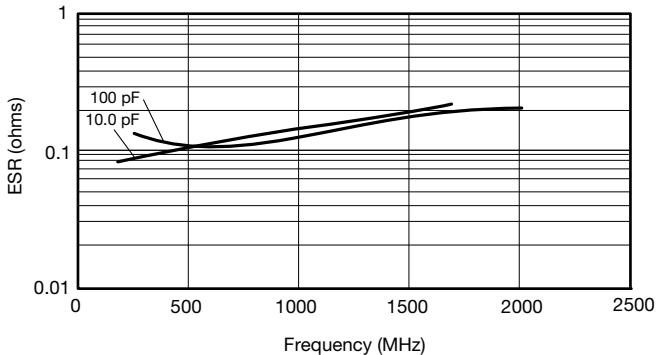
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



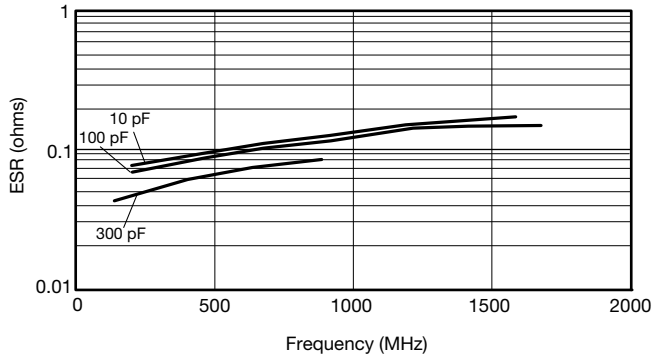
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



ESR Measured on the Boonton 34A

“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	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 ($\pm 5\%$)	130.0	
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