

RF/Microwave Capacitors

RF/Microwave C0G (NP0) Capacitors

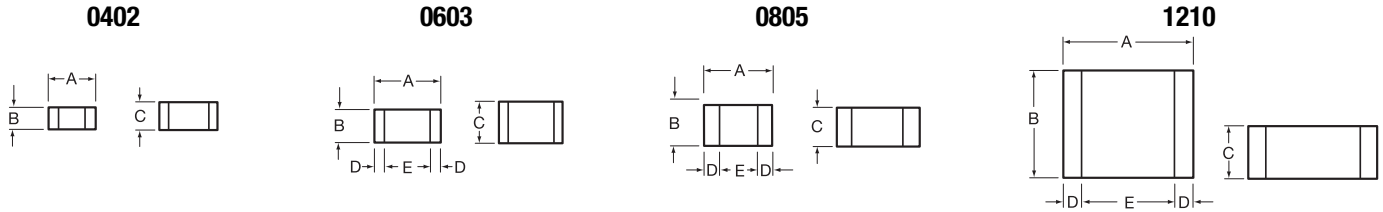
Ultra Low ESR "U" Series, C0G (NP0) Capacitors (RoHS)



GENERAL INFORMATION

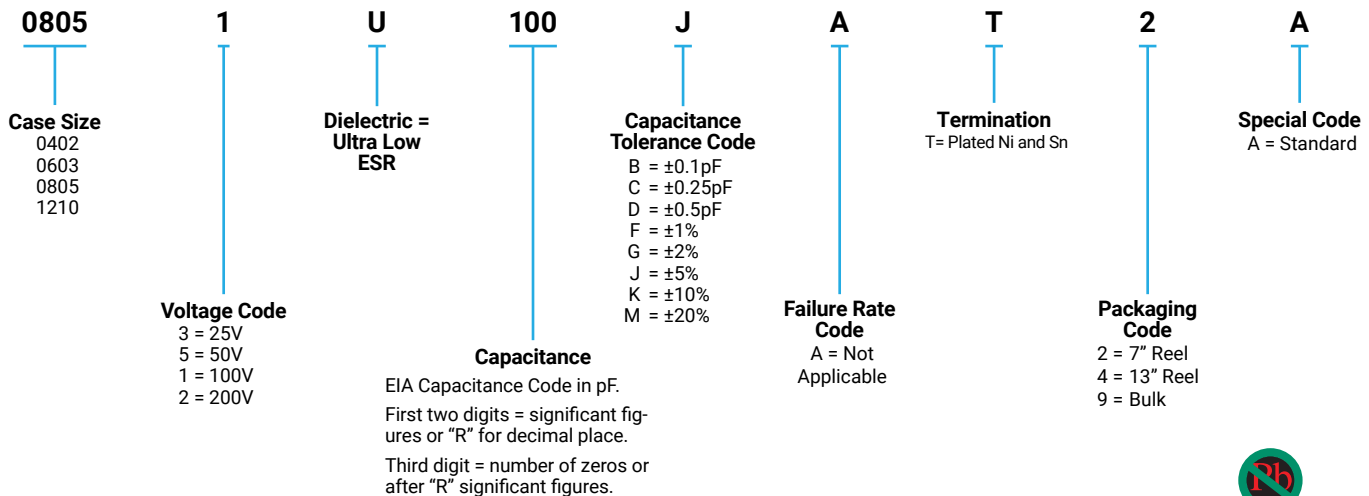
"U" Series capacitors are C0G (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the communications market. Max ESR and effective capacitance are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0603, 0805, and 1210.

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):

- 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 Capacitors

RF/Microwave C0G (NP0) Capacitors

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

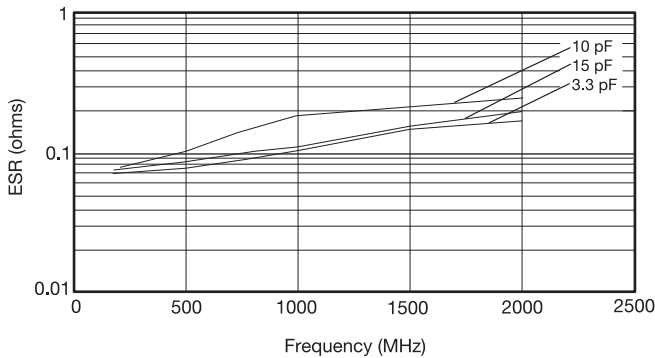


CAPACITANCE RANGE

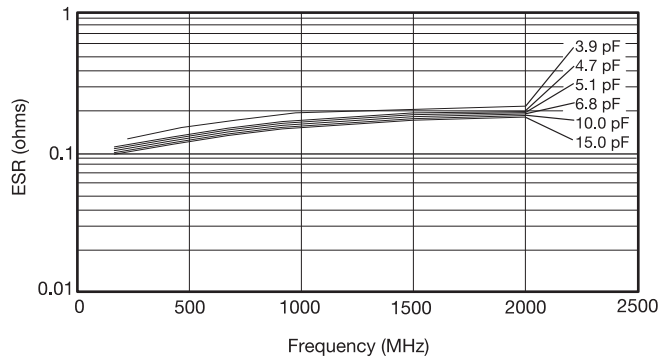
Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size			
		0402	0603	0805	1210			0402	0603	0805	1210			0402	0603	0805	1210
0.2	B,C	50V	N/A	N/A	N/A	1.0	B,C,D	50V	200V	200V	200V	100	FG,J,K,M	N/A	100V	200V	200V
0.3	↓ B,C	↓	↓	↓	↓	1.1	↓	↓	↓	↓	↓	110	↓	↓	↓	↓	↓
0.4						1.2						120					
0.5	B,C	↓	↓	↓	↓	1.3	↓	↓	↓	↓	↓	130	↓	↓	↓	↓	↓
0.6	B,C,D					140											
0.7	B,C,D	↓	↓	↓	↓	1.4	↓	↓	↓	↓	↓	150	↓	↓	↓	↓	↓
0.8	B,C,D					160											
0.9	B,C,D	↓	↓	↓	↓	1.5	↓	↓	↓	↓	↓	180	↓	↓	↓	↓	↓
1.0	B,C,D					200											
1.1	↓	↓	↓	↓	↓	1.6	↓	↓	↓	↓	↓	200	↓	↓	↓	↓	↓
1.2						1.7						220					
1.3	↓	↓	↓	↓	↓	1.8	↓	↓	↓	↓	↓	270	↓	↓	↓	↓	↓
1.4						1.9						300					
1.5	↓	↓	↓	↓	↓	2.0	↓	↓	↓	↓	↓	330	↓	↓	↓	↓	↓
1.6						2.1						360					
1.7	↓	↓	↓	↓	↓	2.2	↓	↓	↓	↓	↓	390	↓	↓	↓	↓	↓
1.8						2.3						430					
1.9	↓	↓	↓	↓	↓	2.4	↓	↓	↓	↓	↓	470	↓	↓	↓	↓	↓
2.0						2.5						510					
2.1	↓	↓	↓	↓	↓	2.6	↓	↓	↓	↓	↓	560	↓	↓	↓	↓	↓
2.2						2.7						620					
2.3	↓	↓	↓	↓	↓	2.7	↓	↓	↓	↓	↓	680	↓	↓	↓	↓	↓
2.4						2.8						750					
2.5	↓	↓	↓	↓	↓	2.8	↓	↓	↓	↓	↓	820	↓	↓	↓	↓	↓
2.6						2.9						910					
2.7	↓	↓	↓	↓	↓	3.0	↓	↓	↓	↓	↓	1000	↓	↓	↓	↓	↓
2.8						3.1											
2.9	↓	↓	↓	↓	↓	3.1	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
3.0						3.2											
3.1	↓	↓	↓	↓	↓	3.2	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
3.2						3.3											
3.3	↓	↓	↓	↓	↓	3.3	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
3.4						3.4											
3.5	↓	↓	↓	↓	↓	3.4	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
3.6						3.5											
3.7	↓	↓	↓	↓	↓	3.5	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
3.8						3.6											
3.9	↓	↓	↓	↓	↓	3.6	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
4.0						3.7											
4.1	↓	↓	↓	↓	↓	3.7	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
4.2						3.8											
4.3	↓	↓	↓	↓	↓	3.8	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
4.4						3.9											
4.5	↓	↓	↓	↓	↓	3.9	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
4.6						4.0											
4.7	↓	↓	↓	↓	↓	4.0	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
4.8						4.1											
4.9	↓	↓	↓	↓	↓	4.1	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
5.0						4.2											
5.1	↓	↓	↓	↓	↓	4.2	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
5.2						4.3											
5.3	↓	↓	↓	↓	↓	4.3	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
5.4						4.4											
5.5	↓	↓	↓	↓	↓	4.4	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
5.6						4.5											
5.7	↓	↓	↓	↓	↓	4.5	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
5.8						4.6											
5.9	↓	↓	↓	↓	↓	4.6	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
6.0						4.7											
6.1	↓	↓	↓	↓	↓	4.7	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
6.2						4.8											
6.3	↓	↓	↓	↓	↓	4.8	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
6.4						4.9											
6.4	↓	↓	↓	↓	↓	4.9	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
6.5						5.0											
6.5	↓	↓	↓	↓	↓	5.0	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
6.6						5.1											
6.6	↓	↓	↓	↓	↓	5.1	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
6.7						5.2											
6.7	↓	↓	↓	↓	↓	5.2	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
6.8						5.3											
6.8	↓	↓	↓	↓	↓	5.3	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
6.9						5.4											
6.9	↓	↓	↓	↓	↓	5.4	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
7.0						5.5											
7.0	↓	↓	↓	↓	↓	5.5	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
7.1						5.6											
7.1	↓	↓	↓	↓	↓	5.6	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
7.2						5.7											
7.2	↓	↓	↓	↓	↓	5.7	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
7.3						5.8											
7.3	↓	↓	↓	↓	↓	5.8	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
7.4						5.9											
7.4	↓	↓	↓	↓	↓	5.9	↓	↓	↓	↓	↓		↓	↓	↓	↓	↓
7.5						6.0											

ULTRA LOW ESR, "U" SERIES

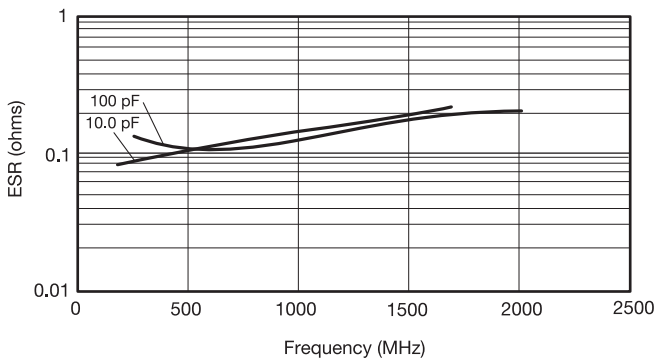
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



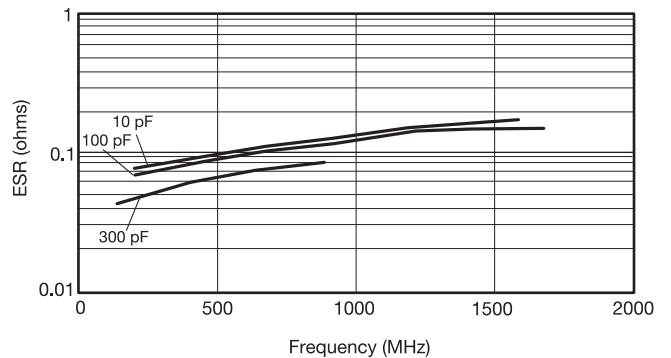
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES

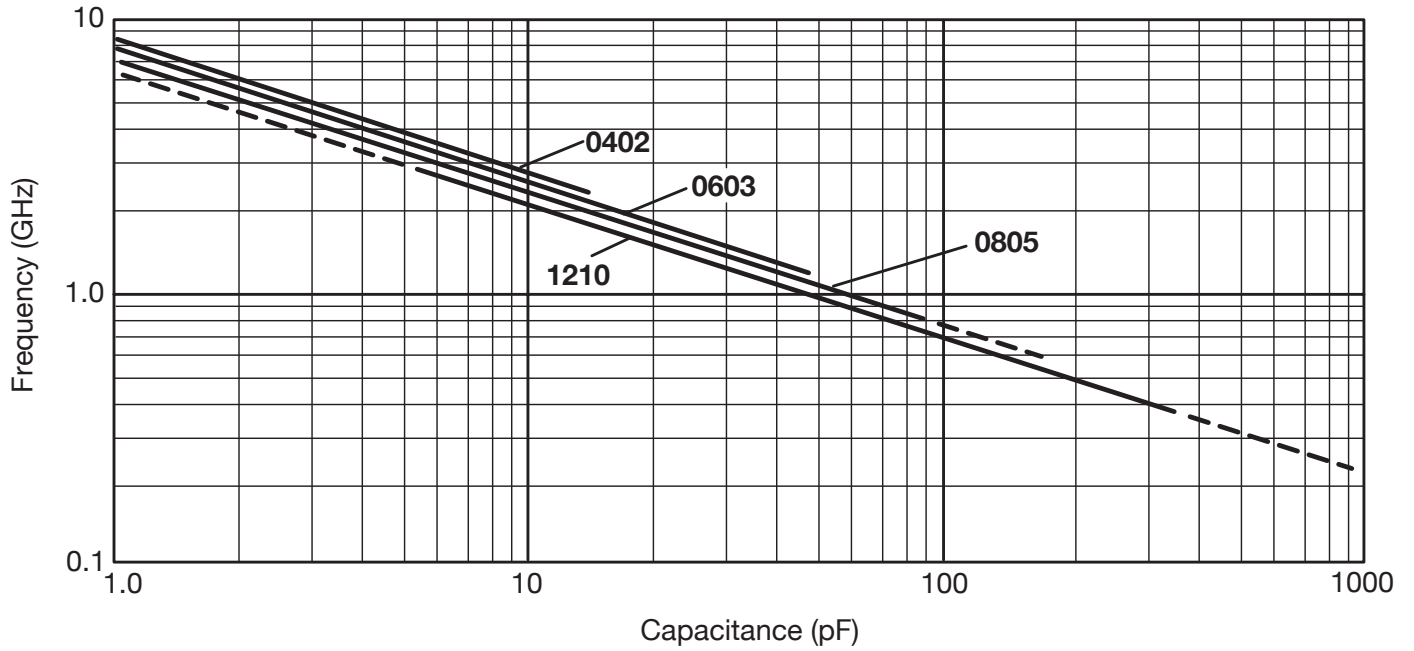


TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



ESR Measured on the Boonton 34A

TYPICAL
 SERIES RESONANT FREQUENCY
 "U" SERIES CHIP



RF/Microwave Capacitors

RF/Microwave COG (NP0) Capacitors

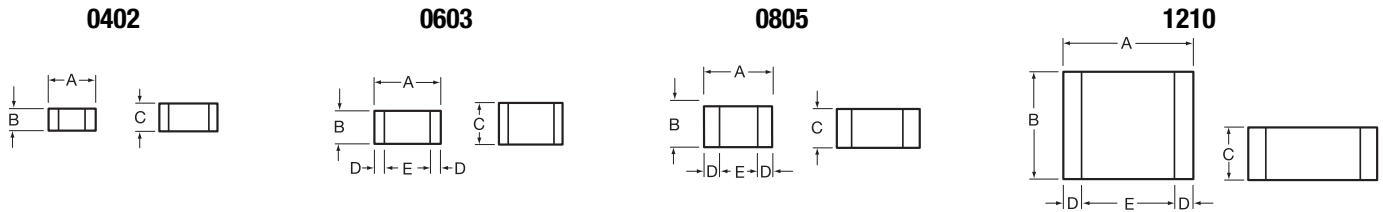
Ultra Low ESR "U" Series, COG (NP0) Capacitors (Sn/Pb)



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	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

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

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):

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

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					
0.7	B,C,D	50V	N/A	N/A	N/A
0.8					
0.9	B,C,D	50V	N/A	N/A	N/A

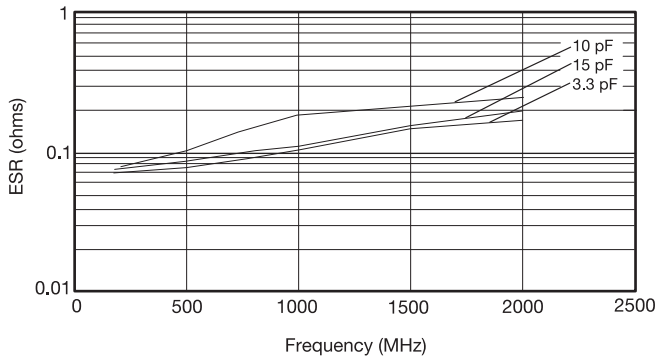
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
1.0	B,C,D	50V	200V	200V	200V
1.1	↓	50V	200V	200V	200V
1.2					
1.3	↓	50V	200V	200V	200V
1.4					
1.5	↓	50V	200V	200V	200V
1.6					
1.7	↓	50V	200V	200V	200V
1.8					
1.9	↓	50V	200V	200V	200V
2.0					
2.1	↓	50V	200V	200V	200V
2.2					
2.4	↓	50V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

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	B,C,J,K,M F,G,J,K,M	50V	200V	200V	200V
11					
12	↓	50V	200V	200V	200V
13					
15	↓	50V	200V	200V	200V
18					
20	↓	50V	200V	200V	200V
22					
24	↓	50V	200V	200V	200V
27					
30	↓	50V	200V	200V	200V
33					
36	↓	50V	200V	200V	200V
39					
43	↓	50V	200V	200V	200V
47					
51	↓	50V	200V	200V	200V
56					
68	↓	50V	200V	200V	200V
75					
82	↓	50V	200V	200V	200V
91					

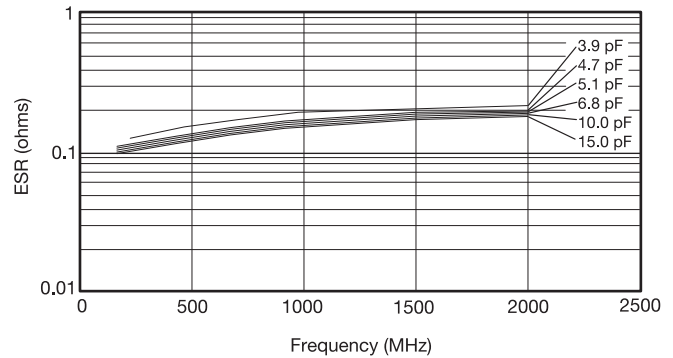
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
100	F,G,J,K,M	N/A	100V	200V	200V
110	↓	N/A	100V	200V	200V
120					
130	↓	N/A	100V	200V	200V
140					
150	↓	N/A	100V	200V	200V
160					
180	↓	N/A	100V	200V	200V
200					
220	↓	N/A	100V	200V	200V
270					
300	↓	N/A	100V	200V	200V
330					
360	↓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

ULTRA LOW ESR, "U" SERIES

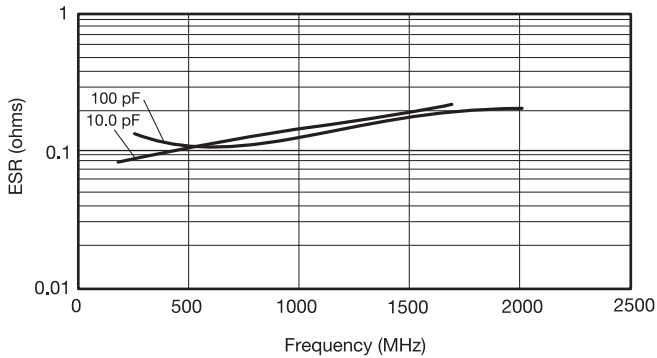
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



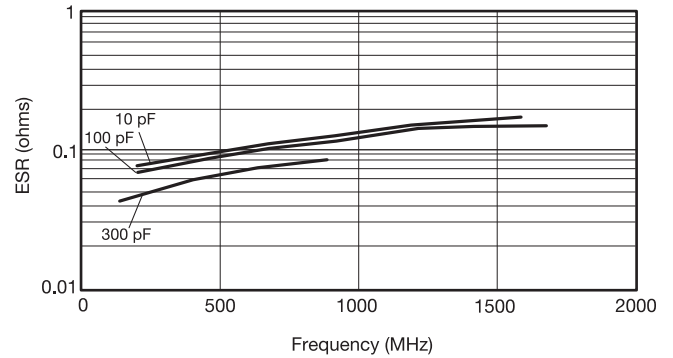
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES

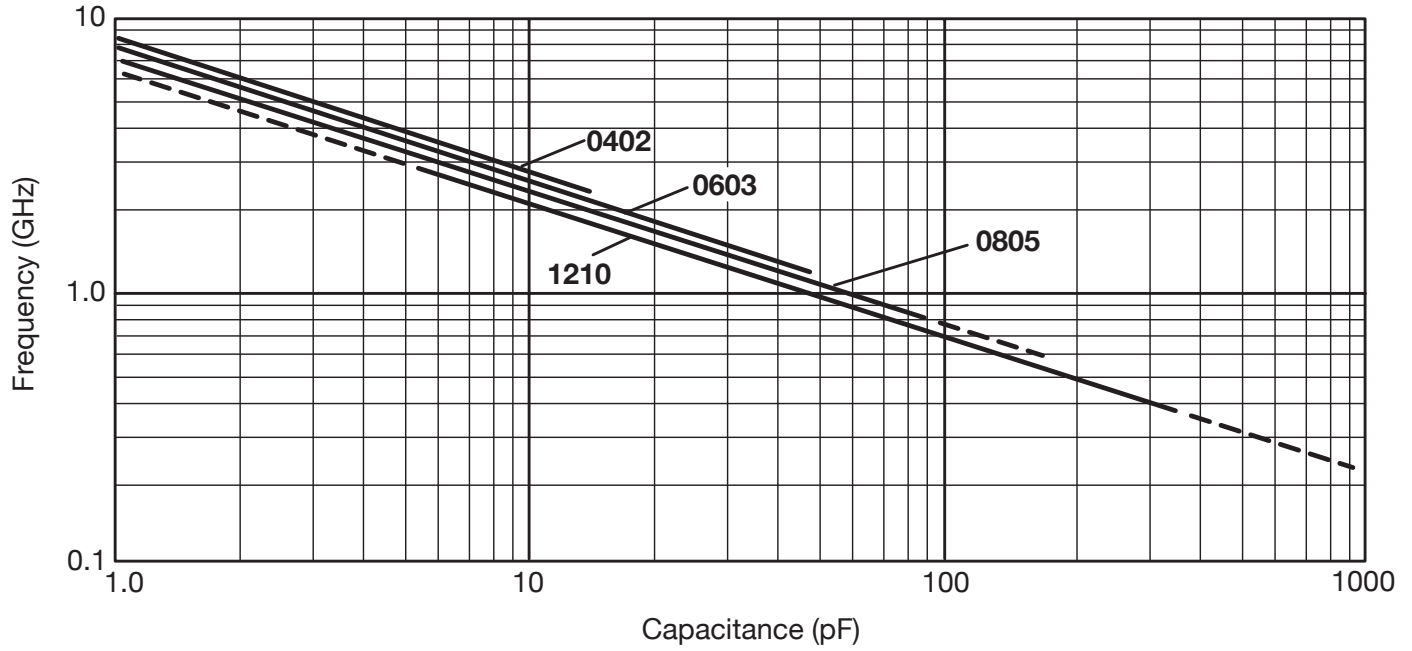


TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



ESR Measured on the Boonton 34A

TYPICAL
 SERIES RESONANT FREQUENCY
 "U" SERIES CHIP



Mouser Electronics

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