

RF/Microwave Capacitors

RF/Microwave COG (NP0) Capacitors

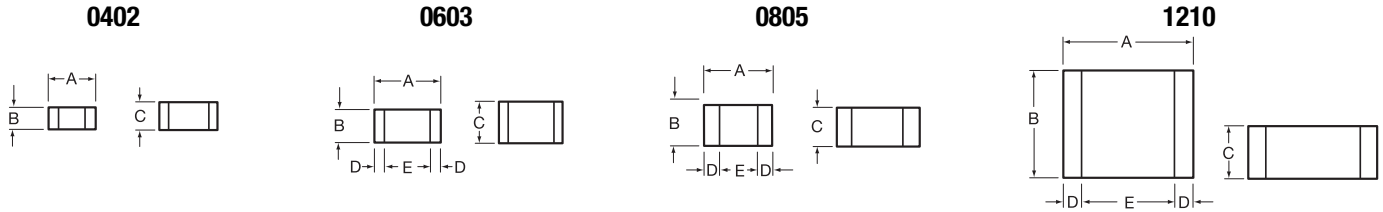
Ultra Low ESR "U" Series, COG (NP0) Capacitors (RoHS)



GENERAL INFORMATION

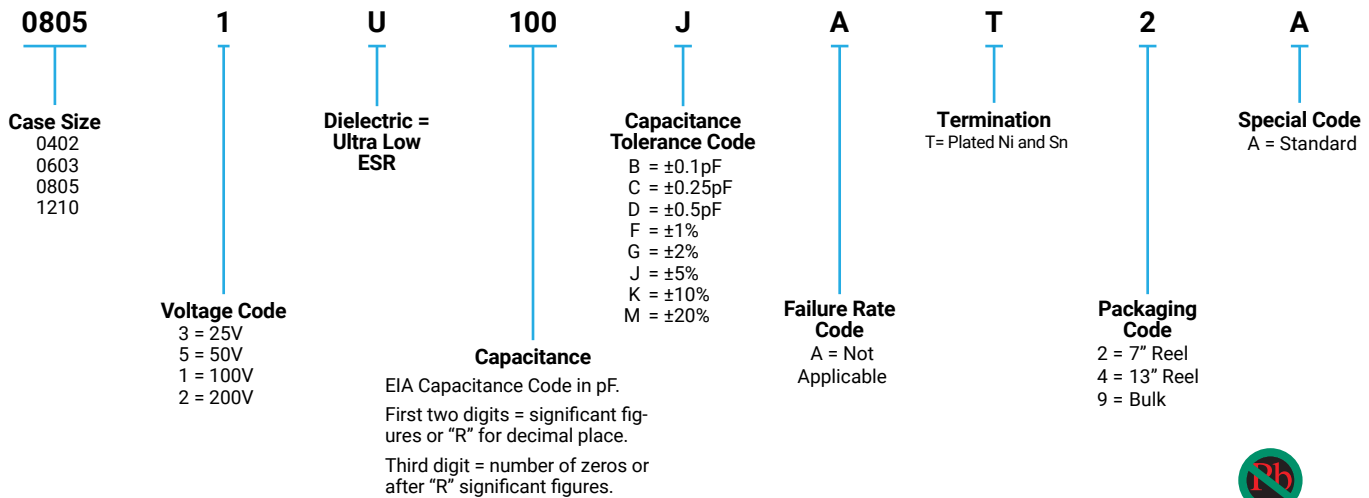
"U" Series capacitors are COG (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the communications market. Max ESR and effective capacitance are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0603, 0805, and 1210.

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



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)

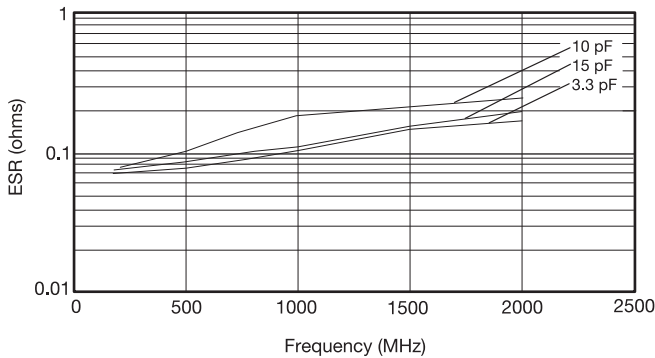


CAPACITANCE RANGE

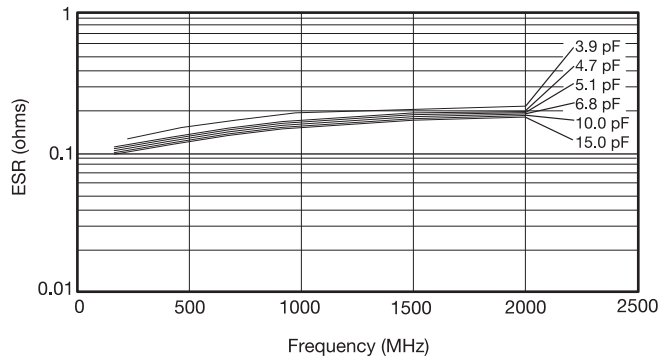
Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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0.2	B,C	50V	N/A	N/A	N/A	1.0	B,C,D	50V	200V	200V	200V	7.5	B,C,J,K,M	50V	200V	200V	200V	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	50V	200V	200V	130	F,G,J,K,M	N/A	50V	200V	200V	140	F,G,J,K,M	N/A	50V	200V	200V	150	F,G,J,K,M	N/A	50V	200V	200V	160	F,G,J,K,M	N/A	50V	200V	200V	170	F,G,J,K,M	N/A	50V	200V	200V	180	F,G,J,K,M	N/A	50V	200V	200V	190	F,G,J,K,M	N/A	50V	200V	200V	200	F,G,J,K,M	N/A	50V	200V	200V	210	F,G,J,K,M	N/A	50V	200V	200V	220	F,G,J,K,M	N/A	50V	200V	200V	230	F,G,J,K,M	N/A	50V	200V	200V	240	F,G,J,K,M	N/A	50V	200V	200V	250	F,G,J,K,M	N/A	50V	200V	200V	260	F,G,J,K,M	N/A	50V	200V	200V	270	F,G,J,K,M	N/A	50V	200V	200V	280	F,G,J,K,M	N/A	50V	200V	200V	290	F,G,J,K,M	N/A	50V	200V	200V	300	F,G,J,K,M	N/A	50V	200V	200V	310	F,G,J,K,M	N/A	50V	200V	200V	320	F,G,J,K,M	N/A	50V	200V	200V	330	F,G,J,K,M	N/A	50V	200V	200V	340	F,G,J,K,M	N/A	50V	200V	200V	350	F,G,J,K,M	N/A	50V	200V	200V	360	F,G,J,K,M	N/A	50V	200V	200V	370	F,G,J,K,M	N/A	50V	200V	200V	380	F,G,J,K,M	N/A	50V	200V	200V	390	F,G,J,K,M	N/A	50V	200V	200V	400	F,G,J,K,M	N/A	50V	200V	200V	410	F,G,J,K,M	N/A	50V	200V	200V	420	F,G,J,K,M	N/A	50V	200V	200V	430	F,G,J,K,M	N/A	50V	200V	200V	440	F,G,J,K,M	N/A	50V	200V	200V	450	F,G,J,K,M	N/A	50V	200V	200V	460	F,G,J,K,M	N/A	50V	200V	200V	470	F,G,J,K,M	N/A	50V	200V	200V	480	F,G,J,K,M	N/A	50V	200V	200V	490	F,G,J,K,M	N/A	50V	200V	200V	500	F,G,J,K,M	N/A	50V	200V	200V	510	F,G,J,K,M	N/A	50V	200V	200V	520	F,G,J,K,M	N/A	50V	200V	200V	530	F,G,J,K,M	N/A	50V	200V	200V	540	F,G,J,K,M	N/A	50V	200V	200V	550	F,G,J,K,M	N/A	50V	200V	200V	560	F,G,J,K,M	N/A	50V	200V	200V	570	F,G,J,K,M	N/A	50V	200V	200V	580	F,G,J,K,M	N/A	50V	200V	200V	590	F,G,J,K,M	N/A	50V	200V	200V	600	F,G,J,K,M	N/A	50V	200V	200V	610	F,G,J,K,M	N/A	50V	200V	200V	620	F,G,J,K,M	N/A	50V	200V	200V	630	F,G,J,K,M	N/A	50V	200V	200V	640	F,G,J,K,M	N/A	50V	200V	200V	650	F,G,J,K,M	N/A	50V	200V	200V	660	F,G,J,K,M	N/A	50V	200V	200V	670	F,G,J,K,M	N/A	50V	200V	200V	680	F,G,J,K,M	N/A	50V	200V	200V	690	F,G,J,K,M	N/A	50V	200V	200V	700	F,G,J,K,M	N/A	50V	200V	200V	710	F,G,J,K,M	N/A	50V	200V	200V	720	F,G,J,K,M	N/A	50V	200V	200V	730	F,G,J,K,M	N/A	50V	200V	200V	740	F,G,J,K,M	N/A	50V	200V	200V	750	F,G,J,K,M	N/A	50V	200V	200V	760	F,G,J,K,M	N/A	50V	200V	200V	770	F,G,J,K,M	N/A	50V	200V	200V	780	F,G,J,K,M	N/A	50V	200V	200V	790	F,G,J,K,M	N/A	50V	200V	200V	800	F,G,J,K,M	N/A	50V	200V	200V	810	F,G,J,K,M	N/A	50V	200V	200V	820	F,G,J,K,M	N/A	50V	200V	200V	830	F,G,J,K,M	N/A	50V	200V	200V	840	F,G,J,K,M	N/A	50V	200V	200V	850	F,G,J,K,M	N/A	50V	200V	200V	860	F,G,J,K,M	N/A	50V	200V	200V	870	F,G,J,K,M	N/A	50V	200V	200V	880	F,G,J,K,M	N/A	50V	200V	200V	890	F,G,J,K,M	N/A	50V	200V	200V	900	F,G,J,K,M	N/A	50V	200V	200V	910	F,G,J,K,M	N/A	50V	200V	200V	920	F,G,J,K,M	N/A	50V	200V	200V	930	F,G,J,K,M	N/A	50V	200V	200V	940	F,G,J,K,M	N/A	50V	200V	200V	950	F,G,J,K,M	N/A	50V	200V	200V	960	F,G,J,K,M	N/A	50V	200V	200V	970	F,G,J,K,M	N/A	50V	200V	200V	980	F,G,J,K,M	N/A	50V	200V	200V	990	F,G,J,K,M	N/A	50V	200V	200V	1000	F,G,J,K,M	N/A	50V	200V	200V

ULTRA LOW ESR, "U" SERIES

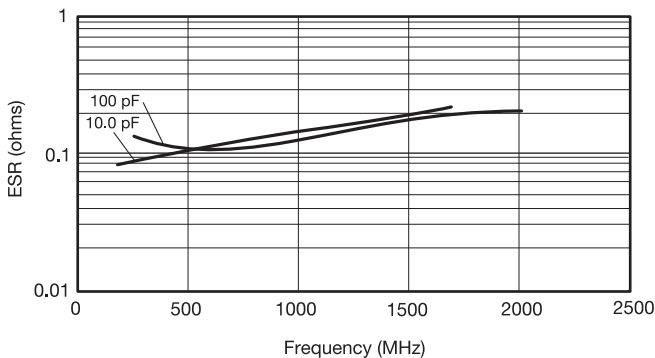
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



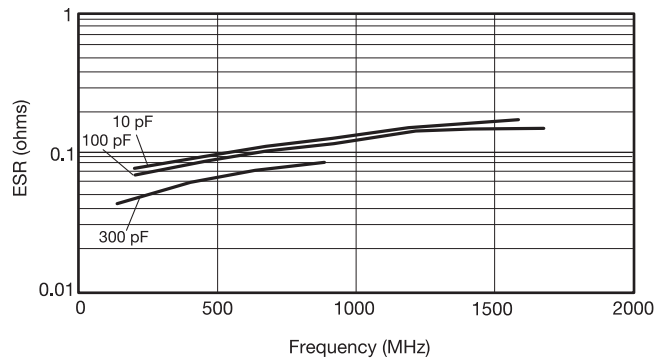
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES

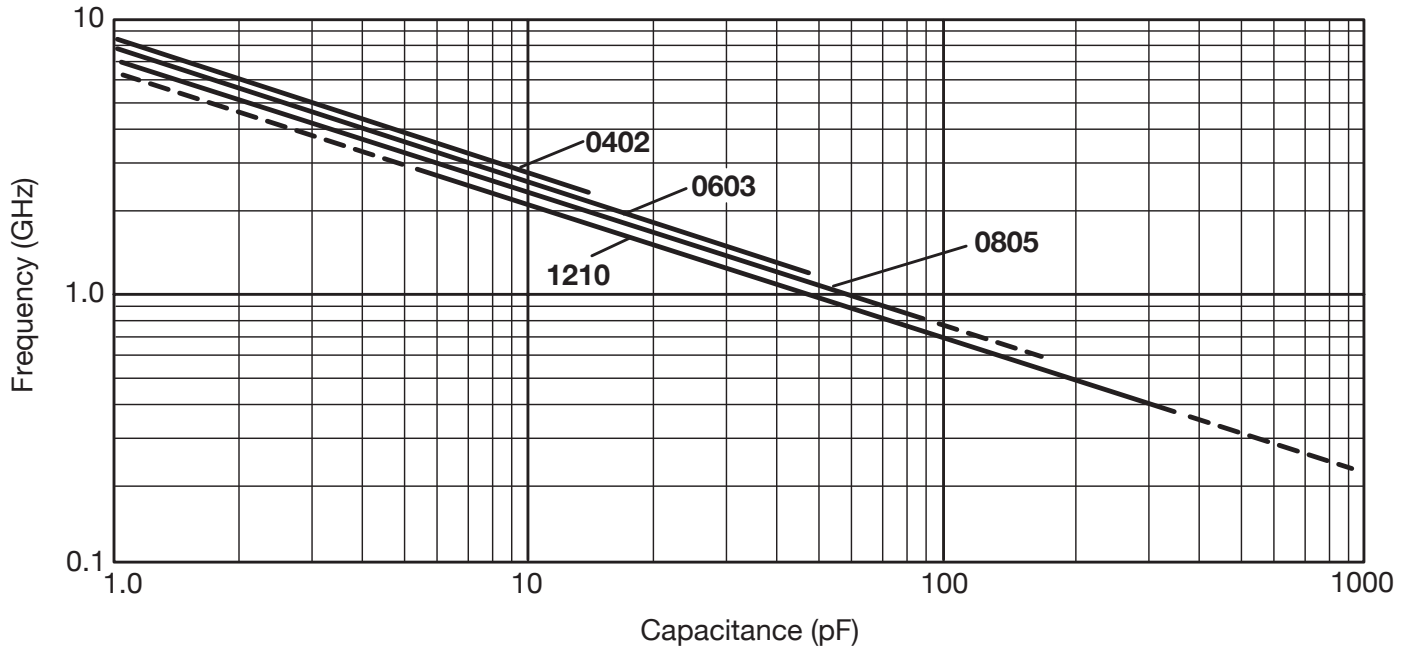


TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



ESR Measured on the Boonton 34A

TYPICAL
SERIES RESONANT FREQUENCY
"U" SERIES CHIP



RF/Microwave Capacitors

RF/Microwave COG (NP0) Capacitors

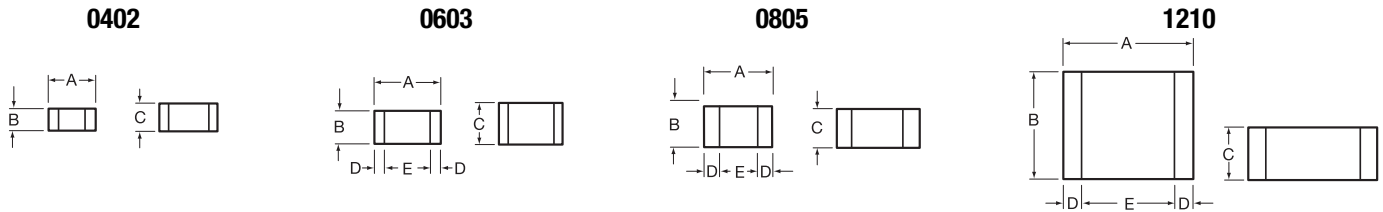
Ultra Low ESR "U" Series, COG (NP0) Capacitors (Sn/Pb)



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	↓	↓	↓	↓	↓
0.4	↓	↓	↓	↓	↓
0.5	B,C	↓	↓	↓	↓
0.6	B,C,D	↓	↓	↓	↓
0.7	↓	↓	↓	↓	↓
0.8	↓	↓	↓	↓	↓
0.9	B,C,D	↓	↓	↓	↓

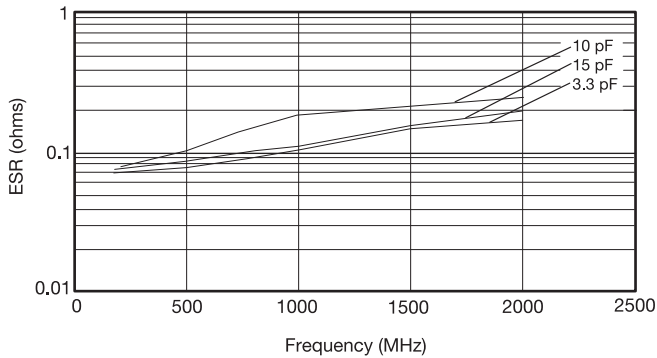
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
1.0	B,C,D	50V	200V	200V	200V
1.1	↓	↓	↓	↓	↓
1.2	↓	↓	↓	↓	↓
1.3	↓	↓	↓	↓	↓
1.4	↓	↓	↓	↓	↓
1.5	↓	↓	↓	↓	↓
1.6	↓	↓	↓	↓	↓
1.7	↓	↓	↓	↓	↓
1.8	↓	↓	↓	↓	↓
1.9	↓	↓	↓	↓	↓
2.0	↓	↓	↓	↓	↓
2.1	↓	↓	↓	↓	↓
2.2	↓	↓	↓	↓	↓
2.4	↓	↓	↓	↓	↓
2.7	↓	↓	↓	↓	↓
3.0	↓	↓	↓	↓	↓
3.3	↓	↓	↓	↓	↓
3.6	↓	↓	↓	↓	↓
4.3	↓	↓	↓	↓	↓
4.7	↓	↓	↓	↓	↓
5.1	↓	↓	↓	↓	↓
5.6	↓	↓	↓	↓	↓
6.2	↓	↓	↓	↓	↓
6.8	B,C,D	↓	↓	↓	↓
	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	↓	↓	↓	↓	↓
24	↓	↓	↓	↓	↓
27	↓	↓	↓	↓	↓
30	↓	↓	↓	↓	↓
33	↓	↓	↓	↓	↓
36	↓	↓	↓	↓	↓
39	↓	↓	↓	↓	↓
43	↓	↓	↓	↓	↓
47	↓	↓	↓	↓	↓
51	↓	↓	↓	↓	↓
56	↓	↓	↓	↓	↓
68	↓	↓	↓	↓	↓
75	↓	↓	↓	↓	↓
82	↓	↓	↓	↓	↓
91	↓	↓	↓	↓	↓

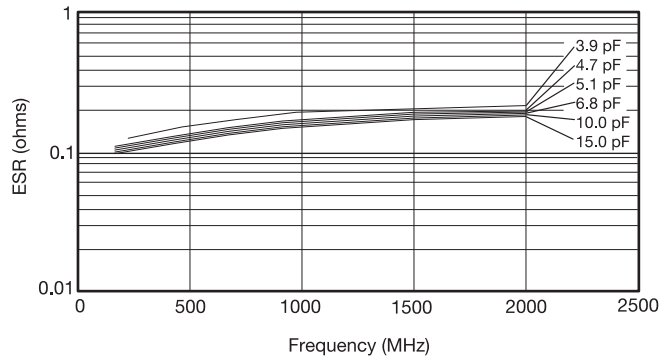
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
100	F,G,J,K,M	N/A	100V	200V	200V
110	↓	↓	↓	↓	↓
120	↓	↓	↓	↓	↓
130	↓	↓	↓	↓	↓
140	↓	↓	↓	↓	↓
150	↓	↓	↓	↓	↓
160	↓	↓	↓	↓	↓
180	↓	↓	↓	↓	↓
200	↓	↓	↓	↓	↓
220	↓	↓	↓	↓	↓
270	↓	↓	↓	↓	↓
300	↓	↓	↓	↓	↓
330	↓	↓	↓	↓	↓
360	↓	↓	↓	↓	↓
390	↓	↓	↓	↓	↓
430	↓	↓	↓	↓	↓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

ULTRA LOW ESR, "U" SERIES

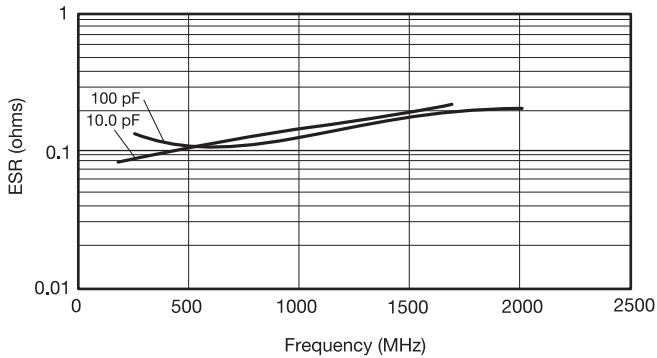
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



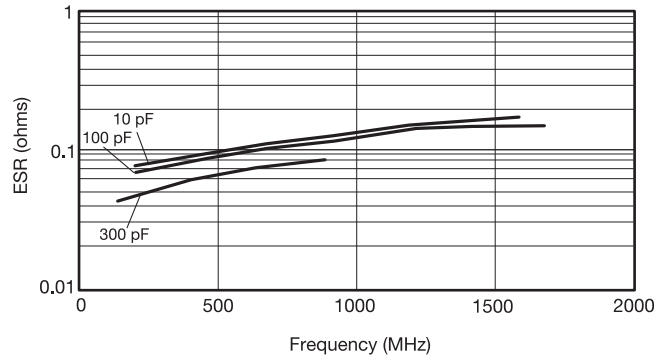
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



ESR Measured on the Boonton 34A

TYPICAL
 SERIES RESONANT FREQUENCY
 "U" SERIES CHIP

