

U Dielectric RF/Microwave COG (NP0) Capacitors (RoHS)

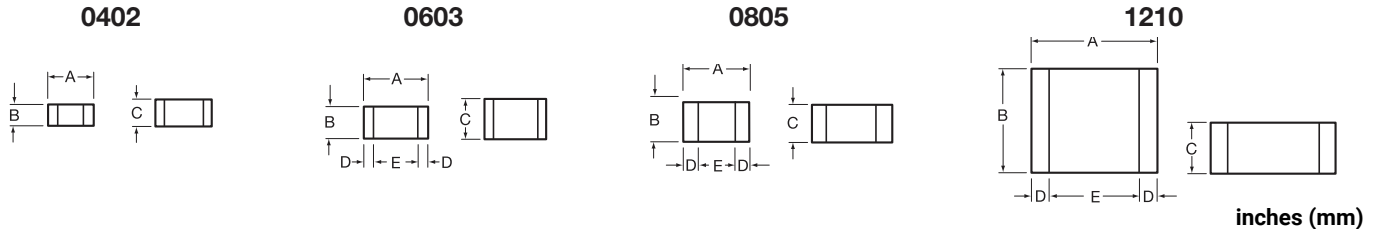


Ultra Low ESR, "U" Series, COG (NP0) Chip Capacitors

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 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)	0.022 (0.55mm) max	N/A	N/A
0603	0.060±0.010 (1.52±0.25)	0.030±0.010 (0.76±0.25)	0.036 (0.91mm) 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

0805

Case Size
0402
0603
0805
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

T

Termination
T = Plated Ni and Sn

2

**Packaging
Code**
2 = 7" Reel
4 = 13" Reel

A

Special Code
A = Standard



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 30 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 | 0805 - 200, 100 WVDC |
| 0402 | - 100, 50, 25 WVDC | 1210 - 200, 100 WVDC |
| 0603 | - 200, 100, 50 WVDC | |

Dielectric Working Voltage (DWV):

250% of rated WVDC

Equivalent Series Resistance Typical (ESR):

- 0402 - See Performance Curve, page 13
- 0603 - See Performance Curve, page 13
- 0805 - See Performance Curve, page 13
- 1210 - See Performance Curve, page 13

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



U Dielectric RF/Microwave COG (NP0) Capacitors (RoHS)



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

CAPACITANCE RANGE

Cap (pF)	Available Tolerance	Size			
		0402	0603	0805	1210
0.2	B,C	100V	N/A	N/A	N/A
0.3	↓ B,C	↓	↓	↓	↓
0.4					
0.5	B,C	↓	↓	↓	↓
0.6	B,C,D	↓	↓	↓	↓
0.7	↓ B,C,D	↓	↓	↓	↓
0.8					
0.9	B,C,D	↓	↓	↓	↓

Cap (pF)	Available Tolerance	Size			
		0402	0603	0805	1210
1.0	B,C,D	100V	200V	200V	200V
1.1	↓ B,C,D	↓	↓	↓	↓
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	B,C,D	↓	↓	↓	↓
3.3	B,C,J,K,M	↓	↓	↓	↓
3.6	↓ B,C,J,K,M	↓	↓	↓	↓
3.9					
4.3					
4.7					
5.1					
5.6					
6.2					
6.8					

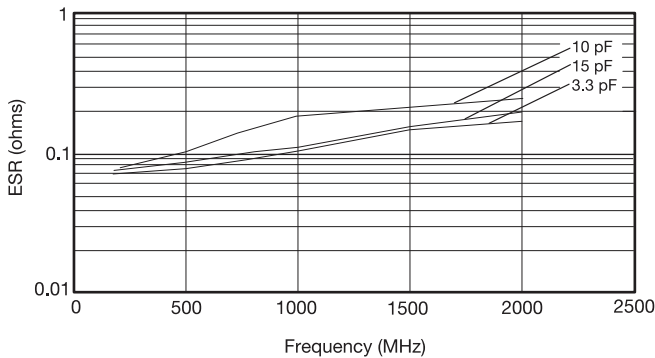
Cap (pF)	Available Tolerance	Size			
		0402	0603	0805	1210
7.5	B,C,J,K,M	100V	200V	200V	200V
8.2	↓ B,C,J,K,M	↓	↓	↓	↓
9.1					
10					
11					
12					
13					
15					
18					
20					
22					
24					
27					
30					
33					
36	50V	↓	↓	↓	
39	N/A	↓	↓	↓	
43	200V	↓	↓	↓	
47	100V	↓	↓	↓	
51	↓ F,G,J,K,M	↓	↓	↓	↓
56					
68					
75					
82					
91					

Cap (pF)	Available Tolerance	Size			
		0402	0603	0805	1210
100	F,G,J,K,M	N/A	100V	200V	200V
110	↓ F,G,J,K,M	↓	↓	↓	↓
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	↓	↓	↓	↓

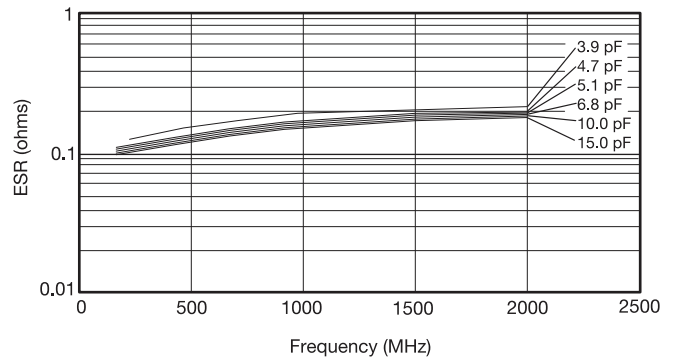


ULTRA LOW ESR, "U" SERIES

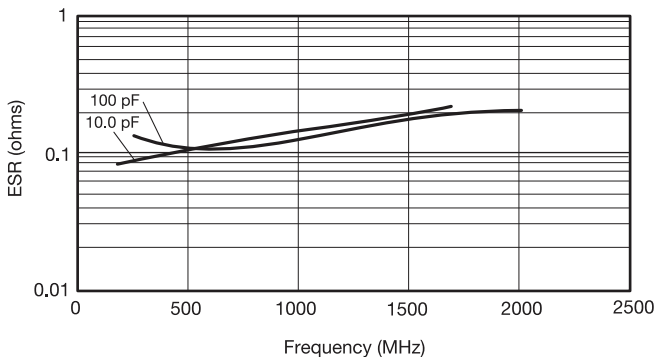
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



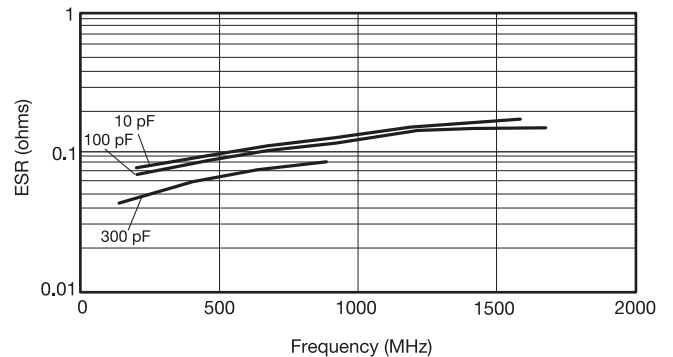
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



ESR Measured on the Boonton 34A

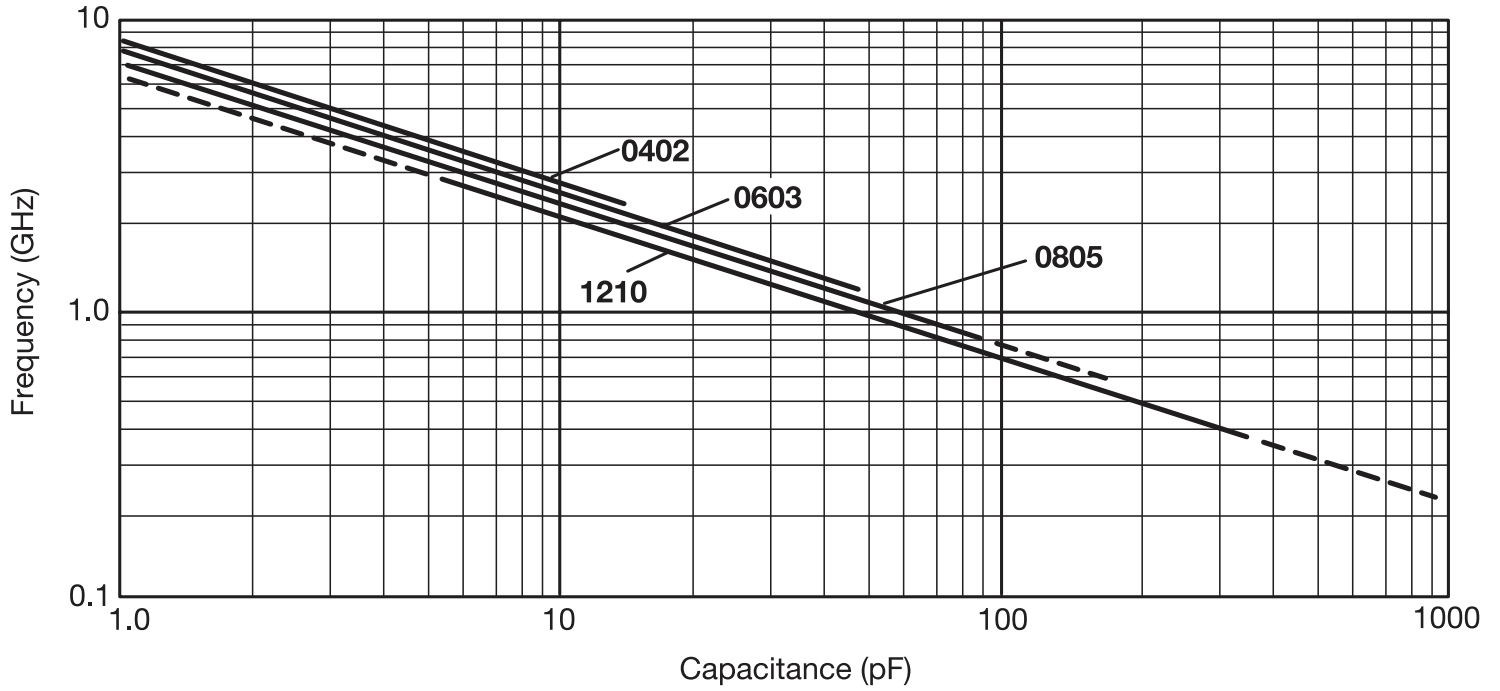
U Dielectric

RF/Microwave C0G (NP0) Capacitors

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



TYPICAL
SERIES RESONANT FREQUENCY
"U" SERIES CHIP



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

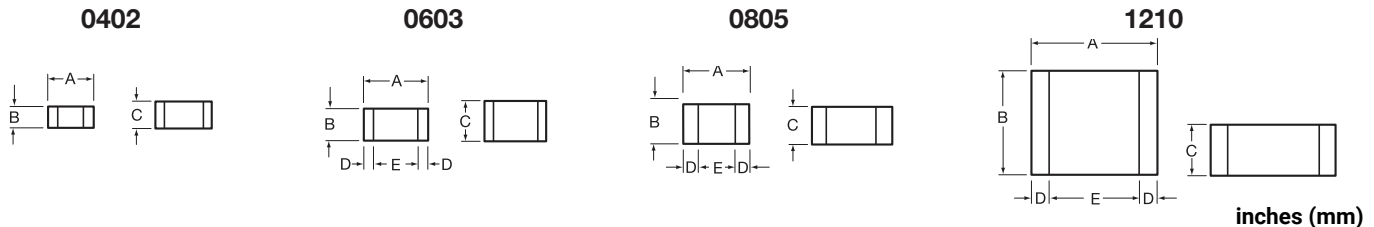


Ultra Low ESR, "U" Series, C0G (NP0) Chip Capacitors

GENERAL INFORMATION

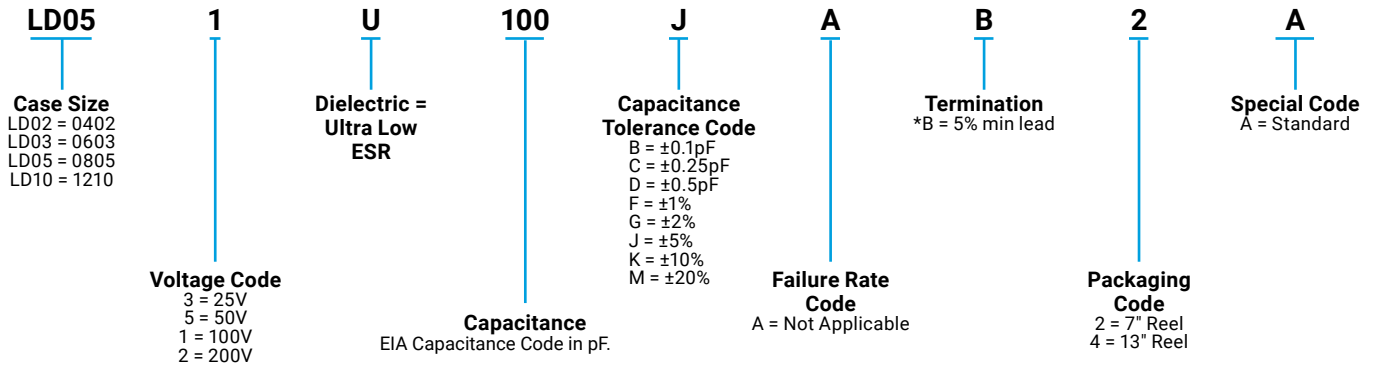
"U" Series capacitors are C0G (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the communications market. Max ESR and effective capacitance are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0402, 0603, 0805, and 1210.

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)	0.022 (0.55mm) max	N/A	N/A
0603	0.060±0.010 (1.52±0.25)	0.030±0.010 (0.76±0.25)	0.036 (0.91mm) 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



*** 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	0805	- 200, 100 WVDC
0402	- 50, 25 WVDC	1210	- 200, 100 WVDC
0603	- 200, 100, 50 WVDC		

Dielectric Working Voltage (DWV):

250% of rated WVDC

Equivalent Series Resistance Typical (ESR):

- 0402 - See Performance Curve, page 16
- 0603 - See Performance Curve, page 16
- 0805 - See Performance Curve, page 16
- 1210 - See Performance Curve, page 16

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



U Dielectric 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	B,C	↓	↓	↓	↓
0.5	B,C,D	↓	↓	↓	↓
0.6	B,C,D	↓	↓	↓	↓
0.7	↓	↓	↓	↓	↓
0.8	B,C,D	↓	↓	↓	↓
0.9	↓	↓	↓	↓	↓

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	↓	↓	↓	↓

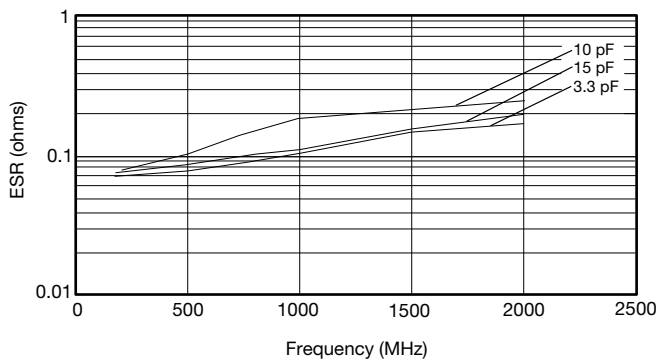
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
7.5	B,C,J,K,M	50V	200V	200V	200V
8.2	↓	↓	↓	↓	↓
9.1	↓	↓	↓	↓	↓
10	B,C,J,K,M	↓	↓	↓	↓
11	↓	↓	↓	↓	↓
12	↓	↓	↓	↓	↓
13	↓	↓	↓	↓	↓
15	↓	↓	↓	↓	↓
18	↓	↓	↓	↓	↓
20	↓	↓	↓	↓	↓
22	↓	↓	↓	↓	↓
24	↓	↓	↓	↓	↓
27	↓	↓	↓	↓	↓
30	↓	↓	↓	↓	↓
33	↓	↓	↓	↓	↓
36	↓	↓	↓	↓	↓
39	↓	↓	↓	↓	↓
43	↓	↓	↓	↓	↓
47	↓	↓	↓	↓	↓
51	↓	↓	↓	↓	↓
56	↓	↓	↓	↓	↓
68	↓	↓	↓	↓	↓
75	↓	↓	↓	↓	↓
82	↓	↓	↓	↓	↓
91	↓	↓	↓	↓	↓

Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
100	FG,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	FG,J,K,M	↓	↓	↓	↓

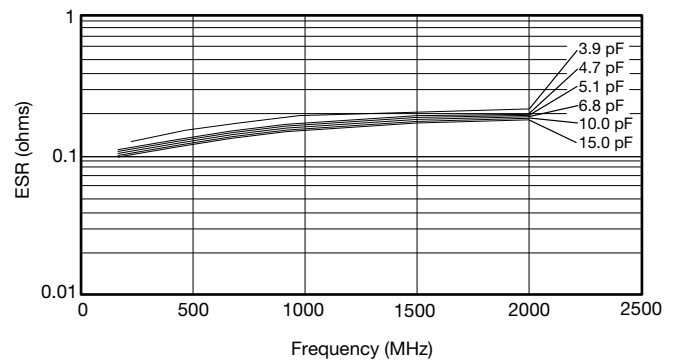


ULTRA LOW ESR, "U" SERIES

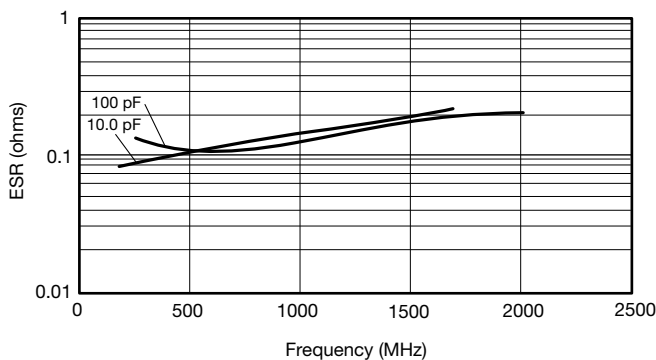
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



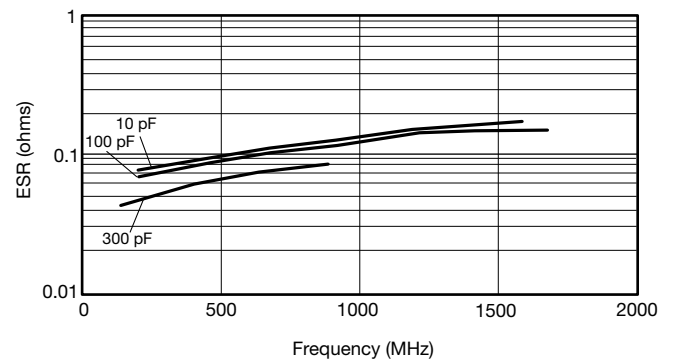
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



ESR Measured on the Boonton 34A



U Dielectric

RF/Microwave Automotive C0G (NP0) Capacitors (RoHS)

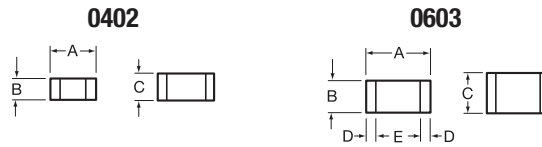
AEC Q200 Qualified Ultra Low ESR, "U" Series, C0G (NP0) Chip Capacitors



GENERAL INFORMATION

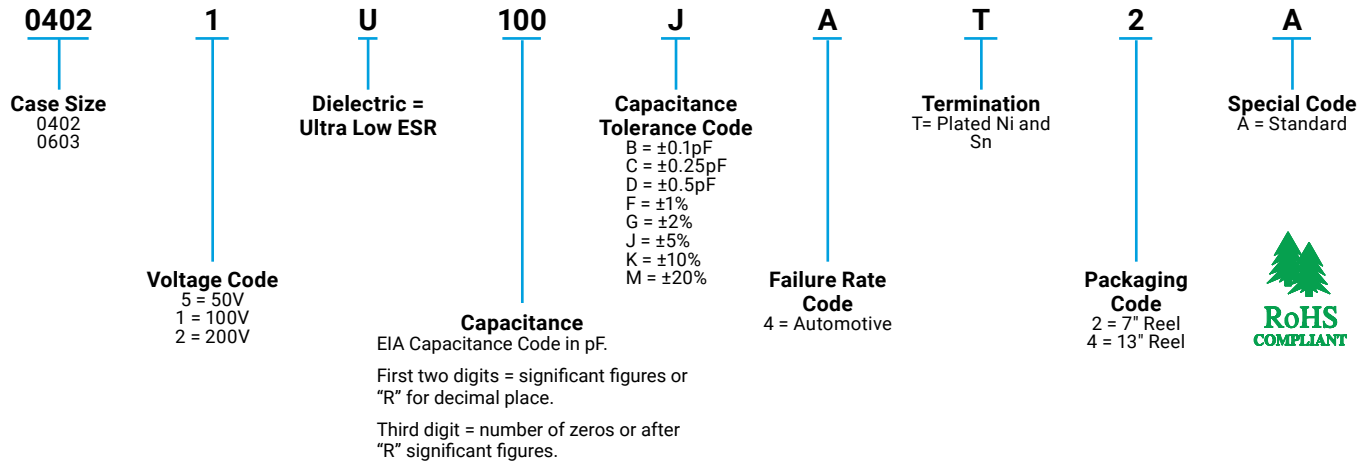
Automotive "U" Series capacitors are C0G (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the automotive market. Max ESR and effective capacitance are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0402 and 0603.

DIMENSIONS: INCHES (MILLIMETERS)



Size	A	B	C	D	E
0402	1.00±0.1 (0.039±0.004)	0.50±0.1 (0.020±0.004)	0.60 max (0.024)	N/A	N/A
0603	1.52±0.25 (0.060±0.010)	0.76±0.25 (0.030±0.010)	0.91 max (0.036)	0.25±0.13 (0.010±0.005)	0.76 min (0.030)

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):

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

Dielectric Working Voltage (DWV):

250% of rated WVDC

Equivalent Series Resistance Typical (ESR):

0402 - See Performance Curve
0603 - See Performance Curve

Automotive Specifications

Meets or exceeds the requirements of AEC Q200

U Dielectric

RF/Microwave Automotive C0G (NP0) Capacitors (RoHS)

AEC Q200 Qualified, Ultra Low ESR, "U" Series, C0G (NP0) Chip Capacitors



CAPACITANCE RANGE

Cap (pF)	Available Tolerance	Size	
		0402	0603
0.2	B,C	100V	N/A
0.3	↓	↓	↓
0.4	B,C	↓	↓
0.5	B,C	↓	↓
0.6	B,C,D	↓	↓
0.7	↓	↓	↓
0.8	↓	↓	↓
0.9	B,C,D	↓	↓

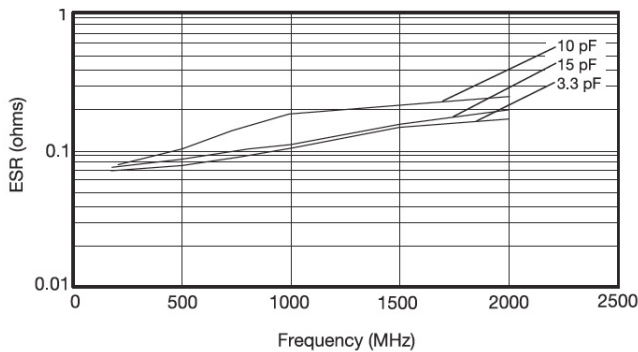
Cap (pF)	Available Tolerance	Size	
		0402	0603
1.0	B,C,D	100V	200V
1.1	↓	↓	↓
1.2	↓	↓	↓
1.3	↓	↓	↓
1.4	↓	↓	↓
1.5	↓	↓	↓
1.6	↓	↓	↓
1.7	↓	↓	↓
1.8	↓	↓	↓
1.9	↓	↓	↓
2.0	↓	↓	↓
2.1	↓	↓	↓
2.2	↓	↓	↓
2.4	↓	↓	↓
2.7	↓	↓	↓
3.0	↓	↓	↓
3.3	↓	↓	↓
3.6	↓	↓	↓
3.9	↓	↓	↓
4.3	↓	↓	↓
4.7	↓	↓	↓
5.1	↓	↓	↓
5.6	↓	↓	↓
6.2	B,C,D	↓	↓
6.8	B,C,J,K,M	↓	↓

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

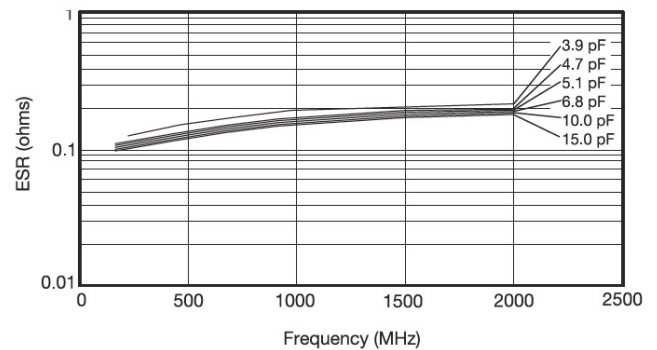
Cap (pF)	Available Tolerance	Size	
		0402	0603
100	F,G,J,K,M	N/A	100V
110	↓	↓	50V
120	↓	↓	50V
130	↓	↓	N/A
140	↓	↓	↓
150	↓	↓	↓
160	↓	↓	↓
180	↓	↓	↓
200	↓	↓	↓
220	↓	↓	↓
270	↓	↓	↓
300	↓	↓	↓
330	↓	↓	↓
360	↓	↓	↓
390	↓	↓	↓
430	↓	↓	↓
470	↓	↓	↓
510	↓	↓	↓
560	↓	↓	↓
620	↓	↓	↓
680	↓	↓	↓
750	↓	↓	↓
820	↓	↓	↓
910	↓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

ULTRA LOW ESR, "U" SERIES

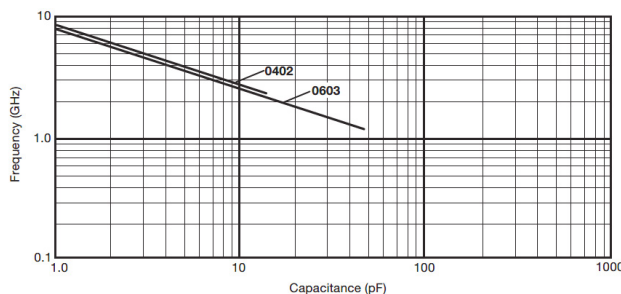
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL SERIES RESONANT FREQUENCY
"U" SERIES CHIP



"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	(±5%)	12.0	(±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		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		100.0	
13.0		120.0	
15.0		130.0	
18.0	J ($\pm 5\%$)	240.0	
20.0		300.0	
24.0		390.0	
27.0		470.0	
30.0		680.0	

***25 each of 30 values