

RF/Microwave COG (NP0) Capacitors (RoHS)



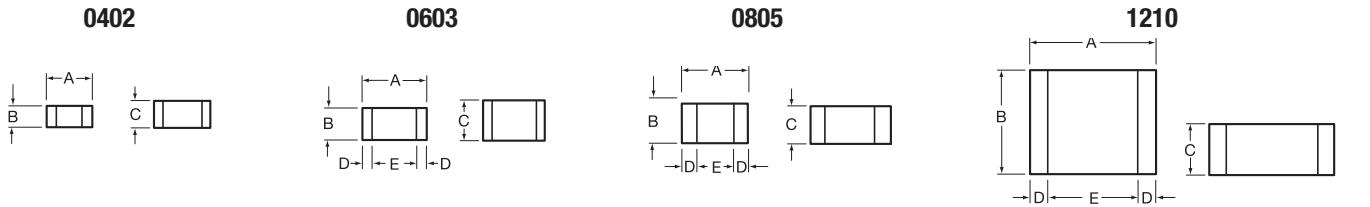
Ultra Low ESR, "U" Series, COG (NP0) Chip Capacitors

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

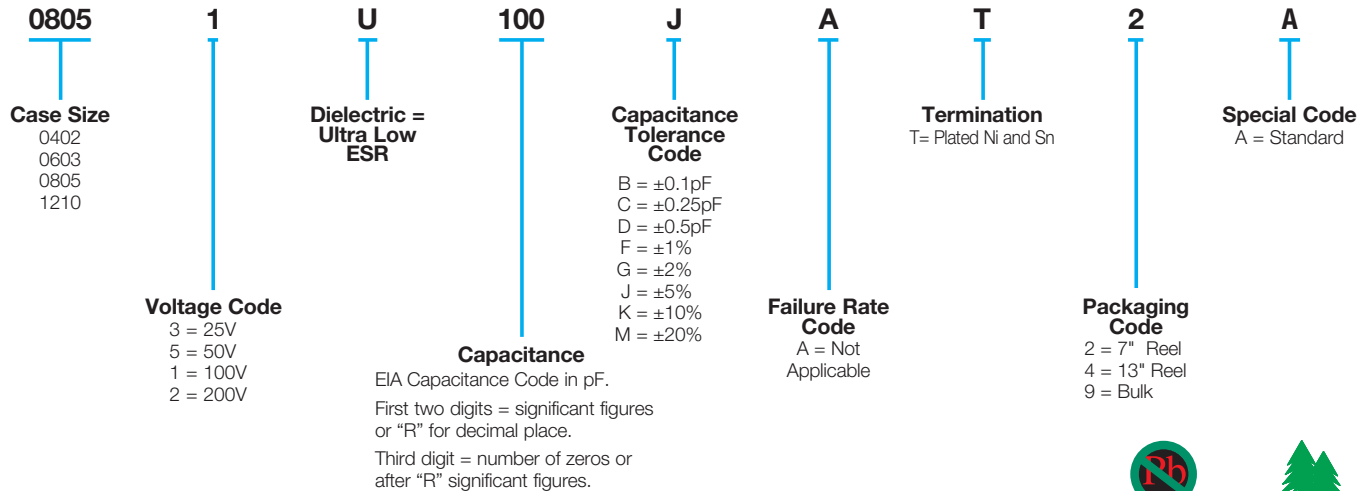
are met on each value producing lot to lot uniformity. Sizes available are EIA chip sizes 0603, 0805, and 1210.

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±0.254)	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



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 C0G (NP0) Capacitors (RoHS)



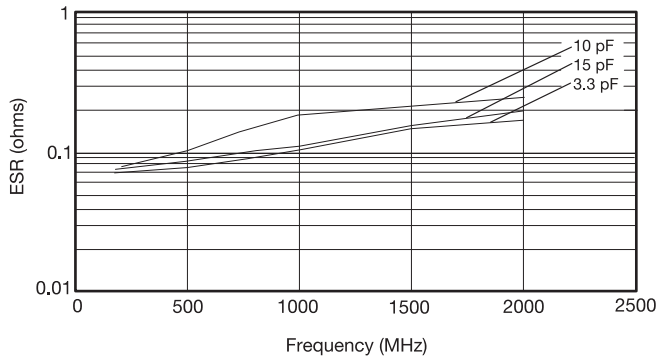
Ultra Low ESR, "U" Series, C0G (NP0) Chip Capacitors

CAPACITANCE RANGE

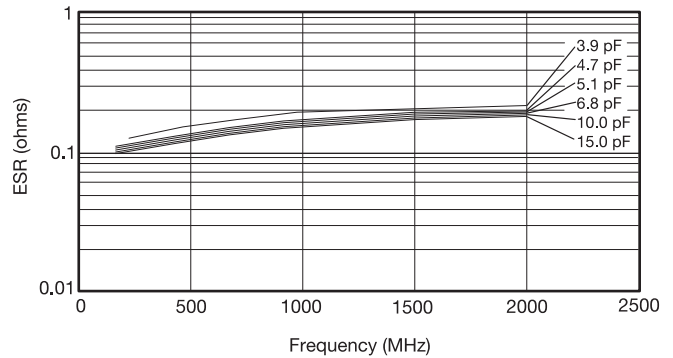
Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size				Cap (pF)	Available Tolerance	Size				
		0402	0603	0805	1210			0402	0603	0805	1210			0402	0603	0805	1210			0402	0603	0805	1210	
0.2	B,C	50V	N/A	N/A	N/A	1.0	B,C,D	50V	200V	200V	200V	100	F,G,J,K,M	N/A	100V	200V	200V	100	F,G,J,K,M	N/A	100V	200V	200V	
0.3	B,C	↓	↓	↓	↓	1.1	↓	↓	↓	↓	↓	110	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
0.4	B,C	↓	↓	↓	↓	1.2	↓	↓	↓	↓	↓	120	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
0.5	B,C,D	↓	↓	↓	↓	1.3	↓	↓	↓	↓	↓	130	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
0.6	B,C,D	↓	↓	↓	↓	1.4	↓	↓	↓	↓	↓	140	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
0.7	B,C,D	↓	↓	↓	↓	1.5	↓	↓	↓	↓	↓	150	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
0.8	B,C,D	↓	↓	↓	↓	1.6	↓	↓	↓	↓	↓	160	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
0.9	B,C,D	↓	↓	↓	↓	1.7	↓	↓	↓	↓	↓	180	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						1.8	↓	↓	↓	↓	↓	200	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						1.9	↓	↓	↓	↓	↓	220	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						2.0	↓	↓	↓	↓	↓	270	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						2.1	↓	↓	↓	↓	↓	300	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						2.2	↓	↓	↓	↓	↓	330	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						2.4	↓	↓	↓	↓	↓	360	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						2.7	↓	↓	↓	↓	↓	390	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						3.0	↓	↓	↓	↓	↓	430	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						3.3	↓	↓	↓	↓	↓	470	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						3.6	↓	↓	↓	↓	↓	510	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						3.9	↓	↓	↓	↓	↓	560	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						4.3	↓	↓	↓	↓	↓	620	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						4.7	↓	↓	↓	↓	↓	680	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						5.1	↓	↓	↓	↓	↓	750	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						5.6	↓	↓	↓	↓	↓	820	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						6.2	B,C,D	↓	↓	↓	↓	910	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
						6.8	B,C,J,K,M	↓	↓	↓	↓	1000	F,G,J,K,M	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

ULTRA LOW ESR, "U" SERIES

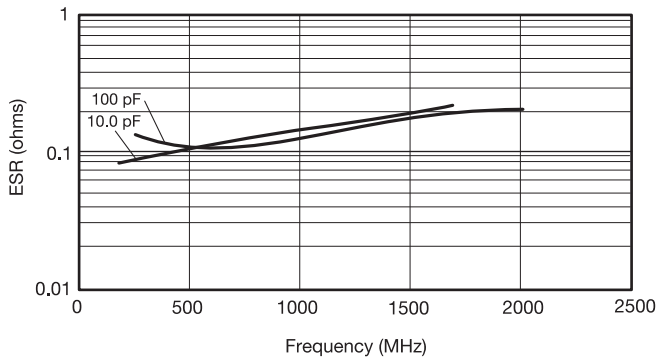
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



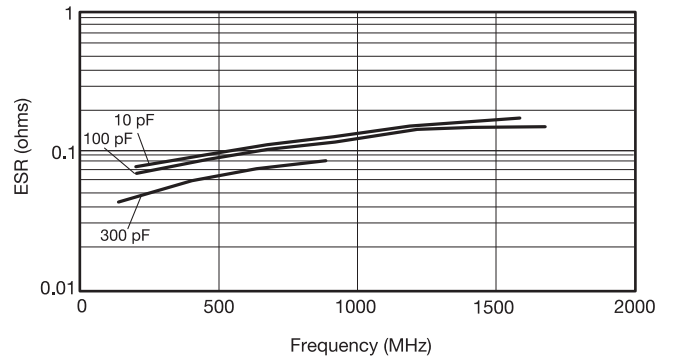
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



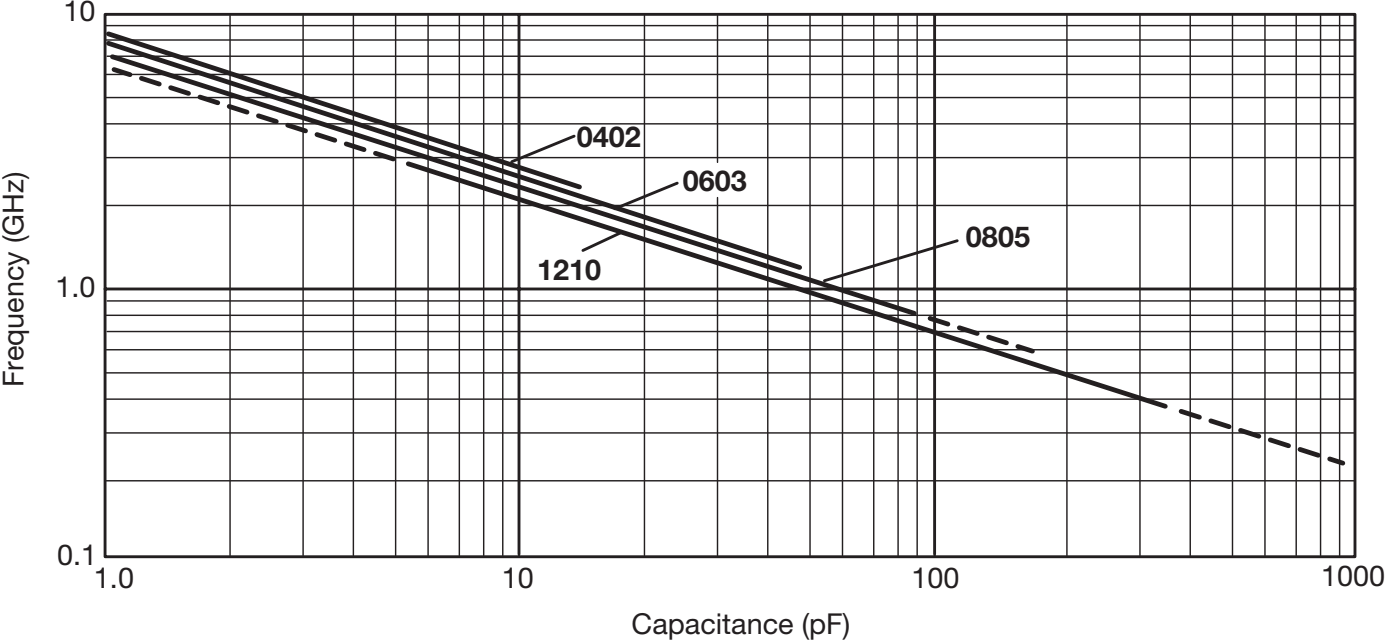
ESR Measured on the Boonton 34A

RF/Microwave C0G (NP0) Capacitors (RoHS)



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

TYPICAL
SERIES RESONANT FREQUENCY
"U" SERIES CHIP



RF/Microwave Automotive C0G (NP0) Capacitors (RoHS), AEC Q200 Qualified



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

GENERAL INFORMATION

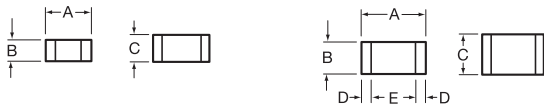
Automotive "U" Series capacitors are C0G (NP0) chip capacitors specially designed for "Ultra" low ESR for applications in the automotive market. Max ESR and effective capacitance

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

DIMENSIONS: inches (millimeters)

0402

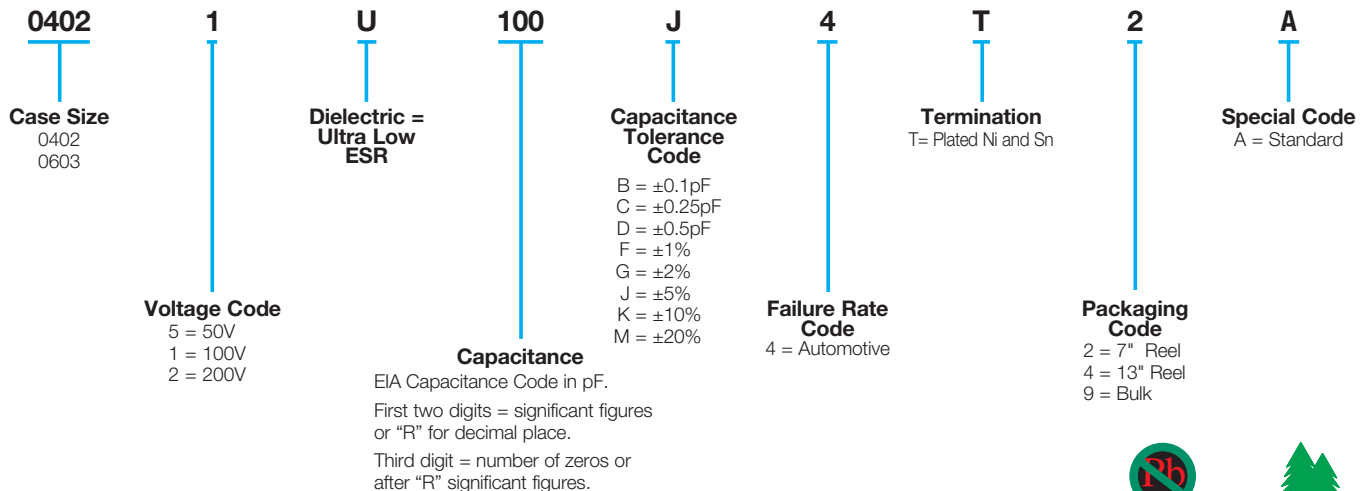
0603



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

inches (mm)

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 - 100, 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, page 303
0603 - See Performance Curve, page 303

Automotive Specifications

Meets or exceeds the requirements of AEC Q200



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

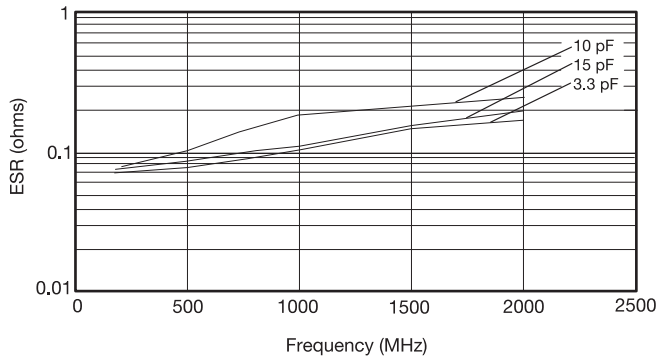
Cap (pF)	Available Tolerance	Size	
		0402	0603
1.0	B,C,D	100V	200V
1.1	↓	↓	↓
1.2			
1.3			
1.4			
1.5			
1.6			
1.7			
1.8			
1.9			
2.0			
2.1			
2.2			
2.4			
2.7			
3.0	↓ B,C,D B,C,J,K,M	↓	↓
3.3			
3.6			
3.9			
4.3			
4.7			
5.1			
5.6			
6.2			
6.8			

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

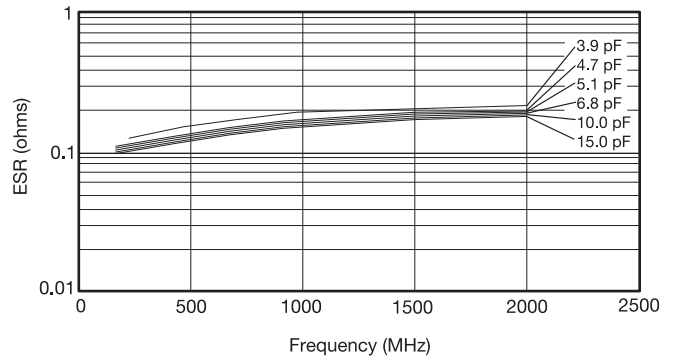
Cap (pF)	Available Tolerance	Size	
		0402	0603
100	F,G,J,K,M	N/A	100V
110	↓	↓	↓
120			
130			
140			
150			
160			
180			
200			
220			
270			
300			
330			
360			
390			
430			
470			
510			
560			
620			
680			
750			
820			
910			
1000	F,G,J,K,M	↓	↓

ULTRA LOW ESR, "U" SERIES

TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES

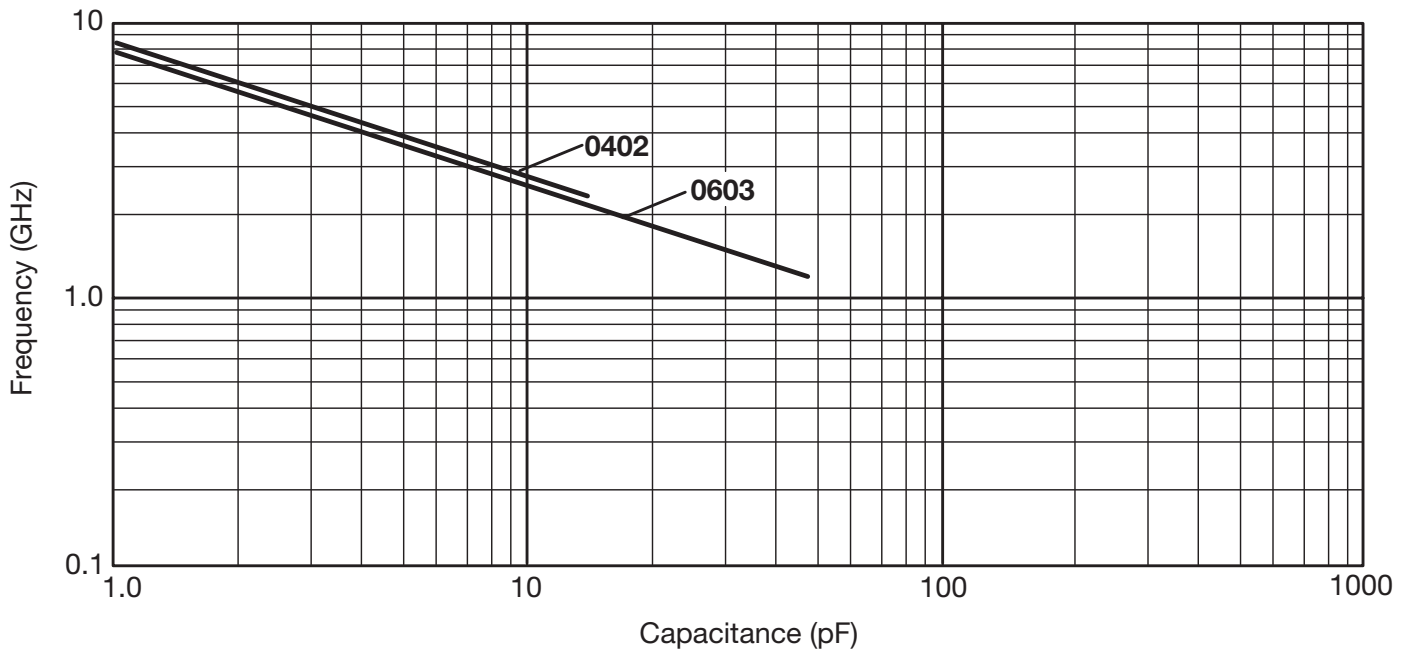


RF/Microwave Automotive C0G (NP0) Capacitors (RoHS), AEC Q200 Qualified



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

TYPICAL
SERIES RESONANT FREQUENCY
"U" SERIES CHIP



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



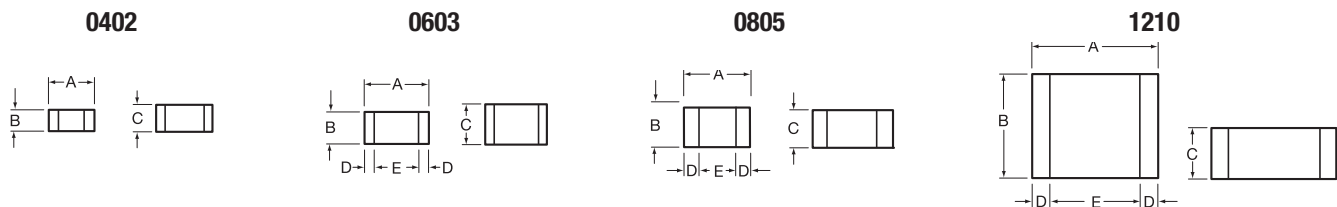
Ultra Low ESR, "U" Series, COG (NP0) Chip Capacitors

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±0.254)	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 | **1** | **U** | **100** | **J** | **A** | **B** | **2** | **A**

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

- 0402 - 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 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				

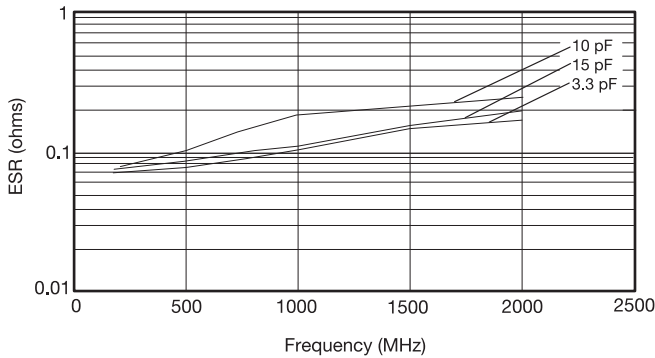
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
1.0	B,C,D	50V	200V	200V	200V
1.1					
1.2					
1.3					
1.4					
1.5					
1.6					
1.7					
1.8					
1.9					
2.0					
2.1					
2.2					
2.4					
2.7					
3.0					
3.3					
3.6					
3.9					
4.3					
4.7					
5.1					
5.6					
6.2	B,C,D				
6.8	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					
24					
27					
30		50V			
33		N/A			
36					
39					
43					
47					
51					
56					
68					
75					
82					
91					

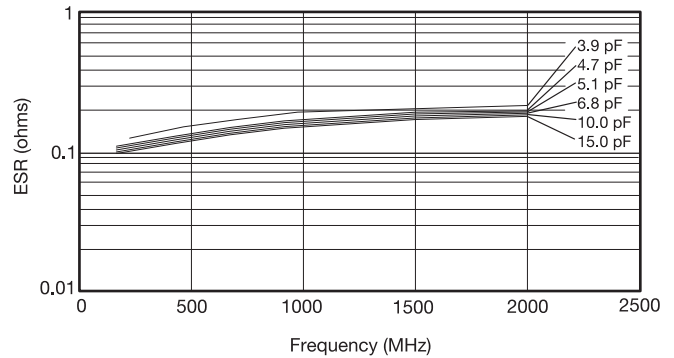
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
100	F,G,J,K,M	N/A	100V	200V	200V
110			50V		
120			50V		
130			N/A		
140					
150					
160					
180					
200					
220					
270					
300					
330					
360					
390					
430					
470					
510					
560					
620					
680					
750					
820					
910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

ULTRA LOW ESR, "U" SERIES

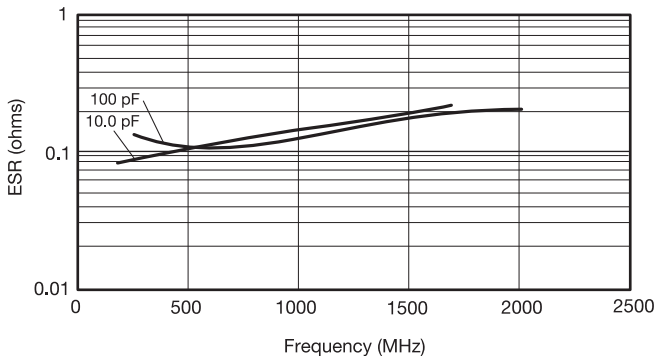
TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



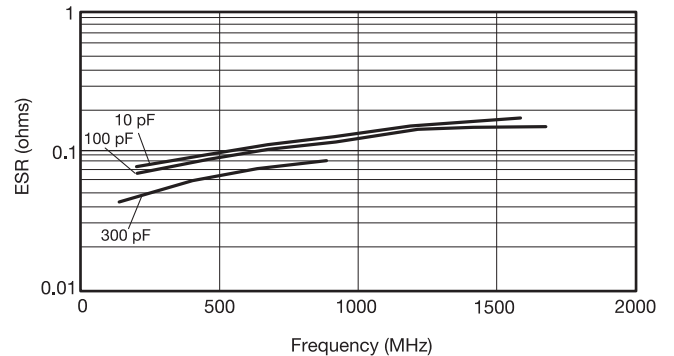
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



TYPICAL ESR vs. FREQUENCY
0805 "U" SERIES



TYPICAL ESR vs. FREQUENCY
1210 "U" SERIES



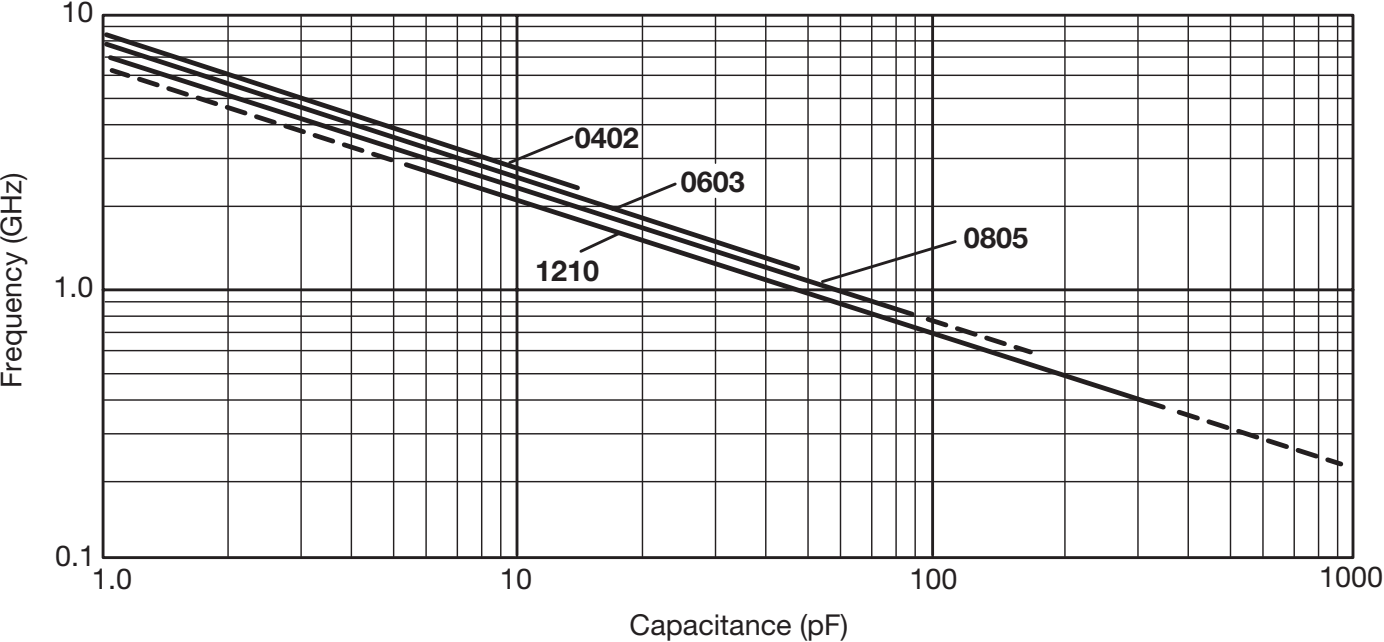
ESR Measured on the Boonton 34A

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



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

TYPICAL
SERIES RESONANT FREQUENCY
"U" SERIES CHIP



“U” Dielectric 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 ($\pm 5\%$)	
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

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