

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)



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

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

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

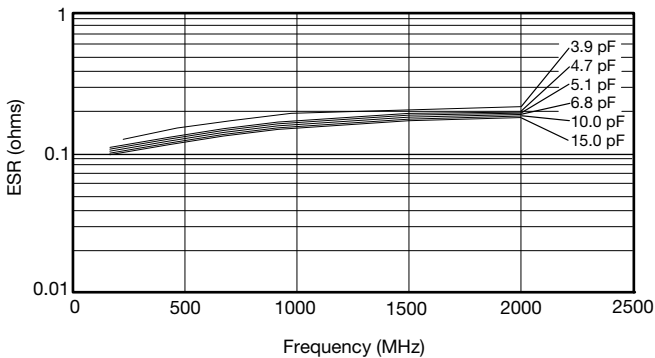
Cap (pF)	Available	Size			
	Tolerance	0402	0603	0805	1210
100	F,G,J,K,M	N/A	100V	200V	200V
110	F,G,J,K,M	↓	↓	↓	↓
120	F,G,J,K,M	↓	↓	↓	↓
130	F,G,J,K,M	↓	↓	↓	↓
140	F,G,J,K,M	↓	↓	↓	↓
150	F,G,J,K,M	↓	↓	↓	↓
160	F,G,J,K,M	↓	↓	↓	↓
180	F,G,J,K,M	↓	↓	↓	↓
200	F,G,J,K,M	↓	↓	↓	↓
220	F,G,J,K,M	↓	↓	↓	↓
270	F,G,J,K,M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

ULTRA LOW ESR, “U” SERIES

TYPICAL ESR vs. FREQUENCY
0402 “U” SERIES



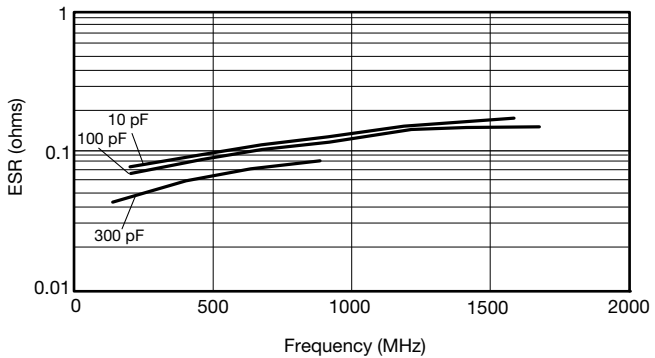
TYPICAL ESR vs. FREQUENCY
0603 “U” SERIES



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



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 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 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					
24					
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30					
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51					
56					
68					
75					
82					
91					

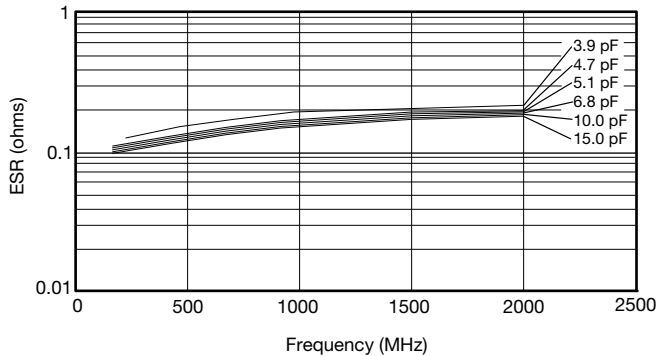
Cap (pF)	Available Tolerance	Size			
		LD02	LD03	LD05	LD10
100	F,G,J,K,M	N/A	100V	200V	200V
110			50V		
120			50V		
130			N/A		
140					
150					
160					
180					
200					
220					
270					
300					
330					
360					
390					
430					
470					
510					
560					
620					
680					
750					
820					
910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

ULTRA LOW ESR, "U" SERIES

TYPICAL ESR vs. FREQUENCY
0402 "U" SERIES



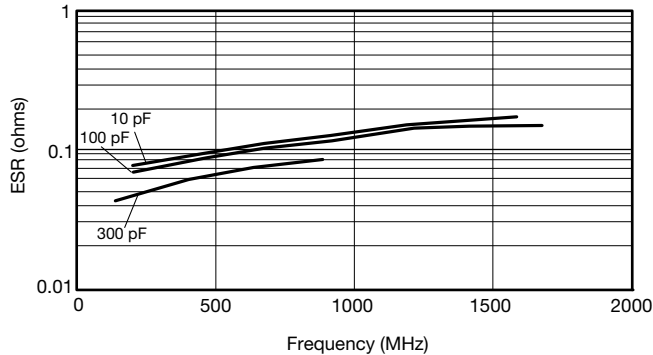
TYPICAL ESR vs. FREQUENCY
0603 "U" SERIES



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 (± 0.1 pF)	4.7	B (± 0.1 pF)
1.0		5.6	
1.5		6.8	
1.8		8.2	
2.2		10.0	J ($\pm 5\%$)
2.4		12.0	
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 (± 0.1 pF)	6.8	B (± 0.1 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 (± 0.1 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 (± 0.1 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