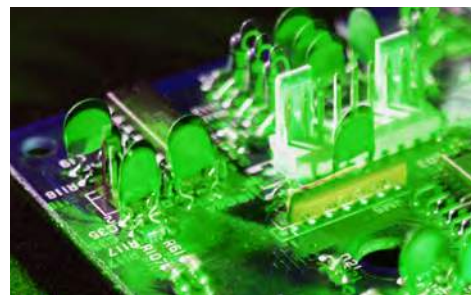
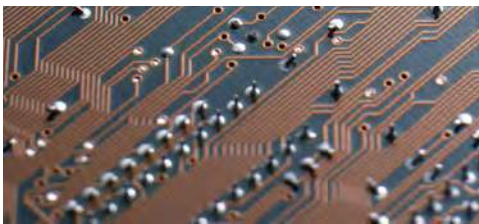




MULTI LAYER CERAMIC CAPACITORS



Ultra High Q, Low ESR Capacitors
High Q, Low ESR Capacitors
General Purpose Capacitors
0201 to 2220 case sizes
6.3 VDC to 3000 VDC
RoHS Compliant
HALOGEN Free

DESIGNING THE CUTTING EDGE

**THE NEW FRONTIER OF
PASSIVE COMPONENTS**
— Designing the Cutting Edge —

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We offer a vast array of industry standard products supported by our expansive manufacturing resources worldwide. Furthermore, Frontier has proven successful in the design and manufacturing of custom products to help our customers succeed.

Frontier's core values:

- Competitive pricing and product innovations
- Continuous improvement programs
- On-time delivery backed by over 30 years of manufacturing and logistics support teams
- Rapid response customer service
- Extensive technical support with an emphasis on design support

Frontier Electronics, Corp.

Classified by the US Dept. of Labor as a Disadvantaged Minority Women Business Enterprise.

Geographically diversified manufacturing locations (U.S., China, Taiwan)

ISO 9001:2008 and ISO TS 16949 certification

Frontier Electronics, Corp. is headquartered at:
Frontier Electronics, Corporation
667 East Cochran Street
Simi Valley, CA 93065

With global manufacturing, our products are produced in the United States, China and Taiwan.

To learn about our new product offerings, to request a quote, to request samples or for any additional information you may need, please contact us:

Frontier's website: **www.frontierusa.com**
General email: **frontiersales@frontierusa.com**
Telephone: 805-522-9998, 800-929-9888
Fax: 805-522-9989

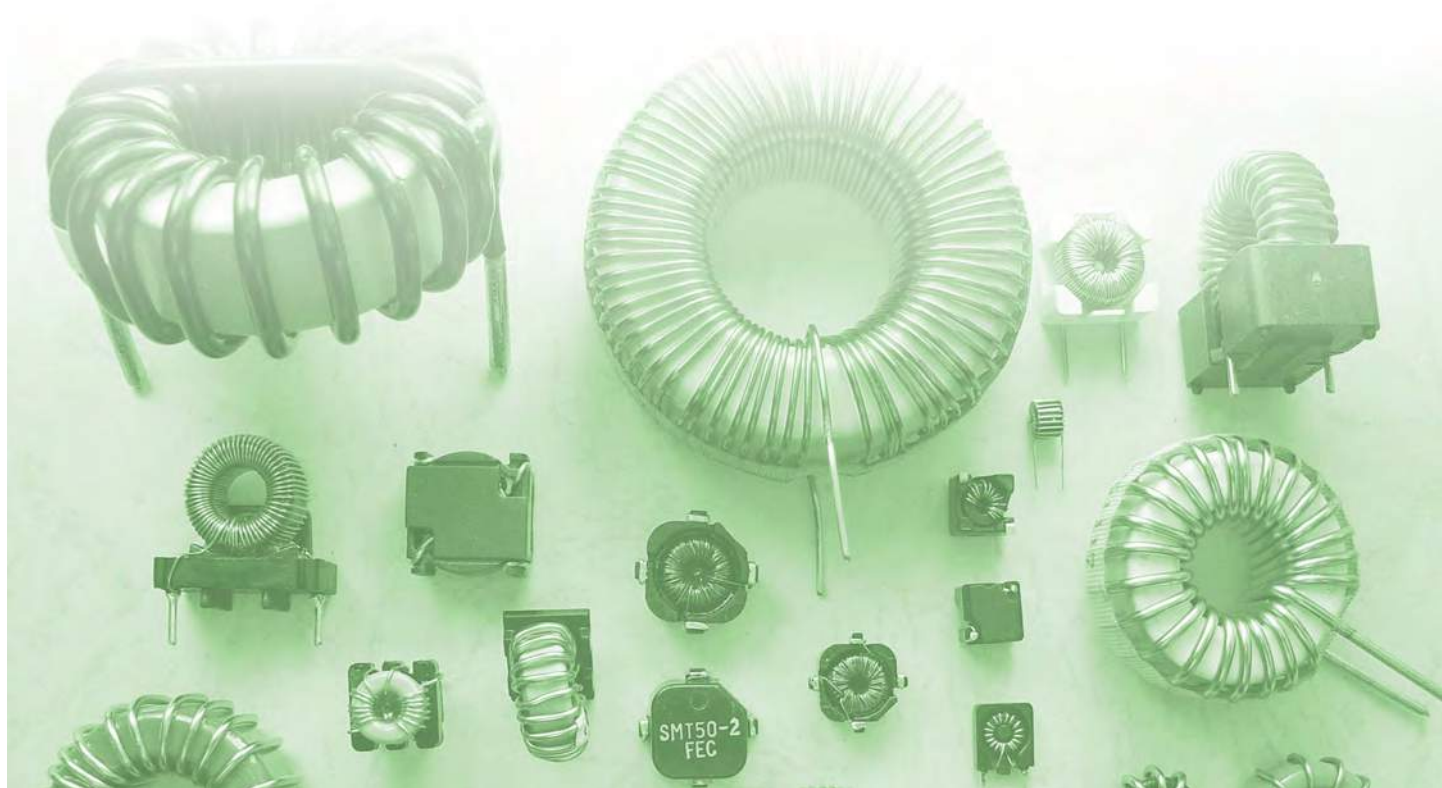
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* Frontier Electronics, Corp. reserves the right to make product design changes without notice. Frontier Electronics' standard terms and conditions are applicable to all listed products unless otherwise specified.

QUICK REFERENCE/PRODUCT SUMMARY

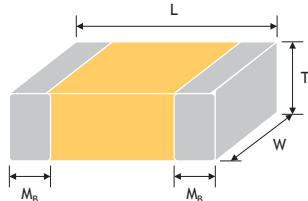
Series	Dielectric	Size	Capacitance	Voltage	Page
General Purpose G Series	NP0	0201, 0402, 0603, 0805, 1206	0.1pF ~ 39pF	6.3, 10, 16, 25, 50, 100, 200, 250 500, 630, 1,000, 2,000, 3,000	7
		1210, 1808, 1812			8
		0201, 0402, 0603, 0805, 1206	40pF ~ 47,000pF		9
		1210, 1808, 1812			10
	X7R	0201, 0402, 0603, 0805, 1206, 1210	100pF ~ 47μF	6.3, 10, 16, 25, 50, 100, 200, 250 500, 630, 1,000, 2,000, 3,000	11
		1808, 1812, 1825, 2220			12
	Y5V	0402, 0603, 0805, 1206, 1210, 1808, 1812	0.01μF ~ 100μF	6.3, 10, 16, 25, 50, 100, 200, 250	13
	X5R	0201, 0402, 0603, 0805, 1206, 1210	100pF ~ 100μF	6.3, 10, 16, 25, 50	14
Ultra High Q M Series	NP0	0201, 0402, 0603, 0805	0.1pF ~ 100pF	6.3, 10, 16, 25, 50, 100, 200, 250	18
High Q H Series	NP0	0402, 0603, 0805	0.1pF ~ 9.1pF	6.3, 10, 16, 25, 50, 100, 200, 250 500, 630	21
			10pF ~ 3300pF		22



HOW TO ORDER

0402	H	250	N	4R7	B	C	T
Size	Series	Rated Voltage (VDC)	Dielectric	Capacitance	Tolerance	Termination	Packaging
0201 (0603)	G: General Purpose	6R3=6.3	N: NP0	R47=0.47pF	A: ±0.05pF	C=Cu/Ni/Sn	T=7" Paper Tape
0402 (1005)	H: High Q, Low ESR	100=10	X: X7R	0R5=0.5pF	B: ±0.1pF		U=13" Paper Tape
0603 (1608)	M: Ultra High Q, Low ESR	160=16	W: X5R	1R0=1.0pF	C: ±0.25pF		E=7" Plastic Tape
0805 (2012)		250=25	Y: Y5V	100=10pF	D: ±0.5pF		Q=13" Plastic Tape
1206 (3216)		500=50		101=100pF	F: ±1%		Z or blank=Bulk
1210 (3225)		101=100			G: ±2%		
1808 (4520)		201=200			J: ±5%		
1812 (4532)		251=250			K: ±10%		
1825 (4563)		501=500			M: ±20%		
2220 (5750)		631=630			Z: -20/+80%		
		102=1,000					
		202=2,000					
		302=3,000					

EXTERNAL DIMENSIONS

Outline	Case Size EIA (mm)	L (mm)	W (mm)	T (mm)	Soldering Method *	M _B (mm)		
	0201 (0603)	0.6±0.03	0.3±0.03	0.3±0.03	R	0.15±0.05		
	0402 (1005)	1.00±0.05	0.50±0.05	0.50±0.05	R	0.25 +0.05/-0.1		
		1.00±0.20	0.50±0.20	0.50+0.02/-0.05				
	0603 (1608)	1.60±0.10	0.80±0.10	0.80±0.07	R / W	0.40±0.15		
		1.60+0.15/-0.10	0.80+0.15/-0.10	0.50±0.10				
		1.60±0.20 ^{#1}	0.80±0.20 ^{#1}	0.80+0.15/-0.10				
	0805 (2012)	2.00±0.15	1.25±0.10	0.50±0.10	R / W	0.50±0.20		
				0.60±0.10	R / W			
				0.80±0.10	R / W			
		2.00±0.20	1.25±0.20	1.25±0.10	R			
				0.85±0.10	R / W			
				1.25±0.20	R			
	1206 (3216)	3.20±0.15	1.60±0.15	0.80±0.10	R / W	0.60±0.20 (0.5±0.25) ^{***}		
				0.95±0.10	R			
				1.25±0.10	R			
		3.20±0.20	1.60±0.20	1.15±0.15	R			
				1.60±0.20	R			
				0.85±0.10	R / W			
	1210 (3225)	3.20+0.30/-0.10	1.60 +0.30/-0.10	1.60+0.30/-0.10	R	0.75±0.25		
				3.20±0.30	2.50±0.20		0.95±0.10	R
							0.85±0.10	
		3.20±0.40	2.50±0.30	1.25±0.10	R			
				1.60±0.20				
	1808 (4520)	4.50±0.40 (4.5+0.5/-0.3) ^{**}	2.03±0.25	2.00±0.20	R	0.75±0.25 (0.5±0.25) ^{***}		
				1.40±0.15				
				1.60±0.20				
				2.00±0.20				
	1812 (4532)	4.50±0.40 (4.5+0.5/-0.3) ^{**}	3.20±0.30	1.25±0.10	R	0.75±0.25 (0.5±0.25) ^{***}		
1.60±0.20								
3.20±0.40			2.00±0.20					
			2.50±0.30					
2220 (5750)	5.70±0.40	5.00±0.40	2.80±0.30	R	0.75±0.25			
			2.0±0.20					
		4.50±0.40		2.5±0.30	R	0.75±0.25		

* R = Reflow soldering process; W = Wave soldering process

** For 1808 (200~3kV), 1812 (200V~3kV)

*** For 1206 (1000V ~3kV), 1808 (200~3kV), 1812 (200~3kV)

#1 For 0603/X5R/6.3V/Cap≥10μF



SIZE CODES/PACKAGING STYLE & QUANTITY

Case Size	Size Code	Max Thickness	Length	Width	Thickness	Paper Tape		Embossed Plastic Tape	
						7" Reel	13" Reel	7" Reel	13" Reel
0201	AA	0.33	0.6 ± 0.03	0.3 ± 0.03	0.3 ± 0.03	15,000	70,000		
0402	BA	0.55	1.0 ± 0.05	0.5 ± 0.05	0.5 ± 0.05	10,000	50,000		
0402	BC	0.7	1.0 ± 0.2	0.5 ± 0.2	0.5 ± 0.2	10,000	-		
0603	CA	0.87	1.6 ± 0.1	0.8 ± 0.1	0.8 ± 0.07	4,000	15,000		
0603	CC	0.95	1.6 +0.15/-0.1	0.8 +0.15/-0.1	0.8 ± +0.15/-0.1	4,000	15,000		
0603	CD	1	1.6 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	4,000	15,000		
0805	DB	0.7	2.0 ± 0.15	1.25 ± 0.1	0.6 ± 0.1	4,000	15,000		
0805	DC	0.9	2.0 ± 0.15	1.25 ± 0.1	0.8 ± 0.1	4,000	15,000		
0805	DD	1.35	2.0 ± 0.15	1.25 ± 0.1	1.25 ± 0.1			3,000	10,000
0805	DE	0.95	2.0 ± 0.2	1.25 ± 0.2	0.85 ± 0.1	4,000	15,000		
0805	DF	1.45	2.0 ± 0.2	1.25 ± 0.2	1.25 ± 0.2			3,000	10,000
1206	EA	0.9	3.2 ± 0.15	1.6 ± 0.15	0.8 ± 0.1	4,000	15,000		
1206	EB	1.05	3.2 ± 0.15	1.6 ± 0.15	0.95 ± 0.1			3,000	10,000
1206	EC	1.35	3.2 ± 0.15	1.6 ± 0.15	1.25 ± 0.1			3,000	10,000
1206	ED	1.3	3.2 ± 0.2	1.6 ± 0.15	1.15 ± 0.15			3,000	10,000
1206	EE	1.8	3.2 ± 0.2	1.6 ± 0.2	1.6 ± 0.2			2,000	10,000
1206	EG	2.1	3.2 +0.3/-0.1	1.6 +0.3/-0.1	1.8 +0.3/-0.1			2,000	9,000
1206	EL	1.8	3.2 ± 0.2	1.6 ± 0.2	1.6 ± 0.2			2,000	10,000
1210	FA	1.05	3.2 ± 0.3	2.5 ± 0.2	0.95 ± 0.1			3,000	10,000
1210	FC	1.35	3.2 ± 0.3	2.5 ± 0.2	1.25 ± 0.1			3,000	10,000
1210	FD	1.8	3.2 ± 0.4	2.5 ± 0.3	1.6 ± 0.2			2,000	-
1210	FE	2.2	3.2 ± 0.4	2.5 ± 0.3	2.0 ± 0.2			1,000	6,000
1210	FF	2.8	3.2 ± 0.4	2.5 ± 0.3	2.5 ± 0.3			1,000	6,000
1210	FL	1.45	3.2 ± 0.4	2.5 ± 0.2	1.25 ± 0.2			3,000	10,000
1210	FM	1.45	3.2 ± 0.4	2.5 ± 0.2	1.25 ± 0.2			3,000	10,000
1808	GE	1.35	4.5 +0.5/-0.3	2.03 ± 0.25	1.25 ± 0.1			2,000	10,000
1808	GH	2.2	4.5 +0.5/-0.3	2.03 ± 0.25	2.0 ± 0.2			1,000	6,000
1808	GK	1.35	4.5 ± 0.4	2.03 ± 0.25	1.25 ± 0.1			2,000	10,000
1808	GL	1.8	4.5 ± 0.4	2.03 ± 0.25	1.6 ± 0.2			2,000	8,000
1812	HA	1.35	4.5 ± 0.4	3.2 ± 0.3	1.25 ± 0.1			1,000	5,000
1812	HC	2.2	4.5 ± 0.4	3.2 ± 0.3	2.0 ± 0.2			1,000	-
1812	HD	2.8	4.5 ± 0.4	3.2 ± 0.4	2.5 ± 0.3			500	3,000
1812	HN	1.8	4.5 +0.6/-0.4	3.2 ± 0.3	1.6 ± 0.2			1,000	-
1812	HO	2.2	4.5 +0.6/-0.4	3.2 ± 0.3	2.0 ± 0.2			1,000	-
1812	HP	2.7	4.5 +0.6/-0.4	3.2 ± 0.4	2.5 ± 0.2			500	3,000
1825	IA	2.2	4.5 ± 0.4	6.3 ± 0.4	2.0 ± 0.2			1,000	-
1825	IB	2.7	4.5 ± 0.4	6.3 ± 0.4	2.5 ± 0.2			500	3,000
2220	JA	2.2	5.7 ± 0.4	5.0 ± 0.4	2.0 ± 0.2			1,000	-
2220	JB	2.8	4.5 ± 0.4	5.0 ± 0.4	2.5 ± 0.3			500	-



GENERAL PURPOSE (G SERIES)

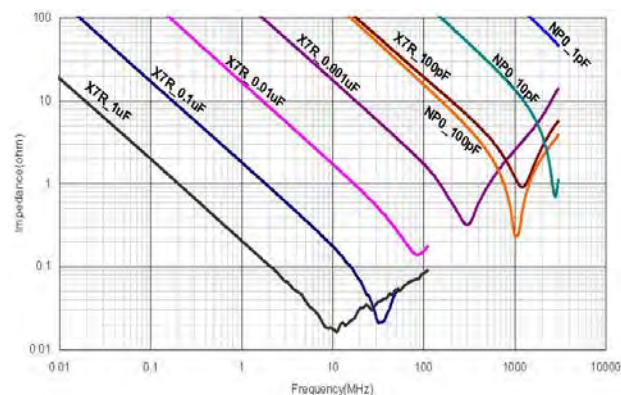
Part Number Description

1206	G	250	Y	101	Z	C	T
Size	Series	Voltage	Dielectric	Capacitance	Tolerance	Termination	Packaging
1206 (3216)	G (General Purpose)	250=25 VDC	Y=Y5V	101=100pF	Z=-20%/+80%	C=Cu/Ni/Sn	T=7" Paper Tape

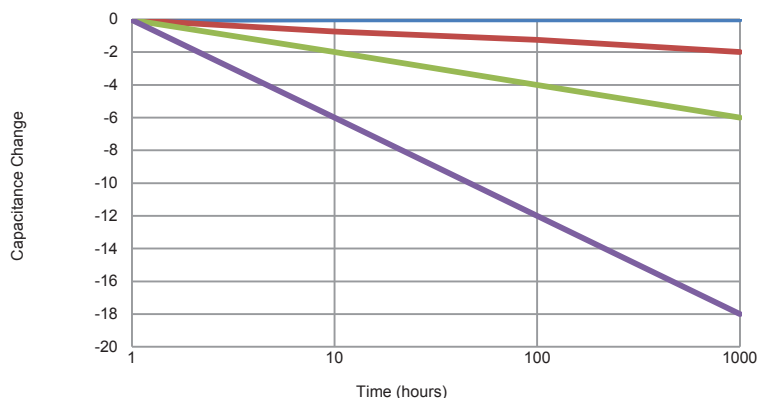
General Electrical Data

Dielectric	NP0	X7R	X5R	Y5V
Size	0201, 0402, 0603, 0805, 1206, 1210, 1808, 1812	0201, 0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220	0201, 0402, 0603, 0805, 1206, 1210	0402, 0603, 0805, 1206, 1210, 1808, 1812
Capacitance range	0.1pF to 0.047μF	100pF to 47μF	100pF to 100μF	0.01μF to 100μF
Capacitance tolerance	Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%), K (±10%)	J (±5%) K (±10%) M (±20%)	K (±10%) M (±20%)	M (±20%) Z (-20/+80%)
Rated voltage (VDC)	6.3, 10, 16, 25, 50, 100, 200, 250, 500, 630, 1,000, 2,000, 3,000		6.3, 10, 16, 25, 50	6.3, 10, 16, 25, 50, 100, 200, 250
Operating temperature	-55 to +125°C		-55 to +85°C	-25 to +85°C
Capacitance characteristic	±30ppm	±15%	±15%	-0.375
Insulation resistance at Ur	Ur=200~630V: ≥10GΩ or RxC≥100Ω·F (whichever is lower) Ur=1000~3000V: ≥10GΩ			
Dielectric Strength	<200V: ≥2.5 x VDC 200~300V: ≥2 x VDC 500~999V: ≥1.5 x VDC 1000~3000V: ≥1.2 x VDC *Duration: 1 to 5 seconds *Charge and discharge current less than 50mA			
Termination	Ni/Sn (lead-free termination)			

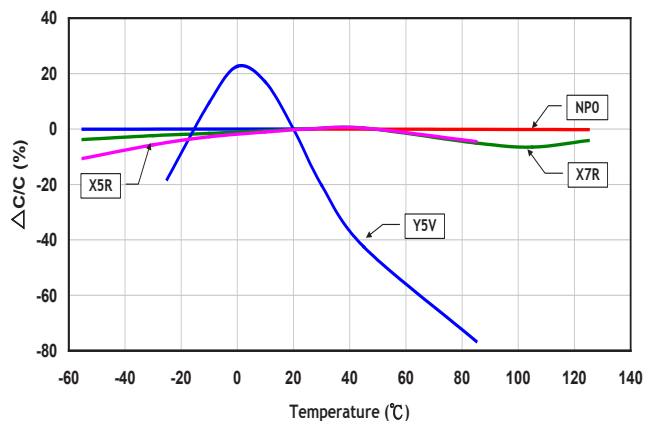
Electrical Characteristics



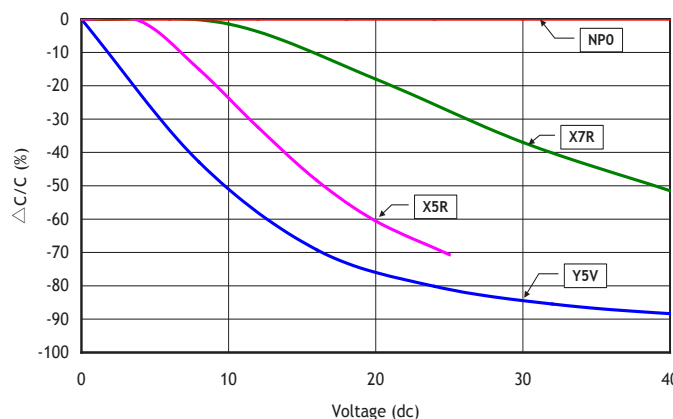
Typical Impedance vs. Frequency



Capacitance Change – Typical Aging Rate



Temperature Coefficient of Capacitance (TCC)



DC Bias Characteristics



GENERAL PURPOSE (G SERIES)

General Purpose (G Series) NP0 Dielectric, 0R1 (0.1pF) – 390 (39pF)																																			
		Tolerance	0201		0402			0603				0805						1206																	
			6.3		6.3			6.3				200	6.3						500	6.3					250										
			10		10			10						10						630	10					500									
			DC Volts	DC Volts			DC Volts				DC Volts						DC Volts																		
0R1	0.1 pF	*B *C			BA	BA																													
0R2	0.2 pF				BA	BA																													
0R3	0.3 pF		AA	AA	BA	BA			CA	CA																									
R33	0.33 pF								CA	CA																									
0R4	0.4 pF		AA	AA	BA	BA																													
R47	0.47 pF		AA	AA	BA	BA			CA	CA				DB	DB																				
0R5	0.5 pF		AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB																
R56	0.56 pF		AA	AA	BA	BA			CA	CA				DB	DB																				
0R6	0.6 pF		AA	AA	BA	BA	BA		CA	CA	CA			DB	DB	DB																			
R68	0.68 pF				BA	BA			CA	CA				DB	DB	DB																			
0R7	0.7 pF		AA	AA	BA	BA	BA		CA	CA	CA			DB	DB	DB																			
R75	0.75 pF		AA		BA	BA			CA	CA	CA	CA		DB	DB																				
0R8	0.8 pF		AA		BA	BA	BA		CA	CA	CA			DB	DB	DB																			
R82	0.82 pF				BA	BA			CA	CA				DB	DB																				
0R9	0.9 pF		AA		BA	BA	BA		CA	CA	CA			DB	DB	DB																			
1R0	1.0 pF		AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA													
1R1	1.1 pF		AA	AA	BA	BA			CA	CA				DB	DB						EA	EA													
1R2	1.2 pF		AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA										
1R3	1.3 pF		AA	AA	BA	BA			CA	CA				DB	DB						EA	EA													
1R4	1.4 pF								CA	CA																									
1R5	1.5 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
1R6	1.6 pF	AA		BA	BA			CA	CA				DB	DB						EA	EA														
1R8	1.8 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
2R0	2.0 pF	AA	AA	BA	BA	BA		CA	CA	CA			DB	DB	DB	DB	DB		EA	EA															
2R2	2.2 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
2R4	2.4 pF	AA	AA	BA	BA			CA	CA	CA	CA		DB	DB						EA	EA														
2R5	2.5 pF			BA	BA			CA	CA				DB	DB																					
2R7	2.7 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
3R0	3.0 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA														
3R3	3.3 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
3R5	3.5 pF			BA	BA			CA	CA				DB	DB																					
3R6	3.6 pF	AA	AA	BA	BA			CA	CA				DB	DB						EA	EA														
3R9	3.9 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
4R0	4.0 pF	AA	AA	BA	BA	BA		CA	CA	CA			DB	DB	DB	DB	DB	DB		EA	EA														
4R3	4.3 pF	AA	AA	BA	BA			CA	CA	CA			DB	DB	DB					EA	EA														
4R7	4.7 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
5R0	5.0 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
5R1	5.1 pF			BA	BA			CA	CA	CA	CA		DB	DB						EA	EA														
5R6	5.6 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
6R0	6.0 pF	AA	AA	BA	BA	BA		CA	CA				DB	DB						EA	EA														
6R2	6.2 pF	AA	AA	BA	BA			CA	CA				DB	DB	DB					EA	EA														
6R8	6.8 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
7R0	7.0 pF	AA	AA	BA	BA	BA		CA	CA				DB	DB						EA	EA														
7R5	7.5 pF	AA	AA	BA	BA			CA	CA	CA			DB	DB	DB					EA	EA	EA													
8R0	8.0 pF	AA	AA	BA	BA	BA		CA	CA				DB	DB						EA	EA														
8R2	8.2 pF	AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
9R0	9.0 pF	AA	AA	BA	BA			CA	CA				DB	DB						EA	EA														
9R1	9.1 pF	AA	AA	BA	BA			CA	CA	CA			DB	DB	DB					EA	EA														
100	10 pF	*F *G *J *K	AA	AA	BA	BA	BA	CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
110	11 pF		AA		BA	BA			CA	CA				DB	DB					EA	EA														
120	12 pF		AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
130	13 pF		AA	AA	BA	BA			CA	CA				DB	DB						EA	EA													
140	14 pF				BA	BA			CA	CA				DB	DB																				
150	15 pF		AA	AA	BA	BA	BA		CA	CA	CA	CA		DB	DB	DB	DB	DB	DB		EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
160	16 pF		AA		BA	BA			CA	CA	CA																								

GENERAL PURPOSE (G SERIES)

General Purpose (G Series) NP0 Dielectric, 0R1 (0.1pF) – 390 (39pF)

		Tolerance	1210						1808						1812									
			6.3 10 16 25			200 250 500 630			6.3 10 16 25	50 100 200 250					6.3 10 16 25		50 100 200		250 630 500					
				50	100		1000	2000		250	250	630	1000	2000	3000		25	100	200	250	630	1000	2000	3000
			DC Volts						DC Volts						DC Volts									
0R1	0.1 pF	*B *C																						
0R2	0.2 pF																							
0R3	0.3 pF																							
R33	0.33 pF																							
0R4	0.4 pF																							
R47	0.47 pF																							
0R5	0.5 pF																							
R56	0.56 pF																							
0R6	0.6 pF																							
R68	0.68 pF																							
0R7	0.7 pF																							
R75	0.75 pF																							
0R8	0.8 pF																							
R82	0.82 pF																							
0R9	0.9 pF																							
1R0	1.0 pF																							
1R1	1.1 pF																							
1R2	1.2 pF																							
1R3	1.3 pF																							
1R4	1.4 pF																							
1R5	1.5 pF																							
1R6	1.6 pF																							
1R8	1.8 pF																							
2R0	2.0 pF																							
2R2	2.2 pF							GE	GE	GE	GE	GE	GE											
2R4	2.4 pF																							
2R5	2.5 pF																							
2R7	2.7 pF							GE	GE	GE	GE	GE	GE											
3R0	3.0 pF							GE	GE	GE	GE	GE	GE											
3R3	3.3 pF	FA	FA	FA				GE	GE	GE	GE	GE	GE											
3R5	3.5 pF																							
3R6	3.6 pF																							
3R9	3.9 pF	FA	FA	FA				GE	GE	GE	GE	GE	GE											
4R0	4.0 pF																							
4R3	4.3 pF																							
4R7	4.7 pF	FA	FA	FA				GE	GE	GE	GE	GE	GE											
5R0	5.0 pF							GE	GE	GE	GE	GE	GE											
5R1	5.1 pF																							
5R6	5.6 pF	FA	FA	FA				GE	GE	GE	GE	GE	GE											
6R0	6.0 pF																							
6R2	6.2 pF																							
6R8	6.8 pF	FA	FA	FA				GE	GE	GE	GE	GE	GE											
7R0	7.0 pF																							
7R5	7.5 pF																							
8R0	8.0 pF																							
8R2	8.2 pF	FA	FA	FA				GE	GE	GE	GE	GE	GE											
9R0	9.0 pF																							
9R1	9.1 pF																							
100	10 pF	*F *G *J *K	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA	HA	HA	HA	HA	HA	HA	
110	11 pF		FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA	HA	HA	HA	HA	HA	HA	
120	12 pF																							
130	13 pF																							
140	14 pF																							
150	15 pF		FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA	HA	HA	HA	HA	HA	HA	
160	16 pF																							
170	17 pF																							
180	18 pF		FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA	HA	HA	HA	HA	HA	HA	
200	20 pF																							
210	21 pF																							
220	22 pF		FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA	HA	HA	HA	HA	HA	HA	
230	23 pF																							
240	24 pF																							
250	25 pF																							
270	27 pF		FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA	HA	HA	HA	HA	HA	HA	
300	30 pF																							
330	33 pF		FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA	HA	HA	HA	HA	HA	HA	
350	35 pF																							
360	36 pF																							
390	39 pF	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA	HA	HA	HA	HA	HA	HA		

*B, *C, *F, *G Tolerance available for 100 volts and lower

*B, *C, *F, *G Tolerance available for 100 volts and lower

The code in the cell indicates the dimensions and packaging quantity. The definitions can be found on page 5.



GENERAL PURPOSE (G SERIES)

General Purpose (G Series) NP0 Dielectric, 400 (40pF) – 473 (47,000pF)

[illegible]

*F. *G Tolerance available for 100 volts and lower

The code in the cell indicates the dimensions and packaging quantity. The definitions can be found on page 5.

GENERAL PURPOSE (G SERIES)

General Purpose (G Series) NP0 Dielectric, 400 (40pF) – 473 (47,000pF)

	Tolerance	1210						1808						1812								
		6.3		200				6.3	50					6.3								
		10		250				10	100					10								
		16		500				16	200					16	50							
		25	50	100	630	1000	2000	25	250	630	1000	2000	3000	25	100	200	250	500	630	1000	2000	3000
DC Volts							DC Volts							DC Volts								
400	40 pF																					
430	43 pF																					
470	47 pF	FA	FA	FA	FA	FA	FA	GE	GE	GE	GE	GE	GE	HA	HA	HA	HA	HA	HA	HA	HA	HA
500	50 pF																					
510	51 pF																					
560	56 pF	FA	FA	FA	FA	FA	FC	GE	GE	GE	GE	GE	GE	HA	HA	HA	HA	HA	HA	HA	HA	HA
600	60 pF																					
620	62 pF																					
680	68 pF	FA	FA	FA	FA	FA	FC	GE	GE	GE	GE	GE	GE	HA	HA	HA	HA	HA	HA	HA	HA	HA
700	70 pF																					
750	75 pF																					
800	80 pF																					
820	82 pF	FA	FA	FA	FA	FA	FC	GE	GE	GE	GE	GE	GE	HA	HA	HA	HA	HA	HA	HA	HA	HA
910	91 pF																					
101	100 pF	FA	FA	FA	FA	FC	FC	GE	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HA	HA	HA	HA
111	110 pF																					
121	120 pF	FA	FA	FA	FA	FC	FC	GE	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HA	HA	HA	HA
131	130 pF																					
151	150 pF	FA	FA	FA	FA	FC	FD	GE	GE	GE	GE	GH	GH	HA	HA	HA	HA	HA	HA	HA	HA	HA
161	160 pF																					
181	180 pF	FA	FA	FA	FA	FC	FD	GE	GE	GE	GE	GH	GH	HA	HA	HA	HA	HA	HA	HA	HA	HC
201	200 pF																					
221	220 pF	FA	FA	FA	FA	FD	FD	GH	GH	GH	GH	GH	GH	HA	HA	HA	HA	HA	HA	HA	HA	HC
241	240 pF																					
251	250 pF																					
271	270 pF	FA	FA	FA	FA	FD		GH	GH	GH	GH	GH	GH	HA	HA	HA	HA	HA	HA	HA	HC	HC
301	300 pF							GH	GH	GH	GH	GH	GH									
331	330 pF	FA	FA	FA	FA	FD		GH	GH	GH	GH	GH	GH	HA	HA	HA	HA	HA	HA	HA	HC	HC
361	360 pF	FA																				
391	390 pF	FA	FA	FA	FA	FD		GH	GH	GH	GH	GH		HA	HA	HA	HA	HA	HA	HA	HC	HC
431	430 pF																					
471	470 pF	FA	FA	FA	FA	FD		GH	GH	GH	GH	GH		HC	HC	HC	HC	HA	HC	HC	HC	
501	500 pF																					
511	510 pF																					
561	560 pF	FA	FA	FA	FA			GH	GH	GH	GH	GH		HA	HA	HA	HA	HA	HA	HC	HC	
621	620 pF																					
681	680 pF	FA	FA	FA	FA			GH	GH	GH	GH	GH		HA	HA	HA	HA	HA	HA	HC	HC	
751	750 pF																					
821	820 pF	FA	FA	FA	FA			GH	GH	GH	GH	GH		HA	HA	HA	HA	HA	HA	HC	HC	
911	910 pF																					
102	1,000 pF	FA	FA	FA	FC			GH	GH	GH	GH			HA	HA	HA	HA	HA	HA	HC	HC	
112	1,100 pF																					
122	1,200 pF	FA	FA	FA	FC									HA	HA	HA	HA	HA	HA	HC		
132	1,300 pF																					
152	1,500 pF	FA	FA	FA	FC									HA	HA	HA	HA	HA	HA	HC		
162	1,600 pF																					
182	1,800 pF	FA	FA	FA	FC									HA	HA	HA	HA	HA				
202	2,000 pF																					
222	2,200 pF	FA	FA	FA	FC									HA	HA	HA	HA	HA				
272	2,700 pF	FA	FA	FA	FC									HA	HA	HA	HA	HA				
302	3,000 pF																					
332	3,300 pF	FA	FA	FA	FC									HA	HA	HA	HA	HA				
362	3,600 pF																					
392	3,900 pF	FA	FA	FA	FC									HA	HA	HA						
432	4,300 pF																					
472	4,700 pF	FA	FA	FA										HA	HA	HA						
512	5,100 pF																					
562	5,600 pF	FA	FA	FA	FC									HA	HA	HA						
622	6,200 pF																					
682	6,800 pF	FA	FA	FA										HA	HA	HA						
752	7,500 pF																					
822	8,200 pF	FA	FA	FA										HA	HA							
103	10,000 pF	FA	FA	FA										HA	HA							
123	12,000 pF	FA	FC	FC										HA	HA							
153	15,000 pF	FA	FA	FC										HA	HA							
183	18,000 pF													HA	HA							
223	22,000 pF													HA	HA							
273	27,000 pF													HA	HA							
333	33,000 pF													HA	HA							
393	39,000 pF													HA	HA							
473	47,000 pF													HA	HA							

*F, *G Tolerance available for 100 volts and lower

The code in the cell indicates the dimensions and packaging quantity. The definitions can be found on page 5.



GENERAL PURPOSE (G SERIES)

General Purpose (G Series) X7R Dielectric																													
	Tolerance	0201		0402		0603				0805				1206				1210											
		6.3	25	6.3	10	6.3	25	100	200	6.3	25	100	200	500	6.3	10	200	500	6.3	16	200	500							
		10	16	50	16	25	50	10	16	25	50	100	250	630	25	50	100	250	630	1K	2K	10	25	50	100	250	630	1K	2K
		DC Volts		DC Volts		DC Volts				DC Volts				DC Volts				DC Volts											
101	100 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
121	120 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
131	130 pF							CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
151	150 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
161	160 pF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
181	180 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
201	200 pF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
221	220 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
241	240 pF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
271	270 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
301	300 pF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
331	330 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
361	360 pF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
391	390 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
431	430 pF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
471	470 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
501	500 pF							CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
511	510 pF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
561	560 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
621	620 pF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
681	680 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
751	750 pF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
821	820 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
102	1,000 pF	AA	AA	AA	BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
122	1,200 pF	AA	AA		BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
152	1,500 pF	AA	AA		BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
182	1,800 pF	AA	AA		BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
202	2,000 pF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
222	2,200 pF	AA	AA		BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
272	2,700 pF	AA	AA		BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
302	3,00 pF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
332	3,300 pF	AA	AA		BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
392	3,900 pF	AA	AA		BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
472	4,700 pF	AA	AA		BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
502	5,000 pF							CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
562	5,600 pF	AA			BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
682	6,800 pF	AA			BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
822	8,200 pF	AA			BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
103	10,000 pF	AA	AA		BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
123	12,000 pF				BA	BA		CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
153	15,000 pF				BA	BA		CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
183	18,000 pF				BA	BA		CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
203	20,000 pF				BA	BA		CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
223	22,000 pF				BA	BA		CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
273	27,000 pF				BA	BA		CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
333	33,000 pF				BA	BA		CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
393	39,000 pF				BA	BA		CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
473	47,000 pF				BA	BA		CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
563	56,000 pF				BA	BA		CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
683	68,000 pF				BA			CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
823	82,000 pF				BA			CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
104	0.1 μF				BA	BA	BA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
124	0.12 μF							CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
154	0.15 μF							CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
184	0.18 μF							CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
204	0.2 μF							CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
224	0.22 μF				BA			CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA	CA									
274	0.27 μF							CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC									
334	0.33 μF							CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC									
394	0.39 μF							CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC									
474	0.47 μF							CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC									
564	0.56 μF							CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC									
684	0.68 μF							CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC									
824	0.82 μF							CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC									
105	1 μF							CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC	CC									
125	1.2 μF																												
155	1.5 μF																												
185	1.8 μF																												
225	2.2 μF							CC																					
275	2.7 μF																												
335	3.3 μF																												

*J Tolerance available for 100 volts and lower

The code in the cell indicates the dimensions and packaging quantity. The definitions can be found on page 5.

GENERAL PURPOSE (G SERIES)

General Purpose (G Series) X7R Dielectric																								
	Tolerance	1808					1812						1825						2220					
		6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50			
		100	500	200	630	250	100	250	630	1K	2K	3K	100	250	630	1K	2K	3K	100	250	630	1K	2K	3K
		DC Volts					DC Volts						DC Volts						DC Volts					
101	100 pF	GK	GK	GK	GL	GL	HN	HN	HN	HN	HN	HN												
121	120 pF	GK	GK	GK	GL	GL	HN	HN	HN	HN	HN	HN												
131	130 pF																							
151	150 pF	GE	GE	GE	GE	GE	HN	HN	HN	HN	HN	HN												
161	160 pF																							
181	180 pF	GE	GE	GE	GE	GE	HN	HN	HN	HN	HN	HN												
201	200 pF																							
221	220 pF	GE	GE	GE	GE	GE	HN	HN	HN	HN	HN	HN												
241	240 pF																							
271	270 pF	GE	GE	GE	GE	GE	HN	HN	HN	HN	HN	HA	HN											
301	300 pF																							
331	330 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HA	HN											
361	360 pF																							
391	390 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HA	HN											
431	430 pF																							
471	470 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HA	HN											
501	500 pF																							
511	510 pF																							
561	560 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HA	HN											
621	620 pF																							
681	680 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HA	HC											
751	750 pF																							
821	820 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HA	HC											
102	1,000 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA
122	1,200 pF	GH	GH	GH	GH		HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA
152	1,500 pF	GH	GH	GH	GH		HA	HA	HA	HA	HA	HA	HO	IA	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA
182	1,800 pF	GE	GE	GE	GH		HA	HA	HA	HA	HA	HA	HP	IA	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA
202	2,000 pF																							
222	2,200 pF	GE	GE	GE	GH		HA	HA	HA	HA	HA	HA	HP	IA	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA
272	2,700 pF	GE	GE	GE			HA	HA	HA	HA	HA	HA	HP	IA	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA
302	3,00 pF																							
332	3,300 pF	GE	GE	GE			HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA
392	3,900 pF	GE	GE	GE			HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA
472	4,700 pF	GE	GE	GE			HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA
502	5,000 pF																							
562	5,600 pF	GH	GH	GH			HA	HA	HA	HA	HA	HA	HP	IA	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA
682	6,800 pF	GH	GH	GH			HA	HA	HA	HA	HA	HA		IA	IA	IA	IA	IA	IB	IB	JA	JA	JA	JA
822	8,200 pF	GH	GH	GH			HA	HA	HA	HA	HA	HA		IA	IA	IA	IA	IA	IB	IB	JA	JA	JA	JA
103	10,000 pF	GH	GH	GH			HA	HA	HA	HA	HA	HA		IA	IA	IA	IA	IA	IB	IB	JA	JA	JA	JA
123	12,000 pF	GL	GL	GL			HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IB		JA	JA	JA	JA
153	15,000 pF	GL	GL	GL			HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IB		JA	JA	JA	JA
183	18,000 pF						HA	HA	HA	HA	HA	HA	HP	IA	IA	IA	IA	IA			JA	JA	JA	JA
203	20,000 pF																							
223	22,000 pF						HA	HA	HA	HA	HA	HA	HP	IA	IA	IA	IA	IA			JA	JA	JA	JA
273	27,000 pF						HA	HA	HA	HA	HA	HA	HP	IA	IA	IA	IA	IA			JA	JA	JA	JA
333	33,000 pF						HA	HA	HA	HA	HA	HA	HP	IA	IA	IA	IA	IA			JA	JA	JA	JA
393	39,000 pF						HA	HA	HA	HA	HA	HA	HP	IA	IA	IA	IA	IA			JA	JA	JA	JA
473	47,000 pF						HA	HA	HA	HA	HA	HA		IA	IA	IA	IA	IA			JA	JA	JA	JA
563	56,000 pF						HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA			JA	JA	JA	JA
683	68,000 pF						HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IB			JA	JA	JA	JB
823	82,000 pF						HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IB			JA	JA	JA	JB
104	0.1 µF						HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IB			JA	JA	JA	JB
124	0.12 µF						HA	HA	HA	HA	HA	HA	HP	IA	IA	IA	IA				JA	JA	JA	JA
154	0.15 µF						HA	HA	HA	HA	HA	HA	HP	IA	IA	IA	IA				JA	JA	JA	JA
184	0.18 µF						HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA				JA	JA	JA	JA
204	0.2 µF																							
224	0.22 µF						HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA				JA	JA	JA	JA
274	0.27 µF						HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA				JA	JA	JA	JA
334	0.33 µF						HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA				JA	JA	JA	JA
394	0.39 µF						HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA				JA	JA	JA	JA
474	0.47 µF						HA	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA				JA	JA	JA	JA
564	0.56 µF						HA	HA	HA	HA	HA	HA	HN	IA	IA	IA	IB				JA	JA	JA	JB
684	0.68 µF						HA	HA	HA	HA	HA	HA	HN	IA	IA	IA	IB				JA	JA	JA	JB
824	0.82 µF						HA	HA	HA	HA	HA	HA	HN	IA	IA	IA	IA				JA	JA	JA	JA
105	1 µF						HA	HA	HA	HA	HA	HA	HD	IA	IA	IA					JA	JA	JA	JA
125	1.2 µF													IA	IA	IA					JA	JA	JA	JA
155	1.5 µF						HC	HC						IA	IA	IA					JA	JA	JA	JA
185	1.8 µF													IA	IA	IA					JA	JA	JA	JA
225	2.2 µF						HD	HD						IA	IA	IA					JA	JA	JA	JA
275	2.7 µF													IA	IA	IA					JA	JA	JA	JA
335	3.3 µF													IA	IA	IA					JA	JA	JA	JA
395	3.9 µF													IA	IA	IA					JA	JA	JA	JA
475	4.7 µF													IA	IA	IA					JA	JA	JA	JA
565	5.6 µF													IA	IA	IA					JA	JA	JA	JA
685	6.8 µF													IA	IA	IA					JA	JA	JA	JA
825	8.2 µF													IA	IA									

*J Tolerance available for 100 volts and lower

The code in the cell indicates the dimensions and packaging quantity. The definitions can be found on page 5.



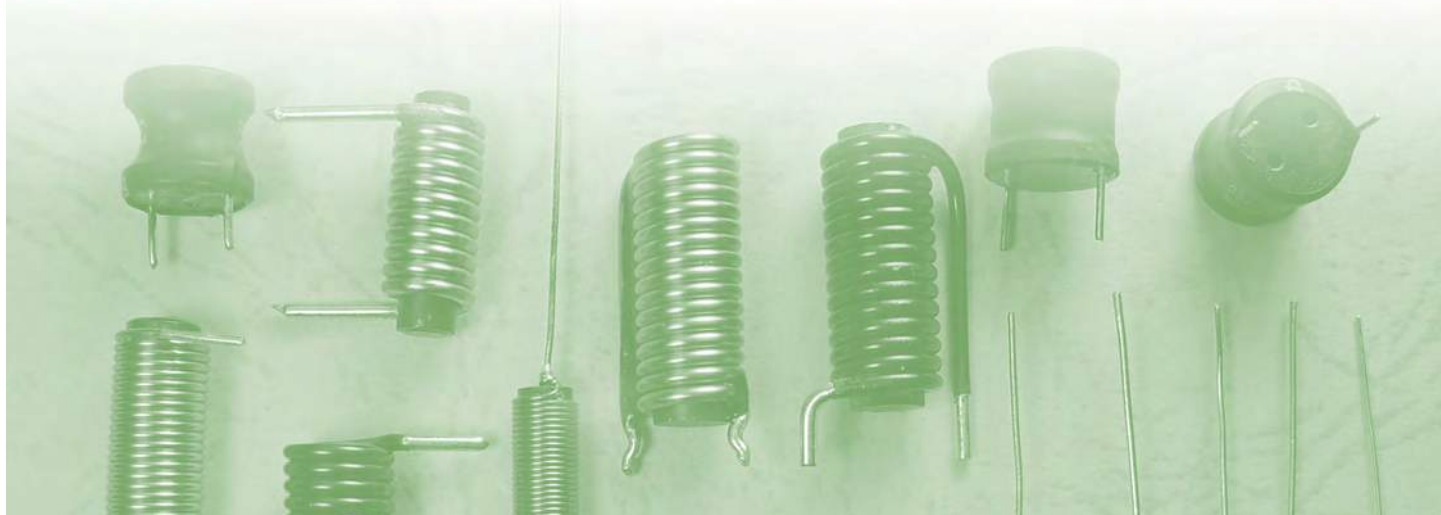
GENERAL PURPOSE (G SERIES)

General Purpose (G Series) Y5V Dielectric

		Tolerance	0402					0603					0805					1206					1210					1812												
			6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	100	250	6.3	10	16	25	50	100	250	6.3	10	16	25	50	100	250	6.3	10	25	50	100	250	
			DC Volts					DC Volts					DC Volts					DC Volts					DC Volts					DC Volts												
103	10,000 pF	*M Z	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
123	12,000 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA																	
153	15,000 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
183	18,000 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	DB	DB	DB	DB				EA	EA	EA	EA	EA																
203	20,000 pF							CA	CA	CA	CA	CA																												
223	22,000 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
273	27,000 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	DB	DB	DB	DB				EA	EA	EA	EA	EA																
333	33,000 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
393	39,000 pF		BA	BA	BA	BA		CA	CA	CA	CA	CA	DB	DB	DB	DB				EA	EA	EA	EA	EA																
473	47,000 pF		BA	BA	BA	BA		CA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
563	56,000 pF		BA	BA	BA	BA		CA	CA	CA	CA	CA	DB	DB	DB	DB				EA	EA	EA	EA	EA																
683	68,000 pF		BA	BA	BA	BA		CA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	
823	82,000 pF		BA	BA	BA	BA		CA	CA	CA	CA	CA	DB	DB	DB	DB				EA	EA	EA	EA	EA																
104	0.1 µF		BA	BA	BA	BA		CA	CA	CA	CA	CA	DB	DB	DB	DB	DC			EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA		
124	0.12 µF							CA	CA	CA	CA	CA	DB	DB	DB	DB																								
154	0.15 µF		BA	BA	BA			CA	CA	CA	CA	CA	DB	DB	DB	DB				EA	EA	EA	EA	EA	EA	EB	EB													
184	0.18 µF							CA	CA	CA			DB	DB	DB	DB																								
224	0.22 µF		BA	BA	BA			CA	CA	CA	CA	CA	DB	DB	DB	DB				EA	EA	EA	EA	EA	EA	EB														
274	0.27 µF							CA	CA	CA																														
334	0.33 µF		BA	BA	BA			CA	CA	CA			DC	DC	DC	DC				EA	EA	EA	EA	EA																
394	0.39 µF							CA	CA				DC	DC	DC	DC																								
474	0.47 µF		BA	BA	BA			CA	CA	CC	CA		DC	DC	DC	DC				EA	EA	EA	EA	EA																
564	0.56 µF							CA	CA											EA	EA	EA	EA	EA																
684	0.68 µF		BA					CA	CC				DC	DC	DD	DD				EA	EA	EA	EA	EA																
824	0.82 µF							CC	CC																															
105	1 µF		BA	BA				CA	CC	CC			DC	DC		DD				EB	EB	EB	EB	EC																
155	1.5 µF							CA					DD	DD						EB	EB	EB	EB																	
225	2.2 µF							CA	CC				DD	DD		DF				EB	EB	EB	EB	ED																
335	3.3 µF												DD	DD						ED	ED	ED	ED																	
475	4.7 µF							CC					DD	DD		DF				ED	ED	ED	ED	EG																
685	6.8 µF												DF							ED	ED	ED																		
106	10 µF												DF	DF						ED	ED	ED	EG																	
226	22 µF												DF							EG	EG																			
476	47 µF																			EG																				
107	100 µF																																							

*M Tolerance available for 100 volts and lower

The code in the cell indicates the dimensions and packaging quantity. The definitions can be found on page 5.



GENERAL PURPOSE (G SERIES)

General Purpose (G Series) X5R Dielectric

		Tolerance	0201					0402				0603					0805					1206					1210					
			6.3	10	16	25	50	6.3	10	16	25	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50	
			DC Volts					DC Volts				DC Volts					DC Volts					DC Volts					DC Volts					
101	100 pF	*J K M	AA	AA	AA	AA	AA																									
121	120 pF		AA	AA	AA	AA	AA																									
151	150 pF		AA	AA	AA	AA	AA																									
181	180 pF		AA	AA	AA	AA	AA																									
221	220 pF		AA	AA	AA	AA	AA																									
271	270 pF		AA	AA	AA	AA	AA																									
331	330 pF		AA	AA	AA	AA	AA																									
391	390 pF		AA	AA	AA	AA	AA																									
471	470 pF		AA	AA	AA	AA	AA																									
561	560 pF		AA	AA	AA	AA	AA																									
681	680 pF		AA	AA	AA	AA	AA																									
821	820 pF		AA	AA	AA	AA	AA																									
102	1,000 pF		AA	AA	AA	AA	AA																									
122	1,200 pF		AA	AA	AA																											
152	1,500 pF		AA	AA	AA																											
222	2,200 pF		AA	AA	AA																											
332	3,300 pF		AA	AA	AA																											
472	4,700 pF		AA	AA	AA																											
562	5,600 pF		AA	AA																												
682	6,800 pF		AA	AA																												
103	10,000 pF		AA	AA																												
123	12,000 pF		AA																													
153	15,000 pF		AA	AA																												
183	18,000 pF		AA																													
223	22,000 pF		AA	AA																												
273	27,000 pF		AA					BA	BA	BA																						
333	33,000 pF		AA					BA	BA	BA																						
393	39,000 pF		AA					BA	BA	BA																						
473	47,000 pF		AA					BA	BA	BA																						
563	56,000 pF		AA	AA				BA	BA																							
683	68,000 pF		AA					BA	BA	BA																						
823	82,000 pF		AA					BA	BA	BA																						
104	0.1 µF		AA	AA				BA	BA	BA	BA																					
154	0.15 µF							BA	BA	BA	BA																					
184	0.18 µF							BA	BA																							
224	0.22 µF		AA					BA	BA	BA	BA	CC	CD	CD	CD																	
274	0.27 µF											CD	CD	CD																		
334	0.33 µF							BA	BA			CD	CD	CD	CD																	
394	0.39 µF											CD	CD	CD																		
474	0.47 µF		AA					BA	BA			CD	CD	CD	CD																	
564	0.56 µF											CD	CD																			
634	0.63 µF																															
824	0.82 µF											CC	CD	CD																		
105	1 µF		AA					BA	BA	BA	BA	CC	CD	CD	CD	CD	DD	DD	DD	DD	DF											
155	1.5 µF											CC					DF	DF				ED	ED	ED			FE	FE	FE			
225	2.2 µF							BA	BA			CC	CD	CD	CD		DF	DF	DF	DF		ED	ED	ED	EG		FE	FE	FE			
335	3.3 µF											CC	CD				DF	DF	DF	DF		EG	EG	EG	EG							
395	3.9 µF																					EG	EG	EG	EG							
475	4.7 µF							BA				CC	CD	CD			DF	DF	DF	DF		EG	EG	EG	EG	EG	FE	FE	FE	FE		
685	6.8 µF																					EG	EG									
106	10 µF							BC				CD	CD				DF	DF	DF	DF		EG	EG	EG	EG		FE	FE	FE	FE	FF	
226	22 µF											CD					DF	DF				EG	EG	EG			FF	FF	FF	FF		
476	47 µF																DF					EG	EG				FF	FF	FF			
107	100 µF																					EG					FF					
*J Tolerance available in 0201 case size only																																

*J Tolerance available in 0201 case size only

The code in the cell indicates the dimensions and packaging quantity. The definitions can be found on page 5.



SOFT TERMINATION

• Available on G series NP0 and X7R dielectric parts

• Withstands up to 7mm of substrate bending

General Electrical Data

Dielectric	NP0	X7R
Size	0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225	
Rated voltage (VDC)	6.3, 10, 16, 25, 50, 100, 200, 250, 500, 630, 1,000, 2,000, 3,000	
Capacitance range	0.3pF to 0.047μF	100pF to 47μF
Operating temperature	-55 to +125°C	
Capacitance characteristic	±30ppm	±15%
Insulation resistance at Ur	≥100GΩ or RxC≥1000Ω-F (whichever is lower)	≥10GΩ or RxC≥500Ω-F (whichever is lower)
Termination	Ni/Sn (lead-free termination)	

Electrical Characteristics (Typical)

	Failure Point (mm)	
	Standard Termination	SOFT Termination
0603	≥2	≥5
0805	≥2	≥5
1206	≥2	≥5
1210	≥2	≥5
1808	≥3	≥5
1812	≥3	≥5
1825	≥3	≥5
2220	≥5	≥7
2225	≥5	≥7

Soft Termination, which allows for up to 7MM of PCB flex before failure, is available on most of our G series capacitors. The soft termination material is placed between the ceramic body and the Ni barrier and absorbs mechanical stress to prevent stress cracks from bending.

• Please contact Frontier for specific inquiries or more information.



ULTRA HIGH Q, LOW ESR (M SERIES)

• Ultra High Q and low ESR at high frequencies

• Extremely stable performance above 1GHz

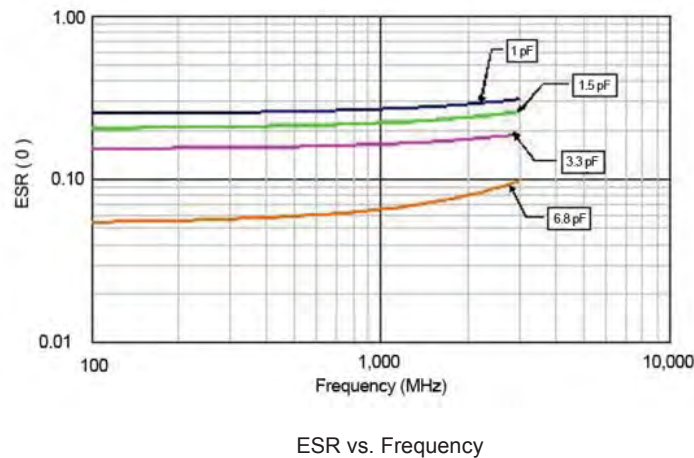
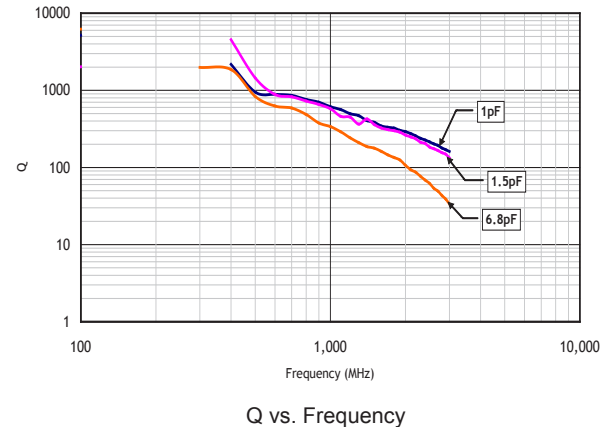
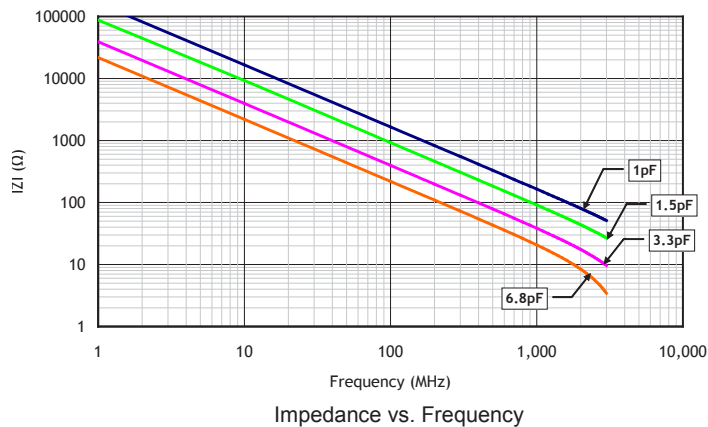
Part Number Description

0201	M	250	N	0R3	A	C	T
Size	Series	Voltage	Dielectric	Capacitance	Tolerance	Termination	Packaging
0201 (0603)	M (Ultra High Q, Low ESR)	250=25 VDC	N=NP0	0R3=0.3pF	A=±0.05pF	C=Cu/Ni/Sn	T=7" Paper Tape

General Electrical Data

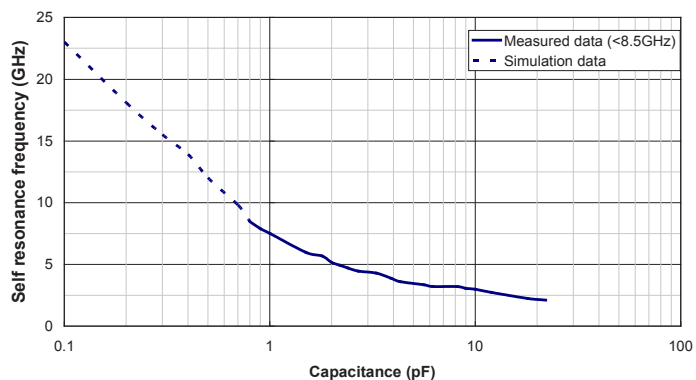
Dielectric	NP0
Size	0201, 0402, 0603, 0805
Capacitance	0.1pF to 100pF
Capacitance tolerance	Cap≤5pF: A (±0.05pF), B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: B (±0.1pF), C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%)
Rated voltage (WVDC)	6.3V, 10V, 16V, 25V, 50V, 100V, 200V, 250V
Q	Cap≥30pF, Q≥1000 Cap<30pF, Q≥400+20C
Insulation resistance at Ur	≥10GΩ
Operating temperature	-55 to +125°C
Capacitance change	±30ppm/°C; 0201Cap≥22pF, ±60ppm/°C
Termination	Ni/Sn (lead-free termination)

Electrical Characteristics

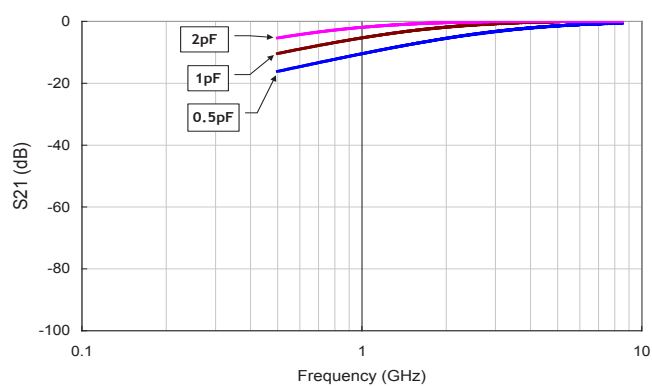


ULTRA HIGH Q, LOW ESR (M SERIES)

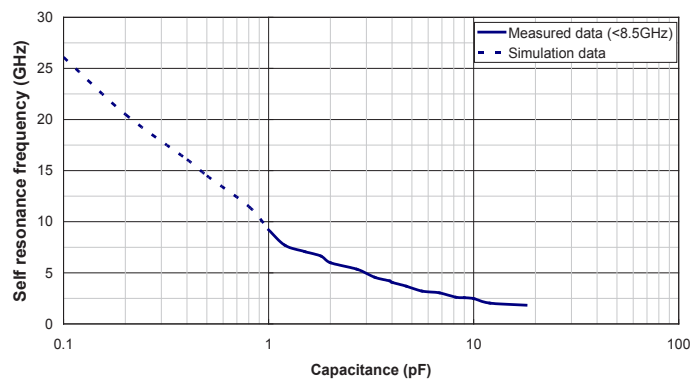
Electrical Characteristics



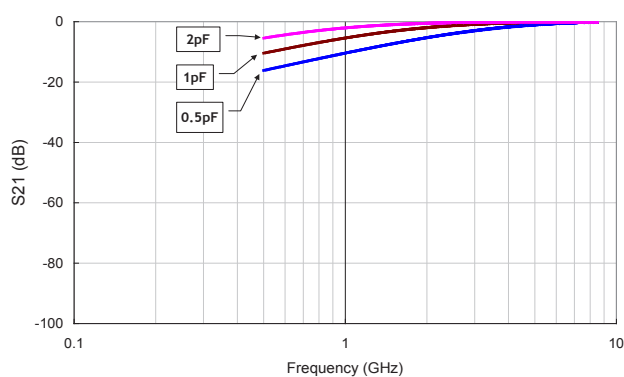
SRF vs. Capacitance (0201)



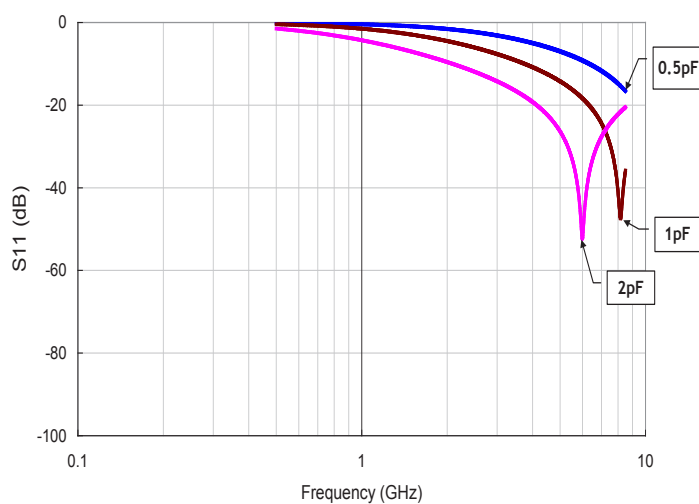
S21 vs. Frequency (0201)



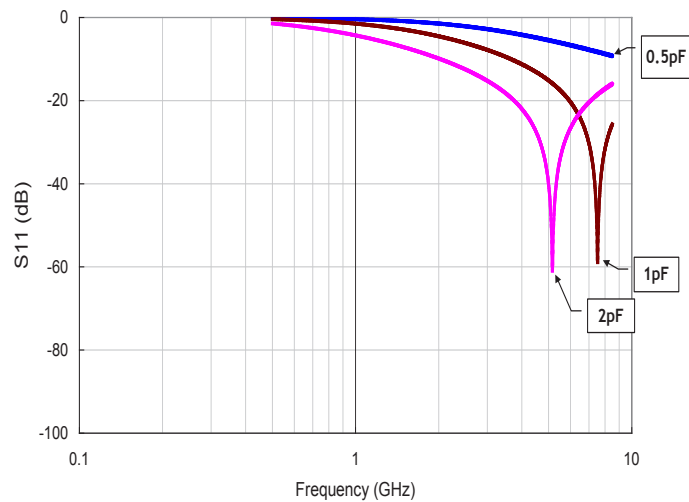
SRF vs. Capacitance (0402)



S21 vs. Frequency (0402)



S11 vs. Frequency (0201)



S11 vs. Frequency (0402)

ULTRA HIGH Q, LOW ESR (M SERIES)

Ultra High Q, Low ESR (M Series), NP0 Dielectric

[illegible]

The code in the cell indicates the dimensions and packaging quantity. The definitions can be found on page 5.

HIGH Q, LOW ESR (H SERIES), NPO DIELECTRIC

• High Q and low ESR at high frequencies

• Extremely stable performance up to 1GHz

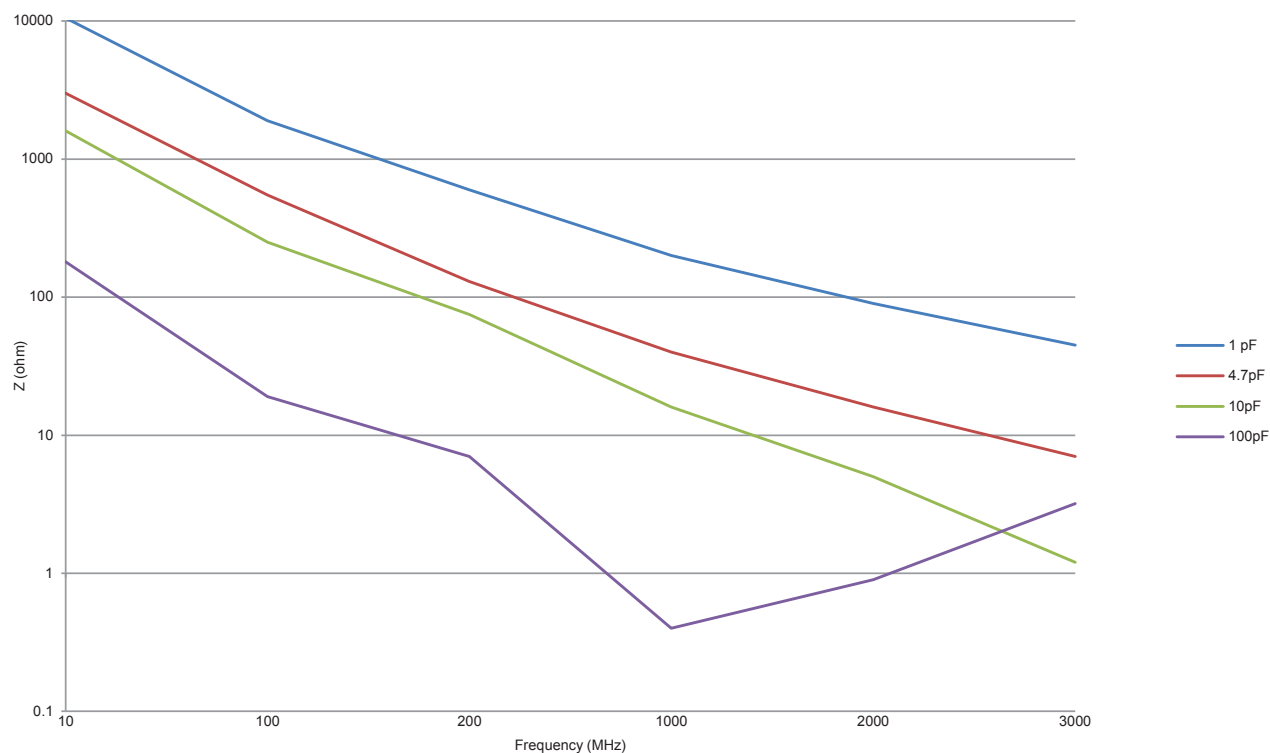
Part Number Description

0402	H	250	N	0R3	A	C	T
Size	Series	Voltage	Dielectric	Capacitance	Tolerance	Termination	Packaging
0201 (0603)	H (High Q, Low ESR)	250=25 VDC	N=NPO	0R3=0.3pF	A=±0.05pF	C=Cu/Ni/Sn	T=7" Paper Tape

General Electrical Data

Dielectric	NPO
Size	0402, 0603, 0805
Capacitance	0402: 0.1pF to 470pF 0603: 0.5pF to 3300pF 0805: 0.5pF to 330pF
Capacitance tolerance	Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%)
Rated voltage (WVDC)	6.3V, 10V, 16V, 25V, 50V, 100V, 200V, 250V, 500V, 630V
Q	Cap<30pF: Q≥400+20C Cap≥30pF: Q≥1000
Insulation resistance at Ur	≥10GΩ
Operating temperature	-55 to +125°C
Capacitance change	±30ppm
Termination	Ni/Sn (lead-free termination)

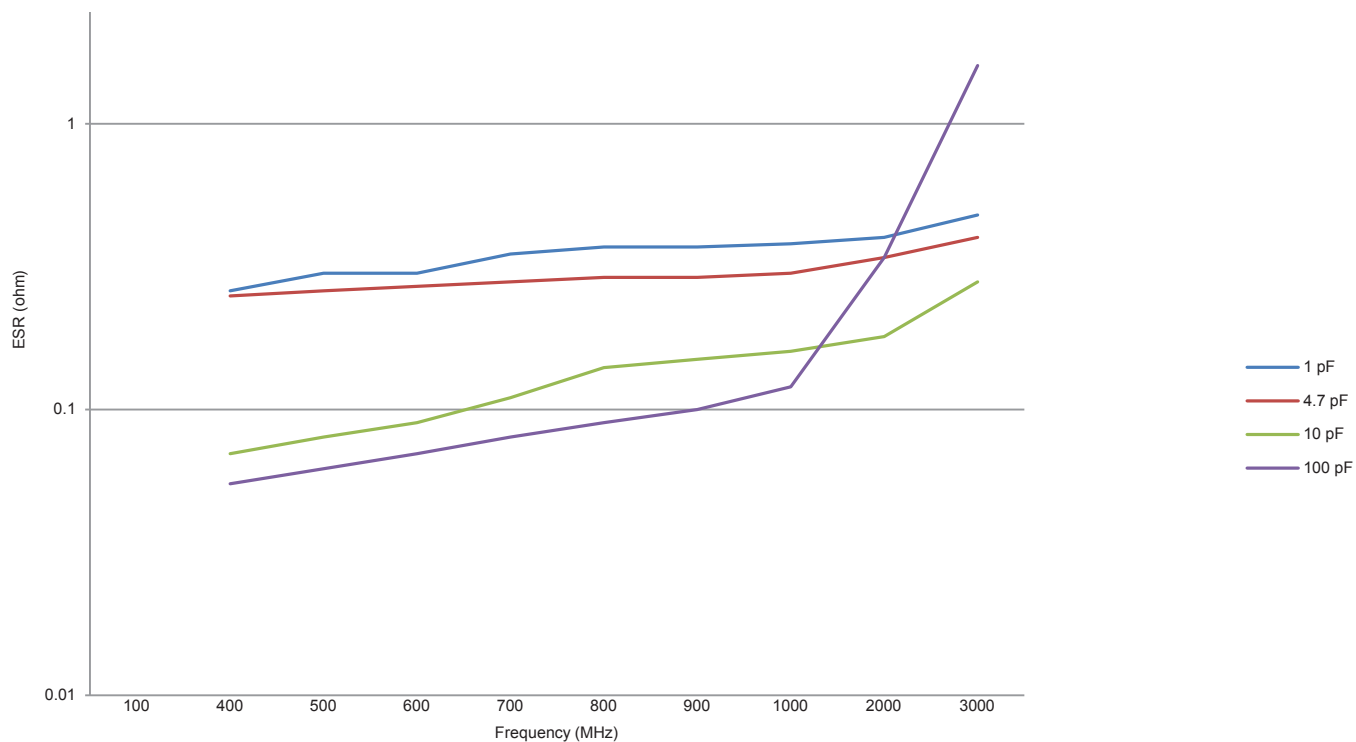
Electrical Characteristics (Typical)



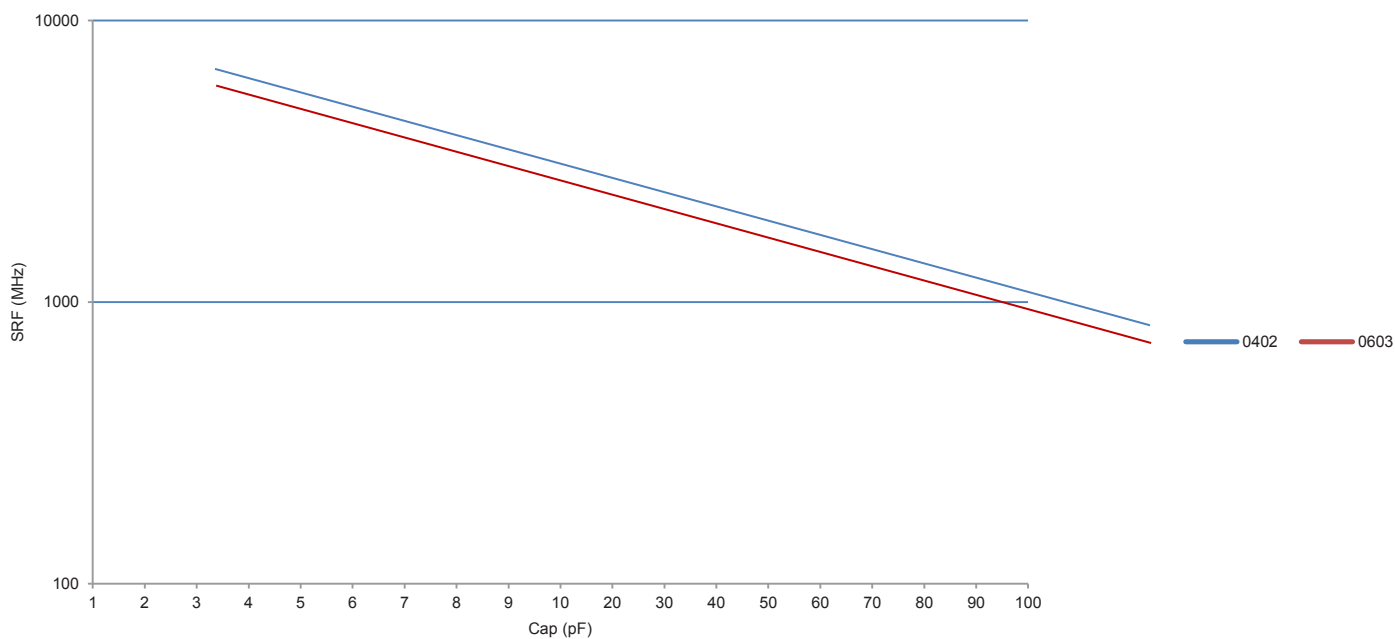
Impedance vs. Frequency (Typical)

HIGH Q, LOW ESR (H SERIES), NPO DIELECTRIC

Electrical Characteristics (Typical)



ESR vs. Frequency (Typical)



SRF vs. Capacitance (Typical)



HIGH Q, LOW ESR (H SERIES)

High Q, Low ESR (H Series), NP0 Dielectric, 0R1 (0.1pF) – 9R1 (9.1pF)

		Tolerance	0402					0603						0805										
			6.3	10	16	25	50	6.3	10	16	25	50	100	6.3	10	16	25	50	100	200	250	500	630	
			DC Volts					DC Volts						DC Volts										
0R1	0.1 pF	B C	BA	BA	BA	BA	BA																	
0R2	0.2 pF		BA	BA	BA	BA	BA																	
0R3	0.3 pF		BA	BA	BA	BA	BA																	
0R4	0.4 pF		BA	BA	BA	BA	BA																	
R47	0.47 pF		BA	BA	BA	BA	BA																	
0R5	0.5 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
R56	0.56 pF		BA	BA	BA	BA	BA																	
0R6	0.6 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
R68	0.68 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA												
0R7	0.7 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
R75	0.75 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC					
0R8	0.8 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
R82	0.82 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA												
0R9	0.9 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
1R0	1.0 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC			
1R1	1.1 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA												
1R2	1.2 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC	
1R3	1.3 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC							
1R4	1.4 pF	BA	BA	BA	BA	BA																		
1R5	1.5 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC				
1R6	1.6 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA												
1R7	1.7 pF						CA	CA	CA	CA	CA													
1R8	1.8 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC						
1R9	1.9 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA													
2R0	2.0 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC						
2R1	2.1 pF						CA	CA	CA	CA	CA													
2R2	2.2 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC				
2R3	2.3 pF	BA	BA	BA	BA	BA																		
2R4	2.4 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC						
2R5	2.5 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA													
2R7	2.7 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC						
3R0	3.0 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC						
3R3	3.3 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC		
3R6	3.6 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC						
3R9	3.9 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC						
4R0	4.0 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA													
4R3	4.3 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC						
4R7	4.7 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC		
5R0	5.0 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA													
5R1	5.1 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC						
5R6	5.6 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC	DC	DC		
6R0	6.0 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA													
6R2	6.2 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC						
6R8	6.8 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC				
7R0	7.0 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA													
7R5	7.5 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC						
8R0	8.0 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA													
8R2	8.2 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC						
9R0	9.0 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA													
9R1	9.1 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC						

The code in the cell indicates the dimensions and packaging quantity. The definitions can be found on page 5.

HIGH Q, LOW ESR (H SERIES)

High Q, Low ESR (H Series), NP0 Dielectric, 100 (10 pF) – 332 (3,300 pF)

		Tolerance	0402					0603						0805										
			6.3	10	16	25	50	6.3	10	16	25	50	100	6.3	10	16	25	50	100	200	250	500	630	
			DC Volts					DC Volts						DC Volts										
100	10 pF	F G J	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC	DC		
110	11 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC					
120	12 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC	DC			
130	13 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC	DC				
140	14pF													DC	DC	DC	DC	DC	DC					
150	15 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC	DC		
160	16 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC					
180	18 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
200	20 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
220	22 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC			
240	24 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC					
270	27 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
300	30 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC					
330	33 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC				
360	36 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC					
390	39 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
430	43 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC					
470	47 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
500	50 pF							CA	CA	CA	CA	CA		DC										
510	51 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC					
560	56 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
620	62 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC					
680	68 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
750	75 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC	DC					
820	82 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC					
910	91 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA		DC	DC	DC	DC	DC						
101	100 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DC			
121	120 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DD	DD	DD	DD	DD	DD	DD	DD			
131	130 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA												
151	150 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DD	DD	DD	DD	DD	DD	DD	DD			
181	180 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DD			
201	200 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA												
221	220 pF		BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DD	DD	DD	DD	DD	DD	DD	DD			
241	240 pF						CA	CA	CA	CA	CA	CA												
271	270 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DD				
301	300 pF						CA	CA	CA	CA	CA													
331	330 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA	DC	DC	DC	DC	DC	DC	DC	DD				
391	390 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA												
471	470 pF	BA	BA	BA	BA	BA	CA	CA	CA	CA	CA	CA												
561	560 pF						CA	CA	CA	CA	CA	CA												
681	680 pF						CA	CA	CA	CA	CA	CA												
821	820 pF						CA	CA	CA	CA	CA	CA												
102	1,000 pF						CA	CA	CA	CA	CA	CA												
122	1,200 pF						CA	CA	CA	CC	CC													
152	1,500 pF						CA	CA	CA	CC	CC													
182	1,800 pF						CA	CA	CA	CC	CC													
222	2,200 pF						CA	CA	CA	CC	CC													
272	2,700 pF						CA	CA	CA	CC	CC													
332	3,300 pF						CA	CA	CA	CC	CC													

The code in the cell indicates the dimensions and packaging quantity. The definitions can be found on page 5.



APPENDIX I: RELIABILITY TEST CONDITIONS AND REQUIREMENTS (1 OF 3)

Item		Test Condition	Requirements					
1	Visual and Mechanical	---	* No remarkable defect * Dimensions conform to individual specification sheet					
2	Capacitance		* Shall not exceed the limits given in the detailed spec NP0: Cap≥30pF, Q≥1000, Cap<30pF,Q≥400+20C X7R, X5R:					
3	Q/ DF (Dissipation Factor)	Class I: NP0 Class I: NP0 Cap≤1,000pF 1.0±0.2Vrms, 1MHz±10% Cap>1,000pF 1.0±0.2Vrms, 1KHz±10% Class II: X7R, X5R,Y5V Cap≤10μF, 1.0±0.2Vrms, 1KHz±10% ** Cap>10μF, 0.5±0.2Vrms, 120Hz±20% ** Test condition: 0.5±0.2Vrms, 1KHz±10% X7R: 0603≥225 (10V), 0805=106 (6.3V&10V) X5R: 0201≥224 (6.3V), 0402≥475 (6.3V), 0402≥225(10V),0603=106 (6.3V)	Rated voltage (DCV)	D.F. ≤	Exception of D.F. ≤			
			≥ 50V	≤ 2.5%	≤3%	0201(50V), 0603 ≥ 0.047μF, 0805 ≥ 0.18μF, 1206 ≥ 0.47μF		
					≤5%	1210 ≥ 4.7μF		
					≤10%	0603≥1μF, 0805≥1μF,1206≥2.2μF, 1210≥10μF		
			35V	≤3.5%	≤10%	0805≥2.2μF, 1210≥10μF		
			25V	≤3.5%	≤5%	0201≥0.01μF,0805≥1μF, 1210≥10μF		
					≤7%	0603≥0.33μF, 1206≥4.7μF		
					≤10%	0402≥0.10μF,0603≥0.47μF, 0805≥2.2μF,		
			16V	≤3.5%	≤5%	0201≥0.01μF,0402≥0.033μF, 0603≥0.15μF, 0805≥0.68μF, 1206≥2.2μF, 1210≥4.7μF		
					≤10%	0402≥ 0.22uF, 0603≥0.68μF,0805≥2.2μF, 1206≥4.7μF, 1210≥22μF		
			10V	≤5%	≤10%	0201≥0.012μF,0402≥0.33μF,0603≥0.33μF,0805 ≥2.2μF, 1206≥2.2μF,1210≥22μF		
					≤15%	0201≥0.1μF, 0402≥1μF		
			6.3V	≤10%	≤15%	0201≥0.1μF,0402≥1μF,0603≥10μF, 0805≥4.7μF, 1206≥47μF :1210≥100μF		
					≤20%	0402≥2.2μF		
			4V	≤15%	---	---		
			Y5V:					
					Rated voltage	D.F. ≤	Exception of D.F.≤	
					≥50V	≤5%	≤7%	0603≥0.1μF, 0805≥0.47μF, 1206≥4.7μF, Cap≥1μF
					35V	≤7%	---	---
					25V	≤5%	≤7%	0402≥0.047μF,0603≥0.1μF, 0805≥0.33μF,1206≥1μF, 1210≥4.7μF
							≤9%	0402≥0.068μF,0603≥0.47μF, 1206≥4.7μF, 1210≥22μF, Cap≥1μF
					16V (C<1.0μF)	≤7%	≤9% ≤12.5%	0402≥0.068μF, 0603≥0.68μF 0402≥0.22μF
					16V (C≥1.0μF)	≤9%	≤12.5%	0603≥2.2μF, 0805≥3.3μF,1206≥10μF, 1210≥22μF, 1812≥47μF, Cap≥1μF
		10V	≤12.5%	≤20%	0402≥0.47μF			
		6.3V	≤20%	---	---			
4	Dielectric Strength	*To apply voltage(≤100V) 250%. *Duration: 1 to 5 sec. *Charge & discharge current less than 50mA.		*No evidence of damage or flash over during test.				
		*To apply voltage: 200V~300V & LD series ≥2 times VDC 500V ~ 999V ≥1.5 times VDC 1000V ~ 3000V ≥1.2 times VDC *Cut-off, set at 10mA *TEST= 15 sec. *RAMP=0						
5	Insulation Resistance	To apply rated voltage for max. 120 sec.		10GΩ or RxC≥500Ω-F whichever is lower. Class II (X7R, X7E, X5R, Y5V):				
				Rated voltage	Insulation Resistance			
				100V: X7R	10GΩ or RxC≥100 Ω-F whichever is lower.			
				50V:0603≥1μF,0805≥1μF, 1206≥2.2μF, 1210≥4.7μF				
		35V:0805≥2.2μF,1210≥10μF						
		25V:0402≥1μF,0603≥2.2μF,0805≥2.2μF, 1206≥10μF,1210≥10μF						
				16V:0402≥0.22μF,0603≥1μF,0805≥2.2μF, 1206≥10μF,1210≥47μF				
				10V:0201≥47nF,0402≥0.47μF,0603≥0.47μF, 0805≥2.2μF,				
		Rated Voltage: 200V ~ 630V	To apply rated voltage (500V max.) for 60 sec.	>10GΩ or 100Ω-F whichever is lower.				
		>630V	To apply 500V for 60sec.	>10GΩ				
6	Temperature Coefficient	With no electrical load.		T.C.				
				Operating Temp				
				NP0 (C0G)				
				NP0 (C0H)				
				NP0 (C0J)				
				X7R				
				X5R				
		Y5V						
7	Adhesive Strength of Termination	*Pressurizing force : 0201: 2N 0402 & 0603: 5N >0603: 10N *Test time : 10 ±1 sec		* No remarkable damage or removal of the terminations.				

APPENDIX I: RELIABILITY TEST CONDITIONS AND REQUIREMENTS (2 OF 3)

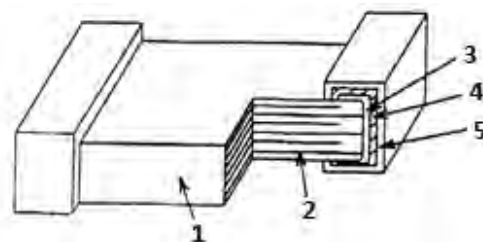
Item		Test Condition	Requirements																																																																																												
8	Vibration Resistance	* Vibration frequency: 10~55 Hz/min. * Total amplitude: 1.5mm * Test time: 6 hours (Two hrs each in three mutually perpendicular directions) * Measurement to be made after keeping at room temp. for 24±2 hours	* No remarkable damage. * Cap change and Q/D.F.: To meet initial spec.																																																																																												
9	Solderability	* Solder temperature: 235±5°C * Dipping time: 2±0.5 sec.	95% min. coverage of all metalized area.																																																																																												
10	Bending Test	*The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of approximately 1 mm per second until the deflection becomes 1 mm and then the pressure shall be maintained for 5±1 sec. *Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage. * Capacitance change : NP0: within ±5% or 0.5pF whichever is larger X7R, X7E, X5R: within ±12.5% Y5V: within ±30% (This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test.)																																																																																												
11	Resistance to Soldering Heat	* Solder temperature: 260±5°C * Dipping time: 10±1 sec * Preheating: 120 to 150°C for 1 minute before immersing the capacitor in an eutectic solder. * Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage. * Capacitance change: NP0: within ±2.5% or 0.25pF whichever is larger X7R, X7E, X5R: within ±7.5% Y5V: within ±20% * Q/D.F., I.R. and dielectric strength: To meet initial requirements. * 25% max. leaching on each edge.																																																																																												
12	Temperature Cycle	* Conduct the five cycles according to the temperatures and time. <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min.)</th></tr><tr><td>1</td><td>Min. operating temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room temp.</td><td>2~3</td></tr><tr><td>3</td><td>Max. operating temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room temp.</td><td>2~3</td></tr></table> * Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs.	Step	Temp. (°C)	Time (min.)	1	Min. operating temp. +0/-3	30±3	2	Room temp.	2~3	3	Max. operating temp. +3/-0	30±3	4	Room temp.	2~3	* No remarkable damage. * Capacitance change NP0: within ±2.5% or 0.25pF whichever is larger X7R, X7E, X5R: within ±7.5% Y5V: within ±20% * Q/D.F., I.R. and dielectric strength: To meet initial requirements.																																																																													
Step	Temp. (°C)	Time (min.)																																																																																													
1	Min. operating temp. +0/-3	30±3																																																																																													
2	Room temp.	2~3																																																																																													
3	Max. operating temp. +3/-0	30±3																																																																																													
4	Room temp.	2~3																																																																																													
13	Humidity (Damp Heat) Steady State	* Test temp.: 40±2°C * Humidity: 90~95% RH * Test time: 500+24/-0hrs. * Before initial measurement (Class II only): Perform 150 +0/-10°C for 1 hr and then set for 24±2 hrs. at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage. * Cap change: NP0: within ±5% or 0.5pF whichever is larger X7R, X7E, X5R: ≥10V**, within ±12.5%; 6.3V within ±25%; TT series, within ±25% **10V: 0603≥4.7μF; 0402≥1μF; 0201≥0.1μF, within ±25%; Y5V: ≥10V, within ±30%; 6.3V, within +30/-40% * Q/D.F. value: NP0: More than 30pF Q≥350, 10pF≤Cs≤30pF, Q≥275+2.5C, Less than 10pF Q≥200+10C X7R, X5R: <table><tr><th>Rated vol.</th><th>D.F.≤</th><th colspan="2">Exception of D.F.≤</th></tr><tr><td rowspan="3">≥50V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>0201(50V); 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF</td></tr><tr><td>≤10%</td><td>1210≥4.7μF</td></tr><tr><td>≤20%</td><td>0603≥1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF</td></tr><tr><td rowspan="3">35V</td><td rowspan="3">≤5%</td><td>≤20%</td><td>0805≥2.2μF; 1210≥10μF</td></tr><tr><td>≤10%</td><td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td></tr><tr><td>≤14%</td><td>0603≥0.33μF; 1206≥4.7μF</td></tr><tr><td rowspan="3">25V</td><td rowspan="3">≤5%</td><td>≤15%</td><td>6≥6.8μF; 1210≥22μF</td></tr><tr><td>≤10%</td><td>0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF</td></tr><tr><td>≤15%</td><td>0201≥0.01μF; 0402≥0.033μF; 0603≥0.68μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF</td></tr><tr><td>10V</td><td>≤7.5%</td><td>≤15%</td><td>0201≥0.012μF; 0402≥0.33μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥1.1μF; 0402≥1μF</td></tr><tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF;</td></tr><tr><td>4V</td><td>≤20%</td><td>---</td><td>---</td></tr></table> Y5V: <table><tr><th>Rated vol.</th><th>D.F.≤</th><th colspan="2">Exception of D.F.≤</th></tr><tr><td>≥50V</td><td>≤7.5%</td><td>≤10%</td><td>0603≥0.1μF; 0805≥0.47μF; 1206≥4.7μF; Cap≥1μF</td></tr><tr><td>35V</td><td>≤10%</td><td>---</td><td>---</td></tr><tr><td rowspan="3">25V</td><td rowspan="3">≤7.5%</td><td>≤10%</td><td>0402≥0.047μF; 0603≥0.1μF; 0805≥0.33μF; 1206≥1μF; 1210≥4.7μF</td></tr><tr><td>≤15%</td><td>0402≥0.068μF; 0603≥0.47μF; 1206≥4.7μF; 1210≥22μF; Cap≥1μF</td></tr><tr><td>≤12.5%</td><td>0402≥0.068μF; 0603≥0.68μF</td></tr><tr><td>16V (C<1.0μF)</td><td>≤10%</td><td>≤20%</td><td>0402≥0.22μF</td></tr><tr><td>16V (C≥1.0μF)</td><td>≤12.5%</td><td>≤20%</td><td>0603≥2.2μF; 0805≥3.3μF; 1206≥10μF; 1210≥22μF; 1812≥47μF; Cap≥1μF</td></tr><tr><td>10V</td><td>≤20%</td><td>≤30%</td><td>0402≥0.47μF</td></tr><tr><td>6.3V</td><td>≤30%</td><td>---</td><td>---</td></tr></table> *I.R.: ≥10V, 1GΩ or 50 Ω-F whichever is lower. Class II (X7R, X7E, X5R, Y5V) <table><tr><th colspan="2">Rated voltage</th><th rowspan="2">Insulation Resistance</th></tr><tr><td colspan="2">100V: X7R</td></tr><tr><td colspan="2">50V: 0603≥1μF; 0805≥1μF; 206≥2.2μF; 1210≥4.7μF</td><td rowspan="5">1GΩ or RxC≥10 Ω-F whichever is lower.</td></tr><tr><td colspan="2">25V: 0402≥1μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF</td></tr><tr><td colspan="2">16V: 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF; 1206≥10μF; 1210≥47μF</td></tr><tr><td colspan="2">10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥47μF</td></tr><tr><td colspan="2">7μF; 1210≥47μF</td></tr></table>	Rated vol.	D.F.≤	Exception of D.F.≤		≥50V	≤3%	≤6%	0201(50V); 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF	≤10%	1210≥4.7μF	≤20%	0603≥1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF	35V	≤5%	≤20%	0805≥2.2μF; 1210≥10μF	≤10%	0201≥0.01μF; 0805≥1μF; 1210≥10μF	≤14%	0603≥0.33μF; 1206≥4.7μF	25V	≤5%	≤15%	6≥6.8μF; 1210≥22μF	≤10%	0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF	≤15%	0201≥0.01μF; 0402≥0.033μF; 0603≥0.68μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥22μF	10V	≤7.5%	≤15%	0201≥0.012μF; 0402≥0.33μF; 0603≥0.33μF; 0805≥2.2μF; 1206≥2.2μF; 1210≥1.1μF; 0402≥1μF	6.3V	≤15%	≤30%	0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF;	4V	≤20%	---	---	Rated vol.	D.F.≤	Exception of D.F.≤		≥50V	≤7.5%	≤10%	0603≥0.1μF; 0805≥0.47μF; 1206≥4.7μF; Cap≥1μF	35V	≤10%	---	---	25V	≤7.5%	≤10%	0402≥0.047μF; 0603≥0.1μF; 0805≥0.33μF; 1206≥1μF; 1210≥4.7μF	≤15%	0402≥0.068μF; 0603≥0.47μF; 1206≥4.7μF; 1210≥22μF; Cap≥1μF	≤12.5%	0402≥0.068μF; 0603≥0.68μF	16V (C<1.0μF)	≤10%	≤20%	0402≥0.22μF	16V (C≥1.0μF)	≤12.5%	≤20%	0603≥2.2μF; 0805≥3.3μF; 1206≥10μF; 1210≥22μF; 1812≥47μF; Cap≥1μF	10V	≤20%	≤30%	0402≥0.47μF	6.3V	≤30%	---	---	Rated voltage		Insulation Resistance	100V: X7R		50V: 0603≥1μF; 0805≥1μF; 206≥2.2μF; 1210≥4.7μF		1GΩ or RxC≥10 Ω-F whichever is lower.	25V: 0402≥1μF; 0603≥2.2μF; 0805≥2.2μF; 1206≥10μF; 1210≥10μF		16V: 0402≥0.22μF; 0603≥1μF; 0805≥2.2μF; 1206≥10μF; 1210≥47μF		10V: 0201≥47nF; 0402≥0.47μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥4.7μF; 1210≥47μF		7μF; 1210≥47μF	
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APPENDIX I: RELIABILITY TEST CONDITIONS AND REQUIREMENTS (3 OF 3)

Item		Test Condition	Requirements																																																																																																																															
14	Humidity (Damp Heat) Load	* Test temp.: 40±2°C * Humidity: 90~95%RH * Test time: 500+24/-0 hrs. * Voltage : Rated voltage,(Max500V) * Before initial measurement (Class II only): To apply test voltage for 1hr at 40°C and then set for 24±2 hrs at room temp.* Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage. Cap change: NP0: ±7.5% or 0.75pF whichever is larger. X7R, X7E, X5R: ≥10V**, within ±12.5%, 6.3V within ±25%; **10V:0603≥4.7µF;0402≥1µF;0201≥0.1µF, within ±25%; Y5V: ≥10V, within ±30%; 6.3V, within +30/-40% Q/D.F. value: NP0: C≥30pF, Q≥200; C<30pF, Q≥100+10/3C X7R, X5R: <table><tr><th>Rated voltage</th><th>D.F.≤</th><th colspan="2">Exception of D.F.≤</th></tr><tr><td rowspan="3">≥50V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>0201(50V);0603≥0.047µF; 0805≥0.18µF; 1206≥0.47µF</td></tr><tr><td>≤10%</td><td>1210≥4.7µF</td></tr><tr><td>≤20%</td><td>0603≥1µF; 0805≥1µF; 1206≥2.2µF; 1210≥10µF</td></tr><tr><td>35V</td><td>≤5%</td><td>≤20%</td><td>0805≥2.2µF; 1210≥10µF</td></tr><tr><td rowspan="3">25V</td><td rowspan="3">≤5%</td><td>≤10%</td><td>0201≥0.01µF;0805≥1µF; 1210≥10µF</td></tr><tr><td>≤14%</td><td>0603≥0.33µF;1206≥4.7µF</td></tr><tr><td>≤15%</td><td>0402≥0.10µF;0603≥0.47µF;0805≥2.2µF; 1206≥6.8µF;1210≥22µF</td></tr><tr><td rowspan="3">16V</td><td rowspan="3">≤5%</td><td>≤10%</td><td>0603≥0.15µF;0805≥0.68µF;1206≥2.2µF;1210≥4.7µF</td></tr><tr><td>≤15%</td><td>0201≥0.01µF;0402≥0.033µF;0603≥0.68µF;0805≥2.2µF; 1206≥4.7µF; 1210≥22µF</td></tr><tr><td>≤20%</td><td>0201≥0.1µF ;0402≥1µF</td></tr><tr><td rowspan="3">10V</td><td rowspan="3">≤7.5%</td><td>≤15%</td><td>0201≥0.012µF;0402≥0.033µF; 0603≥0.33µF;0805≥2.2µF; 1206≥2.2µF; 1210≥22µF</td></tr><tr><td>≤20%</td><td>0201≥0.1µF ;0402≥1µF</td></tr><tr><td>≤30%</td><td>0201≥0.1µF;0402≥1µF;0603≥10µF; 0805≥4.7µF;1206≥47µF;1210≥100µF</td></tr><tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0201≥0.1µF;0402≥1µF;0603≥10µF; 0805≥4.7µF;1206≥47µF;1210≥100µF</td></tr><tr><td>4V</td><td>≤20%</td><td>---</td><td>---</td></tr></table> X7R/X7E, LD series : DF≤3% Y5V: <table><tr><th>Rated voltage</th><th>D.F.≤</th><th colspan="2">Exception of D.F.≤</th></tr><tr><td>≥50V</td><td>≤7.5%</td><td>≤10%</td><td>0603≥0.1µF; 0805≥0.47µF;1206≥4.7µF; Cap≥1µF</td></tr><tr><td>35V</td><td>≤10%</td><td>---</td><td>---</td></tr><tr><td rowspan="3">25V</td><td rowspan="3">≤7.5%</td><td>≤10%</td><td>0402≥0.047µF;0603≥0.1µF;0805≥0.33µF;1206≥1µF; 1210≥4.7µF</td></tr><tr><td>≤15%</td><td>0402≥0.068µF;0603≥0.47µF;1206≥4.7µF;1210≥22µF; Cap≥1µF</td></tr><tr><td>≤12.5%</td><td>0402≥0.068µF; 0603≥0.68µF</td></tr><tr><td>16V (C<1.0µF)</td><td>≤10%</td><td>≤20%</td><td>0402≥0.22µF</td></tr><tr><td>16V (C≥1.0µF)</td><td>≤12.5%</td><td>≤20%</td><td>0603≥2.2µF;0805≥3.3µF;1206≥10µF;1210≥22µF;1812≥47µF; Cap≥1µF</td></tr><tr><td>10V</td><td>≤20%</td><td>≤30%</td><td>0402≥0.47µF</td></tr><tr><td>6.3V</td><td>≤30%</td><td>---</td><td>---</td></tr></table> *I.R.: ≥10V, 500MQ or 25 Ω-F whichever is lower. 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15	High Temperature Load (Endurance)	*Test temp.: NP0, X7R/X7E: 125±3°C X5R, Y5V: 85±3°C *Test time: 1000+24/-0 hrs. *To apply voltage: (1) 6.3V or C≥10µF 150% of rated voltage: (2) 10VsUr<500V: 200% of rated voltage. (3) 500V: 150% of rated voltage. (4) Ur≥630V: 120% of rated voltage.(5) 100% of rated voltage for below range: <table><tr><th>Size</th><th>Dielectric</th><th>Rated voltage</th></tr><tr><td>0201</td><td>X5R/X7R</td><td>6.3V, 10V</td></tr><tr><td>0402</td><td>X5R/X7R</td><td>6.3V, 10V</td></tr><tr><td>0603</td><td>X5R/X7R</td><td>6.3V, 10V</td></tr><tr><td>0805</td><td>X5R/X7R</td><td>6.3V</td></tr><tr><td>1206</td><td>X5R/X7R NP0</td><td>6.3V 3000V</td></tr></table> (6)150% of rated voltage for below range: <table><tr><th>Size</th><th>Dielectric</th><th>Rated voltage</th><th>Capacitance</th></tr><tr><td rowspan="2">0402</td><td>X5R/X7R</td><td>10V,16V,25V</td><td>C≥0.22µF</td></tr><tr><td>Y5V</td><td>16V</td><td>C≥0.47µF</td></tr><tr><td rowspan="2">0603</td><td>X5R/X7R</td><td>10V,16V</td><td>C≥1.0µF</td></tr><tr><td>Y5V</td><td>16V</td><td>C≥2.2µF</td></tr><tr><td rowspan="2">0805</td><td>X5R/X7R</td><td>10V</td><td>C≥4.7µF</td></tr><tr><td>Y5V</td><td>16V</td><td>C≥4.7µF</td></tr></table> *Before initial measurement (Class II only): To apply test voltage for 1hr at test temp. and then set for 24±2 hrs at room temp. *Measurement to be made after keeping at room temp. for 24±2 hrs.	Size	Dielectric	Rated voltage	0201	X5R/X7R	6.3V, 10V	0402	X5R/X7R	6.3V, 10V	0603	X5R/X7R	6.3V, 10V	0805	X5R/X7R	6.3V	1206	X5R/X7R NP0	6.3V 3000V	Size	Dielectric	Rated voltage	Capacitance	0402	X5R/X7R	10V,16V,25V	C≥0.22µF	Y5V	16V	C≥0.47µF	0603	X5R/X7R	10V,16V	C≥1.0µF	Y5V	16V	C≥2.2µF	0805	X5R/X7R	10V	C≥4.7µF	Y5V	16V	C≥4.7µF	* No remarkable damage. Cap change: NP0: ±3.0% or ±0.3pF whichever is larger X7R, X7E, X5R: ≥10V**, within ±12.5%, 6.3V within ±25%; **10V:0603≥4.7µF;0402≥1µF;0201≥0.1µF, within ±25%; Y5V: ≥10V, within ±30%; 6.3V, within +30/-40% Q/D.F. value: NP0: More than 30pF, Q≥350; 10pF≤C<30pF, Q≥275+2.5C; Less than 10pF, Q≥200+10C X7R, X5R: <table><tr><th>Rated voltage</th><th>D.F.≤</th><th colspan="2">Exception of D.F.≤</th></tr><tr><td rowspan="3">≥50V</td><td rowspan="3">≤3%</td><td>≤6%</td><td>0201(50V);0603≥0.047µF; 0805≥0.18µF; 1206≥0.47µF</td></tr><tr><td>≤10%</td><td>1210≥4.7µF</td></tr><tr><td>≤20%</td><td>0603≥1µF; 0805≥1µF; 1206≥2.2µF; 1210≥10µF</td></tr><tr><td>35V</td><td>≤5%</td><td>≤20%</td><td>0805≥2.2µF; 1210≥10µF</td></tr><tr><td rowspan="3">25V</td><td rowspan="3">≤5%</td><td>≤10%</td><td>0201≥0.01µF;0805≥1µF; 1210≥10µF</td></tr><tr><td>≤14%</td><td>0603≥0.33µF;1206≥4.7µF</td></tr><tr><td>≤15%</td><td>0402≥0.10µF;0603≥0.47µF;0805≥2.2µF; 1206≥6.8µF;1210≥22µF</td></tr><tr><td rowspan="3">16V</td><td rowspan="3">≤5%</td><td>≤10%</td><td>0603≥0.15µF;0805≥0.68µF; 1206≥2.2µF;1210≥4.7µF</td></tr><tr><td>≤15%</td><td>0201≥0.01µF;0402≥0.033µF; 0603≥0.68µF;0805≥2.2µF; 1206≥4.7µF; 1210≥22µF</td></tr><tr><td>≤20%</td><td>0201≥0.012µF;0402≥0.033µF; 0603≥0.33µF;0805≥2.2µF; 1206≥2.2µF; 1210≥22µF</td></tr><tr><td>10V</td><td>≤7.5%</td><td>≤15%</td><td>0201≥0.1µF ;0402≥1µF</td></tr><tr><td>6.3V</td><td>≤15%</td><td>≤30%</td><td>0201≥0.1µF;0402≥1µF; 0603≥10µF;0805≥4.7µF; 1206≥47µF; 1210≥100µF</td></tr><tr><td>4V</td><td>≤20%</td><td>---</td><td>---</td></tr></table> X7R: DF≤3% Y5V: <table><tr><th>Rated voltage</th><th>D.F.≤</th><th colspan="2">Exception of D.F.≤</th></tr><tr><td>≥50V</td><td>≤7.5%</td><td>≤10%</td><td>0603≥0.1µF; 0805≥0.47µF;1206≥4.7µF;Cap≥1µF</td></tr><tr><td rowspan="3">25V</td><td rowspan="3">≤7.5%</td><td>≤10%</td><td>0402≥0.047µF;0603≥0.1µF; 0805≥0.33µF;1206≥1µF; 1210≥4.7µF</td></tr><tr><td>≤15%</td><td>0402≥0.068µF;0603≥0.47µF; 1206≥4.7µF;1210≥22µF;Cap≥1µF</td></tr><tr><td>≤12.5%</td><td>0402≥0.068µF; 0603≥0.68µF</td></tr><tr><td>16V (C<1.0µF)</td><td>≤10%</td><td>≤20%</td><td>0402≥0.22µF</td></tr><tr><td>16V (C≥1.0µF)</td><td>≤12.5%</td><td>≤20%</td><td>0603≥2.2µF;0805≥3.3µF;1206≥10µF; 1210≥22µF;1812≥47µF;Cap≥1µF</td></tr><tr><td>10V</td><td>≤20%</td><td>≤30%</td><td>0402≥0.47µF</td></tr><tr><td>6.3V</td><td>≤30%</td><td>---</td><td>---</td></tr></table> *I.R.: ≥10V, 1GΩ or 50 Ω-F whichever is lower. Class II (X7R, X7E, X5R, Y5V): <table><tr><th>Rated voltage</th><th>Insulation Resistance</th></tr><tr><td>100V: X7R</td><td rowspan="5">1GΩ or RxC≥10 Ω-F whichever is lower.</td></tr><tr><td>50V:0603≥1µF;0805≥1µF; 1206≥2.2µF;1210≥4.7µF</td></tr><tr><td>25V:0402≥1µF;0603≥2.2µF; 0805≥2.2µF;1206≥10µF;1210≥10µF</td></tr><tr><td>16V:0402≥0.22µF;0603≥1µF;0805≥2.2µF;1206≥10µF;1210≥47µF</td></tr><tr><td>10V:0201≥47nF;0402≥0.47µF; 0603≥0.47µF;0805≥2.2µF; 1206≥4.7µF;1210≥47µF</td></tr></table>	Rated voltage	D.F.≤	Exception of D.F.≤		≥50V	≤3%	≤6%	0201(50V);0603≥0.047µF; 0805≥0.18µF; 1206≥0.47µF	≤10%	1210≥4.7µF	≤20%	0603≥1µF; 0805≥1µF; 1206≥2.2µF; 1210≥10µF	35V	≤5%	≤20%	0805≥2.2µF; 1210≥10µF	25V	≤5%	≤10%	0201≥0.01µF;0805≥1µF; 1210≥10µF	≤14%	0603≥0.33µF;1206≥4.7µF	≤15%	0402≥0.10µF;0603≥0.47µF;0805≥2.2µF; 1206≥6.8µF;1210≥22µF	16V	≤5%	≤10%	0603≥0.15µF;0805≥0.68µF; 1206≥2.2µF;1210≥4.7µF	≤15%	0201≥0.01µF;0402≥0.033µF; 0603≥0.68µF;0805≥2.2µF; 1206≥4.7µF; 1210≥22µF	≤20%	0201≥0.012µF;0402≥0.033µF; 0603≥0.33µF;0805≥2.2µF; 1206≥2.2µF; 1210≥22µF	10V	≤7.5%	≤15%	0201≥0.1µF ;0402≥1µF	6.3V	≤15%	≤30%	0201≥0.1µF;0402≥1µF; 0603≥10µF;0805≥4.7µF; 1206≥47µF; 1210≥100µF	4V	≤20%	---	---	Rated voltage	D.F.≤	Exception of D.F.≤		≥50V	≤7.5%	≤10%	0603≥0.1µF; 0805≥0.47µF;1206≥4.7µF;Cap≥1µF	25V	≤7.5%	≤10%	0402≥0.047µF;0603≥0.1µF; 0805≥0.33µF;1206≥1µF; 1210≥4.7µF	≤15%	0402≥0.068µF;0603≥0.47µF; 1206≥4.7µF;1210≥22µF;Cap≥1µF	≤12.5%	0402≥0.068µF; 0603≥0.68µF	16V (C<1.0µF)	≤10%	≤20%	0402≥0.22µF	16V (C≥1.0µF)	≤12.5%	≤20%	0603≥2.2µF;0805≥3.3µF;1206≥10µF; 1210≥22µF;1812≥47µF;Cap≥1µF	10V	≤20%	≤30%	0402≥0.47µF	6.3V	≤30%	---	---	Rated voltage	Insulation Resistance	100V: X7R	1GΩ or RxC≥10 Ω-F whichever is lower.	50V:0603≥1µF;0805≥1µF; 1206≥2.2µF;1210≥4.7µF	25V:0402≥1µF;0603≥2.2µF; 0805≥2.2µF;1206≥10µF;1210≥10µF	16V:0402≥0.22µF;0603≥1µF;0805≥2.2µF;1206≥10µF;1210≥47µF	10V:0201≥47nF;0402≥0.47µF; 0603≥0.47µF;0805≥2.2µF; 1206≥4.7µF;1210≥47µF
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APPENDIX II: GENERAL INFORMATION

	Name	NP0/X7R	NPO/X7R/X5R/Y5V
1	Ceramic material	BaTiO ₃ based	
2	Inner electrode	Ni	
3	Termination	Inner layer	Cu
4		Middle layer	Ni
5		Outer layer	Sn



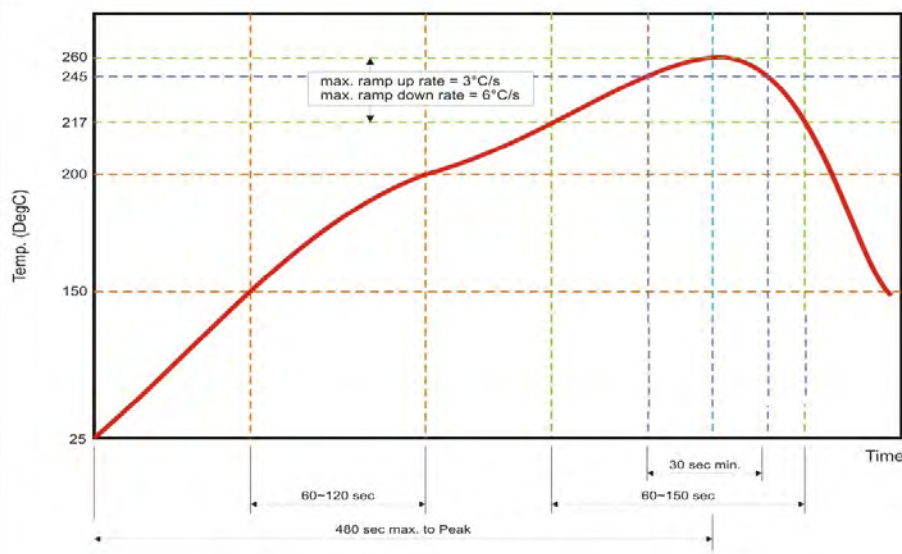
Storage and handling

- 1) Products should be stored at 5° to 40°C ambient temperature and 20% to 70% relative humidity.
- 2) It is recommended that the product be used within one year from shipment. After one year from shipment, solderability should be checked.

Cautions

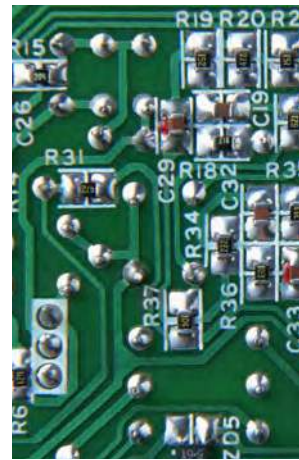
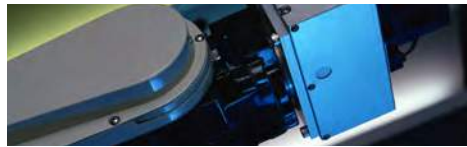
- 1) Do not store capacitors in the proximity of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas etc.). Doing so may cause solderability issues. Corrosive gas may react with the terminal electrodes of the capacitors.
- 2) In a corrosive atmosphere, solderability might be degraded, and/or silver migration may occur. This may result in lower reliability.
- 3) Do not store capacitors under direct sunlight or in dewing conditions. Dewing, caused by rapid humidity changes, and/or photochemical changes of the terminal electrode, may result in poor solderability and reduced electrical performance.

Recommended **reflow** profile for SnAgCu solder paste:



Recommended **wave** profile for SnAgCu solder paste:





FRONTIER ELECTRONICS CORP

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1-800-929-9888 E-Mail: frontiersales@frontierusa.com www.frontierusa.com