



G SERIES STANDARD Q CAPACITOR SPECIFICATION

Rev. A

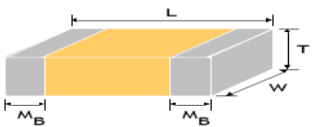
PART NUMBER DESCRIPTION

0402	G	250	N	0R1	B	C	T
Size	Series	Rated Voltage (VDC)	Dielectric	Capacitance	Tolerance	Termination	Packaging
0201 (0603) 0402 (1005) 0603 (1608) 0805 (2012) 1206 (3216) 1210 (3225) 1808 (4520) 1812 (4532) 1825 (4563) 2220 (5750) 2225 (5763)	G:General Purpose/High Volt	6R3: 6.3V 100: 10V 160: 16V 250: 25V 500: 50V 101: 100V 201: 200V 251: 250V 501: 500V 631: 630V 102: 1,000V 202: 2,000V 302: 3,000V	N: NP0 X: X7R W: X5R Y: Y5V	0R1=0.10pF 0R5=0.50pF 1R0=1.0pF 100=10pF 101=100pF	A: ±0.05pF B: ±0.1pF C: ±0.25pF D: ±0.5pF F: ±1% G: ±2% J: ±5% K: ±10% M: ±20% Z: -20%/+80%	C=Cu/Ni/Sn	T=7" Paper Tape U=13" Paper Tape E=7" Plastic Tape Q=13" Plastic Tape Z or blank=Bulk

General Electrical Data

Dielectric	NP0	X7R	X5R	Y5V
Size	0201, 0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225	0201, 0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225	0201, 0402, 0603, 0805, 1206, 1210	0402, 0603, 0805, 1206, 1210, 1808, 1812
Capacitance range	0.1pF to 0.1µF	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)			

External Dimensions

Outline	Case Size EIA (mm)	L (mm)	W (mm)	T (mm)	Soldering Method	M _B (mm)
	0201 (0603)	0.60 ±0.03	0.30 ±0.03	0.30 ±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 ±0.20		
	0505 (1414)	1.40 +0.33/-0.25	1.40 ±0.38	1.15 ±0.15	R/W	0.25 +0.25/-0.13
	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	0.80±0.20	0.80±0.15/-0.10		
	0805 (2012)	2.0 ±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	
		1.25±0.10	R			
		2.0 ±0.20	1.25 ±0.20	0.85±0.10	R / W	
	1.25±0.20	R				
	1206 (3216)	3.2 ±0.15	1.6 ±0.15	0.8 ±0.10	R/W	0.6 ±0.20
				0.95 ±0.10	R	
		3.2 ±0.20	1.6 ±0.20	1.15 ±0.15	R	
				1.25 ±0.10	R	
		3.2 +0.3/-0.1	1.6 +0.3/-0.1	1.6 ±0.20	R/W	
	1.6 ±0.20	R				
	1210 (3225)	3.2 ±0.30	2.5 ±0.20	0.85 ±0.10	R	0.75 ±0.25
1.25 ±0.10				R		
3.2 ±0.40		2.5 ±0.30	1.6 ±0.20	R		
			2.0 ±0.20	R		
1808 (4520)	4.5 ±0.40	2.03 ±0.25	2.5 ±0.30	R		
			1.4 ±0.15	R		
			1.6 ±0.20	R		
1812 (4532)	4.5 ±0.40	3.2 ±0.30	2.0 ±0.20	R	0.75 ±0.25	
			1.25 ±0.10	R		
			1.6 ±0.20	R		
			2.0 ±0.20	R		
			2.5 ±0.30	R		
1825 (4563)	4.6 ±0.30	6.3 ±0.40	2.8 ±0.30	R		
			2.0 ±0.20	R		
			2.5 ±0.30	R		
			2.8 ±0.30	R		
2220 (5750)	5.7 ±0.40	5.0 ±0.40	2.0 ±0.20	R	>0.30	
			2.5 ±0.30			
			2.8 ±0.30			
2225 (5763)	5.7 ±0.40	6.3 ±0.40	2.0 ±0.20	R	>0.30	
			2.5 ±0.30			
			2.8 ±0.30			



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Thickness Codes/Packaging Quantity

Case Size	Size Code	Max. Thickness (mm)	Length (mm)	Width (mm)	Thickness (mm)	Reel Quantity			
						Paper Tape		Embossed Plastic Tape	
						7" Reel	13" Reel	7" Reel	13" Reel
0201	AA	0.33	0.60 ±0.03	0.30 ±0.03	0.30 ±0.03	15,000	70,000	-	-
0402	BA	0.55	1.00 ±0.05	0.50 ±0.05	0.50 ±0.05	10,000	50,000	-	-
0402	BC	0.52	1.0 ±0.20	0.50 ±0.20	0.50 ±0.2	10,000	-	-	-
0505	LA	1.3	1.4 +0.33/-0.25	1.4 ±0.38	1.15 ±0.15	-	-	-	-
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/-0.01	0.8 +0.15/-0.1	0.8 +0.15/-0.1	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	1.9	3.2 +0.3/-0.1	1.6 +0.3/-0.1	1.6 +0.3/-0.1	-	-	2,000	9,000
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
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
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	-
1825	IA	2.2	4.6 ±0.3	6.3 ±0.4	2.0 ±0.2	-	-	1,000	-
1825	IB	2.8	4.6 ±0.3	5.0 ±0.4	2.5 ±0.3	-	-	500	-
2220	JA	2.2	5.7 ±0.4	5.0 ±0.4	2.0 ±0.2	-	-	1,000	-
2220	JB	2.8	5.7 ±0.4	5.0 ±0.4	2.5 ±0.3	-	-	500	-
2220	JC	3.1	5.7 ±0.4	5.0 ±0.4	2.8 ±0.3	-	-	500	-
2225	KA	2.2	5.7 ±0.4	6.3 ±0.4	2.0 ±0.2	-	-	1,000	-
2225	KB	2.8	5.7 ±0.4	6.3 ±0.4	2.5 ±0.3	-	-	500	-
2225	KC	3.1	5.7 ±0.4	6.3 ±0.4	2.8 ±0.3	-	-	500	-



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X7R Dielectric

	Tolerance	1808					1812					1825					2220					2225							
		6.3	10	16	25	50	6.3	10	16	25	50	10	16	25	50	6.3	10	16	25	50	6.3	10	16	25	50				
		1K	2K	3K			100	200	500	630	1K	2K	3K	100	200	500	630	1K	2K	3K	100	200	500	630	1K	2K			
DC Volts																													
101	100 pF																												
121	120 pF																												
151	150 pF	GE	GE	GE	GE	GE																							
181	180 pF	GE	GE	GE	GE	GE																							
221	220 pF	GE	GE	GE	GE	GE																							
271	270 pF	GE	GE	GE	GE	GE	HA	HA	HA	HA	HA																		
331	330 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA																		
391	390 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA																		
471	470 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA																		
561	560 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA																		
681	680 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HC	HC																
821	820 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HC	HC																
102	1,000 pF	GE	GE	GE	GE	GH	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
122	1,200 pF	GE	GE	GE	GH	GH	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
152	1,500 pF	GE	GE	GE	GH	GH	HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
182	1,800 pF	GE	GE	GE	GH		HA	HA	HA	HA	HA	HD	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
222	2,200 pF	GE	GE	GE	GH		HA	HA	HA	HA	HA	HD	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
272	2,700 pF	GE	GE	GE	GH		HA	HA	HA	HA	HA	HD	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
332	3,300 pF	GE	GE	GE	GH		HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
392	3,900 pF	GE	GE	GE	GH		HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
472	4,700 pF	GE	GE	GE	GH		HA	HA	HA	HA	HA	HC	IA	IA	IA	IA	IA	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
562	5,600 pF	GH	GH	GH	GH		HA	HA	HA	HA	HA		IA	IA	IA	IA	IA	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
682	6,800 pF	GH	GH	GH			HA	HA	HA	HA	HA		IA	IA	IA	IA	IA	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
822	8,200 pF	GH	GH	GH			HA	HA	HA	HA	HA		IA	IA	IA	IA	IB	IA	JA	JA	JA	JA	JA	JB	KA	KA	KA	KA	KA
103	10,000 pF	GH	GH	GH			HA	HA	HA	HA	HA		IA	IA	IA	IA	IB	IA	JA	JA	JA	JA	JA	JB	KA	KA	KA	KA	KA
123	12,000 pF	GH	GH	GH			HA	HA	HA	HA	HA		IA	IA	IA	IA	IB	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
153	15,000 pF	*J	GH	GH	GH		HA	HA	HA	HA	HC		IA	IA	IA	IA	IB	IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
183	18,000 pF	GH	GH	GH			HA	HA	HA	HA	HA		IA	IA	IA	IA		IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
223	22,000 pF	GH	GH	GH			HA	HA	HA	HA	HA		IA	IA	IA	IA		IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
273	27,000 pF	GH	GH	GH			HA	HA	HA	HA	HA		IA	IA	IA	IA		IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
333	33,000 pF	GH	GH	GH			HA	HA	HA	HA	HA		IA	IA	IA	IA		IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
393	39,000 pF	GH	GH	GH			HA	HA	HA	HA	HA		IA	IA	IA	IA		IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
473	47,000 pF	GH	GH				HA	HA	HA	HA	HA		IA	IA	IA	IA		IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
563	56,000 pF	GH	GH				HA	HA	HA	HC	HA		IA	IA	IA	IA		IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
683	68,000 pF	GH	GH				HA	HA	HA	HC	HA		IA	IA	IA	IA		IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
823	82,000 pF						HA	HA	HA	HC	HA		IA	IA	IA	IB		IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
104	0.1 μF						HA	HA	HA	HC	HA		IA	IA	IA	IB		IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
124	0.12 μF						HA	HA	HA	HD	HA		IA	IA	IA			IA	JA	JA	JA	JA	JA	JB	KA	KA	KA	KA	KA
154	0.15 μF						HA	HA	HC	HD	HA		IA	IA	IA			IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
184	0.18 μF						HA	HA	HC				IA	IA	IA			IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
224	0.22 μF						HA	HA	HC				IA	IA	IA			IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
274	0.27 μF						HA	HA	HC				IA	IA				IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
334	0.33 μF						HA	HA	HC				IA	IA				IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
394	0.39 μF						HA	HA	HC				IA	IA				IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
474	0.47 μF						HA	HC	HC				IA	IA				IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
564	0.56 μF						HA	HC	HD				IA	IA				IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
684	0.68 μF						HA	HC	HD				IA	IA				IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
824	0.82 μF						HA	HC	HD				IA	IA				IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KA
105	1 μF						HA	HC	HD				IA	IA				IA	JA	JA	JA	JA	JA	JA	KA	KA	KA	KA	KB
155	1.5 μF						HC	HC	HD				IA					IA	JA	JA	JA	JA	JA	JA	KA	KA	KB		
225	2.2 μF						HD	HD					IA					IA	JA	JA	JB				KA	KA	KB		
335	3.3 μF												IA					IA	JA	JA					KA	KA			
475	4.7 μF												IA					IA	JB						KA				
685	6.8 μF																								KB				
106	10 μF																								KB				
226	22 μF																								KB				
476	47 μF																								KB				

*J Tolerance available only for 100V and lower



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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	200	6.3	10	16	25	50	100	200	6.3	10	16	25	50	100	200	6.3	10	25	200
		DC Volts																																		
103	10,000 pF	BA	BA	BA	BA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
153	15,000 pF	BA	BA	BA	BA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
223	22,000 pF	BA	BA	BA	BA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
333	33,000 pF	BA	BA	BA	BA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
473	47,000 pF	BA	BA	BA	BA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
683	68,000 pF	BA	BA	BA	BA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
104	0.1 μF	BA	BA	BA	BA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
154	0.15 μF	BA	BA	BA	BA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
224	0.22 μF	BA	BA	BA	BA	CA	CA	CA	CA	DB	DB	DB	DB	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
334	0.33 μF	BA	BA	BA	BA	CA	CA	CA	CC	DC	DC	DC	DC	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
474	0.47 μF	BA	BA	BA	BA	CA	CA	CA	CC	DC	DC	DC	DC	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
684	0.68 μF	BA	BA	BA	BA	CA	CA	CA	CC	DC	DC	DC	DC	DC	DC	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
105	1 μF	BA	BA	BA	BA	CA	CC	CC	CC	DC	DC	DD	DD	DD	DD	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
155	1.5 μF	BA	BA	BA	BA	CA	CC	CC	CC	DC	DC	DD	DD	DD	DD	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
225	2.2 μF	BA	BA	BA	BA	CA	CC	CC	CC	DC	DC	DD	DD	DF	DF	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
335	3.3 μF	BA	BA	BA	BA	CA	CC	CC	CC	DC	DC	DD	DD	DF	DF	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
475	4.7 μF	BA	BA	BA	BA	CA	CC	CC	CC	DC	DC	DD	DD	DF	DF	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
685	6.8 μF	BA	BA	BA	BA	CA	CC	CC	CC	DC	DC	DD	DD	DF	DF	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
106	10 μF	BA	BA	BA	BA	CA	CC	CC	CC	DC	DC	DD	DD	DF	DF	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
226	22 μF	BA	BA	BA	BA	CA	CC	CC	CC	DC	DC	DD	DD	DF	DF	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
476	47 μF	BA	BA	BA	BA	CA	CC	CC	CC	DC	DC	DD	DD	DF	DF	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			
107	100 μF	BA	BA	BA	BA	CA	CC	CC	CC	DC	DC	DD	DD	DF	DF	EA	EA	EA	EA	EA	EA	EA	FA	FA	FA	FA	FA	FA	FA	HA	HA	HA	HA			

*M Tolerance available only for 100V and lower

X5R Dielectric

	Tolerance	0201					0402					0603					0805					1206					1210							
		6.3	10	16	25	50	6.3	10	16	25	50	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																																
101	100 pF	AA	AA	AA	AA	AA																												
221	220 pF	AA	AA	AA	AA	AA																												
471	470 pF	AA	AA	AA	AA	AA																												
102	1,000 pF	AA	AA	AA	AA	AA																												
222	2,200 pF	AA	AA	AA	AA	AA																												
472	4,700 pF	AA	AA	AA	AA	AA																												
103	10,000 pF	AA	AA	AA	AA	AA																												
273	27,000 pF	AA	AA	AA	AA	AA																												
333	33,000 pF	AA	AA	AA	AA	AA																												
393	39,000 pF	AA	AA	AA	AA	AA																												
473	47,000 pF	AA	AA	AA	AA	AA																												
563	56,000 pF	AA	AA	AA	AA	AA																												
683	68,000 pF	AA	AA	AA	AA	AA																												
823	82,000 pF	AA	AA	AA	AA	AA																												
104	0.1 μF	AA	AA	AA	AA	AA																												
154	0.15 μF	AA	AA	AA	AA	AA																												
224	0.22 μF	AA	AA	AA	AA	AA																												
274	0.27 μF	AA	AA	AA	AA	AA																												
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394	0.39 μF	AA	AA	AA	AA	AA																												
474	0.47 μF	AA	AA	AA	AA	AA																												
684	0.68 μF	AA	AA	AA	AA	AA																												
824	0.82 μF	AA	AA	AA	AA	AA																												
105	1 μF	AA	AA	AA	AA	AA																												
155	1.5 μF	AA	AA	AA	AA	AA																												
225	2.2 μF	AA	AA	AA	AA	AA																												
335	3.3 μF	AA	AA	AA	AA	AA																												
475	4.7 μF	AA	AA	AA	AA	AA																												
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*J Tolerance available in 0201 case size only



G SERIES STANDARD Q CAPACITOR SPECIFICATION

Rev. A

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 \geq 30pF, Q \geq 1000, Cap $<$ 30pF, Q \geq 400+20C X7R, X5R: <table border="1"> <thead> <tr> <th>Rated voltage (DCV)</th> <th>D.F. \leq</th> <th colspan="2">Exception of D.F. \leq</th> </tr> </thead> <tbody> <tr> <td rowspan="3">\geq 50V</td> <td rowspan="3">\leq 2.5%</td> <td>\leq3%</td> <td>0201(50V), 0603 \geq 0.047μF, 0805 \geq 0.18μF, 1206 \geq 0.47μF</td> </tr> <tr> <td>\leq5%</td> <td>1210 \geq 4.7μF</td> </tr> <tr> <td>\leq10%</td> <td>0603\geq1μF, 0805\geq1μF, 1206\geq2.2μF, 1210\geq10μF</td> </tr> <tr> <td>35V</td> <td>\leq3.5%</td> <td>\leq10%</td> <td>0805\geq2.2μF, 1210\geq10μF</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">\leq3.5%</td> <td>\leq5%</td> <td>0201\geq0.01μF, 0805\geq1μF, 1210\geq10μF</td> </tr> <tr> <td>\leq7%</td> <td>0603\geq0.33μF, 1206\geq4.7μF</td> </tr> <tr> <td>\leq10%</td> <td>0402\geq0.10μF, 0603\geq0.47μF, 0805\geq2.2μF,</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">\leq3.5%</td> <td>\leq5%</td> <td>0201\geq0.01μF, 0402\geq0.033μF, 0603\geq0.15μF, 0805\geq0.68μF, 1206\geq2.2μF, 1210\geq4.7μF</td> </tr> <tr> <td>\leq10%</td> <td>0402\geq 0.22μF, 0603\geq0.68μF, 0805\geq2.2μF, 1206\geq4.7μF, 1210\geq22μF</td> </tr> <tr> <td rowspan="2">10V</td> <td rowspan="2">\leq5%</td> <td>\leq10%</td> <td>0201\geq0.012μF, 0402\geq0.33μF, 0603\geq0.33μF, 0805 \geq2.2μF, 1206\geq2.2μF, 1210\geq22μF</td> </tr> <tr> <td>\leq15%</td> <td>0201\geq0.1μF, 0402\geq1μF</td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">\leq10%</td> <td>\leq15%</td> <td>0201\geq0.1μF, 0402\geq1μF, 0603\geq10μF, 0805\geq4.7μF, 1206\geq47μF : 1210\geq100μF</td> </tr> <tr> <td>\leq20%</td> <td>0402\geq2.2μF</td> </tr> <tr> <td>4V</td> <td>\leq15%</td> <td>---</td> <td>---</td> </tr> </tbody> </table>	Rated voltage (DCV)	D.F. \leq	Exception of D.F. \leq		\geq 50V	\leq 2.5%	\leq 3%	0201(50V), 0603 \geq 0.047 μ F, 0805 \geq 0.18 μ F, 1206 \geq 0.47 μ F	\leq 5%	1210 \geq 4.7 μ F	\leq 10%	0603 \geq 1 μ F, 0805 \geq 1 μ F, 1206 \geq 2.2 μ F, 1210 \geq 10 μ F	35V	\leq 3.5%	\leq 10%	0805 \geq 2.2 μ F, 1210 \geq 10 μ F	25V	\leq 3.5%	\leq 5%	0201 \geq 0.01 μ F, 0805 \geq 1 μ F, 1210 \geq 10 μ F	\leq 7%	0603 \geq 0.33 μ F, 1206 \geq 4.7 μ F	\leq 10%	0402 \geq 0.10 μ F, 0603 \geq 0.47 μ F, 0805 \geq 2.2 μ F,	16V	\leq 3.5%	\leq 5%	0201 \geq 0.01 μ F, 0402 \geq 0.033 μ F, 0603 \geq 0.15 μ F, 0805 \geq 0.68 μ F, 1206 \geq 2.2 μ F, 1210 \geq 4.7 μ F	\leq 10%	0402 \geq 0.22 μ F, 0603 \geq 0.68 μ F, 0805 \geq 2.2 μ F, 1206 \geq 4.7 μ F, 1210 \geq 22 μ F	10V	\leq 5%	\leq 10%	0201 \geq 0.012 μ F, 0402 \geq 0.33 μ F, 0603 \geq 0.33 μ F, 0805 \geq 2.2 μ F, 1206 \geq 2.2 μ F, 1210 \geq 22 μ F	\leq 15%	0201 \geq 0.1 μ F, 0402 \geq 1 μ F	6.3V	\leq 10%	\leq 15%	0201 \geq 0.1 μ F, 0402 \geq 1 μ F, 0603 \geq 10 μ F, 0805 \geq 4.7 μ F, 1206 \geq 47 μ F : 1210 \geq 100 μ F	\leq 20%	0402 \geq 2.2 μ F	4V	\leq 15%	---	---
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3	Q/ DF (Dissipation Factor)	Class I: NP0 Class I: NP0 Caps \leq 1,000pF 1.0 \pm 0.2Vrms, 1MHz \pm 10% Cap $>$ 1,000pF 1.0 \pm 0.2Vrms, 1KHz \pm 10% Class II: X7R, X5R, Y5V Caps \leq 10 μ F, 1.0 \pm 0.2Vrms, 1kHz \pm 10% ** Cap $>$ 10 μ F, 0.5 \pm 0.2Vrms, 120Hz \pm 20% ** Test condition: 0.5 \pm 0.2Vrms, 1KHz \pm 10% X7R: 0603 \geq 225 (10V), 0805=106 (6.3V&10V) X5R: 0201 \geq 224 (6.3V), 0402 \geq 475 (6.3V), 0402 \geq 225(10V), 0603=106 (6.3V)																																														
4	Dielectric Strength	*To apply voltage(\leq 100V) 250%. *Duration: 1 to 5 sec. *Charge & discharge current less than 50mA. *To apply voltage: 200V~300V & LD series \geq 2 times VDC 500V~999V \geq 1.5 times VDC 1000V~3000V \geq 1.2 times VDC *Cut-off, set at 10mA *TEST= 15 sec. *RAMP=0																																														
5	Insulation Resistance	10G Ω or RxC \geq 500 Ω -F whichever is lower. Class II (X7R, X7E, X5R, Y5V): To apply rated voltage for max. 120 sec. <table border="1"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>100V: X7R</td> <td rowspan="7">10GΩ or RxC\geq100 Ω-F whichever is lower.</td> </tr> <tr> <td>50V: 0603\geq1μF, 0805\geq1μF, 1206\geq2.2μF, 1210\geq4.7μF</td> </tr> <tr> <td>35V: 0805\geq2.2μF, 1210\geq10μF</td> </tr> <tr> <td>25V: 0402\geq1μF, 0603\geq2.2μF, 0805\geq2.2μF, 1206\geq10μF, 1210\geq10μF</td> </tr> <tr> <td>16V: 0402\geq0.22μF, 0603\geq1μF, 0805\geq2.2μF, 1206\geq10μF, 1210\geq47μF</td> </tr> <tr> <td>10V: 0201\geq47nF, 0402\geq0.47μF, 0603\geq0.47μF, 0805\geq2.2μF,</td> </tr> <tr> <td>6.3V</td> </tr> </tbody> </table>	Rated voltage	Insulation Resistance	100V: X7R	10G Ω or RxC \geq 100 Ω -F whichever is lower.	50V: 0603 \geq 1 μ F, 0805 \geq 1 μ F, 1206 \geq 2.2 μ F, 1210 \geq 4.7 μ F	35V: 0805 \geq 2.2 μ F, 1210 \geq 10 μ F	25V: 0402 \geq 1 μ F, 0603 \geq 2.2 μ F, 0805 \geq 2.2 μ F, 1206 \geq 10 μ F, 1210 \geq 10 μ F	16V: 0402 \geq 0.22 μ F, 0603 \geq 1 μ F, 0805 \geq 2.2 μ F, 1206 \geq 10 μ F, 1210 \geq 47 μ F	10V: 0201 \geq 47nF, 0402 \geq 0.47 μ F, 0603 \geq 0.47 μ F, 0805 \geq 2.2 μ F,	6.3V																																				
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6	Temperature Coefficient	With no electrical load. <table border="1"> <thead> <tr> <th>T.C.</th> <th>Operating Temp</th> <th>T.C.</th> <th>Capacitance Change</th> </tr> </thead> <tbody> <tr> <td>NPO (C0G)</td> <td rowspan="3">-55~125°C at 25°C</td> <td>NPO (C0G)</td> <td>Within \pm30ppm/°C</td> </tr> <tr> <td>NPO (C0H)</td> <td>NPO (C0H)</td> <td>Within \pm60ppm/°C</td> </tr> <tr> <td>NPO (C0J)</td> <td>NPO (C0J)</td> <td>Within \pm120ppm/°C</td> </tr> <tr> <td>X7R</td> <td rowspan="2">-55~85°C at 25°C</td> <td>X7R</td> <td>Within \pm15%</td> </tr> <tr> <td>X5R</td> <td>X5R</td> <td>Within \pm15%</td> </tr> <tr> <td>Y5V</td> <td>-25~85°C at 20°C</td> <td>Y5V</td> <td>Within +30%/-80%</td> </tr> </tbody> </table>	T.C.	Operating Temp	T.C.	Capacitance Change	NPO (C0G)	-55~125°C at 25°C	NPO (C0G)	Within \pm 30ppm/°C	NPO (C0H)	NPO (C0H)	Within \pm 60ppm/°C	NPO (C0J)	NPO (C0J)	Within \pm 120ppm/°C	X7R	-55~85°C at 25°C	X7R	Within \pm 15%	X5R	X5R	Within \pm 15%	Y5V	-25~85°C at 20°C	Y5V	Within +30%/-80%																					
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7	Adhesive Strength of Termination	*Pressurizing force : 0201: 2N 0402 & 0603: 5N >0603: 10N *Test time : 10 \pm 1 sec																																														



G SERIES STANDARD Q CAPACITOR SPECIFICATION

Rev. A

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 : NPO: 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: NPO: 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 border="1" style="margin-left: 20px;"> <thead> <tr> <th>Step</th> <th>Temp. (°C)</th> <th>Time (min.)</th> </tr> </thead> <tbody> <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> </tbody> </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 NPO: 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.																																																																													
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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: NPO: 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: NPO: More than 30pF Q≥350, 10pF≤C≤30pF, Q≥275+2.5C, Less than 10pF Q≥200+10C X7R, X5R: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Rated vol.</th> <th>D.F.≤</th> <th colspan="2">Exception of D.F.≤</th> </tr> </thead> <tbody> <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="2">35V</td> <td rowspan="2">≤5%</td> <td>≤20%</td> <td>0805≥2.2µF; 1210≥10µF</td> </tr> <tr> <td>≤10%</td> <td>0201≥0.1µF; 0805≥1µF; 1210≥10µF</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤5%</td> <td>≤14%</td> <td>0603≥0.33µF; 1206≥4.7µF</td> </tr> <tr> <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 rowspan="2">16V</td> <td rowspan="2">≤5%</td> <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>≤10%</td> <td>0201≥0.012µF; 0402≥0.33µF; 0603≥0.33µF; 0805≥2.2µF; 1206≥2.2µF;</td> </tr> <tr> <td>10V</td> <td>≤7.5%</td> <td>≤20%</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;</td> </tr> <tr> <td>4V</td> <td>≤20%</td> <td>---</td> <td>---</td> </tr> </tbody> </table> Y5V: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Rated vol.</th> <th>D.F.≤</th> <th colspan="2">Exception of D.F.≤</th> </tr> </thead> <tbody> <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>≤10%</td> <td>0402≥0.068µF; 0603≥0.68µF</td> </tr> <tr> <td>16V</td> <td>≤10%</td> <td>≤20%</td> <td>0402≥0.22µF</td> </tr> <tr> <td>16V</td> <td rowspan="2">≤12.5%</td> <td>≤20%</td> <td>0603≥2.2µF; 0805≥3.3µF; 1206≥10µF; 1210≥22µF;</td> </tr> <tr> <td>(C<1.0µF)</td> <td>---</td> <td>---</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> </tbody> </table> *I.R.: ≥10V, 1GΩ or 50 Ω-F whichever is lower. 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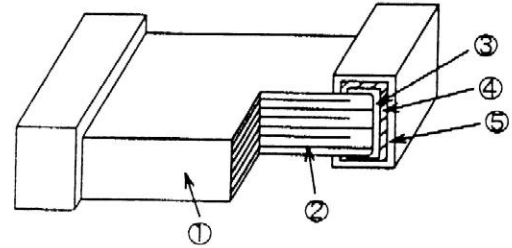


G SERIES STANDARD Q CAPACITOR SPECIFICATION

Rev. A

Item	Test Condition	Requirements																																																																																																																																			
14	<p>Humidity (Damp Heat) Load</p> <p>* Test temp.: 40±2°C * Humidity: 90~95%RH * Test time: 500+24/0 hrs. * Voltage : Rated voltage.(Max.500V) * 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.</p>	<p>* No remarkable damage. Cap change: NPO: ±7.5% or 0.75pF whichever is larger. 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(4) Ur≥630V: 120% of rated voltage.(5) 100% of rated voltage for below range:</p> <table border="1"> <thead> <tr> <th>Size</th> <th>Dielectric</th> <th>Rated voltage</th> </tr> </thead> <tbody> <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 rowspan="2">1206</td> <td>X5R/X7R</td> <td>6.3V</td> </tr> <tr> <td>NPO</td> <td>3000V</td> </tr> </tbody> </table> <p>(6)150% of rated voltage for below range:</p> <table border="1"> <thead> <tr> <th>Size</th> <th>Dielectric</th> <th>Rated voltage</th> <th>Capacitance</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>*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.</p>	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	6.3V	NPO	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	<p>* No remarkable damage. Cap change: NPO: ±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: NPO: More than 30pF, Q≥350; 10pF≤C<30pF, Q≥275+2.5C; Less than 10pF, Q≥200+10C X7R, X5R:</p> <table border="1"> <thead> <tr> <th>Rated voltage</th> <th>D.F.≤</th> <th colspan="2">Exception of D.F.≤</th> </tr> </thead> <tbody> <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="2">35V</td> <td rowspan="2">≤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 rowspan="3">25V</td> <td rowspan="3">≤5%</td> <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>≤10%</td> <td>0603≥0.15μF;0805≥0.68μF; 1206≥2.2μF;1210≥4.7μF</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">≤5%</td> <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>≤15%</td> <td>0201≥0.012μF;0402≥0.33μF; 0603≥0.33μF;0805≥2.2μF; 1206≥2.2μF; 1210≥22μF</td> </tr> <tr> <td>10V</td> <td>≤7.5%</td> <td>≤20%</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> </tbody> </table> <p>X7R: DF≤3%</p> <p>Y5V:</p> <table border="1"> <thead> <tr> <th>Rated voltage</th> <th>D.F.≤</th> <th colspan="2">Exception of D.F.≤</th> </tr> </thead> <tbody> <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="2">25V</td> <td rowspan="2">≤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 rowspan="2">16V (C<1.0μF)</td> <td rowspan="2">≤10%</td> <td>≤12.5%</td> <td>0402≥0.068μF; 0603≥0.68μF</td> </tr> <tr> <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> </tbody> </table> <p>*I.R.: ≥10V, 1GΩ or 50 Ω-F whichever is lower.</p> <p>Class II (X7R, X7E, X5R, Y5V):</p> <table border="1"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <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> <tr> <td>6.3V: 4V</td> <td></td> </tr> </tbody> </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	≤10%	0201≥0.01μF;0805≥1μF; 1210≥10μF	25V	≤5%	≤14%	0603≥0.33μF;1206≥4.7μF	≤15%	0402≥0.10μF;0603≥0.47μF;0805≥2.2μF; 1206≥6.8μF;1210≥22μF	≤10%	0603≥0.15μF;0805≥0.68μF; 1206≥2.2μF;1210≥4.7μF	16V	≤5%	≤15%	0201≥0.01μF;0402≥0.033μF; 0603≥0.68μF;0805≥2.2μF; 1206≥4.7μF; 1210≥22μF	≤15%	0201≥0.012μF;0402≥0.33μF; 0603≥0.33μF;0805≥2.2μF; 1206≥2.2μF; 1210≥22μF	10V	≤7.5%	≤20%	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	16V (C<1.0μF)	≤10%	≤12.5%	0402≥0.068μF; 0603≥0.68μF	≤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	6.3V: 4V	
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Name		NP0/X7R	NPO/X7R/X5R/Y5V
1	Ceramic material	BaTiO ₃ based	
2	Inner electrode	Ni	
3	Inner layer	Cu	
	Middle layer	Ni	
	Outer layer	Sn	



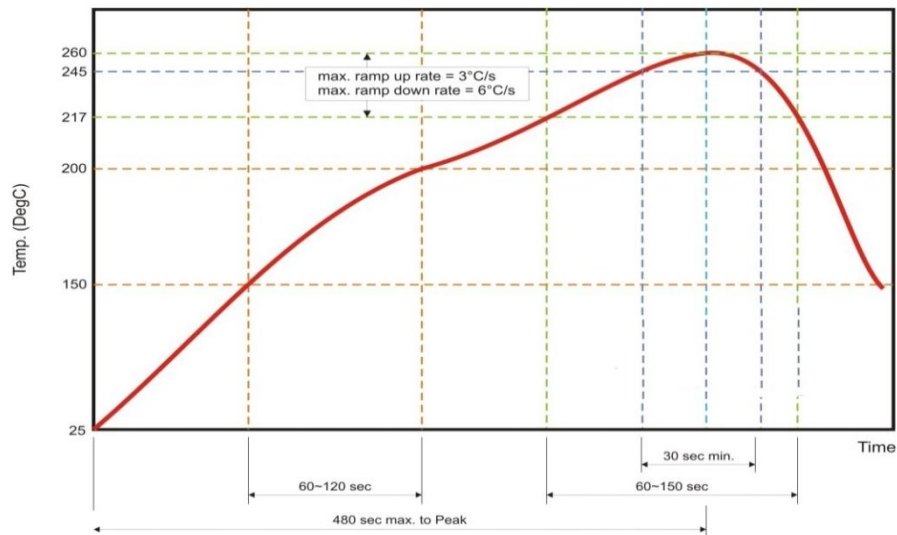
Storage and handling

- (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

- a. Corrosive gas reacts with the terminal electrodes of capacitors. Do not store capacitors in the proximity of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas etc.) otherwise there can be solderability issues.
- b. In a corrosive atmosphere, solderability might be degraded, and/or silver migration may occur which can cause lower reliability.
- c. Dewing caused by rapid humidity changes and/or photochemical changes of the terminal electrode (caused by direct sunlight contact) can affect the solderability and electrical performance. Do not store capacitors under direct sunlight or in dewing conditions.

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



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

