Quantic™ Eulex

TECHNICAL DATA SHEET ***(XQ Series)***

Ultra-High Q

Product Description

Eulex ultra-high Q and ultra-low ESR XQ-series capacitors feature ultra-high Q, ultra-high self-resonance frequencies and ultra-low ESR. Manufactured with stable NP0 & X8G dielectrics (±30ppm/°C). Pb-free terminations and copper electrodes.

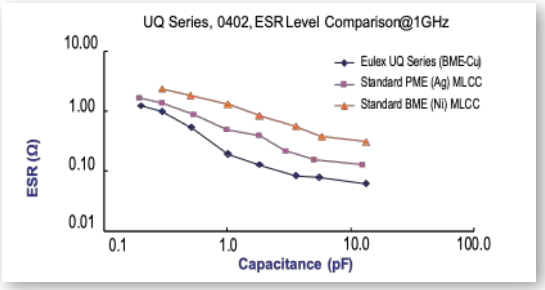
Features

- High Q
- Low ESR/ESL
- Ultra Stable Dielectric Characteristic ±30ppm/°C
- Capacitance (0.1 pF to 1000pF)
- Size 01005 to 1111
- Voltage up to 1500V
- RoHS Compliant

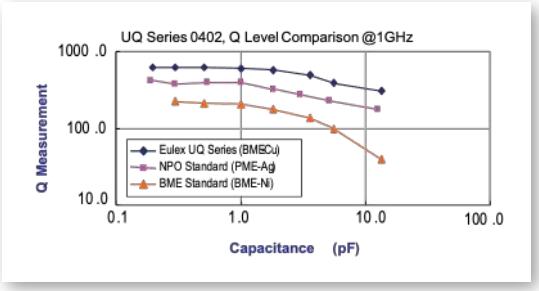
Applications

- Power Station
- Base Station
- UHF/Microwave
- Timing Circuits
- Mixers

Ultra-High Q



Ultra-Low ESR



Part Numbering

XQ	G	02	N	0R5	B	N	T
Series	Voltage Code	Case Code	Dielectric Type	* Capacitance	Tolerance	Termination	** Packaging
Ultra-High Q	A = 6.3VDC	01 = 01005	N = NP0	R05 = 0.05pF	A = ±0.05pF	N = Cu/Ni/Sn	T = 7" reel
	C = 10VDC	02 = 0201	G = X8G	0R2 = 0.20pF	B = ±0.10pF		R = 13" reel
	E = 16VDC	04 = 0402		1R0 = 1.0pF	C = ±0.25pF		
	L = 25VDC	05 = 0505		2R7 = 2.7pF	D = ±0.5pF		
	G = 50VDC	06 = 0603		270 = 27pF	F = ±1%		
	B = 100VDC	08 = 0805		271 = 270pF	G = ±2%		
	R = 200VDC	11 = 1111		102 = 1000pF	J = ±5%		
	H = 250VDC						
	S = 500VDC						
	F = 1500VDC						

RoHS

* Below 10pF, R denotes a decimal point.
For 10pF and above, first 2 digits are significant values and 3rd digit indicates the number of zeros.

** 0505 and 1111 Case sizes shipped in plastic carrier tape. All other case sizes are shipped in paper carrier.

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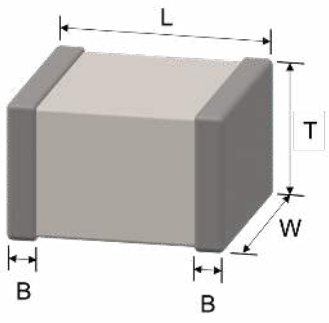
Standard Dimensions

Case Size EIA (metric)	Length (L) inch (mm)	Width (W) Inch (mm)	Thickness (T) inch (mm)	End-Band (B) inch (mm)
01 01005 (0402)	**.016±.001** (0.40±0.02)	**.008±.001** (0.20±0.02)	**.008±.001** (0.20±.002)	**.004±.001** (0.10±0.03)
02 0201 (0603)	**.024±.001** (0.60±0.03)	**0.012±.001** (0.30±0.03)	**0.012±.001** (0.30±0.03)	**.006±.002** (0.15±0.05)
04 0402 (1005)	**.039±.002** (1.00±0.05)	**.020±.002** (0.50±0.05)	**.020±.002** (0.50±0.05)	**.010+.002/-.004** (0.25+0.05/-0.10)
05 0505 (1414)	**.055+.015/-.010** (1.40+0.38/-0.25)	**.055±.015** (1.40±0.38)	**.045±.006** (1.15±0.15)	**.010+.010/-.005** (0.25+0.25/-0.13)
06 0603 (1608)	**.063±.004** (1.60±0.10)	**.031±.004** (0.80±0.10)	**.031±.003** (0.80±0.07)	**.016±.005** (0.40±0.15)
06 * 0603 (1608)	**.063+.006/-.004** (1.60+0.15/-0.10)	**.031+.006/-.004** (0.80+0.15/-0.10)	**.020±.004** (0.50±0.10)	**.016±.005** (0.40±0.15)
08 0805 (2012)	**.079±.006** (2.00±0.15)	**.049±.004** (1.25±0.10)	**.024±.004** (0.60±0.10)	**.020±.008** (0.50±0.20)
08 * 0805 (2012)	**.079±.008** (2.00±0.20)	**.049±.008** (1.25±0.20)	**.033±.004** (0.85±0.10)	**.020±.008** (0.50±0.20)
11 1111 (2828)	**.110+.020/-.010** (2.79+0.51/-0.25)	**.110±.015** (2.79±0.38)	**≤.070** (≤1.78)	**.015±.010** (0.38±0.25)



Dielectric Properties & Electrical Summary

Dielectric	NP0 (Class I)	X8G (Class I)
Size	01005, 0201, 0402, 0505, 0603, 0805, 1111	0603, 0805
Capacitance [1]	0.1pF to 1000pF	0.2pF to 82pF
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 Voltages (WVDC)	6.3V, 10V, 25V, 50V, 100V, 200V, 250V, 500V, 1500V	250V, 500V
Q. [2]	01005, 0201, 0402/25V to 50V: Cap<30pF:Q≥400+20C; Cap≥30pF:Q≥1000 0402/100V~200V, 0603, 0805, 0505, 1111:Cap<30pF:Q≥800+20C; Cap≥30pF:Q≥1400	
Insulation Resistance	≥10GΩ @ 25°C or ≥100GΩ @ 125°C	
Operating Temperature	-55 to +125°C	-55 to +150°C
Capacitance Change (TC)	±30ppm/°C	
Dissipation Factor (DF)	0.10% Max	0.15% Max

1. Measured at 1.0±0.2Vrms, 1.0MHz±10% for capacitance values ≤1000pF and 1.0kHz±10% for capacitance>1000pF
2. Measured at 25°C and between 30% to 70% relative humidity.

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Available Capacitance Values

X8G Dielectric (0603 - 0805)

Capacitance	Case Size	0603	0805		Tolerance
	Voltage	250	250	500	
0.2pF (0R2)			◑	◑	A, B
0.3pF (0R3)		●	●	●	A, B
0.4pF (0R4)		●	●	●	A, B
0.5pF (0R5)		●	●	●	A, B, C
0.6pF (0R6)		●	●	●	A, B, C
0.7pF (0R7)		●	●	●	A, B, C
0.8pF (0R8)		●	●	●	A, B, C
0.9pF (0R9)		●	●	●	A, B, C
1.0pF (1R0)		●	●	●	A, B, C
1.1pF (1R1)		●	●	●	A, B, C
1.2pF (1R2)		●	●	●	A, B, C
1.3pF (1R3)		●	●	●	A, B, C
1.4pF (1R4)		●	●	●	A, B, C
1.5pF (1R5)		●	●	●	A, B, C
1.6pF (1R6)		●	●	●	A, B, C
1.7pF (1R7)		●	●	●	A, B, C
1.8pF (1R8)		●	●	●	A, B, C
1.9pF (1R9)		●	●	●	A, B, C
2.0pF (2R0)		●	●	●	A, B, C
2.1pF (2R1)		●	●	●	A, B, C
2.2pF (2R2)		●	●	●	A, B, C
2.3pF (2R3)		●	●	●	A, B, C
2.4pF (2R4)		●	●	●	A, B, C
2.5pF (2R5)		●	●	●	A, B, C
2.6pF (2R6)		●	●	●	A, B, C
2.7pF (2R7)		●	●	●	A, B, C
2.8pF (2R8)		●	●	●	A, B, C
2.9pF (2R9)		●	●	●	A, B, C
3.0pF (3R0)		●	●	●	A, B, C
3.1pF (3R1)		●	●	●	A, B, C
3.2pF (3R2)		●	●	●	A, B, C
3.3pF (3R3)		●	●	●	A, B, C
3.4pF (3R4)		●	●	●	A, B, C
3.5pF (3R5)		●	●	●	A, B, C
3.6pF (3R6)		●	●	●	A, B, C
3.7pF (3R7)		●	●	●	A, B, C
3.8pF (3R8)		●	●	●	A, B, C
3.9pF (3R9)		●	●	●	A, B, C
4.0pF (4R0)		●	●	●	A, B, C
4.1pF (4R1)		●	●	●	A, B, C
4.2pF (4R2)		●	●	●	A, B, C
4.3pF (4R3)		●	●	●	A, B, C
4.4pF (4R4)		●	●	●	A, B, C
4.5pF (4R5)		●	●	●	A, B, C
4.6pF (4R6)		●	●	●	A, B, C
4.7pF (4R7)		●	●	●	A, B, C
4.8pF (4R8)		●	●	●	A, B, C
4.9pF (4R9)		●	●	●	A, B, C
5.0pF (5R0)		●	●	●	A, B, C
5.1pF (5R1)		●	●	●	B, C, D
5.2pF (5R2)		●	●	●	B, C, D
5.3pF (5R3)		●	●	●	B, C, D
5.4pF (5R4)		●	●	●	B, C, D
5.5pF (5R5)		●	●	●	B, C, D
5.6pF (5R6)		●	●	●	B, C, D
5.7pF (5R7)		●	●	●	B, C, D
5.8pF (5R8)		●	●	●	B, C, D
5.9pF (5R9)		●	●	●	B, C, D
6.0pF (6R0)		●	●	●	B, C, D

CONTINUED - X8G Dielectric (0603 - 0805)

Capacitance	Case Size	0603	0805		Tolerance
	Voltage	250	250	500	
6.1pF (6R1)		●	●	●	B, C, D
6.2pF (6R2)		●	●	●	B, C, D
6.3pF (6R3)		●	●	●	B, C, D
6.4pF (6R4)		●	●	●	B, C, D
6.5pF (6R5)		●	●	●	B, C, D
6.6pF (6R6)		●	●	●	B, C, D
6.7pF (6R7)		●	●	●	B, C, D
6.8pF (6R8)		●	●	●	B, C, D
6.9pF (6R9)		●	●	●	B, C, D
7.0pF (7R0)		●	●	●	B, C, D
7.1pF (7R1)		●	●	●	B, C, D
7.2pF (7R2)		●	●	●	B, C, D
7.3pF (7R3)		●	●	●	B, C, D
7.4pF (7R4)		●	●	●	B, C, D
7.5pF (7R5)		●	●	●	B, C, D
7.6pF (7R6)		●	●	●	B, C, D
7.7pF (7R7)		●	●	●	B, C, D
7.8pF (7R8)		●	●	●	B, C, D
7.9pF (7R9)		●	●	●	B, C, D
8.0pF (8R0)		●	●	●	B, C, D
8.1pF (8R1)		●	●	●	B, C, D
8.2pF (8R2)		●	●	●	B, C, D
8.3pF (8R3)		●	●	●	B, C, D
8.4pF (8R4)		●	●	●	B, C, D
8.5pF (8R5)		●	●	●	B, C, D
8.6pF (8R6)		●	●	●	B, C, D
8.7pF (8R7)		●	●	●	B, C, D
8.8pF (8R8)		●	●	●	B, C, D
8.9pF (8R9)		●	●	●	B, C, D
9.0pF (9R0)		●	●	●	B, C, D
9.1pF (9R1)		●	●	●	B, C, D
9.2pF (9R2)		●	●	●	B, C, D
9.3pF (9R3)		●	●	●	B, C, D
9.4pF (9R4)		●	●	●	B, C, D
9.5pF (9R5)		●	●	●	B, C, D
9.6pF (9R6)		●	●	●	B, C, D
9.7pF (9R7)		●	●	●	B, C, D
9.8pF (9R8)		●	●	●	B, C, D
9.9pF (9R9)		●	●	●	B, C, D
10pF (100)		●	●	●	F, G, J
11pF (110)		●	●	●	F, G, J
12pF (120)		●	●	●	F, G, J
13pF (130)		●	●	●	F, G, J
15pF (150)		●	●	●	F, G, J
16pF (160)		●	●	●	F, G, J
18pF (180)		●	●	●	F, G, J
20pF (200)		●	●	●	F, G, J
22pF (220)		●	●	●	F, G, J
24pF (240)		●	●		F, G, J
27pF (270)		●	●		F, G, J
30pF (300)		●	●		F, G, J
33pF (330)		●	●		F, G, J
36pF (360)		●	●		F, G, J
39pF (390)		●	●		F, G, J
43pF (430)		●	●		F, G, J
47pF (470)			●		F, G, J
56pF (560)			●		F, G, J
68pF (680)			●		F, G, J
82pF (820)			●		F, G, J

NP0 Dielectric (01005)

Capacitance	Case Size	01005		Tolerance
	Voltage	16	25	
0.2pF (0R2)		●	●	A, B
0.3pF (0R3)		●	●	A, B
0.4pF (0R4)		●	●	A, B
0.5pF (0R5)		●	●	A, B, C
0.6pF (0R6)		●	●	A, B, C
0.7pF (0R7)		●	●	A, B, C
0.75pF (R75)		●	●	A, B, C
0.8pF (0R8)		●	●	A, B, C
0.9pF (0R9)		●	●	A, B, C
1.0pF (1R0)		●	●	A, B, C
1.2pF (1R2)		●	●	A, B, C
1.5pF (1R5)		●	●	A, B, C
1.8pF (1R8)		●	●	A, B, C
2.0pF (2R0)		●	●	A, B, C
2.2pF (2R2)		●	●	A, B, C
2.7pF (2R7)		●	●	A, B, C
3.0pF (3R0)		●	●	A, B, C
3.3pF (3R3)		●	●	A, B, C
3.9pF (3R9)		●	●	A, B, C
4.0pF (4R0)		●	●	A, B, C
4.7pF (4R7)		●	●	A, B, C
5.0pF (5R0)		●	●	A, B, C
5.6pF (5R6)		●	●	B, C, D
6.0pF (6R0)		●	●	B, C, D
6.8pF (6R8)		●		B, C, D
7.0pF (7R0)		●		B, C, D
8.0pF (8R0)		●		B, C, D
8.2pF (8R2)		●		B, C, D
9.0pF (9R0)		●		B, C, D
10pF (100)		●	●	C ,D, G
12pF (120)		●	●	J
15pF (150)		●	●	J
20pF (200)		●	●	J
22pF (220)		●	●	J

● Capacitance available

◑ Capacitance available (thin profile)

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Ultra-High Q

NP0 Dielectric (0201 to 1111)

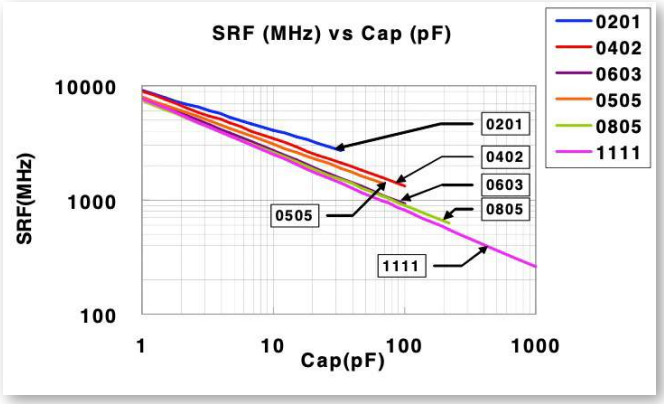
Capacitance	Case Size	0201					0402					0505				0603					0805					1111						Tolerance
	Voltage	6.3	10	25	50	100	25	50	100	200	50	100	250	25	50	100	250	50	100	250	500	50	100	200	250	500	1500	Code
0.1pF (0R1)		●	●	●	●	●	●	●	●	●				◑	◑	◑	◑											A,B
0.2pF (0R2)		●	●	●	●	●	●	●	●	●				◑	◑	◑	◑	◑	◑	◑	◑							A, B
0.3pF (0R3)		●	●	●	●	●	●	●	●	●				●	●	●	●	●	●	●	●							A, B
0.4pF (0R4)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B
0.5pF (0R5)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
0.6pF (0R6)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
0.7pF (0R7)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
0.75pF (R75)		●	●	●	●	●	●	●	●	●																		A, B, C
0.8pF (0R8)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
0.9pF (0R9)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
1.0pF (1R0)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
1.1pF (1R1)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
1.2pF (1R2)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
1.3pF (1R3)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
1.4pF (1R4)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
1.5pF (1R5)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
1.6pF (1R6)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
1.7pF (1R7)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
1.8pF (1R8)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
1.9pF (1R9)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
2.0pF (2R0)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
2.1pF (2R1)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
2.2pF (2R2)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
2.3pF (2R3)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
2.4pF (2R4)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
2.5pF (2R5)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
2.6pF (2R6)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
2.7pF (2R7)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
2.8pF (2R8)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
2.9pF (2R9)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
3.0pF (3R0)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
3.1pF (3R1)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
3.2pF (3R2)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
3.3pF (3R3)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
3.4pF (3R4)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
3.5pF (3R5)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
3.6pF (3R6)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
3.7pF (3R7)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
3.8pF (3R8)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
3.9pF (3R9)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
4.0pF (4R0)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
4.1pF (4R1)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
4.2pF (4R2)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
4.3pF (4R3)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	A, B, C
4.4pF (4R4)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
4.5pF (4R5)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
4.6pF (4R6)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
4.7pF (4R7)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
4.8pF (4R8)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
4.9pF (4R9)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							A, B, C
5.0pF (5R0)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	B, C, D
5.1pF (5R1)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	B, C, D
5.2pF (5R2)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
5.3pF (5R3)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
5.4pF (5R4)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
5.5pF (5R5)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
5.6pF (5R6)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	B, C, D
5.7pF (5R7)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
5.8pF (5R8)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
5.9pF (5R9)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
6.0pF (6R0)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	B, C, D
6.1pF (6R1)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
6.2pF (6R2)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
6.3pF (6R3)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
6.4pF (6R4)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
6.5pF (6R5)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
6.6pF (6R6)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
6.7pF (6R7)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
6.8pF (6R8)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	B, C, D
6.9pF (6R9)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D

CONTINUED - **NP0** Dielectric (0201 to 1111)

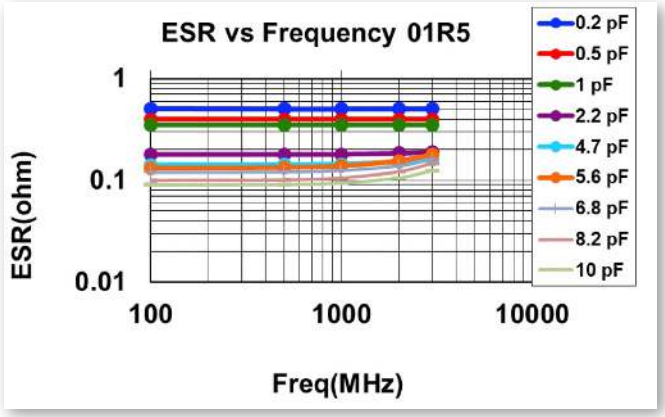
Capacitance	Case Size	0201					0402				0505			0603				0805				1111						Tolerance
	Voltage	6.3	10	25	50	100	25	50	100	200	50	100	250	25	50	100	250	50	100	250	500	50	100	200	250	500	1500	Code
	7.0pF (7R0)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	B, C, D
	7.1pF (7R1)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	7.2pF (7R2)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	7.3pF (7R3)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	7.4pF (7R4)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	7.5pF (7R5)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	7.6pF (7R6)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	7.7pF (7R7)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	7.8pF (7R8)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	7.9pF (7R9)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	8.0pF (8R0)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	B, C, D
	8.1pF (8R1)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	8.2pF (8R2)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	B, C, D
	8.3pF (8R3)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	8.4pF (8R4)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	8.5pF (8R5)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	8.6pF (8R6)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	8.7pF (8R7)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	8.8pF (8R8)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	8.9pF (8R9)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	9.0pF (9R0)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	9.1pF (9R1)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	9.2pF (9R2)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	9.3pF (9R3)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	9.4pF (9R4)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	9.5pF (9R5)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	9.6pF (9R6)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	9.7pF (9R7)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	9.8pF (9R8)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	9.9pF (9R9)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							B, C, D
	10pF (100)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	F, G, J
	11pF (110)	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							F, G, J
	12pF (120)	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	F, G, J
	13pF (130)	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							F, G, J
	15pF (150)	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	F, G, J
	16pF (160)	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							F, G, J
	18pF (180)	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	F, G, J
	20pF (200)	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							F, G, J
	22pF (220)	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	F, G, J
	24pF (240)	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							F, G, J
	27pF (270)	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	F, G, J
	30pF (300)	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●							F, G, J
	33pF (330)	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	F, G, J
	36pF (360)						●	●	●		●	●	●	●	●	●	●	●	●	●	●							F, G, J
	39pF (390)						●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	F, G, J
	43pF (430)						●	●	●		●	●	●	●	●	●	●	●	●	●	●							F, G, J
	47pF (470)						●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	F, G, J
	56pF (560)						●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	F, G, J
	68pF (680)						●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	F, G, J
	82pF (820)						●	●			●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	F, G, J
	100pF (101)						●	●			●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	F, G, J
	120pF (121)													●	●			●	●	●		●	●	●	●	●	●	F, G, J
	150pF (151)													●	●			●	●	●		●	●	●	●	●	●	F, G, J
	180pF (181)													●	●			●	●	●		●	●	●	●	●	●	F, G, J
	220pF (221)													●	●			●	●	●		●	●	●	●	●	●	F, G, J
	270pF (271)																					●	●	●	●	●	●	F, G, J
	330pF (331)																					●	●	●	●	●	●	F, G, J
	390pF (391)																					●	●	●	●	●	●	F, G, J
	470pF (471)																					●	●	●	●	●	●	F, G, J
	560pF (561)																					●	●	●	●	●	●	F, G, J
	680pF (681)																					●	●	●	●	●	●	F, G, J
	820pF (821)																					●	●	●	●	●	●	F, G, J
	1000pF (102)																					●	●	●	●	●	●	F, G, J

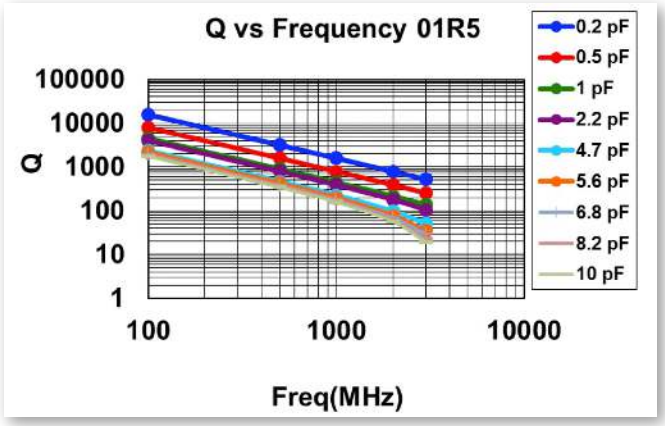
Frequency Characteristics

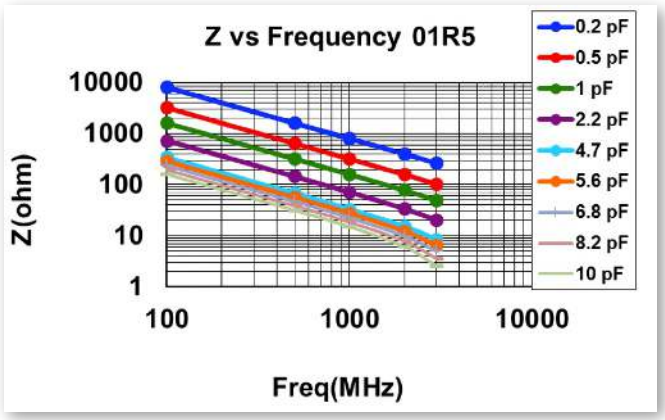
SRF vs Cap (0201 thru 111)



01005 Frequency Characteristics

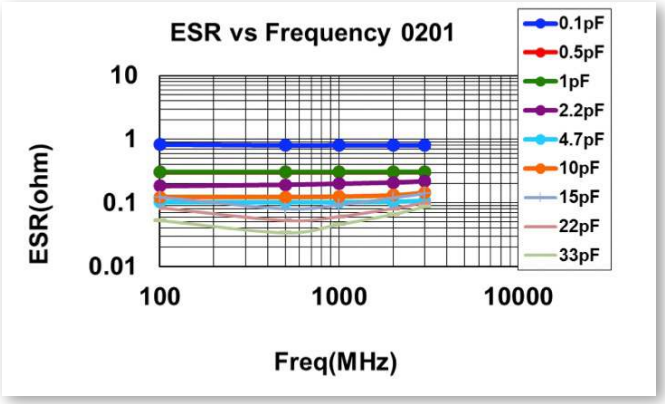




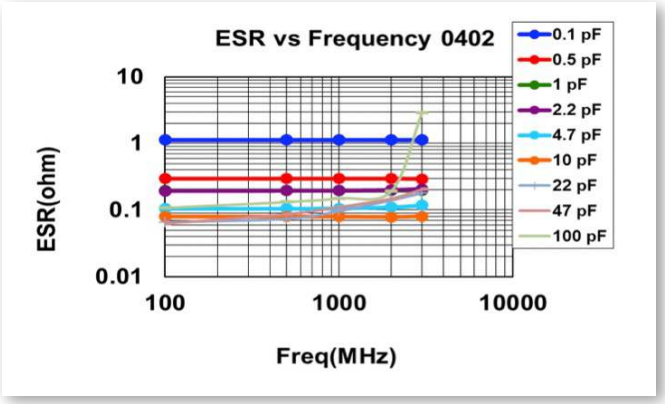


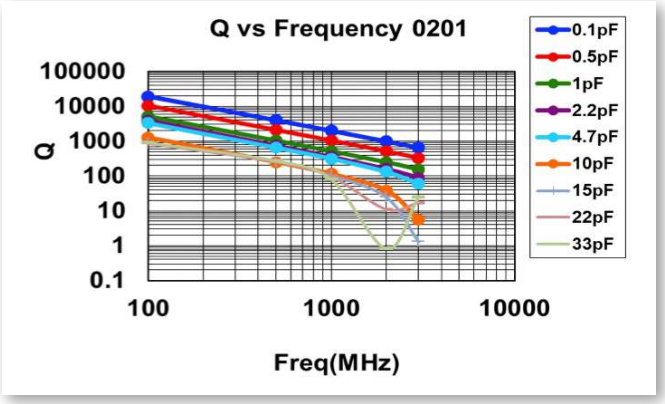
Frequency Characteristics

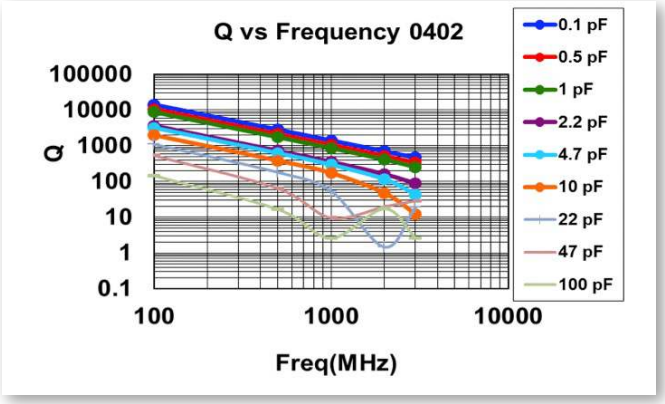
0201 Frequency Characteristics

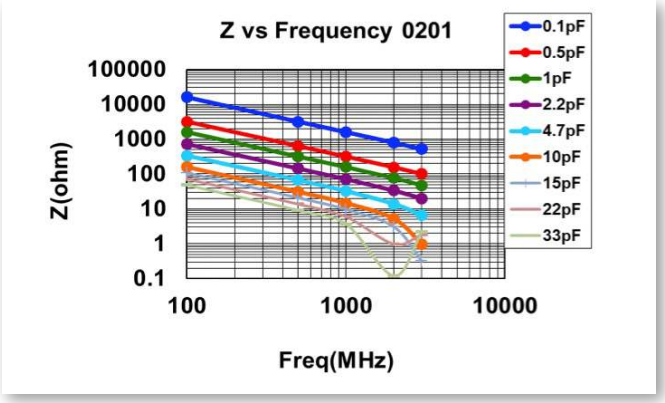


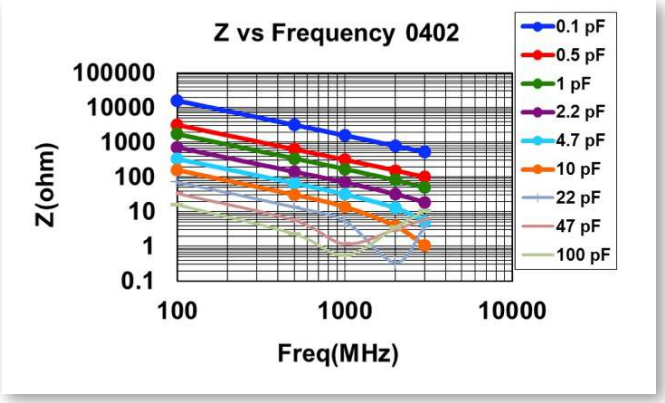
0402 Frequency Characteristics





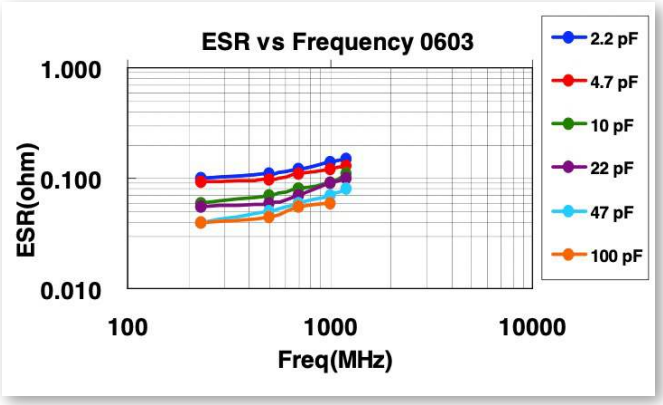


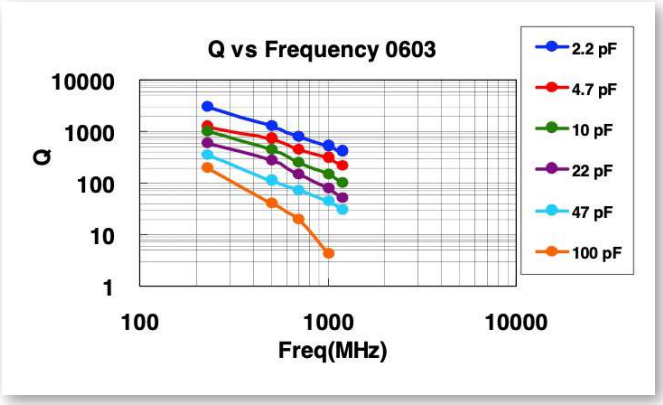


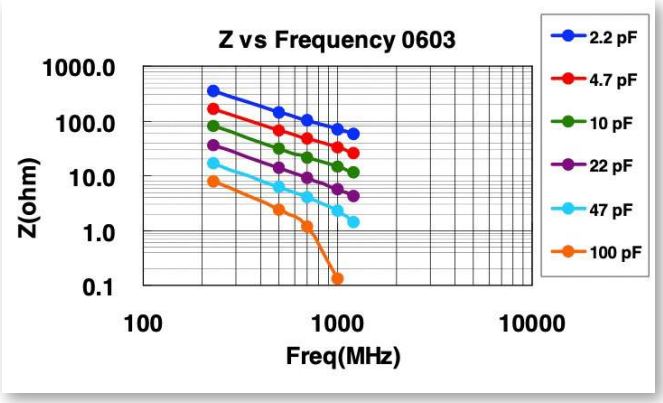


Frequency Characteristics

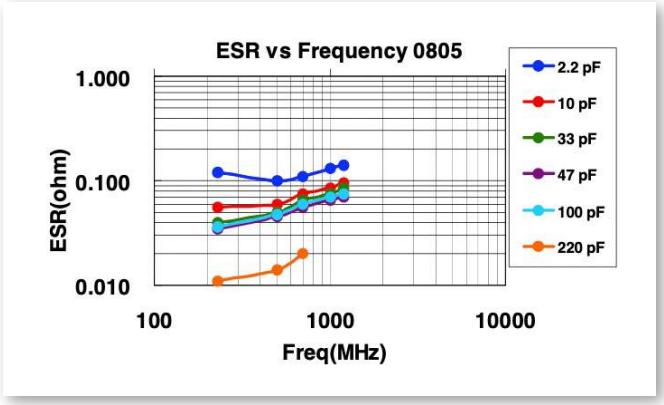
0603 Frequency Characteristics

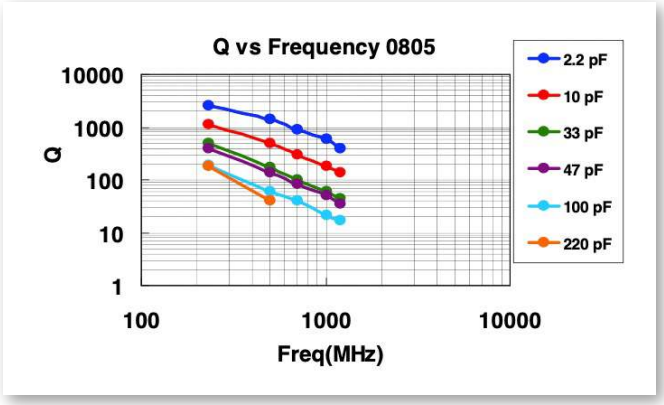


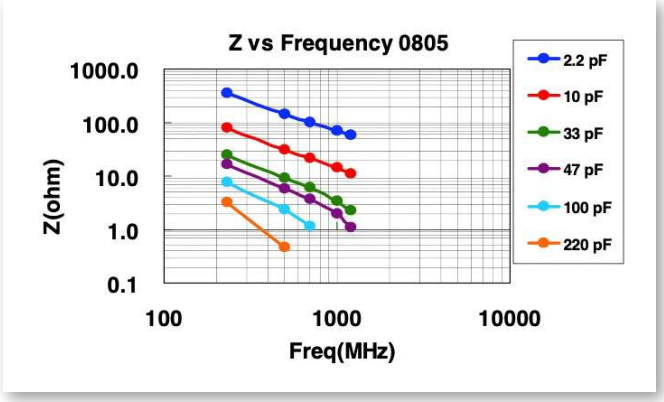




0805 Frequency Characteristics

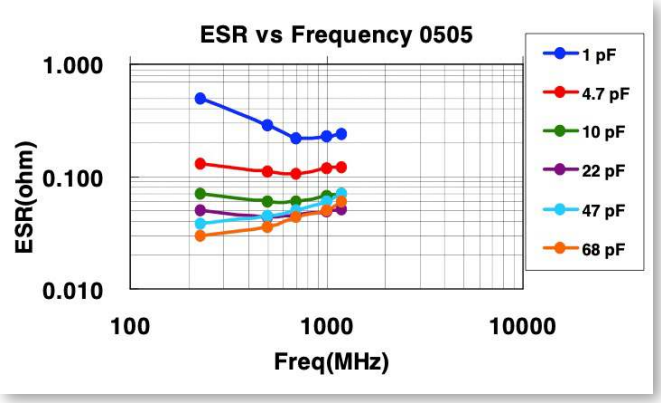


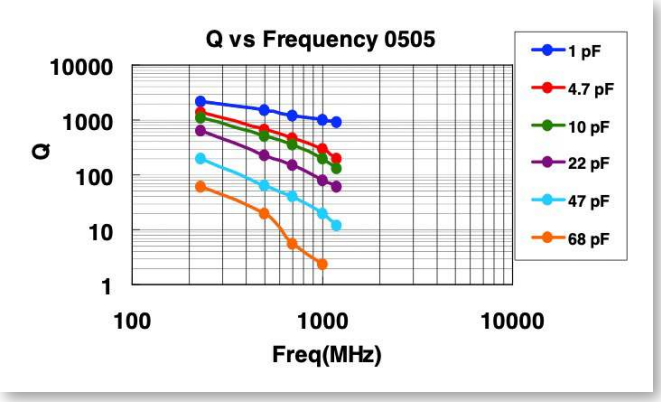


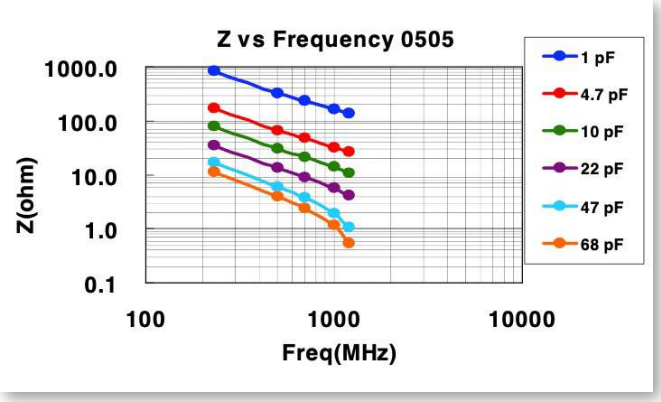


Frequency Characteristics

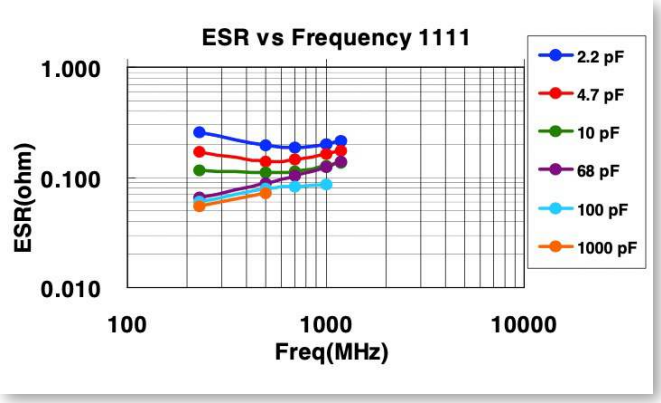
0505 Frequency Characteristics

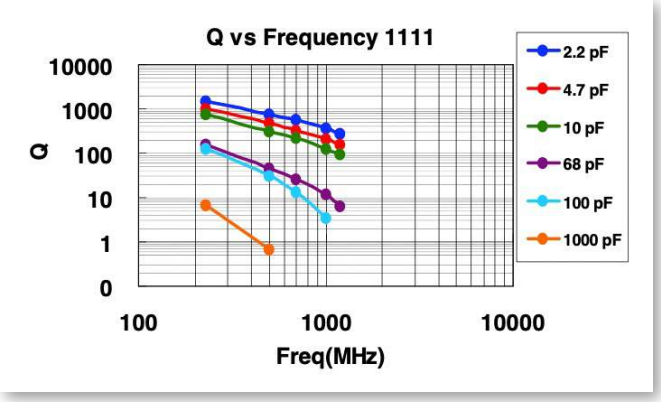


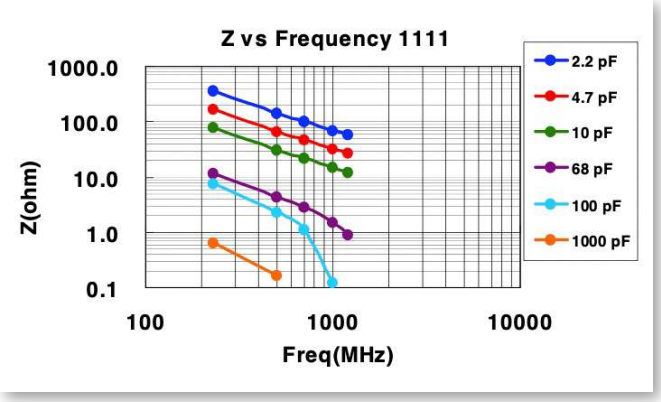




1111 Frequency Characteristics







XQ – Series Test Conditions

No.	Item	Test Condition	Requirements
1	Visual & Dimensions	Suitable optical or mechanical measurement system	▪ No major defects ▪ Conforms to individual specification sheet
2	Capacitance	▪ For capacitance ≤ 1000pF: 1.0±0.2Vrms, 1.0MHz±10% ▪ For capacitance values >1000pF: 1.0±0.2Vrms, 1.0kHz±10% ▪ Measured at room temperature	▪ Shall not exceed specified capacitance plus allowed tolerance
3	Q / DF		▪ 01005, 0201, 0402/25V to 50V: Cap<30pF, Q≥400+20C; Cap≥30pF, Q≥1000 ▪ 0402/100V~200V, 0603, 0805, 0505, 1111: Cap<30pF:Q≥800+20C;Cap≥30pF:Q≥1400
4	Dielectric Strength	▪ Applied voltage: ≦100V : 250% of rated voltage. (RF02: 300% rated voltage.) 200V ~ 300V : 200% rated voltage. 500V ~ 999V : 150% rated voltage. 1000V ~ 3000V : 120% rated voltage. ▪ Duration: 1 to 5 sec. ▪ Charge & discharge current <50mA.	▪ No evidence of damage or arc-over during test.
5	Insulation Resistance	▪ Time rated voltage applied ≤100V → max. 120 sec. ≥200V → max 60 sec. (Max 500V) ▪ Test at room temperature	▪ ≥10GΩ or RxC≥100Ω-F whichever is smaller
6	Temperature Coefficient	▪ No electrical load ▪ Allow temperature to equilibrate prior to measure	▪ Capacitance change: within ±30ppm/°C; → NP0: -55~125°C at 25°C → X8G: -55~150°C at 25°C
7	Termination Adhesion Strength	▪ Applied Force 01005: 1N; 0201: 2N; 0402 to 0603: 5N; >0603: 10N ▪ Test time: 10±1 sec.	▪ No major damage or removal of termination
8	Vibration Resistance	▪ Vibration frequency: 10~55 Hz/min. ▪ Total amplitude: 1.5mm ▪ Test time: 6 hrs. (Two hrs each in three mutually perpendicular directions.) ▪ Cap./DF(Q) Measurement to be made after de-aging at 150°C for 1hr then set for 24±2 hrs at room temp	▪ No major damage ▪ Capacitance change, Q and DF to meet initial specification
9	Solderability	▪ Solder temperature: 235±5°C ▪ Dipping time: 2±0.5 sec.	▪ 95% min. coverage of all metalized area.
10	Bend Test	▪ Force applied to middle of substrate at a rate of approx. 1mm/s until 1mm deflection achieved, pressure maintained for 5±1 sec.	▪ No major damage ▪ Capacitance change before and after test within ±5.0% or ±0.5pF (whichever is larger).
11	Resistance to Soldering Heat	▪ Solder temperature: 260±5°C ▪ Dipping time: 10±1 sec ▪ Preheating: 120-150°C for 1 min before immersion ▪ Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150°C for 1hr then 24hr age at RT	▪ No major damage ▪ Capacitance change: within ±2.5% or ±0.25pF whichever is larger. Q/D.F., I.R. and dielectric strength meet initial spec ▪ 25% max. leaching on each edge.

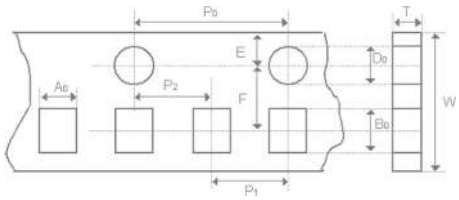
CONTINUED **XQ – Series Test Conditions**

No.	Item	Test Condition	Requirements
12	Temperature Cycle	▪ Conduct 5-cycles: 1. Min operating temp: +0/-3°C for 30±3mins 2. Room temp for 2-3mins 3. Max operating temp: +0/-3°C for 30±3mins 4. Room Temp for 2-3 mins ▪ Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150°C for 1hr then 24±2hr age at RT	▪ No major defects ▪ Cap change: within ±2.5% or ±0.25pF whichever is larger. ▪ Q/D.F., I.R. and dielectric strength: To meet initial requirements.
13	Humidity (Steady State)	▪ Test temp.: 40±2°C ▪ Humidity: 90~95% RH ▪ Test time: 500+24/-0hrs. ▪ Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150°C for 1hr then 24±2hr age at RT	▪ No major damage ▪ Cap change: within ±5.0% or ±0.5pF whichever is larger. ▪ Q/D.F. value: Cap≥30pF, Q≥350; 10pF≤Cap<30pF, Q≥275+2.5C Cap<10pF; Q≥200+10C ▪ I.R. ≥1GΩ
14	Humidity (Under Load)	▪ Test temp.: 40±2°C ▪ Humidity: 90~95%RH ▪ Test time: 500+24/-0 hrs. ▪ Applied voltage: rated voltage (MAX. 500V) ▪ Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150°C for 1hr then 24±2hr age at RT	▪ No major damage ▪ Cap change: within ±7.5% or ±0.75pF whichever is larger. ▪ Q/D.F. value: Cap≥30pF, Q≥200; Cap<30pF, Q≥100+10/3C ▪ I.R.: ≥500MΩ.
15	High Temperature Load	▪ Test temp.: NP0: 125±3°C X8G: 150±3°C ▪ Applied voltage: 1. (1) 10V≦Ur<500V: 200% rated voltage. 2. (2) ≦6.3V or 500V: 150% rated voltage. 3. (3) Ur≧630V: 120% rated voltage. ▪ Test time: 1000+24/-0 hrs. ▪ Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150°C for 1hr then 24±2hr age at RT	▪ No major damage ▪ Cap change: within ±3.0% or ±0.3pF whichever is larger. ▪ Q/D.F. value: Cap≥30pF, Q≥350; 10pF≤Cap<30pF, Q≥275+2.5C Cap<10pF; Q≥200+10C ▪ I.R. ≥1GΩ
16	ESR	▪ The ESR should be measured at room temperature and tested at 1.0±0.1 GHz.	01005: 0.2pF≤Caps≤1pF:< 700mΩ/pF; 1pF<Caps≤2pF:< 600mΩ; 2pF<Caps≤5pF:< 500mΩ; 5pF<Caps≤10pF:< 300mΩ; 10pF<Caps≤22pF:< 350mΩ 0201: 0.1pF≤Caps≤1pF:< 350mΩ/pF; 1pF<Caps≤5pF:< 300mΩ; 5pF<Caps≤22pF:< 250mΩ 0402: 0.1pF≤Caps≤1pF:< 350mΩ/pF; 1pF<Caps≤5pF:< 300mΩ; 5pF<Caps≤100pF:< 250mΩ 0603: 0.1pF≤Caps≤1pF:< 1500mΩ; 1pF<Caps≤10pF:< 250mΩ; 10pF<Caps≤220pF:< 200mΩ 0505: 0.4pF≤Cap<1.0pF: < 1500mΩ; 1.0pF≤Cap<10pF: < 250mΩ; 10pF≤Caps≤100pF: < 200mΩ 0805: 0.3pF≤Caps≤1pF: < 1500mΩ; 1pF<Caps≤10pF: < 250mΩ; Cap>10pF: < 200mΩ
		▪ The ESR should be measured at room temperature and tested at 500±50 MHz.	0201, 22pF≤Caps≤33pF: < 300mΩ 1111, 100pF<Caps≤1000pF: < 150mΩ

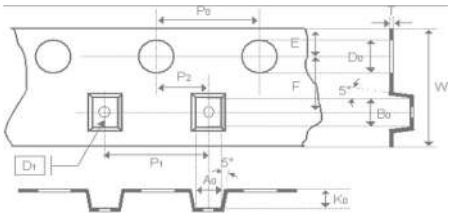
”Room Temperature” or “RT” equivalent to 15 to 35°C, Relative humidity: 25 to 75%, Atmospheric pressure: 86 to 106kPa.

Packaging Dimensions & Part Count

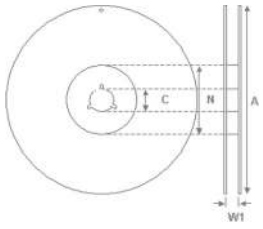
SIZE	01005	0201	0402	0505	0603	0805	1111
A_0	0.25 ±0.05	0.40 ±0.10	0.70 ±0.20	<1.90	1.05 ±0.30	1.50 ±0.20	<3.05
B_0	0.45 ±0.05	0.70 ±0.10	1.20 ±0.20	<1.90	1.80 ±0.30	2.30 ±0.20	<3.80
T	≤ 0.50	≤ 0.55	≤ 0.80	0.23 ±0.10	≤ 1.20	≤ 1.20	0.23 ±0.10
K_0	N/A	N/A	N/A	<1.50	N/A	N/A	< 2.50
W	8.00 ±0.30	8.00 ±0.30	8.00 ±0.30	8.00 ±0.30	8.00 ±0.30	8.00 ±0.30	8.00 ±0.30
P_0	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10
$10xP_0$	40.00 ±0.1	40.00 ±0.1	40.00 ±0.1	40.00 ±0.1	40.00 ±0.1	40.00 ±0.1	40.00 ±0.1
P_1	2.00 ±0.05	2.00 ±0.05	2.00 ±0.05	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10	4.00 ±0.10
P_2	2.00 ±0.05	2.00 ±0.05	2.00 ±0.05	2.00 ±0.05	2.00 ±0.05	2.00 ±0.05	2.00 ±0.05
D_0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0
D_1	N/A	N/A	N/A	1.00 ±0.10	N/A	N/A	1.00 ±0.10
E	1.75 ±0.10	1.75 ±0.10	1.75 ±0.10	1.75 ±0.10	1.75 ±0.10	1.75 ±0.10	1.75 ±0.10
F	3.30 ±0.05	3.30 ±0.05	3.30 ±0.05	3.30 ±0.05	3.30 ±0.05	3.30 ±0.05	3.30 ±0.05



Paper Tape Dimensions



Plastic Tape Dimensions



Reel Dimensions

Size	Thickness (mm)	Type	7" Reel	13" Reel
01005	0.20±0.02	Paper	20,000	-
0201	0.30±0.03		15,000	70,000
0402	0.50±0.05		10,000	50,000
0603	0.80±0.07		4,000	15,000
	0.50±0.10		4,000	-
0805	0.60±0.10		4,000	15,000
	0.85±0.10		4,000	15,000
0505	1.15±0.15	Plastic	3,000	-
1111	≤ 1.78		2,000	-

Reel Size	01001, 0201, 0402, 0505, 0603, 0805, 1111	
	7" Reel	13" Reel
C	13.0±0.5	13.0±0.5
W_1	10.0±1.5	10.0±1.5
A	178.0±2.0	330.0±2.0
N	60.0+1.0/-0.0	50.0 min

Storage & Handling Conditions

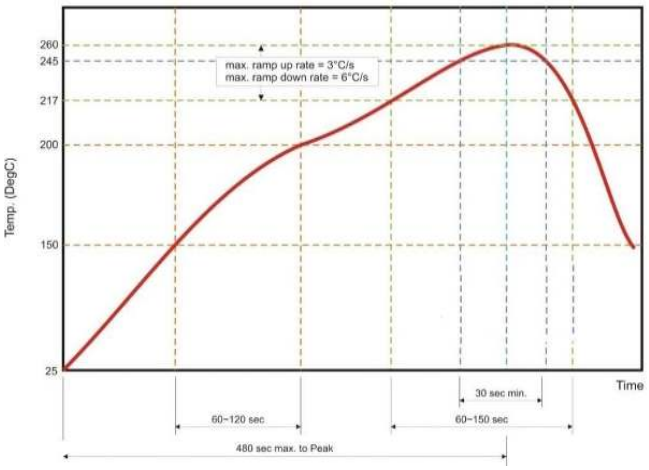
- Parts should be stored in their original packing where possible. Temperature should be between 5°C and 40 C. Relative humidity maintained between 20% to 70%
- Do not store in the presence of salts, hydrogen sulfide, sulfur dioxide, chloride gas, ammonia or other acid and alkali.
- It is recommended that the product be used within one year of receipt. Check solderability in case shelf-life extension is needed.

Soldering Conditions

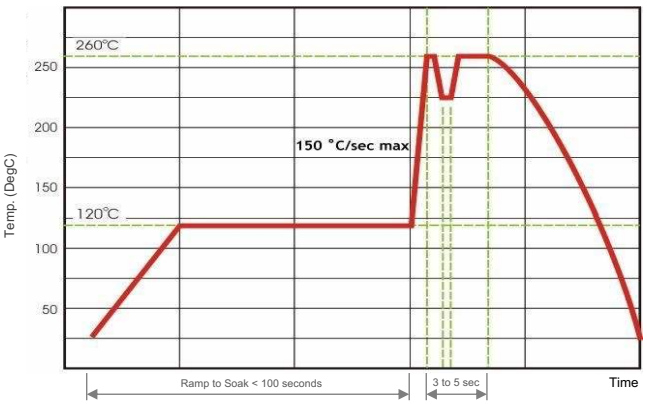
Termination material is suitable for Pb-free soldering and high-Pb containing solder. Reflow and Wave solder profiles for SAC305 alloy are suggest below. The use of N_2 may be required to aide in solderability especially for higher temperature solder compositions. Case sizes ≤ 0402, 0505 and, 1111 should only be attached using reflow soldering.

Vapour phase soldering can expose parts to similar stresses to those experienced during wave reflow and similar pre-heat and cool down conditions should be considered.

Hand soldering and re-work using a soldering iron can expose the capacitors to very high temperature deltas increasing the risk to cracking of the ceramic body. If use of soldering iron can not be avoided, a fine tip iron not exceeding 30 watts should be used. Parts should be pre-heated carefully and the soldering iron tip must NOT touch the capacitor.



*Recommended **reflow** profile for SAC305 (Sn/Ag/Cu alloy) solder pastes.*



*Recommended **wave** profile for SAC305 (Sn/Ag/Cu alloy) solder pastes.*