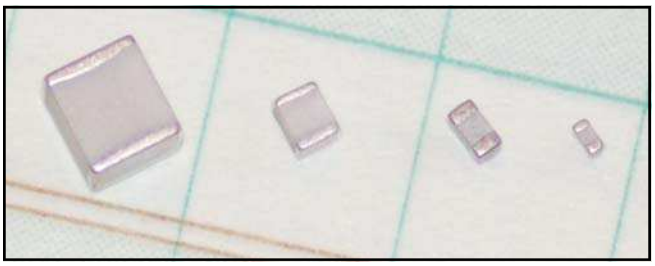
Q-Max / ULTRA Q-Max

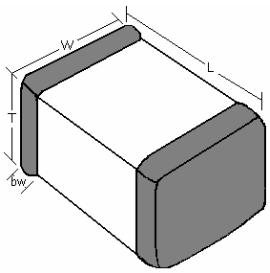
RF/ Microwave Porcelain Multi-Layer Capacitors (MLC)

The Q-Max/Ultra Q-Max series of porcelain and ceramic dielectric capacitors are ideally suited for RF/Microwave frequency application from 10MHz to 4.2 GHz. The combination of high density, high purity dielectric material impervious to moisture, heavy pure palladium internal electrodes and strict statistical process controls allows Q-Max/Ultra Q-Max MLCs to meet or exceed applicable performance characteristics of MIL-PRF-55681/4.

These capacitors are suitable solutions for applications that require:

- Extremely High Quality Factors
- Very Low Equivalent Series Resistance
- Very High Series Resonance
- High Current Carrying Capabilities
- Greatest Stability Under Changing Factors





MECHANICAL DIMENSIONS in Inches (mm)

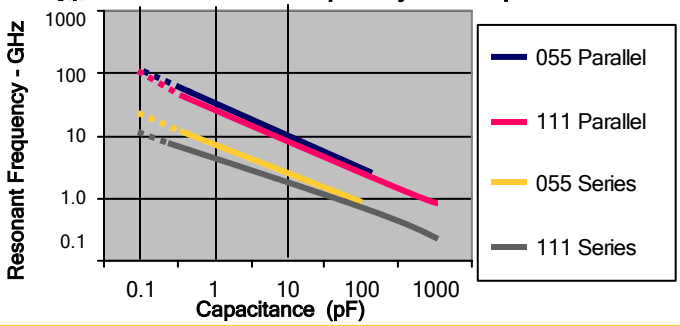
Case Size	Length (L)	Width (W)	Thickness (T)	Bandwidth (bw)
0402	.040±.010 (1.02±.250)	.020±.005 (.510±.120)	.020±.006 (.510±.152)	.010±.005 (.250±.120)
0603	.063±.006 (1.60±.152)	.032±.006 (.813±.152)	Max: .035 Max: (.889)	.014±.006 (.357±.152)
055	.055±.015 (1.40±.381)	.055±.015 (1.40±.381)	.035±.010 (.889±.25)	.015±.005 (.381±.120)
111	.110±.020 (2.79±.508)	.110±.020 (2.79±.508)	.100±.020 (2.54±.508)	.015±.010 (.381±.254)

ORDERING INFORMATION

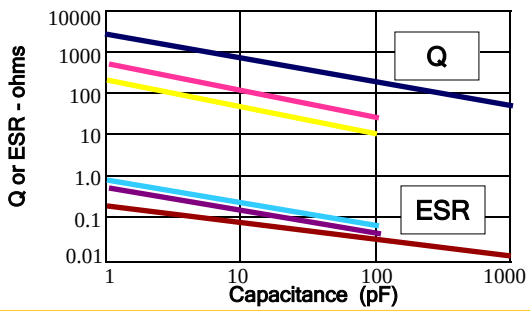
Case Size	Dielectric	Capacitance	Tolerance	Voltage	Termination	Packaging	Marking	Hi-Reli Testing
111	Q	201	J	201	S	T	M	- A
Example: **0402** **0603** **055** **111**	**Q** High Q (Porcelain Dielectric) **U** Hi-Q (Porcelain NPO Dielectric)	First 2 digits are Significant; Third digit indicates number of Zeros Examples: 201 = 200pF 2R2 = 2.2pF	**A** ±0.05pF **B** ±0.10pF **C** ±0.25pF **F** ±1% **G** ±2% **J** ±5% **K** ±10% **M** ±20%	First 2 digits are Significant; Third digit indicates number of Zeros Examples: 201 = 200V 151 = 150V 202 = 2000V	**P** Pd/Ag Plated *(RoHS Compliant)* **S** Solder Plated Over Nickel **SN** Tin over Nickel Plated *(RoHS Compliant)* **G** Gold over Nickel Plated *(RoHS Compliant)*	**T** Tape and Reel **W** Waffle Pack	*(Optional)* **M** = Marking	*(Optional)* **A** = Group A **B** = Group B **C** = Group C Tested and Screened

Performance

Typical Resonant Frequency vs. Capacitance



Typical Q and ESR vs. Capacitance



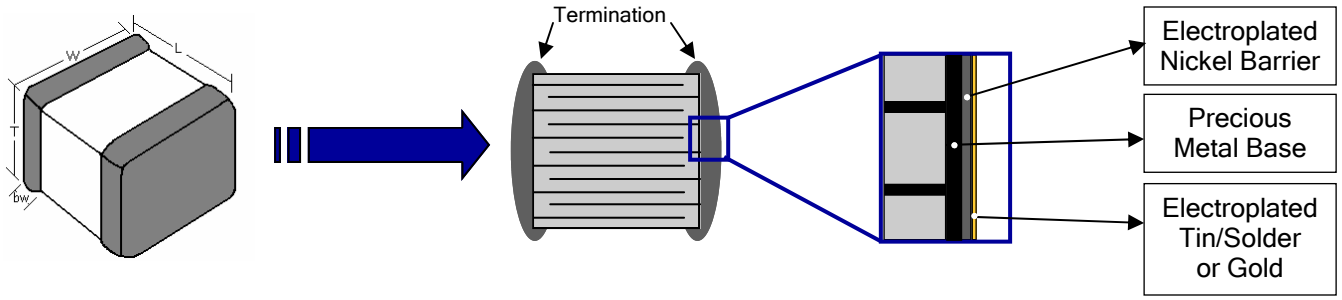
Electrical Specifications
for Case Sizes: 0402, 0603, 055, 111 and Dielectric Materials: "Q" and "U"

Temperature Coefficient	(Q)+90 ±20PPM/°C (U) 0 ±30PPM/°C
Capacitance Range	0.1pF to 1000pF
Capacitance Tolerance	±0.1pF to ±20%
Operating Temperature	-55°C + 125°C
Quality Factor or Dissipation Factor	Per MIL-PRF-55681/4
Insulation Resistance	Per MIL-PRF-55681 10^6 megohm to 470pF @ +25°C 10^5 megohm to 470pF @ +125°C 10^5 megohm over 470pF @ +25°C 10^4 megohm over 470pF @ +125°C
Aging	None
Piezoelectric Effects	None
Dielectric Withstanding Voltage	2.5 x rated voltage (for 500V rated 1.5 x rated voltage)

Environmental Characteristics
will meet/exceed performance characteristics per MIL-PRF-55681/4

Requirement	MIL-STD-202 METHOD
Life	108, Condition F
Shock	213, Condition J
Vibration	204, Condition B
Immersion	104, Condition B
Salt Spray	101, Condition B
Solderability	208
Thermal Shock	107, Condition B
Terminal Strength	211
Temperature Cycling	102, Condition C
Moisture Resistance	106
Barometric Pressure	105, Condition B
Resistance to Soldering Heat	210, Condition C

Mechanical Dimensions



Quality Factor vs. Frequency (Typical)

Capacitance	@ 30 MHz	@ 150 MHz	@ 500 MHz	@ 1000 MHz
1 pF	30000	4000	800	350
10 pF	9000	2000	400	150
30 pF	5000	800	200	60
100 pF	2800	400	70	25
200 pF	1500	250	40	12

Capacitance Selection

** Please contact the Factory for additional capacitances and voltages. **

Capacitance		0402 (Q, U)	0603 (Q, U)	055 (Q, U)	111 (Q, U)
Code	Value				
0R1	0.1pF	100 VDC	100 VDC	250 VDC	2500 VDC
0R2	0.2pF				
0R3	0.3pF				
0R4	0.4pF				
0R5	0.5pF				
0R6	0.6pF				
0R7	0.7pF				
0R8	0.8pF				
0R9	0.9pF				
1R0	1.0pF				
1R1	1.1pF				
1R2	1.2pF				
1R3	1.3pF				
1R4	1.4pF				
1R5	1.5pF				
1R6	1.6pF				
1R7	1.7pF				
1R8	1.8pF				
1R9	1.9pF				
2R0	2.0pF				
2R1	2.1pF				
2R2	2.2pF				
2R4	2.4pF				
2R7	2.7pF				
3R0	3.0pF				
3R3	3.3pF				
3R6	3.6pF				
3R9	3.9pF				
4R3	4.3pF				
4R7	4.7pF				
5R1	5.1pF				
5R6	5.6pF				
6R2	6.2pF				
6R8	6.8pF				
7R5	7.5pF				
8R2	8.2pF				
9R1	9.1pF				
100	10pF				
110	11pF				
120	12pF				
130	13pF				
150	15pF				
160	16pF				

Capacitance		0402 (Q, U)	0603 (Q, U)	055 (Q, U)	111 (Q, U)
Code	Value				
180	18pF	50 VDC	100 VDC	250 VDC	2000 VDC
200	20pF				
220	22pF				
240	24pF				
270	27pF				
300	30pF				
330	33pF				
360	36pF				
390	39pF				
430	43pF				
470	47pF				
510	51pF			200 VDC	
560	56pF				
620	62pF				
680	68pF				
750	75pF				
820	82pF				
910	91pF				
101	100pF				
111	110pF				1000 VDC
121	120pF				
131	130pF				
151	150pF				
161	160pF				
181	180pF				
201	200pF				
221	220pF				
241	240pF				500 VDC
271	270pF				
301	300pF				
331	330pF				
361	360pF				200 VDC
391	390pF				
431	430pF				
471	470pF				
511	510pF				
561	560pF				
621	620pF				100 VDC
681	680pF				
751	750pF				
821	820pF				
911	910pF				50V
102	1000pF				