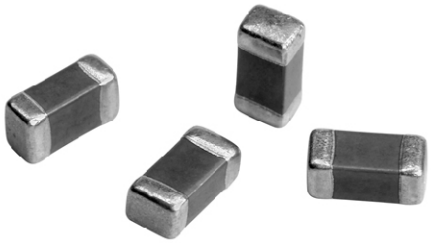
Surface Mount Multilayer Ceramic Chip Capacitors for Ultra High Q Commodity Applications



FEATURES

- Ultra stable class 1 dielectric
- Ultra high Q and low ESR at high frequency
- Four standard sizes
- High SRF characteristic
- Ultra low capacitance to 0.1 pF
- High precision capacitance tolerance ± 0.05 pF
- Supplied in tape on reel
- Ni-barrier with 100 % tin terminations
- Dry sheet manufacturing technology
- Base Metal Electrode system (BME)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

APPLICATIONS

- Mobile telecommunication
- WLAN
- RF modules
- Tuner

ELECTRICAL SPECIFICATIONS

Note

- Electrical characteristics at 25 °C, 30 % to 70 % related humidity, unless otherwise specified

Operating Temperature: - 55 °C to + 125 °C

Capacitance Range: 0.1 pF to 100 pF

Voltage Range: 10 V_{DC} to 250 V_{DC}

Temperature Coefficient of Capacitance (TCC):
0 ppm/°C ± 30 ppm/°C from - 55 °C to + 125 °C
0201: ≥ 22 pF: 0 ppm/°C ± 60 ppm/°C from - 55 °C to + 125 °C

Dissipation Factor:
Cap < 30 pF: Q ≥ 400 + 20 C
Cap ≥ 30 pF: Q ≥ 1000

Test Conditions for Capacitance and DF Measurement:
Cap. ≤ 1000 pF 1.0 V_{RMS} ± 0.2 V_{RMS}, 1 MHz ± 10 %
Cap. > 1000 pF 1.0 V_{RMS} ± 0.2 V_{RMS}, 1 kHz ± 10 %

Aging Rate: 0 % maximum per decade

Insulation Resistance (IR): after 120 s at U_R (DC)
≥ 10 GΩ or R x C ≥ 500 Ω x F whichever is less

Dielectric Strength Test:

This is the maximum voltage the capacitors are tested for 1 s to 5 s period and the charge/discharge current does not exceed 50 mA
≤ 100 V_{DC}: DWV at 250 % of rated voltage
250 V_{DC}: DWV at 200 % of rated voltage

QUICK REFERENCE DATA

DIELECTRIC	CASE	MAXIMUM VOLTAGE (V)	CAPACITANCE	
			MINIMUM	MAXIMUM
Ultra High Q	0201	50	0.1 pF	33 pF
	0402	100	0.1 pF	22 pF
	0603	250	0.3 pF	47 pF
	0805	250	0.3 pF	100 pF

Note

- Detail ratings see “Selection Chart”

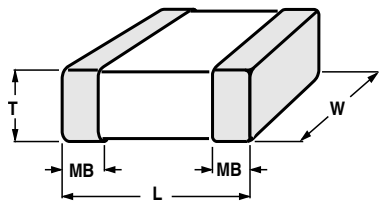
ORDERING INFORMATION

VJ0402	L	100	F	X	A	C	W1BC
SIZE CODE	DIELECTRIC	CAPACITANCE	TOLERANCE (1)	TERMINATION	VOLTAGE	PACKAGING	PROCESS CODE FOR BASIC COMMODITY
0201 0402 0603 0805	L = Ultra High Q	Expressed in pF two significant digits followed by the number of zeros: 0R3 = 0.3 pF 1R0 = 1.0 pF 150 = 15 pF	Cap. value ≤ 5 pF V = ± 0.05 pF B = ± 0.10 pF C = ± 0.25 pF D = ± 0.50 pF 5 pF > Cap. value < 10 pF B = ± 0.10 pF C = ± 0.25 pF D = ± 0.50 pF Cap. value ≥ 10 pF F = ± 1 % G = ± 2 % J = ± 5 %	X = Ni barrier 100 % tin termination	Q = 10 V X = 25 V A = 50 V B = 100 V P = 250 V	C = 7" reel/ paper tape P = 13" reel/ paper tape	

Note

(1) Details see “Selection Chart”

DIMENSIONS in inches [millimeters]



SIZE CODE	L	W	T MAX.	MB
0201 (0603)	0.024 ± 0.0012 (0.60 ± 0.03)	0.012 ± 0.0012 (0.30 ± 0.03)	0.013 (0.33)	0.006 ± 0.002 (0.15 ± 0.05)
0402 (1005)	0.040 ± 0.002 (1.00 ± 0.05)	0.020 ± 0.002 (0.50 ± 0.05)	0.022 (0.55)	0.010 + 0.002/- 0.004 (0.25 + 0.05/- 0.10)
0603 (1608)	0.063 ± 0.004 (1.60 ± 0.10)	0.030 ± 0.004 (0.80 ± 0.10)	0.035 (0.87)	0.015 ± 0.006 (0.40 ± 0.15)
0805 (2012)	0.080 ± 0.008 (2.00 ± 0.20)	0.050 ± 0.008 (1.25 ± 0.20)	0.038 (0.95)	0.020 ± 0.008 (0.50 ± 0.20)

SELECTION CHART

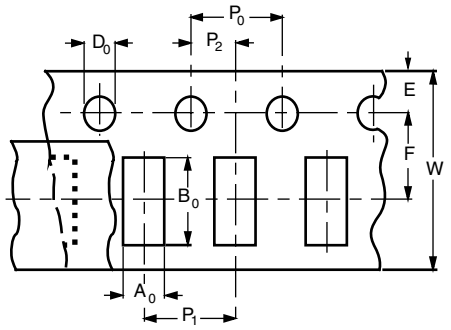
DIELECTRIC		ULTRA HIGH Q											
STYLE		VJ0201			VJ0402		VJ0603			VJ0805			TOLERANCE
SIZE CODE		0201			0402		0603			0805			
VOLTAGE V_{DC}		10 V	25 V	50 V	50 V	100 V	50 V	100 V	250 V	50 V	100 V	250 V	
VOLTAGE CODE		Q	X	A	A	B	A	B	P	A	B	P	
CAP. CODE	CAP.												
0R1	0.1 pF	L	L		N	N							B
0R2	0.2 pF	L	L		N	N							V, B
0R3	0.3 pF	L	L		N	N	S	S	S	T	T	T	V, B
0R4	0.4 pF	L	L		N	N	S	S	S	T	T	T	V, B
0R5	0.5 pF	L	L		N	N	S	S	S	T	T	T	V, B, C
0R6	0.6 pF	L	L		N	N	S	S	S	T	T	T	V, B, C
0R7	0.7 pF	L	L		N	N	S	S	S	T	T	T	V, B, C
0R8	0.8 pF	L	L		N	N	S	S	S	T	T	T	V, B, C
0R9	0.9 pF	L	L		N	N	S	S	S	T	T	T	V, B, C
1R0	1.0 pF	L	L	L	N	N	S	S	S	T	T	T	V, B, C
1R2	1.2 pF	L	L		N	N	S	S	S	T	T	T	V, B, C
1R5	1.5 pF	L	L	L	N	N	S	S	S	T	T	T	V, B, C
1R8	1.8 pF	L	L		N	N	S	S	S	T	T	T	V, B, C
2R2	2.2 pF	L	L	L	N	N	S	S	S	T	T	T	V, B, C
2R4	2.4 pF								S				V, B, C
2R7	2.7 pF	L	L		N	N	S	S	S	T	T	T	V, B, C
3R3	3.3 pF	L	L	L	N	N	S	S	S	T	T	T	V, B, C
3R9	3.9 pF	L	L		N	N	S	S	S	T	T	T	V, B, C
4R7	4.7 pF	L	L	L	N	N	S	S	S	T	T	T	V, B, C
5R6	5.6 pF	L	L		N	N	S	S	S	T	T	T	B, C, D
6R8	6.8 pF	L	L	L	N	N	S	S	S	T	T	T	B, C, D
8R2	8.2 pF	L	L		N	N	S	S	S	T	T	T	B, C, D
100	10 pF	L	L	L	N	N	S	S	S	T	T	T	F, G, J
110	11 pF	L	L		N		S	S	S	T	T	T	F, G, J
120	12 pF	L	L		N		S	S	S	T	T	T	F, G, J
130	13 pF	L	L		N		S	S	S	T	T	T	F, G, J
150	15 pF	L	L	L	N		S	S	S	T	T	T	F, G, J
160	16 pF	L	L		N		S	S	S	T	T	T	F, G, J
180	18 pF	L	L		N		S	S	S	T	T	T	F, G, J
200	20 pF	L			N		S	S	S	T	T	T	F, G, J
220	22 pF	L	L		N		S	S	S	T	T	T	F, G, J
240	24 pF	L					S	S	S	T	T	T	F, G, J
270	27 pF	L					S	S	S	T	T	T	F, G, J
300	30 pF	L					S	S	S	T	T	T	F, G, J
330	33 pF	L	L				S	S	S	T	T	T	F, G, J
360	36 pF						S	S	S	T	T	T	F, G, J
390	39 pF						S	S	S	T	T	T	F, G, J
430	43 pF						S	S	S	T	T	T	F, G, J
470	47 pF						S	S	S	T	T	T	F, G, J
560	56 pF									T	T	T	F, G, J
680	68 pF									T	T	T	F, G, J
820	82 pF									T	T	T	F, G, J
101	100 pF									T	T	T	F, G, J

Note

- Letters indicate product thickness, see “Packaging Quantities”

PACKAGING QUANTITIES				
SIZE CODE (inch/mm)	THICKNESS (mm)	THICKNESS SYMBOL	PAPER TAPE	
			7" REEL (C)	13" REEL (P)
0201 (0603)	0.30 ± 0.03	L	15K	-
0402 (1002)	0.50 ± 0.05	N	10K	50K
0603 (1608)	0.80 ± 0.07	S	4K	15K
0805 (2012)	0.85 ± 0.10	T	4K	15K

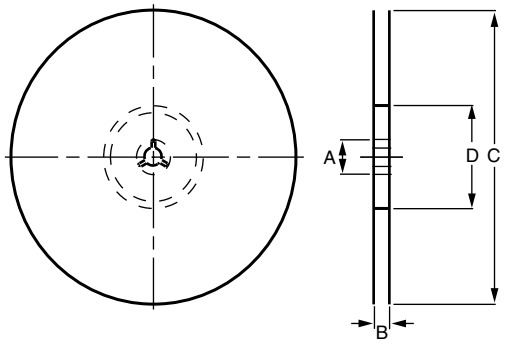
PAPER TAPE SPECIFICATION



DIMENSIONS OF PAPER TAPE
in millimeters

SYM.	PRODUCT SIZE CODE			
	0201	0402	0603	0805
A_0	0.37 ± 0.03	0.62 ± 0.05	1.02 ± 0.05	1.50 ± 0.10
B_0	0.67 ± 0.03	1.12 ± 0.05	1.82 ± 0.05	2.30 ± 0.10
W	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10
E	1.75 ± 0.05	1.75 ± 0.05	1.75 ± 0.05	1.75 ± 0.05
F	3.50 ± 0.05	3.50 ± 0.05	3.50 ± 0.05	3.50 ± 0.05
D_0	1.55 ± 0.05	1.55 ± 0.05	1.55 ± 0.05	1.55 ± 0.05
P_0	4.00 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	4.00 ± 0.10
P_1	2.00 ± 0.05	2.00 ± 0.05	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

REEL SPECIFICATIONS

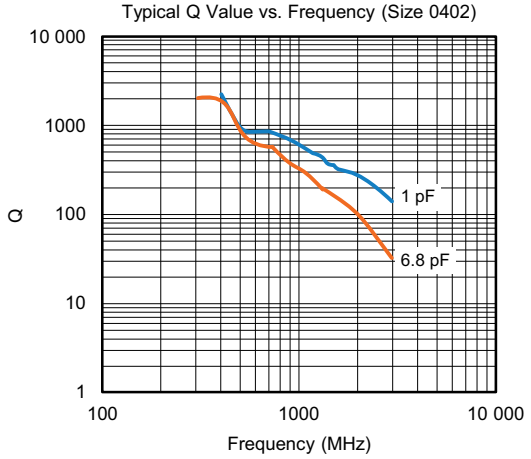


REEL DIMENSIONS AND TAPE WIDTH
in millimeters

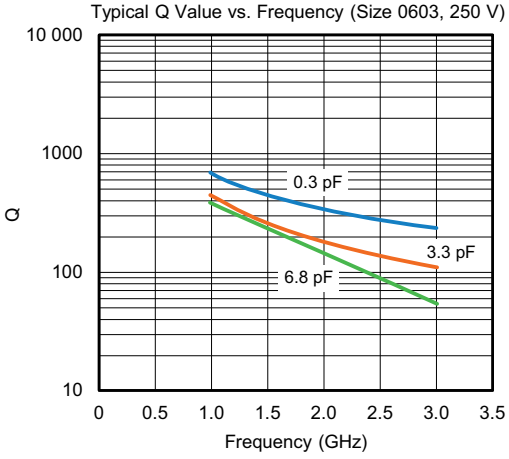
SYM.	Ø 180 mm; 7"	Ø 330 mm; 13"
A	13.0 ± 0.5	13.0 ± 0.5
B	9.0 ± 1.0	9.0 ± 1.0
C	178.0 ± 1.0	330.0 ± 1.0
D	60.0 ± 1.0	100.0 ± 1.0

ELECTRICAL CHARACTERISTICS

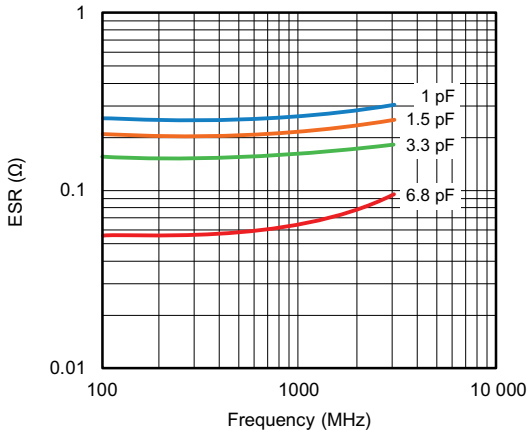
Typical Q Value vs. Frequency (Size 0402)



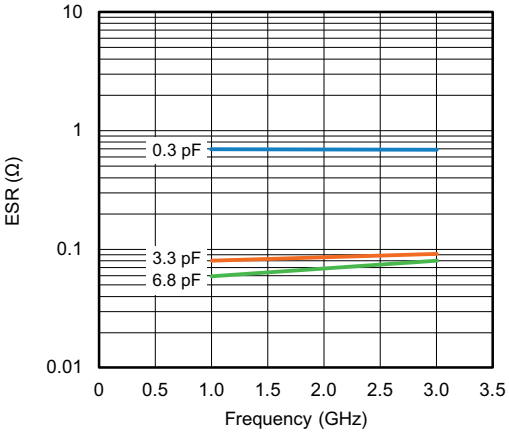
Typical Q Value vs. Frequency (Size 0603, 250 V)



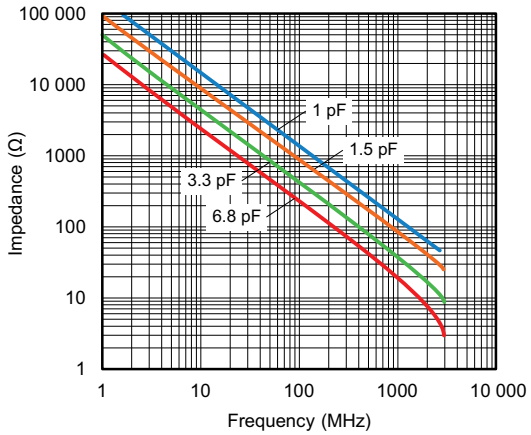
Typical ESR vs. Frequency (Size 0402)



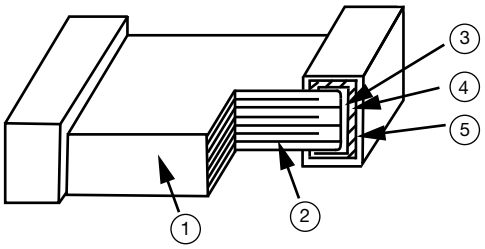
Typical ESR vs. Frequency (Size 0603, 250 V)



Typical Impedance vs. Frequency (Size 0402)



CONSTRUCTION			
NO.	NAME		ULTRA HIGH Q
1	Ceramic material		$BaTiO_3$ based
2	Inner electrode		Cu
3	Termination	Inner layer	Cu
4		Middle layer	Ni
5		Outer layer	Sn (matt)



STORAGE AND HANDLING CONDITIONS

(1) To store products at 5 °C to 40 °C ambient temperature and 20 % to 70 % related humidity conditions.
(2) The product is recommended to be used within one year after shipment. Check solderability in case of shelf life extension is needed.

Cautions:
a. Do not store products in a corrosive environment such as sulfide, chloride gas, or acid. It may cause oxidization of electrode, which easily be resulted in poor soldering.
b. To store products on the shelf and avoid exposure to moisture.
c. Do not expose products to excessive shock, vibration, direct sunlight and so on.

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