Surface Mount Multilayer Ceramic Chip Capacitors for High Temperatures 175 °C / 200 °C

FEATURES

- Case size 0402, 0505, 0603, 0805, 1111
- High frequency / high temperature 175 °C / 200 °C
- Ultra-stable dielectric material
- Lead (Pb)-free terminations code “X”
- Surface mount, wet build process
- Reliable Noble Metal Electrode (NME) system
- Made with a combination of design, materials and tight process control to achieve very high field reliability
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free RoHS COMPLIANT HALOGEN FREE GREEN (5-2008)

LINKS TO ADDITIONAL RESOURCES

Design Tools | S-Parameters | Packages | Technical Notes | Related Documents

APPLICATIONS

- RF and microwave
- Broadband communication
- Satellite communication
- Base stations
- Medical instrumentation and test
- Military devices (radar, communication, etc.)
- Wireless devices

ELECTRICAL SPECIFICATIONS

Note

- Electrical characteristics at 25 °C unless otherwise specified

Operating Temperature: -55 °C to +200 °C

Capacitance Range:

0402: 0.1 pF to 47 pF

0505: 0.1 pF to 330 pF

0603: 0.1 pF to 270 pF

0805: 0.1 pF to 1000 pF

1111: 0.2 pF to 3300 pF

Voltage Rating: 25 V_{DC} to 500 V_{DC}

Temperature Coefficient of Capacitance (TCC):

C0G (D): 0 ppm/°C ± 30 ppm/°C from -55 °C to +200 °C

Dissipation Factor (DF):

C0G (D): 0.05 % max. at 1.0 V_{RMS} and 1 MHz
for values ≤ 1000 pF

C0G (D): 0.05 % max. at 1.0 V_{RMS} and 1 kHz
for values > 1000 pF

Aging Rate: 0 % maximum per decade

Insulation Resistance (IR):

at +25 °C and rated voltage 100 000 MΩ minimum or 1000 ΩF, whichever is less

at +200 °C and rated voltage 10 000 MΩ minimum or 100 ΩF, whichever is less

Dielectric Strength Test:

performed per method 103 of EIA-198-2-E.

Applied test voltages:
≤ 100 V_{DC}-rated: min. 250 % of rated voltage

For technical questions, contact: mlccrf@vishay.com

QUICK REFERENCE DATA

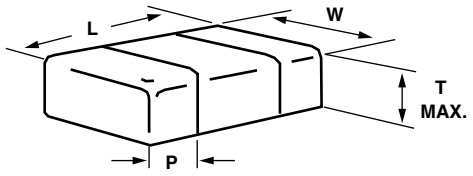
DIELECTRIC	CASE	MAXIMUM VOLTAGE (V)	CAPACITANCE	
			MINIMUM	MAXIMUM
D = HIFREQ	0402	100	0.1 pF	47 pF
	0505	250	0.1 pF	470 pF
	0603	200	0.1 pF	270 pF
	0805	250	0.1 pF	1.0 nF
	1111	500	0.2 pF	3.3 nF

ORDERING INFORMATION

VJ0805	D	2R2	V	X	A	A	C	HT
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	DC VOLTAGE RATING (1)	MARKING	PACKAGING	PROCESS CODE
0402 0505 0603 0805 1111	D = HIFREQ	Expressed in picofarads (pF). The first two digits are significant, the third is a multiplier. An "R" indicates a decimal point. Examples: 1R0 = 1.0 pF	V = ± 0.05 pF B = ± 0.10 pF C = ± 0.25 pF D = ± 0.50 pF F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % M = ± 20 % **Note:** for details see "Selection Chart"	X = Ni barrier 100 % tin plate matte finish	J = 16 V X = 25 V A = 50 V B = 100 V K = 150 V C = 200 V P = 250 V D = 300 V E = 500 V	A = unmarked (2) Q = marked	T = 7" reel / plastic tape C = 7" reel / paper tape J = 7" reel (low quantity) R = 11 1/4 / 13" reel / plastic tape P = 11 1/4 / 13" reel / paper tape	

Notes
(1) DC voltage rating should not be exceeded in application
(2) Case size 0402 only available with A

DIMENSIONS in inches (millimeters)



CASE CODE	STYLE	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATIONS PAD (P)	
					MINIMUM	MAXIMUM
0402	VJ0402	0.040 ± 0.004 (1.02 ± 0.10)	0.020 ± 0.004 (0.51 ± 0.10)	0.021 (0.61)	0.004 (0.10)	0.016 (0.41)
0505	VJ0505	0.055 + 0.015 / - 0.010 (1.40 + 0.382 / - 0.254)	0.055 ± 0.015 (1.40 ± 0.38)	0.057 (1.45)	0.004 (0.10)	0.016 (0.41)
0603	VJ0603	0.063 ± 0.006 (1.60 ± 0.15)	0.031 ± 0.005 (0.80 ± 0.12)	0.037 (0.94)	0.010 (0.25)	0.022 (0.55)
0805	VJ0805	0.079 ± 0.008 (2.00 ± 0.20)	0.049 ± 0.008 (1.25 ± 0.20)	0.057 (1.45)	0.010 (0.25)	0.030 (0.76)
1111	VJ1111	0.117 + 0.015 / - 0.010 (2.98 + 0.382 / - 0.254)	0.110 + 0.015 / - 0.020 (2.79 + 0.382 / - 0.509)	0.102 (2.59)	0.012 (0.30)	0.018 (0.46)

SELECTION CHART

DIELECTRIC (VISHAY CODE)		C0G (D)				
STYLE		VJ0402				TOLERANCE
CASE SIZE		0402				
VOLTAGE (V_{DC})		16	25	50	100	
VOLTAGE CODE		J	X	A	B	
CAP. CODE	CAP.					
0R1	0.1 pF	••	••	••	••	V, B, C, D
0R2	0.2 pF	••	••	••	••	V, B, C, D
0R3	0.3 pF	••	••	••	••	V, B, C, D
0R4	0.4 pF	••	••	••	••	V, B, C, D
0R5	0.5 pF	••	••	••	••	V, B, C, D
0R6	0.6 pF	••	••	••	••	V, B, C, D
0R7	0.7 pF	••	••	••	••	V, B, C, D
0R8	0.8 pF	••	••	••	••	V, B, C, D
0R9	0.9 pF	••	••	••	••	V, B, C, D
1R0	1.0 pF	••	••	••	••	B, C, D
1R1	1.1 pF	••	••	••	••	B, C, D
1R2	1.2 pF	••	••	••	••	B, C, D
1R3	1.3 pF	••	••	••	••	B, C, D
1R4	1.4 pF	••	••	••	••	B, C, D
1R5	1.5 pF	••	••	••	••	B, C, D
1R6	1.6 pF	••	••	••	••	B, C, D
1R7	1.7 pF	••	••	••	••	B, C, D
1R8	1.8 pF	••	••	••	••	B, C, D
1R9	1.9 pF	••	••	••	••	B, C, D
2R0	2.0 pF	••	••	••	••	B, C, D
2R1	2.1 pF	••	••	••	••	B, C, D
2R2	2.2 pF	••	••	••	••	B, C, D
2R4	2.4 pF	••	••	••	••	B, C, D
2R7	2.7 pF	••	••	••	••	B, C, D
3R0	3.0 pF	••	••	••		B, C, D
3R3	3.3 pF	••	••	••		B, C, D
3R6	3.6 pF	••	••	••		B, C, D
3R9	3.9 pF	••	••	••		B, C, D
4R3	4.3 pF	••	••	••		B, C, D
4R7	4.7 pF	••	••	••		B, C, D
5R1	5.1 pF	••	••	••		B, C, D
5R6	5.6 pF	••	••	••		B, C, D
6R2	6.2 pF	••	••	••		B, C, D
6R8	6.8 pF	••	••	••		B, C, D
7R5	7.5 pF	••	••	••		B, C, D
8R2	8.2 pF	••	••	••		B, C, D
9R1	9.1 pF	••	••	••		B, C, D
100	10 pF	••	••	••		F, G, J, K, M
110	11 pF	••	••	••		F, G, J, K, M
120	12 pF	••	••	••		F, G, J, K, M
130	13 pF	••	••	••		F, G, J, K, M
150	15 pF	••	••	••		F, G, J, K, M
180	18 pF	••	••			F, G, J, K, M
200	20 pF	••	••			F, G, J, K, M
220	22 pF	••	••			F, G, J, K, M
240	24 pF	••	••			F, G, J, K, M
270	27 pF	••	••			F, G, J, K, M
300	30 pF	••				F, G, J, K, M
330	33 pF	••				F, G, J, K, M
360	36 pF	••				F, G, J, K, M
390	39 pF	••				F, G, J, K, M
430	43 pF	••				F, G, J, K, M
470	47 pF	••				F, G, J, K, M
510	51 pF					
560	56 pF					
620	62 pF					

Notes

•• Paper carrier

Approved 200 °C range

SELECTION CHART							
DIELECTRIC (VISHAY CODE)		C0G (D)					
STYLE		VJ0505					TOLERANCE
CASE SIZE		0505					
VOLTAGE (V_{DC})		50	100	150	200	250	
VOLTAGE CODE		A	B	K	C	P	
CAP. CODE	CAP.						
0R1	0.1 pF	•	•	•	•	•	V, B, C, D
0R2	0.2 pF	•	•	•	•	•	V, B, C, D
0R3	0.3 pF	•	•	•	•	•	V, B, C, D
0R4	0.4 pF	•	•	•	•	•	V, B, C, D
0R5	0.5 pF	•	•	•	•	•	V, B, C, D
0R6	0.6 pF	•	•	•	•	•	V, B, C, D
0R7	0.7 pF	•	•	•	•	•	V, B, C, D
0R8	0.8 pF	•	•	•	•	•	V, B, C, D
0R9	0.9 pF	•	•	•	•	•	V, B, C, D
1R0	1.0 pF	•	•	•	•	•	V, B, C, D
1R1	1.1 pF	•	•	•	•	•	V, B, C, D
1R2	1.2 pF	•	•	•	•	•	V, B, C, D
1R3	1.3 pF	•	•	•	•	•	V, B, C, D
1R4	1.4 pF	•	•	•	•	•	V, B, C, D
1R5	1.5 pF	•	•	•	•	•	V, B, C, D
1R6	1.6 pF	•	•	•	•	•	V, B, C, D
1R7	1.7 pF	•	•	•	•	•	V, B, C, D
1R8	1.8 pF	•	•	•	•	•	V, B, C, D
1R9	1.9 pF	•	•	•	•	•	V, B, C, D
2R0	2.0 pF	•	•	•	•	•	V, B, C, D
2R1	2.1 pF	•	•	•	•	•	V, B, C, D
2R2	2.2 pF	•	•	•	•	•	V, B, C, D
2R4	2.4 pF	•	•	•	•	•	V, B, C, D
2R7	2.7 pF	•	•	•	•	•	V, B, C, D
3R0	3.0 pF	•	•	•	•	•	V, B, C, D
3R3	3.3 pF	•	•	•	•	•	V, B, C, D
3R6	3.6 pF	•	•	•	•	•	V, B, C, D
3R9	3.9 pF	•	•	•	•	•	V, B, C, D
4R3	4.3 pF	•	•	•	•	•	V, B, C, D
4R7	4.7 pF	•	•	•	•	•	V, B, C, D
5R1	5.1 pF	•	•	•	•	•	V, B, C, D
5R6	5.6 pF	•	•	•	•	•	B, C, D
6R2	6.2 pF	•	•	•	•	•	B, C, D
6R8	6.8 pF	•	•	•	•	•	B, C, D
7R5	7.5 pF	•	•	•	•	•	B, C, D
8R2	8.2 pF	•	•	•	•	•	B, C, D
9R1	9.1 pF	•	•	•	•	•	B, C, D
100	10 pF	•	•	•	•	•	F, G, J, K, M
110	11 pF	•	•	•	•	•	F, G, J, K, M
120	12 pF	•	•	•	•	•	F, G, J, K, M
130	13 pF	•	•	•	•	•	F, G, J, K, M
150	15 pF	•	•	•	•	•	F, G, J, K, M
160	16 pF	•	•	•	•	•	F, G, J, K, M
180	18 pF	•	•	•	•	•	F, G, J, K, M

SELECTION CHART							
DIELECTRIC (VISHAY CODE)		C0G (D)					
STYLE		VJ0505					TOLERANCE
CASE SIZE		0505					
VOLTAGE (V_{DC})		50	100	150	200	250	
VOLTAGE CODE		A	B	K	C	P	
CAP. CODE	CAP.						
200	20 pF	•	•	•	•	•	F, G, J, K, M
220	22 pF	•	•	•	•	•	F, G, J, K, M
240	24 pF	•	•	•	•	•	F, G, J, K, M
270	27 pF	•	•	•	•	•	F, G, J, K, M
300	30 pF	•	•	•	•	•	F, G, J, K, M
330	33 pF	•	•	•	•	•	F, G, J, K, M
360	36 pF	•	•	•	•	•	F, G, J, K, M
390	39 pF	•	•	•	•	•	F, G, J, K, M
430	43 pF	•	•	•	•	•	F, G, J, K, M
470	47 pF	•	•	•	•	•	F, G, J, K, M
510	51 pF	•	•	•	•	•	F, G, J, K, M
560	56 pF	•	•	•	•	•	F, G, J, K, M
620	62 pF	•	•	•	•	•	F, G, J, K, M
680	68 pF	•	•	•	•	•	F, G, J, K, M
750	75 pF	•	•	•	•	•	F, G, J, K, M
820	82 pF	•	•	•	•	•	F, G, J, K, M
910	91 pF	•	•	•	•		F, G, J, K, M
101	100 pF	•	•	•	•		F, G, J, K, M
111	110 pF	•	•	•	•		F, G, J, K, M
121	120 pF	•	•	•	•		F, G, J, K, M
131	130 pF	•	•	•	•		F, G, J, K, M
151	150 pF	•	•	•			F, G, J, K, M
161	160 pF	•	•	•			F, G, J, K, M
181	180 pF	•	•	•			F, G, J, K, M
201	200 pF	•	•				F, G, J, K, M
221	220 pF	•	•				F, G, J, K, M
241	240 pF	•	•				F, G, J, K, M
271	270 pF	•	•				F, G, J, K, M
301	300 pF	•					F, G, J, K, M
331	330 pF	•					F, G, J, K, M
361	360 pF	•					F, G, J, K, M
391	390 pF	•					F, G, J, K, M
431	430 pF	•					F, G, J, K, M
471	470 pF	•					F, G, J, K, M

Notes

Approved 200 °C range

Approved 175 °C range

• Plastic carrier tape

SELECTION CHART							
DIELECTRIC (VISHAY CODE)		C0G (D)					
STYLE		VJ0603					TOLERANCE
CASE SIZE		0603					
VOLTAGE (V_{DC})		16	25	50	100	200	
VOLTAGE CODE		J	X	A	B	C	
CAP. CODE	CAP.						
0R1	0.1 pF	••	••	••	••	••	V, B, C, D
0R2	0.2 pF	••	••	••	••	••	V, B, C, D
0R3	0.3 pF	••	••	••	••	••	V, B, C, D
0R4	0.4 pF	••	••	••	••	••	V, B, C, D
0R5	0.5 pF	••	••	••	••	••	V, B, C, D
0R6	0.6 pF	••	••	••	••	••	V, B, C, D
0R7	0.7 pF	••	••	••	••	••	V, B, C, D
0R8	0.8 pF	••	••	••	••	••	V, B, C, D
0R9	0.9 pF	••	••	••	••	••	V, B, C, D
1R0	1.0 pF	••	••	••	••	••	V, B, C, D
1R1	1.1 pF	••	••	••	••	••	B, C, D
1R2	1.2 pF	••	••	••	••	••	B, C, D
1R3	1.3 pF	••	••	••	••	••	B, C, D
1R4	1.4 pF	••	••	••	••	••	B, C, D
1R5	1.5 pF	••	••	••	••	••	B, C, D
1R6	1.6 pF	••	••	••	••	••	B, C, D
1R7	1.7 pF	••	••	••	••	••	B, C, D
1R8	1.8 pF	••	••	••	••	••	B, C, D
1R9	1.9 pF	••	••	••	••	••	B, C, D
2R0	2.0 pF	••	••	••	••	••	B, C, D
2R1	2.1 pF	••	••	••	••	••	B, C, D
2R2	2.2 pF	••	••	••	••	••	B, C, D
2R4	2.4 pF	••	••	••	••	••	B, C, D
2R7	2.7 pF	••	••	••	••	••	B, C, D
3R0	3.0 pF	••	••	••	••	••	B, C, D
3R3	3.3 pF	••	••	••	••	••	B, C, D
3R6	3.6 pF	••	••	••	••	••	B, C, D
3R9	3.9 pF	••	••	••	••	••	B, C, D
4R3	4.3 pF	••	••	••	••	••	B, C, D
4R7	4.7 pF	••	••	••	••	••	B, C, D
5R1	5.1 pF	••	••	••	••	••	B, C, D
5R6	5.6 pF	••	••	••	••	••	B, C, D
6R2	6.2 pF	••	••	••	••	••	B, C, D
6R8	6.8 pF	••	••	••	••	••	B, C, D
7R5	7.5 pF	••	••	••	••	••	B, C, D
8R2	8.2 pF	••	••	••	••	••	B, C, D
9R1	9.1 pF	••	••	••	••		B, C, D

SELECTION CHART							
DIELECTRIC (VISHAY CODE)		C0G (D)					
STYLE		VJ0603					TOLERANCE
CASE SIZE		0603					
VOLTAGE (V_{DC})		16	25	50	100	200	
VOLTAGE CODE		J	X	A	B	C	
CAP. CODE	CAP.						
100	10 pF	••	••	••	••		F, G, J, K, M
110	11 pF	••	••	••	••		F, G, J, K, M
120	12 pF	••	••	••	••		F, G, J, K, M
130	13 pF	••	••	••	••		F, G, J, K, M
150	15 pF	••	••	••	••		F, G, J, K, M
180	18 pF	••	••	••	••		F, G, J, K, M
200	20 pF	••	••	••	••		F, G, J, K, M
220	22 pF	••	••	••	••		F, G, J, K, M
240	24 pF	••	••	••	••		F, G, J, K, M
270	27 pF	••	••	••	••		F, G, J, K, M
300	30 pF	••	••	••	••		F, G, J, K, M
330	33 pF	••	••	••	••		F, G, J, K, M
360	36 pF	••	••	••	••		F, G, J, K, M
390	39 pF	••	••	••	••		F, G, J, K, M
430	43 pF	••	••	••	••		F, G, J, K, M
470	47 pF	••	••	••	••		F, G, J, K, M
510	51 pF	••	••	••			F, G, J, K, M
560	56 pF	••	••	••			F, G, J, K, M
620	62 pF	••	••	••			F, G, J, K, M
680	68 pF	••	••	••			F, G, J, K, M
750	75 pF	••	••	••			F, G, J, K, M
820	82 pF	••	••	••			F, G, J, K, M
910	91 pF	••	••	••			F, G, J, K, M
101	100 pF	••	••	••			F, G, J, K, M
111	110 pF	••	••				F, G, J, K, M
121	120 pF	••	••				F, G, J, K, M
131	130 pF	••	••				F, G, J, K, M
151	150 pF	••	••				F, G, J, K, M
181	180 pF	••					F, G, J, K, M
201	200 pF	••					F, G, J, K, M
221	220 pF	••					F, G, J, K, M
241	240 pF	••					F, G, J, K, M
271	270 pF	••					F, G, J, K, M
301	300 pF						
331	330 pF						

Notes

Approved 200 °C range

•• Paper carrier

SELECTION CHART

DIELECTRIC (VISHAY CODE)		C0G (D)						
STYLE		VJ0805						TOLERANCE
CASE SIZE		0805						
VOLTAGE (V_{DC})		16	25	50	100	200	250	
VOLTAGE CODE		J	X	A	B	C	P	
CAP. CODE	CAP.							
0R1	0.1 pF	•	•	•	•	•	•	V, B, C, D
0R2	0.2 pF	•	•	•	•	•	•	V, B, C, D
0R3	0.3 pF	•	•	•	•	•	•	V, B, C, D
0R4	0.4 pF	•	•	•	•	•	•	V, B, C, D
0R5	0.5 pF	•	•	•	•	•	•	V, B, C, D
0R6	0.6 pF	•	•	•	•	•	•	V, B, C, D
0R7	0.7 pF	•	•	•	•	•	•	V, B, C, D
0R8	0.8 pF	•	•	•	•	•	•	V, B, C, D
0R9	0.9 pF	•	•	•	•	•	•	V, B, C, D
1R0	1.0 pF	•	•	•	•	•	•	V, B, C, D
1R1	1.1 pF	•	•	•	•	•	•	B, C, D
1R2	1.2 pF	•	•	•	•	•	•	B, C, D
1R3	1.3 pF	•	•	•	•	•	•	B, C, D
1R4	1.4 pF	•	•	•	•	•	•	B, C, D
1R5	1.5 pF	•	•	•	•	•	•	B, C, D
1R6	1.6 pF	•	•	•	•	•	•	B, C, D
1R7	1.7 pF	•	•	•	•	•	•	B, C, D
1R8	1.8 pF	•	•	•	•	•	•	B, C, D
1R9	1.9 pF	•	•	•	•	•	•	B, C, D
2R0	2.0 pF	•	•	•	•	•	•	B, C, D
2R1	2.1 pF	•	•	•	•	•	•	B, C, D
2R2	2.2 pF	•	•	•	•	•	•	B, C, D
2R4	2.4 pF	•	•	•	•	•	•	B, C, D
2R7	2.7 pF	•	•	•	•	•	•	B, C, D
3R0	3.0 pF	•	•	•	•	•	•	B, C, D
3R3	3.3 pF	•	•	•	•	•	•	B, C, D
3R6	3.6 pF	•	•	•	•	•	•	B, C, D
3R9	3.9 pF	•	•	•	•	•	•	B, C, D
4R3	4.3 pF	•	•	•	•	•	•	B, C, D
4R7	4.7 pF	•	•	•	•	•	•	B, C, D
5R1	5.1 pF	•	•	•	•	•	•	B, C, D
5R6	5.6 pF	•	•	•	•	•	•	B, C, D
6R2	6.2 pF	•	•	•	•	•	•	B, C, D
6R8	6.8 pF	•	•	•	•	•	•	B, C, D
7R5	7.5 pF	•	•	•	•	•	•	B, C, D
8R2	8.2 pF	•	•	•	•	•	•	B, C, D
9R1	9.1 pF	•	•	•	•	•	•	B, C, D
100	10 pF	•	•	•	•	•	•	F, G, J, K, M
110	11 pF	•	•	•	•	•	•	F, G, J, K, M
120	12 pF	•	•	•	•	•	•	F, G, J, K, M
130	13 pF	•	•	•	•	•	•	F, G, J, K, M
150	15 pF	•	•	•	•	•	•	F, G, J, K, M
180	18 pF	•	•	•	•	•	•	F, G, J, K, M
200	20 pF	•	•	•	•	•	•	F, G, J, K, M
220	22 pF	•	•	•	•	•	•	F, G, J, K, M

SELECTION CHART

DIELECTRIC (VISHAY CODE)		C0G (D)						
STYLE		VJ0805						TOLERANCE
CASE SIZE		0805						
VOLTAGE (V_{DC})		16	25	50	100	200	250	
VOLTAGE CODE		J	X	A	B	C	P	
CAP. CODE	CAP.							
240	24 pF	•	•	•	•	•	•	F, G, J, K, M
270	27 pF	•	•	•	•	•	•	F, G, J, K, M
300	30 pF	•	•	•	•	•	•	F, G, J, K, M
330	33 pF	•	•	•	•	•	•	F, G, J, K, M
360	36 pF	•	•	•	•	•	•	F, G, J, K, M
390	39 pF	•	•	•	•	•	•	F, G, J, K, M
430	43 pF	•	•	•	•	•	•	F, G, J, K, M
470	47 pF	•	•	•	•	•	•	F, G, J, K, M
510	51 pF	•	•	•	•	•	•	F, G, J, K, M
560	56 pF	•	•	•	•	•	•	F, G, J, K, M
620	62 pF	•	•	•	•	•	•	F, G, J, K, M
680	68 pF	•	•	•	•	•		F, G, J, K, M
750	75 pF	•	•	•	•	•		F, G, J, K, M
820	82 pF	•	•	•	•			F, G, J, K, M
910	91 pF	•	•	•	•			F, G, J, K, M
101	100 pF	•	•	•	•			F, G, J, K, M
111	110 pF	•	•	•	•			F, G, J, K, M
121	120 pF	•	•	•	•			F, G, J, K, M
131	130 pF	•	•	•	•			F, G, J, K, M
151	150 pF	•	•	•	•			F, G, J, K, M
181	180 pF	•	•	•	•			F, G, J, K, M
201	200 pF	•	•	•	•			F, G, J, K, M
221	220 pF	•	•	•	•			F, G, J, K, M
241	240 pF	•	•	•	•			F, G, J, K, M
271	270 pF	•	•	•				F, G, J, K, M
301	300 pF	•	•	•				F, G, J, K, M
331	330 pF	•	•	•				F, G, J, K, M
361	360 pF	•	•	•				F, G, J, K, M
391	390 pF	•	•	•				F, G, J, K, M
431	430 pF	•	•	•				F, G, J, K, M
471	470 pF	•	•	•				F, G, J, K, M
511	510 pF	•	•	•				F, G, J, K, M
561	560 pF	•	•					F, G, J, K, M
621	620 pF	•	•					F, G, J, K, M
681	680 pF	•	•					F, G, J, K, M
751	750 pF	•						F, G, J, K, M
821	820 pF	•						F, G, J, K, M
911	910 pF	•						F, G, J, K, M
102	1000 pF	•						F, G, J, K, M
112	1100 pF							
122	1200 pF							
132	1300 pF							
152	1500 pF							

Notes

Approved 200 °C range

• Plastic carrier tape

SELECTION CHART

DIELECTRIC (VISHAY CODE)		C0G (D)					
STYLE		VJ1111					TOLERANCE
CASE SIZE		1111					
VOLTAGE (V_{DC})		50	100	200	300	500	
VOLTAGE CODE		A	B	C	D	E	
CAP. CODE	CAP.						
0R2	0.2 pF	•	•	•	•	•	V, B, C, D
0R3	0.3 pF	•	•	•	•	•	V, B, C, D
0R4	0.4 pF	•	•	•	•	•	V, B, C, D
0R5	0.5 pF	•	•	•	•	•	V, B, C, D
0R6	0.6 pF	•	•	•	•	•	V, B, C, D
0R7	0.7 pF	•	•	•	•	•	V, B, C, D
0R8	0.8 pF	•	•	•	•	•	V, B, C, D
0R9	0.9 pF	•	•	•	•	•	V, B, C, D
1R0	1.0 pF	•	•	•	•	•	V, B, C, D
1R1	1.1 pF	•	•	•	•	•	B, C, D
1R2	1.2 pF	•	•	•	•	•	B, C, D
1R3	1.3 pF	•	•	•	•	•	B, C, D
1R4	1.4 pF	•	•	•	•	•	B, C, D
1R5	1.5 pF	•	•	•	•	•	B, C, D
1R6	1.6 pF	•	•	•	•	•	B, C, D
1R7	1.7 pF	•	•	•	•	•	B, C, D
1R8	1.8 pF	•	•	•	•	•	B, C, D
1R9	1.9 pF	•	•	•	•	•	B, C, D
2R0	2.0 pF	•	•	•	•	•	B, C, D
2R1	2.1 pF	•	•	•	•	•	B, C, D
2R2	2.2 pF	•	•	•	•	•	B, C, D
2R4	2.4 pF	•	•	•	•	•	B, C, D
2R7	2.7 pF	•	•	•	•	•	B, C, D
3R0	3.0 pF	•	•	•	•	•	B, C, D
3R3	3.3 pF	•	•	•	•	•	B, C, D
3R6	3.6 pF	•	•	•	•	•	B, C, D
3R9	3.9 pF	•	•	•	•	•	B, C, D
4R3	4.3 pF	•	•	•	•	•	B, C, D
4R7	4.7 pF	•	•	•	•	•	B, C, D
5R1	5.1 pF	•	•	•	•	•	B, C, D
5R6	5.6 pF	•	•	•	•	•	B, C, D
6R2	6.2 pF	•	•	•	•	•	B, C, D
6R8	6.8 pF	•	•	•	•	•	B, C, D
7R5	7.5 pF	•	•	•	•	•	B, C, D
8R2	8.2 pF	•	•	•	•	•	B, C, D
9R1	9.1 pF	•	•	•	•	•	B, C, D
100	10 pF	•	•	•	•	•	F, G, J, K, M
110	11 pF	•	•	•	•	•	F, G, J, K, M
120	12 pF	•	•	•	•	•	F, G, J, K, M
130	13 pF	•	•	•	•	•	F, G, J, K, M
150	15 pF	•	•	•	•	•	F, G, J, K, M
160	16 pF	•	•	•	•	•	F, G, J, K, M
180	18 pF	•	•	•	•	•	F, G, J, K, M
200	20 pF	•	•	•	•	•	F, G, J, K, M
220	22 pF	•	•	•	•	•	F, G, J, K, M
240	24 pF	•	•	•	•	•	F, G, J, K, M
270	27 pF	•	•	•	•	•	F, G, J, K, M
300	30 pF	•	•	•	•	•	F, G, J, K, M
330	33 pF	•	•	•	•	•	F, G, J, K, M
360	36 pF	•	•	•	•	•	F, G, J, K, M

SELECTION CHART

DIELECTRIC (VISHAY CODE)		C0G (D)					
STYLE		VJ1111					TOLERANCE
CASE SIZE		1111					
VOLTAGE (V_{DC})		50	100	200	300	500	
VOLTAGE CODE		A	B	C	D	E	
CAP. CODE	CAP.						
390	39 pF	•	•	•	•	•	F, G, J, K, M
430	43 pF	•	•	•	•	•	F, G, J, K, M
470	47 pF	•	•	•	•	•	F, G, J, K, M
510	51 pF	•	•	•	•	•	F, G, J, K, M
560	56 pF	•	•	•	•	•	F, G, J, K, M
620	62 pF	•	•	•	•	•	F, G, J, K, M
680	68 pF	•	•	•	•	•	F, G, J, K, M
750	75 pF	•	•	•	•	•	F, G, J, K, M
820	82 pF	•	•	•	•	•	F, G, J, K, M
910	91 pF	•	•	•	•	•	F, G, J, K, M
101	100 pF	•	•	•	•	•	F, G, J, K, M
111	110 pF	•	•	•	•	•	F, G, J, K, M
121	120 pF	•	•	•	•	•	F, G, J, K, M
131	130 pF	•	•	•	•	•	F, G, J, K, M
151	150 pF	•	•	•	•	•	F, G, J, K, M
161	160 pF	•	•	•	•	•	F, G, J, K, M
181	180 pF	•	•	•	•	•	F, G, J, K, M
201	200 pF	•	•	•	•	•	F, G, J, K, M
221	220 pF	•	•	•	•	•	F, G, J, K, M
241	240 pF	•	•	•	•	•	F, G, J, K, M
271	270 pF	•	•	•	•	•	F, G, J, K, M
301	300 pF	•	•	•	•	•	F, G, J, K, M
331	330 pF	•	•	•	•	•	F, G, J, K, M
361	360 pF	•	•	•	•	•	F, G, J, K, M
391	390 pF	•	•	•	•	•	F, G, J, K, M
431	430 pF	•	•	•	•		F, G, J, K, M
471	470 pF	•	•	•	•		F, G, J, K, M
511	510 pF	•	•	•	•		F, G, J, K, M
561	560 pF	•	•	•			F, G, J, K, M
621	620 pF	•	•	•			F, G, J, K, M
751	750 pF	•	•	•			F, G, J, K, M
821	820 pF	•	•	•			F, G, J, K, M
911	910 pF	•	•	•			F, G, J, K, M
102	1000 pF	•	•	•			F, G, J, K, M
112	1100 pF	•	•				F, G, J, K, M
122	1200 pF	•	•				F, G, J, K, M
132	1300 pF	•	•				F, G, J, K, M
152	1500 pF	•	•				F, G, J, K, M
162	1600 pF	•	•				F, G, J, K, M
182	1800 pF	•	•				F, G, J, K, M
202	2000 pF	•	•				F, G, J, K, M
222	2200 pF	•	•				F, G, J, K, M
242	2400 pF	•	•				F, G, J, K, M
272	2700 pF	•	•				F, G, J, K, M
302	3000 pF	•	•				F, G, J, K, M
332	3300 pF	•	•				F, G, J, K, M

Notes

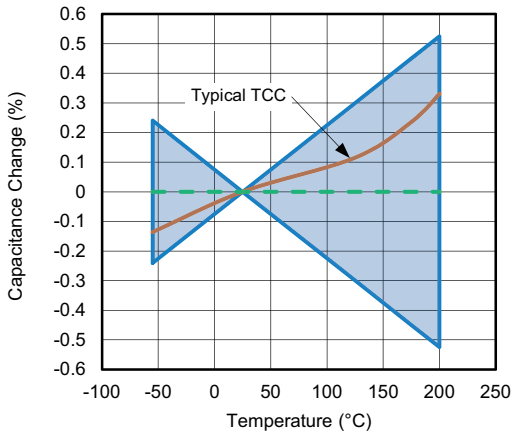
Approved 200 °C range

Approved 175 °C range

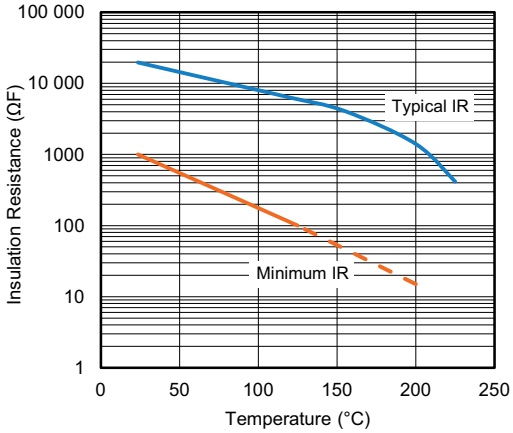
• Plastic carrier tape

HIGH FREQ HT DIELECTRIC - TYPICAL PARAMETERS

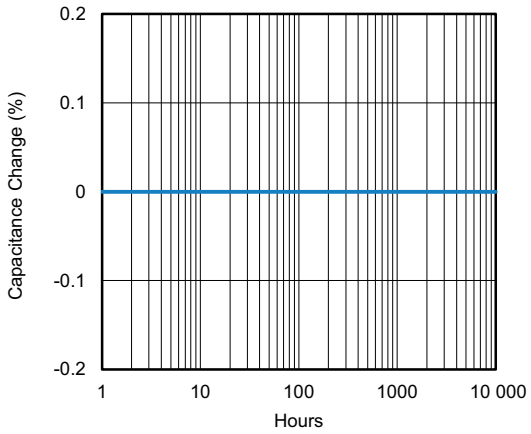
Temperature Coefficient of Capacitance



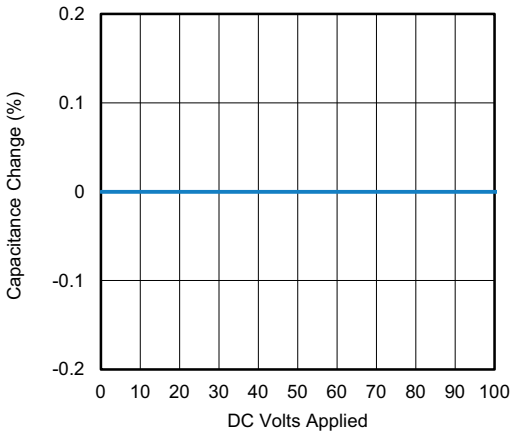
Insulation Resistance vs. Temperature



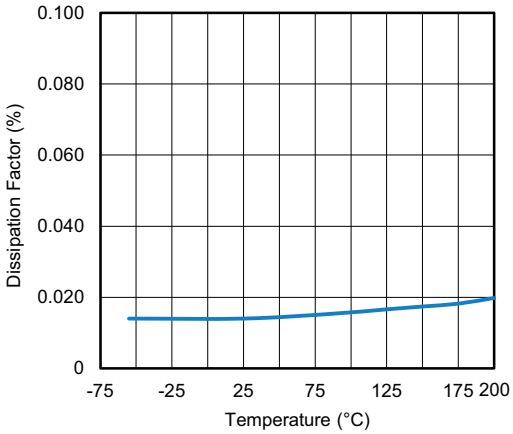
Aging Rate



Voltage Coefficient of Capacitance

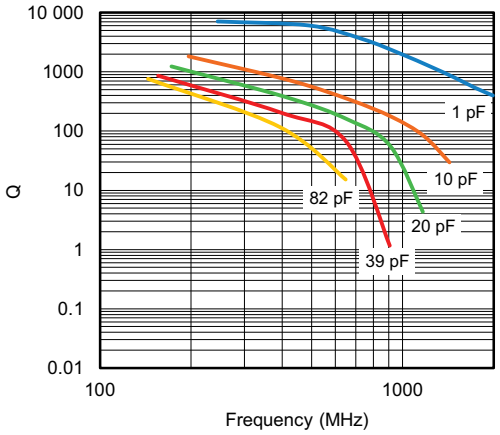


Typical Dissipation Factor

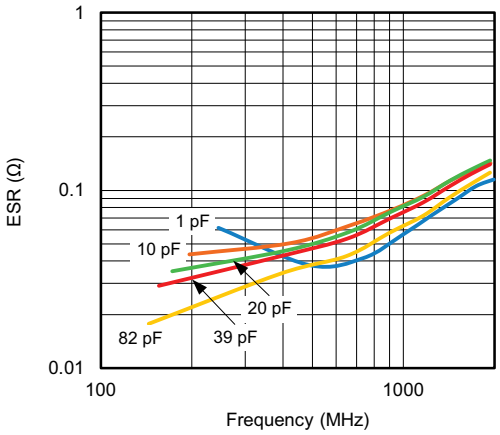


HIGH FREQ HT DIELECTRIC - TYPICAL PARAMETERS

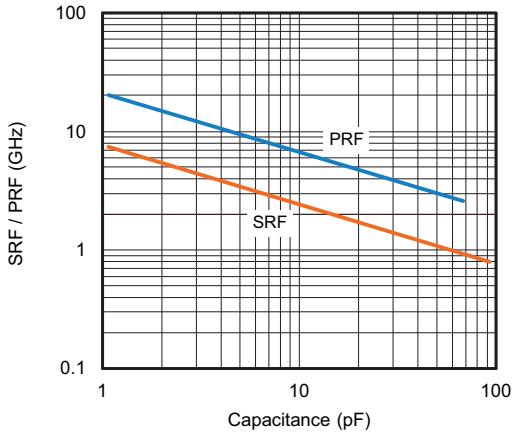
Typical Q Value vs. Frequency (Size 0402)



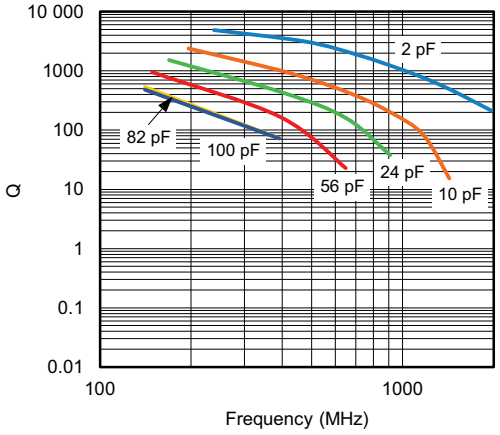
Typical ESR vs. Frequency (Size 0402)



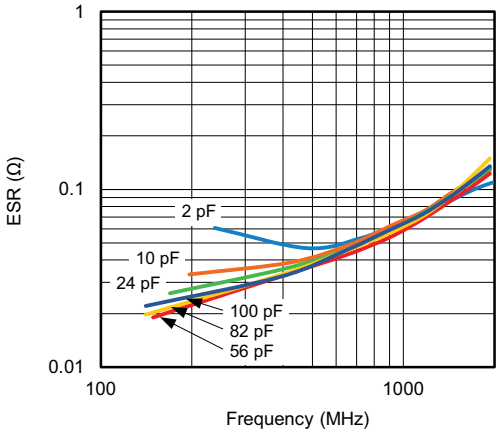
Typical SRF / PRF vs. Capacitance (Size 0402)



Typical Q Value vs. Frequency (Size 0505)

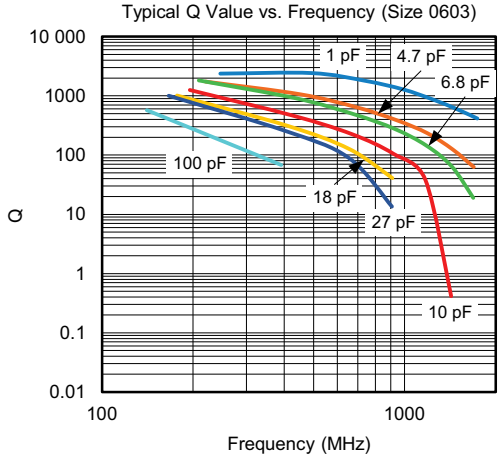


Typical ESR vs. Frequency (Size 0505)

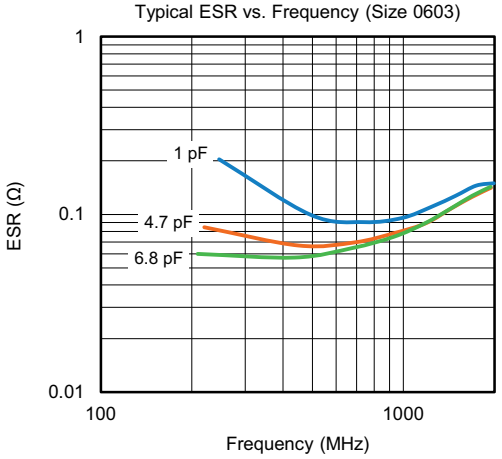


HIGH FREQ HT DIELECTRIC - TYPICAL PARAMETERS

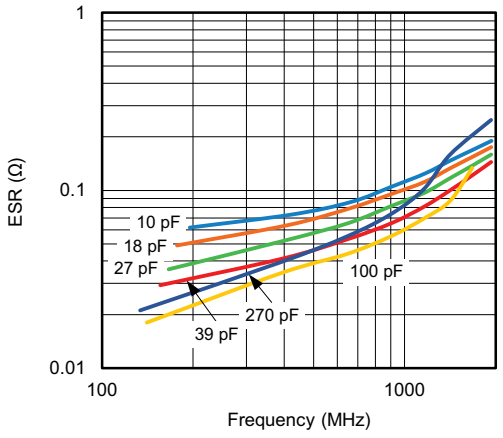
Typical Q Value vs. Frequency (Size 0603)



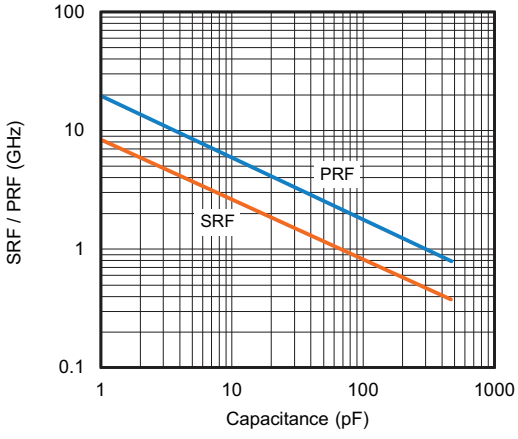
Typical ESR vs. Frequency (Size 0603)



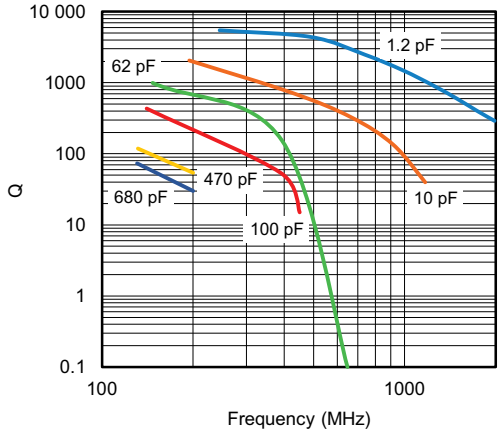
Typical ESR vs. Frequency (Size 0603)



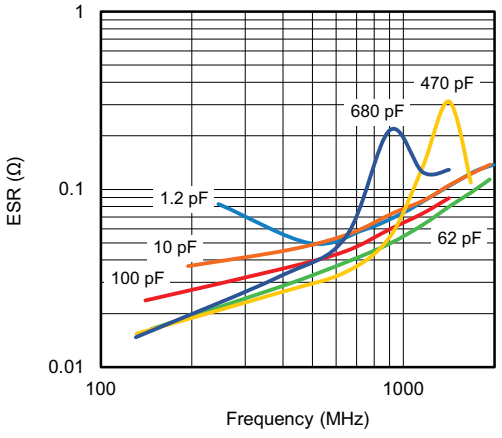
Typical SRF / PRF vs. Capacitance (Size 0603)



Typical Q Value vs. Frequency (Size 0805)

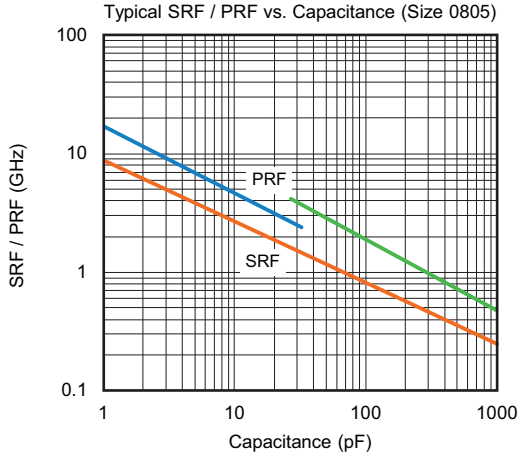


Typical ESR vs. Frequency (Size 0805)

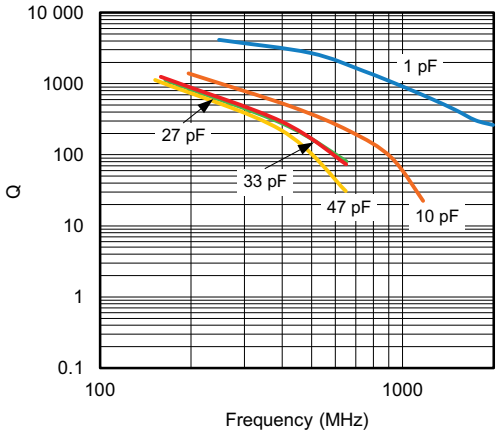


HIGH FREQ HT DIELECTRIC - TYPICAL PARAMETERS

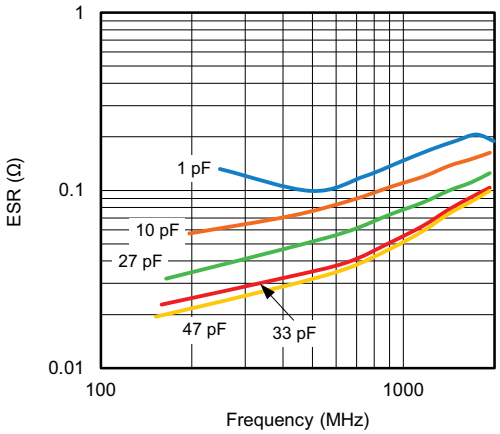
Typical SRF / PRF vs. Capacitance (Size 0805)



Typical Q Value vs. Frequency (Size 1111)



Typical ESR vs. Frequency (Size 1111)



STANDARD PACKAGING QUANTITIES (1)(2)(3)

CASE CODE	TAPE SIZE	7" REEL QUANTITIES			11 1/4" AND 13" REEL QUANTITIES	
		PAPER TAPE PACKAGING CODE "C"	PLASTIC TAPE PACKAGING CODE "T"	LOW QUANTITY "J" (5)	PAPER TAPE PACKAGING CODE "P"	PLASTIC TAPE PACKAGING CODE "R"
0402	8 mm	5000	n/a	1000	10 000	n/a
0505	8 mm	n/a	3000	1000	n/a	10 000
0603 (4)	8 mm	4000	4000	1000	10 000	10 000
0805 (4)	8 mm	3000	3000	1000	10 000	10 000
1111	8 mm	n/a	2500	1000	n/a	9000

Notes

(1) Vishay Vitramon uses embossed plastic carrier tape
(2) REFERENCE: EIA standard RS 481 - "Taping of Surface Mount Components for Automatic Placement"
(3) n/a = not available
(4) Packaging "C" / "P" and "T" / "R" or lower quantities can depend from product thickness
(5) Paper / plastic tape used by availability

STORAGE AND HANDLING CONDITIONS

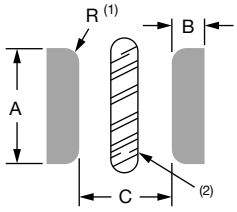
(1) Store the components at 5 °C to +40 °C ambient temperature and ≤ 70 % relative humidity conditions.
(2) The product is recommended to be used within a time-frame of 2 years after shipment.
Check solderability in case extended shelf life beyond the expiry date is needed.

Precautions:

a. Do not store products in an environment containing corrosive elements, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. This may cause corrosion or oxidization of the terminations, which can easily lead to poor soldering.
b. Store products on the shelf and avoid exposure to moisture or dust.
c. Do not expose products to excessive shock, vibration, direct sunlight and so on.

Solder Pad Dimensions for Vishay Surface-Mount Multilayer Ceramic Chip Capacitors

DIMENSIONS in millimeters



CASE CODE	A	B	C
0402	0.50	0.50	0.40
0505	1.35	1.00	0.60
0603	0.90	1.00	1.00 (3)
0805	1.30	1.20	1.00
1111	2.90	1.30	1.75
1206	1.80	1.20	2.10
1210	2.80	1.30	1.90
1808	2.40	1.50	3.00
1812	3.60	1.50	3.00
1825	6.50	1.50	3.00
2008	2.70	1.50	4.08
2220	5.50 (4)	1.50	4.20
2225	6.50	1.50	4.20
2525	6.60	1.50	4.50
3040	10.80	2.00	5.50
3640	10.80	2.00	7.00
3838	10.20	2.00	7.50
4044	12.30	2.00	8.00

Notes

(1) For safety capacitors and voltages above 3000 V, corner rounding (R) of 0.5 mm is recommended to suppress arcing
(2) Add a 1 mm slot in PCB between pads to allow cleaning and coating under MLCC
(3) For VJ HiFREQ Series, this dimension is 0.6 mm
(4) For safety capacitors, the A dimension should be 5.80 mm

PRINTED CIRCUIT BOARD PCB DESIGN CONSIDERATIONS FOR HIGH VOLTAGE SURFACE-MOUNT MLCCS

Special assembly process and design considerations should be employed for today's high voltage rating MLCCs. As case sizes remain the same and voltage ratings increase, MLCC manufacturers must design, evaluate, and qualify their capacitors using methods that reduce the occurrence of corona discharge and arcover events. To meet similar capability in high voltage applications, users should employ similar cautionary design and assembly methods.

MLCC PAD LAYOUT

A capacitor's arcover inception point can degrade due to factors such as the MLCC termination, PCB pad design, PCB cleanliness, solder flux residue, surface contamination / deposits and environmental conditions. PCB pads and their design affect the air gap distance between the opposing polarities of the MLCC termination. For voltage rating greater than 1500 V_{DC} add a corner radius to the inward facing edge of the MLCC pads and as large a gap as possible between the pads. Too small of a pad gap distance will reduce the capacitor's own arcover inception voltage level. Refer to the Figure and Table Figure 1.0, MLCC Pad Layout and Table 1.0, Vishay MLCC Solder Pad Dimensions for the recommended MLCC solder pad dimensions.

SLOT OR TRENCH BETWEEN PADS

PCB assembly can deposit dust, trap solder balls, or flux residue underneath the capacitors. These contaminants will reduce conductive clearances and the arcover inception level. Assembly methods must include a final PCB cleaning process. A slot or trench can be cut into the PCB in between the pads to allow cleaners to penetrate underneath the MLCC. The slot will also allow conformal or epoxy coatings to flow underneath the MLCC and build an insulative barrier between pads. Refer to Figure 1.0 MLCC Pad Layout for slot reference location.

COATING PRINTED CIRCUIT BOARD

Coating a printed circuit board with materials such as acrylic, silicone and urethane resins provide a protective dielectric barrier that is non-conductive and will enhance the resistance to arcing. Various processes exist which include dipping, brushing, and spaying. Optimal performance will come from coating the MLCC on all sides, top and bottom. The PCB slot in between the pads should extend slightly beyond the width of the MLCC. Refer to Figure 1.0 MLCC Pad Layout for slot reference location.

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