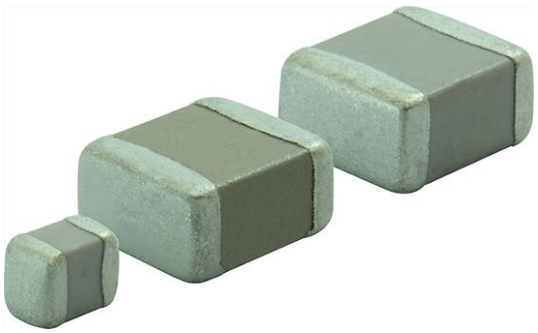
High Power Surface Mount Multilayer Ceramic Chip Capacitors for High Frequency



FEATURES

- Case size 0505 and 1111
- Ultra-stable, high Q dielectric material
- Lead (Pb)-free terminations code "X"
- Tin/lead termination code "L"
- Reliable Noble Metal Electrode (NME) system
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb Available
RoHS* Available
HALOGEN FREE
GREEN (5-2008) Available

Note

* This datasheet provides information about parts that are RoHS-compliant and/or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information/tables in this datasheet for details.

APPLICATIONS

- MRI coils and generators
- RF instruments
- Lasers, CATV, UHF/microwave RF power amplifiers
- Filter networks, timing circuits
- Mixers, oscillators impedance matching networks

ELECTRICAL SPECIFICATIONS

Note

- Electrical characteristics at 25 °C unless otherwise specified

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

Capacitance Range:
0505: 1.0 pF to 100 pF
1111: 1.0 pF to 1000 pF

Voltage Rating: 25 V_{DC} to 1500 V_{DC}

Temperature Coefficient of Capacitance (TCC):
C0G (D): 0 ppm/°C ± 30 ppm/°C from - 55 °C to + 125 °C with zero (0) V_{DC} applied

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 + 125 °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:
≤ 200 V_{DC}-rated: Min. 250 % of rated voltage
300 V_{DC}-rated: Min. 150 % of rated voltage
630 V_{DC} to 1000 V_{DC}-rated: 150 % of rated voltage
1500 V_{DC}: 120 % rated voltage

QUICK REFERENCE DATA

DIELECTRIC	CASE	MAXIMUM VOLTAGE (V)	CAPACITANCE	
			MINIMUM	MAXIMUM
D = NP0	0505	250	1.0 pF	100 pF
	1111	1500	1.0 pF	1000 pF

Note

- For values below 1.0 pF, contact mlcc@vishay.com

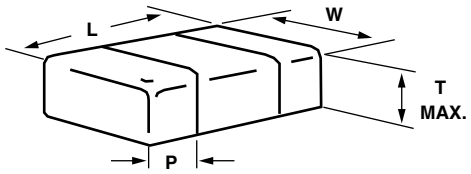
ORDERING INFORMATION

VJ0505	X	1R0	B	X	B	A	C
CASE CODE	DIELECTRIC	CAPACITANCE NOMINAL CODE	CAPACITANCE TOLERANCE	TERMINATION	DC VOLTAGE RATING (1)	MARKING	PACKAGING
0505 1111	D = NP0	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	B = ± 0.10 pF C = ± 0.25 pF D = ± 0.50 pF F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 % M = ± 20 % **Note** Details see “Selection Chart”	X = Ni barrier 100 % tin plate matte finish L = Ni barrier with tin lead plated finish min. 4 % lead	C = 200 V P = 250 V D = 300 V L = 630 V G = 1000 V R = 1500 V	A = No marking	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

DIMENSIONS in inches (millimeters)



CASE CODE	STYLE	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATIONS PAD (P)	
					MINIMUM	MAXIMUM
0505	VJ0505	0.055 ± 0.025 (1.40 ± 0.64)	0.055 ± 0.015 (1.40 ± 0.38)	0.057 (1.45)	0.004 (0.10)	0.016 (0.41)
1111	VJ1111	0.117 ± 0.028 (2.98 ± 0.70)	0.110 ± 0.030 (2.79 ± 0.76)	0.102 (2.59)	0.012 (0.30)	0.018 (0.46)

SELECTION CHART

DIELECTRIC (VISHAY CODE)		C0G (D)		
STYLE		VJ0505		TOLERANCE
CASE CODE		0505		
VOLTAGE (V_{DC})		200	250	
VOLTAGE CODE		C	P	
CAP. CODE	CAP.			
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	••	••	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	••		
101	100 pF	••		
111	110 pF			
121	120 pF			

Note

•• Paper carrier • Plastic carrier tape

SELECTION CHART

DIELECTRIC (VISHAY CODE)		C0G (D)				
STYLE		VJ1111				TOLERANCE
CASE CODE		1111				
VOLTAGE (V_{DC})		300	630	1000	1500	
VOLTAGE CODE		D	L	G	R	
CAP. CODE	CAP.					
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	••	••	••	••	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

Note

•• Paper carrier • Plastic carrier tape

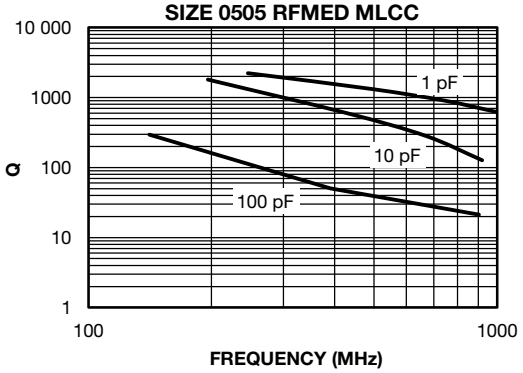
SELECTION CHART						
DIELECTRIC (VISHAY CODE)		C0G (D)				
STYLE		VJ1111				TOLERANCE
CASE CODE		1111				
VOLTAGE (V_{DC})		300	630	1000	1500	
VOLTAGE CODE		D	L	G	R	
CAP. CODE	CAP.					
101	100 pF	•	•	•	•	F, G, J, K, M
111	110 pF	•	•	•	•	F, G, J, K, M
121	120 pF	•	•	•		F, G, J, K, M
131	130 pF	•	•	•		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
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	•				
561	560 pF	•				
621	620 pF	•				
681	680 pF	•				
751	750 pF	•				
821	820 pF	•				
911	910 pF	•				
102	1.0 nF	•				
112	1.1 nF					
122	1.2 nF					
132	1.3 nF					
152	1.5 nF					
182	1.8 nF					

Note

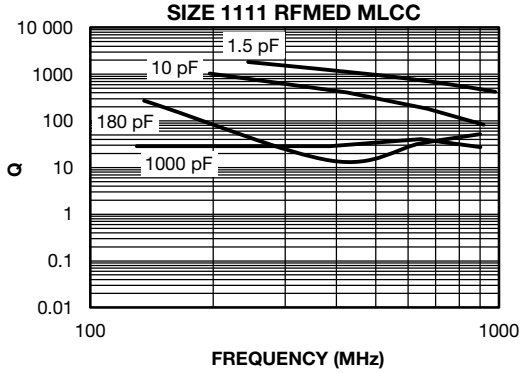
•• Paper carrier • Plastic carrier tape

QUAD HIGH FREQ DIELECTRIC - TYPICAL PARAMETERS

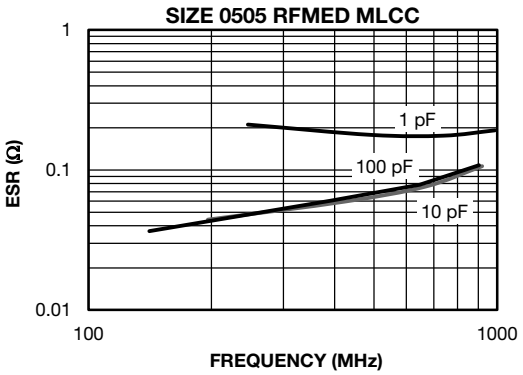
Q VALUE VS. FREQUENCY
SIZE 0505 RFMED MLCC



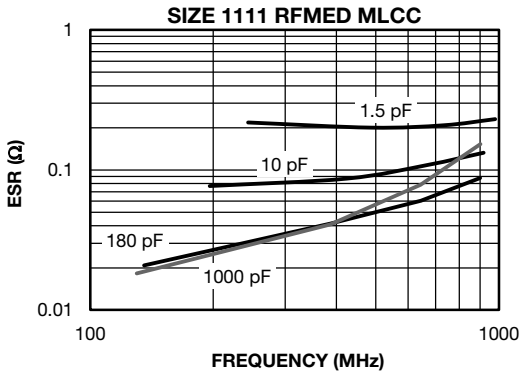
Q VALUE VS. FREQUENCY
SIZE 1111 RFMED MLCC



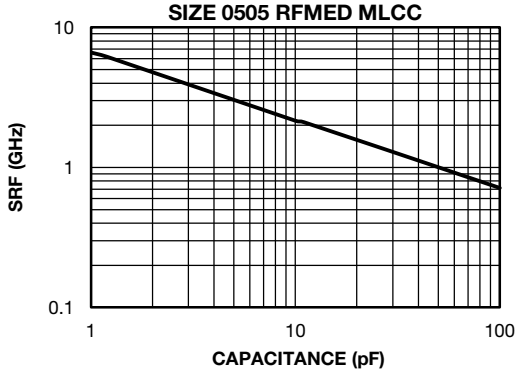
ESR VS. FREQUENCY
SIZE 0505 RFMED MLCC



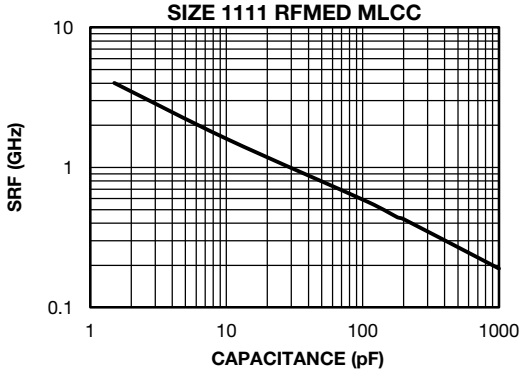
ESR VS. FREQUENCY
SIZE 1111 RFMED MLCC



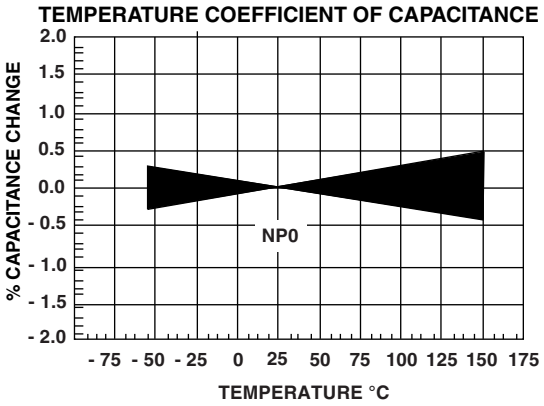
SRF VS. CAPACITANCE
SIZE 0505 RFMED MLCC

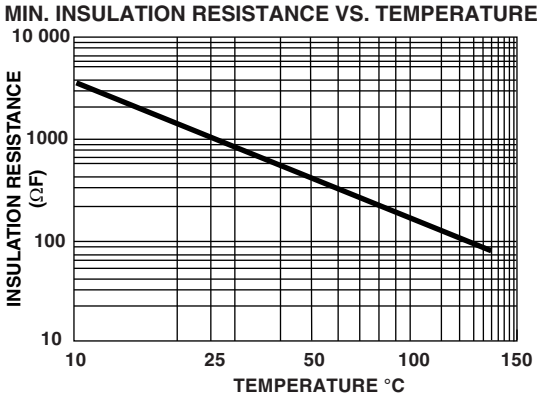


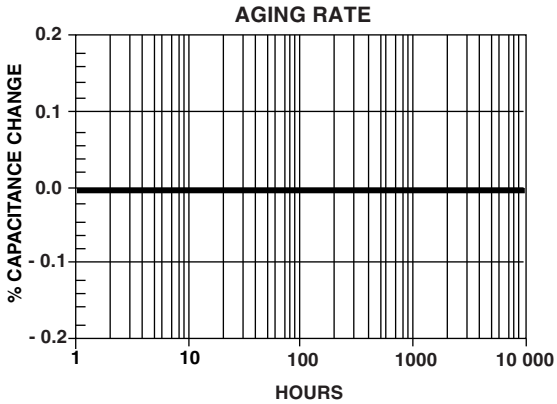
SRF VS. CAPACITANCE
SIZE 1111 RFMED MLCC

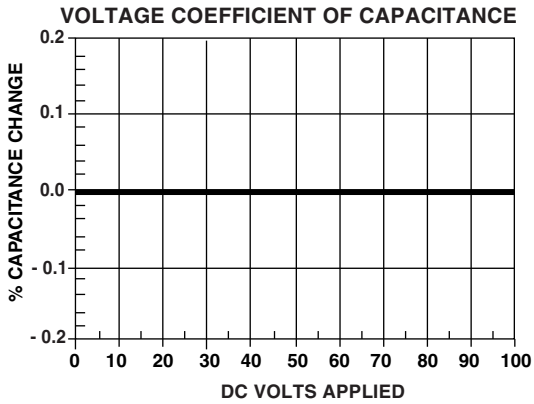


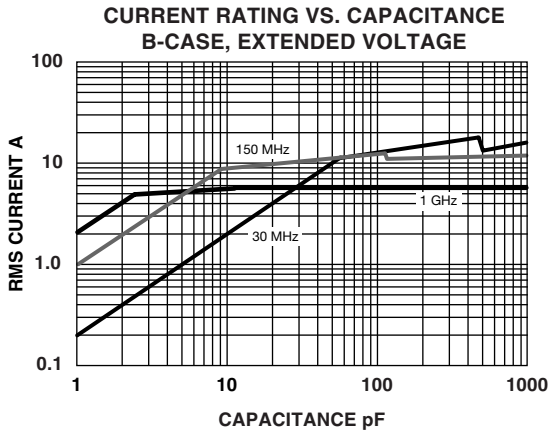
QUAD HIGH FREQ DIELECTRIC - TYPICAL PARAMETERS

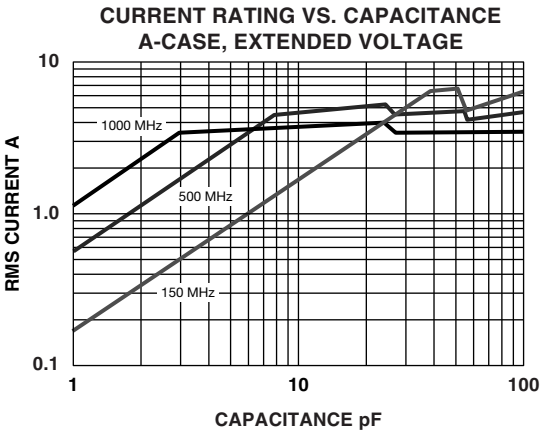












STANDARD PACKAGING QUANTITIES (1)(2)(3)

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"
0505	8 mm	3000	n/a	1000	10 000	10 000
1111 (4)	8 mm	n/a	3000	1000	10 000	10 000

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 % related 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.

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Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.