

Surface Mount Multilayer Ceramic Chip Capacitors for Commodity Applications



FEATURES

- Ultra stable class 1 dielectric
- Four standard sizes
- High capacitance per unit volume
- Supplied in tape on reel
- For high frequency applications
- Ni-barrier with 100 % tin terminations
- Dry sheet manufacturing technology
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Consumer electronics
- Telecommunications
- Data processing

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: 0.5 pF to 39 nF

Voltage Range: 10 V_{DC} to 100 V_{DC}

Temperature Coefficient of Capacitance (TCC):

0 ppm/°C ± 30 ppm/°C from - 55 °C to + 125 °C

Dissipation Factor (DF):

Cap. < 30 pF: Q ≥ 400 + 20C

Cap. ≥ 30 pF: Q ≥ 1000

Test Conditions for Capacitance and DF Measurement:

Cap. ≤ 1000 pF 1.0 ± 0.2 V_{RMS}, 1 MHz ± 10 %

Cap. > 1000 pF 1.0 ± 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 1 s to 5 s period and the charge/discharge current does not exceed 50 mA

≤ 100 V_{DC}: 250 % of rated voltage



VJ...W1BC C0G (NP0) Dielectric

Surface Mount Multilayer Ceramic Chip Capacitors
for Commodity Applications

Vishay

QUICK REFERENCE DATA				
DIELECTRIC	CASE	MAXIMUM VOLTAGE (V)	CAPACITANCE	
			MINIMUM	MAXIMUM
C0G (NP0)	0402	100	0.5 pF	470 pF
	0603	100	0.5 pF	3.3 nF
	0805	100	0.5 pF	12 nF
	1206	100	1.5 pF	39 nF

Note

- Detail ratings see selection chart

ORDERING INFORMATION							
VJ0402	A	101	J	X	Q	C	W1BC
SIZE CODE	DIELECTRIC	CAPACITANCE	TOLERANCE	TERMINATION	VOLTAGE	PACKAGING	PROCESS CODE FOR BASIC COMMODITY
0402 0603 0805 1206	A = C0G (NP0)	Two significant digits followed by the number of zeros: 101 = 100 pF 102 = 1000 pF 152 = 1500 pF 103 = 10 000 pF	Cap. < 10 pF: B = ± 0.10 pF C = ± 0.25 pF D = ± 0.50 pF Cap. ≥ 10 pF: F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 %	X = Ni Barrier	Q = 10 V J = 16 V X = 25 V A = 50 V B = 100 V	C = 7" reel/ paper tape P = 13" reel/ paper tape T = 7" reel/ plastic tape R = 13" reel/ plastic tape	

DIMENSIONS in inches (millimeters)				
SIZE CODE	LENGTH (L)	WIDTH (W)	MAXIMUM THICKNESS (T)	TERMINATION PAD (MB)
0402 (1002)	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 + 0.006/- 0.004 (1.60 + 0.15/- 0.10)	0.030 + 0.006/- 0.004 (0.80 + 0.15/- 0.10)	0.038 (0.95)	0.016 ± 0.006 (0.40 ± 0.15)
0805 (2012)	0.080 ± 0.008 (2.00 ± 0.20)	0.050 ± 0.008 (1.25 ± 0.20)	0.057 (1.45)	0.020 ± 0.008 (0.50 ± 0.20)
1206 (3216)	0.126 + 0.012/- 0.008 (3.20 + 0.30/- 0.20)	0.063 + 0.012/- 0.008 (1.60 + 0.30/- 0.20)	0.075 (1.90)	0.024 ± 0.008 (0.60 ± 0.20)

VJ....W1BC C0G (NP0) Dielectric



Vishay

Surface Mount Multilayer Ceramic Chip Capacitors
for Commodity Applications

SELECTION CHART																					
DIELECTRIC		C0G (NP0)																			
STYLE		VJ0402					VJ0603					VJ0805					VJ1206				
EIA CODE		0402					0603					0805					1206				
VOLTAGE (V _{DC})		10	16	25	50	100	10	16	25	50	100	10	16	25	50	100	10	16	25	50	100
VOLTAGE CODE		Q	J	X	A	B	Q	J	X	A	B	Q	J	X	A	B	Q	J	X	A	B
CAP. CODE	CAP.																				
0R5	0.5 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A					
1R0	1.0 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A					
1R2	1.2 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A					
1R5	1.5 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
1R8	1.8 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
2R2	2.2 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
2R7	2.7 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
3R3	3.3 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
3R9	3.9 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
4R7	4.7 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
5R6	5.6 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
6R8	6.8 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
8R2	8.2 pF	N*	N*	N*	N*	N*	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
100	10 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
120	12 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
150	15 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
180	18 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
220	22 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
270	27 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
330	33 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
390	39 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
470	47 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
560	56 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
680	68 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
820	82 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
101	100 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
121	120 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
151	150 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
181	180 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
221	220 pF	N	N	N	N	N	S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
271	270 pF	N	N	N	N		S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
331	330 pF	N	N	N	N		S	S	S	S	S	A	A	A	A	A	B	B	B	B	B
391	390 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	B
471	470 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	B
561	560 pF						S	S	S	S	S	B	B	B	B	B	B	B	B	B	B
681	680 pF						S	S	S	S	S	B	B	B	B	B	B	B	B	B	B
821	820 pF						S	S	S	S	S	B	B	B	B	B	B	B	B	B	B

Notes

- Letters indicate product thickness, see packaging quantities
- “ * ” indicate product with Ag/Ni/Sn termination



VJ...W1BC C0G (NP0) Dielectric

Surface Mount Multilayer Ceramic Chip Capacitors
for Commodity Applications

Vishay

SELECTION CHART																					
DIELECTRIC		C0G (NP0)																			
STYLE		VJ0402					VJ0603					VJ0805					VJ1206				
EIA CODE		0402					0603					0805					1206				
VOLTAGE (V _{DC})		10	16	25	50	100	10	16	25	50	100	10	16	25	50	100	10	16	25	50	100
VOLTAGE CODE		Q	J	X	A	B	Q	J	X	A	B	Q	J	X	A	B	Q	J	X	A	B
CAP. CODE	CAP.																				
102	1.0 nF						S	S	S	S	S	B	B	B	B	B	B	B	B	B	B
122	1.2 nF						X	X	X	X		B	B	B	B	B	B	B	B	B	B
152	1.5 nF						X	X	X	X		B	B	B	B	B	B	B	B	B	B
182	1.8 nF						X	X	X	X		B	B	B	B	B	B	B	B	B	B
222	2.2 nF						X	X	X	X		B	B	B	B	B	B	B	B	B	B
272	2.7 nF						X	X	X	X		D	D	D	D	D	B	B	B	B	B
332	3.3 nF						X	X	X	X		D	D	D	D	D	B	B	B	B	B
392	3.9 nF											D	D	D	D	D	B	B	B	B	B
472	4.7 nF											D	D	D	D		B	B	B	B	B
562	5.6 nF											D*	D*				B	B	B	B	B
682	6.8 nF											D*	D*				C	C	C	C	C
822	8.2 nF											D*	D*				D	D	D	D	D
103	10 nF											D*	D*				D	D	D	D	
123	12 nF											D*	D*				D*	D*			
153	15 nF																D*	D*			
183	18 nF																D*	D*			
223	22 nF																D*	D*			
273	27 nF																D*	D*			
333	33 nF																D*	D*			
393	39 nF																G*	G*			
473	47 nF																				
563	56 nF																				
683	68 nF																				
823	82 nF																				
104	100 nF																				

Notes

- Letters indicate product thickness, see packaging quantities
- “ * ” indicate product with Ag/Ni/Sn termination

PACKAGING QUANTITIES						
SIZE CODE (inch/mm)	MAX. THICKNESS (mm)	THICKNESS SYMBOL	PAPER TAPE		PLASTIC TAPE	
			7" REEL (C)	13" REEL (P)	7" REEL (T)	13" REEL (R)
0402 (1002)	0.55	N	10 000	50 000		
0603 (1608)	0.90	S	4000	15 000		
	0.95	X	4000	15 000		
0805 (2012)	0.75	A	4000	15 000		
	0.95	B	4000	15 000		
	1.40	D			3000	10 000
1206 (3216)	0.95	B	4000	15 000		
	1.05	C			3000	10 000
	1.30	J			3000	10 000
	1.35	D			3000	10 000
	1.80	G			2000	
	1.80	H			2000	8000
	1.90	P			2000	

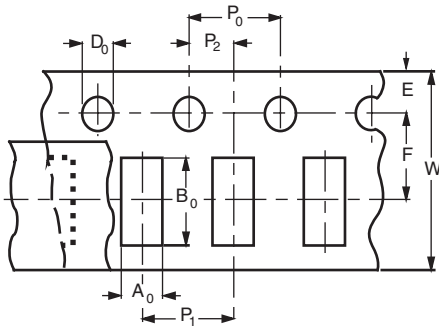
VJ....W1BC C0G (NP0) Dielectric



Vishay

Surface Mount Multilayer Ceramic Chip Capacitors
for Commodity Applications

PAPER TAPE SPECIFICATIONS

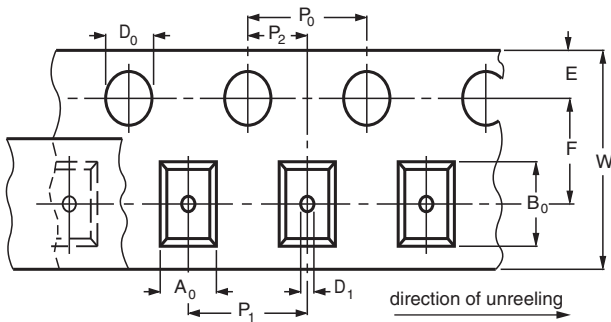


DIMENSIONS OF PAPER TAPE

in millimeters

SYM.	PRODUCT SIZE CODE			
	0402	0603	0805	1206
A_0	0.62 ± 0.05	1.02 ± 0.05	1.50 ± 0.10	2.00 ± 0.10
B_0	1.12 ± 0.05	1.80 ± 0.05	2.30 ± 0.10	3.50 ± 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 ± 0.10
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	1.50 ± 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	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

BLISTER TAPE SPECIFICATION

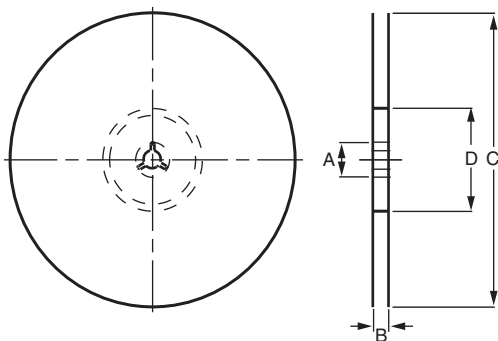


DIMENSIONS OF BLISTER TAPE

in millimeters

SYM.	PRODUCT SIZE CODE	
	0805	1206
A_0	< 1.57	< 2.00
B_0	< 2.45	< 3.70
W	8.00 ± 0.10	8.00 ± 0.10
E	1.75 ± 0.10	1.75 ± 0.10
F	3.50 ± 0.05	3.50 ± 0.05
D_0	1.50 ± 0.05	1.50 ± 0.05
P_0	1.00 ± 0.10	1.00 ± 0.10
P_1	4.00 ± 0.10	4.00 ± 0.10
P_2	4.00 ± 0.10	4.00 ± 0.10
A_0	2.00 ± 0.05	2.00 ± 0.05

REEL SPECIFICATIONS



REEL DIMENSIONS AND TAPE WIDTH

in millimeters

	$\varnothing 180 \text{ mm}; 7''$	$\varnothing 330 \text{ mm}; 13''$
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



VJ...W1BC C0G (NP0) Dielectric

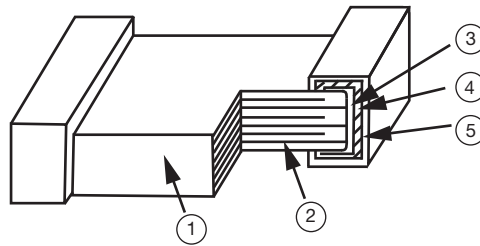
Surface Mount Multilayer Ceramic Chip Capacitors
for Commodity Applications

Vishay

CONSTRUCTION			
NO.	NAME	C0G (NP0) ⁽¹⁾	C0G (NP0)
1	Ceramic material	BaTiO ₃ based	
2	Inner electrode	AgPd alloy	Ni
3	Termination	Inner layer	Ag
4		Middle layer	Ni
5		Outer layer	Sn

Note

(1) C0G (NP0) items are with Ag/Ni/Sn terminations, please see selection chart



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.



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

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.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [Multilayer Ceramic Capacitors MLCC - SMD/SMT](#) category:

Click to view products by [Vishay](#) manufacturer:

Other Similar products are found below :

[M39014/01-1467](#) [M39014/02-1218V](#) [M39014/02-1225V](#) [M39014/02-1262V](#) [M39014/02-1301](#) [M39014/22-0631](#) [1210J5000102JCT](#)
[1210J2K00102KXT](#) [1210J5000103KXT](#) [1210J5000223KXT](#) [D55342E07B379BR-TR](#) [D55342E07B523DR-T/R](#) [1812J1K00103KXT](#)
[1812J1K00473KXT](#) [1812J2K00680JCT](#) [1812J4K00102MXT](#) [1812J5000102JCT](#) [1812J5000103JCT](#) [1812J5000682JCT](#) [NIN-FB391JTRF](#)
[NIN-FC2R7JTRF](#) [NPIS27H102MTRF](#) [C1206C101J1GAC](#) [C1608C0G1E472JT000N](#) [C2012C0G2A472J](#) [2220J2K00101JCT](#)
[KHC201E225M76N0T00](#) [LRC-LRF1206LF-01R025FTR1K](#) [1812J1K00222JCT](#) [1812J2K00102KXT](#) [1812J2K00222KXT](#)
[1812J2K00472KXT](#) [2-1622820-7-CUT-TAPE](#) [2220J3K00102KXT](#) [2225J2500824KXT](#) [CCR07CG103KM](#) [CGA2B2C0G1H010C](#)
[CGA2B2C0G1H040C](#) [CGA2B2C0G1H050C](#) [CGA2B2C0G1H060D](#) [CGA2B2C0G1H070D](#) [CGA2B2C0G1H151J](#) [CGA2B2C0G1H1R5C](#)
[CGA2B2C0G1H2R2C](#) [CGA2B2C0G1H3R3C](#) [CGA2B2C0G1H680J](#) [CGA2B2C0G1H6R8D](#) [CGA2B2X8R1H221K](#) [CGA2B2X8R1H472K](#)
[CGA3E1X7R1C474K](#)