

## Surface Mount Multilayer Ceramic Chip Capacitors for Ultra Small Commodity Applications



### FEATURES

- High capacitance in unit size
- High precision dimensional tolerances
- Suitably used in high-accuracy automatic mounting machine
- Dry sheet manufacturing technology
- Noble Metal Electrode system (NME) for C0G (NP0)
- Base Metal Electrode system (BME) for X5R, X7R
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### APPLICATIONS

- Miniature microwave module
- Portable equipment - mobile phone, PDA
- High frequency circuits

ELECTRICAL SPECIFICATIONS			
Size	0201		
Dielectric	C0G (NP0)	X7R	X5R
Capacitance	0.5 pF to 100 pF	100 pF to 10 nF	100 pF to 220 nF
Capacitance Tolerance <sup>(2)</sup>	Cap. ≤ 5 pF: B (± 0.1 pF), C (± 0.25 pF) 5 pF < Cap. < 10 pF: C (± 0.25 pF), D (± 0.5 pF) Cap. ≥ 10 pF: F (± 1 %), G (2 %), J (5 %), K = (± 10 %)	J (± 5 %) K (± 10 %) M (± 20 %)	J (± 5 %) K (± 10 %) M (± 20 %)
Rated Voltage (V <sub>DC</sub> )	16 V, 25 V, 50 V	10 V, 16 V, 50 V	6.3 V, 10 V, 16 V, 50 V
tan δ/Q <sup>(1)</sup>	Cap. < 30 pF, Q ≥ 400 + 20 C Cap. ≥ 30 pF, Q ≥ 1000	10 V ≤ 5 % 16 V: ≤ 3.5 % 50 V: ≤ 3.0 %	6.3 V: ≤ 10 % 10 V: ≤ 5.0 % 16 V: ≤ 3.5 % 50 V: ≤ 3.0 %
Insulation Resistance at U <sub>R</sub>	≥ 10 GΩ	≥ 10 GΩ or R x C ≥ 500 ΩF, whichever is less	
Operating Temperature	- 55 °C to + 125 °C		- 55 % to + 85 °C
Capacitance Change	± 30 ppm	± 15 %	
Termination	Ni/Sn lead (Pb)-free termination		

### Notes

<sup>(1)</sup> Measured at 30 % ~ 70 % related humidity

NP0: apply 1.0 V<sub>RMS</sub> ± 0.2 V<sub>RMS</sub>, 1.0 MHz ± 10 % at the conditions of 25 °C ambient temperature

X7R, X5R: apply 1.0 V<sub>RMS</sub> ± 0.2 V<sub>RMS</sub>, 1.0 kHz ± 10 % at the conditions of 25 °C ambient temperature

<sup>(2)</sup> Preconditioning for X5R, X7R MLCC: Perform a heat treatment at 150 °C ± 10 °C for 1 h, then leave in ambient condition for 24 h ± 2 h before measurement.



QUICK REFERENCE DATA				
DIELECTRIC	CASE	MAXIMUM VOLTAGE (V)	CAPACITANCE	
			MINIMUM	MAXIMUM
C0G (NP0)	0201	50	0.5 pF	100 pF
X7R	0201	50	100 pF	10 nF
X5R	0201	50	100 pF	220 nF

**Note**

- Detail ratings see “Selection Chart” table

ORDERING INFORMATION							
VJ0201	A	100	J	X	X	C	W1BC
SIZE CODE	DIELECTRIC	CAPACITANCE	TOLERANCE <sup>(1)</sup>	TERMINATION	RATED VOLTAGE	PACKAGING	PROCESS CODE FOR BASIC COMMODITY
0201	A = C0G (NP0) Y = X7R G = X5R	Two significant digits followed by the number of zeros. R is in place of decimal point: 0R5 = 0.5 pF 1R0 = 1.0 pF 100 = 10 pF	B = ± 0.10 pF C = ± 0.25 pF D = ± 0.5 pF J = ± 5 % K = ± 10 % M = ± 20 %	X = Ni Barrier	Y = 6.3 V Q = 10 V J = 16 V X = 25 V A = 50 V	C = 7" reel/ paper tape	

**Note**

- <sup>(1)</sup> Detail tolerance see under “Electrical Specifications” table

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)



SELECTION CHART											
DIELECTRIC		COG (NP0)			X7R			X5R			
STYLE		VJ0201									
SIZE CODE		0201									
VOLTAGE V <sub>DC</sub>		16 V	25 V	50 V	10 V	16 V	50 V	6.3 V	10 V	16 V	50 V
VOLTAGE CODE		J	X	A	Q	J	A	Y	Q	J	A
CAP. CODE	CAP.										
0R5	0.5 pF		L	L							
1R0	1.0 pF		L	L							
1R2	1.2 pF		L	L							
1R5	1.5 pF		L	L							
1R8	1.8 pF		L	L							
2R2	2.2 pF		L	L							
2R7	2.7 pF		L	L							
3R3	3.3 pF		L	L							
3R9	3.9 pF		L	L							
4R7	4.7 pF		L	L							
5R6	5.6 pF		L	L							
6R8	6.8 pF		L	L							
8R2	8.2 pF		L	L							
100	10 pF		L	L							
120	12 pF		L	L							
150	15 pF		L	L							
180	18 pF		L	L							
220	22 pF		L	L							
270	27 pF		L	L							
330	33 pF		L	L							
390	39 pF		L	L							
470	47 pF		L	L							
560	56 pF	L	L								
680	68 pF	L	L								
820	82 pF	L	L								
101	100 pF	L	L			L	L				L
121	120 pF					L	L				L
151	150 pF					L	L				L
181	180 pF					L	L				L
221	220 pF					L	L				L
271	270 pF					L	L				L
331	330 pF					L	L				L
391	390 pF					L	L				L
471	470 pF					L	L				L
561	560 pF					L	L				L
681	680 pF					L	L				L
821	820 pF					L	L				L
102	1000 pF				L	L	L			L	L
152	1500 pF				L	L			L	L	
222	2200 pF				L	L			L	L	
332	3300 pF				L	L			L	L	
472	4700 pF				L	L			L	L	
682	6800 pF				L				L		
103	0.010 μF				L				L		
153	0.015 μF							L			
223	0.022 μF							L			
333	0.033 μF							L			
473	0.047 μF							L			
683	0.068 μF							L			
104	0.10 μF							L	L		
224	0.22 μF							L			

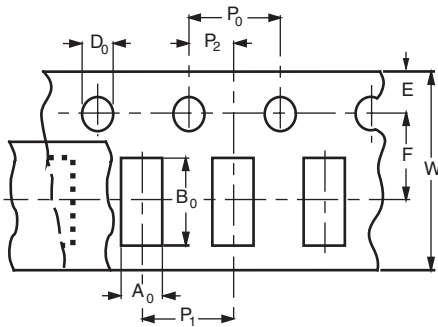
**Note**

- Letters indicate product thickness, see “Packaging quantities”



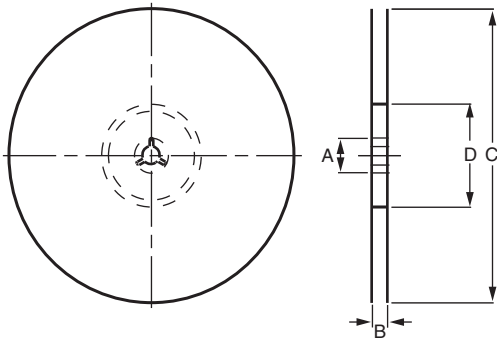
PACKAGING QUANTITIES			
SIZE CODE (inch/mm)	THICKNESS (mm)	PAPER TAPE	
		7" REEL (C)	13" REEL (P)
0201 (0603)	0.30 ± 0.03	15K	-

**PAPER TAPE SPECIFICATIONS**



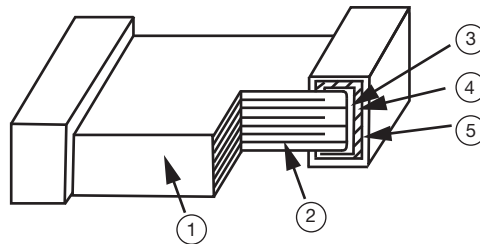
DIMENSIONS OF PAPER TAPE in millimeters	
SYM.	PRODUCT SIZE CODE
	0201
A <sub>0</sub>	0.38 ± 0.05
B <sub>0</sub>	0.68 ± 0.05
W	8.00 ± 0.10
E	1.75 ± 0.05
F	3.50 ± 0.05
D <sub>0</sub>	1.55 ± 0.05
P <sub>0</sub>	4.00 ± 0.10
P <sub>1</sub>	2.00 ± 0.05
P <sub>2</sub>	2.00 ± 0.05

**REEL SPECIFICATION**



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

<b>CONSTRUCTION</b>			
<b>NO.</b>	<b>NAME</b>	<b>COG (NPO)</b>	<b>X5R, X7R</b>
1	Ceramic material	BaTiO <sub>3</sub> based	
2	Inner electrode	AgPd alloy	Ni
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 % relative 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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