

Surface Mount Multilayer Ceramic Chip Capacitors for Commodity Applications



FEATURES

- Stable class 2 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 technology process.
- Base Metal Electrode System (BME)
- Halogen-free according to IEC 61249-2-21



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Consumer electronics
- Telecommunications
- Data processing

ELECTRICAL SPECIFICATION

Note: Electrical characteristics at 25 °C, unless otherwise specified

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

Capacitance Range: 100 pF to 4.7 μF

Voltage Rating: 10 Vdc to 100 Vdc

Temperature Coefficient of Capacitance (TCC):

± 15 % without voltage applied

Dissipation Factor (DF):

10 V: ≤ 5 %

≤ 10 % for 0603 ≥ 1 μF; 0805 ≥ 2.2 μF; 1206 ≥ 6.8 μF

16 V: ≤ 3.5 %

≤ 5 % for 0402 ≥ 0.033 μF; 0603 ≥ 0.15 μF; 0805 ≥ 0.68 μF;

1206 ≥ 2.2 μF

≤ 10 % for Cap ≥ 1 μF; 0603 ≥ 0.68 μF; 1206 ≥ 6.8 μF

25 V: ≤ 3.5 %

≤ 5 % for 0805 ≥ 1 μF ≤ 7 % for 0402 ≥ 0.10 μF; 0603 ≥ 0.33 μF;

0805 ≥ 0.2.2 μF; 1206 ≥ 4.7 μF

≤ 10 % for 0603 ≥ 0.2.2 μF; 0805 ≥ 4.7 μF; 1206 ≥ 6.8 μF

≥ 50 V: ≤ 2.5 %

≤ 3 % for 0603 ≥ 0.047 μF; 0805 ≥ 0.18 μF; 1206 ≥ 0.47 μF

Aging Rate:

≤ 10 V: maximum 1.5 % per decade

≥ 16 V: maximum 1 % per decade

Insulation Resistance (IR):

10 GΩ or 500 ΩF whichever is less

Dielectric Withstanding Voltage (DWV):

This is the maximum voltage the capacitors are tested for 1 to 5 s period and the charge/discharge current does not exceed 50 mA

≤ 50 Vdc: DWV at 250 % of rated voltage

≤ 100 Vdc: DWV at 300 % of rated voltage

DIMENSIONS in inches [millimeters]

	SIZE CODE	L	W	T MAX.	MB
	0402	0.040 ± 0.002 [1.0 ± 0.05]	0.020 ± 0.002 [0.5 ± 0.05]	0.022 [0.55]	0.010 + 0.002/- 0.004 [0.25 + 0.05/- 0.10]
0603	0.063 + 0.006/- 0.004 [1.6 + 0.15/- 0.10]	0.030 + 0.006/- 0.004 [0.8 + 0.15/- 0.10]	0.038 [0.95]	0.015 ± 0.006 [0.40 ± 0.15]	
0805	0.080 ± 0.006 [2.0 ± 0.15]	0.050 ± 0.004 [1.25 ± 0.10]	0.053 [1.35]	0.020 ± 0.008 [0.50 ± 0.20]	
1206	0.125 ± 0.006 [3.2 ± 0.15]	0.063 ± 0.008 [1.6 ± 0.20]	0.075 [1.90]	0.025 ± 0.008 [0.60 ± 0.20]	

ORDERING INFORMATION

VJ0402	Y	101	J	X	Q	C	W1BC
SIZE CODE	DIELECTRIC	CAPACITANCE	TOLERANCE	TERMINATION	VOLTAGE	PACKAGING	PROCESS CODE FOR BASIC COMMODITY
0402 0603 0805 1206	Y = X7R	two significant digits followed by the number of zeros: 101 = 100 pF 102 = 1000 pF 152 = 1500 pF 103 = 10 000 pF	J = ± 5 % ⁽¹⁾ K = ± 10 % M = ± 20 %	X = Ni Barrier	Q = 10 V J = 16 V X = 25 V A = 50 V B = 100 V	C = 7" reel/paper P = 13" reel/paper T = 7" reel/blister R = 13" reel/blister	

Note:

⁽¹⁾ Not all values, see selection chart sizes 0603, 0805, 1206



VJ...W1BC X7R Dielectric

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for Commodity Applications

Vishay

SELECTION CHART																					
DIELECTRIC		X7R																			
EIA CAP. CODE	EIA SIZE CAP.	0402					0603					0805					1206				
		10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V
101	100 pF	N	N	N	N		S+	S+	S+	S+	S+	B+	B+	B+	B+	B+					
121	120 pF	N	N	N	N		S+	S+	S+	S+	S+	B+	B+	B+	B+	B+					
151	150 pF	N	N	N	N		S+	S+	S+	S+	S+	B+	B+	B+	B+	B+	B*+	B*+	B*+	B*+	
181	180 pF	N	N	N	N		S+	S+	S+	S+	S+	B+	B+	B+	B+	B+	B*+	B*+	B*+	B*+	
221	220 pF	N	N	N	N		S+	S+	S+	S+	S+	B+	B+	B+	B+	B+	B*+	B*+	B*+	B*+	
271	270 pF	N	N	N	N		S+	S+	S+	S+	S+	B+	B+	B+	B+	B+	B*+	B*+	B*+	B*+	
331	330 pF	N	N	N	N		S+	S+	S+	S+	S+	B+	B+	B+	B+	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*+	
471	470 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B*	B*	B*	B*	
561	560 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B*	B*	B*	B*	
681	680 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B*	B*	B*	B*	
821	820 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
102	1000 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
122	1200 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
152	1500 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
182	1800 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
222	2200 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
272	2700 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
332	3300 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
392	3900 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
472	4700 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
562	5600 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
682	6800 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
822	8200 pF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
103	0.01 μF	N	N	N	N		S	S	S	S	S	B	B	B	B	B	B	B	B	B	
123	0.012 μF	N	N	N			S	S	S	S		B	B	B	B	B	B	B	B	B	
153	0.015 μF	N	N	N			S	S	S	S		B	B	B	B	B	B	B	B	B	
183	0.018 μF	N	N	N			S	S	S	S		B	B	B	B	B	B	B	B	B	
223	0.022 μF	N	N	N			S	S	S	S		B	B	B	B	B	B	B	B	B	
273	0.027 μF	N	N				S	S	S	S		B	B	B	B	D	B	B	B	B	
333	0.033 μF	N	N				S	S	S	X		B	B	B	B	D	B	B	B	B	
393	0.039 μF	N	N				S	S	S	X		B	B	B	B	D	B	B	B	B	
473	0.047 μF	N	N				S	S	S	X		B	B	B	B	D	B	B	B	B	
563	0.056 μF	N					S	S	S	X		B	B	B	B	D	B	B	B	B	
683	0.068 μF	N					S	S	S	X		B	B	B	B	D	B	B	B	B	
823	0.082 μF	N					S	S	S	X		B	B	B	B	D	B	B	B	D	
104	0.1 μF	N					S	S	S	X		B	B	B	B/D	D	B	B	B	D	
124	0.12 μF						S	S				B	B	B	D		B	B	B	D	
154	0.15 μF						S	S				D	D	D	D		C	C	C	G	
184	0.18 μF						S	S				D	D	D	D		C	C	C	G	
224	0.22 μF						S	S				D	D	D	D		C	C	C	G	
274	0.27 μF						X					D	D	D			C	C	C	D	
334	0.33 μF						X					D	D	D			C	C	C	D	
394	0.39 μF						X					D	D	D			C	C	J	P	
474	0.47 μF						X	X				D	D	D			J	J	J	P	
564	0.56 μF											D	D	D			J	J	J	P	
684	0.68 μF							X				D	D	D			J	J	J	P	
824	0.82 μF											D	D	D			J	J	J	P	
105	1 μF						X	X				D	D	D			J	J	J	P	
155	1.5 μF																J	J			
225	2.2 μF																J	J	P		
335	3.3 μF																P	P			
475	4.7 μF																P	P			
685	6.8 μF																				
106	10 μF																				

Notes:
 Letters indicate product thickness, see packaging quantities
 * Items are made by NME (Nobel Metal Electrode)
 + Not in 5 % (Code "J") tolerance

PACKAGING QUANTITIES						
SIZE (inch/mm)	THICKNESS (mm)	THICKNESS SYMBOL	PAPER TAPE		PLASTIC TAPE	
			7" reel (C)	13" reel (P)	7" reel (T)	13" reel (R)
0402 (1002)	0.50 ± 0.05	N	10K	50K		
0603 (1608)	0.80 ± 0.07	S	4K	15K		
	0.80 + 0.15/- 0.10	X	4K	15K		
0805 (2012)	0.60 ± 0.10	A	4K	15K		
	0.80 ± 0.10	B	4K	15K		
	1.25 ± 0.10	D			3K	10K
1206 (3216)	0.80 ± 0.10	B	4K	15K		
	0.95 ± 0.10	C			3K	10K
	1.15 ± 0.15	J			3K	10K
	1.25 ± 0.10	D			3K	10K
	1.60 ± 0.20	G			2K	
	1.60 ± 0.30/- 0.10	P			2K	

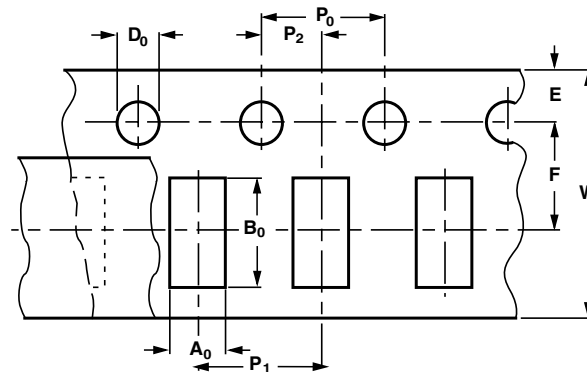
COVER TAPE (POLYESTER - ANTISTATIC)

PROPERTIES OF COVER TAPE	
PARAMETER	WIDTH
Breaking force	≥ 10.7 N
Elongation at break	≥ 63 %
Surface resistance	< 10 ¹⁰ Ω/sq.
Softening point	71 ± 5 °C
Thickness	62 μm

CARRIER TAPE (POLYCARBONATE)

PROPERTIES OF CARRIER TAPE	
PARAMETER	WIDTH
Thickness	190 to 280 μm
Tensile strength at break	> 60 N/mm ²
Elongation at break	100 to 150 %
Surface resistance	> 10 ¹² Ω/sq.

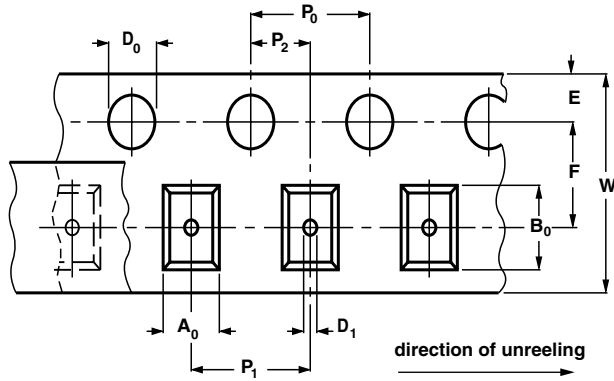
PAPER TAPE SPECIFICATIONS



DIMENSIONS OF PAPER TAPE in millimeters								
SYMBOL	PRODUCT SIZE CODE							
	0402		0603		0805		1206	
	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.
A ₀	0.62	± 0.05	1.02	± 0.05	1.50	± 0.10	2.00	± 0.10
B ₀	1.12	± 0.05	1.82	± 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



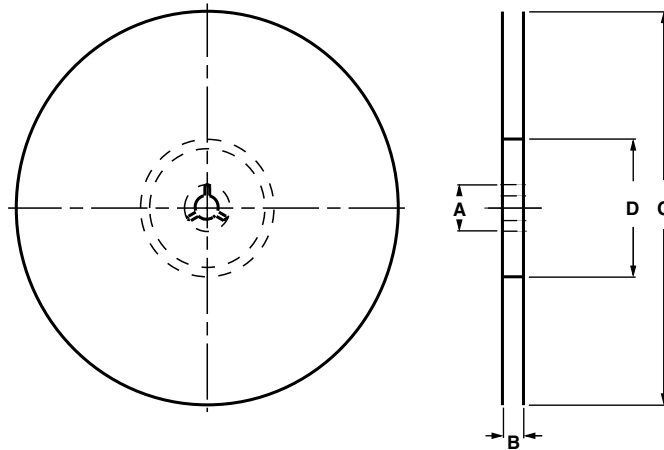
BLISTER TAPE SPECIFICATIONS



BLISTER TAPE SPECIFICATIONS

DIMENSIONS OF BLISTER TAPE in millimeters			
DIMENSION	PRODUCT		TOLERANCE
	0805	1206	
A ₀	< 1.57	< 2.00	-
B ₀	< 2.45	< 3.60	-
W	8.00	8.00	± 0.10
E	1.75	1.75	± 0.10
F	3.50	3.50	± 0.05
D ₀	1.50	1.50	± 0.05
D ₁	1.00	1.00	± 0.10
P ₀	4.00	4.00	± 0.10
P ₁	4.00	4.00	± 0.10
P ₂	2.00	2.00	± 0.05

REEL SPECIFICATIONS



REEL DIMENSIONS AND TAPE WIDTH in millimeters		
	Ø 180 mm; 7"	Ø 330 mm; 13"
A	13.0 ± 1.0	13.0 ± 0.5
B	9.0 ± 1.0	9.0 ± 1.0
C	178.0 ± 1.0	330.0 ± 1.0
D	60.5 ± 1.0	100.0 ± 1.0



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