

## Surface Mount Multilayer Ceramic Chip Capacitors for Commodity Applications



### FEATURES

- Class 3 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)



RoHS  
COMPLIANT

### APPLICATIONS

- Consumer electronics
- Telecommunications
- Data processing
- Mobile applications

### ELECTRICAL SPECIFICATIONS

Note: Electrical characteristics values - temperature at 20 °C, unless otherwise specified

**Operating Temperature:** - 25 °C to + 85 °C

**Capacitance Range:** 100 pF to 22 μF

**Voltage Rating:** 6.3 Vdc to 100 Vdc

**Temperature Coefficient of Capacitance (TCC):**

+ 30 %/- 80 % without voltage applied

**Dissipation Factor (DF):**

**6.3 V:** ≤ 20 %

**10 V:** ≤ 12.5 %

**16 V:** for Cap. < 1 μF ≤ 7.0 %

≤ 9 % for 0402 ≥ 0.068 μF; 0603 ≥ 0.68 μF

**16 V:** for Cap. ≥ 1.0 μF ≤ 9 %

≤ 12.5 % for 0805 ≥ 4.7 μF; 1206 ≥ 10 μF

**25 V:** ≤ 5 %

≤ 7 % for 0402 ≥ 0.047 pF; 0603 ≥ 0.1 μF; 0805 ≥ 0.33 μF; 1206 ≥ 1 μF

≤ 9 % for 0402 ≥ 0.068 μF; 0603 ≥ 0.47 μF; 1206 ≥ 4.7 μF

≥ 50 V: ≤ 5.0 %

≤ 7 % for 0603 ≥ 0.1 μF; 0805 ≥ 0.47 μF

**Aging Rate:**

6.3 V: 12.5 % maximum per decade

10 V/16 V: 9 % maximum per decade

≥ 25 V: 7 % maximum 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 (1005)	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 (1608)	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 (2012)	0.080 ± 0.008 [2.0 ± 0.20]	0.050 ± 0.008 [1.25 ± 0.20]	0.058 [1.45]	0.020 ± 0.008 [0.50 ± 0.20]
1206 (3216)	0.125 + 0.012/- 0.004 [3.2 + 0.30/- 0.10]	0.063 + 0.012/- 0.004 [1.6 + 0.30/- 0.10]	0.075 [1.90]	0.025 ± 0.008 [0.60 ± 0.20]

### ORDERING INFORMATION

VJ0402	V	103	M	X	Q	C	W1BC
SIZE CODE	DIELECTRIC	CAPACITANCE	TOLERANCE	TERMINATION	VOLTAGE	PACKAGING	PROCESS CODE FOR BASIC COMMODITY
0402 0603 0805 1206	V = Y5V	two significant digits followed by the number of zeros: 103 = 10 000 pF	M = ± 20 % Z = - 20/+ 80 %	X = Ni-Barrier	Y = 6.3 V 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	



# VJ...W1BC Y5V Dielectric

Surface Mount Multilayer Ceramic Chip Capacitors  
for Commodity Applications

Vishay

SELECTION CHART																					
DIELECTRIC		Y5V																			
EIA CAP.	EIA SIZE CAP.	0402					0603					0805					1206				
		6.3 V	10 V	16 V	25 V	50 V	100 V	10 V	16 V	25 V	50 V	100 V	10 V	16 V	25 V	50 V	100 V	10 V	16 V	25 V	50 V
102	1000 pF																				
122	1200 pF																				
152	1500 pF																				
182	1800 pF																				
222	2200 pF																				
272	2700 pF																				
332	3300 pF																				
392	3900 pF																				
472	4700 pF																				
562	5600 pF																				
682	6800 pF																				
822	8200 pF																				
103	0.01 μF		N	N	N	N		S	S	S	S		A	A	A	A	B	B	B	B	B
123	0.012 μF		N	N	N	N		S	S	S	S		A	A	A	A		B	B	B	B
153	0.015 μF		N	N	N	N		S	S	S	S		A	A	A	A	B	B	B	B	B
183	0.018 μF		N	N	N	N		S	S	S	S		A	A	A	A		B	B	B	B
223	0.022 μF		N	N	N	N		S	S	S	S		A	A	A	A	B	B	B	B	B
273	0.027 μF		N	N	N	N		S	S	S	S		A	A	A	A		B	B	B	B
333	0.033 μF		N	N	N	N		S	S	S	S		A	A	A	A	B	B	B	B	B
393	0.039 μF		N	N	N			S	S	S	S		A	A	A	A		B	B	B	B
473	0.047 μF		N	N	N			S	S	S	S		A	A	A	A	B	B	B	B	B
563	0.056 μF		N	N	N			S	S	S	S		A	A	A	A		B	B	B	B
683	0.068 μF		N	N	N			S	S	S	S		A	A	A	A	B	B	B	B	B
823	0.082 μF		N	N	N			S	S	S	S		A	A	A	A		B	B	B	B
104	0.1 μF	N	N	N	N			S	S	S	S		A	A	A	A	B	B	B	B	B
154	0.15 μF		N					S	S	S	S		A	A	A	A		B	B	B	C
224	0.22 μF		N					S	S	S			A	A	A	A		B	B	B	C
334	0.33 μF	N	N					S	S	S			B	B	B	B		B	B	B	
474	0.47 μF	N	N					S	S				B	B	B	B		B	B	B	
684	0.68 μF	N						S	X				B	B	D	D		B	B	B	
105	1 μF	N						S	X				B	B	D	D		C	C	C	
155	1.5 μF							S					D	D				C	C	C	
225	2.2 μF							S					D	D				C	C	C	J
335	3.3 μF												D	D				J	J	J	
475	4.7 μF												D	D				J	J	J	
685	6.8 μF												I					J	J		
106	10 μF												I					J	J		
226	22 μF																	P			
336	33 μF																				
476	47 μF																				
686	68 μF																				
107	100 μF																				

**Note:**  
Letters indicate product thickness, please see packaging quantities

PACKAGING						
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)	1.25 ± 0.20	I			3K	10K
	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	

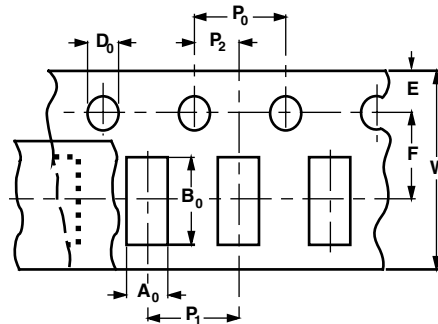
### COVER TAPE (POLYESTER - ANTISTATIC)

PROPERTIES OF COVER TAPE	
PARAMETER	WIDTH
Breaking force	≥ 10.7 N
Elongation at break	≥ 63 %
Surface resistance	< 10 <sup>10</sup> 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 <sup>2</sup>
Elongation at break	100 to 150 %
Surface resistance	> 10 <sup>12</sup> Ω /sq.

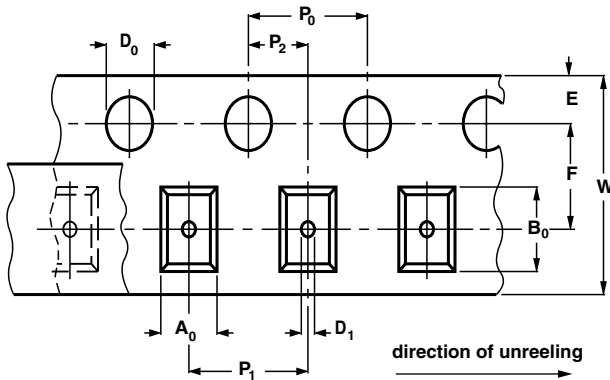
### PAPER TAPE SPECIFICATIONS



DIMENSIONS OF PAPER TAPE in millimeters								
SYMBOL	PRODUCT SIZE CODE							
	0402		0603		0805		1206	
	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.	SIZE	TOL.
A <sub>0</sub>	0.62	± 0.05	1.02	± 0.05	1.50	± 0.10	2.00	± 0.10
B <sub>0</sub>	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 <sub>0</sub>	1.55	± 0.05	1.55	± 0.05	1.55	± 0.05	1.50	± 0.05
P <sub>0</sub>	4.00	± 0.10	4.00	± 0.10	4.00	± 0.10	4.00	± 0.10
P <sub>1</sub>	2.00	± 0.05	4.00	± 0.10	4.00	± 0.10	4.00	± 0.10
P <sub>2</sub>	2.00	± 0.05	2.00	± 0.05	2.00	± 0.05	2.00	± 0.05

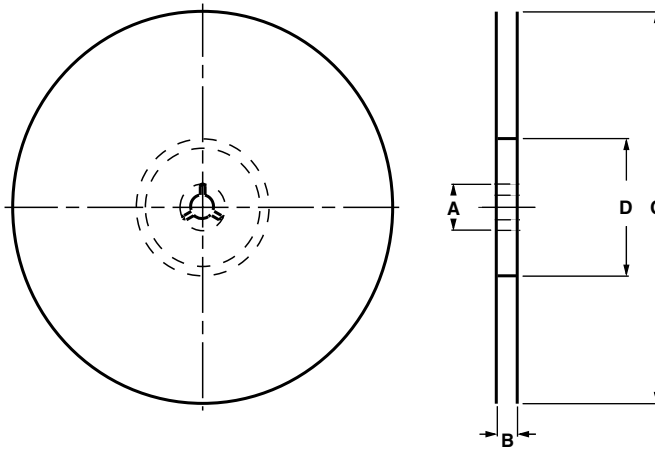


**BLISTER TAPE SPECIFICATIONS**



<b>DIMENSIONS OF BLISTER TAPE</b> in millimeters			
DIMENSION	PRODUCT		TOLERANCE
	0805	1206	
A <sub>0</sub>	< 1.57	< 2.00	-
B <sub>0</sub>	< 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 <sub>0</sub>	1.50	1.50	± 0.05
D <sub>1</sub>	1.00	1.00	± 0.10
P <sub>0</sub>	4.00	4.00	± 0.10
P <sub>1</sub>	4.00	4.00	± 0.10
P <sub>2</sub>	2.00	2.00	± 0.05

**REEL SPECIFICATIONS**



<b>REEL DIMENSIONS AND TAPE WIDTH</b> 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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