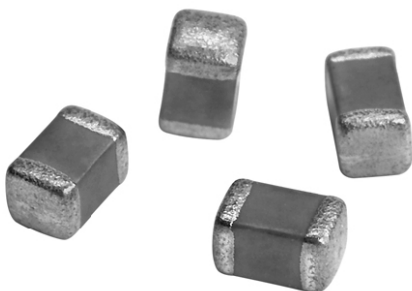


## Surface Mount Multilayer Ceramic Chip Capacitors for Commodity Applications



### FEATURES

- Class 2 dielectric
- Four standard sizes
- High capacitance per unit volume
- Supplied in tape and reel
- 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
- Mobile application
- Data processing

### ELECTRICAL SPECIFICATION

**Note:** Electrical characteristics values - temperature at 25 °C, unless otherwise specified

**Operating Temperature:** - 55 °C to + 85 °C

**Capacitance Range:** 47 nF to 22 μF

**Voltage Rating:** 6.3 Vdc to 25 Vdc

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

± 15 % without voltage applied

**Dissipation Factor (DF):**

**6.3 V:** ≤ 10 %

≤ 15 % for 0805 ≥ 10 μF

**10 V:** ≤ 5 %

≤ 10 % for 0603 ≥ 0.33 μF; 0805 ≥ 2.2 μF; 1206 ≥ 2.2 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 0603 ≥ 0.68 μF; 0805 ≥ 2.2 μF; 1206 ≥ 6.8 μF

**25 V:** ≤ 3.5 %

≤ 5 % for 0805 ≥ 1 μF

≤ 7 % for 0603 ≥ 0.33 μF; 0805 ≥ 2.2 μF; 1206 ≥ 4.7 μF

≤ 10 % for 0402 ≥ 0.10 μF; 0603 ≥ 0.68 μF; 0805 ≥ 4.7 μF;

1206 ≥ 6.8 μF

**Aging Rate:**

6.3 V/10 V: 3 % maximum per decade

16 V/25 V: 2 % 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 ≤ 25 Vdc: DWV at 250 % 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	G	104	K	X	Q	C	W1BC
SIZE CODE	DIELECTRIC	CAPACITANCE	TOLERANCE	TERMINATION	VOLTAGE	PACKAGING	PROCESS CODE FOR BASIC COMMODITY
0402 0603 0805 1206	G = X5R	two significant digits followed by the number of zeros: 104 = 100 000 pF	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 P = 13" reel/paper T = 7" reel/blister R = 13" reel/blister	



# VJ...W1BC X5R Dielectric

Surface Mount Multilayer Ceramic Chip Capacitors  
for Commodity Applications

Vishay

SELECTION CHART																					
DIELECTRIC		X5R																			
EIA CAP. CODE	EIA SIZE	0402					0603					0805					1206				
	CAP.	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
473	0.047 μF			N																	
563	0.056 μF		N																		
683	0.068 μF		N																		
823	0.082 μF		N																		
104	0.1 μF		N	N																	
124	0.12 μF																				
154	0.15 μF																				
184	0.18 μF																				
224	0.22 μF	N																			
274	0.27 μF							X													
334	0.33 μF	N						X	X												
394	0.39 μF							X													
474	0.47 μF	N					X	X	X												
564	0.56 μF																				
684	0.68 μF						X	X													
824	0.82 μF						X														
105	1 μF	N					X	X	X	X											
225	2.2 μF						X					I	I	I	I				J	J	
335	3.3 μF											I	I		I			P	P		
475	4.7 μF											I	I	I	I		P	P	P	P	
685	6.8 μF																P	P			
106	10 μF											I					P	P	P	P	
226	22 μF																P				
336	33 μF																				
476	47 μF																				
686	68 μF																				
107	100 μF																				

**Note:**

Letters indicate product thickness, see packaging quantities

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
	1.25 ± 0.20	I			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	

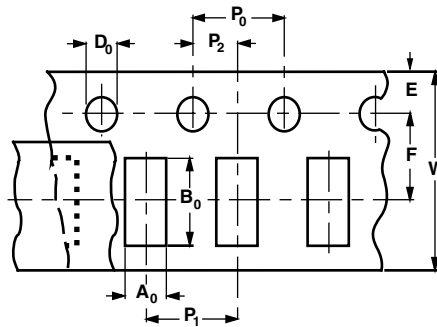
### COVER TAPE (POLYESTER - ANTISTATIC)

PROPERTIES OF COVER TAPE	
PARAMETER	WIDTH
Breaking force	≥ 10.7 N
Elongation at break	≥ 63 %
Surface resistance	< 10 <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.

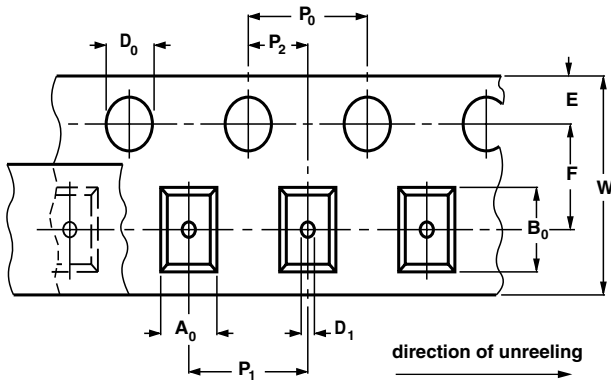
### PAPER TAPE SPECIFICATIONS



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



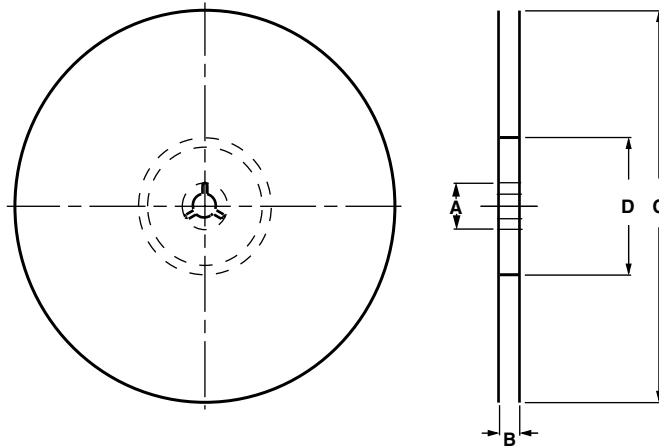
**BLISTER TAPE SPECIFICATIONS**



**BLISTER TAPE SPECIFICATIONS**

DIMENSIONS OF BLISTER TAPE 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**



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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