

Surface Mount Multilayer Chip Capacitors for Commodity Solutions

Below tables are test procedures and requirements unless specified in detail datasheet

VJ....W1BC TEST PROCEDURES AND REQUIREMENTS																																																																					
TEST	PROCEDURE	REQUIREMENTS																																																																			
1) Visual and mechanical		<ul style="list-style-type: none"> No remarkable defect Dimensions should confirm to individual specification sheet 																																																																			
2) Capacitance		<ul style="list-style-type: none"> Shall not exceed the limits given in the detailed specification <p>C0G (NP0): Cap. ≥ 30 pF: Q ≥ 1000 Cap. < 30 pF: Q ≥ 400 °C + 20 C</p> <p>X7R, X5R:</p> <table border="1"> <thead> <tr> <th>RATED VOLTAGE</th> <th>DF</th> <th colspan="2">EXCEPTION OF DF</th> </tr> </thead> <tbody> <tr> <td>≥ 50 V</td> <td>≤ 2.5 %</td> <td>≤ 3 %</td> <td>0603 ≥ 0.047 μF, 0805 ≥ 0.18 μF, 1206 ≥ 0.47 μF</td> </tr> <tr> <td rowspan="3">25 V</td> <td rowspan="3">≤ 3.5 %</td> <td>≤ 5 %</td> <td>0805 ≥ 1 μF, 1210 ≥ 10 μF</td> </tr> <tr> <td>≤ 7 %</td> <td>0603 ≥ 0.33 μF, 1206 ≥ 4.7 μF</td> </tr> <tr> <td>≤ 10 %</td> <td>0402 ≥ 0.10 μF, 0603 ≥ 0.47 μF, 0805 ≥ 2.2 μF, 1206 ≥ 6.8 μF</td> </tr> <tr> <td rowspan="2">16 V</td> <td rowspan="2">≤ 3.5 %</td> <td>≤ 5 %</td> <td>0402 ≥ 0.033 μF, 0603 ≥ 0.15 μF, 0805 ≥ 0.68 μF, 1206 ≥ 2.2 μF, 1210 ≥ 4.7 μF</td> </tr> <tr> <td>≤ 10 %</td> <td>0603 ≥ 0.68 μF, 0805 ≥ 2.2 μF, 1206 ≥ 4.7 μF, 1210 ≥ 22 μF</td> </tr> <tr> <td rowspan="2">10 V</td> <td rowspan="2">≤ 5.0 %</td> <td>≤ 10 %</td> <td>0402 ≥ 0.33 μF, 0603 ≥ 0.33 μF, 0805 ≥ 2.2 μF, 1206 ≥ 2.2 μF, 1210 ≥ 22 μF</td> </tr> <tr> <td>≤ 15 %</td> <td>0201 ≥ 0.1 μF, 0402 ≥ 1 μF</td> </tr> <tr> <td rowspan="2">6.3 V</td> <td rowspan="2">≤ 10 %</td> <td>≤ 15 %</td> <td>0603 ≥ 10 μF, 0805 ≥ 4.7 μF, 1210 ≥ 100 μF</td> </tr> <tr> <td>≤ 20 %</td> <td>0402 ≥ 2.2 μF</td> </tr> </tbody> </table> <p>Y5V:</p> <table border="1"> <thead> <tr> <th>RATED VOLTAGE</th> <th>DF</th> <th colspan="2">EXCEPTION OF DF</th> </tr> </thead> <tbody> <tr> <td>≥ 50 V</td> <td>≤ 5.0 %</td> <td>≤ 7 %</td> <td>0603 ≥ 0.1 μF, 0805 ≥ 0.47 μF, 1206 ≥ 4.7 μF</td> </tr> <tr> <td rowspan="2">25 V</td> <td rowspan="2">≤ 5.0 %</td> <td>≤ 7 %</td> <td>0402 ≥ 0.047 μF, 0603 ≥ 0.1 μF, 0805 ≥ 0.33 μF, 1206 ≥ 1 μF, 1210 μF ≥ 4.7 μF</td> </tr> <tr> <td>≤ 9 %</td> <td>0402 ≥ 0.068 μF, 0603 ≥ 0.47 μF, 1206 ≥ 4.7 μF, 1210 ≥ 22 μF</td> </tr> <tr> <td rowspan="2">16 V (C < 1.0 μF)</td> <td rowspan="2">≤ 7.0 %</td> <td>≤ 9 %</td> <td>0402 ≥ 0.068 μF, 0603 ≥ 0.68 μF</td> </tr> <tr> <td>≤ 12.5 %</td> <td>0402 ≥ 0.22 μF</td> </tr> <tr> <td>16 V (C ≥ 1 μF)</td> <td>≤ 9.0 %</td> <td>≤ 12.5 %</td> <td>0603 ≥ 2.2 μF, 0805 ≥ 3.3 μF, 1206 ≥ 10 μF, 1210 μF ≥ 22 μF, 1812 ≥ 47 μF</td> </tr> <tr> <td>10 V</td> <td>≤ 12.5 %</td> <td>≤ 20 %</td> <td>0402 ≥ 0.47 μF</td> </tr> <tr> <td>6.3 V</td> <td>≤ 20 %</td> <td>-</td> <td>-</td> </tr> </tbody> </table>		RATED VOLTAGE	DF	EXCEPTION OF DF		≥ 50 V	≤ 2.5 %	≤ 3 %	0603 ≥ 0.047 μ F, 0805 ≥ 0.18 μ F, 1206 ≥ 0.47 μ F	25 V	≤ 3.5 %	≤ 5 %	0805 ≥ 1 μ F, 1210 ≥ 10 μ F	≤ 7 %	0603 ≥ 0.33 μ F, 1206 ≥ 4.7 μ F	≤ 10 %	0402 ≥ 0.10 μ F, 0603 ≥ 0.47 μ F, 0805 ≥ 2.2 μ F, 1206 ≥ 6.8 μ F	16 V	≤ 3.5 %	≤ 5 %	0402 ≥ 0.033 μ F, 0603 ≥ 0.15 μ F, 0805 ≥ 0.68 μ F, 1206 ≥ 2.2 μ F, 1210 ≥ 4.7 μ F	≤ 10 %	0603 ≥ 0.68 μ F, 0805 ≥ 2.2 μ F, 1206 ≥ 4.7 μ F, 1210 ≥ 22 μ F	10 V	≤ 5.0 %	≤ 10 %	0402 ≥ 0.33 μ F, 0603 ≥ 0.33 μ F, 0805 ≥ 2.2 μ F, 1206 ≥ 2.2 μ F, 1210 ≥ 22 μ F	≤ 15 %	0201 ≥ 0.1 μ F, 0402 ≥ 1 μ F	6.3 V	≤ 10 %	≤ 15 %	0603 ≥ 10 μ F, 0805 ≥ 4.7 μ F, 1210 ≥ 100 μ F	≤ 20 %	0402 ≥ 2.2 μ F	RATED VOLTAGE	DF	EXCEPTION OF DF		≥ 50 V	≤ 5.0 %	≤ 7 %	0603 ≥ 0.1 μ F, 0805 ≥ 0.47 μ F, 1206 ≥ 4.7 μ F	25 V	≤ 5.0 %	≤ 7 %	0402 ≥ 0.047 μ F, 0603 ≥ 0.1 μ F, 0805 ≥ 0.33 μ F, 1206 ≥ 1 μ F, 1210 μ F ≥ 4.7 μ F	≤ 9 %	0402 ≥ 0.068 μ F, 0603 ≥ 0.47 μ F, 1206 ≥ 4.7 μ F, 1210 ≥ 22 μ F	16 V (C < 1.0 μ F)	≤ 7.0 %	≤ 9 %	0402 ≥ 0.068 μ F, 0603 ≥ 0.68 μ F	≤ 12.5 %	0402 ≥ 0.22 μ F	16 V (C ≥ 1 μ F)	≤ 9.0 %	≤ 12.5 %	0603 ≥ 2.2 μ F, 0805 ≥ 3.3 μ F, 1206 ≥ 10 μ F, 1210 μ F ≥ 22 μ F, 1812 ≥ 47 μ F	10 V	≤ 12.5 %	≤ 20 %	0402 ≥ 0.47 μ F	6.3 V	≤ 20 %	-	-
RATED VOLTAGE	DF	EXCEPTION OF DF																																																																			
≥ 50 V	≤ 2.5 %	≤ 3 %	0603 ≥ 0.047 μ F, 0805 ≥ 0.18 μ F, 1206 ≥ 0.47 μ F																																																																		
25 V	≤ 3.5 %	≤ 5 %	0805 ≥ 1 μ F, 1210 ≥ 10 μ F																																																																		
		≤ 7 %	0603 ≥ 0.33 μ F, 1206 ≥ 4.7 μ F																																																																		
		≤ 10 %	0402 ≥ 0.10 μ F, 0603 ≥ 0.47 μ F, 0805 ≥ 2.2 μ F, 1206 ≥ 6.8 μ F																																																																		
16 V	≤ 3.5 %	≤ 5 %	0402 ≥ 0.033 μ F, 0603 ≥ 0.15 μ F, 0805 ≥ 0.68 μ F, 1206 ≥ 2.2 μ F, 1210 ≥ 4.7 μ F																																																																		
		≤ 10 %	0603 ≥ 0.68 μ F, 0805 ≥ 2.2 μ F, 1206 ≥ 4.7 μ F, 1210 ≥ 22 μ F																																																																		
10 V	≤ 5.0 %	≤ 10 %	0402 ≥ 0.33 μ F, 0603 ≥ 0.33 μ F, 0805 ≥ 2.2 μ F, 1206 ≥ 2.2 μ F, 1210 ≥ 22 μ F																																																																		
		≤ 15 %	0201 ≥ 0.1 μ F, 0402 ≥ 1 μ F																																																																		
6.3 V	≤ 10 %	≤ 15 %	0603 ≥ 10 μ F, 0805 ≥ 4.7 μ F, 1210 ≥ 100 μ F																																																																		
		≤ 20 %	0402 ≥ 2.2 μ F																																																																		
RATED VOLTAGE	DF	EXCEPTION OF DF																																																																			
≥ 50 V	≤ 5.0 %	≤ 7 %	0603 ≥ 0.1 μ F, 0805 ≥ 0.47 μ F, 1206 ≥ 4.7 μ F																																																																		
25 V	≤ 5.0 %	≤ 7 %	0402 ≥ 0.047 μ F, 0603 ≥ 0.1 μ F, 0805 ≥ 0.33 μ F, 1206 ≥ 1 μ F, 1210 μ F ≥ 4.7 μ F																																																																		
		≤ 9 %	0402 ≥ 0.068 μ F, 0603 ≥ 0.47 μ F, 1206 ≥ 4.7 μ F, 1210 ≥ 22 μ F																																																																		
16 V (C < 1.0 μ F)	≤ 7.0 %	≤ 9 %	0402 ≥ 0.068 μ F, 0603 ≥ 0.68 μ F																																																																		
		≤ 12.5 %	0402 ≥ 0.22 μ F																																																																		
16 V (C ≥ 1 μ F)	≤ 9.0 %	≤ 12.5 %	0603 ≥ 2.2 μ F, 0805 ≥ 3.3 μ F, 1206 ≥ 10 μ F, 1210 μ F ≥ 22 μ F, 1812 ≥ 47 μ F																																																																		
10 V	≤ 12.5 %	≤ 20 %	0402 ≥ 0.47 μ F																																																																		
6.3 V	≤ 20 %	-	-																																																																		
3) Q/DF (dissipation factor)	<p>Class 1: C0G (NP0) Cap. ≤ 1000 pF; $1.0 V_{RMS} \pm 0.2 V_{RMS}$; 1 MHz ± 10 % Cap. > 1000 pF; $1.0 V_{RMS} \pm 0.2 V_{RMS}$; 1 kHz ± 10 %</p> <p>Class 2: X7R, X5R, Y5V Cap. ≤ 10 μF; $1.0 V_{RMS} \pm 0.2 V_{RMS}$; 1 kHz ± 10 %</p> <p>Cap. > 10 μF; $0.5 V_{RMS} \pm 0.2 V_{RMS}$; 120 Hz ± 20 %</p>																																																																				

VJ....W1BC Test Procedures and Requirements



Vishay

Surface Mount Multilayer Chip Capacitors
for Commodity Solutions

VJ....W1BC TEST PROCEDURES AND REQUIREMENTS					
TEST	PROCEDURE		REQUIREMENTS		
4) Dielectric strength	<ul style="list-style-type: none"> To apply voltage (≤ 100 V) 250 % Duration: 1 s to 5 s Charge and discharge current less than 50 mA 		<ul style="list-style-type: none"> No evidence of damage or flash-over during test 		
	<ul style="list-style-type: none"> To apply voltage 200 V to 300 V ≥ 2 times V_{DC} 500 V to 999 V ≥ 1.5 times V_{DC} 1000 V to 3000 V ≥ 1.2 times V_{DC} Cut-off, set at 10 mA TEST = 15 s RAMP = 0 				
5) Insulation resistance	Rated voltage ≤ 100 V: To apply rated voltage for max. 120 s		≥ 10 G Ω or $R \times C \geq 500$ Ω F whichever is smaller		
			Class 2 (X7R, X5R, Y5V):		
			RATED VOLTAGE	INSULATION RESISTANCE	
			100 V: X7R	R x C ≥ 100 Ω F	
			16 V: 0402 ≥ 0.22 μ F		
		10 V: 0201 ≥ 47 nF, 0402 ≥ 0.47 μ F, 0603 ≥ 0.47 μ F, 0805 ≥ 2.2 μ F, 1206 ≥ 4.7 μ F, 1210 ≥ 47 μ F			
		6.3 V			
	Rated voltage: 200 V to 500 V	To apply rated voltage (500 V max.) for 60 s	≥ 10 G Ω or $R \times C > 100$ Ω F whichever is smaller		
	Rated voltage: ≥ 630 V	To apply 500 V for 60 s	≥ 10 G Ω		
6) Temperature coefficient	With no electrical load:				
	T.C.	Operating Temp.	T.C.	Capacitance change	
	C0G (NP0)	- 55 °C to 125 °C at 25 °C	C0G (NP0)	Within ± 30 ppm/°C	
	X7R	- 55 °C to 125 °C at 25 °C	X7R	Within ± 15 %	
	X5R	- 55 °C to 85 °C at 25 °C	X5R	Within ± 15 %	
Y5V	- 25 °C to 85 °C at 20 °C	Y5V	Within + 30 %/- 80 %		
7) Adhesive strength of termination	<ul style="list-style-type: none"> Pressurizing force: 0201: 2N 0402 and 0603: 5 N > 0603: 10 N Test time 10 s ± 1 s 		<ul style="list-style-type: none"> No remarkable damage or removal of the terminations 		
8) Vibration resistance	<ul style="list-style-type: none"> Vibration frequency: 10 Hz/min to 55 Hz/min Total amplitude: 1.5 mm Test time: 6 h (2 h each in 3 mutually perpendicular directions) 		<ul style="list-style-type: none"> No remarkable damage Capacitance change and Q/DF: to meet initial specification 		
9) Solderability	<ul style="list-style-type: none"> Solder temperature: 235 °C ± 5 °C Dipping time: 2 s ± 0.5 s 		95 % minimum coverage of all metallized area		



VJ....W1BC Test Procedures and Requirements

Surface Mount Multilayer Chip Capacitors
for Commodity Solutions

Vishay

VJ....W1BC TEST PROCEDURES AND REQUIREMENTS				
TEST	PROCEDURE			REQUIREMENTS
10) Bending test	<ul style="list-style-type: none"> The middle part of the substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per s until the deflection becomes 1 mm and then the pressure shall be maintained for $5 \text{ s} \pm 1 \text{ s}$ Measurement to be made after keeping at room temperature for $24 \text{ h} \pm 2 \text{ h}$ (class 1) or $48 \text{ h} \pm 4 \text{ h}$ (class 2) 			<ul style="list-style-type: none"> No remarkable damage Capacitance change: C0G (NP0): within $\pm 5.0 \%$ or $\pm 0.5 \text{ pF}$ whichever is larger X7R, X5R: within $\pm 12.5 \%$ Y5V: within $\pm 30 \%$ <p>(This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test)</p>
11) Resistance to soldering heat	<ul style="list-style-type: none"> Solder temperature: $270 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$ Dipping time: $10 \text{ s} \pm 1 \text{ s}$ Preheating: $120 \text{ }^\circ\text{C}$ to $150 \text{ }^\circ\text{C}$ for 1 min before immerse the capacitor in a eutectic solder Before initial measurement (class 2 only): Perform $150 \text{ }^\circ\text{C} + 0 \text{ }^\circ\text{C}/ - 10 \text{ }^\circ\text{C}$ for 1 h and then set for $48 \text{ h} \pm 4 \text{ h}$ at room temperature Measurement to be made after keeping at room temperature for $24 \text{ h} \pm 2 \text{ h}$ (class 1) or $48 \text{ h} \pm 4 \text{ h}$ (class 2) 			<ul style="list-style-type: none"> No remarkable damage Capacitance change: C0G (NP0): within $\pm 2.5 \%$ or $\pm 0.25 \text{ pF}$ whichever is larger X7R, X5R: within $\pm 7.5 \%$ Y5V: within $\pm 20 \%$ Q/DF, I.R. and dielectric strength: To meet initial requirements 25 % maximum leaching on each edge
12) Temperature cycle	<ul style="list-style-type: none"> Conduct the 5 cycles according to the temperature and time 			<ul style="list-style-type: none"> No remarkable damage Capacitance change: C0G (NP0): within $\pm 2.5 \%$ or $\pm 0.25 \text{ pF}$ whichever is larger X7R, X5R: within $\pm 7.5 \%$ Y5V: within $\pm 20 \%$ Q/DF, I.R. and dielectric strength: To meet initial requirements
	Step	Temperature ($^\circ\text{C}$)	Time (min.)	
	1	Min. operating temp. + 0/- 3	30 ± 3	
	2	Room temperature	2 ~ 3	
	3	Max. operating temp. + 3/- 0	30 ± 3	
	4	Room temperature	2 ~ 3	
<ul style="list-style-type: none"> Before initial measurement (class 2 only): Perform $150 \text{ }^\circ\text{C} + 0 \text{ }^\circ\text{C}/ - 10 \text{ }^\circ\text{C}$ for 1 h and then set for $48 \text{ h} \pm 4 \text{ h}$ at room temperature Measurement to be made after keeping at room temperature for $24 \text{ h} \pm 2 \text{ h}$ (class 1) or $48 \text{ h} \pm 4 \text{ h}$ (class 2) 				

VJ....W1BC Test Procedures and Requirements



Vishay

Surface Mount Multilayer Chip Capacitors
for Commodity Solutions

VJ....W1BC TEST PROCEDURES AND REQUIREMENTS					
TEST	PROCEDURE	REQUIREMENTS			
13) Humidity (damp heat) steady state	<ul style="list-style-type: none"> • Test temperature: 40 °C ± 2 °C • Humidity: 90 % to 95 % RH • Test time: 500 h + 24 h/- 0 h • Measurement to be made after keeping at room temperature for 24 h ± 2 h (class 1) or 48 ± 4 h (class 2) 	<ul style="list-style-type: none"> • No remarkable damage • Capacitance change: C0G (NP0): within ± 5.0 % or ± 0.5 pF whichever is larger X7R, X5R: ≥ 10 V within ± 12.5 %; 6.3 V, within ± 25 % Y5V: ≥ 10 V within ± 30 %, 6.3 V within + 30 %/- 40 % • Q/DF value: C0G (NP0): more than 30 pF: Q ≥ 350 10 pF ≤ C ≤ 30 pF: Q ≥ 275 + 2.5 C; Less than 10 pF: Q ≥ 200 + 10 C 			
		X7R, X5R:			
		RATED VOLTAGE	DF	EXCEPTION OF DF	
		≥ 50 V	≤ 3.0 %	≤ 6 %	0603 ≥ 0.047 μF, 0805 ≥ 0.18 μF, 1206 ≥ 0.47 μF
		25 V	≤ 5.0 %	≤ 10 %	0805 ≥ 1 μF, 1210 ≥ 10 μF
				≤ 14 %	0603 ≥ 0.33 μF, 1206 ≥ 4.7 μF
				≤ 15 %	0402 ≥ 0.10 μF, 0603 ≥ 0.47 μF, 0805 ≥ 2.2 μF, 1206 ≥ 6.8 μF
		16 V	≤ 5.0 %	≤ 10 %	0603 ≥ 0.15 μF, 0805 ≥ 0.68 μF, 1206 ≥ 2.2 μF, 1210 ≥ 4.7 μF
				≤ 15 %	0402 ≥ 0.033 μF, 0603 ≥ 0.68 μF, 0805 ≥ 2.2 μF, 1206 ≥ 4.7 μF, 1210 ≥ 22 μF
		10 V	≤ 7.5 %	≤ 15 %	0402 ≥ 0.33 μF, 0603 ≥ 0.33 μF, 0805 ≥ 2.2 μF, 1206 ≥ 2.2 μF, 1210 ≥ 22 μF
				≤ 20 %	0201 ≥ 0.1 μF, 0402 ≥ 1 μF
		6.3 V	≤ 15 %	≤ 30 %	0402 ≥ 2.2 μF, 0603 ≥ 10 μF, 0805 ≥ 4.7 μF, 1210 ≥ 100 μF
		Y5V:			
		RATED VOLTAGE	DF	EXCEPTION OF DF	
		≥ 50 V	≤ 7.5 %	≤ 10 %	0603 ≥ 0.1 μF, 0805 ≥ 0.47 μF, 1206 ≥ 4.7 μF
		25 V	≤ 7.5 %	≤ 10 %	0402 ≥ 0.047 μF, 0603 ≥ 0.1 μF, 0805 ≥ 0.33 μF, 1206 ≥ 1 μF, 1210 ≥ 4.7 μF
				≤ 15 %	0402 ≥ 0.068 μF, 0603 ≥ 0.47 μF, 1206 ≥ 4.7 μF, 1210 ≥ 22 μF
		16 V (C < 1.0 μF)	≤ 10 %	≤ 12.5 %	0402 ≥ 0.068 μF, 0603 ≥ 0.68 μF
				≤ 20 %	0402 ≥ 0.22 μF
		16 V (C ≥ 1.0 μF)	≤ 12.5 %	≤ 20 %	0603 ≥ 2.2 μF, 0805 ≥ 3.3 μF, 1206 ≥ 10 μF, 1210 ≥ 22 μF, 1812 > 47 μF
10 V	≤ 20 %	≤ 30 %	0402 ≥ 0.47 μF		
≤ 6.3 V	≤ 30 %	-	-		
		<ul style="list-style-type: none"> • I.R.: ≥ 10 V: 1 GΩ or R x C ≥ 50 ΩF whichever is smaller 			
CLASS 2 (X7R, X5R, Y5V):					
RATED VOLTAGE		INSULATION RESISTANCE			
100 V: X7R		R x C ≥ 10 ΩF			
16 V: 0402 ≥ 0.22 μF					
10 V: 0201 ≥ 47 nF, 0402 ≥ 0.47 μF, 0603 ≥ 0.47 μF, 0805 ≥ 2.2 μF, 1206 ≥ 4.7 μF, 1210 ≥ 47 μF					
6.3 V:					



VJ....W1BC Test Procedures and Requirements

Surface Mount Multilayer Chip Capacitors
for Commodity Solutions

Vishay

VJ....W1BC TEST PROCEDURES AND REQUIREMENTS					
TEST	PROCEDURE	REQUIREMENTS			
14) Humidity (damp heat) load	<ul style="list-style-type: none"> • Test temperature: 40 °C ± 2 °C • Humidity: 90 % ~ 95 % RH • Test time: 500 h + 24 h/- 0 h • To apply voltage: rated voltage (max. 500 V) • Measurement to be made after keeping at room temperature for 24 h ± 2 h (class 1) or 48 h ± 4 h (class 2) 	<ul style="list-style-type: none"> • No remarkable damage • Capacitance change: C0G (NP0): within ± 7.5 % or ± 0.75 pF whichever is larger. X7R, X5R: ≥ 10 V within ± 12.5 %; 6.3 V, with ± 25 % Y5V: ≥ 10 V within ± 30 %; 6.3 V, within + 30 %/- 40 % • Q/DF value: C0G (NP0) Cap ≥ 30 pF: Q ≥ 200; Cap < 30 pF: Q ≥ 100 + 10/3 C 			
		X7R, X5R:			
		RATED VOLTAGE	DF	EXCEPTION OF DF	
		≥ 50 V	≤ 3.0 %	≤ 6 %	0603 ≥ 0.047 μF, 0805 ≥ 0.18 μF, 1206 ≥ 0.47 μF
		25 V	≤ 5.0 %	≤ 10 %	0805 ≥ 1 μF; 1210 ≥ 10 μF
				≤ 14 %	0603 ≥ 0.33 μF, 1206 ≥ 4.5 μF
				≤ 15 %	0402 ≥ 0.10 μF, 0603 ≥ 0.47 μF, 0805 ≥ 2.2 μF, 1206 ≥ 6.8 μF
		16 V	≤ 5.0 %	≤ 10 %	0603 ≥ 0.15 μF, 0805 ≥ 0.68 μF, 1206 ≥ 2.2 μF, 1210 ≥ 4.7 μF
				≤ 15 %	0402 ≥ 0.033 μF, 0603 ≥ 0.68 μF, 0805 ≥ 2.2 μF, 1206 ≥ 4.7 μF, 1210 ≥ 22 μF
		10 V	≤ 7.5 %	≤ 15 %	0402 ≥ 0.033 μF, 0603 ≥ 0.33 μF, 0805 ≥ 2.2 μF, 1206 ≥ 2.2 μF, 1210 ≥ 22 μF
				≤ 20 %	0201 ≥ 0.1 μF, 0402 ≥ 1 μF
		6.3 V	≤ 15 %	≤ 30 %	0402 ≥ 2.2 μF, 0603 ≥ 10 μF, 0805 ≥ 4.7 μF, 1210 ≥ 100 μF
		Y5V:			
		RATED VOLTAGE	DF	EXCEPTION OF DF	
		≥ 50 V	≤ 7.5 %	≤ 10 %	0603 ≥ 0.1 μF, 0805 ≥ 0.47 μF, 1206 ≥ 4.7 μF
		25 V	≤ 7.5 %	≤ 10 %	0402 ≥ 4.7 μF, 0603 ≥ 0.1 μF, 0805 ≥ 0.33 μF, 1206 ≥ 1.0 μF, 1210 ≥ 4.7 μF
				≤ 15 %	0402 ≥ 0.068 μF, 0603 ≥ 0.47 μF, 1206 ≥ 4.7 μF, 1210 ≥ 2.2 μF
		16 V (C < 1.0 μF)	≤ 10 %	≤ 12.5 %	0402 ≥ 0.068 μF, 0603 ≥ 0.68 μF
				≤ 20 %	0402 ≥ 0.22 μF
		16 V (C ≥ 1 μF)	≤ 12.5 %	≤ 20 %	0603 ≥ 2.2 μF, 0805 ≥ 3.3 μF, 1206 ≥ 10 μF, 1210 ≥ 22 μF, 1812 ≥ 47 μF
		10 V	≤ 15 %	-	0402 ≥ 0.47 μF
		6.3 V	≤ 30 %	-	-
		<ul style="list-style-type: none"> • I.R.: ≥ 10 V: 500 MΩ or 25 ΩF whichever is smaller 			
CLASS 2 (X7R, X5R, Y5V):					
RATED VOLTAGE		INSULATION RESISTANCE			
100 V: X7R		R x C ≥ 5 ΩF			
16 V: 0402 ≥ 0.22 μF					
10 V: 0201 ≥ 47 nF, 0402 ≥ 0.47 μF, 0603 ≥ 0.47 μF, 0805 ≥ 2.2 μF, 1206 > 4.7 μF, 1210 > 47 μF					
6.3 V:					

VJ....W1BC Test Procedures and Requirements



Vishay

Surface Mount Multilayer Chip Capacitors
for Commodity Solutions

VJ....W1BC TEST PROCEDURES AND REQUIREMENTS								
TEST	PROCEDURE				REQUIREMENTS			
15) High temp. load (endurance)	<ul style="list-style-type: none"> Test temperature: C0G (NP0), X7R/X7E: 125 °C ± 3 °C X5R, Y5V: 85 °C ± 3 °C To apply voltage: (1.1) 100 % of rated voltage for below range 				<ul style="list-style-type: none"> No remarkable damage Capacitance change: C0G (NP0): ± 3.0 % or ± 0.3 pF whichever is larger. X7R, X5R: ≥ 10 V within ± 12.5 %; 6.3 V, with ± 25 % Y5V: ≥ 10 V within ± 30 %; 6.3 V, within ± 30 % to - 40 % Q/DF value: C0G (NP0): More than 30 pF, Q ≥ 350 10 pF ≤ C < 30 pF: Q ≥ 275 C + 2.5 C; Less than 10 pF: Q ≥ 200 C + 10 C 			
	SIZE	DIELECTRIC	RATED VOLTAGE	CAP. RANGE	RATED VOLTAGE	DF	EXCEPTION OF DF	
	0201	X5R	6.3 V, 10 V	C ≥ 0.1 μF	≥ 50 V	≤ 3.0 %	≤ 6 %	0603 ≥ 0.047 μF, 0805 ≥ 0.18 μF, 1206 ≥ 0.47 μF
	0402	X5R, Y5V		C ≥ 1.0 μF	25 V	≤ 5.0 %	≤ 10 %	0805 ≥ 1 μF, 1210 ≥ 10 μF
	0603	X5R		C ≥ 4.7 μF			≤ 14 %	0603 ≥ 0.33 μF, 1206 ≥ 4.7 μF
	0805	X5R	6.3 V	C ≥ 22 μF	16 V	≤ 5.0 %	≤ 15 %	0402 ≥ 0.10 μF, 0603 ≥ 0.47 μF, 0805 ≥ 2.2 μF, 1206 ≥ 6.8 μF
	(1.2) 6.3 V or C ≥ 10 μF: 150 % of rated voltage (2) 10 V ≤ U _R < 500 V: 200 % of rated voltage 150 % of rated voltage for below range:						10 V	≤ 7.5 %
	SIZE	DIELECTRIC	RATED VOLTAGE	CAP. RANGE	≤ 15 %	0402 ≥ 0.033 μF, 0603 ≥ 0.68 μF, 0805 ≥ 2.2 μF, 1206 ≥ 4.7 μF, 1210 ≥ 22 μF		
	0603	X5R	10 V, 16 V	C ≥ 1.0 μF	6.3 V	≤ 15 %	≤ 15 %	0402 ≥ 0.33 μF, 0603 ≥ 0.33 μF, 0805 ≥ 2.2 μF, 1206 ≥ 2.2 μF, 1210 ≥ 22 μF
	0805	X5R	10 V	C ≥ 4.7 μF			≤ 20 %	0201 ≥ 0.1 μF, 0402 ≥ 1 μF
				C ≥ 2.2 μF and T = 0.85 ± 0.1 mm	≤ 30 %	0402 ≥ 2.2 μF, 0603 ≥ 10 μF, 0805 ≥ 4.7 μF, 1210 ≥ 100 μF		
	1206	X5R	10 V	C ≥ 4.7 μF and T = 0.85 ± 0.1 mm	Y5V:			
	(3) 500 V : 150 % of rated voltage (4) U _R ≥ 630 V: 120 % of rated voltage				RATED VOLTAGE	DF	EXCEPTION OF DF	
	<ul style="list-style-type: none"> Test time: 1000 h + 24 h/- 0 h Measurement to be made after keeping at room temperature for 24 h ± 2 h (class 1) or 48 h ± 4 h (class 2) 				≥ 50 V	≤ 7.5 %	≤ 10 %	0603 ≥ 0.1 μF, 0805 ≥ 0.47 μF, 1206 ≥ 4.7 μF
					25 V	≤ 7.5 %	≤ 10 %	0402 ≥ 0.047 μF, 0603 ≥ 0.1 μF, 0805 ≥ 0.33 μF, 1206 ≥ 1 μF, 1210 ≥ 4.7 μF
							≤ 15 %	0402 ≥ 0.068 μF, 0603 ≥ 0.47 μF, 1206 ≥ 4.7 μF, 1210 ≥ 22 μF
					16 V (C < 1.0 μF)	≤ 10 %	≤ 12.5 %	0402 ≥ 0.068 μF, 0603 ≥ 0.68 μF
					16 V (C ≥ 1.0 μF)	≤ 12.5 %	≤ 20 %	0402 ≥ 0.22 μF
							≤ 20 %	0603 ≥ 2.2 μF, 0805 ≥ 3.3 μF, 1206 ≥ 10 μF, 1210 ≥ 22 μF, 1812 ≥ 47 μF
					10 V	≤ 15 %	≤ 30 %	0402 ≥ 0.47 μF
				6.3 V	≤ 30 %	-	-	
<ul style="list-style-type: none"> I. R.: ≥ 10 V: 1 GΩ or 50 ΩF whichever is smaller 								
CLASS 2 (X7R, X5R, Y5V):								
				RATED VOLTAGE		INSULATION RESISTANCE		
				100 V: X7R		R x C ≥ 10 ΩF		
				16 V: 0402 ≥ 0.22 μF				
				10 V: 0201 ≥ 47 nF, 0402 ≥ 0.47 μF, 0603 ≥ 0.47 μF, 0805 ≥ 2.2 μF, 1206 > 4.7 μF, 1210 > 47 μF				
				6.3 V:				