



## 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"> <li>No remarkable defect</li> <li>Dimensions should confirm to individual specification sheet</li> </ul>																																																																																			
2) Capacitance		<ul style="list-style-type: none"> <li>Shall not exceed the limits given in the detailed specification</li> </ul> <p><b>C0G (NP0):</b> Cap. <math>\geq 30</math> pF; Q <math>\geq 1000</math> Cap. <math>&lt; 30</math> pF; Q <math>\geq 400 + 20 C</math></p> <p><b>X5R, X7R:</b></p> <table border="1"> <thead> <tr> <th>RATED VOLTAGE</th> <th>DF <math>\leq</math></th> <th colspan="2">EXCEPTION OF DF <math>\leq</math></th> </tr> </thead> <tbody> <tr> <td rowspan="3"><math>\geq 50</math> V</td> <td rowspan="3">2.5 %</td> <td>3 %</td> <td>0201 (50 V); 0603 <math>\geq 0.047</math> <math>\mu</math>F; 0805 <math>\geq 0.18</math> <math>\mu</math>F; 1206 <math>\geq 0.47</math> <math>\mu</math>F</td> </tr> <tr> <td>5 %</td> <td>1210 <math>\geq 4.7</math> <math>\mu</math>F</td> </tr> <tr> <td>10 %</td> <td>0603 <math>\geq 1</math> <math>\mu</math>F; 0805 <math>\geq 1</math> <math>\mu</math>F; 1206 <math>\geq 2.2</math> <math>\mu</math>F; 1210 <math>\geq 10</math> <math>\mu</math>F</td> </tr> <tr> <td>35 V</td> <td>3.5 %</td> <td>10 %</td> <td>0805 <math>\geq 2.2</math> <math>\mu</math>F; 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3) Q/DF (dissipation factor)	<p>Class 1: C0G (NP0) Cap. <math>\leq 1000</math> pF; <math>1.0 V_{RMS} \pm 0.2 V_{RMS}</math>; 1 MHz <math>\pm 10</math> % Cap. <math>&gt; 1000</math> pF; <math>1.0 V_{RMS} \pm 0.2 V_{RMS}</math>; 1 kHz <math>\pm 10</math> %</p> <p>Class 2: X7R, X5R, Y5V Cap. <math>\leq 10</math> <math>\mu</math>F; <math>1.0 V_{RMS} \pm 0.2 V_{RMS}</math>; 1 kHz <math>\pm 10</math> % <sup>(1)</sup></p> <p>Cap. <math>&gt; 10</math> <math>\mu</math>F; <math>0.5 V_{RMS} \pm 0.2 V_{RMS}</math>; 120 Hz <math>\pm 20</math> %</p> <p><b>Note</b> <sup>(1)</sup> Test conditions <math>0.5 V_{RMS} \pm 0.2 V_{RMS}</math>; 1 kHz <math>\pm 10</math> %</p> <p>X7R: 0603: <math>\geq 2.2</math> <math>\mu</math>F/10 V 0805: 10 <math>\mu</math>F/6.3 V and 10 V</p> <p>X5R: 0201: <math>\geq 220</math> nF/6.3 V 0402: <math>\geq 4.7</math> <math>\mu</math>F/6.3 V 0402: <math>\geq 2.2</math> <math>\mu</math>F/10 V 0603: 10 <math>\mu</math>F/6.3 V</p>																																																																																				



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



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TEST	PROCEDURE			REQUIREMENTS
10) Bending test	<ul style="list-style-type: none"> <li>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 s ± 1 s</li> <li>Measurement to be made after keeping at room temperature for 24 h ± 2 h</li> </ul>			<ul style="list-style-type: none"> <li>No remarkable damage</li> <li>Capacitance change: C0G (NP0): within ± 5.0 % or ± 0.5 pF whichever is larger X7R, X5R: within ± 12.5 % Y5V: within ± 30 %</li> </ul> (This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test)
11) Resistance to soldering heat	<ul style="list-style-type: none"> <li>Solder temperature: 260 °C ± 5 °C</li> <li>Dipping time: 10 s ± 1 s</li> <li>Preheating: 120 °C to 150 °C for 1 min before immerse the capacitor in a eutectic solder</li> <li>Before initial measurement (class 2 only): Perform 150 °C + 0 °C/ - 10 °C for 1 h and then set for 24 h ± 2 h at room temperature</li> <li>Measurement to be made after keeping at room temperature for 24 h ± 2 h</li> </ul>			<ul style="list-style-type: none"> <li>No remarkable damage</li> <li>Capacitance change: C0G (NP0): within ± 2.5 % or ± 0.25 pF whichever is larger X7R, X5R: within ± 7.5 % Y5V: within ± 20 %</li> <li>Q/DF, I.R. and dielectric strength: To meet initial requirements</li> <li>25 % maximum leaching on each edge</li> </ul>
12) Temperature cycle	<ul style="list-style-type: none"> <li>Conduct the 5 cycles according to the temperature and time</li> </ul>			<ul style="list-style-type: none"> <li>No remarkable damage</li> <li>Capacitance change: C0G (NP0): within ± 2.5 % or ± 0.25 pF whichever is larger X7R, X5R: within ± 7.5 % Y5V: within ± 20 %</li> <li>Q/DF, I.R. and dielectric strength: To meet initial requirements</li> </ul>
	Step	Temperature (°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"> <li>Before initial measurement (class 2 only): Perform 150 °C + 0 °C/ - 10 °C for 1 h and then set for 24 h ± 2 h at room temperature</li> <li>Measurement to be made after keeping at room temperature for 24 h ± 2 h</li> </ul>				



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13) Humidity (damp heat) steady state	<ul style="list-style-type: none"> <li>Test temperature: 40 °C ± 2 °C</li> <li>Humidity: 90 % to 95 % RH</li> <li>Test time: 500 h + 24 h/- 0 h</li> <li>Before measurement (class 2 only): Perform 150 °C + 0 °C/ - 10 °C for 1 h and then set for 24 h ± 2 h at room temperature</li> <li>Measurement to be made after keeping at room temperature for 24 h ± 2 h</li> </ul>	<ul style="list-style-type: none"> <li>No remarkable damage</li> <li>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 %</li> <li>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</li> </ul>			
		<b>X5R, X7R:</b>			
		<b>RATED VOLTAGE</b>	<b>DF ≤</b>	<b>EXCEPTION OF DF ≤</b>	
		≥ 50 V	3 %	6 %	0201 (50 V); 0603 ≥ 0.047 μF; 0805 ≥ 0.18 μF; 1206 ≥ 0.47 μF
				10 %	1210 ≥ 4.7 μF
				20 %	0603 ≥ 1 μF; 0805 ≥ 1 μF; 1206 ≥ 2.2 μF; 1210 ≥ 10 μF
		35 V	5 %	20 %	0805 ≥ 2.2 μF; 1210 ≥ 10 μF
		25 V	5 %	10 %	0201 ≥ 0.01 μF; 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; 1210 ≥ 22 μF
		16 V	5 %	10 %	0603 ≥ 0.15 μF; 0805 ≥ 0.68 μF; 1206 ≥ 2.2 μF; 1210 ≥ 4.7 μF
				15 %	0201 ≥ 0.01 μF; 0402 ≥ 0.033 μF; 0603 ≥ 0.68 μF; 0805 ≥ 2.2 μF; 1206 ≥ 4.7 μF; 1210 ≥ 22 μF
		10 V	7.5 %	15 %	0201 ≥ 0.012 μF; 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 %	0201 ≥ 0.1 μF; 0402 ≥ 1 μF; 0603 ≥ 10 μF; 0805 ≥ 4.7 μF; 1206 ≥ 47 μF; 1210 ≥ 100 μF
		4 V	20 %	-	-
		<b>Y5V:</b>			
		<b>RATED VOLTAGE</b>	<b>DF ≤</b>	<b>EXCEPTION OF DF ≤</b>	
		≥ 50 V	7.5 %	10 %	0603 ≥ 0.1 μF; 0805 ≥ 0.47 μF; 1206 ≥ 4.7 μF
		35 V	10 %	-	-
		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		
10 V	20 %	30 %	0402 ≥ 0.47 μF		
6.3 V	30 %	-	-		
		<ul style="list-style-type: none"> <li>I.R.: ≥ 10 V: 1 GΩ or R x C ≥ 50 ΩF whichever is smaller</li> </ul>			
<b>CLASS 2 (X5R, X7R, Y5V):</b>					
<b>RATED VOLTAGE</b>			<b>INSULATION RESISTANCE</b>		
100 V: X7R			1 GΩ or R x C ≥ 10 ΩF whichever is less		
50 V: 0603 ≥ 1 μF; 0805 ≥ 1 μF; 1206 ≥ 2.2 μF; 1210 ≥ 4.7 μF					
35 V: 0805 ≥ 2.2 μF; 1210 ≥ 10 μF					
25 V: 0402 ≥ 1 μF; 0603 ≥ 2.2 μF; 0805 ≥ 2.2 μF; 1206 ≥ 10 μF; 1210 ≥ 10 μF					
16 V: 0402 ≥ 0.22 μF; 0603 ≥ 1 μF; 0805 ≥ 2.2 μF; 1206 ≥ 10 μF; 1210 ≥ 47 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; 4 V					



VJ....W1BC TEST PROCEDURES AND REQUIREMENTS					
TEST	PROCEDURE	REQUIREMENTS			
14) Humidity (damp heat) load	<ul style="list-style-type: none"> <li>• Test temperature: 40 °C ± 2 °C</li> <li>• Humidity: 90 % ~ 95 % RH</li> <li>• Test time: 500 h + 24 h/- 0 h</li> <li>• To apply voltage: rated voltage (max. 500 V)</li> <li>• Before initial measurement (class 2 only): Perform 150 °C + 0 °C/- 10 °C for 1h and then set for 24 h ± 2 h at room temperature</li> <li>• Measurement to be made after keeping at room temperature for 24 h ± 2 h</li> </ul>	<ul style="list-style-type: none"> <li>• No remarkable damage</li> <li>• 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 %</li> <li>• Q/DF value: C0G (NP0) Cap ≥ 30 pF: Q ≥ 200; Cap &lt; 30 pF: Q ≥ 100 + 10/3 C</li> </ul>			
		<b>X5R, X7R:</b>			
		<b>RATED VOLTAGE</b>	<b>DF ≤</b>	<b>EXCEPTION OF DF ≤</b>	
		≥ 50 V	3 %	6 %	0201 (50 V); 0603 ≥ 0.047 μF; 0805 ≥ 0.18 μF; 1206 ≥ 0.47 μF
				10 %	1210 ≥ 4.7 μF
				20 %	0603 ≥ 1 μF; 0805 ≥ 1 μF; 1206 ≥ 2.2 μF; 1210 ≥ 10 μF
		35 V	5 %	20 %	0805 ≥ 2.2 μF; 1210 ≥ 10 μF
		25 V	5 %	10 %	0201 ≥ 0.01 μF; 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; 1210 ≥ 22 μF
		16 V	5 %	10 %	0603 ≥ 0.15 μF; 0805 ≥ 0.68 μF; 1206 ≥ 2.2 μF; 1210 ≥ 4.7 μF
				15 %	0201 ≥ 0.01 μF; 0402 ≥ 0.033 μF; 0603 ≥ 0.68 μF; 0805 ≥ 2.2 μF; 1206 ≥ 4.7 μF; 1210 ≥ 22 μF
		10 V	7.5 %	15 %	0201 ≥ 0.012 μF; 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 %	0201 ≥ 0.1 μF; 0402 ≥ 1 μF; 0603 ≥ 10 μF; 0805 ≥ 4.7 μF; 1206 ≥ 47 μF; 1210 ≥ 100 μF
		4 V	20 %	-	-
		<b>Y5V:</b>			
		<b>RATED VOLTAGE</b>	<b>DF ≤</b>	<b>EXCEPTION OF DF ≤</b>	
		≥ 50 V	7.5 %	10 %	0603 ≥ 0.1 μF; 0805 ≥ 0.47 μF; 1206 ≥ 4.7 μF
		35 V	10 %	-	-
		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		
10 V	20 %	30 %	0402 ≥ 0.47 μF		
6.3 V	30 %	-	-		
<ul style="list-style-type: none"> <li>• I.R.: ≥ 10 V: 500 MΩ or 25 ΩF whichever is smaller</li> </ul>					
<b>CLASS 2 (X5R, X7R, Y5V):</b>					
<b>RATED VOLTAGE</b>			<b>INSULATION RESISTANCE</b>		
100 V: X7R			500 MΩ or R x C ≥ 5 ΩF whichever is less		
50 V: 0603 ≥ 1 μF; 0805 ≥ 1 μF; 1206 ≥ 2.2 μF; 1210 ≥ 4.7 μF					
35 V: 0805 ≥ 2.2 μF; 1210 ≥ 10 μF					
25 V: 0402 ≥ 1 μF; 0603 ≥ 2.2 μF; 0805 ≥ 2.2 μF; 1206 ≥ 10 μF; 1210 ≥ 10 μF					
16 V: 0402 ≥ 0.22 μF; 0603 ≥ 1 μF; 0805 ≥ 2.2 μF; 1206 ≥ 10 μF; 1210 ≥ 47 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; 4 V					



VJ...W1BC TEST PROCEDURES AND REQUIREMENTS									
TEST	PROCEDURE			REQUIREMENTS					
15) High temp. load (endurance)	<ul style="list-style-type: none"> <li>Test temperature: COG (NP0), X7R/X7E: 125 °C ± 3 °C X5R, Y5V: 85 °C ± 3 °C</li> <li>To apply voltage:</li> </ul>			<ul style="list-style-type: none"> <li>No remarkable damage</li> <li>Capacitance change: COG (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 %</li> <li>Q/DF value: COG (NP0): More than 30 pF, Q ≥ 350 10 pF ≤ C &lt; 30 pF: Q ≥ 275 C + 2.5 C; Less than 10 pF: Q ≥ 200 C + 10 C</li> </ul>					
	(1.1) 100 % of rated voltage for below range			<b>X5R, X7R:</b>					
	<b>SIZE</b>	<b>DIELECTRIC</b>	<b>RATED VOLTAGE</b>	<b>CAP. RANGE</b>	<b>RATED VOLTAGE</b>	<b>DF ≤</b>	<b>EXCEPTION OF DF ≤</b>		
	0201	X5R/X7R	6.3 V, 10 V	C ≥ 0.1 μF	≥ 50 V	3 %	6 %	0201 (50 V); 0603 ≥ 0.047 μF; 0805 ≥ 0.18 μF; 1206 ≥ 0.47 μF	
	0402	X5R/X7R	6.3 V, 10 V	C ≥ 1 μF			10 %	1210 ≥ 4.7 μF	
	0603	X5R/X7R	6.3 V, 10 V	C ≥ 4.7 μF			20 %	0603 ≥ 1 μF; 0805 ≥ 1 μF; 1206 ≥ 2.2 μF; 1210 ≥ 10 μF	
	0805	X5R/X7R	6.3 V	C ≥ 22 μF	35 V	5 %	20 %	0805 ≥ 2.2 μF; 1210 ≥ 10 μF	
	1206	X5R/X7R	6.3 V	C ≥ 47 μF	25 V	5 %	10 %	0201 ≥ 0.01 μF; 0805 ≥ 1 μF; 1210 ≥ 10 μF	
	(1.2) 6.3 V or C ≥ 10 μF: 150 % of rated voltage			14 %			0603 ≥ 0.33 μF; 1206 ≥ 4.7 μF		
	(2) 10 V ≤ U <sub>R</sub> < 500 V: 200 % of rated voltage			15 %			0402 ≥ 0.10 μF; 0603 ≥ 0.47 μF; 0805 ≥ 2.2 μF; 1206 ≥ 6.8 μF; 1210 ≥ 22 μF		
	150 % of rated voltage for below range:			16 V	5 %	10 %	0603 ≥ 0.15 μF; 0805 ≥ 0.68 μF; 1206 ≥ 2.2 μF; 1210 ≥ 4.7 μF		
	<b>SIZE</b>	<b>DIELECTRIC</b>	<b>RATED VOLTAGE</b>			<b>CAP. RANGE</b>	15 %	0201 ≥ 0.01 μF; 0402 ≥ 0.033 μF; 0603 ≥ 0.68 μF; 0805 ≥ 2.2 μF; 1206 ≥ 4.7 μF; 1210 ≥ 22 μF	
	0402	X5R/X7R	10 V, 16 V, 25 V			C ≥ 0.22 μF	10 V	7.5 %	15 %
		Y5V	16 V	C ≥ 0.47 μF	20 %	0201 ≥ 0.1 μF; 0402 ≥ 1 μF			
		0603	X5R/X7R	10 V, 16 V	C ≥ 1.0 μF	6.3 V	15 %	30 %	0201 ≥ 0.1 μF; 0402 ≥ 1 μF; 0603 ≥ 10 μF; 0805 ≥ 4.7 μF; 1206 ≥ 47 μF; 1210 ≥ 100 μF
			Y5V	16 V	C ≥ 2.2 μF	4 V	20 %	-	-
		0805	X5R/X7R	10 V	C ≥ 4.7 μF	<b>Y5V:</b>			
			Y5V	16 V	C ≥ 4.7 μF	<b>RATED VOLTAGE</b>	<b>DF ≤</b>	<b>EXCEPTION OF DF ≤</b>	
	(3) 500 V: 150 % of rated voltage			≥ 50 V	7.5 %	10 %	0603 ≥ 0.1 μF; 0805 ≥ 0.47 μF; 1206 ≥ 4.7 μF		
	(4) U <sub>R</sub> ≥ 630 V: 120 % of rated voltage			35 V	10 %	-	-		
<ul style="list-style-type: none"> <li>Test time: 1000 h + 24 h/- 0 h</li> <li>Before measurement (class 2 only): Perform 150 °C + 0 °C/- 10 °C for 1 h and then set for 24 h ± 2 h at room temperature</li> <li>Measurement to be made after keeping at room temperature for 24 h ± 2 h</li> </ul>			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			
					12.5 %	0402 ≥ 0.068 μF; 0603 ≥ 0.68 μF			
			16 V C < 1.0 μF	10 %	20 %	0603 ≥ 2.2 μF; 0805 ≥ 3.3 μF; 1206 ≥ 10 μF; 1210 ≥ 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			
			10 V	20 %	30 %	0402 ≥ 0.47 μF			
			6.3 V	30 %	-	-			
			<ul style="list-style-type: none"> <li>I. R.: ≥ 10 V: 1 GΩ or 50 ΩF whichever is smaller</li> </ul>						
			<b>CLASS 2 (X5R, X7R, Y5V):</b>						
			<b>RATED VOLTAGE</b>				<b>INSULATION RESISTANCE</b>		
			100 V: X7R				1 GΩ or R x C ≥ 10 ΩF whichever is less		
			50 V: 0603 ≥ 1 μF; 0805 ≥ 1 μF; 1206 ≥ 2.2 μF; 1210 ≥ 4.7 μF						
			35 V: 0805 ≥ 2.2 μF; 1210 ≥ 10 μF						
			25 V: 0402 ≥ 1 μF; 0603 ≥ 2.2 μF; 0805 ≥ 2.2 μF; 1206 ≥ 10 μF; 1210 ≥ 10 μF						
			16 V: 0402 ≥ 0.22 μF; 0603 ≥ 1 μF; 0805 ≥ 2.2 μF; 1206 ≥ 10 μF; 1210 ≥ 47 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; 4 V						