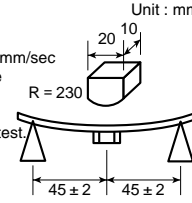


PERFORMANCE AND TEST METHOD (CHIP TYPE)

Item	Performance			Test method and conditions (In accordance with JIS 5101-1)																		
	CG characteristics	R characteristics	E characteristics																			
Capacitance	Within the tolerance			Heat treatment																		
Dissipation factor (or Q)	$C^*30pF \rightarrow Q \geq 1,000$ , $C^* < 30pF \rightarrow Q \geq 400+20C^*$	RC : 5.0% or less VC : 2.5% or less TC : 2.5% or less XC : 2.5% or less VH : 2.0% or less	5.0% or less( * )	Class1 <table border="1"> <tr> <th>Capacitance value</th> <th>Measurement frequency</th> <th>Measurement frequency</th> </tr> <tr> <td><math>C \leq 1000pF</math></td> <td>1MHz <math>\pm 20\%</math></td> <td>0.5 ~ 5Vrms.</td> </tr> <tr> <td><math>C &gt; 1000pF</math></td> <td>1kHz <math>\pm 10\%</math></td> <td>1.0 <math>\pm 0.2Vrms.</math></td> </tr> </table> Class2 <table border="1"> <tr> <th>Capacitance value</th> <th>Measurement frequency</th> <th>Measurement frequency</th> </tr> <tr> <td><math>C \leq 10\mu F</math></td> <td>1kHz <math>\pm 10\%</math></td> <td>1.0 <math>\pm 0.2Vrms.</math></td> </tr> <tr> <td><math>C &gt; 10\mu F</math></td> <td>120Hz <math>\pm 10\%</math></td> <td>0.5 <math>\pm 0.2Vrms.</math></td> </tr> </table>	Capacitance value	Measurement frequency	Measurement frequency	$C \leq 1000pF$	1MHz $\pm 20\%$	0.5 ~ 5Vrms.	$C > 1000pF$	1kHz $\pm 10\%$	1.0 $\pm 0.2Vrms.$	Capacitance value	Measurement frequency	Measurement frequency	$C \leq 10\mu F$	1kHz $\pm 10\%$	1.0 $\pm 0.2Vrms.$	$C > 10\mu F$	120Hz $\pm 10\%$	0.5 $\pm 0.2Vrms.$
Capacitance value	Measurement frequency	Measurement frequency																				
$C \leq 1000pF$	1MHz $\pm 20\%$	0.5 ~ 5Vrms.																				
$C > 1000pF$	1kHz $\pm 10\%$	1.0 $\pm 0.2Vrms.$																				
Capacitance value	Measurement frequency	Measurement frequency																				
$C \leq 10\mu F$	1kHz $\pm 10\%$	1.0 $\pm 0.2Vrms.$																				
$C > 10\mu F$	120Hz $\pm 10\%$	0.5 $\pm 0.2Vrms.$																				
Withstanding voltage	No insulation breakdown and no failure. Applied 25V ~ 100V Applied 250% Applied 250V ~ 350V Applied 200% Applied 630V Applied 150% Applied 1,000V ~ Applied 120%			Applied voltage : 1 ~ 5sec. Applied in silicon oil ( W.V.630V or more ) Charging and discharging current : 50mA max.																		
Insulation resistance	No less than 10,000M $\Omega$ or 500M $\Omega$ $\cdot$ $\mu F$ , whichever is smaller.( * )			Applied voltage : Rated voltage (W.V.630V or more=500V) Applied time : 1min.																		
Adhesion strength of termination	No peeling-off or exfoliation shall be manifest or recognizable in its incipient stages			Applied force : 5N Keeping time : 10 sec.																		
Resistance to soldering heat	Visual	No serious mechanical damage		Heat treatment Temperature : 270 $\pm$ 5 Immersion time : 10 $\pm$ 1sec. Preheating : 80 ~ 100 ( 1 ~ 2min. ) 170 ~ 200 ( 1 ~ 2min. ) Continuous immersion after preheating																		
	Rate change in capacitance	No more than $\pm 2.5\%$ or $\pm 0.25pF$ , whichever is larger.	$\pm 7.5\%$ or less( * )		$\pm 20\%$ or less																	
	Dissipation factor (or Q)	Initial standard values must be satisfied.																				
	Insulation resistance	Initial standard values must be satisfied.																				
	Withstanding voltage	No insulation breakdown and no failure.																				
Solderability	Termination surface should be covered with new solder to over 75%.			Temperature : 230 $\pm$ 5 Immersion time : 2 $\pm$ 1sec.																		
Temperature cycle	Visual	No serious mechanical damage		Room temp. Minimum operation temp. Room temp. Maximum operation temp. 3min. 30min. 3min. 30min. Leaving a specimen under the temperature of step 1~4 above in order to complete 1 cycle. The cycle is repeated 5 times.																		
	Capacitance change	No more than $\pm 2.5\%$ or $\pm 0.25pF$ , whichever is larger.	$\pm 7.5\%$ or less( * )		$\pm 20\%$ or less																	
	Dissipation factor (or Q)	Initial standard values must be satisfied.																				
	Insulation resistance	Initial standard values must be satisfied.																				
	Withstanding voltage	No insulation breakdown and no failure.																				
Humidity load test	Visual	No serious mechanical damage		Voltage treatment Test temperature : 40 $\pm$ 2 ( * ) Relative humidity : 90 ~ 95%RH Test time : 500hours																		
	Capacitance change	No more than $\pm 2.5\%$ or $\pm 0.25pF$ , whichever is larger.	$\pm 12.5\%$ or less( * )		$\pm 30\%$ or less																	
	Dissipation factor (or Q)	$C^*30pF \rightarrow Q \geq 350$ , $30pF > C^* \geq 10pF \rightarrow Q \geq 275+(5/2)C^*$ $C^* < 10pF \rightarrow Q \geq 200+10C^*$	Less than double of the initial value( * )																			
	Insulation resistance	No less than 10,00M $\Omega$ or 50M $\Omega$ $\cdot$ $\mu F$ , whichever is smaller.( * )																				
Life test (at elevated ambient temperature)	Visual	No serious mechanical damage		Voltage treatment Test temperature : Maximum operation temp. $\pm 3$ Test voltage : W.V.=250V or less Rated voltage $\times$ 200% of DC Voltage W.V.=630V or more Rated voltage $\times$ 100% of DC Voltage Test time : 1000hours																		
	Capacitance change	No more than $\pm 3\%$ or $\pm 0.3pF$ , whichever is larger.	$\pm 12.5\%$ or less( * )		$\pm 30\%$ or less																	
	Dissipation factor (or Q)	$C^*30pF \rightarrow Q \geq 350$ , $30pF > C^* \geq 10pF \rightarrow Q \geq 275+(5/2)C^*$ $C^* < 10pF \rightarrow Q \geq 200+10C^*$	Less than double of the initial value( * )																			
	Insulation resistance	No less than 10,00M $\Omega$ or 50M $\Omega$ $\cdot$ $\mu F$ , whichever is smaller.( * )																				
Flexion	Visual	No serious mechanical damage		Heat treatment Flexure : 1mm( * ) Moving speed : 0.5mm/sec Have a capacitance meter connected to both ends of the specimen during a test. Unit : mm 																		
	Capacitance change	No more than $\pm 5\%$ or $\pm 0.5pF$ , whichever is larger.	$\pm 12.5\%$ or less( * )		$\pm 30\%$ or less																	

Note1 : C\* represents capacitance values (pF).

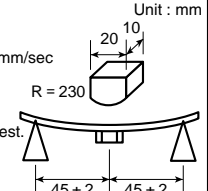
Note2 : Heat treatment : The capacitor shall be allowed to stand in air at 150+0/-10 for 1 hour, and then allowed to be left at room temperature for 48  $\pm$  4 hours.

Note3 : Voltage treatment : The capacitor shall be allowed to be processed in a prescribed examination condition for 1 hour, and then allowed to be left at room temperature for 48  $\pm$  4 hours.

Note4 : Specifications of ( \* ) are different by a kind. Please refer to the individual specifications.

**PERFORMANCE AND TEST METHOD (STACKED TYPE)**

CERAMIC CAPACITORS

Item	Performance			Testing method and conditions (In accordance with JIS 5101-1)									
	R characteristics		E characteristics										
Capacitance	Within the tolerance			Heat treatment  <table border="1"> <tr> <th>Capacitance value</th> <th>Measurement frequency</th> <th>Measurement frequency</th> </tr> <tr> <td>C ≤ 10μF</td> <td>1kHz ± 10%</td> <td>1.0 ± 0.2Vrms.</td> </tr> <tr> <td>C &gt; 10μF</td> <td>120Hz ± 10%</td> <td>0.5 ± 0.2Vrms.</td> </tr> </table>	Capacitance value	Measurement frequency	Measurement frequency	C ≤ 10μF	1kHz ± 10%	1.0 ± 0.2Vrms.	C > 10μF	120Hz ± 10%	0.5 ± 0.2Vrms.
Capacitance value	Measurement frequency	Measurement frequency											
C ≤ 10μF	1kHz ± 10%	1.0 ± 0.2Vrms.											
C > 10μF	120Hz ± 10%	0.5 ± 0.2Vrms.											
Dissipation factor	RS : 5.0% or less VS : 2.5% or less( * )	5.0% or less( * )											
Withstanding voltage	No insulation breakdown and no failure. Applied 16V ~ 100V    Applied 250% Applied 250V            Applied 200% Applied 630V            Applied 150%			Applied voltage : 1 ~ 5sec. Applied in silicon oil ( W.V.630V ) Charging and discharging current : 50mA max.									
Insulation resistance	No less than 10,000MΩ or 500MΩ • μF, whichever is smaller.( * )			Applied voltage : Rated voltage (W.V.630V=500V) Applied time : 1min.									
Adhesion strength of termination	No peeling-off or exfoliation shall be manifest or recognizable in its incipient stages			Applied force : 5N Keeping time : 10 sec.									
Solderability (Applied to frame side)	Termination surface should be covered with new solder to over 75%.			Temperature : 230 ± 5 Immersion time : 2 ± 1sec.									
Temperature cycle	Visual	No serious mechanical damage		Room temp.    Minimum operation temp. Room temp.    Maximum operation temp. 3min.            30min.            3min.            30min. Leaving a specimen under the temperature of step 1~4 above in order to complete 1 cycle. The cycle is repeated 5 times.									
	Capacitance change	± 7.5% or less( * )	± 20% or less										
	Dissipation factor	Initial standard values must be satisfied.											
	Insulation resistance	Initial standard values must be satisfied.											
	Withstanding voltage	No insulation breakdown and no failure.											
Humidity load test	Visual	No serious mechanical damage		Voltage treatment Test temperature : 40 ± 2 ( * ) Relative humidity : 90 ~ 95%RH Test time : 500hours									
	Capacitance change	± 12.5% or less( * )	± 30% or less										
	Dissipation factor	Less than double of the initial value( * )											
	Insulation resistance	No less than 1,000MΩ or 50MΩ • μF, whichever is smaller.( * )											
Life test (at elevated ambient temperature)	Visual	No serious mechanical damage		Voltage treatment Test temperature : Maximum operation temp. ± 3 Test voltage : W.V.=250V or less Rated voltage × 200% of DC Voltage W.V.=630V or more Rated voltage × 100% of DC Voltage Test time : 1000hours									
	Capacitance change	± 12.5% or less( * )	± 30% or less										
	Dissipation factor	Less than double of the initial value( * )											
	Insulation resistance	No less than 1,000MΩ or 50MΩ • μF, whichever is smaller.( * )											
Flexion	Visual	No serious mechanical damage		Heat treatment Flexure : 1mm( * ) Moving speed : 0.5mm/sec Have a capacitance meter connected to both ends of the specimen during a test. 									
	Capacitance change	No more than ±5% or ±0.5pF, whichever is larger.	± 12.5% or less( * )		± 30% or less								

Note1 : Heat treatment : The capacitor shall be allowed to stand in air at 150±0/-10 for 1 hour, and then allowed to be left at room temperature for 48 ± 4 hours.  
 Note2 : Voltage treatment : The capacitor shall be allowed to be processed in a prescribed examination condition for 1 hour, and then allowed to be left at room temperature for 48 ± 4 hours.  
 Note3 : Specifications of( \* ) are different by a kind. Please refer to the individual specifications.