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## GJM Series Specifications and Test Methods (1)

Ite			Test Method				
No. Item		Temperature Compensating Type	Test Method				
1 Operating Temperature Range		−55 to +125℃	Reference Temperatu (2C, 3C, 4C: 20°C)	ire: 25℃			
2 Rated Voltage		See the previous pages.	The rated voltage is defined as the maximum voltage w may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, V <sup>p,p</sup> whichever is larger, should be maintained within the rat voltage range.				
Appearar	nce	No defects or abnormalities	Visual inspection				
Dimensio	ns	Within the specified dimensions	Using calipers				
Dielectric	: Strength	No defects or abnormalities	No failure should be observed when 300% of the rated vol is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA.				
Insulation (I.R.)	Resistance	10,000MΩ min. or $500\Omega \cdot F$ min. (Whichever is smaller)	The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at 25°C and 75%RI max. and within 2 minutes of charging.				
Capacita	nce	Within the specified tolerance		ould be measured at 25℃ at the			
Q		30pF and over: Q≥1000 30pF and below: Q≥400+20C C: Nominal Capacitance (pF)	frequency and voltage Frequency Voltage	e shown in the table. 1±0.1MHz 0.5 to 5Vrms			
	Temperature Coefficient	Within the specified tolerance (Table A)	The capacitance change should be measured after 5 min. at each specified temperature stage.				
onuluotonotios	Capacitance Drift		Within ±0.2% or ±0.05pF (Whichever is larger.)	The temperature coefficapacitance measured When cycling the temp 5, (5C: +25 to 125°C: capacitance should be temperature coefficien The capacitance drift i between the maximum	ficient is determined using the d in step 3 as a reference. perature sequentially from step 1 through other temp. coeffs.: +20 to 125°C) the e within the specified tolerance for the nt and capacitance change as Table A. is calculated by dividing the differences n and minimum measured values in steps acitance value in step 3.		
			Step	Temperature (℃)			
			1	Reference Temp. ±2			
			2	-55±3			
			3	Reference Temp. ±2			
				125±3			
			5 Reference Temp. ±2				
10 Adhesive Strength of Termination		No removal of the terminations or other defect should occur.	Fig. 1 using a eutectic s with the test jig for $10\pm$ with an iron or using th	the test jig (glass epoxy board) shown in solder. Then apply a 5N* force in parallel 1 sec. The soldering should be done either the reflow method and should be conducted oldering is uniform and free of defects such *2N (GJM03)			
	Temperati         Rated Vo         Appearar         Dimension         Dielectric         Insulation (I.R.)         Capacita         Q         Capacitance         Temperature         Characteristics	Temperature Range         Rated Voltage         Appearance         Dimensions         Dielectric Strength         Insulation Resistance (I.R.)         Capacitance         Q         Capacitance Coefficient         Capacitance Coefficient         Capacitance Coefficient         Capacitance Coefficient         Capacitance Coefficient         Capacitance Coefficient         Adhesive Strength	Temperature Range       -50 ID + 125 C         Rated Voltage       See the previous pages.         Appearance       No defects or abnormalities         Dimensions       Within the specified dimensions         Dielectric Strength       No defects or abnormalities         Insulation Resistance (I.R.)       10,000MΩ min. or 500Ω · F min. (Whichever is smaller)         Capacitance       Within the specified tolerance         Q       30pF and over: Q≥1000 30pF and over: Q≥400+20C C: Nominal Capacitance (pF)         Q       Capacitance       Within the specified tolerance (Table A)         Capacitance Temperature Obracteristics       Capacitance       Within ±0.2% or ±0.05pF         Q       Capacitance       Within ±0.2% or ±0.05pF         Adhesive Strength       No removal of the terminations or other defect should occur	Temperature Range     -05 10 + 125 C     (2C, 3C, 4C: 20C)       Rated Voltage     See the previous pages.     The rated voltage is a may be applied continger is a whichever is larger, is voltage range.       Appearance     No defects or abnormalities     Visual inspection       Dimensions     Within the specified dimensions     Using calipers       Dielectric Strength     No defects or abnormalities     No failure should be c is applied between th provided the charged in woltage not exceeding max.       Capacitance     Within the specified tolerance     The insulation resistance (IR)       Q     30pF and over: Q≥1000 30pF and over: Q≥1000 C: C: Nominal Capacitance (pF)     The capacitance char each specified tolerance (pF)       Q     30pF and over: Q≥1000 C: C: Nominal Capacitance (pF)     The capacitance char each specified tolerance (Table A)       Capacitance     Within the specified tolerance (Table A)     The capacitance char each specified tolerance (Table A)       Capacitance     Within ±0.2% or ±0.05pF     The capacitance should be trengerature coefficient the easyncharous the trengerature coefficient for the termination sor other defect should occur.     Image the stock of the termination sor other defect should occur.       Adhesive Strength     No removal of the terminations or other defect should occur.     Image the stock occur.			

Continued on the following page.



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### GJM Series Specifications and Test Methods (1)

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No.			Specifications			- Test Method								
			Temperature Compensating Type											
		Appearance	No defects or abnormalities		Solder the capacitor to the test jig (glass epoxy board) in the									
11	Vibration Resistance Q		Within the specified tolerance         30pF and over: Q≥1000         30pF and below: Q≥400+20C         C: Nominal Capacitance (pF)		<ul> <li>same manner and under the same conditions as (10).</li> <li>The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz.</li> <li>The frequency range, from 10 to 55Hz and return to 10Hz, should be traversed in approximately 1 minute. This motion should be applied for a period of 2 hours in each of 3 mutually perpendicular directions (total of 6 hours).</li> </ul>				onic motior ng varied 55Hz. 10Hz, motion					
_		Appearance	No marking defects	5			Solder the capacitor to the test jig (glass epoxy boards) shown							
		Capacitance Change	Within ±5% or ±0.5pF (Whichever is larger)			in Fig. 2 using a eutectic solder. Then apply a force in the direction shown in Fig. 3. The soldering should be done by the reflow method and shoul be conducted with care so that the soldering is uniform and fre								
12	Deflection	n	Type GJM03 GJM15	a 0.3 0.4 Fig.	b 0.9 1.5	t: 0.8mm C 0.3 0.5 (in mm)	of defects such as heat shock. $\begin{array}{c}             20 & 50 \text{ Pressurizing} \\             $presd: 1.0mm/sec.} \\             Pressurize \\             Fresurize \\             Flexure : \leq 1 \\             Gapacitance meter \\             45 & (in mm)             Fig. 3         $							
3	3 Solderability of Termination		75% of the terminations are to be soldered evenly and continuously.			Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Preheat at 80 to 120°C for 10 to 30 seconds. After preheating, immerse in eutectic solder solution for 2±0.5 seconds at 230±5°C or Sn-3.0Ag-0.5Cu solder solution for 2±0.5 seconds at 245±5°C								
			The measured and specifications in the			nould satisfy the								
		Appearance	No marking defects	6										
4	Resistance to Soldering	Capacitance Change	Within ±2.5% or ± (Whichever is large 30pF and over: Q≧	er)			Preheat the capacitor at 120 to 150°C for 1 minu Immerse the capacitor in a eutectic solder or Sr solder solution at 270±5°C for 10±0.5 seconds.		older or Sn-3.0/	Sn-3.0Ag-0.5Cu				
	Heat	Q	30pF and below: C C: Nominal Capaci	tance (pF)			Let sit at room temperature for 24±2 hours.							
		I.R. Dielectric	More than 10,000M	1Ω or 500Ω · F	(Whichever i	is smaller)								
		Strength	No failure											
			The measured and observed characteristics should satisfy the specifications in the following table.											
		Appearance	No marking defects				Fix the capacitor to the supporting jig in the same manner and under the same conditions as (10). Perform the five cycles							
	Temperature	Capacitance Change	Within ±2.5% or ± (Whichever is large	•			•		eat treatments listed in the following table at room temperature, then measure.					
5	Cycle	Q	30pF and over: Q≧ 30pF and below: Q C: Nominal Capaci	≧400+20C			Step Temp. (℃)	1 Min. Operating Temp. —3		3 Max. Operating Temp. $\stackrel{+3}{-0}$	4 Room			
		I.R.	More than 10,000N		(Whichever i	is smaller)	Time (min.)	30±3	Temp. 2 to 3	30±3	Temp. 2 to 3			
		Dielectric Strength	No failure											
			The measured and specifications in the			nould satisfy the								
16 S		Appearance	No marking defects	No marking defects										
	Humidity, Steady State	Capacitance Change	Within ±5% or ±0. (Whichever is large	•			Let the capacitor sit at $40\pm2$ °C and 90 to 95% humidit 500±12 hours.		-					
		Q	30pF and below: 10pF and over, 30p 10pF and below: C: Nominal Capaci	oF and below:	Q≧350 Q≧275+ <del>5</del> 0 Q≧200+10C			Remove and let sit for 24±2 hours (temperature compens type) at room temperature, then measure.			ipensating			
		I.R.	More than 10,000	$I\Omega$ or 500 $\Omega$ · F	(Whichever i	is smaller)	1							
			More than 10,000M $\Omega$ or 500 $\Omega \cdot F$ (Whichever is smaller)											

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### GJM Series Specifications and Test Methods (1)

Continued from the preceding page.

No.	Ite	m	Specifications	- Test Method			
NO.	. nem		Temperature Compensating Type	restivietiou			
			The measured and observed characteristics should satisfy the specifications in the following table.				
17	Humidity Load	Appearance	No marking defects				
		Capacitance Change	Within ±7.5% or ±0.75pF (Whichever is larger)	Apply the rated voltage at 40±2°C and 90 to 95% humidity for 500±12 hours. Remove and let sit for 24±2 hours at room temperature, then			
		Q	30pF and over: Q≥200 30pF and below: Q≥100+ ⅓ C C: Nominal Capacitance (pF)	measure. The charge/discharge current is less than 50mA.			
		I.R.	More than 500M $\Omega$ or 25 $\Omega \cdot$ F (Whichever is smaller)				
			The measured and observed characteristics should satisfy the specifications in the following table.				
		Appearance	No marking defects				
18	High Temperature	Capacitance Change	Within ±3% or ±0.3pF (Whichever is larger)	Apply 200% of the rated voltage for $1000\pm12$ hours at the maximum operating temperature $\pm3$ °C. Let sit for 24 $\pm2$ hours (temperature compensating type) at room temperature, then			
	Load	Q	30pF and over: $Q \ge 350$ 10pF and over, 30pF and below: $Q \ge 275 + \frac{5}{2}$ C10pF and below: $Q \ge 200 + 10$ CC: Nominal Capacitance (pF)	The charge/discharge current is less than 50mA.			
		I.R.	More than 1,000M $\Omega$ or 50 $\Omega \cdot$ F (Whichever is smaller)				
19	9 ESR		0.1pF≦C≦1pF: 350mΩ · pF below 1pF <c≦5pf: 300mω="" below<br="">5pF<c≦10pf: 250mω="" below<="" td=""><td>The ESR should be measured at room temperature, and frequency <math>1\pm 0.2</math>GHz with the equivalent of BOONTON Model 34A.</td></c≦10pf:></c≦5pf:>	The ESR should be measured at room temperature, and frequency $1\pm 0.2$ GHz with the equivalent of BOONTON Model 34A.			
		10pF <c≦33pf: 400mω="" below<="" td=""><td colspan="3">The ESR should be measured at room temperature, and frequency 500±500Hz with the equivalent of HP8753B.</td></c≦33pf:>		The ESR should be measured at room temperature, and frequency 500±500Hz with the equivalent of HP8753B.			

# Table A

Char. Code	Temp. Coeff. (ppm/℃) *1	Capacitance Change from 25°C Value (%)						
		−55℃		-30°C		_10℃		
		Max.	Min.	Max.	Min.	Max.	Min.	
5C	0±30	0.58	-0.24	0.40	-0.17	0.25	-0.11	
6C	0±60	0.87	-0.48	0.60	-0.33	0.38	-0.21	

\*1: Nominal values denote the temperature coefficient within a range of 25 to 125°C.

#### (2)

Char.	Nominal Values (ppm/℃) *2	Capacitance Change from 20°C Value (%)						
		_55℃		–25℃		–10℃		
		Max.	Min.	Max.	Min.	Max.	Min.	
2C	0±60	0.82	-0.45	0.49	-0.27	0.33	-0.18	
3C	0±120	1.37	-0.90	0.82	-0.54	0.55	-0.36	
4C	0±250	2.56	-1.88	1.54	-1.13	1.02	-0.75	

\*2: Nominal values denote the temperature coefficient within a range of 20 to 125°C.

