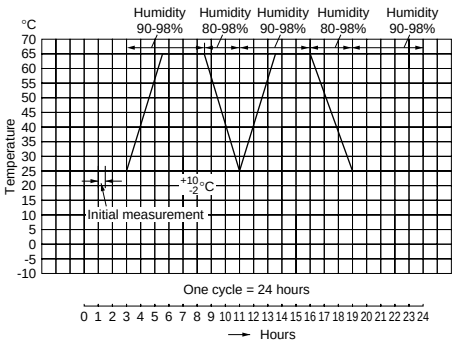
Medium Voltage for Automotive Soft Termination Type GCJ Series Specifications and Test Methods

No.	AEC-Q200 Test Item		Specifications	AEC-Q200 Test Method
1	Pre- and Post-Stress Electrical Test		–	
2	High Temperature Exposure (Storage)		The measured and observed characteristics should satisfy the specifications in the following table.	Set the capacitor for 1000±12 hours at 150±3°C. Let sit for 24±2 hours at room temperature, then measure.
		Appearance	No marking defects	
		Capacitance Change	Within ±10%	
		D.F.	0.05 max.	
		I.R.	More than 10,000MΩ or 100MΩ · μF (Whichever is smaller)	
3	Temperature Cycle		The measured and observed characteristics should satisfy the specifications in the following table.	Fix the capacitor to the supporting jig in the same manner and under the same conditions as (19). Perform the 1000 cycles according to the 4 heat treatments listed in the following table. Let sit for 24±2 hours at room temperature, then measure. Step 1: -55+0/-3, Time 15±3 Step 2: Room Temp., Time 1 Step 3: 125+3/-0, Time 15±3 Step 4: Room Temp., Time 1 •Pretreatment Perform the heat treatment at 150+0/-10°C for 60±5 minutes and then let sit for 24±2 hours at room temperature.
		Appearance	No marking defects	
		Capacitance Change	Within ±10%	
		D.F.	0.025 max.	
		I.R.	More than 10,000MΩ or 100MΩ · μF (Whichever is smaller)	
4	Destructive Physical Analysis		No defects or abnormalities	Per EIA-469
5	Moisture Resistance		The measured and observed characteristics should satisfy the specifications in the following table.	Apply the 24-hour heat (25 to 65°C) and humidity (80 to 98%) treatment shown below, 10 consecutive times. Let sit for 24±2 hours at room temperature, then measure. 
		Appearance	No marking defects	
		Capacitance Change	Within ±12.5%	
		D.F.	0.05 max.	
		I.R.	More than 10,000MΩ or 100MΩ · μF (Whichever is smaller)	
6	Biased Humidity		The measured and observed characteristics should satisfy the specifications in the following table.	Apply the rated voltage and DC1.3+0.2/-0V (add 6.8kΩ resistor) at 85±3°C and 80 to 85% humidity for 1000±12 hours. Remove and let sit for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA. •Pretreatment Perform the heat treatment at 150+0/-10°C for 60±5 minutes and then let sit for 24±2 hours at room temperature.
		Appearance	No marking defects	
		Capacitance Change	Within ±12.5%	
		D.F.	0.05 max.	
		I.R.	More than 1,000MΩ or 10MΩ · μF (Whichever is smaller)	
7	Operational Life		The measured and observed characteristics should satisfy the specifications in the following table.	Apply voltage as in the Table for 1000±12 hours at 125±3°C. Let sit for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA. Rated Voltage: DC250V, Applied Voltage: 150% of the rated voltage Rated Voltage: DC630V, Applied Voltage: 120% of the rated voltage •Pretreatment Apply test voltage for 60±5 minutes at test temperature. Remove and let sit for 24±2 hours at room temperature.
		Appearance	No marking defects	
		Capacitance Change	Within ±12.5%	
		D.F.	0.05 max.	
		I.R.	More than 1,000MΩ or 10MΩ · μF (Whichever is smaller)	
8	External Visual		No defects or abnormalities	Visual inspection
9	Physical Dimension		Within the specified dimensions	Using calipers and micrometers

Continued on the following page.

Medium Voltage for Automotive Soft Termination Type GCJ Series Specifications and Test Methods

Continued from the preceding page.

No.	AEC-Q200 Test Item		Specifications	AEC-Q200 Test Method
10	Resistance to Solvents	Appearance	No marking defects	Per MIL-STD-202 Method 215 Solvent 1: 1 part (by volume) of isopropyl alcohol 3 parts (by volume) of mineral spirits Solvent 2: Terpene defluxer Solvent 3: 42 parts (by volume) of water 1 part (by volume) of propylene glycol monomethyl ether 1 part (by volume) of monoethanolamine
		Capacitance Change	Within the specified tolerance	
		D.F.	0.025 max.	
		I.R.	More than 10,000MΩ or 100MΩ · μF (Whichever is smaller)	
11	Mechanical Shock	Appearance	No marking defects	Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks). The specified test pulse should be Half-sine and should have a duration: 0.5ms, peak value: 1500g and velocity change: 4.7m/s.
		Capacitance Change	Within the specified tolerance	
		D.F.	0.025 max.	
12	Vibration	Appearance	No defects or abnormalities	Solder the capacitor to the test jig (glass epoxy board) in the same manner and under the same conditions as (19). 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 2000Hz. The frequency range, from 10 to 2000Hz and return to 10Hz, should be traversed in approximately 20 minutes. This motion should be applied for 12 items in each 3 mutually perpendicular directions (total of 36 times).
		Capacitance Change	Within the specified tolerance	
		D.F.	0.025 max.	
13	Resistance to Soldering Heat		The measured and observed characteristics should satisfy the specifications in the following table.	Immerse the capacitor in a eutectic solder solution at 260±5°C for 10±1 seconds. Let sit at room temperature for 24±2 hours, then measure. •Pretreatment Perform the heat treatment at 150+0/-10°C for 60±5 minutes and then let sit for 24±2 hours at room temperature.
		Appearance	No marking defects	
		Capacitance Change	Within ±10%	
		D.F.	0.025 max.	
		I.R.	More than 10,000MΩ or 100MΩ · μF (Whichever is smaller)	
14	Thermal Shock		The measured and observed characteristics should satisfy the specifications in the following table.	Fix the capacitor to the supporting jig in the same manner and under the same conditions as (19). Perform the 300 cycles according to the two heat treatments listed in the following table (maximum transfer time is 20 seconds). Let sit for 24±2 hours at room temperature, then measure. Step / 1 / 2 Temp. (°C) / -55+0/-3 / 125+3/-0 Time (min.) / 15±3 / 15±3 •Pretreatment Perform the heat treatment at 150+0/-10°C for 60±5 minutes and then let sit for 24±2 hours at room temperature.
		Appearance	No marking defects	
		Capacitance Change	Within ±10%	
		D.F.	0.025 max.	
		I.R.	More than 10,000MΩ or 100MΩ · μF (Whichever is smaller)	
15	ESD	Appearance	No marking defects	Per AEC-Q200-002
		Capacitance Change	Within the specified tolerance	
		D.F.	0.025 max.	
		I.R.	More than 10,000MΩ or 100MΩ · μF (Whichever is smaller)	
16	Solderability		95% of the terminations are to be soldered evenly and continuously.	(a) Preheat at 155°C for 4 hours. After preheating, immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in eutectic solder solution for 5+0/-0.5 seconds at 235±5°C.
				(b) Should be placed into steam aging for 8 hours±15 minutes. After preheating, immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in eutectic solder solution for 5+0/-0.5 seconds at 235±5°C.
				(c) Should be placed into steam aging for 8 hours±15 minutes. After preheating, immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in eutectic solder solution for 120 ±5 seconds at 260±5°C.

Continued on the following page.

Medium Voltage for Automotive Soft Termination Type GCJ Series Specifications and Test Methods

Continued from the preceding page.

No.	AEC-Q200 Test Item		Specifications	AEC-Q200 Test Method
17	Electrical Characterization	Appearance	No defects or abnormalities	Visual inspection.
		Capacitance Change	Within the specified tolerance	The capacitance/Q should be measured at 25°C at the frequency and voltage shown in the table.
		D.F.	0.025 max.	
		I.R.	25°C More than 10,000MΩ or 100MΩ · μF (Whichever is smaller) Max. Operating Temperature···125°C More than 1,000MΩ or 10MΩ · μF (Whichever is smaller)	The insulation resistance should be measured with DC500±50V (DC250±25V in case of rated voltage: DC250V) at 25°C and 125°C and within 2 minutes of charging.
		Dielectric Strength	No failure	No failure should be observed when voltage as in the Table is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA.
18	Board Flex	Appearance	No marking defects	Solder the capacitor on the test jig (glass epoxy board) as shown in Fig. 1 using a eutectic solder. Then apply a force in the direction shown in Fig. 2 for 5±1 seconds. The soldering should be done by the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock.
		Capacitance Change	Within ±12.5%	
				(in mm)
19	Terminal Strength	Appearance	No marking defects	Solder the capacitor to the test jig (glass epoxy board) as shown in Fig. 3 using a eutectic solder. Then apply 18N force in parallel with the test jig for 60 seconds. The soldering should be done by the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock.
		Capacitance Change	Within the specified tolerance	
		D.F.	0.025 max.	
		I.R.	More than 10,000MΩ or 100MΩ · μF (Whichever is smaller)	

Capacitance	Frequency	Voltage
C<1000pF	1±0.2MHz	AC0.5 to 5V(r.m.s.)
C≧1000pF	1±0.2kHz	AC1±0.2V(r.m.s.)

Rated Voltage	Test Voltage
DC250V	200% of the rated voltage
DC630V	150% of the rated voltage

Type	a	b	c
GCJ21	0.8	3.0	1.3
GCJ31	2.0	4.4	1.7
GCJ32	2.0	4.4	2.6
GCJ43	3.0	6.0	3.3
GCJ55	4.2	7.2	5.1

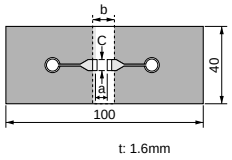


Fig. 1

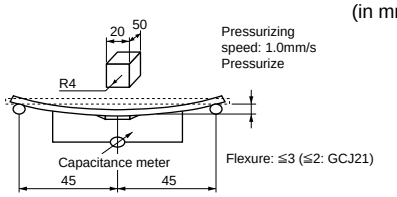


Fig. 2

Type	a	b	c
GCJ21	1.2	4.0	1.65
GCJ31	2.2	5.0	2.0
GCJ32	2.2	5.0	2.9
GCJ43	3.5	7.0	3.7
GCJ55	4.5	8.0	5.6

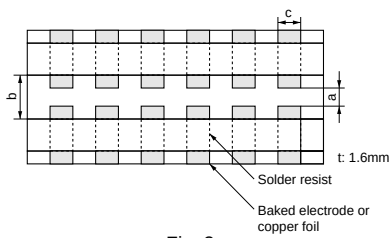
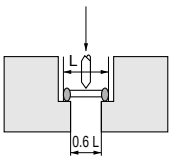


Fig. 3

Continued on the following page.

Medium Voltage for Automotive Soft Termination Type GCJ Series Specifications and Test Methods

Continued from the preceding page.

No.	AEC-Q200 Test Item		Specifications	AEC-Q200 Test Method
20	Beam Load Test		The chip should endure the following force. Chip thickness < 1.25mm rank: 15N Chip thickness ≧ 1.25mm rank: 54.5N	Place the capacitor in the beam load fixture as in Fig. 4. Apply force.  Fig. 4 Speed at which to supply the Stress Load: 2.5mm / s
21	Capacitance Temperature Character-istics	Capacitance Change	Within ±15%	The capacitance change should be measured after 5 minutes at each specified temperature stage. Step / Temperature (°C) 1 / 25±2 2 / -55±3 3 / 25±2 4 / 125±3 5 / 25±2 The ranges of capacitance change compared with the above 25°C value over the temperature ranges shown in the table should be within the specified ranges. •Pretreatment Perform the heat treatment at 150+0/-10°C for 60±5 minutes and then let sit for 24±2 hours at room temperature. Perform the initial measurement.