

Specification Sheet

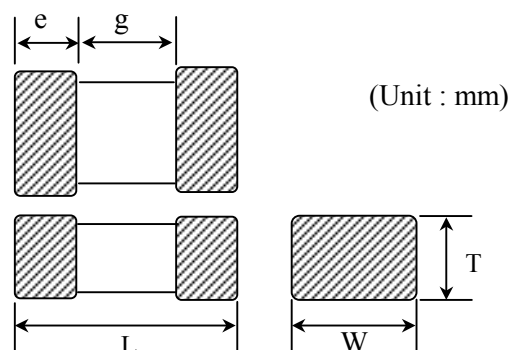
<Chip Monolithic Ceramic Capacitor>

Murata Global P/N : GRM155R60J106ME44D (0402,X5R,10 μ F,6.3V)

Corresponding products for RoHS directive

1. Dimensions (Unit : mm)

| | |
|---|--------------|
| L | 1.0+/-0.2 |
| W | 0.5+/-0.2 |
| T | 0.5+/-0.2 |
| e | 0.15 to 0.35 |
| g | 0.3min. |



2. Rated Value

| | |
|--------------------------|-----------------------|
| TC code | R6 |
| TC | X5R |
| Temp.Coeff or Cap.Change | +/-15% at -55 to 85°C |
| CAP. , CAP.TOL | 10 μ F, +/-20% |
| DC Rated Voltage | 6.3V |
| Size Code | 0402 |

3. Packaging

| Specification | Packaging unit [pcs/reel] |
|---|---------------------------|
| ϕ 180 Paper Tape Carrier Packaging | 10000 |

4. Specification

Please refer to next page.

△Note

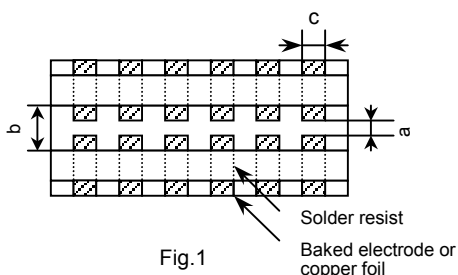
- (1) This specification sheet is applied for CHIP MONOLITHIC CERAMIC CAPACITOR used for General Electronics equipment for your design.
- (2) Please contact our sales representative or product engineers before using our products for the application listed below.
 - ① Aircraft equipment ② Aerospace equipment ③ Undersea equipment ④ Medical equipment
 - ⑤ Transportation equipment ⑥ Traffic signal equipment ⑦ Disaster prevention / crime prevention equipment
 - ⑧ Application of similar complexity and/or requirements to the applications listed in the above.
- (3) Solderability of Tin plating termination chip might be deteriorated when low temperature soldering profile where peak solder temperature is below the Tin melting point is used. Please confirm the solderability of Tin plating termination chip before use.
- (4) Use of Sn-Zn based solder will deteriorate reliability of MLCC. Please contact murata factory for the use of Sn-Zn based solder in advance.
- (5) This specification sheet has only typical specification because there is no space for detailed specifications.

Therefore, please approve our product specification or transact the approval sheet for product specification before your ordering. Especially, please read rating and CAUTION (for storage, operating, rating, soldering, mounting, and handling) in them to prevent smoking and/or burning, etc.
- (6) You are able to read a detailed specification of our some products listed in this specification sheet in the web-site of MURATA (<http://www.murata.com/>) before to require our product specification or to transact the approval sheet.
- (7) Product specifications are subject to change without advance notice.

Please check with our sales representatives or product engineers before ordering.
If there are any questions, please contact our sales representatives or product engineers.

Business Development Support Sec. I
Planning & Market Promotion Department

| No | Item | Specification | Test Method | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------|--|---|---|-----------------------------|-----------------|--------------------------------|---------------------|--|--|----------------------|------------|-----------------|----------|-------------|----------------|----------------|------|-----------------|-----|-----------------|------|-------------|-----|-----------------|------|-------------|------|-----------------|------|-----------------|-----|-----------------|------|-----------------|---|-------|-----|-----|-----|-------|-----|-----|-----|
| 1 | Operating Temperature Range | R6 : -55°C to +85°C R7/ C7/ E7/ D7 : -55°C to +125°C F5 : -30°C to +85°C C8 : -55°C to +105°C | Reference Temperature : 25°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Rated Voltage | See the previous pages | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, V^{P-P} or V^{O-P} , whichever is larger, should be maintained within the rated voltage range. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Appearance | No defects or abnormalities | Visual inspection. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Dimensions | Within the specified dimension | Using calipers or Microscope. (GRM02 size is based on Microscope) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Dielectric Strength | No defects or abnormalities | No failure should be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Insulation Resistance | More than 50Ω·F | The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at 25°C and 75%RH max. and within 1 minutes of charging. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Capacitance | Within the specified tolerance | The capacitance/D.F. should be measured at 25°C at the frequency and voltage shown in the table. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Dissipation Factor (D.F.) | R6 / R7 / C7/ C8/ E7 /D7 : 0.1 max. F5 : 0.2 max. | <table border="1"> <thead> <tr> <th>Capacitance</th> <th>Frequency</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>C ≤ 10μF (10V min.)</td> <td>1 ± 0.1kHz</td> <td>* 1.0 ± 0.2 Vrms</td> </tr> <tr> <td>C ≤ 10μF (6.3V max.)</td> <td>1 ± 0.1kHz</td> <td>0.5 ± 0.1 Vrms</td> </tr> <tr> <td>C > 10μF</td> <td>120 ± 24Hz</td> <td>0.5 ± 0.1 Vrms</td> </tr> </tbody> </table> <p>* Measuring Voltage : 0.5±0.1Vrms GRM155R61A124 to 105, GRM022R61A103 GRM185R61A/1C105, GRM188R61A/1C225 GRM188C8/D71A225, GRM188R71A225 GRM188R61A335, GRM219R61A106/475, GRM219R61C475 GRM21BR6/R71A/1C106, GRM319R61A/1C106</p> <p>7. Capacitance GRM033 R6 0G/0J 105 Perform a heat treatment at 150 +0/-10°C for one hour and then set for 24±2 hours at room temprature</p> | Capacitance | Frequency | Voltage | C ≤ 10μF (10V min.) | 1 ± 0.1kHz | * 1.0 ± 0.2 Vrms | C ≤ 10μF (6.3V max.) | 1 ± 0.1kHz | 0.5 ± 0.1 Vrms | C > 10μF | 120 ± 24Hz | 0.5 ± 0.1 Vrms | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance | Frequency | Voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C ≤ 10μF (10V min.) | 1 ± 0.1kHz | * 1.0 ± 0.2 Vrms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C ≤ 10μF (6.3V max.) | 1 ± 0.1kHz | 0.5 ± 0.1 Vrms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C > 10μF | 120 ± 24Hz | 0.5 ± 0.1 Vrms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Capacitance Temperature Characteristics | <table border="1"> <thead> <tr> <th>Char.</th> <th>Temp. Range</th> <th>Reference Temp.</th> <th>Cap. Change</th> </tr> </thead> <tbody> <tr> <td>R6</td> <td>-55°C to +85°C</td> <td>25°C</td> <td>Within ±15%</td> </tr> <tr> <td>R7</td> <td>-55°C to +125°C</td> <td>25°C</td> <td>Within ±15%</td> </tr> <tr> <td>F5</td> <td>-30°C to +85°C</td> <td>25°C</td> <td>Within +22/-82%</td> </tr> <tr> <td>C7</td> <td>-55°C to +125°C</td> <td>25°C</td> <td>Within ±22%</td> </tr> <tr> <td>C8</td> <td>-55°C to +105°C</td> <td>25°C</td> <td>Within ±22%</td> </tr> <tr> <td>E7</td> <td>-55°C to +125°C</td> <td>25°C</td> <td>Within +22/-56%</td> </tr> <tr> <td>D7</td> <td>-55°C to +125°C</td> <td>25°C</td> <td>Within +22/-33%</td> </tr> </tbody> </table> | Char. | Temp. Range | Reference Temp. | Cap. Change | R6 | -55°C to +85°C | 25°C | Within ±15% | R7 | -55°C to +125°C | 25°C | Within ±15% | F5 | -30°C to +85°C | 25°C | Within +22/-82% | C7 | -55°C to +125°C | 25°C | Within ±22% | C8 | -55°C to +105°C | 25°C | Within ±22% | E7 | -55°C to +125°C | 25°C | Within +22/-56% | D7 | -55°C to +125°C | 25°C | Within +22/-33% | <p>The capacitance change should be measured after 5 min. at each specified temperature stage. The ranges of capacitance change compared with the 25°C value over the temperature ranges shown in the table shall be within the specified ranges.</p> <p>Measuring Voltage : GRM43 R6 0J/1A 336/476 : 1.0+/-0.2Vrms GRM033 R6 0J 474, GRM155 R6 0J 475, GRM153 R6 0G/0J 225 GRM155 R6 0G 106, GRM188 R6 0G/0J 226, GRM219 R6 1A 226 : 0.2+/-0.05Vrms GRM155 R6 0J 106, GRM033 R6 0G/0J 105: 0.1+/-0.03Vrms</p> <p>Initial measurement for high dielectric constant type Perform a heat treatment at 150+0/-10°C for one hour and then set for 24±2 hour at room temperature. Perform the initial measurement.</p> | | | | | | | | |
| Char. | Temp. Range | Reference Temp. | Cap. Change | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R6 | -55°C to +85°C | 25°C | Within ±15% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R7 | -55°C to +125°C | 25°C | Within ±15% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F5 | -30°C to +85°C | 25°C | Within +22/-82% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C7 | -55°C to +125°C | 25°C | Within ±22% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C8 | -55°C to +105°C | 25°C | Within ±22% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E7 | -55°C to +125°C | 25°C | Within +22/-56% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D7 | -55°C to +125°C | 25°C | Within +22/-33% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Adhesive Strength of Termination | No removal of the terminations or other defects should occur. | <p>Solder the capacitor to the test jig (glass epoxy board) shown in Fig.1 using a eutectic solder. Then apply 10N* force in parallel with the test jig for 10±1 sec. The soldering should be done either with an iron or using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock.</p> <p>*1N:GRM02 , 2N:GR□03 , 5N:GR□15/GRM18,</p> <table border="1"> <thead> <tr> <th>Type</th> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>GRM02</td> <td>0.2</td> <td>0.56</td> <td>0.23</td> </tr> <tr> <td>GR□03</td> <td>0.3</td> <td>0.9</td> <td>0.3</td> </tr> <tr> <td>GR□15</td> <td>0.4</td> <td>1.5</td> <td>0.5</td> </tr> <tr> <td>GRM18</td> <td>1.0</td> <td>3.0</td> <td>1.2</td> </tr> <tr> <td>GRM21</td> <td>1.2</td> <td>4.0</td> <td>1.65</td> </tr> <tr> <td>GRM31</td> <td>2.2</td> <td>5.0</td> <td>2.0</td> </tr> <tr> <td>GRM32</td> <td>2.2</td> <td>5.0</td> <td>2.9</td> </tr> <tr> <td>GRM43</td> <td>3.5</td> <td>7.0</td> <td>3.7</td> </tr> <tr> <td>GRM55</td> <td>4.5</td> <td>8.0</td> <td>5.6</td> </tr> </tbody> </table> <p>(in:mm)</p> | Type | a | b | c | GRM02 | 0.2 | 0.56 | 0.23 | GR□03 | 0.3 | 0.9 | 0.3 | GR□15 | 0.4 | 1.5 | 0.5 | GRM18 | 1.0 | 3.0 | 1.2 | GRM21 | 1.2 | 4.0 | 1.65 | GRM31 | 2.2 | 5.0 | 2.0 | GRM32 | 2.2 | 5.0 | 2.9 | GRM43 | 3.5 | 7.0 | 3.7 | GRM55 | 4.5 | 8.0 | 5.6 |
| Type | a | b | c | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM02 | 0.2 | 0.56 | 0.23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GR□03 | 0.3 | 0.9 | 0.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GR□15 | 0.4 | 1.5 | 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM18 | 1.0 | 3.0 | 1.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM21 | 1.2 | 4.0 | 1.65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM31 | 2.2 | 5.0 | 2.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM32 | 2.2 | 5.0 | 2.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM43 | 3.5 | 7.0 | 3.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM55 | 4.5 | 8.0 | 5.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Vibration | <table border="1"> <tbody> <tr> <td>Appearance</td> <td>No defects or abnormalities</td> </tr> <tr> <td>Capacitance</td> <td>Within the specified tolerance</td> </tr> <tr> <td>D.F</td> <td>R6/R7/C7/C8/E7/D7 : 0.1 max. F5: 0.2 max.</td> </tr> </tbody> </table> | Appearance | No defects or abnormalities | Capacitance | Within the specified tolerance | D.F | R6/R7/C7/C8/E7/D7 : 0.1 max. F5: 0.2 max. | <p>Solder the capacitor on the test jig (glass epoxy board) in the same manner and under the same conditions as (10). 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. 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 3 mutually perpendicular directions (total of 6 hours).</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Appearance | No defects or abnormalities | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance | Within the specified tolerance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D.F | R6/R7/C7/C8/E7/D7 : 0.1 max. F5: 0.2 max. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



| No | Item | Specification | | Test Method | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|---|---|---|---|-------------|------|---|----------------|-----------|---------------------------|----------------|---------------------------|------------|------------|------------|--------|------------|--------|-----|-----|-------|-----|-----|-----|-------|-----|-----|------|-------|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|-------|-----|-----|-----|
| 12 | Deflection | Appearance | No defects or abnormalities | Solder the capacitor to the test jig (glass epoxy board) shown 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 should be conducted with care so that the soldering is uniform and free of defects such as heat shock. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Capacitance Change | Within $\pm 10\%$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | <table border="1"> <thead> <tr> <th>Type</th> <th>a</th> <th>b</th> <th>c</th> </tr> </thead> <tbody> <tr> <td>GRM02</td> <td>0.2</td> <td>0.56</td> <td>0.23</td> </tr> <tr> <td>GR□03</td> <td>0.3</td> <td>0.9</td> <td>0.3</td> </tr> <tr> <td>GR□15</td> <td>0.4</td> <td>1.5</td> <td>0.5</td> </tr> <tr> <td>GRM18</td> <td>1.0</td> <td>3.0</td> <td>1.2</td> </tr> <tr> <td>GRM21</td> <td>1.2</td> <td>4.0</td> <td>1.65</td> </tr> <tr> <td>GRM31</td> <td>2.2</td> <td>5.0</td> <td>2.0</td> </tr> <tr> <td>GRM32</td> <td>2.2</td> <td>5.0</td> <td>2.9</td> </tr> <tr> <td>GRM43</td> <td>3.5</td> <td>7.0</td> <td>3.7</td> </tr> <tr> <td>GRM55</td> <td>4.5</td> <td>8.0</td> <td>5.6</td> </tr> </tbody> </table> <p style="text-align: right;">(in:mm)</p> | Type | a | b | c | GRM02 | 0.2 | 0.56 | 0.23 | GR□03 | 0.3 | 0.9 | 0.3 | GR□15 | 0.4 | 1.5 | 0.5 | GRM18 | 1.0 | 3.0 | 1.2 | GRM21 | 1.2 | 4.0 | 1.65 | GRM31 | 2.2 | 5.0 | 2.0 | GRM32 | 2.2 | 5.0 | 2.9 | GRM43 | 3.5 | 7.0 | 3.7 | GRM55 | 4.5 | 8.0 | 5.6 |
| Type | a | b | c | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM02 | 0.2 | 0.56 | 0.23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GR□03 | 0.3 | 0.9 | 0.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GR□15 | 0.4 | 1.5 | 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM18 | 1.0 | 3.0 | 1.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM21 | 1.2 | 4.0 | 1.65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM31 | 2.2 | 5.0 | 2.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM32 | 2.2 | 5.0 | 2.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM43 | 3.5 | 7.0 | 3.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GRM55 | 4.5 | 8.0 | 5.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | Solderability of Termination | 75% of the terminations is 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 \pm 0.5 seconds at 230 \pm 5°C or Sn-3.0 Ag-0.5 Cu solder solution for 2 \pm 0.5 seconds at 245 \pm 5°C. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | Resistance to Soldering Heat | Appearance | No defects or abnormalities | Preheat the capacitor at 120 to 150°C for 1 minute. Immerse the capacitor in an eutectic solder solution* or Sn-3.0 Ag-0.5 Cu solder solution at 270 \pm 5°C for 10 \pm 0.5 seconds. Set at room temperature for 24 \pm 2 hours, then measure. * Not apply to GRM02 · Initial measurement for high dielectric constant type Perform a heat treatment at 150+0/-10°C for one hour and then set at room temperature for 24 \pm 2 hours. Perform the initial measurement. * Preheating for GRM32/43/55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Capacitance Change | R6/R7/C7/C8/E7/D7 : Within $\pm 15\%$ F5: Within $\pm 20\%$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | D.F. | R6/R7/C7/C8/E7/D7 : 0.1 max. F5: 0.2 max. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | I.R. | More than 50 Ω · F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Dielectric Strength | No defects | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>100°C to 120°C</td> <td>1min.</td> </tr> <tr> <td>2</td> <td>170°C to 200°C</td> <td>1min.</td> </tr> </tbody> </table> | | Step | Temperature | Time | 1 | 100°C to 120°C | 1min. | 2 | 170°C to 200°C | 1min. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Step | Temperature | Time | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 100°C to 120°C | 1min. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 170°C to 200°C | 1min. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | Temperature Sudden Change | Appearance | No defects or abnormalities | Fix the capacitor to the supporting jig in the same manner and under the same conditions as (10). Perform the five cycles according to the four heat treatments shown in the following table. Set for 24 \pm 2 hours at room temperature, then measure. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Capacitance Change | R6/R7/C7/C8/D7 : Within $\pm 7.5\%$ E7 : Within $\pm 30\%$ F5 : Within $\pm 20\%$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | D.F. | R6/R7/C7/C8/E7/D7 : 0.1 max. F5 : 0.2 max. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | I.R. | More than 50 Ω · F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Dielectric Strength | No defects | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Step</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Temp.(°C)</td> <td>Min. Operating Temp.+0/-3</td> <td>Room Temp.</td> <td>Max. Operating Temp.+3/-0</td> <td>Room Temp.</td> </tr> <tr> <td>Time(min.)</td> <td>30\pm3</td> <td>2 to 3</td> <td>30\pm3</td> <td>2 to 3</td> </tr> </tbody> </table> | | Step | 1 | 2 | 3 | 4 | Temp.(°C) | Min. Operating Temp.+0/-3 | Room Temp. | Max. Operating Temp.+3/-0 | Room Temp. | Time(min.) | 30 \pm 3 | 2 to 3 | 30 \pm 3 | 2 to 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Step | 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temp.(°C) | Min. Operating Temp.+0/-3 | Room Temp. | Max. Operating Temp.+3/-0 | Room Temp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Time(min.) | 30 \pm 3 | 2 to 3 | 30 \pm 3 | 2 to 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | High Temperature High Humidity (Steady) | Appearance | No defects or abnormalities | Apply the rated voltage at 40 \pm 2°C and 90 to 95% humidity for 500 \pm 12 hours. The charge/discharge current is less than 50mA. · Initial measurement Perform a heat treatment at 150+0/-10°C for one hour and then set for 24 \pm 2 hours at room temperature. Perform the initial measurement. · Measurement after test Perform a heat treatment at 150+0/-10°C for one hour and then set for 24 \pm 2 hours at room temperature, then measure. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Capacitance Change | R6/R7/C7/C8/E7/D7 : Within $\pm 12.5\%$ F5: Within $\pm 30\%$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | D.F. | R6/R7/C7/C8/E7/D7 : 0.2max. F5: 0.4max. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | I.R. | More than 12.5 Ω · F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | Durability | Appearance | No defects or abnormalities | Apply 100% of the rated voltage for 1000 \pm 12 hours at the maximum operating temperature $\pm 3^\circ\text{C}$. Set for 24 \pm 2 hours at room temperature, then measure. The charge/ discharge current is less than 50mA. · Initial measurement Perform a heat treatment at 150+0/-10°C for one hour and then set for 24 \pm 2 hours at room temperature. Perform the initial measurement. · Measurement after test Perform a heat treatment at 150+0/-10°C for one hour and then set for 24 \pm 2 hours at room temperature, then measure. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Capacitance Change | R6/R7/C7/C8/E7/D7 : Within $\pm 12.5\%$ F5: Within $\pm 30\%$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | D.F. | R6/R7/C7/C8 /E7/D7 : 0.2max. F5: 0.4max. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | I.R. | More than 25 Ω · F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |