Specification No. FM7171SA2-0019

Specification Sheet

<Chip Monolithic Ceramic Capacitor, Low ESL Series >

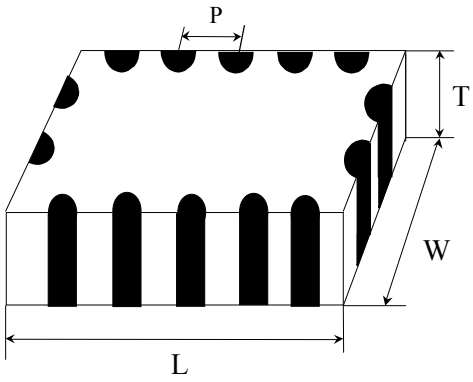
Murata Global P/N : LLK215C70G225ME01L

(Low ESL 0805-14T,T=0.5,X7S,2.2uF,4V)

Corresponding products for RoHS directive

Dimensions(mm)

L	W	T	p
2.0+/-0.1	1.25+/-0.1	0.5+0.05/-0.1	0.4+/-0.05



Rated Value

TC code	TC	DC Rated Voltage (V)	CAP.		CAP.TOL
C7	X7S	4	2.2	μF	+/-20%

Packaging

Specification	Packaging unit [pcs/reel]
ϕ180 Plastic Tape Carrier Packaging	4,000

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 ②Aerospace 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.

(8) Do not use under the condition that causes condensation.
Use dampproof countermeasure if using under the condition that causes condensation

Business Development Support Sec. I
Planning & Market Promotion Department
FUKUI MURATA MFG. CO., LTD.

SPECIFICATIONS AND TEST METHODS

<table>
<tr><th>No</th><th>Item</th><th>Specification</th><th>Test Method</th></tr>
<tr><td>1</td><td>Operating Temperature Range</td><td>R7 / C7 : −55℃ to +125℃</td><td></td></tr>
<tr><td>2</td><td>Rated Voltage</td><td>See the previous pages.</td><td>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, shall be maintained within the rated voltage range.</td></tr>
<tr><td>3</td><td>Appearance</td><td>No defects or abnormalities.</td><td>Visual inspection.</td></tr>
<tr><td>4</td><td>Dimensions</td><td>Within the specified dimension.</td><td>Using calipers.</td></tr>
<tr><td>5</td><td>Dielectric Strength</td><td>No defects or abnormalities.</td><td>No failure shall 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.</td></tr>
<tr><td>6</td><td>Insulation Resistance</td><td>50Ω･F min.</td><td>The insulation resistance shall be measured with a DC voltage not exceeding the rated voltage at 25℃ and 75%RH max. and within 1 minutes of charging.</td></tr>
<tr><td>7</td><td>Capacitance</td><td>Within the specified tolerance.</td><td rowspan="2">The capacitance/D.F. shall be measured at 25°C at the frequency and voltage shown in the table.
<table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><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></table></td></tr>
<tr><td>8</td><td>Dissipation Factor (D.F.)</td><td>0.120max.</td></tr>
<tr><td>9</td><td>Capacitance Temperature Characteristics</td><td><table><tr><th>Char.</th><th>Temp.Range (℃)</th><th>Reference Temp.</th><th>Cap.Change</th></tr><tr><td>R7</td><td>-55 to +125</td><td>25℃</td><td>Within ±15%</td></tr><tr><td>C7</td><td>-55 to +125</td><td>25℃</td><td>Within ±22%</td></tr></table></td><td>The capacitance change shall be measured after 5 min. at each specified temperature stage.
<table><tr><th>Step</th><th>Temperature(℃)</th></tr><tr><td>1</td><td>25±2</td></tr><tr><td>2</td><td>-55±3</td></tr><tr><td>3</td><td>25±2</td></tr><tr><td>4</td><td>125±3</td></tr><tr><td>5</td><td>25±2</td></tr></table>The ranges of capacitance change compared with the 25℃ value over the temperature ranges shown in the table shall be within the specified ranges.</td></tr>
<tr><td>10</td><td>Adhesive Strength of Termination</td><td>No removal of the terminations or other defects shall occur.</td><td>Solder the capacitor to the test jig (glass epoxy board) using a eutectic solder. Then apply 5N force in parallel with the test jig for 10±1 sec. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock.</td></tr>
<tr><td>11</td><td>Vibration</td><td><table><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>0.120max.</td></tr></table></td><td>Solder the capacitor to the test jig (glass epoxy board) in the same manner and under the same conditions as (10). The capacitor shall 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, shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total of 6 hours).</td></tr>
<tr><td>12</td><td>Solderability of Termination</td><td>75% of the terminations is to be soldered evenly and continuously.</td><td>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℃ for 10 to 30 seconds. After preheating, immerse in eutectic solder solution for 2±0.5 seconds at 230±5℃,or Sn-3.0Ag-0.5Cu solder solution for 2±0.5 seconds at 245±5℃.</td></tr>
</table>

SPECIFICATIONS AND TEST METHODS

<table>
<tr><th>No</th><th>Item</th><th colspan="2">Specification</th><th>Test Method</th></tr>
<tr><td rowspan="5">13</td><td rowspan="5">Temperature Sudden Change</td><td>Appearance</td><td>No marking defects.</td><td rowspan="5">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 listed in the following table. Let sit for 24±2 hours at room temperature, then measure.
<table><tr><td>Step</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Temp.(℃)</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±3</td><td>2 to 3</td><td>30±3</td><td>2 to 3</td></tr></table>・Initial measurement
Perform a heat treatment at 150+0/-10 ℃ for one houg and then let sit for 24±2 hours at room temperature.Perform the initial measurement.</td></tr>
<tr><td>Capacitance Change</td><td>Within ±12.5%</td></tr>
<tr><td>D.F.</td><td>0.120max.</td></tr>
<tr><td>I.R.</td><td>50Ω・F min.</td></tr>
<tr><td>Dielectric Strength</td><td>No failure</td></tr>
<tr><td rowspan="4">14</td><td rowspan="4">High Temperature High Humidity (Steady State)</td><td>Appearance</td><td>No marking defects.</td><td rowspan="4">Apply the rated voltage at 40±2℃ and 90 to 95% humidity for 500±12 hours. The charge/discharge current is less than 50mA.
・Initial measurement
Perform a heat treatment at 150+0/-10 ℃ for one houg and then let sit for 24±2 hours at room temperature.Perform the initial measurement.
・Measurement after test
Perform a heat treatment at 150+0/-10℃ for one houg and then let sit for 24±2 hours at room temperature, then measure.</td></tr>
<tr><td>Capacitance Change</td><td>Within ±12.5%</td></tr>
<tr><td>D.F.</td><td>0.2 max.</td></tr>
<tr><td>I.R.</td><td>12.5Ω・F min.</td></tr>
<tr><td rowspan="4">15</td><td rowspan="4">Durability</td><td>Appearance</td><td>No marking defects.</td><td rowspan="4">Apply 150% of the rated voltage for 1000±12 hours at the maximum operating temperature ±3℃. Let sit for 24±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℃ for one houg and then let sit for 24±2 hours at room temperature.Perform the initial measurement.
・Measurement after test
Perform a heat treatment at 150+0/-10℃ for one houg and then let sit for 24±2 hours at room temperature, then measure.</td></tr>
<tr><td>Capacitance Change</td><td>Within ±12.5%</td></tr>
<tr><td>D.F.</td><td>0.2 max.</td></tr>
<tr><td>I.R.</td><td>25Ω・F min.</td></tr>
</table>

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