Ultra high voltage ceramic capacitors
With metal terminals
For GCB/GIS

TSF/H/GA series
(1) During transportation and storage
Do not transport or store where the products will be exposed to high temperature or high humidity.
Do not expose to poisonous gases such as H2SO4, HCl, or HNO3.
Avoid excessive impact such as that caused by falling.

(2) During operation
Avoid contact with electrolytes such as perspiration. Do not touch with bare hands.
Avoid excessive impact such as that caused by falling.
Do not apply solder to stud terminals.
Do not re-machine the terminals.

(3) Usage
Make sure that the products are not exposed to radiant heat from chambers or transformers.

(4) Others
The products listed on this catalog are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property.
If you intend to use the products in the applications listed below or if you have special requirements exceeding the range or conditions set forth in the each catalog, please contact us.

(1) Aerospace/aviation equipment
(2) Transportation equipment (cars, electric trains, ships, etc.)
(3) Medical equipment
(4) Power-generation control equipment
(5) Atomic energy-related equipment
(6) Seabed equipment
(7) Transportation control equipment

(8) Public information-processing equipment
(9) Military equipment
(10) Electric heating apparatus, burning equipment
(11) Disaster prevention/crime prevention equipment
(12) Safety equipment
(13) Other applications that are not considered general-purpose applications

When designing your equipment even for general-purpose applications, you are kindly requested to take into consideration securing protection circuit/device or providing backup circuits in your equipment.
Ultra high voltage ceramic capacitors
With metal terminals
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Overview of TSF/H/GA series

■ FEATURES
- TSF series with molded metal terminals (rated voltage Eac: 20 kV), H series with non-insulated metal terminals (rated voltage Eac: 8 kV), and GA series with non-insulated metal terminals (rated voltage Eac: 10 kV) available
- Strong impulse voltage
- High capacitance and excellent temperature characteristics
- Low-loss and low distortion factor
- Excellent voltage-capacitance characteristics

■ APPLICATION
- Circuit breakers for gas insulation switchgears (supporting SF6 gas)

■ OPERATING TEMPERATURE RANGE, PRODUCT WEIGHT

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Sub part No.</th>
<th>Operating temperature (°C)</th>
<th>Storage temperature (°C)</th>
<th>Individual weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSF-40C</td>
<td>60734ZT112J4DA</td>
<td>~30 to +85</td>
<td>~30 to +85</td>
<td>149</td>
</tr>
<tr>
<td>TSF-30</td>
<td>60722ZT401K4DAA</td>
<td>~30 to +85</td>
<td>~30 to +85</td>
<td>80</td>
</tr>
<tr>
<td>H-11</td>
<td>60739ZT292K4AA</td>
<td>~20 to +70</td>
<td>~20 to +70</td>
<td>79</td>
</tr>
<tr>
<td>GA-14</td>
<td>60739ZT172K4AA</td>
<td>~20 to +70</td>
<td>~20 to +70</td>
<td>124</td>
</tr>
</tbody>
</table>


Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use. Please note that the contents may change without any prior notice due to reasons such as upgrading.
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**CAPACITORS**

**TSF series**

**SHAPE & DIMENSIONS**

Molded with epoxide resin; alumina filler.

**MARKINGS**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Sub part No.</th>
<th>øD (mm)</th>
<th>ød (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSF-40C</td>
<td>60734ZT112J4DA</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>TSF-30</td>
<td>60722ZT401K4DAA</td>
<td>30</td>
<td>10</td>
</tr>
</tbody>
</table>

**ELECTRICAL CHARACTERISTICS**

**CHARACTERISTICS SPECIFICATION TABLES**

Class 2 (Temperature stable)

Temperature characteristics: Z5T(+10 to +85°C, +22/~33%)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Sub part No.</th>
<th>Rated voltage</th>
<th>Capacitance</th>
<th>Withstanding voltage</th>
<th>Dissipation factor (tanδ)</th>
<th>Insulation resistance</th>
<th>AC corona starting voltage [3PC*] (kV) min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSF-40C</td>
<td>60734ZT112J4DA</td>
<td>20</td>
<td>1080±10%</td>
<td>42</td>
<td>0.2</td>
<td>100000</td>
<td>25</td>
</tr>
<tr>
<td>TSF-30</td>
<td>60722ZT401K4DAA</td>
<td>20</td>
<td>400±10%</td>
<td>42</td>
<td>0.2</td>
<td>100000</td>
<td>25</td>
</tr>
</tbody>
</table>

* PC : Pico coulomb.

**CAPACITANCE VS. TEMPERATURE CHARACTERISTICS**

![Capacitance change rate vs. temperature graph]

**CAPACITANCE VS. AC VOLTAGE CHARACTERISTICS**

![Capacitance change rate vs. AC voltage graph]
H series

**SHAPE & DIMENSIONS**

Non-insulated type

Dimensions in mm

**ELECTRICAL CHARACTERISTICS**

**CHARACTERISTICS SPECIFICATION TABLES**

Class 2 (Temperature stable)

Temperature characteristics: Z5T(+10 to +85°C, +22/-33%)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Sub part No.</th>
<th>Rated voltage</th>
<th>Capacitance</th>
<th>Withstanding voltage</th>
<th>Dissipation factor (tanδ)</th>
<th>Insulation resistance</th>
<th>AC corona starting voltage [3PC-] (kV) min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-11</td>
<td>60739ZT292K4AA</td>
<td>8</td>
<td>2900±10%</td>
<td>16</td>
<td>0.2</td>
<td>100000</td>
<td>8</td>
</tr>
</tbody>
</table>

* PC : Pico coulomb.

**CAPACITANCE VS. TEMPERATURE CHARACTERISTICS**

**CAPACITANCE VS. AC VOLTAGE CHARACTERISTICS**

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GA series

■ SHAPE & DIMENSIONS
Non-insulated type

Dimensions in mm

■ ELECTRICAL CHARACTERISTICS

□ CHARACTERISTICS SPECIFICATION TABLES
Class 2 (Temperature stable)
Temperature characteristics: Z5T(+10 to +85°C, +22/~33%)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Sub part No.</th>
<th>Rated voltage (kV)</th>
<th>Capacitance (pF)</th>
<th>Withstanding voltage (kV)</th>
<th>Dissipation factor (tanδ) (%) max.</th>
<th>Insulation resistance (MΩ) min.</th>
<th>AC corona starting voltage [3PC*] (kV) min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA-14</td>
<td>60739ZT172K4AA</td>
<td>10</td>
<td>1700±10%</td>
<td>20</td>
<td>0.2</td>
<td>100000</td>
<td>10</td>
</tr>
</tbody>
</table>

* PC : Pico coulomb.

□ CAPACITANCE VS. TEMPERATURE CHARACTERISTICS

□ CAPACITANCE VS. AC VOLTAGE CHARACTERISTICS

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