# ShenZhen Topmay Electronic Co., Ltd

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## Ceramic Trimmer Capacitors

### Features

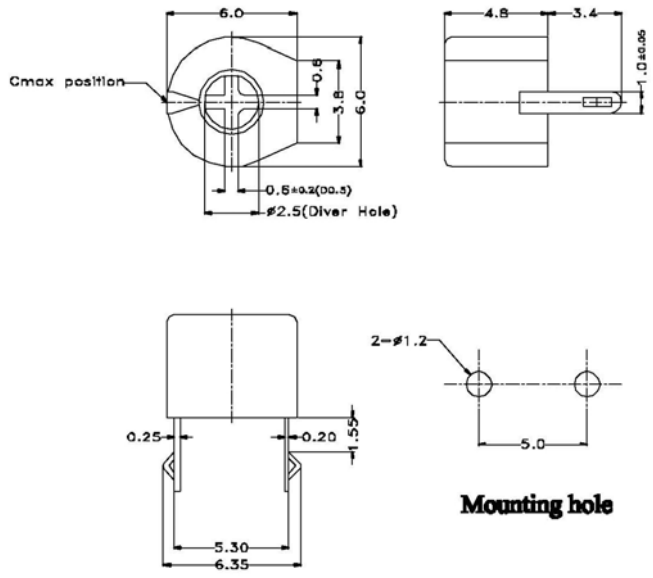
1. Small and thin size.
2. New shape of cover can improve the flux invasion compared with current products.
3. Improvement of the adhesion between rotor and stator leads to superior stability.
4. Unique construction with no plastic material provides superior soldering heat resistance to maintain excellent characteristic performance after reflow soldering.
5. Suitable for high frequency circuit due to high self-resonant frequency.

### Application

Crystal oscillators, Crystal filters, pagers, cordless telephones, PHS, hand radios, cellular telephones, remote keyless entry systems, W-LAN, etc.

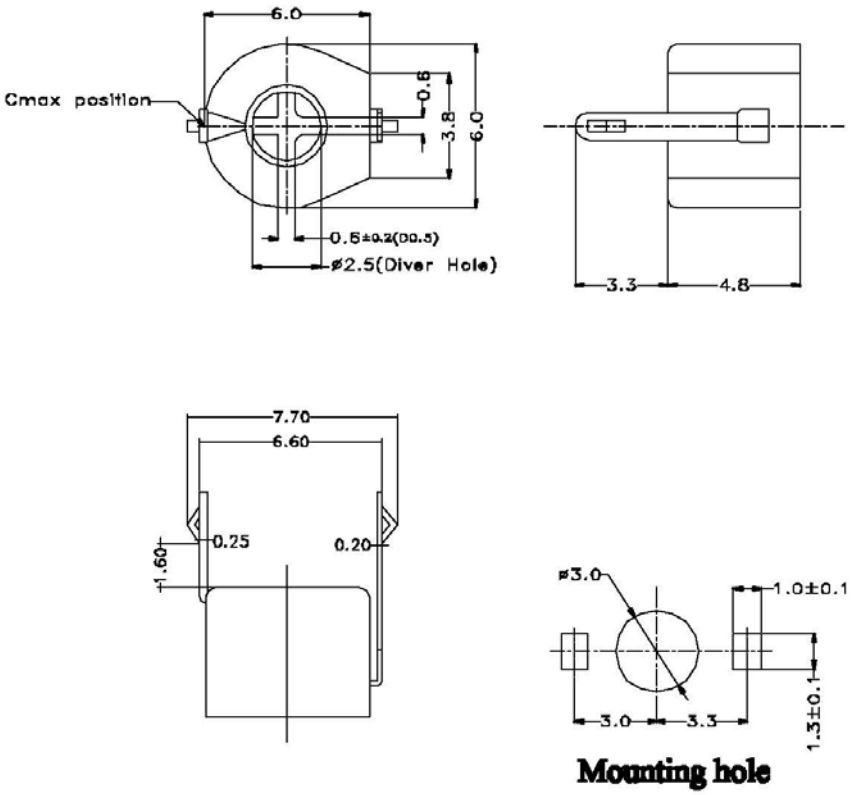
### Specifications:

**Outline drawing**




**Mounting hole**

## Outline drawing




Mounting hole

| Capacitance(pF) | | Temperature coefficient(ppm/℃) | Q factor (1MHz,Cmax) | Marking color |
|---|---|---|---|---|
| Min | Max | | | |
| 1.6 or less | $4.0_{0}^{+50\%}$ | NP0±300 | ≧500 | Black |
| 2.0 or less | $5.0_{0}^{+50\%}$ | NP0±300 | ≧500 | Blue |
| 3.0 or less | $10.0_{0}^{+50\%}$ | N750±300 | ≧500 | White |
| 5.5 or less | $20.0_{0}^{+50\%}$ | N750±300 | ≧500 | Red |
| 6.5 or less | $30.0_{0}^{+50\%}$ | N1200±500 | ≧500 | Green |
| 12.0 or less | $50.0_{0}^{+50\%}$ | N1200±500 | ≧300 | Yellow |
| 15.0 or less | $60.0_{0}^{+50\%}$ | N2200±500 | ≧300 | Brown |

## 3. Characteristics

Standard atmospherics conditions:

Unless otherwise specified, the standard range of atmospherics conditions for making measurements and tests are as follows:

Ambient temperature : 5℃ to 35℃ ;
Relative humidity : 45% to 85% ;
Air pressure : 86kPa to 106kPa.

If there is any doubt about the results. measurement shall be made within the following limits:

Ambient temperature : 20℃ ± 2℃ ;
Relative humidity : 60% to 70% ;
Air pressure : 86kPa to 106kPa.

Operating temperature range:

The operating temperature range is the range of ambient temperature of which the trimmer capacitor can be operatec continuously within rated voltage.

-25℃ to +85℃

Storage temperature range:

The Storage temperature range is the range of ambient temperature at which the trimmer capacitor can be Stored withou damage, conditions are as specified elsewhere in these specification.

-25℃ to +85℃

### 3-1 Mechanical characteristics:

| | Items | Conditions | Specification |
|---|---|---|---|
| 1 | Rotational torque | When the spindle is rotated at a rate of 10 rpm | 2.0~20.0Nm (20~200gf.cm) |
| 2 | Difference between the maximum and minimum value of rotational torque | Difference between the maximum value and the minimum value when the shaft is rotated at a rate of 10 rpm | 3 : 1 or less |
| 3 | Terminal strength | A static load of 5N (510gf) shall be applied to the terminal for 10 sec. | Without excessive looseness of terminals |
| | | Terminals shall be inclined through an angle of 45?in the vertical plane and then returned to its initial position . This cycle shall be made for twice | |
| 4 | Shaft load | A load of 1 N shall be applied perpendicular to the shaft for 10s. | Clauses 3-1-1 and 3-1-2 should be satisfied |

### 3-2 Electrical characteristics:

| | Items | Conditions | Specification |
|---|---|---|---|
| 1 | Rated voltage | | 100 V d.c. |
| 2 | Nominal capacitance | Maximum capacitance(Measured at 1MHz) | Table 1 shall be satisfied. |
| | | Minimum capacitance(Measured at 1MHz) | Table 1 shall be satisfied. |

<table>
<tr><th></th><th>Items</th><th>Conditions</th><th>Specifications</th></tr>
<tr><td>3</td><td>Q</td><td>Measured at 1MHz, Cmax</td><td>Table 1 shall be satisfied.</td></tr>
<tr><td>4</td><td>Insulation resistance</td><td>A voltage of 100 V d.c. shall be applied for 1 min, after which measurement shall be made</td><td>10000 MΩ or more</td></tr>
<tr><td>5</td><td>Dielectric strength</td><td>100 V d.c. for 1 min</td><td>Without damage</td></tr>
<tr><td>6</td><td>Capacitance drift after adjustment</td><td>Rotation shall be made for 1 cycles for 180 degree at a rate of 20 rpm.<br>Difference between the capacitance value immediately after the shaft is stopped at the position of the maximum capacitance value and the value after 1.5min later.(measured at 1 MHZ)</td><td>±1% within</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Temperature characteristics and change in capacitance</td><td>Test condition :<br>Capacitance shall be 80% to 90% of the maximum value.
<table>
<tr><th>Step</th><th>Temperature</th><th>Duration</th></tr>
<tr><td>1</td><td>20℃±2℃</td><td rowspan="5">60min</td></tr>
<tr><td>2</td><td>-25℃±3℃</td></tr>
<tr><td>3</td><td>20℃±2℃</td></tr>
<tr><td>4</td><td>85℃±2℃</td></tr>
<tr><td>5</td><td>20℃±2℃</td></tr>
</table>
<u>Temperature coefficient</u><br>=(C2-C1)/C1(T2-T1)X10$^{6}$(ppm/℃)<br>however:<br>C1= capacitance at step3<br>C2= capacitance at step2/or step4<br>T1= measuring temperature at step3<br>T2= measuring temperature at step2/or step4</td><td>Table 1 shall be satisfied</td></tr>
<tr><td><u>Change in capacitance</u><br>For difference of maximum capacitance at steps 1,3 or 5, refer to the value at step 3</td><td>5% within</td></tr>
</table>

## 3-3 Endurance characteristics:

Test capacity shall be 80% to 90% of the maximum value excluding clauses 3-3-1, 3-3-3 and 3-3-10.

| | Items | Conditions | Specification |
|---|---|---|---|
| 1 | Solder ability | Bit temperature : 390±10℃<br><br>Application time<br>of solder iron : 3sec or less | (1)Solder wetting time shall be 3 s or less.<br>(2)A new uniform coating of solder shall cover a minimum of 95% of the surface being immersed. |
| 2 | Resistance to soldering heat | Solder bath method<br>Solder temperature : 260±5℃<br>Immersion time : 7 ±0.5sec<br>Immersion dept : up to the surface of the board.<br>Solder iron method<br>Bit temperature : 390±10℃<br>Application time<br>of solder iron : 3 ±0.5sec | Table 2 shall be satisfied. |
| 3 | Resistance to flux penetration | The printed wiring board shall be fully immersed in the flux for 3 to 5 s and then taken out of the flux . the capacitor shall be inserted completely into the board as soon as the board is removed from the flux . either the flux bath method or the foaming method shall be used to apply flux to the board . in either case , flux should not come into contact with the component side surface and fluxing time shall be 3 to 4 s.<br>Note :after fluxing , if preheating is necessary before mounting ,then the surface of the solder side shall be heated to 75℃ to 90℃ for 1 min or less.<br>Using an automatic soldering system or a hand dipping system. The board shall be soldered up the component side surface (but the solder shall not come into contact with the component side )for 5±1 s at 250℃ to 260 ℃,the board shall be subjected to standard atmospheric conditions for 24 h or more after the soldering .tests shall then be carried out as specified below.<br>① visual inspection of appearance .<br>②measurement of characteristics as specified. | Electrical characteristics and mechanical characteristics shall be satisfied. |
| 4 | Vibration | At maximum capacitance , only endurance conditioning by a frequency shall be made .the entire frequency range , from 10Hz to 50Hz and return to 10Hz , shall be transverse in 1 min.<br>Amplitude (total excursion) : 1.5 mm<br>This motion shall be applied for a period of 2 h in each of mutually perpendicular axis (a total of 6 h)<br>The variable capacitance shall be subjected to standard atmospheric for other procedures. | Table 2 shall be satisfied. |
| 5 | Shock | At maximum capacitance.<br>Peak acceleration : 490 $m/s^2$ (50G)<br>Duration of pulse : 11 ms<br>Three successive shall be applied in both directions of mutually perpendicular axis (a total of 18 shock). | Table 2 shall be satisfied. |

<table>
<tr><th></th><th>Items</th><th>Conditions</th><th>Specification</th></tr>
<tr><td>6</td><td>Cold</td><td>Placed in tank at -25±2℃ for 48±4hours,left at room temperature for 1 hour after which measurement shall be made.</td><td>Table 2 shall be satisfied.</td></tr>
<tr><td>7</td><td>Dry heat</td><td>Placed in tank at 85±2℃ for 48±4hours,left at room temperature for 1 hour after which measurement shall be made.</td><td>Table 2 shall be satisfied.</td></tr>
<tr><td>8</td><td>Damp heat</td><td>Placed in tank at 40±2℃,90% to 95%RH for 96±4hours,left at room temperature for 1 hour after which measurement shall be made.</td><td>Table 2 shall be satisfied.</td></tr>
<tr><td>9</td><td>Change of temperature</td><td>The capacitor shall be subject to 5 continuous cycles, such as shown in table below . And then it shall be subjected to the controlled recovery conditions for 1 hour, after which measurement shall be made.
<table>
<tr><th>Step</th><th>Temperature</th><th>Duration(min)</th></tr>
<tr><td>1</td><td>-25℃±3℃</td><td>30</td></tr>
<tr><td>2</td><td>20℃±2℃</td><td>10~15</td></tr>
<tr><td>3</td><td>85℃±2℃</td><td>30</td></tr>
<tr><td>4</td><td>20℃±2℃</td><td>10~15</td></tr>
</table></td><td>Table 2 shall be satisfied.</td></tr>
<tr><td>10</td><td>Operating endurance</td><td>The capacitor shall be subject to 10 cycles(5 cycles for each left and right) at a speed of 10 rpm to 15rpm.</td><td>Table 2 shall be satisfied.</td></tr>
</table>

Table 2

| | Items | Conditions | Specification |
|---|---|---|---|
| 1 | Appearance | | There shall be no deformation, excessive looseness, or damage |
| 2 | Rotational torque | Refer to clauses 3-1-1and 3-1-2 | Clauses 3-1-1 and 3-1-2 should be satisfied |
| 3 | Change in capacitance | Refer to clauses 3-2-2 | Relative to previously (± 5%)within specified value |
| 4 | Q | Refer to clauses 3-2-3 | Clauses 3-2-3 should be satisfied |
| 5 | Insulation resistance | Refer to clauses 3-2-4 | Clauses 3-2-4should be satisfied |
| 6 | Dielectric strength | Refer to clauses 3-2-5 | Clauses 3-2-5should be satisfied |

※ Change in capacitance =(C2-C1)/C1X100(%)

C1=value measured before test

C2=value measured after test