



| Items                        | Characteristics                                                                                                                                                                                                                                                                   |              |                                                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------|------|--------------------|------|------|---------------------------------|------|------|------|----|-----|
| Operating Temperature Range  | -55°C to +105°C                                                                                                                                                                                                                                                                   |              |                                                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |
| Voltage Range                | 4V to 100V                                                                                                                                                                                                                                                                        |              |                                                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |
| Capacitance Range            | 0.1μF to 6800μF                                                                                                                                                                                                                                                                   |              |                                                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |
| Capacitance Tolerance        | ±20% at 120 Hz, 20°C                                                                                                                                                                                                                                                              |              |                                                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |
| Leakage Current              | For Φ4 to Φ10, after 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3(μA), whichever is greater.<br>For Φ12.5 to Φ16, after 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4(μA), whichever is greater. |              |                                                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |
| Tan δ                        | Measurement Frequency: 120Hz. Temperature: 20°C                                                                                                                                                                                                                                   |              |                                                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |
|                              | Rated voltage (V DC)                                                                                                                                                                                                                                                              |              | 4                                                                                                                                | 6.3  | 10                 | 16   | 25   | 35                              | 50   | 63   | 100  |    |     |
|                              | Tanδ (max)                                                                                                                                                                                                                                                                        | Φ4 to Φ10    | 0.35                                                                                                                             | 0.26 | 0.2                | 0.16 | 0.14 | 0.12                            | 0.12 | 0.12 | 0.12 |    |     |
|                              |                                                                                                                                                                                                                                                                                   | Φ12.5 to Φ16 | 0.42                                                                                                                             | 0.38 | 0.34               | 0.3  | 0.26 | 0.22                            | 0.18 | 0.14 | 0.12 |    |     |
| Stability at Low Temperature | Measurement Frequency: 120Hz.                                                                                                                                                                                                                                                     |              |                                                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |
|                              | Rated voltage (V DC)                                                                                                                                                                                                                                                              |              |                                                                                                                                  |      | 4                  | 6.3  | 10   | 16                              | 25   | 35   | 50   | 63 | 100 |
|                              | Impedance ratio<br>ZT/Z20 (max)                                                                                                                                                                                                                                                   | Φ4 to Φ10    | Z(-25°C)/Z (20°C)                                                                                                                | 7    | 4                  | 3    | 2    | 2                               | 2    | 2    | 2    | 3  |     |
|                              |                                                                                                                                                                                                                                                                                   |              | Z(-55°C)/Z (20°C)                                                                                                                | 15   | 8                  | 6    | 4    | 4                               | 3    | 3    | 3    | 4  |     |
|                              |                                                                                                                                                                                                                                                                                   | Φ12.5 to Φ16 | Z(-25°C)/Z (20°C)                                                                                                                | 7    | 5                  | 4    | 3    | 2                               | 2    | 2    | 2    | 2  |     |
|                              |                                                                                                                                                                                                                                                                                   |              | Z(-55°C)/Z (20°C)                                                                                                                | 17   | 12                 | 10   | 8    | 5                               | 4    | 3    | 3    | 3  |     |
| Load Life                    | After 2000 hours' application of rated voltage at 105°C, capacitors meet the characteristics requirements listed at right .                                                                                                                                                       |              |                                                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |
|                              | Capacitance Change                                                                                                                                                                                                                                                                |              | Within ±20% of the initial value for capacitors of 10V or more, and within ±30% of the initial value for capacitors of 4V & 6.3V |      |                    |      |      |                                 |      |      |      |    |     |
|                              | tan δ                                                                                                                                                                                                                                                                             |              | 200% or less of Initial Specified Value                                                                                          |      |                    |      |      |                                 |      |      |      |    |     |
|                              | Leakage Current                                                                                                                                                                                                                                                                   |              | Initial Specified Value or less                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |
| Shelf Life                   | After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above.                                                                                                                                         |              |                                                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |
| Resistance to Soldering Heat | After reflow soldering and restored at room temperature, they meet the characteristics requirements listed at right.                                                                                                                                                              |              |                                                                                                                                  |      | Capacitance Change |      |      | Within ±10% of Initial Value    |      |      |      |    |     |
|                              |                                                                                                                                                                                                                                                                                   |              |                                                                                                                                  |      | Tan δ              |      |      | Initial Specified Value or less |      |      |      |    |     |
|                              |                                                                                                                                                                                                                                                                                   |              |                                                                                                                                  |      | Leakage Current    |      |      | Initial Specified Value or less |      |      |      |    |     |
| Applicable Standards         | JIS C-5141 and JIS C-5102                                                                                                                                                                                                                                                         |              |                                                                                                                                  |      |                    |      |      |                                 |      |      |      |    |     |

## Scope

This specification applies to aluminium electrolytic capacitor, used in electronic equipment.

## Electrical Characteristics

| Item                        | Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Specification                                                                                                                                                                                 |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|---|---------|------------|---|----------|---------|---|---------|------------|---|----------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rated Voltage               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Voltage range, capacitance range, see specification of this series.                                                                                                                           |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |
| Capacitance                 | Measuring frequency : 120 ±12Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Voltage range, capacitance range, see specification of this series.                                                                                                                           |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |
| Dissipation factor          | Measuring voltage : ≤0.5Vrms + 0.5 ~ 2V DC<br>Measurement circuit :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Dissipation factor, leakage current, see specification of this series.                                                                                                                        |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |
| Leakage current             | DC leakage current shall be measured after 1~2 minutes application of the DC rated working voltage through the 1000Ω resistor at 20°C<br><br>R : 1000 ±100Ω      S1 : Switch<br>A : DC current meter      S2 : Switch for protect of current meter<br>V : DC voltage meter      CX : Testing capacitor                                                                                                                                                                                                                                                                                                                                                                         | Dissipation factor leakage current, see specification of this series.                                                                                                                         |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |
| Temperature characteristics | <table border="1"> <thead> <tr> <th>Step</th><th>Temperature</th><th>Storage Time</th></tr> </thead> <tbody> <tr> <td>1</td><td>20 ±2°C</td><td>30 minutes</td></tr> <tr> <td>2</td><td>-40 ±3°C</td><td>2 hours</td></tr> <tr> <td>3</td><td>20 ±2°C</td><td>15 minutes</td></tr> <tr> <td>4</td><td>105 ±2°C</td><td>2 hours</td></tr> </tbody> </table> <p>Step 1. Measure the capacitance and impedance. (<math>Z_{r0}</math>) (<math> Z </math>, 20°C, 120Hz ±10%)<br/>Step 2. Measure the impedance at thermal balance after 2 hours. (<math> Z </math>, 20°C, 120Hz ±10%)<br/>Step 4. Measure the capacitance and leakage current at thermal balance after 2 hours.</p> | Step                                                                                                                                                                                          | Temperature | Storage Time | 1 | 20 ±2°C | 30 minutes | 2 | -40 ±3°C | 2 hours | 3 | 20 ±2°C | 15 minutes | 4 | 105 ±2°C | 2 hours | <p>Step 2. Impedance ratio (<math>Z_r / Z_{r0}</math>) less than specified value.<br/>Step 4. Capacitance change : within ± 20% of the initial measured value.<br/>Leakage current : Less than 10 times of initial specified value .</p> |
| Step                        | Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Storage Time                                                                                                                                                                                  |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |
| 1                           | 20 ±2°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 30 minutes                                                                                                                                                                                    |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |
| 2                           | -40 ±3°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2 hours                                                                                                                                                                                       |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |
| 3                           | 20 ±2°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 15 minutes                                                                                                                                                                                    |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |
| 4                           | 105 ±2°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2 hours                                                                                                                                                                                       |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |
| Surge test                  | Rated surge voltage shall be applied (switch on) for 30 ±5 seconds and then shall be applied (switch off) with discharge for 5 ±0.5 min at room temperature . This cycle shall be repeated for 1000 cycles.<br>Duration of one cycle is 6 ± 0.5 minutes .                                                                                                                                                                                                                                                                                                                                                                                                                      | Capacitance change : within ± 20% of the initial specified value.<br>Dissipation factor : less than 200% of the initial specified value.<br>Leakage current : within initial specified value. |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |
| Applicable Ripple Current   | The maximum A.C. current having frequency of 100k Hz which can be applied to the capacitor at 105 ±2°C continuously. Peak voltage not to exceed rated D.C. voltage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                               |             |              |   |         |            |   |          |         |   |         |            |   |          |         |                                                                                                                                                                                                                                          |

## Mechanical characteristics

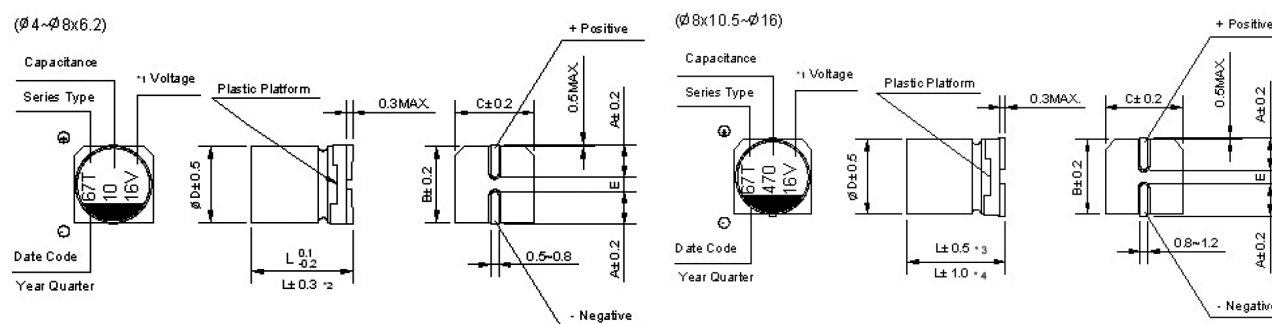
| Item                                                                                                                                                                                                                                                                                                                                                       | Test Method                                                                                                                                                                                                                                                                                                                                                                       | Specification                                                                                                           |                  |             |             |           |      |      |   |                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-------------|-----------|------|------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lead strength                                                                                                                                                                                                                                                                                                                                              | (A) Tensile strength :<br>wire lead terminal : <table><tr><td>d (mm)</td><td>≤0.45</td><td>0.5 ~ 0.8</td><td>0.8&lt;d ≤1.25</td></tr><tr><td>Load (kg)</td><td>0.51</td><td>1</td><td>2</td></tr></table>                                                                                                                                                                         | d (mm)                                                                                                                  | ≤0.45            | 0.5 ~ 0.8   | 0.8<d ≤1.25 | Load (kg) | 0.51 | 1    | 2 | When the capacitance is measured, there shall be no intermittent contacts, or open- or short-circuiting.<br>There shall be no such mechanical damage as terminal damage etc. |
|                                                                                                                                                                                                                                                                                                                                                            | d (mm)                                                                                                                                                                                                                                                                                                                                                                            | ≤0.45                                                                                                                   | 0.5 ~ 0.8        | 0.8<d ≤1.25 |             |           |      |      |   |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            | Load (kg)                                                                                                                                                                                                                                                                                                                                                                         | 0.51                                                                                                                    | 1                | 2           |             |           |      |      |   |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            | Snap-in terminal <table><tr><td>d (mm)</td><td>snap-in terminal</td></tr><tr><td>Load (kg)</td><td>2</td></tr></table>                                                                                                                                                                                                                                                            | d (mm)                                                                                                                  | snap-in terminal | Load (kg)   | 2           |           |      |      |   |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            | d (mm)                                                                                                                                                                                                                                                                                                                                                                            | snap-in terminal                                                                                                        |                  |             |             |           |      |      |   |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            | Load (kg)                                                                                                                                                                                                                                                                                                                                                                         | 2                                                                                                                       |                  |             |             |           |      |      |   |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            | The capacitor shall withstand the constant tensile force specified between the body and each lead for 10 seconds without damage either mechanical or electrical.                                                                                                                                                                                                                  |                                                                                                                         |                  |             |             |           |      |      |   |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            | (B) Bending strength :<br>wire lead terminal : <table><tr><td>d (mm)</td><td>≤0.45</td><td>0.5 ~ 0.8</td><td>0.8&lt;d ≤1.25</td></tr><tr><td>Load (kg)</td><td>0.25</td><td>0.51</td><td>1</td></tr></table>                                                                                                                                                                      | d (mm)                                                                                                                  | ≤0.45            | 0.5 ~ 0.8   | 0.8<d ≤1.25 | Load (kg) | 0.25 | 0.51 | 1 |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            | d (mm)                                                                                                                                                                                                                                                                                                                                                                            | ≤0.45                                                                                                                   | 0.5 ~ 0.8        | 0.8<d ≤1.25 |             |           |      |      |   |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            | Load (kg)                                                                                                                                                                                                                                                                                                                                                                         | 0.25                                                                                                                    | 0.51             | 1           |             |           |      |      |   |                                                                                                                                                                              |
| Snap-in terminal <table><tr><td>Cross section area of terminal</td><td>Force (kg)</td></tr><tr><td>0.5&lt;S≤1</td><td>1</td></tr><tr><td>S&gt;1</td><td>2.5</td></tr></table>                                                                                                                                                                              | Cross section area of terminal                                                                                                                                                                                                                                                                                                                                                    | Force (kg)                                                                                                              | 0.5<S≤1          | 1           | S>1         | 2.5       |      |      |   |                                                                                                                                                                              |
| Cross section area of terminal                                                                                                                                                                                                                                                                                                                             | Force (kg)                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                         |                  |             |             |           |      |      |   |                                                                                                                                                                              |
| 0.5<S≤1                                                                                                                                                                                                                                                                                                                                                    | 1                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                         |                  |             |             |           |      |      |   |                                                                                                                                                                              |
| S>1                                                                                                                                                                                                                                                                                                                                                        | 2.5                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                         |                  |             |             |           |      |      |   |                                                                                                                                                                              |
| With the capacitor in a vertical position apply the load specified axially to each lead. The capacitor shall be rotated slowly from the vertical to the horizontal position, back to the vertical position. The 90° in the opposite direction and back the original position. Performance of capacitor shall not have changed and leads shall be undamaged |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                         |                  |             |             |           |      |      |   |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                         |                  |             |             |           |      |      |   |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                         |                  |             |             |           |      |      |   |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                         |                  |             |             |           |      |      |   |                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                         |                  |             |             |           |      |      |   |                                                                                                                                                                              |
| Vibration resistance                                                                                                                                                                                                                                                                                                                                       | The frequency of the vibration shall vary uniformly within the range 10 to 55 Hz with the amplitude of 1.5mm, completing the cycle in the interval of one minute.<br>The capacitor shall be securely mounted by its leads with hold the body of capacitor. The capacitor shall be vibrated in three mutually perpendicular directions for a period of 2 hours in each direction . | Capacitance : no unsteady.<br>Appearance : no abnormal.<br>Capacitance change : within ± 5% of initial measured value . |                  |             |             |           |      |      |   |                                                                                                                                                                              |
| Solderability                                                                                                                                                                                                                                                                                                                                              | The leads are dipped in the solder bath of Sn at 260 ±5°C for 2 ± 0.5 seconds . The dipping depth should be set at 1.5 ~ 2mm .                                                                                                                                                                                                                                                    | The solder alloy shall cover the 95% or more of the dipped lead's area .                                                |                  |             |             |           |      |      |   |                                                                                                                                                                              |

## Reliability

| Item                       | Test Method                                                                                                                                                                                                                                                                                    | Specification                                                                                                                                                                                              |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Soldering heat resistance  | The leads immerse in the solder bath of Sn at $260 \pm 5^\circ\text{C}$ for $10 \pm 1$ seconds until a distance of 1.5 ~ 2mm from the case.                                                                                                                                                    | No damage or leakage of electrolyte.<br>Capacitance change : within $\pm 10\%$ of the initial measured value.<br>Tan $\delta$ : less than specified value.<br>Leakage current : less than specified value. |
| Damp heat (Steady state )  | Subject the capacitors to $40 \pm 2^\circ\text{C}$ and 90% to 95% relative humidity for $240 \pm 8$ hours.                                                                                                                                                                                     | Capacitance change : within $\pm 10\%$ of the initial measured value.<br>Tan $\delta$ : less than specified value.<br>Leakage current : less than specified value.                                         |
| Load life                  | After X hours continuous application of DC rated working voltage at $105 \pm 2^\circ\text{C}$ , the measurements shall meet the following limits. Measurements shall be performed after 2 hours exposed at room temperature .                                                                  | Standard of judgement is according to requirement of this series.                                                                                                                                          |
| Shelf life                 | After storage for Y hours at $105 \pm 2^\circ\text{C}$ without voltage application , the measurements shall meet the following limits. Measurements shall be performed after exposed for 1 to 2 hrs at room temperature after application of DC rated voltage to the capacitor for Z minutes . |                                                                                                                                                                                                            |
| Storage at Low Temperature | The capacitor shall be stored at temperature of $-40 \pm 3^\circ\text{C}$ for $240 \pm 8$ hours, during which time no voltage shall be applied. And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours or more, after which measurements shall be made.     | Capacitance change : within $\pm 10\%$ of the initial value.<br>Tan $\delta$ : less than specified value.<br>Leakage current : less than specified value<br>Appearance : no abnormal.                      |

## MCVVT Series

### Dimensions:



1. Voltage mark [6V] represents 6.3V for  $\Phi 4 \sim \Phi 10$ ;  
3 [ $\pm 0.5$ ] is applicable to  $\Phi 8 \times 10.5 \sim \Phi 10$

2. [ $\pm 0.3$ ] is applicable to  $\Phi 6.3 \times 7.7$  and  $\Phi 8 \times 6.2$   
4. [ $\pm 1.0$ ] is applicable to  $\Phi 12.5 \sim \Phi 16$ .

| D×L    | 4×5.4 | 5×5.4 | 6.3×5.4/7.7 | 8×6.2 | 8×10.5 | 10×10.5/13.5 | 12.5×13.5/16 | 16×16.5 |
|--------|-------|-------|-------------|-------|--------|--------------|--------------|---------|
| A      | 1.8   | 2.1   | 2.4         | 3.3   | 2.9    | 3.2          | 4.7          | 5.5     |
| B      | 4.3   | 5.3   | 6.6         | 8.3   | 8.3    | 10.3         | 13           | 16.3    |
| C      | 4.3   | 5.3   | 6.6         | 8.3   | 8.3    | 10.3         | 13           | 16.3    |
| E ±0.2 | 1     | 1.3   | 2.2         | 2.2   | 3.1    | 4.4          | 4.4          | 6.7     |
| L      | 5.4   | 5.4   | 5.4/7.7     | 6.2   | 10.5   | 10.5/13.5    | 13.5/16      | 16.5    |

Dimensions : Millimetres

## Standard size and Maximum permissible ripple current

| WV<br>Cap.(µF) |     | 4                    |              | 6.3                    |              | 10                  |              | 16                                  |                       | 25                  |                   |
|----------------|-----|----------------------|--------------|------------------------|--------------|---------------------|--------------|-------------------------------------|-----------------------|---------------------|-------------------|
|                |     | 0G                   |              | 0J                     |              | 1A                  |              | 1C                                  |                       | 1E                  |                   |
| 4.7            | 4R7 |                      |              |                        |              |                     |              |                                     |                       | 4×5.4               | 13                |
| 10             | 100 |                      |              |                        |              |                     |              | 4×5.4                               | 18                    | 5×5.4<br>(4×5.4)    | 20<br>(14)        |
| 22             | 220 |                      |              | 4×5.4                  | 22           | 5×5.4<br>(4×5.4)    | 25<br>(20)   | 5×5.4<br>(4×5.4)                    | 27<br>(20)            | 6.3×5.4<br>(5×5.4)  | 36<br>(25)        |
| 33             | 330 | 5×5.4<br>(4×5.4)     | 30<br>(18)   | 5×5.4<br>(4×5.4)       | 27<br>(22)   | 5×5.4<br>(4×5.4)    | 30<br>(22)   | 6.3×5.4<br>(5×5.4)                  | 40<br>(28)            | 6.3×5.4<br>(5×5.4)  | 44<br>(29)        |
| 47             | 470 | 5×5.4<br>(4×5.4)     | 36<br>(24)   | 5×5.4<br>(4×5.4)       | 33<br>(25)   | 6.3×5.4<br>(5×5.4)  | 41<br>(30)   | 6.3×5.4<br>(5×5.4)                  | 48<br>(31)            | 6.3×5.4<br>(8×6.2)  | 48<br>(91)        |
| 100            | 101 | 6.3×5.4<br>(5×5.4)   | 60<br>(43)   | 6.3×5.4<br>(5×5.4)     | 50<br>(39)   | 6.3×5.4<br>(8×6.2)  | 53<br>(110)  | 6.3×5.4<br>(8×6.2)                  | 60<br>(120)           | 6.3×7.7             | 91                |
| 150            | 151 | 6.3×5.4              | 52           | 6.3×5.4                | 55           | 6.3×5.4             | 62           | 6.3×7.7                             | 95                    | 8×10.5<br>(6.3×7.7) | 140<br>(100)      |
| 220            | 221 | 6.3×5.4              | 57           | 6.3×7.7<br>(6.3×5.4)   | 105<br>(67)  | 6.3×7.7<br>(8×6.2)  | 105<br>(105) | 8×10.5<br>(6.3×7.7)<br>(8×6.2)      | 150<br>(105)<br>(85)  | 8×10.5              | 175               |
| 330            | 331 | 6.3×7.7              | 100          | 6.3×7.7                | 105          | 8×10.5              | 196          | 8×10.5                              | 195                   | 10×10.5<br>(8×10.5) | 240<br>(220)      |
| 470            | 471 | 6.3×7.7              | 105          | 8×10.5<br>(6.3×7.7)    | 210<br>(120) | 10×10.5<br>(8×10.5) | 260<br>(210) | 10×10.5<br>(8×10.5)                 | 295<br>(230)          | 10×10.5             | 280               |
| 680            | 681 | 8×10.5               | 210          | 8×10.5                 | 210          | 10×10.5             | 270          | 10×10.5                             | 315                   | 10×13.5             | 400               |
| 1000           | 102 | 8×10.5               | 230          | 10×10.5<br>(8×10.5)    | 300<br>(230) | 10×10.5             | 315          | 12.5×13.5<br>(10×13.5)<br>(10×10.5) | 500<br>(340)<br>(390) | 12.5×13.5           | 580               |
| 1500           | 152 | 10×10.5              | 315          | 10×13.5<br>(10×10.5)   | 450<br>(315) | 10×13.5             | 460          | 12.5×13.5                           | 550                   | 12.5×16             | 850               |
| 2200           | 222 | 10×13.5<br>(10×10.5) | 440<br>(340) | 12.5×13.5<br>(10×13.5) | 620<br>(500) | 12.5×13.5           | 680          | 16×16.5<br>(12.5×16)                | 950<br>(750)          | 16×16.5             | 1050              |
| 3300           | 332 | 10×13.5              | 490          | 12.5×16<br>(12.5×13.5) | 700<br>(660) | 16×16.5             | 1000         | 16×16.5                             | 1000                  |                     |                   |
| 4700           | 472 | 12.5×13.5            | 600          | 16×16.5                | 1000         |                     |              |                                     |                       |                     |                   |
| 6800           | 682 | 16×16.5<br>(12.5×16) | 950<br>(650) |                        |              |                     |              |                                     |                       | Case Size           | Ripple<br>Current |

Ripple Current (mA rms) at 105°C 120Hz

## Standard size and Maximum permissible ripple current

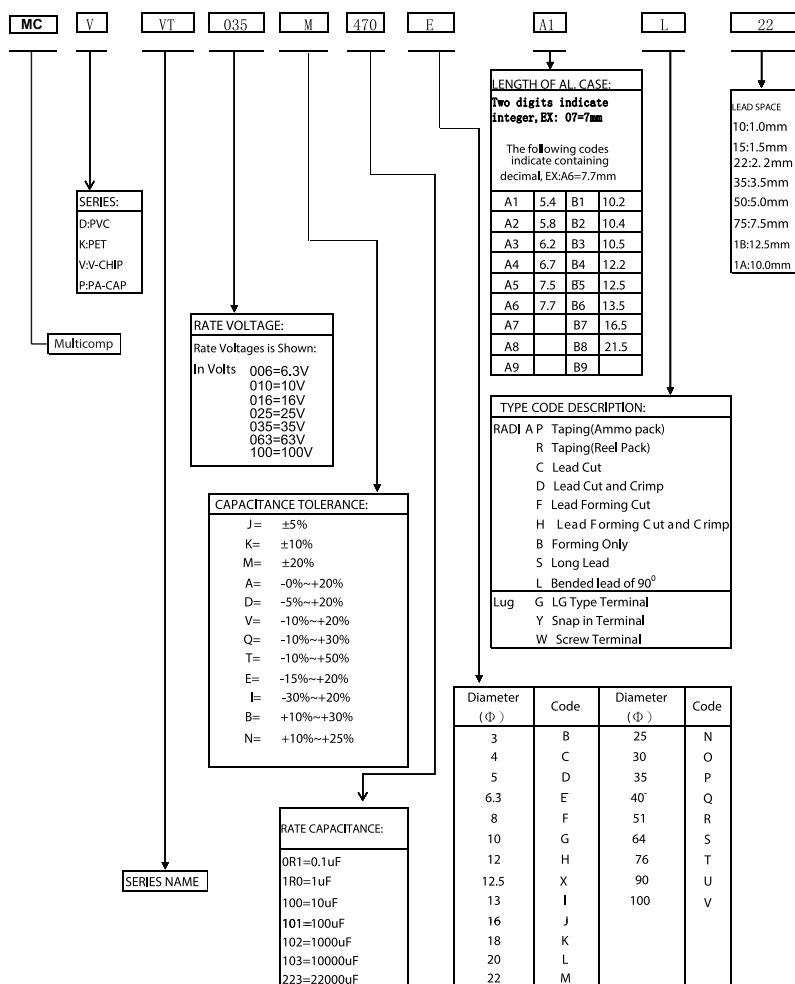
| WV<br>Cap.(µF) |     | 35                                  |                       | 50                                  |                       | 63                                  |                       | 100                                 |                       |
|----------------|-----|-------------------------------------|-----------------------|-------------------------------------|-----------------------|-------------------------------------|-----------------------|-------------------------------------|-----------------------|
|                |     | 1V                                  |                       | 1H                                  |                       | 1J                                  |                       | 2A                                  |                       |
| 0.1            | 0R1 |                                     |                       | 4×5.4                               | 0.7                   | 4×5.4                               | 0.7                   |                                     |                       |
| 0.22           | R22 |                                     |                       | 4×5.4                               | 1.6                   | 4×5.4                               | 1.6                   |                                     |                       |
| 0.33           | R33 |                                     |                       | 4×5.4                               | 2.5                   | 4×5.4                               | 2.5                   |                                     |                       |
| 0.47           | R47 |                                     |                       | 4×5.4                               | 3.5                   | 4×5.4                               | 3.5                   |                                     |                       |
| 1              | 010 |                                     |                       | 4×5.4                               | 7                     | 4×5.4                               | 7                     | 4×5.4                               | 7                     |
| 2.2            | 2R2 |                                     |                       | 4×5.4                               | 11                    | 4×5.4                               | 11                    | 6.3×5.4                             | 14                    |
| 3.3            | 3R3 | 4×5.4                               | 13                    | 4×5.4                               | 13                    | 5×5.4                               | 13                    | 6.3×7.7<br>(6.3×5.4)<br>(8×6.2)     | 32<br>(20)<br>(30)    |
| 4.7            | 4R7 | 4×5.4                               | 14                    | 5×5.4<br>(4×5.4)                    | 16<br>(13)            | 5×5.4                               | 16                    | 6.3×7.7<br>(6.3×5.4)                | 35<br>(21)            |
| 10             | 100 | 5×5.4<br>(4×5.4)                    | 21<br>(14)            | 6.3×5.4                             | 24                    | 6.3×7.7<br>(6.3×5.4)<br>(8×6.2)     | 39<br>(24)<br>(25)    | 8×10.5<br>(6.3×7.7)                 | 77<br>(35)            |
| 22             | 220 | 6.3×5.4<br>(5×5.4)                  | 38<br>(18)            | 6.3×7.7<br>(6.3×5.4)<br>(8×6.2)     | 51<br>(42)<br>(70)    | 8×10.5<br>(6.3×7.7)                 | 98<br>(49)            | 10×10.5<br>(8×10.5)                 | 126<br>(84)           |
| 33             | 330 | 6.3×5.4<br>(8×6.2)                  | 42<br>(84)            | 6.3×7.7                             | 60                    | 8×10.5                              | 112                   | 10×10.5                             | 133                   |
| 47             | 470 | 6.3×7.7<br>(6.3×5.4)                | 70<br>(50)            | 8×10.5<br>(6.3×7.7)                 | 120<br>(63)           | 10×10.5<br>(8×10.5)                 | 160<br>(119)          | 12.5×13.5<br>(10×13.5)<br>(10×10.5) | 250<br>(160)<br>(140) |
| 68             | 680 | 6.3×7.7                             | 80                    |                                     |                       | 8×10.5                              | 170                   | 12.5×13.5<br>(10×13.5)              | 300<br>(180)          |
| 100            | 101 | 8×10.5<br>(6.3×7.7)                 | 120<br>(84)           | 10×10.5<br>(8×10.5)                 | 170<br>(140)          | 12.5×13.5<br>(10×13.5)<br>(10×10.5) | 270<br>(210)<br>(196) | 16×16.5<br>(12.5×13.5)              | 450<br>(380)          |
| 150            | 151 | 8×10.5                              | 155                   | 10×10.5                             | 170                   | 10×13.5                             | 225                   |                                     |                       |
| 220            | 221 | 10×10.5<br>(8×10.5)                 | 220<br>(190)          | 10×13.5<br>(10×10.5)                | 280<br>(220)          | 16×16.5<br>(12.5×13.5)<br>(10×13.5) | 560<br>(470)<br>(235) | 16×16.5                             | 550                   |
| 330            | 331 | 10×10.5                             | 245                   | 16×16.5<br>(12.5×13.5)<br>(10×13.5) | 600<br>(420)<br>(295) | 16×16.5<br>(12.5×16)                | 700<br>(510)          |                                     |                       |
| 470            | 471 | 12.5×13.5<br>(10×13.5)<br>(10×10.5) | 520<br>(375)<br>(280) | 16×16.5<br>(12.5×16)                | 700<br>(520)          | 16×16.5                             | 750                   |                                     |                       |
| 680            | 681 | 12.5×13.5<br>(10×13.5)              | 530<br>(395)          | 16×16.5                             | 750                   |                                     |                       |                                     |                       |
| 1000           | 102 | 16×16.5<br>(12.5×16)                | 750<br>(600)          |                                     |                       |                                     |                       | Case Size                           | Ripple Current        |

Ripple Current (mA rms) at 105°C 120Hz

## Frequency Correction Factor of Rated Ripple Current

| Frequency Capacitance (μF) |           | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz~ |
|----------------------------|-----------|------|-------|-------|------|--------|
| Φ4~Φ10                     | 0.1~68    | 0.7  | 1     | 1.17  | 1.36 | 1.5    |
|                            | 100~3300  | 0.85 |       | 1.08  | 1.2  | 1.3    |
| Φ12.5~Φ16                  | ~68       | 0.75 |       | 1.35  | 1.57 | 2      |
|                            | 100~680   | 0.8  |       | 1.23  | 1.34 | 1.5    |
|                            | 1000~6800 | 0.85 |       | 1.1   | 1.13 | 1.15   |

## Explanation of parts numbers



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