

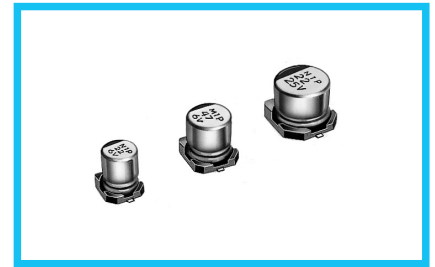
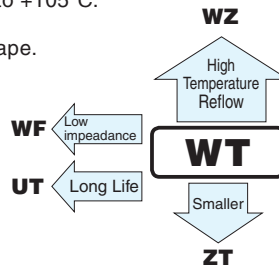
# ALUMINUM ELECTROLYTIC CAPACITORS

## WT series

Chip Type, Wide Temperature Range



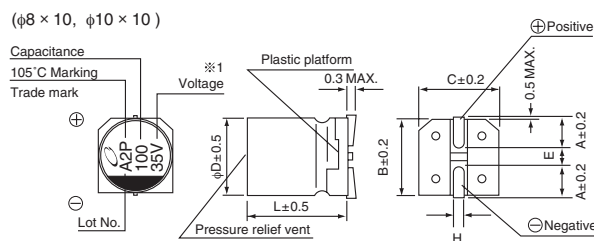
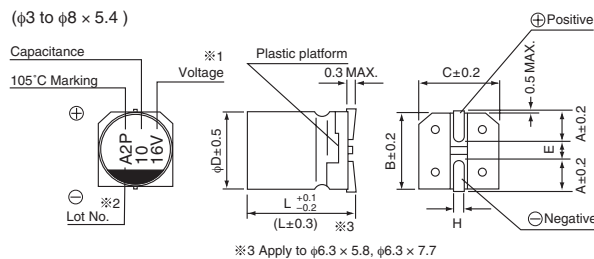
- Chip type operating over wide temperature range of to  $-55$  to  $+105^{\circ}\text{C}$ .
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine fed with carrier tape.
- Compliant to the RoHS directive (2011/65/EU).



### Specifications

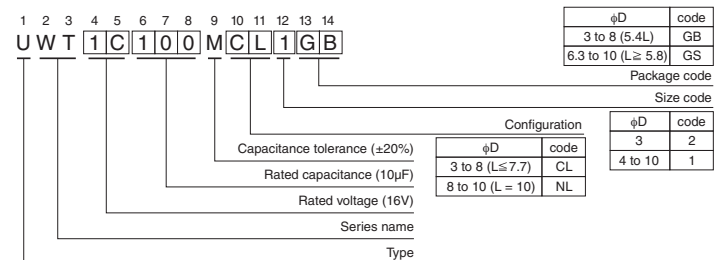
| Item                                  | Performance Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------|-----------------|---------------------------------------------------|----|----|---------------------|---------------------------------------------------|------|------|------|------|------|------|-----------------|---------------------------------------------------|----|---|---|---|---|---|
| Category Temperature Range            | $-55$ to $+105^{\circ}\text{C}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Rated Voltage Range                   | 4 to 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Rated Capacitance Range               | 0.1 to $1500\mu\text{F}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Capacitance Tolerance                 | $\pm 20\%$ at 120Hz, $20^{\circ}\text{C}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Leakage Current                       | After 2 minutes' application of rated voltage, leakage current is not more than $0.01\text{CV}$ or $3(\mu\text{A})$ , whichever is greater.                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Tangent of loss angle (tan $\delta$ ) | <table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>tan <math>\delta</math> (MAX.)</td> <td>0.40</td> <td>0.30</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.14</td> </tr> </tbody> </table> <p>Measurement frequency : 120Hz at <math>20^{\circ}\text{C}</math></p>                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Rated voltage (V)  | 4                                                                                                                                                                                               | 6.3          | 10                                                | 16              | 25                                                | 35 | 50 | tan $\delta$ (MAX.) | 0.40                                              | 0.30 | 0.24 | 0.20 | 0.16 | 0.14 | 0.14 |                 |                                                   |    |   |   |   |   |   |
| Rated voltage (V)                     | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10                 | 16                                                                                                                                                                                              | 25           | 35                                                | 50              |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| tan $\delta$ (MAX.)                   | 0.40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.24               | 0.20                                                                                                                                                                                            | 0.16         | 0.14                                              | 0.14            |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Stability at Low Temperature          | <table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>Impedance ratio</td> <td>Z<math>-25^{\circ}\text{C}</math> / Z<math>+20^{\circ}\text{C}</math></td> <td>7</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>ZT / Z20 (MAX.)</td> <td>Z<math>-40^{\circ}\text{C}</math> / Z<math>+20^{\circ}\text{C}</math></td> <td>15</td> <td>8</td> <td>8</td> <td>4</td> <td>4</td> <td>3</td> </tr> </tbody> </table> <p>Measurement frequency : 120Hz</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Rated voltage (V)  | 4                                                                                                                                                                                               | 6.3          | 10                                                | 16              | 25                                                | 35 | 50 | Impedance ratio     | Z $-25^{\circ}\text{C}$ / Z $+20^{\circ}\text{C}$ | 7    | 4    | 3    | 2    | 2    | 2    | ZT / Z20 (MAX.) | Z $-40^{\circ}\text{C}$ / Z $+20^{\circ}\text{C}$ | 15 | 8 | 8 | 4 | 4 | 3 |
| Rated voltage (V)                     | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10                 | 16                                                                                                                                                                                              | 25           | 35                                                | 50              |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Impedance ratio                       | Z $-25^{\circ}\text{C}$ / Z $+20^{\circ}\text{C}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4                  | 3                                                                                                                                                                                               | 2            | 2                                                 | 2               |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| ZT / Z20 (MAX.)                       | Z $-40^{\circ}\text{C}$ / Z $+20^{\circ}\text{C}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 8                  | 8                                                                                                                                                                                               | 4            | 4                                                 | 3               |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Endurance                             | The specifications listed at right shall be met when the capacitors are restored to $20^{\circ}\text{C}$ after the rated voltage is applied for 1000 hours at $105^{\circ}\text{C}$ .                                                                                                                                                                                                                                                                                                                                                                                                                   | <table border="1"> <tbody> <tr> <td>Capacitance change</td> <td>Within <math>\pm 25\%</math> of the initial capacitance value for capacitors of <math>\phi 3\text{mm}</math> unit, and 16V or less. Within <math>\pm 20\%</math> of the initial capacitance value for capacitors of 25V or more.</td> </tr> <tr> <td>tan <math>\delta</math></td> <td>200% or less than the initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>Less than or equal to the initial specified value</td> </tr> </tbody> </table> | Capacitance change | Within $\pm 25\%$ of the initial capacitance value for capacitors of $\phi 3\text{mm}$ unit, and 16V or less. Within $\pm 20\%$ of the initial capacitance value for capacitors of 25V or more. | tan $\delta$ | 200% or less than the initial specified value     | Leakage current | Less than or equal to the initial specified value |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Capacitance change                    | Within $\pm 25\%$ of the initial capacitance value for capacitors of $\phi 3\text{mm}$ unit, and 16V or less. Within $\pm 20\%$ of the initial capacitance value for capacitors of 25V or more.                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| tan $\delta$                          | 200% or less than the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Leakage current                       | Less than or equal to the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Shelf Life                            | After storing the capacitors under no load at $105^{\circ}\text{C}$ for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at $20^{\circ}\text{C}$ , they shall meet the specified values for the endurance characteristics listed above.                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Resistance to soldering heat          | The capacitors are kept on a hot plate for 30 seconds, which is maintained at $250^{\circ}\text{C}$ . The capacitors shall meet the characteristic requirements listed at right when they are removed from the plate and restored to $20^{\circ}\text{C}$ .                                                                                                                                                                                                                                                                                                                                             | <table border="1"> <tbody> <tr> <td>Capacitance change</td> <td>Within <math>\pm 10\%</math> of the initial capacitance value</td> </tr> <tr> <td>tan <math>\delta</math></td> <td>Less than or equal to the initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>Less than or equal to the initial specified value</td> </tr> </tbody> </table>                                                                                                                                                                | Capacitance change | Within $\pm 10\%$ of the initial capacitance value                                                                                                                                              | tan $\delta$ | Less than or equal to the initial specified value | Leakage current | Less than or equal to the initial specified value |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Capacitance change                    | Within $\pm 10\%$ of the initial capacitance value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| tan $\delta$                          | Less than or equal to the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Leakage current                       | Less than or equal to the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |
| Marking                               | Black print on the case top.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                                                                                                                                                                                 |              |                                                   |                 |                                                   |    |    |                     |                                                   |      |      |      |      |      |      |                 |                                                   |    |   |   |   |   |   |

### Chip Type



$\phi 1$ . Voltage mark for 6.3V is [6V]. In case of marking for  $\phi 3$  units, "V" for rated voltage is omitted.  
 $\phi 2$ . In case of marking for  $\phi 3$  units. Lot No is expressed by a digit (month code).

### Type numbering system (Example : 16V $10\mu\text{F}$ )



| $\phi D \times L$ | (mm)       |            |            |            |            |            |            |            |            |
|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                   | 3 × 5.4    | 4 × 5.4    | 5 × 5.4    | 6.3 × 5.4  | 6.3 × 5.8  | 6.3 × 7.7  | 8 × 5.4    | 8 × 10     | 10 × 10    |
| A                 | 1.5        | 1.8        | 2.1        | 2.4        | 2.4        | 2.4        | 3.3        | 2.9        | 3.2        |
| B                 | 3.3        | 4.3        | 5.3        | 6.6        | 6.6        | 6.6        | 8.3        | 8.3        | 10.3       |
| C                 | 3.3        | 4.3        | 5.3        | 6.6        | 6.6        | 6.6        | 8.3        | 8.3        | 10.3       |
| E                 | 0.8        | 1.0        | 1.3        | 2.2        | 2.2        | 2.2        | 2.3        | 3.1        | 4.5        |
| L                 | 5.4        | 5.4        | 5.4        | 5.4        | 5.8        | 7.7        | 5.4        | 10         | 10         |
| H                 | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.8 to 1.1 | 0.8 to 1.1 |

● Dimension table in next page.



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[UCX1H561MNS1MS](#) [UCX1H471MNS1MS](#) [UCX1H102MNQ1MS](#) [UCX1E332MNS1MS](#) [HZA277M035G24T-F](#) [TYEH1V337H10MTR](#)  
[EDT107M035S9MAA](#) [BMVK100ADA330MF60G](#) [BMVK160ADA4R7MD60G](#) [NACK222M10V12.5X14TR13F](#) [NRLF332M25V22X20F](#)  
[NRSZ102M16V10X22TBF](#) [EEV-HA1H330UP](#) [MAL215097513E3](#) [UCZ1V681MNQ1MS](#) [EEE-FT1C122UP](#) [EEE-FT1C821UP](#)