

# ALUMINUM ELECTROLYTIC CAPACITORS

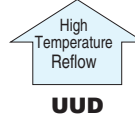
# UWD

Chip Type, Low Impedance  
High Temperature (260°C) Reflow



- Corresponding with 260°C peak reflow soldering  
Recommended reflow condition : 260°C peak 5 sec. 230°C over 60 sec. 2 times ( $\phi 10 \times 10$  : 1 time)
- Chip type, low impedance temperature range up to +105°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,(EU)2015/863).
- AEC-Q200 Qualified. Please contact us for details.

## UWD



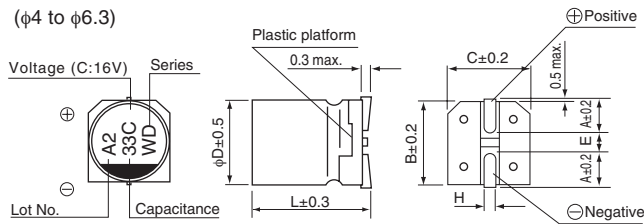
### Specifications

| Item                                  | Performance Characteristics  |                    |  |              |   |                 |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
|---------------------------------------|--|--------------------|--|--------------|---|-----------------|---|----|-------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------|---------------------|---|---|---|---|---|---|
| Category Temperature Range            | -55 to +105°C  |                    |  |              |   |                 |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| Rated Voltage Range                   | 6.3 to 50V   |                    |  |              |   |                 |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| Rated Capacitance Range               | 1 to 1500 $\mu$ F  |                    |  |              |   |                 |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| Capacitance Tolerance                 | $\pm 20\%$ at 120Hz, 20°C  |                    |  |              |   |                 |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| Leakage Current ※                     | After 2 minutes' application of rated voltage at 20°C, leakage current is not more than 0.01 CV or 3 ( $\mu$ A), whichever is greater.   |                    |  |              |   |                 |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| Tangent of loss angle (tan $\delta$ ) | <p>Measurement frequency : 120Hz at 20°C</p> <table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>tan <math>\delta</math> (max.)</td> <td>0.26 (0.28)</td> <td>0.20 (0.24)</td> <td>0.16 (0.20)</td> <td>0.14 (0.16)</td> <td>0.12 (0.14)</td> <td>0.12 (0.14)</td> </tr> </table> <p>( ) is <math>\phi 8</math> over</p>  | Rated voltage (V)  | 6.3  | 10           | 16  | 25              | 35  | 50 | tan $\delta$ (max.)                 | 0.26 (0.28) | 0.20 (0.24) | 0.16 (0.20) | 0.14 (0.16) | 0.12 (0.14) | 0.12 (0.14) |                 |                     |   |   |   |   |   |   |
| Rated voltage (V)                     | 6.3  | 10                 | 16   | 25           | 35  | 50              |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| tan $\delta$ (max.)                   | 0.26 (0.28)  | 0.20 (0.24)        | 0.16 (0.20)  | 0.14 (0.16)  | 0.12 (0.14)                                       | 0.12 (0.14)     |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| Stability at Low Temperature          | <p>Measurement frequency : 120Hz</p> <table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>Impedance ratio Z(-25°C) / Z(+20°C)</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>ZT / Z20 (max.)</td> <td>Z(-55°C) / Z(+20°C)</td> <td>5</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>   | Rated voltage (V)  | 6.3  | 10           | 16  | 25              | 35  | 50 | Impedance ratio Z(-25°C) / Z(+20°C) | 3           | 2           | 2           | 2           | 2           | 2           | ZT / Z20 (max.) | Z(-55°C) / Z(+20°C) | 5 | 4 | 4 | 3 | 3 | 3 |
| Rated voltage (V)                     | 6.3  | 10                 | 16   | 25           | 35  | 50              |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| Impedance ratio Z(-25°C) / Z(+20°C)   | 3  | 2                  | 2  | 2            | 2   | 2               |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| ZT / Z20 (max.)                       | Z(-55°C) / Z(+20°C)  | 5                  | 4  | 4            | 3   | 3               | 3   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| Endurance                             | <p>The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 5000 hours (2000 hours for <math>\phi D = 4, 5</math> and 6.3) at 105°C.</p> <table border="1"> <tr> <td>Capacitance change</td> <td>Within <math>\pm 30\%</math> of the initial capacitance value</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> </table>                      | Capacitance change | Within $\pm 30\%$ of the initial capacitance value | tan $\delta$ | 200% or less than the initial specified value     | Leakage current | Less than or equal to the initial specified value |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| Capacitance change                    | Within $\pm 30\%$ of the initial capacitance value   |                    |  |              |   |                 |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| 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°C for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they shall meet the specified values for the endurance characteristics listed above.  |                    |  |              |   |                 |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |
| Resistance to soldering heat          | <p>The capacitors are kept on a hot plate for 30 seconds, which is maintained at 250°C. The capacitors shall meet the characteristic requirements listed at right when they are removed from the plate and restored to 20°C.</p> <table border="1"> <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> </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.   |                    |  |              |   |                 |   |    |                                     |             |             |             |             |             |             |                 |                     |   |   |   |   |   |   |

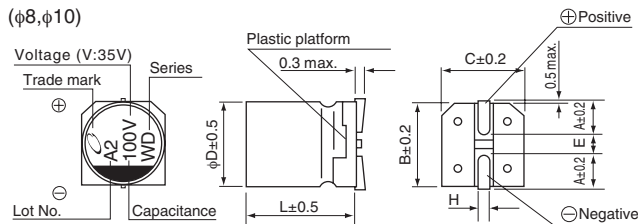
※ I : Leakage Current ( $\mu$ A), C : Rated Capacitance ( $\mu$ F), V : Rated Voltage (V)

### Chip Type

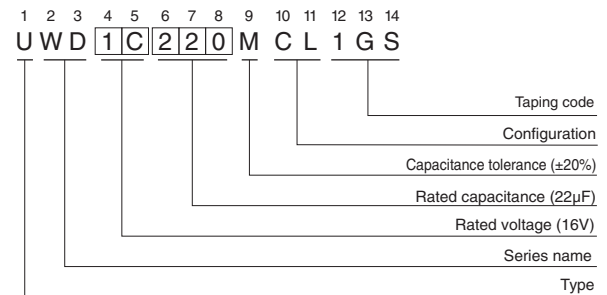
( $\phi 4$  to  $\phi 6.3$ )



( $\phi 8, \phi 10$ )



### Type numbering system (Example : 16V 22 $\mu$ F)



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

Voltage

|      |     |    |    |    |    |    |
|------|-----|----|----|----|----|----|
| V    | 6.3 | 10 | 16 | 25 | 35 | 50 |
| Code | j   | A  | C  | E  | V  | H  |

### Frequency coefficient of rated ripple current

|             |       |        |        |       |                |
|-------------|-------|--------|--------|-------|----------------|
| Frequency   | 50 Hz | 120 Hz | 300 Hz | 1 kHz | 10 kHz or more |
| Coefficient | 0.35  | 0.50   | 0.64   | 0.83  | 1.00           |

● Dimension table in next page.

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## ■ Dimensions

| Rated Voltage (V) (code) | Rated Capacitance (μF) | Case Size φD×L (mm) | tan δ | Leakage Current (μA) (at 20°C after 2 minutes) | Impedance (Ω) max. (20°C/100kHz) | Rated Ripple (mArms) (105°C/100kHz) | Part Number    |
|--------------------------|------------------------|---------------------|-------|--|----------------------------------|-------------------------------------|----------------|
| 6.3 (0J)                 | 27                     | 4×5.8               | 0.26  | 3  | 1.80                             | 80                                  | UWD0J270MCL1GS |
|                          | 33                     | 5×5.8               | 0.26  | 3  | 0.76                             | 150                                 | UWD0J330MCL1GS |
|                          | 47                     | 5×5.8               | 0.26  | 3  | 0.76                             | 150                                 | UWD0J470MCL1GS |
|                          | 56                     | 5×5.8               | 0.26  | 3.528  | 0.76                             | 150                                 | UWD0J560MCL1GS |
|                          | 68                     | 6.3×5.8             | 0.26  | 4.284  | 0.44                             | 230                                 | UWD0J680MCL1GS |
|                          | 100                    | 6.3×5.8             | 0.26  | 6.3  | 0.44                             | 230                                 | UWD0J101MCL1GS |
|                          | 150                    | 6.3×5.8             | 0.26  | 9.45   | 0.44                             | 230                                 | UWD0J151MCL1GS |
|                          | 220                    | 6.3×5.8             | 0.26  | 13.86  | 0.44                             | 230                                 | UWD0J221MCL1GS |
|                          | 330                    | 6.3×7.7             | 0.26  | 20.79  | 0.34                             | 280                                 | UWD0J331MCL1GS |
|                          | 470                    | 8×10                | 0.28  | 29.61  | 0.17                             | 450                                 | UWD0J471MCL1GS |
|                          | 680                    | 8×10                | 0.28  | 42.84  | 0.17                             | 450                                 | UWD0J681MCL1GS |
|                          | 1000                   | 10×10               | 0.28  | 63   | 0.09                             | 670                                 | UWD0J102MCL1GS |
|                          | 1500                   | 10×10               | 0.28  | 94.5   | 0.09                             | 670                                 | UWD0J152MCL1GS |
| 10 (1A)                  | 22                     | 4×5.8               | 0.20  | 3  | 1.80                             | 80                                  | UWD1A220MCL1GS |
|                          | 27                     | 5×5.8               | 0.20  | 3  | 0.76                             | 150                                 | UWD1A270MCL1GS |
|                          | 33                     | 5×5.8               | 0.20  | 3.3  | 0.76                             | 150                                 | UWD1A330MCL1GS |
|                          | 47                     | 6.3×5.8             | 0.20  | 4.7  | 0.44                             | 230                                 | UWD1A470MCL1GS |
|                          | 56                     | 6.3×5.8             | 0.20  | 5.6  | 0.44                             | 230                                 | UWD1A560MCL1GS |
|                          | 68                     | 6.3×5.8             | 0.20  | 6.8  | 0.44                             | 230                                 | UWD1A680MCL1GS |
|                          | 100                    | 6.3×5.8             | 0.20  | 10   | 0.44                             | 230                                 | UWD1A101MCL1GS |
|                          | 150                    | 6.3×5.8             | 0.20  | 15   | 0.44                             | 230                                 | UWD1A151MCL1GS |
|                          | 220                    | 6.3×7.7             | 0.20  | 22   | 0.34                             | 280                                 | UWD1A221MCL1GS |
|                          | 330                    | 8×10                | 0.24  | 33   | 0.17                             | 450                                 | UWD1A331MCL1GS |
|                          | 470                    | 8×10                | 0.24  | 47   | 0.17                             | 450                                 | UWD1A471MCL1GS |
|                          | 680                    | 10×10               | 0.24  | 68   | 0.09                             | 670                                 | UWD1A681MCL1GS |
|                          | 1000                   | 10×10               | 0.24  | 100  | 0.09                             | 670                                 | UWD1A102MCL1GS |
| 16 (1C)                  | 15                     | 4×5.8               | 0.16  | 3  | 1.80                             | 80                                  | UWD1C150MCL1GS |
|                          | 22                     | 5×5.8               | 0.16  | 3.52   | 0.76                             | 150                                 | UWD1C220MCL1GS |
|                          | 27                     | 5×5.8               | 0.16  | 4.32   | 0.76                             | 150                                 | UWD1C270MCL1GS |
|                          | 33                     | 6.3×5.8             | 0.16  | 5.28   | 0.44                             | 230                                 | UWD1C330MCL1GS |
|                          | 47                     | 6.3×5.8             | 0.16  | 7.52   | 0.44                             | 230                                 | UWD1C470MCL1GS |
|                          | 56                     | 6.3×5.8             | 0.16  | 8.96   | 0.44                             | 230                                 | UWD1C560MCL1GS |
|                          | 68                     | 6.3×5.8             | 0.16  | 10.88  | 0.44                             | 230                                 | UWD1C680MCL1GS |
|                          | 100                    | 6.3×5.8             | 0.16  | 16   | 0.44                             | 230                                 | UWD1C101MCL1GS |
|                          | 150                    | 6.3×7.7             | 0.16  | 24   | 0.34                             | 280                                 | UWD1C151MCL1GS |
|                          | 220                    | 6.3×7.7             | 0.16  | 35.2   | 0.34                             | 280                                 | UWD1C221MCL1GS |
|                          | 330                    | 8×10                | 0.20  | 52.8   | 0.17                             | 450                                 | UWD1C331MCL1GS |
|                          | 470                    | 8×10                | 0.20  | 75.2   | 0.17                             | 450                                 | UWD1C471MCL1GS |
|                          | 680                    | 10×10               | 0.20  | 108.8  | 0.09                             | 670                                 | UWD1C681MCL1GS |

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## ■ Dimensions

| Rated Voltage (V) (code) | Rated Capacitance (μF) | Case Size φD×L (mm) | tan δ | Leakage Current (μA) (at 20°C after 2 minutes) | Impedance (Ω) max. (20°C/100kHz) | Rated Ripple (mArms) (105°C/100kHz) | Part Number    |
|--------------------------|------------------------|---------------------|-------|--|----------------------------------|-------------------------------------|----------------|
| 25 (1E)                  | 10                     | 4×5.8               | 0.14  | 3  | 1.80                             | 80                                  | UWD1E100MCL1GS |
|                          | 15                     | 5×5.8               | 0.14  | 3.75   | 0.76                             | 150                                 | UWD1E150MCL1GS |
|                          | 22                     | 5×5.8               | 0.14  | 5.5  | 0.76                             | 150                                 | UWD1E220MCL1GS |
|                          | 27                     | 6.3×5.8             | 0.14  | 6.75   | 0.44                             | 230                                 | UWD1E270MCL1GS |
|                          | 33                     | 6.3×5.8             | 0.14  | 8.25   | 0.44                             | 230                                 | UWD1E330MCL1GS |
|                          | 47                     | 6.3×5.8             | 0.14  | 11.75  | 0.44                             | 230                                 | UWD1E470MCL1GS |
|                          | 56                     | 6.3×5.8             | 0.14  | 14   | 0.44                             | 230                                 | UWD1E560MCL1GS |
|                          | 68                     | 6.3×5.8             | 0.14  | 17   | 0.44                             | 230                                 | UWD1E680MCL1GS |
|                          | 100                    | 6.3×7.7             | 0.14  | 25   | 0.34                             | 280                                 | UWD1E101MCL1GS |
|                          | 150                    | 8×10                | 0.16  | 37.5   | 0.17                             | 450                                 | UWD1E151MCL1GS |
|                          | 220                    | 8×10                | 0.16  | 55   | 0.17                             | 450                                 | UWD1E221MCL1GS |
|                          | 330                    | 10×10               | 0.16  | 82.5   | 0.09                             | 670                                 | UWD1E331MCL1GS |
|                          | 470                    | 10×10               | 0.16  | 117.5  | 0.09                             | 670                                 | UWD1E471MCL1GS |
| 35 (1V)                  | 4.7                    | 4×5.8               | 0.12  | 3  | 1.80                             | 80                                  | UWD1V47MCL1GS  |
|                          | 10                     | 5×5.8               | 0.12  | 3.5  | 0.76                             | 150                                 | UWD1V100MCL1GS |
|                          | 15                     | 5×5.8               | 0.12  | 5.25   | 0.76                             | 150                                 | UWD1V150MCL1GS |
|                          | 22                     | 5×5.8               | 0.12  | 7.7  | 0.76                             | 150                                 | UWD1V220MCL1GS |
|                          | 27                     | 6.3×5.8             | 0.12  | 9.45   | 0.44                             | 230                                 | UWD1V270MCL1GS |
|                          | 33                     | 6.3×5.8             | 0.12  | 11.55  | 0.44                             | 230                                 | UWD1V330MCL1GS |
|                          | 47                     | 6.3×5.8             | 0.12  | 16.45  | 0.44                             | 230                                 | UWD1V470MCL1GS |
|                          | 56                     | 6.3×7.7             | 0.12  | 19.6   | 0.34                             | 280                                 | UWD1V560MCL1GS |
|                          | 68                     | 6.3×7.7             | 0.12  | 23.8   | 0.34                             | 280                                 | UWD1V680MCL1GS |
|                          | 100                    | 8×10                | 0.14  | 35   | 0.17                             | 450                                 | UWD1V101MCL1GS |
|                          | 150                    | 8×10                | 0.14  | 52.5   | 0.17                             | 450                                 | UWD1V151MCL1GS |
|                          | 220                    | 10×10               | 0.14  | 77   | 0.09                             | 670                                 | UWD1V221MCL1GS |
|                          | 330                    | 10×10               | 0.14  | 115.5  | 0.09                             | 670                                 | UWD1V331MCL1GS |
| 50 (1H)                  | 1                      | 4×5.8               | 0.12  | 3  | 5.00                             | 30                                  | UWD1H010MCL1GS |
|                          | 2.2                    | 4×5.8               | 0.12  | 3  | 5.00                             | 30                                  | UWD1H2R2MCL1GS |
|                          | 3.3                    | 4×5.8               | 0.12  | 3  | 5.00                             | 30                                  | UWD1H3R3MCL1GS |
|                          | 4.7                    | 5×5.8               | 0.12  | 3  | 1.52                             | 85                                  | UWD1H47MCL1GS  |
|                          | 10                     | 6.3×5.8             | 0.12  | 5  | 0.88                             | 165                                 | UWD1H100MCL1GS |
|                          | 15                     | 6.3×5.8             | 0.12  | 7.5  | 0.88                             | 165                                 | UWD1H150MCL1GS |
|                          | 22                     | 6.3×5.8             | 0.12  | 11   | 0.88                             | 165                                 | UWD1H220MCL1GS |
|                          | 27                     | 6.3×7.7             | 0.12  | 13.5   | 0.68                             | 185                                 | UWD1H270MCL1GS |
|                          | 33                     | 6.3×7.7             | 0.12  | 16.5   | 0.68                             | 185                                 | UWD1H330MCL1GS |
|                          | 47                     | 6.3×7.7             | 0.12  | 23.5   | 0.68                             | 185                                 | UWD1H470MCL1GS |
|                          | 56                     | 8×10                | 0.14  | 28   | 0.34                             | 300                                 | UWD1H560MCL1GS |
|                          | 68                     | 8×10                | 0.14  | 34   | 0.34                             | 300                                 | UWD1H680MCL1GS |
|                          | 100                    | 8×10                | 0.14  | 50   | 0.34                             | 300                                 | UWD1H101MCL1GS |
|                          | 150                    | 10×10               | 0.14  | 75   | 0.18                             | 670                                 | UWD1H151MCL1GS |
| 220                      | 10×10                  | 0.14                | 110   | 0.18   | 670                              | UWD1H221MCL1GS                      |                |

• For taping specifications, recommended land size/soldering by reflow and minimum order quantity, please refer to the Guidelines for Aluminum Electrolytic Capacitors.