

# ALUMINUM ELECTROLYTIC CAPACITORS

nichicon

**WD**

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



For SMD



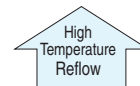
Low Impedance



Anti-Solvent  
Feature

- 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).

**WD**



UD

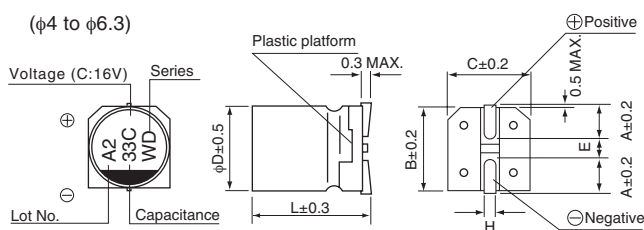


## Specifications

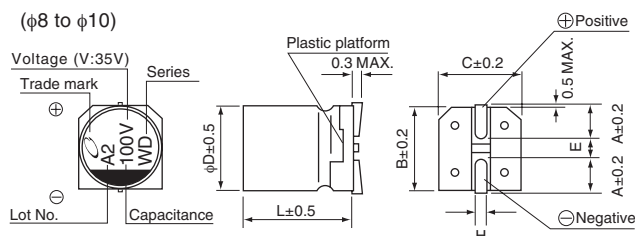
|                               |                                                                                                                                                                                                                                         |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------|-------------|-------------|-------------|-------------|--------------------|---------------------------------------------------|--|--|--|--|
| Item                          | Performance Characteristics                                                                                                                                                                                                             |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
| Category Temperature Range    | -55 to +105°C                                                                                                                                                                                                                           |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
| Rated Voltage Range           | 6.3 to 50V                                                                                                                                                                                                                              |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
| Rated Capacitance Range       | 1 to 1500μF                                                                                                                                                                                                                             |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
| Capacitance Tolerance         | ±20% at 120Hz, 20°C                                                                                                                                                                                                                     |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
| Leakage Current               | After 2 minutes' application of rated voltage, leakage current is not more than 0.01 CV or 3 (μA), whichever is greater.                                                                                                                |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
| Tangent of loss angle (tan δ) | Measurement frequency : 120Hz at 20°C                                                                                                                                                                                                   |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
|                               | Rated voltage (V)                                                                                                                                                                                                                       | 6.3                                               | 10          | 16          | 25          | 35          | 50          |                    |                                                   |  |  |  |  |
|                               | tan δ (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) |                    |                                                   |  |  |  |  |
| ( ) is φ8 over                |                                                                                                                                                                                                                                         |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
| Stability at Low Temperature  | Measurement frequency : 120Hz                                                                                                                                                                                                           |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
|                               | 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                     | 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 φD = 4, 5 and 6.3) at 105°C.                                                 |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
|                               |                                                                                                                                                                                                                                         |                                                   |             |             |             |             |             | Capacitance change | Within ±30% of the initial capacitance value      |  |  |  |  |
|                               |                                                                                                                                                                                                                                         |                                                   |             |             |             |             |             | tan δ              | 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  | 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.               |                                                   |             |             |             |             |             |                    |                                                   |  |  |  |  |
|                               |                                                                                                                                                                                                                                         |                                                   |             |             |             |             |             | Capacitance change | Within ±10% of the initial capacitance value      |  |  |  |  |
|                               |                                                                                                                                                                                                                                         |                                                   |             |             |             |             |             | tan δ              | 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

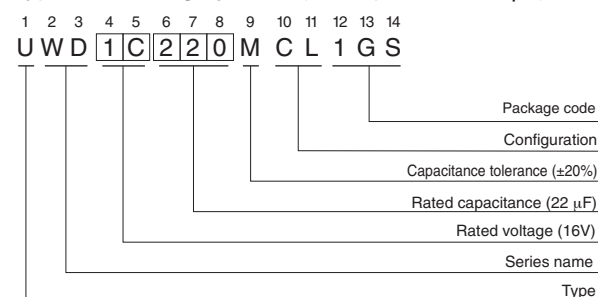
( $\phi 4$  to  $\phi 6.3$ )



( $\phi 8$  to  $\phi 10$ )



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



| $\phi D \times L$ | 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  |

●Dimension table in next page.

CAT.8100D

## ■ Dimensions

| Cap.<br>( $\mu$ F) | V<br>Code | 6.3       |      |     | 10        |      |     | 16        |      |     | 25        |      |     | 35        |      |     | 50                             |           |                 |
|--------------------|-----------|-----------|------|-----|-----------|------|-----|-----------|------|-----|-----------|------|-----|-----------|------|-----|--------------------------------|-----------|-----------------|
|                    |           | 0J        |      |     | 1A        |      |     | 1C        |      |     | 1E        |      |     | 1V        |      |     | 1H                             |           |                 |
| 1                  | 010       |           |      |     |           |      |     |           |      |     |           |      |     |           |      |     | 4 × 5.8                        | 5.00      | 30              |
| 2.2                | 2R2       |           |      |     |           |      |     |           |      |     |           |      |     |           |      |     | 4 × 5.8                        | 5.00      | 30              |
| 3.3                | 3R3       |           |      |     |           |      |     |           |      |     |           |      |     |           |      |     | 4 × 5.8                        | 5.00      | 30              |
| 4.7                | 4R7       |           |      |     |           |      |     |           |      |     |           |      |     | 4 × 5.8   | 1.80 | 80  | 5 × 5.8                        | 1.52      | 85              |
| 10                 | 100       |           |      |     |           |      |     |           |      |     | 4 × 5.8   | 1.80 | 80  | 5 × 5.8   | 0.76 | 150 | 6.3 × 5.8                      | 0.88      | 165             |
| 15                 | 150       |           |      |     |           |      |     | 4 × 5.8   | 1.80 | 80  | 5 × 5.8   | 0.76 | 150 | 5 × 5.8   | 0.76 | 150 | 6.3 × 5.8                      | 0.88      | 165             |
| 22                 | 220       |           |      |     | 4 × 5.8   | 1.80 | 80  | 5 × 5.8   | 0.76 | 150 | 5 × 5.8   | 0.76 | 150 | 5 × 5.8   | 0.76 | 150 | 6.3 × 5.8                      | 0.88      | 165             |
| 27                 | 270       | 4 × 5.8   | 1.80 | 80  | 5 × 5.8   | 0.76 | 150 | 5 × 5.8   | 0.76 | 150 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 7.7                      | 0.68      | 185             |
| 33                 | 330       | 5 × 5.8   | 0.76 | 150 | 5 × 5.8   | 0.76 | 150 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 7.7                      | 0.68      | 185             |
| 47                 | 470       | 5 × 5.8   | 0.76 | 150 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 7.7                      | 0.68      | 185             |
| 56                 | 560       | 5 × 5.8   | 0.76 | 150 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 7.7 | 0.34 | 280 | 8 × 10                         | 0.34      | 300             |
| 68                 | 680       | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 7.7 | 0.34 | 280 | 8 × 10                         | 0.34      | 300             |
| 100                | 101       | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 7.7 | 0.34 | 280 | 8 × 10    | 0.17 | 450 | 8 × 10                         | 0.34      | 300             |
| 150                | 151       | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 7.7 | 0.34 | 280 | 8 × 10    | 0.17 | 450 | 8 × 10    | 0.17 | 450 | 10 × 10                        | 0.18      | 670             |
| 220                | 221       | 6.3 × 5.8 | 0.44 | 230 | 6.3 × 7.7 | 0.34 | 280 | 6.3 × 7.7 | 0.34 | 280 | 8 × 10    | 0.17 | 450 | 10 × 10   | 0.09 | 670 | 10 × 10                        | 0.18      | 670             |
| 330                | 331       | 6.3 × 7.7 | 0.34 | 280 | 8 × 10    | 0.17 | 450 | 8 × 10    | 0.17 | 450 | 10 × 10   | 0.09 | 670 | 10 × 10   | 0.09 | 670 |                                |           |                 |
| 470                | 471       | 8 × 10    | 0.17 | 450 | 8 × 10    | 0.17 | 450 | 8 × 10    | 0.17 | 450 | 10 × 10   | 0.09 | 670 |           |      |     |                                |           |                 |
| 680                | 681       | 8 × 10    | 0.17 | 450 | 10 × 10   | 0.09 | 670 | 10 × 10   | 0.09 | 670 |           |      |     |           |      |     |                                |           |                 |
| 1000               | 102       | 10 × 10   | 0.09 | 670 | 10 × 10   | 0.09 | 670 |           |      |     |           |      |     |           |      |     | Case size<br>$\phi$ D × L (mm) | Impedance | Rated<br>ripple |
| 1500               | 152       | 10 × 10   | 0.09 | 670 |           |      |     |           |      |     |           |      |     |           |      |     |                                |           |                 |

Max. Impedance ( $\Omega$ ) at 20°C 100kHz,  
Rated ripple current (mA<sub>rms</sub>) at 105°C 100kHz

## ● 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           |

- Taping specifications are given in page 23.
- Recommended land size, soldering by reflow are given in page 18, 19.
- Please refer to page 3 for the minimum order quantity.