

ALUMINUM ELECTROLYTIC CAPACITORS

CD series Chip Type, Low Impedance



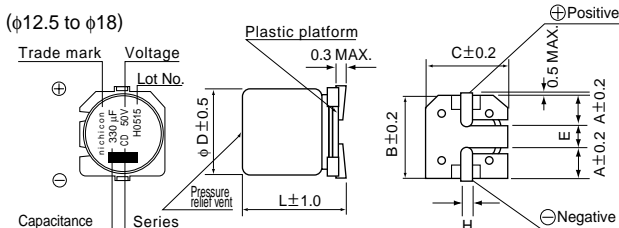
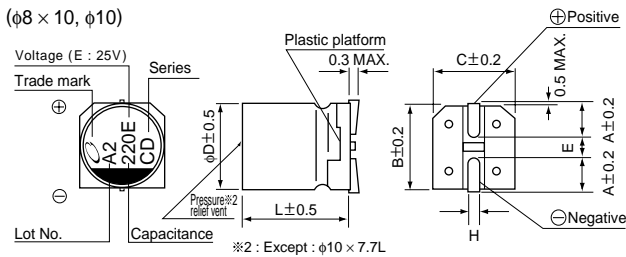
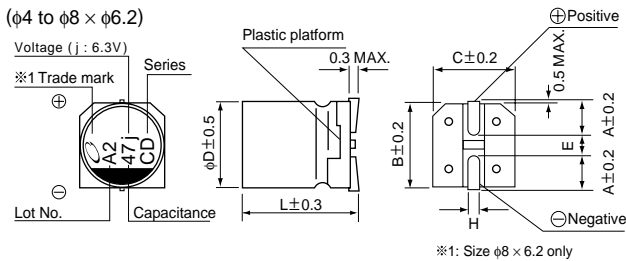
- Chip type, low impedance temperature range up to +105°C.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine fed with carrier tape.
- Compliant to the RoHS directive (2002/95/EC).



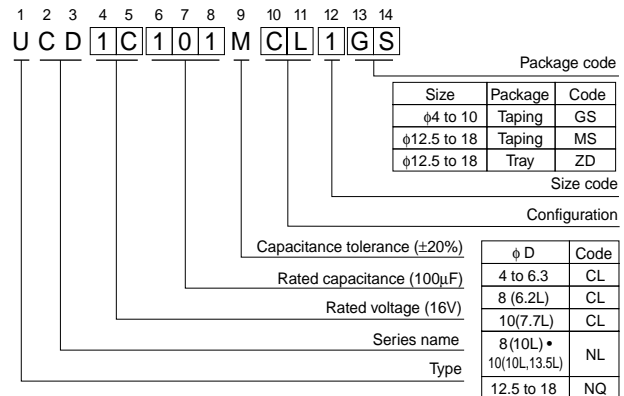
Specifications

| Item | Performance Characteristics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|---|--------------------|---|-------|--|-----------------|---|------|------|-----|-----|-----------------------------------|-----------------|------|------|------|------|------|------|------|------|-----------------|---|---|---|---|---|---|---|---|-----------------|---|---|---|---|---|---|---|---|
| Category Temperature Range | - 55 to +105°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated Voltage Range | 6.3 to 100V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated Capacitance Range | 1 to 3300μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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, Temperature : 20°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <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> <td>63</td> <td>80</td> <td>100</td> </tr> <tr> <td>tan δ (MAX.)</td> <td>0.26</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> <td>0.08</td> <td>0.07</td> </tr> </table> <p>For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF.</p> | Rated voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | tan δ (MAX.) | 0.26 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.08 | 0.07 | | | | | | | | | | | | | | | | | | |
| Rated voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| tan δ (MAX.) | 0.26 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.08 | 0.07 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stability at Low Temperature | Measurement frequency : 120Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <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> <td>63</td> <td>80</td> <td>100</td> </tr> <tr> <td rowspan="3">Impeance ratio ZT / Z20 (MAX.)</td> <td>Z-25°C / Z+20°C</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> <tr> <td>Z-55°C / Z+20°C</td> <td>4</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table> | Rated voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | Impeance ratio ZT / Z20 (MAX.) | Z-25°C / Z+20°C | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | Z-40°C / Z+20°C | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | Z-55°C / Z+20°C | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 |
| | Rated voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Impeance ratio ZT / Z20 (MAX.) | Z-25°C / Z+20°C | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Z-40°C / Z+20°C | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Z-55°C / Z+20°C | 4 | 4 | 4 | 3 | 3 | 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 L < 10 mm: 50V or less, and for L ≤ 10mm: 63V or more) at 105°C.</p> <table border="1"> <tr> <td>Capacitance Change</td> <td>Within ± 30% of the initial capacitance value</td> </tr> <tr> <td>tan δ</td> <td>200% or less than the initial specified value 300% or less than the initial specified value for 63V or more</td> </tr> <tr> <td>Leakage current</td> <td>Less than or equal to the initial specified value</td> </tr> </table> | Capacitance Change | Within ± 30% of the initial capacitance value | tan δ | 200% or less than the initial specified value 300% or less than the initial specified value for 63V or more | Leakage current | Less than or equal to the initial specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| tan δ | 200% or less than the initial specified value 300% or less than the initial specified value for 63V or more | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage current | Less than or equal to the initial specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shelf Life | <p>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.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 ± 10% of the initial capacitance value</td> </tr> <tr> <td>tan δ</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 ± 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| tan δ | Less than or equal to the initial specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage current | Less than or equal to the initial specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Marking | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Chip Type



Type numbering system (Example : 16V 100μF)



| φD×L | 4 × 5.8 | 5 × 5.8 | 6.3 × 5.8 | 6.3 × 7.7 | 8 × 6.2 | 8 × 10 | 10 × 7.7 | 10 × 10 | (mm) |
|------|------------|------------|------------|------------|------------|------------|------------|------------|------|
| A | 1.8 | 2.1 | 2.4 | 2.4 | 3.3 | 2.9 | 3.2 | 3.2 | |
| B | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 8.3 | 10.3 | 10.3 | |
| C | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 8.3 | 10.3 | 10.3 | |
| E | 1.0 | 1.3 | 2.2 | 2.2 | 2.3 | 3.1 | 4.5 | 4.5 | |
| L | 5.8 | 5.8 | 5.8 | 7.7 | 6.2 | 10 | 7.7 | 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 | 0.8 to 1.1 | 0.8 to 1.1 | 0.8 to 1.1 | |

| φD×L | 10 × 13.5 | 12.5 × 13.5 | 16 × 16.5 | 18 × 16.5 |
|------|------------|-------------|------------|------------|
| A | 3.2 | 4.8 | 5.4 | 6.4 |
| B | 10.3 | 13.6 | 17.1 | 19.1 |
| C | 10.3 | 13.6 | 17.1 | 19.1 |
| E | 4.5 | 4.0 | 6.3 | 6.3 |
| L | 13.5 | 13.5 | 16.5 | 16.5 |
| H | 0.8 to 1.1 | 1.0 to 1.4 | 1.0 to 1.4 | 1.0 to 1.4 |

Voltage

| | | | | | | | | | |
|------|-----|----|----|----|----|----|----|----|-----|
| V | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 |
| Code | j | A | C | E | V | H | J | K | 2A |

• Dimension table in next page.

CD series

■ Dimensions

| Cap. (μF) | V Code | 6.3 | | | 10 | | | 16 | | | 25 | | | 35 | | | 50 | | | | | | |
|-----------|-----------|-----|-------------|------|------|-------------|------|------|-------------|------|------|-------------|-------|------|-------------|-------|---------|-------------|-------|-----------|-------------|-----------|--------------|
| | | 0J | | | 1A | | | 1C | | | 1E | | | 1V | | | 1H | | | | | | |
| 1 | 010 | | | | | | | | | | | | | | | | 4 × 5.8 | 2.70 | 60 | | | | |
| 2.2 | 2R2 | | | | | | | | | | | | | | | | 4 × 5.8 | 2.70 | 60 | | | | |
| 3.3 | 3R3 | | | | | | | | | | | | | | | | 4 × 5.8 | 2.70 | 60 | | | | |
| 4.7 | 4R7 | | | | | | | | | | | | | | | | 4 × 5.8 | 1.35 | 90 | | | | |
| 10 | 100 | | | | | | | | 4 × 5.8 | 1.35 | 90 | 4 × 5.8 | 1.35 | 90 | ● 4 × 5.8 | 1.35 | 90 | ● 5 × 5.8 | 1.50 | 90 | | | |
| | | | | | | | | | | | | | | | | | 5 × 5.8 | 0.70 | 160 | 6.3 × 5.8 | 0.86 | 170 | |
| 15 | 150 | | | | | | | | 4 × 5.8 | 1.35 | 90 | 5 × 5.8 | 0.70 | 160 | | | | | | | | | |
| 22 | 220 | | 4 × 5.8 | 1.35 | 90 | 4 × 5.8 | 1.35 | 90 | ● 4 × 5.8 | 1.35 | 90 | 5 × 5.8 | 0.70 | 160 | 5 × 5.8 | 0.70 | 160 | 5 × 5.8 | 0.70 | 160 | 6.3 × 5.8 | 0.86 | 170 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | 270 | | 4 × 5.8 | 1.35 | 90 | 5 × 5.8 | 0.70 | 160 | 5 × 5.8 | 0.70 | 160 | 6.3 × 5.8 | 0.36 | 240 | | | | | | | | | |
| 33 | 330 | | 5 × 5.8 | 0.70 | 160 | ● 4 × 5.8 | 1.35 | 90 | 6.3 × 5.8 | 0.36 | 240 | ● 5 × 5.8 | 0.70 | 160 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 7.7 | 0.66 | 195 |
| | | | | | | 5 × 5.8 | 0.70 | 160 | | | | 6.3 × 5.8 | 0.36 | 240 | | | | | | | ● 8 × 6.2 | 0.63 | 200 |
| 47 | 470 | | ● 4 × 5.8 | 1.35 | 90 | 6.3 × 5.8 | 0.36 | 240 | ● 5 × 5.8 | 0.70 | 160 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 7.7 | 0.66 | 195 |
| | | | 5 × 5.8 | 0.70 | 160 | | | | 6.3 × 5.8 | 0.36 | 240 | | | | | | | | | | ● 8 × 6.2 | 0.63 | 200 |
| 56 | 560 | | 5 × 5.8 | 0.70 | 160 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | | | | | | |
| 68 | 680 | | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 7.7 | 0.32 | 290 | | | |
| 100 | 101 | | ● 5 × 5.8 | 0.70 | 160 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 7.7 | 0.32 | 290 | ● 6.3 × 7.7 | 0.32 | 290 | 8 × 10 | 0.32 | 350 | | | |
| | | | 6.3 × 5.8 | 0.36 | 240 | | | | | | | ● 8 × 6.2 | 0.26 | 300 | 8 × 10 | 0.16 | 600 | ● 10 × 7.7 | 0.36 | 330 | | | |
| 150 | 151 | | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 7.7 | 0.32 | 290 | 8 × 10 | 0.16 | 600 | 8 × 10 | 0.16 | 600 | 10 × 10 | 0.16 | 700 | | | |
| | | | | | | | | | | | | ● 10 × 7.7 | 0.18 | 600 | ● 10 × 7.7 | 0.18 | 600 | | | | | | |
| 220 | 221 | | 6.3 × 5.8 | 0.36 | 240 | 6.3 × 7.7 | 0.32 | 290 | 6.3 × 7.7 | 0.32 | 290 | 8 × 10 | 0.16 | 600 | 8 × 10 | 0.16 | 600 | 10 × 10 | 0.16 | 700 | | | |
| | | | | | | ● 8 × 6.2 | 0.26 | 300 | ● 8 × 6.2 | 0.26 | 300 | ● 10 × 7.7 | 0.18 | 600 | ● 10 × 7.7 | 0.18 | 600 | | | | | | |
| 330 | 331 | | 6.3 × 7.7 | 0.32 | 290 | 8 × 10 | 0.16 | 600 | 8 × 10 | 0.16 | 600 | 8 × 10 | 0.16 | 600 | 10 × 10 | 0.08 | 850 | ● 10 × 13.5 | 0.14 | 800 | | | |
| | | | ● 8 × 6.2 | 0.26 | 300 | ● 10 × 7.7 | 0.18 | 600 | ● 10 × 7.7 | 0.18 | 600 | | | | | | | 12.5 × 13.5 | 0.12 | 900 | | | |
| 390 | 391 | | | | | | | | | | | | | | | | | 12.5 × 13.5 | 0.12 | 900 | | | |
| 470 | 471 | | 8 × 10 | 0.16 | 600 | 8 × 10 | 0.16 | 600 | 8 × 10 | 0.16 | 600 | 10 × 10 | 0.08 | 850 | ● 10 × 13.5 | 0.08 | 950 | 16 × 16.5 | 0.073 | 1610 | | | |
| | | | ● 10 × 7.7 | 0.18 | 600 | ● 10 × 7.7 | 0.18 | 600 | ● 10 × 7.7 | 0.18 | 600 | | | | 12.5 × 13.5 | 0.08 | 1100 | | | | | | |
| 680 | 681 | | 8 × 10 | 0.16 | 600 | 10 × 10 | 0.08 | 850 | 10 × 10 | 0.08 | 850 | 10 × 13.5 | 0.08 | 950 | 12.5 × 13.5 | 0.08 | 1100 | 16 × 16.5 | 0.073 | 1610 | | | |
| | | | ● 10 × 7.7 | 0.18 | 600 | | | | | | | | | | | | | | | | | | |
| 1000 | 102 | | 8 × 10 | 0.16 | 600 | 10 × 10 | 0.08 | 850 | 10 × 13.5 | 0.08 | 950 | 12.5 × 13.5 | 0.08 | 1100 | 16 × 16.5 | 0.035 | 1800 | | | | | | |
| 1500 | 152 | | 10 × 10 | 0.08 | 850 | 10 × 13.5 | 0.08 | 950 | 12.5 × 13.5 | 0.08 | 1100 | | | | | | | | | | | | |
| 2200 | 222 | | 10 × 13.5 | 0.08 | 950 | 12.5 × 13.5 | 0.08 | 1100 | | | | 16 × 16.5 | 0.035 | 1800 | | | | | | | Case size | Impedance | Rated ripple |
| 3300 | 332 | | 12.5 × 13.5 | 0.08 | 1100 | | | | | | | | | | | | | | | | φD × L (mm) | | |

| Cap. (μF) | V Code | 63 | | | 80 | | | 100 | | | |
|-----------|-----------|----|-------------|-------|---------|-------------|------|-----|-------------|-----------|--------------|
| | | 1J | | | 1K | | | 2A | | | |
| 3.3 | 3R3 | | | | 5 × 5.8 | 5.00 | 25 | | | | |
| 4.7 | 4R7 | | 5 × 5.8 | 3.00 | 50 | 6.3 × 5.8 | 3.00 | 40 | | | |
| 10 | 100 | | 6.3 × 5.8 | 1.50 | 80 | 6.3 × 7.7 | 2.40 | 60 | | | |
| | | | | | | ● 8 × 6.2 | 2.40 | 60 | | | |
| 22 | 220 | | 6.3 × 7.7 | 1.20 | 120 | 8 × 10 | 1.30 | 130 | 8 × 10 | 1.30 | 130 |
| | | | ● 8 × 6.2 | 1.20 | 120 | | | | | | |
| 33 | 330 | | 8 × 10 | 0.65 | 250 | 8 × 10 | 1.30 | 130 | 10 × 10 | 0.70 | 200 |
| 47 | 470 | | 8 × 10 | 0.65 | 250 | 10 × 10 | 0.70 | 200 | 12.5 × 13.5 | 0.32 | 500 |
| 68 | 680 | | 10 × 10 | 0.35 | 400 | 12.5 × 13.5 | 0.32 | 500 | 12.5 × 13.5 | 0.32 | 500 |
| 100 | 101 | | 10 × 10 | 0.35 | 400 | 12.5 × 13.5 | 0.32 | 500 | 16 × 16.5 | 0.17 | 793 |
| 150 | 151 | | 12.5 × 13.5 | 0.16 | 800 | 12.5 × 13.5 | 0.32 | 500 | 16 × 16.5 | 0.17 | 793 |
| 220 | 221 | | 12.5 × 13.5 | 0.16 | 800 | | | | 18 × 16.5 | 0.15 | 917 |
| 330 | 331 | | | | | 16 × 16.5 | 0.17 | 793 | 18 × 16.5 | 0.15 | 917 |
| 470 | 471 | | 16 × 16.5 | 0.082 | 1410 | 18 × 16.5 | 0.15 | 917 | Case size | Impedance | Rated ripple |
| 680 | 681 | | 18 × 16.5 | 0.08 | 1690 | | | | φD × L (mm) | | |

Max. Impedance (Ω) at 20°C 100kHz, Rated ripple current (mArms) at 105°C 100kHz

●: In this case, [] will be put at 12th digit of type numbering system.

● Frequency coefficient of rated ripple current

| Frequency | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz 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.