

**nichicon**

### Chip Type, Low Impedance series



- CL**  
Smaller  
Higher capacitance
- CM**



| Item                                    | Performance Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                                              |               |                                                   |                 |                                                   |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------------------|---------------|---------------------------------------------------|-----------------|---------------------------------------------------|----|----------------------|------------------------------------|-----------------|------|------|------|------|---|---|-----------------|---|---|---|---|---|---|-----------------|---|---|---|---|---|---|
| Category Temperature Range              | -55 to +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                                              |               |                                                   |                 |                                                   |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
| Rated Voltage Range                     | 6.3 to 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                                              |               |                                                   |                 |                                                   |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
| Rated Capacitance Range                 | 10 to 2200μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                                              |               |                                                   |                 |                                                   |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                                              |               |                                                   |                 |                                                   |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
| Tangent of loss angle ( $\tan \delta$ ) | <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><math>\tan \delta</math> (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></tr> </table> Measurement frequency : 120Hz at 20°C                                                                                                                                                                                                                                                 | Rated voltage (V)  | 6.3                                          | 10            | 16                                                | 25              | 35                                                | 50 | $\tan \delta$ (MAX.) | 0.26                               | 0.19            | 0.16 | 0.14 | 0.12 | 0.10 |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
| Rated voltage (V)                       | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10                 | 16                                           | 25            | 35                                                | 50              |                                                   |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
| $\tan \delta$ (MAX.)                    | 0.26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.19               | 0.16                                         | 0.14          | 0.12                                              | 0.10            |                                                   |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
| Stability at Low Temperature            | <table border="1"> <tr> <td colspan="2">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 rowspan="3">Impedance ratio<br/>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></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></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></tr> </table> Measurement frequency : 120Hz                         | Rated voltage (V)  |                                              | 6.3           | 10                                                | 16              | 25                                                | 35 | 50                   | Impedance ratio<br>ZT / Z20 (MAX.) | Z-25°C / Z+20°C | 2    | 2    | 2    | 2    | 2 | 2 | Z-40°C / Z+20°C | 3 | 3 | 3 | 3 | 3 | 3 | Z-55°C / Z+20°C | 4 | 4 | 4 | 3 | 3 | 3 |
| Rated voltage (V)                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 6.3                | 10                                           | 16            | 25                                                | 35              | 50                                                |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
| Impedance ratio<br>ZT / Z20 (MAX.)      | Z-25°C / Z+20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2                  | 2                                            | 2             | 2                                                 | 2               | 2                                                 |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
|                                         | Z-40°C / Z+20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3                  | 3                                            | 3             | 3                                                 | 3               | 3                                                 |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
|                                         | Z-55°C / Z+20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 4                  | 4                                            | 4             | 3                                                 | 3               | 3                                                 |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |
| Endurance                               | <div>The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 105°C.</div> <table border="1"> <tr> <td>Capacitance change</td><td>Within ±30% of the initial capacitance value</td></tr> <tr> <td><math>\tan \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 ±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 ±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 ±10% of the initial capacitance value</td></tr> <tr> <td><math>\tan \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 ±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 ±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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                                              |               |                                                   |                 |                                                   |    |                      |                                    |                 |      |      |      |      |   |   |                 |   |   |   |   |   |   |                 |   |   |   |   |   |   |

Figure 1-10 Type numbering system (Example: 10V100P1)

| $\phi$ D | Code |
|----------|------|
| 4 to 6.3 | CL   |
| 8 - 10   | NL   |

|      | (mm)       |            |            |            |            |            |
|------|------------|------------|------------|------------|------------|------------|
| φD×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 |

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

CAT.8100D



## ■ Dimensions

| Cap.<br>( $\mu$ F) | V   | 6.3     |      |      | 10      |      |      | 16      |      |      | 25      |      |      | 35      |      |      | 50                                                                |      |     |
|--------------------|-----|---------|------|------|---------|------|------|---------|------|------|---------|------|------|---------|------|------|-------------------------------------------------------------------|------|-----|
|                    |     | 0J      |      |      | 1A      |      |      | 1C      |      |      | 1E      |      |      | 1V      |      |      | 1H                                                                |      |     |
| 10                 | 100 |         |      |      |         |      |      |         |      |      |         |      |      |         |      |      | ● 4×5.8                                                           | 2.30 | 85  |
|                    |     |         |      |      |         |      |      |         |      |      |         |      |      |         |      |      | 5×5.8                                                             | 0.88 | 165 |
| 22                 | 220 |         |      |      |         |      |      |         |      |      | 4×5.8   | 1.00 | 160  | 4×5.8   | 1.00 | 160  | 5×5.8                                                             | 0.88 | 165 |
| 33                 | 330 |         |      |      |         |      |      |         |      |      | 4×5.8   | 1.00 | 160  | 5×5.8   | 0.36 | 240  |                                                                   |      |     |
| 47                 | 470 |         |      |      |         |      |      | 4×5.8   | 1.00 | 160  | 5×5.8   | 0.36 | 240  | 5×5.8   | 0.36 | 240  | 6.3×5.8                                                           | 0.68 | 195 |
| 68                 | 680 |         |      |      | 4×5.8   | 1.00 | 160  | 5×5.8   | 0.36 | 240  | 5×5.8   | 0.36 | 240  | 6.3×5.8 | 0.26 | 300  |                                                                   |      |     |
| 100                | 101 | 4×5.8   | 1.00 | 160  |         |      |      | 5×5.8   | 0.36 | 240  | 6.3×5.8 | 0.26 | 300  | 6.3×5.8 | 0.26 | 300  | 6.3×7.7                                                           | 0.34 | 350 |
| 150                | 151 |         |      |      | 5×5.8   | 0.36 | 240  | 6.3×5.8 | 0.26 | 300  | 6.3×7.7 | 0.16 | 600  | 6.3×7.7 | 0.16 | 600  |                                                                   |      |     |
| 220                | 221 | 5×5.8   | 0.36 | 240  | 6.3×5.8 | 0.26 | 300  | 6.3×5.8 | 0.26 | 300  | 6.3×7.7 | 0.16 | 600  |         |      |      | 8×10                                                              | 0.18 | 670 |
| 330                | 331 | 6.3×5.8 | 0.26 | 300  | 6.3×7.7 | 0.16 | 600  | 6.3×7.7 | 0.16 | 600  |         |      |      | 8×10    | 0.08 | 850  | 10×10                                                             | 0.12 | 900 |
| 470                | 471 | 6.3×7.7 | 0.16 | 600  | 6.3×7.7 | 0.16 | 600  |         |      |      | 8×10    | 0.08 | 850  |         |      |      |                                                                   |      |     |
| 560                | 561 |         |      |      |         |      |      |         |      |      |         |      |      | 10×10   | 0.06 | 1190 |                                                                   |      |     |
| 680                | 681 | 6.3×7.7 | 0.16 | 600  |         |      |      | 8×10    | 0.08 | 850  |         |      |      |         |      |      |                                                                   |      |     |
| 820                | 821 |         |      |      |         |      |      |         |      |      | 10×10   | 0.06 | 1190 |         |      |      |                                                                   |      |     |
| 1000               | 102 |         |      |      | 8×10    | 0.08 | 850  | 10×10   | 0.06 | 1190 |         |      |      |         |      |      |                                                                   |      |     |
| 1500               | 152 | 8×10    | 0.08 | 850  | 10×10   | 0.06 | 1190 |         |      |      |         |      |      |         |      |      | Case size<br>$\phi D \times L$ (mm)   Impedance   Rated<br>ripple |      |     |
| 2200               | 222 | 10×10   | 0.06 | 1190 |         |      |      |         |      |      |         |      |      |         |      |      |                                                                   |      |     |

MAX. Impedance ( $\Omega$ ) at 20°C 100kHz, Rated ripple current(mArms) at 105°C 100kHz

● In this case, [6] will be put at 12th digit of type numbering system.

## ● 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.

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