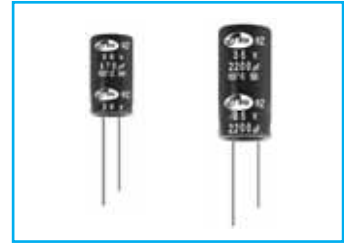


# MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS



## RZ Extremely Low Impedance Series



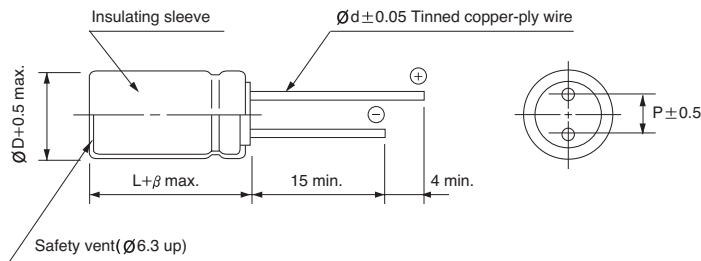
- Extremely low impedance at high frequency
- High reliability withstanding 5000 hours load life at 105°C (2000/3000 hours for smaller case sizes as specified below)
- Ideally suited for use in switching power supplies
- Complied to the RoHS directive



| Item  | Characteristics   |                     |                           |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
|---|---|---------------------|---------------------------|--------------------|------------------------------------|---------------|-----------------------------------|-----------------|--------------------------|---------------------|-------------------------|-----------|------------|------------|------------|------|------|
| <b>Operating temperature range</b>                                | -55 ~ +105°C  |                     |                           |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| <b>Leakage current max.</b>                                       | I = 0.01CV or 3 $\mu$ A whichever is greater (after 2 minutes)<br>I = 0.03CV or 4 $\mu$ A whichever is greater (after 1 minute)   |                     |                           |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| <b>Capacitance tolerance</b>                                      | $\pm 20\%$ at 120Hz, 20°C   |                     |                           |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| <b>Dissipation factor max. (at 120Hz, 20°C)</b>                   | Capacitance > 1000 $\mu$ F : $\tan\delta$ increases by 0.02 for each 1000 $\mu$ F from below value<br><table border="1"> <tr> <td>WV</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td><math>\tan\delta</math></td> <td>0.22</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> </tr> </table>   | WV                  | 6.3                       | 10                 | 16                                 | 25            | 35                                | 50              | 63                       | $\tan\delta$        | 0.22                    | 0.19      | 0.16       | 0.14       | 0.12       | 0.10 | 0.08 |
| WV  | 6.3   | 10                  | 16                        | 25                 | 35                                 | 50            | 63                                |                 |                          |                     |                         |           |            |            |            |      |      |
| $\tan\delta$  | 0.22  | 0.19                | 0.16                      | 0.14               | 0.12                               | 0.10          | 0.08                              |                 |                          |                     |                         |           |            |            |            |      |      |
| <b>Low temperature characteristics (Impedance ratio at 120Hz)</b> | <table border="1"> <tr> <td>WV</td> <td>6.3, 10</td> <td>16 ~ 35</td> <td>50, 63</td> </tr> <tr> <td>Z-55°C/Z+20°C</td> <td>4</td> <td>3</td> <td>2</td> </tr> </table>   | WV                  | 6.3, 10                   | 16 ~ 35            | 50, 63                             | Z-55°C/Z+20°C | 4                                 | 3               | 2                        |                     |                         |           |            |            |            |      |      |
| WV  | 6.3, 10   | 16 ~ 35             | 50, 63                    |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| Z-55°C/Z+20°C   | 4   | 3                   | 2                         |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| <b>Load life</b>  | After an application of DC bias voltage plus the rated AC ripple current for 5000 hours at 105°C. The measurement shall meet the following limits. The DC voltage plus the peak AC voltage combined must not exceed the rated voltage.<br><table border="1"> <tr> <td>Leakage current</td> <td>Less than specified value</td> </tr> <tr> <td>Capacitance change</td> <td>Within <math>\pm 20\%</math> of initial value</td> </tr> <tr> <td><math>\tan\delta</math></td> <td>Less than 200% of specified value</td> </tr> </table> <table border="1"> <tr> <td><math>\varnothing D</math></td> <td><math>\varnothing D \leq 6.3</math></td> <td><math>\varnothing D = 8</math></td> <td><math>\varnothing D \geq 10</math></td> </tr> <tr> <td>Life time</td> <td>2000 hours</td> <td>3000 hours</td> <td>5000 hours</td> </tr> </table> | Leakage current     | Less than specified value | Capacitance change | Within $\pm 20\%$ of initial value | $\tan\delta$  | Less than 200% of specified value | $\varnothing D$ | $\varnothing D \leq 6.3$ | $\varnothing D = 8$ | $\varnothing D \geq 10$ | Life time | 2000 hours | 3000 hours | 5000 hours |      |      |
| Leakage current   | Less than specified value   |                     |                           |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| Capacitance change  | Within $\pm 20\%$ of initial value  |                     |                           |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| $\tan\delta$  | Less than 200% of specified value   |                     |                           |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| $\varnothing D$   | $\varnothing D \leq 6.3$  | $\varnothing D = 8$ | $\varnothing D \geq 10$   |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| Life time   | 2000 hours  | 3000 hours          | 5000 hours                |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| <b>Shelf life (at 105°C)</b>                                      | After 1000 hours no load test, leakage current, capacitance and $\tan\delta$ are same as load life value. The measurement shall be performed at 20°C by the KS C 6035 clause 5.4.<br><table border="1"> <tr> <td>Leakage current</td> <td>Less than specified value</td> </tr> <tr> <td>Capacitance change</td> <td>Within <math>\pm 20\%</math> of initial value</td> </tr> <tr> <td><math>\tan\delta</math></td> <td>Less than 150% of specified value</td> </tr> </table>  | Leakage current     | Less than specified value | Capacitance change | Within $\pm 20\%$ of initial value | $\tan\delta$  | Less than 150% of specified value |                 |                          |                     |                         |           |            |            |            |      |      |
| Leakage current   | Less than specified value   |                     |                           |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| Capacitance change  | Within $\pm 20\%$ of initial value  |                     |                           |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |
| $\tan\delta$  | Less than 150% of specified value   |                     |                           |                    |                                    |               |                                   |                 |                          |                     |                         |           |            |            |            |      |      |

### DRAWING

Unit : mm



| $\varnothing D$ | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----------------|-----|-----|-----|-----|------|-----|-----|
| P               | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| $\varnothing d$ | 0.5 | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |
| $\beta$         | 1.5 |     |     | 2.0 |      |     |     |

### FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

| $\mu$ F     | Frequency | 120Hz | 1kHz | 10kHz | 50kHz | 100kHz $\leq$ |
|-------------|-----------|-------|------|-------|-------|---------------|
| ~ 33        |           | 0.40  | 0.65 | 0.82  | 0.91  | 1.00          |
| 47 ~ 220    |           | 0.50  | 0.70 | 0.84  | 0.92  | 1.00          |
| 330 ~ 680   |           | 0.55  | 0.75 | 0.86  | 0.93  | 1.00          |
| 1000 ~ 1500 |           | 0.60  | 0.80 | 0.88  | 0.94  | 1.00          |
| 2200 ~      |           | 0.70  | 0.85 | 0.90  | 0.95  | 1.00          |

MINIATURE TYPES

# MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

**RZ** series

● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

| WV<br>Item<br>μF | 6.3          |  |   | 10           |  |   | 16           |  |   | 25           |  |   |
|------------------|--------------|--|---|--------------|--|---|--------------|--|---|--------------|--|---|
|                  | ØD×L<br>(mm) | Impedance<br>(Ω)max.<br>20°C<br>100kHz | Ripple current<br>(mA rms)<br>105°C<br>100kHz | ØD×L<br>(mm) | Impedance<br>(Ω)max.<br>20°C<br>100kHz | Ripple current<br>(mA rms)<br>105°C<br>100kHz | ØD×L<br>(mm) | Impedance<br>(Ω)max.<br>20°C<br>100kHz | Ripple current<br>(mA rms)<br>105°C<br>100kHz | ØD×L<br>(mm) | Impedance<br>(Ω)max.<br>20°C<br>100kHz | Ripple current<br>(mA rms)<br>105°C<br>100kHz |
| 33               |              |  |   |              |  |   |              |  |   | 5×11         | 0.80                                   | 155   |
| 47               |              |  |   |              |  |   | 5×11         | 0.80                                   | 155   | 6.3×11       | 0.55                                   | 210   |
| 68               |              |  |   | 5×11         | 0.80                                   | 155   | 6.3×11       | 0.50                                   | 220   | 6.3×11       | 0.36                                   | 260   |
| 100              | 5×11         | 0.85                                   | 150   | 6.3×11       | 0.55                                   | 210   | 6.3×11       | 0.35                                   | 265   | 8×11.5       | 0.24                                   | 383   |
| 150              | 6.3×11       | 0.49                                   | 225   | 6.3×11       | 0.35                                   | 265   | 8×11.5       | 0.23                                   | 388   | 8×11.5       | 0.16                                   | 460   |
| 220              | 6.3×11       | 0.30                                   | 285   | 8×11.5       | 0.24                                   | 387   | 8×11.5       | 0.16                                   | 460   | 10×12.5      | 0.13                                   | 600   |
| 330              | 8×11.5       | 0.20                                   | 292   | 8×11.5       | 0.16                                   | 460   | 10×12.5      | 0.12                                   | 625   | 10×16        | 0.095                                  | 750   |
| 470              | 10×12.5      | 0.14                                   | 575   | 10×12.5      | 0.13                                   | 600   | 10×16        | 0.09                                   | 770   | 10×20        | 0.065                                  | 1020  |
| 680              | 10×16        | 0.11                                   | 700   | 10×16        | 0.09                                   | 770   | 10×20        | 0.065                                  | 1020  | 12.5×20      | 0.046                                  | 1392  |
| 1000             | 10×20        | 0.075                                  | 950   | 10×20        | 0.060                                  | 1060  | 12.5×20      | 0.047                                  | 1411  | 12.5×25      | 0.036                                  | 1660  |
| 1500             | 10×25        | 0.055                                  | 1220  | 12.5×20      | 0.045                                  | 1417  | 12.5×25      | 0.036                                  | 1660  | 16×20        | 0.034                                  | 1770  |
| 2200             | 12.5×20      | 0.043                                  | 1438  | 12.5×25      | 0.034                                  | 1710  | 16×20        | 0.033                                  | 1800  | 16×25        | 0.028                                  | 2051  |
| 3300             | 12.5×25      | 0.034                                  | 1710  | 16×20        | 0.031                                  | 1850  | 16×25        | 0.027                                  | 2095  | 16×35.5      | 0.020                                  | 2680  |
| 4700             | 16×25        | 0.032                                  | 1935  | 16×31.5      | 0.023                                  | 2420  | 16×35.5      | 0.020                                  | 2680  | 18×40        | 0.018                                  | 2960  |
| 6800             | 16×31.5      | 0.024                                  | 2370  | 16×35.5      | 0.020                                  | 2680  | 18×35.5      | 0.018                                  | 2900  |              |  |   |
| 10000            | 16×40        | 0.020                                  | 2750  | 18×40        | 0.017                                  | 3040  |              |  |   |              |  |   |
| 15000            | 18×40        | 0.018                                  | 2960  |              |  |   |              |  |   |              |  |   |

| WV<br>Item<br>μF | 35           |  |   | 50           |  |   | 63           |  |   |
|------------------|--------------|--|---|--------------|--|---|--------------|--|---|
|                  | ØD×L<br>(mm) | Impedance<br>(Ω)max.<br>20°C<br>100kHz | Ripple current<br>(mA rms)<br>105°C<br>100kHz | ØD×L<br>(mm) | Impedance<br>(Ω)max.<br>20°C<br>100kHz | Ripple current<br>(mA rms)<br>105°C<br>100kHz | ØD×L<br>(mm) | Impedance<br>(Ω)max.<br>20°C<br>100kHz | Ripple current<br>(mA rms)<br>105°C<br>100kHz |
| 1.0              |              |  |   | 5×11         | 4.0                                    | 36  |              |  |   |
| 1.5              |              |  |   | 5×11         | 3.8                                    | 45  |              |  |   |
| 2.2              |              |  |   | 5×11         | 3.5                                    | 54  |              |  |   |
| 3.3              |              |  |   | 5×11         | 3.0                                    | 66  |              |  |   |
| 4.7              |              |  |   | 5×11         | 2.2                                    | 81  |              |  |   |
| 6.8              |              |  |   | 5×11         | 1.8                                    | 91  |              |  |   |
| 10               |              |  |   | 5×11         | 1.8                                    | 115   | 5×11         | 1.06                                   | 135   |
| 15               |              |  |   | 5×11         | 0.93                                   | 145   | 6.3×11       | 0.73                                   | 185   |
| 22               | 5×11         | 0.75                                   | 160   | 6.3×11       | 0.65                                   | 195   | 6.3×11       | 0.52                                   | 215   |
| 33               | 6.3×11       | 0.49                                   | 225   | 6.3×11       | 0.43                                   | 240   | 8×11.5       | 0.35                                   | 320   |
| 47               | 6.3×11       | 0.34                                   | 270   | 8×11.5       | 0.30                                   | 344   | 8×11.5       | 0.25                                   | 365   |
| 68               | 8×11.5       | 0.24                                   | 384   | 8×11.5       | 0.20                                   | 410   | 10×12.5      | 0.19                                   | 495   |
| 100              | 8×11.5       | 0.16                                   | 460   | 10×16        | 0.16                                   | 581   | 10×20        | 0.12                                   | 750   |
| 150              | 10×12.5      | 0.12                                   | 625   | 10×20        | 0.10                                   | 820   | 10×25        | 0.09                                   | 950   |
| 220              | 10×16        | 0.09                                   | 770   | 10×25        | 0.075                                  | 1040  | 12.5×20      | 0.065                                  | 1140  |
| 330              | 10×20        | 0.060                                  | 1060  | 12.5×20      | 0.075                                  | 1281  | 12.5×25      | 0.049                                  | 1420  |
| 470              | 12.5×20      | 0.046                                  | 1401  | 12.5×25      | 0.044                                  | 1500  | 16×25        | 0.042                                  | 1700  |
| 680              | 12.5×25      | 0.036                                  | 1660  | 16×20        | 0.040                                  | 1630  | 16×31.5      | 0.032                                  | 2050  |
| 1000             | 16×20        | 0.034                                  | 1770  | 16×31.5      | 0.030                                  | 2120  | 18×35.5      | 0.029                                  | 2280  |
| 1500             | 16×31.5      | 0.028                                  | 2385  | 16×40        | 0.026                                  | 2410  |              |  |   |
| 2200             | 16×35.5      | 0.020                                  | 2680  | 18×40        | 0.024                                  | 2560  |              |  |   |
| 3300             | 18×40        | 0.017                                  | 3040  |              |  |   |              |  |   |