

# ALUMINUM ELECTROLYTIC CAPACITORS

**RZ** series Compact & Low-Profile Sized, Wide Temperature Range



- Very small case sizes same as RS series, but operating over wide temperature range of  $-55$  ( $-40$ ) to  $+105^{\circ}\text{C}$ .
- Compliant to the RoHS directive (2002/95/EC).

RZ



## Specifications

| Item                                    | Performance Characteristics   |   |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
|---|---|---|------------|------------|-------|--|---|------|------|------|------|------|-----|-----|----------------------|-----------------|---|------|------|------|------|------|------|------|------|------|------|---|---|-----------------|---|----|---|---|---|---|---|---|---|---|---|---|
| Category Temperature Range              | $-55$ to $+105^{\circ}\text{C}$ (6.3 to 100V), $-40$ to $+105^{\circ}\text{C}$ (160 to 400V)  |   |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| Rated Voltage Range                     | 6.3 to 400V   |   |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| Rated Capacitance Range                 | 0.1 to 10000 $\mu\text{F}$  |   |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| Capacitance Tolerance                   | $\pm 20\%$ at 120Hz, $20^{\circ}\text{C}$   |   |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| Leakage Current                         | <table border="1"> <tr> <th>Rated voltage (V)</th> <th>6.3 to 100</th> <th>160 to 400</th> </tr> <tr> <td>_____</td> <td>After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (<math>\mu\text{A}</math>), whichever is greater.<br/>After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (<math>\mu\text{A}</math>), whichever is greater.</td> <td>After 1 minute's application of rated voltage, <math>I = 0.04CV + 100</math> (<math>\mu\text{A}</math>) or less</td> </tr> </table>   | Rated voltage (V)   | 6.3 to 100 | 160 to 400 | _____ | After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 ( $\mu\text{A}$ ), whichever is greater.<br>After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 ( $\mu\text{A}$ ), whichever is greater. | After 1 minute's application of rated voltage, $I = 0.04CV + 100$ ( $\mu\text{A}$ ) or less |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
|   | Rated voltage (V)   | 6.3 to 100  | 160 to 400 |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| _____                                   | After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 ( $\mu\text{A}$ ), whichever is greater.<br>After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 ( $\mu\text{A}$ ), whichever is greater.  | After 1 minute's application of rated voltage, $I = 0.04CV + 100$ ( $\mu\text{A}$ ) or less |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| Tangent of loss angle ( $\tan \delta$ ) | For capacitance of more than 1000 $\mu\text{F}$ , add 0.02 for every increase of 1000 $\mu\text{F}$ . Measurement frequency : 120Hz at $20^{\circ}\text{C}$ <table border="1"> <tr> <th>Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160</th> <th>200</th> <th>250</th> <th>400</th> </tr> <tr> <td><math>\tan \delta</math> (MAX.)</td> <td>0.28</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> <td>0.20</td> <td>0.20</td> <td>0.20</td> <td>0.25</td> </tr> </table>   | Rated voltage (V)   | 6.3        | 10         | 16    | 25   | 35  | 50   | 63   | 100  | 160  | 200  | 250 | 400 | $\tan \delta$ (MAX.) | 0.28            | 0.24  | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.20 | 0.20 | 0.20 | 0.25 |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| Rated voltage (V)                       | 6.3   | 10  | 16         | 25         | 35    | 50   | 63  | 100  | 160  | 200  | 250  | 400  |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| $\tan \delta$ (MAX.)                    | 0.28  | 0.24  | 0.20       | 0.16       | 0.14  | 0.12   | 0.10  | 0.08 | 0.20 | 0.20 | 0.20 | 0.25 |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| Stability at Low Temperature            | Measurement frequency : 120Hz   |   |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
|   | <table border="1"> <tr> <th colspan="2">Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160</th> <th>200</th> <th>250</th> <th>400</th> </tr> <tr> <td>Impedance ratio</td> <td>Z<math>-25^{\circ}\text{C}</math> / Z<math>+20^{\circ}\text{C}</math></td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>3</td> <td>3</td> <td>3</td> <td>6</td> </tr> <tr> <td>ZT / Z20 (MAX.)</td> <td>Z<math>-40^{\circ}\text{C}</math> / Z<math>+20^{\circ}\text{C}</math></td> <td>10</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>4</td> <td>4</td> <td>6</td> <td>10</td> </tr> </table> | Rated voltage (V)   |            | 6.3        | 10    | 16   | 25  | 35   | 50   | 63   | 100  | 160  | 200 | 250 | 400                  | Impedance ratio | Z $-25^{\circ}\text{C}$ / Z $+20^{\circ}\text{C}$ | 5    | 4    | 3    | 2    | 2    | 2    | 2    | 2    | 3    | 3    | 3 | 6 | ZT / Z20 (MAX.) | Z $-40^{\circ}\text{C}$ / Z $+20^{\circ}\text{C}$ | 10 | 8 | 6 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 6 |
| Rated voltage (V)                       |   | 6.3   | 10         | 16         | 25    | 35   | 50  | 63   | 100  | 160  | 200  | 250  | 400 |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| Impedance ratio                         | Z $-25^{\circ}\text{C}$ / Z $+20^{\circ}\text{C}$   | 5   | 4          | 3          | 2     | 2  | 2   | 2    | 2    | 3    | 3    | 3    | 6   |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| ZT / Z20 (MAX.)                         | Z $-40^{\circ}\text{C}$ / Z $+20^{\circ}\text{C}$   | 10  | 8          | 6          | 4     | 3  | 3   | 3    | 3    | 4    | 4    | 6    | 10  |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| Endurance                               | The specifications listed at right shall be met when the capacitors are restored to $20^{\circ}\text{C}$ after the rated voltage is applied for 1000 hours at $105^{\circ}\text{C}$ .   |   |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
|   | Capacitance change  | Within $\pm 20\%$ of the initial capacitance value  |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
|   | $\tan \delta$   | 200% or less than the initial specified value   |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| Shelf Life                              | The specifications listed at right shall be met when the capacitors are restored to $20^{\circ}\text{C}$ after the rated voltage is applied for 1000 hours at $105^{\circ}\text{C}$ .   |   |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
|   | Leakage current   | Less than or equal to the initial specified value   |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |
| Marking                                 | Printed with white color letter on black sleeve.  |   |            |            |       |  |   |      |      |      |      |      |     |     |                      |                 |   |      |      |      |      |      |      |      |      |      |      |   |   |                 |   |    |   |   |   |   |   |   |   |   |   |   |

## Radial Lead Type



| $\alpha$         |     | (mm)     |     |     |     |     |      |     |     |      |  |  |
|------------------|-----|----------|-----|-----|-----|-----|------|-----|-----|------|--|--|
| $\phi D < 20$    | 1.5 | $\phi D$ | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 20   |  |  |
| $\phi D \geq 20$ | 2.0 | P        | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10.0 |  |  |
|                  |     | $\phi d$ | 0.5 | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 | 1.0  |  |  |

● Please refer to page 20 about the end seal configuration.

## Type numbering system (Example : 10V 330 $\mu\text{F}$ )



| ※ Configuration |  |
|-----------------|--|
| $\phi D$        | Pb-free leadwire<br>Pb-free PET sleeve |
| 5 · 6.3         | DD                                     |
| 8 · 10          | PD                                     |
| 12.5 to 18      | HD                                     |
| 20              | RD                                     |

Please refer to page 20, 21, 22 about the formed or taped product spec.  
Please refer to page 4 for the minimum order quantity.

● Dimension table in next page.

## ■Dimensions

| V        |      | 6.3     |      | 10      |      | 16        |      | 25      |      | 35        |      | 50                     |                 |
|----------|------|---------|------|---------|------|-----------|------|---------|------|-----------|------|------------------------|-----------------|
| Cap.(μF) | Code | 0J      |      | 1A      |      | 1C        |      | 1E      |      | 1V        |      | 1H                     |                 |
| 0.1      | 0R1  |         |      |         |      |           |      |         |      |           |      | 5×9                    | 1.1             |
| 0.22     | R22  |         |      |         |      |           |      |         |      |           |      | 5×9                    | 2.3             |
| 0.33     | R33  |         |      |         |      |           |      |         |      |           |      | 5×9                    | 3.5             |
| 0.47     | R47  |         |      |         |      |           |      |         |      |           |      | 5×9                    | 5               |
| 1        | 010  |         |      |         |      |           |      |         |      |           |      | 5×9                    | 12              |
| 2.2      | 2R2  |         |      |         |      |           |      |         |      |           |      | 5×9                    | 18              |
| 3.3      | 3R3  |         |      |         |      |           |      |         |      |           |      | 5×9                    | 25              |
| 4.7      | 4R7  |         |      |         |      |           |      | 5×9     | 20   | 5×9       | 25   | 5×9                    | 30              |
| 10       | 100  |         |      |         |      | 5×9       | 30   | 5×9     | 35   | 5×9       | 40   | 5×9                    | 46              |
| 22       | 220  | 5×9     | 25   | 5×9     | 40   | 5×9       | 50   | 5×9     | 55   | 5×9       | 60   | 5×9                    | 65              |
| 33       | 330  | 5×9     | 40   | 5×9     | 55   | 5×9       | 60   | 5×9     | 70   | 5×9       | 75   | 6.3×9                  | 85              |
| 47       | 470  | 5×9     | 55   | 5×9     | 65   | 5×9       | 70   | 5×9     | 80   | 6.3×9     | 95   | 6.3×9                  | 100             |
| 100      | 101  | 5×9     | 90   | 5×9     | 95   | 6.3×9     | 115  | 6.3×9   | 130  | 8×9       | 155  | 10×9                   | 170             |
| 220      | 221  | 6.3×9   | 145  | 6.3×9   | 155  | 8×9       | 205  | 10×9    | 220  | 10×9      | 235  | 10×12.5                | 290             |
| 330      | 331  | 6.3×9   | 180  | 8×9     | 210  | 10×9      | 240  | 10×9    | 270  | 10×12.5   | 340  | 12.5×12.5              | 370             |
| 470      | 471  | 8×9     | 235  | 8×9     | 275  | 10×9      | 290  | 10×12.5 | 370  | 12.5×12.5 | 420  | 16×15                  | 540             |
| 1000     | 102  | 10×9    | 370  | 10×12.5 | 450  | 12.5×12.5 | 520  | 12.5×15 | 590  | 16×15     | 720  | 18×20                  | 830             |
| 2200     | 222  | 12.5×15 | 635  | 12.5×15 | 690  | 16×15     | 830  | 18×15   | 970  | 18×20     | 1110 | 20×25                  | 1250            |
| 3300     | 332  | 16×15   | 860  | 16×15   | 940  | 18×15     | 1050 | 18×20   | 1220 | 20×25     | 1430 |                        |                 |
| 4700     | 472  | 16×15   | 1010 | 18×15   | 1120 | 18×20     | 1260 | 18×25   | 1470 |           |      |                        |                 |
| 6800     | 682  | 18×15   | 1200 | 18×20   | 1330 | 18×25     | 1560 |         |      |           |      |                        |                 |
| 10000    | 103  | 18×20   | 1450 | 18×25   | 1700 |           |      |         |      |           |      |                        |                 |
|          |      |         |      |         |      |           |      |         |      |           |      | Case size<br>φD×L (mm) | Rated<br>ripple |

| V        |      | 63        |     | 100     |     | 160    |     | 200    |     | 250    |     | 400                    |                 |
|----------|------|-----------|-----|---------|-----|--------|-----|--------|-----|--------|-----|------------------------|-----------------|
| Cap.(μF) | Code | 1J        |     | 2A      |     | 2C     |     | 2D     |     | 2E     |     | 2G                     |                 |
| 0.1      | 0R1  |           |     | 5×9     | 1.2 |        |     |        |     |        |     |                        |                 |
| 0.22     | R22  |           |     | 5×9     | 3   |        |     |        |     |        |     |                        |                 |
| 0.33     | R33  |           |     | 5×9     | 4.5 |        |     |        |     |        |     |                        |                 |
| 0.47     | R47  |           |     | 5×9     | 6.5 |        |     |        |     |        |     |                        |                 |
| 1        | 010  |           |     | 5×9     | 12  |        |     |        |     |        |     |                        |                 |
| 2.2      | 2R2  |           |     | 5×9     | 17  |        |     |        |     |        |     |                        |                 |
| 3.3      | 3R3  |           |     | 5×9     | 25  |        |     |        |     |        |     |                        |                 |
| 4.7      | 4R7  |           |     | 6.3×9   | 32  |        |     |        |     |        |     |                        |                 |
| 10       | 100  | 5×9       | 42  | 6.3×9   | 50  |        |     |        |     |        |     | 16×15                  | 100             |
| 22       | 220  | 6.3×9     | 71  | 8×9     | 93  |        |     |        |     | 16×15  | 200 | ●18×15                 | 200             |
| 33       | 330  | 8×9       | 100 | 10×9    | 130 |        |     | 16×15  | 250 | ●18×15 | 250 | 18×20                  | 250             |
| 47       | 470  | 8×9       | 120 | 10×12.5 | 165 | 16×15  | 300 | ●18×15 | 300 | △18×20 | 300 | ★18×25                 | 300             |
| 68       | 680  |           |     |         |     | ●18×15 | 350 | △18×20 | 350 | 18×20  | 350 | 20×25                  | 350             |
| 100      | 101  | 10×9      | 215 | 12.5×15 | 265 | △18×20 | 420 | ★18×25 | 420 | 18×25  | 420 |                        |                 |
| 150      | 151  |           |     |         |     | ★18×25 | 510 | 18×25  | 510 |        |     |                        |                 |
| 220      | 221  | 12.5×12.5 | 335 | 16×15   | 440 | 20×25  | 550 |        |     |        |     |                        |                 |
| 330      | 331  | 12.5×15   | 510 | 18×15   | 540 |        |     |        |     |        |     |                        |                 |
| 470      | 471  | 16×15     | 640 |         |     |        |     |        |     |        |     |                        |                 |
|          |      |           |     |         |     |        |     |        |     |        |     | Case size<br>φD×L (mm) | Rated<br>ripple |

Rated ripple current (mA rms) at 105°C 120Hz

Size φ16×20 is available for capacitors marked "●"  
 Size φ20×15 is available for capacitors marked "△"  
 Size φ20×20 is available for capacitors marked "★"

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

## ●Frequency coefficient of rated ripple current

| V          | Frequency     |  | 50Hz | 120Hz | 300Hz | 1 kHz | 10kHz or more |
|------------|---------------|--|------|-------|-------|-------|---------------|
|            | Cap.(μF)      |  |      |       |       |       |               |
| 6.3 to 100 | 0.1 to 47     |  | 0.75 | 1.00  | 1.35  | 1.57  | 2.00          |
|            | 100 to 470    |  | 0.80 | 1.00  | 1.23  | 1.34  | 1.50          |
|            | 1000 to 10000 |  | 0.85 | 1.00  | 1.10  | 1.13  | 1.15          |
| 160 to 400 | 10 to 220     |  | 0.80 | 1.00  | 1.25  | 1.40  | 1.60          |



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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