

# Surface Mount Aluminum Electrolytic

# CZ [ For Low Impedance ]

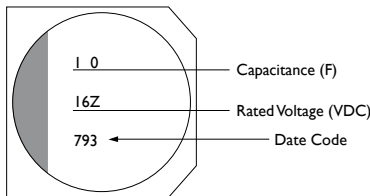


## FEATURE

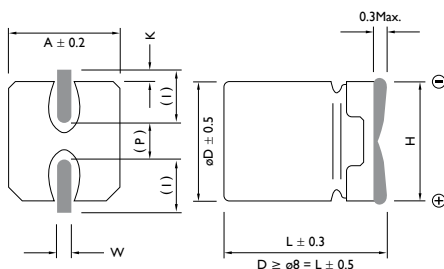
For Low ESR Series with 105°C 1000 Hours

Suitable for AV (TV, Video, Audio), Monitor / Computer, Battery Charger, DC / DC Converter, SMPS, Noise Filter

## MARKING



## DIMENSIONS



## ELECTRICAL CHARACTERISTICS

| Operation Temperature Range | -40 to +105°C  |     |    |    |    |    |    |        |   |     |    |    |    |    |    |                       |   |   |   |   |   |   |   |                       |   |   |   |   |   |   |   |
|-----------------------------|--|-----|----|----|----|----|----|--------|---|-----|----|----|----|----|----|-----------------------|---|---|---|---|---|---|---|-----------------------|---|---|---|---|---|---|---|
| Rated Voltage Range         | 4 to 50VDC   |     |    |    |    |    |    |        |   |     |    |    |    |    |    |                       |   |   |   |   |   |   |   |                       |   |   |   |   |   |   |   |
| Rated Capacitance Range     | 0.1 ~ 1000 $\mu$ F   |     |    |    |    |    |    |        |   |     |    |    |    |    |    |                       |   |   |   |   |   |   |   |                       |   |   |   |   |   |   |   |
| Capacitance Tolerance       | $\pm 20\%$ at 120Hz, 20°C  |     |    |    |    |    |    |        |   |     |    |    |    |    |    |                       |   |   |   |   |   |   |   |                       |   |   |   |   |   |   |   |
| Leakage Current (Max. 20°C) | $I \leq 0.01 CV$ ( $\mu$ A) or 3 $\mu$ A<br>(After 2 Minutes Application of DC Rated Voltage at 20°C)<br>$I$ = Leakage Current ( $\mu$ A), $C$ = Rated Capacitance ( $\mu$ F), $V$ = Rated Voltage (V)   |     |    |    |    |    |    |        |   |     |    |    |    |    |    |                       |   |   |   |   |   |   |   |                       |   |   |   |   |   |   |   |
| Low Temperature Stability   | Impedance Ratio at 120Hz<br><table border="1"> <thead> <tr> <th>WV (V)</th><th>4</th><th>6.3</th><th>10</th><th>16</th><th>25</th><th>35</th><th>50</th></tr> </thead> <tbody> <tr> <td>Z (-25°C) / Z (+20°C)</td><td>4</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>8</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td></tr> </tbody> </table> |     |    |    |    |    |    | WV (V) | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | Z (-25°C) / Z (+20°C) | 4 | 2 | 2 | 2 | 2 | 2 | 2 | Z (-40°C) / Z (+20°C) | 8 | 4 | 4 | 3 | 3 | 3 | 3 |
| WV (V)                      | 4  | 6.3 | 10 | 16 | 25 | 35 | 50 |        |   |     |    |    |    |    |    |                       |   |   |   |   |   |   |   |                       |   |   |   |   |   |   |   |
| Z (-25°C) / Z (+20°C)       | 4  | 2   | 2  | 2  | 2  | 2  | 2  |        |   |     |    |    |    |    |    |                       |   |   |   |   |   |   |   |                       |   |   |   |   |   |   |   |
| Z (-40°C) / Z (+20°C)       | 8  | 4   | 4  | 3  | 3  | 3  | 3  |        |   |     |    |    |    |    |    |                       |   |   |   |   |   |   |   |                       |   |   |   |   |   |   |   |
| Endurance                   | After 1000 hours application of WV at 105°C, the capacitors shall meet following requirements.<br>(a) Capacitance Change: Within $\pm 20\%$ of the Initial Value<br>(b) Dissipation Factor: Not Exceeding 200% of Specified Value<br>(c) Leakage Current: Not Exceeding the Specified Value  |     |    |    |    |    |    |        |   |     |    |    |    |    |    |                       |   |   |   |   |   |   |   |                       |   |   |   |   |   |   |   |
| Shelf Life                  | After having been placed at 105°C without voltage applied for 1000 hours, the capacitors shall meet the same requirements as Endurance.  |     |    |    |    |    |    |        |   |     |    |    |    |    |    |                       |   |   |   |   |   |   |   |                       |   |   |   |   |   |   |   |

Unit: mm

| SIZE CODE | D $\phi$ | L    | A    | H         | I   | W              | P             | K                       |
|-----------|----------|------|------|-----------|-----|----------------|---------------|-------------------------|
| B         | 4.0      | 5.4  | 4.3  | 5.5 Max.  | 1.8 | 0.65 $\pm$ 0.1 | 1.0 $\pm$ 0.2 | 0.35 $^{+0.15}_{-0.20}$ |
| C         | 5.0      | 5.4  | 5.3  | 6.5 Max.  | 2.2 | 0.65 $\pm$ 0.1 | 1.5 $\pm$ 0.2 | 0.35 $^{+0.15}_{-0.20}$ |
| D         | 6.3      | 5.4  | 6.6  | 7.8 Max.  | 2.6 | 0.65 $\pm$ 0.1 | 1.8 $\pm$ 0.2 | 0.35 $^{+0.15}_{-0.20}$ |
| E         | 8.0      | 6.5  | 8.3  | 9.5 Max.  | 3.4 | 0.65 $\pm$ 0.1 | 2.2 $\pm$ 0.2 | 0.35 $^{+0.15}_{-0.20}$ |
| F         | 8.0      | 10.5 | 8.3  | 10.0 Max. | 3.4 | 0.90 $\pm$ 0.2 | 3.1 $\pm$ 0.2 | 0.70 $\pm$ 0.20         |
| G         | 10.0     | 10.5 | 10.3 | 12.0 Max. | 3.5 | 0.90 $\pm$ 0.2 | 4.6 $\pm$ 0.2 | 0.70 $\pm$ 0.20         |
| H         | 6.3      | 7.7  | 6.6  | 7.8 Max.  | 2.6 | 0.65 $\pm$ 0.1 | 1.8 $\pm$ 0.2 | 0.35 $^{+0.15}_{-0.20}$ |

## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

| CAP. (μF) | RATED VOLTAGE W V (SURGE VOLTAGE W V) |                   |                       |      |                 |                   |                       |      |
|-----------|---------------------------------------|-------------------|-----------------------|------|-----------------|-------------------|-----------------------|------|
|           | 4 (5)<br>SIZE                         | RIPPLE<br>CURRENT | DISSIPATION<br>FACTOR | ESR  | 6.3 (8)<br>SIZE | RIPPLE<br>CURRENT | DISSIPATION<br>FACTOR | ESR  |
| 4.7       | 4 × 5.4                               | 60                | 0.35                  | 4.00 |                 |                   |                       |      |
| 6.8       | 4 × 5.4                               | 60                | 0.35                  | 4.00 |                 |                   |                       |      |
| 10        | 4 × 5.4                               | 60                | 0.35                  | 4.00 |                 |                   |                       |      |
| 22        | 4 × 5.4                               | 60                | 0.35                  | 4.00 | 4 × 5.4         | 60                | 0.26                  | 4.00 |
| 33        | 4 × 5.4                               | 60                | 0.35                  | 4.00 | 5 × 5.4         | 95                | 0.26                  | 2.60 |
| 47        | 4 × 5.4                               | 60                | 0.35                  | 4.00 | 5 × 5.4         | 95                | 0.26                  | 2.60 |
| 68        | 4 × 5.4                               | 60                | 0.35                  | 4.00 | 6.3 × 5.4       | 140               | 0.26                  | 1.30 |
| 100       | 5 × 5.4                               | 95                | 0.35                  | 3.00 | 6.3 × 5.4       | 140               | 0.26                  | 1.30 |
| 150       | 6.3 × 5.4                             | 140               | 0.35                  | 2.60 | 8 × 6.5         | 230               | 0.35                  | 0.80 |
| 220       | 6.3 × 5.4                             | 140               | 0.35                  | 2.60 | 8 × 6.5         | 230               | 0.35                  | 0.80 |
| 330       |                                       |                   |                       |      | 8 × 10.5        | 450               | 0.35                  | 0.50 |
| 470       |                                       |                   |                       |      | 10 × 10.5       | 670               | 0.35                  | 0.30 |
| 1000      |                                       |                   |                       |      | 10 × 10.5       | 670               | 0.35                  | 0.30 |

Note: 1. Ripple Current: (mA/rms) 105°C, 100KHz

2. Dissipation Factor: 20°C, 120Hz

3. ESR: 20°C, 100KHz (Ω)

CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D × L: mm

| CAP. (μF) | RATED VOLTAGE WV (SURGE VOLTAGE WV) |                   |                       |      |                 |                   |                       |      |
|-----------|-------------------------------------|-------------------|-----------------------|------|-----------------|-------------------|-----------------------|------|
|           | 10 (13)<br>SIZE                     | RIPPLE<br>CURRENT | DISSIPATION<br>FACTOR | ESR  | 16 (20)<br>SIZE | RIPPLE<br>CURRENT | DISSIPATION<br>FACTOR | ESR  |
| 4.7       |                                     |                   |                       |      | 4 × 5.4         | 60                | 0.16                  | 4.00 |
| 6.8       |                                     |                   |                       |      | 4 × 5.4         | 60                | 0.16                  | 4.00 |
| 10        | 4 × 5.4                             | 60                | 0.22                  | 4.00 | 4 × 5.4         | 60                | 0.16                  | 4.00 |
| 22        | 5 × 5.4                             | 95                | 0.22                  | 2.60 | 5 × 5.4         | 95                | 0.16                  | 2.60 |
| 33        | 5 × 5.4                             | 95                | 0.22                  | 2.60 | 5 × 5.4         | 95                | 0.16                  | 2.60 |
| 47        | 6.3 × 5.4                           | 95                | 0.22                  | 1.30 | 6.3 × 5.4       | 140               | 0.16                  | 1.30 |
| 68        | 6.3 × 5.4                           | 140               | 0.22                  | 1.30 | 8 × 6.5         | 230               | 0.20                  | 0.80 |
| 100       | 6.3 × 5.4                           | 140               | 0.22                  | 1.30 | 8 × 6.5         | 230               | 0.20                  | 0.80 |
| 150       | 8 × 6.5                             | 230               | 0.26                  | 0.80 | 10 × 10.5       | 450               | 0.20                  | 0.50 |
| 220       | 8 × 6.5                             | 230               | 0.26                  | 0.80 | 10 × 10.5       | 450               | 0.20                  | 0.50 |
| 330       | 8 × 10.5                            | 450               | 0.26                  | 0.50 | 10 × 10.5       | 670               | 0.20                  | 0.30 |
| 470       | 10 × 10.5                           | 670               | 0.26                  | 0.30 | 10 × 10.5       | 670               | 0.20                  | 0.30 |
| 1000      | 10 × 10.5                           | 670               | 0.26                  | 0.30 |                 |                   |                       |      |

Note: 1. Ripple Current: (mA/rms) 105°C, 100KHz  
2. Dissipation Factor: 20°C, 120Hz  
3. ESR: 20°C, 100KHz (Ω)

## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D × L: mm

| CAP.<br>(μF) | RATED VOLTAGE WV (SURGE VOLTAGE WV) |                   |                       |      |           |                   |                       |      |           |                   |                       |      |
|--------------|-------------------------------------|-------------------|-----------------------|------|-----------|-------------------|-----------------------|------|-----------|-------------------|-----------------------|------|
|              | 25 (32)                             |                   |                       |      | 35 (44)   |                   |                       |      | 50 (63)   |                   |                       |      |
|              | SIZE                                | RIPPLE<br>CURRENT | DISSIPATION<br>FACTOR | ESR  | SIZE      | RIPPLE<br>CURRENT | DISSIPATION<br>FACTOR | ESR  | SIZE      | RIPPLE<br>CURRENT | DISSIPATION<br>FACTOR | ESR  |
| 0.10         |                                     |                   |                       |      |           |                   |                       |      | 4 × 5.4   | 60                | 0.12                  | 5.00 |
| 0.22         |                                     |                   |                       |      |           |                   |                       |      | 4 × 5.4   | 60                | 0.12                  | 5.00 |
| 0.33         |                                     |                   |                       |      |           |                   |                       |      | 4 × 5.4   | 60                | 0.12                  | 5.00 |
| 0.47         |                                     |                   |                       |      |           |                   |                       |      | 4 × 5.4   | 60                | 0.12                  | 5.00 |
| 1.0          |                                     |                   |                       |      | 4 × 5.4   | 60                | 0.12                  | 4.00 | 4 × 5.4   | 60                | 0.12                  | 5.00 |
| 2.2          |                                     |                   |                       |      | 4 × 5.4   | 60                | 0.12                  | 4.00 | 4 × 5.4   | 60                | 0.12                  | 5.00 |
| 3.3          |                                     |                   |                       |      | 4 × 5.4   | 60                | 0.12                  | 4.00 | 4 × 5.4   | 60                | 0.12                  | 5.00 |
| 4.7          | 4 × 5.4                             | 60                | 0.14                  | 4.00 | 4 × 5.4   | 60                | 0.12                  | 4.00 | 5 × 5.4   | 95                | 0.12                  | 4.00 |
| 6.8          | 4 × 5.4                             | 60                | 0.14                  | 4.00 | 5 × 5.4   | 95                | 0.12                  | 2.60 | 6.3 × 5.4 | 140               | 0.12                  | 2.60 |
| 10           | 5 × 5.4                             | 95                | 0.14                  | 2.60 | 5 × 5.4   | 95                | 0.12                  | 2.60 | 6.3 × 5.4 | 140               | 0.12                  | 2.60 |
| 22           | 6.3 × 5.4                           | 140               | 0.14                  | 1.30 | 6.3 × 5.4 | 140               | 0.12                  | 1.30 | 8 × 6.5   | 230               | 0.12                  | 1.30 |
| 33           | 6.3 × 5.4                           | 140               | 0.14                  | 1.30 | 8 × 6.5   | 230               | 0.14                  | 0.80 | 8 × 10.5  | 300               | 0.12                  | 1.10 |
| 47           | 6.3 × 5.4                           | 140               | 0.14                  | 1.30 | 8 × 6.5   | 230               | 0.14                  | 0.80 | 10 × 10.5 | 670               | 0.12                  | 0.80 |
| 68           | 8 × 10.5                            | 450               | 0.16                  | 0.50 | 8 × 10.5  | 450               | 0.14                  | 0.50 | 10 × 10.5 | 670               | 0.12                  | 0.80 |
| 100          | 8 × 10.5                            | 450               | 0.16                  | 0.50 | 10 × 10.5 | 670               | 0.14                  | 0.30 | 10 × 10.5 | 670               | 0.12                  | 0.80 |
| 150          | 10 × 10.5                           | 670               | 0.16                  | 0.30 | 10 × 10.5 | 670               | 0.14                  | 0.30 |           |                   |                       |      |
| 220          | 10 × 10.5                           | 670               | 0.16                  | 0.30 | 10 × 10.5 | 670               | 0.14                  | 0.30 |           |                   |                       |      |

Note: 1. Ripple Current: (mA/rms) 105°C, 100KHz

2. Dissipation Factor: 20°C, 120Hz

3. ESR: 20°C, 100KHz (Ω)