



Miniature Aluminum Electrolytic Capacitors

Series
CSR

FEATURES

1. Rated Working Voltage Range 6.3 to 100 VDC/160 to 450VDC at Operation Temperature Range -40 to +105°C
2. This series is for communication equipments, switching power supply, industrial measuring instruments, Automotive electric products, etc

SPECIFICATIONS

| Item | Performance Characteristics | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--------------------------|------|------|-------|-------|------|--------|----------------------|------|----------------------|------|------|------|------|------|------|------|------|--|--|--|--|--|--|--|
| Operating Temperature Range | -40 to +105°C | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated Working voltage Range | 6.3 to 100V DC | 160 to 450V DC | | | | | | | | | | | | | | | | | | | | | | | | |
| Nominal Capacitance Range | 2.2- 15000(uF) | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance Tolerance | ± 20% (120Hz, +20°C) | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage Current | $I \leq 0.01CV$ or $3(uA)$ Whichever is greater | $I \leq 0.03CV + 40(uA)$ | | | | | | | | | | | | | | | | | | | | | | | | |
| | after 2 minutes application of rated working voltage at +20°C | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissipation Factor $\tan \delta$ (120Hz+20°C) | <table border="1"> <thead> <tr> <th>Working 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> </tr> </thead> <tbody> <tr> <td>$\tan \delta$ (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> </tr> </tbody> </table> | Working voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | $\tan \delta$ (max.) | 0.28 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | | | | | | | |
| | Working voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | | | | | | | | | | | | | | | | | |
| | $\tan \delta$ (max.) | 0.28 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | | | | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>Working voltage(V)</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>$\tan \delta$ (max.)</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> </tr> </tbody> </table> | Working voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 | $\tan \delta$ (max.) | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | | | | | | | | | | | |
| Working voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 | | | | | | | | | | | | | | | | | | | | |
| $\tan \delta$ (max.) | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | | | | | | | | | | | | | | | | | | | | |
| For capacitance value >1000uF add 0.02 per another 1000uF | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ripple Current | Refer to standard products table (120Hz,+105°C) Correction factor for frequency | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Voltage (V) | Freq(Hz) CAP(uF) | | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz~ | | | | | | | | | | | | | | | | | | |
| | | 0.1~47 | | 0.75 | 1.00 | 1.35 | 1.57 | 2.00 | | | | | | | | | | | | | | | | | | |
| | 100~470 | | 0.80 | 1.00 | 1.23 | 1.34 | 1.50 | | | | | | | | | | | | | | | | | | | |
| | 1000~33000 | | 0.85 | 1.00 | 1.10 | 1.13 | 1.15 | | | | | | | | | | | | | | | | | | | |
| | 160~450 | 0.47~220 | | 0.80 | 1.00 | 1.25 | 1.40 | 1.60 | | | | | | | | | | | | | | | | | | |
| 330~1000 | | 0.90 | 1.00 | 1.10 | 1.13 | 1.15 | | | | | | | | | | | | | | | | | | | | |
| Multiplier for Ripple Current vs. Temperature | Temperature °C | 45 | 60 | 70 | 85 | 105 | | | | | | | | | | | | | | | | | | | | |
| | Multiplier | 2.10 | 1.90 | 1.40 | 1.25 | 1.00 | | | | | | | | | | | | | | | | | | | | |

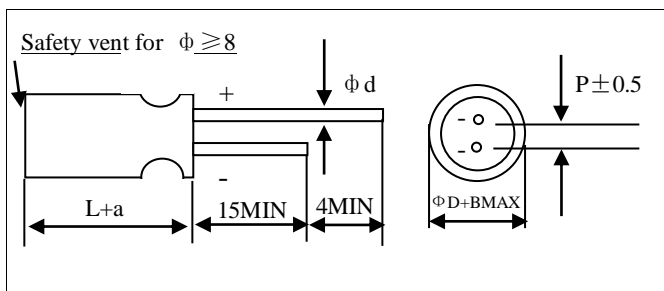


Miniature Aluminum Electrolytic Capacitors

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|---|--|--------------------|-----|-----|-----|-----|-----|---------------|-----|-----|---------------|---|---|----|---|---|---|---|---|---------------|----|----|---|---|---|---|---|---|
| Low Temperature Characteristics | Impedance ratio max. at 120Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <tr> <td>Working 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>100</td> </tr> <tr> <td>Z-25°C/Z+20°C</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> </tr> <tr> <td>Z-40°C/Z+20°C</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table> | Working voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | Z-25°C/Z+20°C | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | Z-40°C/Z+20°C | 12 | 10 | 8 | 5 | 4 | 3 | 3 | 3 |
| | Working voltage(V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | | | | | | | | | | | | | | | | | | | |
| | Z-25°C/Z+20°C | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | |
| Z-40°C/Z+20°C | 12 | 10 | 8 | 5 | 4 | 3 | 3 | 3 | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <tr> <td>Working voltage(V)</td> <td>160</td> <td>200</td> <td>250</td> <td>350</td> <td>400</td> <td>450</td> </tr> <tr> <td>Z-40°C/Z+20°C</td> <td>3</td> <td>3</td> <td>4</td> <td>4</td> <td>6</td> <td>15</td> </tr> </table> | Working voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 | Z-40°C/Z+20°C | 3 | 3 | 4 | 4 | 6 | 15 | | | | | | | | | | | | | | |
| Working voltage(V) | 160 | 200 | 250 | 350 | 400 | 450 | | | | | | | | | | | | | | | | | | | | | | |
| Z-40°C/Z+20°C | 3 | 3 | 4 | 4 | 6 | 15 | | | | | | | | | | | | | | | | | | | | | | |
| For capacitance value >1000uF | Add0.5 per another 1000uF for Z-25°C/Z+20°C Add1.0 per another 1000uF for Z-40°C/Z+20°C | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High temperature Loading | Test conditions Duration : 3000 hours Ambient temperature : +105°C Applied voltage : DC voltage with maximum permissible ripple current specified at +105°C (Sum of the DC voltage and superimposed pea AC voltage for maximum permissible ripple current should be equal to rated DC working voltage) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Post test requirements at +20°C Leakage current : ≤ Initial specified value Capacitance change : ≤ ±20% of initial measured value tan δ : ≤200% of initial specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shelf life | Test conditions Duration : 1000 hours Ambient temperature : +105°C Applied voltage : (None) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Post test requirements at +20°C Same Limits for high temperature loading | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Others | JIS C-5141 JIS C-5102 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

CASE SIZE TABLE

Unit:mm



| | | | | | | | | |
|-----------|-----|-----|-----|-----|-----|-----|-----|------|
| Dφ | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 | 22 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 | 10.0 |
| d φ ±0.05 | 0.5 | | 0.6 | | 0.8 | | | |

| | |
|------|-----------|
| aMAX | (L<20)1.5 |
| | (L≥20)2.0 |

| | |
|------|-----------|
| BMAX | (D<20)0.5 |
| | (D≥20)1.0 |

DIMENSIONS

ΦD×L(mm)

| WV(SV) | | 6.3V(8) | 10V(13) | 16V(20) | 25V(32) | 35V(44) |
|----------|------|---------|---------|---------|---------|---------|
| Cap.(uF) | Code | 0J | 1A | 1C | 1E | 1V |
| 10 | 106 | | | 5×11 | 62 | |
| 22 | 226 | | | 5×11 | 85 | |
| 33 | 336 | | | 5×11 | 100 | 5×11 |
| 47 | 476 | | | 5×11 | 150 | 6.3×11 |
| 68 | 686 | | 5×11 | 160 | 6.3×11 | 215 |
| 82 | 826 | | 5×11 | 170 | 6.3×11 | 262 |
| | | | | | | 282 |
| | | | | | | 8×12 |
| | | | | | | 180 |
| | | | | | | 230 |
| | | | | | | 370 |
| | | | | | | 420 |



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| | | | | | | | | | | | |
|-------|-----|---------|------|---------|------|---------|------|-------|------|-----------|------------------|
| 100 | 107 | 5×11 | 205 | 6.3×11 | 205 | 6.3×11 | 255 | 8×12 | 365 | 8×12 | 455 |
| 220 | 227 | 6.3×11 | 280 | 8×12 | 365 | 8×12 | 545 | 8×14 | 752 | 10×15 | 812 |
| 270 | 277 | 6.3×11 | 325 | 8×12 | 415 | 8×16 | 660 | 8×20 | 755 | 10×20 | 985 |
| 330 | 337 | 8×12 | 415 | 8×12 | 555 | 10×12.5 | 750 | 10×15 | 810 | 10×20 | 1120 |
| 470 | 477 | 10×12.5 | 575 | 10×12.5 | 745 | 10×15 | 810 | 10×20 | 860 | 13×21 | 1380 |
| 680 | 687 | 10×15 | 705 | 10×15 | 810 | 10×20 | 860 | 13×21 | 880 | 13×25 | 1620 |
| 1000 | 108 | 10×15 | 940 | 10×20 | 1070 | 10×20 | 900 | 13×21 | 920 | 13×30 | 1940 |
| 2200 | 228 | 10×25 | 1460 | 13×25 | 1650 | 13×30 | 2060 | 13×40 | 2320 | 16×36 | 2510 |
| 3300 | 338 | 13×25 | 1850 | 13×35 | 2110 | 13×40 | 2350 | 16×36 | 2650 | 18×40 | 3050 |
| 4700 | 478 | 13×35 | 2060 | 16×32 | 2380 | 16×36 | 2650 | 18×40 | 2920 | | |
| 6800 | 688 | 16×32 | 2320 | 16×36 | 2610 | 18×35 | 2860 | | | | |
| 8200 | 828 | 16×36 | 2430 | 18×35 | 2820 | 18×40 | 3050 | | | | |
| 10000 | 109 | 18×32 | 2540 | 18×40 | 3050 | | | | | | |
| 15000 | 159 | 18×40 | 2910 | | | | | | | Case size | Allowable ripple |

Allowable Ripple (mA rms) at 105°C 120HZ

Φ D × L (mm)

| WV(SV) Cap.(uF) Code | | 50V(63) | | 63V(79) | | 100V(125) | | 160V(200) | | 200V(250) | |
|-------------------------|-----|---------|------|---------|------|-----------|------|-----------|------|-----------|------------------|
| | | 1H | | 1J | | 2A | | 2C | | 2D | |
| 3.3 | 335 | | | | | | | 8×12 | 87 | 8×12 | 92 |
| 4.7 | 475 | | | | | 6.3×11 | 65 | 8×12 | 88 | 8×12 | 105 |
| 10 | 106 | | | | | 8×12 | 95 | 10×12.5 | 145 | 10×12.5 | 165 |
| 22 | 226 | 6.3×11 | 165 | 6.3×11 | 185 | 8×14 | 200 | 10×15 | 205 | 10×20 | 370 |
| 33 | 336 | 6.3×11 | 200 | 8×12 | 250 | 10×15 | 295 | 10×20 | 445 | 10×25 | 485 |
| 47 | 476 | 8×12 | 322 | 8×12 | 455 | 10×25 | 555 | 13×21 | 575 | 13×21 | 585 |
| 68 | 686 | 8×12 | 455 | 8×16 | 540 | 13×21 | 640 | 13×21 | 690 | 13×25 | 790 |
| 100 | 107 | 10×15 | 545 | 10×20 | 680 | 13×25 | 810 | 16×26 | 1023 | 16×26 | 1020 |
| 220 | 227 | 10×20 | 1110 | 13×21 | 1320 | 16×32 | 1410 | 16×36 | 1155 | 18×32 | 1205 |
| 330 | 337 | 13×21 | 1280 | 13×25 | 1410 | 18×40 | 1620 | 18×35 | 1475 | | |
| 470 | 477 | 13×25 | 1430 | 13×35 | 1640 | | | | | | |
| 680 | 687 | 13×35 | 1820 | 16×32 | 2020 | | | | | | |
| 1000 | 108 | 16×32 | 2110 | 18×35 | 2210 | | | | | | |
| 2200 | 228 | 18×40 | 2610 | | | | | | | Case size | Allowable ripple |

Allowable Ripple (mA rms) at 105°C 120HZ

| WV(SV) Cap.(uF) Code | | 250V(300) | | 350(400) | | 400V(450) | | 450V(500) | |
|-------------------------|-----|-----------|-----|----------|-----|-----------|-----|-----------|-----|
| | | 2E | | | | 2G | | 2W | |
| 2.2 | 225 | 8×12 | 86 | 8×12 | 48 | 8×12 | 65 | 10×12.5 | 75 |
| 3.3 | 335 | 8×12 | 98 | 10×12.5 | 86 | 10×12.5 | 90 | 10×15 | 105 |
| 4.7 | 475 | 10×12.5 | 110 | 10×12.5 | 102 | 10×15 | 130 | 10×20 | 115 |
| 10 | 106 | 10×15 | 245 | 10×17 | 145 | 10×20 | 158 | 13×21 | 225 |
| 22 | 226 | 13×21 | 390 | 13×21 | 278 | 13×25 | 285 | 16×26 | 465 |
| 33 | 336 | 13×21 | 498 | 13×25 | 453 | 13×25 | 462 | 16×26 | 500 |
| 47 | 476 | 13×25 | 655 | 16×26 | 580 | 16×26 | 585 | 16×32 | 685 |
| 68 | 686 | 16×26 | 812 | 16×30 | 952 | 16×32 | 965 | 18×32 | 755 |



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| | | | | | | | | | |
|-----|-----|-------|------|-------|-----|-------|------|-----------|------------------|
| 82 | 826 | | | | | | | 18×32 | 850 |
| 100 | 107 | 16×32 | 1120 | 16×35 | 998 | 18×35 | 1010 | 18×43 | 1150 |
| 120 | 127 | | | | | | | 18×43/40 | 1280/1250 |
| 220 | 227 | 18×40 | 1210 | | | | | Case size | Allowable ripple |

Allowable Ripple (mA rms) at 105°C 120HZ