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# MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

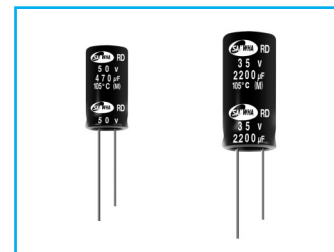


UPGRADE

**RD**

Wide Temperature Range Series

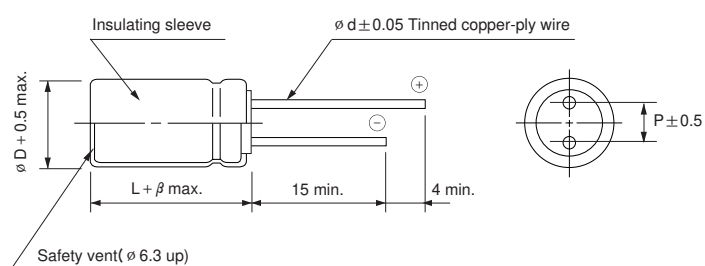
- Standard series for general purpose
- High CV value
- Wide operating temperature range of -55 ~ +105°C
- Complied to the RoHS directive



| Item                                                                          | Characteristics                                                                                              |      |              |      |                                   |              |      |        |                               |         |         |     |
|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------|--------------|------|-----------------------------------|--------------|------|--------|-------------------------------|---------|---------|-----|
| Operating temperature range                                                   | WV                                                                                                           |      | 6.3 ~ 100    |      |                                   | 160 ~ 350    |      |        | 400, 450                      |         |         |     |
|                                                                               | Temperature range                                                                                            |      | -55 ~ +105°C |      |                                   | -40 ~ +105°C |      |        | -25 ~ +105°C                  |         |         |     |
| Leakage current max.                                                          | WV ≤ 100                                                                                                     |      |              |      |                                   |              |      |        | WV > 100                      |         |         |     |
|                                                                               | I = 0.01CV or 3μA whichever is greater (after 2 min)<br>I = 0.03CV or 4μA whichever is greater (after 1 min) |      |              |      |                                   |              |      |        | I = 0.02CV+15μA (after 5 min) |         |         |     |
| Capacitance tolerance                                                         | ±20% at 120Hz, 20°C                                                                                          |      |              |      |                                   |              |      |        |                               |         |         |     |
| Dissipation factor max.<br>(at 120Hz, 20°C)                                   | Capacitance > 1000μF : tanδ increases by 0.02 for each 1000μF from below value.                              |      |              |      |                                   |              |      |        |                               |         |         |     |
|                                                                               | WV                                                                                                           | 6.3  | 10           | 16   | 25                                | 35           | 50   | 63     | 100                           | 160~250 | 350~450 |     |
|                                                                               | tanδ                                                                                                         | 0.28 | 0.24         | 0.20 | 0.16                              | 0.14         | 0.12 | 0.10   | 0.08                          | 0.15    | 0.20    |     |
| Low temperature characteristics<br>(Impedance ratio at 120Hz)                 | WV                                                                                                           |      | 6.3          | 10   | 16                                | 25           | 35   | 50~100 | 160                           | 200~350 | 400     | 450 |
|                                                                               | Z-25°C/Z+20°C                                                                                                |      | 5            | 4    | 3                                 | 2            | 2    | 2      | 3                             | 4       | 6       | 10  |
|                                                                               | Z-40°C/Z+20°C                                                                                                |      | 10           | 8    | 6                                 | 4            | 3    | 3      | 4                             | 8       | —       | —   |
| Load life<br>(after application of the rated voltage for 2000 hours at 105°C) | Leakage current                                                                                              |      |              |      | Less than specified value         |              |      |        |                               |         |         |     |
|                                                                               | Capacitance change                                                                                           |      |              |      | Within ±20% of initial value      |              |      |        |                               |         |         |     |
|                                                                               | tanδ                                                                                                         |      |              |      | Less than 200% of specified value |              |      |        |                               |         |         |     |
|                                                                               | ø 5, 6.3 and ø 8 products are for 1000 hours                                                                 |      |              |      |                                   |              |      |        |                               |         |         |     |
| Shelf life (at 105°C)                                                         | After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.            |      |              |      |                                   |              |      |        |                               |         |         |     |

## DRAWING

Unit : mm



| ø D | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 22   | 25. |
|-----|-----|-----|-----|-----|------|-----|-----|------|-----|
| P   | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10.0 | 12. |
| ø d | 0.5 | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 | 1.0  | 1.0 |
| α   | 0.5 |     |     |     |      |     |     | 1.0  |     |
| β   | 1.5 |     |     | 2.0 |      |     |     |      |     |

# MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

**RD** series

## ● DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

| WV<br>μF | 6.3             | 10              | 16              | 25              | 35              | 50              | 63                                                                                                                    | 100             | 160            | 200            | 250            | 350            | 400            | 450            | 500            |
|----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------------------------------------------------------------------------------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 2.2      |                 |                 |                 |                 |                 | 5×11<br>24      | 5×11<br>26                                                                                                            | 5×11<br>26      | 6.3×11<br>23   | 6.3×11<br>23   | 6.3×11<br>23   | 8×11.5<br>28   | 8×11.5<br>28   | 10×12.5<br>27  |                |
| 3.3      |                 |                 |                 |                 |                 | 5×11<br>29      | 5×11<br>32                                                                                                            | 5×11<br>32      | 6.3×11<br>29   | 6.3×11<br>29   | 8×11.5<br>34   | 8×11.5<br>34   | 10×12.5<br>39  | 10×16<br>36    |                |
| 4.7      |                 |                 |                 |                 |                 | 5×11<br>35      | 5×11<br>38                                                                                                            | 5×11<br>38      | 6.3×11<br>34   | 8×11.5<br>40   | 8×11.5<br>40   | 10×12.5<br>47  | 10×12.5<br>47  | 10×16<br>43    | 10×16<br>59    |
| 6.8      |                 |                 |                 |                 |                 | 5×11<br>42      | 5×11<br>46                                                                                                            | 5×11<br>46      | 8×11.5<br>49   | 10×12.5<br>56  | 10×12.5<br>56  | 10×16<br>62    | 10×16<br>62    | 10×20<br>56    | 10×16<br>72    |
| 10       |                 |                 |                 |                 |                 | 5×11<br>51      | 5×11<br>56                                                                                                            | 5×11<br>56      | 10×12.5<br>68  | 10×12.5<br>68  | 10×12.5<br>68  | 10×16<br>75    | 10×20<br>82    | 12.5×20<br>80  | 12.5×25<br>88  |
| 15       |                 |                 |                 |                 |                 | 5×11<br>62      | 5×11<br>68                                                                                                            | 6.3×11<br>78    | 10×16<br>92    | 10×16<br>92    | 10×16<br>92    | 10×20<br>100   | 12.5×20<br>118 | 12.5×25<br>107 | 12.5×30<br>115 |
| 22       |                 |                 |                 |                 |                 | 5×11<br>75      | 5×11<br>83                                                                                                            | 6.3×11<br>95    | 10×16<br>111   | 10×16<br>111   | 10×20<br>121   | 12.5×20<br>143 | 12.5×25<br>155 | 16×25<br>144   | 16×25<br>159   |
| 33       |                 |                 |                 |                 |                 | 5×11<br>92      | 6.3×11<br>116                                                                                                         | 8×11.5<br>137   | 10×20<br>149   | 10×20<br>149   | 12.5×20<br>175 | 12.5×25<br>190 | 16×25<br>211   | 16×31.5<br>193 | 16×31.5<br>207 |
| 47       |                 |                 |                 |                 | ★ 5×11<br>96    | ★ 6.3×11<br>127 | 6.3×11<br>139                                                                                                         | 10×12.5<br>190  | 12.5×20<br>208 | 12.5×20<br>208 | 12.5×25<br>227 | 16×25<br>252   | 16×31.5<br>276 | 16×35.5<br>242 | 18×31.5<br>261 |
| 68       |                 |                 |                 | ★ 5×11<br>108   | 6.3×11<br>132   | 8×11.5<br>180   | 8×11.5<br>197                                                                                                         | 10×16<br>251    | 12.5×25<br>273 | 16×20<br>279   | 16×25<br>303   | 16×31.5<br>332 | 18×35.5<br>373 | 18×40<br>352   | 18×31.5<br>335 |
| 100      |                 |                 | ★ 5×11<br>119   | 6.3×11<br>151   | ★ 6.3×11<br>160 | 8×11.5<br>218   | 8×11.5<br>239                                                                                                         | 10×20<br>332    | 12.5×25<br>331 | 16×25<br>368   | 16×31.5<br>402 | 18×35.5<br>407 | 18×40<br>427   | 22×41<br>486   |                |
| 150      |                 | 5×11<br>134     | 6.3×11<br>167   | 6.3×11<br>185   | 8×11.5<br>231   | 10×12.5<br>310  | 10×12.5<br>340                                                                                                        | 12.5×20<br>477  | 16×25<br>450   | 16×35.5<br>517 | 18×35.5<br>554 | 18×40<br>523   | 22×41<br>596   |                |                |
| 220      | 5×11<br>146     | ★ 5×11<br>162   | ★ 6.3×11<br>203 | 8×11.5<br>264   | 8×11.5<br>280   | 10×12.5<br>376  | 10×16<br>451                                                                                                          | 12.5×25<br>630  | 16×31.5<br>596 | 18×35.5<br>671 | 18×40<br>694   | 22×41<br>721   |                |                |                |
| 330      | ★ 6.3×11<br>206 | ★ 6.3×11<br>228 | 8×11.5<br>293   | 8×11.5<br>324   | 10×12.5<br>399  | 10×16<br>504    | 10×20<br>603                                                                                                          | 16×25<br>856    | 18×35.5<br>822 | 18×40<br>850   | 22×41<br>968   |                |                |                |                |
| 470      | ★ 6.3×11<br>246 | 6.3×11<br>272   | 8×11.5<br>349   | 10×12.5<br>449  | 10×16<br>521    | 10×20<br>657    | 12.5×20<br>844                                                                                                        | 16×25<br>1021   | 18×40<br>1015  | 22×41<br>1155  |                |                |                |                |                |
| 680      | 8×11.5<br>348   | 10×12.5<br>449  | 10×12.5<br>488  | 10×16<br>591    | 12.5×16<br>740  | 12.5×20<br>927  | 12.5×25<br>1107                                                                                                       | 16×31.5<br>1344 | 22×41<br>1390  |                |                |                |                |                |                |
| 1000     | 8×11.5<br>422   | 10×12.5<br>544  | 10×16<br>648    | 10×16<br>782    | 12.5×20<br>974  | 12.5×25<br>1226 | 16×25<br>1490                                                                                                         | 18×40<br>1925   |                |                |                |                |                |                |                |
| 1500     | 10×16<br>621    | 10×16<br>680    | 12.5×16<br>862  | 12.5×20<br>1017 | 16×20<br>1188   | 16×25<br>1442   | 16×35.5<br>1770                                                                                                       |                 |                |                |                |                |                |                |                |
| 2200     | 10×20<br>778    | 10×20<br>844    | 12.5×20<br>1055 | 12.5×25<br>1235 | 16×25<br>1426   | 16×25<br>1442   | 16×35.5<br>1770                                                                                                       |                 |                |                |                |                |                |                |                |
| 3300     | 12.5×16<br>983  | 12.5×20<br>1148 | 12.5×25<br>1323 | 16×25<br>1562   | 16×35.5<br>1857 | 18×35.5<br>1794 | 18×40<br>2689                                                                                                         |                 |                |                |                |                |                |                |                |
| 4700     | 12.5×20<br>1219 | 12.5×25<br>1421 | 16×25<br>1657   | 16×31.5<br>1916 | 16×35.5<br>2224 | 18×35.5<br>2152 | <div> <div>← Case size <math>\phi</math> D × L (mm)</div> <div>← Ripple current (mA rms) at 105°C, 120Hz</div> </div> |                 |                |                |                |                |                |                |                |
| 6800     | 12.5×25<br>1480 | 16×25<br>1737   | 16×31.5<br>1982 | 18×35.5<br>2335 |                 |                 |                                                                                                                       |                 |                |                |                |                |                |                |                |
| 10000    | 16×25<br>1807   | 16×35.5<br>2172 | 18×35.5<br>2409 |                 |                 |                 |                                                                                                                       |                 |                |                |                |                |                |                |                |
| 15000    | 16×35.5<br>2233 | 18×35.5<br>2482 |                 |                 |                 |                 |                                                                                                                       |                 |                |                |                |                |                |                |                |
| 22000    | 18×40<br>2652   |                 |                 |                 |                 |                 |                                                                                                                       |                 |                |                |                |                |                |                |                |

Size  $\phi 8 \times 9$  is available for capacitors marked "★"

Size  $\phi 10 \times 9$  is available for capacitors marked "●"

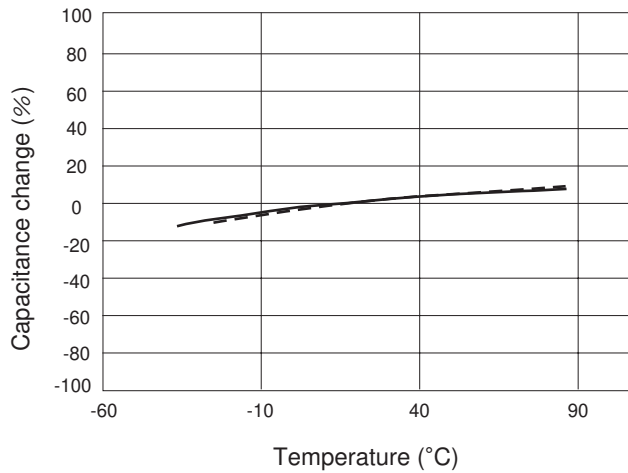
**RD** series

## TYPICAL PERFORMANCE

— 16V 1000 $\mu$ F  
 ..... 400V 10 $\mu$ F

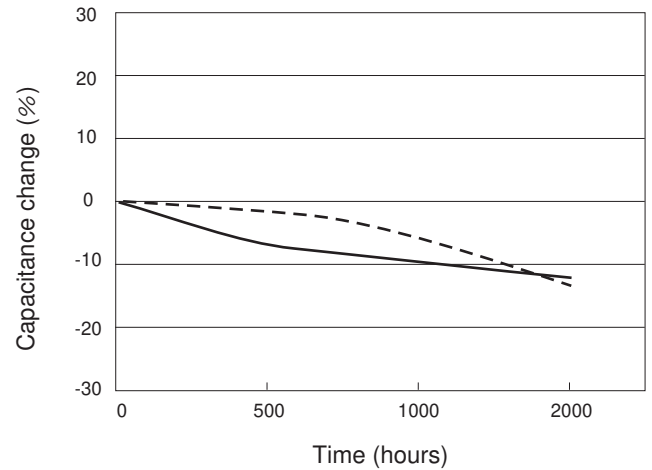
### ● TEMPERATURE CHARACTERISTICS

Capacitance change vs. temperature

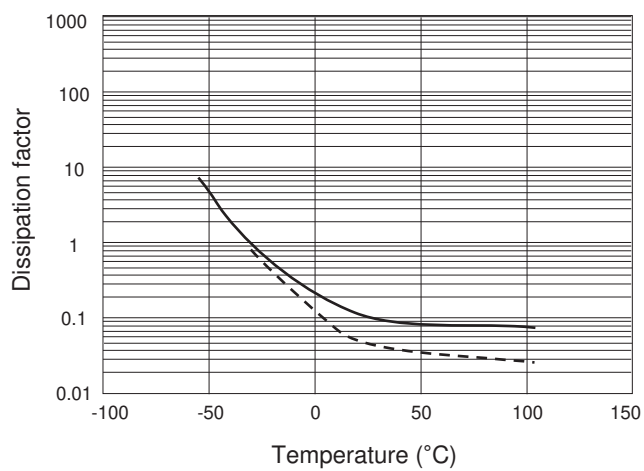


### ● LOAD LIFE (at +105°C)

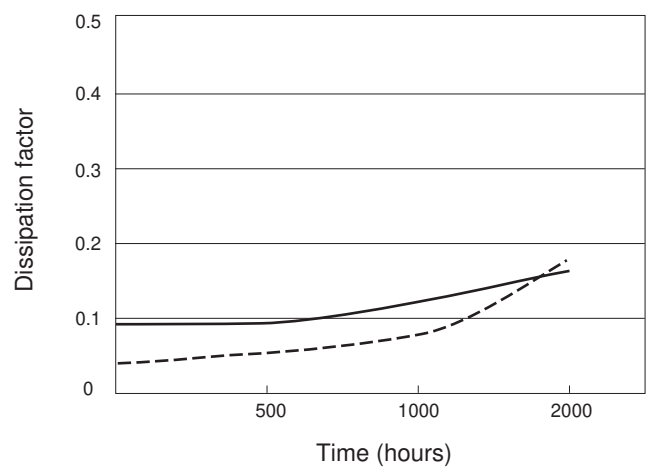
Capacitance change vs. time



Dissipation factor vs. temperature

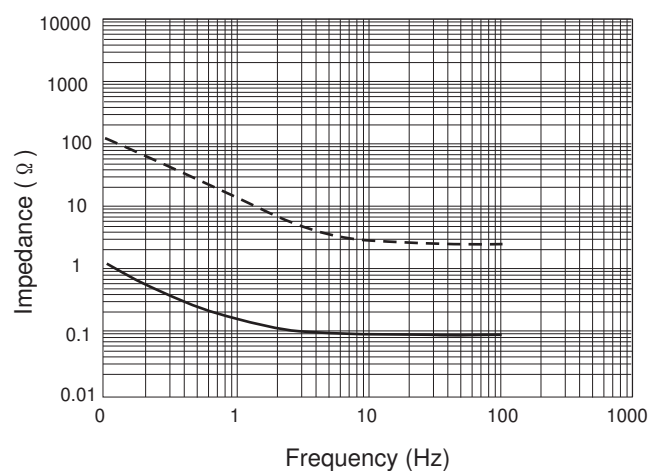


Dissipation factor vs. time



### ● FREQUENCY CHARACTERISTICS

Impedance vs. frequency



Leakage current vs. time

