

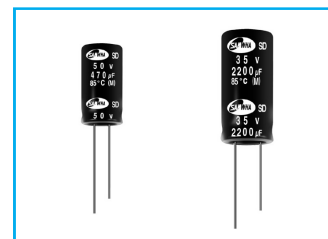
# MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS



## SD

Standard, For General Purposes  
Series

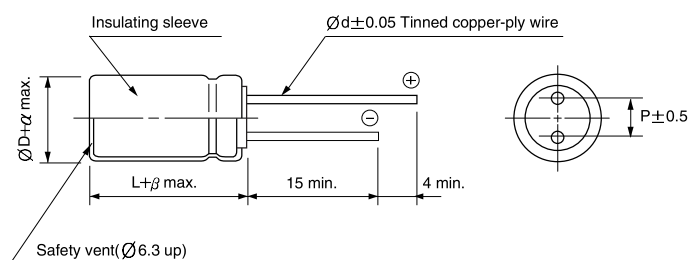
- Standard series for general purposes
- High CV value
- Voltage range of 6.3~500V
- Complied to the RoHS directive



| Item                                                                         | Characteristics                                                                                              |      |      |      |                                   |      |      |                               |             |           |           |
|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------|------|------|-----------------------------------|------|------|-------------------------------|-------------|-----------|-----------|
| Operating temperature range                                                  | WV                                                                                                           |      |      |      | 6.3 ~ 250                         |      |      |                               | 350 ~ 500   |           |           |
|                                                                              | Temperature range                                                                                            |      |      |      | -40 ~ +85°C                       |      |      |                               | -25 ~ +85°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 ~ 500 |
|                                                                              | 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 ~ 500 |
|                                                                              | Z-25°C/Z+20°C                                                                                                |      | 5    | 4    | 3                                 | 2    | 2    | 2                             | 4           | 6         | 12        |
|                                                                              | Z-40°C/Z+20°C                                                                                                |      | 12   | 10   | 8                                 | 5    | 4    | 3                             | 6           | 8         | —         |
| Load life<br>(after application of the rated voltage for 2000 hours at 85°C) | Leakage current                                                                                              |      |      |      | Less than specified value         |      |      |                               |             |           |           |
|                                                                              | Capacitance change                                                                                           |      |      |      | Within ±20% of initial value      |      |      |                               |             |           |           |
|                                                                              | tanδ                                                                                                         |      |      |      | Less than 200% of specified value |      |      |                               |             |           |           |
| Shelf life (at 85°C)                                                         | After 1000 hours no load test, leakage current, capacitance and tanδ are same as load life value.            |      |      |      |                                   |      |      |                               |             |           |           |

## DRAWING

Unit : mm



| ØD | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 22   | 25.4 |
|----|-----|-----|-----|-----|------|-----|-----|------|------|
| P  | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10.0 | 12.5 |
| Ød | 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 TYPES

## FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

| WV      | µF | Frequency  | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz≤ |
|---------|----|------------|------|-------|-------|------|--------|
| 6.3~100 |    | ~ 47       | 0.75 | 1.00  | 1.35  | 1.55 | 2.00   |
|         |    | 68 ~ 680   | 0.80 | 1.00  | 1.25  | 1.35 | 1.50   |
|         |    | 1000 ~     | 0.85 | 1.00  | 1.10  | 1.15 | 1.15   |
| 160~500 |    | 0.47 ~ 220 | 0.80 | 1.00  | 1.25  | 1.40 | 1.60   |
|         |    | 330 ~      | 0.90 | 1.00  | 1.10  | 1.13 | 1.15   |

# MINIATURE ALUMINUM ELECTROLYTIC CAPACITORS

**SD** 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            |
|----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------------------------------------------------------------------------------------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|
| 1.0      |                 |                 |                 |                 |                 | 5×11<br>21      | 5×11<br>23      | 5×11<br>23                                                                                        |                 |                 |                 |                |                | 8×11.5<br>26   |                |
| 1.5      |                 |                 |                 |                 |                 | 5×11<br>26      | 5×11<br>28      | 5×11<br>28                                                                                        |                 |                 |                 |                |                | 8×11.5<br>32   |                |
| 2.2      |                 |                 |                 |                 |                 | 5×11<br>32      | 5×11<br>34      | 5×11<br>34                                                                                        |                 |                 |                 |                |                | 8×11.5<br>33   |                |
| 3.3      |                 |                 |                 |                 |                 | 5×11<br>39      | 5×11<br>42      | 5×11<br>42                                                                                        | 6.3×11<br>45    | 6.3×11<br>45    | 6.3×11<br>48    | 8×11.5<br>53   | 8×11.5<br>56   | 8×11.5<br>50   |                |
| 4.7      |                 |                 |                 |                 |                 | 5×11<br>46      | 5×11<br>50      | 5×11<br>50                                                                                        | 6.3×11<br>53    | 6.3×11<br>57    | 6.3×11<br>57    | 8×11.5<br>66   | 10×12.5<br>61  | 10×12.5<br>72  | 10×16<br>69    |
| 6.8      |                 |                 |                 |                 |                 | 5×11<br>56      | 5×11<br>60      | 5×11<br>60                                                                                        | 8×11.5<br>76    | 8×11.5<br>76    | 8×11.5<br>76    | 10×12.5<br>88  | 10×12.5<br>87  | 10×16<br>86    | 10×16<br>76    |
| 10       |                 |                 |                 |                 |                 | 5×11<br>68      | 5×11<br>72      | 5×11<br>76                                                                                        | 8×11.5<br>96    | 8×11.5<br>96    | 10×12.5<br>107  | 10×12.5<br>107 | 10×16<br>115   | 10×20<br>115   | 12.5×25<br>178 |
| 15       |                 |                 |                 |                 |                 | 5×11<br>83      | 5×11<br>89      | 6.3×11<br>89                                                                                      | 10×12.5<br>131  | 10×16<br>143    | 10×16<br>143    | 10×20<br>156   | 12.5×20<br>165 | 12.5×20<br>164 |                |
| 22       |                 |                 |                 |                 |                 | 5×11<br>101     | 5×11<br>108     | 6.3×11<br>124                                                                                     | 10×12.5<br>156  | 10×16<br>173    | 10×16<br>170    | 12.5×20<br>222 | 12.5×20<br>218 | 12.5×25<br>217 | 16×25<br>265   |
| 33       |                 |                 |                 |                 |                 | 5×11<br>123     | 6.3×11<br>151   | 8×11.5<br>178                                                                                     | 10×16<br>209    | 10×20<br>232    | 10×20<br>247    | 16×20<br>297   | 12.5×25<br>296 | 16×25<br>294   | 16×31.5<br>310 |
| 47       |                 |                 |                 |                 | 5×11<br>131     | ★6.3×11<br>169  | 6.3×11<br>181   | 8×11.5<br>222                                                                                     | 10×20<br>293    | 10×20<br>293    | 12.5×20<br>319  | 16×20<br>353   | 16×25<br>387   | 16×31.5<br>384 | 18×31.5<br>412 |
| 68       |                 |                 |                 | 5×11<br>144     | ★6.3×11<br>182  | 6.3×11<br>203   | 8×11.5<br>256   | 10×12.5<br>293                                                                                    | 12.5×20<br>391  | 12.5×25<br>426  | 16×20<br>425    | 16×25<br>465   | 16×31.5<br>488 | 16×35.5<br>503 | 18×35.5<br>457 |
| 100      |                 |                 | 5×11<br>162     | ★5×11<br>181    | 6.3×11<br>220   | 8×11.5<br>291   | 8×11.5<br>311   | 10×16<br>388                                                                                      | 12.5×25<br>516  | 16×25<br>516    | 16×25<br>564    | 18×31.5<br>592 | 18×35.5<br>667 | 18×40<br>546   |                |
| 150      |                 |                 | ★5×11<br>198    | 6.3×11<br>246   | 8×11.5<br>318   | 10×12.5<br>414  | 10×12.5<br>422  | 10×20<br>528                                                                                      | 16×20<br>632    | 16×25<br>691    | 16×31.5<br>726  | 18×40<br>845   | 18×40<br>863   | 22×45<br>1283  |                |
| 220      | 5×11<br>201     | ★5×11<br>218    | 6.3×11<br>276   | 6.3×11<br>327   | 8×11.5<br>386   | 10×12.5<br>501  | 10×16<br>586    | 12.5×20<br>737                                                                                    | 16×25<br>873    | 18×31.5<br>962  | 18×35.5<br>988  | 22×41<br>1112  | 22×45<br>1183  |                |                |
| 330      | ★6.3×11<br>283  | 6.3×11<br>307   | 6.3×11<br>359   | 8×11.5<br>431   | 10×12.5<br>549  | 10×16<br>672    | 10×20<br>784    | 12.5×25<br>1002                                                                                   | 16×35.5<br>1152 | 18×35.5<br>1206 | 22×41<br>1495   |                |                |                |                |
| 470      | 6.3×11<br>338   | 6.3×11<br>366   | 8×11.5<br>476   | 10×12.5<br>550  | 10×16<br>740    | 10×20<br>875    | 12.5×20<br>1098 | 16×25<br>1328                                                                                     | 18×40<br>1434   | 22×41<br>1495   | 25.4×41<br>1612 |                |                |                |                |
| 680      | 8×11.5<br>480   | 8×11.5<br>520   | 8×11.5<br>600   | 10×16<br>754    | 10×20<br>947    | 12.5×20<br>1235 | 12.5×25<br>1440 | 16×31.5<br>1643                                                                                   | 25.4×51<br>1831 | 25.4×51<br>1902 | 2151            |                |                |                |                |
| 1000     | 8×11.5<br>581   | 10×12.5<br>659  | 10×12.5<br>796  | 10×16<br>942    | 12.5×20<br>1306 | 12.5×25<br>1633 | 16×25<br>1937   | 18×31.5<br>1965                                                                                   | 25.4×51<br>2105 |                 |                 |                |                |                |                |
| 2200     | 10×16<br>983    | 10×16<br>1051   | 10×20<br>1331   | 12.5×20<br>1542 | 16×25<br>2032   | 16×31.5<br>2220 | 18×31.5<br>2445 | 25.4×41<br>2612                                                                                   |                 |                 |                 |                |                |                |                |
| 3300     | 10×20<br>1286   | 12.5×20<br>1545 | 12.5×20<br>1686 | 16×25<br>2194   | 16×31.5<br>2502 | 18×31.5<br>2765 | 18×40<br>2987   |                                                                                                   |                 |                 |                 |                |                |                |                |
| 4700     | 12.5×20<br>1736 | 12.5×25<br>1903 | 12.5×25<br>2129 | 16×25<br>2448   | 16×35.5<br>2905 | 18×40<br>3272   | 25.4×41<br>3412 |                                                                                                   |                 |                 |                 |                |                |                |                |
| 6800     | 12.5×25<br>2129 | 16×25<br>2332   | 16×25<br>2577   | 18×31.5<br>3114 | 18×40<br>3408   | 25.4×41<br>4251 | 25.4×51<br>4351 | <div> <div>← Case size ØD×L (mm)</div> <div>← Ripple current (mA rms) at 85°C, 120Hz</div> </div> |                 |                 |                 |                |                |                |                |
| 10000    | 16×25<br>2629   | 16×31.5<br>2830 | 16×31.5<br>3176 | 18×40<br>3544   | 25.4×41<br>3899 |                 |                 |                                                                                                   |                 |                 |                 |                |                |                |                |
| 15000    | 16×35.5<br>2959 | 16×35.5<br>3284 | 18×35.5<br>3656 | 25.4×41<br>4399 |                 |                 |                 |                                                                                                   |                 |                 |                 |                |                |                |                |
| 22000    | 18×40<br>3733   | 18×40<br>3843   | 22×41<br>4012   |                 |                 |                 |                 |                                                                                                   |                 |                 |                 |                |                |                |                |

Size Ø8×9 is available for capacitors marked "★"

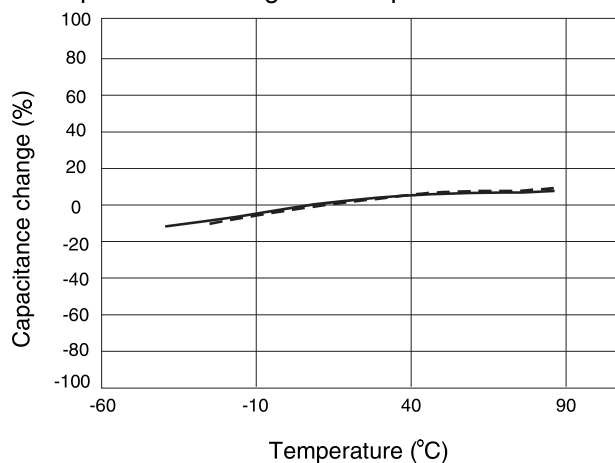
**SD** series

## TYPICAL PERFORMANCE

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

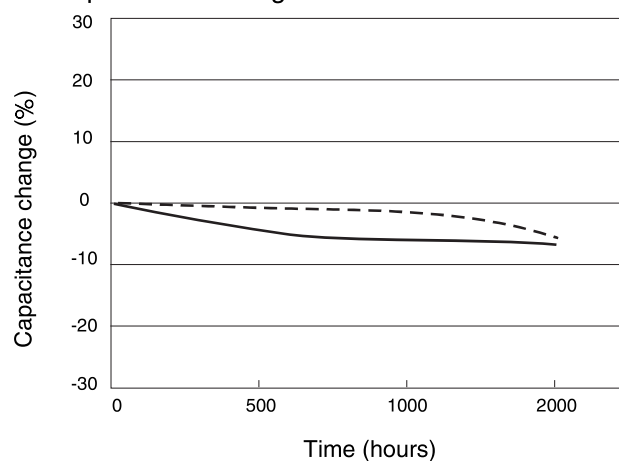
### ● TEMPERATURE CHARACTERISTICS

Capacitance change vs. temperature

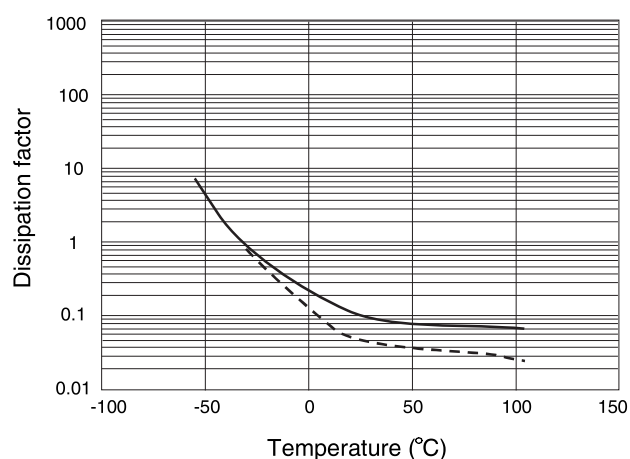


### ● LOAD LIFE (at +85°C)

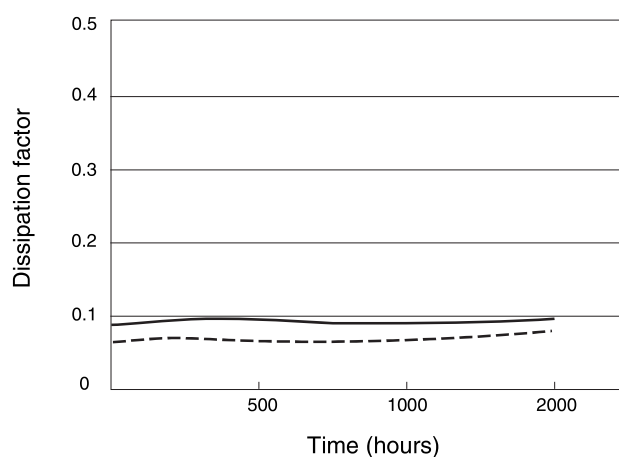
Capacitance change vs. time



Dissipation factor vs. temperature

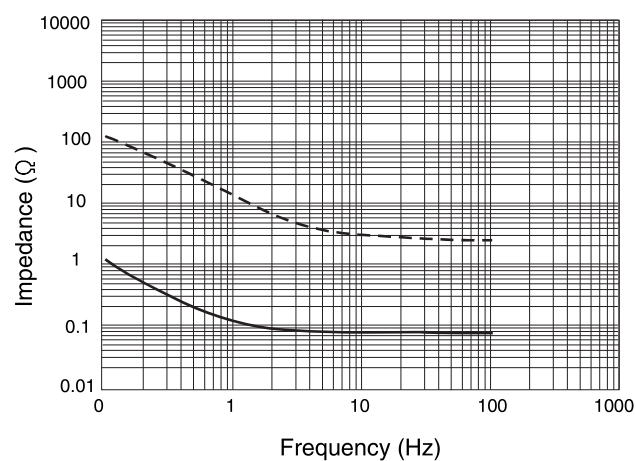


Dissipation factor vs. time



### ● FREQUENCY CHARACTERISTICS

Impedance vs. frequency



Leakage current vs. time

