

# ALUMINUM ELECTROLYTIC CAPACITOR (CD113 LL)

## LL FEATURES

- Low leakage current for radial lead type
- $\Phi D \geq 8\text{mm}$  with top safety vent construction
- Ideally suited for high stability circuits

## SPECIFICATIONS

| Item                                | Performance Characteristics  |   |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
|-------------------------------------|--|---|------|------|------|------|------|------|-----|-----|---------------------------------|------|------|------|------|------|------|------|
| Rated Voltage Range                 | 6.3V.DC~100V.DC  |   |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
| Operating Temperature Range         | -40°C+85°C   |   |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
| Nominal Capacitance Range           | 0.1 $\mu$ F~10000 $\mu$ F  |   |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
| Capacitance Tolerance               | $\pm 20\%$ (M,+25°C,120Hz)   |   |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
| Leakage Current                     | After application of rated voltage for 2 minutes: $I \leq 0.002CV$ or $0.4\mu\text{A}$ (Whichever is greater)25°C<br>C: Nominal Capacitance in $\mu\text{F}$ ; V: Rated Working Voltage in V   |   |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
| Dissipation Factor ( $\tan\delta$ ) | When capacitance is over 1000 $\mu\text{F}$ , $\tan\delta$ shall be added 0.02 with increase of every 1000 $\mu\text{F}$   |   |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
|                                     | <table border="1"> <tr> <td>Rated 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><math>\tan\delta</math>(MAX) (25°C,120Hz)</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>0.09</td> <td>0.08</td> </tr> </table> | Rated Working Voltage(V)                        | 6.3  | 10   | 16   | 25   | 35   | 50   | 63  | 100 | $\tan\delta$ (MAX) (25°C,120Hz) | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 |
| Rated Working Voltage(V)            | 6.3  | 10  | 16   | 25   | 35   | 50   | 63   | 100  |     |     |                                 |      |      |      |      |      |      |      |
| $\tan\delta$ (MAX) (25°C,120Hz)     | 0.24   | 0.20  | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 |     |     |                                 |      |      |      |      |      |      |      |
| Temperature Stability               | Rated Working Voltage(V)   | 6.3   | 10   | 16   | 25   | 35   | 50   | 63   | 100 |     |                                 |      |      |      |      |      |      |      |
|                                     | Impedance Ratio(120Hz)   | Z-25°C/Z+20°C                                   | 4    | 3    | 2    |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
|                                     |  | Z-40°C/Z+20°C                                   | 10   | 8    | 6    | 4    | 3    |      |     |     |                                 |      |      |      |      |      |      |      |
| Load Life                           | After application of rated working voltage and maximum permissible ripple current specified at +85°C for 1000 hours, Capacitors meet the characteristics requirements measured at +25°C listed below:  |   |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
|                                     | Leakage Current  | Less than the initial specified value           |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
|                                     | $\tan\delta$   | Less than 200% of the initial specified value   |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
| Shelf Life                          | After leaving capacitor under no load at +85°C for 500 hours, Capacitors meet the characteristics listed above.  |   |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |
|                                     | Capacitance Change   | Within $\pm 20\%$ of the initial measured value |      |      |      |      |      |      |     |     |                                 |      |      |      |      |      |      |      |

## MULTIPLIER FOR RIPPLE CURRENT

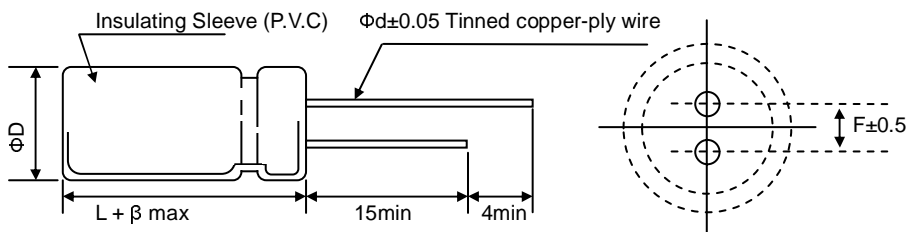
Frequency coefficient

| Cap( $\mu\text{F}$ ) \ Freq(Hz) | 50(60) | 100(120) | 1K   | 10K  |
|---------------------------------|--------|----------|------|------|
| 0.1-47                          | 0.8    | 1.0      | 1.30 | 1.50 |
| 68-1000                         | 0.8    | 1.0      | 1.10 | 1.15 |
| 1500-10000                      | 0.8    | 1.0      | 1.10 | 1.15 |

Temperature coefficient

| Ambient Temperature(°C) | +85 | +70 | +50 |
|-------------------------|-----|-----|-----|
| Factor                  | 1.0 | 1.6 | 2.0 |

## CASE SIZE TABLE



Safety vent ( $\Phi 8\text{up}$ )  
\* $\Phi 6.3$  is available by Request

| $\beta$          | 0.5 |       | 1.0                       |       |       |          |    |
|------------------|-----|-------|---------------------------|-------|-------|----------|----|
| $\Phi D$         | 5   | 6.3   | 8                         | 10    | 12,13 | 16       | 18 |
| $F \pm 0.5$      | 2.0 | 2.5   | 3.5                       | 5     |       | 7.5      |    |
| $\Phi d \pm 0.1$ | 0.5 |       | 0.6                       |       |       | 0.8      |    |
| L                | 11  | 12,16 | 14,17,20                  | 20,25 | 25,30 | 30,35,40 |    |
| $\alpha$         | 1.0 |       | L<17:1.0; L $\geq$ 17:2.0 |       |       |          |    |

# ALUMINUM ELECTROLYTIC CAPACITOR (CD113 LL)

## DIMENSIONS, RATED VOLTAGE RANGE AND CAPACITANCE

| V<br>uF | 6.3             |      | 10     |      | 16              |      | 25              |      | 35     |      | 50              |      | 63              |      | 100             |     |
|---------|-----------------|------|--------|------|-----------------|------|-----------------|------|--------|------|-----------------|------|-----------------|------|-----------------|-----|
|         | (1)             | (2)  | (1)    | (2)  | (1)             | (2)  | (1)             | (2)  | (1)    | (2)  | (1)             | (2)  | (1)             | (2)  | (1)             | (2) |
| 0.1     |                 |      |        |      |                 |      |                 |      |        |      | 5X11            | 1.1  |                 |      |                 |     |
| 0.15    |                 |      |        |      |                 |      |                 |      |        |      | 5X11            | 1.6  |                 |      |                 |     |
| 0.22    |                 |      |        |      |                 |      |                 |      |        |      | 5X11            | 2.3  |                 |      |                 |     |
| 0.33    |                 |      |        |      |                 |      |                 |      |        |      | 5X11            | 3.5  |                 |      |                 |     |
| 0.47    |                 |      |        |      |                 |      |                 |      |        |      | 5X11            | 5.0  |                 |      |                 |     |
| 0.68    |                 |      |        |      |                 |      |                 |      |        |      | 5X11            | 7.3  |                 |      |                 |     |
| 1       |                 |      |        |      |                 |      |                 |      |        |      | 5X11            | 10.7 |                 |      |                 |     |
| 1.5     |                 |      |        |      |                 |      |                 |      |        |      | 5X11            | 16   |                 |      |                 |     |
| 2.2     |                 |      |        |      |                 |      |                 |      |        |      | 5X11            | 23   |                 |      |                 |     |
| 3.3     |                 |      |        |      |                 |      |                 |      |        |      | 5X11            | 40   |                 |      | 8X12            | 45  |
| 4.7     |                 |      |        |      |                 |      | 5X11            | 30   | 5X11   | 34   | 5X11            | 45   | 5X11            | 48   | 8X12            | 50  |
| 6.8     |                 |      |        |      |                 |      | 5X11            | 37   | 5X11   | 41   | 5X11            | 55   | 6.3X11          | 59   | 8X12            | 65  |
| 10      |                 |      |        |      | 5X11            | 40   | 5X11            | 57   | 5X11   | 59   | 5X11            | 70   | 6.3X11          | 75   | 8X16<br>(10X14) | 90  |
| 15      |                 |      |        |      | 5X11            | 48   | 5X11            | 70   | 5X11   | 72   | 6.3X11          | 95   | 8X12            | 100  | 10X17           | 110 |
| 22      |                 |      | 5X11   | 56   | 5X11            | 74   | 5X11            | 99   | 6.3X11 | 101  | 6.3X11          | 110  | 8X12            | 115  | 10X17           | 136 |
| 33      | 5X11            | 30   | 5X11   | 89   | 5X11            | 90   | 5X11            | 121  | 6.3X11 | 144  | 6.3X11          | 165  | 8X16<br>(10X14) | 170  | 10X17           | 180 |
| 47      | 5X11            | 45   | 5X11   | 104  | 5X11            | 127  | 6.3X11          | 172  | 6.3X11 | 192  | 8X12            | 190  | 10X17           | 200  | 10X20           | 220 |
| 68      | 5X11            | 60   | 6.3X11 | 150  | 6.3X11          | 155  | 6.3X11          | 210  | 8X12   | 234  | 8X12            | 250  | 10X17           | 270  | 10X20           | 290 |
| 100     | 5X11            | 100  | 6.3X11 | 180  | 6.3X11          | 220  | 8X12            | 270  | 8X12   | 300  | 8X16<br>(10X14) | 320  | 12X20           | 330  | 13X20           | 370 |
| 150     | 6.3X11          | 150  | 8X12   | 250  | 8X12            | 268  | 8X12            | 329  | 10X17  | 370  | 10X17           | 420  | 13X20           | 450  | 13X25           | 470 |
| 220     | 6.3X11          | 220  | 8X12   | 310  | 8X12            | 370  | 8X16<br>(10X14) | 400  | 10X17  | 440  | 12X20           | 490  | 13X20           | 550  | 16X25           | 580 |
| 330     | 8X12            | 320  | 8X12   | 400  | 8X16<br>(10X14) | 420  | 10X17           | 490  | 10X20  | 550  | 13X20           | 600  | 13X25           | 710  | 16X30           | 730 |
| 470     | 8X12            | 390  | 8X12   | 530  | 10X17           | 550  | 10X20           | 660  | 13X20  | 680  | 13X25           | 760  | 16X25           | 850  |                 |     |
| 680     | 8X16<br>(10X14) | 480  | 10X17  | 600  | 10X20           | 730  | 13X20           | 810  | 13X25  | 840  | 16X25           | 910  | 18X30           | 1050 |                 |     |
| 1000    | 10X17           | 650  | 10X17  | 810  | 13X20           | 910  | 13X20           | 1010 | 16X25  | 1100 | 16X30           | 1140 | 18X35           | 1350 |                 |     |
| 1500    | 10X20           | 910  | 13X20  | 1020 | 13X20           | 1120 | 16X25           | 1270 | 16X30  | 1390 | 18X35           | 1480 |                 |      |                 |     |
| 2200    | 10X20           | 1060 | 13X20  | 1200 | 13X25           | 1300 | 16X30           | 1440 | 18X30  | 1580 |                 |      |                 |      |                 |     |
| 3300    | 13X20           | 1270 | 16X25  | 1420 | 16X30           | 1550 | 18X30           | 1720 | 18X40  | 1920 |                 |      |                 |      |                 |     |
| 4700    | 13X25           | 1500 | 16X30  | 1650 | 18X30           | 1820 | 18X40           | 2090 |        |      |                 |      |                 |      |                 |     |
| 6800    | 16X25           | 1760 | 18X30  | 1890 | 18X35           | 2300 |                 |      |        |      |                 |      |                 |      |                 |     |
| 10000   | 18X30           | 1900 | 18X40  | 2350 |                 |      |                 |      |        |      |                 |      |                 |      |                 |     |

(1) Case Size DxL(mm)

(2) Max allowable ripple current (mArms+85°C120Hz)