

# Aluminum Electrolytic Capacitor

## How To Order:

Series: FMR & FHR, FMA & FHA Part No.

FMR 476

M

500

R

B S1

|  |  |   |  |  |
|--|--|---|--|--|
| <b>Capacitance</b><br>10PF=100<br>100PF=101<br>1000PF=102<br>1NF=1000PF<br>=102<br>1UF=1000000PF<br>=105 | <b>Tolerance</b><br>B=0.1PF<br>C=0.25PF<br>D=0.5PF<br>G=2%<br>J=5%<br>K=10%<br>Z=+80%/ -20%<br>M=20% | <b>Voltage</b><br>50V=500<br>500V=501<br>1000V=102<br>2KV=2000V=202 | <b>Type</b><br>R=Radial Type<br>A=Axial Type | <b>Packing</b><br>B=Bulk<br>T=Tape for<br>Reel/Box |
|--|--|---|--|--|

(The last letter S1 means special spec. Standard goods is without it)

FMR : 85°C Radial Type , FMA :85°C Axial type

FHR : 105°C Radial type , FHA : 105°C Axial Type

LHR: 105°C Radial Type and long Life (2000~5000hrs)

LLM: Low Leakage Radial type

SMR :105°C Radial Type, small size , SMA : 85°C Axial Type Small size.

Description: FMR ALUMINUN 47uf 20% 50V RADIAL BULK

### Note:

The normal packing of ALUMINUM ELECTRONIC cap. is BULK.

S = special Spec., such as leg length ,pitch size, show special need here.

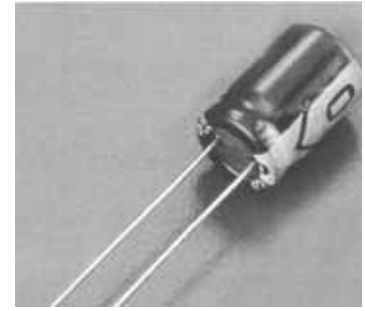
# Aluminum Electrolytic Capacitor

## FMR Radial Type Standard Series

### Features

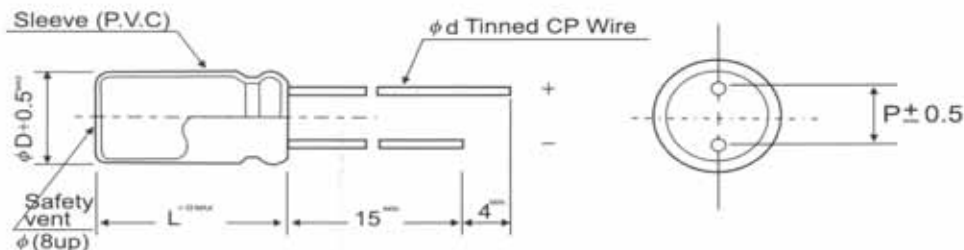
- Standard series for general purposes.
- Guaranteed long life (1000hrs. at 85C).
- Expanded applications for automatic mounting.
- Anti-solvent

### Specifications



| Item   | Performance Characteristics   |  |      |      |      |  |        |         |      |         |         |
|--|---|--|------|------|------|--|--------|---------|------|---------|---------|
| Operating Temperature Range  | -40~ +85 (6.3~400V): +25~ +85 (450V)  |  |      |      |      |  |        |         |      |         |         |
| Rated Voltage  | 6.3~ 450V   |  |      |      |      |  |        |         |      |         |         |
| Nominal Capacitance Range  | 0.1~ 22000uF  |  |      |      |      |  |        |         |      |         |         |
| Capacitance Tolerance  | ±20% (120Hz:20 )  |  |      |      |      |  |        |         |      |         |         |
| Leakage Current  | 6.3~ 100WV  |  |      |      |      | 160~ 450WV   |        |         |      |         |         |
|  | I= 0.03CV or 4 (uA), whichever is greater, after 1 minute application of rated voltage<br>I= 0.01CV or 3(uA), whichever is greater, after 2 minutes application of rated voltage      |  |      |      |      | CV 1000: I=0.1CV+40(uA) or less after 1 minute application of rated voltage<br>CV>1000: I=0.04CV+100(uA) or less after 1 minute application of rated voltage |        |         |      |         |         |
| Dissipation Factor   | Rated voltage (V)   | 6.3                                      | 10   | 16   | 25   | 35   | 50     | 63      | 100  | 160~350 | 400~450 |
|  | Tan δ (max)   | 0.24                                     | 0.20 | 0.16 | 0.14 | 0.12   | 0.10   | 0.09    | 0.08 | 0.2     | 0.25    |
| For capacitance of more than 100uF, add 0.02 for every increase of 100uF(120Hz: 20 ) |   |  |      |      |      |  |        |         |      |         |         |
| Temperature Characteristics  | Impedance Ratio (120Hz)   |  |      |      |      |  |        |         |      |         |         |
|  | Rated Voltage (V)   | 6.3                                      | 10   | 16   | 25   | 35   | 50~100 | 160~200 | 250  | 315~400 | 400~450 |
|  | Z(-25 ) / Z(20 )  | 4  | 3    | 2    | 2    | 2  | 2      | 3       | 3    | 3       | 5       |
|  | Z(-40 ) / Z(20 )  | 10                                       | 8    | 6    | 4    | 3  | 3      | 6       | 6    | 6       | ---     |
| Load life  | After 1000hrs of application of rated voltage at 85 , capacitors meet the characteristics requirement mentioned below.  |  |      |      |      |  |        |         |      |         |         |
|  | Capacitance change  | Within ±20% of Initial Value.            |      |      |      |  |        |         |      |         |         |
|  | Tan   | 200% or Less of Initial Specified Value. |      |      |      |  |        |         |      |         |         |
|  | Leakage Current   | Initial Specified Value or Less          |      |      |      |  |        |         |      |         |         |
| Shelf Life   | After leaving capacitors under no load at 85 for 500hours and applying voltage according to JIS C-5102 4-3. They meet the specified value for load life characteristics listed above. |  |      |      |      |  |        |         |      |         |         |
| Applicable standards   | Characteristics W of JIS C-5141   |  |      |      |      |  |        |         |      |         |         |

### Dimensions



|   |        |     |     |     |      |     |     |      |
|---|--------|-----|-----|-----|------|-----|-----|------|
| D | 5      | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 22   |
| P | 2.0    | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10.0 |
| D | 0.5    | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 | 0.8  |
|   | ~100WV | 1.0 | 1.0 | 1.0 | 1.5  | 1.5 | 1.5 | 2.0  |
|   | 160WV~ | -   | 1.5 | 1.5 | 2.0  | 2.0 | 2.0 | 2.5  |

# Aluminum Electrolytic Capacitor

## Standard Products Table

Case size ( DxL(mm)) / MAX PERMISSIBLE RIPPLE CURRENT (RC(mArms) / 120 Hz, 85 )

| W.V<br>Cap(μF) |     | 6.3     |      | 10      |      | 16      |      | 25      |      | 35      |      | 50      |      | 63      |      | 100     |      |
|----------------|-----|---------|------|---------|------|---------|------|---------|------|---------|------|---------|------|---------|------|---------|------|
|                |     | Size    | RC   | Size    | RC   | Size    | RC   | Size    | RC   | Size    | RC   | Size    | RC   | Size    | RC   | Size    | RC   |
| 0.1            | 104 |         |      |         |      |         |      |         |      |         |      | 5x11    | 1    |         |      | 5x11    | 2    |
| 0.22           | 224 |         |      |         |      |         |      |         |      |         |      | 5x11    | 2    |         |      | 5x11    | 4    |
| 0.33           | 334 |         |      |         |      |         |      |         |      |         |      | 5x11    | 3    |         |      | 5x11    | 7    |
| 0.47           | 474 |         |      |         |      |         |      |         |      |         |      | 5x11    | 5    |         |      | 5x11    | 10   |
| 1              | 105 |         |      |         |      |         |      |         |      |         |      | 5x11    | 10   |         |      | 5x11    | 21   |
| 2.2            | 225 |         |      |         |      |         |      |         |      |         |      | 5x11    | 23   |         |      | 5x11    | 30   |
| 3.3            | 335 |         |      |         |      |         |      |         |      |         |      | 5x11    | 35   |         |      | 5x11    | 40   |
| 4.7            | 475 |         |      |         |      |         |      | 5x11    | 30   | 5x11    | 35   | 5x11    | 40   | 5x11    | 45   | 5x11    | 50   |
| 10             | 106 |         |      |         |      | 5x11    | 40   | 5x11    | 50   | 5x11    | 55   | 5x11    | 65   | 5x11    | 70   | 6.3x11  | 75   |
| 22             | 226 | 5x11    | 35   | 5x11    | 50   | 5x11    | 75   | 5x11    | 80   | 5x11    | 85   | 5x11    | 95   | 6.3x11  | 110  | 8x11.5  | 135  |
| 33             | 336 | 5x11    | 55   | 5x11    | 80   | 5x11    | 90   | 5x11    | 95   | 5x11    | 105  | 6.3x11  | 125  | 6.3x11  | 135  | 10x12.5 | 175  |
| 47             | 476 | 5x11    | 75   | 5x11    | 95   | 5x11    | 110  | 5x11    | 115  | 6.3x11  | 135  | 6.3x11  | 150  | 8x11.5  | 185  | 10x16   | 225  |
| 100            | 107 | 5x11    | 130  | 5x11    | 145  | 6.3x11  | 175  | 6.3x11  | 185  | 8x11.5  | 230  | 8x11.5  | 250  | 10x16   | 280  | 12.5x20 | 400  |
| 220            | 227 | 6.3x11  | 210  | 6.3x11  | 230  | 8x11.5  | 300  | 8x11.5  | 320  | 10x12.5 | 370  | 10x16   | 440  | 10x20   | 500  | 16x25   | 710  |
| 330            | 337 | 6.3x11  | 260  | 8x11.5  | 330  | 8x11.5  | 360  | 10x12.5 | 420  | 10x16   | 490  | 10x20   | 580  | 12.5x20 | 680  | 16x25   | 870  |
| 470            | 477 | 8x11.5  | 360  | 8x11.5  | 390  | 10x12.5 | 470  | 10x16   | 540  | 10x20   | 630  | 12.5x20 | 770  | 16x25   | 880  | 16x31.5 | 980  |
| 1000           | 108 | 10x12.5 | 560  | 10x16   | 610  | 10x20   | 800  | 12.5x20 | 950  | 12.5x25 | 1110 | 16x25   | 1350 | 18x35.5 | 1540 | 18x40   | 1680 |
| 2200           | 228 | 12.5x20 | 1040 | 12.5x20 | 1130 | 12.5x25 | 1350 | 16x25   | 1590 | 16x31.5 | 1830 | 18x35.5 | 2090 | 22x36   | 2130 | 22x51   | 2640 |
| 3300           | 338 | 12.5x20 | 1230 | 12.5x25 | 1430 | 16x25   | 1740 | 16x31.5 | 1980 | 18x35.5 | 2210 | 22x36   | 2340 | 22x41   | 2540 |         |      |
| 4700           | 478 | 16x25   | 1700 | 16x25   | 1820 | 16x31.5 | 2140 | 18x35.5 | 2360 | 18x40   | 2430 | 22x41   | 2740 | 22x51   | 3150 |         |      |
| 6800           | 688 | 16x25   | 1920 | 16x31.5 | 2200 | 18x35.5 | 2490 | 22x36   | 2570 | 22x41   | 2810 | 22x51   | 3290 |         |      |         |      |
| 10000          | 109 | 16x31.5 | 2310 | 18x35.5 | 2570 | 18x40   | 2730 | 22x41   | 2910 | 22x51   | 3370 |         |      |         |      |         |      |
| 15000          | 159 | 18x35.5 | 2670 | 18x40   | 2720 | 22x41   | 3080 | 22x51   | 3450 |         |      |         |      |         |      |         |      |
| 22000          | 229 | 22x36   | 2830 | 22x41   | 3060 | 22x51   | 3530 |         |      |         |      |         |      |         |      |         |      |

| W.V<br>Cap(μF) |     | 160     |     | 200     |     | 250     |     | 315     |     | 350     |     | 400     |     | 450     |     |
|----------------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|
|                |     | Size    | RC  | Size    | RC  | Size    | RC  | Size    | RC  | Size    | RC  | Size    | RC  | Size    | RC  |
| 0.47           | 474 | 6.3x11  | 11  | 6.3x11  | 11  | 6.3x11  | 11  |         |     |         |     |         |     |         |     |
| 1              | 105 | 6.3x11  | 16  | 6.3x11  | 16  | 6.3x11  | 16  | 6.3x11  | 16  | 8x11.5  | 19  | 8x11.5  | 16  | 10x12.5 | 18  |
| 2.2            | 225 | 6.3x11  | 25  | 6.3x11  | 25  | 8x11.5  | 30  | 8x11.5  | 30  | 10x12.5 | 30  | 10x12.5 | 25  | 10x16   | 30  |
| 3.3            | 335 | 8x11.5  | 35  | 8x11.5  | 35  | 10x12.5 | 40  | 10x12.5 | 40  | 10x16   | 40  | 10x16   | 35  | 10x20   | 40  |
| 4.7            | 475 | 8x11.5  | 40  | 10x12.5 | 45  | 10x12.5 | 45  | 10x16   | 50  | 10x16   | 50  | 10x20   | 45  | 12.5x20 | 50  |
| 10             | 106 | 10x12.5 | 65  | 10x16   | 70  | 10x20   | 75  | 10x20   | 75  | 12.5x20 | 80  | 12.5x20 | 75  | 12.5x25 | 80  |
| 22             | 226 | 10x20   | 110 | 10x20   | 110 | 12.5x25 | 130 | 12.5x25 | 130 | 12.5x25 | 130 | 16x25   | 130 | 16x31.5 | 140 |
| 33             | 336 | 12.5x20 | 150 | 12.5x25 | 160 | 12.5x25 | 160 | 16x25   | 180 | 16x31.5 | 190 | 16x31.5 | 170 | 18x35.5 | 180 |
| 47             | 476 | 12.5x20 | 190 | 12.5x25 | 190 | 16x25   | 210 | 16x31.5 | 230 | 18x35.5 | 240 | 18x35.5 | 220 | 22x36   | 220 |
| 100            | 107 | 16x25   | 310 | 16x31.5 | 340 | 18x35.5 | 360 | 18x40   | 350 | 22x36   | 360 | 22x41   | 330 |         |     |
| 220            | 227 | 18x35.5 | 520 | 18x40   | 530 | 22x36   | 540 | 22x46   | 590 |         |     |         |     |         |     |
| 330            | 337 | 22x36   | 640 | 22x41   | 680 | 22x46   | 720 |         |     |         |     |         |     |         |     |
| 470            | 477 | 22x46   | 850 |         |     |         |     |         |     |         |     |         |     |         |     |

Frequency coefficient of allowable ripple current

Allowable ripple current V.S. Ambient temperature

| W.V     | Frequency  | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|---------|------------|------|-------|-------|------|--------|
|         | Cap.(μF)   |      |       |       |      |        |
| 63~100  | ~47        | 0.75 | 1     | 1.35  | 1.57 | 2.00   |
|         | 100~470    | 0.80 | 1     | 1.23  | 1.34 | 1.50   |
|         | 1000~22000 | 0.85 | 1     | 1.10  | 1.13 | 1.15   |
| 160~450 | 0.47~220   | 0.80 | 1     | 1.25  | 1.40 | 1.60   |
|         | 330~470    | 0.90 | 1     | 1.10  | 1.13 | 1.15   |

| Ambient Temp. ( )          | ~+ 70 | +85 | +105 |
|----------------------------|-------|-----|------|
| Compensating co-efficiency | 1.78  | 1.4 | 1.0  |

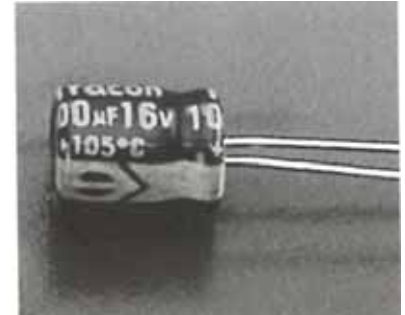
# Aluminum Electrolytic Capacitor

## FHR Radial Type Wide Temperature Range

### Features

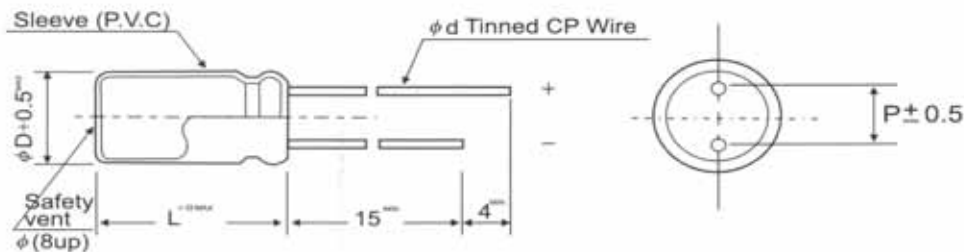
- Wide temperature range (-40~+105 ) in FMR size
- Guaranteed long life (1000hrs. at 105 )
- Anti-solvent

### Specifications



| Item   | Performance Characteristics  |   |      |      |      |   |        |         |      |         |         |
|--|--|---|------|------|------|---|--------|---------|------|---------|---------|
| Operating Temperature Range  | -40~ +105  |   |      |      |      |   |        |         |      |         |         |
| Rated Voltage  | 6.3~ 450V  |   |      |      |      |   |        |         |      |         |         |
| Nominal Capacitance Range  | 0.1~ 22000uF   |   |      |      |      |   |        |         |      |         |         |
| Capacitance Tolerance  | ±20% (120Hz: 20 )  |   |      |      |      |   |        |         |      |         |         |
| Leakage Current  | 6.3~ 100WV   |   |      |      |      | 160~ 450WV  |        |         |      |         |         |
|  | I= 0.03CV or 4 (uA), whichever is greater, after 1 minute application of rated voltage<br>I= 0.01CV or 3(uA), whichever is greater, after 2 minutes application of rated voltage |   |      |      |      | CV 1000: I=0.1CV+40(uA) or less after 1 minute application of rated voltage<br>CV >1000: I=0.04CV+100(uA) or less after 1 minute application of rated voltage |        |         |      |         |         |
| Dissipation Factor   | Rated voltage (V)  | 6.3                                     | 10   | 16   | 25   | 35  | 50     | 63      | 100  | 160~350 | 400~450 |
|  | Tan (max)  | 0.24                                    | 0.20 | 0.16 | 0.14 | 0.12  | 0.10   | 0.09    | 0.08 | 0.2     | 0.25    |
| For capacitance of more than 1000uF, add 0.02 for every increase of 1000uF(120Hz: 20 ) |  |   |      |      |      |   |        |         |      |         |         |
| Temperature Characteristics  | Impedance Ratio (120Hz)  |   |      |      |      |   |        |         |      |         |         |
|  | Rated Voltage (V)  | 6.3                                     | 10   | 16   | 25   | 35  | 50~100 | 160~200 | 250  | 315~400 | 400~450 |
|  | Z (-25 ) / Z(20 )  | 4                                       | 3    | 2    | 2    | 2   | 2      | 2       | 3    | 3       | 5       |
| Load life  | After 1000hrs of application of rated voltage at 105 , capacitors meet the characteristics requirement mentioned below   |   |      |      |      |   |        |         |      |         |         |
|  | Capacitance change   | Within ±20% of initial value            |      |      |      |   |        |         |      |         |         |
|  | Tan δ  | 200% or Less of Initial Specified Value |      |      |      |   |        |         |      |         |         |
| Shelf Life   | After leaving capacitors under no load at 105 for 500 hours and applying voltage according to JIS C-5102 4-3.  |   |      |      |      |   |        |         |      |         |         |
|  | They meet the specified value for load life characteristics listed above.  |   |      |      |      |   |        |         |      |         |         |
| Applicable Standards   | Characteristics W of JIS C-5141  |   |      |      |      |   |        |         |      |         |         |

### Dimensions



|        |     |     |     |     |      |     |     |      |
|--------|-----|-----|-----|-----|------|-----|-----|------|
| D      | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 22   |
| P      | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10.0 |
| d      | 0.5 | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 | 0.8  |
| ~100WV | 1.0 | 1.0 | 1.0 | 1.5 | 1.5  | 1.5 | 1.5 | 2.0  |
| 160WV~ | --- | 1.5 | 1.5 | 2.0 | 2.0  | 2.0 | 2.0 | 2.5  |

# Aluminum Electrolytic Capacitor

## Standard Products Table

Case size ( DxL(mm)) / MAX PERMISSIBLE RIPPLE CURRENT (RC(mArms) / 120 Hz, 105 )

| W.V   |     | 6.3     |      | 10      |      | 16      |      | 25      |      | 35      |      | 50      |      | 63      |      | 100     |      |
|-------|-----|---------|------|---------|------|---------|------|---------|------|---------|------|---------|------|---------|------|---------|------|
|       |     | Size    | RC   | Size    | RC   | Size    | RC   | Size    | RC   | Size    | RC   | Size    | RC   | Size    | RC   | Size    | RC   |
| 0.1   | 104 |         |      |         |      |         |      |         |      |         |      | 5x11    | 1    |         |      | 5x11    | 2    |
| 0.22  | 224 |         |      |         |      |         |      |         |      |         |      | 5x11    | 2    |         |      | 5x11    | 4    |
| 0.33  | 334 |         |      |         |      |         |      |         |      |         |      | 5x11    | 3    |         |      | 5x11    | 7    |
| 0.47  | 474 |         |      |         |      |         |      |         |      |         |      | 5x11    | 5    |         |      | 5x11    | 10   |
| 1     | 105 |         |      |         |      |         |      |         |      |         |      | 5x11    | 10   |         |      | 5x11    | 15   |
| 2.2   | 225 |         |      |         |      |         |      |         |      |         |      | 5x11    | 18   |         |      | 5x11    | 23   |
| 3.3   | 335 |         |      |         |      |         |      |         |      |         |      | 5x11    | 25   |         |      | 5x11    | 30   |
| 4.7   | 475 |         |      |         |      |         |      | 5x11    | 20   | 5x11    | 25   | 5x11    | 30   | 5x11    | 35   | 5x11    | 40   |
| 10    | 106 |         |      |         |      | 5x11    | 35   | 5x11    | 40   | 5x11    | 45   | 5x11    | 50   | 5x11    | 55   | 6.3x11  | 65   |
| 22    | 226 | 5x11    | 30   | 5x11    | 50   | 5x11    | 60   | 5x11    | 65   | 5x11    | 70   | 5x11    | 75   | 6.3x11  | 90   | 8x11.5  | 110  |
| 33    | 336 | 5x11    | 50   | 5x11    | 65   | 5x11    | 75   | 5x11    | 80   | 5x11    | 85   | 6.3x11  | 105  | 6.3x11  | 110  | 10x12.5 | 160  |
| 47    | 476 | 5x11    | 70   | 5x11    | 80   | 5x11    | 90   | 5x11    | 95   | 6.3x11  | 110  | 6.3x11  | 125  | 8x11.5  | 150  | 10x16   | 200  |
| 100   | 107 | 5x11    | 105  | 5x11    | 115  | 6.3x11  | 140  | 6.3x11  | 150  | 8x11.5  | 190  | 8x11.5  | 210  | 10x12.5 | 260  | 12.5x20 | 370  |
| 220   | 227 | 6.3x11  | 170  | 6.3x11  | 190  | 8x11.5  | 240  | 8x11.5  | 260  | 10x12.5 | 330  | 10x16   | 400  | 10x20   | 460  | 16x25   | 580  |
| 330   | 337 | 6.3x11  | 200  | 8x11.5  | 270  | 8x11.5  | 300  | 10x12.5 | 380  | 10x16   | 450  | 10x20   | 530  | 12.5x20 | 640  | 16x25   | 710  |
| 470   | 477 | 8x11.5  | 290  | 8x11.5  | 320  | 10x12.5 | 420  | 10x16   | 490  | 10x20   | 580  | 12.5x20 | 730  | 12.5x25 | 810  | 16x31.5 | 860  |
| 1000  | 108 | 10x12.5 | 510  | 10x16   | 610  | 10x20   | 730  | 12.5x20 | 900  | 12.5x25 | 1030 | 16x25   | 1110 | 16x31.5 | 1190 | 18x40   | 1440 |
| 2200  | 228 | 12.5x20 | 980  | 12.5x20 | 1060 | 12.5x25 | 1250 | 16x25   | 1300 | 16x31.5 | 1420 | 18x35.5 | 1530 | 18x40   | 1830 |         |      |
| 3300  | 338 | 12.5x20 | 1150 | 12.5x25 | 1320 | 16x25   | 1420 | 16x31.5 | 1530 | 18x35.5 | 1620 | 22x36   | 1970 | 22x41   | 2160 |         |      |
| 4700  | 478 | 16x25   | 1390 | 16x25   | 1490 | 16x31.5 | 1650 | 18x35.5 | 1730 | 18x40   | 2090 | 22x41   | 2320 |         |      |         |      |
| 6800  | 688 | 16x25   | 1570 | 16x31.5 | 1700 | 18x35.5 | 1830 | 22x36   | 2160 | 22x41   | 2380 |         |      |         |      |         |      |
| 10000 | 109 | 16x31.5 | 1790 | 18x35.5 | 1880 | 18x40   | 2290 | 22x41   | 2480 |         |      |         |      |         |      |         |      |
| 15000 | 159 | 18x35.5 | 1960 | 18x40   | 2340 | 22x41   | 2560 |         |      |         |      |         |      |         |      |         |      |
| 22000 | 229 | 22x36   | 2380 | 22x41   | 2600 |         |      |         |      |         |      |         |      |         |      |         |      |

| W.V  |     | 160     |     | 200     |     | 250     |     | 315     |     | 350     |     | 400     |     | 450     |     |
|------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|
|      |     | Size    | RC  | Size    | RC  | Size    | RC  | Size    | RC  | Size    | RC  | Size    | RC  | Size    | RC  |
| 0.47 | 474 | 6.3x11  | 10  | 6.3x11  | 10  | 6.3x11  | 10  |         |     |         |     |         |     |         |     |
| 1    | 105 | 6.3x11  | 14  | 6.3x11  | 14  | 6.3x11  | 14  | 6.3x11  | 16  | 8x11.5  | 19  | 8x11.5  | 16  | 10x12.5 | 18  |
| 2.2  | 225 | 6.3x11  | 21  | 6.3x11  | 21  | 8x11.5  | 25  | 8x11.5  | 30  | 10x12.5 | 30  | 10x12.5 | 25  | 10x16   | 30  |
| 3.3  | 335 | 8x11.5  | 31  | 8x11.5  | 31  | 10x12.5 | 35  | 10x12.5 | 40  | 10x16   | 40  | 10x16   | 35  | 10x20   | 40  |
| 4.7  | 475 | 8x11.5  | 37  | 10x12.5 | 42  | 10x12.5 | 42  | 10x16   | 50  | 10x16   | 50  | 10x20   | 45  | 12.5x20 | 50  |
| 10   | 106 | 10x12.5 | 62  | 10x16   | 69  | 10x20   | 74  | 10x20   | 75  | 12.5x20 | 80  | 12.5x20 | 75  | 12.5x25 | 80  |
| 22   | 226 | 10x20   | 105 | 10x20   | 105 | 12.5x25 | 125 | 12.5x25 | 130 | 12.5x25 | 130 | 16x25   | 130 | 16x31.5 | 140 |
| 33   | 336 | 12.5x20 | 145 | 12.5x25 | 155 | 12.5x25 | 155 | 16x25   | 180 | 16x31.5 | 190 | 16x31.5 | 170 | 18x35.5 | 180 |
| 47   | 476 | 12.5x25 | 190 | 12.5x25 | 190 | 16x25   | 195 | 16x31.5 | 230 | 18x35.5 | 240 | 18x35.5 | 220 | 22x36   | 220 |
| 100  | 107 | 16x25   | 280 | 16x31.5 | 285 | 18x35.5 | 290 | 18x40   | 350 | 22x36   | 360 | 22x41   | 330 |         |     |
| 220  | 227 | 18x35.5 | 430 | 18x40   | 435 | 22x36   | 440 | 22x46   | 590 |         |     |         |     |         |     |
| 330  | 337 | 22x36   | 520 | 22x41   | 550 | 22x46   | 580 |         |     |         |     |         |     |         |     |
| 470  | 477 | 22x46   | 690 |         |     |         |     |         |     |         |     |         |     |         |     |

Frequency coefficient of allowable ripple current

Allowable ripple current V.S. Ambient

| W.V     | Frequency  | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|---------|------------|------|-------|-------|------|--------|
|         | Cap.(uF)   |      |       |       |      |        |
| 6.3~100 | ~47        | 0.75 | 1     | 1.35  | 1.57 | 2.00   |
|         | 100~470    | 0.80 | 1     | 1.23  | 1.34 | 1.50   |
|         | 1000~22000 | 0.85 | 1     | 1.10  | 1.13 | 1.15   |
| 160~450 | 0.47~220   | 0.80 | 1     | 1.25  | 1.40 | 1.60   |
|         | 330~470    | 0.90 | 1     | 1.10  | 1.13 | 1.15   |

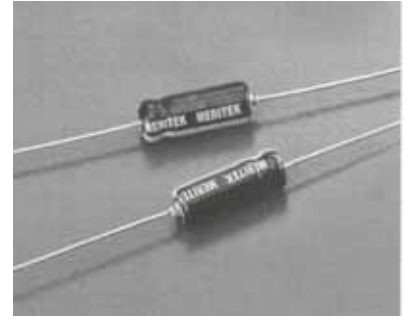
| Ambient Temp. ( )          | ~+ 70 | +85 | +105 |
|----------------------------|-------|-----|------|
| Compensating co-efficiency | 1.78  | 1.4 | 1.0  |

# Aluminum Electrolytic Capacitor

## FMA Axial Type Standard Series

### Features

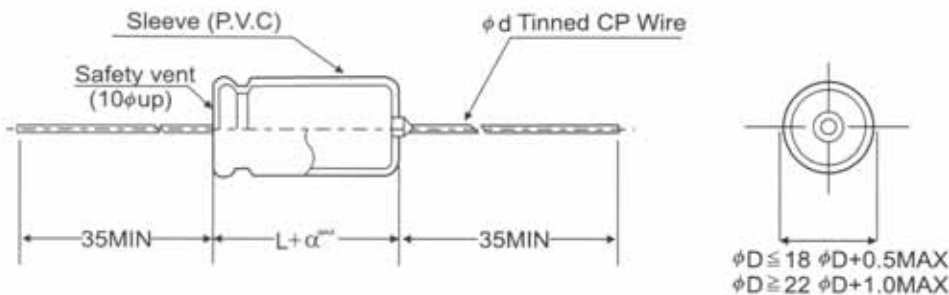
- Axial lead type of standard series for general purposes
- Guaranteed long life (1000hrs. at 85 )
- Expanded applications for automatic mounting
- Anti-solvent



### Specifications

| Item   | Performance Characteristics   |   |      |      |      |  |        |         |      |         |         |
|--|---|---|------|------|------|--|--------|---------|------|---------|---------|
| Operating Temperature Range  | -40~ +85 (6.3~ 400V): - 25~ +85 (450)   |   |      |      |      |  |        |         |      |         |         |
| Rated Voltage  | 6.3~ 450V   |   |      |      |      |  |        |         |      |         |         |
| Nominal Capacitance Range  | 0.47~ 22000uF   |   |      |      |      |  |        |         |      |         |         |
| Capacitance Tolerance  | ±20% (120Hz: 20 )   |   |      |      |      |  |        |         |      |         |         |
| Leakage Current  | 6.3~ 100WV  |   |      |      |      | 160~ 450WV   |        |         |      |         |         |
|  | I= 0.03CV or 4 (uA), whichever is greater, after 1 minute application of rated voltage.<br>I= 0.01CV or 3(uA), whichever is greater, after 2 minutes application of rated voltage.        |   |      |      |      | CV 1000: I=0.1CV+40(uA) or less after 1 minute application of rated voltage.<br>CV >1000: I=0.04CV+100(uA) or less after 1 minute application of rated voltage |        |         |      |         |         |
| Dissipation Factor   | Rated voltage (V)   | 6.3                                     | 10   | 16   | 25   | 35   | 50     | 63      | 100  | 160~350 | 400~450 |
|  | Tan (max)   | 0.24                                    | 0.20 | 0.16 | 0.14 | 0.12   | 0.10   | 0.09    | 0.08 | 0.2     | 0.25    |
| For capacitance of more than 1000uF, add 0.02 for every increase of 1000uF(120Hz: 20 ) |   |   |      |      |      |  |        |         |      |         |         |
| Temperature Characteristics  | Impedance Ratio (120Hz)   |   |      |      |      |  |        |         |      |         |         |
|  | Rated Voltage (V)   | 6.3                                     | 10   | 16   | 25   | 35   | 50~100 | 160~200 | 250  | 315~400 | 400~450 |
|  | Z (-25 ) / Z(20 )   | 4                                       | 3    | 2    | 2    | 2  | 2      | 3       | 3    | 3       | 5       |
|  | Z(-40 ) / Z(20 )  | 10                                      | 8    | 6    | 4    | 3  | 3      | 6       | 6    | 6       | ---     |
| Load life  | After 1000hrs of application of rated voltage at 85 , capacitors meet the characteristics requirement mentioned below   |   |      |      |      |  |        |         |      |         |         |
|  | Capacitance change  | Within ±20% of initial value            |      |      |      |  |        |         |      |         |         |
|  | Tan δ   | 200% or Less of Initial Specified Value |      |      |      |  |        |         |      |         |         |
|  | Leakage current   | Initial Specified Value or Less         |      |      |      |  |        |         |      |         |         |
| Shelf Life   | After leaving capacitors under no load at 85 for 500 hours and applying voltage according to JIS C-5102 4-3.<br>They meet the specified value for load life characteristics listed above. |   |      |      |      |  |        |         |      |         |         |
| Applicable Standards   | Characteristics W of JIS C-5141   |   |      |      |      |  |        |         |      |         |         |

### Dimensions



|           |        |       |       |
|-----------|--------|-------|-------|
| D         | 5~12.5 | 16~18 | 22~25 |
| d         | 0.6    | 0.8   | 0.8   |
| 6.3~100WV | 1.0    |       | 2.0   |
|           | 2.0    |       | -     |

# Aluminum Electrolytic Capacitor

## Standard Products Table

Case size ( DxL(mm)) / MAX PERMISSIBLE RIPPLE CURRENT (RC(mArms) / 120 Hz, 85 )

| W.V<br>Cap(μF) |     | 6.3     |      | 10       |      | 16       |      | 25       |      | 35       |      | 50       |      | 63       |      | 100      |      |
|----------------|-----|---------|------|----------|------|----------|------|----------|------|----------|------|----------|------|----------|------|----------|------|
|                |     | Size    | RC   | Size     | RC   | Size     | RC   | Size     | RC   | Size     | RC   | Size     | RC   | Size     | RC   | Size     | RC   |
| 0.47           | 474 |         |      |          |      |          |      |          |      |          |      | 5x12.5   | 5    |          |      | 5x12.5   | 10   |
| 1              | 105 |         |      |          |      |          |      |          |      |          |      | 5x12.5   | 10   |          |      | 5x12.5   | 21   |
| 2.2            | 225 |         |      |          |      |          |      |          |      |          |      | 5x12.5   | 23   |          |      | 5x12.5   | 27   |
| 3.3            | 335 |         |      |          |      |          |      |          |      |          |      | 5x12.5   | 30   |          |      | 5x12.5   | 35   |
| 4.7            | 475 |         |      |          |      |          |      |          |      |          |      | 5x12.5   | 36   | 5x12.5   | 38   | 5x12.5   | 40   |
| 10             | 106 |         |      |          |      |          |      | 5x12.5   | 40   | 5x12.5   | 45   | 5x12.5   | 50   | 5x12.5   | 55   | 6.3x12.5 | 65   |
| 22             | 226 |         |      |          |      | 5x12.5   | 60   | 5x12.5   | 65   | 5x12.5   | 70   | 6.3x12.5 | 85   | 6.3x12.5 | 90   | 8x16     | 115  |
| 33             | 336 |         |      | 5x12.5   | 70   | 5x12.5   | 75   | 5x12.5   | 80   | 6.3x12.5 | 95   | 6.3x16   | 115  | 6.3x16   | 125  | 8x16     | 145  |
| 47             | 476 |         |      | 5x12.5   | 80   | 5x12.5   | 90   | 6.3x12.5 | 105  | 6.3x16   | 125  | 6.3x16   | 140  | 8x16     | 160  | 8x20     | 190  |
| 100            | 107 | 5x12.5  | 110  | 6.3x12.5 | 130  | 6.3x12.5 | 145  | 6.3x16   | 170  | 8x16     | 200  | 8x16     | 220  | 8x20     | 260  | 10x26    | 340  |
| 220            | 227 | 6.3x16  | 200  | 6.3x16   | 220  | 8x16     | 260  | 8x16     | 280  | 8x20     | 340  | 10x21    | 410  | 10x26    | 480  | 12.5x26  | 560  |
| 330            | 337 | 6.3x16  | 250  | 8x16     | 300  | 8x16     | 320  | 8x20     | 380  | 10x21    | 460  | 10x26    | 560  | 12.5x26  | 640  | 12.5x31  | 740  |
| 470            | 477 | 8x16    | 330  | 8x16     | 350  | 8x20     | 430  | 10x26    | 560  | 10x26    | 610  | 12.5x26  | 730  | 12.5x31  | 830  | 16x31    | 960  |
| 1000           | 108 | 10x21   | 600  | 10x21    | 640  | 10x26    | 770  | 12.5x26  | 900  | 12.5x31  | 1050 | 16x31    | 1250 | 16x31    | 1320 | 22x41    | 1700 |
| 2200           | 228 | 12.5x26 | 1020 | 12.5x26  | 1090 | 12.5x31  | 1280 | 16x31    | 1470 | 16x31    | 1570 | 18x41    | 1920 | 22x41    | 2150 | 22x51    | 2590 |
| 3300           | 338 | 12.5x26 | 1200 | 12.5x31  | 1380 | 16x31    | 1610 | 16x41    | 1910 | 16x41    | 2020 | 22x41    | 2340 | 22x51    | 2450 |          |      |
| 4700           | 478 | 16x31   | 1630 | 16x31    | 1720 | 16x41    | 2060 | 18x41    | 2170 | 22x41    | 2460 | 22x51    | 2630 | 25x61    | 3180 |          |      |
| 6800           | 688 | 16x31   | 1830 | 16x41    | 2160 | 18x41    | 2290 | 22x41    | 2560 | 22x51    | 2700 | 25x61    | 3310 |          |      |          |      |
| 10000          | 109 | 16x41   | 2290 | 18x41    | 2390 | 22x41    | 2680 | 22x51    | 2800 | 25x61    | 3400 |          |      |          |      |          |      |
| 15000          | 159 | 22x41   | 2630 | 22x41    | 2750 | 22x51    | 2890 | 25x61    | 3480 |          |      |          |      |          |      |          |      |
| 22000          | 229 | 22x51   | 2830 | 22x51    | 2940 | 25x61    | 3570 |          |      |          |      |          |      |          |      |          |      |

| W.V<br>Cap(μF) |     | 160      |     | 200      |     | 250     |     | 315     |     | 350     |     | 400     |     | 450       |                  |
|----------------|-----|----------|-----|----------|-----|---------|-----|---------|-----|---------|-----|---------|-----|-----------|------------------|
|                |     | Size     | RC  | Size     | RC  | Size    | RC  | Size    | RC  | Size    | RC  | Size    | RC  | Size      | RC               |
| 1              | 105 | 6.3x12.5 | 13  | 6.3x12.5 | 13  | 6.3x16  | 15  | 6.3x16  | 15  | 6.3x16  | 15  | 8x16    | 16  | 8x16      | 16               |
| 2.2            | 225 | 6.3x16   | 23  | 6.3x16   | 23  | 8x16    | 27  | 8x16    | 27  | 8x16    | 27  | 8x20    | 27  | 10x21     | 31               |
| 3.3            | 335 | 8x16     | 33  | 8x16     | 33  | 8x16    | 33  | 8x20    | 37  | 8x20    | 37  | 10x21   | 38  | 10x21     | 38               |
| 4.7            | 475 | 8x16     | 39  | 8x16     | 45  | 8x20    | 45  | 8x20    | 45  | 10x21   | 50  | 10x21   | 45  | 10x26     | 50               |
| 10             | 106 | 8x20     | 60  | 10x21    | 70  | 10x21   | 70  | 10x26   | 80  | 12.5x16 | 90  | 12.5x26 | 85  | 12.5x26   | 85               |
| 22             | 226 | 10x26    | 120 | 12.5x26  | 140 | 12.5x26 | 140 | 12.5x31 | 150 | 12.5x31 | 150 | 16x31   | 150 | 16x31     | 150              |
| 33             | 336 | 12.5x26  | 170 | 12.5x26  | 190 | 12.5x31 | 190 | 16x31   | 210 | 16x31   | 210 | 16x41   | 220 | 18x41     | 230              |
| 47             | 476 | 12.5x31  | 220 | 12.5x31  | 250 | 16x31   | 250 | 16x31   | 250 | 16x41   | 290 | 18x41   | 280 |           |                  |
| 100            | 107 | 16x41    | 420 | 16x41    | 420 | 16x41   | 420 |         |     |         |     |         |     | Case size | Allowable Ripple |

Frequency coefficient of allowable ripple current

Allowable ripple current V.S. Ambient

| W.V     | Frequency Cap.(μF) | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|---------|--------------------|------|-------|-------|------|--------|
| 6.3~100 | ~47                | 0.75 | 1     | 1.35  | 1.57 | 2.00   |
|         | 100~470            | 0.80 | 1     | 1.23  | 1.34 | 1.50   |
|         | 1000~22000         | 0.85 | 1     | 1.10  | 1.13 | 1.15   |
| 160~450 | 1~100              | 0.80 | 1     | 1.25  | 1.40 | 1.60   |

| Ambient Temp. ( )        | ~+ 70 | +85 |
|--------------------------|-------|-----|
| Compensating coefficient | 1.27  | 1.0 |

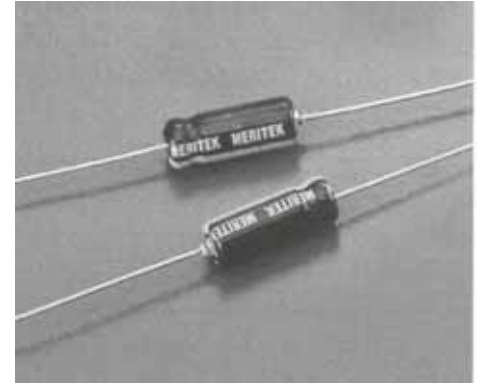
# Aluminum Electrolytic Capacitor

## FHA Axial Type Wide Temperature Range Series

### Features

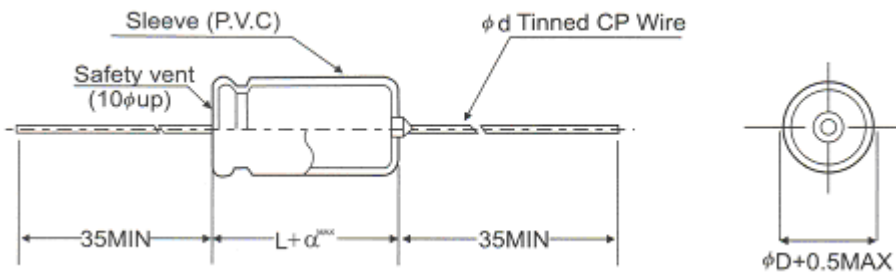
- Wide temperature range (-40~+105 °C) in FMA size
- Guaranteed long life (1000hrs. at 105 °C)
- Anti-solvent

### Specifications



| Item   | Performance Characteristics   |   |      |      |      |      |      |      |      |
|--|---|---|------|------|------|------|------|------|------|
| Operating Temperature Range  | -40~ +105   |   |      |      |      |      |      |      |      |
| Rated Voltage  | 6.3~ 100V   |   |      |      |      |      |      |      |      |
| Nominal Capacitance Range  | 0.47~ 6800uF  |   |      |      |      |      |      |      |      |
| Capacitance Tolerance  | ±20% (120Hz: 20%)   |   |      |      |      |      |      |      |      |
| Leakage Current  | I = 0.03CV or 4 (uA), whichever is greater, after 1 minute application of rated voltage. I = 0.01CV or 3(uA), whichever is greater, after 2 minutes application of rated voltage.           |   |      |      |      |      |      |      |      |
| Dissipation Factor   | Rated voltage (V)   | 6.3                                     | 10   | 16   | 25   | 35   | 50   | 63   | 100  |
|  | Tan (max)   | 0.24                                    | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 |
| For capacitance of more than 1000uF, add 0.02 for every increase of 1000uF(120Hz: 20%) |   |   |      |      |      |      |      |      |      |
| Temperature Characteristics  | Impedance Ratio (120Hz)   |   |      |      |      |      |      |      |      |
|  | Rated Voltage (V)   | 6.3                                     | 10   | 16   | 25   | 35   | 50   | 63   | 100  |
|  | Z(-25 °C) / Z(20 °C)  | 4                                       | 3    | 2    | 2    | 2    | 2    | 2    | 2    |
|  | Z(-40 °C) / Z(20 °C)  | 10                                      | 8    | 6    | 4    | 3    | 3    | 3    | 3    |
| Load life  | After 1000hrs of application of rated voltage at 105 °C, capacitors meet the characteristics requirements mentioned below   |   |      |      |      |      |      |      |      |
|  | Capacitance Change  | Within ±20% of Initial Value            |      |      |      |      |      |      |      |
|  | Tan   | 200% or Less of Initial Specified Value |      |      |      |      |      |      |      |
| Shelf Life   | After leaving capacitors under no load at 105 °C for 1000 hours and applying voltage according to JIS C-5102 4-3. They meet the specified value for load life characteristics listed above. |   |      |      |      |      |      |      |      |
|  | Leakage Current   | Initial Specified Value or Less         |      |      |      |      |      |      |      |
| Applicable Standards   | Characteristics W of JIS C-5141   |   |      |      |      |      |      |      |      |

### Dimensions



|   |        |       |
|---|--------|-------|
| D | 5~12.5 | 16~18 |
| d | 0.6    | 0.8   |
|   | 1.0    |       |

# Aluminum Electrolytic Capacitor

## Standard Products Table

Case size ( DxL(mm)) / MAX PERMISSIBLE RIPPLE CURRENT (RC(mArms) / 120 Hz, 105 )

| W.V<br>Cap.(uF) |     | 6.3      |      | 10       |      | 16       |      | 25       |      | 35       |      | 50       |      | 63       |      | 100      |           |                  |
|-----------------|-----|----------|------|----------|------|----------|------|----------|------|----------|------|----------|------|----------|------|----------|-----------|------------------|
|                 |     | Size     | RC   | Size     | RC   | Size     | RC   | Size     | RC   | Size     | RC   | Size     | RC   | Size     | RC   | Size     | RC        |                  |
| 0.47            | 474 |          |      |          |      |          |      |          |      |          |      | 5x12.5   | 5    | 5x12.5   | 5    | 5x12.5   | 10        |                  |
| 1               | 105 |          |      |          |      |          |      |          |      |          |      | 5x12.5   | 10   | 5x12.5   | 13   | 5x12.5   | 16        |                  |
| 2.2             | 225 |          |      |          |      |          |      |          |      |          |      | 5x12.5   | 20   | 5x12.5   | 22   | 5x12.5   | 23        |                  |
| 3.3             | 335 |          |      |          |      |          |      |          |      |          |      | 5x12.5   | 25   | 5x12.5   | 26   | 6.3x12.5 | 31        |                  |
| 4.7             | 475 |          |      |          |      |          |      | 5x12.5   | 25   | 5x12.5   | 27   | 5x12.5   | 30   | 5x12.5   | 32   | 6.3x12.5 | 37        |                  |
| 10              | 106 |          |      |          |      |          |      | 5x12.5   | 37   | 5x12.5   | 40   | 6.3x12.5 | 49   | 6.3x12.5 | 51   | 8x16     | 67        |                  |
| 22              | 226 |          |      |          |      | 5x12.5   | 52   | 6.3x12.5 | 61   | 6.3x12.5 | 66   | 6.3x16   | 81   | 8x16     | 94   | 8x16     | 100       |                  |
| 33              | 336 |          |      | 6.3x12.5 | 64   | 6.3x12.5 | 70   | 6.3x12.5 | 75   | 6.3x16   | 91   | 8x16     | 110  | 8x16     | 115  | 8x20     | 135       |                  |
| 47              | 476 |          |      | 6.3x12.5 | 77   | 6.3x12.5 | 84   | 6.3x16   | 100  | 8x16     | 120  | 8x16     | 130  | 8x16     | 135  | 10x21    | 180       |                  |
| 100             | 107 | 6.3x12.5 | 100  | 6.3x16   | 125  | 8x16     | 150  | 8x16     | 160  | 8x20     | 190  | 8x20     | 210  | 10x21    | 245  | 12.5x26  | 320       |                  |
| 220             | 227 | 8x16     | 190  | 8x16     | 205  | 8x16     | 220  | 8x20     | 260  | 10x21    | 320  | 10x26    | 385  | 12.5x26  | 445  | 12.5x31  | 510       |                  |
| 330             | 337 | 8x16     | 230  | 8x16     | 250  | 8x20     | 300  | 10x21    | 360  | 10x26    | 430  | 12.5x26  | 520  | 12.5x26  | 545  | 16x41    | 775       |                  |
| 470             | 477 | 8x20     | 305  | 8x20     | 330  | 10x21    | 405  | 10x26    | 475  | 12.5x26  | 565  | 12.5x26  | 620  | 12.5x31  | 705  | 16x41    | 930       |                  |
| 1000            | 108 | 10x26    | 555  | 10x26    | 595  | 12.5x26  | 715  | 12.5x26  | 765  | 12.5x31  | 890  | 16x31    | 1060 | 16x41    | 1270 |          |           |                  |
| 2200            | 228 | 12.5x26  | 865  | 12.5x31  | 1000 | 16x31    | 1170 | 16x41    | 1410 | 16x41    | 1510 |          |      |          |      |          |           |                  |
| 3300            | 338 | 16x31    | 1030 | 16x31    | 1270 | 16x41    | 1550 | 18x41    | 1610 |          |      |          |      |          |      |          |           |                  |
| 4700            | 478 | 16x31    | 1370 | 16x41    | 1650 | 18x41    | 1740 |          |      |          |      |          |      |          |      |          |           |                  |
| 6800            | 688 | 16x41    | 1760 | 18x41    | 1820 |          |      |          |      |          |      |          |      |          |      |          | Case size | Allowable Ripple |

Frequency coefficient of allowable ripple current

| Frequency Cap.(uF) | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ |
|--------------------|------|-------|-------|------|--------|
| ~47                | 0.75 | 1     | 1.35  | 1.57 | 2.00   |
| 100~470            | 0.80 | 1     | 1.23  | 1.34 | 1.50   |
| 1000~6800          | 0.85 | 1     | 1.10  | 1.13 | 1.15   |

Allowable ripple current V.S. Ambient temperature

| Ambient Temp. ( )        | ~+ 70 | +85 | +105 |
|--------------------------|-------|-----|------|
| Compensating coefficient | 1.62  | 1.4 | 1.0  |

# Aluminum Electrolytic Capacitor

## LHR Radial Type for Switching Power Supply Series

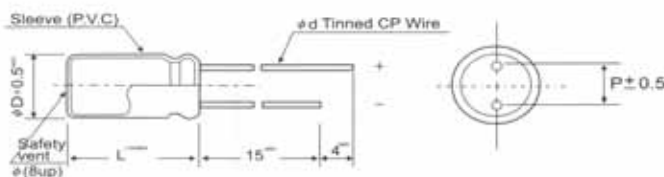
### Features

- Compact size with low impedance for high frequency.
- Guaranteed long life (at 105 °C for 2000, 3000 and 5000 hours. Depending on case size)
- Available in flat and long types
- Anti-solvent

### Specifications

| Item   | Performance Characteristics  |   |      |      |      |      |      |      |             |
|--|--|---|------|------|------|------|------|------|-------------|
| Operating Temperature Range  | -55~ +105  |   |      |      |      |      |      |      |             |
| Rated Voltage  | 6.3~ 63V   |   |      |      |      |      |      |      |             |
| Nominal Capacitance Range  | 0.47~ 15000uF  |   |      |      |      |      |      |      |             |
| Capacitance Tolerance  | ±20% (120Hz: 20%)  |   |      |      |      |      |      |      |             |
| Leakage Current  | I = 0.03CV or 4 (uA), whichever is greater, after 1 minute application of rated voltage.   |   |      |      |      |      |      |      |             |
| Dissipation Factor   | Rated voltage (V)  | 6.3                                     | 10   | 16   | 25   | 35   | 50   | 63   | . 120Hz 20% |
|  | Tan δ (max)  | 0.24                                    | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 |             |
| For capacitance of more than 1000uF, add 0.02 for every increase of 1000uF(120Hz: 20%) |  |   |      |      |      |      |      |      |             |
| Temperature Characteristics  | Impedance Ratio  |   |      |      |      |      |      |      |             |
|  | Rated Voltage (V)  | 6.3                                     | 10   | 16   | 25   | 35   | 50   | 63   | . 120Hz     |
| Z (-55 °C) / Z(20 °C)  |  |   |      |      |      |      |      |      |             |
| Load life  | After 5000hrs of application of rated voltage at 105 °C, capacitors meet the characteristics requirements mentioned below<br>( D 6.3: 2000hrs. 8 D 10: 3000hrs.)                               |   |      |      |      |      |      |      |             |
|  | Capacitance change   | Within ±20% of Initial Value            |      |      |      |      |      |      |             |
|  | Tan δ  | 200% or Less of Initial Specified Value |      |      |      |      |      |      |             |
|  | Leakage Current  | Initial Specified Value or Less         |      |      |      |      |      |      |             |
| Shelf Life   | After leaving capacitors under no load at 105 °C for 1000 hours and applying voltage according to JIS C-5102 4-3.<br>They meet the specified value for load life characteristics listed above. |   |      |      |      |      |      |      |             |
| Applicable Standards   | Characteristics W of JIS C-5141  |   |      |      |      |      |      |      |             |

### Dimensions



|   |     |     |     |     |      |     |     |
|---|-----|-----|-----|-----|------|-----|-----|
| D | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| d | 0.5 | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |

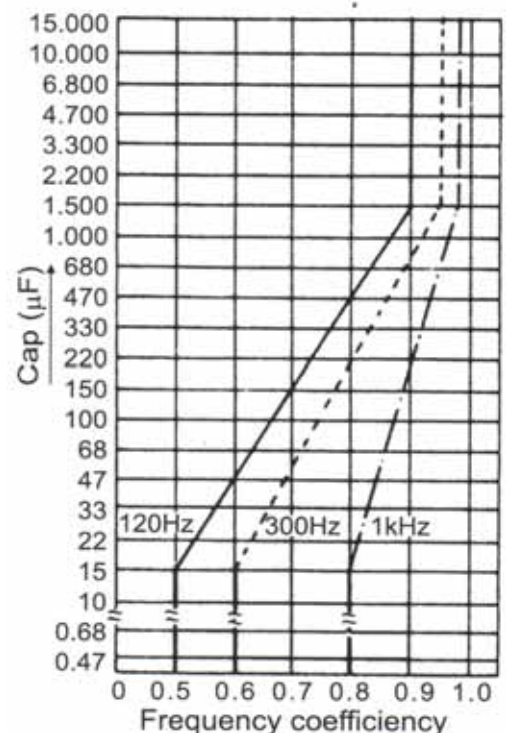
: D=0.8 for 12.5 at L>25

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

Allowable ripple current vs. Ambient temp.

|                          |      |     |     |      |
|--------------------------|------|-----|-----|------|
| Ambient temp. ( °C )     | ~+45 | +65 | +85 | +105 |
| Compensation coefficient | 2.4  | 2.2 | 1.7 | 1    |

Frequency coefficient of allowable ripple current (10KHz~200KHz=1)



# Aluminum Electrolytic Capacitor

## Standard Products Table

Case size ( DxL(mm)) / MAX PERMISSIBLE RIPPLE CURRENT (RC(mArms) / 120 Hz, 105 )

| V     | W.  | 6.3       |         | 10        |         | 16        |         | 25        |         | 35        |         | 50        |         | 63        |         |
|-------|-----|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|
|       |     | Size      | 5       | Size      | 5       | Size      | 5       | Size      | 5       | Size      | 5       | Size      | 5       | Size      | 5       |
| 0.47  | 474 |           |         |           |         |           |         |           |         |           |         |           | 5x11    |           |         |
| 0.68  | 684 |           |         |           |         |           |         |           |         |           |         |           | 5x11    |           |         |
| 1     | 105 |           |         |           |         |           |         |           |         |           |         |           | 5x11    |           |         |
| 1.5   | 155 |           |         |           |         |           |         |           |         |           |         |           | 5x11    |           |         |
| 2.2   | 225 |           |         |           |         |           |         |           |         |           |         |           | 5x11    |           |         |
| 3.3   | 335 |           |         |           |         |           |         |           |         |           |         |           | 5x11    |           |         |
| 4.7   | 475 |           |         |           |         |           |         |           |         |           |         |           | 5x11    |           |         |
| 6.8   | 685 |           |         |           |         |           |         |           |         |           |         |           | 5x11    |           |         |
| 10    | 106 |           |         |           |         |           |         |           |         |           |         |           | 5x11    | 5x11      |         |
| 15    | 156 |           |         |           |         |           |         |           |         |           |         |           | 5x11    | 6.3x11    |         |
| 22    | 226 |           |         |           |         |           |         |           |         |           | 5x11    |           | 6.3x11  | 6.3x11    |         |
| 33    | 336 |           |         |           |         |           |         | 5x11      |         |           | 6.3x11  |           | 6.3x11  | 6.3x15    |         |
| 47    | 476 |           |         |           |         | 5x11      |         | 6.3x11    |         |           | 6.3x11  |           | 6.3x15  | 8x11.5    |         |
| 68    | 686 |           |         | 5x11      |         | 6.3x11    |         | 6.3x11    |         |           | 6.3x15  |           | 8x11.5  | 8x15      | 10x12.5 |
| 100   | 107 | 5x11      |         | 6.3x11    |         | 6.3x11    |         | 6.3x15    |         |           | 8x11.5  |           | 8x20    | 10x15     | 10x20   |
| 150   | 157 | 6.3x11    |         | 6.3x11    |         | 6.3x15    |         | 8x11.5    |         |           | 8x15    | 10x12.5   | 10x20   | 12.5x15   | 10x25   |
| 220   | 227 | 6.3x11    |         | 6.3x15    |         | 8x11.5    |         | 8x15      | 10x12.5 |           | 8x20    | 10x15     | 10x25   | 12.5x15   | 12.5x20 |
| 330   | 337 | 6.3x15    |         | 8x11.5    |         | 8x15      | 10x12.5 | 8x20      | 10x15   | 10x20     | 12.5x15 | 10x31.5   | 16x15   | 12.5x25   | 18x15   |
| 470   | 477 | 8x15      | 10x12.5 | 8x15      | 10x12.5 | 8x20      | 10x15   | 10x20     | 12.5x15 | 10x31.5   | 16x15   | 12.5x25   | 18x15   | 12.5x35.5 | 16x25   |
| 680   | 687 | 8x20      | 10x15   | 8x20      | 10x15   | 10x20     | 12.5x15 | 10x31.5   | 16x15   | 12.5x25   | 18x15   | 12.5x35.5 | 16x20   | 16x31.5   | 18x25   |
| 1000  | 108 | 10x20     | 12.5x15 | 10x20     | 12.5x15 | 10x31.5   | 16x15   | 12.5x25   | 18x15   | 12.5x31.5 | 16x20   | 16x31.5   | 18x25   | 16x40     | 18x35.5 |
| 1500  | 158 | 10x25     | 12.5x15 | 10x31.5   | 16x15   | 12.5x25   | 18x15   | 12.5x31.5 | 16x20   | 12.5x40   | 18x20   | 16x40     | 18x31.5 |           |         |
| 2200  | 228 | 10x31.5   | 16x15   | 12.5x25   | 18x15   | 12.5x31.5 | 16x20   | 12.5x40   | 18x20   | 16x35.5   | 18x31.5 | 18x40     |         |           |         |
| 3300  | 338 | 12.5x25   | 18x15   | 12.5x35.5 | 16x20   | 12.5x40   | 18x20   | 16x35.5   | 18x31.5 | 18x40     |         |           |         |           |         |
| 4700  | 478 | 12.5x35.5 | 18x20   | 16x31.5   | 18x25   | 16x35.5   | 18x31.5 | 18x40     |         |           |         |           |         |           |         |
| 6800  | 688 | 16x31.5   | 18x25   | 16x35.5   | 18x31.5 | 18x35.5   |         |           |         |           |         |           |         |           |         |
| 10000 | 109 | 16x40     | 18x31.5 | 18x40     |         |           |         |           |         |           |         |           |         |           |         |
| 15000 | 159 | 18x40     |         |           |         |           |         |           |         |           |         |           |         |           |         |

\*Flat model will have the fig. 5 in 10th place of its numbering code.

## Quick Guide for Product Selection

| Cap(uF) | W.V (Code) | Size Code | 6.3              |                       |                 |              |                         |              |                       |                 |              |                         |              |
|---------|------------|-----------|------------------|-----------------------|-----------------|--------------|-------------------------|--------------|-----------------------|-----------------|--------------|-------------------------|--------------|
|         |            |           | Description Code | —                     |                 |              |                         |              | 5                     |                 |              |                         |              |
|         |            |           |                  | Case Size<br>ψDxL(mm) | Impedance(ΩMAX) |              | Allowable ripple(mArms) |              | Case Size<br>ψDxL(mm) | Impedance(ΩMAX) |              | Allowable ripple(mArms) |              |
|         |            |           |                  |                       | 20°C/100KHz     | -10°C/100KHz | 105°C/100KHz            | 105°C/100KHz |                       | 20°C/100KHz     | -10°C/100KHz | 105°C/100KHz            | 105°C/100KHz |
| 100     | 107        | 5x11      | 0.85             | 1.70                  | 150             | 100          |                         |              |                       |                 |              |                         |              |
| 150     | 157        | 6.3x11    | 0.49             | 0.98                  | 220             | 155          |                         |              |                       |                 |              |                         |              |
| 220     | 227        | 6.3x11    | 0.30             | 0.60                  | 260             | 190          |                         |              |                       |                 |              |                         |              |
| 330     | 337        | 6.3x15    | 0.20             | 0.40                  | 405             | 310          |                         |              |                       |                 |              |                         |              |
| 470     | 477        | 8x15      | 0.14             | 0.28                  | 550             | 440          | 10x12.5                 | 0.14         | 0.28                  | 570             | 455          |                         |              |
| 680     | 687        | 8x20      | 0.10             | 0.20                  | 735             | 610          | 10x15                   | 0.11         | 0.22                  | 700             | 580          |                         |              |
| 1000    | 108        | 10x20     | 0.075            | 0.15                  | 950             | 825          | 12.5x15                 | 0.085        | 0.17                  | 885             | 765          |                         |              |
| 1500    | 158        | 10x25     | 0.055            | 0.11                  | 1220            | 1090         | 12.5x15                 | 0.065        | 0.13                  | 1040            | 935          |                         |              |
| 2200    | 228        | 10x31.5   | 0.043            | 0.086                 | 1470            | 1320         | 16x15                   | 0.048        | 0.098                 | 1340            | 1200         |                         |              |
| 3300    | 338        | 12.5x25   | 0.034            | 0.068                 | 1690            | 1520         | 18x15                   | 0.039        | 0.078                 | 1600            | 1440         |                         |              |
| 4700    | 478        | 12.5x35.5 | 0.028            | 0.056                 | 2100            | 1890         | 18x20                   | 0.032        | 0.064                 | 1920            | 1720         |                         |              |
| 6800    | 688        | 16x31.5   | 0.024            | 0.048                 | 2370            | 2130         | 18x25                   | 0.027        | 0.054                 | 2190            | 1970         |                         |              |
| 10000   | 109        | 16x40     | 0.020            | 0.040                 | 2750            | 2470         | 18x31.5                 | 0.023        | 0.046                 | 2490            | 2240         |                         |              |
| 15000   | 159        | 18x40     | 0.018            | 0.036                 | 2960            | 2660         |                         |              |                       |                 |              |                         |              |

# Aluminum Electrolytic Capacitor

## LLM Radial Type Low Leakage Current Series

### Features

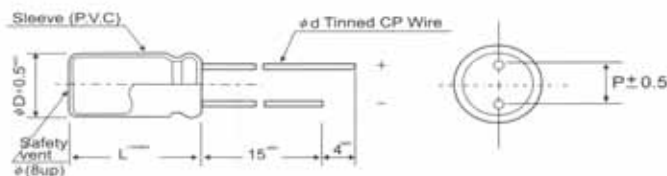
- Further miniaturization of the conventional type.
- Guaranteed long life (1000 hrs, at 85 °C)
- Available both in resin and rubber seals.
- Anti-solvent



### Specifications

| Item                        | Performance Characteristics  |   |      |      |      |      |            |
|-----------------------------|--|---|------|------|------|------|------------|
| Operating Temperature Range | -40~ +85   |   |      |      |      |      |            |
| Rated Voltage               | 10~50V   |   |      |      |      |      |            |
| Nominal Capacitance Range   | 0.1~ 1000uF  |   |      |      |      |      |            |
| Capacitance Tolerance       | ±20% (120Hz: 20%)  |   |      |      |      |      |            |
| Leakage Current             | I = 0.002CV or 0.4 (uA), whichever is greater, after 2 minutes application of rated voltage.                             |   |      |      |      |      |            |
| Dissipation Factor          | Rated voltage (V)  | 10                                      | 16   | 25   | 35   | 50   | .120Hz 20% |
|                             | Tan (max)  | 0.20                                    | 0.16 | 0.14 | 0.12 | 0.10 |            |
| Temperature Characteristics | For capacitance of more than 1000uF, add 0.02 for every increase of 1000uF(120Hz: 20%)                                   |   |      |      |      |      |            |
|                             | Impedance Ratio  |   |      |      |      |      |            |
|                             | Rated Voltage (V)  | 10                                      | 16   | 25   | 35   | 50   | .120Hz     |
|                             | Z (-25 °C) / Z(20 °C)  | 3                                       | 2    | 2    | 2    | 2    |            |
| Z (-40 °C) / Z(20 °C)       | 6  | 4                                       | 4    | 3    | 3    |      |            |
| Load life                   | After 1000hrs of application of rated voltage at 85 °C, capacitors meet the characteristics requirements mentioned below |   |      |      |      |      |            |
|                             | Capacitance change   | Within ±20% of Initial Value            |      |      |      |      |            |
|                             | Tan  | 200% or Less of Initial Specified Value |      |      |      |      |            |
| Shelf Life                  | After leaving capacitors under no load at 85 °C for 500 hours and applying voltage according to JIS C-5102 4-3.          |   |      |      |      |      |            |
|                             | They meet the specified value for load life characteristics listed above.  |   |      |      |      |      |            |
| Applicable Standards        | Characteristics W of JIS C-5141  |   |      |      |      |      |            |

### Dimensions



|   |     |     |     |     |      |
|---|-----|-----|-----|-----|------|
| D | 5   | 6.3 | 8   | 10  | 12.5 |
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  |
| d | 0.5 | 0.5 | 0.6 | 0.6 | 0.6  |
|   | 1.0 |     | 1.5 |     |      |

# Aluminum Electrolytic Capacitor

## Standard Products Table

Case size ( DxL(mm)) / MAX PERMISSIBLE RIPPLE CURRENT (RC(mArms) / 120 Hz, 85 )

| W.V. (Code)<br>Cap (uF) |     | 10      |     | 16      |     | 25      |     | 35      |     | 50      |           |
|-------------------------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----------|
|                         |     | Size    | RC  | Size    | RC  | Size    | RC  | Size    | RC  | Size    | RC        |
| 0.1                     | 104 |         |     |         |     |         |     |         |     | 5x11    | 1.1       |
| 0.15                    | 154 |         |     |         |     |         |     |         |     | 5x11    | 1.6       |
| 0.22                    | 224 |         |     |         |     |         |     |         |     | 5x11    | 2.3       |
| 0.33                    | 334 |         |     |         |     |         |     |         |     | 5x11    | 3.5       |
| 0.47                    | 474 |         |     |         |     |         |     |         |     | 5x11    | 5.0       |
| 0.68                    | 684 |         |     |         |     |         |     |         |     | 5x11    | 7.3       |
| 1                       | 105 |         |     |         |     |         |     |         |     | 5x11    | 10        |
| 1.5                     | 155 |         |     |         |     |         |     |         |     | 5x11    | 16        |
| 2.2                     | 225 |         |     |         |     |         |     |         |     | 5x11    | 23        |
| 3.3                     | 335 |         |     |         |     |         |     |         |     | 5x11    | 35        |
| 4.7                     | 475 |         |     |         |     | 5x11    | 35  |         |     | 5x11    | 45        |
| 6.8                     | 685 |         |     |         |     | 5x11    | 45  |         |     | 5x11    | 50        |
| 10                      | 106 |         |     | 5x11    | 50  | 5x11    | 55  |         |     | 5x11    | 60        |
| 15                      | 156 |         |     | 5x11    | 60  | 5x11    | 65  | 5x11    | 70  | 6.3x11  | 85        |
| 22                      | 226 |         |     | 5x11    | 75  | 5x11    | 80  | 6.3x11  | 95  | 6.3x11  | 100       |
| 33                      | 336 |         |     | 5x11    | 90  | 6.3x11  | 105 | 6.3x11  | 115 | 8x11.5  | 145       |
| 47                      | 476 | 5x11    | 100 | 6.3x11  | 120 | 6.3x11  | 130 | 8x11.5  | 160 | 8x11.5  | 175       |
| 68                      | 686 | 6.3x11  | 130 | 6.3x11  | 145 | 8x11.5  | 180 | 8x11.5  | 190 | 10x12.5 | 225       |
| 100                     | 107 | 6.3x11  | 155 | 8x11.5  | 200 | 8x11.5  | 215 | 10x12.5 | 250 | 10x16   | 295       |
| 150                     | 157 | 8x11.5  | 220 | 8x11.5  | 250 | 10x12.5 | 280 | 10x16   | 330 | 10x20   | 395       |
| 220                     | 227 | 8x11.5  | 270 | 10x12.5 | 320 | 10x16   | 370 | 10x20   | 435 | 12.5x20 | 530       |
| 330                     | 337 | 10x12.5 | 350 | 10x16   | 425 | 10x20   | 495 | 12.5x20 | 590 |         |           |
| 470                     | 477 | 10x16   | 455 | 10x20   | 495 |         |     |         |     | Case    | Allowable |
| 1000                    | 108 | 12.5x20 | 800 |         |     |         |     |         |     | Size    | Ripple    |

# Aluminum Electrolytic Capacitor

## SMR 7mm Standard Series

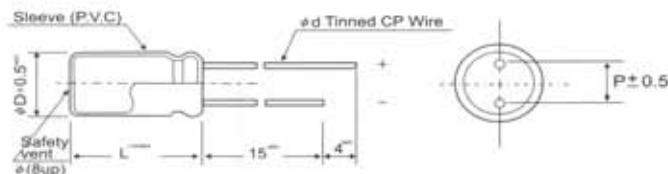
### Features

- Excellent spacing factors with 7mm height.
- Guaranteed long life (1000 hrs, at 85 °C)
- Anti-solvent
- Available in taping configuration for automatic mounting.

### Specifications

| Item   | Performance Characteristics  |   |      |      |      |      |      |             |
|--|--|---|------|------|------|------|------|-------------|
| Operating Temperature Range  | -40~ +85   |   |      |      |      |      |      |             |
| Rated Voltage  | 6.3~50V  |   |      |      |      |      |      |             |
| Nominal Capacitance Range  | 0.1~ 100uF   |   |      |      |      |      |      |             |
| Capacitance Tolerance  | ±20% (120Hz: 20%)  |   |      |      |      |      |      |             |
| Leakage Current  | I = 0.01CV or 3 (uA), whichever is greater, after 2 minutes application of rated voltage.                                |   |      |      |      |      |      |             |
| Dissipation Factor   | Rated voltage (V)  | 6.3                                     | 10   | 16   | 25   | 35   | 50   | . 120Hz 20% |
|  | Tan (max)  | 0.24                                    | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 |             |
| For capacitance of more than 1000uF, add 0.02 for every increase of 1000uF(120Hz: 20%) |  |   |      |      |      |      |      |             |
| Temperature Characteristics  | Impedance Ratio  |   |      |      |      |      |      |             |
|  | Rated Voltage (V)  | 6.3                                     | 10   | 16   | 25   | 35   | 50   | . 120Hz     |
|  | Z (-25 °C) / Z(20 °C)  | 4                                       | 3    | 2    | 2    | 2    | 2    |             |
| Z (-40 °C) / Z(20 °C)  | 8  | 6                                       | 4    | 4    | 3    | 3    |      |             |
| Load life  | After 1000hrs of application of rated voltage at 85 °C, capacitors meet the characteristics requirements mentioned below |   |      |      |      |      |      |             |
|  | Capacitance change   | Within ±20% of Initial Value            |      |      |      |      |      |             |
|  | Tan  | 200% or Less of Initial Specified Value |      |      |      |      |      |             |
| Shelf Life   | After leaving capacitors under no load at 85 °C for 1000 hours and applying voltage according to JIS C-5102 4-3.         |   |      |      |      |      |      |             |
|  | They meet the specified value for load life characteristics listed above.  |   |      |      |      |      |      |             |
| Applicable Standards   | Characteristics W of JIS C-5141  |   |      |      |      |      |      |             |

### Dimensions



|   |      |      |      |
|---|------|------|------|
| D | 4    | 5    | 6.3  |
| P | 1.5  | 2.0  | 2.5  |
| d | 0.45 | 0.45 | 0.45 |

### Standard Products Table

Case size ( D x L(mm)) / MAX PERMISSIBLE RIPPLE CURRENT (RC(mArms) / 120 Hz, 85 °C)

| Cap (uF) | W.V. | 6.3   |    | 10    |    | 16    |    | 25    |    | 35    |    | 50    |            |
|----------|------|-------|----|-------|----|-------|----|-------|----|-------|----|-------|------------|
|          |      | Size  | RC | Size  | RC | Size  | RC | Size  | RC | Size  | RC | Size  | RC         |
| 0.1      | 104  |       |    |       |    |       |    |       |    |       |    | 4x7   | 1          |
| 0.22     | 224  |       |    |       |    |       |    |       |    |       |    | 4x7   | 2          |
| 0.33     | 334  |       |    |       |    |       |    |       |    |       |    | 4x7   | 3          |
| 0.47     | 474  |       |    |       |    |       |    |       |    |       |    | 4x7   | 5          |
| 1        | 105  |       |    |       |    |       |    |       |    |       |    | 4x7   | 10         |
| 2.2      | 225  |       |    |       |    |       |    |       |    |       |    | 4x7   | 16         |
| 3.3      | 335  |       |    |       |    |       |    |       |    |       |    | 4x7   | 19         |
| 4.7      | 475  |       |    |       |    |       |    |       |    | 4x7   | 21 | 5x7   | 25         |
| 10       | 106  |       |    |       |    | 4x7   | 27 | 5x7   | 31 | 5x7   | 34 | 6.3x7 | 40         |
| 22       | 226  | 4x7   | 29 | 5x7   | 39 | 5x7   | 43 | 6.3x7 | 50 | 6.3x7 | 54 |       |            |
| 33       | 336  | 5x7   | 43 | 5x7   | 48 | 6.3x7 | 58 | 6.3x7 | 62 |       |    |       |            |
| 47       | 476  | 5x7   | 52 | 6.3x7 | 61 | 6.3x7 | 69 |       |    |       |    | Case  | Allow-able |
| 1000     | 108  | 6.3x7 | 82 |       |    |       |    |       |    |       |    | Size  | Ripple     |

# Aluminum Electrolytic Capacitor

## Lead Cutting & Forming Specifications

Coding (Symbol) of lead cutting and forming be added to the end of part number (as 12<sup>th</sup>~14<sup>th</sup> places).

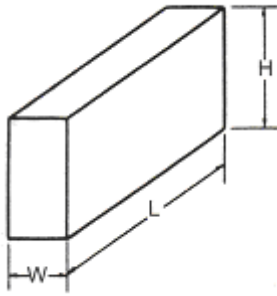
| Type         | Configuration  | Symbol                     | Dimensions (mm)                    |     |      | Dimensions Figure                         |   |     |     |   |   |   |
|--------------|----------------|----------------------------|------------------------------------|-----|------|---|---|-----|-----|---|---|---|
|              |                |                            | D                                  | F   | P    |   |   |     |     |   |   |   |
| Forming Cut  | 4~ 8           | CF<br>: Select Figure in F | 4                                  | 5   | 1.5  | <p>Applicable to 5mmL and 7mmL series</p> |   |     |     |   |   |   |
|              |                |                            | 5                                  | 5   | 2.0  |   |   |     |     |   |   |   |
|              |                |                            | 6.3                                | 5   | 2.5  |   |   |     |     |   |   |   |
|              |                |                            | 8                                  | 5   | 3.5  |   |   |     |     |   |   |   |
| Straight Cut | 4~ 8           | CO<br>: Select Figure in L | 10                                 | 5   | -    |   |   |     |     |   |   |   |
|              |                |                            | 12.5                               | 5   | -    |   |   |     |     |   |   |   |
|              |                |                            | 16                                 | 7.5 | -    |   |   |     |     |   |   |   |
|              |                |                            | 18                                 | 7.5 | -    |   |   |     |     |   |   |   |
| Kinked Cut   | 4~ 8<br>10~ 18 | CK<br>: Select Figure in F | Dimensions (Figure)                |     |      |   |   |     |     |   |   |   |
|              |                |                            |                                    |     |      |   |   |     |     |   |   |   |
|              |                |                            | Applicable to 5mmL and 7mmL series |     |      |   |   |     |     |   |   |   |
|              |                |                            | Dimensions (mm)                    |     |      |   |   |     |     |   |   |   |
|              |                |                            | D                                  | F   | P    | ℓ   | H | D   | F   | P | ℓ | H |
| 4            | 5              | 1.5                        | 0.85                               | 2.6 | 10   | 5   | - | 1.0 | 2.7 |   |   |   |
| 5            | 5              | 2.0                        | 0.85                               | 2.8 | 12.5 | 5   | - | 1.0 | 2.7 |   |   |   |
| 6.3          | 5              | 2.5                        | 0.85                               | 2.8 | 16   | 7.5                                       | - | 1.0 | 2.7 |   |   |   |
| 8            | 5              | 3.5                        | 1.0                                | 2.7 | 18   | 7.5                                       | - | 1.0 | 2.7 |   |   |   |



# Aluminum Electrolytic Capacitor

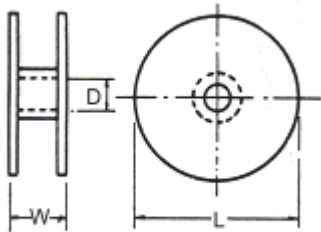
## Packaging Specifications

### Ammo-Pack



| L   | H   | W  | Size                  | Q'ty (pcs) |
|-----|-----|----|-----------------------|------------|
| 340 | 190 | 48 | 3x5, 3.5x5, 4x5, 4x7  | 2000       |
| 340 | 280 | 48 | 5x5, 5x7              | 2000       |
|     |     |    | 6.3x5, 6.3x7          | 2000       |
| 340 | 280 | 54 | 5x9, 5x11             | 2000       |
|     |     |    | 6.3x9, 6.3x11, 6.3x15 | 2000       |
|     |     |    | 8x9, 8x11.5, 8x15     | 1000       |
|     |     |    | 10x9, 10x12.5         | 500        |
| 340 | 280 | 62 | 8x20                  | 1000       |
|     |     |    | 10x16, 10x20          | 500        |

### Reel-Pack



| L   | W  | D  | Size                 | Q'ty (pcs) |
|-----|----|----|----------------------|------------|
| 360 | 54 | 30 | 3x5, 3.5x5, 4x5, 4x7 | 1500       |
|     |    |    | 5x5, 5x7, 5x9, 5x11  | 1000       |
|     |    |    | 6.3x5, 6.3x7, 6.3x9  | 1000       |
|     |    |    | 6.3x11, 6.3x15       |            |
|     |    |    | 8x9, 8x11.5, 8x15    | 800        |
|     |    |    | 10x9, 10x12.5        | 500        |
| 380 | 62 | 15 | 8x20                 | 800        |
|     |    |    | 10x16, 10x20         | 500        |