

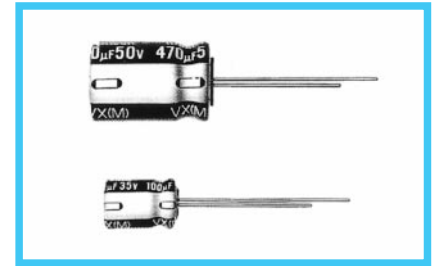
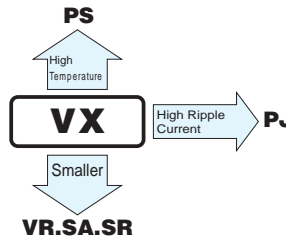
# ALUMINUM ELECTROLYTIC CAPACITORS

**VX** Standard, For General Purposes  
(04 type)series



Approved by Reliability Center for Electronic Component, Japan-Certification No. RCJ-03-22C

- Standard series for general purposes.

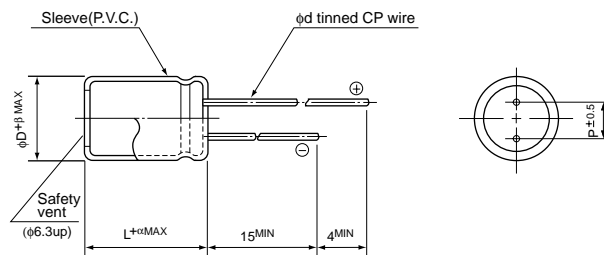


## Specifications

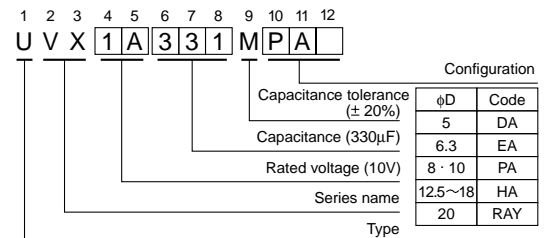
| Item                            | Performance Characteristics   |  |  |           |   |  |  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
|---------------------------------|---|--|--|-----------|---|--|--|-----------|---|---|-----------|-----|---------------------------------|---------------|------|------|------|------|------|------|------|---|----|---------------|----|---|---|---|---|---|---|---|---|
| Operating Temperature Range     | -40 ~ +85°C(6.3 ~ 400V), -25 ~ +85°C(450V)  |  |  |           |   |  |  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| Voltage Range                   | 6.3 ~ 450V  |  |  |           |   |  |  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| Capacitance Range               | 0.1 ~ 22000μF   |  |  |           |   |  |  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| Capacitance Tolerance           | ±20% at 120Hz, 20°C   |  |  |           |   |  |  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| Leakage Current                 | <table border="1"> <tr> <th>Rated voltage(V)</th> <th>6.3 ~ 100</th> <th>160 ~ 450</th> </tr> <tr> <td>φ D ≤ 18</td> <td>After 1 minute's application of rated voltage, not more than 0.03CV or 4 μA, whichever is greater.<br/>After 2 minutes' application of rated voltage, not more than 0.01CV or 3 μA, whichever is greater.</td> <td>In case of CV ≤ 1000<br/>After 1 minute's application of rated voltage, not more than 0.1CV+40(μA).<br/>In case of CV &gt; 1000<br/>After 1 minute's application of rated voltage, not more than 0.04CV+100(μA).</td> </tr> <tr> <td>φ D = 20</td> <td>After 5 minutes' application of rated voltage, not more than 3√CV (μA).</td> <td>After 5 minutes' application of rated voltage, not more than 3√CV (μA).</td> </tr> </table> | Rated voltage(V)   | 6.3 ~ 100  | 160 ~ 450 | φ D ≤ 18                                | After 1 minute's application of rated voltage, not more than 0.03CV or 4 μA, whichever is greater.<br>After 2 minutes' application of rated voltage, not more than 0.01CV or 3 μA, whichever is greater. | In case of CV ≤ 1000<br>After 1 minute's application of rated voltage, not more than 0.1CV+40(μA).<br>In case of CV > 1000<br>After 1 minute's application of rated voltage, not more than 0.04CV+100(μA). | φ D = 20  | After 5 minutes' application of rated voltage, not more than 3√CV (μA). | After 5 minutes' application of rated voltage, not more than 3√CV (μA). |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
|                                 | Rated voltage(V)  | 6.3 ~ 100  | 160 ~ 450  |           |   |  |  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
|                                 | φ D ≤ 18  | After 1 minute's application of rated voltage, not more than 0.03CV or 4 μA, whichever is greater.<br>After 2 minutes' application of rated voltage, not more than 0.01CV or 3 μA, whichever is greater. | In case of CV ≤ 1000<br>After 1 minute's application of rated voltage, not more than 0.1CV+40(μA).<br>In case of CV > 1000<br>After 1 minute's application of rated voltage, not more than 0.04CV+100(μA). |           |   |  |  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| φ D = 20                        | After 5 minutes' application of rated voltage, not more than 3√CV (μA).   | After 5 minutes' application of rated voltage, not more than 3√CV (μA).  |  |           |   |  |  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| tan δ                           | <p>For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz, Temperature : 20°C</p> <table border="1"> <tr> <th>Rated voltage(V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63 ~ 100</th> <th>160 ~ 315</th> <th>350 ~ 450</th> </tr> <tr> <td></td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> <td>0.20</td> <td>0.25</td> </tr> </table>   | Rated voltage(V)   | 6.3  | 10        | 16                                      | 25   | 35   | 50        | 63 ~ 100  | 160 ~ 315   | 350 ~ 450 |     | 0.24                            | 0.20          | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.20 | 0.25 |   |    |               |    |   |   |   |   |   |   |   |   |
| Rated voltage(V)                | 6.3   | 10   | 16   | 25        | 35                                      | 50   | 63 ~ 100   | 160 ~ 315 | 350 ~ 450   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
|                                 | 0.24  | 0.20   | 0.16   | 0.14      | 0.12                                    | 0.10   | 0.08   | 0.20      | 0.25  |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| Stability at Low Temperature    | <p>Measurement frequency : 120Hz</p> <table border="1"> <tr> <th>Rated voltage(V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35 ~ 100</th> <th>160 ~ 200</th> <th>250</th> <th>315 ~ 350</th> <th>400</th> <th>450</th> </tr> <tr> <td rowspan="2">Impedance ratio<br/>ZT/Z20(MAX.)</td> <td>Z-25°C/Z+20°C</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>3</td> <td>6</td> <td>6</td> <td>15</td> </tr> <tr> <td>Z-40°C/Z+20°C</td> <td>10</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> <td>4</td> <td>6</td> <td>6</td> <td>—</td> </tr> </table>   | Rated voltage(V)   | 6.3  | 10        | 16                                      | 25   | 35 ~ 100   | 160 ~ 200 | 250   | 315 ~ 350   | 400       | 450 | Impedance ratio<br>ZT/Z20(MAX.) | Z-25°C/Z+20°C | 4    | 3    | 2    | 2    | 2    | 3    | 6    | 6 | 15 | Z-40°C/Z+20°C | 10 | 8 | 6 | 4 | 3 | 4 | 6 | 6 | — |
| Rated voltage(V)                | 6.3   | 10   | 16   | 25        | 35 ~ 100                                | 160 ~ 200  | 250  | 315 ~ 350 | 400   | 450   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| Impedance ratio<br>ZT/Z20(MAX.) | Z-25°C/Z+20°C   | 4  | 3  | 2         | 2                                       | 2  | 3  | 6         | 6   | 15  |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
|                                 | Z-40°C/Z+20°C   | 10   | 8  | 6         | 4                                       | 3  | 4  | 6         | 6   | —   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| Load Life                       | <p>After 2000 hours' application of rated voltage at 85°C, capacitors meet the characteristics requirements listed at right.</p> <table border="1"> <tr> <td>Capacitance change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>tan δ</td> <td>200% or less of initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>Initial specified value or less</td> </tr> </table>   | Capacitance change   | Within ±20% of initial value   | tan δ     | 200% or less of initial specified value | Leakage current  | Initial specified value or less  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| 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°C for 1000 hours, they meet the specified value for load life characteristics listed above.  |  |  |           |   |  |  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| Marking                         | Printed with white color letter on purple blue sleeve.  |  |  |           |   |  |  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |
| Applicable Standards            | JIS C 5141 and JIS C 5102.  |  |  |           |   |  |  |           |   |   |           |     |                                 |               |      |      |      |      |      |      |      |   |    |               |    |   |   |   |   |   |   |   |   |

## Radial Lead Type

Type numbering system(Example : 10V 330μF)



|     |        |     |     |     |      |     |     |      |
|-----|--------|-----|-----|-----|------|-----|-----|------|
| φD  | 5      | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 20   |
| P   | 2.0    | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10.0 |
| φ d | 0.5    | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 | 1.0  |
| α   | ~ 100V | 1.0 | 1.0 | 1.0 | 1.5  | 1.5 | 1.5 | 2.0  |
|     | 160V~  | —   | 1.5 | 1.5 | 2.0  | 2.0 | 2.0 | 2.0  |
| β   | 0.5    | 0.5 | 0.5 | 0.5 | 0.5  | 0.5 | 0.5 | 1.0  |



Please refer to page 17, 18, 19 about the formed or taped product spec.  
Please refer to page 3 for the minimum order quantity.

Dimension table in next page.



## ■ Dimensions

D X L(mm)

| Cap.(μF) | V<br>Code | 6.3       |      | 10        |      | 16        |      | 25        |      | 35        |      | 50        |      | 63        |      | 100       |      |
|----------|-----------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|
|          |           | OJ        |      | 1A        |      | 1C        |      | 1E        |      | 1V        |      | 1H        |      | 1J        |      | 2A        |      |
| 0.1      | 0R1       |           |      |           |      |           |      |           |      |           |      | 5 X 11    | 1.1  |           |      | 5 X 11    | 2.1  |
| 0.22     | R22       |           |      |           |      |           |      |           |      |           |      | 5 X 11    | 2.3  |           |      | 5 X 11    | 4.7  |
| 0.33     | R33       |           |      |           |      |           |      |           |      |           |      | 5 X 11    | 3.5  |           |      | 5 X 11    | 7    |
| 0.47     | R47       |           |      |           |      |           |      |           |      |           |      | 5 X 11    | 5    |           |      | 5 X 11    | 10   |
| 1        | 010       |           |      |           |      |           |      |           |      |           |      | 5 X 11    | 10   |           |      | 5 X 11    | 21   |
| 2.2      | 2R2       |           |      |           |      |           |      |           |      |           |      | 5 X 11    | 23   |           |      | 5 X 11    | 30   |
| 3.3      | 3R3       |           |      |           |      |           |      |           |      |           |      | 5 X 11    | 35   |           |      | 5 X 11    | 40   |
| 4.7      | 4R7       |           |      |           |      |           |      | 5 X 11    | 30   | 5 X 11    | 35   | 5 X 11    | 40   | 5 X 11    | 45   | 5 X 11    | 45   |
| 10       | 100       |           |      |           |      | 5 X 11    | 40   | 5 X 11    | 50   | 5 X 11    | 55   | 5 X 11    | 65   | 5 X 11    | 70   | 6.3 X 11  | 75   |
| 22       | 220       | 5 X 11    | 35   | 5 X 11    | 55   | 5 X 11    | 75   | 5 X 11    | 80   | 5 X 11    | 85   | 5 X 11    | 95   | 6.3 X 11  | 115  | 8 X 11.5  | 130  |
| 33       | 330       | 5 X 11    | 55   | 5 X 11    | 80   | 5 X 11    | 90   | 5 X 11    | 95   | 5 X 11    | 105  | 6.3 X 11  | 125  | 6.3 X 11  | 140  | 10 X 12.5 | 170  |
| 47       | 470       | 5 X 11    | 75   | 5 X 11    | 95   | 5 X 11    | 110  | 5 X 11    | 115  | 6.3 X 11  | 140  | 6.3 X 11  | 150  | 8 X 11.5  | 190  | 10 X 15   | 230  |
| 100      | 101       | 5 X 11    | 130  | 5 X 11    | 145  | 6.3 X 11  | 175  | 6.3 X 11  | 185  | 8 X 11.5  | 230  | 8 X 11.5  | 250  | 10 X 12.5 | 300  | 12.5 X 20 | 400  |
| 220      | 221       | 6.3 X 11  | 215  | 6.3 X 11  | 230  | 8 X 11.5  | 300  | 8 X 11.5  | 320  | 10 X 12.5 | 370  | 10 X 15   | 440  | 10 X 20   | 490  | 16 X 25   | 710  |
| 330      | 331       | 6.3 X 11  | 265  | 8 X 11.5  | 330  | 8 X 11.5  | 360  | 10 X 12.5 | 420  | 10 X 15   | 490  | 10 X 20   | 580  | 12.5 X 20 | 680  | 16 X 25   | 860  |
| 470      | 471       | 8 X 11.5  | 360  | 8 X 11.5  | 390  | 10 X 12.5 | 470  | 10 X 15   | 540  | 10 X 20   | 640  | 12.5 X 20 | 760  | 12.5 X 25 | 880  | 16 X 31.5 | 1100 |
| 1000     | 102       | 10 X 12.5 | 570  | 10 X 15   | 630  | 10 X 20   | 790  | 12.5 X 20 | 950  | 12.5 X 25 | 1100 | 16 X 25   | 1350 | 16 X 31.5 | 1550 | 18 X 40   | 1690 |
| 2200     | 222       | 12.5 X 20 | 1050 | 12.5 X 20 | 1100 | 12.5 X 25 | 1350 | 16 X 25   | 1550 | 16 X 31.5 | 1800 | 18 X 35.5 | 2090 | 18 X 40   | 2200 | 20 X 35   | 1720 |
| 3300     | 332       | 12.5 X 20 | 1250 | 12.5 X 25 | 1400 | 16 X 25   | 1700 | 16 X 31.5 | 1950 | 18 X 35.5 | 2220 | 20 X 31   | 2190 | 20 X 40   | 2360 |           |      |
| 4700     | 472       | 16 X 25   | 1700 | 16 X 25   | 1800 | 16 X 31.5 | 2100 | 18 X 35.5 | 2360 | 18 X 40   | 2490 | 20 X 35   | 2460 |           |      |           |      |
| 6800     | 682       | 16 X 25   | 1900 | 16 X 31.5 | 2150 | 18 X 35.5 | 2500 | 20 X 31   | 2470 | 20 X 40   | 2590 |           |      |           |      |           |      |
| 10000    | 103       | 16 X 31.5 | 2250 | 18 X 35.5 | 2500 | 18 X 40   | 2640 | 20 X 35   | 2610 |           |      |           |      |           |      |           |      |
| 12000    | 123       | 16 X 35.5 | 2450 | 18 X 35.5 | 2600 | 20 X 31   | 2560 | 20 X 40   | 2730 |           |      |           |      |           |      |           |      |
| 15000    | 153       | 18 X 35.5 | 2680 | 18 X 40   | 2720 | 20 X 35   | 2680 |           |      |           |      |           |      |           |      |           |      |
| 18000    | 183       | 18 X 40   | 2750 | 20 X 35   | 2720 | 20 X 40   | 2850 |           |      |           |      |           |      |           |      |           |      |
| 22000    | 223       | 20 X 40   | 2850 |           |      |           |      |           |      |           |      |           |      |           |      |           |      |

| Cap.(μF) | V<br>Code | 160       |     | 200       |     | 250       |     | 315       |     | 350       |     | 400       |     | 450       |           |
|----------|-----------|-----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----------|
|          |           | 2C        |     | 2D        |     | 2E        |     | 2F        |     | 2V        |     | 2G        |     | 2W        |           |
| 0.47     | R47       | 6.3 X 11  | 12  | 6.3 X 11  | 12  | 6.3 X 11  | 12  |           |     |           |     |           |     |           |           |
| 1        | 010       | 6.3 X 11  | 17  | 6.3 X 11  | 17  | 6.3 X 11  | 17  | 6.3 X 11  | 17  | 8 X 11.5  | 18  | 8 X 11.5  | 18  | 10 X 12.5 | 19        |
| 2.2      | 2R2       | 6.3 X 11  | 26  | 6.3 X 11  | 26  | 8 X 11.5  | 30  | 8 X 11.5  | 30  | 10 X 12.5 | 28  | 10 X 12.5 | 28  | 10 X 15   | 29        |
| 3.3      | 3R3       | 8 X 11.5  | 35  | 8 X 11.5  | 35  | 10 X 12.5 | 35  | 10 X 12.5 | 35  | 10 X 15   | 35  | 10 X 15   | 35  | 10 X 20   | 35        |
| 4.7      | 4R7       | 8 X 11.5  | 40  | 10 X 12.5 | 45  | 10 X 12.5 | 45  | 10 X 15   | 45  | 10 X 15   | 40  | 10 X 20   | 45  | 12.5 X 20 | 50        |
| 10       | 100       | 10 X 12.5 | 65  | 10 X 15   | 70  | 10 X 20   | 70  | 10 X 20   | 70  | 12.5 X 20 | 70  | 12.5 X 20 | 70  | 12.5 X 25 | 75        |
| 22       | 220       | 10 X 20   | 110 | 10 X 20   | 110 | 12.5 X 25 | 130 | 12.5 X 25 | 120 | 12.5 X 25 | 110 | 16 X 25   | 110 | 16 X 31.5 | 110       |
| 33       | 330       | 12.5 X 20 | 150 | 12.5 X 25 | 160 | 12.5 X 25 | 160 | 16 X 25   | 150 | 16 X 31.5 | 140 | 16 X 31.5 | 140 | 18 X 35.5 | 150       |
| 47       | 470       | 12.5 X 25 | 180 | 12.5 X 25 | 180 | 16 X 25   | 210 | 16 X 31.5 | 190 | 18 X 35.5 | 220 | 18 X 35.5 | 220 | 20 X 40   | 230       |
| 100      | 101       | 16 X 25   | 300 | 16 X 31.5 | 330 | 18 X 35.5 | 340 | 18 X 40   | 340 | 20 X 31   | 330 | 20 X 35   | 330 | 20 X 40   | 360       |
| 150      | 151       | 16 X 35.5 | 420 | 18 X 35.5 | 450 | 18 X 40   | 460 | 20 X 35   | 460 | 20 X 40   | 450 |           |     |           |           |
| 220      | 221       | 18 X 35.5 | 510 | 18 X 40   | 520 | 20 X 35   | 510 | 20 X 40   | 530 |           |     |           |     |           |           |
| 270      | 271       | 18 X 40   | 540 | 20 X 35   | 540 | 20 X 40   | 570 |           |     |           |     |           |     |           |           |
| 330      | 331       | 20 X 40   | 60  |           |     |           |     |           |     |           |     |           |     |           | Case size |

Allowable Ripple (mA rms) at 85°C 120Hz

## ■ Frequency coefficient of allowable ripple current

| V         | Cap.(μF)     | Frequency |      |       |       |      |
|-----------|--------------|-----------|------|-------|-------|------|
|           |              | ~ 47      | 50Hz | 120Hz | 300Hz | 1kHz |
| 6.3 ~ 100 | ~ 47         | 0.75      | 1.00 | 1.35  | 1.57  | 2.00 |
|           | 100 ~ 470    | 0.80      | 1.00 | 1.23  | 1.34  | 1.50 |
|           | 1000 ~ 22000 | 0.85      | 1.00 | 1.10  | 1.13  | 1.15 |
| 160 ~ 450 | 0.47 ~ 220   | 0.80      | 1.00 | 1.25  | 1.40  | 1.60 |
|           | 270 ~ 330    | 0.90      | 1.00 | 1.10  | 1.13  | 1.15 |