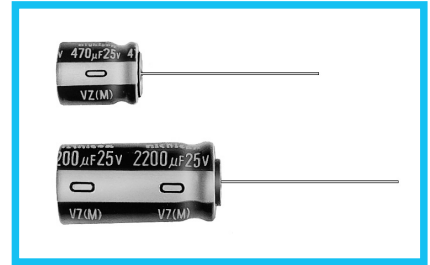
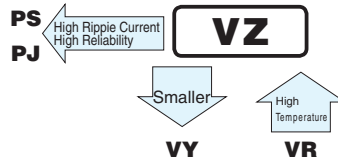


**VZ** series Wide Temperature Range



Anti-Solvent Feature  
(Through 100V only)

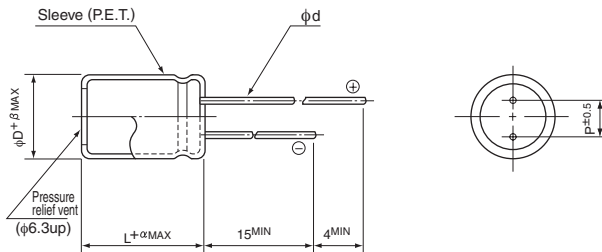
- Small case sizes as same as VR series, but operating over wide temperature range of  $-55$  to  $+105^{\circ}\text{C}$ .
- Compliant to the RoHS directive (2011/65/EU).



## Specifications

| Item                                  | Performance Characteristics  |   |
|---------------------------------------|--|---|
| Category Temperature Range            | $-55$ to $+105^{\circ}\text{C}$ (6.3 to 100V), $-40$ to $+105^{\circ}\text{C}$ (160 to 400V), $-25$ to $+105^{\circ}\text{C}$ (450V)   |   |
| Rated Voltage Range                   | 6.3 to 450V  |   |
| Rated Capacitance Range               | 0.1 to 33000µF   |   |
| Capacitance Tolerance                 | $\pm 20\%$ at 120Hz, $20^{\circ}\text{C}$  |   |
| Leakage Current                       | Rated voltage (V)  | 6.3 to 100  |
|                                       |  | 160 to 450  |
| Tangent of loss angle (tan $\delta$ ) | For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Measurement frequency : 120Hz at $20^{\circ}\text{C}$  |   |
|                                       | Rated voltage (V)  | 6.3 10 16 25 35 50 63 100 160 to 315 350 to 450   |
| Stability at Low Temperature          | Measurement frequency : 120Hz  |   |
|                                       | Impedance ratio ZT / Z20 (MAX.)  | Z $-25^{\circ}\text{C}$ / Z $+20^{\circ}\text{C}$ 5 4 3 2 2 2 2 2 3 4 6 15<br>Z $-40^{\circ}\text{C}$ / Z $+20^{\circ}\text{C}$ 10 8 6 4 3 3 3 3 4 8 10 — |
| Endurance                             | The specifications listed at right shall be met when the capacitors are restored to $20^{\circ}\text{C}$ after the rated voltage is applied for 1000 hours at $105^{\circ}\text{C}$ .  |   |
|                                       | Capacitance change   | Within $\pm 20\%$ of the initial capacitance value  |
|                                       | Leakage current  | Less than or equal to the initial specified value   |
| Shelf Life                            | After storing the capacitors under no load at $105^{\circ}\text{C}$ for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at $20^{\circ}\text{C}$ , they shall meet the specified values for the endurance characteristics listed above. |   |
| Marking                               | Printed with white color letter on black sleeve.   |   |

## Radial Lead Type

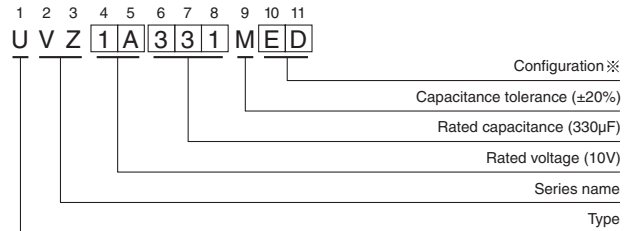


|          | (mm) |     |     |     |      |     |     |      |      |      |  |
|----------|------|-----|-----|-----|------|-----|-----|------|------|------|--|
| $\phi D$ | 5    | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 20   | 22   | 25   |  |
| P        | 2.0  | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10.0 | 10.0 | 12.5 |  |
| $\phi d$ | 0.5  | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 | 1.0  | 1.0  | 1.0  |  |
| $\beta$  | 0.5  | 0.5 | 0.5 | 0.5 | 0.5  | 0.5 | 0.5 | 0.5  | 1.0  | 1.0  |  |

|          |                                   |
|----------|-----------------------------------|
| $\alpha$ | (L < 20) 1.5<br>(L $\geq$ 20) 2.0 |
|----------|-----------------------------------|

• Please refer to page 20 about the end seal configuration.

## Type numbering system (Example : 10V 330µF)



※ Configuration

| $\phi D$   | Pb-free leadwire<br>Pb-free PET sleeve |
|------------|--|
| 5          | DD                                     |
| 6.3        | ED                                     |
| 8 · 10     | PD                                     |
| 12.5 to 18 | HD                                     |
| 20 to 25   | RD                                     |

Please refer to page 20, 21, 22 about the formed or taped product spec.  
Please refer to page 4 for the minimum order quantity.

• Dimension table in next page.



## Dimensions

| V        |      | 6.3       |      | 10        |      | 16        |      | 25        |      | 35        |      | 50                       |                 |
|----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|--------------------------|-----------------|
| Cap.(μF) | Code | 0J        |      | 1A        |      | 1C        |      | 1E        |      | 1V        |      | 1H                       |                 |
| 0.1      | 0R1  |           |      |           |      |           |      |           |      |           |      | 5 × 11                   | 1.3             |
| 0.22     | R22  |           |      |           |      |           |      |           |      |           |      | 5 × 11                   | 2.9             |
| 0.33     | R33  |           |      |           |      |           |      |           |      |           |      | 5 × 11                   | 4.3             |
| 0.47     | R47  |           |      |           |      |           |      |           |      |           |      | 5 × 11                   | 7               |
| 1        | 010  |           |      |           |      |           |      |           |      |           |      | 5 × 11                   | 13              |
| 2.2      | 2R2  |           |      |           |      |           |      |           |      |           |      | 5 × 11                   | 20              |
| 3.3      | 3R3  |           |      |           |      |           |      |           |      |           |      | 5 × 11                   | 25              |
| 4.7      | 4R7  |           |      |           |      |           |      | 5 × 11    | 25   | 5 × 11    | 28   | 5 × 11                   | 30              |
| 10       | 100  |           |      |           |      | 5 × 11    | 35   | 5 × 11    | 36   | 5 × 11    | 41   | 5 × 11                   | 46              |
| 22       | 220  | 5 × 11    | 45   | 5 × 11    | 45   | 5 × 11    | 54   | 5 × 11    | 58   | 5 × 11    | 61   | 5 × 11                   | 68              |
| 33       | 330  | 5 × 11    | 55   | 5 × 11    | 58   | 5 × 11    | 65   | 5 × 11    | 68   | 5 × 11    | 75   | 5 × 11                   | 90              |
| 47       | 470  | 5 × 11    | 65   | 5 × 11    | 68   | 5 × 11    | 79   | 5 × 11    | 83   | 5 × 11    | 93   | 6.3 × 11                 | 115             |
| 100      | 101  | 5 × 11    | 95   | 5 × 11    | 105  | 5 × 11    | 115  | 6.3 × 11  | 140  | 6.3 × 11  | 150  | 8 × 11.5                 | 190             |
| 220      | 221  | 5 × 11    | 145  | 6.3 × 11  | 175  | 6.3 × 11  | 190  | 8 × 11.5  | 240  | 10 × 12.5 | 275  | 10 × 12.5                | 300             |
| 330      | 331  | 6.3 × 11  | 195  | 6.3 × 11  | 210  | 8 × 11.5  | 265  | 10 × 12.5 | 315  | 10 × 12.5 | 350  | 10 × 16                  | 410             |
| 470      | 471  | 6.3 × 11  | 230  | 6.3 × 11  | 250  | 8 × 11.5  | 315  | 10 × 12.5 | 380  | 10 × 16   | 460  | 12.5 × 20                | 530             |
| 1000     | 102  | 8 × 11.5  | 390  | 10 × 12.5 | 460  | 10 × 16   | 560  | 10 × 20   | 680  | 12.5 × 20 | 810  | 12.5 × 25                | 950             |
| 2200     | 222  | 10 × 20   | 710  | 10 × 20   | 760  | 12.5 × 20 | 920  | 12.5 × 25 | 1090 | 16 × 25   | 1260 | 16 × 35.5                | 1470            |
| 3300     | 332  | 10 × 20   | 840  | 12.5 × 20 | 1000 | 12.5 × 25 | 1170 | 16 × 25   | 1400 | 16 × 35.5 | 1610 | 18 × 35.5                | 1770            |
| 4700     | 472  | 12.5 × 20 | 1090 | 12.5 × 25 | 1260 | 16 × 25   | 1480 | 16 × 31.5 | 1710 | 18 × 35.5 | 1910 | 20 × 40                  | 2100            |
| 6800     | 682  | 12.5 × 25 | 1350 | 16 × 25   | 1570 | 16 × 35.5 | 1780 | 18 × 35.5 | 2040 | 20 × 40   | 2150 | 22 × 50                  | 2500            |
| 10000    | 103  | 16 × 25   | 1650 | 16 × 35.5 | 1890 | 18 × 35.5 | 2060 | 20 × 40   | 2150 | 22 × 50   | 2650 | 25 × 50                  | 2850            |
| 15000    | 153  | 16 × 35.5 | 2010 | 18 × 35.5 | 2180 | 20 × 40   | 2430 | 22 × 50   | 2750 | 25 × 50   | 3100 |                          |                 |
| 22000    | 223  | 18 × 40   | 2350 | 20 × 40   | 2650 | 22 × 50   | 3000 | 25 × 50   | 3250 |           |      |                          |                 |
| 33000    | 333  | 22 × 50   | 2800 | 22 × 50   | 3250 | 25 × 50   | 3450 |           |      |           |      |                          |                 |
|          |      |           |      |           |      |           |      |           |      |           |      | Case size<br>φD × L (mm) | Rated<br>ripple |

| V        |      | 63        |      | 100       |      | 160       |      | 200       |     | 250       |     | 315       |     | 350       |     | 400       |     | 450       |     |                          |                 |
|----------|------|-----------|------|-----------|------|-----------|------|-----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|--------------------------|-----------------|
| Cap.(μF) | Code | 1J        |      | 2A        |      | 2C        |      | 2D        |     | 2E        |     | 2F        |     | 2V        |     | 2G        |     | 2W        |     |                          |                 |
| 0.1      | 0R1  |           |      | 5 × 11    | 1.5  |           |      |           |     |           |     |           |     |           |     |           |     |           |     |                          |                 |
| 0.22     | R22  |           |      | 5 × 11    | 3.4  |           |      |           |     |           |     |           |     |           |     |           |     |           |     |                          |                 |
| 0.33     | R33  |           |      | 5 × 11    | 5.0  |           |      |           |     |           |     |           |     |           |     |           |     |           |     |                          |                 |
| 0.47     | R47  |           |      | 5 × 11    | 7.1  | 6.3 × 11  | 11   | 6.3 × 11  | 11  | 6.3 × 11  | 10  |           |     |           |     |           |     |           |     |                          |                 |
| 1        | 010  |           |      | 5 × 11    | 15   | 6.3 × 11  | 16   | 6.3 × 11  | 16  | 6.3 × 11  | 15  | 6.3 × 11  | 15  | 8 × 11.5  | 17  | 8 × 11.5  | 13  |           |     |                          |                 |
| 2.2      | 2R2  |           |      | 5 × 11    | 21   | 6.3 × 11  | 25   | 6.3 × 11  | 25  | 6.3 × 11  | 23  | 8 × 11.5  | 26  | 8 × 11.5  | 26  | 10 × 12.5 | 30  | 10 × 12.5 | 23  |                          |                 |
| 3.3      | 3R3  |           |      | 5 × 11    | 29   | 6.3 × 11  | 30   | 6.3 × 11  | 30  | 8 × 11.5  | 32  | 10 × 12.5 | 38  | 10 × 12.5 | 38  | 10 × 12.5 | 38  | 10 × 16   | 31  |                          |                 |
| 4.7      | 4R7  |           |      | 5 × 11    | 32   | 6.3 × 11  | 34   | 8 × 11.5  | 39  | 8 × 11.5  | 39  | 10 × 12.5 | 45  | 10 × 12.5 | 45  | 10 × 16   | 50  | 10 × 20   | 40  |                          |                 |
| 10       | 100  | 5 × 11    | 46   | 6.3 × 11  | 54   | 8 × 11.5  | 41   | 10 × 12.5 | 65  | 10 × 16   | 74  | 10 × 20   | 80  | 10 × 20   | 80  | 12.5 × 20 | 90  | 12.5 × 20 | 65  |                          |                 |
| 22       | 220  | 5 × 11    | 71   | 6.3 × 11  | 93   | 10 × 16   | 100  | 10 × 20   | 120 | 12.5 × 20 | 130 | 12.5 × 20 | 115 | 12.5 × 25 | 115 | 16 × 25   | 165 | 16 × 25   | 115 |                          |                 |
| 33       | 330  | 6.3 × 11  | 100  | 8 × 11.5  | 130  | 10 × 20   | 145  | 12.5 × 20 | 160 | 12.5 × 20 | 160 | 16 × 25   | 195 | 16 × 25   | 195 | 16 × 31.5 | 215 | 16 × 35.5 | 165 |                          |                 |
| 47       | 470  | 6.3 × 11  | 120  | 10 × 12.5 | 165  | 12.5 × 20 | 195  | 12.5 × 20 | 195 | 12.5 × 25 | 210 | 16 × 25   | 230 | 16 × 35.5 | 270 | 16 × 35.5 | 270 | 18 × 40   | 185 |                          |                 |
| 100      | 101  | 10 × 12.5 | 215  | 10 × 20   | 265  | 12.5 × 25 | 215  | 16 × 31.5 | 375 | 16 × 31.5 | 365 | 18 × 35.5 | 395 | 18 × 40   | 420 | 20 × 40   | 450 | 22 × 40   | 270 |                          |                 |
| 220      | 221  | 10 × 16   | 335  | 12.5 × 25 | 440  | 16 × 35.5 | 570  | 18 × 35.5 | 575 | 20 × 40   | 600 | 22 × 50   | 620 | 22 × 50   | 620 | 25 × 50   | 660 |           |     |                          |                 |
| 330      | 331  | 10 × 20   | 510  | 12.5 × 25 | 540  | 18 × 40   | 750  | 20 × 40   | 705 | 22 × 50   | 730 | 25 × 50   | 760 |           |     |           |     |           |     |                          |                 |
| 470      | 471  | 12.5 × 20 | 640  | 16 × 25   | 715  | 22 × 40   | 900  | 22 × 50   | 840 | 25 × 50   | 870 |           |     |           |     |           |     |           |     |                          |                 |
| 1000     | 102  | 16 × 25   | 930  | 18 × 40   | 985  | 25 × 50   | 1310 |           |     |           |     |           |     |           |     |           |     |           |     |                          |                 |
| 2200     | 222  | 18 × 35.5 | 1650 | 22 × 50   | 1750 |           |      |           |     |           |     |           |     |           |     |           |     |           |     |                          |                 |
| 3300     | 332  | 20 × 40   | 1950 | 25 × 50   | 2070 |           |      |           |     |           |     |           |     |           |     |           |     |           |     |                          |                 |
| 4700     | 472  | 22 × 50   | 2450 |           |      |           |      |           |     |           |     |           |     |           |     |           |     |           |     |                          |                 |
| 6800     | 682  | 25 × 50   | 2800 |           |      |           |      |           |     |           |     |           |     |           |     |           |     |           |     |                          |                 |
|          |      |           |      |           |      |           |      |           |     |           |     |           |     |           |     |           |     |           |     | Case size<br>φD × L (mm) | Rated<br>ripple |

Rated ripple current (mArms) at 105°C 120Hz

## Frequency coefficient of rated ripple current

| V          | Cap.(μF)      | Frequency |       |       |       |                |
|------------|---------------|-----------|-------|-------|-------|----------------|
|            |               | 50Hz      | 120Hz | 300Hz | 1 kHz | 10 kHz or more |
| 6.3 to 100 | 0.1 to 47     | 0.75      | 1.00  | 1.35  | 1.57  | 2.00           |
|            | 100 to 470    | 0.80      | 1.00  | 1.23  | 1.34  | 1.50           |
|            | 1000 to 33000 | 0.85      | 1.00  | 1.10  | 1.13  | 1.15           |
| 160 to 450 | 0.47 to 220   | 0.80      | 1.00  | 1.25  | 1.40  | 1.60           |
|            | 330 to 1000   | 0.90      | 1.00  | 1.10  | 1.13  | 1.15           |