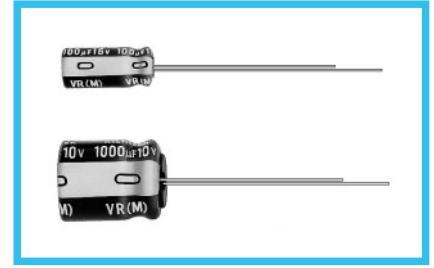
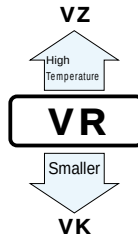


**VR** Miniature Sized  
series



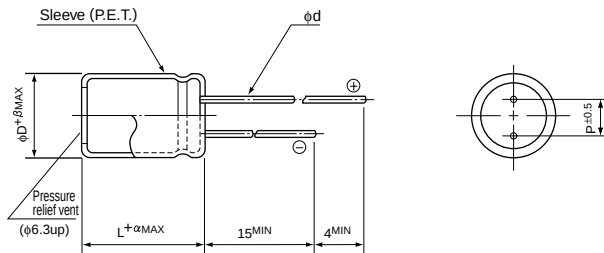
- One rank smaller case sizes than VX series.
- Compliant to the RoHS directive (2002/95/EC).



## Specifications

| Item                          | Performance Characteristics                                                                                                                                                                                                            |                                                                                                                                                                                                                                                    |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category Temperature Range    | -40 to +85°C (6.3V to 400V), -25 to +85°C (450V)                                                                                                                                                                                       |                                                                                                                                                                                                                                                    |
| Rated Voltage Range           | 6.3 to 450V                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                    |
| Rated Capacitance Range       | 0.1 to 33000μF                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                    |
| Capacitance Tolerance         | ±20% at 120Hz, 20°C                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                    |
| Leakage Current               | Rated voltage (V)                                                                                                                                                                                                                      | 6.3 to 100V                                                                                                                                                                                                                                        |
|                               | _____                                                                                                                                                                                                                                  | After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.<br>After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater. |
| Tangent of loss angle (tan δ) | Rated voltage (V)                                                                                                                                                                                                                      | 160 to 450V                                                                                                                                                                                                                                        |
|                               | _____                                                                                                                                                                                                                                  | After 1 minute's application of rated voltage, CV ≤ 1000 : I = 0.1CV+40μA or less<br>After 1 minute's application of rated voltage, CV > 1000 : I = 0.04CV+100 (μA) or less                                                                        |
| Stability at Low Temperature  | For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz, Temperature : 20°C                                                                                                          |                                                                                                                                                                                                                                                    |
|                               | Rated voltage (V)                                                                                                                                                                                                                      | 6.3 10 16 25 35 50 63 100 160 to 200 250 to 350 400 450                                                                                                                                                                                            |
| Endurance                     | tan δ (MAX.)                                                                                                                                                                                                                           | 0.28 0.24 0.20 0.16 0.14 0.12 0.10 0.08 0.20 0.25                                                                                                                                                                                                  |
|                               | tan δ (MAX.)                                                                                                                                                                                                                           | 0.28 0.24 0.20 0.16 0.14 0.12 0.10 0.08 0.20 0.25                                                                                                                                                                                                  |
| Shelf Life                    | Rated voltage (V)                                                                                                                                                                                                                      | 6.3 10 16 25 35 50 63 100 160 to 200 250 to 350 400 450                                                                                                                                                                                            |
|                               | Impedance ratio                                                                                                                                                                                                                        | Z-25°C / Z+20°C 5 4 3 2 2 2 2 2 3 4 6 15                                                                                                                                                                                                           |
| Marking                       | ZT / Z20 (MAX.)                                                                                                                                                                                                                        | 12 10 8 5 4 3 3 3 4 8 10 —                                                                                                                                                                                                                         |
|                               | Z-40°C / Z+20°C                                                                                                                                                                                                                        | 12 10 8 5 4 3 3 3 4 8 10 —                                                                                                                                                                                                                         |
| Endurance                     | The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C.                                                                                    | Capacitance change Within ±20% of the initial capacitance value                                                                                                                                                                                    |
|                               |                                                                                                                                                                                                                                        | tan δ 200% or less than the initial specified value                                                                                                                                                                                                |
| Shelf Life                    |                                                                                                                                                                                                                                        | Leakage current Less than or equal to the initial specified value                                                                                                                                                                                  |
|                               |                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                    |
| Marking                       | After storing the capacitors under no load at 85°C for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they shall meet the specified values for the endurance characteristics listed above. |                                                                                                                                                                                                                                                    |
|                               | Printed with white color letter on black sleeve.                                                                                                                                                                                       |                                                                                                                                                                                                                                                    |

## Radial Lead Type

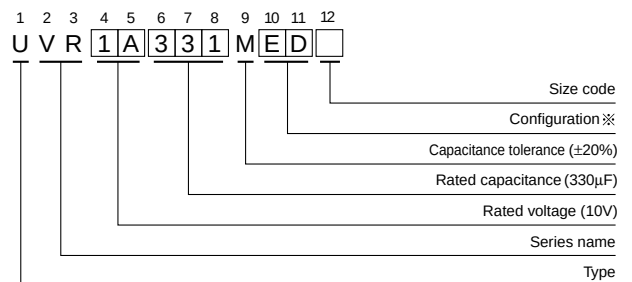


|    | 4    | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 20   | 22   | 25   |
|----|------|-----|-----|-----|-----|------|-----|-----|------|------|------|
| φD | 4    | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 20   | 22   | 25   |
| P  | 1.5  | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10.0 | 10.0 | 12.5 |
| φd | 0.45 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 | 1.0  | 1.0  | 1.0  |
| β  | 0.5  | 0.5 | 0.5 | 0.5 | 0.5 | 0.5  | 0.5 | 0.5 | 0.5  | 1.0  | 1.0  |

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

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

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



### ※ Configuration

| φ D        | Pb-free leadwire<br>Pb-free PET sleeve |
|------------|----------------------------------------|
| 4          | DD6                                    |
| 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

| Cap.(μF) | V<br>Code | 6.3             |              | 10              |              | 16                |              | 25                |              | 35                |              | 50                |              | 63              |              | 100                     |                 |
|----------|-----------|-----------------|--------------|-----------------|--------------|-------------------|--------------|-------------------|--------------|-------------------|--------------|-------------------|--------------|-----------------|--------------|-------------------------|-----------------|
|          |           | 0J              |              | 1A              |              | 1C                |              | 1E                |              | 1V                |              | 1H                |              | 1J              |              | 2A                      |                 |
| 0.1      | 0R1       |                 |              |                 |              |                   |              |                   |              |                   |              | • 5×11            | 13           |                 |              | 5×11                    | 21              |
| 0.22     | R22       |                 |              |                 |              |                   |              |                   |              |                   |              | • 5×11            | 2.9          |                 |              | 5×11                    | 4.7             |
| 0.33     | R33       |                 |              |                 |              |                   |              |                   |              |                   |              | • 5×11            | 4.3          |                 |              | 5×11                    | 7               |
| 0.47     | R47       |                 |              |                 |              |                   |              |                   |              |                   |              | • 5×11            | 6.2          |                 |              | 5×11                    | 10              |
| 1        | 010       |                 |              |                 |              |                   |              |                   |              |                   |              | • 5×11            | 17           |                 |              | 5×11                    | 21              |
| 2.2      | 2R2       |                 |              |                 |              |                   |              |                   |              |                   |              | • 5×11            | 28           |                 |              | 5×11                    | 30              |
| 3.3      | 3R3       |                 |              |                 |              |                   |              |                   |              |                   |              | • 5×11            | 35           |                 |              | 5×11                    | 40              |
| 4.7      | 4R7       |                 |              |                 |              |                   |              | • 5×11            | 35           | • 5×11            | 40           | • 5×11            | 40           |                 |              | 5×11                    | 45              |
| 10       | 100       |                 |              |                 |              | • 5×11            | 50           | • 5×11            | 55           | • 5×11            | 60           | • 5×11            | 60           | 5×11            | 65           | 6.3×11                  | 75              |
| 22       | 220       | • 5×11          | 65           | • 5×11          | 65           | • 5×11            | 75           | • 5×11            | 80           | • 5×11            | 90           | 5×11              | 95           | 5×11            | 100          | 6.3×11                  | 130             |
| 33       | 330       | • 5×11          | 80           | • 5×11          | 85           | • 5×11            | 90           | • 5×11            | 95           | 5×11              | 105          | 5×11              | 125          | 6.3×11          | 140          | 8×11.5                  | 180             |
| 47       | 470       | • 5×11          | 95           | • 5×11          | 100          | • 5×11            | 110          | • 5×11            | 115          | 5×11              | 130          | 6.3×11            | 155          | 6.3×11          | 170          | 10×12.5                 | 230             |
| 100      | 101       | • 5×11          | 135          | • 5×11          | 145          | 5×11              | 160          | 6.3×11            | 190          | 6.3×11            | 210          | 8×11.5            | 260          | 10×12.5         | 300          | 10×20                   | 370             |
| 220      | 221       | 5×11            | 200          | 6.3×11          | 240          | 6.3×11            | 260          | 8×11.5            | 330          | 10×12.5           | 385          | 10×12.5           | 430          | 10×16           | 490          | 12.5×25                 | 620             |
| 330      | 331       | 6.3×11          | 270          | 6.3×11          | 290          | 8×11.5            | 370          | 10×12.5           | 440          | 10×12.5           | 490          | 10×16             | 590          | 10×20           | 710          | 12.5×25                 | 760             |
| 470      | 471       | 6.3×11          | 320          | 6.3×11          | 350          | 8×11.5            | 440          | 10×12.5           | 550          | 10×16             | 650          | 12.5×20           | 760          | 12.5×20         | 900          | 16×25                   | 1000            |
| 1000     | 102       | 8×11.5          | 540          | 10×12.5         | 650          | 10×16             | 790          | 10×20             | 960          | 12.5×20           | 1150         | 12.5×25           | 1350         | 16×25           | 1300         | 18×40                   | 1380            |
| 2200     | 222       | 10×20           | 1000         | 10×20           | 1100         | 12.5×20           | 1300         | 12.5×25           | 1550         | 16×25             | 1800         | 16×35.5           | 2100         | 18×35.5         | 2300         | 22×50                   | 2400            |
| 3300     | 332       | 10×20           | 1190         | 12.5×20         | 1450         | 12.5×25           | 1700         | 16×25             | 1980         | 16×35.5           | 2280         | 18×35.5<br>▲22×30 | 2500<br>2450 | 20×40<br>▲25×30 | 2700<br>2600 | 25×50                   | 2900            |
| 4700     | 472       | 12.5×20         | 1550         | 12.5×25         | 1800         | 16×25             | 2100         | 16×31.5           | 2450         | 18×35.5<br>▲20×31 | 2700         | 20×40<br>▲25×30   | 2900<br>2900 | 22×50<br>▲25×40 | 3400<br>3200 |                         |                 |
| 6800     | 682       | 12.5×25         | 1920         | 16×25           | 2250         | 16×35.5           | 2650         | 18×35.5<br>▲20×31 | 2900<br>2700 | 20×40<br>▲25×30   | 3000<br>2900 | 22×50<br>▲25×40   | 3500<br>3300 | 25×50           | 3900         |                         |                 |
| 10000    | 103       | 16×25           | 2350         | 16×35.5         | 2700         | 18×35.5<br>▲20×31 | 2950<br>3000 | 20×40<br>▲25×30   | 3000<br>2900 | 22×50<br>▲25×40   | 3700<br>3600 | 25×50             | 4000         |                 |              |                         |                 |
| 15000    | 153       | 16×35.5         | 2850         | 18×35.5         | 3100         | 20×40<br>▲25×30   | 3400<br>3300 | 22×50<br>▲25×40   | 3800<br>3600 | 25×50             | 4300         |                   |              |                 |              |                         |                 |
| 22000    | 223       | 18×40<br>▲22×30 | 3350<br>3200 | 20×40<br>▲25×30 | 3700<br>3300 | 22×50<br>▲25×40   | 4200<br>4000 | 25×50             | 4500         |                   |              |                   |              |                 |              |                         |                 |
| 33000    | 333       | 22×50<br>▲25×40 | 3900<br>3800 | 22×50<br>▲25×40 | 4500<br>4800 | 25×50             | 4800         |                   |              |                   |              |                   |              |                 |              | Case size<br>φ D×L (mm) | Rated<br>ripple |

| Cap.(μF) | V<br>Code | 160             |              | 200             |              | 250             |             | 315             |            | 350             |            | 400             |            | 450                     |                 |
|----------|-----------|-----------------|--------------|-----------------|--------------|-----------------|-------------|-----------------|------------|-----------------|------------|-----------------|------------|-------------------------|-----------------|
|          |           | 2C              |              | 2D              |              | 2E              |             | 2F              |            | 2V              |            | 2G              |            | 2W                      |                 |
| 0.47     | R47       | 6.3×11          | 15           | 6.3×11          | 15           | 6.3×11          | 15          |                 |            |                 |            |                 |            |                         |                 |
| 1        | 010       | 6.3×11          | 22           | 6.3×11          | 22           | 6.3×11          | 22          | 6.3×11          | 22         | 6.3×11          | 22         | 8×11.5          | 25         | 8×11.5                  | 23              |
| 2.2      | 2R2       | 6.3×11          | 33           | 6.3×11          | 33           | 6.3×11          | 33          | 8×11.5          | 33         | 8×11.5          | 38         | 10×12.5         | 45         | 10×12.5                 | 35              |
| 3.3      | 3R3       | 6.3×11          | 40           | 6.3×11          | 40           | 8×11.5          | 46          | 10×12.5         | 55         | 10×12.5         | 55         | 10×12.5         | 55         | 10×16                   | 45              |
| 4.7      | 4R7       | 6.3×11          | 50           | 8×11.5          | 55           | 8×11.5          | 55          | 10×12.5         | 65         | 10×12.5         | 65         | 10×16           | 70         | 10×20                   | 55              |
| 10       | 100       | 8×11.5          | 80           | 10×12.5         | 95           | 10×16           | 105         | 10×20           | 115        | 10×20           | 115        | 12.5×20         | 130        | 12.5×20                 | 90              |
| 22       | 220       | 10×16           | 155          | 10×20           | 170          | 12.5×20         | 190         | 12.5×20         | 190        | 12.5×25         | 200        | 16×25           | 240        | 16×25                   | 165             |
| 33       | 330       | 10×20           | 205          | 12.5×20         | 230          | 12.5×20         | 230         | 16×25           | 275        | 16×25           | 275        | 16×31.5         | 300        | 16×35.5                 | 230             |
| 47       | 470       | 12.5×20         | 270          | 12.5×20         | 270          | 12.5×25         | 300         | 16×25           | 340        | 16×35.5         | 380        | 16×35.5         | 370        | 18×40<br>▲22×30         | 300<br>290      |
| 100      | 101       | 12.5×25         | 430          | 16×31.5         | 530          | 16×31.5         | 520         | 18×35.5         | 560        | 18×40<br>▲22×30 | 590<br>570 | 20×40<br>▲25×30 | 550<br>530 | 22×40                   | 350             |
| 220      | 221       | 16×35.5         | 800          | 18×35.5         | 810          | 20×40<br>▲22×30 | 740<br>820  | 22×50<br>▲25×30 | 850<br>770 | 22×50<br>▲25×40 | 850<br>890 | 25×50           | 750        |                         |                 |
| 330      | 331       | 18×40<br>▲22×30 | 940<br>900   | 20×40<br>▲25×30 | 1130<br>1090 | 22×50<br>▲25×30 | 1170<br>970 | 25×50           | 1250       |                 |            |                 |            |                         |                 |
| 470      | 471       | 22×40<br>▲25×30 | 1410<br>1290 | 22×50<br>▲25×40 | 1490<br>1550 | 25×50           | 1600        |                 |            |                 |            |                 |            | Case size<br>φ D×L (mm) | Rated<br>ripple |
| 1000     | 102       | 25×50           | 1900         |                 |              |                 |             |                 |            |                 |            |                 |            |                         |                 |

Size 4×11 is available for capacitors marked "•"

Rated ripple current (mA) at 85°C 120Hz

In this case, [6] will be put at 12th digit of type numbering system "▲"

## ●Frequency coefficient of rated ripple current

| V          | Cap.(μF)      | Frequency |       |       |       |               |
|------------|---------------|-----------|-------|-------|-------|---------------|
|            |               | 50Hz      | 120Hz | 300Hz | 1 kHz | 10kHz or more |
| 6.3 to 100 | Less than 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          |