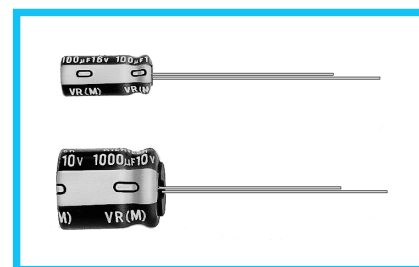
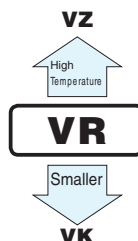


**VR** Miniature Sized  
series

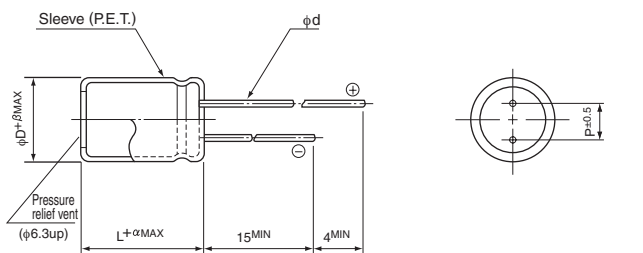

- One rank smaller case sizes than VX series.
- Compliant to the RoHS directive (2011/65/EU).



## 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                                                                                                                     |      |      |      |      | 160 to 450V                                                                                    |      |                                                   |            |            |     |     |   |
|                               | _____                                                                                                                                                                                                                                  | After 1 minute's application of rated voltage at 20°C, leakage current is not more than 0.03CV or 4 (μA), whichever is greater. |      |      |      |      | After 1 minute's application of rated voltage at 20°C, CV ≤ 1000 : I = 0.1CV+40μA or less      |      |                                                   |            |            |     |     |   |
|                               |                                                                                                                                                                                                                                        | After 2 minutes' application of rated voltage at 20°C, leakage current is not more than 0.01CV or 3 (μA), whichever is greater. |      |      |      |      | After 1 minute's application of rated voltage at 20°C, CV > 1000 : I = 0.04CV+100 (μA) or less |      |                                                   |            |            |     |     |   |
| Tangent of loss angle (tan δ) | For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz at 20°C                                                                                                                      |                                                                                                                                 |      |      |      |      |                                                                                                |      |                                                   |            |            |     |     |   |
|                               | Rated voltage (V)                                                                                                                                                                                                                      | 6.3                                                                                                                             | 10   | 16   | 25   | 35   | 50                                                                                             | 63   | 100                                               | 160 to 315 | 350 to 450 |     |     |   |
|                               | tan δ (MAX.)                                                                                                                                                                                                                           | 0.28                                                                                                                            | 0.24 | 0.20 | 0.16 | 0.14 | 0.12                                                                                           | 0.10 | 0.08                                              | 0.20       | 0.25       |     |     |   |
| Stability at Low Temperature  | Measurement frequency : 120Hz                                                                                                                                                                                                          |                                                                                                                                 |      |      |      |      |                                                                                                |      |                                                   |            |            |     |     |   |
|                               | Rated voltage (V)                                                                                                                                                                                                                      | 6.3                                                                                                                             | 10   | 16   | 25   | 35   | 50                                                                                             | 63   | 100                                               | 160 to 200 | 250 to 350 | 400 | 450 |   |
|                               | Impedance ratio ZT / Z20 (MAX.)                                                                                                                                                                                                        | Z-25°C / Z+20°C                                                                                                                 | 5    | 4    | 3    | 2    | 2                                                                                              | 2    | 2                                                 | 3          | 4          | 6   | 15  |   |
|                               |                                                                                                                                                                                                                                        | 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     |            |            |     |     |   |
|                               |                                                                                                                                                                                                                                        |                                                                                                                                 |      |      |      |      | Leakage current                                                                                |      | Less than or equal to the initial specified value |            |            |     |     |   |
| Shelf Life                    | 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. |                                                                                                                                 |      |      |      |      |                                                                                                |      |                                                   |            |            |     |     |   |
| Marking                       | Printed with white color letter on black sleeve.                                                                                                                                                                                       |                                                                                                                                 |      |      |      |      |                                                                                                |      |                                                   |            |            |     |     |   |

## Radial Lead Type

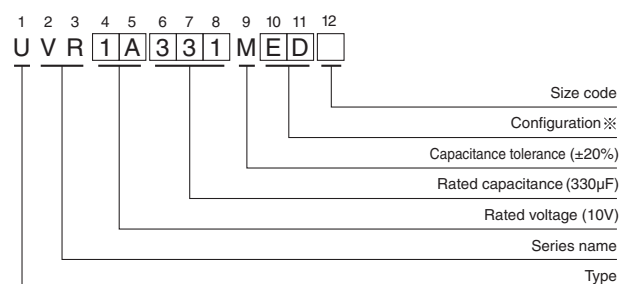


|    | φD   | 4   | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18   | 20   | 22   | 25   |
|----|------|-----|-----|-----|-----|-----|------|-----|------|------|------|------|
| P  | 1.5  | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5  | 7.5 | 10.0 | 10.0 | 10.0 | 12.5 |
| φd | 0.45 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.8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

| V<br>Cap.(μF) 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 29                     |                               | 5 × 11 47                                 |
| 0.33 R33           |                               |                               |                                 |                                 |                                 | • 5 × 11 43                     |                               | 5 × 11 7                                  |
| 0.47 R47           |                               |                               |                                 |                                 |                                 | • 5 × 11 62                     |                               | 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<br>▲25 × 40 2400             |
| 3300 332           | 10 × 20 1190                  | 12.5 × 20 1450                | 12.5 × 25 1700                  | 16 × 25 1980                    | 16 × 35.5 2280                  | 18 × 35.5 2500<br>▲22 × 30 2450 | 20 × 40 2700<br>▲25 × 30 2600 | 25 × 50 2900                              |
| 4700 472           | 12.5 × 20 1550                | 12.5 × 25 1800                | 16 × 25 2100                    | 16 × 31.5 2450                  | 18 × 35.5 2700<br>▲20 × 31 2700 | 20 × 40 2900<br>▲25 × 30 2900   | 22 × 50 3400<br>▲25 × 40 3200 |                                           |
| 6800 682           | 12.5 × 25 1920                | 16 × 25 2250                  | 16 × 35.5 2650                  | 18 × 35.5 2900<br>▲20 × 31 2700 | 20 × 40 3000<br>▲25 × 30 2900   | 22 × 50 3500<br>▲25 × 40 3300   | 25 × 50 3900                  |                                           |
| 10000 103          | 16 × 25 2350                  | 16 × 35.5 2700                | 18 × 35.5 2950<br>▲20 × 31 3000 | 20 × 40 3000<br>▲25 × 30 2900   | 22 × 50 3700<br>▲25 × 40 3600   | 25 × 50 4000                    |                               |                                           |
| 15000 153          | 16 × 35.5 2850                | 18 × 35.5 3100                | 20 × 40 3400<br>▲25 × 30 3300   | 22 × 50 3800<br>▲25 × 40 3600   | 25 × 50 4300                    |                                 |                               |                                           |
| 22000 223          | 18 × 40 3350<br>▲22 × 30 3200 | 20 × 40 3700<br>▲25 × 30 3300 | 22 × 50 4200<br>▲25 × 40 4000   | 25 × 50 4500                    |                                 |                                 |                               |                                           |
| 33000 333          | 22 × 50 3900<br>▲25 × 40 3800 | 22 × 50 4500<br>▲25 × 40 4800 | 25 × 50 4800                    |                                 |                                 |                                 |                               | Case size<br>φ D × L (mm) Rated<br>ripple |

| V<br>Cap.(μF) 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 × 40 300<br>▲22 × 30 290               |
| 100 101            | 12.5 × 25 430                 | 16 × 31.5 530                 | 16 × 31.5 520                | 18 × 35.5 560               | 18 × 40 590<br>▲22 × 30 570 | 20 × 40 550<br>▲25 × 30 530 | 22 × 40 350                               |
| 220 221            | 16 × 35.5 800                 | 18 × 35.5 810                 | 20 × 40 740<br>▲22 × 30 820  | 22 × 50 850<br>▲25 × 30 770 | 22 × 50 850<br>▲25 × 40 890 | 25 × 50 750                 |                                           |
| 330 331            | 18 × 40 940<br>▲22 × 30 900   | 20 × 40 1130<br>▲25 × 30 1090 | 22 × 50 1170<br>▲25 × 30 970 | 25 × 50 1250                |                             |                             |                                           |
| 470 471            | 22 × 40 1410<br>▲25 × 30 1290 | 22 × 50 1490<br>▲25 × 40 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 "•"

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

Rated ripple current (mA<sub>rms</sub>) at 85°C 120Hz

## ● Frequency coefficient of rated ripple current

| V          | Cap.(μF)    | Frequency     | 50Hz | 120Hz | 300Hz | 1 kHz | 10kHz 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          |