

VR Miniature Sized series



Anti-Solvent Feature (Through 100V only)

- 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 | <table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>6.3 to 100V</th> <th>160 to 450V</th> </tr> </thead> <tbody> <tr> <td>_____</td> <td>After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.</td> <td>After 1 minute's application of rated voltage, CV ≤ 1000 : I = 0.1CV+40μA or less</td> </tr> <tr> <td></td> <td>After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater.</td> <td>After 1 minute's application of rated voltage, CV > 1000 : I = 0.04CV+100 (μA) or less</td> </tr> </tbody> </table> | Rated voltage (V) | 6.3 to 100V | 160 to 450V | _____ | After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater. | After 1 minute's application of rated voltage, CV ≤ 1000 : I = 0.1CV+40μA or less | | After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater. | After 1 minute's application of rated voltage, CV > 1000 : I = 0.04CV+100 (μA) or less | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 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 <table border="1"> <thead> <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</th> <th>100</th> <th>160 to 315</th> <th>350 to 450</th> </tr> </thead> <tbody> <tr> <td>tan δ (MAX.)</td> <td>0.28</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> </tbody> </table> | 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 | | | | | | | | | | | | | | | | | | | |
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| Stability at Low Temperature | <table border="1"> <thead> <tr> <th colspan="2">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</th> <th>100</th> <th>160 to 200</th> <th>250 to 350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance ratio</td> <td>Z-25°C / Z+20°C</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>3</td> <td>4</td> <td>6</td> <td>15</td> </tr> <tr> <td>ZT / Z20 (MAX.)</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>4</td> <td>8</td> <td>10</td> <td>—</td> </tr> </tbody> </table> | 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 | ZT / Z20 (MAX.) | 12 | 10 | 8 | 5 | 4 | 3 | 3 | 3 | 4 | 8 | 10 | — |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ZT / Z20 (MAX.) | 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. <table border="1"> <tbody> <tr> <td>Capacitance change</td> <td>Within ±20% of the initial capacitance value</td> </tr> <tr> <td>tan δ</td> <td>200% or less than the initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>Less than or equal to the initial specified value</td> </tr> </tbody> </table> | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 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



| | (mm) | | | | | | | | | | |
|----|------|-----|-----|-----|-----|------|-----|-----|------|------|------|
| 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 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 Code | 6.3 | | 10 | | 16 | | 25 | | 35 | | 50 | | 63 | | 100 | |
|----------|-----------|---------|------|---------|------|---------|------|---------|------|---------|------|---------|------|---------|------|---------|-------------------------|
| | | 0J | | 1A | | 1C | | 1E | | 1V | | 1H | | 1J | | 2A | |
| 0.1 | 0R1 | | | | | | | | | | | • 5×11 | 1.3 | | | 5×11 | 2.1 |
| 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 | 2500 | 20×40 | 2700 | 25×50 | 2900 |
| 4700 | 472 | 12.5×20 | 1550 | 12.5×25 | 1800 | 16×25 | 2100 | 16×31.5 | 2450 | 18×35.5 | 2700 | 20×40 | 2900 | 22×50 | 3400 | | |
| 6800 | 682 | 12.5×25 | 1920 | 16×25 | 2250 | 16×35.5 | 2650 | 18×35.5 | 2900 | 20×40 | 3000 | 22×50 | 3500 | 25×50 | 3900 | | |
| 10000 | 103 | 16×25 | 2350 | 16×35.5 | 2700 | 18×35.5 | 2950 | 20×40 | 3000 | 22×50 | 3700 | 25×50 | 4000 | | | | |
| 15000 | 153 | 16×35.5 | 2850 | 18×35.5 | 3100 | 20×40 | 3400 | 22×50 | 3800 | 25×50 | 4300 | | | | | | |
| 22000 | 223 | 18×40 | 3350 | 20×40 | 3700 | 22×50 | 4200 | 25×50 | 4500 | | | | | | | | |
| 33000 | 333 | 22×50 | 3900 | 22×50 | 4500 | 25×50 | 4800 | | | | | | | | | | Case size φ D×L (mm) |

| Cap.(μF) | V 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 |
| 100 | 101 | 12.5×25 | 430 | 16×31.5 | 530 | 16×31.5 | 520 | 18×35.5 | 560 | 18×40 | 590 | 20×40 | 550 | 22×40 | 350 |
| 220 | 221 | 16×35.5 | 800 | 18×35.5 | 810 | 20×40 | 740 | 22×50 | 850 | 22×50 | 850 | 25×50 | 750 | | |
| 330 | 331 | 18×40 | 940 | 20×40 | 1130 | 22×50 | 1170 | 25×50 | 1250 | 25×50 | 1250 | | | | |
| 470 | 471 | 22×40 | 1410 | 22×50 | 1490 | 25×50 | 1600 | | | | | | | | |
| 1000 | 102 | 25×50 | 1900 | | | | | | | | | | | | Case size φ D×L (mm) |

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 (mArms) 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 |

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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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