

VEJ Series

Features

- 4 ϕ ~ 18 ϕ , 105°C, 2,000 hours assured
- Designed for surface mounting on high density PC board
- RoHS Compliance



Marking color: Black

Specifications

| Items | Performance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|----------------|-----------------|------------|--------------------|---|-----------------|---|-----------------|------------------------|------------------|-----------------|---|---|-----------------|----------|------------------------|------|------|------|------|------|---|---|------------------|------|-----------|--------------------|------|------|------|------|------|------|------|---|---|--------------|-----------------|----|---|---|---|---|---|---|---|---|-----------|--------------------|----|---|---|---|---|---|---|---|---|
| Category Temperature Range | 6.3 ~ 100V | 160 ~ 400V | 450V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | -55°C ~ +105°C | -40°C ~ +105°C | -25°C ~ +105°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance Tolerance | ±20% (at 120Hz, 20°C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage Current (at 20°C) | <table border="1"> <thead> <tr> <th>Rated voltage</th> <th>6.3 ~ 100V</th> <th>160 ~ 450V</th> </tr> </thead> <tbody> <tr> <td>Time</td> <td colspan="2">after 2 minutes</td> </tr> <tr> <td>Case size</td> <td>4 ~ 10 ϕ</td> <td>12.5 ~ 18 ϕ</td> </tr> <tr> <td>Leakage Current</td> <td>I = 0.01CV or 3μA, whichever is greater</td> <td>I = 0.03CV or 4μA, whichever is greater</td> </tr> </tbody> </table> <p>Where, C = rated capacitance in μF V = rated DC working voltage in V</p> | | | Rated voltage | 6.3 ~ 100V | 160 ~ 450V | Time | after 2 minutes | | Case size | 4 ~ 10 ϕ | 12.5 ~ 18 ϕ | Leakage Current | I = 0.01CV or 3 μ A, whichever is greater | I = 0.03CV or 4 μ A, whichever is greater | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated voltage | 6.3 ~ 100V | 160 ~ 450V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Time | after 2 minutes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Case size | 4 ~ 10 ϕ | 12.5 ~ 18 ϕ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage Current | I = 0.01CV or 3 μ A, whichever is greater | I = 0.03CV or 4 μ A, whichever is greater | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tan δ (at 120Hz, 20°C) | <table border="1"> <thead> <tr> <th>Rated Voltage</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 ~ 250</th> <th>400 ~ 450</th> </tr> </thead> <tbody> <tr> <td>4 ~ 10 ϕ</td> <td>0.45</td> <td>0.35</td> <td>0.28</td> <td>0.18</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.12</td> <td>-</td> <td>-</td> </tr> <tr> <td>12.5 ~ 18 ϕ</td> <td>0.40</td> <td>0.38</td> <td>0.34</td> <td>0.26</td> <td>0.22</td> <td>0.18</td> <td>0.14</td> <td>0.10</td> <td>0.20</td> <td>0.25</td> </tr> </tbody> </table> <p>When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.</p> | | | Rated Voltage | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 ~ 250 | 400 ~ 450 | 4 ~ 10 ϕ | 0.45 | 0.35 | 0.28 | 0.18 | 0.16 | 0.14 | 0.12 | 0.12 | - | - | 12.5 ~ 18 ϕ | 0.40 | 0.38 | 0.34 | 0.26 | 0.22 | 0.18 | 0.14 | 0.10 | 0.20 | 0.25 | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated Voltage | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 ~ 250 | 400 ~ 450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 ~ 10 ϕ | 0.45 | 0.35 | 0.28 | 0.18 | 0.16 | 0.14 | 0.12 | 0.12 | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12.5 ~ 18 ϕ | 0.40 | 0.38 | 0.34 | 0.26 | 0.22 | 0.18 | 0.14 | 0.10 | 0.20 | 0.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Low Temperature Characteristics (at 120Hz) | <p>Impedance ratio shall not exceed the values given in the table below.</p> <table border="1"> <thead> <tr> <th colspan="2">Rated Voltage</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 ~ 250</th> <th>400 ~ 450</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Impedance Ratio</td> <td>Z(-25°C)</td> <td>$\phi D < 12.5$</td> <td>4</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>3</td> <td>-</td> </tr> <tr> <td>/Z(+20°C)</td> <td>$\phi D \geq 12.5$</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>3</td> <td>6</td> </tr> <tr> <td>Z(-55/-40°C)</td> <td>$\phi D < 12.5$</td> <td>12</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>4</td> <td>-</td> </tr> <tr> <td>/Z(+20°C)</td> <td>$\phi D \geq 12.5$</td> <td>10</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>6</td> </tr> </tbody> </table> | | | Rated Voltage | | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 ~ 250 | 400 ~ 450 | Impedance Ratio | Z(-25°C) | $\phi D < 12.5$ | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 3 | - | /Z(+20°C) | $\phi D \geq 12.5$ | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 3 | 6 | Z(-55/-40°C) | $\phi D < 12.5$ | 12 | 8 | 6 | 4 | 3 | 3 | 3 | 4 | - | /Z(+20°C) | $\phi D \geq 12.5$ | 10 | 8 | 6 | 4 | 3 | 3 | 3 | 3 | 6 |
| Rated Voltage | | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 ~ 250 | 400 ~ 450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Impedance Ratio | Z(-25°C) | $\phi D < 12.5$ | 4 | 4 | 3 | 2 | 2 | 2 | 2 | 3 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | /Z(+20°C) | $\phi D \geq 12.5$ | 5 | 4 | 3 | 2 | 2 | 2 | 2 | 3 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Z(-55/-40°C) | $\phi D < 12.5$ | 12 | 8 | 6 | 4 | 3 | 3 | 3 | 4 | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | /Z(+20°C) | $\phi D \geq 12.5$ | 10 | 8 | 6 | 4 | 3 | 3 | 3 | 3 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Endurance | <table border="1"> <thead> <tr> <th>Test Time</th> <th>2,000 Hrs</th> </tr> </thead> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±25% of initial value for $\phi D \leq 6.3$mm; Within ±20% of initial value for $\phi D \geq 8$mm</td> </tr> <tr> <td>Tanδ</td> <td>Less than 300% of specified value for $\phi D \leq 6.3$mm; Less than 200% of specified value for $\phi D \geq 8$mm</td> </tr> <tr> <td>Leakage Current</td> <td>Within specified value</td> </tr> </tbody> </table> <p>* The above Specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for 2,000 hours at 105°C.</p> | | | Test Time | 2,000 Hrs | Capacitance Change | Within ±25% of initial value for $\phi D \leq 6.3$ mm; Within ±20% of initial value for $\phi D \geq 8$ mm | Tan δ | Less than 300% of specified value for $\phi D \leq 6.3$ mm; Less than 200% of specified value for $\phi D \geq 8$ mm | Leakage Current | Within specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test Time | 2,000 Hrs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Leakage Current | Within specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shelf Life Test | <p>Test time: 1,000 hours; other items are the same as those for the Endurance. The rated voltage shall be applied to the capacitors before the measurements for 160 ~ 450V (Refer to JIS C 5101-4 4.1).</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ripple Current & Frequency Multipliers | <table border="1"> <thead> <tr> <th rowspan="2">Cap. (μF)</th> <th colspan="4">Freq. (Hz)</th> </tr> <tr> <th>50</th> <th>120</th> <th>1k</th> <th>10k up</th> </tr> </thead> <tbody> <tr> <td>Under 1,000</td> <td>0.80</td> <td>1.00</td> <td>1.25</td> <td>1.40</td> </tr> <tr> <td>1,000 < C \leq 8,200</td> <td>0.85</td> <td>1.00</td> <td>1.15</td> <td>1.25</td> </tr> </tbody> </table> | | | Cap. (μ F) | Freq. (Hz) | | | | 50 | 120 | 1k | 10k up | Under 1,000 | 0.80 | 1.00 | 1.25 | 1.40 | 1,000 < C \leq 8,200 | 0.85 | 1.00 | 1.15 | 1.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cap. (μ F) | Freq. (Hz) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 50 | 120 | 1k | 10k up | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Under 1,000 | 0.80 | 1.00 | 1.25 | 1.40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,000 < C \leq 8,200 | 0.85 | 1.00 | 1.15 | 1.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Diagram of Dimensions

Fig. 1

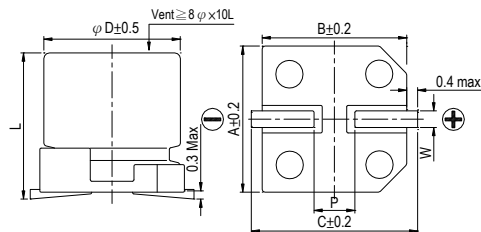
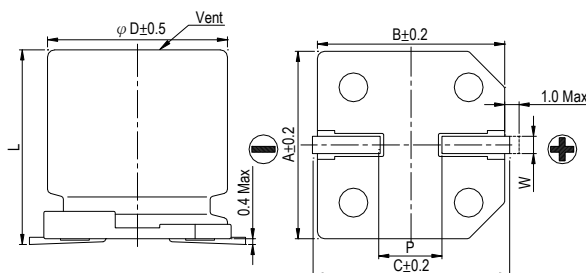


Fig. 2



Lead Spacing and Diameter

Unit: mm

| ϕD | L | A | B | C | W | P ± 0.2 | Fig. No. |
|----------|------------|------|------|------|-----------|---------|----------|
| 4 | 5.7 ± 0.3 | 4.3 | 4.3 | 5.1 | 0.5 ~ 0.8 | 1.0 | 1 |
| 5 | 5.7 ± 0.3 | 5.3 | 5.3 | 5.9 | 0.5 ~ 0.8 | 1.5 | 1 |
| 6.3 | 5.7 ± 0.3 | 6.6 | 6.6 | 7.2 | 0.5 ~ 0.8 | 2.0 | 1 |
| 6.3 | 7.7 ± 0.3 | 6.6 | 6.6 | 7.2 | 0.5 ~ 0.8 | 2.0 | 1 |
| 8 | 6.5 ± 0.3 | 8.4 | 8.4 | 9.0 | 0.5 ~ 0.8 | 2.3 | 1 |
| 8 | 10 ± 0.5 | 8.4 | 8.4 | 9.0 | 0.7 ~ 1.1 | 3.1 | 1 |
| 10 | 7.7 ± 0.3 | 10.4 | 10.4 | 11.0 | 0.7 ~ 1.3 | 4.7 | 1 |
| 10 | 10 ± 0.5 | 10.4 | 10.4 | 11.0 | 0.7 ~ 1.3 | 4.7 | 1 |
| 12.5 | 13.5 ± 0.5 | 13.0 | 13.0 | 13.7 | 1.1 ~ 1.4 | 4.4 | 2 |
| 12.5 | 16 ± 0.5 | 13.0 | 13.0 | 13.7 | 1.1 ~ 1.4 | 4.4 | 2 |
| 16 | 16.5 ± 0.5 | 17.0 | 17.0 | 18.0 | 1.1 ~ 1.4 | 6.4 | 2 |
| 16 | 21.5 ± 0.5 | 17.0 | 17.0 | 18.0 | 1.1 ~ 1.4 | 6.4 | 2 |
| 18 | 16.5 ± 0.5 | 19.0 | 19.0 | 20.0 | 1.1 ~ 1.4 | 6.4 | 2 |
| 18 | 21.5 ± 0.5 | 19.0 | 19.0 | 20.0 | 1.1 ~ 1.4 | 6.4 | 2 |

Marking

$\phi D \leq 6.3 \text{ mm}$



$\phi D = 8 \sim 10 \text{ mm}$



$\phi D \geq 12.5 \text{ mm}$



Dimension & Permissible Ripple Current

Dimension: $\phi D \times L$ (mm)

Ripple Current: mA/rms at 120 Hz, 105°C

| V. DC μF | Contents | 6.3V (0J) | | 10V (1A) | | 16V (1C) | | 25V (1E) | | 35V (1V) | | 50V (1H) | | 63V (1J) | | 100V (2A) | |
|------------------------|----------|--------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|-------------------|----------|-------------------|----------|-------------------|----------|--------------------|------------|
| | | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA |
| 1 | 010 | | | | | | | | | | | 4×5.7 | 8 | 4×5.7 | 8 | | |
| 2.2 | 2R2 | | | | | | | | | | | 4×5.7 | 12 | 4×5.7 | 12 | | |
| 3.3 | 3R3 | | | | | | | | | | | 4×5.7 | 14 | 5×5.7 | 17 | | |
| 4.7 | 4R7 | | | | | | | 4×5.7 | 17 | 4×5.7 | 17 | 5×5.7 | 20 | 6.3×5.7 | 22 | | |
| 10 | 100 | | | | | 4×5.7 | 20 | 4×5.7 | 20 | 5×5.7 | 27 | 6.3×5.7 | 32 | 6.3×5.7 8×6.5 | 32 51 | | |
| 22 | 220 | 4×5.7 | 22 | 4×5.7 | 22 | 5×5.7 | 30 | 5×5.7 | 30 | 6.3×5.7 | 44 | 6.3×5.7 8×6.5 | 38 67 | 6.3×7.7 | 58 | 8×10 | 100 |
| 33 | 330 | 5×5.7 | 34 | 5×5.7 | 34 | 5×5.7 | 34 | 6.3×5.7 | 46 | 6.3×5.7 8×6.5 | 46 76 | 6.3×7.7 | 65 | 8×10 | 140 | 10×10 | 150 |
| 47 | 470 | 5×5.7 | 38 | 5×5.7 | 38 | 6.3×5.7 | 48 | 6.3×5.7 8×6.5 | 48 79 | 6.3×7.7 | 80 | 6.3×7.7 | 70 | 8×10 | 170 | 12.5×13.5 | 250 |
| 100 | 101 | 6.3×5.7 | 69 | 6.3×5.7 8×6.5 | 69 90 | 6.3×5.7 | 69 | 6.3×7.7 | 100 | 8×10 | 240 | 8×10 | 210 | 10×10 | 310 | 12.5×13.5 | 380 |
| 220 | 221 | 6.3×7.7 8×6.5 | 120 120 | 6.3×7.7 | 120 | 6.3×7.7 | 120 | 8×10 10×7.7 | 270 270 | 8×10 | 270 | 10×10 | 330 | 12.5×13.5 | 470 | 16×16.5 | 450 |
| 330 | 331 | 8×10 | 290 | 8×10 | 290 | 8×10 10×7.7 | 290 290 | 8×10 | 290 | 10×10 | 370 | 12.5×13.5 | 490 | 16×16.5 | 650 | 18×16.5 16×21.5 | 590 750 |
| 470 | 471 | 8×10 | 320 | 8×10 10×7.7 | 320 320 | 10×10 | 380 | 10×10 | 380 | 12.5×13.5 | 520 | 12.5×16 | 550 | 16×16.5 | 700 | 18×21.5 | 980 |
| 1,000 | 102 | 10×10 | 410 | 10×10 | 410 | 12.5×13.5 | 550 | 12.5×16 | 550 | 16×16.5 | 800 | 18×16.5 | 990 | | | | |
| 2,200 | 222 | 12.5×13.5 | 680 | 12.5×13.5 | 680 | 16×16.5 | 900 | 16×16.5 | 900 | 18×16.5 | 1,050 | | | | | | |
| 3,300 | 332 | 12.5×16 | 850 | 16×16.5 | 950 | 16×16.5 | 950 | 18×16.5 16×21.5 | 1,150 1,200 | | | | | | | | |
| 4,700 | 472 | 16×16.5 | 1,000 | 16×16.5 | 1,000 | 18×16.5 16×21.5 | 1,225 1,275 | 18×21.5 | 1,300 | | | | | | | | |
| 6,800 | 682 | 18×16.5 16×21.5 | 1,290 1,350 | 18×16.5 16×21.5 | 1,290 1,350 | | | | | | | | | | | | |
| 8,200 | 822 | 18×21.5 | 1,450 | 18×21.5 | 1,450 | | | | | | | | | | | | |

| V. DC μF | Contents | 160V (2C) | | 200V (2D) | | 250V (2E) | | 400V (2G) | | 450V (2W) | |
|------------------------|----------|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|
| | | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA |
| 4.7 | 4R7 | | | | | 12.5×13.5 | 65 | 12.5×13.5 | 45 | 12.5×13.5 | 45 |
| 10 | 100 | | | 12.5×13.5 | 80 | 12.5×13.5 | 70 | 12.5×13.5 | 50 | 12.5×16 | 75 |
| 22 | 220 | | | 12.5×16 | 110 | 12.5×13.5 | 105 | 16×16.5 | 85 | 16×16.5 | 85 |
| 33 | 330 | 12.5×13.5 | 95 | 12.5×16 | 120 | 16×16.5 | 180 | 18×16.5 | 100 | 18×16.5 | 100 |
| 47 | 470 | 16×16.5 | 240 | 16×16.5 | 220 | 16×16.5 | 220 | 18×21.5 | 130 | | |
| 100 | 101 | 16×16.5 | 250 | 18×16.5 | 280 | 18×16.5 | 260 | | | | |

Part Numbering System

VEJ series 470 μF $\pm 20\%$ 6.3V Carrier Tape 8 $\phi \times 10\text{L}$ Pb-free and PET coating case

VEJ **471** **M** **OJ** **TR** - **0810**

Series name Capacitance Capacitance Tolerance Rated Voltage Package Type Terminal Type Case size Lead Wire and Coating Type

Note: For more details, please refer to "Part Numbering System (SMD Type)" on page 12.

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