

## VEJ Series

### Features

- 4  $\phi$  ~ 18  $\phi$ , 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                                                                                                                             |
|                                            | -55°C ~ +105°C                                                                                                                                                                                           | -40°C ~ +105°C                                                                                                                         |
| Capacitance Tolerance                      | $\pm 20\%$ (at 120Hz, 20°C)                                                                                                                                                                              |                                                                                                                                        |
| Leakage Current (at 20°C)                  | Rated voltage                                                                                                                                                                                            | 6.3 ~ 100V                                                                                                                             |
|                                            | Time                                                                                                                                                                                                     | after 2 minutes                                                                                                                        |
|                                            | Case size                                                                                                                                                                                                | 4 ~ 10 $\phi$                                                                                                                          |
|                                            | Leakage Current                                                                                                                                                                                          | I = 0.01CV or 3 $\mu$ A, whichever is greater                                                                                          |
|                                            | Leakage Current                                                                                                                                                                                          | I = 0.03CV or 4 $\mu$ A, whichever is greater                                                                                          |
| Tan $\delta$ (at 120Hz, 20°C)              | Rated Voltage                                                                                                                                                                                            | 6.3 10 16 25 35 50 63 100 160 ~ 250 400 ~ 450                                                                                          |
|                                            | 4 ~ 10 $\phi$                                                                                                                                                                                            | 0.45 0.35 0.28 0.18 0.16 0.14 0.12 0.12 - -                                                                                            |
|                                            | 12.5 ~ 18 $\phi$                                                                                                                                                                                         | 0.40 0.38 0.34 0.26 0.22 0.18 0.14 0.10 0.20 0.25                                                                                      |
|                                            | When the capacitance exceeds 1,000 $\mu$ F, 0.02 shall be added every 1,000 $\mu$ F increase.                                                                                                            |                                                                                                                                        |
|                                            | Impedance ratio shall not exceed the values given in the table below.                                                                                                                                    |                                                                                                                                        |
| Low Temperature Characteristics (at 120Hz) | Rated Voltage                                                                                                                                                                                            | 6.3 10 16 25 35 50 63 100 160 ~ 250 400 ~ 450                                                                                          |
|                                            | Z(-25°C)                                                                                                                                                                                                 | $\phi D < 12.5$ 4 4 3 2 2 2 2 2 3 - -                                                                                                  |
|                                            | /Z(+20°C)                                                                                                                                                                                                | $\phi D \geq 12.5$ 5 4 3 2 2 2 2 2 3 6                                                                                                 |
|                                            | Z(-55/-40°C)                                                                                                                                                                                             | $\phi D < 12.5$ 12 8 6 4 3 3 3 3 4 - -                                                                                                 |
|                                            | /Z(+20°C)                                                                                                                                                                                                | $\phi D \geq 12.5$ 10 8 6 4 3 3 3 3 6 10                                                                                               |
| Endurance                                  | Test Time                                                                                                                                                                                                | 2,000 Hrs                                                                                                                              |
|                                            | Capacitance Change                                                                                                                                                                                       | Within $\pm 25\%$ of initial value for $\phi D \leq 6.3\text{mm}$ ;<br>Within $\pm 20\%$ of initial value for $\phi D \geq 8\text{mm}$ |
|                                            | Tan $\delta$                                                                                                                                                                                             | Less than 300% of specified value for $\phi D \leq 6.3\text{mm}$ ;<br>Less than 200% of specified value for $\phi D \geq 8\text{mm}$   |
|                                            | Leakage Current                                                                                                                                                                                          | Within specified value                                                                                                                 |
|                                            | * 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.                                                         |                                                                                                                                        |
| Shelf Life Test                            | Test time: 1,000 hours; other items are the same as those for the Endurance.<br>The rated voltage shall be applied to the capacitors before the measurements for 160 ~ 450V (Refer to JIS C 5101-4 4.1). |                                                                                                                                        |
| Ripple Current & Frequency Multipliers     | Freq. (Hz)                                                                                                                                                                                               | 50 120 1k 10k up                                                                                                                       |
|                                            | Cap. ( $\mu$ F)                                                                                                                                                                                          | Under 1,000 0.80 1.00 1.25 1.40                                                                                                        |
|                                            | 1,000 < C $\leq$ 6,800                                                                                                                                                                                   | 0.85 1.00 1.15 1.25                                                                                                                    |

### Diagram of Dimensions

Fig. 1

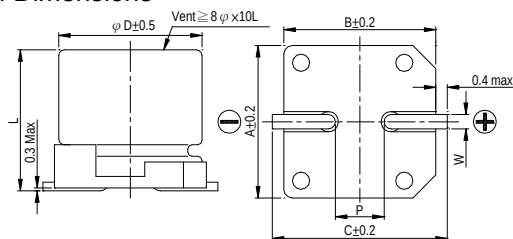
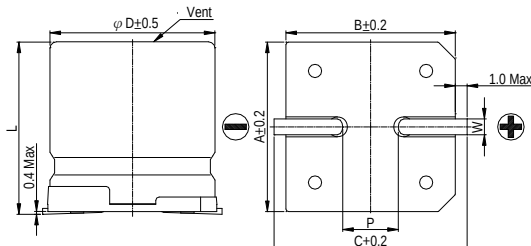


Fig. 2



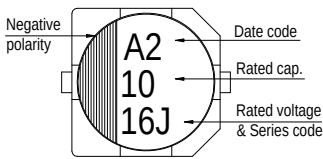
### Lead Spacing and Diameter

Unit: mm

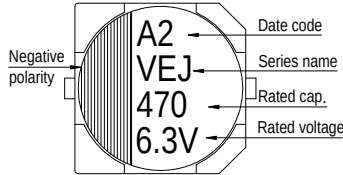
| $\phi D$ | L              | A    | B    | C    | W         | P $\pm 0.2$ | Fig. No. |
|----------|----------------|------|------|------|-----------|-------------|----------|
| 4        | 5.7 $\pm$ 0.3  | 4.3  | 4.3  | 5.1  | 0.5 ~ 0.8 | 1.0         | 1        |
| 5        | 5.7 $\pm$ 0.3  | 5.3  |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

## Marking

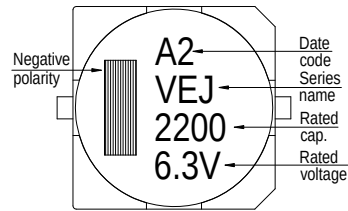
$\phi D \leq 6.3\text{mm}$



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



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



## Dimension & Permissible Ripple Current

Dimension:  $\phi D \times L(\text{mm})$

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

| V. DC                  | 6.3V (0J)                      | 10V (1A)                       | 16V (1C)                       | 25V (1E)                       | 35V (1V)               | 50V (1H)               | 63V (1J)               | 100V (2A)                  |
|------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|------------------------|------------------------|------------------------|----------------------------|
| $\mu\text{F}$ Contents | $\phi D \times L$ 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               | 5×5.7 22               |                            |
| 10 100                 |                                |                                | 4×5.7 20                       | 4×5.7 20                       | 5×5.7 27               | 6.3×5.7 32             | 6.3×5.7 32<br>8×6.5 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 38<br>8×6.5 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 46<br>8×6.5 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 48<br>8×6.5 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 69<br>8×6.5 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                | 6.3×7.7 120<br>8×6.5 120       | 6.3×7.7 120                    | 6.3×7.7 120                    | 8×10 270<br>10×7.7 270         | 8×10 270               | 10×10 330              | 12.5×13.5 470          | 16×16.5 450                |
| 330 331                | 8×10 290                       | 8×10 290                       | 8×10 290<br>10×7.7 290         | 8×10 290                       | 10×10 370              | 12.5×13.5 490          | 16×16.5 650            | 18×16.5 590<br>16×21.5 750 |
| 470 471                | 8×10 320                       | 8×10 320<br>10×7.7 320         | 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 1,150<br>16×21.5 1,200 |                        |                        |                        |                            |
| 4,700 472              | 16×16.5 1,000                  | 16×16.5 1,000                  | 18×16.5 1,225<br>16×21.5 1,275 | 18×21.5 1,300                  |                        |                        |                        |                            |
| 6,800 682              | 18×16.5 1,290<br>16×21.5 1,350 | 18×16.5 1,290<br>16×21.5 1,350 |                                |                                |                        |                        |                        |                            |
| 8,200 822              | 18×21.5 1,450                  | 18×21.5 1,450                  |                                |                                |                        |                        |                        |                            |

| V. DC                  | 160V (2C)            | 200V (2D)            | 250V (2E)            | 400V (2G)            | 450V (2W)            |
|------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| $\mu\text{F}$ Contents | $\phi D \times L$ mA | $\phi D \times L$ mA | $\phi D \times L$ mA | $\phi D \times L$ mA | $\phi D \times L$ mA |
| 3.3 3R3                |                      |                      | 12.5×13.5 60         |                      | 12.5×13.5 40         |
| 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 $\mu\text{F}$ | ±20%                  | 6.3V          | Carrier Tape | 8 $\phi$ × 10L | Pb-free and PET coating case |
| <b>VEJ</b>  | <b>471</b>        | <b>M</b>              | <b>0J</b>     | <b>TR</b>    | <b>-</b>       | <b>0810</b>                  |
| 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.