

## VEH Series

### Features

- $4\phi \sim 10\phi$ , 105°C, 2,000 hours assured
- Vertical chip type miniaturized
- Low impedance capacitors
- Designed for surface mounting on high density PC board
- RoHS Compliance

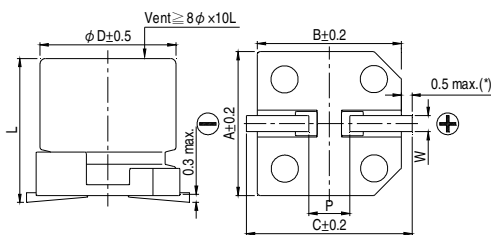


Marking color: Black

### Specifications

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|--------|------|------|----|----------------|-----------|-----|----|--------|------------|------|--------------------|-----------------------------------------------------------------------------------------------|-----------------|------|------|------|------|------|-----------------------------------|-----------------|----|---|---|---|-----------------|------------------------|--|--|--|--|--|
| Items                                      | Performance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Category Temperature Range                 | -55℃ ~ +105℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Capacitance Tolerance                      | ± 20%<br>(at 120Hz, 20℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Leakage Current (at 20℃)                   | I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes)<br>Where, C = rated capacitance in μF, V = rated DC working voltage in V                                                                                                                                                                                                                                                                                                                                                                                                                      |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Tanδ (at 120Hz, 20℃)                       | <table><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td>Tanδ (max)</td><td>0.30</td><td>0.26</td><td>0.22</td><td>0.16</td><td>0.13</td><td>0.13</td></tr></table>                                                                                                                                                                                                                                                                                                                               |      |      |        |      |      |    | Rated Voltage  | 6.3       | 10  | 16 | 25     | 35         | 50   | Tanδ (max)         | 0.30                                                                                          | 0.26            | 0.22 | 0.16 | 0.13 | 0.13 |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Rated Voltage                              | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10   | 16   | 25     | 35   | 50   |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Tanδ (max)                                 | 0.30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.26 | 0.22 | 0.16   | 0.13 | 0.13 |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Low Temperature Characteristics (at 120Hz) | Impedance ratio shall not exceed the values given in the table below. <table><tr><td colspan="2">Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-55℃)/Z(+20℃)</td><td>10</td><td>7</td><td>5</td><td>3</td><td>3</td><td>3</td></tr></table>                                                                                                                        |      |      |        |      |      |    | Rated Voltage  |           | 6.3 | 10 | 16     | 25         | 35   | 50                 | Impedance Ratio                                                                               | Z(-25℃)/Z(+20℃) | 4    | 3    | 2    | 2    | 2    | 2                                 | Z(-55℃)/Z(+20℃) | 10 | 7 | 5 | 3 | 3               | 3                      |  |  |  |  |  |
| Rated Voltage                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 6.3  | 10   | 16     | 25   | 35   | 50 |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Impedance Ratio                            | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4    | 3    | 2      | 2    | 2    | 2  |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
|                                            | Z(-55℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 10   | 7    | 5      | 3    | 3    | 3  |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Endurance                                  | <table><tr><td>Test Time</td><td colspan="6">2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="6">Within ±25% of initial value for ϕ D ≤ 6.3 mm;<br/>Within ±20% of initial value for ϕ D ≥ 8 mm</td></tr><tr><td>Tanδ</td><td colspan="6">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="6">Within specified value</td></tr></table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 2,000 hours at 105℃.</p>             |      |      |        |      |      |    | Test Time      | 2,000 Hrs |     |    |        |            |      | Capacitance Change | Within ±25% of initial value for ϕ D ≤ 6.3 mm;<br>Within ±20% of initial value for ϕ D ≥ 8 mm |                 |      |      |      |      | Tanδ | Less than 200% of specified value |                 |    |   |   |   | Leakage Current | Within specified value |  |  |  |  |  |
| Test Time                                  | 2,000 Hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Capacitance Change                         | Within ±25% of initial value for ϕ D ≤ 6.3 mm;<br>Within ±20% of initial value for ϕ D ≥ 8 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Tanδ                                       | Less than 200% of specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Leakage Current                            | Within specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Shelf Life Test                            | <table><tr><td>Test Time</td><td colspan="6">1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td colspan="6">Within ±25% of initial value for ϕ D ≤ 6.3 mm;<br/>Within ±20% of initial value for ϕ D ≥ 8 mm</td></tr><tr><td>Tanδ</td><td colspan="6">Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td colspan="6">Within specified value</td></tr></table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied.</p> |      |      |        |      |      |    | Test Time      | 1,000 Hrs |     |    |        |            |      | Capacitance Change | Within ±25% of initial value for ϕ D ≤ 6.3 mm;<br>Within ±20% of initial value for ϕ D ≥ 8 mm |                 |      |      |      |      | Tanδ | Less than 200% of specified value |                 |    |   |   |   | Leakage Current | Within specified value |  |  |  |  |  |
| Test Time                                  | 1,000 Hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Capacitance Change                         | Within ±25% of initial value for ϕ D ≤ 6.3 mm;<br>Within ±20% of initial value for ϕ D ≥ 8 mm                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Tanδ                                       | Less than 200% of specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Leakage Current                            | Within specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |        |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Ripple Current and Frequency Multipliers   | <table><tr><td>Frequency (Hz)</td><td>50, 60</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.64</td><td>0.8</td><td>0.93</td><td>1.0</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                        |      |      |        |      |      |    | Frequency (Hz) | 50, 60    | 120 | 1k | 10k up | Multiplier | 0.64 | 0.8                | 0.93                                                                                          | 1.0             |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Frequency (Hz)                             | 50, 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 120  | 1k   | 10k up |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |
| Multiplier                                 | 0.64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.8  | 0.93 | 1.0    |      |      |    |                |           |     |    |        |            |      |                    |                                                                                               |                 |      |      |      |      |      |                                   |                 |    |   |   |   |                 |                        |  |  |  |  |  |

### Diagram of Dimensions



### Lead Spacing and Diameter

Unit: mm

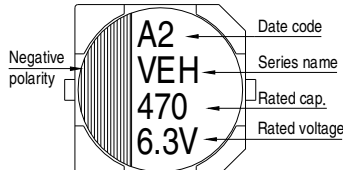
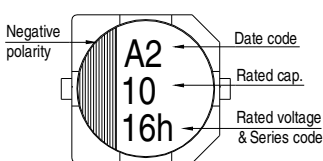
| φD  | L         | A    | B    | C    | W         | P ± 0.2 |
|-----|-----------|------|------|------|-----------|---------|
| 4   | 5.7 ± 0.3 | 4.3  | 4.3  | 5.1  | 0.5 ~ 0.8 | 1.0     |
| 5   | 5.7 ± 0.3 | 5.3  | 5.3  | 5.9  | 0.5 ~ 0.8 | 1.5     |
| 6.3 | 5.7 ± 0.3 | 6.6  | 6.6  | 7.2  | 0.5 ~ 0.8 | 2.0     |
| 8   | 10 ± 0.5  | 8.3  | 8.3  | 9.0  | 0.7 ~ 1.1 | 3.1     |
| 10  | 10 ± 0.5  | 10.3 | 10.3 | 11.0 | 0.7 ~ 1.3 | 4.7     |

(\*): For 4 ~ 6.3φ is 0.4 max.

### Marking

φD ≤ 6.3mm

φD = 8 ~ 10 mm





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

Ripple Current: mA/rms at 100k Hz, 105°C

Impedance:  $\Omega/$  at 100k Hz, 20°C

## Dimension and Permissible Ripple Current

| V. DC         |          | 6.3V (0J)         |      |     | 10V (1A)          |      |     | 16V (1C)          |      |     | 25V (1E)          |      |     | 35V (1V)          |      |     | 50V (1H)          |      |     |
|---------------|----------|-------------------|------|-----|-------------------|------|-----|-------------------|------|-----|-------------------|------|-----|-------------------|------|-----|-------------------|------|-----|
| $\mu\text{F}$ | Contents | $\phi D \times L$ | Imp. | mA  | $\phi D \times L$ | Imp. | mA  | $\phi D \times L$ | Imp. | mA  | $\phi D \times L$ | Imp. | mA  | $\phi D \times L$ | Imp. | mA  | $\phi D \times L$ | Imp. | mA  |
| 3.3           | 3R3      |                   |      |     |                   |      |     |                   |      |     |                   |      |     |                   |      |     | 4×5.7             | 5.0  | 30  |
| 4.7           | 4R7      |                   |      |     |                   |      |     |                   |      |     | 4×5.7             | 3.2  | 65  | 4×5.7             | 3.2  | 65  | 4×5.7             | 5.0  | 30  |
| 10            | 100      |                   |      |     |                   |      |     | 4×5.7             | 3.2  | 65  | 5×5.7             | 1.5  | 110 | 5×5.7             | 1.5  | 110 | 5×5.7             | 3.0  | 50  |
| 22            | 220      |                   |      |     | 4×5.7             | 3.2  | 65  | 5×5.7             | 1.5  | 110 | 6.3×5.7           | 0.85 | 170 | 6.3×5.7           | 0.85 | 170 | 6.3×5.7           | 2.0  | 70  |
| 33            | 330      | 4×5.7             | 3.2  | 65  | 5×5.7             | 1.5  | 110 | 6.3×5.7           | 0.85 | 170 | 6.3×5.7           | 0.85 | 170 | 6.3×5.7           | 0.85 | 170 | 8×10              | 0.6  | 300 |
| 47            | 470      | 5×5.7             | 1.5  | 110 | 6.3×5.7           | 0.85 | 170 | 6.3×5.7           | 0.85 | 170 | 6.3×5.7           | 0.85 | 170 | 8×10              | 0.45 | 450 | 8×10              | 0.6  | 300 |
| 100           | 101      | 6.3×5.7           | 0.85 | 170 | 6.3×5.7           | 0.85 | 170 | 8×10              | 0.45 | 450 | 8×10              | 0.45 | 450 | 8×10              | 0.45 | 450 | 8×10              | 0.6  | 300 |
| 150           | 151      | 6.3×5.7           | 0.85 | 170 | 6.3×5.7           | 0.85 | 170 | 8×10              | 0.45 | 450 | 8×10              | 0.45 | 450 | 8×10              | 0.45 | 450 | 10×10             | 0.3  | 500 |
| 220           | 221      | 6.3×5.7           | 0.85 | 170 | 8×10              | 0.45 | 450 | 8×10              | 0.45 | 450 | 8×10              | 0.45 | 450 | 10×10             | 0.25 | 670 |                   |      |     |
| 330           | 331      | 8×10              | 0.45 | 450 | 8×10              | 0.45 | 450 | 8×10              | 0.45 | 450 | 10×10             | 0.25 | 670 |                   |      |     |                   |      |     |
| 470           | 471      | 8×10              | 0.45 | 450 | 8×10              | 0.45 | 450 | 10×10             | 0.25 | 670 |                   |      |     |                   |      |     |                   |      |     |
| 820           | 821      | 10×10             | 0.25 | 670 | 10×10             | 0.25 | 670 |                   |      |     |                   |      |     |                   |      |     |                   |      |     |
| 1,000         | 102      | 10×10             | 0.25 | 670 |                   |      |     |                   |      |     |                   |      |     |                   |      |     |                   |      |     |

## Part Numbering System

|             |                   |                       |               |              |                |                              |
|-------------|-------------------|-----------------------|---------------|--------------|----------------|------------------------------|
| VEH Series  | 470 $\mu\text{F}$ | ±20%                  | 6.3V          | Carrier Tape | 8 $\phi$ × 10L | Pb-free and PET coating case |
| <b>VEH</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 15.



**Стандарт  
Электрон  
Связь**

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

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