

## VZH Series

### Features

- 4  $\phi$  ~ 18  $\phi$ , 105°C, 2,000 ~ 5,000 hours assured
- Large capacitance with ultra low impedance capacitors
- Designed for surface mounting on high density PC board
- RoHS compliance



Marking color: Black

### Specifications

Items	Performance																																
Category Temperature Range	-55°C ~ +105°C																																
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																																
Leakage Current (at 20°C)	$I = 0.01CV$ or 3 ( $\mu$ A) whichever is greater (after 2 minutes) Where, C = rated capacitance in $\mu$ F, V = rated DC working voltage in V																																
Tan $\delta$ (at 120 Hz, 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>80</th> <th>100</th> </tr> </thead> <tbody> <tr> <td>Tan<math>\delta</math> (max)</td> <td>0.30</td> <td>0.26</td> <td>0.22</td> <td>0.16</td> <td>0.13</td> <td>0.10</td> <td>0.08</td> <td>0.08</td> <td>0.07</td> </tr> </tbody> </table> <p>When the capacitance exceeds 1,000<math>\mu</math>F, 0.02 shall be added every 1,000<math>\mu</math>F increase.</p>	Rated Voltage	6.3	10	16	25	35	50	63	80	100	Tan $\delta$ (max)	0.30	0.26	0.22	0.16	0.13	0.10	0.08	0.08	0.07												
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Low Temperature Characteristics (at 120 Hz)	<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>80</th> <th>100</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance Ratio</td> <td>Z(-25°C)/Z(+20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-55°C)/Z(+20°C)</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	Rated Voltage		6.3	10	16	25	35	50	63	80	100	Impedance Ratio	Z(-25°C)/Z(+20°C)	4	3	2	2	2	2	2	2	2	Z(-55°C)/Z(+20°C)	8	5	4	3	3	3	3	3	3
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Endurance	<table border="1"> <thead> <tr> <th>Test Time</th> <td>2,000 Hrs for <math>\phi D \leq 6.3\text{mm}</math> &amp; <math>8 \times 6.5L</math> &amp; <math>10 \phi \times 7.7L</math>; 5,000 Hrs for <math>\phi D \geq 8\text{mm}</math></td> </tr> </thead> <tbody> <tr> <td>Capacitance Change</td> <td>Within <math>\pm 30\%</math> of initial value</td> </tr> <tr> <td>Tan<math>\delta</math></td> <td>Less than 300% of specified value</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 ~ 5,000 hours at 105°C.</p>	Test Time	2,000 Hrs for $\phi D \leq 6.3\text{mm}$ & $8 \times 6.5L$ & $10 \phi \times 7.7L$ ; 5,000 Hrs for $\phi D \geq 8\text{mm}$	Capacitance Change	Within $\pm 30\%$ of initial value	Tan $\delta$	Less than 300% of specified value	Leakage Current	Within specified value																								
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Ripple Current and Frequency Multipliers	<table border="1"> <thead> <tr> <th>Frequency(Hz)</th> <th>50, 60</th> <th>120</th> <th>1k</th> <th>10k up</th> </tr> </thead> <tbody> <tr> <td>Multiplier</td> <td>0.60</td> <td>0.70</td> <td>0.85</td> <td>1.0</td> </tr> </tbody> </table>	Frequency(Hz)	50, 60	120	1k	10k up	Multiplier	0.60	0.70	0.85	1.0																						
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### Diagram of Dimensions

Fig. 1

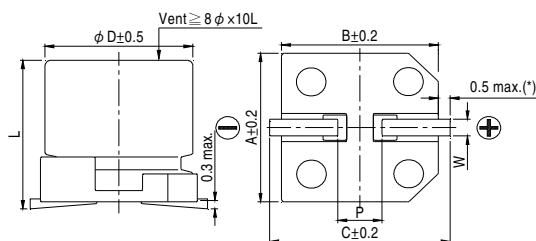
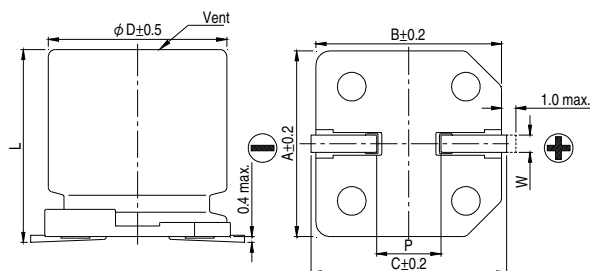


Fig. 2



### Lead Spacing and Diameter

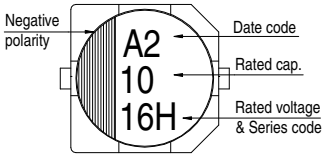
Unit: mm

$\phi D$	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	8.3	8.3	9.0	0.5 ~ 0.8	2.3	1
8	10 $\pm$ 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1	1
10	7.7 $\pm$ 0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
10	10 $\pm$ 0.5	10.3	10.3	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

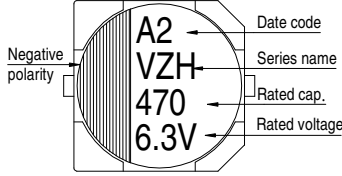
(\*): For 4 ~ 6.3  $\phi$  is 0.4 max.

### Marking

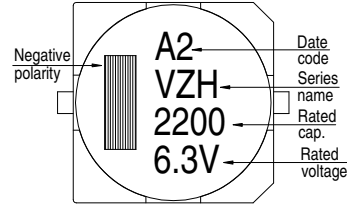
$\phi D \leq 6.3 \text{ mm}$



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



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



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

Rated Volt. (V <sub>DC</sub> )		6.3V (0J)			10V (1A)			16V (1C)			25V (1E)			35V (1V)			50V (1H)											
Cap. (μF)	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									
1	010																4×5.7	2.9	60									
2.2	2R2																4×5.7	2.9	60									
3.3	3R3																4×5.7	2.9	60									
4.7	4R7													4×5.7	1.35	80	5×5.7	1.52	85									
10	100							4×5.7	1.35	80	4×5.7	1.35	80	5×5.7	0.80	150	6.3×5.7	0.88	165									
22	220	4×5.7	1.35	80	4×5.7	1.35	80	5×5.7	0.80	150	5×5.7	0.80	150	6.3×5.7	0.44	230	6.3×5.7	0.88	165									
33	330	4×5.7	1.35	80	5×5.7	0.80	150	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×7.7	0.68	185									
47	470	5×5.7	0.80	150	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×7.7	0.68	185									
68	680										6.3×5.7	0.44	230	8×6.5	0.36	280	8×10	0.34	369									
100	101	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×7.7	0.36	280	8×10	0.17	450	10×10	0.18	553									
150	151	6.3×5.7	0.44	230	6.3×5.7	0.44	230	6.3×7.7	0.36	280	8×6.5	0.36	280	8×10	0.17	450	10×10	0.18	553									
220	221	6.3×5.7	0.44	230	6.3×7.7	0.36	280	8×6.5	0.36	280	6.3×7.7	0.36	280	8×10	0.17	450	10×10	0.09	670	12.5×13.5	0.12	650						
330	331	8×6.5	0.36	280	8×10	0.17	450	10×7.7	0.17	450	8×10	0.17	450	10×7.7	0.17	450	8×10	0.17	450	10×10	0.09	670	12.5×13.5	0.070	820			
470	471	8×10	0.17	450	8×10	0.17	450	10×7.7	0.17	450	8×10	0.17	450	10×7.7	0.17	450	10×10	0.09	670	10×10	0.09	670	12.5×16	0.060	950	16×16.5	0.073	1,000
680	681	8×10	0.17	450	10×7.7	0.17	450	10×10	0.09	670	8×10	0.17	450	10×10	0.09	670	12.5×13.5	0.070	820	12.5×16	0.060	950	16×16.5	0.073	1,000	16×16.5	0.073	1,000
1,000	102	8×10	0.17	450	10×10	0.09	670	10×10	0.09	670	12.5×13.5	0.070	820	12.5×16	0.060	950	16×16.5	0.054	1,260	16×16.5	0.054	1,260	18×16.5	0.048	1,500	18×16.5	0.066	1,500
1,500	152	10×10	0.09	670	12.5×13.5	0.070	820	12.5×16	0.060	950	12.5×16	0.060	950	16×16.5	0.054	1,260	16×16.5	0.054	1,260	16×16.5	0.054	1,260	18×16.5	0.048	1,500	18×16.5	0.038	1,630
2,200	222	12.5×13.5	0.070	820	12.5×16	0.060	950	16×16.5	0.054	1,260	16×16.5	0.054	1,260	16×16.5	0.054	1,260	18×16.5	0.048	1,500	16×16.5	0.054	1,260	18×16.5	0.048	1,500	18×16.5	0.038	1,630
3,300	332	12.5×16	0.060	950	16×16.5	0.054	1,260	16×16.5	0.054	1,260	16×16.5	0.054	1,260	16×16.5	0.054	1,260	18×16.5	0.048	1,500	16×16.5	0.054	1,260	18×16.5	0.048	1,500	18×16.5	0.038	1,630
4,700	472	16×16.5	0.054	1,260	16×16.5	0.054	1,260	18×16.5	0.048	1,500	16×16.5	0.054	1,260	18×16.5	0.048	1,500	16×16.5	0.054	1,260	16×16.5	0.054	1,260	18×16.5	0.048	1,500	18×16.5	0.038	1,630
6,800	682	18×16.5	0.048	1,500	16×21.5	0.038	1,630	18×16.5	0.048	1,500	16×16.5	0.054	1,260	18×16.5	0.048	1,500	16×16.5	0.054	1,260	16×16.5	0.054	1,260	18×16.5	0.048	1,500	18×16.5	0.038	1,630
8,200	822	18×16.5	0.048	1,500	16×21.5	0.038	1,630	18×16.5	0.048	1,500	16×16.5	0.054	1,260	18×16.5	0.048	1,500	16×16.5	0.054	1,260	16×16.5	0.054	1,260	18×16.5	0.048	1,500	18×16.5	0.038	1,630



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

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

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

### Dimension and Permissible Ripple Current

Rated Volt. (Vdc)		63V (1J)			80V (1K)			100V (2A)		
Cap. ( $\mu$ F)	Contents	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA	$\phi D \times L$	Imp.	mA
4.7	4R7	5×5.7	1.90	70						
10	100	6.3×5.7	1.20	130						
22	220	6.3×7.7	0.90	150	8×10	1.3	130	8×10	1.3	130
33	330	8×10	0.50	280	8×10	1.3	130	10×10	0.7	200
47	470	8×10	0.50	280	10×10	0.7	200	10×10	0.7	200
100	101	10×10	0.25	450	10×10	0.7	200	12.5×13.5	0.32	450
150	151	12.5×13.5	0.15	700	12.5×13.5	0.32	450	16×16.5	0.17	650
220	221	12.5×13.5	0.15	700	16×16.5	0.17	650	16×16.5	0.17	650
								18×21.5	0.15	950
330	331	16×16.5	0.082	900	16×16.5	0.17	650	18×16.5	0.15	850
								16×21.5	0.15	900
470	471	16×16.5	0.082	900	16×21.5	0.15	900	18×21.5	0.15	950
680	681	18×16.5	0.080	1,150	18×21.5	0.15	950			
		16×21.5	0.080	1,150						
1,000	102	18×21.5	0.06	1,250						

### Part Numbering System

VZH Series 470 $\mu$ F

$\pm 20\%$

6.3V

Carrier Tape

8 $\phi$  × 10L

Pb-free and PET coating case

**VZH**

**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 15.