



**THE DATASHEET OF  
VZH471M1ETR-1010CS**



### 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
- AEC-Q200 qualified



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 (μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF, V = rated DC working voltage in V																																
Tanδ (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>Tanδ (max)</td> <td>0.30</td> <td>0.26</td> <td>0.22</td> <td>0.16</td> <td>0.13</td> <td>0.10</td> <td>0.08</td> <td>0.08</td> <td>0.07</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	80	100	Tanδ (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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Ripple Current and Frequency Multipliers	<table border="1"> <tbody> <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>0.60</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

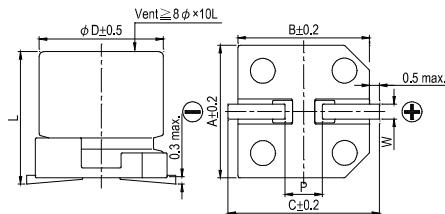
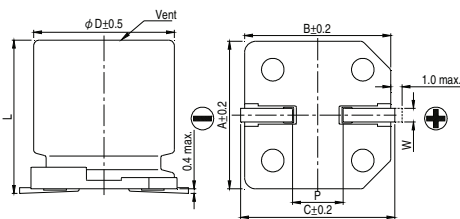


Fig. 2



### Lead Spacing and Diameter

Unit: mm

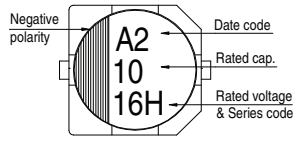
$\phi D$	L	A	B	C	W	P ± 0.2	Fig. No.
4	5.7 ± 0.3	4.3	4.3	5.1	0.5 ~ 0.8	1.0	1
5	5.7 ± 0.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5	1
6.3	5.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0	1
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0	1
8	6.5 ± 0.3	8.3	8.3	9.0	0.5 ~ 0.8	2.3	1
8	10 ± 0.5	8.3	8.3	9.0	0.7 ~ 1.1	3.1	1
10	7.7 ± 0.3	10.3	10.3	11.0	0.7 ~ 1.3	4.7	1
10	10 ± 0.5	10.3	10.3	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

All product specifications in the catalog are subject to change without notice. (Cat. 2023E1)

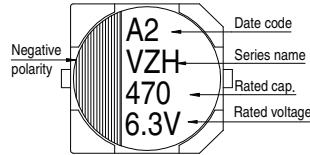
115

### Marking

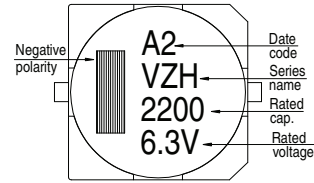
$\phi D \leq 6.3 \text{ mm}$



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



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



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> )	Cap. (μF)	Contents	6.3V (0J)			10V (1A)			16V (1C)			25V (1E)			35V (1V)			50V (1H)							
			$\phi D \times L$	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																			4x5.7	2.9	60			
2.2	2R2																			4x5.7	2.9	60			
3.3	3R3																			4x5.7	2.9	60			
4.7	4R7																		4x5.7	1.35	80	5x5.7	1.52	85	
10	100									4x5.7	1.35	80	4x5.7	1.35	80	5x5.7	0.80	150	6.3x5.7	0.88	165				
22	220	4x5.7	1.35	80	4x5.7	1.35	80	5x5.7	0.80	150	5x5.7	0.80	150	6.3x5.7	0.44	230	6.3x5.7	0.44	230	6.3x5.7	0.88	165			
33	330	4x5.7	1.35	80	5x5.7	0.80	150	6.3x5.7	0.44	230	6.3x5.7	0.44	230	6.3x5.7	0.44	230	6.3x5.7	0.44	230	6.3x7.7	0.68	185			
47	470	5x5.7	0.80	150	6.3x5.7	0.44	230	6.3x5.7	0.44	230	6.3x5.7	0.44	230	6.3x5.7	0.44	230	6.3x5.7	0.44	230	6.3x7.7	0.68	185	8x6.5	0.68	185
68	680												6.3x5.7	0.44	230	8x6.5	0.36	280	8x10	0.34	369				
100	101	6.3x5.7	0.44	230	6.3x5.7	0.44	230	6.3x5.7	0.44	230	6.3x7.7	0.36	280	8x6.5	0.36	280	8x10	0.17	450	8x10	0.34	369	8x10	0.34	369
150	151	6.3x5.7	0.44	230	6.3x5.7	0.44	230	6.3x7.7	0.36	280	8x6.5	0.36	280	8x10	0.17	450	8x10	0.17	450	10x10	0.18	553	10x10	0.18	553
220	221	6.3x5.7	0.44	230	6.3x7.7	0.36	280	6.3x7.7	0.36	280	6.3x7.7	0.36	280	8x10	0.17	450	8x10	0.17	450	10x10	0.12	650	12.5x13.5	0.12	650
330	331	8x6.5	0.36	280	8x10	0.17	450	8x10	0.17	450	8x10	0.17	450	8x10	0.17	450	8x10	0.17	450	10x10	0.090	670	12.5x13.5	0.12	650
470	471	8x10	0.17	450	8x10	0.17	450	8x10	0.17	450	8x10	0.17	450	10x10	0.09	670	10x10	0.09	670	10x10	0.070	820	12.5x13.5	0.070	820
680	681	8x10	0.17	450	8x10	0.17	450	8x10	0.17	450	8x10	0.17	450	10x10	0.09	670	10x10	0.09	670	12.5x13.5	0.070	820	12.5x16	0.060	950
1,000	102	8x10	0.17	450	10x10	0.09	670	10x10	0.09	670	10x10	0.09	670	12.5x13.5	0.070	820	12.5x16	0.060	950	16x16.5	0.054	1,260	16x16.5	0.073	1,000
1,500	152	10x10	0.09	670	12.5x13.5	0.070	820	12.5x16	0.060	950	12.5x16	0.060	950	16x16.5	0.054	1,260	16x16.5	0.054	1,260	16x16.5	0.054	1,260	18x16.5	0.048	1,500
2,200	222	12.5x13.5	0.070	820	12.5x16	0.060	950	16x16.5	0.054	1,260	16x16.5	0.054	1,260	16x16.5	0.054	1,260	18x21.5	0.038	1,630	18x21.5	0.038	1,630	18x21.5	0.038	1,630
3,300	332	12.5x16	0.060	950	16x16.5	0.054	1,260	16x16.5	0.054	1,260	16x16.5	0.054	1,260	18x21.5	0.038	1,630	18x21.5	0.038	1,630	18x21.5	0.038	1,630	18x21.5	0.038	1,630
4,700	472	16x16.5	0.054	1,260	16x16.5	0.054	1,260	16x16.5	0.054	1,260	18x16.5	0.048	1,500	16x21.5	0.038	1,630	18x21.5	0.038	1,630	18x21.5	0.038	1,630	18x21.5	0.038	1,630
6,800	682	18x16.5	0.048	1,500	18x16.5	0.048	1,500	18x16.5	0.048	1,500	18x16.5	0.048	1,500	18x21.5	0.038	1,630	18x21.5	0.038	1,630	18x21.5	0.038	1,630	18x21.5	0.038	1,630
8,200	822	18x16.5	0.048	1,500	18x16.5	0.048	1,500	18x16.5	0.048	1,500	18x21.5	0.038	1,630	18x21.5	0.038	1,630	18x21.5	0.038	1,630	18x21.5	0.038	1,630	18x21.5	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. (Voc)		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 18×21.5	0.17 0.15	650 950
330	331	16×16.5	0.082	900	16×16.5	0.17	650	18×16.5 16×21.5	0.15 0.15	850 900
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 16×21.5	0.080 0.080	1,150 1,150	18×21.5	0.15	950			
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

**VZH**    **471**    **M**    **0J**    **TR**    -    **0810**

Series Name    Capacitance    Capacitance Tolerance    Rated Voltage    Package Type    Terminal Type    Case Size

**XX**  
**S** = Standard  
**KS** = AEC-Q200 Qualified, Safety Critical Application  
**LS** = AEC-Q200 Qualified, Non-Safety Critical Application

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