

VZH Series

Features

- 4 ϕ ~ 18 ϕ , 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 Parts Available: Use "LS" or "KS" Suffix



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><tr><td>Rated Voltage</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>80</td><td>100</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>0.10</td><td>0.08</td><td>0.08</td><td>0.07</td></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.	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												
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																								
Low Temperature Characteristics (at 120 Hz)	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><td>63</td><td>80</td><td>100</td></tr><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></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
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																							
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Endurance	<table><tr><td>Test Time</td><td>2,000 Hrs for ϕ D ≤ 6.3mm & 8×6.5L & 10 ϕ ×7.7L; 5,000 Hrs for ϕ D ≥ 8mm</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * 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.	Test Time	2,000 Hrs for ϕ D ≤ 6.3mm & 8×6.5L & 10 ϕ ×7.7L; 5,000 Hrs for ϕ D ≥ 8mm	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value																								
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Shelf Life Test	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±30% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied.	Test Time	1,000 Hrs	Capacitance Change	Within ±30% of initial value	Tanδ	Less than 300% of specified value	Leakage Current	Within specified value																								
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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>0.60</td><td>0.70</td><td>0.85</td><td>1.0</td></tr></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

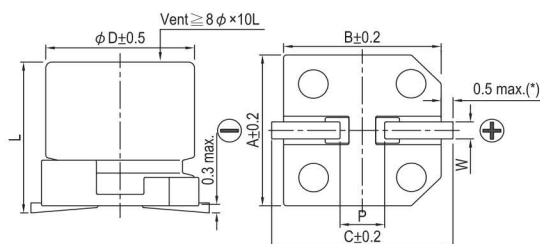
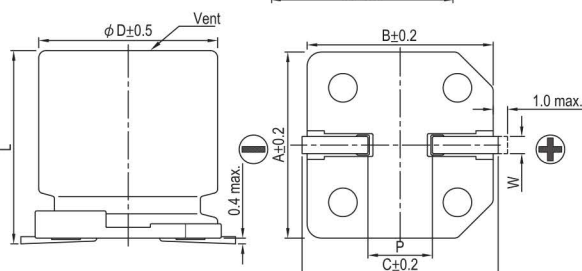


Fig. 2



Lead Spacing and Diameter

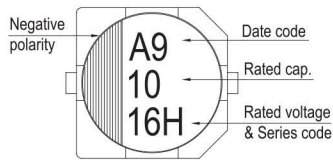
Unit: mm

φ 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

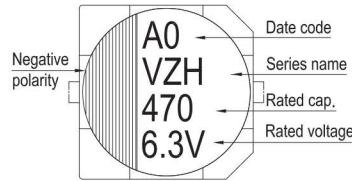
(*): For 4 ~ 6.3φ is 0.4 max.

Marking

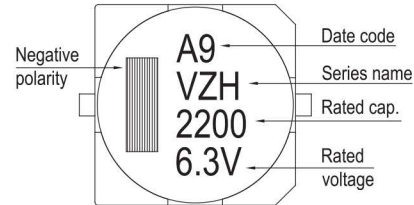
$\phi D \leq 6.3\text{mm}$



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



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



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

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

Impedance: Ω at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (Voc)	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																	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	2.9	60
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	8×10	0.34	369
150	151		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	8×10	0.17	450	10×10	0.18	553
220	221		6.3×7.7	0.36	280	6.3×7.7	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	8×10	0.17	450	8×10	0.17	450	10×10	0.090	670	12.5×13.5	0.12	650
470	471		8×10	0.17	450	8×10	0.17	450	8×10	0.17	450	10×10	0.09	670	12.5×13.5	0.070	820	12.5×16	0.060	950
680	681		10×7.7	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
1,000	102		8×10	0.17	450	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	0.073	1,000
1,500	152		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	18×16.5	0.048	1,500	18×16.5	0.066	1,500
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	18×21.5	0.038	1,630	18×21.5	0.05	1,620
3,300	332		12.5×16	0.060	950	16×16.5	0.054	1,260	16×16.5	0.054	1,260	16×21.5	0.038	1,630	18×21.5	0.038	1,750			
4,700	472		16×16.5	0.054	1,260	16×16.5	0.054	1,260	18×16.5	0.048	1,500									
6,800	682		18×16.5	0.048	1,500	18×16.5	0.048	1,500	16×21.5	0.038	1,630									
8,200	822		18×16.5	0.048	1,500	18×16.5	0.048	1,500												

SMD

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

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

Impedance: Ω / at 100k Hz, 20°C

Dimension and Permissible Ripple Current

Rated Volt. (Vdc)		63V (1J)			80V (1K)			100V (2A)		
Cap. (μF)	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	470μF	±20%	6.3V	Carrier Tape	8 ϕ × 10L	Pb-free and PET coating case
VZH	471	M	0J	TR	-	S
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case size
						Lead Wire and Coating Type

For automotive application, please replace "S" suffix with an "LS" or "KS" suffix, for non-safety critical and safety critical applications respectively

Note: For more details, please refer to "Part Numbering System (SMD Type)" on page 15.