

VE Series

Features

- 3φ ~ 18φ, 85°C, 2,000 hours assured
- Chip type large capacitance capacitors
- Designed for surface mounting on high density PC board
- RoHS compliance
- AEC-Q200 Parts Available: Replace "S" Suffix with "KS" or "LS" Suffix



Marking color: Black

Specifications

Items	Performance																																				
Category Temperature Range	-40°C ~ +85°C																																				
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																																				
Leakage Current (at 20°C)	<table border="1"> <tr> <td>Rated Voltage</td> <td colspan="2">6.3 ~ 100V</td> <td>160 ~ 450V</td> </tr> <tr> <td>Time</td> <td colspan="2">after 2 minutes</td> <td>after 5 minutes</td> </tr> <tr> <td>Case size</td> <td>3 ~ 10φ</td> <td>12.5 ~ 18φ</td> <td>12.5 ~ 18φ</td> </tr> <tr> <td>Leakage Current</td> <td colspan="2">I = 0.01CV or 3μA, whichever is greater</td> <td>I = 0.03CV or 4μA, whichever is greater</td> </tr> </table>	Rated Voltage	6.3 ~ 100V		160 ~ 450V	Time	after 2 minutes		after 5 minutes	Case size	3 ~ 10φ	12.5 ~ 18φ	12.5 ~ 18φ	Leakage Current	I = 0.01CV or 3μA, whichever is greater		I = 0.03CV or 4μA, whichever is greater																				
	Rated Voltage	6.3 ~ 100V		160 ~ 450V																																	
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	Case size	3 ~ 10φ	12.5 ~ 18φ	12.5 ~ 18φ																																	
Leakage Current	I = 0.01CV or 3μA, whichever is greater		I = 0.03CV or 4μA, whichever is greater																																		
Where, C = rated capacitance in μF, V = rated DC working voltage in V																																					
Tanδ (at 120 Hz, 20°C)	<table border="1"> <tr> <td>Rated Voltage</td> <td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160 ~ 250</td><td>400 ~ 450</td> </tr> <tr> <td>3 ~ 10φ</td> <td>0.42</td><td>0.28</td><td>0.24</td><td>0.20</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.10</td><td>0.10</td><td>-</td><td>-</td> </tr> <tr> <td>12.5 ~ 18φ</td> <td>-</td><td>0.38</td><td>0.34</td><td>0.30</td><td>0.26</td><td>0.22</td><td>0.18</td><td>0.14</td><td>0.10</td><td>0.20</td><td>0.25</td> </tr> </table>	Rated Voltage	4	6.3	10	16	25	35	50	63	100	160 ~ 250	400 ~ 450	3 ~ 10φ	0.42	0.28	0.24	0.20	0.14	0.12	0.10	0.10	0.10	-	-	12.5 ~ 18φ	-	0.38	0.34	0.30	0.26	0.22	0.18	0.14	0.10	0.20	0.25
	Rated Voltage	4	6.3	10	16	25	35	50	63	100	160 ~ 250	400 ~ 450																									
	3 ~ 10φ	0.42	0.28	0.24	0.20	0.14	0.12	0.10	0.10	0.10	-	-																									
12.5 ~ 18φ	-	0.38	0.34	0.30	0.26	0.22	0.18	0.14	0.10	0.20	0.25																										
When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.																																					
Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below.																																				
	Impedance Ratio	Rated Voltage		4.0	6.3	10	16	25	35	50	63	100	160 ~ 250	400 ~ 450																							
		Z(-25°C)	φD < 12.5	7	4	4	3	2	2	2	2	2	-	-																							
		/Z(+20°C)	φD ≥ 12.5	-	5	5	4	2	2	2	2	2	3	6																							
Z(-40°C)		φD < 12.5	15	8	5	4	3	3	3	3	3	-	-																								
		/Z(+20°C)	φD ≥ 12.5	-	14	12	10	5	4	3	3	6	10																								
Endurance	Test Time	2,000 Hrs																																			
	Capacitance Change	Within ±20% of initial value (4V: ±30%)																																			
	Tanδ	Less than 200% of specified value (4V: <300%)																																			
	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 85°C.																																				
Shelf Life Test	Test time: 1,000 hours; other items are the same as those for the Endurance. 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 and Frequency Multipliers	Freq. (Hz)		50	120	1k	10k up																															
	Cap. (μF)	≤ 1,000	0.80	1.00	1.25	1.40																															
		1,000 < C ≤ 10,000	0.85	1.00	1.15	1.25																															

Diagram of Dimensions

Fig. 1

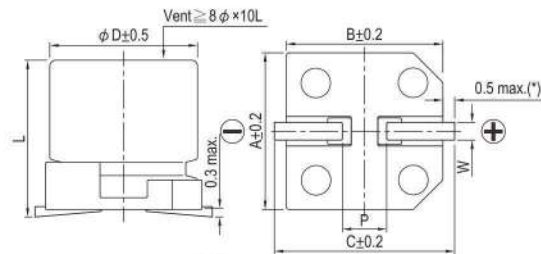
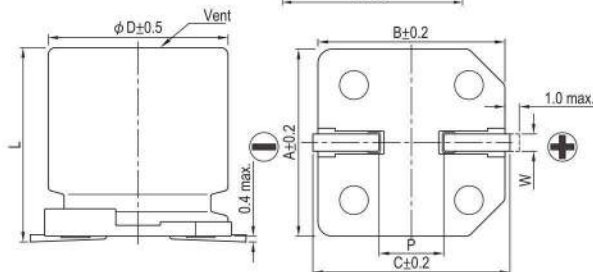


Fig. 2



Lead Spacing and Diameter

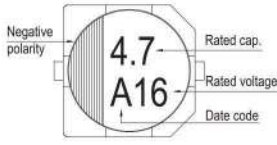
Unit: mm

φD	L	A	B	C	W	P ± 0.2	Fig. No.
3	5.3 ± 0.2	3.3	3.3	4.1	0.45 ~ 0.75	0.8	1
4	5.3 ± 0.2	4.3	4.3	5.1	0.5 ~ 0.8	1.0	1
5	5.3 ± 0.2	5.3	5.3	5.9	0.5 ~ 0.8	1.5	1
6.3	5.3 ± 0.2	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

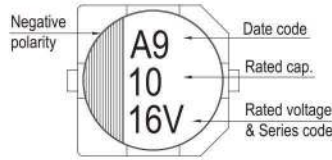
(*): For 3 ~ 6.3φ is 0.4 max.

Marking

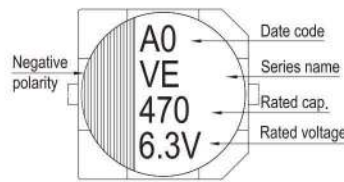
φ D = 3 mm



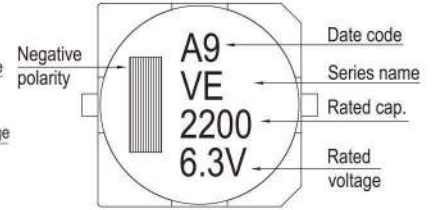
φ D = 4 ~ 6.3 mm



φ D = 8 ~ 10 mm



φ D ≥ 12.5 mm



Dimension: φ D × L (mm)

Ripple Current: mA/rms at 120 Hz, 85°C

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC}) Cap. (μF) - Contents	4V (0G)		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63 (1J)		
	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	
1 010														4×5.3	10	4×5.3	8
2.2 2R2														4×5.3	14	4×5.3	12
3.3 3R3										3×5.3	14	3×5.3	14	4×5.3	17	5×5.3	22
4.7 4R7					3×5.3	14	3×5.3	14	4×5.3	26	4×5.3	26	4×5.3	20	5×5.3	25	
10 100			3×5.3	16	4×5.3	26	4×5.3	26	5×5.3	44	5×5.3	44	5×5.3	35	6.3×5.3 8×6.5	40 46	
22 220	3×5.3	16	4×5.3	26	5×5.3	44	4×5.3 5×5.3	30 44	5×5.3 6.3×5.3	47 59	5×5.3 6.3×5.3	47 59	6.3×5.3 6.3×7.7	50 65	8×10	139	
33 330	4×5.3	31	4×5.3	31	4×5.3 5×5.3	31 55	5×5.3	55	5×5.3 6.3×5.3	55 67	6.3×5.3 6.3×7.7	67 85	6.3×7.7 8×6.5	75 95	8×10	139	
47 470	4×5.3	34	4×5.3 5×5.3	34 55	6.3×5.3	75	5×5.3 6.3×5.3	55 75	6.3×5.3 6.3×7.7	75 98	6.3×7.7 8×6.5	98 105	6.3×7.7 8×10	75 190	10×10	200	
68 680	5×5.3	58	5×5.3 6.3×5.3	58 89	5×5.3 6.3×5.3	58 89	6.3×5.3	89	6.3×7.7	109	6.3×7.7	109	8×10	190	10×10	226	
100 101	5×5.3 6.3×5.3	58 89	6.3×5.3	89	6.3×5.3 6.3×7.7	89 109	6.3×5.3 6.3×7.7 8×6.5	89 109 125	6.3×7.7 8×6.5	109 125	8×10	252	8×10	190	10×10	226	
150 151											10×7.7	252					
220 221	6.3×5.3 6.3×7.7	89 124	6.3×5.3 6.3×7.7	89 124	6.3×7.7 8×6.5 8×10	124 175 270	6.3×7.7 8×10	124 270	8×10 10×7.7	270 270	8×10 10×10	270 370	10×10	320	12.5×13.5	500	
330 331	6.3×7.7	124	6.3×7.7 8×6.5	124 190	8×10	290	8×10 10×7.7	290 290	10×10	400	10×10	400	12.5×13.5	600	12.5×16	600	
470 471	8×10	290	8×10	290	10×7.7 10×10	290 400	10×10	400	10×10	400	12.5×13.5	680	12.5×16	740	16×16.5	850	
680 681			10×7.7	290	10×10	410	10×10	410	12.5×13.5	680	12.5×13.5	680	16×16.5	1,000	18×16.5	1,100	
1,000 102			10×10	430	10×10	430	12.5×13.5	750	12.5×13.5	750	16×16.5	1,100	18×16.5 16×21.5	1,350 1,400			
2,200 222			12.5×13.5	890	12.5×13.5	890	16×16.5	1,100	16×16.5	1,100	18×16.5 16×21.5	1,450 1,500					
3,300 332			12.5×16	1,000	16×16.5	1,300	16×16.5	1,300	18×16.5 16×21.5	1,450 1,500	18×21.5	1,750					
4,700 472			16×16.5	1,400	16×16.5	1,400	18×16.5 16×21.5	1,600 1,650	18×21.5	1,750							
6,800 682			18×16.5 16×21.5	1,700 1,750	18×16.5 16×21.5	1,700 1,750	18×21.5	2,000									
10,000 103			18×21.5	2,000	18×21.5	2,000											

Rated Volt. (V _{DC}) Cap. (μF) - Contents	100V (2A)		160V (2C)		200V (2D)		250V (2E)		400V (2G)		450V (2W)	
	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA	φ D×L	mA
4.7 4R7									12.5×13.5	120	12.5×13.5	120
10 100	8×10	90					12.5×13.5	150	12.5×13.5	120	12.5×16	130
22 220	8×10	90			12.5×13.5	240	12.5×13.5	150	16×16.5	140	16×16.5	140
33 330	10×10	120	12.5×13.5	290	12.5×16	310	12.5×16	240	16×16.5	140	18×16.5	180
47 470	10×10	120	12.5×16	370	16×16.5	420	16×16.5	340	18×16.5	280	18×21.5	250
68 680	12.5×13.5	380	16×16.5	500	16×16.5	420	18×16.5 16×21.5	440 450	18×21.5	350		
100 101	12.5×13.5	440	18×16.5 16×21.5	650 690	18×16.5 16×21.5	550 590	18×21.5	490				
220 221	16×16.5	600										
330 331	18×16.5 16×21.5	780 850										

Part Numbering System



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