



VE Series

Features

- 3 ϕ ~ 18 ϕ , 85°C, 2,000 hours assured
- Chip type large capacitance capacitors
- Designed for surface mounting on high density PC board
- RoHS compliance



Marking color: Black

Specifications

Items	Performance																																															
Category Temperature Range	-40℃ ~ +85℃																																															
Capacitance Tolerance	±20% (at 120 Hz, 20℃)																																															
Leakage Current (at 20℃)	Rated Voltage		6.3 ~ 100V						160 ~ 450V																																							
	Time		after 2 minutes						after 5 minutes																																							
	Case size		3 ~ 10 ϕ			12.5 ~ 18 ϕ			12.5 ~ 18 ϕ																																							
	Leakage Current		I = 0.01CV or 3μA, whichever is greater			I = 0.03CV or 4μA, whichever is greater			I = 0.04CV +100μA																																							
	Where, C = rated capacitance in μF, V = rated DC working voltage in V																																															
Tanδ (at 120 Hz, 20℃)	<table><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 ~ 10 ϕ</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 ~ 18 ϕ</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 ~ 10 ϕ	0.42	0.28	0.24	0.20	0.14	0.12	0.10	0.10	0.10	-	-	12.5 ~ 18 ϕ	-	0.38	0.34	0.30	0.26	0.22	0.18	0.14	0.10	0.20	0.25
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12.5 ~ 18 ϕ	-	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.																																															
	Rated Voltage		4.0	6.3	10	16	25	35	50	63	100	160 ~ 250	400 ~ 450																																			
	Impedance Ratio	Z(-25℃)	ϕ D < 12.5	7	4	4	3	2	2	2	2	-	-																																			
		/Z(+20℃)	ϕ D ≥ 12.5	-	5	5	4	2	2	2	2	3	6																																			
		Z(-40℃)	ϕ D < 12.5	15	8	5	4	3	3	3	3	-	-																																			
/Z(+20℃)		ϕ D ≥ 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℃after the rated voltage applied for 2,000 hours at 85℃.																																															
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	<table><tr><td colspan="2">Freq. (Hz)</td><td>50</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Cap. (μF)</td><td>≤ 1,000</td><td>0.80</td><td>1.00</td><td>1.25</td><td>1.40</td></tr><tr><td></td><td>1,000 < C ≤ 10,000</td><td>0.85</td><td>1.00</td><td>1.15</td><td>1.25</td></tr></table>												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																		
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Diagram of Dimensions

Fig. 1

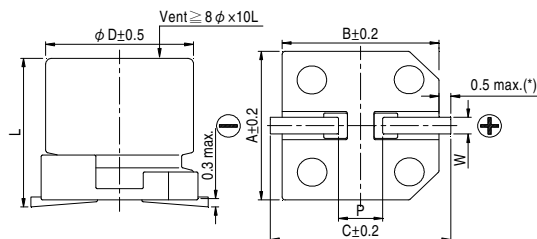
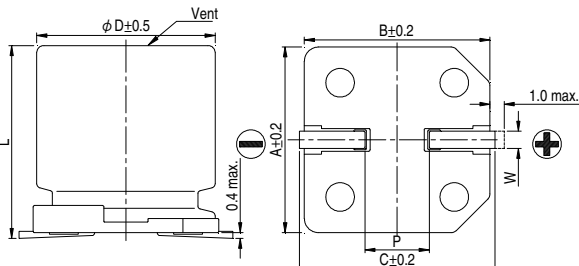


Fig. 2



Lead Spacing and Diameter

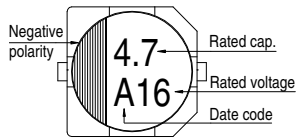
Unit: mm

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

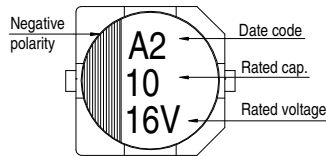
(*) For 3 ~ 6.3 ϕ is 0.4 max.

Marking

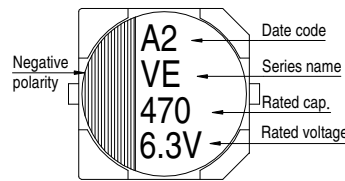
φ D = 3 mm



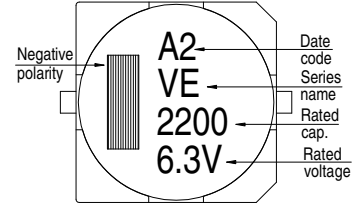
φ D = 4 ~ 6.3 mm



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})	4V (0G)	6.3V (0J)	10V (1A)	16V (1C)	25V (1E)	35V (1V)	50V (1H)	63 (1J)
Cap. (μF) Contents	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 40 8×6.5 46
22 220	3×5.3 16	4×5.3 26	5×5.3 44	4×5.3 30 5×5.3 44	5×5.3 47 6.3×5.3 59	5×5.3 47 6.3×5.3 59	6.3×5.3 50 6.3×7.7 65	8×10 139
33 330	4×5.3 31	4×5.3 31	4×5.3 31 5×5.3 55	5×5.3 55	5×5.3 55 6.3×5.3 67	6.3×5.3 67 6.3×7.7 85	6.3×7.7 75 8×6.5 95	8×10 139
47 470	4×5.3 34	4×5.3 34 5×5.3 55	6.3×5.3 75	5×5.3 55 6.3×5.3 75	6.3×5.3 75 6.3×7.7 98	6.3×7.7 98 8×6.5 105	6.3×7.7 75 8×10 190	10×10 200
68 680	5×5.3 58	5×5.3 58 6.3×5.3 89	5×5.3 58 6.3×5.3 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 58 6.3×5.3 89	6.3×5.3 89	6.3×5.3 89 6.3×7.7 109	6.3×5.3 89 6.3×7.7 109	6.3×7.7 109 8×6.5 125	8×10 252	8×10 190	10×10 226
150 151						10×7.7 252		
220 221	6.3×5.3 89 6.3×7.7 124	6.3×5.3 89 6.3×7.7 124	6.3×7.7 124 8×6.5 175 8×10 270	6.3×7.7 124 8×10 270	8×10 270 10×7.7 270	8×10 270 10×10 370	10×10 320	12.5×13.5 500
330 331	6.3×7.7 124	6.3×7.7 124 8×6.5 190	8×10 290	8×10 290 10×7.7 290	10×10 400	10×10 400	12.5×13.5 600	12.5×16 600
470 471	8×10 290	8×10 290	10×7.7 290 10×10 400	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 1,350 16×21.5 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 1,450 16×21.5 1,500		
3,300 332		12.5×16 1,000	16×16.5 1,300	16×16.5 1,300	18×16.5 1,600 16×21.5 1,650	18×21.5 1,750		
4,700 472		16×16.5 1,400	16×16.5 1,400	18×16.5 1,600 16×21.5 1,650	18×21.5 1,750			
6,800 682		18×16.5 1,700 16×21.5 1,750	18×16.5 1,700 16×21.5 1,750	18×21.5 2,000				
10,000 103		18×21.5 2,000	18×21.5 2,000					

Rated Volt. (V _{DC})	100V (2A)	160V (2C)	200V (2D)	250V (2E)	400V (2G)	450V (2W)
Cap. (μF) Contents	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	18×16.5 440 16×21.5 450	18×21.5 350	
100 101	12.5×13.5 440	18×16.5 650 16×21.5 690	18×16.5 550 16×21.5 590	18×21.5 490		
220 221	16×16.5 600					
330 331	18×16.5 780 16×21.5 850					

Part Numbering System

VE Series 470μF ±20% 6.3V Carrier Tape 8φ×10L Pb-free and PET coating case

VE- **471** **M** **0J** **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.