



VES Series

Features

- 4 ϕ ~ 6.3 ϕ , 105°C, 1,000 hours assured
- Vertical chip type miniaturized for 4.5 / 5.3mm high capacitor
- Designed for surface mounting on high density PC board
- RoHS compliant, AEC-Q200 compliant

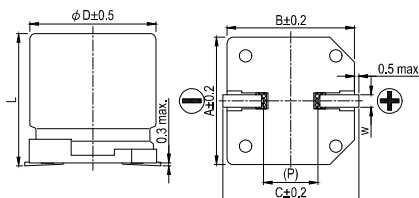


Marking color: Black

Specifications

Items	Performance																														
Category Temperature Range	-55℃ ~ +105℃																														
Capacitance Tolerance	± 20% (at 120 Hz, 20℃)																														
Leakage Current (at 20℃)	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℃)	<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></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>0.12</td></tr></table>							Rated Voltage	6.3	10	16	25	35	50	Tanδ (max.)	0.30	0.26	0.22	0.16	0.13	0.12										
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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></tr><tr><td>Impedance</td><td>Z(-25℃) / Z(+20℃)</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Ratio</td><td>Z(-55℃) / Z(+20℃)</td><td>8</td><td>5</td><td>4</td><td>3</td><td>3</td><td>3</td></tr></table>							Rated Voltage		6.3	10	16	25	35	50	Impedance	Z(-25℃) / Z(+20℃)	4	3	2	2	2	2	Ratio	Z(-55℃) / Z(+20℃)	8	5	4	3	3	3
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Endurance	<table><tr><td>Test Time</td><td>1,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ± 25% of initial value for 4.5 mmL Within ± 20% of initial value for 5.3 mmL</td></tr><tr><td>Tanδ</td><td>Less than 300% of specified value for 4.5 mmL Less than 200% of specified value for 5.3 mmL</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied for 1,000 hours at 105℃.</p>							Test Time	1,000 Hrs	Capacitance Change	Within ± 25% of initial value for 4.5 mmL Within ± 20% of initial value for 5.3 mmL	Tanδ	Less than 300% of specified value for 4.5 mmL Less than 200% of specified value for 5.3 mmL	Leakage Current	Within specified value																
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Shelf Life Test	Test time: 1,000 hours; other items are the same as those for the Endurance.																														
Ripple Current and Frequency Multipliers	<table><tr><td>Frequency (Hz)</td><td>50</td><td>120</td><td>1k</td><td>10k up</td></tr><tr><td>Multiplier</td><td>0.7</td><td>1.0</td><td>1.3</td><td>1.4</td></tr></table>							Frequency (Hz)	50	120	1k	10k up	Multiplier	0.7	1.0	1.3	1.4														
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Diagram of Dimensions



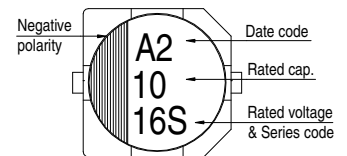
Lead Spacing and Diameter

Unit: mm

φ D	L ± 0.2	A	B	C	W	P
4	4.5 / 5.3	4.3	4.3	5.1	0.5 ~ 0.8	1.0
5	4.5 / 5.3	5.3	5.3	5.9	0.5 ~ 0.8	1.5
6.3	4.5 / 5.3	6.6	6.6	7.2	0.5 ~ 0.8	2.0

The diagram is marking "()" for reference dimension.

Marking



Dimension and Permissible Ripple Current

Dimension: φ D × L(mm)

Ripple Current: mA/rms at 120 Hz, 105°C

Rated Volt. (V _{DC})		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)	
Cap. (μF)	Contents	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											4×4.5 4×5.3	5.4 7
2.2	2R2											4×4.5 4×5.3	9.6 10
3.3	3R3											4×4.5 4×5.3	11 12
4.7	4R7							4×4.5 4×5.3	11 12	4×4.5 4×5.3	13 14	5×4.5 5×5.3	16 17
10	100			4×4.5 4×5.3	14 15	4×4.5 4×5.3	15 16	5×4.5 5×5.3	20 21	5×4.5 5×5.3	22 23	6.3×4.5 6.3×5.3	26 28
22	220	4×4.5 4×5.3	19 21	5×4.5 5×5.3	22 25	5×4.5 5×5.3	26 28	6.3×4.5 6.3×5.3	33 36	6.3×4.5 6.3×5.3	36 50	6.3×5.3	51
33	330	5×4.5 5×5.3	26 30	5×4.5 5×5.3	28 31	6.3×4.5 6.3×5.3	35 40	6.3×4.5 6.3×5.3	42 44				
47	470	5×4.5 5×5.3	32 36	6.3×4.5 6.3×5.3	40 43	6.3×4.5 6.3×5.3	44 47	6.3×4.5 6.3×5.3	57 60				
100	101	6.3×4.5 6.3×5.3	52 61	6.3×4.5 6.3×5.3	60 65	6.3×5.3	70						

Part Numbering System

VES Series	10μF	± 20%	16V	Carrier Tape		4 ϕ × 5.3L	General Purpose
<u>VES</u>	<u>100</u>	<u>M</u>	<u>1C</u>	<u>TR</u>	<u>-</u>	<u>0405</u>	
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case Size	Application

Note: For more details, please refer to "Part Numbering System - SMD Type" on page 106.