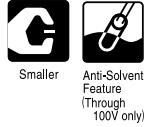
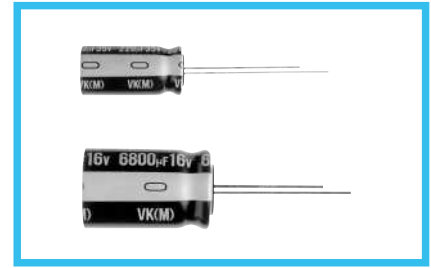
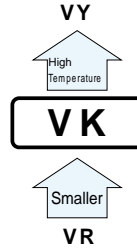


ALUMINUM ELECTROLYTIC CAPACITORS

VK Miniature Sized series



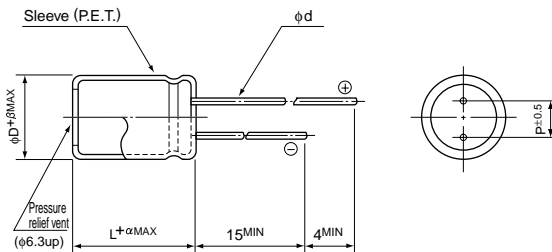
- One rank smaller case sizes than VR series.
- Compliant to the RoHS directive (2002/95/EC).



Specifications

Item	Performance Characteristics																																	
Category Temperature Range	-40 to +85°C (6.3V to 400V), -25°C to +85°C (450V)																																	
Rated Voltage Range	6.3 to 450V																																	
Rated Capacitance Range	0.1 to 68000μF																																	
Capacitance Tolerance	±20% at 120Hz, 20°C																																	
Leakage Current	<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>6.3 to 100V</th> <th>160 to 450V</th> </tr> </thead> <tbody> <tr> <td>After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.</td> <td>After 1 minute's application of rated voltage, CV ≤ 1000 : I = 0.1CV+40μA or less</td> <td>After 1 minute's application of rated voltage, CV > 1000 : I = 0.04CV+100 (μA) or less</td> </tr> <tr> <td>After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater.</td> <td></td> <td></td> </tr> </tbody> </table>	Rated voltage (V)	6.3 to 100V	160 to 450V	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.	After 1 minute's application of rated voltage, CV ≤ 1000 : I = 0.1CV+40μA or less	After 1 minute's application of rated voltage, CV > 1000 : I = 0.04CV+100 (μA) or less	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater.																										
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Tangent of loss angle (tan δ)	For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz at 20°C <table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160 to 250</th> <th>350 to 450</th> </tr> </thead> <tbody> <tr> <td>tan δ (MAX.)</td> <td>0.28</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> <td>0.20</td> <td>0.25</td> </tr> </tbody> </table>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 to 250	350 to 450	tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08	0.20	0.25											
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Stability at Low Temperature	Measurement frequency : 120Hz <table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50 to 100</th> <th>160 to 200</th> <th>250 to 350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>Impedance ratio Z-25°C / Z+20°C</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>3</td> <td>4</td> <td>6</td> <td>15</td> </tr> <tr> <td>ZT / Z20 (MAX.) Z-40°C / Z+20°C</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>4</td> <td>8</td> <td>10</td> <td>—</td> </tr> </tbody> </table>	Rated voltage (V)	6.3	10	16	25	35	50 to 100	160 to 200	250 to 350	400	450	Impedance ratio Z-25°C / Z+20°C	5	4	3	2	2	2	3	4	6	15	ZT / Z20 (MAX.) Z-40°C / Z+20°C	12	10	8	5	4	3	4	8	10	—
	Rated voltage (V)	6.3	10	16	25	35	50 to 100	160 to 200	250 to 350	400	450																							
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ZT / Z20 (MAX.) Z-40°C / Z+20°C	12	10	8	5	4	3	4	8	10	—																								
Endurance	The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C. <table border="1"> <tbody> <tr> <td>Capacitance change</td> <td>Within ±20% of the initial capacitance value</td> </tr> <tr> <td>tan δ</td> <td>200% or less than the initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>Less than or equal to the initial specified value</td> </tr> </tbody> </table>	Capacitance change	Within ±20% of the initial capacitance value	tan δ	200% or less than the initial specified value	Leakage current	Less than or equal to the initial specified value																											
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Shelf Life	After storing the capacitors under no load at 85°C for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they shall meet the specified values for the endurance characteristics listed above.																																	
Marking	Printed with white color letter on black sleeve.																																	

Radial Lead Type

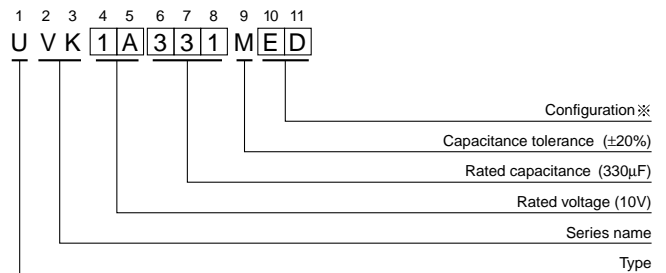


	(mm)	5	6.3	8	10	12.5	16	18	20	22	25
φD		5	6.3	8	10	12.5	16	18	20	22	25
P		2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
φd		0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0
β		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

α	(L < 20)	1.5
	(L ≥ 20)	2.0

- Please refer to page 20 about the end seal configuration.

Type numbering system (Example : 10V 330μF)



※ Configuration	
φ D	Pb-free leadwire Pb-free PET sleeve
5	DD
6.3	ED
8 · 10	PD
12.5 to 18	HD
20 to 25	RD

Please refer to page 20, 21, 22 about the formed or taped product spec.
Please refer to page 4 for the minimum order quantity.

● Dimension table in next page.

ALUMINUM ELECTROLYTIC CAPACITORS



■ Dimensions

Cap.(μF)	Code	V		6.3		10		16		25		35		50		63	
		0J	1A	1C	1E	1V	1H	1J									
0.1	0R1														5 × 11	1.3	
0.22	R22														5 × 11	2.9	
0.33	R33														5 × 11	4.3	
0.47	R47														5 × 11	6.2	
1	010														5 × 11	17	
2.2	2R2														5 × 11	28	
3.3	3R3														5 × 11	35	
4.7	4R7														5 × 11	40	
10	100														5 × 11	60	
22	220														5 × 11	95	5 × 11 100
33	330														5 × 11	125	6.3 × 11 140
47	470											5 × 11 130		6.3 × 11 155	6.3 × 11 170		
68	680										6.3 × 11 160		6.3 × 11 210	8 × 11.5 220			
100	101								5 × 11 180		6.3 × 11 210		8 × 11.5 260	8 × 11.5 280			
220	221			5 × 11 220		6.3 × 11 260		6.3 × 11 280		8 × 11.5 350		10 × 12.5 430	10 × 16 490				
330	331			6.3 × 11 290		6.3 × 11 320		8 × 11.5 390		10 × 12.5 490		10 × 16 590	10 × 20 710				
470	471			6.3 × 11 350		8 × 11.5 440		10 × 12.5 550		10 × 16 650		10 × 20 760	12.5 × 20 900				
1000	102	8 × 11.5 540		10 × 12.5 650		10 × 12.5 700		10 × 16 860		12.5 × 20 1150		12.5 × 25 1350	16 × 25 1300				
2200	222	10 × 16 890		10 × 16 990		10 × 20 1000		12.5 × 25 1550		16 × 25 1800		16 × 31.5 1980	18 × 35.5 2300				
3300	332	10 × 20 1190		12.5 × 20 1450		12.5 × 25 1700		16 × 25 1980		16 × 31.5 2100		18 × 35.5 2500	20 × 40 2700				
4700	472	12.5 × 20 1550		12.5 × 25 1800		16 × 25 2100		16 × 25 2200		16 × 35.5 2500		20 × 40 2900	22 × 50 3400				
6800	682	12.5 × 25 1920		16 × 25 2250		16 × 25 2250		16 × 35.5 2600		18 × 40 2800		22 × 50 3500	25 × 50 3900				
10000	103	16 × 25 2350		16 × 31.5 2550		16 × 35.5 2710		18 × 40 2800		22 × 50 3700		25 × 50 4000					
15000	153	16 × 31.5 2550		16 × 35.5 2880		18 × 40 3100		22 × 50 3800		25 × 50 4300							
22000	223	18 × 35.5 3200		18 × 40 3400		22 × 40 3800		25 × 50 4500									
33000	333	20 × 40 3500		22 × 50 4500		25 × 50 4800											
47000	473	22 × 50 3900		25 × 50 5000													
68000	683	25 × 50 4300															
																	Case size φD×L (mm)
																	Rated ripple

Cap.(μF)	Code	V		100		160		200		250		350		400		450	
		2A	2C	2D	2E	2V	2G	2W									
0.1	0R1	5 × 11 2.1				6.3 × 11 2.1											
0.22	R22	5 × 11 4.7				6.3 × 11 4.7											
0.33	R33	5 × 11 7				6.3 × 11 7											
0.47	R47	5 × 11 10				6.3 × 11 15							6.3 × 11 12				
1	010	5 × 11 21				6.3 × 11 22							6.3 × 11 20				
2.2	2R2	5 × 11 30				6.3 × 11 33				6.3 × 11 30		8 × 11.5 38	8 × 11.5 28				
3.3	3R3	5 × 11 40				6.3 × 11 40		6.3 × 11 40		8 × 11.5 43		8 × 11.5 48	10 × 12.5 40				
4.7	4R7	5 × 11 45				6.3 × 11 50		6.3 × 11 50		8 × 11.5 55		10 × 12.5 60	10 × 12.5 46				
10	100	5 × 11 70	8 × 11.5 80		8 × 11.5 80	10 × 12.5 100		10 × 12.5 90		10 × 16 90		10 × 20 80					
22	220	6.3 × 11 130	10 × 12.5 130		10 × 16 150	10 × 20 150		12.5 × 20 150		12.5 × 25 200		12.5 × 25 200	12.5 × 25 140				
33	330	8 × 11.5 180	10 × 16 180		10 × 20 200	10 × 20 200		12.5 × 25 240		16 × 25 240		16 × 25 240	16 × 25 180				
47	470	8 × 11.5 200	10 × 20 210		12.5 × 20 270	12.5 × 20 270		16 × 25 300		16 × 25 280		16 × 25 280	16 × 31.5 220				
68	680	10 × 12.5 270	12.5 × 20 350		12.5 × 25 350	16 × 25 380		16 × 25 400		16 × 31.5 340		18 × 35.5 260					
100	101	10 × 16 340	12.5 × 25 430		16 × 25 450	16 × 25 440		18 × 35.5 520		18 × 35.5 440		18 × 40 280					
220	221	12.5 × 20 550	16 × 31.5 580		16 × 35.5 700	18 × 35.5 680		22 × 50 760		22 × 50 650		25 × 50 350					
330	331	12.5 × 25 760	18 × 35.5 800		18 × 40 950	20 × 40 1000		25 × 50 1000									
470	471	16 × 25 1000	18 × 40 1200		22 × 40 1300	22 × 50 1400											
1000	102	18 × 35.5 1350	25 × 50 1900														
2200	222	22 × 50 2400															
3300	332	25 × 50 2900															
																	Case size φD×L (mm)
																	Rated ripple

Rated ripple current (mA_{rms}) at 85°C 120Hz

● Frequency coefficient of rated ripple current

V	Cap.(μF)	Frequency				
		50Hz	120Hz	300Hz	1 kHz	10kHz or more
6.3 to 100	0.1 to 68	0.75	1.00	1.35	1.57	2.00
	100 to 470	0.80	1.00	1.23	1.34	1.50
	1000 to 68000	0.85	1.00	1.10	1.13	1.15
160 to 450	0.1 to 220	0.80	1.00	1.25	1.40	1.60
	330 to 1000	0.90	1.00	1.10	1.13	1.15