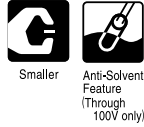
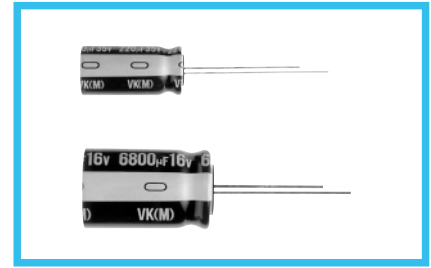
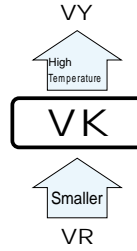


**VK** Miniature Sized series



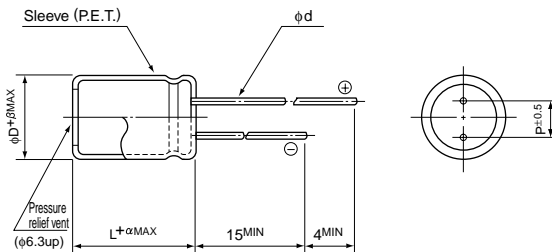
- One rank smaller case sizes than VR series.
- Compliant to the RoHS directive (2011/65/EU).



## 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 &gt; 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.																									
	Rated voltage (V)	6.3 to 100V	160 to 450V																														
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After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater.																																	
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										
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																							
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																							
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	—																							
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.																																
	Capacitance change	Within ±20% of the initial capacitance value																															
	tan δ	200% or less than the initial specified value																															
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.																																
		Leakage current	Less than or equal to the initial specified value																														
Marking	Printed with white color letter on black sleeve.																																

## Radial Lead Type

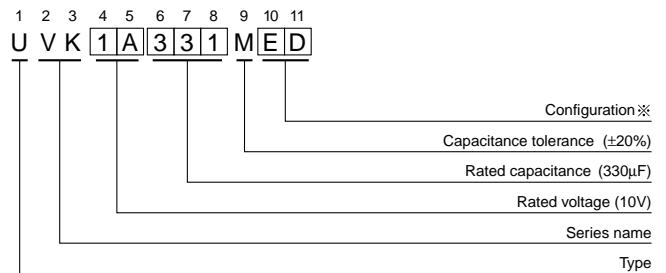


	(mm)	5	6.3	8	10	12.5	16	18	20	22	25
φD		5	6.3	8	10	12.5	16	18	20	22	25
P		2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
φd		0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0
β		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

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 × 25 140			
33	330	8 × 11.5 180		10 × 16 180		10 × 20 200		10 × 20 200		12.5 × 25 240		16 × 25 240		16 × 25 180			
47	470	8 × 11.5 200		10 × 20 210		12.5 × 20 270		12.5 × 20 270		16 × 25 300		16 × 25 280		16 × 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<sub>rms</sub>) 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