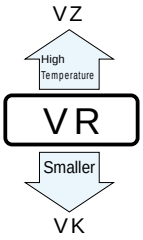
ALUMINUM ELECTROLYTIC CAPACITORS

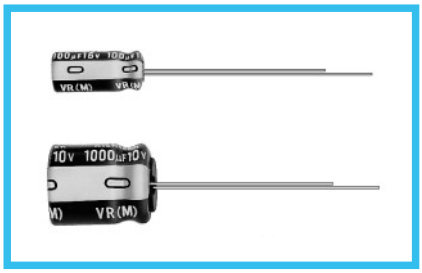
nichicon

VR Miniature Sized series

Anti-Solvent Feature (Through 100V only)

- One rank smaller case sizes than VX 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 to +85˚C (450V)
Rated Voltage Range	6.3 to 450V
Rated Capacitance Range	0.1 to 33000μF
Capacitance Tolerance	±20% at 120Hz, 20˚C
Leakage Current	Rated voltage (V) | 6.3 to 100V: After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater. After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA), whichever is greater. | 160 to 450V: 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
Tangent of loss angle (tan δ)	For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz, Temperature : 20˚C

Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 to 315	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

Rated voltage (V)		6.3	10	16	25	35	50	63	100	160 to 200	250 to 350	400	450
Impedance ratio	Z−25˚C / Z+20˚C	5	4	3	2	2	2	2	2	3	4	6	15
ZT / Z20 (MAX.)	Z−40˚C / Z+20˚C	12	10	8	5	4	3	3	3	4	8	10	—

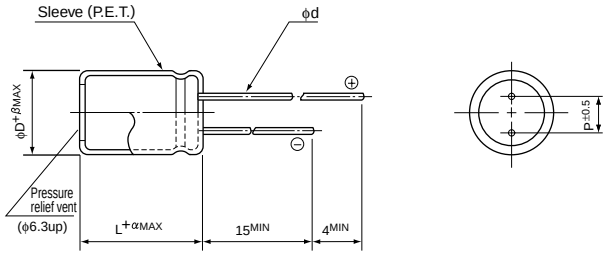
Endurance — The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C.

Capacitance change	Within ±20% of the initial capacitance value
tan δ	200% or less than the initial specified value
Leakage current	Less than or equal to 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.

Marking — Printed with white color letter on black sleeve.

■Radial Lead Type



(mm)

φD	4	5	6.3	8	10	12.5	16	18	20	22	25
P	1.5	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
φd	0.45	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	0.5	1.0	1.0

α	(L<20) 1.5
	(L≧20) 2.0

• Please refer to page 20 about the end seal configulation.

Type numbering system (Example : 10V 330μF)

1	2	3	4	5	6	7	8	9	10	11	12
U	V	R	1	A	3	3	1	M	E	D	

- 12: Size code
- 10–11: Configuration※
- 9: Capacitance tolerance (±20%)
- 6–8: Rated capacitance (330μF)
- 4–5: Rated voltage (10V)
- 3: Series name
- 1–2: Type

※ Configuration

φ D	Pb-free leadwire Pb-free PET sleeve
4	DD6
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.

VR series

■Dimensions

Cap.(μF) \ V / Code	6.3		10		16		25		35		50		63		100	
	0J		1A		1C		1E		1V		1H		1J		2A	
0.1	0R1										• 5×11	1.3			5×11	2.1
0.22	R22										• 5×11	2.9			5×11	4.7
0.33	R33										• 5×11	4.3			5×11	7
0.47	R47										• 5×11	6.2			5×11	10
1	010										• 5×11	17			5×11	21
2.2	2R2										• 5×11	28			5×11	30
3.3	3R3										• 5×11	35			5×11	40
4.7	4R7						• 5×11	35	• 5×11	40	• 5×11	40			5×11	45
10	100				• 5×11	50	• 5×11	55	• 5×11	60	• 5×11	60	5×11	65	6.3×11	75
22	220	• 5×11	65	• 5×11	65	• 5×11	75	• 5×11	80	• 5×11	90	5×11	95	5×11	100	6.3×11	130
33	330	• 5×11	80	• 5×11	85	• 5×11	90	• 5×11	95	5×11	105	5×11	125	6.3×11	140	8×11.5	180
47	470	• 5×11	95	• 5×11	100	• 5×11	110	• 5×11	115	5×11	130	6.3×11	155	6.3×11	170	10×12.5	230
100	101	• 5×11	135	• 5×11	145	5×11	160	6.3×11	190	6.3×11	210	8×11.5	260	10×12.5	300	10×20	370
220	221	5×11	200	6.3×11	240	6.3×11	260	8×11.5	330	10×12.5	385	10×12.5	430	10×16	490	12.5×25	620
330	331	6.3×11	270	6.3×11	290	8×11.5	370	10×12.5	440	10×12.5	490	10×16	590	10×20	710	12.5×25	760
470	471	6.3×11	320	6.3×11	350	8×11.5	440	10×12.5	550	10×16	650	12.5×20	760	12.5×20	900	16×25	1000
1000	102	8×11.5	540	10×12.5	650	10×16	790	10×20	960	12.5×20	1150	12.5×25	1350	16×25	1300	18×40	1380
2200	222	10×20	1000	10×20	1100	12.5×20	1300	12.5×25	1550	16×25	1800	16×35.5	2100	18×35.5	2300	22×50 ▲25×40	2400 2400
3300	332	10×20	1190	12.5×20	1450	12.5×25	1700	16×25	1980	16×35.5	2280	18×35.5 ▲22×30	2500 2450	20×40 ▲25×30	2700 2600	25×50	2900
4700	472	12.5×20	1550	12.5×25	1800	16×25	2100	16×31.5	2450	18×35.5 ▲20×31	2700	20×40 ▲25×30	2900 2900	22×50 ▲25×40	3400 3200		
6800	682	12.5×25	1920	16×25	2250	16×35.5	2650	18×35.5 ▲20×31	2900 2700	20×40 ▲25×30	3000 2900	22×50 ▲25×40	3500 3300	25×50	3900		
10000	103	16×25	2350	16×35.5	2700	18×35.5 ▲20×31	2950 3000	20×40 ▲25×30	3000 2900	22×50 ▲25×40	3700 3600	25×50	4000				
15000	153	16×35.5	2850	18×35.5	3100	20×40 ▲25×30	3400 3300	22×50 ▲25×40	3800 3600	25×50	4300						
22000	223	18×40 ▲22×30	3350 3200	20×40 ▲25×30	3700 3300	22×50 ▲25×40	4200 4000	25×50	4500								
33000	333	22×50 ▲25×40	3900 3800	22×50 ▲25×40	4500 4800	25×50	4800									Case size φD×L (mm)	Rated ripple

Cap.(μF) \ V / Code	160		200		250		315		350		400		450		
	2C		2D		2E		2F		2V		2G		2W		
0.47	R47	6.3×11	15	6.3×11	15	6.3×11	15								
1	010	6.3×11	22	6.3×11	22	6.3×11	22	6.3×11	22	6.3×11	22	8×11.5	25	8×11.5	23
2.2	2R2	6.3×11	33	6.3×11	33	6.3×11	33	8×11.5	33	8×11.5	38	10×12.5	45	10×12.5	35
3.3	3R3	6.3×11	40	6.3×11	40	8×11.5	46	10×12.5	55	10×12.5	55	10×12.5	55	10×16	45
4.7	4R7	6.3×11	50	8×11.5	55	8×11.5	55	10×12.5	65	10×12.5	65	10×16	70	10×20	55
10	100	8×11.5	80	10×12.5	95	10×16	105	10×20	115	10×20	115	12.5×20	130	12.5×20	90
22	220	10×16	155	10×20	170	12.5×20	190	12.5×20	190	12.5×25	200	16×25	240	16×25	165
33	330	10×20	205	12.5×20	230	12.5×20	230	16×25	275	16×25	275	16×31.5	300	16×35.5	230
47	470	12.5×20	270	12.5×20	270	12.5×25	300	16×25	340	16×35.5	380	16×35.5	370	18×40 ▲22×30	300 290
100	101	12.5×25	430	16×31.5	530	16×31.5	520	18×35.5	560	18×40 ▲22×30	590 570	20×40 ▲25×30	550 530	22×40	350
220	221	16×35.5	800	18×35.5	810	20×40 ▲22×30	740 820	22×50 ▲25×30	850 770	22×50 ▲25×40	850 890	25×50	750		
330	331	18×40 ▲22×30	940 900	20×40 ▲25×30	1130 1090	22×50 ▲25×30	1170 970	25×50	1250						
470	471	22×40 ▲25×30	1410 1290	22×50 ▲25×40	1490 1550	25×50	1600							Case size φD×L (mm)	Rated ripple
1000	102	25×50	1900												

Size 4×11 is available for capacitors marked "●"
In this case, 6 will be put at 12th digit of type numbering system "▲"

Rated ripple current (mArms) 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 47	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 33000	0.85	1.00	1.10	1.13	1.15
160 to 450	0.47 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