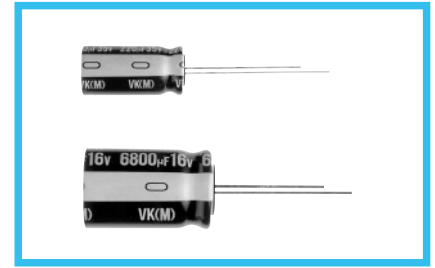
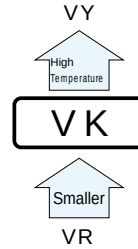


VK Miniature Sized
series



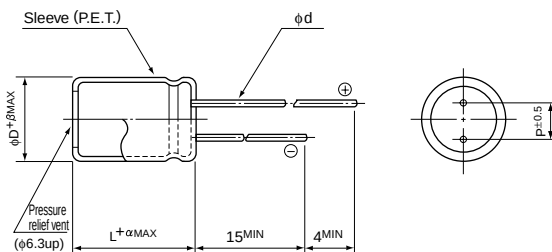
- One rank smaller case sizes than VR series.
- Compliant to the RoHS directive (2002/95/EC).



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	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.	
Tangent of loss angle (tan δ)	Rated voltage (V)	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	
Stability at Low Temperature	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 250 350 to 450
Endurance	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 to 100 160 to 200 250 to 350 400 450
Shelf Life	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 —
Marking	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
	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.	
	Printed with white color letter on black sleeve.	

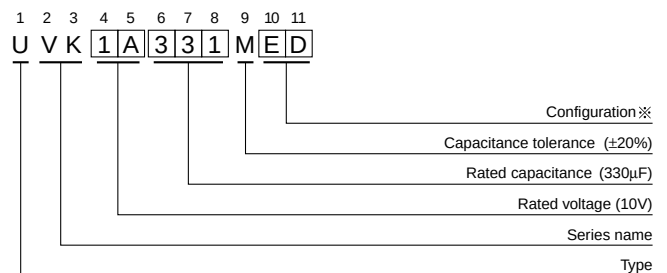
Radial Lead Type



	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

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 about the end seal configuration.

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.

■ Dimensions

V		6.3		10		16		25		35		50		63	
Cap.(μF)	Code	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									Case size φD×L (mm)	Rated ripple
68000	683	25×50	4300												

V Cap.(μF) Code		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 rms) at 85°C 120Hz

● Frequency coefficient of rated ripple current

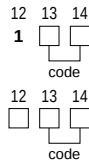
V	Cap.(μF)	Frequency	50Hz	120Hz	300Hz	1 kHz	10kHz or more
6.3 to 100	0.1 to 68		0.75	1.00	1.35	1.57	2.00
		100 to 470	0.80	1.00	1.23	1.34	1.50
		1000 to 68000	0.85	1.00	1.10	1.13	1.15
160 to 450	0.1 to 220		0.80	1.00	1.25	1.40	1.60
		330 to 1000	0.90	1.00	1.10	1.13	1.15

※Trimmed (Cut) or Formed Leads

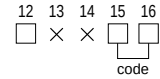
●Radial lead type

In order to identify correct part number for the processed lead product, cut/formed lead code must be added to bulk part number.

- If the bulk part number is up to 11th digit, processed lead coding shall be as follows:



- In case 12th digit is alphabet, it shall be:



- In case 12th digit is numeral, it shall be:



Configurations	Cut / Formed lead code		Dimensions (mm)				Lead configurations
	Code	Case length	φD	F	L	ℓ	
Forming and cutting	[B][A]	5mmL, 7mmL	4	5	5.0	—	(Code [B][A], [B][B]) 1.5MAX. (Code [F][A], [F][V]) 2.5MAX.
		Other length	5			—	
			6.3			—	
	[F][A]	Other length	8			—	
			—			—	
			—			—	
Cutting	[B][B]	5mmL, 7mmL	4	5	3.5	—	
		Other length	5			—	
			6.3			—	
		Other length	8			—	
			—			—	
			—			—	
			—			—	
			—			—	
			—			—	
	[F][V]	5mmL, 7mmL	4			—	
		Other length	5			—	
			6.3			—	
		Other length	8			—	
			—			—	
			—			—	
			—			—	
			—			—	
			—			—	
	[C][A]	All length	3	1.0	5.0	—	
		All length	4	1.5		—	
			5	2.0		—	
		All length	6.3	2.5		—	
			8	※ 3.5		—	
		All length	10	5		—	
			12.5	—		—	
		All length	16	7.5		—	
			18	—		—	
	[C][P]	All length	20	10	—	—	
		All length	22	—		—	
			25	12.5		—	
		All length	—	—		—	
			—	—		—	
		All length	—	—		—	
			—	—		—	
		All length	—	—		—	
			—	—		—	
Snap-in	[A][E]	5mmL, 7mmL	4	5	4.5	1.1	(φ4, 5, 6.3, 8) (Code [A][E]) 1.5 MAX. (Code [A][A]) 2.5 MAX.
		Other length	5			1.3	
			6.3			—	
	[A][A]	Other length	8			—	
			—			—	
		Other length	10			—	
			12.5			—	
	[A][A]	All length	16	7.5	4.5	1.3	
			18			—	
		All length	20	10	5.0	1.8	
			22			—	
		All length	25			—	
			—			—	

● Conductive polymer aluminum solid electrolytic capacitors : Cutting configurations only

*Lead diameter (φd) and lead pitch (P) are subject to capacitor specifications.

※End seal Configuration

Configuration	※2		※1		
φ	3	5 · 6.3	4 · 8 · 10	12.5 · 16 · 18	20 · 22 · 25

Exception : φ5, φ6.3 case size of MA, MR, MF, MP, MT, MW, SA, SF, SP, SR, ST, SW, HC (7mmL), PW (7mmL), TT (7mmL), TS (7mmL) series : configuration ※1
 φ6.3 × 6mmL, φ6.3 × 9mmL, φ8 × 7mmL, φ8 × 9mmL, φ10 × 8mmL, φ10 × 10mmL size of LF※ LE※, LG※, LS※, LV※ series, MV, SV, PV series : configuration ※2

※ Conductive polymer aluminum solid electrolytic capacitors

※Taped Leads for Automatic Insertion Systems

● Radial lead type (Applicable standard JIS C0806-2)

(mm)

In order to identify correct part number for the taped product, taping code must be added.

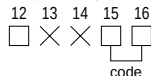
- If the bulk part number is up to 11th digit, taping code shall be as follows:



- In case 12th digit is numeral, it shall be



- In case 12th digit is alphabet, it shall be



Specifications					Capacitor diameter (φ)	Taping code	
Packaging	Lead style	Leader	F	P ₀		Code	Applicable size
Ammo-pack	Formed lead	—	See Table 1	12.7	3 to 8	T E T P T A	φ 4 to 8 Case length (5mmL, 7mmL) (φ 3 × 5, φ 4 × 11) (φ 5 × 9 to φ 8 × 9, φ 4 × 11 to φ 8 × 20)
		—	See Table 2	12.7	4 to 10	T P T D	φ 4 to 8 Case length (5mmL), φ 6.3 × 6 ※ φ 4 to 6.3 Case length (7mmL), φ 4 φ 5 × 9 or more, φ 6.3 × 9 or more, φ 8 × 7 or more, φ 10 × 8 to 25)
	Straight lead	—	See Table 2	15.0	12.5	T O	(φ 12.5 × 12.5 to 25)
		—	See Table 2	15.0	16, 18	T N	(φ 16 × 15 to 25, φ 18 × 15 to 25)

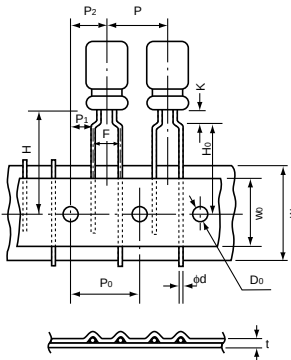
Notes:

※ Conductive polymer aluminum solid electrolytic capacitors

Table 1

(mm)

(Formed lead type)

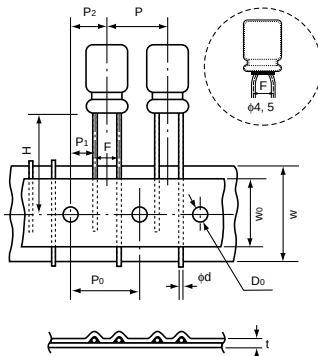


Item	Case Size Taping Code	Tolerance	Formed Lead Type Case dia (φ) × Length (L)							
			φ 3 × 5	φ 4 × 11	φ 4 × 5 φ 4 × 7	φ 5 × 5 φ 5 × 7	φ 6.3 × 5 φ 6.3 × 7	φ 8 × 5 φ 8 × 7	φ 4 × 11 φ 5 × 9 φ 5 × 11	φ 6.3 × 9 φ 6.3 × 11 φ 6.3 × 15
			TP	TP	TE				TA	
φ d Lead-wire diameter		±0.05	0.40	0.45	0.45 (φ 8 × 7 : 0.5)				0.5 (φ 4 × 11 : 0.45)	
P Pitch of component		±1.0	12.7	12.7	12.7				12.7	
P ₀ Feed hole pitch		±0.2	12.7	12.7	12.7				12.7	
P ₁ Hole center to lead		±0.5	5.1	5.1	3.85				3.85	
P ₂ Feed hole center to component center		±1.0	6.35	6.35	6.35				6.35	
F Lead-to-lead distance		+0.8 -0.2	2.5	2.5	5.0				5.0	
K Clinch height		MAX	1.5	2.5	1.5				2.5	
H Height of component from tape center		+0.75 -0.5	18.5	18.5	17.5				18.5	
H ₀ Lead-wire clinch height		±0.5	16.0 ※ 3	16.0	16.0				16.0	
W Tape Width		±0.5	18.0	18.0	18.0				18.0	
W ₀ Hold down tape width		MIN	7.0	7.0	7.0				7.0	
φ D ₀ Feed hole diameter		±0.2	4.0	4.0	4.0				4.0	
t Total tape thickness		±0.2	0.6	0.6	0.6				0.6	

Table 2

(mm)

(Straight lead type)



Item	Case Size Taping Code	Tolerance	Straight Lead Type Case dia (φ) × Length (L)							
			φ 4 × 5 φ 4 × 7	φ 5	φ 6.3	φ 8 × 5	φ 8 × 7	φ 8	φ 10	φ 12.5
			TP	TP, TD	TP, TD	TP	TD	TD	TD	TO
φ d Lead-wire diameter		±0.05	0.45	0.45 0.5, 0.6	0.45 0.5, 0.6	0.45	0.5	0.6	0.6	0.6
P Pitch of component		±1.0	12.7	12.7	12.7	12.7	12.7	12.7	12.7	15.0
P ₀ Feed hole pitch		±0.2	12.7	12.7	12.7	12.7	12.7	12.7	12.7	15.0
P ₁ Hole center to lead		±0.5	5.1 (※ 1 5.35)	5.1 (※ 1 5.35)	5.1	5.1	4.6	4.6	3.85	5.0
P ₂ Feed hole center to component center		±1.0	6.35	6.35	6.35	6.35	6.35	6.35	6.35	7.5
F Lead-to-lead distance		+0.8 -0.2	2.5 ※ 1	2.5 ※ 1	2.5	2.5	3.5	3.5	5.0	5.0
H Height of component from tape center		+0.75 -0.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
W Tape Width		±0.5	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
W ₀ Hold down tape width		MIN	7.0	7.0	7.0	7.0	7.0	7.0	7.0	12.5
φ D ₀ Feed hole diameter		±0.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
t Total tape thickness		±0.2	0.6	0.6	0.6 0.7 ※ 4	0.6	0.6	0.6 0.7 ※ 4	0.6 0.7 ※ 4	0.6

Notes:

※ 1 F = 2.0mm is also available, provided that capacitor case length is less than 9mm.
Taping code to be T C.

※ 2 Tolerance on F for φ 16 and φ 18 units shall be ±0.8mm.

※ 3 Tolerance on H₀ for φ 3 units shall be 16.0 MIN.

※ 4 Conductive polymer aluminum solid electrolytic capacitors

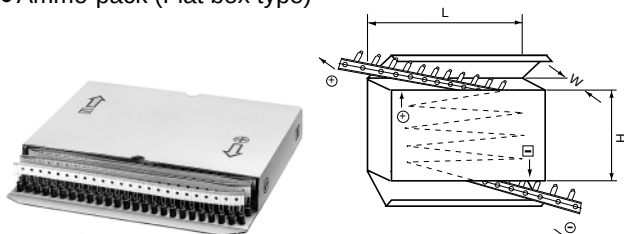
- Special taping specifications on H, F, and K dimensions other than the above figures are available upon request.

- Conductive polymer aluminum solid electrolytic capacitors : Straight lead type only

- Only the above mentioned dimensions are specified.

Packaging

● Ammo-pack (Flat box type)



(mm)				
L	H	W	Case Size ($\phi D \times L$)	Q'ty / Box
340	150	50	3 × 5	2,000
340	200	50	4 × 5, 4 × 7	2,000
340	250	50	5 × 5, 5 × 7	2,000
			8 × 5, 8 × 7, 8 × 8	1,000
340	300	50	6.3 × 5, 6.3 × 6, 6.3 × 7	2,000
340	260	54	4 × 11, 5 × 9, 5 × 11	2,000
			8 × 9, 8 × 10, 8 × 11.5, 8 × 12, 8 × 15	1,000
340	200	54	10 × 8, 10 × 9, 10 × 10, 10 × 12.5, 10 × 13, 10 × 15, 10 × 16	500
340	300	54	6.3 × 9, 6.3 × 10.5, 6.3 × 11, 6.3 × 15	2,000
340	260	62	8 × 20	1,000
340	200	62	10 × 20	500
340	200	65	10 × 25	500
330	290	65	12.5 × 12.5, 12.5 × 15, 12.5 × 20	500
			12.5 × 25	
			18 × 15, 18 × 20, 18 × 25	250
320	230	65	16 × 15, 16 × 20, 16 × 25	250

● Axial lead type (Applicable standard JIS C0805)

The following code shall be put at 12th to 14th digit of the corresponding type number of capacitors.

(mm)

Taping Specifications		Case dia (ϕ)	Taping code	Q'ty / Reel (pcs.)
Dim. W (Tape distance)	Dim. P (Component Pitch)			
52.4	10	5	1LS	1,600
		6.3		1,300
		8		1,000
63.5	10	5	1LV	1,600
		6.3		1,300
		8		1,000
73.0	10	5	1LY	1,600
		6.3		1,300
		8		1,000
52.4	15	10	1LT	500
		13 (except 31.5L)		350
63.5	15	10	1LW	500
		13		350
73.0	15	10	1LZ	500
		13		350

Please contact us for complete information on the package dimensions for tapes axial lead capacitors.

