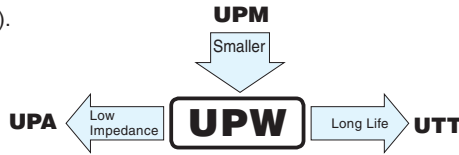
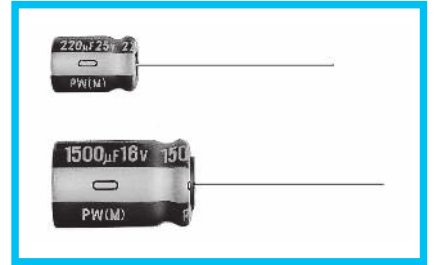


# ALUMINUM ELECTROLYTIC CAPACITORS

**UPW** Miniature Sized, Low Impedance,  
High Reliability For  
Switching Power Supplies



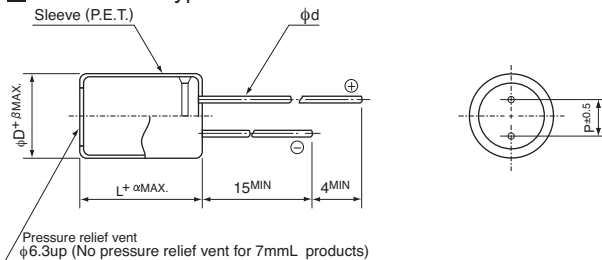
- Smaller case size and lower impedance than UPM.
- Low impedance and high reliability withstanding 2000 hours to 8000 hours.
- Capacitance ranges available based on the numerical values in E12 series under JIS.
- Compliant to the RoHS directive (2011/65/EU).



## Specifications

Item		Performance Characteristics										
Category Temperature Range	-55 to +105°C (6.3 to 100V), -40 to +105°C (160 to 400V), -25 to +105°C (450V)											
Rated Voltage Range	6.3 to 450V											
Rated Capacitance Range	0.47 to 15000µF											
Capacitance Tolerance	±20% at 120Hz, 20°C											
Leakage Current	Rated voltage (V)	6.3 to 100					160 to 450					
	Leakage current	After 1 minute's application of rated voltage at 20°C, leakage current is not more than 0.03CV or 4 (µA), whichever is greater.					CV ≤ 1000 : I = 0.1CV+40 (µA) max. CV > 1000 : I = 0.04CV+100 (µA) max.					
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											
	Rated voltage (V)	6.3	10	16	25	35	50	63	100	160 to 250	315 · 350	400 · 450
Stability at Low Temperature	Impedance ratio (MAX.)	Z-25°C / Z+20°C	—	—	—	—	3	3	4	6	15	—
		Z-40°C / Z+20°C	—	—	—	—	4	6	8	10	—	—
		Z-55°C / Z+20°C	3	3	3	3	—	—	—	—	—	—
Endurance	The specifications listed at right shall be met when the capacitors are restored to 20°C after D.C. bias plus rated ripple current is applied for 8000 hours (2000 hours for φD=4, 5 and 6.3, 3000 hours for φD=8, 5000 hours for φD=10, 7000 hours for φD=12.5) at 105°C, the peak voltage shall not exceed the rated voltage.											
	Capacitance change	Within ±20% of the initial capacitance value										
	Leakage current	Less than or equal to the initial specified value										
Shelf Life	After storing the capacitors under no load at 105°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 dark brown sleeve.											

## Radial Lead Type

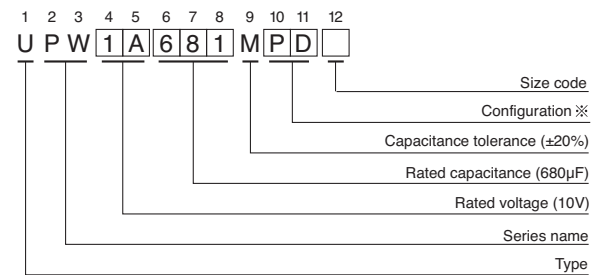


α	(L = 7) 1.0
	(L < 20) 1.5
	(L ≥ 20) 2.0

	(mm)	4	5	6.3	8	10	12.5	16	18	20	22	25
φD		1.5	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0	12.5
P		0.45	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0
φd		(0.45)	(0.45)	(0.45)			※0.8					
β		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

※: Applied to L>25 products  
( ): Applied to 7mmL products

## Type numbering system (Example : 10V 680µF)



φ D	Pb-free leadwire / Pb-free PET sleeve
4 · 5	DD
6.3	ED (7mm L : DD)
8 · 10	PD
12.5 to 18	HD
20 to 25	RD

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

## Frequency coefficient of rated ripple current

V	Cap. (µF)	Frequency				
		50Hz	120Hz	300Hz	1kHz	10kHz or more
6.3 to 100	0.47 to 56	0.20	0.30	0.50	0.80	1.00
	68 to 330	0.55	0.65	0.75	0.85	1.00
	390 to 1000	0.70	0.75	0.80	0.90	1.00
	1200 to 15000	0.80	0.85	0.90	0.95	1.00
160 to 450	0.47 to 220	0.80	1.00	1.25	1.40	1.60
	330 to 470	0.90	1.00	1.10	1.13	1.15

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.



## Standard Ratings

Cap.(μF)	V (Code)	Item Code	6.3 (0J)			10 (1A)				
			Case size φD × L (mm)	Impedance (Ω) MAX.		Rated ripple (mA <sub>rms</sub> ) 105°C / 100kHz	Case size φD × L (mm)	Impedance (Ω) MAX.		Rated ripple (mA <sub>rms</sub> ) 105°C / 100kHz
				20°C / 100kHz	-10°C / 100kHz			20°C / 100kHz	-10°C / 100kHz	
22	220		5 × 11	0.60	1.20	180	5 × 11 ▲ 4 × 7	0.60 2.00	1.20 5.00	180 65
27	270		4 × 7	2.00	5.00	65				
33	330		5 × 11 ▲ 5 × 7	0.60 0.95	1.20 2.40	180 120	5 × 11 ▲ 5 × 7	0.60 0.95	1.20 2.40	180 120
39	390						5 × 7	0.95	2.40	120
47	470		5 × 11 ▲ 5 × 7	0.60 0.95	1.20 2.40	180 120	5 × 11 ▲ 4 × 11	0.60 1.30	1.20 2.60	180 120
56	560		5 × 7	0.95	2.40	120				
68	680		4 × 11	1.30	2.60	120				
82	820						5 × 11 ▲ 6.3 × 7	0.60 0.45	1.20 1.20	180 200
100	101		5 × 11	0.60	1.20	180	5 × 11 ▲ 5 × 15	0.60 0.50	1.20 1.00	180 235
120	121		6.3 × 7	0.45	1.20	200				
150	151		6.3 × 11 ▲ 5 × 15	0.25 0.50	0.50 1.00	290 235	6.3 × 11	0.25	0.50	290
180	181						6.3 × 11	0.25	0.50	290
220	221		6.3 × 11	0.25	0.50	290	6.3 × 11 ▲ 6.3 × 15	0.25 0.23	0.50 0.46	290 430
330	331		6.3 × 11 ▲ 6.3 × 15	0.25 0.23	0.50 0.46	290 430	8 × 11.5	0.117	0.234	555
470	471		8 × 11.5	0.117	0.234	555	8 × 11.5	0.117	0.234	555
560	561		8 × 11.5	0.117	0.234	555				
680	681		10 × 12.5	0.090	0.180	755	10 × 12.5 ▲ 8 × 15	0.090 0.085	0.180 0.170	760 730
820	821		8 × 15 ▲ 10 × 12.5	0.085 0.090	0.170 0.180	730 755				
1000	102		10 × 12.5	0.090	0.180	755	10 × 16 ▲ 8 × 20	0.068 0.065	0.136 0.130	1050 995
1200	122		8 × 20 ▲ 10 × 16	0.065 0.068	0.130 0.136	995 1050	10 × 20	0.052	0.104	1220
1500	152		10 × 20	0.052	0.104	1220	10 × 20 ▲ 10 × 25	0.052 0.045	0.104 0.090	1220 1440
2200	222		12.5 × 20 ▲ 10 × 25	0.038 0.045	0.076 0.090	1655 1440	12.5 × 20 ▲ 10 × 31.5	0.038 0.035	0.076 0.070	1655 1815
2700	272		10 × 31.5	0.035	0.070	1815	12.5 × 25	0.030	0.060	1945
3300	332		12.5 × 20	0.038	0.076	1655	12.5 × 25 ▲ 12.5 × 31.5	0.030 0.025	0.060 0.050	1950 2310
3900	392		12.5 × 25	0.030	0.060	1945	12.5 × 35.5 ▲ 16 × 20	0.022 0.029	0.044 0.058	2510 2210
4700	472		16 × 25 ▲ 12.5 × 31.5	0.022 0.025	0.044 0.050	2555 2310	16 × 25	0.022	0.044	2555
5600	562		12.5 × 35.5 ▲ 16 × 20	0.022 0.029	0.044 0.058	2510 2210	16 × 25 ▲ 18 × 20	0.022 0.028	0.044 0.056	2560 2490
6800	682		16 × 25 ▲ 18 × 20	0.022 0.028	0.044 0.056	2560 2490	16 × 31.5 ▲ 18 × 25	0.018 0.020	0.036 0.040	3010 2740
8200	822		16 × 31.5	0.018	0.036	3010	16 × 35.5 ▲ 18 × 31.5	0.016 0.016	0.032 0.032	3150 3635
10000	103		16 × 31.5 ▲ 18 × 25	0.016 0.020	0.032 0.040	3150 2740	18 × 35.5	0.015	0.030	3680
12000	123		18 × 31.5	0.016	0.032	3635				
15000	153		18 × 35.5	0.015	0.030	3680	18 × 40	0.014	0.028	3800

▲ : In this case, [6] will be put at 12th digit of type numbering system.



■ Standard Ratings

Cap. (μF)	V(Code)	Item Code	16 (1C)				25 (1E)			
			Case size φD × L (mm)	Impedance (Ω) MAX.		Rated ripple (mA <sub>rms</sub> ) 105°C / 100kHz	Case size φD × L (mm)	Impedance (Ω) MAX.		Rated ripple (mA <sub>rms</sub> ) 105°C / 100kHz
				20°C / 100kHz	-10°C / 100kHz			20°C / 100kHz	-10°C / 100kHz	
4.7	4R7					5 × 11	0.60	1.20	180	
10	100	5 × 11	0.60	1.20	180	5 × 11 ▲4 × 7	0.60 2.00	1.20 5.00	180 65	
15	150	4 × 7	2.00	5.00	65					
22	220	5 × 11 ▲5 × 7	0.60 0.95	1.20 2.40	180 120	5 × 11 ▲5 × 7	0.60 0.95	1.20 2.40	180 120	
27	270	5 × 7	0.95	2.40	120	4 × 11	1.30	2.60	120	
33	330	5 × 11 ▲6.3 × 7	0.60 0.45	1.20 1.20	180 200	5 × 11	0.60	1.20	180	
39	390	4 × 11	1.30	2.60	120	5 × 11 ▲6.3 × 7	0.60 0.45	1.20 1.20	180 200	
47	470	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180	
56	560	5 × 11 ▲6.3 × 7	0.60 0.45	1.20 1.20	180 200	5 × 15	0.50	1.00	235	
82	820	5 × 15	0.50	1.00	235	6.3 × 11	0.25	0.50	290	
100	101	6.3 × 11	0.25	0.50	290	6.3 × 11	0.25	0.50	290	
120	121	6.3 × 11	0.25	0.50	290	6.3 × 15	0.23	0.46	430	
150	151	6.3 × 11	0.25	0.50	290	8 × 11.5	0.117	0.234	555	
180	181	6.3 × 15	0.23	0.46	430					
220	221	8 × 11.5	0.117	0.234	555	8 × 11.5	0.117	0.234	555	
330	331	8 × 11.5	0.117	0.234	555	10 × 12.5 ▲8 × 15	0.090 0.085	0.180 0.170	760 730	
470	471	10 × 12.5 ▲8 × 15	0.090 0.085	0.180 0.170	760 730	10 × 16 ▲8 × 20	0.068 0.065	0.136 0.130	1050 995	
560	561					10 × 20	0.052	0.104	1220	
680	681	10 × 16 ▲8 × 20	0.068 0.065	0.136 0.130	1050 995	10 × 20	0.052	0.104	1220	
820	821	10 × 20	0.052	0.104	1220	10 × 25	0.045	0.090	1440	
1000	102	10 × 20	0.052	0.104	1220	12.5 × 20 ▲10 × 31.5	0.038 0.035	0.076 0.070	1660 1815	
1200	122	10 × 25	0.045	0.090	1440					
1500	152	12.5 × 20 ▲10 × 31.5	0.038 0.035	0.076 0.070	1655 1815	16 × 25 ▲12.5 × 25	0.022 0.030	0.044 0.060	2555 1950	
1800	182					12.5 × 31.5 ▲16 × 20	0.025 0.029	0.050 0.058	2310 2210	
2200	222	12.5 × 25	0.030	0.060	1945	16 × 25 ▲18 × 20 ※12.5 × 35.5	0.022 0.028 0.022	0.044 0.056 0.044	2555 2490 2510	
2700	272	12.5 × 31.5 ▲16 × 20	0.025 0.029	0.050 0.058	2310 2210	16 × 25	0.022	0.044	2555	
3300	332	16 × 25 ▲12.5 × 35.5	0.022 0.022	0.044 0.044	2555 2510	16 × 31.5 ▲18 × 25	0.018 0.020	0.036 0.040	3010 2740	
3900	392	16 × 25 ▲18 × 20	0.022 0.028	0.044 0.056	2560 2490	16 × 35.5 ▲18 × 31.5	0.016 0.016	0.032 0.032	3150 3635	
4700	472	16 × 31.5 ▲18 × 25	0.018 0.020	0.036 0.040	3010 2740	18 × 35.5	0.015	0.030	3680	
5600	562	16 × 35.5 ▲18 × 31.5	0.016 0.016	0.032 0.032	3150 3635					
6800	682	18 × 35.5	0.015	0.030	3680	18 × 40	0.014	0.028	3800	
8200	822	18 × 35.5	0.015	0.030	3680					
10000	103	18 × 40	0.014	0.028	3800					

▲ : In this case, [6] will be put at 12th digit of type numbering system.  
 ※ : In this case, [3] will be put at 12th digit of type numbering system.

## UPW

### Standard Ratings

Cap.( $\mu$ F)	V(Code)	Item Code	35 (1V)				50 (1H)			
			Case size $\phi$ D $\times$ L (mm)	Impedance ( $\Omega$ ) MAX.		Rated ripple (mArms) 105°C / 100kHz	Case size $\phi$ D $\times$ L (mm)	Impedance ( $\Omega$ ) MAX.		Rated ripple (mArms) 105°C / 100kHz
				20°C / 100kHz	-10°C / 100kHz			20°C / 100kHz	-10°C / 100kHz	
0.47	R47									
1	010					5 × 11	5.00	10.0		25
2.2	2R2					5 × 11	3.50	7.00		40
3.3	3R3					5 × 11	3.00	6.00		55
4.7	4R7	5 × 11	0.60	1.20	180	5 × 11	2.60	5.20		65
6.8	6R8	4 × 7	2.00	5.00	65					90
10	100	5 × 11 ▲ 5 × 7	0.60 0.95	1.20 2.40	180 120	5 × 11 ▲ 4 × 11	1.40 2.50	2.80 5.00		120 90
12	120	5 × 7	0.95	2.40	120					
18	180	4 × 11	1.30	2.60	120	5 × 11	1.30	2.60		155
22	220	5 × 11	0.60	1.20	180	5 × 11	1.20	2.40		170
27	270	5 × 11 ▲ 6.3 × 7	0.60 0.45	1.20 1.20	180 200	5 × 15	0.90	1.80		215
33	330	5 × 11	0.60	1.20	180	6.3 × 11	0.43	0.86		300
39	390	5 × 15	0.50	1.00	235					
47	470	6.3 × 11	0.25	0.50	290	6.3 × 11	0.43	0.86		300
56	560	6.3 × 11	0.25	0.50	290	6.3 × 15	0.40	0.80		360
82	820	6.3 × 15	0.23	0.46	430	8 × 11.5	0.234	0.468		485
100	101	8 × 11.5	0.117	0.234	555	8 × 11.5	0.234	0.468		485
120	121					8 × 15 ▲ 10 × 12.5	0.155 0.162	0.310 0.324		635 620
150	151	8 × 11.5	0.117	0.234	555	10 × 12.5	0.162	0.324		615
180	181					8 × 20 ▲ 10 × 16	0.120 0.119	0.240 0.238		860 850
220	221	10 × 12.5 ▲ 8 × 15	0.090 0.085	0.180 0.170	760 730	10 × 16 ▲ 10 × 20	0.119 0.090	0.238 0.180		850 1030
270	271					10 × 25	0.082	0.164		1200
330	331	10 × 16 ▲ 8 × 20	0.068 0.065	0.136 0.130	1050 995	10 × 20 ▲ 10 × 31.5	0.090 0.060	0.180 0.120		1030 1610
390	391	10 × 20	0.052	0.104	1220	12.5 × 20	0.063	0.126		1480
470	471	10 × 20	0.052	0.104	1220	12.5 × 20	0.060	0.120		1500
560	561	10 × 25	0.045	0.090	1440	12.5 × 25	0.050	0.100		1832
680	681	12.5 × 20 ▲ 10 × 31.5	0.038 0.035	0.076 0.070	1660 1815	12.5 × 25 ▲ 16 × 20	0.050 0.048	0.100 0.096		1840 1840
820	821					12.5 × 35.5 ▲ 18 × 20	0.034 0.042	0.068 0.084		2290 2420
1000	102	12.5 × 25	0.030	0.060	1950	16 × 25	0.034	0.068		2235
1200	122	12.5 × 31.5 ▲ 16 × 20	0.025 0.029	0.050 0.058	2310 2210	16 × 31.5 ▲ 18 × 25	0.028 0.029	0.056 0.058		2700 2610
1500	152	16 × 25 ▲ 12.5 × 35.5	0.022 0.022	0.044 0.044	2555 2510	16 × 31.5 ▲ 16 × 35.5	0.028 0.025	0.056 0.050		2700 2790
1800	182	16 × 25 ▲ 18 × 20	0.022 0.028	0.044 0.056	2555 2490	18 × 31.5	0.025	0.050		3000
2200	222	16 × 31.5 ▲ 18 × 25	0.018 0.020	0.036 0.040	3010 2740	18 × 35.5	0.023	0.046		3100
2700	272	16 × 35.5 ▲ 18 × 31.5	0.016 0.016	0.032 0.032	3150 3635					
3300	332	18 × 35.5	0.015	0.030	3680					
4700	472	18 × 40	0.014	0.028	3800					

▲ : In this case, [6] will be put at 12th digit of type numbering system.



Standard Ratings

V(Code)		63 (1J)				100 (2A)			
Cap.(μF)	Item Code	Case size φD × L (mm)	Impedance (Ω) MAX.		Rated ripple (mArms) 105°C / 100kHz	Case size φD × L (mm)	Impedance (Ω) MAX.		Rated ripple (mArms) 105°C / 100kHz
			20°C / 100kHz	-10°C / 100kHz			20°C / 100kHz	-10°C / 100kHz	
0.47	R47					5 × 11	43.0	86.0	20
1	010					5 × 11	20.0	40.0	30
2.2	2R2					5 × 11	9.80	19.6	44
3.3	3R3					5 × 11	6.60	13.2	58
4.7	4R7	5 × 11	4.70	9.40	68	5 × 11	4.60	9.20	74
6.8	6R8	5 × 11	2.50	5.00	95	5 × 11	3.50	7.00	95
		▲ 4 × 11	3.50	7.00	80				
10	100	5 × 11	2.10	4.20	110	6.3 × 11	1.80	3.60	130
12	120	5 × 11	2.00	4.00	145				
15	150	6.3 × 11	1.20	2.40	160	8 × 11.5	0.83	1.66	180
18	180	5 × 15	1.30	2.60	200	6.3 × 15	0.80	1.60	200
22	220	6.3 × 11	0.71	1.42	250	8 × 11.5	0.68	1.36	230
33	330	6.3 × 11	0.71	1.42	250	10 × 12.5	0.46	0.92	320
		▲ 8 × 15				0.45	0.90	360	
39	390	6.3 × 15	0.70	1.40	330				
47	470	8 × 11.5	0.342	0.684	405	10 × 16	0.37	0.74	420
						▲ 8 × 20	0.37	0.74	420
68	680	8 × 11.5	0.342	0.684	405	10 × 20	0.30	0.60	490
82	820					10 × 25	0.25	0.50	540
100	101	10 × 12.5	0.256	0.512	540	12.5 × 20	0.18	0.36	580
		▲ 8 × 15	0.230	0.460	535				
120	121	10 × 16	0.194	0.388	600				
150	151	10 × 16	0.194	0.388	660	12.5 × 25	0.13	0.26	710
180	181	10 × 20	0.147	0.294	890	12.5 × 31.5	0.12	0.24	790
		▲ 12.5 × 15	0.150	0.300	1020	▲ 16 × 20	0.13	0.26	750
220	221	10 × 20	0.147	0.294	885	16 × 25	0.10	0.20	890
		▲ 10 × 25	0.130	0.260	1050	▲ 18 × 20	0.11	0.22	850
270	271	16 × 15	0.090	0.180	1410				
330	331	12.5 × 20	0.085	0.170	1290	16 × 25	0.090	0.18	1080
390	391	12.5 × 25	0.070	0.140	1720	18 × 25	0.083	0.166	1260
		▲ 18 × 15	0.086	0.172	1690				
470	471	12.5 × 25	0.070	0.140	1720	16 × 31.5	0.076	0.152	1310
		▲ 12.5 × 31.5	0.055	0.110	2090				
560	561					18 × 31.5	0.068	0.136	1370
		16 × 25	0.050	0.100	2160				
680	681	▲ 12.5 × 35.5	0.047	0.094	2270	16 × 35.5	0.064	0.128	1410
		※ 18 × 20	0.055	0.110	2290				
820	821	16 × 31.5	0.043	0.086	2670				
		▲ 18 × 25	0.043	0.086	2590				
1000	102	16 × 31.5	0.043	0.086	2770	18 × 40	0.047	0.094	1520
		▲ 16 × 35.5	0.036	0.072	2770				
1200	122	18 × 31.5	0.032	0.064	2950				
1500	152	18 × 35.5	0.030	0.060	3100				
2200	222	18 × 40	0.028	0.056	3200				

▲ : In this case, [6] will be put at 12th digit of type numbering system.

※ : In this case, [3] will be put at 12th digit of type numbering system.

V(Code)		160		200		250		315		350		400		450	
Cap. (μF)	Code	2C		2D		2E		2F		2V		2G		2W	
		0.47	R47	6.3 × 11	12	6.3 × 11	12	6.3 × 11	12	8 × 11.5	11	8 × 11.5	11		
1	010	6.3 × 11	17	6.3 × 11	17	6.3 × 11	17	8 × 11.5	16	10 × 12.5	17	10 × 12.5	16	10 × 12.5	18
2.2	2R2	6.3 × 11	25	6.3 × 11	25	8 × 11.5	29	10 × 12.5	28	10 × 16	31	10 × 16	27	10 × 20	29
3.3	3R3	8 × 11.5	36	8 × 11.5	36	10 × 12.5	42	10 × 12.5	34	10 × 16	38	10 × 20	36	12.5 × 20	41
4.7	4R7	8 × 11.5	43	10 × 12.5	50	10 × 12.5	50	10 × 16	45	10 × 20	49	10 × 20	43	12.5 × 20	49
10	100	10 × 12.5	70	10 × 16	80	10 × 20	88	10 × 20	72	12.5 × 20	82	12.5 × 25	72	16 × 25	75
22	220	10 × 20	130	10 × 20	140	12.5 × 25	155	12.5 × 25	120	16 × 25	130	16 × 25	110	16 × 31.5	115
33	330	12.5 × 20	180	12.5 × 25	190	12.5 × 25	190	16 × 25	155	16 × 31.5	160	16 × 31.5	140	● 18 × 35.5	145
47	470	12.5 × 25	220	12.5 × 25	220	16 × 25	230	16 × 35.5	190	● 18 × 35.5	200	● 18 × 35.5	170	20 × 40	175
100	101	16 × 25	330	16 × 31.5	335	● 18 × 35.5	340	▲ 18 × 40	285	20 × 40	290	22 × 50	350	25 × 50	350
220	221	● 18 × 35.5	500	▲ 18 × 40	515	20 × 40	525	22 × 50	540	25 × 50	550				
330	331	20 × 40	900	22 × 40	1100	22 × 50	1150								
470	471	22 × 50	1200	22 × 50	1310	25 × 50	1350								

※ Rated ripple current (mArms) at 105°C 120Hz

Size φ20 × 31 is available for capacitors marked " ● "

Size φ20 × 35 is available for capacitors marked " ▲ "

In this case, [6] will be put at 12th digit of type numbering system.