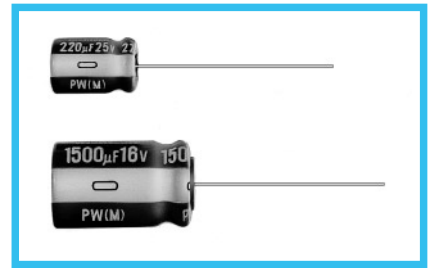
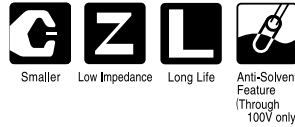
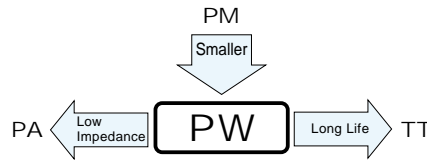


ALUMINUM ELECTROLYTIC CAPACITORS

PW Miniature Sized, Low Impedance, High Reliability For Switching Power Supplies series



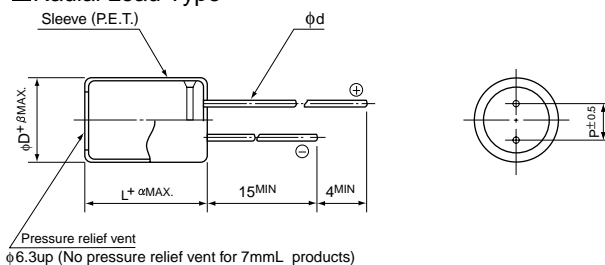
- Smaller case size and lower impedance than PM series.
- Low impedance and high reliability withstanding 2000 hours to 8000 hours.
- Capacitance ranges available based on the numerical values in E12 series under JIS.
- Compliant to the RoHS directive (2002/95/EC).



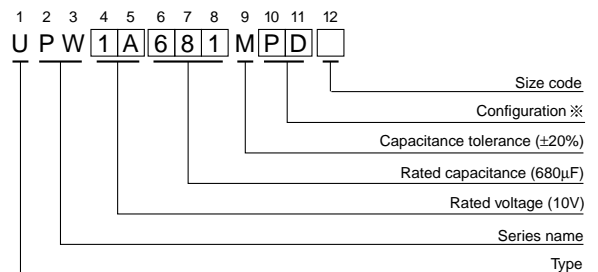
Specifications

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
	Leakage current After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (µA), whichever is greater.
Tangent of loss angle (tan δ)	160 to 450
	CV ≤ 1000: I = 0.1CV+40 (µA) max. (1 minute's) CV > 1000: I = 0.04CV+100 (µA) max. (1 minute's)
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 250 315 · 350 400 · 450
Endurance	tan δ (MAX.) 0.22 0.19 0.16 0.14 0.12 0.10 0.09 0.08 0.15 0.20 0.25
	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.
Shelf Life	Capacitance change Within ±20% of the initial capacitance value
	tan δ 200% or less than the initial specified value
Marking	Leakage current Less than or equal to the initial specified value
	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.
	Printed with white color letter on dark brown sleeve.

Radial Lead Type



Type numbering system (Example : 10V 680µF)



α	(L = 7) 1.0 (L < 20) 1.5 (L ≥ 20) 2.0	(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 (0.45)	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

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

※ Configuration

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

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

ALUMINUM ELECTROLYTIC CAPACITORS

PW series

Standard Ratings

Cap. (μF)	V(Code)	Item Code	16 (1C)				25 (1E)												
			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										
4.7	4R7																		
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.

Standard Ratings

Cap.(μ F)	V(Code)	Item Code	35 (1V)			50 (1H)				
			Case size ϕ D \times L (mm)	Impedance (Ω) MAX.		Rated ripple (mA rms) 105°C / 100kHz	Case size ϕ D \times L (mm)	Impedance (Ω) MAX.		Rated ripple (mA rms) 105°C / 100kHz
				20°C / 100kHz	-10°C / 100kHz			20°C / 100kHz	-10°C / 100kHz	
0.47	R47					5 × 11	5.00	10.0	25	
1	010					5 × 11	3.50	7.00	40	
2.2	2R2					5 × 11	3.00	6.00	55	
3.3	3R3					5 × 11	2.60	5.20	65	
4.7	4R7	5 × 11	0.60	1.20	180	5 × 11	2.30	4.60	90	
6.8	6R8	4 × 7	2.00	5.00	65					
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.

ALUMINUM ELECTROLYTIC CAPACITORS

Standard Ratings

V(Code)		63 (1J)				100 (2A)					
Cap.(μF)	Code	Item	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					
							10 × 16	0.37	0.74	420	
47	470		8 × 11.5	0.342	0.684	405	▲ 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		16 × 25	0.050	0.100	2160	18 × 31.5	0.068	0.136	1370	
680	681		16 × 25	0.050	0.100	2160	16 × 35.5	0.064	0.128	1410	
		▲ 12.5 × 35.5	0.047	0.094	2270						
		※ 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
		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
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	Δ 18 × 40	285	20 × 40	290	22 × 50	350	25 × 50	350
220	221	● 18 × 35.5	500	Δ 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								Case size φD × L (mm) ※

※ Rated ripple current (mArms) at 105°C 120Hz
 Size 20 × 31 is available for capacitors marked " ● "
 Size 20 × 35 is available for capacitors marked " Δ "
 In this case, [6] will be put at 12th digit of type numbering system.