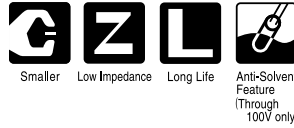
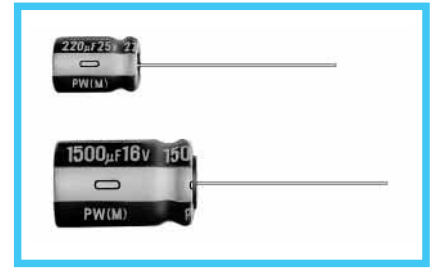
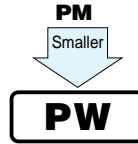


**PW** Low Impedance, High Reliability  
For Switching Power Supplies  
series



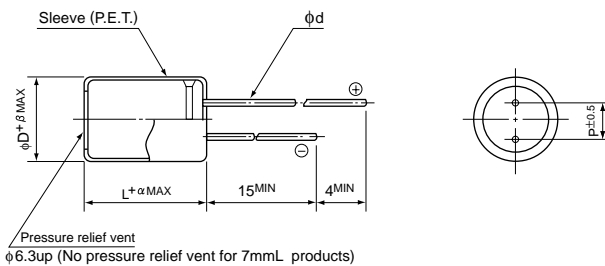
- Smaller case size and lower impedance than PM series.
- Low impedance and high reliability withstanding 2000 hours to 8000 hours.
- Capacitance ranges available based on the numerical values in E12 series under JIS.
- Adapted to the RoHS directive (2002/95/EC).



## Specifications

Item	Performance Characteristics
Category Temperature Range	-55 ~ +105°C (6.3 ~ 100V), -40 ~ +105°C (160 ~ 400V), -25 ~ +105°C (450V)
Rated Voltage Range	6.3 ~ 450V
Rated Capacitance Range	0.47 ~ 15000µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	Rated voltage (V) 6.3 ~ 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.
tan δ	CV ≤ 1000: I = 0.1CV+40 (µA) max. (1 minute's) CV > 1000: I = 0.04CV+100 (µA) max. (1 minute's)
	For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF. Measurement frequency : 120Hz, Temperature : 20°C
Stability at Low Temperature	Rated voltage (V) 6.3 10 16 25 35 50 63 100 160 ~ 250 315 ~ 350 400 450
	Impedance ratio Z-25°C / Z+20°C Z-40°C / Z+20°C Z-55°C / Z+20°C
Endurance	After an application of D.C. bias voltage plus the rated ripple current for 8000 hours (2000 hours for D = 4, 5 and 6.3, 3000 hours for D = 8, 5000 hours for D = 10, 7000 hours for D = 12.5) at 105°C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed at right.
	Capacitance change tan δ Leakage current
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed
Marking	Printed with white color letter on dark brown sleeve.

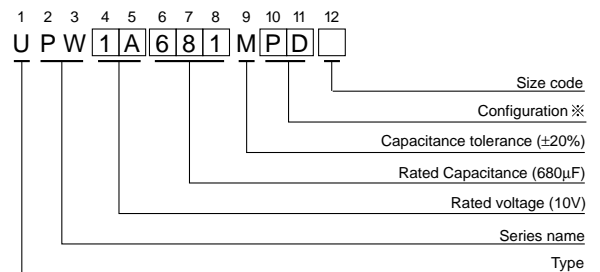
## Radial Lead Type



α	(mm)										
	φD	4	5	6.3	8	10	12.5	16	18	20	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

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

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



※ Configuration

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

## Frequency coefficient of rated ripple current

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

Please refer to page 21, 22, 23 about the formed or taped product spec.  
Please refer to page 3 for the minimum order quantity.

● Dimension table in next page.



## Standard ratings

V (Code)		6.3 (0J)				10 (1A)			
Cap. (μF)	Item Code	Case size φD × L (mm)	Impedance (Ω MAX.)		Rated ripple (mA rms) 105°C / 100kHz	Case size φD × 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 × 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	0.18	755	10 × 12.5 ▲ 8 × 15	0.090 0.085	0.18 0.17	760 730
820	821	8 × 15 ▲ 10 × 12.5	0.085 0.090	0.17 0.18	730 755				
1000	102	10 × 12.5	0.090	0.18	755	10 × 16 ▲ 8 × 20	0.068 0.065	0.136 0.13	1050 995
1200	122	8 × 20 ▲ 10 × 16	0.065 0.068	0.13 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

V(Code)		16 (1C)				25 (1E)			
Cap. (μF)	Item Code	Case size φD × L (mm)	Impedance (Ω MAX.)		Rated ripple (mA rms) 105°C / 100kHz	Case size φD × L (mm)	Impedance (Ω MAX.)		Rated ripple (mA rms) 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	0.18 0.17	760 730
470	471	10 × 12.5 ▲ 8 × 15	0.090 0.085	0.18 0.17	760 730	10 × 16 ▲ 8 × 20	0.068 0.065	0.136 0.13	1050 995
560	561					10 × 20	0.052	0.104	1220
680	681	10 × 16 ▲ 8 × 20	0.068 0.065	0.136 0.13	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. (μF)	Code	V(Code)	35 (1V)				50 (1H)			
			Case size φD × L (mm)	Impedance (Ω MAX.)		Rated ripple (mA rms) 105°C / 100kHz	Case size φD × 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	0.60	1.20	180	5 × 11	1.40	2.80	120
		▲ 5 × 7	0.95	2.40	120	▲ 4 × 11	2.50	5.00	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	0.60	1.20	180	5 × 15	0.90	1.80	215
		▲ 6.3 × 7	0.45	1.20	200					
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	0.155	0.31	635
		▲ 10 × 12.5	0.162	0.324	620					
150	151		8 × 11.5	0.117	0.234	555	10 × 12.5	0.162	0.324	615
180	181						8 × 20	0.120	0.240	860
		▲ 10 × 16	0.119	0.238	850					
220	221		10 × 12.5	0.090	0.18	760	10 × 16	0.119	0.238	850
		▲ 8 × 15	0.085	0.17	730	▲ 10 × 20	0.090	0.18	1030	
270	271					10 × 25	0.082	0.164	1200	
330	331		10 × 16	0.068	0.136	1050	10 × 20	0.090	0.18	1030
		▲ 8 × 20	0.065	0.13	995	▲ 10 × 31.5	0.060	0.12	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	0.12	1500
560	561		10 × 25	0.045	0.090	1440	12.5 × 25	0.050	0.10	1832
680	681		12.5 × 20	0.038	0.076	1660	12.5 × 25	0.050	0.10	1840
		▲ 10 × 31.5	0.035	0.070	1815	▲ 16 × 20	0.048	0.096	1840	
820	821						12.5 × 35.5	0.034	0.068	2290
		▲ 18 × 20	0.042	0.084	2420					
1000	102		12.5 × 25	0.030	0.060	1950	16 × 25	0.034	0.068	2235
1200	122		12.5 × 31.5	0.025	0.050	2310	16 × 31.5	0.028	0.056	2700
		▲ 16 × 20	0.029	0.058	2210	▲ 18 × 25	0.029	0.058	2610	
1500	152		16 × 25	0.022	0.044	2555	16 × 31.5	0.028	0.056	2700
		▲ 12.5 × 35.5	0.022	0.044	2510	▲ 16 × 35.5	0.025	0.050	2790	
1800	182		16 × 25	0.022	0.044	2555	18 × 31.5	0.025	0.050	3000
		▲ 18 × 20	0.028	0.056	2490					
2200	222		16 × 31.5	0.018	0.036	3010	18 × 35.5	0.023	0.046	3100
		▲ 18 × 25	0.020	0.040	2740					
2700	272		16 × 35.5	0.016	0.032	3150				
		▲ 18 × 31.5	0.016	0.032	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

Cap.(μF)	V(Code)	Item Code	63 (1J)				100 (2A)			
			Case size φD × L (mm)	Impedance (Ω MAX.)		Rated ripple (mA rms) 105°C / 100kHz	Case size φD × 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	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	0.23	0.46	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	0.15	0.30	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	0.13	0.26	1050	▲ 18 × 20	0.11	0.22	850	
270	271		16 × 15	0.090	0.18	1410				
330	331		12.5 × 20	0.085	0.17	1290	16 × 25	0.090	0.18	1080
390	391		12.5 × 25	0.070	0.14	1720	18 × 25	0.083	0.166	1260
		▲ 18 × 15	0.086	0.172	1690					
470	471		12.5 × 25	0.070	0.14	1720	16 × 31.5	0.076	0.152	1310
		▲ 12.5 × 31.5	0.055	0.11	2090					
560	561		16 × 20	0.059	0.118	1770	18 × 31.5	0.068	0.136	1370
		※ 16 × 20								
680	681		16 × 25	0.050	0.10	2160	16 × 35.5	0.064	0.128	1410
		▲ 12.5 × 35.5	0.047	0.094	2270					
		※ 18 × 20	0.055	0.11	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.

Cap. (μF)	V(Code)	Code	160		200		250		315		350		400		450	
			2C	12	2D	12	2E	12	2F	11	2V	11	2G	16	2W	18
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	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 ※

※ Rated Ripple (mA rms) 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.