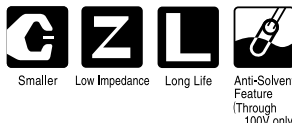
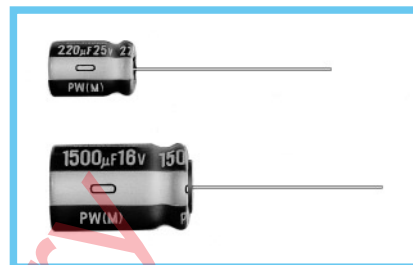
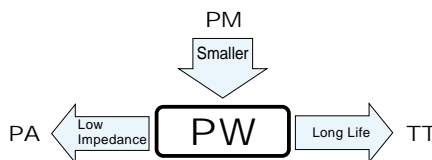


**PW** Miniature Sized, Low Impedance, High Reliability For Switching Power Supplies series



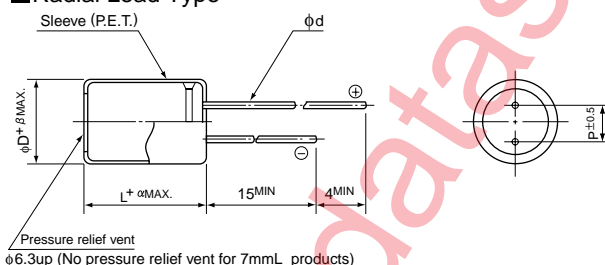
- Smaller case size and lower impedance than PM series.
- Low impedance and high reliability withstanding 2000 hours to 8000 hours.
- Capacitance ranges available based on the numerical values in E12 series under JIS.
- Adapted to the RoHS directive (2002/95/EC).



## 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	160 to 450										
	Leakage current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (µA), whichever is greater.	CV ≤ 1000: I = 0.1CV+40 (µA) max. (1 minute's) CV > 1000: I = 0.04CV+100 (µA) max. (1 minute's)										
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 250	315 · 350	400 · 450	
Stability at Low Temperature	Impedance ratio (MAX.)	120Hz											
		Rated voltage (V)											
		Z-25°C / Z+20°C	—	—	—	—	—	—	3	3	4	6	15
		Z-40°C / Z+20°C	—	—	—	—	—	—	4	6	8	10	—
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 initial value											
	tan δ	200% or less of initial specified value											
Shelf Life	After storing the capacitors under no load at 105°C for 1000 hours, and after performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they will meet the specified value for endurance characteristics listed above.												
	Marking	Printed with white color letter on dark brown sleeve.											

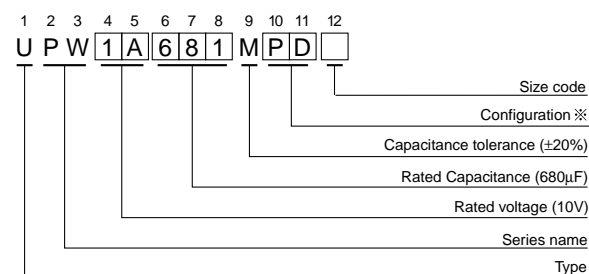
## Radial Lead Type



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

V (Code)		6.3 (0J)				10 (1A)			
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	
22	220	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
		▲ 4 × 7				▲ 4 × 7	2.00	5.00	
27	270	4 × 7	2.00	5.00	65				
33	330	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
		▲ 5 × 7	0.95	2.40		▲ 5 × 7	0.95	2.40	
39	390					5 × 7	0.95	2.40	120
47	470	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
		▲ 5 × 7	0.95	2.40		▲ 4 × 11	1.30	2.60	
56	560	5 × 7	0.95	2.40	120				
68	680	4 × 11	1.30	2.60	120				
82	820					5 × 11	0.60	1.20	180
						▲ 6.3 × 7	0.45	1.20	
100	101	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180
120	121	6.3 × 7	0.45	1.20	200	▲ 5 × 15	0.50	1.00	235
150	151	6.3 × 11	0.25	0.50	290	6.3 × 11	0.25	0.50	290
		▲ 5 × 15	0.50	1.00					
180	181					6.3 × 11	0.25	0.50	290
220	221	6.3 × 11	0.25	0.50	290	6.3 × 11	0.25	0.50	290
							▲ 6.3 × 15	0.23	
330	331	6.3 × 11	0.25	0.50	290	8 × 11.5	0.117	0.234	555
		▲ 6.3 × 15	0.23	0.46		430			
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	0.090	0.18	760
							▲ 8 × 15	0.085	
820	821	8 × 15	0.085	0.17	730				
		▲ 10 × 12.5	0.090	0.18		755			
1000	102	10 × 12.5	0.090	0.18	755	10 × 16	0.068	0.136	1050
							▲ 8 × 20	0.065	
1200	122	8 × 20	0.065	0.13	995	10 × 20	0.052	0.104	1220
		▲ 10 × 16	0.068	0.136		1050			
1500	152	10 × 20	0.052	0.104	1220	10 × 20	0.052	0.104	1220
							▲ 10 × 25	0.045	
2200	222	12.5 × 20	0.038	0.076	1655	12.5 × 20	0.038	0.076	1655
		▲ 10 × 25	0.045	0.090		1440	▲ 10 × 31.5	0.035	
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	0.030	0.060	1950
							▲ 12.5 × 31.5	0.025	
3900	392	12.5 × 25	0.030	0.060	1945	12.5 × 35.5	0.022	0.044	2510
							▲ 16 × 20	0.029	
4700	472	16 × 25	0.022	0.044	2555	16 × 25	0.022	0.044	2555
		▲ 12.5 × 31.5	0.025	0.050		2310			
5600	562	12.5 × 35.5	0.022	0.044	2510	16 × 25	0.022	0.044	2560
		▲ 16 × 20	0.029	0.058		2210	▲ 18 × 20	0.028	
6800	682	16 × 25	0.022	0.044	2560	16 × 31.5	0.018	0.036	3010
		▲ 18 × 20	0.028	0.056		2490	▲ 18 × 25	0.020	
8200	822	16 × 31.5	0.018	0.036	3010	16 × 35.5	0.016	0.032	3150
							▲ 18 × 31.5	0.016	
10000	103	16 × 31.5	0.016	0.032	3150	18 × 35.5	0.015	0.030	3680
		▲ 18 × 25	0.020	0.040		2740			
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) Code	Item	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					5 × 11	0.60	1.20	180	
10	100	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180	
15	150	4 × 7	2.00	5.00	65	▲ 4 × 7	2.00	5.00	65	
22	220	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180	
27	270	▲ 5 × 7	0.95	2.40	120	▲ 5 × 7	0.95	2.40	120	
33	330	5 × 7	0.95	2.40	120	4 × 11	1.30	2.60	120	
39	390	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180	
47	470	▲ 6.3 × 7	0.45	1.20	200	5 × 11	0.60	1.20	180	
56	560	4 × 11	1.30	2.60	120	▲ 6.3 × 7	0.45	1.20	200	
82	820	5 × 11	0.60	1.20	180	5 × 11	0.60	1.20	180	
100	101	▲ 6.3 × 7	0.45	1.20	200	5 × 15	0.50	1.00	235	
120	121	5 × 15	0.50	1.00	235	6.3 × 11	0.25	0.50	290	
150	151	6.3 × 11	0.25	0.50	290	6.3 × 11	0.25	0.50	290	
180	181	6.3 × 11	0.25	0.50	290	6.3 × 15	0.23	0.46	430	
220	221	6.3 × 15	0.23	0.46	430	8 × 11.5	0.117	0.234	555	
330	331	8 × 11.5	0.117	0.234	555	8 × 11.5	0.117	0.234	555	
470	471	10 × 12.5	0.090	0.18	760	10 × 12.5	0.090	0.18	760	
560	561	▲ 8 × 15	0.085	0.17	730	▲ 8 × 15	0.085	0.17	730	
680	681	10 × 16	0.068	0.136	1050	10 × 16	0.068	0.136	1050	
820	821	▲ 8 × 20	0.065	0.13	995	▲ 8 × 20	0.065	0.13	995	
1000	102	10 × 20	0.052	0.104	1220	10 × 20	0.052	0.104	1220	
1200	122	10 × 25	0.045	0.090	1440	10 × 25	0.045	0.090	1440	
1500	152	12.5 × 20	0.038	0.076	1655	12.5 × 20	0.038	0.076	1660	
1800	182	▲ 10 × 31.5	0.035	0.070	1815	▲ 10 × 31.5	0.035	0.070	1815	
2200	222	12.5 × 25	0.030	0.060	1945	12.5 × 25	0.030	0.060	1945	
2700	272	16 × 25	0.022	0.044	2555	16 × 25	0.022	0.044	2555	
3300	332	▲ 12.5 × 35.5	0.022	0.044	2510	▲ 12.5 × 35.5	0.022	0.044	2510	
3900	392	16 × 25	0.022	0.044	2560	16 × 25	0.022	0.044	2555	
4700	472	▲ 18 × 20	0.028	0.056	2490	▲ 18 × 20	0.028	0.056	2490	
5600	562	16 × 31.5	0.018	0.036	3010	16 × 31.5	0.018	0.036	3010	
6800	682	▲ 18 × 25	0.020	0.040	2740	▲ 18 × 25	0.020	0.040	2740	
8200	822	18 × 35.5	0.015	0.030	3680	18 × 35.5	0.015	0.030	3680	
10000	103	18 × 40	0.015	0.030	3680	18 × 40	0.014	0.028	3800	
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

V(Code)		35 (1V)				50 (1H)			
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	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) Code	Item	63 (1J)				100 (2A)			
			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	0.23	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					
		※ 16 × 20	0.059	0.118	1770					
560	561					18 × 31.5	0.068	0.136	1370	
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		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	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 (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.