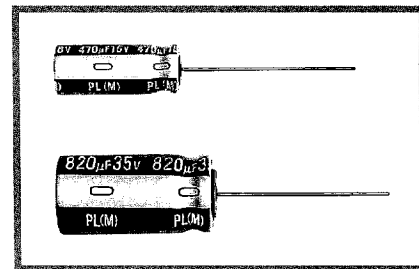


PL series Extremely Low Impedance, High Reliability



- Same case size as PF series, but extremely low impedance as little as 1/2 or PF series.
- High reliability withstanding 5000 hours load life at +105°C (3000/2000 hours for smaller case size as specified below).
- Capacitance ranges available based on the numerical values in E12 series under JIS.

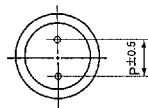
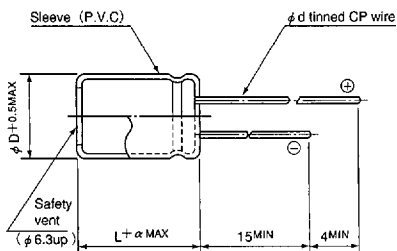


Specifications

Item	Performance Characteristics																
Operating Temperature Range	-55~+105°C																
Voltage Range	6.3~63V																
Capacitance Range	0.47~15000 µF																
Capacitance Tolerance	±20% at 120Hz, 20°C																
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	For capacitance of more than 1000 µF, add 0.02 for every increase of 1000 µF. Measurement frequency : 120Hz, Temperature : 20°C																
	<table border="1"> <tr> <td>Rated voltage(V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>tan δ (MAX.)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> </tr> </table>	Rated voltage(V)	6.3	10	16	25	35	50	63	tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12	0.10	0.08
Rated voltage(V)	6.3	10	16	25	35	50	63										
tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12	0.10	0.08										
Stability at Low Temperature	Measurement frequency : 120Hz																
	<table border="1"> <tr> <td>Rated voltage(V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>Impedance ratio ZT/Z20(MAX.)</td> <td>Z-55°C / Z+20°C</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> </tr> </table>	Rated voltage(V)	6.3	10	16	25	35	50	63	Impedance ratio ZT/Z20(MAX.)	Z-55°C / Z+20°C	4	4	3	3	3	2
Rated voltage(V)	6.3	10	16	25	35	50	63										
Impedance ratio ZT/Z20(MAX.)	Z-55°C / Z+20°C	4	4	3	3	3	2	2									
Load Life	After an application of D.C. bias voltage plus the rated ripple current for 5000 hours (2000 hours for D=5 and 6.3, 3000 hours for D=8) at 105°C the peak voltage shall not exceed the rated D.C. voltage, the capacitors meet the characteristic requirements shown on the right.																
	<table border="1"> <tr> <td>Capacitance change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>tan δ</td> <td>200% or less of initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>Initial specified value or less</td> </tr> </table>	Capacitance change	Within ±20% of initial value	tan δ	200% or less of initial specified value	Leakage current	Initial specified value or less										
	Capacitance change	Within ±20% of initial value															
tan δ	200% or less of initial specified value																
Leakage current	Initial specified value or less																
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. The value of tan δ is, however, 150% or less of initial specified value.																
Marking	Printed with white color letter on dark brown sleeve.																
Applicable Standards	JIS C - 5141 and JIS C - 5102.																

Radial Lead Type

Type numbering system (Example : 25V 470 µF φ 12.5X15)



1 2 3 4 5 6 7 8 9 10 11 12
U P L 1 E 4 7 1 M H H 6

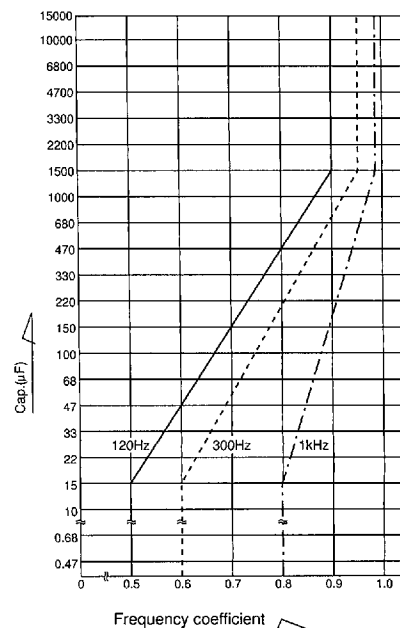
Configuration		Type	Code
Capacitance tolerance (±20%)	φ D	Small Dia	-
Capacitance (470 µF)	Code	Low Profile	6
Rated voltage (25V)	8 - 10		
Series name	12.5~18		
Type	HH		

α	(L < 20)	1.5
	(L ≥ 20)	2.0

φ D	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φ d	0.5	0.5	0.6	0.6	0.6*	0.8	0.8

*In case L > 25 for φ 12.5 (D) case sizes, lead diameter φ 0.8 (d) will be applied.

- Frequency coefficient of allowable ripple current (10kHz~200kHz=1)



• Dimension table in next pages.

PL series

Dimensions

Cap. (μF)	V (Code)	Size code	DXL (mm)													
			6.3 (0J)		10 (1A)		16 (1C)		25 (1E)		35 (1V)		50 (1H)		63 (1J)	
			—	6	—	6	—	6	—	6	—	6	—	6	—	6
0.47	R47														5X11	
0.68	R68														5X11	
1	010														5X11	
1.5	1R5														5X11	
2.2	2R2														5X11	
3.3	3R3														5X11	
4.7	4R7														5X11	
6.8	6R8														5X11	
10	100														5X11	5X11
12	120														5X11	5X11
15	150														5X11	6.3X11
18	180														5X11	6.3X11
22	220														5X11	6.3X11
27	270													5X11	6.3X11	6.3X11
33	330													5X11	6.3X11	6.3X15
39	390													5X11	6.3X11	6.3X15
47	470													5X11	6.3X11	6.3X15
56	560													5X11	6.3X11	6.3X15
68	680													5X11	6.3X11	6.3X15
82	820													5X11	6.3X11	6.3X15
100	101	5X11												5X11	6.3X11	6.3X15
120	121	5X11												5X11	6.3X11	6.3X15
150	151	6.3X11												6.3X11	6.3X15	6.3X15
180	181	6.3X11												6.3X11	6.3X15	6.3X15
220	221	6.3X11												6.3X11	6.3X15	6.3X15
270	271	6.3X15												6.3X15	6.3X15	6.3X15
330	331	6.3X15												6.3X15	6.3X15	6.3X15
390	391	8X11.5												8X11.5	8X11.5	8X11.5
470	471	8X15	10X12.5											8X15	10X12.5	10X12.5
560	561	8X15	10X12.5											8X15	10X12.5	10X12.5
680	681	8X20	10X15											8X20	10X15	10X15
820	821	8X20	10X15											8X20	10X15	10X15
1000	102	10X20	12.5X15											10X20	12.5X15	12.5X15
1200	122	10X20	12.5X15											10X20	12.5X15	12.5X15
1500	152	10X25	12.5X15											10X25	12.5X15	12.5X15
1800	182	10X31.5	16X15											10X31.5	16X15	16X15
2200	222	10X31.5	16X15											10X31.5	16X15	16X15
2700	272	12.5X25	18X15											12.5X25	18X15	18X15
3300	332	12.5X25	18X15											12.5X25	18X15	18X15
3900	392	12.5X31.5	16X20											12.5X31.5	16X20	16X20
4700	472	12.5X35.5	18X20											12.5X35.5	18X20	18X20
5600	562	12.5X40	18X20											12.5X40	18X20	18X20
6800	682	16X31.5	18X25											16X31.5	18X25	18X25
8200	822	16X35.5	18X31.5											16X35.5	18X31.5	18X31.5
10000	103	16X40	18X31.5											16X40	18X31.5	18X31.5
12000	123	18X35.5														
15000	153	18X40														

*In case of low profile type, ② will be put at 12th digit of type numbering system.

PL series

■ Standard ratings

Cap. (μF)		V (Code) Size code Item Code		6.3 (0J)									
				—				6					
				Case size φ D×L (mm)		Impedance (Ω MAX)		Allowable ripple (mA rms)		Case size φ D×L (mm)		Impedance (Ω MAX)	
		20°C/100kHz	-10°C/100kHz	105°C/10kHz~ 200kHz	105°C/120Hz	20°C/100kHz	-10°C/100kHz	105°C/10kHz~ 200kHz	105°C/120Hz				
100	101	5×11	0.85	1.70	150	99							
120	121	5×11	0.65	1.30	175	115							
150	151	6.3×11	0.49	0.98	225	155							
180	181	6.3×11	0.39	0.78	250	175							
220	221	6.3×11	0.30	0.60	285	205							
270	271	6.3×15	0.24	0.48	370	275							
330	331	6.3×15	0.20	0.40	405	310							
390	391	8×11.5	0.17	0.34	445	345							
470	471	8×15	0.14	0.28	550	435	10×12.5	0.14	0.28	575	455		
560	561	8×15	0.12	0.24	595	480	10×12.5	0.13	0.26	600	485		
680	681	8×20	0.10	0.20	730	605	10×15	0.11	0.22	700	580		
820	821	8×20	0.085	0.17	795	670	10×15	0.095	0.19	750	635		
1000	102	10×20	0.075	0.15	950	820	12.5×15	0.085	0.17	890	765		
1200	122	10×20	0.065	0.13	1020	895	12.5×15	0.075	0.15	950	835		
1500	152	10×25	0.055	0.11	1220	1090	12.5×15	0.065	0.13	1020	915		
1800	182	10×31.5	0.050	0.10	1370	1230	16×15	0.055	0.11	1270	1140		
2200	222	10×31.5	0.043	0.086	1470	1320	16×15	0.049	0.098	1340	1200		
2700	272	12.5×25	0.038	0.076	1590	1430	18×15	0.044	0.088	1500	1350		
3300	332	12.5×25	0.034	0.068	1710	1530	18×15	0.039	0.078	1600	1440		
3900	392	12.5×31.5	0.031	0.062	1910	1710	16×20	0.036	0.072	1720	1540		
4700	472	12.5×35.5	0.028	0.056	2100	1890	18×20	0.032	0.064	1920	1720		
5600	562	12.5×40	0.026	0.052	2270	2040	18×20	0.030	0.060	1980	1780		
6800	682	16×31.5	0.024	0.048	2370	2130	18×25	0.027	0.054	2210	1980		
8200	822	16×35.5	0.022	0.044	2550	2290	18×31.5	0.025	0.050	2390	2150		
10000	103	16×40	0.020	0.040	2750	2470	18×31.5	0.023	0.046	2490	2240		
12000	123	18×35.5	0.019	0.038	2820	2530							
15000	153	18×40	0.018	0.036	2960	2660							

Cap. (μF)		V (Code) Size code Item Code		10 (1A)									
				—				6					
				Case size φ D×L (mm)		Impedance (Ω MAX)		Allowable ripple (mA rms)		Case size φ D×L (mm)		Impedance (Ω MAX)	
		20°C/100kHz	-10°C/100kHz	105°C/10kHz~ 200kHz	105°C/120Hz	20°C/100kHz	-10°C/100kHz	105°C/10kHz~ 200kHz	105°C/120Hz				
68	680	5×11	0.80	1.60	155	97							
82	820	5×11	0.65	1.30	175	110							
100	101	6.3×11	0.55	1.10	210	135							
120	121	6.3×11	0.44	0.88	235	160							
150	151	6.3×11	0.35	0.70	265	185							
180	181	6.3×11	0.29	0.58	290	205							
220	221	6.3×15	0.24	0.48	370	270							
270	271	6.3×15	0.20	0.40	405	300							
330	331	8×11.5	0.16	0.32	460	350							
390	391	8×15	0.14	0.28	550	430	10×12.5	0.15	0.30	555	430		
470	471	8×15	0.12	0.24	595	475	10×12.5	0.13	0.26	600	475		
560	561	8×20	0.10	0.20	730	590	10×15	0.11	0.22	700	565		
680	681	8×20	0.085	0.17	795	660	10×15	0.090	0.18	770	635		
820	821	10×20	0.070	0.14	985	835	12.5×15	0.080	0.16	920	780		
1000	102	10×20	0.060	0.12	1060	915	12.5×15	0.065	0.13	1040	895		
1200	122	10×25	0.050	0.10	1280	1120	12.5×15	0.060	0.12	1060	930		
1500	152	10×31.5	0.045	0.090	1440	1290	16×15	0.050	0.10	1330	1190		
1800	182	12.5×20	0.039	0.078	1470	1320	16×15	0.044	0.088	1420	1270		
2200	222	12.5×25	0.034	0.068	1710	1530	18×15	0.039	0.078	1600	1440		
2700	272	12.5×31.5	0.030	0.060	1940	1740	16×20	0.035	0.070	1740	1560		
3300	332	12.5×35.5	0.026	0.052	2180	1960	16×20	0.031	0.062	1850	1660		
3900	392	12.5×40	0.024	0.048	2360	2120	18×20	0.028	0.056	2050	1840		
4700	472	16×31.5	0.023	0.046	2420	2170	18×25	0.026	0.052	2250	2020		
5600	562	16×35.5	0.021	0.042	2610	2340	18×25	0.024	0.048	2340	2100		
6800	682	16×35.5	0.020	0.040	2680	2410	18×31.5	0.022	0.044	2540	2280		
8200	822	16×40	0.019	0.038	2820	2530	18×35.5	0.021	0.042	2690	2420		
10000	103	18×40	0.017	0.034	3040	2730							

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

PL series

■ Standard ratings

Cap. (μF)	Code	Item	Case size φ D×L (mm)	35 (1V)				6				
				Impedance (Ω MAX.)		Allowable ripple (mA rms)		Impedance (Ω MAX.)		Allowable ripple (mA rms)		
				20°C/100kHz	-10°C/100kHz	105°C/10kHz~ 200kHz	105°C/120Hz	20°C/100kHz	-10°C/100kHz	105°C/10kHz~ 200kHz	105°C/120Hz	
22	220	5×11		0.75	1.50	160	85					
27	270	5×11		0.60	1.20	180	99					
33	330	6.3×11		0.49	0.98	225	125					
39	390	6.3×11		0.41	0.82	245	140					
47	470	6.3×11		0.34	0.68	270	160					
56	560	6.3×11		0.28	0.56	295	180					
68	680	6.3×15		0.24	0.48	370	230					
82	820	6.3×15		0.19	0.38	415	265					
100	101	8×11.5		0.16	0.32	460	305					
120	121	8×15		0.14	0.28	550	370	10×12.5	0.15	0.30	555	375
150	151	8×15		0.12	0.24	595	415	10×12.5	0.12	0.24	625	435
180	181	8×20		0.10	0.20	730	520	10×15	0.11	0.22	700	500
220	221	8×20		0.085	0.17	795	580	10×15	0.090	0.18	770	560
270	271	10×20		0.070	0.14	985	735	12.5×15	0.080	0.16	920	690
330	331	10×20		0.060	0.12	1060	810	12.5×15	0.065	0.13	1020	780
390	391	10×25		0.055	0.11	1220	955	12.5×15	0.060	0.12	1060	825
470	471	10×31.5		0.046	0.092	1420	1130	16×15	0.055	0.11	1270	1010
560	561	12.5×20		0.041	0.082	1430	1160	16×15	0.048	0.096	1360	1100
680	681	12.5×25		0.036	0.072	1660	1370	18×15	0.042	0.084	1540	1270
820	821	12.5×25		0.032	0.064	1760	1490	18×15	0.038	0.076	1620	1370
1000	102	12.5×31.5		0.029	0.058	1980	1710	16×20	0.034	0.068	1770	1530
1200	122	12.5×35.5		0.026	0.052	2180	1920	16×25	0.031	0.062	1980	1740
1500	152	12.5×40		0.024	0.048	2360	2120	18×20	0.028	0.056	2050	1840
1800	182	16×31.5		0.022	0.044	2470	2220	18×25	0.025	0.050	2290	2060
2200	222	16×35.5		0.020	0.040	2680	2410	18×31.5	0.023	0.046	2490	2240
2700	272	16×40		0.018	0.036	2900	2610	18×35.5	0.021	0.042	2690	2420
3300	332	18×40		0.017	0.034	3040	2730					

Cap. (μF)	Code	Item	Case size φ D×L (mm)	50 (1H)				6				
				Impedance (Ω MAX.)		Allowable ripple (mA rms)		Impedance (Ω MAX.)		Allowable ripple (mA rms)		
				20°C/100kHz	-10°C/100kHz	105°C/10kHz~ 200kHz	105°C/120Hz	20°C/100kHz	-10°C/100kHz	105°C/10kHz~ 200kHz	105°C/120Hz	
0.47	R47	5×11		23.0	46.0	22	11					
0.68	R68	5×11		16.0	32.0	28	14					
1	010	5×11		11.0	22.0	36	18					
1.5	1R5	5×11		7.50	15.0	45	22					
2.2	2R2	5×11		5.00	10.0	54	27					
3.3	3R3	5×11		3.30	6.60	66	33					
4.7	4R7	5×11		2.20	4.40	81	40					
6.8	6R8	5×11		1.80	3.60	91	45					
10	100	5×11		1.40	2.80	115	57					
12	120	5×11		1.20	2.40	125	62					
15	150	5×11		0.93	1.86	145	72					
18	180	5×11		0.80	1.60	155	79					
22	220	6.3×11		0.65	1.30	195	100					
27	270	6.3×11		0.53	1.06	215	115					
33	330	6.3×11		0.43	0.86	240	135					
39	390	6.3×11		0.36	0.72	260	150					
47	470	6.3×15		0.30	0.60	330	195					
56	560	6.3×15		0.25	0.50	360	220					
68	680	8×11.5		0.20	0.40	410	255					
82	820	8×15		0.17	0.34	500	320	10×12.5	0.18	0.36	510	330
100	101	8×20		0.14	0.28	620	410	10×15	0.16	0.32	580	385
120	121	8×20		0.12	0.24	670	455	10×15	0.13	0.26	640	435
150	151	10×20		0.10	0.20	820	570	12.5×15	0.11	0.22	785	545
180	181	10×20		0.085	0.17	890	635	12.5×15	0.095	0.19	845	605
220	221	10×25		0.075	0.15	1040	760	12.5×15	0.080	0.16	920	670
270	271	10×31.5		0.065	0.13	1200	900	16×15	0.070	0.14	1120	840
330	331	10×31.5		0.055	0.11	1300	995	16×15	0.060	0.12	1210	925
390	391	12.5×25		0.048	0.096	1440	1120	16×15	0.055	0.11	1270	990
470	471	12.5×25		0.044	0.088	1500	1190	18×15	0.046	0.092	1470	1170
560	561	12.5×31.5		0.040	0.080	1680	1360	16×20	0.044	0.088	1550	1260
680	681	12.5×35.5		0.036	0.072	1850	1530	16×20	0.040	0.080	1630	1350
820	821	12.5×40		0.033	0.066	2010	1700	18×20	0.036	0.072	1810	1530
1000	102	16×31.5		0.030	0.060	2120	1830	18×25	0.033	0.066	2000	1730
1200	122	16×35.5		0.028	0.056	2260	1990	18×31.5	0.031	0.062	2140	1880
1500	152	16×40		0.026	0.052	2410	2170	18×31.5	0.029	0.058	2220	1990
1800	182	18×35.5		0.025	0.050	2460	2210					
2200	222	18×40		0.024	0.048	2560	2300					

※In case of low profile type, 6 will be put at 12th digit of type numbering system.

PL series

Standard ratings

Cap. (μF)	Code	Item	63 (1J)									
			Case size φ D×L (mm)	Impedance (Ω MAX.)		Allowable ripple (mA rms)		Case size φ D×L (mm)	Impedance (Ω MAX.)		Allowable ripple (mA rms)	
				20°C/100kHz	-10°C/100kHz	105°C/10kHz~ 200kHz	105°C/120Hz		20°C/100kHz	-10°C/100kHz	105°C/10kHz~ 200kHz	105°C/120Hz
10	100	5×11	1.06	2.12	135	67						
12	120	5×11	0.93	1.86	145	72						
15	150	6.3×11	0.73	1.46	185	92						
18	180	6.3×11	0.63	1.26	195	100						
22	220	6.3×11	0.52	1.04	215	110						
27	270	6.3×11	0.43	0.86	240	130						
33	330	6.3×15	0.35	0.70	305	170						
39	390	6.3×15	0.30	0.60	330	190						
47	470	8×11.5	0.25	0.50	365	215						
56	560	8×15	0.21	0.42	450	275	10×12.5	0.23	0.46	450	275	
68	680	8×15	0.17	0.34	500	315	10×12.5	0.19	0.38	495	310	
82	820	8×20	0.15	0.30	600	385	10×15	0.16	0.32	580	375	
100	101	10×20	0.12	0.24	750	495	12.5×15	0.14	0.28	695	460	
120	121	10×20	0.10	0.20	820	555	12.5×15	0.12	0.24	750	510	
150	151	10×25	0.090	0.18	950	665	12.5×15	0.095	0.19	845	590	
180	181	10×31.5	0.075	0.15	1110	790	16×15	0.080	0.16	1050	750	
220	221	12.5×20	0.065	0.13	1140	835	16×15	0.070	0.14	1120	820	
270	271	12.5×25	0.055	0.11	1340	1000	18×15	0.060	0.12	1290	965	
330	331	12.5×25	0.049	0.098	1420	1090	18×15	0.050	0.10	1410	1080	
390	391	12.5×31.5	0.043	0.086	1620	1260	16×20	0.047	0.094	1500	1170	
470	471	12.5×35.5	0.039	0.078	1780	1420	16×25	0.042	0.084	1700	1350	
560	561	12.5×40	0.035	0.070	1950	1580	18×20	0.039	0.078	1730	1400	
680	681	16×31.5	0.032	0.064	2050	1700	18×25	0.035	0.070	1940	1610	
820	821	16×35.5	0.029	0.058	2220	1880	18×31.5	0.032	0.064	2110	1780	
1000	102	16×40	0.027	0.054	2370	2050	18×35.5	0.029	0.058	2280	1970	
1200	122	18×40	0.025	0.050	2510	2210						

※ In case of low profile type, 6 will be put at 12th digit of type numbering system.