

LF Series

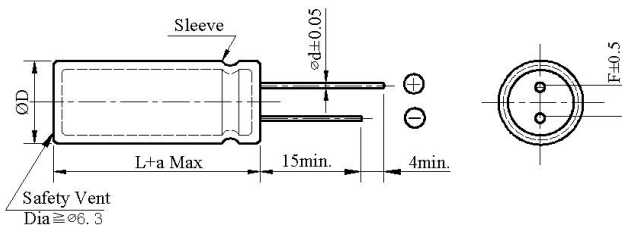
- High frequency, low impedance.
- Load life 2,000~3,000 hours at 105°C
- RoHS Compliant



◆ SPECIFICATIONS

Item	Performance Characteristics																																											
Category Temperature Range	-40 ~ +105℃																																											
Working Voltage Range	6.3 ~ 120Vdc																																											
Capacitance Range	10 ~ 10,000μF																																											
Capacitance Tolerance	±20% (at 20℃ and 120Hz)																																											
Dissipation Factor (tanδ) (at 20℃, 120Hz)	<table><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><td>80</td><td>100</td><td>120</td></tr><tr><td>tanδ(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>0.09</td><td>0.08</td><td>0.08</td><td>0.12</td></tr></table>											Rated Voltage (V)	6.3	10	16	25	35	50	63	80	100	120	tanδ(Max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.08	0.12											
	Rated Voltage (V)	6.3	10	16	25	35	50	63	80	100	120																																	
	tanδ(Max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.08	0.12																																	
The above values should be increased by 0.02 for every additional 1000μF																																												
Leakage Current	I=0.01CV or 3μA whichever is greater I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V) Impress the rated voltage for 2 minutes																																											
Low Temperature Characteristics Impedance Ratio(MAX)	<table><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><td>80</td><td>100</td><td>120</td></tr><tr><td>Z(-25℃)/Z(+20℃)</td><td>5</td><td>4</td><td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>3</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>8</td><td>6</td><td>6</td><td>5</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td><td>6</td></tr></table> (at 120Hz)											Rated voltage (V)	6.3	10	16	25	35	50	63	80	100	120	Z(-25℃)/Z(+20℃)	5	4	4	3	2	2	2	2	2	3	Z(-40℃)/Z(+20℃)	8	6	6	5	4	3	3	3	3	6
Rated voltage (V)	6.3	10	16	25	35	50	63	80	100	120																																		
Z(-25℃)/Z(+20℃)	5	4	4	3	2	2	2	2	2	3																																		
Z(-40℃)/Z(+20℃)	8	6	6	5	4	3	3	3	3	6																																		
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied for 2,000 to 3,000 hours at 105℃. <table><tr><td>Capacitance change</td><td>≧ ±25% of the initial value</td></tr><tr><td>Dissipation factor(tanδ)</td><td>≧ 200% of the specified value</td></tr><tr><td>Leakage current</td><td>≧ specified value</td></tr></table> <table><tr><td>Size</td><td>Life time (hours)</td></tr><tr><td>≦6.3 Φ</td><td>2,000</td></tr><tr><td>≧8 Φ</td><td>3,000</td></tr></table>											Capacitance change	≧ ±25% of the initial value	Dissipation factor(tanδ)	≧ 200% of the specified value	Leakage current	≧ specified value	Size	Life time (hours)	≦6.3 Φ	2,000	≧8 Φ	3,000																					
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Size	Life time (hours)																																											
≦6.3 Φ	2,000																																											
≧8 Φ	3,000																																											
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 20℃ after the rated voltage applied for 1,000 hours at 105℃ without voltage applied. <table><tr><td>Capacitance change</td><td>≧ ±25% of the initial value</td></tr><tr><td>Dissipation factor(tanδ)</td><td>≧ 200% of the specified value</td></tr><tr><td>Leakage current</td><td>≧ 200% of the specified value</td></tr></table>											Capacitance change	≧ ±25% of the initial value	Dissipation factor(tanδ)	≧ 200% of the specified value	Leakage current	≧ 200% of the specified value																											
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◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD+0.5 Max						
Φd	0.5	0.5	0.5/0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L+2.0 Max						

◆ **PART NUMBER SYSTEM(Example : 10V 100μF)**

E	L	F	1	A	1	0	1	M	0	5	1	1	0	0	I
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Sleeve code(Green)

Lead length code

Lead forming Type code

Size code(0511 : 5×11)

Capacitance tolerance code(M: $\pm 20\%$)

Capacitance code (100μF)

Voltage code(10V)

Series code(LF)

Category code(E)

LF Series

◆ Case size & Permissible rated ripple current

Nominal capacitance (μF)	6.3V				10V			
	Case size ΦD×L (mm)	Impedance (Ω _{max} /100KHz)		Max. Rated ripple current @105℃ 100KHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ω _{max} /100KHz)		Max. Rated ripple current @105℃ 100KHz (mA rms)
		20℃	-10℃			20℃	-10℃	
100	5×11	0.650	3.600	200	5×11	0.580	2.300	210
220	6.3×11	0.400	1.600	310	6.3×11	0.220	0.870	340
330	6.3×11	0.220	0.870	570	6.3×11	0.210	0.850	410
470	8×12	0.180	0.800	650	6.3×11	0.130	0.520	650
560	8×12	0.170	0.750	680	8×16	0.120	0.480	675
680	8×12	0.130	0.520	750	8×16	0.087	0.350	820
820	8×16	0.095	0.480	800	8×20	0.085	0.330	875
1000	8×16	0.087	0.350	880	10×16	0.060	0.240	1210
1200	8×20	0.069	0.270	1050	10×16	0.046	0.180	1400
1500	10×16	0.046	0.180	1400	10×20	0.045	0.180	1440
2200	10×20	0.045	0.180	1440	12.5×20	0.042	0.170	1750
2700	10×25	0.042	0.170	1700	12.5×20	0.040	0.160	1945
3300	12.5×20	0.040	0.160	1900	12.5×25	0.038	0.150	2230
3900	12.5×25	0.035	0.145	2230	12.5×30	0.033	0.140	2650
4700	12.5×30	0.030	0.120	2650	12.5×35	0.028	0.115	2880
5600	12.5×35	0.025	0.100	2880	12.5×35	0.022	0.092	2930
6800	12.5×35	0.022	0.092	2930	16×30	0.020	0.084	3450
8200	16×30	0.020	0.084	3450	16×35	0.018	0.076	3610
10000	16×35	0.018	0.076	3610	16×40	0.016	0.068	4080

Nominal capacitance (μF)	16V				25V			
	Case size ΦD×L (mm)	Impedance (Ω _{max} /100KHz)		Max. Rated ripple current @105℃ 100KHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ω _{max} /100KHz)		Max. Rated ripple current @105℃ 100KHz (mA rms)
		20℃	-10℃			20℃	-10℃	
47	5×11	0.800	2.800	155	5×11	0.580	2.300	210
68	6.3×11	0.560	2.200	220	6.3×11	0.360	1.800	230
100	6.3×11	0.520	1.500	255	6.3×11	0.220	0.870	340
150	8×12	0.210	0.860	350	8×12	0.200	0.690	405
220	8×12	0.200	0.790	650	8×12	0.150	0.550	650
330	8×12	0.130	0.520	680	8×16	0.130	0.520	840
470	8×16	0.110	0.420	870	10×12	0.100	0.420	1210
560	8×20	0.085	0.340	865	10×16	0.078	0.330	1220
680	8×20	0.069	0.270	1050	10×16	0.065	0.250	1400
820	10×16	0.058	0.230	1220	10×20	0.050	0.0210	1450
1000	10×20	0.045	0.180	1400	12.5×20	0.040	0.160	1730
1200	10×25	0.042	0.170	1650	12.5×25	0.036	0.130	1936
1500	12.5×20	0.035	0.130	1900	12.5×25	0.033	0.120	2230
2200	12.5×25	0.027	0.089	2230	12.5×35	0.026	0.088	2880
2700	12.5×30	0.024	0.078	2650	12.5×35	0.020	0.065	2930
3300	12.5×35	0.020	0.065	2880	16×30	0.018	0.055	3450
3900	12.5×40	0.018	0.056	3350	16×35	0.017	0.054	3610
4700	16×30	0.018	0.050	3450	16×40	0.016	0.044	4080
5600	16×35	0.016	0.044	3610				
6800	16×40	0.013	0.038	4080				

LF Series

◆ Case size & Permissible rated ripple current

Nominal capacitance (μF)	35V				50V			
	Case size ΦD×L (mm)	Impedance (Ω _{max} /100KHz)		Max. Rated ripple current @105℃ 100KHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ω _{max} /100KHz)		Max. Rated ripple current @105℃ 100KHz (mA rms)
		20℃	-10℃			20℃	-10℃	
10	5×11	1.600	6.500	100	5×11	1.450	5.600	110
22	5×11	0.750	3.200	160	5×11	1.200	5.200	180
33	5×11	0.580	2.300	210	6.3×11	0.480	1.700	215
47	6.3×11	0.480	1.800	250	6.3×11	0.450	1.600	220
68	8×12	0.210	0.870	350	8×12	0.280	1.100	355
100	8×12	0.200	0.850	580	8×12	0.250	1.000	620
150	8×12	0.170	0.720	650	8×16	0.200	0.850	730
220	8×15	0.120	0.650	840	10×16	0.150	0.650	1050
330	10×12	0.100	0.420	1210	10×20	0.120	0.520	1440
470	10×16	0.082	0.350	1400	12.5×20	0.100	0.420	1660
560	10×20	0.065	0.280	1650	12.5×25	0.086	0.360	1950
680	10×25	0.060	0.250	1910	12.5×30	0.070	0.290	2310
820	12.5×20	0.052	0.220	1938	12.5×35	0.055	0.230	2510
1000	12.5×20	0.038	0.150	2230	16×25	0.040	0.170	2555
1200	12.5×35	0.035	0.150	2650	16×30	0.038	0.150	3010
1500	12.5×30	0.030	0.120	2880	16×35	0.035	0.150	3150
2200	16×30	0.028	0.110	3450	18×35	0.030	0.120	3680
2700	16×35	0.026	0.098	3610	18×40	0.028	0.110	3800
3300	16×40	0.024	0.096	4080				
3900	18×40	0.022	0.094	4280				

Nominal capacitance (μF)	63V				80V			
	Case size ΦD×L (mm)	Impedance (Ω _{max} /100KHz)		Max. Rated ripple current @105℃ 100KHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ω _{max} /100KHz)		Max. Rated ripple current @105℃ 100KHz (mA rms)
		20℃	-10℃			20℃	-10℃	
10	5×11	2.850	9.300	30	6.3×11	2.400	8.000	60
22	6.3×11	1.850	7.200	60	8×12	1.500	6.600	90
33	6.3×11	1.200	5.000	115	8×12	1.000	4.500	135
47	8×12	1.000	4.500	170	8×16	0.750	3.100	200
56	8×12	0.600	2.600	235	8×16	0.510	2.100	260
68	8×12	0.580	2.500	245	8×16	0.400	1.680	290
100	8×16	0.430	1.900	305	10×12	0.300	1.250	430
220	10×16	0.170	0.750	450	10×20	0.180	0.780	510
330	12.5×25	0.120	0.450	784	12.5×20	0.150	0.650	760
470	12.5×20	0.100	0.420	950	12.5×25	0.083	0.350	980
560	12.5×35	0.083	0.350	1050	12.5×40	0.078	0.330	1160
680	12.5×40	0.071	0.300	1280	16×30	0.072	0.310	1300
820	16×30	0.054	0.200	1650	16×35	0.060	0.220	1700
1000	16×35	0.048	0.160	1900	16×40	0.045	0.150	1960
1200	18×35	0.045	0.150	2100	18×40	0.042	0.140	2200
1500	18×40	0.036	0.130	2330	18×45	0.035	0.125	2510
1800	18×45	0.035	0.125	2550				

LF Series

◆ Case size & Permissible rated ripple current

Nominal capacitance (μF)	100V				120V			
	Case size ΦD×L (mm)	Impedance (Ω _{max} /100KHz)		Max. Rated ripple current @105°C 100KHz (mA rms)	Case size ΦD×L (mm)	Impedance (Ω _{max} /100KHz)		Max. Rated ripple current @105°C 100KHz (mA rms)
		20°C	-10°C			20°C	-10°C	
10	6.3×11	2.200	9.300	60	6.3×11	6.000	25.30	75
15	6.3×11	1.800	7.700	105	6.3×11	5.000	21.20	96
22	6.3×11	1.100	5.000	150	8×12	4.000	17.20	125
33	8×12	0.620	2.800	242	8×16	3.500	15.10	220
47	8×16	0.430	1.800	288	8×20	2.800	12.00	260
56	10×12	0.400	1.700	300	10×16	2.500	10.80	280
68	10×12	0.310	1.500	360	10×16	2.200	9.500	300
82	10×16	0.250	1.000	470	10×20	2.000	8.500	360
100	10×20	0.200	0.840	535	10×25	1.800	7.700	400
120	12.5×16	0.180	0.770	650	12.5×20	1.500	6.400	495
150	12.5×20	0.160	0.680	700	12.5×25	1.100	4.700	540
220	12.5×30	0.100	0.420	930	16×20	0.820	3.500	660
270	16×20	0.095	0.400	1020	16×25	0.600	2.500	750
330	16×30	0.071	0.300	1180	18×25	0.450	1.900	810
470	16×35	0.045	0.170	1810	18×30	0.350	1.500	900
560	16×40	0.040	0.150	2020	18×35	0.300	1.300	1000
680	18×35	0.040	0.150	2180	18×40	0.250	1.000	1100
820	18×40	0.036	0.130	2330				

◆ RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

Vdc	Cap(μF)	Frequency (Hz)			
		120	1K	10K	100K
6.3 ~ 120	6.8~180	0.40	0.75	0.90	1.00
	220~560	0.50	0.85	0.94	1.00
	680~1800	0.60	0.87	0.95	1.00
	2200~3900	0.75	0.90	0.95	1.00
	≥4700	0.85	0.95	0.98	1.00