

LF Series

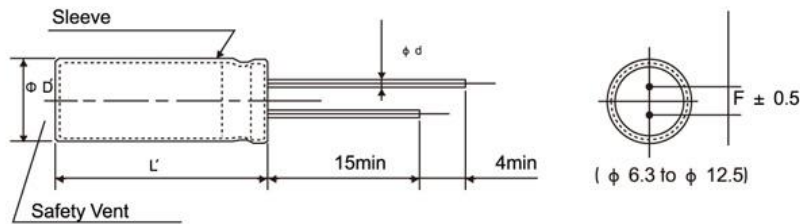
- Low impedance for high frequency
- Life time: +105 °C 2,000 to 4,000 hours
- Suitable for switching power, UPS, power sources etc
- RoHS Compliant



● SPECIFICATIONS

Items	Characteristics										
Category	-40 to +105 °C (6.3 to 100Vdc)										
Temperature Range											
Rated Voltage Range	6.3 to 100Vdc										
Capacitance Tolerance	± 20%(M) (at 20 °C 120Hz)										
Leakage Current	$1 \leq 0.01CV$ or $3 \mu A$, whichever is greater Where, I:Max.leakage current(μA), C:Nominal capacitance (μF) V:Rated voltage(V) (at 20 °C ,after 2minutes)										
Dissipation Factor (tan δ)	Rated voltage(Vdc)	6.3	10	16	25	35	50	63	100		
	tan δ (Max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08		
	When nominal capacitance exceeds 1,000 μF add 0.02 to the value above for each 1,000 μF increase (at 20 °C 120Hz)										
Low Temperature Characteristics (Max.Impedance Ratio)	Rate Voltage(Vdc)	6.3	10	16	5	35	50	63	100		
	Z(-25 °C)/Z(+20 °C)	4	3	2							
	Z(-40 °C)/Z(+20 °C)	8	6	4	3						
Endurance	The following specification shall be satisfied when the capacitors are restored to 20 °C after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105 °C										
	Capacitance Change	≤ ± 25% of the initial value							Case Dia	Life time(hours)	
	D.F. (tan δ)	≤ 200% of the initial specified value							Φ D=6.3	6.3-100WV	
	Leakage Current	≤ The initial specified value							Φ D=8&10	2000	
									Φ D ≥ 12.5	3000	
									4000		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20 °C after exposing them for 1,000 hours at 105 °C without voltage applied										
	Capacitance Change	≤ ± 25% of the initial value									
	D.F. (tan δ)	≤ 200% of the initial specified value									
	Leakage current	≤ 200% The initial specified value									

● DIMENSIONS[mm]



Φ D	6.3	8	10	12.5
Φ d	0.5	0.5	0.6	0.6
F	2.5	3.5	5.0	5.0
Φ D'	Φ D+0.5max			
L'	L+2max			

● RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

CAP(μF)	Freq (Hz)			
	120	1k	10k	100k
CAP < 220	0.40	0.75	0.90	1.00
220 ≤ Cap < 680	0.60	0.85	0.94	1.00
680 ≤ Cap < 2200	0.60	0.87	0.95	1.00
2200 ≤ Cap < 4700	0.75	0.90	0.95	1.00
Cap ≥ 4700	0.85	0.95	0.98	1.00

The endurance of capacitors is shorted with internal heating produced by ripple current at the rate of halving the lifetime with every 5 °C rise. When long life performance is required in actual use, the rms ripple current has to be reduced

LF Series

STANDARD RATINGS (Impedance: at 20 °C 100kHz/ Ω max, Ripple current; mArms/105 °C 100kHz)

WV (V _d)	Cap (μF)	Case Size φ D × L(mm)	tan δ	Impedance (Ω max)	Ripple current (mArms)	
6.3(OJ)	180	6.3 × 11 8 × 9	0.22	0.25 0.33	340 300	
	220	6.3 × 11 8 × 9	0.22	0.25 0.33	340 300	
	270	6.3 × 11 8 × 9	0.22	0.25 0.33	340 300	
	330	8 × 11 10 × 9	0.22	0.13 0.17	650 580	
	470	8 × 11 10 × 9	0.22	0.13 0.17	650 580	
	560	8 × 11 10 × 9	0.22	0.13 0.17	650 580	
	680	8 × 11 10 × 9	0.22	0.13 0.17	650 580	
	820	10 × 12	0.22	0.08	870	
	1000	10 × 9 10 × 12	0.22	0.17 0.08	580 870	
	1200	10 × 12	0.22	0.08	870	
	1500	8 × 20 10 × 16	0.22	0.068 0.060	1050 1210	
	1800	10 × 20	0.22	0.045	1400	
	2200	10 × 20	0.24	0.045	1400	
	2700	10 × 25 12.5 × 20	0.24	0.042 0.035	1650 1900	
	3300	10 × 25 12.5 × 20	0.26	0.042 0.036	1860 1900	
	3900	12.5 × 20	0.26	0.035	1900	
	4700	12.5 × 25	0.28	0.030	2130	
	10(1A)	150	6.3 × 11 8 × 9	0.19	0.25 0.33	340 300
180		6.3 × 11 8 × 9	0.19	0.25 0.33	340 300	
220		6.3 × 11 8 × 9	0.19	0.25 0.33	340 300	
270		8 × 9 10 × 9	0.19	0.33 0.17	300 580	
330		10 × 9	0.19	0.17	580	
470		10 × 9	0.19	0.17	580	
560		10 × 9	0.19	0.17	580	
680		10 × 9	0.19	0.17	580	
820		10 × 12	0.19	0.08	870	
1000		8 × 16 10 × 16	0.19	0.087 0.06	850 1210	
1200		10 × 20	0.19	0.045	1400	
1500		10 × 20	0.19	0.045	1400	
1800		10 × 20	0.19	0.045	1400	
2200		10 × 20	0.21	0.045	1400	
2700		10 × 25 12.5 × 20	0.21	0.042 0.035	1650 1900	
3300		12.5 × 25	0.23	0.030	2130	
16(1C)		100	8 × 9	0.16	0.33	300
		120	8 × 9	0.16	0.33	300
	150	8 × 9 10 × 9	0.16	0.33	300 580	
	180	8 × 9 10 × 9	0.16	0.33	300 580	
	220	8 × 9 10 × 9	0.16	0.33	300 580	
	270	10 × 9	0.16	0.17	580	
	330	10 × 9	0.16	0.17	580	
	470	10 × 9 10 × 12	0.16	0.17 0.08	580 870	
	560	10 × 12	0.16	0.08	870	
	680	8 × 16 10 × 12	0.16	0.087 0.08	850 870	
	820	10 × 16	0.16	0.06	1210	
	1000	10 × 16	0.16	0.06	1210	
	1200	10 × 20	0.16	0.045	1400	
	1500	10 × 20	0.16	0.045	1400	
	1800	10 × 25 12.5 × 20	0.16	0.042 0.035	1650 1800	
	2200	12.5 × 20	0.18	0.035	1900	
	2700	12.5 × 20	0.18	0.030	2130	

WV (V _d)	Cap (μF)	Case Size φ D × L(mm)	tan δ	Impedance (Ω max)	Ripple current (mArms)	
25(1E)	82	6.3 × 11 8 × 9	0.14	0.25 0.33	340 300	
	100	6.3 × 11 8 × 9	0.14	0.25 0.23	340 300	
	120	8 × 11 10 × 9	0.14	0.13 0.17	650 580	
	150	8 × 11 10 × 9	0.14	0.13 0.17	650 580	
	180	8 × 11 10 × 9	0.14	0.13 0.17	650 580	
	220	8 × 11 10 × 9	0.14	0.13 0.17	650 580	
	270	10 × 9 10 × 12	0.14	0.17 0.08	580 870	
	330	10 × 9 10 × 12	0.14	0.17 0.08	580 870	
	470	8 × 16 10 × 12	0.14	0.087 0.080	840 870	
	560	10 × 16	0.14	0.060	1210	
	680	10 × 16	0.14	0.060	1210	
	820	10 × 20	0.14	0.045	1400	
	1000	10 × 20	0.14	0.045	1400	
	1200	10 × 20	0.14	0.045	1400	
	1500	10 × 25 12.5 × 20	0.14	0.042 0.035	1650 1900	
	1800	12.5 × 25	0.14	0.030	2130	
	2200	12.5 × 25	0.16	0.030	2130	
	35(1V)	47	6.3 × 11 8 × 9	0.12	0.25 0.33	340 300
		56	6.3 × 11 8 × 9	0.12	0.25 0.33	340 300
		68	6.3 × 11 8 × 9	0.12	0.25 0.33	340 300
		82	8 × 11 10 × 9	0.12	0.13 0.17	650 580
		100	8 × 11 10 × 9	0.12	0.13 0.17	650 580
120		8 × 11 10 × 9	0.12	0.13 0.17	650 580	
150		8 × 11 10 × 9	0.12	0.13 0.17	650 580	
180		10 × 12	0.12	0.080	870	
220		8 × 11 10 × 9 8 × 16 10 × 12	0.12	0.13 0.17 0.087 0.080	650 580 840 870	
270		10 × 15	0.12	0.06	1210	
330		8 × 20 10 × 12 10 × 16	0.12	0.069 0.080 0.060	1000 870 1210	
470		10 × 16	0.12	0.060	1210	
560		10 × 20	0.12	0.045	1400	
680		10 × 20	0.12	0.045	1400	
820		10 × 25 12.5 × 20	0.12	0.042 0.035	1650 1900	
1000		12.5 × 20 12.5 × 25	0.12	0.035 0.030	1900 2130	
50(1H)		33	6.3 × 11 8 × 9	0.10	0.30 0.40	295 260
		39	6.3 × 11 8 × 9	0.10	0.30 0.40	295 260
	47	6.3 × 11 8 × 9	0.10	0.30 0.40	295 260	
	56	8 × 11 10 × 9	0.10	0.17 0.23	560 500	
	68	8 × 11 10 × 9	0.10	0.17 0.23	560 500	
	82	8 × 11 10 × 9	0.10	0.17 0.23	560 500	
	100	10 × 12	0.10	0.12	760	
	120	8 × 16 10 × 12	0.10	0.12 0.12	730 760	
	150	10 × 16	0.10	0.084	1050	
	180	8 × 20 10 × 16	0.10	0.090 0.084	1050	
	220	10 × 16	0.10	0.084	1050	
	270	10 × 25	0.10	0.055	1440	
	330	12.5 × 20	0.10	0.045	1660	
	470	12.5 × 25	0.10	0.034	1950	
	580	12.5 × 25	0.10	0.034	1950	

LF Series

STANDARD RATINGS (Impedance: at 20 °C 100kHz/ Ω max, Ripple current; mArms/105 °C 100kHz)

WV (V _d)	Cap (μF)	Case Size φ D × L(mm)	tan δ	Impedance (Ω max)	Ripple current (mArms)
63(1J)	22	6.3 × 11 8 × 9	0.09	0.95 1.24	120 100
	27	6.3 × 11 8 × 9	0.09	0.95 1.24	120 100
	33	6.3 × 11 8 × 9	0.09	0.95 1.24	120 100
	39	8 × 11 10 × 9	0.09	0.51 0.67	235 210
	47	8 × 11 10 × 9	0.09	0.51 0.67	235 210
	56	8 × 11 10 × 9	0.09	0.51 0.67	235 210
	68	8 × 11 10 × 9	0.09	0.51 0.67	235 210
	82	10 × 12	0.09	0.340	315
	100	8 × 16 10 × 12	0.09	0.350 0.340	300 315
	120	10 × 16	0.09	0.245	360
	150	8 × 20	0.09	0.265	360
	180	10 × 20	0.09	0.165	470
	220	10 × 20	0.09	0.165	470
	270	12.5 × 20	0.09	0.125	700
	330	12.5 × 20	0.09	0.125	700
	390	12.6 × 25	0.09	0.095	930

WV (V _d)	Cap (μF)	Case Size φ D × L(mm)	tan δ	Impedance (Ω max)	Ripple current (mArms)
100(2A)	15	6.3 × 11 8 × 9	0.08	0.95 1.24	120 100
	27	8 × 11 10 × 9	0.08	0.51 0.67	235 210
	39	8 × 16	0.08	0.36	300
	47	10 × 12	0.08	0.34	315
	56	8 × 20	0.08	0.265	360
	68	10 × 16	0.08	0.245	360
	82	10 × 20	0.08	0.165	470
	100	10 × 20	0.08	0.165	470
	120	12.5 × 20	0.08	0.125	700
	180	12.5 × 25	0.08	0.095	930
	220	12.5 × 25	0.08	0.095	930

LF Series

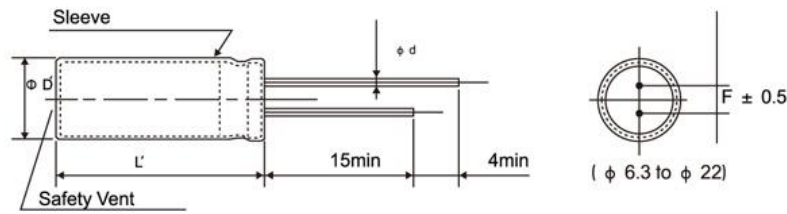
- High frequency, low impedance
- Endurance; +105 °C 2,000 ~ 3,000 hours
- RoHS Compliant



● SPECIFICATIONS

Items	Characteristics							
Category Temperature Range	-25 to +105 °C (160V-450Vdc)							
Rated Voltage Range	160 to 450Vdc							
Capacitance Tolerance	± 20%(M) (at20 °C 120Hz)							
Leakage Current	$1 \leq 0.02CV$ or $10 \mu A$, whichever is greater Where, I:Max.leakage current(μA), C:Nominal capacitance (μF) V:Rated voltage(V) (at20 °C ,after 2minutes)							
Dissipation Factor (tan δ)	Rated voltage(Vdc)	160	200	250	350	400	450	(at20 °C 120Hz)
	tan δ (Max)	0.12	0.12	0.12	0.15	0.15	0.20	
Low Temperature Characteristics (Max.Impedance Ratio)	Rate Voltage(Vdc)	160	200	250	350	400	450	(at120Hz)
	Z[-25 °C]/Z(+20 °C)	3	5			6		
	Z[-40 °C]/Z(+20 °C)	4	7			-		
Endurance	The following specification shall be satisfied when the capacitors are restored to 20 °C after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105 °C							
	Capacitance Change	$\leq \pm 20\%$ of the initial value					Case Dia	Life time(hours)
	D.F. (tan δ)	$\leq 200\%$ of the initial specified value					$\Phi D \leq 8$	2000
	Leakage Current	\leq The initial specified value					$\Phi D \geq 10$	3000
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20 °C after exposing them for 1,000 hours at 105 °C without voltage applied							
	Capacitance Change	$\leq \pm 20\%$ of the initial value						
	D.F. (tan δ)	$\leq 200\%$ of the initial specified value						
	Leakage Current	$\leq 200\%$ The initial specified value						

● DIMENSIONS[mm]



ΦD	6.3	8	10	12.5	16	18	22
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.5	3.5	5.0	5.0	7.5	7.5	10.0
$\Phi D'$	$\Phi D+0.5\max$						
L'	L+2max						

● RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

CAP(μF) \ Freq (Hz)	120	1k	10k	100k
CAP < 18	0.59	0.85	0.97	1.00
18 \leq Cap. < 100	0.62	0.89	0.97	1.00
Cap \geq 100	0.72	0.90	0.98	1.00

The endurance of capacitors is shorted with internal heating produced by ripple current at the rate of halving the lifetime with every 5 °C rise, When long life performance is required in actual use, the rms ripple current has to be reduced

LF Series

STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case Size φ D × L(mm)	tan δ	Ripple current (mAmps/105 °C, 100kHz)
160(2C)	2.2	6.3 × 11	0.12	54
	3.3	6.3 × 11	0.12	70
	4.7	8 × 12	0.12	82
	10	10 × 12	0.12	142
	22	10 × 16	0.12	206
	33	10 × 20	0.12	265
	47	12.5 × 20	0.12	332
	100	12.5 × 25	0.12	546
	220	16 × 30	0.12	822
200(2D)	1	5 × 11	0.12	34
	2.2	6.3 × 11	0.12	52
	3.3	6.3 × 11	0.12	70
	4.7	8 × 12	0.12	82
	10	10 × 12	0.12	144
	22	10 × 16	0.12	206
	22	10 × 20	0.12	215
	33	10 × 20	0.12	288
	33	12.5 × 20	0.12	330
	47	12.5 × 20	0.12	366
	56	12.5 × 25	0.12	430
	68	12.5 × 25	0.12	488
	82	10 × 30	0.12	518
	100	16 × 25	0.12	720
	120	16 × 25	0.12	745
	150	18 × 25	0.12	845
	180	12.5 × 35	0.12	882
	220	18 × 30	0.12	960
250(2E)	0.47	6.3 × 11	0.12	35
	1	6.3 × 11	0.12	40
	2.2	6.3 × 11	0.12	52
	3.3	8 × 12	0.12	72
	4.7	8 × 12	0.12	84
	10	10 × 12	0.12	144
	22	10 × 20	0.12	220
	33	12.5 × 20	0.12	335
	47	12.5 × 25	0.12	382
	56	12.5 × 25	0.12	426
	82	16 × 25	0.12	575
	100	16 × 30	0.12	740
	220	18 × 35	0.12	1010
	330	18 × 45	0.12	1100
	470	22 × 45	0.12	1200
350(2V)	0.47	6.3 × 11	0.15	35
	1	6.3 × 11	0.15	40
	2.2	8 × 12	0.15	54
	3.3	8 × 12	0.15	74
	3.3	10 × 12	0.15	80
	4.7	10 × 16	0.15	104
	10	10 × 16	0.15	170
	22	12.5 × 25	0.15	285
	33	16 × 25	0.15	330
47	16 × 30	0.15	480	

WV (Vdc)	Cap (μF)	Case Size φ D × L(mm)	tan δ	Ripple current (mAmps/105 °C, 100kHz)	
400(2G)	1	8 × 12	0.15	40	
	2.2	8 × 12	0.15	62	
	3.3	8 × 12	0.15	85	
	3.3	10 × 12	0.15	90	
	4.7	10 × 12	0.15	106	
	10	10 × 16	0.15	175	
	10	10 × 20	0.15	200	
	22	12.5 × 20	0.15	300	
	27	10 × 30	0.15	385	
	33	10 × 35	0.15	450	
	33	16 × 20	0.15	440	
	39	10 × 40	0.15	490	
	47	12.5 × 30	0.15	595	
	47	16 × 25	0.15	584	
	56	10 × 45	0.15	655	
	56	12.5 × 35	0.15	650	
	68	12.5 × 40	0.15	815	
	68	16 × 30	0.15	780	
	82	12.5 × 40	0.15	850	
	82	18 × 30	0.15	835	
450(2W)	100	12.5 × 50	0.15	890	
	100	18 × 30	0.15	870	
	120	22 × 31	0.15	895	
	150	12.5 × 60	0.15	950	
	150	22 × 31	0.15	940	
	450(2W)	1	8 × 12	0.20	40
		2.2	10 × 12	0.20	65
		3.3	10 × 16	0.20	92
		4.7	10 × 20	0.20	108
		10	12.5 × 20	0.20	160
		18	10 × 30	0.20	200
		22	16 × 20	0.20	305
		27	10 × 30	0.20	385
		33	10 × 35	0.20	460
		33	16 × 25	0.20	455
39		10 × 40	0.20	500	
47		10 × 45	0.20	635	
47		12.5 × 30	0.20	630	
47		18 × 25	0.20	620	
56		12.5 × 35	0.20	705	
56		18 × 25	0.20	695	
68		12.5 × 40	0.20	750	
68		18 × 30	0.20	730	
82		12.5 × 45	0.20	800	
82		18 × 30	0.20	770	
100	18 × 35	0.20	860		
120	18 × 40	0.20	1050		
150	22 × 40	0.20	1260		
220	22 × 46	0.20	1430		

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