

# SL [ Long Life and Low Impedance ]

105°C 3000 ~ 7000 Hours, High Ripple Current and Long Life

## Miniature Aluminum Electrolytic Capacitors

### ELECTRICAL CHARACTERISTICS

Operating Temperature Range: -40 ~ +105°C / -25 ~ +105°C

Rated Voltage Range: 6.3 ~ 100V / 160 ~ 450V

Rated Capacitance Range: 2.2 ~ 18000μF

Capacitance Tolerance: ±20% at 120Hz, 20°C

Leakage Current (Max.) (20°C): I = 0.01CV or 3μA whichever is greater:

(After Rated Voltage Applied for 2 Minutes)

CV ≤ 1000: I = 0.1CV+40μA (max.), CV > 1000: I = 0.04CV+100μA (max.) (After 1 minute)

Dissipation Factor (Max.) (tanδ) (120Hz, 20°C)

WV (V) :	6.3	10	16	25	35	50	63	100	160~250	40~450
D.F. (%) :	22	19	16	14	12	10	9	8	20	24

When nominal capacitance exceeds 1000μF, add 0.02 to the value above for each 1000μF increase.

Temperature Characteristics (Impedance Ratio at 120Hz)

WV (V) :	6.3	10	16	25	35	50	63	100	160~250	400	450
Z-25°C/Z+20°C :	4	3	3	3	3	3	2	2	3	5	6
Z-40°C/Z+20°C :	8	6	4	4	3	3	3	3			

Endurance: After the rated voltage has been applied at 105°C and then has resumed its original condition for 16 hours.

Dø :	6.3ø	8ø	10ø	12.5ø
Load Life :	3000hrs	4000hrs	5000hrs	7000hrs

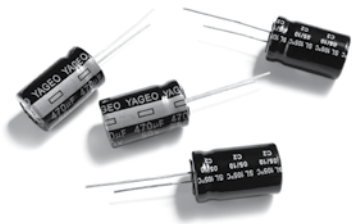
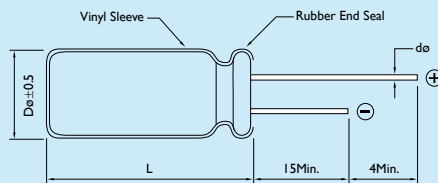
- (a) Capacitance Change: ±25% of the Initial Measured Value
- (b) Dissipation Factor: ≤ The Initial Specified Value
- (c) Leakage Current: ≤ 2 Times of the Initial Specified Value

Shelf Life: After having been stored at 105°C for 1000 hours, and then has resumed its original condition for 16 hours.

- (a) Capacitance Change: ±25% of the Initial Measured Value
- (b) Dissipation Factor: ≤ The Initial Specified Value
- (c) Leakage Current: ≤ 2 Times of the Initial Specified Value

### DIAGRAM OF DIMENSIONS

Dø	F	dø
6.3	2.5	0.5
8.0	3.5	0.6
10.0	5.0	
12.5		
16.0	7.5	0.8
18.0		



### DESCRIPTION

Excellent Ripple Current Capability

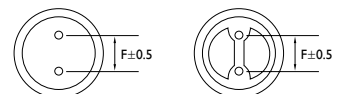
Used in communication equipment, switching power supplies, industrial measuring.

### MULTIPLIER FOR RIPPLE CURRENT

Frequency Coefficient

FREQUENCY (Hz)	120	1K	10K	100K
~180μF	0.40	0.75	0.90	1.00
220~560μF	0.50	0.85	0.94	1.00
680~1800μF	0.60	0.87	0.95	1.00
2200~3900μF	0.75	0.90	0.95	1.00
4700~18000μF	0.85	0.95	0.98	1.00

Dimensions: mm



Dø ≤ 20 Dø + 0.5  
Dø ≥ 20 Dø + 1



## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)								
	6.3 (8) SIZE			10 (13) SIZE			16 (20) SIZE		
	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR
100							6.3 x 11	298	0.286
120							6.3 x 11	298	0.286
150				6.3 x 11	298	0.286			
180				6.3 x 11	298	0.286	8 x 11	561	0.169
220	6.3 x 11	298	0.286	6.3 x 11	298	0.286	8 x 11	561	0.169
				8 x 11	561	0.169			
270	6.3 x 11	298	0.286				8 x 11	561	0.169
330	6.3 x 11	298	0.286	8 x 11	561	0.169	8 x 11	561	0.169
	8 x 11	561	0.169						
390	8 x 11	561	0.169	8 x 11	561	0.169	10 x 12	759	0.104
470	8 x 11	561	0.169	8 x 11	561	0.169	10 x 15	737	0.113
560	8 x 11	561	0.169	10 x 12	759	0.104	10 x 15	1061	0.078
680				8 x 15	737	0.113	8 x 20	921	0.090
				10 x 12	759	0.104	10 x 15	1061	0.078
820	8 x 15	737	0.113	10 x 15	1061	0.078	10 x 19.5	1228	0.060
	10 x 15	1061	0.078				12.5 x 15	1272	0.064
1000	10 x 15	1061	0.078	8 x 20	921	0.090	10 x 19.5	1228	0.060
				10 x 15	1061	0.078	10 x 25	1447	0.055
1200	8 x 15	921	0.090	10 x 19.5	1228	0.060	10 x 25	1447	0.055
				12.5 x 15	1272	0.064	16 x 15	1649	0.065
1500	10 x 19.5	1228	0.060	10 x 25	1447	0.055	10 x 30	1675	0.040
	12.5 x 15	1272	0.064				16 x 15	1570	0.072
1800	10 x 25	1447	0.055	10 x 19.5	1228	0.060	12.5 x 25	1863	0.039
				16 x 15	1649	0.065	18 x 15	1687	0.073
2200	10 x 25	1447	0.055	16 x 20	1938	0.046	12.5 x 25	1863	0.039
	16 x 15	1649	0.065				16 x 20	1938	0.046
2700	10 x 30	1675	0.040	12.5 x 25	1863	0.039	12.5 x 30	2214	0.034
	16 x 15	1649	0.065	18 x 15	1772	0.066	16 x 20	1938	0.046
3300	18 x 15	1772	0.066	12.5 x 30	2214	0.034	12.5 x 35	2406	0.029
				16 x 20	1938	0.046	18 x 20	2188	0.044

Note: 1. Ripple Current: (mA/rms) 105°C, 100KHz

2. ESR: 100KHz / 20°C (Ω)

## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)								
	6.3 (8) SIZE			10 (13) SIZE			16 (20) SIZE		
	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR
3900	12.5 x 25	1863	0.039	12.5 x 35	2406	0.029	16 x 25	2238	0.036
				16 x 20	1938	0.046	18 x 20	2188	0.044
4700	12.5 x 30	2214	0.034	12.5 x 40	2798	0.025	16 x 30	2657	0.029
	16 x 20	1938	0.046	16 x 25	2238	0.036	18 x 25	2430	0.031
5600	12.5 x 35	2406	0.029	16 x 25	2238	0.036	16 x 35	2740	0.026
	16 x 20	1938	0.046	18 x 20	2188	0.044	18 x 30	3157	0.026
6800	12.5 x 40	2798	0.025	16 x 30	2657	0.029	16 x 40	3408	0.022
	16 x 30	2657	0.029	18 x 25	2430	0.031			
	18 x 25	2430	0.031						
8200	16 x 35	2740	0.026	16 x 35	2740	0.026	18 x 35	3191	0.025
				18 x 30	3157	0.026			
10000	16 x 35	2740	0.026	18 x 35	3191	0.025	18 x 40	3316	0.020
	18 x 30	3157	0.026						
12000	16 x 40	3408	0.022	18 x 40	3316	0.020			
	18 x 35	3191	0.025						
15000	18 x 35	3191	0.025						
18000	18 x 40	3316	0.020						

Note: 1. Ripple Current: (mA/rms) 105°C, 100KHz

2. ESR: 100KHz / 20°C (Ω)



## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)								
	25 (32) SIZE			35 (44) SIZE			50 (63) SIZE		
	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR
33							6.3 x 11	259	0.390
39							6.3 x 11	259	0.390
47				6.3 x 11	298	0.286	6.3 x 11	259	0.390
56				6.3 x 11	298	0.286	8 x 11	487	0.221
68				6.3 x 11	298	0.286	8 x 11	487	0.221
82	6.3 x 11	298	0.286	8 x 11	561	0.169	8 x 11	487	0.221
100	6.3 x 11	298	0.286	8 x 11	561	0.169	10 x 12	487	0.156
120	8 x 11	561	0.169	8 x 11	561	0.169	8 x 15	667	0.156
							10 x 12	640	0.156
150				8 x 11	561	0.169	10 x 15	667	0.109
180	8 x 11	561	0.169	10 x 12	759	0.104	8 x 15	921	0.118
							10 x 15	798	0.109
220	8 x 11	561	0.169	8 x 15	737	0.113	10 x 19.5	921	0.078
				10 x 12	759	0.104	12 x 15	1070	0.079
270	10 x 12	759	0.104	10 x 15	1061	0.078	10 x 25	1105	0.072
330	8 x 15	737	0.113	8 x 20	921	0.090	10 x 30	1263	0.056
	10 x 12	759	0.104	10 x 15	1061	0.078			
390	10 x 15	1061	0.078	10 x 19.5	1228	0.060	16 x 15	1456	0.072
				12 x 15	1272	0.064			
470	8 x 20	921	0.090	10 x 19.5	1228	0.060	10 x 30	1482	0.056
	10 x 15	1061	0.078				12.5 x 25	1482	0.044
560	10 x 19.5	1228	0.060	10 x 25	1447	0.055	12.5 x 25	1710	0.044
	12.5 x 15	1272	0.064				18 x 15	1710	0.070
680	10 x 19.5	1228	0.060	10 x 30	1482	0.056	12.5 x 30	1693	0.039
				12.5 x 25	1863	0.039	16 x 20	2026	0.044
				16 x 15	1570	0.072			
820	10 x 25	1447	0.055	12.5 x 25	1863	0.039	12.5 x 35	2201	0.033
				18 x 15	1687	0.073	18 x 20	2184	0.047
1000	10 x 30	1675	0.040	12.5 x 25	1920	0.046	12.5 x 35	2561	0.027
	16 x 15	1570	0.072	16 x 20	1938	0.046	16 x 25	2241	0.033
1200	12.5 x 25	1863	0.039	12.5 x 30	2214	0.034	16 x 30	2640	0.029
	18 x 15	1687	0.073	16 x 20	1938	0.046	18 x 25	2403	0.034

## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)								
	25 (32) SIZE			35 (44) SIZE			50 (63) SIZE		
	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR
1500	12.5 x 25	1863	0.039	12.5 x 35	2406	0.029	16 x 35	2763	0.025
	16 x 20	1938	0.046	16 x 25	2238	0.036			
1800	12.5 x 30	2214	0.034	12.5 x 40	2798	0.025	18 x 30	3188	0.027
	16 x 20	1938	0.046	16 x 25	2238	0.036			
2200	12.5 x 35	2406	0.029	16 x 30	2657	0.029	18 x 35	3228	0.022
	18 x 20	2188	0.044	18 x 25	2430	0.031			
2700	16 x 25	2238	0.036	16 x 35	2740	0.026	18 x 40	3333	0.018
				18 x 30	3157	0.026			
3300	16 x 30	2657	0.029	18 x 35	3191	0.025			
	18 x 25	2430	0.031						
3900	16 x 35	2740	0.026	18 x 40	3316	0.020			
	18 x 30	3157	0.026						
4700	18 x 35	3191	0.025						
5600	18 x 40	3316	0.020						

Note: 1. Ripple Current: (mA/rms) 105°C, 100KHz  
 2. ESR: 100KHz / 20°C (Ω)



## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)								
	63 (79)			100 (125)			160 (200)		
	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR
10							10 x 15	219	2.925
15				6.3 x 11	101	1.560			
22	6.3 x 11	101	1.560				10 x 19.5.5	307	1.950
27				8 x 11	203	0.819			
33	6.3 x 11	101	1.560						
39	8 x 11	203	0.819	8 x 15	263	0.585			
47	8 x 11	203	0.819	10 x 12	253	0.559	12.5 x 25	526	0.897
56	8 x 11	203	0.819	8 x 20	317	0.429			
68	8 x 11	203	0.819	10 x 15	313	0.403			
82	10 x 12	253	0.559	10 x 19.5	409	0.273			
				12.5 x 15	409	0.299			
100	8 x 15	263	0.585	10 x 25	466	0.260	16 x 25	798	0.455
	10 x 12	253	0.559						
120	10 x 15	313	0.403	10 x 30	581	0.195			
150	8 x 20	317	0.429	16 x 15	697	0.182			
180	10 x 19.5	409	0.273	12.5 x 25	688	0.156			
	12.5 x 15	409	0.299	18 x 15	807	0.156			
220	10 x 19.5	409	0.273	12.5 x 30	794	0.130	18 x 35	1202	0.273
	10 x 25	466	0.260	16 x 20	912	0.118			
270	16 x 15	697	0.182	12.5 x 35	921	0.108			
				16 x 25	1096	0.095			
330	10 x 30	581	0.195	12.5 x 40	1035	0.092			
				18 x 20	1088	0.104			
390	12.5 x 25	688	0.156	16 x 30	1377	0.070			
	18 x 15	807	0.156	18 x 25	1307	0.074			
470	12.5 x 30	794	0.130	16 x 32	1570	0.059			
	16 x 20	912	0.118	18 x 30	1430	0.061			
560	16 x 25	1096	0.095	18 x 36	1570	0.052			
680	12.5 x 35	921	0.108	18 x 36	1570	0.052			
	16 x 25	1096	0.095						
	18 x 20	1088	0.104						
820	12.5 x 40	1035	0.092	18 x 40	2044	0.047			
	16 x 30	1377	0.070						
	18 x 25	1307	0.074						
1000	16 x 30	1377	0.070						
	16 x 35	1570	0.059						
1200	16 x 40	1772	0.052						
	18 x 30	1430	0.061						
1500	18 x 35	1570	0.052						
1800	18 x 40	2044	0.047						

Note: 1. Ripple Current: (mA/rms) 105°C, 100KHz

2. ESR: 100KHz / 20°C (Ω)

**CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS**

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)											
	200 (250)			250 (300)			400 (450)			450 (500)		
	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR	SIZE	RIPPLE	ESR
2.2										10 x 15	96	10.270
3.3							10 x 19.5	171	5.460	10 x 19.5	118	8.060
4.7				10 x 15	145	6.285	10 x 25	193	4.485			
10	10 x 15	219	2.925	10 x 19.5	202	5.200	12.5 x 25	316	2.340	12.5 x 25	228	3.380
22	10 x 19.5	307	1.950	12.5 x 25	316	2.340	16 x 25	500	1.586	16 x 30	421	1.300
33				12.5 x 25	316	2.340	16 x 30	614	0.897	18 x 35	579	0.806
47	12.5 x 25	526	0.897	16 x 25	500	1.105	18 x 30	754	0.650			
100	16 x 30	1017	0.468	18 x 35	820	0.585						
220	18 x 35	1202	0.234	18 x 40	877	0.520						

Note: 1. Ripple Current: (mA/rms) 105°C, 100KHz

2. ESR: 100KHz / 20°C (Ω)