

# SX [ For Low Impedance & Low E.S.R ]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors For High Frequency Applications

## Miniature Size Aluminum Electrolytic Capacitors

### ELECTRICAL CHARACTERISTICS

Operating Temperature : -40° ~ +105°C

Working Voltage : 6.3 ~ 100V

Rate Capacitance Range : 1 ~ 15000μF

Capacitance Tolerance : -20 ~ +20%

DC Leakage Current (μA) : I = 0.01 CV or 3(μA) Whichever is greater.

( Measurements shall be Made After a 2 Minute Charge at Rated Working Voltage )

Dissipation Factor : at 120 Hz, 25°C

WV (V) :	6.3	10	16	25	35	50	63	80	100
D.F (%) :	19	16	14	12	10	8	8	7	7

For capacitor whose capacitance exceeds 1000μF. The value of D.F(%) is increased by 2% for every addition of 1000μF.

Temperature Characteristics : at 120 Hz

WV (V) :	6.3	10	16	25	35	50	63	100
Impedance : Z - 40°C / Z + 20°C	10	6	5	4	4	4	4	4

Load Life : At 105°C Assured with Full Rated Maximum Ripple Current Applied

Case Dia     $\phi D \leq 8$      $\phi D = 10$      $\phi D \geq 12$

Load Life    2000    3000    5000

(a) Capacitance Change : Within 20% of Initial Value

(b) Dissipation Factor : Not Exceed 200% of Initial Requirement

(c) Leakage Current : Not Exceed the Initial Requirement

Shelf Life : 1000 Hours, No Voltage Applied, at 105°C

(a) Capacitance Change : Within 20% of Initial Value

(b) Dissipation Factor : Not Exceed 200 % of Initial Requirement

(c) Leakage Current : Not Exceed 200% of Initial Requirement

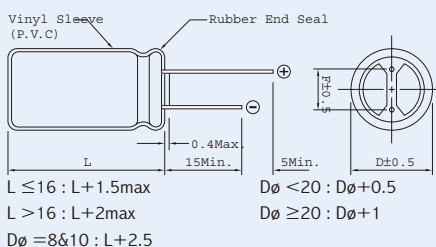


RoHS COMPLIANT

### DIAGRAM OF DIMENSIONS

D $\phi$	F	d $\phi$
4.0	1.5	0.45
5.0	2.0	0.5
6.0	2.5	
8.0	3.5	
10.0	5.0	0.6
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	0.8

Rubber Stand-off



### DESCRIPTION

Used in switching regulator applications in computers. Especially for high frequency.

Low impedance and E.S.R., high permissible ripple current at high frequency and higher operation temperature (-40°C to +105°C).

High Temperature Load Life at 105°C for 2000 ~ 5000 Hours

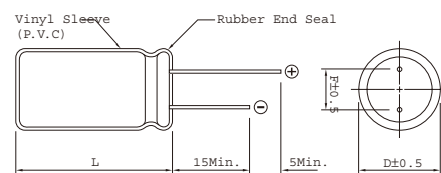
Multiplier for Ripple Current  
Frequency coefficient

Frequency(Hz)	50	120	300	1K	10K	100K
~4.4μF	0.30	0.40	0.50	0.70	0.80	1.00
5.6~33μF	0.40	0.50	0.60	0.80	0.90	1.00
34~330μF	0.60	0.70	0.80	0.90	0.95	1.00
331~1000μF	0.65	0.90	0.90	0.98	1.00	1.00
1200μF higher	0.85	0.90	0.95	0.98	1.00	1.00

Temperature coefficient

Temperature(°C)	65	85	105
Factor	1.80	1.50	1.00

Dimensions : mm





## CASE SIZE OF STANDARD PRODUCTS D<sub>2</sub> ≥ ø 6mm with Safety Vent at Can Bottom

CAP. (µF)	RATED VOLTAGE								
	6.3			10			16		
	SIZE	Ripple	ESR	SIZE	Ripple	ESR	SIZE	Ripple	ESR
4.7									
6.8									
10				5 x 11	20	5.900			
22							5 x 11	42	1.180
33	5 x 11	131	0.217	5 x 11	44	5.400	5 x 11	53	3.300
47	5 x 11	139	0.203	5 x 11	66	3.300	5 x 11	79	2.100
56							5 x 11	94	2.200
68	5 x 11	150	0.182	5 x 11	136	1.300	5 x 11	210	0.580
82							5 x 11	210	0.580
100	5 x 11	210	0.58	5 x 11	210	0.58	6.3 x 11	210	0.580
				6.3 x 11	200	0.10	8 x 11	163	0.920
120	5 x 11	210	0.58	5 x 11	210	0.58	6.3 x 11	241	0.890
				6.3 x 11	240	0.91	8 x 11	340	0.220
150	5 x 11	210	0.58	6.3 x 11	265	0.700	6.3 x 11	340	0.470
	6.3 x 11	210	0.58				8 x 11	380	0.470
180	6.3 x 11	340	0.22	6.3 x 11	340	0.22	8 x 11	640	0.130
220	8 x 11	285	0.61	6.3 x 11	340	0.22	8 x 11	410	0.330
	6.3 x 11	340	0.22	8 x 11	370	0.480			
270	6.3 x 11	340	0.22	8 x 11	640	0.13	8 x 11	640	0.130
330	8 x 11	410	0.40	8 x 11	470	0.330	10 x 12	600	0.230
	6.3 x 11	340	0.22				8 x 11	600	0.230
390	8 x 11	640	0.13				10 x 12	640	0.130
470	10 x 12	550	0.28	8 x 11	480	0.300	8 x 20	710	0.180
	6.3 x 11	540	0.22	10 x 12	590	0.240	8 x 15	750	0.180
	8 x 11	640	0.13				10 x 15	750	0.180
							10 x 12	750	0.180
560	8 x 11	640	0.13	8 x 15	790	0.18	8 x 15	840	0.06
							10 x 15	1050	0.14
680	10 x 15	735	0.220	8 x 20	790	0.180	10 x 19	1050	0.140
	8 x 11	640	0.13	10 x 12	750	0.18	8 x 20	1050	0.140
	8 x 15	840	0.087	10 x 15	790	0.18	10 x 15	1050	0.140
820	8 x 11	640	0.13	10 x 15	990	0.14	10 x 12	865	0.140
	10 x 15	795	0.190	10 x 19.5	990	0.140	10 x 15	1050	0.140
	8 x 15	840	0.089						
	10 x 12	865	0.08						
1000	10 x 19.5	950	0.170	8 x 20	1060	0.12	10 x 19	990	0.042
	10 x 12	865	0.08	10 x 15	1060	0.12	10 x 30	1400	0.091
				10 x 19.5	1060	0.12	10 x 25	990	0.042
1200	10 x 19.5	1000	0.136	10 x 25	1290	0.120	10 x 25	1450	0.086
	8 x 20	1050	0.069				12 x 25	1450	0.086
	10 x 15	1210	0.06						
1500	10 x 12	865	0.08	10 x 30	1450	0.093	12 x 25	1650	0.072
	10 x 19.5	1000	0.046	10 x 25	1450	0.093	10 x 30	1650	0.072
	8 x 20	1050	0.069				13 x 25	1790	0.055
	10 x 25	1200	0.120						
1800	10 x 25	1650	0.042	13 x 20	1900	0.046	13 x 25	1924	0.056
2200	10 x 30	1450	0.095	12 x 30	1900	0.073	12 x 30	2000	0.063
	10 x 25	1650	0.042	10 x 30	1900	0.073	16 x 20	2210	0.030
				13 x 20	1900	0.073	13 x 25	2124	0.030
2700	10 x 30	1910	0.031	13 x 25	2020	0.051	13 x 30	2524	0.035
	13 x 20	1900	0.035				16 x 20	2210	0.035
3300	12 x 35	1700	0.081	10 x 30	1690	0.077	13 x 40	2400	0.055
	10 x 25	1650	0.042	13 x 30	2110	0.052	18 x 20	2400	0.045
	13 x 20	1700	0.035	12 x 35	2110	0.052	12 x 35	2400	0.045
				16 x 20	2210	0.035	12 x 40	2400	0.045
3900	13 x 25	2124	0.03	16 x 20	2210	0.035	16 x 25	2552	0.028
							18 x 20	2495	0.034
4700	12 x 35	2110	0.063	13 x 40	2300	0.057	16 x 36	2650	0.046
	12 x 30	2110	0.053	12 x 40	2450	0.054	16 x 32	3029	0.220
				16 x 32	2450	0.054	18 x 25	2771	0.024
				16 x 25	2450	0.054			
5600	13 x 35	2743	0.022	16 x 25	2495	0.034	18 x 32	3600	0.020
	16 x 20	2210	0.035						
				18 x 20	2495	0.034			
6800	16 x 32	2350	0.055	16 x 36	2680	0.046	18 x 36	2900	0.040
	12 x 35	2743	0.022	16 x 32	2680	0.046	16 x 40	2900	0.040
	16 x 25	2552	0.028	18 x 25	2680	0.046			
	18 x 20	2495	0.034						
8200	16 x 36	2550	0.047	16 x 40	2850	0.038	18 x 40	3050	0.036
	16 x 32	3029	0.022	16 x 36	2850	0.038	18 x 36	3050	0.036
				18 x 32	2850	0.038			
10000	16 x 40	2750	0.039	18 x 36	3050	0.037	18 x 40	3781	0.015
	16 x 36	2750	0.039	16 x 40	3050	0.037			
	18 x 25	2771	0.024						
15000	18 x 40	2950	0.037						
	18 x 36	2950	0.037						
12000	16 x 40	3886	0.017	18 x 40	3781	0.020			
	18 x 32	3600	0.020						
18000	18 x 40	3781	0.02						

Note : \* 1. D x L : mm

\* 2. Ripple Current : ( mA r.m.s 105°C / 100KHz )

\* 3. ESR ( Ω Max20°C / 100KHz )



## CASE SIZE OF STANDARD PRODUCTS $D \geq \varnothing 6\text{mm}$ with Safety Vent at Can Bottom

CAP. ( $\mu\text{F}$ )	RATED VOLTAGE								
	25			35			50		
	SIZE	Ripple	ESR	SIZE	Ripple	ESR	SIZE	Ripple	ESR
1							5 x 11	180	2.4
2.2							5 x 11	180	1.3
3.3							5 x 11	180	1.3
15							5 x 11	180	1.3
18							5 x 11	180	0.7
4.7							5 x 11	180	1.3
6.8				4 x 7	20	0.770	5 x 11	180	1.3
10				5 x 11	42	0.310	5 x 11	180	1.3
12							5 x 11	180	1.3
22	5 x 11	66	3.300	5 x 11	101	0.580	6.3 x 11	129	0.900
							5 x 11	180	0.7
27				5 x 11	210	0.580	5 x 11	180	0.7
33	5 x 11	99	1.300	6.3 x 11	151	0.870	8 x 11	194	0.720
							6.3 x 11	295	0.3
39	5 x 11	210	0.580	5 x 11	210	0.580	6.3 x 11	295	0.3
47	5 x 11	210	0.580	8 x 11	216	0.870	8 x 11	276	0.660
				6.3 x 11	340	0.220	6.3 x 11	222	0.82
56	5 x 11	210	0.580	6.3 x 11	340	0.220	8 x 11	555	0.17
68	8 x 11	204	0.570	8 x 11	340	0.220	10 x 12	400	0.310
				6.3 x 11	340	0.220	8 x 11	555	0.17
82	5 x 11	340	0.220	8 x 11	640	0.130	8 x 11	555	0.17
100	6.3 x 11	340	0.220	8 x 11	370	0.390	8 x 15	730	0.12
							8 x 11	400	0.29
	8 x 11	300	0.420	10 x 12	460	0.320	10 x 15	440	0.29
							10 x 12	440	0.29
120	8 x 11	400	0.380	8 x 11	550	0.260	8 x 15	670	0.17
				10 x 12	550	0.260	10 x 15	670	0.170
							10 x 12	670	0.17
150	8 x 11	460	0.330	8 x 11	600	0.230	10 x 19.5	860	0.150
	10 x 12	460	0.330	10 x 12	600	0.230	10 x 15	860	0.15
180	8 x 11	640	0.130	10 x 12	800	0.180	8 x 20	910	0.091
							10 x 15	910	0.091
220	10 x 15	630	0.230	10 x 12	690	0.210	10 x 15	780	0.150
				8 x 15	800	0.180	10 x 19.5	1030	0.110
				10 x 15	800	0.180	10 x 25	1030	0.110
270	10 x 12	865	0.08	10 x 15	800	0.180	10 x 25	1440	0.550
330	10 x 12	800	0.190	10 x 19.5	1060	0.130	10 x 30	1070	0.110
	8 x 15	800	0.190	8 x 20	1060	0.130	12 x 20	1220	0.092
	10 x 15	800	0.190	10 x 15	1060	0.130	13 x 20	1300	0.086
	8 x 20	525	0.069				13 x 25	1300	0.086
390	10 x 15	1210	0.060	10 x 19.5	1420	0.089	13 x 20	1660	0.055
470	10 x 15	1050	0.140	10 x 30	990	0.089	12 x 25	1500	0.068
	8 x 20	1050	0.140	10 x 19.5	1420	0.089	10 x 30	1690	0.043
	10 x 19.5	1050	0.140	13 x 25	1060	0.086	13 x 25	1690	0.043
560	10 x 19.5	1400	0.046	12 x 20	1500	0.080	13 x 25	1930	0.054
				10 x 25	1650	0.042			
				10 x 30	1450	0.035			
680	10 x 15.5	1400	0.090	12 x 25	1650	0.070	13 x 30	1850	0.048
	10 x 30	1400	0.090	10 x 30	1450	0.035	12 x 35	1850	0.048
				13 x 20	1650	0.070	16 x 20	1850	0.048
820	12 x 25	1450	0.085	12 x 30	1750	0.066	12 x 40	2020	0.042
	10 x 25	1650	0.042	12 x 25	1750	0.076	16 x 25	1553	0.025
	13 x 20	1900	0.035	13 x 25	1750	0.076	18 x 20	2020	0.042
				18 x 15	1750	0.076			
1000	10 x 30	1650	0.071	12 x 30	2000	0.061	16 x 25	1800	0.060
	12 x 20	1420	0.091	13 x 25	2000	0.061	16 x 32	2120	0.050
	13 x 20	1650	0.071	16 x 20	2000	0.061			
	12 x 25	1650	0.071						
1200	12 x 30	1700	0.078	12 x 35	2200	0.049	16 x 36	2260	0.043
	13 x 25	1700	0.078	13 x 30	2200	0.049	18 x 25	2260	0.043
	18 x 15	1700	0.078						
1500	12 x 30	1950	0.062	12 x 40	2350	0.046	16 x 40	2420	0.035
	13 x 25	1950	0.062	16 x 25	2948	0.028	16 x 36	2420	0.035
	16 x 20	1950	0.062						
1800	13 x 30	2210	0.035	18 x 20	2882	0.034	16 x 40	3635	0.021
				16 x 25	2882	0.034			
2200	12 x 40	2360	0.044	16 x 36	2700	0.044	18 x 32	3635	0.021
	12 x 35	2360	0.044	16 x 32	2700	0.044	18 x 36	3680	0.017
	16 x 25	2495	0.034	18 x 25	2700	0.044			
	18 x 20	2495	0.034						
2700	16 x 25	2552	0.028	16 x 36	3608	0.020	18 x 40	3800	0.014
				18 x 32	3608	0.020			
3300	16 x 36	2700	0.045	18 x 36	3050	0.035			
	16 x 32	2700	0.045	18 x 40	3050	0.035			
	18 x 25	2700	0.045						
3900	16 x 36	3124	0.024	18 x 40	4367	0.015			
	18 x 32	3124	0.024						
4700	18 x 36	3000	0.036						
	18 x 40	3000	0.036						
4900	18 x 40	3781	0.015						
5600	18 x 40	3781	0.015						
6800									
8200									
10000									
15000									

Note : \* 1. D x L : mm

\* 2. Ripple Current : ( mA r.m.s 105°C / 100KHz )

\* 3. ESR (  $\Omega$  Max 20°C / 100KHz )



## CASE SIZE OF STANDARD PRODUCTS $D \geq \varnothing 6\text{mm}$ with Safety Vent at Can Bottom

CAP. ( $\mu\text{F}$ )	RATED VOLTAGE								
	63			80			100		
	SIZE	Ripple	ESR	SIZE	Ripple	ESR	SIZE	Ripple	ESR
4.7	5 x 11	36	4.600	5 x 11	43	4.200	5 x 11	65	4.100
6.8	5 x 11	52	4.300	5 x 11	62	1.900	5 x 11	55	1.840
							8 x 11	94	1.300
10	5 x 11	77	2.000	6.3 x 11	92	1.400	8 x 11	138	1.100
12	5 x 11	55	1.840				6.3 x 11	115	0.960
15	6.3 x 11	116	1.400	8 x 11	138	1.100	8 x 11	207	0.800
18	6.3 x 11	85	1.500						
22	8 x 11	170	1.200	8 x 11	203	0.640	10 x 12	305	0.530
	6.3 x 11	115	0.960						
27							8 x 11	232	0.504
33	8 x 11	250	0.750	10 x 12	305	0.540	10 x 15	500	0.350
39	8 x 11	232	0.504				8 x 15	288	0.344
47	10 x 12	365	0.560	10 x 15	410	0.360	10 x 19.5	288	0.344
	8 x 11	232	0.504				10 x 12	288	0.344
56	8 x 11	232	0.504				8 x 20	362	0.264
68	10 x 15	500	0.360	10 x 19.5	600	0.260	10 x 25	357	0.248
	8 x 11	232	0.504				10 x 15	357	0.248
82	10 x 12	288	0.344				10 x 19.5	466	0.168
100	10 x 15	288	0.344	10 x 25	795	0.190	10 x 30	531	0.160
	8 x 15	300	0.344				13 x 20	531	0.160
	10 x 12	288	0.344				10 x 25	531	0.160
120	10 x 15	357	0.248	10 x 30	900	0.170	12 x 30	663	0.130
	10 x 19.5	820	0.270						
	10 x 30	663	0.120						
	13 x 20	690	0.128						
150	8 x 20	362	0.264	10 x 30	955	0.150	12 x 30	1200	0.128
	10 x 25	950	0.200						
180	10 x 19.5	466	0.168				13 x 25	784	0.096
220	12 x 25	531	0.160	12 x 30	1200	0.130	16 x 32	905	0.086
	10 x 19.5	466	0.210				12 x 30	905	0.080
	10 x 25	531	0.160				16 x 20	905	0.080
	13 x 20	531	0.160						
270							12 x 35	1050	0.066
							16 x 25	1050	0.066
330	10 x 30	663	0.130	12 x 35	1450	0.088	12 x 40	1180	0.057
	12 x 30	663	0.130				16 x 32	1180	0.062
	13 x 20	663	0.130				18 x 20	1180	0.064
	13 x 25	663	0.130				16 x 36	1180	0.062
390	13 x 25	784	0.096				16 x 32	1570	0.043
							18 x 25	1490	0.046
470	12 x 35	905	0.091	16 x 32	1790	0.063	16 x 36	1790	0.036
	12 x 30	905	0.080				16 x 40	2160	0.048
	13 x 25	392	0.096				18 x 32	1630	0.038
	16 x 20	905	0.073				18 x 36	1630	0.047
560	16 x 25	1250	0.058				18 x 40	2020	0.032
680	16 x 32	1240	0.065	16 x 40	1990	0.060	18 x 36	1790	0.032
	12 x 35	1050	0.066						
	16 x 25	1250	0.058						
	18 x 20	1240	0.064						
820	16 x 36	1490	0.056	18 x 36	2200	0.060	18 x 40	2330	0.029
	12 x 40	1180	0.057						
	16 x 32	1180	0.057						
	18 x 25	1490	0.046						
1000	18 x 36	1570	0.049	18 x 40	2370	0.044			
	16 x 32	1570	0.043						
	16 x 36	1570	0.036						
1200	18 x 40	2520	0.046						
	16 x 40	1630	0.032						
	18 x 32	1630	0.038						
1500	18 x 36	1790	0.032						
1800	18 x 40	2330	0.029						
2200									
3300									
3900									
4700									
6800									
8200									
10000									
15000									

Note : \* 1. D x L : mm

\* 2. Ripple Current : ( mA r.m.s 105°C / 100KHz )

\* 3. ESR (  $\Omega$  Max25°C / 100KHz )