

# Miniature Aluminum Electrolytic Capacitors

# SH [ For General ]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors  
for the Rated Voltage up to 450V

## ELECTRICAL CHARACTERISTICS

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

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

Rated Capacitance Range : 0.47 ~ 15000µF / 0.47 ~ 470µF

Capacitance Tolerance : -20 ~ +20% at 120Hz, 20°C

Leakage Current (µA) :  $I = 0.01CV (\mu A) + 3\mu A / 0.03CV (\mu A) + 10\mu A$   
(After Rated Voltage Applied for 2 Minutes )

Dissipation Factor

WV (V) :	6.3	10	16	25	35	50	63 ~ 100	160 ~ 250	350 ~ 450
D.F (%) :	26	22	18	16	14	12	10	15	20

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

Low Temperature Stability Impedance Ratio (Max.)

WV (V) :		6.3	10	16	25 ~ 100	160 ~ 250	350 ~ 450
Impedance :	Z - 25°C / Z + 25°C	4	3	2	2	4	4
	Z - 40°C / Z + 20°C	8	6	4	3	-	-

Endurance : After the rated voltage has been applied at 105°C for 2000 hours, the capacitors shall meet following requirements.

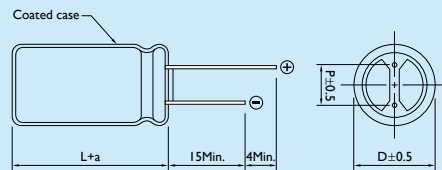
- (a) Capacitance Change : Within 20% of Initial Value
- (b) Dissipation Factor : 200% or Less of Initial Specified Value
- (c) Leakage Current : Initial Specified Value or Less

Shelf Life: After leaving capacitors under no load at 105°C for 1000 hours, the capacitors shall meet the same requirements as Endurance.

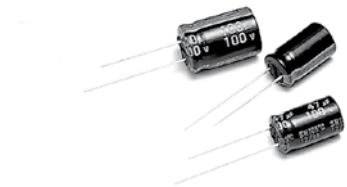
## DIAGRAM OF DIMENSIONS

Dø	F	dø
5.0	2.0	0.5
6.3	2.5	
8.0	3.5	0.6
10.0	5.0	
12.0		
13.0		
16.0	7.5	0.8
18.0		
22.0	10.0	

Rubber Stand-off



$L \leq 16$   $L + 1.5Max.$   $D\phi < 20$   $D\phi + 0.5$   
 $L > 16$   $L + 2Max.$   $D\phi \geq 20$   $D\phi + 1$   
 $D\phi = 8 \& 10$   $L + 2.5Max.$



## DESCRIPTION

Long life for 2000 hours at 105°C, ideally suited for high quality and high reliability applications.

Featuring high CV products

### MULTIPLIER FOR RIPPLE CURRENT

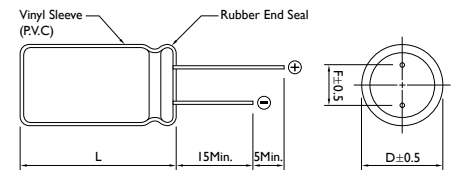
Frequency Coefficient

FREQUENCY (Hz)	120	300	1K	10K~100K
6.3~100V Below~68µF	1.00	1.30	1.57	2.00
6.3~100V 100~470µF	1.00	1.23	1.34	1.50
6.3~100V 471~22000µF	1.00	1.10	1.13	1.15
160~450V ALL Cap(µF)	1.00	1.25	1.40	1.60

Temperature Coefficient

TEMPERATURE (°C)	65	85	105
FACTOR	1.70	1.40	1.00

Dimensions: mm





## 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		25 (32) SIZE		35 (44) SIZE	
		RIPPLE		RIPPLE		RIPPLE		RIPPLE		RIPPLE
10					5 x 11	44	5 x 11	43	5 x 11	44
15									5 x 11	50
22							5 x 11	60	5 x 11	65
33					5 x 11	70	5 x 11	75	5 x 11	85
47			5 x 11	75	5 x 11	85	5 x 11	90	6.3 x 11	115
68			5 x 11	80	5 x 11	100	6.3 x 11	125	8 x 11	130
100	5 x 11	100	5 x 11	110	5 x 11	115	6.3 x 11	145	6.3 x 11	150
					6.3 x 11	135			8 x 11	190
150	5 x 11	120	6.3 x 11	130	8 x 11	180	8 x 11	200	10 x 12	240
220	6.3 x 11	165	6.3 x 11	180	6.3 x 11	180	8 x 11	200	10 x 12	315
					8 x 11	235	10 x 12	250		
330	6.3 x 11	161	8 x 11	255	8 x 11	315	10 x 12	355	10 x 12	380
	8 x 11	200			10 x 12	285			10 x 15	440
470	6.3 x 11	225	8 x 11	305	8 x 11	315	10 x 15	470	10 x 15	440
	8 x 11	280			10 x 12	395			10 x 19.5	460
									13 x 20	580
680	10 x 12	320	10 x 12	420	10 x 15	530	10 x 19.5	650	13 x 20	730
1000	10 x 12	470	10 x 12	490	10 x 19.5	700	13 x 20	855	13 x 25	995
			10 x 15	570						
1500	10 x 15	600	10 x 19.5	750	10 x 19.5	705	13 x 25	1020	16 x 25	1110
					13 x 20	860				
2200	13 x 20	930	10 x 19.5	800	13 x 20	991	16 x 25	1230	16 x 25	1236
			13 x 20	1010	13 x 25	1150			16 x 32	1450
3300	13 x 20	1100	13 x 25	1220	13 x 25	1150	16 x 32	1450	16 x 36	1477
					16 x 25	1350			18 x 36	1660
4700	16 x 25	1320	16 x 25	1410	16 x 25	1330	18 x 36	1690		
					16 x 32	1560				
6800	16 x 25	1490	16 x 32	1610	18 x 36	1790				
10000	16 x 32	1830	18 x 36	1980						
15000	18 x 36	2280								

Note: I. Ripple Current: (mA/rms) 105°C, 120Hz

## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)									
	50 (63)		63 (79)		100 (125)		160 (200)		200 (250)	
	SIZE	RIPPLE	SIZE	RIPPLE	SIZE	RIPPLE	SIZE	RIPPLE	SIZE	RIPPLE
0.47	5 x 11	7	5 x 11	8	5 x 11	10	5 x 11	12	5 x 11	12
1.0	5 x 11	12	5 x 11	12	5 x 11	15	5 x 11	17	6.3 x 11	17
2.2	5 x 11	18	5 x 11	20	5 x 11	22	6.3 x 11	25	6.3 x 11	25
3.3	5 x 11	25	5 x 11	27	5 x 11	29	8 x 11	36	8 x 11	36
4.7	5 x 11	30	5 x 11	34	5 x 11	37	6.3 x 11	34	10 x 12	50
							8 x 11	43		
6.8	5 x 11	30	5 x 11	37	5 x 11	46	10 x 12	54	10 x 12	60
10	5 x 11	50	5 x 11	55	6.3 x 11	65	10 x 12	70	10 x 12	69
									10 x 15	80
15	5 x 11	50	5 x 11	65	8 x 11	82	10 x 15	90	10 x 19.5	110
22	5 x 11	75	6.3 x 11	90	8 x 11	115	10 x 19.5	130	10 x 15	140
									10 x 19.5	150
33	6.3 x 11	105	8 x 11	110	10 x 12	160	13 x 20	180	13 x 20	220
									13 x 25	190
47	6.3 x 11	101	8 x 11	155	10 x 15	210	13 x 25	250	13 x 20	220
	8 x 11	125							13 x 25	260
68	8 x 11	159	10 x 12	198	10 x 19.5	241	13 x 25	270	16 x 20	242
									16 x 25	280
100	8 x 11	169	10 x 12	260	10 x 19.5	305	16 x 25	390	16 x 32	400
	10 x 12	210			13 x 20	385				
150	10 x 12	289	10 x 15	330	13 x 25	414	16 x 32	435	16 x 36	450
220	10 x 12	346	10 x 19.5	465	13 x 25	495	16 x 36	700	18 x 36	675
	10 x 15	400			16 x 25	590			18 x 40	750
330	10 x 19.5	535	13 x 20	650	16 x 25	720	18 x 40	850	18 x 40	780
	13 x 20	600							22 x 40	920
470	10 x 19.5	560	13 x 20	650	16 x 32	875	22 x 40	980	18 x 45	800
	13 x 20	730	13 x 25	800					22 x 40	920
680	13 x 25	860	16 x 25	1000	16 x 36	1200				
1000	16 x 25	1110	16 x 25	1023						
			16 x 32	1200						
1500	16 x 32	1350	16 x 36	1450						
2200	16 x 36	1360	18 x 45	1800						
	18 x 36	1530								

Note: I. Ripple Current: (mA/rms) 105°C, 120Hz



## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)													
	250 (300) SIZE		350 (400) SIZE		400 (450) SIZE		450 (500) SIZE							
		RIPPLE		RIPPLE		RIPPLE		RIPPLE						
0.47	5 x 11	12	6.3 x 11	14	6.3 x 11	14	6.3 x 11	16						
1.0	6.3 x 11	17	6.3 x 11	15	6.3 x 11	17	8 x 11	22						
			8 x 11	20	8 x 11	20								
2.2	6.3 x 11	23	10 x 12	35	8 x 11	29	10 x 12	37						
	8 x 11	29			10 x 12	35								
3.3	8 x 11	34	10 x 15	47	10 x 12	42	10 x 12	42						
	10 x 12	42			10 x 15	49			10 x 15	51				
4.7	8 x 11	41	10 x 12	43	10 x 12	66	10 x 15	59						
	10 x 12	52			10 x 15	57			10 x 15	57				
6.8	10 x 12	62	10 x 19.5	65	10 x 15	67	13 x 20	69						
10	10 x 15	75	10 x 15	65	10 x 19.5	75	10 x 19.5	72						
	10 x 19.5	88			13 x 20	95			13 x 20	97	13 x 25	99		
15	13 x 20	120	13 x 20	140	13 x 25	145	16 x 25	150						
22	13 x 20	130	13 x 20	125	13 x 20	120	16 x 25	145						
					13 x 25	155			16 x 25	165	13 x 25	140	16 x 32	175
									16 x 20	147				
					16 x 25	170								
33	13 x 25	200	16 x 20	150	16 x 20	164	16 x 32	211						
			16 x 32	195	16 x 25	190			18 x 36	250				
			18 x 16	148	16 x 32	230								
47	13 x 25	228	16 x 36	210	16 x 25	200	18 x 40	350						
					16 x 25	270			16 x 32	250				
									18 x 25	243				
									18 x 36	300				
68	16 x 32	300	18 x 36	320	18 x 25	310	18 x 32	320						
					18 x 36	325			22 x 40	380				
100	16 x 36	300	18 x 40	300	18 x 32	280								
					18 x 36	440			18 x 36	290				
									22 x 40	365				
120					18 x 32	300	18 x 45	420						
					18 x 36	320								
					18 x 40	350								
150	18 x 40	600	22 x 40	480	22 x 40	465								
220	22 x 40	800												

Note: I. Ripple Current: (mA/rms) 105°C, 120Hz