

# Large Can Aluminum Electrolytic Capacitors

## LH [ For Miniature ]

For Printed Circuit Board High-Performance Aluminum Electrolytic Power Supply Input and Output Filter Capacitors

### ELECTRICAL CHARACTERISTICS

Operating Temperature Range	-40 to +85°C	-25 to +85°C																								
Rated Voltage Range	6.3 ~ 100V	160 to 450VDC																								
Rated Capacitance	820 ~ 120000µF	56 ~ 2200µF																								
Capacitance Tolerance	±20% at 120Hz, 20°C																									
Leakage Current	I = 0.02CV or 3mA Whichever is smaller. (After 5 Minutes Application of DC Working Voltage at 20°C)																									
Dissipation Factor (tanδ)	<table border="1"> <tr> <td>Rate Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63-100</td> <td>160-400</td> <td>450-500</td> </tr> <tr> <td>D.F. (%)</td> <td>60</td> <td>55</td> <td>55</td> <td>45</td> <td>35</td> <td>30</td> <td>25</td> <td>15</td> <td>20</td> </tr> </table>		Rate Voltage (V)	6.3	10	16	25	35	50	63-100	160-400	450-500	D.F. (%)	60	55	55	45	35	30	25	15	20				
Rate Voltage (V)	6.3	10	16	25	35	50	63-100	160-400	450-500																	
D.F. (%)	60	55	55	45	35	30	25	15	20																	
Low Temperature Stability	Measurement frequency: 120Hz																									
Impedance Ratio (Max.)	<table border="1"> <tr> <td>Rate Voltage (V)</td> <td>6.3~16</td> <td>25</td> <td>35</td> <td>50~63</td> <td>80~10</td> <td>160~400</td> <td>450</td> </tr> <tr> <td>Z(-25°C) / Z(20°C)</td> <td>3</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>4</td> <td>8</td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>12</td> <td>10</td> <td>8</td> <td>6</td> <td>5</td> <td>-</td> <td>-</td> </tr> </table>		Rate Voltage (V)	6.3~16	25	35	50~63	80~10	160~400	450	Z(-25°C) / Z(20°C)	3	3	3	2	2	4	8	Z(-40°C) / Z(20°C)	12	10	8	6	5	-	-
Rate Voltage (V)	6.3~16	25	35	50~63	80~10	160~400	450																			
Z(-25°C) / Z(20°C)	3	3	3	2	2	4	8																			
Z(-40°C) / Z(20°C)	12	10	8	6	5	-	-																			
Endurance	After the rated voltage and rated ripple current have been applied at 85°C for 2000 hours, the capacitors shall meet the following requirements. (a) Capacitance Change: Within 20% of the Initial Value (b) Dissipation Factor: 200% or Less of Initial Specified Value (c) Leakage Current: Initial Specified Value or Less																									
Shelf Life	After having been placed at 85°C without voltage applied for 1000 hours, the capacitors shall meet the same requirements as Endurance.																									



### DESCRIPTION

Endurance : 85°C, 2000 Hours

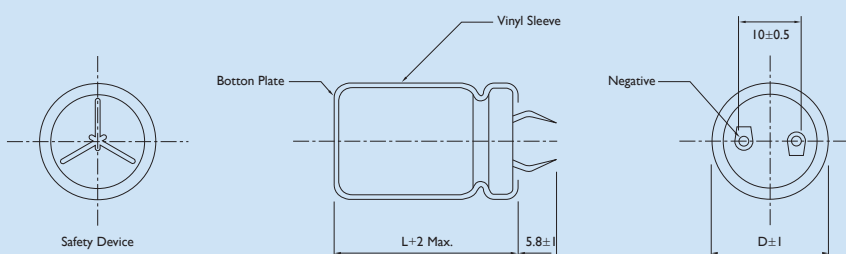
Ideally suitable for using in switching power supplies and other industrial / commercial applications

### MULTIPLIER FOR RIPPLE CURRENT

Frequency Coefficient

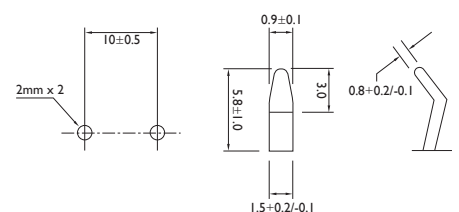
FREQUENCY (Hz)	50	60	120	1K	10K
6.3~100V	0.88	0.90	1.00	1.15	1.16
160~250V	0.75	0.78	1.00	1.16	1.23
350~450V	0.74	0.76	1.00	1.10	1.15
500V	0.72	0.74	1.00	1.05	1.10

### DIAGRAM OF DIMENSIONS



Unit: mm

Location of P.C.B. Holes





## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D × L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)							
	6.3 (8) SIZE		10 (13) SIZE		16 (20) SIZE		25 (32) SIZE	
		RIPPLE		RIPPLE		RIPPLE		RIPPLE
5600							22 × 25	2.20
6800							22 × 30	2.40
							25 × 25	2.45
8200					22 × 25	2.60	22 × 35	2.70
							25 × 25	2.75
10000					22 × 30	2.70	22 × 40	3.10
					25 × 25	2.75	25 × 30	3.15
							30 × 25	3.20
12000			22 × 25	2.40	22 × 30	2.90	22 × 45	3.50
					25 × 25	2.95	25 × 35	3.45
							30 × 30	3.50
							35 × 25	3.55
15000	22 × 25	2.44	22 × 30	2.75	22 × 35	3.30	22 × 50	4.00
			25 × 25	2.75	25 × 30	3.45	25 × 40	3.95
					30 × 25	3.50	30 × 35	4.00
							35 × 30	4.05
18000	22 × 30	2.60	22 × 35	3.15	22 × 40	3.70	25 × 45	4.45
	25 × 25	2.62	25 × 25	3.05	25 × 35	3.75	30 × 35	4.45
					30 × 30	3.80	35 × 30	4.60
22000	22 × 30	3.06	22 × 40	3.55	22 × 50	4.35	30 × 40	5.20
	25 × 25	3.07	25 × 30	3.50	25 × 40	4.30	35 × 35	5.15
			30 × 25	3.55	30 × 30	4.25	30 × 45	5.95
					35 × 25	4.20	35 × 40	5.90
27000	22 × 35	3.49	22 × 45	4.05	25 × 45	4.70	30 × 50	6.70
	25 × 30	3.52	25 × 35	4.00	30 × 35	4.65	35 × 45	6.75
	30 × 25	3.57	30 × 30	4.05	35 × 30	4.65		
33000	22 × 40	3.97	22 × 50	4.60	30 × 40	5.35	35 × 50	7.55
	25 × 35	4.02	25 × 40	4.55	35 × 30	5.40		
	30 × 30	4.05	30 × 30	4.50				
	35 × 25	4.10	35 × 25	4.50				

Note: I. Ripple Current: (A/rms) 85°C, 120Hz

## 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	
		RIPPLE		RIPPLE		RIPPLE		RIPPLE
39000	22 x 50	4.56	25 x 45	5.10	30 x 45	6.00		
	25 x 40	4.50	30 x 35	5.05	35 x 35	5.95		
	30 x 30	4.46	35 x 30	5.05				
	35 x 25	4.51						
47000	25 x 45	5.09	25 x 50	5.75	30 x 50	6.80		
	30 x 35	5.06	30 x 40	5.70	35 x 40	6.75		
	35 x 30	5.03	35 x 30	5.65				
56000	25 x 50	5.71	30 x 45	6.45	35 x 45	7.60		
	30 x 40	5.70	35 x 35	6.40				
	35 x 30	5.75						
68000	30 x 45	6.48	30 x 50	7.05	35 x 50	8.00		
	35 x 35	6.42	35 x 40	7.10				
82000	30 x 50	7.32	35 x 50	7.50				
	35 x 40	7.29						
100000	35 x 45	8.31						
120000	35 x 50	8.60						

Note: I. Ripple Current: (A/rms) 85°C, 120Hz



## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)							
	35 (44) SIZE		50 (63) SIZE		63 (79) SIZE		80 (100) SIZE	
		RIPPLE		RIPPLE		RIPPLE		RIPPLE
1200							22 x 25	1.65
1500							22 x 30	1.90
							25 x 25	1.90
1800					22 x 25	1.85	22 x 35	2.20
							25 x 30	2.20
							30 x 25	2.20
2200			22 x 25	1.90	22 x 30	2.30	22 x 40	2.45
					25 x 25	2.30	25 x 30	2.45
							30 x 25	2.50
2700			22 x 30	2.10	22 x 35	2.45	22 x 45	2.80
			25 x 25	2.20	25 x 30	2.45	25 x 35	2.80
					30 x 25	2.50	30 x 30	2.85
							35 x 25	2.85
3300			22 x 30	2.35	22 x 40	2.60	22 x 50	3.15
			25 x 25	2.35	25 x 30	2.65	25 x 40	3.20
					30 x 25	2.70	30 x 30	3.20
							35 x 25	3.20
3900	22 x 25	2.20	22 x 35	2.65	22 x 45	2.95	25 x 45	3.60
			25 x 30	2.65	25 x 35	2.95	30 x 35	3.60
			30 x 25	2.65	30 x 30	3.00	35 x 30	3.60
4700	22 x 30	2.40	22 x 40	3.00	22 x 50	3.40	25 x 50	4.05
	25 x 25	2.40	25 x 35	3.00	25 x 40	3.35	30 x 40	4.05
			30 x 25	2.95	30 x 30	3.35	35 x 35	4.10
					35 x 25	3.40		
5600	22 x 35	2.75	22 x 45	3.35	25 x 45	3.70	30 x 45	4.55
	25 x 25	2.75	25 x 40	3.35	30 x 35	3.75	35 x 35	4.50
			30 x 30	3.35	35 x 30	3.75		
			35 x 25	3.40				

Note: I. Ripple Current: (A/rms) 85°C, 120Hz

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

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)							
	35 (44) SIZE		50 (63) SIZE		63 (79) SIZE		80 (100) SIZE	
		RIPPLE		RIPPLE		RIPPLE		RIPPLE
6800	22 x 40	2.85	22 x 50	3.80	30 x 40	4.25	30 x 50	5.15
	25 x 30	2.85	25 x 40	3.80	35 x 30	4.20	35 x 40	5.15
	30 x 25	2.90	30 x 30	3.80				
			30 x 35	3.85				
			35 x 30	3.85				
8200	22 x 45	3.15	25 x 50	4.35	30 x 45	4.80	35 x 45	5.85
	25 x 35	3.10	30 x 40	4.35	35 x 35	4.80		
	30 x 30	3.15	35 x 30	4.40				
10000	22 x 50	3.55	30 x 45	5.00	30 x 50	5.50	35 x 50	6.60
	25 x 40	3.50	35 x 35	4.95	35 x 40	5.45		
	30 x 30	3.45						
	35 x 25	3.40						
12000	25 x 45	3.95	30 x 50	5.60	35 x 45	6.20		
	30 x 35	4.00	35 x 40	5.55				
	35 x 30	4.05						
15000	25 x 50	4.95	35 x 45	6.45				
	30 x 40	4.95						
	35 x 35	5.00						
18000	30 x 45	5.50	35 x 50	6.70				
	35 x 40	5.55						
22000	30 x 50	6.00						
	35 x 45	6.05						
27000	35 x 50	6.90						

Note: I. Ripple Current: (A/rms) 85°C, 120Hz



## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D × L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)							
	100 (125) SIZE		160 (200) SIZE		180 (225) SIZE		200 (250) SIZE	
		RIPPLE		RIPPLE		RIPPLE		RIPPLE
180					22 × 20	1.00	22 × 25	0.95
220					22 × 25	1.10	22 × 25	1.10
270			22 × 25	1.15	22 × 25	1.25	22 × 25	1.25
					25 × 20	1.25	22 × 30	1.25
							25 × 25	1.25
330			22 × 25	1.40	22 × 25	1.40	22 × 25	1.45
			25 × 20	1.35	22 × 30	1.40	22 × 30	1.45
					25 × 25	1.40	25 × 25	1.45
390			22 × 30	1.55	22 × 30	1.60	22 × 30	1.60
			25 × 25	1.55	25 × 25	1.60	25 × 25	1.55
			30 × 25	1.50				
470			22 × 30	1.75	22 × 35	1.80	22 × 35	1.80
			25 × 25	1.75	25 × 30	1.80	25 × 30	1.80
			30 × 25	1.70	30 × 25	1.80	30 × 25	1.80
560			22 × 30	1.95	22 × 35	2.00	22 × 40	2.00
			25 × 30	1.95	22 × 40	2.00	25 × 35	2.00
			30 × 25	1.90	25 × 30	1.95	30 × 25	2.00
					30 × 25	2.00		
680			22 × 40	2.20	22 × 45	2.25	22 × 45	2.35
			25 × 30	2.20	25 × 35	2.20	25 × 35	2.30
			30 × 25	2.15	30 × 30	2.20	30 × 30	2.30
					35 × 25	2.20	35 × 25	2.30
820	22 × 25	1.85	22 × 45	2.50	22 × 50	2.55	25 × 40	2.60
			25 × 35	2.55	25 × 40	2.55	25 × 45	2.60
			30 × 30	2.50	30 × 30	2.60	30 × 30	2.60
			35 × 25	2.50	30 × 35	2.60	30 × 35	2.60
					35 × 25	2.60	35 × 30	2.60
1000	22 × 30	2.10	22 × 50	2.85	25 × 45	2.85	25 × 45	3.00
	25 × 25	2.10	25 × 40	2.80	30 × 35	2.85	25 × 50	3.00
			30 × 35	2.80	35 × 30	2.90	30 × 35	3.05
			35 × 25	2.80			30 × 40	3.05
							35 × 30	3.00

Note: I. Ripple Current: (A/rms) 85°C, 120Hz

## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

CAP. ( $\mu$ F)	RATED VOLTAGE WV (SURGE VOLTAGE WV)							
	100 (125) SIZE		160 (200) SIZE		180 (225) SIZE		200 (250) SIZE	
		RIPPLE		RIPPLE		RIPPLE		RIPPLE
1200	22 x 35	2.40	25 x 45	3.15	30 x 40	3.25	25 x 50	3.30
	25 x 30	2.45	30 x 35	3.15	35 x 30	3.30	30 x 40	3.30
			35 x 30	3.20	35 x 35	3.30	30 x 45	3.30
							35 x 30	3.30
							35 x 35	3.30
1500	22 x 40	2.70	30 x 45	3.75	30 x 45	3.85	30 x 45	3.80
	25 x 30	2.75	35 x 30	3.70	35 x 35	3.80	30 x 50	3.80
	30 x 25	2.75	35 x 35	3.70	35 x 40	3.80	35 x 35	3.80
							35 x 40	3.80
1800	22 x 45	3.10	30 x 50	4.20	35 x 40	4.30	35 x 40	4.35
	25 x 35	3.15	35 x 40	4.20	35 x 45	4.30	35 x 45	4.35
	30 x 30	3.15						
	35 x 25	3.15						
2200	22 x 50	3.50	35 x 40	4.60	35 x 45	4.90	35 x 45	4.95
	25 x 40	3.55	35 x 45	4.80	35 x 50	4.90	35 x 50	4.95
	30 x 30	3.55						
	35 x 25	3.60						
2700	25 x 45	4.10	35 x 50	5.45				
	30 x 35	4.05						
	35 x 30	4.05						
3300	25 x 50	4.50						
	30 x 40	4.55						
	35 x 30	4.50						
3900	30 x 45	5.15						
	35 x 35	5.10						
4700	35 x 40	5.75						
5600	35 x 50	6.20						

Note: I. Ripple Current: (A/rms) 85°C, 120Hz



## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)											
	250 (300)		350 (400)		400 (450)		420 (470)		450 (500)		500 (550)	
	SIZE	RIPPLE	SIZE	RIPPLE	SIZE	RIPPLE	SIZE	RIPPLE	SIZE	RIPPLE	SIZE	RIPPLE
47									22 x 25	0.50		
56					22 x 20	0.55			22 x 25	0.65		
68			22 x 20	0.55	22 x 25	0.60			22 x 25	0.67		
					25 x 20	0.60			22 x 30	0.70		
									25 x 25	0.70		
82			22 x 25	0.65	22 x 25	0.80			22 x 30	0.80		
			25 x 20	0.65	25 x 20	0.80			25 x 25	0.80		
100			22 x 30	0.90	22 x 30	0.90			22 x 30	0.85	22 x 40	1.00
			25 x 20	0.90	25 x 25	0.90			22 x 35	0.95	30 x 25	0.90
									25 x 30	0.95		
									30 x 25	0.95		
120	22 x 20	0.78	22 x 30	1.00	22 x 30	0.95	22 x 30	0.95	22 x 30	0.95	30 x 30	1.00
			25 x 25	1.00	22 x 35	1.05			22 x 40	1.05	35 x 25	1.00
					25 x 25	1.05			25 x 30	1.05		
									30 x 25	1.05		
150	22 x 25	0.90	22 x 35	1.15	22 x 35	1.15	22 x 35	1.05	22 x 35	1.05	22 x 50	1.40
			25 x 30	1.15	25 x 30	1.15	25 x 30	1.05	22 x 45	1.20	30 x 35	1.20
			30 x 25	1.15	30 x 25	1.15	30 x 25	1.05	25 x 35	1.20		
									30 x 30	1.20		
180	22 x 25	1.05	22 x 40	1.30	22 x 40	1.20	22 x 40	1.35	25 x 40	1.35	30 x 40	1.40
			25 x 20	1.00	25 x 30	1.25	22 x 45	1.30			30 x 35	1.35
					30 x 25	1.25	25 x 35	1.30			35 x 25	1.35
					30 x 30	1.35						
220	22 x 30	1.15	22 x 45	1.45	22 x 50	1.50	22 x 45	1.40	22 x 45	1.40	30 x 45	1.60
	22 x 35	1.15	25 x 35	1.45	25 x 40	1.50	22 x 50	1.55	25 x 50	1.55	35 x 35	1.50
	25 x 25	1.15	30 x 30	1.45	30 x 30	1.50	25 x 40	1.50	30 x 40	1.55		
			35 x 25	1.45	35 x 25	1.50	25 x 45	1.60	35 x 30	1.55		
270	22 x 30	1.30	25 x 40	1.65	22 x 50	1.60	25 x 40	1.50	25 x 50	1.55	30 x 50	1.80
	25 x 25	1.30	30 x 35	1.65	25 x 40	1.65	30 x 40	1.60	30 x 45	1.75	35 x 40	1.70
			35 x 25	1.65	30 x 35	1.65			35 x 35	1.70		
					35 x 30	1.65						

Note: I. Ripple Current: (A/rms) 85°C, 120Hz



## CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

CAP. (μF)	RATED VOLTAGE WV (SURGE VOLTAGE WV)											
	250 (300)		350 (400)		400 (450)		420 (470)		450 (500)		500 (550)	
	SIZE	RIPPLE	SIZE	RIPPLE	SIZE	RIPPLE	SIZE	RIPPLE	SIZE	RIPPLE	SIZE	RIPPLE
330	22 x 30	1.50	25 x 50	1.80	25 x 45	1.75	25 x 45	1.75	30 x 40	1.75	35 x 45	2.00
	25 x 25	1.50	30 x 40	1.80	25 x 50	1.90	25 x 50	1.85	30 x 50	2.00		
	30 x 25	1.50	35 x 30	1.80	30 x 40	1.90	30 x 40	1.75	35 x 40	2.00		
					35 x 30	1.85	30 x 45	1.90				
390	22 x 35	1.65	30 x 40	2.00	30 x 40	1.95	35 x 45	1.90	30 x 45	2.00	35 x 50	2.30
	25 x 35	1.65	35 x 30	2.00	30 x 45	2.15			35 x 45	2.25		
	30 x 25	1.65			35 x 35	2.10						
470	22 x 40	1.85	30 x 45	2.25	30 x 45	2.20	30 x 45	2.10	30 x 50	2.30		
	25 x 35	1.85	35 x 35	2.25	30 x 50	2.40	30 x 50	2.20	35 x 50	2.50		
	30 x 30	1.90	35 x 40	2.40	35 x 40	2.40						
	35 x 25	1.90										
560	22 x 45	2.10	30 x 50	2.45	30 x 50	2.45	30 x 50	2.30	35 x 50	2.70		
	25 x 40	2.10	35 x 40	2.50	35 x 45	2.70	35 x 45	2.30				
	30 x 30	2.10										
	35 x 25	2.10										
680	25 x 45	2.45	35 x 45	2.90	35 x 50	2.90			35 x 60	2.90		
	30 x 35	2.45										
	35 x 25	2.45										
820	30 x 45	2.75										
	35 x 30	2.75										
1000	30 x 45	3.30										
	35 x 35	3.30										
1200	35 x 40	3.55										
1500	35 x 45	4.05										

Note: I. Ripple Current: (A/rms) 85°C, 120Hz