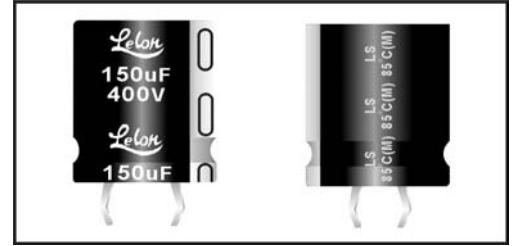


CE69 Type

Features

- Has a snap-in terminal which can solder to PCB directly and need not fixture to save processing time
- Suitable for electronic equipment with medium-high voltage circuits
- Printed circuit board terminal snap-in type and lug terminal type available.
- RoHS Compliance



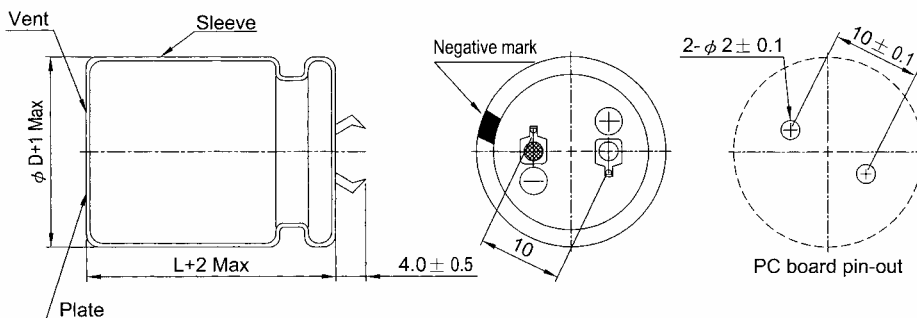
SPECIFICATIONS

Items	Performance																																															
Operating Temperature Range	-40°C ~ +85°C																																															
Capacitance Tolerance	±20% (at 120Hz, 20°C)																																															
Leakage Current (at 20°C)	I = 0.02CV or 1.5 mA whichever is smaller (after 5 minutes) Where, C= rated capacitance in $\mu$ F. V = rated DC working voltage in V.																																															
Dissipation Factor (Tan $\delta$ at 120Hz, 20°C)	<table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>80</th> <th>100</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>Tan <math>\delta</math> (max)</td> <td>0.50</td> <td>0.45</td> <td>0.40</td> <td>0.35</td> <td>0.30</td> <td>0.25</td> <td>0.20</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> </tr> </tbody> </table>	Rated Voltage	16	25	35	50	63	80	100	160	200	250	350	400	450	Tan $\delta$ (max)	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.15	0.15	0.15	0.15	0.15																			
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Low Temperature Characteristics (at 120Hz)	<p>Impedance ratio shall not exceed the values given in the table below.</p> <table border="1"> <thead> <tr> <th colspan="2">Rated Voltage</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>80</th> <th>100</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> <th>500</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance Ratio</td> <td>Z(-25°C)/Z(+20°C)</td> <td>4</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>8</td> <td>8</td> <td>8</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>15</td> <td>10</td> <td>8</td> <td>6</td> <td>6</td> <td>6</td> <td>5</td> <td>4</td> <td>8</td> <td>10</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> </tr> </tbody> </table>	Rated Voltage		16	25	35	50	63	80	100	160	200	250	350	400	450	500	Impedance Ratio	Z(-25°C)/Z(+20°C)	4	3	3	2	2	2	2	4	4	4	4	8	8	8	Z(-40°C)/Z(+20°C)	15	10	8	6	6	6	5	4	8	10	--	--	--	--
Rated Voltage		16	25	35	50	63	80	100	160	200	250	350	400	450	500																																	
Impedance Ratio	Z(-25°C)/Z(+20°C)	4	3	3	2	2	2	2	4	4	4	4	8	8	8																																	
	Z(-40°C)/Z(+20°C)	15	10	8	6	6	6	5	4	8	10	--	--	--	--																																	
Load Life Test	<table border="1"> <thead> <tr> <th>Test Time</th> <th>2,000 Hrs</th> </tr> </thead> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Less than 200% of specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Within specified value</td> </tr> </tbody> </table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 2,000 hrs at 85°C.</p>	Test Time	2,000 Hrs	Capacitance Change	Within ±20% of initial value	Dissipation Factor	Less than 200% of specified value	Leakage Current	Within specified value																																							
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Shelf Life Test	<table border="1"> <thead> <tr> <th>Test Time</th> <th>1,000 Hrs</th> </tr> </thead> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Less than 150% of specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Within specified value</td> </tr> </tbody> </table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hrs at 85°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5102).</p>	Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Dissipation Factor	Less than 150% of specified value	Leakage Current	Within specified value																																							
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Capacitance Change	Within ±20% of initial value																																															
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Leakage Current	Within specified value																																															
Ripple Current & Frequency Multipliers	<table border="1"> <thead> <tr> <th rowspan="2">W. V.(V)</th> <th colspan="5">Freq.(Hz)</th> </tr> <tr> <th>60</th> <th>120</th> <th>500</th> <th>1K</th> <th>10K up</th> </tr> </thead> <tbody> <tr> <td>Under 100</td> <td>0.92</td> <td>1.00</td> <td>1.13</td> <td>1.19</td> <td>1.20</td> </tr> <tr> <td>160 ~ 250</td> <td>0.81</td> <td>1.00</td> <td>1.32</td> <td>1.45</td> <td>1.50</td> </tr> <tr> <td>350 to up</td> <td>0.77</td> <td>1.00</td> <td>1.30</td> <td>1.41</td> <td>1.43</td> </tr> </tbody> </table>	W. V.(V)	Freq.(Hz)					60	120	500	1K	10K up	Under 100	0.92	1.00	1.13	1.19	1.20	160 ~ 250	0.81	1.00	1.32	1.45	1.50	350 to up	0.77	1.00	1.30	1.41	1.43																		
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Other Standards	JIS C 5101-4																																															

• 3,000 Hrs specifications are available upon request

DIAGRAM OF DIMENSIONS

Unit: mm





# Aluminum Electrolytic Capacitors

LS

CE69 Type

Dimension:  $\varphi D \times L(\text{mm})$

Ripple Current: A/rms at 120 Hz, 85°C

## DIMENSION & PERMISSIBLE RIPPLE CURRENT

WV Cap. $\varphi D$	16V(1C)				25V(1E)				35V(1V)														
	22 $\varphi$	25 $\varphi$	30 $\varphi$	35 $\varphi$	22 $\varphi$	25 $\varphi$	30 $\varphi$	35 $\varphi$	22 $\varphi$	25 $\varphi$	30 $\varphi$	35 $\varphi$											
4,700										22x25	2.21	25x25	2.42										
										22x30	2.41												
5,600					22x25	2.31				22x30	2.69	25x25	2.69										
										22x35	2.79												
6,800					22x25	2.38	25x25	2.78		22x35	2.70	25x25	2.67	30x25	3.09								
					22x30	2.56				22x40	2.89	25x30	2.89										
8,200	22x25	2.56			22x25	2.43	25x25	2.78		22x35	3.09	25x30	3.12	30x25	3.04								
					22x35	2.81				22x45	3.47	25x35	3.33	30x30	3.29								
10,000	22x25	2.60	25x25	2.81	22x30	2.97	25x25	2.93	30x25	3.21	22x40	3.22	25x35	3.37	30x25	3.36	35x25	3.32					
	22x30	2.81	25x30	3.03	22x35	3.18	25x30	3.16			22x50	3.59	25x40	3.59	30x30	3.61							
12,000	22x25	2.88	25x25	2.96	22x35	3.33	25x30	3.26	30x25	3.59	35x25	3.58	22x45	3.71	25x40	3.79	30x30	3.74	35x25	3.75			
	22x30	3.13			22x40	3.53	25x35	3.48	30x30	3.86			25x45	4.01	30x35	4.01	35x30	4.02					
15,000	22x30	3.45	25x25	3.38	30x25	3.73			22x40	3.68	25x35	3.77	30x25	3.60	35x25	3.96	25x45	4.55	30x35	4.54	35x25	4.37	
	22x35	3.69	25x30	3.64					22x50	4.08	25x40	4.00	30x35	4.12			30x40	4.80	35x35	5.01			
18,000	22x30	3.47	25x25	3.47					22x50	4.54	25x40	4.42	30x30	4.40	35x25	4.34	25x50	4.84	30x40	4.87	35x30	5.03	
	22x40	3.98	25x35	3.98							25x45	4.68	30x35	4.66	35x30	4.68			30x45	5.18	35x40	5.71	
22,000	22x35	3.84	25x30	3.93	30x25	4.08	35x25	4.15			25x45	4.71	30x35	4.70	35x25	4.60			30x45	5.79	35x35	5.71	
	22x50	4.52	25x40	4.44	30x30	4.38							30x45	5.26	35x35	5.20					35x45	6.38	
27,000	22x50	4.84																					
33,000	22x50	5.20																					

WV Cap. $\varphi D$	50V(1H)				63V(1J)				100V(2A)														
	22 $\varphi$	25 $\varphi$	30 $\varphi$	35 $\varphi$	22 $\varphi$	25 $\varphi$	30 $\varphi$	35 $\varphi$	22 $\varphi$	25 $\varphi$	30 $\varphi$	35 $\varphi$											
1,200										22x30	2.12	25x25	2.10										
1,500										22x35	2.45	25x30	2.43	30x25	2.46								
1,800					22x25	1.90				22x40	2.77	25x35	2.77	30x25	2.65								
2,200	22x25	1.93			22x30	2.35	25x25	2.30		22x45	3.12	25x40	3.20	30x30	3.10	35x25	3.14						
	22x25	2.05			22x35	2.50	25x25	2.29				25x45	3.61	30x35	3.60	35x30	3.71						
2,700	22x30	2.21					25x30	2.52															
3,300	22x30	2.41	25x25	2.38	22x35	2.62	25x30	2.69	30x25	2.78			25x50	4.06	30x40	4.05	35x35	4.07					
	22x30	2.51	25x25	2.46	22x40	2.90	25x35	3.09	30x30	3.09					30x45	4.60	35x35	4.50					
3,900	22x35	2.72	25x30	2.68	22x45	3.10																	
4,700	22x35	2.83	25x30	3.03	30x25	3.01			22x50	3.49	25x40	3.37	30x30	3.37	35x25	3.36			30x50	5.13	35x40	5.12	
	22x40	3.01																					
5,600	22x40	3.21	25x35	3.37	30x25	3.17	35x25	3.47			25x45	3.77	30x35	3.75	35x30	3.88					35x45	5.75	
	22x45	3.43			30x30	3.43																	
6,800	22x45	3.73	25x35	3.59	30x30	3.56	35x25	3.64			25x50	4.41	30x40	4.41	35x30	4.04					35x50	6.01	
	22x50	3.94	25x40	3.87	30x35	3.87									35x35	4.33							
8,200			25x40	4.10	30x30	4.12	35x25	4.07						30x45	4.90	35x35	4.80						
			25x45	4.37	30x35	4.42	35x30	4.41															
10,000			25x50	4.91	30x35	4.68	35x30	4.59						30x50	5.49	35x40	5.47						
					30x40	5.02	35x35	4.92															
12,000					30x40	5.10	35x35	5.30							35x45	5.97							
					30x50	5.60	35x40	5.60							35x50	6.30							
15,000							35x40	6.03															
							35x45	6.44															

### Part number system

LS series    100  $\mu$ F     $\pm 20\%$     400V    22  $\varphi$  x 30L    4.0 $\pm$ 0.5mm  
**LS**    **101**    **M**    **2G**    **-**    **2230**    **(A)**

Series name    Capacitance    Capacitance tolerance    Rated voltage    Terminal type    Case size    Terminal length

Example:

Cap.	Symbol
47	470
1,000	102
10,000	103

M =  $\pm 20\%$   
 K =  $\pm 10\%$

Example:

WV	Symbol
16	1C
100	2A
400	2G

Example:

$\varphi$ DxL	Code
22x35	2235
25x25	2525
35x50	3550

Blank:  
 6.3 $\pm$ 1.0mm



CE69 Type

Dimension:  $\varphi D \times L$ (mm)

Ripple Current: A/rms at 120 Hz, 85°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

Cap.	WV $\varphi D$	160V(2C)								200V(2D)							
		22 $\varphi$		25 $\varphi$		30 $\varphi$		35 $\varphi$		22 $\varphi$		25 $\varphi$		30 $\varphi$		35 $\varphi$	
150		22×25	0.95							22×25	0.95						
180		22×25	1.04							22×25	1.04						
220		22×25	1.15							22×25	1.15						
270		20×25	1.12														
		22×25	1.27							22×25	1.30						
330		20×30	1.28							22×30	1.44	25×25	1.43				
		22×25	1.40														
390		22×30	1.62							22×30	1.65	25×25	1.63				
										22×35	1.76	25×30	1.74				
470		22×30	1.77	25×25	1.77					22×35	1.88	25×30	1.86	30×25	1.85		
										22×40	1.97						
560		22×30	1.92	25×25	1.92	30×25	2.02			22×40	2.08	25×30	2.05	30×25	2.05		
		22×35	2.05	25×30	2.05					22×45	2.18	25×35	2.16	30×30	2.15		
680		22×35	2.12	25×30	2.22	30×25	2.22			22×45	2.36	25×35	2.36	30×30	2.36	35×25	2.10
		22×40	2.24	25×35	2.31					22×50	2.47	25×40	2.43	30×35	2.43		
820		22×40	2.32	25×30	2.32	30×25	2.31	35×25	2.50	22×50	2.68	25×40	2.66	30×30	2.62	35×30	2.72
		22×45	2.55	25×35	2.52	30×30	2.51					25×45	2.79	30×35	2.77	35×25	2.39
1,000		22×50	2.88	25×40	2.86	30×30	2.82	35×25	2.79			25×45	3.12	30×35	3.00	35×30	2.96
				25×45	2.98	30×35	2.94	35×30	2.92			25×50	2.96	30×40	3.10	35×35	3.09
1,200				25×45	3.27	30×35	3.25	35×30	3.24			25×50	3.44	30×40	3.44	35×35	3.40
				25×50	3.43	30×40	3.42	35×35	3.40					30×45	3.53	35×40	3.50
1,500						30×40	3.77	35×35	3.75					30×50	3.93	35×40	3.87
						30×45	3.92	35×40	3.90							35×45	3.95
1,800						30×45	4.10	35×35	4.08							35×45	4.37
						30×50	4.32	35×40	4.30							35×50	4.45
2,200								35×45	4.72							35×50	5.00
								35×50	4.88								

Cap.	WV $\varphi D$	250V(2E)								350V(2E)							
		22 $\varphi$		25 $\varphi$		30 $\varphi$		35 $\varphi$		22 $\varphi$		25 $\varphi$		30 $\varphi$		35 $\varphi$	
82										22×25	0.81						
100										22×25	0.90						
120										20×30	0.95	25×25	1.04				
										22×25	0.99						
150										22×30	1.05						
										20×35	1.05	25×25	1.16	30×25	1.24		
180		22×25	0.91							22×30	1.14						
										22×35	1.24	25×30	1.24				
220		22×25	1.01							20×40	1.23	25×30	1.30	30×25	1.37		
										22×35	1.28						
270		22×25	1.18	25×25	1.24					22×40	1.38	25×35	1.37				
										20×45	1.36	25×35	1.46	30×25	1.47		
330		22×30	1.27							22×40	1.40						
		22×30	1.43	25×25	1.49					22×45	1.49	25×40	1.51	30×30	1.52		
390		22×35	1.52							22×45	1.62	25×35	1.65	30×30	1.71	35×25	1.72
		22×30	1.58	25×25	1.53	30×25	1.59			22×50	1.69	25×40	1.73	30×35	1.76		
470		22×35	1.67	25×30	1.62					22×50	1.94	25×40	1.88	30×35	1.93	35×25	1.77
		22×35	1.79	25×30	1.79	30×25	1.77					25×45	1.96	30×40	1.98	35×30	1.96
560		22×40	1.89	25×35	1.87	30×30	1.85					25×45	2.04	30×35	2.12	35×30	2.19
		22×40	2.05	25×35	2.05	30×25	1.80							30×40	2.18	35×35	2.24
680		22×45	2.14			30×30	2.03							30×45	2.48	35×40	2.50
		22×50	2.43	25×40	2.32	30×30	2.24	35×25	2.21					30×45	2.60	35×35	2.62
820				25×45	2.41	30×35	2.32	35×30	2.30							35×40	2.69
				25×45	2.62	30×35	2.58	35×30	2.54							35×40	2.80
1,000				25×50	2.70	30×40	2.65	35×35	2.62							35×45	3.08
						30×40	2.92	35×35	2.90								
1,200						30×45	3.00	35×40	2.98								
						30×45	3.11	35×35	3.06								
1,500						30×50	3.47	35×40	3.39								
								35×45	3.45								
1,800								35×40	3.39								
								35×45	3.74								
2,200								35×50	3.81								



# Aluminum Electrolytic Capacitors

LS

CE69 Type

Dimension:  $\varphi D \times L(\text{mm})$

Ripple Current: A/rms at 120 Hz, 85°C

## DIMENSION & PERMISSIBLE RIPPLE CURRENT

Cap.	WV $\varphi D$	400V(2G)								450V(2W)							
		22 $\varphi$		25 $\varphi$		30 $\varphi$		35 $\varphi$		22 $\varphi$		25 $\varphi$		30 $\varphi$		35 $\varphi$	
56										20×25	0.57						
										22×25	0.68						
68		20×25	0.66							20×25	0.62						
		22×25	0.72							22×25	0.72						
82										22×30	0.80						
		20×25	0.72							20×30	0.74	25×25	0.85				
100		22×25	0.81							22×30	0.87						
		22×30	0.94	25×25	0.97					22×30	0.87						
120										22×35	1.00						
		22×30	1.04	25×25	1.08					20×40	0.96	25×30	1.09	30×25	1.10		
150		22×35	1.12	25×30	1.16					22×35	1.05						
										22×40	1.15	25×35	1.12				
180		20×35	1.00	25×30	1.21					20×45	1.13	25×30	1.16	30×25	1.16		
		22×35	1.18			30×25	1.24			22×35	1.20	25×35	1.27	30×30	1.32		
220		22×40	1.25							22×40	1.25	25×40	1.35				
		20×40	1.17	25×30	1.23	30×25	1.45			20×50	1.29	25×35	1.31			35×25	1.35
270		22×40	1.34	25×35	1.37	30×30	1.52	35×25	1.54	22×45	1.36	25×40	1.45	30×30	1.43	35×30	1.49
		22×45	1.40							22×50	1.51	25×45	1.50	30×35	1.49		
330		20×50	1.43	25×35	1.56	30×30	1.58	35×25	1.60			25×40	1.47	30×30	1.45	35×25	1.43
		22×50	1.56	25×40	1.62	30×35	1.64					25×45	1.65	30×35	1.63	35×30	1.61
390		22×50	1.56									25×50	1.73	30×40	1.72		
		22×50	1.74	25×40	1.70	30×30	1.56	35×25	1.53			25×45	1.59	30×35	1.65	35×30	1.71
470				25×45	1.76	30×35	1.73	35×30	1.75			25×50	1.72	30×40	1.83	35×35	1.86
						30×40	1.79							30×45	1.95		
560				25×45	1.76	30×35	1.76	35×30	1.95			25×50	1.76	30×40	1.93	35×30	1.88
				25×50	1.90	30×40	1.97	35×35	2.02					30×45	2.10	35×35	2.06
680						30×45	2.02							30×50	2.19	35×40	2.13
				25×50	1.95	30×40	2.15	35×30	1.97					30×45	2.03	35×35	2.00
720						30×45	2.22	35×35	2.17					30×50	2.24	35×40	2.11
								35×40	2.24							35×45	2.34
840						30×45	2.23	35×35	2.20					30×50	2.33	35×45	2.43
						30×50	2.40	35×40	2.42							35×50	2.63
960								35×45	2.48								
						30×50	2.44	35×40	2.49							35×45	2.60
1080								35×45	2.71								
								35×50	2.78								
1200								35×45	2.68							35×50	2.91
								35×50	2.95								

Cap.	WV $\varphi D$	500V(2H)							
		22 $\varphi$		25 $\varphi$		30 $\varphi$		35 $\varphi$	
56		22×25	0.70						
68		22×30	0.82						
82		22×35	0.96	25×30	0.97				
100		22×40	1.14	25×35	1.15	30×30	1.16		
120		22×45	1.30	25×35	1.25	30×30	1.26	35×25	1.20
150		22×50	1.52	25×40	1.48	30×35	1.50	35×30	1.34
180				25×50	1.65	30×40	1.60	35×30	1.55
220						30×45	1.90	35×30	1.85
270								35×40	1.95
330								35×45	2.00

Ripple current: A/rms  
Case size:  $\varphi D \times L(\text{mm})$