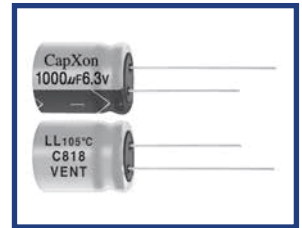


## LL Series Low Leakage Current

### Features

- ◆ Extremely low and stable leakage current characteristics.
- ◆ Close capacitance tolerance  $\pm 20\%$  ( $\pm 10\%$  on requested)
- ◆ RoHS Compliant



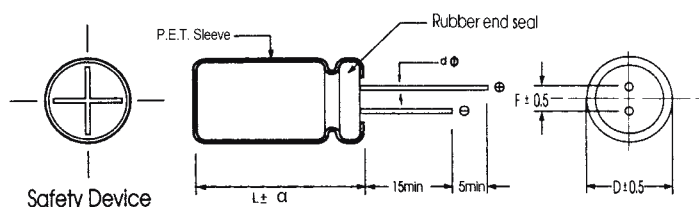
### Specifications

Item	Performance Characteristics																
Operating Temperature Range	-40 to +105°C																
Rated Voltage Range	6.3 to 63 VDC																
Capacitance Range	0.1 to 2200 $\mu$ F																
Capacitance Tolerance	$\pm 20\%$ (120Hz, +20°C)																
Leakage Current(+20°C, max)	$I \leq 0.002 CV$ or $0.4 (\mu A)$ After 3 minutes(90sec. $\leq 10 \mu F$ ) whichever is greater measured with rated working voltage applied.																
Dissipation Factor ( $\tan \delta$ , at 20°C , 120Hz)	<table border="1"> <tr> <td>Working Voltage (VDC)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>D.F. (%)max</td> <td>20</td> <td>17</td> <td>13</td> <td>10</td> <td>9</td> <td>8</td> <td>8</td> </tr> </table>	Working Voltage (VDC)	6.3	10	16	25	35	50	63	D.F. (%)max	20	17	13	10	9	8	8
	Working Voltage (VDC)	6.3	10	16	25	35	50	63									
D.F. (%)max	20	17	13	10	9	8	8										
Low Temperature Characteristics (at 120Hz)	Impedance ratio max <table border="1"> <tr> <td>Working Voltage (VDC)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>Z-40°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> </tr> </table>	Working Voltage (VDC)	6.3	10	16	25	35	50	63	Z-40°C / Z+20°C	4	3	3	2	2	2	2
Working Voltage (VDC)	6.3	10	16	25	35	50	63										
Z-40°C / Z+20°C	4	3	3	2	2	2	2										
Endurance	Test conditions Duration time :2000Hrs Ambient temperature :+105°C Applied voltage :Rated DC working voltage  After test requirement at +20°C Capacitance change : $\leq \pm 20\%$ of the initial measured value Dissipation factor : $\leq 150\%$ of the initial specified value Leakage current : $\leq$ The initial specified value																
Shelf Life	Test conditions Duration time :1000Hrs Ambient temperature :+105°C Applied voltage :None  After test requirement at +20°C:Same limits as Endurance. Pre-treatment for measurements shall be conducted after application of DC working voltage for 30 minutes.																

### Multiplier for Ripple Current vs. Frequency

CAP( $\mu$ F) \ Frequency(Hz)	50(60)	120	400	1K	10K	50K-100K
CAP $\leq 10$	0.8	1	1.30	1.45	1.65	1.70
10 < CAP $\leq 100$	0.8	1	1.23	1.36	1.48	1.53
100 < CAP $\leq 2200$	0.8	1	1.16	1.25	1.35	1.38

### Diagram of Dimensions:(unit:mm)



$\alpha$	D < 18	D=18		D > 18
		L < 35.5	L $\geq 35.5$	
	1.5	1.5	2	2

D $\phi$	5	6.3	8	10	13
F	2.0	2.5	3.5	5.0	5.0
d $\phi$	0.5			0.6	

## Case Size

WV Cap(μF)	6.3		10		16		25		35		50		63	
	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple	Size	Ripple
0.1											5x11	8.8	5x11	8.8
0.22											5x11	8.8	5x11	8.8
0.33											5x11	8.8	5x11	8.8
0.47											5x11	12	5x11	12
1											5x11	17	5x11	17
2.2											5x11	24	5x11	24
3.3											5x11	29	5x11	32
4.7							5x11	32	5x11	33	5x11	36	5x11	39
10					5x11	39	5x11	43	5x11	48	5x11	52	6.3x11	58
22	5x11	36	5x11	50	5x11	62	5x11	65	6.3x11	71	6.3x11	77	6.3x11	94
33	5x11	44	5x11	66	5x11	68	5x11	76	6.3x11	83	6.3x11	99	8x11.5	110
47	5x11	53	5x11	75	5x11	105	6.3x11	116	6.3x11	125	8x11.5	138	8x11.5	152
100	5x11	74	5x11	104	6.3x11	138	8x11.5	149	8x11.5	187	10x12.5	217	10x16	260
220	6.3x11	131	8x11.5	193	8x11.5	220	10x12.5	246	10x12.5	330	10x20	380	13x20	440
330	6.3x11	161	8x11.5	256	8x11.5	268	10x12.5	352	10x16	440	13x20	506	13x25	594
470	8x11.5	242	8x11.5	319	10x12.5	407	10x16	484	13x20	590	13x25	705		
1000	10x12.5	390	10x16	605	10x20	704	13x20	847	13x25	1012				
2200	13x20	665	13x20	860	13x25	890								

φ DxL(mm)

Ripple Current ( mA, rms ) at 105°C 120Hz