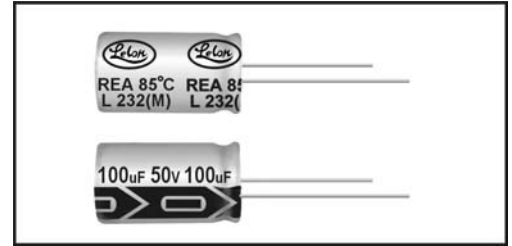




CE04 Type

Features

- 85°C, 2000 ~ 3000 hours assured
- Standard series for general purpose

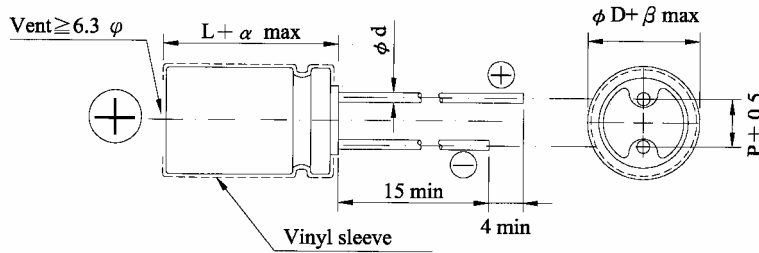


SPECIFICATIONS

Items	Performance																																																																																		
Operating Temperature Range	-40°C ~ +85°C																																																																																		
Capacitance Tolerance	±20% (at 120Hz, 20°C)																																																																																		
Leakage Current (at 20°C)	<table border="1"> <tr> <td>Rated voltage</td> <td>≤ 100V</td> <td colspan="2">&gt; 100V</td> </tr> <tr> <td>Time</td> <td>after 2 minutes</td> <td colspan="2">after 5 minutes</td> </tr> <tr> <td>Leakage Current</td> <td>I = 0.01CV or 3 (µA) whichever is greater</td> <td>CV ≤ 1000 I = 0.03CV + 15 (µA)</td> <td>CV &gt; 1000 I = 0.02CV + 25 (µA)</td> </tr> </table> <p>Where, C = rated capacitance in µF. V = rated DC working voltage in V.</p>	Rated voltage	≤ 100V	> 100V		Time	after 2 minutes	after 5 minutes		Leakage Current	I = 0.01CV or 3 (µA) whichever is greater	CV ≤ 1000 I = 0.03CV + 15 (µA)	CV > 1000 I = 0.02CV + 25 (µA)																																																																						
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Dissipation Factor (Tan δ at 120 Hz, 20°C)	<table border="1"> <tr> <td>Rated Voltage</td> <td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td> </tr> <tr> <td>Tan δ (max)</td> <td>0.23</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.09</td><td>0.08</td><td>0.12</td><td>0.14</td><td>0.17</td><td>0.20</td><td>0.25</td><td>0.25</td> </tr> </table> <p>When the capacitance exceeds 1000 µF, 0.02 shall be added every 1000 µF increase.</p>	Rated Voltage	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	Tan δ (max)	0.23	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.12	0.14	0.17	0.20	0.25	0.25																																																				
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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"> <tr> <td colspan="2">Rated Voltage</td> <td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td> </tr> <tr> <td rowspan="2">Impedance Ratio</td> <td>Z(-25°C) / Z(+20°C)</td> <td>φ D &lt; 16</td><td>6</td><td>4</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>3</td><td>6</td><td>8</td><td>12</td><td>14</td><td>16</td> </tr> <tr> <td></td> <td>φ D ≥ 16</td><td>8</td><td>6</td><td>4</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td rowspan="2">Ratio</td> <td>Z(-40°C) / Z(+20°C)</td> <td>φ D &lt; 16</td><td>10</td><td>8</td><td>6</td><td>6</td><td>4</td><td>3</td><td>3</td><td>3</td><td>4</td><td>8</td><td>10</td><td>16</td><td>18</td><td>20</td> </tr> <tr> <td></td> <td>φ D ≥ 16</td><td>18</td><td>16</td><td>12</td><td>10</td><td>8</td><td>8</td><td>6</td><td>6</td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	Rated Voltage		6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	Impedance Ratio	Z(-25°C) / Z(+20°C)	φ D < 16	6	4	3	3	2	2	2	2	3	6	8	12	14	16		φ D ≥ 16	8	6	4	4	3	3	3	3							Ratio	Z(-40°C) / Z(+20°C)	φ D < 16	10	8	6	6	4	3	3	3	4	8	10	16	18	20		φ D ≥ 16	18	16	12	10	8	8	6	6						
Rated Voltage		6.3	10	16	25	35	50	63	100	160	200	250	350	400	450																																																																				
Impedance Ratio	Z(-25°C) / Z(+20°C)	φ D < 16	6	4	3	3	2	2	2	2	3	6	8	12	14	16																																																																			
		φ D ≥ 16	8	6	4	4	3	3	3	3																																																																									
Ratio	Z(-40°C) / Z(+20°C)	φ D < 16	10	8	6	6	4	3	3	3	4	8	10	16	18	20																																																																			
		φ D ≥ 16	18	16	12	10	8	8	6	6																																																																									
Load Life Test	<table border="1"> <tr> <td>Test Time</td> <td>2000 hrs (3000 hrs for φ D ≥ 10mm)</td> </tr> <tr> <td>Capacitance Change</td> <td>With in ±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> </table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for 2000/3000 hrs at 85°C.</p>	Test Time	2000 hrs (3000 hrs for φ D ≥ 10mm)	Capacitance Change	With in ±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"> <tr> <td>Test Time</td> <td>1000 hrs</td> </tr> <tr> <td>Capacitance Change</td> <td>With in ±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> </table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1000 hrs at 85°C without voltage applied.</p>	Test Time	1000 hrs	Capacitance Change	With in ±20% of initial value	Dissipation Factor	Less than 200% of specified value	Leakage Current	Within specified value																																																																										
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Ripple Current & Frequency Multipliers	<table border="1"> <tr> <td>Freq. (Hz)</td> <td>60 (50)</td><td>120</td><td>500</td><td>1K</td><td>10K up</td> </tr> <tr> <td>Cap. (µF)</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Under 100</td> <td>0.70</td><td>1.00</td><td>1.30</td><td>1.40</td><td>1.50</td> </tr> <tr> <td>100 to 1000</td> <td>0.75</td><td>1.00</td><td>1.20</td><td>1.30</td><td>1.35</td> </tr> <tr> <td>1000 up above</td> <td>0.80</td><td>1.00</td><td>1.10</td><td>1.12</td><td>1.15</td> </tr> </table>	Freq. (Hz)	60 (50)	120	500	1K	10K up	Cap. (µF)						Under 100	0.70	1.00	1.30	1.40	1.50	100 to 1000	0.75	1.00	1.20	1.30	1.35	1000 up above	0.80	1.00	1.10	1.12	1.15																																																				
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1000 up above	0.80	1.00	1.10	1.12	1.15																																																																														
Other Standards	JIS C 5101-4																																																																																		

## CE04 Type

### DIAGRAM OF DIMENSIONS



Unit: mm

### LEAD SPACING AND DIAMETER

$\phi D$	5	6.3	8	10	13	16	18	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10	12.5
$\phi d$	0.5		0.6			0.8		1.0	
$\alpha$	1.0			1.5			2.0		
$\beta$	0.5								

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

Ripple Current: mA/rms at 120 Hz, 85°C

### DIMENSION & PERMISSIBLE RIPPLE CURRENT

$\mu F$	V. DC Contents	6.3V (0J)				10V (1A)				16V (1C)				25V (1E)			
		$\phi D \times L$	mA	* $\phi D \times L$	mA	$\phi D \times L$	mA	* $\phi D \times L$	mA	$\phi D \times L$	mA	* $\phi D \times L$	mA	$\phi D \times L$	mA	* $\phi D \times L$	mA
4.7	4R7																
10	100									5 × 11	49			5 × 11	54		
22	220					5 × 11	70			5 × 11	75			5 × 11	80		
33	330	5 × 11	72			5 × 11	84			5 × 11	90			5 × 11	97		
47	470	5 × 11	90			5 × 11	100			5 × 11	110			5 × 11	115		
100	101	5 × 11	130			5 × 11	145			6.3 × 11	180	5 × 11	160	6.3 × 11	190		
220	221	6.3 × 11	230	5 × 11	200	6.3 × 11	250	5 × 11	220	8 × 11.5	300	6.3 × 11	260	8 × 11.5	320		
330	331	8 × 11.5	290	6.3 × 11	270	8 × 11.5	350	6.3 × 11	290	8 × 11.5	370			10 × 12.5	470	8 × 11.5	440
470	471	8 × 11.5	380	6.3 × 11	320	8 × 11.5	415	6.3 × 11	350	10 × 12.5	520	8 × 11.5	440	10 × 16	620	10 × 12.5	545
1000	102	8 × 11.5	540			10 × 12.5	650			10 × 16	785			13 × 20	1090	10 × 20	955
2200	222	10 × 20	1000			13 × 20	1240	10 × 20	1070	13 × 20	1295			16 × 25	1660	13 × 25	1540
3300	332	13 × 20	1380	10 × 20	1185	13 × 20	1420			16 × 25	1840	13 × 25	1655	16 × 31.5	2070	16 × 25	1975
4700	472	16 × 25	1880	13 × 20	1545	16 × 25	1980	13 × 25	1780	16 × 31.5	2260	16 × 25	2090	18 × 35.5	2520	16 × 31.5	2420
6800	682	16 × 25	2120	13 × 25	1880	16 × 25	2220			16 × 31.5	2520			18 × 35.5	2880		
10000	103	16 × 31.5	2500	16 × 25	2330	18 × 35.5	2880	16 × 35.5	2670	18 × 40	3080	18 × 35.5	2920	22 × 40	3440	18 × 40	3080
22000	223	22 × 40	3700	18 × 40	3320	22 × 40	3790	18 × 40	3370	22 × 40	3900						

$\mu F$	V. DC Contents	35V (1V)				50V (1H)				63V (1J)				100V (2A)			
		$\phi D \times L$	mA	* $\phi D \times L$	mA	$\phi D \times L$	mA	* $\phi D \times L$	mA	$\phi D \times L$	mA	* $\phi D \times L$	mA	$\phi D \times L$	mA	* $\phi D \times L$	mA
0.1	0R1					5 × 11	1.5			5 × 11	3			5 × 11	3		
0.22	R22					5 × 11	3.5			5 × 11	4.5			5 × 11	5.8		
0.33	R33					5 × 11	5			5 × 11	7.5			5 × 11	8.8		
0.47	R47					5 × 11	7			5 × 11	9.5			5 × 11	12		
1	010					5 × 11	15			5 × 11	17			5 × 11	22		
2.2	2R2					5 × 11	29			5 × 11	28			5 × 11	33		
3.3	3R3					5 × 11	35			5 × 11	34			5 × 11	40		
4.7	4R7	5 × 11	40			5 × 11	42			5 × 11	45			5 × 11	48		
10	100	5 × 11	58			5 × 11	65			5 × 11	70			6.3 × 11	80		
22	220	5 × 11	87			5 × 11	95			6.3 × 11	115			8 × 11.5	135	6.3 × 11	115
33	330	6.3 × 11	115	5 × 11	108	6.3 × 11	136	5 × 11	125	8 × 11.5	150	6.3 × 11	140	10 × 16	195	8 × 11.5	145
47	470	6.3 × 11	145	5 × 11	130	6.3 × 11	165			8 × 11.5	190	6.3 × 11	170	10 × 16	255	10 × 12.5	235
100	101	8 × 11.5	240	6.3 × 11	210	8 × 11.5	260			10 × 12.5	320			10 × 20	370		
220	221	10 × 12.5	420	8 × 11.5	385	10 × 16	490	10 × 12.5	455	10 × 20	565	10 × 16	490	13 × 25	675	13 × 20	640
330	331	10 × 16	570	10 × 12.5	490	13 × 20	635	10 × 16	585	13 × 20	765	10 × 20	710	16 × 31.5	972	16 × 25	825
470	471	10 × 16	740			13 × 20	860	10 × 20	755	16 × 25	1050	13 × 20	900	18 × 35.5	1135	16 × 31.5	1070
1000	102	13 × 20	1145			16 × 25	1530	13 × 25	1340	16 × 31.5	1700	16 × 25	1560	22 × 40	2600	18 × 40	2410
2200	222	16 × 31.5	1890	16 × 25	1785	18 × 40	2231	16 × 35.5	2075	18 × 40	2385						
3300	332	18 × 35.5	2430	16 × 35.5	2275	22 × 40	2785	18 × 35.5	2500	22 × 40	3000						
4700	472	18 × 40	2890	18 × 35.5	2700	25 × 40	3300	22 × 40	3155	25 × 40	3560						

Case size in mark of “\*” is smaller.

CE04 Type

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

Ripple Current: mA/rms at 120 Hz, 85°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

$\mu F$	V. DC Contents	160V (2C)				200V (2D)				250V (2E)			
		$\varphi D \times L$	mA	* $\varphi D \times L$	mA	$\varphi D \times L$	mA	* $\varphi D \times L$	mA	$\varphi D \times L$	mA	* $\varphi D \times L$	mA
0.47	R47	6.3 × 11	15	5 × 11	13	6.3 × 11	16	5 × 11	14	8 × 11.5	21		
1	010	6.3 × 11	24	5 × 11	20	6.3 × 11	25	5 × 11	21	8 × 11.5	32		
2.2	2R2	6.3 × 11	34	5 × 11	29	8 × 11.5	44	6.3 × 11	37	8 × 11.5	49	6.3 × 11	42
3.3	3R3	8 × 11.5	50	6.3 × 11	43	8 × 11.5	54	6.3 × 11	46	10 × 12.5	70	8 × 11.5	60
4.7	4R7	8 × 11.5	60	6.3 × 11	51	10 × 12.5	76	8 × 11.5	64	10 × 16	93	8 × 11.5	72
10	100	10 × 16	115	10 × 12.5	104	10 × 20	138	10 × 12.5	112	10 × 20	150	10 × 16	138
22	220	13 × 20	216	10 × 20	189	13 × 20	234	10 × 20	204	13 × 20	255	10 × 20	220
33	330	13 × 20	270	10 × 20	228	13 × 25	318	13 × 20	288	13 × 25	348	13 × 20	310
47	470	13 × 25	354	13 × 20	318	16 × 25	426	13 × 25	378	16 × 25	468	13 × 25	420
100	101	16 × 25	582	13 × 25	510	16 × 35.5	678	16 × 25	582	18 × 40	822	16 × 35.5	732
220	221	18 × 35.5	900	16 × 31.5	792	18 × 40	1062	18 × 35.5	1002	22 × 40	1134		
330	331	18 × 40	1010	18 × 35.5	984								

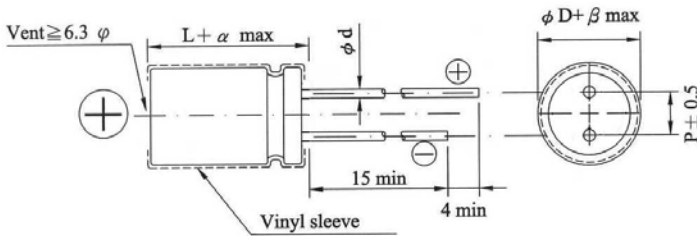
$\mu F$	V. DC Contents	350V (2V)				400V (2G)				450V (2W)			
		$\varphi D \times L$	mA	* $\varphi D \times L$	mA	$\varphi D \times L$	mA	* $\varphi D \times L$	mA	$\varphi D \times L$	mA	* $\varphi D \times L$	mA
0.47	R47	8 × 11.5	21	6.3 × 11	18	10 × 12.5	26	8 × 11.5	21	10 × 12.5	26	8 × 11.5	21
1	010	8 × 11.5	32	6.3 × 11	27	10 × 12.5	38	8 × 11.5	32	10 × 12.5	38	8 × 11.5	32
2.2	2R2	10 × 16	63	8 × 11.5	49	10 × 16	63	10 × 12.5	57	10 × 16	63	10 × 12.5	57
3.3	3R3	10 × 16	78	10 × 12.5	70	10 × 20	86	10 × 16	78	10 × 20	86	10 × 16	78
4.7	4R7	10 × 20	103	10 × 16	93	13 × 20	120	10 × 20	103	13 × 20	120	10 × 20	103
10	100	13 × 20	174	10 × 20	150	13 × 25	192	13 × 20	174	13 × 25	192	13 × 20	174
22	220	13 × 25	282	13 × 20	255	16 × 25	318	13 × 25	280	16 × 25	354		
33	330	16 × 31.5	438	16 × 25	390	16 × 35.5	460	16 × 25	390	18 × 35.5	490	16 × 31.5	435
47	470	16 × 35.5	500	16 × 31.5	474	18 × 35.5	585	16 × 31.5	474	18 × 40	600	16 × 35.5	510
100	101	18 × 40	685			22 × 40	710			22 × 45	750		

Case size in mark of “\*” is smaller.

※ Low-Profile Size

DIAGRAM OF DIMENSIONS

Unit: mm



LEAD SPACING AND DIAMETER

$\varphi D$	13	16	18
P	5.0	7.5	7.5
$\varphi d$	0.6	0.8	
$\alpha$	1.5		
$\beta$	0.5		

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

Ripple Current: mA/rms at 120 Hz, 85°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

$\mu F$	V. DC Contents	6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)	
		$\varphi D \times L$	mA	$\varphi D \times L$	mA	$\varphi D \times L$	mA	$\varphi D \times L$	mA	$\varphi D \times L$	mA	$\varphi D \times L$	mA
470	471											16 × 16	745
1000	102							13 × 16	830	16 × 16	1010	16 × 20	1160
2200	222			13 × 16	970	16 × 16	1160	16 × 20	1360	18 × 20	1560		
3300	332			16 × 16	1310	16 × 20	1460	18 × 20	1720	18 × 25	1970		
4700	472	16 × 16	1410	16 × 20	1560	18 × 20	1770	18 × 25	2070				
6800	682	16 × 20	1660	18 × 20	1870	18 × 25	2170						
10000	103	18 × 20	2020	18 × 25	2370								

$\mu F$	V. DC Contents	160V (2C)		200V (2D)		250V (2E)	
		$\varphi D \times L$	mA	$\varphi D \times L$	mA	$\varphi D \times L$	mA
22	220					13 × 16	280
33	330			16 × 16	350	16 × 16	350
47	470	16 × 16	420	16 × 20	420	16 × 20	420
68	680	16 × 20	490	18 × 20	490	18 × 20	490
100	101	18 × 20	590	18 × 25	590		
150	151	18 × 25	710				