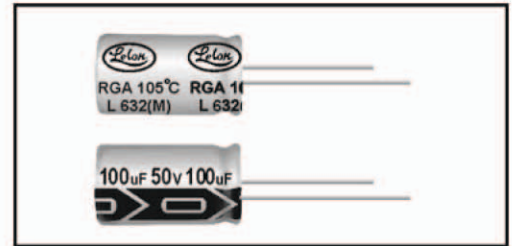


CE04 Type

Features

- 105°C, for general purpose, standard series
- RoHS Compliance

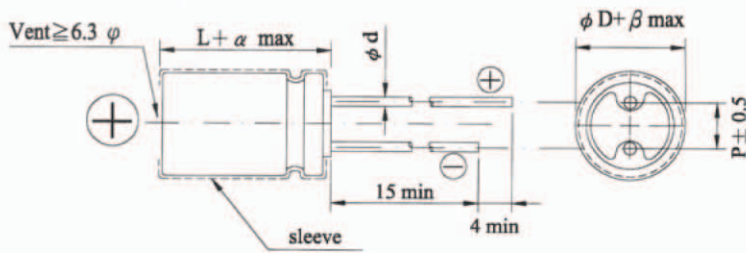


SPECIFICATIONS

Items	Performance																																																																														
Life	2000Hrs, at 105°C																																																																														
Operating Temperature Range	-40°C ~ +105°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">> 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 > 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)																																																																		
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)																																																																												
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 1,000 μF, 0.02 shall be added every 1,000 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																																																
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																																																																	
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 < 16</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>6</td> <td>4</td> <td>4</td> <td>3</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 rowspan="2">Ratio</td> <td>Z(-40°C) / Z(+20°C)</td> <td>φ D < 16</td> <td>8</td> <td>6</td> <td>6</td> <td>4</td> <td>4</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>12</td> <td>10</td> <td>8</td> <td>8</td> <td>8</td> <td>8</td> <td>6</td> <td>6</td> <td>8</td> <td>10</td> <td>16</td> <td>18</td> <td>20</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	4	3	3	2	2	2	2	3	6	8	12	14	16		φ D ≥ 16	6	4	4	3	3	3	3	4	8	10	16	18	20	Ratio	Z(-40°C) / Z(+20°C)	φ D < 16	8	6	6	4	4	3	3	4	8	10	16	18	20		φ D ≥ 16	12	10	8	8	8	8	6	6	8	10	16	18	20
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	4	3	3	2	2	2	2	3	6	8	12	14	16																																																																
		φ D ≥ 16	6	4	4	3	3	3	3	4	8	10	16	18	20																																																																
Ratio	Z(-40°C) / Z(+20°C)	φ D < 16	8	6	6	4	4	3	3	4	8	10	16	18	20																																																																
		φ D ≥ 16	12	10	8	8	8	8	6	6	8	10	16	18	20																																																																
Load Life Test	<table border="1"> <tr> <td>Test Time</td> <td>2,000 Hrs</td> </tr> <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> </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 105°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																																																																						
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																																																																														
Shelf Life Test	<table border="1"> <tr> <td>Test Time</td> <td>1,000 hrs</td> </tr> <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> </table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hrs at 105°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements for 160 ~ 450V (Refer to JIS C 5102).</p>	Test Time	1,000 hrs	Capacitance Change	Within ±20% of initial value	Dissipation Factor	Less than 200% of specified value	Leakage Current	Within specified value																																																																						
Test Time	1,000 hrs																																																																														
Capacitance Change	Within ±20% of initial value																																																																														
Dissipation Factor	Less than 200% of specified value																																																																														
Leakage Current	Within specified value																																																																														
Ripple Current & Frequency Multipliers	<table border="1"> <tr> <td rowspan="4">Cap.(μF)</td> <td>Freq.(Hz)</td> <td>60</td> <td>120</td> <td>500</td> <td>1K</td> <td>10K up</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 < C ≤ 1,000</td> <td>0.75</td> <td>1.00</td> <td>1.20</td> <td>1.30</td> <td>1.35</td> </tr> <tr> <td>1,000 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>	Cap.(μF)	Freq.(Hz)	60	120	500	1K	10K up	Under 100	0.70	1.00	1.30	1.40	1.50	100 < C ≤ 1,000	0.75	1.00	1.20	1.30	1.35	1,000 up above	0.80	1.00	1.10	1.12	1.15																																																					
Cap.(μF)	Freq.(Hz)		60	120	500	1K	10K up																																																																								
	Under 100		0.70	1.00	1.30	1.40	1.50																																																																								
	100 < C ≤ 1,000		0.75	1.00	1.20	1.30	1.35																																																																								
	1,000 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

ϕD	5	6.3	8	10	12.5	16	18	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10	12.5
ϕd	0.5		0.6			0.8		1.0	
α	1.0			1.5			2.0		
β	0.5								

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

Ripple Current: mA/rms at 120 Hz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

μF	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													5×11	26		
10	100									5×11	35			5×11	43		
22	220					5×11	49			5×11	58			5×11	62		
33	330	5×11	54			5×11	60			5×11	71			5×11	76		
47	470	5×11	65			5×11	76			5×11	85			5×11	97		
100	101	5×11	95			5×11	105			6.3×11	133	5×11	110	6.3×11	142		
220	221	6.3×11	160	5×11	140	6.3×11	175			8×11.5	215	6.3×11	190	8×11.5	236		
330	331	8×11.5	195	6.3×11	190	8×11.5	245	6.3×11	200	8×11.5	270			10×12.5	335	8×11.5	310
470	471	8×11.5	270	6.3×11	230	8×11.5	290			10×12.5	370	8×11.5	310	10×16	440	10×12.5	380
1,000	102	10×12.5	460	8×11.5	380	10×16	550	10×12.5	460	10×20	640	10×16	560	12.5×20	770	10×20	680
2,200	222	10×20	810	10×16	690	12.5×20	860	10×20	760	12.5×25	1,000	12.5×20	920	16×25	1,170	12.5×25	1,110
3,300	332	12.5×20	960	10×20	840	12.5×20	1,100			16×25	1,300	12.5×25	1,170	16×31.5	1,460	16×25	1,440
4,700	472	16×25	1,330	12.5×20	1,090	16×25	1,400	12.5×25	1,260	16×31.5	1,600	16×25	1,480	18×35.5	1,780	16×31.5	1,710
6,800	682	16×25	1,640	12.5×25	1,460	16×31.5	1,880	16×25	1,690	18×35.5	2,170	16×31.5	1,930	18×40	2,280	18×35.5	2,160
10,000	103	16×31.5	2,200	16×25	1,990	16×35.5	2,400	16×31.5	2,120	18×35.5	2,640	18×31.5	2,330			22×40	2,720
22,000	223	18×40	3,270	18×35.5	2,930	18×40	3,100						22×40	3,460			

μF	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	3.2			5×11	3.5			5×11	4		
0.22	R22					5×11	4.9			5×11	5.1			5×11	6		
0.33	R33					5×11	6			5×11	7.5			5×11	8		
0.47	R47					5×11	7.1			5×11	9			5×11	9		
1	010					5×11	13			5×11	15			5×11	15		
2.2	2R2					5×11	20			5×11	30			5×11	30		
3.3	3R3					5×11	30			5×11	31			5×11	31		
4.7	4R7	5×11	30			5×11	33			5×11	36			6.3×11	40		
10	100	5×11	46			5×11	50			5×11	54			8×11.5	66	6.3×11	54
22	220	5×11	71			5×11	78			6.3×11	86			8×11.5	99	6.3×11	93
33	330	6.3×11	90	5×11	75	6.3×11	96	5×11	90	8×11.5	114	6.3×11	100	10×12.5	148	8×11.5	130
47	470	6.3×11	110	5×11	90	6.3×11	120			8×11.5	141	6.3×11	130	10×16	180	10×12.5	165
100	101	8×11.5	180	6.3×11	150	8×11.5	188			10×12.5	235			12.5×20	320	10×20	265
220	221	10×12.5	300	8×11.5	270	10×16	300	10×12.5	240	10×20	450	10×16	335	16×25	570	12.5×25	440
330	331	10×16	400	10×12.5	350	10×20	460	10×16	410	12.5×20	540	10×20	510	16×31.5	700	16×25	540
470	471	10×20	520	10×16	460	12.5×25	610	10×20	530	12.5×25	720	12.5×20	640	18×35.5	880	16×31.5	715
1,000	102	12.5×25	920	12.5×20	810	16×25	1,080	12.5×25	950	16×31.5	1,210	16×25	930	22×40	1,760	18×40	985
2,200	222	16×31.5	1,340	16×25	1,260	18×35.5	2,120	16×35.5	1,470	18×40	2,340						
3,300	332	16×35.5	1,610	16×31.5	1,420	22×40	2,290	18×35.5	1,770	22×40	2,510						
4,700	472	18×40	1,920	18×35.5	1,900	25×40	2,610	22×40	2,340	25×40	3,000						

Case size in mark of "*" is smaller.

CE04 Type

Dimension: $\varphi D \times L$ (mm)
Ripple Current: mA/rms at 120 Hz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

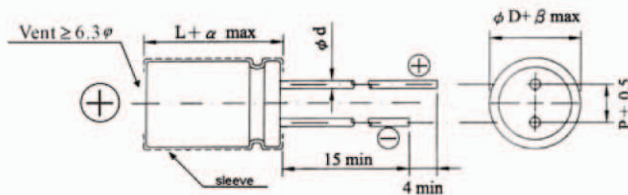
μF	V. DC Contents	160V (2C)			200V (2D)			250V (2E)					
		$\varphi D \times L$	mA	* $\varphi D \times L$	mA	$\varphi D \times L$	mA	* $\varphi D \times L$	mA	$\varphi D \times L$	mA	* $\varphi D \times L$	mA
0.47	R47	6.3×11	13	5×11	11	6.3×11	14	5×11	12	8×11.5	18	5×11	11
1	010	6.3×11	20	5×11	17	6.3×11	21	5×11	18	8×11.5	27	5×11	16
2.2	2R2	6.3×11	29	5×11	25	8×11.5	37	6.3×11	30	8×11.5	41	6.3×11	35
3.3	3R3	8×11.5	42	6.3×11	36	8×11.5	45	6.3×11	39	8×11.5	50	6.3×11	40
4.7	4R7	8×11.5	50	6.3×11	43	8×11.5	54	6.3×11	43	10×16	93	8×11.5	60
10	100	10×12.5	87	8×11.5	73	10×20	115	10×12.5	94	10×16	115	10×12.5	92
22	220	10×20	158	10×16	135	10×20	170	10×16	142	12.5×20	255	10×20	215
33	330	12.5×20	225	10×20	190	12.5×25	265	12.5×20	240	12.5×25	348	12.5×20	315
47	470	12.5×25	295	12.5×20	265	12.5×25	315	12.5×20	250	16×25	468	12.5×25	350
100	101	16×25	485	12.5×25	425	16×35.5	565	16×25	485	16×35.5	610	16×31.5	530
220	221	18×35.5	750	16×31.5	660	18×40	885	18×35.5	835	22×40	945		
330	331	18×40	865	18×35.5	820								

μF	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	18	6.3×11	16	8×11.5	18	6.3×11	15	10×12.5	22	8×11.5	18
1	010	8×11.5	27	6.3×11	23	8×11.5	27	6.3×11	21	10×12.5	32	8×11.5	27
2.2	2R2	10×16	53	8×11.5	41	10×12.5	48	8×11.5	39	10×12.5	48	8×11.5	39
3.3	3R3	10×12.5	59	8×11.5	47	10×16	65	8×11.5	47	10×16	65	10×12.5	55
4.7	4R7	10×16	78	10×12.5	65	10×20	86	10×12.5	70	10×20	86	10×16	75
10	100	10×20	125	10×16	105	12.5×20	145	10×20	125	12.5×25	160	12.5×20	145
22	220	12.5×25	235	12.5×20	210	16×25	265	12.5×25	235	16×25	265	16×20	245
33	330	16×31.5	365	16×25	325	16×31.5	360	16×25	325	16×31.5	360	16×25	325
47	470	16×31.5	395	16×25	365	16×35.5	420	16×31.5	390	18×40	515	16×35.5	420
100	101	18×40	575	18×35.5	505	22×40	595	18×40	530	22×45	625	22×40	595

Case size in mark of "*" is smaller.

※ Low-Profile Size

DIAGRAM OF DIMENSIONS



Unit: mm

LEAD SPACING AND DIAMETER

φD	12.5	16	18
P	5.0	7.5	7.5
φd	0.6	0.8	
α	1.5		
β	0.5		

DIMENSION & PERMISSIBLE RIPPLE CURRENT

Dimension: $\varphi D \times L$ (mm)
Ripple Current: mA/rms at 120 Hz, 105°C

μF	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											12.5×16	425
1,000	102							12.5×16	590	12.5×16	600	16×16	535
2,200	222			13×16	690	16×16	830	16×20	970	18×20	1,110		
3,300	332	12.5×16	700	16×16	940	16×16	950	18×20	1,220	18×25	1,570		
4,700	472	16×16	1,010	16×16	1,060	16×20	1,185	18×25	1,470				
6,800	682	16×20	1,190	16×20	1,270	18×20	1,260						
10,000	103	16×20	1,340	18×20	1,440	18×25	1,700						

μF	V. DC Contents	160V (2C)		200V (2D)		250V (2E)		400V (2E)	
		$\varphi D \times L$	mA	$\varphi D \times L$	mA	$\varphi D \times L$	mA	$\varphi D \times L$	mA
10	101							12.5×16	120
22	220					12.5×16	200	16×20	150
33	330			12.5×16	215	16×16	250	18×20	220
47	470	12.5×16	230	16×16	275	16×20	300	18×25	270
68	680	16×16	275	16×20	300				350
100	101	16×20	330	16×20	330	18×20	350		
150	151	18×20	420	18×20	350				
		18×25	510						