

## REA Series

### Features

- 85°C, 2,000 ~ 3,000 hours assured
- Standard series for general purposes
- RoHS Compliance



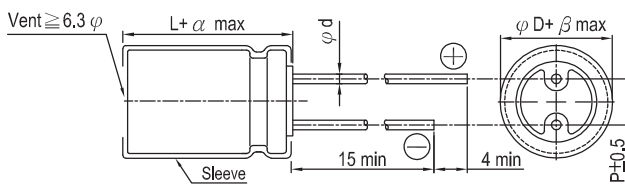
Sleeve & Marking Color: Blue & Black

### Specifications

Items	Performance																																																																		
Category 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>&gt; 100V</td> </tr> <tr> <td>Time</td> <td>after 2 minutes</td> <td>after 5 minutes</td> </tr> <tr> <td>Leakage Current</td> <td>I = 0.01CV or 3 (μA) whichever is greater</td> <td>CV ≤ 1,000 I = 0.03CV + 15(μA) CV &gt; 1,000 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 ≤ 1,000 I = 0.03CV + 15(μA) CV > 1,000 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 ≤ 1,000 I = 0.03CV + 15(μA) CV > 1,000 I = 0.02CV + 25(μA)																																																																	
Tanδ (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>Tanδ (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 1,000μF, 0.02 shall be added every 1,000μF increase.</p>	Rated Voltage	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	Tanδ (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																																																					
Tanδ (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="4">Impedance Ratio</td> <td>Z(-25°C)</td> <td>φD &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 rowspan="2">3</td> <td rowspan="2">6</td> <td rowspan="2">8</td> <td rowspan="2">12</td> <td rowspan="2">14</td> <td rowspan="2">16</td> </tr> <tr> <td>/Z(+20°C)</td> <td>φD ≥ 16</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> </tr> <tr> <td>Z(-40°C)</td> <td>φD &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 rowspan="2">4</td> <td rowspan="2">8</td> <td rowspan="2">10</td> <td rowspan="2">16</td> <td rowspan="2">18</td> <td rowspan="2">20</td> </tr> <tr> <td>/Z(+20°C)</td> <td>φD ≥ 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> </tr> </table>	Rated Voltage		6.3	10	16	25	35	50	63	100	160	200	250	350	400	450	Impedance Ratio	Z(-25°C)	φD < 16	6	4	3	3	2	2	2	3	6	8	12	14	16	/Z(+20°C)	φD ≥ 16	8	6	4	4	3	3	3	Z(-40°C)	φD < 16	10	8	6	6	4	3	3	4	8	10	16	18	20	/Z(+20°C)	φD ≥ 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)	φD < 16	6	4	3	3	2	2	2	3	6	8	12	14	16																																																				
	/Z(+20°C)	φD ≥ 16	8	6	4	4	3	3	3																																																										
	Z(-40°C)	φD < 16	10	8	6	6	4	3	3	4	8	10	16	18	20																																																				
	/Z(+20°C)	φD ≥ 16	18	16	12	10	8	8	6							6																																																			
Endurance	<table border="1"> <tr> <td>Test Time</td> <td>2,000 Hrs for φD ≤ 8mm 3,000 Hrs for φD ≥ 10mm</td> </tr> <tr> <td>Capacitance Change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>Tanδ</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 / 3,000 hours at 85°C.</p>	Test Time	2,000 Hrs for φD ≤ 8mm 3,000 Hrs for φD ≥ 10mm	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																																																										
Test Time	2,000 Hrs for φD ≤ 8mm 3,000 Hrs for φD ≥ 10mm																																																																		
Capacitance Change	Within ±20% of initial value																																																																		
Tanδ	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>Tanδ</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 hours at 85°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements for 160 ~ 450V (Refer to JIS C 5101-4 4.1).</p>	Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 200% of specified value	Leakage Current	Within specified value																																																										
Test Time	1,000 Hrs																																																																		
Capacitance Change	Within ±20% of initial value																																																																		
Tanδ	Less than 200% of specified value																																																																		
Leakage Current	Within specified value																																																																		
Ripple Current and Frequency Multipliers	<table border="1"> <tr> <td></td> <td>Freq. (Hz)</td> <td>60 (50)</td> <td>120</td> <td>500</td> <td>1k</td> <td>10k up</td> </tr> <tr> <td rowspan="3">Cap. (μF)</td> <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 &lt; 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>		Freq. (Hz)	60 (50)	120	500	1k	10k up	Cap. (μF)	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																																								
	Freq. (Hz)	60 (50)	120	500	1k	10k up																																																													
Cap. (μF)	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																																																													

Radial

### Diagram of Dimensions

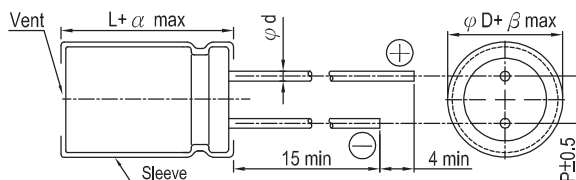


### Lead Spacing and Diameter

Unit: mm

φ D	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
φ d	0.5		0.6			0.8		1.0	
α	L < 20: 1.5, L ≥ 20: 2.0							2.0	
β	0.5								

The case size of 12.5×16, 16×16, 16×20, 18×16, 18×20 and 18×25 are suitable for below diagram:





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

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

Dimension and Permissible Ripple Current

$\mu F$	V. DC Contents	6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		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
2.2	2R2											5×11	29			5×11	33
3.3	3R3											5×11	35			5×11	40
4.7	4R7											5×11	42			5×11	48
10	100											5×11	65	5×11	70	5×11	59
22	220											5×11	95	6.3×11	115	6.3×11	115
33	330									5×11	108	6.3×11	136	6.3×11	140	8×11.5	145
47	470							5×11	115	5×11	130	6.3×11	165	6.3×11	170	10×12.5	235
100	101					5×11	160	6.3×11	190	6.3×11	210	8×11.5	260	8×11.5	245	10×16	325
220	221			5×11	220	6.3×11	260	8×11.5	320	8×11.5	385	10×12.5	455	10×16	490	12.5×20	640
330	331			6.3×11	290	6.3×11	290	8×11.5	440	10×12.5	490	10×16	585	10×20	710	16×20	695
470	471			6.3×11	350	8×11.5	440	10×12.5	545	10×16	740	10×20	755	12.5×16	910	16×25	910
1,000	102	8×11.5	540	10×12.5	650	10×12.5	635	10×20	955	12.5×20	1,145	12.5×25	1,340	16×20	1,260	18×40	1,820
2,200	222	10×16	845	10×20	1,070	12.5×16	930	12.5×25	1,540	16×20	1,390	16×35.5	1,960	18×31.5	2,040		
3,300	332	10×20	1,185	12.5×16	1,420	12.5×20	1,450	16×20	1,490	16×31.5	2,070	18×25	2,500	18×40	2,575		
4,700	472	12.5×20	1,545	12.5×25	1,780	16×16	1,600	16×25	2,100	18×25	2,170	18×35.5	2,700	22×40	3,040		
6,800	682	12.5×25	1,880	16×20	1,700	18×20	1,870	18×25	2,475	18×31.5	2,550	22×40	2,900	22×45	3,185		
10,000	103	16×20	2,000	16×25	2,150	18×31.5	2,590	18×40	3,080	22×45	3,400						
15,000	153	16×31.5	2,460	18×25	2,375	18×40	3,100	22×45	3,780	25×40	3,850						
22,000	223	18×31.5	2,780	18×40	3,370	22×40	3,900	25×45	4,290								
33,000	333	22×40	3,700														

$\mu F$	V. DC Contents	160V (2C)		200V (2D)		250V (2E)		350V (2V)		400V (2G)		450V (2W)	
		$\phi D \times L$	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
1	010					5×11	18	5×11	18	5×11	22	6.3×11	25
2.2	2R2			5×11	29	6.3×11	33	6.3×11	33	6.3×11	33	8×11.5	45
3.3	3R3			6.3×11	46	6.3×11	46	8×11.5	50	8×11.5	50	10×12.5	65
4.7	4R7			6.3×11	50	8×11.5	55	8×11.5	60	8×11.5	60	10×12.5	80
10	100	8×11.5	75	8×11.5	81	10×12.5	100	10×16	110	10×16	110	10×20	140
22	220	10×12.5	130	10×12.5	135	10×16	150	12.5×16	185	12.5×20	200	12.5×20	200
33	330	10×16	175	10×16	180	10×20	215	12.5×20	245	16×16	260	16×20	270
47	470	10×20	230	10×20	240	12.5×20	290	16×20	340	16×20	340	16×31.5	390
68	680	12.5×16	250	12.5×16	250	12.5×25	370	18×16	310	16×25	420	16×35.5	460
100	101	12.5×20	330	16×16	330	16×25	510	18×20	410	16×31.5	435	18×35.5	570
150	151	16×20	440	16×20	460	16×25	510	16×25	540	18×40	560	22×45	800
220	221	16×25	620	18×20	605	16×31.5	625	18×35.5	640	16×40	670	25×45	1,030
330	331	16×31.5	790	16×35.5	830	18×25	630	22×40	920	18×35.5	570		
470	471	18×25	760	18×40	840	22×40	890	25×40	980	22×45	960		
330	331	18×35.5	985	18×40	1,150	22×40	1,200	25×45	1,270				
470	471	18×40	1,150	22×40	1,400	22×45	1,470						

Part Numbering System

REA Series 470 $\mu F$   $\pm 20\%$  16V Bulk Package Gas Type 8  $\phi \times 11.5L$  Pb-free and PET sleeve

**REA** **471** **M** **1C** **BK** **-** **0811**

Series Name Capacitance Capacitance Tolerance Rated Voltage Lead Configuration & Package Rubber Type Case Size Lead Wire and Sleeve type

Note: For more details, please refer to "Part Numbering System (Radial Type)" on page 13.

Radial