



# Aluminum Electrolytic Capacitors

REA

## Features

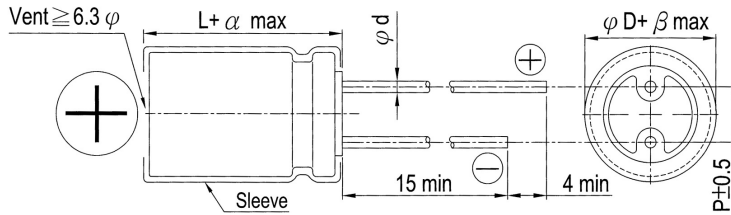
- 85°C, 2,000 ~ 3,000 hours assured
- Standard series for general purpose
- RoHS Compliance



## 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 ≤ 1,000 I = 0.03CV+15(μA)</td> <td>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)																																																																					
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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 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																																																			
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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="4">Impedance Ratio</td> <td>Z(-25°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>/Z(+20°C)</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>4</td> <td>8</td> <td>10</td> <td>16</td> <td>18</td> <td>20</td> </tr> <tr> <td>Z(-40°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>/Z(+20°C)</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>4</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)	φ D < 16	6	4	3	3	2	2	2	2	3	6	8	12	14	16	/Z(+20°C)	φ D ≥ 16	8	6	4	4	3	3	3	3	4	8	10	16	18	20	Z(-40°C)	φ D < 16	10	8	6	6	4	3	3	3	4	8	10	16	18	20	/Z(+20°C)	φ D ≥ 16	18	16	12	10	8	8	6	6	4	8	10	16	18	20
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Load Life Test	<table border="1"> <tr> <td>Test Time</td> <td>2,000 Hrs (3,000 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 with rated ripple current for 2,000/3,000 hours at 85°C.</p>	Test Time	2,000 Hrs (3,000 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>1,000 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 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	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 rowspan="4">Cap. (μF)</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>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 ≤ 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>	Cap. (μF)	Freq. (Hz)	60 (50)	120	500	1K	10K up	Under 100	0.70	1.00	1.30	1.40	1.50	100 < C ≤ 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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## DIAGRAM OF DIMENSIONS



LEAD SPACING AND DIAMETER Unit: mm

$\phi D$	5	6.3	8	10	12.5	16	18	22
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10
$\phi d$	0.5			0.6			0.8	
$\alpha$	1.0				1.5			
$\beta$	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									5x11	49			5x11	54		
22	220					5x11	70			5x11	75			5x11	80		
33	330	5x11	72			5x11	84			5x11	90			5x11	97		
47	470	5x11	90			5x11	100			5x11	110			5x11	115		
100	101	5x11	130			5x11	145			6.3x11	180	5x11	160	6.3x11	190		
220	221	6.3x11	230	5x11	200	6.3x11	250	5x11	220	8x11.5	300	6.3x11	260	8x11.5	320		
330	331	8x11.5	290	6.3x11	270	8x11.5	350	6.3x11	290	8x11.5	370	6.3x11	290	10x12.5	470	8x11.5	440
470	471	8x11.5	380	6.3x11	320	8x11.5	415	6.3x11	350	10x12.5	520	8x11.5	440	10x16	620	10x12.5	545
1,000	102	8x11.5	540			10x12.5	650	8x11.5	550	10x16	785	10x12.5	635	10x20	955	12.5x16	830
2,200	222	10x20	1,000	10x16	845	10x20	1,070	12.5x16	970	12.5x20	1,295	12.5x16	930	12.5x25	1,540	16x16	1,150
3,300	332	10x20	1,185	12.5x16	960	12.5x20	1,420	16x16	1,310	12.5x20	1,450	16x16	1,240	16x25	1,800	16x20	1,490
4,700	472	12.5x20	1,545	16x16	1,410	12.5x25	1,780	16x16	1,420	16x25	2,090	16x20	1,600	16x25	2,100	18x25	2,170
6,800	682	12.5x25	1,880	16x20	1,660	16x25	2,220	16x20	1,700	16x25	2,280	18x20	1,890	16x25	2,420	18x35.5	2,550
10,000	103	16x25	2,330	16x20	2,000	16x31.5	2,370	16x20	2,050	18x31.5	2,590	16x35.5	2,450	22x40	3,440	18x40	3,080
22,000	223	18x40	3,320	18x31.5	2,780	22x40	3,790	18x40	3,370	22x40	3,900						

$\mu F$	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					5x11	1.5			5x11	3			5x11	3		
0.22	R22					5x11	3.5			5x11	4.5			5x11	5.8		
0.33	R33					5x11	5			5x11	7.5			5x11	8.8		
0.47	R47					5x11	7			5x11	9.5			5x11	12		
1	010					5x11	15			5x11	17			5x11	22		
2.2	2R2					5x11	29			5x11	30			5x11	33		
3.3	3R3					5x11	35			5x11	37			5x11	40		
4.7	4R7	5x11	40			5x11	42			5x11	45			5x11	48		
10	100	5x11	58			5x11	65			5x11	70			6.3x11	80	5x11	59
22	220	5x11	87			5x11	95			6.3x11	115			8x11.5	135	6.3x11	115
33	330	6.3x11	115	5x11	108	6.3x11	136	5x11	125	8x11.5	150	6.3x11	140	10x16	195	8x11.5	145
47	470	6.3x11	145	5x11	130	6.3x11	165			8x11.5	190	6.3x11	170	10x16	255	10x12.5	235
100	101	8x11.5	240	6.3x11	210	8x11.5	260			10x12.5	320	8x11.5	245	10x20	370	10x16	325
220	221	10x12.5	420	8x11.5	385	10x16	490	10x12.5	455	10x20	565	10x16	490	12.5x25	675	12.5x20	640
330	331	10x16	570	10x12.5	490	12.5x20	635	10x16	585	12.5x20	765	10x20	710	16x25	825	16x20	695
470	471	10x16	740			10x20	755	12.5x16	610	16x25	1,050	12.5x20	900	16x31.5	1,070	16x25	910
1,000	102	12.5x20	1,145	16x16	1,010	12.5x25	1,340	16x20	1,160	16x25	1,560	16x20	1,260	22x40	2,600	18x40	2,410
2,200	222	16x25	1,785	16x20	1,390	18x40	2,231	16x35.5	2,075	18x40	2,385	18x31.5	1,955				
3,300	332	16x31.5	2,070	18x25	1,970	22x40	2,785	18x35.5	2,500	22x40	3,000	18x40	2,660				
4,700	472	18x35.5	2,700														

Remark: The Case size 12.5x16, 16x16, 16x20, 18x20 and 18x25 are used flat type rubber bung. Case size in mark of "\*" is downsize.



# Aluminum Electrolytic Capacitors

REA

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

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

## DIMENSION & PERMISSIBLE RIPPLE CURRENT

$\mu\text{F}$	V. DC Contents	160V (2C)				200V (2D)				250V (2E)				350V (2V)			
		$\phi D \times L$	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
0.47	R47	6.3x11	15	5x11	13	6.3x11	16	5x11	14	8x11.5	21	5x11	14	8x11.5	21	6.3x11	18
1	010	6.3x11	24	5x11	20	6.3x11	25	5x11	21	8x11.5	32	5x11	21	8x11.5	32	6.3x11	27
2.2	2R2	6.3x11	34	5x11	29	6.3x11	37	5x11	29	8x11.5	49	6.3x11	42	8x11.5	49	6.3x11	42
3.3	3R3	8x11.5	50	6.3x11	43	8x11.5	54	6.3x11	46	8x11.5	60	6.3x11	46	10x12.5	70	8x11.5	60
4.7	4R7	8x11.5	60	6.3x11	51	8x11.5	64	6.3x11	50	10x16	93	8x11.5	72	10x16	93	10x12.5	80
10	100	10x12.5	104	8x11.5	75	10x12.5	112	8x11.5	81	10x16	138	10x12.5	112	10x20	150	10x16	138
22	220	10x20	189	10x16	150	10x20	204	10x16	155	10x20 12.5x20	220 255	12.5x16	280	12.5x25	282	12.5x20	255
33	330	10x20 12.5x20	228 270	12.5x16	305	10x20 12.5x20	230 288	12.5x16 16x16	280 350	12.5x20 12.5x25	310 348	16x16	350	16x25	390	12.5x25	348
47	470	12.5x20 12.5x25	318 354	12.5x16 16x16	360 420	12.5x20 12.5x25	330 378	16x16 16x20	390 420	12.5x25 16x25	420 468	16x20	420	16x31.5	474	16x20	385
68	680	16x20	490	16x16	440	18x20	490	16x16	470			18x20	490				
100	101	12.5x25 16x25	510 582	16x20 18x20	560 590	16x25 16x35.5	582 678	16x20 18x25	520 590	16x35.5	732	16x31.5	645	18x40	685	16x31.5	645
150	151	18x25	710	18x20	640												
220	221	18x35.5	900	16x31.5	792	18x35.5	1,000	18x31.5	885	22x40	1,150	18x40	985				
330	331	18x40	1,010	18x35.5	984	18x40	1,200										

$\mu\text{F}$	V. DC Contents	400V (2G)				450V (2W)			
		$\phi D \times L$	mA	* $\phi D \times L$	mA	$\phi D \times L$	mA	* $\phi D \times L$	mA
0.47	R47	8x11.5	21	5x11	15	8x11.5	21	6.3x11	18
1	010	8x11.5	32	5x11	22	8x11.5	32	6.3x11	25
2.2	2R2	10x12.5	57	6.3x11	33	10x12.5	57	8x11.5	45
3.3	3R3	10x16	78	8x11.5	40	10x16	78	10x12.5	65
4.7	4R7	10x20	103	10x12.5	80	10x20	103	10x12.5	80
10	100	10x20 12.5x20	140 174	12.5x16	150	12.5x20	174	10x20	140
22	220	12.5x20 12.5x25	240 280	16x16	280	16x25	354	12.5x25	300
33	330	16x25	390	16x20	355	16x31.5	435	16x20	355
47	470	16x25 16x31.5	445 475	18x20	435	16x35.5	510	16x31.5	475
100	101	22x40	710	18x35.5	600	22x45	750	18x40	630

Remark: The case size of 12.5x16, 16x16, 16x20, 18x20 and 18x25 are used flat type rubber bung  
Case size in mark of "\*" is downsize. 500 WV specifications are available upon request.