



### RUA Series

Features

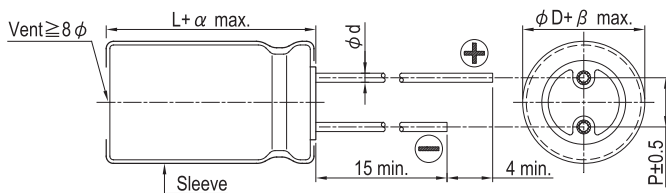
- 130°C, 2,000 ~ 3,000 hours assured
- For automobile modules and other high temperature applications
- RoHS compliant



Specifications

Items	Performance																																										
Category Temperature Range	10 ~ 250V -40°C ~ +130°C	350 ~ 450V -25°C ~ +130°C																																									
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																																										
Leakage Current (at 20°C)	<table border="1"> <tr> <th>Rated voltage</th> <th>≤ 100V</th> <th>&gt; 100V</th> </tr> <tr> <td>Time</td> <td colspan="2">after 2 minutes</td> </tr> <tr> <td>Leakage Current</td> <td>I = 0.01CV or 3 (μA) whichever is greater</td> <td>CV ≤ 1,000 I = 0.1CV + 40(μA)      CV &gt; 1,000 I = 0.04CV + 100(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		Leakage Current	I = 0.01CV or 3 (μA) whichever is greater	CV ≤ 1,000 I = 0.1CV + 40(μA)      CV > 1,000 I = 0.04CV + 100(μA)																																
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Tanδ (at 120 Hz, 20°C)	<table border="1"> <tr> <th>Rated Voltage</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> <tr> <td>Tanδ (max)</td> <td>0.15</td> <td>0.12</td> <td>0.10</td> <td>0.10</td> <td>0.08</td> <td>0.08</td> <td>0.20</td> <td>0.20</td> <td>0.20</td> <td>0.24</td> <td>0.24</td> <td>0.24</td> </tr> </table>		Rated Voltage	10	16	25	35	50	63	160	200	250	350	400	450	Tanδ (max)	0.15	0.12	0.10	0.10	0.08	0.08	0.20	0.20	0.20	0.24	0.24	0.24															
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Low Temperature Characteristics (at 120 Hz)	<p>Impedance ratio shall not exceed the values given in the table below.</p> <table border="1"> <tr> <th colspan="2">Rated Voltage</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> <tr> <td rowspan="2">Impedance Ratio</td> <td>Z(-25°C) / Z(+20°C)</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>3</td> <td>3</td> <td>3</td> <td>6</td> <td>6</td> <td>6</td> </tr> <tr> <td>Z(-40°C) / Z(+20°C)</td> <td>6</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>6</td> <td>6</td> <td>6</td> <td>-</td> <td>-</td> <td>-</td> </tr> </table>		Rated Voltage		10	16	25	35	50	63	160	200	250	350	400	450	Impedance Ratio	Z(-25°C) / Z(+20°C)	3	2	2	2	2	2	3	3	3	6	6	6	Z(-40°C) / Z(+20°C)	6	4	4	4	4	4	6	6	6	-	-	-
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Endurance	<table border="1"> <tr> <td>Test Time</td> <td>2,000 Hrs for φD ≤ 8 mm; 3,000 Hrs for φD ≥ 10 mm</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 applied with rated subjected to DC voltage with the rated ripple current is applied for 2,000 / 3,000 hours at 130°C.</p>		Test Time	2,000 Hrs for φD ≤ 8 mm; 3,000 Hrs for φD ≥ 10 mm	Capacitance Change	Within ±20% of initial value	Tanδ	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>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>Less than 500% of 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 130°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	Less than 500% of specified value																																	
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Ripple Current and Frequency Multipliers	<table border="1"> <tr> <th rowspan="2">Rated Voltage (V)</th> <th rowspan="2">Cap. (μF)</th> <th colspan="4">Freq. (Hz)</th> </tr> <tr> <th>120</th> <th>1k</th> <th>10k</th> <th>100k up</th> </tr> <tr> <td rowspan="3">10 ~ 63</td> <td>0.47 ~ 100</td> <td>1.00</td> <td>1.85</td> <td>2.25</td> <td>2.50</td> </tr> <tr> <td>150 ~ 470</td> <td>1.00</td> <td>1.70</td> <td>1.88</td> <td>2.00</td> </tr> <tr> <td>1,000</td> <td>1.00</td> <td>1.45</td> <td>1.58</td> <td>1.65</td> </tr> <tr> <td rowspan="2">160 ~ 450</td> <td>≤ 33</td> <td>1.00</td> <td>1.50</td> <td>1.75</td> <td>1.80</td> </tr> <tr> <td>47 ≤</td> <td>1.00</td> <td>1.30</td> <td>1.40</td> <td>1.50</td> </tr> </table>		Rated Voltage (V)	Cap. (μF)	Freq. (Hz)				120	1k	10k	100k up	10 ~ 63	0.47 ~ 100	1.00	1.85	2.25	2.50	150 ~ 470	1.00	1.70	1.88	2.00	1,000	1.00	1.45	1.58	1.65	160 ~ 450	≤ 33	1.00	1.50	1.75	1.80	47 ≤	1.00	1.30	1.40	1.50				
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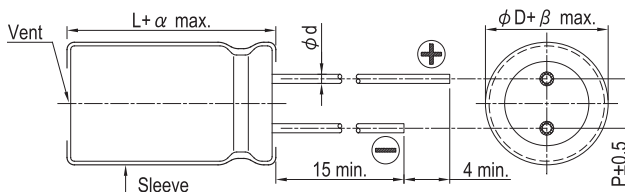
Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

φD	8	10	12.5	16
P	3.5	5.0	5.0	7.5
φd	0.6			0.8
α	L<20: 1.5, L≥20: 2.0			
β	0.5			

The case size of 16×20 is suitable for below diagram:





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

Ripple Current: mA/rms at 120 Hz, 130°C

### Dimension and Permissible Ripple Current

Cap.( $\mu$ F)	Rated Volt. (V <sub>DC</sub> ) Contents	10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)	
		$\phi D \times L$	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
10	100									8×11.5	84	8×11.5	84
22	220							8×11.5	113	10×12.5	149	10×12.5	149
33	330					8×11.5	138	10×12.5	162	10×16	200	10×16	200
47	470			8×11.5	150	10×12.5	194	10×16	213	10×16	239	10×20	260
100	101	10×12.5	231	10×16	285	10×16	312	10×20	338				
220	221	10×16	378	10×20	458	12.5×20	557	12.5×25	605	12.5×20	419	12.5×20	419
330	331	10×16	462	12.5×20	621	12.5×25	740	16×20	755				
470	471	10×20	599	12.5×25	806	16×20	902			16×20	689		
1,000	102	16×20	1073										

Cap.( $\mu$ F)	Rated Volt. (V <sub>DC</sub> ) 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
4.7	4R7							10×20	53	10×20	53	10×25	58
10	100			10×20	78	10×20	78	10×25	85	10×25	86	12.5×20	86
22	220	10×20	115	10×25	126	12.5×20	128	12.5×25	139	12.5×25	142	16×25	154
33	330	10×25	154	12.5×20	157	12.5×25	171	16×25	189	16×25	189	16×31.5	203
47	470	12.5×20	187	12.5×25	204	16×25	225	16×31.5	243	16×31.5	243		
68	680	12.5×25	245	16×20	250	16×31.5	292						
100	101	16×25	329	16×25	329								
150	151	16×31.5	434										

### Part Numbering System

RUA Series    470 $\mu$ F     $\pm 20\%$     16V    Bulk Package    Gas Type    12.5  $\phi \times 25L$     General Purpose

**RUA**    **471**    **M**    **1C**    **BK**    -    **1325**

Series Name    Capacitance    Capacitance Tolerance    Rated Voltage    Lead Configuration and Package    Rubber Type    Case Size    Application

Note: For more details, please refer to "Part Numbering System - Radial Type" on page 139.

Radial