

## Features

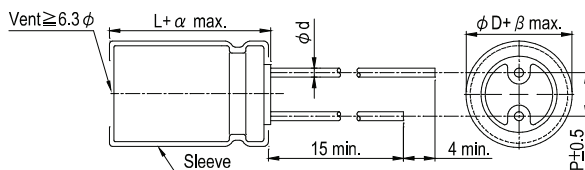
- 105°C, 2,000 hours assured, standard bi-polarized series
- Suitable for use in circuits which has a reversed or unknown polarity
- RoHS compliance



## Specifications

Items	Performance																																						
Category Temperature Range	-40°C ~ +105°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> <th>Time</th> <td colspan="2">after 5 minutes</td> </tr> <tr> <th>Leakage Current</th> <td>I = 0.03CV or 4 (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 5 minutes		Leakage Current	I = 0.03CV or 4 (μA) whichever is greater	CV ≤ 1,000 I = 0.03CV+15(μA)	CV > 1,000 I = 0.02CV+25(μA)																												
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Tanδ (at 120 Hz, 20°C)	<table border="1"> <tr> <th>Rated Voltage</th> <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> </tr> <tr> <th>Tanδ (max)</th> <td>0.25</td> <td>0.22</td> <td>0.18</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> <td>0.15</td> <td>0.15</td> <td>0.20</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	Tanδ (max)	0.25	0.22	0.18	0.16	0.14	0.12	0.10	0.09	0.15	0.15	0.20														
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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> <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> </tr> <tr> <th rowspan="2">Impedance Ratio</th> <th>Z(-25°C)/Z(+20°C)</th> <td>4</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <th>Z(-40°C)/Z(+20°C)</th> <td>8</td> <td>6</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>4</td> <td>4</td> <td>4</td> </tr> </table>	Rated Voltage		6.3	10	16	25	35	50	63	100	160	200	250	Impedance Ratio	Z(-25°C)/Z(+20°C)	4	3	3	2	2	2	2	2	2	2	2	Z(-40°C)/Z(+20°C)	8	6	6	4	4	3	3	3	4	4	4
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Impedance Ratio	Z(-25°C)/Z(+20°C)	4	3	3	2	2	2	2	2	2	2	2																											
	Z(-40°C)/Z(+20°C)	8	6	6	4	4	3	3	3	4	4	4																											
Endurance (After application of the rated voltage at 105°C, the polarity inverted every 250 hours.)	<table border="1"> <tr> <th>Test Time</th> <td>2,000 Hrs</td> </tr> <tr> <th>Capacitance Change</th> <td>Within ±20% of initial value</td> </tr> <tr> <th>Tanδ</th> <td>Less than 200% of specified value</td> </tr> <tr> <th>Leakage Current</th> <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 hours at 105°C.</p>	Test Time	2,000 Hrs	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> <th>Test Time</th> <td>1,000 Hrs</td> </tr> <tr> <th>Capacitance Change</th> <td>Within ±20% of initial value</td> </tr> <tr> <th>Tanδ</th> <td>Less than 200% of specified value</td> </tr> <tr> <th>Leakage Current</th> <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 105°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements for 160 ~ 250V (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																														
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## Diagram of Dimensions



## Lead Spacing and Diameter

Unit: mm

	5	6.3	8	10	12.5	16	18
φD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.5		0.6			0.8	
α	L < 20: 1.5, L ≥ 20: 2.0						
β	0.5						

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

### Dimension and Permissible Ripple Current

Rated Volt. (Voc)		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)		100V (2A)	
Cap. ( $\mu$ F)	Contents	$\phi D \times L$	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
1	010											5x11	10	5x11	11	5x11	12
2.2	2R2											5x11	15	5x11	16	6.3x11	20
3.3	3R3											5x11	18	5x11	20	6.3x11	25
4.7	4R7									5x11	21	5x11	22	6.3x11	24	6.3x11	30
10	100					5x11	27	5x11	27	5x11	30	6.3x11	37	6.3x11	40	8x11.5	50
22	220	5x11	34	5x11	34	5x11	40	6.3x11	46	6.3x11	51	8x11.5	63	8x11.5	68	10x16	97
33	330	5x11	45	5x11	45	5x11	49	6.3x11	56	8x11.5	72	8x11.5	77	10x12.5	98	10x20	140
47	470	5x11	54	5x11	54	6.3x11	67	6.3x11	67	8x11.5	86	10x12.5	105	10x16	130	12.5x20	170
100	101	6.3x11	90	6.3x11	90	8x11.5	110	8x11.5	110	10x16	160	10x20	190	12.5x20	225	16x25	300
220	221	8x11.5	150	8x11.5	150	10x12.5	195	10x16	215	12.5x20	290	12.5x25	340	16x25	405	16x35.5	510
330	331	8x11.5	185	10x16	240	10x16	265	12.5x20	320	12.5x20	350	16x25	460	16x31.5	535		
470	471	10x12.5	260	10x20	290	10x20	345	12.5x25	380	12.5x25	465	16x31.5	590	18x35.5	680		
1,000	102	10x20	460	12.5x20	510	12.5x25	605	16x25	670	16x31.5	805						
2,200	222	12.5x25	820	16x25	940	16x31.5	1,070	18x35.5	1,140								

Rated Volt. (Voc)		160V (2C)		200V (2D)		250V (2E)	
Cap. ( $\mu$ F)	Contents	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
0.47	R47	5x11	8	5x11	9	6.3x11	10
1	010	6.3x11	11	8x11.5	12	8x11.5	13
2.2	2R2	8x11.5	18	8x11.5	22	10x12.5	26
3.3	3R3	8x11.5	26	10x12.5	30	10x16	37
4.7	4R7	10x12.5	31	10x16	37	10x20	50
10	100	10x16	60	10x20	66	10x20	79
22	220	12.5x20	117	12.5x20	117	12.5x25	138
33	330	12.5x20	143	12.5x25	158	16x25	169
47	470	16x25	188				

### Part Numbering System

RNG Series    470 $\mu$ F     $\pm 20\%$     6.3V    Bulk Package    Gas Type    10  $\phi \times 12.5L$

**RNG**    **471**    **M**    **0J**    **BK**    -    **1012**

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

### XX

S = Standard  
KS = AEC-Q200 Qualified, Safety Critical Application  
LS = AEC-Q200 Qualified, Non-Safety Critical Application