

RN Series

Features

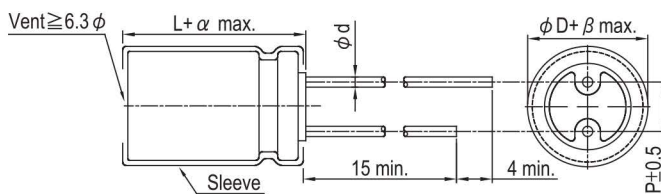
- 85°C, 2,000 hours assured, standard bi-polarized series
- Suitable for use in circuits which has a reversed or unknown polarity
- RoHS compliance
- AEC-Q200 Parts Available: Replace "S" Suffix with "KS" or "LS" Suffix



Specifications

Items	Performance																																																	
Category Temperature Range	-40°C ~ +85°C																																																	
Capacitance Tolerance	±20% (at 120 Hz, 20°C)																																																	
Leakage Current (at 20°C)	<table><tr><td>Rated voltage</td><td colspan="4">≤ 100V</td><td colspan="4">> 100V</td></tr><tr><td>Time</td><td colspan="4">after 2 minutes</td><td colspan="4">after 5 minutes</td></tr><tr><td>Leakage Current</td><td colspan="4">I = 0.03CV or 4 (μA) whichever is greater</td><td colspan="4">CV ≤ 1,000 I = 0.03CV+15(μA)</td><td colspan="4">CV > 1,000 I = 0.02CV+25(μA)</td></tr></table> Where, C = rated capacitance in μF, V = rated DC working voltage in V												Rated voltage	≤ 100V				> 100V				Time	after 2 minutes				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><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></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></tr></table> When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase.												Rated Voltage	6.3	10	16	25	35	50	63	100	160	200	250	Tanδ (max)	0.23	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.12	0.14	0.17														
Rated Voltage	6.3	10	16	25	35	50	63	100	160	200	250																																							
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Low Temperature Characteristics (at 120 Hz)	Impedance ratio shall not exceed the values given in the table below. <table><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></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25°C)/Z(+20°C)</td><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><td>Z(-40°C)/Z(+20°C)</td><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 85°C, the polarity inverted every 250 Hrs.)	<table><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>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> * 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 85°C.												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><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> * 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 ~ 250V (Refer to JIS C 5101-4 4.1).												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

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

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

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

Dimension and Permissible Ripple Current

Rated Volt. (V _{DC})		6.3V (0J)		10V (1A)		16V (1C)		25V (1E)		35V (1V)		50V (1H)		63V (1J)		100V (2A)	
Cap. (μF)	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											5×11	15	5×11	18	5×11	23
2.2	2R2											5×11	23	5×11	25	6.3×11	26
3.3	3R3											5×11	28	5×11	31	6.3×11	32
4.7	4R7									5×11	32	5×11	34	6.3×11	37	6.3×11	40
10	100					5×11	40	5×11	42	5×11	46	6.3×11	55	6.3×11	60	8×11.5	66
22	220	5×11	50	5×11	56	5×11	59	6.3×11	63	6.3×11	76	8×11.5	82	8×11.5	90	10×16	120
33	330	5×11	62	5×11	69	5×11	73	6.3×11	78	8×11.5	94	8×11.5	104	10×12.5	135	10×20	175
47	470	5×11	74	5×11	82	6.3×11	88	6.3×11	95	8×11.5	115	10×12.5	135	10×16	175	12.5×20	200
100	101	6.3×11	115	6.3×11	120	8×11.5	149	8×11.5	155	10×16	202	10×20	235	12.5×20	270	16×25	350
220	221	8×11.5	181	8×11.5	200	10×12.5	240	10×16	294	12.5×20	335	12.5×25	378	16×25	443	16×35.5	590
330	331	8×11.5	250	10×16	308	10×16	330	12.5×20	384	12.5×20	429	16×25	496	16×31.5	653		
470	471	10×12.5	329	10×16	365	10×20	435	12.5×25	479	16×25	548	16×25	590	18×35.5	815		
1,000	102	10×20	505	12.5×20	598	12.5×25	659	16×25	700	16×31.5	880	16×31.5	920				
2,200	222	12.5×25	840	16×25	992	16×31.5	1,150	18×35.5	1,347								

Rated Volt. (V _{DC})		160V (2C)		200V (2D)		250V (2E)	
Cap. (μF)	Contents	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
0.47	R47	5×11	10	5×11	10	6.3×11	12
1	010	6.3×11	14	8×11.5	16	8×11.5	16
2.2	2R2	8×11.5	23	8×11.5	28	10×12.5	32
3.3	3R3	8×11.5	33	10×12.5	33	10×16	46
4.7	4R7	10×12.5	39	10×16	46	10×20	62
10	100	10×16	75	10×20	83	10×20	99
22	220	12.5×20	146	12.5×20	146	12.5×25	172
33	330	12.5×20	179	12.5×25	197	16×25	211
47	470	12.5×25	235				

Part Numbering System

RN Series	470μF	±20%	6.3V	Bulk Package	Gas Type	10 ϕ × 12.5L	
RN-	471	M	0J	BK	-	1012	S
Series Name	Capacitance	Capacitance Tolerance	Rated Voltage	Lead Configuration and Package	Rubber Type	Case Size	Regional Code

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