

## RZW Series

### Features

- 105°C, 4,000 ~ 10,000 hours assured
- Low ESR, suitable for switching power supplies
- Smaller size with large permissible ripple current
- RoHs Compliance

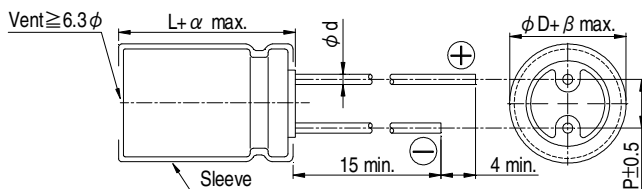


Sleeve & Marking Color: Black & Golden

### Specifications

Items	Performance																																		
Category Temperature Range	-55°C ~ +105°C																																		
Capacitance Tolerance	±20% (at 120Hz, 20°C)																																		
Leakage Current (at 20°C)	$I = 0.01CV$ or $3 (\mu A)$ whichever is greater (after 2 minutes) Where, C = rated capacitance in $\mu F$ , V = rated DC working voltage in V																																		
Tan $\delta$ (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> </tr> <tr> <td>Tan<math>\delta</math> (max)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> </tr> </table> <p>When the capacitance exceeds 1000<math>\mu F</math>, 0.02 shall be added every 1000<math>\mu F</math> increase.</p>	Rated Voltage	6.3	10	16	25	35	50	63	Tan $\delta$ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09																		
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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>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> </tr> <tr> <td>Impedance Ratio</td> <td>Z(-55°C)/Z(+20°C)</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>	Rated Voltage	6.3	10	16	25	35	50	63	Impedance Ratio	Z(-55°C)/Z(+20°C)	3	3	3	3	3	3																		
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Endurance	<table border="1"> <tr> <td rowspan="2">Time</td> <td>6.3 ~ 10V</td> <td>4,000 Hrs for <math>\phi D = 5 \sim 6.3</math> mm; 6,000 Hrs for <math>\phi D = 8 \sim 10</math> mm; 8,000 Hrs for <math>\phi D \geq 12.5</math> mm</td> </tr> <tr> <td>16 ~ 63V</td> <td>5,000 Hrs for <math>\phi D = 5 \sim 6.3</math> mm; 7,000 Hrs for <math>\phi D = 8 \sim 10</math> mm; 10,000 Hrs for <math>\phi D \geq 12.5</math> mm</td> </tr> <tr> <td>Capacitance Change</td> <td colspan="2">Within ±25% of initial value</td> </tr> <tr> <td>Tan<math>\delta</math></td> <td colspan="2">Less than 200% of specified value</td> </tr> <tr> <td>Leakage Current</td> <td colspan="2">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 4,000 ~ 10,000 hours at 105°C.</p>	Time	6.3 ~ 10V	4,000 Hrs for $\phi D = 5 \sim 6.3$ mm; 6,000 Hrs for $\phi D = 8 \sim 10$ mm; 8,000 Hrs for $\phi D \geq 12.5$ mm	16 ~ 63V	5,000 Hrs for $\phi D = 5 \sim 6.3$ mm; 7,000 Hrs for $\phi D = 8 \sim 10$ mm; 10,000 Hrs for $\phi D \geq 12.5$ mm	Capacitance Change	Within ±25% of initial value		Tan $\delta$	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 ±25% of initial value</td> </tr> <tr> <td>Tan<math>\delta</math></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 105°C without voltage applied.</p>	Test Time	1,000 Hrs	Capacitance Change	Within ±25% of initial value	Tan $\delta$	Less than 200% of specified value	Leakage Current	Within specified value																										
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Ripple Current and Frequency Multipliers	<table border="1"> <tr> <td rowspan="2">Cap.(<math>\mu F</math>)</td> <td colspan="4">Freq.(Hz)</td> </tr> <tr> <td>120</td> <td>1k</td> <td>10k</td> <td>100k up</td> </tr> <tr> <td>under ~ 33</td> <td>0.42</td> <td>0.70</td> <td>0.90</td> <td>1.0</td> </tr> <tr> <td>39 ~ 270</td> <td>0.50</td> <td>0.73</td> <td>0.92</td> <td>1.0</td> </tr> <tr> <td>330 ~ 680</td> <td>0.55</td> <td>0.77</td> <td>0.94</td> <td>1.0</td> </tr> <tr> <td>820 ~ 1,800</td> <td>0.6</td> <td>0.80</td> <td>0.96</td> <td>1.0</td> </tr> <tr> <td>2,200 ~ 18,000</td> <td>0.7</td> <td>0.85</td> <td>0.98</td> <td>1.0</td> </tr> </table>	Cap.( $\mu F$ )	Freq.(Hz)				120	1k	10k	100k up	under ~ 33	0.42	0.70	0.90	1.0	39 ~ 270	0.50	0.73	0.92	1.0	330 ~ 680	0.55	0.77	0.94	1.0	820 ~ 1,800	0.6	0.80	0.96	1.0	2,200 ~ 18,000	0.7	0.85	0.98	1.0
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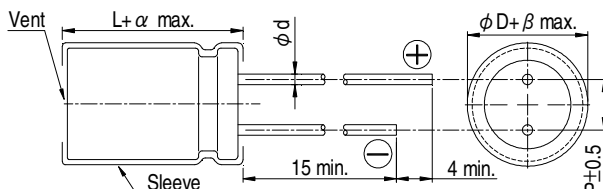
### Diagram of Dimensions



Lead Spacing and Diameter Unit: mm

$\phi D$	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
$\phi d$	0.5		0.6			0.8	
$\alpha$	$L < 20: 1.5, L \geq 20: 2.0$						
$\beta$	0.5						

The case size of 12.5x16, 16x16, 16x20, 18x16, 18x20 and 18x25 are suitable for below diagram:





Dimension:  $\phi D \times L$ (mm)  
Ripple Current: mA/rms at 100k Hz, 105°C

Dimension and Permissible Ripple Current

Rated Volt. $V_{DC}$ Contents Cap. ( $\mu F$ )	6.3V (0J)				10V (1A)				16V (1C)				25V (1E)			
	$\phi D \times L$	Impedance ( $\Omega$ , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	$\phi D \times L$	Impedance ( $\Omega$ , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	$\phi D \times L$	Impedance ( $\Omega$ , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	$\phi D \times L$	Impedance ( $\Omega$ , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz
		20°C	-10°C			20°C	-10°C			20°C	-10°C			20°C	-10°C	
47													5x11	0.58	1.16	210
56									5x11	0.58	1.16	210				
100					5x11	0.58	1.16	210					6.3x11	0.22	0.44	340
120									6.3x11	0.22	0.44	340				
150	5x11	0.58	1.16	210												
220					6.3x11	0.22	0.44	340	8x11.5	0.11	0.22	640	8x11.5	0.11	0.22	640
330	6.3x11	0.22	0.44	340					8x11.5	0.11	0.22	640	8x15 10x12.5	0.083 0.080	0.166 0.160	840 865
470					8x11.5	0.11	0.22	640	8x15 10x12.5	0.083 0.080	0.166 0.160	840 865	8x20 10x16	0.064 0.060	0.128 0.120	1,050 1,210
680	8x11.5	0.11	0.22	640	8x15 10x12.5	0.083 0.080	0.166 0.160	840 865	8x20 10x16	0.064 0.060	0.128 0.120	1,050 1,210	10x20 12.5x16	0.046 0.049	0.092 0.098	1,400 1,450
820	10x12.5	0.080	0.16	865									10x25	0.042	0.084	1,650
1,000	8x15	0.087	0.174	840	8x20 10x16	0.064 0.060	0.128 0.120	1,050 1,210	10x20 12.5x16	0.046 0.049	0.092 0.098	1,400 1,450	10x30 12.5x20 16x16	0.031 0.035 0.042	0.062 0.070 0.084	1,910 1,900 1,940
1,200	8x20 10x16	0.069 0.060	0.128 0.120	1,050 1,210	10x20	0.046	0.092	1,400	10x25	0.042	0.084	1,650	18x16	0.043	0.086	2,210
1,500	10x20	0.046	0.092	1,400	10x25 12.5x16	0.042 0.049	0.084 0.090	1,650 1,450	10x30 12.5x20 16x16	0.031 0.035 0.042	0.062 0.070 0.084	1,910 1,900 1,940	12.5x25	0.027	0.054	2,230
1,800	12.5x16	0.045	0.090	1,450									12.5x30 16x20	0.024 0.027	0.048 0.054	2,650 2,530
2,200	10x25	0.042	0.084	1,650	10x30 12.5x20 16x16	0.031 0.035 0.042	0.062 0.070 0.084	1,910 1,900 1,940	12.5x25 18x16	0.027 0.043	0.054 0.086	2,230 2,210	12.5x35 18x20	0.020 0.026	0.040 0.052	2,880 2,860
2,700	10x30 16x16	0.031 0.042	0.062 0.084	1,910 1,940	18x16	0.043	0.086	2,210	12.5x30 16x20	0.024 0.027	0.048 0.054	2,650 2,530	12.5x40 16x25	0.017 0.021	0.034 0.042	3,350 2,930
3,300	12.5x20	0.035	0.070	1,900	12.5x25	0.027	0.054	2,230	12.5x35	0.020	0.040	2,880	16x31.5 18x25	0.017 0.019	0.034 0.038	3,450 3,140
3,900	12.5x25 18x16	0.027 0.043	0.054 0.086	2,230 2,210	12.5x30 16x20	0.024 0.027	0.048 0.054	2,650 2,530	12.5x40 16x25 18x20	0.017 0.021 0.026	0.034 0.042 0.052	3,350 2,930 2,860	16x35.5 18x31.5	0.015 0.015	0.030 0.030	3,610 4,170
4,700	12.5x30	0.024	0.048	2,650	12.5x35	0.020	0.040	2,880	16x31.5 18x25	0.017 0.019	0.034 0.038	3,450 3,140	16x40 18x35.5	0.013 0.014	0.026 0.028	4,080 4,220
5,600	12.5x35 16x20	0.020 0.027	0.040 0.054	2,880 2,530	12.5x40 16x25 18x20	0.017 0.021 0.026	0.034 0.042 0.052	3,350 2,930 2,860	16x35.5 18x31.5	0.015 0.015	0.030 0.03	3,610 4,170	18x40	0.012	0.024	4,280
6,800	12.5x40 16x25 18x20	0.017 0.021 0.026	0.034 0.042 0.052	3,350 2,930 2,860	16x31.5 18x25	0.017 0.019	0.034 0.038	3,450 3,140	16x40	0.013	0.026	4,080				
8,200	16x31.5	0.017	0.034	3,450	16x35.5 18x31.5	0.015 0.015	0.030 0.030	3,610 4,170	18x35.5	0.014	0.02	4,220				
10,000	16x35.5 18x25	0.015 0.019	0.030 0.038	3,610 3,140	16x40 18x35.5	0.013 0.014	0.026 0.028	4,080 4,220	18x40	0.012	0.024	4,280				
12,000	16x40 18x31.5	0.013 0.015	0.026 0.030	4,080 4,170	18x40	0.012	0.024	4,280								
15,000	18x35.5	0.014	0.028	4,220												
18,000	18x40	0.012	0.024	4,280												



Dimension:  $\phi D \times L$ (mm)  
Ripple Current: mA/rms at 100k Hz, 105°C

### Dimension and Permissible Ripple Current

Rated Volt. $V_{DC}$ Contents Cap. ( $\mu F$ )	35V (1V)				50V (1H)				63V (1J)			
	$\phi D \times L$	Impedance ( $\Omega$ , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	$\phi D \times L$	Impedance ( $\Omega$ , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz	$\phi D \times L$	Impedance ( $\Omega$ , max./100kHz)		Ripple Current (mA/rms, 105°C) 100k Hz
		20°C	-10°C			20°C	-10°C			20°C	-10°C	
3.3					5x11	2.9	5.8	53				
4.7					5x11	2.5	5.0	95				
10					5x11	2.0	4.0	130				
15									5x11	1.2	2.4	165
22					5x11	0.91	1.82	180				
33	5x11	0.58	1.16	210					6.3x11	0.49	0.98	265
56	6.3x11	0.22	0.44	340	6.3x11	0.39	0.78	295	8x11.5	0.31	0.62	500
82									8x15 10x12.5	0.22 0.15	0.44 0.30	665 690
100					8x11.5	0.22	0.44	555				
120					8x15	0.190	0.38	730	8x20 10x16	0.17 0.11	0.34 0.22	820 950
150	8x11.5	0.11	0.22	640	10x12.5	0.160	0.32	760				
180					8x20	0.17	0.34	880	10x20 12.5x16	0.078 0.101	0.156 0.202	1,150 1,150
220	8x15 10x12.5	0.083 0.080	0.166 0.160	840 865	10x16	0.110	0.22	1,050	10x25	0.064	0.128	1,350
270	8x20	0.064	0.128	1,050	10x20 12.5x16	0.078 0.079	0.156 0.158	1,220 1,260	12.5x20	0.057	0.114	1,500
330	10x16	0.060	0.120	1,210	10x25	0.072	0.144	1,440				
390									12.5x25	0.043	0.086	1,900
470	10x20 12.5x16	0.046 0.049	0.092 0.098	1,400 1,450	10x30 12.5x20 16x16	0.056 0.059 0.072	0.112 0.118 0.114	1,690 1,660 1,690	12.5x30 16x20	0.039 0.045	0.078 0.090	2,300 2,000
560	10x25	0.042	0.084	1,650	12.5x25 18x16	0.044 0.070	0.088 0.140	1,950 1,930	12.5x35	0.034	0.068	2,500
680	10x30 12.5x20 16x16	0.031 0.035 0.042	0.062 0.070 0.084	1,910 1,900 1,940	12.5x30	0.039	0.078	2,310	12.5x40 16x25 18x20	0.029 0.035 0.042	0.058 0.070 0.084	2,800 2,600 2,500
820					12.5x35 16x20	0.033 0.044	0.066 0.088	2,510 2,210	16x31.5 18x25	0.029 0.034	0.058 0.068	2,850 2,800
1,000	12.5x25 18x16	0.027 0.043	0.054 0.086	2,230 2,210	12.5x40 16x25 18x20	0.027 0.033 0.047	0.054 0.066 0.094	2,920 2,555 2,490	16x35.5	0.027	0.054	2,900
1,200	12.5x30 16x20	0.024 0.027	0.048 0.054	2,650 2,530	16x31.5 18x25	0.027 0.028	0.054 0.056	3,010 2,740	16x40 18x31.5	0.025 0.028	0.050 0.056	3,400 3,300
1,500	12.5x35	0.020	0.040	2,880	16x35.5	0.024	0.048	3,150	18x35.5	0.025	0.050	3,400
1,800	12.5x40 16x25 18x20	0.017 0.021 0.026	0.034 0.042 0.052	3,350 2,930 2,860	16x40 18x31.5	0.021 0.024	0.042 0.048	3,710 3,635	18x40	0.024	0.048	3,500
2,200	16x31.5 18x25	0.017 0.019	0.034 0.038	3,450 3,140	18x35.5	0.022	0.044	3,680				
2,700	16x35.5 18x31.5	0.015 0.015	0.030 0.030	3,610 4,170	18x40	0.018	0.036	3,800				
3,300	16x40 18x35.5	0.013 0.014	0.026 0.028	4,080 4,220								
3,900	18x40	0.012	0.024	4,280								

### Part Numbering System

RZW Series    470 $\mu F$      $\pm 20\%$     16V    Bulk Package    Gas Type    8  $\phi$  x15L    Pb-free and PET sleeve

**RZW**    **471**    **M**    **1C**    **BK**    -    **0815**

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.