

## ORA Series

### Features

- 105°C, 15,000 hours assured
- Ultra low ESR with large permissible ripple current
- RoHS compliant



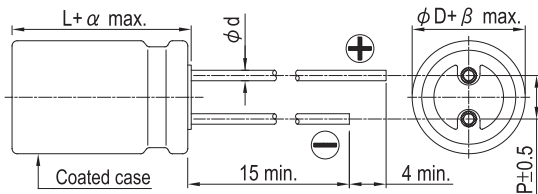
Marking color: Blue

### Specifications

Items	Performance										
Category Temperature Range	-55°C ~ +105°C										
Capacitance Tolerance	±20% (at 120 Hz, 20°C)										
Leakage Current (at 20°C)*	Rated voltage applied, after 2 minutes at 20°C. See Standard Ratings										
Tanδ (at 120 Hz, 20°C)	See Standard Ratings										
ESR (at 100k ~ 300k Hz, 20°C)	See Standard Ratings										
Endurance	<table border="1"> <tr><td>Test Time</td><td>15,000 Hrs</td></tr> <tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr> <tr><td>Tanδ</td><td>Less than 150% of specified value</td></tr> <tr><td>ESR</td><td>Less than 150% of specified value</td></tr> <tr><td>Leakage Current</td><td>Within specified value</td></tr> </table>	Test Time	15,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 150% of specified value	ESR	Less than 150% of specified value	Leakage Current	Within specified value
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	Capacitance Change	Within ±20% of initial value									
	Tanδ	Less than 150% of specified value									
	ESR	Less than 150% of specified value									
Leakage Current	Within specified value										
* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied for 15,000 hours at 105°C.											
Moisture Resistance	<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 150% of specified value</td></tr> <tr><td>ESR</td><td>Less than 150% of specified value</td></tr> <tr><td>Leakage Current</td><td>Within specified value</td></tr> </table>	Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Tanδ	Less than 150% of specified value	ESR	Less than 150% of specified value	Leakage Current	Within specified value
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	ESR	Less than 150% of specified value									
Leakage Current	Within specified value										
* The above specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them at 60°C, 90 ~ 95% RH for 1,000 hours. Leakage current should be tested after voltage treatment*.											
Resistance to Soldering Heat * (Please refer to page 18 for soldering conditions)	<table border="1"> <tr><td>Capacitance Change</td><td>Within ±10% of initial value</td></tr> <tr><td>Tanδ</td><td>Within specified value</td></tr> <tr><td>ESR</td><td>Within specified value</td></tr> <tr><td>Leakage Current</td><td>Within specified value</td></tr> </table>	Capacitance Change	Within ±10% of initial value	Tanδ	Within specified value	ESR	Within specified value	Leakage Current	Within specified value		
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Ripple Current and Frequency Multipliers	<table border="1"> <tr> <th>Frequency (Hz)</th> <th>120 ≤ f &lt; 1k</th> <th>1k ≤ f &lt; 10k</th> <th>10k ≤ f &lt; 100k</th> <th>100k ≤ f &lt; 500k</th> </tr> <tr> <td>Multiplier</td> <td>0.05</td> <td>0.3</td> <td>0.7</td> <td>1.0</td> </tr> </table>	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k	Multiplier	0.05	0.3	0.7	1.0
	Frequency (Hz)	120 ≤ f < 1k	1k ≤ f < 10k	10k ≤ f < 100k	100k ≤ f < 500k						
Multiplier	0.05	0.3	0.7	1.0							

\* For any doubt about measured values, measure the leakage current again after the following voltage treatment.  
Voltage treatment: DC rated voltage is applied to the capacitors for 2 hours at 105°C.

### Diagram of Dimensions



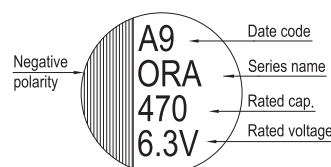
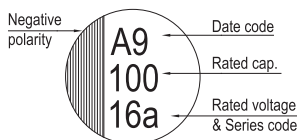
Lead Spacing and Diameter Unit: mm

φD	6.3	8	10
L	11	11.5	12
P	2.5	3.5	5.0
φd	0.5	0.6	
α	1.0		
β	0.5		

### Marking

φD = 6.3

φD = 8 ~ 10





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

Standard Ratings

Rated Volt. (V)	Surge Voltage (V)	Capacitance ( $\mu$ F)	Size $\phi D \times L$ (mm)	Tan $\delta$ (120 Hz, 20°C)	L C ( $\mu$ A)	E S R (m $\Omega$ /at 100k ~ 300k Hz, 20°C max.)	Rated R. C. (mA/rms at 100k Hz, 105°C)
2.5V (0E)	2.9	390	6.3 $\times$ 11	0.12	195	20	3,150
		680	8 $\times$ 11.5		340	7	5,580
		820	8 $\times$ 11.5		410	7	5,580
		1,000	10 $\times$ 12		500	6	5,860
		1,500	10 $\times$ 12		750	7	5,860
4V (0G)	4.6	270	6.3 $\times$ 11	0.12	216	20	3,160
		390	6.3 $\times$ 11	0.12	312	24	3,300
		560	8 $\times$ 11.5	0.08	448	7	5,580
		820	10 $\times$ 12	0.08	656	6	5,860
6.3V (0J)	7.2	220	6.3 $\times$ 11	0.12	277	20	3,160
		330	6.3 $\times$ 11	0.12	416	28	3,190
		390	8 $\times$ 11.5	0.08	491	8	5,080
		470	8 $\times$ 11.5		592	7	5,700
		680	10 $\times$ 12		857	7	5,860
10V (1A)	12.0	47	6.3 $\times$ 11	0.12	94	25	2,820
		68			136		
		100			200		
		150			300		
		270	8 $\times$ 11.5	0.08	540	9	4,710
		470	10 $\times$ 12	0.08	940	8	5,650
16V (1C)	18.0	100	6.3 $\times$ 11	0.12	320	25	2,820

OP-CAP

Part Numbering System

ORA Series	470 $\mu$ F	$\pm$ 20%	6.3V	Bulk Package	Gas Type	8 $\phi$ $\times$ 11.5L	General Purpose
<b>ORA</b>	<b>471</b>	<b>M</b>	<b>0J</b>	<b>BK</b>	-	<b>0811</b>	
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" on page 20.