



## RJA Series

### Features

- 105°C, wide temperature range
- Suitable for high reliability products
- RoHS Compliance

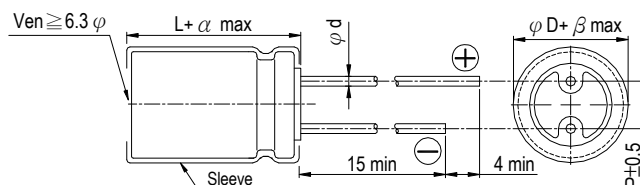


Sleeve & Marking Color: Deep Purple & White

### Specifications

| Items                                                                             | Performance                                                                                                                                                                                                                                                                  |              |                                   |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------|------|------|----------------|--------|------|------|---------------|-----|----|----|----|----|----|----|-----|------------|------|------|------|------|------|------|------|------|
| Category Temperature Range                                                        | 6.3 ~ 63V                                                                                                                                                                                                                                                                    |              |                                   |      |      | 100V           |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | -55°C ~ +105°C                                                                                                                                                                                                                                                               |              |                                   |      |      | -40°C ~ +105°C |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
| Capacitance Tolerance                                                             | ±20% (at 120Hz, 20°C)                                                                                                                                                                                                                                                        |              |                                   |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
| Leakage Current (at 20°C)                                                         | I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes)<br>Where, C = rated capacitance in μF    V = rated DC working voltage in V                                                                                                                                       |              |                                   |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
| 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></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></tr></table> |              |                                   |      |      |                |        |      |      | Rated Voltage | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | Tanδ (max) | 0.23 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 |
|                                                                                   | Rated Voltage                                                                                                                                                                                                                                                                | 6.3          | 10                                | 16   | 25   | 35             | 50     | 63   | 100  |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | Tanδ (max)                                                                                                                                                                                                                                                                   | 0.23         | 0.20                              | 0.16 | 0.14 | 0.12           | 0.10   | 0.09 | 0.08 |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
| When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase. |                                                                                                                                                                                                                                                                              |              |                                   |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
| Low Temperature Characteristics (at 120Hz)                                        | Impedance ratio shall not exceed the values given in the table below.                                                                                                                                                                                                        |              |                                   |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | Rated Voltage                                                                                                                                                                                                                                                                |              | 6.3                               | 10   | 16   | 25             | 35     | 50   | 63   | 100           |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | Impedance Ratio                                                                                                                                                                                                                                                              | Z(-25°C)     | φ D < 16                          | 4    | 3    | 3              | 2      | 2    | 2    | 2             |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   |                                                                                                                                                                                                                                                                              | /Z(+20°C)    | φ D ≥ 16                          | 5    | 4    | 3              | 2      | 2    | 2    | 3             |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   |                                                                                                                                                                                                                                                                              | Z(-40/-55°C) | φ D < 16                          | 8    | 6    | 4              | 4      | 4    | 3    | 3             |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
| /Z(+20°C)                                                                         |                                                                                                                                                                                                                                                                              | φ D ≥ 16     | 12                                | 8    | 6    | 4              | 3      | 3    | 6    |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
| Endurance                                                                         | Test Time                                                                                                                                                                                                                                                                    |              | 2,000 Hrs                         |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | Capacitance Change                                                                                                                                                                                                                                                           |              | Within ±20%of initial value       |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | Tanδ                                                                                                                                                                                                                                                                         |              | Less than 200% 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 with rated ripple current for 2,000 hours at 105°C.                                                                                                   |              |                                   |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
| Shelf Life Test                                                                   | Test Time                                                                                                                                                                                                                                                                    |              | 1,000 Hrs                         |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | Capacitance Change                                                                                                                                                                                                                                                           |              | Within ±20%of initial value       |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | Tanδ                                                                                                                                                                                                                                                                         |              | Less than 200% of specified value |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | Leakage Current                                                                                                                                                                                                                                                              |              | Within specified value            |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | * 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.                                                                                                                 |              |                                   |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
| Ripple Current & Frequency Multipliers                                            | Freq.(Hz)                                                                                                                                                                                                                                                                    |              | 60 (50)                           | 120  | 500  | 1k             | 10k up |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | Cap.(μF)                                                                                                                                                                                                                                                                     |              |                                   |      |      |                |        |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | Under 100                                                                                                                                                                                                                                                                    |              | 0.70                              | 1.00 | 1.30 | 1.40           | 1.50   |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | 100 < C ≤ 1,000                                                                                                                                                                                                                                                              |              | 0.75                              | 1.00 | 1.20 | 1.30           | 1.35   |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |
|                                                                                   | 1,000 up above                                                                                                                                                                                                                                                               |              | 0.80                              | 1.00 | 1.10 | 1.12           | 1.15   |      |      |               |     |    |    |    |    |    |    |     |            |      |      |      |      |      |      |      |      |

### 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                         |     |     |     |      |     |     |



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

Ripple Current: mA/rms at 120 Hz, 105°C

## Dimension & Permissible Ripple Current

| $\mu\text{F}$ | V. DC<br>Contents | 6.3V (0J)         |       | 10V (1A)          |            | 16V (1C)          |       | 25V (1E)          |       | 35V (1V)          |       | 50V (1H)          |            | 63V (1J)           |            | 100V (2A)         |            |
|---------------|-------------------|-------------------|-------|-------------------|------------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|------------|--------------------|------------|-------------------|------------|
|               |                   | $\phi D \times L$ | 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         |
| 2.2           | 2R2               |                   |       |                   |            |                   |       |                   |       |                   |       | 5×11              | 20         |                    |            | 5×11              | 26         |
| 3.3           | 3R3               |                   |       |                   |            |                   |       |                   |       |                   |       | 5×11              | 30         |                    |            | 5×11              | 31         |
| 4.7           | 4R7               |                   |       |                   |            |                   |       |                   |       |                   |       | 5×11              | 33         | 5×11               | 36         | 6.3×11            | 40         |
| 10            | 100               |                   |       |                   |            |                   |       |                   |       |                   |       | 5×11              | 50         | 5×11               | 54         | 6.3×11            | 54         |
| 22            | 220               |                   |       |                   |            |                   |       |                   |       |                   |       | 5×11              | 78         | 6.3×11             | 86         | 6.3×11<br>8×11.5  | 93<br>111  |
| 33            | 330               |                   |       |                   |            |                   |       |                   |       | 5×11              | 85    | 5×11              | 90         | 6.3×11             | 100        | 8×11.5<br>10×12.5 | 144<br>183 |
| 47            | 470               |                   |       |                   |            |                   |       | 5×11              | 97    | 5×11              | 90    | 6.3×11            | 117        | 6.3×11             | 129        | 10×12.5           | 204        |
| 100           | 101               |                   |       |                   |            | 5×11              | 110   | 6.3×11            | 142   | 6.3×11            | 150   | 8×11.5            | 188        | 10×12.5            | 235        | 10×20             | 285        |
| 220           | 221               |                   |       | 5×11              | 150        | 6.3×11            | 180   | 8×11.5            | 236   | 8×11.5            | 270   | 10×16             | 335        | 10×20              | 400        | 12.5×25           | 440        |
| 330           | 331               |                   |       | 6.3×11            | 200        | 8×11.5            | 260   | 8×11.5            | 330   | 10×12.5           | 350   | 10×16<br>10×20    | 410<br>460 | 10×20<br>12.5×20   | 490<br>520 | 16×25             | 478        |
| 470           | 471               | 6.3×11            | 230   | 6.3×11<br>8×11.5  | 250<br>290 | 8×11.5            | 310   | 10×12.5           | 380   | 10×16             | 460   | 12.5×20           | 590        | 12.5×20<br>12.5×25 | 665<br>720 | 16×31.5           | 688        |
| 1,000         | 102               | 8×11.5            | 380   | 10×12.5           | 460        | 10×16             | 560   | 10×20             | 680   | 12.5×20           | 830   | 16×25             | 1,080      | 16×25              | 1,190      |                   |            |
| 2,200         | 222               | 10×16             | 690   | 10×20             | 760        | 12.5×20           | 920   | 12.5×25           | 1,090 | 16×25             | 1,260 | 16×35.5           | 1,470      |                    |            |                   |            |
| 3,300         | 332               | 10×20             | 840   | 12.5×20           | 1,100      | 12.5×25           | 1,170 | 16×25             | 1,400 | 16×35.5           | 1,610 | 18×35.5           | 1,650      |                    |            |                   |            |
| 4,700         | 472               | 12.5×20           | 1,090 | 12.5×25           | 1,260      | 16×25             | 1,480 | 16×31.5           | 1,710 | 18×35.5           | 1,900 |                   |            |                    |            |                   |            |
| 6,800         | 682               | 12.5×25           | 1,460 | 16×25             | 1,690      | 16×31.5           | 1,930 | 18×35.5           | 2,160 |                   |       |                   |            |                    |            |                   |            |
| 10,000        | 103               | 16×25             | 1,990 | 16×31.5           | 2,220      | 18×31.5           | 2,330 |                   |       |                   |       |                   |            |                    |            |                   |            |
| 22,000        | 223               | 18×35.5           | 2,930 | 18×40             | 3,230      |                   |       |                   |       |                   |       |                   |            |                    |            |                   |            |

## Part Numbering System

|            |                   |                       |               |                              |             |                  |                              |
|------------|-------------------|-----------------------|---------------|------------------------------|-------------|------------------|------------------------------|
| RJA series | 470 $\mu\text{F}$ | ±20%                  | 6.3V          | Bulk Package                 | Gas Type    | 6.3 $\phi$ × 11L | Pb-free and PET coating case |
| <b>RJA</b> | <b>471</b>        | <b>M</b>              | <b>0J</b>     | <b>BK</b>                    | -           | <b>0611</b>      |                              |
| Series     | Capacitance       | Capacitance Tolerance | Rated Voltage | Lead Configuration & Package | Rubber Type | Case Size        | Lead Wire and Coating Type   |

Note: For more details, please refer to "Part Numbering System (Radial Type)" on page 10.

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