

**RZ** series

Compact & Low-Profile Sized, Wide Temperature Range



Smaller



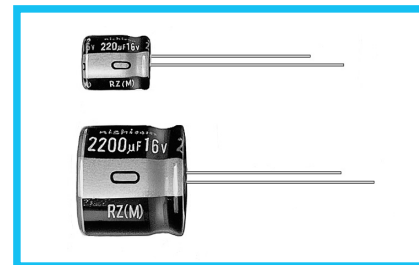
Anti-Solvent  
Feature  
(Through  
100V only)

- Very small case sizes same as RS series, but operating over wide temperature range of  $-55$  ( $-40$ ) to  $+105^{\circ}\text{C}$ .
- Compliant to the RoHS directive (2011/65/EU).

**RZ**



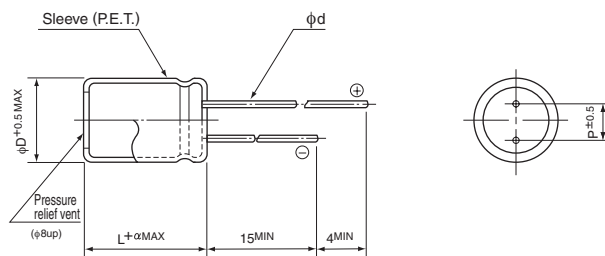
High  
Temperature



## Specifications

| Item                          | Performance Characteristics                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                    |      |      |      |      |      |                    |                                                                                    |                                                   |      |      |      |     |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|--------------------|------------------------------------------------------------------------------------|---------------------------------------------------|------|------|------|-----|
| Category Temperature Range    | −55 to +105°C (6.3 to 100V) , −40 to +105°C (160 to 400V)                                                                                                                                                                               |                                                                                                                                                                                                                                                                    |      |      |      |      |      |                    |                                                                                    |                                                   |      |      |      |     |
| Rated Voltage Range           | 6.3 to 400V                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                    |      |      |      |      |      |                    |                                                                                    |                                                   |      |      |      |     |
| Rated Capacitance Range       | 0.1 to 10000μF                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                    |      |      |      |      |      |                    |                                                                                    |                                                   |      |      |      |     |
| Capacitance Tolerance         | ±20% at 120Hz, 20°C                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                    |      |      |      |      |      |                    |                                                                                    |                                                   |      |      |      |     |
| Leakage Current               | Rated voltage (V)                                                                                                                                                                                                                       | 6.3 to 100                                                                                                                                                                                                                                                         |      |      |      |      |      |                    | 160 to 400                                                                         |                                                   |      |      |      |     |
|                               | _____                                                                                                                                                                                                                                   | After 1 minute's application of rated voltage at 20°C, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.<br>After 2 minutes' application of rated voltage at 20°C, leakage current is not more than 0.01CV or 3 (μA), whichever is greater. |      |      |      |      |      |                    | After 1 minute's application of rated voltage at 20°C, I = 0.04CV+100 (μA) or less |                                                   |      |      |      |     |
| Tangent of loss angle (tan δ) | For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. Measurement frequency : 120Hz at 20°C                                                                                                                       |                                                                                                                                                                                                                                                                    |      |      |      |      |      |                    |                                                                                    |                                                   |      |      |      |     |
|                               | Rated voltage (V)                                                                                                                                                                                                                       | 6.3                                                                                                                                                                                                                                                                | 10   | 16   | 25   | 35   | 50   | 63                 | 100                                                                                | 160                                               | 200  | 250  | 400  |     |
|                               | tan δ (MAX.)                                                                                                                                                                                                                            | 0.28                                                                                                                                                                                                                                                               | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10               | 0.08                                                                               | 0.20                                              | 0.20 | 0.20 | 0.25 |     |
| Stability at Low Temperature  | Measurement frequency : 120Hz                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                    |      |      |      |      |      |                    |                                                                                    |                                                   |      |      |      |     |
|                               | Rated voltage (V)                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                    | 6.3  | 10   | 16   | 25   | 35   | 50                 | 63                                                                                 | 100                                               | 160  | 200  | 250  | 400 |
|                               | Impedance ratio<br>ZT / Z20 (MAX.)                                                                                                                                                                                                      | Z−25°C / Z+20°C                                                                                                                                                                                                                                                    | 5    | 4    | 3    | 2    | 2    | 2                  | 2                                                                                  | 2                                                 | 3    | 3    | 3    | 6   |
|                               |                                                                                                                                                                                                                                         | Z−40°C / Z+20°C                                                                                                                                                                                                                                                    | 10   | 8    | 6    | 4    | 3    | 3                  | 3                                                                                  | 3                                                 | 4    | 4    | 6    | 10  |
| Endurance                     | The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 105°C.                                                                                    |                                                                                                                                                                                                                                                                    |      |      |      |      |      | Capacitance change |                                                                                    | Within ±20% of the initial capacitance value      |      |      |      |     |
|                               |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                    |      |      |      |      |      | tan δ              |                                                                                    | 200% or less than the initial specified value     |      |      |      |     |
|                               |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                    |      |      |      |      |      | Leakage current    |                                                                                    | Less than or equal to the initial specified value |      |      |      |     |
| Shelf Life                    | After storing the capacitors under no load at 105°C for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they shall meet the specified values for the endurance characteristics listed above. |                                                                                                                                                                                                                                                                    |      |      |      |      |      |                    |                                                                                    |                                                   |      |      |      |     |
| Marking                       | Printed with white color letter on black sleeve.                                                                                                                                                                                        |                                                                                                                                                                                                                                                                    |      |      |      |      |      |                    |                                                                                    |                                                   |      |      |      |     |

## Radial Lead Type

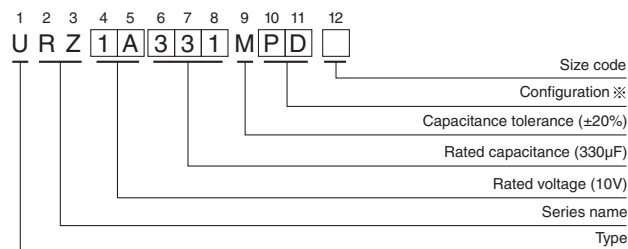


|          |                        |
|----------|------------------------|
| $\alpha$ | $(\phi D < 20)$ 1.5    |
|          | $(\phi D \geq 20)$ 2.0 |

|          | $\phi D$ | 5   | 6.3 | 8   | 10  | 12.5 | 16  | 18  | 20   |
|----------|----------|-----|-----|-----|-----|------|-----|-----|------|
| P        |          | 2.0 | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10.0 |
| $\phi d$ |          | 0.5 | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 | 1.0  |

- Please refer to page 20 about the end seal configuration.

## Type numbering system (Example : 10V 330 $\mu\text{F}$ )



### ※ Configuration

| $\phi D$   | Pb-free leadwire<br>Pb-free PET sleeve |
|------------|----------------------------------------|
| 5 - 6.3    | DD                                     |
| 8 - 10     | PD                                     |
| 12.5 to 18 | HD                                     |
| 20         | RD                                     |

Please refer to page 20, 21, 22 about the formed or taped product spec.  
Please refer to page 4 for the minimum order quantity.

• Dimension table in next page.

## ■ Dimensions

| V        |      | 6.3       |      | 10        |      | 16          |      | 25        |      | 35          |      | 50                        |                 |
|----------|------|-----------|------|-----------|------|-------------|------|-----------|------|-------------|------|---------------------------|-----------------|
| Cap.(μF) | Code | 0J        |      | 1A        |      | 1C          |      | 1E        |      | 1V          |      | 1H                        |                 |
| 0.1      | 0R1  |           |      |           |      |             |      |           |      |             |      | 5 × 9                     | 1.1             |
| 0.22     | R22  |           |      |           |      |             |      |           |      |             |      | 5 × 9                     | 2.3             |
| 0.33     | R33  |           |      |           |      |             |      |           |      |             |      | 5 × 9                     | 3.5             |
| 0.47     | R47  |           |      |           |      |             |      |           |      |             |      | 5 × 9                     | 5               |
| 1        | 010  |           |      |           |      |             |      |           |      |             |      | 5 × 9                     | 12              |
| 2.2      | 2R2  |           |      |           |      |             |      |           |      |             |      | 5 × 9                     | 18              |
| 3.3      | 3R3  |           |      |           |      |             |      |           |      |             |      | 5 × 9                     | 25              |
| 4.7      | 4R7  |           |      |           |      |             |      | 5 × 9     | 20   | 5 × 9       | 25   | 5 × 9                     | 30              |
| 10       | 100  |           |      |           |      | 5 × 9       | 30   | 5 × 9     | 35   | 5 × 9       | 40   | 5 × 9                     | 46              |
| 22       | 220  | 5 × 9     | 25   | 5 × 9     | 40   | 5 × 9       | 50   | 5 × 9     | 55   | 5 × 9       | 60   | 5 × 9                     | 65              |
| 33       | 330  | 5 × 9     | 40   | 5 × 9     | 55   | 5 × 9       | 60   | 5 × 9     | 70   | 5 × 9       | 75   | 6.3 × 9                   | 85              |
| 47       | 470  | 5 × 9     | 55   | 5 × 9     | 65   | 5 × 9       | 70   | 5 × 9     | 80   | 6.3 × 9     | 95   | 6.3 × 9                   | 100             |
| 100      | 101  | 5 × 9     | 90   | 5 × 9     | 95   | 6.3 × 9     | 115  | 6.3 × 9   | 130  | 8 × 9       | 155  | 10 × 9                    | 170             |
| 220      | 221  | 6.3 × 9   | 145  | 6.3 × 9   | 155  | 8 × 9       | 205  | 10 × 9    | 220  | 10 × 9      | 235  | 10 × 12.5                 | 290             |
| 330      | 331  | 6.3 × 9   | 180  | 8 × 9     | 210  | 10 × 9      | 240  | 10 × 9    | 270  | 10 × 12.5   | 340  | 12.5 × 12.5               | 370             |
| 470      | 471  | 8 × 9     | 235  | 8 × 9     | 275  | 10 × 9      | 290  | 10 × 12.5 | 370  | 12.5 × 12.5 | 420  | 16 × 15                   | 540             |
| 1000     | 102  | 10 × 9    | 370  | 10 × 12.5 | 450  | 12.5 × 12.5 | 520  | 12.5 × 15 | 590  | 16 × 15     | 720  | 18 × 20                   | 830             |
| 2200     | 222  | 12.5 × 15 | 635  | 12.5 × 15 | 690  | 16 × 15     | 830  | 18 × 15   | 970  | 18 × 20     | 1110 | 20 × 25                   | 1250            |
| 3300     | 332  | 16 × 15   | 860  | 16 × 15   | 940  | 18 × 15     | 1050 | 18 × 20   | 1220 | 20 × 25     | 1430 |                           |                 |
| 4700     | 472  | 16 × 15   | 1010 | 18 × 15   | 1120 | 18 × 20     | 1260 | 18 × 25   | 1470 |             |      |                           |                 |
| 6800     | 682  | 18 × 15   | 1200 | 18 × 20   | 1330 | 18 × 25     | 1560 |           |      |             |      |                           |                 |
| 10000    | 103  | 18 × 20   | 1450 | 18 × 25   | 1700 |             |      |           |      |             |      | Case size<br>φ D × L (mm) | Rated<br>ripple |

| V        |      | 63          |     | 100       |     | 160       |     | 200       |     | 250       |     | 400                       |                 |
|----------|------|-------------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|---------------------------|-----------------|
| Cap.(μF) | Code | 1J          |     | 2A        |     | 2C        |     | 2D        |     | 2E        |     | 2G                        |                 |
| 0.1      | 0R1  |             |     | 5 × 9     | 1.2 |           |     |           |     |           |     |                           |                 |
| 0.22     | R22  |             |     | 5 × 9     | 3   |           |     |           |     |           |     |                           |                 |
| 0.33     | R33  |             |     | 5 × 9     | 4.5 |           |     |           |     |           |     |                           |                 |
| 0.47     | R47  |             |     | 5 × 9     | 6.5 |           |     |           |     |           |     |                           |                 |
| 1        | 010  |             |     | 5 × 9     | 12  |           |     |           |     |           |     |                           |                 |
| 2.2      | 2R2  |             |     | 5 × 9     | 17  |           |     |           |     |           |     |                           |                 |
| 3.3      | 3R3  |             |     | 5 × 9     | 25  |           |     |           |     |           |     |                           |                 |
| 4.7      | 4R7  |             |     | 6.3 × 9   | 32  |           |     |           |     |           |     |                           |                 |
| 10       | 100  | 5 × 9       | 42  | 6.3 × 9   | 50  |           |     |           |     |           |     | 16 × 15                   | 100             |
| 22       | 220  | 6.3 × 9     | 71  | 8 × 9     | 93  |           |     |           |     | 16 × 15   | 200 | ● 18 × 15                 | 200             |
| 33       | 330  | 8 × 9       | 100 | 10 × 9    | 130 |           |     | 16 × 15   | 250 | ● 18 × 15 | 250 | 18 × 20                   | 250             |
| 47       | 470  | 8 × 9       | 120 | 10 × 12.5 | 165 | 16 × 15   | 300 | ● 18 × 15 | 300 | △ 18 × 20 | 300 | ★ 18 × 25                 | 300             |
| 68       | 680  |             |     |           |     | ● 18 × 15 | 350 | △ 18 × 20 | 350 | 18 × 20   | 350 | 20 × 25                   | 350             |
| 100      | 101  | 10 × 9      | 215 | 12.5 × 15 | 265 | △ 18 × 20 | 420 | ★ 18 × 25 | 420 | 18 × 25   | 420 |                           |                 |
| 150      | 151  |             |     |           |     | ★ 18 × 25 | 510 | 18 × 25   | 510 |           |     |                           |                 |
| 220      | 221  | 12.5 × 12.5 | 335 | 16 × 15   | 440 | 20 × 25   | 550 |           |     |           |     |                           |                 |
| 330      | 331  | 12.5 × 15   | 510 | 18 × 15   | 540 |           |     |           |     |           |     |                           |                 |
| 470      | 471  | 16 × 15     | 640 |           |     |           |     |           |     |           |     | Case size<br>φ D × L (mm) | Rated<br>ripple |

Rated ripple current (mA<sub>rms</sub>) at 105°C 120Hz

Size φ 16 × 20 is available for capacitors marked "●"  
 Size φ 20 × 15 is available for capacitors marked "△"  
 Size φ 20 × 20 is available for capacitors marked "★"

In this case, [6] will be put at 12th digit of  
 type numbering system.

## ● Frequency coefficient of rated ripple current

| V          | Cap.(μF)      | Frequency | 50Hz | 120Hz | 300Hz | 1 kHz | 10kHz or more |
|------------|---------------|-----------|------|-------|-------|-------|---------------|
| 6.3 to 100 | 0.1 to 47     |           | 0.75 | 1.00  | 1.35  | 1.57  | 2.00          |
|            | 100 to 470    |           | 0.80 | 1.00  | 1.23  | 1.34  | 1.50          |
|            | 1000 to 10000 |           | 0.85 | 1.00  | 1.10  | 1.13  | 1.15          |
| 160 to 400 | 10 to 220     |           | 0.80 | 1.00  | 1.25  | 1.40  | 1.60          |