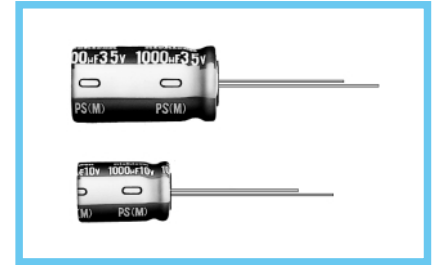
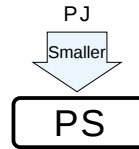


**PS** Miniature Sized, Low Impedance,  
For Switching Power Supplies  
series



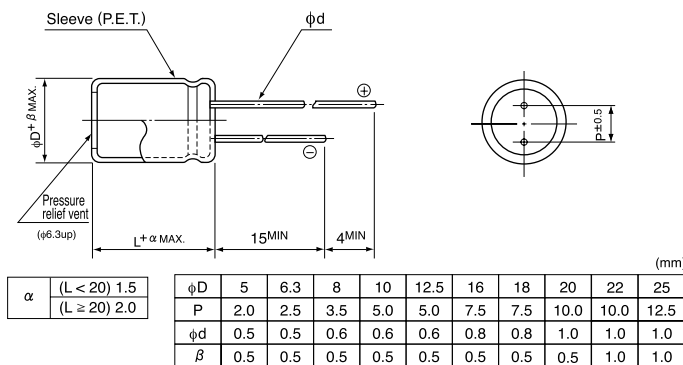
- Wide temperature range type, miniature sized.
- Adapted to the RoHS directive (2002/95/EC).



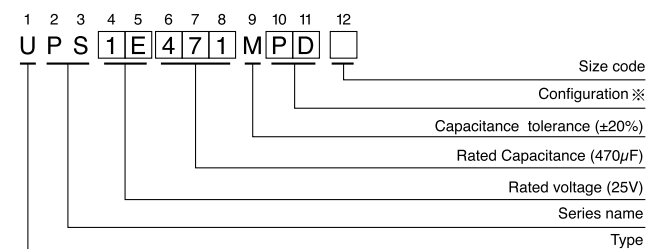
## Specifications

|                              |                                                                                                                                                                                                                                                        |                                                                                                                          |          |         |         |          |                    |                                                                                                |                                         |                                                                                    |      |      |  |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------|---------|---------|----------|--------------------|------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------|------|------|--|
| Item                         | Performance Characteristics                                                                                                                                                                                                                            |                                                                                                                          |          |         |         |          |                    |                                                                                                |                                         |                                                                                    |      |      |  |
| Category Temperature Range   | -55 ~ +105°C (6.3 ~ 100V), -40 ~ +105°C (160 ~ 400V), -25 ~ +105°C (450V)                                                                                                                                                                              |                                                                                                                          |          |         |         |          |                    |                                                                                                |                                         |                                                                                    |      |      |  |
| Rated Voltage Range          | 6.3 ~ 450V                                                                                                                                                                                                                                             |                                                                                                                          |          |         |         |          |                    |                                                                                                |                                         |                                                                                    |      |      |  |
| Rated Capacitance Range      | 0.47 ~ 15000μF                                                                                                                                                                                                                                         |                                                                                                                          |          |         |         |          |                    |                                                                                                |                                         |                                                                                    |      |      |  |
| Capacitance Tolerance        | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                    |                                                                                                                          |          |         |         |          |                    |                                                                                                |                                         |                                                                                    |      |      |  |
| Leakage Current              | Rated voltage (V)                                                                                                                                                                                                                                      | 6.3 ~ 100                                                                                                                |          |         |         |          |                    | 160 ~ 450                                                                                      |                                         |                                                                                    |      |      |  |
|                              | Leakage current                                                                                                                                                                                                                                        | After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA) , whichever is greater. |          |         |         |          |                    | CV ≤ 1000: I= 0.1CV+40 (μA)max. (1 minute's)<br>CV > 1000: I= 0.04CV+100 (μA)max. (1 minute's) |                                         |                                                                                    |      |      |  |
| tan δ                        | For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF                                                                                                                                                                             |                                                                                                                          |          |         |         |          |                    |                                                                                                |                                         |                                                                                    |      |      |  |
|                              | Rated voltage (V)                                                                                                                                                                                                                                      | 6.3                                                                                                                      | 10       | 16      | 25      | 35       | 50                 | 63                                                                                             | 100                                     | Measurement frequency : 120Hz, Temperature : 20°C<br>160 ~ 250 315 ~ 350 400 ~ 450 |      |      |  |
|                              | tan δ (MAX.)                                                                                                                                                                                                                                           | 0.24                                                                                                                     | 0.20     | 0.16    | 0.14    | 0.12     | 0.10               | 0.09                                                                                           | 0.08                                    | 0.15                                                                               | 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                                                                                            | 315 · 350                               | 400                                                                                | 450  |      |  |
|                              | Impedance ratio (MAX.)                                                                                                                                                                                                                                 | Z-25°C / Z+20°C                                                                                                          | —        | —       | —       | 2        | 3                  | 3                                                                                              | 4                                       | 6                                                                                  | 15   |      |  |
|                              |                                                                                                                                                                                                                                                        | Z-40°C / Z+20°C                                                                                                          | —        | —       | —       | 3        | 4                  | 6                                                                                              | 8                                       | 10                                                                                 | —    |      |  |
| Z-55°C / Z+20°C              |                                                                                                                                                                                                                                                        | 5                                                                                                                        | 4        | 3       | —       | —        | —                  | —                                                                                              | —                                       | —                                                                                  |      |      |  |
| Endurance                    | After an application of D.C. bias voltage plus the rated ripple current for 3000 hours (2000 hours for D = 5 ~ 10) at 105°C the peak voltage shall not exceed the rated D.C. voltage, capacitors meet the characteristic requirements listed at right. |                                                                                                                          |          |         |         |          | Capacitance change |                                                                                                | Within ±20% of initial value            |                                                                                    |      |      |  |
|                              |                                                                                                                                                                                                                                                        |                                                                                                                          |          |         |         |          | tan δ              |                                                                                                | 200% or less of initial specified value |                                                                                    |      |      |  |
|                              |                                                                                                                                                                                                                                                        |                                                                                                                          |          |         |         |          | Leakage current    |                                                                                                | Initial specified value or less         |                                                                                    |      |      |  |
| Shelf Life                   | After storing the capacitors under no load at 105°C for 1000 hours, and after performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they will meet the specified value for endurance characteristics listed above.                    |                                                                                                                          |          |         |         |          |                    |                                                                                                |                                         |                                                                                    |      |      |  |
| Marking                      | Printed with white color letter on dark brown sleeve.                                                                                                                                                                                                  |                                                                                                                          |          |         |         |          |                    |                                                                                                |                                         |                                                                                    |      |      |  |

## Radial Lead Type



## Type numbering system (Example : 25V 470µF)



### ※ Configuration

| φ D       | Pb-free leadwire<br>Pb-free PET sleeve |
|-----------|----------------------------------------|
| 5         | DD                                     |
| 6.3       | ED                                     |
| 8 ~ 10    | PD                                     |
| 12.5 ~ 18 | HD                                     |
| 20 ~ 25   | RD                                     |

- Please refer to page 21 about the end seal configuration.

## Frequency coefficient of rated ripple current

| V         | Cap.(µF)   | Frequency    | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz ~ |
|-----------|------------|--------------|------|-------|-------|------|---------|
| 6.3 ~ 100 | ~ 47       | —            | —    | 0.17  | 0.40  | 0.65 | 1.00    |
|           |            | 100 ~ 220    | 0.30 | 0.50  | 0.65  | 0.80 | 1.00    |
|           |            | 330 ~ 680    | 0.57 | 0.71  | 0.82  | 0.90 | 1.00    |
|           |            | 1000 ~ 15000 | 0.75 | 0.87  | 0.96  | 0.98 | 1.00    |
| 160 ~ 450 | 0.47 ~ 220 | 0.80         | 1.00 | 1.25  | 1.40  | 1.60 |         |
|           |            | 330 ~ 470    | 0.90 | 1.00  | 1.10  | 1.13 | 1.15    |

Please refer to page 21, 22, 23 about the formed or taped product spec.  
Please refer to page 3 for the minimum order quantity.

- Dimension table in next pages.

## ■ Standard ratings

| V (Code)  |      | 6.3 (0J)                    |                                      |                                         | 10 (1A)                     |                                      |                                         | 16 (1C)                     |                                      |                                         | 25 (1E)                     |                                      |                                         |
|-----------|------|-----------------------------|--------------------------------------|-----------------------------------------|-----------------------------|--------------------------------------|-----------------------------------------|-----------------------------|--------------------------------------|-----------------------------------------|-----------------------------|--------------------------------------|-----------------------------------------|
| Cap. (μF) | Item | Case size<br>φD × L<br>(mm) | Impedance<br>(Ω) MAX.<br>20°C/100kHz | Rated ripple<br>(mArms)<br>105°C/100kHz | Case size<br>φD × L<br>(mm) | Impedance<br>(Ω) MAX.<br>20°C/100kHz | Rated ripple<br>(mArms)<br>105°C/100kHz | Case size<br>φD × L<br>(mm) | Impedance<br>(Ω) MAX.<br>20°C/100kHz | Rated ripple<br>(mArms)<br>105°C/100kHz | Case size<br>φD × L<br>(mm) | Impedance<br>(Ω) MAX.<br>20°C/100kHz | Rated ripple<br>(mArms)<br>105°C/100kHz |
| 4.7       | 4R7  |                             |                                      |                                         |                             |                                      |                                         |                             |                                      |                                         | 5 × 11                      | 1.50                                 | 160                                     |
| 10        | 100  |                             |                                      |                                         |                             |                                      |                                         | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.50                                 | 160                                     |
| 22        | 220  | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.50                                 | 160                                     |
| 33        | 330  | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.50                                 | 160                                     |
| 47        | 470  | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.50                                 | 160                                     |
| 100       | 101  | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.50                                 | 160                                     | 6.3 × 11                    | 0.50                                 | 250                                     | 6.3 × 11                    | 0.50                                 | 250                                     |
| 150       | 151  | 6.3 × 11                    | 0.50                                 | 250                                     | 6.3 × 11                    | 0.50                                 | 250                                     | 6.3 × 11                    | 0.50                                 | 250                                     | 8 × 11.5                    | 0.28                                 | 410                                     |
| 220       | 221  | 6.3 × 11                    | 0.50                                 | 250                                     | 6.3 × 11                    | 0.50                                 | 250                                     | 8 × 11.5                    | 0.28                                 | 410                                     | 8 × 11.5                    | 0.28                                 | 410                                     |
| 330       | 331  | 6.3 × 11                    | 0.50                                 | 250                                     | 8 × 11.5                    | 0.28                                 | 410                                     | 8 × 11.5                    | 0.28                                 | 410                                     | 10 × 12.5                   | 0.19                                 | 600                                     |
| 470       | 471  | 8 × 11.5                    | 0.28                                 | 410                                     | 8 × 11.5                    | 0.28                                 | 410                                     | 10 × 12.5                   | 0.19                                 | 600                                     | 10 × 16                     | 0.14                                 | 800                                     |
| 680       | 681  | 10 × 12.5                   | 0.19                                 | 600                                     | 10 × 12.5                   | 0.19                                 | 600                                     | 10 × 16                     | 0.14                                 | 800                                     | 10 × 20                     | 0.11                                 | 1000                                    |
| 1000      | 102  | 10 × 12.5                   | 0.19                                 | 600                                     | 10 × 16                     | 0.14                                 | 800                                     | 10 × 20                     | 0.11                                 | 1000                                    | 12.5 × 20                   | 0.075                                | 1250                                    |
| 1500      | 152  | 10 × 20                     | 0.11                                 | 1000                                    | 10 × 20                     | 0.11                                 | 1000                                    | 12.5 × 20                   | 0.075                                | 1250                                    | 16 × 25                     | 0.038                                | 1900                                    |
| 2200      | 222  | 12.5 × 20                   | 0.075                                | 1250                                    | 12.5 × 20                   | 0.075                                | 1250                                    | 12.5 × 25                   | 0.057                                | 1550                                    | 16 × 25                     | 0.038                                | 1900                                    |
| 3300      | 332  | 12.5 × 20                   | 0.075                                | 1250                                    | 12.5 × 25                   | 0.057                                | 1550                                    | 16 × 25                     | 0.038                                | 1900                                    | 16 × 31.5                   | 0.033                                | 2350                                    |
| 4700      | 472  | 16 × 25                     | 0.038                                | 1900                                    | 16 × 25                     | 0.038                                | 1900                                    | 16 × 31.5                   | 0.033                                | 2350                                    | 18 × 35.5                   | 0.030                                | 2700                                    |
| 6800      | 682  | 16 × 25                     | 0.038                                | 1900                                    | 16 × 31.5                   | 0.033                                | 2350                                    | 18 × 35.5                   | 0.030                                | 2700                                    | 18 × 40                     | 0.027                                | 3300                                    |
| 10000     | 103  | 16 × 31.5                   | 0.033                                | 2350                                    | 18 × 35.5                   | 0.030                                | 2700                                    | 18 × 40                     | 0.027                                | 3300                                    |                             |                                      |                                         |
| 15000     | 153  | 18 × 35.5                   | 0.030                                | 2700                                    | 18 × 40                     | 0.027                                | 3300                                    |                             |                                      |                                         |                             |                                      |                                         |

| V (Code)  |      | 35 (1V)                     |                                      |                                         | 50 (1H)                     |                                      |                                         | 63 (1J)                     |                                      |                                         | 100 (2A)                    |                                      |                                         |
|-----------|------|-----------------------------|--------------------------------------|-----------------------------------------|-----------------------------|--------------------------------------|-----------------------------------------|-----------------------------|--------------------------------------|-----------------------------------------|-----------------------------|--------------------------------------|-----------------------------------------|
| Cap. (μF) | Item | Case size<br>φD × L<br>(mm) | Impedance<br>(Ω) MAX.<br>20°C/100kHz | Rated ripple<br>(mArms)<br>105°C/100kHz | Case size<br>φD × L<br>(mm) | Impedance<br>(Ω) MAX.<br>20°C/100kHz | Rated ripple<br>(mArms)<br>105°C/100kHz | Case size<br>φD × L<br>(mm) | Impedance<br>(Ω) MAX.<br>20°C/100kHz | Rated ripple<br>(mArms)<br>105°C/100kHz | Case size<br>φD × L<br>(mm) | Impedance<br>(Ω) MAX.<br>20°C/100kHz | Rated ripple<br>(mArms)<br>105°C/100kHz |
| 0.47      | R47  |                             |                                      |                                         | 5 × 11                      | 7.50                                 | 25                                      |                             |                                      |                                         | 5 × 11                      | 43.0                                 | 20                                      |
| 1         | 010  |                             |                                      |                                         | 5 × 11                      | 5.30                                 | 40                                      |                             |                                      |                                         | 5 × 11                      | 20.0                                 | 30                                      |
| 2.2       | 2R2  |                             |                                      |                                         | 5 × 11                      | 4.50                                 | 55                                      |                             |                                      |                                         | 5 × 11                      | 9.80                                 | 44                                      |
| 3.3       | 3R3  |                             |                                      |                                         | 5 × 11                      | 3.90                                 | 65                                      |                             |                                      |                                         | 5 × 11                      | 6.60                                 | 58                                      |
| 4.7       | 4R7  | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 3.50                                 | 90                                      | 5 × 11                      | 4.70                                 | 68                                      | 5 × 11                      | 4.60                                 | 74                                      |
| 10        | 100  | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 2.10                                 | 120                                     | 5 × 11                      | 2.10                                 | 110                                     | 6.3 × 11                    | 1.80                                 | 130                                     |
| 22        | 220  | 5 × 11                      | 1.50                                 | 160                                     | 5 × 11                      | 1.80                                 | 150                                     | 6.3 × 11                    | 0.98                                 | 180                                     | 8 × 11.5                    | 0.68                                 | 230                                     |
| 33        | 330  | 5 × 11                      | 1.50                                 | 160                                     | 6.3 × 11                    | 0.65                                 | 250                                     | 6.3 × 11                    | 0.71                                 | 220                                     | 10 × 12.5                   | 0.46                                 | 320                                     |
| 47        | 470  | 6.3 × 11                    | 0.50                                 | 250                                     | 6.3 × 11                    | 0.65                                 | 250                                     | 8 × 11.5                    | 0.65                                 | 310                                     | 10 × 16                     | 0.37                                 | 420                                     |
| 100       | 101  | 8 × 11.5                    | 0.28                                 | 410                                     | 8 × 11.5                    | 0.36                                 | 340                                     | 10 × 12.5                   | 0.31                                 | 390                                     | 12.5 × 20                   | 0.18                                 | 580                                     |
| 150       | 151  | 8 × 11.5                    | 0.28                                 | 410                                     | 10 × 12.5                   | 0.26                                 | 490                                     | 10 × 16                     | 0.25                                 | 440                                     | 12.5 × 25                   | 0.13                                 | 710                                     |
| 220       | 221  | 10 × 12.5                   | 0.19                                 | 600                                     | 10 × 16                     | 0.18                                 | 650                                     | 10 × 20                     | 0.20                                 | 700                                     | 16 × 25                     | 0.10                                 | 890                                     |
| 330       | 331  | 10 × 16                     | 0.14                                 | 800                                     | 10 × 20                     | 0.15                                 | 810                                     | 12.5 × 20                   | 0.12                                 | 980                                     | 16 × 25                     | 0.090                                | 1080                                    |
| 470       | 471  | 10 × 20                     | 0.11                                 | 1000                                    | 12.5 × 20                   | 0.13                                 | 1100                                    | 12.5 × 25                   | 0.081                                | 1200                                    | 16 × 31.5                   | 0.076                                | 1310                                    |
| 680       | 681  | 12.5 × 20                   | 0.075                                | 1250                                    | 12.5 × 25                   | 0.10                                 | 1200                                    | 16 × 25                     | 0.058                                | 1300                                    | 16 × 35.5                   | 0.064                                | 1410                                    |
| 1000      | 102  | 12.5 × 25                   | 0.057                                | 1550                                    | 16 × 25                     | 0.058                                | 1600                                    | 16 × 31.5                   | 0.049                                | 1380                                    | 18 × 40                     | 0.047                                | 1520                                    |
| 1500      | 152  | 16 × 25                     | 0.038                                | 1900                                    | 16 × 31.5                   | 0.040                                | 2000                                    | 18 × 35.5                   | 0.038                                | 1750                                    |                             |                                      |                                         |
| 2200      | 222  | 16 × 31.5                   | 0.033                                | 2350                                    | 18 × 35.5                   | 0.035                                | 2300                                    | 18 × 40                     | 0.032                                | 2120                                    |                             |                                      |                                         |
| 3300      | 332  | 18 × 35.5                   | 0.030                                | 2700                                    |                             |                                      |                                         |                             |                                      |                                         |                             |                                      |                                         |
| 4700      | 472  | 18 × 40                     | 0.027                                | 3300                                    |                             |                                      |                                         |                             |                                      |                                         |                             |                                      |                                         |

| V         |      | 160        |      | 200       |      | 250        |      | 315       |     | 350        |     | 400        |     | 450                      |                 |
|-----------|------|------------|------|-----------|------|------------|------|-----------|-----|------------|-----|------------|-----|--------------------------|-----------------|
| Cap. (μF) | Code | 2C         |      | 2D        |      | 2E         |      | 2F        |     | 2V         |     | 2G         |     | 2W                       |                 |
| 0.47      | R47  | 6.3 × 11   | 12   | 6.3 × 11  | 12   | 6.3 × 11   | 12   | 8 × 11.5  | 11  | 8 × 11.5   | 11  |            |     |                          |                 |
| 1         | 010  | 6.3 × 11   | 17   | 6.3 × 11  | 17   | 6.3 × 11   | 17   | 8 × 11.5  | 16  | 10 × 12.5  | 17  | 10 × 12.5  | 16  | 10 × 12.5                | 18              |
| 2.2       | 2R2  | 6.3 × 11   | 25   | 6.3 × 11  | 25   | 8 × 11.5   | 29   | 10 × 12.5 | 28  | 10 × 16    | 31  | 10 × 16    | 27  | 10 × 20                  | 29              |
| 3.3       | 3R3  | 8 × 11.5   | 36   | 8 × 11.5  | 36   | 10 × 12.5  | 42   | 10 × 12.5 | 34  | 10 × 16    | 38  | 10 × 20    | 36  | 12.5 × 20                | 41              |
| 4.7       | 4R7  | 8 × 11.5   | 43   | 10 × 12.5 | 50   | 10 × 12.5  | 50   | 10 × 16   | 45  | 10 × 20    | 49  | 10 × 20    | 43  | 12.5 × 20                | 49              |
| 10        | 100  | 10 × 12.5  | 70   | 10 × 16   | 80   | 10 × 20    | 88   | 10 × 20   | 72  | 12.5 × 20  | 82  | 12.5 × 25  | 72  | 16 × 25                  | 75              |
| 22        | 220  | 10 × 20    | 130  | 10 × 20   | 140  | 12.5 × 25  | 155  | 12.5 × 25 | 120 | 16 × 25    | 130 | 16 × 25    | 110 | 16 × 31.5                | 115             |
| 33        | 330  | 12.5 × 20  | 180  | 12.5 × 25 | 190  | 12.5 × 25  | 190  | 16 × 25   | 155 | 16 × 31.5  | 160 | 16 × 31.5  | 140 | •18 × 35.5               | 145             |
| 47        | 470  | 12.5 × 25  | 220  | 12.5 × 25 | 220  | 16 × 25    | 230  | 16 × 35.5 | 190 | •18 × 35.5 | 200 | •18 × 35.5 | 170 | 20 × 40                  | 175             |
| 100       | 101  | 16 × 25    | 330  | 16 × 31.5 | 335  | •18 × 35.5 | 340  | Δ18 × 40  | 285 | 20 × 40    | 290 | 22 × 50    | 350 | 25 × 50                  | 350             |
| 220       | 221  | •18 × 35.5 | 500  | Δ18 × 40  | 515  | 20 × 40    | 525  | 22 × 50   | 540 | 25 × 50    | 550 |            |     |                          |                 |
| 330       | 331  | 20 × 40    | 900  | 22 × 40   | 1100 | 22 × 50    | 1150 |           |     |            |     |            |     |                          |                 |
| 470       | 471  | 22 × 50    | 1200 | 22 × 50   | 1310 | 25 × 50    | 1350 |           |     |            |     |            |     | Case size<br>φD × L (mm) | Rated<br>ripple |

Rated Ripple (mArms) at 105°C 120Hz

Size φ20×31 is available for capacitors marked "•"

Size φ20×35 is available for capacitors marked "Δ"

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