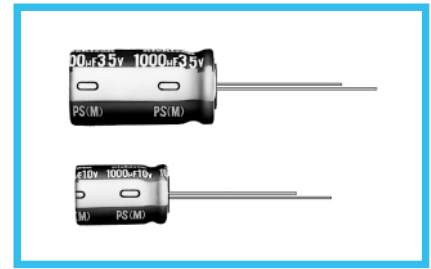
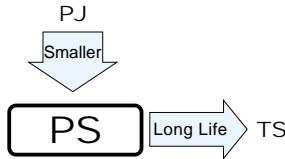


# ALUMINUM ELECTROLYTIC CAPACITORS

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



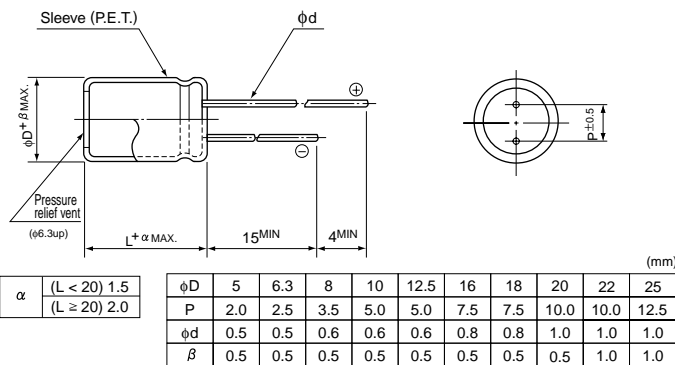
- Wide temperature range type, miniature sized.
- Compliant to the RoHS directive (2002/95/EC).



## Specifications

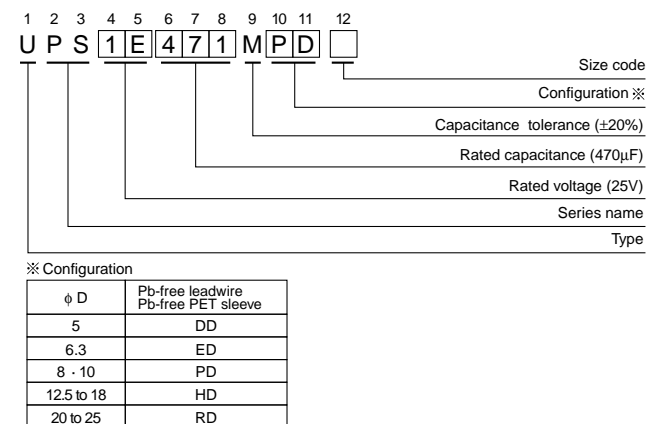
| Item                          | Performance Characteristics  |   |                                       |   |         |         |          |           |     |            |           |           |
|-------------------------------|--|---|---------------------------------------|---|---------|---------|----------|-----------|-----|------------|-----------|-----------|
| Category Temperature Range    | -55 to +105°C (6.3 to 100V), -40 to +105°C (160 to 400V), -25 to +105°C (450V)   |   |                                       |   |         |         |          |           |     |            |           |           |
| Rated Voltage Range           | 6.3 to 450V  |   |                                       |   |         |         |          |           |     |            |           |           |
| Rated Capacitance Range       | 0.47 to 15000μF  |   |                                       |   |         |         |          |           |     |            |           |           |
| Capacitance Tolerance         | ±20% at 120Hz, 20°C  |   |                                       |   |         |         |          |           |     |            |           |           |
| Leakage Current               | Rated voltage (V)  | 6.3 to 100  | 160 to 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. |                                       |   |         |         |          |           |     |            |           |           |
| 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 to 250 | 315 · 350 | 400 · 450 |
| Stability at Low Temperature  | Impedance ratio (MAX.)   | Rated voltage (V)   |                                       | 6.3 · 10  | 16 · 25 | 35 · 50 | 63 · 100 | 160 · 200 | 250 | 315 · 350  | 400       | 450       |
|                               |  | 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                     | The specifications listed at right shall be met when the capacitors are restored to 20°C after D.C. bias plus rated ripple current is applied for 3000 hours (2000 hours for φD= 5 to 10) at 105°C, the peak voltage shall not exceed the rated voltage. |   | 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 dark brown sleeve.  |   |                                       |   |         |         |          |           |     |            |           |           |

## Radial Lead Type



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

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



## Frequency coefficient of rated ripple current

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

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 pages.

## Standard Ratings

| V (Code)<br>Cap. (μF)<br>Code |     | 6.3 (0J)                    |                                      |   | 10 (1A)                     |                                      |   | 16 (1C)                     |                                      |   | 25 (1E)                     |                                      |   |
|-------------------------------|-----|-----------------------------|--------------------------------------|---|-----------------------------|--------------------------------------|---|-----------------------------|--------------------------------------|---|-----------------------------|--------------------------------------|---|
|                               |     | 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)<br>Cap. (μF)<br>Code |     | 35 (1V)                     |                                      |   | 50 (1H)                     |                                      |   | 63 (1J)                     |                                      |   | 100 (2A)                    |                                      |   |
|-------------------------------|-----|-----------------------------|--------------------------------------|---|-----------------------------|--------------------------------------|---|-----------------------------|--------------------------------------|---|-----------------------------|--------------------------------------|---|
|                               |     | 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<br>Cap. (μF)<br>Code |     | 160      |      | 200     |      | 250      |      | 315     |     | 350      |     | 400      |     | 450      |     |
|------------------------|-----|----------|------|---------|------|----------|------|---------|-----|----------|-----|----------|-----|----------|-----|
|                        |     | 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 |         |     |          |     |          |     |          |     |

Rated ripple current (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.