

## UPA

Miniature Sized, Low Impedance,  
High Reliability For  
Switching Power Supplies



Smaller



Low Impedance



Long Life



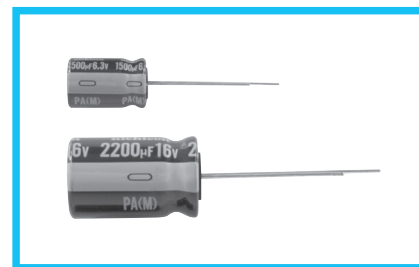
Anti-Solvent  
Feature

- Lower impedance than UPW.
- Smaller case size and high ripple current.
- Compliant to the RoHS directive (2011/65/EU,(EU)2015/863).

**UPA**

Low  
Impedance

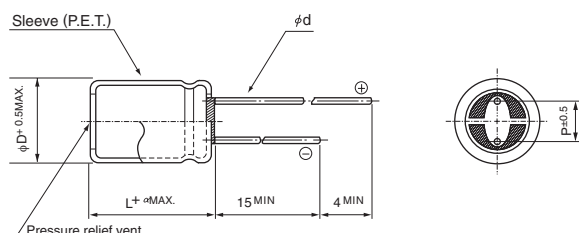
**UPW**



## Specifications

| Item                          | Performance Characteristics                                                                                                                                                                                                                                           |               |      |      |      |      |           |                    |                                                                   |  |  |  |  |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------|------|------|------|-----------|--------------------|-------------------------------------------------------------------|--|--|--|--|
| Category Temperature Range    | -55 to +105℃                                                                                                                                                                                                                                                          |               |      |      |      |      |           |                    |                                                                   |  |  |  |  |
| Rated Voltage Range           | 6.3 to 35V                                                                                                                                                                                                                                                            |               |      |      |      |      |           |                    |                                                                   |  |  |  |  |
| Rated Capacitance Range       | 180 to 10000μF                                                                                                                                                                                                                                                        |               |      |      |      |      |           |                    |                                                                   |  |  |  |  |
| Capacitance Tolerance         | ±20% at 120Hz, 20℃                                                                                                                                                                                                                                                    |               |      |      |      |      |           |                    |                                                                   |  |  |  |  |
| Leakage Current               | After 1 minute's application of rated voltage at 20℃, leakage current is not more than 0.03CV or 4 (μA), whichever is greater.                                                                                                                                        |               |      |      |      |      |           |                    |                                                                   |  |  |  |  |
| Tangent of loss angle (tan δ) | Rated voltage (V)                                                                                                                                                                                                                                                     | 6.3           | 10   | 16   | 25   | 35   | 120Hz 20℃ |                    |                                                                   |  |  |  |  |
|                               | tan δ (MAX.)                                                                                                                                                                                                                                                          | 0.22          | 0.19 | 0.16 | 0.14 | 0.12 |           |                    |                                                                   |  |  |  |  |
|                               | For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF.                                                                                                                                                                                           |               |      |      |      |      |           |                    |                                                                   |  |  |  |  |
| Stability at Low Temperature  | Rated voltage (V)                                                                                                                                                                                                                                                     | 6.3           | 10   | 16   | 25   | 35   | 120Hz     |                    |                                                                   |  |  |  |  |
|                               | Impedance ratio (MAX.)                                                                                                                                                                                                                                                | Z-55℃ / Z+20℃ | 3    | 3    | 3    | 3    |           | 3                  |                                                                   |  |  |  |  |
| Endurance                     | The specifications listed at right shall be met when the capacitors are restored to 20℃ after D.C. bias plus rated ripple current is applied for 5000 hours (3000 hours for φD=8, 4000 hours for φD=10) at 105℃, the peak voltage shall not exceed the rated voltage. |               |      |      |      |      |           |                    |                                                                   |  |  |  |  |
|                               |                                                                                                                                                                                                                                                                       |               |      |      |      |      |           | Capacitance change | Within ± 20% of the initial capacitance value (6.3V, 10V : ± 30%) |  |  |  |  |
|                               |                                                                                                                                                                                                                                                                       |               |      |      |      |      |           | tan δ              | 200% or less than the initial specified value (6.3V, 10V : 300%)  |  |  |  |  |
| Shelf Life                    | After storing the capacitors under no load at 105℃ for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20℃, they shall meet the specified values for the endurance characteristics listed above.                                 |               |      |      |      |      |           |                    |                                                                   |  |  |  |  |
|                               |                                                                                                                                                                                                                                                                       |               |      |      |      |      |           | Leakage current    | Less than or equal to the initial specified value                 |  |  |  |  |
|                               |                                                                                                                                                                                                                                                                       |               |      |      |      |      |           |                    |                                                                   |  |  |  |  |
| Marking                       | Printed with white color letter on dark brown sleeve.                                                                                                                                                                                                                 |               |      |      |      |      |           |                    |                                                                   |  |  |  |  |

## Radial Lead Type

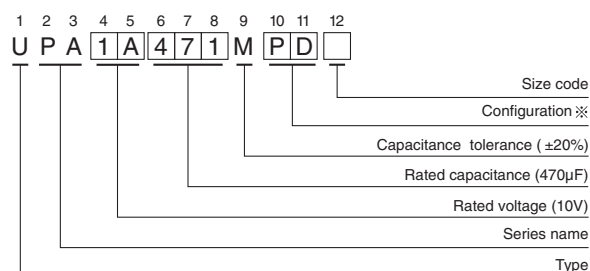


|   |          |     |
|---|----------|-----|
| α | (L < 20) | 1.5 |
|   | (L ≥ 20) | 2.0 |

|    | (mm) |     |      |     |     |
|----|------|-----|------|-----|-----|
| φD | 8    | 10  | 12.5 | 16  | 18  |
| P  | 3.5  | 5.0 | 5.0  | 7.5 | 7.5 |
| φd | 0.6  | 0.6 | *0.6 | 0.8 | 0.8 |

※ : In case L > 25 for the φ12.5 dia. unit, lead dia. φd = 0.8mm.

## Type numbering system (Example : 10V 470µF)



※ Configuration

| φD         | Pb-free leadwire<br>Pb-free PET sleeve |
|------------|----------------------------------------|
| 8 · 10     | PD                                     |
| 12.5 to 18 | HD                                     |

## Frequency coefficient of rated ripple current

| Cap. (µF)     | Frequency | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz or more |
|---------------|-----------|------|-------|-------|------|---------------|
| 180 to 330    |           | 0.55 | 0.65  | 0.75  | 0.85 | 1.00          |
| 390 to 1000   |           | 0.70 | 0.75  | 0.80  | 0.90 | 1.00          |
| 1200 to 10000 |           | 0.80 | 0.85  | 0.90  | 0.95 | 1.00          |

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

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.

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## ■ Dimensions

| Cap.(μF)<br><br>Code |     | V (Code) |                             | 6.3 (0J)           |                   |                                              | 10 (1A)                     |                    |                   | 16 (1C)                                      |                             |                    |                   |                                              |
|----------------------|-----|----------|-----------------------------|--------------------|-------------------|----------------------------------------------|-----------------------------|--------------------|-------------------|----------------------------------------------|-----------------------------|--------------------|-------------------|----------------------------------------------|
|                      |     | Item     | Case size<br>φD × L<br>(mm) | Impedance (Ω) MAX. |                   | Rated<br>ripple<br>(mArms)<br>105°C / 100kHz | Case size<br>φD × L<br>(mm) | Impedance (Ω) MAX. |                   | Rated<br>ripple<br>(mArms)<br>105°C / 100kHz | Case size<br>φD × L<br>(mm) | Impedance (Ω) MAX. |                   | Rated<br>ripple<br>(mArms)<br>105°C / 100kHz |
|                      |     |          |                             | 20°C /<br>100kHz   | −10°C /<br>100kHz |                                              |                             | 20°C /<br>100kHz   | −10°C /<br>100kHz |                                              |                             | 20°C /<br>100kHz   | −10°C /<br>100kHz |                                              |
| 330                  | 331 |          |                             |                    |                   |                                              |                             |                    |                   |                                              | 8 × 11.5                    | 0.090              | 0.180             | 630                                          |
| 390                  | 391 |          |                             |                    |                   |                                              |                             |                    |                   |                                              | 8 × 11.5                    | 0.090              | 0.180             | 630                                          |
| 470                  | 471 |          |                             |                    |                   |                                              | 8 × 11.5                    | 0.090              | 0.180             | 630                                          | 10 × 12.5                   | 0.063              | 0.126             | 900                                          |
| 560                  | 561 |          | 8 × 11.5                    | 0.090              | 0.180             | 630                                          | 8 × 11.5                    | 0.090              | 0.180             | 630                                          |                             |                    |                   |                                              |
| 680                  | 681 |          | 8 × 11.5                    | 0.090              | 0.180             | 630                                          |                             |                    |                   |                                              | 8 × 15                      | 0.062              | 0.124             | 860                                          |
|                      |     |          |                             |                    |                   |                                              |                             |                    |                   |                                              | ▲10 × 12.5                  | 0.063              | 0.126             | 900                                          |
| 820                  | 821 |          |                             |                    |                   |                                              | 8 × 15                      | 0.062              | 0.124             | 860                                          | 8 × 20                      | 0.044              | 0.088             | 1220                                         |
|                      |     |          |                             |                    |                   |                                              | ▲10 × 12.5                  | 0.063              | 0.126             | 900                                          | ▲10 × 16                    | 0.049              | 0.098             | 1240                                         |
|                      |     |          |                             |                    |                   |                                              |                             |                    |                   |                                              |                             |                    |                   |                                              |
| 1000                 | 102 |          | 8 × 15                      | 0.062              | 0.124             | 860                                          | 8 × 20                      | 0.044              | 0.088             | 1220                                         | 10 × 16                     | 0.049              | 0.098             | 1240                                         |
|                      |     |          | ▲10 × 12.5                  | 0.063              | 0.126             | 900                                          | ▲10 × 12.5                  | 0.063              | 0.126             | 900                                          |                             |                    |                   |                                              |
|                      |     |          |                             |                    |                   |                                              | ●10 × 16                    | 0.049              | 0.098             | 1240                                         | ●10 × 20                    | 0.035              | 0.070             | 1490                                         |
| 1200                 | 122 |          | 10 × 12.5                   | 0.063              | 0.126             | 900                                          | 8 × 20                      | 0.044              | 0.088             | 1220                                         |                             |                    |                   |                                              |
|                      |     |          | ●10 × 16                    | 0.049              | 0.098             | 1240                                         | ▲10 × 16                    | 0.049              | 0.098             | 1240                                         | 10 × 20                     | 0.035              | 0.070             | 1490                                         |
|                      |     |          |                             |                    |                   |                                              |                             |                    |                   |                                              |                             |                    |                   |                                              |
| 1500                 | 152 |          | 8 × 20                      | 0.044              | 0.088             | 1220                                         |                             |                    |                   |                                              |                             |                    |                   |                                              |
|                      |     |          | ▲10 × 16                    | 0.049              | 0.098             | 1240                                         | 10 × 20                     | 0.035              | 0.070             | 1490                                         | 10 × 25                     | 0.033              | 0.066             | 1680                                         |
|                      |     |          | ●10 × 20                    | 0.035              | 0.070             | 1490                                         |                             |                    |                   |                                              |                             |                    |                   |                                              |
| 1800                 | 182 |          |                             |                    |                   |                                              | 10 × 20                     | 0.035              | 0.070             | 1490                                         |                             |                    |                   |                                              |
|                      |     |          |                             |                    |                   |                                              | ▲10 × 25                    | 0.033              | 0.066             | 1680                                         |                             |                    |                   |                                              |
| 2200                 | 222 |          | 10 × 20                     | 0.035              | 0.070             | 1490                                         | 10 × 25                     | 0.033              | 0.066             | 1680                                         | 12.5 × 20                   | 0.029              | 0.058             | 1890                                         |
|                      |     |          | ●10 × 25                    | 0.033              | 0.066             | 1680                                         | ●12.5 × 20                  | 0.029              | 0.058             | 1890                                         | ●12.5 × 25                  | 0.022              | 0.044             | 2280                                         |
| 2700                 | 272 |          | 10 × 25                     | 0.033              | 0.066             | 1680                                         | 12.5 × 20                   | 0.029              | 0.058             | 1890                                         | 12.5 × 25                   | 0.022              | 0.044             | 2280                                         |
| 3300                 | 332 |          | 12.5 × 20                   | 0.029              | 0.058             | 1890                                         | 12.5 × 25                   | 0.022              | 0.044             | 2280                                         | 12.5 × 31.5                 | 0.018              | 0.036             | 2720                                         |
|                      |     |          |                             |                    |                   |                                              |                             |                    |                   |                                              | ▲16 × 20                    | 0.026              | 0.052             | 2330                                         |
| 3900                 | 392 |          | 12.5 × 25                   | 0.022              | 0.044             | 2280                                         | 12.5 × 25                   | 0.022              | 0.044             | 2280                                         | 12.5 × 35.5                 | 0.016              | 0.032             | 2940                                         |
| 4700                 | 472 |          | 12.5 × 25                   | 0.022              | 0.044             | 2280                                         | 12.5 × 31.5                 | 0.018              | 0.036             | 2720                                         | 16 × 25                     | 0.019              | 0.038             | 2760                                         |
|                      |     |          |                             |                    |                   |                                              | ▲16 × 20                    | 0.026              | 0.052             | 2330                                         | ▲18 × 20                    | 0.025              | 0.050             | 2640                                         |
| 5600                 | 562 |          | 12.5 × 31.5                 | 0.018              | 0.036             | 2720                                         | 12.5 × 35.5                 | 0.016              | 0.032             | 2940                                         | 16 × 31.5                   | 0.017              | 0.035             | 2810                                         |
|                      |     |          | ▲16 × 20                    | 0.026              | 0.052             | 2330                                         |                             |                    |                   |                                              | ▲18 × 25                    | 0.018              | 0.036             | 2850                                         |
| 6800                 | 682 |          | 12.5 × 35.5                 | 0.016              | 0.032             | 2940                                         | 16 × 25                     | 0.019              | 0.038             | 2760                                         | 18 × 25                     | 0.018              | 0.036             | 2850                                         |
| 8200                 | 822 |          | 16 × 25                     | 0.019              | 0.038             | 2760                                         | 16 × 31.5                   | 0.017              | 0.034             | 2810                                         |                             |                    |                   |                                              |
|                      |     |          | ▲18 × 20                    | 0.025              | 0.050             | 2640                                         | ▲18 × 25                    | 0.018              | 0.036             | 2850                                         |                             |                    |                   |                                              |
| 10000                | 103 |          | 16 × 31.5                   | 0.017              | 0.034             | 2810                                         |                             |                    |                   |                                              |                             |                    |                   |                                              |
|                      |     |          | ▲18 × 25                    | 0.018              | 0.036             | 2850                                         |                             |                    |                   |                                              |                             |                    |                   |                                              |

| V (Code)<br><br>Cap.(μF)<br>Code |     | Item                    |                   | 25 (1E)                     |                    |                         | 35 (1V)                                      |                             |                    |     |
|----------------------------------|-----|-------------------------|-------------------|-----------------------------|--------------------|-------------------------|----------------------------------------------|-----------------------------|--------------------|-----|
|                                  |     |                         |                   | Case size<br>φD × L<br>(mm) | Impedance (Ω) MAX. |                         | Rated<br>ripple<br>(mArms)<br>105°C / 100kHz | Case size<br>φD × L<br>(mm) | Impedance (Ω) MAX. |     |
|                                  |     | 20°C /<br>100kHz        | −10°C /<br>100kHz |                             | 20°C /<br>100kHz   | −10°C /<br>100kHz       |                                              |                             |                    |     |
| 180                              | 181 |                         |                   |                             |                    |                         | 8 × 11.5                                     | 0.090                       | 0.180              | 630 |
| 270                              | 271 | 8 × 11.5                | 0.090             | 0.180                       | 630                | 8 × 15<br>▲10 × 12.5    | 0.062<br>0.063                               | 0.124<br>0.126              | 860<br>900         |     |
| 330                              | 331 | 8 × 11.5                | 0.090             | 0.180                       | 630                |                         |                                              |                             |                    |     |
| 390                              | 391 | 8 × 15                  | 0.062             | 0.124                       | 860                | 8 × 20<br>▲10 × 16      | 0.044<br>0.049                               | 0.088<br>0.098              | 1220<br>1240       |     |
| 470                              | 471 | 8 × 15<br>▲10 × 12.5    | 0.062<br>0.063    | 0.124<br>0.126              | 860<br>900         |                         |                                              |                             |                    |     |
| 560                              | 561 | 8 × 20<br>▲10 × 16      | 0.044<br>0.049    | 0.088<br>0.098              | 1220<br>1240       | 10 × 20                 | 0.035                                        | 0.070                       | 1490               |     |
| 680                              | 681 | 10 × 16                 | 0.049             | 0.098                       | 1240               | 10 × 25                 | 0.033                                        | 0.066                       | 1680               |     |
| 820                              | 821 | 10 × 20                 | 0.035             | 0.070                       | 1490               | 12.5 × 20               | 0.029                                        | 0.058                       | 1890               |     |
| 1000                             | 102 | 10 × 25<br>●12.5 × 20   | 0.033<br>0.029    | 0.066<br>0.058              | 1680<br>1890       | 12.5 × 20               | 0.029                                        | 0.058                       | 1890               |     |
| 1200                             | 122 | 12.5 × 20               | 0.029             | 0.058                       | 1890               | 12.5 × 25               | 0.022                                        | 0.044                       | 2280               |     |
| 1500                             | 152 |                         |                   |                             |                    | 12.5 × 31.5<br>▲16 × 20 | 0.018<br>0.026                               | 0.036<br>0.052              | 2720<br>2330       |     |
| 1800                             | 182 | 12.5 × 25               | 0.022             | 0.044                       | 2280               | 12.5 × 35.5<br>▲16 × 20 | 0.016<br>0.026                               | 0.032<br>0.052              | 2940<br>2330       |     |
| 2200                             | 222 | 12.5 × 31.5<br>▲16 × 20 | 0.018<br>0.026    | 0.036<br>0.052              | 2720<br>2330       | 16 × 25<br>▲18 × 20     | 0.019<br>0.025                               | 0.038<br>0.050              | 2760<br>2640       |     |
| 2700                             | 272 | 12.5 × 35.5             | 0.016             | 0.032                       | 2940               | 16 × 31.5<br>▲18 × 25   | 0.017<br>0.018                               | 0.035<br>0.036              | 2810<br>2850       |     |
| 3300                             | 332 | 16 × 25<br>▲18 × 20     | 0.019<br>0.025    | 0.038<br>0.050              | 2760<br>2640       | 18 × 31.5               | 0.016                                        | 0.032                       | 2910               |     |
| 4700                             | 472 | 18 × 25                 | 0.018             | 0.036                       | 2850               |                         |                                              |                             |                    |     |

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

● : In this case, [3] will be put at 12th digit of type numbering system.