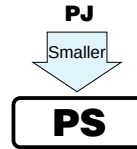


**PS** Miniature Sized, Low Impedance,  
For Switching Power Supplies  
series



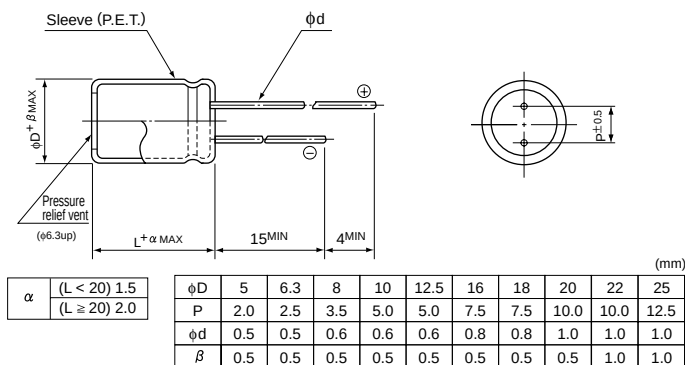
- Wide temperature range type, miniature sized.



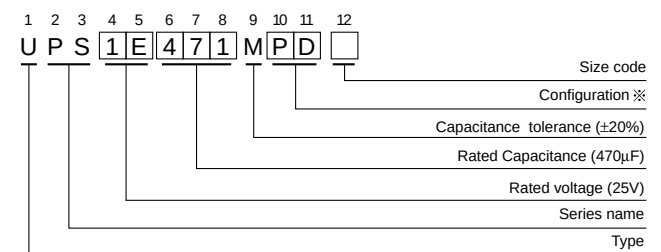
## Specifications

|                              |                                                                                                                                                                                                                                                        |                                                                                                                          |          |         |         |          |                    |                                                                                                |                                         |                                                                                    |      |      |  |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------|---------|---------|----------|--------------------|------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------|------|------|--|
| 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                                                                                                                                                                                                                                        | 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 leaving capacitors under no load at 105°C for 1000 hours, they 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 | Sn-Pb finished leadwire<br>PVC sleeve (containing Pb) |
|-----------|----------------------------------------|-------------------------------------------------------|
| 5         | DD                                     | DH                                                    |
| 6.3       | ED                                     | EH                                                    |
| 8 ~ 10    | PD                                     | PH                                                    |
| 12.5 ~ 18 | HD                                     | HH                                                    |
| 20 ~ 25   | RD                                     | RH                                                    |

※ Please contact to us if other configurations are required.

## 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 19, 20, 21 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) | Code | Item                     |                                   | Rated ripple (mA rms)<br>105°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Rated ripple (mA rms)<br>105°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Rated ripple (mA rms)<br>105°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Rated ripple (mA rms)<br>105°C 100kHz |
|           |      | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz |                                       |                          |                                   |                                       |                          |                                   |                                       |                          |                                   |                                       |
| 4.7       | 4R7  |                          |                                   |                                       |                          |                                   |                                       |                          |                                   |                                       | 5 × 11                   | 1.50                              | 160                                   |
| 10        | 100  |                          |                                   |                                       |                          |                                   |                                       |                          |                                   |                                       | 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) | Code | Item                     |                                   | Rated ripple (mA rms)<br>105°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Rated ripple (mA rms)<br>105°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Rated ripple (mA rms)<br>105°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Rated ripple (mA rms)<br>105°C 100kHz |
|           |      | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°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                                  |                          |                                   |                                       |                          |                                   |                                       |                          |                                   |                                       |

φD × L (mm)

| V         |      | 160                      |                                   | 200                      |                                   | 250                      |                                   | 315                      |                                   | 350                      |                                   | 400                      |                                   | 450                      |                                   |
|-----------|------|--------------------------|-----------------------------------|--------------------------|-----------------------------------|--------------------------|-----------------------------------|--------------------------|-----------------------------------|--------------------------|-----------------------------------|--------------------------|-----------------------------------|--------------------------|-----------------------------------|
| Cap. (μF) | Code | 2C                       |                                   | 2D                       |                                   | 2E                       |                                   | 2F                       |                                   | 2V                       |                                   | 2G                       |                                   | 2W                       |                                   |
|           |      | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz | Case size<br>φD × L (mm) | Impedance (Ω) MAX.<br>20°C 100kHz |
| 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                               | 18 × 40                  | 285                               | 20 × 40                  | 290                               | 22 × 50                  | 350                               | 25 × 50                  | 350                               |
| 220       | 221  | 18 × 35.5                | 500                               | 18 × 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 (mA rms) at 105°C 120Hz

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

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

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