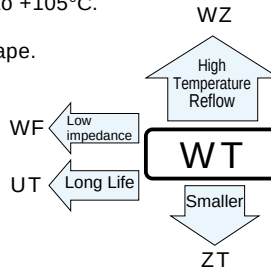


## WT series

Chip Type, Wide Temperature Range



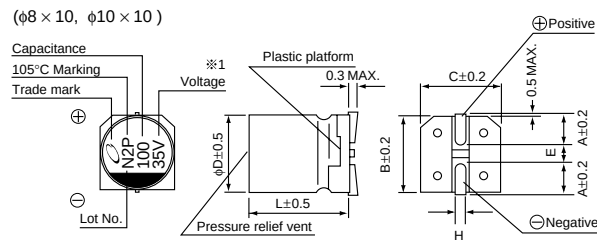
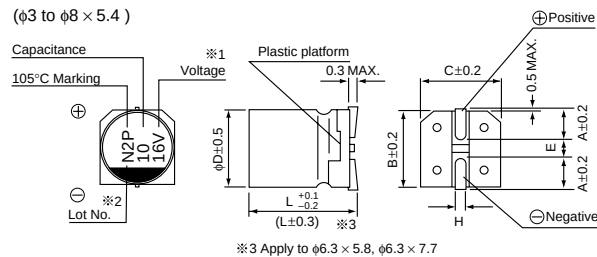
- Chip type operating over wide temperature range of to  $-55$  to  $+105^{\circ}\text{C}$ .
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine fed with carrier tape.
- Compliant to the RoHS directive (2002/95/EC).



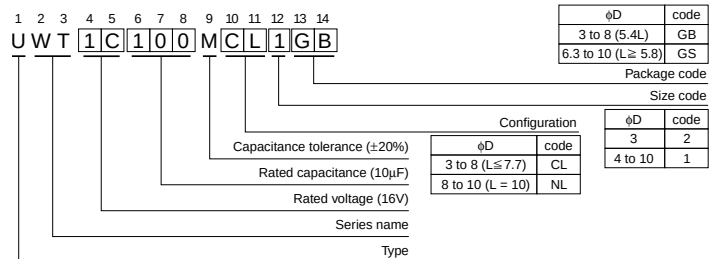
## Specifications

| Item                          | Performance Characteristics                                                                                                                                                                                                             |                 |      |      |                                                   |                                                                                                                                                                        |      |      |    |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------|------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|----|
| Category Temperature Range    | -55 to +105°C                                                                                                                                                                                                                           |                 |      |      |                                                   |                                                                                                                                                                        |      |      |    |
| Rated Voltage Range           | 4 to 50V                                                                                                                                                                                                                                |                 |      |      |                                                   |                                                                                                                                                                        |      |      |    |
| Rated Capacitance Range       | 0.1 to 1500μF                                                                                                                                                                                                                           |                 |      |      |                                                   |                                                                                                                                                                        |      |      |    |
| Capacitance Tolerance         | ±20% at 120Hz, 20°C                                                                                                                                                                                                                     |                 |      |      |                                                   |                                                                                                                                                                        |      |      |    |
| Leakage Current               | After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (μA) , whichever is greater.                                                                                                                |                 |      |      |                                                   |                                                                                                                                                                        |      |      |    |
| Tangent of loss angle (tan δ) | Measurement frequency : 120Hz, Temperature : 20°C                                                                                                                                                                                       |                 |      |      |                                                   |                                                                                                                                                                        |      |      |    |
|                               | Rated voltage (V)                                                                                                                                                                                                                       | 4               | 6.3  | 10   | 16                                                | 25                                                                                                                                                                     | 35   | 50   |    |
|                               | tan δ (MAX.)                                                                                                                                                                                                                            | 0.40            | 0.30 | 0.24 | 0.20                                              | 0.16                                                                                                                                                                   | 0.14 | 0.14 |    |
| Stability at Low Temperature  | Measurement frequency : 120Hz                                                                                                                                                                                                           |                 |      |      |                                                   |                                                                                                                                                                        |      |      |    |
|                               | Rated voltage (V)                                                                                                                                                                                                                       |                 | 4    | 6.3  | 10                                                | 16                                                                                                                                                                     | 25   | 35   | 50 |
|                               | Impedance ratio                                                                                                                                                                                                                         | Z-25°C / Z+20°C | 7    | 4    | 3                                                 | 2                                                                                                                                                                      | 2    | 2    | 2  |
|                               | ZT / Z20 (MAX.)                                                                                                                                                                                                                         | Z-40°C / Z+20°C | 15   | 8    | 8                                                 | 4                                                                                                                                                                      | 4    | 3    | 3  |
| Endurance                     | The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 105°C.                                                                                    |                 |      |      | Capacitance change                                | Within ±25% of the initial capacitance value for capacitors of φ3mm unit, and 16V or less. Within ±20% of the initial capacitance value for capacitors of 25V or more. |      |      |    |
|                               |                                                                                                                                                                                                                                         |                 |      |      | 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. |                 |      |      |                                                   |                                                                                                                                                                        |      |      |    |
| Resistance to soldering heat  | The capacitors are kept on a hot plate for 30 seconds, which is maintained at 250°C. The capacitors shall meet the characteristic requirements listed at right when they are removed from the plate and restored to 20°C.               |                 |      |      | Capacitance change                                | Within ±10% of the initial capacitance value                                                                                                                           |      |      |    |
| tan δ                         |                                                                                                                                                                                                                                         |                 |      |      | Less than or equal to the initial specified value |                                                                                                                                                                        |      |      |    |
| Leakage current               |                                                                                                                                                                                                                                         |                 |      |      | Less than or equal to the initial specified value |                                                                                                                                                                        |      |      |    |
| Marking                       | Black print on the case top.                                                                                                                                                                                                            |                 |      |      |                                                   |                                                                                                                                                                        |      |      |    |

## Chip Type



## Type numbering system (Example : 16V 10 $\mu\text{F}$ )



|        | (mm)       |            |            |            |            |            |            |            |            |
|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| φD × L | 3 × 5.4    | 4 × 5.4    | 5 × 5.4    | 6.3 × 5.4  | 6.3 × 5.8  | 6.3 × 7.7  | 8 × 5.4    | 8 × 10     | 10 × 10    |
| A      | 1.5        | 1.8        | 2.1        | 2.4        | 2.4        | 2.4        | 3.3        | 2.9        | 3.2        |
| B      | 3.3        | 4.3        | 5.3        | 6.6        | 6.6        | 6.6        | 8.3        | 8.3        | 10.3       |
| C      | 3.3        | 4.3        | 5.3        | 6.6        | 6.6        | 6.6        | 8.3        | 8.3        | 10.3       |
| E      | 0.8        | 1.0        | 1.3        | 2.2        | 2.2        | 2.2        | 2.3        | 3.1        | 4.5        |
| L      | 5.4        | 5.4        | 5.4        | 5.4        | 5.8        | 7.7        | 5.4        | 10         | 10         |
| H      | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8 | 0.8 to 1.1 | 0.8 to 1.1 |

## ■Dimensions

| Cap. (μF) | V   | Code    | 4        |         | 6.3      |         | 10  |         | 16        |         | 25        |         | 35      |         | 50                        |                 |
|-----------|-----|---------|----------|---------|----------|---------|-----|---------|-----------|---------|-----------|---------|---------|---------|---------------------------|-----------------|
|           |     |         | 0G       |         | 0J       |         | 1A  |         | 1C        |         | 1E        |         | 1V      |         | 1H                        |                 |
| 0.1       | 0R1 |         |          |         |          |         |     |         |           |         |           |         |         |         | 4×5.4 (3)                 | 1.0             |
| 0.22      | R22 |         |          |         |          |         |     |         |           |         |           |         |         |         | 4×5.4 (3)                 | 2.6             |
| 0.33      | R33 |         |          |         |          |         |     |         |           |         |           |         |         |         | 4×5.4 (3)                 | 3.2             |
| 0.47      | R47 |         |          |         |          |         |     |         |           |         |           |         |         |         | 4×5.4 (3)                 | 3.8             |
| 1         | 010 |         |          |         |          |         |     |         |           |         |           |         |         |         | 4×5.4 (3)                 | 6.3 (5.9)       |
| 2.2       | 2R2 |         |          |         |          |         |     |         |           |         |           |         | 3×5.4   | 7.5     | 4×5.4 (3)                 | 11 (9)          |
| 3.3       | 3R3 |         |          |         |          |         |     |         |           |         |           |         | 3×5.4   | 9       | 4×5.4                     | 14              |
| 4.7       | 4R7 |         |          |         |          |         |     |         |           |         | 4×5.4 (3) | 13 (10) | 4×5.4   | 15      | 5×5.4                     | 19              |
| 10        | 100 |         |          |         |          |         |     |         | 4×5.4 (3) | 18 (14) | 5×5.4     | 23      | 5×5.4   | 25      | 6.3×5.4                   | 30              |
| 22        | 220 | 4×5.4   | 22       | 4×5.4   | 22       | 5×5.4   | 27  | 5×5.4   | 30        | 6.3×5.4 | 38        | 6.3×5.4 | 42      | ● 8×5.4 | 51 (45)                   |                 |
| 33        | 330 | 5×5.4   | 30       | 5×5.4   | 30       | 5×5.4   | 35  | 6.3×5.4 | 40        | 6.3×5.4 | 48        | ● 8×5.4 | 59 (52) | 6.3×7.7 | 60                        |                 |
| 47        | 470 | 5×5.4   | 36       | 5×5.4   | 36       | 6.3×5.4 | 46  | 6.3×5.4 | 50        | ● 8×5.4 | 66 (59)   | 6.3×5.8 | 63      | 6.3×7.7 | 63                        |                 |
| 100       | 101 | 6.3×5.4 | 60       | 6.3×5.4 | 60       | 6.3×5.4 | 60  | 6.3×5.4 | 60        | 6.3×7.7 | 91        | 6.3×7.7 | 84      | 8×10    | 140                       |                 |
| 150       | 151 | 6.3×5.8 | 86       | 6.3×5.8 | 86       | 6.3×5.8 | 86  | 6.3×7.7 | 95        | 8×10    | 140       | 8×10    | 155     | 10×10   | 180                       |                 |
| 220       | 221 | ● 8×5.4 | 102 (91) | ● 8×5.4 | 102 (91) | 6.3×7.7 | 105 | 6.3×7.7 | 105       | 8×10    | 155       | 8×10    | 190     | 10×10   | 220                       |                 |
| 330       | 331 | 6.3×7.7 | 105      | 6.3×7.7 | 105      | 8×10    | 195 | 8×10    | 195       | 8×10    | 190       | 10×10   | 300     |         |                           |                 |
| 470       | 471 | 8×10    | 210      | 8×10    | 210      | 8×10    | 210 | 8×10    | 230       | 10×10   | 300       |         |         |         |                           |                 |
| 680       | 681 | 8×10    | 210      | 8×10    | 210      | 10×10   | 310 | 10×10   | 310       |         |           |         |         |         |                           |                 |
| 1000      | 102 | 8×10    | 230      | 8×10    | 230      | 10×10   | 310 |         |           |         |           |         |         |         |                           |                 |
| 1500      | 152 | 10×10   | 310      | 10×10   | 310      |         |     |         |           |         |           |         |         |         | Case size<br>φ D × L (mm) | Rated<br>ripple |

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

( ) is also available with φ3mm upon request. In such a case, [2] will be put at 12th digit of type numbering system.

Size φ6.3×5.8 is available for capacitors marked. "●". In such a case, [6] will be put at 12th digit of type numbering system.

## ●Frequency coefficient of rated ripple current

| Frequency   | 50 Hz | 120 Hz | 300 Hz | 1 kHz | 10 kHz or more |
|-------------|-------|--------|--------|-------|----------------|
| Coefficient | 0.70  | 1.00   | 1.17   | 1.36  | 1.50           |

- Taping specifications are given in page 23.
- Recommended land size, soldering by reflow are given in page 18, 19.
- Please select UX(p.98), UJ(p.102) series if high C/V products are required.
- Please refer to page 3 for the minimum order quantity.