

UUG

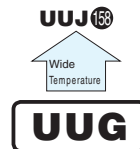
Chip Type, Higher Capacitance Range



For SMD

Anti-Solvent  
Feature  
(Through  
100V only)

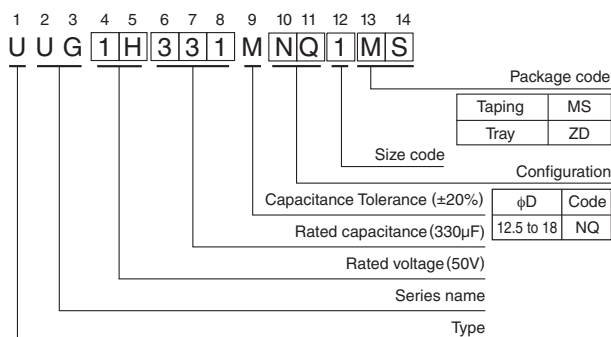
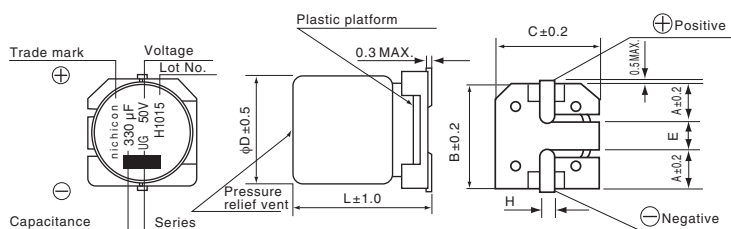
- Chip Type, higher capacitance in larger case sizes ( $\phi 12.5$ ,  $\phi 16$ ,  $\phi 18$ )
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine fed with carrier tape and tray.
- Compliant to the RoHS directive (2011/65/EU).



## Specifications

|                                                                             |                                                                                                                                                                                                                                        |                 |                                                                                                                         |      |      |                    |      |                                                   |                                       |            |            |         |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------|------|------|--------------------|------|---------------------------------------------------|---------------------------------------|------------|------------|---------|
| Item                                                                        | Performance Characteristics                                                                                                                                                                                                            |                 |                                                                                                                         |      |      |                    |      |                                                   |                                       |            |            |         |
| Category Temperature Range                                                  | -40 to +85°C                                                                                                                                                                                                                           |                 |                                                                                                                         |      |      |                    |      |                                                   |                                       |            |            |         |
| Rated Voltage Range                                                         | 6.3 to 450V                                                                                                                                                                                                                            |                 |                                                                                                                         |      |      |                    |      |                                                   |                                       |            |            |         |
| Rated Capacitance Range                                                     | 4.7 to 10000μF                                                                                                                                                                                                                         |                 |                                                                                                                         |      |      |                    |      |                                                   |                                       |            |            |         |
| Capacitance Tolerance                                                       | ±20% at 120Hz, 20°C                                                                                                                                                                                                                    |                 |                                                                                                                         |      |      |                    |      |                                                   |                                       |            |            |         |
| Leakage Current                                                             | Rated voltage (V)                                                                                                                                                                                                                      |                 | 6.3 to 100                                                                                                              |      |      |                    |      |                                                   | 160 to 450                            |            |            |         |
|                                                                             | —                                                                                                                                                                                                                                      |                 | After 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4 (μA), whichever is greater. |      |      |                    |      |                                                   | I = 0.04CV+100 (μA) max. (1 minute's) |            |            |         |
| Tangent of loss angle (tan δ)                                               | Measurement frequency : 120Hz at 20°C                                                                                                                                                                                                  |                 |                                                                                                                         |      |      |                    |      |                                                   |                                       |            |            |         |
|                                                                             | Rated voltage (V)                                                                                                                                                                                                                      | 6.3             | 10                                                                                                                      | 16   | 25   | 35                 | 50   | 63                                                | 100                                   | 160 to 250 | 400・450    |         |
|                                                                             | tan δ (MAX.)                                                                                                                                                                                                                           | 0.28            | 0.24                                                                                                                    | 0.20 | 0.16 | 0.14               | 0.12 | 0.10                                              | 0.08                                  | 0.20       | 0.25       |         |
| For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF. |                                                                                                                                                                                                                                        |                 |                                                                                                                         |      |      |                    |      |                                                   |                                       |            |            |         |
| Stability at Low Temperature                                                | Measurement frequency: 120Hz                                                                                                                                                                                                           |                 |                                                                                                                         |      |      |                    |      |                                                   |                                       |            |            |         |
|                                                                             | Rated voltage (V)                                                                                                                                                                                                                      |                 | 6.3                                                                                                                     | 10   | 16   | 25                 | 35   | 50                                                | 63                                    | 100        | 160 to 250 | 400・450 |
|                                                                             | Impedance ratio ZT / Z20 (MAX.)                                                                                                                                                                                                        | Z-25°C / Z+20°C | 5                                                                                                                       | 4    | 3    | 2                  | 2    | 2                                                 | 2                                     | 2          | 3          | 6       |
|                                                                             |                                                                                                                                                                                                                                        | Z-40°C / Z+20°C | 12                                                                                                                      | 10   | 8    | 5                  | 4    | 3                                                 | 3                                     | 3          | 6          | 10      |
| Endurance                                                                   | The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C.                                                                                    |                 |                                                                                                                         |      |      | Capacitance change |      | Within ±20% of the initial capacitance value      |                                       |            |            |         |
|                                                                             |                                                                                                                                                                                                                                        |                 |                                                                                                                         |      |      | tan δ              |      | 200% or less than the initial specified value     |                                       |            |            |         |
|                                                                             |                                                                                                                                                                                                                                        |                 |                                                                                                                         |      |      | Leakage current    |      | Less than or equal to the initial specified value |                                       |            |            |         |
| Shelf Life                                                                  | After storing the capacitors under no load at 85°C for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they shall meet the specified values for the endurance characteristics listed above. |                 |                                                                                                                         |      |      |                    |      |                                                   |                                       |            |            |         |
| Marking                                                                     | Black print on the case top.                                                                                                                                                                                                           |                 |                                                                                                                         |      |      |                    |      |                                                   |                                       |            |            |         |

## Chip Type

Type numbering system (Example : 50V 330 $\mu$ F)

|    | (mm)       |            |            |            |            |            |            |
|----|------------|------------|------------|------------|------------|------------|------------|
| φD | 12.5×13.5  | 12.5×16    | 12.5×21    | 16×16.5    | 16×21.5    | 18×16.5    | 18×21.5    |
| A  | 4.8        | 4.8        | 4.8        | 5.4        | 5.4        | 6.4        | 6.4        |
| B  | 13.6       | 13.6       | 13.6       | 17.1       | 17.1       | 19.1       | 19.1       |
| C  | 13.6       | 13.6       | 13.6       | 17.1       | 17.1       | 19.1       | 19.1       |
| E  | 4.0        | 4.0        | 4.0        | 6.3        | 6.3        | 6.3        | 6.3        |
| L  | 13.5       | 16.0       | 21.0       | 16.5       | 21.5       | 16.5       | 21.5       |
| H  | 1.0 to 1.4 | 1.0 to 1.4 | 1.0 to 1.4 | 1.0 to 1.4 | 1.0 to 1.4 | 1.0 to 1.4 | 1.0 to 1.4 |

※ The vibration structure-resistant product is also available upon request, please ask for details.

● Dimension table in next page.



## ■ Dimensions

| V                  |      | 6.3         |      | 10          |      | 16          |      | 25          |      | 35          |      | 50          |      |
|--------------------|------|-------------|------|-------------|------|-------------|------|-------------|------|-------------|------|-------------|------|
| ( $\mu$ F)<br>Cap. | Code | 0J          |      | 1A          |      | 1C          |      | 1E          |      | 1V          |      | 1H          |      |
| 220                | 221  |             |      |             |      |             |      |             |      |             |      | 12.5 × 13.5 | 450  |
| 330                | 331  |             |      |             |      |             |      |             |      |             |      | 12.5 × 13.5 | 520  |
| 470                | 471  |             |      |             |      |             |      | 12.5 × 13.5 | 550  | 12.5 × 13.5 | 580  | ● 16 × 16.5 | 740  |
| 1000               | 102  |             |      | 12.5 × 13.5 | 620  | 12.5 × 13.5 | 710  | 12.5 × 16   | 820  | ● 16 × 16.5 | 1000 | 18 × 21.5   | 1150 |
| 2200               | 222  | 12.5 × 16   | 890  | 12.5 × 16   | 960  | ● 16 × 16.5 | 1150 | △ 18 × 16.5 | 1350 | 18 × 21.5   | 1550 |             |      |
| 3300               | 332  | ● 16 × 16.5 | 1200 | 16 × 16.5   | 1300 | △ 18 × 16.5 | 1450 | 18 × 21.5   | 1700 |             |      |             |      |
| 4700               | 472  | 16 × 16.5   | 1400 | △ 18 × 16.5 | 1500 | 18 × 21.5   | 1750 |             |      |             |      |             |      |
| 6800               | 682  | △ 18 × 16.5 | 1650 | 18 × 21.5   | 1850 |             |      |             |      |             |      |             |      |
| 10000              | 103  | 18 × 21.5   | 2000 | □ 18 × 21.5 | 2200 |             |      |             |      |             |      |             |      |

| V                  |      | 63          |     | 100         |     | 160         |     | 200         |     | 250         |     | 400         |     | 450                      |                 |
|--------------------|------|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|--------------------------|-----------------|
| ( $\mu$ F)<br>Cap. | Code | 1J          |     | 2A          |     | 2C          |     | 2D          |     | 2E          |     | 2G          |     | 2W                       |                 |
| 4.7                | 4R7  |             |     |             |     |             |     |             |     |             |     | 12.5 × 13.5 | 115 | 12.5 × 13.5              | 115             |
| 10                 | 100  |             |     |             |     |             |     |             |     | 12.5 × 13.5 | 150 | ● 16 × 16.5 | 140 | ● 16 × 16.5              | 140             |
| 22                 | 220  |             |     |             |     |             |     | 12.5 × 13.5 | 235 | 12.5 × 16   | 240 | △ 18 × 16.5 | 280 | 16 × 21.5                | 275             |
| 33                 | 330  |             |     |             |     |             |     | 12.5 × 16   | 310 | ● 16 × 16.5 | 340 | 18 × 21.5   | 350 | 18 × 21.5                | 345             |
| 47                 | 470  |             |     |             |     | 12.5 × 16   | 370 | ● 16 × 16.5 | 415 | △ 18 × 16.5 | 415 | □ 18 × 21.5 | 430 |                          |                 |
| 68                 | 680  |             |     | 12.5 × 13.5 | 350 | ● 16 × 16.5 | 500 | △ 18 × 16.5 | 505 | 18 × 21.5   | 490 |             |     |                          |                 |
| 100                | 101  | 12.5 × 13.5 | 370 | 12.5 × 16   | 440 | △ 18 × 16.5 | 590 | 18 × 21.5   | 590 |             |     |             |     |                          |                 |
| 220                | 221  | 12.5 × 16   | 580 | △ 18 × 16.5 | 665 |             |     |             |     |             |     |             |     |                          |                 |
| 330                | 331  | ● 16 × 16.5 | 680 | 18 × 21.5   | 825 |             |     |             |     |             |     |             |     |                          |                 |
| 470                | 471  | △ 18 × 16.5 | 850 |             |     |             |     |             |     |             |     |             |     | Case size<br>φD × L (mm) | Rated<br>ripple |

Size φ12.5×21 is available for capacitors marked, "●".

Size φ16×21.5L is available for capacitors marked, "△".

Size φ18×21.5L is available for capacitors marked, "□".

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

Rated ripple current (mArms) at 85°C 120Hz

## ● Frequency coefficient of rated ripple current

| V          | Cap. ( $\mu$ F) | Frequency     | 50Hz | 120Hz | 300Hz | 1kHz | 10kHz or more |
|------------|-----------------|---------------|------|-------|-------|------|---------------|
| 6.3 to 100 | 68              |               | 0.75 | 1.00  | 1.35  | 1.57 | 2.00          |
|            |                 | 100 to 470    | 0.80 | 1.00  | 1.23  | 1.34 | 1.50          |
|            |                 | 1000 to 10000 | 0.85 | 1.00  | 1.10  | 1.13 | 1.15          |
| 160 to 450 | 4.7 to 100      |               | 0.80 | 1.00  | 1.25  | 1.40 | 1.60          |

- Taping specifications are given in page 23.
- Recommended land size, soldering by reflow are given in page 18, 19.
- Please refer to page 3 for the minimum order quantity.