

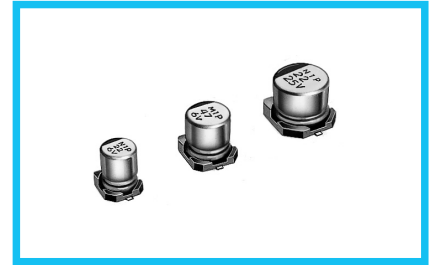
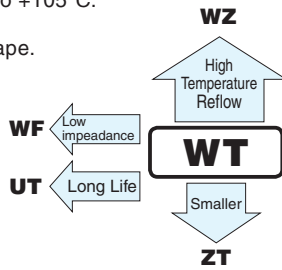
# ALUMINUM ELECTROLYTIC CAPACITORS

## WT series

Chip Type, Wide Temperature Range



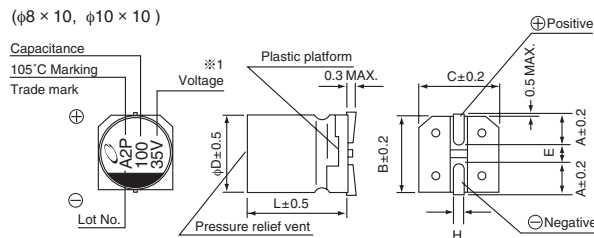
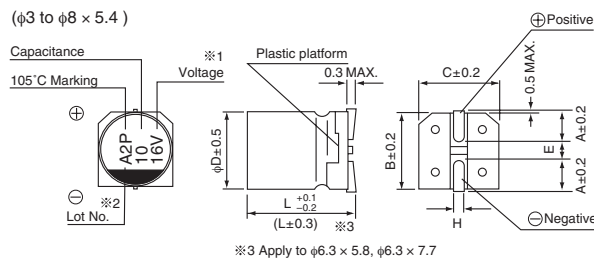
- Chip type operating over wide temperature range of to  $-55$  to  $+105^{\circ}\text{C}$ .
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine fed with carrier tape.
- Compliant to the RoHS directive (2011/65/EU).



### Specifications

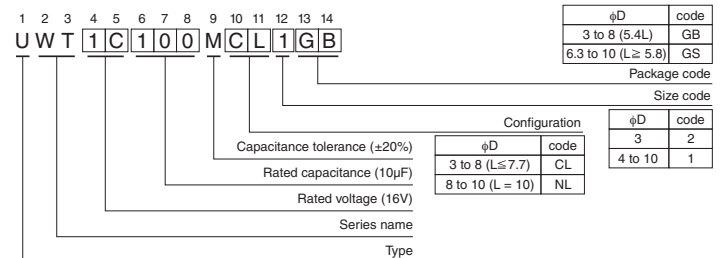
Item	Performance Characteristics																																							
Category Temperature Range	$-55$ to $+105^{\circ}\text{C}$																																							
Rated Voltage Range	4 to 50V																																							
Rated Capacitance Range	0.1 to $1500\mu\text{F}$																																							
Capacitance Tolerance	$\pm 20\%$ at 120Hz, $20^{\circ}\text{C}$																																							
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than $0.01\text{CV}$ or $3(\mu\text{A})$ , whichever is greater.																																							
Tangent of loss angle (tan $\delta$ )	<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>tan <math>\delta</math> (MAX.)</td> <td>0.40</td> <td>0.30</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.14</td> </tr> </tbody> </table> <p>Measurement frequency : 120Hz at <math>20^{\circ}\text{C}</math></p>		Rated voltage (V)	4	6.3	10	16	25	35	50	tan $\delta$ (MAX.)	0.40	0.30	0.24	0.20	0.16	0.14	0.14																						
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Stability at Low Temperature	<table border="1"> <thead> <tr> <th rowspan="2">Impedance ratio ZT / Z20 (MAX.)</th> <th colspan="8">Measurement frequency : 120Hz</th> </tr> <tr> <th colspan="2">Rated voltage (V)</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td></td> <td colspan="2">Z-<math>25^{\circ}\text{C}</math> / Z+<math>20^{\circ}\text{C}</math></td> <td>7</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td></td> <td colspan="2">Z-<math>40^{\circ}\text{C}</math> / Z+<math>20^{\circ}\text{C}</math></td> <td>15</td> <td>8</td> <td>8</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> </tr> </tbody> </table>		Impedance ratio ZT / Z20 (MAX.)	Measurement frequency : 120Hz								Rated voltage (V)		4	6.3	10	16	25	35	50		Z- $25^{\circ}\text{C}$ / Z+ $20^{\circ}\text{C}$		7	4	3	2	2	2	2		Z- $40^{\circ}\text{C}$ / Z+ $20^{\circ}\text{C}$		15	8	8	4	4	3	3
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Endurance	The specifications listed at right shall be met when the capacitors are restored to $20^{\circ}\text{C}$ after the rated voltage is applied for 1000 hours at $105^{\circ}\text{C}$ .	<table border="1"> <tbody> <tr> <td>Capacitance change</td> <td>Within <math>\pm 25\%</math> of the initial capacitance value for capacitors of <math>\phi 3\text{mm}</math> unit, and 16V or less. Within <math>\pm 20\%</math> of the initial capacitance value for capacitors of 25V or more.</td> </tr> <tr> <td>tan <math>\delta</math></td> <td>200% or less than the initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>Less than or equal to the initial specified value</td> </tr> </tbody> </table>	Capacitance change	Within $\pm 25\%$ of the initial capacitance value for capacitors of $\phi 3\text{mm}$ unit, and 16V or less. Within $\pm 20\%$ of the initial capacitance value for capacitors of 25V or more.	tan $\delta$	200% or less than the initial specified value	Leakage current	Less than or equal to the initial specified value																																
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Shelf Life	After storing the capacitors under no load at $105^{\circ}\text{C}$ for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at $20^{\circ}\text{C}$ , 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 $250^{\circ}\text{C}$ . The capacitors shall meet the characteristic requirements listed at right when they are removed from the plate and restored to $20^{\circ}\text{C}$ .	<table border="1"> <tbody> <tr> <td>Capacitance change</td> <td>Within <math>\pm 10\%</math> of the initial capacitance value</td> </tr> <tr> <td>tan <math>\delta</math></td> <td>Less than or equal to the initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>Less than or equal to the initial specified value</td> </tr> </tbody> </table>	Capacitance change	Within $\pm 10\%$ of the initial capacitance value	tan $\delta$	Less than or equal to the initial specified value	Leakage current	Less than or equal to the initial specified value																																
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Marking	Black print on the case top.																																							

### Chip Type



※1. Voltage mark for 6.3V is 「6V」. In case of marking for  $\phi 3$  units, "V" for rated voltage is omitted.  
 ※2. In case of marking for  $\phi 3$  units. Lot No is expressed by a digit (month code).

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



$\phi D \times L$	3 $\times$ 5.4	4 $\times$ 5.4	5 $\times$ 5.4	6.3 $\times$ 5.4	6.3 $\times$ 5.8	6.3 $\times$ 7.7	8 $\times$ 5.4	8 $\times$ 10	10 $\times$ 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

(mm)

● Dimension table in next page.

## ■ Dimensions

Cap. (μF)	Code	V		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		• 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										Case size	
1500	152	10 × 10	310	10 × 10	310												φ D × L (mm)	

Rated ripple current (mArms) 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.154), UJ(p.160) series if high C/V products are required.
- Please refer to page 3 for the minimum order quantity.