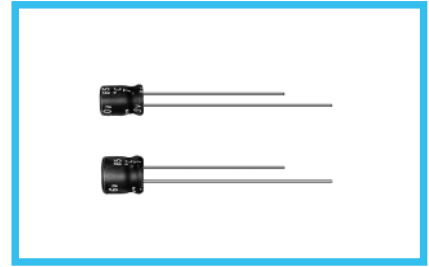
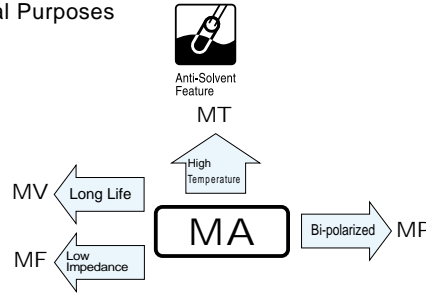


# ALUMINUM ELECTROLYTIC CAPACITORS



**MA** series 5mmL, Standard, For General Purposes

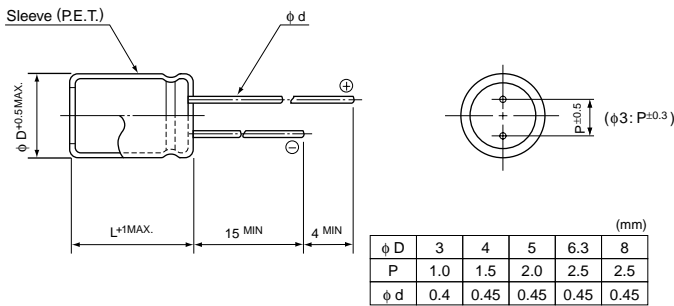
- Standard series with 5mm height.
- Compliant to the RoHS directive (2011/65/EU).



## Specifications

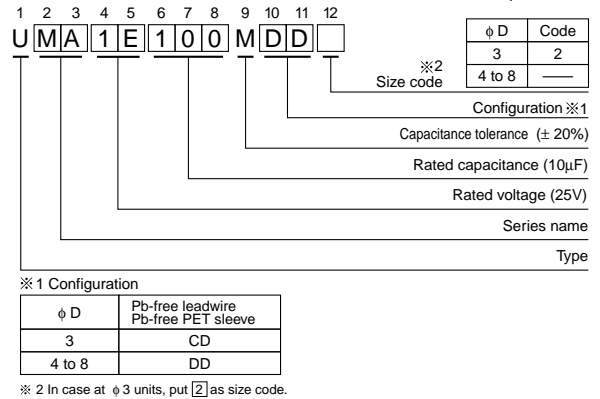
Item	Performance Characteristics																							
Category Temperature Range	-40 to +85°C																							
Rated Voltage Range	4 to 50V																							
Rated Capacitance Range	0.1 to 470μF																							
Rated Capacitance Tolerance	±20% at 120Hz, 20°C																							
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 at 20°C																							
	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>4</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td rowspan="2">Figures in ( ) are for MR series.</td> </tr> <tr> <td>tan δ (MAX.)</td> <td>0.35</td> <td>0.24 (0.30)</td> <td>0.20 (0.24)</td> <td>0.16 (0.20)</td> <td>0.14 (0.18)</td> <td>0.12 (0.16)</td> <td>0.10 (0.13)</td> </tr> </table>	Rated voltage (V)	4	6.3	10	16	25	35	50	Figures in ( ) are for MR series.	tan δ (MAX.)	0.35	0.24 (0.30)	0.20 (0.24)	0.16 (0.20)	0.14 (0.18)	0.12 (0.16)	0.10 (0.13)						
Rated voltage (V)	4	6.3	10	16	25	35	50	Figures in ( ) are for MR series.																
tan δ (MAX.)	0.35	0.24 (0.30)	0.20 (0.24)	0.16 (0.20)	0.14 (0.18)	0.12 (0.16)	0.10 (0.13)																	
Stability at Low Temperature	Measurement frequency : 120Hz																							
	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>4</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>Impedance ratio</td> <td>Z-25°C / Z+20°C</td> <td>7</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>ZT / Z20 (MAX.)</td> <td>Z-40°C / Z+20°C</td> <td>15</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> </tr> </table>	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	ZT / Z20 (MAX.)	Z-40°C / Z+20°C	15	8	6	4	4
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																	
ZT / Z20 (MAX.)	Z-40°C / Z+20°C	15	8	6	4	4	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 2000 hours at 85°C.																							
	Capacitance change	Within ±20% of the initial capacitance value (MR series & φ3 product : Within ±25%)																						
	tan δ	200% or less than 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.																							
	Leakage current	Less than or equal to the initial specified value																						
Marking	Printed with white color letter on black sleeve.																							

## Radial Lead Type



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

## Type numbering system (Example : 25V 10μF)



## Dimensions

Cap. (μF)	Code	4		6.3		10		16		25		35		50		
		0G		0J		1A		1C		1E		1V		1H		
0.1	0R1													4×5(3×5)	1.0(1.0)	
0.22	R22													4×5(3×5)	2.0(2.0)	
0.33	R33													4×5(3×5)	2.8(2.8)	
0.47	R47													4×5(3×5)	4.0(4.0)	
1	010													4×5(3×5)	8.4(8.0)	
2.2	2R2											3×5	8.4	• 4×5	13(10)	
3.3	3R3										3×5	10	• 4×5	15(10)	4×5	17
4.7	4R7										• 4×5	16(12)	4×5	18	5×5	20
10	100			3×5	15			• 4×5	23(18)	5×5	27	5×5	29	6.3×5	33	
22	220	3×5	19	• 4×5	28(21)	5×5	33	5×5	37	6.3×5	42	6.3×5	46	□ 8×5	52(48)	
33	330	4×5	28	5×5	37	5×5	41	○ 6.3×5	49(43)	6.3×5	52	□ 8×5	62(52)	8×5	71	
47	470	4×5	33	5×5	45	○ 6.3×5	52(43)	6.3×5	58	□ 8×5	70(62)	8×5	80			
100	101	5×5	56	○ 6.3×5	70(68)	□ 8×5	80(76)	□ 8×5	92(86)	8×5	110					
220	221	6.3×5	96	□ 8×5	110(90)	8×5	135									
330	331	8×5	145	8×5	170											
470	471	8×5	185													
														Case size φD×L (mm)	Rated ripple	

Size φ3×5 is available for capacitors marked. "•"/ Size φ5×5 is available for capacitors marked. "○"  
Size φ6.3×5 is available for capacitors marked. "□" In such a case, [M][R] will be put at 2nd and 3rd digit of type numbering system.

Rated ripple current (mArms) at 85°C 120Hz  
( ) = φ3 units and MR series.

## 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

Please refer to page 20, 21, 22 about the formed or taped product spec.  
Please refer to page 4 for the minimum order quantity.

CAT.8100C