

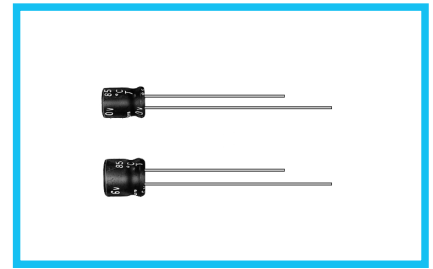
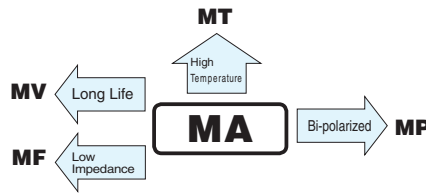
ALUMINUM ELECTROLYTIC CAPACITORS

MA series 5mmL, Standard, For General Purposes



Anti-Solvent Feature

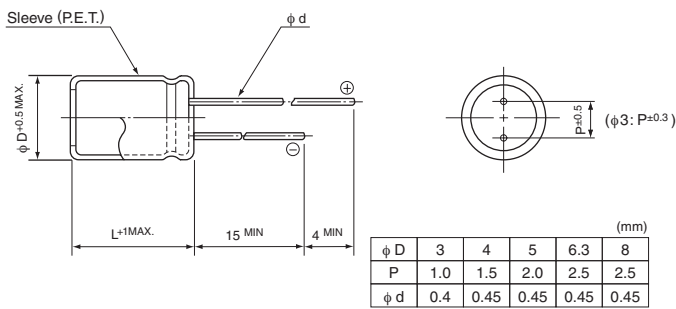
- Standard series with 5mm height.
- Compliant to the RoHS directive (2011/65/EU).



Specifications

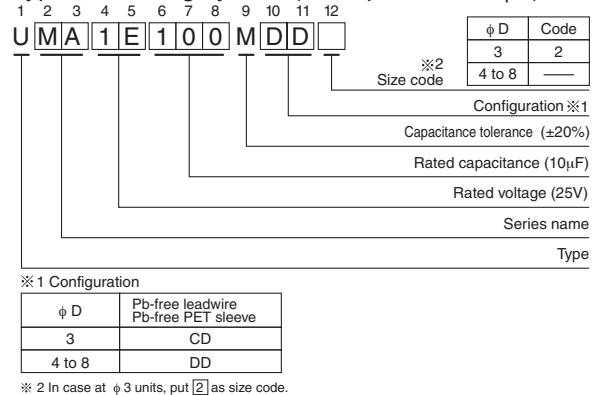
| Item | Performance Characteristics | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------|---|--------------------|---|-------------|---|-----------------|---|----|----|---------------------------------|------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------|-----------------|----|---|---|---|---|
| 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 at 20°C, 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> </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> Figures in () are for MR series. | Rated voltage (V) | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | 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 | | | | | | | | | | | | | | | | | |
| 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 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> <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 | 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 | 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. <table border="1"> <tr> <td>Capacitance change</td> <td>Within ±20% of the initial capacitance value (MR series & φ3 product : Within ±25%)</td> </tr> <tr> <td>tan δ</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> </table> | 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 | Leakage current | Less than or equal to the initial specified value | | | | | | | | | | | | | | | | | |
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| 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 | 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 | 10kHz 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.