

## Aluminum Electrolytic Capacitor

# MD series

- Miniature, Low impedance, 105°C product.
- Applicable to small electronic devices.
- Height: 7 mm.
- RoHS Compliance
- 105°C 低阻抗、小型化產品。
- 適用於小型電子設備。
- 高度：7mm系列。

### SPECIFICATIONS

| Items 項目                                                               | Characteristics 特性                                                                                                                                                                                                                                                                  |                                         |      |      |      |      |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------|------|------|------|
| Capacitance Tolerance<br>靜電容量誤差                                        | ± 20%(120Hz,20°C)                                                                                                                                                                                                                                                                   |                                         |      |      |      |      |
| Operating Temperature Range<br>適用溫度範圍                                  | -40 ~ +105°C                                                                                                                                                                                                                                                                        |                                         |      |      |      |      |
| Rated Voltage Range<br>額定電壓範圍                                          | 6.3 ~ 35VDC                                                                                                                                                                                                                                                                         |                                         |      |      |      |      |
| Leakage Current<br>洩漏電流                                                | I ≤ 0.01CV or 3 (μA) which is greater.( After 2 minutes application of DC rated voltage, at 20 °C)                                                                                                                                                                                  |                                         |      |      |      |      |
| Dissipation Factor<br>散逸因素(tan δ)                                      | Measurement Frequency: 120Hz. Temperature: 20°C                                                                                                                                                                                                                                     |                                         |      |      |      |      |
|                                                                        | Rated Voltage(V)                                                                                                                                                                                                                                                                    | 6.3                                     | 10   | 16   | 25   | 35   |
|                                                                        | tan δ(Max)                                                                                                                                                                                                                                                                          | 0.18                                    | 0.16 | 0.14 | 0.12 | 0.12 |
| Low Temperature Stability<br>低溫特性<br>Impedance Ratio(Max)<br>阻抗比率(最大值) | Measurement Frequency: 120Hz.                                                                                                                                                                                                                                                       |                                         |      |      |      |      |
|                                                                        | Rated Voltage(V)                                                                                                                                                                                                                                                                    | 6.3                                     | 10   | 16   | 25   | 35   |
|                                                                        | Z(-25°C)/Z(20°C)                                                                                                                                                                                                                                                                    | 2                                       | 2    | 2    | 2    | 2    |
|                                                                        | Z(-40°C)/Z(20°C)                                                                                                                                                                                                                                                                    | 3                                       | 3    | 3    | 3    | 3    |
| Load Life 負荷壽命                                                         | 1000hours,with application of rated voltage at 105°C                                                                                                                                                                                                                                |                                         |      |      |      |      |
|                                                                        | Capacitance Change                                                                                                                                                                                                                                                                  | Within ± 20% of Initial Value           |      |      |      |      |
|                                                                        | tan δ                                                                                                                                                                                                                                                                               | 200% or less of Initial Specified Value |      |      |      |      |
|                                                                        | Leakage Current                                                                                                                                                                                                                                                                     | Initial Specified Value or less         |      |      |      |      |
| Shelf Life 放置壽命                                                        | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to them 4.1 of JIS C5101-4. |                                         |      |      |      |      |
|                                                                        | Capacitance Change                                                                                                                                                                                                                                                                  | Within ± 20% of Initial Value           |      |      |      |      |
|                                                                        | tan δ                                                                                                                                                                                                                                                                               | 200% or less of Initial Specified Value |      |      |      |      |
|                                                                        | Leakage Current                                                                                                                                                                                                                                                                     | Initial Specified Value or less         |      |      |      |      |
| Standards 參照標準                                                         | JIS C 5101-4 (IEC 60384)                                                                                                                                                                                                                                                            |                                         |      |      |      |      |

### Frequency Coefficient of Permissible Ripple Current

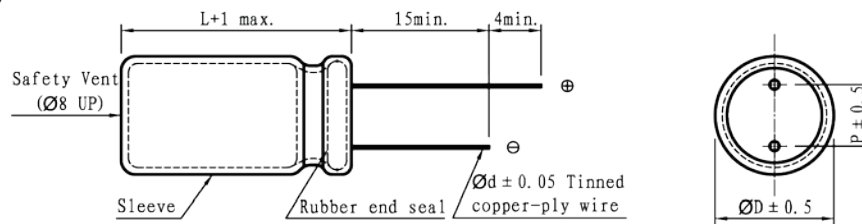
| Frequency (Hz) | 50   | 120  | 300  | 1K   | 10K ~ 100K |
|----------------|------|------|------|------|------------|
| Coefficient    | 0.35 | 0.50 | 0.64 | 0.83 | 1.00       |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

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### DIMENSIONS(mm)



|          |      |     |     |     |
|----------|------|-----|-----|-----|
| $\phi D$ | 4    | 5   | 6.3 | 8   |
| P        | 1.5  | 2.0 | 2.5 | 3.5 |
| $\phi d$ | 0.45 | 0.5 | 0.5 | 0.5 |

### STANDARD RATINGS

D×L(mm) ; R.C.(mA rms) at 105°C 100KHz, IMP (Ω max) at 20°C 100KHz.

| Cap<br>(μF) | V<br>(Code) | 6.3<br>(0J) |      |     | 10<br>(1A) |      |     | 16<br>(1C) |      |     |
|-------------|-------------|-------------|------|-----|------------|------|-----|------------|------|-----|
|             | Item        | D x L       | R.C. | IMP | D x L      | R.C. | IMP | D x L      | R.C. | IMP |
| 15          |             |             |      |     |            |      |     | 4x7        | 70   | 3.3 |
| 22          |             |             |      |     | 4x7        | 70   | 3.3 | 5x7        | 110  | 1.7 |
| 33          |             | 5x7         | 110  | 1.7 | 5x7        | 115  | 1.7 | 6.3x7      | 160  | 0.8 |
| 47          |             | 5x7         | 110  | 1.7 | 5x7        | 143  | 1.3 | 6.3x7      | 165  | 0.8 |
| 68          |             | 6.3x7       | 160  | 0.8 | 6.3x7      | 165  | 0.8 | 8x7        | 200  | 0.5 |
| 100         |             | 6.3x7       | 160  | 0.8 | 8x7        | 200  | 0.5 | 8x7        | 210  | 0.5 |
| 150         |             | 8x7         | 200  | 0.5 | 8x7        | 205  | 0.5 |            |      |     |
| 220         |             | 8x7         | 200  | 0.5 |            |      |     |            |      |     |

| Cap<br>(μF) | V<br>(Code) | 25<br>(1E) |      |     | 35<br>(1V) |      |     |
|-------------|-------------|------------|------|-----|------------|------|-----|
|             | Item        | D x L      | R.C. | IMP | D x L      | R.C. | IMP |
| 6.8         |             |            |      |     | 4x7        | 70   | 3.3 |
| 10          |             | 4x7        | 70   | 3.3 | 5x7        | 110  | 1.7 |
| 15          |             | 5x7        | 110  | 1.7 | 6.3x7      | 132  | 1.7 |
| 22          |             | 5x7        | 110  | 1.7 | 6.3x7      | 160  | 0.8 |
| 33          |             | 6.3x7      | 160  | 0.8 | 8x7        | 200  | 0.5 |
| 47          |             | 8x7        | 200  | 0.5 | 8x7        | 230  | 0.5 |
| 68          |             | 8x7        | 200  | 0.5 |            |      |     |
| 100         |             | 8x7        | 300  | 0.4 |            |      |     |