

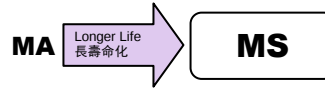
## MS Series

## CHIP TYPE, LONG LIFE

## 貼片式，長壽命品



- Operating with wide temperature range -55~+105°C  
適用於 -55~+105°C 的寬溫範圍
- Long life assurance  
長壽命
- Load life of 5000 hours  
負荷壽命 5000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH，無鹵



## □ SPECIFICATIONS 特性表

| Items 項目                                                                                                      | Characteristics 主要特性                                                                                                                                                                                                     |                                                      |                |
|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------|
| Operation Temperature Range 使用溫度範圍                                                                            | -55 ~ +105°C                                                                                                                                                                                                             |                                                      |                |
| Voltage Range 額定工作電壓範圍                                                                                        | 4 ~ 50V                                                                                                                                                                                                                  |                                                      |                |
| Capacitance Range 靜電容量範圍                                                                                      | 22 ~ 560μF                                                                                                                                                                                                               |                                                      |                |
| Capacitance Tolerance 靜電容量允許偏差                                                                                | ±20% at 120Hz, 20°C                                                                                                                                                                                                      |                                                      |                |
| Leakage Current 漏電流 (*1)                                                                                      | ≤Specified value (after 2 minutes application of rated voltage at 20°C). ≤規範值（在 20°C 環境中施加額定工作電壓 2 分鐘後）。                                                                                                                 |                                                      |                |
| Dissipation Factor (tan δ) 損耗角正切                                                                              | ≤Specified value at 120Hz, 20°C. ≤規範值（在 20°C 120Hz 環境下）。                                                                                                                                                                 |                                                      |                |
| ESR 阻抗值 (*2)                                                                                                  | ≤Specified value at 100KHz, 20°C. ≤規範值（在 20°C 100KHz 環境下）。                                                                                                                                                               |                                                      |                |
| Stability at Low Temperature 低溫特性                                                                             | Measurement frequency 測試頻率: 100KHz                                                                                                                                                                                       |                                                      |                |
|                                                                                                               | Impedance Ratio 阻抗比<br>ZT/Z20 (max.)                                                                                                                                                                                     | Z(+105°C)/Z(20°C)<br>Z(-55°C)/Z(20°C)                | ≤1.25<br>≤1.25 |
| Damp Heat (Steady State) 穩態濕熱                                                                                 | When the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH, they meet the characteristics listed below.<br>在 60°C 和相對濕度 90%環境下施加額定工作電壓 1000 小時並冷卻至 20°C 後，電容器的特性符合下表的要求。 |                                                      |                |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                               | Within ±20% of initial value 為初始值的±20%以內 (*3)        |                |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                 | 150% or less of initial specified value 不大於規範值的 150% |                |
|                                                                                                               | ESR 阻抗值 (*2)                                                                                                                                                                                                             | 150% or less of initial specified value 不大於規範值的 150% |                |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                      | Initial specified value or less 不大於規範值               |                |
|                                                                                                               |                                                                                                                                                                                                                          |                                                      |                |
| Endurance 耐久性                                                                                                 | After 5000 hours application of the rated voltage at 105°C, they meet the characteristics listed below.<br>在 105°C 環境中施加額定工作電壓 5000 小時後，電容器的特性符合下表的要求。                                                                   |                                                      |                |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                               | Within ±20% of initial value 為初始值的±20%以內 (*3)        |                |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                 | 150% or less of initial specified value 不大於規範值的 150% |                |
|                                                                                                               | ESR 阻抗值 (*2)                                                                                                                                                                                                             | 150% or less of initial specified value 不大於規範值的 150% |                |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                      | Initial specified value or less 不大於規範值               |                |
|                                                                                                               |                                                                                                                                                                                                                          |                                                      |                |
| Resistance to Soldering Heat 耐焊接熱特性<br><br>(Please refer page 22 for soldering conditions)<br>(焊接條件請查閱第 22 頁) | After reflow soldering and restored at room temperature, they meet the characteristics listed below.<br>經過回流焊並冷卻至室溫後，電容器的特性符合下表的要求。                                                                                      |                                                      |                |
|                                                                                                               | Capacitance Change 靜電容量變化率                                                                                                                                                                                               | Within ±10% of initial value 初始值的±10%以內 (*3)         |                |
|                                                                                                               | Dissipation Factor 損耗角正切                                                                                                                                                                                                 | 130% or less of initial specified value 不大於規範值的 130% |                |
|                                                                                                               | ESR 阻抗值 (*2)                                                                                                                                                                                                             | 130% or less of initial specified value 不大於規範值的 130% |                |
|                                                                                                               | Leakage Current 漏電流                                                                                                                                                                                                      | Initial specified value or less 不大於規範值               |                |
|                                                                                                               |                                                                                                                                                                                                                          |                                                      |                |
| Marking 標識                                                                                                    | Red print on the case top. 鋁殼頂部紅色字體印刷。                                                                                                                                                                                   |                                                      |                |

(\*1) If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.

如未能確定，在 105°C 環境下連續施加額定工作電壓 120 分鐘後測量漏電流。

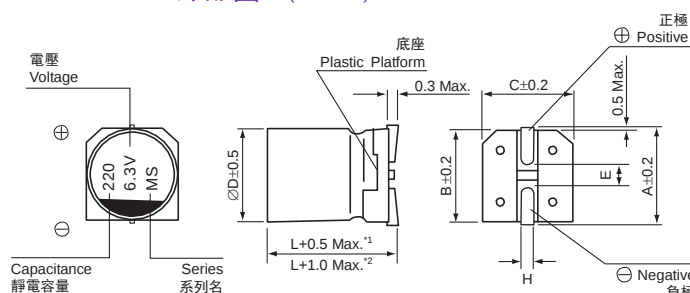
(\*2) Should be measured at both of the terminal ends closest where the terminals protrude through the plastic platform.

測試應為靠近突出底座的兩個端子的末端。

(\*3) The value before test of examination of resistance to soldering.

焊接測試前的值。

## □ DRAWING 外形圖 (Unit: mm)



\*1. Applicable to Ø5~Ø8

適用於Ø5~Ø8

\*2. Applicable to Ø10 and above

適用於Ø10和Ø10以上

Dimension table in next page.  
尺寸表見下一頁。

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.

**注:** 以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CAT.2019/V1

## MS Series

## □ DIMENSIONS 尺寸表 (Unit: mm)

| ∅D × L | 5 × 6   | 6.3 × 6 | 8 × 7   | 6.3 × 7 | 6.3 × 9.5 | 8 × 12  | 10 × 12 |
|--------|---------|---------|---------|---------|-----------|---------|---------|
| A      | 6.0     | 7.3     | 9.0     | 7.3     | 7.3       | 8.0     | 10.0    |
| B      | 5.3     | 6.6     | 8.3     | 6.6     | 6.6       | 8.3     | 10.3    |
| C      | 5.3     | 6.6     | 8.3     | 6.6     | 6.6       | 8.3     | 10.3    |
| E      | 1.6     | 2.1     | 3.2     | 2.1     | 2.1       | 3.2     | 4.6     |
| L      | 6.0     | 6.0     | 7.0     | 7.0     | 9.5       | 12.0    | 12.0    |
| H      | 0.5~0.8 | 0.5~0.8 | 0.8~1.1 | 0.5~0.8 | 0.5~0.8   | 0.8~1.1 | 0.8~1.1 |

## □ DIMENSIONS &amp; STANDARD RATINGS 規格尺寸及標準參數

| WV (V)       |              | 4 (0G)                 |                                  |                          |                                |                                            | 6.3 (0J)               |                                  |                          |                                |                                            |
|--------------|--------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|
| Cap. 容量 (μF) | Parameter 參數 | Case size ∅D×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (μA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 105°C, 100KHz 紋波電流 | Case size ∅D×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (μA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 105°C, 100KHz 紋波電流 |
| 47           | 470          |                        |                                  |                          |                                |                                            | 5 × 6                  | 0.12                             | 59.22                    | 35                             | 1600                                       |
| 100          | 101          |                        |                                  |                          |                                |                                            | 5 × 6 (6.3 × 6)        | 0.12 (0.12)                      | 126 (126)                | 25 (22)                        | 2400 (2800)                                |
| 120          | 121          |                        |                                  |                          |                                |                                            | 6.3 × 6                | 0.12                             | 151                      | 22                             | 2800                                       |
| 150          | 151          | 5 × 6                  | 0.12                             | 120                      | 25                             | 2200                                       |                        |                                  |                          |                                |                                            |
| 220          | 221          |                        |                                  |                          |                                |                                            | 6.3 × 6 (8 × 7)        | 0.12 (0.12)                      | 277 (277)                | 20 (22)                        | 2800 (3200)                                |
| 330          | 331          | 6.3 × 6 (8 × 7)        | 0.12 (0.12)                      | 264 (264)                | 20 (22)                        | 2800 (3200)                                |                        |                                  |                          |                                |                                            |
| 390          | 391          |                        |                                  |                          |                                |                                            | 8 × 7                  | 0.12                             | 491                      | 22                             | 3200                                       |
| 470          | 471          |                        |                                  |                          |                                |                                            | 6.3 × 9.5              | 0.12                             | 592                      | 18                             | 3200                                       |
| 560          | 561          | 8 × 7                  | 0.12                             | 448                      | 18                             | 3600                                       |                        |                                  |                          |                                |                                            |

| WV (V)       |              | 10 (1A)                |                                  |                          |                                |                                            | 16 (1C)                |                                  |                          |                                |                                            |
|--------------|--------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|
| Cap. 容量 (μF) | Parameter 參數 | Case size ∅D×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (μA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 105°C, 100KHz 紋波電流 | Case size ∅D×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (μA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 105°C, 100KHz 紋波電流 |
| 22           | 220          |                        |                                  |                          |                                |                                            | 5 × 6                  | 0.12                             | 70.4                     | 45                             | 1100                                       |
| 33           | 330          | 5 × 6                  | 0.12                             | 66                       | 40                             | 1300                                       |                        |                                  |                          |                                |                                            |
| 39           | 390          |                        |                                  |                          |                                |                                            | 5 × 6 (6.3 × 6)        | 0.12 (0.12)                      | 125 (125)                | 35 (30)                        | 2000 (2200)                                |
| 56           | 560          | 6.3 × 6                | 0.12                             | 112                      | 27                             | 2300                                       |                        |                                  |                          |                                |                                            |
| 68           | 680          | 5 × 6                  | 0.12                             | 136                      | 30                             | 2100                                       | 6.3 × 6                | 0.12                             | 218                      | 30                             | 2200                                       |
| 82           | 820          |                        |                                  |                          |                                |                                            | 8 × 7                  | 0.12                             | 262                      | 28                             | 2800                                       |
| 120          | 121          | 6.3 × 6                | 0.12                             | 240                      | 27                             | 2300                                       | 8 × 7                  | 0.12                             | 384                      | 28                             | 2800                                       |
| 150          | 151          | 8 × 7                  | 0.12                             | 300                      | 30                             | 2600                                       |                        |                                  |                          |                                |                                            |
| 220          | 221          | 6.3 × 7                | 0.12                             | 440                      | 22                             | 2800                                       |                        |                                  |                          |                                |                                            |
| 270          | 271          | 8 × 7                  | 0.12                             | 540                      | 22                             | 3200                                       |                        |                                  |                          |                                |                                            |

| WV (V)       |              | 25 (1E)                |                                  |                          |                                |                                            | 35 (1V)                |                                  |                          |                                |                                            |
|--------------|--------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|
| Cap. 容量 (μF) | Parameter 參數 | Case size ∅D×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (μA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 105°C, 100KHz 紋波電流 | Case size ∅D×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (μA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 105°C, 100KHz 紋波電流 |
| 82           | 820          |                        |                                  |                          |                                |                                            | 8 × 12                 | 0.12                             | 574                      | 29                             | 2200                                       |
| 100          | 101          | 6.3 × 9.5              | 0.12                             | 500                      | 32                             | 2900                                       |                        |                                  |                          |                                |                                            |
| 150          | 151          |                        |                                  |                          |                                |                                            | 10 × 12                | 0.12                             | 1050                     | 28                             | 2600                                       |
| 180          | 181          | 8 × 12                 | 0.12                             | 900                      | 16                             | 4650                                       |                        |                                  |                          |                                |                                            |

| WV (V)       |              | 50 (1H)                |                                  |                          |                                |                                            |
|--------------|--------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|
| Cap. 容量 (μF) | Parameter 參數 | Case size ∅D×L (mm) 尺寸 | Dissipation factor (tan δ) 損耗角正切 | Leakage current (μA) 漏電流 | ESR (mΩ) max. 20°C, 100KHz 阻抗值 | Ripple current (mA rms) 105°C, 100KHz 紋波電流 |
| 39           | 390          | 8 × 12                 | 0.12                             | 390                      | 25                             | 3800                                       |
| 68           | 680          | 10 × 12                | 0.12                             | 680                      | 20                             | 4300                                       |

**Note:** All design and specifications are for reference only and is subject to change without prior notice. If any doubt about safety for your application, please contact us immediately for technical assistance before purchase.

**注:** 以上所提供的設計及特性參數僅供參考，任何修改不作預先通知。如果在使用上有疑問，請在採購前與我們聯繫，以便提供技術上的協助。

CAT.2019/V1