

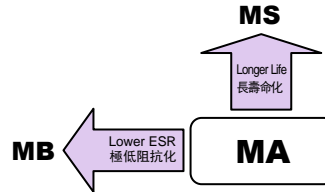
# MA Series

## CHIP TYPE, STANDARD

### 貼片式, 標準品



- Operating with wide temperature range -55~+105°C  
適用於 -55~+105°C 的寬溫範圍
- Low ESR, high ripple current  
低阻抗, 高紋波電流
- Load life of 2000 hours  
負荷壽命 2000 小時
- RoHS & REACH compliant, Halogen-free  
符合 RoHS 與 REACH, 無鹵

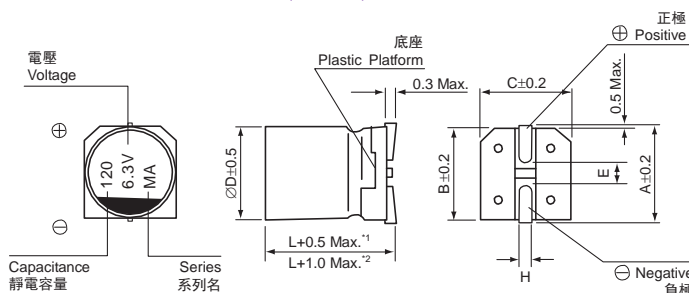


### □ SPECIFICATIONS 特性表

| Items 項目                                                                                                                         | Characteristics 主要特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------|--------------------------|------------------------------------------------------|--------------|------------------------------------------------------|---------------------|----------------------------------------|
| <b>Operation Temperature Range</b> 使用溫度範圍                                                                                        | -55 ~ +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| <b>Voltage Range</b> 額定工作電壓範圍                                                                                                    | 2.5 ~ 25V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| <b>Capacitance Range</b> 靜電容量範圍                                                                                                  | 3.3 ~ 1500µF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| <b>Capacitance Tolerance</b> 靜電容量允許偏差                                                                                            | ±20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| <b>Leakage Current</b> 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)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| <b>Dissipation Factor (tan δ)</b> 損耗角正切                                                                                          | ≤Specified value at 120Hz, 20°C. ≤規範值(在 20°C 120Hz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| <b>ESR</b> 阻抗值 (*2)                                                                                                              | ≤Specified value at 100KHz, 20°C. ≤規範值(在 20°C 100KHz 環境下)。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| <b>Stability at Low Temperature</b> 低溫特性                                                                                         | Measurement frequency 測試頻率: 100KHz<br><table border="1"> <tr> <td>Impedance Ratio 阻抗比<br/>Z(+105°C)/Z(20°C)</td> <td>≤1.25</td> </tr> <tr> <td>ZT/Z20 (max.)</td> <td>≤1.25</td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Impedance Ratio 阻抗比<br>Z(+105°C)/Z(20°C) | ≤1.25                                         | ZT/Z20 (max.)            | ≤1.25                                                |              |                                                      |                     |                                        |
| Impedance Ratio 阻抗比<br>Z(+105°C)/Z(20°C)                                                                                         | ≤1.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| ZT/Z20 (max.)                                                                                                                    | ≤1.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| <b>Damp Heat (Steady State)</b> 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。<br><table border="1"> <tr> <td>Capacitance Change 靜電容量變化率</td> <td>Within ±20% of initial value 為初始值的±20%以內 (*3)</td> </tr> <tr> <td>Dissipation Factor 損耗角正切</td> <td>150% or less of initial specified value 不大於規範值的 150%</td> </tr> <tr> <td>ESR 阻抗值 (*2)</td> <td>150% or less of initial specified value 不大於規範值的 150%</td> </tr> <tr> <td>Leakage Current 漏電流</td> <td>Initial specified value or less 不大於規範值</td> </tr> </table> | 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 |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| <b>Endurance</b> 耐久性                                                                                                             | After 2000 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 2000 小時後, 電容器的特性符合下表的要求。<br><table border="1"> <tr> <td>Capacitance Change 靜電容量變化率</td> <td>Within ±20% of initial value 為初始值的±20%以內 (*3)</td> </tr> <tr> <td>Dissipation Factor 損耗角正切</td> <td>150% or less of initial specified value 不大於規範值的 150%</td> </tr> <tr> <td>ESR 阻抗值 (*2)</td> <td>150% or less of initial specified value 不大於規範值的 150%</td> </tr> <tr> <td>Leakage Current 漏電流</td> <td>Initial specified value or less 不大於規範值</td> </tr> </table>                                                                   | 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 |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| <b>Resistance to Soldering Heat</b> 耐焊接熱特性<br><small>(Please refer page 22 for soldering conditions)<br/>(焊接條件請查閱第 22 頁)</small> | 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。<br><table border="1"> <tr> <td>Capacitance Change 靜電容量變化率</td> <td>Within ±10% of initial value 初始值的±10%以內 (*3)</td> </tr> <tr> <td>Dissipation Factor 損耗角正切</td> <td>130% or less of initial specified value 不大於規範值的 130%</td> </tr> <tr> <td>ESR 阻抗值 (*2)</td> <td>130% or less of initial specified value 不大於規範值的 130%</td> </tr> <tr> <td>Leakage Current 漏電流</td> <td>Initial specified value or less 不大於規範值</td> </tr> </table>                                                                                       | 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 |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                                               |                          |                                                      |              |                                                      |                     |                                        |
| <b>Marking</b> 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  $\phi 5-\phi 8$  適用於  $\phi 5-\phi 8$   
 \*2. Applicable to  $\phi 10$  and above 適用於  $\phi 10$  和  $\phi 10$  以上

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

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CAT.2019/V1

# MA Series

## □ DIMENSIONS 尺寸表 (Unit: mm)

| ∅D × L | 4 × 5.5 | 5 × 6   | 6.3 × 5.5/6 | 8 × 7   | 8 × 12  | 10 × 8/10 | 10 × 12.7 |
|--------|---------|---------|-------------|---------|---------|-----------|-----------|
| A      | 5.0     | 6.0     | 7.3         | 9.0     | 9.0     | 11.0      | 11.0      |
| B      | 4.3     | 5.3     | 6.6         | 8.3     | 8.3     | 10.3      | 10.3      |
| C      | 4.3     | 5.3     | 6.6         | 8.3     | 8.3     | 10.3      | 10.3      |
| E      | 1.0     | 1.6     | 2.1         | 3.2     | 3.2     | 4.6       | 4.6       |
| L      | 5.5     | 6.0     | 5.5/6.0     | 7.0     | 12.0    | 8.0/10.0  | 12.7      |
| H      | 0.5~0.8 | 0.5~0.8 | 0.5~0.8     | 0.8~1.1 | 0.8~1.1 | 0.8~1.1   | 0.8~1.1   |

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

| WV (V)       |              | 2.5 (0E)               |                                  |                          |                                |                                            | 4 (0G)                      |                                  |                          |                                |                                            |
|--------------|--------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|-----------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|
| 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 |
|              |              | 33                     | 330                              |                          |                                |                                            |                             |                                  | 4 × 5.5                  | 0.12                           | 26.4                                       |
| 100          | 101          | 6.3 × 6                | 0.12                             | 50                       | 22                             | 2600                                       | 6.3 × 5.5 (6.3 × 6)         | 0.12 (0.12)                      | 80 (80)                  | 22 (22)                        | 2600 (2600)                                |
| 150          | 151          |                        |                                  |                          |                                |                                            | 6.3 × 5.5 (5 × 6) (6.3 × 6) | 0.12 (0.12) (0.12)               | 120 (300) (120)          | 22 (30) (22)                   | 2800 (2000) (2800)                         |
| 220          | 221          | 6.3 × 5.5 (6.3 × 6)    | 0.12 (0.12)                      | 110 (110)                | 20 (20)                        | 2800 (2800)                                | 8 × 7                       | 0.12                             | 176                      | 21                             | 3200                                       |
| 330          | 331          |                        |                                  |                          |                                |                                            | 8 × 7                       | 0.12                             | 264                      | 21                             | 3400                                       |
| 470          | 471          | 8 × 7                  | 0.12                             | 235                      | 20                             | 3300                                       | 10 × 8                      | 0.12                             | 376                      | 17                             | 4200                                       |
| 560          | 561          |                        |                                  |                          |                                |                                            | 8 × 12                      | 0.12                             | 448                      | 13                             | 4520                                       |
| 680          | 681          |                        |                                  |                          |                                |                                            | 10 × 8                      | 0.12                             | 544                      | 17                             | 4400                                       |
| 820          | 821          | 10 × 8                 | 0.12                             | 410                      | 17                             | 4400                                       | 10 × 10                     | 0.12                             | 656                      | 13                             | 4800                                       |
| 1200         | 122          |                        |                                  |                          |                                |                                            | 10 × 12.7                   | 0.12                             | 960                      | 10                             | 5500                                       |
| 1500         | 152          | 10 × 10 (10 × 12.7)    | 0.12 (0.12)                      | 750 (750)                | 13 (12)                        | 4700 (5440)                                |                             |                                  |                          |                                |                                            |

| WV (V)       |              | 6.3 (0J)                    |                                  |                          |                                |                                            | 10 (1A)                |                                  |                          |                                |                                            |
|--------------|--------------|-----------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|
| 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 |
|              |              | 4.7                         | 4R7                              |                          |                                |                                            |                        |                                  | 4 × 5.5                  | 0.12                           | 9.4                                        |
| 6.8          | 6R8          |                             |                                  |                          |                                |                                            | 4 × 5.5                | 0.12                             | 13.6                     | 240                            | 670                                        |
| 10           | 100          |                             |                                  |                          |                                |                                            | 4 × 5.5                | 0.12                             | 20                       | 220                            | 700                                        |
| 15           | 150          |                             |                                  |                          |                                |                                            | 4 × 5.5                | 0.12                             | 30                       | 200                            | 700                                        |
| 22           | 220          | 4 × 5.5                     | 0.12                             | 27.72                    | 200                            | 700                                        |                        |                                  |                          |                                |                                            |
| 33           | 330          |                             |                                  |                          |                                |                                            | 5 × 6                  | 0.12                             | 66                       | 35                             | 1500                                       |
| 47           | 470          | 5 × 6                       | 0.12                             | 59.22                    | 35                             | 1600                                       | 5 × 6 (6.3 × 6)        | 0.12 (0.12)                      | 94 (94)                  | 26 (26)                        | 2600 (2600)                                |
| 56           | 560          |                             |                                  |                          |                                |                                            | 6.3 × 5.5 (6.3 × 6)    | 0.12 (0.12)                      | 112 (112)                | 25 (25)                        | 2500 (2500)                                |
| 82           | 820          | 6.3 × 5.5 (6.3 × 6)         | 0.12 (0.12)                      | 103 (103)                | 23 (23)                        | 2600 (2600)                                |                        |                                  |                          |                                |                                            |
| 100          | 101          | 6.3 × 5.5 (5 × 6) (6.3 × 6) | 0.12 (0.12) (0.12)               | 126 (315) (126)          | 23 (25) (23)                   | 2800 (2200) (2800)                         |                        |                                  |                          |                                |                                            |
| 120          | 121          | 6.3 × 6                     | 0.12                             | 151                      | 23                             | 3000                                       | 8 × 7                  | 0.12                             | 240                      | 23                             | 3000                                       |
| 150          | 151          | 8 × 7                       | 0.12                             | 189                      | 22                             | 3200                                       | 8 × 7 (10 × 8)         | 0.12 (0.12)                      | 300 (300)                | 23 (21)                        | 3200 (3300)                                |
| 220          | 221          | 8 × 7                       | 0.12                             | 277                      | 22                             | 3400                                       |                        |                                  |                          |                                |                                            |
| 270          | 271          |                             |                                  |                          |                                |                                            | 8 × 12 (10 × 8)        | 0.12 (0.12)                      | 540 (540)                | 13 (20)                        | 4500 (3600)                                |
| 330          | 331          | 10 × 8                      | 0.12                             | 416                      | 18                             | 4200                                       | 8 × 12 (10 × 8)        | 0.12 (0.12)                      | 660 (660)                | 14 (20)                        | 4000 (3700)                                |
| 470          | 471          | 8 × 12 (10 × 8) (10 × 10)   | 0.12 (0.12) (0.12)               | 592 (592) (592)          | 12 (18) (16)                   | 5300 (4300) (4600)                         | 10 × 10 (10 × 12.7)    | 0.12 (0.12)                      | 940 (940)                | 16 (12)                        | 4600 (5300)                                |
| 560          | 561          |                             |                                  |                          |                                |                                            | 10 × 10 (10 × 12.7)    | 0.12 (0.12)                      | 1120 (1120)              | 15 (13)                        | 4800 (5230)                                |
| 680          | 681          | 10 × 10 (10 × 12.7)         | 0.12 (0.12)                      | 857 (857)                | 14 (10)                        | 5000 (5500)                                |                        |                                  |                          |                                |                                            |
| 820          | 821          | 10 × 12.7                   | 0.12                             | 1033                     | 10                             | 5800                                       |                        |                                  |                          |                                |                                            |

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| WV (V)       |              | 16 (1C)                |                                  |                          |                                |                                            | 20 (1D)                |                                  |                          |                                |                                            |
|--------------|--------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|
| Cap. 容量 (μF) | Parameter 參數 | Case size ØD×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 ØD×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 |
| 3.3          | 3R3          | 4 × 5.5                | 0.12                             | 7.04                     | 260                            | 660                                        |                        |                                  |                          |                                |                                            |
| 10           | 100          |                        |                                  |                          |                                |                                            | 4 × 5.5                | 0.12                             | 40                       | 120                            | 900                                        |
| 22           | 220          | 5 × 6                  | 0.12                             | 70.4                     | 45                             | 1210                                       | 6.3 × 5.5 (6.3 × 6)    | 0.12 (0.12)                      | 88 (88)                  | 50 (50)                        | 1700 (1700)                                |
| 33           | 330          | 6.3 × 6                | 0.12                             | 106                      | 31                             | 2400                                       |                        |                                  |                          |                                |                                            |
| 39           | 390          | 6.3 × 5.5 (6.3 × 6)    | 0.12 (0.12)                      | 125 (125)                | 31 (31)                        | 2400 (2400)                                | 8 × 7                  | 0.12                             | 156                      | 45                             | 2000                                       |
| 47           | 470          |                        |                                  |                          |                                |                                            | 8 × 7                  | 0.12                             | 188                      | 45                             | 2000                                       |
| 56           | 560          | 8 × 7                  | 0.12                             | 179                      | 30                             | 2900                                       | 10 × 8                 | 0.12                             | 224                      | 40                             | 2400                                       |
| 68           | 680          |                        |                                  |                          |                                |                                            | 10 × 8                 | 0.12                             | 272                      | 40                             | 2600                                       |
| 82           | 820          | 8 × 7                  | 0.12                             | 262                      | 28                             | 3200                                       | 10 × 8                 | 0.12                             | 328                      | 40                             | 2600                                       |
| 100          | 101          | 10 × 8                 | 0.12                             | 320                      | 27                             | 3300                                       | 8 × 12                 | 0.12                             | 400                      | 22                             | 3200                                       |
| 120          | 121          |                        |                                  |                          |                                |                                            | 10 × 10                | 0.12                             | 480                      | 35                             | 2800                                       |
| 150          | 151          | 10 × 8 (6.3 × 6.5)     | 0.12 (0.12)                      | 480 (480)                | 25 (30)                        | 3500 (2900)                                | 10 × 12.7              | 0.12                             | 600                      | 20                             | 4320                                       |
| 180          | 181          | 8 × 12 (10 × 8)        | 0.12 (0.12)                      | 576 (576)                | 16 (25)                        | 4400 (3600)                                |                        |                                  |                          |                                |                                            |
| 220          | 221          | 10 × 10 (10 × 12.7)    | 0.12 (0.12)                      | 704 (704)                | 20 (14)                        | 3900 (5050)                                |                        |                                  |                          |                                |                                            |
| 330          | 331          | 10 × 12.7              | 0.12                             | 1056                     | 14                             | 5000                                       |                        |                                  |                          |                                |                                            |

| WV (V)       |              | 25 (1E)                |                                  |                          |                                |                                            |
|--------------|--------------|------------------------|----------------------------------|--------------------------|--------------------------------|--------------------------------------------|
| Cap. 容量 (μF) | Parameter 參數 | Case size ØD×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 |
| 6.8          | 6R8          | 6.3 × 6                | 0.12                             | 34                       | 80                             | 1200                                       |
| 10           | 100          | 8 × 7                  | 0.12                             | 50                       | 60                             | 1600                                       |
| 22           | 220          | 10 × 8                 | 0.12                             | 110                      | 50                             | 2200                                       |
| 33           | 330          | 8 × 12                 | 0.12                             | 165                      | 30                             | 2800                                       |
| 47           | 470          | 8 × 12 (10 × 10)       | 0.12 (0.12)                      | 235 (235)                | 30 (45)                        | 3000 (2400)                                |
| 56           | 560          | 10 × 12.7              | 0.12                             | 280                      | 28                             | 3800                                       |
| 100          | 101          | 8 × 7                  | 0.12                             | 500                      | 25                             | 3000                                       |

- Taping specifications are given in page 12. 編帶標準請查閱第 12 頁。
- Soldering conditions and recommended land size are given in page 15. 焊接條件及推薦安裝尺寸請查閱第 15 頁。
- Please refer to page 13 for the minimum package quantity. 最小包裝數量請查閱第 13 頁。
- Please refer to page 10 for the Part Number System. 產品編碼規則請查閱第 10 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。

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