

### 1. 適用範圍 / SCOPE

此份規格書涵蓋 SFCA1206-series 金屬陶瓷電流感測電阻元件相關規格。

This specification covers SFCA1206-series, which are Metal Foil Current Sensing Resistor.

### 2. 產品型號 / TYPE NUMBER

|             |             |          |                       |                        |          |
|-------------|-------------|----------|-----------------------|------------------------|----------|
| <b>SFCA</b> | <b>1206</b> | <b>M</b> | <b>W<sub>xx</sub></b> | <b>R<sub>xxx</sub></b> | <b>*</b> |
|             | (1)         | (2)      | (3)                   | (4)                    | (5)      |

- (1) 產品系列號 / SERIES NUMBER : Ex.SFCA1206 = 短電極/ Short electrode ; 四端子 / four terminal ; 無側導/ without side electrode ; 尺寸 / size “0.12×0.06”
- (2) 產品材質 / Material : M = 錳銅合金 / MnCu alloy
- (3) 產品瓦特數 / Power Rating : Ex. W50=0.50 Watt ; 1W0=1.0 Watt
- (4) 產品阻值 / Nominal Resistance Value : Ex. 0.5mΩ →0M50 ; 10mΩ →R010
- (5) 元件電阻偏差值 / Resistance Tolerance : Ex. D=±0.5% ; F=±1%

### 3. 產品尺寸 / PRODUCT DIMENSIONS

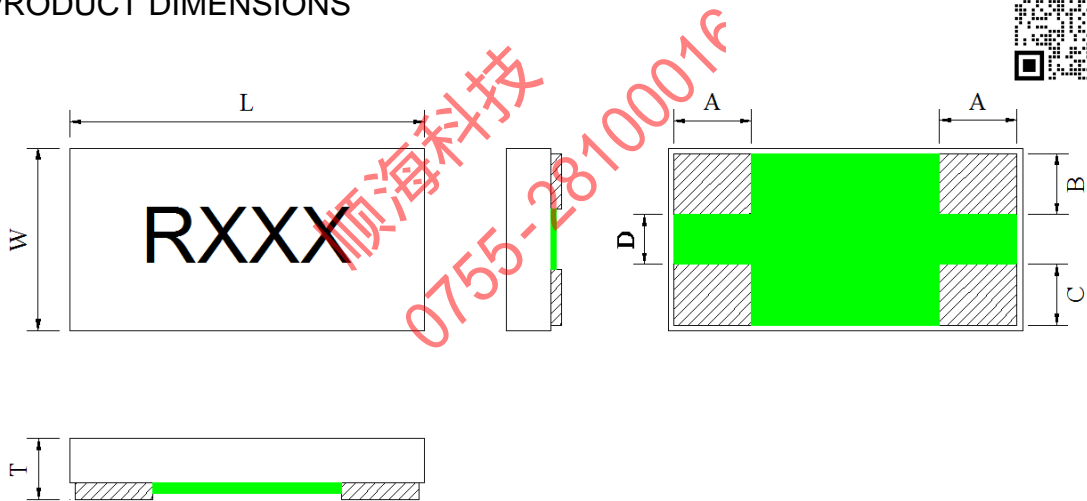


圖 1 / Fig.1

| Part Number                      | w         | L         | T         | A         | B/C       | D         |
|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| SFCA1206MW50-series<br>0M50~R100 | 1.60±0.20 | 3.20±0.20 | 0.60±0.20 | 0.60±0.20 | 0.55±0.20 | 0.50±0.20 |

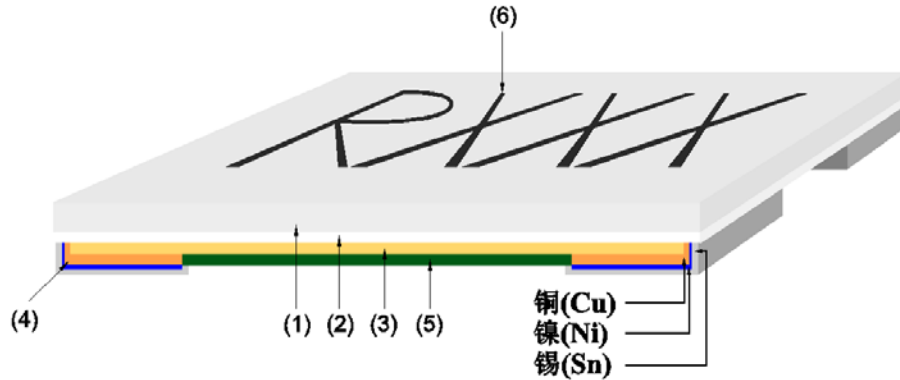
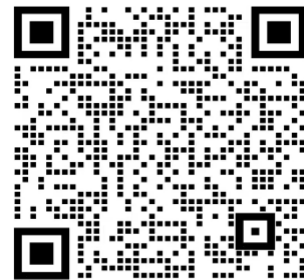
**4. 產品結構及使用材料說明 (參考圖 2) / STRUCTURE & MATERIAL (Ref to Fig.2)**


圖 2 / Fig.2



- 4.1 基板 / Substrate(1) : 氧化鋁陶瓷基板 / Alumina Ceramic
- 4.2 粘著層 / Adhesion layer(2) : 環氧樹脂 / Epoxy
- 4.3 電阻本體 / Resistive element(3) : 錳銅合金 / MnCu alloy
- 4.4 端電極 / Terminal electrode(4) : 錫、鎳、銅 / Sn、Ni、Cu
- 4.5 保護防焊層 / Protective coating(5) : 防火級環氧樹脂,符合 UL- 94-V0 要求(綠色) /  
Flame-retardant epoxy, meets UL- 94-V0 requirements(green)
- 4.6 文印防焊層 / Marking coating(6) : 防火級環氧樹脂,符合 UL- 94-V0 要求(黑色) /  
Flame-retardant epoxy, meets UL- 94-V0 requirements (black)

**5. 電氣特性 / ELECTRICAL CHARACTERISTICS**

| Part Number                   | Resistance Value (mΩ) | Power Rating (Watt) | Resistance Tolerance (%) | TCR (ppm) |
|-------------------------------|-----------------------|---------------------|--------------------------|-----------|
| SFCA1206MW50-series 0M50      | 0.5                   | 0.50                | ±1%(F)                   | ±150      |
| SFCA1206MW50-series R001~R009 | 1~9                   | 0.50                | ±0.5%(D) /±1%(F)         | ±100      |
| SFCA1206MW50-series R010~R100 | 10~100                | 0.50                | ±0.5%(D) /±1%(F)         | ±50       |

規格外阻值可依客戶需求提供 / We can provide other resistance value per request

**6. 產品特性及信賴性測試規範 / PRODUCT CHARACTERISTICS AND RELIABILITY TEST STANDARD**

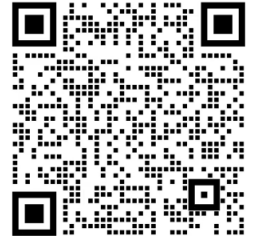
| 測試方法<br>Parameter   | 條件<br>Conditions  | 允收標準<br>Requirements                                    |
|---|---|---|
| 瞬間過載測試 /<br>Short Time Over Load                                      | $P = 2.5P_r$ ; $T = 25 \pm 2^\circ\text{C}$ , $t = 5\text{sec}$ .   | $\pm(1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.13     |
| 高溫測試 /<br>High Temp. Exposure   | $T = +170 \pm 2^\circ\text{C}$ ; $t = 1000\text{h}$   | $\pm(1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.25     |
| 低溫測試 /<br>Low Temp. Storage   | $T = -55 \pm 2^\circ\text{C}$ ; $t = 1000\text{h}$  | $\pm(1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.25     |
| 濕度負載壽命測試 /<br>Moisture Load Life<br>( $60^\circ\text{C}$ 、 $95\%RH$ ) | $V_{\text{test}} = V_{\text{max}}$ ; $T = 60 \pm 2^\circ\text{C}$ ; $RH = 95\%$ ;<br>$t = 90\text{min ON}$ , $30\text{min OFF}$ , $1000\text{h}$  | $\pm(2.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.25     |
| 冷熱衝擊測試 /<br>Thermal Shock   | $[-55^\circ\text{C} \ 30\text{min.} \rightarrow \text{R.T.} \ 3\text{min.} \rightarrow +155^\circ\text{C} \ 30\text{min.}$<br>$\rightarrow \text{R.T.} \ 3\text{min}]$ ,<br>100 個連續循環 / 100Cycles | $\pm(1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.19     |
| 在 $70^\circ\text{C}$ 下負載壽命測試 /<br>Load Life at $70^\circ\text{C}$     | $V_{\text{test}} = V_{\text{max}}$ ; $T = 70 \pm 2^\circ\text{C}$ ; $t = 90\text{min ON}$ ,<br>$30\text{min OFF}$ , $1000\text{h}$  | $\pm(2\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.25       |
| 可焊性測試 /<br>Solderability  | 浸入錫爐 / Dip into solder at $T = 245 \pm 5^\circ\text{C}$ ,<br>$t = 3 \pm 0.5\text{sec}$ .  | 錫涵蓋面積 / The<br>covered area $> 95\%$<br>IEC60115-1 4.17 |
| 抗焊熱性測試 /<br>Resistance to Solder Heat                                 | 經熱風式迴焊爐 / Through Reflow<br>$T = 275 \pm 5^\circ\text{C}$ , $t = 20 \pm 1\text{sec}$ .  | $\pm(1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.18     |
| 機械衝擊測試 /<br>Mechanical Shock  | 加速度 $a = 100G$ , 振幅時間 $t = 11\text{ms}$ , 5 個衝擊<br>$a = 100G$ , $t = 11\text{ms}$ , 5 times shock   | $\pm(1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.21     |
| 基板彎曲測試 /<br>Substrate Bending   | 兩支撐點間距 / Span between fulcrums<br>: $90\text{mm}$ ; 振幅 / Bend Width : $2\text{mm}$ ;<br>測試板 / Test board : 玻璃纖維板 Glass-Epoxy<br>Board ; 厚度 / Thickness = $1.6\text{mm}$                           | $\pm(1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.33     |

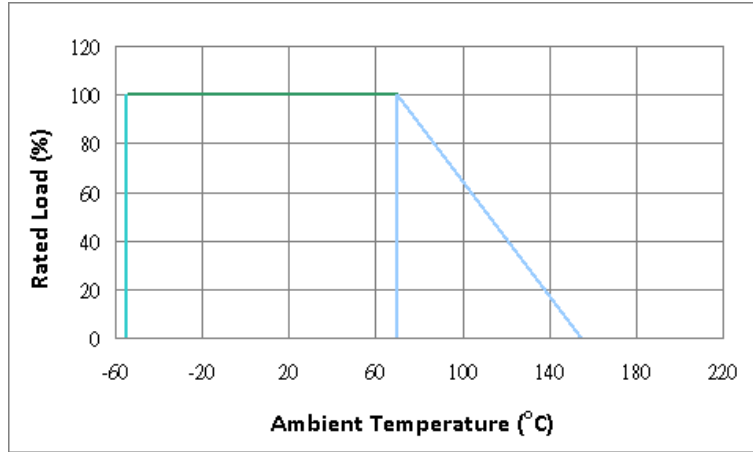
**7. 環境特性 / ENVIRONMENTAL CHARACTERISTIC**
**7-1 操作溫度範圍:  $-55^\circ\text{C} \sim 155^\circ\text{C}$  / Operating Temperature:  $-55^\circ\text{C} \sim 155^\circ\text{C}$** 

額定功率溫度衰變曲線 / Typical Thermal Derating Curve

 額定功率乃指於  $70^\circ\text{C}$  以內可連續滿額功率使用的術語。

 下圖為當操作溫度高於  $70^\circ\text{C}$  時的可使用功率衰減曲線。

 Power rating is based on continuous full load operation at rated ambient temperature of  $70^\circ\text{C}$ . For resistors operated at ambient temp. in excess of  $70^\circ\text{C}$ , the max. load shall be derated in accordance with the following curve.




## 7-2 存儲條件 / STORAGE CONDITIONS

在溫度+10°C~40°C、相對濕度 $\leq 75\%$ 的密閉條件下可存放2年。 /

Under airtight in temperature+10°C~40°C、relative humidity  $\leq 75\%$  can store 2 years.

在溫度+10°C~60°C、相對濕度為95%的非露天下最多可存放30天。 /

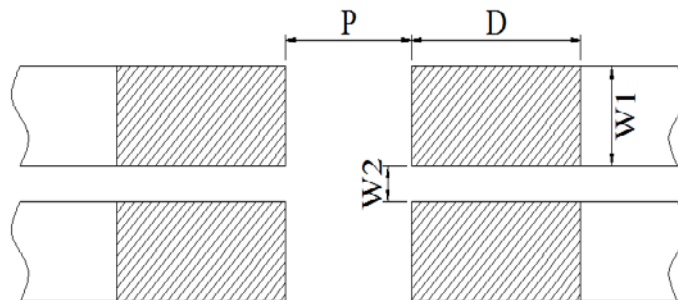
Without dew in temperature+10°C~60°C、relative humidity be 95% maximum value for 30days.

## 8. 焊錫墊尺寸及焊接條件 / SOLDER PAD SIZE AND WELDING CONDITIONS

8-1 建議如下圖焊接方式焊接，並滿足所要求的尺寸。 / Propose that the following picture installation way is installed, and satisfied the required size.

| Part Number                      | P      | D      | W1     | W2     | Loading |
|----------------------------------|--------|--------|--------|--------|---------|
| SFCA1206MW50-seires<br>0M50~R100 | 1.20mm | 1.80mm | 1.10mm | 0.30mm | 0.5w    |

loading : 適用於本公司建議焊墊設計並使用於限定穩定電流下 /  
 suit for specific pad layout and specific steady current



## 8-2 建議客戶焊接參數 / Recommended Customer Soldering Parameters

### 8-2-1 波峰焊溫度曲線 / Wave solder Temperature condition (圖 3 / Fig.3)

預熱段 / Preheating : 100°C~130°C, max.100 sec.

焊錫段 / Soldering: 250°C~265°C max. 10 sec.

允許最高溫度 / Maximum temperature : 260±5°C, max. 10sec.

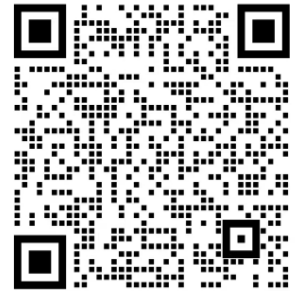
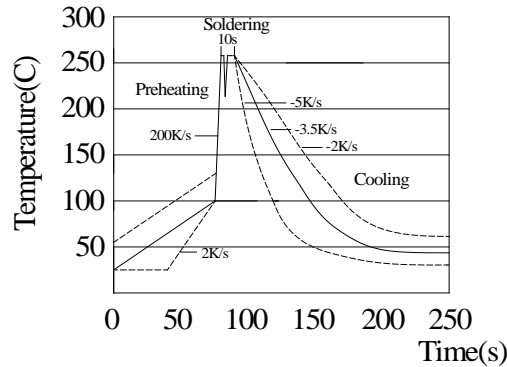


圖3 / Fig.3

### 8-2-2 回流焊溫度曲線 / Solder reflow Temperature condition (圖 4 / Fig.4)

預熱段 / Preheating : 145 ± 15°C, max.120 sec.

焊錫段 / Soldering : min. 220°C, max. 60 sec.

允許最高溫度 / Maximum temperature : 260±5°C, max. 10sec.

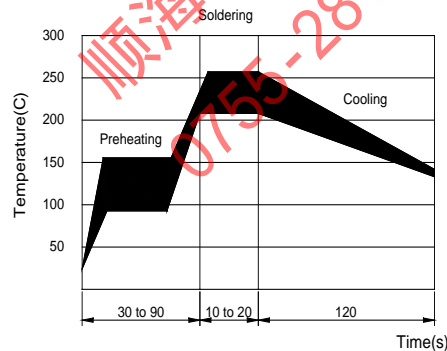


圖4 / Fig.4

### 8-2-3 允許烙鐵焊接條件(熱風設備) / Rework temperature (hot air equipment) : 350°C, 3~5seconds

### 8-2-4 焊接方法建議 / Recommended reflow methods

焊接熱源方式可用紅外線, 熱蒸氣, 熱風. / IR, vapor phase oven, hot air oven

如果焊錫溫度超過允許最高溫度, 則產品本身會有功能損壞的疑慮. / If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

## 9. 批量生產後出貨測試項目 / Lot ACCEPTANCE TEST REQUIREMENTS

每一批生產均須作入庫檢驗, 每一批生產單量不可超過500Kpcs. /

Qualification shall consist of passing a program of following tests. Parts shall be pulled from each lot and maximum lot quantity shall be within 500Kpcs.

### 9-1 外觀 / Visual

方法 / Procedure : 利用放大鏡進行檢查 / Visual

標準 / Acceptance Criteria : 不能有髒污、不潔、文印錯誤、破損等 / No parts are outstandingly stained

### 9-2 尺寸 / Dimensions

方法 / Procedure : 使用合適且經校正的尺規 / As appropriate, calipers, micrometers, optical comparator, or approved gages

標準 / Acceptance Criteria : 尺寸均在規定標準範圍內 / No parts outside specific dimensions

### 9-3 單體元件電阻(Ro) / Resistance (Ro)

方法 / Procedure : 在 25°C 下利用四線量測技術量測之 / Resistance shall be measured with 25 °C in the 4-wire resistance test

標準 / Acceptance Criteria : 電阻值均在規定標準範圍內 / The resistance of the test device shall be within the limits specified

### 9-4 電阻溫度係數 / TCR

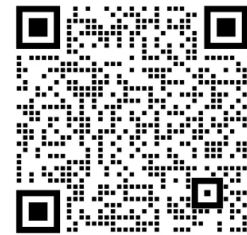
方法 / Procedure : 利用四線法量測出元件分別在 25°C 及125°C 下的電阻值, 並將其帶入下面公式中即可得出 TCR值 / Getting the sampling device resistance values measured in 25°C and 125°C and put them in to the following equation to calculate the TCR

標準 / Acceptance Criteria : 溫度係數值均在規定標準範圍內 / All parts must within the specific  $TCR = (R_b - R_a) / R_a \times 1 / (T_b - T_a) \times 10^6$

### 9-5 絕緣電阻 / Insulation resistance (Ri)

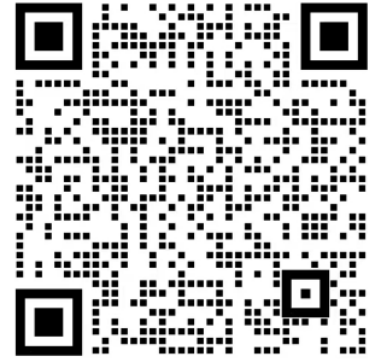
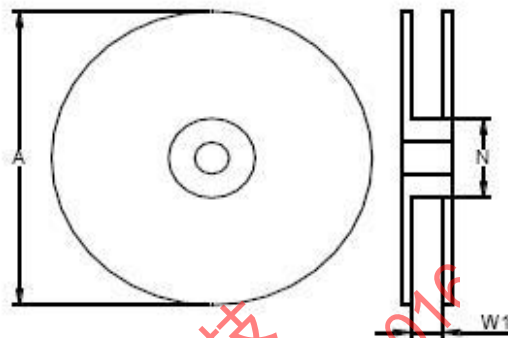
方法 / Procedure : 利用絕緣測試儀量測 / Resistance between protective layer and resistive shall be measured by high ohm meter

標準 / Acceptance Criteria : 防焊層與電阻本體絕緣電阻至少高於100MΩ / The resistance of the test device shall over 100MΩ

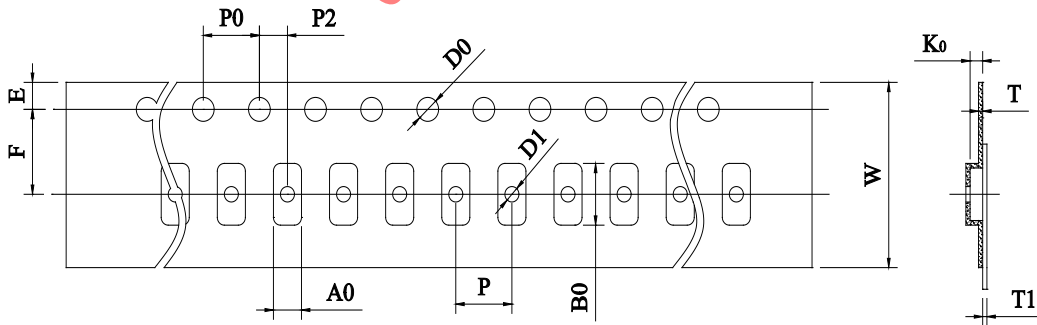


**10. 包裝訊息 / PACKAGING INFORMATION**
**10-1 包裝數量、重量 / QUANTITY & WEIGHT**

| 型號 / Type Number    | 數量 / Quantity (pcs) | 重量 / Weight (g) |
|---------------------|---------------------|-----------------|
| SFCA1206MW50-series | 5,000               | 160±40          |

**10-2 捲輪規格 / Reel & Tape specifications**


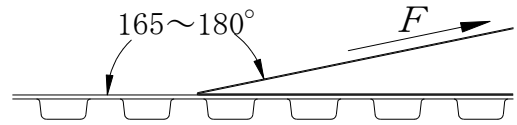
| 型號 / Type Number    | A±5 (mm) | N±2 (mm) | W1±1 (mm) |
|---------------------|----------|----------|-----------|
| SFCA1206MW50-series | 178      | 60       | 9.0       |



| SFCA1206MW50-series |             |    |             |    |             |    |             |
|---------------------|-------------|----|-------------|----|-------------|----|-------------|
| W                   | 8.00 ± 0.30 | P0 | 4.00 ± 0.10 | P  | 4.00 ± 0.10 | P2 | 2.00 ± 0.10 |
| A0                  | 2.05 ± 0.20 | B0 | 3.65 ± 0.20 | D0 | 1.50 ± 0.10 | F  | 3.50 ± 0.10 |
| E                   | 1.75 ± 0.10 | T  | 0.20 ± 0.10 | T1 | Max. 0.1    | K0 | 0.85 ± 0.20 |

10-3 密封膠膜剝離強度要求 / Peeling Strength of Seal Tape

F = 剝離強度 : 0.1 – 1.0N ( 10 - 100gf )  
F = Peeling Strength: 0.1 – 1.0N (10 - 100gf )



11. 其他 / OTHERS

11-1 如果在使用中有超出本規格書的要求，必須經由雙方協商確認。 / In the event that an impropriety is found beyond this specification ,it shall be fixed by mutual agreement between the parties.

11-2 如果本規格書有不適當的情況，必須通過雙方協商並由本公司修改。 / In the event that an impropriety is found in this specification , Juneway Electronic Technology Co., Ltd. shall amend it by mutual agreement between the parties.

順海科技  
0755-28100016

