

### 1. 適用範圍 / SCOPE


此份規格書僅涵蓋0603F系列產品.

This specification covers 0603F series devices, which is SMD Fuse.



### 2. 產品名稱及編碼 / TYPE NUMBER & PART NUMBER

#### 2-1 產品名稱/ TYPE NUMBER

<b>0603F</b>	<b>****A</b>	<b>***V</b>	
(1)	(2)	(3)	(4)

(1) 系列號: 0603F (尺寸: 0.06×0.03; 熔斷特性:快斷)

Series Number: 0603F (Size: 0.06×0.03; Melting characteristic: Fast Acting)

(2) 額定電流: (例如:3.5A=3.5 安培)

Rating Current : (Ex. :3.5A = 3.5 Ampere)

(3) 額定電壓: (例如:63V=63 伏特)

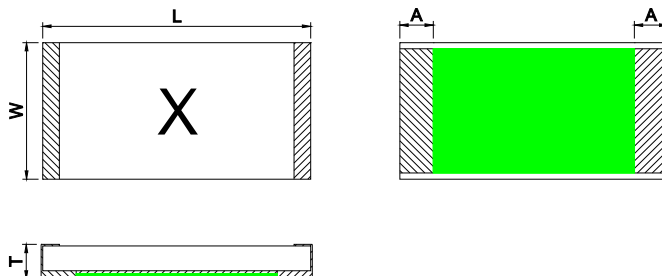
Rating Voltage : (Ex. :63V = 63 Volt)

(4) 安規認證 / Safety Approval

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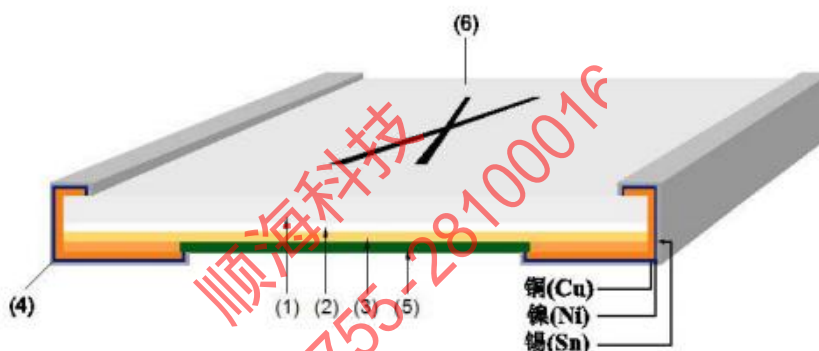
### 3. 產品尺寸和結構 / SIZE AND STRUCTURE

#### 3-1 尺寸 (單位: mm) / SIZE (Unit: mm)



型號 / Type number	W	L	T	A
0603F ****A***V	0.80±0.20	1.60±0.20	0.60±0.15	0.30±0.15

#### 3-2 產品結構及使用材料說明 / STRUCTURE & MATERIAL



編號 No.	元件 Component	材質 Material	數量 Quantity
(1)	基板 Substrate	氧化鋁陶瓷 Alumina Ceramic	1
(2)	粘著層 Adhesion layer	環氧樹脂 Epoxy	1
(3)	熔絲本體 Fuse element	銅合金/錫 Cu Alloy / Sn	1
(4)	端電極 Terminal electrode	銅/鎳/錫 Cu / Ni / Sn	2
(5)	保護防焊層 Protective coating	防火級環氧樹脂 Flame-retardant epoxy	1
(6)	文印防焊層 Marking coating	防火級環氧樹脂 Flame-retardant epoxy	1

### 4. 基本資訊/ ORDERING INFORMATION

● approved ○ pending

型號 Type Number	標示 Marking	額定電流 Rated Current (ADC)	額定電壓 Rated Voltage (VDC)	阻值 Nominal Resistance (Ω)	I <sup>2</sup> t Nominal Melting I <sup>2</sup> t (A <sup>2</sup> s)	安規認證 Safety Approval 
0603F 0.5A 125V	L	0.50	125	0.2750	0.012	●
0603F 0.75A 125V	M1	0.75	125	0.1700	0.027	●
0603F 1A 63V	P	1.0	63	0.1150	0.047	●
0603F 1.25A 63V	Q	1.25	63	0.0800	0.074	●
0603F 1.5A 63V	Q1	1.5	63	0.0660	0.106	●
0603F 1.75A 63V	R1	1.75	63	0.0580	0.145	●
0603F 2A 63V	S	2.0	63	0.0465	0.189	●
0603F 2.5A 63V	T	2.5	63	0.0370	0.296	●
0603F 3A 63V	T1	3.0	63	0.0260	0.426	●
0603F 3.5A 63V	U1	3.5	63	0.0200	0.579	●
0603F 4A 63V	V	4.0	63	0.0180	0.757	●
0603F 5A 63V	W	5.0	63	0.0140	1.183	●
0603F 6A 63V	W1	6.0	63	0.0120	1.703	●

說明/Notes :

a. “一般電阻值”是在通以小於額定電流的 10% 的弱電流條件下量測的阻抗。

Nominal Resistance measured with < 10% rated current ;

b. “一般 I<sup>2</sup>t ”是指自通電至作動時間為 10ms 的過程所對應的 I<sup>2</sup>t.

Nominal Melting I<sup>2</sup>t measured at 10 m sec opening time ;



5. 電氣特性 / ELECTRICAL CHARACTERISTICS

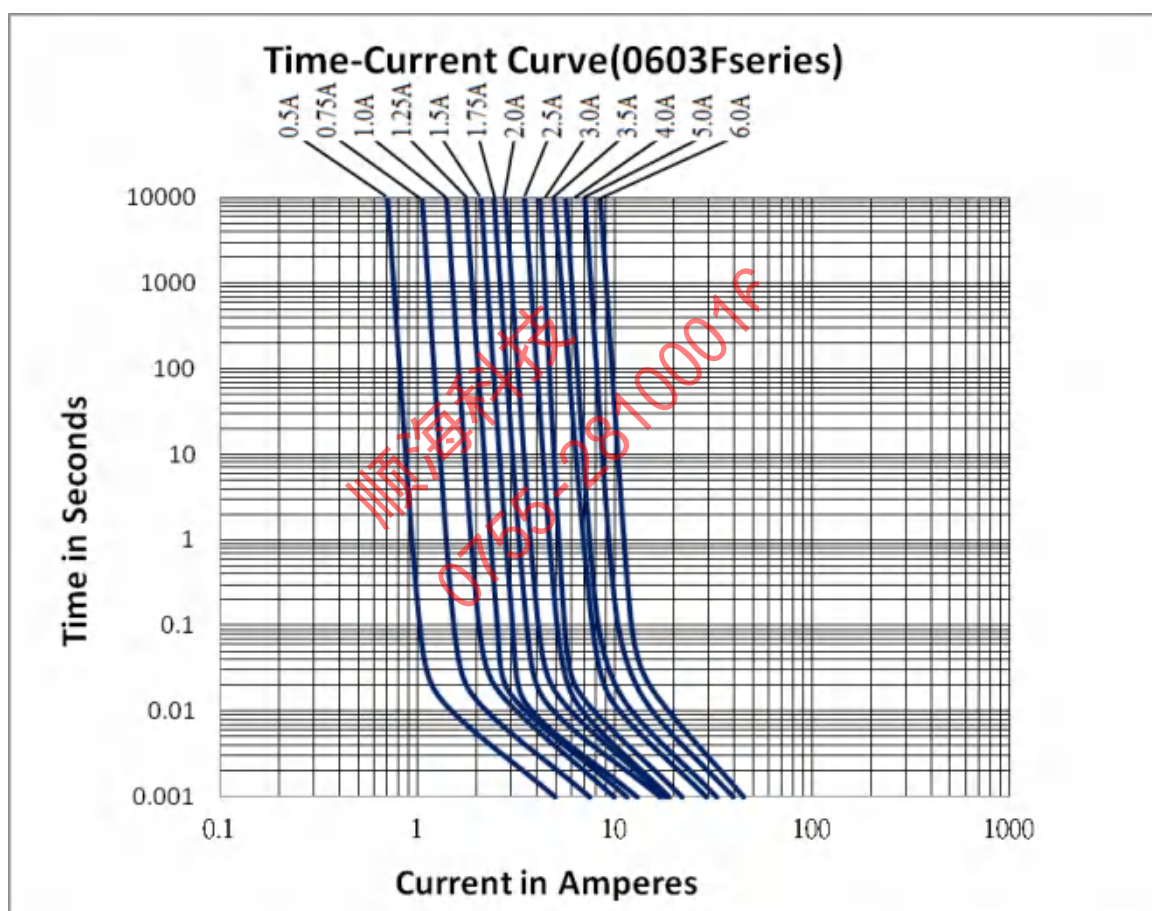
5-1 時間-電流特性/ Pre-Arcing Time-Current Characteristics (limits)



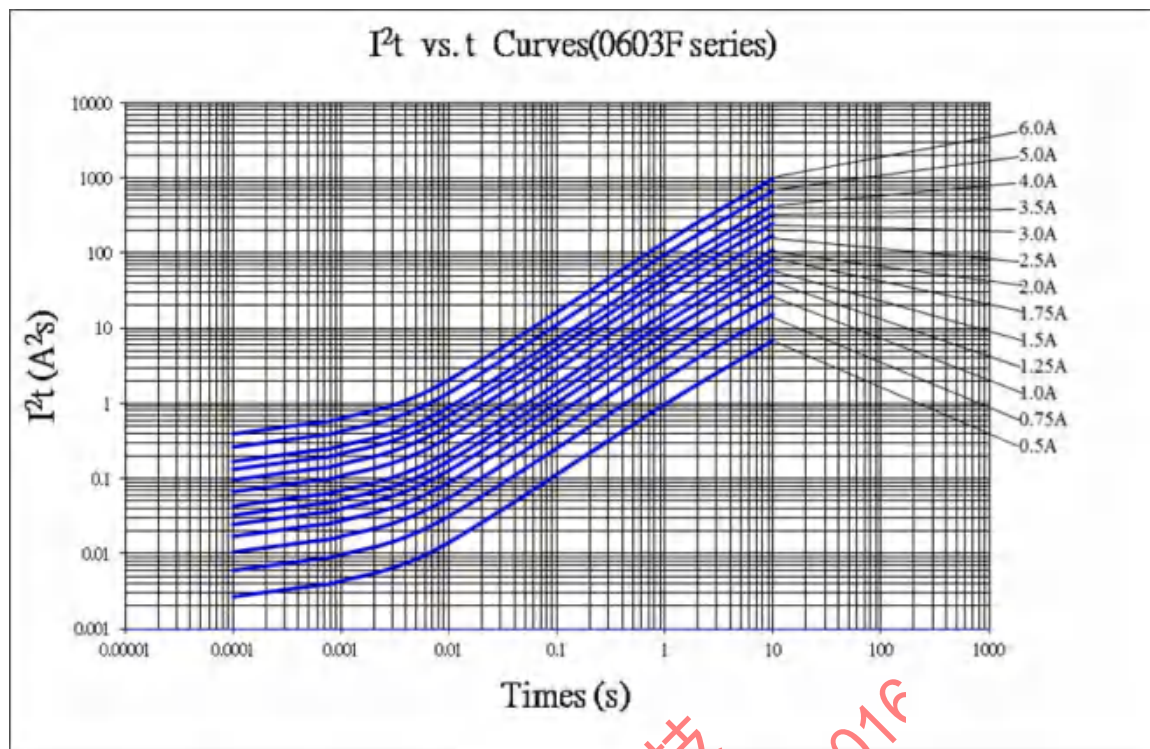
額定電流 RATED CURRENT	1.0I <sub>n</sub>	2.0I <sub>n</sub>
0.5A to 6A	4hrs min.	5sec max.

I<sub>n</sub> : 25°C 下額定電流 / Rating Current at 25°C

時間-電流特性曲線 / Time-Current Curve:



5-2 I<sup>2</sup>t 曲線 / I<sup>2</sup>t Curve:



5-3 分斷能力 / Breaking Capacity

額定電流 RATED CURRENT	分斷能力 BREAKING CAPACITY
0.5A~0.75A	V =125V DC ; I=50A
1A~6A	V =63V DC ; I=50A

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

序號 No.	項目 Item	內容 Content	判定標準 Criteria
1	時間/電流特性 Time/current characteristics	分別通以1.0In、2.0In電流，得出相對應的時間 I=1.0In ; 2.0In and measure the value of time individually by meter ,	各電流條件下的時間參數符合規定值 Value of time measured in different currents is within spec. UL248-1/-14
2	分斷能力測試 Breaking capacity	V = 125V/DC / 63V/DC; I=50A	沒有持續電弧、燃燒、爆炸現象 No a permanent arcing, ignition, bursting UL248-1/-14
3	可焊性 Solder ability	熔錫溫度245°C±5°C，浸錫時間5s±0.5s，浸入深度從基座面起2.0mm±0.5mm，放在20X的放大鏡下檢查T=245°C±5°C，t=5s±0.5s，magnifier : 20X	錫覆蓋率≥95% Cover ≥ 95% MIL-STD-202 Method 208
4	抗焊性測試 Soldering heat resistance	熔錫溫度/ T =250°C±5°C，浸錫時間 / t =30±5s T=250±5°C，t=30±5s	外觀無裂紋和損傷，前後阻值偏差小於或等於±15%；文印清晰可辨 No crack and damage, ΔR<15% Marking is easily legible MIL-STD-202, Method 210F, Condition K
5	冷熱衝擊 Thermal Shock	-65°C,放置時間為 15min,→25°C，,放置時間為 5min→125°C放置時間 15min 循環次數為 100 個 -65°C 15min~25°C 5min~ +125°C 15min ; 100 cycles	外觀無裂紋和損傷，前後阻值偏差<±10% No crack and damage, ΔR<10% MIL-STD-202, Method 107G conditionB-3
6	機械衝擊 Mechanical Shock	峰值100 G,持續時間11ms,波形：半正弦，五次脈衝 a=100G for 11ms, 5pulses	外觀無裂紋和損傷，前後阻值偏差<±10%。 No crack and damage, ΔR<10% MIL-STD-202, Method 213B
7	振動測試 Vibration	承受振幅為0.03 英寸(全程最大0.06英寸),頻率在大約10Hz到55Hz 的範圍均勻地變化的簡諧運動.)	MIL-STD-202, Method 201A
8	高頻振動測試 Vibration, High Frequency	20g's峰值，公差值為±10%，振動頻率10Hz-2000Hz，總計時間為12h	MIL-STD-202, Method 204D, Condition D

## 7. 環境特性 / ENVIRONMENTAL CHARACTERISTIC

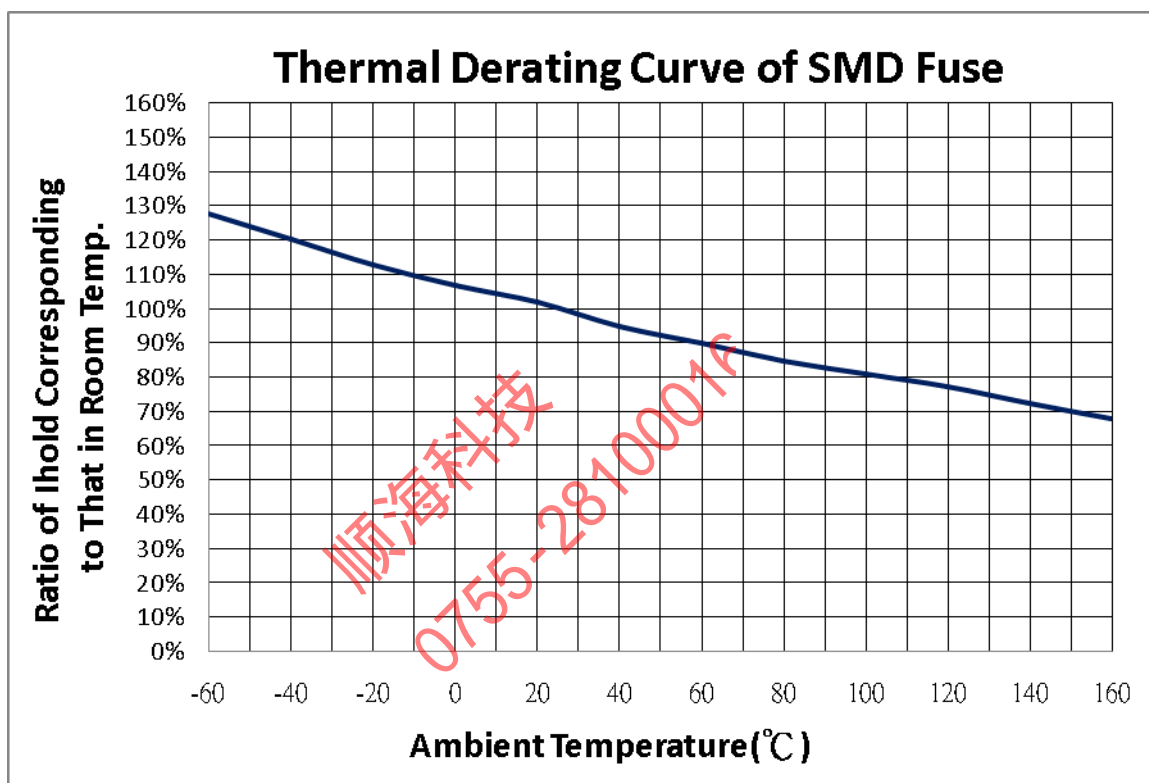
### 7-1 操作溫度範圍: -55°C ~ 150°C / Operating Temperature: -55°C ~ 150°C

若貴司操作環境溫度超出 $25\pm 5^\circ\text{C}$ 範圍，在選用保險絲規格時，需考慮操作環境溫度對保險絲的影響。

請參照：溫度-電流曲線圖。

When choosing the fuse's specification, if the operating environmental temperature beyond the scope from  $20\sim 30^\circ\text{C}$ , you should consider the environmental temperature's affection to fuses. please refer:

Temperature-Current curve:



### 7-2 存儲條件 / Storage Conditions

在溫度 $10^\circ\text{C}\sim 40^\circ\text{C}$ 、相對濕度 $\leq 75\%$ 的密閉條件下可存放2年。

Under airtight in temperature  $10^\circ\text{C}\sim 40^\circ\text{C}$ 、relative humidity  $\leq 75\%$  can store 2 years.

在溫度 $10^\circ\text{C}\sim 40^\circ\text{C}$ 、相對濕度為 $95\%$ 的非露天下最多可存放30天。

Without dew in temperature  $10^\circ\text{C}\sim 40^\circ\text{C}$ 、relative humidity be 95% maximum value for 30days.



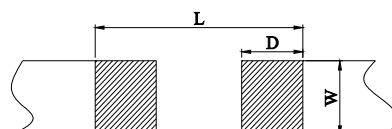
8. 焊錫墊尺寸及焊接條件 / SOLDER PAD SIZE AND WELDING CONDITIONS

8-1 焊墊尺寸建議 / Recommended Size of the Pad.



L	W	D	t
2.50mm	1.60mm	0.88mm	≥ 35μm

t : 元件焊墊金屬層厚度 (min.) / t : Thickness of pad metal (min.)



8-2 焊接參數建議 / Recommended Customer Soldering Parameters

溫度曲線 Temperature Condition

預熱段 : 145 ± 15°C, max. 120 sec.

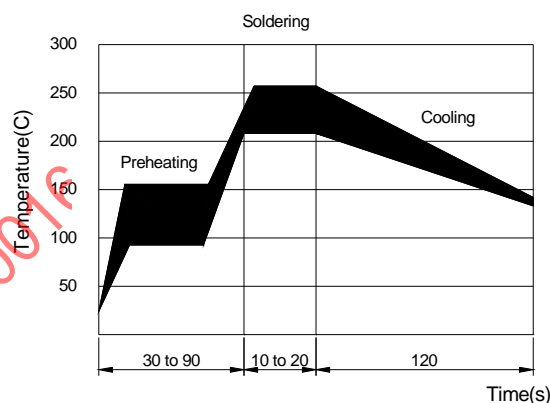
Preheating : 145 ± 15°C, max. 120 sec.

焊錫段 : min. 220°C, max. 60 sec.

Soldering: min. 220°C, max. 60 sec.

允許最高溫度 : 260±5°C, max. 10sec.

Maximum temperature : 260±5°C, max. 10sec.



允許烙鐵焊接條件(熱風設備) : 350°C, 3~5seconds

Rework Temperature ( hot air equipment ) : 350°C, 3~5seconds

8-3 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. 批量生產出貨測試項目 / LOT ACCEPTANCE TEST REQUIREMENTS



### 9-1 外觀 / Visual

方法：利用放大鏡進行檢查

Procedure: Visual

標準：不能有髒汙、不潔、文印錯誤、破損等

Acceptance Criteria: No parts are outstandingly stained.

### 9-2 尺寸 / Dimensions

方法：使用合適且經校正的尺規

Procedure: As appropriate, calipers, micrometers, optical comparator, or approved gages.

標準：尺寸均在規定標準範圍內

Acceptance Criteria: No parts outside specific dimensions.

### 9-3 時間-電流特性 / Time-Current Characteristics

方法：測試電流 $I=1.0I_n$  ;  $2.0I_n$ ,量測出個別電流下的對應時間

Procedure :  $I=1.0I_n$  ;  $2.0I_n$  and measure the value of time individually by meter at  $25^{\circ}\text{C}$

標準：對應時間值均在規定標準範圍內

Acceptance Criteria: All parts must within the specific .

### 9-4 分斷能力 / Breaking Capacity

方法：測試電壓\電流為 $V = 125\text{V}/\text{DC}$  /  $63\text{V}/\text{DC}$  ;  $I=50\text{A}$ , 利用此條件衝擊元件

Procedure:  $V = 125\text{VDC}/63\text{VDC}$  ;  $I=50\text{A}$

標準：元件不發生持續電弧燃燒及爆裂

Acceptance Criteria: No permanent arcing, ignition, bursting

## 10. 安全認證及編號 / STANDARDS AND APPROVALS

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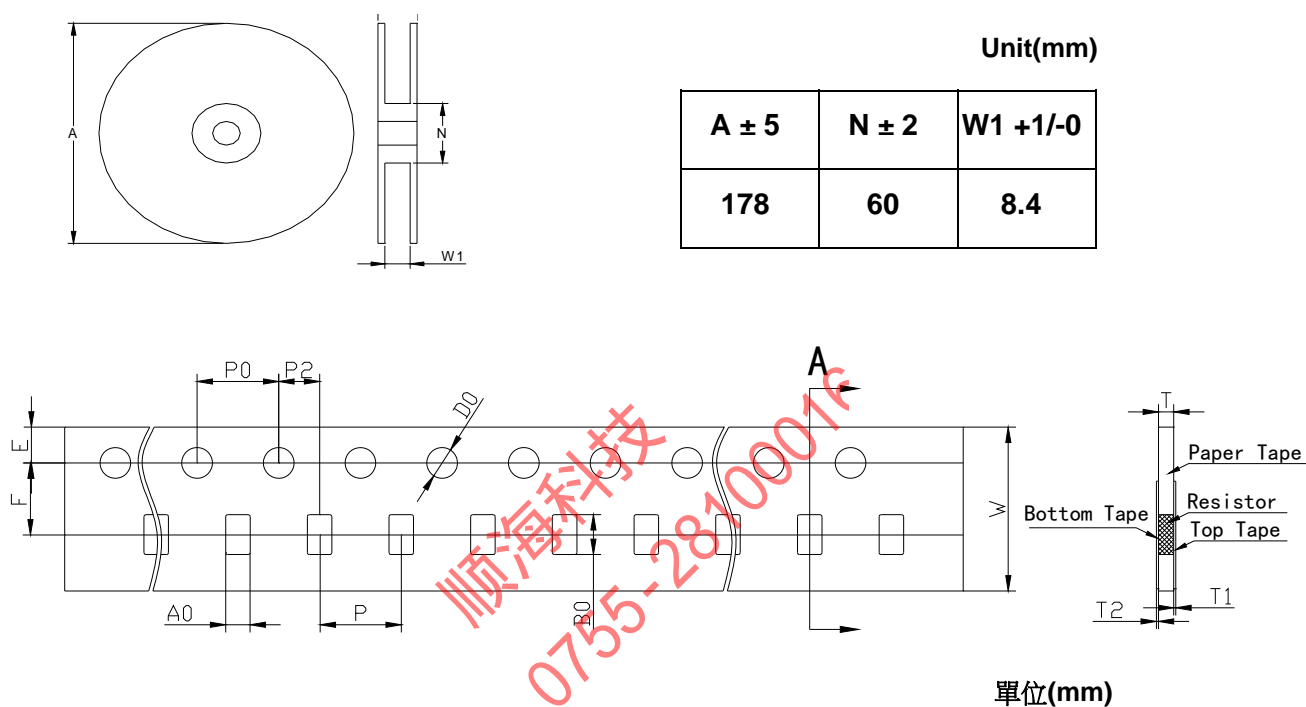
## 11. 包裝訊息 / PACKING INFORMATION

### 11-1 包裝數量、重量 / QUANTITY & WEIGHT



編碼 Part Number	數量 (pcs) Quantity(pcs)	重量 (g) Weight (g)
0603 - F - * A*** - ***	5,000	140±20

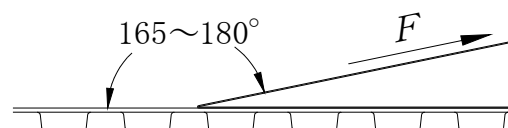
### 11-2 捲輪規格 / Reel & Tape specifications



<b>W</b>	<b>8.00 ± 0.30</b>	<b>D0</b>	<b>1.50 ± 0.10</b>
<b>P0</b>	<b>4.00 ± 0.10</b>	<b>F</b>	<b>3.50 ± 0.10</b>
<b>P</b>	<b>4.00 ± 0.10</b>	<b>E</b>	<b>1.75 ± 0.10</b>
<b>P2</b>	<b>2.00 ± 0.10</b>	<b>T</b>	<b>0.80 ± 0.10</b>
<b>A0</b>	<b>1.20± 0.15</b>	<b>T1</b>	<b>max.01</b>
<b>B0</b>	<b>1.95± 0.15</b>	<b>T2</b>	<b>max.01</b>

### 11-3 密封膠膜剝離強度要求 / Peeling Strength of Seal Tape

F = 剝離強度 : 0.3 – 1.0N ( 30 - 100gf )  
F = Peeling Strength: 0.3 – 1.0N (30 - 100gf)



**12. 其他 / OTHERS**

12-1 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.



12-2 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 , Walter Electronic Technology Co., Ltd. shall amend it by mutual agreement between the parties.

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版次	製作	確認	審核
第1.5版	程正永 2019/11/11	饒紅 2019/11/11	<i>Russel</i> 2019/11/15



# UL iQ for Fuses



## Fuses

E56092

### Guide Information

## SUZHOU WALTER ELECTRONIC CO LTD

Fenhu Technic Development Zone, Wujiang Jiangsu 215211 CN

### J93, 0603F

Supplemental micro fuses

<u>Size</u> <u>mm(in)</u>	<u>Amps</u> <u>(A)</u>	<u>Volts</u> <u>(V)</u>	<u>Interrupting</u> <u>Rating (A)</u>
1.6 x 0.8 x 0.6 (0.06 x 0.03 x 0.02)	0.5 - 0.8	125Vdc	50
	1 - 6	63Vdc	50
	1 - 6	24Vdc	50
	1 - 6	32Vdc	50
	0.5 - 0.8	24Vdc	50
	0.5 - 0.8	32Vdc	50
	0.5 - 0.8	63Vdc	50

Report Date: 2009-06-08

Last Revised: 2018-09-04

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