



功得電子工業股份有限公司
CONQUER ELECTRONICS CO.,LTD.

規格書

Spec. No. SFA029

Specification For Approval

型號：SEF 系列 快速型瓷管保險絲

Model：SEF *Fast Acting Ceramic Surface Mount Fuse*

www.conquer.com.tw

五股廠：新北市五股區五權五路26號(新北產業園區)
Wugu Factory:No.26, Wucyuan 5th Rd., Wugu Dist.,
(New Taipei Industrial Park) New Taipei City
24888, Taiwan
TEL:+886-2-89902189(Rep.)
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北投廠：台北市北投區立德路120巷15號
Peitou Factory:No. 15, Lite Road, Peitou,
Taipei11259, Taiwan.
TEL:+886-2-2895-8895(代表號)
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History of Change

REV.	Description	Date	Drawn	Designed	Checked	Approved
1	(1) Issue	2016.03.10	熊宏偉	邱俊傑	蔡進義	蔡其湖
2	(1)刪除項次11請自行填入	2016.03.15	熊宏偉	邱俊傑	蔡進義	蔡其湖
3	(1)更改項次6 Surge Test→Pulse Test (2)新增項次2 Recommended pad layout (3)新增項次10.3有鉛排除條款說明 (4)新增項次10.4中文解釋 (5)新增項次11建議生產參數 (6)新增項次15溫度-電流流參考曲線 (7)新增項次16 IT曲線圖	2016.04.11	熊宏偉	邱俊傑	蔡進義	蔡其湖
4	(1)修改項次12 新增SEF 1.6A (2)修改項次16 新增SEF 1.6A IT曲線圖	2017.03.21	熊宏偉	邱俊傑	蔡進義	蕭順益

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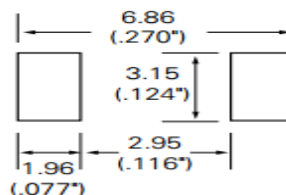
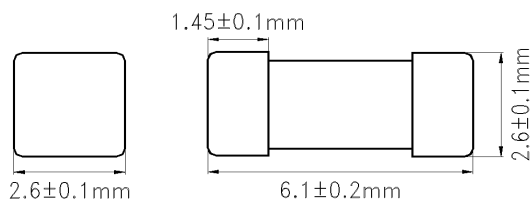
～ 筒管狀保險絲 ～

Fuses for Instrument, Power and Telephone (Non-indicating)

1 適用範圍:本標準適用於保護儀器、電源供應器和電話機用之筒管式熔斷保險絲。
Available Range: For protecting instruments, power supplies and telephone sets.

2 形狀及尺寸如下圖 單位: mm
Shape & Size as following illustrations.

Recommended pad layout



2.1 構造形狀 Structure & Shape : 如上圖 As shown in figure above

2.2 額定電壓 Rated Voltage: 125V/65V

2.3 額定電流 Rated Current: 62mA~15A

3 材料 Material:

3.1 筒管本體: 不透明瓷管不可破裂或變形。

Tube (Body): Non-Transparent ceramic tube fuse. No breaking or deformation is allowed.

3.2 兩端銅蓋: 需以導電率良好之黃銅為材料(銅蓋部份鍍銀)。

Two brass end caps: Made of brass of good conductivity. (Silver Plating)

3.3 銀合金線: 可熔體保險絲線。

Silver Alloy: Fuse element.

NO.	Part Name 部品名稱	Volume 數量
A	Square Cap 方型銅帽 - Silver Plating - 鍍銀	2
B	Square Ceramic Tube 方型瓷管 - Non-Transparent Ceramic Tube - 不透明瓷管	1
C	Fuse Element 可熔體	1

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4 電氣特性Electrical Characteristics:

4.1 負載容量 Loading Capacity:

通過額定電流值 100 % (亦即 $1.0 \times I_n A$) , 能繼續通電至少4小時無任何熔化現象。
Loading 100 % Rated Current (i.e. $1.0 \times I_n A$) for flowing, and it's available to let current keep on flowing at least 4 hour without any melting. (Can keep 4 hours minimum)

4.2 溫度特性 Temperature:

通過額定電流值100%(亦即 $1.0 \times I_n A$)1.5小時，繼續維持原加之電流，每隔十分鐘測試一次，連續測三次，溫度不得升高，若使用熱偶式測量方法，(Thermocouple method) 則本體溫升在 $175^{\circ}C$ 以下。

Loading the 100 % ($1.0 \times I_n A$) for 1.5 hours, keep testing it with the original current every 10 minutes. Continue to test it for 3 times. The temperature is not allowed to be higher.

The main temperature rise is below $175^{\circ}C$ by way of thermocouple method.

4.3 過載熔斷: 請參照下表。

Melting due to overloading: Details as follows Table.

※最大熔斷時限Operating Characteristics

安培數 Rating	100% Rating		200% Rating	
	Min.	Max.	Min.	Max.
62mA~10A	4 Hrs			5 sec
12A~15A	4 Hrs			60 sec

5 機械特性 Mechanical Properties:

拉力強度:當施加軸拉力720g/cm或10牛頓於兩端附腳(或銅帽)，無鬆動或損壞現象發生。
Terminal Strength:Leads and/or caps are soldered (adhered) to withstand axial pulling force of 720g/cm or 10N without loosening or any harmfulness to firmly attachment.

6 突波實驗Pulse Test:

為適應電感或電容性電路所產之暫態電流，本品於10倍額定電流的熔斷時間最少為1ms。
In order to stand transient current caused by inductive or capacitive, the fuses are designed to have minimum clearing time of 1 millisecond at 1000% rated current.

7 脈波實驗 Cycle Test (On-Off Test):

本實驗乃保證產品之壽命與可靠度，施加60%額定電流之脈波，1分鐘ON，2分鐘OFF，1000次以後，本品不熔斷且內阻變化20%以下。

This test is designed to assure a reliable fuse, Controls are set giving 60% of rated ampere. 1 minute ON, 2 minutes OFF per time, the fuse will not open before 1000 times and the internal resistance change will be below 20%.

8 遮斷能力Interrupting rating:

62mA~8A : 50 amperes at 125V AC / DC

300 amperes at 32V DC

12A~15A : 50 amperes at 65V AC / DC

300 amperes at 24V DC

10A : 35 amperes at 125V AC

50 amperes at 125V DC

300 amperes at 32V DC

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9 包裝 Packing:

1000 pcs (7")/盒，20000 pcs /箱。

內盒印明下列標示:料號、額定(電壓、電流、遮斷能力)及安規名稱。

包裝材料均符合RoHS或者HF的環保要求,且包裝材料不會和零件發生化學反應，造成不良。

1000 pcs (7") in an inner box, 20000 pcs in an outter box.

The following items indicated on the box.

Mark: Catalog number; ratings (voltage, current, interrupting capacity), and safety mark.

The packing material conforms to ROHS or the HF environmental protection request.

And the packing material can't have the chemical reaction with the components.

10 其他 Other:

10.1 除非另有指定，上述機械、電器特性，係於常溫，標準狀況下測試之。

Unless otherwise, specified, all tests to be performed at $25\pm 5^{\circ}\text{C}$ and 35-75% RH.

10.2 於標準狀況下儲放一年，本品乃確保上述機械與電氣之特性。

After one year's storage under normal condition, this item is guaranteed to meet the requirements mentioned above.

10.3 使用於此產品之材料中，使用高溫熔化型之焊錫，此焊錫成份中鉛含量大於85%，故此產品符合RoHS指令(2002/95/EC)要求之焊錫含鉛量超過85%之排除條款規範。

Because the materials used in these fuses include high melting temperature type solder and this solder contains more than 85% lead (Pb), so these products can conform to the exempts of the requirements of RoHS Directive (2002/95/EC).

10.4 工作溫度： -55°C to $+125^{\circ}\text{C}$

Operating Temperature： -55°C to $+125^{\circ}\text{C}$

11 建議生產參數：

Recommended Process Parameters：

11.1 波峰參數 Wave Parameter	預熱溫度 Preheat temperature 最低溫度：100度 Temperature Minimum：100°C 最高溫度：150度 Temperature Maximum：150°C	錫槽溫度 Solder Pot Temperature 260度 Maximum 260°C Maximum 焊接時間 2~5 seconds Solder Dwell Time: 2~5 seconds
11.2 建議手持烙鐵焊接參數 Recommended Hand- Solder Parameters	烙鐵溫度：350°C +/-5°C Solder Iron Temperature：350°C +/-5°C 加熱時間：5 seconds max. Heating Time：5 seconds max.	

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12 標記/安規認證 Mark/ Safety certification:

印字方式--->

CQ F ** A

**安培數 Ampere Rating : 62mA~15A

Mark Approvals				Nominal Resistance Cold Ohms
62 mA		*		11.275
80 mA		*		9.9550
100 mA		*		9.5130
125 mA		*		5.8395
200 mA		*		2.0195
250 mA		*		1.1050
300 mA		*		0.8554
375 mA		*		0.7819
400 mA		*		0.5200
500 mA		*		0.4895
700 mA		*		0.2814
750 mA		*		0.1810
1 A	*	*		0.1407
1.5 A	*	*		0.1130
1.6 A	*	*		0.0950
2 A	*	*		0.0594
2.5 A	*	*		0.0384
3 A	*	*		0.0333
3.15 A	*	*		0.0296
3.5 A	*	*		0.0268
4 A	*	*		0.0209
5 A	*	*		0.0179
6 A	*		*	0.0117
7 A	*		*	0.0104
8 A	*		*	0.0095
10 A	*		*	0.0067
12 A	*		*	0.0042
15 A	*		*	0.0025

*: 有安規認證 Have safety certify

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13 產品描述 Product Description: :

描述	安培數
SEF ___A ___V	62mA~15A

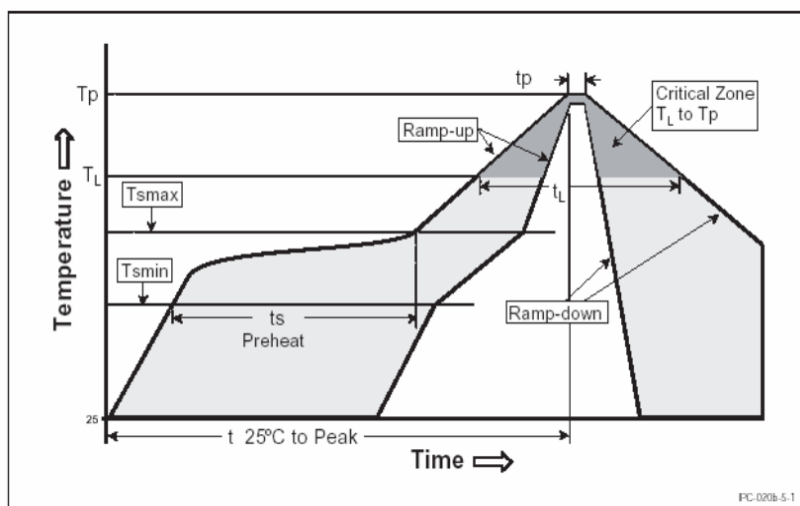
- 1 系列品名 Series Model : SEF
- 2 安培數 Ampere Rating : 62mA~15A
- 3 伏特數 Voltage : 125V / 65V

例: $\frac{\text{SEF}}{1} \frac{\text{A}}{2} \frac{\text{V}}{3}$

14 建議焊接方式及生產參數(無鉛焊錫使用及回流焊):

Recommended Soldering Method and Process Parameters
(for the action to Lead-free solder alloy and reflow soldering):

14.1 Reflow Soldering : 260°C, 30Sec. max.. See detail in the soldering profile.



Reflow Condition		Pb-free assembly
Pre-Heat	Temperature Min. ($T_{s(\min)}$)	150°C
	Temperature Max. ($T_{s(\max)}$)	200°C
	Time (Min to Max) (t_s)	60 - 180 sec
Average Ramp-up Rate (Liquidus Temp (T_L) to peak)		3°C / sec max
$T_{s(\max)}$ to T_L -Ramp-up Rate		5°C / sec max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Time (t_L)	60 - 150 sec
Peak Temperature (T_p)		260 +0/-5°C
Time within 5°C of actual peak Temperature (t_p)		10 - 30 sec
Ramp-down Rate		6°C / sec max
Time 25°C to peak Temperature ($t_{25^\circ\text{C to peak}}$)		8 min max
Do not exceed		260°C

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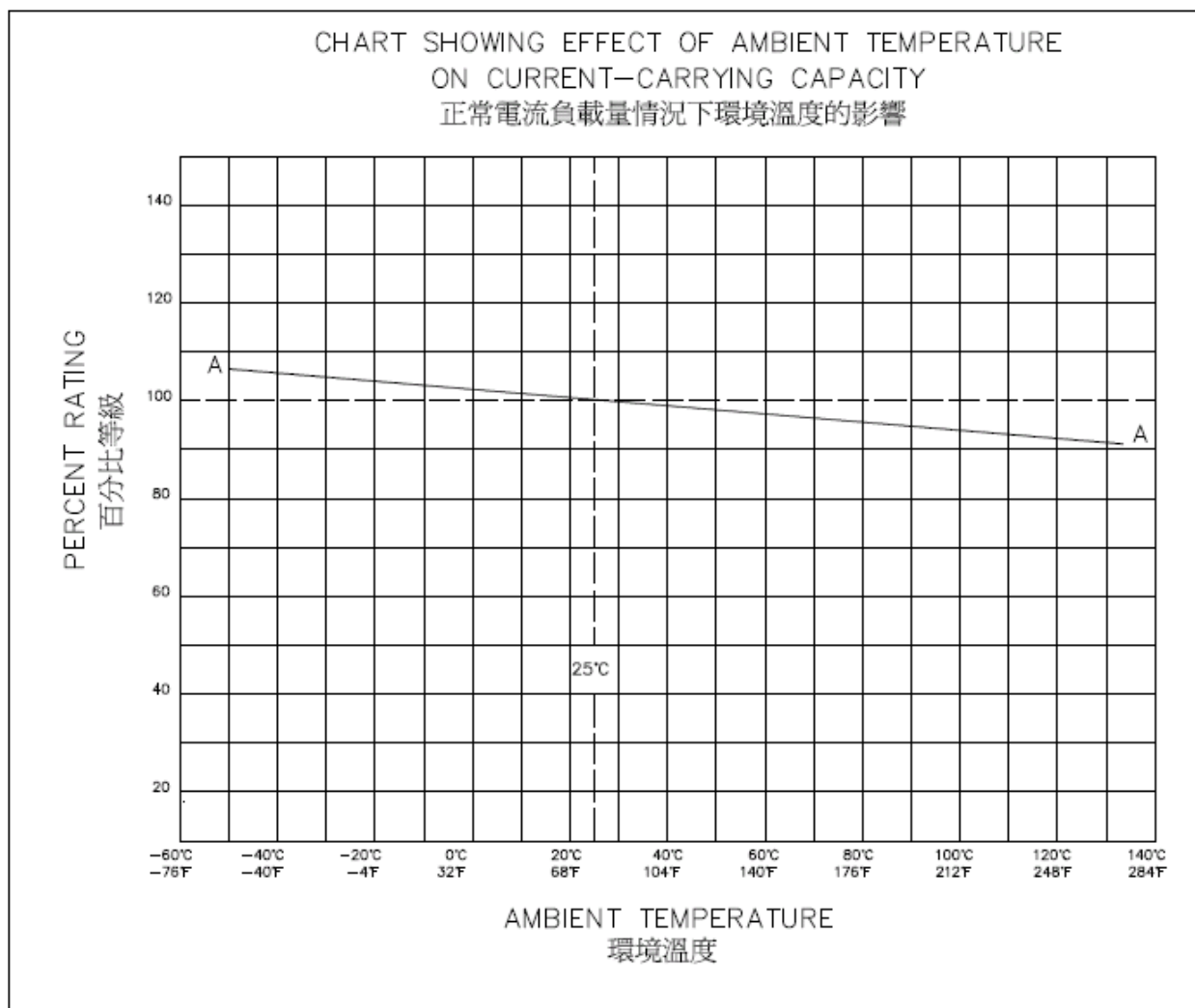
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14.2 Wave Soldering : 260°C, 10Sec. max.

14.3 Hand Soldering : 350°C, 3Sec. max.

15 Temperature Derating curve :



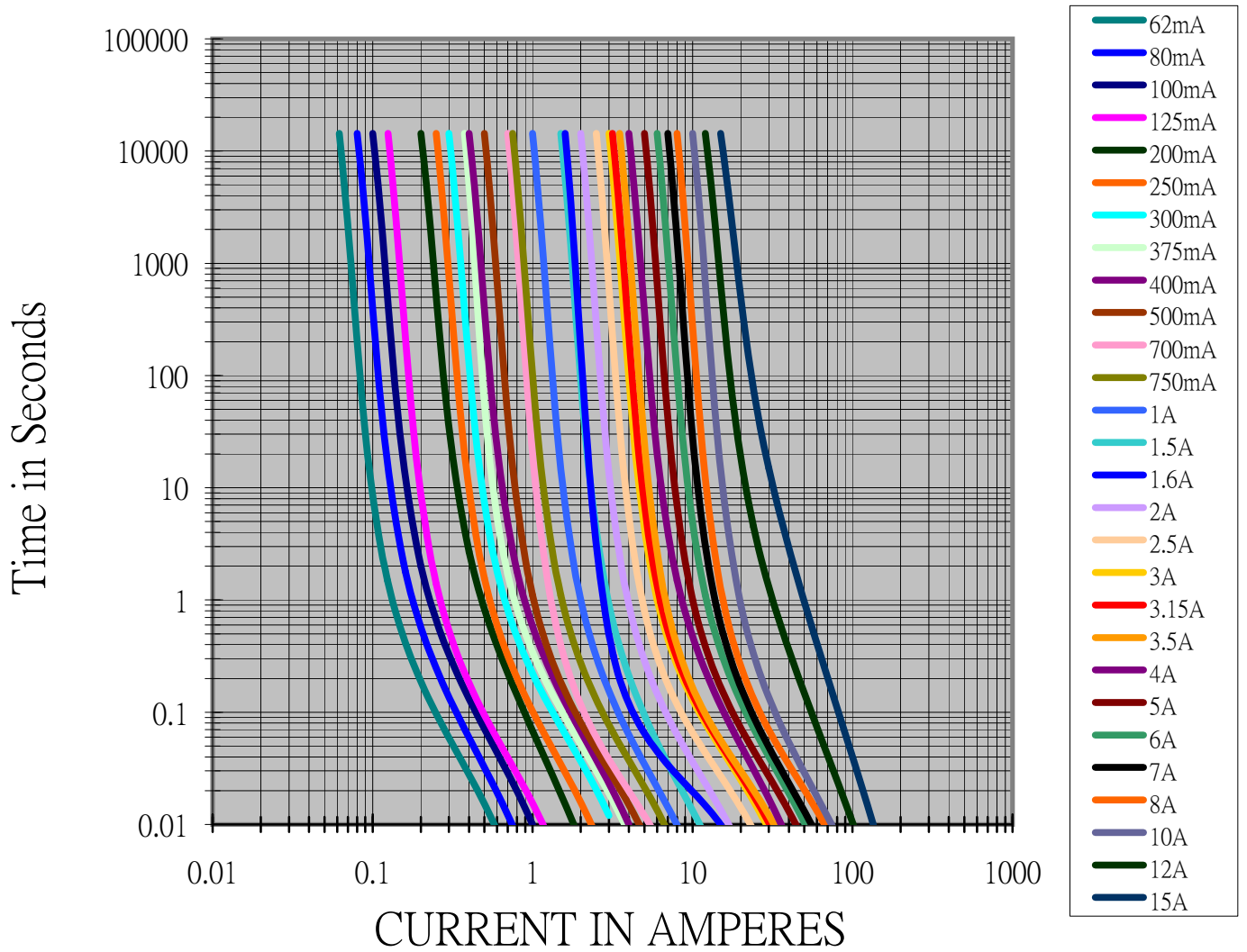
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16. Current / Time 曲線圖



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17 信賴性作業測試規定 Product Characteristics & Reliability Tests:

Test item	Test Description & Reference
Humidity unload test	MIL-STD-202G , Method 103B , Test Condition A Heat (40±0.5°C) & High Humidity (95±1% RH), 240 hours , ΔR<15%
Thermal shock test	MIL-STD-202G, Method 107g , Test Condition B Temperature setup : 25°C ~ -65°C ~ 25°C ~ 125°C Time setup : -65°C (30min)~25°C (5min)~125°C (30min)~ 25°C (5min) 5 cycles , ΔR<15%
Vibration test	MIL-STD-202G , Method 201A Frequency setup : 10 ~ 55 ~ 10 Hz Time setup : 1 Minutes/cycle (X-Y-Z,120 Cycles) 6hrs, ΔR<15%
Salt spray Test	MIL-STD-202G , Method 101E , Test Condition A Salt spray concentration : 5 ± 1% Test liquid temperature : 35 ± 0.5°C 96hrs, ΔR<15%
Solderability test	Reference IEC 60068-2-58 Temperature setup : 250 ± 5°C, 3 ± 0.3 sec After test terminal electrode wetting area must be greater than 95%
Resistance to Solder Heat Test	Reference IEC 60068-2-58 Temperature setup : 260± 5°C, 10± 1 sec ΔR<15%

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