



**CONQUER**  
功得電子

# 規格書

## Specification For Approval

Spec NO. SFA110

**型 號：** SEL 系列

方型瓷管保險絲

**Model：** SEL Series

*Square Ceramic Surface Mount Fuse*

Designed in accordance to UL248 standard.

### Conquer Electronics Co., Ltd.

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## History of Change

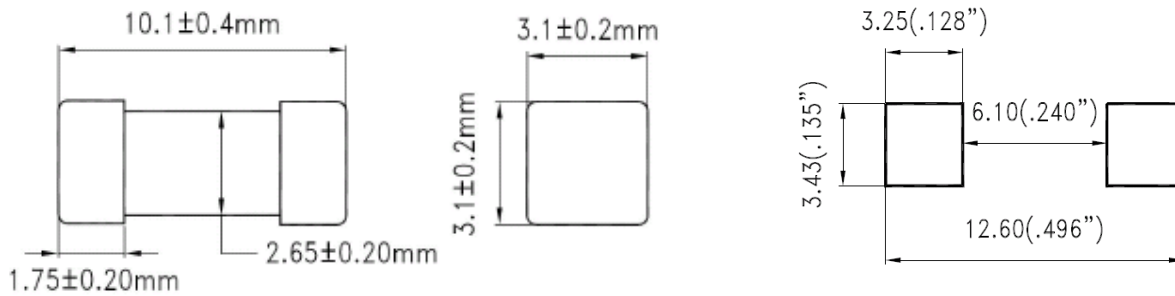
REV.	Description	Date	Drawn	Designed	Checked	Approved
1.0	(1) Issue	2018.12.24	鄭人嘉	勤彥鳴	蔡進義	蕭順益
2.0	(1) 變更封面格式 (2) 變更LOGO (3) 變更項次10 阻值中心更改為阻值範圍	2019.01.29	鄭人嘉	勤彥鳴	蔡進義	蕭順益
3.0	(1) 新增規格40A~60A及相關資訊 (2) 變更項次12.1 Reflow峰值溫度由240°C改 為260°C	2019.04.25	陳志強	勤彥鳴	蔡進義	蕭順益
4.0	(1) 修改項次10 英文敘述部分 (2) 修改項次15 中之耐熱性作業規定，溫度 條件由235°C/30sec.改為260°C/10sec.	2019.05.20	陳志強	勤彥鳴	蔡進義	蕭順益
5.0	(1) 版面重整 (2) 新增項次8 遮斷能力中10A~20A規格之 條件50A 250Vdc	2019.07.11	陳志強	勤彥鳴	邱信雄	蕭順益

~ 筒管狀保險絲 ~  
Fuses for Instrument, Power and Telephone (Non-indicating)

1 **適用範圍** Applications:

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。  
 For protecting instruments, power supplies and telephone sets.

2 **形狀及尺寸** Shape & Dimensions: (單位: mm)



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: 250Vac

2.3 額定電流 Rated Current: 10A ~ 60A

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。

Two brass end caps: Made of brass of good conductivity.

3.3 銅蓋處理: 銅蓋部份鍍金。

Coating of brass caps: Plating the surface with Gold.

**SEL Series**

Part Name 部品名稱	Quantity 數量
Square Cap 方型銅帽	- Gold Plating - 鍍金 2
Square Ceramic Tube 方型瓷管	- Non-Transparent Ceramic - 不透明瓷管 1
Fuse Element 可熔體	1

**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 Hour 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 175K 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 175K by way of thermocouple method.

**4.3 過載熔斷 Melting due to Overloading:**

請參照下表。 Details as Follows Table.

※最大熔斷時限 Operating Characteristics

安培數 Ampere Rating	100% Rating		200% Rating	
	Min.	Max.	Min.	Max.
10A ~ 60A	4 Hr			60 sec

**5 機械特性 Mechanical Properties:**

**拉力強度 Terminal Strength:**

當施加軸拉力1kg於兩端銅帽，無鬆動或損壞現象發生。  
Caps are soldered (adhered) to withstand axial pulling force of 1kg 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 耐久實驗 Endurance (On-Off Cycle 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 Breaking Capacity(Interrupting Rating):**

10A~20A :	100 amperes at 250Vac	50 amperes at 250Vdc
	150 amperes at 125Vac	130 amperes at 80Vdc
		300 amperes at 72Vdc

25A~35A : 100 amperes at 250Vac                      130 amperes at 80Vdc  
 150 amperes at 125Vac                                      300 amperes at 72Vdc

40A~60A : 100 amperes at 250Vac                      100 amperes at 100Vdc  
 150 amperes at 125Vac                                      200 amperes at 75Vdc  
 300 amperes at 65Vac                                         600 amperes at 60Vdc

9 包裝 Packing:

打帶軸裝：SEL 2500pcs/軸(13")/盒；10000pcs/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。

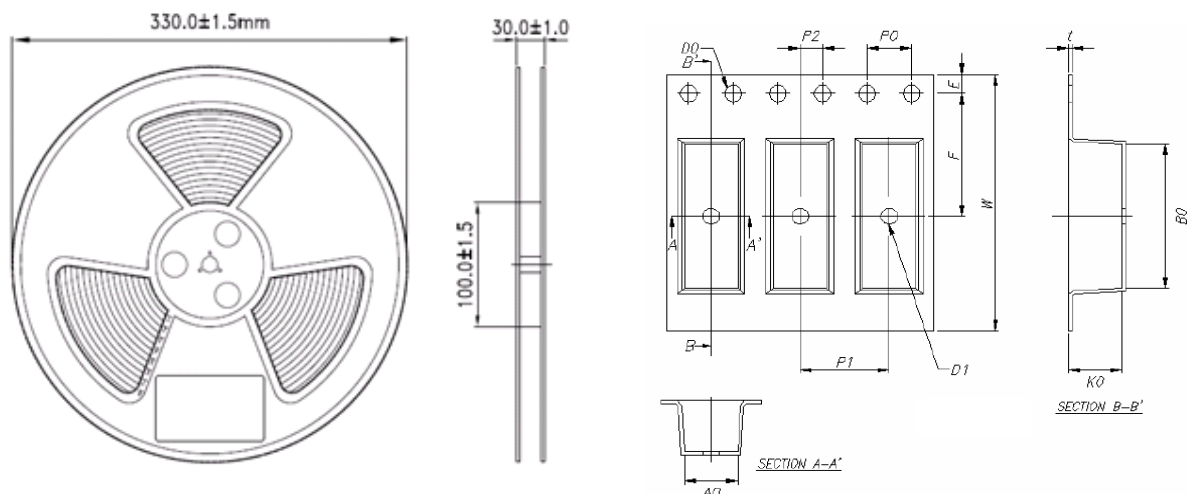
Tape in reel: SEL 2500pcs in a reel(13") in an inner box and 10000pcs in an outer box.

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.



**SEL 10A~60A**


Item	W	P1	E	F	D0	D1	P0	P2	t	K0	A0	B0
Spec	24.00	8.00	1.75	11.50	1.50	1.50	4.00	2.00	0.30	3.40	3.40	10.40
Tolerance	+0.30	+0.10	+0.10	+0.10	+0.10	+0.10	+0.10	+0.10	+0.05	+0.10	+0.10	+0.10
	-0.30	-0.10	-0.10	-0.10	-0.00	-0.00	-0.10	-0.10	-0.05	-0.10	-0.10	-0.10

(Unit: mm)



10 標記/安規認證 Mark/Agency Approvals:

*SEL Series*

Mark Approvals		Nominal Cold Resistance (Ohms)	Nominal Melting I <sup>2</sup> t (A <sup>2</sup> sec.)
10 A	*	0.00469-0.00871	75.000
15 A	*	0.00350-0.00650	141.75
20 A	*	0.00210-0.00390	356.00
25 A	*	0.00168-0.00312	625.00
30 A	*	0.00126-0.00234	900.00
35 A	*	0.00098-0.00182	1320.0
40 A	*	0.00088-0.00164	1897.6
50 A	*	0.00076-0.00140	3150.0
60 A	*	0.00063-0.00117	4224.0

\*: 有安規認證 With agency approvals

I<sup>2</sup>t is measured at 10 times of rated current

印字方式 →



\*\*安培數 Ampere Rating : 10A~60A

11 產品描述 Description :

例: SEL    A    250V  
           1           2           3

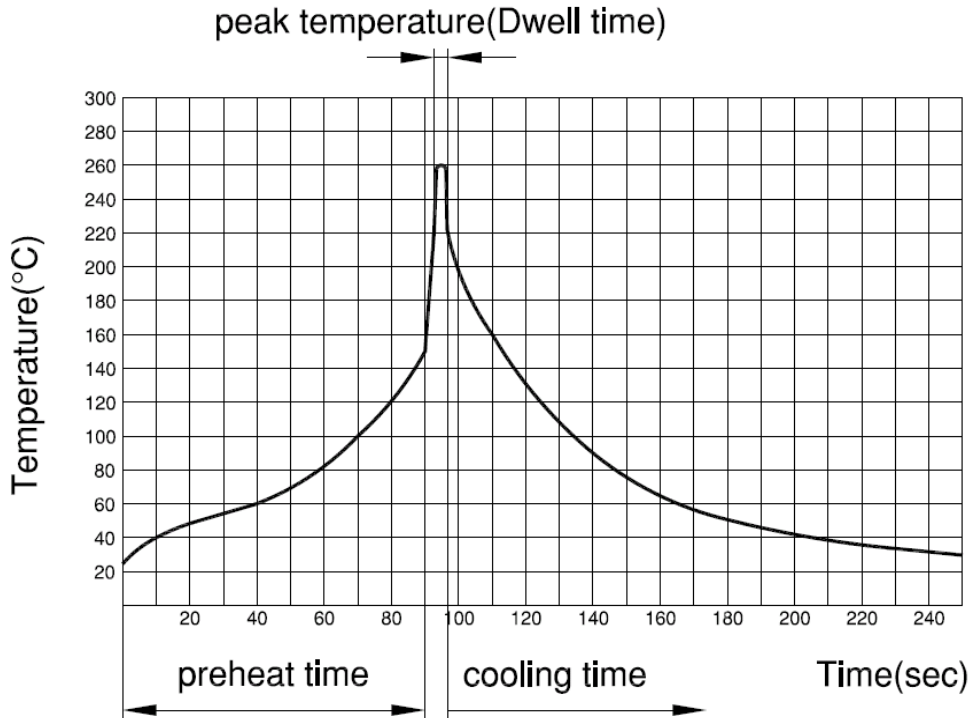
- 1 系列品名 Series Model : SEL
- 2 安培數 Ampere Rating : 10A~60A
- 3 伏特數 Voltage Rating : 250V

12 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) :

12.1 Hand Soldering : 350°C, 3sec. max. (Do not touch the terminal cap.)

12.2 Wave Soldering : 260°C, 3sec. max.



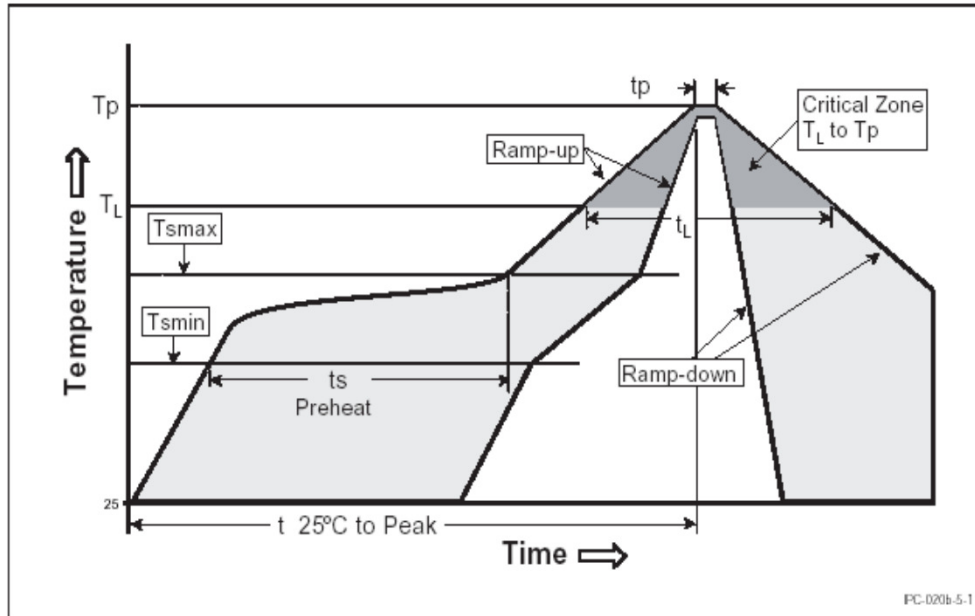
Wave Soldering Condition		Lead-free Assembly
Pre-Heat	Temperature Max.	150°C
	Time (Min. to Max.)	60 - 90 sec
Solder Pot Temperature		260°C max.
Solder Dwell Time		2 - 3 sec

12 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) :

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



Reflow Condition		Lead-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 ( $t_{25°C \text{ to peak}}$ )		8 min max.
Do not exceed		260°C

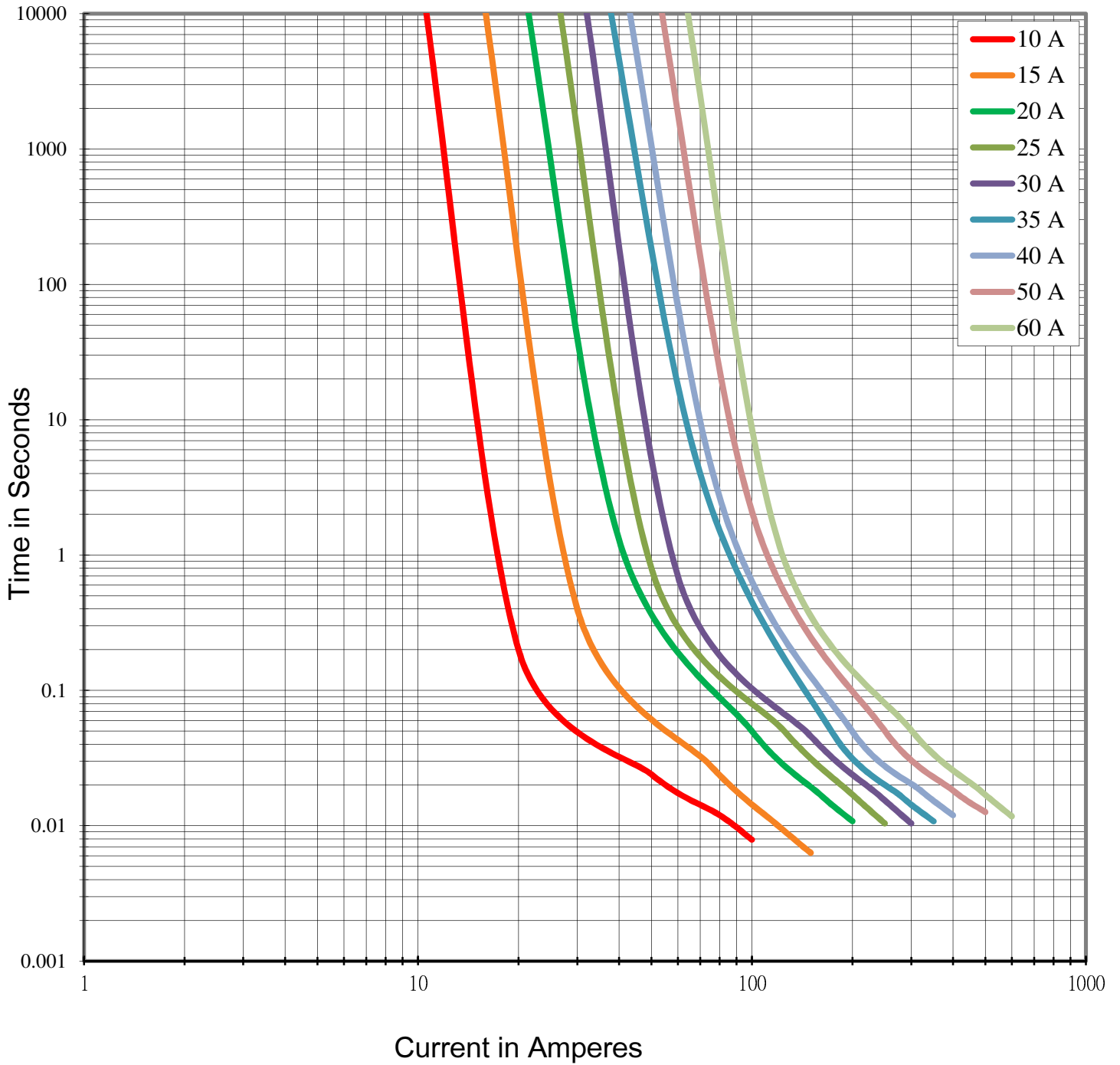
12.2 Wave Soldering : 260°C, 3sec. max.

12.3 Hand Soldering : 350°C, 3sec. max. (Do not touch the terminal cap.)



13 It曲線圖 Time Current Characteristic Curve(I vs t curve):

## Average Melting It Curves



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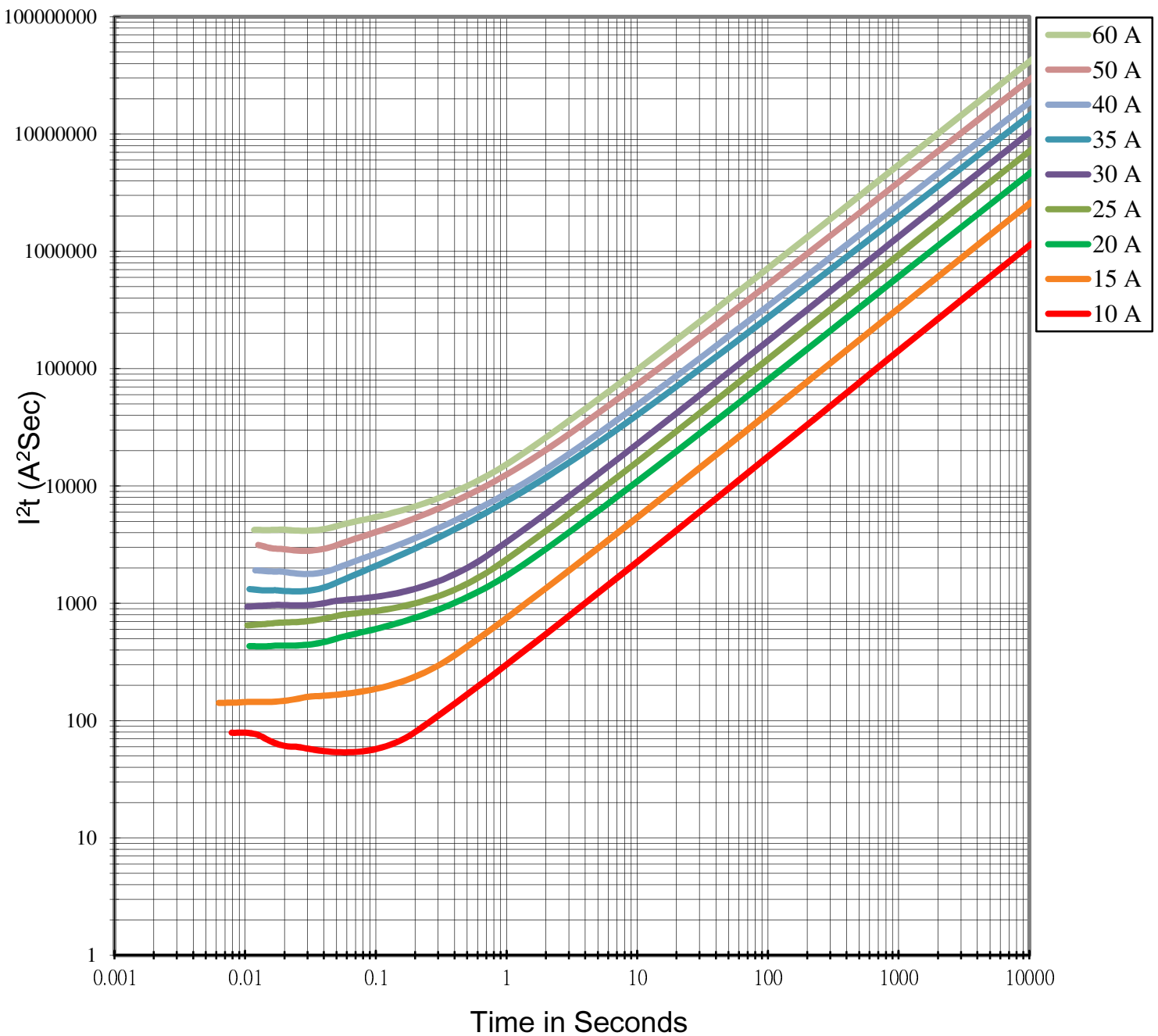
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14 I<sup>2</sup>t 曲線圖 Average Melting I<sup>2</sup>t Curves(I<sup>2</sup>t vs t curve):

## Average Melting I<sup>2</sup>t Curves



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15 信賴性作業測試規定 Product Characteristics:

Test item	Test Description & Reference
Humidity unload test	MIL-STD-202G · Method 103B · Test Condition A Heat (85±0.5°C) & High Humidity (85±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) 6 hrs, 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 96 hrs, ΔR<15%
Solderability test (for reflow soldering condition)	Reference IEC 60068-2-58 Temperature setup : 235 ± 5°C, 10 ± 1 sec After test terminal electrode wetting area must be greater than 95%
Resistance to solder heat test (for reflow soldering condition)	Reference IEC 60068-2-58 Temperature setup : 260 +0/-5°C, 10 sec max. ΔR<15%
Bending test	Reference IEC 60127-4 The board shall be bent by 1mm at a rate of 1mm/sec ΔR<15%



## 16 其他 Other:

- 16.1 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.
- 16.2 於標準狀況下儲放一年內，本品乃確保上述機械與電氣之特性。  
Store under normal conditions for one year, the fuse could meet the electrical and mechanical characteristics in clause 4 and 5.
- 16.3 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 .
- 16.4 操作溫度 Operation:  $-55^{\circ}\text{C}\sim 125^{\circ}\text{C}$

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