



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

規格書

Spec. No. SFA 108

Specification For Approval

型號：EVS 系列 10x38 保險絲

Model：EVS Series 10x38 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)
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History of Change

REV.	Description	Date	Drawn	Designed	Checked	Approved
1	Issue	2018.5.4	蘇聖元	黃琦志	蔡進義 趙宏榮	蕭順益

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

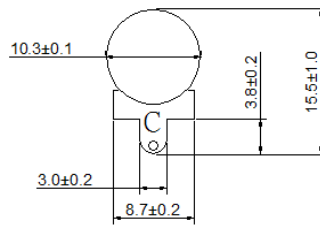
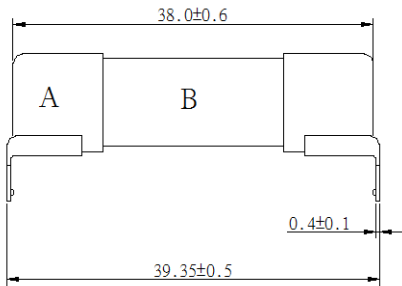
1 適用範圍 Available Range:

本標準適用於保護電動車用系統之筒管式熔斷保險絲。
 For protecting the electrical system of electric vehicle.

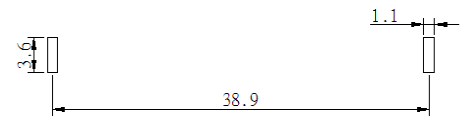
2 形狀及尺寸如下圖 單位: mm

Shape & Size as Following Illustrations.

EVS PCBL Series



Recommend Circuit Board distance



- 2.1 構造形狀 Structure & Shape: 如上圖 As shown in figure above
- 2.2 額定電壓 Rated Voltage: 450V DC
- 2.3 額定電流 Rated Current: 30A

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: 需以導電率良好之銅為材料。
 Two copper alloy end caps: Made of copper alloy of good conductivity.
- 3.3 銅蓋處理: 銅蓋部份鍍鎳。
 Coating of copper alloy caps: Plating the surface with nickel.

No.	Part Name 部品名稱	Volume 數量
A	Copper Alloy Cap 銅帽 - Nickel Plating - 鍍鎳	2
B	Ceramic Tube 瓷管 - Non-Transparent Ceramic Tube - 不透明瓷管	1
C	Terminal 附腳 - Copper (Tin Plated Copper) - 銅鍍錫	2

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4 電氣特性 Electrical Characteristics:

4.1 過載熔斷: 請參照下表。Melting due to overloading: Detail is as following table.

※最大熔斷時限 Operating Characteristics

Test Current	Fuse-links<60A Opening time	
	Min.	Max.
100% In	100hrs	
110% In	4hrs	
135% In	150s	3600s
150% In	10s	1000s
200% In	500ms	100s
300% In	100ms	15s
500% In	50ms	1.0s

4.2 電壓降:通過額定電流值100%(亦即1.0 x In A)15分鐘後,其電壓降不得超過200mV。
Voltage drop: After loading 100% of rated current (i.e.1.0 x In A) for 15 min, the voltage drop should not exceed 200mV.

4.3 溫度特性:通過額定電流值70%(亦即0.7 x In A)40分鐘後,溫度上升不應超過50°C
Temperature rise: Loading 70% of rated current(i.e. 0.7xIn A) for 40 min, the temperature rise should not exceed 50°C.

4.4 絕緣特性:保險絲熔斷後,施加500V直流電壓,絕緣阻抗值不小於1MΩ。
Insulation : After the fuse is blown, the insulation resistance is not less than 1MΩ at 500Vdc volatage.

5 遮斷能力 Interrupting rating:

2000 amperes at 450V DC

10000 amperes at 450V DC

6 機械特性 Mechanical Properties:

拉力強度:當施加軸拉力4 kg於兩端附腳(或銅帽),無鬆動或損壞現象發生。

Terminal Strength : Terminals and/or caps are soldered (adhered) to withstand axial pulling force of 4 kg .

7 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 circuit, the fuses are designed to have minimum clearing time of 1 millisecond at 1000% of rated current.



8 包裝 Packing:

EVS - 50pcs/盒

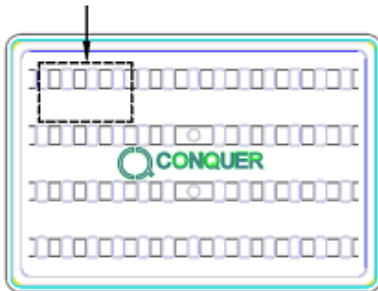
包裝材料均符合RoHS或者HF的環保要求，且包裝材料不會和零件發生化學反應造成不良。

EVS - 50 pcs in an inner box.

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.

虛線框為貼紙黏貼位置



9 其他 Other:

9.1 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.

9.2 於標準狀況下儲放一年，本品乃確保上述電氣之特性。

After one year's storage under normal condition, this item is guaranteed to meet the clause 4 & 5.

10 印字 Marking :

於瓷管表面印安培數、電壓、品名、商標及分斷能力標示。

The rated current, rated voltage, series model, trademark and interrupting rating are marked on the surface of ceramic tube.

標記示意圖



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11 **產品規格** Electrical Specification:

Catalog Number	Ampere Rating [In]	Voltage Rating (V)	Max. Voltage Drop (mV)	Nominal Resistance Cold Ohms	Nominal Melting I^2t A ² Sec
EVS 030	30A	450V	200mV	0.0025	3024.0

(※ I^2t measured at 1000% rated current)

12 **產品描述** Product Description:

描述 Description (Part Number)	安培數 Ampere Rating
EVS ___A ___V ___	30A

例: EVS 30A 450V PCBL
 1 2 3 4

- 1 系列品名 Series Model : EVS
- 2 安培數 Ampere Rating : 30A
- 3 伏特數 Voltage : 450V
- 4 附腳型式 Terminal Type : PCBL (for PCB mount long terminal)

13 **環境特性** Environmental Specification:

操作溫度 Operating Temperature : -55°C ~+125°C

使用環境溫度超出25°C±5°C範圍，在選用保險絲規格時，應考慮使用環境溫度對保險絲的影響如圖2所示。

When the ambient temperature is not at 25°C±5°C, customers should consider the effect of ambient temperature on current-carrying capacity as shown in Fig2.

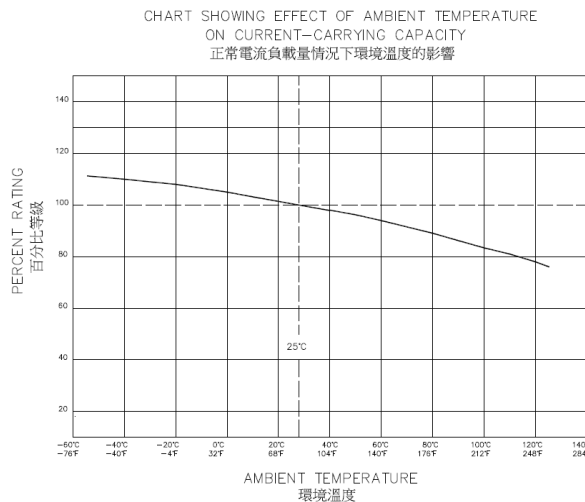


圖2 (Fig 2)

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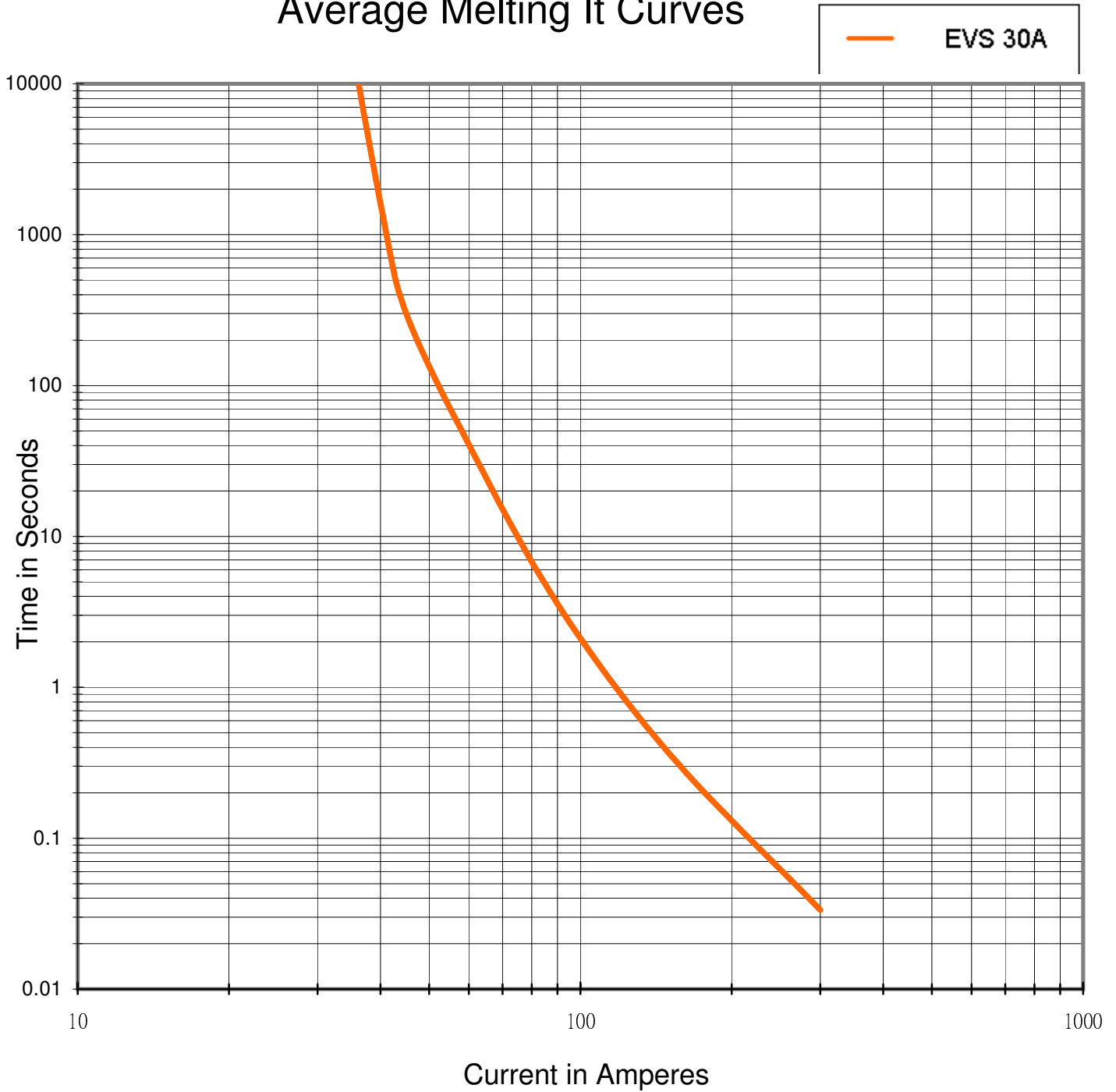
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14 IT 曲線圖 IT Curves:

Average Melting It Curves



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Product Characteristics & Reliability Tests

Test Item	Test Description & Reference
1 Accelerated Ageing (ISO 8820-1 Clause 5.4.3.1)	<p>After voltage drop test, the fuse-links shall be subjected as follows:</p> <p>(a) Maintain the samples at standard conditions for 4 h. (b) Increase t to $(55 \pm 2) ^\circ\text{C}$ at 95 % to 99 % RH within 0,5 h. (c) Maintain t at $(55 \pm 2) ^\circ\text{C}$ at 95 % to 99 % RH for 10 h. (d) Decrease t to $(-40 \pm 2) ^\circ\text{C}$ within 2,5 h; the humidity is uncontrolled. (e) Maintain t at $(-40 \pm 2) ^\circ\text{C}$ for 2 h; the humidity is uncontrolled. (f) Increase t to $(120 \pm 2) ^\circ\text{C}$ within 1,5 h from $(-40 \pm 2) ^\circ\text{C}$; the humidity is uncontrolled. (g) Maintain t at $(120 \pm 2) ^\circ\text{C}$ for 2 h; the humidity is uncontrolled. (h) Allow to return to RT within 1,5 h; the humidity is uncontrolled.</p> <p>After 10 cycles, the fuse should meet Clause 4.1~4.4.</p>
2 Chemical Loads (IEC 60068-2-70 ISO 8820-1 Clause 5.4.4)	<p>Fuses shall be wiped with a cotton cloth having a moistened area of each fluid type in succession. Wipe 5 times with a force of 5N over the external portions of the fuse.</p> <p>Chemicals :</p> <ol style="list-style-type: none"> 1、 Diesel Fuel 2、 Bio diesel fuel 3、 Unleaded petrol (gasoline) 4、 DOT4 brake fluid 5、 Engine coolant water-glycol mixture 1 : 1 6、 Multi-grade engine oil 7、 Engine oil (multi-grade) AU32(Urea) <p>After the test, the marking of fuse should remain legible and colour coding should remain recognisable. And the fuse should meet Clause 4.1~4.4.</p>
3 Mechanical Load	<p>After voltage drop test, the fuse-links shall be subjected as follows:</p> <p>(a) Fuses shall be able to withstand 3 impacts onto a concrete surface after being dropped singly from a height of 1m at random original orientations. The fuse housing shall not crack or the end caps/terminals come apart form the housing.</p> <p>(b) Fuses shall be subjected to a simple harmonic motion with amplitude of 0.76 mm(1.52mm total excursion). The frequency shall be varied uniformly between the limits of 10Hz 55Hz and back to 10Hz in 1-minutes. The motion shall be applied for 3-hours in each of the 3 mutually perpendicular directions (9-hours total). After the Vibration Test. There shall be no physical damage to the fuse and the operation time-rating shall be met.</p> <p>After the above test, the fuse should meet Clause 4.1~4.4.</p>
4 Transient Current Cycling	<p>Fuse shall be subjected to 50,000 pulses of the Transient Current cycle. Each 30s cycle shall have the "spike" portion of the cycle held to 5.6-6 In decaying to 0.9 In at 0.1s and remaining "ON" at 0.9 In for 4.4s and "OFF" for 25.5s.</p> <p>After the above test, the fuse should meet Clause 4.1~4.4.</p>

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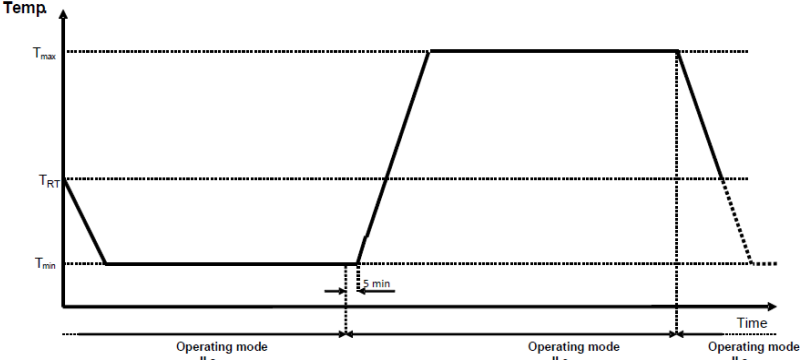
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Product Characteristics & Reliability Tests

Test Item	Test Description & Reference
5 Temperature Shock (ISO 8820-8 Clause 5.10)	After temperature rise test, the fuse-links shall be subjected to 48 temperature shock cycles as follows: (a) 20 min at a temperature of $(-40 \pm 2) ^\circ\text{C}$; (b) 15 s max. transition time; (c) 20 min at the temperature of $(100 \pm 2) ^\circ\text{C}$; (d) 15 s max. transition time. After the above test, the fuse should meet Clause 4.2.
6 Humid heat constant LV 124 Clause 14.14	The fuse-links shall be subjected to heat and humid test as follows: 1. Operating mode: 47 h operating mode II.a (without operating load) and 1 h operating mode II.c (operated at maximum load) 2. Test duration: 96 hrs 3. Test temperature: 65°C 4. Test humidity: 93% relative humidity 5. Number of fuse: 6 pcs After the above test, the fuse should meet Clause 4.1~4.4
7 Current Feed (Current steps) ISO 8820-1 Clause 5.6	First apply a current equivalent in value to the rating of the fuse-link on test until it is temperature stabilized. Sequentially increase the current in steps of 2.5 % of the fuse-link current rating in intervals until it is temperature stabilized. The test ends when the fuse-element melts and the current is interrupted. After the current step test, the fuse-link shall be removable from the test fixture by its intended method after returning to RT.
8 Mechanical Shock LV124 clause 13.5	The fuse-links shall be subjected to mechanical test as follows: (1) Operating mode: If the component is operated with operating load during driving operation: II.c in the "driving operation" operating situation If the component is not operated with operating load during driving operation: II.a (2) Peak acceleration: 500 m/s^2 (3) Shock duration: 6 ms (4) Shock form: Half-sine (5) Number of shocks per direction ($\pm X, \pm Y, \pm Z$): 10 (6) Number of fuse: 6 pcs After the above test, the fuse should meet Clause 4.1~4.4.
9 Lifetime LV 124 Clause 16.3	The fuse-links shall be subjected to lifetime test as follows: (1) $T_{\text{min}} = -40^\circ\text{C}$, $T_{\text{max}} = 125^\circ\text{C}$, (2) Number of Cycles = 320 cycles (3) Operating mode: II.a, and II.c, 15 min/mode After the above test, the fuse should meet Clause 4.1~4.4. 

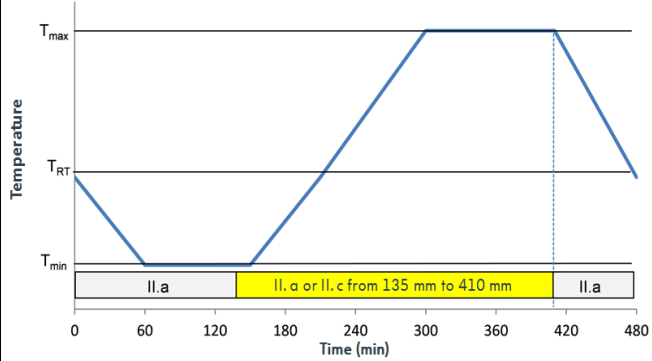
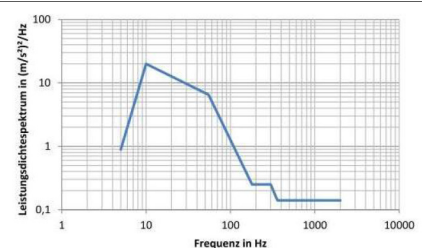
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Product Characteristics & Reliability Tests

Test Item	Test Description & Reference																		
<p>10</p> <p>Vibration LV124 Clause 13.4.2.4</p>	<p>The fuse-links shall be subjected to vibration test as follows:</p> <p>(a) T_{mix}: 125°C, T_{min}: -40°C (b) II.a: 0~135min, OFF (c) II.c: 135~410min, ON (21A) (d) II.a: 410~480min, OFF (e) Frequency: 5~2000Hz (f) Acceleration = 30.8 m/s² (g) Vibration direction: X、Y、Z (h) Each axial test 8 hours</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  </div> <div style="width: 45%;"> <table border="1" data-bbox="861 683 1085 974"> <thead> <tr> <th>Frequency in Hz</th> <th>Power density in (m/s²)²/Hz</th> </tr> </thead> <tbody> <tr><td>5</td><td>0.884</td></tr> <tr><td>10</td><td>20</td></tr> <tr><td>55</td><td>6.5</td></tr> <tr><td>180</td><td>0.25</td></tr> <tr><td>300</td><td>0.25</td></tr> <tr><td>360</td><td>0.14</td></tr> <tr><td>1000</td><td>0.14</td></tr> <tr><td>2000</td><td>0.14</td></tr> </tbody> </table> </div> </div> <div style="text-align: right; margin-top: 10px;">  <p>Bild 30: Schwingungsprofil, Breitbandrauschen für gefederte Massen</p> </div>	Frequency in Hz	Power density in (m/s ²) ² /Hz	5	0.884	10	20	55	6.5	180	0.25	300	0.25	360	0.14	1000	0.14	2000	0.14
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