Customer
(客戶) : 立創電子

**HF**

Part No.
(客戶料號) :

**RoHS**

# 承　　認　　書

# SPECIFICATION FOR APPROVAL

Description
(說明) : **Anti-burst fusible Resistor**
(防爆保險型電阻器)

Futaba Series
(雙羽系列) : **RFB series. (Halogen-Free)**

Futaba Part No.
(雙羽料號) : **see RECOGNITION 2.**

Part No.
(客戶料號) :


台灣雙羽電機股份有限公司
雙羽電子(蘇州)有限公司
雙羽電子(深圳)有限公司

**FUTABA ELECTRIC CO., LTD.**
**FUTABA ELECTRONICS (SU ZHOU) CO., LTD.**
**SHUANGYU ELECTRONICS (SHENZHEN) CO., LTD**

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貴公司承認印
Approval Signatures/Seals

| Product Specification (產品型別)： **RFB series** | | **RVE:** | **S3-A(V3070)** |
|---|---|---|---|
| VER | SPEC Version Record | 雙羽<br>CHECK | RELEASE DATE |
| A | RFB01JR100A520SC　承認 | 熊明偉 | 2026.08.31 |
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| Customer (客戶) | 立創電子 | | S3-A(V3070) |
|---|---|---|---|
| Request for your Approval (承認事由) | ( ☑ New ☐ Engineering Change )<br>( ☑ 新料件 ☐ 工程變更 ) | | |

**RECOGNITION**

(序言)

We are indebted to you for your examination of our products and are pleased to present our insulated, Anti-burst fusible Resistor
(在此很榮幸能向貴公司介紹本公司的產品：防爆保險型電阻器)
The Anti-burst fusible Resistor is a medium power component specifically designed for applications where the high reliability is required.
(防爆保險型電阻器是一中功率型的電阻元件，本元件是針對高信賴度電路應用要求所設計的電阻元件)

Specification(說明)：

1.Kind of Resistor：Anti-burst fusible Resistor **RFB** series.
(1. 電阻類型：防爆保險型電阻器 RFB 系列)

2.Type, Rated Power, Resistance & Tolerance：
(2. 種類 ， 額定功率， 阻值 ， 精密度 )

| Code No.<br>(客戶料號) | Rated Power<br>(額定功率) | Resistance<br>(阻值) | Tolerance<br>(精密度) | Futaba Part No.<br>(雙羽料號) | Packing<br>(包裝) | Remarks<br>(備註) |
|---|---|---|---|---|---|---|
| | 1W | 0.1Ω | ±5% | RFB01JR100A520SC | A52(Ammo) | RoHS |
| | | | | | | |
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3. Resistance Value and Voltage ： see Table 1.
(3. 阻值 與 額定電壓 ：參閱 表格 1 )
4. Wattage at Ambient Temperature ： see Fig 1.
(4. 常溫下的額定功率 ： 參閱 圖 1 )
5. Dimensions ： see Fig 4. and Table 7.
(5. 電阻尺寸 ： 參閱 圖 4,. 和 表格 7 )
6.Coating ： paint, insulated, flameproof
(6. 塗裝：不燃性；絕緣塗料 )

Additional(加註)
We appreciate your wish to entrust us with further business and we are confident that the excellent quality of the resistor dispatched will prove a strong inducement in this direction.
(非常感激敝司能有機會對貴公司提供服務, 相信敝司堅持的品質一定能滿足貴公司嚴格的要求)

| **Draftsman (初稿)** | **Authorized By (審核)** | **FUTABA ELECTRONICS (SU ZHOU) CO., LTD.**<br>雙羽電子(蘇州)有限公司 |
|---|---|---|
| 胡宏利 | 熊明偉 | |

| Product Specification (產品型別)： **RFB series.** | **RVE:** | **S3-A(V3070)** |
|---|---|---|

| Items (項次) | Contents (內容) |
|---|---|

**1.Application (適用範圍)**

This specification covers Anti-burst fusible Resistor, RFB type.
(本規範適用於 防爆保險型電阻器，型別為 RFB )

**2. Type Designation (型別代碼)**

Types are designated as follows (型別代碼說明如下)：

| ex. | RF | B | 01 | J | R100 | A520 | SC |
|---|---|---|---|---|---|---|---|
| | Type (型別) | Size (品名) | Rated Power (額定功率) | Tolerance (精密度) | Resistance (電阻值) | Taping (貼帶) | (小型品 / 塗裝) |
| | (Anti-burst fusible) (防爆保險型) | (wire) (繞線) | (1W) | ( ±5%) | ( 0.1Ω) | (A52) | |

**3.Rating**

**1) Ratings (額定值)**

Ratings are shown at table 1. Ratings
(電阻的使用額定值是規定於表-1)

Table 1. Ratings (表-1 額定值)

| Items (項次) | Contents (內容) |
|---|---|
| Type size (型別品名) | **RFB** |
| Rated wattage (額定功率) | **1W** |
| Working voltage (工作電壓) | AC 250V |
| Maximum overload voltage (最高過負荷電壓) | 500V |
| Dielectric withstanding voltage (塗裝絕緣電壓) | **AC 1,500V** |
| Rated ambient temperature (額定環境溫度) | **25℃** |
| Operating temperature range (使用環境的溫度範圍) | SEE Fig.1 de-rating curve |
| Resistance tolerance (電阻值的精密度) | **J ( ±5%)** |
| Resistance range (額定阻值範圍) | **0.1Ω~100Ω** |

* Rated wattage is the maximum continuous power applicable at ambient temperature from –40 ℃～25 ℃ (額定功率的定義為當使用環境溫度範圍在–40℃～25℃時, 電阻在連續使用的條件下可承受的最高功率 )

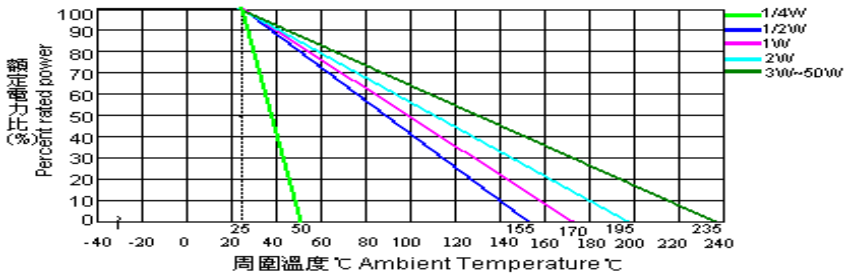



Fig.1 de-rating curve
(圖-1 額定功率遞減曲線)

| Product Specification (產品型別品名)：**RFB series.** | **RVE:** | **S3-A(V3070)** |
|---|---|---|

| Items(項次) | Contents (內容) |
|---|---|

**2).Rated voltage (額定電壓)**

Rated voltage is the D.C voltage at ambient temperature from -40℃ to 25 ℃.
Rated voltage shall be determined from the following formula.
(額定電壓的定義為：當使用環境溫度範圍在-40℃ to 25℃時，電阻可承受的最高直流電壓其計算公式如下: )
If Rated voltage is over maximum operational voltage, then rated voltage is equal to maximum operational voltage on table 1.(當根據下列公式計算出的額定電壓高於表 1 的最高正常使用電壓時, 則額定電壓將以 表-1 的最高正常使用電壓為準 )

$$V = \sqrt{P(W) \times R(\Omega)}$$

Rated voltage (額定電壓) | rated wattage (額定功率) | nominal resistance (額定電阻值)

**4. Nominal resistance (額定阻值)**

Nominal resistance are calculated by the following basic values multiplied by $10^{-1}$, $10^{0}$, $10^{1}$, $10^{2}$, $10^{3}$, $10^{4}$, $10^{5}$(額定阻值為將表-2 的基準值乘以右列倍數)

Table 2. (表-2)

| | basic value (基準值) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E - 96 | 1.00 | 1.21 | 1.47 | 1.78 | 2.15 | 2.61 | 3.16 | 3.83 | 4.64 | 5.62 | 6.81 | 8.25 |
| | 1.02 | 1.24 | 1.50 | 1.82 | 2.21 | 2.67 | 3.24 | 3.92 | 4.75 | 5.76 | 6.98 | 8.45 |
| | 1.05 | 1.27 | 1.54 | 1.87 | 2.26 | 2.74 | 3.32 | 4.02 | 4.87 | 5.90 | 7.15 | 8.66 |
| | 1.07 | 1.30 | 1.58 | 1.91 | 2.32 | 2.80 | 3.40 | 4.12 | 4.99 | 6.04 | 7.32 | 8.87 |
| | 1.10 | 1.33 | 1.62 | 1.96 | 2.37 | 2.87 | 3.48 | 4.22 | 5.11 | 6.19 | 7.50 | 9.09 |
| | 1.13 | 1.37 | 1.65 | 2.00 | 2.43 | 2.94 | 3.57 | 4.32 | 5.23 | 6.34 | 7.68 | 9.31 |
| | 1.15 | 1.40 | 1.69 | 2.05 | 2.49 | 3.01 | 3.65 | 4.42 | 5.36 | 6.49 | 7.87 | 9.53 |
| | 1.18 | 1.43 | 1.74 | 2.10 | 2.55 | 3.09 | 3.74 | 4.53 | 5.49 | 6.65 | 8.06 | 9.76 |

| | basic value(基準值) | | | | |
|---|---|---|---|---|---|
| E - 24 | 1.0 | 1.1 | 1.2 | 1.3 | 1.5 |
| | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 |
| | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 |
| | 4.3 | 4.7 | 5.1 | 5.6 | 6.2 |
| | 6.8 | 7.5 | 8.2 | 9.1 | |

**5.Dimensions and Constructions (尺寸/結構)**

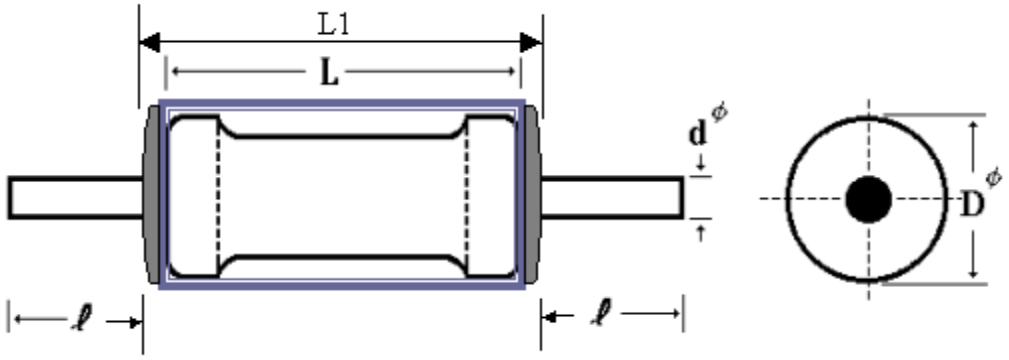



Fig.2. (圖-2)

| Product Specification (產品型別)： **RFB series.** | **RVE:** | **S3-A(V3070)** |
|---|---|---|

| Items (項次) | Contents (內容) |
|---|---|

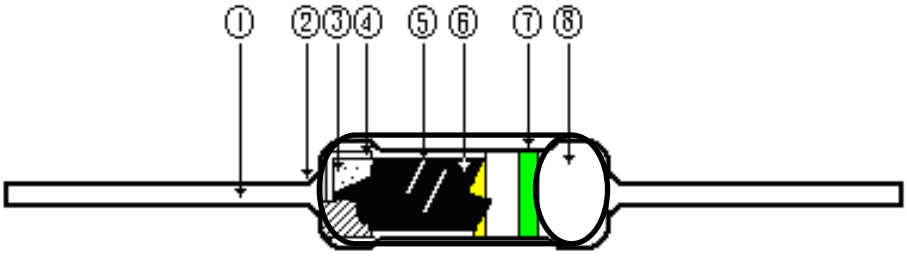
1)Dimensions (尺寸)

Table 3. (表-3) mm (公厘)

| Rated power (額定功率) | body length (長度)L | Package length (長度)L1 | body dia. (直徑)D φ | lead dia. (端線直徑)d φ |
|---|---|---|---|---|
| 1W | 5.5 ±1 | 9（Max） | 5（Max） | 0.6 ±0.05 |
| | | | | |
| | | | | |

Fig.3.

2)Construction 結構圖



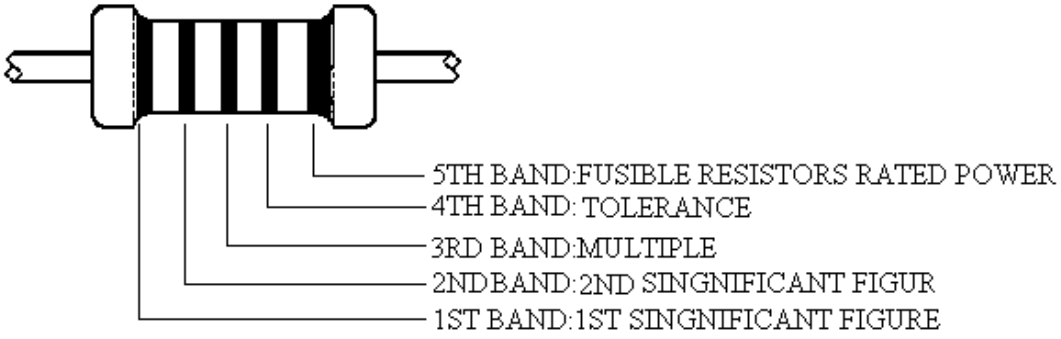

| No. | Parts (組成 | Material (材料) |
|---|---|---|
| 1 | lead wire (端子線) | solder plated copper wire (鍍錫銅線) |
| 2 | contact of cap and lead wire (鐵帽與端線的連接點) | welding (高壓放電點焊接) |
| 3 | ceramic base (陶瓷棒) | alumina ceramic of the kind (氧化鋁) |
| 4 | cap (鐵帽) | tin plated iron base (鍍錫鐵片) |
| 5 | Wire wound (金屬繞線) | Alloy (合金) |
| 6 | marking (捺印) | UV ink (紫外線油墨) |
| 7 | insulation coat (絕緣塗料) | silicon paint of the kind flame proof ( worth UL94-V0 ) (矽化合物) (耐燃材質，符合 UL94-V0) |
| 8 | Ceramic tube (陶瓷管) | aluminum dioxide + silicon dioxide (二氧化矽+氧化鋁) |

| Product Specification (產品型別品名)：**RFB series** | **RVE:** | **S3-A(V3070)** |
|---|---|---|

| Items(項次) | Contents (內容) |
|---|---|

3)
.Marking
(b)

Color Code(色碼表示)




| BAND / COLOR | 1ST BAND (第 1 數位) | 2ND BAND (第 2 數位) | 3RD BAND (乘數) | TOLERANCE (允許誤差率) | TOLERANCE (瓦 特) |
|---|---|---|---|---|---|
| (黑)BLACK | 0 | 0 | 0 | | 1/4W |
| (棕)BROWN | 1 | 1 | 1 | ±1% | |
| (紅)RED | 2 | 2 | 2 | ±2% | 1W |
| (橙)ORANGE | 3 | 3 | 3 | | 1/2W |
| (黃)YELLOW | 4 | 4 | 4 | | 2W |
| (綠)GREEN | 5 | 5 | 5 | ±0.5% | H2W |
| (藍)BLUE | 6 | 6 | 6 | ±0.25% | |
| (紫)VIOLET | 7 | 7 | 7 | ±0.1% | |
| (灰)GREY | 8 | 8 | 8 | ±0.05% | |
| (白(WHITE | 9 | 9 | 9 | | |
| (金)GOLD | | | | ±5% | |
| (銀)SILVER | | | | ±10% | |

4).Out looking
(外觀)

There should be no unusual appearance on the over coat and lead wires.
(電阻體和端子線外觀無明顯異狀)

| Product Specification (產品型別品名)：**RFB series** | **RVE:** | **S3-A(V3070)** |
|---|---|---|

| Items (項次) | Contents (內容) |
|---|---|

6..Characteristics and test methods

Characteristics and test methods are shown in table 6. Characteristics.
(電氣特性與對應的測試方法如表-6)

Table 6. Characteristics (表-6 電氣特性)

| No. | Items (項次) | Characteristics (電氣特性) | Test methods (測試方法) |
|---|---|---|---|
| 1 | Resistance value (電阻值) | class **J** ( **±5 %** ) | JIS C -5201- 1 (4.5 項)<br>classification of applied A |
| 2 | Temperature coefficient of resistance (溫度係數) | ±500ppm/℃ | JIS C -5201- 1<br>measured at room temperature and room temperature+100 ℃ |
| 3 | Short-time overload (短時間過負荷) | resistance change within ±(2 % + 0.1Ω) (阻值變化範圍) | JIS C 5201- 1 (4.13 項)<br>(rated voltage × 2 5 s ) |
| 4 | Endurance (under damp and load ) (高溫高濕負荷壽命實驗) | resistance change within ±(5 % + 0.1Ω) (阻值變化範圍) | JIS C -5201- 1 (4.24 項)<br>1)test temperature.40℃±2℃<br>2) relative humidity 90 % - 95 %<br>3) duration 1,000 hours |
| 5 | Endurance ( rated load ) (負荷壽命實驗) | resistance change within ±(5 % + 0.1Ω) (阻值變化範圍) | JIS C- 5201- 1 (4.25.1 項)<br>1) Rated voltage<br>test temperature70℃±3 ℃<br>2) duration 1,000 hours |
| 6 | Resistance to soldering heat (銲錫耐熱實驗) | resistance change within ±(1 %+0.05Ω) (阻值變化範圍) | JIS C-5201-1 (4.18 項)<br>1)temp. of solder 350℃±10℃<br>2)duration of immersion 3.5 s ±0.5 s |
| 7 | Solder ability (可銲錫性實驗) | 95 % (min) coverage (覆蓋率 95%(最少)) | JIS C-5201-1 (4.17 項)<br>1)temp. of solder 245℃ ± 5℃<br>2)duration of immersion 3 s ±0.5 s<br>3)preparation not applicable |
| 8 | Temperature cycling (溫度循環實驗) | resistance change within ±(1 %+0.05Ω) (阻值變化範圍) | JIS C-5201-1(4.19 項)<br>1) Test temp. -25℃～ +85℃<br>2) number of 5 cycles |
| 9 | Dielectric withstanding voltage (耐電壓實驗) | Flash over, burning, insulation damage should not be observed (不產生火花, 燃燒現象) | JIS C -5201- 1 (4.7 項)<br>1) V-Block<br>2) test voltage：see table 1<br>3) duration time 60 s |
| 10 | Flameproof (不燃性) | No evidence of flaming or arcing (無燃燒現象) | JIS C -5201 -1 (4.23.4 項)<br>AC voltage of,16 times the power rating for 1min.<br>(V≤4 times max. working voltage) |

| Product Specification (產品型別品名)：**RFB series** | **RVE:** | **S3-A(V3070)** |
|---|---|---|

| Items (項次) | Contents (內容) |
|---|---|

Table 6 . Characteristics ( continued ) (表-6 電氣特性 (續) )

| No. | Items (項次) | Characteristics (電氣特性) | Test methods (測試方法) |
|---|---|---|---|
| 11 | Resistance to damp heat (耐高溫高濕) | resistance change within ±(1 % + 0.05Ω) (阻值變化範圍) | JIS C -5201- 1<br>1) test temp. 40℃ ±2℃<br>2) relative humidity 90 % to 95 %<br>3) duration 240 hours |
| 12 | Insulation resistance (絕緣電阻) | more than 1,000MΩ (超過) | JIS C -5201 -1 (4.6.1 項)<br>test voltage<br>DC：500V |
| 13 | Tensile strength (拉力強度) | Neither breakage of the lead wire nor loosening of termination resistance change within ±(1 % + 0.05Ω) (無端線斷裂或端面鬆脫之現象發生. 阻值變化範圍) | JIS C -5201- 1 (4.16 項)<br>10N; 10s±1s |
| 14 | Bending strength (抗折力) | Neither breakage of the lead wire nor loosening of termination resistance change within ±(1 % +0.05Ω) (無端線斷裂或端面鬆脫之現象發生. 阻值變化範圍) | JIS C -5201 -1 (4.16 項)<br>1) 360° Round-trip ; 1.5cycle (0.6 φ )<br>2) 360° Round-trip ; 3 cycle (0.8 φ ) |

| Product Specification (產品型別品名)：**RFB series.** | **RVE:** | **S3-A(V3070)** |
|---|---|---|

| Items(項次) | Contents (內容) |
|---|---|

7.Forming

7.1 Taping (貼帶)

Dimension and form of taping are shown in Fig.4 and table 7
(貼帶的尺寸和造型分別敘述如：圖-4，表-7)

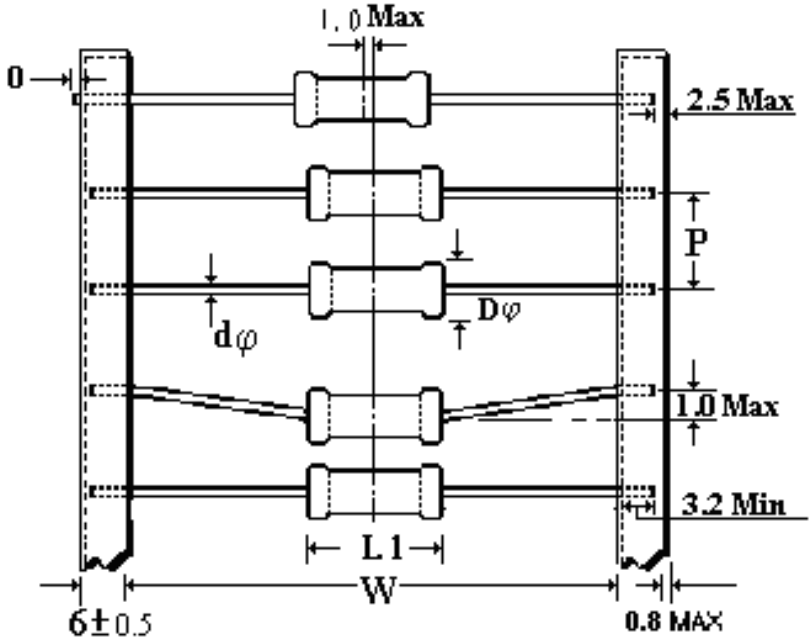



Fig.4 Taping (圖-4 貼帶)

Table 7 (表-7) Unit：mm

| **Rated Power** | **W** | **L1** | **D$\phi$** | **P** | **d$\phi$** | |
|---|---|---|---|---|---|---|
| 1W | 52 ±1 | 9（Max） | 5（Max） | 5 ±0.5 | 0.6 ±0.05 | |
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| Product Specification (產品型別品名)： **RFB series.** | **RVE:** | **S3-A(V3070)** |
|---|---|---|

| Items (項次) | Contents (內容) |
|---|---|

8.Packaging Quantity (包裝數)

| Rated power (額定功率) | Box (pcs) (盒裝(支)) | Forming (造型) | |
|---|---|---|---|
| 1W | 1,000 | A52 | |
| | | | |
| | | | |
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9.The others (其它)

This specification can be modified by the agreement between the customer and the manufacture, in case of necessity to revise the standard of this specification.
(在經過客戶與雙羽協商同意下, 本承認書的標準可予以變更)

10.Doubt (疑問)

If any doubt about this specification occurred, it will be solved by the discussion between the customer and the manufacture.
(對本承認書之任何疑問可經由客戶與雙羽之討論解決之)

11.Revision (修訂)

This specification will be revised through the discussion and consent between the customer and the manufacture.
(本承認書可經由客戶與雙羽之討論同意後予以修訂)

12.Notes (備註)

1)Storage condition (儲存條件)

It is desirable that the Resistors are stored in the ambient temperature from 0 ℃ to 30 ℃ and relative humidity under 65 %. High humidity, dust, harmful gas, for example hydrogen chloride and sulfuric gas should be avoided.
Please do not store the resistors for a long time, use the resistors within a year after the delivery.
(電阻體的恰當儲存條件為 0 ℃ 至 30 ℃ 同時相對溼度低於 65 %. 高濕,灰塵 和有害氣體, 好比 鹽酸氣, 硫酸氣 都需避免接觸電阻體. 電阻請勿儲存過久, 建議在收料 1 年內使用)

2)Power de-rating (功率遞減)

For the long term stability of the application, power should be de-rated obediently according to the power de-rating curve.
(為了維持電阻體在使用中的長期穩定性,使用功率遞減方式需確實遵守功率遞減曲線)

3)Resistor positioning (電阻體的位置)

When the resistors are placed around other electric parts, the minimum space should be kept above 5 mm.
(電阻體與其它電子元件最好距離 0.5 公分)

| Product Specification (產品型別品名)： **RFB series.** | **RVE:** | **S3-A(V3070)** |
|---|---|---|

| Items (項次) | Contents (內容) |
|---|---|

4)Soldering (銲錫)

During the process of soldering, the influence of the heat caused by the soldering should be avoided as much as possible. The suggested condition is under 260 ℃ and within 7 s.
在銲錫過程中, (為了避免高溫影響電阻體, 所以受熱時間最好越短越好. 建議條件為 260 ℃ , 7 秒鐘)

5)Shock to the resistors (對電阻體進行衝撞)

When the resistors are subject to mechanical shock, the resistors might be broken. This is quite likely in the automatic insertion machine. Please adjust the machine accordingly. (當電阻體受到衝撞時, 電阻體可能會斷裂. 這在自動插件時可能發生. 如有類似情形發生, 請調整自動插件機的力量)

Also do not drop the resistors from a high ground. (請勿將電阻體從高處墜落)

6)Forming (造型)

During the forming process, the resistor body and the welding point should not be subjected to too much stress.
(在造型時, 電阻體和焊點必須避免過大的受力)

**7) 2003-01-01 guide Lead-Free products**
**(2003-01-01 導入無鉛產品)**

**8) 2008-08-01 Guide Halogen-Free products.**
**(2008-08-01 導入無鹵產品)**