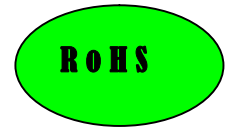


Customer
(客戶) : 立創



Part No.
(客戶料號) : _____



承 認 書

SPECIFICATION FOR APPROVAL



Description
(說明) : Metal Glaze Film Resistors
(金屬釉皮膜電阻器)

Futaba Series
(雙羽系列) : RM 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(深圳)有限公司

雙羽電子(蘇州)有限公司

FUTABA ELECTRIC CO., LTD.

SHUANGYU ELECTRONICS (SHEN ZHEN) CO., LTD.

FUTABA ELECTRIC (SUZHOU) CO., LTD.

9, LANE 240, TAMING ROAD. CHUTUNG, HSINCHU. TAIWAN

TEL : (03) 5966636 FAX : (03) 5943635

E-mail : rita@futaba.com.tw

貴公司承認印

Approval Signatures

Customer(客戶)	立創	REV	S1-A(V1195)
Request for your Approval (承認事由)	(<input checked="" type="checkbox"/> New <input type="checkbox"/> Engineering Change) (<input checked="" type="checkbox"/> 新料件 <input type="checkbox"/> 工程變更)	Date (日期)	Aug.28.2023

RECOGNITION

序言

We are indebted to you for your examination of our products and are pleased to present our insulated, fixed metal glaze resistors.

(在此很榮幸能向貴公司介紹本公司的產品：固定型金屬釉皮膜電阻器)

The fixed metal glaze resistor is a medium power component specifically designed for applications where a highly reliability is required.

(固定型金屬釉皮膜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： Fixed Metal Glaze Film Resistor **RM series.**

(1. 電阻類型： 固定型金屬釉皮膜電阻器 **RM** 系列)

2.Type, Rated Power, Resistance & Tolerance：

(2. 種類，額定功率，阻值，精密度)

Code No. (客戶料號)	Rated Power (額定功率)	Resistance (阻值)	Tolerance (精密度)	Futaba Part No. (雙羽料號)	PACKIND (包裝)	Remarks (備註)
	S2W	2MΩ	±5%	RMS02J2004A520NL	A52(Ammo)	RoHS
	S2W	68KΩ	±5%	RMS02J6802A730NL	A73(Ammo)	RoHS
	S2W	3.9MΩ	±5%	RMS02J3904A520NL	A52(Ammo)	RoHS
	S2W	6.8MΩ	±5%	RMS02J6804A520NL	A52(Ammo)	RoHS
	S2W	2KΩ	±5%	RMS02J2001A520NL	A52(Ammo)	RoHS
	2W	13KΩ	±5%	RMU02J1302A780NL	A78(Ammo)	RoHS
	S3W	750KΩ	±5%	RMS03J7503A640NL	A64(Ammo)	RoHS
	S3W	3.3KΩ	±5%	RMS03J3301A520NL	A52(Ammo)	RoHS

3. Resistance Value and Voltage： see Table 1.

(3. 阻值與額定電壓：參閱表格1)

4. Wattage of Ambient Temperature： see Fig 1.

(4. 常溫下的額定功率：參閱圖1)

5. Dimensions： see Fig 5, and table 7,

(5. 電阻尺寸：參閱圖5,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.

(非常感激敝司可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)	SHUANGYU ELECTRONICS (SHEN ZHEN) CO., LTD. 雙羽電子(深圳)有限公司
江永娣	董青青	

Product Specification (產品型別) : RM series		REV	S1-A(V1195)				
Items (項次)	Contents (內容)						
1.Application (適用範圍)	This specification covers Fixed Metal Glaze Film Resistors ; RM type. (本規範適用於固定型金屬釉皮膜電阻,型別為 RM)						
2. Type Designation (型別代碼)	Types are designated as follows (型別代碼說明如下): Example						
	RM	S	02	J	2004	A750	NL
	型名	品名	額定功率	誤差值	電阻值	二次加工	端子線
	Type	Size	Rated Power	Tolerance	Resistance	Forming	Wire
	RM: 金屬釉 皮膜電 阻器	S:Small	02:2W 03:3W	J:±5%	2004=2MΩ	Taping:編帶 A520=A52 A640=A64 A730=A73 A750=A75	(electric plated) NL:電鍍線

Product Specification (產品型別) : **RM series**

REV

S1-A(V1195)

Items(項次)

Contents(內容)

3.Rating

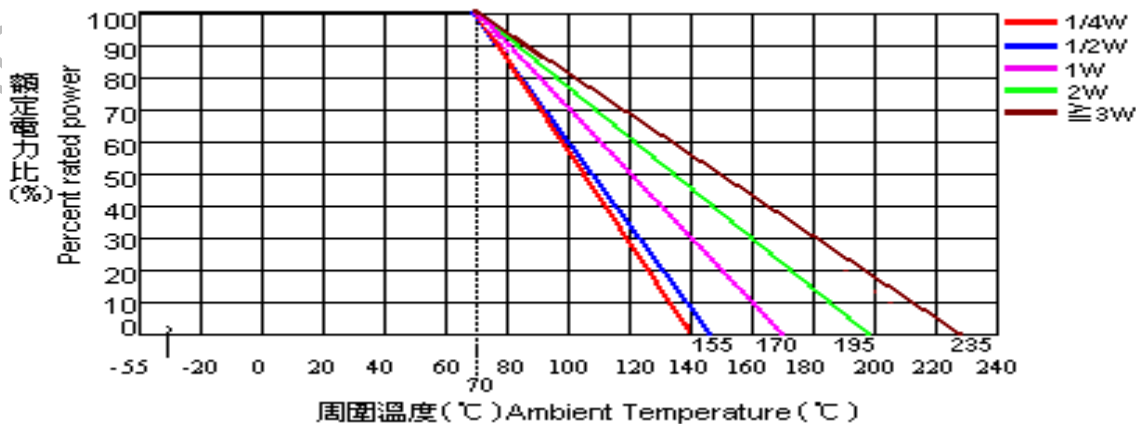
1) Ratings
(額定值)Ratings are shown at table 1. Ratings
(電阻的使用額定值是規定於表-1)

Table 1. Ratings(表-1 額定值)

Items(項次)	Contents(內容)
Type Size(型別品名)	RM
Rated wattage(額定功率)	2W、S3W
Maximum operational voltage (最高正常使用電壓)	\sqrt{PR}
Dielectric withstanding voltage (塗裝絕緣電壓)	700V
Rated ambient temperature (額定環境溫度)	70 °C
Operating temperature range (使用環境的溫度範圍)	(see Fig.1 derating curve)
Resistance tolerance (電阻值的精密度)	J(±5%)

* Rated wattage is the maximum continuous power applicable at ambient temperature from - 55°C~70°C(額定功率的定義為當使用環境溫度範圍在 - 55°C~70°C時，電阻在連續使用的條件下可承受的最高功率)

(see Fig.1 derating curve)



Product Specification (產品型別品名) : RM series	REV	S1-A(V1195)
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Items (項次)	Contents (內容)
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2).Rated voltage
(額定電壓)

Rated voltage is the D.C voltage at ambient temperature from -55°C to 70°C.
 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-55°C to 70 °C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, 10⁰, 10¹, 10², 10³, 10⁴, 10⁵(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)

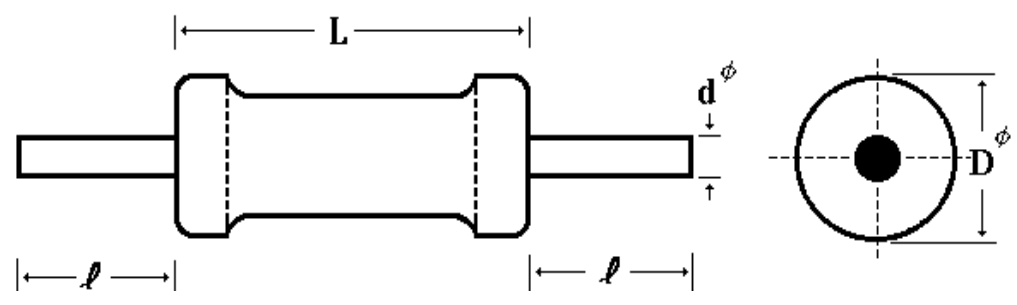
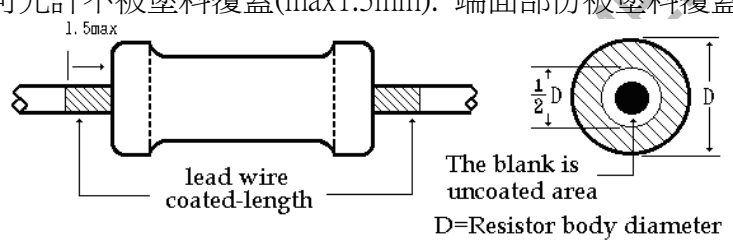
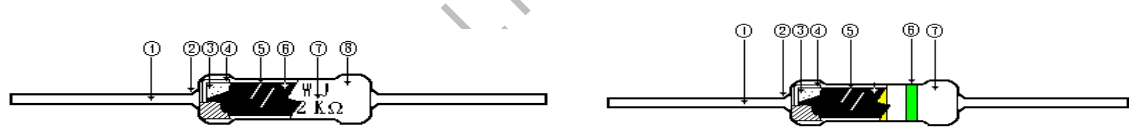


Fig.2. (圖-2)

Product Specification (產品型別) : RM series		REV	S1-A(V1195)
tems(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	Body dia. (直徑)D φ
	S2W	12_{-2}^{+1}	4.5 ± 0.5
	2W、S3W	16_{-2}^{+1}	5.5 ± 0.5
2)Construction (結構圖)	<p>Painting method (塗裝規範)</p> <p>Welding point, terminal and lead wire, is permissible to be exposed without the outer coated cover. The extent should be within 1/2 of the arc angle. (塗裝時電阻的焊點, 端面和端子線可允許不被塗料覆蓋(max1.5mm). 端面部份被塗料覆蓋的限度值為 1/2D)</p>  <p>Fig.3.</p> 		
No.	Parts(組成)	Material(材料)	
1	lead wire (端子線)	tin 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)	aluminum ceramic of the kind (氧化鋁)	
4	Cap (鐵帽)	tin plated iron base (鍍錫鐵片)	
5	helical cutting groove (螺旋切割線)	-----	
6	conductive film (導電皮膜)	metal glaze film (金屬釉皮膜)	
7	Marking (捺印)	Color Code(色環)	
8	Insulation coat (絕緣塗料)	\leq S1/2W: epoxy paint of the kind 絕緣環氧樹脂塗料 \geq 1/2W:silicon paint of the kind flame proof (worth UL94-V0) (矽樹脂塗料) (耐燃材質, 符合 UL94 V0)	

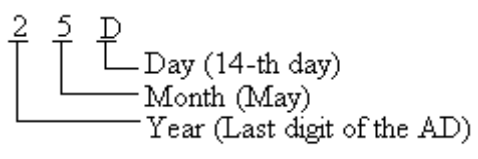
Product Specification(產品型別品名) : RM series	REV	S1-A(V1195)
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Items(項次)	Contents(內容)
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3)Marking
(a)
(捺印(a))

Marking on the resistors are using the following series characters
(在捺印時使用下列字母組合)
M2WJ → (Rated wattage(額定功率), Tolerance(精密度))
2MΩ → (Resistance(阻值))
F U 2 5 D → (Company symbol(商標), Manufacturing date(製造日期))

[Example] The date symbol for the resistors made on May 14, 2012
例子： 2012 年 5 月 14 日的製造日期代碼為下列說明



The symbols representing the manufacturing date(製造日期代碼說明)
Year(年) The last digit of the 4 digits of AD (西元的最後 1 碼)
Month(月) The rules are presented in the following table 4(月份代碼如表-4)

table 4 (表-4)

Month	Symbol	Month	Symbol
January(1 月)	1	July(7 月)	7
February(2 月)	2	August(8 月)	8
March(3 月)	3	September(9 月)	9
April(4 月)	4	October(10 月)	O
May(5 月)	5	November(11 月)	N
June(6 月)	6	December(12 月)	D

Day The rules are presented in the following table 5(日代碼如表-5)

table 5 (表-5)

Day	Symbol	Day	Symbol	Day	Symbol	Day	Symbol
1	1	9	9	17	H	25	T
2	2	10	0	18	J	26	U
3	3	11	A	19	K	27	V
4	4	12	B	20	L	28	W
5	5	13	C	21	M	29	X
6	6	14	D	22	N	30	Y
7	7	15	E	23	P	31	Z
8	8	16	F	24	S	-----	-----

Product Specification(產品型別品名) : RM series

REV

S1-A(V1195)

Items(項次)

Contents(內容)

3).Marking
(b)
(捺印(b))

Color Code(色環表示)



4TH BAND: TOLERANCE
3RD BAND: MULTIPLE
2ND BAND: 2ND SIGNIFICANT FIGURE
1ST BAND: 1ST SIGNIFICANT FIGURE

(±5%)



5TH BAND: TOLERANCE
4TH BAND: MULTIPLE
3RD BAND: 3RD SIGNIFICANT FIGURE
2ND BAND: 2ND SIGNIFICANT FIGURE
1ST BAND: 1ST SIGNIFICANT FIGURE

(±1%)

注：色環斷線可允許 $\leq 1/3$

BAND COLOR	1ST BAND	2ND BAND	3RD BAND	MULTIPLE	TOLERANCE
BLACK	0	0	0	1	
BROWN	1	1	1	10	±1%
RED	2	2	2	100	±2%
ORANGE	3	3	3	1000	
YELLOW	4	4	4	10000	
GREEN	5	5	5	100000	±0.5%
BLUE	6	6	6	1000000	±0.25%
VIOLET	7	7	7	10000000	±0.1%
GREY	8	8	8		±0.05%
WHITE	9	9	9		
GOLD				0.1	±5%
SILVER				0.01	±10%

4).Outlook
(外觀)

There is no unusual evidence affects the characteristics of resistors with the over coat and lead wires. (電阻體和端子線外觀無明顯異狀)

5). Safety
Marking

EN 62368-1:2018 : File No : DK-121135-A1-UL

Product Specification (產品型別品名) : RM series		REV	S1-A(V1195)	
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: ($\pm 5\%$)	JIS C 5201- 1 (4.5 項) classification of applied A
	2	Temperature coefficient of resistance (溫度係數)	<1K Ω : $\pm 500\text{ppm}/^\circ\text{C}$ $\leq 100\text{K}\Omega$: $\pm 300\text{ppm}/^\circ\text{C}$ > 100K Ω : $\pm 200\text{ppm}/^\circ\text{C}$ F % : $\pm 100\text{PPM}/^\circ\text{C}$	JIS C 5201- 1 measured at room temperature and room temperature+100 $^\circ\text{C}$
	3	Short-time overload (短時間過負荷)	resistance change within $\pm(1\% + 0.05\Omega)$ (阻值變化範圍)	JIS C 5201 1 (4.13 項) (rated voltage $\times 2.5 \sim 5\text{ s}$)
	4	Endurance (under damp and load) (高溫高濕負荷壽命實驗)	resistance change within $\pm(5\% + 0.1\Omega)$ (阻值變化範圍)	JIS C -5201- 1 (4.24 項) 1)test temperature. $40^\circ\text{C} \pm 2^\circ\text{C}$ 2) relative humidity 90% - 95% 3) duration 1,000 hours
	5	Endurance (rated load) (負荷壽命實驗)	resistance change within $\pm(5\% + 0.1\Omega)$ (阻值變化範圍)	JIS C- 5201- 1 (4.25.1 項) 1) Rated voltage test temperature $70^\circ\text{C} \pm 3^\circ\text{C}$ 2) duration 1,000 hours
	6	Resistance to soldering heat (銲錫耐熱實驗)	resistance change within $\pm(1\% + 0.05\Omega)$ (阻值變化範圍)	JIS C 5201-1 (4.18 項) 1)temp. of solder $350^\circ\text{C} \pm 10^\circ\text{C}$ 2)duration of immersion $3.5\text{ s} \pm 0.5\text{ s}$
	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) 1)temp. of solder $245^\circ\text{C} \pm 5^\circ\text{C}$ 2)duration of immersion $3\text{ s} \pm 0.5\text{ s}$ 3)preparation not applicable
	8	Temperature cycling (溫度循環實驗)	resistance change within $\pm(1\% + 0.05\Omega)$ (阻值變化範圍)	JIS C 5201-1(4.19 項) 1) Test temp. $-25^\circ\text{C} \sim +85^\circ\text{C}$ 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) 1) V-Block 2) test voltage : see table 1 3) duration time 60 s	
10	Resistance to cold (耐寒實驗)	resistance change within $\pm(1\% + 0.05\Omega)$ (阻值變化範圍)	JIS C 5201-1 (4.23.4 項) 1) test temp. $-25^\circ\text{C} \pm 3^\circ\text{C}$ 2) duration 24+4/-0 hours	

Product Specification (產品型別品名) : RM series

REV

S1-A(V1195)

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 $\pm(1 \% + 0.05 \Omega)$ (阻值變化範圍)	JIS C 5201 1 1) test temp. $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 2) relative humidity 90 % to 95 % 3) duration 240 hours
12	Insulation resistance (絕緣電阻)	more than 1,000M Ω (超過)	JIS C 5201-1 (4.6.1 項) 1) test voltage : DC 100V 2) 額定電壓超過上 500V 時，依 500V 施加。
13	Intermittent overload (斷續過負荷)	resistance change within $\pm(5 \% + 0.1 \Omega)$ (阻值變化範圍)	JIS C 5201-1 (4.13 項) 1) applicable more than 100 Ω 2) Rated voltage $\times 3$ 3) 10,000 cycles
14	Tensile strength (拉力強度)	Neither breakage of the lead wire nor loosening of termination resistance change within $\pm(1 \% + 0.05 \Omega)$ (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) 10N; 10s \pm 1s(1.02kg)
15	Bending strength (抗折力)	Neither breakage of the lead wire nor loosening of termination resistance change within $\pm(1 \% + 0.05 \Omega)$ (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) 1) 360 $^{\circ}$ Round-trip ; 1.5cycle (0.45 ϕ , 0.6 ϕ) 2) 360 $^{\circ}$ Round-trip ; 3cycle (0.8 ϕ)
16	Surge withstanding voltage (脈衝)	Resistance change within $\pm 20 \%$ test circuit 	The following discharge cycle is repeated in the circuit of the left fig. 2.5 sec. ON 2.5 sec. OFF 50 cycles. test voltage (DC source) S1/4W : 3KV ; \geq 1/4W : < 100K Ω : 3KV ; 100K Ω ~ 620K Ω : 5KV ; > 620K Ω : 10KV

Product Specification(產品型別品名) : **RM series**

REV

S1-A(V1195)

Items(項次)

Contents(內容)

7.Forming

7.1Taping

(貼帶)

Dimension and form of taping are shown in Fig.5 and table 7

(貼帶的尺寸和造型分別敘述如：圖-5，表-7)

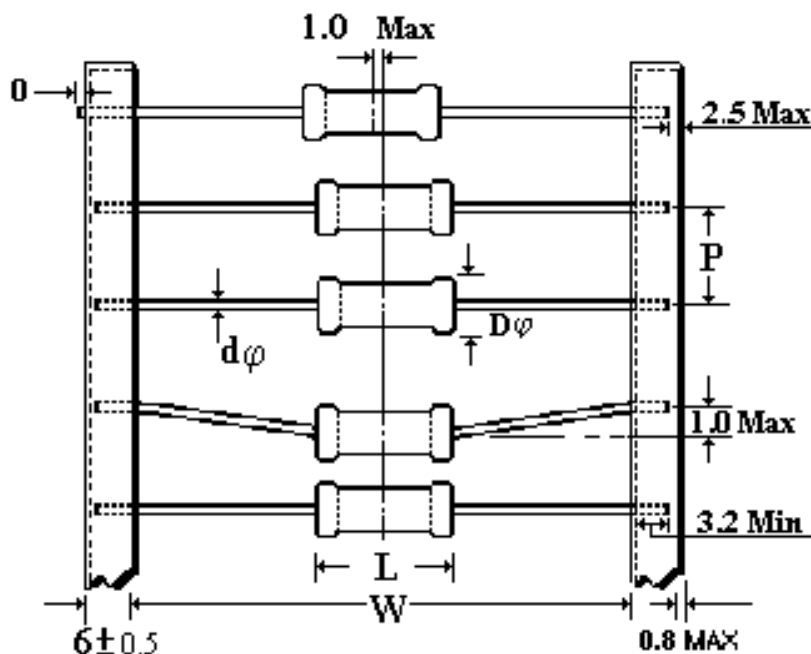


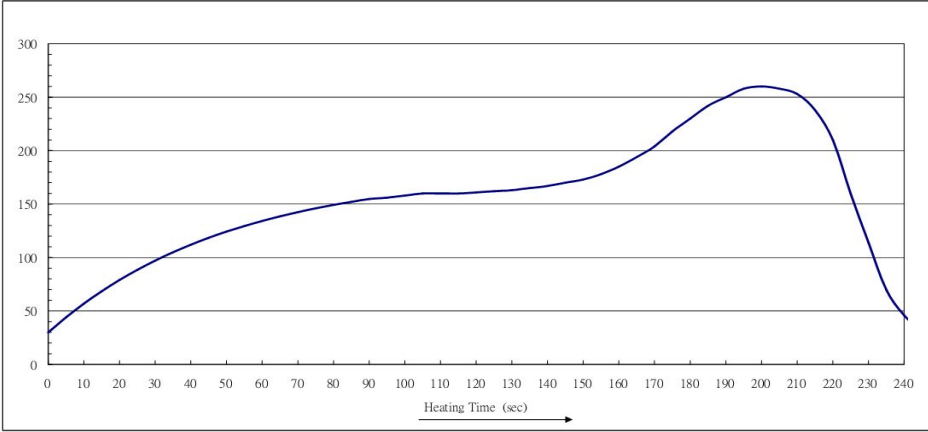
Fig.5 Taping

Table 7 (表-7)

Unit : mm

Rated Power	W	L	Dφ	P	dφ
S2W	73 ±1	12 ⁺¹ ₋₂	4.5 ±0.5	5 ±0.5	0.80 ±0.1
2W、S3W	75±1	16 ⁺¹ ₋₂	5.5 ±0.5	10 ±0.5	0.80 ±0.1

注：Taping编带为胶带，脱带后引脚会粘胶建议不要脱带加工

Product Specification (產品型別品名) : RM series	REV	S1-A(V1195)
Items(項次)	Contents (內容)	
8、耐焊錫溫度曲線圖	<p data-bbox="293 266 552 353">耐焊錫溫度曲線圖</p> <div data-bbox="590 495 1003 555" style="text-align: center;"> <p>台灣雙羽電機股份有限公司 耐焊錫溫度曲線圖 (Lead-Free)</p> </div> <p data-bbox="343 553 630 595"> 1. 沾錫性測試: 245 +5°C / 3.5 sec. 95% 2. 耐焊錫溫度: 260°C / 5 sec </p>  <p data-bbox="119 1070 861 1765" style="transform: rotate(-45deg); opacity: 0.5;">FUTABA ELECTRIC CO., LTD.</p>	

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Items(項次)	Contents (內容)			
9.Packaging Quantity (包裝數)	Rated power (額定功率)	BOX (pcs) (盒裝(支))	Inner box (內盒)	Exterior box (外箱)
	S2W	--	--	--
	S3W	--	--	--
10.The Others (其它)	<p>The standards of the specification can be revised by the agreement between the customer and the manufacture. (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)</p>			
11.Doubt (疑問)	<p>If any doubt about this specification occurred, it could be clarified 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)</p>			
17.Revision (修訂)	<p>This specification will be revised by 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)</p>			
18.Notes (備註)	<p>1)Storage condition (儲存條件) It is desirable that the resistors are stored in the ambient temperature from 0 °C to 30 °C 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. is recommended. (電阻體的恰當儲存條件為 0 °C 至 30 °C 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)</p> <p>2)Power derating (功率遞減) For the long term stability of the application, power should be derated accordingly by the power derating 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)</p> <p>3)Resistor positioning (電阻體的位置) When the resistors are placed around other electrical parts, the minimum space between them should be kept above 5 mm. (電阻體與其它電子元件最好距離 0.5 公分)</p>			

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	<p>4)Soldering (銲錫) During the process of soldering, the effect of heat caused by the soldering should be kept as little as possible. The suggested condition is under 260 °C and within 7 s. (在銲錫過程中, 爲了避免高溫影響電阻體, 所以受熱時間最好越短越好. 建議條件爲 260 °C , 7 秒鐘.)</p> <p>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)</p> <p>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.)</p> <p>7)2003-01-01 guide Lead-Free products (2003-01-01 導入無鉛產品)</p> <p>8) 2008-08-01 Guide Halogen-Free products. (2008-08-01 導入無鹵產品)</p> <p>9) 产品保质期限 3 年。</p>	

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