HF

RoHS

Customer
(客戶) : AKIZUKI DENSHI TSUSHO CO., LTD.

Part No.
(客戶料號) :

承　認　書

SPECIFICATION FOR APPROVAL

Description
(說明) : **Aluminum Cased Power Resistor**
(黃金鋁殼電阻器)

Asian Best Series
(慧羽系列) : **GR series (Halogen-Free)**

Asian Best Part No.
(慧羽料號) : **RGW05J10R0P000GR、RGWA0J15R0P000GR、RGWB5JR100P000GR**

Part No.
(客戶料號) :

慧羽電子科技股份有限公司

ASIAN BEST COMPONENTS CO., LTD.

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貴公司承認印
Approval Signatures/Seals

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新北市汐止區新台五路一段79號12樓之9

Customer (客戶)	**AKIZUKI DENSHI TSUSHO CO., LTD.**	No.	
Request for your Approval (承認事由)	(☑ New ☐ Engineering Change) (☑ 新料件 ☐ 工程變更)	Date (日期)	Apr.22, 2010

RECOGNITION

(序言)

We are indebted to you for your examination of our products and are pleased to present our insulated, Aluminum Cased Power Resistor.

(在此很榮幸能向 貴公司介紹本公司的產品：黃金鋁殼電阻器)

The Aluminum Cased Power Resistor is a medium power component specifically designed for applications where the high reliability is required.

(黃金鋁殼電阻器是一種功率型的電阻元件，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：Aluminum Cased Power Resistor **GR series**

(1. 電阻類型：黃金鋁殼電阻器；**GR** 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)	Part No. (料號)	Packing (包裝)	Remarks (備註)
	5W	**10Ω**	**±5%**	**RGW05J10R0P000GR**	**Bulk**	**RoHS**
	10W	**15Ω**	**±5%**	**RGWA0J15R0P000GR**	**Bulk**	**RoHS**
	25W	**0.1Ω**	**±5%**	**RGWB5JR100P000GR**	**Bulk**	**RoHS**

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 2 and Table 6.

(5. 電阻尺寸：參閱 圖 2 和 表格 6)

6. Coating：silicon cement

(6 塗裝：矽水泥)

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)**	慧羽電子科技股份有限公司 **ASIAN BEST COMPONENTS CO., LTD.**
曾梅娜 04/22/2010	劉雲霞 04/22/2010	

Product Specification (產品型別)：**GR series**	No.:

Items (項次)	Contents (內容)

1.Application (適用範圍)

This specification covers Aluminum Cased Power Resistor：GR type.
(本規範適用於黃金鋁殼電阻器，型別爲 GR)

2. Type Designation (型別代碼)

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

ex.	**RG**	**W**	**B5**	**J**	**R100**	**P000**	**GR**
	Type (型別)	Size (品名)	Rated Power (額定功率)	Tolerance (精密度)	Resistance (電阻值)	(straight) (直線)	Aluminum Cased (黃金鋁殼)
	(Cement) (水泥)	(Wire wound) (繞線)	(25W)	(±5%)	(0.1Ω)	(Bulk)	

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)	**RG**		
Rated wattage (額定功率)	**5W**	**10W**	**25W**
Dielectric withstanding voltage (塗裝絕緣電壓)	**500V**		
Rated ambient temperature (額定環境溫度)	**70℃**		
Operating temperature range (使用環境的溫度範圍)	**-55℃～+155℃**		
Resistance tolerance (電阻值的精密度)	**J (±5%)**		
Resistance range (額定阻值範圍)	**0.1Ω~1.5KΩ**	**0.1Ω~2KΩ**	**0.5Ω~4.7KΩ**

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

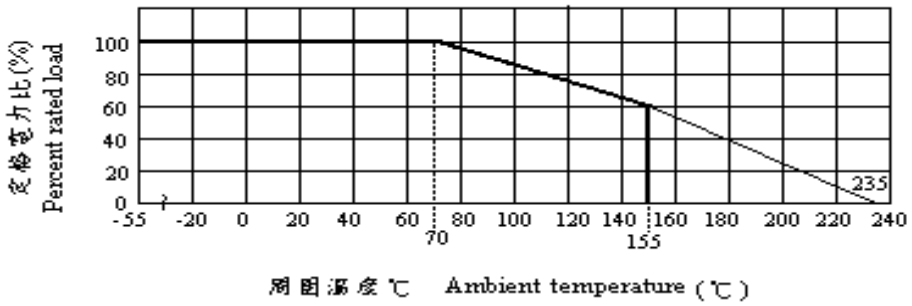


Fig.1 de-rating curve
(圖-1 額定功率遞減曲線)

Product Specification (產品型別品名)：**GR series**	No.:

Items (項次)	Contents (內容)

2).Rated voltage (額定電壓)

Rated voltage is the D.C. or rms A.C. maximum applied voltage at ambient temperature from -55℃ to 70℃. Rated voltage shall be determined by the following formula:
(額定電壓的定義爲：當使用環境溫度範圍在 -55℃ to 70℃ 時，電阻可承受的最高直流電壓或是交流電壓的最高均方根值，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爲準)

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

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} (額定阻值爲將表-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	

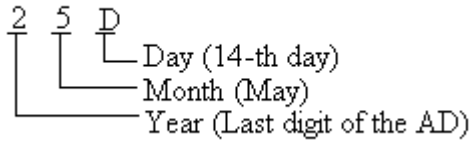
Product Specification (產品型別品名)：**GR series**	No.：

Items (項次)	Contents (內容)

5. Marking (捺印)

Marking on the resistors are using the following series characters:
(在捺印時使用下列字母組合)
25W J 0.1Ω→ (Rated wattage(額定功率), Tolerance(精密度), (Resistance(阻值))
F U 2 5 D WW→ (Company symbol(商標), Manufacturing date(製造日期),
WW: wire wound(繞線)).

[Example] The symbol for the resistors made on May 14, 2002:
例子： 2002 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 3(月份代碼如表-3):

Table 3 (表-3)

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(日) The rules are presented in the following Table 4(日代碼如表-4):

Table 4 (表-4)

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	------	------

4).Outlooking (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)：**GR series**	No.:

Items (項次)	Contents (內容)
6.Characteristics and test methods	Characteristics and test methods are shown in Table 5 Characteristics. (電氣特性與對應的測試方法如表-5)

Table 5 Characteristics (表-5 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-5202 5.1 classification of applied A
2	Temperature coefficient of resistance (溫度係數)	±350ppm/℃	JIS-C5202 5.2 measured at room temperature and room temperature+100℃
3	Short-time overload (短時間過負荷)	resistance change within ±(0.5 % + 0.1Ω) (阻值變化範圍)	JIS-C-5202 5.5 10 Times the rated power for 5 seconds
4	Endurance At upper category temperature (高溫耐熱)	resistance change within ±(1.5 % + 0.1Ω) (阻值變化範圍) no visible damage	JIS-C-5202 7.9 1000 hours；155℃；no load
5	Endurance (rated load) (負荷壽命實驗)	resistance change within ±(5 % + 0.1Ω) (阻值變化範圍)	JIS-C-5202 7.10 1) test temperature 70℃±3℃ 2)1.5 hours on and 0.5 hours off 3) duration 1000 hours
6	Resistance to soldering heat (銲錫耐熱實驗)	resistance change within ±(1.0 % + 0.05Ω) (阻值變化範圍)	JIS-C-5202 6.4 1)temp. of solder 350℃±10℃ 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-5202 6.5 1) temp. of solder 245℃±5℃ 2) duration of immersion 3.0 s ±0.5 s 3) preparation not applicable
8	Temperature cycling (溫度循環實驗)	resistance change within ±(1.0 % + 0.05Ω) (阻值變化範圍)	JIS-C-5202 7.4 1)Test temp. -25℃～+155℃ 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-5202 5.7 1) V-Block 2) test voltage：see Table 1 3) duration time 60 s

Product Specification (產品型別品名)：**GR series**	No.:

Items (項次)	Contents (內容)

Table 5 Characteristics (continued) (表-5 電氣特性 (續))

No.	Items (項次)	Characteristics (電氣特性)	Test methods (測試方法)
10	Resistance to damp heat (耐高溫高濕)	resistance change within ±(1.5% + 0.1Ω) (阻值變化範圍)	JIS-C-5202 7.5 1) test temp. 40℃±2℃ 2) relative humidity 90% to 95% 3) duration 56 days
11	Insulation resistance (絕緣電阻)	more than ≧1000MΩ (超過)	JIS-C-5202 5.6 test voltage： 500V (DC)；1 minute
12	Endurance at upper category temperature (耐高溫)	resistance change within ±(1.5 % + 0.1Ω) (阻值變化範圍)	JIS-C-5202 5.8 1) 1,000 hours；155℃；no load
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-5202 6.1.2(1) Comply with 6.1 and 6.1.2(1)

Product Specification (產品型別品名)：**GR series**	No.:

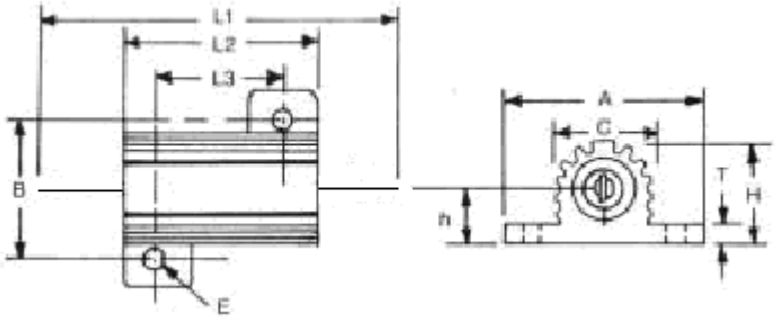
Items (項次)	Contents (內容)

7.Forming

7.1 Straight (直線型)

Fig.2

5W、10W:



25W:

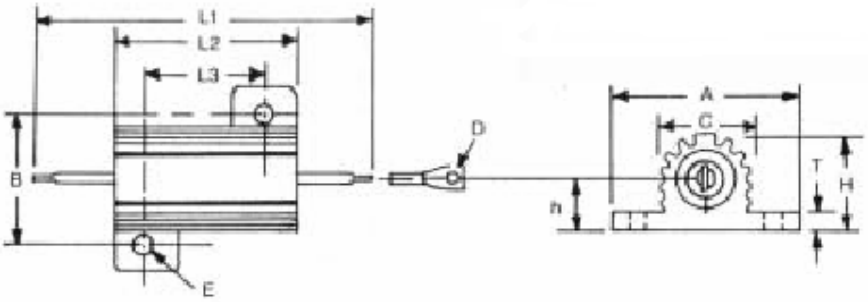


Table 6

Type	Material	Rated Power AT25℃	Resistance Range (Ω)	DIMENSION (mm)										
				L1 ± 2.0	L2 ± 1.0	L3± 0.8	A ± 1.0	B ± 0.8	C ± 1.0	D ± 0.1	E ± 0.3	H ± 1.0	h ± 1.0	T ± 0.2
GR-5	WW	5	0.1Ω～1.5KΩ	82.0	15.0	10.5	16.0	12.0	9.0	- - -	2.5	8.0	4.5	1.6
GR-10	WW	10	0.1Ω～2KΩ	86.0	19.0	14.5	20.5	14.0	10.0	- - -	2.4	10.0	5.0	1.8
GR-25	WW	25	0.5Ω～4.7KΩ	52.0	27.0	18.0	27.3	19.5	15.3	2.2	3.2	15.5	6.6	2.2

Product Specification (產品型別品名)：**GR series**	No.:

Items (項次)	Contents (內容)

8.Packaging quantity (包裝數)

Rated power (額定功率)	**Box (pcs)** (盒裝(支))	**Inner box** (內盒)	**Exterior box** (外箱)
5W	**-----**	**-----**	**525×268×360(mm)**
10W	**-----**	**-----**	**525×268×360(mm)**
25W	**-----**	**-----**	**525×268×360(mm)**

9.The others (其它)

This specification can be revised by the agreement between the customer and the manufacturer, in case of necessity to revise the standard of this specification.
(在經過客戶與敝司協商同意下，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 clarified by the discussion between the customer and the manufacturer.
(對本承認書之任何疑問可經由客戶與敝司討論解決之)

11.Revision (修訂)

This specification will be revised by the discussion and consent between the customer and the manufacturer.
(本承認書可經由客戶與敝司討論後予以修訂)

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 deliver.
(電阻體的恰當儲存條件爲 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.
(爲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)：**GR series**	No.:

Items (項次)	Contents (內容)
	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℃ 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℃, 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)**