



Specification for Approval

Customer : **Dachs Electronica, S.A.**

Product Name: **Resistor Network-SIP**

Part Name : **RNL-5A ±1% 3.3KΩ**

RNL-9A ±1% 1KΩ、3.3KΩ、10KΩ

Part No. : **RNLA**F****B0E**

21 XIAJIA NORTH RD., BINGXI TOWN, KUNSHAN CITY, JIANGSU
PROVINCE, CHINA 215334

TEL: 86 512 57631411 / 22 / 33

FAX: 86 512 57631431

E-mail: globalsales@uniohm.com localsales@uniohm.com

Approved	Checked	Prepared	File NO.	Edition	Date	Page
William Zhao	Apple Liu	Liu Haiqing	SSL - 02 - 015	1	2010.02.21	1/9



Contents

Introduction	Page
1.0 Scope	4
2.0 Ratings.....	4
3.0 Dimension.....	4
4.0 Power rating.....	5
5.0 Voltage rating.....	5
6.0 Circuits Construction.....	5
7.0 Performance Specification	6~7
8.0 Explanation of Part No. System	7~8
9.0 Ordering Procedure	8
10.0 Packing Specification.....	9
11.0 Storage	9

Approved	Checked	Prepared	File NO.	Edition	Date	Page
William Zhao	Apple Liu	Liu Haiqing	SSL - 02 - 015	1	2010.02.21	2/9

昆山厚聲電子工業有限公司
Uniroyal Electronics Industry Company Limited



File Name: RNL-5A、9A ±1%		Date	2010.02.21	Edition No.	1
Amendment Record				Signature	
Edition	Prescription of amendment	Amend Page	Amend Date	Amended by	Checked by

Approved	Checked	Prepared	File NO.	Edition	Date	Page
William Zhao	Apple Liu	Liu Haiqing	SSL - 02 - 015	1	2010.02.21	3/9



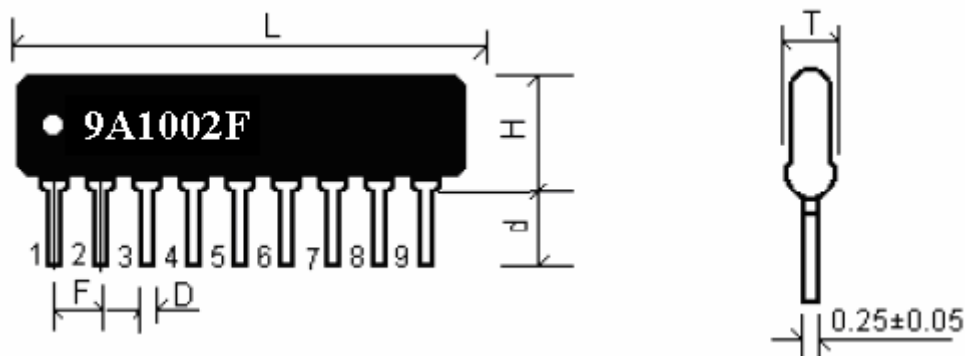
1.0 Scope:

This specification for approve relates to Lead-Free Resistor Network-sip Series manufactured by ROYAL PARTS.

2.0 Rating:

Type	Max Working Voltage	Max Overload Voltage	Dielectric Withstanding Voltage	Resistance Range	Tolerance	Operating temperature
RNL-5A	100V	150V	200V	3.3K Ω	$\pm 1\%$	-55 $^{\circ}$ C~155 $^{\circ}$ C
RNL-9A	100V	150V	200V	1K Ω 3.3K Ω 10K Ω	$\pm 1\%$	-55 $^{\circ}$ C~155 $^{\circ}$ C

3.0 Dimension:



Type	L(max)	H(max)	T(max)	d	D ± 0.1	F ± 0.2
5PIN	12.7	5.08	2.5	+0.5 -0.3	0.5	2.54
9PIN	22.9			3.3		

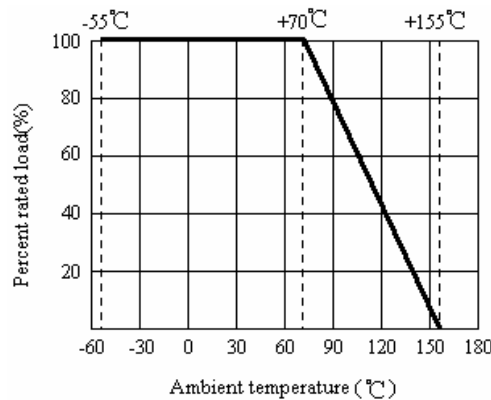
Approved	Checked	Prepared	File NO.	Edition	Date	Page
William Zhao	Apple Liu	Liu Haiqing	SSL - 02 - 015	1	2010.02.21	4/9



4.0 Power rating:

Resistors shall have a power rating based on continuous load operation at an ambient temperature of 70°C. For temperature in excess of 70°C, the load shall be derate as shown in figure 1.

Figure 1



5.0 Voltage rating:

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform corresponding to the power rating, as determined from the following formula:

$$RCWV = \sqrt{P \times R}$$

Where: RCWV commercial-line frequency and waveform (Volt.)

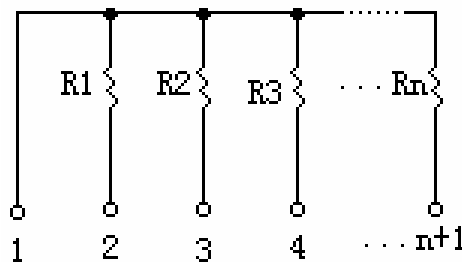
P = power rating (WATT.) R = nominal resistance (OHM)

The overload voltage is 2.5 times RCWV or Max. Overload voltage whichever is less.

In no case shall the rated DC or RMS AC continuous working voltage be greater than the applicable maximum value.

The overload voltage is 2.5 times RCWV or Max. Overload voltage whichever is less.

6.0 Circuits Construction:



$$R1 = R2 = \dots = Rn$$

Approved	Checked	Prepared	File NO.	Edition	Date	Page
William Zhao	Apple Liu	Liu Haiqing	SSL - 02 - 015	1	2010.02.21	5/9



7.0 Performance Specification:

Characteristic	Limits	Test Method (JIS-C-5201&JIS-C-5202)
Temperature Coefficient	$\pm 200 \text{ PPM}/^\circ\text{C}$	4.8 natural resistance changes per temp. Degree centigrade $R_2 - R_1$ $\times 10^6 \text{ (PPM}/^\circ\text{C)}$ $R_1(T_2 - T_1)$ R ₁ : Resistance value at room temp. (T ₁) R ₂ : Resistance value at room temp.+100°C (T ₂) Test pattern: room temp. (T ₁), room temp. +100°C(T ₂)
Short-time overload	Resistance change rate is: $\pm (0.5\% + 0.1 \Omega)$ max. With no evidence of mechanical damage.	4.13 Permanent resistance change after the application of a potential of 2.5 times rcwv for 5 seconds.
Insulation Resistance	10,000 Megaohm Min	4.6 The measuring voltage shall be either (100±15)V DC for resistors with an insulation voltage < 500V or (500±50)V DC, for resistors with an isolation voltage ≥ 500V.
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down.	4.7 Resistors shall be clamped in the trough of a 90°C metallic v-block and shall be tested at ac potential respectively specified in the given list of each product type for 60-70 seconds.
Terminal strength	$\pm (0.5\% + 0.1 \Omega)$	4.16 Tensile: 1KG,30 second / Bending:500g,2 times.
Resistance to soldering heat	$\pm (0.5\% + 0.1 \Omega)$	4.18 Dip the resistor into a solder bath having a temperatuer of 260°C±5°C and hold it for 10±1seconds.
Solderability	95% coverage Min.	Wave Solder: Test temperature of solder: 245°C±3°C Dipping time in solder: 2-3seconds
Thermal Shock	$\pm (0.5\% + 0.1 \Omega)$	4.21 Loaded RWCV at room temp. for 30mins, unloaded and set on -55°C for 15mins, over 2H at room temp. before testing.

Approved	Checked	Prepared	File NO.	Edition	Date	Page
William Zhao	Apple Liu	Liu Haiqing	SSL - 02 - 015	1	2010.02.21	6/9



Temperature cycling	Resistance change rate is: $\pm(0.5\%+0.1\Omega)$ max.. With no evidence of mechanical damage.	4.19 Resistance change after continuous five cycles for duty cycle specified: <table border="1" data-bbox="836 468 1362 714"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>$-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$</td> <td>30Mins</td> </tr> <tr> <td>2</td> <td>Room temp.</td> <td>10 – 15Mins</td> </tr> <tr> <td>3</td> <td>$+155^{\circ}\text{C} \pm 2^{\circ}\text{C}$</td> <td>30Mins</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>10 – 15Mins</td> </tr> </tbody> </table> *Step1-4 Continuous 5 cycles	Step	Temperature	Time	1	$-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$	30Mins	2	Room temp.	10 – 15Mins	3	$+155^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30Mins	4	Room temp.	10 – 15Mins
Step	Temperature	Time															
1	$-55^{\circ}\text{C} \pm 3^{\circ}\text{C}$	30Mins															
2	Room temp.	10 – 15Mins															
3	$+155^{\circ}\text{C} \pm 2^{\circ}\text{C}$	30Mins															
4	Room temp.	10 – 15Mins															
Load life in humidity	$\pm(3\%+0.1\Omega)$	7.9 Resistance change after 1,000 hours (1.5 hours “ON” , 0.5 hour “OFF”) at RCWV in a humidity test chamber controlled at $40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and 90 to 95% relative humidity.															
Load life	$\pm(3\%+0.1\Omega)$	4.25.1 permanent resistance change after 1,000 hours operating at RCWV with duty cycle of 1.5 hours “ON” , 0.5 hour “OFF” at $70^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ambient.															

8.0 Explanation of Part No. System:

The standard Part No. includes 14 digits with the following explanation:

8.1 For Network Resistors, these 4 digits are to indicate the product type but if the product type has only 3digits, the 4th digit will be “0”

Example:

RNLA=Resistor Network

8.2 5th~6th digits:

8.2.1 For Resistor Network, since the power rating is fixed as 1/8W for a circuit, the 5th & 6th digit is to be used to denote the number of pins required.

Example: 05=5PINS 09=09PINS

8.3 The 7th digit is to denote the Resistance Tolerance. The following letter code is to be used for indicating the standard Resistance Tolerance.

G= $\pm 2\%$ J= $\pm 5\%$

Approved	Checked	Prepared	File NO.	Edition	Date	Page
William Zhao	Apple Liu	Liu Haiqing	SSL - 02 - 015	1	2010.02.21	7/9



8.4 The 8th to 11th digits is to denote the Resistance Value.

8.4.1 The following number s and the letter codes are to be used to indicate the number of zeros in the 11th digit:

$$0=10^0 \quad 1=10^1 \quad 2=10^2 \quad 3=10^3 \quad 4=10^4 \quad 5=10^5 \quad J=10^{-1}$$

8.5 The 12th, 13th & 14th digits.

8.5.1 The 12th digit is to denote the Packaging Type with the following codes:

B=Bulk/Box

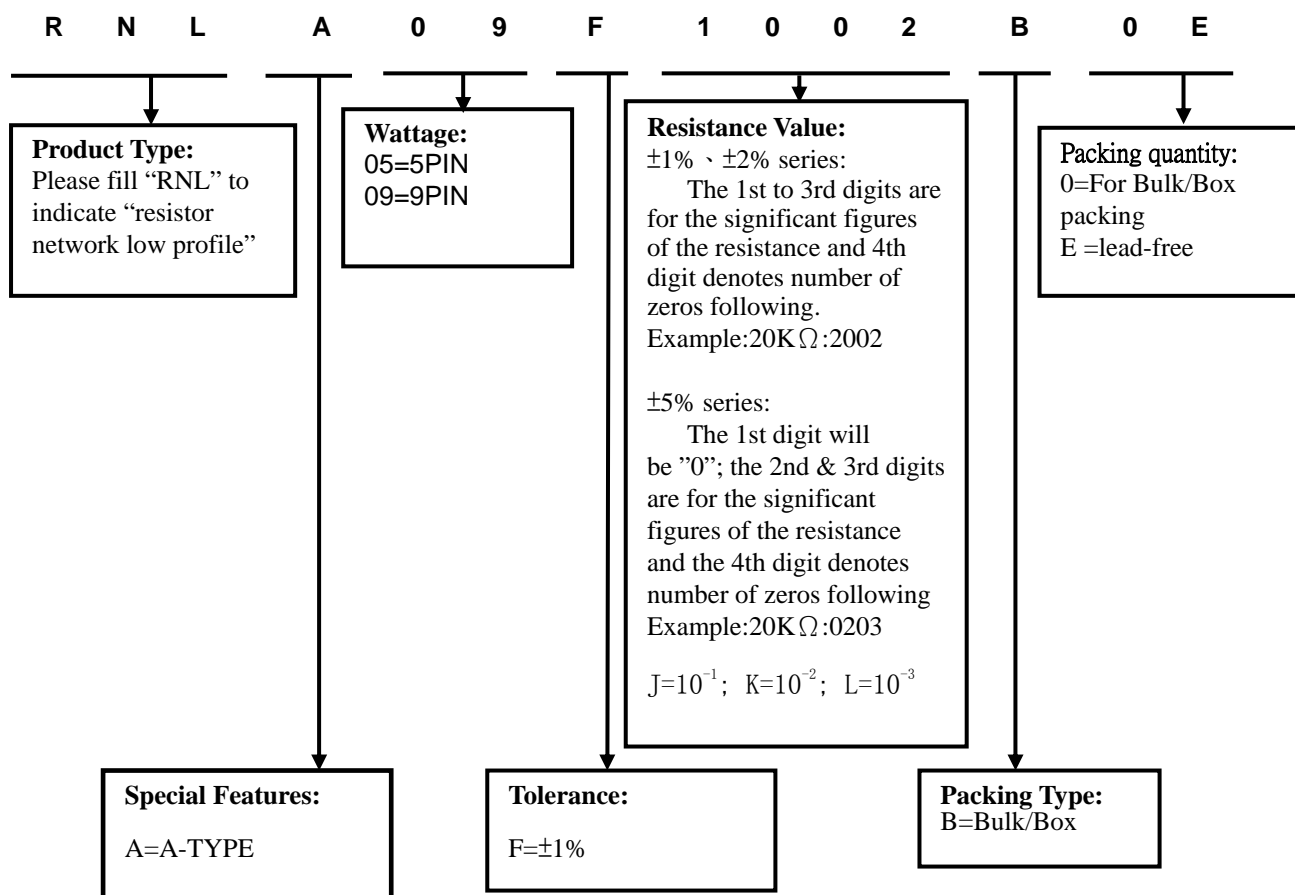
8.5.2 The 13th digit is normally to indicate the Packing Quantity, This digit should be filled with “0” for the Cement products with “Bulk/Box” packing requirements.

8.5.3 For Network, the 14th digit alone can use to denote special features of additional information with the following codes or standard product

Example:

E=For “Environmental Protection, Lead Free type” of Network Resistors.

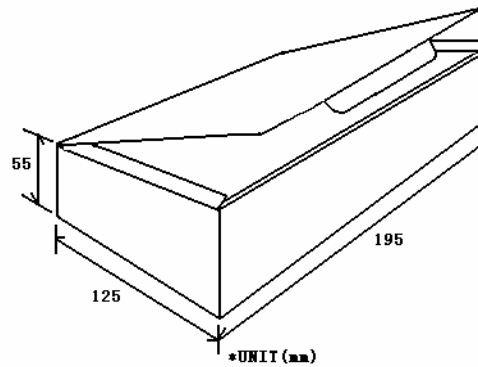
9.0 Ordering Procedure (Example: RNL-A 9PIN ±1% 10KΩ B/B)



Approved	Checked	Prepared	File NO.	Edition	Date	Page
William Zhao	Apple Liu	Liu Haiqing	SSL - 02 - 015	1	2010.02.21	8/9



10.0 Packing Specification:



UNIT: mm

PIN	Quantity Per Bag (pcs)	Quantity Per Box (pcs)	Quantity Per Carton (pcs)
5	400	4,000	60,000
9	200	2,000	30,000

11.0 Storage:

The products should be placed in the dry and ventilation with 15~35°C and lower than 25~75%RH, and prevent it from pressing and humidity. The guaranteed period of product performance is within one year from shipment by the company, provided that the above-mentioned storage conditions have been satisfied.

Approved	Checked	Prepared	File NO.	Edition	Date	Page
William Zhao	Apple Liu	Liu Haiqing	SSL - 02 - 015	1	2010.02.21	9/9