

DATASHEET

Product Name	Resistor Network-SIP Series
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Part Name	RNL Series
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File No.	DIP-SP-020
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1. Scope

- 1.1 This datasheet is the characteristics of Resistor Network-SIP Series manufactured by UNI-ROYAL.
- 1.2 Miniature, high density packaging
- 1.3 High reliability RuO₂
- 1.4 Compliant with RoHS directive.
- 1.5 Halogen free requirement.

2. Part No. System

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

- 2.1 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=Type-A; RNLB=Type-B; RNLC=Type-C; RNLD=Type-D;

RNLE=Type-E; RNLG=Type-G; RNLL=Type-L; RNLR=Type-R;

- 2.2 5th~6th digits:

- 2.2.1 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:

08=8PINS 11=11PINS

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

G= ±2% J= ±5%

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

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

0=10⁰ 1=10¹ 2=10²
3=10³ 4=10⁴ 5=10⁵ J=10⁻¹

- 2.5 The 12th, 13th & 14th digits.

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

B=Bulk/Box

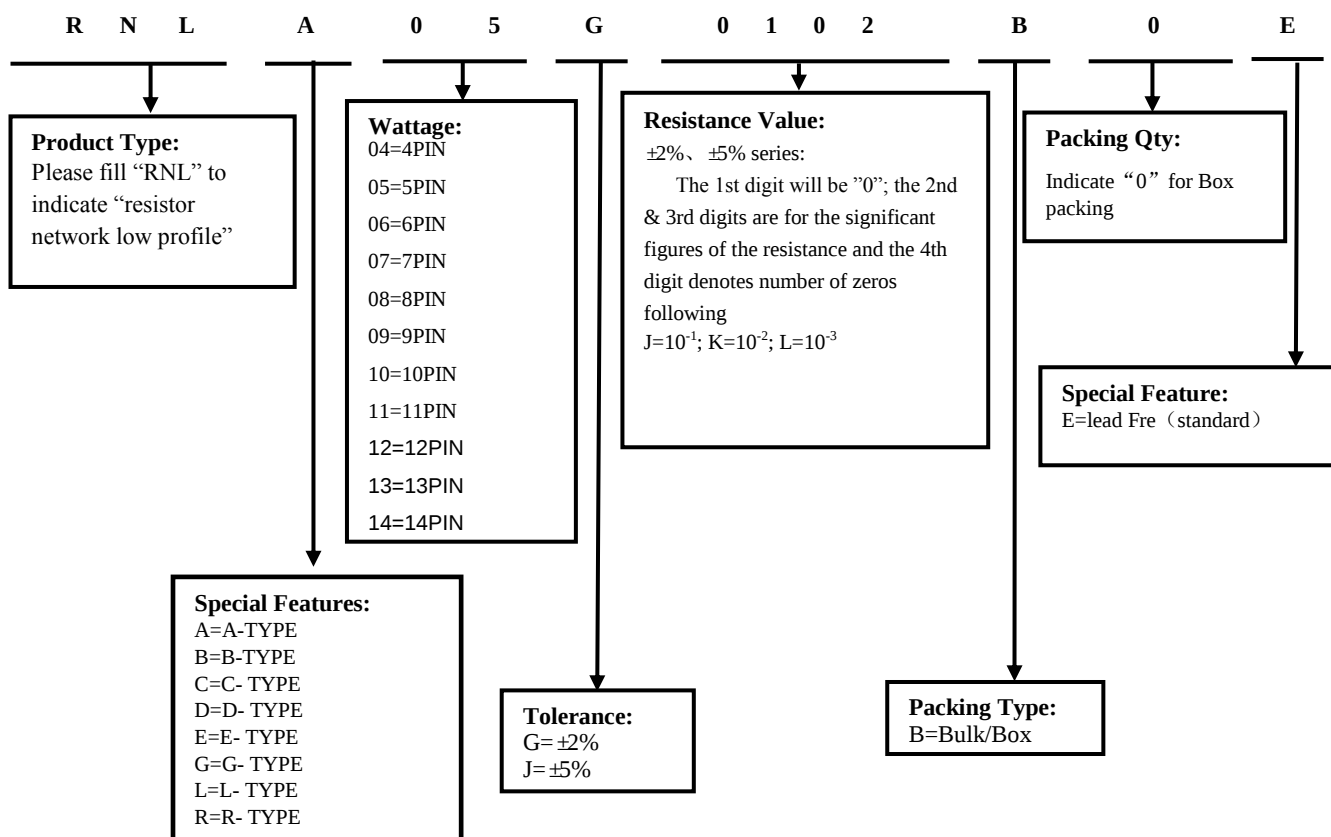
- 2.5.2 The 13th digit is normally to indicate the Packing Quantity, This digit should be filled with "0"for the Cement products with "Bulk/Box"packing requirements.

- 2.5.3 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.

3. Ordering Procedure

(Example: RNL-A 5PIN ±2% 1KΩ B/B)

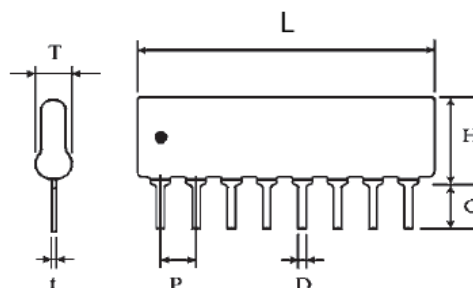


4. Ratings & Dimension

4.1 Ratings:

Type	Power Rating	Max Working Voltage	Max Overload Voltage	Dielectric Withstanding Voltage	Resistance Range	Tolerance	Operating temperature
RNL-A	1/8W	100V	150V	200V	10Ω~1MΩ	±2%、±5%	-55℃~155℃
RNL-B	1/5W	100V	150V	200V	10Ω~1MΩ	±2%、±5%	-55℃~155℃
RNL-C	1/8W	100V	150V	200V	10Ω~1MΩ	±2%、±5%	-55℃~155℃
RNL-D	1/8W	100V	150V	200V	10Ω~1MΩ	±2%、±5%	-55℃~155℃
RNL-E	1/8W	100V	150V	200V	10Ω~1MΩ	±2%、±5%	-55℃~155℃
RNL-G	1/8W	100V	150V	200V	10Ω~1MΩ	±2%、±5%	-55℃~155℃
RNL-H	1/8W	100V	150V	200V	10Ω~1MΩ	±2%、±5%	-55℃~155℃
RNL-L	1/8W	100V	150V	200V	10Ω~1MΩ	±2%、±5%	-55℃~155℃
RNL-P	1/8W	100V	150V	200V	10Ω~1MΩ	±2%、±5%	-55℃~155℃
RNL-R	1/8W	100V	150V	200V	160Ω/240Ω; 180Ω/390Ω; 220Ω/270Ω; 220Ω/330Ω; 330Ω/390Ω; 330Ω/470Ω; 1.5KΩ/3.5KΩ 3.0KΩ/6.2KΩ (Special Value available on a case to case basis.)	±2%、±5%	-55℃~155℃

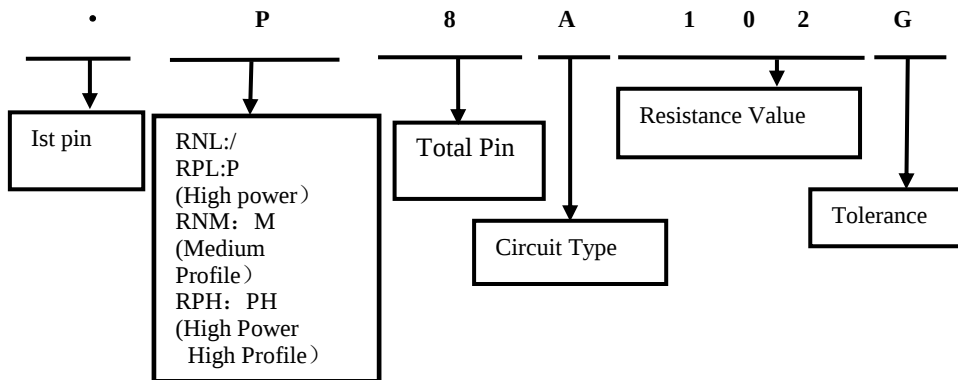
4.2 Dimension (mm) :



Type	L(max)	H(max)	$\begin{matrix} +0.5 \\ C \\ -0.3 \end{matrix}$	T(max)	$t \pm 0.05$	$P \pm 0.2$	$D \pm 0.1$
4PIN	10.2	5.08	3.3	2.5	0.25	2.54	0.5
5PIN	12.7						
6PIN	15.3						
7PIN	17.8						
8PIN	20.4						
9PIN	22.9						
10PIN	25.4						
11PIN	28.0						
12PIN	30.5						
13PIN	33.1						
14PIN	35.6						

5.0 Marking

5.1 Marking (Single Value) :



RNL

● 8A103G

RPL

● P8A103G

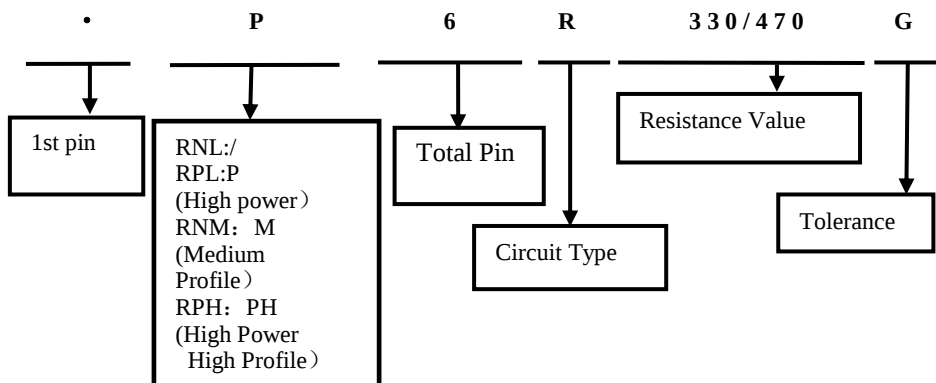
RNM

● M8A102G

RPH

● PH8A102G

5.2 Marking(Dual Value):



Dual Value (R1/R2)(Ohm)

160 Ω /240 Ω	330Ω/390Ω
180 Ω /390 Ω	330Ω/470Ω
220 Ω /270 Ω	1.5K/3.5K
220 Ω /330 Ω	3.0K/6.2K

(Special Value available on a case to case basis.)

6.0 Derating Curve

Power rating will change based on continuous load at ambient temperature from -55 to 155°C.

It is constant between -55 to 70°C, and derate to zero when temperature rise from 70 to 155°C.

Voltage rating:

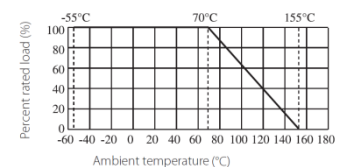
Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform corresponding to the power rating, as determined from the following formula:

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

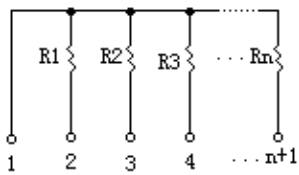
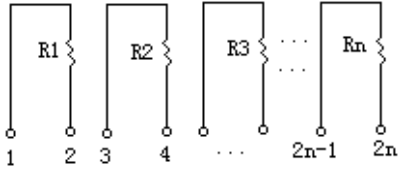
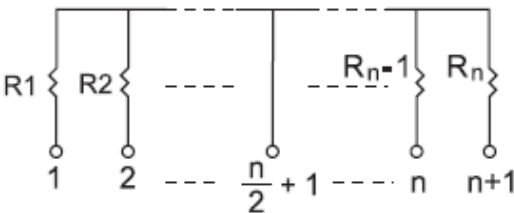
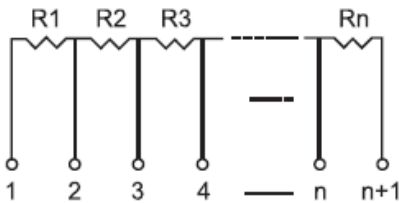
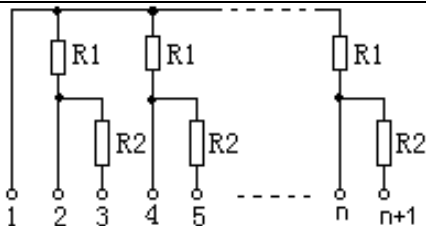
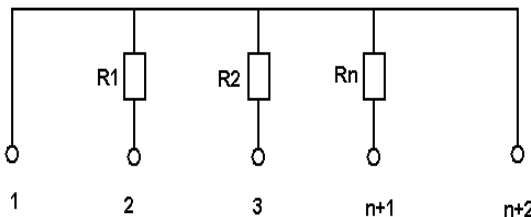
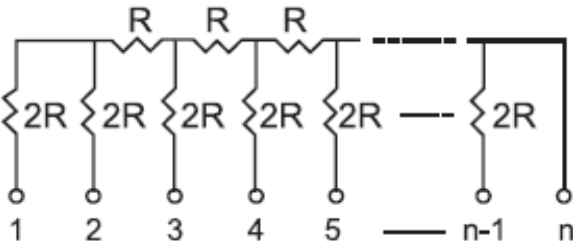
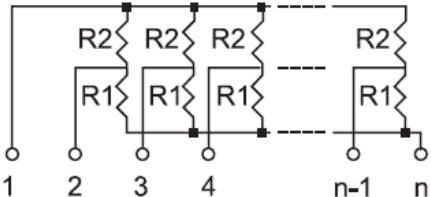
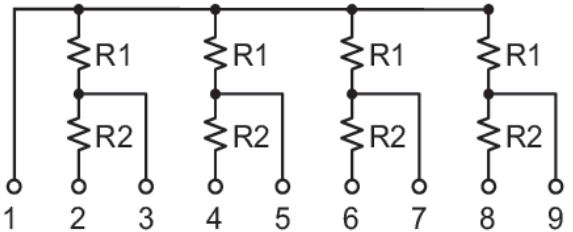
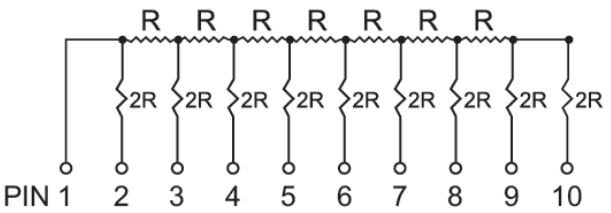
Remark: RCWV: Rating Continuous Working Voltage (Volt.) P: power rating (Watt) R: nominal resistance (Ω)

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 lower.



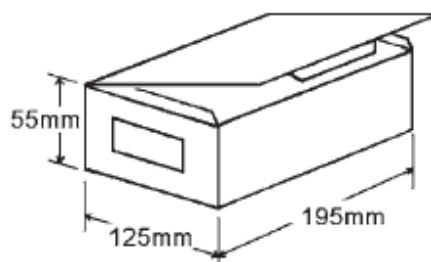
7. Circuits Construction

Type-A	Type-B
 $R1=R2=\dots=Rn$	 $R1=R2=\dots=Rn$
Type-C	Type-D
 $R1=R2=Rn$	 $R1=R2=\dots=Rn$ $R1\neq R2\neq\dots Rn$
Type-E	Type-G
 $R1 = R2$ or $R1 \neq R2$	 $R1=R2=\dots=Rn$
Type-L	Type-R
	 $R1=R2$ or $R1\neq R2$
Type-H	Type-P
	

8. Performance Specification

Characteristic	Limits	Test Methods (GB/T5729&JIS-C-5201&IEC60115-1)
Temperature Coefficient	50Ω~1MΩ: ±200PPM/°C <50Ω&>1MΩ: ±250PPM/°C	4.8 Natural resistance changes per temp. Degree centigrade $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM/°C)}$ R ₁ : Resistance Value at room temperature (t ₁) ; R ₂ : Resistance at test temperature (t ₂) t ₁ : +25 °C or specified room temperature t ₂ : Test temperature (-55 °C or 125 °C)
Short-time overload	$\Delta R/R \leq \pm (0.5\% + 0.1 \Omega)$	4.13 Permanent resistance change after the application of a potential of 2.5 times RCWV or Max.Overload Votage whichever less for 5 seconds.
Insulation Resistance	$\geq 10,000 M\Omega$	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 $\geq 500V$.
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation breaks 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	$\Delta R/R \leq \pm (0.5\% + 0.1 \Omega)$	4.16 Tensile: 1KG,30 secend / Bending:500g,2 times.
Resistance to soldering heat	$\Delta R/R \leq \pm (0.5\% + 0.1 \Omega)$	4.18 Dip the resistor into a solder bath having a temperatuer of 260 °C ±5 °C and hold it for 10 ±1seconds.
Solderability	Coverage must be over 95%.	Wave Solder: Test temperature of solder: 245 °C ±3 °C Dipping time in solder: 2-3seconds
Rapid change of temperature	$\Delta R/R \leq \pm (0.5\% + 0.1 \Omega)$	4.19 30 min at -55 °C and 30 min at 155 °C; 100 cycles
Load life in humidity	$\Delta R/R \leq \pm (3\% + 0.1 \Omega)$	7.9 Resistance change after 1000 hours (1.5hours “ON” , 0.5hours “OFF”) at RCWV or Max.Working Voltage whichever less in a humidity test chamber controlled at 40 ±2 °C and 93% ±3% RH.
Load life	$\Delta R/R \leq \pm (3\% + 0.1 \Omega)$	4.25.1 Permanent Resistance change after 1000 hours operating at RCWV or Max.Working Voltage whichever less with duty cycle of 1.5 hours “ON” , 0.5 hour “OFF” at 70 ±2 °C ambient.
Low Temperature Storage	$\Delta R/R \leq \pm (3\% + 0.1 \Omega)$	IEC 60068-2-1 (Aa) Lower limit temperature , for 2H.
High Temperature Exposure	$\Delta R/R \leq \pm (3\% + 0.1 \Omega)$	MIL-STD-202 108A Upper limit temperature , for 16H.

9. Packing



PIN	Wieight of 1,000pcs	Quantity Per Bag	Quantity Per Box	Quantity Per Carton
4	210g	200	1,000	30,000
5	250g	200	1,000	30,000
6	320g	200	1,000	30,000
7	360g	200	1,000	30,000
8	430g	200	1,000	30,000
9	450g	200	1,000	30,000
10	530g	200	1,000	30,000
11	600g	100	500	15,000
12	650g	100	500	15,000
13	710g	100	500	15,000
14	770g	100	500	15,000

10. Note

- 10.1. UNI-ROYAL recommend products store in warehouse with temperature between 15 to 35 °C under humidity between 25 to 75%RH.
Even under storage conditions recommended above, solder ability of products will be degraded stored over 1 year old.
- 10.2. Cartons must be placed in correct direction which indicated on carton, otherwise the reel or wire will be deformed.
- 10.3. Storage conditions as below are inappropriate:
 - a. Stored in high electrostatic environment
 - b. Stored in direct sunshine, rain, snow or condensation.
 - c. Exposed to sea wind or corrosive gases, such as Cl₂, H₂S, NH₃, SO₂, NO₂, Br etc.

11. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~7	Mar.20, 2018	Haiyan Chen	Nana Chen
2	Modify characteristic	6	Feb.21, 2019	Haiyan Chen	Yuhua Xu
3	Modify the temperature coefficient test conditions	4	Nov.07, 2022	Haiyan Chen	Yuhua Xu

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