

# RESISTOR THIN FILM PRECISION RNP SERIES



## KEY FEATURES

- Resistances from 1 Ohm to 3M Ohms
- Resistance Tolerances to  $\pm 0.01\%$
- Power Rating 0.06 to 0.75 watts
- TCR's up to  $\pm 5\text{ppm}/^\circ\text{C}$
- Operating Temperature:  $-55^\circ\text{C}$  to  $155^\circ\text{C}$
- Available in sizes 0402, 0603, 0805, 1206, 2010, 2512

## APPLICATIONS

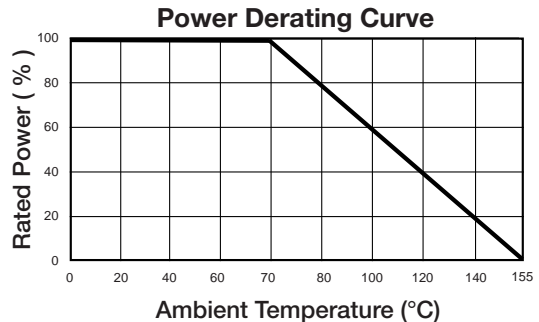
- Motor Control
- Precision Scales
- Smart Grid Metering
- Temperature Sensors

## PRODUCT SUMMARY

| PACKAGE SIZE | STANDARD POWER RATING (PAGE 44) |  | HIGH POWER RATING (PAGE 45)   |  |
|--------------|---------------------------------|--|-------------------------------|--|
|              | RESISTANCE RANGE ( $\Omega$ )   | POWER RATING (W) AT $70^\circ\text{C}$ | RESISTANCE RANGE ( $\Omega$ ) | POWER RATING (W) AT $70^\circ\text{C}$ |
| 0402         | 1 - 511K                        | 0.0625                                 | -                             | -                                      |
| 0603         | 1 - 1M                          | 0.0625                                 | 4.7 - 1M                      | 0.100                                  |
| 0805         | 1 - 2M                          | 0.100                                  | 1 - 1M                        | 0.125                                  |
| 1206         | 1 - 2.49M                       | 0.125                                  | 4.7 - 1M                      | 0.250                                  |
| 2010         | 1 - 3M                          | 0.250                                  | 4.7 - 1M                      | 0.333                                  |
| 2512         | 1 - 3M                          | 0.500                                  | 1 - 2K                        | 0.750                                  |

## AVAILABLE OPTIONS (Consult Factory)

- Special Testing Requirements



## HOW TO ORDER

| RNP                          | 14   | H                              | W  | 003K8   | B   | T              |
|------------------------------|--|--------------------------------|--|---|---|----------------|
| RESISTOR THIN FILM PRECISION | PACKAGE CODE   | POWER RATING                   | TEMPERATURE COEFFICIENT OF RESISTANCE (TCR)  | RESISTANCE  | TOLERANCE   | PACKING        |
|                              | 07 = 0402<br>14 = 0603<br>15 = 0805<br>18 = 1206<br>19 = 2010<br>20 = 2512 | S = Standard<br>H = High Power | X = $\pm 5\text{ppm}/^\circ\text{C}$<br>W = $\pm 10\text{ppm}/^\circ\text{C}$<br>V = $\pm 15\text{ppm}/^\circ\text{C}$<br>T = $\pm 25\text{ppm}/^\circ\text{C}$<br>Q = $\pm 50\text{ppm}/^\circ\text{C}$ | 038R0 = $38\Omega$<br>003K8 = $3.8\text{K}\Omega$<br>038K0 = $38.0\text{K}\Omega$<br>380K0 = $380.0\text{K}\Omega$<br>003M8 = $3.8\text{M}\Omega$<br>Letter denotes decimal place.<br>R = decimal, "K" $10^3$ , "M" $10^6$<br>Remaining 4 digits are significant or placeholders. | T = $\pm 0.01\%$<br>A = $\pm 0.05\%$<br>B = $\pm 0.1\%$<br>C = $\pm 0.25\%$<br>D = $\pm 0.5\%$<br>F = $\pm 1.0\%$ | T = Paper Tape |

Standard Termination Finish: Nickel Tin Alloy

Example P/N:

RNP14HW003K8BE is Resistor Thin Film Precision, 0603 size, high power rating,  $\pm 10\text{ppm}/^\circ\text{C}$ ,  $3.8\text{K}\Omega$ ,  $\pm 0.1\%$ , embossed tape & reel



# RESISTOR THIN FILM PRECISION



## RNP SERIES

### STANDARD POWER RATING SPECIFICATIONS

| Standard Package Size                 |                  | Size 0402 (RNP07S) |               |                 |               |               | Size 0603 (RNP14S) |     |           |           |               | Size 0805 (RNP15S) |     |             |     |     |
|---------------------------------------|------------------|--------------------|---------------|-----------------|---------------|---------------|--------------------|-----|-----------|-----------|---------------|--------------------|-----|-------------|-----|-----|
| Max Working Voltage (V) <sup>1</sup>  |                  | 25V                |               |                 |               |               | 50V                |     |           |           |               | 100V               |     |             |     |     |
| Max Overload Voltage (V) <sup>2</sup> |                  | 50V                |               |                 |               |               | 100V               |     |           |           |               | 200V               |     |             |     |     |
| Power Rating (W) at 70°C              |                  | 0.0625             |               |                 |               |               | 0.0625             |     |           |           |               | 0.100              |     |             |     |     |
| TCR PPM/°C                            |                  | ±5                 | ±10           | ±15             | ±25           | ±50           | ±5                 | ±10 | ±15       | ±25       | ±50           | ±5                 | ±10 | ±15         | ±25 | ±50 |
| Resistance Range (Ω)                  | ±0.01% Tolerance | 49.9Ω to 4.99KΩ    | 49.9Ω to 12KΩ |                 | -             | 24.9Ω to 15KΩ | 24.9Ω to 100KΩ     |     | -         |           | 24.9Ω to 30KΩ | 24.9Ω to 200KΩ     |     | -           |     |     |
|                                       | ±0.05% Tolerance |                    |               |                 | 49.9Ω to 12KΩ |               | 4.7Ω to 332KΩ      |     |           |           |               |                    |     | 4.7Ω to 1MΩ |     |     |
|                                       | ±0.1% Tolerance  |                    |               |                 | 10Ω to 255KΩ  |               | 4.7Ω to 1MΩ        |     |           |           |               |                    |     | 4.7Ω to 2MΩ |     |     |
|                                       | ±0.25% Tolerance |                    | 49.9Ω to 60KΩ | 49.9Ω to 69.8KΩ | 4.7Ω to 511KΩ |               | 4.7Ω to 511KΩ      |     | 1Ω to 1MΩ | 1Ω to 1MΩ |               |                    |     | 1Ω to 2MΩ   |     |     |
|                                       | ±0.5% Tolerance  |                    |               |                 |               |               |                    |     |           |           |               |                    |     |             |     |     |
|                                       | ±1% Tolerance    |                    |               |                 |               |               |                    |     |           |           |               |                    |     |             |     |     |

| Standard Package Size                 |                  | Size 1206 (RNP18S) |                |     |                |                | Size 2010 (RNP19S) |     |             |     |                | Size 2512 (RNP20S) |     |             |     |     |
|---------------------------------------|------------------|--------------------|----------------|-----|----------------|----------------|--------------------|-----|-------------|-----|----------------|--------------------|-----|-------------|-----|-----|
| Max Working Voltage (V) <sup>1</sup>  |                  | 150V               |                |     |                |                | 150V               |     |             |     |                | 150V               |     |             |     |     |
| Max Overload Voltage (V) <sup>2</sup> |                  | 300V               |                |     |                |                | 300V               |     |             |     |                | 300V               |     |             |     |     |
| Power Rating (W) at 70°C              |                  | 0.125              |                |     |                |                | 0.250              |     |             |     |                | 0.500              |     |             |     |     |
| TCR PPM/°C                            |                  | ±5                 | ±10            | ±15 | ±25            | ±50            | ±5                 | ±10 | ±15         | ±25 | ±50            | ±5                 | ±10 | ±15         | ±25 | ±50 |
| Resistance Range (Ω)                  | ±0.01% Tolerance | 24.9Ω to 49.9KΩ    | 24.9Ω to 499KΩ |     | -              | 24.9Ω to 100KΩ | 24.9Ω to 499KΩ     |     | -           |     | 24.9Ω to 100KΩ | 24.9Ω to 499KΩ     |     | -           |     |     |
|                                       | ±0.05% Tolerance |                    |                |     | 4.7Ω to 1MΩ    |                | 4.7Ω to 1MΩ        |     | 4.7Ω to 1MΩ |     |                |                    |     | 4.7Ω to 1MΩ |     |     |
|                                       | ±0.1% Tolerance  |                    |                |     | 4.7Ω to 2.49MΩ |                | 4.7Ω to 3MΩ        |     |             |     |                |                    |     | 4.7Ω to 3MΩ |     |     |
|                                       | ±0.25% Tolerance |                    |                |     | 1Ω to 2.49MΩ   |                | 1Ω to 3MΩ          |     |             |     |                |                    |     | 1Ω to 3MΩ   |     |     |
|                                       | ±0.5% Tolerance  |                    |                |     |                |                |                    |     |             |     |                |                    |     |             |     |     |
|                                       | ±1% Tolerance    |                    |                |     |                |                |                    |     |             |     |                |                    |     |             |     |     |

<sup>1</sup> Working Voltage =  $\sqrt{P \cdot R}$  or MAX Listed, whichever is lower.

<sup>2</sup> Overload Voltage =  $2.5 \cdot \sqrt{P \cdot R}$  or MAX Listed, whichever is lower.

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## High Power Ratings Specifications

| High Power Package Size               | Size 0603 (RNP14H) |               |                |     |               | Size 0805 (RNP15H) |              |             |             |     | Size 1206 (RNP18H) |                |     |     |     |
|---------------------------------------|--------------------|---------------|----------------|-----|---------------|--------------------|--------------|-------------|-------------|-----|--------------------|----------------|-----|-----|-----|
| Max Working Voltage (V) <sup>1</sup>  | 75V                |               |                |     |               | 150V               |              |             |             |     | 200V               |                |     |     |     |
| Max Overload Voltage (V) <sup>2</sup> | 150V               |               |                |     |               | 300V               |              |             |             |     | 400V               |                |     |     |     |
| Power Rating (W) at 70°C              | 0.100              |               |                |     |               | 0.125              |              |             |             |     | 0.250              |                |     |     |     |
| TCR PPM/°C                            | ±5                 | ±10           | ±15            | ±25 | ±50           | ±5                 | ±10          | ±15         | ±25         | ±50 | ±5                 | ±10            | ±15 | ±25 | ±50 |
| Resistance Range (Ω)                  | ±0.01% Tolerance   | 24.9Ω to 15KΩ | 24.9Ω to 100KΩ |     |               | 24.9Ω to 30KΩ      | 24.9 to 200K |             |             |     | 24.9Ω to 49.9KΩ    | 24.9Ω to 499KΩ |     |     |     |
|                                       | ±0.05% Tolerance   |               | 4.7Ω to 332KΩ  |     | 4.7Ω to 511KΩ |                    |              | 4.7Ω to 1MΩ |             |     |                    |                |     |     |     |
|                                       | ±0.1% Tolerance    |               | 4.7Ω to 332KΩ  |     | 4.7Ω to 1MΩ   |                    | 4.7Ω to 1MΩ  |             | 4.7Ω to 1MΩ |     |                    |                |     |     |     |
|                                       | ±0.25% Tolerance   |               | 4.7Ω to 332KΩ  |     | 4.7Ω to 1MΩ   |                    | 4.7Ω to 1MΩ  |             | 4.7Ω to 1MΩ |     |                    |                |     |     |     |
|                                       | ±0.5% Tolerance    |               | 4.7Ω to 332KΩ  |     | 4.7Ω to 1MΩ   |                    | 4.7Ω to 1MΩ  |             | 4.7Ω to 1MΩ |     |                    |                |     |     |     |
|                                       | ±1% Tolerance      |               | 4.7Ω to 332KΩ  |     | 4.7Ω to 1MΩ   |                    | 4.7Ω to 1MΩ  |             | 4.7Ω to 1MΩ |     |                    |                |     |     |     |

| High Power Package Size               | Size 2010 (RNP19H) |                 |                |     |     | Size 2512 (RNP20H) |     |     |     |
|---------------------------------------|--------------------|-----------------|----------------|-----|-----|--------------------|-----|-----|-----|
| Max Working Voltage (V) <sup>1</sup>  | 200V               |                 |                |     |     | 200V               |     |     |     |
| Max Overload Voltage (V) <sup>2</sup> | 400V               |                 |                |     |     | 400V               |     |     |     |
| Power Rating (W) at 70°C              | 0.333              |                 |                |     |     | 0.750              |     |     |     |
| TCR PPM/°C                            | ±5                 | ±10             | ±15            | ±25 | ±50 | ±10                | ±15 | ±25 | ±50 |
| Resistance Range (Ω)                  | ±0.01% Tolerance   | 24.9Ω to 49.9KΩ | 24.9Ω to 499KΩ |     |     | 24.9Ω to 2KΩ       |     |     |     |
|                                       | ±0.05% Tolerance   |                 | 4.7Ω to 1MΩ    |     |     | 4.7Ω to 2KΩ        |     |     |     |
|                                       | ±0.1% Tolerance    |                 | 4.7Ω to 1MΩ    |     |     | 4.7Ω to 2KΩ        |     |     |     |
|                                       | ±0.25% Tolerance   |                 | 4.7Ω to 1MΩ    |     |     | 4.7Ω to 2KΩ        |     |     |     |
|                                       | ±0.5% Tolerance    |                 | 4.7Ω to 1MΩ    |     |     | 4.7Ω to 2KΩ        |     |     |     |
|                                       | ±1% Tolerance      |                 | 4.7Ω to 1MΩ    |     |     | 4.7Ω to 2KΩ        |     |     |     |

<sup>1</sup> Working Voltage =  $\sqrt{P \cdot R}$  or MAX Listed, whichever is lower.

<sup>2</sup> Overload Voltage =  $2.5 \cdot \sqrt{P \cdot R}$  or MAX Listed, whichever is lower.



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## MECHANICAL CHARACTERISTICS



| Package Size | Dimensions                |                          |                              |                              |
|--------------|---------------------------|--------------------------|------------------------------|------------------------------|
|              | L (Length)<br>Inches [mm] | W (Width)<br>Inches [mm] | T (Thickness)<br>Inches [mm] | EB (End Band)<br>Inches [mm] |
| <b>0402</b>  | 0.04 [1.02]               | 0.02 [0.51]              | 0.012 [0.30]                 | 0.007 [0.18]                 |
| <b>0603</b>  | 0.06 [1.52]               | 0.03 [0.76]              | 0.018 [0.46]                 | 0.012 [0.30]                 |
| <b>0805</b>  | 0.08 [2.03]               | 0.05 [1.27]              | 0.022 [0.56]                 | 0.012 [0.30]                 |
| <b>1206</b>  | 0.12 [3.05]               | 0.06 [1.52]              | 0.022 [0.56]                 | 0.016 [0.41]                 |
| <b>2010</b>  | 0.19 [4.83]               | 0.09 [2.29]              | 0.022 [0.56]                 | 0.023 [0.58]                 |
| <b>2512</b>  | 0.25 [6.35]               | 0.12 [3.05]              | 0.022 [0.56]                 | 0.023 [0.58]                 |

## ENVIRONMENTAL CHARACTERISTICS

| Test                                | Requirement                                     |                       | Conditions  |
|-------------------------------------|---|-----------------------|---|
|                                     | Tolerance<br><0.05%                             | Tolerance<br>>0.05%   |   |
| <b>Bending Strength</b>             | $\Delta R \pm 0.05\%$                           | $\Delta R \pm 0.2\%$  | Bending amplitude 3mm for 10 seconds  |
| <b>Resistance to Soldering Heat</b> | $\Delta R \pm 0.05\%$                           | $\Delta R \pm 0.2\%$  | 260±5°C for 10 seconds  |
| <b>Thermal Shock</b>                | $\Delta R \pm 0.05\%$                           | $\Delta R \pm 0.25\%$ | -55°C~150°C, 100 cycles   |
| <b>Insulation Resistance</b>        | >1000 MΩ  |                       | Apply 100VDC for 1 minute   |
| <b>TCR</b>                          | As Spec.  |                       | +25/-55/+25/+125/+25°C  |
| <b>Solderability</b>                | 95% min coverage                                |                       | 245±5°C for 3 seconds   |
| <b>Damp Heat With Load</b>          | $\Delta R \pm 0.05\%$                           | $\Delta R \pm 0.3\%$  | 40±2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
|                                     | $\Delta R \pm 0.5\%$<br>(For High Power Rating) |                       |   |
| <b>Load Life</b>                    | $\Delta R \pm 0.05\%$                           | $\Delta R \pm 0.2\%$  | 70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"             |
|                                     | >7kΩ ΔR ±0.5%                                   |                       |   |
|                                     | $\Delta R \pm 0.5\%$<br>(For High Power Rating) |                       |   |
| <b>Low Temperature Operation</b>    | $\Delta R \pm 0.05\%$                           | $\Delta R \pm 0.2\%$  | 1 hour, -65°C, followed by 45 minutes of RCWW   |
|                                     | $\Delta R \pm 0.5\%$<br>(For High Power Rating) |                       |   |
| <b>Short Time Overload</b>          | $\Delta R \pm 0.05\%$                           | $\Delta R \pm 0.2\%$  | RCWW*2.5 or Max. overload voltage for 5 seconds   |
|                                     | $\Delta R \pm 0.2\%$<br>(For High Power Rating) |                       |   |

Moisture Sensitivity Level: MSL-1

This datasheet is subject to change without notice.

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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