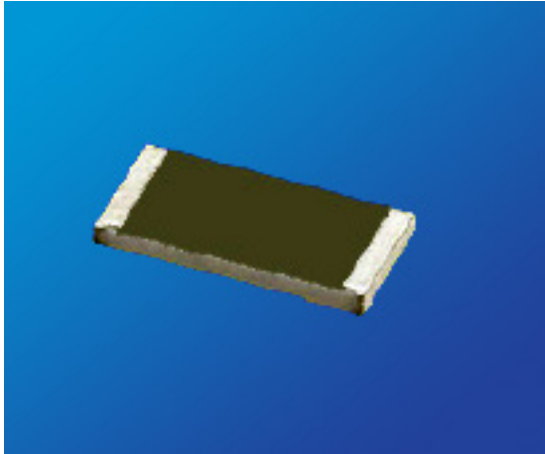


# RESISTOR THIN FILM PRECISION RNP SERIES



## 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

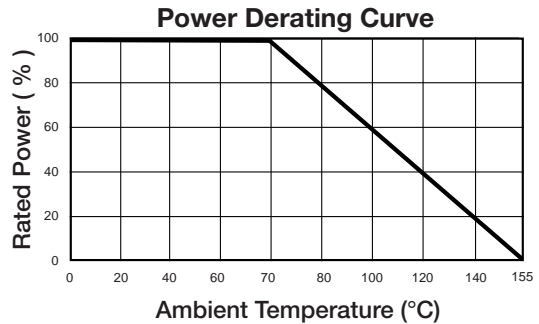
- Motor Control
- Precision Scales
- Smart Grid Metering
- Temperature Sensors

## 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 14 = 0603 15 = 0805 18 = 1206 19 = 2010 20 = 2512	S = Standard H = High Power	X = $\pm 5\text{ppm}/^\circ\text{C}$ W = $\pm 10\text{ppm}/^\circ\text{C}$ V = $\pm 15\text{ppm}/^\circ\text{C}$ T = $\pm 25\text{ppm}/^\circ\text{C}$ Q = $\pm 50\text{ppm}/^\circ\text{C}$	038R0 = $38\Omega$ 003K8 = $3.8\text{K}\Omega$ 038K0 = $38.0\text{K}\Omega$ 380K0 = $380.0\text{K}\Omega$ 003M8 = $3.8\text{M}\Omega$ Letter denotes decimal place. R = decimal, "K" $10^3$ , "M" $10^6$ Remaining 4 digits are significant or placeholders.	T = $\pm 0.01\%$ A = $\pm 0.05\%$ B = $\pm 0.1\%$ C = $\pm 0.25\%$ D = $\pm 0.5\%$ 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			4.7Ω to 1MΩ	4.7Ω to 1MΩ			
	±0.1% Tolerance		10Ω to 255KΩ		4.7Ω to 1MΩ		1Ω to 1MΩ		1Ω 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 2MΩ		
	±0.5% Tolerance		4.7Ω to 511KΩ		4.7Ω to 511KΩ		4.7Ω to 511KΩ		4.7Ω to 511KΩ			1Ω to 2MΩ		1Ω to 2MΩ		
	±1% Tolerance		4.7Ω to 511KΩ		4.7Ω to 511KΩ		4.7Ω to 511KΩ		4.7Ω to 511KΩ			1Ω to 2MΩ		1Ω to 2MΩ		

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		4.7Ω to 1MΩ		
	±0.1% Tolerance		4.7Ω to 1MΩ		4.7Ω to 2.49MΩ		4.7Ω to 1MΩ		4.7Ω to 3MΩ			4.7Ω to 3MΩ		4.7Ω to 3MΩ		
	±0.25% Tolerance		4.7Ω to 1MΩ		1Ω to 2.49MΩ		4.7Ω to 1MΩ		1Ω to 3MΩ			1Ω to 3MΩ		1Ω to 3MΩ		
	±0.5% Tolerance		4.7Ω to 1MΩ		1Ω to 2.49MΩ		4.7Ω to 1MΩ		1Ω to 3MΩ			1Ω to 3MΩ		1Ω to 3MΩ		
	±1% Tolerance		4.7Ω to 1MΩ		1Ω to 2.49MΩ		4.7Ω to 1MΩ		1Ω to 3MΩ			1Ω to 3MΩ		1Ω to 3MΩ		

<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.



# RESISTOR THIN FILM PRECISION RNP SERIES



## 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	24.9 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 1MΩ		4.7Ω to 511KΩ		4.7Ω to 1MΩ		4.7Ω to 1MΩ						
	±0.5% Tolerance		4.7Ω to 1MΩ		4.7Ω to 1MΩ		1Ω to 1MΩ		1Ω to 1MΩ						
	±1% Tolerance		4.7Ω to 1MΩ		4.7Ω to 1MΩ		1Ω to 1MΩ		1Ω 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			1Ω to 2KΩ			
	±1% Tolerance		4.7Ω to 1MΩ			1Ω to 2KΩ			

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

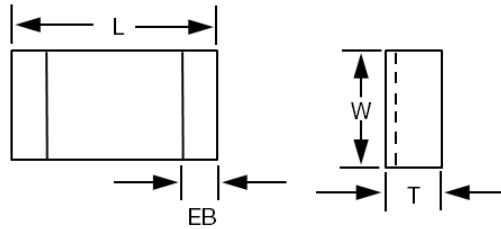
<sup>2</sup> Overload Voltage =  $2.5 \cdot \sqrt{P \cdot R}$  or MAX Listed, whichever is lower.



# RESISTOR THIN FILM PRECISION RNP SERIES



## MECHANICAL CHARACTERISTICS



Package Size	Dimensions			
	L (Length) Inches [mm]	W (Width) Inches [mm]	T (Thickness) Inches [mm]	EB (End Band) 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 <0.05%	Tolerance >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"
	$\Delta R \pm 0.5\%$ (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%		
	$\Delta R \pm 0.5\%$ (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
	$\Delta R \pm 0.5\%$ (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
	$\Delta R \pm 0.2\%$ (For High Power Rating)		

Moisture Sensitivity Level: MSL-1

This datasheet is subject to change without notice.