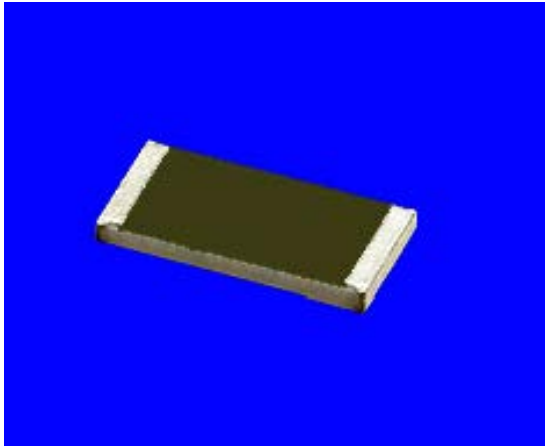


# Resistor Thin Film Precision RNP Series



## 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
- RoHS Compliant

## APPLICATIONS

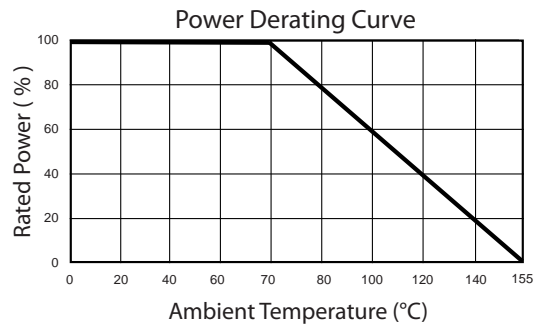
- Motor Control
- Precision Scales
- Smart Grid Metering
- Temperature Sensors

## 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	E
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 = 3.8K $\Omega$ 038K0 = 38.0K $\Omega$ 380K0 = 380.0K $\Omega$ 003M8 = 3.8M $\Omega$ 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 = $\pm 1.0\%$	E = Embossed Tape & Reel

Example P/N:

RNP14HW003K8BE is Resistor Thin Film Precision, 0603 size, high power rating,  $\pm 10\text{ppm}/^\circ\text{C}$ , 3.8K $\Omega$ ,  $\pm 0.1\%$ , 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		4.7Ω to 1MΩ		4.7Ω to 1MΩ		
	±0.1% Tolerance				4.7Ω to 2.49MΩ		4.7Ω to 3MΩ		4.7Ω to 3MΩ			4.7Ω to 3MΩ		4.7Ω to 3MΩ		4.7Ω to 3MΩ		
	±0.25% Tolerance		4.7Ω to 1MΩ		1Ω to 2.49MΩ		1Ω to 3MΩ		1Ω to 3MΩ			1Ω to 3MΩ		1Ω to 3MΩ		1Ω to 3MΩ		
	±0.5% Tolerance																	
	±1% Tolerance																	

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

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

# Resistor Thin Film Precision RNP Series

## HIGH POWER RATING 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		1Ω to 1MΩ			4.7Ω to 1MΩ			
	±0.25% Tolerance		4.7Ω to 332KΩ		4.7Ω to 1MΩ		4.7Ω to 1MΩ		1Ω to 1MΩ			4.7Ω to 1MΩ			
	±0.5% Tolerance		4.7Ω to 332KΩ		4.7Ω to 1MΩ		4.7Ω to 1MΩ		1Ω to 1MΩ			4.7Ω to 1MΩ			
	±1% Tolerance		4.7Ω to 332KΩ		4.7Ω to 1MΩ		4.7Ω to 1MΩ		1Ω 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			1Ω to 2KΩ			
	±0.25% Tolerance		4.7Ω to 1MΩ			1Ω to 2KΩ			
	±0.5% Tolerance		4.7Ω to 1MΩ			1Ω to 2KΩ			
	±1% Tolerance		4.7Ω to 1MΩ			1Ω to 2KΩ			

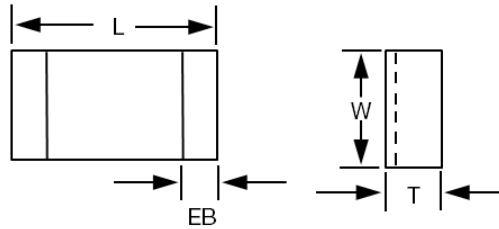
<sup>1</sup> Working Voltage =  $\sqrt{P * R}$  or MAX Listed, whichever is lower.

<sup>2</sup> Overload Voltage =  $2.5 * \sqrt{P * R}$  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]
0402	0.04 [1.02]	0.02 [0.51]	0.012 [0.30]	0.007 [0.18]
0603	0.06 [1.52]	0.03 [0.76]	0.018 [0.46]	0.012 [0.30]
0805	0.08 [2.03]	0.05 [1.27]	0.022 [0.56]	0.012 [0.30]
1206	0.12 [3.05]	0.06 [1.52]	0.022 [0.56]	0.016 [0.41]
2010	0.19 [4.83]	0.09 [2.29]	0.022 [0.56]	0.023 [0.58]
2512	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%	
Bending Strength	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	Bending amplitude 3mm for 10 seconds
Resistance to Soldering Heat	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	260±5°C for 10 seconds
Thermal Shock	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.25\%$	-55°C~150°C, 100 cycles
Insulation Resistance	>1000 MΩ		Apply 100VDC for 1 minute
TCR	As Spec.		+25/-55/+25/+125/+25°C
Solderability	95% min coverage		245±5°C for 3 seconds
Damp Heat With Load	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.3\%$	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)		
Load Life	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	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)		
Low Temperature Operation	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	1 hour, -65°C, followed by 45 minutes of RCWV
	$\Delta R \pm 0.5\%$ (For High Power Rating)		
Short Time Overload	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	RCWV*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.