

## Features

- Precision tolerances to  $\pm 0.1\%$
- TCR down to  $\pm 25 \text{ ppm}/^\circ\text{C}$
- Wide resistance value range
- Anti-sulfur
- RoHS compliant, REACH compliant, lead free, and halogen free
- AEC-Q200 qualified



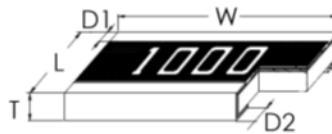
## Electrical Specifications

Type/Code	Power Rating (W) @ 125°C	Maximum Working Voltage (V) <sup>(1)</sup>	Maximum Overload Voltage (V) <sup>(2)</sup>	TCR (ppm/°C)	Ohmic Range ( $\Omega$ ) and Tolerance
					0.1%, 0.25%, 0.5%, 1%
RNWA0612	1	75	150	$\pm 25$	2.5 - 80K
				$\pm 50$	
RNWA1020	1.5	100	200	$\pm 25$	2.5 - 200K
				$\pm 50$	
RNWA1225	2	200	400	$\pm 25$	2.5 - 250K
				$\pm 50$	

(1)  $\sqrt{P \cdot R}$  or maximum working voltage, whichever is lower.

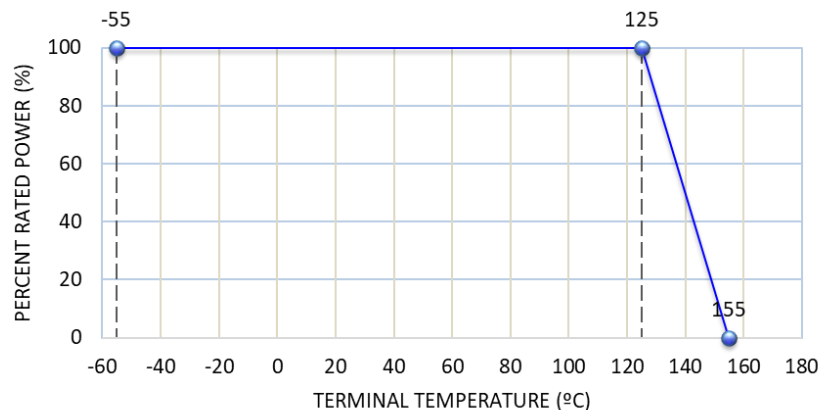
(2)  $2.5 \cdot \sqrt{P \cdot R}$  or maximum overload voltage, whichever is lower.

## Mechanical Specifications



Type/Code	Typical Unit Wt.(mg)	L	W	T	D1	D2	Unit
		Body Length	Body Width	Body Height	Top Termination	Bottom Termination	
RNWA0612	7.7	$0.061 \pm 0.006$	$0.118 \pm 0.006$	$0.017 \pm 0.004$	$0.010 \pm 0.006$	$0.013 \pm 0.006$	inches
		$1.55 \pm 0.15$	$3.00 \pm 0.15$	$0.43 \pm 0.10$	$0.25 \pm 0.15$	$0.32 \pm 0.15$	mm
RNWA1020	21.0	$0.096 \pm 0.008$	$0.193 \pm 0.008$	$0.017 \pm 0.004$	$0.016 \pm 0.008$	$0.020 \pm 0.008$	inches
		$2.45 \pm 0.20$	$4.90 \pm 0.20$	$0.43 \pm 0.10$	$0.40 \pm 0.20$	$0.52 \pm 0.20$	mm
RNWA1225	33.2	$0.124 \pm 0.008$	$0.248 \pm 0.008$	$0.017 \pm 0.004$	$0.018 \pm 0.008$	$0.020 \pm 0.008$	inches
		$3.15 \pm 0.20$	$6.30 \pm 0.20$	$0.43 \pm 0.10$	$0.45 \pm 0.20$	$0.52 \pm 0.20$	mm

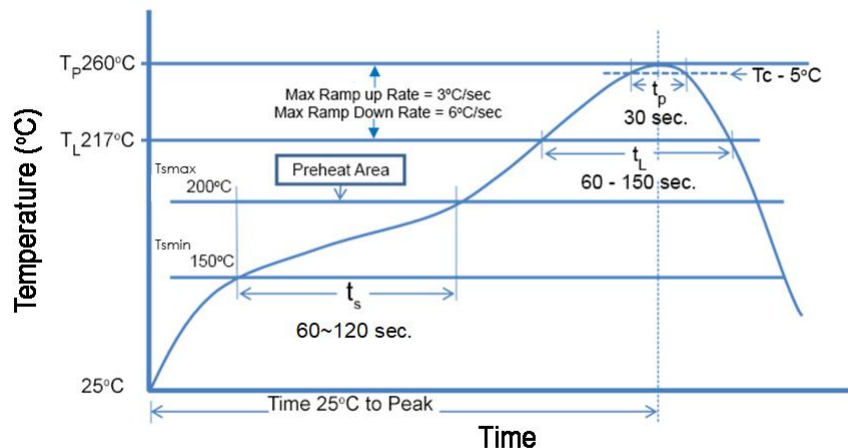
## Power Derating Curve:



Performance Characteristics			
Test	Test Method	Test Specification	Test Condition
Temperature coefficient of Resistance (T.C.R.)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	As specified	-55 ~ +125°C, 25°C is the reference temperature
Short Time Overload	JIS-C-5201-1 4.13	$\Delta R \pm 0.1\%$	RCWV*2.5 or Max. overload voltage, whichever is lower for 5 seconds.
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	> 1000M $\Omega$	Apply 100 V <sub>DC</sub> for 1 minute
Endurance	MIL-STD-202 Method 108	$\Delta R \pm 0.2\%$	70 $\pm$ 2°C, RCWV for 1000 hours with 1.5 hours "ON" and 0.5 hour "OFF"
Operational Life	MIL-STD-202 Method 108	$\Delta R \pm 0.2\%$	Condition D Steady State TA = 125°C at derated power. Measurement at 24 $\pm$ 4 hours after test conclusion.
Biased Humidity	MIL-STD-202 Method 103	$\Delta R \pm 0.1\%$	1000 hours 85°C / 85% R.H. 10% of operating power
High Temperature Exposure	MIL-STD-202 Method 108	$\Delta R \pm 0.2\%$	at +155°C for 1000 hours
Temperature Cycling	JESD22 Method JA-104	$\Delta R \pm 0.1\%$	-55 to +125°C, 1000 cycles
Bending Strength	JIS-C-5201-1 4.33	$\Delta R \pm 0.1\%$	Bending once for 60 seconds Bending displacement: 1020, 1225 sizes: 2mm and 0612 size: 3mm
Solderability	JIS-C-5201-1 4.17 IEC-60115-1 4.17	95% min. coverage	245 $\pm$ 5°C for 3 seconds
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	$\Delta R \pm 0.05\%$	260 $\pm$ 5°C for 10 seconds
Terminal Strength	AEC-Q200-006	No breakage	Force of 1.8 kg for 60 seconds
Mechanical Shock	MIL-STD-202 Method 213	$\Delta R \pm 0.1\%$	Wave form: Tolerance for half sine shock pulse. Peak value is 100 g's. Normal duration (D) is 6.
Vibration	MIL-STD-202 Method 204	$\Delta R \pm 0.1\%$	5 g's for 20 minutes, 12 cycles each of 3 orientations, 1-2000 Hz
ESD	AEC-Q200-002	$\Delta R \pm 0.5\%$	Human body model 0612, 1020, 1225 2 KV
Resistance to Solvents	MIL-STD-202 Method 215	Marking unsmearred	Add aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Sulfur Test	ASTM-B-809-95 Modified	$\Delta R \pm 1\%$	105 $\pm$ 2°C, no power rating for 1000 hours
Flammability	UL-94	No ignition of the tissue paper or scorching of the pinewood board	V-0 or V-1 are acceptable. Electrical test not required.

RCWV (Rated Continuous Working Voltage) =  $\sqrt{P \cdot R}$  or Max. Operating Voltage, whichever is lower  
Recommended storage temperature: 15~28°C. Humidity < 80% R.H.

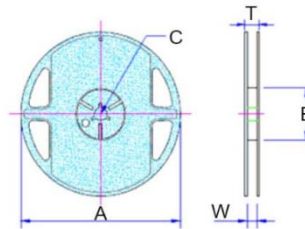
### Soldering Condition:



Number of reflow cycles allowed: 3 times

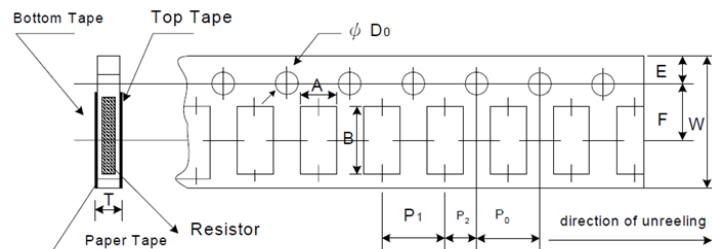
Profile Feature	Pb-Free Assembly
Preheat	
Min. Temperature (T <sub>min</sub> )	150°C
Max. Temperature (T <sub>max</sub> )	200°C
Preheating time (ts) from (T <sub>min</sub> to T <sub>max</sub> )	60-120 seconds
Ramp-up Rate (T <sub>L</sub> to T <sub>P</sub> )	3°C/second max.
Liquidous Temperature (T <sub>L</sub> )	217°C
Time (t <sub>L</sub> ) maintained above T <sub>L</sub>	60-150 seconds
Min. Peak Temperature (T <sub>p</sub> min)	235°C
Max. Peak Temperature (T <sub>p</sub> max)	260°C
Time (t <sub>p</sub> ) within 5°C of the specified classification temperature (T <sub>c</sub> )	30 seconds max.
Ramp-down rate (T <sub>P</sub> to T <sub>L</sub> )	6°C/second max.
Time 25°C to peak temperature	8 minutes max.

## Reel Specifications



Type/Code	A	B	C	W	T	Unit
RNWA0612	7.008 ± 0.039	2.362 ± 0.039	0.531 ± 0.028	0.374 ± 0.039	0.453 ± 0.039	inches
	178.00 ± 1.00	60.00 ± 1.00	13.50 ± 0.70	9.50 ± 1.00	11.50 ± 1.00	mm
RNWA1020	7.008 ± 0.039	2.362 ± 0.039	0.531 ± 0.028	0.531 ± 0.039	0.610 ± 0.039	inches
	178.00 ± 1.00	60.00 ± 1.00	13.50 ± 0.70	13.50 ± 1.00	15.50 ± 1.00	mm
RNWA1225	7.008 ± 0.039	2.362 ± 0.039	0.531 ± 0.028	0.531 ± 0.039	0.610 ± 0.039	inches
	178.00 ± 1.00	60.00 ± 1.00	13.50 ± 0.70	13.50 ± 1.00	15.50 ± 1.00	mm

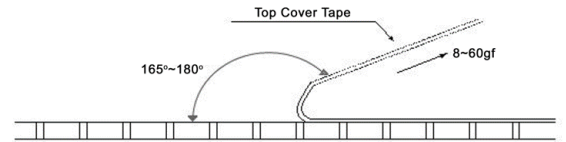
## Packaging Specifications – Paper Tape



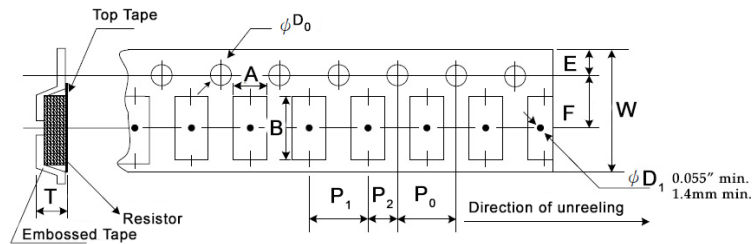
Type/Code	A	B	W	E	F	Unit
RNWA0612	0.079 ± 0.002	0.140 ± 0.002	0.315 ± 0.004	0.069 ± 0.002	0.138 ± 0.002	inches
	2.00 ± 0.05	3.55 ± 0.05	8.00 ± 0.10	1.75 ± 0.05	3.50 ± 0.05	mm
	P0	P1	P2	D0	T	Unit
	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.002	0.061 ± 0.002	0.030 ± 0.002	inches
	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	1.55 ± 0.05	0.75 ± 0.05	mm

## Peel Force of Top Cover Paper Tape

The peel speed shall be about 300 mm/min  $\pm$  5%  
The peel force of top cover tape shall be between 8 to 60 gf



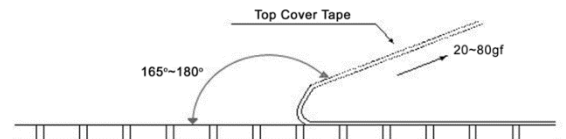
## Packaging Specifications – Plastic Tape



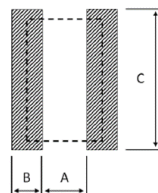
Type/Code	A	B	W	E	F	Unit
RNWA1020	0.112 $\pm$ 0.004	0.215 $\pm$ 0.004	0.472 $\pm$ 0.004	0.069 $\pm$ 0.004	0.217 $\pm$ 0.002	inches
	2.85 $\pm$ 0.10	5.45 $\pm$ 0.10	12.00 $\pm$ 0.10	1.75 $\pm$ 0.10	5.50 $\pm$ 0.05	mm
RNWA1225	0.134 $\pm$ 0.004	0.262 $\pm$ 0.004	0.472 $\pm$ 0.004	0.069 $\pm$ 0.004	0.217 $\pm$ 0.002	inches
	3.40 $\pm$ 0.10	6.65 $\pm$ 0.10	12.00 $\pm$ 0.10	1.75 $\pm$ 0.10	5.50 $\pm$ 0.05	mm
Type/Code	P0	P1	P2	D0	T	Unit
RNWA1020	0.157 $\pm$ 0.002	0.157 $\pm$ 0.004	0.079 $\pm$ 0.002	0.059 $\pm$ 0.004	0.039 $\pm$ 0.008	inches
	4.00 $\pm$ 0.05	4.00 $\pm$ 0.10	2.00 $\pm$ 0.05	1.50 $\pm$ 0.10	1.00 $\pm$ 0.20	mm
RNWA1225	0.157 $\pm$ 0.002	0.157 $\pm$ 0.004	0.079 $\pm$ 0.002	0.059 $\pm$ 0.004	0.039 $\pm$ 0.008	inches
	4.00 $\pm$ 0.05	4.00 $\pm$ 0.10	2.00 $\pm$ 0.05	1.50 $\pm$ 0.10	1.00 $\pm$ 0.20	mm

## Peel Force of Top Cover Plastic Tape

The peel speed shall be about 300 mm/min  $\pm$  5%  
The peel force of top cover tape shall be between 20 to 80 gf



## Recommended Pad Layout



Type/Code	A	B	C	Unit
RNWA0612	0.024	0.039	0.126 $\pm$ 0.008	inches
	0.60	1.00	3.20 $\pm$ 0.20	mm
RNWA1020	0.039	0.047	0.197 $\pm$ 0.008	inches
	1.00	1.20	5.00 $\pm$ 0.20	mm
RNWA1225	0.071	0.079	0.256 $\pm$ 0.008	inches
	1.80	2.00	6.50 $\pm$ 0.20	mm

## Part Marking Instructions



4.7Ω

100Ω

The nominal resistance is marked on the surface of the part with the use of four-character marking, with the letter "R" used as the decimal place holder.

## RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

## RoHS Compliance Status

Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
RNWA	Automotive Grade Wide Terminal Thin Film Precision Chip Resistor	SMD	YES	100% Matte Sn over Ni	Always	Always

## "Conflict Metals" Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

## Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

## Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

# RNWA Series

Automotive Grade Wide Terminal Thin Film Precision  
Chip Resistor

Stackpole Electronics, Inc.

Resistive Product Solutions

## How to Order

**R N W A 0 6 1 2 B T E 4 K 7 5**

Product Series	Size	Tolerance			Packaging				TCR		Resistance Value <sup>(2)</sup>
Code		Code	Tol	Value	Code	Description	Size	Quantity	Code	ppm	
RNWA	0612	B	0.1%	E96, E24	T	7" Reel Paper Tape	0612	5000	E	25	Four characters with the multiplier used as the decimal holder. 2.5 ohm = 2R50 10 Kohm = 10K0 250 Kohm = 250K
	1020	C	0.25%			7" Reel Plastic Tape	1020, 1225	4000	C	50	
	1225	D	0.5%								
		F	1%								

# Mouser Electronics

Authorized Distributor

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## [SEI Stackpole:](#)

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[RNWA0612DTE330R](#) [RNWA0612BTC10R0](#) [RNWA0612BTC24R0](#) [RNWA0612BTC3K60](#) [RNWA0612BTC7K50](#)  
[RNWA0612BTE160R](#) [RNWA0612BTE36R0](#) [RNWA0612BTE39K0](#) [RNWA0612BTE680R](#) [RNWA0612DTC10R0](#)  
[RNWA0612DTC11K0](#) [RNWA0612DTC2K40](#) [RNWA0612DTC910R](#) [RNWA0612DTE24K0](#) [RNWA0612BTE1K10](#)  
[RNWA0612DTE2K20](#) [RNWA0612DTE62R0](#) [RNWA0612BTC1K80](#) [RNWA0612BTE12K0](#) [RNWA0612BTE560R](#)  
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