RNWA Series

Automotive Grade Wide Terminal Thin Film Precision Chip Resistor

Stackpole Electronics, Inc.
Resistive Product Solutions

Features

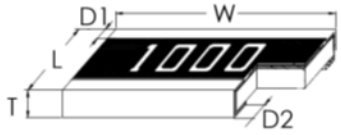
- Precision tolerances to ± 0.1%
- TCR down to ± 25 ppm/ºC
- Wide resistance value range
- Anti-sulfur
- RoHS compliant, REACH compliant, lead free, and halogen free
- AEC-Q200 qualified

Electrical Specifications

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

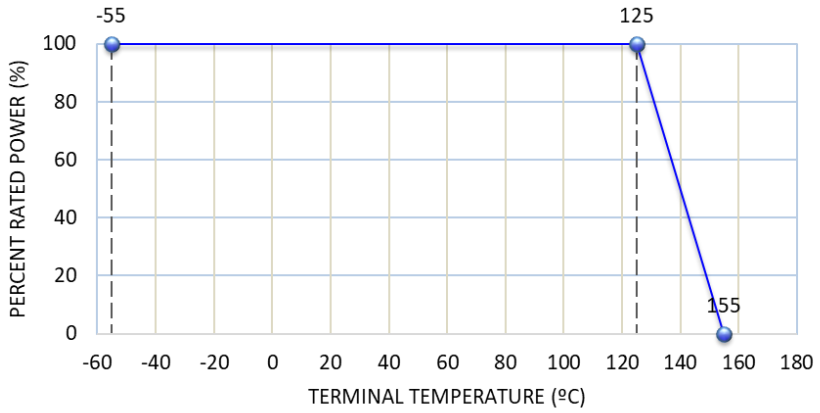
(1) √(P*R) or maximum working voltage, whichever is lower.
(2) 2.5*√(P*R) or maximum overload voltage, whichever is lower.

Mechanical Specifications



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

Power Derating Curve:



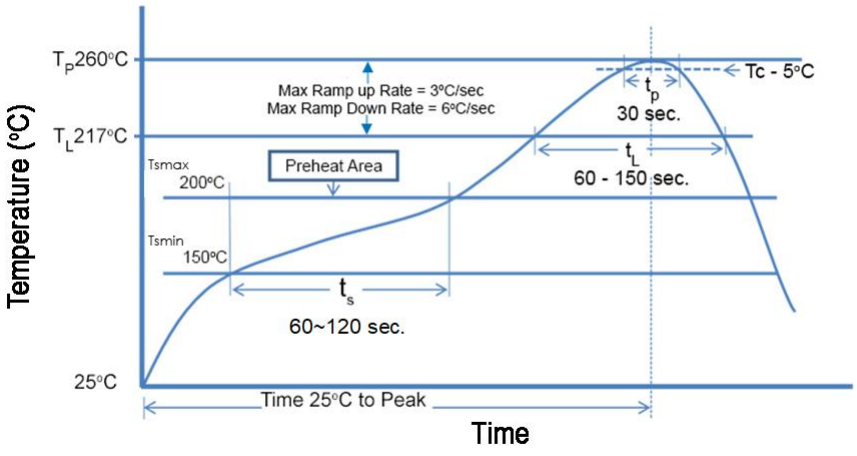
This specification may be changed at any time without prior notice.
Please confirm technical specifications before use.

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	ΔR ± 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	> 1000MΩ	Apply 100 V_{DC} for 1 minute
Endurance	MIL-STD-202 Method 108	ΔR ± 0.2%	70 ± 2°C, RCWV for 1000 hours with 1.5 hours "ON" and 0.5 hour "OFF"
Operational Life	MIL-STD-202 Method 108	ΔR ± 0.2%	Condition D Steady State TA = 125°C at derated power. Measurement at 24 ± 4 hours after test conclusion.
Biased Humidity	MIL-STD-202 Method 103	ΔR ± 0.1%	1000 hours 85°C / 85% R.H. 10% of operating power
High Temperature Exposure	MIL-STD-202 Method 108	ΔR ± 0.2%	at +155°C for 1000 hours
Temperature Cycling	JESD22 Method JA-104	ΔR ± 0.1%	-55 to +125°C, 1000 cycles
Bending Strength	JIS-C-5201-1 4.33	ΔR ± 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 ± 5°C for 3 seconds
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	ΔR ± 0.05%	260 ± 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	ΔR ± 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	ΔR ± 0.1%	5 g's for 20 minutes, 12 cycles each of 3 orientations, 1-2000 Hz
ESD	AEC-Q200-002	ΔR ± 0.5%	Human body model 0612, 1020, 1225 2 KV
Resistance to Solvents	MIL-STD-202 Method 215	Marking unsmeared	Add aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Sulfur Test	ASTM-B-809-95 Modified	ΔR ± 1%	105 ± 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) = √(P*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

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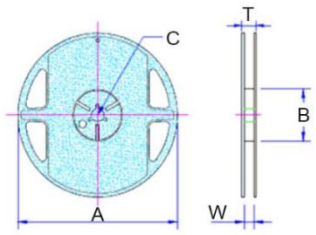
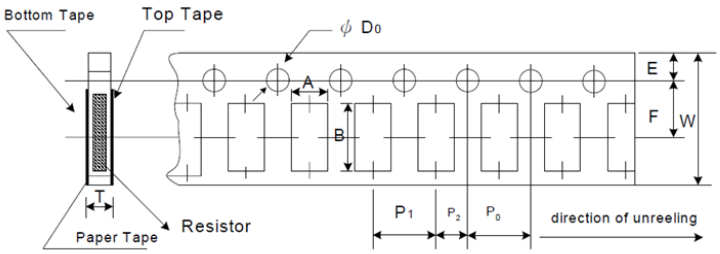
Profile Feature	Pb-Free Assembly
Preheat Min. Temperature (Tsmin) Max. Temperature (Tsmax) Preheating time (ts) from (Tsmin to Tsmax)	 150°C 200°C 60-120 seconds
Ramp-up Rate (T_L to T_P)	3°C/second max.
Liquidous Temperature (T_L)	217°C
Time (t_L) maintained above T_L	60-150 seconds
Min. Peak Temperature (Tp min)	235°C
Max. Peak Temperature (Tp max)	260°C
Time (tp) within 5°C of the specified classification temperature (Tc)	30 seconds max.
Ramp-down rate (T_P to T_L)	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 ± 0.039 178.00 ± 1.00	2.362 ± 0.039 60.00 ± 1.00	0.531 ± 0.028 13.50 ± 0.70	0.374 ± 0.039 9.50 ± 1.00	0.453 ± 0.039 11.50 ± 1.00	inches mm
RNWA1020	7.008 ± 0.039 178.00 ± 1.00	2.362 ± 0.039 60.00 ± 1.00	0.531 ± 0.028 13.50 ± 0.70	0.531 ± 0.039 13.50 ± 1.00	0.610 ± 0.039 15.50 ± 1.00	inches mm
RNWA1225	7.008 ± 0.039 178.00 ± 1.00	2.362 ± 0.039 60.00 ± 1.00	0.531 ± 0.028 13.50 ± 0.70	0.531 ± 0.039 13.50 ± 1.00	0.610 ± 0.039 15.50 ± 1.00	inches mm

Packaging Specifications – Paper Tape



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

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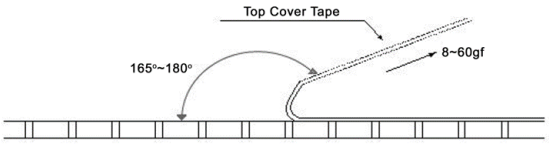
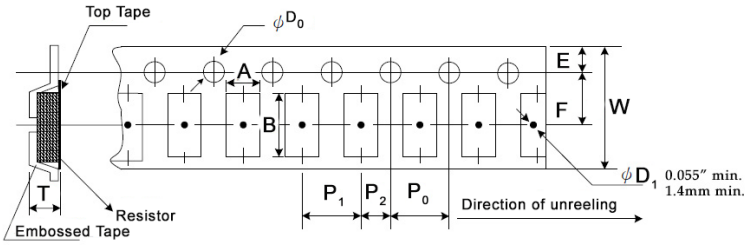
Peel Force of Top Cover Paper Tape

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



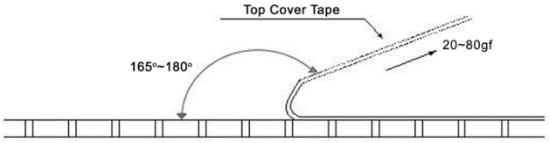
Packaging Specifications – Plastic Tape



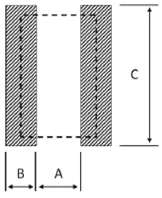
Type/Code	A	B	W	E	F	Unit
RNWA1020	0.112 ± 0.004 2.85 ± 0.10	0.215 ± 0.004 5.45 ± 0.10	0.472 ± 0.004 12.00 ± 0.10	0.069 ± 0.004 1.75 ± 0.10	0.217 ± 0.002 5.50 ± 0.05	inches mm
RNWA1225	0.134 ± 0.004 3.40 ± 0.10	0.262 ± 0.004 6.65 ± 0.10	0.472 ± 0.004 12.00 ± 0.10	0.069 ± 0.004 1.75 ± 0.10	0.217 ± 0.002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

Peel Force of Top Cover Plastic Tape

The peel speed shall be about 300 mm/min ± 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 0.60	0.039 1.00	0.126 ± 0.008 3.20 ± 0.20	inches mm
RNWA1020	0.039 1.00	0.047 1.20	0.197 ± 0.008 5.00 ± 0.20	inches mm
RNWA1225	0.071 1.80	0.079 2.00	0.256 ± 0.008 6.50 ± 0.20	inches mm

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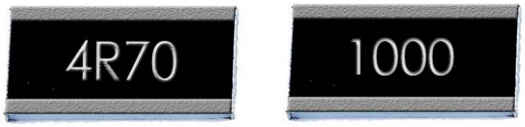
Part Marking Instructions



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.

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How to Order

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

Product Series
RNWA

Size
0612
1020
1225

Tolerance		
Code	Tol	Value
B	0.1%	E96, E24
C	0.25%	
D	0.5%	
F	1%	

Packaging			
Code	Description	Size	Quantity
T	7" Reel Paper Tape	0612	5000
	7" Reel Plastic Tape	1020, 1225	4000

TCR	
Code	ppm
E	25
C	50

Resistance Value [2]
Four characters with the multiplier used as the decimal holder.
2.5 ohm = 2R50 10 Kohm = 10K0 250 Kohm = 250K

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