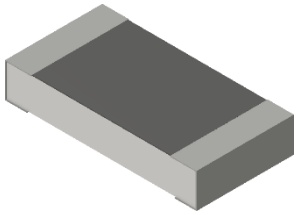
Features



- Special passivation for moisture sensitive applications
- Test proven performance under humidity and moisture
- Cost effective option for tantalum nitride resistors
- RoHS compliant, REACH compliant, lead free, and halogen free
- AEC-Q200 compliant
- For anti-sulfur version, refer to RNCS-AS specification

The RNCS series employs a special manufacturing process to ensure high power, high precision, ultra-stable performance, and long life in the harshest environments. In moisture comparison testing, the RNCS series outperformed conventionally passivated nichrome chip resistors and demonstrated the anti-corrosive claims characterized by tantalum nitride resistor products.

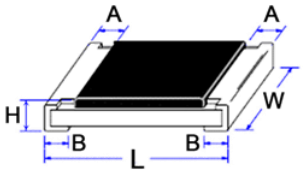
Electrical Specifications

Type/Code	Power Rating (W) @ 70ºC	Maximum Working Voltage (V)(1)	Maximum Overload Voltage (V)	TCR (ppm/ºC)	Ohmic Range (Ω) and Tolerance
					0.1%, 0.25%, 0.5%
RNCS0402	0.063	50	100	±15	49.9 - 69.8K
				±25	10 - 221K
				±50	
RNCS0603	0.063	50	100	±15	10 - 332K
				±25	10 - 680K
				±50	
RNCS0805	0.1	100	200	±15	10 - 1M
				±25	
				±50	
RNCS1206	0.125	150	300	±15	10 - 1M
				±25	10 - 1.5M
				±50	
RNCS2010	0.25 (0.5)(2)	150	300	±15	10 - 1M
				±25	
				±50	
RNCS2512	0.5 (1)(2)	150	300	±15	10 - 1M
				±25	
				±50	

(1) Lesser of √(P*R) or maximum working voltage

(2) Higher power rating for each package size is valid if ambient temperature ≤ 80ºC and terminal temperature ≤ 105ºC

Mechanical Specifications



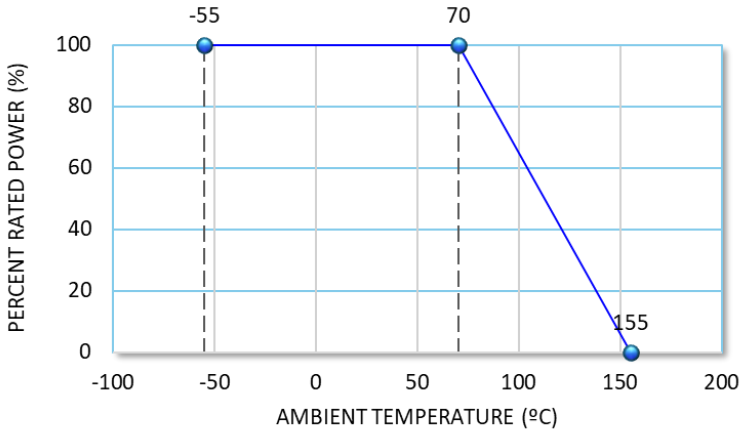
Type/Code	Typical Unit Weight (mg)	L Body Length	W Body Width	H Body Height	A Top Termination	B Bottom Termination	Unit
RNCS0402	0.54	0.039 ± 0.002 1.00 ± 0.05	0.020 ± 0.002 0.50 ± 0.05	0.012 ± 0.002 0.30 ± 0.05	0.008 ± 0.004 0.20 ± 0.10	0.008 ± 0.004 0.20 ± 0.10	inches mm
RNCS0603	1.8	0.061 ± 0.008 1.55 ± 0.20	0.031 ± 0.008 0.80 ± 0.20	0.018 ± 0.004 0.45 ± 0.10	0.012 ± 0.008 0.30 ± 0.20	0.012 ± 0.008 0.30 ± 0.20	inches mm

Mechanical Specifications (cont.)							
Type/Code	Typical Unit Weight (mg)	L Body Length	W Body Width	H Body Height	A Top Termination	B Bottom Termination	Unit
RNCS0805	4.7	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.022 ± 0.004 0.55 ± 0.10	0.012 ± 0.008 0.30 ± 0.20	0.016 ± 0.010 0.40 ± 0.25	inches mm
RNCS1206	9.0	0.120 ± 0.008 3.05 ± 0.20	0.061 ± 0.008 1.55 ± 0.20	0.022 ± 0.004 0.55 ± 0.10	0.017 ± 0.012 0.42 ± 0.30	0.014 ± 0.010 0.35 ± 0.25	inches mm
RNCS2010	23.6	0.193 ± 0.006 4.90 ± 0.15	0.094 ± 0.006 2.40 ± 0.15	0.022 ± 0.004 0.55 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	0.020 ± 0.010 0.50 ± 0.25	inches mm
RNCS2512	38.1	0.248 ± 0.006 6.30 ± 0.15	0.122 ± 0.006 3.10 ± 0.15	0.022 ± 0.004 0.55 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	0.020 ± 0.010 0.50 ± 0.25	inches mm

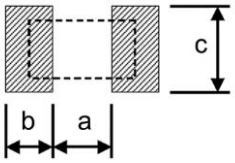
Performance Characteristics			
Test	Test Method	Test Specification	Test Condition
Short Time Overload	JIS-C-5201-1 4.13	≤ ± 0.05%	RCWV * 2.5 or Max. overload voltage whichever is lower for 2 seconds
Endurance	MIL-STD-202 Method 108	≤ ± 0.2%	Condition D Steady State T_A=125°C at derated power. Measurement at 24 ± 4 hours after test conclusion.
Biased Humidity	MIL-STD-202 Method 103	ΔR ± 0.1%	1000 hours 85°C/85% RH 10% of operating power
Solderability	MIL-STD-202 Method 208H	95% min. coverage	245 ± 5°C for 3 seconds
Resistance to Soldering Heat	MIL-STD-202 Method 210E	≤ ± 0.05%	260 ± 5°C for 10 seconds
Temperature Cycling	JESD22 Method JA-104	ΔR ± 0.1%	-55 to +125°C, 1000 cycles

RCWV (Rated Continuous Work Voltage) = √(P*R) or Max. Operating voltage whichever is lower
Operating temperature range is -55 to +155°C
Recommended storage temperature is 15 to 28°C. Humidity < 80% R.H.

Power Derating Curve:

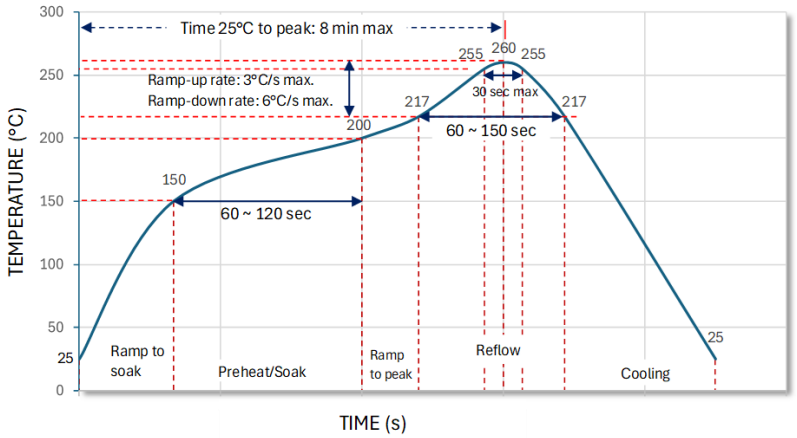


Recommended Solder Pad



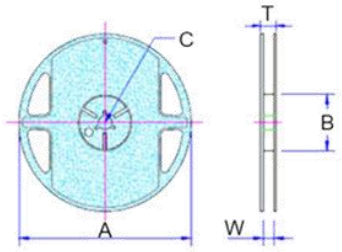
Type/Code	a	b	c	Unit
RNCS0402	0.020 0.50	0.020 0.50	0.024 ± 0.008 0.60 ± 0.20	inches mm
RNCS0603	0.031 0.80	0.039 1.00	0.035 ± 0.008 0.90 ± 0.20	inches mm
RNCS0805	0.039 1.00	0.039 1.00	0.053 ± 0.008 1.35 ± 0.20	inches mm
RNCS1206	0.079 2.00	0.045 1.15	0.067 ± 0.008 1.70 ± 0.20	inches mm
RNCS2010	0.142 3.60	0.055 1.40	0.098 ± 0.008 2.50 ± 0.20	inches mm
RNCS2512	0.193 4.90	0.063 1.60	0.122 ± 0.008 3.10 ± 0.20	inches mm

Recommended Resistor Reflow Profile



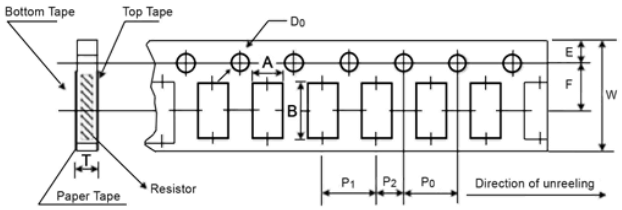
Number of reflow cycles allowed is 3 times.

Reel Specifications



Type/Code	A	B	C	W	T	Unit
RNCS0402	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
RNCS0603	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
RNCS0805	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
RNCS1206	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
RNCS2010	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
RNCS2512	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

Taping Specifications - Paper Tape

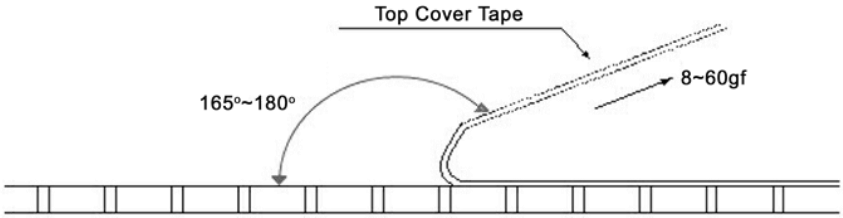


Type/Code	A	B	W	E	F	Unit
RNCS0402	0.028 ± 0.002 0.70 ± 0.05	0.046 ± 0.002 1.16 ± 0.05	0.315 ± 0.004 8.00 ± 0.10	0.069 ± 0.020 1.75 ± 0.50	0.138 ± 0.002 3.50 ± 0.05	inches mm
RNCS0603	0.043 ± 0.002 1.10 ± 0.05	0.075 ± 0.002 1.90 ± 0.05	0.315 ± 0.004 8.00 ± 0.10	0.069 ± 0.002 1.75 ± 0.05	0.138 ± 0.002 3.50 ± 0.05	inches mm
RNCS0805	0.063 ± 0.002 1.60 ± 0.05	0.093 ± 0.002 2.37 ± 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
RNCS1206	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

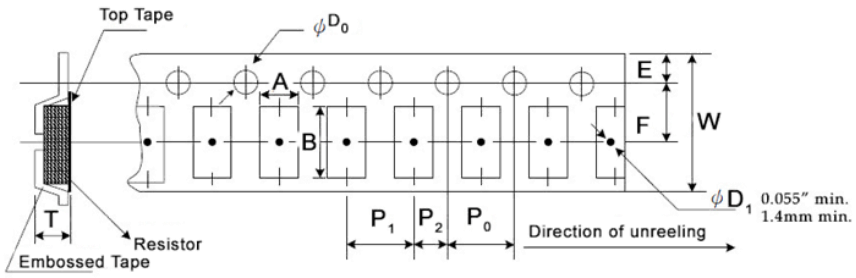
Type/Code	P0	P1	P2	D0	T	Unit
RNCS0402	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.079 ± 0.002 2.00 ± 0.05	0.061 ± 0.002 1.55 ± 0.05	0.016 ± 0.001 0.40 ± 0.03	inches mm
RNCS0603	0.157 ± 0.004 4.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.061 ± 0.002 1.55 ± 0.05	0.024 ± 0.001 0.60 ± 0.03	inches mm
RNCS0805	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
RNCS1206	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

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 gf to 60 gf



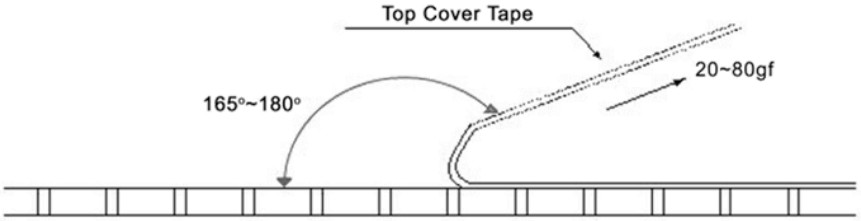
Packaging Specifications - Plastic Tape



Type/Code	A	B	W	E	F	Unit
RNCS2010	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
RNCS2512	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
RNCS2010	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
RNCS2512	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 gf to 80 gf



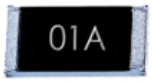
Part Marking Specifications

1. **0402 is unmarked**

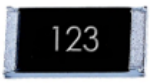
2. **3-digit marking for 0603 in E24**
   First and second digits are E24 code; third digit is the multiplier

E24 Codes	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47	51	56	62	68	75	82	91

   Examples:
   Values that are both E24 and E96 follow E96 marking rules.



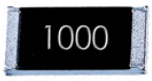
100 Ω



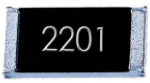
12 KΩ

3. **4-digit marking for 0805, 1206, 2010 and 2512**
   Values below 100Ω will use "R" as the decimal holder
   Examples:

4-digit marking						
Marking	10R0	1000	2201	1002	1003	1004
Resistance	10Ω	100Ω	2.2KΩ	10KΩ	100KΩ	1MΩ

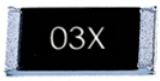


100 Ω



2.2 KΩ

4. **E96 Values for 0603**
   A two character number is assigned to each standard R-Value (E96) as shown in the chart below.
   This is followed by one alpha character which is used as a multiplier.
   Each letter from "Y" to "F" represents a specific multiplier.



10.5Ω

Alpha Character = Multiplier	
X = 1	C = 1000
A = 10	D = 10000
B = 100	E = 100000

Chip Marking	Value
01B	10.0 x 100 = 1 KΩ
25C	17.8 x 1000 = 17.8 KΩ
51D	33.2 x 10000 = 332 KΩ

E96

#	R-Value	#	R-Value	#	R-Value	#	R-Value	#	R-Value	#	R-Value
01	10.0	**17**	14.7	**33**	21.5	**49**	31.6	**65**	46.4	**81**	68.1
02	10.2	**18**	15.0	**34**	22.1	**50**	32.4	**66**	47.5	**82**	69.8
03	10.5	**19**	15.4	**35**	22.6	**51**	33.2	**67**	48.7	**83**	71.5
04	10.7	**20**	15.8	**36**	23.2	**52**	34.0	**68**	49.9	**84**	73.2
05	11.0	**21**	16.2	**37**	23.7	**53**	34.8	**69**	51.1	**85**	75.0
06	11.3	**22**	16.5	**38**	24.3	**54**	35.7	**70**	52.3	**86**	76.8
07	11.5	**23**	16.9	**39**	24.9	**55**	36.5	**71**	53.6	**87**	78.7
08	11.8	**24**	17.4	**40**	25.5	**56**	37.4	**72**	54.9	**88**	80.6
09	12.1	**25**	17.8	**41**	26.1	**57**	38.3	**73**	56.2	**89**	82.5
10	12.4	**26**	18.2	**42**	26.7	**58**	39.2	**74**	57.6	**90**	84.5
11	12.7	**27**	18.7	**43**	27.4	**59**	40.2	**75**	59.0	**91**	86.6
12	13.0	**28**	19.1	**44**	28.0	**60**	41.2	**76**	60.4	**92**	88.7
13	13.3	**29**	19.6	**45**	28.7	**61**	42.2	**77**	61.9	**93**	90.9
14	13.7	**30**	20.0	**46**	29.4	**62**	43.2	**78**	63.4	**94**	93.1
15	14.0	**31**	20.5	**47**	30.1	**63**	44.2	**79**	64.9	**95**	95.3
16	14.3	**32**	21.0	**48**	30.9	**64**	45.3	**80**	66.5	**96**	97.6

5. **E192 values are unmarked**

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
RNCS	Moisture Resistant Precision Thin Film Chip Resistor	SMD	YES	100% Matte Sn over Ni

"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.

How to Order

R	N	C	S	0	8	0	5	D	T	E	4	K	7	5

Product Series

RNCS

Size

Code
0402
0603
0805
1206
2010
2512

Tolerance

Code	Tol	Value (1)
B	0.1%	E192, E96, E24
C	0.25%	
D	0.5%	

Packaging

Code	Description	Size	Quantity
T	7" Reel Paper Tape	0402	10000
		0603, 0805, 1206	5000
	7" Reel Plastic Tape	2010, 2512	4000
K(2)	7" Reel Paper Tape	0402, 0603, 0805,1206	1000

TCR

Code	ppm
S	15
E	25
C	50

Resistance Value

Four characters with the multiplier used as the decimal holder.
10 ohm = 10R0 332 Kohm 332K 1 Mohm = 1M00

(1) E192 values are not marked and subject to higher MOQ
(2) MOQ for K packaging is 5000 pieces