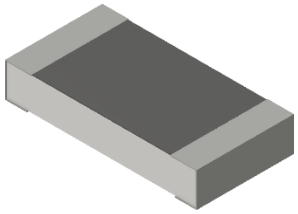
Features:

- Excellent long-term stability
- Operating temperature up to 175°C
- Advanced sulfur resistance verified according to ASTM B 809
- RoHS compliant, REACH compliant, lead free, and halogen free
- AEC-Q200 compliant



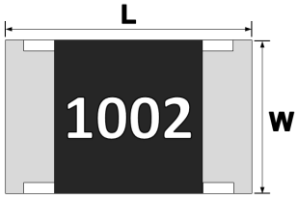
Electrical Specifications

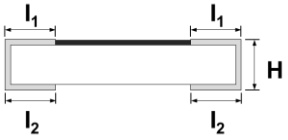
Type/Code	Power Rating (W) @ 70ºC	Maximum Working Voltage (V) (1)	Maximum Overload Voltage (V)	TCR (ppm/ºC)	Ohmic Range (Ω) and Tolerance				
					±0.05%	±0.1%	±0.25%	±0.5%	±1%
RNCE0402	0.063	75	100	± 25 ± 50	49.9 - 12K	10 - 220K			
RNCE0603	0.1	100	200	± 25 ± 50	49.9 - 33K	10 - 680K			
RNCE0805	0.125	150	300	± 25 ± 50	49.9 - 51K	10 - 1M			
RNCE1206	0.25	200	400	± 25 ± 50	49.9 - 100K	10 - 1.5M			

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

Operating temperature range is -55 to +175°C

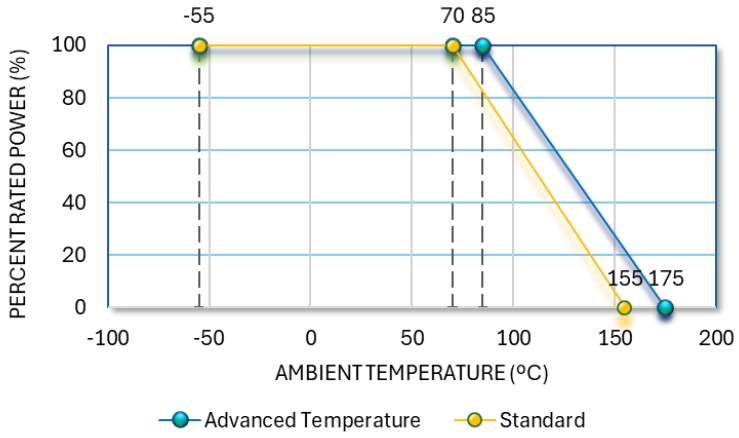
Mechanical Specifications





Type/Code	L Body Length	W Body Width	H Body Height	l_1 Top Termination	l_2 Bottom Termination	Unit
RNCE0402	0.039 ± 0.004 1.00 ± 0.10	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
RNCE0603	0.063 ± 0.006 1.60 ± 0.15	0.031 ± 0.004 0.80 ± 0.10	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
RNCE0805	0.079 ± 0.006 2.00 ± 0.15	0.049 ± 0.006 1.25 ± 0.15	0.022 ± 0.004 0.55 ± 0.10	0.014 ± 0.008 0.35 ± 0.20	0.016 ± 0.008 0.40 ± 0.20	inches mm
RNCE1206	0.122 ± 0.006 3.10 ± 0.15	0.063 ± 0.006 1.60 ± 0.15	0.022 ± 0.004 0.55 ± 0.10	0.018 ± 0.008 0.45 ± 0.20	0.020 ± 0.008 0.50 ± 0.20	inches mm

Power Derating Curve:



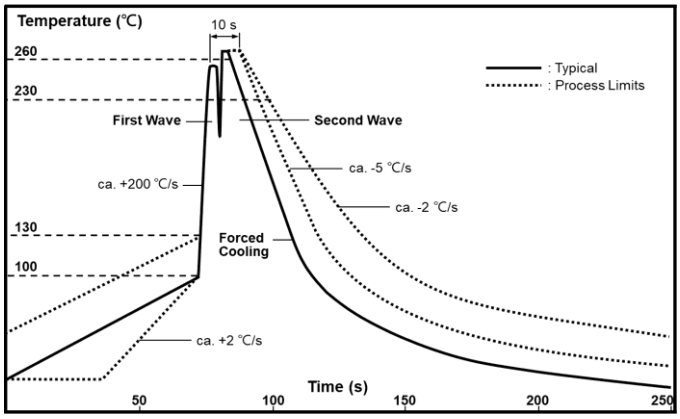
Performance Specifications			
Test	Test Method	Test Specifications	Test Condition
Temperature Coefficient of Resistance (TCR)	JIS-C-5201-1 4.8 IEC-60115-1 4.8	Refer to Electrical Specification table	At 25 / -55°C and 25°C / +125°C, 25°C is the reference temperature
Short Time Overload	JIS-C-5201-1 4.13 IEC-60115-1 4.13	± (0.1% + 0.01Ω) No visual damage	2.5 times RCWV or max. overload voltage whichever is less for 5 seconds
Leaching	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1	>95% coverage No visual damage	260 ± 5°C for 30 seconds
Resistance to Soldering Heat	JIS-C-5201-1 4.18 IEC-60115-1 4.18	± (0.1% + 0.01Ω) No visual damage	260 ± 5°C for 10 seconds
Insulation Resistance	JIS-C-5201-1 4.6 IEC-60115-1 4.6	≥ 10GΩ	Apply 100VDC for 1 minute
Temperature Cycling	JESD22 Method JA-104	± (0.1% + 0.01Ω) No visual damage	1000 cycles (-55°C to +155°C). Measurement at 24 ± 4 hours after test conclusion. 30 minutes maximum dwell time at each temperature extreme.
Resistance to Solvent	MIL-STD-202 Method 215	± (0.1% + 0.01Ω) No visual damage	Add aqueous wash chemical - OKEM clean or equivalent
Biased Humidity	MIL-STD-202 Method 103	± (0.1% + 0.01Ω)	1000 hours; 85°C / 85% RH, 10% of operating power. Measurement at 24 ± 4 hours after test conclusion.
High Temperature Exposure (Storage)	MIL-STD-202 Method 108	@155°C standard temperature ± (0.1% + 0.01Ω) @175°C Advanced temperature ± (0.3% + 0.01Ω)	1000 hours. Unpowered. Measurement at 24 ± 4 hours after test conclusion.
Operation Life	MIL-STD-202 Method 108	@70°C standard temperature ± (0.1% + 0.01Ω) @85°C Advanced temperature ± (0.3% + 0.01Ω)	1000 hours; maximum specified operating temperature at 100% rated power without derating. Measurement at 24 ± 4 hours after test conclusion.
External Visual	MIL-STD-883 Method 2009	No visual damage	Electrical test not required Inspect device construction, marking and workmanship.
Mechanical Shock	MIL-STD-202 Method 213	± (0.1% + 0.01Ω)	Wave form: Tolerance for half sine shock pulse. Peak value is 100 g. Normal duration (D) is 6 ms.
Vibration	MIL-STD-202 Method 204	± (0.1% + 0.01Ω)	5 g for 20 minutes, 12 cycles each of 3 orientations. Note: test from 10 - 2000 H
ESD	AEC-Q200-002 or ISO/DIS 10605	± (0.5% + 0.01Ω)	Human body model 0402: 400 V, 0603: 1000 V 0805: 1500 V , 1206: 2000 V

Performance Specifications (cont.)

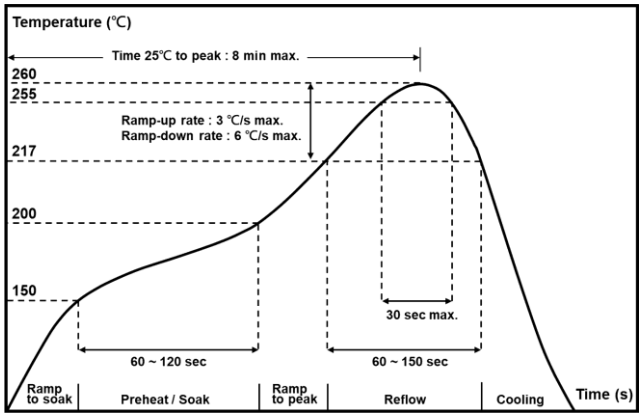
Test	Test Method	Test Specifications	Test Condition
Solderability	J-STD-002	>95% Coverage No visual damage	(1) 4 hours 155°C dry heat (2) 245 ± 5°C 3 seconds
Terminal Strength (SMD)	AEC Q200-006	No breakage	Pressurizing force for 60 seconds 0402 / 0603: 8 N 0805 / 1206: 17.7 N
Board Flex	AEC Q200-005	± (0.1% + 0.01Ω)	Bending once for 60 seconds. 3mm
Sulfur Test (FoS)	ASTM B809-95 ANSI/EIA-977	± (1% + 0.01Ω)	105 ± 2°C, unpowered for 1000 hours

Soldering Condition

Wave soldering profile



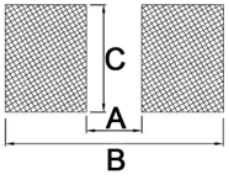
Solder reflow temperature condition



The peak temperature of soldering heat is 260°C for 10 seconds.

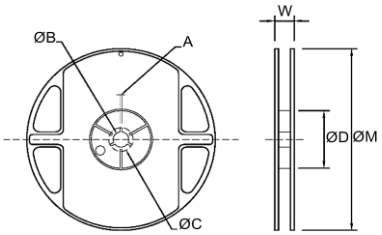
- Rework temperature (hot air equipment): 350°C, 3 ~ 5 seconds
- Recommended reflow methods:
  - IR, vapor phase oven, hot air oven. If reflow temperature exceed the recommended profile, devices may not meet the performance requirements.

Recommended Pad Layout



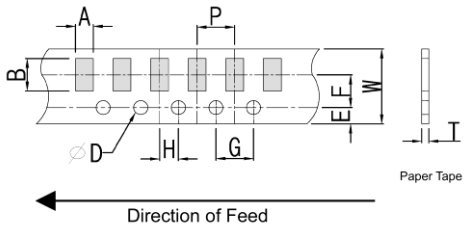
Type/Code	A	B	C	Unit
RNCE0402	0.020 0.50	0.063 1.60	0.028 0.70	inches mm
RNCE0603	0.031 0.80	0.094 2.40	0.039 1.00	inches mm
RNCE0805	0.051 1.30	0.114 2.90	0.055 1.40	inches mm
RNCE1206	0.087 2.20	0.165 4.20	0.067 1.70	inches mm

Reel Specifications



Type/Code	Size		ØA	ØB	ØC	ØD	W	ØM	Unit
0402	7"	10K/Reel	0.079 ± 0.020 2.00 ± 0.50	0.531 ± 0.039 13.50 ± 1.00	0.827 ± 0.039 21.00 ± 1.00	2.362 ± 0.039 60.00 ± 1.00	0.453 ± 0.079 11.50 ± 2.00	7.008 ± 0.079 178.00 ± 2.00	inches mm
0603/0805/1206	7"	5K/Reel	0.079 ± 0.020 2.00 ± 0.50	0.531 ± 0.039 13.50 ± 1.00	0.827 ± 0.039 21.00 ± 1.00	2.362 ± 0.039 60.00 ± 1.00	0.453 ± 0.079 11.50 ± 2.00	7.008 ± 0.079 178.00 ± 2.00	inches mm

Paper Tape Specifications



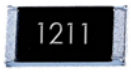
Type/Code	A	B	W	E	F	Unit
RNCE0402	0.028 ± 0.004 0.70 ± 0.10	0.047 ± 0.004 1.20 ± 0.10	0.315 ± 0.008 8.00 ± 0.20	0.069 ± 0.004 1.75 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	inches mm
RNCE0603	0.041 ± 0.008 1.05 ± 0.20	0.071 ± 0.008 1.80 ± 0.20	0.315 ± 0.008 8.00 ± 0.20	0.069 ± 0.004 1.75 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	inches mm
RNCE0805	0.061 ± 0.008 1.55 ± 0.20	0.091 ± 0.008 2.30 ± 0.20	0.315 ± 0.008 8.00 ± 0.20	0.069 ± 0.004 1.75 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	inches mm
RNCE1206	0.075 ± 0.008 1.90 ± 0.20	0.138 ± 0.008 3.50 ± 0.20	0.315 ± 0.008 8.00 ± 0.20	0.069 ± 0.004 1.75 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	inches mm

Type/Code	G	H	T	ØD	P	Unit
RNCE0402	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.018 ± 0.004 0.45 ± 0.10	0.059 +0.004 / -0 1.50 +0.1 / -0	0.079 ± 0.004 2.00 ± 0.10	inches mm
RNCE0603	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.024 ± 0.004 0.60 ± 0.10	0.059 +0.004 / -0 1.50 +0.1 / -0	0.157 ± 0.004 4.00 ± 0.10	inches mm
RNCE0805	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.030 ± 0.004 0.75 ± 0.10	0.059 +0.004 / -0 1.50 +0.1 / -0	0.157 ± 0.004 4.00 ± 0.10	inches mm
RNCE1206	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.030 ± 0.004 0.75 ± 0.10	0.059 +0.004 / -0 1.50 +0.1 / -0	0.157 ± 0.004 4.00 ± 0.10	inches mm

Part Marking

E96 and E24 Values for 0805 and 1206

The nominal resistance is marked on the surface of the overcoating with the use of **four character markings.**

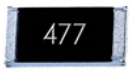


1.21KΩ

E24 Values for 0603

The nominal resistance is marked on the surface of the overcoating with the use of **three character markings.**

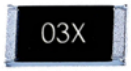
1. Values that are both E24 and E96 follow E96 marking rules.



477Ω

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" - "F" represents a specific multiplier.



10.5Ω

Chip Marking	Value
01B	10.0 x 100 = 1 KΩ
25C	17.8 x 1000 = 17.8 KΩ
93D	90.9 x 10000 = 909 KΩ

Alpha Character = Multiplier	
Y = 0.1	C = 1000
X = 1	D = 10000
A = 10	E = 100000
B = 100	F = 1000000

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

Note: 0402 size is 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	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
RNCE	High Temperature High Stability Thin Film 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. 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	E	1	2	0	6	B	T	E	1	0	K	0

Product Series

Product Series
RNCE

Size

Size
0402
0603
0805
1206

Tolerance

Code	Tol.	Value
A	0.05%	E96, E24
B	0.1%	
C	0.25%	
D	0.5%	
F	1%	

Packaging

Code	Description	Size	Quantity
T	7" Reel	0402	10000
	Paper Tape	0603, 0805, 1206	5000

TCR

Code	ppm
E	25
C	50

Resistance Value

Four characters with the multiplier used as the decimal holder.
10 ohm = 10R0
12 Kohm = 12K0
1.5 Mohm = 1M50