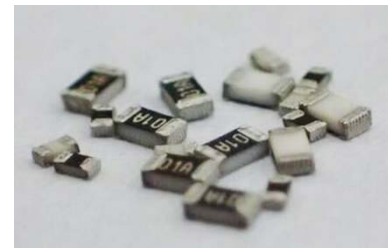# RTAN Series
Tantalum Nitride Thin Film Chip Resistor

Stackpole Electronics, Inc.
Resistive Product Solutions

Features:
- TaN thin film resistor
- Self-passivating technology is impervious to moisture
- Sulfur resistant (per ASTM B809-95 humid vapor test)
- Meets or exceeds 85°C/85% R.H. at 10% rated power humidity test
- AEC-Q200 qualified
- RoHS compliant

Applications:
- Automotive electronics
- Medical equipment
- Measuring instrumentation
- Communication devices

Electrical Specifications

Type / Code	Power Rating (Watts) @ 85°C	Maximum Working Voltage[1]	Maximum Overload Voltage	Resistance Temperature Coefficient	Ohmic Range (Ω) and Tolerance 0.05%, 0.1%, 0.25%, 0.5%, 1%
RTAN0402	0.063W	50V	100V	±25ppm/°C ±50ppm/°C	40 - 35K
RTAN0603	0.15W	75V	150V		40 - 130K
RTAN0805	0.2W	100V	200V		10 - 350K
RTAN1206	0.4W	200V	400V		10 - 1M

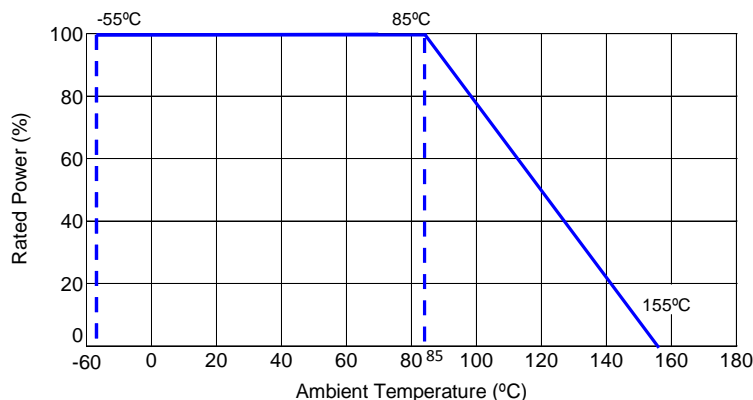Operating Temperature: -55 ~ +155°C
(1) Lesser of $\sqrt{P*R}$ or maximum working voltage.

Mechanical Specifications

Type / Code	L	W	A	B	t	Unit
RTAN0402	0.039 ± 0.004 / 1.00 ± 0.10	0.020 ± 0.002 / 0.50 ± 0.05	0.010 ± 0.006 / 0.25 ± 0.15	0.012 ± 0.004 / 0.30 ± 0.10	0.012 ± 0.004 / 0.30 ± 0.10	inches / mm
RTAN0603	0.061 ± 0.004 / 1.55 ± 0.10	0.031 ± 0.004 / 0.80 ± 0.10	0.012 ± 0.008 / 0.30 ± 0.20	0.012 ± 0.006 / 0.30 ± 0.15	0.018 ± 0.006 / 0.45 ± 0.15	inches / mm
RTAN0805	0.079 ± 0.004 / 2.00 ± 0.10	0.049 ± 0.004 / 1.25 ± 0.10	0.014 ± 0.008 / 0.35 ± 0.20	0.016 ± 0.008 / 0.40 ± 0.20	0.020 ± 0.006 / 0.50 ± 0.15	inches / mm
RTAN1206	0.122 ± 0.004 / 3.10 ± 0.10	0.063 ± 0.004 / 1.60 ± 0.10	0.016 ± 0.008 / 0.40 ± 0.20	0.016 ± 0.008 / 0.40 ± 0.20	0.024 ± 0.006 / 0.60 ± 0.15	inches / mm

Power Derating Curve:

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Performance Characteristics

Test	Test Method	Test Specification	Test Condition
Electrical Characteristics	IEC-60115-1 4.8	Within the specified tolerance	DC resistance values measurement Temperature Coefficient of Resistance (TCR) Natural resistance change per change in degree centigrade $$\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \ (ppm/^oC) \quad t_1: 20°C \ +5°C/-1°C$$ R1: Resistance at reference temperature (20°C +5°C/-1°C) R2: Resistance at test temperature (-55°C or +125°C)
Short Time Overload	IEC-60115-1 4.13	ΔR/R max. ± (0.1%+0.02Ω)	Permanent resistance change after a 5 second application of a voltage 2.5 times RCWV or the maximum overload voltage specified in the above list, whichever is less.
Resistance to Soldering Heat	AEC-Q200-15	No visible damage ΔR/R max. ± (0.1%+0.02Ω)	Un-mounted chips completely immersed for 10±1 second in a SAC solder bath at 260±5°C
Solderability	IEC-60068-2-58	Good tinning (>95% covered) No visible damage	Un-mounted chips completely immersed for 2±0.5 seconds in a SAC solder bat at 235±5°C
Thermal Shock	MIL-STD-202 Method 107	No visible damage ΔR/R max. ± (0.1%+0.02Ω)	Test -55 to 125°C /dwell time 15 minutes/max. transfer time 20 seconds 1000 cycles
Load Life and Moisture	AEC-Q200-7	ΔR/R max. ± (0.1%+0.02Ω)	1000 +48/-0 hours, loaded with 10% rated power in humidity chamber controller at +85°C /85% R.H.
Load Life	IEC-60115-1 4.25	ΔR/R max. ± (0.1%+0.02Ω)	1000 +48/-0 hours, loaded with RCWV or Vmax in chamber controller 85±2°C, 1.5 hours ON and 0.5 hours OFF
High Temperature Load Life	AEC-Q200-8 MIL-STD-202-108	ΔR/R max. ± (0.1%+0.02Ω)	1000 hours at 125±2°C, loaded with rated power continuously
High Temperature Exposure	AEC-Q200-3	ΔR/R max. ± (0.1%+0.02Ω)	1000 hours at 125°C, unpowered
Biased Humidity	AEC-Q200-6 MIL-STD-202 Method 106	ΔR/R max. ± (0.1%+0.02Ω)	65±2°C, 80~100% R.H., 10 cycles, 24 hours/cycle
Mechanical Shock	MIL-STD-202 Method 213	ΔR/R max. ± (0.1%+0.02Ω)	1/2 Sine Pulse / 150g Peak / Velocity 15.4 foot/second
Vibration	MIL-STD-202 Method 204	ΔR/R max. ± (0.1%+0.02Ω)	5 g's for 20 minutes, 12 cycles each of 3 orientations
Terminal Strength	AEC-Q200-6	No breaking	1 Kg. for 60 seconds
Bending Strength	AEC-Q200-21	ΔR/R max. ± (0.1%+0.02Ω)	Bending 2mm for 60 seconds

Storage conditions: Temperature 5 to 40°C. Humidity: 20 to 70% R.H.

Soldering Condition:

The robust construction of chip resistors allows them to be completely immersed in a solder bath of 260°C for 10 seconds. Therefore, it is possible to mount surface mount resistors on one side of a PCB and other discrete components on the reverse (mixed PCBs).

Surface mount resistors are tested for solderability at 235°C during 2 seconds within lead-free solder bath. The test condition for no leaching is 260°C for 30 seconds. Typical examples of soldering profile and condition that provide reliable joints without any damage are given on the picture on the right.

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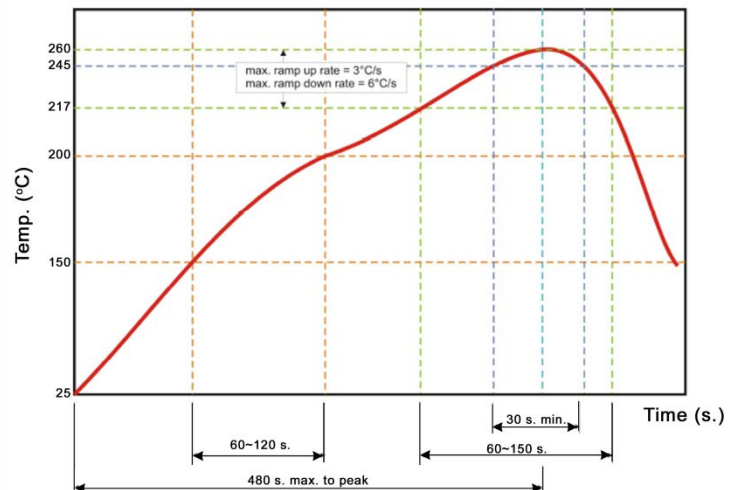
Packaging Specifications
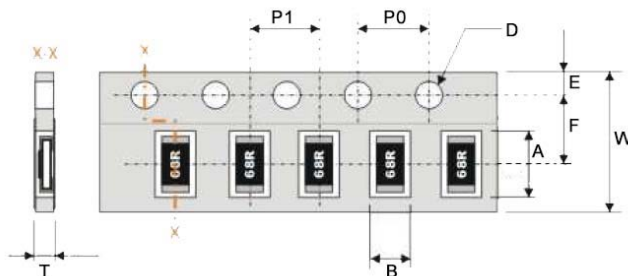
| Type / Code	A	B	W	F	E	P1	P0	D	T	Unit
RTAN0402	0.047 ± 0.004	0.028 ± 0.004	0.315 ± 0.012	0.138 ± 0.008	0.069 ± 0.004	0.079 ± 0.004	0.157 ± 0.004	0.059 ± 0.004	0.016 ± 0.002	inches
	1.20 ± 0.10	0.70 ± 0.10	8.00 ± 0.30	3.50 ± 0.20	1.75 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.50 ± 0.10	0.40 ± 0.05	mm
RTAN0603	0.075 ± 0.008	0.043 ± 0.008	0.315 ± 0.012	0.138 ± 0.008	0.069 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.059 ± 0.004	0.026 ± 0.002	inches
	1.90 ± 0.20	1.10 ± 0.20	8.00 ± 0.30	3.50 ± 0.20	1.75 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	1.50 ± 0.10	0.65 ± 0.05	mm
RTAN0805	0.094 ± 0.008	0.065 ± 0.008	0.315 ± 0.012	0.138 ± 0.008	0.069 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.059 ± 0.004	0.039 max.	inches
	2.40 ± 0.20	1.65 ± 0.20	8.00 ± 0.30	3.50 ± 0.20	1.75 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	1.50 ± 0.10	1.00 max.	mm
RTAN1206	0.142 ± 0.008	0.079 ± 0.008	0.315 ± 0.012	0.138 ± 0.002	0.069 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.059 ± 0.004	0.039 max.	inches
	3.60 ± 0.20	2.00 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	1.50 ± 0.10	1.00 max.	mm

Reel Specifications
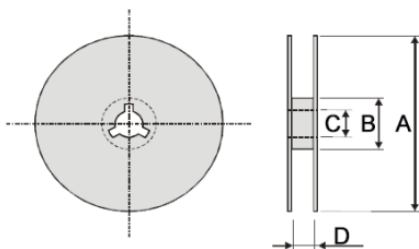
Type / Code	A	B	C	D	Unit
All Sizes	7.008 ± 0.079	2.362 ± 0.039	0.512 ± 0.008	0.354 ± 0.020	inches
	178.00 ± 2.00	60.00 ± 1.00	13.00 ± 0.20	9.00 ± 0.50	mm

Part Marking Specifications

1% Marking
The nominal resistance is marked on the surface of the overcoating with the use of 4 digit markings.
0402 are not marked

5% Marking
The nominal resistance is marked on the surface of the oercoating with the use of 3 digit markings.
0402 are not marked

For shared E24/E96 values, 1% tolerance product may be marked with three digit marking instead of the standard four digit marking for all other E96 values. All E24 values available in 1% tolerance are also marked with three digit marking.

Mark Instructions for 0603 1% Chip Resistors (per EIA-J)

A two-digit 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 as follows:
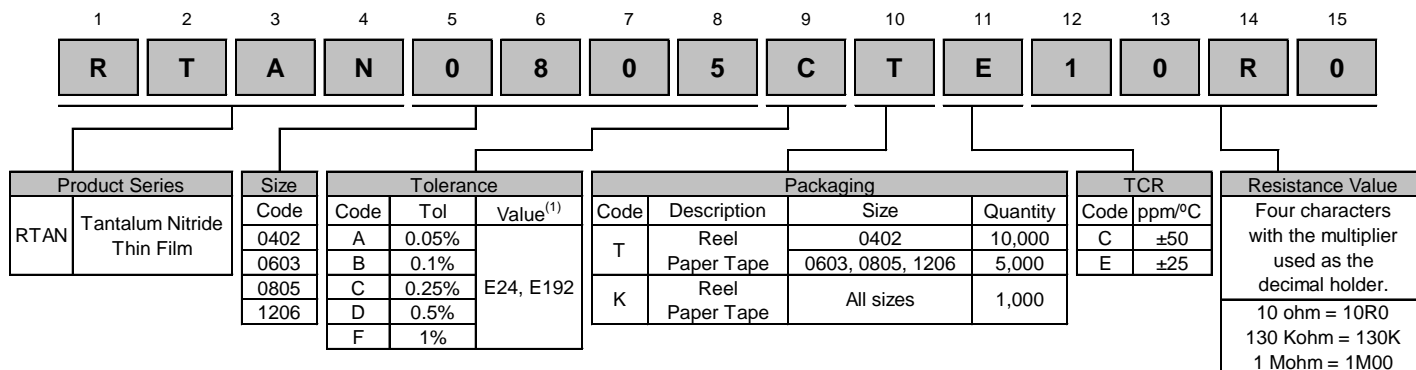
Y = 0.1	B = 100	E = 100,000
X = 1	C = 1,000	F = 1,000,000
A = 10	D = 10,000	

EXAMPLE:

Chip Marking	Explanation	Value
01B	01 means 10.0 and B = 100	10.0 x 100 = 1 K ohm
25C	25 means 17.8 and C = 1,000	17.8 x 1,000 = 17.8 K ohm
93D	93 means 90.9 and D = 10,000	90.9 x 10,000 = 909 K ohm

E96															
1%	#	1%	#	1%	#	1%	#	1%	#	1%	#	1%	#	1%	#
10.0	01	14.7	17	21.5	33	31.6	49	46.4	65	68.1	81				
10.2	02	15.0	18	22.1	34	32.4	50	47.5	66	69.8	82				
10.5	03	15.4	19	22.6	35	33.2	51	48.7	67	71.5	83				
10.7	04	15.8	20	23.2	36	34.0	52	49.9	68	73.2	84				
11.0	05	16.2	21	23.7	37	34.8	53	51.1	69	75.0	85				
11.3	06	16.5	22	24.3	38	35.7	54	52.3	70	76.8	86				
11.5	07	16.9	23	24.9	39	36.5	55	53.6	71	78.7	87				
11.8	08	17.4	24	25.5	40	37.4	56	54.9	72	80.6	88				
12.1	09	17.8	25	26.1	41	38.3	57	56.2	73	82.5	89				
12.4	10	18.2	26	26.7	42	39.2	58	57.6	74	84.5	90				
12.7	11	18.7	27	27.4	43	40.2	59	59.0	75	86.6	91				
13.0	12	19.1	28	28.0	44	41.2	60	60.4	76	88.7	92				
13.3	13	19.6	29	28.7	45	42.2	61	61.9	77	90.9	93				
13.7	14	20.0	30	29.4	46	43.2	62	63.4	78	93.1	94				
14.0	15	20.5	31	30.1	47	44.2	63	64.9	79	95.3	95				
14.3	16	21.0	32	30.9	48	45.3	64	66.5	80	97.6	96				

How to Order

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
R	T	A	N	0	8	0	5	C	T	E	1	0	R	0

Product Series		Size	Tolerance			Packaging				TCR		Resistance Value
RTAN	Tantalum Nitride Thin Film	Code	Code	Tol	Value(1)	Code	Description	Size	Quantity	Code	ppm/ºC	Four characters with the multiplier used as the decimal holder.
		0402	A	0.05%		T	Reel Paper Tape	0402	10,000	C	±50	
		0603	B	0.1%				0603, 0805, 1206	5,000	E	±25	10 ohm = 10R0
		0805	C	0.25%	E24, E192	K	Reel Paper Tape	All sizes	1,000			130 Kohm = 130K
		1206	D	0.5%								1 Mohm = 1M00
			F	1%								

(1) E192 values are not marked and may be subject to 20Kpc MOQ

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