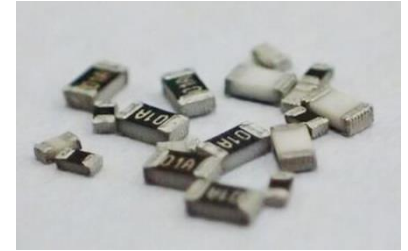


### Features:

- 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 and halogen-free



### Applications:

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

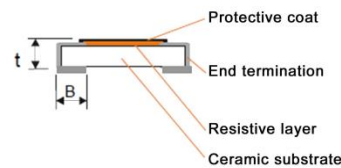
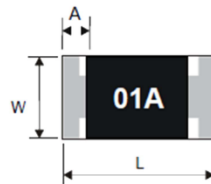
### Electrical Specifications

| Type / Code | Power Rating (Watts) @ 85°C | Maximum Working Voltage <sup>(1)</sup> | 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                     | ±10ppm/°C<br>±15ppm/°C<br>±25ppm/°C<br>±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

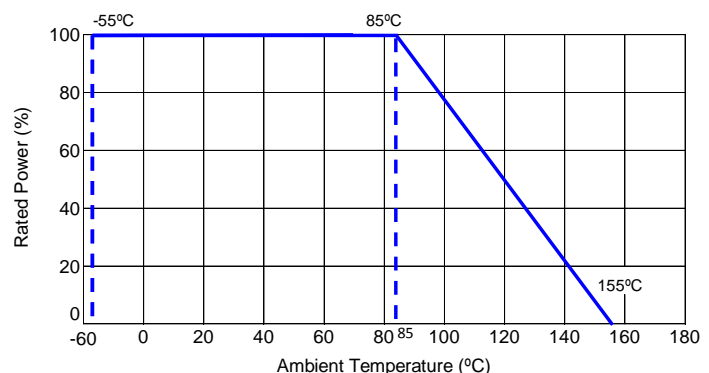
(1) Lesser of  $\sqrt{P \cdot R}$  or maximum working voltage.

### Mechanical Specifications



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

### Power Derating Curve:



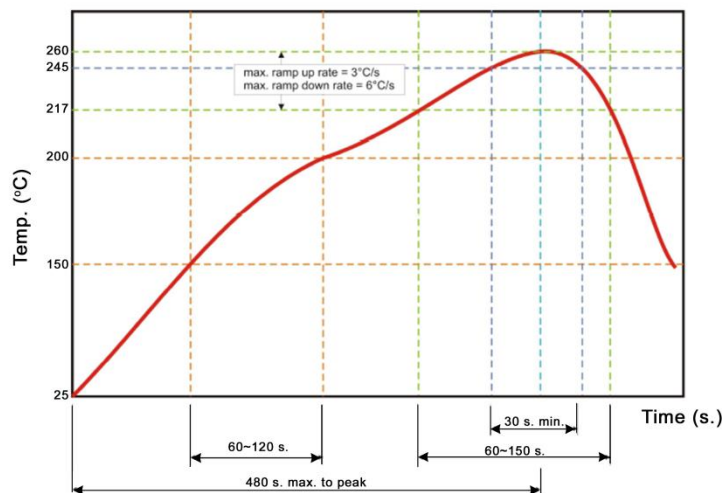
| Performance Characteristics  |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| Test                         | Test Method                          | Test Specification   | Test Condition   |
| Electrical Characteristics   | IEC-60115-1 4.8                      | Within the specified tolerance   | DC resistance values measurement<br>Temperature Coefficient of Resistance (TCR)<br>Natural resistance change per change in degree centigrade<br>$\frac{R_2 - R_1}{R_1 (t_2 - t_1)} \times 10^6 \text{ (ppm/}^\circ\text{C)}$ $t_1: 20^\circ\text{C} +5^\circ\text{C}/-1^\circ\text{C}$<br>R1: Resistance at reference temperature (20°C +5°C/-1°C)<br>R2: Resistance at test temperature (-55°C or +125°C) |
| Short Time Overload          | IEC-60115-1 4.13                     | $\Delta R/R \text{ max. } \pm (0.1\%+0.02\Omega)$                      | 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<br>$\Delta R/R \text{ max. } \pm (0.1\%+0.02\Omega)$ | 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)<br>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<br>$\Delta R/R \text{ max. } \pm (0.1\%+0.02\Omega)$ | Test -55 to 125°C /dwell time 15 minutes/max. transfer time 20 seconds 1000 cycles   |
| Load Life and Moisture       | AEC-Q200-7                           | $\Delta R/R \text{ max. } \pm (0.1\%+0.02\Omega)$                      | 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                     | $\Delta R/R \text{ max. } \pm (0.1\%+0.02\Omega)$                      | 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<br>MIL-STD-202-108        | $\Delta R/R \text{ max. } \pm (0.1\%+0.02\Omega)$                      | 1000 hours at 125±2°C, loaded with rated power continuously  |
| High Temperature Exposure    | AEC-Q200-3                           | $\Delta R/R \text{ max. } \pm (0.1\%+0.02\Omega)$                      | 1000 hours at 125°C, unpowered   |
| Biased Humidity              | AEC-Q200-6<br>MIL-STD-202 Method 106 | $\Delta R/R \text{ max. } \pm (0.1\%+0.02\Omega)$                      | 65±2°C, 80~100% R.H., 10 cycles, 24 hours/cycle  |
| Mechanical Shock             | MIL-STD-202 Method 213               | $\Delta R/R \text{ max. } \pm (0.1\%+0.02\Omega)$                      | 1/2 Sine Pulse / 150g Peak / Velocity 15.4 foot/second   |
| Vibration                    | MIL-STD-202 Method 204               | $\Delta R/R \text{ max. } \pm (0.1\%+0.02\Omega)$                      | 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                          | $\Delta R/R \text{ max. } \pm (0.1\%+0.02\Omega)$                      | Bending 2mm for 60 seconds   |

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

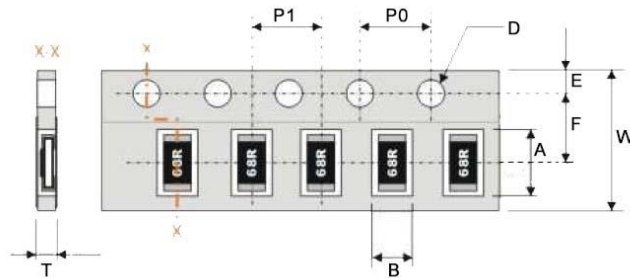
**Soldering Condition:**

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.

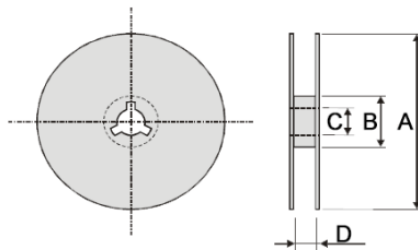


**Packaging Specifications**



| 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 overcoating 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%   | #  |
| 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 |

**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) |
|-------------------------|--|----------------------------|--------------------------------|-----------------------------------|--|---------------------------------------|
| RTAN                    | Tantalum Nitride Thin Film Chip Resistor | SMD                        | YES                            | 100% Matte Sn                     | 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.

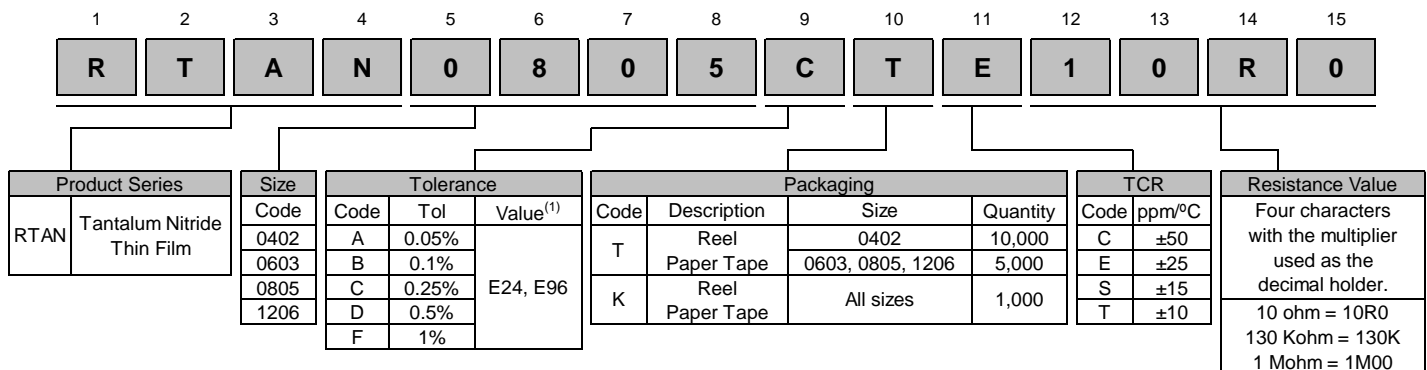
**Compliance to “REACH”**

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.

**How to Order**



(1) E192 values may be available.

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