APPROVAL SHEET

Product Name : **Thin Film Power Anti-Sulfur Chip Resistor**

Part No. : **TNR**

Description : **Size 0201~2512**

For more contact information, please refer to our website: www.rideetech.com

Thin Film Power Anti-Sulfur Chip Resistor — TNR Series

■ Applications

— Consumer electronics
— Computer
— Converter
— Printing equipment
— Measuring instrument

■ Features

— Tolerance to ±0.01 %
— Low TCR to ±25 ppm/℃
— Miniature size 0201 available
— RoHS compliant
— Halogen free and lead free

■ Part Number Explanation

TNR	1206	B	10R0	T	25	S
Product Type	**Size (Inch)**	**Tolerance**	**Resistance**	**Packaging**	**TCR (ppm/℃)**	**Functional**
Thin Film Power Anti-Sulfur Chip Resistor	0201 0402 0603 0805 1206 1210 2010 2512	T：±0.01% U：±0.02% A：±0.05% B：±0.10% C：±0.25% D：±0.50% F：±1.00%	1R00=1Ω 10R0=10Ω 100R=100Ω 2K20=2.2KΩ 332K=332KΩ 1M00=1MΩ	T=Tape & Reel	25：±25 50：±50	S= Standard Type P= High Power

Standard Electrical Specifications

Standard Type	Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Temperature Coefficient of Resistance (ppm/℃)	Resistance Tolerance (%)	Resistance Range	
						Min.	Max.
TNR0201	1/32W	15V	30V	±25 ±50	±0.01 ±0.05 ±0.10 ±0.50 ±1.00	100Ω	12KΩ
TNR0402	1/16W	50V	100V	±25 ±50	±0.01 ±0.02 ±0.05 ±0.10 ±0.25 ±0.50 ±1.00	10Ω	255KΩ
TNR0603	1/16W	50V	100V			3.9Ω	1MΩ
TNR0805	1/10W	100V	200V			4.7Ω	2MΩ
TNR1206	1/8W	200V	400V			1Ω	2.49MΩ
TNR1210	1/4W	200V	400V			4.7Ω	2.49MΩ
TNR2010	1/2W	200V	400V			4.7Ω	3MΩ
TNR2512	3/4W	200V	400V			1Ω	3MΩ

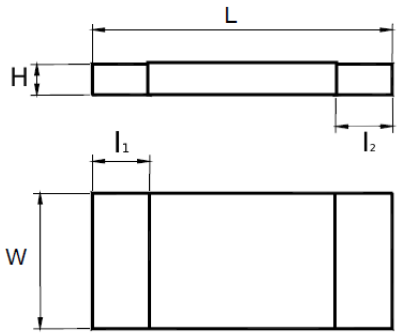
- Functional code: S
- Beyond the above specification also can meet the special requirements. For detail questions, please contact us freely.

High Power Electrical Specifications

High Power Type	Power Rating @ 70℃	Max. RCWV	Max. Overload Voltage	Temperature Coefficient of Resistance (ppm/℃)	Resistance Tolerance (%)	Resistance Range	
						Min.	Max.
TNR0201	1/20W	15V	30V	±25	±0.50 ±1.00	27Ω	12KΩ
TNR0201	1/20W	15V	30V	±50	±0.50 ±1.00	27Ω	22.1KΩ
TNR0402	1/10W	50V	100V	±25 ±50	±0.01 ±0.02 ±0.05 ±0.10 ±0.25 ±0.50 ±1.00	10Ω	255KΩ
TNR0603	1/10W	75V	150V			3.9Ω	1MΩ
TNR0805	1/8W	150V	300V			4.7Ω	2MΩ
TNR1206	1/4W	200V	400V			1Ω	2.5MΩ
TNR1210	2/5W	200V	400V			4.7Ω	2.5MΩ
TNR2010	3/4W	200V	400V			4.7Ω	3MΩ
TNR2512	1W	200V	400V			1Ω	3MΩ

- Functional code: P
- Beyond the above specification also can meet the special requirements. For detail questions, please contact us freely.

Dimension



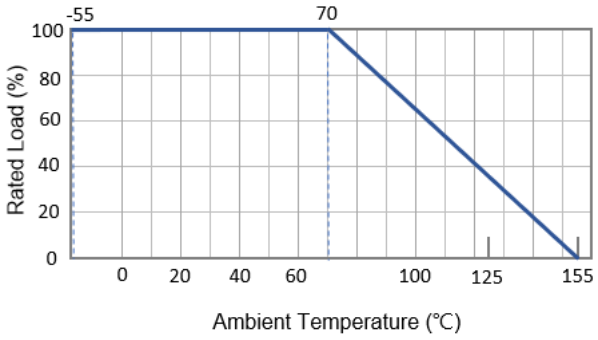
Unit: mm

TYPE	L	W	l_1	l_2	H
TNR0201	0.60 ± 0.03	0.30 ± 0.03	0.10 ± 0.05	0.15 ± 0.05	0.23 ± 0.03
TNR0402	1.00 ± 0.05	0.50 ± 0.05	0.20 ± 0.10	0.25 ± 0.10	0.35 ± 0.05
TNR0603	1.55 ± 0.10	0.80 ± 0.10	0.25 ± 0.15	0.30 ± 0.15	0.45 ± 0.15
TNR0805	2.00 ± 0.10	1.25 ± 0.10	0.25 ± 0.20	0.40 ± 0.20	0.50 ± 0.15
TNR1206	3.10 ± 0.10	1.60 ± 0.10	0.45 ± 0.20	0.45 ± 0.20	0.60 ± 0.15
TNR1210	3.10 ± 0.10	2.60 ± 0.15	0.50 ± 0.20	0.50 ± 0.20	0.55 ± 0.10
TNR2010	5.00 ± 0.10	2.50 ± 0.15	0.60 ± 0.20	0.50 ± 0.20	0.55 ± 0.10
TNR2512	6.35 ± 0.10	3.20 ± 0.15	0.60 ± 0.20	0.50 ± 0.20	0.55 ± 0.10

Power Derating Curve

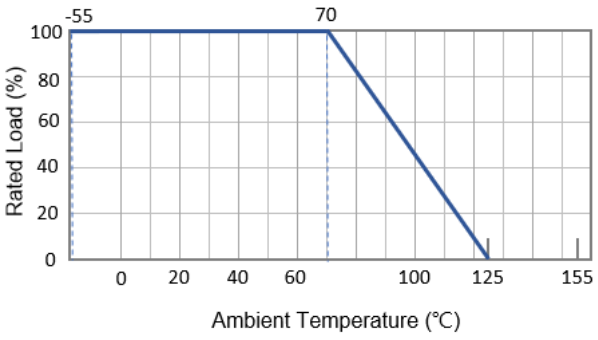
2512. 2010. 1210. 1206. 0805. 0603. 0402

Operating Temperature Range: -55 to +155℃



0201

Operating Temperature Range: -55 to +125℃



Voltage Rating or Current Rating

The direct or alternating voltage for the rated power can be calculated from the following formula but must not exceed the maximum voltage.

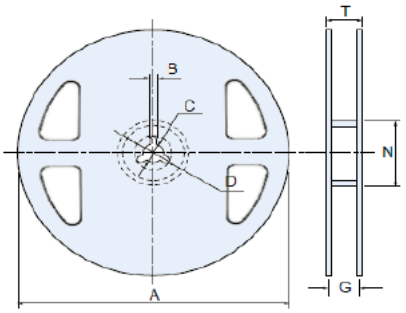
$V=\sqrt{P \times R}$

V=Rated Voltage(V)
P=Rated Power(W)
R=Rated Resistance(Ω)

Reliability Test and Requirement

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS C 5202 5.2 IEC 60115-1 4.8.4.2	At 25 / -55℃ and 25℃ /+155℃, 25℃ is the reference temperature TCR (ppm/℃) = $(R_2-R_1)/R_1\times1$ / $(T_2-T_1)\times10^6$	As Spec
Short Time Overload	JIS C 5202 5.5 IEC 60115-1 4.13	Ultra Power：2.5 x Rated power for 5 seconds. Measure resistance after 30 minutes (0201 2 sec.)	±1%、±0.25%、±0.5%、±0.1%、±0.05%: △R ≦ ±(0.2% + 0.05Ω) 0201＞1KΩ：△R ≦ ±(0.25% + 0.05Ω)
Resistance to Soldering Heat	JIS C 5202 6.4 IEC 60115-1 4.18	Solder dipping @ 260±5℃ for 10 seconds ±1sec.	±1%、±0.25%、±0.5%、±0.1%、±0.05%: △R ≦±(0.1% + 0.05Ω)
Temperature Cycling	JIS C 5202 7.4 IEC 60115-1 4.19	Repeat 5 cycles as follows-55℃(30 min.)+25℃(2-3 min.)+155℃(30 min.)+25℃(2-3 min.)	±1%、±0.25%、±0.5%、±0.1%、±0.05%: △R ≦ ±(0.1% + 0.05Ω) 0201＞1KΩ：△R ≦ ±(0.25% + 0.05Ω)
Damp Heat	JIS C 5202 7.9 IEC 60115-1 4.24.2	40±2℃ with related humidity 90~95% D.C. rated voltage for 1.5 hours ON 30 minutes OFF. Cycle repeated 1000+48/-0 hours. After 1～4 hour, measure the resistance value.	±1%、±0.25%、±0.5%、±0.1%、±0.05%: △R ≦ ±(0.5% + 0.05Ω) 0201＞1KΩ：△R ≦ ±(1.0% + 0.05Ω)
Load Life	JIS C 5202 7.10 IEC 60115-1 4.25.1	Permanent resistance change after 1000+48/-0 hours (1.5 hours ON, 0.5 hour OFF) at RCWV or Max. Keep the resistor at 70±2℃ ambient	±1%、±0.25%、±0.5%、±0.1%、±0.05%: △R ≦ ±(0.5% + 0.05Ω) 0201＞1KΩ：△R ≦ ±(1.0% + 0.05Ω)
Bending Strength	IEC 60115-1 4.33	Resistance change after bended 3mm on the 90mm PCB	±1%、±0.25%、±0.5%、±0.1%、±0.05%: △R ≦±(0.1% + 0.05Ω) 0201＞1KΩ：△R ≦±(0.25% + 0.05Ω)
Solderability	IEC 60115-1 / JIS C 5201-1 , 4.17	After immersing flux, dip in the245±2℃ molten solder bath for 3±0.5 sec	Over 95% of termination must be covered with solder

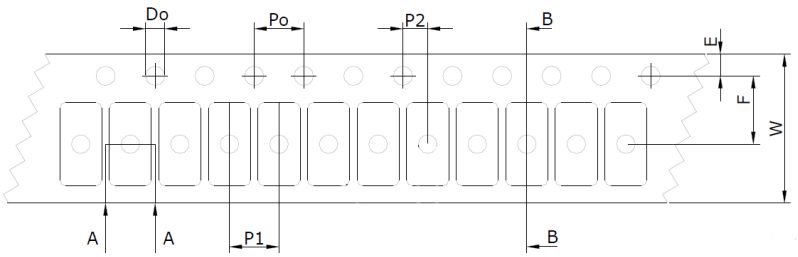
■ Packaging Information



Unit:mm

Size	Type		A	N	C	D	B	G	T
0201	7”	15K/Reel	178±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	9.0±0.5	14.9 max
0402	7”	10K/Reel	178±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max
0603 / 0805 / 1206 / 1210	7”	5K/Reel	178±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	10.0±1.5	14.9 max
2010/2512	7”	4K/Reel	178±2.0	60.0±0.5	13.0±0.5	20min	2.0±0.5	13.8±1.5	16.7 max.

■ Tapping Specification



Unit:mm

Packaging	Size	A	B	W	E	F	P1	P2	D0	P0
Paper Type	0201	0.37±0.05	0.67±0.05	8.00±0.20	1.75±0.10	3.50±0.05	2.00±0.05	2.00±0.05	1.50+0.10/-0	4.00±0.10
	0402	0.70±0.10	1.20±0.10	8.00±0.30	1.75±0.10	3.50±0.05	2.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10
	0603	1.10±0.20	1.90±0.20	8.00±0.30	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10
	0805	1.65±0.20	2.40±0.20	8.00±0.30	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10
	1206	2.00±0.20	3.60±0.20	8.00±0.30	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10
	1210	3.00±0.20	3.60±0.20	8.00±0.30	1.75±0.10	3.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10

Packaging	Size	A	B	W	E	F	P1	P2	D0	P0
Embossed Type	2010	2.80±0.20	5.50±0.20	12.00±0.30	1.75±0.10	5.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10
	2512	3.50±0.20	6.70±0.20	12.00±0.30	1.75±0.10	5.50±0.05	4.00±0.10	2.00±0.05	1.50+0.10/-0	4.00±0.10

Marking

E24 Series

0805, 1206, 1210, 2010, 2512: 4 digits marking

Resistance	47K
4 digits code	4702

0603: 3 digits marking

Resistance	47K
3 digits code	473

E96 Series

0805, 1206, 1210, 2010, 2512: 4 digits marking

Resistance	47.5K
4 digits code	472

0603: 3 digit included two numbers and one letter

Resistance	10.2K
3 digits code	02C

No marking code for 0402、0201 size