

APPROVAL SHEET

Product Name : Thin Film Chip Resistor

Part No. : TNR

Description : Size 0201~2512

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

Thin Film Chip Resistor — TNR Series

■ Applications

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



■ Features

- Tolerance to $\pm 0.01\%$
- Low TCR to $\pm 25 \text{ ppm}/^{\circ}\text{C}$
- 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/ $^{\circ}\text{C}$)	Functional
Thin Film Chip Resistor	0201 0402 0603 0805 1206 1210 2010 2512	T : $\pm 0.01\%$ U : $\pm 0.02\%$ A : $\pm 0.05\%$ B : $\pm 0.10\%$ C : $\pm 0.25\%$ D : $\pm 0.50\%$ F : $\pm 1.00\%$	1R00=1 Ω 10R0=10 Ω 100R=100 Ω 2K20=2.2K Ω 332K=332K Ω 1M00=1M Ω	T=Tape & Reel	25 : ± 25 50 : ± 50	S= Standard Type P= High Power

■ Standard Electrical Specifications

Standard Type	Power Rating @ 70℃	Max. RCWV (V)	Max. Overload Voltage (V)	Temperature Coefficient of Resistance (ppm/℃)	Resistance Tolerance (%)	Resistance Range		Standard Resistance Values
						Min.	Max.	
0201	1/32W	15	30	±25 ±50	±0.01 ±0.05 ±0.10 ±0.50 ±1.00	100Ω	12KΩ	E24 E96
0402	1/16W	50	100	±25 ±50	±0.01 ±0.02 ±0.05 ±0.10 ±0.25 ±0.50 ±1.00	10Ω	255KΩ	
0603	1/16W	50	100			3.9Ω	1MΩ	
0805	1/10W	100	200			4.7Ω	2MΩ	
1206	1/8W	200	400			1Ω	2.49MΩ	
1210	1/4W	200	400			4.7Ω	2.49MΩ	
2010	1/2W	200	400			4.7Ω	3MΩ	
2512	3/4W	200	400			1Ω	3MΩ	

●For non-standard parts, please contact our sales dept.

●Functional code: S

■ High Power Electrical Specifications

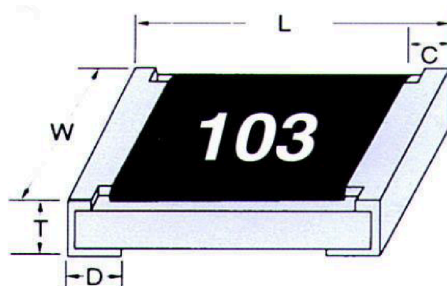
High Power Type	Power Rating @ 70℃	Max. RCWV (V)	Max. Overload Voltage (V)	Temperature Coefficient of Resistance (ppm/℃)	Resistance Tolerance (%)	Resistance Range		Standard Resistance Values
						Min.	Max.	
0201	1/20W	15	30	±25	±0.50	27Ω	12KΩ	E24 E96
					±1.00			
0201	1/20W	15	30	±50	±0.50	27Ω	22.1KΩ	
					±1.00			
0402	1/10W	50	100	±25 ±50	±0.01 ±0.02 ±0.05 ±0.10 ±0.25 ±0.50 ±1.00	10Ω	255KΩ	
0603	1/10W	75	150			3.9Ω	1MΩ	
0805	1/8W	150	300			4.7Ω	2MΩ	
1206	1/4W	200	400			1Ω	2.5MΩ	
1210	2/5W	200	400			4.7Ω	2.5MΩ	
2010	3/4W	200	400			4.7Ω	3MΩ	
2512	1W	200	400			1Ω	3MΩ	

●For non-standard parts, please contact our sales dept.

●Functional code: P

■ Type Dimension

■ Standard & High Power



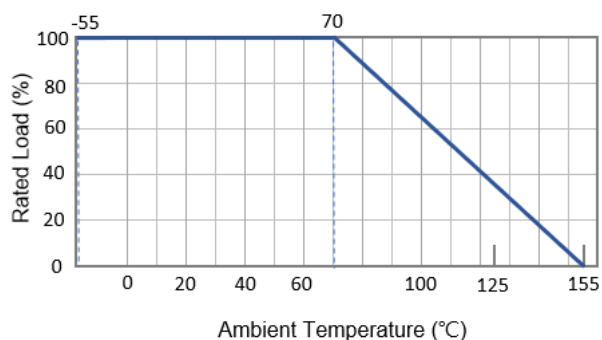
Unit: mm

TYPE	L	W	C	D	T
0201	0.60 ± 0.03	0.30 ± 0.03	0.10 ± 0.05	0.15 ± 0.05	0.23 ± 0.03
0402	1.00 ± 0.05	0.50 ± 0.05	0.20 ± 0.10	0.25 ± 0.10	0.35 ± 0.05
0603	1.55 ± 0.10	0.80 ± 0.10	0.25 ± 0.15	0.30 ± 0.15	0.45 ± 0.15
0805	2.00 ± 0.10	1.25 ± 0.10	0.25 ± 0.20	0.40 ± 0.20	0.50 ± 0.15
1206	3.10 ± 0.10	1.60 ± 0.10	0.45 ± 0.20	0.45 ± 0.20	0.60 ± 0.15
1210	3.10 ± 0.10	2.60 ± 0.15	0.50 ± 0.20	0.50 ± 0.20	0.55 ± 0.10
2010	5.00 ± 0.10	2.50 ± 0.15	0.60 ± 0.20	0.50 ± 0.20	0.55 ± 0.10
2512	6.35 ± 0.10	3.20 ± 0.15	0.60 ± 0.20	0.50 ± 0.20	0.55 ± 0.10

■ Power Derating Curve

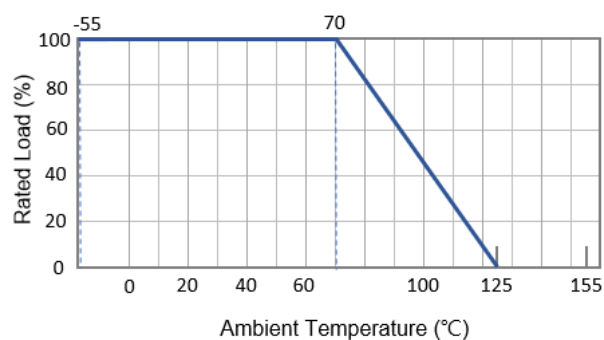
2512. 2010. 1210. 1206. 0805. 0603. 0402

Operating Temperature Range: -55 to +155°C



0201

Operating Temperature Range: -55 to +125°C

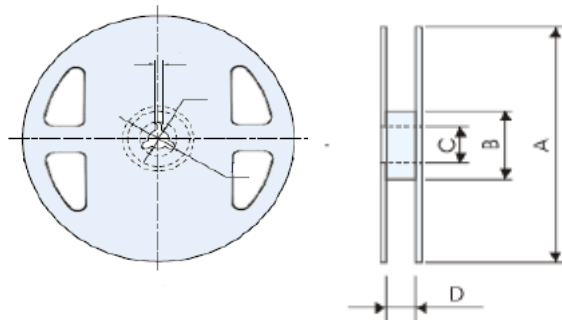


For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve above.

■ 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 $TCR (ppm/℃) = (R_2 - R_1) / R_1 \times 1 / (T_2 - T_1) \times 10^6$	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.)	$\pm 1\%、\pm 0.25\%、\pm 0.5\%、\pm 0.1\%、\pm 0.05\%:$ $\Delta R \leq \pm(0.2\% + 0.05\Omega)$ $0201 > 1K\Omega : \Delta R \leq \pm(0.25\% + 0.05\Omega)$
Resistance to Soldering Heat	JIS C 5202 6.4 IEC 60115-1 4.18	Solder dipping @ 260±5℃ for 10 seconds ±1sec.	$\pm 1\%、\pm 0.25\%、\pm 0.5\%、\pm 0.1\%、\pm 0.05\%:$ $\Delta R \leq \pm(0.1\% + 0.05\Omega)$
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.)	$\pm 1\%、\pm 0.25\%、\pm 0.5\%、\pm 0.1\%、\pm 0.05\%:$ $\Delta R \leq \pm(0.1\% + 0.05\Omega)$ $0201 > 1K\Omega : \Delta R \leq \pm(0.25\% + 0.05\Omega)$
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.	$\pm 1\%、\pm 0.25\%、\pm 0.5\%、\pm 0.1\%、\pm 0.05\%:$ $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ $0201 > 1K\Omega : \Delta R \leq \pm(1.0\% + 0.05\Omega)$
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	$\pm 1\%、\pm 0.25\%、\pm 0.5\%、\pm 0.1\%、\pm 0.05\%:$ $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ $0201 > 1K\Omega : \Delta R \leq \pm(1.0\% + 0.05\Omega)$
Bending Strength	IEC 60115-1 4.33	Resistance change after bended 3mm on the 90mm PCB	$\pm 1\%、\pm 0.25\%、\pm 0.5\%、\pm 0.1\%、\pm 0.05\%:$ $\Delta R \leq \pm(0.1\% + 0.05\Omega)$ $0201 > 1K\Omega : \Delta R \leq \pm(0.25\% + 0.05\Omega)$
Solderability		After immersing flux, dip in the 245±2℃ molten solder bath for 3±0.5 sec	Over 95% of termination must be covered with solder

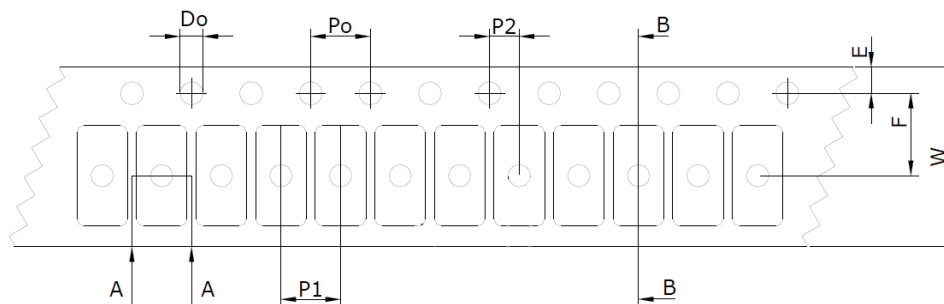
■ Packaging Information



Unit : mm

Symbol	A	B	C	D
0201 0402 0603 0805 1206 1210 2010 2512	178.0±2.0	60.0±0.10	13.0±0.2	9.0±0.5

■ Tapping Specification



Unit : mm

Type	A	B	W	F	E	P1	P0	ØD	T
0201	0.37±0.05	0.45±0.03	8.00±0.30	3.50±0.05	1.75±0.10	2.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	0.45±0.05
0402	1.20±0.10	0.7±0.10	8.00±0.30	3.50±0.05	1.75±0.10	2.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	0.40±0.05
0603	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	Ø 1.50+0.10/-0	0.65±0.05
0805	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	Ø 1.50+0.10/-0	Max. 1.0
1206	3.60±0.20	2.00±0.20	8.00±0.30	3.50±0.20	1.75±0.10	4.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	Max. 1.0
1210	3.60±0.20	3.00±0.20	8.00±0.30	3.50±0.20	1.75±0.10	4.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	Max. 1.0
2010	5.50±0.20	2.80±0.20	12.0±0.30	5.50±0.10	1.75±0.10	4.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	Max. 1.2
2512	6.90±0.20	3.60±0.20	12.0±0.30	5.50±0.10	1.75±0.10	4.00±0.10	4.00±0.10	Ø 1.50+0.10/-0	Max. 1.2

●0201~1210: Paper Tape / 2010~2512: Plastic Tape

■ 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