

APPROVAL SHEET

Product Name : High Precision Thin Film Chip Resistor
Part No. : TPR
Description : Size 0402~2512

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

High Precision Thin Film Chip Resistor — TPR Series

■ Applications

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



■ Features

- Tight Tolerance to $\pm 0.01\%$
- Low TCR down to $\pm 2 \text{ ppm}/^\circ\text{C}$
- Excellent long-term stability
- The variance of reliability test is reduced to $\pm 0.1\%$
- RoHS compliant
- Halogen free and lead free

■ Part Number Explanation

TPR	1206	B	10K0	T	10	S
Product Type	Size (Inch)	Tolerance	Resistance	Packaging	TCR (ppm/ $^\circ\text{C}$)	Functional
Precision Thin Film	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: $\pm 1.00\%$	22R0 = 22 Ω 100R = 100 Ω 2K20 = 2.2 K Ω 22K0 = 22 K Ω 100K = 100 K Ω	T=Tape & Reel	02: ± 2 03: ± 3 05: ± 5 10: ± 10 15: ± 15	S=Standard UT=Ultra TCR

■ Standard Electrical Specifications

Narrow TCR Type*	Power Rating @ 70°C	Max. RCWV (V)	Max. Overload Voltage (V)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Tolerance (%)	Resistance Range		Standard Resistance Values
						Min.	Max.	
0402	1/10W	50	100	±10 ±15	±0.01 ±0.02 ±0.05 ±0.10 ±0.25 ±0.50 ±1.00	10Ω	100KΩ	E24 E96
0603	1/10W	75	150			4.7Ω	200KΩ	
0805	1/8W	150	300			4.7Ω	400KΩ	
1206	1/4W	200	400			4.7Ω	500KΩ	
1210	2/5W	200	400			10Ω	600KΩ	
2010	3/4W	200	400			10Ω	1MΩ	
2512	1W	200	400			10Ω	1.5MΩ	

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

●Functional code: S

■ Ultra TCR Electrical Specifications

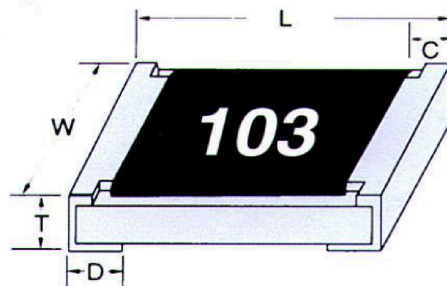
Narrow TCR Type*	Power Rating @ 70°C	Max. RCWV (V)	Max. Overload Voltage (V)	Temperature Coefficient of Resistance (ppm/°C)	Resistance Tolerance (%)	Resistance Range		Standard Resistance Values
						Min.	Max.	
0402	1/10W	50	100	±5	±0.01 ±0.02 ±0.05 ±0.10 ±0.25 ±0.50 ±1.00	10Ω	10KΩ	E24 E96
0603	1/10W	75	150			4.7Ω	50KΩ	
0805	1/8W	150	300			4.7Ω	100KΩ	
1206	1/4W	200	400			4.7Ω	150KΩ	
1210	2/5W	200	400			4.7Ω	150KΩ	
2010	3/4W	200	400			4.7Ω	360KΩ	
2512	1W	200	400			4.7Ω	600KΩ	
0402	1/10W	50	100	±3	±0.01 ±0.02 ±0.05 ±0.10 ±0.25 ±0.50 ±1.00	10Ω	8KΩ	E24 E96
0603	1/10W	75	150			4.7Ω	40KΩ	
0805	1/8W	150	300			4.7Ω	80KΩ	
1206	1/4W	200	400			4.7Ω	120KΩ	
1210	2/5W	200	400			4.7Ω	150KΩ	
2010	3/4W	200	400			4.7Ω	360KΩ	
2512	1W	200	400			4.7Ω	600KΩ	
0402	1/10W	50	100	±2	±0.01 ±0.02 ±0.05 ±0.10 ±0.25 ±0.50 ±1.00	10Ω	8KΩ	E24 E96
0603	1/10W	75	150			4.7Ω	40KΩ	
0805	1/8W	150	300			4.7Ω	80KΩ	
1206	1/4W	200	400			4.7Ω	120KΩ	
1210	2/5W	200	400			4.7Ω	150KΩ	
2010	3/4W	200	400			4.7Ω	360KΩ	
2512	1W	200	400			4.7Ω	600KΩ	

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

●Functional code: UT

■ Type Dimension

■ Standard & Ultra TCR



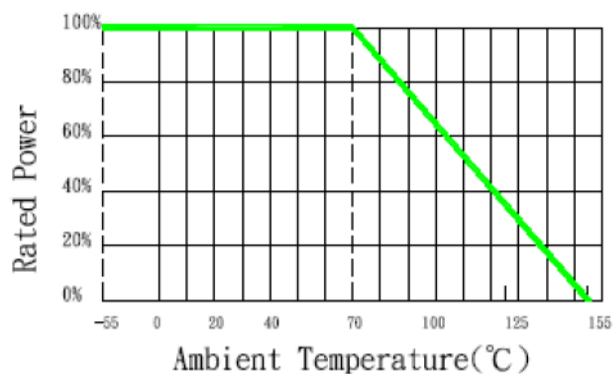
Unit: mm

TYPE	L	W	C	D	T
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



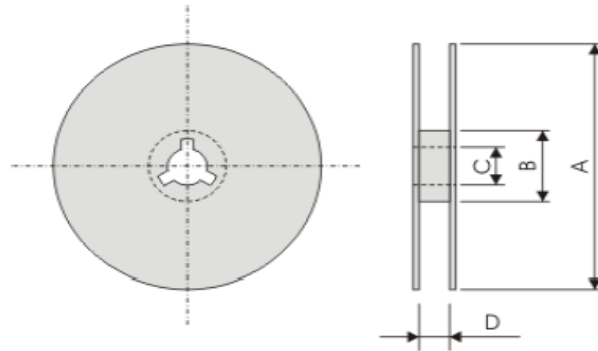
For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve above.

■ 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.)	±1%、±0.25%、±0.5%、±0.1%、±0.05%: ±(0.2% + 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%: ±(0.1% + 0.05Ω)
Rapid Change of Temperature	JIS C 5202 7.4 IEC 60115-1 4.19	-55℃ to +155℃ ,5 cycles.	±1%、±0.25%、±0.5%、±0.1%、±0.05%: ±(0.1% + 0.05Ω)
Damp Heat With Load	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%: ±(0.5% + 0.05Ω)
Load Life (Endurance)	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%: ±(0.5% + 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%: ±(0.1% + 0.05Ω)

■ Appendix For SMD Chip Resistor

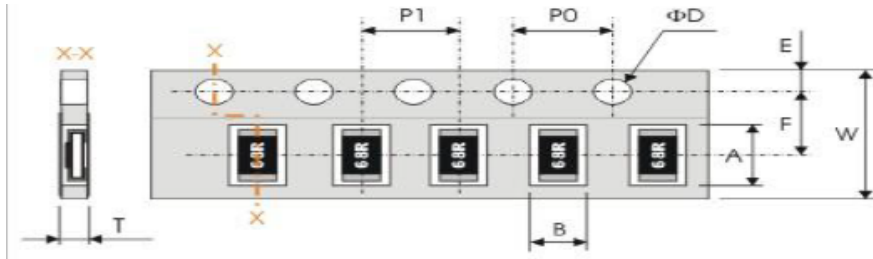
■ Reel Dimensions



Unit : mm

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

■ Tapping Specification



Unit : mm

Type	A	B	W	F	E	P1	P0	ØD	T
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

●0402~1210: 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 size