

Data Sheet

Customer :

Product : Thin Film Precision Chip Resistor - TAR Series

Size: 0402/0603/0805/1206

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Thin Film Precision Chip Resistor (TAR Series)



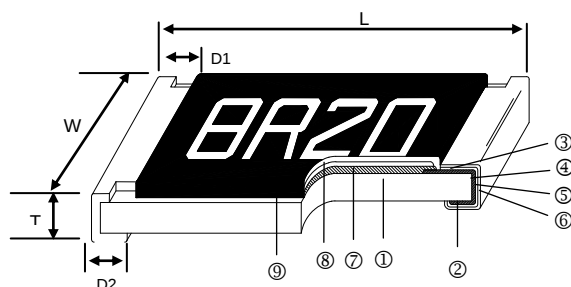
■ Features

- Tantalum nitride thin film resistor
- High stability in humid environments
- High Temperature Exposure stability 0.1 % at 1000 h at 155 °C
- AEC-Q200 Compliance
- Tight tolerance down to $\pm 0.05\%$
- Extremely low TCR down to $\pm 15\text{PPM}/^\circ\text{C}$
- Resistance values from 80 ohm to 250K ohm
- Special materials, design, and processing for high sulfur applications
- Test proven immunity to humidity, moisture, and sulfur

■ Applications

- Automotive
- Medical Equipment
- Testing / Measurement Equipment
- Automatic Equipment Controller
- Converters
- Communication Device

■ Construction



① Alumina Substrate	④ Edge Electrode	⑦ Resistor Layer
② Bottom Electrode	⑤ Barrier Layer	⑧ Overcoat
③ Top Electrode	⑥ External Electrode	⑨ Marking

■ Dimensions

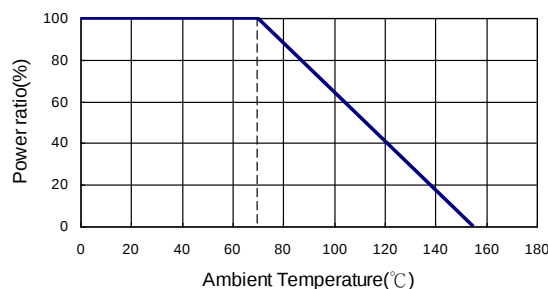
Unit: mm

Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
TAR02	0402	1.00 $\pm$ 0.05	0.50 $\pm$ 0.05	0.30 $\pm$ 0.05	0.20 $\pm$ 0.10	0.20 $\pm$ 0.10	0.54
TAR03	0603	1.55 $\pm$ 0.10	0.80 $\pm$ 0.10	0.45 $\pm$ 0.10	0.30 $\pm$ 0.20	0.30 $\pm$ 0.20	1.83
TAR05	0805	2.00 $\pm$ 0.15	1.25 $\pm$ 0.15	0.55 $\pm$ 0.10	0.30 $\pm$ 0.20	0.40 $\pm$ 0.20	4.71
TAR06	1206	3.05 $\pm$ 0.15	1.55 $\pm$ 0.15	0.55 $\pm$ 0.10	0.42 $\pm$ 0.20	0.35 $\pm$ 0.25	9.02

■ Part Numbering

TAR	03	T	T	B	Y	1001	N
Product Type	Dimensions (L×W)	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Marking Code
	02: 0402 03: 0603 05: 0805 06: 1206	B: $\pm 0.1\%$ C: $\pm 0.25\%$ D: $\pm 0.5\%$ F: $\pm 1\%$	T: Taping Reel B: Bulk	C: ± 25 D: ± 50 E: ± 100	: Standard Y: 1/16W X: 1/10W W: 1/8W M: 1/6W P: 1/5W V: 1/4W	0010: 1Ω 4R70: 4.7Ω 1001: 1KΩ	: Standard Marking for E96 / E24 N: No Marking

Derating Curve



Standard Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/°C)
					±0.05%	±0.1%	±0.25%	±0.5%	±1%	
TAR02 (0402)	1/16W	-55 ~ +155°C	50V	100V	80Ω – 20kΩ					±15,±25,±50
TAR03 (0603)	1/8W	-55 ~ +155°C	75V	150V	80Ω – 50kΩ					±15,±25,±50
TAR05 (0805)	1/6W	-55 ~ +155°C	100V	200V	80Ω – 150kΩ					±15,±25,±50
TAR06 (1206)	1/4W	-55 ~ +155°C	200V	400V	80Ω – 250kΩ					±15,±25,±50

Operating Voltage= $\sqrt{P \cdot R}$ or Max. operating voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$ or Max. overload voltage listed above, whichever is lower.

Environmental Characteristics

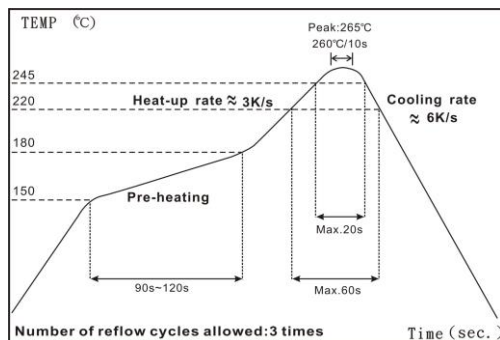
Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	JIS-C-5201-1 4.8 IEC-60115-1 4.8 -55°C~+125°C, 25°C is the reference temperature
Short Time Overload	$\Delta R \pm 0.1\%$	JIS-C-5201-1 4.13 RCWV*2.5 or Max. overload voltage whichever is lower for 5 seconds
Insulation Resistance	>1000 MΩ	JIS-C-5201-1 4.6 IEC-60115-1 4.6 Apply 100V _{DC} for 1 minute
Operational Life	$\Delta R \pm 0.1\%$	MIL-STD-202 Method 108 Condition D Steady State T _A =125°C at derated power. Measurement at 24±4 hours after test conclusion.
Biased Humidity	$\Delta R \pm 0.1\%$	MIL-STD-202 Method 103 1000 hrs 85°C/85%RH 10% of operating power.
High Temperature Exposure	$\Delta R \pm 0.1\%$	MIL-STD-202 Method 108 at +155°C for 1000 hrs
Temperature Cycling	$\Delta R \pm 0.1\%$	JESD22 Method JA-104 -55°C to +125°C, 1000 cycles
Bending Strength (Board Flex)	$\Delta R \pm 0.1\%$	JIS-C-5201-1 4.33 Bending once for 60 seconds
Solderability	95% min. coverage	JIS-C-5201-1 4.17 IEC-60115-1 4.17 245±5°C for 3 seconds
Resistance to Soldering Heat	$\Delta R \pm 0.1\%$	JIS-C-5201-1 4.18 IEC-60115-1 4.18 260±5°C for 10 seconds
Terminal strength	No broken	AEC-Q200-006 Force of 1.8kg for 60 seconds.
Mechanical Shock	$\Delta R \pm 0.1\%$	MIL-STD-202 Method 213 Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.

Vibration	$\Delta R \pm 0.1\%$	MIL-STD-202 Method 204 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	$\Delta R \pm 0.1\%$	AEC-Q200-002 Human body model TAR02、TAR03 0.2KV TAR05、TAR06 1KV
Resistance to solvents	Marking Unsmeared	MIL-STD-202 Method 215 Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Sulfur Test	$\Delta R \pm 1\%$	EIA-977(Conditions B) 105 $\pm$ 2 °C no power rating for 750 hrs.
Flammability	No ignition of the tissue paper or scorching or the pinewood board	UL-94 V-0 or V-1 are acceptable. Electrical test not required.

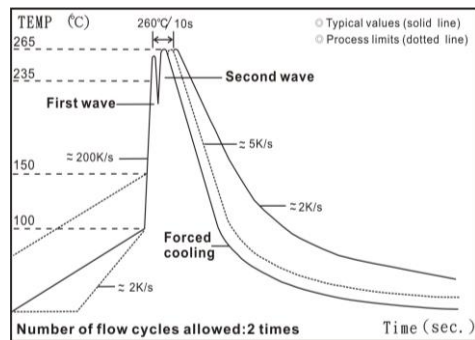
RCWV(Rated continuous working voltage)= $\sqrt{P \cdot R}$ or Max. Operating voltage whichever is lower

■ Storage Temperature: 15~28°C; Humidity < 80%RH

■ Soldering Condition



IR Reflow Soldering



Wave Soldering (Flow Soldering)

- (1) Time of IR reflow soldering at maximum temperature point 260°C : 10s
- (2) Time of wave soldering at maximum temperature point 260°C : 10s
- (3) Time of soldering iron at maximum temperature point 410°C : 5s

■ Marking

0603 3digit marking for E24

Example: 101=100Ω 102=1KΩ

E24	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47	51	56	62	68	75	82	91
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0805~1206 4digit marking

Example

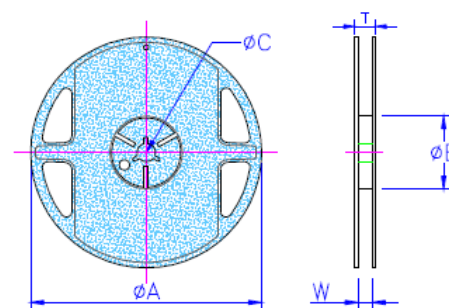
Resistance	100Ω	2.2KΩ	10KΩ	49.9KΩ	100KΩ
marking	1000	2201	1002	4992	1003

■ Packaging

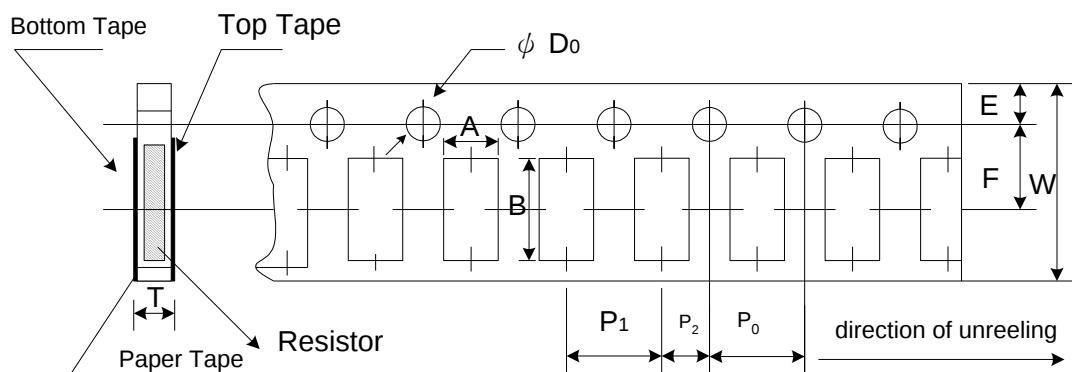
Packing Quantity & Reel Specifications

Unit :mm

Type	ØA	ØB	ØC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
TAR02	178.0 $\pm$ 1.0	60.0 $\pm$ 1.0	13.5 $\pm$ 0.7	9.5 $\pm$ 1.0	11.5 $\pm$ 1.0	10,000	-
TAR03	178.0 $\pm$ 1.0	60.0 $\pm$ 1.0	13.5 $\pm$ 0.7	9.5 $\pm$ 1.0	11.5 $\pm$ 1.0	5,000	-
TAR05	178.0 $\pm$ 1.0	60.0 $\pm$ 1.0	13.5 $\pm$ 0.7	9.5 $\pm$ 1.0	11.5 $\pm$ 1.0	5,000	-
TAR06	178.0 $\pm$ 1.0	60.0 $\pm$ 1.0	13.5 $\pm$ 0.7	9.5 $\pm$ 1.0	11.5 $\pm$ 1.0	5,000	-



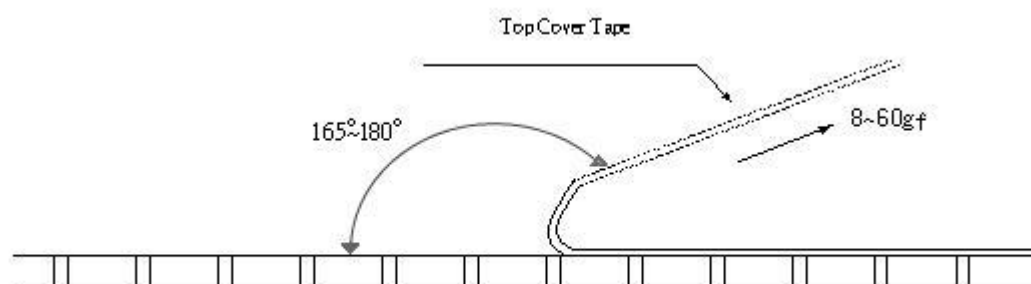
Paper Tape Specifications



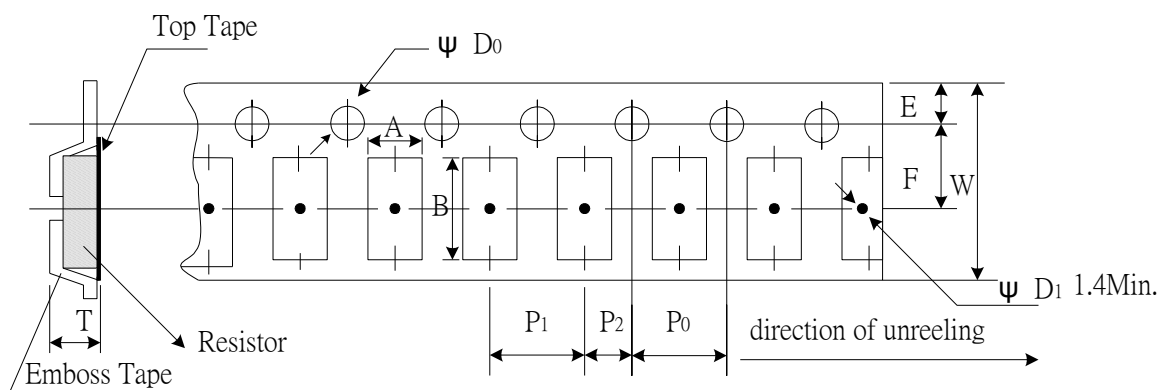
Unit: mm

Type	A	B	W	E	F	P_0	P_1	P_2	ϕD_0	T
TAR02	0.70 ± 0.05	1.16 ± 0.05	8.00 ± 0.10	1.75 ± 0.05	3.5 ± 0.05	4.00 ± 0.10	2.00 ± 0.05	2.00 ± 0.05	1.55 ± 0.05	0.40 ± 0.03
TAR03	1.10 ± 0.05	1.90 ± 0.05	8.00 ± 0.10	1.75 ± 0.05	3.5 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	1.55 ± 0.05	0.60 ± 0.03
TAR05	1.60 ± 0.05	2.37 ± 0.05	8.00 ± 0.10	1.75 ± 0.05	3.5 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	1.55 ± 0.05	0.75 ± 0.05
TAR06	2.00 ± 0.05	3.55 ± 0.05	8.00 ± 0.10	1.75 ± 0.05	3.5 ± 0.05	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	1.55 ± 0.05	0.75 ± 0.05

- Peel force of top cover tape
- The peel speed shall be about 300mm/min $\pm$ 5%
- The peel force of top cover tape shall be between 8gf to 60gf



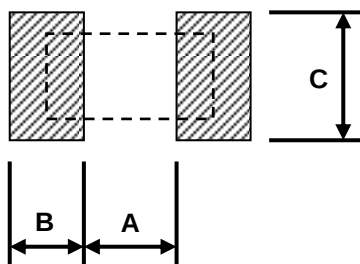
Emboss Plastic Tape Specifications



Unit: mm

■ Recommend Land Pattern

Unit: mm



Type	A	B	C
TAR02	0.50	0.50	0.60±0.2
TAR03	0.80	1.00	0.90±0.2
TAR05	1.00	1.00	1.35±0.2
TAR06	2.00	1.15	1.70±0.2