Data Sheet

Customer：	
Product :	Automotive Grade Tantalum Nitride Thin Film Precision Chip Resistor - TAR Series
Size:	0402/0603/0805/1206
Issued Date:	9-Jul-26
Edition :	REV A6

RoHS Compliant

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Automotive Grade Tantalum Nitride Thin Film Precision Chip Resistor (TAR Series)



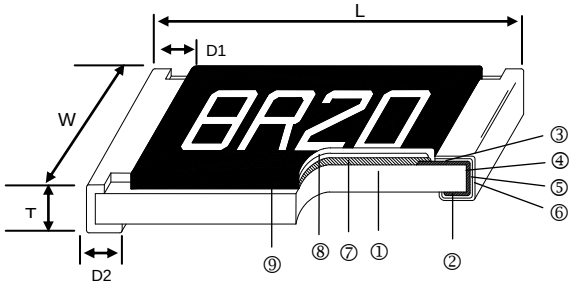
Features

- Tantalum nitride thin film resistor
- High stability in humid environments
- AEC-Q200 Qualified
- Tight tolerance down to ±0.05%
- Extremely low TCR down to ±10PPM/°C
- Resistance values from 10 ohm to 1M ohm
- Special materials, design, and processing for high sulfur applications
- Test proven immunity to humidity, moisture, and sulfur
- RoHS (Pb)-free without exemption

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

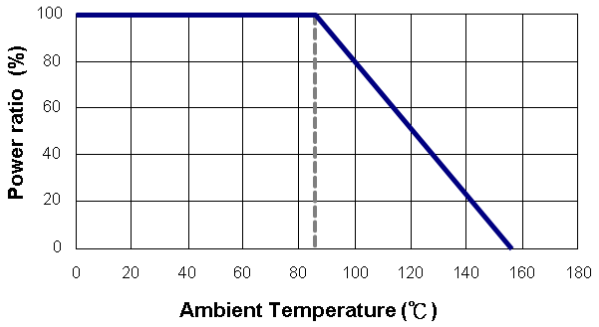
Unit: mm

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

Part Numbering

TAR	03	A	T	C	M	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	A: ±0.05% B: ±0.1% C: ±0.25% D: ±0.5% F: ±1%	T: Taping Reel B: Bulk	B: ±10 N: ±15 C: ±25 D: ±50	Y: 1/16W M: 1/6W P: 1/5W U: 1/2W	0010: 1Ω 1001: 1KΩ 1004: 1MΩ	: Standard Marking for E96 / E24 N: No Marking

■Derating Curve



■Standard Electrical Specifications

Item / Type	Power Rating at 85°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	40Ω – 35KΩ					±10,±15,±25,±50
TAR03 (0603)	1/6W	-55 ~ +155°C	75V	150V	40Ω – 130KΩ					±10,±15,±25,±50
TAR05 (0805)	1/5W	-55 ~ +155°C	100V	200V	10Ω – 350KΩ					±10,±15,±25,±50
TAR06 (1206)	1/2W	-55 ~ +155°C	200V	400V	10Ω – 1MΩ					±10,±15,±25,±50

Operating Voltage=$\sqrt{}$(P*R) or Max. operating voltage listed above, whichever is lower.
Overload Voltage=2.5*$\sqrt{}$(P*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	ΔR±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	ΔR±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	ΔR±0.1%	**MIL-STD-202 Method 103** 1000 hrs 85°C/85%RH 10% of operating power.
High Temperature Exposure	ΔR±0.15%	**MIL-STD-202 Method 108** at +155°C for 1000 hrs
Temperature Cycling	ΔR±0.1% for 125℃	**JESD22 Method JA-104** -55°C to +125°C, 1000 cycles
	ΔR±0.2% for 155℃	-55°C to +155°C, 1000 cycles
Bending Strength (Board Flex)	ΔR±0.1%	**JIS-C-5201-1 4.33** Bending 2mm 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	ΔR±0.1%	**JIS-C-5201-1 4.18** **IEC-60115-1 4.18** 260±5°C for 10 seconds

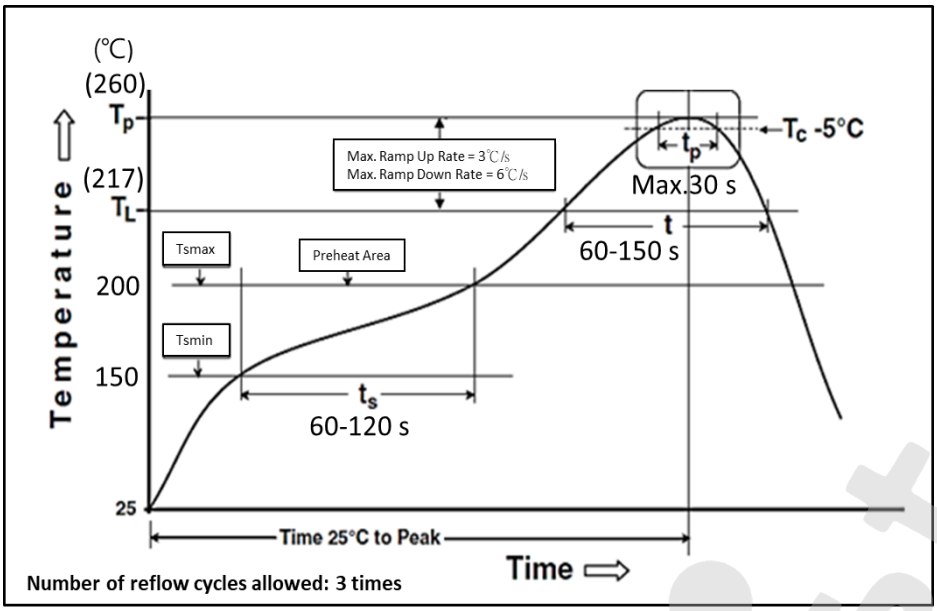
Terminal strength	No broken	**AEC-Q200-006** Force of 1kg for 60 seconds.
Mechanical Shock	ΔR±0.1%	**MIL-STD-202 Method 213** Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.
Vibration	ΔR±0.1%	**MIL-STD-202 Method 204** 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	ΔR±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	0402: △R±0.2% Other : △R±0.1%	**ASTM-B-809-95 Modified** 105±2 °C no power rating for 1000 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.
Endurance	△R±0.1%	**IEC60115-1 4.25** 1000 +48/-0 hours, loaded with RCWV or Vmax in chamber controller 85 ±2ºC, 1.5 hours on and 0.5 hours off
Moisture Resistance	△R±0.1%	**MIL-STD-202 Method 106** 65±2°C, 80~100% RH, 10 cycles, 24 hours/cycle

RCWV(Rated continuous working voltage)= √(P*R) or Max. Operating voltage whichever is lower

■ **Storage Temperature: 15~28℃; Humidity < 80%RH**

■ **Shelf Life: 2 years from production date.**

■Soldering Condition(IPC/JEDEC J-STD-020)



Reflow Profiles	
Profile Feature	**Pb-Free Assembly**
Preheat Min. Temperature (T_{smin}) Max Temperature (T_{smax}) Preheating time (t_s) from (T_{smin} to T_{smax})	 150 °C 200 °C 60-120 seconds
Ramp-up rate (T_L to Tp)	3 °C/second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	217 °C 60-150 seconds
Min. Peak temperature (Tp min)	235°C
Max. Peak temperature (Tp max)	260°C
Time (tp) within 5 °C of the specified classification temperature (Tc)	30 seconds max.
Ramp-down rate (Tp to T_L)	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

■Marking

0603 3digit marking in E96



3digit marking for Example: 14C=13K7Ω 13C=13K3Ω

68B=4K99Ω 68X=49.9Ω

Marking Table

Code	E96	Code	E96	Code	E96	Code	E96
01	100	**25**	178	**49**	316	**73**	562
02	102	**26**	182	**50**	324	**74**	576
03	105	**27**	187	**51**	332	**75**	590
04	107	**28**	191	**52**	340	**76**	604
05	110	**29**	196	**53**	348	**77**	619
06	113	**30**	200	**54**	357	**78**	634
07	115	**31**	205	**55**	365	**79**	649
08	118	**32**	210	**56**	374	**80**	665
09	121	**33**	215	**57**	383	**81**	681
10	124	**34**	221	**58**	392	**82**	698
11	127	**35**	226	**59**	402	**83**	715
12	130	**36**	232	**60**	412	**84**	732
13	133	**37**	237	**61**	422	**85**	750
14	137	**38**	243	**62**	432	**86**	768
15	140	**39**	249	**63**	442	**87**	787
16	143	**40**	255	**64**	453	**88**	806
17	147	**41**	261	**65**	464	**89**	825
18	150	**42**	267	**66**	475	**90**	845
19	154	**43**	274	**67**	487	**91**	866
20	158	**44**	280	**68**	499	**92**	887
21	162	**45**	287	**69**	511	**93**	909
22	165	**46**	294	**70**	523	**94**	931
23	169	**47**	301	**71**	536	**95**	953
24	174	**48**	309	**72**	549	**96**	976

Code	A	B	C	D	E	F	G	H	X	Y	Z
Multiplier	10^0	10^1	10^2	10^3	10^4	10^5	10^6	10^7	10^{-1}	10^{-2}	10^{-3}

0603 3digit marking for E24, but when E24 and E96 share the same resistance, E96 marking shall take priority

Example:

Resistance	100Ω	11KΩ	12KΩ	27KΩ
Marking	01A	05C	123	273

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

0805~1206 4digit marking

Example

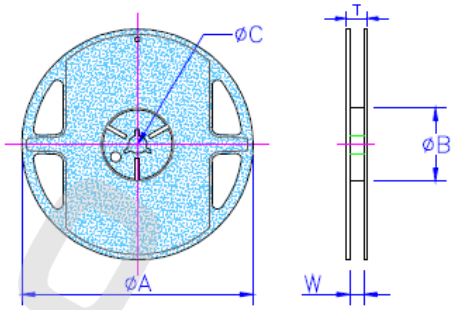
Resistance	100Ω	2.2KΩ	10KΩ	49.9KΩ	100KΩ
marking	1000	2201	1002	4992	1003

■Packaging

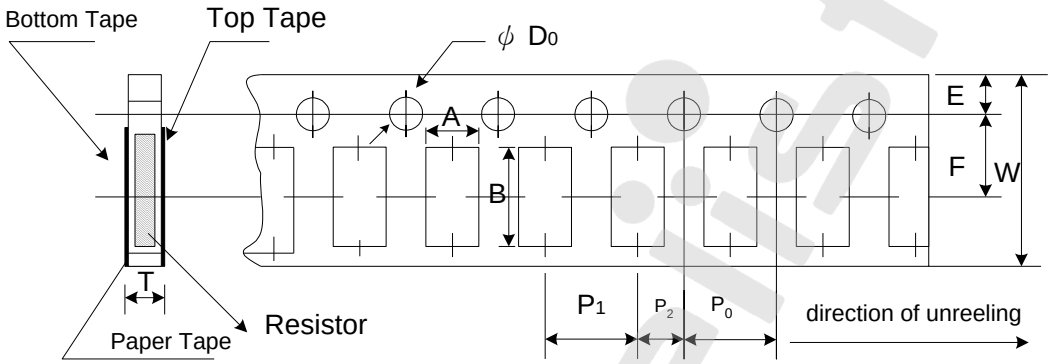
Packing Quantity & Reel Specifications

Unit :mm

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



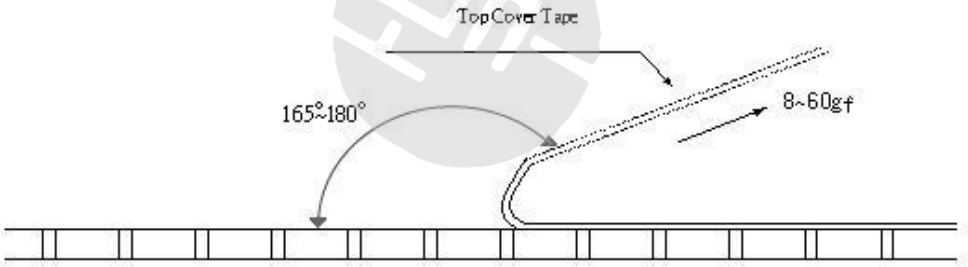
Paper Tape Specifications



Unit: mm

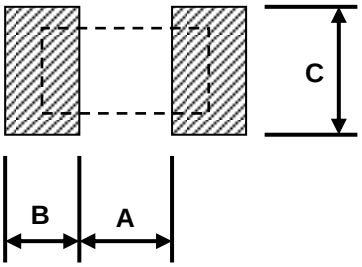
Type	A	B	W	E	F	P_0	P_1	P_2	$ΦD_0$	T
TAR02	0.70±0.05	1.16±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	2.00±0.05	2.00±0.05	1.55±0.05	0.40±0.03
TAR03	1.10±0.05	1.90±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.55±0.05	0.60±0.03
TAR05	1.60±0.05	2.37±0.05	8.00±0.10	1.75±0.05	3.5±0.05	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±5%
■ The peel force of top cover tape shall be between 8gf to 60gf



■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

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A1	Jan 26 ,2022	-	- Add shelf life description. - Modify IR reflow profile to comply IPC/JEDEC J-STD-020.
Version A2	May 17 ,2023	-	-Modify Test Method for Sulfur Test. - Add Reflow Profiles table.
Version A3	May 06 ,2026	-	- Revise Sulfur Test duration from 750 hours to 1000 hours.
Version A4	Jun. 01,2026	-	- Add new rule for 0603 3digit marking: When E24 and E96 share the same resistance, E96 marking shall take priority. - Modify the description in Features from "AEC Q200 Compliance" to "AEC Q200 Qualified".
Version A5	Jul. 02,2026	-	- Add Sulfur Test in Environmental Characteristics
Version A6	Jul. 09,2026	-	- Add new description "RoHS (Pb)-free without exemption" to Features.