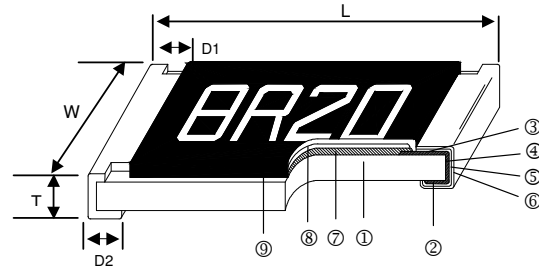
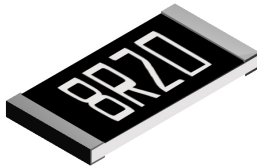


Thin Film Precision Chip Resistor – AR Series

Construction



① Alumina Substrate	④ Edge Electrode (NiCr)	⑦ Resistor Layer (NiCr)
② Bottom Electrode (Ag)	⑤ Barrier Layer (Ni)	⑧ Overcoat (Epoxy)
③ Top Electrode (Ag-Pd)	⑥ External Electrode (Sn)	⑨ Marking

Features

- Advanced thin film technology
- Very tight tolerance down to $\pm 0.01\%$
- Extremely low TCR down to $\pm 5\text{PPM}/^\circ\text{C}$
- Wide resistance range 1ohm ~ 3Mega ohm
- Miniature size 0201 available

Applications

- Medical Equipment
- Testing / Measurement Equipment
- Printer Equipment
- Automatic Equipment Controller
- Converters
- Communication Device, Cell Phone, GPS, PDA

Dimensions

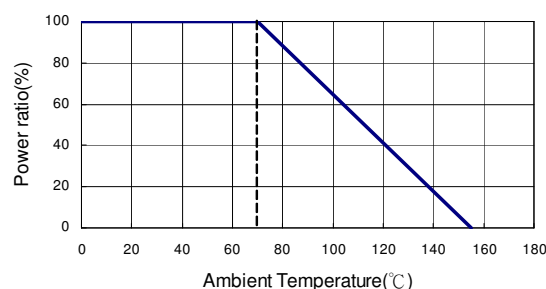
Unit: mm

Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
AR01	0201	0.58 \pm 0.05	0.29 \pm 0.05	0.23 \pm 0.05	0.12 \pm 0.05	0.15 \pm 0.05	0.14
AR02	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
AR03	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
AR05	0805	2.00 \pm 0.15	1.25 \pm 0.15	0.55 \pm 0.10	0.30 \pm 0.20	0.40 \pm 0.25	4.71
AR06	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
AR13	1210	3.10 \pm 0.15	2.40 \pm 0.15	0.55 \pm 0.10	0.40 \pm 0.20	0.55 \pm 0.25	10
AR10	2010	4.90 \pm 0.15	2.40 \pm 0.15	0.55 \pm 0.10	0.60 \pm 0.30	0.50 \pm 0.25	23.61
AR12	2512	6.30 \pm 0.15	3.10 \pm 0.15	0.55 \pm 0.10	0.60 \pm 0.30	0.50 \pm 0.25	38.06

Part Numbering

AR	03	T	T	B	Y	1001	N
Product Type	Dimensions (LxW)	Resistance Tolerance	Packaging Code	TCR (PPM/ $^\circ\text{C}$)	Power Rating	Resistance	Marking Code
	01: 0201 02: 0402 03: 0603 05: 0805 06: 1206 13: 1210 10: 2010 12: 2512	T: $\pm 0.01\%$ A: $\pm 0.05\%$ B: $\pm 0.1\%$ C: $\pm 0.25\%$ D: $\pm 0.5\%$ F: $\pm 1\%$	T: Taping Reel B: Bulk	S: ± 5 B: ± 10 N: ± 15 C: ± 25 D: ± 50	: Standard Y: 1/16W X: 1/10W W: 1/8W P: 1/5W V: 1/4W O: 1/3W U: 1/2W T: 1W	0010: 1 Ω 4R70: 4.7 Ω 1001: 1K Ω 1004: 1M Ω	: 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%	
AR01 (0201)	1/32W	-55 ~ +155°C	15V	30V	-		50Ω - 5KΩ	±25 ±50	
							5.1KΩ - 33KΩ	±50	
AR02 (0402)	1/16W	-55 ~ +155°C	25V	50V	-	10Ω - 205KΩ			±25 ±50
AR03 (0603)	1/16W	-55 ~ +155°C	50V	100V	4.7Ω - 150KΩ	4.7Ω - 1MΩ	2Ω - 1MΩ	±25 ±50	
AR05 (0805)	1/10W	-55 ~ +155°C	100V	200V	4.7Ω - 500KΩ	4.7Ω - 2MΩ	1Ω - 2MΩ	±25 ±50	
AR06 (1206)	1/8W	-55 ~ +155°C	150V	300V	4.7Ω - 1MΩ	4.7Ω - 2.5MΩ	1Ω - 2.5MΩ	±25 ±50	
AR13 (1210)	1/5W	-55 ~ +155°C	150V	300V	4.7Ω - 1MΩ	4.7Ω - 2.5MΩ	1Ω - 2.5MΩ	±25 ±50	
AR10 (2010)	1/4W	-55 ~ +155°C	150V	300V	4.7Ω - 1MΩ	4.7Ω - 3MΩ	1Ω - 3MΩ	±25 ±50	
AR12 (2512)	1/2W								

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.

■ Viking is capable of manufacturing the optional spec based on customer's requirement.

Special Electrical Specifications

Item Type	Power Rating at 70 °C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range			TCR (PPM/°C)
					±0.01%	±0.05%	±0.1%	
AR02 (0402)	1/16W	-55 ~ +155°C	25V	50V	49.9Ω - 3KΩ			±5
					49.9Ω - 12KΩ			±10 ±15
AR03 (0603)	1/16W	-55 ~ +155°C	50V	100V	25Ω - 15KΩ			±5
					25Ω - 100KΩ			±10 ±15
					-	4.7Ω - 332KΩ		±10
AR05 (0805)	1/10W	-55 ~ +155°C	100V	200V	25Ω - 30KΩ			±5
					25Ω - 200KΩ			±10 ±15
					-	4.7Ω - 511KΩ		±10
AR06 (1206)	1/8W	-55 ~ +155°C	150V	300V	25Ω - 50KΩ			±5
					25Ω - 500KΩ			±10 ±15
					-	4.7Ω - 1MΩ		±10
AR13 (1210)	1/5W	-55 ~ +155°C	150V	300V	25Ω - 50KΩ			±5
					25Ω - 500KΩ			±10 ±15
					-	4.7Ω - 1MΩ		±10
AR10 (2010)	1/4W	-55 ~ +155°C	150V	300V	25Ω - 100KΩ			±5
					25Ω - 500KΩ			±10 ±15
					-	4.7Ω - 1MΩ		±10
AR12 (2512)	1/2W	-55 ~ +155°C	150V	300V	25Ω - 100KΩ			±5
					25Ω - 500KΩ			±10 ±15
					-	4.7Ω - 1MΩ		±10

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.

High Power Rating Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/°C)	
					±0.01%	±0.05%	±0.1%	±0.25%	±0.5%		
AR03 (0603)	1/10W	-55 ~ +155°C	75V	150V	25.1Ω - 15KΩ					±5	
					25.1Ω - 100KΩ	4.7Ω - 332KΩ					±10 ±15 ±25 ±50
AR05 (0805)	1/8W	-55 ~ +155°C	150V	300V	25.1Ω - 30KΩ					±5	
					25.1Ω - 200KΩ	4.7Ω - 500KΩ					±10 ±15 ±25 ±50
					—	501KΩ - 1MΩ					±25 ±50
AR06 (1206)	1/4W	-55 ~ +155°C	200V	400V	25.1Ω - 50KΩ					±5	
					25.1Ω - 500KΩ	4.7Ω - 1MΩ					±10 ±15 ±25 ±50
AR13 (1210)	1/3W	-55 ~ +155°C	200V	400V	25.1Ω - 50KΩ					±5	
					25.1Ω - 500KΩ	4.7Ω - 1MΩ					±10 ±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
	Tol. ≤ 0.05%	Tol. > 0.05%	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.		+25/-55/+25/+125/+25°C
Short Time Overload	ΔR±0.05%	ΔR±0.2%	RCWV*2.5 or Max. overload voltage for 5 seconds
	ΔR±0.2% for high power rating		
Insulation Resistance	>1000 MΩ		Apply 100V _{DC} for 1 minute
Endurance	ΔR±0.05%	ΔR±0.2%	70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
	>7kΩ ΔR±0.5%		
	ΔR±0.5% for high power rating		
Damp Heat with Load	ΔR±0.05%	ΔR±0.3%	40±2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
	ΔR±0.5% for high power rating		
Bending Strength	ΔR±0.05%	ΔR±0.2%	Bending amplitude 3 mm for 10 seconds
Solderability	95% min. coverage		245±5°C for 3 seconds
Resistance to Soldering Heat	ΔR±0.05%	ΔR±0.2%	260±5°C for 10 seconds
Dielectric Withstand Voltage	By Type		Max. overload voltage for 1 minute
Thermal Shock	ΔR±0.05%	ΔR±0.25%	-55°C ~150°C, 100 cycles
Low Temperature Operation	ΔR±0.05%	ΔR±0.2%	1 hour, -65°C, followed by 45 minutes of RCWV
	ΔR±0.5% for high power rating		

Reference Standards: MIL-STD-202, JIS-C 5201-1

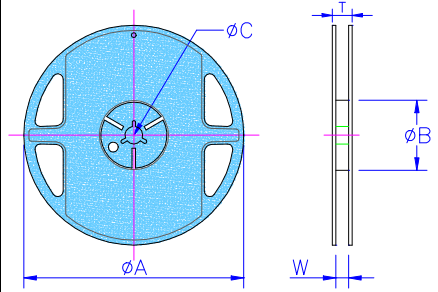
Storage Temperature: 25±3°C; Humidity < 80%RH

■ Packaging

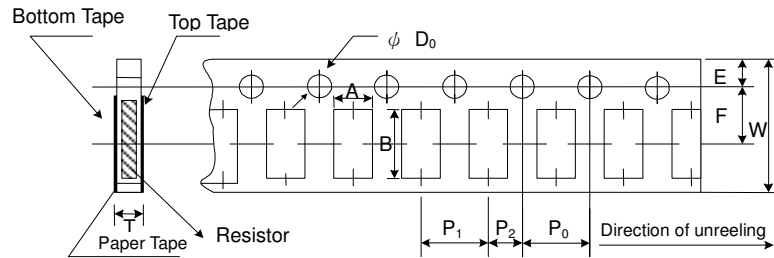
Packaging Quantity & Reel Specifications

Unit: mm

Type	ΦA	ΦB	ΦC	W	T	Paper Tape (EA)	Embossed Plastic Tape (EA)
AR01	178.0 ± 1.0	60.0 + 1.0	13.5 ± 0.7	9.5 ± 1.0	11.5 ± 1.0	10,000	-
AR02	178.0 ± 1.0	60.0 + 1.0	13.5 ± 0.7	9.5 ± 1.0	11.5 ± 1.0	10,000	-
AR03	178.0 ± 1.0	60.0 + 1.0	13.5 ± 0.7	9.5 ± 1.0	11.5 ± 1.0	5,000	-
AR05	178.0 ± 1.0	60.0 + 1.0	13.5 ± 0.7	9.5 ± 1.0	11.5 ± 1.0	5,000	-
AR06	178.0 ± 1.0	60.0 + 1.0	13.5 ± 0.7	9.5 ± 1.0	11.5 ± 1.0	5,000	-
AR13	178.0 ± 1.0	60.0 + 1.0	13.5 ± 0.7	9.5 ± 1.0	11.5 ± 1.0	5,000	-
AR10	178.0 ± 1.0	60.0 + 1.0	13.5 ± 0.7	13.5 ± 1.0	15.5 ± 1.0	-	4,000
AR12	178.0 ± 1.0	60.0 + 1.0	13.5 ± 0.7	13.5 ± 1.0	15.5 ± 1.0	-	4,000



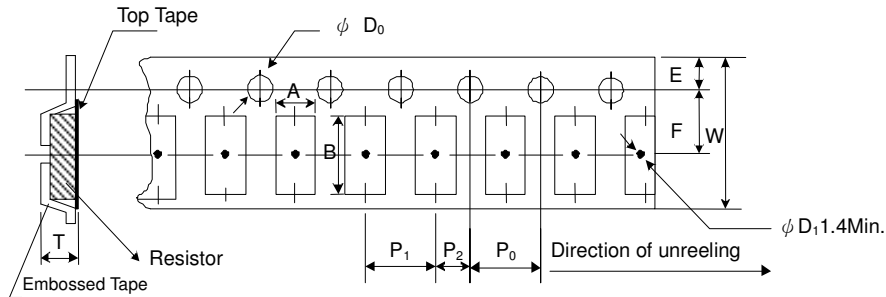
Paper Tape Specifications



Unit: mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
AR01	0.40±0.05	0.70±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±0.03	0.42±0.02
AR02	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
AR03	1.10±0.05	1.90±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	0.60±0.03
AR05	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
AR06	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
AR13	2.75±0.05	3.40±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.60±0.10	0.75±0.05

Embossed Plastic Tape Specifications

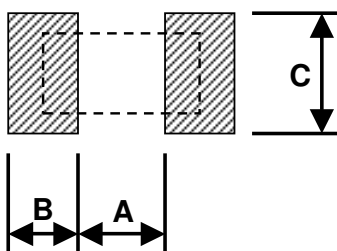


Unit: mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
AR10	2.85±0.10	5.45±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.00±0.20
AR12	3.40±0.10	6.65±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.00±0.20

■ Recommend Land Pattern

Unit: mm



Type	A	B	C
AR01	0.25	0.30	0.40±0.2
AR02	0.50	0.50	0.60±0.2
AR03	0.80	1.00	0.90±0.2
AR05	1.00	1.00	1.35±0.2
AR06	2.00	1.15	1.70±0.2
AR13	2.00	1.15	2.50±0.2
AR10	3.60	1.40	2.50±0.2
AR12	4.90	1.60	3.10±0.2