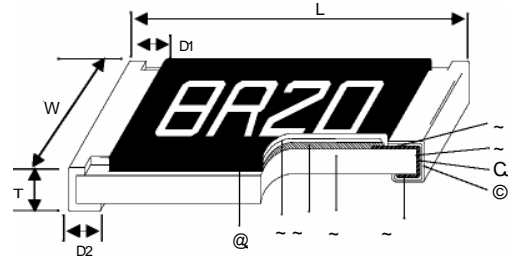


## Thin Film Precision Chip Resistor-AR Series

### Construction



~ Alumina Substrate	® Edge Electrode (NiCr)	© Resistor Layer (NiCr)
® Bottom Electrode (Ag)	CJ Barrier Layer (Ni)	® Overcoat (Epoxy)
® Top Electrode (Ag-Pd)	© External Electrode (Sn)	@ 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

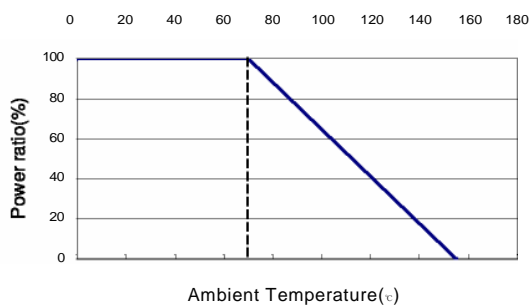
Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
AR01	0201	0.58 $\pm$ 0.05	0.29 $\pm$ 0.05	0.23 $\pm$ 0.05	0.12 $\pm$ 0.05	0.15 $\pm$ 0.05	0.14
AR02	0402	1.00 $\pm$ 0.05	0.50 $\pm$ 0.05	0.30 $\pm$ 0.05	0.20 $\pm$ 0.10	0.20 $\pm$ 0.10	0.54
AR03	0603	1.55 $\pm$ 0.10	0.80 $\pm$ 0.10	0.45 $\pm$ 0.10	0.30 $\pm$ 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
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Product Type	Dimensions	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: $\pm 5$ B: $\pm 10$ N: $\pm 15$ C: $\pm 25$ D: $\pm 50$	: 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: 1fl 4R70: 4.7fl 1001: 1Kfl 1004: 1Mfl	: 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%	
AR01 (0201)	1/32W	-55 ~ +155°C	15V	30V	-					±25
										±50
AR02 (0402)	1/16W	-55 ~ +155°C	25V	50V	-	10 - 9.990				±50
AR03 (0603)	1/16W	-55 ~ +155°C	50V	100V	4.70 - 332K0	4.70 - 1M0	20 - 1M0		±25	
AR05 (0805)	1/10W	-55 ~ +155°C	100V	200V	4.70 - 511K0	4.70 - 2M0	10 - 2M0		±50	
AR06 (1206)	1/8W	-55 ~ +155°C	150V	300V	4.70 - 1M0	4.70 - 2.5M0	10 - 2.5M0		±25	
AR13 (1210)	1/5W								±50	
AR10 (2010)	1/4W	-55 ~ +155°C	150V	300V	4.70 - 1M0	4.70 - 3M0	10 - 3M0		±25	
AR12 (2512)	1/2W								±50	

Operating Voltage=f(P\*R) or Max. operating voltage listed above, whichever is lower.

Overload Voltage=2.5\*f(P\*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	49.90 - 5K0			±5
					49.90 - 12K0			±10
					49.90 - 70K0			±15
AR03 (0603)	1/16W	-55 ~ +155°C	50V	100V	24.90 - 15K0			±5
					24.90 - 100K0			±10
					4.70 - 332K0			±15
AR05 (0805)	1/10W	-55 ~ +155°C	100V	200V	24.90 - 30K0			±5
					24.90 - 200K0			±10
					4.70 - 511K0			±15
AR06 (1206)	1/8W	-55 ~ +155°C	150V	300V	24.90 - 50K0			±5
					24.90 - 500K0			±10
					4.70 - 1M0			±15
AR13 (1210)	1/ 5W	-55 ~ +155°C	150V	300V	24.90 - 50K0			±5
					24.90 - 500K0			±10
					4.70 - 1M0			±15
AR10 (2010)	1/4W	-55 ~ +155°C	150V	300V	24.90 - 100K0			±5
					24.90 - 500K0			±10
					4.70 - 1M0			±15
AR12 (2512)	1/2W	-55 ~ +155°C	150V	300V	24.90 - 100K0			±5
					24.90 - 500K0			±10
					4.70 - 1M0			±15

Operating Voltage=f(P\*R) or Max. operating voltage listed above, whichever is lower.

Overload Voltage=2.5\*f(P\*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	24.90 - 15K0					±5
	1/6W		100V	150V	24.90 - 100KD	4.70 - <sup>332K52</sup>			±10 ±15 ±25 ±50	
AR05 (0805)	1/8W	-55 ~ +155 C	150V	300V	24.90 - 30K0					±5
					24.90 - 200K0	4.70 - 511K0			±10 ±15 ±25 ±50	
	1/4W		150V	300V	-	4.70 - 1M0			±15 ±25 ±50	
AR06 (1206)	1/4W	-55 ~ +155 C	200V	400V	24.90 - 50K0					±5
	1/3W		200V	400V	24.90 - 500KD	4.70 - 1MS2			±10 ±15 ±25 ±50	
AR13 (1210)	1/ 3W	-55 ~ +155 C	200V	400V	24.90 - 50K0					±5
					24.90 - 500K0	4.70 - 1M0			±10 ±15 ±25 ±50	

Operating Voltage= $f(P \cdot R)$  or Max. operating voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot f(P \cdot R)$  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	AR±0.05%	AR±0.2%	RCWV*2.5 or Max. overload voltage for 5 seconds
	AR±0.2% for high power rating		
Insulation Resistance	>1000 M0		Apply 100V <sub>dc</sub> for 1 minute
Endurance	AR±0.05%	AR±0.2%	70.2C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
	>7k0 AR±0.5%		
	AR±0.5% for high power rating		
Damp Heat with Load	AR±0.05%	AR±0.3%	40.2C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
	AR±0.5% for high power rating		
Bending Strength	AR±0.05%	AR±0.2%	Bending amplitude 3 mm for 10 seconds
Solderability	95% min. coverage		245.5C for 3 seconds
Resistance to Soldering Heat	AR±0.05%	AR±0.2%	260±5C for 10 seconds
Dielectric Withstand Voltage	By Type		Max. overload voltage for 1 minute
Thermal Shock	AR±0.05%	AR±0.25%	-55C~150C, 100 cycles
Low Temperature Operation	AR±0.05%	AR±0.2%	1 hour, -65C, followed by 45 minutes of RCWV
	AR±0.5% for high power rating		

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

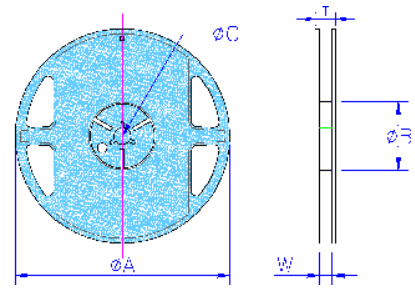
■ Storage Temperature: 25±3C; Humidity < 80%RH

## Packaging

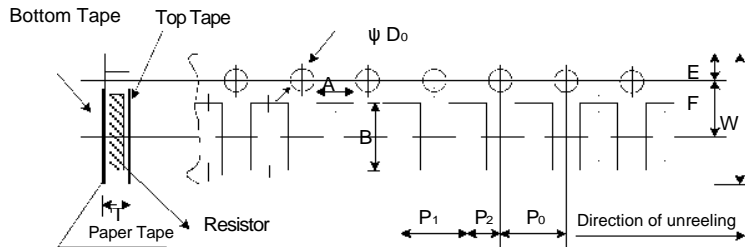
Packaging Quantity & Reel Specifications

Unit: mm

Type	ØA	ØB	ØC	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



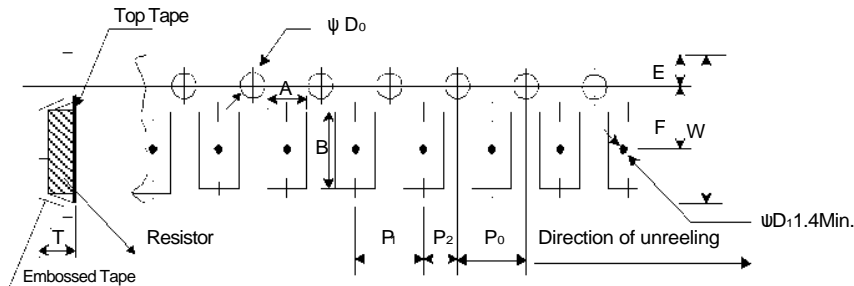
Paper Tape Specifications



Unit: mm

Type	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ØD <sub>0</sub>	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

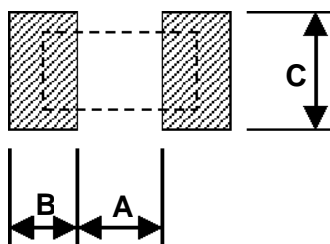


Unit: mm

Type	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ØD <sub>0</sub>	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