

# ARN series

## Thin Film High Precision Chip Resistor

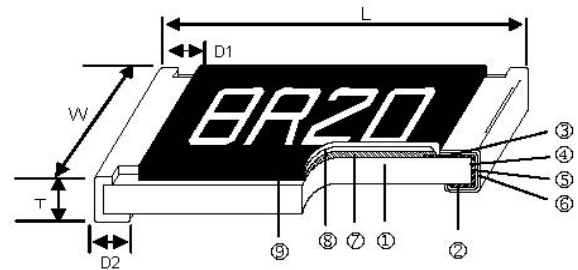
### ◆ Features

- » 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, Smart phone  
Navigation system

### ◆ Construction



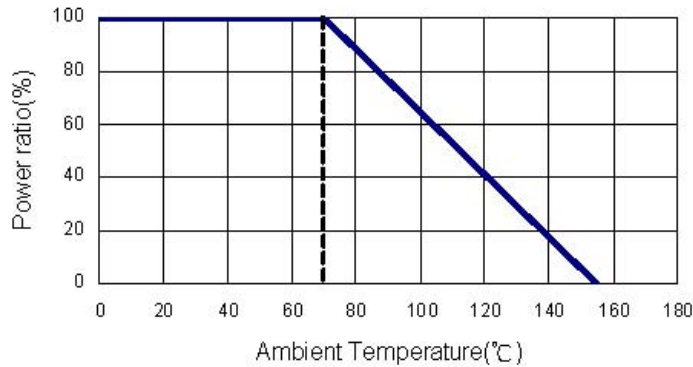
1	Alumina Substrate	4	Edge Electrode (NiCr)	7	Resistor Layer (NiCr)
2	Bottom Electrode (Ag)	5	Barrier Layer (Ni)	8	Overcoat (Epoxy)
3	Top Electrode (Ag-Pd)	6	External Electrode (Sn)	9	Marking

### ◆ Dimensions

Unit: mm

Type	L	W	T	D1	D2
ARN0201	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
ARN0402	1.00 $\pm$ 0.10	0.50 $\pm$ 0.05	0.30 $\pm$ 0.05	0.20 $\pm$ 0.10	0.20 $\pm$ 0.10
ARN0603	1.60 $\pm$ 0.20	0.80 $\pm$ 0.15	0.45 $\pm$ 0.10	0.30 $\pm$ 0.20	0.30 $\pm$ 0.20
ARN0805	2.00 $\pm$ 0.20	1.25 $\pm$ 0.15	0.55 $\pm$ 0.10	0.30 $\pm$ 0.20	0.40 $\pm$ 0.25
ARN1206	3.05 $\pm$ 0.15	1.60 $\pm$ 0.20	0.55 $\pm$ 0.15	0.42 $\pm$ 0.20	0.45 $\pm$ 0.25
ARN1210	3.10 $\pm$ 0.15	2.50 $\pm$ 0.20	0.55 $\pm$ 0.15	0.40 $\pm$ 0.20	0.55 $\pm$ 0.25
ARN1812	4.50 $\pm$ 0.10	3.00 $\pm$ 0.10	0.55 $\pm$ 0.05	0.55 $\pm$ 0.10	0.80 $\pm$ 0.10
ARN1218	3.10 $\pm$ 0.15	4.60 $\pm$ 0.10	0.55 $\pm$ 0.10	0.45 $\pm$ 0.10	0.40 $\pm$ 0.10
ARN2010	5.00 $\pm$ 0.20	2.50 $\pm$ 0.20	0.55 $\pm$ 0.10	0.60 $\pm$ 0.30	0.60 $\pm$ 0.25
ARN2512	6.30 $\pm$ 0.20	3.10 $\pm$ 0.20	0.55 $\pm$ 0.10	0.60 $\pm$ 0.30	0.60 $\pm$ 0.25

## ◆ 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%	
ARN0201	1/32W	-55~+155 °C	15V	30V	---	49.9Ω-4.99KΩ			±25	
						49.9Ω-33KΩ			±50	
ARN0402	1/32W		25V	50V	49.9Ω-12KΩ	10Ω – 205KΩ			±25	
						10Ω – 205KΩ	1Ω – 205KΩ	±50		
ARN0603	1/16W		50V	100V	4.7Ω -332KΩ	4.7Ω -1MΩ	2Ω-1MΩ		±25	
							1Ω-1MΩ		±50	
ARN0805	1/10W		100V	200V	4.7Ω -511KΩ	4.7Ω -2MΩ	1Ω-2MΩ		±25 ±50	
ARN1206	1/8W						150V	300V	4.7Ω -1MΩ	4.7Ω -2.49MΩ
ARN1210	1/6W									
ARN1218	1/2W		150V	300V	24.9Ω -100KΩ	10Ω-499KΩ			±10	
		1Ω-1MΩ				±25 ±50				
ARN2010	1/4W	150V	300V	4.7Ω -1MΩ	4.7Ω -3MΩ	1Ω-3MΩ		±25		
ARN2512	1/2W									±50

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

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

Faithful Link is capable of manufacturing the optional spec based on customer's requirement.

Lower Resistance: 1~10Ω

## ◆ Special Electrical Specifications

Type	Item	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%	
ARN0402	1/32W			25V	50V	49.9Ω-4.99KΩ			±5
						49.9Ω-12KΩ			±10
						49.9Ω-12KΩ	49.9Ω-69.8KΩ		±15
ARN0603	1/16W			50V	100V	24.9Ω-15KΩ			±5
						24.9Ω-100KΩ	4.7Ω-332KΩ		±10 ±15
ARN0805	1/10W			100V	200V	24.9Ω-30KΩ			±5
						24.9Ω-200KΩ	4.7Ω-511KΩ		±10 ±15
ARN1206	1/8W		-55~+155 °C	150V	300V	24.9R-49.9KΩ			±5
						24.9Ω-499KΩ	4.7Ω-1MΩ		±10 ±15
ARN1210	1/6W			150V	300V	24.9Ω-49.9KΩ			±5
						24.9Ω-499KΩ	4.7Ω-1MΩ		±10 ±15
ARN2010	1/4W			150V	300V	24.9Ω-100KΩ			±5
						24.9Ω-499KΩ	4.7Ω-1MΩ		±10 ±15
ARN2512	1/2W			150V	300V	24.9Ω-100KΩ			±5
						24.9Ω-499KΩ	4.7Ω-1MΩ		±10 ±15

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

Overload Voltage =  $2.5 \times \sqrt{P \times R}$  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)
					±0.05%	±0.1%	±0.25%	±0.5%	±1%	
ARN0603	1/10W		75V	150V	24.9Ω-15KΩ					±5
					24.9Ω -100KΩ	4.7Ω -332KΩ	4.7Ω-332KΩ		4.7Ω-1.21MΩ	±10 ±15
	1/6W		100V	150V	---	10Ω-332KΩ				±25 ±50
ARN0805	1/8W	-55~+155 °C	150V	300V	24.9Ω-30KΩ					±5
					24.9Ω -200KΩ	4.7Ω -511KΩ	4.7Ω-511KΩ		±10	
							4.7Ω-1MΩ			±15
	4.7Ω -1MΩ		1Ω-1MΩ		±25 ±50					
	1/4W		150V	300V	---	10Ω-499KΩ			±25 ±50	
ARN1206	1/4W		200V	400V	24.9Ω-49.9KΩ					±5
					24.9Ω -499KΩ	4.7Ω-1MΩ			±10 ±15 ±25 ±50	
	1/3W		200V	400V	---	10Ω-1MΩ			±25 ±50	
ARN1210	1/4W		200V	400V	24.9Ω-49.9KΩ					±5
					24.9Ω -499KΩ	4.7Ω-1MΩ			±10 ±15 ±25 ±50	
ARN2010	1/3W		200V	400V	24.9Ω-49.9KΩ					±5
					24.9Ω -499KΩ	4.7Ω-1MΩ			±10 ±15 ±25 ±50	
ARN2512	3/4W		200V	400V	24.9Ω -2KΩ	4.7Ω-2KΩ		1Ω-2KΩ		±10 ±15 ±25 ±50
					---	4.7Ω -100Ω	1Ω-100Ω		±25 ±50	

Operating Voltage=  $\sqrt{P \times R}$  ; Overload Voltage listed above, whichever is lower

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

Faithful Link is capable of manufacturing the optional spec based on customer's requirement

Lower Resistance: 1~10Ω; high Power Rating

◆ **Part Number**

<b>ARN</b>	<b>0603</b>	<b>F</b>	<b>T</b>	<b>B</b>	<b>Y</b>	<b>1K</b>
<b>Type</b>	<b>size</b>	<b>Tolerance</b>	<b>Packing</b>	<b>TCR (ppm/°C)</b>	<b>Watt</b>	<b>R Value</b>
<b>ARN</b>	<b>0201</b>	<b>T: ±0.01%</b>	<b>T: Taping Reel</b>	<b>S: ±5</b>	<b>Blank: Standard</b>	<b>1Ω = 1R</b>
	<b>0402</b>	<b>A: ±0.05%</b>		<b>B: ±10</b>	<b>Y: 1/16W</b>	<b>4.7Ω = 4R7</b>
	<b>0603</b>	<b>B: ±0.1%</b>		<b>N: ±15</b>	<b>X: 1/10W</b>	<b>1KΩ = 1K</b>
	<b>0805</b>	<b>C: ±0.25%</b>		<b>C: ±25</b>	<b>W: 1/8W</b>	<b>1MΩ = 1M</b>
	<b>1206</b>	<b>D: ±0.5%</b>		<b>D: ±50</b>	<b>M: 1/6W</b>	
	<b>1210</b>	<b>F: ±1%</b>			<b>P: 1/5W</b>	
	<b>1218</b>				<b>V: 1/4W</b>	
	<b>2010</b>				<b>O: 1/3W</b>	
	<b>2512</b>				<b>U: 1/2W</b>	
					<b>Q: 3/4W</b>	
					<b>T: 1W</b>	
					<b>Z: 1/32W</b>	

## ◆ Environmental Characteristics

ITEM	REQUIREMENTS		TEST METHODS
	Tol. $\leq$ 0.05%	Tol. $>$ 0.05%	
Temperature coefficient of Resistance (T.C.R)	As spec		+25/-55/+25/+125/+25°C
Short Time Overload	$\Delta R_{\pm 0.05\%}$	$\Delta R_{\pm 0.2\%}$	RCWV x 2.5 or Max. Overload Voltage for 5 seconds
	$\Delta R_{\pm 0.2\%}$ for high power rating		
Insulation Resistance	$>1000M\Omega$		Apply 100VDC for 1 minute
Endurance	$\Delta R_{\pm 0.05\%}$	$\Delta R_{\pm 0.2\%}$	70 $\pm$ 2 °C, Max 1.5hrs "ON" and 0.5hrs "OFF"
	$>7K\Omega$ <del>±0.5%</del>		
	$\Delta R_{\pm 0.5\%}$ for high power rating		
Damp Heat with Load	$\Delta R_{\pm 0.05\%}$	$\Delta R_{\pm 0.3\%}$	40 $\pm$ 2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5hrs "ON" and 0.5hrs "OFF"
	$\Delta R_{\pm 0.5\%}$ for high power rating		
Bending Strength	$\Delta R_{\pm 0.05\%}$	$\Delta R_{\pm 0.2\%}$	Bending amplitude 3mm for 10 seconds
Solderability	95% min coverage		245 $\pm$ 5°C for 3 seconds
Resistance to Soldering Heat	$\Delta R_{\pm 0.05\%}$	$\Delta R_{\pm 0.2\%}$	260 $\pm$ 5°C for 10 seconds
Dielectric Withstand Voltage	By type		Max Overload Voltage for 1 minute
Thermal Shock	$\Delta R_{\pm 0.05\%}$	$\Delta R_{\pm 0.25\%}$	-55°C~150°C, 100 cycles
Low Temperature Operation	$\Delta R_{\pm 0.05\%}$	$\Delta R_{\pm 0.2\%}$	1 hour, -65°C, followed by 45minutes of RCWV
	$\Delta R_{\pm 0.5\%}$ for high power rating		

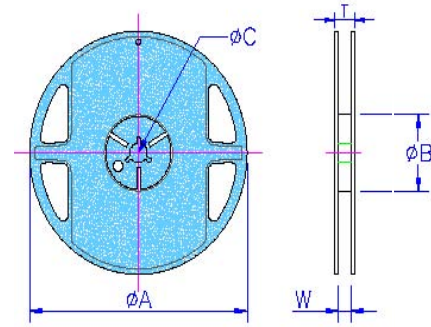
Reference Standards: MIL-STD-202, JIS-C 5201-1

## ◆ Packaging

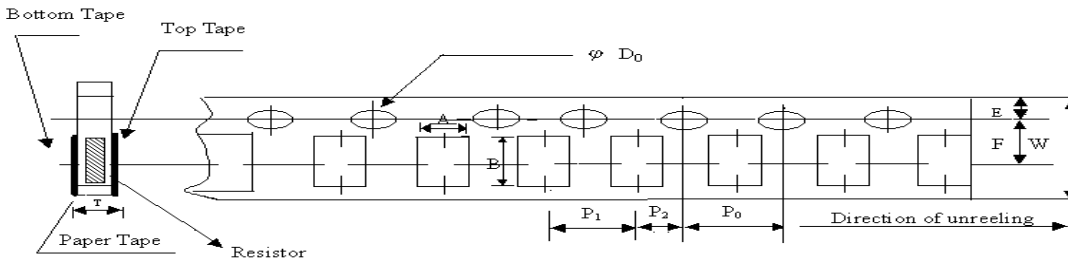
### Packaging Quantity & Reel Specifications

Unit: mm

Size	øA	øB	øC	W	T	Paper Tape(EA)	Embossed Plastic Tape(EA)
ARN0201	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
ARN0402	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
ARN0603	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARN0805	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARN1206	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARN1210	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARN1218	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	4,000	-
ARN2010	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
ARN2512	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000



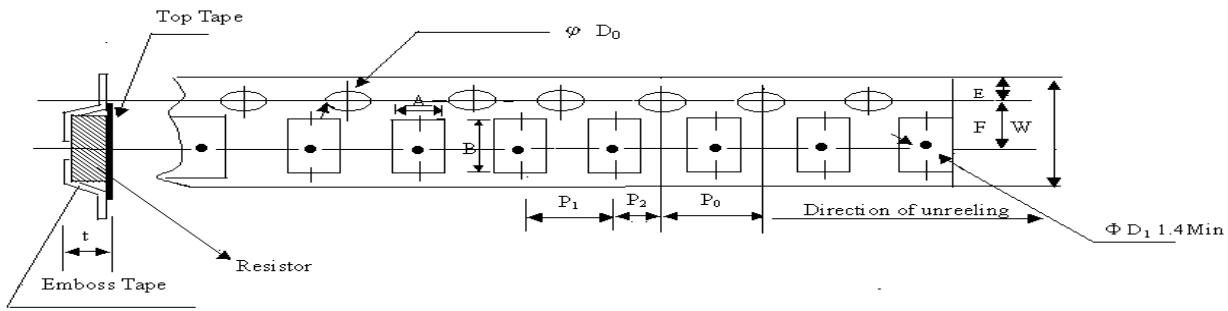
### Paper Tape Specifications



Unit: mm

Size	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ΦD <sub>0</sub>	T
ARN0201	0.40±0.05	0.70±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.0±0.10	2.0±0.05	2.0±0.05	1.55±0.03	0.42±0.02
ARN0402	0.70±0.05	1.20±0.05	8.00±0.20	1.75±0.10	3.5±0.05	4.0±0.10	2.0±0.05	2.0±0.05	1.55±0.05	0.45±0.10
ARN0603	1.10±0.05	1.90±0.20	8.00±0.20	1.75±0.10	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.55±0.05	0.60±0.10
ARN0805	1.60±0.05	2.37±0.20	8.00±0.20	1.75±0.10	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.55±0.05	0.75±0.10
ARN1206	2.00±0.05	3.55±0.20	8.00±0.20	1.75±0.10	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.55±0.05	0.75±0.10
ARN1210	2.75±0.05	3.50±0.20	8.00±0.20	1.75±0.10	3.5±0.05	4.0±0.05	4.0±0.10	2.0±0.05	1.60±0.10	0.75±0.10

## Embossed Plastic Tape Specifications

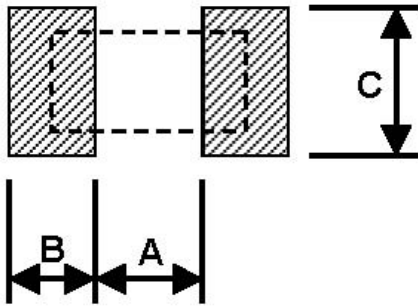


Unit: mm

Type	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ΦD <sub>0</sub>	T
ARN1218	3.30±0.20	4.60±0.20	12±0.10	1.75±0.10	5.5±0.05	4.0±0.05	4.0±0.10	2.0±0.05	1.5±0.10	0.85±0.15
ARN2010	2.85±0.20	5.45±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.0±0.05	4.0±0.10	2.0±0.05	1.5±0.10	1.00±0.20
ARN2512	3.40±0.10	6.65±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.0±0.05	4.0±0.10	2.0±0.05	1.5±0.10	1.00±0.20

## ◆ Recommend Land Pattern

Unit: mm



Size	A	B	C
ARN0201	0.25	0.30	0.40±0.2
ARN0402	0.50	0.50	0.60±0.2
ARN0603	0.80	1.00	0.90±0.2
ARN0805	1.00	1.00	1.35±0.2
ARN1206	2.00	1.15	1.70±0.2
ARN1210	2.00	1.15	2.50±0.2
ARN1812	3.11	1.40	3.00
ARN1218	2.04	1.10	4.5±0.2
ARN2010	3.60	1.40	2.50±0.2
ARN2512	4.90	1.60	3.10±0.2



## ◆ Storage and handling condition

1. Products are recommended to be used up within two years under the following recommendable storing conditions:

◎Ambient temperature: 5~40°C

◎Relative humidity: 20%~70%

2. Caution:

◎Don't store products in a corrosive environment such as sulfide, chloride gas, or acid. It may cause oxidization of electrode, which easily be resulted in poor soldering.

◎To store products on the shelf and avoid exposure to moisture.

◎Don't expose products to excessive shock, vibration, direct sunlight and so on.