

ARN series

Thin Film High Precision Chip Resistor

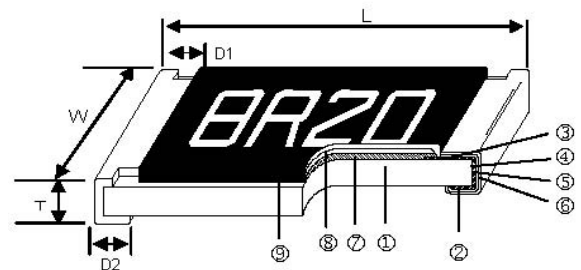
◆ Features

- » 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



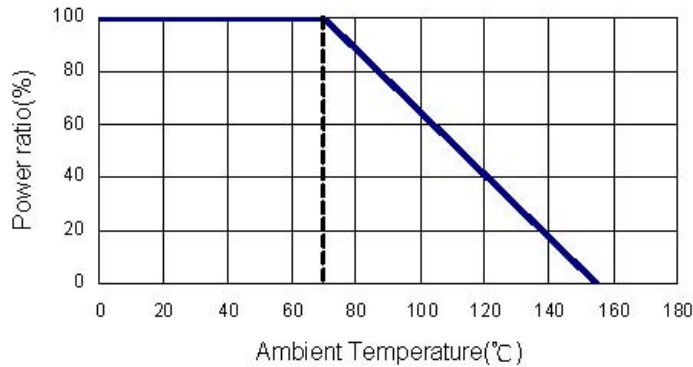
1	Alumina Substrate	4	Edge Electrode (NiCr)	7	Resistor Layer (NiCr)
2	Bottom Electrode (Ag)	5	Barrier Layer (Ni)	8	Overcoat (Epoxy)
3	Top Electrode (Ag-Pd)	6	External Electrode (Sn)	9	Marking

◆ 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	1/16W		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						1Ω-2.49MΩ		±25	
ARN1210	1/6W		150V	300V	4.7Ω -1MΩ	4.7Ω -2.49MΩ	1Ω-2.49MΩ		±50	
							10Ω-499KΩ		±10	
ARN1218	1/2W	150V	300V	24.9Ω -100KΩ	1Ω-1MΩ			±25 ±50		
					1Ω-3MΩ			±25		
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	1/16W			25V	50V	49.9Ω-4.99KΩ			±2 ±3 ±5
						49.9Ω-12KΩ			±10
						49.9Ω-12KΩ	49.9Ω-69.8KΩ		±15
ARN0603	1/16W			50V	100V	24.9Ω-15KΩ			±2 ±3 ±5
						24.9Ω-100KΩ	4.7Ω-332KΩ		±10 ±15
ARN0805	1/10W			100V	200V	24.9Ω-30KΩ			±2 ±3 ±5
						24.9Ω-200KΩ	4.7Ω-511KΩ		±10 ±15
ARN1206	1/8W	-55~+155°C		150V	300V	24.9R-49.9KΩ			±2 ±3 ±5
						24.9Ω-499KΩ	4.7Ω-1MΩ		±10 ±15
ARN1210	1/6W			150V	300V	24.9Ω-49.9KΩ			±2 ±3 ±5
						24.9Ω-499KΩ	4.7Ω-1MΩ		±10 ±15
ARN2010	1/4W			150V	300V	24.9Ω-100KΩ			±2 ±3 ±5
						24.9Ω-499KΩ	4.7Ω-1MΩ		±10 ±15
ARN2512	1/2W			150V	300V	24.9Ω-100KΩ			±2 ±3 ±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%	
ARN0402	1/10W		50V	100V	49.9Ω-4.99KΩ					±5
					49.9Ω-12KΩ		49.9Ω-60KΩ			±10
					49.9Ω-12KΩ		49.9Ω-68KΩ			±15
					49.9Ω-12KΩ	10Ω-255KΩ	4.7Ω-255KΩ		±25 ±50	
ARN0603	1/10W	-55~+155°C	75V	150V	24.9Ω-15KΩ		---		±5	
					24.9Ω	4.7Ω	4.7Ω-332KΩ		±10 ±15	
	-100KΩ				-332KΩ	4.7Ω-1MΩ	4.7Ω-1.21MΩ	±25 ±50		
	1/6W	100V	150V	---	10Ω-332KΩ			±25 ±50		
ARN0805	1/8W	-55~+155°C	150V	300V	24.9Ω-30KΩ					±5
					24.9Ω	4.7Ω	4.7Ω-511KΩ		±10	
							4.7Ω-1MΩ		±15	
	-200KΩ				-511KΩ	4.7Ω	1Ω-1MΩ		±25 ±50	
	1/4W	150V	300V	---	10Ω-499KΩ			±25 ±50		
ARN1206	1/4W	-55~+155°C	200V	400V	24.9Ω-49.9KΩ					±5
					24.9Ω	4.7Ω-1MΩ			±10 ±15 ±25 ±50	
-499KΩ										
	1/3W		200V	400V	---	10Ω-1MΩ			±25 ±50	
ARN1210	1/4W	-55~+155°C	200V	400V	24.9Ω-49.9KΩ					±5
					24.9Ω	4.7Ω-1MΩ			±10 ±15 ±25 ±50	
-499KΩ										
	1/3W		200V	400V	---	10Ω-1MΩ			±25 ±50	
ARN2010	1/3W	-55~+155°C	200V	400V	24.9Ω-49.9KΩ					±5
					24.9Ω	4.7Ω-1MΩ			±10 ±15 ±25 ±50	
-499KΩ										
	3/4W		200V	400V	24.9Ω	4.7Ω-2KΩ		1Ω-2KΩ		±10 ±15 ±25 ±50
	1W	---	4.7Ω	1Ω-100Ω		±25 ±50				
					-100Ω					

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

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

◆ 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. working voltage for 1000 hrs with 1.5hrs "ON" and 0.5hrs "OFF"
	$>7K\Omega \Delta R_{\pm 0.5\%}$		
	$\Delta R_{\pm 0.5\%}$ 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		

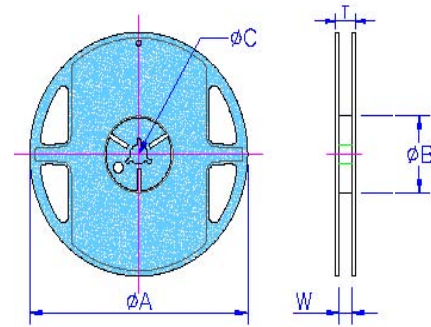
Reference Standards: MIL-STD-202, JIS-C 5201-1

◆ Packaging

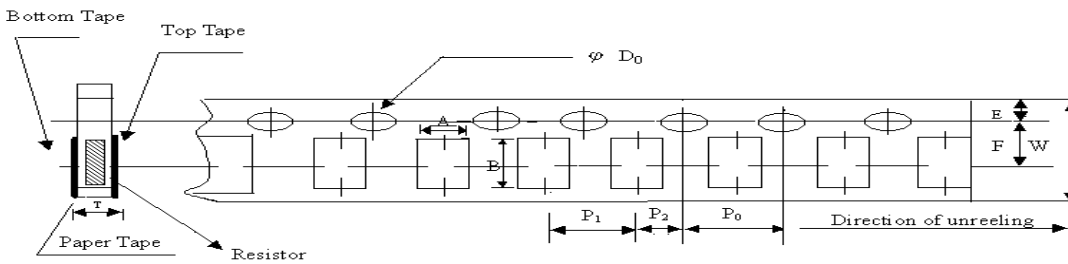
Packaging Quantity & Reel Specifications

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



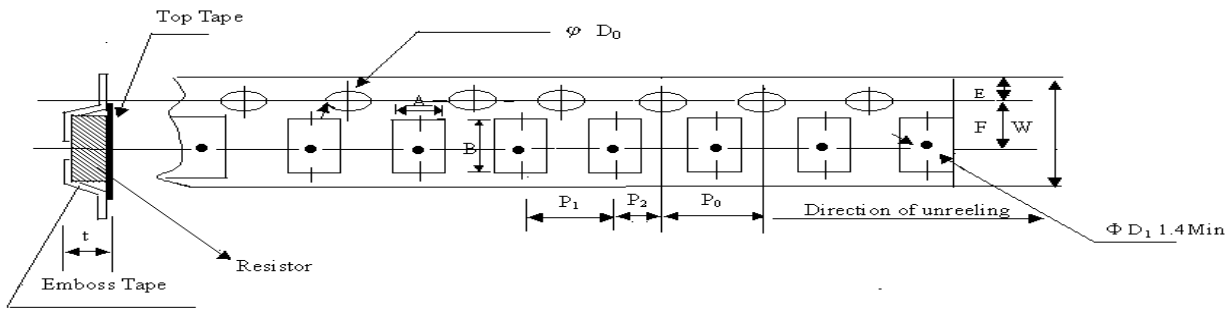
Paper Tape Specifications



Unit: mm

Size	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	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

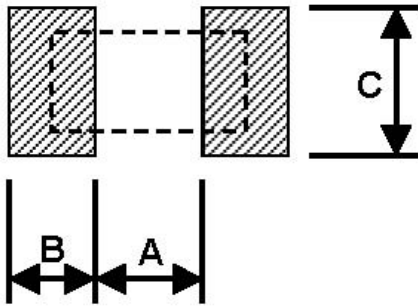


Unit: mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	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.