

## ARNA series

### Thin Film High Precision Chip Resistor Automotive

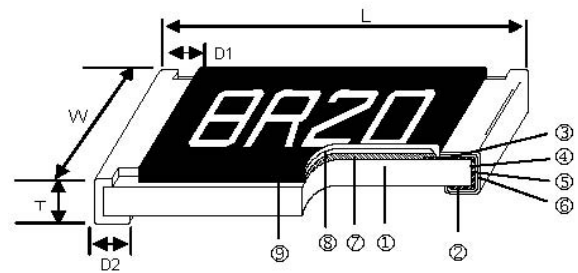
#### ◆ Features

- » Advanced thin film technology
- » Meet AEC-Q200 test
- » Special materials, design, and processing for high sulfur applications.
- » Test proven immunity to humidity, moisture, and sulfur.

#### ◆ Applications

- » Automotive.
- » Medical equipment
- » Testing/ Measurement equipment
- » Printer equipment
- » Automatic equipment controller
- » Converters
- » Communication device, Smart phone  
Navigation system

#### ◆ Construction



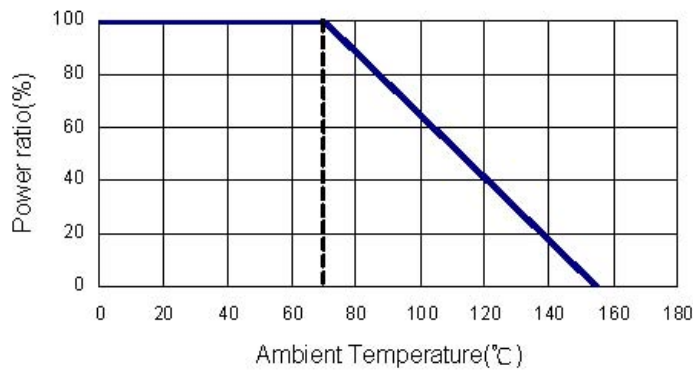
1	Alumina Substrate	4	Edge Electrode (NiCr)	7	Resistor Layer (NiCr)
2	Bottom Electrode (Ag)	5	Barrier Layer (Ni)	8	Overcoat (Epoxy)
3	Top Electrode (Ag-Pd)	6	External Electrode (Sn)	9	Marking

#### ◆ Dimensions

Unit: mm

Type	L	W	T	D1	D2
ARNA0402	1.00±0.10	0.50±0.05	0.30±0.05	0.20±0.10	0.20±0.10
ARNA0603	1.60±0.20	0.80±0.15	0.45±0.10	0.30±0.20	0.30±0.20
ARNA0805	2.00±0.20	1.25±0.15	0.55±0.10	0.30±0.20	0.40±0.25
ARNA1206	3.05±0.15	1.60±0.20	0.55±0.15	0.42±0.20	0.45±0.25
ARNA1210	3.10±0.15	2.50±0.20	0.55±0.15	0.40±0.20	0.55±0.25
ARNA2010	5.00±0.20	2.50±0.20	0.55±0.10	0.60±0.30	0.60±0.25
ARNA2512	6.30±0.20	3.10±0.20	0.55±0.10	0.60±0.30	0.60±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%	
ARNA0402	1/16W	-55~+155 °C	25V	50V	---					±25
					49.9Ω-10KΩ	49.9Ω-100KΩ			±50	
ARNA0603	1/16W		50V	100V	10Ω-49.9KΩ	10Ω-332KΩ			±25	
								±50		
ARNA0805	1/10W		100V	200V	10Ω-100KΩ	10Ω-1MΩ			±25	
								±50		
ARNA1206	1/8W		150V	300V	10Ω-200KΩ	10Ω-1MΩ			±25	
								±50		
ARNA1210	1/4W		150V	300V	10Ω-499KΩ	10Ω-1MΩ			±25	
ARNA2010									±50	
ARNA2512	1/2W	150V	300V	10Ω-499KΩ	10Ω-1MΩ			±25		
							±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.

## ◆ Special Electrical Specifications

Item Type	Power Rating At 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/°C)
					±0.05%	±0.1%	±0.25%	±0.5%	±1%	
ARNA0402	1/16W	-55~+155°C	25V	50V	49.9Ω-10KΩ					±10
					49.9Ω-10KΩ	49.9Ω-69.8KΩ			±15	
ARNA0603	1/16W		50V	100V	10Ω-49.9KΩ	10Ω-332KΩ			±10	
ARNA0805	1/10W		100V	200V	10Ω-100KΩ	10Ω-511KΩ			±15	
						10Ω-1MΩ			±10	
ARNA1206	1/8W		150V	300V	10Ω-200KΩ	10Ω-1MΩ			±15	
ARNA1210	1/4W		150V	300V	10Ω-499KΩ	10Ω-1MΩ			±10	
ARNA2010									±15	
ARNA2512	1/2W		150V	300V	10Ω-499KΩ	10Ω-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%	
ARNA0603	1/10W	-55~+155 °C	75V	150V	10Ω-49.9KΩ		10Ω-332KΩ			±10 ±15 ±25 ±50
ARNA0805	1/8W		150V	300V			10Ω-511KΩ		±10	
			10Ω-100KΩ	10Ω-1MΩ			±15			
							±25 ±50			
ARNA1206	1/4W		200V	400V	10Ω-200KΩ		10Ω-1MΩ		±10 ±15 ±25 ±50	
ARNA1210	1/3W		200V	400V	10Ω-499KΩ		10Ω-1MΩ		±10 ±15 ±25 ±50	
	1/2W					±25 ±50				
ARNA2010	1/3W	10Ω-499KΩ						±10 ±15 ±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

◆ **Part Number**

<b>ARNA</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>ARNA</b>	<b>0402</b>	<b>A: ±0.05%</b>	<b>T: Taping Reel</b>	<b>B: ±10</b>	<b>X: 1/10W</b>	<b>1Ω = 1R</b>
	<b>0603</b>	<b>B: ±0.1%</b>		<b>N: ±15</b>	<b>W: 1/8W</b>	<b>4.7Ω = 4R7</b>
	<b>0805</b>	<b>C: ±0.25%</b>		<b>C: ±25</b>	<b>V: 1/4W</b>	<b>1KΩ = 1K</b>
	<b>1206</b>	<b>D: ±0.5%</b>		<b>D: ±50</b>	<b>O: 1/3W</b>	<b>1MΩ = 1M</b>
	<b>1210</b>	<b>F: ±1%</b>		<b>X: ±2</b>	<b>U: 1/2W</b>	
	<b>2010</b>	<b>T: ±0.01%</b>		<b>O: ±3</b>	<b>Blank: Standard</b>	
	<b>2512</b>			<b>S: ±5</b>		

## ◆ Environmental Characteristics

ITEM	REQUIREMENTS		TEST METHODS
	Tol. $\leq$ 0.05%	Tol. > 0.05%	
Temperature coefficient of Resistance (T.C.R)	As spec		-55°C~+125°C, 25°C is the reference temperature
Short Time Overload	$\Delta R \pm 0.05\%$		RCWV x 2.5 or Max. Overload Voltage for 5 seconds
Insulation Resistance	>1000M $\Omega$		Apply 100VDC for 1 minute
Operational Life	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	Condition D Steady State T <sub>A</sub> =125°C at rated power. Measurement at 24±4 hours after test conclusion.
	>7K $\Omega$ $\Delta R \pm 0.2\%$		
	$\Delta R \pm 0.5\%$ for high power rating		
Biased Humidity	$\Delta R \pm 0.1\%$		1000 hrs 85°C/85%RH 10% of operating power.
High Temperature Exposure	$\Delta R \pm 0.2\%$		at +155°C for 1000 hrs
Temperature Cycling	$\Delta R \pm 0.1\%$		-55°C to +125°C, 1000 cycles
Bending Strength	$\Delta R \pm 0.1\%$		Bending once for 60 seconds Bending displacement: 2010 2512 sizes: 2 mm Other sizes: 3 mm
Solderability	95% min coverage		245±5°C for 3 seconds
Resistance to Soldering Heat	$\Delta R \pm 0.05\%$		260±5°C for 10 seconds
Terminal strength	No broken		Force of 1.8kg for 60 seconds.
Mechanical Shock	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.1\%$	Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.
Vibration	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.1\%$	5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	$\Delta R \pm 0.1\%$		Human body, 2KV
Resistance to solvents	Marking Unsmearred		Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Sulfur Test	$\Delta R \pm 1\%$		105±2 °C no power rating for 750 hrs.
Flammability	No ignition of the tissue paper or scorching or the pinewood board		V-0 or V-1 are acceptable. Electrical test not required.

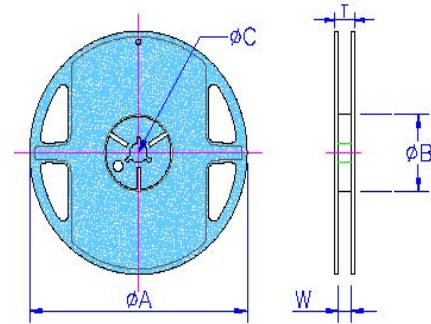
Reference Standards: MIL-STD-202, JIS-C 5201-1, AEC-Q200, JESD22, IEC-60115-1, EIA-997, UL-94

## ◆ Packaging

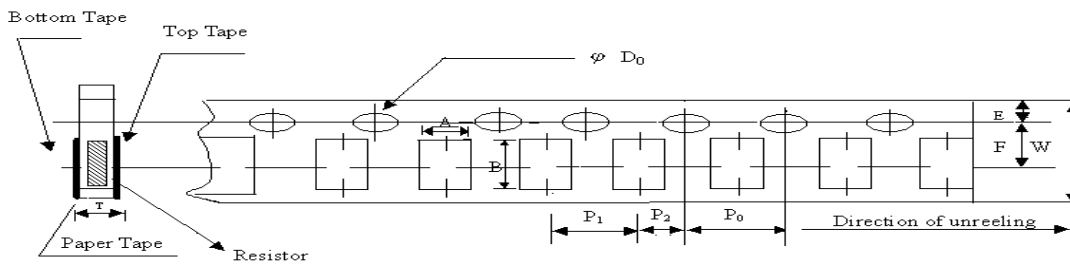
### Packaging Quantity & Reel Specifications

Unit: mm

Size	øA	øB	øC	W	T	Paper Tape(EA)	Embossed Plastic Tape(EA)
ARNA0402	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	10,000	-
ARNA0603	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARNA0805	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARNA1206	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARNA1210	178.0±1.0	60.0±1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARNA2010	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
ARNA2512	178.0±1.0	60.0±1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000



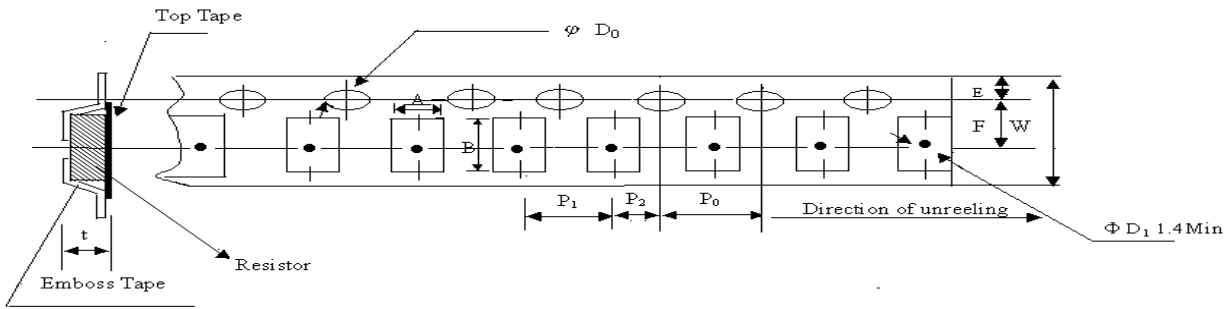
### Paper Tape Specifications



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
ARNA0402	0.70±0.05	1.16±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±0.05	0.40±0.03
ARNA0603	1.10±0.05	1.90±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.55±0.05	0.60±0.03
ARNA0805	1.60±0.05	2.37±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.55±0.05	0.75±0.03
ARNA1206	2.00±0.05	3.55±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.0±0.10	4.0±0.10	2.0±0.05	1.55±0.05	0.75±0.03
ARNA1210	2.75±0.05	3.40±0.05	8.00±0.10	1.75±0.05	3.5±0.05	4.0±0.05	4.0±0.10	2.0±0.05	1.60±0.10	0.75±0.03

## Embossed Plastic Tape Specifications

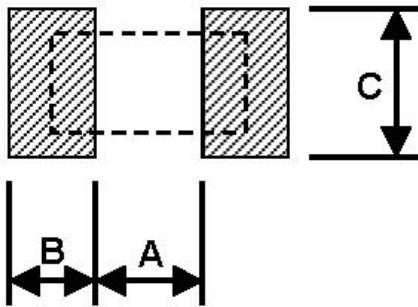


Unit: mm

Type	A	B	W	E	F	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	ΦD <sub>0</sub>	T
ARNA2010	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
ARNA2512	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
ARNA0402	0.50	0.50	0.60±0.2
ARNA0603	0.80	1.00	0.90±0.2
ARNA0805	1.00	1.00	1.35±0.2
ARNA1206	2.00	1.15	1.70±0.2
ARNA1210	2.00	1.15	2.50±0.2
ARNA2010	3.60	1.40	2.50±0.2
ARNA2512	4.90	1.60	3.10±0.2

### ◆ Storage Temperature:

15~28°C; Humidity &lt; 80% RH