

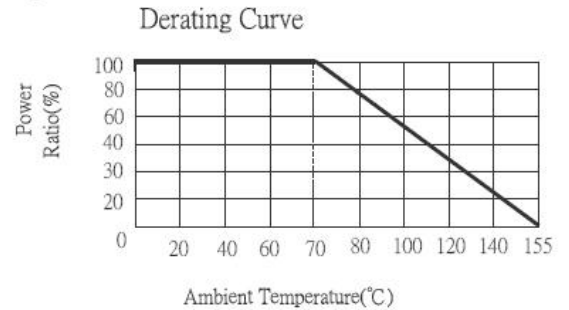
High Precision Chip Resistors (AR Series)

1. Scope

This specification applies to all sizes of rectangular-type fixed chip resistors with Ni/Cr as material.

2. Features

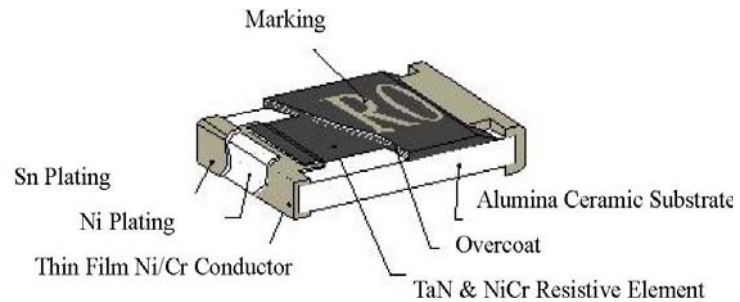
- Advanced thin film Technology
- Very tight tolerance down to $\pm 0.01\%$
- Extremely low TCR down $\pm 5\text{ppm}$
- Wide resistance range 1ohm-3Mega ohm
- Miniature size 0201 available



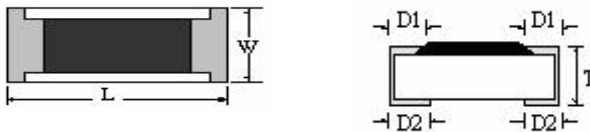
3. Applications

- Medical Equipment
- Testing/Measure Equipment
- Communication Device, Cell phone, GPS, PDA
- Converters
- Printer equipment
- Consumer Product
- Automatic Equipment Controller

4. Construction



5. Dimensions

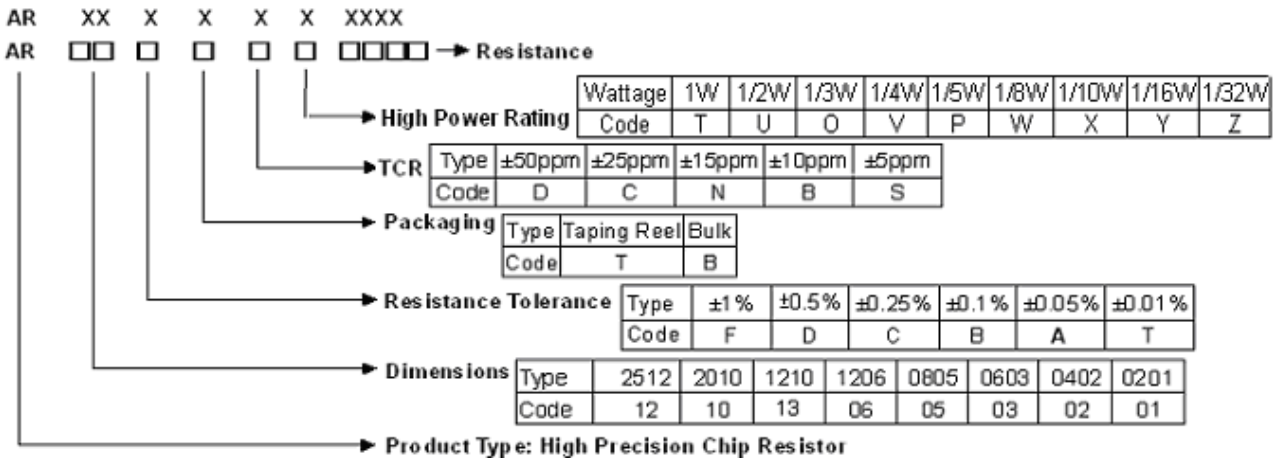


Unit:mm

Code	L	W	T	D1	D2
AR01(0201)	0.58±0.05	0.29±0.05	0.23±0.05	0.12±0.05	0.15±0.05
AR02(0402)	1.00±0.05	0.50±0.05	0.30±0.05	0.20±0.10	0.20±0.10
AR03(0603)	1.55±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20
AR05(0805)	2.00±0.15	1.25±0.15	0.55±0.10	0.30±0.20	0.40±0.25
AR06(1206)	3.05±0.15	1.55±0.15	0.55±0.10	0.42±0.20	0.35±0.25
AR13(1210)	3.10±0.15	2.40±0.15	0.55±0.10	0.40±0.20	0.55±0.25
AR10(2010)	4.90±0.15	2.40±0.15	0.55±0.10	0.60±0.30	0.50±0.25
AR12(2512)	6.30±0.15	3.10±0.15	0.55±0.10	0.60±0.30	0.50±0.25

High Precision Chip Resistors (AR Series)

6. Product Identification



7. Standard Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max Operating Voltage	Max Overloading Voltage	Resistance Tolerance	Resistance Range	TCR (ppm/°C)
AR12(2512)	1/2W	-55~+155°C	150V	300V	±1% ±0.5% ±0.25%	1Ω~3MΩ	±25ppm ±50ppm
AR10(2010)	1/4W				±0.1% ±0.05%	4.7Ω~3MΩ 4.7Ω~1MΩ	
AR13(1210)	1/5W	-55~+155°C	150V	300V	±1% ±0.5% ±0.25%	1Ω~2.5MΩ	±25ppm ±50ppm
AR06(1206)	1/8W				±0.1% ±0.05%	4.7Ω~2.5MΩ 4.7Ω~1MΩ	
AR05(0805)	1/10W	-55~+155°C	100V	200V	±1% ±0.5% ±0.25%	1Ω~2MΩ	±25ppm ±50ppm
					±0.1% ±0.05%	4.7Ω~2MΩ 4.7Ω~511KΩ	
AR03(0603)	1/16W	-55~+155°C	50V	100V	±1% ±0.5% ±0.25%	2Ω~1MΩ	±25ppm ±50ppm
					±0.1% ±0.05%	4.7Ω~1MΩ 4.7Ω~332KΩ	
AR02(0402)	1/16W	-55~+155°C	25V	50V	±1% ±0.5% ±0.25% ±0.1%	10Ω~205KΩ	±25ppm ±50ppm
AR01(0201)	1/32W	-55~+155°C	15V	30V	±1%, ±0.5%	49.9Ω~5KΩ	±25ppm ±50ppm
					±1%, ±0.5%	5KΩ~33KΩ	

Operating Voltage $V = \sqrt{(P * R)}$ or Max. Operating Voltage listed above, whichever is lower.

Overload Voltage $= 2.5 * \sqrt{(P * R)}$ or Max. Operating Voltage listed above, whichever is lower.

※ Faithfullink is capable of manufacturing the optional spec based on customer's requirement.

High Precision Chip Resistors (AR Series)

8. 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%	
AR12(2512)	1/2W	-55~+155°C	150V	300V	24.9Ω~100KΩ			±5ppm
					24.9Ω~500KΩ			±10ppm
					-	4.7Ω~1MΩ		±15ppm
AR10(2010)	1/4W	-55~+155°C	150V	300V	24.9Ω~100KΩ			±5ppm
					24.9Ω~500KΩ			±10ppm
					-	4.7Ω~1MΩ		±15ppm
AR13(1210)	1/5W	-55~+155°C	150V	300V	24.9Ω~50KΩ			±5ppm
					24.9Ω~500KΩ			±10ppm
					-	4.7Ω~1MΩ		±15ppm
AR06(1206)	1/8W	-55~+155°C	150V	300V	24.9Ω~50KΩ			±5ppm
					24.9Ω~500KΩ			±10ppm
					-	4.7Ω~1MΩ		±15ppm
AR05(0805)	1/10W	-55~+155°C	100V	200V	24.9Ω~30KΩ			±5ppm
					24.9Ω~200KΩ			±10ppm
					-	4.7Ω~511KΩ		±15ppm
AR03(0603)	1/16W	-55~+155°C	50V	100V	24.9Ω~15KΩ			±5ppm
					24.9Ω~100KΩ			±10ppm
					-	4.7Ω~332KΩ		±15ppm
AR02(0402)	1/16W	-55~+155°C	25V	50V	49.9Ω~5KΩ			±5ppm
					49.9Ω~12KΩ			±10ppm
					-	12.1KΩ~33KΩ		±15ppm

Operating Voltage $V = \sqrt{(P * R)}$ or Max. Operating Voltage listed above, whichever is lower.

Overload Voltage $= 2.5 * \sqrt{(P * R)}$ or Max. Operating Voltage listed above, whichever is lower.

High Precision Chip Resistors (AR Series)

9. 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%		
AR13(1210)	1/3W	-55~+155°C	200V	400V	24.9Ω~50KΩ					±5ppm	
					24.9Ω~500KΩ	4.7Ω~1MΩ					±10ppm ±15ppm ±25ppm ±50ppm
AR06(1206)	1/4W	-55~+155°C	200V	400V	24.9Ω~50KΩ					±5ppm	
	1/3W				24.9Ω~500KΩ	4.7Ω~1MΩ					±10ppm ±15ppm ±25ppm ±50ppm
AR05(0805)	1/8W	-55~+155°C	150V	300V	24.9Ω~30KΩ					±5ppm	
					24.9Ω~200KΩ	4.7Ω~511KΩ					±10ppm ±15ppm ±25ppm ±50ppm
	-				511KΩ~1MΩ					±15ppm ±25ppm ±50ppm	
	1/4W				-	100Ω~500KΩ					±25ppm ±50ppm
AR03(0603)	1/10W	-55~+155°C	75V	150V	24.9Ω~15KΩ					±5ppm	
	1/6W		100V		24.9Ω~100KΩ	4.7Ω~332KΩ					±10ppm ±15ppm ±25ppm ±50ppm
					-	100Ω~332KΩ					±25ppm ±50ppm

Operating Voltage $V = \sqrt{(P * R)}$ or Max. Operating Voltage listed above, whichever is lower.

Overload Voltage = $2.5 * \sqrt{(P * R)}$ or Max. Operating Voltage listed above, whichever is lower.

High Precision Chip Resistors (AR Series)

10. 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	>1000MΩ		Apply 100VDC for 1 minute
Endurance	ΔR±0.05%	ΔR±0.2%	70±2°C, Max. working voltage for 1000 hrs with 1.5hrs "ON" and 0.5hrs "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 1.5hrs "ON" and 0.5hrs "OFF"
	ΔR±0.5% for high power rating		
Bending Strength	ΔR±0.05%	ΔR±0.2%	Bending Amplitude 3mm 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 hours, -65°C, followed by 45minutes of RCWV
	ΔR±0.5% for high power rating		

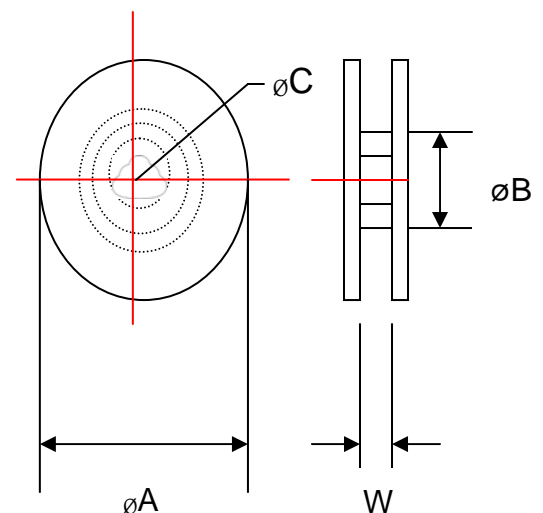
* Reference Standards: MIL-STD-202, JIS-C 5201-1

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

11. Packaging

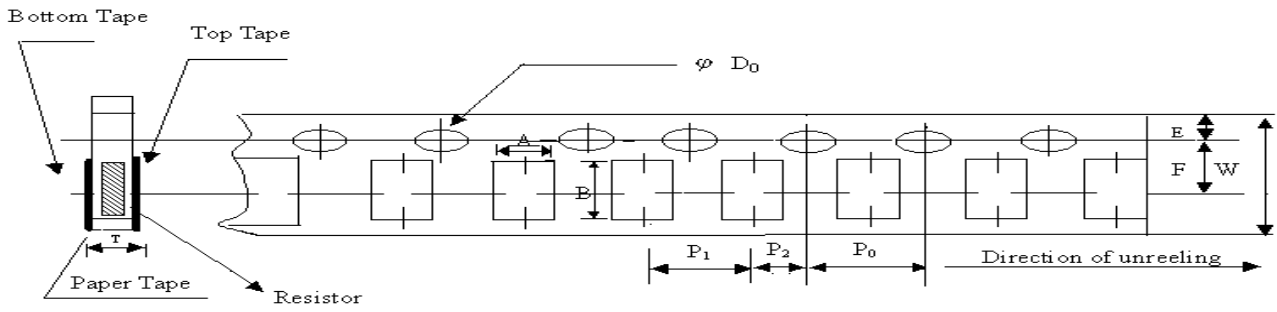
Packaging Quantity & Reel Specifications Unit: mm

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



High Precision Chip Resistors (AR Series)

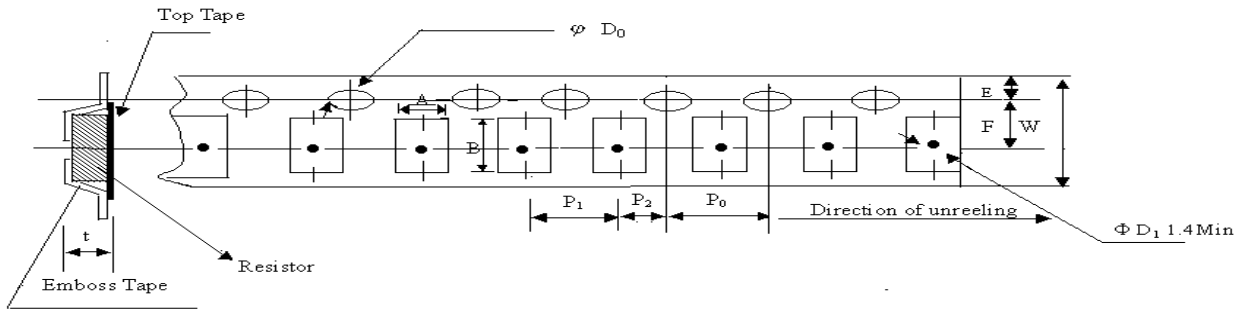
11-1. Paper Tape Specifications



Unit: mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
AR01	0.40±0.05	0.80±0.10	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
AR02	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
AR03	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
AR05	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±0.05
AR06	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±0.05
AR13	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±0.05

11-2 Embossed Plastic Tape Specifications

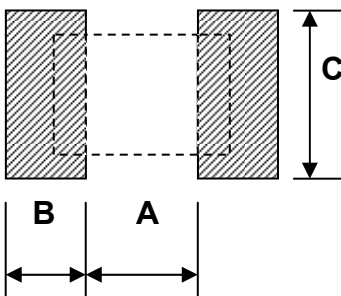


Unit: mm

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	4.0±0.05	4.0±0.10	2.0±0.05	1.5±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	4.0±0.05	4.0±0.10	2.0±0.05	1.5±0.10	1.00±0.20

11-3 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