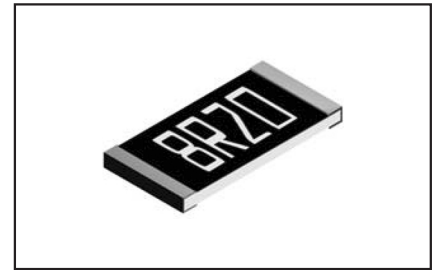


# High Precision Chip Resistors

- Thin film passivated NiCr resistor
- Very tight tolerance from  $\pm 0.01\%$ ~ $1\%$
- Extremely low TCR from  $\pm 5\sim\pm 50\text{ppm}/^\circ\text{C}$
- Wide R-value range  $1\Omega\sim 3\text{M}\Omega$



## GENERAL SPECIFICATIONS

Type	Item	Power Rating at 70°C	Operating Temperature Range	Maximum Operating Voltage	Maximum Overload Voltage	Resistance Range					TCR (ppm/°C)
						$\pm 0.05\%$	$\pm 0.1\%$	$\pm 0.25\%$	$\pm 0.5\%$	$\pm 1\%$	
AR01 (0201)	1/32W		-55°C~+155°C	15V	30V				49.9Ω~4.99KΩ		$\pm 25$
									49.9Ω~33KΩ		$\pm 50$
AR02 (0402)	1/16W			25V	50V	49.9Ω~12KΩ		100Ω~205KΩ			$\pm 25$
							10Ω~205KΩ		1Ω~205KΩ		$\pm 50$
AR03 (0603)	1/16W			50V	100V	4.7Ω~332KΩ	4.7Ω~1MΩ		2Ω~1MΩ		$\pm 25$
									1Ω~1MΩ		$\pm 50$
AR05 (0805)	1/10W			100V	200V	4.7Ω~511KΩ	4.7Ω~2MΩ		1Ω~2MΩ		$\pm 25$
										$\pm 50$	
AR06 (1206)	1/8W		150V	300V	4.7Ω~1MΩ	4.7Ω~2.49MΩ	1Ω~2.49MΩ				$\pm 25$
AR13 (1210)	1/4W										$\pm 50$
AR10 (2010)	1/4W										$\pm 25$
AR12 (2512)	1/2W		150V	300V	4.7Ω~1MΩ	4.7Ω~3MΩ	1Ω~3MΩ				$\pm 50$

Operating Voltage:  $\sqrt{P \cdot R}$  or maximum operating voltage listed above, whichever is lower

Overload Voltage:  $2.5 \cdot \sqrt{P \cdot R}$  or maximum overload voltage listed above, whichever is lower.

■ Optional specifications are also available.

■ Lower Resistance: 1~10Ω

## CHARACTERISTICS

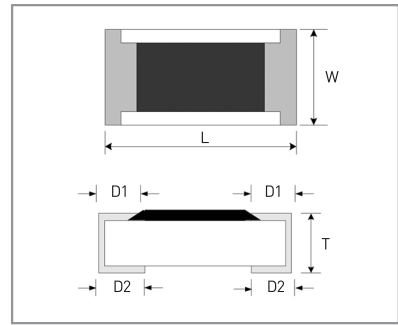
Test	Specification		Test Method
	ToL $\leq 0.05\%$	ToL $> 0.05\%$	
Temperature Coefficient	As Spec.		+25/-55/+25/+125/+25°C
Operating Temperature Range			-55°C~+155°C
Short Time Overload	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	RCW $\times 2.5$ or maximum overload voltage for 5seconds
	$\Delta R \pm 0.2\%$ for high power rating		
Dielectric Withstand Voltage	By Type		Apply maximum overload voltage for 1minute
Insulation Resistance	$> 1000\text{M}\Omega$		Apply 100VDC for 1minute
Thermal Shock	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.25\%$	-55°C~+150°C, 100Cycles
Load Life	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	70 $\pm 2^\circ\text{C}$ , Maximum Working voltage for 1000hours with 1.5hours "ON" and 0.5hours "OFF"
	$> 7\text{K}\Omega$ $\Delta R \pm 0.5\%$		
	$\Delta R \pm 0.5\%$ for high power rating		
Damp Heat with Load	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.3\%$	40 $\pm 2^\circ\text{C}$ , 90~95%, Maximum working voltage for 1000hours with 1.5hours "ON" and 0.5hours "OFF"
	$\Delta R \pm 0.5\%$ for high power rating		
Low Temperature Operation	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	1 hours, -65°C, followed by 45 minutes of RCW
	$\Delta R \pm 0.5\%$ for high power rating		
Bending Strength	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	Bending amplitude 3mm for 10seconds
Solderability	95% coverage minimum		245 $\pm 5^\circ\text{C}$ , 3seconds
Resistance to Soldering Heat	$\Delta R \pm 0.05\%$	$\Delta R \pm 0.2\%$	260 $\pm 5^\circ\text{C}$ , 10 $\pm 1$ seconds

\* Storage Temperature: 25 $\pm 3^\circ\text{C}$ , Humidity < 80% RH

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

**DIMENSIONS [mm]**

Model	Size (inch)	Dimensions [mm]				
		L	W	T	D1	D2
AR01	0201	0.58±0.05	0.29±0.05	0.23±0.05	0.21±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

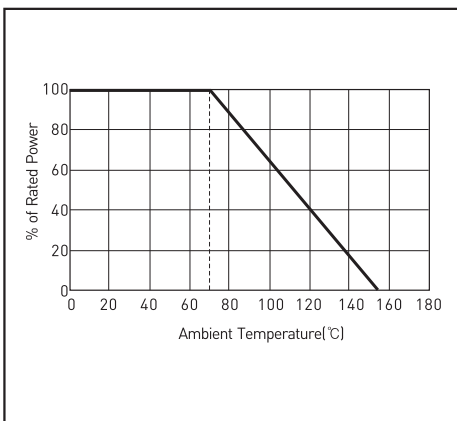


**SPECIAL SPECIFICATIONS**

Model	Power Rating At 70°C	Operating Temp. Range	Max Operating Voltage	Max Overloading Voltage	Resistance Range			TCR (ppm/°C)
					±0.01%	±0.05%	±0.1%	
AR02 (0402)	1/16W		25V	50V	49.9Ω~4.99KΩ			±5
					49.9Ω~12KΩ			±10
					49.9Ω~12KΩ	49.9Ω~69.8KΩ	±15	
AR03 (0603)	1/16W		50V	100V	24.9Ω~15KΩ			±5
					24.9Ω~100KΩ	4.7Ω~332KΩ		±10, ±15
AR05 (0805)	1/10W		100V	200V	24.9Ω~30KΩ			±5
					24.9Ω~200KΩ	4.7Ω~411KΩ		±10, ±15
AR06 (1206)	1/8W	-55°C ~ +155°C	150V	300V	24.9Ω~49.9KΩ			±5
					24.9Ω~499KΩ	4.7Ω~1MΩ		±10, ±15
AR13 (1210)	1/4W		150V	300V	24.9Ω~49.9KΩ			±5
					24.9Ω~499KΩ	4.7Ω~1MΩ		±10, ±15
AR10 (2010)	1/4W		150V	300V	24.9Ω~100KΩ			±5
					24.9Ω~499KΩ	4.7Ω~1MΩ		±10, ±15
AR12 (2512)	1/2W		150V	300V	24.9Ω~100KΩ			±5
					24.9Ω~499KΩ	4.7Ω~1MΩ		±10, ±15

Operating Voltage:  $\sqrt{P \cdot R}$  or maximum operating voltage listed above, whichever is lower  
 Overload Voltage:  $2.5 \cdot \sqrt{P \cdot R}$  or maximum overload voltage listed above, whichever is lower.

**DERATING CURVE**



**ORDERING PROCEDURE EXAMPLE**

**AR 12**   **C**   **T**   **N**   **T**   **1001**   **N**

↓   ↓   ↓   ↓   ↓   ↓   ↓

**Model #**  
 AR01: 0201  
 AR02: 0420  
 AR03: 0603  
 AR05: 0805  
 AR06: 1206  
 AR13: 1210  
 AR10: 2010  
 AR12: 2512

**Resistance Tolerance**  
 T: ±0.01%  
 A: ±0.05%  
 B: ±0.10%  
 C: ±0.25%  
 D: ±0.50%  
 F: ±1.0%

**Packaging**  
 T: Taping Reel  
 B: Bulk

**Power Rating None=Standard/Special**  
 T: 1W  
 Q: 3/4W  
 U: 1/2W  
 O: 1/3W  
 V: 1/4W  
 P: 1/5W  
 M: 1/6W  
 W: 1/8W  
 X: 1/10W  
 Y: 1/16W

**TCR**  
 S: ±5ppm/°C  
 B: ±10ppm/°C  
 N: ±15ppm/°C  
 C: ±25ppm/°C  
 D: ±50ppm/°C

**Resistance**  
 0010: 1Ω  
 4R70: 4.7Ω  
 1001: 1KΩ  
 1004: 1MΩ

**Marking**  
 None=Standard Marking for E96/E24  
 N: No Marking

**RECOMMENDED LAND PATTERN [mm]**

Model	Dimension [mm]		
	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
AR10	3.60	1.40	2.50±0.2
AR12	4.90	1.60	3.10±0.2
AR13	2.00	1.15	2.56±0.2

