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(AH)

# Power Precision Heat Sinkable Resistors

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## ▶ Product Introduction

### Outstanding Heat sink Aluminum Housed Wire wound Power Resistors (AH)

Token Electronics aluminum chassis mount units are designed for maximum heat dissipation mounting solidly to metal chassis surface for maximum heat transfer. AH series are outstanding for their high power dissipation with precision tolerances in minimum physical sizes.

Lower hot spot ratings due to exclusive complete encapsulation of element within anodized aluminum body. AH series high-performance welded construction throughout assures long stable load life with threaded heavy stud axial-terminals.



The AH Series is RoHS compliant and lead free. For non-standard technical requirements and custom special applications, please contact us to discuss the details, or link to Token official website "[High Power Resistors](http://www.token.com.tw)" to get more information.

#### Materials:

- Encapsulant: S: Silicone, C: Cement; End caps: Stainless steel.
- Core: Ceramic steatite or alumina.
- Housing: Aluminum with hard anodic coating.
- Element: Copper-nickel alloy, nickel-chrome alloy or manganese copper.
- Standard Terminals: 5~50 W Tinned terminals, 100~250 W Threaded terminals.

#### General Specification:

- Operating Temperature Range:  $-55^{\circ}\text{C}$  to  $+275^{\circ}\text{C}$ .
- Resistance Tolerance:  $\pm 10\%$ ,  $\pm 5\%$ ,  $\pm 1\%$ ,  $\pm 0.5\%$ ,  $\pm 0.25\%$ ,  $\pm 0.1\%$ ,  $\pm 0.05\%$
- Wattage Range: 6 styles to choose ranging from 5 to 250 watts.

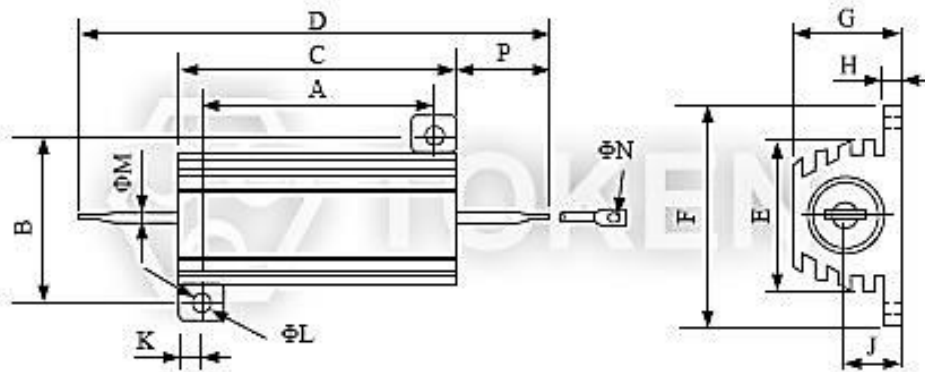
#### Non-Inductive & Features:

- Ayrton Perry type non-inductive winding is available. When required add "N" to the part number.
- Standard winding & non-inductive winding available. High power rating, strong construction, small size, and ultra precision.
- Aluminum housing allows chassis mounting and provides heat sink capability.

## ► Dimensions

### Heat Sinkable Dimensions (AH 5W ~ 50W)

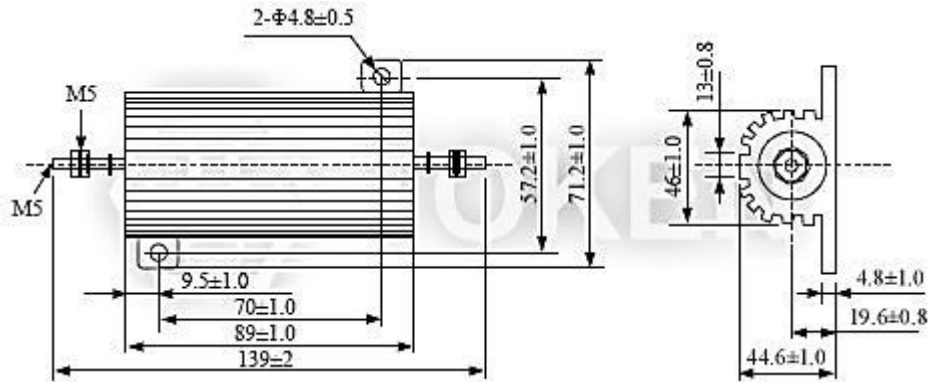
Type	Dimensions (Unit: mm)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
	± 1.0	± 1.0	± 1.0	± 2.0	± 1.0	± 1.0	± 1.0	± 0.8	± 1.0	± 0.8	± 0.5	± 0.5	± 0.2	± 0.8
AH-5	11.2	12.5	15.2	28.6	8.5	16.4	8.1	1.7	3.8	2	2.4	1.5	1.3	6.7
AH-5N	11.2	12.5	15.2	28.6	8.5	16.4	8.1	1.7	3.8	2	2.4	1.5	1.3	6.7
AH-10	14.2	15.9	19	34.9	10.7	20.3	9.9	1.9	4.2	2.4	2.4	2	2.2	7.95
AH-10N	14.2	15.9	19	34.9	10.7	20.3	9.9	1.9	4.2	2.4	2.4	2	2.2	7.95
AH-25	18.2	19.8	27	49.2	14	27.4	13.9	1.9	5.9	4.4	3.2	1	2.2	11.1
AH-25N	18.2	19.8	27	49.2	14	27.4	13.9	1.9	5.9	4.4	3.2	1	2.2	11.1
AH-50	40	21.4	50	70.6	16	29	15.5	2.2	6.6	5	3.2	2	2.2	10.3
AH-50N	40	21.4	50	70.6	16	29	15.5	2.2	6.6	5	3.2	2	2.2	10.3



Heat Sinkable Dimensions (AH 5W ~ 50W)

- Note: The "N" for end of type name is Non-inductive winding.
- Token's AH resistor wattage ratings are based on mounting to the following heat sink:
  - AH-5W/10W: aluminum chassis area is 832 cm<sup>2</sup> × 1.0 mm thick or equiv.
  - AH-25W: aluminum chassis area is 1077 cm<sup>2</sup> × 1.0 mm thick or equiv.
  - AH-50W: aluminum chassis area is 1877 cm<sup>2</sup> × 1.5 mm thick or equiv.
  - AH-100W: aluminum chassis area is 1896 cm<sup>2</sup> × 3.2 mm thick or equiv.
  - AH-250W: aluminum chassis area is 5780 cm<sup>2</sup> × 3.2 mm thick or equiv.

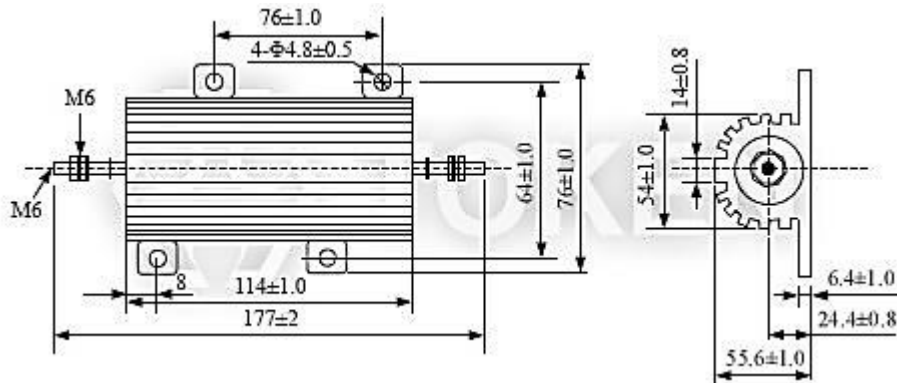
## Heat Sinkable Dimensions (AH 100W)



Heat Sinkable Dimensions (AH-100, AH-100N)

- Note: The "N" for end of type name is Non-inductive winding.

## Heat Sinkable Dimensions (AH 250W)



Heat Sinkable Dimensions (AH-250, AH-250N)

- Note: The "N" for end of type name is Non-inductive winding.

## ► AHS Electrical Spec.

### Silicone Filler Electrical Specification (AHS)

Type	MIL Type	25°C Rated Power (W)		Resistance Tolerance (± %)	Resistance Range (Ω)	Temperature Coefficient (±PPM/°C)
		Industry	Military			
AHS-5	RE60G	5	5	0.1, 0.25, 0.5	10~1K	25
				0.5, 1	1.0~3.32K	25, 50
				5, 10	0.1~3.32K	100, 250
				10	0.01~3.32K	100, 250
AHS-5N	RE60N	5	5	1, 5	10~200	25, 50
				5	1.0~860	100
				5, 10	0.1~860	100, 250
				10	0.01~1K	100, 250
AHS-10	RE65G	10	10	0.1, 0.25, 0.5	10~1.2K	25, 50
				0.5, 1	1.0~2.7K	50, 100
				5, 10	0.1~2.7K	100, 250
				10	0.01~5.62K	100, 250
AHS-10N	RE65N	10	10	1, 5	10~860	25, 50
				5	1.0~1.2K	100
				5, 10	0.1~1.2K	100, 250
				10	0.01~1.5K	100, 250
AHS-25	RE70G	25	20	0.1, 0.25, 0.5	10~2.7K	25, 50
				0.5, 1	1.0~3.9K	50, 100
				5, 10	0.1~3.9K	100, 250
				10	0.01~12.1K	100, 250
AHS-25N	RE70N	25	20	1, 5	10~1.2K	25, 50
				5	1.0~2.7K	100
				5, 10	0.1~2.7K	100, 250
				10	0.01~6.04K	100, 250
AHS-50	RE75G	50	30	0.1, 0.25, 0.5	10~3.9K	25, 50
				0.5, 1	1.0~5.6K	50, 100
				5, 10	0.1~5.6K	100, 250
				10	0.01~39.2K	100, 250
AHS-50N	RE75N	50	30	1, 5	10~2.7K	25, 50
				5	1.0~3.9K	100
				5, 10	0.1~3.9K	100, 250
				10	0.01~19.6K	100, 250
AHS-100	RE77G	100	75	0.1, 0.25, 0.5	10~5.6K	25, 50
				0.5, 1	1.0~8.2K	50, 100
				5, 10	0.1~12K	100, 250
				10	0.01~29.4K	100, 250
AHS-100N	RE77N	100	75	1, 5	10~3.9K	25, 50
				5	1.0~5.6K	100
				5, 10	0.1~5.6K	100, 250
				10	0.01~14.7K	100, 250
AHS-250	RE80G	250	120	0.1, 0.25, 0.5	10~12K	25, 50
				0.5, 1	1.0~27K	50, 100
				5, 10	0.1~27K	100, 250
				10	0.01~35.7K	100, 250
AHS-250N	RE80N	250	120	1, 5	10~5.6K	25, 50
				5	1.0~8.2K	100
				5, 10	0.1~8.2K	100, 250
				10	0.01~17.4K	100, 250

● Note: All values might be changed or modified, please consult factory for details.

## ▶ AHC Electrical Spec.

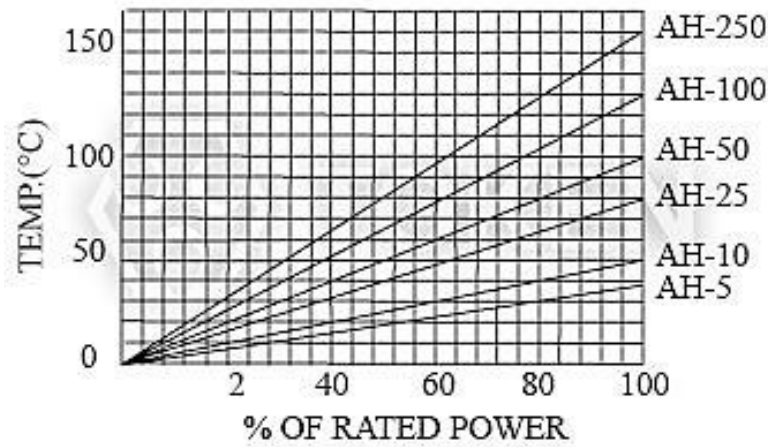
### Cement Filler Electrical Specification (AHC)

Type	25°C Rated Power (W)	Resistance Tolerance (± %)	Resistance Range (Ω)	Temperature Coefficient (±PPM/°C)
AHC-5	5	0.1, 0.25, 0.5	10~1K	25
		0.5, 1	1.0~3.32K	25, 50
		5, 10	0.1~3.32K	100, 250
		10	0.01~3.32K	100, 250
AHC-5N	5	1, 5	10~200	25, 50
		5	1.0~860	100
		5, 10	0.1~860	100, 250
		10	0.01~1K	100, 250
AHC-10	10	0.1, 0.25, 0.5	10~1.2K	25, 50
		0.5, 1	1.0~2.7K	50, 100
		5, 10	0.1~2.7K	100, 250
		10	0.01~5.62K	100, 250
AHC-10N	10	1, 5	10~860	25, 50
		5	1.0~1.2K	100
		5, 10	0.1~1.2K	100, 250
		10	0.01~1.5K	100, 250
AHC-25	25	0.1, 0.25, 0.5	10~2.7K	25, 50
		0.5, 1	1.0~3.9K	50, 100
		5, 10	0.1~3.9K	100, 250
		10	0.01~12.1K	100, 250
AHC-25N	25	1, 5	10~1.2K	25, 50
		5	1.0~2.7K	100
		5, 10	0.1~2.7K	100, 250
		10	0.01~6.04K	100, 250
AHC-50	50	0.1, 0.25, 0.5	10~3.9K	25, 50
		0.5, 1	1.0~5.6K	50, 100
		5, 10	0.1~5.6K	100, 250
		10	0.01~39.2K	100, 250
AHC-50N	50	1, 5	10~2.7K	25, 50
		5	1.0~3.9K	100
		5, 10	0.1~3.9K	100, 250
		10	0.01~19.6K	100, 250
AHC-100	100	0.1, 0.25, 0.5	10~5.6K	25, 50
		0.5, 1	1.0~8.2K	50, 100
		5, 10	0.1~12K	100, 250
		10	0.01~29.4K	100, 250
AHC-100N	100	1, 5	10~3.9K	25, 50
		5	1.0~5.6K	100
		5, 10	0.1~5.6K	100, 250
		10	0.01~14.7K	100, 250
AHC-250	250	0.1, 0.25, 0.5	10~12K	25, 50
		0.5, 1	1.0~27K	50, 100
		5, 10	0.1~27K	100, 250
		10	0.01~35.7K	100, 250
AHC-250N	250	1, 5	10~5.6K	25, 50
		5	1.0~8.2K	100
		5, 10	0.1~8.2K	100, 250
		10	0.01~17.4K	100, 250

● Note: All values might be changed or modified, please consult factory for details.

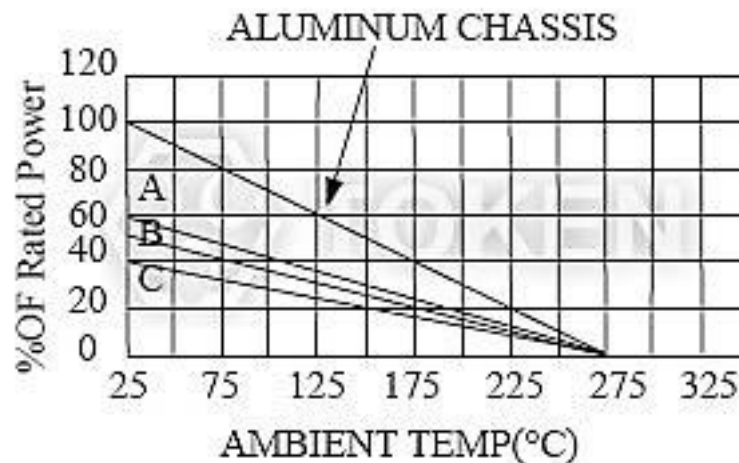
## Heat-Sink & Derating Curve

### Surface Temperature Versus Power Load (Mounted on heat-sink chassis) (AH)



(AH) Surface Temperature Versus Power Load

### Ambient Temperature Derating (AH)



(AH) Ambient Temperature Derating

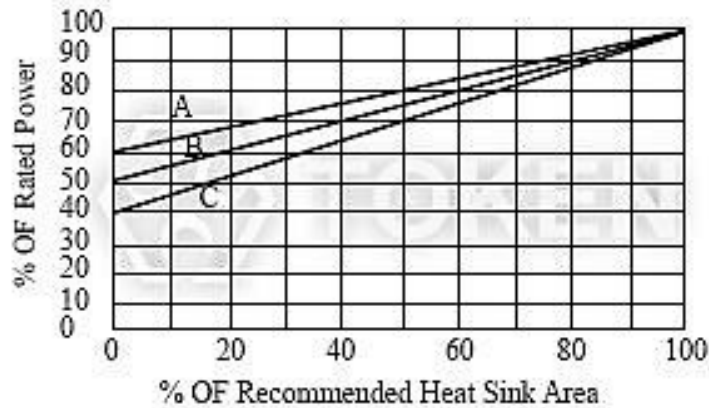
Derating is required for ambient temperatures above 25°C, see the graph.

Curve Aluminum Chassis applies to all types when mounted to specified heat sink.

Curves A, B, C applies to operation of unmounted resistors.

- Curves A: AH 5 and 10 watt unites, unmounted.
- Curves B: AH 25 watt units, unmounted.
- Curves C: AH 50, 100 and 250 watt units, unmounted.

## Reduced Heat Sink Derating (AH)



(AH) Reduced Heat Sink Derating

Derating is also required when recommended heat sink area is reduced.

- Curves A: AH-5 and AH-10 size resistor.
- Curves B: AH-25 size resistor.
- Curves C: AH-50, AH-100 and AH-250 size resistor.

## Test Conditions

### Test Conditions (AH)

Parameters	Test Conditions	Specifications
<b>Vibration</b>	10~50~10Hz/Min -X- Y- Z Axis 2 Hours each.	$\Delta R \pm (0.2\% + 0.05\Omega)$ Max.
<b>Load Life</b>	Load Rating (chassis mounted) 25°C (1.5 Hour on 0.5 Hour OFF) Repeat 1000 Hours	$\Delta R \pm (5\% + 0.05\Omega)$ Max.
<b>Terminal Strength</b>	(1) Pull Test (30 sec Min) AH-5 1kg, AH-10 2.3kg, AH-25, AH-50 4.5kg (2) Torque Test (5~15sec) AH-100 27kg-cm, AH-250 36kg-cm	$\Delta R \pm (0.2\% + 0.05\Omega)$ Max.
<b>Dielectric Strength</b>	AHS-5 AHS-10 AHS-25 1000V AHS-50 2000V AHS-100 AHS-250 3000V AHC-5 AHC-10 AHC-25 1000V AHC-50 1500V AHC-100 AHC-250 2500V	$\Delta R \pm (0.5\% + 0.05\Omega)$ Max.
<b>Insulation Resistance</b>	Under the same test condition of Dielectric Strength, Load DC500V and measure the Insulation R.	1000 M $\Omega$ Min.
<b>Moisture Resistance</b>	Temp 40°C moisture 95% DC 100V 100Hr	$\Delta R \pm (5\% + 0.05\Omega)$ Max.
<b>Short Time Over Load</b>	5 × wattage rating-5sec.	$\Delta R \pm (2\% + 0.05\Omega)$ Max.



## Order Codes

### Order Codes (AH)

AH	S	10	20Ω	D			
Part Number	Encapsulant	Rated Power (W)		Resistance Value (Ω)		Resistance Tolerance (%)	
	S: Silicone	10	10W	R51	0.51Ω	A5	±0.05%
	C: Cement	10N	10W	5R1	5.1Ω	B	±0.10%
		250	250W	51R	51Ω	C	±0.25%
		250N	250W	510R	510Ω	D	±0.5%
		N	Non-Inductive	5K1	5.1KΩ	F	±1%
						J	±5%
						K	±10%

## ► General Information

### Benefits & Features

Providing design engineers with an economical resistor with high quality performance, Token Electronics offers industry grade power wire wound devices.

Token provide terminal blocks, thermal switches, fusing, fans, junction boxes, screened or solid bottom plates, conduit knockouts, and customer specified requirements. For large applications a welded frame construction is utilized to provide a robust design for power resistor mounting in both indoor and outdoor environments.

Products range from large capacity metal clad, nonflammable fixed and adjustable, wave ribbon wire-wound, slide, starter, box type, to nonflammable flat type. Token extends a complete line for both military and commercial applications.

### Utilization Notes

1. Smoke emitted from non-flammable resistors on initial use in powered circuits is a normal phenomenon and the component can be safely utilized.
2. All resistors manufactured by Token Electronics Industry Corporation comply with the U.S. UL-94 non-flammability test, Class V-0, a continuous combustion period of zero seconds.
3. Never use organic solvents to clean non-flammable resistors.
4. Non-flammable resistors cannot be utilized in oil.
5. Non-flammable resistors cannot be used in high frequency machinery because of the inductance produced by the windings. A suitable type of resistor must be selected. Contact us for details.
6. In applications where resistors are subject to intermittent current surges and spikes, be sure in advance that the components selected are capable of withstanding brief durations of increased load.
7. Do not exceed the recommended usable load. Resistors must use within the rated voltage range to prevent the shortening of service life and/or failure of the wound resistance elements.
8. Minimum load. Resistors must be utilized at 1/10 or more of the rated voltage to prevent poor conductance due to oxidation build-up.
9. Although the hardness exceeds that of a 3H pencil lead, do not nick the resistor coating with screw drivers or other pointed objects.
10. Avoid touching non-flammable resistors in operation; the surface temperature ranges from approximately 350°C ~ 400°C when utilized at the full rated value. Maintaining a surface temperature of 200°C or less will extend resistor service life.
11. Keep temperature from rising by choosing a resistor with a higher rated capacity; do not use a component having the exact load value required. For considerations of safety in extended period applications, the resistor rating should be more than four times higher than the actual wattage involved, but never use a resistor at less than 25% of its rated power.
12. Application and Placement: Wire-wound resistors use different gauges of wire as resistance elements. Sometimes the gauge is extremely thin (finer than a strand of human hair) and very susceptible to breakage in environments containing salts, ash, dust and corrosives. Avoid utilization in such environments. Do not install in dusty areas because the accumulation will cause shorts and poor conductance.

