

Data Sheet No: E01025

Version: V0

Date: 2024/10/09



# ARCS8518-L250

## Automotive-Grade Precision Mn-Cu Alloy Shunt



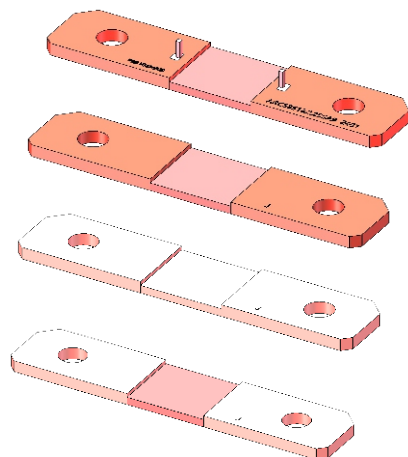
<b>Resistance</b>	<b>250<math>\mu\Omega</math></b>
<b>Tolerance</b>	<b><math>\pm 0.5\%</math></b>
<b>Rated Power</b>	<b>25W</b>
<b>Rated Current</b>	<b>316A</b>

### Applications

Automotive Electronics  
Industrial Control  
Energy Storage Equipment  
Testing & Measurement  
Electrical Equipment

**Better Solution for Sustainable  
High End Manufacturing**

### Electron Beam Welded Shunt, High Reliability & Stability High Power, Low Thermal EMF, Low Inductance



#### Introduction

The ARCS series which targets automotive market can cover from hundreds to thousands of amperes. Due to special alloy materials, ARCS series has good long-term stability and can withstand pulse currents that are higher than the rated current several times.

Shunt resistance value and surface temperature will keep changing when loaded. The factors that cause the change in resistance include TCR and dimensional change caused by thermal expansion, etc. Shunt resistance tends to be stable when self-heating and heat dissipation reach dynamic balance, but high current coefficient will cause the change of shunt resistance greater than nominal tolerance. The special heat treatment process of the ARCS series make it a low current coefficient with very good compensation characteristics.

Because there is always a distance between the voltage sampling point and the resistor heating center, temperature difference is appeared, so a lower thermal EMF is particularly important. The ARCS series has thermal EMF of less than 0.5μV/°C to copper, and has little effect on the voltage output of the millivolt level. The flat structure of the ARCS series makes the inductance less than 3nH, which also performs perfect at high frequency applications.



#### Electrical Parameters

Size	Structure	Rated Power (+70°C)	Max. Operating Current	Operating Temperature	TCR ppm/°C(+20°CRef)	Thermal <sup>[1]</sup> Resistance	Resistance	Tolerance %	Weight g
ARCS8518	PIN	25W	316A	-55°C~+170°C	±150(-55°C~+20°C) ±100(+20°C~+170°C)	3.8°C/W	250μΩ	±0.5 ±1.0 ±5.0	35±5
ARCS8518	Standard	25W	316A	-55°C~+170°C	±150(-55°C~+20°C) ±100(+20°C~+170°C)	3.8°C/W	250μΩ	±0.5 ±1.0 ±5.0	35±5
ARCS8518	Standard- Overall Nickel Plating	25W	316A	-55°C~+170°C	±200(-55°C~+20°C) ±150(+20°C~+170°C)	3.8°C/W	250μΩ	±0.5 ±1.0 ±5.0	35±5
ARCS8518	Standard- Nickel Plated Terminal	25W	316A	-55°C~+170°C	±150(-55°C~+20°C) ±100(+20°C~+170°C)	3.8°C/W	250μΩ	±0.5 ±1.0 ±5.0	35±5

1. Thermal Resistance: Refer to the internal thermal resistance between the center of the resistive alloy and the copper electrode. As the heat dissipation efficiency is influenced by operating environment, copper bus bars, PCB design, etc., this parameter is only for reference.

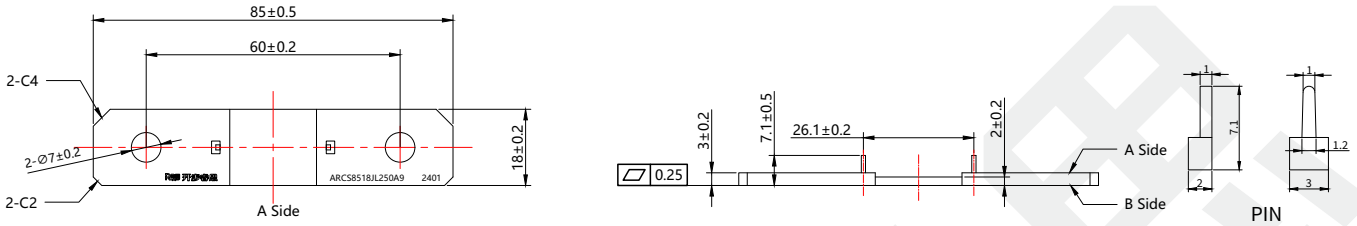
#### Applications

Battery Management System, Current Sensing of Power Electronic Device, Frequency Converter, UPS, Motor Control, and Electronic Load Equipment.

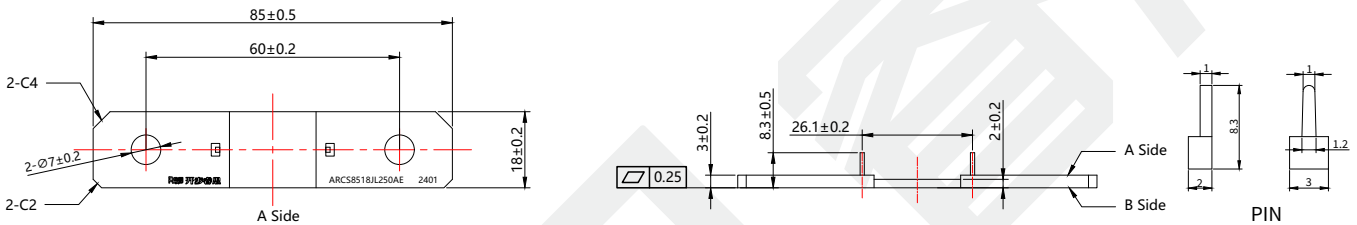
### Dimensions

Unit:mm

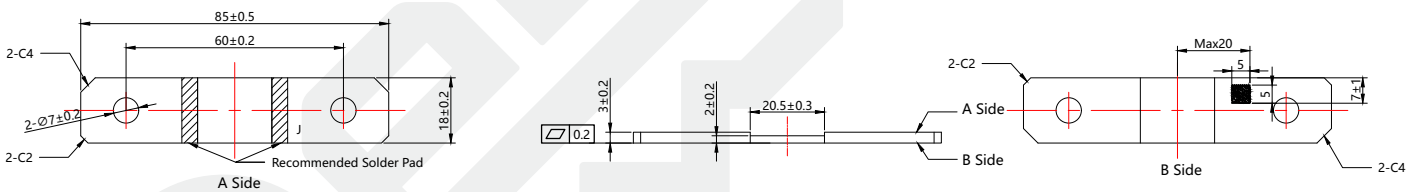
#### PIN-A9



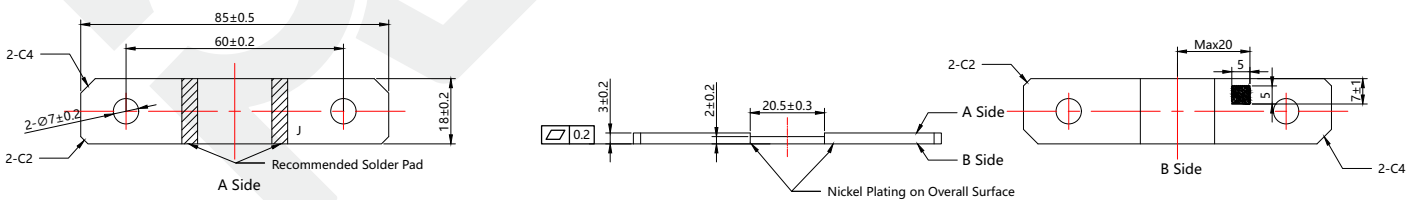
#### PIN-AE



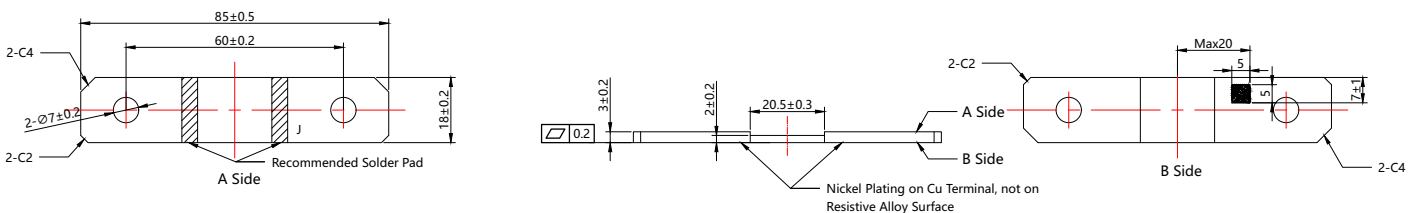
#### Standard



#### Standard-Overall Nickel Plating

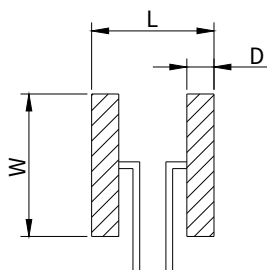


#### Standard-Nickel Plated Terminal



### Land Pattern

Unit:mm



L	D	W
29.2	4	19

Not following the recommended land pattern design can seriously affect the temperature coefficient measurement results and current sensing accuracy!

### Part Number Information

Example: ARCS8518DL250A9 (ARCS 8518  $\pm 0.5\%$  250 $\mu\Omega$  pin)

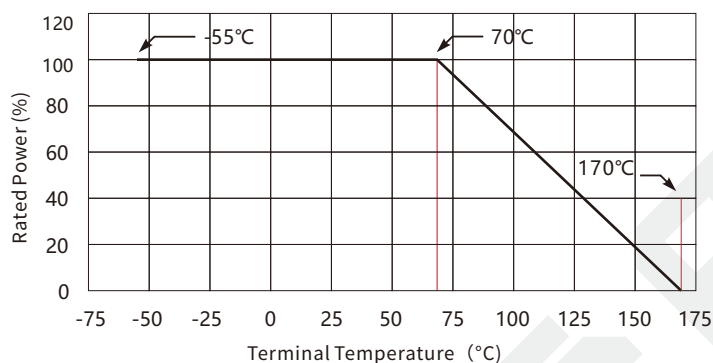
Series	Size	Tolerance	Resistance	Structure	Code
ARCS	8518	D= $\pm 0.5\%$ F= $\pm 1.0\%$ J= $\pm 5.0\%$	L250=250 $\mu\Omega$	A=PIN S=Standard	9=Standard 4=Nickel Plated Terminal N=Overall Nickel Plating E=Overall Height 8.3mm

For higher/lower resistance, tighter tolerance, higher power, lower TCR and larger size, please contact us.

### Performance

Test	Test Method	Standards	Test Limits
Thermal Shock	-55°C, 15min ~ +150°C, 15min, 1000 cycles	MIL-STD-202 Method 107	$\Delta R \leq \pm 0.5\%$
Short Time Overload	5x rated power, 5s	IEC 60115-1 4.13	$\Delta R \leq \pm 0.5\%$
Low Temperature Storage	-55°C for 24h, unpowered	IEC 60115-1 4.36	$\Delta R \leq \pm 0.5\%$
Bias Humidity	+85°C, 85%RH, powered no less than 10% rated power for 1000h	MIL-STD-202 Method 103B	$\Delta R \leq \pm 0.5\%$
High Temperature Storage	1000h@+170°C, unpowered	MIL-STD-202 Method 108	$\Delta R \leq \pm 1.0\%$
Mechanical Shock	Half Sine Wave, peak acceleration 100g, pulse duration 6ms, 3 times in each of directions, on three different axes, total 18 times shock	MIL-STD-202 Method 213	$\Delta R \leq \pm 0.5\%$
Vibration	10-2k Hz, 5g's, 20min/cycle, 12 cycles in each directions of XYZ	MIL-STD-202 Method 204	$\Delta R \leq \pm 0.5\%$
Load Life	1000h @ +70°C, rated current, 90min on, 30min off +70°C refers to copper busbar. Please use prescriptive busbar	MIL-STD-202 Method 108	$\Delta R \leq \pm 1.0\%$
Resistance to Solder Heat	+260°C tin bath for 10s	MIL-STD-202G Method 210	$\Delta R \leq \pm 0.5\%$
TCR	-55°C and +170°C, +20°C Ref.	MIL-STD-202G Method 304	See Electrical Parameters

### Derating Curve



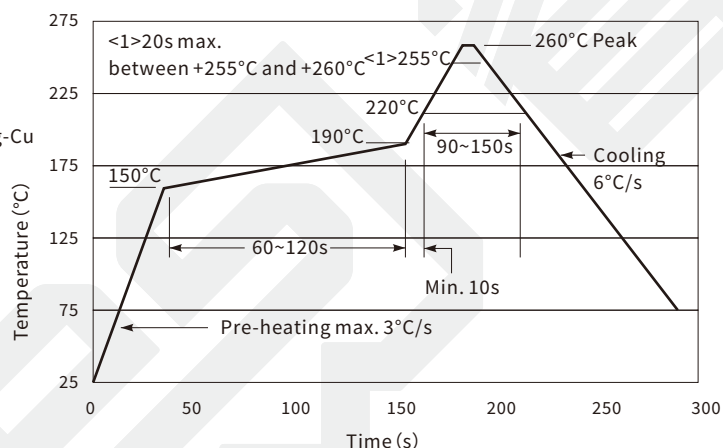
### Reflow Soldering Profile

Resistor Surface Temperature:

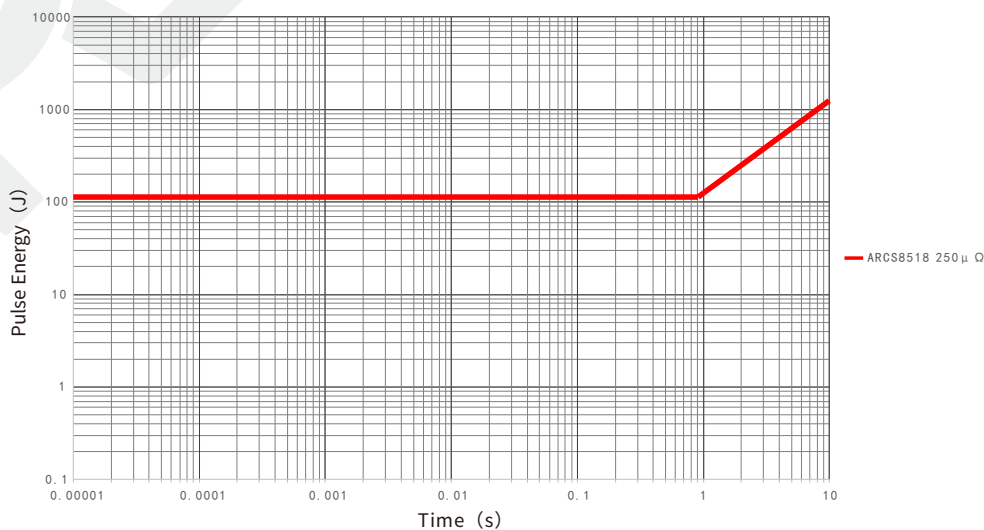
Pre-Heat: +150°C~+190°C, 60~120sec.

Reflow: Above +220°C, 90~150sec.

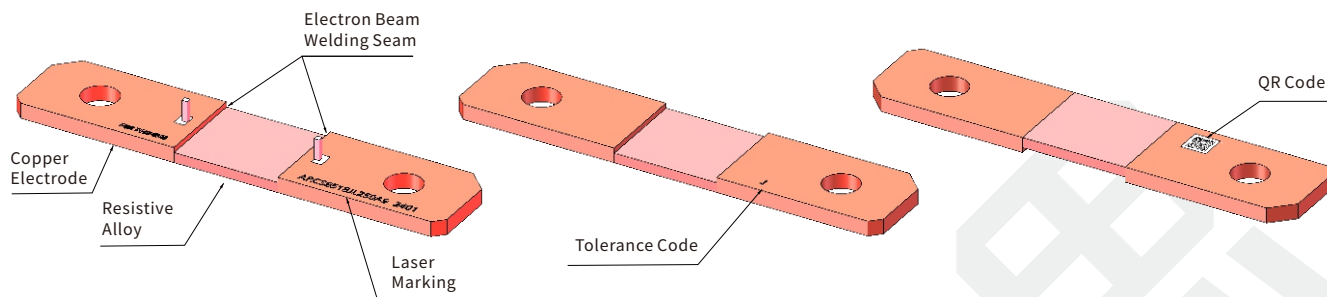
Applicable Solder Composition: Sn-Ag-Cu



### Maximum Pulse Energy Curve



### Construction



### Marking

The marking on the surface of PIN type: Brand+Part Number+Date Code

Size	Illustration	Demonstration
8518		RES 睿思 : Brand ARCS8518DL250A9: Part Number 2401: Date Code

The marking on the surface of standard type: Resistance Tolerance Code+QR Code

Size	Illustration	Demonstration
8518		QR Code: (27 characters in total, including a space) ARCS8518DL250S9 AL23H13P001 Part Number      Traceability Number J: Tolerance Code

### Storage Instructions

- (1) Resistors should be stored at a temperature of 5 to 35°C, with a humidity of <60% RH. The humidity should be kept as low as possible.
- (2) Resistors should be protected from direct sunlight.
- (3) Resistors should be stored in a clean and dry environment free of harmful gases (HCl, Sulfuric acid, H<sub>2</sub>S, etc.)
- (4) Do not move the resistor from the packaging unless use it.
- (5) Under the above storage conditions, the resistor can be stored for at least 1 year.

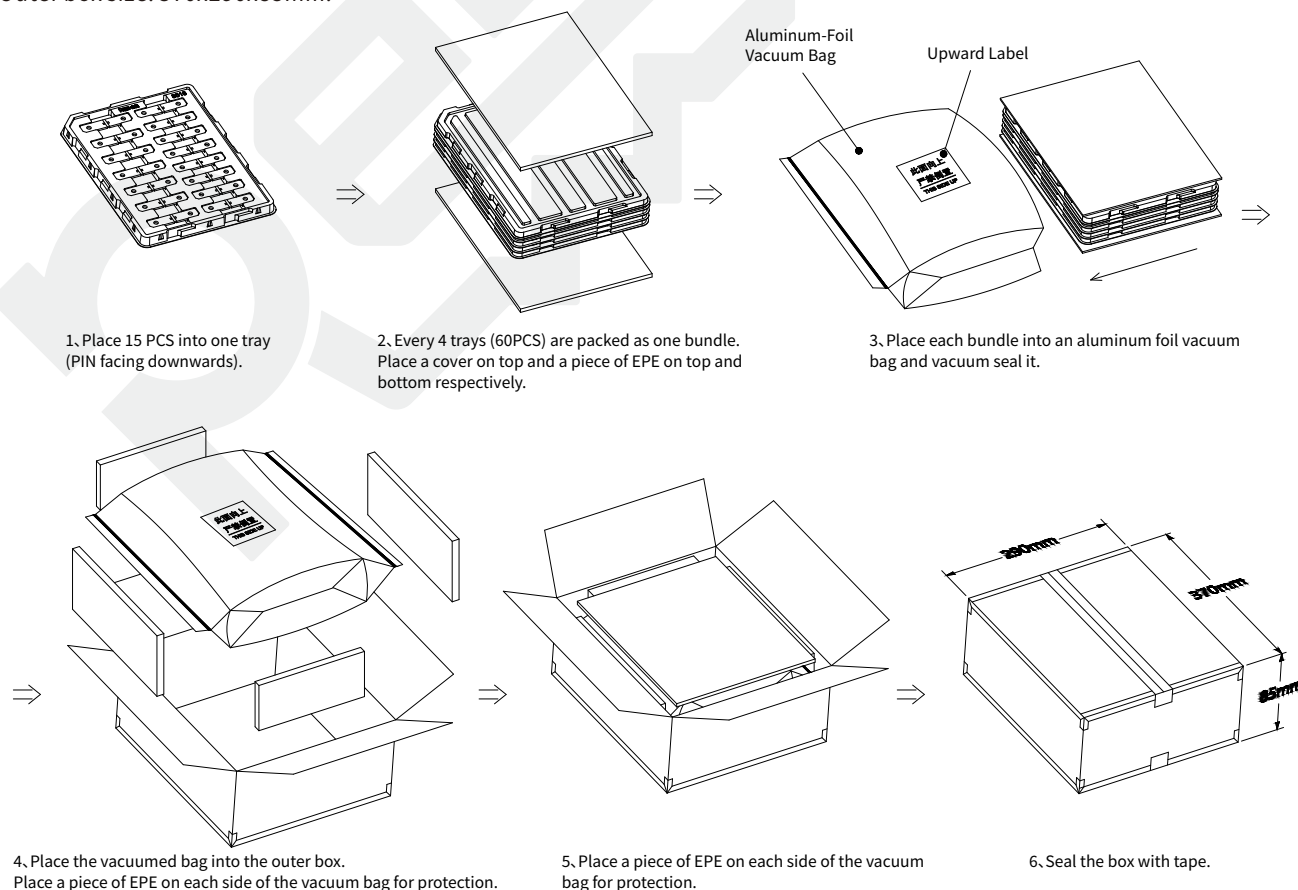
### Usage Suggestions

- (1) Please protect the surface of the resistor during use. Prevent defects such as scratches, bumps, and oil stains on the surface.
- (2) When installing and using resistors, avoid the impact of mechanical stress on the resistor.
- (3) The long-term operating power of resistors should not be larger than the rated power to avoid resistance drift caused by long-term overload.
- (4) Please refer to the derating curve when operating under high temperature conditions or poor heat dissipation environment.
- (5) If the operating conditions exceed the pulse specified in the pulse curve, a systematic evaluation is required.
- (6) If the resistor is not used after being moved from the packaging, it should be stored under vacuum to avoid risks such as poor solderability caused by oxidation of the resistor.
- (7) Suggested installation torque: no less than 10 N·m for M6 bolt.
- (8) To ensure that the temperature rise of the shunt is within the standard range, the recommended copper busbar sizes for the shunt under different test currents are shown in the table below:

Test Current	100A	200A	300A	500A	750A	1000A	1500A
Busbar Size WxT (mm)	20x2	20x3	20x6	50x4	80x4	100x4	100x7

### Packaging

- (1) Place 15 PCS into one vacuum formed tray (If PIN type, the PIN facing downwards).
- (2) Every 4 trays (60PCS) are packed as one bundle.
- (3) Place each bundle into an aluminum foil vacuum bag and vacuum seal it.
- (4) Outer box size: 370x290x85mm.



### Popular Part Numbers

Part Number	Size	Tolerance	Resistance	TCR	Power	Max. Operating Current
ARCS8518DL250A9	8518	±0.5%	250μΩ	±150ppm/°C	25W	316A
ARCS8518FL250A9	8518	±1.0%	250μΩ	±150ppm/°C	25W	316A
ARCS8518JL250A9	8518	±5.0%	250μΩ	±150ppm/°C	25W	316A
ARCS8518DL250AE	8518	±0.5%	250μΩ	±150ppm/°C	25W	316A
ARCS8518FL250AE	8518	±1.0%	250μΩ	±150ppm/°C	25W	316A
ARCS8518JL250AE	8518	±5.0%	250μΩ	±150ppm/°C	25W	316A
ARCS8518DL250S9	8518	±0.5%	250μΩ	±150ppm/°C	25W	316A
ARCS8518FL250S9	8518	±1.0%	250μΩ	±150ppm/°C	25W	316A
ARCS8518JL250S9	8518	±5.0%	250μΩ	±150ppm/°C	25W	316A
ARCS8518DL250SN	8518	±0.5%	250μΩ	±200ppm/°C	25W	316A
ARCS8518FL250SN	8518	±1.0%	250μΩ	±200ppm/°C	25W	316A
ARCS8518JL250SN	8518	±5.0%	250μΩ	±200ppm/°C	25W	316A
ARCS8518DL250S4	8518	±0.5%	250μΩ	±150ppm/°C	25W	316A
ARCS8518FL250S4	8518	±1.0%	250μΩ	±150ppm/°C	25W	316A
ARCS8518JL250S4	8518	±5.0%	250μΩ	±150ppm/°C	25W	316A



### Revision

Version	Revised Content	Date	Approver
V0	Initial Issue	2024.10.09	LWW

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