DataSheet No.: E18013

Version: V6

Date: 2025/05/15

睿思

RTBS0050

High Precision High Current Alloy Shunt

Resistance	**1.0mΩ~2.0mΩ**
Tolerance	**±0.1%**
Rated Current	**50A**
Output Voltage	**50mV~100mV**



Applications

Automotive Electronics

Testing & Measurement

Engineering Machinery

Power Equipment

Energy Storage Equipment

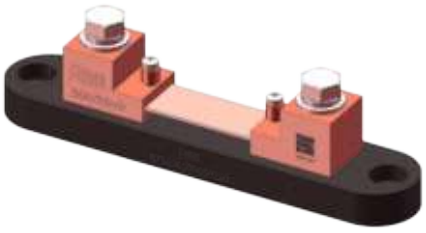
Better Solution for Sustainable High End Manufacturing

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RTBS0050

High Precision High Current Alloy Shunt

Excellent Current Sensing Capability
Low Current Coefficient & Thermal EMF Versus Copper



Introduction

The high-precision high-current alloy shunt is welded with the resistive alloy independently developed by C&B Electronics after precision machining and brazing technology.Based on the perfect combination of the control ability of the resistive alloy's consistency, the precision processing ability, the process control ability and the precision welding level, the product can ensure 0.1% current detection accuracy at 10%~100% rated current.This series of products will pass 100% power-on test before leaving the factory, and each single product can realize the data traceability.

For the high-current shunt, the resistance value and surface temperature will constantly change with the current loading, among which the temperature coefficient of resistance and the internal structure change of the resistive alloy after electrifying and heating are the main factors leading to the change of resistance value.When the surface temperature of the product reaches thermal equilibrium, the resistance value will tend to be stable. Based on the precise control of the batching, preparation and heat treatment processes of resistive alloys by C&B Electronics, the temperature coefficient of this series of products can reach ±20 ppm/°C in the range of -20 °C to +120 °C, and has a very low thermal electromotive force (EMF) versus copper and current coefficient.

RoHS AEC-Q200 3D

RTBS series, from core materials to core processes, have achieved independent and controllable production, stable quality, and timely delivery. If the standard specifications cannot meet your needs, please contact our sales for consultation. Resi is committed to providing the best precision resistor solutions to meet the needs of customers in automotive electronics, testing and measurement, power equipment, construction machinery, energy storage equipment and other fields .

Electrical Parameters

Series	Resistance	Rated Current	Output Voltage	Max. Operating Current	Operating Temperature	TCR ppm/°C(+20°C Ref)	Tolerance %	Weight g
RTBS0050	1.0mΩ	50A	50mV	60A	-55°C~+170°C	±20(-20°C～+120°C)	±0.1	255±20
RTBS0050	1.5mΩ	50A	75mV	60A	-55°C~+170°C	±20(-20°C～+120°C)	±0.1	255±20
RTBS0050	2.0mΩ	50A	100mV	60A	-55°C~+170°C	±20(-20°C～+120°C)	±0.1	271±20

Part Number Information

Example：RTBS0050B075Z00 (RTBS 50A ±0.1% 75mV Standard)

R	T	B	S	0	0	5	0	B	0	7	5	Z	0	0

Series	Rated Current	Tolerance	Output Voltage	Code
RTBS	0050=50A	B=±0.1%	050=50mV 075=75mV 100=100mV	Z00=Standard

For higher/lower rated current, higher output voltage, please contact us.

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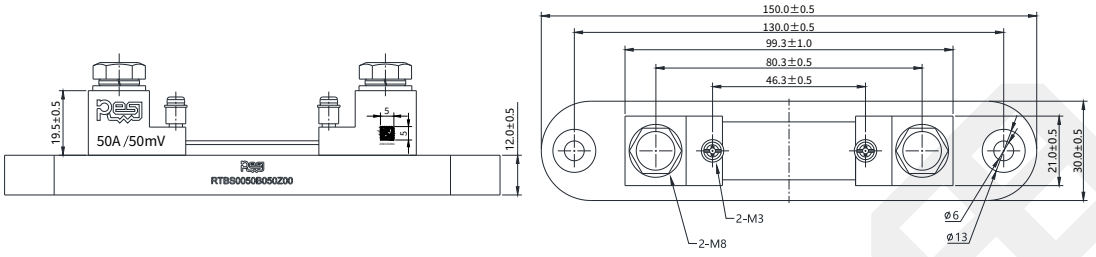
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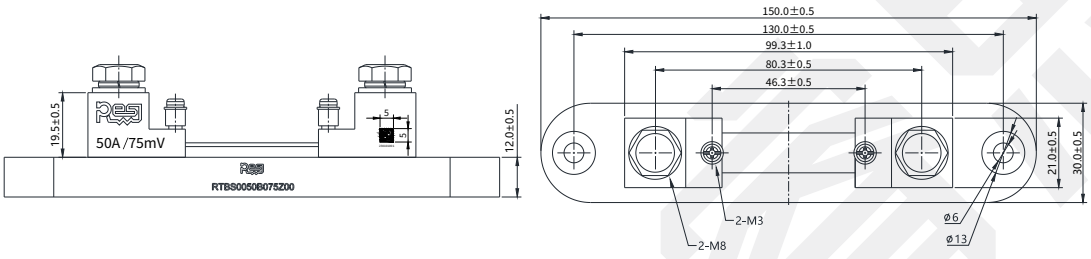
RTBS0050

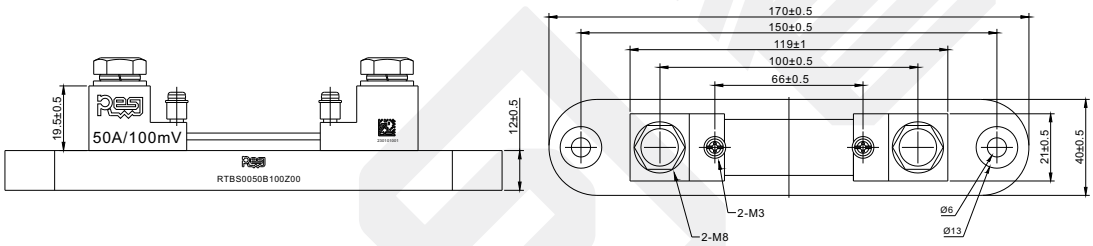
High Precision High Current Alloy Shunt

Dimensions

Unit: mm





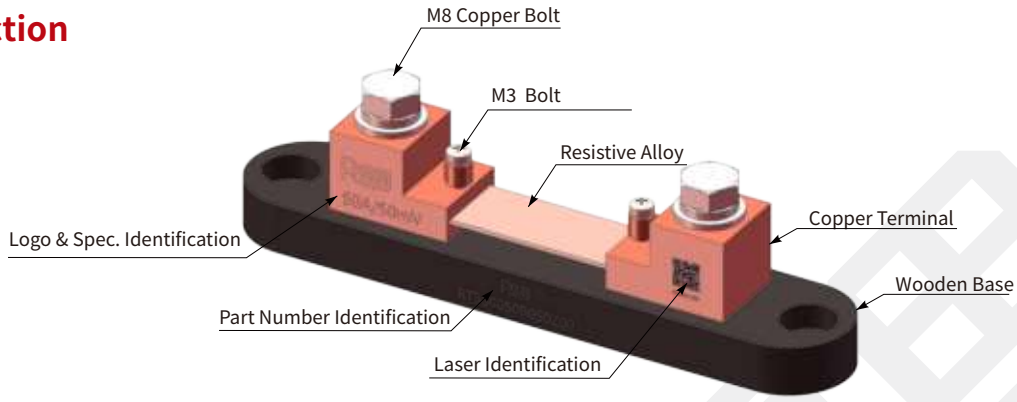


Performance

Test	Test Method	Standards	Test Result
Basic Tolerance	Load 5%, 10%, 20%, 60%, 80%, 120% rated current for 1 minute.	Q/GDW11850-2018	△R≤±0.1%
Tolerance Consistency	Load 100% rated current. Measure the consistency of the basic tolerance of three parts in the same lot after thermal balance is reached.	Q/GDW11850-2018	△R≤±0.05%
Tolerance Stability	Load 100% rated current. Measure the resistance after thermal balance is reached. After the shunt cools to room temperature, power on again at 100% rated current to reach thermal balance. Measure the resistance and calculate the rate of change of the two resistance values.	Q/GDW11850-2018	△R≤±0.05%
Measurement Repeatability	Load 100% rated current. Measure the resistance every 5s after thermal balance is reached. Record 21 times, and calculate repeatability.	Q/GDW11850-2018	△R≤±0.02%
Thermal Balance Time	Load 100% rated current. Record the tolerance of the shunt per minute. If the change rate every 1 minute of the shunt tolerance does not exceed 1/10 of the rated shunt tolerance, it is considered that the shunt has reached thermal balance.	Q/GDW11850-2018	≤5min
Overload Test	2.25 times rated current for 1.5s	Q/GDW11850-2018	△R≤±0.1%
Temperature Alternating	Cycle every 24 hours, repeat 6 times, maintain humidity at 95%RH. Temperature curve:Rise from room temperature (+25°C) to +60°C in 3h, hold for 9h, Fall to +25°C in 3h, hold for 9h.	Q/GDW11850-2018 GB/T2423.4	△R≤±0.1%
High Temperature High Current	70 °C for 30 minutes, and load 100% rated current to reach thermal balance,Calculate the error.	Q/GDW11850-2018	△R≤±0.1%
Low Temperature Low Current	-40 °C for 30 minutes, and load 10% rated current for 1 minute,Calculate the error.	Q/GDW11850-2018	△R≤±0.1%
Drop Test	1000mm, horizontal drop and vertical drop, twice per position	Q/GDW11850-2018 GB/2423.8	△R≤±0.05%

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Construction



Marking

Marking of product: Logo + product specifications + QR code.

Rated Current	Illustration	Demonstration
50A		RESI：Brand 50A/50mV：Rated Current/Output Voltage RTBS0050B050Z00：Product Model QR Code：(9 characters in total, with the content being the same as the plain code below the QR code) 230101001 DC(2301)+Today's date is the 1st(01)+Serial Number(001)

Storage Instructions

(1) The shunt shall be stored at a temperature of 5 to 35°C, humidity<60% RH, and the humidity shall be kept at a low level;

(2) The shunt shall be protected from direct sunlight;

(3) The shunt shall be stored in a clean and dry environment, free of harmful gases (hydrogen chloride, sulfuric acid, hydrogen sulfur, etc.);

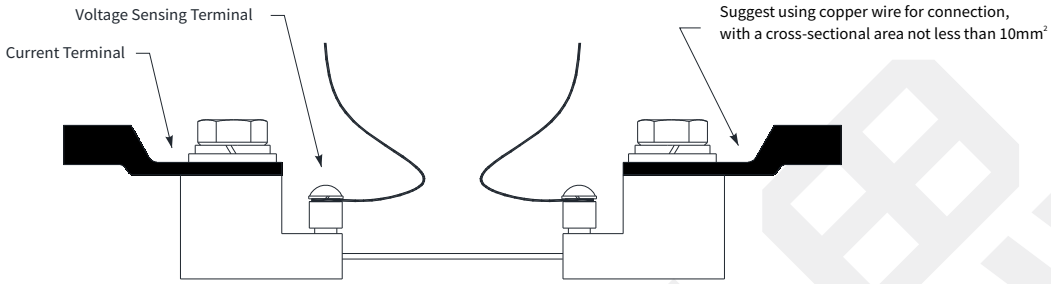
(4) Special gloves shall be worn for during installation、storage and handling to reduce the risk of surface oxidation;

(5) During installation and storage, do not put heavy objects or apply pressure onto the surface of the shunt alloy to avoid product deformation;

(6) Under the above conditions, the shunt can be stored for at least 1 year.

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Reverse Installation Illustration



Operation Suggestion

(1) Please pay attention to the surface protection of the product during use to prevent defects such as scratches, bumps, and oil stains on the surface.

(2) When installing and using the product, it is important to avoid the influence of mechanical stress on the product.

(3) According to the IEEE standards, the operating current should not be higher than 2/3 of the rated current under the normal conditions.

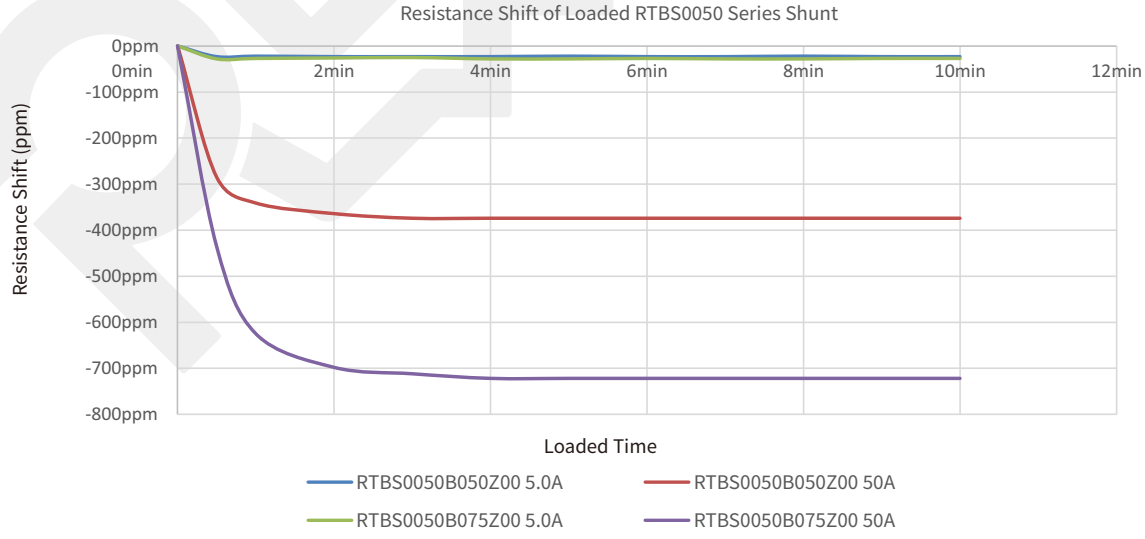
(4) Air cooling, water cooling, increased physical size, and installation of heat sinks can be used to reduce operating temperature.

(5) The surface of the copper bar used for installing the shunt shall be smooth and clean. It is recommended that the surface be plated with nickel or tin to reduce the contact resistance.

(6) Suggested installation torque: 0.4 ~ 0.8 N · m for M3 bolt and 10 ~ 15 N · m for M8 bolt.

(7) During the installation of the shunt, it shall be ensured that the copper head is in close contact with the bus bar, and the contact area between the copper head and the bus bar shall be as large as possible. If conditions permit, the size of the bus bar shall be as large as possible and the bus bar shall be clean.

Curve of the Resistance of Loaded Shunt



*Under different heat dissipation conditions and different applied copper bar sizes, there will be some differences in the change of shunt on resistance. The above operating conditions are under normal temperature with 100mm² copper wire; For customized test, please contact us to provide detailed operating conditions.

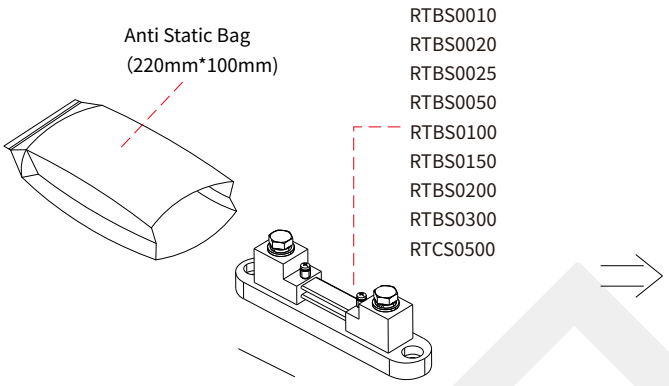
Packaging

(1) Place each shunt into an anti-static bag, evacuate and seal it. The size of the anti-static bag is 220mm×100mm.

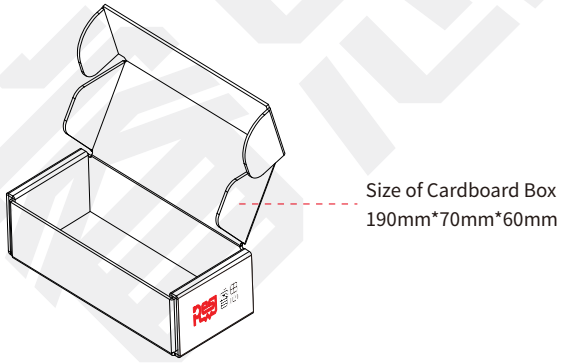
(2) Wrap the blister-packed product with an air bubble bag and place it into a plane box. The approximate size of the plane box is 190mm×70mm×60mm.

(3) Fill the gaps inside the plane box with air bubble bags until the product does not loosen.

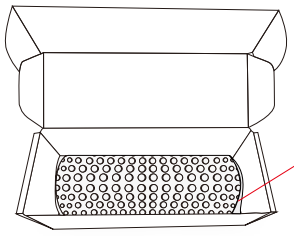
(4) After folding the plane box, check the product specifications and affix a material label.



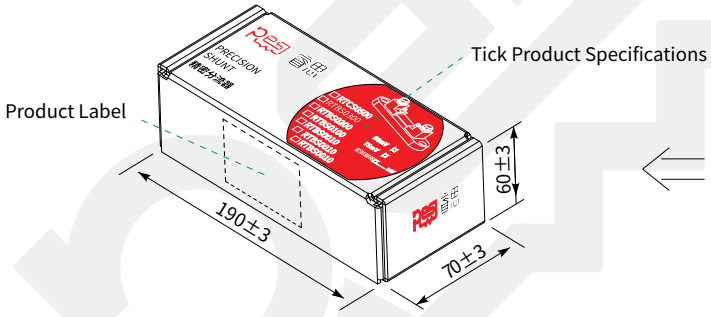
1、Place the product into an anti-static bag and vacuum-seal it.



2、Wrap the blister-packed product with an air bubble bag and then place it into a plane box.



3、It is appropriate to fill the gaps inside the plane box with bubble bags until the product does not loosen.



4、Attach the product label and tick the product model and output voltage.

Popular Part Numbers

Part Number	Rated Current	Output Voltage	Tolerance	Resistance	TCR	Max. Operating Current
RTBS0050B050Z00	50A	50mV	±0.1%	1.0mΩ	±20ppm/°C	60A
RTBS0050B075Z00	50A	75mV	±0.1%	1.5mΩ	±20ppm/°C	60A
RTBS0050B100Z00	50A	100mV	±0.1%	2.0mΩ	±20ppm/°C	60A

Revision

Version	Revised Content	Date	Approver
V0	New product launch.	2019.12.13	YBP
V1	Add the product specification of 1.0mΩ and complete the description of the material information for this specification.	2020.03.02	LFY
V2	Add a title and reformat	2020.03.09	YBP
V3	Change physical images.	2020.04.14	LWW
V4	Overall revision of the specification document and refinement of the information description for materials of all specifications.	2022.12.26	LWW
V5	Overall revision of the specification document and refinement of the information description for materials of all specifications.	2024.08.08	LWW
V6	Add models with an output voltage of 100mV.	2025.05.15	LWW

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