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(FLH) Four-terminal Alloy Shunt Resistors

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Product Introduction

Four-terminal Alloy Shunt Resistors (FLH) tackle current sensing applications with TCR 20ppm.

Features :

- Resistance values down to 0.0003Ω.
- TCR down to ±20ppm/°C and ±50ppm/°C.
- Low inductance. RoHS compliant and Lead-free.
- Tolerance ±1%, ±2% and ±5%. Rated Power 3 Watts.

Applications :

- Current Sensing, Drive technology.
- Automotive electronics, Power Electronic.
- Communication System, Home Appliance.

Token FLH open four-pin alloy shunt series, also known as four-lead sampling shunt, current sensing resistor, or four-pin sampling resistor.

Kelvin four-terminal resistors are used to ensure that the current acts on two opposite terminals and to measure the detection voltage of the other two terminals, thereby reducing the influence of resistance and temperature coefficient between terminals and obtaining more accurate current measurements.

Four-lead alloy shunt FLH adopts U-shaped design and high-pulse special alloy element structure, which can improve the power of the resistor and expand the operating temperature range. It has the characteristics of low resistance, low inductance and high reliability. The temperature coefficient is lower than that of 20 ppm/C, which provides excellent performance and is suitable for various applications.

Token FLH devices always preferred in current sense applications, standard rated power 3W is available packages, resistance values down to 0.0003Ω, with tolerances as tight as ±1%, ±2%, and ±5% with low-inductance 10 nH. TCR is as low as ±20ppm/°C and ±50ppm/°C with high-impulse proprietary metal element that gives the device its extended power and temperature ratings.

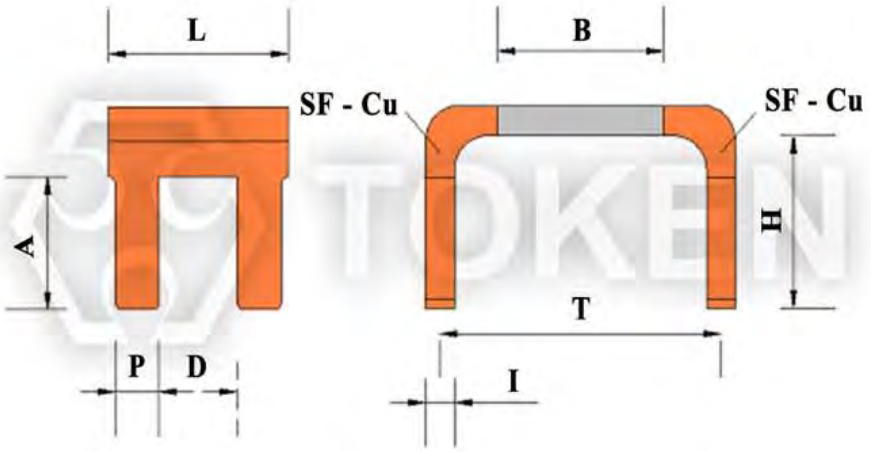
With modern technology and production methods, we continuously upgrade production equipment, provide complete low resistance current detection resistor products, and all aspects of current sensing shunt product information and application information. The products meet RoHS requirements.

FLH series as current divider and current detection resistor products can be customized according to customers'needs. For special resistance value and latest product information, contact us with your specific needs. Or link to Token official website "**Current Sense Resistors**". Contact us with your specific needs.

Dimensions

Alloy Shunt Resistors (FLH) Dimensions (Unit:mm)

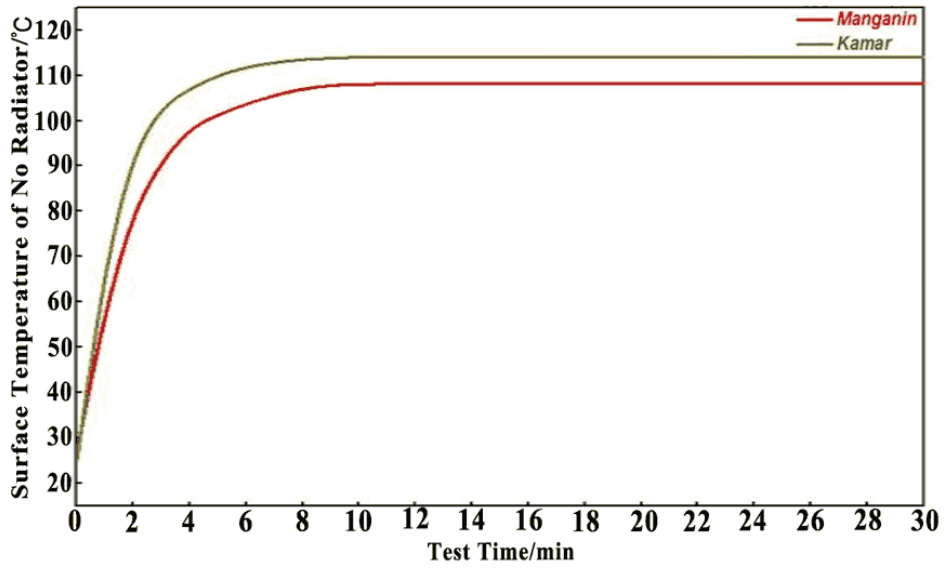
Type	B (mm)	W (mm)	L (mm)	A (mm)	P (mm)	H (mm)	D (mm)	I (mm)
FLH-M-0m30	5.0±0.3	8.3±0.3	5.3±0.3	3.8±0.5	1.3±0.3	5.0±1.0	1.8±0.3	1.43±0.3
FLH-M-0m50	5.0±0.3	8.3±0.3	5.3±0.3	3.8±0.5	1.3±0.3	5.0±1.0	1.8±0.3	0.86±0.3
FLH-M-R001	5.0±0.3	8.3±0.3	5.3±0.3	3.8±0.5	1.3±0.3	5.0±1.0	1.8±0.3	0.44±0.3
FLH-M-R002	5.0±0.3	8.3±0.3	5.3±0.3	3.8±0.5	1.3±0.3	5.0±1.0	1.8±0.3	0.63±0.3
FLH-M-R003	5.0±0.3	8.3±0.3	5.3±0.3	3.8±0.5	1.3±0.3	5.0±1.0	1.8±0.3	0.43±0.3



Alloy Shunt Resistors (FLH) - Dimensions

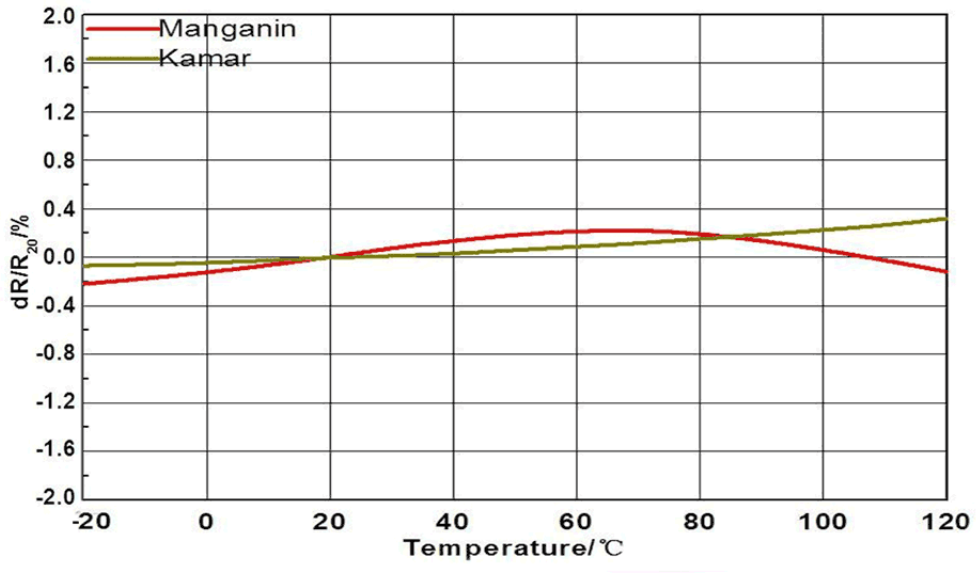
Technical Specifications

Alloy Shunt Resistors (FLH) Surface Temperature Curve



FLH - Surface Temperature Curve

Alloy Shunt Resistors (FLH) TCR Derating Curve



FLH - TCR Derating Curve

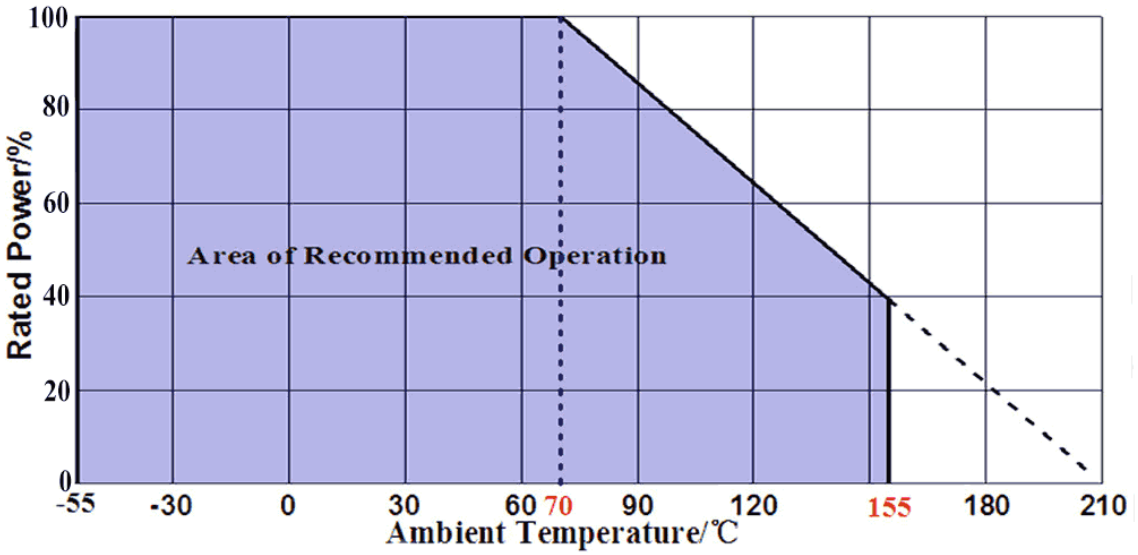
Environmental Characteristics

Alloy Shunt Resistors (FLH) Environmental Characteristics

Items	Requirement	Test Methods
Temperature Cycling	±0.5%	JESD22 1000 Cycles(-55°C to +125°C). Measurement at 24±2 hours after test conclusion.
High Temperature Exposure	±0.5%	MIL-STD-202 1000hrs. @T=125°C. Unpowered. Measurement at 24±2 hours after test conclusion.
Moisture Resistor	±0.5%	MIL-STD-202 t = 24 hrs/cycle. Steps 7a & 7b not required. Unpowered. Measurement at 24±2 hours after test conclusion.
Biased Humidity	±0.5%	MIL-STD-202 1000hrs 85°C/85% RH. Note: Specified conditions: 10% of operating power. Measurement at 24±2 hours after test conclusion.
Operational Life	±0.5%	MIL-STD-202 Condition D Steady State TA=125°C at rated power. Measurement at 24±2 hours after test conclusion.
Solderability	95% Coverage Minimum.	J-STD-002C 245±5°C, 5s+0.5s/-0.
Vibration	±0.5%	MIL-STD-202 5g's for 20 min, 12 cycles each of 3 orientations. Note: Use 8"X5" PCB. 031" thick 7" secure points on one long side and secure points at corners of opposite sides which parts mounted within 2 from any secure point. Test from 10-2000 Hz. Measurement at 24±2 hours after test conclusion.
Resistance to Soldering Heat	±0.5%	MIL-STD-202 260±5°C, 10s±1s. Measurement at 24±2 hours after test conclusion.
Short Time Overload	±0.5%	MIL-STD-202 55×Rated power for 5s. Measurement at 24±2 hours after test conclusion.
Thermal Shock	±1%	MIL-STD-202 -55°C/+125°C, 300 Cycles. Maximum transfer time 20s, Dwell time 15min.

Derating Curve

Alloy Shunt Resistors (FLH) Derating Curve

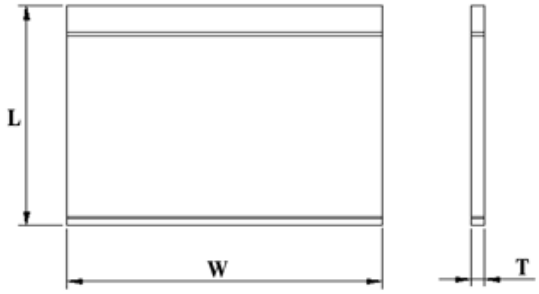


Rated power VS Ambient temperature (Derating Cruve)

Packaging

Alloy Shunt Resistors (FLH) Internal Package

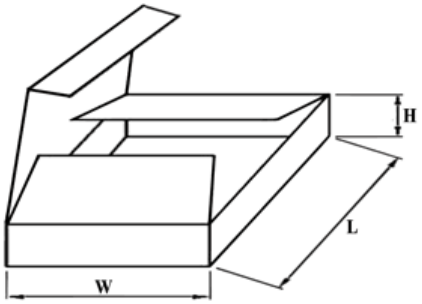
Type	L/mm	W/mm	T/mm
P1	130	130	0.2
P2	160	160	0.2
P3	210	150	0.1



FLH - Internal Package

Alloy Shunt Resistors (FLH) External Package

Type	L/mm	W/mm	H/mm
B1	170	120	50
B2	240	180	115
B3	230	170	200
B4	250	250	250
B5	300	300	300



FLH - External Package

Order Codes

Alloy Current Sensing Resistors (FLU) Order Code

FLH	M	0m30	F

Part Number	Material		Resistance (Ω)		Tolerance (%)	
FLH	M	Manganin	0m30	0.0003Ω	J	±5
	K	Kamar	R001	0.001Ω	G	±2
			R003	0.003Ω	F	±1

General Information

Your Current Options - Token Current Sense

As the world becomes more and more technology-driven, the uses for current sensing components will continue to increase. The need for even lower resistance value ranges is already becoming evident, as is the need for these resistors to handle more power. The industry-wide trend is the emergence of smaller and smaller products.

Token Electronics offers a wide variety of current sensing products from the industry to military standards, such as current sense in Thin-Film / Thick-Film Technology, Bare Element Resistors, and Open Air Shunts. This enables Token to present an astounding number of possible solutions for any circuit design needs.

Applications of Current Detecting Components

Token's TCS and CS Series unique form factor provides automotive designers with several advantages. Both TCS and CS Series are ideal for applications involving window lift motors, fuel pump systems, seat belt pretensioners, and pulse width modulator feedback.

The wider resistive element and lower resistance enables higher current to pass through the device. Token's LRC ultra low Ohmic metal strip chip series provides the inherent ability to flex slightly and offers stress relief during extreme temperature cycling on typical or metal substrates. This LRC series is suitable for switch power supply applications (DC-DC Converter, Charger, and Adaptor) and power management of monitor.

The open air design of bare element resistor LRA and LRB Series provide a far cooler operation by allowing more air flow under the resistive element to keep excess heat from being transmitted to the PC board. They are suitable for high power AC/DC detection of power supply circuit.

Token axial moulded BWL series provides power rating up to 10 watts and lower resistance 0.005Ω, is ideal for all types of current sensing applications including switching and linear power supplies, instruments and power amplifiers.

Token standard current sensing components can be replacement for Vishay, IRC, Ohmite, KOA, Yageo devices with fast delivery and more competitive price. Contact us with your specific needs.