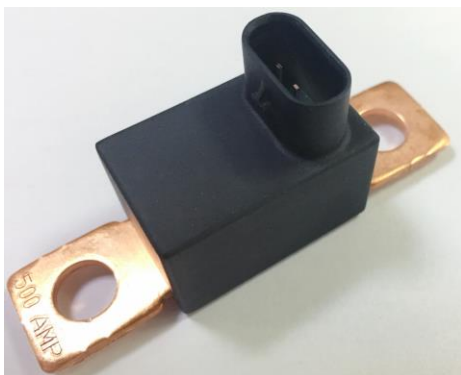
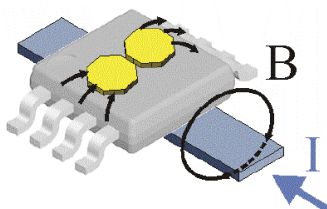


## Automotive Business Unit



### General Description

- ♦ Littelfuse Current Sensor use a single Hall IC which provides an output signal proportional to the flux density applied horizontally, therefore it is suitable for current measurement.



### Features

- ♦ Electrically isolated measurement
- ♦ Busbar design using the Hall effect
- ♦ +5V DC power supply
- ♦ Analog ratiometric output
- ♦ Output voltage: 0.5V~4.5V
- ♦ Operating temperature:  $-40^{\circ}\text{C} < T < +125^{\circ}\text{C}$
- ♦ Programmable linear transfer characteristic

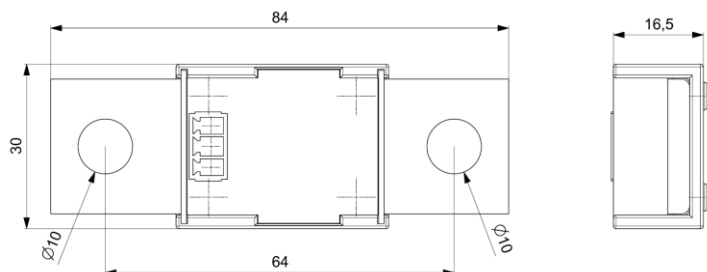
### Benefits

- ♦ High current measurement:  $\pm 750\text{A}$  peak current
- ♦ High accuracy: 2% max
- ♦ High linearity: 1% max
- ♦ Quick response time: 3  $\mu\text{s}$
- ♦ Wideband: 250KHz
- ♦ Cost saving solution
- ♦ Easy assemble with Wires/Busbar at customer side
- ♦ Can replace the busbar at customer side
- ♦ Ability to customize design and programming output.

### Applications

- ♦ Inverter
- ♦ Converter
- ♦ Battery
- ♦ Battery Charger
- ♦ Power Distributor Unit
- ♦ Smart Fuse
- ♦ Power Relay

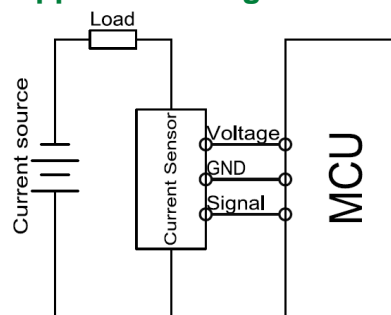
### Dimensions (in mm)



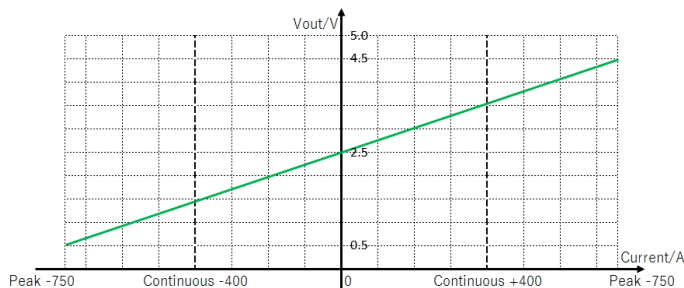
### Mechanical characteristics

- ♦ Plastic Housing: PA66+30GF
- ♦ Busbar: Copper
- ♦ Mass: 80g
- ♦ M10 bolt fixation
- ♦ Customization connector design
- ♦ Pin definitions: Vsupply, GND, Vout

### Typical application diagram



### Output curve



## Automotive Business Unit

### Absolute maximum ratings

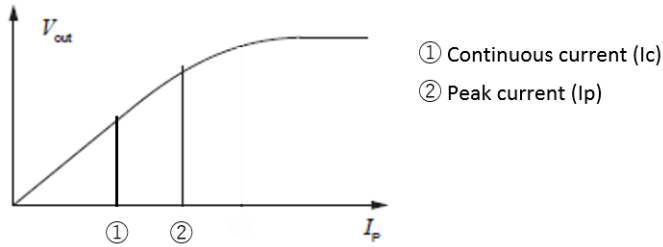
Parameter	Symbol	Comments	Min	Typ.	Max	Units
Positive Supply Voltage(Overvoltage)					10	V
Positive Output Voltage					10	V
Positive Output Current			-70		70	mA
Reverse Supply Voltage protection					-0.3	V
Reverse Output Voltage					-0.3	V
Reverse Output Current					-50	mA
Storage Temperature			-55		165	Degree

### Functional Characteristics

Parameter	Symbol	Comments	Min	Typ.	Max	Units
Supply Voltage	Vdd		4.5	5	5.5	V
Supply Current	Idd		7	12	14	mA
Output current	I <sub>max</sub>		-2		2	mA
Output Voltage Swing	Vout		0.5		4.5	V
Peak Current	I <sub>p</sub>		-750		750	A
Continuous current	I <sub>c</sub>	Full temperature range		400		A
Operating Temperature	T <sub>a</sub>		-40		125	Degree
Bandwidth	BW				250	kHz
Accuracy	E <sub>a</sub>	Full temperature range	-2		2	%
Linearity	E <sub>l</sub>	Full temperature range	-1		1	%
Repeatability	E <sub>r</sub>	Full temperature range	-0.5		0.5	%
Hysteresis	E <sub>h</sub>	Full temperature range	-0.5		0.5	%
Sensitivity	G	@500A		0.4		mV/A
Resolution	R	@5V power supply		1.22		mV
Offset voltage error	V <sub>oe</sub>		-10		10	mV
Response time	t				3	us

## Automotive Business Unit

### Primary current definition (Ip)



### Accuracy (Ea)

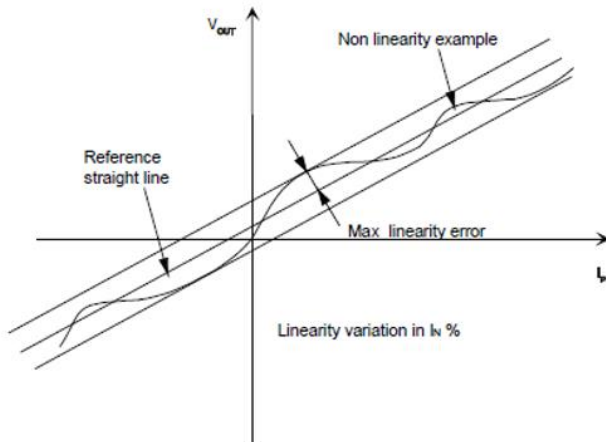
Accuracy is the comprehensive error. Using below formula to calculate accuracy.

Note: The calculation results of using 3 sigma method, can also meet the parameters that mentioned in this datasheet.

$$E_a = \sqrt{E_l^2 + E_r^2 + E_h^2}$$

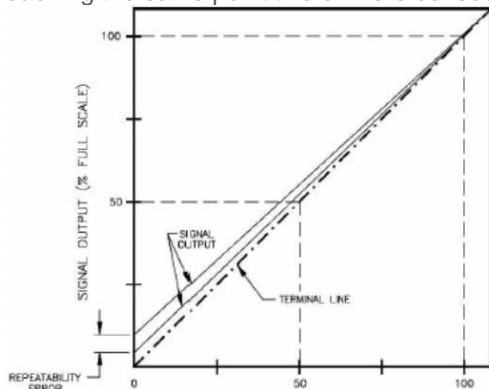
### Linearity (El)

The maximum positive or negative discrepancy with a reference straight line  $V_{out}=f(I_p)$ .



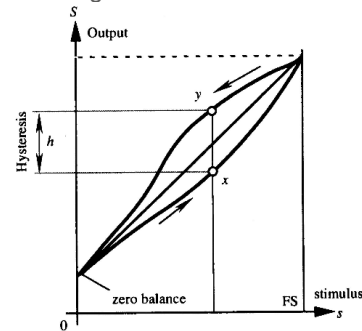
### Repeatability (Er)

Repeatability error is the maximum difference in output when approaching the same point two or more consecutive.



### Hysteresis (Eh)

The hysteresis error is the maximum difference in output at any measurement value within the sensor's specified range when approaching the point first with increasing and then with decreasing current value.



### Offset with temperature (Et)

The Accuracy error of the offset in the operating temperature is the variation of the offset in the temperature considered with the initial offset at 25°C.

### Sensitivity (G)

The sensor's sensitivity is the slope of the straight line  $V_{out}=f(I_p)$

### Resolution (R)

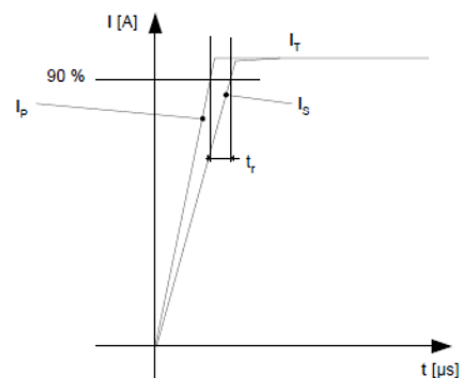
Hall IC use 12 bits ADC, the typical step size would be  $5V/4096 = 1.22 \text{ mV}$ , but the actual size can differ from the nominal value because of internal gain tolerance. A maximum step size of 1.5 mV is guaranteed.

### Offset voltage error @ $I_p=0A$ (Voe)

Is the output voltage when the primary current is null. The ideal value is 2.5V. So, the difference of the measured value and ideal value is called the total offset voltage error. This offset error can be attributed to the electrical offset, the magnetic offset, the thermal drift and the thermal hysteresis.

### Response time (t)

The time between the primary current signal and the output signal reach at 90% of its final value.





## Automotive Business Unit

Custom electrical and environmental specifications can be designed to meet any need, please contact Littelfuse Engineering for details.

### Littelfuse

Website: [www.littelfuse.com](http://www.littelfuse.com)  
Sales Support: [ALL\\_Autosensors\\_Sales@littelfuse.com](mailto:ALL_Autosensors_Sales@littelfuse.com)  
Technical Support: [ALL\\_Autosensors\\_Tech@littelfuse.com](mailto:ALL_Autosensors_Tech@littelfuse.com)

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