Current Sense Resistors

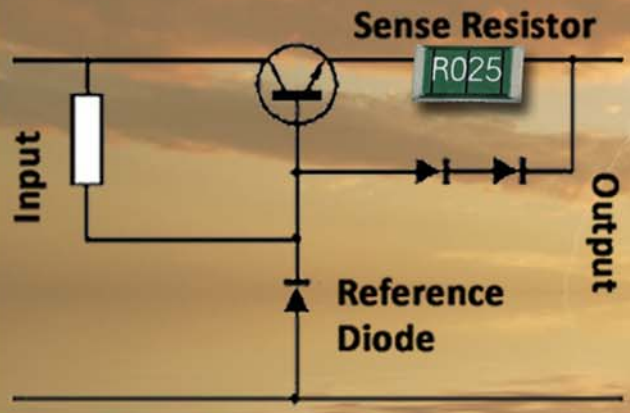
When designing power supplies and regulated battery circuits, the aim is to eliminate the risk of short circuits or over current conditions which are likely to damage other components. Ohmite's current sense resistors are the simple and economic solution.

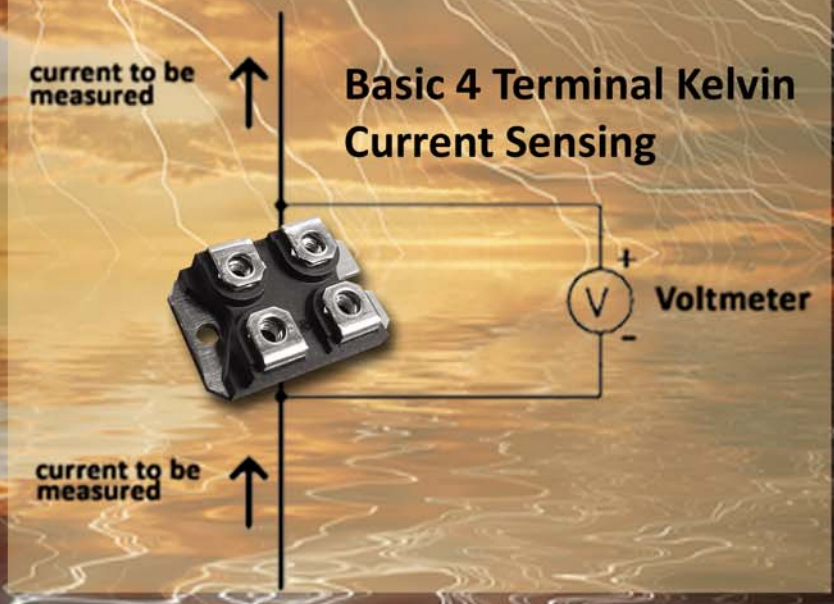
What is a current sensing resistor?

Current sensing products are established industry favorites among resistive products which, as with most passive products, the majority are surface mount. These resistors, often referred to as 'shunt' resistors, are used to monitor the current in a circuit and translate the amount of current in that circuit into a voltage that can be easily measured and monitored. Such resistors have very low resistance values, typically less than 50 milliohms (0.050 ohms) and often lower.

How do they work?

As stated by Ohm's Law, there is a voltage drop across any resistance when current is flowing. A current sensing resistor is designed for low resistance so as to minimize power consumption. As a result, the calibrated resistance senses the current flowing through it in the form of a voltage drop which is detected and monitored by the control circuitry.





What is a Kelvin Configuration?

A 'Kelvin' configuration resistor features four leads. These four terminal resistors enable a current to be applied through two opposite leads and a sensing voltage to be measured across the other two leads.

The Kelvin configuration effectively eliminates the resistance and temperature coefficient of the leads. A Kelvin connection is essential for accurate current sensing. Current measurement using a shunt resistor and voltmeter is particularly well-suited for applications involving particularly large magnitudes of current. In such applications, the shunt resistor's resistance will be in the order of milliohms or micro ohms, so that only a modest amount of voltage will be dropped at full current. Resistance this low is comparable to wire connection resistance, which means voltage measured across such a shunt must be done in such a way as to avoid detecting voltage dropped across the current carrying wire connections, in case huge measurement errors are induced. In order that the voltmeter only measures the voltage dropped by the shunt resistance itself, without any stray voltages originating from wire or connection resistance, shunts are usually equipped with four connection terminals

Current Sense Resistors

	Part Number Prefix	Ω	Watts
 MCS	MCS1632 - MCS3264	0.005 - 0.05	1.0 – 2.0
 FCSL	FCSL64 - FCSL90	0.001 - 0.050	2.0 – 4.0
 RW1/RW2 (4 Term.)	RW1S0CK - RW2S0DK	0.005 – 0.05	1.0 – 2.0
 60S	602SJR - 610SJR	0.002 – 0.01	0.25 – 1.0
 LVK	LVK12 - LVK25	0.001 – 0.5	0.5 – 2.0
 LVC	LVC06 - LVC25	0.01 - 1.00	0.25 – 1.0
 10	12F - 15F	0.005 - 0.25	2.0 – 5.0
10 (4 Term.)	13F - 17F	0.005 - 0.1	3.0 – 7.0
 WL	WLA – WLC	0.005 – 0.1	0.5 – 2.0
 60 (2 & 4 Term.)	600 - 650	0.002 - 0.10	0.10 – 5.0
 CS3	CS3F/J/K	0.001 - 0.05	3
 TGHG	TGHG	0.0005 - 10K	100 - 200