

SOLUTIONS TECH BRIEF

Technical solutions on circuit protection from Littelfuse, Inc.

Littelfuse Resistors for Voltage Suppression

The Littelfuse Resistor assembly is designed to adjust voltage in a circuit. It does so by resisting the flow of current as it passes through the resistor, thereby reducing voltage.

Littelfuse Resistors are available in ATO® and MINI® size packages for voltage suppression in a variety of resistance values and power ratings from 1/8 to 1/2 watts.

The Need for Resistors in Networks

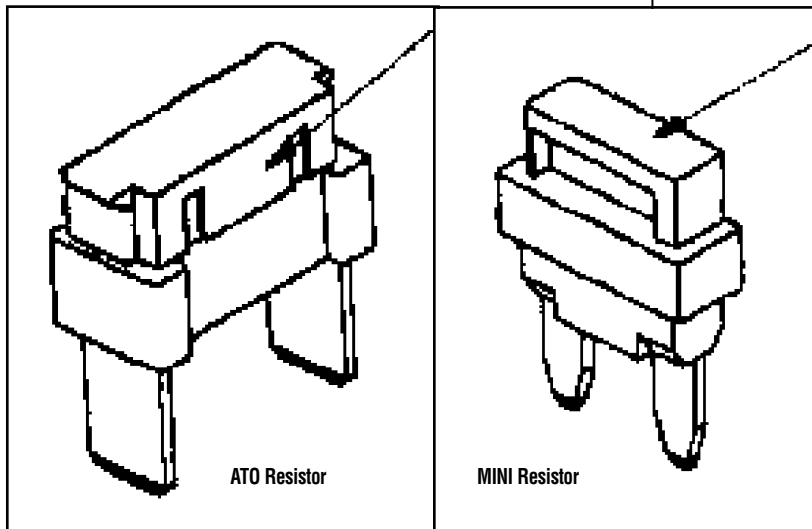
Resistors can control the amount of voltage in a circuit, and are used to suppress or adjust that voltage if it becomes too high. High voltages are a concern because they can damage sensitive solid state electronics. Computer chips are very voltage sensitive, because overvoltage can cause a microscopic spark between the contacts which damages the interior construction of the chip and makes it no longer usable.

Littelfuse Resistor Advantages

- Convenient Package
- Reliable Bladed Termination
- Quick Fix
- Customizable
- Impact Proof
- High Quality

Applications for Resistors

Littelfuse Resistors can be used in a variety of applications requiring voltage suppression. Resistors are becoming increasingly popular, and are currently designed in by major North American automotive original equipment manufacturers.



Here are a few examples of Resistor applications:

- Placed between a motor and switch to step down voltage for a motor requiring low voltage.
- Providing control in an air bag sensor system.
- Providing means of reducing current for lamps in a dashboard.
- Used in a filter network with an inductor to help filter out noise, such as alternator hum or spark plug noise, by trapping the noise frequency in the circuit formed by the resistor and capacitor.

The Difference Between Resistors and Fuses

Although Littelfuse produces ATO® and MINI® Fuses in the same package sizes as Littelfuse Resistor assemblies, the products are quite different. A fuse is designed to open, to protect a circuit from an overcurrent condition. A Resistor is not designed to open. It does not protect the circuit, but provides a means to adjust applied voltage to the circuit.

The Function of a Resistor

The design of the Resistor includes a carbon-based material placed between two leads. The material has a different conductivity than the circuit's wire, and as the current passes through the material, the voltage is reduced. The Resistor is bi-directional, allowing it to be mounted on either side.

Inside the Resistor a thin film conductor is applied to a small ceramic slug. Varying thicknesses of this very thin material slightly changes the conductivity to achieve specific resistance values for the devices.

Resistor Specifications

Operating Temp:	-40°C to +85°C
Resistor Value:	Optional
Power Rating:	1/2 W Max
Body Material:	Thermoplastic
Termination Material:	CRS (Ni/Zn Plated)
Termination Retention:	25 N

The Advantages of Littelfuse Resistors

The advantages of Littelfuse Resistor assemblies are due to the unique way the Resistor is packaged. Traditionally, resistors had to be spliced into one of the leads of the wiring harness or soldered to a circuit board, a time consuming task that is very costly when automated on a production line.

Littelfuse Resistor assemblies, however, can be easily added to any circuit through the fuse block. With the same bladed termination design of Littelfuse automotive fuses, Resistor assemblies are simply plugged right into the fuse block next to the fuses. And as well as providing convenience, the bladed terminations are also a very reliable method of termination.

The Resistor package enables use as a "Quick Fix" when auto manufacturers need to add surge protection late in the design phase or after the vehicle is manufactured. Because Littelfuse Resistors are easily inserted into the fuse block, they can be added later without difficulty. This ease of installation also facilitates use of Resistors for options that are only included on a small number of vehicles.

Littelfuse's efficient design also allows the resistor values to be changed easily within the body of the Resistor, customized for a customer's specific requirements. A wide range of resistor values are available, from 1 ohm to 1 gigaohm.

Littelfuse Resistors are durable and impact-resistant, carrying the same quality guarantee held by Littelfuse circuit protection products. Littelfuse products are manufactured in QS-9000 certified facilities.



Littelfuse®

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