



Automotive-grade Hall-effect linear current sensors offer high accuracy

The new ACS714 and ACS715 from Allegro MicroSystems Europe are a range of automotive-grade Hall-effect linear current sensors combining high accuracy with excellent voltage isolation.

The new devices are designed to provide economical and precise sensing solutions for AC and DC currents in automotive applications such as motor control, load detection and management, switched-mode power supply control, and overcurrent fault protection.

ACS714 and ACS715

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- Combining high accuracy with excellent voltage isolation
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Each of the new products consists of a precise, low-offset, linear Hall sensor circuit with a copper conduction path located near the surface of the die. Applied current flowing through this copper conduction path generates a magnetic field which is sensed by the integrated Hall IC and converted into a proportional voltage. Device accuracy is optimised through the close proximity of the magnetic signal to the Hall transducer.

A precise, proportional voltage is provided by the low-offset, chopper-stabilised BiCMOS Hall IC, which is programmed for accuracy after packaging. Total output error is 1.5% at +25°C and 5% over the range -40°C to +150°C, and the risetime in response to a step input current is only 6 μ s.

The internal resistance of the conductive path is typically 1.2 milliohms, which leads to low power losses. The thickness of the copper conductor allows survival of the device at up to five times overcurrent conditions.

The terminals of the conductive path are electrically isolated from the sensor leads with an isolation voltage of 2.1 kV RMS. This allows the ACS714 and ACS715 current sensors to be used in applications requiring electrical isolation without the use of optoisolators or other costly isolation techniques.

The conductive shield across the face of the ACS714/15 is connected to ground, so that, in the presence of high dV/dt events on the device conductor, it will shunt the resultant capacitively coupled energy to ground. This prevents output voltage disturbances in the presence of very high conductor dV/dt events, which are often present in motor control and switched-mode power supply applications.

Both devices are supplied in a small, surface mount SOIC8 package. The leadframe is plated with 100% matt tin, which is compatible with standard lead (Pb) free printed circuit board assembly processes. Internally, the device is Pb-free, except for flip-chip high-temperature Pb-based solder balls, currently exempt from RoHS.