Press Release

New ams current-sensing solution for battery management systems needs no shunt resistor

Design breakthrough achieves accurate, linear current measurement up to 100A by monitoring voltage drop across a PCB's copper track

Unterpremstaetten, Austria (23 April, 2014), ams AG (SIX: AMS), a leading provider of high performance analog ICs and sensors, has introduced a reference design board which measures current to an accuracy of ±1% by monitoring the voltage drop across a copper track on a PCB.

The development of the new technique, which uses the ams AS8510 data-acquisition front end, enables designers of Battery Management Systems (BMS) to reduce bill-of-materials cost by eliminating the precision shunt resistor normally used in current-sensing applications. A precision resistor with low temperature drift can typically cost as much as $1.50 in volume.

Accurate current measurement is an essential function in a BMS, which provides functions including monitoring of a battery's state of charge and state of health. The new reference design board from ams provides a blueprint for the current measurement function in a BMS, and can be applied in e-bikes, pedelecs and other applications drawing current of up to 40A. The same design can also readily be adapted to measure currents of up to 100A using only the resistance of a PCB's copper track.

The new ams reference design takes advantage of the very high sensitivity and precision of the AS8510, an integrated data acquisition front end which provides two measurement channels.

One channel is used to measure current by sensing the voltage drop over a 10mm section of a PCB track with a known resistance value and temperature coefficient. The other, matched channel measures the temperature of the copper track. This temperature measurement can be performed either internally by the AS8510, or by an external temperature sensor.

By applying a compensation algorithm developed by ams, the AS8510 can eliminate the effect of the variation in the resistance of the copper track over temperature. This means that it can produce current measurements accurate to ±1% over its entire operating temperature range (-40°C to +125°C) without the normal requirement for a precision shunt resistor with a low temperature coefficient.

'When paired with a precision 100µΩ resistor, the AS8510 provides extremely high accuracy of ±0.5% over a current range from a few mA up to several kA,' said Bernd Gessner, Vice-President and General Manager of the automotive business unit at ams. 'This new reference design from ams shows how the same device can be used to capture measurements almost as accurately while completely eliminating

the resistor.

'For designers of BMS for use in pedelecs and electrics scooter, for instance, which are subject to very wide swings in ambient temperature, the technique for temperature compensation implemented in this design is a valuable breakthrough, enabling a worthwhile reduction in component cost while meeting many applications' requirement for measurement accuracy.'

For further information on the AS8510 data acquisition front end reference design please visit www.ams.com/AS8510/CopperShunt

about ams

ams develops and manufactures high performance analog semiconductors that solve its customers' most challenging problems with innovative solutions. ams' products are aimed at applications which require extreme precision, accuracy, dynamic range, sensitivity, and ultra-low power consumption. ams' product range includes sensors, sensor interfaces, power management ICs and wireless ICs for customers in the consumer, industrial, medical, mobile communications and automotive markets.

With headquarters in Austria and 9 design centers world wide ams employs over 1,400 people globally and serves more than 7,800 customers around the globe. ams is listed on the SIX Swiss stock exchange (ticker symbol: AMS). More information about ams can be found at www.ams.com.

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