STMicroelectronics Unveils World's First 3-Axis Gyroscope for Automotive Applications

The robust sensor aims to increase accuracy in car navigation and telematics systems

STMicroelectronics [1]has introduced the market's first 3-axis digital-output gyroscope that meets the industry-standard qualification for automotive integrated circuits (AEC-Q100). ST's newest angular-rate sensor aims to add positioning accuracy and stability to a wide range of automotive applications, including in-dash navigation, telematics and vehicle tolling systems.

Accurate measurements of angular-motion detection with ST's automotive-qualified gyroscopes will significantly enhance dead-reckoning and/or map-matching capabilities in car navigation and telematics applications. In situations when a GPS signal can't be seen, such as indoors and in urban canyons between tall buildings, dead-reckoning systems compensate for loss of satellite signal by monitoring motion, distance traveled and altitude. Precise gyroscope readings can also improve map-matching, the process of aligning a sequence of observed user positions with the road network on a digital map, used in a number of applications, including traffic flow analysis and driving directions.

These new dead-reckoning and map-matching capabilities are enabled with the industry-unique design concept of ST's gyroscopes, which employ a single sensing structure for motion measurement along all three orthogonal axes.[1] This eliminates any interference between the axes, significantly increasing measurement precision, coupled with excellent output stability over time and temperature.

ST's A3G4250D gyroscope measures angular rates up to +/-250dps (degree per second). An on-chip IC interface converts the angular-motion data into a 16-bit digital bit stream that is transmitted with high reliability to a dedicated microcontroller chip through a standard SPI or I2C protocol. The device provides two output lines (interrupt and data ready) and four user-selectable output data rates.

The 3V single-supply sensor integrates power-down and sleep modes and an embedded FIFO (first-in first-out) memory block for smarter power management. The A3G4250D embeds an 8-bit temperature sensor and operates within an extended temperature range from -40 to 85°C. The device is robust to electromagnetic interference and withstands shocks up to 10,000g.

ST's 3-axis gyroscope for automotive applications has been designed and produced using the same manufacturing-process technology that ST has already successfully applied to 1.8 billion motion sensors sold in the market. ST customers benefit from the industry-unique combination of state-of-the-art product design and ST's capability to manage the whole supply chain, leveraging large-scale production capacity at the company's dedicated 8-inch MEMS production lines.

Samples of ST's A3G4250D are available and volume production will start by Q2 2012. Unit pricing is $6 for volumes in the range of 1,000 pieces. Further pricing options are available for larger quantities.

[1] There are three main types of angular motion: **yaw** is rotation around the vertical axis; **roll** is rotation around the front-to-back axis and **pitch** is the rotation around the side-to-side axis.

For more information, please visit www.st.com [1].

Posted by Ron M. Seidel, Editorial Intern

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[1] http://www.st.com