Press release

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Semiconductors – market of the future: Bosch is growing faster than the market

Driving force in the automotive industry

- Jens Fabrowsky: “When it comes to semiconductors for vehicles, we have a singular advantage: Bosch is the only company equally at home in the automotive and semiconductor industries.”
- Electrification and automated driving are fueling the growth of Bosch’s semiconductor business.
- Every new vehicle has an average of nine Bosch chips on board.
- Bosch to premiere numerous semiconductor innovations at electronica 2018.

Reutlingen, Germany – Every car nowadays makes use of semiconductors, and that has been true for quite a while. A key technology in today’s modern world, these chips are core components of electrical systems – including those in vehicles. They regulate the powertrain and vehicle handling, tell the navigational system which way the vehicle is going, and signal the airbag to deploy when needed. Having been making semiconductors for more than 45 years, Bosch today is one of the world’s leading manufacturers of chips for mobility applications. “Semiconductors may have been around for a long time, but we have yet to realize their full potential. These components are key to modern-day mobility, and it is impossible to imagine cars today without them,” says Jens Fabrowsky, member of the executive management of Bosch’s Automotive Electronics division. In 2016, every vehicle newly registered worldwide had an average of more than nine Bosch chips on board. “When it comes to semiconductors for cars, we have a singular advantage: Bosch is the only company equally at home in both the automotive and semiconductor industries,” Fabrowsky says. In 2018, every new vehicle featured semiconductors worth 370 dollars (source: ZVEI), and thanks to increasing electrification and automation, demand for chips in vehicles is expected to rise further over the next few years.

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The ultimate discipline: semiconductors for the auto industry

The global semiconductor market is worth billions: the market research company Gartner expects global semiconductor sales to reach 451 billion dollars in 2018. By 2019 alone, the market will have grown at an annual growth rate of more than 5 percent (source: PwC). “The Bosch semiconductor business is growing faster than the market,” Fabrowsky says. In the semiconductor market, the ultimate discipline is making chips for vehicles. Bosch has been making vehicles smart since the 1970s, when it started equipping them with its application-specific integrated circuits (ASICs). In a car, chips are exposed to strong vibrations and extreme temperatures that range from far below zero to far above 100 degrees Celsius. This requires higher standards for the toughness of these special components. Developing semiconductors that can withstand these stresses for a vehicle’s entire lifetime is an intensive process. Here is where Bosch leverages its special dual role: while other companies can process the information collected from semiconductors, Bosch can also apply its deep understanding of the physical principles at work in the chips, and of how to gather the data and ultimately integrate it into the vehicle systems. “Our comprehensive expertise in semiconductors helps us to both develop new automotive functions and steadily improve the chips themselves,” Fabrowsky says. Bosch holds over 1,500 patents and patent applications for engineering and manufacturing its semiconductors.

Electromobility and driver assistance systems boost demand

Bosch’s current semiconductor portfolio focuses on microelectromechanical systems (MEMS), ASICs for vehicle ECUs, and power semiconductors. Without the latter, there would be no hybrid or electric vehicles, as they regulate the electric motor and make sure that the battery is being used as efficiently as possible. “Power electronics for hybrid and electric vehicles are a growth driver for Bosch,” Fabrowsky says. Besides electrification, continued strong growth in demand for driver assistance systems is ensuring that more semiconductors with more and more functions are finding their way into cars. Chips with built-in “intelligence,” known as ASICs, are tailored to a particular application; for instance, signaling to airbags in a vehicle when they should deploy. These chips control handling to ensure a consistently safe journey. They also boost the measured signal from radar sensors, so that the proximity warning always functions reliably. “Progress in microelectronics is what made development of assistance systems and automated driving possible in the first place,” Fabrowsky says. Bosch microelectromechanical systems, or MEMS for short, are the sensory organs of modern vehicles. They supply a vehicle’s ECUs with important information regarding its handling, such as if the vehicle is braking or accelerating, or if it is skidding on a smooth road surface. The ESP electronic stability program uses this information to keeps cars, trucks, and even motorcycles safely on track and in their lanes.

MEMS sensors tell runners how many calories they are burning

As a key technology for the internet of things (IoT), Bosch semiconductors have applications that extend far beyond the world of vehicles. The company's sensors can be found in more than half the world's smartphones, and are indispensable for fitness trackers, drones, game consoles, and smart home applications. When it comes to MEMS sensors, Bosch is both a pioneer and the world's leading manufacturer. More than 20 years ago, the supplier of technology and services itself developed the microfabrication technique, known worldwide as the "Bosch process," used to make these semiconductors.

One billion euros for one of Europe's most advanced wafer fabs

Bosch is underpinning its growth strategy for semiconductors with the single largest investment in the company's history: it is putting some one billion euros into a new wafer fab in Dresden, which will manufacture 300 mm wafers. Following a rollout phase, pilot manufacturing operations are expected to start at the end of 2021. Compared with conventional 150 and 200 mm wafers, 300 mm wafer technology offers greater economies of scale. Up to 700 associates will be involved in the highly automated chip manufacturing process, working to plan, manage, and monitor production. After Reutlingen, the Dresden plant will be Bosch's second wafer fab in Germany. With it, the company aims to expand its manufacturing capacity, and thus to further boost its competitive edge in global markets.

Press photos: #1136637, #1136646, #1339965, #1373444, #1371812, #1373446, #1687945

Additional information:

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BOSCH AT ELECTRONICA 2018 IN MUNICH

- **BOOTH: Tuesday through Friday, November 13-16, 2018**
  Booth 522 in hall C3
- **FOLLOW** the Bosch electronica 2018 highlights on Twitter: **#BoschMEMS**

- **PANELS WITH BOSCH EXPERTS:**
  - **Monday, November 12, 2018, 12:30 p.m.:** Presentation: “Sensors enabling future mobility solutions” with Dr. Markus Sonnemann, Vice President of Advance Engineering MEMS Sensors at Robert Bosch GmbH; electronica Automotive Conference of Messe München
  - **Tuesday, November 13, 2018, 11:30 a.m.:** Presentation: “MEMS – One product one process?” with Dr. Udo-Martin Gómez, Senior Vice President of Engineering MEMS Sensors at Robert Bosch GmbH; SEMICON Europa; Fab Management Forum; ICM München; room 14c
  - **Tuesday, November 13, 2018, 3:00 p.m.:** Automobilwoche’s electronica Talk from the Top with Jens Fabrowsky, executive management member of the Automotive Electronics division at Robert Bosch GmbH; Discovery Stage in hall C6
  - **Tuesday, November 13, 2018, 3:30 p.m.:** Presentation: “MEMS mobility sensors for motion detection” with Michael Rupp, Senior Expert for Product Management Sensors at Robert Bosch GmbH; electronica Automotive Forum in hall B4
  - **Wednesday, November 14, 2018, 3:10 p.m.:** Presentation: “The future of MEMS-based smart sensor nodes in the context of highly functional and ultra-low power IoT applications” by Dr. Ralf Schellin, Head of the MEMS business unit at Bosch Sensortec GmbH; International Congress Center (ICC)

Mobility Solutions is the largest Bosch Group business sector. In 2017, its sales came to 47.4 billion euros, or 61 percent of total group sales. This makes the Bosch Group one of the leading automotive suppliers. The Mobility Solutions business sector pursues a vision of mobility that is accident-free. emissions-free, and stress-free, and combines the group’s expertise in the domains of automation, electrification, and connectivity. For its customers, the outcome is integrated mobility solutions. The business sector’s main areas of activity are injection technology and powertrain peripherals for internal-combustion engines, diverse solutions for powertrain electrification, vehicle safety systems, driver-assistance and automated functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, repair-shop concepts, and technology and services for the automotive aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP anti-skid system, and common-rail diesel technology.

The Bosch Group is a leading global supplier of technology and services. It employs roughly 402,000 associates worldwide (as of December 31, 2017). The company generated sales of 78.1 billion euros in 2017. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group’s strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm.

In short, Bosch creates technology that is "Invented for life." The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiary and regional companies in 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company's future growth is its innovative strength. At 125 locations across the globe, Bosch employs some 64,500 associates in research and development.

To learn more, please visit www.bosch.com, iot.bosch.com, www.bosch-press.com, twitter.com/BoschPresse.