

Mems Automobile Sensors Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

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Report description:

The MEMS automobile sensor market is expected to grow by registering a CAGR of about 14.61% over the forecast period. The increased demand for safety applications, the inclusion of new functionalities in automobiles, and the availability of robust, reliable, and cost-effective sensors are expected to drive the MEMS automobile sensor market in the forecast period.

Key Highlights

MEMS sensors have become an indispensable part of vehicles. From the first versions used in motor vehicles, such as the accelerometer, this sensor technology has evolved significantly to become the most prominent technology driver for automotive applications. In most advanced vehicles, these delicate sensors continuously supply the automotive system with precise data, based on which the connected electric control units trigger necessary actions in real-time.

The growing demand for safety and security in automobiles is one of the main factors that play a vital role in the market's growth. According to the World Health Organization, more than 1.5 million people are killed in road accidents yearly, and about 50 million people get injured. As MEMS sensors play a critical role in improving the safety features of vehicles, such trends act as catalysts for the growth of the market.

Moreover, electrification and automation are two significant trends in the automotive industry. The emergence of electric vehicles (EVs) in the industry has dramatically impacted the demand for and distribution of pressure and magnetic sensors. It is expected to increase the demand in the long-term further. Increasing sales of electric cars are thereby increasing the demand for sensors. Furthermore, the increasing integration of various positioning and high-value sensing modules, such as RADAR, LIDAR, and imaging in automotive systems, is expected to create significant opportunities during the forecast period.

In addition, strict government regulations encourage automotive manufacturers to include mandated safety systems, such as tire pressure monitoring systems (TPMS) and electronic stability control (ESC), in new vehicles in major automotive markets, creating new use cases for implementing MEMS sensors. Various manufacturers are also making several product innovations to grab the

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market's opportunities. For instance, at CES 2021, TDK announced Smart Automotive IAM-20685, an automotive grade 6-axis ASIL-B MEMS IMU.

MEMS devices vary from a relatively simple structure to highly complex ones with multiple moving elements under the control of integrated microelectronics. Hence, the industry faces various challenges during the complex manufacturing process. Additionally, these sensors often have a more significant drift over temperature, which further challenges the growth of the market.

Additionally, due to the COVID-19 pandemic, the demand for automotive slowed down, along with the effect on the supply chain of automotive parts. Over the short to medium term, the pandemic delayed the development of advanced technologies, such as autonomous driving, as automakers divert research budgets to fund immediate cash requirements. However, with the condition improving and the automotive sector gaining momentum, the industry is expected to offer ample growth opportunities during the forecast period.

MEMS Automobile Sensors Market Trends

Airbag Deployment Sensors to Witness a Significant Growth

MEMS sensors play a vital role in improving the safety features of vehicles. With the evolution of autonomous driving, the demand for these sensors is expected to increase multiple-fold for safety-based applications, such as airbag deployment. To reduce accident levels, governments are framing stringent regulations, pushing automotive vendors to implement the latest MEMS-based sensors in airbag deployment systems, creating growth opportunities for the market.

Crash sensing for airbag control is among the largest automotive application areas of inertial MEMS sensors. In this application, an accelerometer continuously measures the acceleration of the car. When the preset parameter goes beyond the threshold, the airbags are fired. The resulting increase in reliability and reduction in the price of the airbag system is further bringing about its near-universal inclusion in cars.

Considering the growing rate of road accidents, governments across various countries are framing stringent regulations that promote the use of airbags. A minimum two airbag rule came into effect in India. The government proposed that automobile manufacturers include six airbags as standard across all variants, regardless of the body style or segment. Such trends are expected to create more growth opportunities in the market.

The past years have witnessed significant growth in the sale of luxury vehicles, especially in developing countries. As these cars usually contain more airbags, the sales growth is expected to impact the growth of the market positively. For instance, recently, BMW, one of the leading luxury car brands, sold 2.52 million units of cars globally. Furthermore, the increasing demand for electric and hybrid vehicles is also expected to positively impact the growth of the market as these vehicles usually come with advanced safety and comfort features.

Asia-Pacific to Exhibit the Fastest Growth Rate

Due to the rapidly growing automotive industry in economies such as China, India, and Japan, the Asia-Pacific is expected to exhibit the highest growth rate in the automotive MEMS sensors market. For instance, according to OICA, last year, China was the leading automobile manufacturer globally, with a production volume of about 26 million vehicles. China was followed by the United States, Japan, and India in annual vehicle production volume.

The standardization of autonomous driving and ADAS is accelerating in China. For instance, last year, the Chinese government issued three new national safety standards (Electric Vehicle Safety Requirements, Electrical Vehicle Traction Battery Safety Requirements, and Electric Bus Safety Requirements). These mandatory standards put forward safety requirements for the battery pack and vehicle, including the implementation of early battery failure detection mechanisms.

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A similar trend is being adopted by other countries of the Asia-Pacific region, considering the growing number of road accident cases. For instance, to encourage automobile manufacturers to provide advanced safety features and boost the "export worthiness" of vehicles produced in the country, the Indian Ministry of Road Transport and Highways (MoRTH) proposed to introduce a safety rating system, Bharat New Car Assessment Program (BNCAP), for passenger cars, in June this year. Furthermore, countries such as Japan and South Korea are progressing fast to develop autonomous vehicles. For instance, the South Korean government plans to pursue full autonomy and wants half of its domestically-built cars to be fully autonomous by 2035. As these vehicles need minimal manual intervention, sensors play a crucial role in their successful operation. Hence, the growth of the autonomous vehicle industry is expected to drive the demand for MEMS sensors further.

MEMS Automobile Sensors Market Competitor Analysis

The MEMS automobile sensors market is fragmented in nature and consists of many global and regional players, such as, STMicroelectronics NV, Panasonic Corporation, Robert Bosch GmbH, Analog Devices Inc., and Infineon Technologies AG. These players focus on expanding their customer base across the globe. They focus on the research and development investment in introducing new solutions, strategic alliances, and other organic and inorganic growth strategies to earn a competitive edge over the forecast period.

In October 2022, Zvision, a leading provider of automotive-grade MEMS LiDAR solutions in China, and NVIDIA signed a collaborative agreement whereby Zvision joined the NVIDIA Jetson ecosystem as one of the platform's key LiDAR sensor partners. Through this agreement, Zvision plans to leverage NVIDIA's full-fledged software toolchains and lead AI chip hardware to develop a range of solid-state LiDAR-based autonomous driving sensors and systems.

In April 2021, STMicroelectronics unveiled AIS2IH three-axis linear accelerometer, a next-generation MEMS accelerometer for high-performance automotive applications. These accelerometers bring enhanced resolution, mechanical robustness, and temperature stability to non-safety automotive applications, including telematics, anti-theft, infotainment, vehicle navigation, and tilt/inclination measurement.

Additional Benefits:

The market estimate (ME) sheet in Excel format
3 months of analyst support

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