

# Trends in the automotive electronics industry for 2020

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The automotive industry exhibited multiple facets in 2019. While on one side automotive production on a global basis slowed down due to headwinds coming from macroeconomic forces and trade tensions, the transformation of the market and, more in general, of the concept of mobility continued. Key secular trends driving automotive business remain intact and the momentum continues to accelerate. Despite the current slowdown in vehicle production, automotive will continue to be among the fastest growing semiconductor end markets for a long time. In the automotive market, the adoption of electric vehicles and active safety continue to accelerate driving strong growth in power semiconductor and sensor businesses.

The transformation of mobility will continue in 2020. From a high level we are seeing disruptive developments such as commercially operated sharing services (from e-scooters to cars) in urban areas, making it even less necessary to own a vehicle if you live in a city. In certain areas and situations, the car is moving away from a pure ownership model towards a 'pay per journey' one. This trend will inevitably result in cars being more highly utilised, which puts increased pressure on the reliability of vehicles, down to the very last component.

Semiconductors are now critical for the car OEMs – they are the key enablers of this revolution and represent a significant portion of the cost of a vehicle. The traditional supply chain is changing, as OEMs and Tier 1 suppliers now see the benefit and value in working more closely with semiconductor manufacturers. At a lower level, where it impacts the engineer, we are also seeing change. The continued electrification of the drivetrain and move towards autonomous vehicles is a fundamental development impacting how vehicles are designed, built, utilised and recycled. This will continue to drive demand for semiconductor solutions designed specifically for this growing application area throughout 2020.

Reduction in vehicle emissions will continue to accelerate to meet more stringent government regulations. Environmental concerns are also creating increased consumer awareness. In the next years, more than half of vehicles produced globally will be electrified in some way – from Mild-Hybrid to PHEV / BEV. Innovations in traditional silicon and wide-band gap technologies will drive improved performance allowing to further reduce CO2 emissions, increase vehicle range and decrease charging times. Improved battery technology and cost are also contributing to better vehicle performance and are making these vehicles affordable for a larger group of consumers.

The request for power components in 2020 (and beyond) will grow exponentially due to the market penetration of



electrified vehicles. ON Semiconductor is a leader in the technologies, which are fundamental to the continued development of HEV/EV technology. The market release of power transistors based on Super Junction High Voltage MOSFETs, Silicon IGBTs, Silicon-Carbide (SiC) and Gallium Nitride (GaN), which are essential in high-voltage applications, is well underway. ON Semiconductor is one of the very few companies that can offer a fully independent, vertically integrated supply chain (from substrates to assembled finished components) with a global, extensive manufacturing footprint (including the recently acquired 300mm wafer fab in East Fishkill, NY).

Another major change on the horizon is, of course, autonomy and as the number of pilot projects increases, the enabling technologies continue to develop as well. While we can't expect to see Level 5 autonomous vehicles in 2020, the release to market of L2+ / L2.5 vehicles are accelerating. These vehicles have, in specific situations / use cases, the ability to operate at L4 autonomy levels.

The ecosystem surrounding autonomous vehicle development needs to expand as well. Vehicles are no longer a collection of independent sub-system but interconnected functions designed to work closely together. Data needs to be exhaustive, redundant, shared by multiple systems and users. This data needs to be

available locally and centrally; used to train the machine learning algorithms and, at the same time, to make decisions while the vehicle is operated. The data is generated by a variety of sensors – complementary and redundant. The demand for advanced sensors and sensor fusion, which provides vehicles with the input they need to be more aware of their surroundings, is increasing. This data will also be shared externally (with other vehicles and to the cloud) through V2X networking.

This will be essential in automated driving levels 2+ / 2.5 through 5, as vehicles not only become aware of their surroundings, but enabled and required to act in the face of unpredictable road conditions. This change isn't going to happen overnight, but the technology to support this vision is already being integrated into vehicles to provide automation levels 1 and 2. This is largely focused on sensing, using ultrasonic, vision, radar and LiDAR sensors. ON Semiconductor is actively developing and acquiring new sensing technologies to address this growing demand, which we predict will accelerate during 2020. The natural evolution of sensing technology will enable future levels of autonomy, based on developments being made right now.

The way we think about vehicles is already changing and it will continue to change as we strive to achieve Vision Zero; a world without road deaths, accidents, failures and emissions.

As the seventh largest supplier of semiconductors to the automotive electronics industry, ON Semiconductor is dedicated to the cross-industry Vision Zero initiative and driven by its own Zero Defects strategy. This philosophy is applied in every automotive product we design, manufacture, supply and support. As the global leader in power semiconductors and sensing technologies, we are enabling the continued electrification of vehicles and the development of ADAS / autonomous driving systems already today. ON Semiconductor will continue to focus and drive innovations on power management, in-vehicle networking and advanced sensing, during 2020 and the near future.

