

The role of semiconductor industry for carbon-free mobility

Global issues such as increasing electricity demand, limited mobility in large communities and CO₂ emissions, just to cite some, can be greatly mitigated thanks to the progress in power electronics. In particular e-mobility can be enabled thanks to the advent of new semiconductors such as silicon carbide (SiC) and gallium nitride (GaN). These new materials are replacing silicon in a large variety of energy converters thanks to their intrinsic capability to improve efficiency, reduce the weight and size of electronic systems and in the end to increase power density or, said differently, to enable miniaturization on large scale. This is particularly true for electric vehicle (EV) that are benefiting from the industrialization of SiC transistors. Commercial vehicles already equipped with this new family of devices have longer driving ranges for a given battery pack, generate less heat and make electronics lighter while reducing the need for installing bulky and expensive cooling systems. Improvements are also visible in other systems like on-board chargers, for instance. The charging infrastructure that completes the e-mobility eco-system is also taking advantage from these new semiconductors. The GaN is also very promising and will come hand in hand with SiC to address numerous power conversion systems. Worth being stressed is also the role of digital electronics to suit the requirements for EV's safety features and connectivity that are pre-requisites for autonomous driving.