PRESS RELEASE

Fraunhofer IZM is putting the electric car in the fast lane

Silicon carbide has been undergoing testing for several years within the research sector as a promising alternative material in the semiconductor industry. In the SiC Modul project, the power semiconductor is now to be put on the road to industrial production.

Skeptics of electromobility have raised critical questions, such as how fast an electric car can be driven and the maximum distances it can cover. That depends on the built-in power electronics – the heart of electromobility, if you will. Three factors are decisive when it comes to the installation of power electronics: space, weight, and efficiency. The semiconductor material silicon carbide (SiC) meets these conditions because it has a higher degree of efficiency and can or must be installed more compactly than conventional semiconductors made of silicon only.

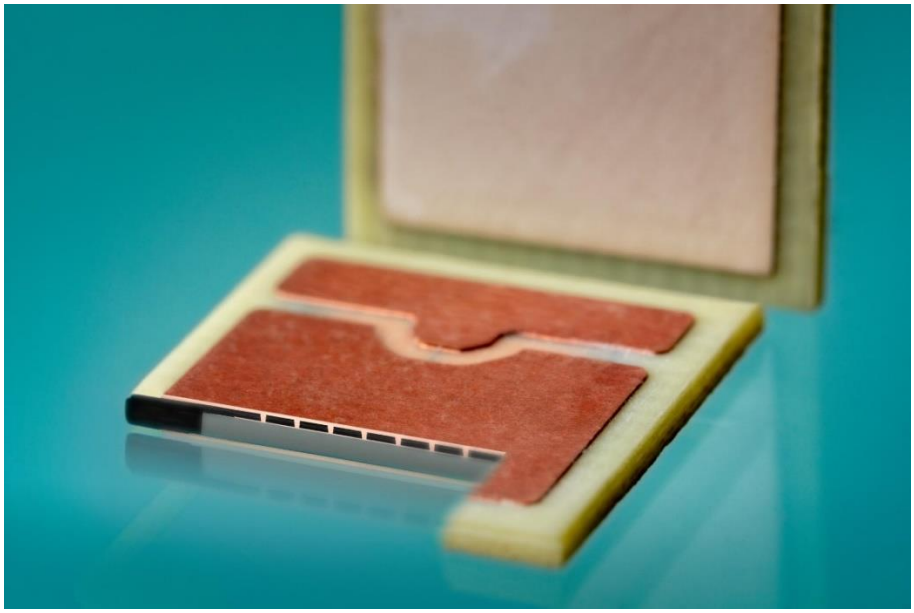
Although some electric cars already run on SiC semiconductors, there is still considerable potential here to fully exploit the efficiency of the SiC semiconductor material. The key to the success of SiC lies in the packaging of the semiconductors. In order to be able to use the material for large-scale industrial production, the SiC Modul project will take industrial framework conditions into consideration right from the start. For example, the module being developed within the project is based on a traditional printed circuit board design that has already been established in industry and is easy to implement.

At the same time, the module will include the latest lessons learned from research: the semiconductor is not contacted with a wire bond connection, but is embedded directly into the circuit via a galvanically produced copper contact, meaning that the cable can be shortened and the power routing can be optimized. The potential customer is also involved in the development process: in the first year of the project, a requirement specification was drawn up in which the electrical, thermal, and performance requirements for the module and the semiconductors were defined. The specifications that the product must meet were drawn up and agreed in close collaboration with users such as automobile manufacturers, component suppliers, and component manufacturers.

Lars Böttcher is group manager at Fraunhofer IZM and subproject manager for the SiC project. He explains: “We are going beyond general feasibility,” because the intention is that the project should develop more than just a prototype. The aim is therefore to put both the new semiconductor material silicon carbide and the embedment technology towards series production.

Editorial team
Georg Weigelt | Fraunhofer Institute for Reliability and Microintegration IZM | Phone +49 30 46403-279 |
Gustav-Meyer-Allee 25 | 13355 Berlin | Germany | www.izm.fraunhofer.de | georg.weigelt@izm.fraunhofer.de |

The project is funded by the German Federal Ministry of Education and Research as part of the E-Mobility call with a project volume of 3.89 million euros and runs from January 2018 to December 2020. As well as Fraunhofer IZM, seven other partners are participating in the project.



Embedded silicon carbide on the way towards series production in electromobility | © Volker Mai / Fraunhofer IZM

Research of practical utility lies at the heart of all activities pursued by the **Fraunhofer-Gesellschaft.** At present, it maintains 72 institutes and research units. The majority of the 26,600 staff are qualified scientists and engineers, who work with an annual research budget of 2.6 billion euros. Of this sum, 2.2 billion euros is generated through contract research. More than 70 percent of the Fraunhofer-Gesellschaft's contract research revenue is derived from contracts with industry and from publicly financed research projects. Almost 30 percent is contributed by the German federal and state governments in the form of base funding, enabling the institutes to work ahead on solutions to problems that will not become acutely relevant to industry and society until five or ten years from now.

Fraunhofer IZM specializes in industry-oriented applied research. With four technology clusters, Fraunhofer IZM covers the entire spectrum of technologies and services necessary for developing reliable electronics and integrating new technology into applications. Our customers are as varied as the applications for electronics. We take on development projects for the automotive industry, healthcare and industrial electronics and even textile companies. Fraunhofer IZM has two sites in Germany. Apart from its headquarters near Berlin Mitte, the institute is also represented in Dresden, a strategically important centers for electronic development and manufacturing.

Specialist contact
Lars Böttcher I Phone +49 30 46403-643 I lars.boettcher@izm.fraunhofer.de | Fraunhofer Institute for Reliability and Microintegration IZM, Berlin I www.izm.fraunhofer.de