1200V SiC MOSFET vs Silicon IGBT: Technology and cost comparison

New SiC MOSFET technologies are trying to compete with well-established silicon IGBTs, but will they succeed?

The report provides an in-depth analysis of the latest innovations in 1200V power devices showing the differences between silicon field-stop, punch-through (PT) and carrier stored trench bipolar transistor IGBTs and planar and trench silicon carbide (SiC) MOSFETs from the technical and economic points of view. It includes details on manufacturing processes and materials, packaging structures, component designs, die sizes, electrical performance, current density, and more.

Silicon IGBT technology was first commercially released in 1986 with a PT technology and continues to improve and develop. SiC MOSFETs offer new capabilities, such as the possibility of working at higher frequencies and temperatures.

SiC MOSFETs are good candidates to enter the 1200V power device sector, but the high manufacturing cost and at improvement of silicon IGBTs will keep the latest models on the market and drive towards standardization and popularization of these devices.

To understand technological innovations in silicon IGBTs and SiC MOSFETs, we have opened and analyzed 16 devices from 7 different manufacturers: Infineon, STMicroelectronics, Fuji Electric, IXYS, Mitsubishi, Rohm, and Wolfspeed. The report includes detailed pictures of device structures and cost breakdown analyses of the manufacturing processes.
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**POWER CoSim+** is a process-based costing tool used to evaluate the manufacturing cost per wafer using your own inputs or using the pre-defined parameters included in the tool.

**POWER Price+** is a parametric costing tool used to evaluate the manufacturing cost of devices using few process related inputs. All these tools are on sale under corporate licence.
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CREE 1200V SiC Module 2nd Generation SiC MOSFET with Z-Rec Diode SiC

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