



# Press release

## Key topic power electronics

### Core components of a sustainable world

20. September 2023

- Industry segment with large share in the power electronics market
- Significantly higher efficiencies due to wide bandgap semiconductors
- SiC frequency converter for electric cars at productronica

Power electronics has a vital role to play in the generation, distribution and use of electrical energy in nearly all branches of industry, where it is contributing significantly to the efficiency of increasingly sustainable communities. productronica will present all the relevant developments along the innovation and value chain from power semiconductors from November 14 to 17, 2023. Conceptual sponsor of the most important event for the industry is VDMA Productronics.

Power semiconductors are indispensable for the transformation into a climate-neutral and digital society. The industry, renewable energies, and automotive sectors, in particular, are driving a rising demand. The goals are always to reduce CO<sub>2</sub> emissions, increase system efficiencies and advance digitalization. The analysts from the Yole Group expect the global power electronics market to grow from USD 20.9 billion (2022) to USD 33.3 billion by 2028 at a compound annual growth rate (CAGR) of 8.1 percent. They name governmental regulations, the expansion of renewable energies and the demand for energy-efficient solutions as the reasons for this trend.

### **Power electronics for industry**

According to Spherical Insights, the industry segment holds the largest market share with over 24 percent, as power electronic devices and systems find widespread usage in motor drives, power supplies, robotics and process control. With regards to the continuous growth of industrial automation, the analysts also consider the industry segment to still be an essential driver of the power electronic market. The industrial sector in particular requires reliable and efficient power electronics in order to increase productivity, reduce energy consumption and optimize manufacturing processes. Every failure in the field can lead to enormous costs. Innovative test solutions from productronica exhibitors Rohde&Schwarz, Viscom, Löhnert, CRS Prüftechnik and SPEA address this issue.

### **Silicon, silicon carbide and gallium nitride**

Power electronics is divided into three main segments based on the types of material used: silicon, silicon carbide and gallium nitride. The choice of semiconductor material significantly affects the performance, efficiency and reliability of the system. The competitive cost/performance ratio of silicon makes it still the most widespread semiconductor material. However, it reaches its limits when it comes to what operating frequencies and breakdown voltages it can achieve. Because of this, components made of gallium nitride (GaN) and silicon carbide (SiC) are increasingly entering the field. Inverters based on wide bandgap semiconductors enable faster and lower-loss switching with significantly higher efficiencies. They are able to switch higher voltages at higher frequencies – with less cooling required. Shorter switching times significantly reduce energy losses and at the same time are able to tolerate more compact passive components such as inductors or capacitors.

Because of the lengthier and more complex manufacturing processes they require, chips made from silicon carbide and gallium nitride are significantly more expensive than their silicon counterparts. However, the manufacturers expect to reduce costs by switching to 300-mm wafer technology.

The choice between silicon, silicon carbide and gallium nitride ultimately depends on the specific requirements of the application, including power, switching frequency, temperature and cost.

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### **SiC in motion**

Silicon carbide offers significant advantages for the power electronics of electric vehicles in particular. That's because more efficient and compact drive and charging systems increase ranges and shorten charging times. For that reason, SiC is a key technology for the future of mobility for many car manufacturers and suppliers.

In [Hall B2, Stand 448](#), VDMA co-exhibitor Breuer-Motoren is presenting a SiC inverter power amplifier developed as part of the research project "SiC-Mobil – SiC frequency converter for electromobility" as a test platform for investigating the reliability, service life, EMC and efficiency of fast-switching SiC power semiconductors.

### **Power electronics at productronica**

In cooperation with the [Productronics Department of the VDMA](#) – the conceptual and technical sponsor of productronica – lectures and live demonstrations in Hall B2 Stand 448 will cover the topic of power electronics.

In the [Semiconductors Cluster](#), the productronica exhibitors will show their latest innovations in these areas.

With [SEMICON Europa](#), which is once again taking place alongside productronica, the world's leading trade fair for development and manufacturing is expanding its offering in the semiconductor manufacturing industry.

**More information:** [www.productronica.com](http://www.productronica.com)

### **productronica**

productronica is the world's leading trade fair for electronics development and production and is supported from a conceptual and technical perspective by the Productronics Department of the VDMA (German Mechanical Engineering Industry Association). The trade fair has been held in Munich every two years since 1975 and the next productronica is due to take place from November 14 to 17, 2023.

### **productronica worldwide**

In addition to productronica, Messe München organizes productronica China, productronica South China and productronica India. The network of electronics trade fairs also includes electronica in Munich, electronica China, electronica South China, electronica India, Smart Tech Asia, electronicAsia and LOPEC.

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### **Messe München**

Messe München is one of the leading exhibition organizers worldwide with more than 50 of its own trade shows for capital goods, consumer goods and new technologies.

Every year, about 50,000 exhibitors and around 3 million visitors take part in more than 200 events at the exhibition center in Munich, at the ICM – Internationales Congress Center München, the Conference Center Nord and the MOC Veranstaltungszentrum München, and also abroad.

Together with its subsidiary companies, Messe München organizes trade fairs in China, India, Brazil, Russia, Africa, Turkey, and Vietnam. With a network of associated companies in Europe, Asia, and South America, and with around 70 offices worldwide for more than 100 countries, Messe München has a global presence.