# Industrial
# Solutions

Pushing innovation to create intelligent power and sensing technologies that solve the most challenging customer problems.

# onsemi

# Industrial Solutions

Within the industrial space, **onsemi** helps OEMs develop innovative products and navigate the ongoing transformation across Energy Infrastructure, Industrial Automation, Smart Buildings, and Power Conversion. From wide-bandgap technologies (SiC and GaN), power MOSFETs, IGBTs, and gate drivers to state-of-the-art imaging, depth sensing, and connectivity devices, our versatile portfolio helps OEMs tailor their designs to fulfill the needs of every application.

With decades of experience in power conversion and management, motion, and a variety of sensing and connectivity solutions, **onsemi** brings the expertise and technologies necessary to address present and future environmental challenges and to support the opportunities of e-mobility and the fourth industrial revolution.

# Energy Infrastructure Solutions

**onsemi** leverages decades of experience in innovative technologies—reliable, highly efficient, and quality next-gen power semiconductors to shorten your development time while exceeding your power density and beating power loss budgets. We help you and your manufacturing team sleep better at night, knowing you have helped make the world better.

### DC Fast EV Charging

Our leading silicon carbide (SiC) technology and continuous innovation in packaging solutions help simplify the design process of EV chargers. With a comprehensive portfolio of discrete power and analog solutions, protections, sensing, and connectivity, **onsemi** offers high-quality components to tailor the system to your needs. Our system expertise has been fostered over the last 20 years while bringing together all these technologies to deliver well-rounded solutions.



### Energy Storage

**onsemi**'s long-term expertise and leading role in renewable energy generation, power management, and energy conversion help customers across the globe handle the challenges of Energy Storage Systems. We create suitable solutions for the evolution of the power grid.

### Solar Power

The falling cost of solar panels and increased regulations for zero-carbon energy have led to increasing solar power generation installations worldwide. The transformation of our energy system will require solutions with the highest efficiency, reliability, and safety. **onsemi**'s boost and inverter Power Integrated Modules (PIMs) anchor the grid-interface electronics using our gate drivers, sensing, control, and peripheral power products complete the system.

### Uninterruptible Power Supply (UPS)

**onsemi**'s silicon carbide (SiC) and innovative packaging technologies are the gateways to improved density, reducing system losses and simplifying cooling, thus improving overall system reliability across a wide range of mission-critical UPS systems. We developed our system expertise into optimized power modules supporting all key power stage topologies, power discretes, and tailored isolated gate driver solutions. We recognize the critical nature of UPS systems, so we have formulated an "infrastructure-class" reliability framework. Our robust physical modeling delivers predictable simulation results that reflect real-world operation, thus accelerating development time.

# Fully Vertical Integrated Supply Chain – From Crystal to System

**onsemi** is the only supplier of silicon carbide solutions with a fully vertical integration capability, including SiC boule growth, substrate, epitaxy, device fabrication, best-in-class integrated modules, and discrete package solutions.

Solutions based on SiC have more power and higher efficiency. **onsemi** brings a unique value proposition with its breadth and depth of high-efficiency intelligent power solutions. **onsemi** offers a host of SiC solutions giving customers the flexibility to choose from discrete or module solutions based on their system requirements, including SiC diodes, SiC MOSFETs, SiC modules, and silicon and SiC hybrid modules.

**onsemi** provides technical support with a world-class team, complete ecosystem design tools, and detailed technical documentation of physical, scalable SPICE Models to support customers at each stage of their design and development. With years of manufacturing expertise, substantial capital investment in verticalization, and expanded R&D efforts, **onsemi** enables its customers to achieve their goals.

**onsemi** Silicon Carbide Wafers

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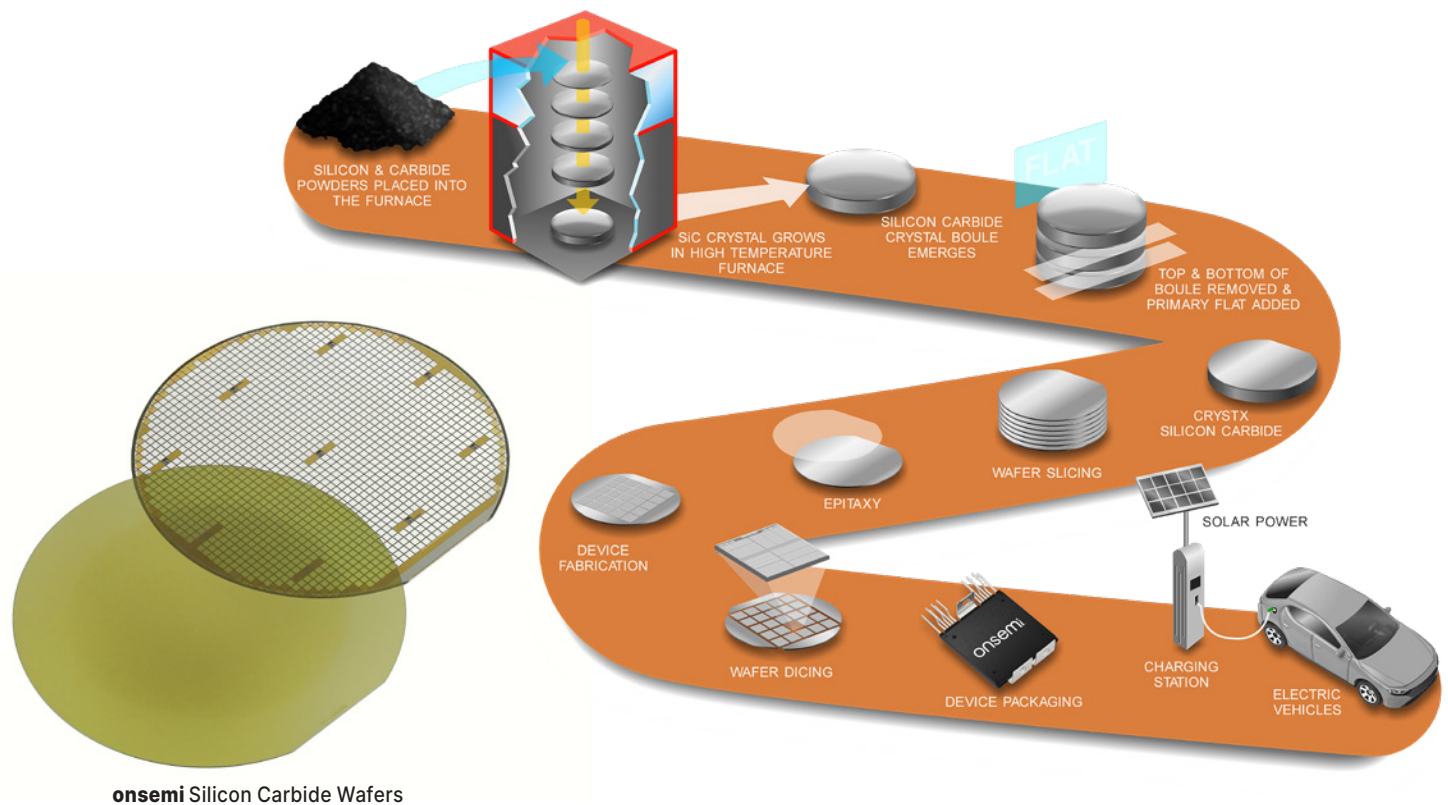
## Machine Vision

- Image Sensors
- Image Processors
- DC-DC Power Conversion

## Robotics

- Motor Control
  - ecoSpin™ motor controllers
  - Gate Drivers
  - MOSFETs
  - Motor Development Kits
- Intelligent Sensing
  - Image Sensors
- Power Supply
  - AC-DC Power Conversion
  - DC-DC Power Conversion
- Connectivity & Lighting
  - Intelligent LED Drivers with VLC
  - Bluetooth® Low Energy solutions
  - Industrial Ethernet (10BASE-T1S)

## Power Conversion

- MOSFETS
- DC-DC Power Conversion
- AC-DC Power Conversion
- Linear Regulators (LDO)
- IGBTs
- Voltage Protection

## Connected Lighting

- Intelligent LED Drivers with VLC
- Bluetooth® Low Energy solutions
- Power over Ethernet (PoE) solutions

## Industrial Drives & Pumps

- Motor Drivers
- ecoSpin Motor Controllers
- Gate Drivers
- MOSFETs

**Industrial Automation**

**Smart Buildings**

**Energy Infrastructure**
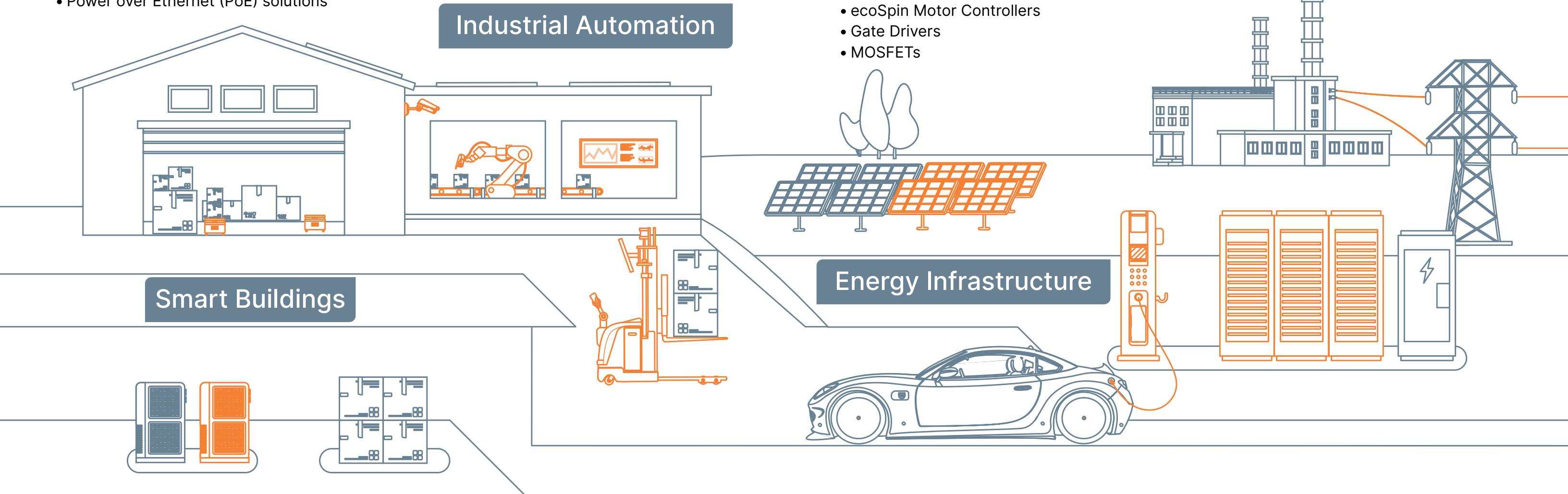
# Industrial Automation Solutions

**onsemi** is driving the next industrial revolution with the most reliable, intelligent, and energy-efficient technologies that accelerate the growth of fully autonomous manufacturing environments. We provide high-speed intelligent sensing for robotics, scanning, and inspection and the most comprehensive intelligent power portfolio across all voltages and technologies, helping OEMs optimize their production flows, reduce risk, and lower operating costs.

## Power Conversion

There is an increasing focus on achieving higher and consistent power conversion efficiencies at any load in high-voltage applications such as industrial/factory automation and other adjacent markets. As such applications are seeking a high level of performance in addition to an equal emphasis on carbon footprint reductions, future-ready power conversion topologies are fundamental to making such applications commercially viable and sustainable. As the industry leader in supplying integrated and discrete power conversion semiconductors, **onsemi** has always worked with its partners to address the principal challenge of achieving higher power efficiency and performance. We offer several topologies, including boost, fly-back, and quasi-resonant, with the choice of monolithic ICs or discrete implementation.

## Industrial Lidar

LiDAR sensing is a trending solution for Industrial Automation and Control Systems because it is cost-effective, highly accurate, fast, and scalable. LiDAR sensing using SiPM (Silicon Photomultiplier) arrays enables object detection and avoidance, and movement and occupancy detection.

**onsemi** SiPM arrays feature an innovative fast mode that decreases sensing time. Our SiPM technology has industry-leading efficiency and dynamic range, enabling the sensors to work in various environments, including direct sunlight. **onsemi** offers LiDAR solutions alongside a wide range of LiDAR development platforms and tools supported by highly technical and experienced applications engineers to assist product development.

## Machine Vision

With the most image sensor offerings from VGA up to 45 MP, **onsemi** has the most suitable resolution to make your machine vision camera a reality. Our intelligent sensing solutions are developed with nearly fifty years of imaging expertise and proprietary pixel design processes, enabling the highest resolution image capture. Offering unique features tailored to the machine vision market, **onsemi** image sensor families provide the industry's best global shutter efficiency and frame rates exceeding modern camera needs. These features, alongside system components designed specifically for our sensors, allow you to develop reliable inspection cameras that capture high-quality images without blurriness.

## Asset Management

IoT technology has transformed asset management by digitizing objects and providing real-time, actionable data and insights into the asset's state of being (monitoring) and location (tracking). The need for businesses to manage what is most important to them has always been significant. It is even more prevalent with the COVID-19 crisis escalating the need for automated processes and cost reductions. It has also given rise to new asset management applications, including people flow and monitoring social distancing.

# Industrial Automation Solutions (cont.)

## Industrial Drives

Electrical drive systems are a vital component of automation systems in the industrial context since they account for a large proportion of electrical energy consumption. Such drive systems have a central function in achieving energy savings. With automation growing at an increasing pace, the motor drive is the backbone of the future industrial facility. This growth challenges us to further focus on the efficiency of industrial drive systems while designing for higher currents, more accurate control, and better system reliability. **onsemi**'s complete portfolio of motor drive solutions addresses this challenge with our industry-leading MOSFETs, IGBTs, gate drivers, and power modules that provide the building blocks for high-power motor drive. In contrast, our motor driver family supports various lower voltage motors, including brushed, brushless, and steppers. Galvanic isolation and high-performance op-amps allow for safety and control, completing the system solution.

## Robotics

Along with the acceleration of digital transformation and the transition to Industry 4.0, the robotics market is flourishing in many industries, from automotive and manufacturing to logistics, medical care, and transportation, to name a few. As robots become more intelligent and capable of interacting and working together with humans, the number of necessary technologies increases, from motion to machine vision and autonomous navigation to sensing and connectivity.



We bring a well-rounded portfolio of differentiated products and years of application expertise to help customers develop innovative robotic systems—from traditional or collaborative robotic arms to Automated Guided Vehicles (AGV), Autonomous Mobile Robots (AMRs), and other types of robots.

# Smart Building Solutions

A Smart building is based on an intelligent network fabric to enable IoT products to communicate with each other and over the Internet, allowing remote sensing, control, or programming of an array of automated electronic devices in the home or building. For example, a homeowner on vacation can use a phone, tablet, or PC to arm a home security system, control temperature gauges, switch appliances on or off, control lighting, program a home theater or entertainment system, and perform many other tasks.

There are essential requirements for a Smart building: devices should have some level of intelligence, should be connected to each other and the cloud, and should have the ability to split the application from the primary function of the device (for example, a stereo could broadcast an alert) and should be able to add new devices, apps, and services.



## *Connected Lighting*

Today's lighting systems provide high efficiency and power savings opportunities in industrial and residential buildings. By adding temperature, humidity, and image sensors to the lighting fixtures, consumers can monitor room temperature, humidity, and occupancy. By adding wired or wireless connectivity to these solutions, end-users can now track all the information in the cloud and make real-time adjustments for improved efficiency, comfort, and safety.

# Solving the Most Challenging Industrial Problems

**onsemi** propels the sustainable energy evolution in the industrial market with our intelligent power technologies for the highest efficiency solar strings, industrial power, and storage systems. **onsemi** enables Industry 4.0 with our intelligent sensing technologies for smarter factories and buildings, driving the development of the Smart Factory or Manufacturing 4.0.

Future-proofing energy infrastructure and industrial automation systems with the ideal high-performance power and sensing devices will increase efficiency, speed, and reliability while ensuring an increased return on investment. Furthermore, from the physical to digital domains, these technologies enable supply chain visibility and automate business processes and decision-making, which are critical to Industry 4.0.

**onsemi** designs its intelligent power and sensing solutions to enable you to develop, manufacture and get products to market faster, with guaranteed quality, reliability, and scalability that add value to your product and application portfolios.

- **Charging Stations**: High-efficiency intelligent power solutions with IGBT and SiC increase power throughput.
- **Energy Infrastructure**: High-efficiency intelligent power solutions with IGBT and SiC increase power throughput.
- **Factory Automation**: High-speed intelligent sensing for robotics, scanning, and inspection; and the broadest intelligent power portfolio across all voltages and technologies.

# Global Supply Chain Operations

## *Advanced Capability*

**onsemi** invests in EDI, VMI, and other logistics agreements.

## *Global Locations*

Worldwide, **onsemi** employs ~32,000 people. Headquartered in Phoenix, Arizona, U.S.A., the company owns and operates multiple development centers and manufacturing facilities in the U.S.A., Europe, and Asia.

## *Global Supply Chain*

**onsemi** operates a flexible, reliable, responsive supply chain that supports complex manufacturing networks and dynamic global market conditions. This includes multiple manufacturing and logistics sites near our customers to ensure supply continuity.

## *Safety First, Quality Always*

At **onsemi**, we are committed to engineering a better tomorrow through the actions we take every day. Every **onsemi** employee is personally responsible for delivering the highest quality products and services to internal and external customers. Continual improvement in the quality of our processes, products, and services is fundamental to customer satisfaction.

**onsemi** is committed to maintaining a distinctive, world-class quality system that transcends all international quality standards and aims to exceed customer expectations. For more information, please see our Quality and Reliability Handbook **onsemi**'s Quality Systems and Business Operating System are synonymous. Our Business Process Model ensures that we meet or exceed our customer's expectations and our business goals.



## *High-Temperature Capability*

**onsemi** offers a broad portfolio of products that operate in extended temperature ranges, up to 150°C. The company has also launched an initiative to extend high-temperature capabilities to 200°C.

# For additional information, please visit our website at:

## www.onsemi.com/solutions/industrial
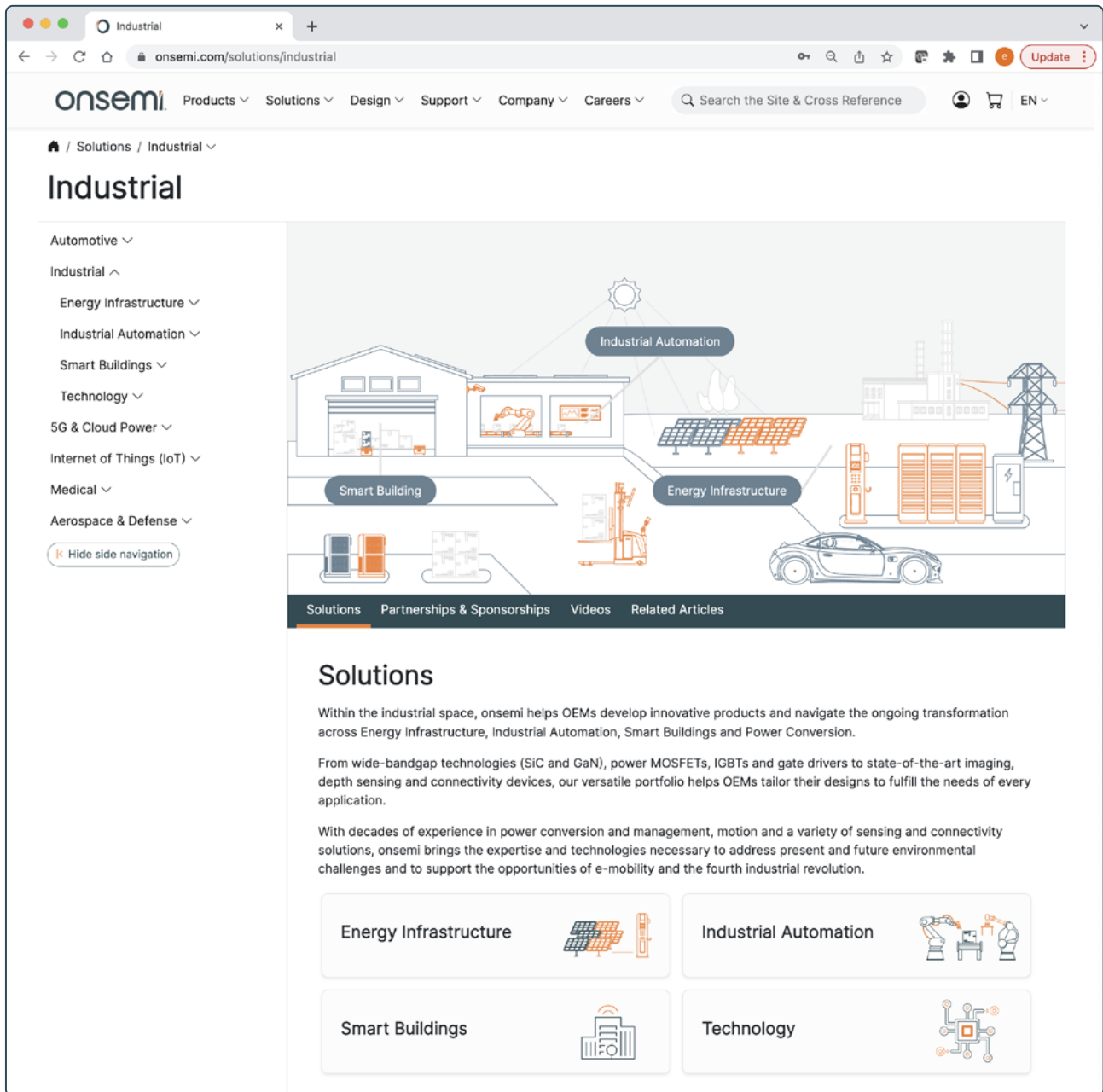
# Sales and Design Assistance

**Worldwide Technical Support**
## www.onsemi.com/support

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