UNLEASHING UNPRECEDENTED PERFORMANCE
SILICON CARBIDE

The revolutionary semiconductor material is propelling us into a future of immense possibilities - a future where energy efficiency, sustainability, and technological advancements converge. With its transformative impact on various industries, silicon carbide is set to shape the world of tomorrow, making it smarter, more efficient and more connected than ever before.

Silicon carbide is:

- 10 TO 15% MORE ENERGY EFFICIENT THAN LEGACY SILICON COUNTERPARTS
- DELIVERING: 10X HIGHER SWITCHING FREQUENCIES
- REDUCING: POWER LOSSES BY AS MUCH AS 50%
- ACHIEVING: 98% HIGHER POWER CONVERSION EFFICIENCIES

Silicon Carbide has the possibility of operating in temperatures over...

150°C

Silicon carbide-powered data centers can save enough energy to power Manhattan for a year, offsetting...

...of global energy consumption projected for data centers by 2050.

Silicon carbide technology:

- Drives smaller, lighter, and more efficient power devices.
- Contributes to the acceleration of the EV market, enabling faster charging and longer ranges.
- Plays a crucial role in optimizing energy conversion and storage in renewable energy systems.
- Revolutionizes industrial applications, enabling high-temperature operation and robust components.

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Silicon carbide’s game-changing properties are driving the rapid growth of electric vehicles (EVs), enabling faster charging times, extended driving ranges, and lower overall costs.

# From Race to Road

Our silicon carbide semiconductor technology in the Jaguar I-TYPE 6 creates an ‘Innovation Lab on Wheels’ to engineer improved powertrain efficiency in a high-performance electric vehicle.

Wolfspeed is the Official Power Semiconductor Partner to Jaguar TCS Racing on the Formula E Circuit.

## In electric vehicles, silicon carbide provides:

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>FASTER CHARGING SPEEDS</td>
<td>3x</td>
</tr>
<tr>
<td>Compared with traditional chargers</td>
<td></td>
</tr>
<tr>
<td>ENERGY SAVINGS</td>
<td>13:1</td>
</tr>
<tr>
<td>When used in EV powertrains</td>
<td></td>
</tr>
<tr>
<td>SYSTEM COST SAVINGS</td>
<td>10%</td>
</tr>
<tr>
<td>REDUCTION IN MANUFACTURING &amp; MAINTENANCE COSTS PER VEHICLE</td>
<td>$2,000</td>
</tr>
<tr>
<td>HIGHER POWER DENSITY</td>
<td>50%</td>
</tr>
<tr>
<td>EXTENSION IN DRIVING DISTANCE</td>
<td>10%</td>
</tr>
<tr>
<td>Helping alleviate range anxiety</td>
<td></td>
</tr>
<tr>
<td>LOWER LOSSES</td>
<td>10%</td>
</tr>
<tr>
<td>REDUCTION IN POWER LOSSES</td>
<td>80%</td>
</tr>
</tbody>
</table>
POWERING RENEWABLE ENERGY

Silicon carbide semiconductors enhance the efficiency of renewable energy systems, such as solar and wind power, maximizing energy conversion and reducing losses.

Solar inverters using silicon carbide can achieve over:

- **99%** EFFICIENCY
  - Enabling far more effective utilization of solar energy
- **5%** IMPROVEMENT
  - In power conversion efficiencies

Replacing traditional silicon with silicon carbide in three-phase inverters can create a:

- **50%** ENHANCEMENT IN POWER DENSITY
- **SIMPLER CIRCUIT TOPOLOGIES**
- **REDUCED COMPONENT COUNT**
- **LOWER ASSEMBLY COST**

In residential solar inverters create:

- **> INCREASED POWER DENSITY**
- **> LOWER SWITCHING LOSSES**

In a 7kW residential inverter, silicon carbide can provide impressive and significant improvements compared with silicon MOSFETs:

- **0.4%** HIGHER EFFICIENCES
- **3kW/L** SIGNIFICANT INCREASE IN POWER DENSITY
  (3kW/L vs. 2.5 kW/L)
- **48kHz** SWITCHING FREQUENCY
  (a full 32 kHz higher than using silicon MOSFETs)

UNLEASHING UNPRECEDENTED PERFORMANCE
ENABLING NEXT-GEN INDUSTRIES AND DATA CONNECTIVITY

Silicon carbide is the cornerstone of our future, unlocking unparalleled possibilities in technology and sustainability. It supports the ever-growing demand for data connectivity by empowering more efficient, high-speed communication networks, data centers, and IoT devices.

Silicon carbide enables:
- **FASTER PROCESSING**
- **INCREASED BANDWIDTH CAPACITY**
- **ENHANCED EFFICIENCY**

2% of all electrical energy in the U.S. is consumed by data centers. From 2010 to 2020, servers running silicon carbide devices will have contributed 620 billion kWh in energy savings.

Compared with traditional silicon devices, power devices using silicon carbide can:
- Enable faster data processing with up to 10x faster switching speeds.
- Improve thermal performance to create up to 40% savings in energy costs for data center cooling.
- Achieve switching speeds in the nanosecond range: $10^{-9}$.

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