

Innovation Day Villach
8 October 2025

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public

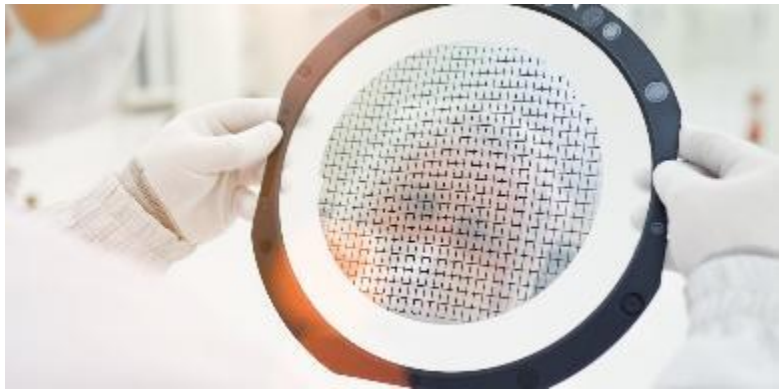
Infineon leading in power systems – mastering all three key materials

Infineon is the leader across all power semiconductor technologies including wide bandgap materials SiC and GaN

Si

World's thinnest silicon power wafer with 20 µm on 300 mm

- Broadest Si-power portfolio in the market
- Unmatched quality and leading in all figures of merit (FOM)
- Best price/performance ratio
- High variety of customized optimizations across all voltage classes



SiC WBG

World's most competitive 200 mm silicon carbide power fab

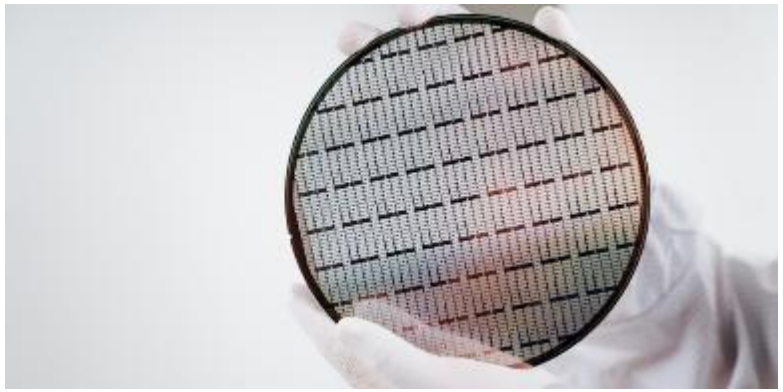
- Broadest portfolio covering auto and industrial applications
- Leading trench performance
- High reliability and robustness in extreme conditions up to 3.3 kV
- Smaller system size



GaN WBG

World's first 300 mm gallium nitride power wafer

- Enabling cost parity with silicon
- Highest efficiency at the highest frequency enabling smallest system size
- Allow functional integration
- GaN voltage classes from 40 V to 700 V



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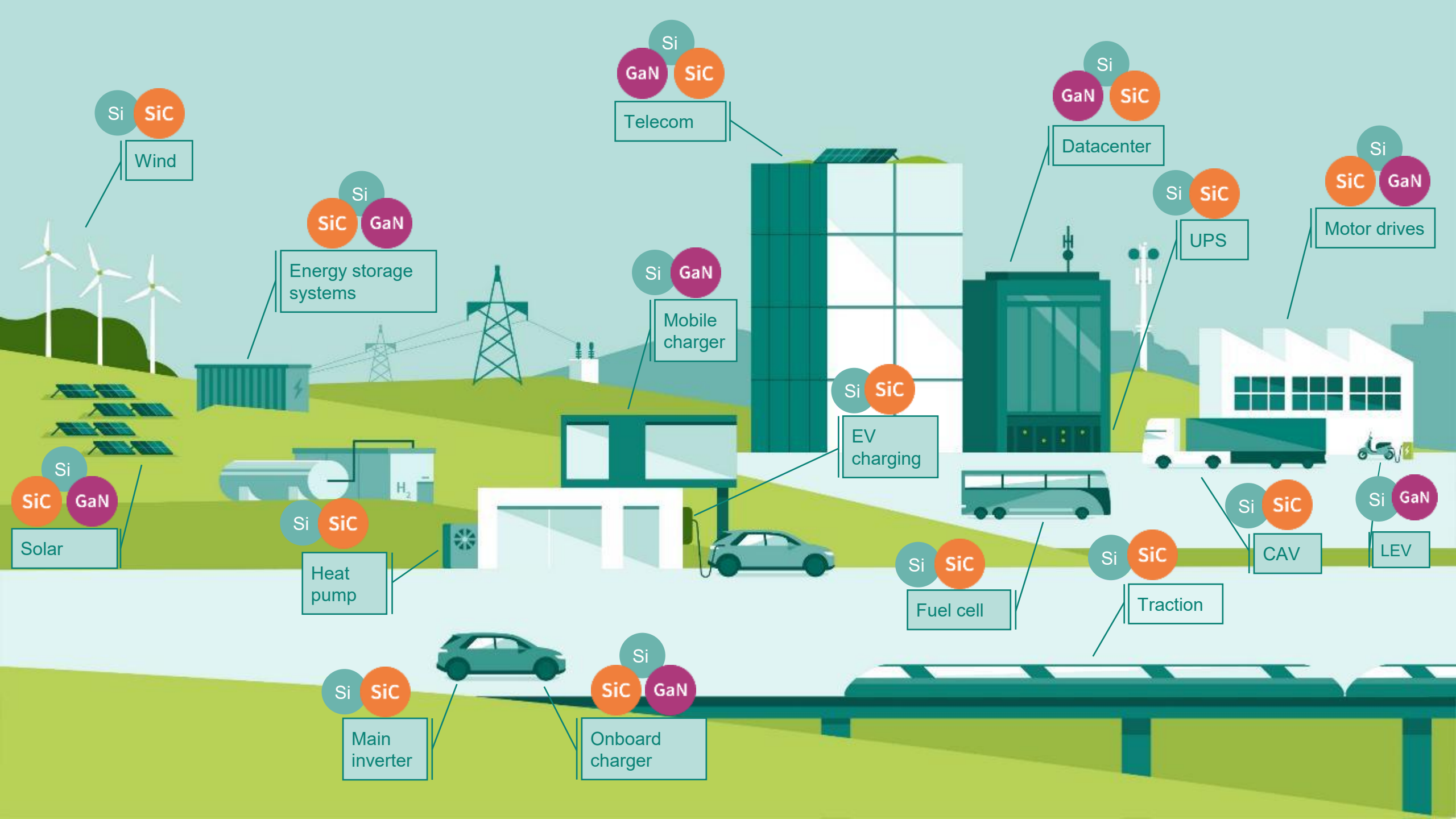
Si
SiC
Wind
Si
GaN
SiC
Telecom
Si
GaN
SiC
Datacenter
Si
SiC
GaN
Energy storage systems
Si
GaN
Mobile charger
Si
SiC
UPS
Si
SiC
GaN
Motor drives
Si
SiC
EV charging
Si
SiC
GaN
Solar
Si
SiC
Heat pump
Si
SiC
CAV
Si
GaN
LEV
Si
SiC
Fuel cell
Si
SiC
Traction
Si
SiC
Main inverter
Si
SiC
GaN
Onboard charger



Silicon innovation highlights

Infineon silicon power MOSFETs

Customer value

- **Broad portfolio** with high variety of customized optimizations for every application
- **Best price-performance** from standard to high-performance components
- **Easy and robust to use** with short time to market



Leadership in silicon power MOSFETs
World-class innovation enabling next generation power efficiency and performance



Maximizing performance with the OptiMOS™ 7 application-optimized power MOSFETs for industrial and consumer markets

Price-performance

Innovation for growth

- New OptiMOS™ 7 25 V switching optimized
- New OptiMOS™ 7 40 V motor-drives optimized
- New OptiMOS™ 7 80 V $R_{DS(on)}$ optimized

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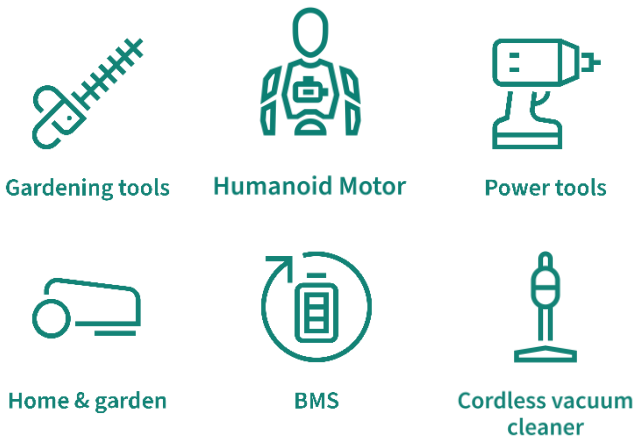
OptiMOS™ 7 40 V motor-drives optimized

Product



SuperSO8
PQFN 5x6 mm²
package

Applications



Value Proposition & Benefits

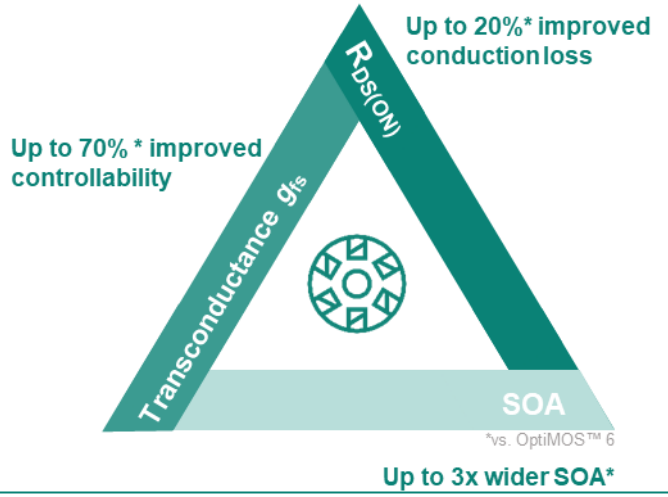
Features

- Improved switching behavior to reduce switching losses by up to 20%
- Tuned switching for improved EMI/ease of use
- x3 improved SOA for harsh application environments
- Industry-leading $R_{DS(on)}$ in PQFN 5x6 & PQFN 3.3x3.3

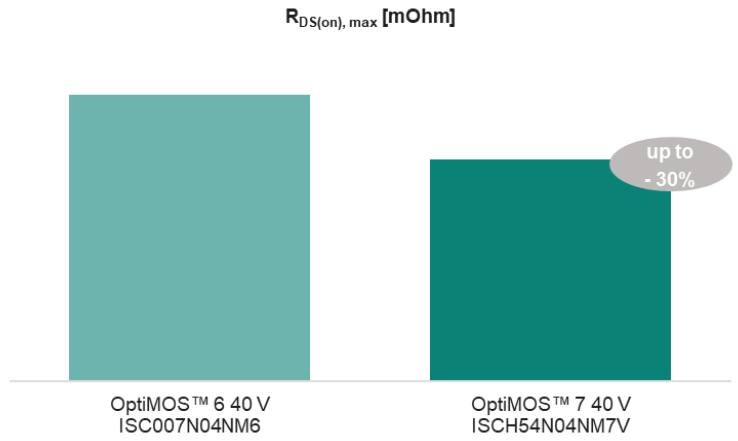
Benefits

- Enhanced efficiency and superior performance, reducing power losses
- Improved ease of use due to robustness and Intrinsic short-circuit current limitation

Motor-drives optimized



Comparison to OptiMOS™ 6



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Silicon carbide innovation highlights

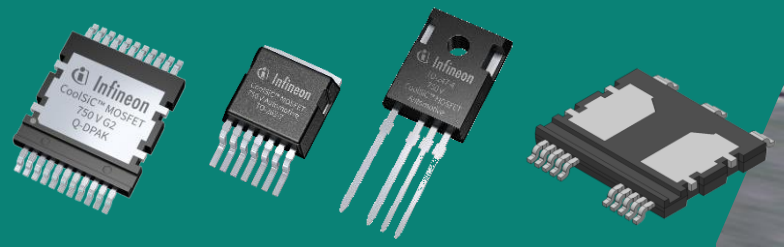
CoolSiC™ MOSFET 750 V Generation 2

Revolutionizing automotive and industrial power electronics

- Industry leading switching performance with **FoM by 25%** improvement over the previous generation
- **Unique robustness in overload condition** with **extended Tvj = 200°C**
- **Short circuit robustness**
- **Maximum RDS(on) at Tj = 150°C** specified in datasheet



$R_{DS(on,typ)}$ @25 °C
4 mΩ - 60 mΩ



Automotive

On-board charger | HV-LV DC-DC converter | eFuses e-Disconnect | HVAC compressor | PTC heating

Industrial

EV charging | Server | Telecom | Solar | Energy storage | SSCB

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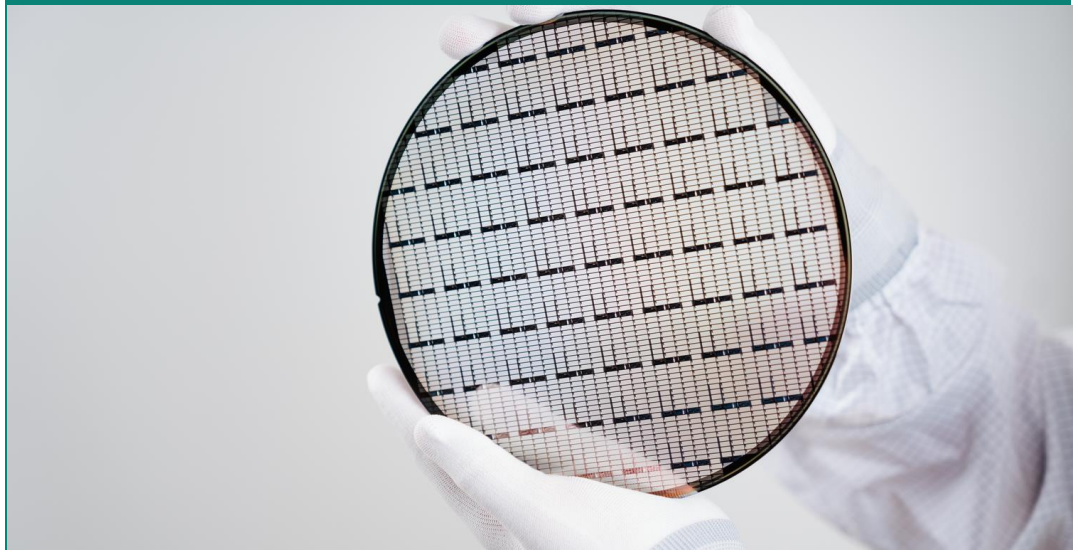
Gallium nitride innovation highlights

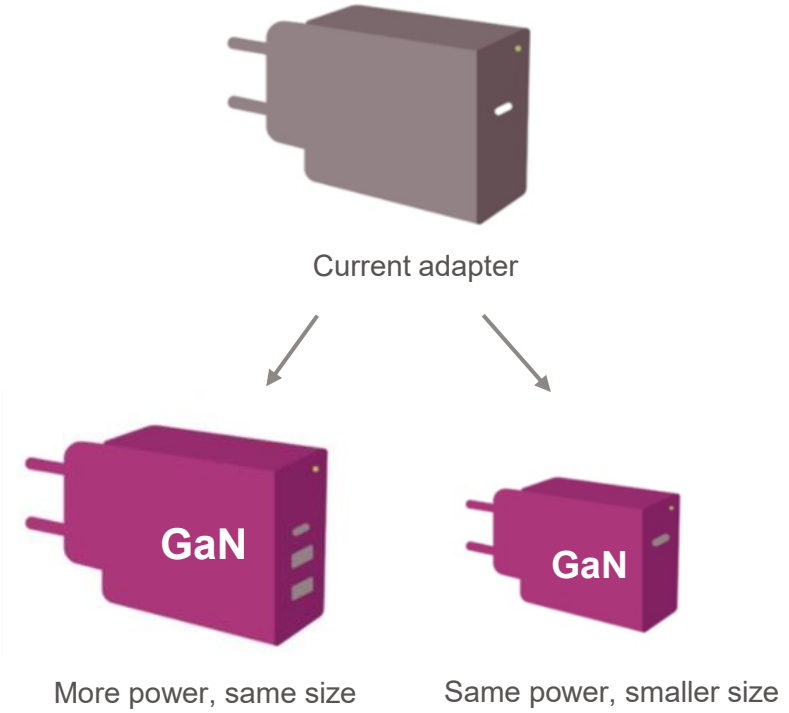
Gallium nitride (GaN) delivering highest efficiency and power density – in the smallest form factor

GaN-based devices

- Higher switching frequencies
- Higher density
- Lower energy losses
- Smaller form factors

Voltage classes from 40 V to 700 V





>30% energy savings

2x less size & weight

Lower system cost

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Infineon a leading player in GaN – Key differentiators

Broadest IP portfolio in the market (350 patent families)

Highest quality and reliability

Leading GaN product portfolio in the market for MV and HV applications



Proven application expertise with >400 GaN experts and system know-how

Superior customer supply stability through scalability

Capability to invest in leading edge GaN technology and system solutions

GaN Innovation

- World's first 300 mm GaN wafers
- World's first monolithically integrated bi-directional switch (BDS)
- Dedicated Automotive GaN

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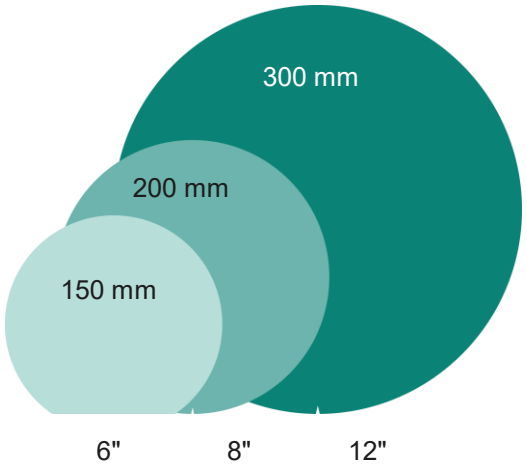
Infineon pioneers world's first 300 mm power GaN technology – an industry game-changer

GaN 300

- **2.3x more chips** per wafer
- Utilizing existing 300 mm silicon equipment allows for **accelerated implementation and efficient use of capital**



Sep 2024
Announced world's first 300 mm power GaN technology

Jul 2025
300 mm transition process is on track, leveraging its Integrated Device Manufacturer (IDM) manufacturing strategy

Oct 2025
300 mm GaN transistors meet internal milestone requirements and have been sampled to customers for evaluation

Infineon will commercialize 300 mm power GaN capacity according to market needs

* At RDS(on) level = for comparable Si and GaN products

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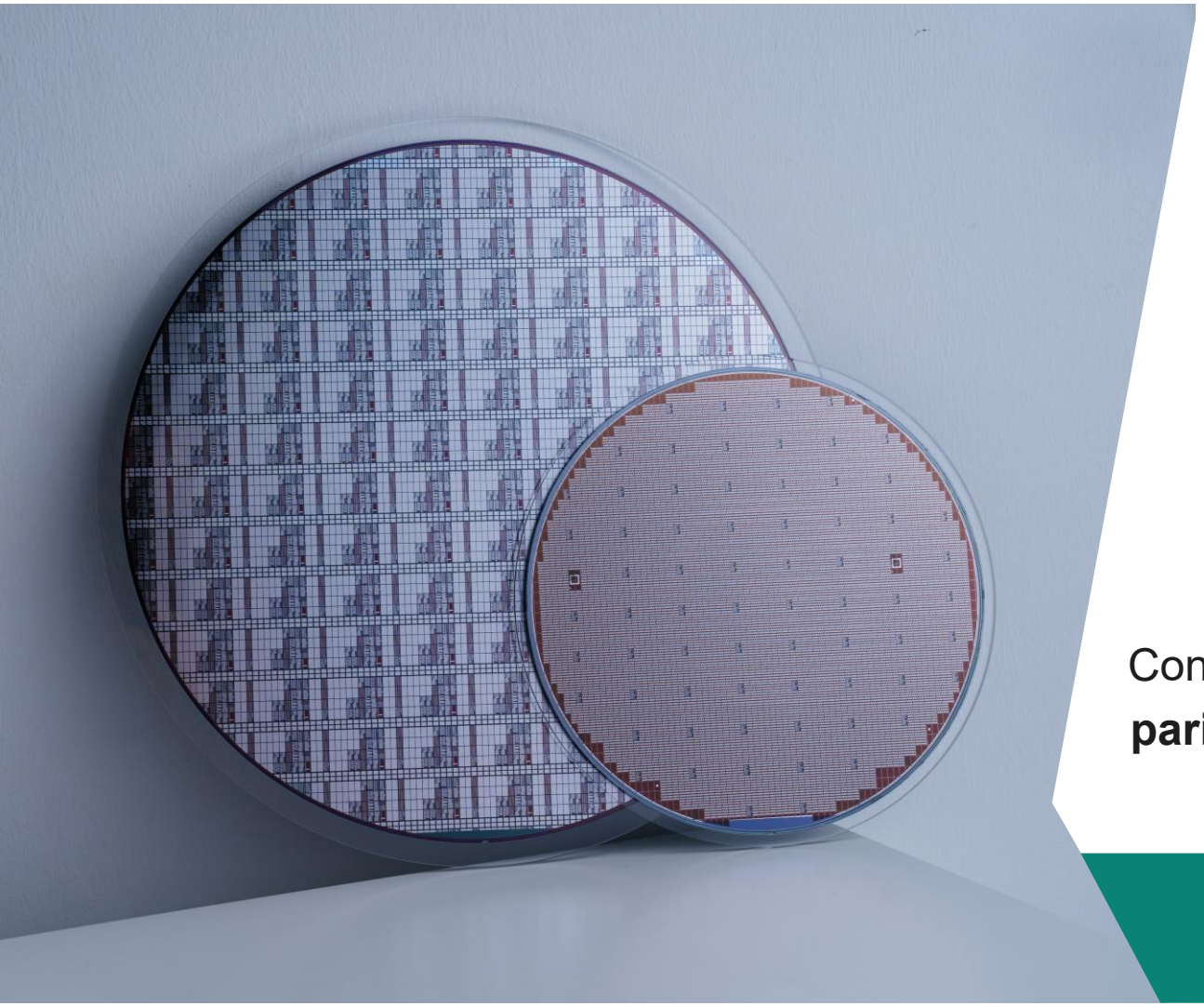
Customer benefits of 300 mm GaN



Higher system performance &
increased cost-effectiveness
through GaN technology

Contribute to **achieving cost parity with silicon** over time

Supply stability
for business continuity

Superior Value Proposition

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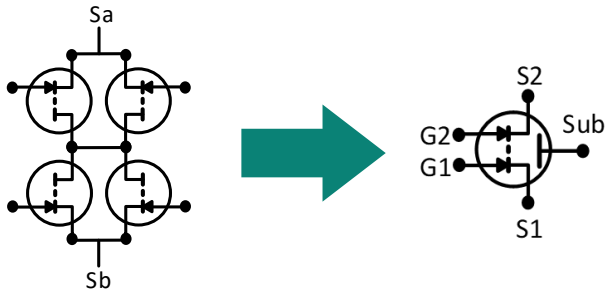
GaN enables the realization of 4-quadrant switches conducting current and blocking voltage – in both polarities

GaN
BDS



Discrete switches

4x devices

Monolithic BDS

1x devices

What is an HV monolithic bidirectional switch (BDS)?

- It's a GaN switch that can **block voltage and current in both polarities**.
- It has an **innovative monolithic structure** that integrates two isolated gates.
- Its advanced architecture results in a **reduced die size** compared to conventional back-to-back arrangements.
- Four modes of operation **providing unprecedented control and flexibility** for power system design.
- **Significant advancement for a growing set of applications** requiring bidirectional current flow, such as AC/DC converters and power inverters.

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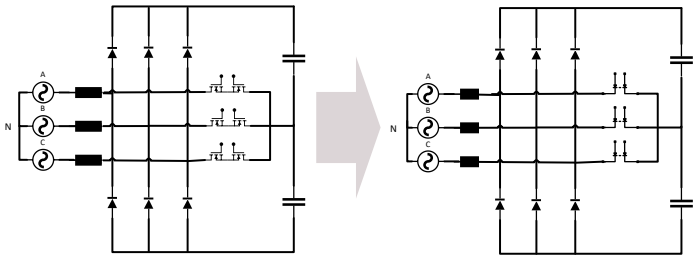
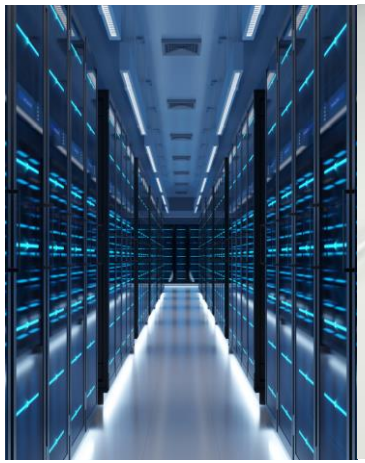
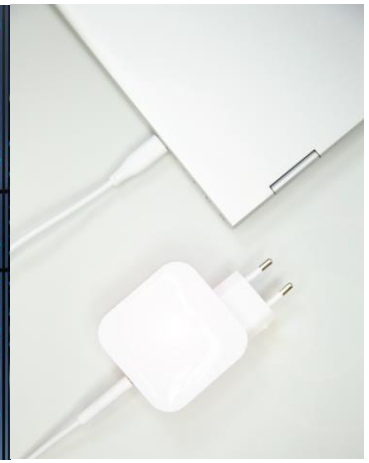
CoolGaN™ BDS 650 V G5
Creating a paradigm shift in power electronics

Replacement of back-to-back switches in AC/DC applications



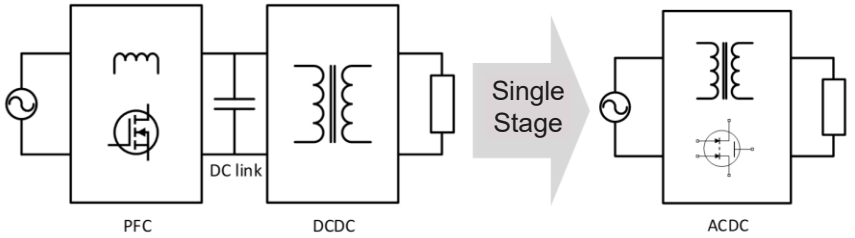




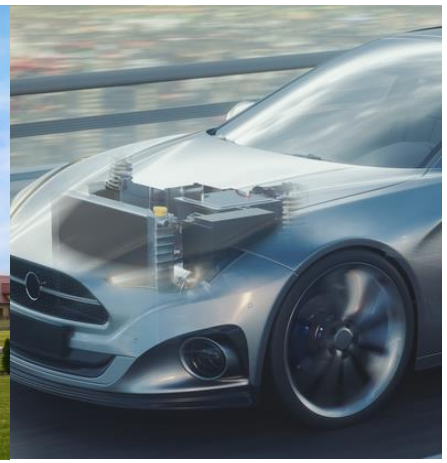
AI & Enterprise servers 10 kW+

High power USB chargers 200 W+

Replacement of Two-stage with Single-stage isolated AC power conversion



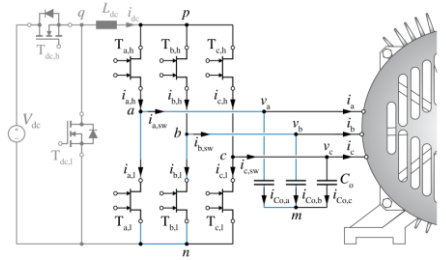


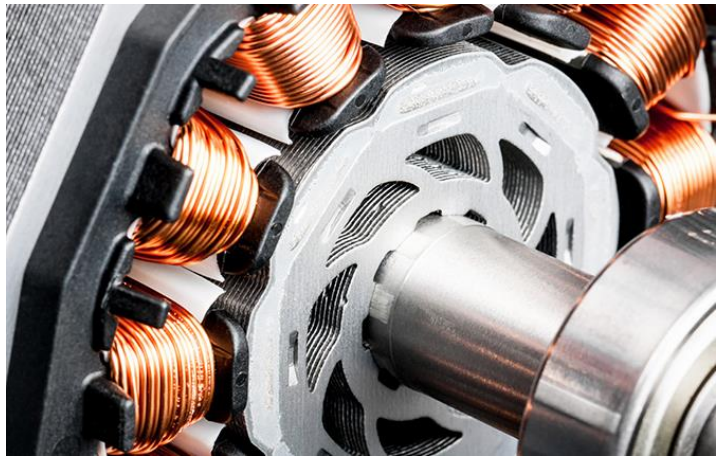


Solar

EV OBC

New topology enablement such as Current Source Converters (CSI)





Motor drives

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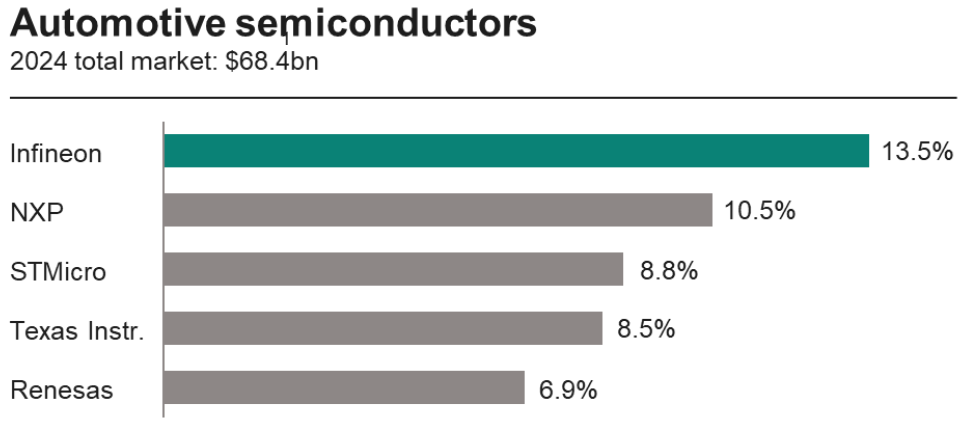
Automotive GaN is enabling highly-efficient & affordable e-mobility

GaN Auto

- 100 V to high-voltage
- Transistors and BDS
- Leveraging Infineon **automotive market leadership** and **quality & reliability expertise**



Infineon leads with innovation in product breadth, application solutions, and quality methods

- Widest voltage range
- Single stage and T-type solutions
- AEC-Q above and beyond
- Unique reliability validation methods
- Zero defect approach



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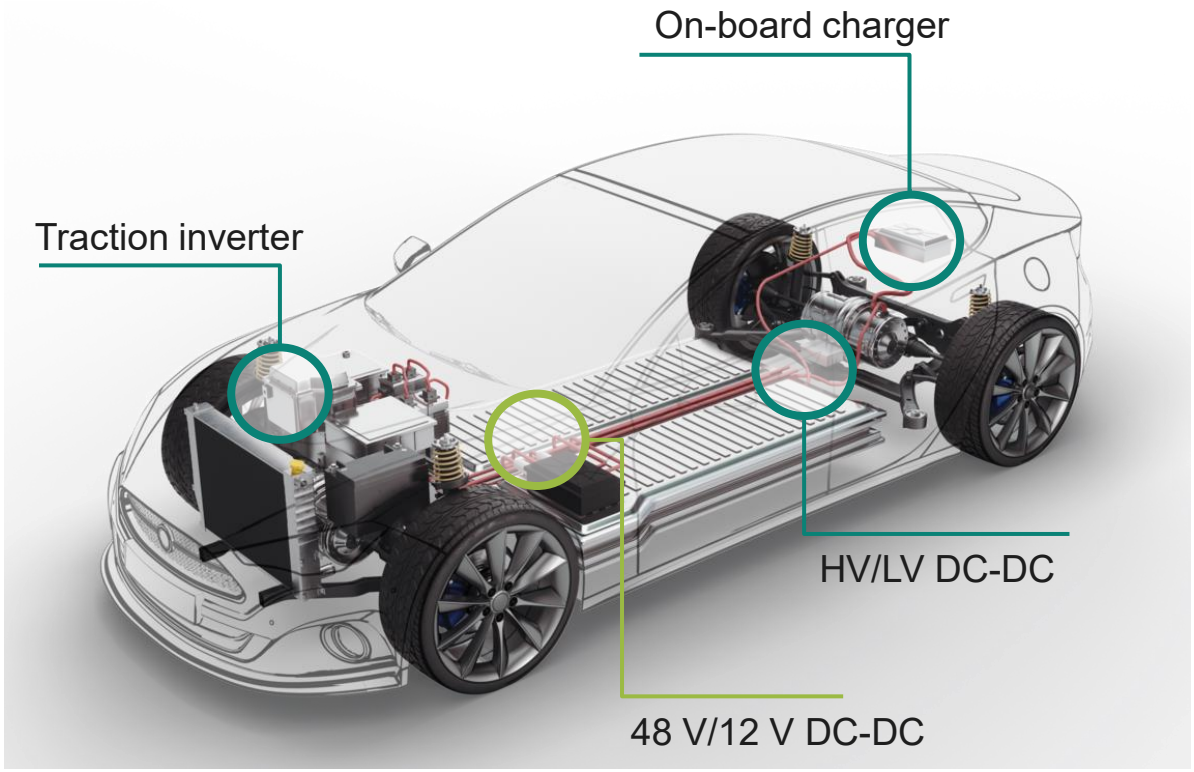
[1] Based on TechInsights: *Automotive Semiconductor Vendor Market Shares*. March 2025.

GaN technology enables higher performance & lower system cost for key automotive applications

Battery electric vehicle system overview



Benefits of **GaN** across applications*

On-board charger

HV/LV DC-DC

+1%pt Higher efficiency: energy savings

30% Higher power density: less material & smaller size

10% Lower system cost: more affordable

Traction inverter

GaN supports new inverter topologies:

Up to **4%** efficiency gain (more range or smaller battery)

48 V/12 V DC-DC

Power conversion for E/E architecture

Less material & smaller size

15% Lower system cost

*compared to today state-of-the art systems

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Powering AI

Data center construction is booming



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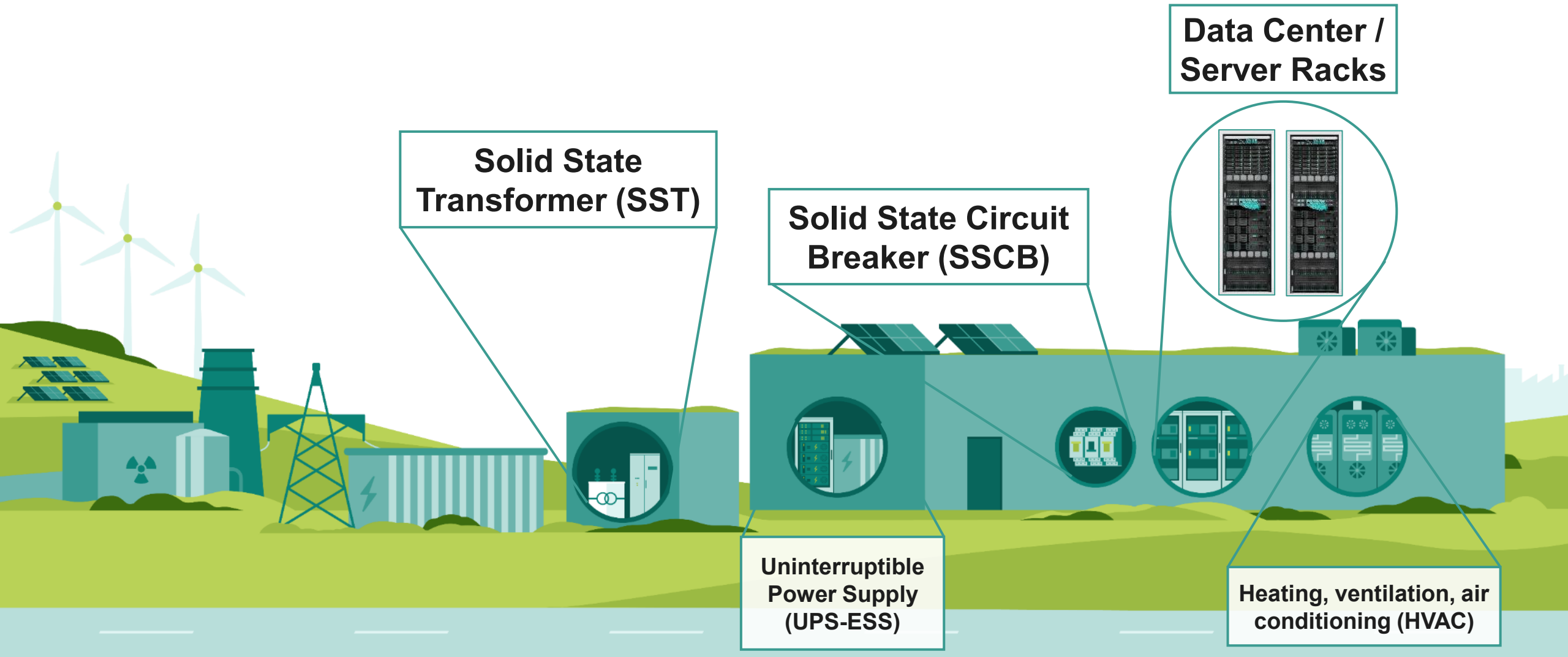
We power AI from grid to core!

from grid

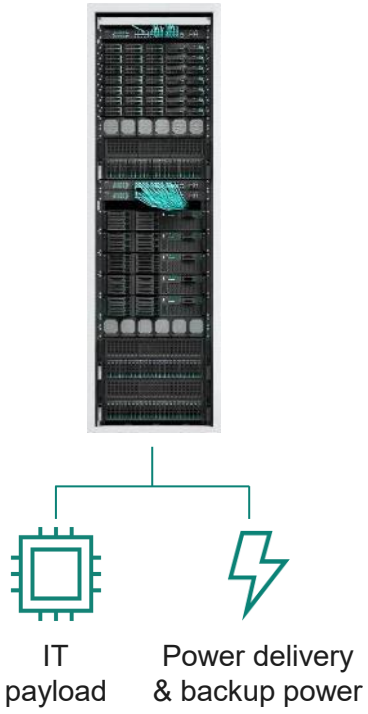
to core



Architectural evolution beyond 250 kW, and up to 1 MW per rack

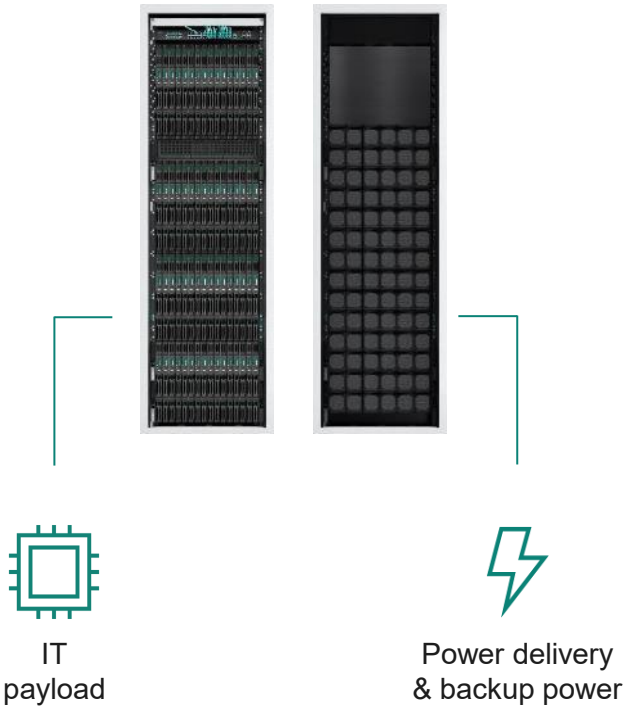
1. Today

1-Φ PSUs within server rack
<250 kW/rack



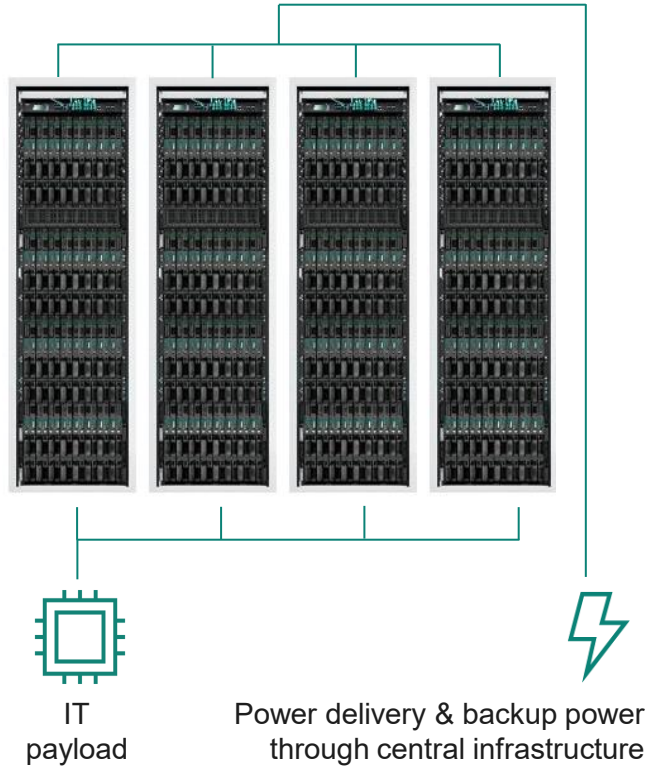
2. 2027+

3-Φ HVDC Power Sidecar
~500 kW+/Rack



3. 2029+

Hybrid microgrid
1 MW/Rack



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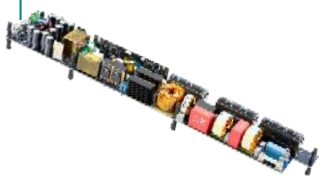
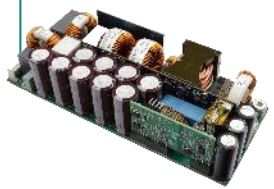
The evolution of power supply units for AI server racks

Infineon addresses the growing power demand of AI

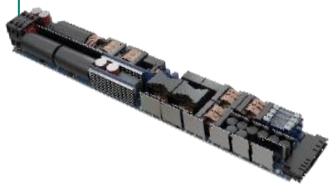
3 kW
η 97.5%
32 W/in^3
1-phase
Si SiC



3.3 kW
η 97.4%
98 W/in^3
1-phase
Si SiC GaN



8 kW
η ~97.5%
100 W/in^3
1-phase
Si SiC GaN



12 kW
η ~97.5%
113 W/in^3
1-phase
Si SiC GaN



>12 kW
3-phase
Si SiC GaN



Available in 25/26

Available now

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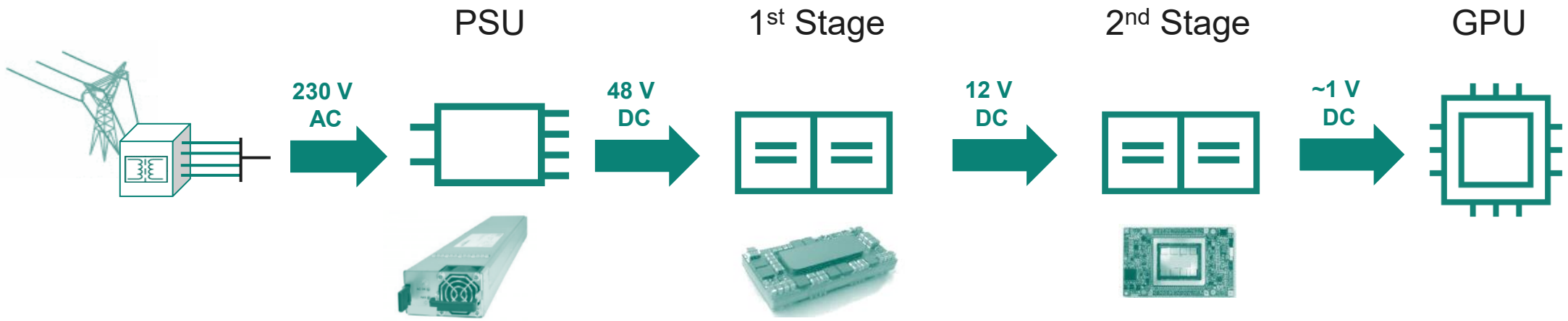
We are offering industry leading solutions to increase efficiency in all stages of the power flow

Server power flow



Average data center power flow efficiency today	97%	97.5%	90%	**~85%**
Efficiency potential from Infineon's leading power semi solutions*	**98%**	**98%**	**94%**	**~90%* = 5%P**

* Using GaN, SiC & vertical power modules

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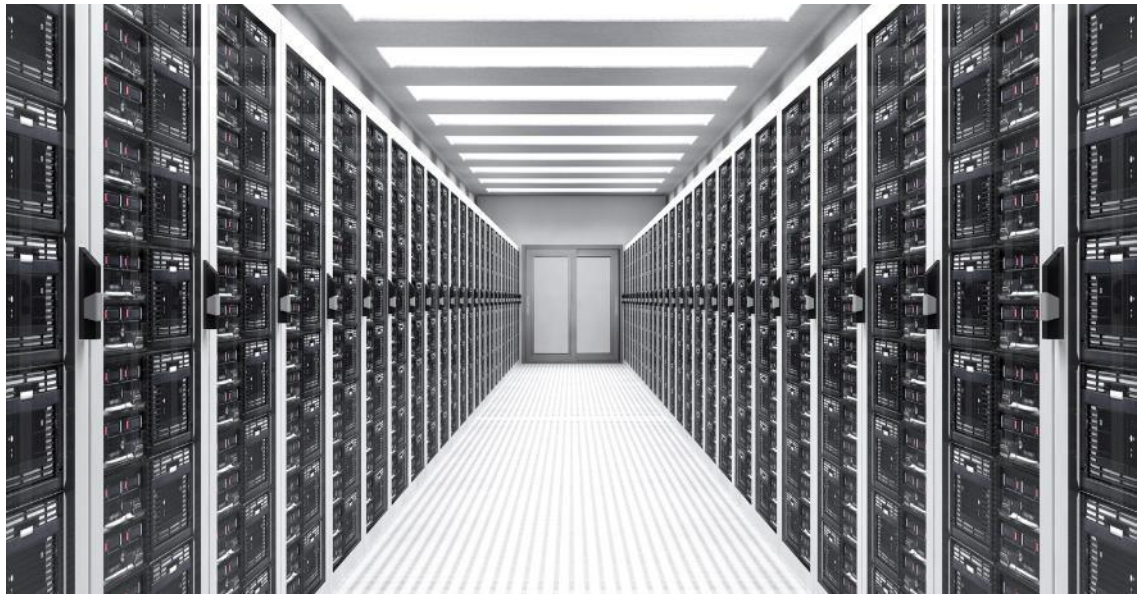
Substantial energy saving potential for data center with Infineon solutions





5% efficiency win
at a 1 GW data center

≙ powers **125.000 homes**

*1 gigawatts data center; 50 MW efficiency win (3,500 kWh per household)

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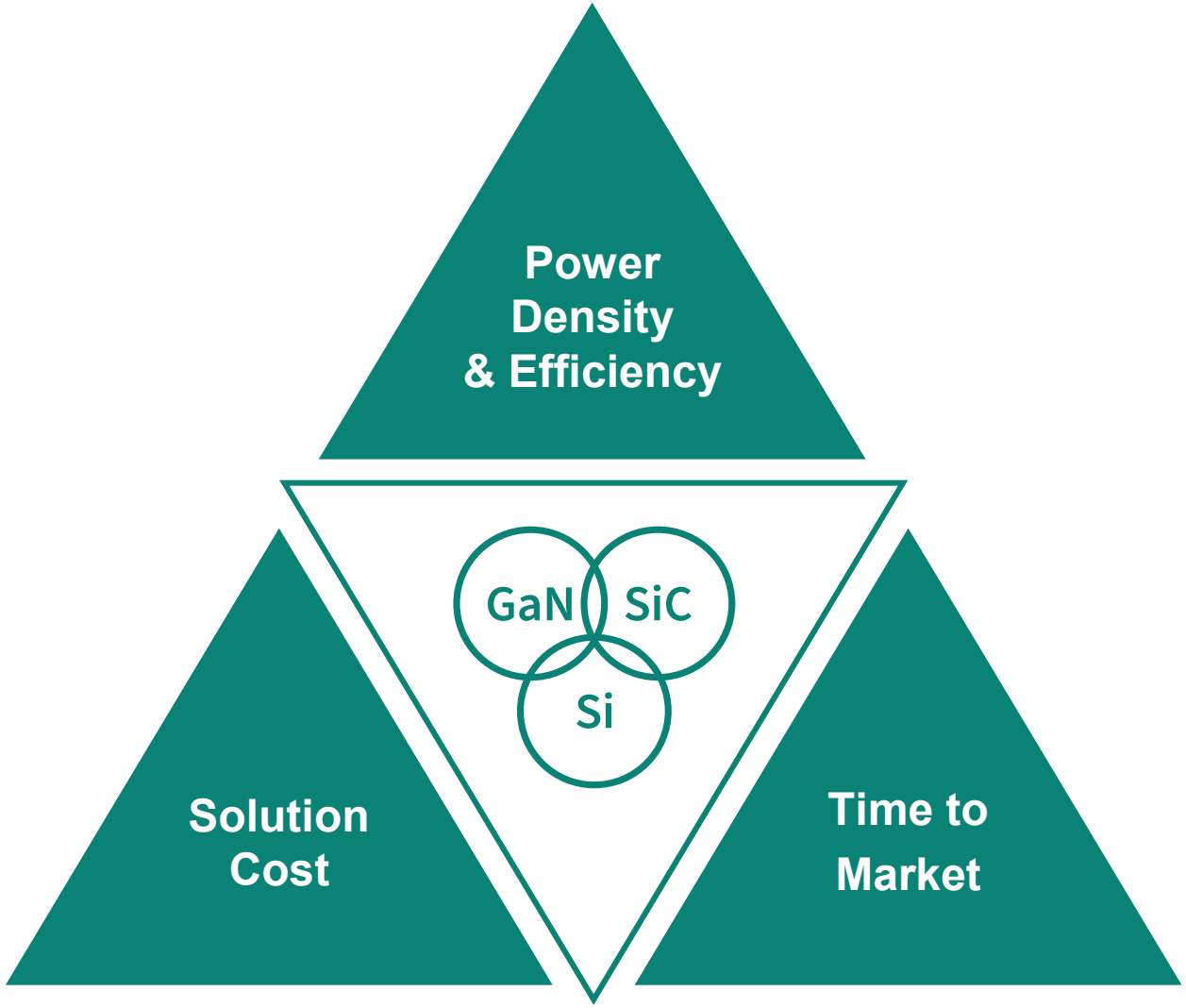
Si, SiC and GaN in AI Data Centers

Hybrid architectures combining Si, SiC and GaN offer a balanced approach to meeting various needs in AI data centers

Modular design unlocks each technology's strengths, **maximizing efficiency, power density, cost** and **time-to-market** in AI data centers.



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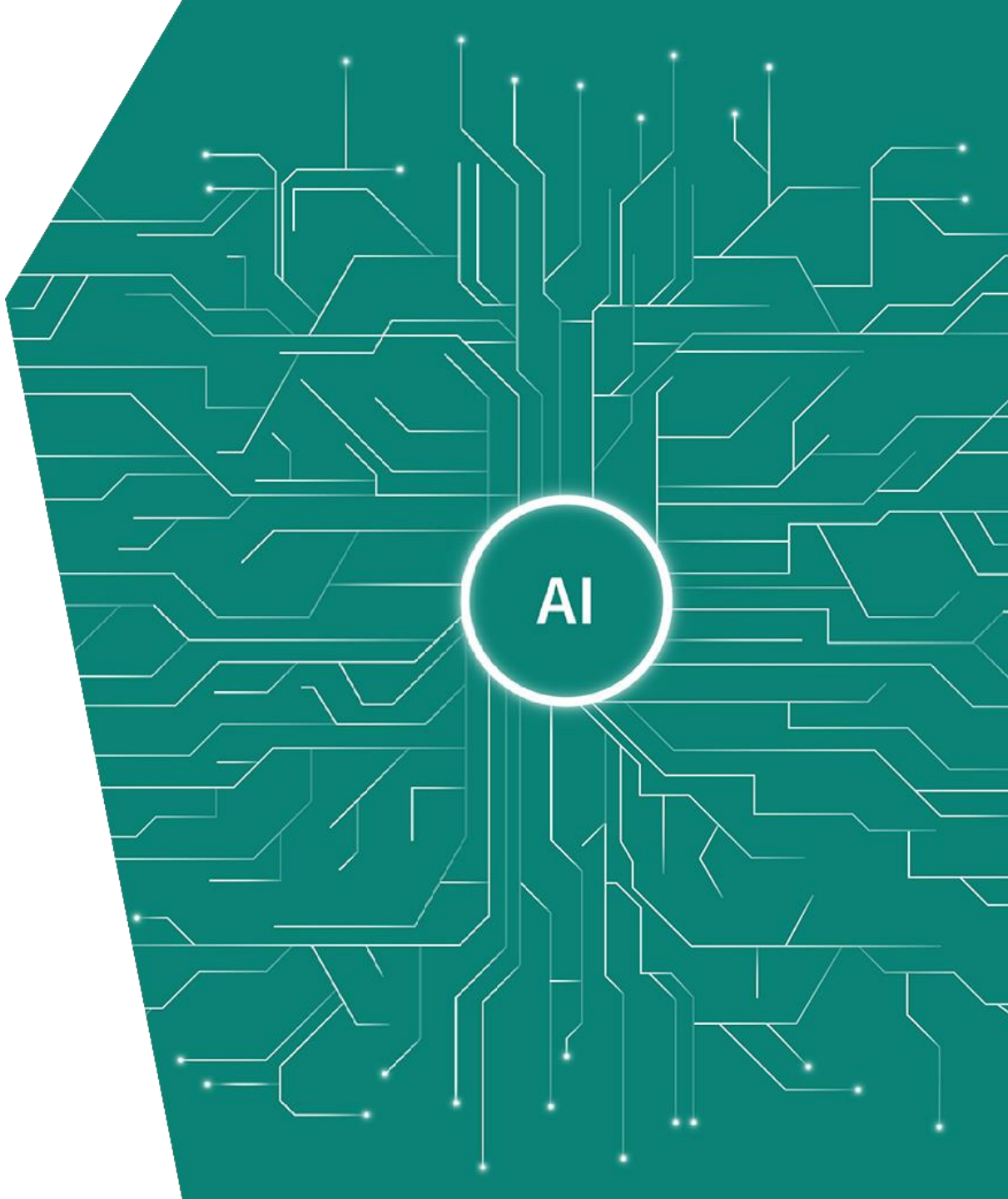
Power is just one element in the world of AI.

But there is
no AI without power.



Humanoid robots



Humanoid Robots

A market of up to 1.7 trillion USD by 2050

Source: UBS

We empower humanoid robots

To sense, move, act and connect.
Safe and secure.

Infineon enables the key functional blocks in humanoid robots with a broad portfolio of dedicated products and technologies, from power switches to microcontrollers, to sensors, memory solutions and connectivity.

The architecture of a humanoid robot is based on compute and connectivity, sensorics, actuation, and energy technology

Compute & Connectivity

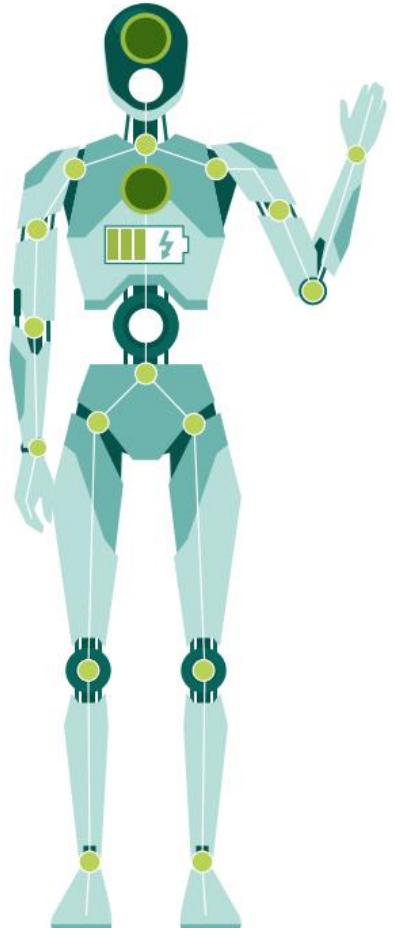
for decision-making and AI

- Main Compute
- Zone Compute
- Edge AI
- Functional safety and security

Energy

for power supply
and thermal management

- Battery management systems
- Charging modules
- Cooling systems



Sensorics

for environmental perception

- Audio
- Vision
- Radar
- Lidar
- Force
- Sensor fusion

Actuation

for efficient and precise motion

- Motor control
- Actuation
- Structural integration

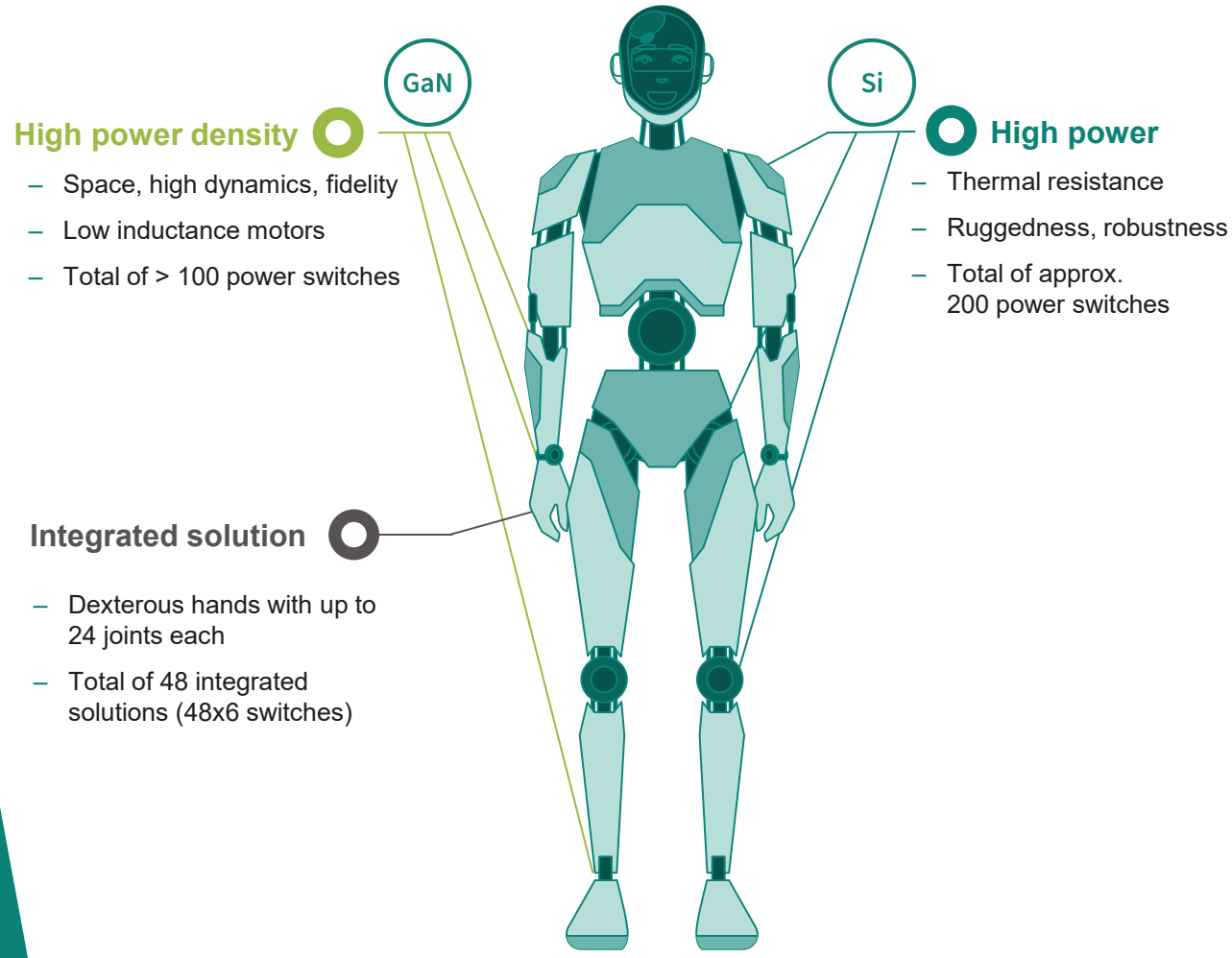
Infineon solutions for humanoid robots

- Main Compute
- Zone Compute
- Motor control
- Battery Management System (BMS)
- Charging
- Environmental sensing

Battery management ICs
Ethernet / Transceivers
Isolation
Memory devices
Microcontrollers
Power switches
Radar
Security
Sensors (environmental and tactile)
Sensors (current and position)
Small signal transistors and diodes
Software and ecosystem
USB
Wireless connectivity

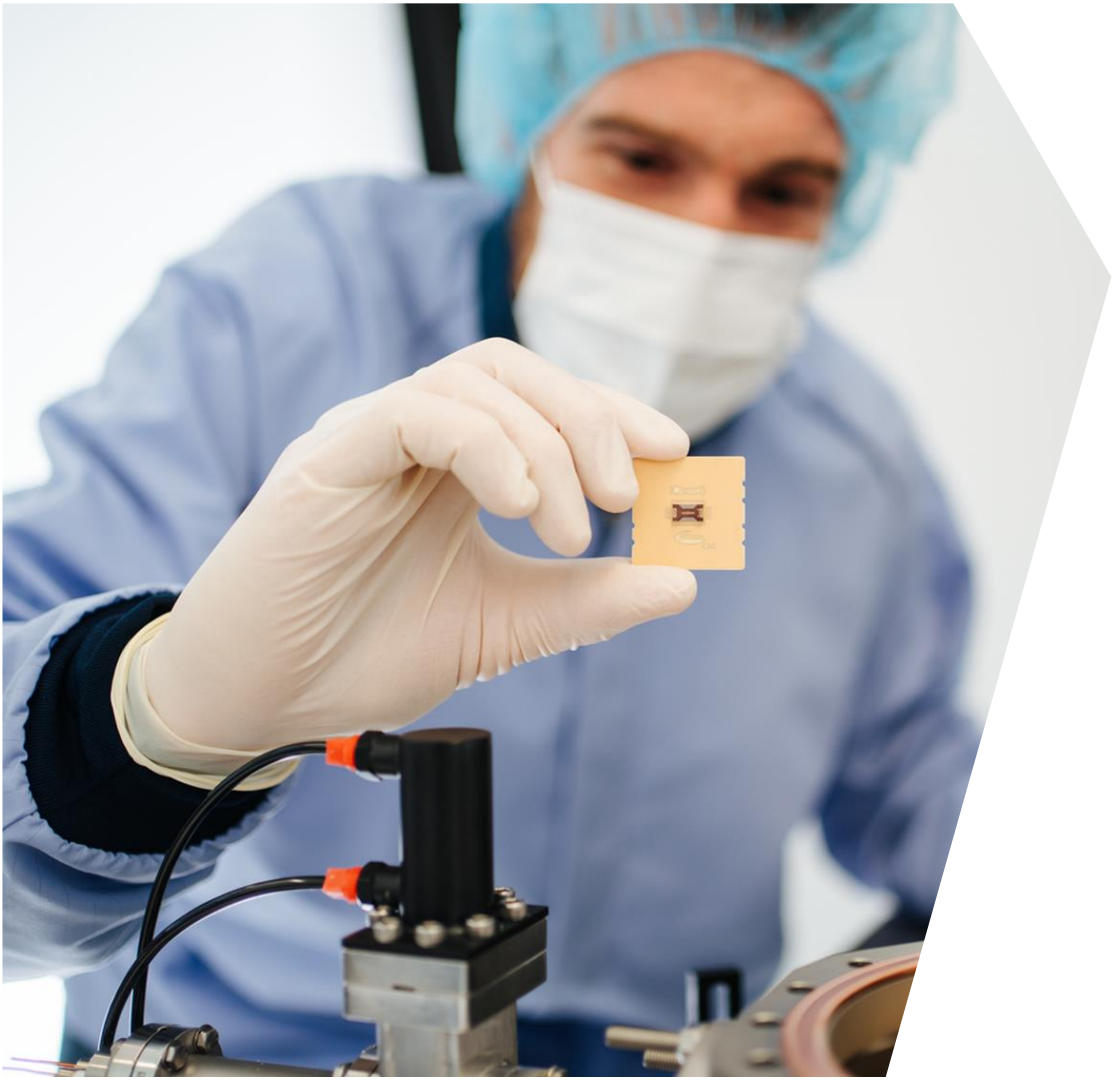
Si SiC GaN

Total 70+ joints with up to 600 power switches in a humanoid robot



Quantum Computing

The next transformational technology innovation: Quantum Computing



Opens up **new breakthroughs** in tackling extremely complex challenges like in logistics, finance, pharmacy and cybersecurity

We are shaping the quantum era

In performance:
Quantum Processing Units based on predictable, reliable trapped ion platform for meaningful quantum computers

In collaboration:
Trusted partner for researchers, industry and entrepreneurs powering a strong quantum eco-system

In security:
Post-quantum cryptography and worlds first common criteria certification on a security controller

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Trapped-Ion Quantum Computing at Infineon

Clemens Rössler, Richard Kuncic, Klemens Schüppert, Silke Auchter

10/2025

public

Quantum computing: efficient solving of hard problems



https://www.x-sieben.at/weiterbildung/logistik-supply-chain-management-academy-lehrgang



https://www.i-med.ac.at/mypoint/news/748888.html

Optimization
Finance, logistics, …

Quantum Simulations
Chemistry (pharmaceutics), material science,…

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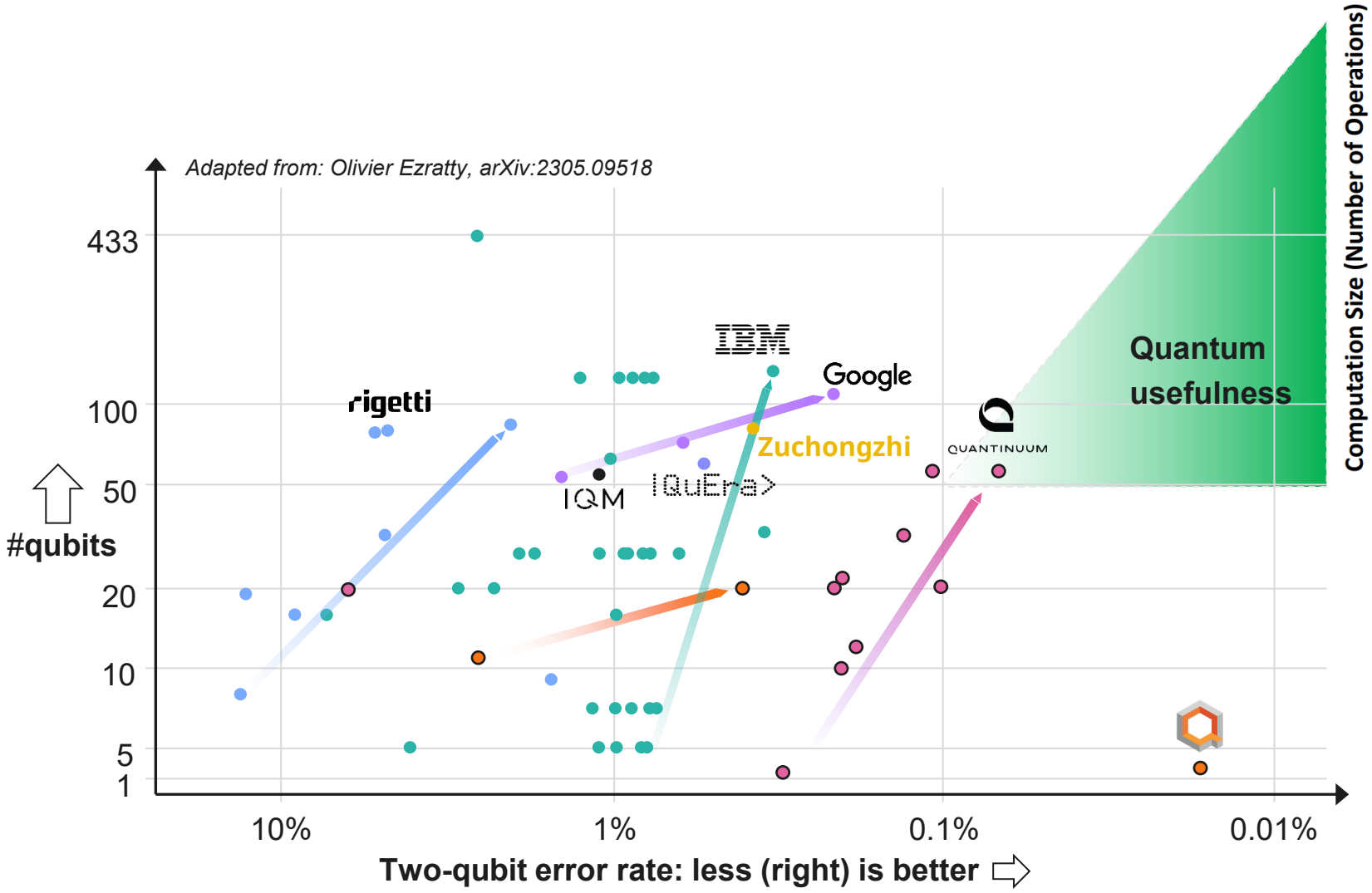
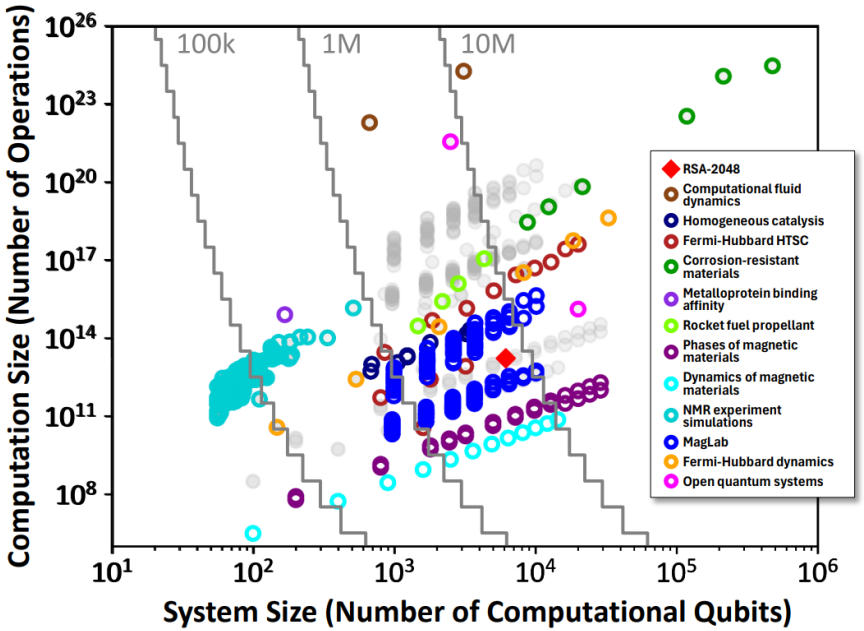
Quantum Computing is approaching usefulness!



Source reference: Graphic adapted from Olivier Ezratty, arXiv: 2305.09518



From DARPA QBI: https://www.darpa.mil/sites/default/files/attachment/2024-12/qbi-proposers-day-2024-program-manager.pdf

Utility-scale simulations/calculations:

- Superconductivity (material science)
- Catalysis (quantum chemistry)
- RSA (prime factorization)

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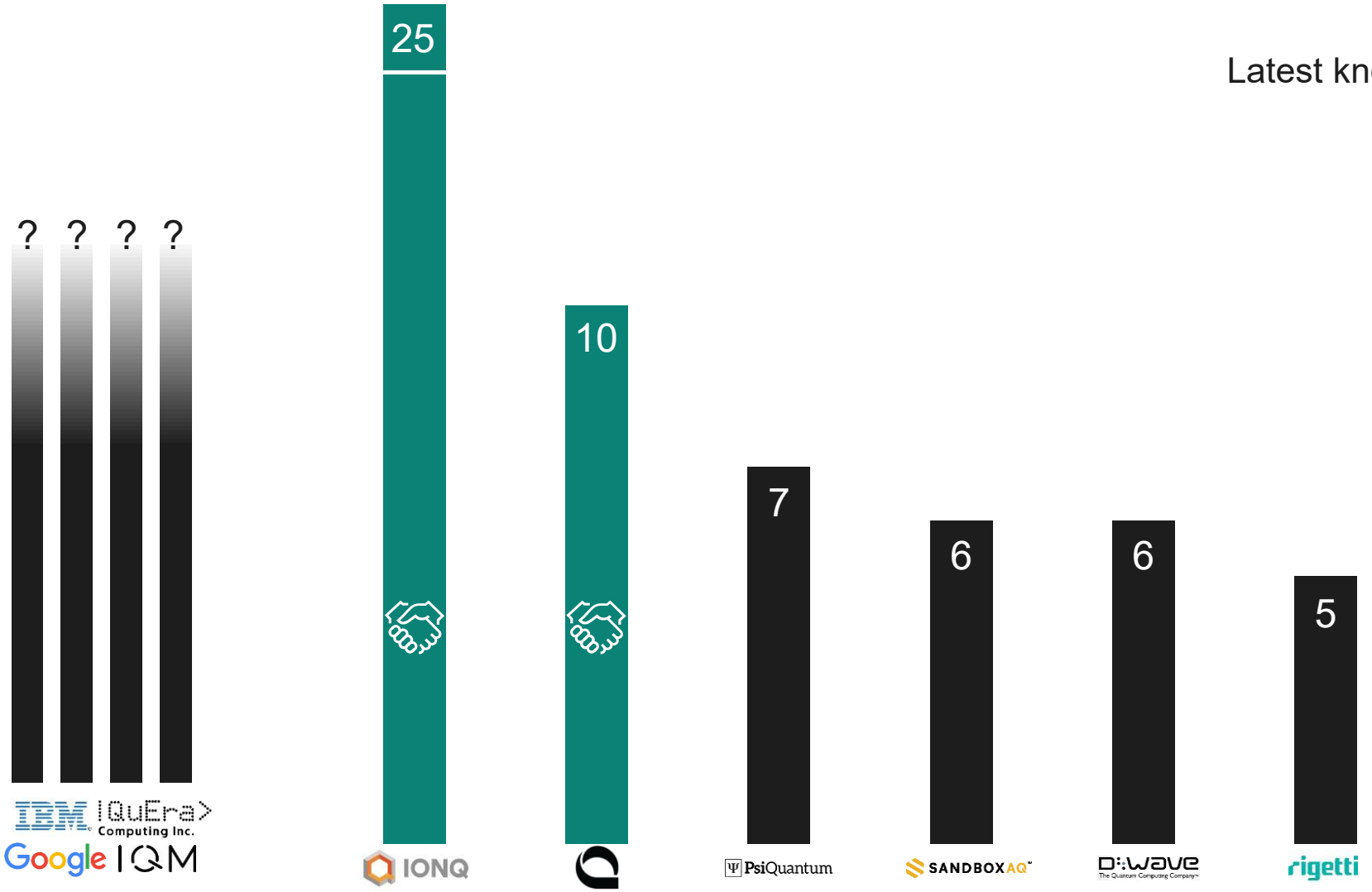
Our customers lead in market capitalization

Latest known valuation, in **$Bn**
(non-exhaustive)



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