



Innovation Day Villach

8 October 2025

Richard Kuncic, Johannes Schoiswohl



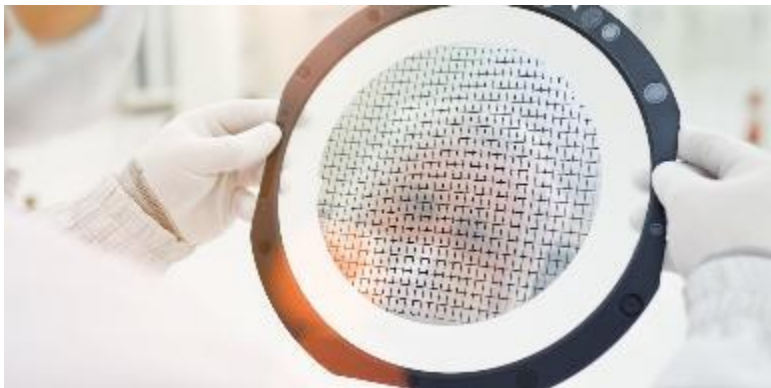
Infineon leading in power systems – mastering all three key materials

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



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



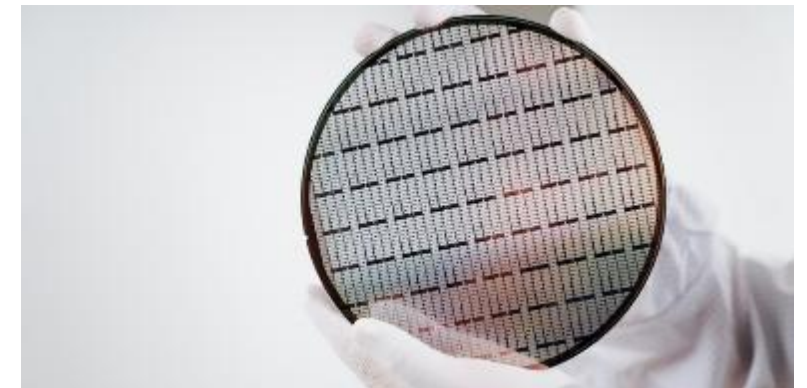
World's most competitive 200 mm silicon carbide power fab

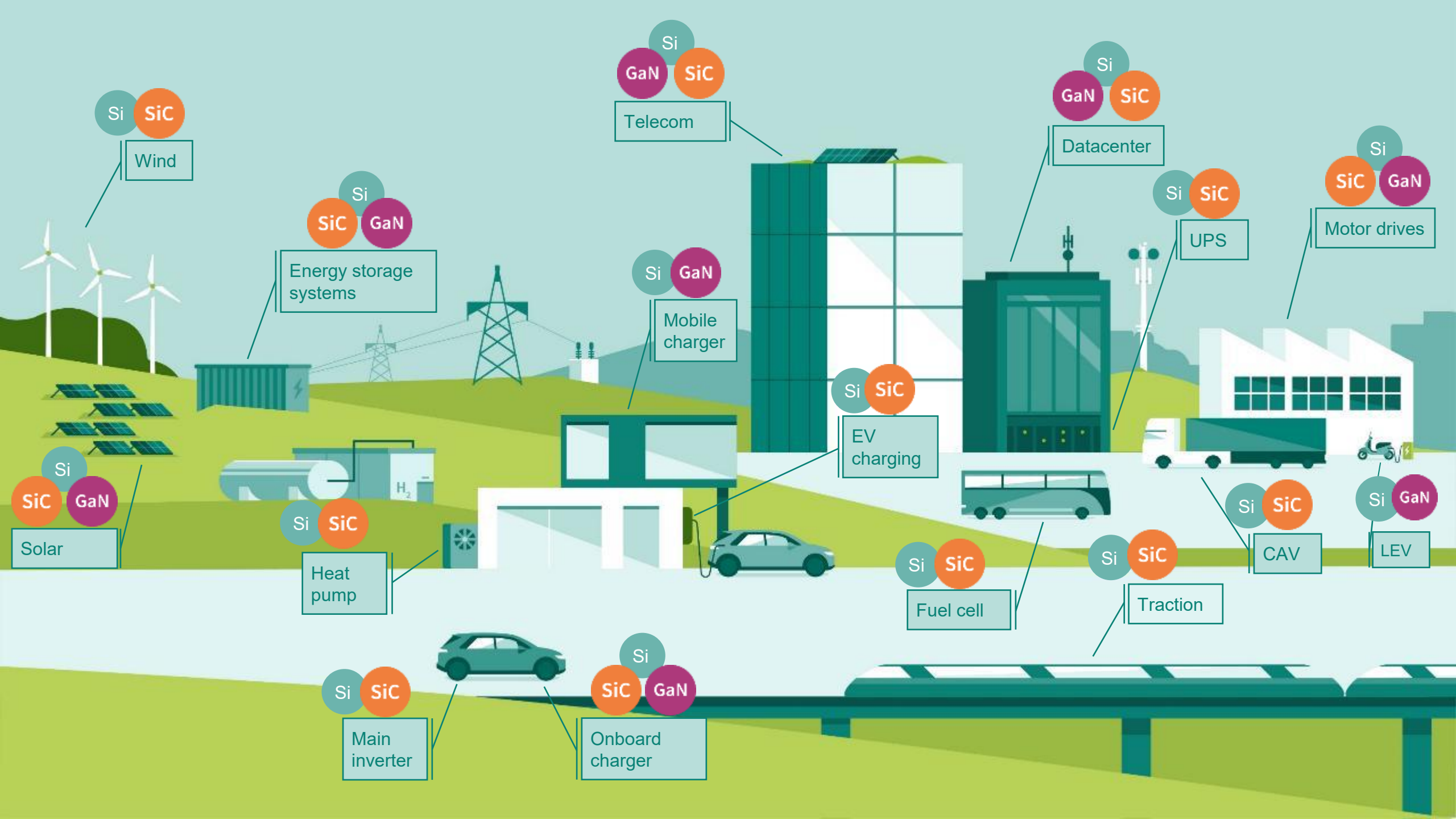
- Broadest portfolio covering auto and industrial applications
- Leading trench performance
- High reliability and robustness in extreme conditions up to 3.3 kV
- Smaller system size



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







Silicon innovation highlights

Infiniteon 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

OptiMOS™ 7 40 V motor-drives optimized

Product



SuperSO8
PQFN 5x6 mm²
package

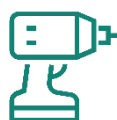
Applications



Gardening tools



Humanoid Motor



Power tools



Home & garden



BMS



Cordless vacuum
cleaner

Value Proposition & Benefits

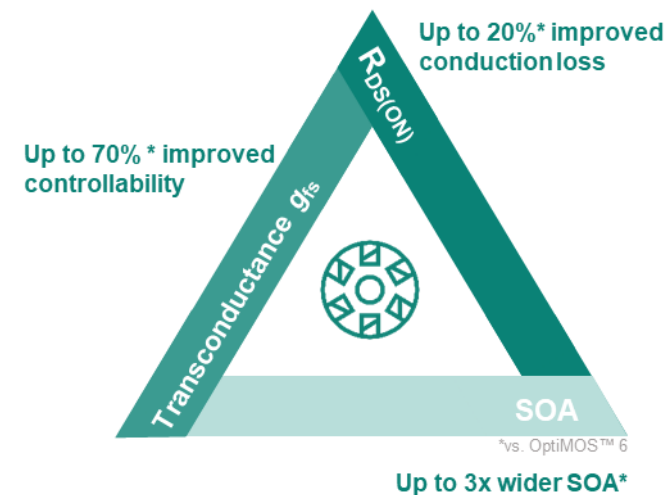
Features

- 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

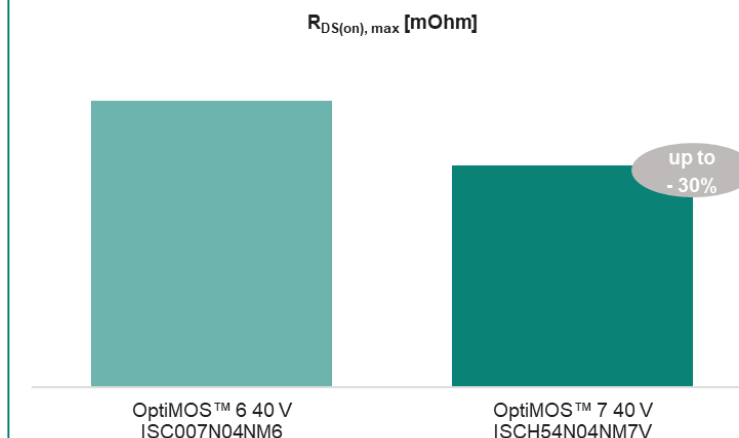
Benefits

- 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



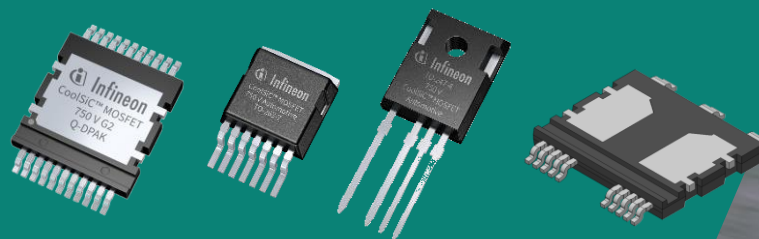


Silicon carbide innovation highlights

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 $T_{vj} = 200^{\circ}\text{C}$**
- **Short circuit robustness**
- **Maximum $R_{DS(on)}$ at $T_j = 150^{\circ}\text{C}$** specified in datasheet

$R_{DS(on,typ)} @ 25^{\circ}\text{C}$
4 m Ω - 60 m Ω



CoolSiC™
Generation 2



On-board
charger



HV-LV DC-DC
converter



eFuses
e-Disconnect



HVAC
compressor



PTC heating

Automotive

Industrial



EV charging



Server



Telecom



Solar



Energy storage



SSCB



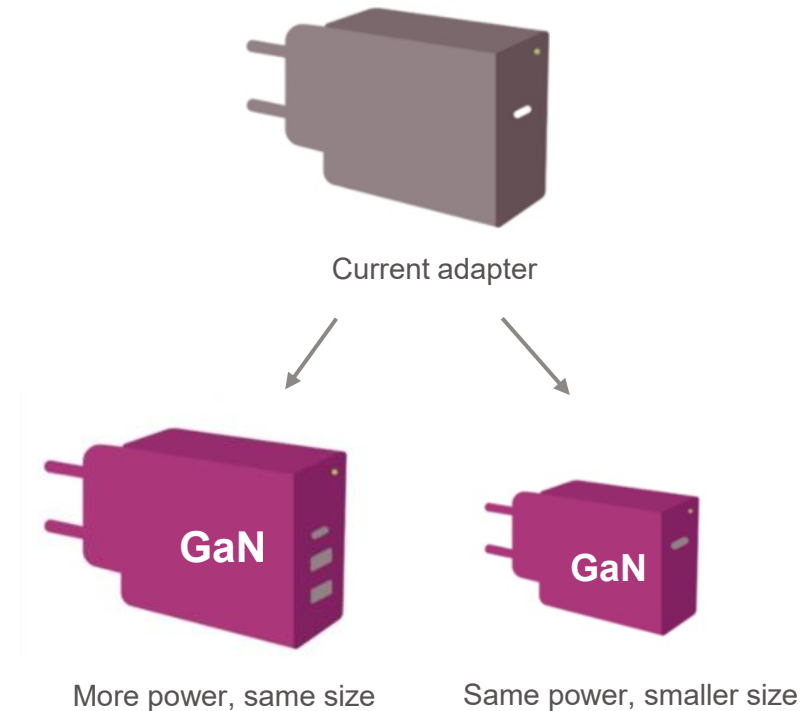
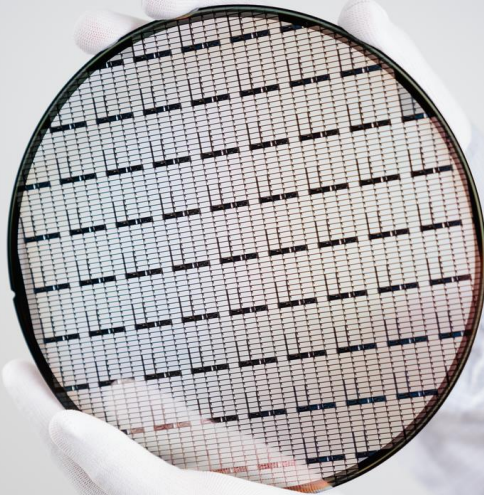
Gallium nitride innovation highlights

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

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

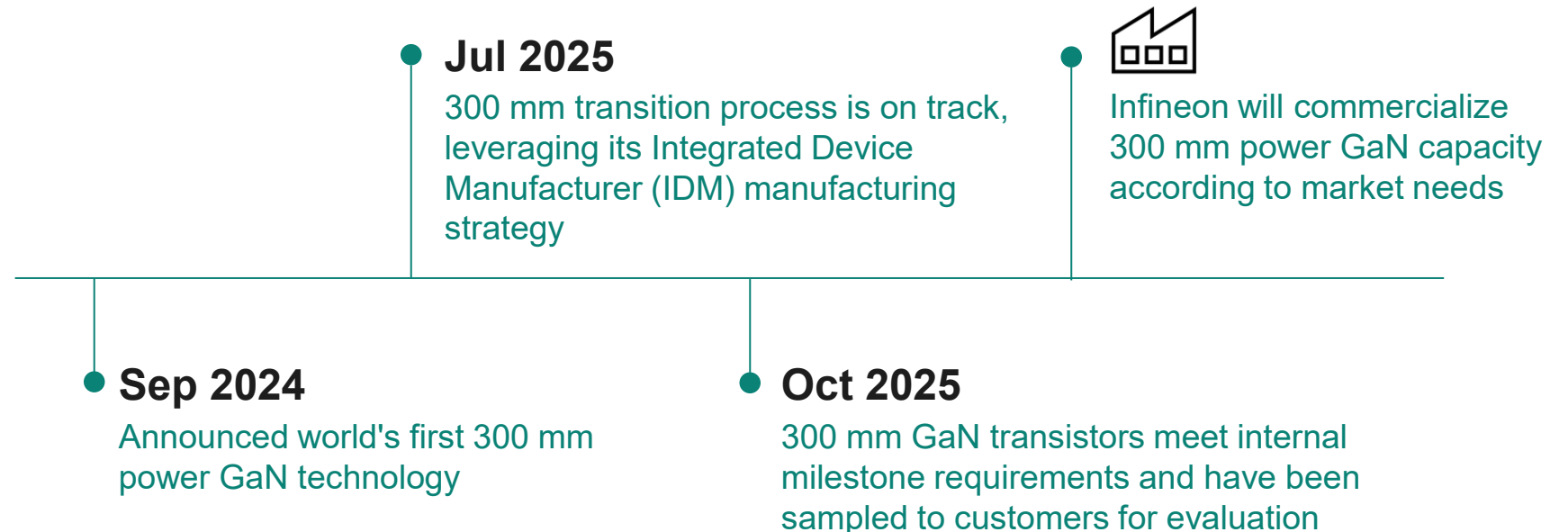
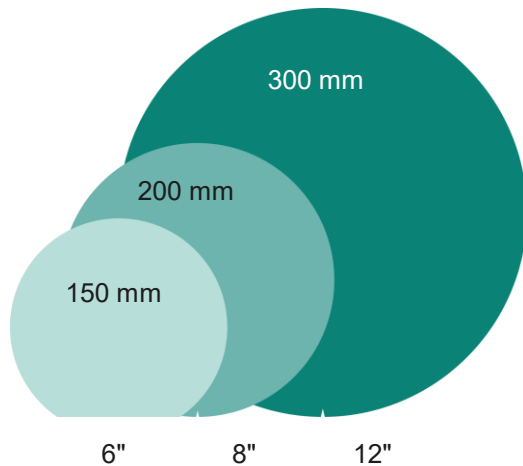
GaN Innovation

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

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

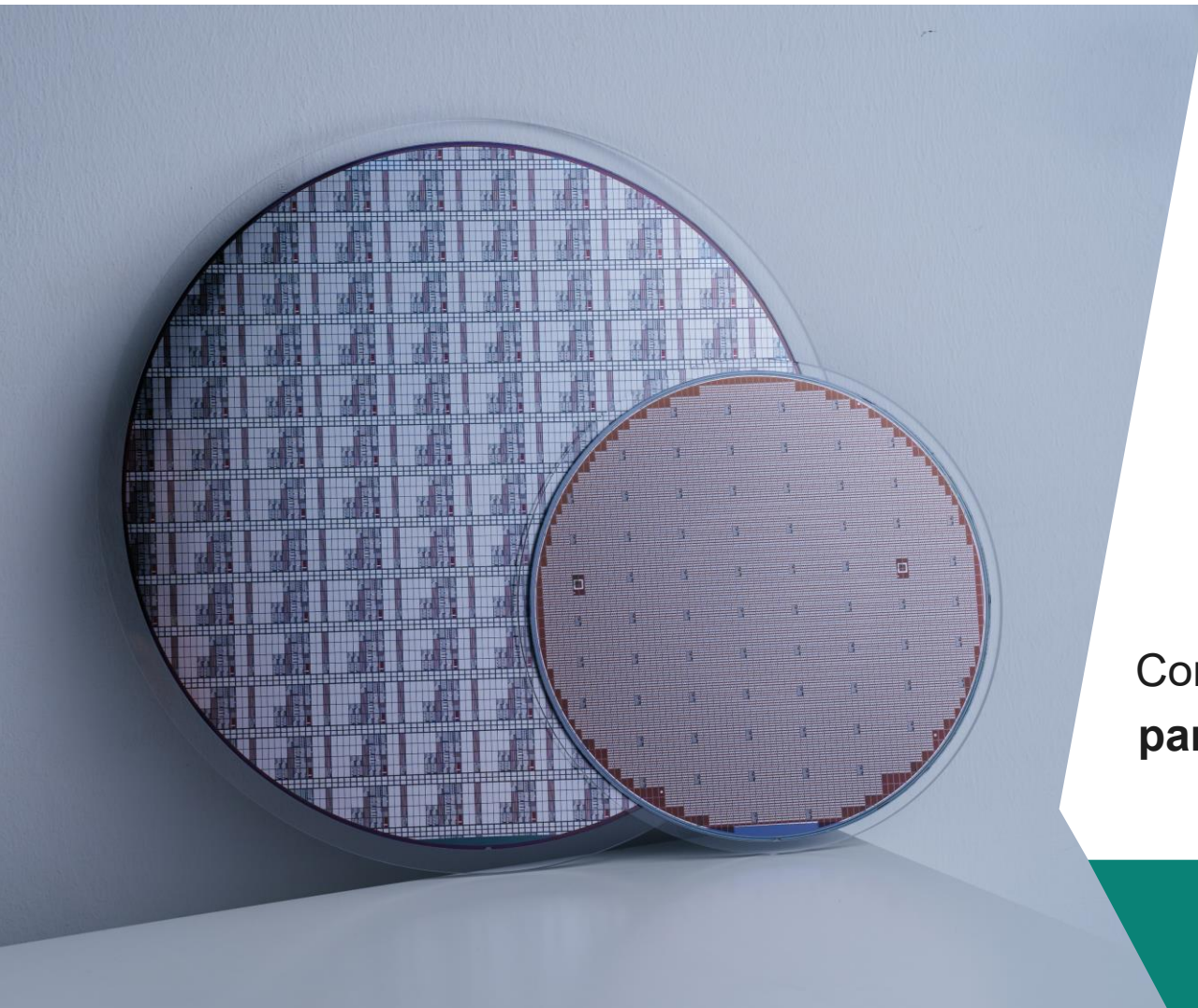
GaN
300

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



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

Customer benefits of 300 mm GaN



Higher system performance & increased cost-effectiveness
through GaN technology



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

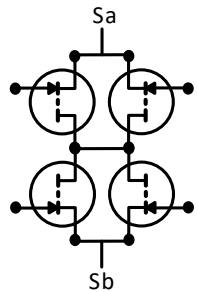


Supply stability
for business continuity

Superior Value Proposition

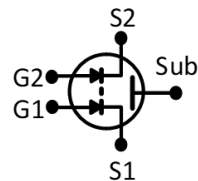
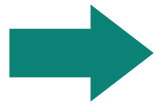
GaN enables the realization of 4-quadrant switches conducting current and blocking voltage – in both polarities

GaN BDS



Discrete
switches

4x devices



Monolithic
BDS

1x devices

What is an HV monolithic bidirectional switch (BDS)?

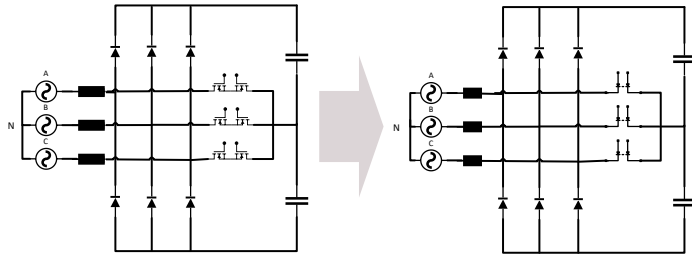
- It's a GaN switch that can **block voltage and current in both polarities**.
- It has an **innovative monolithic structure** that integrates two isolated gates.
- Its advanced architecture results in a **reduced die size** compared to conventional back-to-back arrangements.
- Four modes of operation **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.

CoolGaN™ BDS 650 V G5

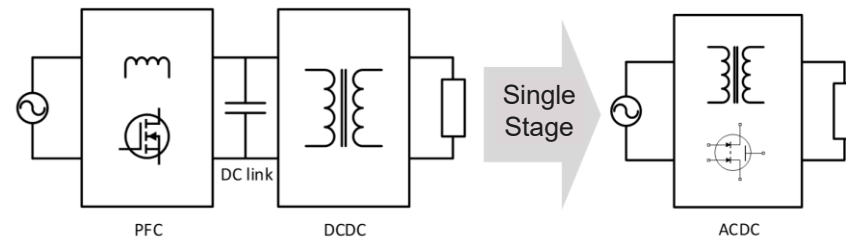
Creating a paradigm shift in power electronics



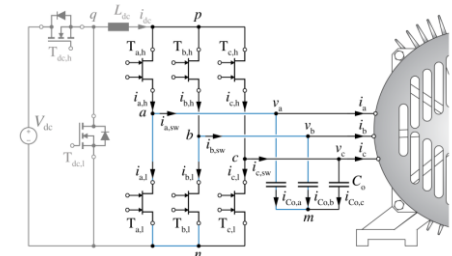
Replacement of back-to-back switches in AC/DC applications



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



New topology enablement such as Current Source Converters (CSI)



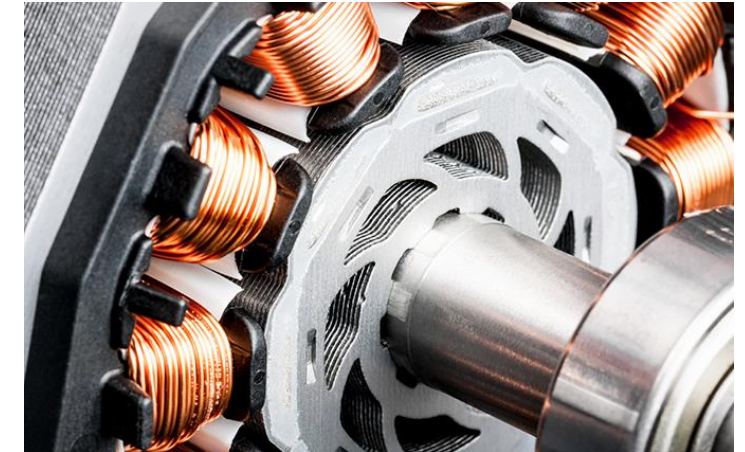
**AI & Enterprise
servers
10 kW+**

**High power
USB chargers
200 W+**



Solar

EV OBC



Motor drives

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

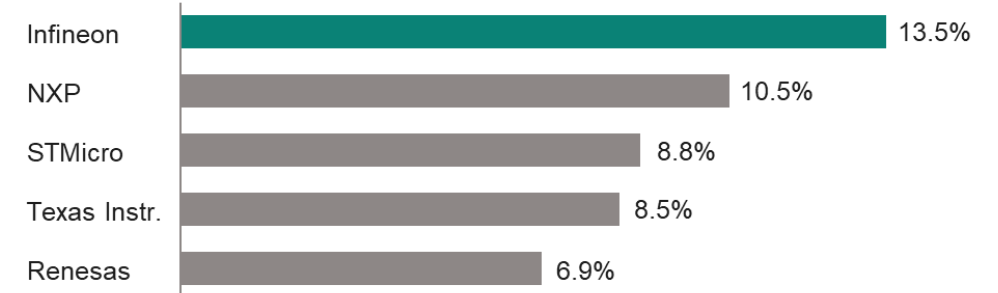


GaN Auto

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

Automotive semiconductors

2024 total market: \$68.4bn



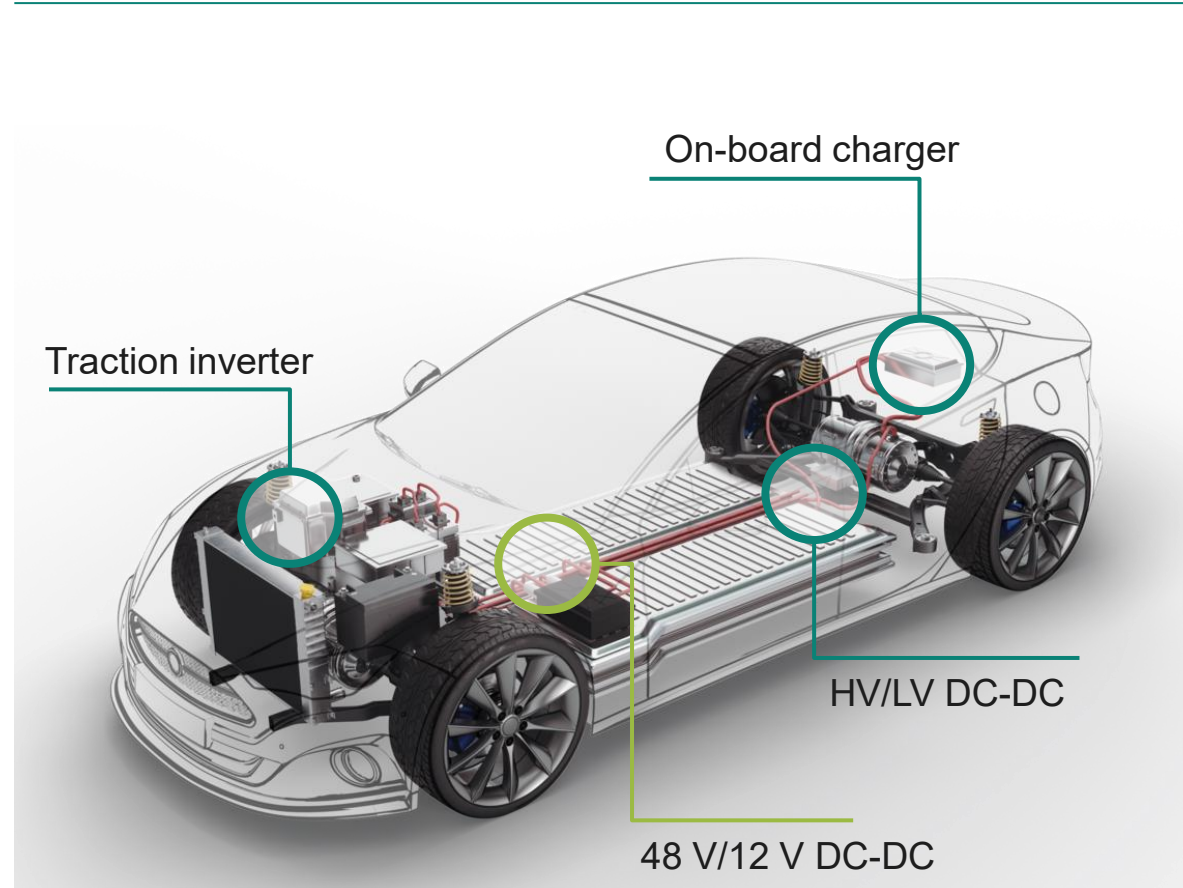
Infineon leads with innovation in product breadth, application solutions, and quality methods

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



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

Powering AI

Data center construction is booming



We power AI from grid to core!

from grid

to core

**Solid State
Transformer (SST)**

**Solid State Circuit
Breaker (SSCB)**

**Data Center /
Server Racks**

**Uninterruptible
Power Supply
(UPS-ESS)**

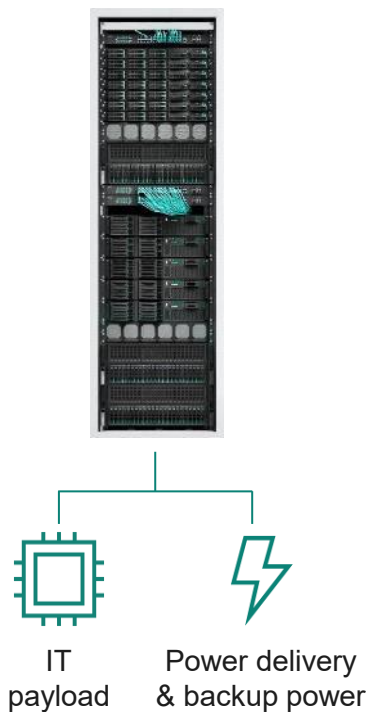
**Heating, ventilation, air
conditioning (HVAC)**



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

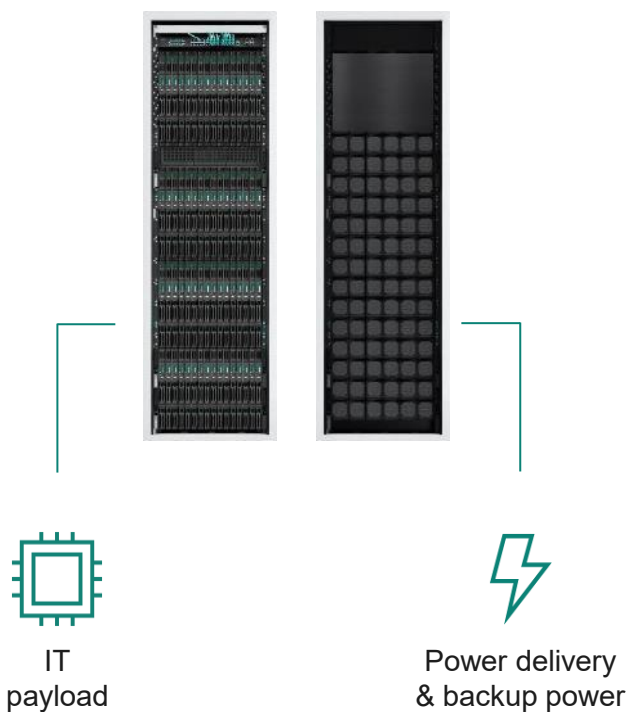
1. Today

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



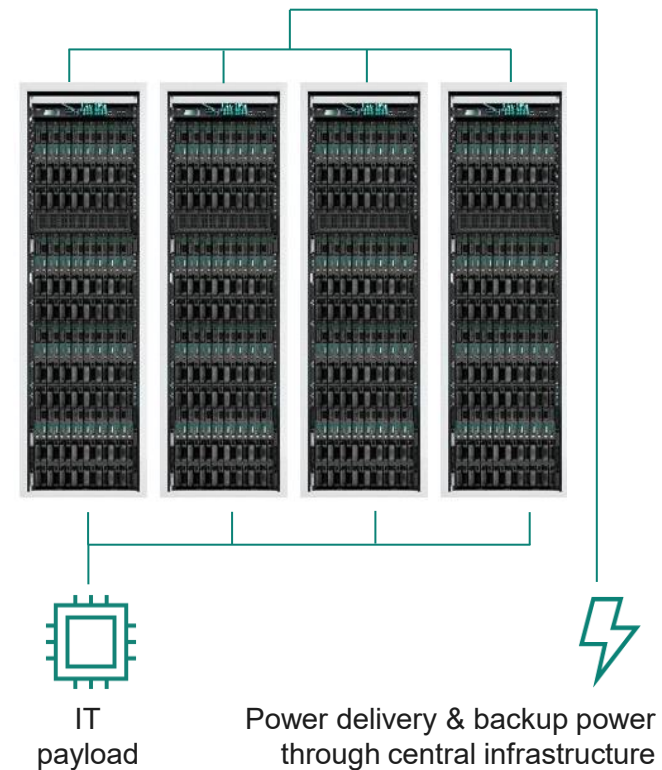
2. 2027+

3- Φ HVDC Power Sidecar
~500 kW+/Rack



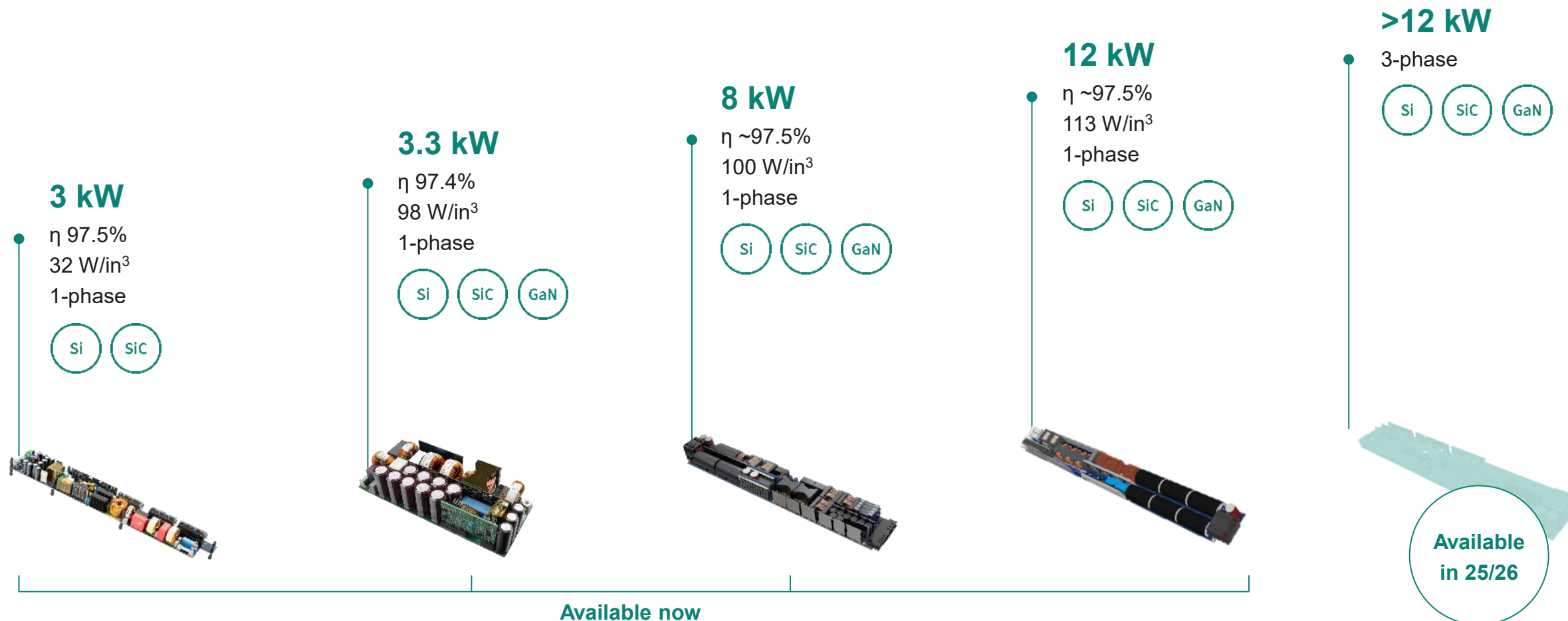
3. 2029+

Hybrid microgrid
1 MW/Rack



The evolution of power supply units for AI server racks

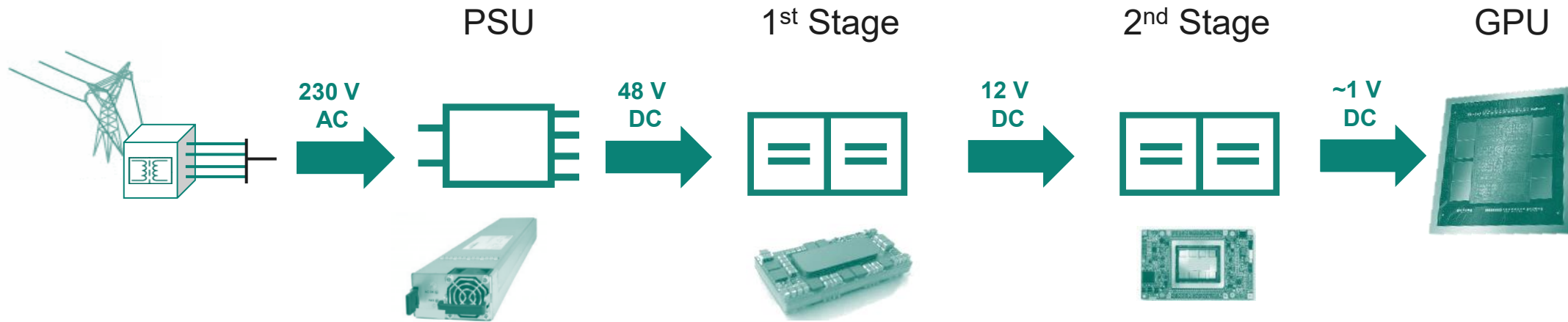
Infineon addresses the growing power demand of AI



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

Substantial energy saving potential for data center with Infineon solutions



**5% efficiency win
at a 1 GW data center**

≡ powers 125.000 homes

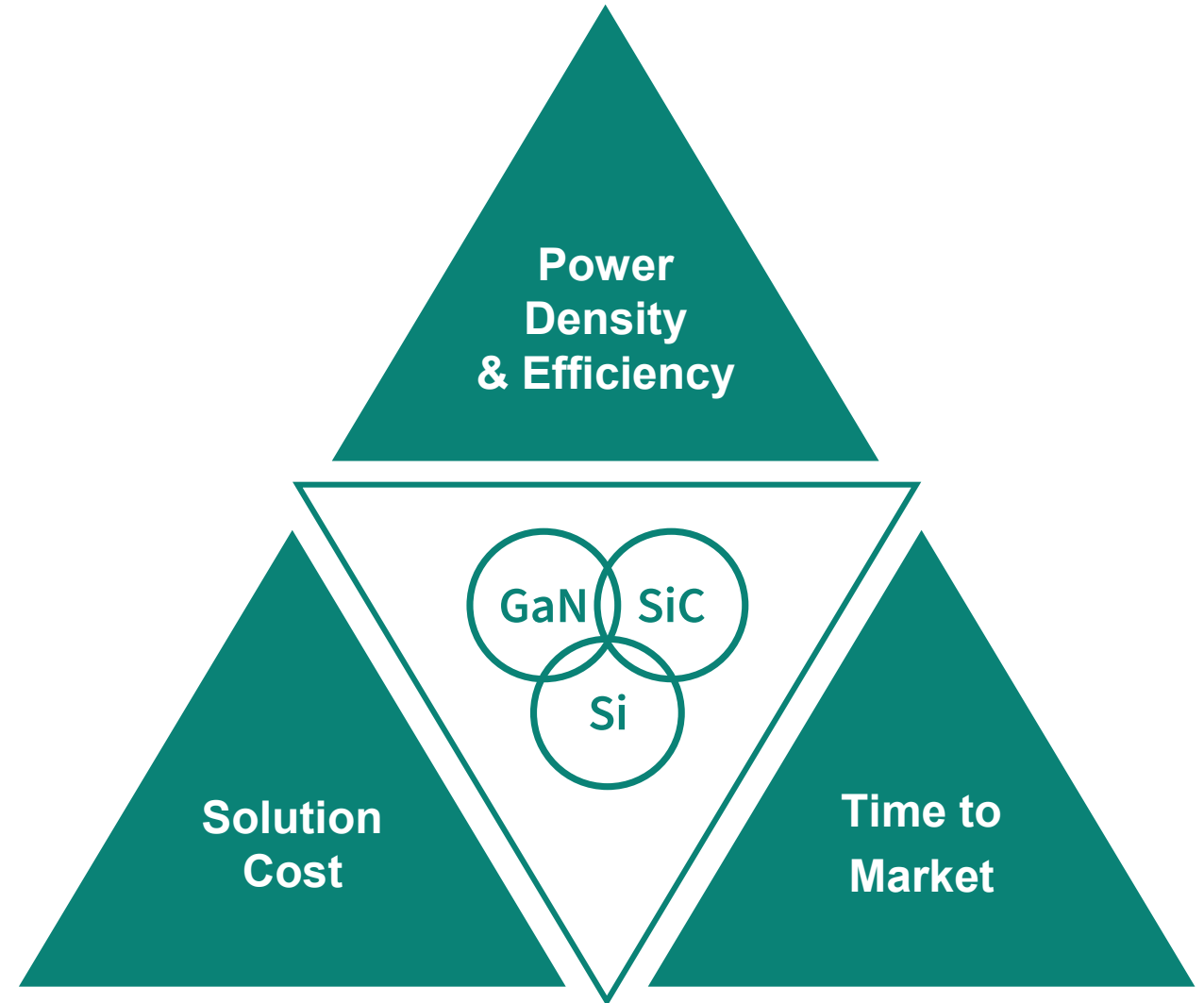
*1 gigawatts data center; 50 MW efficiency win (3,500 kWh per household)



Si, SiC and GaN in AI Data Centers

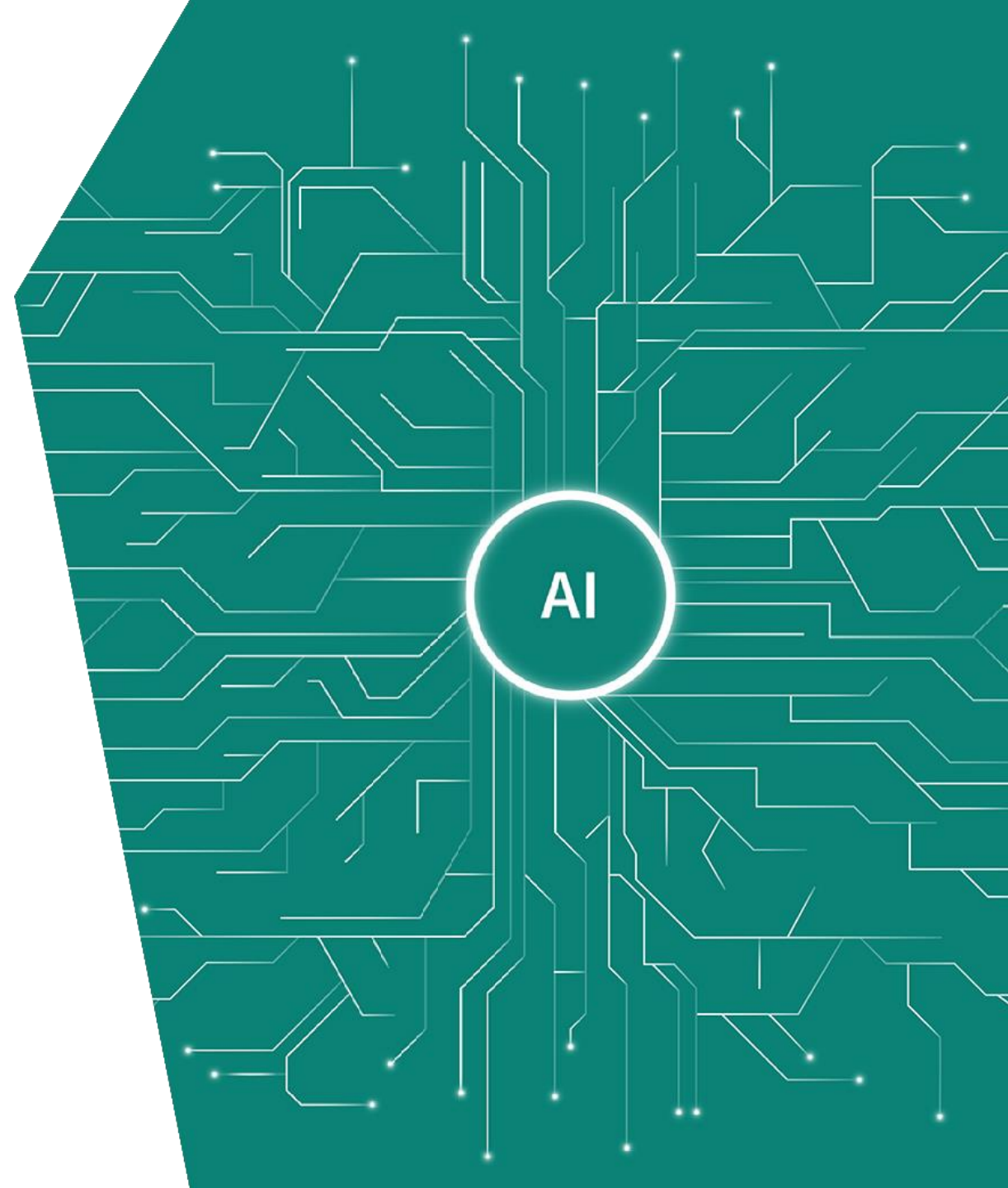
Hybrid architectures combining Si, SiC and GaN offer a balanced approach to meeting various needs in AI data centers

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



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

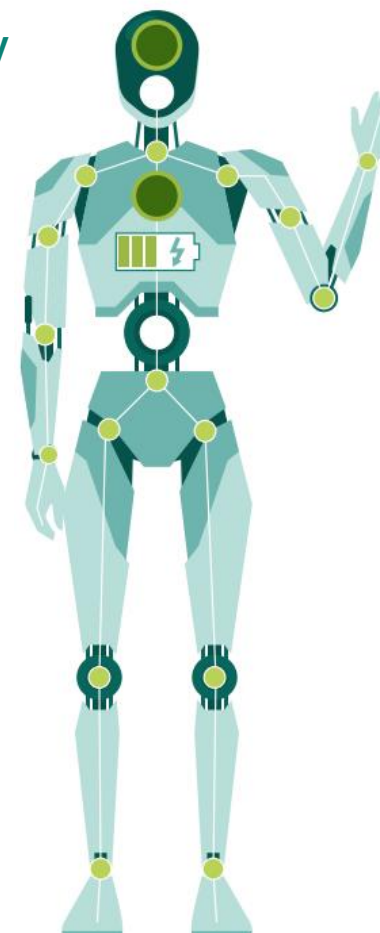
for environmental perception

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

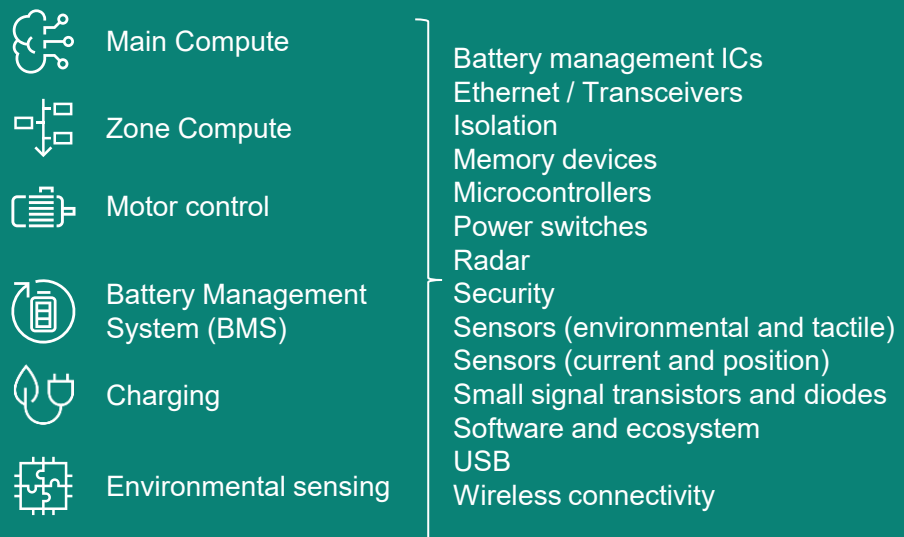
Actuation

for efficient and precise motion

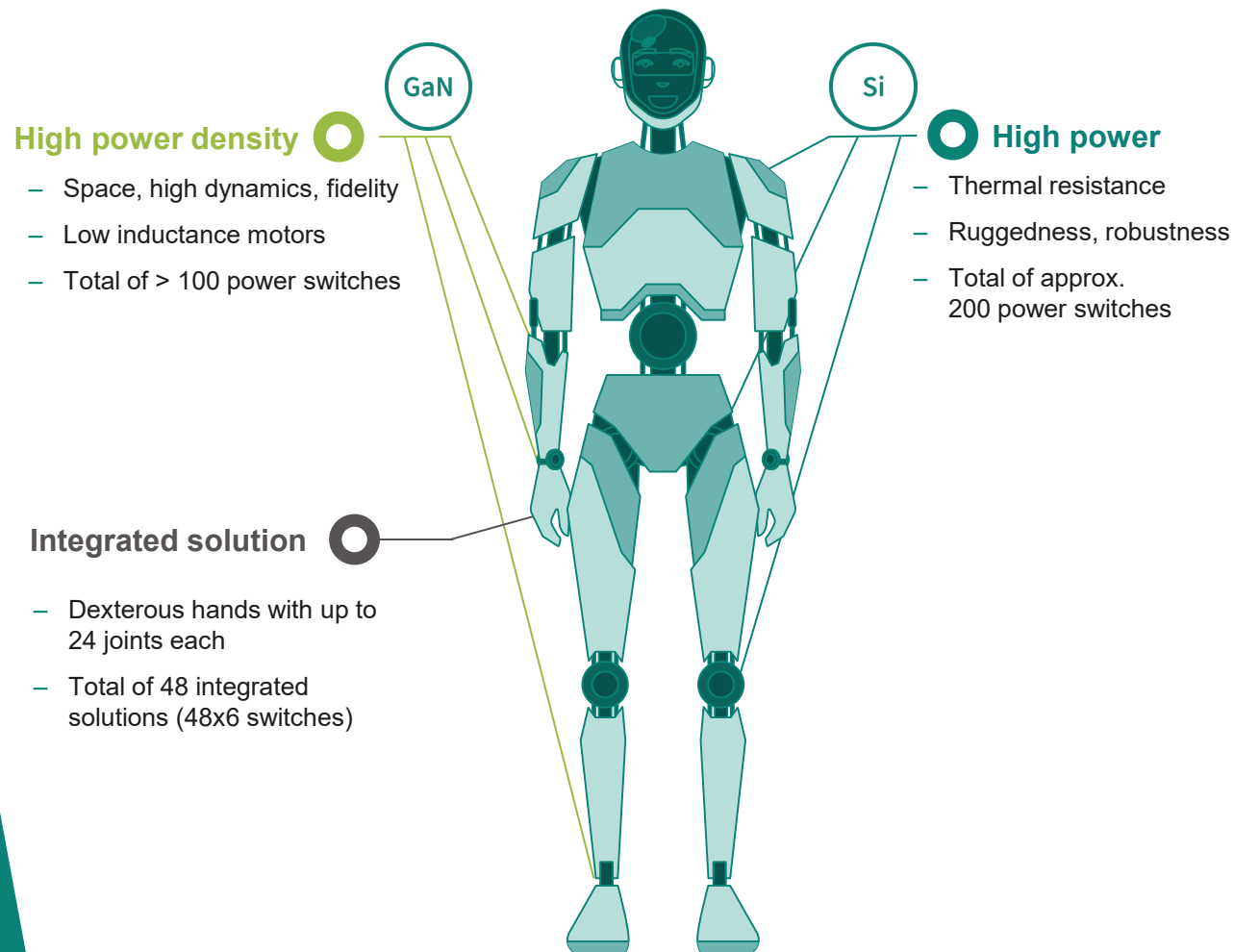
- Motor control
- Actuation
- Structural integration



Infineon solutions for humanoid robots

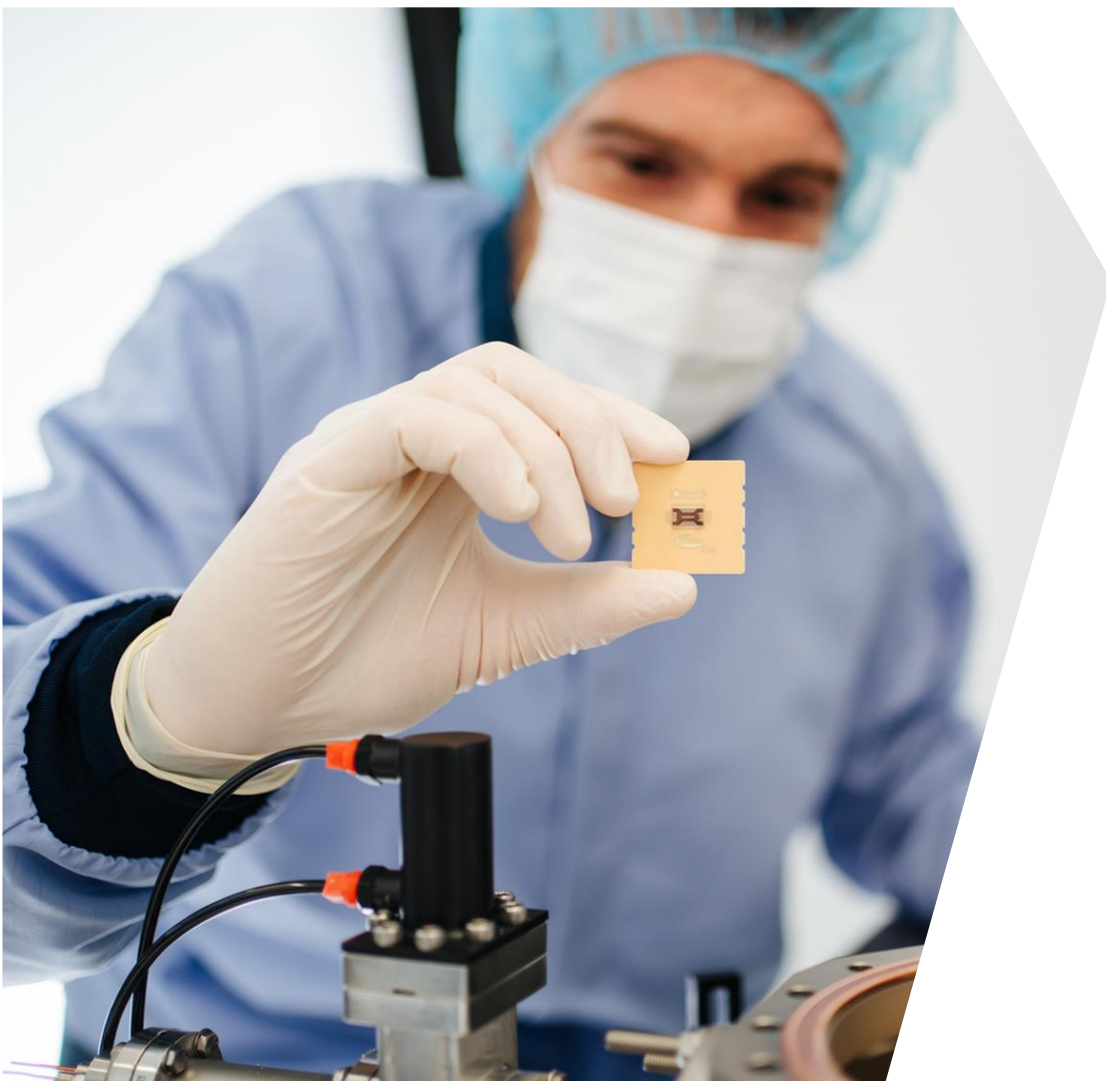


Total 70+ joints with up to 600 power switches in a humanoid robot



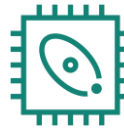
Quantum Computing

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



Trapped-Ion Quantum Computing at Infineon

Clemens Rössler, Richard Kuncic, Klemens Schüppert, Silke Auchter
10/2025

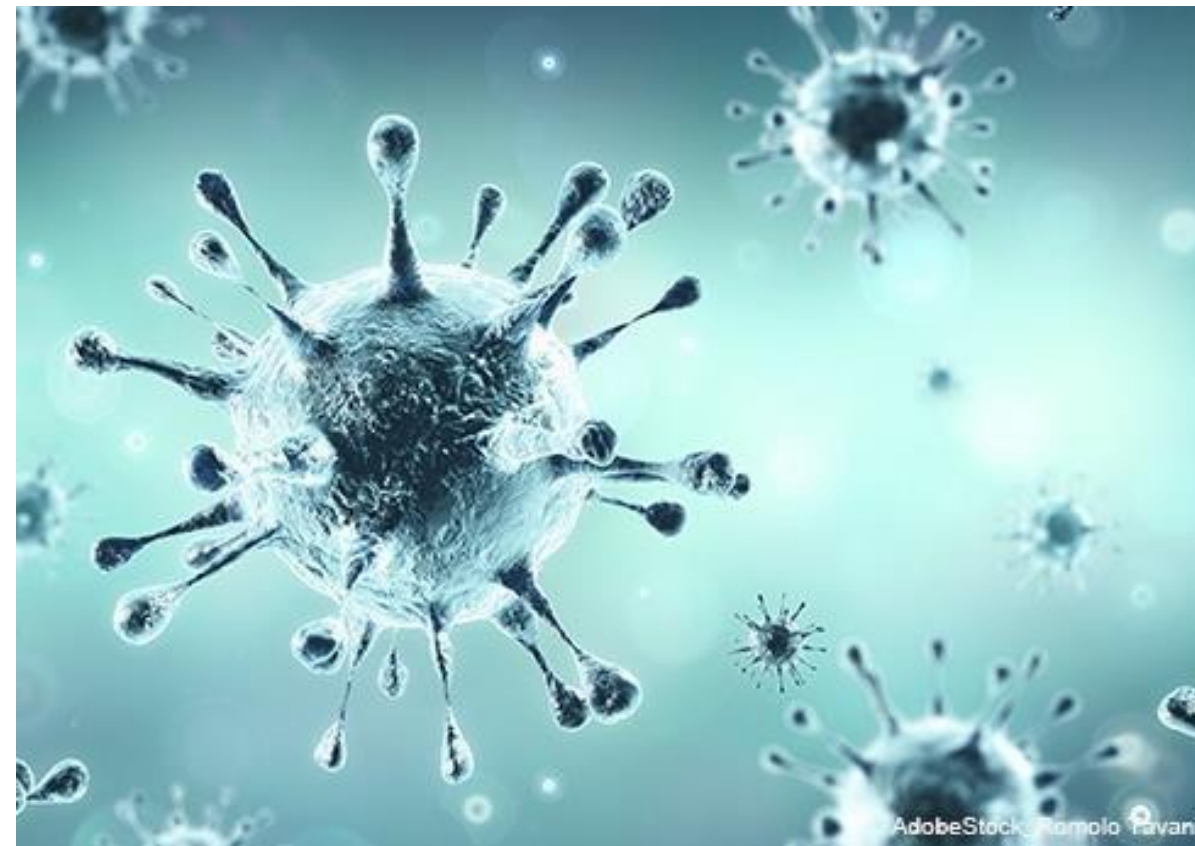


Quantum computing: efficient solving of hard problems



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

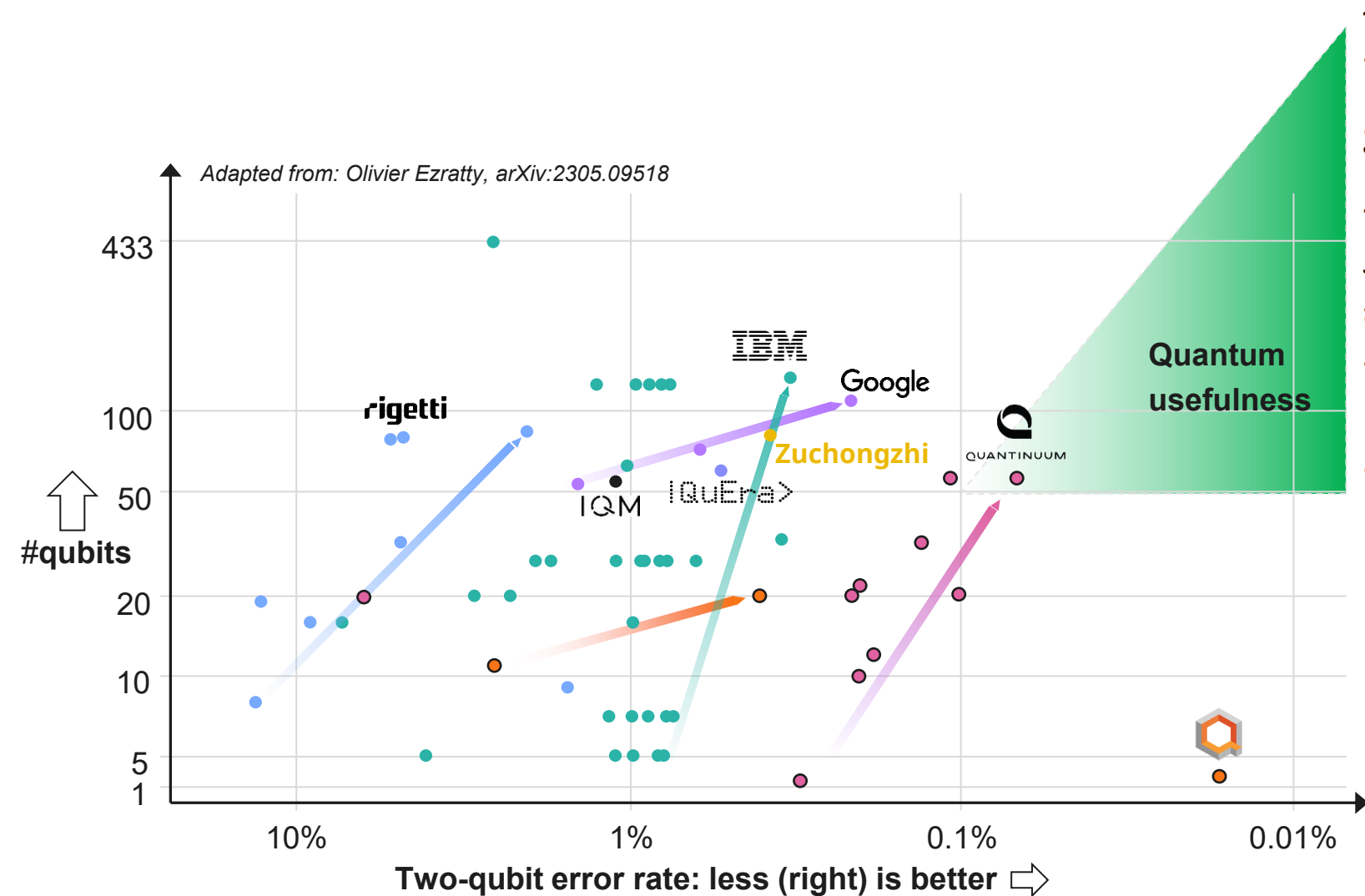
Optimization
Finance, logistics, ...



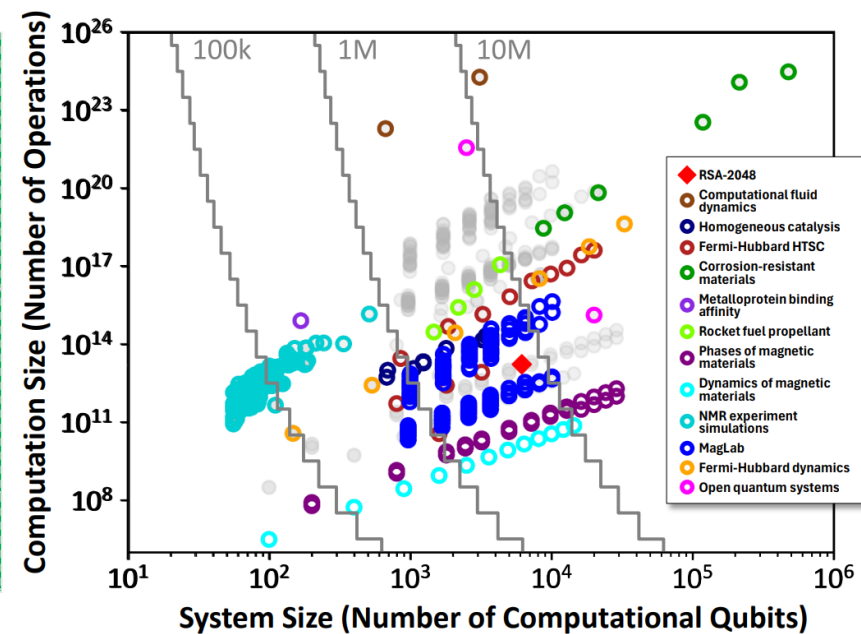
<https://www.i-med.ac.at/mypoint/news/748888.html>

Quantum Simulations
Chemistry (pharmaceuticals), material science,...

Quantum Computing is approaching usefulness!



Source reference: Graph 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)

Our customers lead in market capitalization

