



Automotive Division Call 2024

Peter Schiefer, Division President Automotive (ATV)

4 December 2024



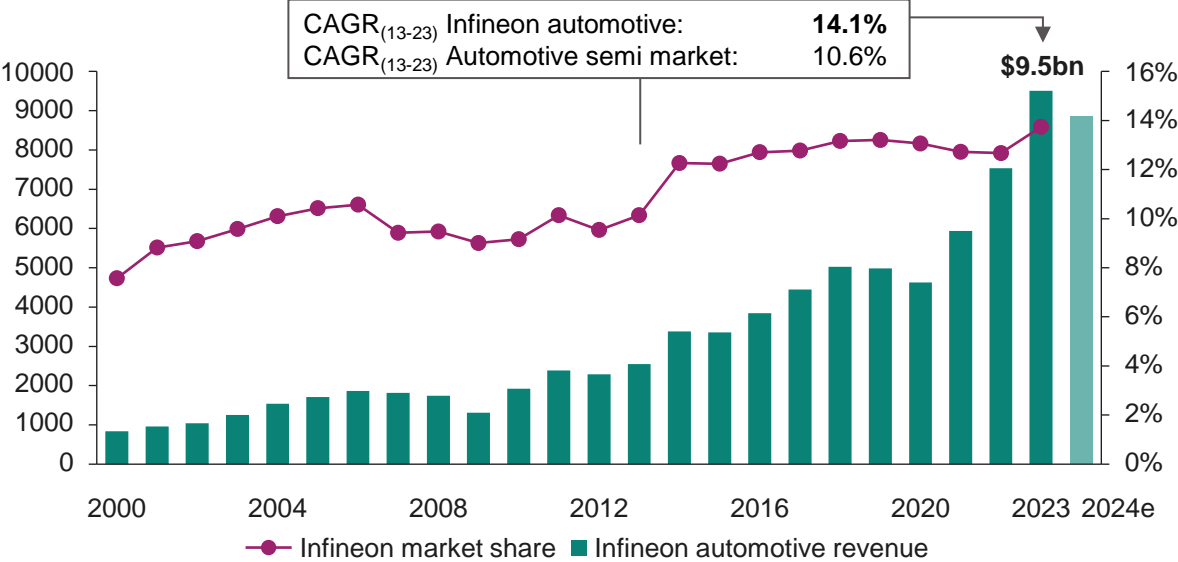
Agenda

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| 1 | The automotive market and Infineon's market position | 2 |
| 2 | Our key structural growth drivers: | 5 |
| | Electromobility (xEV) | 7 |
| | Software-defined vehicle (SDV) | 10 |
| 4 | Infineon automotive semis innovation showcase | 13 |
| 5 | Financial growth trajectory and levers for improved profitability | 20 |
| 6 | Conclusion | 22 |

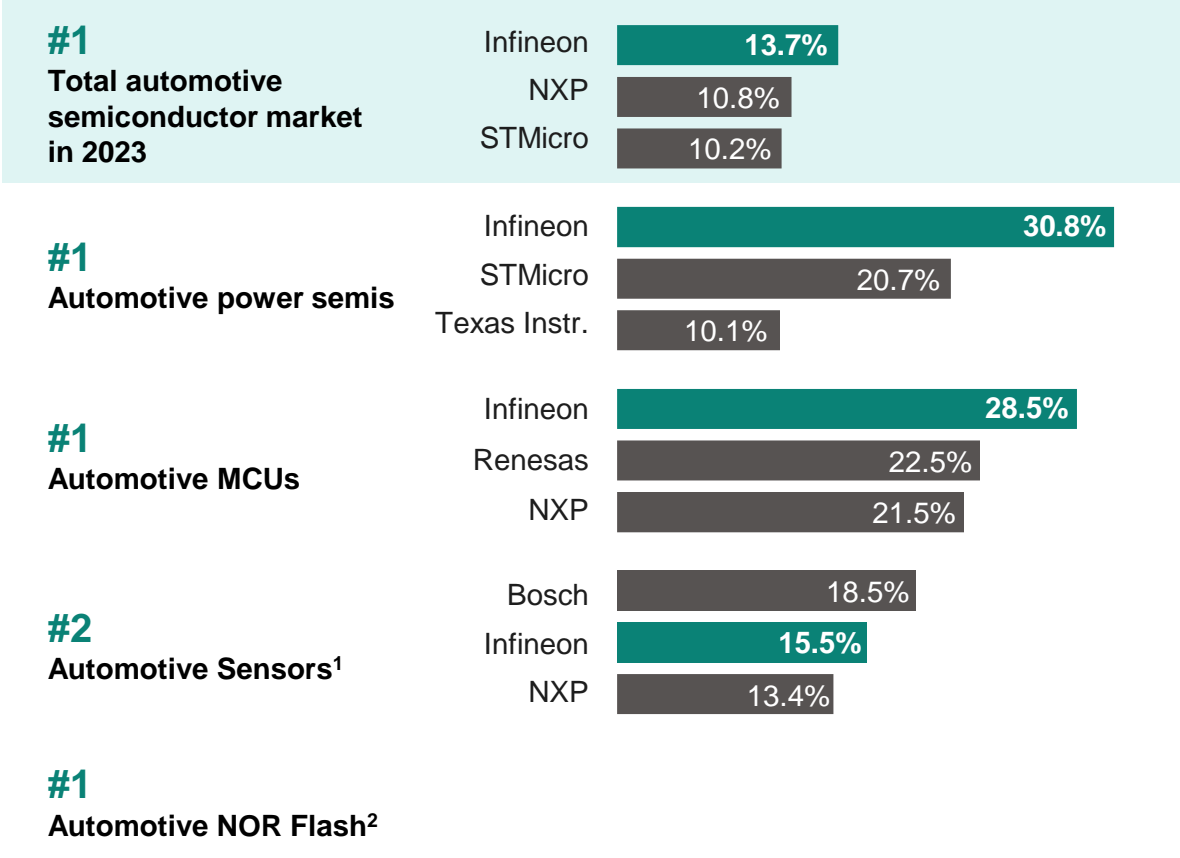
Unrivaled track record – global #1 automotive semis provider

Infineon automotive revenue since 2000

[\$ m; calendar year view]



Infineon’s market position in key product segments



TechInsights: Automotive Semiconductor Vendor Market Shares. 2001 through 2023.
¹ Sensors: S&P Global: Automotive Semiconductor Market Shares 2023. May 2024. ² NOR Flash: Omdia: Competitive Landscaping Tool. March 2024; Infineon.

Spotlight China: Infineon as #1 automotive semi player best positioned to succeed in competitive environment

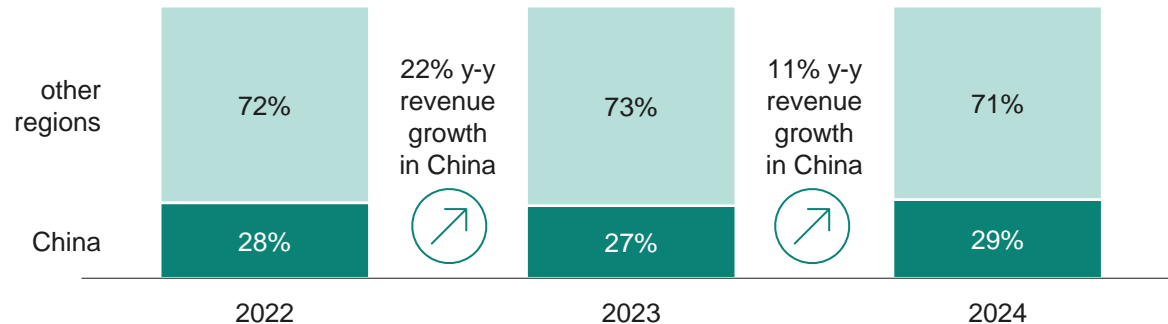


China becoming lead market for automotive semis



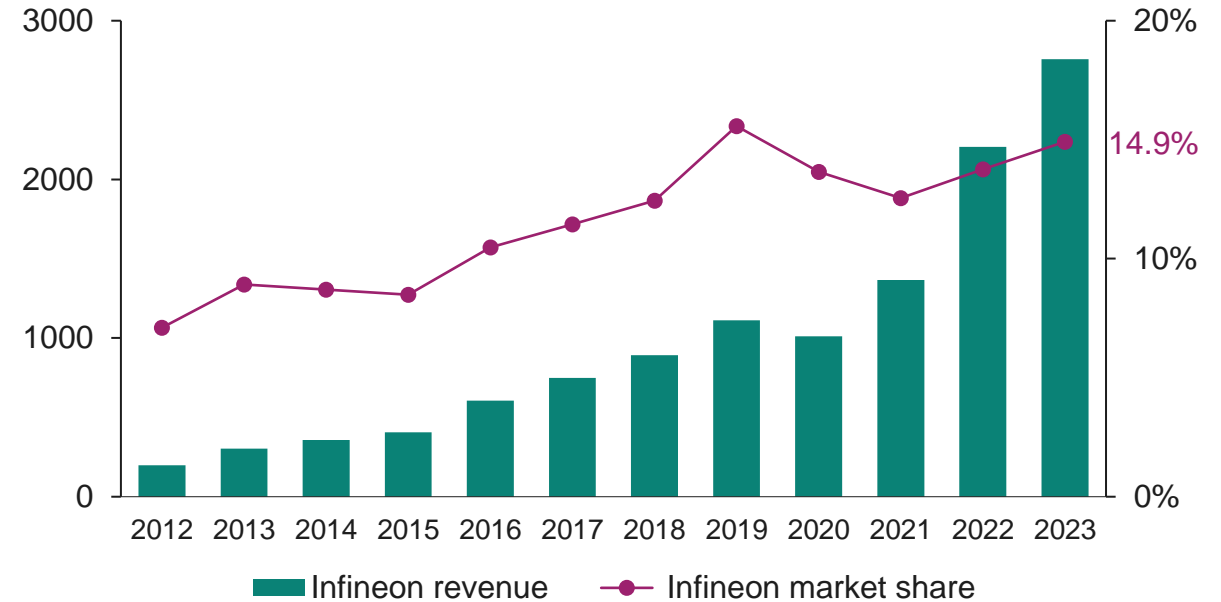
- China taking innovation leadership in selected areas, adopting new technologies faster than other regions
- Light vehicle market size exceeding Europe and USA
- High quality semi suppliers are key for Chinese export ambitions – Infineon #1 auto semis supplier in China
- Infineon with differentiated local manufacturing strategy – decision on a product-by-product basis

Infineon revenue by region and growth in China



Infineon automotive market share in China since 2012

[\$ m; TechInsights estimate, calendar year view]



Market position improvement



TechInsights: Automotive Semiconductor Vendor Market Shares. 2001 through 2023.

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Several strong content growth drivers for Infineon in xEV and software-defined vehicles, even at flat LV production



Structural trends fueling our growth

xEV

- Strong volume growth of BEVs and PHEVs
- Increasing share of SiC in traction inverters
- More kW per vehicle lead to higher BoM in inverter

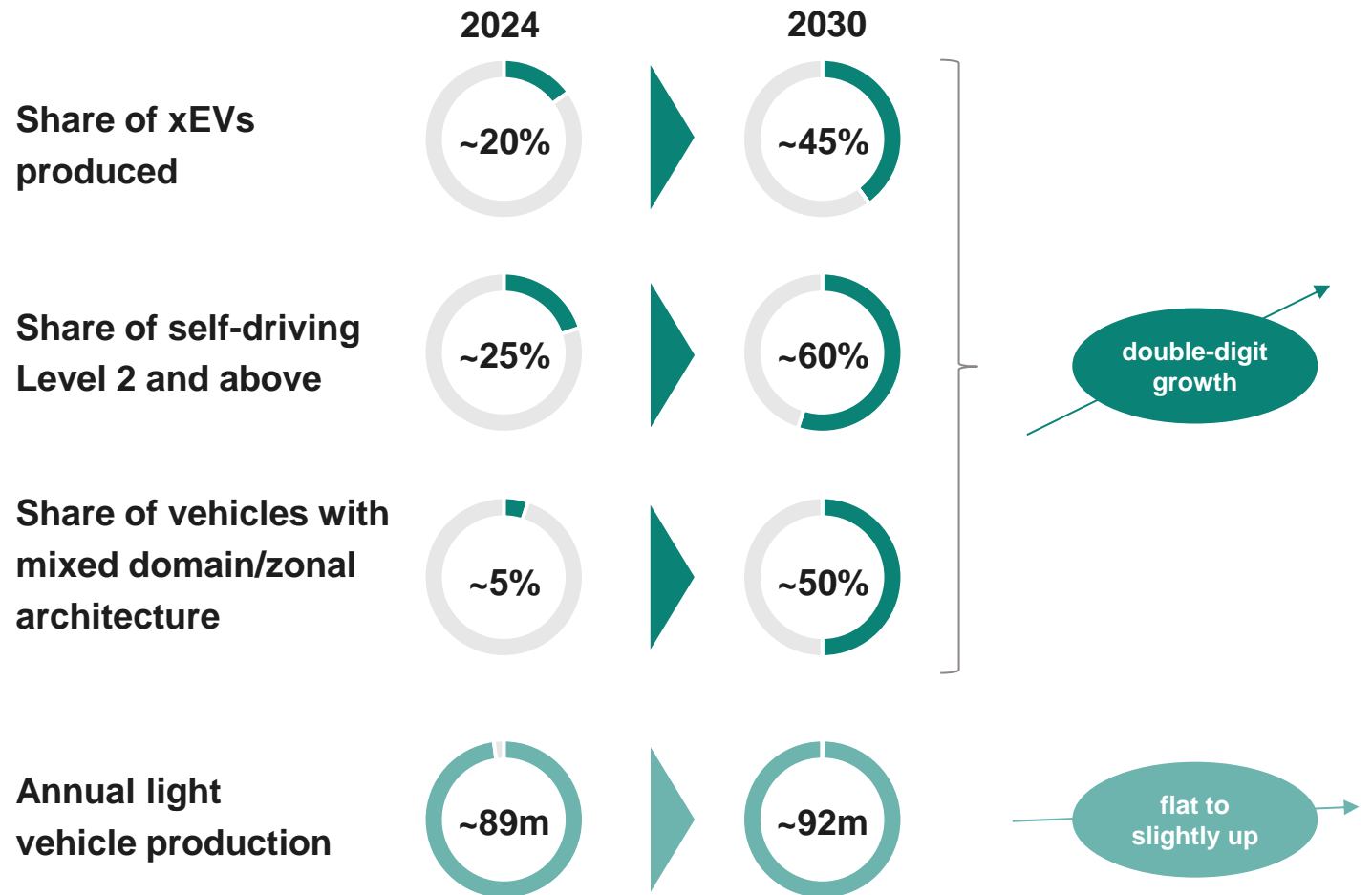
SDV for automated smart driving

- Centralized computing routed by zone controllers
- More sensors, more computing performance
- Smart switches for decentralized power distribution
- Future-readiness of automated driving forces the introduction of >L2 platforms and zonal architectures
- Secure connectivity, functional safety, redundancy, cybersecurity indispensable

Comfort and premium features

- More loads (motors, heating, cooling etc.)
- More elaborate lighting, both exterior (matrix light) and interior (instruments and ceiling)

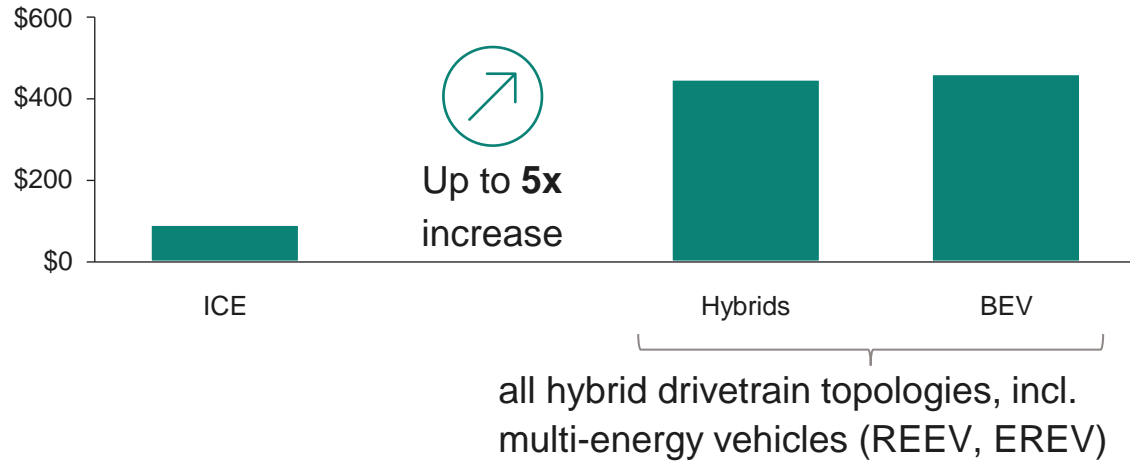
Overview of growth vectors until 2030



Infineon estimates

xEV is a strong content growth driver for Infineon, even at flat LV production

Power semi content per vehicle for drivetrain only



Addressing further electric drivetrain end-markets



REEVs / EREVs



eTrucks



2/3-eWheelers

Based on S&P Automotive Semiconductor Tracker - September 2024. Infineon, October 2024

Infineon's power semiconductor offering

- Only player offering Si, SiC and GaN
- Addressing traction inverter, OBC, DC-DC converter, BMS, aux.
- Fusion modules seamlessly combine Si and SiC
- Technology leader in all three technology fields:



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



World's most competitive 200 mm SiC power fab



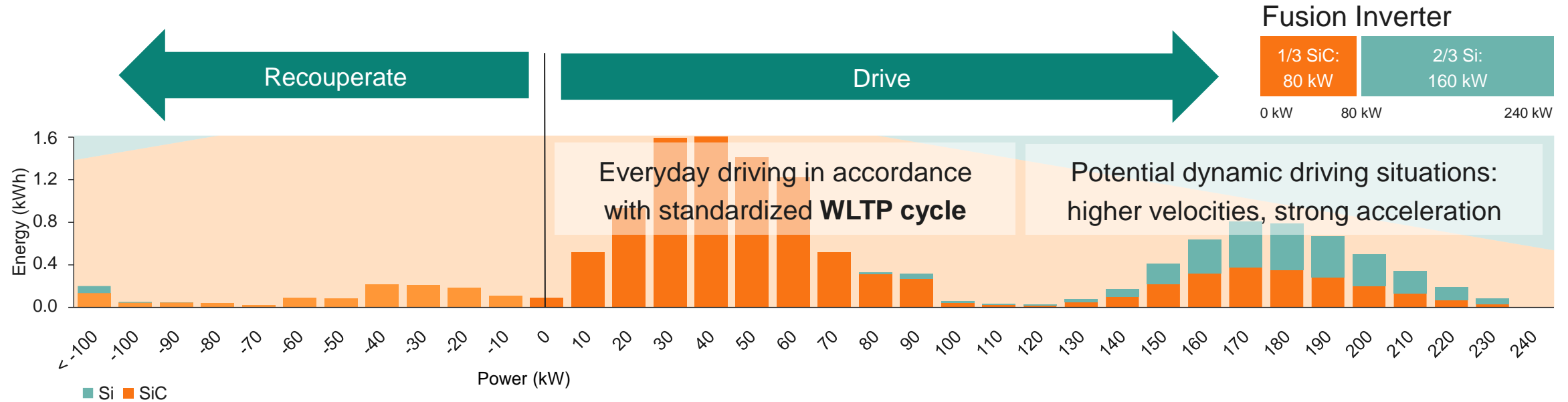
World's first 300 mm GaN power wafer

Infineon has the right power semiconductor solution for all drivetrain applications in any drivetrain topology

Infineon fusion modules offering unique cost-performance ratio, confirmed by cycle data for normal driving scenarios

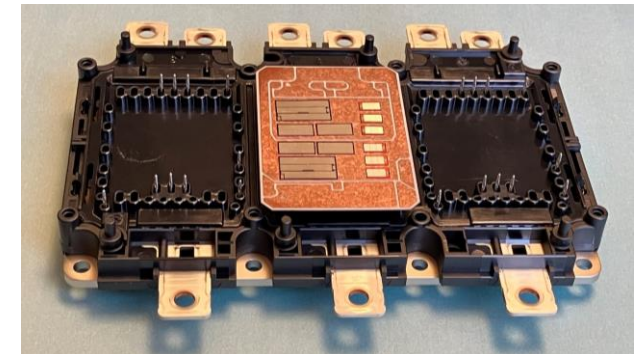


Distribution of semiconductor usage in a typical car for an average driving scenario



Combining efficiency of SiC with cost-effectiveness of Si

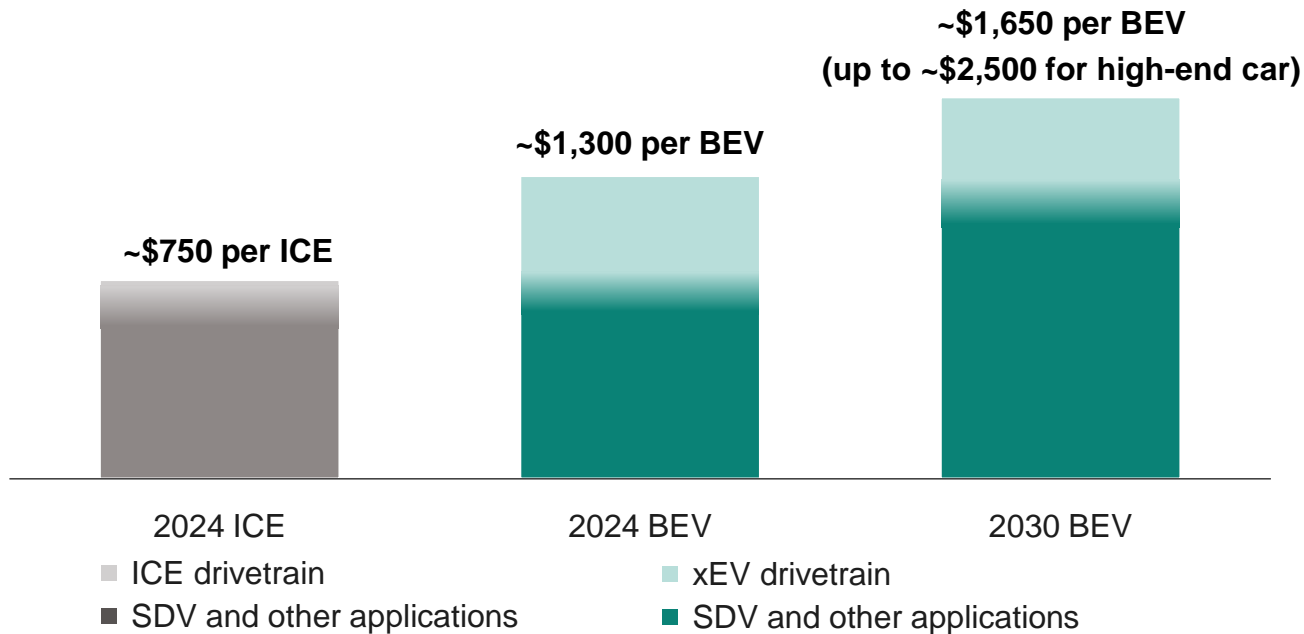
- Typical car driving conditions usually allow for >90% SiC usage
- High power needed for higher velocities and strong accelerations only
- Unique Infineon solution without additional design-in complexity



Infineon is the world leader in automotive semis, serving all key applications and benefiting strongly from content growth



Average semiconductor bill-of-material per car in 2024 and 2030



Semiconductors covered by Infineon

Drivetrain applications:

- Traction inverter, OBC, DC-DC, BMS, auxiliaries
- Drivers for BoM increase:
 - SiC and GaN replacing Si
 - more motors and stronger motors per car
 - slight increase in kW per car

SDV and other non-drivetrain applications:

- Domain/Zone
- SDV, incl. E/E architecture and ADAS
- Safety and advanced security
- Comfort and premium
- Connectivity and infotainment

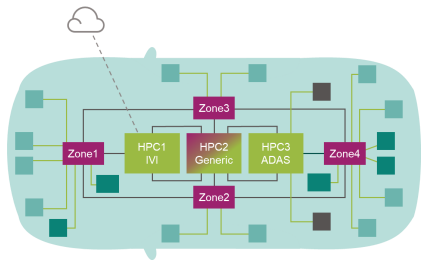
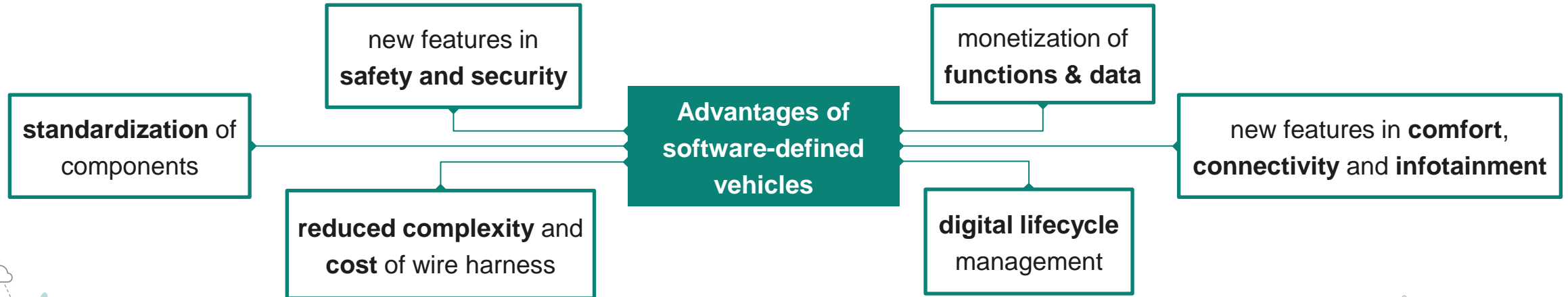
BEV market size growth (vehicle production)



With a growing xEV market and growing non-drivetrain BoM, Infineon profits twice

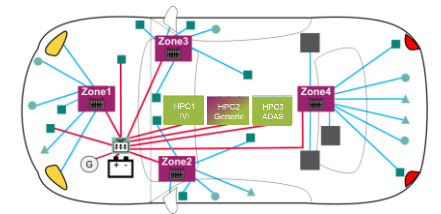
Infineon estimate based on S&P Automotive Semiconductor Tracker - September 2024; October 2024

Software-defined vehicles are enabled by safe/secure computing, high-speed in-vehicle networks, and intelligent power distribution



Safe and secure computing and high-speed in-vehicle network

- Evolution to hierarchical / centralized
- Application software decoupled from hardware
- Management of real-time communication in each zone



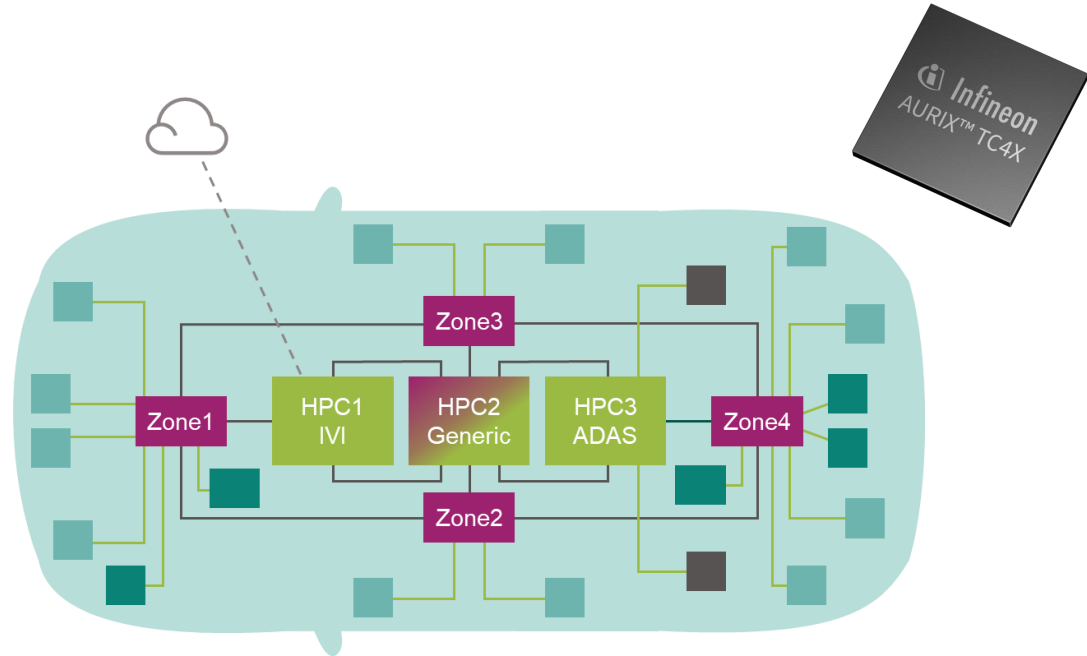
Intelligent power distribution

- Evolution from centralized to decentralized
- Power distribution safety element for
 - freedom from interference
 - system availability up to ASIL-C for ADAS
 - fail-operational of ASIL-D for AD and x-by-wire

Besides edge computing AURIX™ is driving the transition towards zonal architecture



Components of hierarchical E/E architectures



- Control ECU
- Complex sensors & actuators
- Simple sensors & actuators

IVNs (in-vehicle networks):

- service-oriented vehicle network
- signal-based vehicle network

ADAS = advanced driver assistance system

HPC = high-performance computing

IVI = in-vehicle infotainment

AURIX™ MCUs enable zone control units for SDV

Strong performance and versatility

- High frequency, multi-core, large memory, data routing engine
- Scalable MCU family

Rich connectivity

- Bridges and HW accelerators
- High-speed interfaces

High safety and security

- ASIL-D functional safety
- Asym. and sym. cryptography

Freedom from interference

- Hypervisor mode and virtual machines for efficient isolation and separation of applications

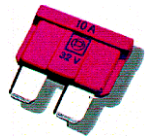
AURIX™ TC4x is already equipped for the requirements of the new E/E architectures

Smart semiconductors in power distribution systems is key enabler for SDV while ensuring high availability and resilience

Infineon PROFET™ Wire Guard enables SDV



Relay replacement



Fuse replacement



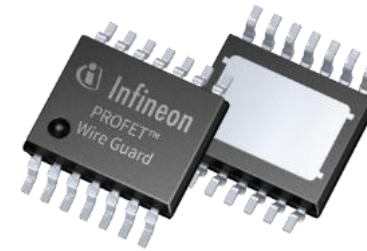
Load status diagnostics

Switch

Protect

Diagnose

PROFET™ Wire Guard



Iso 26262 compliant

Fast failure isolation (< 500 μs)

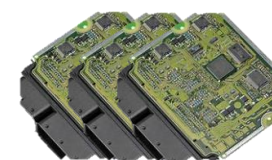
Central fuse box + many individual ECUs



- Big and heavy
- Complex wire harness
- High power loss
- Risk of interference



Decentral zone ECUs



- Light and small
- Simplified wire harness
- Power efficient
- Freedom from interference
- Design flexibility
- Enable ADAS/AD, x-by-wire

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48 V enables higher power demand features for future E/E architectures and automated driving

Demand of in-vehicle loads is sharply increasing and requires 48 V architectures

- More high-power applications and the introduction of zonal E/E architectures drive the need for higher power capabilities
- 12 V power systems are facing challenges
- Future-readiness for automated driving

Present high-power features

| | |
|----------------------------|---------|
| - Body control | ~1 kW |
| - Chassis control | ~1 kW |
| - Powertrain control | ~1 kW |
| - Cockpit and ADAS control | ~0.5 kW |

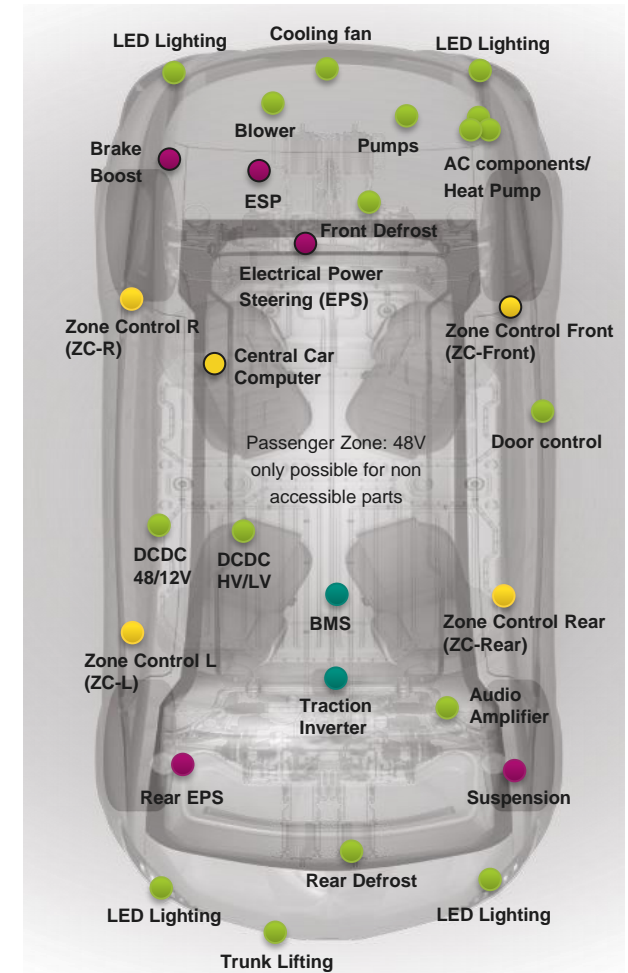
↗
around
3x

Power demand 3-4 kW

Future high-power features

| | |
|--|----------|
| - Steer-by-wire (EPS) | 1-2 kW |
| - Rear wheel steering | 1-1.5 kW |
| - Brake-by-wire (electro-mechanical brake) | 1-2 kW |
| - Active roll control | ~3 kW |
| - Active suspension | 2-3 kW |
| - Central computer | 1-3 kW |
| - Cockpit (infotainment) | 0.5 kW |

Power demand 9-12 kW



● High-power body applications ● Zone/central computer
● High-power chassis applications ● Powertrain control

Infineon is ready to support the transition towards 48 V with the most comprehensive product portfolio



Applications



Cooling fan



HVAC blower



Auxiliary water pump



Electric power steering



Braking



Power distribution



BMS



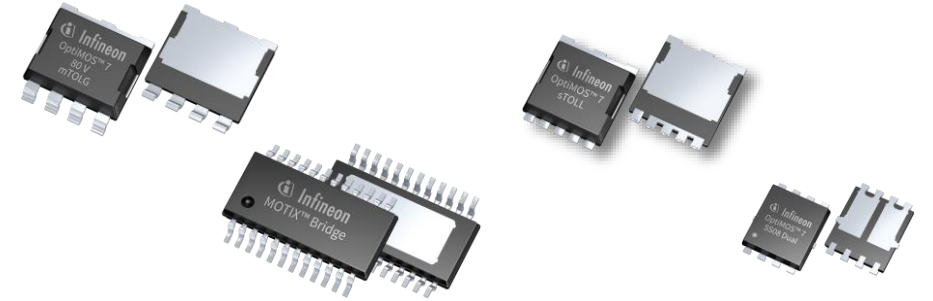
OPTIREG™



48V → 12V

Dedicated 48 V product portfolio with ~80 products

- MOTIX™ BLDC Gate Driver
- MOTIX™ Full Bridge Motor Driver
- OptiMOS™ 80 V / 100 V / 120 V



- EICEDRIVER™ 48 V
- Power PROFET™ + 48 V
- PROFET™ Guard 48 V



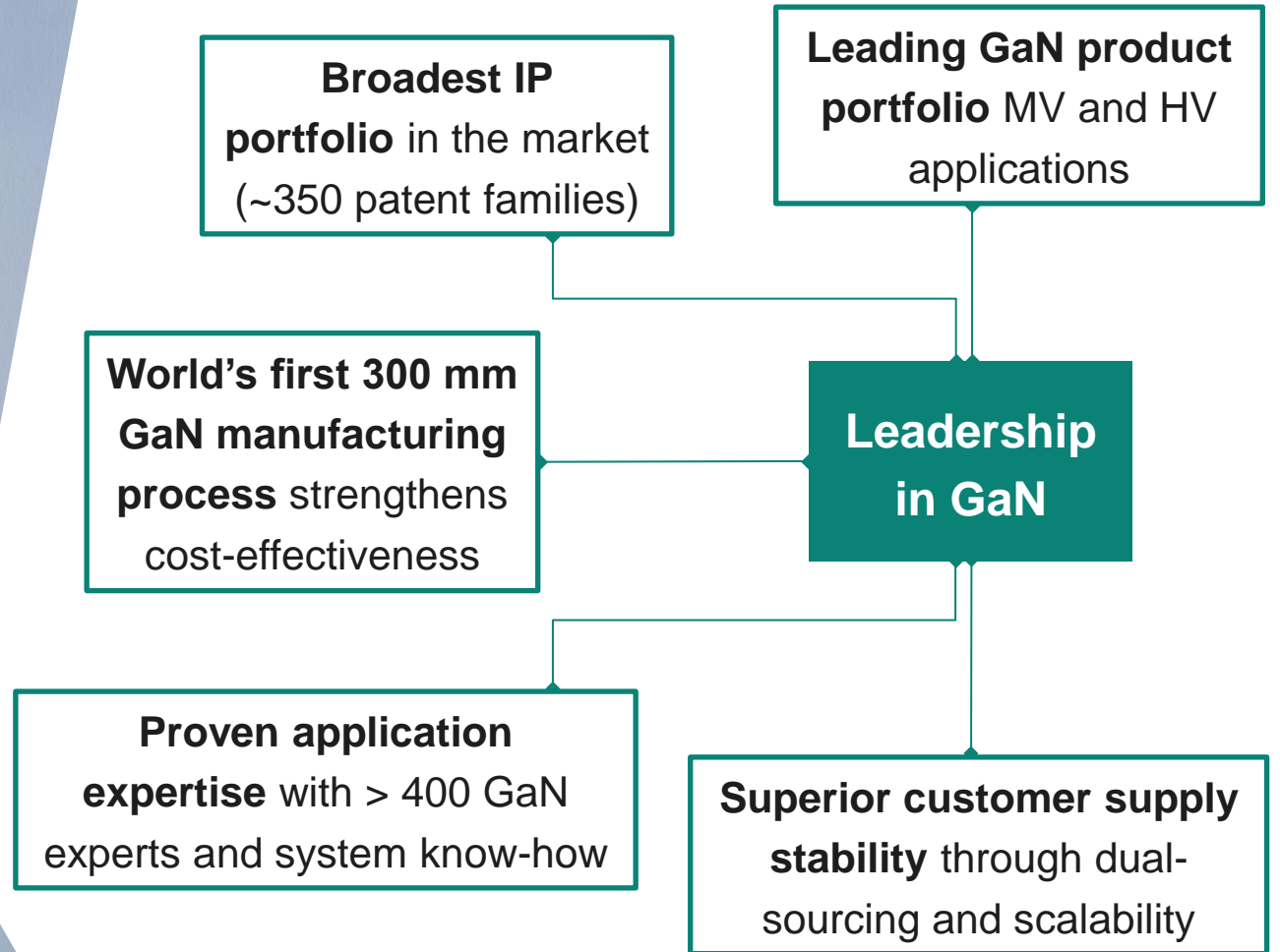
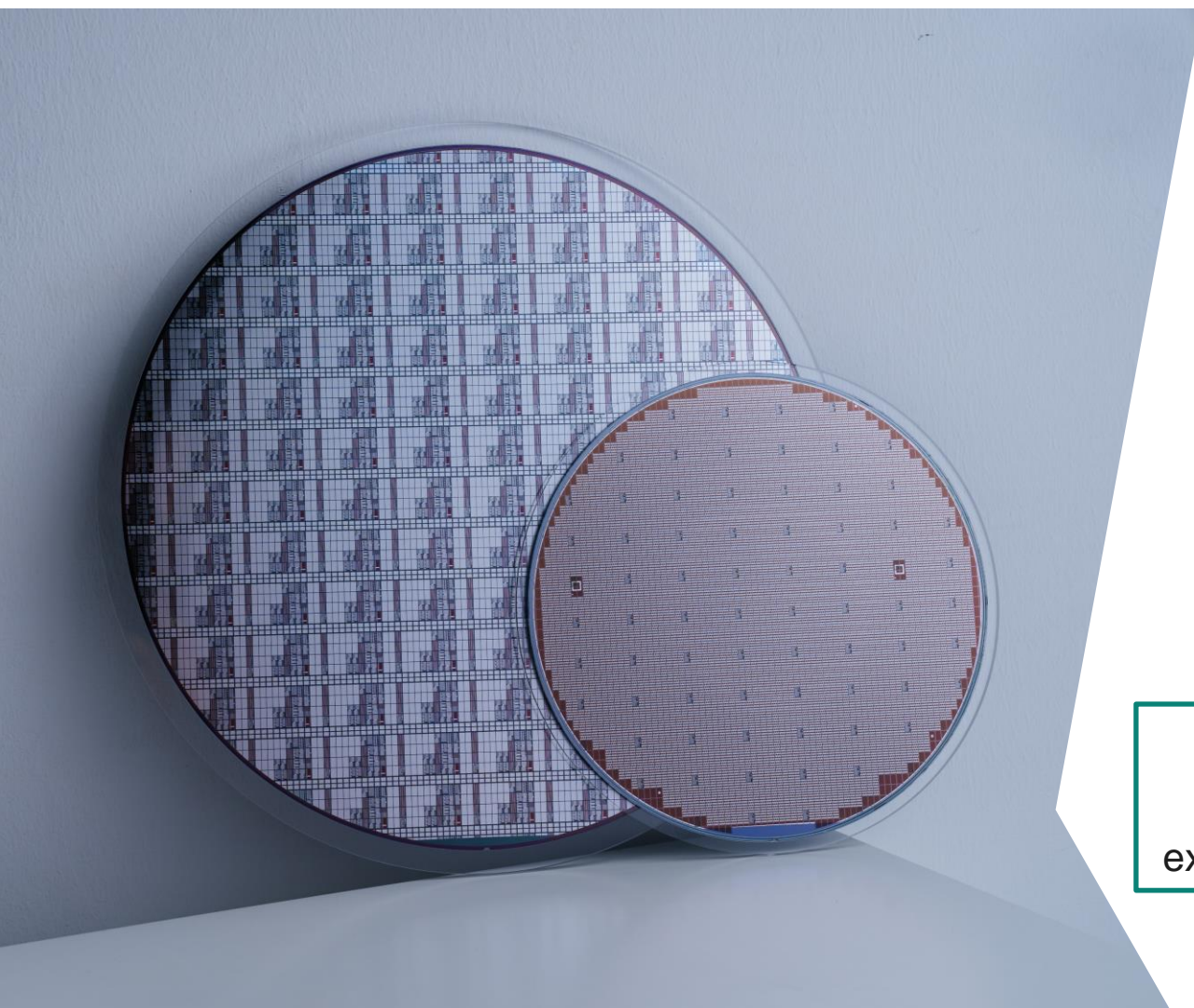
- Battery Cell Monitoring



- OPTIREG™ Switcher 48 V to 12 V
- OptiMOS™ 80 V / 100 V / 120 V
- CoolGaN™ 100 V



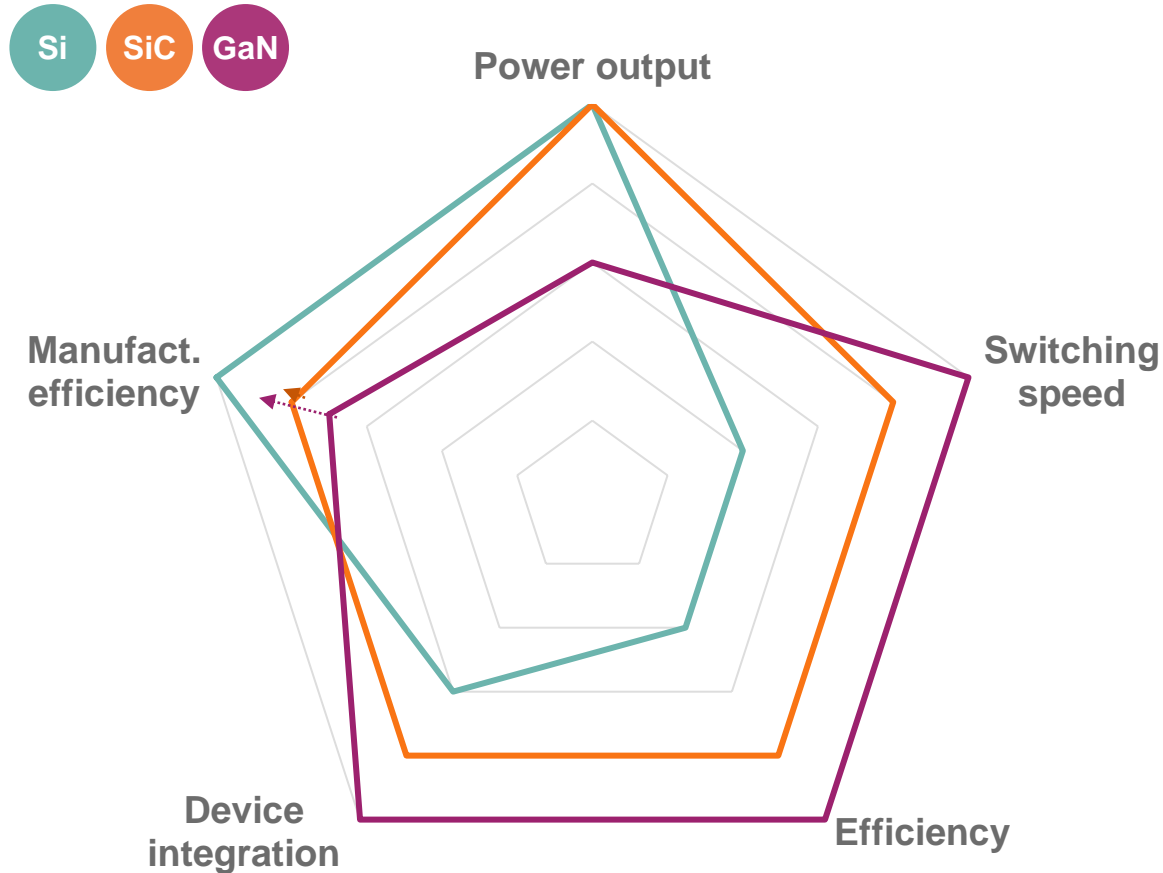
Infiniteon is a leader in GaN technology and can build on the industry's broadest IP portfolio and application expertise



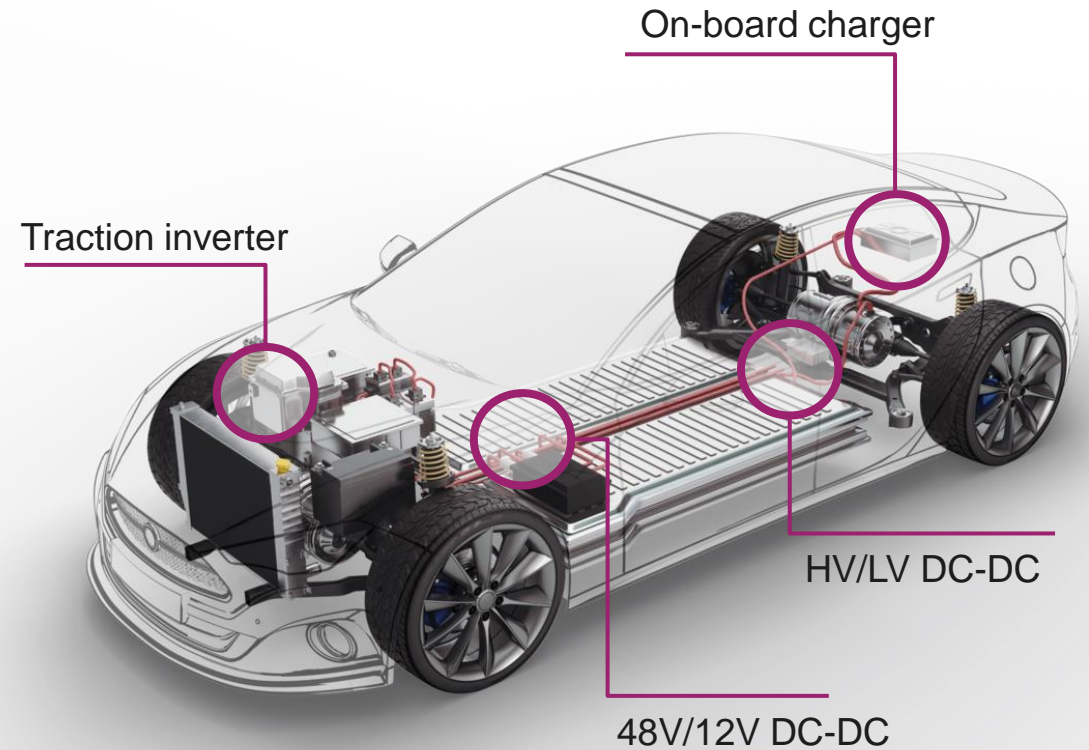
GaN moves the boundaries for efficiency in Infineon's xEV core applications: OBC, DC-DC converter and traction inverter



Power technology comparison



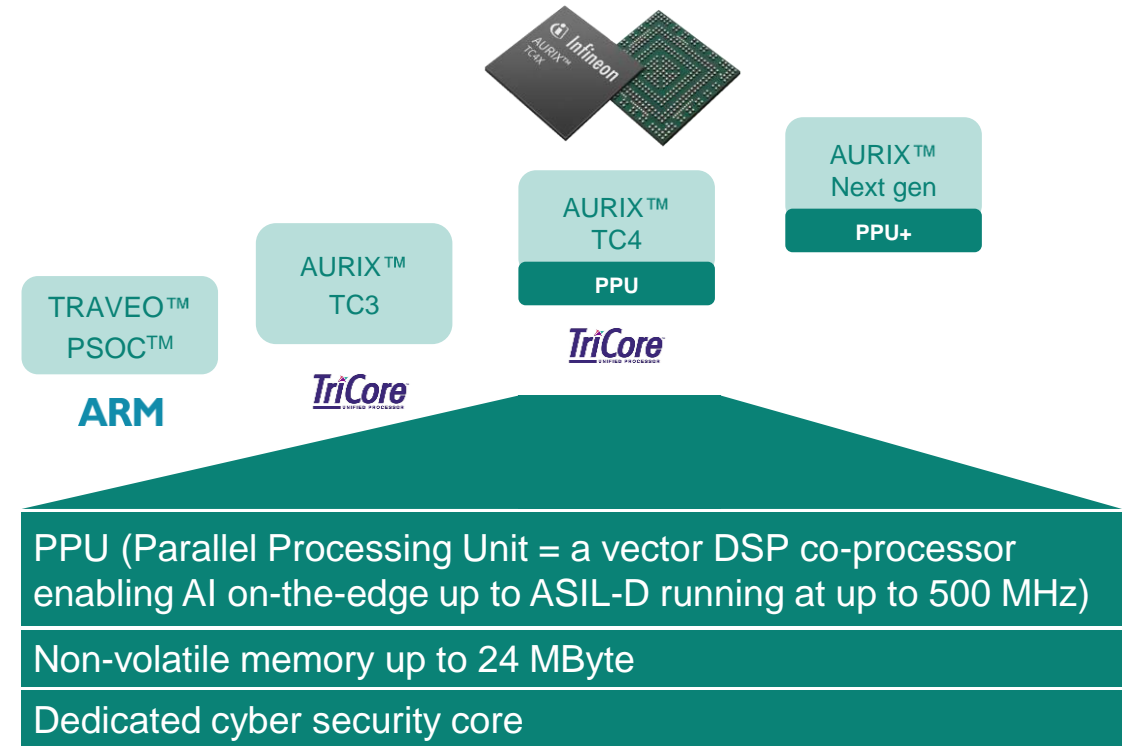
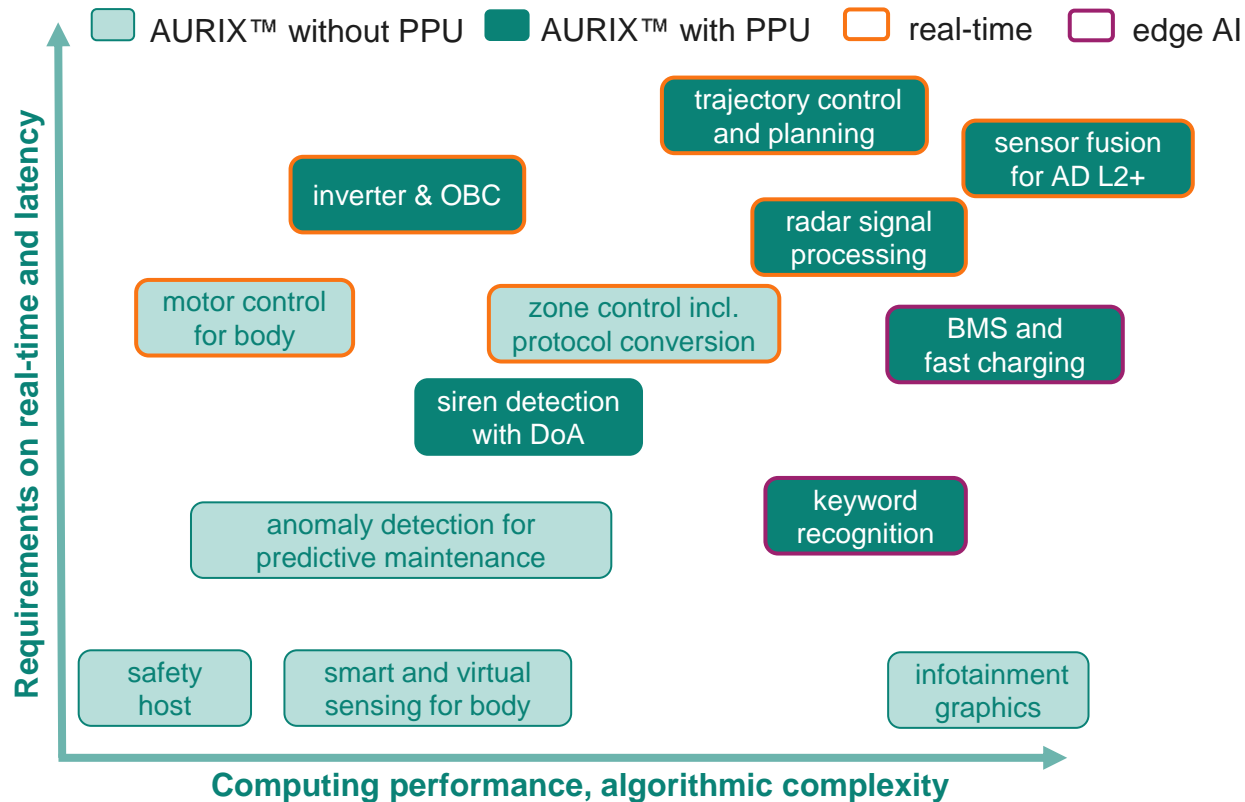
Target applications for GaN in electric vehicles



The Infineon AURIX™ family matches ideally all requirements in today's high-end applications



Map of application complexity and latency requirements



- Most of the real-time and safety-critical applications will not merge into a zone
- TC3 as safety host will remain the gold standard
- Emerging edge AI applications, fostered by imagimob acquisition



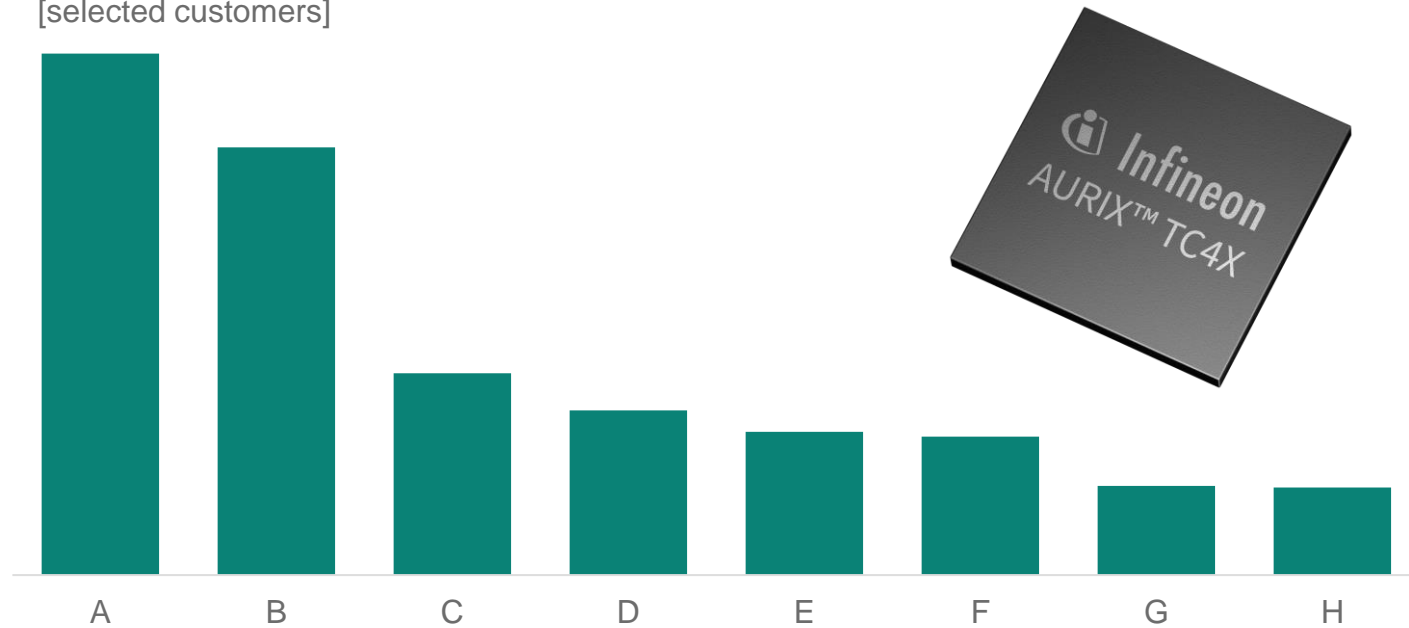
AURIX™ TC4 family repeats the success of previous AURIX™ generations: significant design-wins prior to market launch in 2025



AURIX™ TC4x design-wins across OEMs and T1s



[selected customers]



By delivering high quality products, Infineon achieves strong reputation and high demand for its next-generation products pre-launch

Sustainable growth by product leadership

- AURIX™ TC4 is part of next-generation European OEM platform as lead product
- AURIX™ family remains leading architecture for high-end 32-bit real-time applications
- Lifetime of MCU platform projects last until end 2030s
- Triple-digit € million lifetime design-win volume per project becoming standard

Target applications for customers:

Zonal control, data routing engine, BMS, radar signal pre-processing, chassis, steer-by-wire, electro-mechanical braking, edge AI

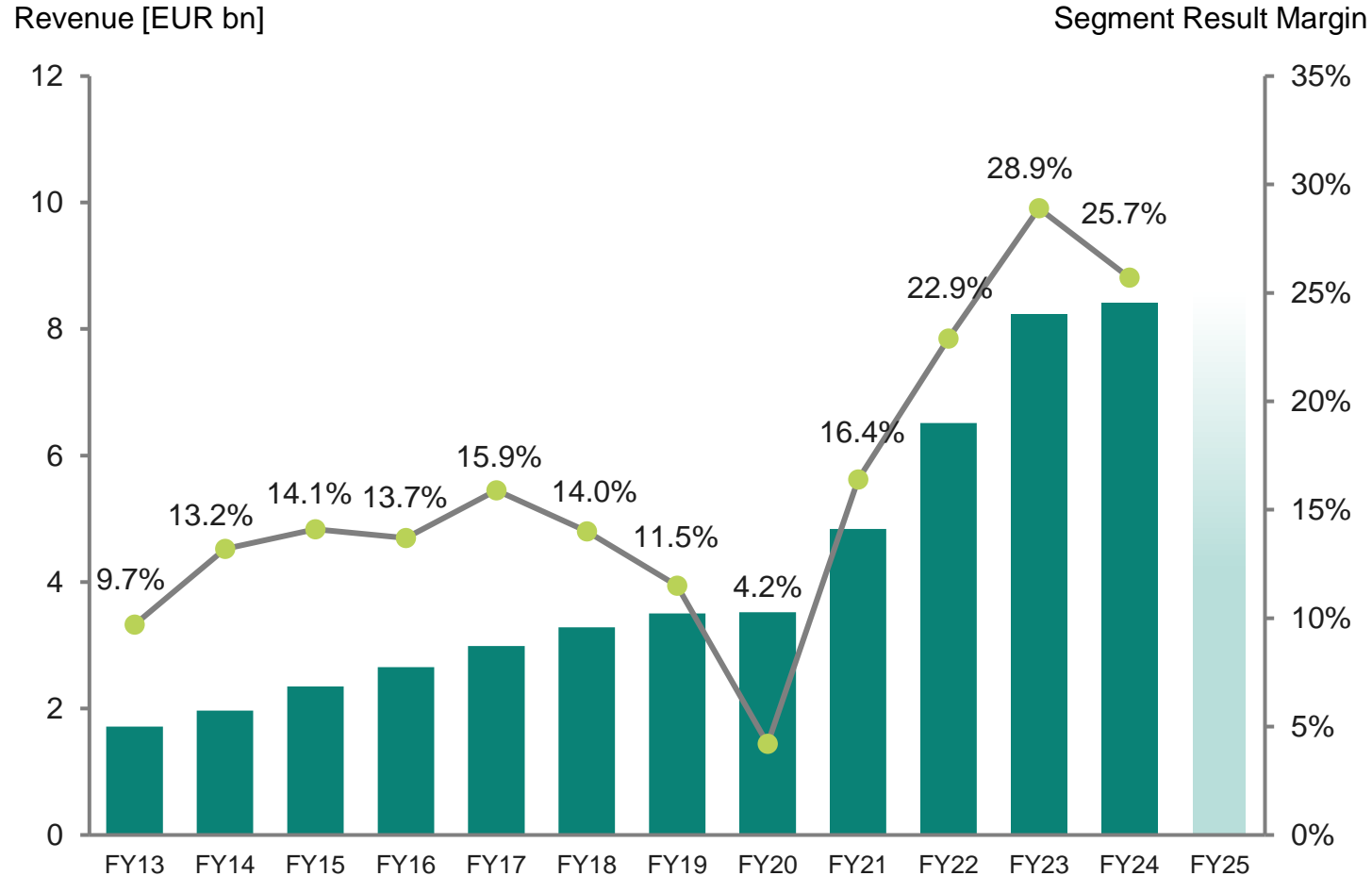
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Profitable growth journey supported by active cycle management and structural improvements



ATV Division



Financial achievements:

- Further revenue growth in FY24 – better than peers
- Profitability fully within expected corridor
- FY25 impacted by transitory effects: extended inventory correction, reduced market momentum (exception China), higher idle cost
- Mid to long term growth intact

Levers to improve margin resilience:

- More scale in key business areas, including MCUs, SiC and smart power components
- Mix and portfolio improvement
- Increased value contribution
- Active cycle management
- Structural improvement (STEP UP program)

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Key take-aways

Unrivaled track record – global #1 automotive semis provider

Strong secular growth in coming years:

- xEV incl. multi-energy vehicles
- Software-defined vehicle
- Innovation and technology leadership (Si/SiC/GaN, smart power, MCUs) plus system understanding

Healthy design-win momentum,
ideally diversified global presence and accelerated time-to-market

Current focus on margin resilience, supported by

- greater scale across portfolio
- active cycle management
- improvement of structural cost position







Peter Schiefer

- Peter Schiefer has been the Division President Automotive at Infineon Technologies AG since 2016.
- He has been with Infineon since 1990 (Semiconductor Group of Siemens AG until 1999).
- Peter Schiefer was born in 1965 in Munich, Germany. He holds a Diploma in Electrical Engineering from the University of Applied Sciences in Munich.

Glossary

| | | | |
|------------------|---|-----------|--|
| AC-DC | alternating current – direct current | MHEV | vehicles using start-stop systems, recuperation, DC-DC conversion, e-motor |
| AD | automated driving | MOSFET | metal-oxide silicon field-effect transistor |
| ADAS | advanced driver assistance system | MPU | microprocessor unit |
| AFE | analog frontend | MV | medium-voltage |
| AI | artificial intelligence | OBC | on-board charger |
| ASIL | automotive safety integrity level | OEM | original equipment manufacturer |
| BEV | battery electric vehicle | P2S | Infineon's product-to-system approach |
| BMS | battery management system | PHEV | plug-in hybrid electric vehicle |
| BoM | bill-of-material | PMIC | power management IC |
| CAN | controller area network | PPU | parallel processing unit |
| CMOS | complementary metal-oxide semiconductor | PT | powertrain |
| DC-DC | direct current – direct current | REEV | range extended electric vehicle |
| ECU | electronic control unit | RF | radio frequency |
| E/E architecture | electric-electronic architecture | RoW | rest of world |
| EREV | extended range electric vehicle | SAE | Society of Automotive Engineers |
| EV | electric vehicle | SBC | system basis chip |
| FCEV | fuel cell electric vehicle | SDV | software-defined vehicle |
| GaN | gallium nitride | Si | silicon |
| HV | high-voltage | SiC | silicon carbide |
| HW | hardware | SoC | system-on-chip |
| IC | integrated circuit | SOTA | software over-the-air |
| ICE | internal combustion engine | SSC | single-sided cooling |
| IGBT | insulated gate bipolar transistor | SW | software |
| IVN | in-vehicle networking | X-by-wire | steer/break/drive/... by wire |
| LV | light vehicle | xEV | all degrees of vehicle electrification |
| MCU | microcontroller unit | WLTP | worldwide harmonized light vehicles test procedure |
| MEMS | micro electro-mechanical system | ZCU | Zone control unit |

Disclaimer

Disclaimer

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