Automotive Division Call 2023

Peter Schiefer, Division President Automotive (ATV) 4 October 2023





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	E/E architecture and ADAS/AD	11
	E-mobility	15
	MOSFETs	21
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Infineon's strong growth track record in the automotive semiconductor market based on #1 and #2 positions will continue



Infineon automotive revenue since 2000 fueled by Decarbonization & Digitalization



TechInsights: Automotive Semiconductor Vendor Market Shares. 2001 through 2022; S&P Global Mobility. May 2023; Infineon Note: 2023 Infineon automotive revenue and automotive semiconductor market is estimated

Infineon's market position in key product segments



Automotive NOR Flash

Several strong content growth drivers for Infineon, even at flat LV production





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xEV

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



Semiconductor bill-of-material in a car in 2023 and 2030



- Semis for drivetrain function (e.g. Inverters, on-board chargers, BMS, etc.)
- Semis for non-drivetrain functions

Based on TechInsights: Global xEV System Semiconductor and Sensor Demand Forecast 2019-2028. July 2023; Infineon

Secular growth drivers and structural improvements led to significant upshift in profitability – our base going forward



ATV Division



Segment Result Margin resilience driven by:

xEV products running at scale:
 volume ramp at customers in high-voltage EV
 business with both IGBT and SiC

– MCUs:

- rapid market share gains: already #2 and going for #1 in coming years
- strongly enlarged customer base with high stickiness
- Long-term off-take commitments from OEMs and Tier 1s
- Mix and portfolio improvement
- Increased value contribution
- Successful Cypress integration
- Successful opex scaling

¹ Vara consensus as of 16 August 2023: 28.6%

Infineon has the ideal footprint to participate in worldwide growth; revenue share of North America expected to grow



N. America ~20% Europe ~25% China Asia Pacific ~30% incl. Japan Today Short-term to mid-term

Infineon Automotive revenue split by region

- Infineon's automotive business remains well-balanced across regions
- Infineon is ranked #1 in China and South Korea, and ranked #2 in Europe and Japan
- In the US market, new design-wins propel strong growth and will lead to higher share of revenue
- Decreasing relative share of European sales following re-location and off-shoring by market players
- Stable share of revenue in the fast-growing Chinese market

Infineon benefits disproportionally from Chinese OEMs, at the same time portfolio breadth, quality and innovation ensure stickiness



Infineon is present in a multitude of different applications



 >40 different applications, covering all segments: ADAS, traction inverter, BMS, standard safety, and comfort etc.

- Hundreds of different products, incl.
 >20 MCUs incl. software
- System solution (P2S) levering combined Infineon product advantages, e.g., motor control MCU + driver + MOSFETs; MCU for signal pre-processing + radar

Exemplary Chinese OEM model

– Infineon value: >€800/car

Infineon auto sales track record in China			
FY	ATV y-y sales growth		
FY22	+35%		
FY23e	>25%		

High innovation pace and at the same time platform stickiness of up to 10 years



High quality suppliers are key for Chinese export ambitions



Content growth even excluding power semis





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	E/E architecture and ADAS/AD	7	11
	E-mobility	>70% of ATV division revenue	15
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Infineon strongly benefits from new E/E architectures that drive centralization of data and decentralization of power distribution



E/E architecture in a software-defined vehicle



New E/E architectures lead to more centralized processing of data and signal while more decentralized power distribution.

Components of E/E architecture and corresponding applications addressed by Infineon

High Performance Computing (HPC)	Safety companion MCU for service- oriented SoCs, secure trust anchor, fail-safe power supply		
Zone	Zone controller, gateway controller, incl. protocol translation, smart power distribution		
Control	Smart real-time mechatronics (e.g. transmission, motor control, power steering, braking), BMS		
Complex sensors and actuators	Radar, incl. signal pre-processing, bus connections, dedicated Al accelerators, camera		
Simple sensors and actuators	Smart functional ECU (e.g. seat adjustment, power window, central lock, wiper), touch pad		

AURIX[™] MCU is the gold standard for ADAS/AD, control, safety, and high-speed in-vehicle network





Total automotive MCU market development, excl. MPUs and SoCs



Infineon's revenue growth



€19bn MCU design-win volume secured

- Total automotive MCU design-win volume in the last four years exceeded €19bn
- Design-wins covering current and next decade ensuring robust and long lasting growth
- Up to 40 MCUs per vehicle awarded to Infineon
- Strongest momentum in essential MCUs for E/E architecture, ADAS/AD, and xEV
- Around €3bn of revenues already in 2023

AURIX[™], TRAVEO[™], and PSoC[™] families

Power distribution becomes a critical aspect of the E/E architecture and the SW-defined vehicle





... are driving replacement of fuses/relays



Smart switches are mandatory for SAE L3 and above

- Superiority of semiconductors over fuses and relays:
 - Fast failure isolation (< 500 μs) and activation of an alternative supply
 - Configurable wire protection
 - Diagnosis and non-destructive recovery
- Mandatory for SAE levels L3, L4 and L5
- Growth of smart switches per car:
 - Volume OEMs: from today's ~50 pieces/car towards ~200 pieces/car by 2028+
 - Innovator OEMs: already ~200 pieces/car today

Infineon's revenue growth





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Infineon's broad product portfolio and system understanding enable higher BoM and allows for compact designs and fast T2M



Infineon inverter reference design, covering up to 95% of value



P2S (product-to-system approach)

- Reference design for up to 300 kW, further customization possible
- System solution for easy implementation
- Fast time-to-market (T2M)

Freedom of choice

- IGBT and SiC in 750/1,200 V scale up to preferred power class
- HybridPACK[™] Drive CoolSiC[™] Gen2 continuous operation at 175°C
- EiceDRIVER[™] gate driver Gen3 optimized for CoolSiC[™]
- Optimized 32-bit AURIX™ MCU

Leading the growth in IGBTs (bare die, discrete and modules) including Si/SiC hybrid designs



[m units] 12 Si/SiC hybrid module optionality mainly SiC 9 mainly IGBTs for 2nd motor 6 3 0 kW 0-24 50 - 74 100 - 124 125 - 149 150 - 174 175 - 199 200 - 224 25 - 49 75 - 99 225 +■ 2022 ■ 2030 Infineon estimates based on S&P Global Mobility. September 2023

Electric motor power, grouped by 25 kW increments

First SiC-MOSFET/IGBT fusion module



Infineon's revenue growth



- IGBTs will still account for ~40% of power semis in traction inverters in 2030; also benefitting from Si/SiC hybrid (fusion) solutions and modules
- IGBTs are essential for the growth of affordable electric cars
- Infineon can leverage scale effects in packaging R&D and S&M for SiC

World-scale capacity, unmatched portfolio breadth and our worldwide customer base lead to accelerated growth in SiC



Leading SiC technology and production efficiency Most scalable SiC auto portfolio 650 V 750 \ 1.200 V Unrivaled productivity with world-_ scale fab and most diversified Phase 2 supplier network Superior trench technology and _ highest reliability Extensive packaging portfolio and _ Module DSC/SSC Discrete Bare die complete system competence module

Continued strong SiC design-win momentum



30% market share target in SiC by end of decade underpinned by significant capacity expansion





End of decade

FY25e

Villach Kulim

Infineon's extended BMS (battery management system) product portfolio paves the way for an exceptional growth story





BMS semi market growth is driven by xEV unit and battery capacity

BMS analog frontend IC



Infineon's revenue growth



- Drivers for BoM: increasing battery capacity, more cells, more channels
- Triple-digit million € design-win in pipeline
- Additional upside from non-automotive markets: ESS, street lighting, forklifts



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Number of power MOSFETs per car continues to increase, and drives accelerated growth for the leading portfolio



Examples of MOSFET applications



Infineon's revenue growth



- 100 to 180 MOSFETs are used per vehicle in ~90 different applications in all segments: body, chassis, safety, ADAS/AD, powertrain
- Infineon offers broadest portfolio (>600 products) and eco-system to _ address specific and high-margin applications:
 - embedded control, gate driver, MOSFETs, software, P2S
 - entire eco-system with digital twins
 - simulation environment (esp. for motor control)



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Key take aways

Infineon's automotive business will **continue to grow strongly** (>>10%) and deliver structurally higher margins, fully supporting Infineon's target operating model.

Addressing all aspects of future cars, Infineon's profitable growth in coming years is built on a broad base of **fast-expanding businesses – covering more than 70% of the portfolio:**

- MCUs and smart power distribution businesses will strongly benefit from trends like new E/E architectures
- With leadership in IGBT and ongoing strong design-win momentum in SiC Infineon will be key to shaping e-mobility

Infineon's leading market positions in all key segments and ideally balanced regional split **propel our growth** and make the business more **resilient to major geopolitical and industry changes**.







Glossary

AC-DC	alternating current – direct current	MEMS	micro electro-mechanical system
AD	automated driving	mild-hybrid	vehicles using start-stop systems, recuperation, DC-DC conversion, e-motor
ADAS	advanced driver assistance system	MOSFET	metal-oxide silicon field-effect transistor
AFE	analog frontend	MPU	microprocessor unit
BEV	battery electric vehicle	OBC	on-board charger
BMS	battery management system	OEM	original equipment manufacturer
BoM	bill-of-material	P2S	Infineon's product-to-system approach
CAN	controller area network	PCB	printed circuit board
CMOS	complementary metal-oxide semiconductor	PHEV	plug-in hybrid electric vehicle
DC-DC	direct current – direct current	PMIC	power management IC
ECU	electronic control unit	PT	powertrain
ESS	energy storage system	RF	radio frequency
EV	electric vehicle	RoW	rest of world
GaN	gallium nitride	SAE	Society of Automotive Engineers
HV	high-voltage	SBC	system basis chip
HW	hardware	Si	silicon
IC	integrated circuit	SiC	silicon carbide
ICE	internal combustion engine	SoC	system-on-chip
IGBT	insulated gate bipolar transistor	SOTA	software over-the-air
IVN	in-vehicle networking	SSC	single-sided cooling
MCU	microcontroller unit	SW	software
		xEV	all degrees of vehicle electrification



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Disclaimer

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