

# Third Quarter FY 2018 Quarterly Update

Infineon Technologies AG  
Investor Relations

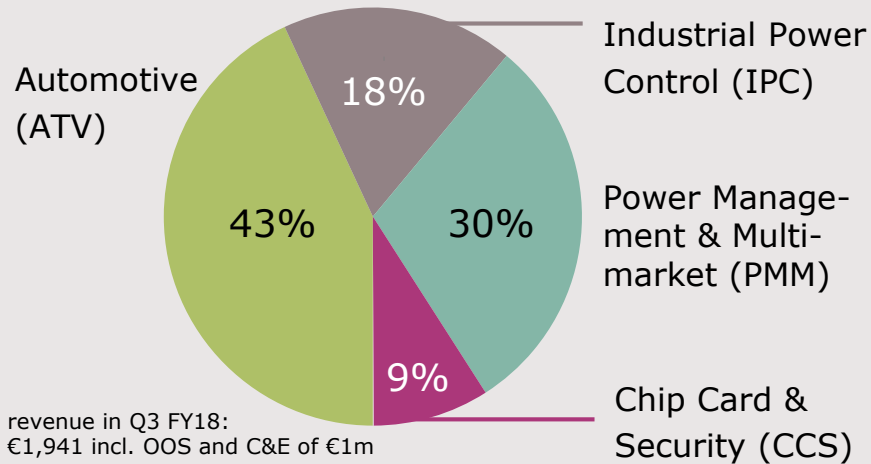


# Agenda

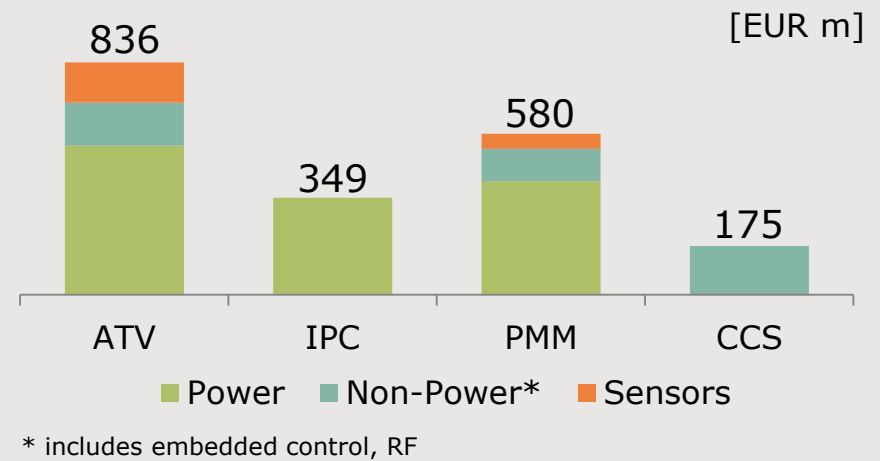
- 1 Infineon at a glance
- 2 Updated target operating model (TOM)
- 3 Quarterly highlights
- 4 Automotive
- 5 Industrial Power Control
- 6 Power Management & Multimarket
- 7 Chip Card & Security
- 8 Selected financial figures

# Infineon at a glance; Q3 FY18 figures

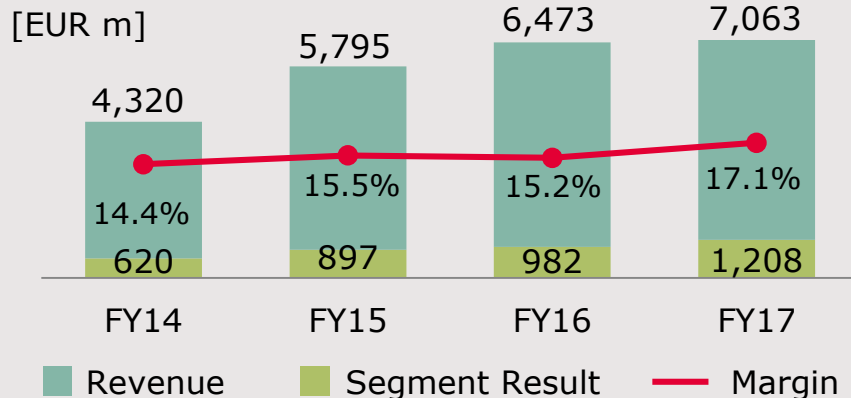
## Business Segments



## Power represents ~65% of revenue



## Financials



## Market Position



# Our strategy is targeted at value creation through sustainable organic growth



Focus	Technology leadership	System understanding
<ul style="list-style-type: none"><li>› Focus on fastest growing segments of semi market</li><li>› Tackle global megatrends</li></ul>	<ul style="list-style-type: none"><li>› Leverage core competencies in different end markets to maximize ROI</li></ul>	<ul style="list-style-type: none"><li>› Create value for customers through system understanding</li></ul>

Auto	Power	RF & Sensors	Security
System leader in automotive	#1; system and technology leader	Broad RF and sensor technology portfolio	#1 in Security Solutions

## Average-cycle financial targets

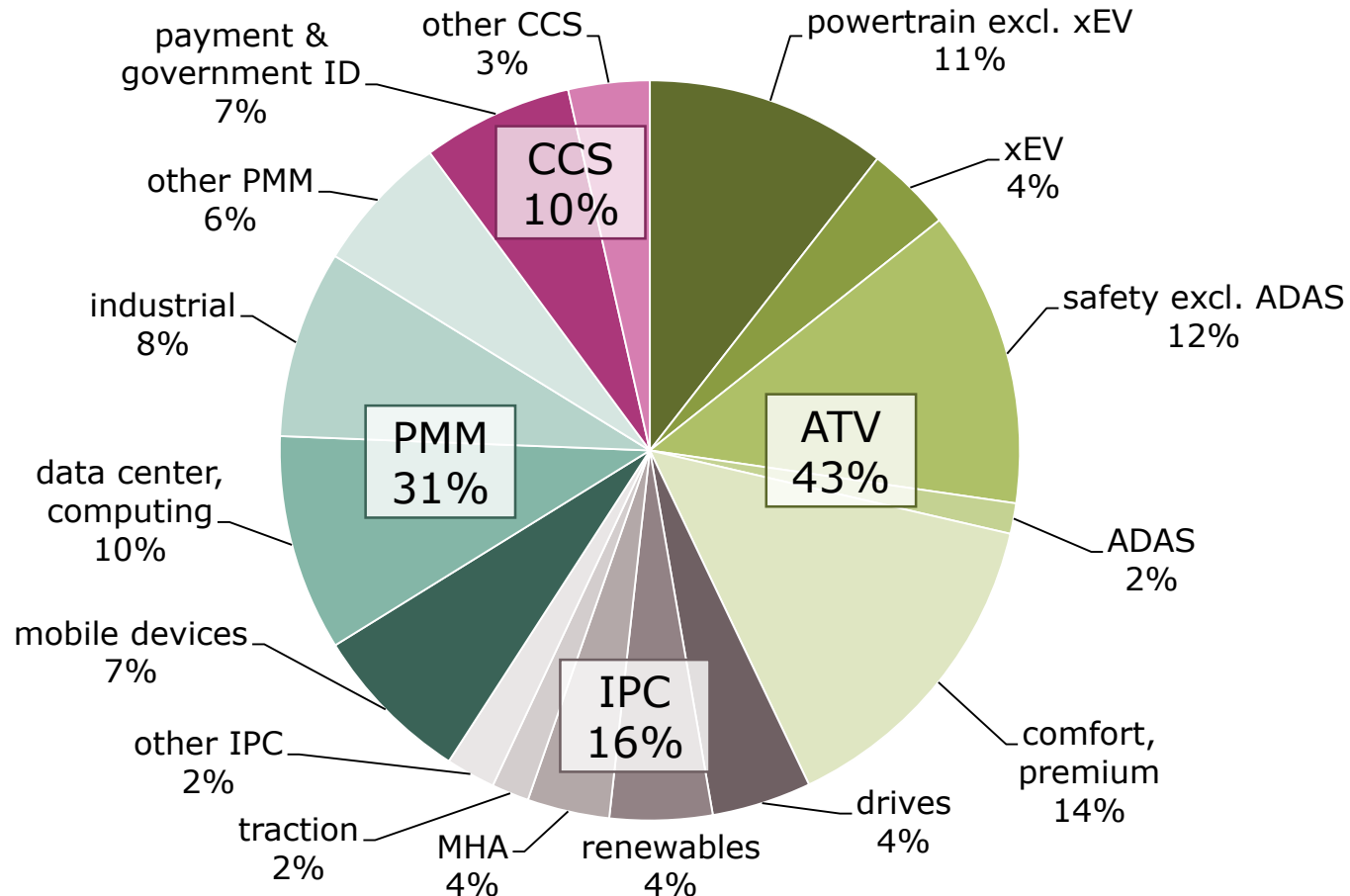
Revenue growth      Segment Result margin      Investment-to-sales  
————— updated targets please see on page 16 —————

## Continued value creation for shareholders

- › Organic RoCE  $\triangleq$   $\sim 2 \times$  WACC; paying out at least a constant dividend even in periods of slower growth
- › continuous EPS increase

# Well diversified exposure to end-markets and applications provide resilient growth model

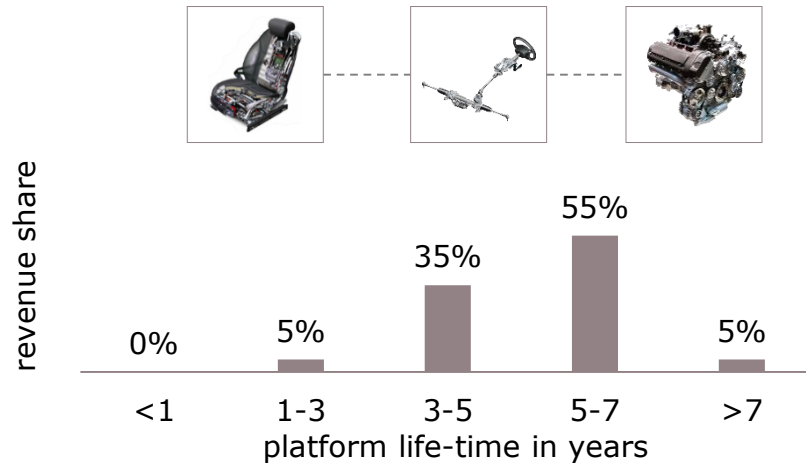
## FY17 revenue by target application\*



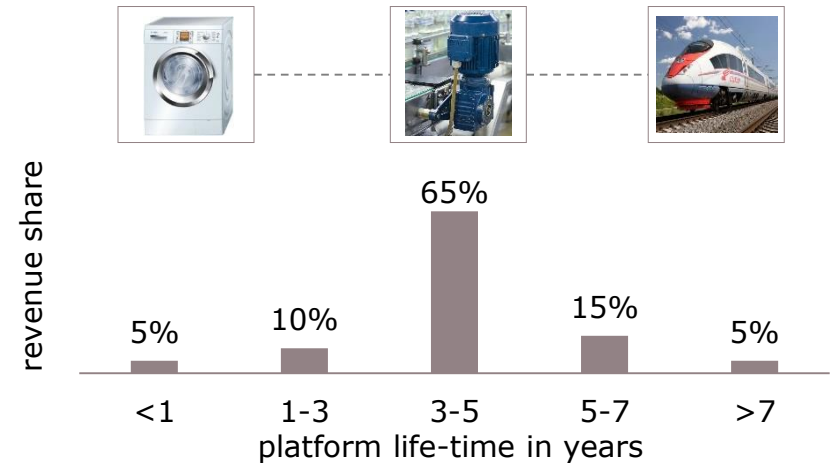
\* based on revenue of €7,051m in FY17, without OOS and Corporate & Eliminations.

# Long platform life-times in majority of our businesses provide stickiness and visibility

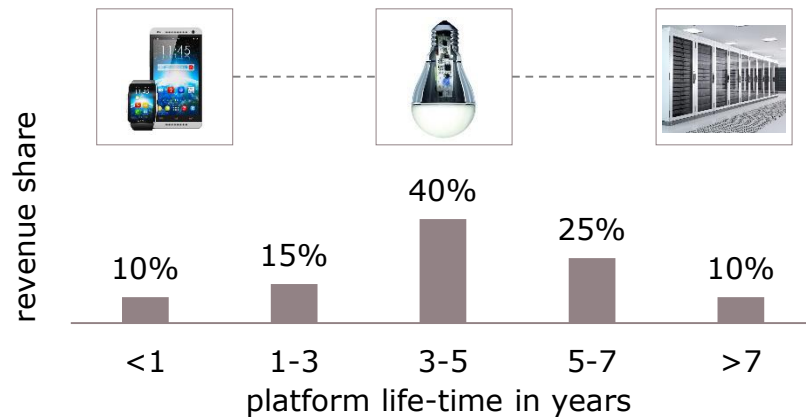
## ATV – average platform life-time: ~6 years



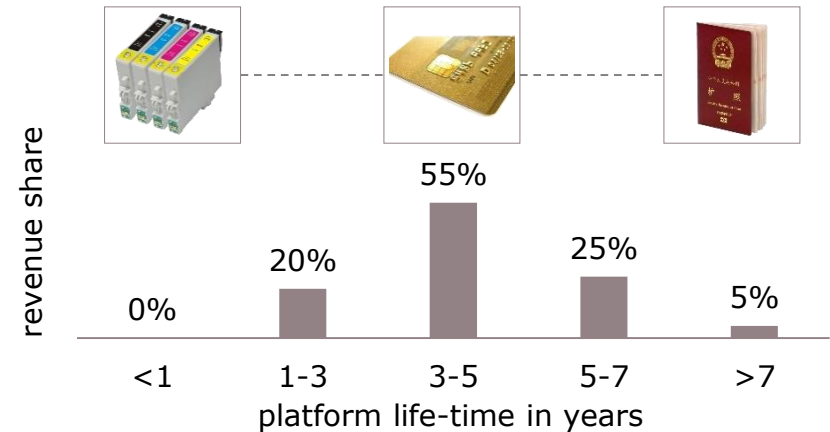
## IPC – average platform life-time: ~5 years



## PMM – average platform life-time: ~4 years



## CCS – average platform life-time: ~4 years





# Tight customer relationships, based on system know-how and application understanding



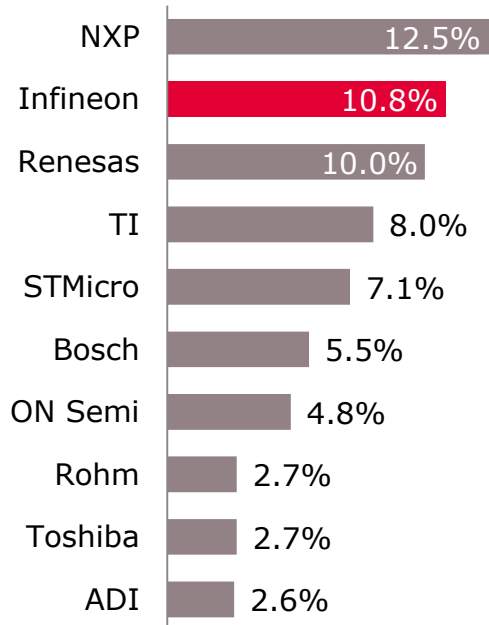
ATV	IPC	PMM	CCS
EMS partners	Distribution partners		

# Infineon holds a leading position in its target markets



## Automotive semiconductors

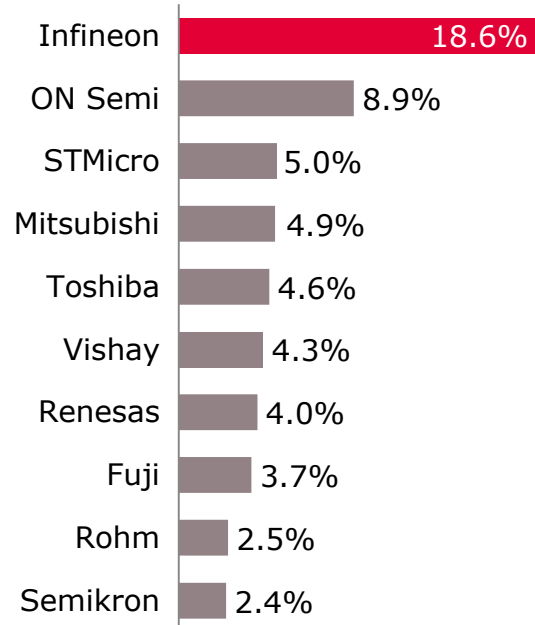
total market in 2017: \$34.5bn



Source: Strategy Analytics, "2017 Automotive Semiconductor Vendor Share", April 2018

## Power discretes and modules

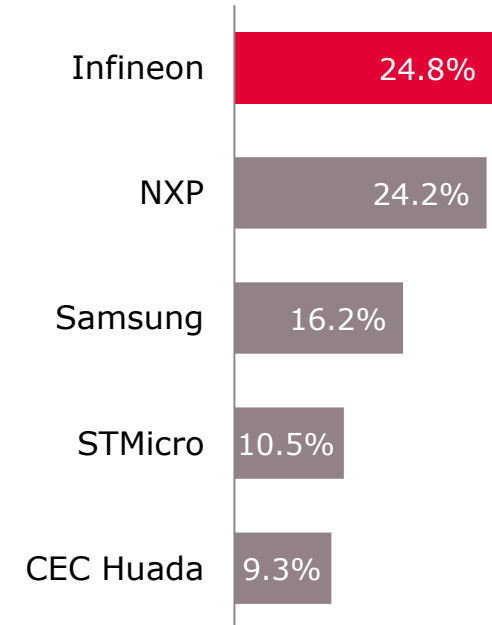
total market in 2017: \$18.7bn



Source: Based on or includes content supplied by IHS Markit, Technology Group, "Power Semiconductor Market Share Database 2017", August 2018

## microcontroller-based Smart Card ICs

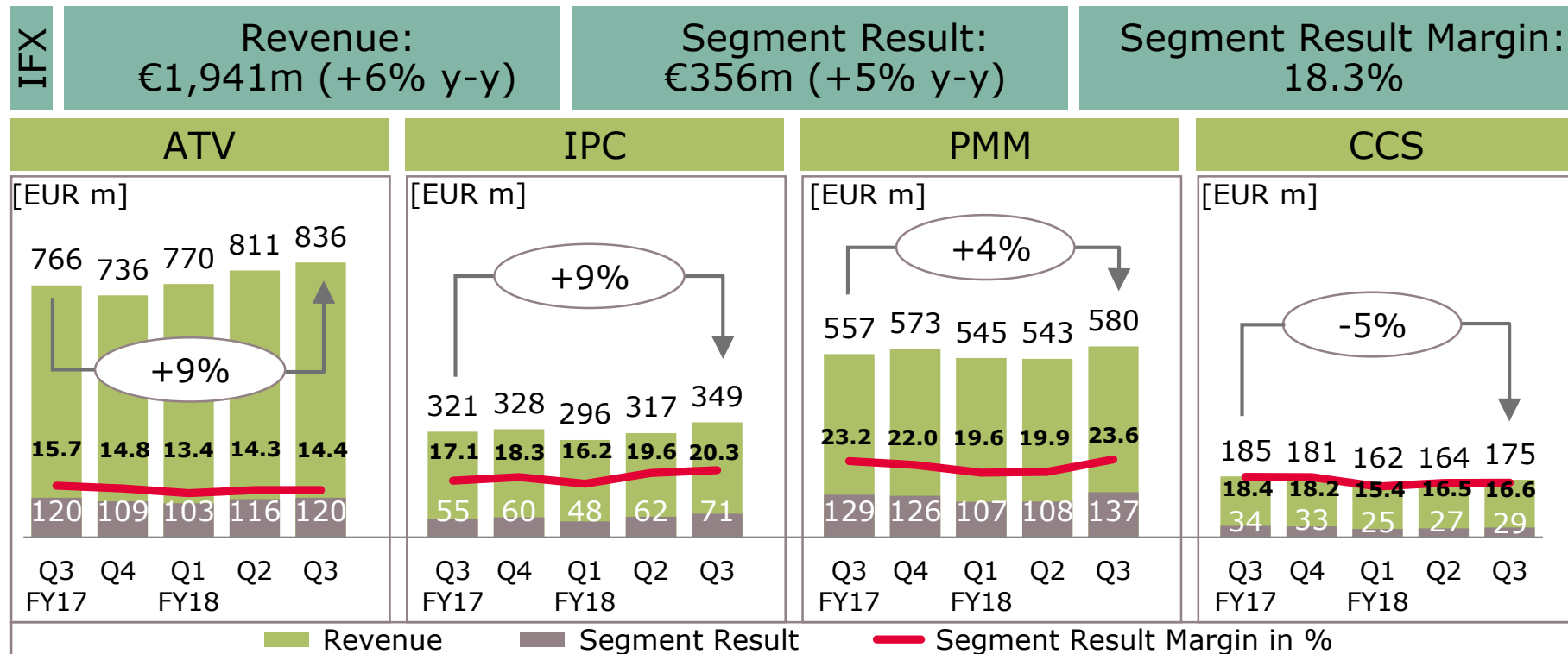
total market in 2016: \$2.79bn



Source: Based on or includes content supplied by IHS Markit, Technology Group, "Smart Card Semiconductors Report", July 2017



# Q3 FY18 Group and Division Performance



› Q3 FY18: q-q revenue increase mainly from products for electric drivetrain

› Q3 FY18: q-q revenue increase mainly driven by wind, home appliances and drives

› Q3 FY18: q-q revenue increase due to multitude of applications: e.g. server, power tools, eScooter and integrated solutions for mobile devices

› Q3 FY18: all business areas mainly Payment, TPMs and Authentication contributed to the q-q revenue increase

# Outlook for Q4 FY18 and FY18

	Outlook Q4 FY18*	Outlook FY18* (compared to FY17)
Revenue	Increase of 3% +/- 2%-points	Q4 FY18 outlook leads to an <b>increase between 6.4% and 7.4%</b> (prev.: "Increase between 4 and 7%")
Segment Result Margin	At the mid-point of the revenue guidance: <b>~19%</b>	At the mid-point of the revenue guidance: <b>~17.5%</b> (previously: 17.0%)
Investments in FY18		<b>~€1.2bn</b>
D&A in FY18		<b>~€850m**</b>

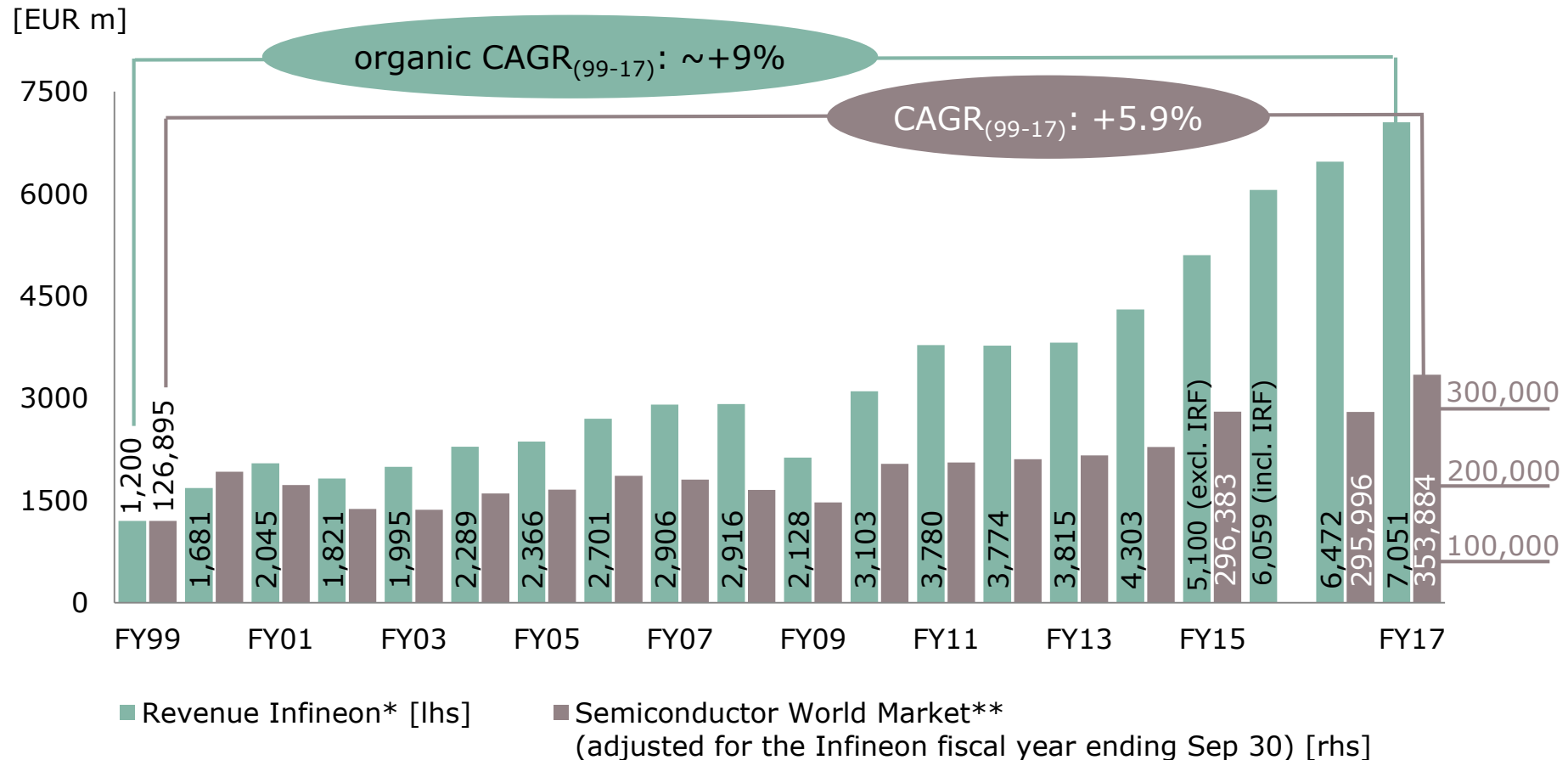
\* Based on an assumed average exchange rate of \$1.20 for €1.00.

\*\* Including D&A on tangible and intangible assets from purchase price allocation of International Rectifier.

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# Infineon's organic revenue development clearly outperformed the total semi market

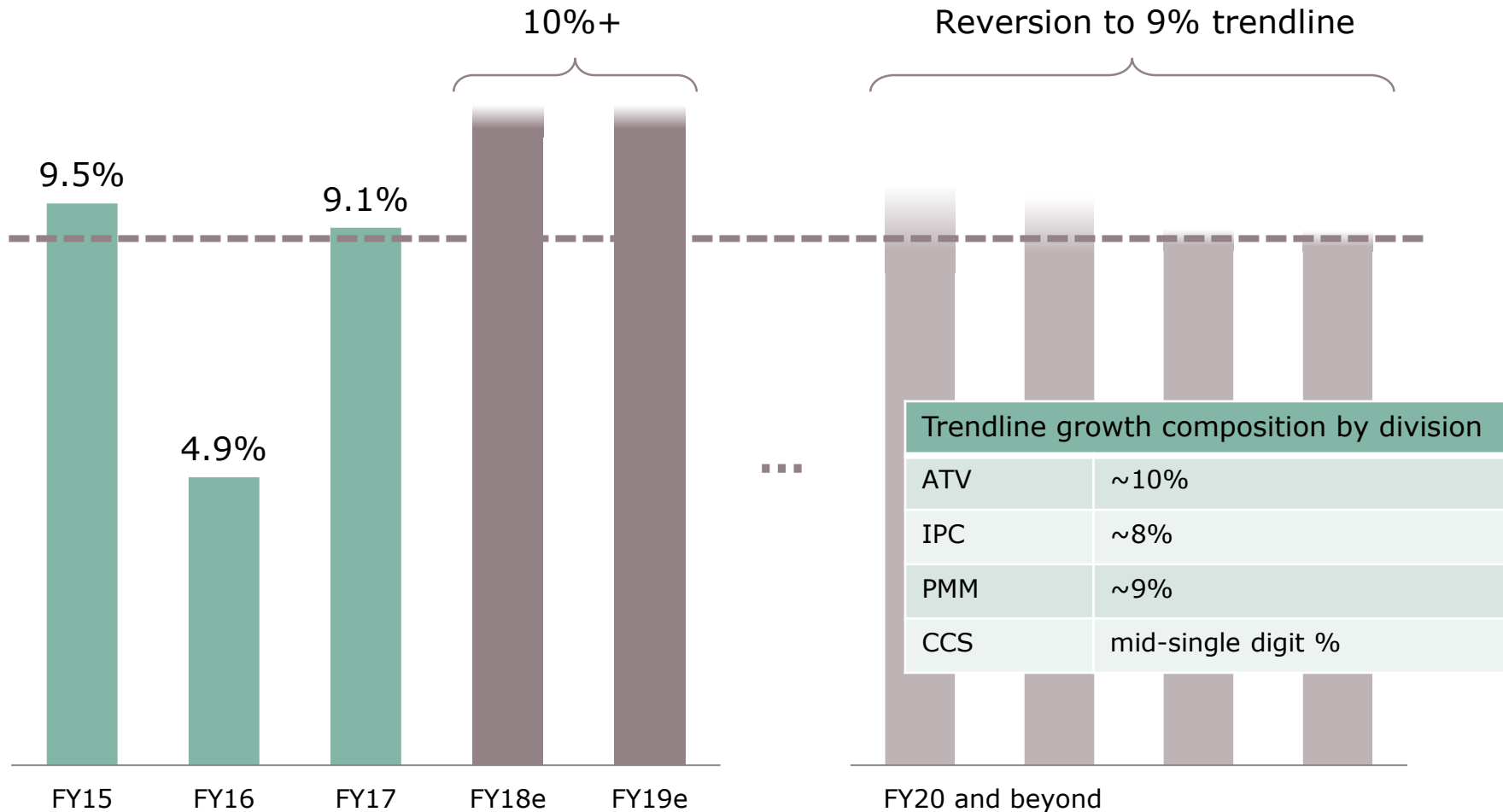


\* Based on Infineon's portfolio (excl. Other Operating Segments and Corporate & Eliminations) per end of FY17.

\*\* Source: WSTS (World Semiconductor Trade Statistics) in EUR, October 2017

# After temporary growth acceleration, revised TOM assumes reversion to 9% trendline

## Organic revenue growth projection at constant currencies



# Increased average-cycle investment-to-sales model is necessary to fuel growth

## Previous investment-to-sales model

~8% p.a.  
revenue  
growth



~13%  
investment-  
to-sales

Thereof 11% capex\*, thereof:

- › 6%-pt fixed

- › **5%-pt capacity expansion**

**growth-  
driven**

## New investment-to-sales model

~9% p.a.  
revenue  
growth



~15%  
investment-  
to-sales

thereof 13% capex\*, thereof:

- › 6%-pt fixed

- › **7%-pt capacity expansion**

### Various effects:

- › automotive growth
- › higher equipment prices
- › structural investments for SiC and GaN

### Additional investments beyond model:

- › FY19 – FY23: ~€700m for major fab and office buildings

\* Infineon reports under IFRS and has therefore to capitalize development costs which represents currently ~2% of sales

# Segment result margin target of 17% gradually improving due to economies of scale in opex



- › We want to continuously drive the "virtuous circle" of market share gains by offering our customers competitive pricing while achieving above-cost-of-capital returns on our growth investments
- › Increased investment level drives further economic value added, but results in P&L headwind in particular from roll-on of depreciation
- › Productivity gains from increasing 300 mm and Kulim share expected to offset depreciation roll-on and other ramp-up costs resulting in a stable gross margin
- › Opex to scale at the following percentages of revenue growth:

R&D:  
100%

S&M:  
90%

G&A:  
60%

Even with high investments fueling our strong growth,  
we expect to gradually increase 17% Segment Result Margin



# Period of accelerated growth with correspondingly higher investments will precede long-term TOM

	Current	Near-term (FY19+)	Long-term
Revenue growth	~8%	~10%+	~9%
Segment result margin	~17%	~17%+ opex economies of scale	
Investment-to-sales	~13%*	~15%+* <sup>+</sup>	~15%*

- › Period of accelerated growth with correspondingly higher investment needs according to linear formula
- › Additional investments to be prepared for potential revenue upside and for potential structural changes

- › Investments into cleanrooms and office buildings

\* Thereof ~2%-points capitalized R&D according to IFRS reporting standards.

# Reference to IFX Day presentations



## IFX Day 2018

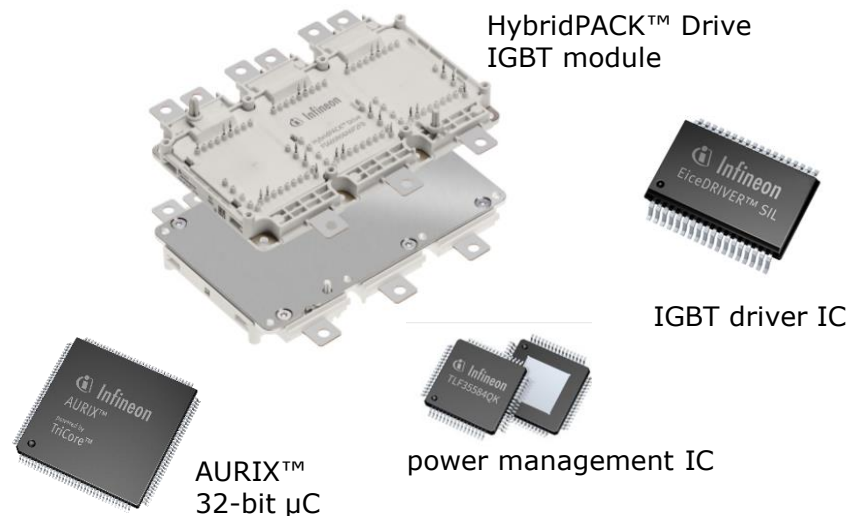
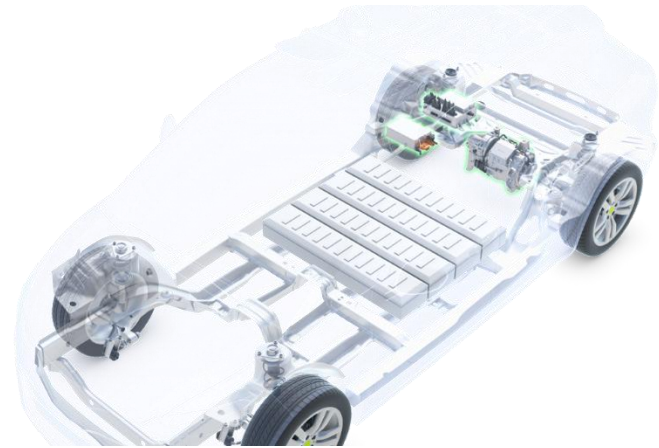
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# Design-win for drivetrain platform proves Infineon's strength in xEV system solutions

## Key facts

- › design-win at a North American tier-1 for a BEV drivetrain platform of a major European OEM
- › strategic platform as a base for future BEV developments
- › set of components for inverter solution:
  - HybridPACK™ Drive IGBT module
  - IGBT driver IC
  - AURIX™ 32-bit  $\mu$ C
  - power management IC
  - Schottky diode
  - small signal MOSFET
- › start of production: 2020



# First major 3D ToF sensor design-win for gesture camera and in-cabin sensing



## Key facts

- › major European OEM selected Infineon 3D ToF sensor XENSIV™ REAL3™ for current and next-generation platforms
- › two platforms to be served:

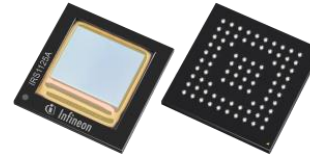
### 1<sup>st</sup> platform: gesture camera

- › outstanding performance at 50% reduced illumination power
- › 50% reduced system BoM
- › state-of-the-art optical BGA package
- › used in facelifts for all OEM car models from lower mid class to premium class

### 2<sup>nd</sup> platform: in-cabin sensing

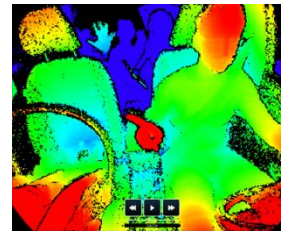
- › unique sensor features enable extended use-cases covering driver and passenger
- › used in future car platforms
- › start of production: 2020

## About 3D in-cabin sensing



Infineon automotive-grade 3D ToF sensor XENSIV™ REAL3™ (IRS1125A) in optical BGA package

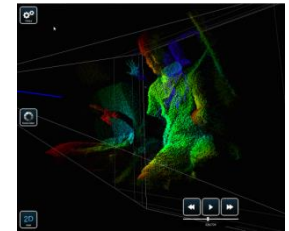
ToF provides depth and amplitude simultaneously



depth picture



amplitude picture



rotated 3D point cloud

### Examples of use-cases:

- › hand gestures: pointing direction, touch prediction
- › occupant detection
- › body position
- › smart airbag
- › object in hand: eating, reading, using phone

# New Villach 300 mm module will add significant capacity in power semiconductors

## Key criteria for site selection

- › Economies of scale
- › Time to revenue
- › Geographic diversification



Building space	~60,000 m <sup>2</sup>
Total frontend investment	> €1.6bn over 6 years
Revenue potential	> €1.8bn per year
Start of construction	early 2019
Ready-for-equipment	mid 2020
Ready-for-production	early 2021
Technologies	IGBT and MOSFET for all end markets





# Automotive



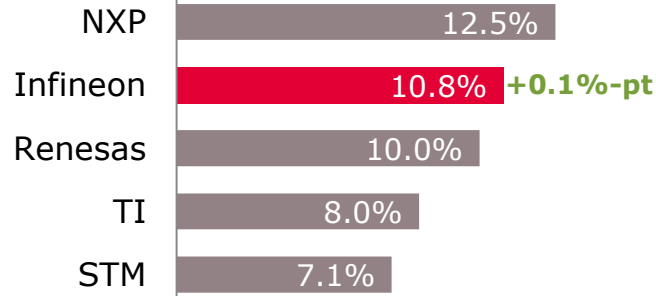


# Infineon's position in the automotive semiconductor universe



## Automotive semiconductors

2017 total market size: \$34.5bn

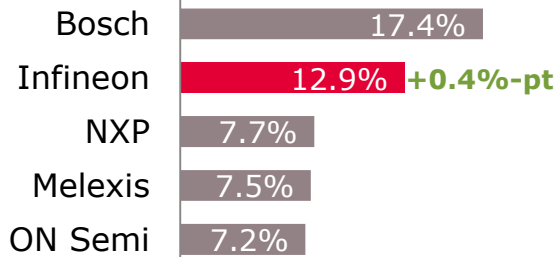


### Market share trend

- Infineon benefits disproportionately from the two mega trends
- ADAS/AD
- clean cars

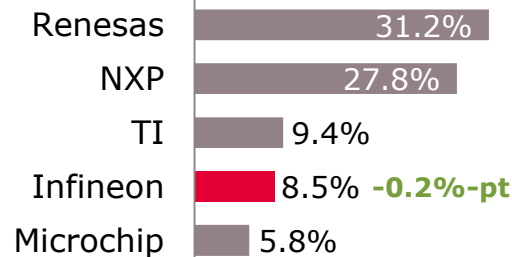


## Sensors



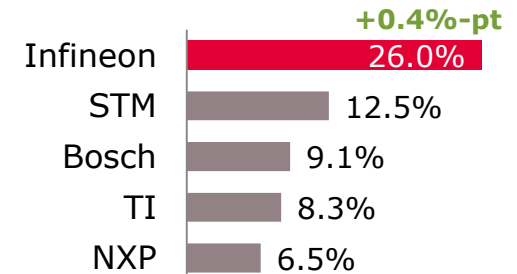
long-term drivers: - 24 / 77 GHz radar  
- lidar

## Microcontrollers



long-term drivers: - ADAS/AD  
- Powertrain

## Power



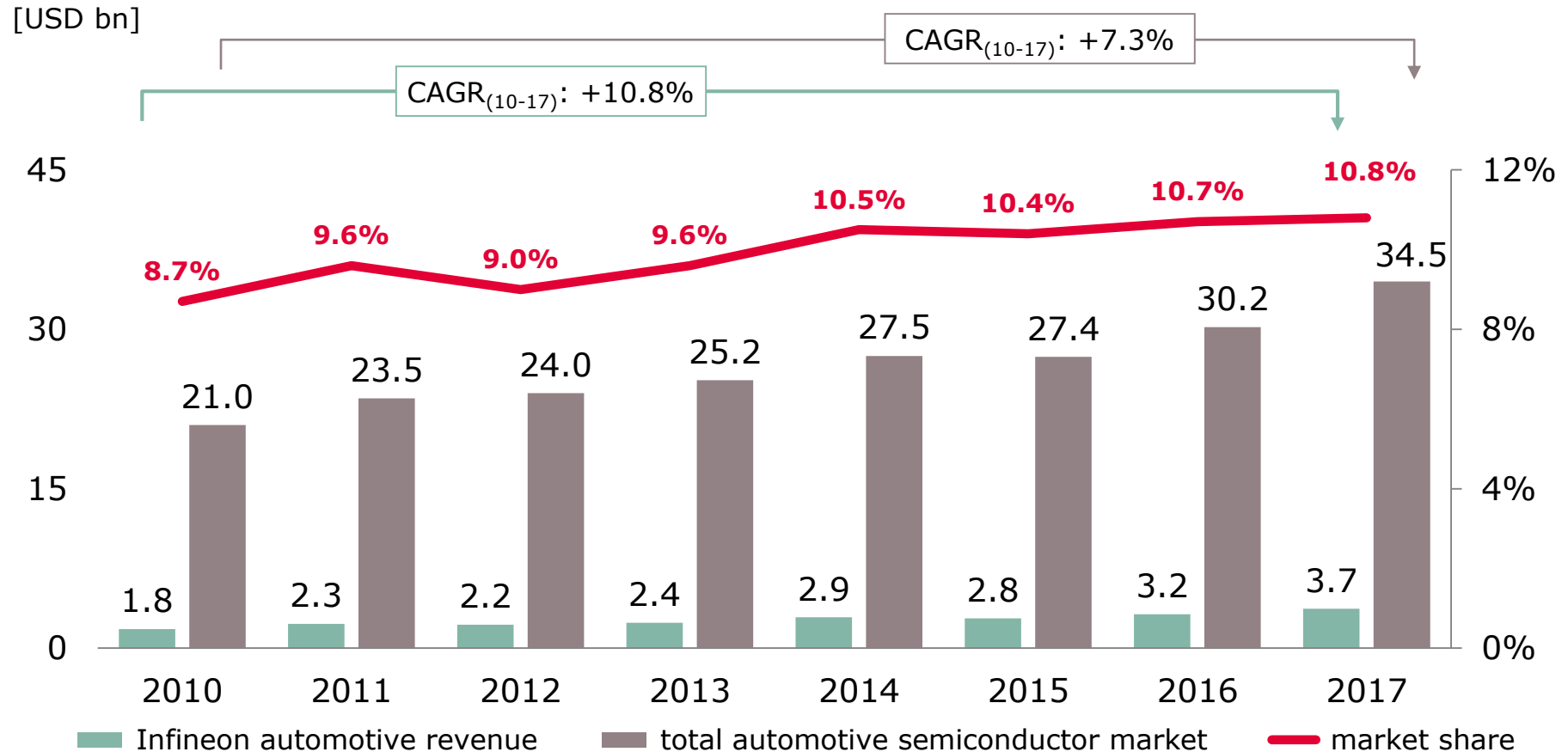
long-term drivers: - xEV penetration  
- EPS  
- Lighting

Source: Strategy Analytics, "Automotive Semiconductor Vendor Market Shares", April 2018

# Infineon is continuously outgrowing the market since 2010



## Infineon automotive market share development\*



\* Infineon automotive revenue as reported to Strategy Analytics incl. revenue from ATV, IPC and PMM. Adjusted to calendar year.  
Source: Strategy Analytics, "Automotive Semiconductor Vendor 2017 Market Share", April 2018.

# Clean cars, ADAS/AD, and adoption of premium features drive growth

## Vehicle production



- › ~2% growth p.a.

## Drivers for semiconductor content per car

### Electro-mobility



- › Legislation
- › Improvements of ICE
- › Higher efficiency of all electric consumers
- › Adoption of xEV

### Automated Driving



#### **Today**

- › crash avoidance
- › ADAS

#### **Tomorrow**

- › Autonomous Driving

### Comfort, premium



- › Premium cars are early adopters of high-end comfort and safety features
- › Trickle down to mid-range

~10% p.a. through-cycle growth

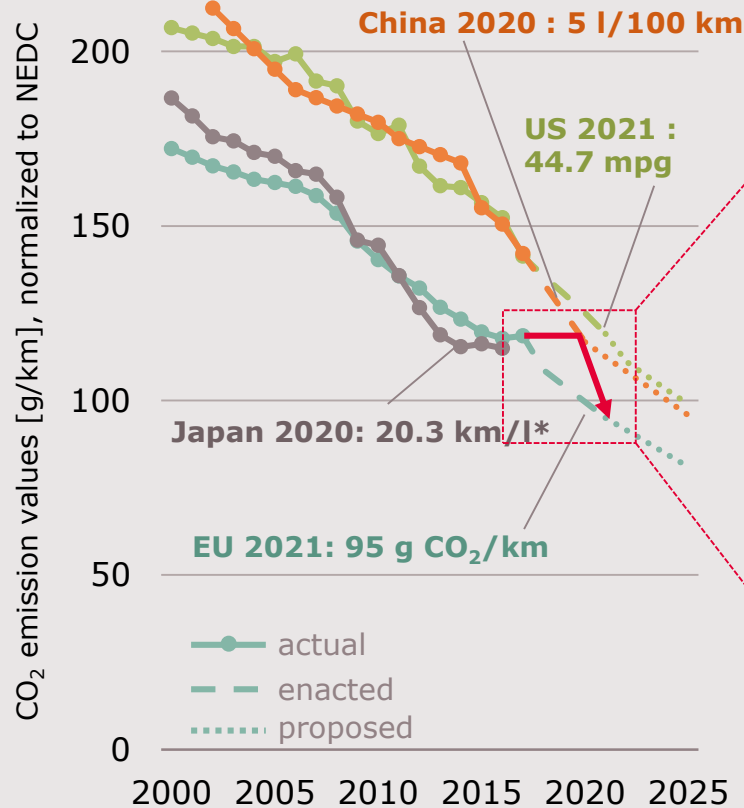


# Electro-mobility



# xEV growth driven by emission regulation; but consumer preferences thwart CO<sub>2</sub> reduction

## CO<sub>2</sub> emission development and regulations for main regions



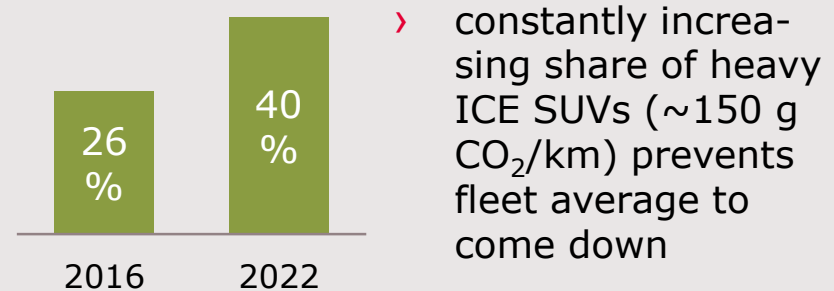
\*Note: Japan has already met its 2020 statutory target as of 2013

Source: 1) IHS Markit, Automotive Group, Report "SUV-B segment to drive crossover growth in Europe", January 2018

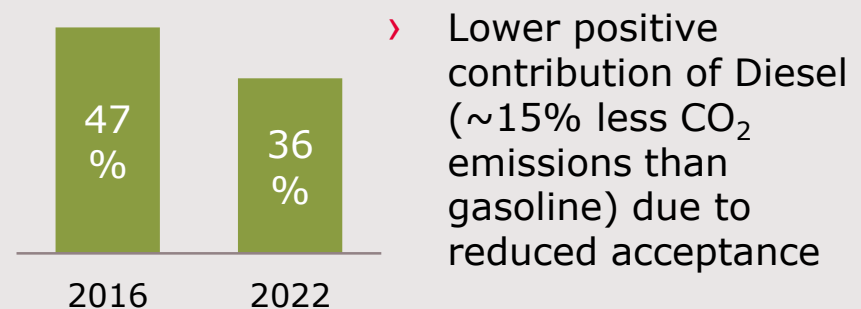
2) based on or includes content supplied by IHS Markit, Automotive Group, "Light Vehicle Alternative Propulsion Forecast", March 2018

## Two consumer trends countervail CO<sub>2</sub> reduction

### (1) SUV share of registered cars in Europe<sup>1)</sup>



### (2) Diesel share of registered cars in Europe<sup>2)</sup>



# Short-term, MHEV/FHEV/PHEVs are first choice; mid-term BEVs are preferred solution

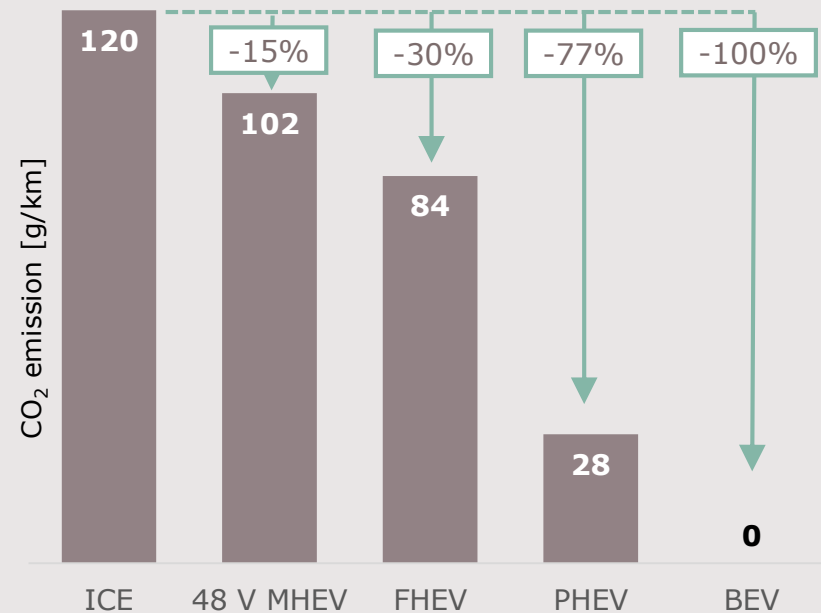
## Growth drivers of electro-mobility

- + Regulation
- + Incentives; China industry politics
- + Decreasing Diesel share
- + Increasing SUV share



- Cost and range vs. ICE
- Limited charging infrastructure
- Further ICE improvements
- Attractive oil price

## CO<sub>2</sub> emission reduction by powertrain system



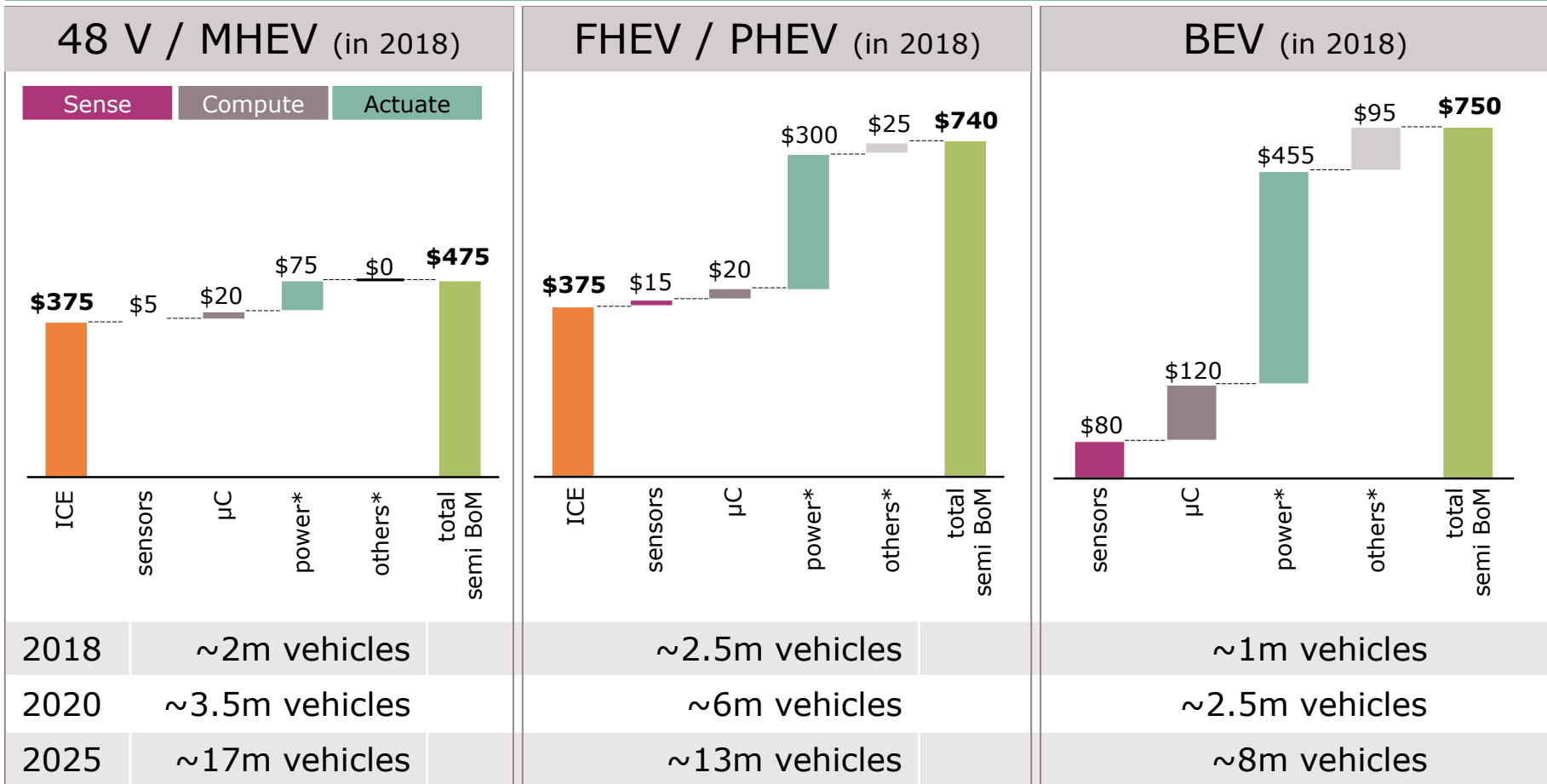
Source: Infineon estimates

- > Due to absence of improvements in CO<sub>2</sub> reduction in the past years, OEMs have to switch to "catch-up" mode until 2021
- > OEMs expected to push 48 V MHEV, FHEV, PHEV systems near-term to meet CO<sub>2</sub> targets
- > Mid- to long-term, BEVs will become the preferred solution



# The incremental demand of power semi-conductors is a significant opportunity

## 2018 average xEV semiconductor content by degree of electrification

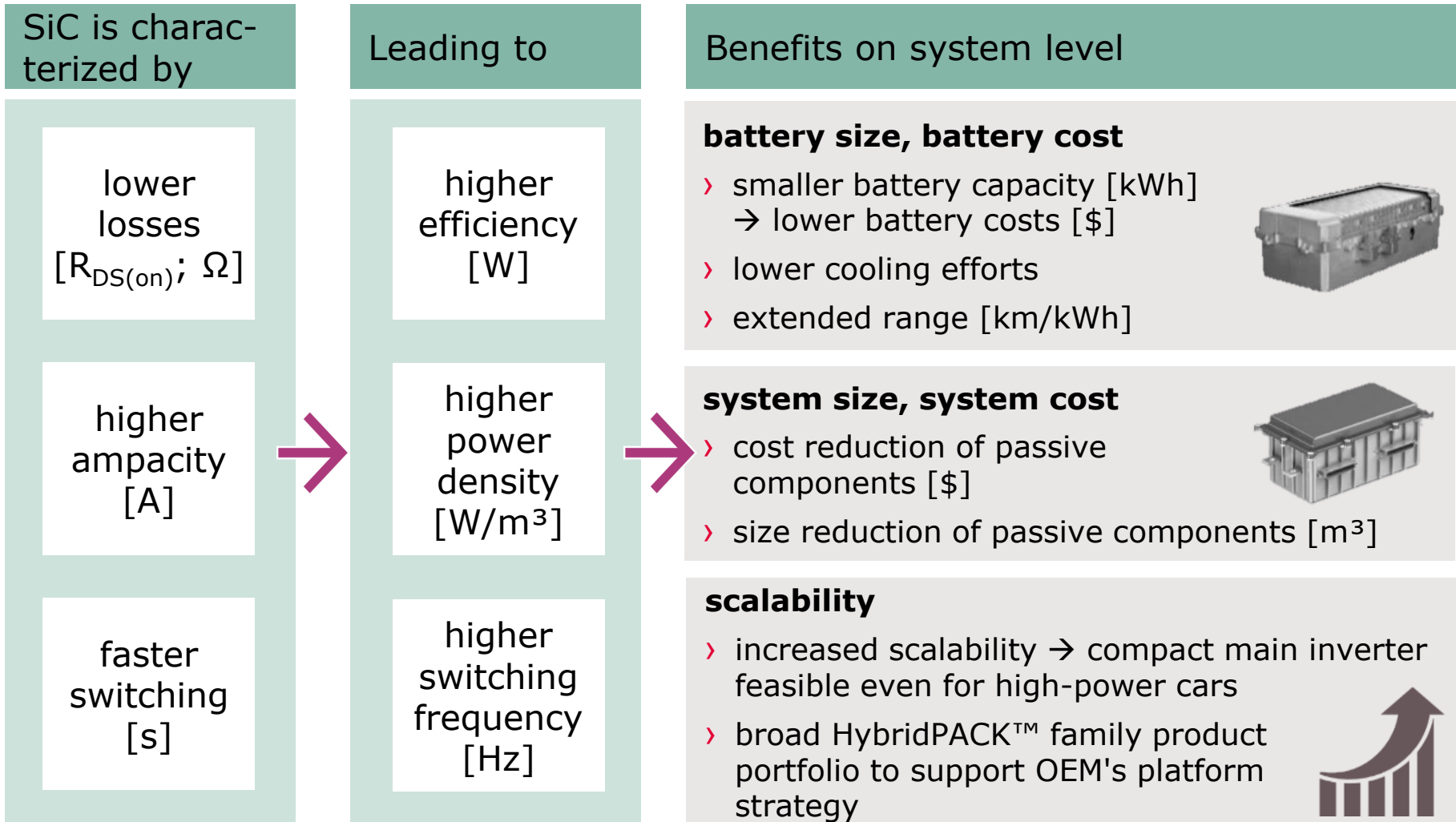


Source: Strategy Analytics, "Automotive Semiconductor Content", May 2018; Infineon estimates

\* "power" includes linear and ASIC; "others" include opto, small signal discrete, memory



# System cost reduction can justify the higher SiC component price



ampacity = current carrying capability

# Infiniteon has unparalleled expertise and portfolio for high-power xEV applications



## Bare dies



## Discretes

Diodes

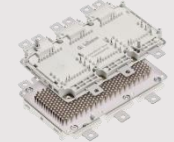
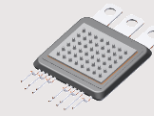
MOSFETs



## Modules

molded

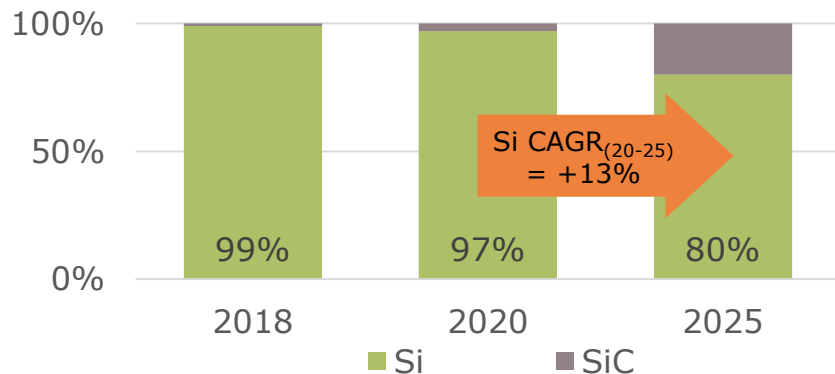
frame-based



Si will dominate the xEV market throughout next decade\*



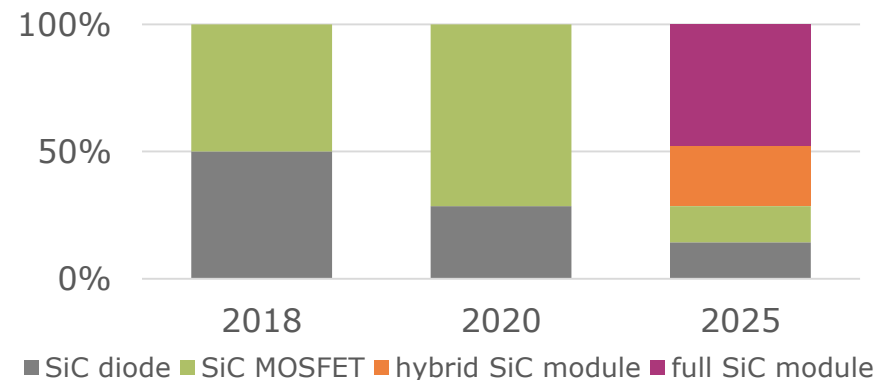
[by \$ value]



Modules will be preferred form factor in SiC mass market\*



[by \$ value]



\* Source: Infineon estimates

# Infineon offers the complete automotive-grade portfolio of SiC components



## CoolSiC™ Automotive Schottky diode



on-board charger



ramp in  
2018!

## CoolSiC™ Automotive MOSFET



on-board charger

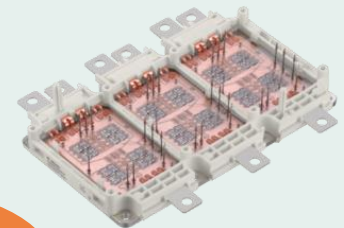


ramp in  
2019!

## Full SiC module HybridPACK™ Drive CoolSiC™



main inverter



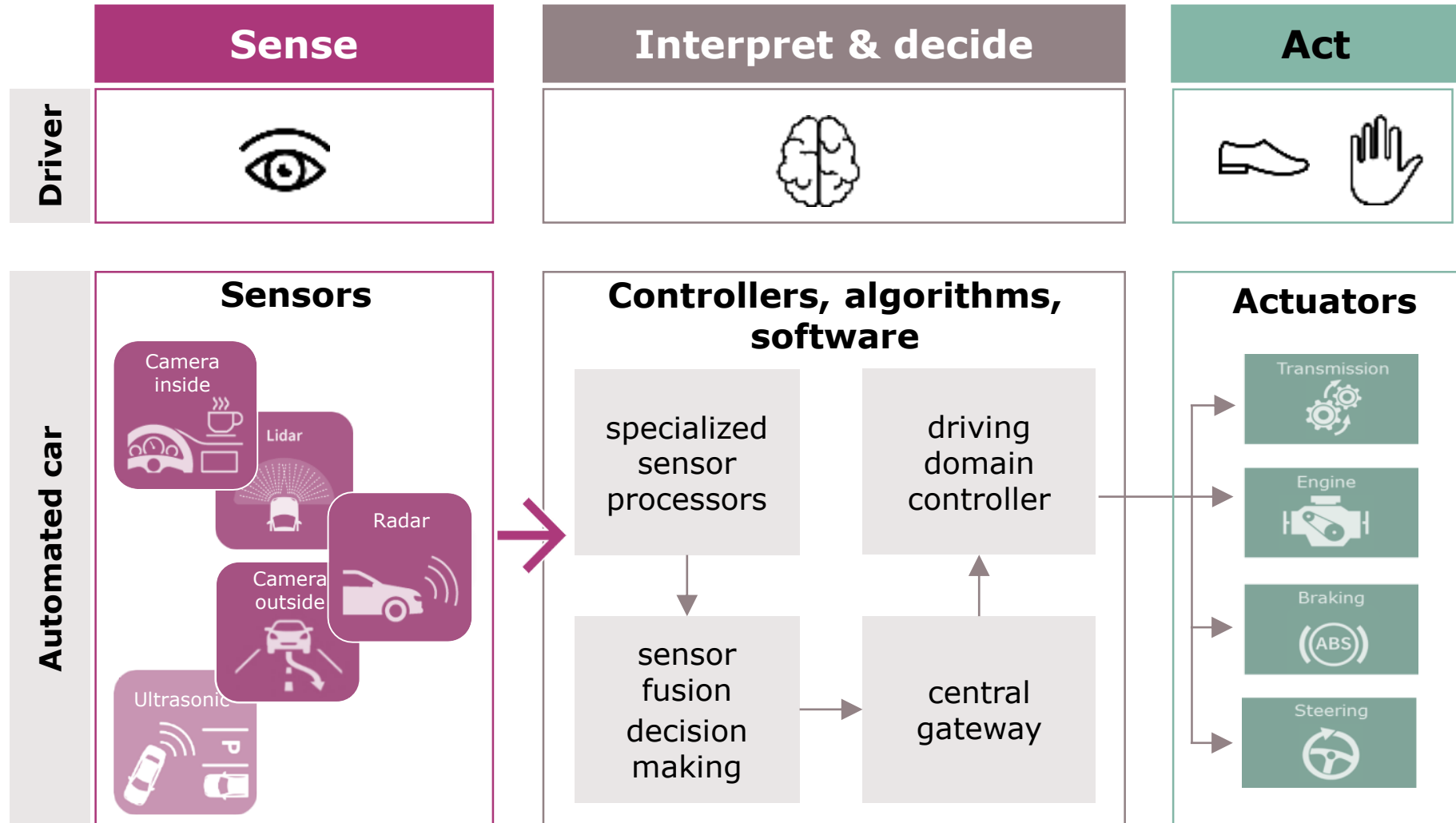
ramp in  
2020!

- › More than 20 leading OEMs and tier-1s are evaluating Infineon's SiC solutions for automotive
- › Customer feedback clearly shows that Infineon has deepest understanding of technical quality threats
- › Infineon's internal quality test procedures exceed common industry norm; test results proof that Infineon's SiC products reach that quality level
- › Industry's broadest portfolio allows customer to "pick what they need" rather than to "take what we have"



# Automated Driving

# For Automated Driving more compute power but also a higher security and safety is needed



# Increased sensor requirements drive the content in the next 5 years and beyond

More sensors required for any next level of automation			
	NCAP 5 Star, AD L2	AD L3	AD L4/L5
Application*	Automatic emergency brake/ forward collision warning		
	Parking assist		Valet parking
	Lane keep assist	Highway assist	Highway and urban chauffeur
Radar # of modules**	Corner  MRR/LRR New: Corner starting 2020 $\geq 3$	MRR/LRR  Corner $\geq 6$	Imaging  Surround $\geq 10$
Camera # of modules**	 $\geq 1$	 $\geq 4$	 $\geq 8$
Lidar # of modules**	0	 $\leq 1$	 $\geq 1$
Others	> Ultrasonic	> Ultrasonic > Interior camera	> Ultrasonic > Interior camera > V2X

\* Source: VDA (German Association of the Automotive Industry); Society of Automotive Engineers

\*\* Market assumption



# Infineon opens the door for mass-deployable lidar systems for Automated Driving



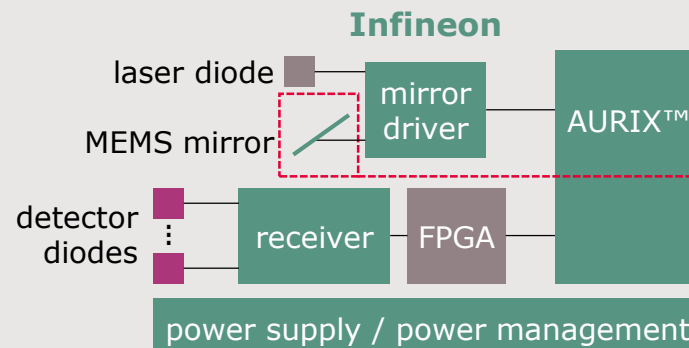
## Classification of long-range lidar systems

mechanically moving mirror	solid state optical system		
	scanning optical phased array	flash lidar	scanning MEMS-based mirror
<ul style="list-style-type: none"> <li>⊕ proven concept</li> <li>⊖ bulky</li> <li>⊖ expensive</li> </ul>	<ul style="list-style-type: none"> <li>⊕ allows optical beam forming</li> <li>⊖ high demand of laser power, especially for long-range</li> </ul>	<ul style="list-style-type: none"> <li>⊕ no moving parts</li> <li>⊖ more complex laser system (more expensive, higher power demand)</li> </ul>	<ul style="list-style-type: none"> <li>⊕ robust signal path</li> <li>⊕ more compact</li> <li>⊕ more cost-effective</li> <li>⊕ roadmap for higher level of integration</li> </ul>

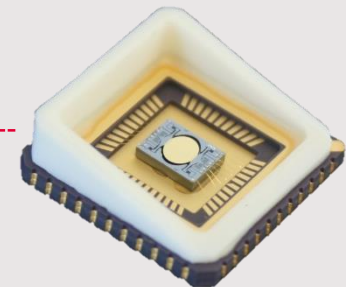


- › Lidar is Infineon's AD portfolio expansion adjacent to radar
- › Infineon intends to repeat its radar success story
- › In addition to MEMS, room to increase BoM by receiver, microcontroller, power management ICs

### 1<sup>st</sup> System reference design



### MEMS mirror

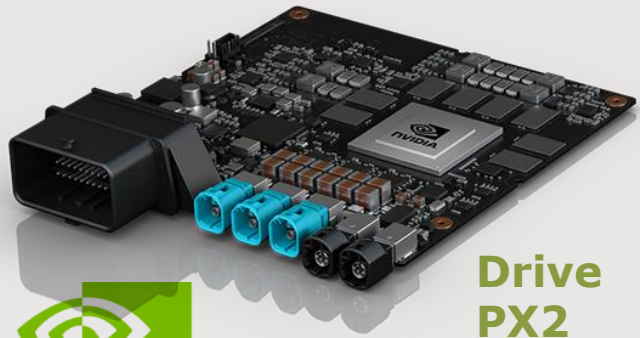




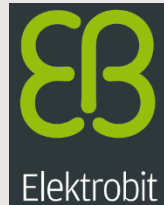
# Outstanding characteristics make AURIX™ first-choice $\mu$ C in the AD platform market



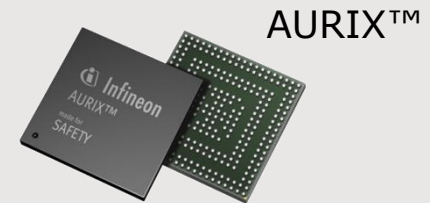
AURIX™ is the market reference as host controller in central computing platforms complementing CPU/GPU to make central computer robust and fail operational



**Go™ Automated Driving Platform with AURIX™**



**EB robinos**



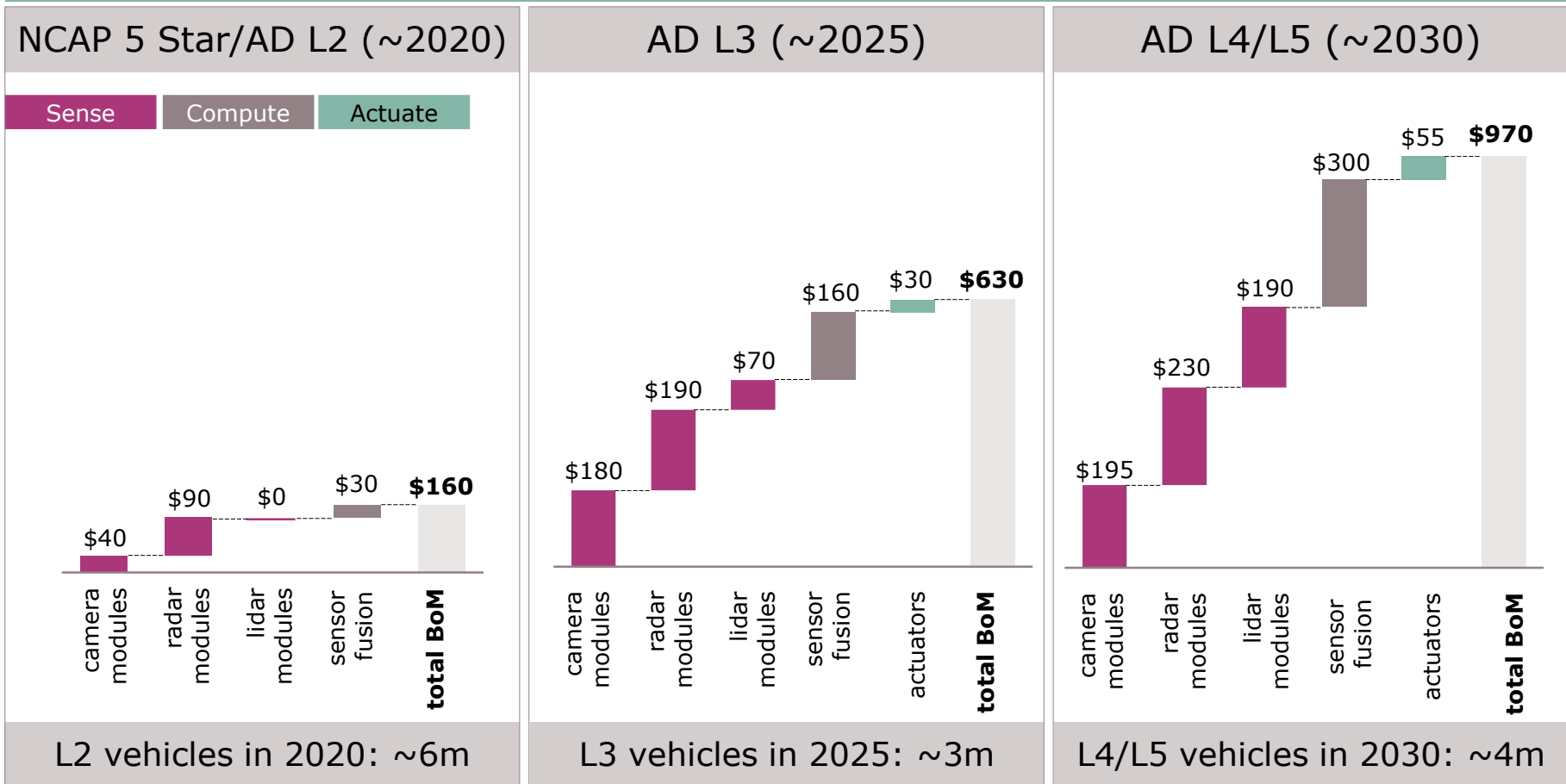
AURIX™

- › Safety host monitoring the operation of the data fusion ECU enables ISO 26262 ASIL-D
- › Safe and secure gateway to the vehicle network
- › Fallback operation in case of a GPU/CPU fail
- › Safe communication to actuator control units

- › Awareness for safety and security aspects of AD is increasing rapidly
- › Infineon is cooperating with the leading AD platform providers

# ADAS/AD semi growth driven by radar and camera sensor modules over the next 5 years

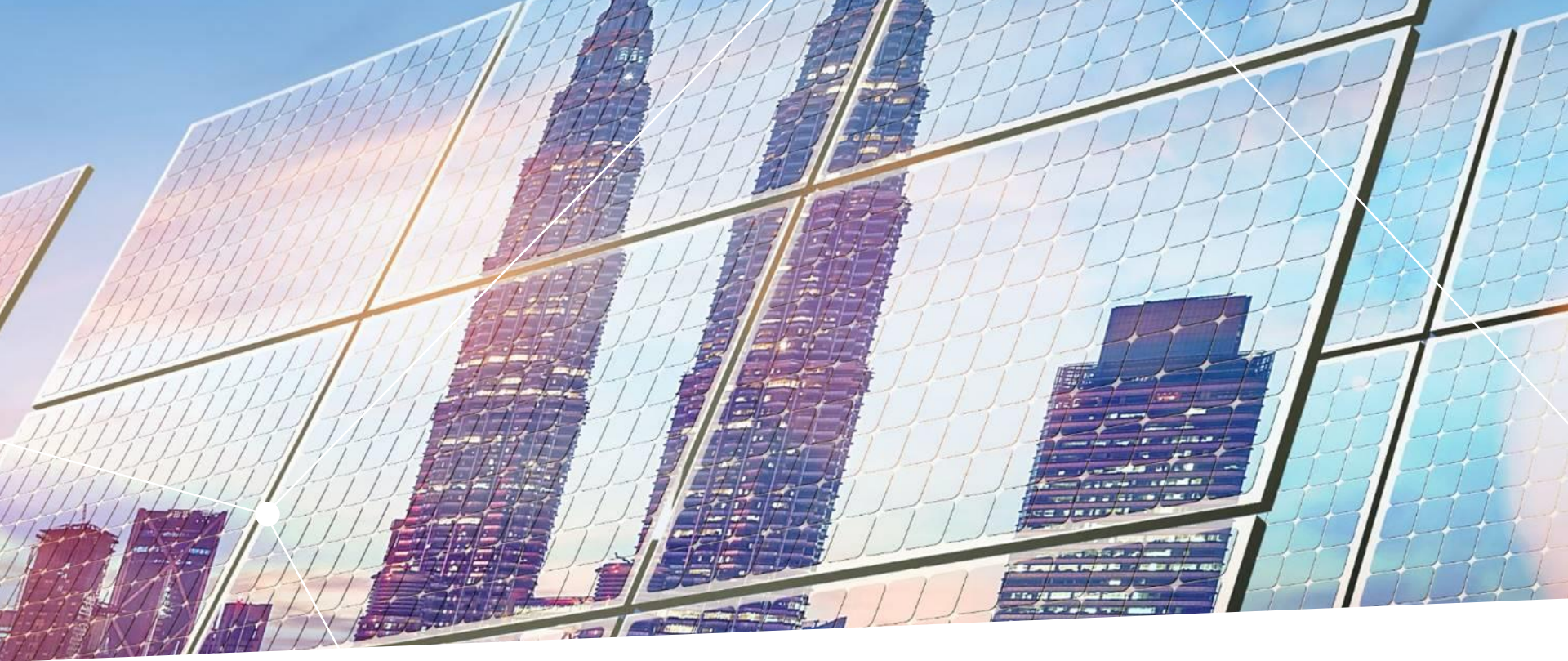
## Average semi content per car by level of automation at the given years



Source: Strategy Analytics; Infineon.

BoM contains all type of semiconductors (e.g. radar modules include  $\mu$ C); sensor fusion does not include memory.

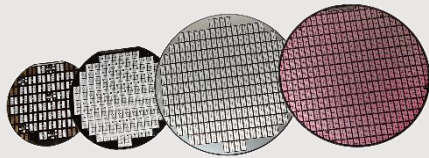
BoM are projected figures for the respective time frame.



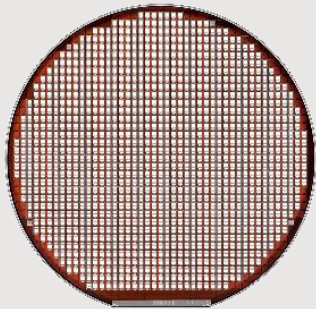
# Industrial Power Control

# To empower this variety of applications we rely on the most comprehensive power portfolio

## Bare Die

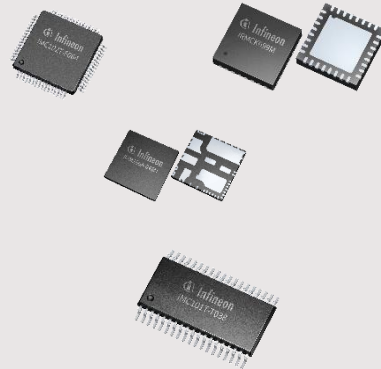


IGBTs and Si diodes

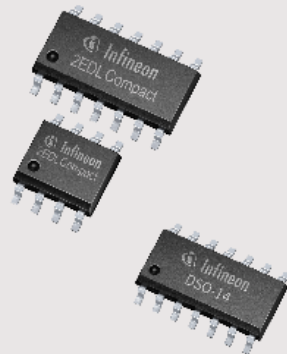


SiC MOSFET  
SiC diodes

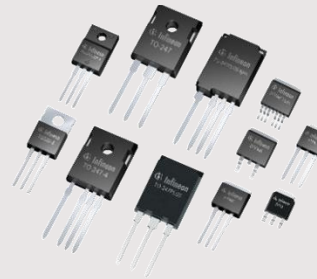
## Controllers



## Driver



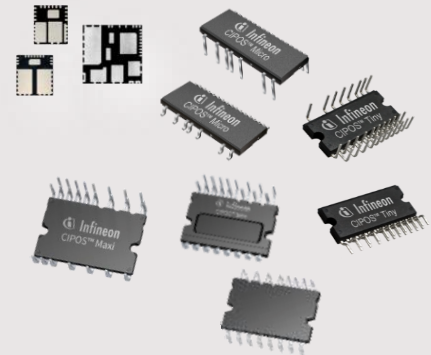
## Discretes



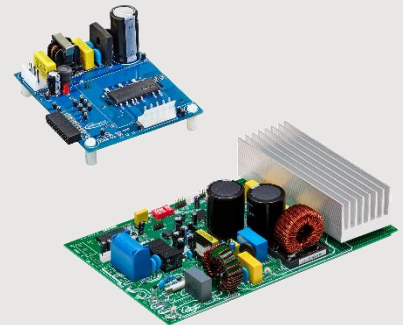
## Modules



## IPMs



## Solutions



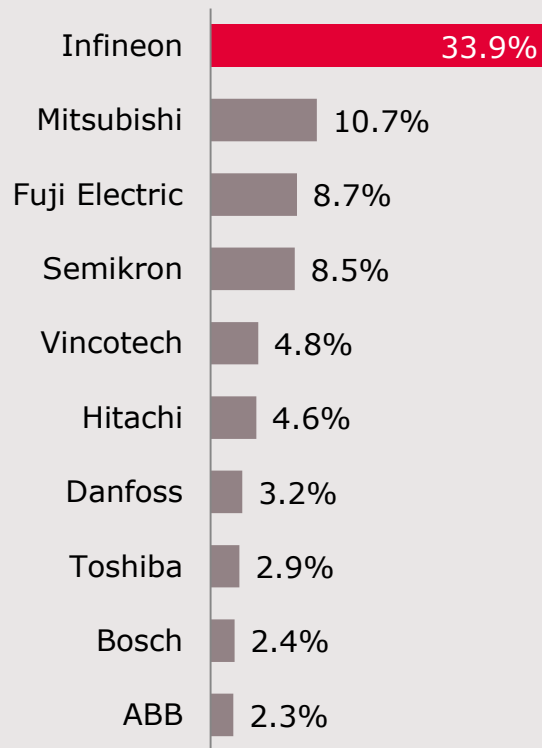


# Clear leader in IGBT standard modules and discrete IGBTs; IPMs improved from #4 to #3



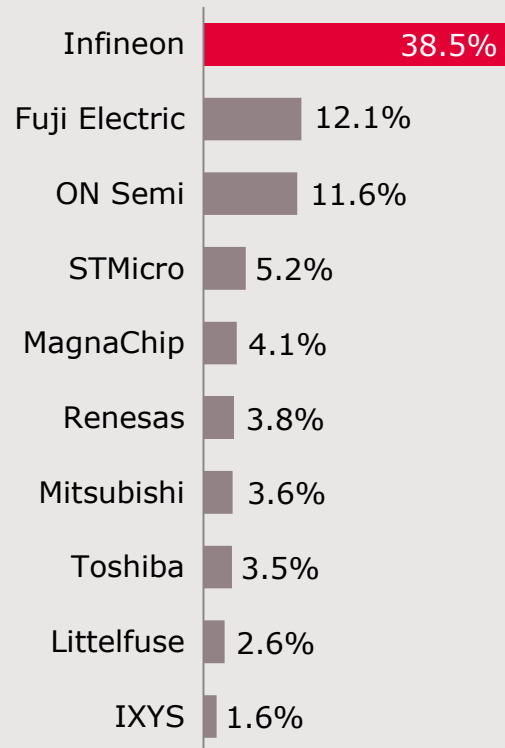
## IGBT std. modules

total market in 2017: \$2.16bn



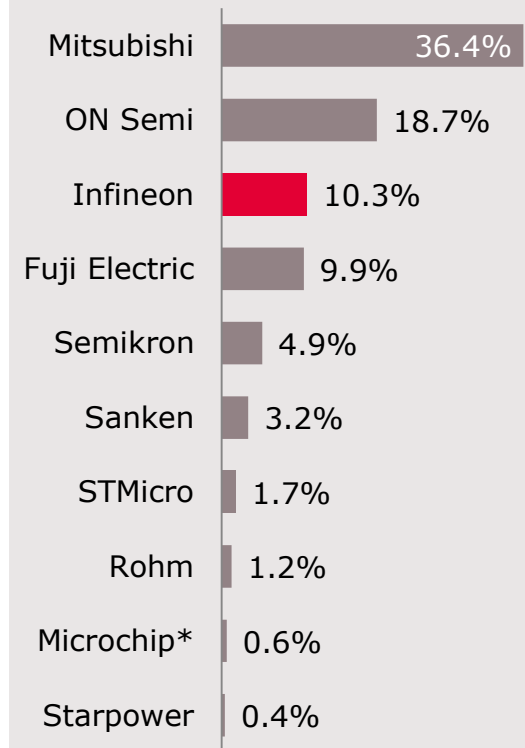
## Discrete IGBTs

total market in 2017: \$1.10bn



## IPMs

total market in 2017: \$1.57bn

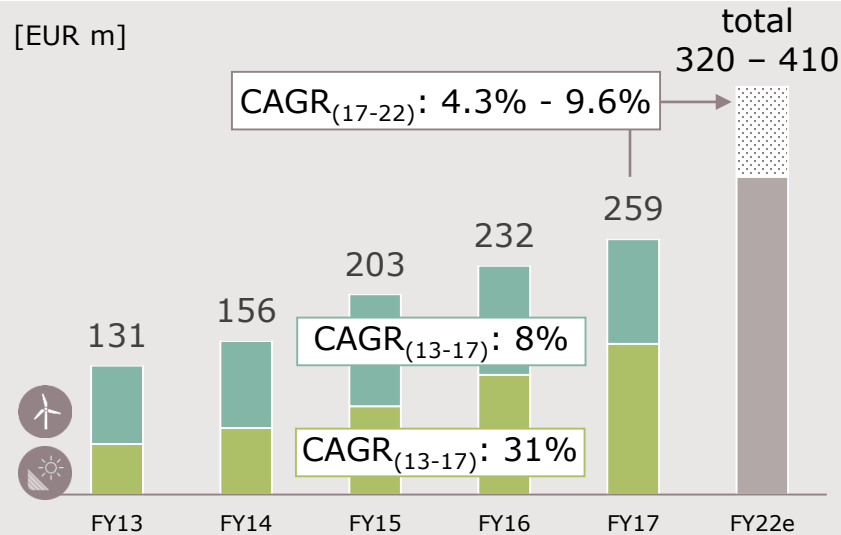


\* On 29 May 2018, Microchip closed the acquisition of Microsemi. The 2017 revenue depicted here was contributed entirely by Microsemi.  
Source: Based on or includes content supplied by IHS Markit, Technology Group, "Power Semiconductor Market Share Database 2017", August 2018.

# Infiniteon serves all major players for PV inverters and wind turbines



## IPC revenue in renewables



Installed wind capacity<sup>3)</sup>

CAGR<sub>(13-17)</sub>

**+7%**

IPC wind revenue

CAGR<sub>(13-17)</sub>

**+8%**

Installed PV capacity<sup>1)</sup>

CAGR<sub>(13-17)</sub>

**+25%**

IPC PV revenue

CAGR<sub>(13-17)</sub>

**+31%**

## Infineon is powering all leading renewable energy players\*

### PV inverter<sup>2)</sup>

- 1 | Huawei ✓
- 2 | Sungrow ✓
- 3 | SMA ✓
- 4 | TBEA Sunoasis ✓
- 5 | Wuxi Sineng ✓
- 6 | ABB ✓
- 7 | Kstar ✓
- 8 | Goodwe ✓
- 9 | Growatt ✓
- 10 | Power Electr. ✓

### Wind<sup>4)</sup>

- 1 | Siemens/Gamesa ✓
- 2 | Vestas ✓
- 3 | Goldwind ✓
- 4 | GE ✓
- 5 | Enercon ✓
- 6 | Envision ✓
- 7 | Nordex ✓
- 8 | Senvion ✓
- 9 | United Power ✓
- 10 | Mingyang ✓

\* Infineon is serving the top-10 of each category but not necessarily as a sole supplier.

Source: 1) based on or includes content supplied by IHS Markit, Technology Group, "PV Installations Tracker - Q1 2018"; March 2018; including off-grid

2) by shipped capacity in MW: based on or includes content supplied by IHS Markit, Technology Group, "PV Inverter Market Tracker - Q1 2018 - v4"; June 2018

3) MAKE Consulting - Market Outlook Update Q1 2018; March 2018

4) by shipped/installed capacity (in MW): MAKE Consulting - Historical Wind Turbine OEM Market Share; April 2018

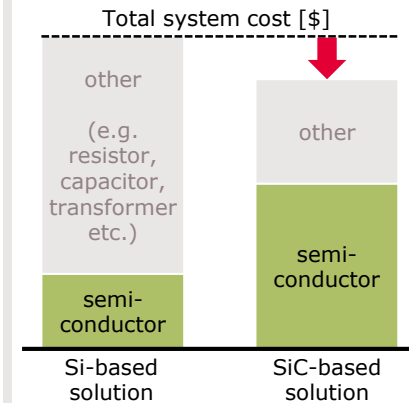


# SiC MOSFETs bring down system cost and size of PV inverters despite higher component cost



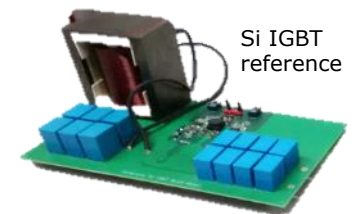
## Reduction of system cost, higher semi-value

- › 15-20% lower bill of material for inverter manufacturer
- › 2-3x higher semiconductor value as compared to Si-based design



## Reduction of system size

- › Simpler topologies with less control effort
- › Higher switching frequency with smaller transformers
- › Same power in smaller box size results in significant system cost reduction

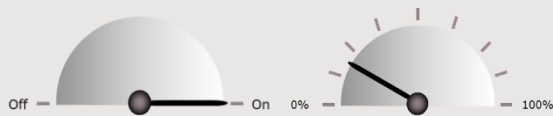


SiC MOSFET demonstrator

# Inverterization of home appliances is a key driver for our business

Uncontrolled motor

Variable speed drive



Extended lifetime



Less noise



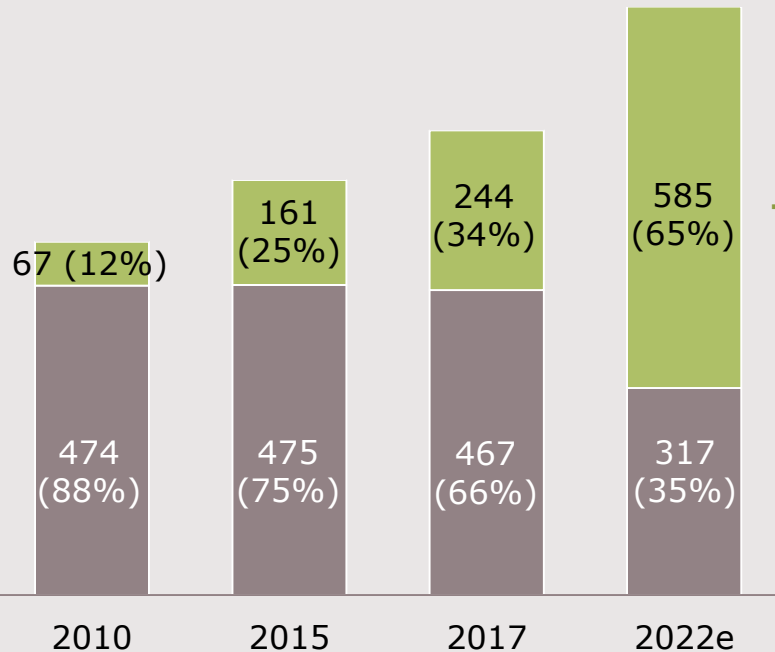
Up to 40% less energy<sup>1)</sup>

Number of home appliances by motor type<sup>2)</sup>

[units m]

CAGR<sub>(17-22)</sub>

Semi content<sup>3)</sup>



+19%

~€9.50

-7%

~€0.70

■ Uncontrolled motor ■ Motor with variable speed drive

Source:

1) Compared to devices without inverter

2) Source: based on or includes content supplied by IHS Markit, Technology Group, "Home Appliance Database: All Devices and Associated Electronics", May 2018

3) Infineon estimate for a typical aircon

# IPC's business success in home appliances is based on several success factors



Early identification of trend for **inverterization**

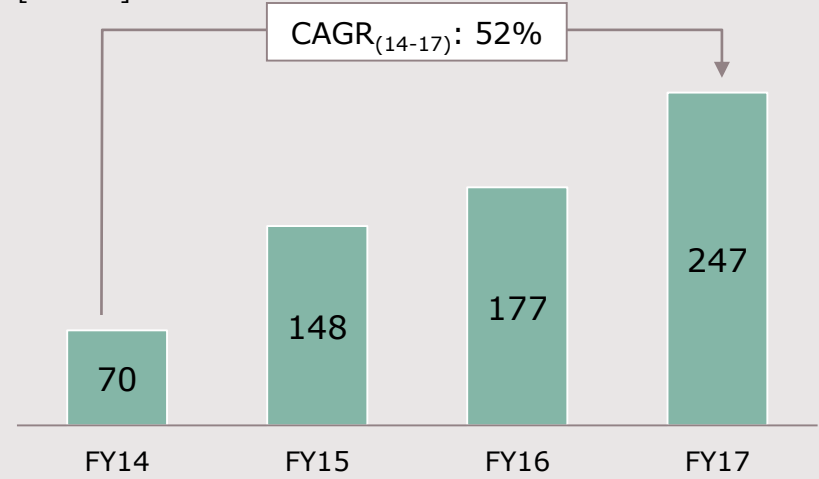
**Market access** through inorganic growth (acquisit. of LSPS and IRF)

Improved delivery capability through **capacity increase**

Extension of portfolio of **integrated products** to gather higher semiconductor share at customers

## IPC revenue in home appliances is showing outstanding growth

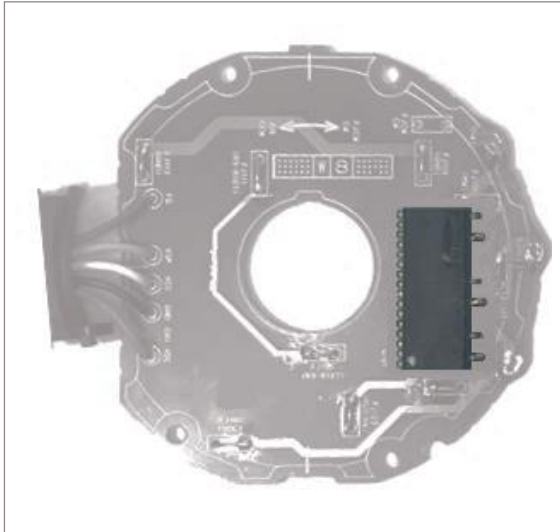
[EUR m]



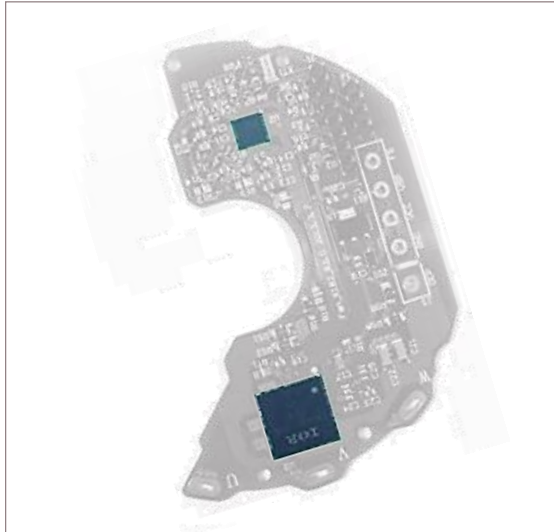
# IPC's digital control strategy enables customers to shrink their system

## Example: motor control solution for aircon indoor fan

### Solution based on standard IPM



### Solution based on CIPOS™ Nano



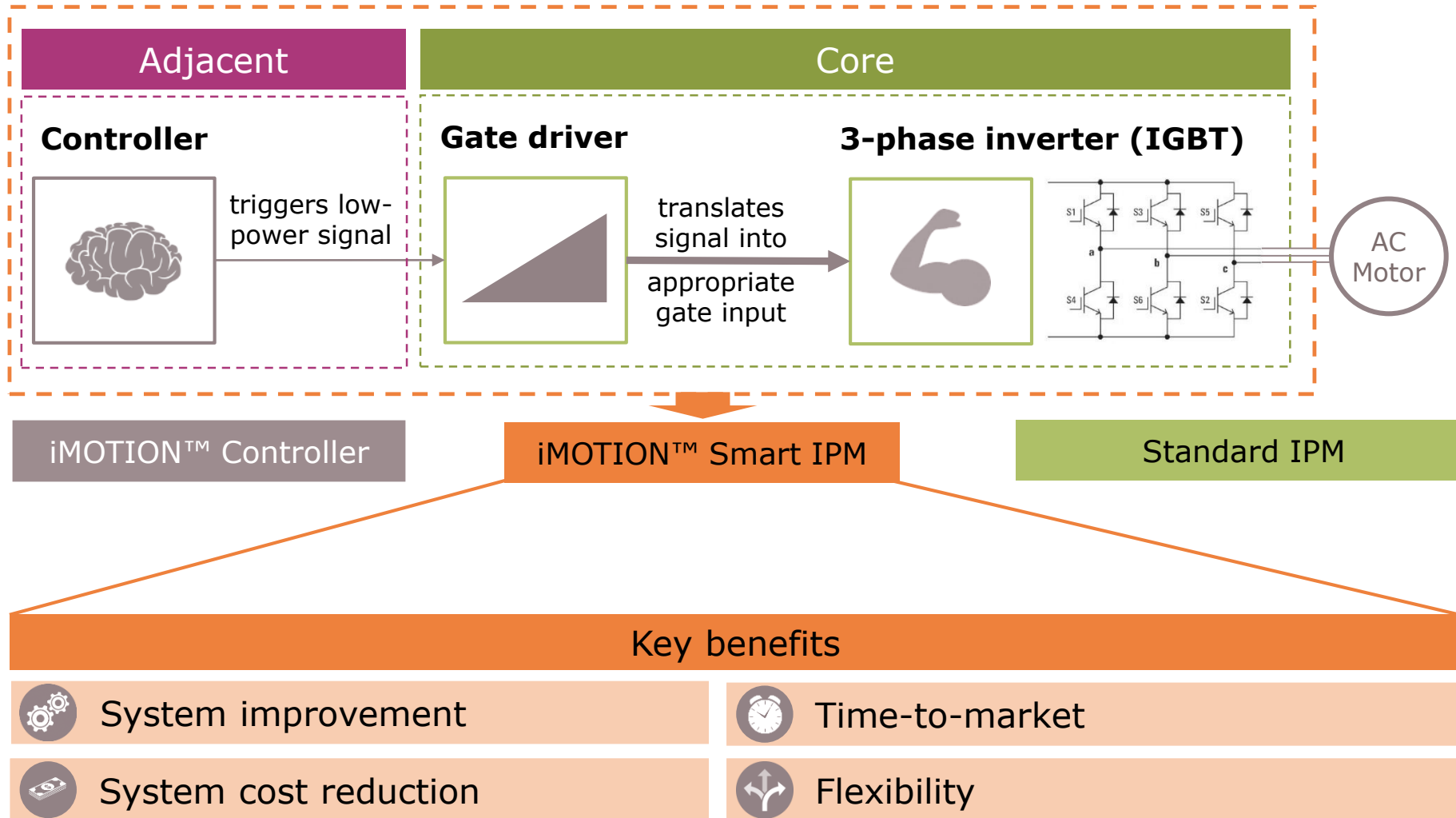
### Solution based on iMOTION™ Smart IPM



## Customer benefits of highly integrated power ICs

- › Significant system cost reduction with BoM savings of ~30%
- › Reduction in engineering efforts
- › Reduction in time-to-market

# Digitalization: motor control platform with scalable integration of HW and SW



# HMI and AI are driving the penetration of collaborative robots (cobots)

**700,000** new cobots by 2025<sup>1)</sup>

**~€350** semiconductor content<sup>2)</sup> per cobot of which

**~€200** for power semiconductors<sup>2)</sup>

**~€150** for sensors,  $\mu$ C, and security controllers

System understanding and extended product portfolio allow for growth in adjacent markets



Source:

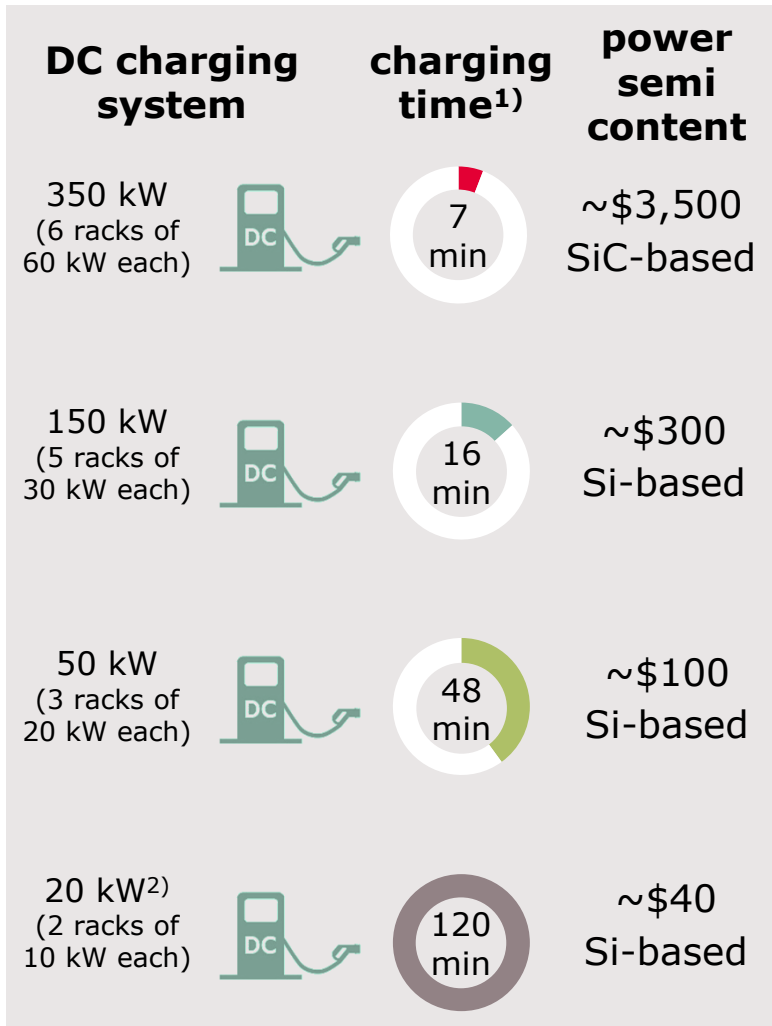
1) Barclays Equity Research, "The rise of co-bots: Sizing the market", 2016

2) Infineon estimate; excl. tools

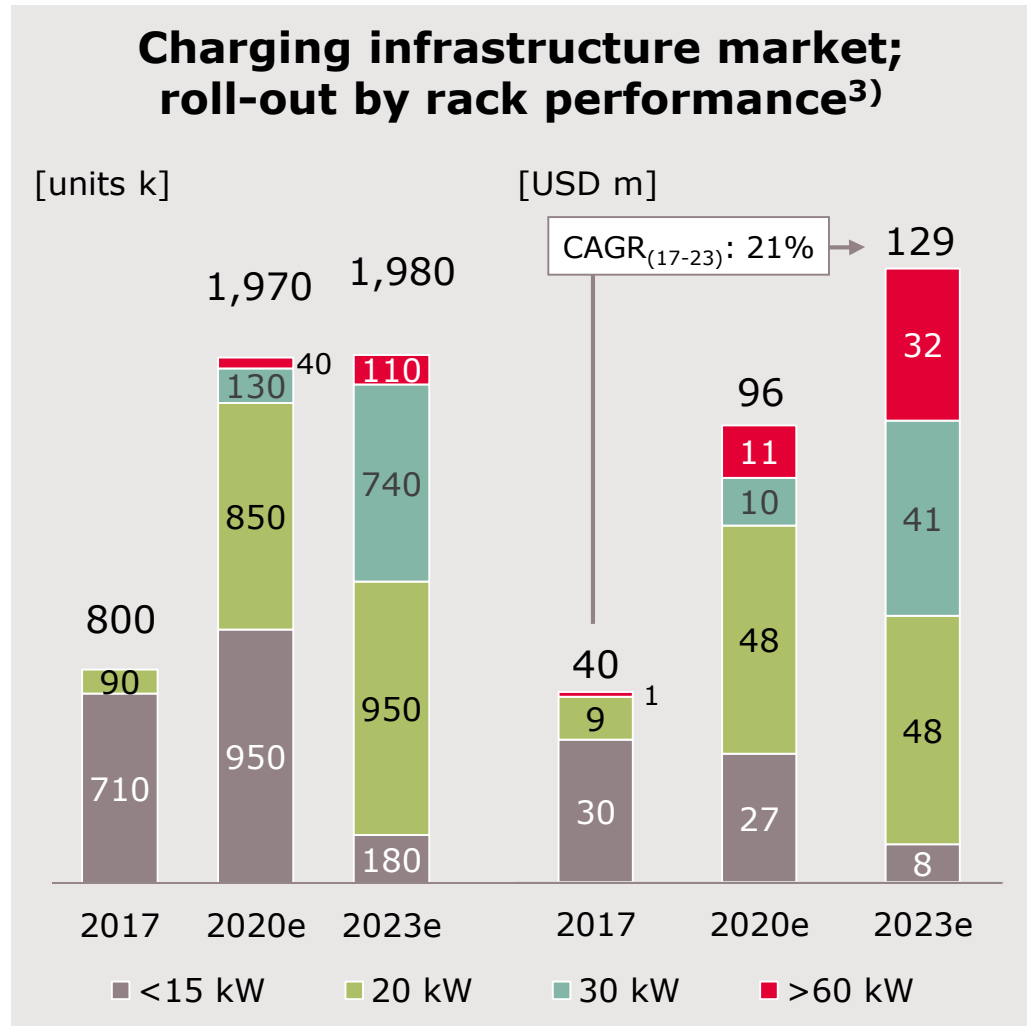
Courtesy: Franka Emika



# Growing penetration of electric vehicles will drive roll-out of charging infrastructure



- 1) to charge for a reach of 200 km  
2) incl. DC wall boxes



3) Source: Infineon estimate

# Electrification of trains is accelerating and Infineon is part of two subsystems

## Locomotive



## Metro



## HST/ EMU



### Trends in traction

Electrification of freight transport

Urbanization and new mobility concepts

Strong governmental investment programs

### Market size

~500 units/a

~700 units/a

~600 units/a

### Power semiconductor content per unit

~\$70,000

~\$50,000

~\$100,000

## Subsystem 1: Auxiliary inverter

Air conditioning, power sockets, air brake, control stand, etc.

SiC



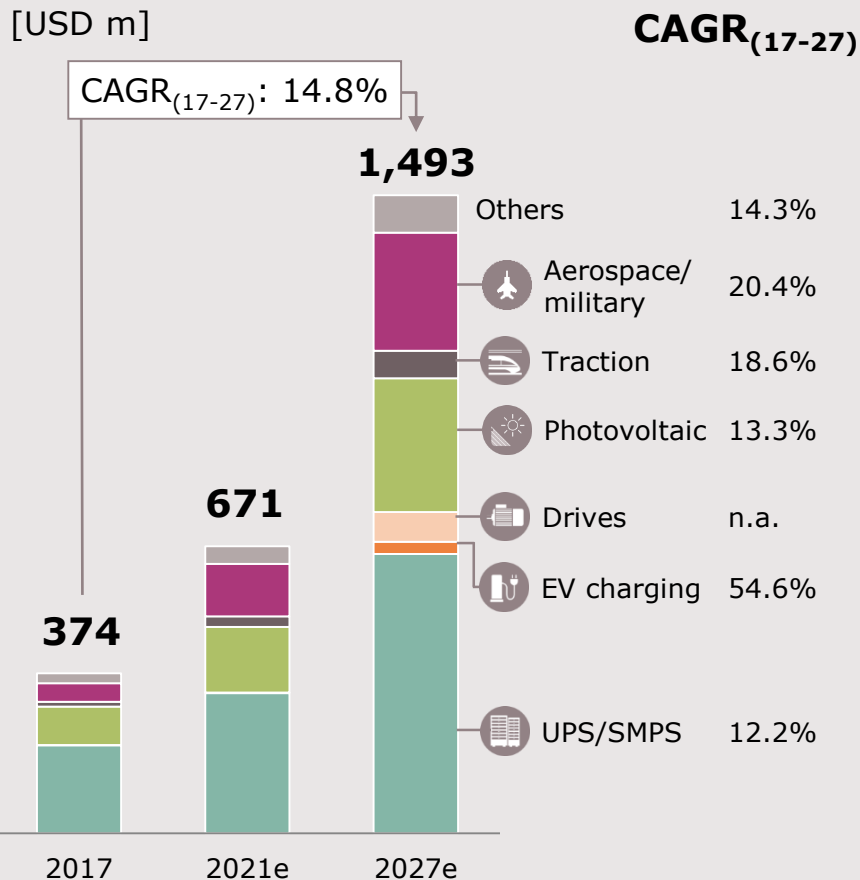
## Subsystem 2: Propulsion inverter

Motor and motor traction converter

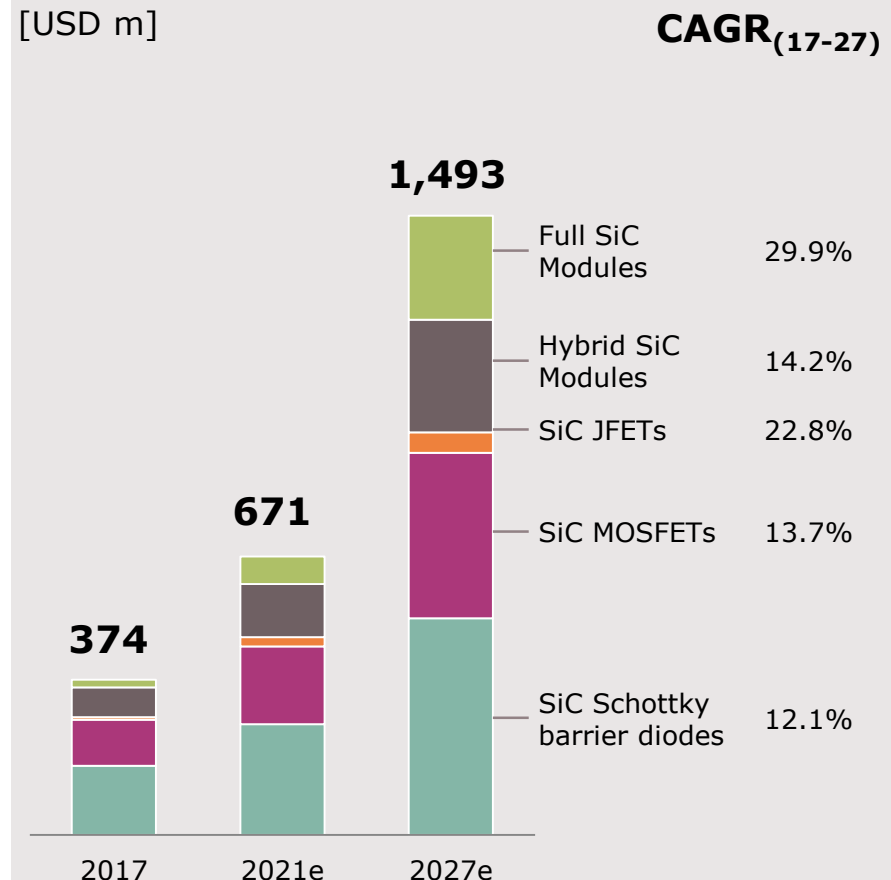


# With an increasing number of applications, particularly module players will win in SiC

## SiC power semiconductors by application excl. xEV



## SiC power semiconductors by product type excl. xEV



Sources: based on or includes content supplied by IHS Markit, Technology Group, "SiC and GaN Power Semiconductors Report - 2018", April 2018, mid case



# Power Management & Multimarket





# PMM's growth is built on many applications from different sectors in power and non-power

## PMM

### Computing



- › Data Center
- › PC, Notebook
- › Peripherals



### Industrial



- › Power supplies
- › EV on-board charger
- › PV inverter
- › Power tools
- › Lighting
- › Industry 4.0
- › Internet of Things



### Consumer / Misc



- › eBikes
- › Multicopter
- › Aviation
- › LSEV
- › Space
- › Gaming
- › Smart home



### Communications



- › Handsets
- › Wearables
- › 5G massive MIMO



● AC-DC ● DC-DC ● RF and sensors (non-power)



# PMM – Power



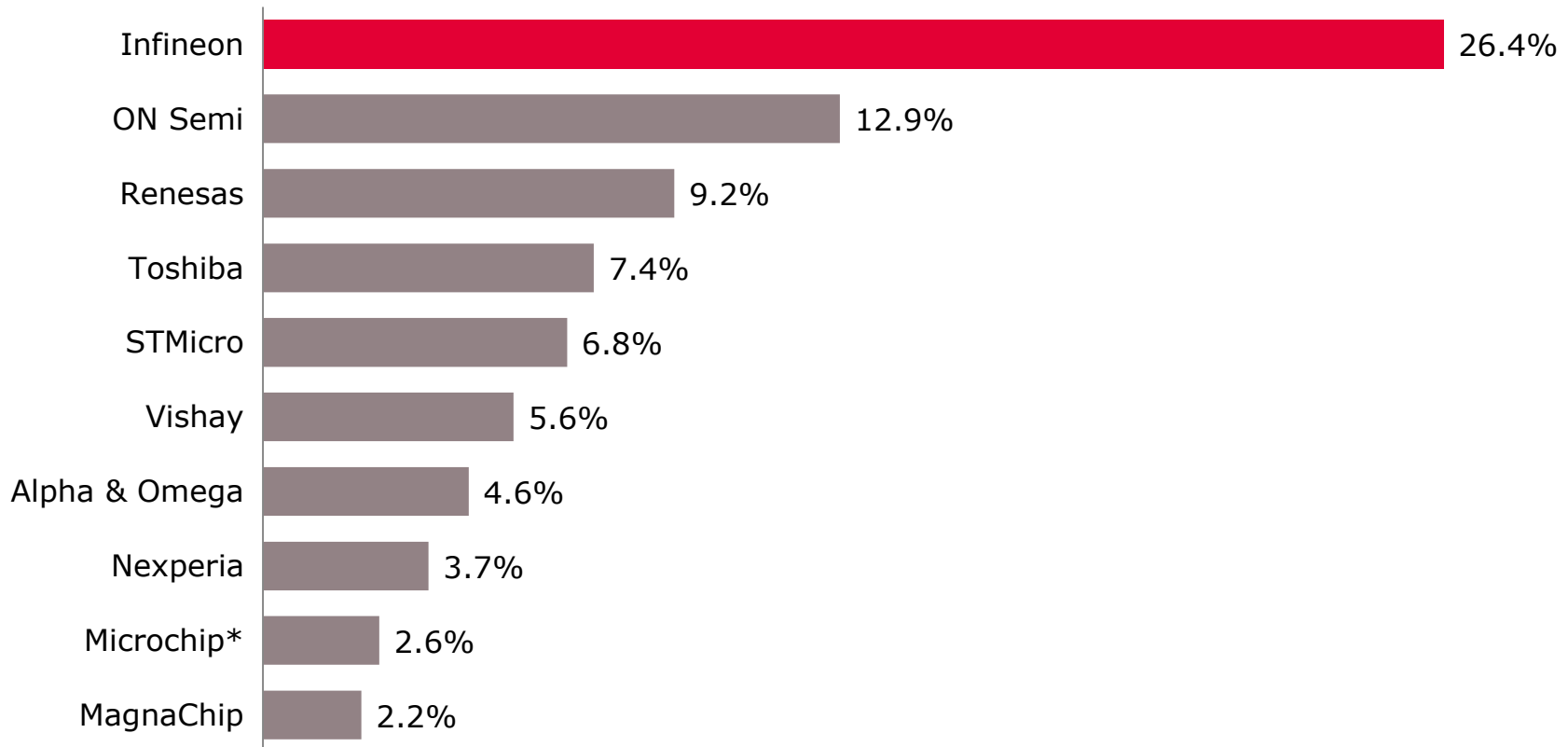


# In 2017, PMM grew by 15.1% vs market of 13.5%; now more than 2x as big as #2



## Discrete power MOSFETs market shares

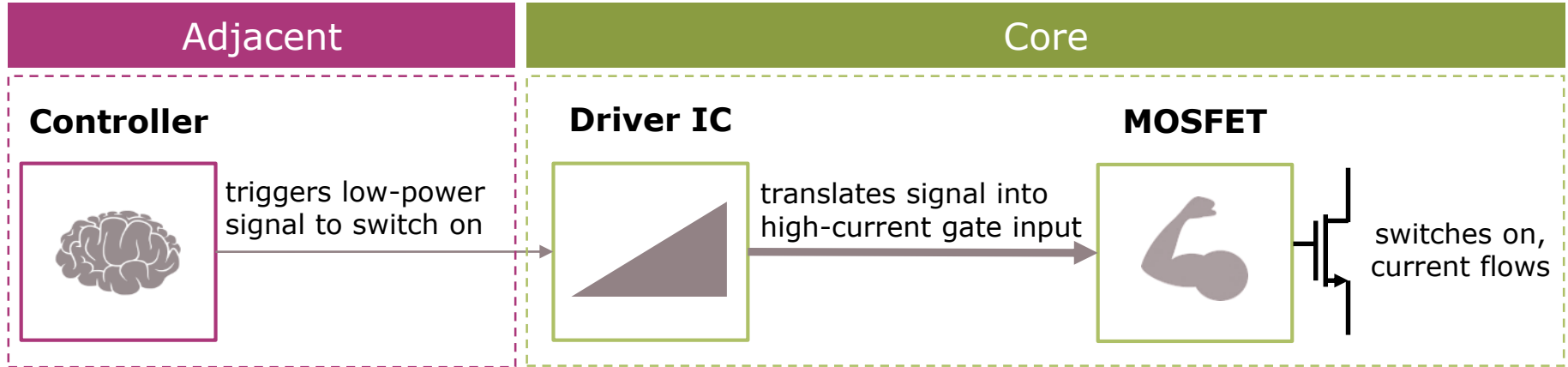
total market in 2017: \$6.65bn



\* On 29 May 2018, Microchip closed the acquisition of Microsemi. The 2017 revenue depicted here was contributed entirely by Microsemi.

Source: Based on or includes content supplied by IHS Markit, Technology Group, "Power Semiconductor Market Share Database 2017", August 2018; incl. automotive MOSFETs.

# Technology leadership in MOSFETs and digital power: highest efficiency and power density

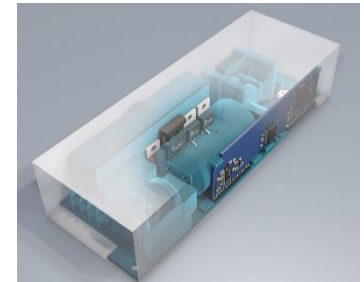


Power management solutions reduce TCO



## More efficient semiconductors

- › lower power consumption
- › lower opex

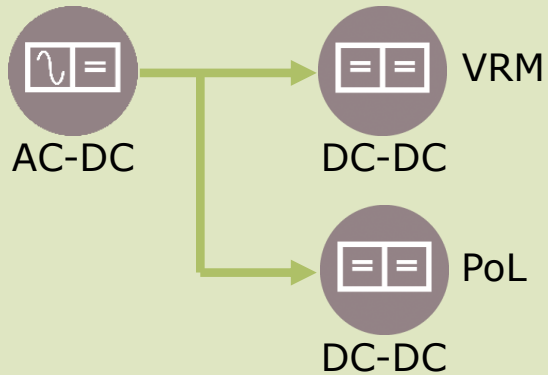


## Higher power-density

- › more compact system designs
- › lower capex

# Highly differentiating solution for data center enables significant opex and capex reduction

## Powerflow (schematic)

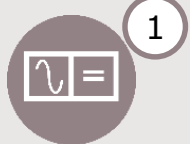


## Customer benefit

- > reducing opex and capex by >10%
- > saving >3bn kWh annually for US data centers
- > doubling compute power per server rack



## Infineon-enabled optimization of data center powerflow – examples:



AC-DC



DC-DC

**CoolGaN™** allows for 2x output power in a given slot size and thus frees up space for the backup battery in more efficient architecture.

Benchmark **digital power solutions** including fully integrated PoL devices: highest efficiency, highest power density; supporting latest processor technologies.

# AC-DC power supply by Eltek using CoolGaN™



## Eltek "Flatpack2 SHE"

- > 3 kW / 48 V
- > Fixed and wireless telecom applications
- > Size: 4.25 x 1.61 x 13 inch<sup>3</sup>
- > Weight: 4.5 lbs
- > High power density: 33 W/inch<sup>3</sup>

**98%**

efficiency

**-50%**

reduction in  
power loss

**> -6%**

proven operational  
cost reduction

## Infineon content per device

- > 2x **CoolGaN™** 600 V
- > 2x **CoolMOS™** C7
- > 2x **CoolMOS™** CFD7
- > 4x **OptiMOS™** 150 V
- > Gate driver

~ US\$30

# Server eco-system is supported by PMM's various DC-DC solutions



## Data center market trends

Increasing memory and processing power

Adoption of AI drives high-end analytics and data management

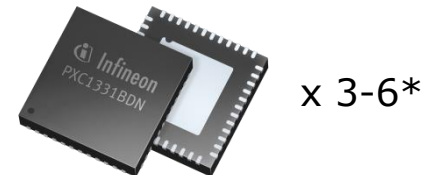
Expanding CPU supplier base: AMD, IBM, NVIDIA, ARM, Intel etc.

Hyper-scale users invest in proprietary processor designs (e.g. Google)

Saving space is a key requirement and a focus of product development



**Digital controllers**  
with flexible communications interface



**Integrated power stages and iPoL**  
for high power density



\* devices per server



# PMM – RF and Sensing



# RF and Sensing devices enable new services and will shape the way we live and work

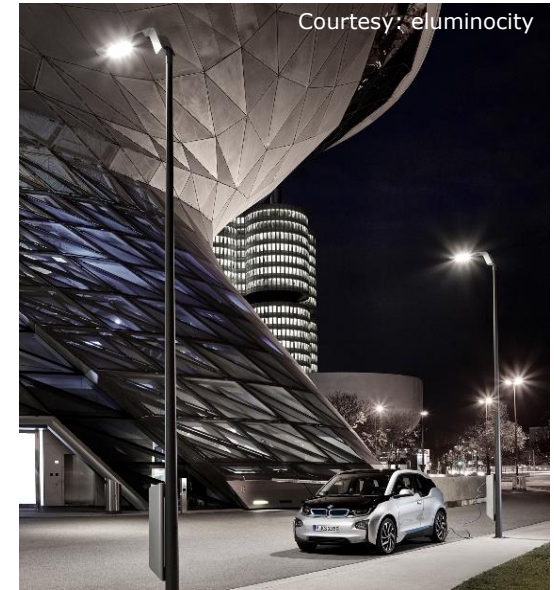


Augmented Reality



Voice-controlled devices

Various use cases are enabled by a small set of versatile core technologies



Smart streetlights



Commercial and consumer multicopters



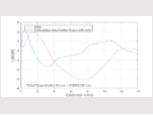






Gesture control



Industrial robotics

# We focus on MEMS sensors and target to become the leader in 3D Imaging and Radar



Microphone	Pressure	Environmental	3D Radar	3D ToF
 No distortions	 Best-in-class resolution	 World smallest form factor 6x6mm <sup>2</sup>	 Highest Energy Efficiency	 Best-in class resolution
 Receive clear audio signals	 Measure Height	 Measure CO <sub>2</sub>	 Biometrics	 3D Mapping



## Smart Ears, Smart Feeling, Smart Nose



## Smart Eyes & Sixth Sense

Key Use Cases - Examples				
Voice Authentication	Advanced Fitness Tracking	Smog Alarm	Gesture Sensing	3D AR Gaming
			Face Recognition & Biometric identification	
Human Machine Interface				

# XENSIV™ Si microphones have plenty of growth opportunities beyond smartphones

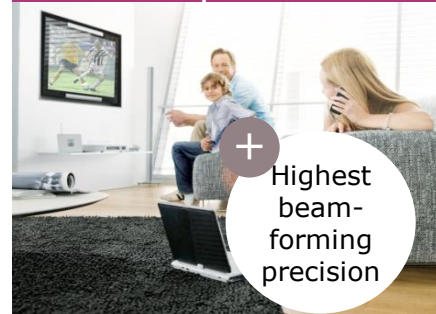
## Smart speaker



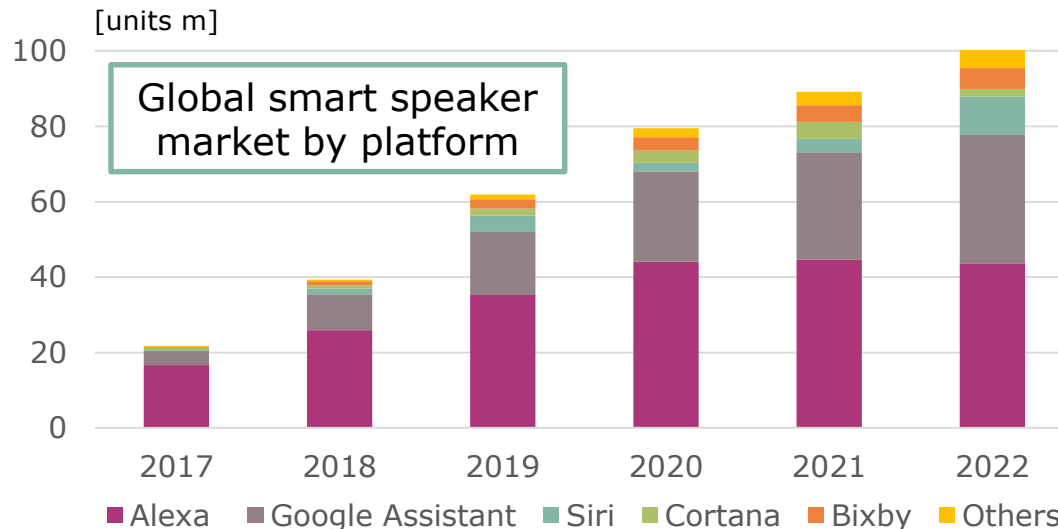
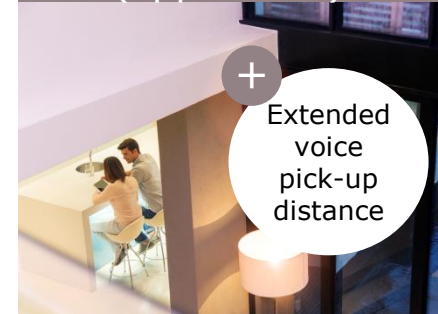
## Robotics



## TV, laptop and set-top box



## Smart home (appliances)



## Market snapshot:

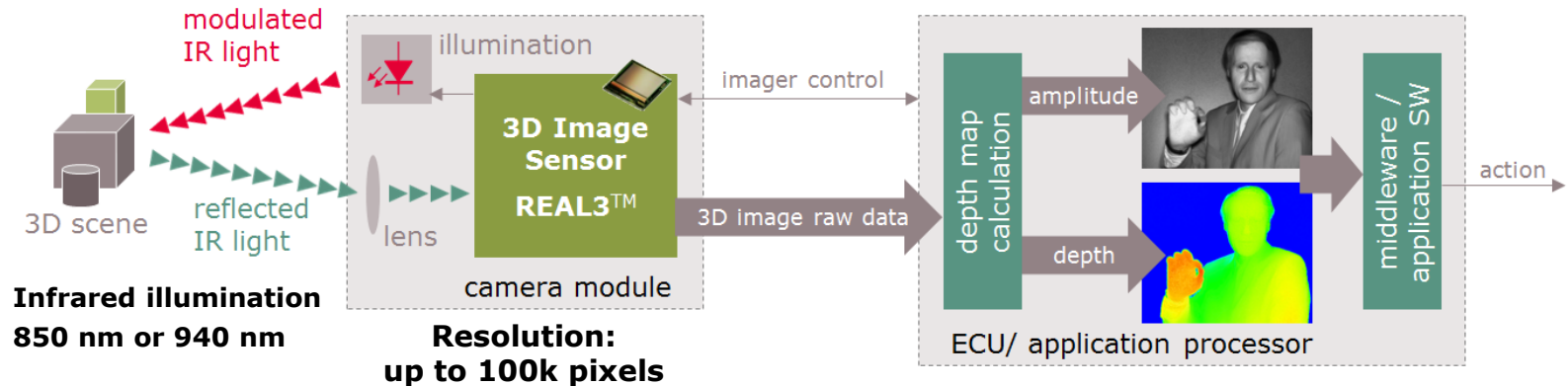
- › Global market for smart speakers expected to reach 100m units in 2022
- › Platform developers drive unit growth via licensing models to other hardware manufacturers
- › Average number of silicon microphones per devices by 2022: ~5

Source: SAR Insight & Consulting, Smart Speaker Market Growth, March 2018

# Leading base technologies for sensor solutions: Time-of-Flight

## Time-of-Flight

Time-of-Flight: Modulated infrared-light is emitted and reflected by objects. Phase-shift of returned light is measured in each pixel of the image sensor.



## Examples of uses cases enabled by Time-of-Flight technology

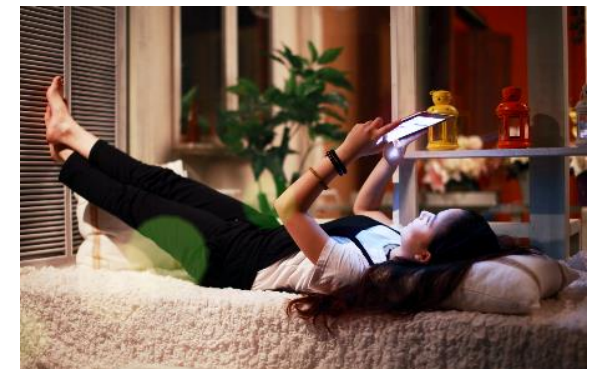
### 3D scanning



### AR / VR / gaming



### Secure face recognition







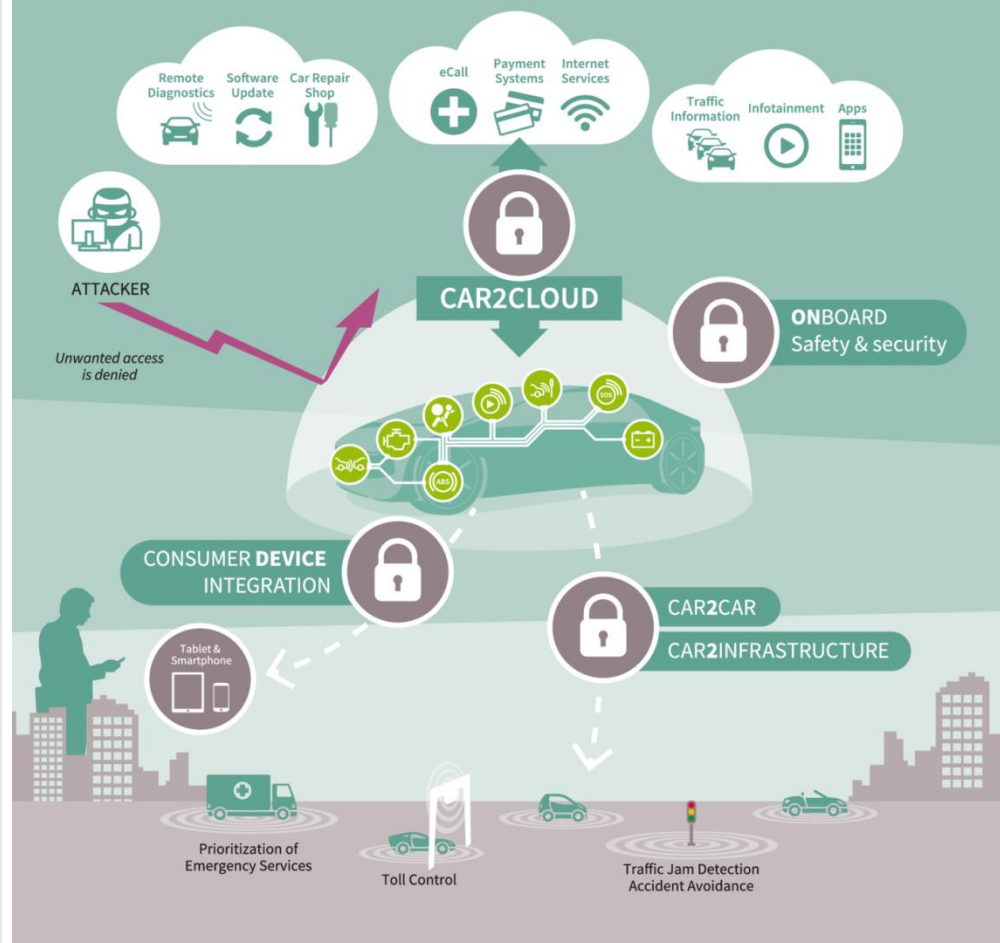
# Chip Card & Security



# Security is a system approach

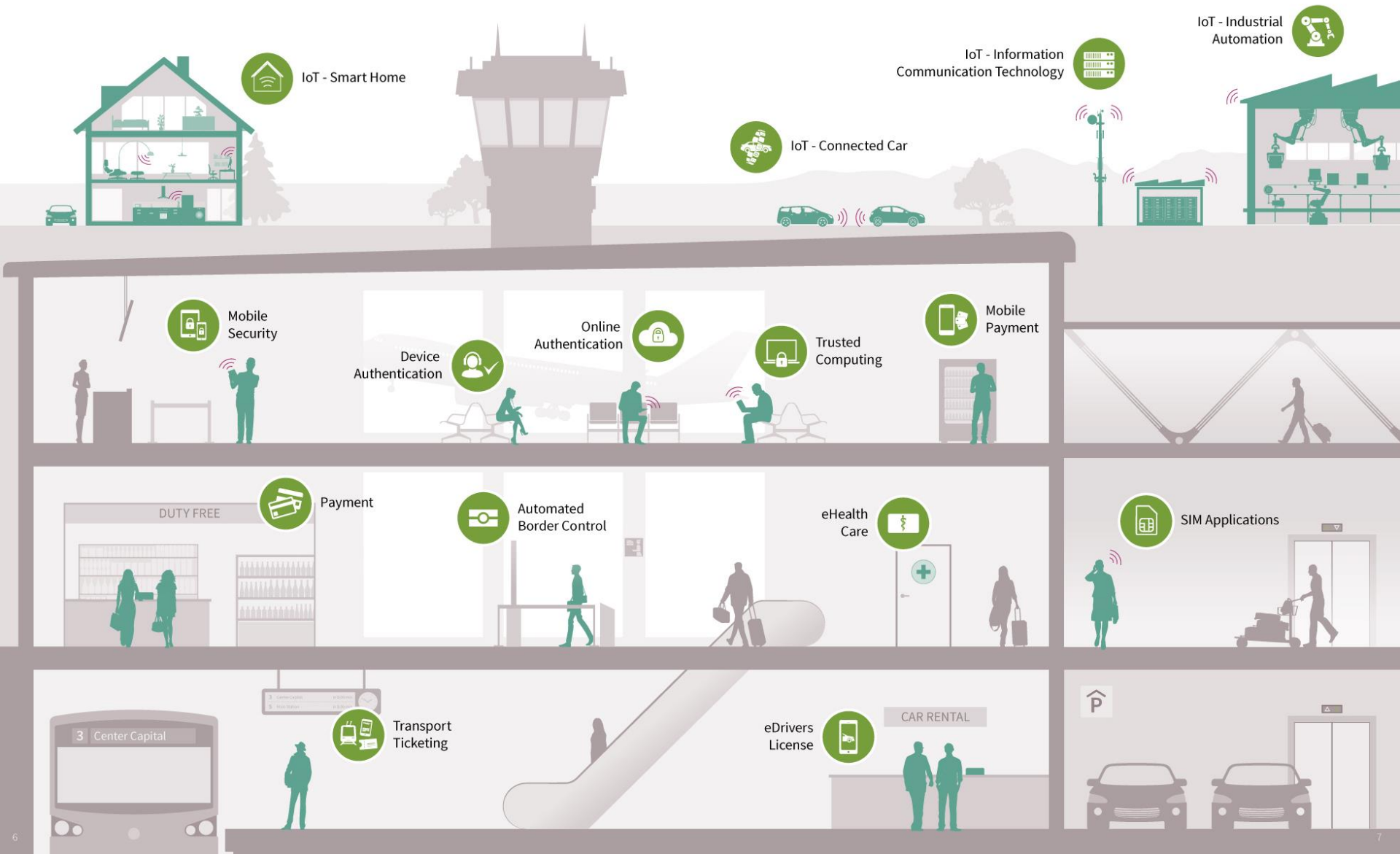
- › As humans, machines, 'things' are getting connected, the risks of security attacks increase strongly as attack paths increase
- › Accordingly, there is a greater need for security in fields like smart home, connected cars, information and communication technologies, Industry 4.0
- › Many manufacturers of devices and systems do not have the necessary security know-how

## Example: Automotive Security

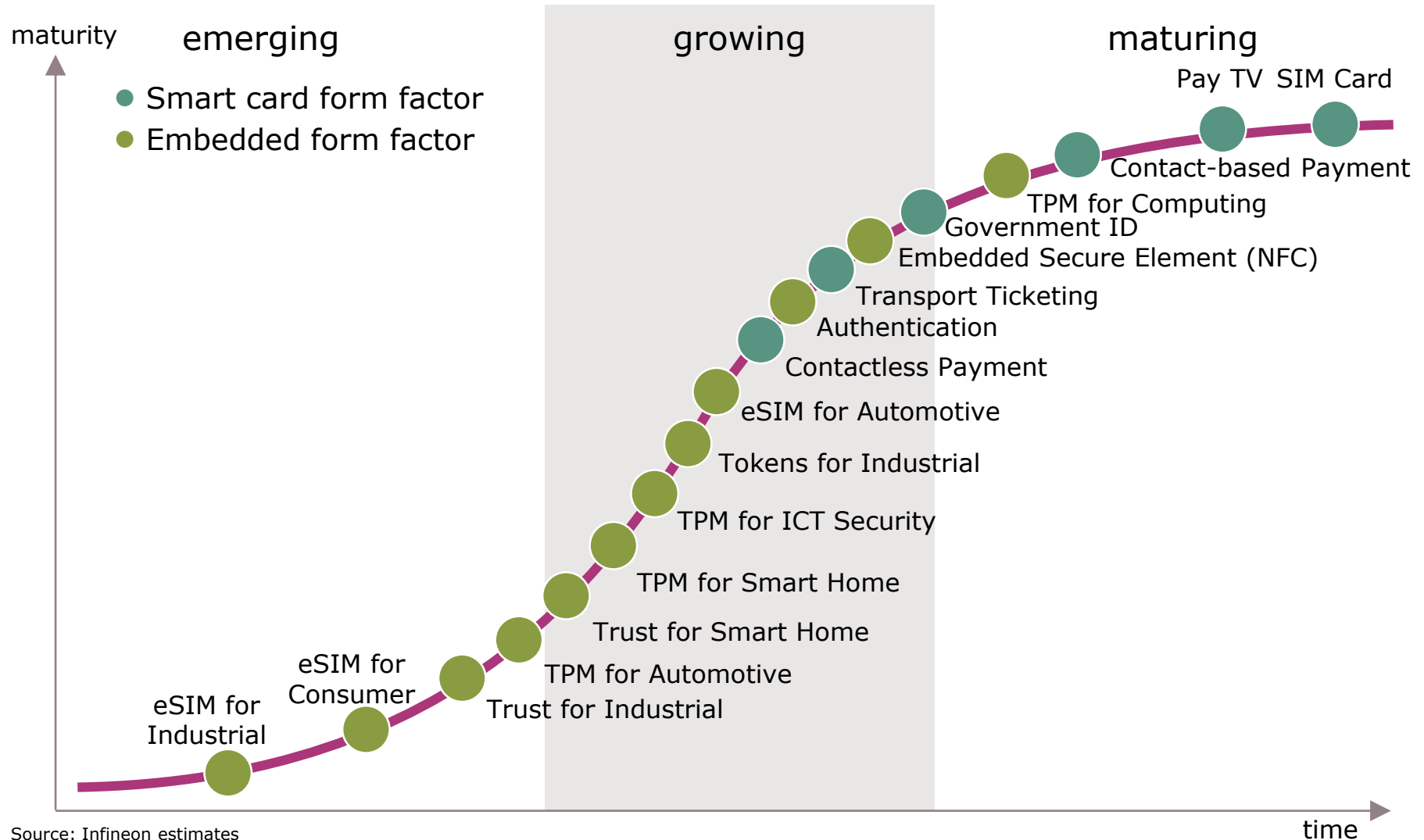




# Infineon offers security for the connected world



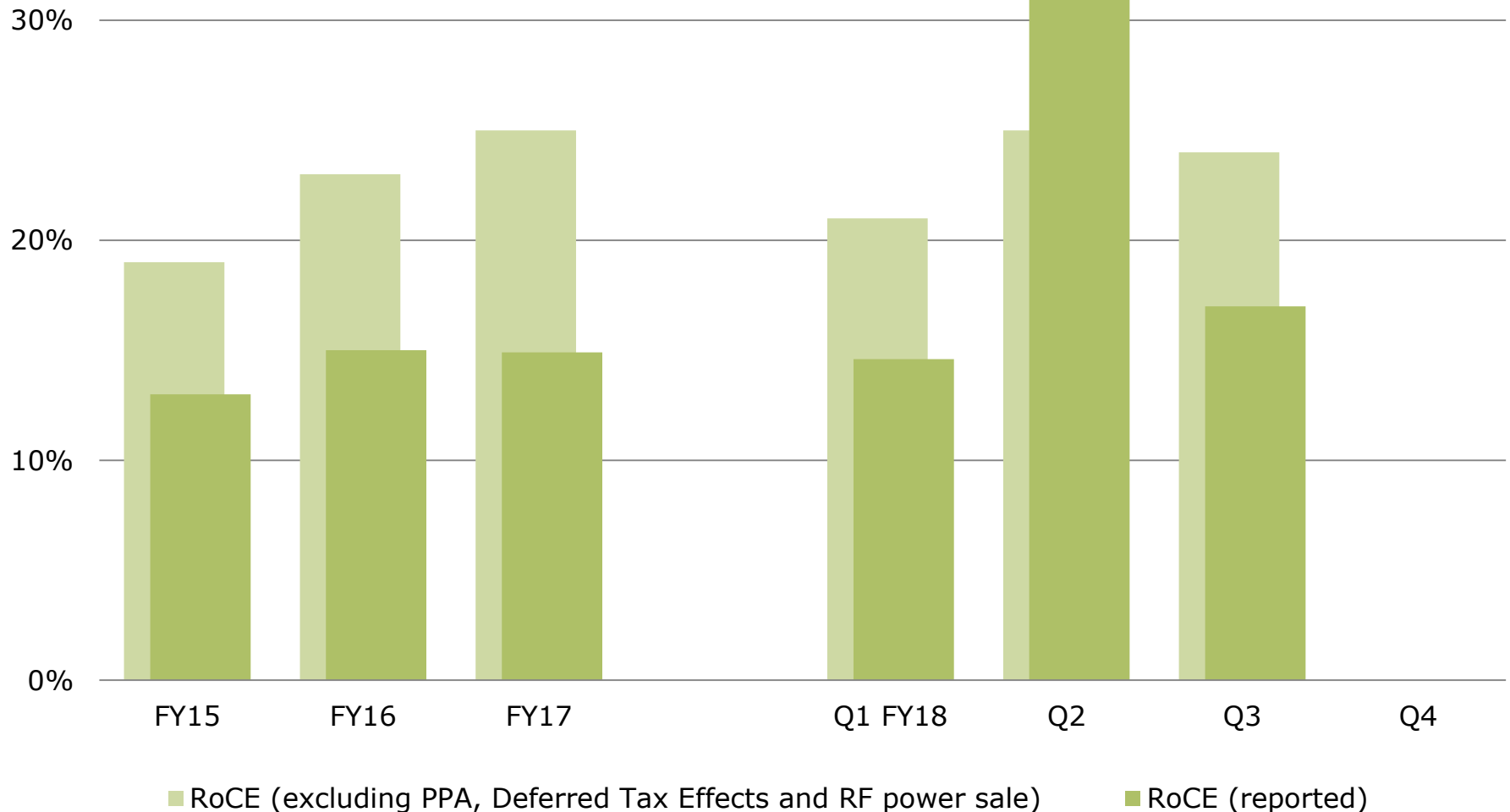
# Continuous stream of new topics aging and exiting



# Agenda

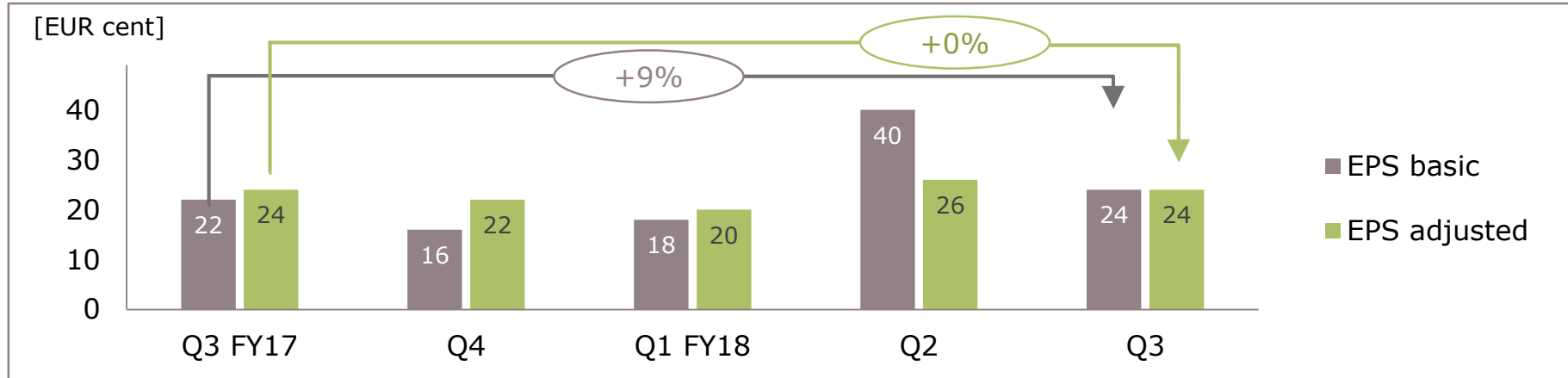
- 1 Infineon at a glance
- 2 Updated target operating model (TOM)
- 3 Quarterly highlights
- 4 Automotive
- 5 Industrial Power Control
- 6 Power Management & Multimarket
- 7 Chip Card & Security
- 8 Selected financial figures

# Organic RoCE as the key value metric typically amounts to $\sim 2\times$ WACC

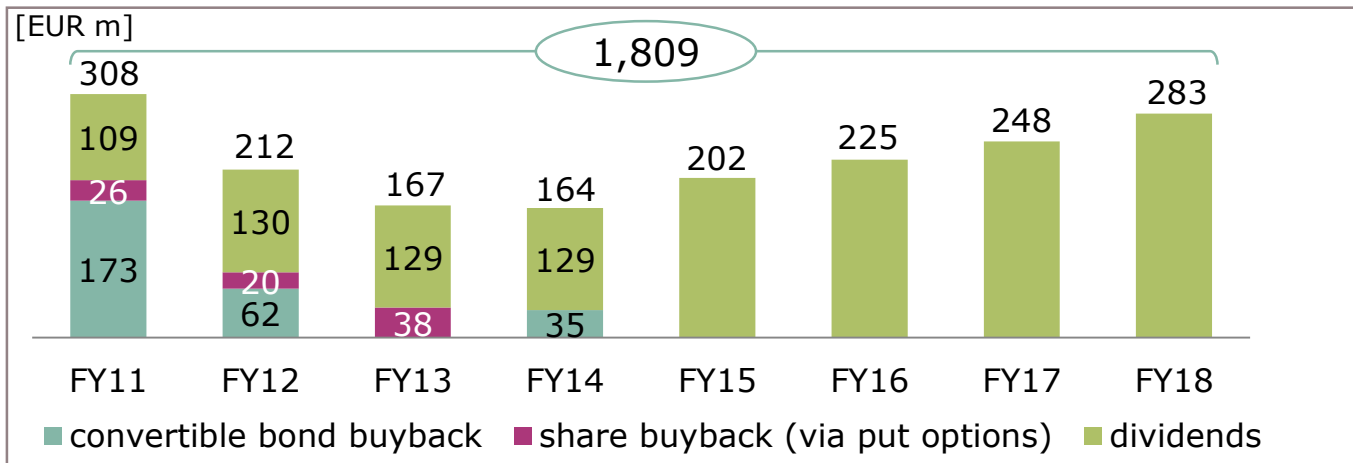


# Our commitment to investors: Continued value creation through growth

## Earnings-per-share (EPS) development

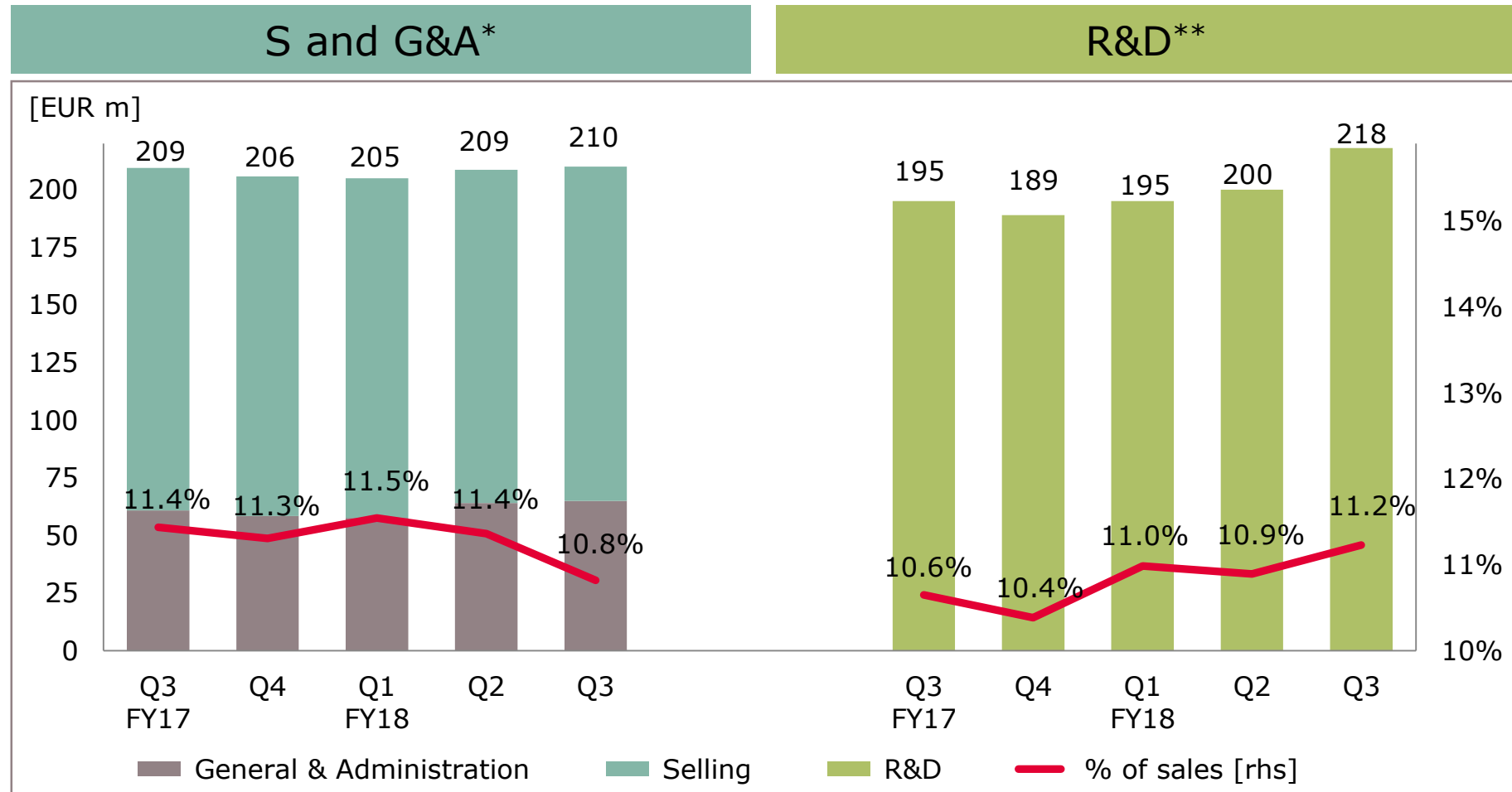


## Total cash return to shareholders



- › Policy of sustainable dividend payout
- › Increase of dividend from €0.22 in FY17 to €0.25 in FY18
- › Dividend of €283m paid end of February 2018

# SG&A - still including noticeable acquisition-related costs - on healthy level



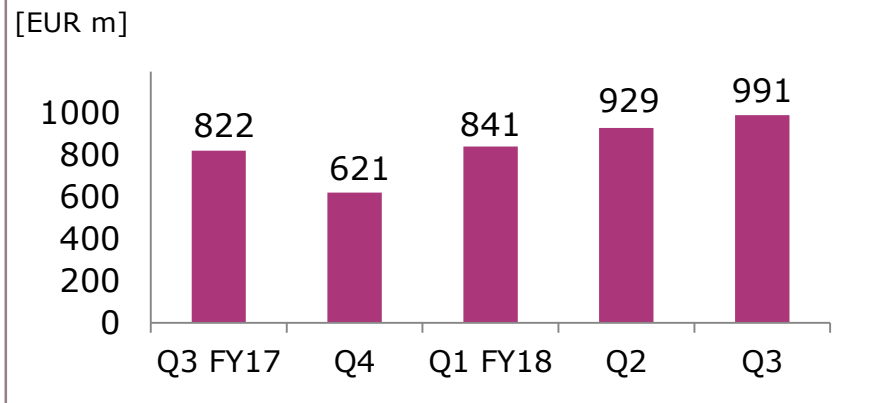
\* Target range for SG&A: „Low teens percentage of sales“.

\*\* Target range for R&D: „Low to mid teens percentage of sales“. In FY17, reported R&D expenses amounted to €776m, net of €68m of grants received and net of €129m of capitalized development costs.

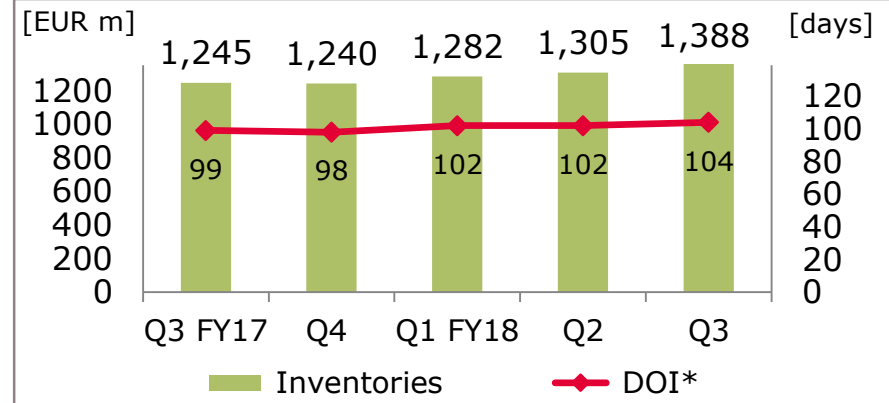


# Inventory increased due to increase of work in progress and more raw material

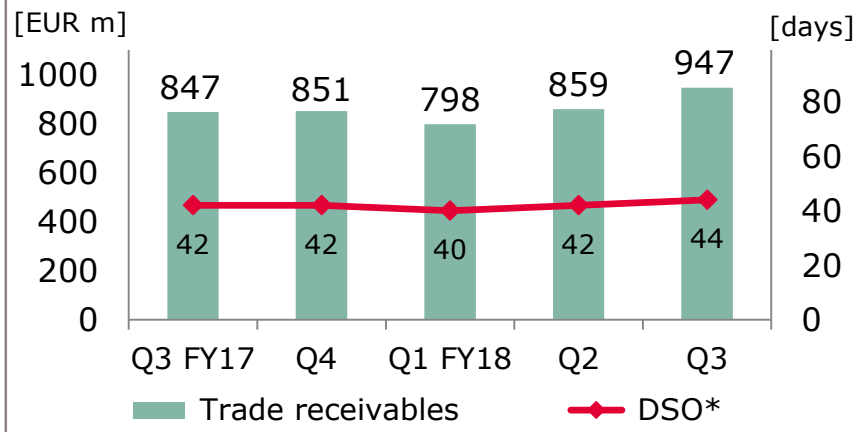
## Working capital\*



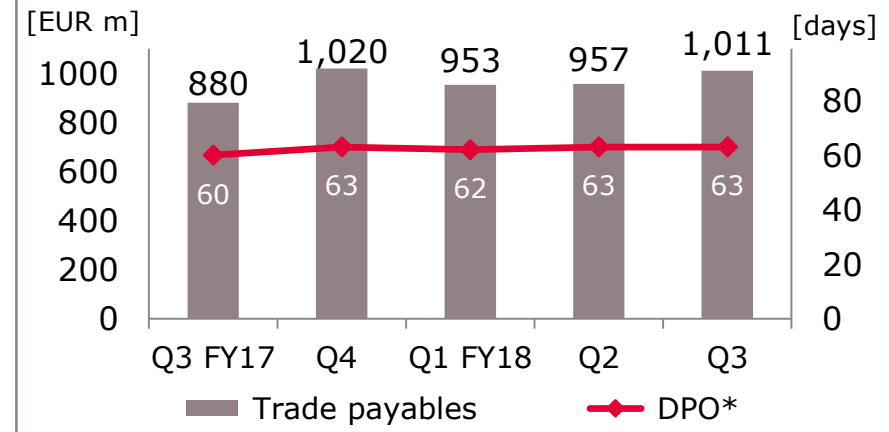
## Inventories



## Trade receivables

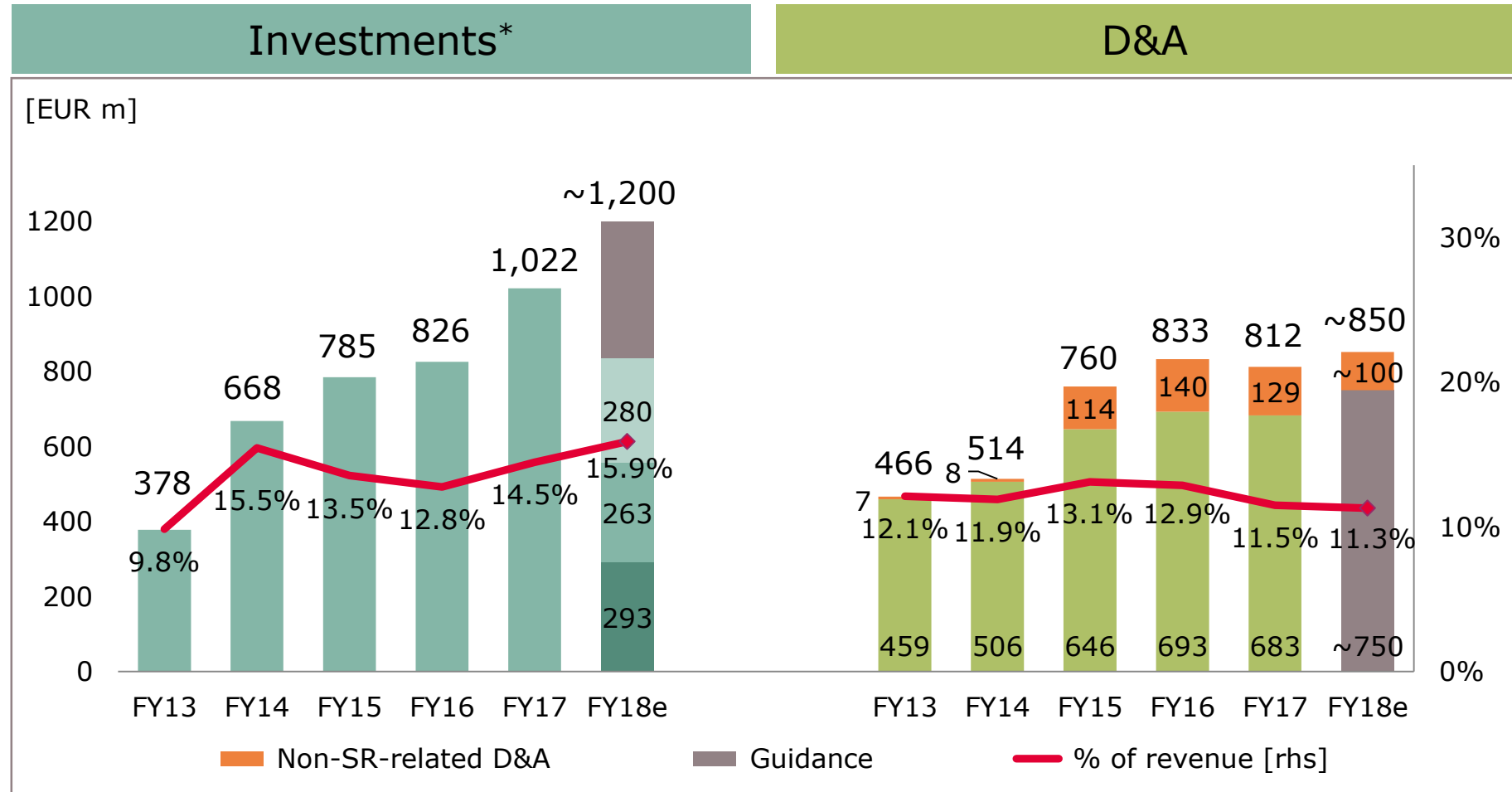


## Trade payables



\* For definition please see page "Notes".

# Investments of ~€1.2bn due to strong order intake

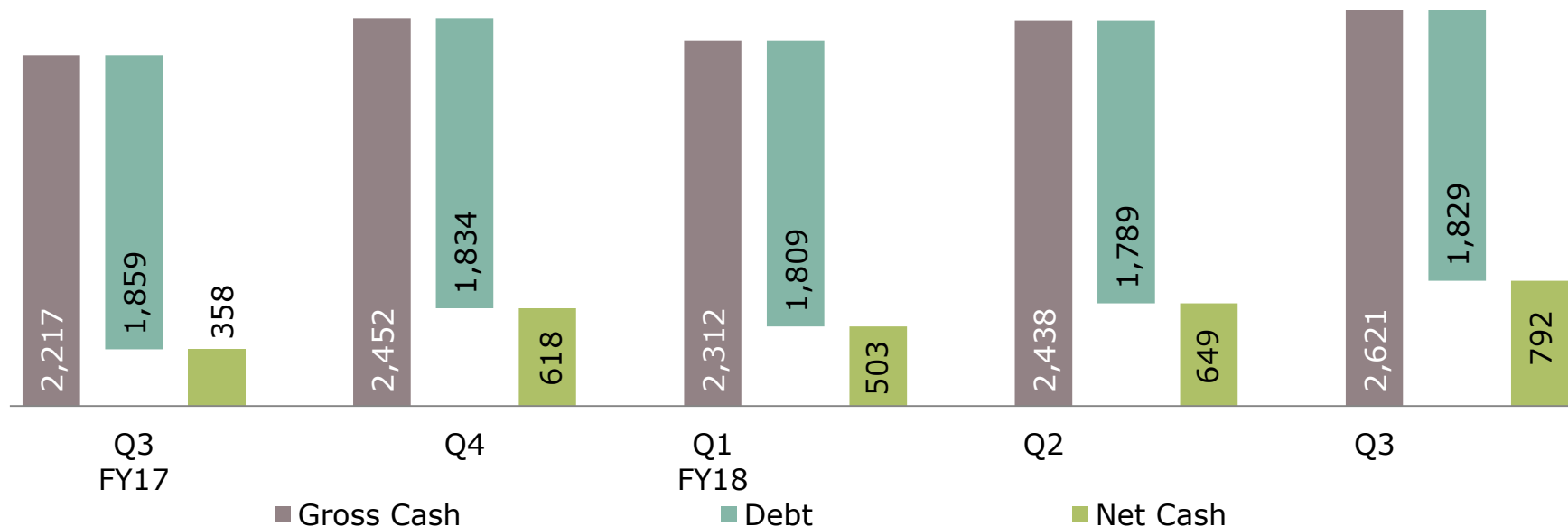


\* For definition please see page „Notes“.

# Healthy gross cash and net cash position

## Liquidity development

[EUR m]



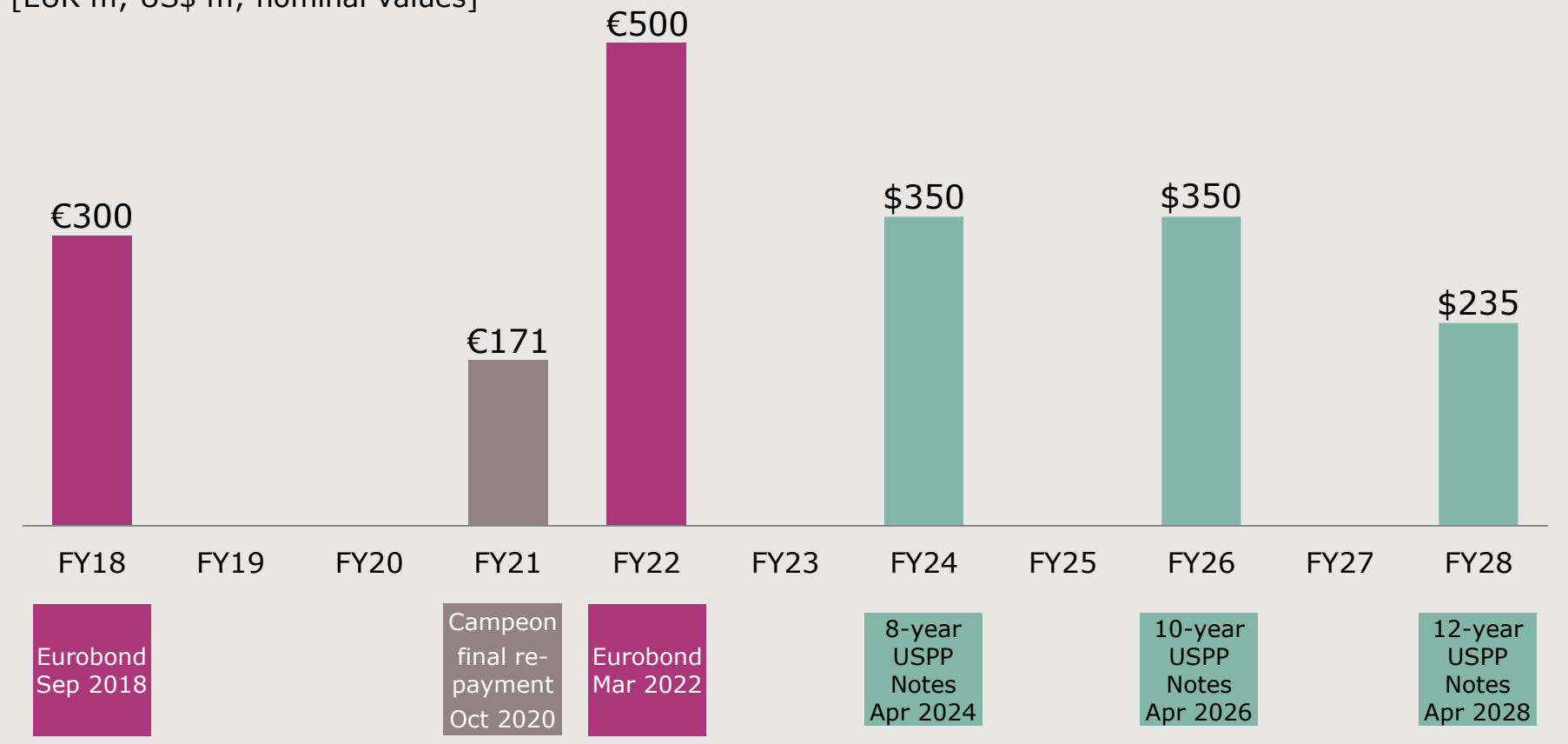
- › Operating cash flow from continuing operations was €462m
- › Free Cash Flow from continuing operations was €192m
- › Debt increased by €40m due to a change in the FX-rate used for valuing US\$-denominated debt.

Infineon has a balanced maturity profile and a solid investment grade rating (BBB) from S&P



## Maturity profile

[EUR m; US\$ m; nominal values]



Note: Additional debt with maturities between 2018 and 2023 totaling €56m of which €27m repayments related to Campeon.



Part of your life. Part of tomorrow.



# Glossary (1 of 2)

AC	alternating current
AC-DC	alternating current - direct current
AD	automated driving
ADAS	advanced driver assistance system
AEB	automatic emergency braking
AI	artificial intelligence
AR	augmented reality
BEV	battery electric vehicle
BGA	ball grid array
BoM	bill of material
CPU	central processing unit
DC	direct current
DC-DC	direct current - direct current
DPM	digital power management
eCall	emergency call

ECU	electronic control unit
ECU	electronic control unit
EMU	electric multiple unit
EPS	electric power steering
eSIM	embedded subscriber identity module
eSIM	embedded SIM
EV	electric vehicle
FPGA	field programmable gate array
GPU	graphics processing unit
HEV	mild and full hybrid electric vehicle
HMI	human machine interaction
HSM	hardware security module
HST	high-speed train
HW	hardware
ICE	internal combustion engine



# Glossary (2 of 2)

IPM	intelligent power module
iPol	image processing line
IRF	International Rectifier
LSPS	LS Power Semitech Co. Ltd.
μC	microcontroller
MEMS	micro electro-mechanical systems
MHA	major home appliances
micro-hybrid	vehicles using start-stop systems and limited recuperation
mild-hybrid	vehicles using start-stop systems, recuperation, DC-DC conversion, e-motor
MOSFET	metal-oxide silicon field-effect transistor
OBC	on-board charger
OEM	original equipment manufacturer
PHEV	plug-in hybrid electric vehicle
Pol	point-of-load
PV	photovoltaic

RF	radio frequency
rhs	right-hand scale
Si	silicon
SiC	silicon carbide
SiGe	silicon germanium
SMPS	switch-mode power supply
SOTA	software over-the-air
SW	software
ToF	time-of-flight
TPM	trusted platform module
UPS	uninterruptible power supply
V2X	vehicle-to-everything communication
VR	virtual reality
VSD	variable speed drive
xEV	all degrees of vehicle electrification (EV, HEV, PHEV)

# Disclaimer

## **Disclaimer:**

This presentation contains forward-looking statements about the business, financial condition and earnings performance of the Infineon Group.

These statements are based on assumptions and projections resting upon currently available information and present estimates. They are subject to a multitude of uncertainties and risks. Actual business development may therefore differ materially from what has been expected.

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# Infineon is a long-standing member of Europe's leading sustainability indices



## Infineon's most recent achievements

MEMBER OF  
**Dow Jones  
Sustainability Indices**  
In Collaboration with RobecoSAM

- › Jan 2018: Infineon is listed in the Sustainability Yearbook for the 8<sup>th</sup> consecutive year and has received the Bronze Class distinction for its excellent sustainability performance.
- › Sep 2017: Infineon is listed in the Dow Jones Sustainability Europe Index (as the only semiconductor company) for the 8<sup>th</sup> consecutive year and in the World Index for the 3<sup>rd</sup> time

- › Sep 2017: Infineon is listed in the STOXX® Global ESG Leaders Indices, which serves as an indicator of the quality of Infineon's performance in the governance, social and environmental areas (ESG)



FTSE4Good

- › Infineon was added to the FTSE4Good Index Series in 2001 and has been confirmed as a member since then
- › Jul 2017: Most recent review

- › Since 2014, Infineon has been publishing information on opportunities and risks due to climate change through the "Carbon Disclosure Project" (CDP).
- › For 2017, Infineon has earned a spot among the three best companies in the "Information Technology" sector in the Germany, Austria and Switzerland region.



- › Mar 2018: Infineon has been reconfirmed as a constituent of the Ethibel Sustainability Index (ESI) Excellence Europe

# Financial calendar

Date	Location	Event
30 Aug 2018	Frankfurt	Commerzbank Sector Conference
24 Sep 2018	Unterschleißheim nearby Munich	Berenberg and Goldman Sachs German Corporate Conference
25 Sep 2018	Munich	Baader Investment Conference
02 Oct 2018	London	ATV Presentation by Peter Schiefer, Division President
12 Nov 2018*		Q4 FY18 and FY 2018 Results
14 – 15 Nov 2018	Barcelona	Morgan Stanley TMT Conference
27 – 28 Nov 2018	Scottsdale, AZ	Credit Suisse TMT Conference
28 Nov 2018	Milan	Equita European Conference
28 Nov 2018	Munich	UBS German Senior Investor Day
10 or 11 Dec 2018	London	Power Presentation (IPC + PMM) by Division Presidents Peter Wawer and Andreas Urschitz

\* preliminary

# Notes

## Investments =

- 'Purchase of property, plant and equipment'
- + 'Purchase of intangible assets and other assets' *incl. capitalization of R&D expenses*

## Capital Employed =

- 'Total assets'
- 'Cash and cash equivalents'
- 'Financial investments'
- 'Assets classified as held for sale'
- ('Total Current liabilities'
  - 'Short-term debt and current maturities of long-term debt'
  - 'Liabilities classified as held for sale')

### Please note:

All positions in ' ' refer to the respective accounting position and therefore should be applied with the positive or negative sign used in the relevant accounting table.

## RoCE =

- NOPAT / Capital Employed =
- ('Income from continuing operations'
  - 'financial income'
  - 'financial expense')
- / Capital Employed

## Working Capital =

- ('Total current assets'
  - 'Cash and cash equivalents'
  - 'Financial investment'
  - 'Assets classified as held for sale')
- ('Total current liabilities'
  - 'Short term debt and current maturities of long-term debt'
  - 'Liabilities classified as held for sale')

## DOI (days of inventory; quarter-to-date) =

('Net Inventories' / 'Cost of goods sold') \* 90

## DSO (days sales outstanding; quarter-to-date) =

('Trade receivables' / 'revenue') \* 90

## DPO (days payables outstanding; quarter-to-date) =

('Trade payables' / ['Cost of goods sold' + 'Purchase of property, plant and equipment']) \* 90

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