# Deutsche Bank dbAccess TMT Conference

London, 8 - 9 September 2016

Dominik Asam
Chief Financial Officer

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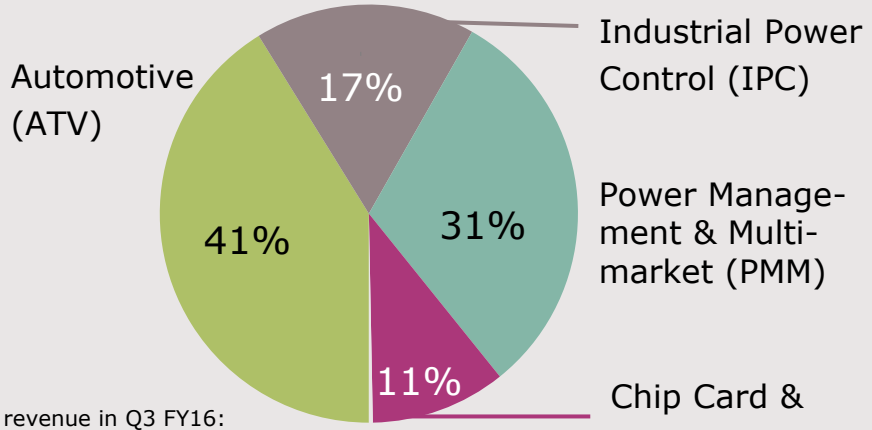
5 Long-term outlook



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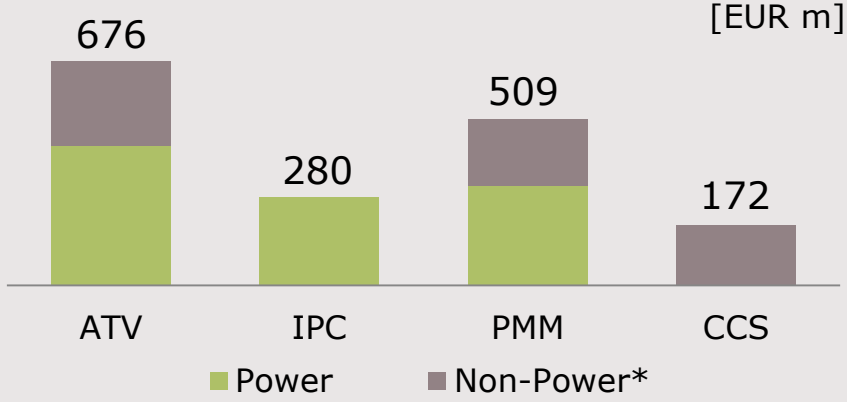
# Infineon at a glance

## Business Segments



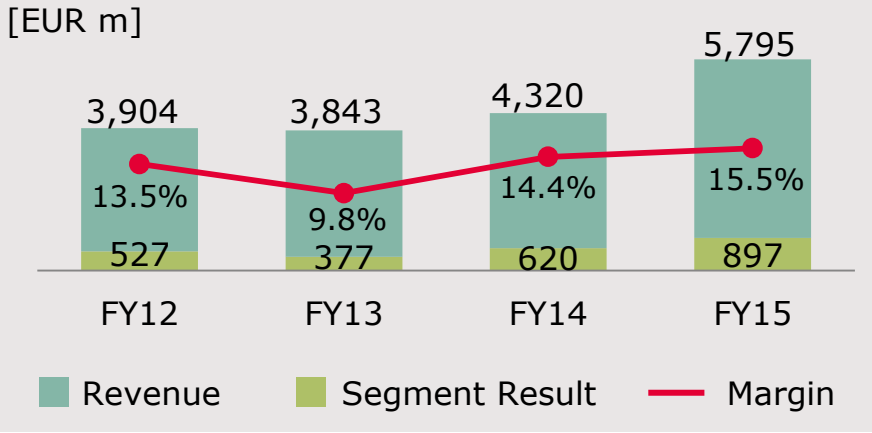

revenue in Q3 FY16:
€1,632m incl. OOS & C&E of -€5m

## Power represents ~60% of revenue




*embedded control, sensors, RF

## Financials




## Market Position

| Automotive | Power | Smart card ICs |
|---|---|---|
|  |  |  |
| **# 2** | **# 1** | **# 2** |
| Strategy Analytics, April 2016 | IHS Markit, July 2016 | IHS Markit, July 2016 |


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# Technology leadership and system understanding fosters growth and profitability

| Competitive advantages | |
|---|---|
| Auto | system leader in automotive |
| Power | #1, system and technology leader |
| RF | broadest technology portfolio;#1 in SiGe; become #1 in base stations by 2020 |
| Security | Leader in security solutions |

## Average-cycle financial targets

Revenue Growth:

**~8%**

Segment Result Margin:

**~15%**

Investment-to-Sales:

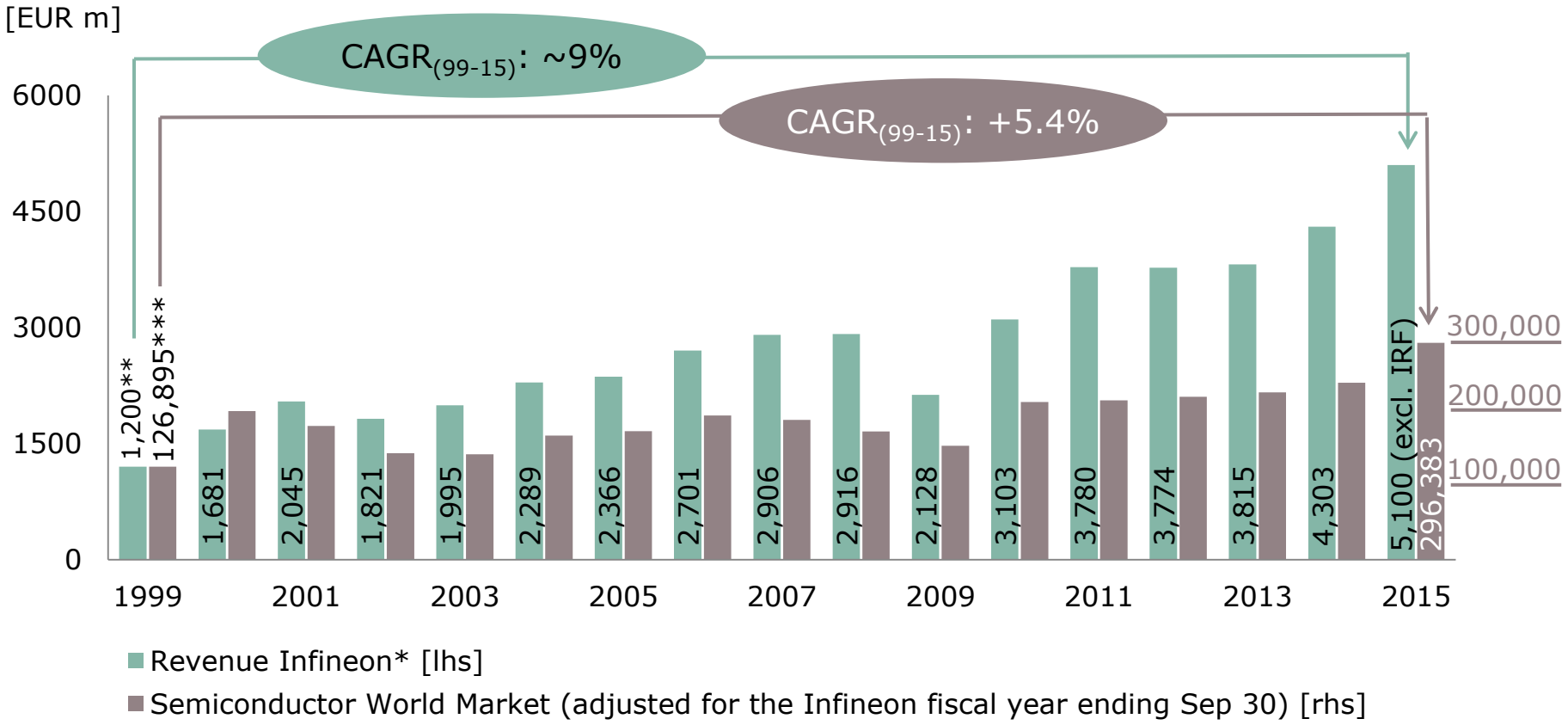
**~13%**

(Capex*: ~11%; capital. R&D*: ~2%)

* Infineon reports under IRFS


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# Infineon's Revenue Development (excl. IRF) Outperformed Total Semi Market




* Based on Infineon's portfolio (excl. Other Operating Segments and Corporate & Eliminations) per end of 2015 fiscal year.

** Based on market development assumptions FY99's revenue figures for some smaller product categories have been derived from the FY00's revenue figures.

*** Scale indexed to the Infineon FY99 revenue.

Source: Infineon; WSTS (World Semiconductor Trade Statistics), November 2015


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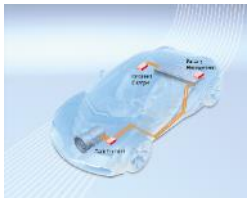


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# Deal rationale at a glance







GM 55%*

CAGR 20%

- Become #1 in RF power amplifier market by ~2020 with most complete technology portfolio by capitalizing on technology disruption in cellular infrastructure
- #1 in silicon carbide for power, strengthen automotive and industrial and accelerate market introduction with cutting-edge products as cost-performance leader and create thereby a higher addressable market for Infineon
- Deal is margin and adjusted EPS accretive from day 1 with expected 55% incremental gross margin* and 20% incremental revenue growth of the acquired businesses

- For detailed information on the deal rational please refer to the web call and the corresponding investor presentation at http://www.infineon.com/poweringthefuture

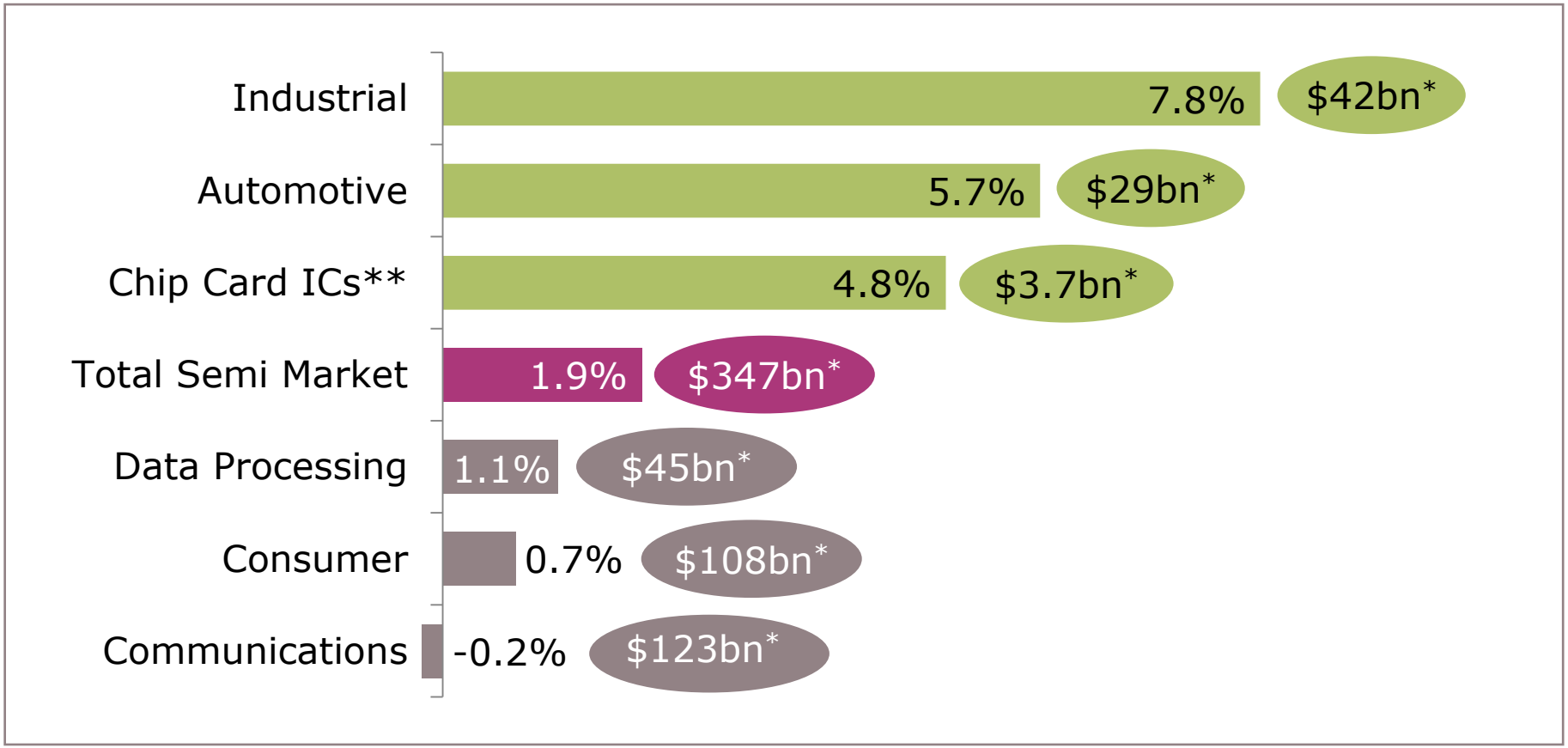
Wolfspeed™
A CREE COMPANY

* According to US GAAP, excluding effects from purchase price accounting


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# Infineon benefits from industrial, auto and security, the by far fastest growing segments

## CAGR 2015 – 2020 by Semiconductor Industry Segment

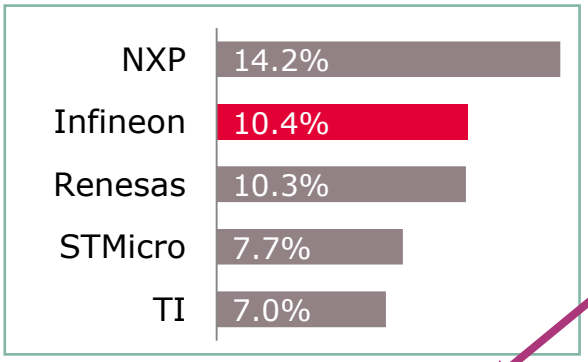



Source: IHS Markit, Worldwide Semiconductor Shipment Forecast, June 2016
* In calendar year 2015
** source: ABI Research, "Secure Smart Card & Embedded Security IC Technologies", January 2016; microcontroller ICs

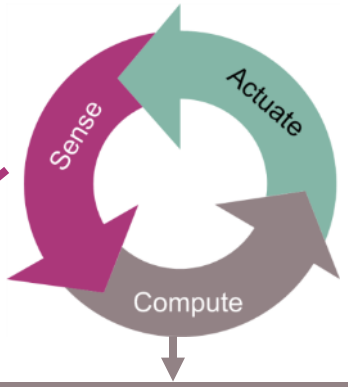

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# Infineon is system leader with most balanced portfolio in the market

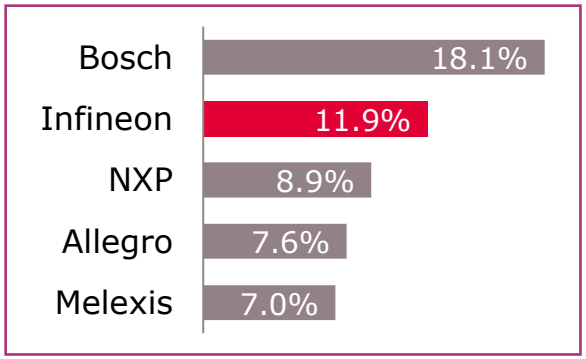
## Automotive semis
total market in 2015: $27.4bn



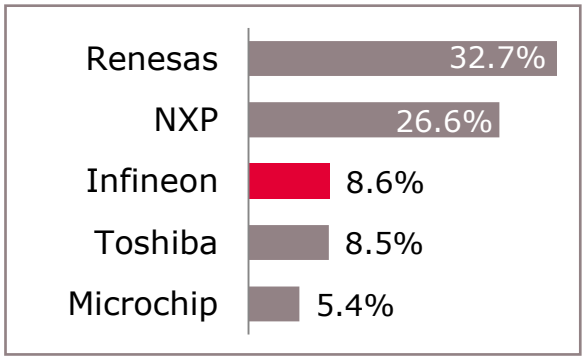

## Infineon covers the entire control loop in powertrain, safety/ADAS, and comfort/body



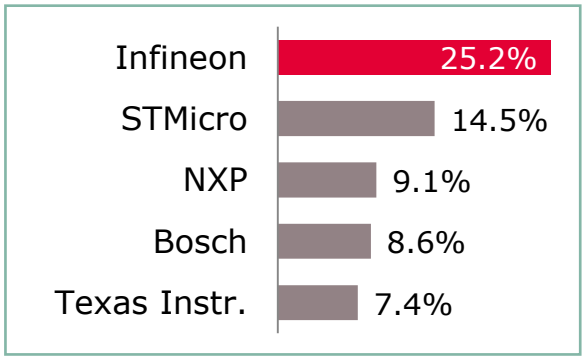

## sensors
total market in 2015: $4.2bn




## microcontrollers
total market in 2015: $6.5bn




## power
total market in 2015: $7.1bn




Source: Strategy Analytics, "Automotive Semiconductor Vendor Market Shares", April 2016


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# Four megatrends are shaping the automotive market, significantly increasing the semi content per vehicle

## ADAS/Autonomous driving

- From ADAS to semi-automated and finally autonomous driving
- Every world region is striving for "0-accident"




## xEV/eMobility

- Mandated $CO_2$ reductions make electrification of powertrain inevitable






- Advanced connectivity is driven by making the car part of the Internet
- The car will be fully connected (V2I, V2V, in-vehicle)

## Connectivity

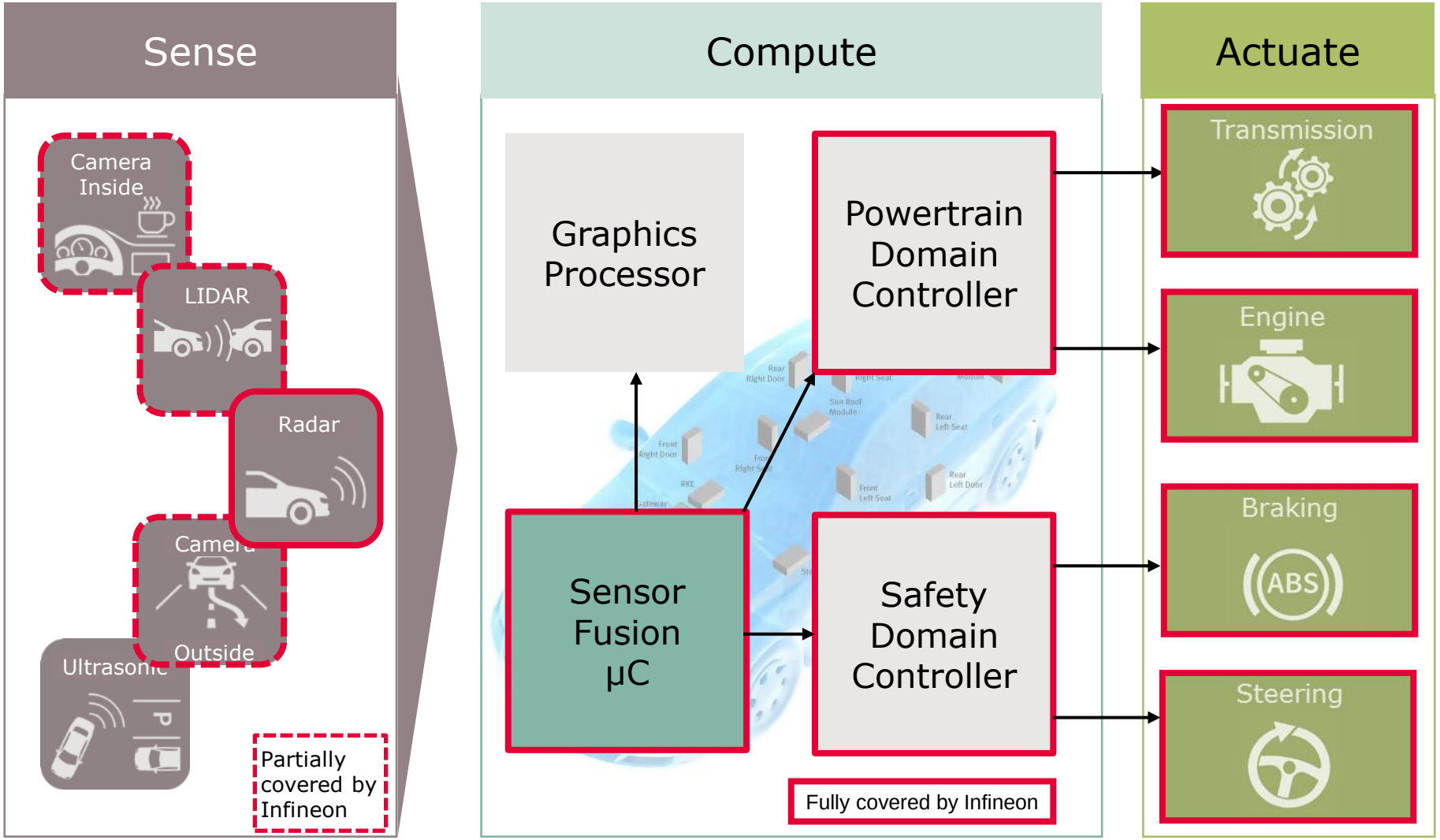



- Increased connectivity and software content increase risk exposure to hackers
- Internal/external connectivity must be secured

## Advanced security


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# ADAS system overview and chipset coverage by Infineon

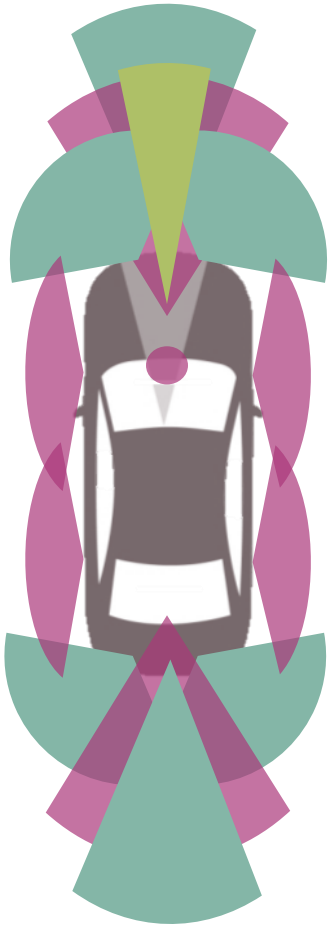




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# More sensors required for each automation level – sensor "cocoon" in level 4/5

Sense



Radar Camera Lidar

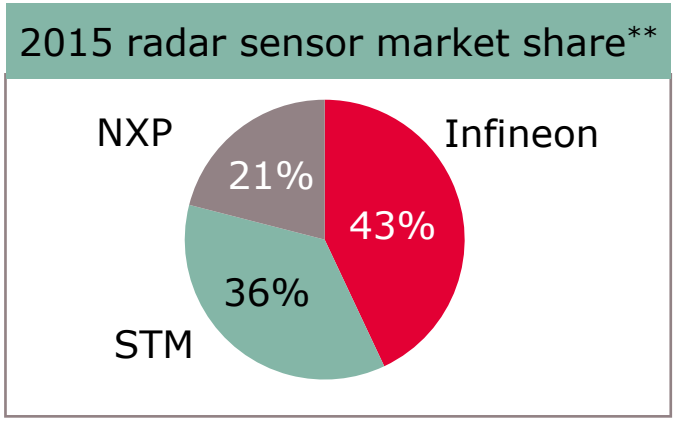
| Sensor technologies | 2015 Euro-NCAP* | 2018 Euro-NCAP* | Level 2 | Level 3 | Level 4/5 |
|---|---|---|---|---|---|
| Front looking camera | 0.5 | 1 | 1 | 1 | 1 |
| Front looking radar | 0.5 | 1 | 1 | 1 | 1 |
| Front looking lidar | – | – | – | – | 1 |
| Surround camera | – | – | – | – | 4 |
| Corner radar | – | 2 | 2 | 4 | 4 |
| Surround radar | – | – | – | – | 6 |
| Rear looking camera | – | – | – | 1 | 1 |
| Rear looking radar | – | – | – | – | 1 |
| Driver monitoring Camera | – | – | – | 1 | 1 |
| V2X sensor | – | – | – | – | 1 |
| Parking aid | Up to 12 ultrasonic sensors per car | | | | |
| Automated parking | Potential future replacement by RF CMOS radar | | | | |

**Up to 12 SiGe radars per vehicle (24/77 GHz)**

* Euro-NCAP is focusing on collision avoidance, requirements are increasing over time


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# Infineon market leader in radar; 20m sensor chips sold; ~50% $CAGR_{16-21}$ based on design wins*




Innovation for performance

Innovation for cost

Vision Zero
+ Autonomous Driving

**ACC radar**
1st SiGe 77 GHz transceiver



**mid-range radar**
1st radar product
eWLB package



**Blind Spot Detection**
(24 GHz)

**mid- & long-range radar**
Dual Chip System solution +
power supply



**next gen. of mid- and long-range radar**
AURIX™ 3rd gen., power supply
SiGe

**short- to mid-range radar**
CMOS solution
CMOS

2009 | Today | Tomorrow

* Refers to 77 GHz radar sensor chip market
** Source: IHS Markit, "Advanced Driver Assistance Applications Sensor Market Database – H2 2015", February 2016


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# Infineon‘s automotive offering in ADAS camera systems

Sense | Compute

## Driver monitoring

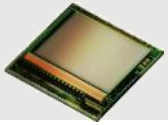
- Most robust detection of head position, head orientation and eye closure
- Observe the state of the driver and passengers
- Optimize head-up displays and augmented reality to driver’s head position



Kostal camera system



REAL3™ sensor



## Front camera

- AURIX™ microcontroller is today the reference for safety allowing ASIL-D systems
- The safe & secure microcontroller is represented in most of today’s camera systems
- OEMs prefer software on AURIX™

Image processor e.g.

MOBILEYE

+

Infineon safe & secure µC





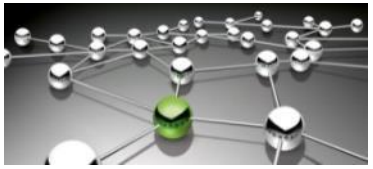
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# Secure µCs from Infineon offer the required safety and necessary scalability

Compute

## Sensor fusion

AURIX™ as main or host controller



## Radar & camera

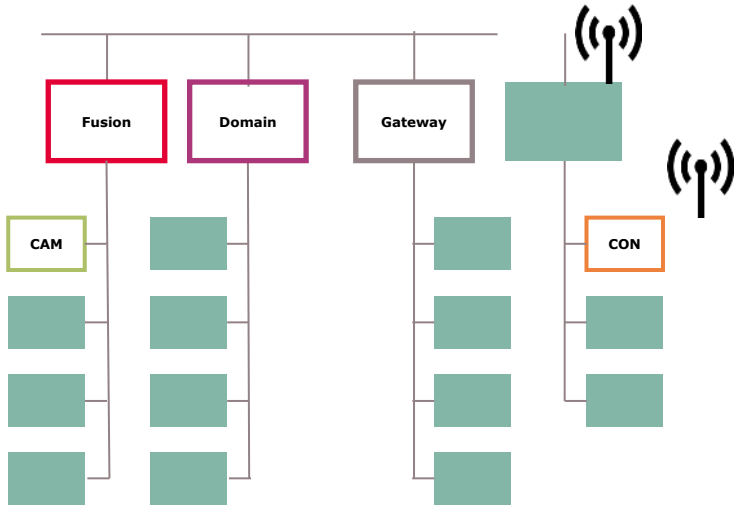
AURIX™ as main* or host controller



* for radar

## Domain control

AURIX™ as hard-realtime main processor







Safety  Security  Automotive Quality

## Connectivity gateway

AURIX™ as hard-realtime main controller



## Always-on connectivity

AURIX™ as host controller




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# Infineon AURIX™ microcontrollers make autonomous driving reliable

Compute




The central driver assistance ECU ("zFAS*") is the core of future systems for piloted driving for Audi

**Key components from Infineon, designed for reliability:**

- AURIX™ controller as decision maker and interface to the car architecture
- DC-DC – safety system supply

Strategic cooperation with TTTech to enable zFAS* based architecture and position Infineon as leading supplier

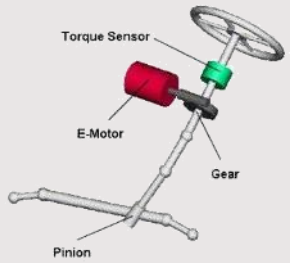
* zFAS = zentrales Fahrerassistenzsystem


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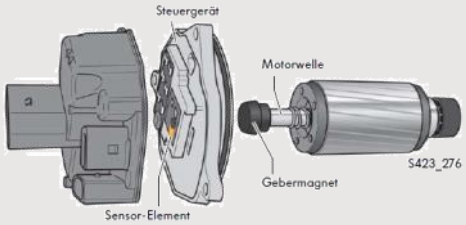
# 30%+ higher BoM on fail operational systems in level 3-compliant vehicles

## Electric power steering as an example for Infineon's P2S* approach

System




Electric motor

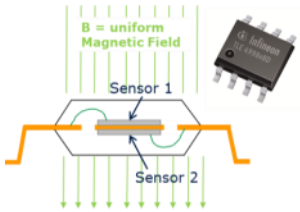



Courtesy: ZF Lenksysteme

Electronic control unit



### Sense




2 independent dies

### Compute



multicore

### Actuate



multi-phase control

## Safe power supply

## Infineon with 100% BoM coverage

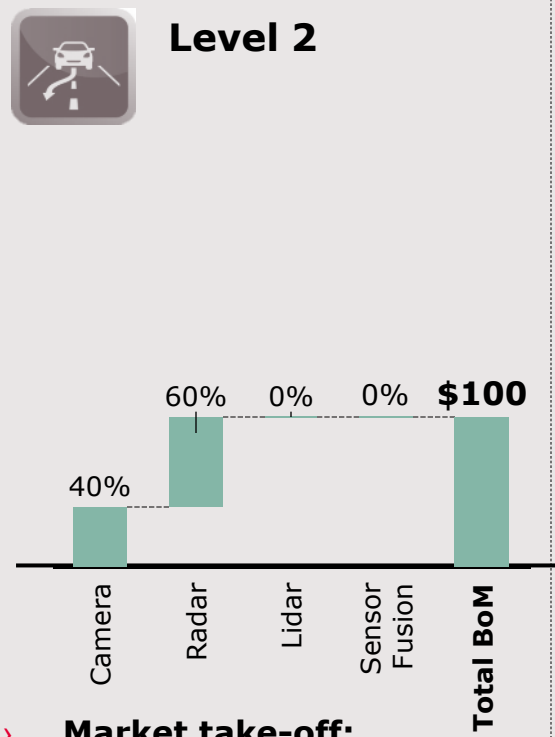
*Product to System (P2S): The shift from product thinking to system understanding is the core element of Infineon's strategy.


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# ADAS semi growth driven by radar and camera sensor modules

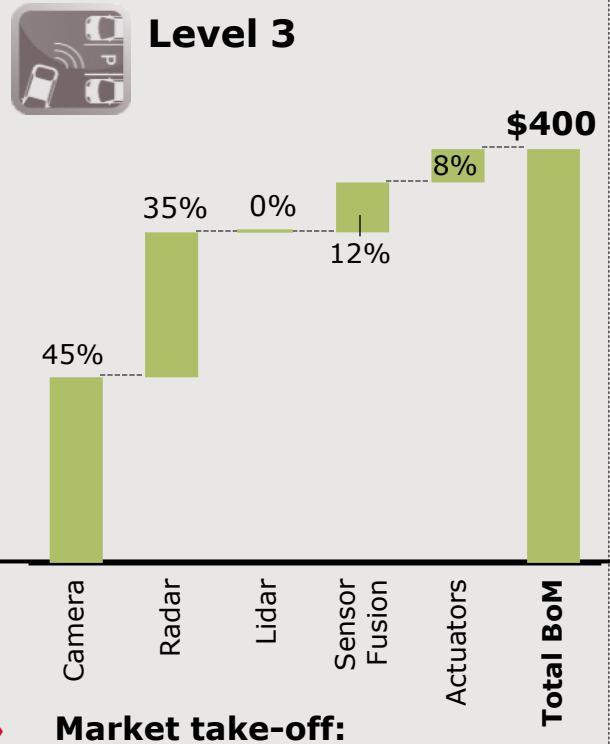
## Average ADAS semiconductor content per level of automation

### Level 2



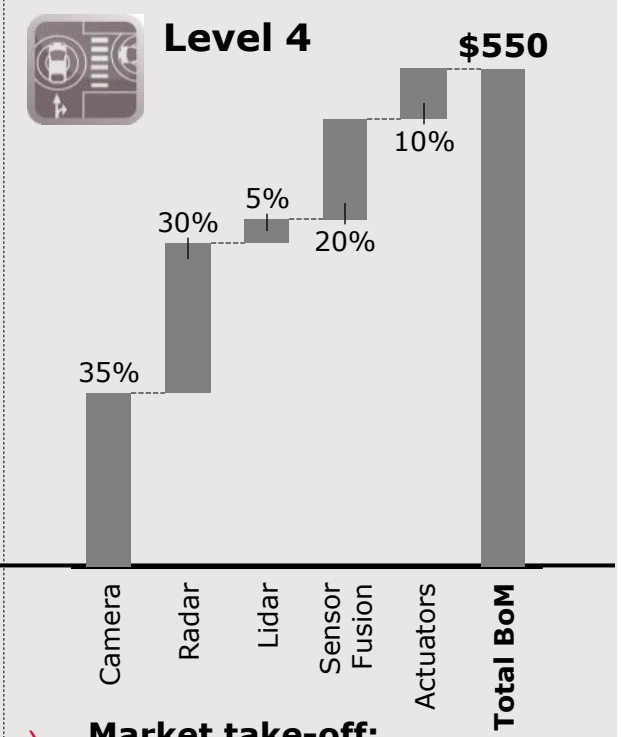

- **Market take-off:** 2015-2020 (up to 30m vehicles p.a.)
- **Key market driver:** NCAP, Automatic Emergency Brake, Blindspot Detection

### Level 3




- **Market take-off:** 2020-2025 (up to 10m vehicles p.a.)
- **Key market driver:** Automated Driving in specific situations (e.g. parking, highway)

### Level 4




- **Market take-off:** 2025-2030 (up to 5m vehicles p.a.)
- **Key market driver:** Autonomous Driving


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# Four megatrends are shaping the automotive market, significantly increasing the semi content per vehicle

## ADAS/Autonomous driving

- From ADAS to semi-automated and finally autonomous driving
- Every world region is striving for "0-accident"




## xEV/eMobility

- Mandated $CO_2$ reductions make electrification of powertrain inevitable






- Advanced connectivity is driven by making the car part of the Internet
- The car will be fully connected (V2I, V2V, in-vehicle)

## Connectivity

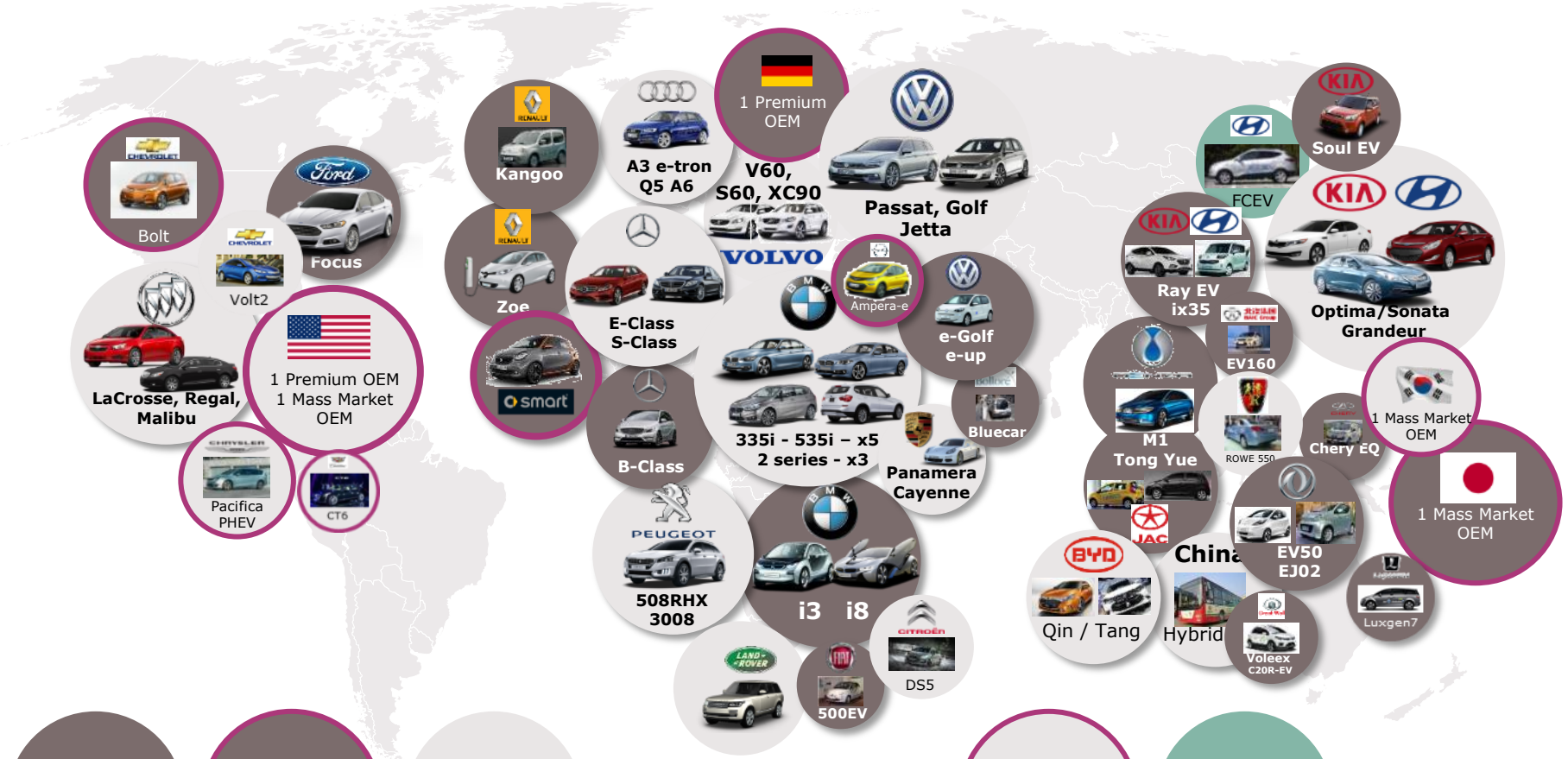



- Increased connectivity and software content increase risk exposure to hackers
- Internal/external connectivity must be secured

## Advanced security


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# Infineon is well positioned globally to benefit disproportionally from xEV boom




**EV** in production

**EV** future SOP

**HEV** in production

SOP = Start of production

**HEV** future SOP

**Fuel Cell** in production


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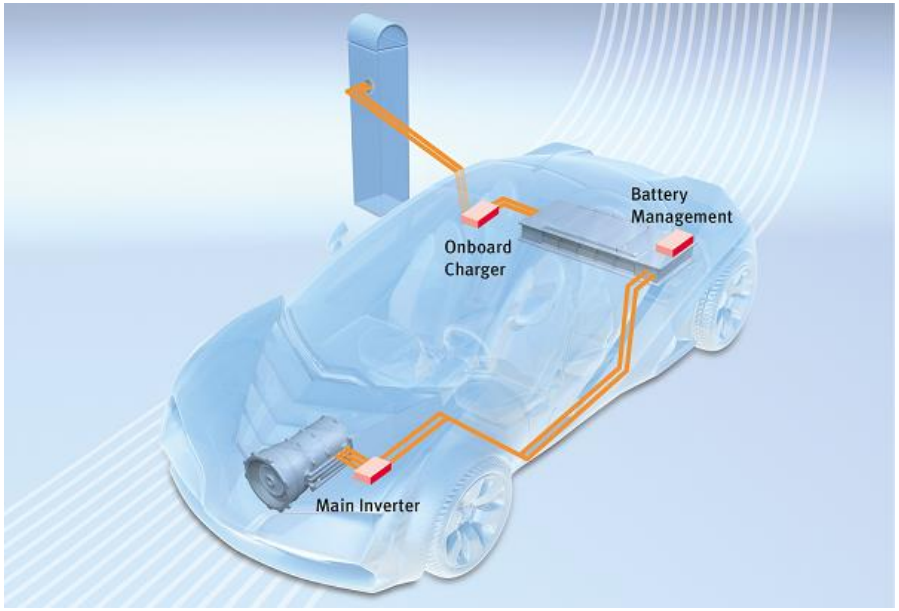
# Silicon carbide can help accelerate the adoption of plug-in (hybrid) electric vehicles

## SiC onboard charger

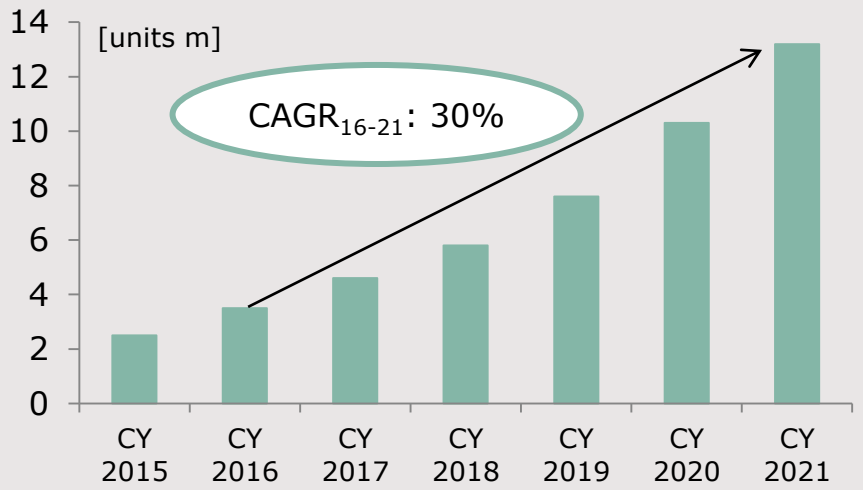
- Smaller form factor
- Lower cooling effort

## SiC main inverter

- Higher efficiency – higher reach
- Smaller form factor
- Lower cooling effort




## Total xEV market*




* Source: IHS Markit, „Alternative Propulsion Forecast", Jan 2016 (includes BEV, PHEV, HEV, mild-hybrids)

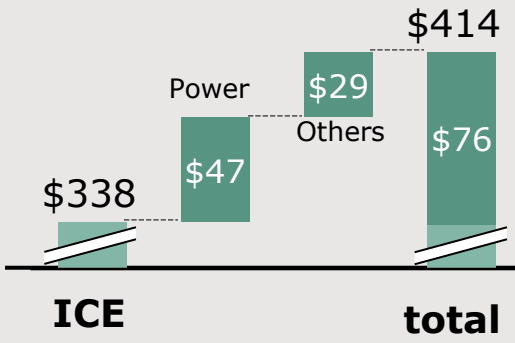

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# xEV growth driven by power semis

## Average xEV semiconductor content by degree of electrification

### 48 V

Adder for DC-DC and starter/generator

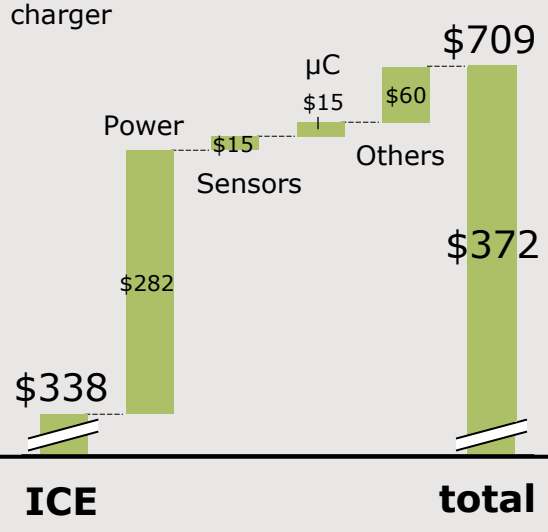



**2020: 1.6m***

› high growth for 48 V (not even including 48 V auxiliaries nor mild hybrid)

### HEV / PHEV

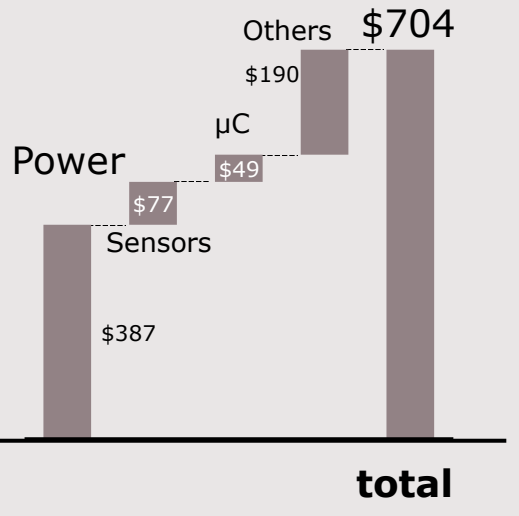
Adder for DC-DC, inverter, onboard charger




**2020: 3.5m HEVs* 1.9m PEHs***

› PHEV to overtake HEV after 2020, especially in Europe

### EV




**2020: 1.4m EVs***

› strong growth driven by Chinese OEMs

*Source: IHS Markit, "Alternative Propulsion Forecast", January 2016, expected number of vehicles


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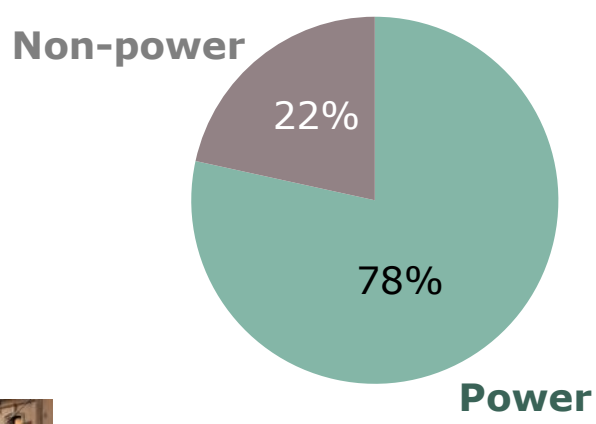
# #1 semi supplier of German premium OEMs

## Powered by Infineon

**> $500 semiconductor content**




Courtesy: BMW




**740e**

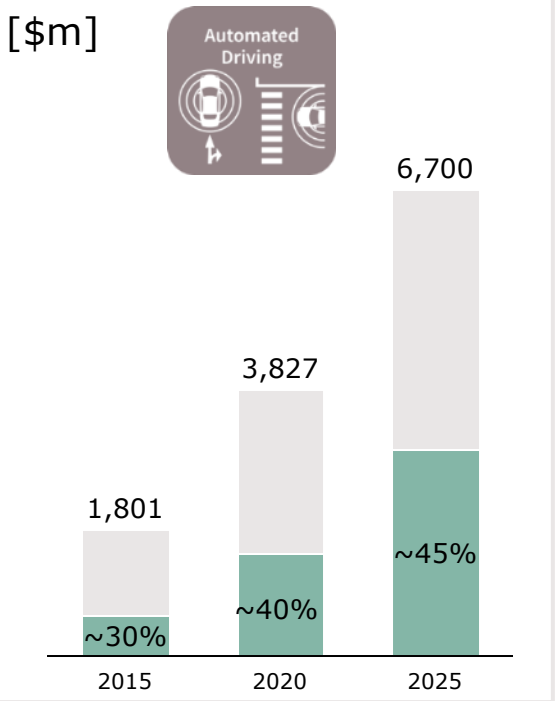
**Plug-in hybrid**

The expected big expansion of PHEV model line-up from premium OEMs will boost Infineon revenues


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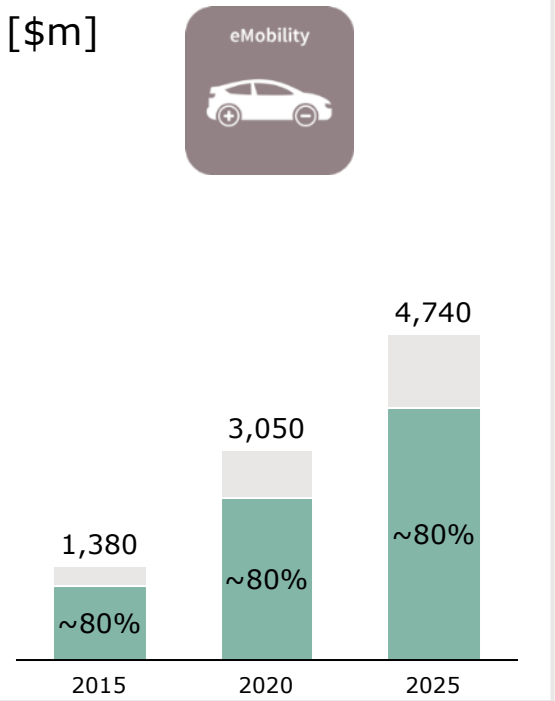
# Infineon is ideally positioned to benefit most from megatrends ADAS, xEV, and security

## ADAS/autonomous driving semi market



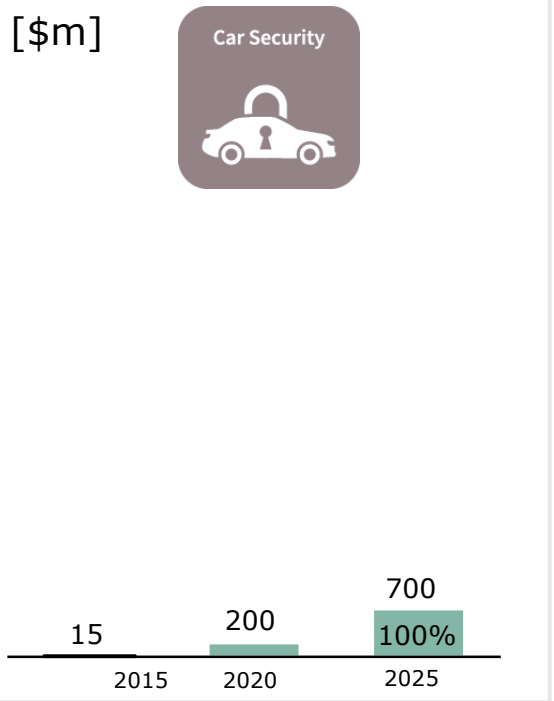

Higher market coverage driven by radar penetration, AURIX™ penetration and actuators

## xEV/e-mobility semi market




High market coverage already in 2015 will be kept with ramp-up of new power products

## Security semi market




Key enabler for secure connectivity

Source: IHS Markit, Strategy Analytics, Infineon estimations

Addressed by Infineon | Not addressed by Infineon


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# ADAS, $CO_2$ reduction and adoption of premium features drive Infineon growth

## Vehicle production



- ~2% growth p.a.
- Further growth in Western Europe, US, Korea and China
- Electro-mobility gaining momentum, especially in China

## Drivers for semiconductor content per car

### $CO_2$ reduction




- Driven by legislation
- Improvements of ICE (e.g. electric steering, electric pumps and motors)
- Adoption of EV/HEV

### Advanced safety




- Current: crash avoidance
- Next: assisted Driving
- Future: autonomous driving

### Comfort, premium



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

**~8% p.a. through-cycle growth**


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# Infineon is #1 and technology leader in power semiconductors

- #1 in the market*
- Broadest product and technology portfolio
- Addressing broadest range of applications
- 300 mm thin-wafer manufacturing for power semiconductors
- System leader with digitalization of the control loop and functional integration
- Leader in next-generation power semiconductor materials GaN and SiC

Infineon is ideally positioned to gain further market share and earn superior margins in power semiconductors

* Source: IHS Markit, "Power Semiconductor Discretes & Modules Report – 2016", July 2016


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# Strong #1 position in power allows driving of key areas of differentiation and innovation

Unique 300 mm thin wafer power semiconductor manufacturing

Compound semiconductors GaN and SiC

Digitalization of the power control loop

Functional integration of IGBT modules


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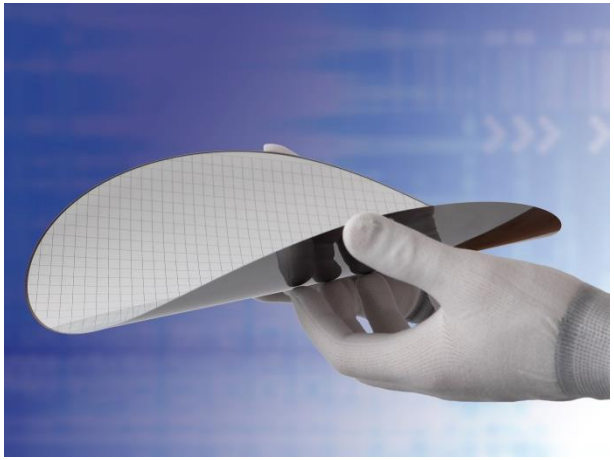
4 Update on 300 mm

5 Long-term outlook



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# Progress on 300 mm manufacturing technology on track



## Advantages of 300 mm manufacturing of power semiconductors

- When fully loaded, frontend manufacturing cost per unit will be 20 – 30% lower than on 200 mm.
- Capital intensity is 30% lower than on 200 mm.



## Current status of Dresden 300 mm fab

- Less than 1%-pt margin headwind from 300 mm-related expenses (process development, product qualification and manufacturing infrastructure) already digested in today‘s P&L.
- Cost break even versus 200 mm expected by end of CY17 when reaching 25 – 30% utilization.


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# Infineon's long-term growth is based on sustainable growth drivers

| ATV | IPC | PMM | CCS |
|---|---|---|---|
|  Courtesy: BMW Group |  |  |  |
| › $CO_2$ reduction<br>› Advanced Driver Assistance Systems | › Energy efficiency<br>› Automation<br>› Productivity increase | › Energy efficiency<br>› Power density<br>› BLDC motors<br>› Mobile device and LTE growth | › Security as a function<br>› Mobile payments<br>› Authentication<br>› Internet of Things |

**~8% p.a. through-cycle growth**


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# Financial calendar

| Date | Location | Event |
|---|---|---|
| 19 Sep 2016 | Munich | Berenberg Bank and Goldman Sachs German Corporate Conference |
| 21 Sep 2016 | Munich | Baader Investment Conference |
| 11 Oct 2016 | | ATV Conference Call by Peter Schiefer, Division President |
| 16 – 17 Nov 2016 | Barcelona | Morgan Stanley TMT Conference |
| 23 Nov 2016* | | Q4 FY16 and FY 2016 Results |
| 29 – 30 Nov 2016 | Scottsdale, AZ | Credit Suisse TMT Conference |
| 02 Feb 2017* | | Q1 FY17 Results |
| 16 Feb 2017 | Munich | Annual General Meeting |
| 04 May 2017* | | Q2 FY17 Results |
| 01 Aug 2017* | | Q3 FY17 Results |
| 30 Nov 2017* | | Q4 FY17 and FY 2017 Results |

* preliminary


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