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Agenda

1 Infineon – the leading player in power semiconductors

2 Division Industrial Power Control (IPC)

3 Division Power Management & Multimarket (PMM)

Infineon's portfolio covers the entire range of power and frequency

What is a power switch?

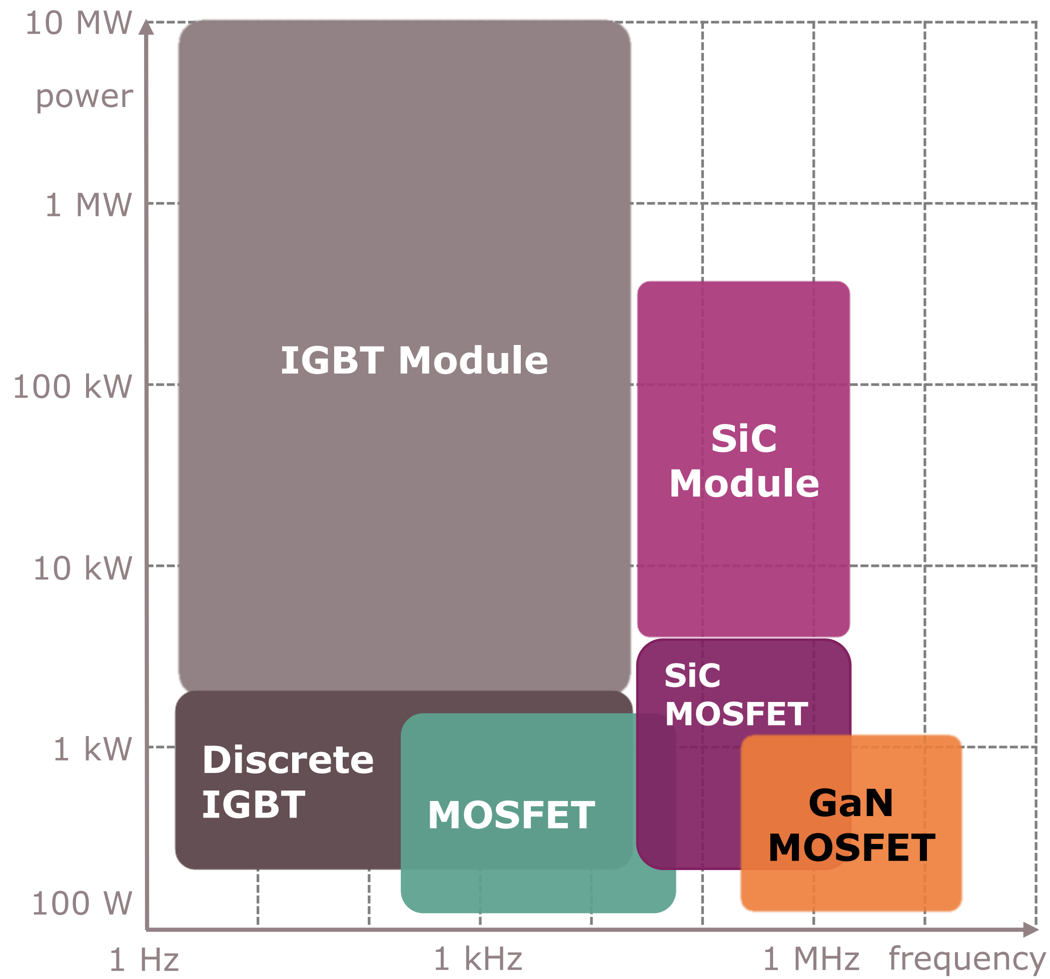
when turned on
→ current flows

when turned off
→ current is blocked

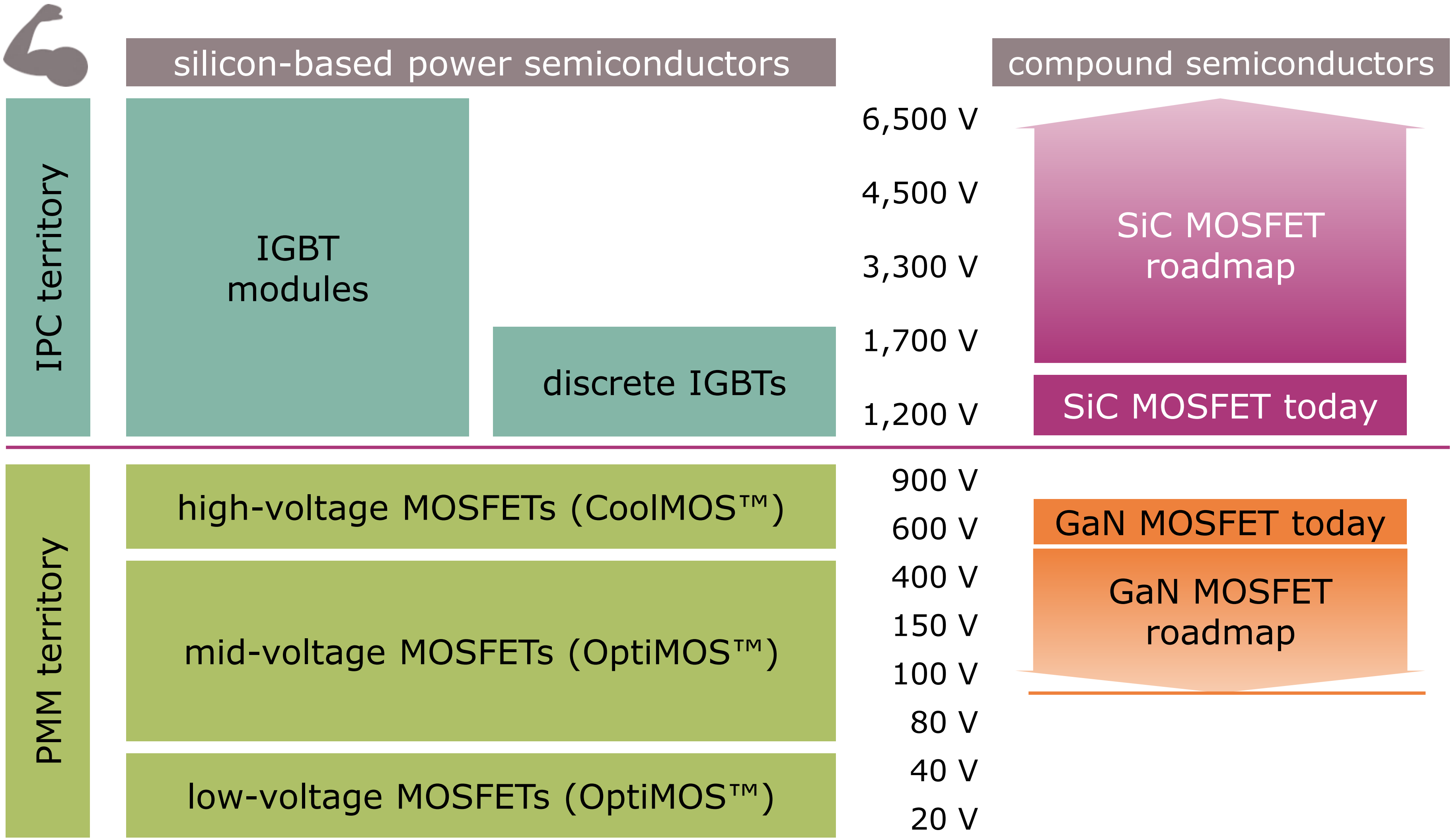
What counts?

- losses in on-state ($R_{(DS)on}$)
- heat dissipation
- max. switching frequency
- die size
- package size (form factor)

How are power switches categorized?



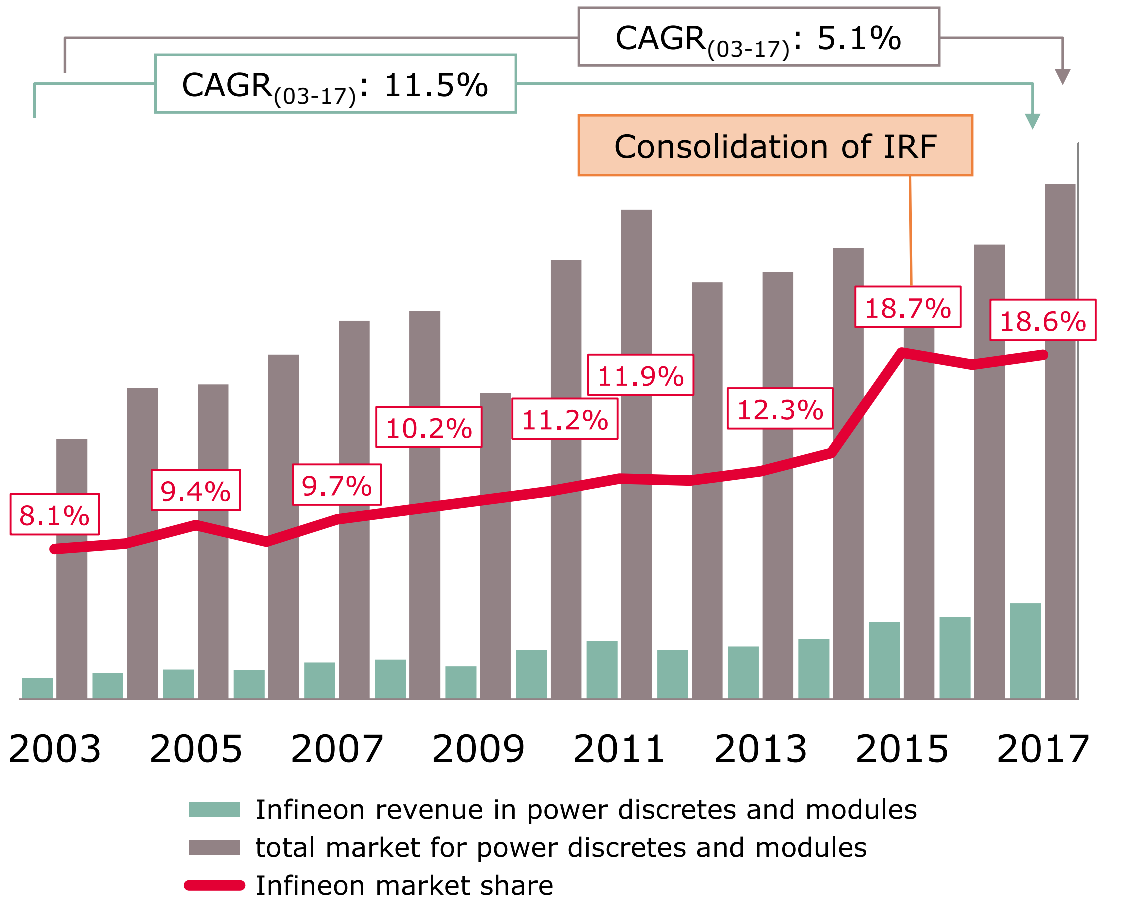
IPC's and PMM's discrete power portfolio* is basically separated by voltage classes



* excluding drivers and control ICs

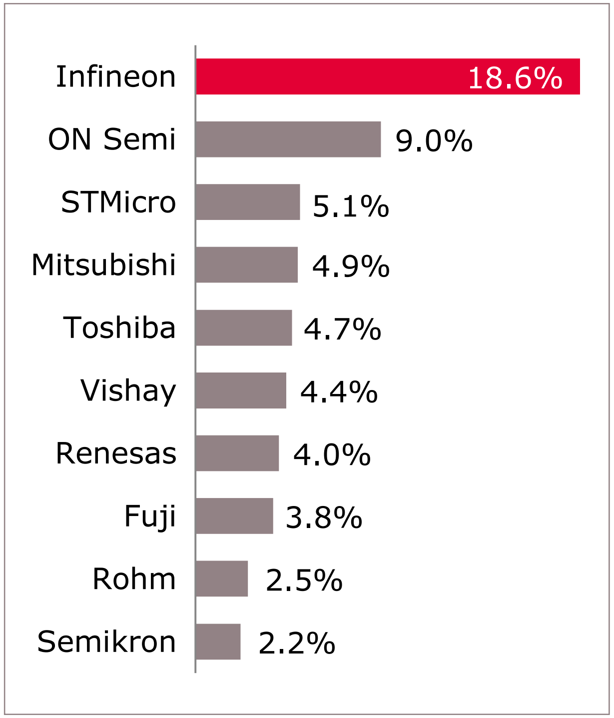
Infineon is outgrowing the power semi market since 15 years and holds #1 position

Power discretes and modules



Power discretes and modules

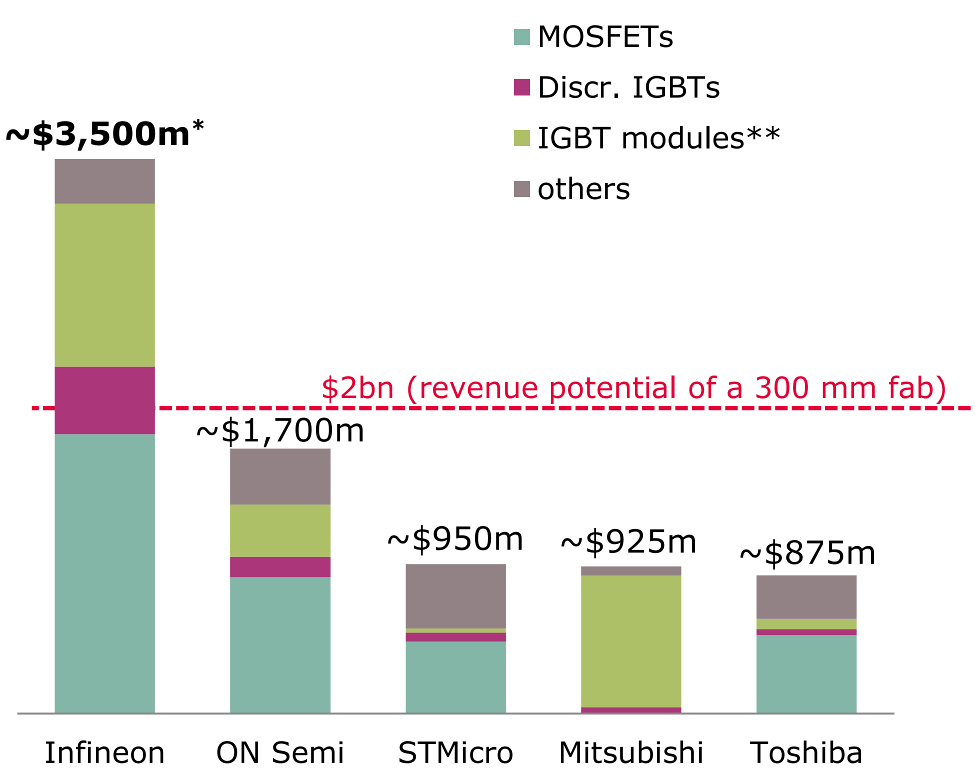
total market in 2017: $18.5bn



Source: Based on or includes content supplied by IHS Markit, Technology Group, several reports from 2004 through 2016 and 2018.
Note: No backward revision of market shares and market sizes; except for year 2016.

Unique position allows to fill a 300 mm module in a commercially viable timeframe

2017 revenues with products feasible for 300 mm manufacturing



of years to fully load a cost competitive 300 mm module

annual rev in power semis	growth per annum: 6%	growth per annum: 9%
$4bn	7 yrs	5 yrs
$3bn	9 yrs	6 yrs
$2bn	12 yrs	8 yrs
$1bn	19 yrs	13 yrs

Infineon's territory

Competitors' territory

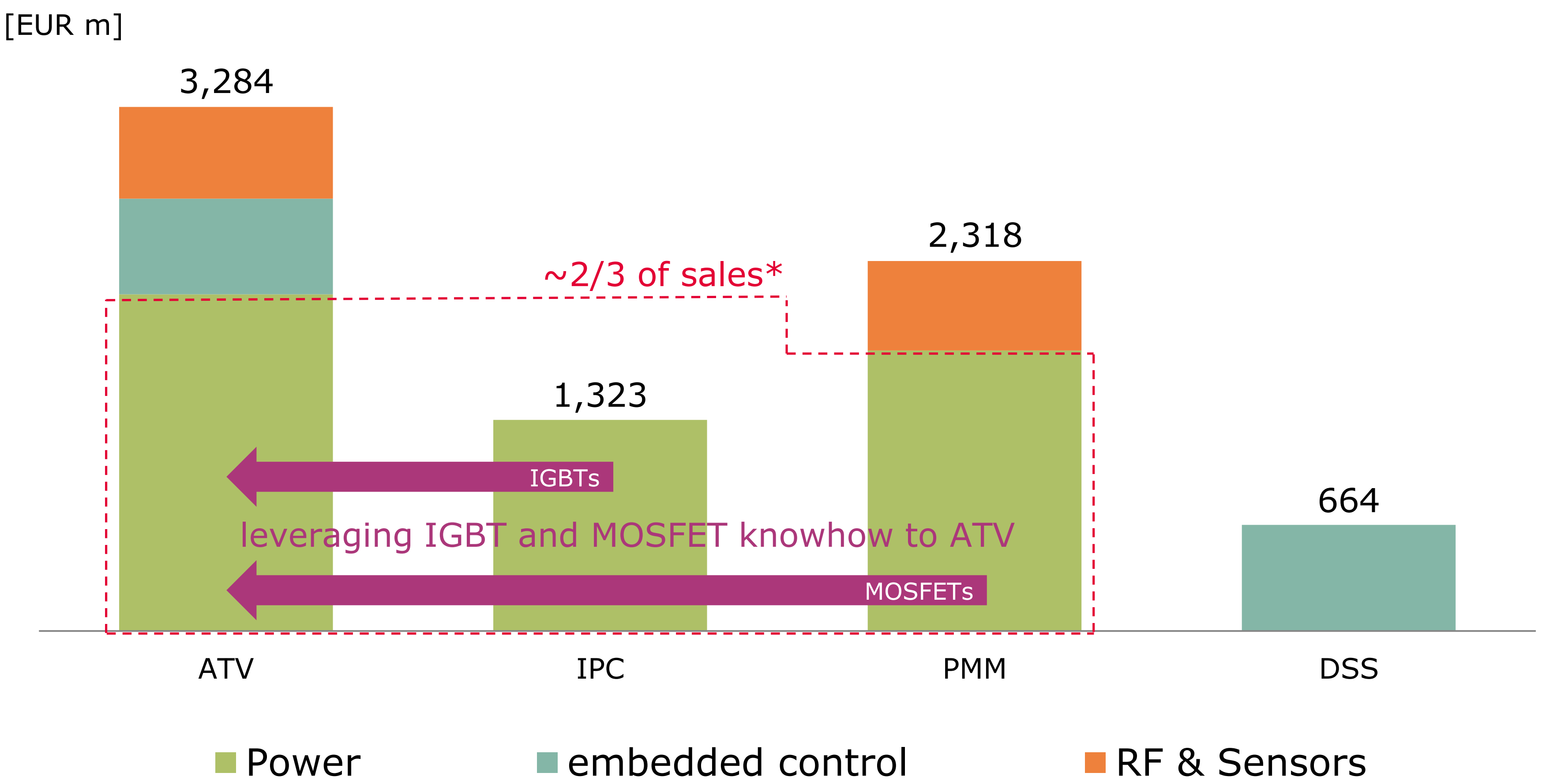
* rounded figures.

** including standard IGBT modules, IPMs (IGBT + MOSFET), PIM/CIBs.

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

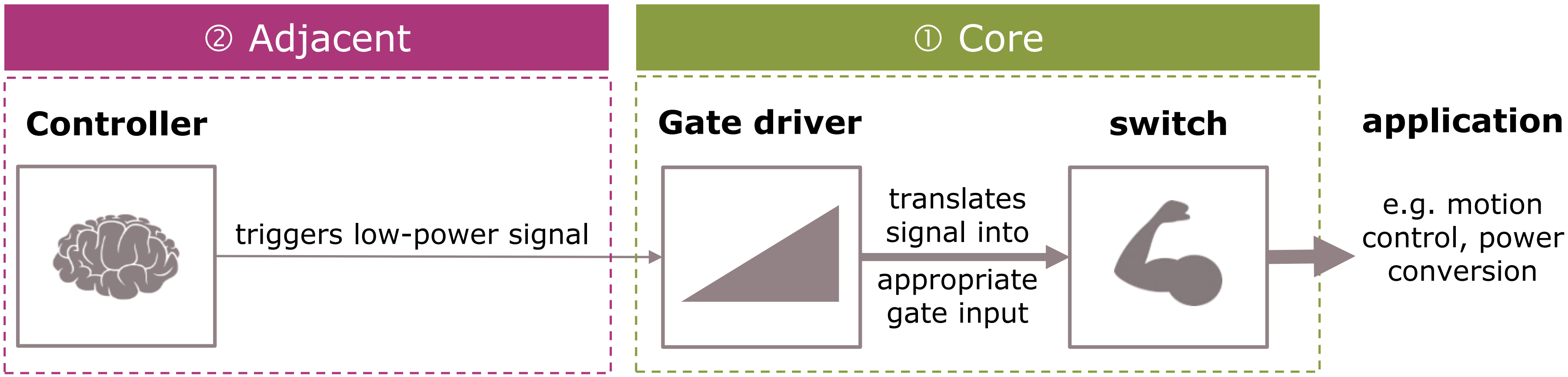
Power semis represent ~2/3 of Infineon sales; high synergies in R&D and manufacturing

Infineon FY18 revenues by product category



* including drivers and control ICs

Three strategic levers to outgrow the power semi market: "core – adjacent – new"



② Grow in adjacent fields

- Invest into products for digital control loop including algorithms for drives

① Strengthen core

- Complement leadership in today's discrete power and module portfolio with SiC and GaN

③ New

③ Broaden scope to new applications

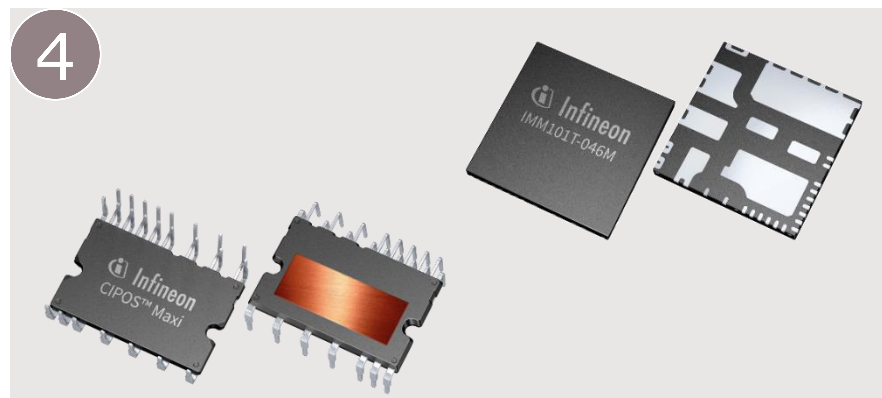
- System understanding and strong R&D force allow us to enter emerging power applications

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

Unique 300 mm thin wafer power semiconductor manufacturing

Compound semiconductors SiC and GaN

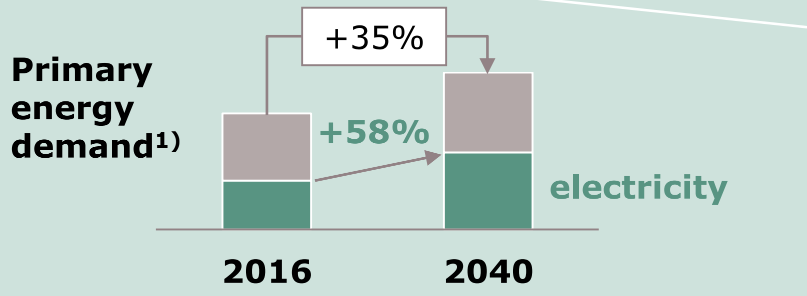
Digitalization of the power control loop



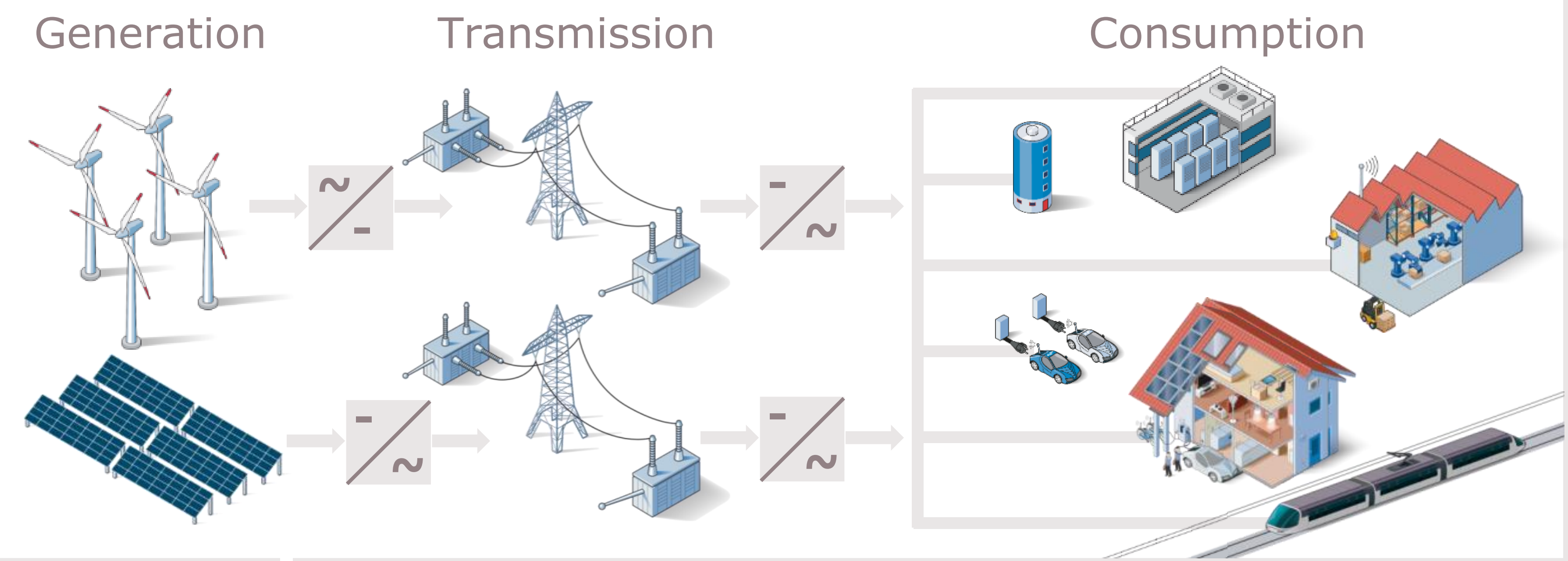
Functional integration

Industrial Power Control

Increasing demand for electrical energy is driving our power business



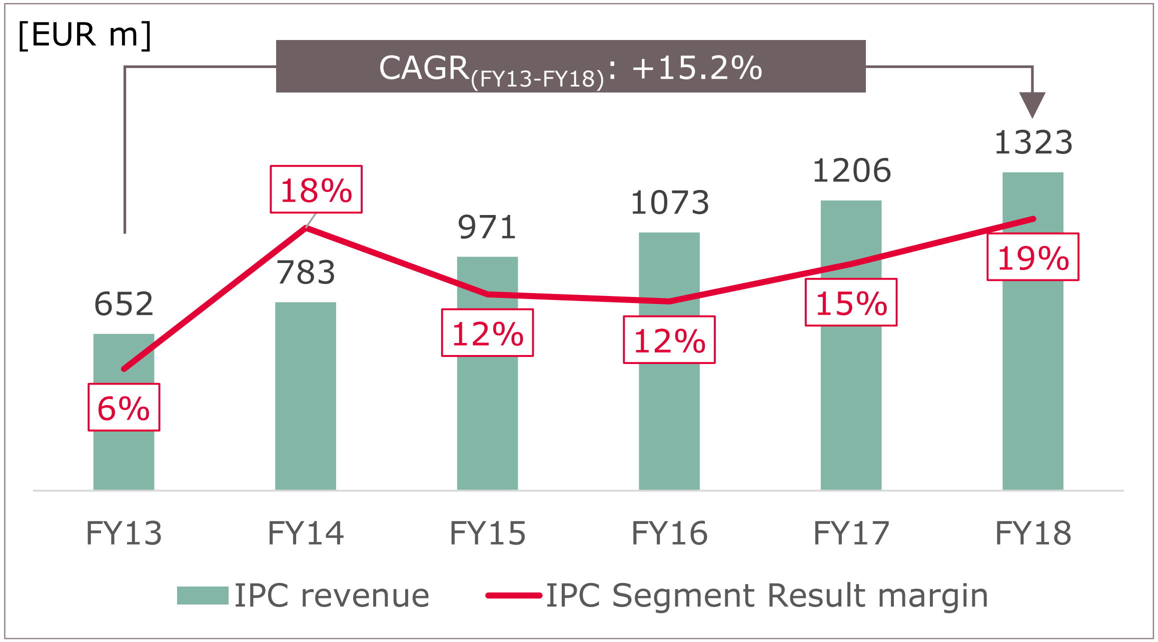
Shaping the electrical energy chain



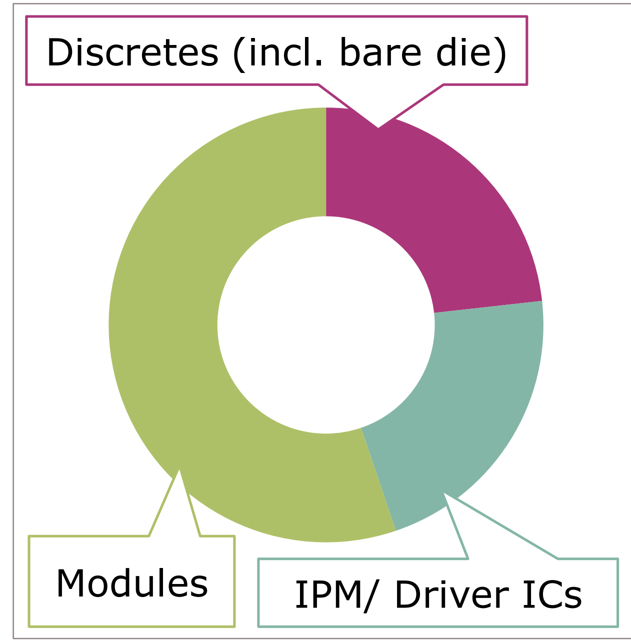
1) Source: BP 2018 Energy Outlook

IPC at a glance: market leader in discrete IGBTs, IGBT modules and Driver ICs

IPC revenue and Segment Result margin



Split by major segments



Key customers

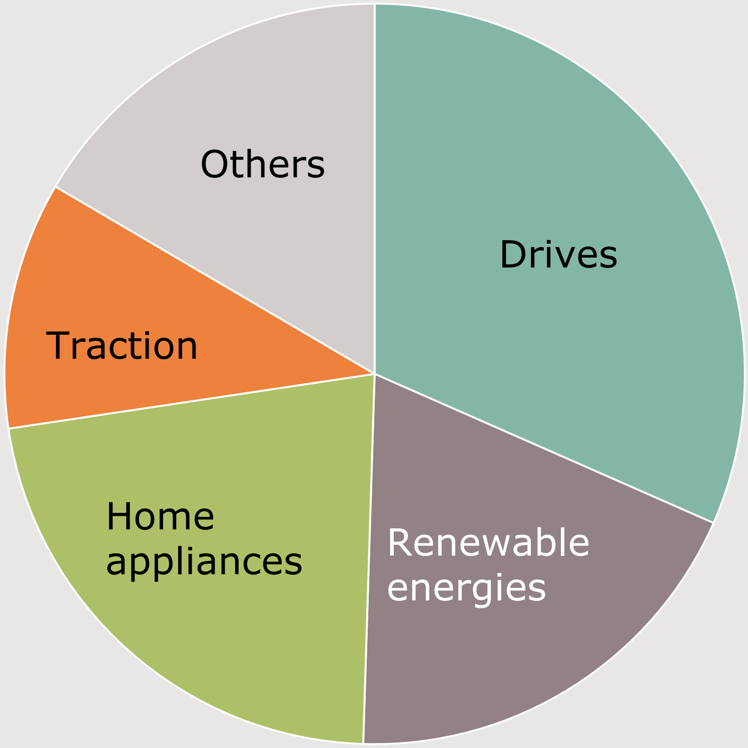
ABB, ALSTOM, Midea, Schneider Electric, Nidec, BOMBARDIER, CRRC 中国中车, Rockwell Automation, SUNGROW, Danfoss, EATON, SIEMENS, Inovance, GOLDWIND, YASKAWA, TOSHIBA, Vestas

Distribution and EMS partners

ARROW, AVNET Reach Further, intron 英恒, JCET 晶川电子, NEXTY Electronics, wpg

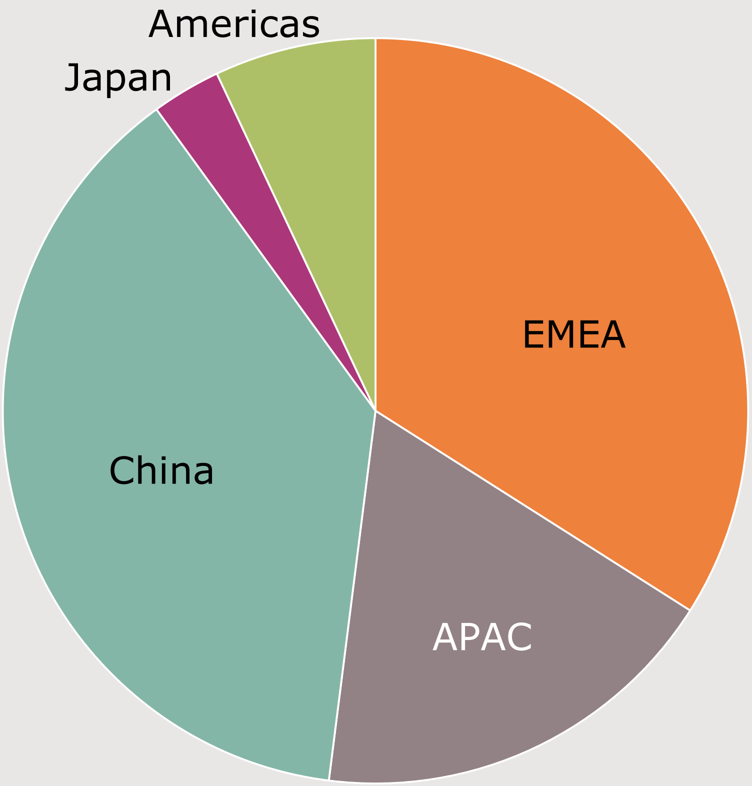
IPC at a glance: well-balanced portfolio of applications; China represents ~1/3 of sales

IPC FY18 revenue by application



Distribution share: ~40%

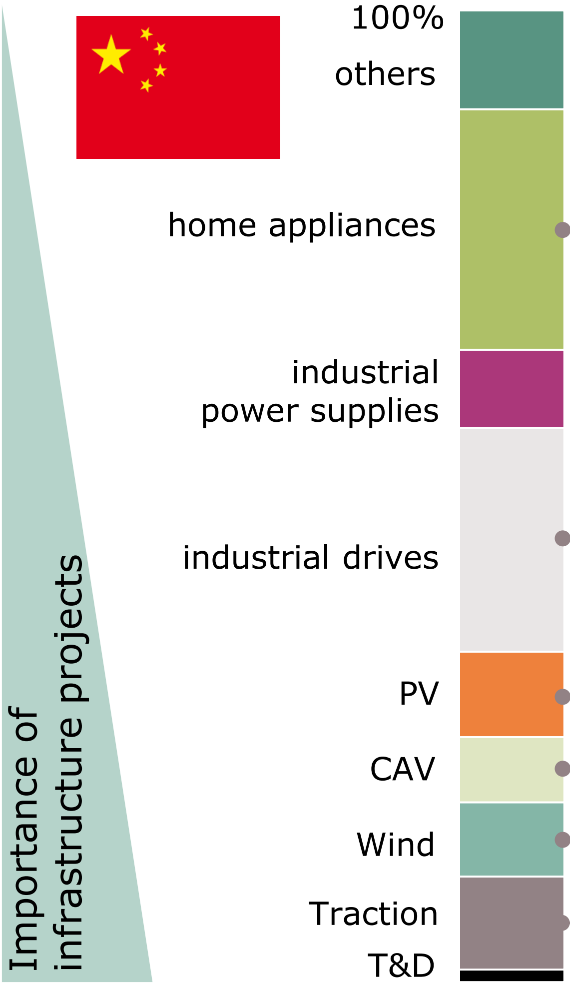
IPC FY18 revenue by region



US$ exposure: ~30%

IPC business in China rather robust due to considerable amount of infrastructure projects

FY18 revenue by application



Key insights

- Inverterization trend ongoing – backed by regional regulations
- As follower in IPMs we gain sockets from competition

- "Made in China 2025" causes stable demand for industrial drives to upgrade factory automation

- PV is a key instrument for China to balance increasing electricity demand with environmental pollution
- China with strong industry in PV

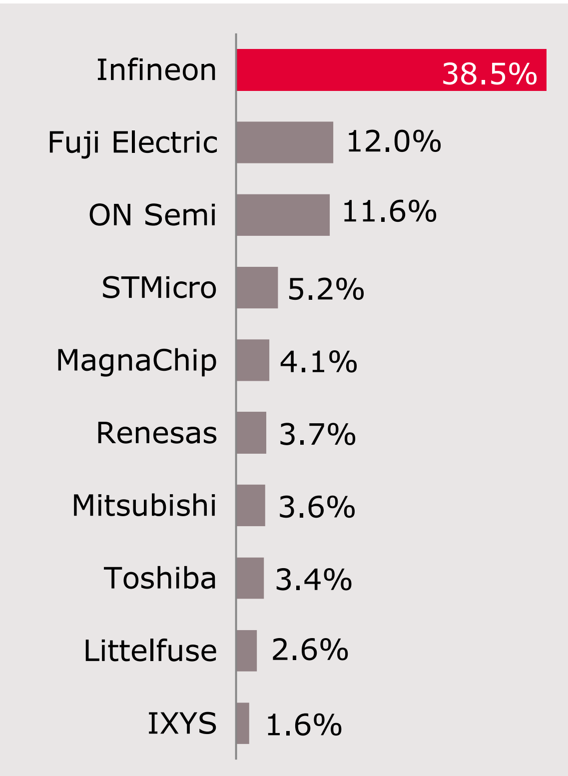
- eBus deployment in cities is a key measure to limit pollution levels

- Growth expected on moderate level for onshore, offshore accelerating

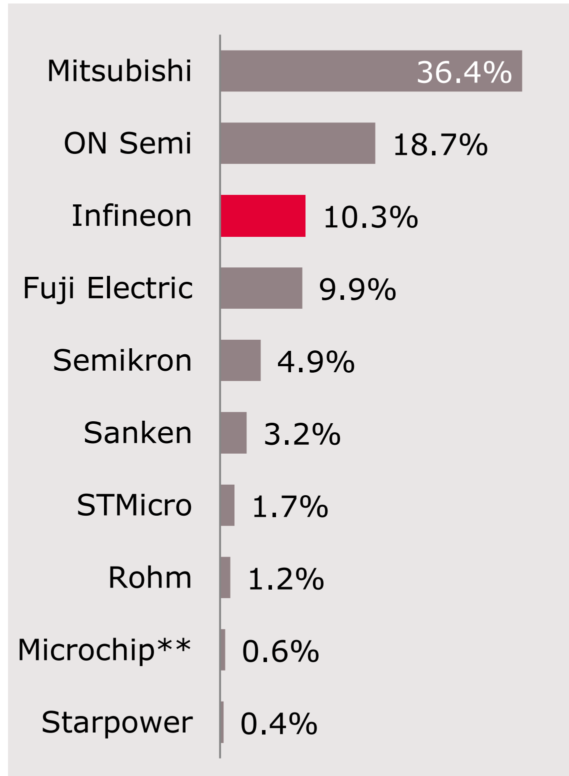
- Governmental decisions focus on large projects
- Chinese top OEM increasingly grow outside of China

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

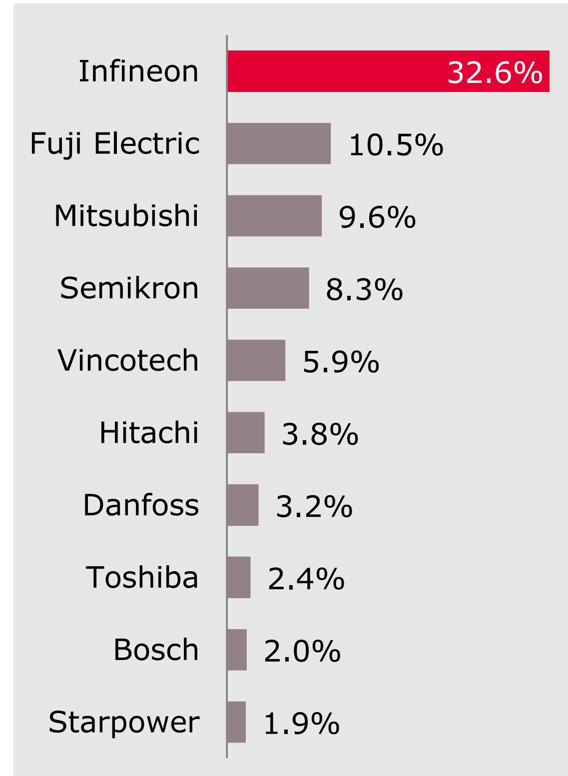
Discrete IGBTs
total market in 2017: $1.10bn



IPMs
total market in 2017: $1.57bn



IGBT modules*
total market in 2017: $2.63bn

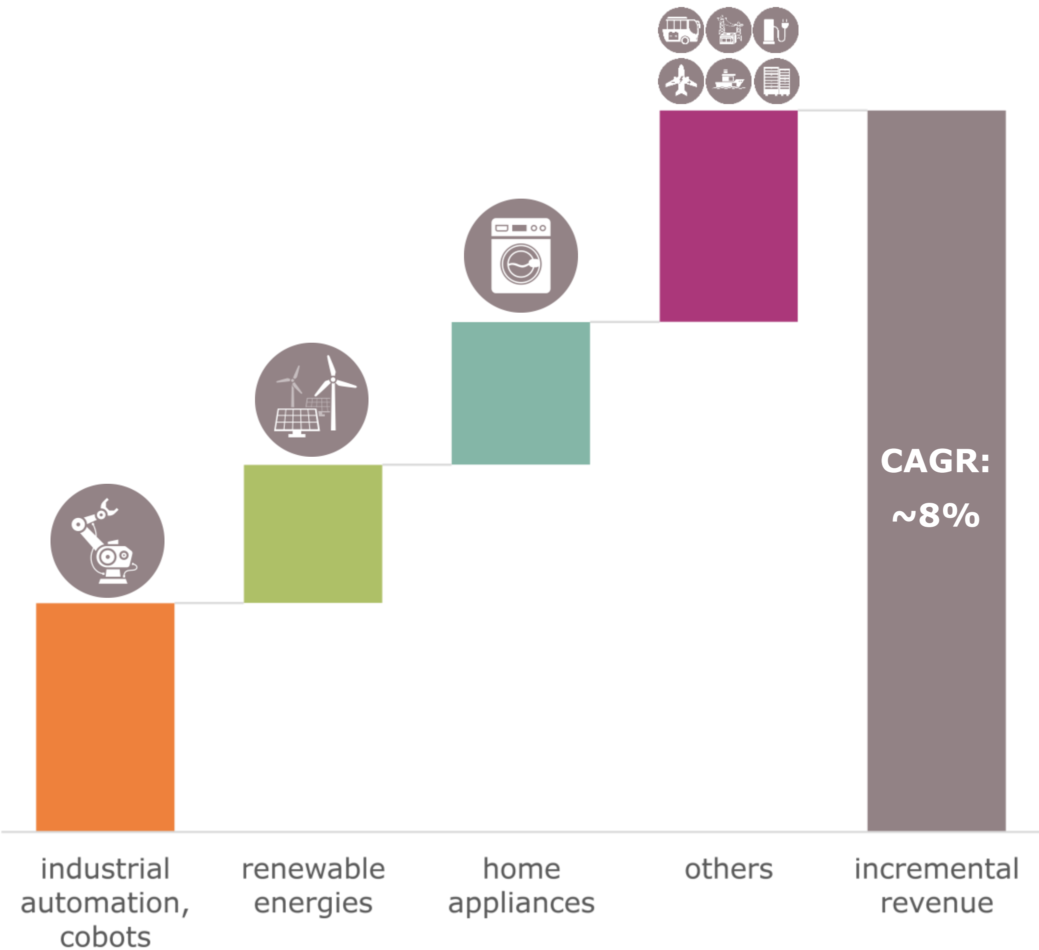


* Including standard (non-integrated) IGBT modules and power integrated modules (PIMs) / converter inverter brake (CIB) modules.
** On 29 May 2018, Microchip closed the acquisition of Microsemi. The 2017 revenue depicted here was contributed entirely by Microsemi.

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

IPC's mid-term growth is based on a broad range of applications

5-year planning horizon



industrial automation, cobots

inverterization; cobots: acceptance to accelerate due to ever higher safety levels and ease of use

renewable energies

grid parity reached; higher growth from China, India, RoW

home appliances

inverterization; growth in China; strong market success with IPMs

others

energy storage; electric buses; electric delivery vehicles; EV infrastructure

Three strategic levers to outgrow the power semiconductor market

Strengthen core

- Complement technology leadership and #1 position in IGBT standard modules with next-generation WBG power semis with focus on SiC (CoolSiC™)
- Continuously increase scale leadership with 300 mm
- Exploit scale in R&D

Grow in adjacent fields

- Invest into growth of IPM business, using existing IGBT, driver and iMOTION™ portfolio to become top-3 player in IPMs soon
- Invest into products for digital control sequence for IPC including algorithms for drives

Courtesy: Lilium GmbH

Broaden scope to new applications

- System understanding and strong R&D force enable entering emerging power applications like charging infrastructure for xEV, Commercial and Agriculture Vehicles (CAV), eMarine, eAviation

IPC's biggest application "drives" segmented by end applications in the industry

Industrial drives

Servo drives

25%

Examples

- robotics
- material handling
- machine tools

General purpose drives

64%

Examples

- pumps & fans
- process automation
- cranes
- marine drives

High-power drives

11%

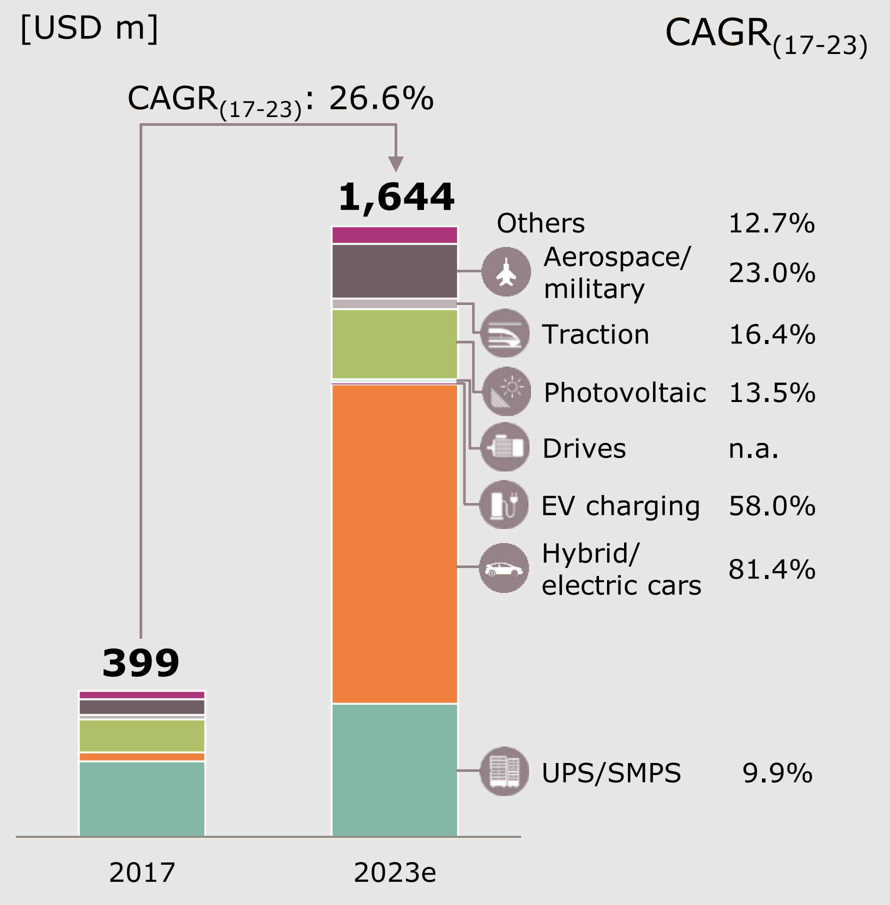
Examples

- oil & gas industry
- chemical industry (e.g. air compressors)
- cement mills

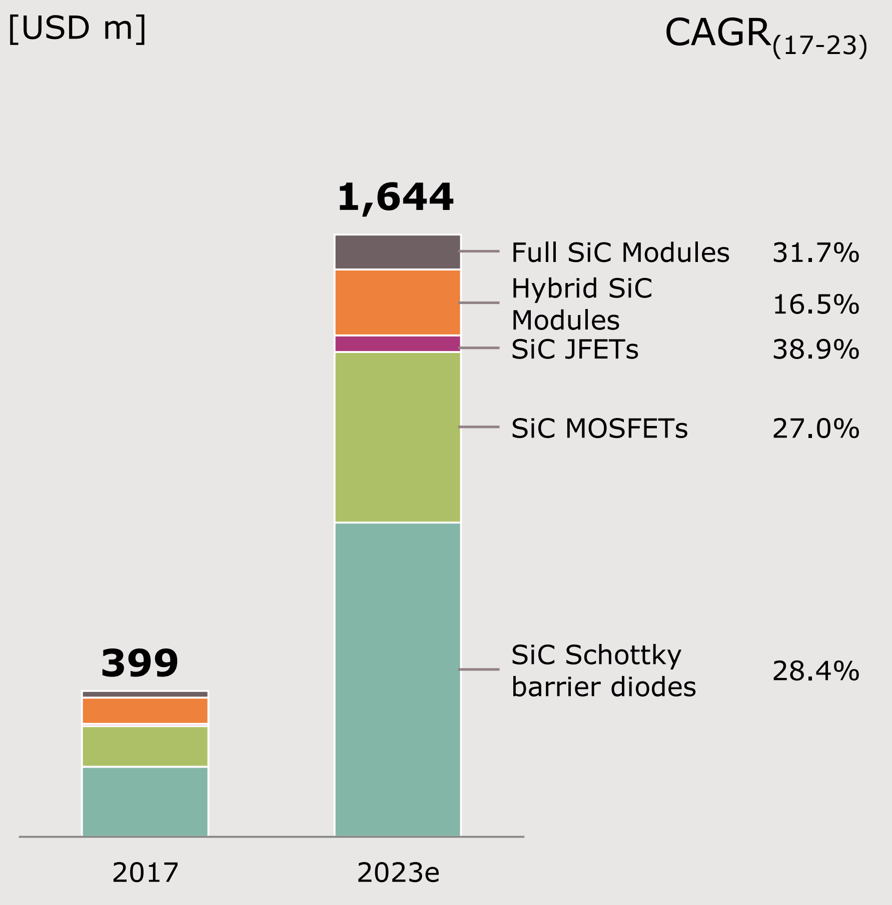
Source: Based on or includes content supplied by IHS Markit, Technology Group, “Industrial Motor Controls Source Book”, December 2017; share by revenue.

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

SiC power semiconductors by application

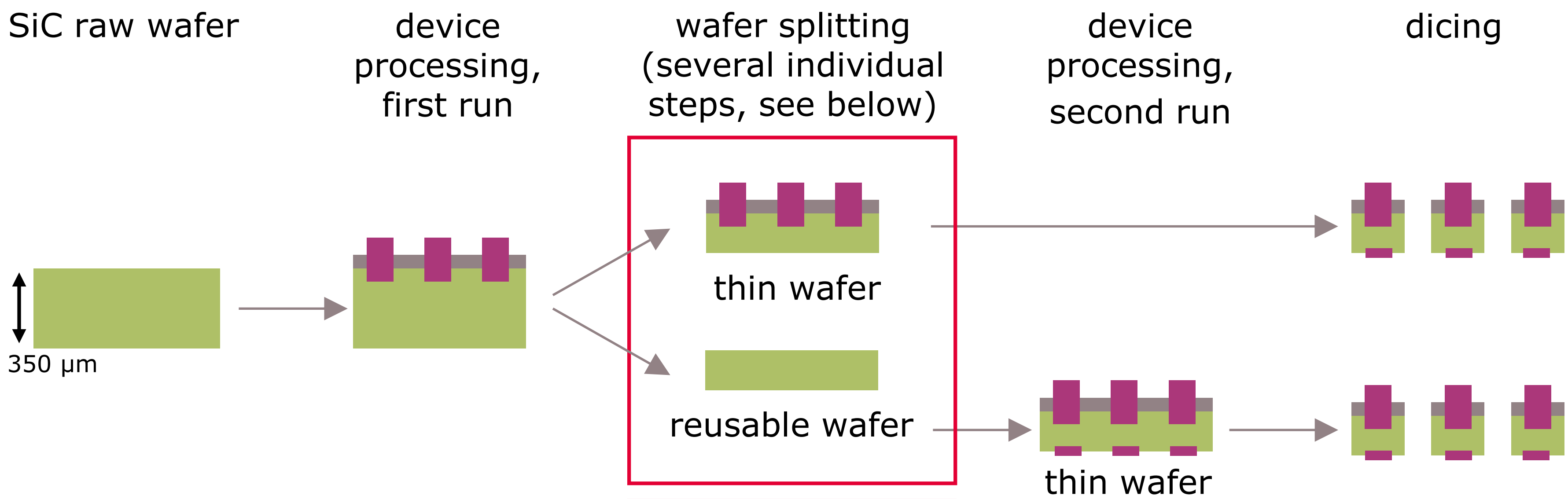


SiC power semiconductors by product type

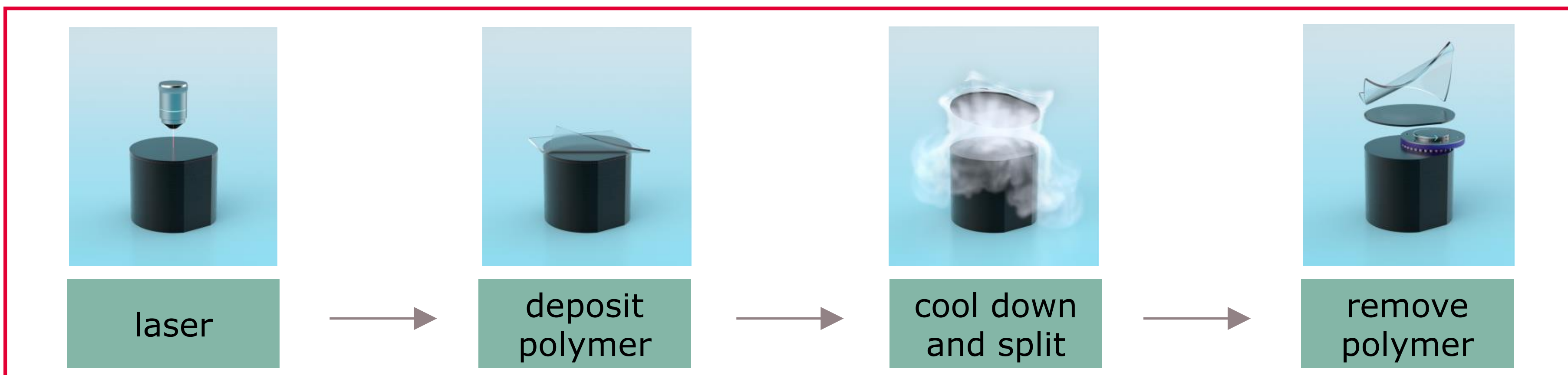


Sources: Based on or includes content supplied by IHS Markit, Technology Group, "SiC and GaN Power Semiconductors Report - 2018", April 2018, mid case.

Cold Split technology allows splitting of processed SiC wafers

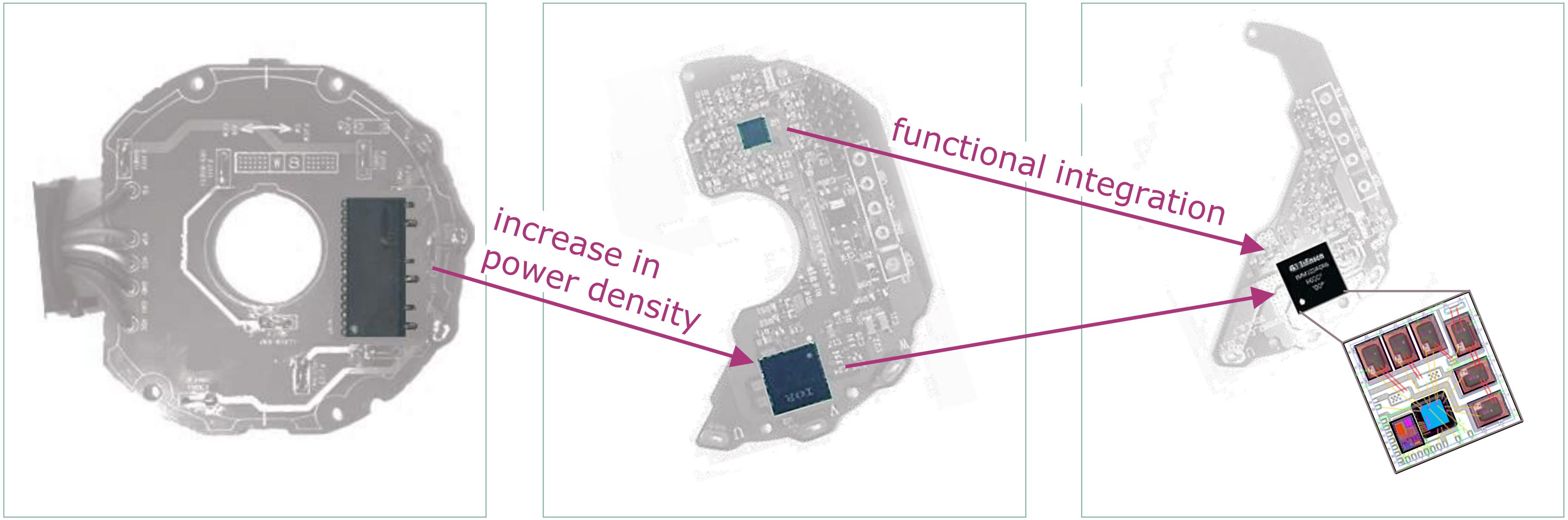


Cold Split technology



IPC's digital control strategy enables our customers to reduce their systems significantly

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

What comes next? Mid- to long-term structural growth opportunities

Core

+SiC Silicon Carbide

new material

EV charging

cobots

Adjacent

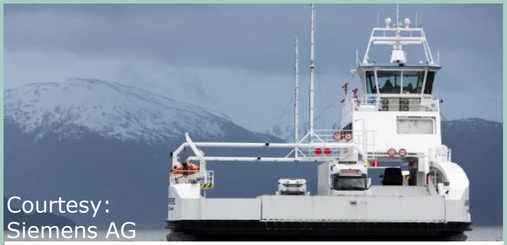
solar pumps

energy storage

eDelivery vehicles

New area

fuel cell



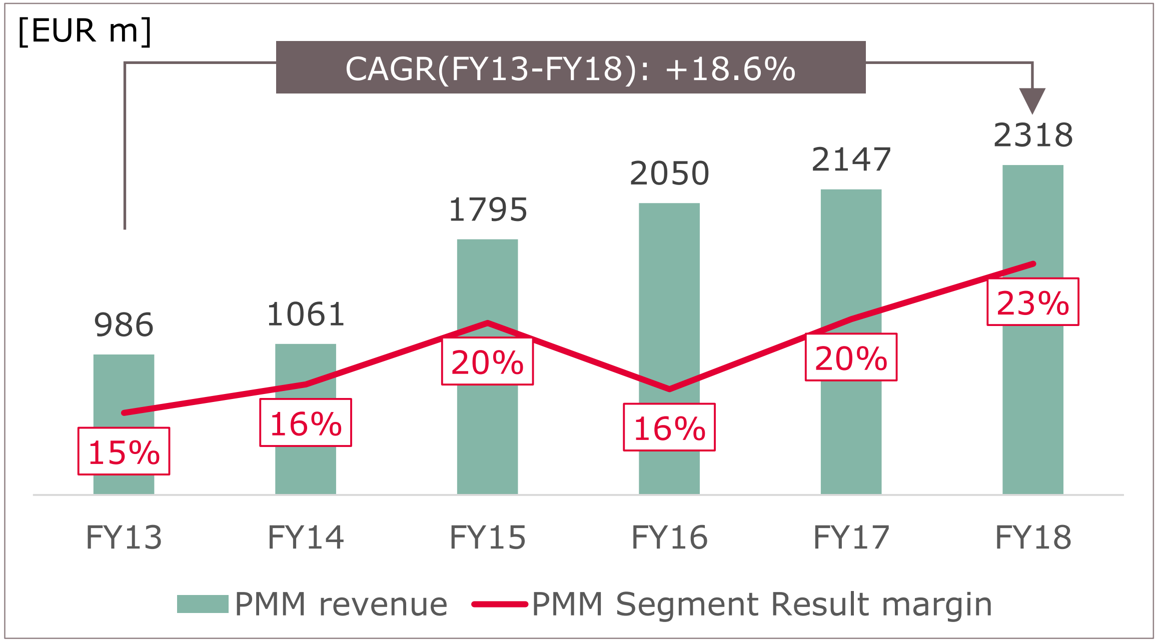
eMarine

eAviation

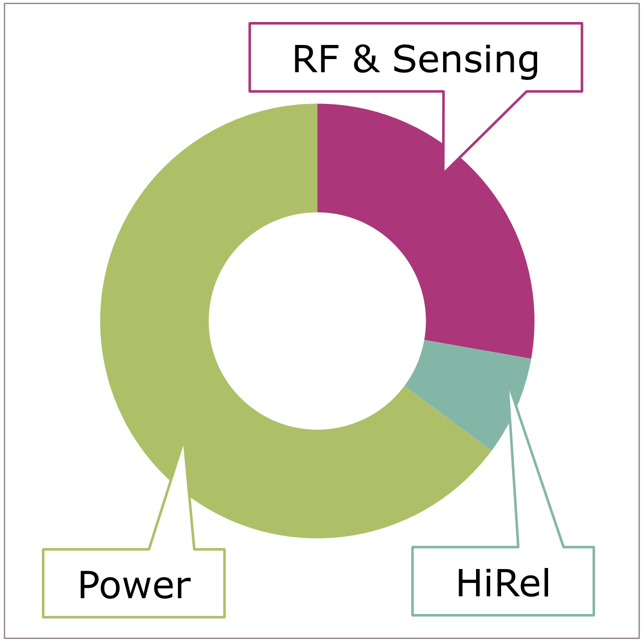
PMM – Power

PMM at a glance

PMM revenue and Segment Result margin



Split by major segments



Key customers

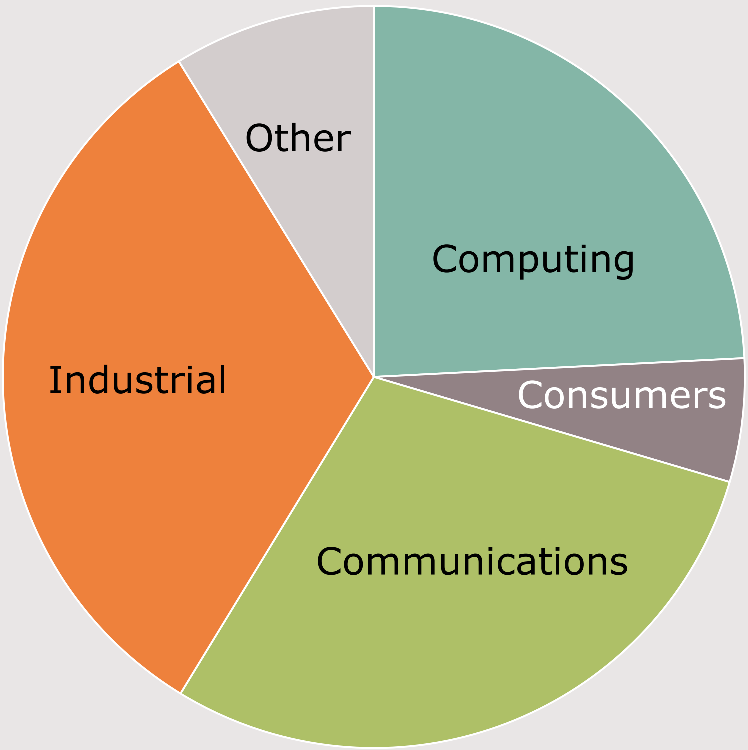
Amazon, Alibaba Group, Samsung, Delta, Hewlett Packard Enterprise, Huawei, LG, Google, Ericsson, Boeing, Osram, Quanta Computer, Dell, Tencent 腾讯

Distribution and EMS partners

Arrow, NEXTY Electronics Corporation, AVNET Reach Further, intron 英恒, SAC, Weikeng

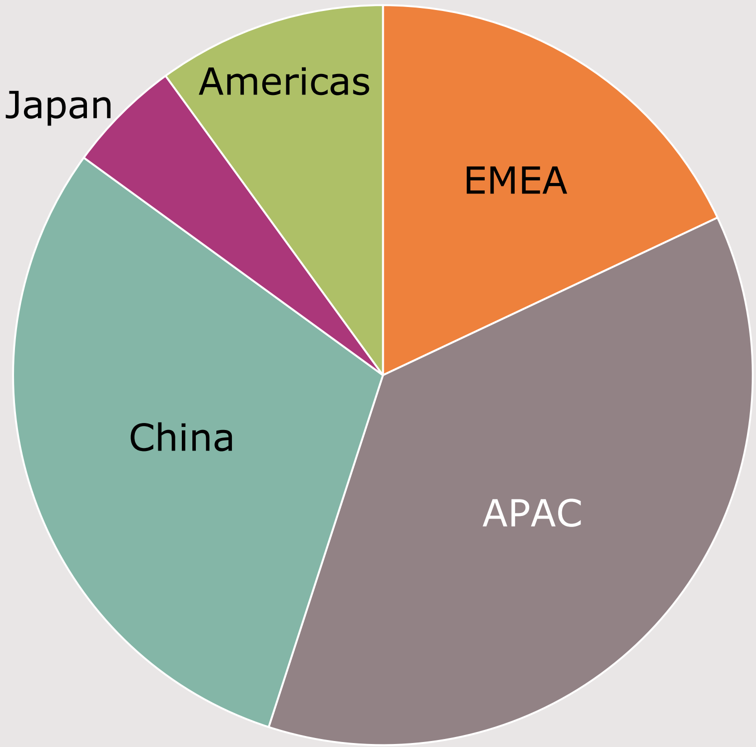
PMM has a high exposure to the US$ as most of the Asia revenue is US$-denominated

PMM FY18 revenue by application



Distribution share: ~60%

PMM FY18 revenue by region

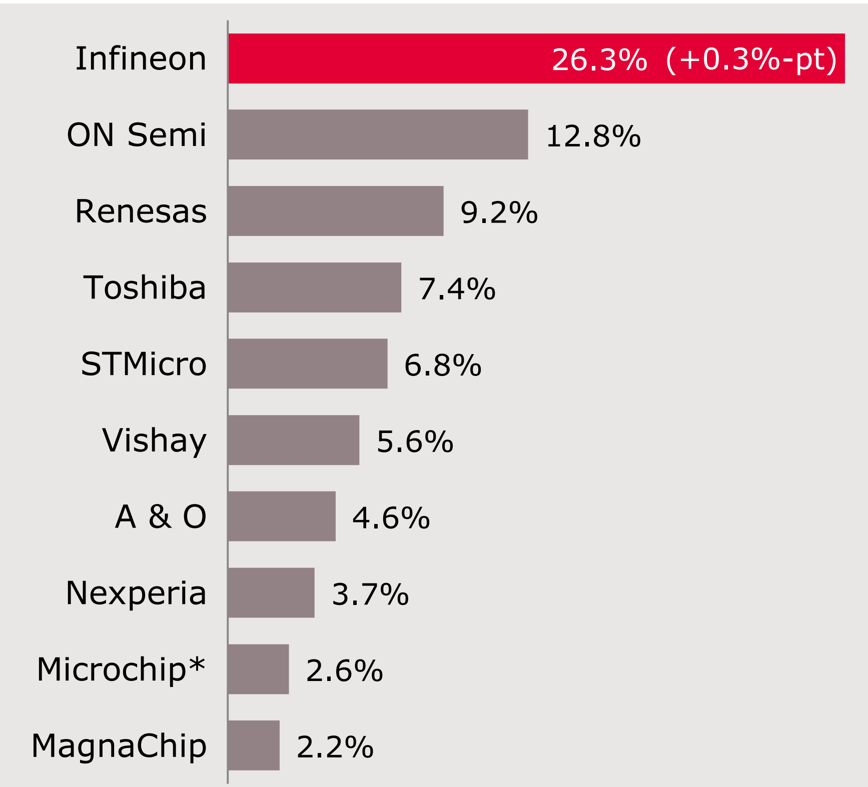


US$ exposure: ~80%

Infineon is the clear leader in MOSFETs; growth potential in power ICs

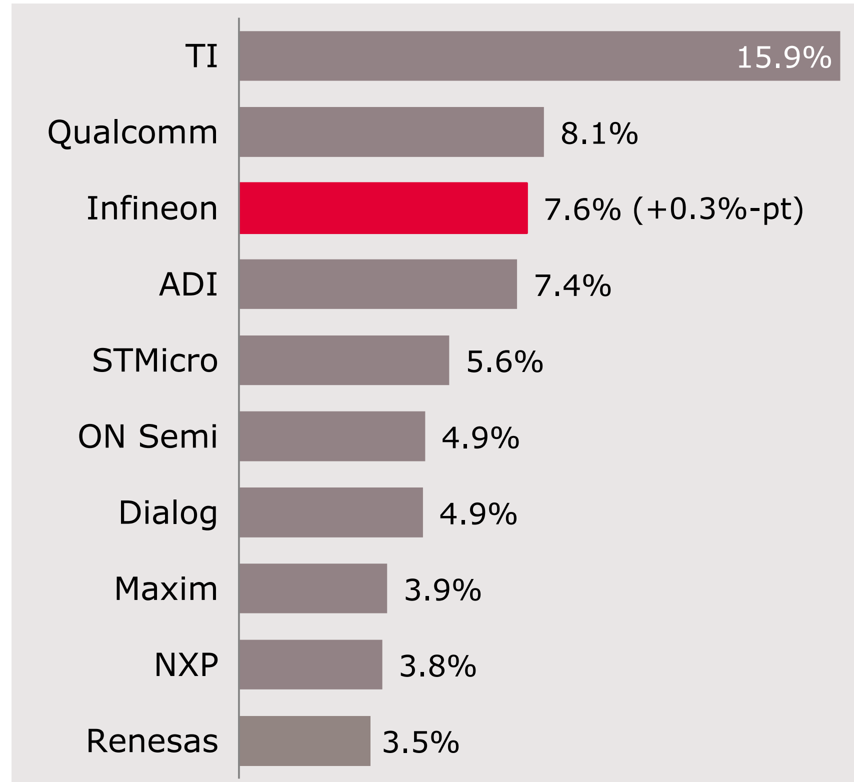
Discrete Power MOSFET market

total market in 2017: $6.65bn



Power IC market

total market in 2017: $23.6bn



* 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", September 2018.
Discrete Power MOSFET market incl. automotive MOSFETs. Power IC market incl. automotive power ICs.

Three strategic levers to outgrow the power semiconductor market

Strengthen core

- Complement technology leadership and #1 position in CoolMOS™ and OptiMOS™ with next-generation wide band gap power semis (CoolGaN™, CoolSiC™)
- Continuously increase scale leadership with 300 mm
- Exploit scale in R&D

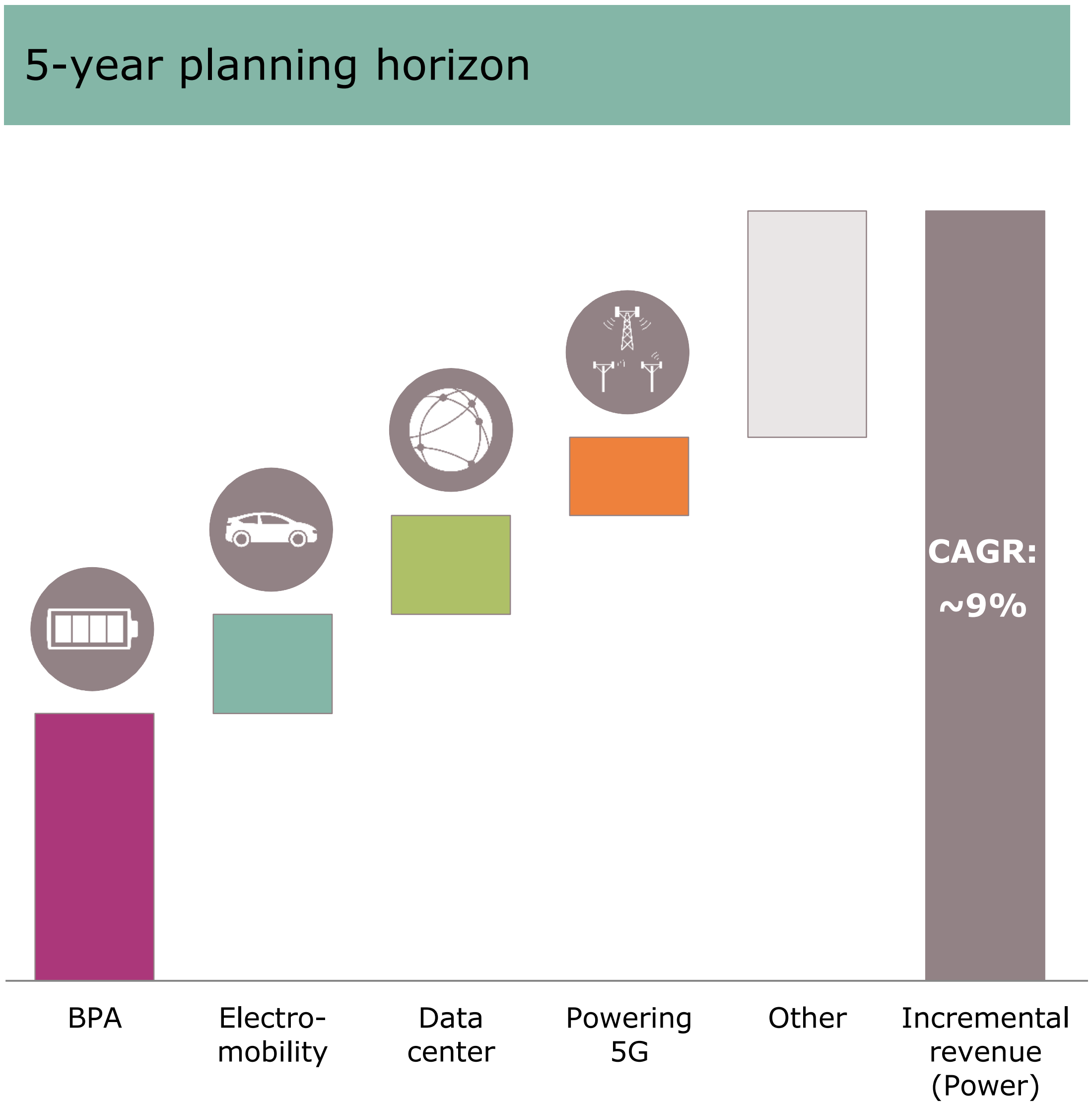
Grow in adjacent fields

- Complement core (= switch and driver ICs) by adding further (digital) power management ICs
- Grow into adjacent markets such as class D audio amplifiers or PoL in telecom and data center

Broaden scope to new applications

- System understanding and strong R&D force allow us to enter emerging power applications like AI data center, wireless power, EV on-board charger, infrastructure, cobots and low-speed electric vehicles

PMM's mid-term growth in power is strongly driven by several high-growth applications



Battery-powered applications
E.g. power tools, consumer devices, robots and drones

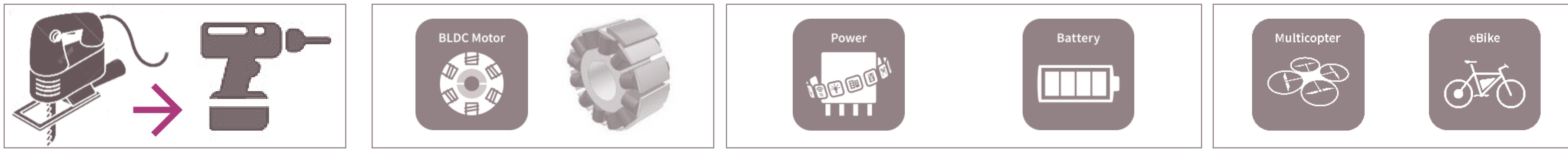
xEV and LSEV
Densification of charging infrastructure; power semis for on-board charger and battery switch (CoolMOS™)

Data center
Classical data centers and high-computing data centers for AI

Powering 5G
Densification of infrastructure; higher number of antennas in radio boards (massive MIMO) drives MOSFET content

Four interrelated trends drive power semiconductor BoM in battery-powered applications

Interrelated trends for battery-powered applications



1. From corded to **cordless** power tools
2. From brushed DC to **brushless** DC motors
3. Trend towards **higher power** and **higher battery** voltage
4. **New applications** with trend towards "batteryfication"

BoM increase:

power semiconductor content increase up to 4x for DIY tools

Premium products:

~15% higher ASP for MOSFETs and drivers

significant volume increase

In total battery-powered applications are a significant growth driver for PMM's power business

Highly differentiating solution for data centers enables significant opex and capex reduction

Infineon

Structural trends for data center

- Higher memory content; higher computing power
- Diversified processor supplier base: AMD, ARM, intel + nervana, NVIDIA, XILINX
- Data center operators invest in proprietary processor designs
  Alibaba Group, Tencent 腾讯, Baidu 百度, amazon, Google, facebook, Microsoft

Data center power flow optimized by Infineon

AC-DC

CoolMOS™ and **CoolGaN™** enable 2x the output power in a given slot size

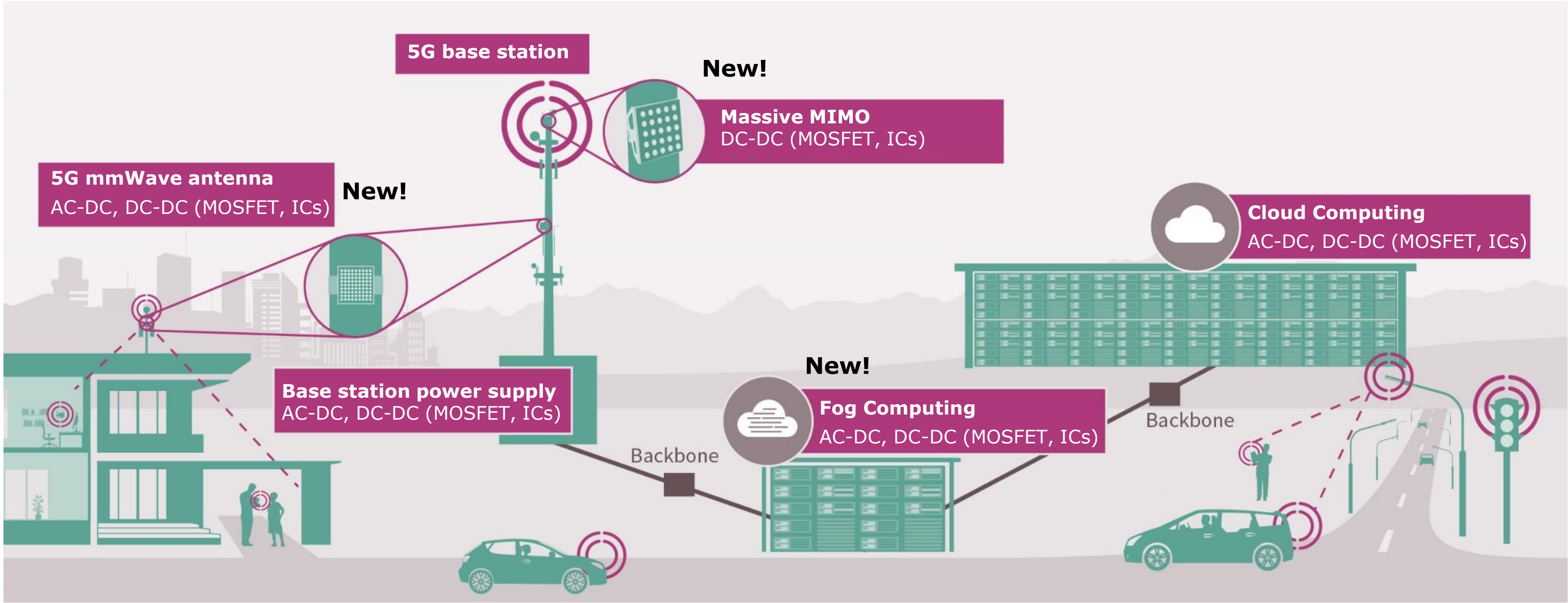
DC-DC

Digital power solutions based on **OptiMOS™**, **driver** and **control ICs** supporting latest processor technologies

Customer benefit

- **Capex reduction**: doubling computing power per server rack
- **Opex savings**: higher efficiency of power conversion reduces electricity cost (computing & cooling)

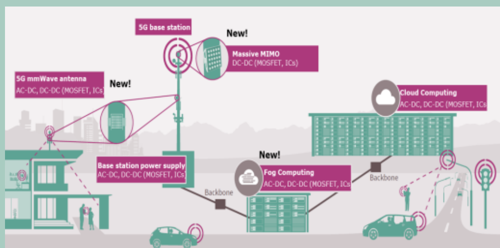
Transition from 3G/4G to 5G drives demand in power semis for antennas and power supplies



- driver #1: massive growth of data and computing power
- driver #2: higher number of base stations due to denser network
- driver #3: ~4x higher power semiconductor content per radio board: from ~$25 for MIMO antenna to ~$100 for massive MIMO antenna array
- driver #4: fog computing data center as a completely new market

What comes next? Mid- to long-term structural growth opportunities

Core



5G infrastructure

hyperscale AI data center

new material

Adjacent

Courtesy: Nissan

on-board charger

wireless charging

battery main switch

New area

collaborative robots

smart speaker

class D audio

Part of your life. Part of tomorrow.

Dr. Peter Wawer
Division President Industrial Power Control

- since 2016: Division President Industrial Power Control
- 2012: Member of the Management Board of the Power Management & Multimarket Division
- 2011: Senior VP Technology and Production at Q-Cells SE in Bitterfeld, Germany
- 2008 – 2011: Senior VP Technology at Q-Cells SE
- 1997 – 2008: various position at Infineon

- Dr. Peter Wawer was born in Berlin, Germany, in 1967. He holds a Diploma in Electrical Engineering from the Technical University in Berlin where he also received his PhD.
- He joined Infineon (Siemens AG until 1999) in 1997.

Andreas Urschitz, Division President Power Management & Multimarket

- since 2012: Division President Power Management & Multimarket (PMM)
- 2011: Head of Distribution of the PMM Division
- 2001 – 2011: several management positions within PMM Division

- Andreas Urschitz was born in Klagenfurt, Austria, in 1972. He holds a master's degree in Commercial Science from the Vienna University of Economics and Business.
- He joined Infineon (Siemens AG until 1999) in 1995.

Abbreviations

AC	alternating current
AC-DC	alternating current - direct current
BLDC	brushless direct current
DC	direct current
DC-DC	direct current - direct current
EMS	electronic manufactoring services
GaAs	gallium arsenide
GaN	gallium nitride
HST	high-speed train
Hz	Hertz
IC	integrated circuit
IGBT	insulated-gate bipolar transistor
IPM	intelligent power module

LSEV	low-speed electric vehicle
MIMO	multiple input, multiple output
MOSFET	metal-oxide silicon field-effect transistor
OBC	on-board charger
OEM	original equipment manufacturer
PV	photovoltaic
$R_{(DS)on}$	drain-source on resistance
RF	radio frequency
RoW	rest of world
Si	silicon
SiC	silicon carbide
T&D	transport and distribution
WBG	wide band gap

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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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