IFX Day 2010

Campeon – June 24, 2010

Dr. Reinhard Ploss
Member of the Management Board

Executive Vice President, Head of Operations

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- Manufacturing Strategy
- Competitive Advantage of In-house Frontend Manufacturing
- Competitive Advantage of In-house Backend Manufacturing
- Development of Outsourcing
- Flexible Fab Management and Outlook

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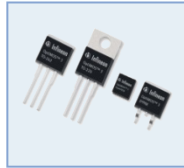
Frontend and Backend Manufacturing Is a Differentiating Factor Today and Tomorrow



Relative contribution to product differentiation

High

Low

Frontend

Backend

Application

IP-Blocks

Design Flow

Software

Small signal Discretes

Power Discretes

IGBT Modules

Power ICs

Mixed-signal ICs

embedded Flash

Standard CMOS

Differentiation by technology & manufacturing.

Invest in own technologies and production.

Differentiation by functionality.

Use of standard CMOS technologies and manufacturing outsourcing.

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Power Semiconductors – Power vs Frequency
Infineon Covers the Full Range

- HVDC
- Reactive compensators
- AC-AC interties
- High-current-supplies
- Large drives
- Cement mills
- Ships and vessels
- Heavy locomotives
- Large solar plants
- Trams, busses
- Electric cars
- On-roof PV
- Small drives
- Airconditioner
- Robotics
- Washing machine
- Switch mode power supplies

power by application [W]
1 G
100 M
10 M
1 M
100 k
10 k
1 k
100
10
100
1 k
10 k
100 k
1 M
10 M
100 M
frequency [Hz]
Ultra high power
High power
Medium power
Thyristor
IGBT
SiC
MOSFET

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The Bridge Between Logic and Power: SPT9 (130nm) Puts Infineon into a Leading Positon

level of integration

SoC, SiP

μC

control logic, state machine

status protection

single transistor

CMOS

SPT
1.0μm - 0.13μm

Smart
HITFET
PROFET
TEMPFET

MOSFET
CoolMOS
OptiMOS

0.1 **1** **10** **100**

switching current [A]

SPT = Smart Power Technology

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SPT9 Products – Digital and Power in One

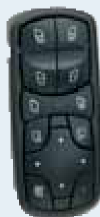
ASIC power audio solution

- First product in this technology.
- High performance 2x25W class D amplifier.
- 2.5m transistors along with high-voltage drivers.
- Reduced BoM due to integration of digital and analog functionality.

Automotive window lift SoC

- SPT9 – world's first 130nm process qualified for automotive.
- World's smallest window lift solution.
- 8-bit µC with analog mixed-signal IPs.
- High-power switches, LIN transceiver and eFlash integrated.

Automotive target markets for SPT9 SoC



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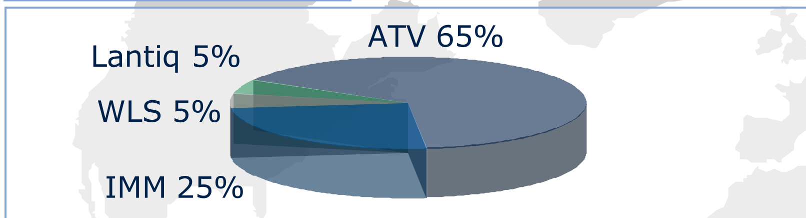
Infineon's In-house Manufacturing Is Focusing on Embedded Flash, Sensor and Power

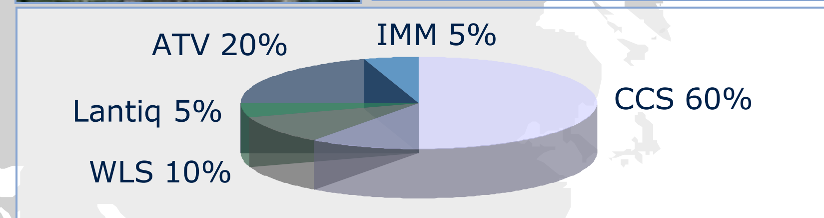
Regensburg

Employees:	1,090
Capacity:	42k WSPM
Technology:	≥350nm
Complexity:	16 mask layers
Products:	Power



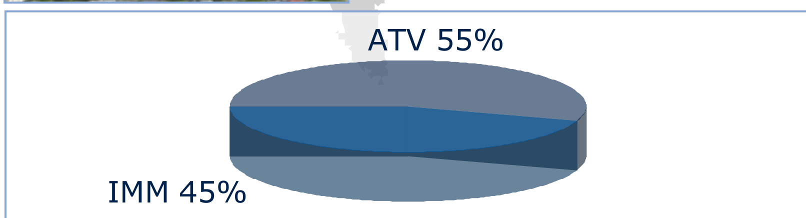
Dresden

Employees:	1,790
Capacity:	40k WSPM
Technology:	≥90nm
Complexity:	30 mask layers
Products:	CMOS



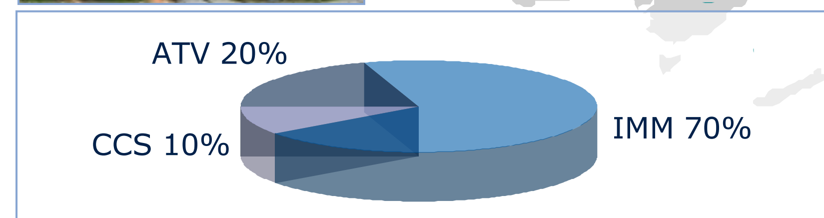
Villach

Employees:	1,590
Capacity:	110k WSPM
Technology:	≥200nm
Complexity:	11 mask layers
Products:	Power



Kulim

Employees:	990
Capacity:	51k WSPM
Technology:	≥200nm
Complexity:	13 mask layers
Products:	Power, CMOS



WSPM = Wafer Starts Per Month (200mm equivalent)

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Worldwide Production Sites Backend

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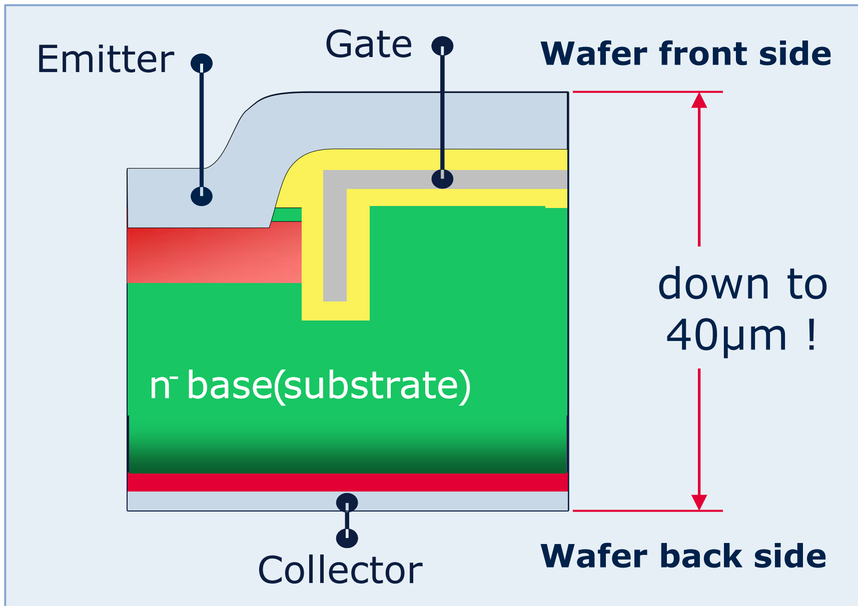
Unique Manufacturing Know-How in Ultra-thin Wafers

IGBT transistor



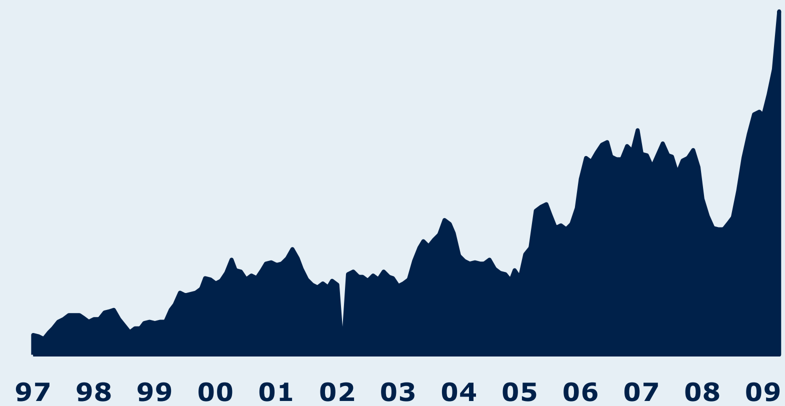
Manufacturing competencies

- Ultra-thin wafer handling
- Frontside processing
- Backside processing
- Outstanding cost performance, e.g. IGBTs and SiC diodes

Applications

- Speed-controlled motors for traction, drives, pumps, and fans
- Power supplies
- Lighting
- Inductive cooking
- Automotive

Rev^{*}_{cum} = EUR 136,108,251



* = Cumulated revenue of all thin wafer IGBTs over lifetime.

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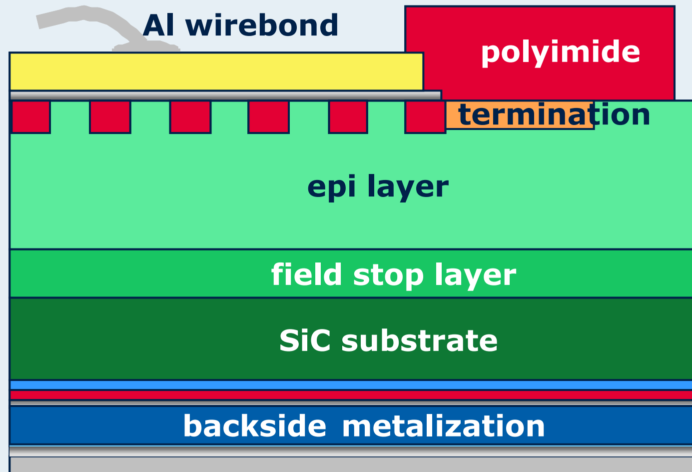
Unique Technology and Manufacturing Know-How in Silicon-Carbide (SiC)

Silicon-carbide diode



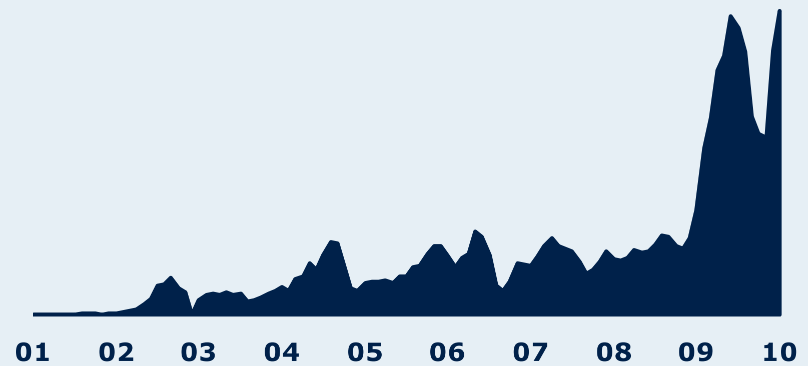
Applications

- Power factor correction in high-end power supplies (server, telecom, flat panel displays).
- Solar inverter.
- Speed-controlled motors for traction and drives.

Manufacturing competencies

- 100 mm SiC manufacturing line in Villach, Austria, on standard 150/200mm equipment.
- World's 1st 10x100 mm SiC epi system.
- About 30-50% smaller chip size than competition with same performance.
- Special high-temperature processes.

Rev^{*}_{cum} = EUR 12,117,616



* = Cumulated revenue of all SiC products over lifetime.

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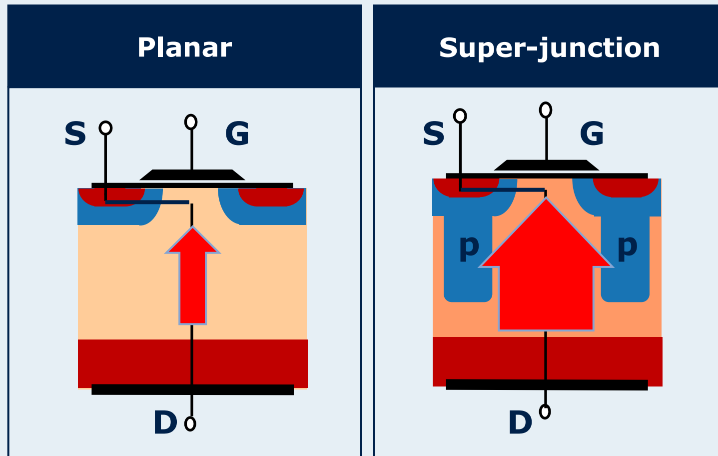
Outstanding Electrical Performance With CoolMOS™ Super-Junction Power MOSFETs

Super-junction transistor



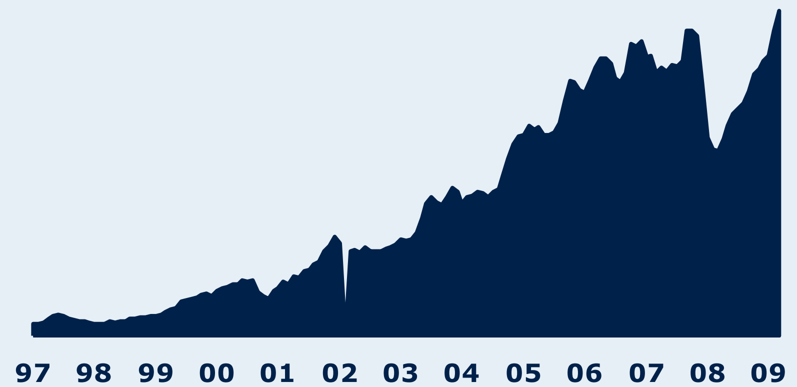
Manufacturing competencies

- In the late 1990s, a super-junction transistor was invented, dubbed CoolMOS™.
- Manufacturing improvements led to a cost reduction by a factor of 4.
- Reduction of RDS(on) by a factor of 6.

Applications

- Power supplies for servers, PCs, notebooks, games consoles, adapters.
- Graphics boards
- Lighting
- Solar inverter
- Automotive

Rev^{*}_{cum} = EUR 1,382,570,554



* = Cum. revenue of all CoolMOS™ products over lifetime.

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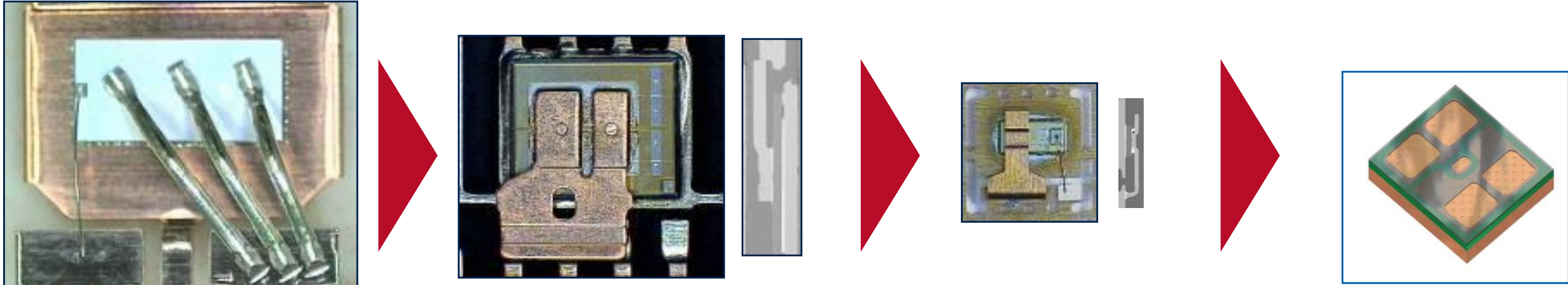
Package Follows Chip Technology – Strong Interaction to Achieve Performance

infineon

Future limitations: package shrink and thermal density on PCB



D²PAK	SSO8	S3O8	Blade 3x3
■ footprint 150 mm² ■ chip size: 1-30 mm² ■ Al thick wire 3x500 µm (⇨0.4 mΩ) ■ package height: 4 mm	■ package 30 mm² ■ chip size: 1-13mm² ■ clip: 0.2mΩ ■ package height: 1 mm	■ package: 11 mm² ■ chip size: 1-4,5mm² ■ clip: 0.3 mΩ ■ package height: 1 mm	■ chip embedding ■ chip size: 0.5-6mm² ■ galvanic interconnect 0.1 mΩ ■ double side cooling ■ lowest parasitics
■ power density: 0.66 A/mm²	■ power density: 1.7 A/mm²	■ power density: 1.8 A/mm²	■ power density: 3.9 A/mm²
2000	2003	2006	2011

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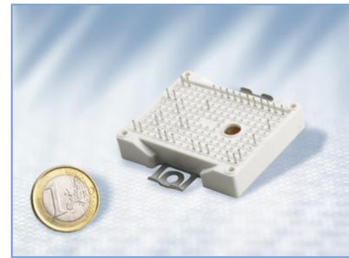
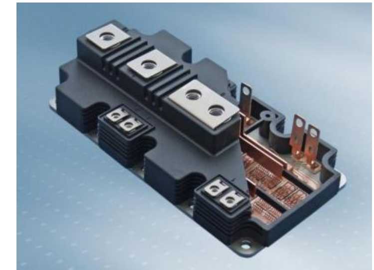
Infineon Improved Power Density of Power Modules by More Than 180% Since 1995

State-of-the-art power modules and chips enable higher power density





IGBT2	IGBT3	IGBT4	IGBT4.XT
34mm module	EconoPACK™2	EasyPACK2B	PrimePACK™2
1200 V	1200 V	1200 V	1200 V
45 kW	37.2 kW	31.3 kW	600 kW
0.46 kW/cm²	**0.89 kW/cm²**	**1.16 kW/cm²**	**1.31 kW/cm²**
Tj=125 °C	Tj=125 °C	Tj=150 °C	Tj=175 °C
1995	2001	2007	2011

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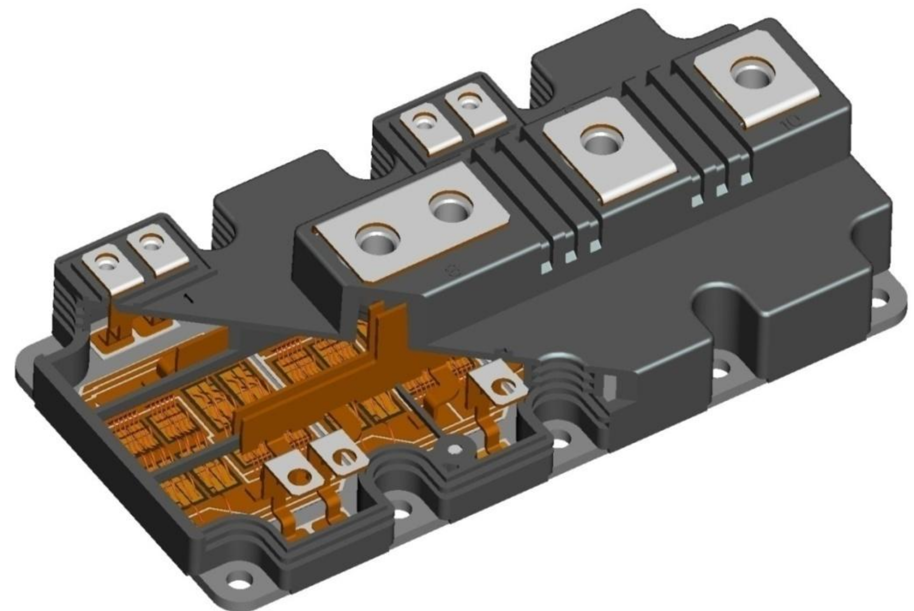
.XT Technology Will Improve Lifetime By a Factor of 10 Versus Standard Technology

- Emerging applications requiring longer life time.
- Trend to higher power density leads to new internal packaging technology.
- .XT technology is a set of internal connection technologies that will improve all life time limiting areas within an IGBT module.
- Start of Production: 2011.



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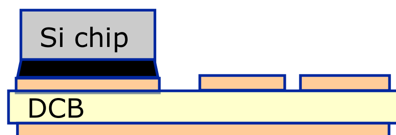
What Is .XT Technology?

Standard technology

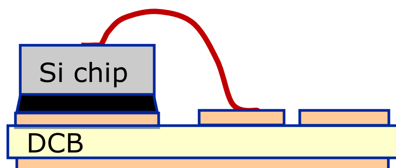
.XT technology

Chip-to-substrate joint



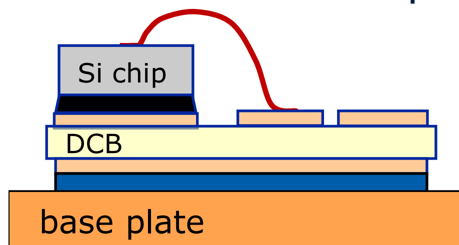
Soft soldering with SnAg paste → Diffusion soldering

Front side interconnect



Al wedge bonding → Cu wedge bonding

Substrate-to-base plate joint



Soft soldering with SnAg pre-form → High reliability system soldering

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Differentiating Technologies In-house; Standard CMOS Technologies Outsourced

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Make-or-Buy Decision Based on Differentiation Potential

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1 pin	10 pins	100 pins	1000 pins

In-house assembly & test

High volume fabs

Batam
High volumes for power DSO

Wuxi
High volumes for discretes, chip card

Cegléd
High power

Singapore
Tester pool for CMOS, test for wafer, power, CMOS

Competence center

Warstein
High power, complex power products

Malacca
High volumes for leadfames, laminates, sensors, discretes

Regensburg
Chip card, sensors, eWLB pilot

Subcontractos

Subcontractors Power

	Assembly	Test
Amkor		●
ASE		●
Nantong	●	●
PSI	●	●
Unisem	●	

Subcontractors CMOS

	Assembly			Test
	Leadframe	Laminate	eWLB	
Amkor	●	●		●
ASE	●	●	●	●
KYEC				●
Nanium			●	●
STATS ChipPac			●	●
UTAC				●

Power CMOS

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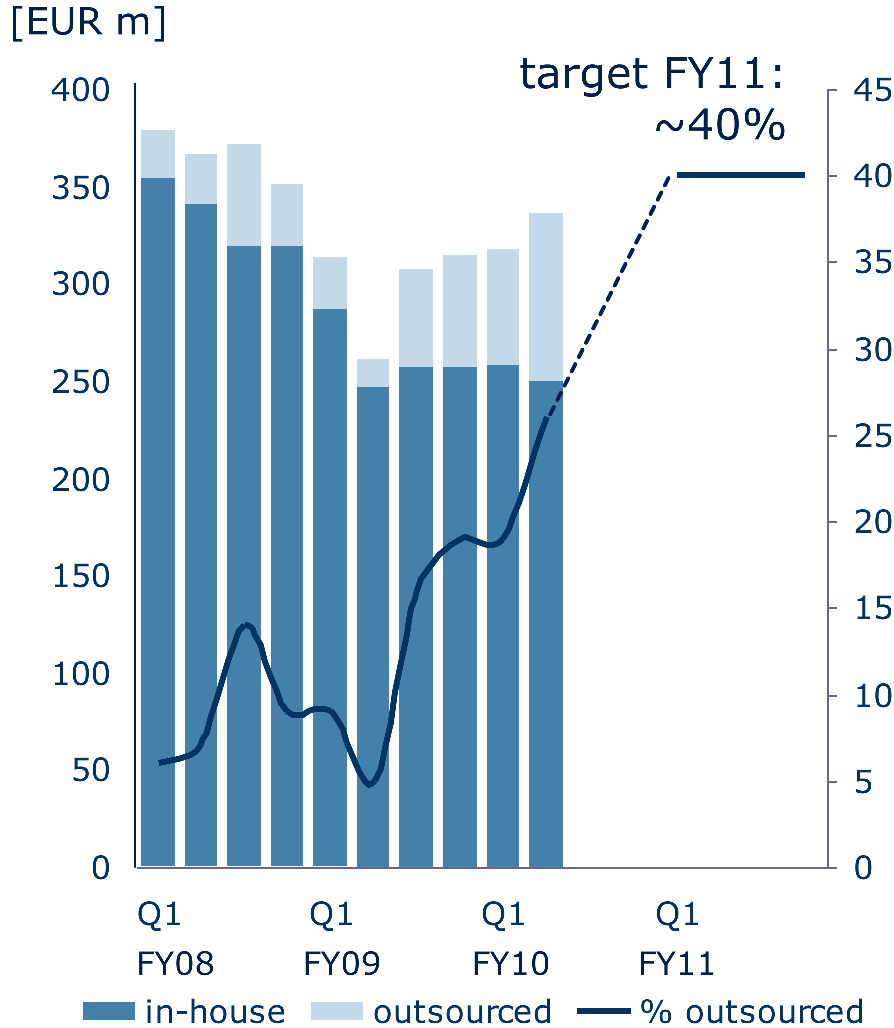
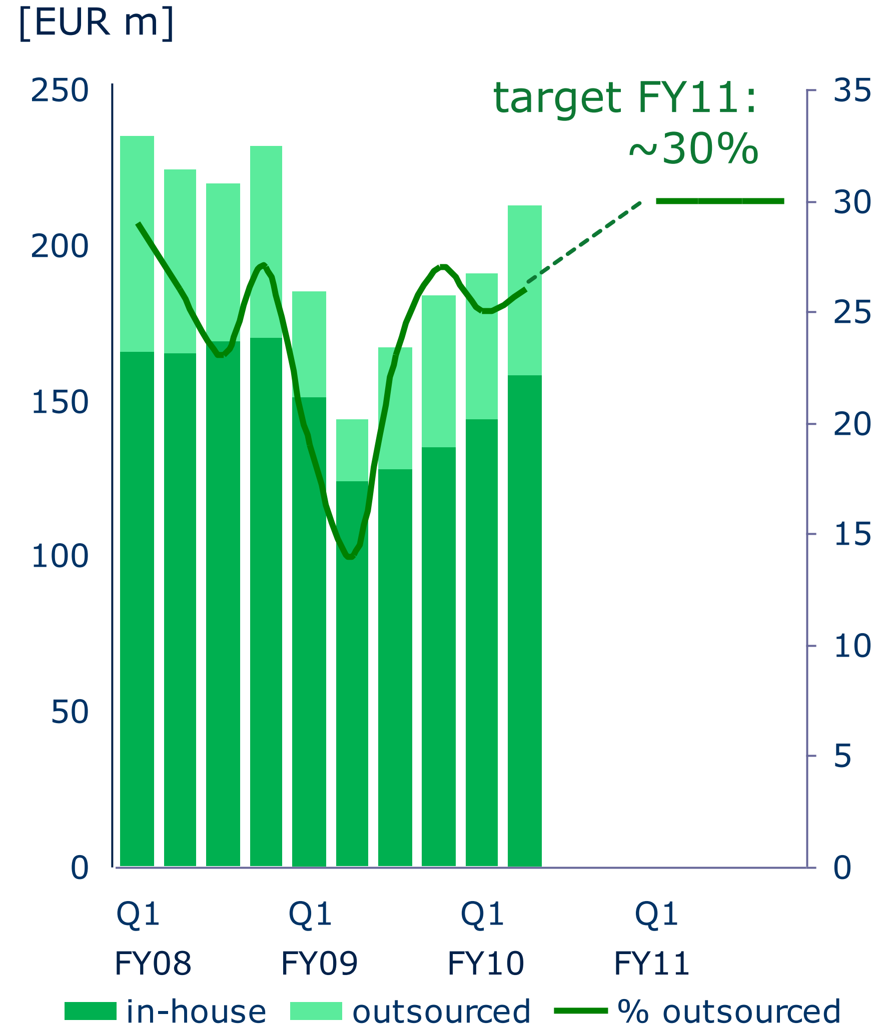
Infineon's Outsourcing Strategy Helps to Reduce CapEx and to Improve Flexibility





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Flexible Labor Management Models Allow For Fast Reaction During Downturn

[kWSPM; (200mm equivalents)]

[employees]

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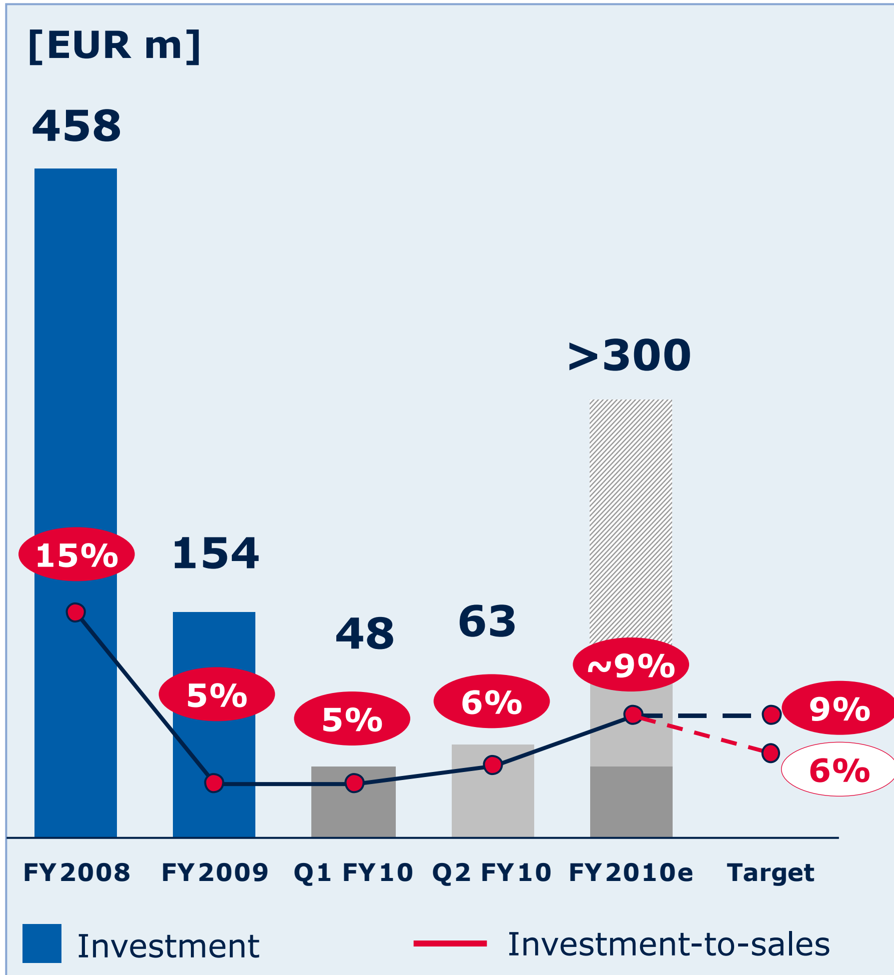
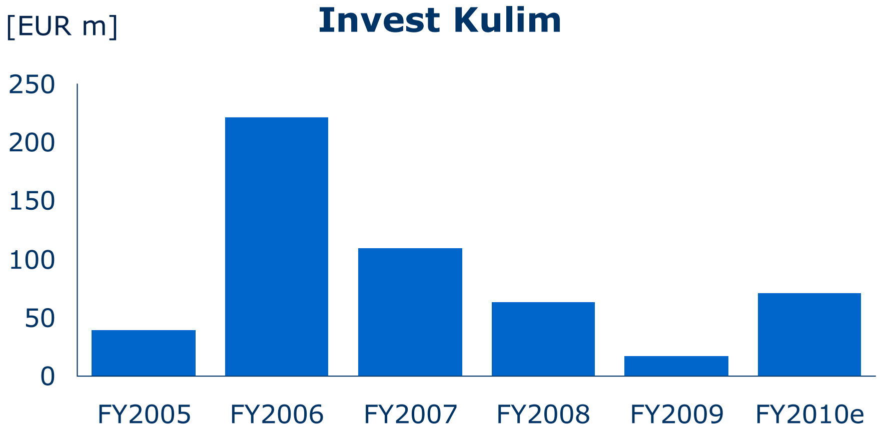
Frontend Invest: Grow in Best-cost Countries With Focus on Distinctive Technologies





Kulim:
- Clean room ~50% equipped by end of CY 2010.
- ~25% of PPE invest in FY10e.

Villach, Regensburg:
- Invest for innovation.
- ~11% of PPE invest in FY10e.

Dresden:
- Conversion from Al to Cu.
- ~15% of PPE invest in FY10e.

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

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ENERGY EFFICIENCY COMMUNICATIONS SECURITY

Innovative semiconductor solutions for energy efficiency, communications and security.

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These forward-looking statements are subject to a number of uncertainties, such as broader economic developments, including the sustainability of recent improvements in the market environment; trends in demand and prices for semiconductors generally and for our products in particular, as well as for the end-products, such as automobiles and consumer electronics, that incorporate our products; the success of our development efforts, both alone and with partners; the success of our efforts to introduce new production processes at our facilities; the actions of competitors; the availability of funds; the outcome of antitrust investigations and litigation matters; and the resolution of Qimonda's insolvency proceedings; as well as the other factors mentioned in this presentation and those described in the "Risk Factors" section of our most recent annual report on Form 20-F on file with the U.S. Securities and Exchange Commission. As a result, Infineon's actual results could differ materially from those contained in or suggested by these forward-looking statements. You are cautioned not to place undue reliance on these forward-looking statements.

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