



# Company Presentation 2012

Sensors expo & conference 2012  
Chicago, June 6 – 7, 2012

# Agenda

## Overview

Hall-effect sensors

Gas sensors

Embedded controllers for smart actuators

Customers

Summary

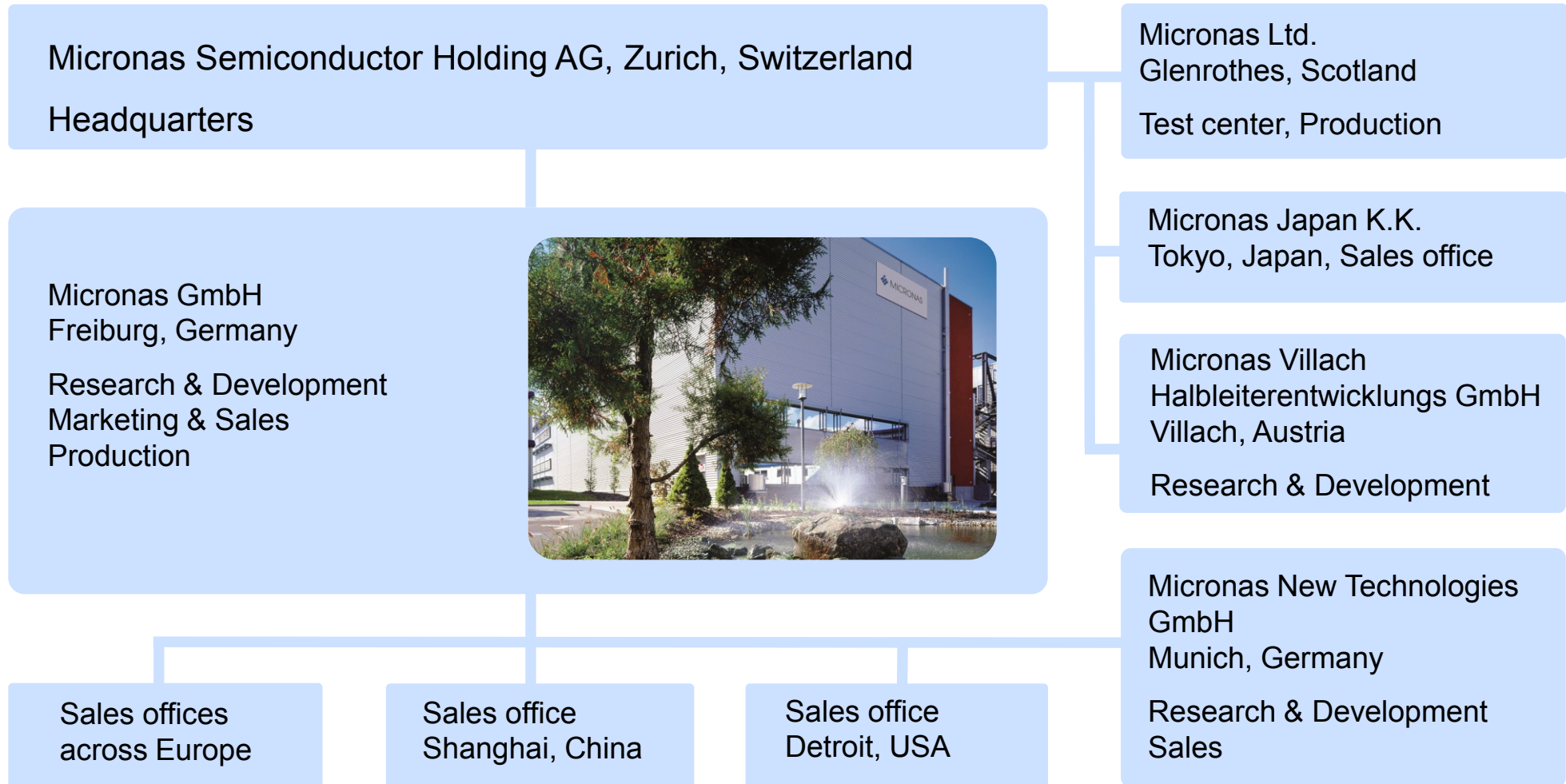
## Micronas at a glance

Known and recognized in the automotive and industrial business as a reliable global acting partner for intelligent, sensor-based system solutions

- ◆ About 900 employees worldwide
- ◆ Own wafer fab with 6" and 8" production line
- ◆ Backend operation including testing and packaging
- ◆ Zero ppm quality to ensure customer satisfaction
- ◆ Commitment to environmental protection

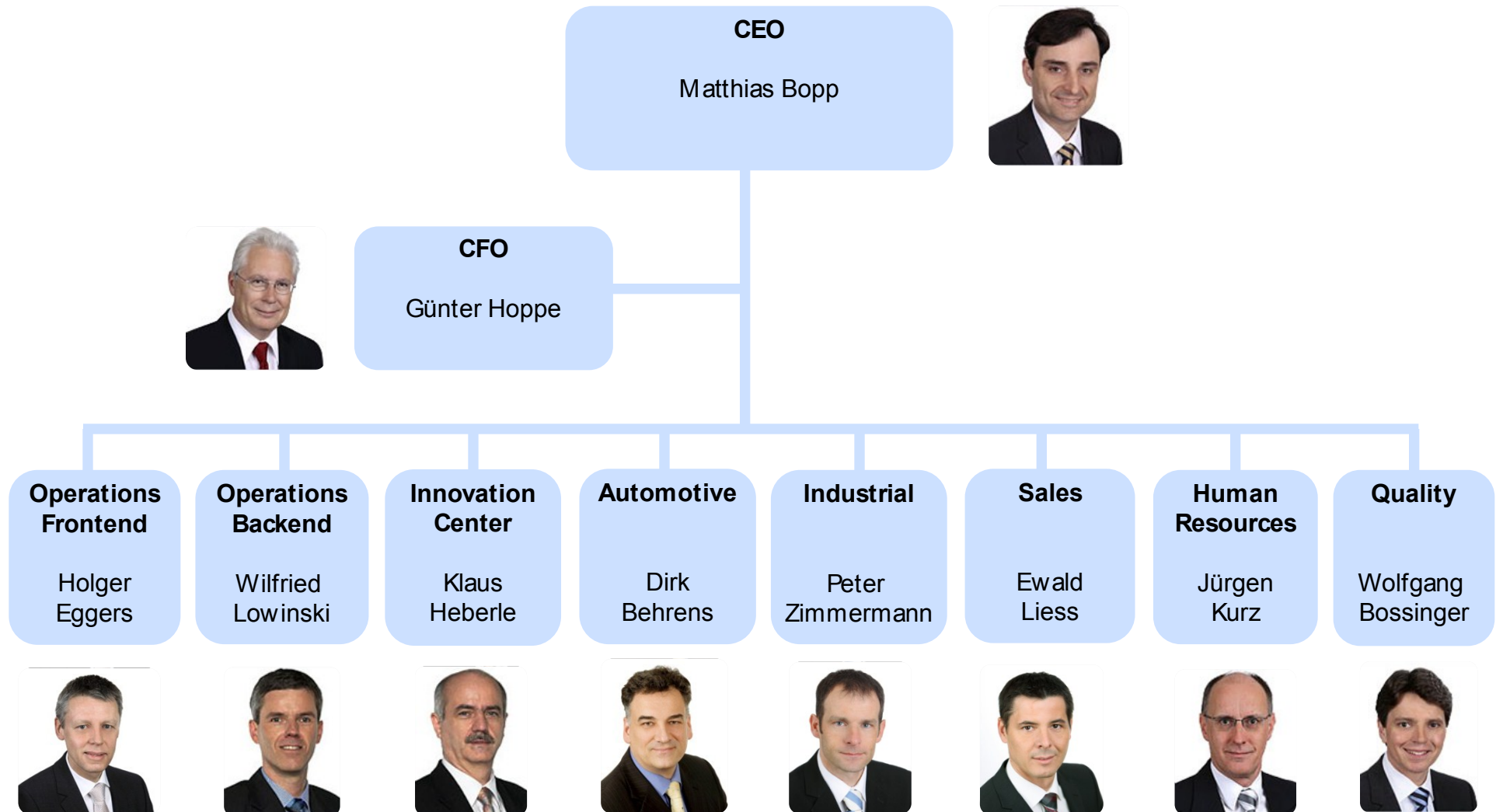


# Group structure and locations



Distributor base all around the world

# Management team





# Micronas – business year 2011

- ◆ Micronas once again achieved a double-digit EBIT margin of 13 percent
- ◆ Automotive business recovered already by the end of the third quarter from the crisis resulting from the earthquake of Japan
- ◆ Sales in our core business, Hall sensors, were up by 7 percent on an euro basis
- ◆ Capacity utilization peaked at around 80 percent during the fourth quarter after being only 70 percent during the Japan crisis
- ◆ Micronas increased its investments in R&D to more than 17 percent of sales
- ◆ Micronas continued the expansion of marketing and sales activities along clear lines of responsibility



## Micronas – business year 2011, cont.

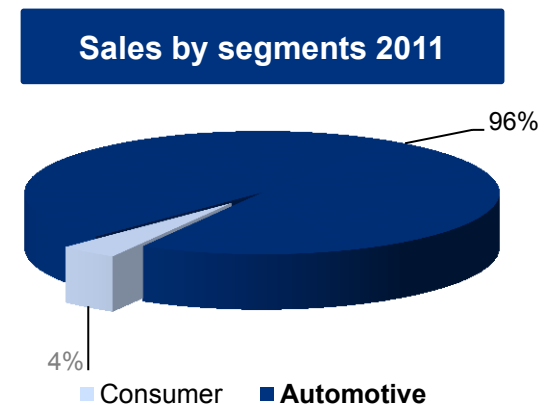
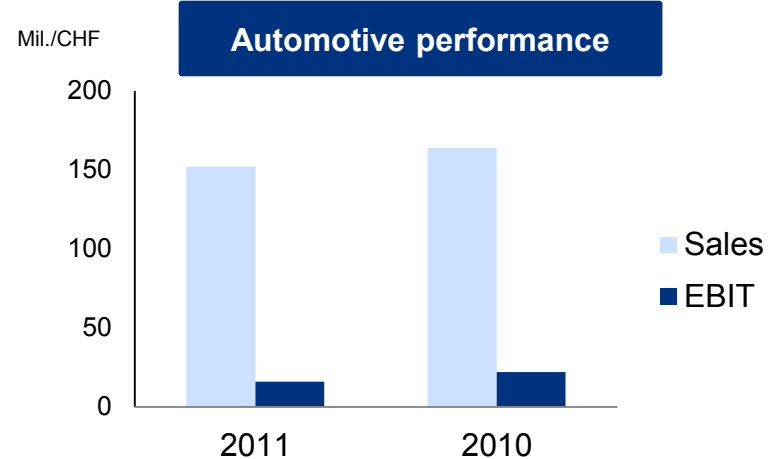
- ◆ A milestone in the Industrial sector was the partnership agreement on gas sensors between Siemens and Micronas
- ◆ Micronas has secured access to next-generation technologies by a cooperation agreement and an investment in X-FAB
- ◆ Micronas acquired all previously leased land and buildings in Freiburg
- ◆ Micronas installed a 2000 m<sup>2</sup> photovoltaic system in order to further strengthen its contribution to environmental protection
- ◆ Micronas was granted the ISO/TS 16949 certification for another three years for its comprehensive quality-focused systems



# Micronas Group – segment information

Mil./CHF	31.12.2011	31.12.2010
<b>Automotive</b>		
<b>Net sales</b>	<b>151.8</b>	163.7
<b>Gross margin</b>	<b>58.1</b>	61.0
in % of sales	38.3%	37.3%
<b>Operating profit (EBIT)</b>	<b>16.3</b>	21.9
in % of sales	10.7%	13.4%

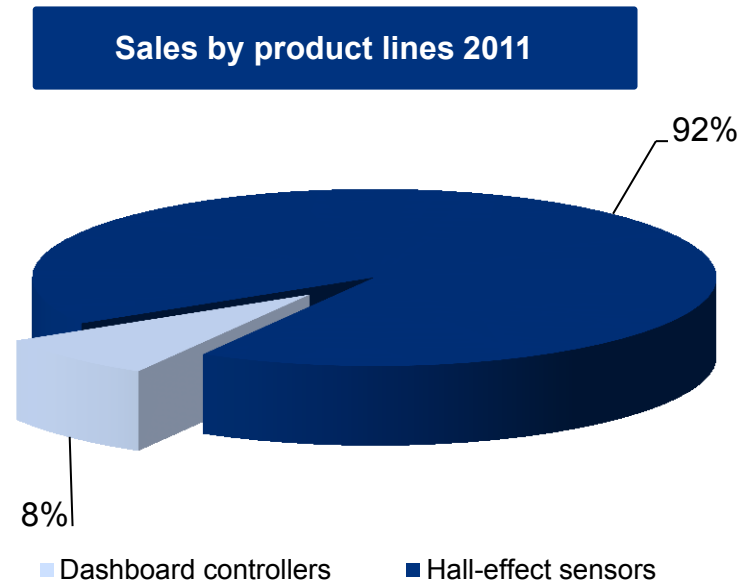
Mil./CHF	31.12.2011	31.12.2010
<b>Consumer</b>		
<b>Net sales</b>	<b>7.0</b>	26.6
<b>Gross margin</b>	<b>1.1</b>	3.2
in % of sales	15.2%	12.1%
<b>Operating profit (EBIT)</b>	<b>4.3</b>	4.2
in % of sales	61.9%	15.8%





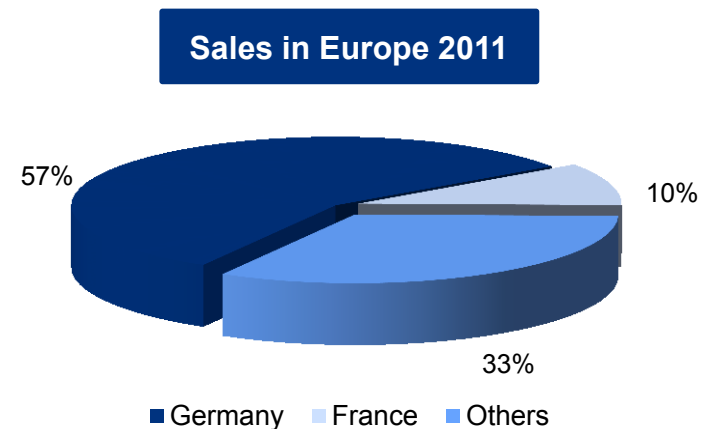
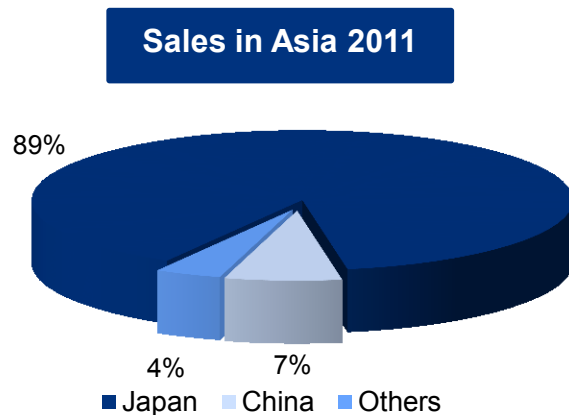
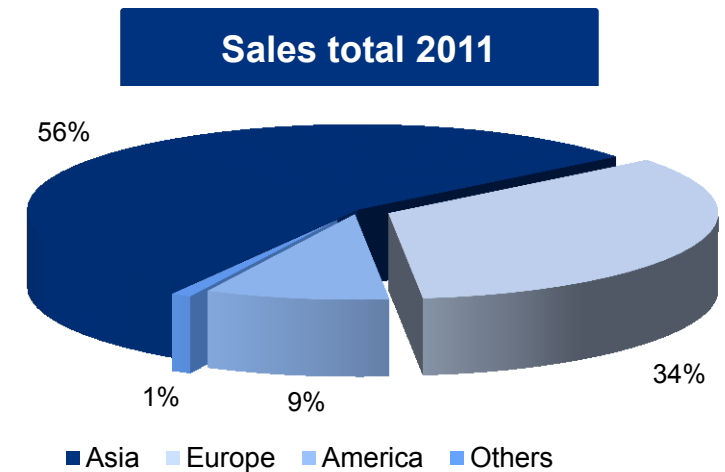
## Segment Automotive – product lines

Mil./CHF	31.12.2011	31.12.2010	Change in % based in CHF	Change in % based in EUR
Hall-effect sensors	140.0	146.1	-4%	7%
Dashboard controllers	11.8	17.6	-33%	-25%
<b>Total</b>	<b>151.8</b>	<b>163.7</b>	<b>-7%</b>	<b>3%</b>



# Segment Automotive – regional information

Mil./CHF	31.12.2011	31.12.2010	Change in % based in CHF	Change in % based in EUR
Europe	51.7	57.1	-9%	1%
Asia	85.3	88.5	-4%	7%
America	14.7	17.8	-17%	-8%
Others	0.1	0.3	-67%	-63%
<b>Total</b>	<b>151.8</b>	<b>163.7</b>	<b>-7%</b>	<b>3%</b>



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**Hall-effect sensors**

Gas sensors

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Customers

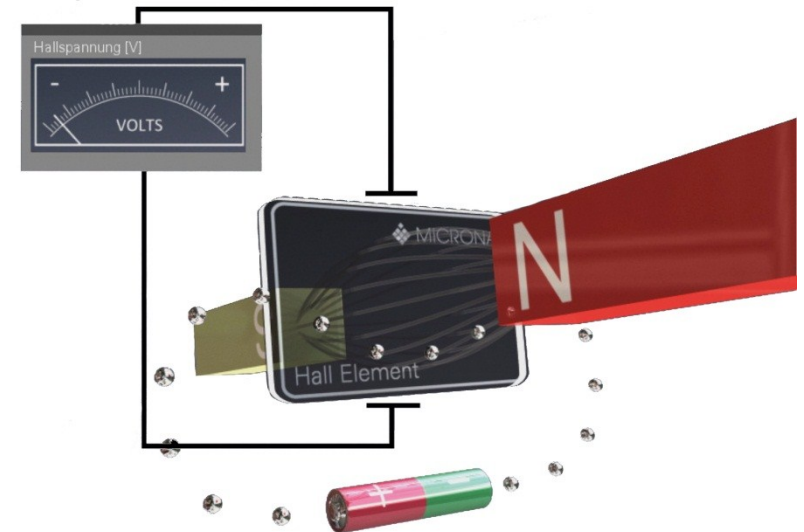
Summary

# Hall-effect sensors – technology

**Hall-effect sensors are the technology of choice for contact-less sensing. Micronas, the pioneer of CMOS Hall sensors, continues to innovate in this field.**

## Introduction

- ◆ Contact-less sensing improves system reliability, especially in harsh environments
- ◆ CMOS technology is the most cost-effective method to realize Hall sensors
- ◆ High levels of integration enable sensors to configure to a wide range of applications
- ◆ Micronas has a strong track record of supplying sensors that meet the most demanding quality standards



# Hall-effect sensors – technology and market drivers

Hall technology is suitable to serve expanding market requirements and thus provides sustaining growth.

## Environmental protection

Hybrid and electrical vehicles as well as CO<sub>2</sub> reduction in combustion engines increase sensor demand

## Economy

Highly integrated sensors reduce overall system cost

## Safety

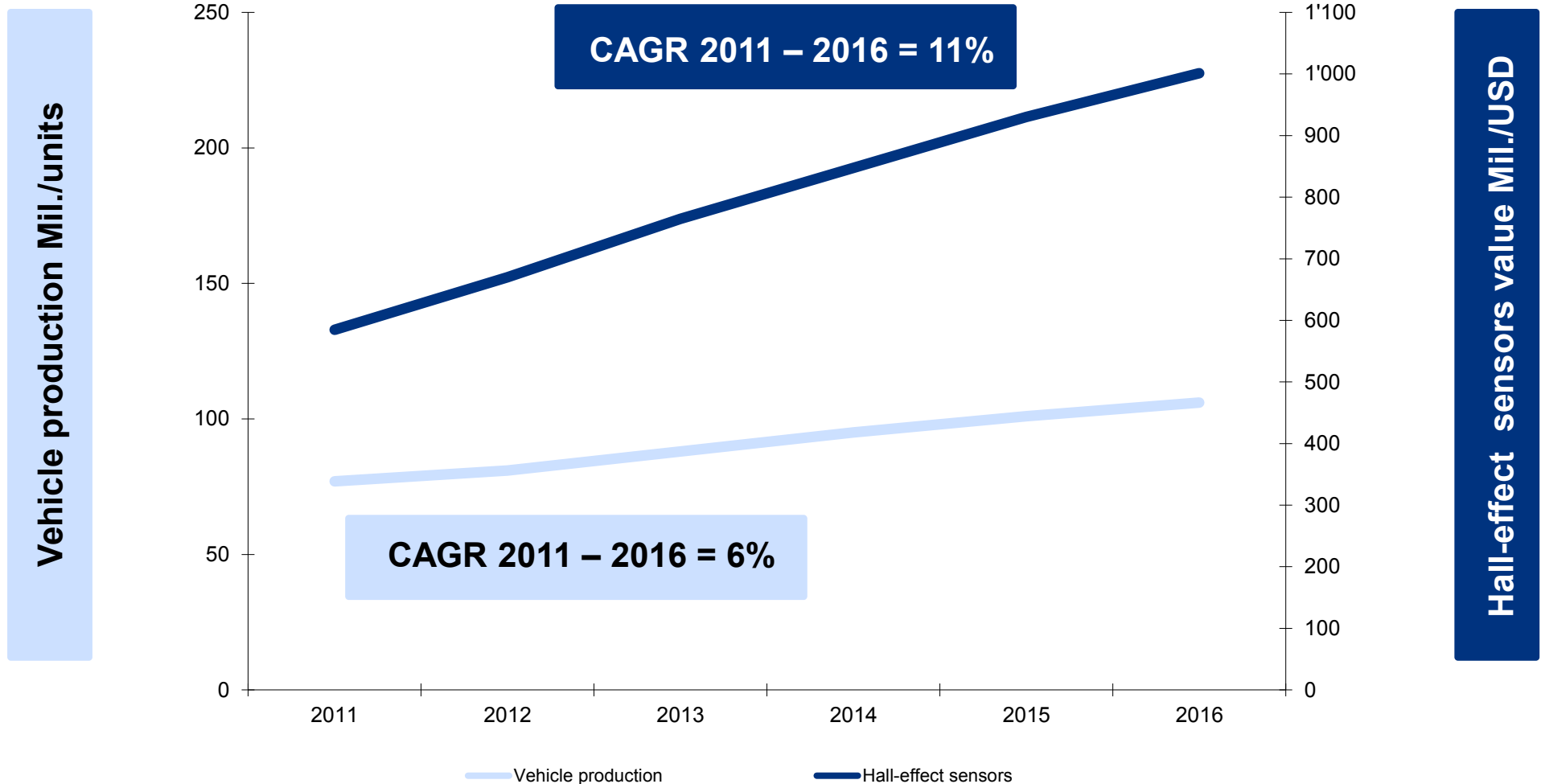
Increased safety demands drive growth for intelligent and redundant solutions

## Comfort and lifestyle

Low power and small form factor enable contact-less sensing in new applications



# Automotive and Hall-effect sensor markets

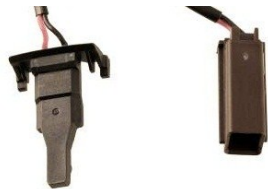


Source: Strategy Analytics / isuppli / Micronas, January 2012

# Hall-effect sensors – functions and applications

Micronas offers the broadest portfolio of Hall sensors for automotive and industrial systems.

## Switches



buckle switch



roller shutter

- ◆ Easy to implement contact-less switch
- ◆ Replacement of micro switches

## Linear

throttle flap



gas pedal sensor

- ◆ Highly accurate position detection
- ◆ Replacement of conventional potentiometers

## Angular



steering angle

**3D|HAL**  
by Micronas

License Note:  
3D HAL uses licenses of  
Fraunhofer Institute for  
Integrated Circuits IIS.

selection switch



- ◆ Precise angle detection with a single sensor
- ◆ Replacement of inductive or optical angle encoders

## Current



power management

Continental

current sensor module



- ◆ Small form factor contact-less current transducer
- ◆ Replacement of shunt based solutions

# Hall-effect sensors – application fields for Automotive

## Powertrain

High accuracy sensors designed to withstand harsh environments: Insensitive to vibrations, temperature drift and dirt



## Chassis and body

Programmable sensors with integrated communication links provide flexibility



## Safety

Proven history of meeting Automotive's highest quality standards. Expanding portfolio addresses increasing safety requirements



# Hall-effect sensors – application fields for Industrial

## Heavy machines / factory automation

Micronas products have been developed to meet the demands for long lifetime and high reliability in harsh environments



## Building and home automation

Micronas products offer intelligent sensor solutions for smart automation networks for an increased comfort and lifestyle



## White goods / home appliances

Micronas offers a wide range of cost-effective sensor solutions for eco-friendly home appliances at minimal size



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Financials

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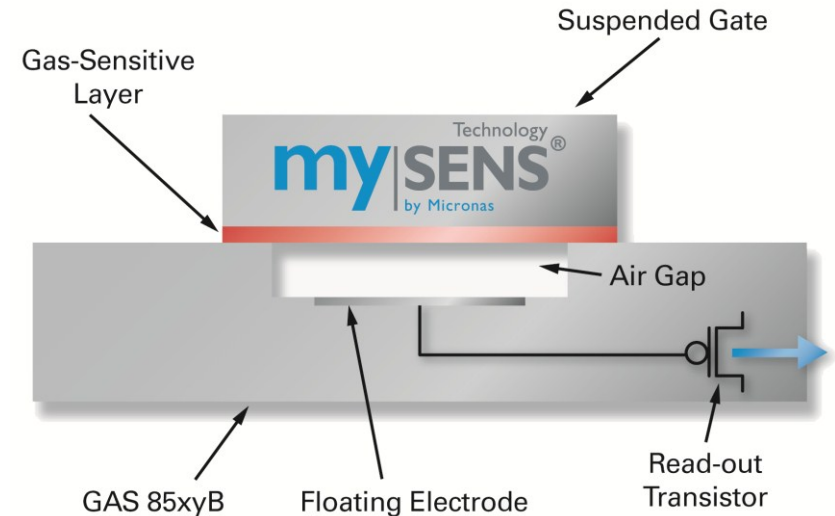


# – Gas sensing technology

**Gas sensors become digital: Micronas mySENS® gas sensing technology to overcome the limitations of existing technologies.**

## Introduction

- ◆ Digital ambient sensor platform with:
  - ◆ two independent gas sensors
  - ◆ integrated relative humidity sensor
  - ◆ integrated temperature sensor
- ◆ Target gases: detection of NO<sub>2</sub>, NH<sub>3</sub>, H<sub>2</sub>, VOC, CO, CO<sub>2</sub>
- ◆ CCFET sensor (Capacitive Coupled Field Effect Transistor)
- ◆ Manufactured in-house on Micronas latest CMOS technology



## – technology and market drivers

**Micronas mySENS® gas sensors represent a new versatile sensor technology serving major industrial and automotive trends.**

### **Environmental protection**

High energy efficiency and low CO<sub>2</sub> emissions of HVAC systems due to air quality measurement

### **Economy**

Highly integrated multi parameter sensors reduce overall system cost

### **Safety**

Increased legislation requirements and public safety awareness need new sensors

### **Comfort and lifestyle**

Personalized comfort requirements  
Literally invisible modules and controls

# **– Gas sensing markets and applications**

**First digital gas sensor to diversify Micronas' product portfolio and target markets.**

## Fire detection



- ◆ Reduction of system size to almost invisible
- ◆ Improved false alarm security
- ◆ Long lifetime and low power consumption

## HVAC

(Heating, Ventilation and Air Conditioning)



- ◆ Comfort and energy efficiency in building automation
- ◆ Integration of climate control and air quality in a single device

## Leakage



- ◆ High sensitivity to ambient trace gases
- ◆ Broad dynamic range of gas concentration
- ◆ Robust against overdose exposure

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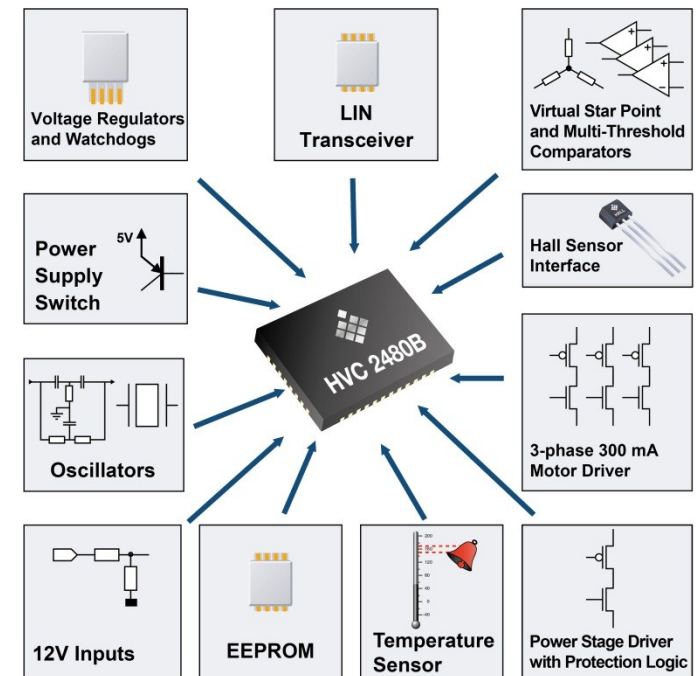
Summary

# Embedded controllers – technology

The actuator market is transitioning to BLDC motors. Micronas' highly integrated solutions enable cost-effective system implementation.

## Introduction

- ◆ Specialized high voltage, analog and embedded flash CMOS processes uniquely serve the demanding requirements of a BLDC system
- ◆ Single package enables solutions to be realized in space constrained applications
- ◆ Micronas is uniquely positioned to combine two critical aspects of motor commutation – embedded control and Hall sensors – creating solutions that are unmatched in terms of power consumption and physical dimensions





# Embedded controllers – technology and market drivers

The actuator market is transitioning to more efficient Brushless DC (BLDC) motors. Specialized embedded controllers are key enablers for fully realizing the benefits of BLDC.

## Environmental protection

BLDC motors deliver significant efficiency gains relative to brushed and stepper motors

## Economy

BLDC motors can achieve a given performance with less magnetic material and lower weight

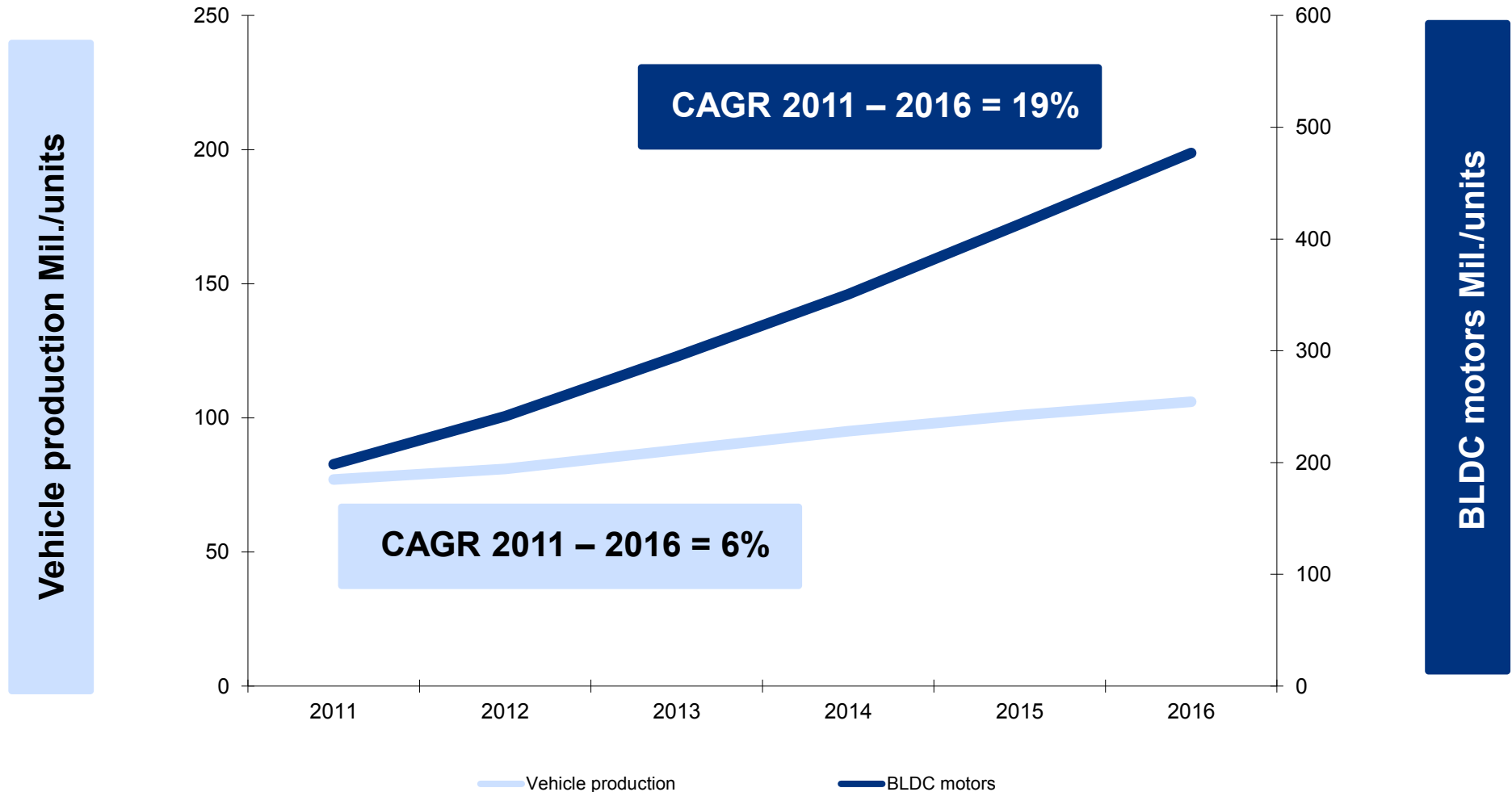
## Safety

Increased intelligence in a single SOC enables improved safety feature integration

## Comfort and lifestyle

High levels of functionality and computing power permit cost and power effective implementation of comfort features

# Automotive and BLDC motor markets



Source: Strategy Analytics, January 2012 / IMS Research, July 2011

# Embedded controllers – applications

Adaptive intelligent control of electrical current or speed in Automotive and Industrial applications.

## Fans



- ◆ Engine cooling system
- ◆ HVAC
- ◆ Cooling (battery, LED)

## Pumps



- ◆ Fuel
- ◆ Oil
- ◆ Water (HVAC, coffee)

## Specialized actuators



- ◆ Seat and mirror adjustment
- ◆ Window lifter
- ◆ Head light adjustment
- ◆ Active grill modules
- ◆ Flaps (HVAC, exhaust)

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# Customer and distributor base





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- ◆ Micronas can look back on a successful year 2011
- ◆ Increasing investments in R&D, marketing and sales
- ◆ Investing in the development of new hall sensors in the field of multi-dimensional magnetic field detection
- ◆ Adding gas sensors and embedded controllers for smart actuators to the product portfolio
- ◆ Micronas now has excellent access to future technologies
- ◆ Thanks to the gross margin improvement the EBIT-margin was 13 percent despite the strategic investments
- ◆ This confirms that Micronas is well positioned for the upcoming years

