



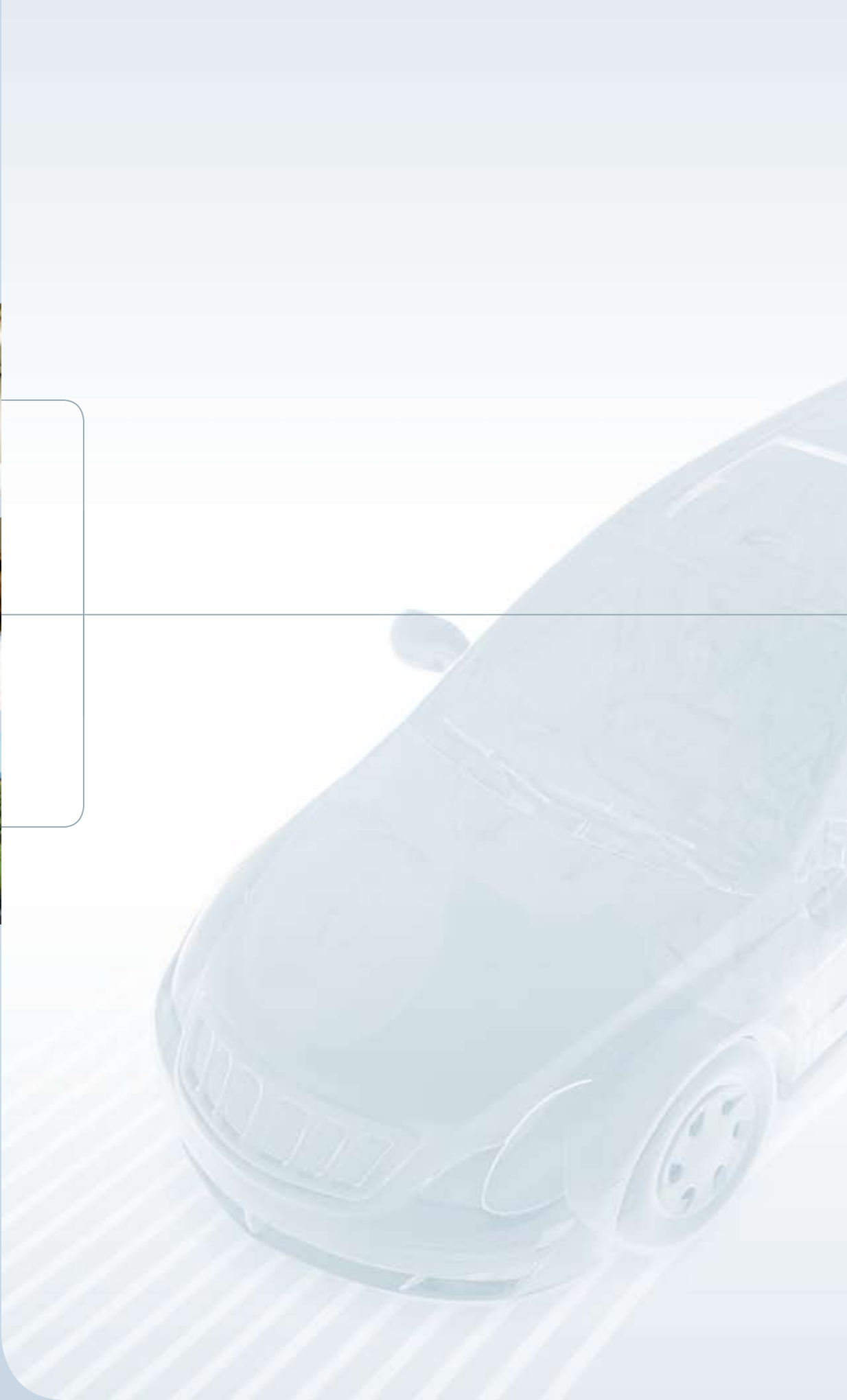
Never stop thinking




# Driving the Future of Automotive Electronics

## Automotive system solutions

[ [www.infineon.com/automotive](http://www.infineon.com/automotive) ]





## Contents

Challenges and Trends	4
Safety System Solutions	6
Body & Convenience System Solutions	12
Powertrain System Solutions	18
Electrified Powertrain System Solutions	28
Enhanced Communication	34
Peripheral Highlights	36
Embedded Software	37
Automotive Excellence Program	38



## Driving the Future of Automotive Electronics

INFINEON TECHNOLOGIES' sustained success in automotive electronics is attributed to a consistent focus on automotive applications and their requirements, a profound understanding of the automotive system based on almost 40 years of experience and a broad innovative product portfolio of outstanding quality. Infineon supplies the automotive industry with sensors, micro-controllers and power semiconductors that contribute to a more sustainable mobility in terms of reduced fuel consumption/emissions, improved safety and affordability.

### Reducing road fatalities

INFINEON PROVIDES SOLUTIONS in order to optimize chipsets that will lead to better systems that will reduce the number of road fatalities. For example, tire pressure sensor systems are required by legislation in the US, and Infineon has gained a leading position in this field. Safety systems are becoming more proactive, in that they act before accidents occur (e.g. adaptive cruise control, lane departure warning) instead of only reacting when these happen.

### Contributing to the environment

THE INCREASED MOBILITY of today's modern lifestyle comes at the cost of higher CO<sub>2</sub> emissions and consumption of ever scarcer natural resources. Personal transportation is evolving to ensure future personal mobility with lower emissions than those we have today. Electronic components are a key to this improved energy efficiency. To help save energy and reduce pollution, Infineon delivers innovative high-performance solutions with best-in-class technologies for hybrid electric vehicles (HEVs), which represent one of the most efficient energy conversion approaches for personal transportation.



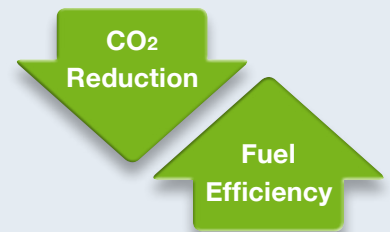
INFINEON COMBINES the know-how of the world leader in advanced power electronics and the world's second largest automotive semiconductor company to deliver innovative electronic solutions for these new forms of personal transportation. These solutions continue our commitment to exceptional quality and reliability that the world's leading light vehicle manufacturers expect.

OUR SYSTEMS EXPERTISE means we are able to provide complete chipsets offering the best balance between performance and cost. Today, we are proud to serve our customer with technologically leading products in many areas of HEV applications, such as: power semiconductors, power modules, microcontrollers and sensors.

## Meeting increased data security demand

AS SYSTEM COMPLEXITY increases so does the quantity of data to be processed and distributed. Automakers therefore need to ensure that information is processed securely, avoiding external access or manipulation attempts (e.g. car tuning, counterfeit spare parts). Additionally, new payment methods, such as parking or road tolls, are based on the availability of secure transaction data. Infineon can provide years of expertise in chip card and identification systems in order to enable data security to become reality.

WITH OUR COMPONENTS delivering cost-effectiveness, high efficiency and power density, Infineon is driving the future of automotive electronics.



Green arrows will mark specific systems, which can contribute to reduce CO<sub>2</sub> emissions and increase fuel efficiency.

The named figures refer to the following baselines:

CO<sub>2</sub> reduction in g/km:  
170 g CO<sub>2</sub>/km on average European cars (2007)

Fuel efficiency standard in the US:  
35 mpg (miles per gallon) CAFE 2020



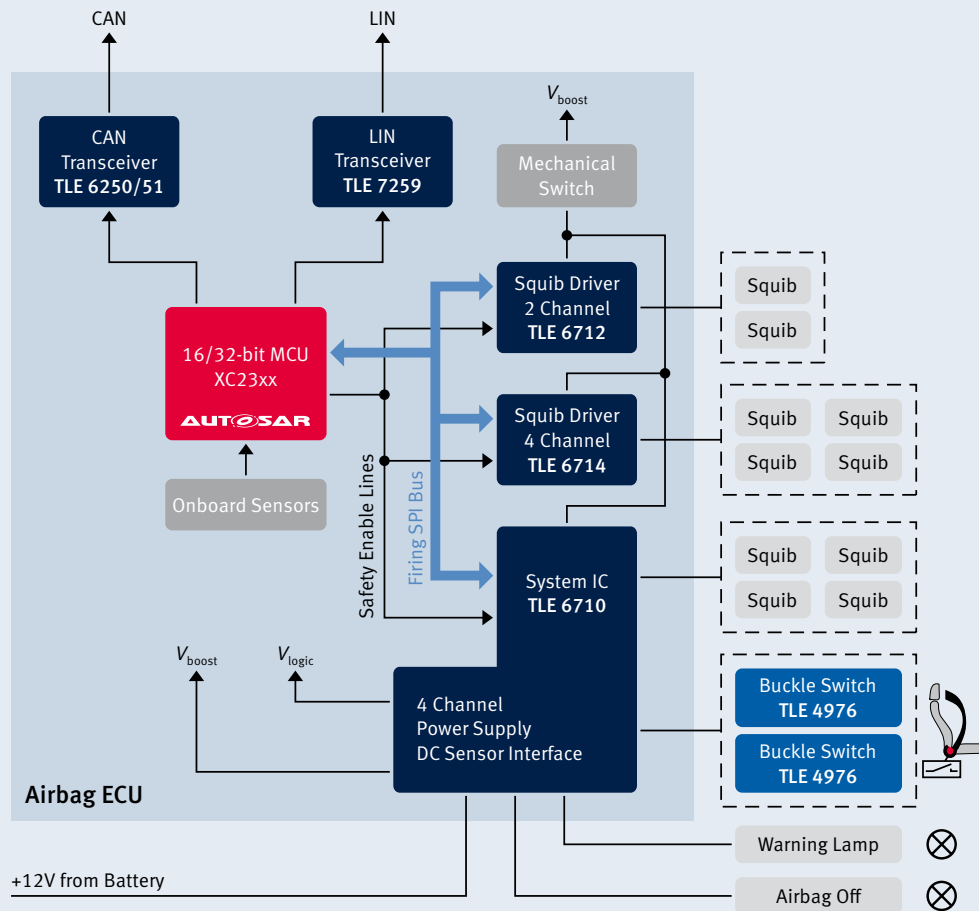
## Safety System Solutions

SAFETY ELECTRONICS is one of the key drivers for reducing road fatalities. Today, it is not only the demands of customers, governments are also implementing legislation to achieve this goal. In areas such as electric power steering the safety aspect can ideally be combined with reduction of fuel consumption/emissions reduction and improved overall energy efficiency of the car.

INFINEON IS ONE OF THE FEW broadband suppliers with products comprising intelligent sensors, 8-, 16-, 32-bit microcontrollers, along with automotive power standard products, application-specific standard products (ASSPs) and highly integrated customized application-specific ICs (ASICs). This flexibility combined with our systems expertise, and with about four decades of experience in the automotive segment, allows us to support our customers by meeting their key challenges.

THESE CHALLENGES include further cost optimization, stringent quality requirements, and fulfilling future challenges in the safety market, such as meeting the safety integrity level requirements to come.

## Airbag System (Basic)



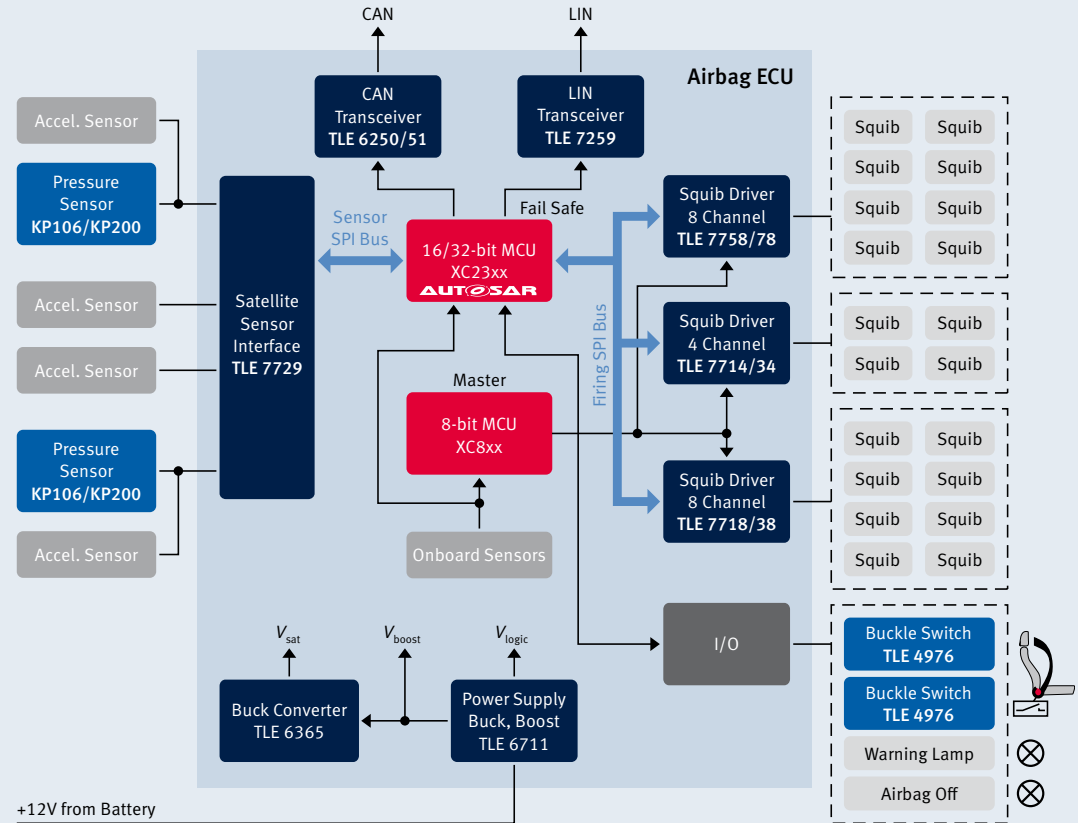
### System benefits

- With this chipset for basic airbag systems we support low-cost designs for emerging markets
- The 16/32-bit microcontroller offers 32-bit performance at 16-bit price
- Dedicated mixed signal airbag ASSPs provide flexibility and scalability for up to ten firing loops

### Suggested products

Product	Description
XC23xx	Powerful 16/32-bit microcontroller family with dedicated safety features
TLE 6710	Airbag ASSP with integrated buck, boost supply, DC sensor interface, 4-loop squib drivers, integrated safety functions
TLE 6712/14	Squib driver ICs for 2, 4 loops
TLE 6250/51	CAN transceiver
TLE 7259	LIN transceiver

# Airbag System (Advanced)



### System benefits

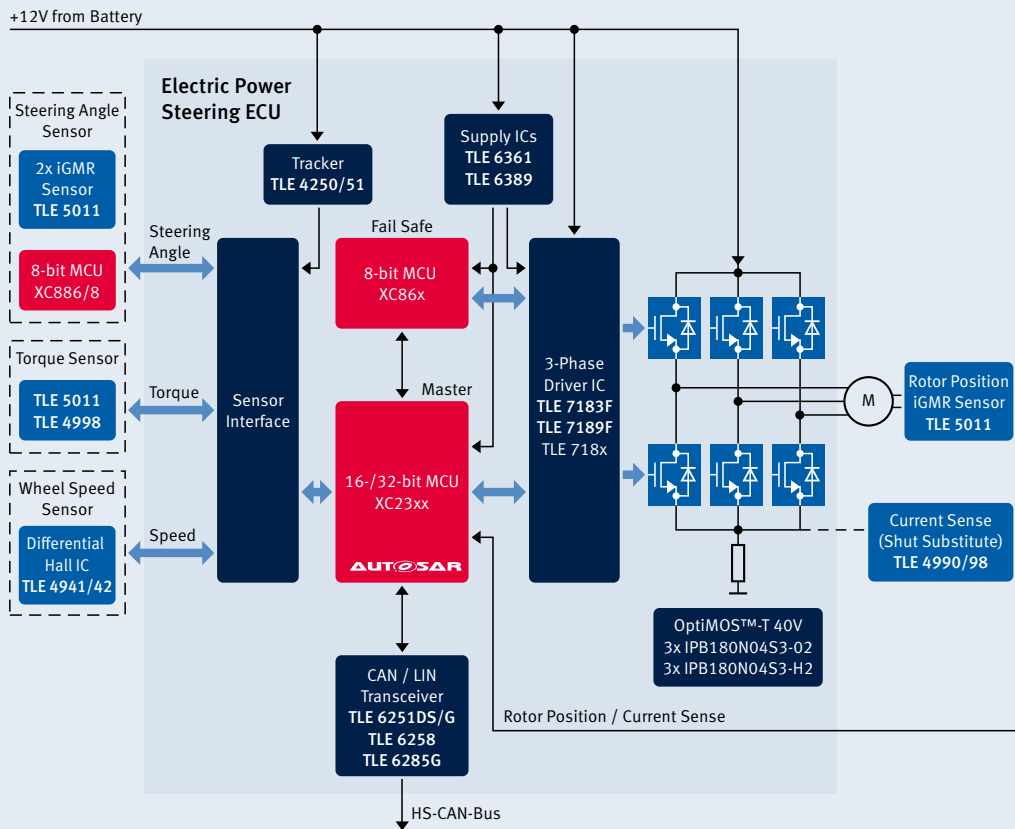
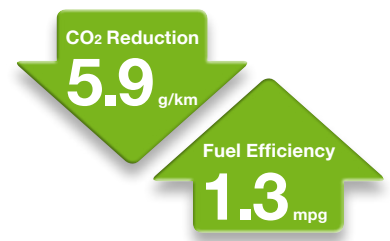
- Full range of airbag ASSPs ranging from pressure sensors for side crash detection to drivers and transceiver ICs
- 16/32-bit microcontrollers with dedicated safety functions
- With our broad product spectrum we support scalability and flexibility to build systems from 4 up to more than 20 firing loops
- The parts are optimized in terms of system interoperability as well as best price/performance in this extremely price-critical application

### Suggested products

Product	Description
XC23xx	Powerful 16/32-bit microcontroller family with dedicated safety features
TLE 7714 /34 /18 /38 /58 /78	Airbag deployment ASSPs
TLE 7729	Airbag satellite receiver
KP 106/200	Application-specific sensor for side airbag pressure sensing
TLE 4906/76	Hall switches for buckle switch application



# Electric Power Steering



## System benefits

- EPS increases fuel efficiency by 3% while improving handling of the car and the driving experience
- These EPS systems combine compact design and reduced mounting costs with the ability to be adapted by software to diverse cars
- EPS is the basis system for advanced driver assist systems such as side wind compensation, lane assist and parking assist
- Infineon has more than ten years experience in this exciting application and provides the full range of ICs, from steering sensor to microcontroller, from bridge driver to world-class MOSFETs

## Suggested products

Product	Description
XC23xx	Powerful 16/32-bit microcontroller family with dedicated safety features
XC8xx	8-bit microcontroller family with dual-cycle 8051 core
XC88x	8-bit microcontroller family with CORDIC unit
TLE 718x	3-phase bridge driver IC family
IBP1x0Nxx	OptiMOS™-T 40V N-channel MOSFET family, optimized for EPS applications
TLE 499x	Linear Hall sensor family for torque and current sensing
TLE 501x	iGMR sensor family for angle and rotor position sensing

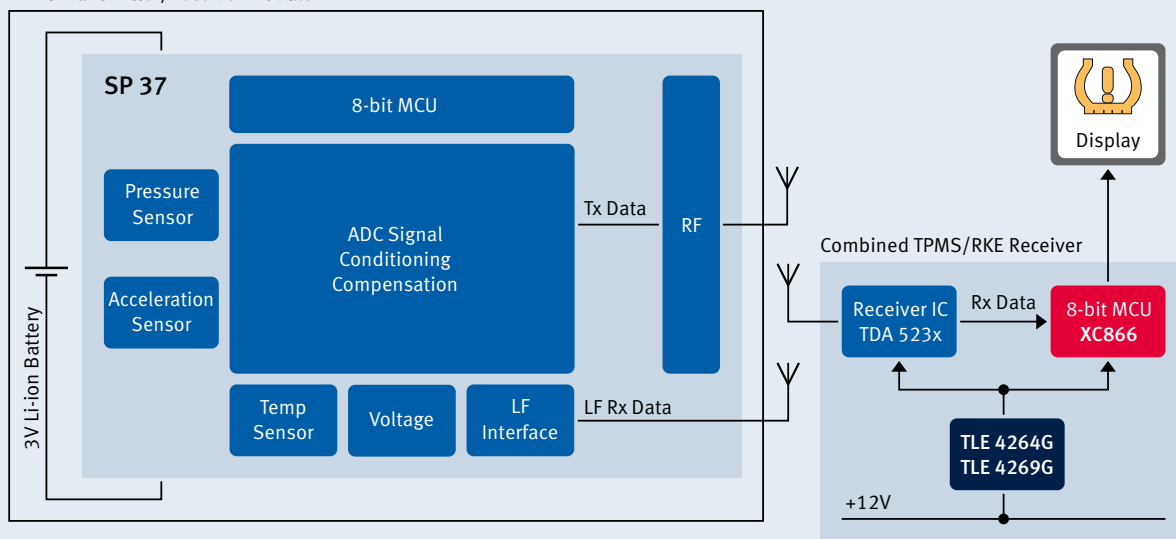
safety

# Tire Pressure Monitoring System (TPMS)

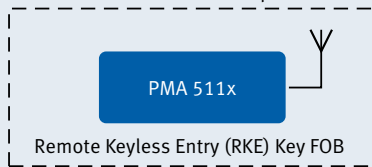
CO<sub>2</sub> Reduction  
**2** g/km

Fuel Efficiency  
**0.42** mpg

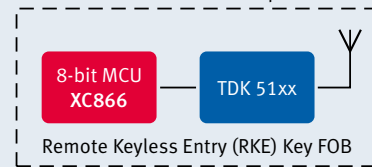
TPMS Transmitter/Receiver Module



Innovative Transceiver Concept



Innovative Transceiver Concept



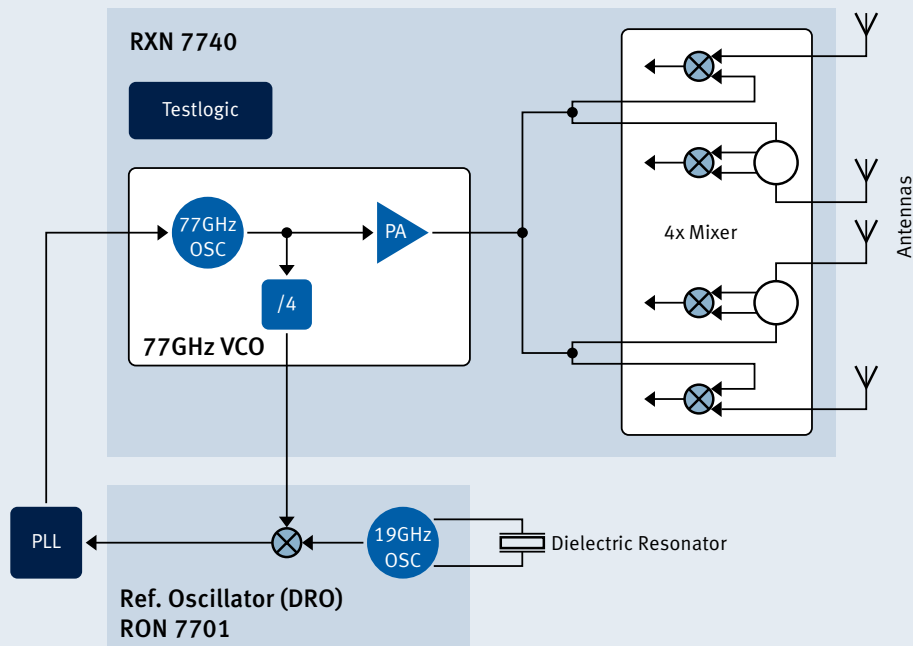
### System benefits

- High integration level reduces overall system component count
- Fully packaged sensor system proven to withstand harsh automotive environments
- Various surveillance functions ensuring reliable measurements
- Microcontroller-based architecture enables flexible system design
- Pre-calibrated pressure sensor system for instant use
- Increases tire lifetime by up to 30%

### Suggested products

Product	Description
SP 30	TPMS with integrated microcontroller
SP 30T	Like SP 30 with pressure range up to 1,600 kPa
SP 37	Highly integrated TPMS with microcontroller and RF transmitter
TDA 523x	SmartLEWIS™ RX autonomous receiver
PMA 511x	SmartLEWIS™ MCU transmitter with embedded microcontroller
TDK 51xx	Wireless control transmitter
XC8xx	8-bit microcontroller family with dual-cycle 8051 core

# Automotive Radar 77 GHz



## System benefits

- The Radar System IC (RASICTM) series is made up by a group of highly integrated functions for the 76–77 GHz range for automotive radar
- The ICs offer a high level of integration and need only a few or no external components
- Infineon's SiGe process benefits from its origins in the volume bipolar segment. Its unique features are its high frequency capability and robustness, which make it suitable for automotive environments over the full temperature range up to full automotive qualification according to AEC-Q100

## Suggested products

Product	Description
RXN 7740	Single chip quad-transceiver for 76–77 GHz incorporating all core functions of a radar frontend
RON 7701	Dielectric resonance oscillator (DRO) to run the RXN 7740 in a PLL-environment

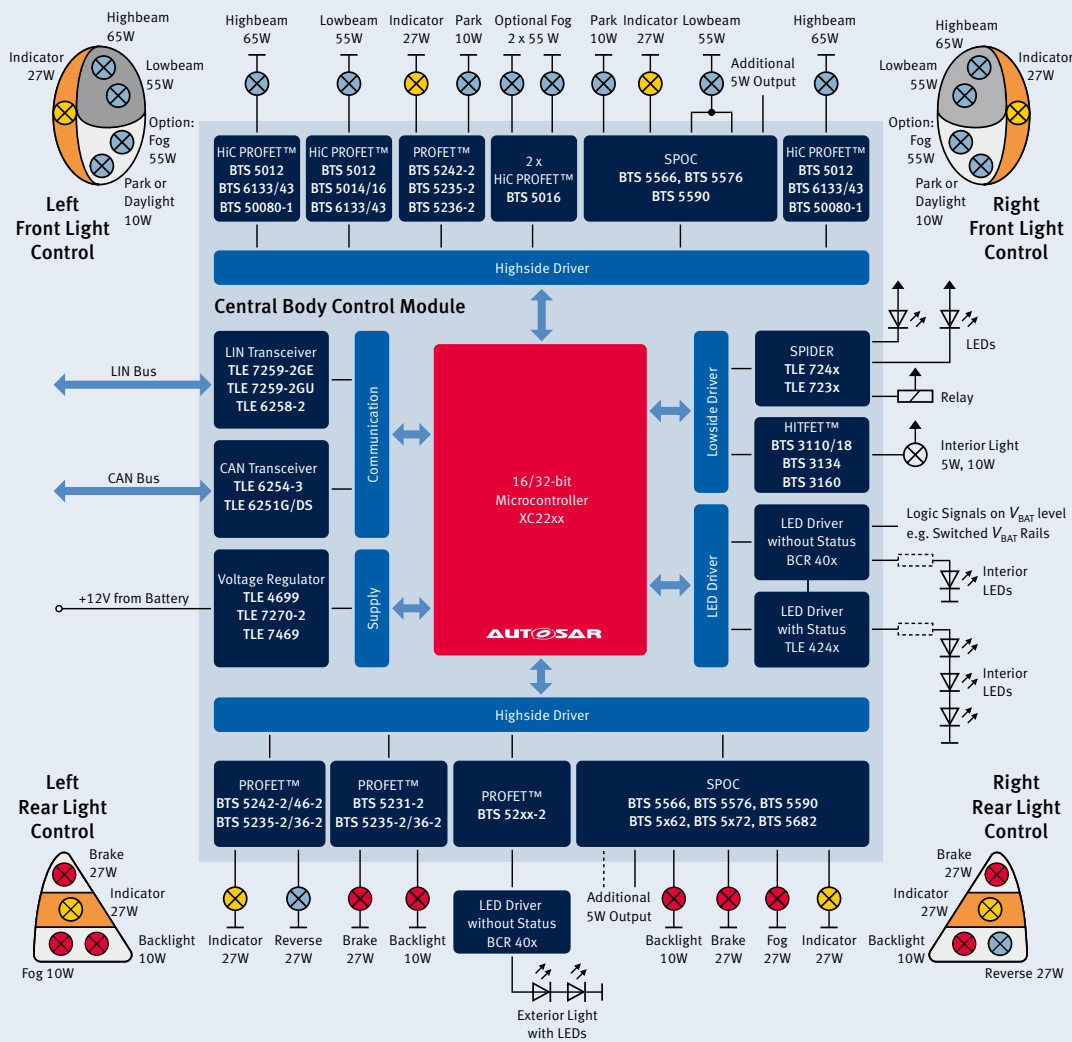


## Body System Solutions

INFINEON OFFERS a wide variety of products dedicated for body and interior electronics, e.g. protected power switches for bulb and motor control, dedicated system basis chips and easy-to-use Hall sensor solutions. The intelligent heart of a body system is supported with Infineon's new XC2200 family.

THE BLOCK DIAGRAM on the right-hand side shows an example application diagram of a central body control module, showing solutions for the microcontroller, all bulb and motor loads as well as supply ICs and network transceivers. It's a virtual diagram showing two different load control concepts (discrete vs. integrated) in a single diagram, while in practice load partitioning is symmetrically built dependent on system parameters, such as power rails, power dissipation and scalability.

# Central Body Computer



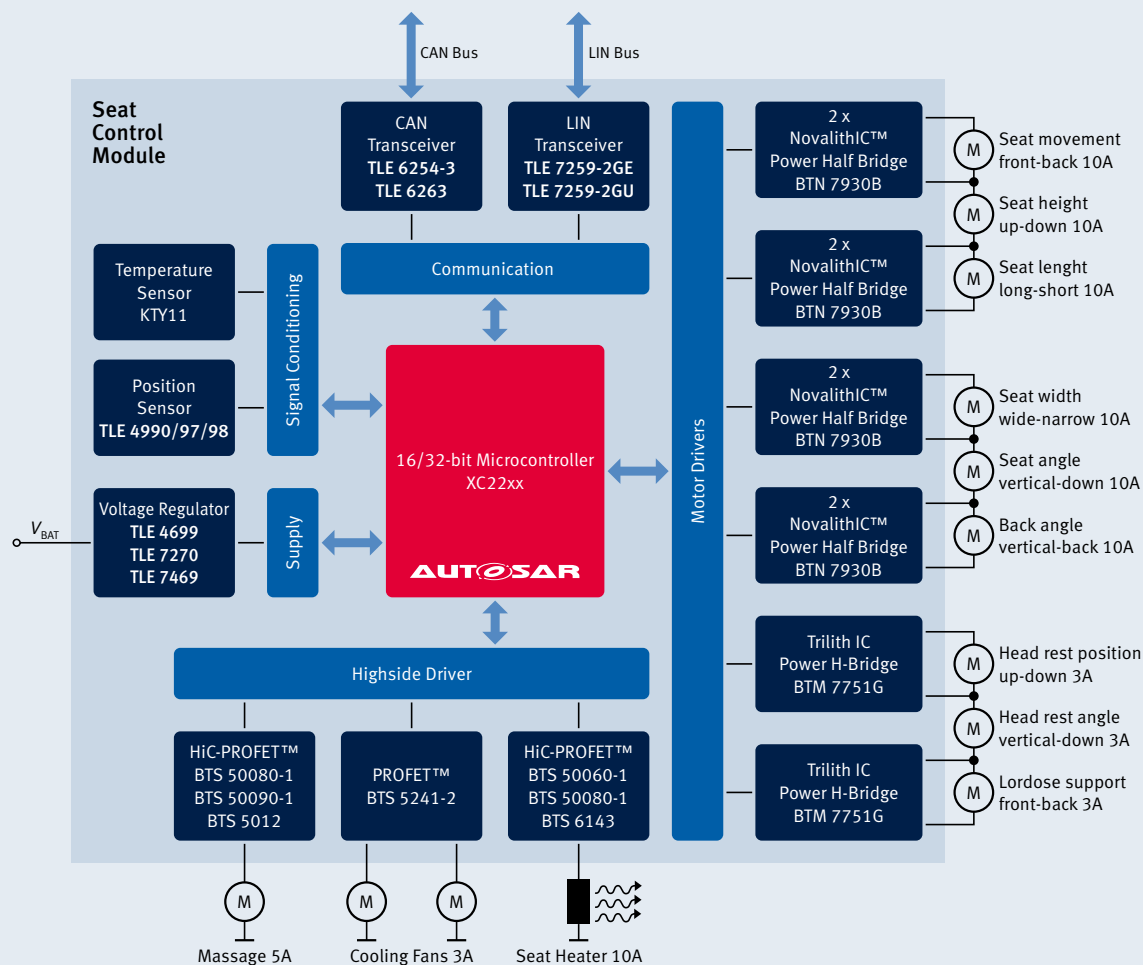
## System benefits

- Reduced board space due to integrated functionality
- Protected load control with sophisticated diagnosis features
- Supports functional safety concept “Limp Home”
- High scalability of power semiconductors
- Supports smooth transition to LEDs for interior and exterior lighting

## Suggested product families

Product	Description
supply ICs	Voltage regulators, DC/DC converter
SBCs, network transceiver	System Basis Chips, CAN and LIN Transceiver
PROFET™, SPOC	Protected highside switches
SPIDER, HITFET™	Protected single and multichannel switches
XC22xx	16/32-bit microcontroller family with dedicated body features

# Seat Control



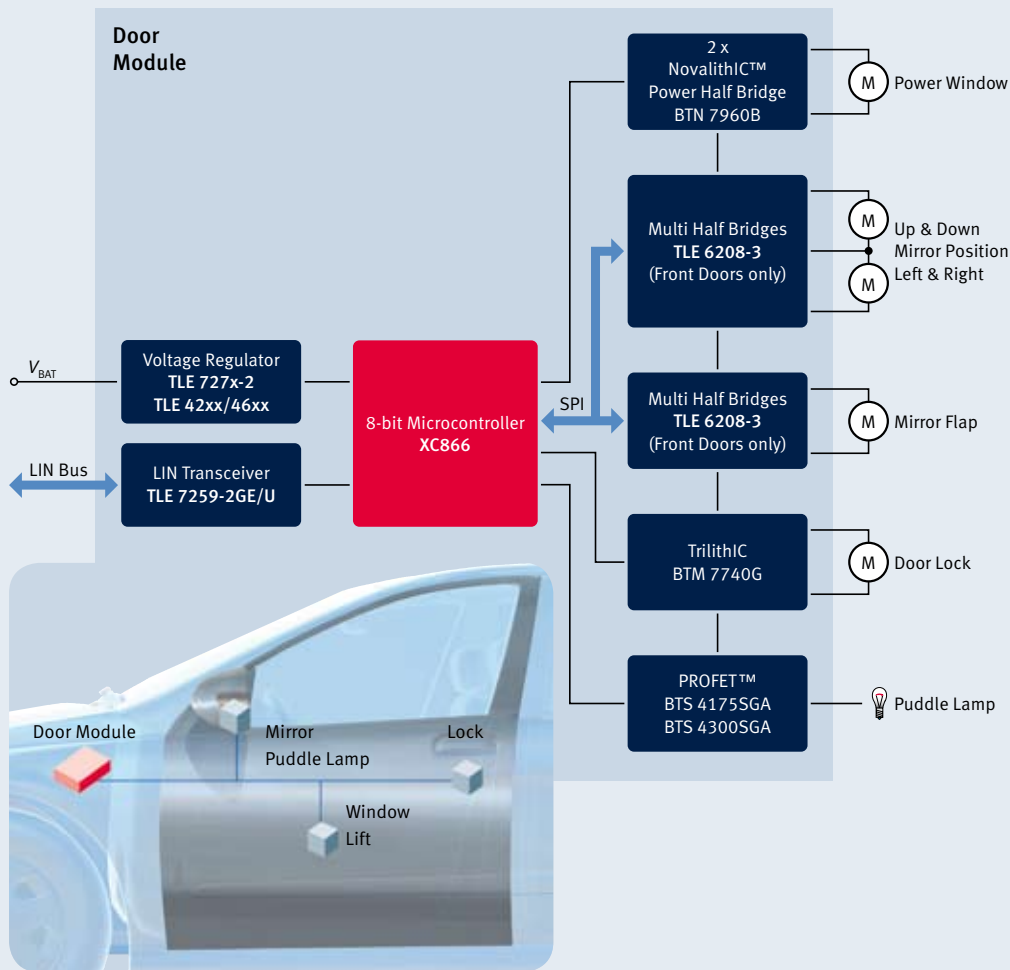
### System benefits

- Integrated motor control with diagnosis
- Supports cascaded as well as dedicated control architecture
- Scalable protected switches family for fans and seat heating
- Easy-to-use temperature and position sensing

### Suggested product families

Product	Description
Supply ICs	Voltage regulators
SBCs, network transceiver	System Basis Chips, CAN and LIN Transceiver
PROFET™	Protected highside switches
Trilith IC, NovalithIC™	Integrated motor control
XC22xx	16/32-bit microcontroller family with dedicated body features

# Door Module Front and Rear

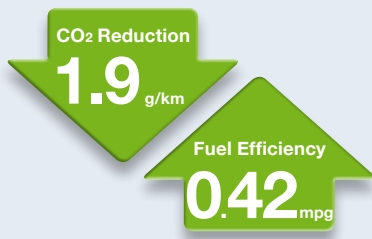


### System benefits

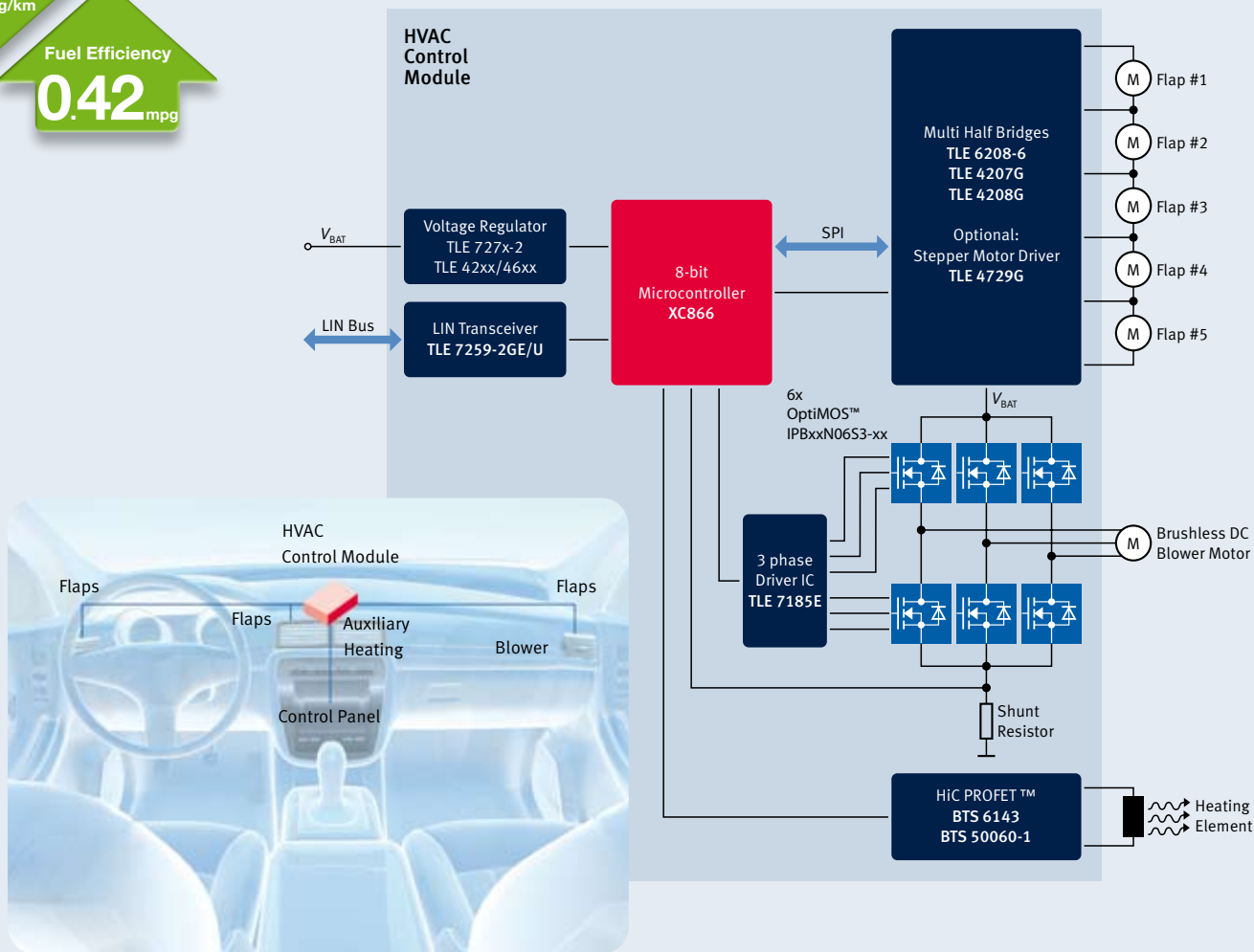
- Integrated motor control with diagnosis
- Diagram shows scalable architecture with separated load control, applicable for both front and rear doors
- Door module IC integrating several functions in a single device as an option
- Dedicated solutions for rear door available as well

### Suggested product families

Product	Description
SBCs, network transceiver	System Basis Chips, CAN and LIN Transceiver
PROFET™	Protected highside switches
Trilith IC, NovalithIC™	Integrated motor control
XC8xx	8-bit microcontroller family



# HVAC



### System benefits

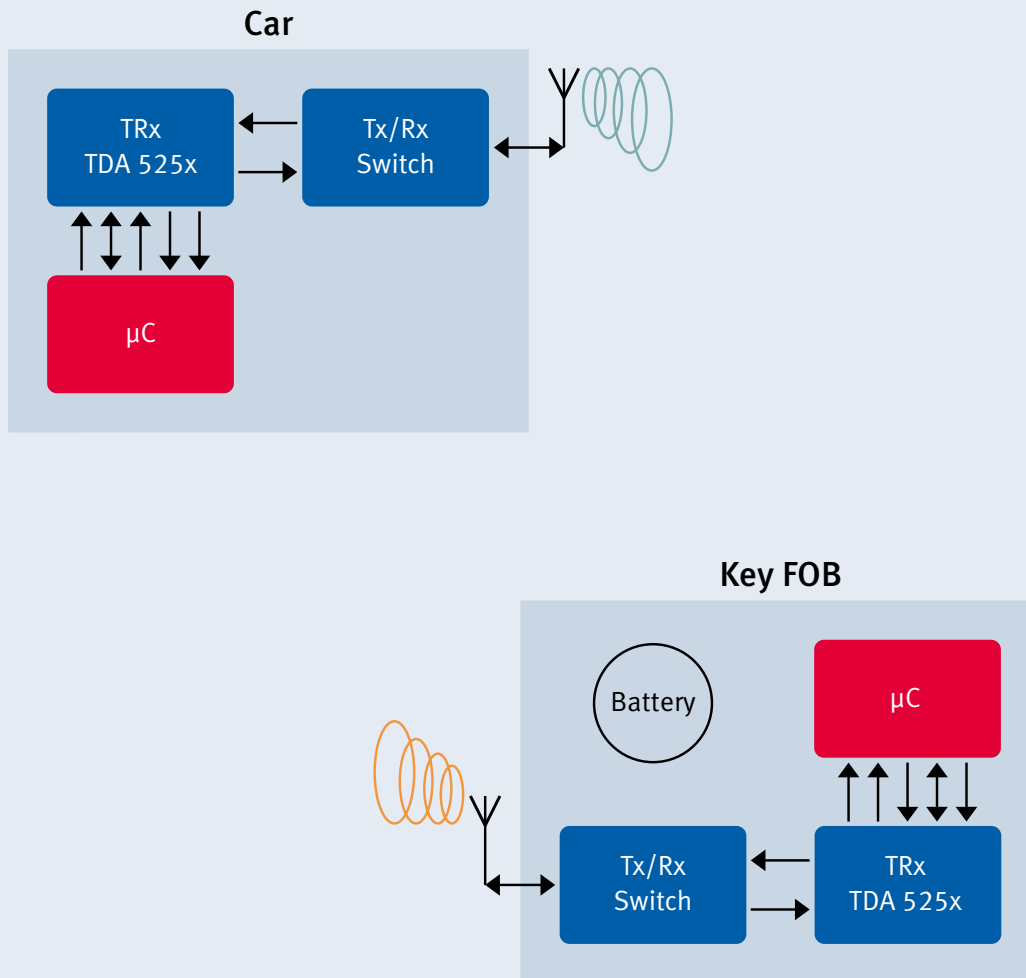
- Dedicated multi half bridges device for low-cost flap control
- Energy-efficient blower control, either using PWM-controlled DC or brushless DC motors
- Low-cost 8-bit microcontroller family XC800

### Suggested product families

Product	Description
SBCs, network transceiver	System Basis Chips, CAN and LIN Transceiver
PROFET™	Protected highside switches
Multi half bridges	Integrated motor control
OptiMOS™	Automotive MOSFETs
XC8xx	8-bit microcontroller family



## Two-way Remote Keyless Control

**System benefits**

- Status update (e.g. door, HVAC, windows, fuel, etc.)
- Listen before talk (LBT) (avoids data collision)
- Lower power consumption
- Higher bidirectional encryption (standard “handshake”)
- Alarm system status
- Possible integration with tire pressure monitoring

**Suggested products**

Product	Description
TDA 525x	High integrated RF transceiver for 315 MHz, 434 MHz and 915 MHz ISM bands Low current consumption Minimum external peripherals needed
BGS12AL7-4	RF transmitter/receiver antenna switch

# body system



## Powertrain System Solutions

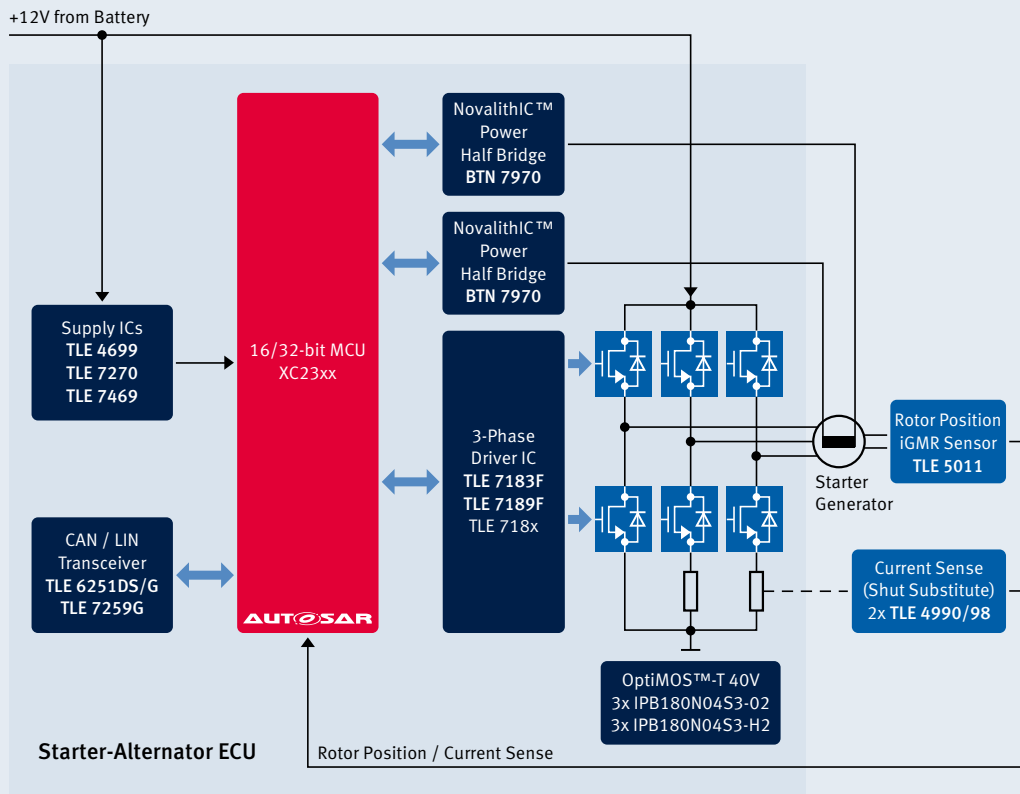
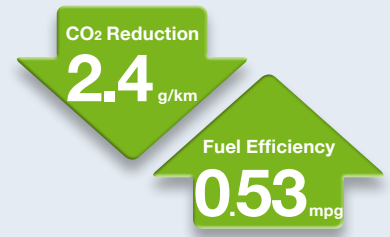
NOWADAYS, EMISSION REDUCTION and lower fuel consumption are increasingly becoming key to the future of the automotive industry. Developments in oil prices and government regulations are some of the drivers behind this.

INFINEON PROVIDES A FULL BREADTH of products ranging from microcontrollers, sensors and transceivers to smart power drivers. By combining technology and system expertise, Infineon is a reliable partner in helping customers achieve better performance in engine management and transmission that will lead to reduced fuel consumption and emissions. The aim is to achieve these goals while also improving the driving experience.

Improvements in powertrain (current and hybrid) and transmission technologies lead to an estimated CO<sub>2</sub> reduction by 30%. Engine, transmission and hybrid options are mutually exclusive, so average fleet values have been taken as baseline.

INFINEON'S CONTRIBUTION IS NOT LIMITED to a mere product offering, but also allows partners to optimize their electronic systems setup by means of support, demoboards, etc.

# Start/Stop Alternator



### System benefits

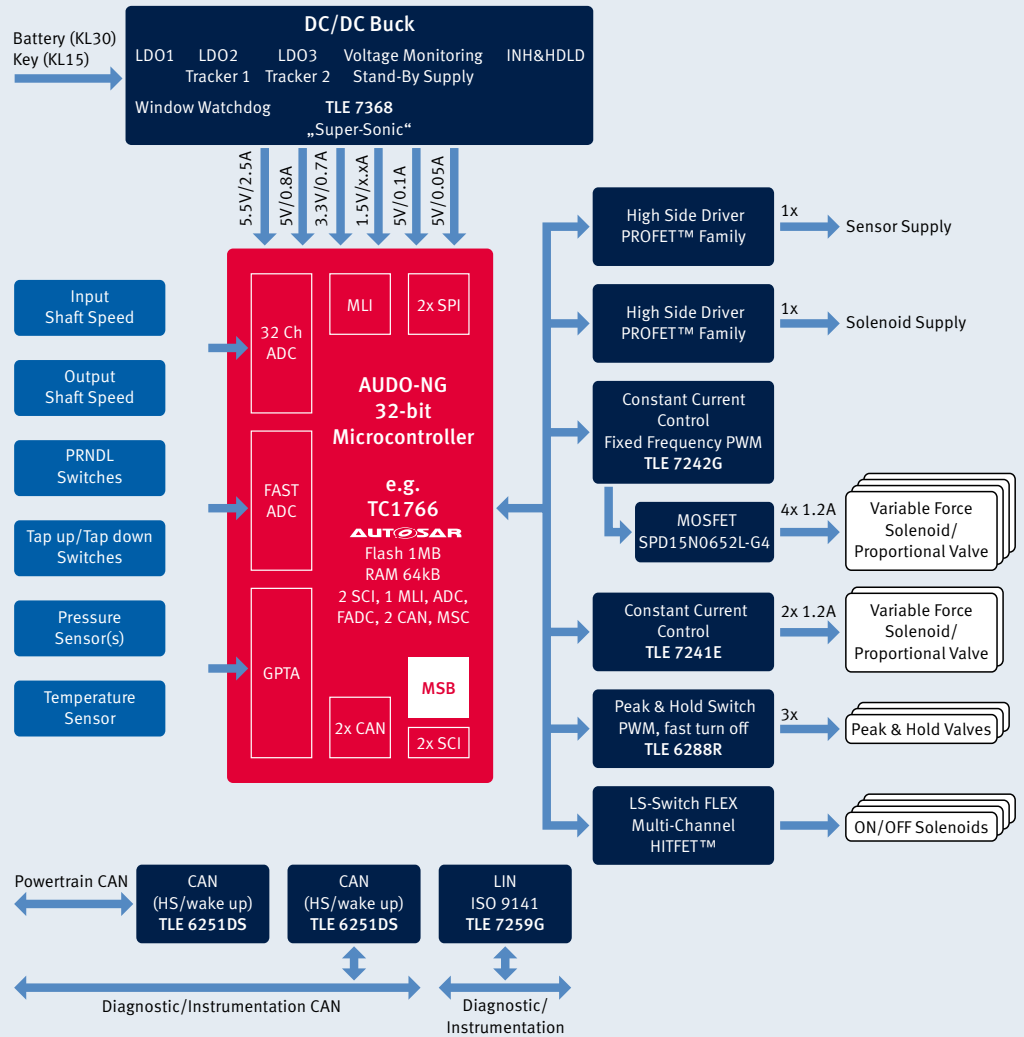
- Higher efficiency of alternator by MOSFET rectification
- Higher output current at low alternator RPM
- Use of generator also as starter motor
- Field-oriented control of starter alternator

### Suggested products

Product	Description
XC23xx	Powerful 16/32-bit microcontroller family with dedicated motor control features
TLE 718x	3-phase bridge driver IC family
IPB180Nxx	OptiMOS™-T 40V N-channel MOSFET family, optimized for high current motor applications
TLE 499x	Linear Hall sensor family for current sensing
TLE 501x	iGMR sensor family for angle and rotor position sensing
BTN 79xx	NovalithIC™ power half bridge for excitation current control
TLE 6250	CAN transceiver
TLE 7259	LIN transceiver
TLE 72xx	Voltage regulator

# Automatic Transmission – Hydraulic Control

**Transmission Control**  
Typical Partitioning for Constant Current Control



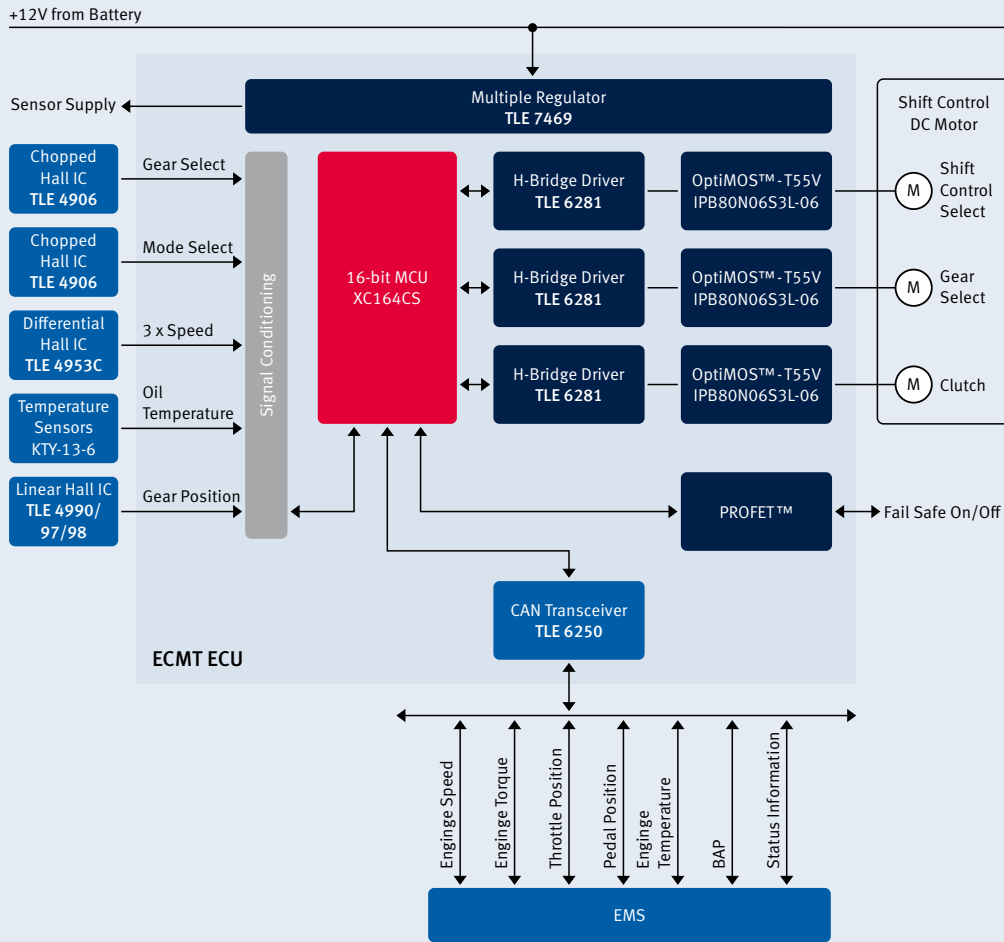
**System benefits**

- Full range of products ranging from voltage regulators, transceivers, sensors, microcontrollers and smart power drivers
- Integrated constant current valve actuator power ICs for solenoids
- Optimized sensors provide enhanced disturbance immunity (e.g. vibration) and direction detection
- Hot bare die capabilities enable microcontroller to be placed directly where it is needed in the system

**Suggested products**

Product	Description
TC1766, XC27xx	TriCore™ 32-bit, 16/32-bit microcontroller family
PROFET™, Multichannel HITFET™	Scalable highside and lowside smart power drivers for general actuation
Sensors	iGRM speed sensors, differential Hall ICs
TLE 6288	Integrated ICs for proportional solenoid control
PROFET™	Fail-safe switches

# Automatic Transmission – Electric Motor Control



### System benefits

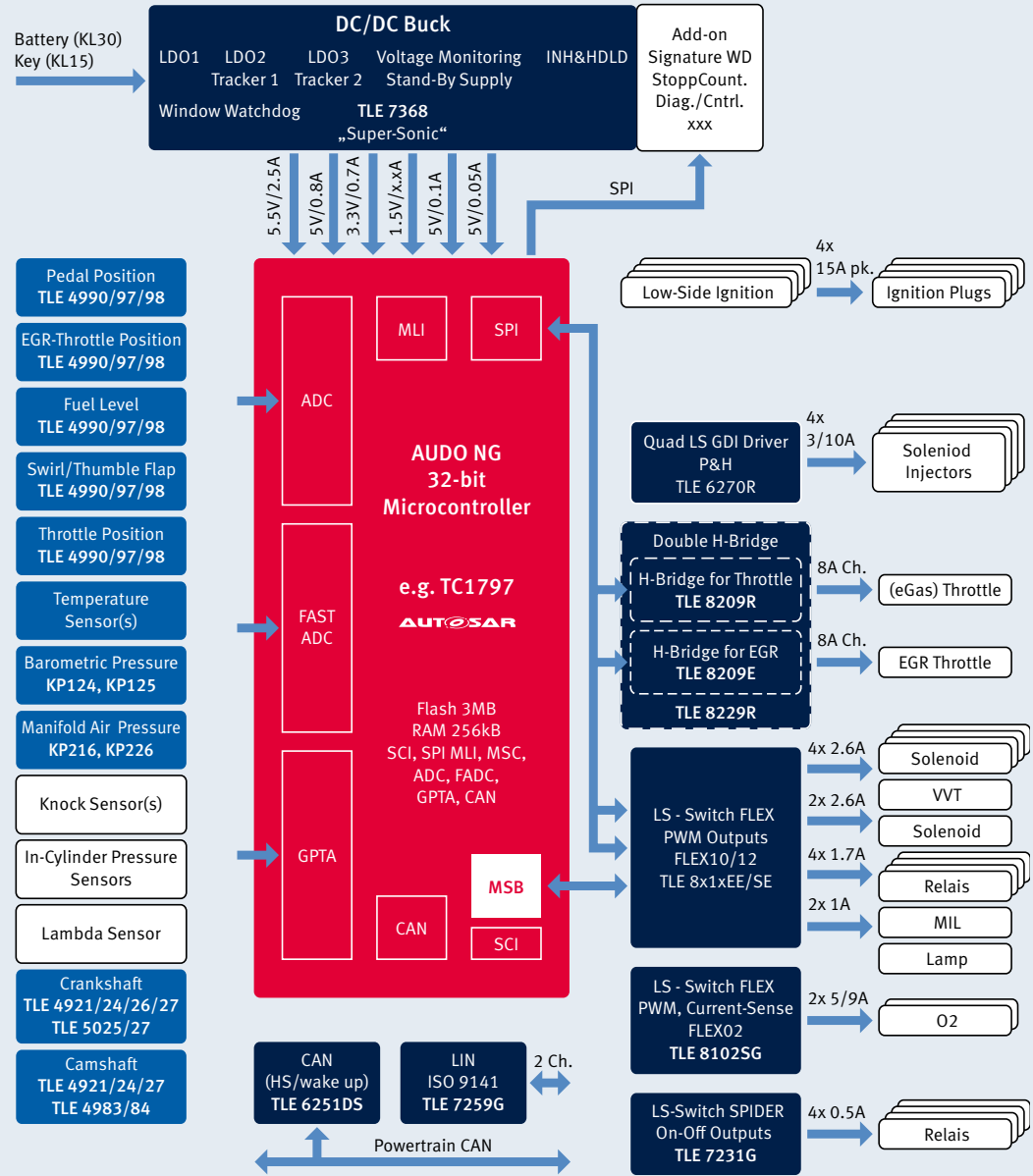
- Full range of products ranging from voltage regulators, transceivers, sensors, micro-controllers and smart power drivers
- Integrated constant current valve actuator power ICs for solenoids
- Optimized sensors provide enhanced disturbance immunity (e.g. vibration) and direction detection
- 16-bit microcontroller performance is ideal for most ECMT, MT systems

### Suggested products

Product	Description
TC1766, XC27xx	TriCore™ 32-bit, 16/32-bit microcontroller family
PROFET™, Multichannel HITFET™	Scalable highside and lowside smart power drivers for general actuation
Sensors	iGRM speed sensors, differential Hall ICs
TLE 628x	Half bridge drivers

# Gasoline Engine Management

Engine Management  
Typical Partitioning for DDI Discrete



**System benefits**

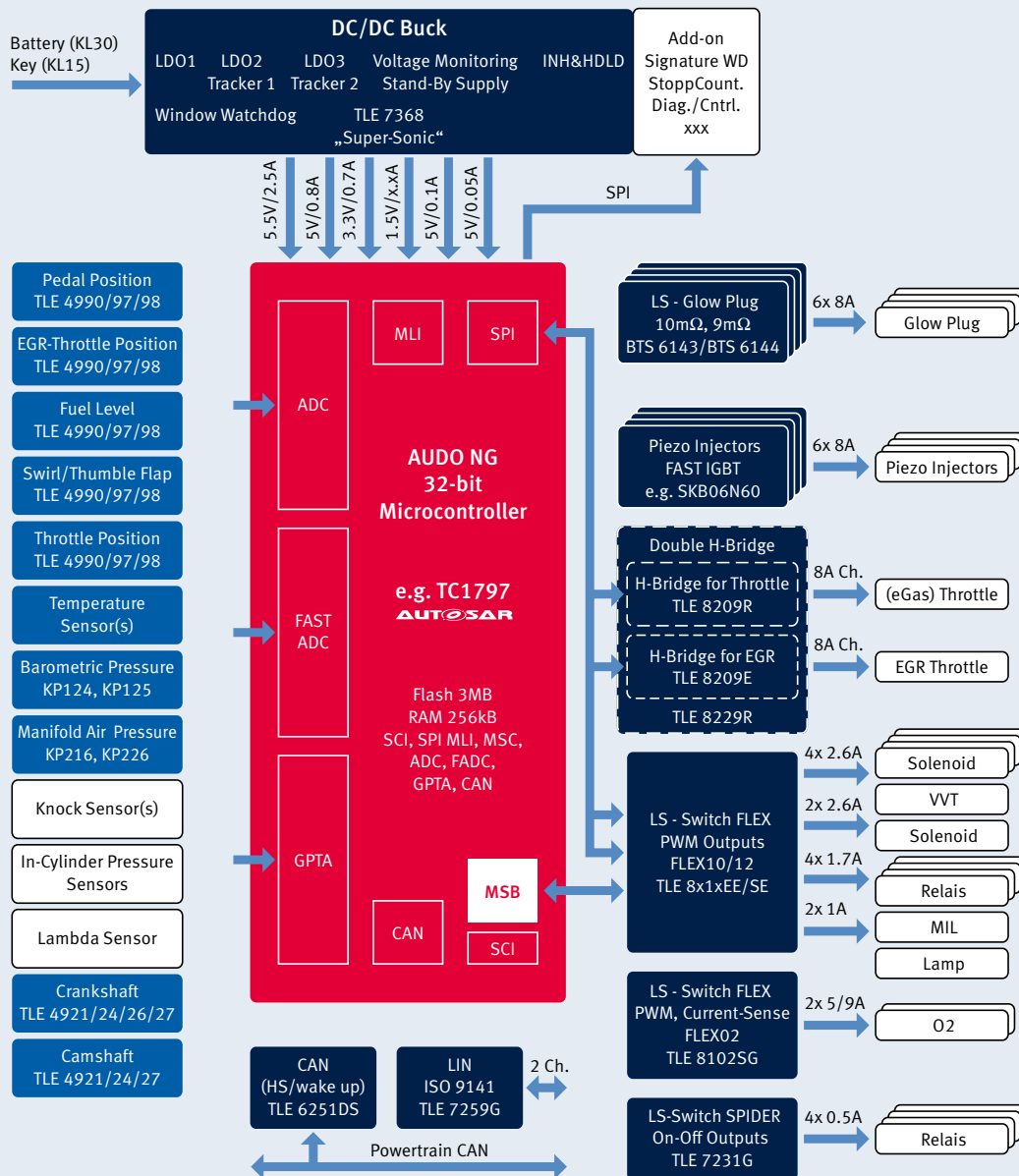
- Flexible and scalable products to meet requirements ranging from high-end vehicles to affordable cars in emerging markets
- For GDI systems, dedicated power drivers for solenoid injectors
- Microcontroller real-time performance benchmark in mid/high-end segment; dedicated peripherals for powertrain
- New sensor families provide enhanced measurement precision (e.g. ignition control, misfire detection)

**Suggested products**

Product	Description
TC1797	TriCore™ 32-bit microcontroller family, XC27xx 16/32-bit microcontroller family
TLE 81xx	Scalable FLEX lowside smart power drivers
TLE 6270	Direct injection drivers
KP 12x/KP 2xx	KP pressure sensors, iGMR crankshaft sensors, new linear Hall sensor family, new Hall camshaft sensor family
TLE 8209	Exhaust gas recirculation (EGR) and electronic throttle control (ETC) drivers

# Diesel Engine Management

## Engine Management Typical Partitioning for DDI Discrete



### System benefits

- Full range of products ranging from voltage regulators, transceivers, sensors, micro-controllers and smart power drivers
- New sensor families provide enhanced measurement precision
- Microcontroller real-time performance benchmark in mid/high-end segment; dedicated peripherals for powertrain

### Suggested products

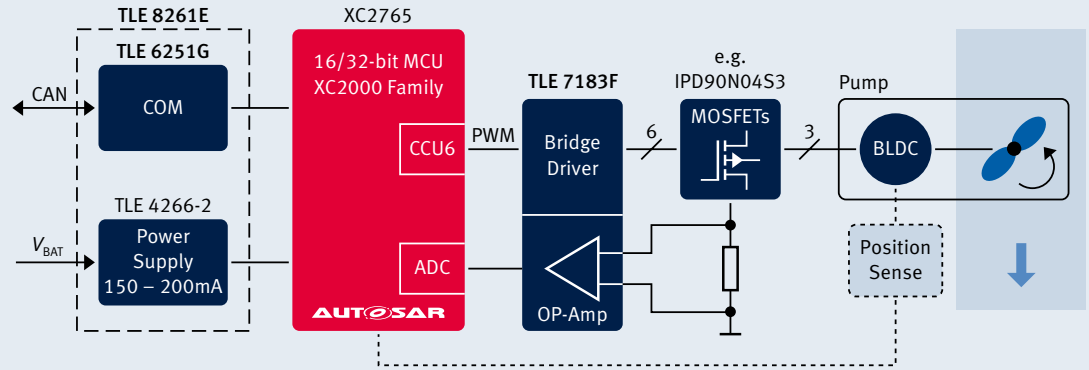
Product	Description
TC1797	TriCore™ 32-bit microcontrollers
TLE 81xx	Scalable FLEX low side smart power drivers
TLE 6270	Direct injection drivers
KP 12x/KP 2xx	KP pressure sensors, iGMR crankshaft sensors, new linear Hall sensor family, new Hall camshaft sensor family
TLE 8209	Exhaust gas recirculation (EGR) and electronic throttle control (ETC) drivers

CO<sub>2</sub> Reduction  
**7.1** g/km

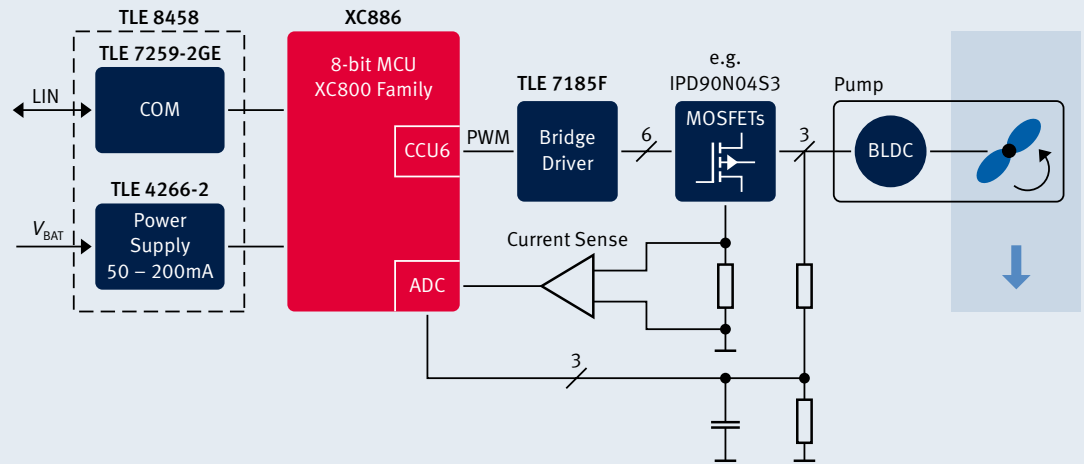
Fuel Efficiency  
**1.56** mpg

# Electric Water Pump

## High Performance



## Low Cost



### System benefits

- Improved thermal control of engine
- Better efficiency of pump
- Reduced power consumption
- Speed can be adjusted to actual needs
- Completely switched off at motor start for a faster warm-up

### Suggested products

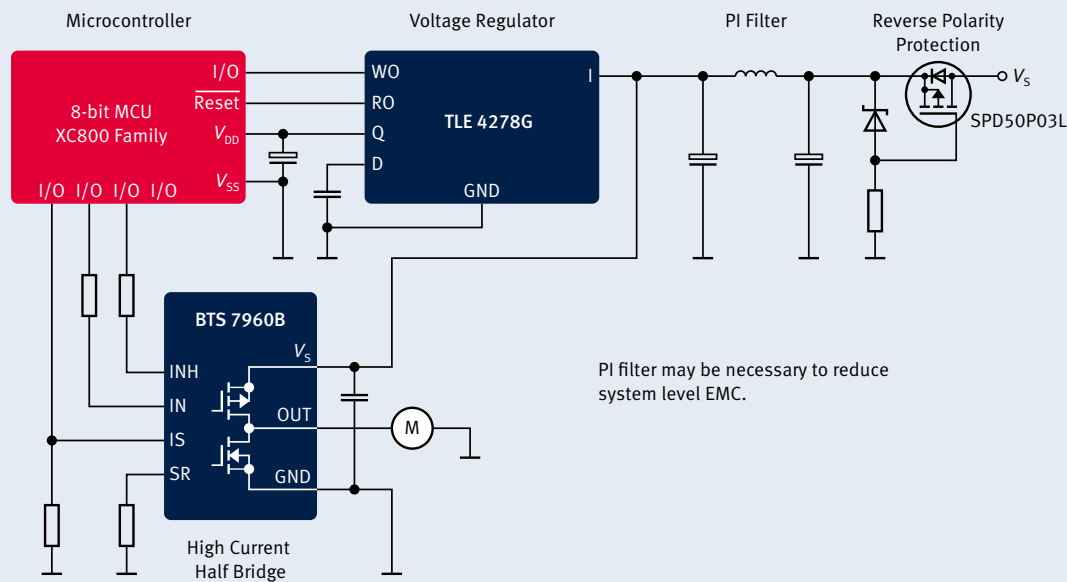
Product	Description
XC27xx	16/32-bit microcontroller family
XC886	8-bit microcontroller family
TLE 718x	Bridge driver
TLE 8261	System basis chip



# Fuel Pump

CO<sub>2</sub> Reduction  
**1.9** g/km

Fuel Efficiency  
**0.42** mpg



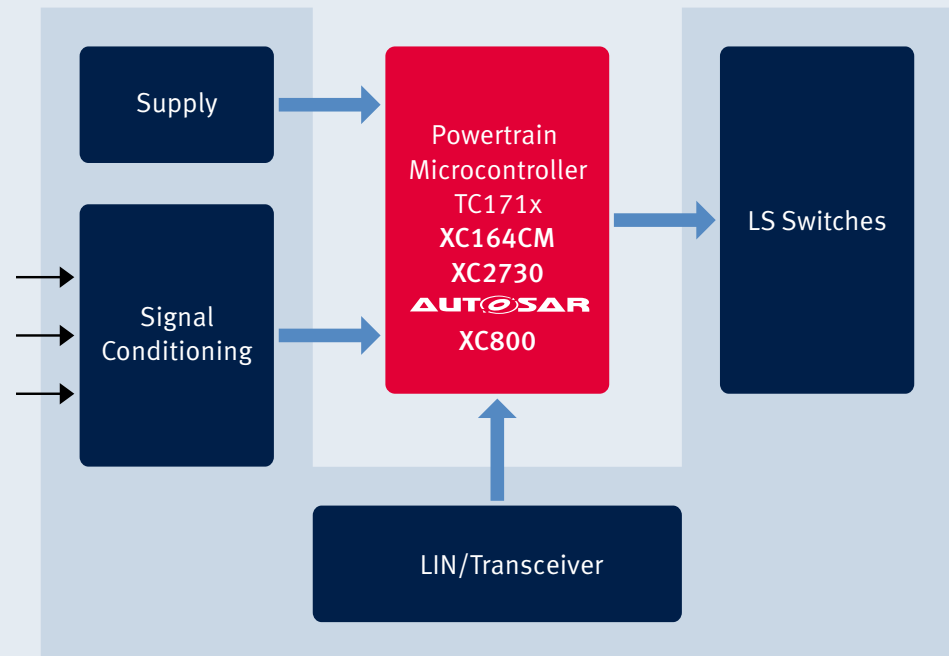
### System benefits

- Runs only at full speed when needed
- Power consumption reduced by 40% on average
- Lower emission of hydrocarbons
- Increased lifetime

### Suggested products

Product	Description
XC800	8-bit microcontroller family
NovalithIC™	Integrated half bridge

## Motorcycle Engine Management



### System benefits

- Full range of products ranging from voltage regulators, transceivers, sensors, microcontrollers and smart power devices
- New sensor families provide enhanced measurement precision
- Scalable power drivers offer flexibility and adaptability to different load and channel configurations
- 16-bit microcontrollers provide a cost-optimized solution and an easy-to-use standard C166 core



#### Suggested products

Product	Description
XC27xx	16/32-bit microcontroller family with dedicated motor control features; in the future also 32-bit microcontrollers
TLE 81xx	Scalable FLEX low side smart power drivers
KP 12x/KP 2xx	KP pressure sensors, iGMR crankshaft sensors, new linear Hall sensor family, new Hall camshaft sensor family
TLE 472x	Stepper motor driver for idle-speed control



## Electrified Powertrain System Solutions

THE INCREASED MOBILITY of today's modern lifestyle comes at the cost of higher CO<sub>2</sub> emissions and consumption of ever scarcer natural resources. Personal transportation is evolving to ensure future mobility with lower emissions than we have today.

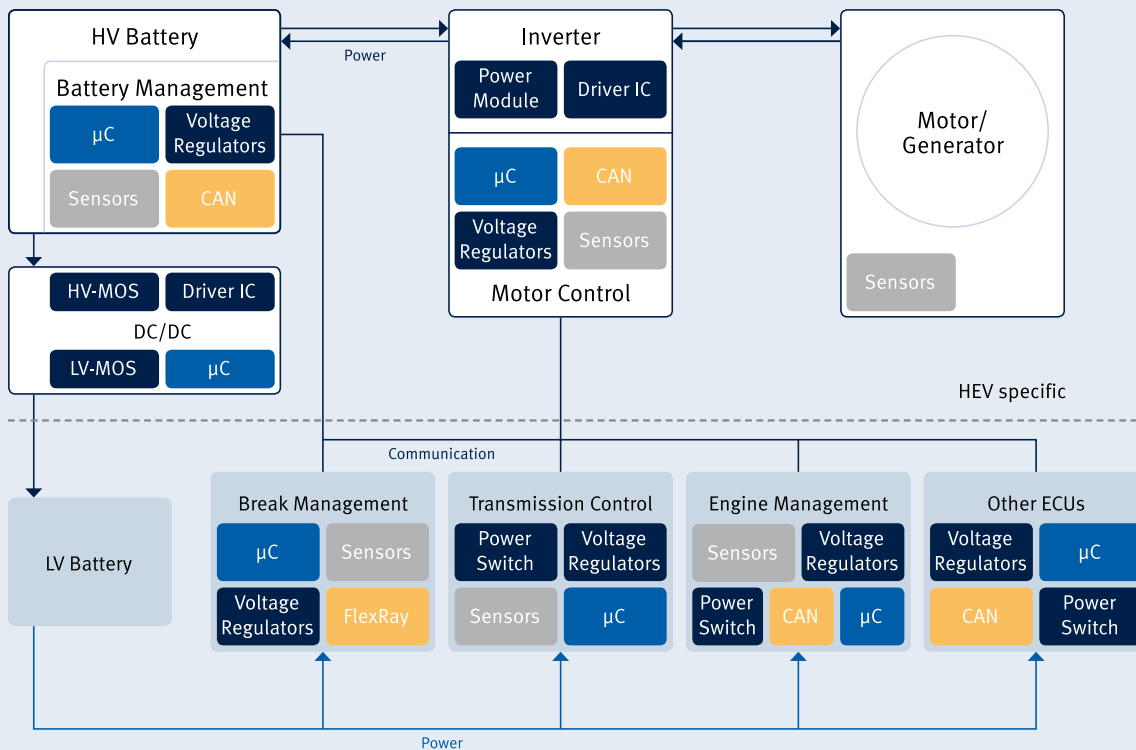
Additionally, new developments in oil prices and governmental regulations are creating new boundary conditions that are accelerating the market introduction of electrical vehicles (EV). Emissions regulations on both sides of the Atlantic is introducing severe penalties to those automakers that do not comply with ambitious fuel efficiency or emissions guidelines.

As a matter of fact, we are already seeing a major shift in consumer demand towards more fuel-efficient vehicles. Demographics also play a role in that more people will live in mega-cities which will increase demand for electric vehicles.

Taking into account future stricter emissions regulations, the only way to achieve this is by means of the introduction of zero emissions vehicles; this will only be achieved by developing emerging technologies such as full electrical vehicles or hydrogen fuel cell vehicles.

In the future, it is highly likely that different technologies will coexist; for example, high-performance batteries that store electricity, fuel cells that produce power and ultra capacitors that provide for sudden energy demand peaks. Infineon can capitalize on this trend by expanding on its electrical drivetrain activities such as on hybrid electric vehicles.

[ [www.infineon.com/powertrain](http://www.infineon.com/powertrain) ]



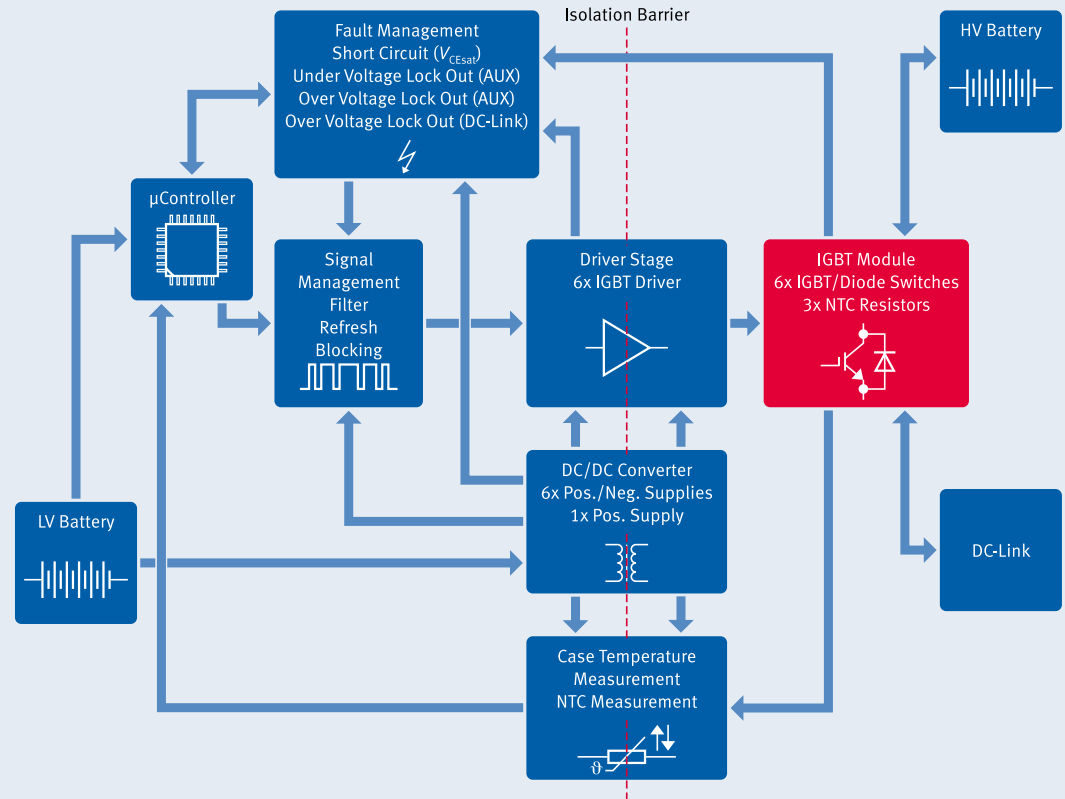
ELECTRONIC COMPONENTS ARE A KEY to this improved energy efficiency. To help save energy and reduce pollution, Infineon delivers innovative high-performance solutions with best-in-class technologies for (hybrid) electric vehicles, which represent one of the most efficient energy conversion approaches for personal transportation.

Infineon combines know-how from the world leader in advanced power electronics and the world's second largest automotive semiconductor company to deliver innovative electronic solutions for these new forms of personal transportation. These solutions continue our commitment to exceptional quality and reliability that the world's leading light vehicle manufacturers expect.

OUR SYSTEMS EXPERTISE means we are able to provide complete chipsets offering the best balance between performance and cost. Today, we are proud to serve our customer with technologically leading products in many areas of HEV applications, such as: power semiconductors, power modules, microcontrollers and sensors.

With our components delivering cost-effectiveness, high efficiency and power density, Infineon is driving electrified powertrain solutions for future personal mobility.

## EV/HEV – DC/DC



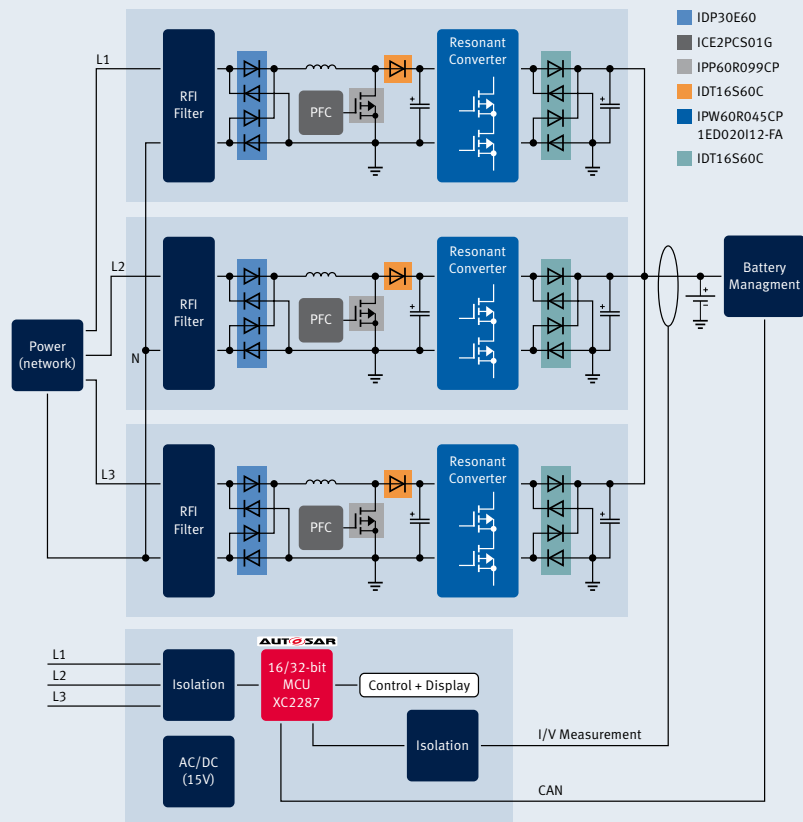
### System benefits

- Enable hybrid or electric driving
- Very efficient 3-phase drive due to very low switching losses also at high switching frequencies
- Already automotive-qualified products
- Isolation-integrated in IGBT drivers
- DC BUS voltages up to 450 V

### Suggested products

Product	Description
HYBRIDPACK™1	Power modules
1EDxxx	Gate driver IC
XC2887	16/32-bit microcontroller family

## EV/HEV – AC/DC (Battery Charger)



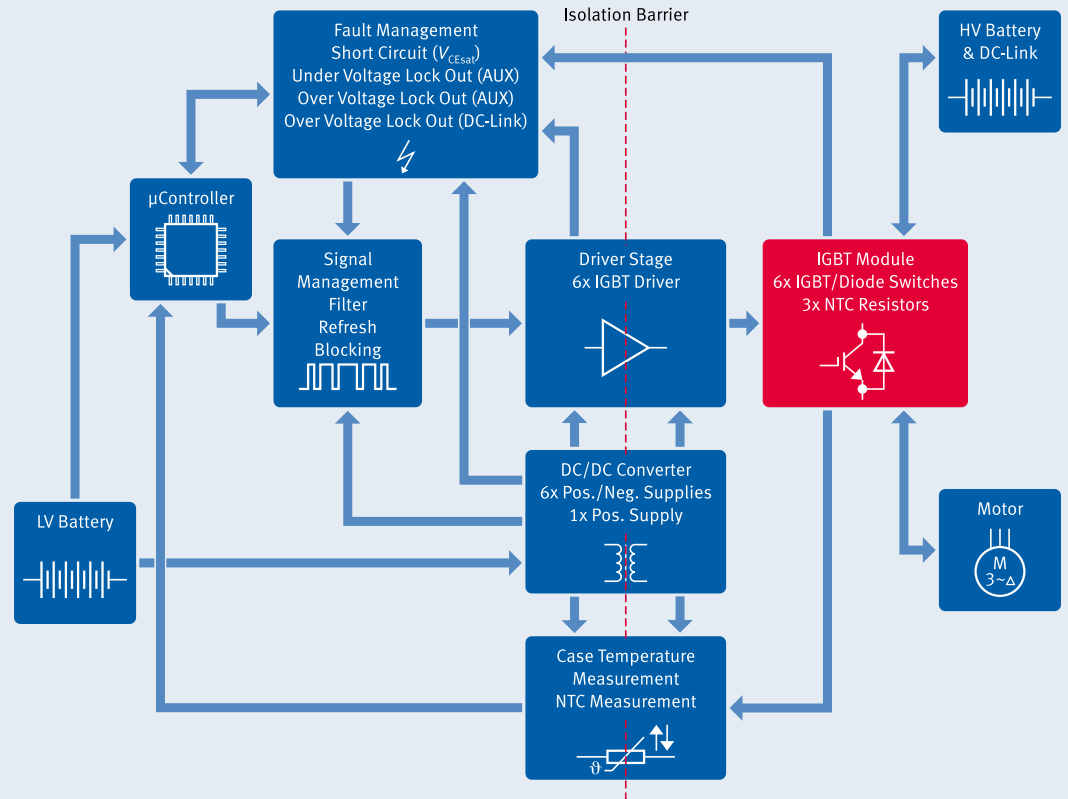
## System benefits

- Enables plug-in hybrid or EV
- High efficiency through PFC
- Wide range input and output voltages
- Adjustable current limits
- Automotive standard communication (CAN)
- Also 3-phase power net compatible

## Suggested products

Product	Description
XC2287	16/32-bit microcontroller family
COOLMOS™	High-voltage automotive MOSFETs

# EV/HEV – Inverter



### System benefits

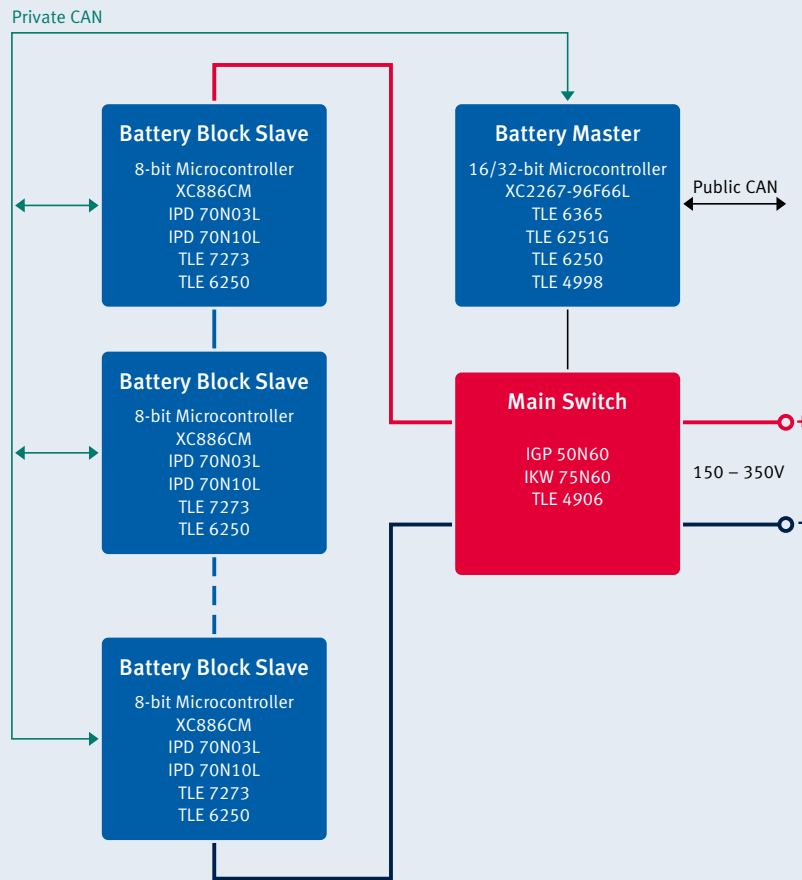
- Enable hybrid or electric driving
- Very efficient 3-phase drive due to very low switching losses also at high switching frequencies
- Already automotive-qualified products
- Isolation-integrated in IGBT drivers
- DC BUS voltages up to 450 V

### Suggested products

Product	Description
HYBRIDPACK™1	Power modules
1EDxxx	Gate driver IC



# Battery Management



### System benefits

- Safe operation of Li-ion cells
- Lifetime extension of whole battery
- Cell monitoring (SOC – state of charge, SOH – state of health)

### Suggested products

Product	Description
XC886CM	8-bit microcontroller family
XC22xx	16/32-bit microcontroller family
OptiMOS™	Low-ohmic, low voltage automotive MOSFETs
TLE 6250/51	CAN transceiver
TLE 7273, TLE 4299	Voltage regulator

[ [www.infineon.com/batterymanagement](http://www.infineon.com/batterymanagement) ]

# e-powertrain

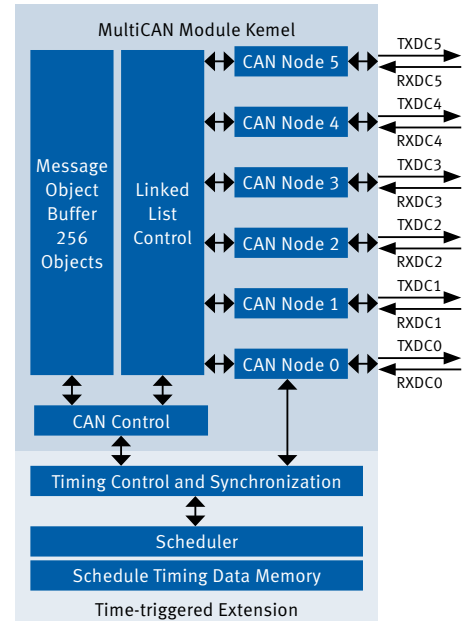
# Enhanced Communication

## MultiCAN

COMPLEX APPLICATIONS increasingly require intelligent communication over the CAN network. A CAN gateway and a FIFO are only two examples of what can easily be implemented with XC2000's enhanced MultiCAN module.

### MultiCAN features

- Full CAN with CAN 2.0B active
- Up to six independent CAN nodes
- Up to 256 message objects
- Programmable acceptance filtering
- Data transfer rate up to 1 Mbit/s, individually programmable for each node
- Powerful analysis capability
- FIFO data handling support
- Automatic gateway support



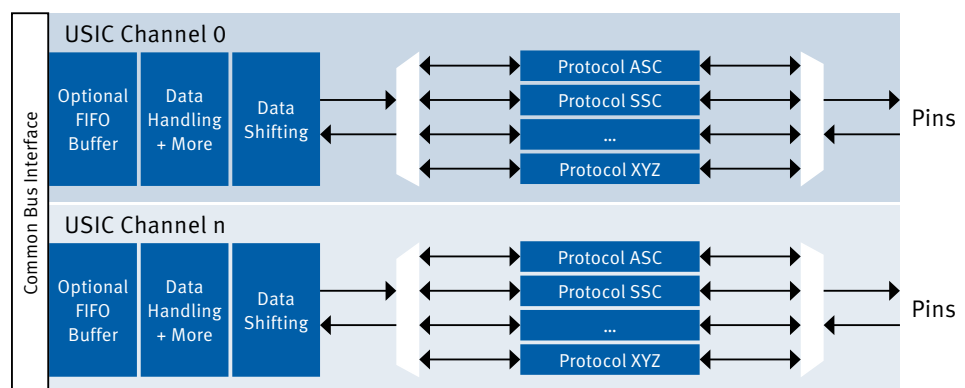
## Universal serial interface (USIC)

### Each USIC channel

- is capable of handling UART, SPI, LIN, IIC and IIS
- is individually configurable (incl. baud rate generation)
- handles full duplex data transfers
- has programmable Rx and Tx FIFOs
- can be reprogrammed on the fly without chip reset

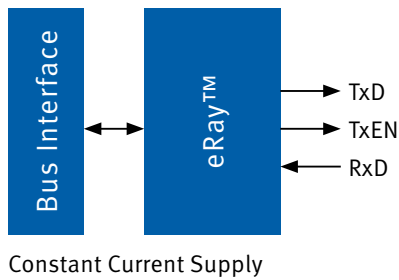
### A USIC module

- is a cluster of two independent, identical USIC channels
- up to five USIC modules available (= 10 channels)



DESIGNERS CAN NOW configure universal serial interfaces depending on their system's requirements. Whether UART, SSC (SPI compatible), LIN, IIC or IIS, any interface is possible after a quick adjustment of the USIC module.

## FlexRay™



- Embedded FlexRay™ module available in 2009
- Module based on Bosch eRay™ 1.0.2
- Follows latest FlexRay™ specification 2.1
- Flexible operation features
- Support of 16/32-bit adaption
- Support of XC2000 PEC

## Scalable integrated and discrete solutions



### Discrete FlexRay™ Solutions

**FlexRay™-Companion IC – fits perfectly with Infineon XC2200 microcontrollers**

- Power-down features and communication interface options for body applications

**Infineon XC2300 microcontrollers**

- Safety features and redundancies for safety-relevant applications such as power steering and airbag

**Infineon XC2700 microcontrollers**

- Powerful motor control features for low-end engine control

### Integrated FlexRay™ Solutions

**XC2000 fully integrated, most powerful automotive microcontroller**

- Up to 100 MHz
- FlexRay™ integrated
- Up to 1.6 MB eFlash
- XC2200 optimized for high-end body applications, XC2300 optimized for safety, XC2700 optimized for low-end engine control

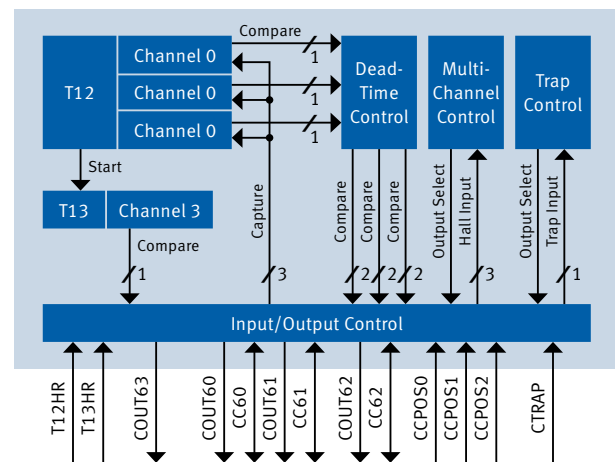
# Peripheral Highlights

## CCU6E – High-performance PWM

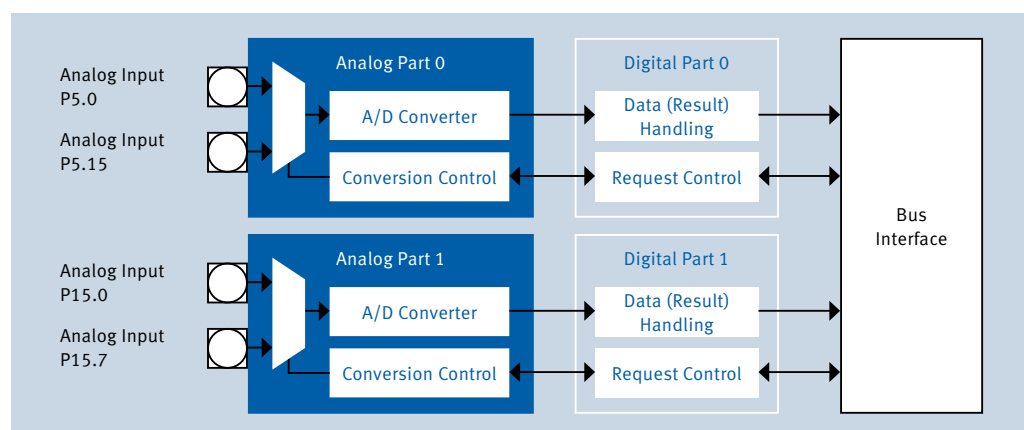
CONSISTS OF A 16-bit timer block (T12) with three capture/compare channels and another 16-bit timer block (T13) with one compare channel. The T12 channels can generate up to six PWM signals or accept up to six capture triggers. The T12 channels can be used to control up to three half bridges with automatic dead-time generation. They can jointly generate control signal patterns to drive AC motors or inverters. Sinusoidal or space vector modulation can be easily implemented. Special operating modes support the control of brushless DC motors using Hall sensors or back EMF detection. In addition, block commutation and control mechanisms for multiphase machines are supported.

### CCU6E features

- Capture for time measurement
- Compare for PWM generation
- Burst for additional modulation
- Single-shot for flexible signal generation
- Multichannel for unipolar machines
- Block commutation for brushless DC drives



## Enhanced analog-digital converter (ADC)

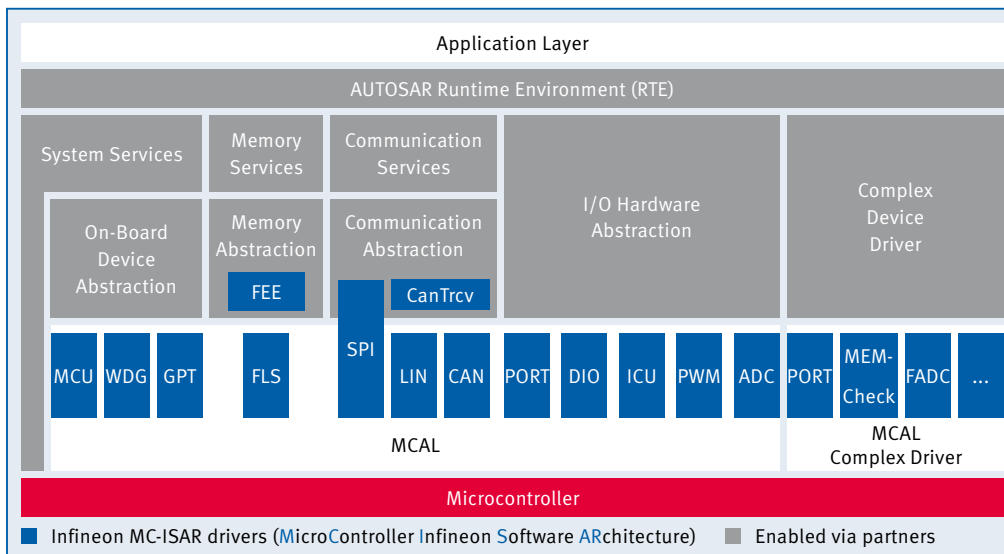


### Two synchronizable A/D converters with

- Total of up to 40 channels
- 10-bit resolution, +/-2 LSB
- Conversion time down to 1.2  $\mu$ s
- Data reduction pre-processing
- Result accumulation, limit check
- External or internal trigger events and automatic conversion sequencing

# Embedded Software

## AUTOSAR



### Fast development start

- Off-the-shelf low level driver
- Useable with or without AUTOSAR environment
- The complete AUTOSAR suite is available via partners

### Automotive commitment

- AUTOSAR member since 2004
- AUTOSAR driver implementation since 2005
- MC-ISAR will be implemented for new microcontrollers

### Software competence

- MC-ISAR AUTOSAR MCAL drivers developed in house
- CMM level 3 certified process applied
- Drivers applied in production applications

### Supported devices

- TriCore™: AUDO Next Generation, AUDO FUTURE
- XC2000: XC2200, XC2300, XC2700

## Living Automotive Excellence – on the Way to Zero-Defect Products and Services

THE MOST VALUABLE ASPECT of cars is the people they carry. Therefore, safety should never be compromised. It is the most important consideration for everybody involved in making automobiles – from the smallest suppliers to the manufacturers themselves.

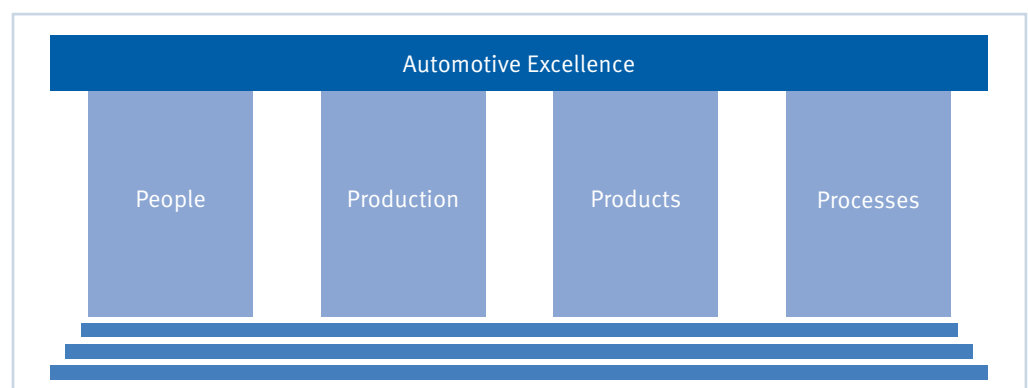
AS CAR COMPONENTS BECOME more and more complex, and as the number of control units in vehicles increases, the likelihood of a product failure becomes greater. Quality performance is a key differentiator in the automotive industry. This means:

- No quality events
- Defect-free product launches
- Automotive product quality of 0 failed parts per million

One differentiator for your success is Zero-Defect by Automotive Excellence.

### No compromise when it comes to quality

INFINEON ESTABLISHED THE MOST COMPREHENSIVE quality program of the semiconductor industry in 2003. The Automotive Excellence Program is founded on four pillars: people, products, processes and production. Due to our “no compromise” policy in all four pillars our program really works. Our employees truly live the credos of “Zero-Defect”, considering the highest quality requirements and understanding the importance of prevention. They are trained to deeply understand the tools and methods used to avoid deviations and to solve problems proactively.

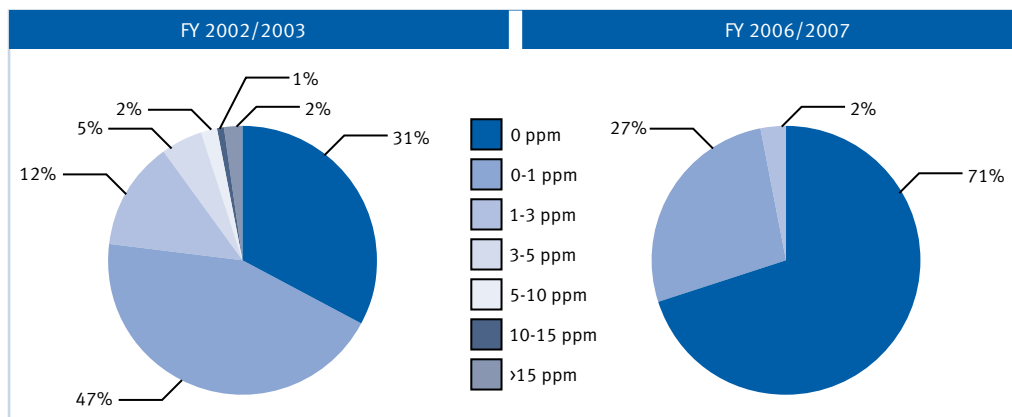




## On the way to zero-defect products

On the way to zero-defect products, some examples:

- “First time right” is our zero defect principle in the development phase
- Excellent requirement management that the product fits your application
- Products with proof of design quality and robustness for harsh automotive environment



## Automotive Excellence is your competitive advantage

IN FIVE YEARS THE PPM RATE FOR OUR AUTOMOTIVE PRODUCTS decreased by a factor of 7 down to approximately 0.2 ppm. This means that there are only two fails within ten million delivered devices. In addition, we see that zero defects is really possible. Today already two-thirds of our delivery volume in fact shows zero defects, up from one-third at the beginning of our program. Our quality is clearly seen as the industry benchmark by most of our automotive customers.

Many of our partners have expressed their satisfaction with the quality of our products and the way we execute Automotive Excellence:

- “Supplier Performance Award” for the year 2008 from Continental
- “Excellent Supplier Award 2008” from Hitachi Cable Japan
- German “TOPIT Award” for the year 2008 for the Automotive Excellence Program

For more information, please ask for our eLearning “Living Automotive Excellence”

# INFINEON TECHNOLOGIES SALES OFFICES WORLDWIDE\*

(COUNTRY/AREA)

## Australia

Infineon Technologies Australia Pty. Ltd.  
885 Mountain Highway  
Bayswater, Victoria 3153  
☎ (+61) 3-97 21 88 88  
Fax (+61) 3-97 21 88 08

## Austria

Infineon Technologies Austria AG  
Production/Development Center  
Siemensstraße 2  
9500 Villach  
☎ (+43) 5-17 77 0  
Fax (+43) 5-17 77 35 01

Infineon Technologies Austria AG  
Opengasse 20B/31  
1040 Wien  
☎ (+43) 1-51 77 71 11 00  
Fax (+43) 1-51 77 71 15 00

## Belgium /Luxembourg Netherlands

Infineon Technologies Holding B.V.  
Generaal  
Lemanstraat 67  
2018 Antwerpen  
☎ (+31) 10-21 76 80 0  
Fax (+31) 10-21 76 81 9

Infineon Technologies Holding B.V.  
Westblaak 32  
3012 KM Rotterdam  
☎ (+31) 10-21 76 80 0  
Fax (+31) 10-21 76 81 9

## Brazil

Infineon Technologies  
South America Ltda.  
Avenida Paulista  
n° 1337-CJ 172  
01311-200 Cerqueira Cesar  
São Paulo  
☎ (+55) 11-33 72 92 40  
Fax (+55) 11-33 72 92 30

## Canada

Infineon Technologies  
North America Corp.  
340 March Road, Suite 301  
Kanata, Ontario K2K 2E2  
☎ (+1) 866-95 19 51 95 1  
Fax (+1) 613-59 18 95 4

## China

Infineon Technologies  
Center of Competence (Shanghai) Co., Ltd.  
12th Floor, Quantum Plaza  
No.27 Zhi Chun Road  
Haidian District  
Beijing 100083  
☎ (+86) 10-82 35 61 18  
Fax (+86) 10-82 35 54 74

Infineon Technologies  
Hong Kong Ltd.  
Suite 302, Level 3 Festival Walk  
80 Tat Chee Avenue  
Kowloon Tong  
Hong Kong  
☎ (+852) 28-32 05 00  
Fax (+852) 28-27 97 62

Infineon Technologies  
International Trade (Shanghai) Co., Ltd.  
No. 7 & 8, Lane 647, Song Tao Road  
Zhang Jian Hi-Tech Park  
Shanghai 201203  
☎ (+86) 21-61 01 90 00  
Fax (+86) 21-50 80 62 04

Infineon Technologies  
Taiwan Co., Ltd.  
12F-1, No. 3-2 Yuan Qu Street  
Nan Kang District  
Taipei 115  
☎ (+886) 2-26 55 75 00  
Fax (+886) 2-26 55 75 01 8

## Denmark

Infineon Technologies Nordic AB  
Herlev Hovedgade 201A  
2730 Herlev  
☎ (+45) 44-50 77 00  
Fax (+45) 44-50 77 01

## Finland

Infineon Technologies Nordic AB  
Visitor's Address Upseerinkatu 1  
P.O. Box 276  
02601 Espoo  
☎ (+358) 10-6 80 84 00  
Fax (+358) 10-6 80 84 01

## France

Infineon Technologies France S.A.S.  
Centre de vie Agora – Bat. A2  
Z.I. des Paluds  
13400 Aubagne  
☎ (+33) 44-28 24 61 0  
Fax (+33) 44-28 24 61 8

Infineon Technologies France S.A.S.  
Burolines 2  
2 ter, rue Marcel Doret  
31700 Blagnac  
☎ (+33) 5-34 55 13 30  
Fax (+33) 5-34 55 13 34

Infineon Technologies France S.A.S.  
39-47, Boulevard Ornano  
93527 Saint-Denis CEDEX 2  
☎ (+33) 1-48 09 72 00  
Fax (+33) 1-48 09 72 90

## Germany

Comneon GmbH  
Südwestpark 2-4  
90449 Nuremberg  
☎ (+49) 911-37 88 0  
Fax (+49) 911-37 88 10 00

Hitex Development Tools GmbH  
Greschbachstraße 12  
76229 Karlsruhe  
☎ (+49) 72-19 62 80  
Fax (+49) 72-19 62 81 89

Infineon Technologies AG  
Siemensstraße 31-33  
71254 Ditzingen/Stuttgart  
☎ (+49) 7156-17 91 90  
Fax (+49) 7156-17 91 99 0

Infineon Technologies AG  
Düsseldorfer Landstraße 401  
47259 Duisburg  
☎ (+49) 203-72 98 71 1  
Fax (+49) 203-72 98 76 0

Infineon Technologies AG  
Naegelsbacherstraße 26  
91052 Erlangen  
☎ (+49) 9131-97 00 10  
Fax (+49) 9131-97 00 19 9

Infineon Technologies AG  
Lindenplatz 2  
20099 Hamburg  
☎ (+49) 40-23 51 94 74  
Fax (+49) 40-23 51 94 75

Infineon Technologies AG  
Paderborner Straße 1  
30539 Hannover  
☎ (+49) 511-87 65 62 0  
Fax (+49) 511-87 65 62 90

Infineon Technologies AG  
Am Campeon 1-12  
85579 Neubiberg  
☎ (+49) 89-23 40  
Fax (+49) 89-23 42 46 94

Infineon Technologies AG  
Südwestpark 65  
90449 Nuremberg  
☎ (+49) 911-25 29 30  
Fax (+49) 911-25 29 39 3

Infineon Technologies AG  
Max-Planck-Straße 5  
59581 Warstein  
☎ (+49) 2902-76 40  
Fax (+49) 2902-76 41 25 6

## Hungary

Infineon Technologies Cegléd Kft.  
Gizella u. 51-57  
1143 Budapest  
☎ (+36) 1-47 12 82 4  
Fax (+36) 1-47 12 82 5

## India

Infineon Technologies India Pvt. Ltd.  
10th Floor, Discover Building  
International Technology Park  
Whitefield Road  
Bangalore 560 066  
☎ (+91) 80-41 39 20 01  
Fax (+91) 80-41 39 23 33

## Iran

Siemens SSK  
No. 32 Taleghani Ave.  
15875-4773 Teheran  
☎ (+98) 2-16 14 23 17  
Fax (+98) 2-16 46 30 60

## Ireland

Infineon Technologies Ireland Ltd.  
69 Fitzwilliam Lane  
Dublin 2  
☎ (+353) 1-79 99 50 0  
Fax (+353) 1-79 99 50 1

## Israel

Nisko Ltd.  
2A, Habarzel Street  
Tel Aviv 69710  
☎ (+972) 3-76 57 30 0  
Fax (+972) 3-76 57 33 3

## Italy

Infineon Technologies Italia S. r. l.  
Via Vipiteno, 4  
20128 Milan  
☎ (+39) 2-25 20 41  
Fax (+39) 2-25 20 44 39 5

## Japan

Infineon Technologies Japan K. K.  
Maruyama Nissei Building 14F  
2-14-21 Nishiki, Naka-ku  
Nagoya-shi, Aichi 460-0003  
☎ (+81) 52-22 31 57 0  
Fax (+81) 52-22 31 46 1

Infineon Technologies Japan K. K.  
ORIX-Dojima Building 8F  
2-1-31, Dojima, Kita-ku  
Osaka-shi  
Osaka 530-0003  
☎ (+81) 6-47 97 44 60  
Fax (+81) 6-47 97 44 62

Infineon Technologies Japan K. K.  
DCJC KWE Narita Terminal  
Osato 157-1, Shibayama-cho  
Sanbu-gun, Chiba 289-1603  
☎ (+81) 479-70-92 31

Infineon Technologies Japan K.K.  
Gate City Osaka, East Tower  
21F / 22F / 23F  
1-11-2 Osaka  
Shinagawa-ku  
Tokyo 141-0032  
☎ (+81) 3-57 45 71 00  
Fax (+81) 3-57 45 74 10

## Korea

Infineon Technologies Korea Co., Ltd.  
4th Floor Sigma Tower  
7-19 Shincheon-dong Songpa-gu  
Seoul 138-734  
☎ (+82) 2-34 60 09 50  
Fax (+82) 2-34 60 09 01

Infineon Technologies Korea Co., Ltd.  
15th Floor SJ Technoville 60-19  
Gasan-dong Geumcheongu  
Seoul 153-801  
☎ (+82) 2-34 60 08 80  
Fax (+82) 2-34 60 09 09

## Mexico

Everest Sales & Solutions  
Av. Manuel Acuña 2674-101  
Col. Ladrón de Guevara  
44680 Guadalajara, J. AL  
☎ (+52) 33-36 42 21 01  
Fax (+52) 33-36 40 65 62

## Poland

Siemens Sp. z o.o.  
Ul. Zupnicza 11  
03-821 Warsaw  
☎ (+48) 22-87 09 15 0  
Fax (+48) 22-87 09 15 9

## Puerto Rico

Klamco Electronics  
527 Street QH No. 1  
Country Club  
Carolina, PR 00982  
☎ (+1787) 257-79 22  
Fax (+1787) 257-79 61

## Russia

Infineon Technologies RUSS LLC  
Leninsky prospect 113/1  
117 198 Moscow  
☎ (+7) 495-95 65 19 5  
Fax (+7) 495-95 65 19 5

## Singapore

Infineon Technologies Asia  
Pacific Pte. Ltd.  
8 Kallang Sector  
Singapore 349 282  
☎ (+65) 68-76 28 88  
Fax (+65) 68-76 31 22

## South Africa

Siemens Components  
P.O. Box 3438  
Halfway House 1680  
2146 Sandton  
☎ (+27) 11-70 66 09 9  
Fax (+27) 11-70 69 04 9

## Spain

Infineon Distribution Sales Office IBERIA  
c/ Chile, 10 1a Planta – Oficina 141  
Edificio Madrid 92  
28290 Las Rozas de Madrid, Madrid  
☎ (+34) 91-63 05 72 8  
Fax (+34) 91-63 05 72 8

Siemens, S.A.  
División de Componentes  
Ronda de Europa, 5  
28760 Tres Cantos-Madrid  
☎ (+34) 91-51 47 15 5  
Fax (+34) 91-51 47 01 4

## Sweden

Infineon Technologies Sweden AB  
Isafjordsgatan 16  
16481 Kista  
☎ (+46) 8-75 75 00 0  
Fax (+46) 8-75 74 61 2

## Switzerland

Infineon Technologies Schweiz AG  
Badener Strasse 623  
P.O. Box 1570  
8048 Zurich  
☎ (+41) 1-49 78 04 0  
Fax (+41) 1-49 78 05 0

## Turkey

Infineon Technologies Turkey  
Sehit Mehmet Fatih Ongul Sok.  
Bagdatlioglu Plaza No:3  
Office:4 Kozyatagi  
34742 Kozyatagi, Istanbul  
☎ (+90) 216-46 40 75 5  
Fax (+90) 216-46 40 75 6

## United Kingdom

Infineon Technologies  
Kingswood  
Kings Ride  
Ascot SL5 8AD  
☎ (+44) 1344-86 59 00

Infineon House  
Great Western Court  
Hunts Ground Road  
Stoke Gifford  
Bristol BS34 8HP  
☎ (+44) 11-79 52 88 23

## U.S.A.

Infineon Technologies  
North America Corp.  
2529 Commerce Drive, Suite H  
Kokomo, IN 46902  
☎ (+1) 765-45 61 92 8  
Fax (+1) 765-45 63 83 6

Infineon Technologies  
Industrial Power, Inc.  
1050 Route 22  
Lebanon, NJ 08833  
☎ (+1) 908-23 65 62 1  
Fax (+1) 908-23 65 62 0

Infineon Technologies  
North America Corp.  
1880 W. Winchester Drive, Suite 108  
Libertyville, IL 60048  
☎ (+1) 847-99 60 48 0

Infineon Technologies  
North America Corp.  
19111 Victor Parkway  
Livonia, MI 48152  
☎ (+1) 734-77 95 00 0  
Fax (+1) 734-77 95 00 1

Infineon Technologies  
North America Corp.  
640 N. McCarthy Blvd.  
Milpitas, CA 95035  
☎ (+1) 866-95 19 51 9

Infineon Technologies  
North America Corp.  
12770 High Bluff Drive, Suite 100  
San Diego, CA 92130  
☎ (+1) 858-50 92 16 0  
Fax (+1) 858-50 92 16 1

\* and representative offices

Automotive System Solutions September 2008, Published by Infineon Technologies AG

[ [www.infineon.com](http://www.infineon.com) ]

Order No.  
B112-H9279-X-X-7600

2008/2009