Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

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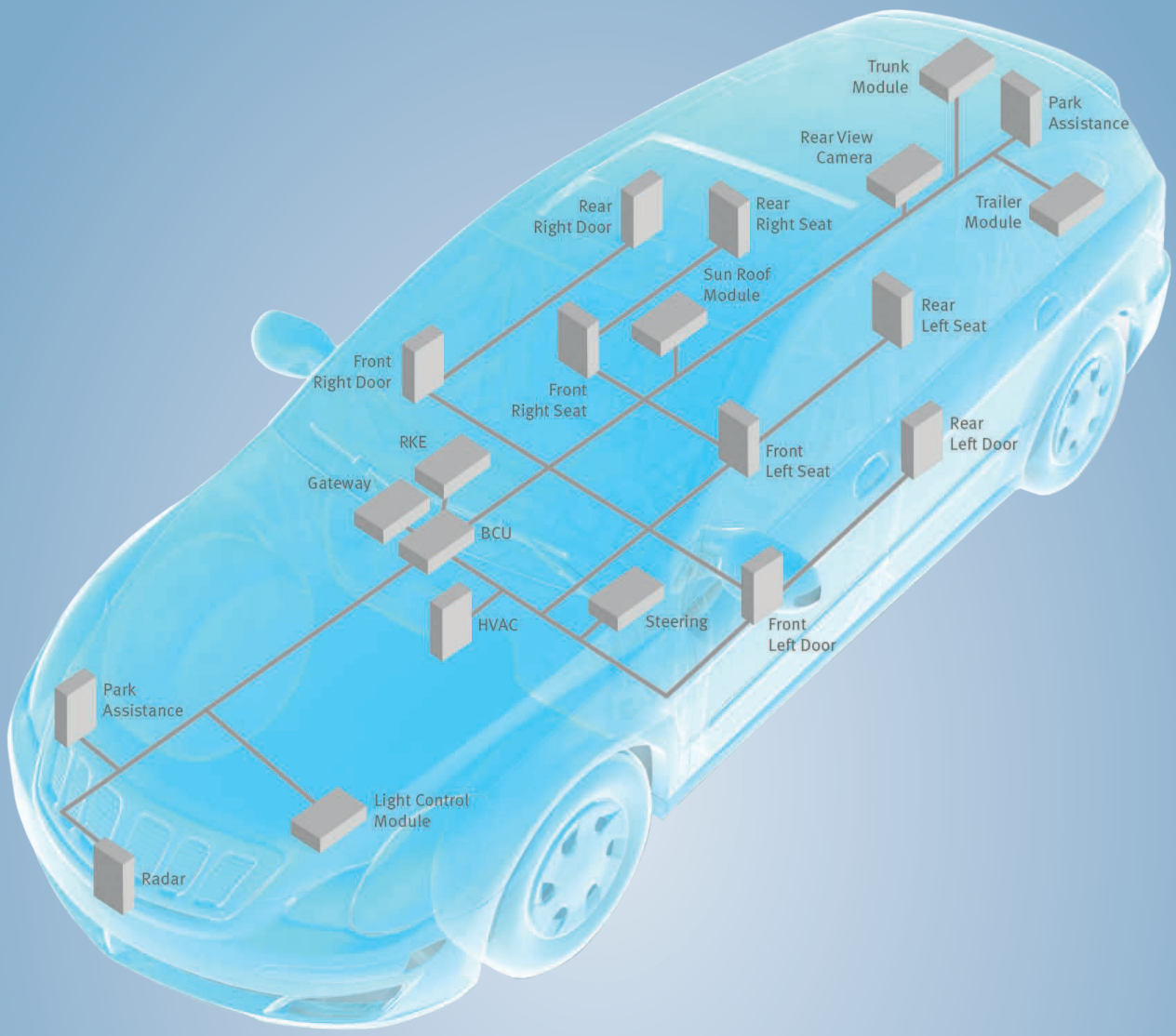
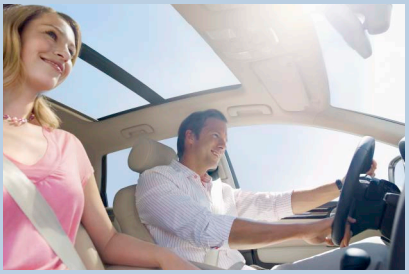


The Path to Robust Automotive Networking



www.infineon.com/automotive-networking

Content

Introduction

Automotive Networking

Automotive networking technology is evolving fast, driven by a number of key trends. With an ever-increasing number of cars on the road and rising fuel costs, demands for energy efficiency are growing. Worldwide legislation is establishing ever-stricter caps on CO_2 emissions. The spotlight is also on functional safety. With the ISO 26262 automotive standard increasingly moving into applications that were not typically safety-relevant, the bar is moving upwards and we are seeing increasingly granular system safety concepts. At the same time, complexity is on the increase. Growing consumer expectations are fuelling new comfort and safety features also in low-end segments, and this, in turn, is placing pressure on semiconductor manufacturers to reduce complexity through hardware/software compatibility and design-in support.

Last but not least, standardized, high-performance communication interfaces and protocols are needed to support the growing volume of data shared across automotive networks. CAN & LIN are the most commonly used interfaces. High-speed infotainment tends, however, to rely on Ethernet and MOST, but these involve high implementation costs. Partial networking and flexible data rates (e.g. CAN FD) can help to balance cost/performance here.

World leader in automotive electronics for over 40 years, we actively engage with many industry, standardization and research organizations to drive in-vehicle networking innovations capable of meeting today's demands for energy efficiency, safety, smooth interfacing and complexity management. Our broad portfolio extends from standalone transceivers through system basis chips to embedded power solutions for CAN, LIN and FlexRay protocols. We also offer microcontrollers with enhanced communication capabilities to support multiple protocols. All of our products are designed to deliver the exceptional levels of ESD and EMC performance required in automotive environments. And to ease and accelerate your design-in process, we offer a range of demo boards, configuration tools, tool chains and development platforms.

Automotive Standards

Infineon is actively participating as a member in several standardization groups and is also funding some research projects with major OEM's in terms of networking:

Local Interconnect Network (LIN) is used to interconnect sensors and actuators where the high bandwidth and fast reaction time is not required.

High-Speed Controlled Area Network (HS-CAN) is the most used communication interface in automotive and allows communication speed up to 1Mbps, frame up to 8 data bytes and a high level of data integrity.

CAN Partial Networking (PN) or Selective Wake has been introduced as a solution to reduce the current consumption in active mode allowing to set selectively an ECU in low power or active mode.

CAN with Flexible Data-Rate (CAN FD) extends the performance of HS-CAN with a very low system effort. Up to 5Mbps communication speed and up to 64 data bytes per frame can be reached using the same physical layer.

FlexRay provides up to 10Mbps communication speed per channel for advanced in-vehicle control applications. It provides a fault-tolerant network for safety critical applications.

Ethernet – Ethernet technology rolls out the path to the next level of connectivity and provides not only improved bandwidth for e.g. ADAS application, but also lower latencies for control applications based on proved and well-known standards.

Your Partner of Trust for Automotive Network Solutions

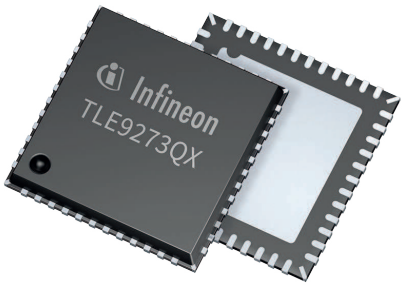
Infineon Automotive Networking Products

- Comprehensive product portfolio of standalone transceivers, system basis chips and embedded power solutions
- Microcontrollers with enhanced communication capabilities to support flexible communication protocols

World leader in automotive electronics for 40 years, Infineon focuses on the in-vehicle networking, a major driver today for innovation in the automotive field, meeting the ever-increasing demands of consumers for energy efficiency, mobility and security.

With over fifteen years' experience developing communication interfaces, Infineon offers a broad product portfolio of standalone transceivers, system basis chips, embedded power solutions for CAN, LIN and FlexRay protocols. AURIX™ microcontrollers with enhanced communication capabilities to support flexible communication protocols such as LIN, SPI, I^2C, CAN, CAN FD, FlexRay™, Ethernet, DigRF/LVDS complement the offering.

Continuously improving its SPT chip technology, Infineon provides solutions for the challenges faced by the automotive industry, featuring outstanding ESD robustness and EMC performance to fulfill the latest OEM requirements.



In this brochure Infineon introduces its standalone transceiver, system basis chip, embedded power & AURIX™ microcontroller portfolio, with a detailed description of their distinctive key features and benefits.

For more detailed information please visit the Infineon website at www.infineon.com/Automotive-Networking or contact your sales or distribution partners www.infineon.com/WhereToBuy.

Products Overview

Protocol/Product Type	LIN	High-Speed CAN	High-Speed CAN + LIN	FlexRay
Standalone Transceivers	TLE7257SJ/LE TLE7258SJ/LE TLE7259-3GE/-3LE TLE7269G	TLE6250G/GV33 TLE7250G/GVIO TLE8250G/GVIO TLE6251D/DS TLE6251-2G/-3G		TLE9221SX TLE9222PX [1)]
System Basis Chips		TLE826x TLE926x	TLE826x TLE926x	
Infineon® Embedded Power	TLE983x [2)] TLE986x [2)] TLE987X [2)]			

1) In development
2) In development, samples available

SPT: Smart Power Technology
SBC: System Basis Chip
EMC: Electro Magnetic Compatibility
CAN: Controller Area Network
ESD: Electro Static Discharge

OEM: Original Equipment Manufacturer
LIN: Local Interconnect Network
ePower: Infineon® Embedded Power
CAN PN: CAN Partial Networking
CAN FD: CAN with Flexible Data-rate

Automotive Transceivers

Because of the ever-increasing demand for data exchange in modern vehicles, the automotive industry implemented networks like CAN (Controller Area Network), LIN (Local Interconnect Network) and FlexRay protocol-based bus systems.

Infineon is offering a broad product portfolio of automotive transceivers for these different automotive bus segments, that are perfectly suited and designed to withstand the harsh automotive environment.

Dependent on the respective vehicle network architecture and the related ECU supply path, different transceiver types are used. Infineon transceivers ensure reliable communication and help minimize the current consumption and the related CO_2-emissions at the vehicle level. The Infineon transceiver products provide the best value through high performance, ruggedness and reliable communication.

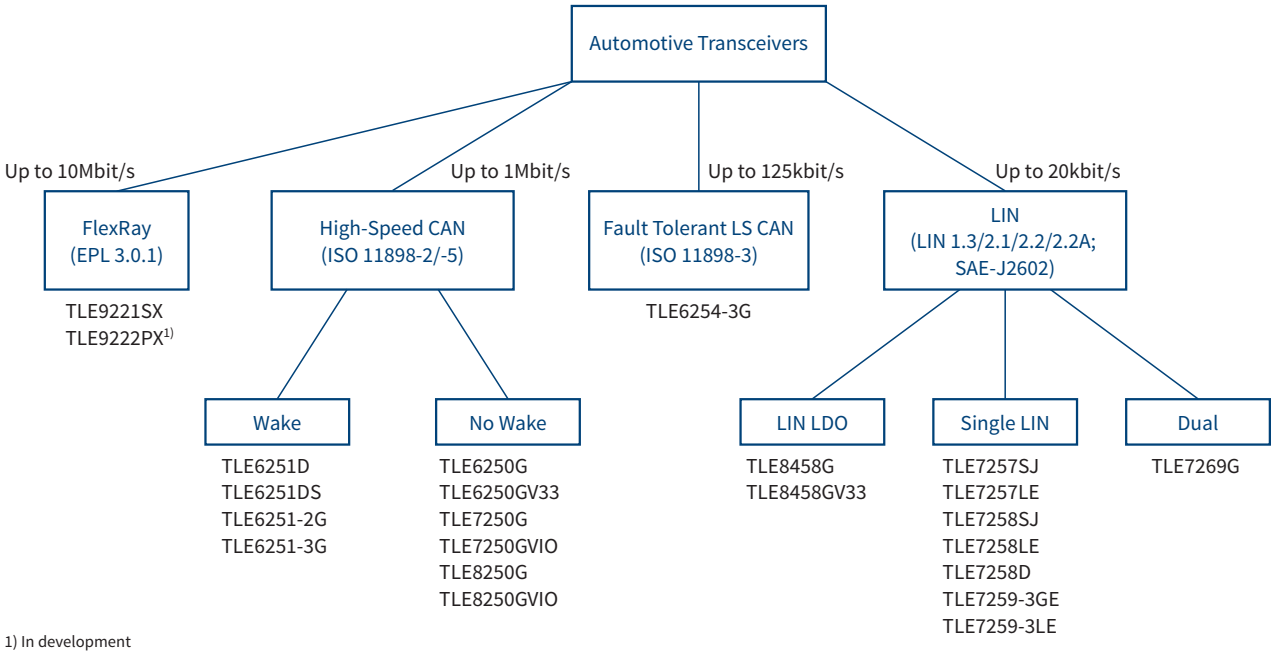
Key Features and Benefits

- Broad product portfolio
- Outstanding ESD robustness
- Excellent EMC performance
- Low quiescent currents
- Worldwide OEM approval
- Highest quality
- Transceiver family concept

OEM HAL AEC Qualified RoHS

www.infineon.com/transceiver

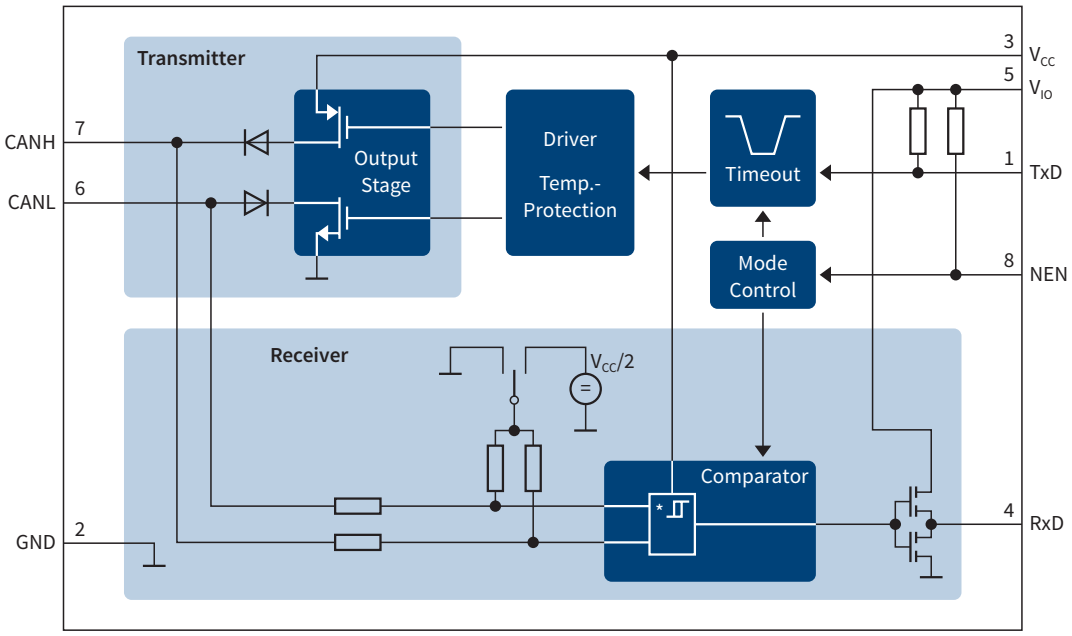
Selection Tree Automotive Transceivers



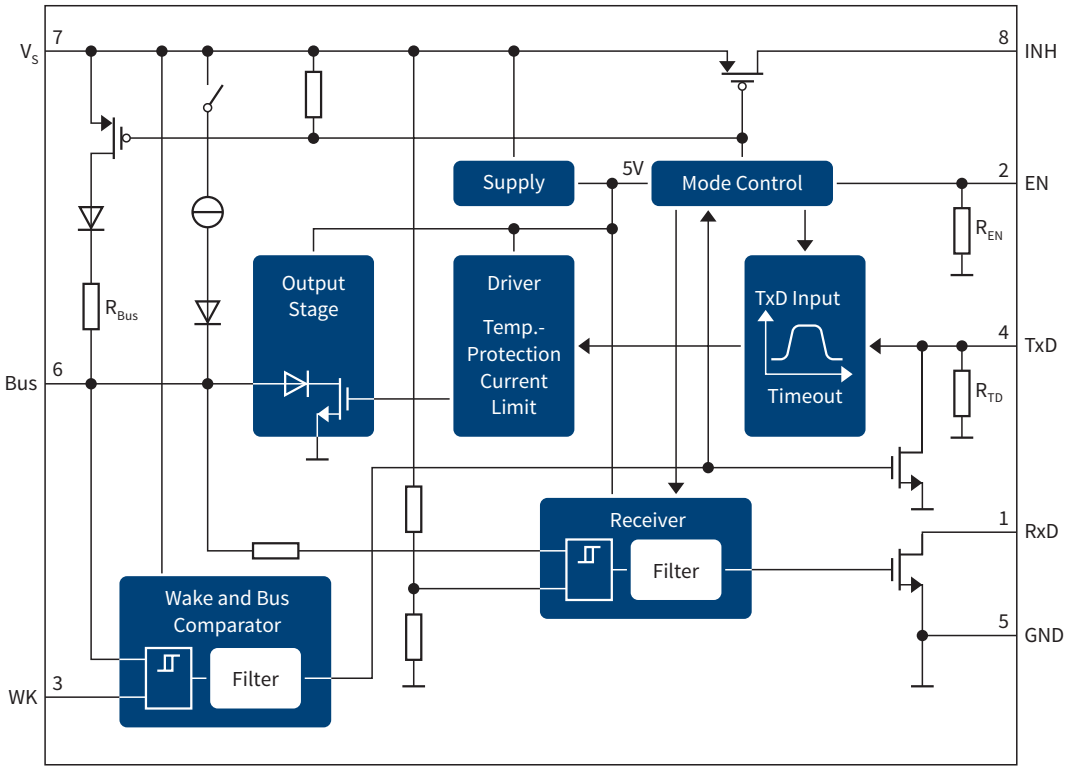
1) In development

Automotive Transceivers

Block Diagram Example High-Speed CAN: TLE7250GVIO



Block Diagram Example LIN: TLE7259-3GE



Product Table

Product Type	Transmission Rate (max)	I_q [µA]	Bus Wake-up Capability	Wake-up Inputs	Number of Channel	Bus Failure Management	Package
High-Speed CAN ISO 11898-2							
TLE6250G	1Mbit/s	< 10 @ 5V stand-by			1		PG-DSO-8
TLE6250GV33	1Mbit/s	< 10 @ 5V stand-by			1		PG-DSO-8
TLE7250G	1Mbit/s	< 10 @ 5V stand-by			1		PG-DSO-8
TLE7250GVIO	1Mbit/s	< 10 @ 5V stand-by			1		PG-DSO-8
TLE8250G	1Mbit/s	< 10 @ 5V stand-by			1		PG-DSO-8
TLE8250GVIO	1Mbit/s	< 10 @ 5V stand-by			1		PG-DSO-8
High-Speed CAN ISO 11898-5							
TLE6251-2G	1Mbit/s	< 30 sleep mode	●	●	1	●	PG-DSO-14
TLE6251-3G	1Mbit/s	< 30 sleep mode	●	●	1	●	PG-DSO-14
TLE6251DS	1Mbit/s	< 30 @ 5V stand-by	●		1		PG-DSO-8
TLE6251D	1Mbit/s	< 30 @5V stand-by	●		1		PG-DSO-8
Fault-tolerant CAN ISO 11898-3							
TLE6254-3G	125kbit/s	< 65 sleep mode	●	●	1	●	PG-DSO-14
LIN/SAE J2602/k-line							
TLE6258-2G	20kbit/s	< 40 stand-by mode			1		PG-DSO-8
TLE7257SJ NEW! TLE7257LE NEW!	20kbit/s	< 10 sleep mode	●		1	●	PG-DSO-8 TSON-8
TLE7258SJ NEW! TLE7258LE NEW!	20kbit/s	< 10 sleep mode	●		1	●	PG-DSO-8 TSON-8
TLE7259-3GE NEW! TLE7259-3LE NEW!	20kbit/s	< 10 sleep mode	●	●	1	●	PG-DSO-8 TSON-8
TLE7269G	20kbit/s	< 10 sleep mode	●	●	2	●	PG-DSO-14
TLE8458	20kbit/s	< 10 sleep mode	●	●	1	●	PG-DSO-8
FLexRay							
TLE9221SX NEW!	10Mbit/s	< 45 sleep mode	●	●	1	●	PG-SSOP-16
TLE9222PX[1)]	10Mbit/s	< 40 stand-by mode	●		1	●	PG-TSSOP-14

1) In development

System Basis Chips (SBCs)

The Driver SBCs Family

The Driver SBC is the first family of the new generation of Infineon SBC in an exposed pad PG-VQFN-48 (7mm x 7mm) power package. The family offers several variants to meet the different application requirements. The devices are designed for various CAN-LIN automotive body applications as a main supply for the microcontroller and as an interface for a CAN and LIN bus network (optional CAN partial networking). To support these applications, the Driver SBC provides the main functions, such as a 5V low-dropout voltage regulator (LDO) for microcontroller supply, a 5V low-dropout voltage regulator with short circuit protection against supply voltage V_S for e.g. sensor supply, HS-CAN transceiver and LIN transceiver for data transmission, fully protected low- and high-side switches, and a 16-bit Serial Peripheral Interface (SPI) to control and monitor the device. Also implemented are a Window Watchdog circuit with a reset feature, a fail output and an under voltage reset feature. The device offers low-power modes in order to support applications that are connected permanently to the battery. A wake up from the low-power mode is possible via a message on the buses, via the bi-level sensitive monitoring/wake-up inputs as well as via cyclic wake. The device is designed to withstand the severe conditions of automotive applications.

Features

- Low-drop voltage regulator 5V, 250mA
- Low-drop voltage regulator 5V, 100mA, robust against short to V_S
- High-speed CAN transceiver ISO 11898-2/5
- LIN transceiver LIN 2.2, J2602-2
- Fully compliant to “Hardware Requirements for LIN, CAN and FlexRay Interfaces in Automotive Applications” Revision 1.3, 2012-05-04
- Two low-side outputs and six high-side outputs
- Four wake inputs, reset output and fail output
- Overtemperature and short circuit protection feature

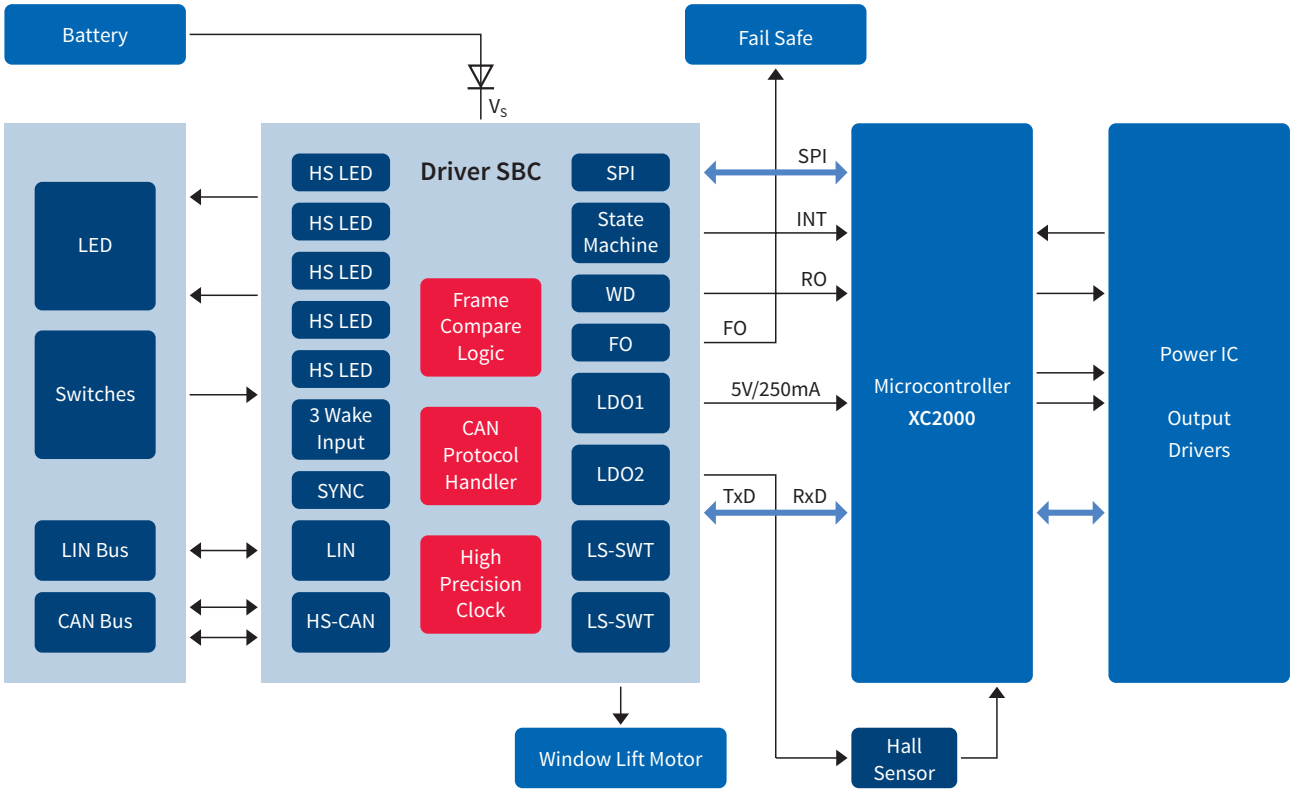
Applications

- Door control units
- Central body computer
- Low-cost bodycontrol
- HVAC control module
- Trunk control module
- Seat control
- Roof module

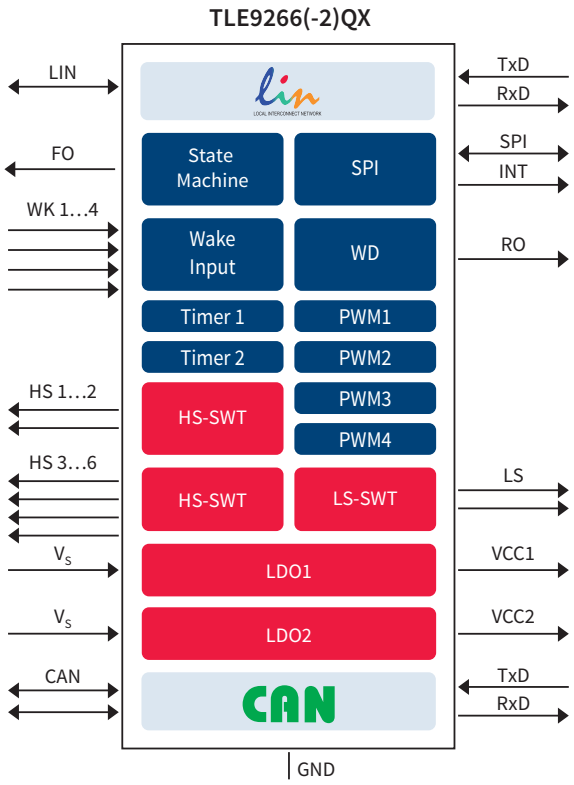
OEM HAL AEC Qualified RoHS

www.infineon.com/sbc

Application Diagram



Block Diagram



System Basis Chips (SBCs)

The Mid-Range SBCs Family

Mid-Range SBC family offers a high level of integration, performance and scalability. Up to three low-drop voltage regulators with 5V or 3.3V output voltage, one HS CAN (including partial networking and flexible data-rate) and up to two LIN transceivers complying with the latest automotive standards and OEM requirements.

The devices include fail-safe features to support ECU functional safety concept like under-voltage monitoring, window watchdog with reset, fail-safe operating mode, fail-safe outputs. There are also available four high-side switches to drive external loads, wake-inputs and general purpose input-outputs (GPIOs) to monitor inputs or activate loads. Mid-Range SBCs offer low-power modes in order to support applications that are connected permanently to the battery. All devices feature an exposed pad PG-VQFN-48 (7mm x 7mm) power package (supporting Automatic Optical Inspection). The entire family is pin-to–pin and software compatible and is designed to withstand the severe conditions of automotive applications.

Features

- Low-drop voltage regulator (5V or 3.3V up to 250mA)
- Low-drop voltage regulator (5V up to 100mA), robust against short to V_S
- Voltage regulator (5V, 3.3V or 1.8V) with external PNP transistor, robust against short to V_S
- High-speed CAN transceiver ISO 11898-2/-5/-6: suitable for chokeless operation up to 500kbit/s
- High-speed CAN transceiver supporting CAN FD communication up to 2Mbit/s featuring CAN Partial Networking FD Tolerant mode[1)]
- Two LIN transceivers LIN2.2/J2602
- Four high-side outputs 7Ω typ., two HV GPIOs and three HV wake inputs
- Watchdog, cyclic sensing, interrupt and reset output
- Integrated fail-safe functions: 3 fail-safe outputs, Watchdog, fail-safe operating modes
- Voltage, current and temperature protection and monitoring
- Fully compliant to “Hardware Requirements for LIN, CAN and FlexRay Interfaces in Automotive Applications” Revision 1.3, 2012-05-04

1) The CAN FD requirements for Transceiver are not finalized. All statements regarding CAN FD are therefore based on Infineon’s today’s knowledge and expectation on the future CAN FD standard currently being worked out.

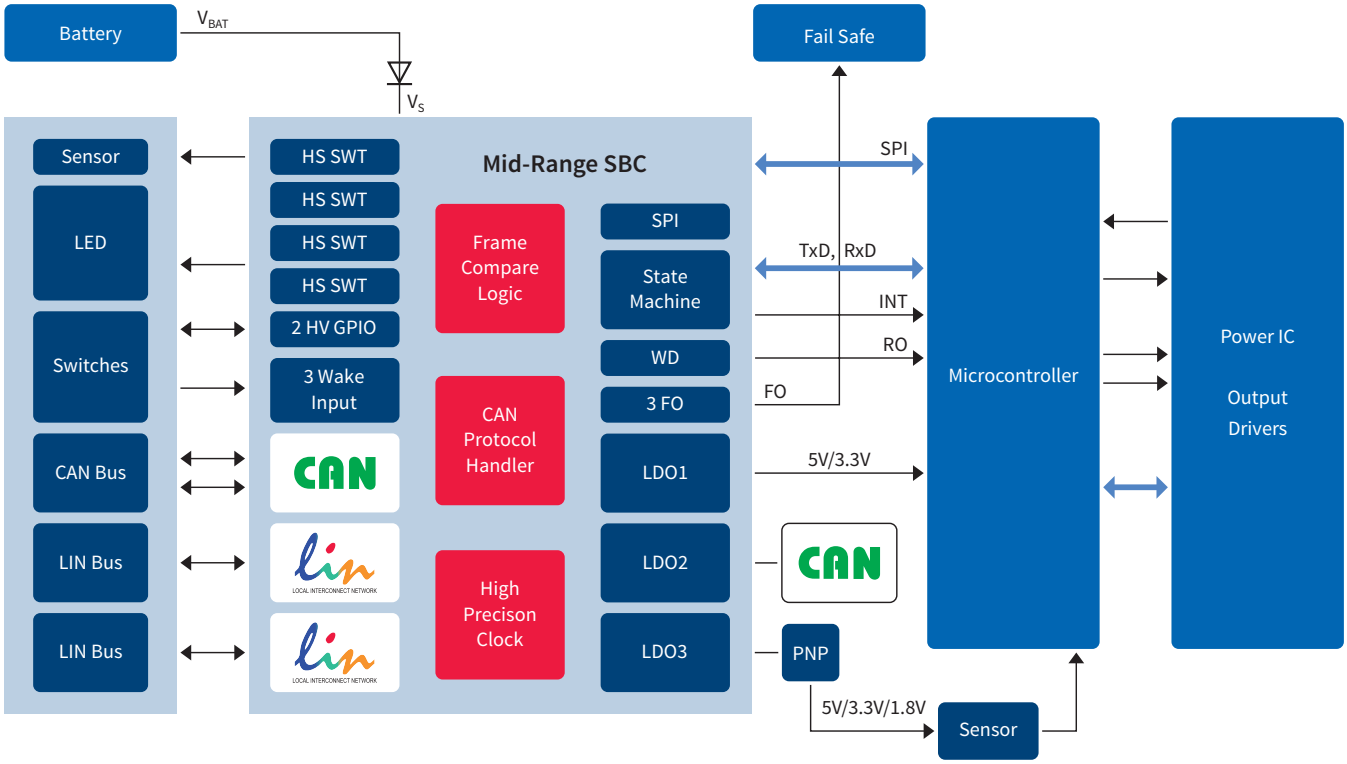
Applications

- Body control modules
- Gateway
- Climate control
- Seat control
- Door control and closures
- Light control modules
- Engine management systems

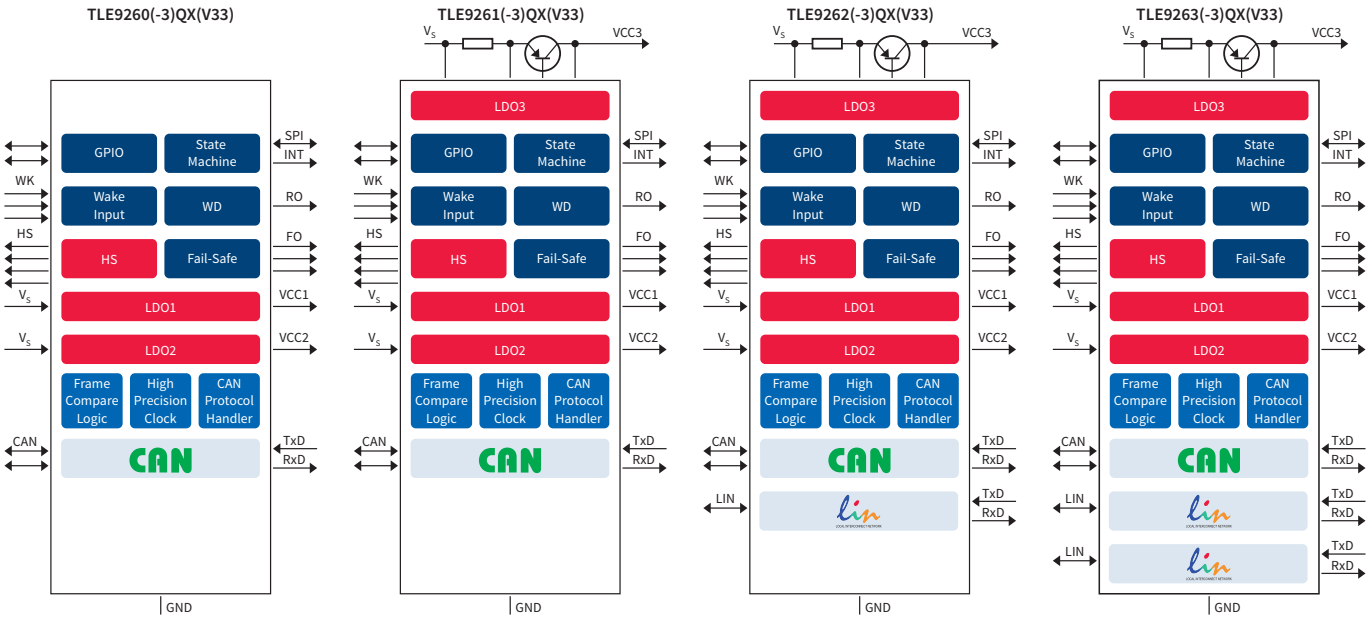
OEM HAL AEC Qualified RoHS CAN FD

www.infineon.com/sbc

Application Diagram



The Mid-Range SBCs Family



System Basis Chips (SBCs)

Body System ICs – System Basis Chips Product Overview

Product Type	Family Name	Transmission Rate (max)	I_q [µA]	I_Q [µA]	V_{reg} 1 [V]	V_{reg} 2 [V]
High-Speed CAN ISO 11898-5 / LIN 2.x and SAE J2602						
TLE9266QX	Driver SBC	1Mbit/s (CAN) 20kbit/s 10.4kbit/s (LIN)	25 (typ) Sleep Mode (V_{reg} 1 off)	53 (typ) Stop Mode (V_{reg} 1 on)	250mA @ 5V	100mA @ 5V
TLE9266-2QX	Driver SBC	1Mbit/s (CAN) 20kbit/s 10.4kbit/s (LIN)	25 (typ) Sleep Mode (V_{reg} 1 off)	53 (typ) Stop Mode (V_{reg} 1 on)	250mA @ 5V	100mA @ 5V
TLE9260QX(V33)[1]	Mid-Range SBC	2Mbit/s (CAN) 20kbit/s 10.4kbit/s (LIN)	30 (typ) Sleep Mode (V_{reg} 1 off)	50 (typ) Stop Mode (V_{reg} 1 on)	250mA @ 5V (3.3V on V33 variant)	100mA @ 5V
TLE9261QX(V33)[1]	Mid-Range SBC	2Mbit/s (CAN) 20kbit/s 10.4kbit/s (LIN)	30 (typ) Sleep Mode (V_{reg} 1 off)	50 (typ) Stop Mode (V_{reg} 1 on)	250mA @ 5V (3.3V on V33 variant)	100mA @ 5V
TLE9262QX(V33)[1]	Mid-Range SBC	2Mbit/s (CAN) 20kbit/s 10.4kbit/s (LIN)	30 (typ) Sleep Mode (V_{reg} 1 off)	50 (typ) Stop Mode (V_{reg} 1 on)	250mA @ 5V (3.3V on V33 variant)	100mA @ 5V
TLE9263QX(V33)[1]	Mid-Range SBC	2Mbit/s (CAN) 20kbit/s 10.4kbit/s (LIN)	30 (typ) Sleep Mode (V_{reg} 1 off)	50 (typ) Stop Mode (V_{reg} 1 on)	250mA @ 5V (3.3V on V33 variant)	100mA @ 5V
High-Speed CAN ISO 11898-6 / LIN 2.x and SAE J2602						
TLE9260-3QX(V33)[1]	Mid-Range SBC	2Mbit/s (CAN) 20kbit/s 10.4kbit/s (LIN)	30 (typ) Sleep Mode (V_{reg} 1 off)	50 (typ) Stop Mode (V_{reg} 1 on)	250mA @ 5V (3.3V on V33 variant)	100mA @ 5V
TLE9261-3QX(V33)[1]	Mid-Range SBC	2Mbit/s (CAN) 20kbit/s 10.4kbit/s (LIN)	30 (typ) Sleep Mode (V_{reg} 1 off)	50 (typ) Stop Mode (V_{reg} 1 on)	250mA @ 5V (3.3V on V33 variant)	100mA @ 5V
TLE9262-3QX(V33)[1]	Mid-Range SBC	2Mbit/s (CAN) 20kbit/s 10.4kbit/s (LIN)	30 (typ) Sleep Mode (V_{reg} 1 off)	50 (typ) Stop Mode (V_{reg} 1 on)	250mA @ 5V (3.3V on V33 variant)	100mA @ 5V
TLE9263-3QX(V33)[1]	Mid-Range SBC	2Mbit/s (CAN) 20kbit/s 10.4kbit/s (LIN)	30 (typ) Sleep Mode (V_{reg} 1 off)	50 (typ) Stop Mode (V_{reg} 1 on)	250mA @ 5V (3.3V on V33 variant)	100mA @ 5V

1) Available in Q4/2014
2) CAN FD up to 2Mbit/s
3) CAN PN FD tolerant

V_{reg} 3 [V]	CAN	LIN	Wake-up Inputs	Watchdog	Output Drivers	Package
–	1x High-Speed CAN ISO 11898-5	1x LIN 2.x and SAE J2602	3 High-Voltage and 1 Low-Voltage Wake Inputs (cyclic sense)	●	2x Low-Side Switch 250mA, 2x High-Side Switch 250mA, 4x High-Side Switch 150mA	PG-VQFN-48
–	1x High-Speed CAN ISO 11898-5	1x LIN 2.x and SAE J2602	3 High-Voltage and 1 Low-Voltage Wake Inputs (cyclic sense)	●	2x Low-Side Switch 250mA with inverted logic, 2x High-Side Switch 250mA, 4x High-Side Switch 150mA	PG-VQFN-48
–	1x High-Speed CAN [2] ISO 11898-5	–	3 High-Voltage (cyclic sense)	●	4x High-Side Switch 150mA, 3 Fail-Safe Outputs	PG-VQFN-48
400mA @ 5V/3.3V (3.3V/1.8V avail. on V33 variant)	1x High-Speed CAN [2] ISO 11898-5	–	3 High-Voltage (cyclic sense)	●	4x High-Side Switch 150mA, 3 Fail-Safe Outputs	PG-VQFN-48
400mA @ 5V/3.3V (3.3V/1.8V avail. on V33 variant)	1x High-Speed CAN [2] ISO 11898-5	1x LIN 2.x and SAE J2602	3 High-Voltage (cyclic sense)	●	4x High-Side Switch 150mA, 3 Fail-Safe Outputs	PG-VQFN-48
400mA @ 5V/3.3V (3.3V/1.8V avail. on V33 variant)	1x High-Speed CAN [2] ISO 11898-5	2x LIN 2.x and SAE J2602	3 High-Voltage (cyclic sense)	●	4x High-Side Switch 150mA, 3 Fail-Safe Outputs	PG-VQFN-48
–	1x High-Speed CAN [2] [3] ISO 11898-6	–	3 High-Voltage (cyclic sense)	●	4x High-Side Switch 150mA, 3 Fail-Safe Outputs	PG-VQFN-48
400mA @ 5V/3.3V (3.3V/1.8V avail. on V33 variant)	1x High-Speed CAN [2] [3] ISO 11898-6	–	3 High-Voltage (cyclic sense)	●	4x High-Side Switch 150mA, 3 Fail-Safe Outputs	PG-VQFN-48
400mA @ 5V/3.3V (3.3V/1.8V avail. on V33 variant)	1x High-Speed CAN [2] [3] ISO 11898-6	1x LIN 2.x and SAE J2602	3 High-Voltage (cyclic sense)	●	4x High-Side Switch 150mA, 3 Fail-Safe Outputs	PG-VQFN-48
400mA @ 5V/3.3V (3.3V/1.8V avail. on V33 variant)	1x High-Speed CAN [2] [3] ISO 11898-6	2x LIN 2.x and SAE J2602	3 High-Voltage (cyclic sense)	●	4x High-Side Switch 150mA, 3 Fail-Safe Outputs	PG-VQFN-48

Infineon® Embedded Power ICs

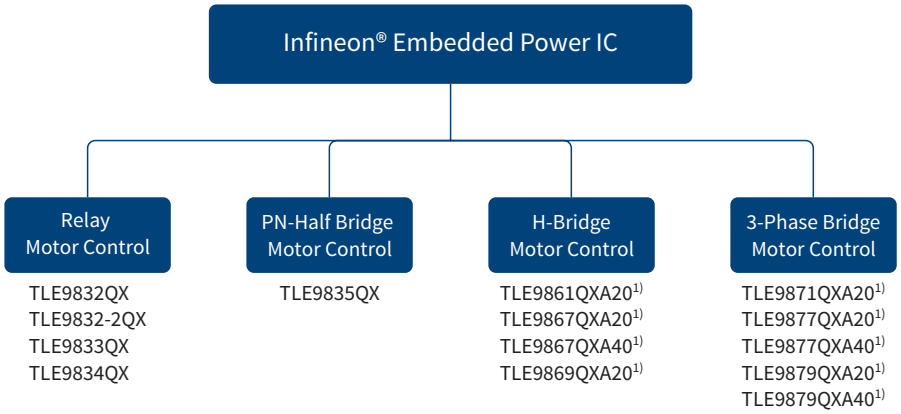
System on a Chip Motor Control

Infineon® embedded power ICs are specifically designed to enable mechatronic motor control solutions for a range of motor control applications, where a small package form factor and a minimum number of external components are essential. Examples applications include window lift, sunroof, wiper, fuel pump, HVAC fans, engine cooling fan, water pumps to name a few.

Produced on Infineon's automotive qualified smart power technologies, the Infineon embedded power System-on-chip solutions offer an unmatched level of integration of all functions required to sense, control and actuate a motor.

The Infineon® embedded power IC integrate on single die the microcontroller, the non volatile memory, the analog and mixed signal peripherals, the communication interfaces along with the driving stages needed for either relay, or half-bridge or full-bridge DC and BLDC motor applications.

Selection Tree for Infineon Embedded Power IC Motor Control



1) In development, samples available

2nd Generation: Relay Driver IC with Integrated Microcontroller

The 2nd generation of Infineon® embedded power ICs integrates on a single die all the necessary functions to sense, control and actuate motor a via a relay or via a PN MOSFET half-bridge. The TLE983x product family integrates a high performance 8-bit microcontroller derived from the established XC800 microcontroller family with application specific power drivers, control and communication on Infineon's first-in-industry automotive qualified 130nm smart power technology. TLE983x product family improves the microcontroller performance and the product feature set over the first generation (TLE78xx) product offering.

The TLE983x product family is offered in a space saving PG-VQFN-48 package, while the first product generation is realized as a Multi-Chip-Module (MCM) in a PG-DSO-28 package.

The devices are designed for LIN based motor control applications such as window lifts, wipers, sun roofs, power seats, fan/blower control.

General Characteristics

- Operating voltage V_{Bat}: 3.0V to 27V, maximum rating 40V
- Stop mode 85µA & sleep mode 25µA
- ESD performance:
  - up to 2kV / handling on all pins
  - 4kV @ HV inputs
  - 6kV @ LIN pin
  - ECU/car handling ruggedness (gun model for pins directly connected to ECU plug/socket)
- Overvoltage device clamp (load dump ruggedness): ≥ 40V
- Wide operating temperature range: T_j:-40°C up to 150°C

Features of 8-bit Microcontroller, XC8xx

- 8051 compatible, up 40MHz Frequency
- 256byte RAM and 3072byte XRAM
- 36KB to 64KB flash memory for code and data
- 10-bit ADC (5V max.), 8 channels including battery and supply supervision
- Five 16-bit timers
- Capture/compare unit for PWM signal generation (CCU6) with 2 x 16-bits timers

TLE983x Product Family Offers

- LIN transceiver (single wire), compliant with LIN Spec. 2.1, 2.0/SAE J2602 and compatible with LIN 1.3
- Two protected low-side switches (250mA)
- Up to two protected high-side switches (150mA)
- Five high-voltage inputs with wake up functionality
- Full duplex serial interface (UART) with LIN support
- Synchronous serial channel (SSC)
- Two watchdog timers
- Programmable window watchdog
- Measurement unit with 10 channels, 8-bit A/D Converter and data post processing
- Voltage regulator with undervoltage reset
- Power saving modes
  - MCU slow-down mode
  - Stop mode
  - Sleep mode
  - Cyclic wake-up and cyclic sense during stop mode and sleep mode

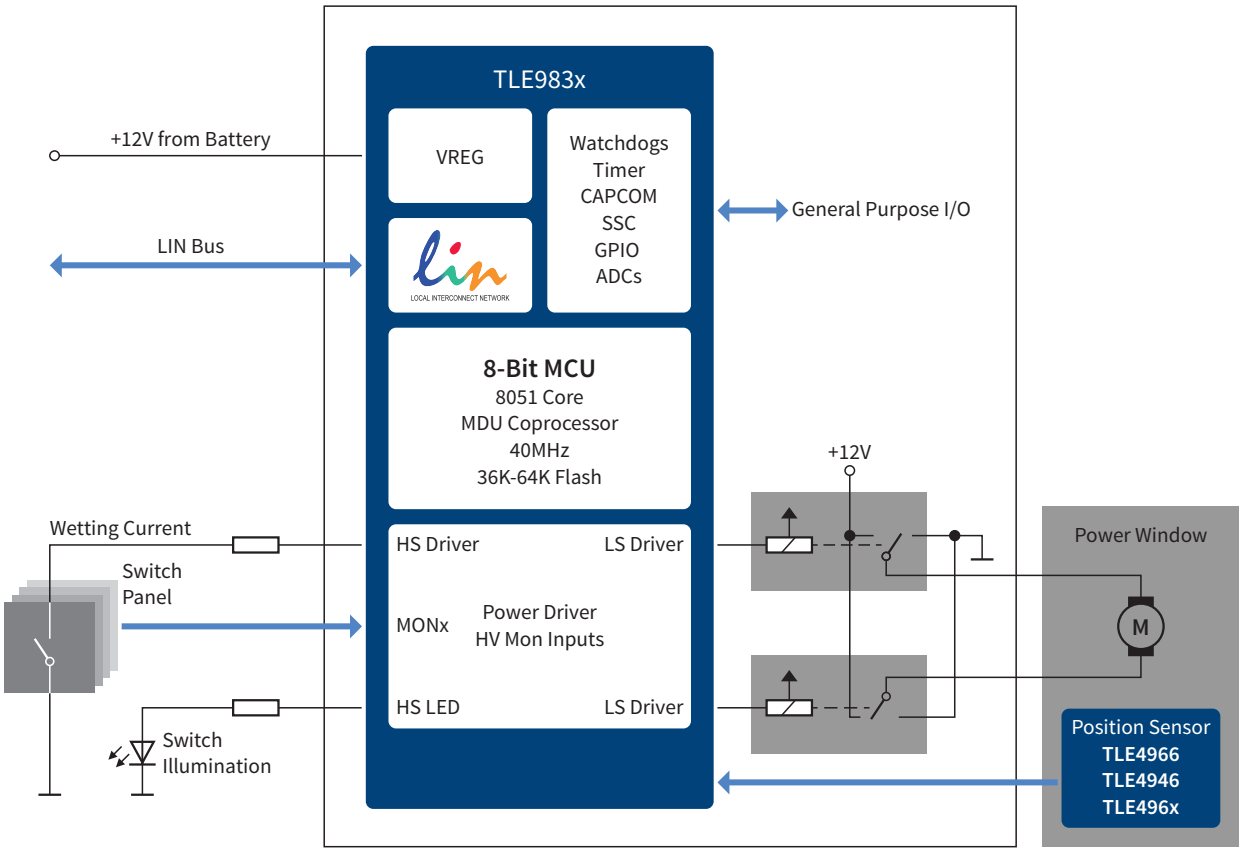
Applications

- Window lift
- Sun roof
- Fan control
- Seat control
- Key pad interface
- Switch panel interface

Infineon® Embedded Power ICs

Product Name	Core	Flash [KB]	Freq [MHz]	High-Side Switch	High-Voltage Monitor Input	16-bit Timer	GPIO	OP-AMP	PN MOS Driver	Package
TLE983x Product Family										
TLE9835QX	XC800	64	40	2	5	5	11	Yes	Yes	PG-VQFN-48
TLE9834QX	XC800	64	40	2	5	5	11	No	No	PG-VQFN-48
TLE9833QX	XC800	48	40	2	5	5	11	No	No	PG-VQFN-48
TLE9832-2QX	XC800	36	40	2	5	5	11	No	No	PG-VQFN-48
TLE9832QX	XC800	36	40	1	5	5	11	No	No	PG-VQFN-48
TLE9832QV	XC800	36	40	1	5	5	11	No	No	PG-VQFN-48

Smart LIN-based Relay Driver IC & Switch Panel Interface with Integrated 8-bit Microcontroller



3rd Generation: 2-Phase Bridge Driver IC with Integrated ARM® Cortex™-M3 Core

Infineon has combined its wealth of experience in motor control drivers for automotive applications with an industry-standard core. The unique result, our 3rd generation embedded power IC based on ARM® Cortex™-M cores, addresses a wide range of smart 2-phase DC motor control applications like, sunroof, power window lift, electrical pumps, electrical fans.

Produced on Infineon's first-in-industry automotive qualified 130nm smart power technology, the Infineon embedded power system-on-chip solutions offer an unmatched level integration and system cost to performance to optimization for the target application segments.

The TLE986x family offers scalability in terms of flash memory sizes and MCU system clock frequency supporting a wide range of motor control algorithms. It uses the same MCU and peripherals as the TLE987x family, 3-phase driver, enabling design synergies between DC and BLDC motor control applications

TLE986x Family Offers

- Four current programmable drivers with charge pump for N-Channel MOSFET
- Integrated LIN transceiver compatible with LIN 2.2 and SAE J2602
- Two full duplex serial interface (UART) with LIN support
- Two Synchronous Serial Channel (SSC)
- On-chip OSC and PLL for clock generation
- One high-voltage monitoring input with wake-up functionality
- High-speed operational amplifier for motor current sensing via shunt
- Measurement unit:
  - 8-bit ADC module with 10 multiplexed inputs
  - 10-bit ADC module with 8 multiplexed inputs, 5 external analog inputs
  - On chip temperature and battery voltage measurement unit
- Independent programmable window watchdog
- 5V/1.5V Internal supplies
- External supply (VDDEXT): 5V ±2% @ 20mA
- Power saving modes
  - MCU slow-down mode
  - Sleep mode
  - Stop mode
  - Cyclic wake-up sleep mode

Features of the Microcontroller

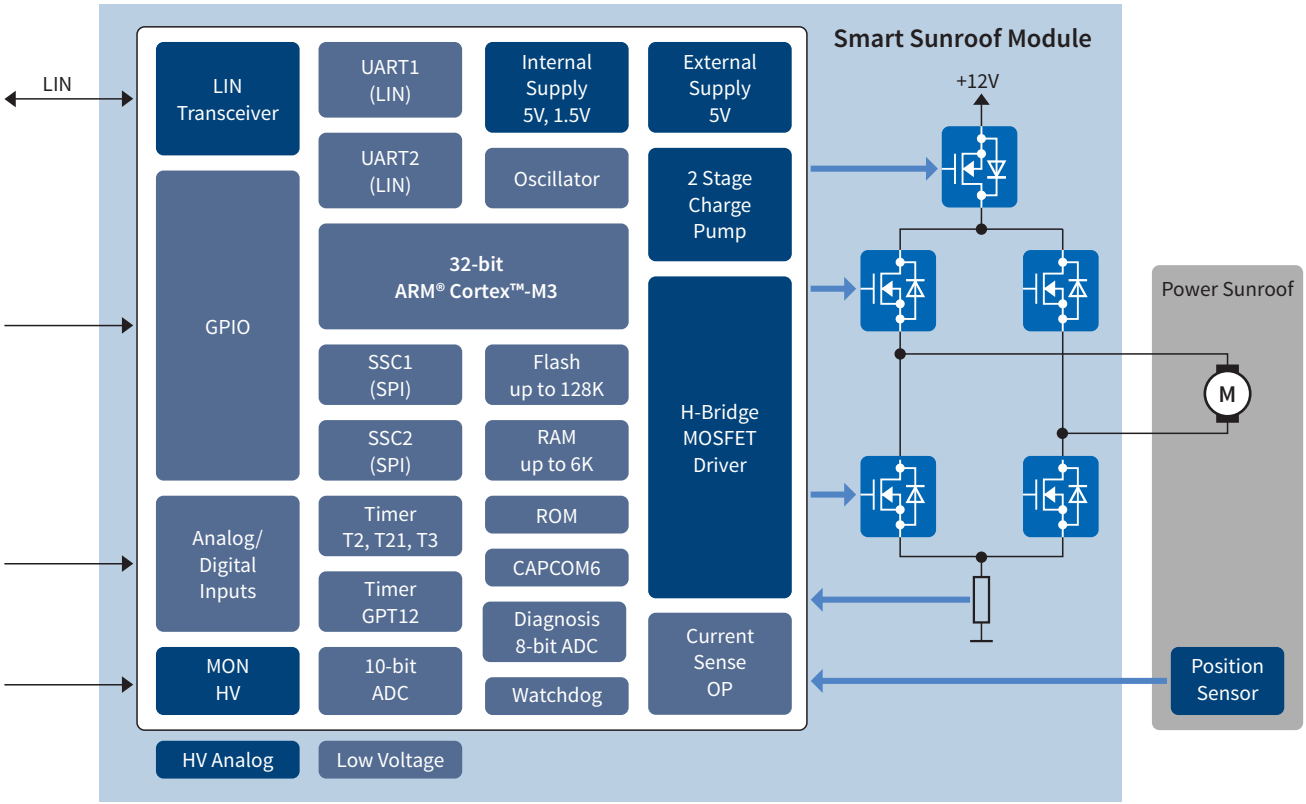
- 32-bit ARM® Cortex™-M3 Core, up to 40MHz clock frequency
- 36KB to 128KB flash memory
- Up to 6KB RAM memory
- Harvard architecture
- Thumb®-2 Instruction Set and hardware divide and multiplication unit
- Four 16-bit timers
- Capture/compare unit for PWM signal generation (CCU6) with 2x 16-bits timers

General Characteristics

- Operating supply voltage V_s = 5.5 to 28V, maximum rating 40V
- Extended operating range V_s = 3.0 to 28V, MCU / Flash fully functional
- ESD performance :
  - up to 2kV / handling on all pins
  - 4kV @ HV inputs
  - 6kV @ LIN pin
- Overvoltage device clamp (load dump ruggedness) up to 40V
- Wide operating temperature range: T_j: -40°C up to 150°C

Infineon® Embedded Power ICs

Block Diagram



Product Summary

TLE986x 32-bit µC with 2-Phase MOSFET Gate Driver for DC Motors									
Product Name	**Frequency [MHz]**	**Interface**	**RAM [KB]**	**Flash [KB]**	**EEPROM Emulation [KB]**	**OP-AMP**	**Low-Side MOSFET Drivers**	**High-Side MOSFET Drivers**	**Package**
TLE9861QXA20[1)]	24	PWM	3	36	4	y	2	2	PG-VQFN-48
TLE9867QXA20[1)]	24	PWM + LIN	6	64	4	y	2	2	PG-VQFN-48
TLE9867QXA40[1)]	40	PWM + LIN	6	64	4	y	2	2	PG-VQFN-48
TLE9869QXA20[1)]	24	PWM + LIN	6	128	4	y	2	2	PG-VQFN-48

1) In development, samples available

3rd Generation: 3-Phase Bridge Driver IC with Integrated ARM® Cortex™-M3 Core

Infineon has combined its wealth of experience in motor control drivers for automotive applications with all the benefits of an industry-standard core. The unique result, our 3rd generation embedded power IC based on ARM® Cortex™-M cores, addresses a wide range of smart 3-phase brushless DC motor control applications like, fuel pumps, HVAC fans, engine cooling fans, electrical water pumps. Produced on Infineon's first-in-industry automotive qualified 130nm smart power technology, the Infineon embedded power system-on-chip solutions offer an unmatched level integration and system cost to performance to optimization for the target application segments.

The TLE987x family offers scalability in terms of flash memory sizes and MCU system clock frequency supporting a wide range of motor control algorithms, either sensor-based or sensor-less. It uses the same MCU and peripherals as the TLE986x family, 2-phase driver, enabling design synergies between DC and BLDC motor control applications.

TLE987x Family Offers

- Six current programmable drivers with charge pump for N-channel MOSFET
- Integrated LIN transceiver compatible with LIN 2.2 and SAE J2602
- Two full duplex serial interface (UART) with LIN support
- Two Synchronous Serial Channel (SSC)
- On-chip OSC and PLL for clock generation
- One high-voltage monitoring input with wake-up functionality
- High-speed operational amplifier for motor current sensing via shunt
- Measurement unit:
  - 8-bit ADC module with 10 multiplexed inputs
  - 10-bit ADC module with 8 multiplexed inputs, 5 external Analog inputs
  - On chip temperature and battery voltage measurement unit
- Independent programmable window watchdog
- 5V/1.5V Internal supplies
- External supply (VDDEXT): 5V ±2% @ 20mA
- Power saving modes
  - MCU slow-down mode
  - Sleep mode
  - Stop mode
  - Cyclic wake-up sleep mode

Features of the Microcontroller

- 32-bit ARM® Cortex™-M3 Core, up to 40MHz clock frequency
- 36KB to 128KB flash memory
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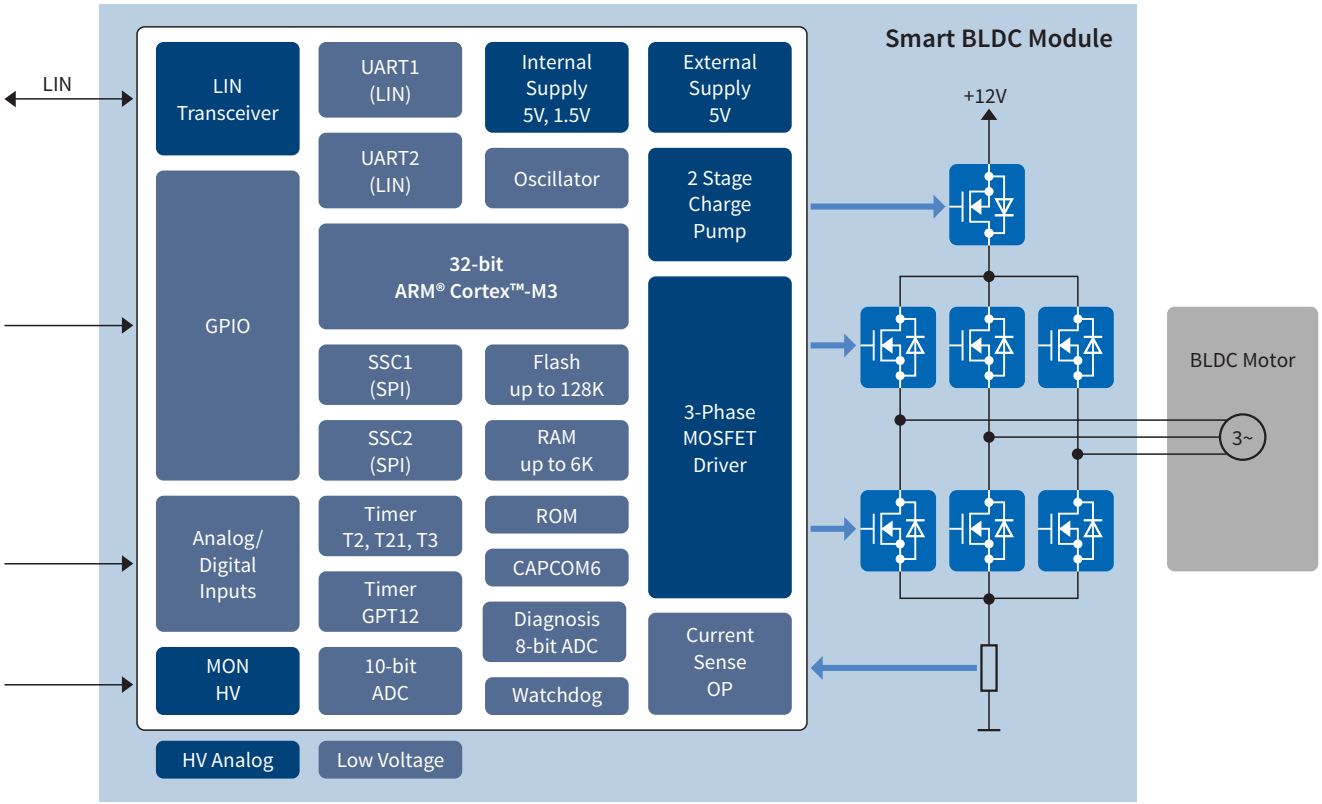
- Overvoltage device clamp (load dump ruggedness) up to 40V
- Wide operating temperature range: T_j: -40°C up to 150°C

www.infineon.com/embeddedpower

Infineon® Embedded Power ICs

Block Diagram



Product Summary

TLE987x 32-bit µC with 3-Phase MOSFET Gate Driver for BLDC Motors									
Product Name	**Frequency [MHz]**	**Interface**	**RAM [KB]**	**Flash [KB]**	**EEPROM Emulation [KB]**	**OP-AMP**	**Low-Side MOSFET Drivers**	**High-Side MOSFET Drivers**	**Package**
TLE9871QXA20[1)]	24	PWM	3	36	4	y	3	3	PG-VQFN-48
TLE9877QXA20[1)]	24	PWM + LIN	6	64	4	y	3	3	PG-VQFN-48
TLE9877QXA40[1)]	40	PWM + LIN	6	64	4	y	3	3	PG-VQFN-48
TLE9879QXA20[1)]	24	PWM + LIN	6	128	4	y	3	3	PG-VQFN-48
TLE9879QXA40[1)]	40	PWM + LIN	6	128	4	y	3	3	PG-VQFN-48

1) In development, samples available

Microcontrollers

AURIX™ – 32-bit Automotive Microcontrollers

AURIX™ is Infineon's family of microcontrollers serving exactly the needs of automotive applications in terms of performance and safety. Its innovative multicore architecture, based on up to three independent 32-bit TriCore™ CPUs @300MHz, has been designed to meet the highest safety standards while increasing the performance at the same time. The key strengths of the scalable AURIX™ family is to combine multiple worlds in one family supporting safety and security as well as high-performance computing and latest connectivity while supporting innovative power supply concepts.

AURIX™ Family Package Scalability

	TQFP-80	TQFP-100	LQFP-144 TQFP-144	LQFP-176	LFBGA-292	BGA-416	LFBGA-516
9x Series up to 8MB Max. SRAM 2.75MB Triple-Core					TC297	TC298	TC299
7x Series up to 4MB Max. SRAM 472KB Triple-Core				TC275	TC277		
6x Series up to 2.5MB Max. SRAM 752KB Dual-Core			TC264	TC265	TC267		
3x Series up to 2MB Max. SRAM 452KB Lockstep-Core		TC233	TC234		TC237		
2x Series up to 1MB Max. SRAM 96KB Lockstep-Core	TC222	TC223	TC224				
1x Series up to 512KB Max. SRAM 56KB Lockstep-Core	TC212	TC213	TC214				

Upgrade/Downgrade with pin-compatible packages

- Advanced package technologies deliver the best price/performance ratio
- Customers can choose between different devices in the same pin-compatible package