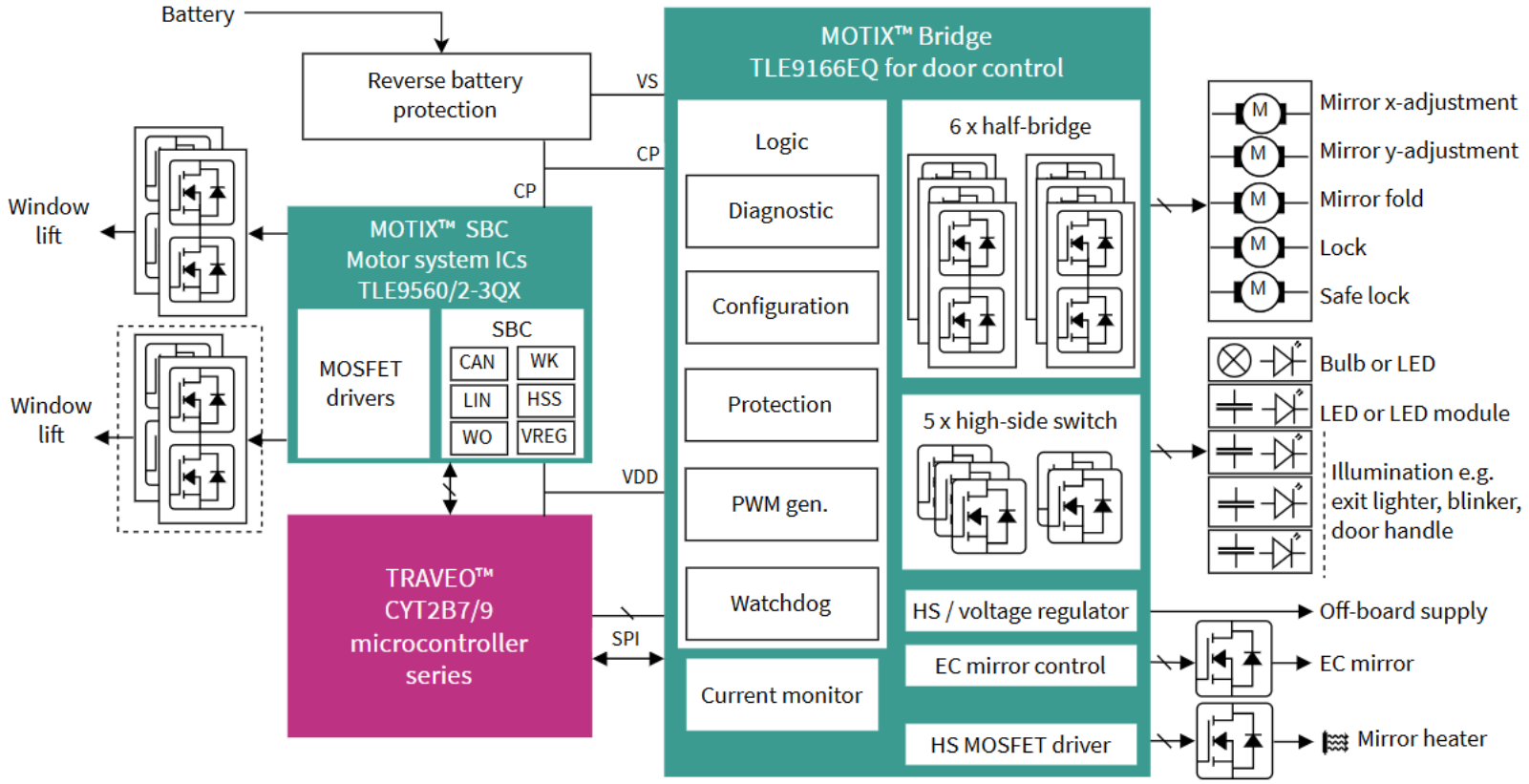


MOTIX™ TLE9166EQ: Versatile, cost and space saving solution for door control

Infineon Technologies
Automotive Smart Power | Motor Control Solutions
February 2025

Versatile, cost and space saving door control solution with MOTIX™ TLE9166EQ



SBC integrating gate driver, power supply and communication

- MOTIX™ motor system ICs (SBC)
  - TLE9562-3QX
  - TLE9562QX
  - TLE9560-3QX

Microcontroller

- 32-bit TRAVEO™ T2G Arm® Cortex® for body
  - CYT2B95CACQ0AZEGS
  - CYT2B95CACQ0AZSGS
  - CYT2B97BACQ0AZEGS
  - CYT2B95BACQ0AZEGS

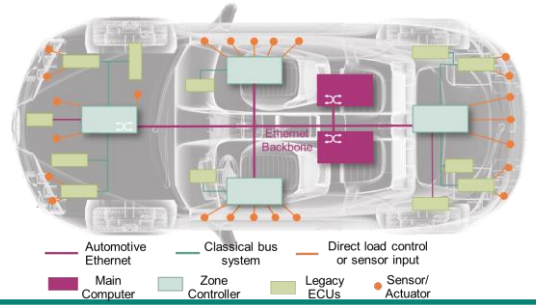
Copyright © Infineon Technologies AG 2025. All rights reserved.

MOTIX™TLE9166EQ for door control targets the following applications & system architectures

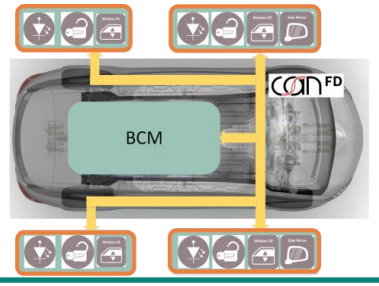
Auto-dimming mirror | Mirror heater | Mirror fold | Mirror adjustment | Door lock & safe | Window lift | Bulb or LED

System architectures

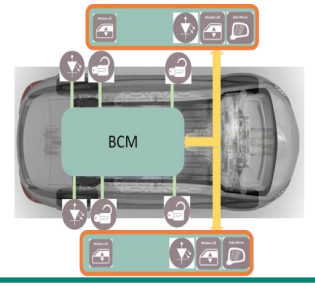
Zone Controller ZCU



Classic door control units DCU



Emerging Front Drives Rear FDR



Motivation

- Increase in comfort and convienience features in cars
- Trend towards zone architectures and door control modules in cars driven by the rapid advancements in automotive technology and the need for more efficient, cost effective, flexible, and scalable vehicle architectures.

Product description

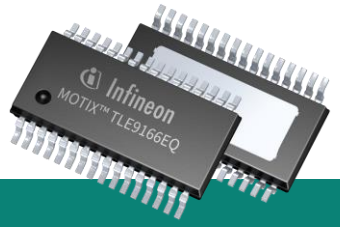
- MOTIX™ TLE9166EQ is a powerful, versatile, and adaptable solution for door control modules and zone controls. The device is optimized for use with the MOTIX™ TLE956x motor system IC (SBC) family.
- Combination of TLE9166 and TLE956x offers high configurability and advanced features to address different loads. The chipset provides the scalability required to adapt to various system architectures, for example door control modules, front drives rear and zonal applications.

Copyright © Infineon Technologies AG 2025. All rights reserved.

MOTIX™ TLE9166EQ for door control

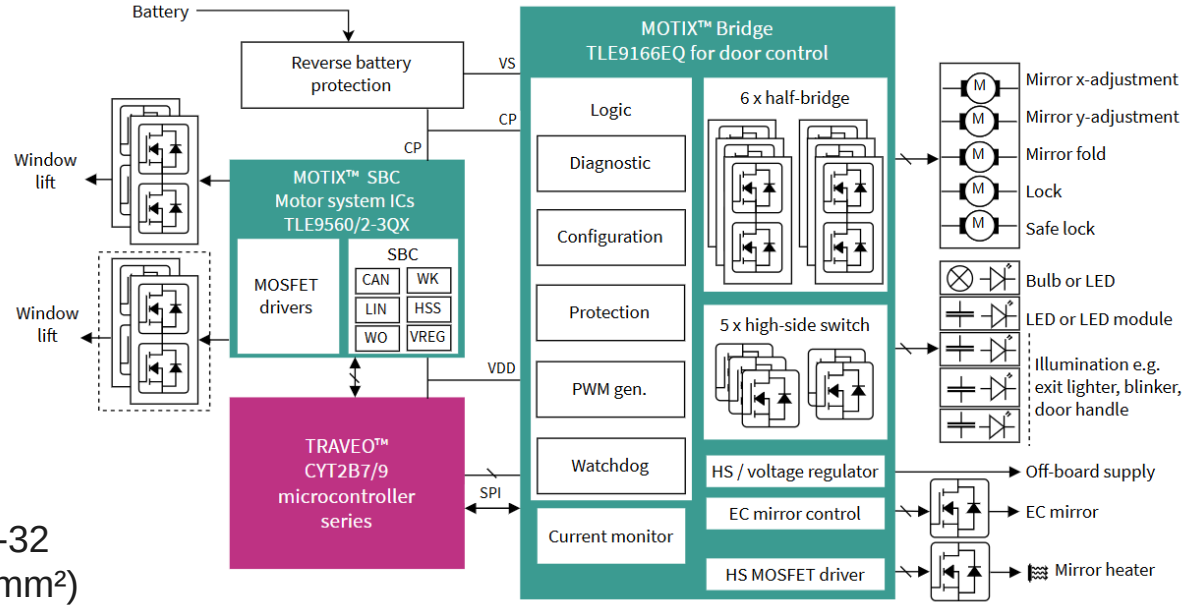
Main Features

- Supply voltage range 5.5 V – 20 V (ext. 40 V)
- **6 half-bridges** for lock, safe lock, mirror fold and adjustment
  - Configurable slew rate
  - 25 kHz capable
- **5 high-side switches** with configurable constant current mode
  - PWM generator with phase shift
- **Voltage regulator for off-board sensor**
- **MOSFET driver for electrochromic mirror**
- **MOSFET driver for mirror heater**
- Multiplexed analog current monitor output for high-sides
- SPI interface
- Timeout watchdog



TSDSO-32
(8.65 x 6 mm²)

Application Diagram



Key Benefits

- Flexibility and adjustability in setting the overvoltage threshold to prevent damage to components
- PWM: (100~400 Hz, phase shift) wider range of PWM frequencies
- Low Rds (on) for the High sides controlling the LEDs
- Current Monitoring by combining the VS voltage measurement with the CM pin

Target Applications

- “Classic” door modules (one module per door)
- “Front drives rear” door modules
- Zone controller

www.infineon.com/tle9166

Copyright © Infineon Technologies AG 2025. All rights reserved.

MOTIX™ TLE9166 enables a scalable and flexible solution for door control together with MOTIX™ TLE965x motor system IC (SBC)

TLE956x advantages

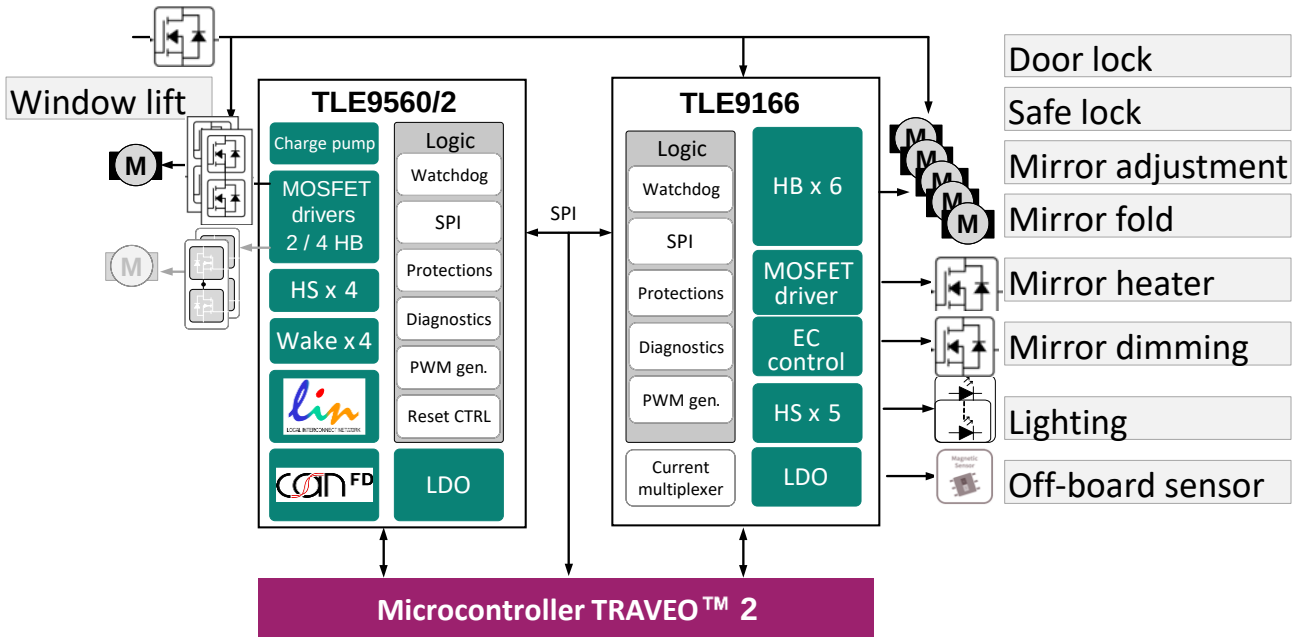
- Established SBC features
- Unique integration of bridge driver and SBC with certified CAN FD
- Adaptive MOSFET control

TLE9166 advantages

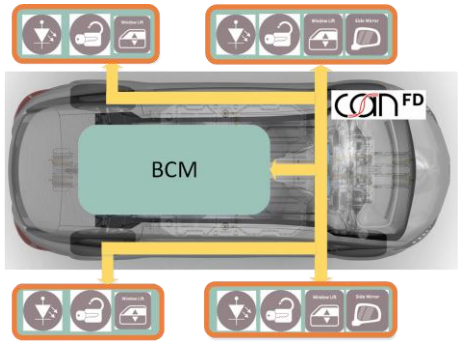
- Optimized as companion to TLE9560/62
- Feature set fulfilling the latest application requirements e.g.
  - Control of capacitive loads
  - 25 kHz PWM-capable integrated half-bridges

Synergies TLE9166 + TLE956x

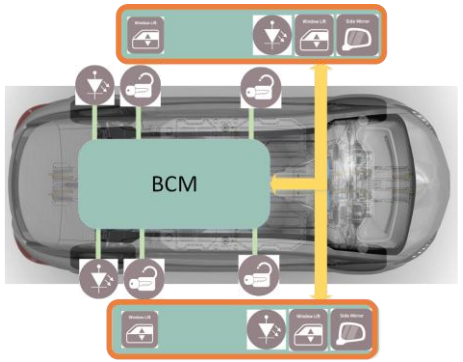
- Smaller footprint vs competition
- Distribution of the power dissipation over two packages
- Reduced complexity vs. full integration
- Scalable and flexible solution for DCU, FDR, and zonal modules



Classic door control units DCU



Emerging Front Drives Rear FDR



Copyright © Infineon Technologies AG 2025. All rights reserved.

Key features and benefits of the chipset MOTIX™ TLE9166 & TLE956x motor system ICs (SCB)

Key features	Key benefits	Value
Thermal performance of a chip set solution	Thermal decoupling	Scalability is achieved without encountering thermal bottlenecks
TLE9166 optimized as companion to TLE9560/62 which boast a unique integration of bridge driver and SBC	Multiple product variants from TLE956x to adapt to different system architectures(e.g. DCU, zone, FDR) and requirements	Flexibility of chipset to adapt to different system architectures for additional loads
Small footprint (TLE9166 – 51mm²; TLE956x – 49mm²)	Saves PCB space	Reduced system costs and increased integration functionality
25 kHz PWM-capable integrated half-bridges	Achieve precise motor speed control, and reduce power dissipation with active free-wheeling	Smaller total footprint, and more flexible during layout
Adaptive MOSFET control (AMC, TLE956x)	Precise MOSFET control with optimized EMC and power dissipation	Reliable device with high quality and safety standards
ISO 26262-ready documentation (TLE956x)	Could be integrated into a customer's ISO 26262-compliant, safety-related application	

Copyright © Infineon Technologies AG 2025. All rights reserved.

MOTIX™ TLE9166EQ for door control
Overview collaterals, software and design tools

Technical documents	Status
Datasheet	online
User manual	online
Hardware design guide AN	online
Application oriented IC feature AN	online

Software	Status
Device driver	online
Example code for door module	online

Boards	Status
Evaluation board	online
User guide evaluation board	online

Design and simulation tools	Status
Configuration Wizard GUI	online
Configuration Wizard GUI user guide	online
TTM model*	on request
Power dissipation tool*	1Q2025

Other’s	Status
Repetitive short circuit test report*	on request
EMC test report (A13)*	on request
Pin FMEA*	on request
eLearning	online

www.infineon.com/TLE9166

* Please consider NDA restrictions for TLE9166 collaterals, software and design tools and contact your regional Infineon sales partner in order to get access to restricted information.

Copyright © Infineon Technologies AG 2025. All rights reserved.


Infineon