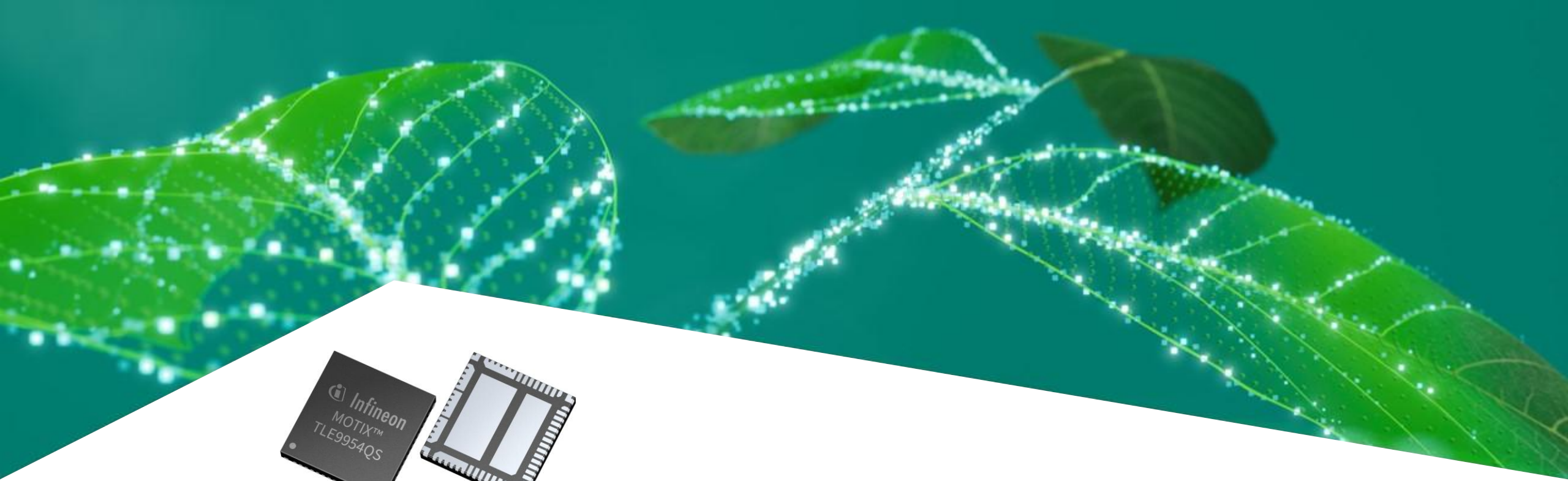


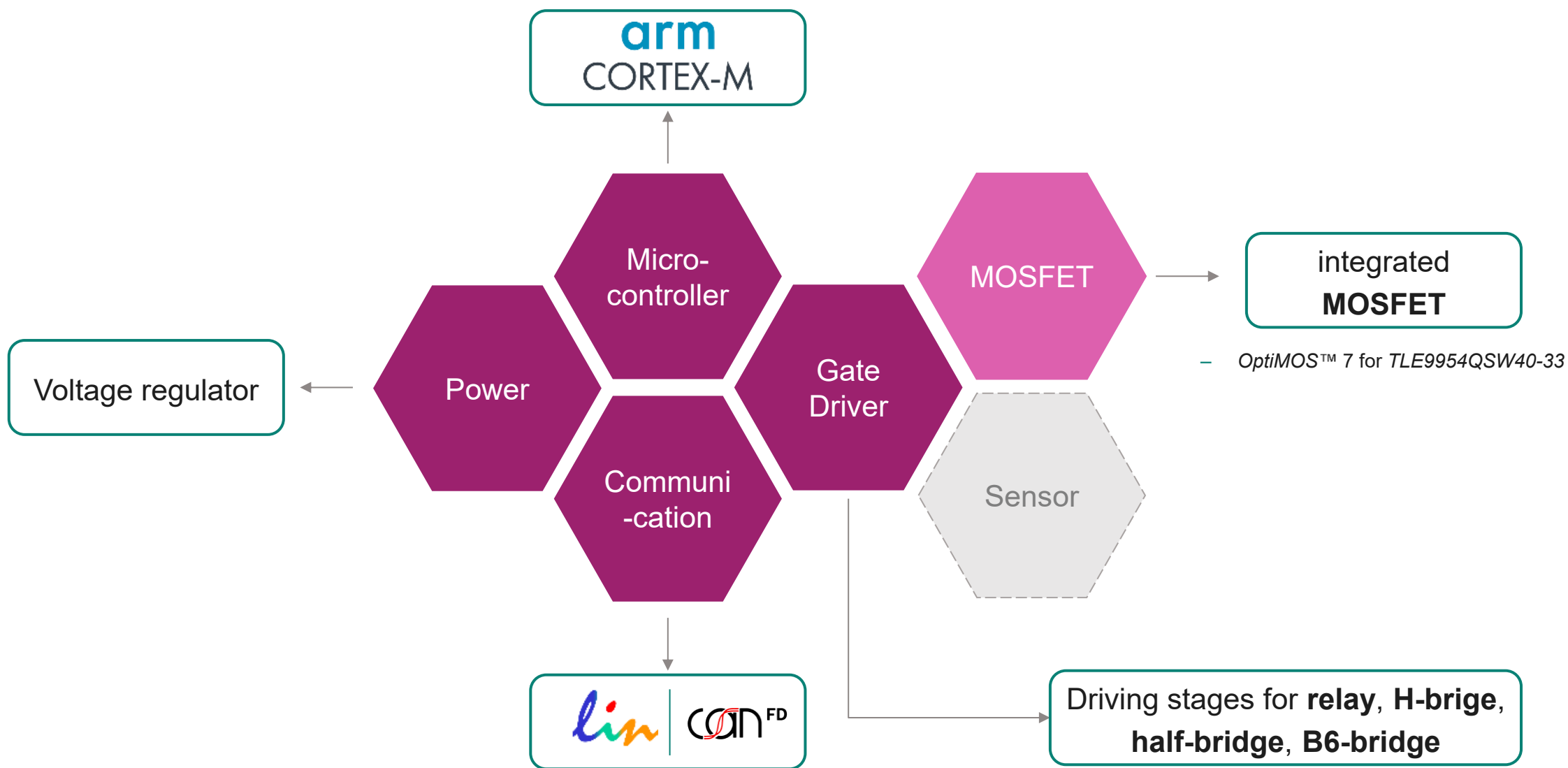


MOTIX™ TLE9954QSW40-33 motor control SiP – System-in-Package with integrated MOSFETs

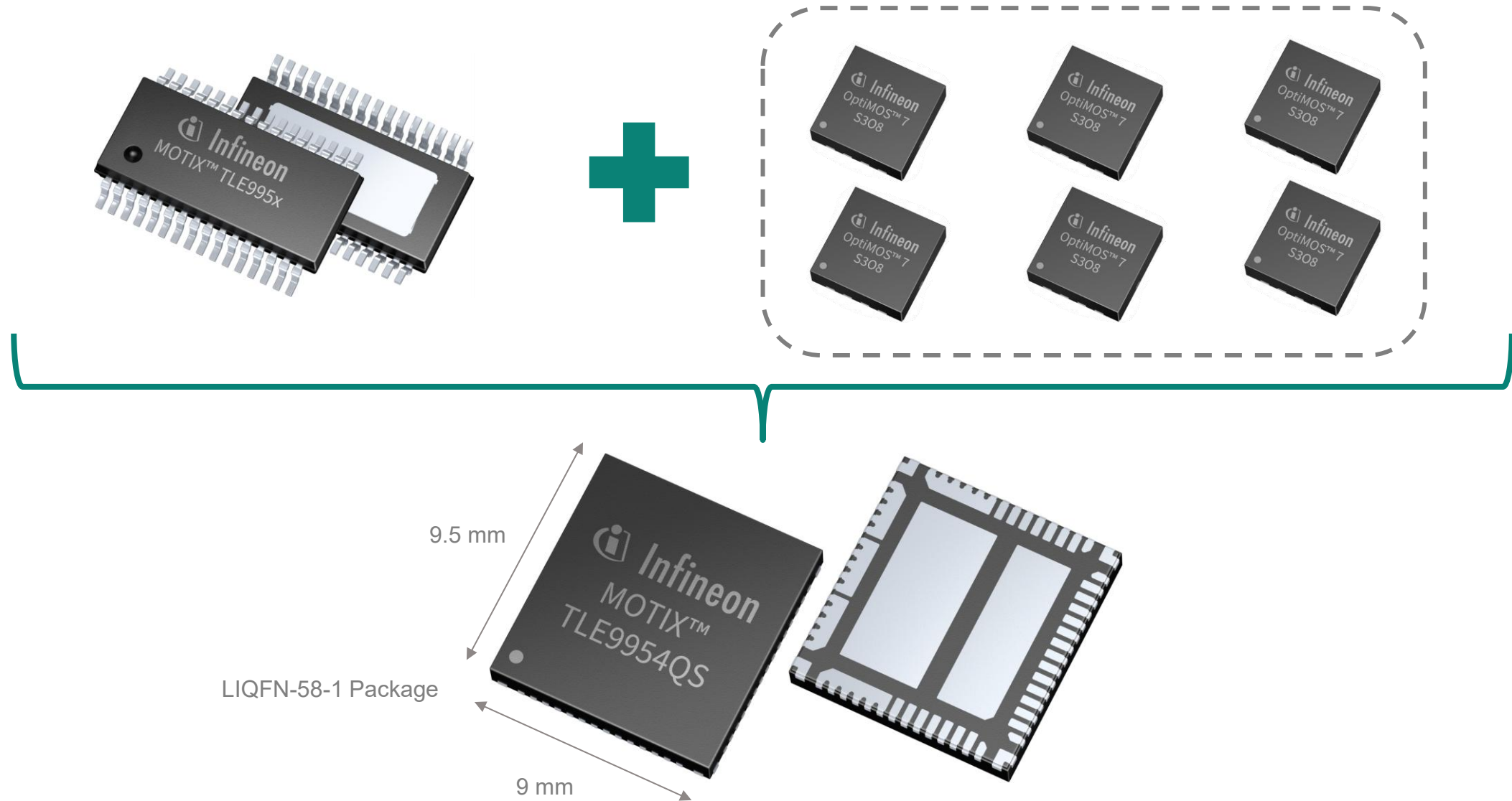
Infineon Technologies
Automotive Smart Power | Motor Control Solutions



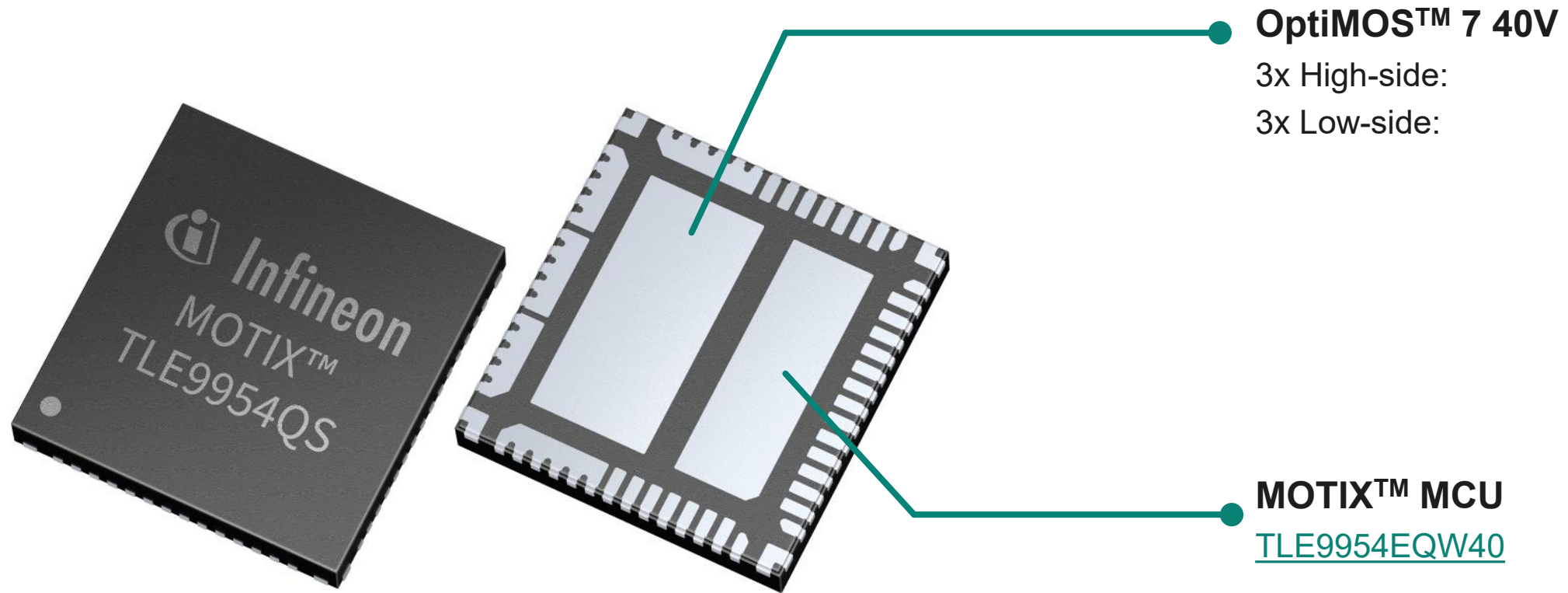
What is MOTIX™ MCU | motor control SoC/SiP?



MOTIX™ TLE9954QSW40-33 System-in-Package (SiP) TLE9954EQW40 & OptiMOS™ 7 MOSFETs



MOTIX™ TLE9954QSW40-33 System-in-Package (SiP) TLE9954EQW40 & OptiMOS™ 7 MOSFETs



MOTIX™ TLE9954QSW40-33

System-in-Package (SiP) with Arm® Cortex®-M23



KEY BENEFITS

-  up to **≈40% space saving** compared to SoC solution
-  **Increased efficiency** thanks to fast switching
-  **Savings** through reduced BOM system cost
-  **Enhanced EMC performance** compared to discrete solution
-  ASIL-B certified **safe motor operation**
-  **Premium design-in experience**



LIQFN-58
(9.5x9mm)

MCTRL Perf.

Dual cycle FOC

Voltage

12V board net

arm
Cortex®-M23
40 MHz

Flash
72 kB

Supply
(PMU)

MCTRL
SW Dual
Cycle
FOC



Motor Control

**3-phase
power stage**

Charge
Pump

B6-
Bridge

CCU7

CSA

ADC
12



ISO 26262
compliant

TrustZone

TARGET APPLICATIONS



Water pump



Oil pump



Seat



Fans

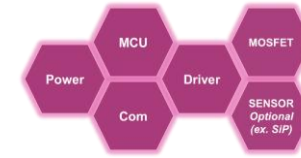


In production

Active & Preferred

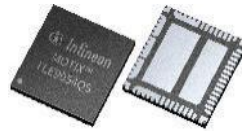
MOTIX™ TLE9954QSW40-33

System-in-Package with Arm® Cortex®-M23

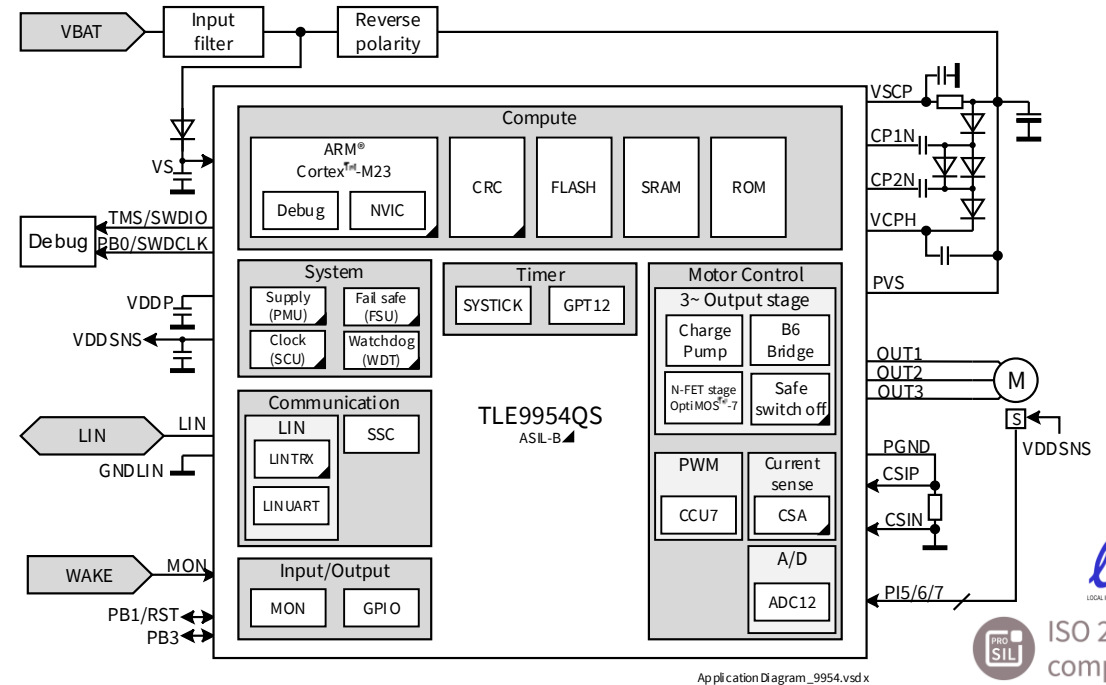


Main Features

- Same Properties as TLE994x/5x
 - 32-bit Arm® Cortex®-M23 core up to 40 MHz
 - 72 KB FLASH, 6 KB RAM
 - LIN-Transceiver, CCU7 Motor Timer
 - 3-phase bridge driver with charge pump (<55nC) incl. sequencer
 - CCU7 Motor-Control timer
 - 1x low-side shunt CSA
- B6-Bridge in package; 2.5mΩ HS / 3.5 mΩ LS(@150°C) OptiMOS™-7, 40V
- T_J: -40 °C up to 175 °C, Grade 0
- Developed according to ISO26262
- Custom QFN Package 9,5 x 9,0 mm²
- Competitive in lower end power range



Application Diagram



Key Benefits

- **Smallest design** for up to **150W @12V**
- Better motor control thanks to **fast switching**
- **Decreased design effort**
- **ASIL-B** certified safe motor operation

Target Applications



Water pump



Oil pump



Seat



Fans

Active & Preferred

MOTIX™ TLE9954QSW40-33

System-in-Package (SiP) with Arm® Cortex®-M23



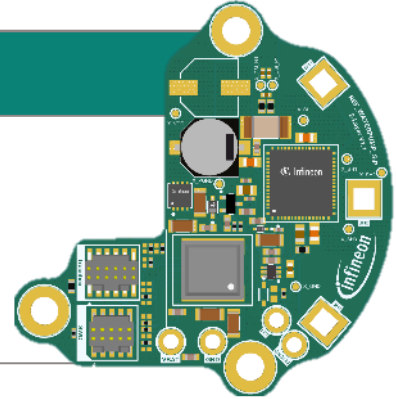
BOM Optimization

- 30% less components vs SoC solution
- 2-layers PCB becomes real



PCB Miniaturization

- Extreme reduction in BOM enables very small PCB designs



Fast Switching Time

- Very low inductances allow fastest slew-rate at phase voltages



Optimized EMC

- Fully integrated solution minimizes EMC noise at high frequencies



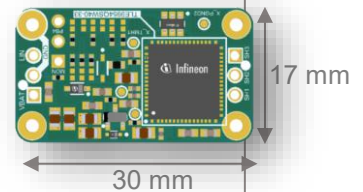
Thermal Performance

- Innovative package construction optimizes the heat dissipation from MOSFETs to PCB



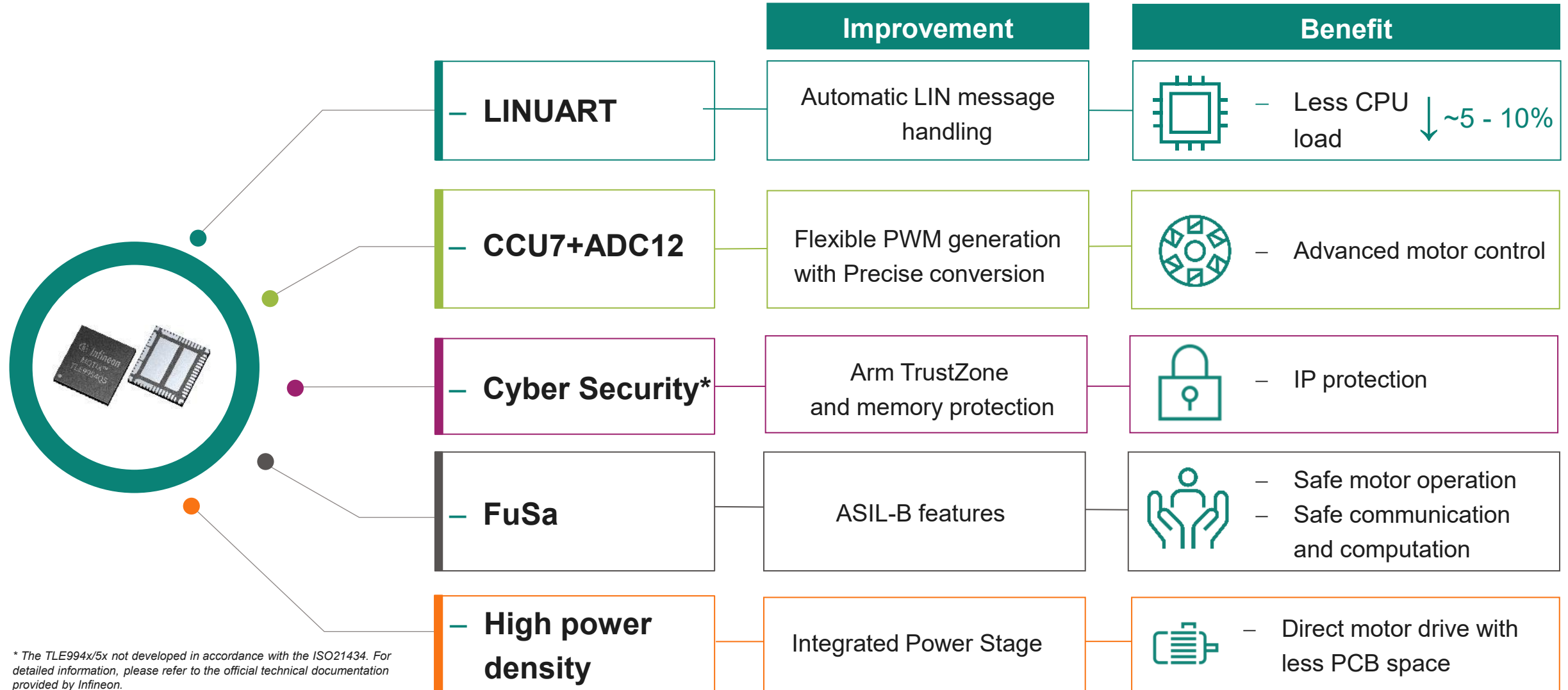
Applications

- Smart motors are now possible also in applications with very limited space



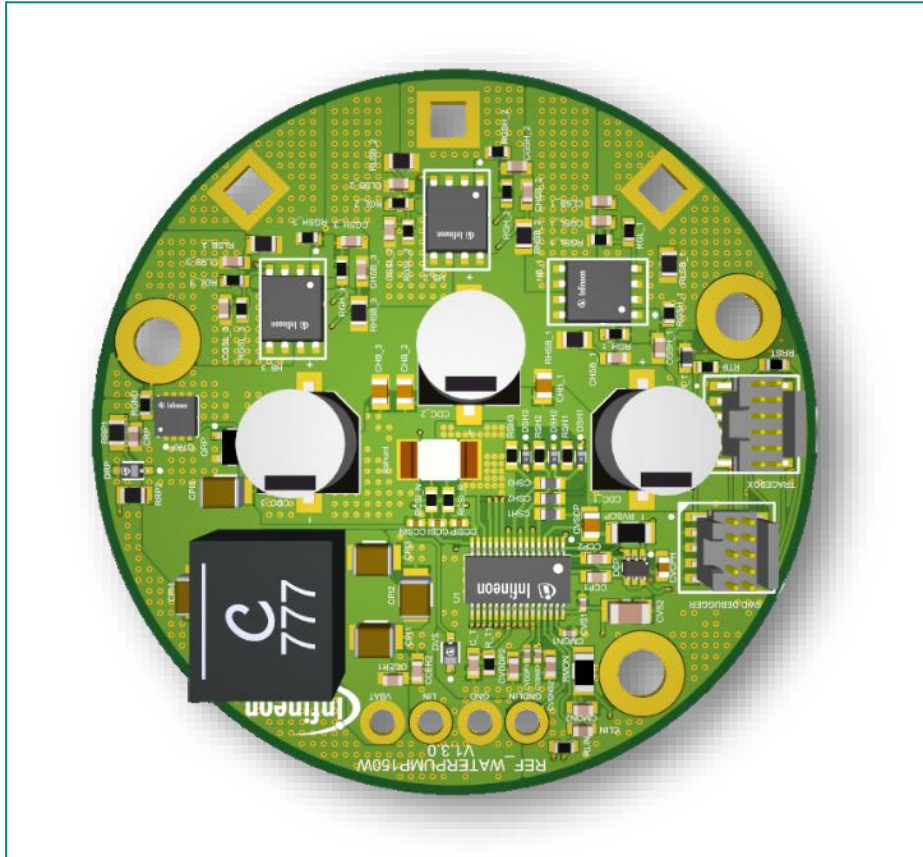
MOTIX™ TLE9954QSW40-33

Improved features in a nutshell

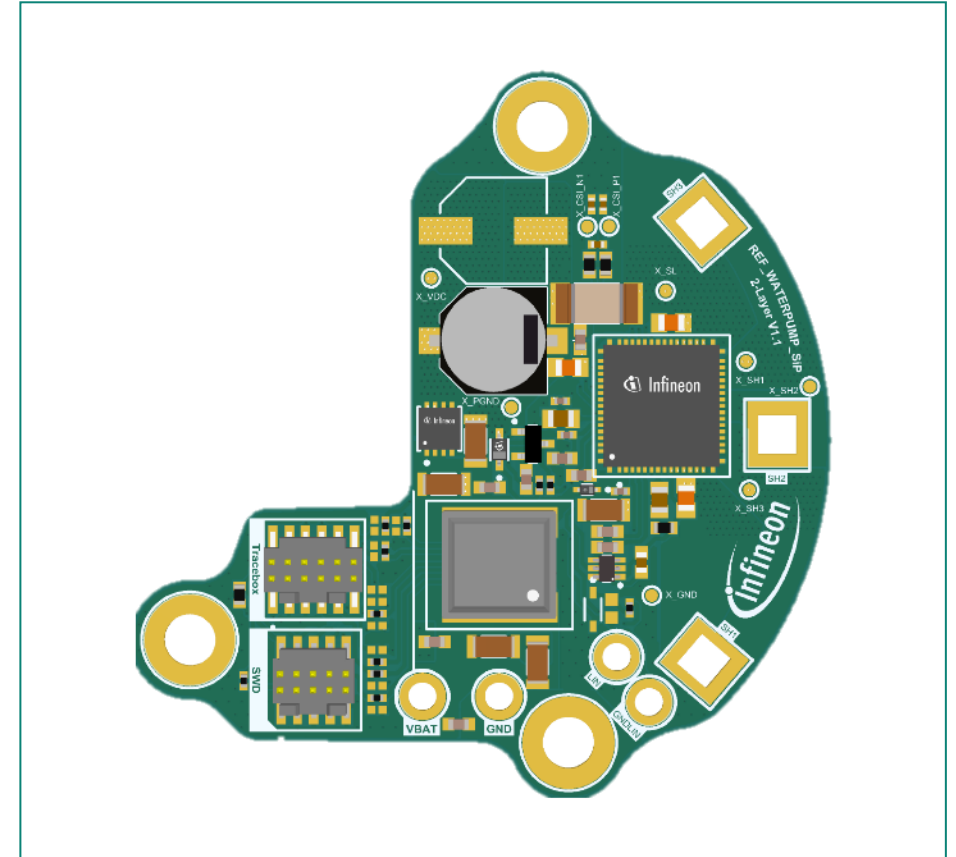


PCB space comparison – Water Pump Reference Design

4 Layer PCB with TLE9954EQW40 (SoC)



2 Layer PCB with TLE9954QSW40-33 (SiP)

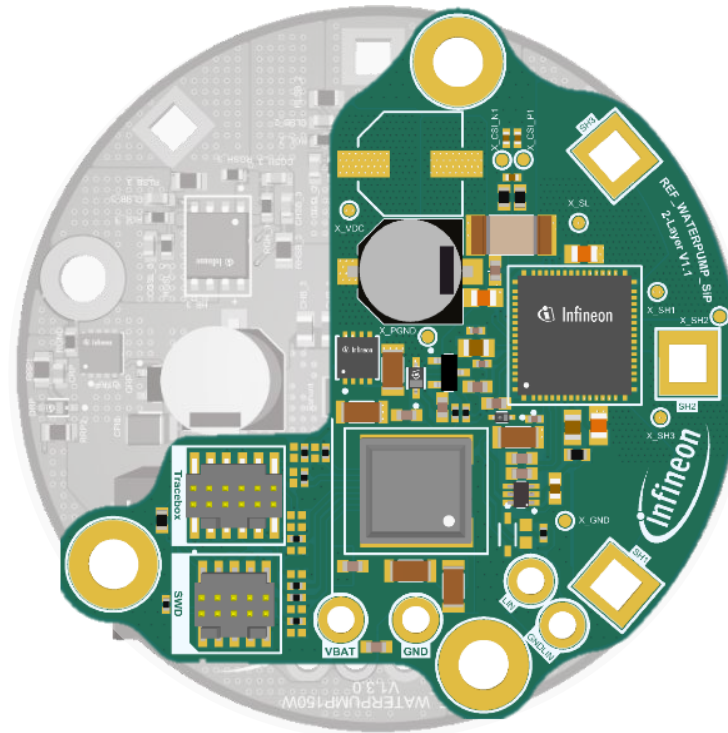


PCB space comparison – Water Pump Reference Design

≈40%

area saving
with

**2-layer
PCB**



up to **150W**
@12V

MOTIX™ TLE9954QSW40-33 solution offering

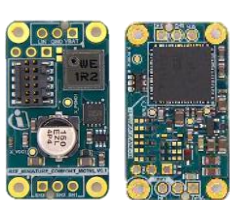


HARDWARE SUPPORT

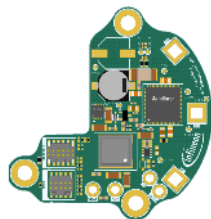
Evaluation hardware for an easy getting started



Evaluation Kit



Ref. Design for Comfort Applications



Water Pump Reference Design



TOOLS

Comprehensive set of tools to facilitate development process



- Device configuration
- MOTIX™ MCU Solution
- Programmer
- Register viewer
- Infineon Automotive Power Explorer



SOFTWARE

SW for evaluation in target applications and partner ecosystem for productive implementation

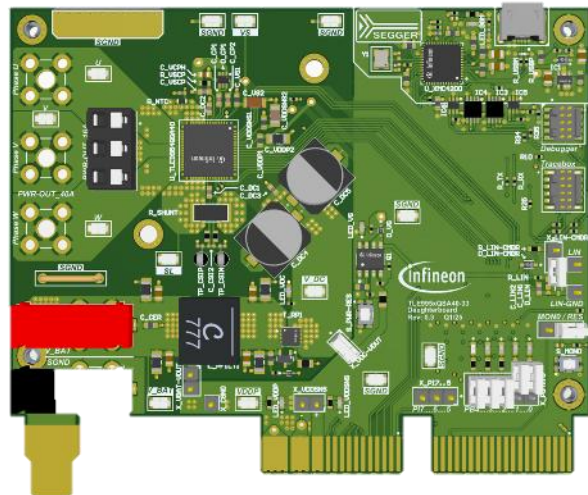
- **Free** evaluation **SDK** including **PDL**, peripheral drivers, example codes and tool configs, KEIL µVision support
- **Free motor control target application examples**: configurable 6/12-step block commutation, CPU load optimized FOC
- Licenses for productive use and end-to-end engineering services by **MOTEON**
- Certified LIN stacks from **IHR**

MOTIX™ TLE9954QSW40-33 hardware support for getting started



HARDWARE SUPPORT

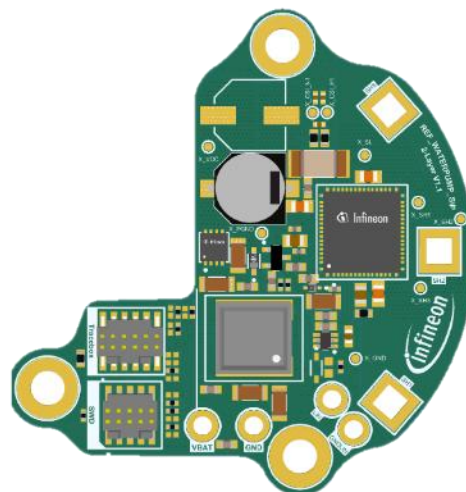
TLE9954QSW Evaluation Kit



OPN: TLE9954QSWEVALKITTOBO1

Ready-to-use evalkit for rapid assessment and prototyping with the TLE9954QSW40-33. The device is pre-mounted on the board for easy setup and testing.

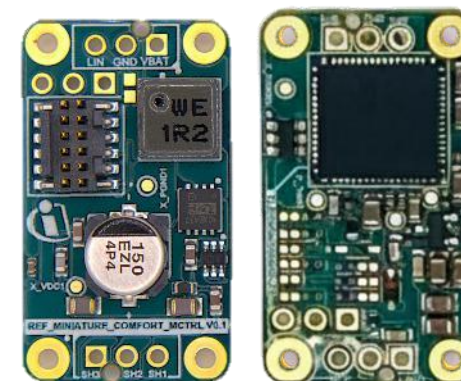
150W Water Pump Reference Design



OPN: REFWATERPUMPSIPTOBO1

System reference design for a water pump application to simplify design process, enabling reduced development effort and time-to-market.

Reference Design for Comfort



OPN: REFMINICMFRTSIPTOBO1

Compact system reference design for comfort applications

MOTIX™ TLE9954QSW40-33 PC tools for an easy design-in



MOTIX™ TOOLS



Infineon
Developer Center

Extensive development environment offering a comprehensive set of tools by MOTIX™



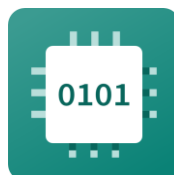
Device Configurator

Allows to enable and configure device peripherals.



Solution Designer

A graphical configuration tool to analyze, debug and tune motor control applications.



BSL

User interface to control the firmware of an MCU target via the provided BSL commands interactively.



Automotive Power Explorer

GUI-based Tool which allows users to easily and swiftly compute power dissipation of the device



Memory Analyzer

A graphical visualization tool that analyses the memory consumption of Infineon microcontroller families

Overview collaterals, software and design tools



Technical documents	Status
Product Overview	Online
Datasheet	On request ¹⁾
User Manual	On request ¹⁾
Firmware Reference Manual	On request ¹⁾
HW Design Guideline	Q3 2026
Safety Documentation	On request ¹⁾



Software	Status
SDK incl. Low-Level Driver for TLE995x peripherals and getting started examples	On request ²⁾
Field Oriented Control SW , supports configuration of runtime and static parameters to fit to various motors	On request ²⁾
12-step block commutation SW	On request ²⁾

www.infineon.com/tle9954qs



Boards	Status
Evaluation kit	Online
150W Water Pump Reference Design	Online
Mini Comfort Motor Control Reference Design	Online



Design and simulation tools	Status
Device Configurator	Online
Simulation Models	Q3 2026
BSL Tool	Online
Infineon Automotive Power Explorer	Online
Solution Designer	Online
Memory Analyzer	Online

- 1) Available via [myInfineon Collaboration Platform \(myICP\)](#); please contact your regional Infineon sales partner in order to get access to restricted information
- 2) Available via [Infineon Developer Center \(IDC\)](#)

Product naming nomenclature

TLE9954QSW40-33

Automotive
Qualified Electronic

MOTIX™ MCU

— 5 = 3-phase

Flash/RAM:

— 4 = 72 kB / 6 kB

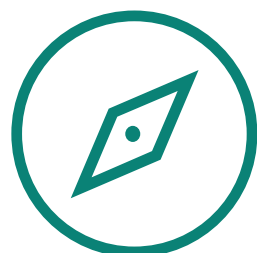
QS = Quadrature SiP

-33 = 3.3mOhm LogicLevel

40 = 40 MHz

W = Tj, max 175° C, Grade 0

Further resources on www.infineon.com/tle9954qs



Product and application information

- Product family page: www.infineon.com/tle9954qs
- Get started with MOTIX MCU | motor control SoC/SiP (coming soon)
- Target applications – examples: [Thermal management](#) and [Seat](#)



Design resources

- Evaluation Kit
- 150W Water Pump Reference Design
- Mini Comfort Motor Control Reference Dsign
- Development tools
- Embedded software



Technical documents

- Application notes, safety documentation, etc. are available on request via [myInfineon collaboration platform \(myICP\)](#); please contact your regional Infineon sales partner in order to get access to restricted information.



Videos

- TLE9954QSW40-33 in a nutshell



Trainings

- Technical product introduction
- Get started with the toolchain
- Get started with the reference designs

Explore our product trainings

