



Discover MOTIX™ MCU (SoC) TLE988x/9x: Unlocking enhanced performance and faster communication through CAN FD

Infineon Technologies AG

Automotive Smart Power | Motor Control Solutions



MOTIX™ MCU | 32-bit motor control SoC-families TLE988x & TLE989x based on Arm® Cortex®-M3 with integrated 3-phase bridge driver



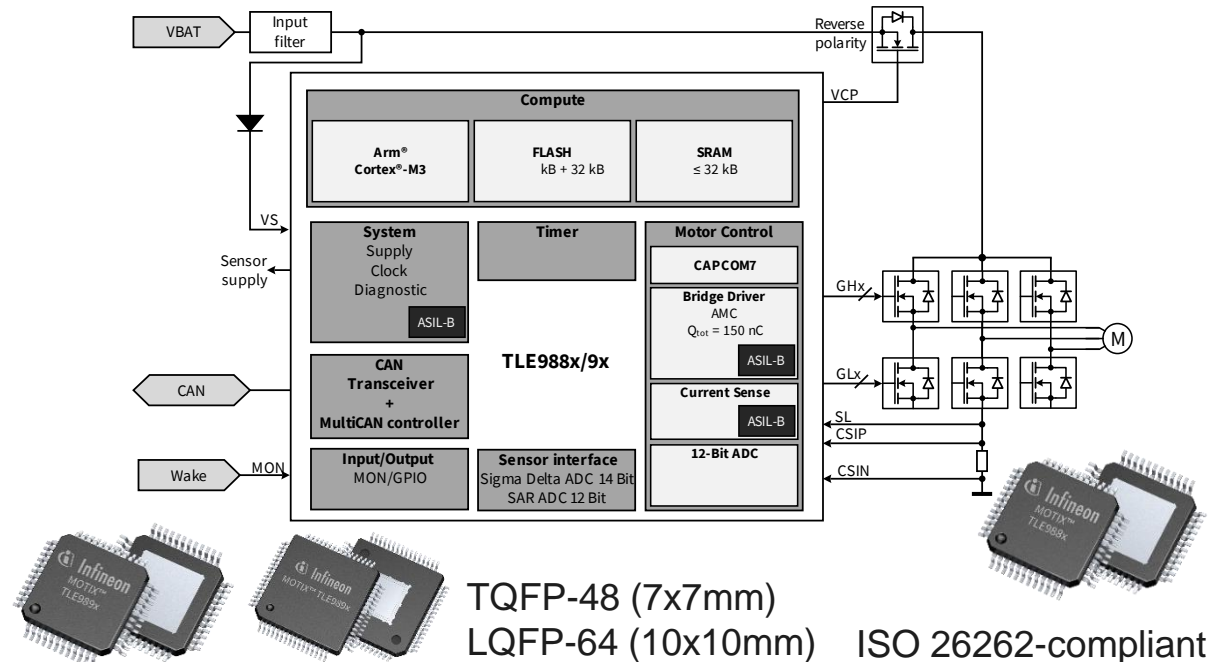
Main Features

- 32-bit Arm® Cortex®-M3 core at up to 60 MHz
- up to **256 kB FLASH**, up to **32 kB RAM**
- 1x **CAN FD** protocol handler and transceiver
- **ASIL B** features
- Security: Layered access right mgmt, secured boot, key storage
- Single power supply from **5.5 V to 28 V**
- **5 V** voltage supply for external loads (e.g. hall-sensor)
- **2- and 3-phase bridge driver with charge pump and PWM generator**
- **Adaptive MOSFET Control (AMC)**
- 1 current sense amplifier for motor current sensing via shunt
- 1x **12-bit ADC** with **19 chan.** and 1x **10-bit ADC** with **12 channel**
- **14-bit sigma-delta ADC**
- Temperature range: Tj: **-40°C** up to **175°C**

Key Benefits

- High performance
- Optimized BOM and system control
- Fast and robust communication
- Functional safety & cybersecurity
- Decreased switching losses and better EMC performance
- Easy design-in

Application Diagram



Target Applications

- Electric coolant pump
- Oil pump
- Fuel pump
- Power sliding door
- eBike (companion chip TLE9140)

Status: in production

MOTIX™ MCU | 32-bit motor control SoC-families TLE988x & TLE989x

Product highlights



By integrating a gate driver, microcontroller, communication interface and power supply on a single chip, Infineon's system-on-chip solutions achieve a minimal footprint. The TLE988x and TLE989x devices utilize a B4 or B6 bridge N-channel MOSFET driver, respectively, an Arm® Cortex®-M3 microcontroller, and a CAN (FD) controller and transceiver (2 Mbps). Customers benefit not only from fast and robust communication but also from the highest computing performance thanks to the high system frequency (60 MHz) and its dual flash supporting read-while-write operation. The relevant features of the MOTIX™ MCU TLE988x and TLE989x products are ISO 26262 (ASIL B) compliant and some variants have built-in cybersecurity. All of these features are offered in a 7 mm x 7 mm TQFP package with a market-leading footprint.

High system frequency (60 MHz) and dual flash (read-while-write)

Smallest fully integrated motor control solution with CAN FD

On-chip CAN FD transceiver and controller

ISO 26262 compliance (ASIL B) and context segregation (layered access right management)

Infineon's patented Adaptive MOSFET Control (AMC) feature

Premium design-in support with evaluation boards/kits, reference designs, tools and software to reduce time and effort

High performance

Optimized BOM & system control

Fast & robust communication

Functional safety & cybersecurity

Decreased switching losses & better EMC performance

Easy design-in

www.infineon.com/TLE988x / www.infineon.com/TLE989x

MOTIX™ MCU | 32-bit motor control SoC-families TLE988x & TLE989x

Product table



Product name	Orderable part number (OPN)	Freq. [MHz]	Interface	RAM [kB]	Flash [kB]	Crypto library [KB]	Configuration	2x 14bit SDADC	Func. safety	Tj max	Package
TLE9893-2QTW62S	TLE98932QTW62SXUMA1	60	PWM, CAN FD	32	256	8	3-phase	Yes	ASIL B	175° C	TQFP-48
TLE9891-2QTW61	TLE98912QTW61XUMA1	60	PWM, CAN 2.0	16	128	0	3-phase	Yes	ASIL B	175° C	TQFP-48
TLE9891-2QTW60	TLE98912QTW60XUMA1	60	PWM, CAN 2.0	16	128	0	3-phase	Yes	QM	175° C	TQFP-48
TLE9893-2QTA62S	TLE98932QTA62SXUMA1	60	PWM, CAN FD	32	256	8	3-phase	Yes	ASIL B	150° C	TQFP-48
TLE9893-2QTA62	TLE98932QTA62XUMA1	60	PWM, CAN FD	32	256	0	3-phase	Yes	ASIL B	150° C	TQFP-48
TLE9891QTA61	TLE9891QTA61XUMA1	60	PWM, CAN 2.0	16	128	0	3-phase	No	ASIL B	150° C	TQFP-48
TLE9883-2QTW62S	TLE98832QTW62SXUMA1	60	PWM, CAN FD	32	256	8	2-phase	Yes	ASIL B	175° C	TQFP-48
TLE9881-2QTW60	TLE98812QTW60XUMA1	60	PWM, CAN 2.0	16	128	0	2-phase	Yes	QM	175° C	TQFP-48
TLE9883QTA62	TLE9883QTA62XUMA1	60	PWM, CAN FD	32	256	0	2-phase	No	ASIL B	150° C	TQFP-48
TLE9893-2QKW62S	TLE98932QKW62SXUMA1	60	PWM, CAN FD	32	256	8	3-phase	Yes	ASIL B	175° C	LQFP-64
TLE9893QKW62S	TLE9893QKW62SXUMA1	60	PWM, CAN FD	32	256	8	3-phase	No	ASIL B	175° C	LQFP-64

www.infineon.com/TLE988x / www.infineon.com/TLE989x

MOTIX™ MCU | 32-bit motor control SoC-families TLE988x & TLE989x

Collaterals, software and design-in tools



Technical documents	Status
Data sheet	available
User manual	available
Firmware user manual	available
Safety manual*	available
CAN compliance application note**	available

Software	Status
MOTIX™ Motor Control Library (Free of charge demo version and licensed version for productive use)	available
Example code for Arm® Keil® µVision & IAR Embedded Workbench	available
CAN stack - please contact our partners (Vector or IHR)	

Training	Status
MOTIX™ TLE988x/9x with CAN for smart actuators	available

Boards	Status
REF_COOLANTPUMP150W	Q3/2023
TLE989X EVALB_LQFP	available
TLE989X EVALB_TQFP	available
TLE9893-2QK EVALKIT	available
UIO STICK V2	available

Design and simulation tools	Status
MOTIX™ MCU Configuration Wizard	available
MOTIX™ MCU BSL Tool	available
Infineon MCU Memory Analyzer	available
MOTIX™ MCU Solution Designer	available
MOTEON TraceBox	available
SIMetrix and PSpice simulation model	available

*NDA restrictions, **on request

More information about **design support:**

www.infineon.com/TLE988x
www.infineon.com/TLE989x



More info about products & design support:

www.infineon.com/TLE988x

www.infineon.com/TLE989x

Download and manage software & tools in the Infineon Developer Center (IDC):

www.infineon.com/idc

Ask the community:

[MOTIX™ MCU | 32-bit motor control SoC](#)

All about MOTIX™ motor control ICs

www.infineon.com/motor-control-ics



