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

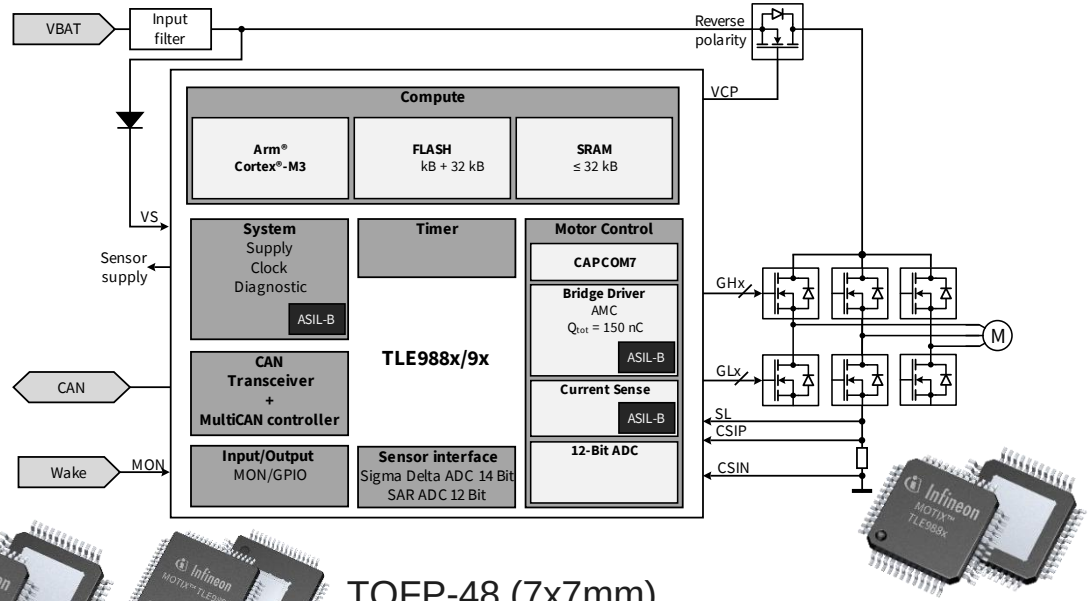
Infineon Technologies AG
Automotive Smart Power | Motor Control Solutions

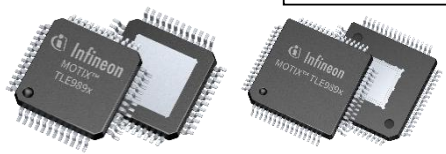
MOTIX™ MCU | 32-bit motor control SoC-families TLE988x & TLE989x based on Arm® Cortex®-M3 with integrated 3-phase bridge driver

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**

Application Diagram





TQFP-48 (7x7mm)
LQFP-64 (10x10mm)

ISO 26262-compliant

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

Target Applications

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

Status: in production

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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)	**High performance**
Smallest fully integrated motor control solution with CAN FD	**Optimized BOM & system control**
On-chip CAN FD transceiver and controller	**Fast & robust communication**
ISO 26262 compliance (ASIL B) and context segregation (layered access right management)	**Functional safety & cybersecurity**
Infineon's patented Adaptive MOSFET Control (AMC) feature	**Decreased switching losses & better EMC performance**
Premium design-in support with evaluation boards/kits, reference designs, tools and software to reduce time and effort	**Easy design-in**

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

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Product table

Product name	Orderable part number (OPN)	Freq. [MHz]	Interface	RAM [kB]	Flash [kB]	Crypto library [KB]	Configu-ration	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

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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 and test report*	available
EMC test report*	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, please request access to myInfineon Collaboration Platform myICP (via the product page/documents)

More information about **design support:**
www.Infineon.com/TLE988x
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