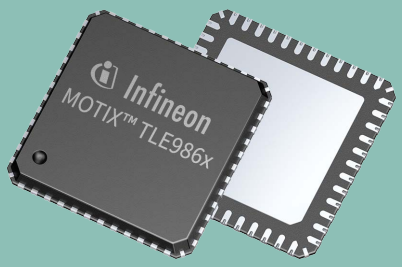


Product brief

MOTIX™ MCU Embedded Power IC TLE986x

2-phase motor driver with integrated ARM® Cortex®-M3

The MOTIX™ TLE986x family is part of the Infineon Embedded Power IC portfolio. The MOTIX™ TLE986x is a single chip 2-phase motor driver that integrates the industry standard ARM® Cortex®-M3 core, enabling the implementation of advanced motor control algorithms. It includes four fully integrated NFET drivers optimized to drive a 2-phase motor via four external power NFETs, a charge pump enabling low voltage operation and programmable current along with current slope control for optimized EMC behavior. Its peripheral set includes a current sensor, a successive approximation ADC synchronized with the capture and compare unit for PWM control and 16-bit timers. A LIN transceiver is also integrated to enable communication to the device along with a number of general purpose I/Os. It includes an on-chip linear voltage regulator to supply external loads.

The MOTIX™ 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 MOTIX™ TLE987x family, 3-phase driver, enabling design synergies between DC and BLDC motor control applications.

It is a highly integrated automotive (grade-1 & grade-0) qualified device enabling cost and space efficient solutions for mechatronic DC motor drive applications such as sunroof, power window lifts, exhaust flaps and water valves lift.

Applications

- **Enable cost and board space improvement**s – Our system-on-chip solution for DC motor control integrates data processing, actuation and sensing. The chip comes in a leadless VQFN package with 7 x 7 mm footprint and enables PCB space saving. The TLE986x family allows driving MOSFETs at $V_{BATT} \geq 6$ V with a low number of external components, providing a very cost-effective solution on a system level. Minimum number of external components reduces BOM cost.
- **Support in-cabin and underhood applications with same design** – Some TLE986x derivatives are qualified up to $T_j = 175°C$ and therefore enable a family design approach due to pin, package and software-compatibility.
- **Enable high levels of system reliability** – Extensive diagnostics and protections are embedded within the system on chip, more than a discrete approach can offer. In addition, the Embedded Power IC and the external MOFESTs can be protected.

Key features

- ARM® Cortex®-M3 MCU
- System clock up to 40 MHz
- Up to 256 kB flash memory
- 14-bit Sigma-Delta ADCs
- 4 K EEPROM emulation
- NFET drivers with charge pump
- Current programmable NFET driver with patented slope control for optimized EMC behavior
- Integrated LIN transceiver compatible with LIN standard 2.2 and SAE J2602
- Support fast programming via LIN
- Direct Memory Access (DMA)
- 10-bit SAR ADC for sensing
- Timers for PWM signal generation for 2-phase motor control
- On chip oscillator & PLL
- Current sense amplifier
- Grade-1 & grade-0 qualification

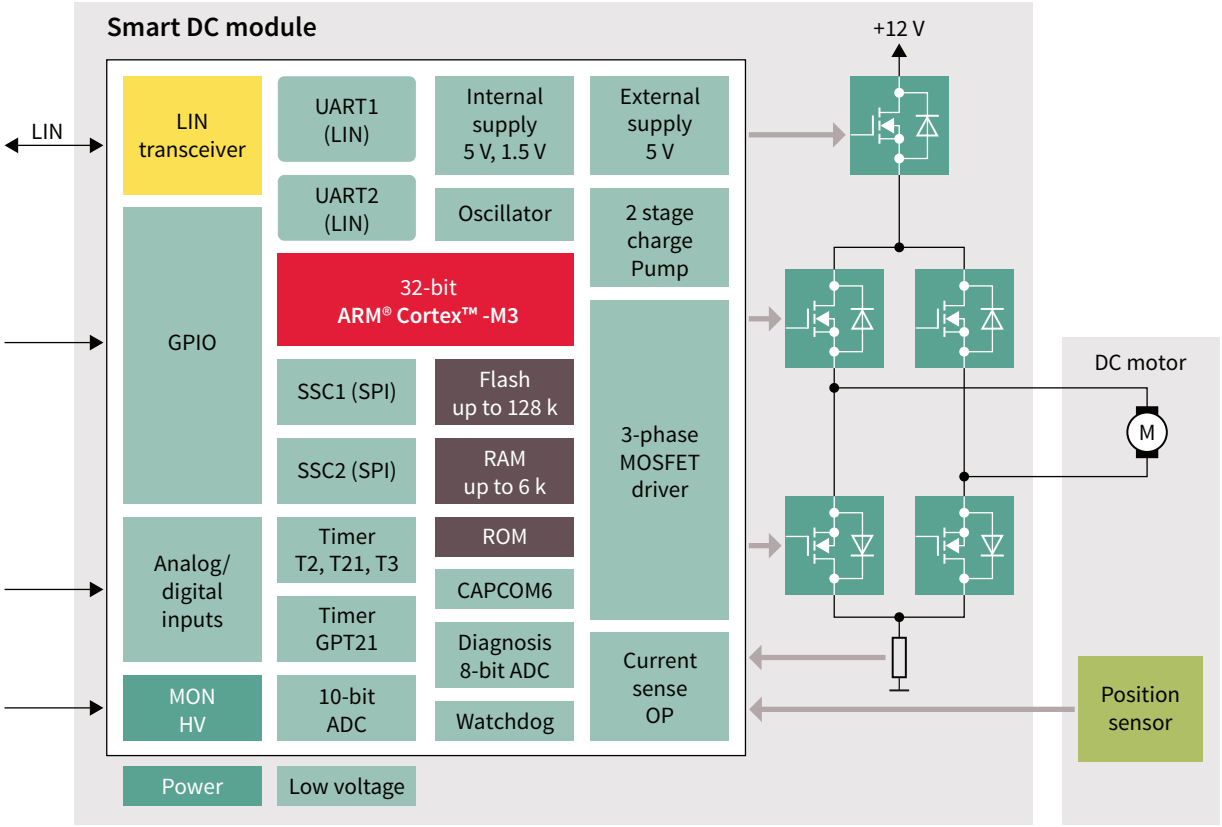
Key applications

- Sunroof
- Exhaust flaps
- Water valves
- Wiper
- Smart motor control via NFET H-bridge

MOTIX™ Embedded Power IC TLE986x

2-phase motor driver with integrated ARM® Cortex®-M3 MCU

Block diagram



Product overview TLE986x

Product name	Frequency [MHz]	Interface	RAM [kB]	Flash [kB]	EEPROM emulation [kB]	OP-AMP	2x 14-bit Sigma-Delta ADC	Package
MOTIX™ TLE9861QXA20	24	PWM	3	36	4	yes	no	PG-VQFN-48-31
MOTIX™ TLE9867QXA20	24	PWM + LIN	6	64	4	yes	no	PG-VQFN-48-31
MOTIX™ TLE9867QXA40	40	PWM + LIN	6	64	4	yes	no	PG-VQFN-48-31
MOTIX™ TLE9868QXB20	20	PWM + LIN	4	128	4	no	yes	PG-VQFN-48-31
MOTIX™ TLE9869QXA20	24	PWM + LIN	6	128	4	yes	no	PG-VQFN-48-31
MOTIX™ TLE9862QXA40	40	PWM + LIN	8	256	4	yes	no	PG-VQFN-48-29
MOTIX™ TLE9867QXW20	24	PWM + LIN	6	64	4	yes	no	PG-VQFN-48-29

Published by
Infineon Technologies AG
81726 Munich, Germany

Additional information
For further information on technologies, our products, the application of our products, delivery terms and conditions and/or prices, please contact your nearest Infineon Technologies office (www.infineon.com).

Warnings
Due to technical requirements, our products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by us in a written document signed by authorized representatives of Infineon Technologies, our products may not be used in any life-endangering applications, including but not limited to medical, nuclear, military, life-critical or any other applications where a failure of the product or any consequences of the use thereof can result in personal injury.

Date: 2021-10