

Product Brief

TLE987x Infineon® Embedded Power IC

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

The TLE987x family is part of the Infineon® Embedded Power IC portfolio. The TLE987x is a single chip 3-phase motor driver that integrates the industry standard ARM® Cortex®-M3 core, enabling the implementation of advanced motor control algorithms such as field-oriented control. It includes six fully integrated NFET drivers optimized to drive a 3-phase motor via six 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 TLE987x family offers scalability in terms of flash memory sizes and MCU system clock frequency supporting a wide range of motor control algorithms, either sensor based or sensor-less. It uses the same MCU and peripherals as the TLE986x family, 2-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 BLDC motor drive applications such as pumps and fans.

Applications

- > Fuel pump
- > HVAC blower
- > Engine cooling fan
- > Water pumps
- > High efficiency pumps and fans
- > Sensor-less and sensor based BLDC motor applications controlled by the Local Interconnect Network (LIN) or PWM.

Key features

- > ARM® Cortex®-M3 MCU
- > System clock up to 40 MHz
- > Up to 128 KB flash memory
- > 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
- > Supports fast programming via LIN
- > Direct Memory Access (DMA)
- > 10-bit SAR ADC for sensing
- > Timers for PWM signal generation for 3-phase motor control
- > On chip oscillator & PLL
- > Current sense amplifier
- > Grade-1 & grade-0 qualification

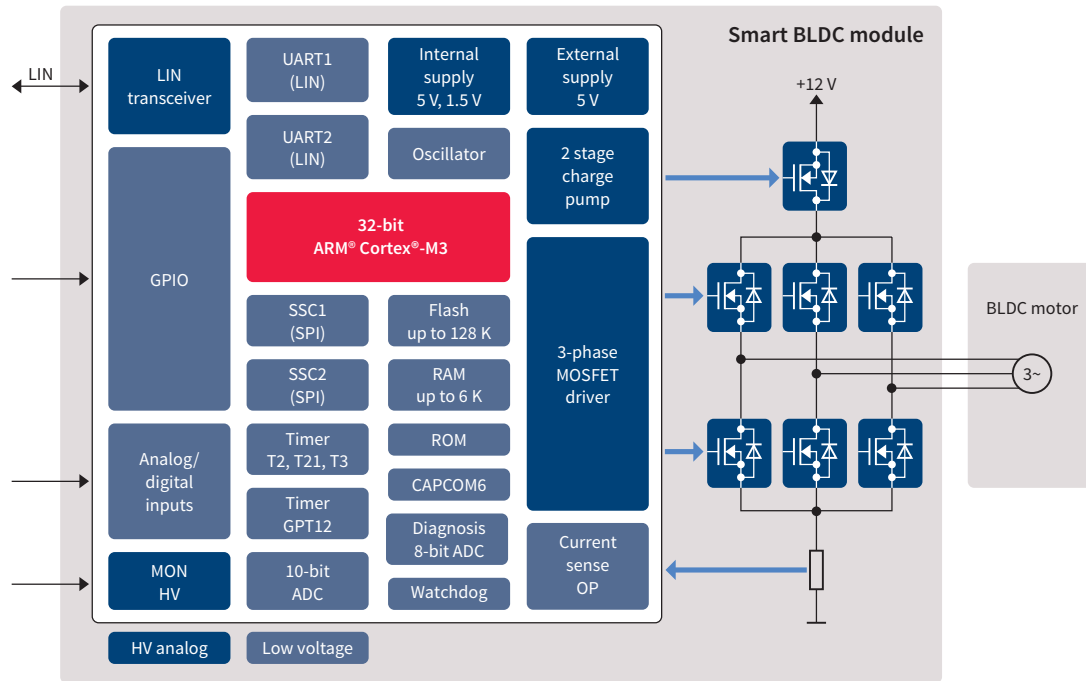
Key benefits

- > Complete system-on-chip for BLDC motor control
- > Minimum number of external components reduce BOM cost
- > VQFN package with 7 x 7 mm footprint enable PCB space saving

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Block diagram



Product summary

Product name	Frequency [MHz]	Interface	RAM [KB]	Flash [KB]	EEPROM in flash included [KB]	OP-AMP	Low-side MOSFET drivers	High-side MOSFET drivers
TLE987x 32-bit µC with 3-phase NFET gate driver for DC motors (grade-1, T_j = 150°C)								
TLE9871QXA20	24	PWM	3	36	4	y	3	3
TLE9877QXA20	24	PWM + LIN	6	64	4	y	3	3
TLE9877QXA40	40	PWM + LIN	6	64	4	y	3	3
TLE9879QXA20	24	PWM + LIN	6	128	4	y	3	3
TLE9879QXA40	40	PWM + LIN	6	128	4	y	3	3
TLE987x 32-bit µC with 3-phase NFET gate driver for DC motors (grade-0, T_j = 175°C)								
TLE9873QXW40	40	PWM + LIN	3	48	4	y	3	3
TLE9877QXW40	40	PWM + LIN	6	64	4	y	3	3
TLE9879QXW40	40	PWM + LIN	6	128	4	y	3	3

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