

Product Brief

TLE9180D-21QK / TLE9180D-31QK 3-phase gate driver IC

The TLE9180D-21QK and TLE9180D-31QK are advanced gate driver ICs dedicated to control 6 external N-channel MOSFETs forming an inverter for high current 3 phase motor drives application in the automotive sector.

A sophisticated high voltage technology allows ICs to support applications for single and mixed battery systems with battery voltages of 12 V, 24 V and 48 V. Bridge, motor and supply related pins can withstand voltages of up to 90 V. Motor related pins can even withstand negative voltage transients down to - 15 V without damage.

All low- and high-side output stages are based on a floating concept and its driver strength allows to drive lowest RDS(on) MOSFETs common on the market. In 12 V applications the gate driver IC is capable of driving 6 MOSFETs, each with a maximum total gate charge of $Q_{gTOT} = 300 \text{ nC}$, at a frequency of up to 20 kHz.

An integrated SPI interface is used to configure the IC for the application after power-up. After successful power-up parameters can be adjusted by SPI, monitoring data, configuration and error registers can be read. Cyclic redundancy check over data and address bits ensures safe communication and data integrity.

The TLE9180D-21QK has two integrated current sense amplifier (CSA) for shunt signal conditioning, whereas the THE9180D-31QK has three CSA. Gain and zero current voltage offset can be adjusted by SPI. The offset can be calibrated.

Diagnostic coverage and redundancy have increased steadily in recent years in automotive drive applications. Therefore the TLE9180D-31QK offers a wide range of diagnostic features, like monitoring of power supply voltages as well as system parameters. A testability of safety relevant supervision functions has been integrated. Failure behavior, threshold voltages and filter times of the supervisions of the device are adjustable via SPI.

Key features

- > Supply range from 5.5 V - 60 V
- > Powerful driver stage with typ. 2 A output current per channel
- > 0 to 100% duty cycle range
- > Two integrated current sense amplifier for shunt signal
- > Extended protection & supervision
- > LQFP-64 exposed pad package

Key benefits

- > Suitable for 12 V, 24 V and 48 V battery voltages
- > Integrated load current measurement
- > Detailed diagnosis supports safety relevant use cases
- > Limp home mode

Key applications

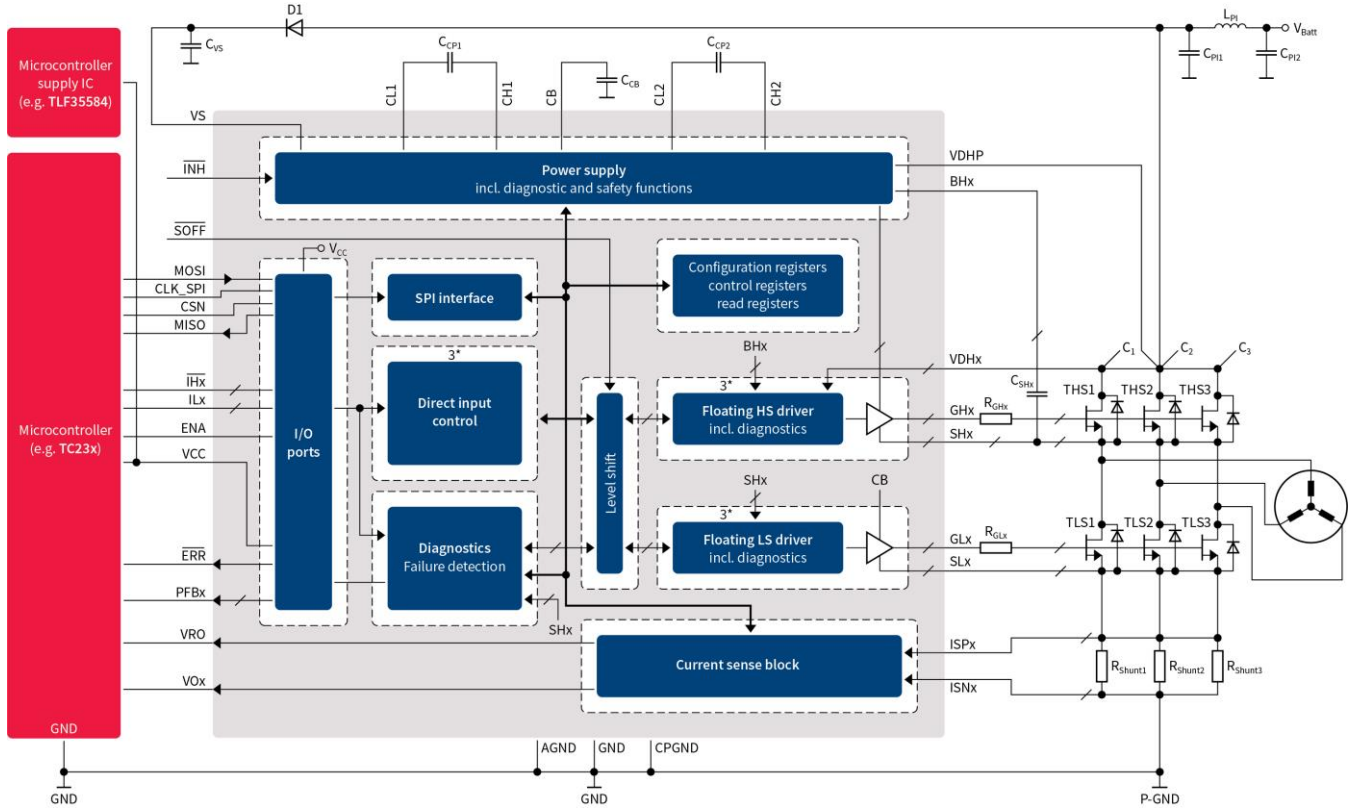
- > 48 V motor drives
- > Cooling fans
- > Water pump
- > Oil pump
- > HVAC compressor
- > Commercial and agricultural vehicles



TLE9180D-21QK / TLE9180D-31QK

3-phase gate driver IC

Typical application schematic



Product Table

Type	Description	Ordering code	Package
TLE9180D-21QK	3-phase gate driver IC with 2 current sense amplifier	SP001615886	PG-LQFP-64
TLE9180D-31QK	3-phase gate driver IC with 3 current sense amplifier	SP001417250	PG-LQFP-64
EVAL_TLE9180D-31QK	Evaluation board for TLE9180D-31QK incl GUI for register configuration	SP005344733	Box

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