

Automotive DC Motor Predriver Simplifies EMI Optimization And Saves Power

[STMicroelectronics'](#) L99H92 automotive gate driver provides an SPI port for programming and diagnostics, a charge pump, protective features, and two additional current-sense amplifiers for system monitoring. Containing two high-side and two low-side drivers, the L99H92 can control a single H-bridge powering one bidirectional dc motor or two half bridges for two unidirectional motors. Typical applications for the highly integrated and easily configurable driver include electric sunroof, window lift, powered trunk, sliding doors, and seat-belt pre-tensioners (see the figure).

The gate-driving current is programmed through the SPI port, allowing slew-rate control to minimize electromagnetic emissions and thermal dissipation. Programming the current saves up to four external discrete components per MOSFET, typically needed for slew-rate setting with conventional drivers. The maximum drive current of 170 mA gives designers flexibility to use the driver with a wide variety of external MOSFETs, including high-power devices with large gate capacitance.

The charge pump powers the high-side drivers to maintain correct operation as the vehicle battery voltage fluctuates, enabling the outputs to function with a supply as low as 5.41 V. The charge-pump output is also available at an external pin to control a MOSFET for reverse-battery protection.

With many features for system protection and diagnostics, the L99H92 is built for reliability and safety. There is overcurrent protection with a programmable threshold, detected by monitoring the MOSFET drain current. Also, cross-conduction protection with programmable dead time ensures safety and efficiency.

Additional protection includes overtemperature early warning and shutdown, overvoltage and undervoltage protection on analog and digital power supply inputs, and open-load and output short-circuit detection in off-state diagnostic mode. A fail-safe input can turn off all MOSFETs instantaneously and a dedicated diagnostic pin provides immediate fault warning without waiting for periodic SPI transfers.

Additionally, two current-sense amplifiers are integrated for system-status monitoring, helping minimize the bill of materials. Suitable for high-side, low-side, and inline sensing, the amplifiers have independently programmable gain, low offset, and low thermal drift. They can be independently disabled to reduce current consumption when unused. In standby mode, the L99H92's current consumption is less than 5 μ A.

The L99H92 is in production now and packaged as a TQFP32 or QFN32 with wettable flanks to facilitate inspection. Pricing starts from \$1.7062 in the QFN32 package and \$1.7246 in TQFP32 package, for orders of 1000 pieces. For further information see the [website](#).

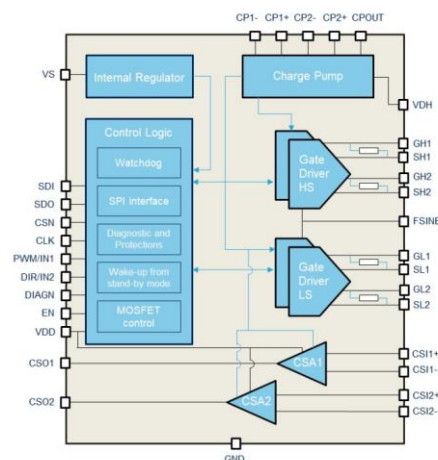


Figure. The L99H92 is designed to drive four external n-channel MOSFET transistors in single H-bridge or dual independent half-bridge configuration for dc-motor control in automotive applications. Two free configurable current-sense amplifiers are integrated for system monitoring. The gate-driving current is programmed through an SPI port, allowing slew-rate control to minimize electromagnetic emissions and thermal dissipation.