Data Sheet

ADP1804

12V Battery Pack PMIC

FEATURES

- Startup with 5.5V supply voltage and operating down to 4V
- Preboost controller, 9V; 1A load
- Dual buck regulators, programmable as 3.3V, 5V, and 5.6V; 600mA load
- LDO1, 5V; 150mA load
- LDO2, programmable as 3.3V and 5.0V; 100mA load
- LDO3, tracking LDO2 output within the error range of 25mV; 100mA load
- Ultra-low power LDO4, 10mA load
- Dual high side driver with auxiliary boost regulator
- Pyro fuse driver with energy reserve supply
- Multiple wakeup sources in sleep mode
- Timers
  - Question and answer (QA) window and pulse watchdog timer
  - Long duration timer up to 194 days
- Standard 4-wire, 4MHz SPI and 3.3V/5V compliance
- Dedicated fault and reset monitor output
- Voltage monitors and ADC for diagnostic
- ADP1804 is designed for use in ISO26262 application with ASIL C in normal operation mode and ASIL B in sleep mode
- AEC-Q100 qualified for automotive applications

APPLICATIONS

- 12V battery pack power system bias
- Electric power steering
- Engine management
- Transmission and active suspension
- Electric vehicle (EV), hybrid electric vehicle (HEV), and inverter
- Advanced driver assistance systems

TYPICAL APPLICATION DIAGRAM

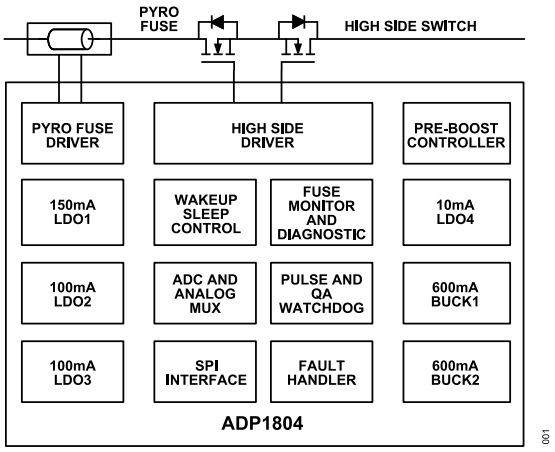

Figure 1. Typical Application Diagram

GENERAL DESCRIPTION

The ADP1804 is a multiple output power supply including two synchronous buck regulators, one preboost controller, four low dropout (LDO) regulators, a high-side driver, and a pyro fuse driver and is dedicated for the automotive market. The sleep mode and deep sleep mode are available with various wake-up modes.

Multiple switching and linear voltage regulators supply the microprocessor, sensor, and interface devices. The switching regulators operate in default fixed 2MHz switching frequency. The device can also be configured with the spread spectrum feature. The switching frequency of preboost is configurable. Four low noise LDO regulators provide clean voltage for the system. The LDO4 is a high voltage always on LDO with extremely low quiescent current and low noise that is suitable for the system base load. An advanced power management scheme is implemented to maintain high efficiency over a wide range of input voltages (down to 4V). The power on/off sequence and operation status can be easily managed by the scheme.

High-side driver and pyro fuse driver manage the power path for battery charging and loading. The two independent high-side switch drivers are, by default, targeted to control two sets of common source metal-oxide semiconductor field effect transistors (MOSFETs). The devices strong driving capability is suitable for high current, multiparalleled power devices. The pyro fuse driver provides redundant power path management to make sure the system works in a safe state—even in worst case scenarios.

The ADP1804 includes enhanced safety features with voltage monitors, an analog-to-digital converter (ADC), a question answer (QA) watchdog, a pulse watchdog, and a fail-safe output becoming a full part of a safety-oriented system partitioning to reach a high integrity safety level (up to ASIL C).

Each voltage rail and driver is monitored internally, and any fault event is reported to the system through the signal pins. Two window watchdogs (one pulse watchdog and one QA watchdog) monitor the processor or other devices in the system to ensure that any software or hardware errors are detected. The ADP1804 integrates a 4-wire 4MHz serial peripheral interface (SPI) target interface for system control and diagnostics.

Additional protection includes current-limit protection, overvoltage protection, undervoltage protection, and thermal shutdown (TSD).

The ADP1804 is available in a 12mm × 12mm, 64-lead LQFP package and operates from −40°C to +125°C ambient temperature range.

Rev. SpB

DOCUMENT FEEDBACK
TECHNICAL SUPPORT

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