



ADI Power Controllers Boost Power Application Efficiency

Power control is an essential role in electronic products, given that both stability and life span of electronic products will be overly reduced in the absence of reliable power input. Choosing an excellent power controller will be an important for electronic product design. This article will introduce ADI's two power products.

High Efficiency, High Density, Switched Capacitor Converter Suitable for High Power Applications

The LTC7820 is a fixed ratio high voltage high power switched capacitor/charge pump controller. It includes four N-channel MOSFET gate drivers to drive external power MOSFETs in voltage divider, doubler or inverter configurations. The device achieves a 2:1 stepdown ratio from an input voltage as high as 72V, a 1:2 step-up ratio from an input voltage as high as 36V, or a 1:1 inverting ratio from an input voltage up to 36V. Each power MOSFET is switched with 50% duty cycle at a constant pre-programmed switching frequency. System efficiency can be optimized to over 99%. The LTC7820 provides a small and cost-effective solution for high power, non-isolated intermediate bus applications with fault protection.

The LTC7820 switching frequency can be linearly programmed from 100kHz to 1MHz. The device is available in a thermally enhanced 28-lead QFN package with no-connect pins for high voltage compatible pin spacing.

These LTC7820 eliminating the need for bulky and costly surge suppression devices. Many feature low quiescent currents and adjustable gate drive to enable the use of standard threshold or logic-level power MOSFETs to optimize performance in industrial control, transportation, robotic and datacom applications.

For high voltage input/output applications, inductorless, switched capacitor converters (charge pumps) significantly improve efficiency and reduce solution size over conventional inductor-based buck or boost topologies. By using a charge pump instead of an inductor, a "flying capacitor" is used to store and transfer the energy from input to output. The energy density of capacitors is much higher than inductors, improving power density by a factor of

10 using a charge pump. However, charge pumps have traditionally been limited to low power applications, due to the challenges presented in start-up, protection, gate drive and regulation. The LTC7820 overcomes these problems. Robust protection features enable an LTC7820 switched capacitor converter to fit high voltage, high power applications such as bus converters, high power distributed power systems, communications systems and industrial applications.

Quad Output, Triple Monolithic Synchronous Buck Converter & Boost Controller for automotive and industrial applications

The LT8603 is a highly flexible, quad output regulator combining two high input voltage capable monolithic step-down switching regulators, one low input voltage capable monolithic step-down regulator, and a boost controller to satisfy a wide range of applications while occupying minimal board space.

With the boost controller configured to supply the chip V_{IN} supply, the LT8603 produces three precisely regulated outputs even when the boost input voltage falls significantly below the regulated output voltages (such as during an automotive cold crank scenario). Alternatively, with the boost controller driven from one of the step-down regulator outputs or configured as a SEPIC, the LT8603 provides four precisely regulated outputs over a wide input voltage range.

The LT8603's flexible power supply system is capable of four regulated outputs with ($V_{BATT} \ll V_{OUT}$). Its two high voltage synchronous buck regulators support an input voltage range from 3V to 42V and output currents up to 2.5A and 1.5A. The built-in low voltage synchronous buck regulator supports an input voltage range from 2.6V to 5.5V and output currents up to 1.8A. One boost controller allows buck converters to regulate with $V_{BATT} \ll V_{OUT}$. The selectable Burst Mode[®] operation allows low $28\mu A$ I_Q with high voltage channels active. Programmable power-on reset and power good indicators for each channel ensure overall system reliability. The step-down switching frequency is from 250kHz to 2.2MHz. The LT8603 is available in 40-Lead QFN (6mm x 6mm) package.

The LT8603 provides robust regulation by including a cycle-by-cycle current limit for all step-down regulators, thermal shutdown, and a boost controller that can tolerate reverse battery connections and negative transient input voltages down to -42V. Major applications off the LT8603 include automotive stop-start and cold crank ride through, last-gasp CPU power hold-up, and industrial controls and power supplies.

After acquiring Linear Technology Corporation (LTC) in 2016, Analog Devices, Inc. (ADI) continues to develop Linear's product lineups and launches Power by Linear power product portfolios. By integrating ADI's power management products, ADI demonstrates the advantages of this power-power merger which enables the continuous escalation of its analog market share. This strategy also enables ADI to become the premier analog technology company. The two products introduced in this article are worthy of further understanding.