Nanopower Buck-Boost DC/DC Converter with Energy Harvesting Battery Charger

MILPITAS, CA – June 23, 2014 – Linear Technology announces the LTC3331, a complete energy harvesting solution that delivers up to 50mA of continuous output current to extend battery life when harvestable energy is available. A simple 10mA shunt enables charging of a rechargeable battery with harvested energy while a low battery disconnect function protects the battery from deep discharge. The LTC3331 requires only 200nA of supply current from the battery when providing regulated power to the load from harvested energy and only 950nA operating when powered from the battery under no-load conditions.

The LTC3331 integrates a high voltage energy harvesting power supply, a battery charger, and a synchronous buck-boost DC/DC converter powered by a rechargeable battery, creating a single continuous regulated output for energy harvesting applications such as those in wireless sensor networks. The energy harvesting power supply, consisting of a full-wave bridge rectifier accommodating AC or DC inputs and a high efficiency buck converter, harvests energy from piezoelectric (AC), solar (DC), or magnetic (AC) sources. When harvested energy is not available, the rechargeable battery input powers a buck-boost converter that operates over the full battery voltage range up to 4.2V and can regulate whether the input is above, below or equal to the output. The LTC3331 automatically transitions to the battery when the harvesting source is no longer available.

The LTC3331's energy harvesting inputs operate from a voltage range of 3V to 19V AC or DC, making the device ideal for a wide array of piezoelectric, solar, or magnetic energy

sources. Its input undervoltage lockout threshold settings are programmable between 3V and 18V, enabling the application to operate the energy harvesting source at its peak power transfer point. Other features include pin-programmable output voltages and buck-boost peak current limits, a supercapacitor balancer, and an input protective shunt (up to 25mA at V_{IN} ≥20V).

The LTC3331EUH is available in a 5mm x 5mm QFN package. Pricing starts at $3.55 each for 1,000-piece quantities. An industrial temperature grade version, the LTC3331IUH, is also available. Pricing starts at $3.90 each for 1,000-piece quantities. All versions are available from stock. For more information, visit www.linear.com/product/LTC3331

Photo Caption: Complete Regulating Energy Harvesting Solution

Summary of Features: LTC3331

- Dual Input, Single Output DC/DCs with Input Prioritizer
  - Energy Harvesting Input: 3.0V to 19V Buck DC/DC
  - Battery Input: Up to 4.2V Buck-Boost DC/DC
- 10mA Shunt Battery Charger with Programmable Float Voltages: 3.45V, 4.0V, 4.1V, 4.2V
- Low Battery Disconnect
- Ultralow Quiescent Current: 950nA at No Load
- Integrated Supercapacitor Balancer
- Up to 50mA of Output Current
- Programmable DC/DC Output Voltage, Buck UVLO & Buck-Boost Peak Input Current
- Integrated Low-Loss Full-Wave Bridge Rectifier
- Input Protective Shunt: Up to 25mA at V_{IN} ≥ 20V
- 5mm × 5mm QFN-32 Package

About Linear Technology

Linear Technology Corporation, a member of the S&P 500, has been designing, manufacturing and marketing a broad line of high performance analog integrated circuits for major companies worldwide for over three decades. The Company's products provide an essential bridge between our analog world and the digital electronics in communications, networking, industrial, automotive, computer, medical, instrumentation, consumer, and military and aerospace systems. Linear Technology produces power management, data conversion, signal conditioning, RF and interface ICs, µModule® subsystems, and wireless sensor network products. For more information, visit www.linear.com

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