Energy Meter with Integrated Sense Resistor

Now it’s easy to digitally monitor the parameters required to accurately manage your system’s power profile or energy consumption. Current, voltage, power, charge and energy data are available via a simple I²C/SPI interface. The LTC®2947 utilizes three ΔΣ ADCs to simultaneously measure current and voltage, and calculate power for true power readings. An integrated temperature-compensated sense resistor maximizes measurement accuracy over temperature and simplifies space-constrained designs.

Features
- Monitors Current (1.0%), Voltage (0.5%), Power (1.2%), Charge (1.0%) and Energy (1.2%)
- Integrated 300μΩ Sense Resistor with ±30A Current Range and Low 9mA Offset
- 0V to 15V Rail-to-Rail Input Range
- Three ΔΣ ADCs for Instantaneous Multiplication of Voltage and Current
- Internal ±1% or External Time Bases
- Max and Min Value Tracking
- Alerts when Limits Exceeded
- I²C or SPI Configurable Interface
- 32-Pin 4mm × 6mm QFN Package

Internal 30A/300μΩ Sense Resistor with 1.0% Current Accuracy
Integrated Sense Resistor
At high current levels, power dissipation typically mandates the use of a low value sense resistor which also reduces input voltage signal. As a result, current measurement accuracy becomes susceptible to thermoelectric voltages and board layout. The LTC2947’s integrated temperature-compensated 300μΩ sense resistor is insensitive to such disturbances and provides low power dissipation and high accuracy across the entire operating range, producing a ±30A monitoring solution that is superior to external sense resistor solutions.

Three ADCs
The LTC2947 employs three ΔΣ ADCs to measure voltage, current and power. Instead of multiplying average values of current and voltage, the LTC2947 multiplies raw (pre-decimation filter) readings of current and voltage at a 5MHz sampling frequency, then converts the results. This technique enables the LTC2947 to accurately measure power in the presence of current and voltage variations up to 50kHz—far beyond its conversion frequency. This may happen when power is drawn from a battery with significant impedance, resulting in up to 10% more accurate power measurement results.

Demonstration System
Quickly evaluate the LTC2947’s functions and performance with the simple DC2334 demonstration circuit and intuitive QuikEval™ PC software, or attach an available LCD keypad shield to run as a standalone power, charge and energy monitor without the need of a PC. Further minimize development time with complete driver code (written in C), schematics, bill of materials (BOM) and Gerber files.