High Efficiency Dual-Chemistry Charger Using The bq2000

**Features**

- Circuit board measures only 1.5 x 1.0 in (37.5 x 25 mm)
- Supports 1 Li-Ion or 3 NiCd/NiMH cells
- 1A charging current
- 6–16V input DC voltage
- Pre-charge qualification by checking battery voltage and temperature
- Pre-charge conditioning for reviving deeply discharged batteries
- Charge status display
- High-frequency buck regulator
- Thermistor interface
- Input for synchronizing to an external oscillator
- Schematic, bill-of-materials and board layout available from Benchmarq for immediate implementation

**Typical Applications**

- Low cost chemistry-independent fast chargers for cellular and handheld electronic equipment
- Cigarette lighter adapter chargers

**Functional Block Diagram**
bq2000 Designed to Go

General Description

In this example the bq2000 is used to design a simple and cost-effective chemistry-independent charger. This implementation is suitable for any application requiring a high efficiency charge management in a small footprint.

This design takes advantage of various built-in features of the bq2000 to safely manage charging of both lithium and nickel based chemistries.

Circuit topology: Switching buck regulator with high-side current sensing

Charge algorithm: NiCd/NiMH: Constant current followed by top-off and trickle charge. Li-Ion: Constant current followed by constant voltage

Battery chemistries supported: Lithium-Ion, NiCd, and NiMH
Maximum number of cells: Configured for one Li-Ion, or three NiCd/NiMH
Maximum charging current: 1A
Input requirements: 6–16V
Pre-charge qualification: Battery voltage and temperature
Charge termination: NiCd/NiMH: Peak voltage detection. Li-Ion: Minimum current. There also is a safety charge timer for both chemistries.
Chemistry select: For Li-Ion, the CSEL is left floating.
For NiCd/NiMH, the CSEL is tied to BAT-

Please refer to bq2000 Data Sheet for full specifications

bq2000 Schematic

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