# USB-Compliant, Li-Ion Battery Switching Charger Shortens Charge Time and Reduces Heat

When charging a single-cell or parallel-cell Lithium Ion (Li-Ion) battery through a USB port or AC/DC adaptor, designers need a solution that provides faster charge times and overcomes the thermal issues associated with the linear charger solutions in use today. To meet this need, Fairchild Semiconductor developed the FAN5400 family of USB-compliant, Li-Ion switching chargers with USB On-The-Go (USB-OTG) capabilities.

The FAN5400 family is ideal for single-cell or parallel-cell Li-Ion battery charging in devices such as cell phones, smartphones, tablets, wireless broadband hotspots, digital cameras and portable media/game players. As charge currents and battery sizes continue to increase, charging through the USB port or 5V AC/DC adaptor with a linear charger becomes increasingly inefficient. The FAN5400’s switch-mode charger provides up to 94 percent efficiency, which helps with faster charging and lower thermal dissipation.

Integrated with the switch-mode charger is a 5V 300mA boost regulator that uses the same inductor as the charger thereby reducing external component count. In addition, both the charger and boost circuit switch at 3MHz minimizing the size and cost of external passive components. Available in a 1.96 x 1.87mm, 20-bump, 0.4mm pitch CSP package, the FAN5400 family is the smallest solution on the market that provides both charger and USB-OTG boost functionality.

For flexibility the device’s charging parameters and operating modes are programmable through an I2C interface, which operates up to 3.4Mbps. Maximum charge current of up to 1.25A ensures fast charging times and high charge voltage accuracy (±0.5 percent @25ºC) allows for more “topping out” of the battery, resulting in longer battery life.

In addition to the standard thermal and short circuit protections, the FAN5400 family can sustain up to 20V DC on the input in order to protect against unregulated over voltage conditions on the USB port.

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