

## ***Inductorless Power Converter Delivers 10 A With Over 98% Efficiency***

[Dialog Semiconductor](#), a provider of highly integrated power management, ac-dc power conversion, and Bluetooth low energy technology, has unveiled the first of a new series of charging products and what it claims is one of the world's most efficient switched-capacitor dc-dc converters, the DA9313. This IC offers high peak efficiency and can power more than 50 W in less than 10 mm<sup>2</sup> of board area, allowing developers to extend battery life and reduce charging time in direct charging and 2S lithium-ion (Li-ion) systems such as notebook PCs, DSLR cameras and portable Bluetooth speakers (Fig. 1.)

According to the vendor, the power converter is the first of its kind to achieve 98% efficiency and deliver 50 W enabling reduced system costs, PCB sizes and extended battery life in various applications of mobile devices (Fig. 2.) In comparison to traditional buck regulators, DA9313 enables greater than 20% efficiency improvement at light loads. The converter also enables a reduction in PCB size of more than 50% and reduces the solution height to less than 1 mm, which is mandated for the thinner next-gen mobile phones and Ultrabooks coming to market. For systems that require up to 100 W of power, two DA9313 devices may also be put into an integrated master-slave configuration, providing designers with scalability for a wide range of system designs.

Note however that while buck converters produce regulated outputs, the DA9313 charge-pump converter produces an unregulated output. Nevertheless, the part appears to deliver reasonable load regulation at lower current levels (Fig. 3.)

For smartphone direct charging applications, the DA9313 can be used as a companion to the main charger IC. During the high-power constant-current charging phase, the DA9313 bypasses the main charger and delivers 6 A to the battery without exceeding thermal design requirements. With a 9-V supply using Dialog's RapidCharge technology in travel adapters, a low-cost 3-A USB Type-C cable can be used instead of a more costly 5-A electronically marked Type-C cable, helping to reduce significant system costs for mobile phone manufacturers.

"This switched capacitor power converter represents another breakthrough in our industry-leading power management technology," said Paul Wheeler, vice president Mobile Systems, Dialog Semiconductor. "Not only is it the first converter that can achieve such high efficiency at this power level, it has been developed with the changing needs of developers in mind, as they seek to reduce PCB sizes, system costs and charging times without sacrificing power efficiency."

The DA9313 is offered in a 43-pin 3.545-mm x 2.815-mm WLCSP. For more information, visit [www.dialog-semiconductor.com/products/da9313](http://www.dialog-semiconductor.com/products/da9313)

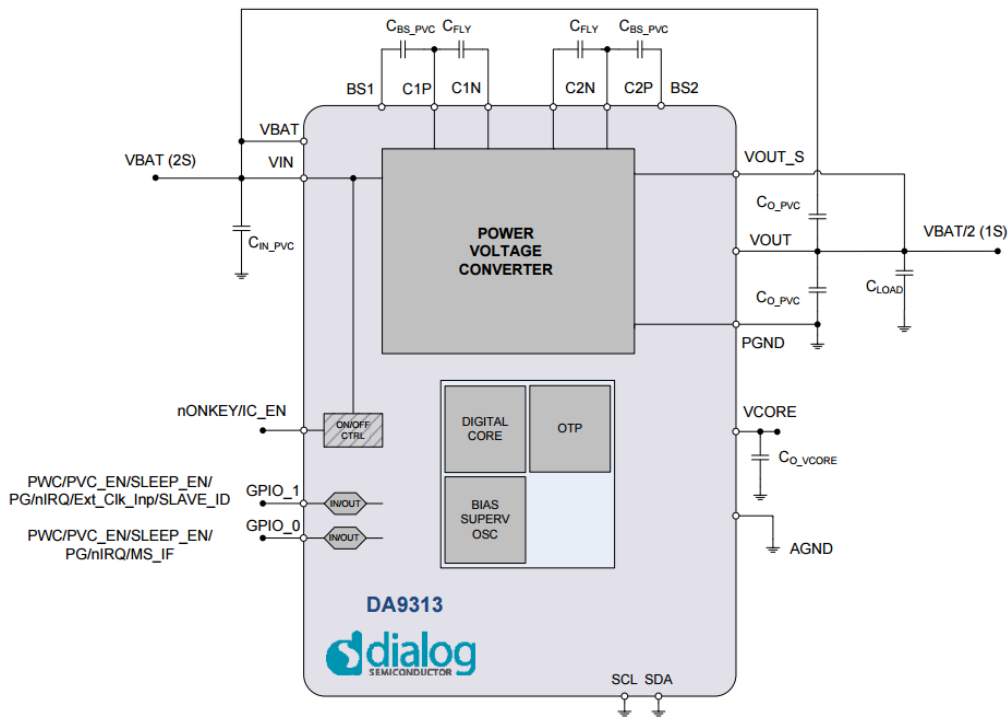


Fig. 1. The DA9313 switched-capacitor dc-dc converter delivers up to 10 A or 50 Wpk of unregulated output at  $\frac{1}{2} V_{IN}$  while operating from a 5 to 10.5-V input. Two devices can be configured in a master/slave configuration for double the current and power output.

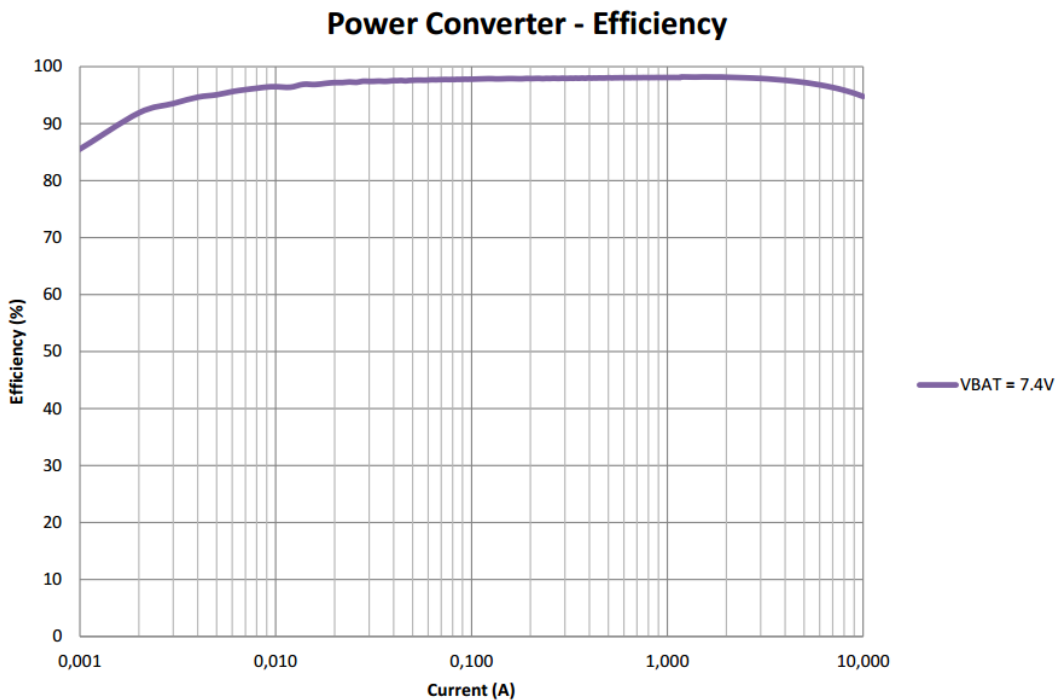


Fig. 2. Operating from a 7.4-V input, the dc-dc converter achieves percentage efficiencies in the high 90s across most of the load range.

### Power Converter - Load Regulation

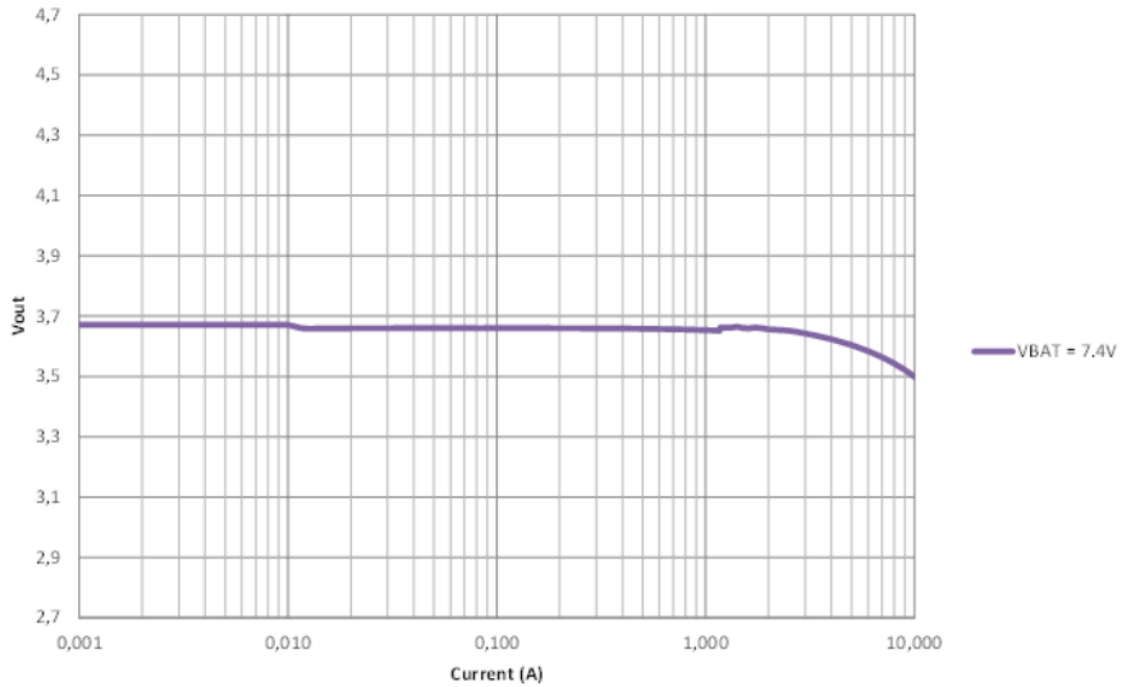


Fig. 3. Though the DA9313 is described as unregulated, it achieves reasonably flat load regulation over a good portion of its load range.