

ZVS Chipset Enables Smaller Adapters At 100-W+ Power Levels

[Dialog Semiconductor](#)'s digital zero voltage switching (ZVS) chipset enables high-power density (HPD) power supply units (PSUs) up to 100 W and beyond that are 30% to 50% smaller than conventional high-power PSUs, according to the vendor. Dialog's ZVS RapidCharge solution includes the iW9801 primary-side controller and the iW709 secondary-side USB PD protocol IC (Fig. 1).

The secondary-side digital compensation loop ensures stability and eliminates the need for extra compensation components. The integrated synchronous rectifier controller in the secondary-side iW709 further reduces the overall component count. The chipset also provides seamless multi-mode control for up to 94% efficiency and eliminates audible noise for high-power charging with safe, cool operation in a small physical charger size (Fig. 2). It employs switching frequencies up to 200 kHz, so designers can use a smaller and lighter transformer and smaller passive components. Meanwhile, its low standby power of less than 20 mW is eco-friendly.

To illustrate the size reduction enabled by its ZVS chipset, the company compares its solution with an off-the-shelf 65-W adapter from Dell. That adapter measures 4.17 in. (l) x 2.60 in. (w) x 0.87 in. (h) for a total volume of 9.43 in.³. In contrast, a Dialog customer's 65-W adapter design, which is based on the ZVS chipset and fully released to production, measures 1.99 in. (l) x 1.96 in. (w) x 1.11 in. (h). This equates to a total volume of 4.33 in.³. So the example adapter design based on the ZVS chipset achieves a 54% reduction in size versus the existing Dell adapter.

The iW9801 primary-side controller supports fine-step CV/CC regulation when paired with the iW709 secondary-side controller or with a TL431 reference. The controller IC also drives GaN devices via its output pin directly or an external GaN driver.

Protection features include overvoltage (OVP), overcurrent (OCP), user-configurable overtemperature, shoot-through, brown-in/brown-out VSENSE/ISENSE short, output short, and extra primary-side OCP and OVP. The controller also has ac unplug detection and X-cap discharge.

"The introduction of Dialog's patented ZVS technology builds on our extensive ac-dc expertise and expands our addressable market into higher power density PSUs," said Davin Lee, senior vice president and general manager of the Advanced Mixed-Signal Business Group at Dialog Semiconductor. "With this innovative ZVS chipset, customers can simply design higher power density chargers that are not only light-weight and ultra-small, but also very cost-effective."

Dialog's ZVS chipset supports most fast charge protocols, including USB PD 3.0 with Programmable Power Supply (PPS) and other third-party proprietary protocols. This complete solution uses built-in digital compensation, making circuit design quick and easy compared to analog approaches, according to the vendor.

The ZVS chipset is available now. For more information, see the [website](#).

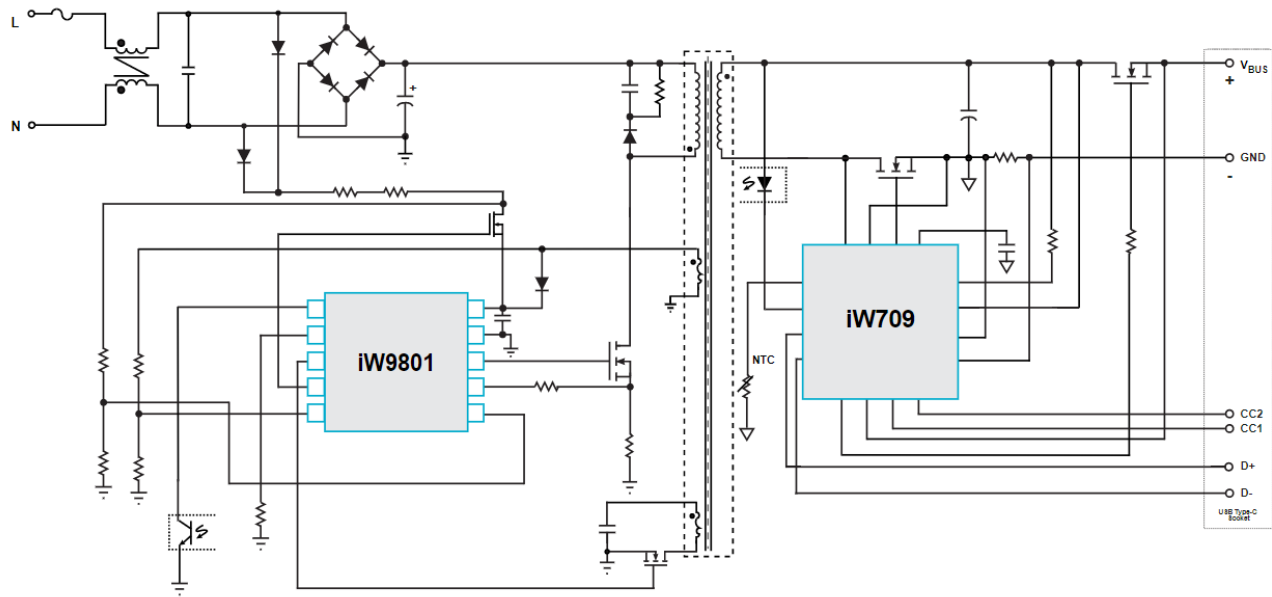


Fig. 1. The iW9801 primary-side controller and the iW709 secondary-side USB PD protocol IC provide a complete ZVS two-chip solution for USB PD chargers.

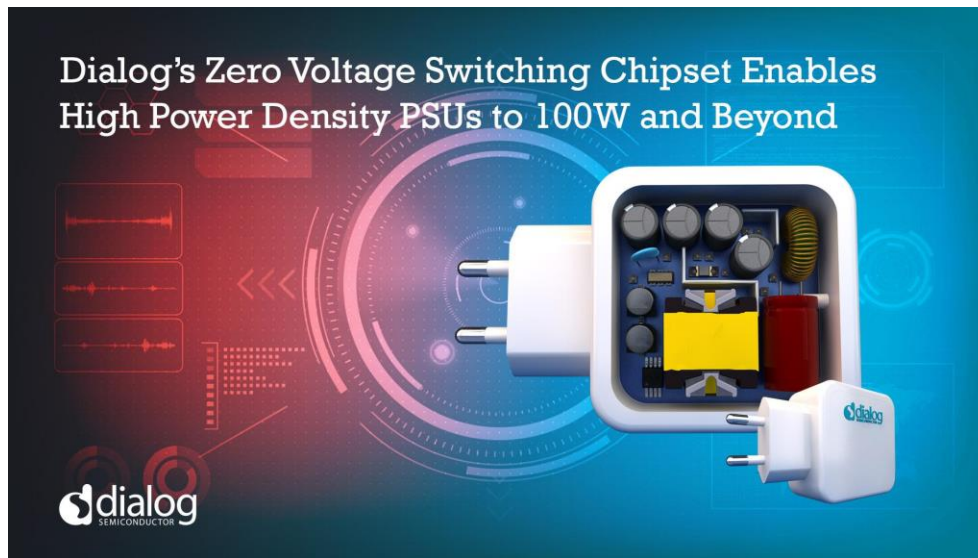


Fig. 2. With Dialog's ZVS chipset, designers can reduce component size and BOM cost to enable smaller form-factor, lighter weight power supplies, including travel adapters for smartphones, tablets, laptops, power tools, and other portable devices, according to the vendor.