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Multi-Level Buck Converter Offers Low-Profile Fast-Charging In USB-PD Systems

From pSemi, a Murata company, the PE26100 is a multi-level buck converter for high-efficiency power delivery. According to the vendor, it is now optimized for main, direct battery charging in next-generation smartphones, tablets, and compact mobile devices. The PE26100 delivers fast-charging capability, high output current up to 6 A, and exceptional thermal performance in an ultra-thin (<1 mm) wafer-level chipscale package measuring 4.7 mm x 3 mm..

The PE26100's architecture and performance characteristics make it uniquely suited for today's global migration toward high-power USB power delivery (USB-PD) and programmable power supply (PPS) fast-charging ecosystems, says the vendor. Supporting 4.5-V to 18.5-V input, the device enables four-level buck mode for higher USB-PD voltage inputs and three-level buck mode for mid-to-low input voltages. In applications using USB PPS, the PE26100 can also operate as a fixed-ratio, capacitor-divider charge pump, offering divider ratios of 2:1 and 3:1 depending on programmed input voltage (see the figure).

Devices can be connected in parallel to increase the fast-charging capability. Reverse boost support is available for on-the-go (OTG) or reverse wireless charging with up to 10 W. Accurate telemetry measurements are available via an I^2C interface.

According to Laurence McGarry, director, product line management at pSemi, the PE26100 was initially released at APEC 2025 as an "auxiliary" power supply for smartphones. As McGarry explains, "In a smartphone, there are usually two parallel charging paths to the battery—first through the main PMIC (sometimes called the main charger) providing a moderate level of charge, and secondly through the auxiliary charger used to provide the fast charge and to reduce charge times. The power is provided by two parallel ICs to spread the dissipation and heat."

"At APEC 2026, we came up with a way to make the PE26100 a main charger for broader applications through the addition of external components, thereby expanding the device's field of use," says McGarry.

At this time, the PE26100 is available from the company only (not through distribution). For more information, see the PE26100 product or contact the company.

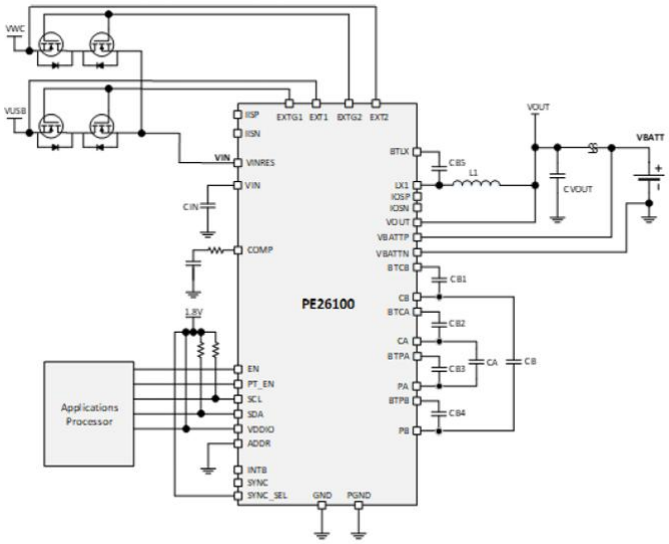

Figure. The PE26100 is described as the world's first four-level buck converter for battery charging applications. The device operates as a regulated multi-level buck converter (four-level or three-level modes) when a fixed input voltage such as a USB-PD source is applied. The reduced inductance associated with the multi-level buck converter allows the PE26100 to provide highly efficient 6-A power delivery in a low-profile (< 1 mm height) compact solution. The PE26100 can also be configured as a charge pump capacitor divider in divide-by-2 or divide-by-3 modes when a variable source—such as a USB programmable power source (USB_PPS)—is applied.