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20-A Buck Regulator And 10-A Charge Pump Offer High Efficiency And Low Profile

pSemi's PE24111 is a 3.3-V input, two-stage buck regulator capable of supplying up to 20 A, while the PE25213 is a 10-A high-efficiency charge pump that includes both divide by 2 and 3 capacitor dividers.

The PE24111 expands pSemi's portfolio of two-stage buck regulators that target applications requiring high efficiency in a low-profile form-factor (<1.2-mm) applications. The device consists of a two-phase interleaved charge pump followed by an interleaved buck regulator stage. This combination greatly reduces the dependency on inductance for high efficiency solutions in small-footprint and height-constrained form-factors.

The output voltage is selected with external feedback resistors or by an external DAC and can be adjusted between 0.35 and 0.85 V. This makes the PE24111 well suited for stepdown dc-dc converter solutions for low-profile point-of-load regulators (POLs), high-density, optical transceiver modules, core supplies, ASICs, and FGPAs. To achieve higher power delivery, the PE24111 can be connected in parallel—up to four devices—with synchronization capability (see the figure, left diagram).

The PE25213 is an ultra-high efficiency charge pump that is configurable to divide down an input voltage by two or three and delivers up to 10 A with peak efficiency up to 99%. The device uses pSemi's patented adiabatic or lossless switching architecture to maximize efficiency and reduce solution size.

The PE25213 supports an input voltage range of 5.7 V to 15 V in divide-by-2 mode and 8.4 V to 15 V in divide-by-3 mode. It is primarily used as a front-end converter to convert a two- or three-cell battery input to a 1 to 1.5S output for downstream regulator to improve overall system efficiency and extend run time (see the figure, right diagram).

The PE25213 also offers a unique auto-switch mode to change the divide-down ratio during operation to avoid a downstream under-voltage lockout (UVLO) event at heavy system loading during low battery condition. Using proprietary technology, the converter performs "glitchless" transition between the two divide-by ratios.

The PE25213 comes in a 4.545-mm × 2.715-mm 47-pin WLCSP package. The pinout is specially designed to be fully compatible with Type III PCB design to reduce system cost. It targets 2 and 3S battery input systems such as laptop and 12-V input systems such as datacenter and networking applications. The PE24111 and PE25213 are available for sampling now. For more product information, see the PE24111 product page, and the PE25213 product page or contact sales@psemi.com.

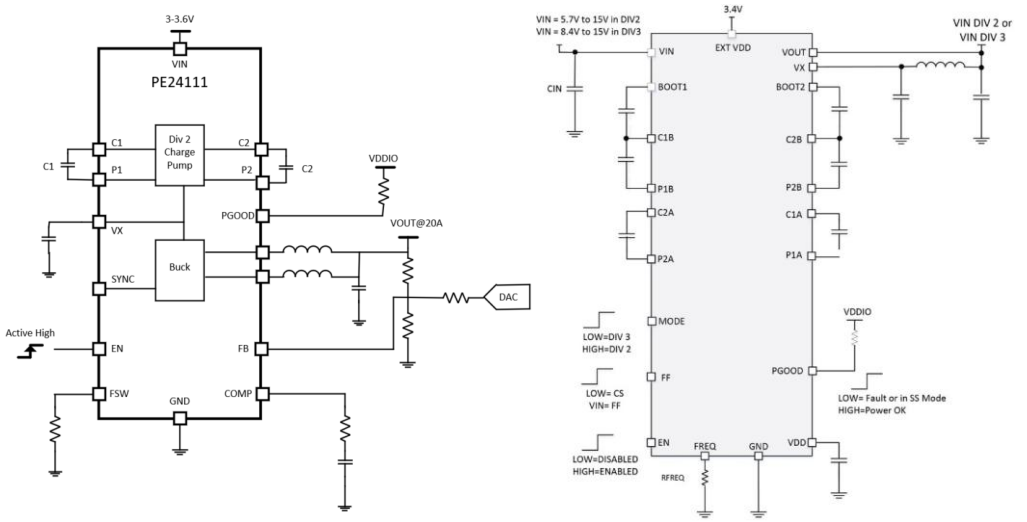

Fig. 1. The PE24111 (left) achieves extremely low height and compact footprint by using an innovative two-stage design that combines a capacitor divider charge pump followed by a dual-phase buck regulator. The PE25213 (right) is a user selectable divide-by-2 or 3 charge pump capacitor divider IC with integrated FETs. It is capable of delivering up to 10 A of output current with peak efficiency of 99%. The choice of divider ratio of 2 or 3 enables the regulator to convert two-cell or three-cell lithium platforms into one-cell platform in mobile computing application. A dynamic switch over function prevents downstream VRs from going into UVLO in a low three-cell battery condition.