

Flyback Switcher ICs Enable Compact Mobile Chargers

[Power Integrations'](#) InnoSwitch4-CZ high-frequency, zero voltage switching (ZVS) flyback switcher ICs incorporate a robust 750-V primary switch using Power Integrations' PowiGaN technology and a novel high frequency active clamp flyback controller to facilitate a new class of ultra-compact chargers suitable for phones, tablets, and laptops. The first consumer devices based on InnoSwitch4-CZ devices were introduced recently by Anker, which is using PI's chips in its 30-, 45- and 65-W USB-C Nano II chargers.

Balu Balakrishnan, CEO of Power Integrations said, "The introduction of the InnoSwitch4-CZ family of ICs marks a significant milestone for GaN technology. PowiGaN switches, in conjunction with our active clamp solution – ClampZero, enable a highly efficient design and an extremely compact form-factor. We're pleased to have worked closely with the Anker team to bring this new class of mobile charger to market."

Steven Yang, CEO at Anker added, "We are excited to work with Power Integrations as their exclusive launch partners for their InnoSwitch4 chipsets. The InnoSwitch4-CZ was a natural choice for Anker's new Nano II series of USB-C chargers. Its outstanding levels of integration and efficiency are key to the Nano II series' extremely compact design."

In addition to the 750-V GaN power switch, members of the InnoSwitch4-CZ family incorporate primary and secondary controllers, a ClampZero interface, synchronous rectification, and safety-rated feedback in a single, compact InSOP-24D package (see the figure). A steady-state switching frequency of up to 140 kHz minimizes transformer size, further increasing power density.

In contrast with older active clamp flyback approaches, the InnoSwitch4-CZ and ClampZero combination provides up to 95% efficiency and maintains very high efficiency across variations in line voltage, system load and output voltage, according to the company. This is achieved with variable frequency asymmetrical control of the active clamp with intelligent zero-voltage switching, enabling both discontinuous and continuous conduction modes of operation, greatly enhancing design flexibility and maximizing efficiency across the entire operating envelope.

The flyback switcher ICs also enable exceptional CV/CC accuracy, independent of external components, and consume less than 30 mW no-load including line-sensing safety and protection features. Targeting high efficiency compact USB PD adapters, high-density flyback designs up to 110 W and high-efficiency CV/CC power supplies, InnoSwitch4-CZ ICs provide variable output voltage and constant current profiles. Devices are fully protected featuring auto-restart or latching fault response for output overvoltage and undervoltage protection, multiple output undervoltage fault thresholds and latching or hysteretic primary overtemperature protection.

A technical overview video of the InnoSwitch4-CZ and ClampZero devices is available [here](#). For more information, see the InnoSwitch4-CZ [page](#). The InnoSwitch4-CZ ICs are priced at \$3.85 per unit in 10,000-unit quantities.

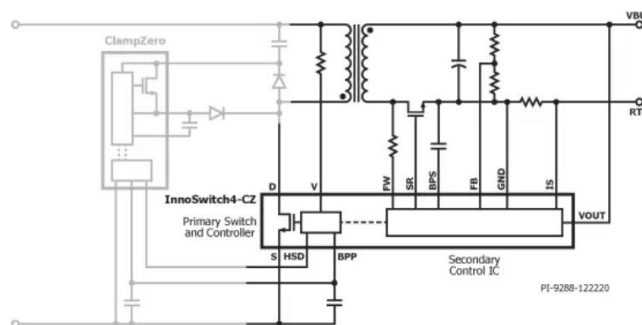


Figure. InnoSwitch4-CZ, an offline CV/CC ZVS flyback integrated switcher IC with a 750-V PowiGaN switch, active clamp drive and synchronous rectification, pairs with the company's ClampZero Active Clamp IC to improve the efficiency of flyback power converters, particularly those requiring a compact form-factor. The InnoSwitch4-CZ family incorporates primary and secondary controllers and safety-rated feedback into a single IC. The combination of InnoSwitch4-CZ with ClampZero greatly reduces system and primary switch losses, allowing for extremely high power densities. InnoSwitch4-CZ also incorporates multiple protection features.