News Release

ON Semiconductor Announces Innovative New USB-C™ PD 3.0 Controllers with Advanced Feature Sets and Enhanced Efficiency

New USB-C Power Delivery (PD) 3.0 Devices provide market-leading solutions for power adapter and battery charger applications

PHOENIX, Ariz. – Feb. 26, 2020 - ON Semiconductor (Nasdaq: ON), driving energy efficient innovations, has announced a pair of novel devices that are fully compliant with the USB-C PD 3.0 standard. The FAN6390 adaptive charging controller brings ease of integration of the USB-C PD 3.0 programmable power supply (PPS) standard into systems while the NCP12601 is a highly integrated multi-mode flyback controller for rugged, high-performance, offline power supplies such as adapters. The new devices greatly simplify USB-C PD 3.0 based power supply designs, provide higher level integration and reliability, and enable higher power density design for applications such as smartphone chargers, AC-DC power adapters and auxiliary / housekeeping power supplies for various electronic devices.

ON Semiconductor's continued leadership in power management and USB-C PD solutions culminates with this first integrated synchronous rectifier and autonomous controller product for ease of secondary side system design. The FAN6390 is the first in a family of USB-C PD 3.0 with PPS controllers to be offered by ON Semiconductor. "The trend of higher capacity batteries requiring the same or faster charging times is accelerating the adoption of USB-C PD. The family of FAN6390 products enables an impressive level of integration which will enhance industrial design and improve power density for travel adapters," states Scott Haddow, Senior Director and General Manager. The optimized architecture provides state machine based operation for all features required for PD 3.0 and PPS functionality lending to ease of end product design and manufacturing. The FAN6390 yields high efficiency through industry leading synchronous rectifier FET driving techniques. The FAN6390 can also provide designers with flexibility and programmability through trim optioning.

The PPS constant current / constant voltage (CC/CV) requirements were meticulously addressed through an internal, high resolution 10-bit DAC that is fully compliant with the USB-C PD 3.0 requirements. ON Semiconductor further assists ease of designer integration by providing fully verified reference designs. Adding further to ON Semiconductor's extensive USB-C PD 3.0 portfolio is the NCP12601 variable frequency controller that combines multi-mode continuous current mode or discontinuous current mode (CCM / DCM) operation with valley switching to suit a wide variety of load conditions. This approach provides superior efficiency when compared to traditional fixed frequency PWM controllers. The addition of valley lockout and a proprietary quiet skip feature enhance the noise performance significantly to market-leading levels while frequency jitter provides an improved EMI signature.

Meeting the USB-C PD 3.0 standard can be challenging for designers and the NCP12601 includes a unique auto-tune and dual-level overcurrent protection (OCP) that enables the OCP features

necessary to meet the requirements of the standard. Along with this, low loss VCC bias enables the wide output voltage range without additional external circuitry or complex transformer design.

Adjustable over power protection provides slope compensation that ensures a flat output power level regardless of the operating input voltage through the addition of a single external resistor. Other protection features include auto-recovery or latched short circuit protection that is pre-short compatible and over temperature protection (OTP) that can utilize a dedicated pin or be combined on the versatile CS pin.

Additional resources & documents:

Landing page: USB-Type C

Video: PWM Controller Optimized for USB-C PD | NCP12601

White paper: FAN6390 Highly Integrated Secondary-Side Adaptive USB Type-C Charging Controller with USB-PD