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STMicroelectronics' new chip boosts energy efficiency in consumer electronics, with potential to save almost 100 terawatt-hours worldwide

ST-ONE power-supply controller combines with ST's MasterGaN technology in a record-breaking laptop/smartphone charger design with energy recovery

Geneva, June 20, 2022 – STMicroelectronics (NYSE: STM), a global semiconductor leader serving customers across the spectrum of electronics applications, is enhancing the sustainability of personal computing with its latest innovation. The new chip, called **ST-ONE**, sets to increase energy efficiency in a wide variety of ac-dc adapters, fully compliant with USB-PD 3.1, including laptop and smartphone chargers. New adapters built with ST-ONE can reduce both CO₂ emissions and the quantity of plastics consumed.

The new ST-ONE chip pairs with ST's MasterGaN power output modules based on advanced gallium-nitride (GaN) semiconductor technology. The GaN chips enable significant energy savings and smaller equipment dimensions.

Although laptops provide optional power-saving settings, every machine can save even more energy if equipped with a more efficient power adapter. This improves the environmental profile and CO₂ footprint. The ST-ONE chip is optimized for controlling power supplies that recover energy normally dissipated as heat from conventional circuits. It also simplifies circuit design with a significant reduction in the number of components, enabling this type of power supply to become more robust, affordable and more widely adopted throughout the market.

*"If every power adapter achieved at least 1% higher efficiency, which is possible using the **ST-ONE** energy-recovery circuit design, the world could save about 93 terawatt-hours of energy, equivalent to the output of 15 nuclear plants," commented Domenico Arrigo, Industrial and Power Conversion Division General Manager, STMicroelectronics. "In addition, if one billion chargers worldwide were to use our technology, 0.2 million tons of plastics and raw materials could be saved."*

The reduction in consumption of materials such as plastics is achieved with the increase in so-called power density that enables smaller components to manage a larger power delivery. A high power density also cuts down recycling and environmental costs.

On display at the Embedded World exhibition in Nuremberg, Germany, ST's reference design, **EVLONE65W**, enables a 65-Watt USB-C adapter of the same size and weight (less than 70g in a 37cm³) of a standard 20-Watt smartphone charger to handle the demands of charging a laptop. This unit achieves the world's highest power density, packing more than 1.8 Watts of power per cubic centimetre.

Further technical information

ST-ONE is optimized for designs based on a novel non-complementary active-clamp flyback topology, which allows high power, above 65W, with higher efficiency than other topologies such as the quasi-resonant flyback.

It is the world's first digital controller to integrate a programmable offline power-supply controller based on Arm® Cortex®-M0+ core, a high voltage start-up circuit, a synchronous-rectification controller, and USB Power Delivery (USB-PD) circuitry in one package.

The ST-ONE contains all the peripherals required to control the conversion. USB-PD communication is implemented on the secondary side and reinforced galvanic isolation is provided to let the primary and the secondary side circuits communicate while respecting safety requirements.

Also using the MasterGaN integrated power stage with advanced wide-bandgap transistors and optimized drivers, adapters operate at elevated switching frequencies and thus permit smaller-size magnetic components to maximize power density.

The ST-ONE comes with 64kByte of embedded flash for designers to customize both the USB-PD protocol and the power-conversion stage.

The ST-ONE controller comes with USB-PD 3.1 PPS certified firmware pre-loaded into the flash memory, presenting users with a turnkey solution for designing standard applications.

ST-ONE is in production and available now, in a SSOP36 package, from \$3.70 for orders of 1000 pieces.

Please visit www.st.com/st-one

About STMicroelectronics

At ST, we are 48,000 creators and makers of semiconductor technologies mastering the semiconductor supply chain with state-of-the-art manufacturing facilities. An integrated device manufacturer, we work with more than 200,000 customers and thousands of partners to design and build products, solutions, and ecosystems that address their challenges and opportunities, and the need to support a more sustainable world. Our technologies enable smarter mobility, more efficient power and energy management, and the wide-scale deployment of the Internet of Things and connectivity. ST is committed to becoming carbon neutral by 2027. Further information can be found at www.st.com.

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