

# Energy Savings and Low Cost Are Our Goal

Interview with Doug Bailey, Vice President of Marketing, Power Integrations

During the 11th China International Power Supply Show held in Shenzhen, China, Mr. Doug Bailey, Vice President of Marketing for Power Integrations, talked to *PSD China* about Power Integrations' two newly introduced IC families, the LinkSwitch-LP family for designing the world's simplest handset chargers, and the LinkSwitch-XT family, targeted for power supply applications where tight output is required. These ICs are the simplest and energy efficient solutions that designers can choose for designing their power supplies.



Doug Bailey, Vice President of Marketing, Power Integrations.

This article is based on an interview with Mr. Doug Bailey.

## Fewer components means cost savings

"Energy efficient, low power chargers using an IC from the LinkSwitch-LP family require just 14 components—the lowest component count available for energy efficient switched-mode chargers," Mr. Bailey told *PSD China*.

He said that this new IC family is mainly for ultra low cost battery charger applications. It is the simplest and most energy efficient solution, being capable of entire replacement of the unregulated line frequency transformers. These chargers are commonly sold with products such as cell phones, cordless phones, portable audio players, shavers and other personal electronics, and therefore are extremely price sensitive.

This family of products with its cost advantage is enabled by the simplicity of circuit design offered by a number of Power Integrations innovations, including Clamless™ design methodology utilizing proprietary IC trimming technology and innovative transformer construction

techniques to eliminate RCD clam circuitry and control of charger output voltage and current by primary circuitry to eliminate optical coupler and relevant components. Other innovations include an integrated frequency jitter and unique Filterfuse™ input stage to achieve EMI filtering with a single capacitor and E-Shield™ transformer design to eliminate the need for a Y capacitor.

Hysteretic thermal shutdown feature removes the need for thermal fuses commonly used in transformer based design or additional components associated with RCC designs. In addition, EcoSmart® energy efficiency technology enables compliance with all current and proposed energy standards worldwide and a universal input range enables designs that can be used worldwide. Plus, an auto restart feature reduces output power by more than 85% when short circuit and open loop failures occur and a simple ON/OFF control scheme eliminates the need for loop compensation. On top of that, a high bandwidth provides fast no-overshoot

and outstanding transitive load response. All these features make it possible to reduce system cost and increase efficiency.

"Chargers employing LinkSwitch-LP are vastly simpler than discrete designs, which typically contain dozens of components," said Bailey. "LinkSwitch-LP also offers integrated energy efficiency and safety features that are either unavailable in discrete designs or require additional components and design effort." He said that LinkSwitch-LP family features a 700-V power MOSFET integrated with control and fault protection circuitry on a single silicon chip. The chip operates across the universal input range of 85 to 265 VAC, and achieves an extremely low no-load power consumption of less than 150 mW at 265 VAC. The simple ON/OFF control scheme of LinkSwitch-LP provides constant efficiency even at light loads, enabling easy compliance with recent efficiency standards, and offer excellent efficiency as compared with designs using linear transformers. Figure 1 shows a typical application of LinkSwitch-LP.

The lowest system cost and advanced safety features of LinkSwitch-LP family make it a switch device with impressive performance and the lowest count of external components, superior to linear transformer and RCC designs, and the simplest energy efficient replacement for linear transformer based chargers. Its typical applications include battery chargers for handsets or cordless phones, PDAs, power tools, MP3 players or portable audio equipment and shavers, and standby and auxiliary power sources.

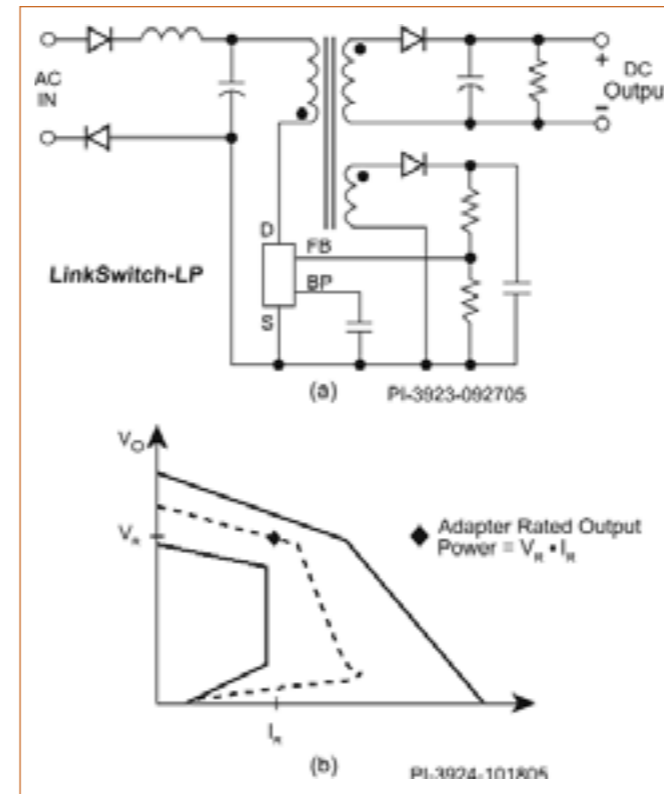


Figure 1. The typical application circuitry of LinkSwitch-LP.

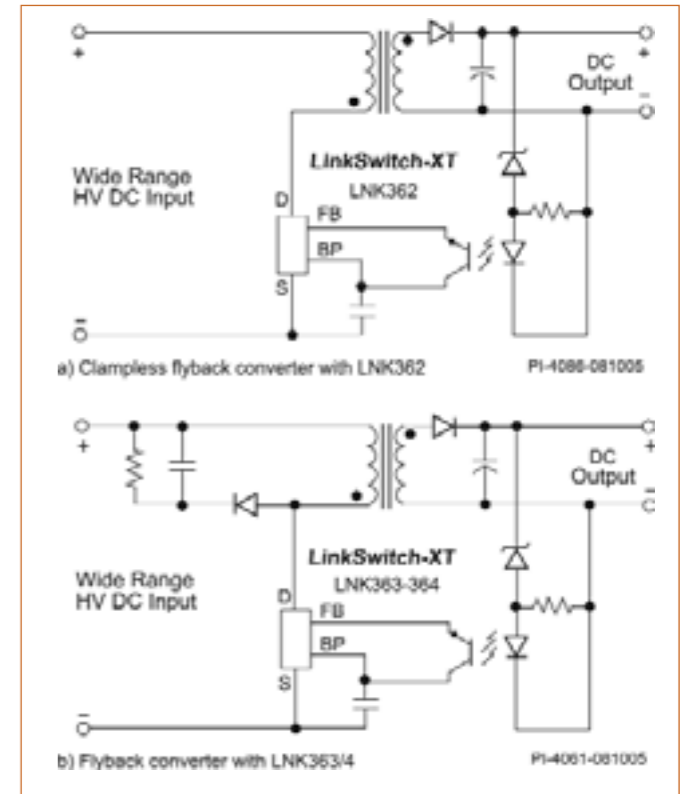


Figure 2. The typical application circuitry of LinkSwitch-XT.

## Compliance and Accuracy

Mr. Bailey said that the IC products for low power supply applications are growing rapidly. Power Integrations, therefore, continues to expand its high efficient and low power IC families for charger and adapter applications. The newly introduced LinkSwitch-XT is targeted for applications in which tight regulation of output voltage and current are key design priorities. The new ICs support universal input (85 VAC to 265 VAC) range chargers and adapters with output levels of up to 4 watts and may be used in open frame applications up to 9 watts (230 VAC).

He said that the simple ON/OFF control scheme of LinkSwitch-XT enables a high level of efficiency even at light loads, and reduces no-load consumption to less than 300 mW. The use of a transformer with a bias winding further reduces no-load power consumption to less than 50 mW.

LinkSwitch-XT features a 700-V power MOSFET together with control circuitry on a single silicon die. Its integrated

safety and reliability features include hysteretic thermal shutdown for over temperature protection, as well as auto restart for output short circuit and open loop protection. It offers replacement of low efficient power supplies using linear line frequency transformers. The LinkSwitch family offers a variety of parts to meet a range of power levels and design parameters at universal input voltage: LinkSwitch-LP family (LNK562-564) for ultra low cost, loosely regulated power supplies up to 3 W; LinkSwitch (LNK500-501, LNK520) for loosely regulated power supplies up to 3.5 W; LinkSwitch-XT (LNK362-364) for tightly regulated power supplies up to 6 W; and the LinkSwitch-TN (LNK302-306) for no-isolated buck converters with output current up to 360 mA. Typical applications include chargers for handsets or cordless phones, PDAs, digital still cameras, MP3 players or portable audio players and shavers, and power supplies for home appliances, industrial equipment as well as measurement instruments. Figure 2 is a typical application circuitry of LinkSwitch-XT.

"With the introduction of LinkSwitch-XT, we now have a complete portfolio of linear replacement," Mr. Bailey said. "The designers can choose his desired output characteristics and be guaranteed an energy efficient design with the lowest possible cost. We have a LinkSwitch that fits every common charger and adapter application."

"Power Integrations' breakthrough technology enables compact, energy efficient power supplies in a wide range of electronics products, including both AC-DC and DC-DC converters. This company's EcoSmart energy efficiency technology dramatically reduces energy waste, and has saved consumers and businesses around the world an estimated more than \$1 billion on their electricity bills since its introduction in 1998."

—Liu Hong, editor, *Power Systems Design China*.

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