

Using SP6685 to Provide a Tiny, Efficient, High Power LED Camera Flash Solution

Introduction

Feature sets for new cell phones and PDAs are expanding with the latest models including built-in cameras and video cameras. Today's cell phones now offer megapixel resolution cameras which then necessitate more sophisticated flash technology. At the same time, consumers demand increasingly smaller form factors and longer battery life, making the circuit design challenging.

Xenon flash lamps could provide high lumen flash capability but are not used in cell phones and PDAs because they are too bulky. LED solutions are more suited to the form factor requirements of cell phones and PDAs, not only for their small size but also because they operate in "torch" or video mode. Until recently, LED solutions were only popular in sub 1 megapixel digital cameras, but improvements in LED technology made them viable solutions for 1 megapixel and higher cell phone cameras.

Sipex offers the highest performance, extremely compact solution for driving the latest high light output LEDs, including Lumileds Luxeon Flash LEDs. Luxeon LEDs are up to 12 times brighter than conventional LEDs and are ideal for applications in cell phones, PDAs, digital still cameras and digital camcorders.

Requirements for LED Drivers in Portable Electronics

While switcher based DC-DC converters offer the efficiency and small size required for high current LED drivers used in battery operated portable equipment, they have one fundamental drawback. Traditional switchers are designed to provide a regulated voltage for varying load currents. However, LEDs must be driven with a constant current to generate a predictable light output. If a typical switcher were to be used for such an application, it would require using an opamp and additional circuitry, which is undesirable in space constrained applications. Besides the constant current requirement, the solution must also be able to either step-up or step down the input voltage from the Lithium-ion battery depending on where the Li-ion battery is in its discharge cycle.

The SP6685 Charge Pump Solution

The SP6685 operates in either the 1x or 2x mode, providing constant current to the LED with either a step-up or step-down in voltage. The SP6685 eliminates the need for the inductor because of the charge pump operation. With an industry leading switching frequency of 2.4MHz, the SP6685 offers the smallest solution

size. The device is available in a space saving 10 pin DFN package and requires only 3 small capacitors and 2 small resistors (0603 and 0402 size), making it the ideal choice for small form factor applications

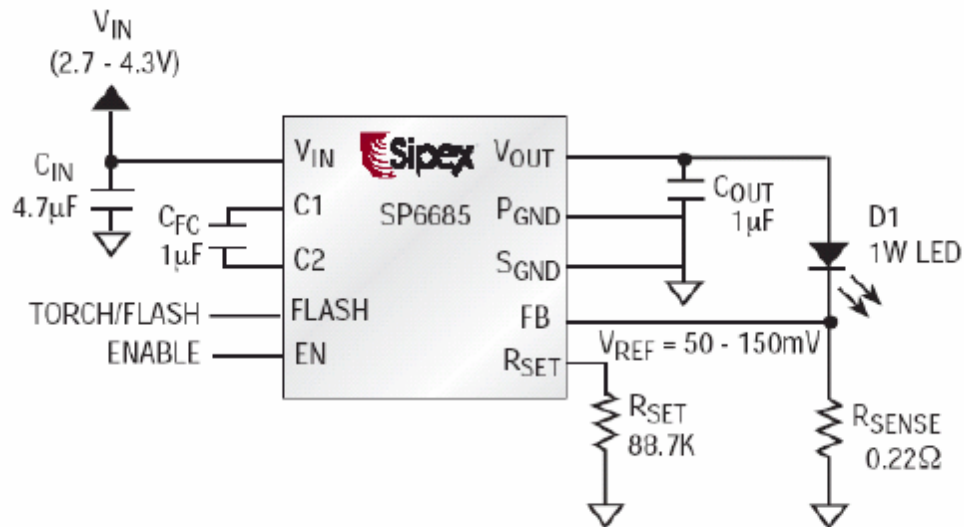


Figure 1. Small, Efficient LXCL-PWF1 Luxeon Flash Driver using the SP6685.

This charge pump based design eliminates the need of an inductor and requires just 5 small external components to realize a 700mA solution in flash mode and 200mA in torch mode.

The SP6685 delivers up to 92% efficiency thanks to a proprietary feature that enables the IC to automatically transition from the buck mode to the boost mode based on the battery input voltage. This also ensures the current does not depend on the LED forward voltage. An extremely low output equivalent resistance and reference voltage allow for the highest white LED flash brightness and an ultra low dropout voltage. The SP6685 also features a very low shutdown current, an automatic soft-start mode to limit inrush current, as well as over current, over voltage and thermal-shutdown control.

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Live Technical Chat: <http://www.geolink-group.com/sipex/>
Sipex Application Notes: <http://www.sipex.com/applicationNotes.aspx>



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