

## LCD Backlight Control

### Introduction

Cell phones and other mobile products increasingly incorporate color LCD panels. Because these devices run on battery power with finite battery life, it is becoming more common to use a white LED that can emit bright light for backlighting while consuming little power. As a result, world demand for white LEDs is rapidly increasing. Monolithic Power Systems and Actel are meeting these needs by bringing to market a Fixed Frequency LCD Backlight Control System that realizes low-power consumption, high efficiency, and high precision.

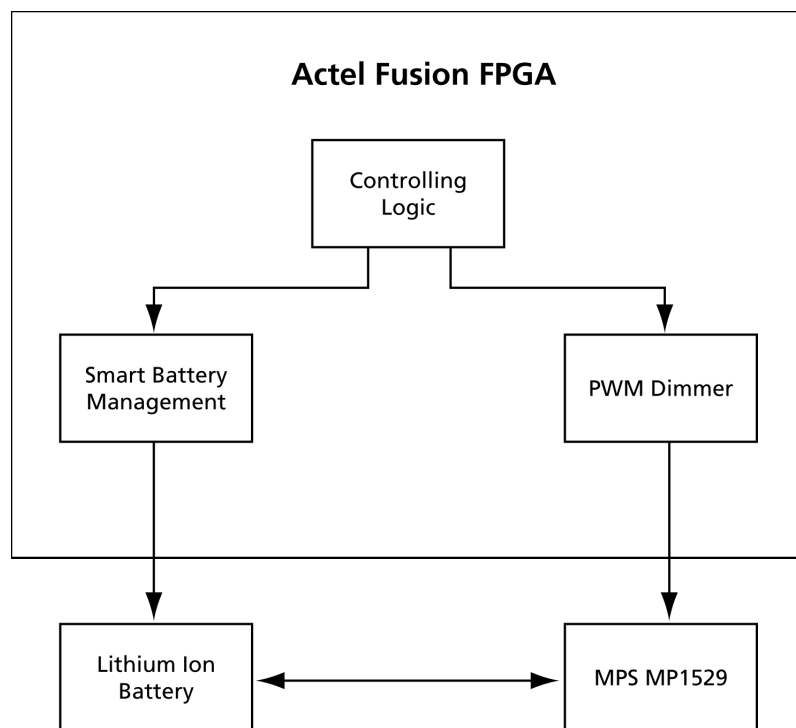


Figure 1 • Fixed Frequency LCD Backlight Control System

### Monolithic Power Systems MP1529 Fixed Frequency White LED Driver

The MP1529 is a step-up converter plus three current sources for driving two 6-LED backlight strings to 30 mA and a 4-LED flash string to 150 mA from a single Lithium-Ion battery. Three current sources drive in three modes. In backlight mode, two strings of 6 LEDs are lit with up to 30 mA of current. In the backlight plus preview mode, the 4 flash LEDs are lit with the preview current. In flash mode, the flash LEDs are lit with up to 150 mA of current and the two backlight strings are turned off. There are three pins to independently set the backlight, preview, and flash current.

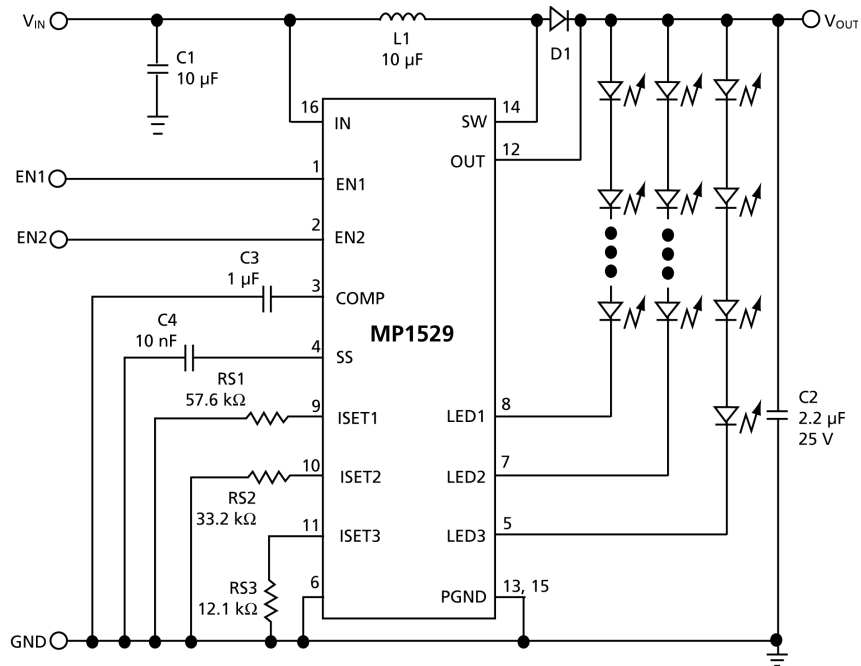


Figure 2 · Typical Application Circuit

## Actel Fusion™ Mixed-Signal FPGAs

Actel provides all the benefits of a single-chip, Flash-based FPGA in Fusion devices, plus a configurable bit analog to digital converter, analog inputs, large embedded Flash memory, and numerous control features for power management, thermal management, and other applications.

## Actel Fusion with MPS Backlight Control

Actel Fusion FPGAs offer a one-chip solution that supports integrated Smart Battery management and PWM generation for LCD backlighting control. The integrated features of Fusion also provide greater flexibility for miniaturization of portable end products. When used in conjunction with its robust power management capabilities, the Fusion FPGA supports the designer's need for low power (sleep mode) while maintaining level 0 live at power-up.

Figure 3 on page 3 illustrates the block diagram in which the PWM signal is generated through a PWM IP and passed to an appropriate I/O Bank for external interfacing with MP1529.

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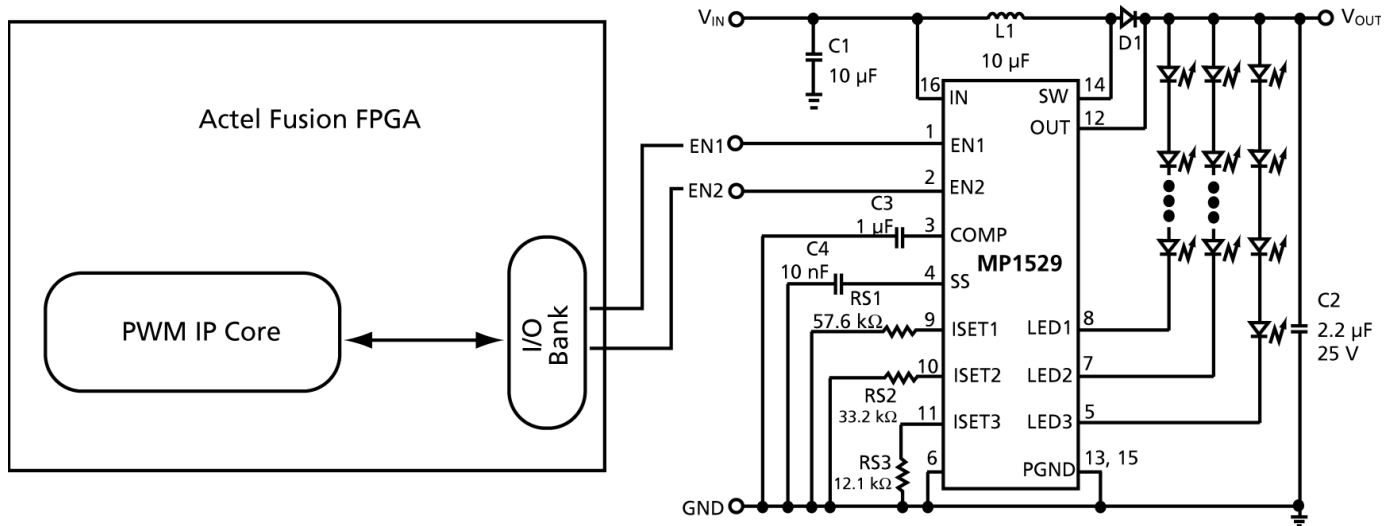


Figure 3 • Fixed Frequency White LED Dimmer

## Conclusion

Actel Fusion has all of the features needed to implement a Fixed Frequency LCD Backlight Control System. The reprogrammable nature of the FPGA fabric enables designers to freely choose appropriate control logic. The embedded Flash memory and Flash-based FPGA fabric enable a simple single-chip solution. The user interface and IP allow customers to implement their applications simply and quickly. With all of these features tied to Flash FPGA logic, the Fixed Frequency LCD Backlight Control System can be completely customized by the user, offering flexibility unmatched by any other solution, all at a competitive price.