Design Solution 11

SP6682HV Boost from Li-ion input to 9 WLED output at 20mA

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Part Number: SP6682EU

Application Description: Powering LED display backlight

Electrical Requirements:

Input Voltage	3.0V – 4.2V
Output Voltage	29V – 31V (9 White LEDs)
Output Current	20mA

Circuit Description:

This circuit has been designed to provide 29V to 31V output at 20mA for powering 9 White LEDs in series for LCD backlight applications. High output voltage and low cost dictated the choice of the controller and external components. In order to reduce cost, a non-synchronous boost regulator topology was chosen. The SP6682 is a charge pump regulator that is being used instead as a boost DC/DC controller to drive an N-channel MOSFET for charging the inductor in the discontinuous mode. As a non-synchronous boost, a second MOSFET driver is not needed and instead a small inexpensive MBR0540 Schottky diode is used in the discharge phase to charge the output capacitor. An output over-voltage protection circuit is an option provided by simply adding a Zener diode and resistor. High switching frequency (600 kHz) allows the use of a small 3.3uH inductor and two 1uF ceramic output capacitors.

This report includes the application schematic complete with component part numbers and figures 1-3 illustrating electrical performance of the design.

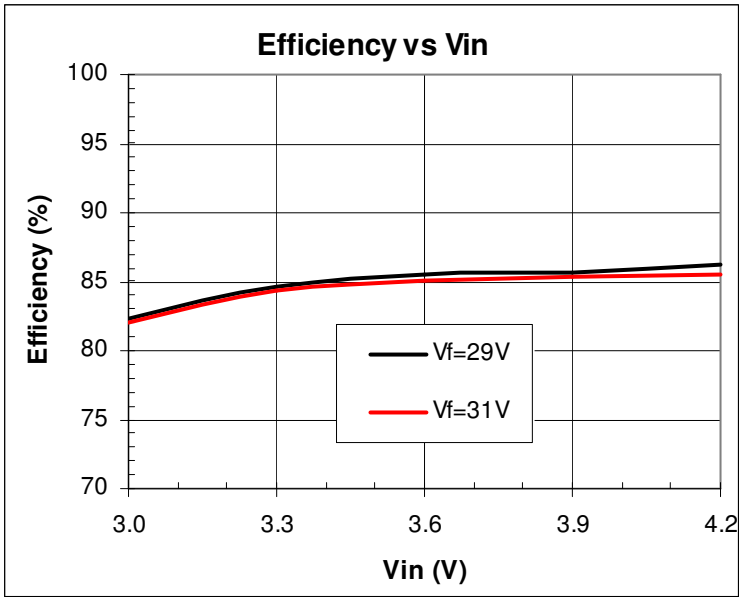

Figure 1. Efficiency Graph

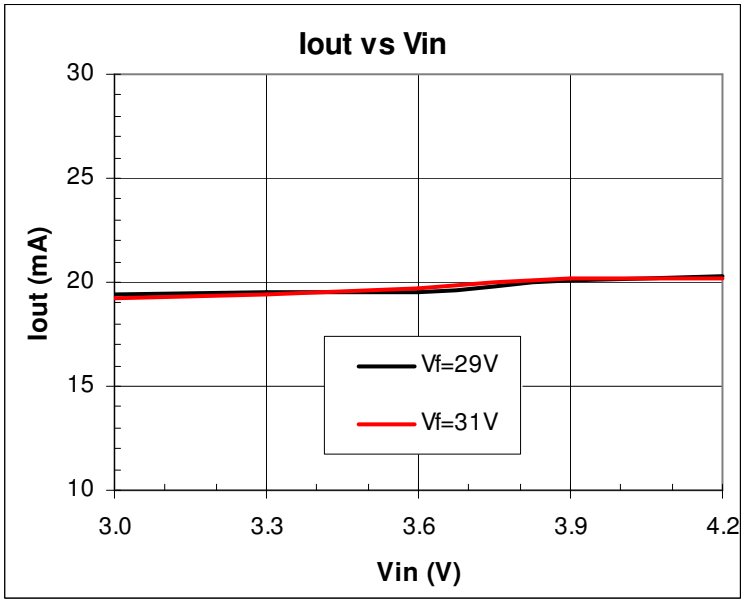

Figure 2. Output Current Graph

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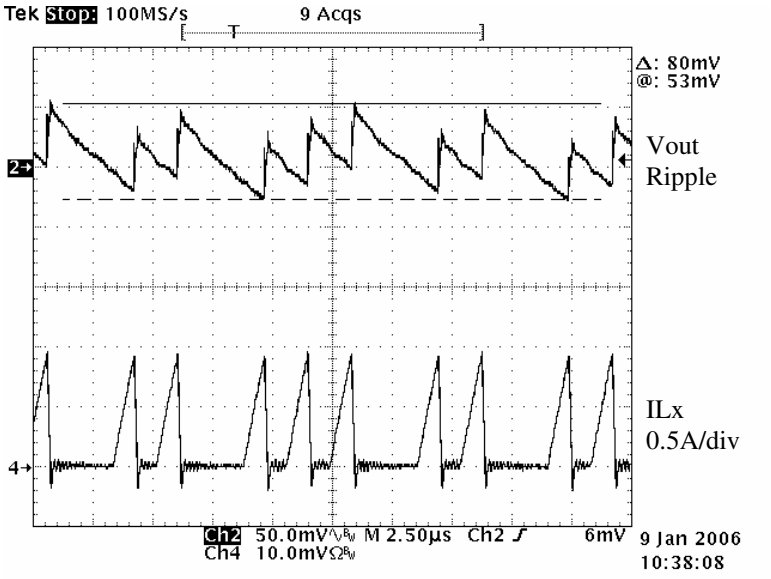

Figure 3. Output Noise and Inductor Current

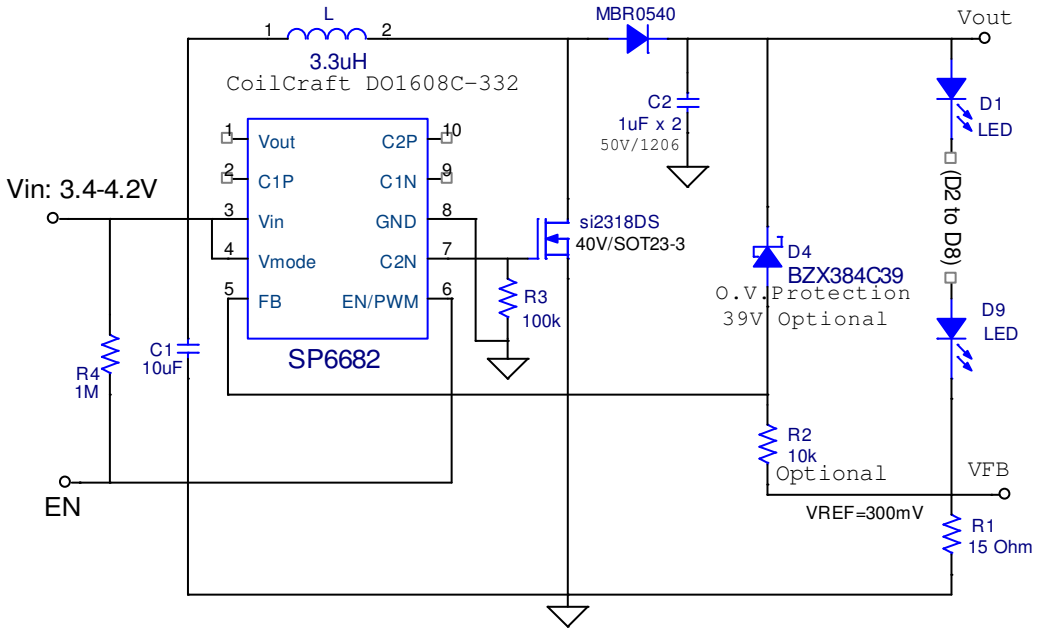

Figure 4. Application Schematic