DC376 Introduction

Description

Demonstration Circuit DC376 is a step-down (buck) regulator using the LTC®1701B. The combination of the LTC1701B's tiny SOT-23 package and high switching frequency results in a highly efficient application in a small board space. It is ideal for cell phones and other portable electronics operating from one Li-Ion cell or three to four NiCd or NiMH cells. DC376 operates from a 2.5 to 5.5V input voltage range and is capable of providing 0.5A with a jumper-selectable output voltage of 1.5/2.5/3.3V-ADJ.

This board highlights the capabilities of the LTC1701B, which uses a current mode, constant off-time architecture to control an internal P-channel power MOSFET at about 1MHz. This high performance power supply occupies less than 0.3 square inches and has low output voltage ripple and fast transient response.

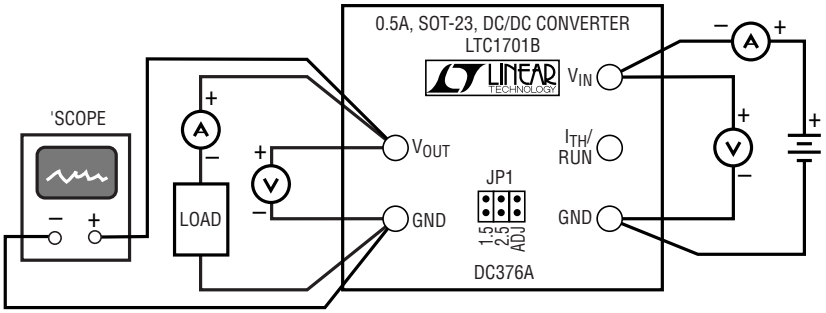
At low output currents, the LTC1701B automatically skips cycles to maintain a high operating frequency and to minimize output voltage ripple. The part can be shut down by pulling the I_{TH}/RUN pin low, further reducing the supply current to less than 1μA.

In dropout, the P-channel MOSFET is turned on continuously (100% duty cycle), providing low dropout operation with $V_{OUT} \cong V_{IN}$, thereby maximizing battery life.

Quick Start Guide

Demonstration Board DC376 is easy to set up for evaluation of the LTC1701B. Please follow the procedure below for proper operation:

1. Move jumper JP1 to the appropriate position for the required output voltage. For voltages other than the preset values, make sure you install the calculated resistor at the pad provided for R7.
2. To shut down the circuit, connect the I_{TH}/RUN terminal to ground. When the part is not shut down, be careful not to add excessive capacitance to the I_{TH}/RUN pin, since it affects the transient response.
3. Connect the input power supply to the V_{IN} and GND terminals.
4. Connect the load between the V_{OUT} and GND terminals. Refer to the connection diagram (Figure 1) for proper measurement equipment setup.



FOR ALTERNATE OUTPUT VOLTAGES, OPTIONAL RESISTOR R7 CAN BE CALCULATED BY:

$$R7 = \frac{R4 \times R3}{\frac{V_{FB}}{V_{OUT} - V_{FB}} \times R4 - R3} \qquad \text{WHERE } V_{FB} = 1.25V$$

Figure 1. DC376A Connection Diagram