DESCRIPTION

Demonstration Circuit 425B is a constant-frequency synchronous Buck-Boost converter using the LTC3440. The input range is from 2.5V to 5.5V, making it ideal for single-cell lithium-ion or three-cell NiCd/NiMH battery applications. This converter provides up to 95% efficiency, much higher than traditional Buck-Boost converters. For 2.5V minimum input voltage, this converter can provide up to 500mA load current.

The output voltage is set at 3.3V. A different output voltage in the range of 2.5V to 5.5V can be obtained by changing one of the feedback resistors. The frequency is set at 1MHz, which is a good trade-off between efficiency and size. The frequency can be modified by changing R6 or by synchronizing to an external clock. In shutdown, the board draws about 2.5µA, where 2µA goes through the 1MΩ pull up resistor (R4) and the IC itself draws less than 1µA.

Design files for this circuit board are available. Call the LTC factory.

LTC is a trademark of Linear Technology Corporation

QUICK START GUIDE

Refer to Figure 1 for the connection diagram and follow the procedure below:

1. Apply a voltage source to the input of the circuit between the V_{IN} and GND terminals. The circuit will start up at input voltage higher than 2.5V.

   **NOTE** Do not apply more than 5.5V to the input.

2. Attach a voltmeter or oscilloscope probe between the V_{OUT} and GND terminals of the circuit to monitor the output. To start the circuit, the shunt at JP1 needs to be put in RUN position.

3. Attach a load to the output. The available output current depends on the input voltage.

![Figure 1. Proper Measurement Equipment Setup](image-url)
PERFORMANCE SUMMARY

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CONDITION</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage Range</td>
<td></td>
<td>2.5V to 5.5V</td>
</tr>
<tr>
<td>Maximum Load Current, Min</td>
<td>$V_{<em>\text{OUT}} = 3.3V, V</em>{_\text{IN}} = 2.5V$</td>
<td>500mA</td>
</tr>
<tr>
<td>Typical Output Ripple</td>
<td>$V_{<em>\text{OUT}} = 3.3V, I</em>{_\text{OUT}} = 500mA$</td>
<td>13mV_{_\text{P-P}}</td>
</tr>
<tr>
<td>Typical Operating Frequency</td>
<td>$R_6 = 62K$</td>
<td>1MHz</td>
</tr>
</tbody>
</table>

TYPICAL PERFORMANCE CHARACTERISTICS

Figure 2. Efficiency vs. Load Current (without External Schottky Diodes)
NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE IN OHMS, 0402.
2. INSTALL SHUNTS ON JP1 AND JP2 PIN 2 AND 3.