DESCRIPTION

Demonstration circuit 1167 is a monolithic step-down DC/DC switching regulator featuring LT3685. The LT3685 can be synchronized over a 250 kHz to 2 MHz range. The demo board is designed for 5V output from a 6.3V to 38V input with transient up to 60V. The wide input range of the LT3685 allows a variety of input sources. The typical sources are automotive batteries, wall adaptors and industrial supplies.

The current mode control scheme creates fast transient response and good loop stability. The gate drive of the internal switch is boosted to a voltage that is higher than the Vin to ensure saturation of the switch. The LT3685’s integrated boost diode reduces the parts count. The RUN/SS pin can be used to set the part in micropower shutdown mode, reducing the supply current to less than 1uA. The RUN/SS pin can also be used to program soft start. In this mode, the RUN/SS pin is driven through an external RC filter to create a voltage ramp on this pin. The soft start function reduces the input current surge during start-up.

The LT3685 datasheet gives a complete description of the part, operation and application information. The data-sheet must be read in conjunction with this quick start guide for demo circuit 1167.

Note: It is best to ground the SYNC pin if the SYNC function is not being used.

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

QUICK START PROCEDURE

Demonstration circuit 1167 is easy to set up to evaluate the performance of the LT3685. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Place JP1 on the RUN position.
2. With power off, connect the input power supply to Vin and GND.
3. Turn on the power at the input.
4. Check for the proper output voltage.

NOTE: If there is no output, temporarily disconnect the load to make sure that the load is not set too high.

5. Once the proper output voltage is established, adjust the load within the operating range and observe the

Performance Summary for Step-down Switching Regulator (T_A = 25°C)

<table>
<thead>
<tr>
<th>PARAMETER FOR BUCK REGULATOR</th>
<th>CONDITION</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Input Voltage</td>
<td>6.3V</td>
<td></td>
</tr>
<tr>
<td>Maximum Input Voltage</td>
<td>38V</td>
<td></td>
</tr>
<tr>
<td>Output Voltage (V_out)</td>
<td>5V +/- 4%</td>
<td></td>
</tr>
<tr>
<td>Maximum Output Current</td>
<td>2A</td>
<td></td>
</tr>
<tr>
<td>Typical Switching Frequency</td>
<td>550kHz</td>
<td></td>
</tr>
</tbody>
</table>

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output voltage regulation, ripple voltage, efficiency and other parameters.

6. An external clock can be added to the SYNC pin when SYNC function is used. See synchronization section in the datasheet for details.

Figure 1. Proper Measurement Equipment Setup

Figure 2. Measuring Input or Output Ripple