DEMON CIRCUIT 1345
QUICK START GUIDE
WIDE INPUT VOLTAGE RANGE
NO RSENSE STEP-DOWN DC/DC CONVERTER
LTC3879EMSE

DESCRIPTION

Demonstration circuit 1345 is a wide input voltage range, no Rsense step-down dc/dc converter featuring the LTC3879EMSE. Its output voltage is 1.2V with a load rating of 12A and the input voltage range is 4.5V to 34V.

The fixed on-time valley current mode architecture of the LTC3879EMSE provides a very fast load step response. Other features of the board include a RUN pin, a TRACK pin, a PGOOD pin and a MODE jumper to select either CCM or DCM operation at light load.

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

Table 1. Performance Summary ($T_A = 25°C$)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CONDITION</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Input Voltage</td>
<td></td>
<td>4.5V</td>
</tr>
<tr>
<td>Maximum Input Voltage</td>
<td></td>
<td>34V</td>
</tr>
<tr>
<td>Output Voltage $V_{OUT}$</td>
<td>$V_{IN} = 4.5V$ to $34V$, $I_{OUT} = 0A$ to $12A$</td>
<td>1.2V ±2%</td>
</tr>
<tr>
<td>Maximum Output Current</td>
<td></td>
<td>12A</td>
</tr>
<tr>
<td>Typical Output Voltage Ripple</td>
<td>$V_{IN} = 12V$, $I_{OUT} = 12A$ (20MHz BW)</td>
<td>20mV_{p-p}</td>
</tr>
<tr>
<td>Nominal Switching Frequency</td>
<td>$V_{IN} = 12V$, $I_{OUT} = 12A$</td>
<td>300kHz</td>
</tr>
<tr>
<td>Efficiency (see Figure 3 for efficiency curves)</td>
<td>$V_{IN} = 12V$, $I_{OUT} = 12A$</td>
<td>90% Typical</td>
</tr>
</tbody>
</table>

QUICK START PROCEDURE

Demonstration circuit 1345 is easy to set up to evaluate the performance of the LTC3879EMSE. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Place jumpers in the following positions:
   - RUN ON
   - MODE CCM

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 voltages.
   - $V_{out} = 1.176V$ to $1.224V$

5. Once the proper output voltages are established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

NOTE: When measuring the output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. See Figure 2 for proper scope probe technique. Short, stiff leads should be soldered to the (+) and (-) terminals of an output capacitor. The probe’s ground ring needs to touch the (-) lead and the probe tip needs to touch the (+) lead.
Figure 1. Proper Measurement Equipment Setup

Figure 2. Measuring Output Voltage Ripple
Fsw = 300kHz, CCM

Parameters:
- QT = Infineon BSC093N04LSG
- QB = Infineon BSC035N04LSG
- L = Wurth 744325072
- 0.72uH, DCR=1.3mΩ +/- 10%
- Ron = 576kΩ

Figure 3. Typical Efficiency Curves
NOTE:
Only apply load from E8 to E10.