DEMO MANUAL DC2249B

LTM4622
Ultrathin Dual 2.5A Step-Down μModule Regulator

DESCRIPTION

Demonstration circuit 2249B features the LTM®4622 μModule® regulator, a tiny low profile high performance high efficiency dual step-down regulator. The LTM4622 has an operating input voltage range of 3.6V to 20V and is able to provide an output current of up to 2.5A for each channel. Each output’s voltage is programmable from 0.6V to 5.5V. The LTM4622 is a complete DC-DC point of load regulator in a low profile thermally enhanced 6.25mm × 6.25mm × 1.82mm LGA package requiring only a few input and output capacitors. Output voltage tracking is available through the TRACK/SS pin for supply rail sequencing. External clock synchronization is available through the SYNC/MODE pin. For high efficiency at low load currents the MODE pin jumper (JP3) selects the Burst Mode® option for operation in less noise sensitive applications. The LTM4622 data sheet must be read in conjunction with this demo manual for working on or modifying demo circuit 2249B.

Design files for this circuit board are available.

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PERFORMANCE SUMMARY

Specifications are at Ta = 25°C

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage Range</td>
<td></td>
<td>4V to 20V</td>
</tr>
<tr>
<td>Output Voltage VOUT1, VOUT2</td>
<td>Programmable with FB Pin Resisters</td>
<td>3.3VDC, 1.2VDC</td>
</tr>
<tr>
<td>Maximum Continuous Output Current Each Phase</td>
<td>Derating is Necessary for Certain Operating Conditions. See Data Sheet for Details</td>
<td>2.5ADC</td>
</tr>
<tr>
<td>Default Operating Frequency</td>
<td></td>
<td>1MHz</td>
</tr>
<tr>
<td>Efficiency</td>
<td>VIN = 12V, VOUT1 = 3.3V, IOUT = 2.5A, fSW = 2MHz, VIN = 12V, VOUT2 = 1.2V, IOUT = 2.5A, fSW = 1MHz</td>
<td>87.5%. See Figure 2, 76.7%. See Figure 2</td>
</tr>
</tbody>
</table>

BOARD PHOTO
QUICK START PROCEDURE

Demonstration circuit 2249B is an easy way to evaluate the performance of the LTM4622. Please refer to Figure 1 for test setup connections and follow the procedure below.

1. With power off, place the jumpers in the following positions for a typical application for 3.3V\textsubscript{OUT} and 1.2V\textsubscript{OUT} rails:

<table>
<thead>
<tr>
<th>JP1</th>
<th>JP2</th>
<th>JP3</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUN1</td>
<td>RUN2</td>
<td>MODE</td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
<td>CCM</td>
</tr>
</tbody>
</table>

2. Before powering up the input supply and loads, preset the input voltage supply to be between 4V to 20V. Preset the load current for each output rail to 0A.

3. With power off, connect the loads, input voltage supply and meters as shown in Figure 1.

4. Turn on the input power supply. The output voltage meters for each output rail should display the programmed output voltage ± 2%.

5. Once the proper output voltages are established, adjust the load current on each rail within the 0A to 2.5A range and observe each output rail’s load regulation, efficiency, and other parameters.

6. To observe increased light load efficiency place the mode pin jumper (JP3) in the BURST position.

Note: Demonstration circuit 2249B is designed to exhibit the wide output voltage range of the LTM4622. In order to keep inductor current ripple within reasonable limits it is recommended to increase programmed switching frequency for higher output voltages. The programmed switching frequency for data provided in this manual is consistent with switching frequency recommendations corresponding to the programmed output voltage. Please refer to the LTM4622 data sheet for more details regarding recommended switching frequency for your particular application.
QUICK START PROCEDURE

LTM4622
DUAL 2.5A STEP-DOWN
μMODULE REGULATOR
DEMO CIRCUIT 2249B

Figure 1. Test Setup
**QUICK START PROCEDURE**

![Graphs showing measured supply efficiency at 12VIN and 5VIN](image)

**Figure 2. Measured Supply Efficiency at 12VIN and 5VIN**
QUICK START PROCEDURE

VIN (V) | VOUT (V) | COUT
---|---|---
12 | 1.2 | 1 × 22µF + 1 × 47µF

VIN (V) | VOUT (V) | COUT
---|---|---
12 | 3.3 | 1 × 22µF + 1 × 47µF

Figure 3. Measured Load Transient Response (1A to 2A Load Step)  
Figure 4. Measured Load Transient Response (1A to 2A Load Step)

VIN (V) | VOUT1 (V), IOUT1 (A) | VOUT2 (V), IOUT2 (A) | fSW (MHz) | TAMBIENT (°C)
---|---|---|---|---
12 | 3.3, 2.5 | 1.2, 2.5 | 2 | 22

Figure 5. Thermal Capture at Full Load Natural Convection
# PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>REFERENCE</th>
<th>PART DESCRIPTION</th>
<th>MANUFACTURER/PART NUMBER</th>
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<td></td>
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<tr>
<td><strong>Required Circuit Components</strong></td>
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<td>1</td>
<td>1</td>
<td>C1</td>
<td>CAP, X5R, 2.2µF, 10V, 10%, 0603</td>
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<td>2</td>
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<td><strong>Additional Demo Board Circuit Components</strong></td>
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<td>CONN, BNC, 5PINS</td>
<td>CONNEX, 112404</td>
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<td>STAND OFF</td>
<td>STAND OFF SNAP ON, 0.375&quot; TALL</td>
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DUAL 2.5A STEP-DOWN µMODULE REGULATOR

NOTE: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS AND CAPACITORS ARE 0603

* C10 is an optional capacitor. It is inserted to dampen the (possible) ringing voltage due to long input leads. On a normal, typical PCB, the capacitor is not needed.

OPTIONAL JUMPERS FOR PARALLEL OPERATION

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THE CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND IS SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS. SCALE = NONE

DEMO MANUAL DC2249B

DEMO CIRCUIT 2249B

REV. 0

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APPROVALS

SHEET 1 OF 1

DATE: Thursday, May 26, 2016

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