

# LT3480EMSE

## 2A, 38V Step-Down Switching Regulator with SYNC Function

### DESCRIPTION


Demonstration circuit 1091 is a monolithic step-down DC/DC switching regulator featuring the LT3480. The operating frequency can be synchronized up to 2 MHz. The demo board is designed for 5V output from a 6.3V to 38V input with transients up to 60V. The wide input range of the LT3480 allows a variety of input sources. The typical sources are automotive batteries, wall adaptors and industrial supplies. The modes of operation (Burst Mode and fixed frequency) are jumper selectable. The Burst Mode operation increases the efficiency at light loads while fixed frequency mode maintains a constant switching frequency regardless of the load current.

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  $V_{in}$  to ensure saturation of the switch. The LT3480'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 1 $\mu$ A. 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. The soft start function reduces the input current surge during start-up.

The LT3480 datasheet gives a complete description of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for demo circuit 1091.

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

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### Performance Summary for Step-Down Switching Regulator ( $T_A = 25^{\circ}\text{C}$ )

| PARAMETER FOR BUCK REGULATOR | CONDITION | VALUE     |
|------------------------------|-----------|-----------|
| Minimum Input Voltage        |           | 6.3V      |
| Maximum Input Voltage        |           | 38V       |
| Output Voltage $V_{OUT}$     |           | 5V +/- 4% |
| Maximum Output Current       |           | 2A        |
| Typical Switching Frequency  |           | 550kHz    |

### QUICK START PROCEDURE

Demonstration circuit 1091 is easy to set up to evaluate the performance of the LT3480. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

NOTE . When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the  $V_{in}$  or  $V_{out}$  and GND terminals. See Figure 2 for proper scope probe technique.

1. Place JP1 on the RUN position.

2. With power off, connect the input power supply to  $V_{in}$  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

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- output voltage regulation, ripple voltage, efficiency and other parameters.
6. Apply a 5V square wave signal to the SYNC pin and make sure that the SYNC frequency is higher than the set switching frequency.
  7. Observe the switching frequency as the SYNC frequency varies.

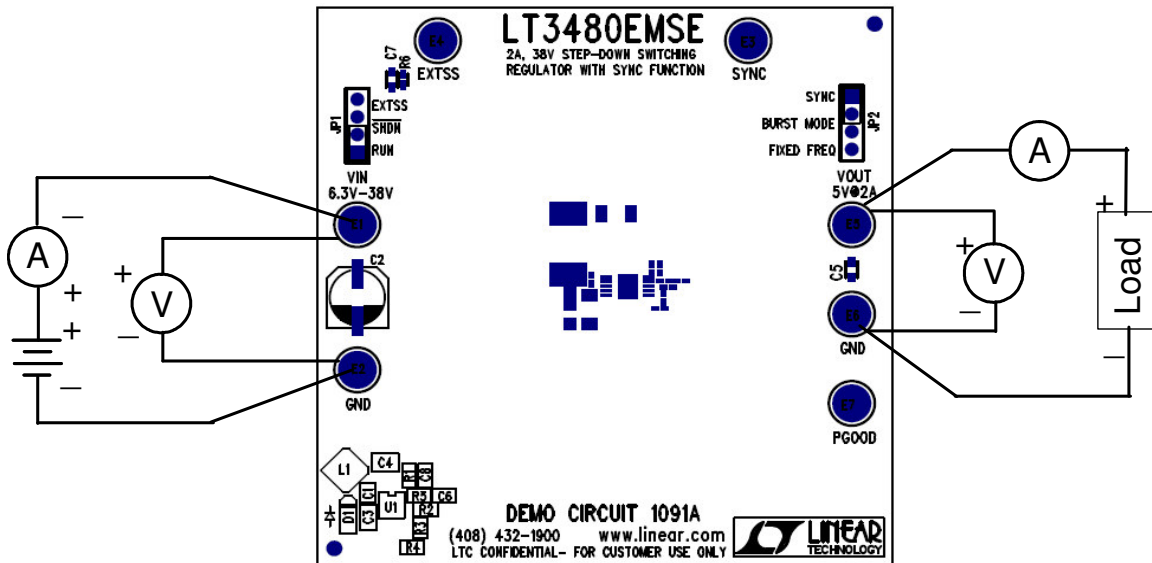


Figure 1. Proper Measurement Equipment Setup

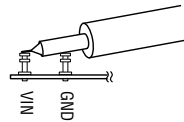
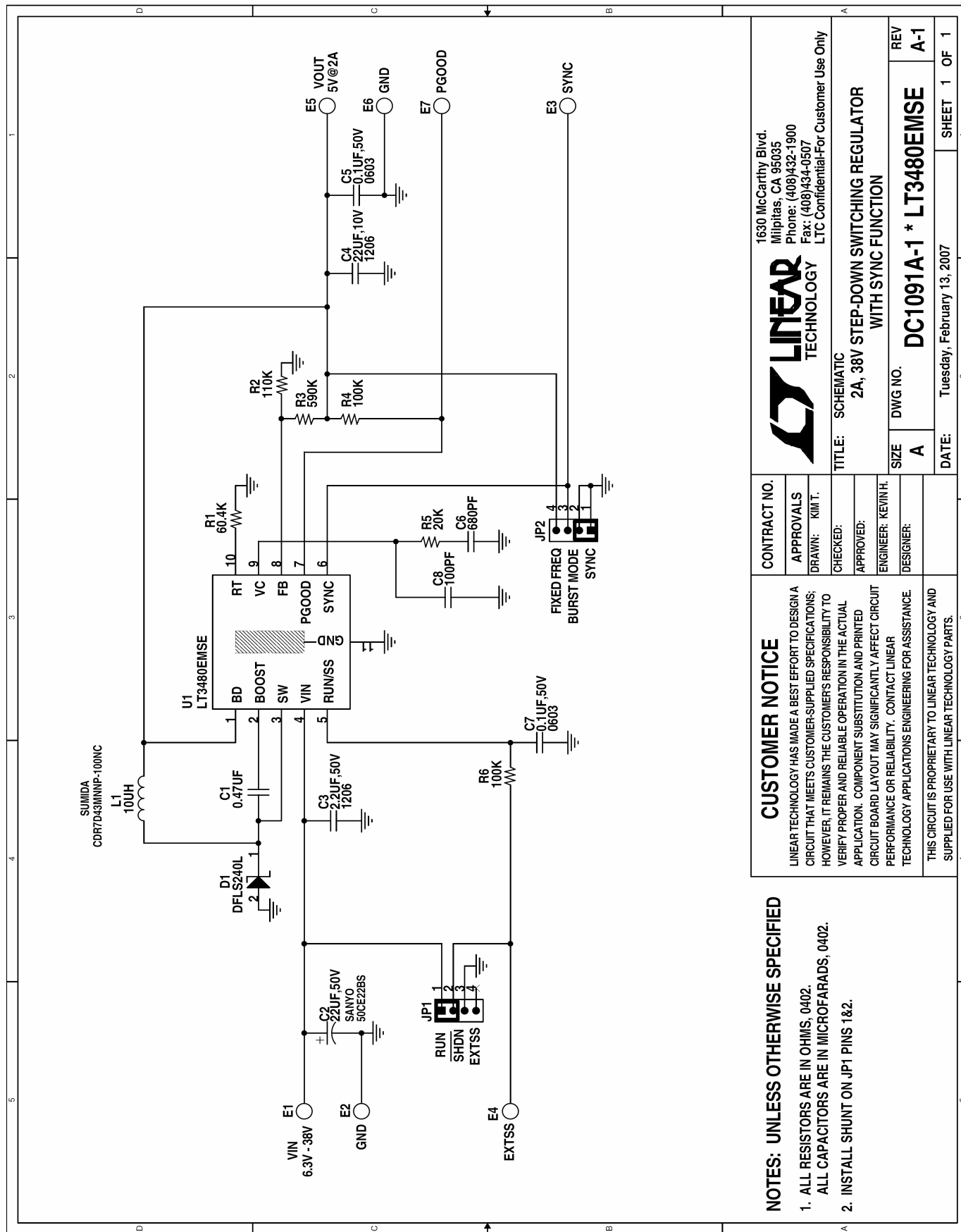


Figure 2. Measuring Input or Output Ripple



|  |                                      |
|--|--------------------------------------|
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| <p><b>CONTRACT NO.</b></p>   |                                      |
| <p><b>APPROVALS</b></p>  |                                      |
| <p>DRAWN: KIM T.</p>   |                                      |
| <p>CHECKED:</p>  |                                      |
| <p>APPROVED:</p>   |                                      |
| <p>ENGINEER: KEVIN H.</p>  |                                      |
| <p>DESIGNER:</p>   |                                      |
| <p><b>TITLE: SCHEMATIC</b></p>   |                                      |
| <p><b>2A, 38V STEP-DOWN SWITCHING REGULATOR WITH SYNC FUNCTION</b></p>   |                                      |
| <p><b>SIZE</b></p>   | <p><b>DWG NO.</b></p>                |
| <p><b>A</b></p>  | <p><b>DC1091A-1 * LT3480EMSE</b></p> |
| <p><b>REV</b></p>  | <p><b>A-1</b></p>                    |
| <p><b>DATE:</b> Tuesday, February 13, 2007</p>   | <p><b>SHEET 1 OF 1</b></p>           |

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LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE

THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.

- NOTES: UNLESS OTHERWISE SPECIFIED**
- ALL RESISTORS ARE IN OHMS, 0402.
  - ALL CAPACITORS ARE IN MICROFARADS, 0402.
  - INSTALL SHUNT ON JP1 PINS 1&2.