

LT3685EMSE

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

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 V_{in} 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 datasheet 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.

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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 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:

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

LT3685

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

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

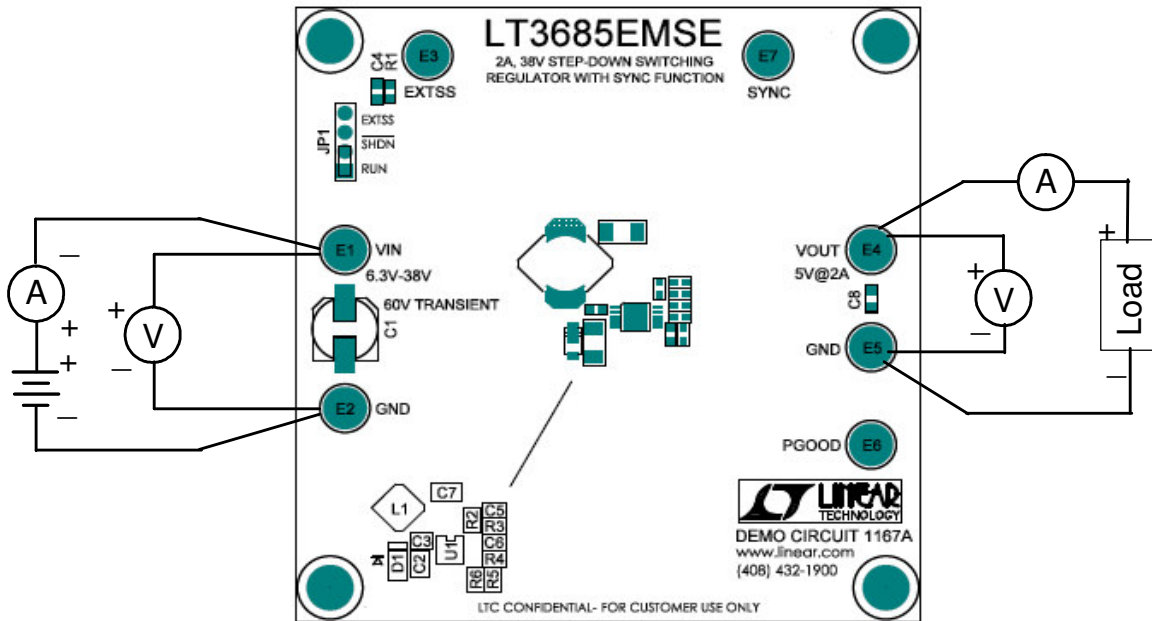


Figure 1. Proper Measurement Equipment Setup

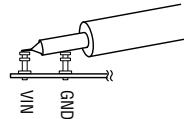
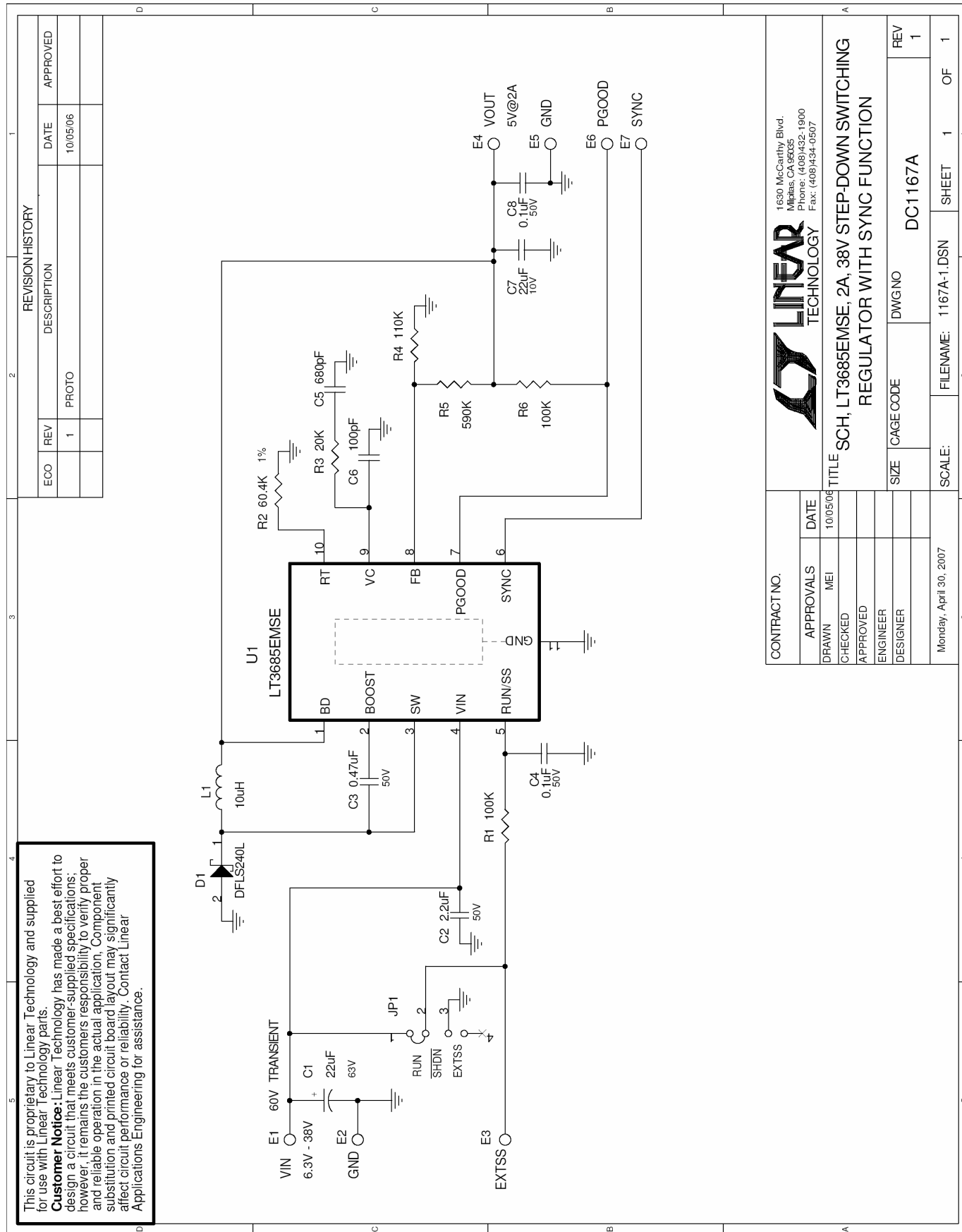


Figure 2. Measuring Input or Output Ripple



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Customer Notice: Linear Technology has made a best effort to design a circuit that meets customer-supplied specifications; however, it remains the customers 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 Applications Engineering for assistance.

REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	APPROVED
	1	PROTO	10/05/06	

CONTRACT NO.		DATE	
APPROVALS	MEI	10/05/06	
DRAWN			
CHECKED			
APPROVED			
ENGINEER			
DESIGNER			
Monday, April 30, 2007			

		1650 McCarthy Blvd. Milpitas, CA 95035 Phone: (408)432-1900 Fax: (408)434-0507	
TITLE SCH, LT3685EMSE, 2A, 38V STEP-DOWN SWITCHING REGULATOR WITH SYNC FUNCTION			
SIZE	CAGE CODE	DWGNO	REV
		DC1167A	1
SCALE:	FILENAME:	SHEET	OF
	1167A-1.DSN	1	1