DESCRIPTION

Demonstration circuit 1126 is a high density 3.3V/5A and 2.5V/5A step down converter featuring the LTC3850EUF. The power components, excluding the bulk output capacitors, fit within a 0.90” X 0.75” area on the top layer and the control circuit resides in a 0.70” X 0.65” area on the bottom layer. The package style for the LTC3850EUF is a 4mm X 4mm 28-lead QFN with an exposed ground pad.

The main features of the board include rail tracking, an internal 5V linear regulator for bias, RUN pins for each output and a PGOOD signal. An optional DCR sense circuit allows the converter to use the inductor’s DCR as the sense element instead of the on-board sense resistors to save cost and board space and to improve efficiency. Other stuffing options allow the converter to be configured for either CCM (original setting), pulse skip or Burst Mode operation, or to be synchronized to an external clock.

The input voltage range is 6.5V to 14V. For applications that have a 5V +/- 0.5V input, the board has an optional resistor to tie the INTVCC pin to the VIN pin.

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

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

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		6.5V
Maximum Input Voltage		14V
Output Voltage V_{OUT1}	I_{OUT} = 0A to 5A	3.3V ±2%
Output Voltage V_{OUT2}	I_{OUT} = 0A to 5A	2.5V ±2%
Nominal Switching Frequency		500kHz
Full Load Efficiency	V_{OUT1} = 3.3V, IOUT1 = 5A, VIN = 12V	91% Typical
(see Figure 3 for efficiency curves)	V_{OUT2} = 2.5V, IOUT2 = 5A, VIN = 12V	89% Typical

QUICK START PROCEDURE

Demonstration circuit 1126 is easy to set up to evaluate the performance of the LTC3850EUF. 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 VIN or VOUT and GND terminals. See Figure 2 for proper scope probe technique.

1. Place jumpers in the following positions:

JP1 ON

JP2 ON

2. With power off, connect the input power supply to VIN and GND.
3. Turn on the power at the input.

   NOTE: Make sure that the input voltage does not exceed 15V.

4. Check for the proper output voltages.
   VOUT1 = 3.234V to 3.366V,
   VOUT2 = 2.450V to 2.550V

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

RAIL TRACKING

Demonstration circuit 1126 is setup for coincident rail tracking where VOUT2 tracks VOUT1 and the ramp-rate for VOUT1 is determined by the value of the TRK/SS1 capacitor at C11. See Figure 4.

This board can be modified on the bench for external rail tracking or for independent turn-on of the rails. For the latter case, the ramp-rate for VOUT1 and VOUT2 will be determined by their respective TRK/SS capacitors. Refer to Tables 2 and 3 for tracking options and to the data sheet for more details.

Table 2. V_{OUT1} Tracking Options

	TRACK1 DIVIDER		TRK/SS1 CAP
CONFIGURATION	**R13**	**R15**	**C11**
Soft Start Without Tracking (original board)	0 Ω	Not Stuffed	10nF
External Coincident Tracking	63.4kΩ	20.0kΩ	Not Stuffed

Table 3. V_{OUT2} Tracking Options

	TRACK2 DIVIDER		TRK/SS2 CAP
CONFIGURATION	**R3**	**R5**	**C3**
Soft Start Without Tracking	Not stuffed	Not stuffed	10nF
Coincident Tracking to V_{OUT1} (original board)	43.2kΩ	20.0kΩ	Not Stuffed

INDUCTOR DCR SENSING

Demonstration circuit 1126 provides an optional circuit for DCR sensing. DCR sensing uses the DCR of the inductor to sense the inductor current instead of discrete sense resistors. The advantages of DCR sensing are lower cost, reduced board space and higher efficiency, but the disadvantage is a less accurate current limit. If DCR sensing is used, be sure to select an inductor current with a sufficiently high saturation current or use an iron powder type.

Tables 4 and 5 show an example of how to modify the DC1126 for DCR sensing using the parameters below:

V_{OUT1} = 3.3V / 5A

V_{OUT2} = 2.5V / 5A

V_{IN} = 6.5V to 14V

Fsw = 500kHz, typical

L1,2 = Vishay IHLP2525CZ-11 2.2uH

(DCR = 15.7mΩ typ, 16.5mΩ max)

ILIM = INTVCC (R25 = 0Ω, R26 = OPEN)

Table 4. V_{OUT1} Configured for 3.3V/5A Using DCR Sensing and Discrete Sense Resistors

			RSENSE FILTER RESISTORS	SENSE FIILTER CAP	DCR FILTER/DIVIDER RESISTORS		SENSE1- TO L1- JUMPER
					TOP	BOTTOM	
CONFIGURATION	**RSNS1**	**L1**	**R7,R9**	**C4**	**R27**	**R29**	**R39**
DCR Sensing	Short with Cu strip or very short & thick piece of wire	Vishay IHLP2525CZ-11 2.2uH	Open	0.1uF	2.7kΩ	2.7kΩ	0 Ω
Discrete RSENSE (original board)	8mΩ	TDK RLF7030T – 2.2uH	10Ω	1nF	Open	Open	Open

Table 5. V_{OUT2} Configured for 2.5V/5A Using DCR Sensing and Discrete Sense Resistors

			RSENSE FILTER RESISTORS	SENSE FIILTER CAP	DCR FILTER/DIVIDER RESISTORS		SENSE2- TO L2- JUMPER
					TOP	BOTTOM	
CONFIGURATION	**RSNS2**	**L2**	**R20,R21**	**C16**	**R34**	**R32**	**R40**
DCR Sensing	Short with Cu strip or very short & thick piece of wire	Vishay IHLP2525CZ-11 2.2uH	Open	0.1uF	2.7kΩ	2.7kΩ	0 Ω
Discrete RSENSE (original board)	8mΩ	TDK RLF7030T – 2.2uH	10Ω	1nF	Open	Open	Open

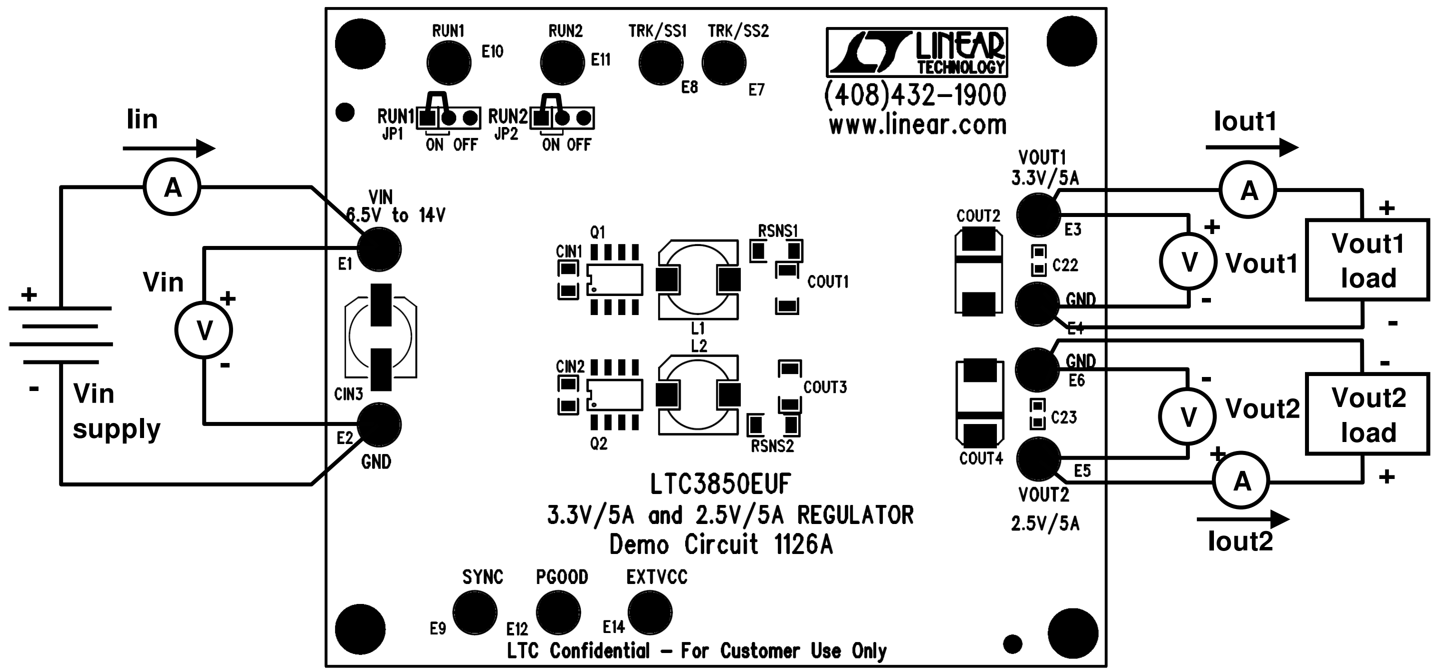


Figure 1. Proper Measurement Equipment Setup

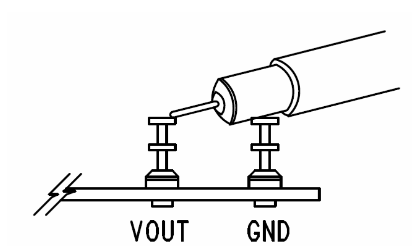


Figure 2. Measuring Output or Input Voltage Ripple

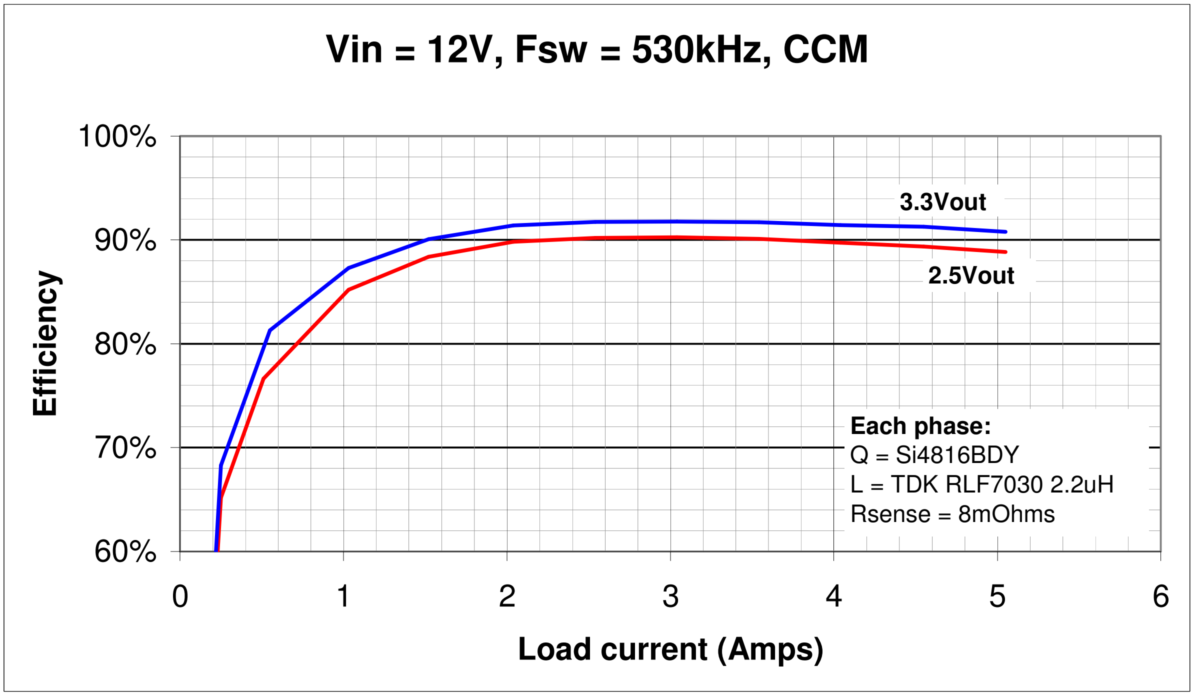


Figure 3. Typical Efficiency vs Load Current

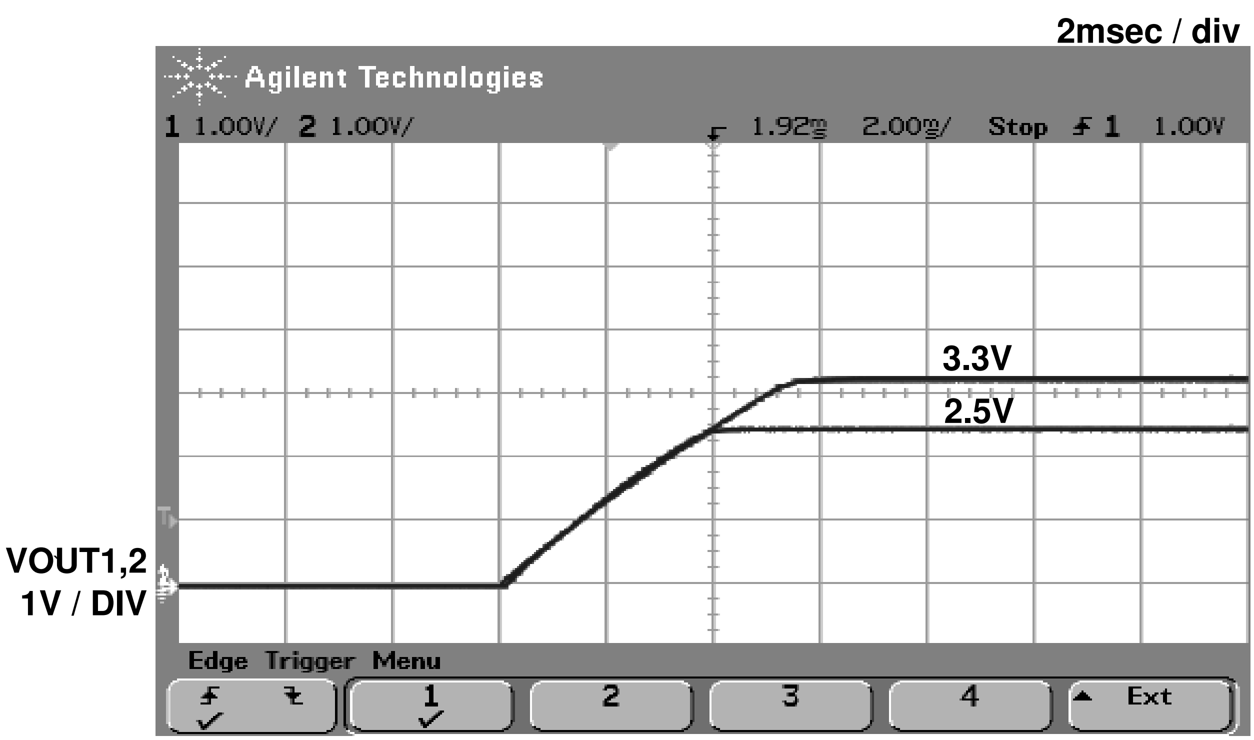
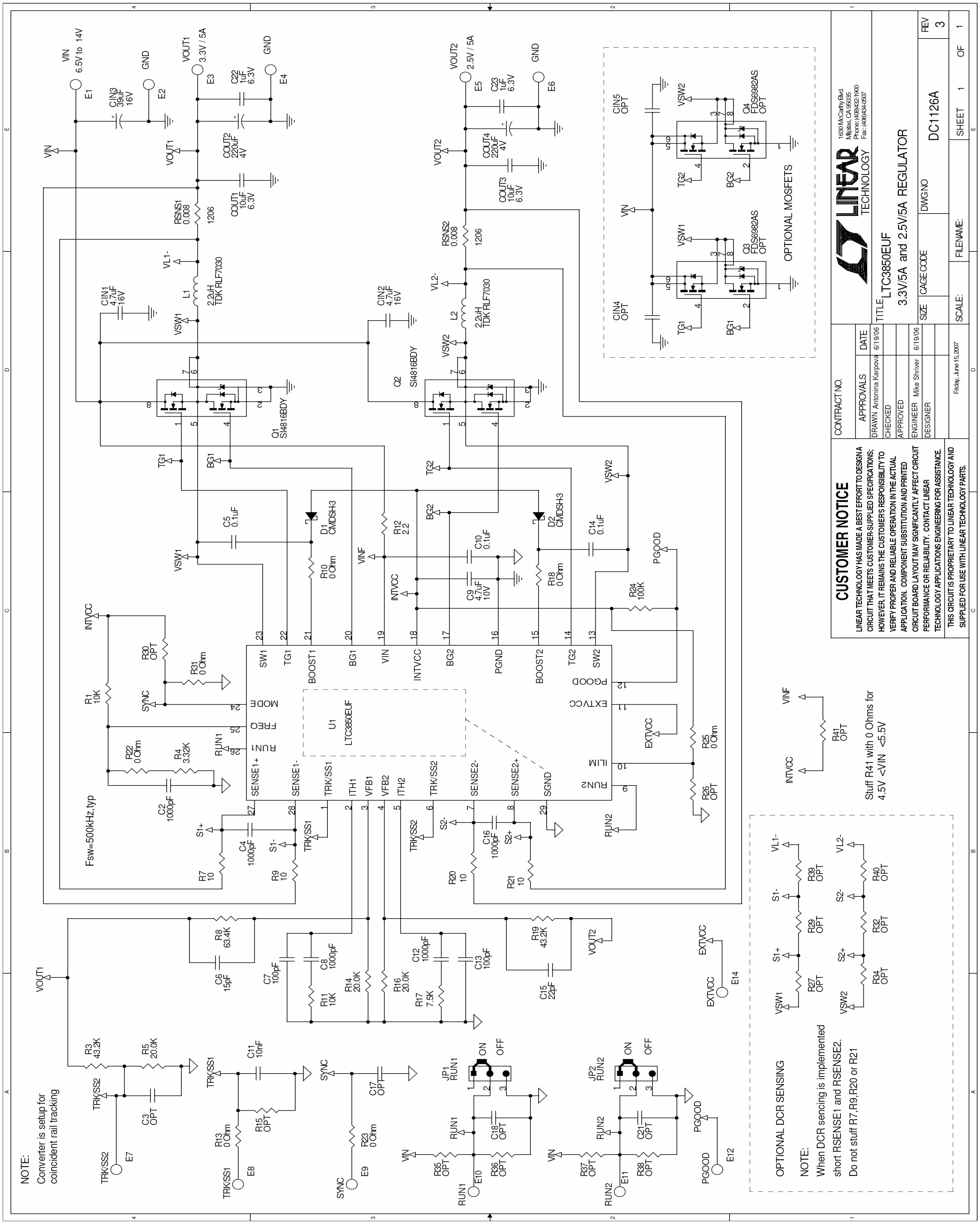


Figure 4. Coincident Rail Tracking During Startup (original board).



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THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.
LTC3850EUF
3.3V/5A and 2.5V/5A REGULATOR
DC1126A
OPTIONAL MOSFETS
OPTIONAL DCR SENSING
NOTE:
When DCR sencing is implemented short RSENSE1 and RSENSE2.
Do not stuff R7,R9,R20 or R21
NOTE:
Converter is setup for coincident rail tracking
Stuff R41 with 0 Ohms for 4.5V <VIN <5.5V
Fsw=500kHz,typ

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
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