

## DESCRIPTION

Demonstration circuit DC1081 is a dual-output low V<sub>in</sub> step down power supply. The input voltage is from 2.75V to 4.5V. The supply has two outputs: 1.8V/12A and 1.2V/12A. The design features the LTC3836EUFD, the low quiescent current, 2-phase, dual-output synchronous buck regulator in 28 pin plastic QFN package.

The LTC3836 is a 2-phase dual output synchronous step-down switching regulator controller with tracking that drives external N-channel power MOSFETs using few external components. The constant-frequency cur-

rent mode architecture with MOSFET V<sub>ds</sub> sensing eliminates the need for sense resistors and improves efficiency.

The power loss and noise due to the ESR of the input capacitance are minimized by operating the two channel out-of-phase. Pulse-skipping operation provides high efficiency at light loads. The 97% duty cycle capability provides low dropout operation, extending operating time in battery-powered systems. **Design files for this circuit board are available. Call the LTC factory.**

**Table 1. Performance Summary**

PARAMETER	CONDITION	VALUE
Input Voltage Range	V <sub>min</sub> =2.75V needed for proper function of the board.	2.75V to 4.5V
V <sub>out1</sub> (Max I <sub>out1</sub> =12A)	V <sub>OUT1</sub> = 1.8V, 0A to 12A; V <sub>in</sub> =2.75-4.5V	1.8V ± 2%
V <sub>out2</sub> (Max I <sub>out2</sub> =12A)	V <sub>OUT2</sub> = 1.2V, 0A to 12A, V <sub>in</sub> =2.75-4.5V	1.2V ± 2%
Typical Output Ripple (V <sub>OUT1</sub> )	20MHz BW, 5A load, V <sub>IN</sub> =3.3V, frequency = 550kHz	<45mV <sub>p-p</sub>
Typical Output Ripple (V <sub>OUT2</sub> )	20MHz BW, 5A load, V <sub>IN</sub> = 3.3V, frequency = 550kHz	<45mV <sub>p-p</sub>
Default Operating Frequency	PLLLPF floating	550kHz
Typical shut down current	Tie Run/SS to SGND, V <sub>in</sub> =3.5V	<15uA
Typical efficiency for V <sub>out1</sub>	V <sub>IN</sub> =3.3V, V <sub>out1</sub> =1.8V at 7A, frequency =550kHz, V <sub>out2</sub> disabled, P.S. Mode	91%
Typical efficiency for V <sub>out2</sub>	V <sub>IN</sub> =3.3V, V <sub>out2</sub> =1.2V at 7A, frequency =550kHz, V <sub>out1</sub> non-load, P.S. Mode	88.5%

Demonstration circuit 1081 is easy to set up to evaluate the performance of the LTC3836EUFD. Refer to 0 for proper measurement equipment setup and follow the procedure below:

1. Place the MODE jumper JP1 in desired Mode (Continuous or Pulse Skipping Mode) position.
2. Connect the desired loads between 1.8V and 1.2V terminals and their closest PGND terminals on the board. The maximum load at 1.8V is 12A and the maximum load at 1.2V is 12A.
3. Connect the input power supply to the VIN and GND terminals on the upper, center of the board. Please

note GND is on top of VIN position. **Do not increase V<sub>IN</sub> over 4.5V.**

4. Turn on input power supply.
5. Measure the output voltages. They should be 1.8V ±2% and 1.2V ±2% respectively.
6. If external synchronization is desired, **remove JP1** and then tie SYNC/FCB turret to external clock signal. Please refer to datasheet for more details of how to use external sync signal.
7. (Optional) If longer soft start time is needed, add external soft start capacitor C14.

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT DC1081

## DUAL PHASE NO R<sub>sense</sub> LOW V<sub>in</sub> SYNCHRONOUS CONTROLLER

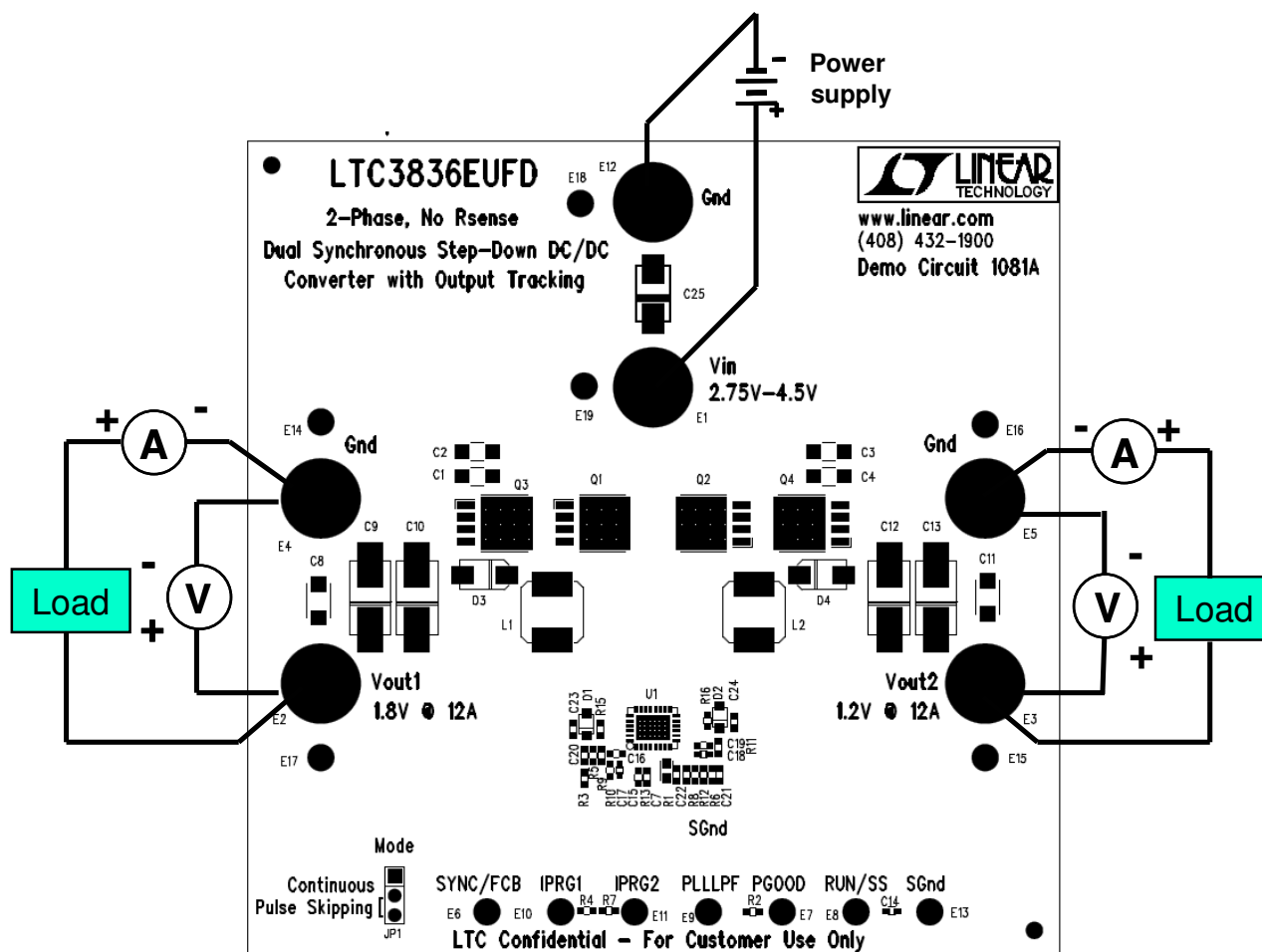
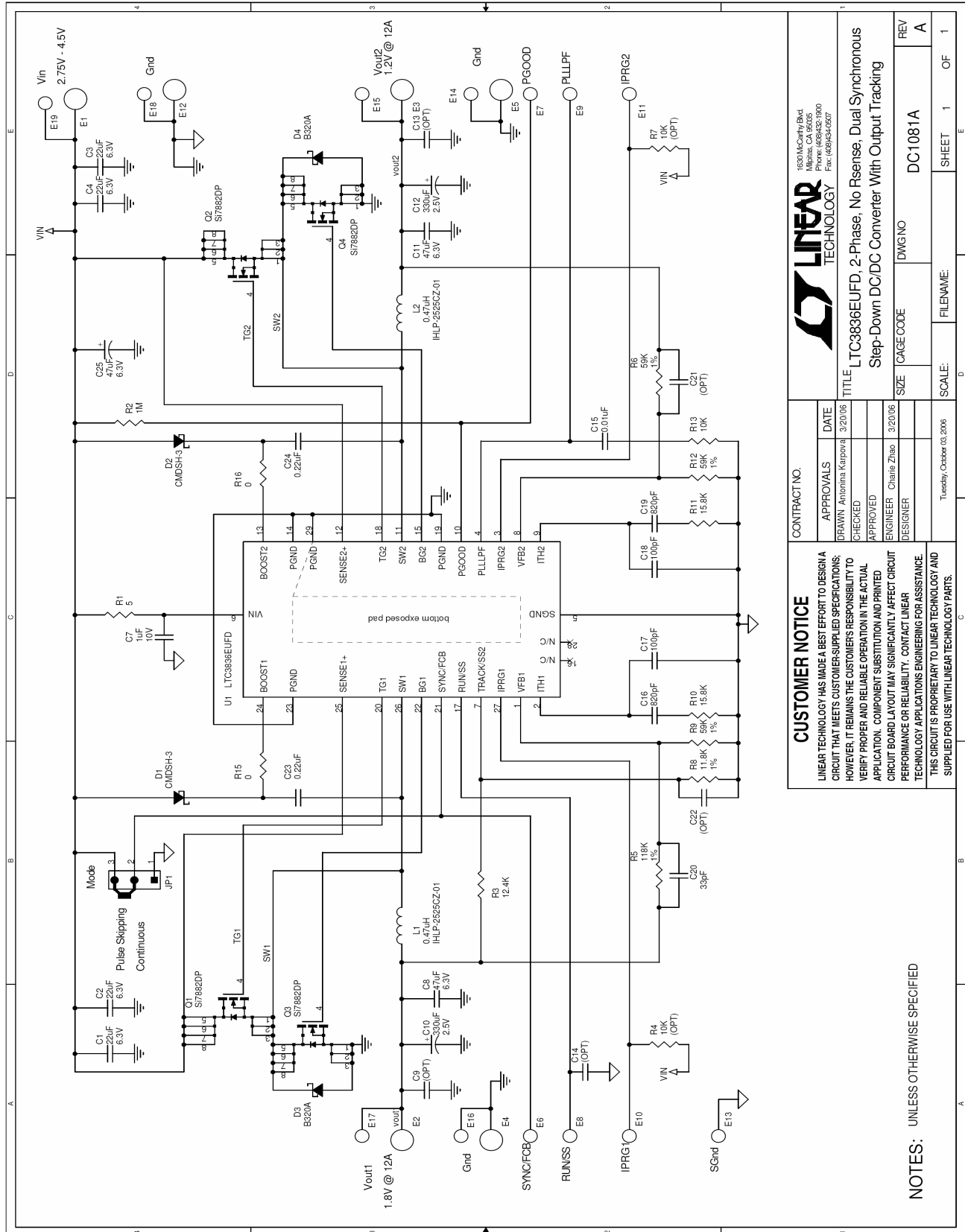


Figure 1. Proper Measurement Equipment Setup

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## DUAL PHASE NO R<sub>sense</sub> LOW V<sub>in</sub> SYNCHRONOUS CONTROLLER



<b>CUSTOMER NOTICE</b>		<b>CONTRACT NO.</b>	
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.			
APPROVALS	DATE	DESIGNER	SCALE:
DRAWN Antonina Kaipova	3/20/06	ENGINEER Charlie Zhao	FILENAME:
CHECKED		DESIGNER	
APPROVED			
TITLE		SIZE	SCALE:
LTC3836EUFD, 2-Phase, No R <sub>sense</sub> , Dual Synchronous Step-Down DC/DC Converter With Output Tracking		CAGE CODE	FILENAME:
DWG NO		REV	SHEET
DC1081A		A	1 OF 1

NOTES: UNLESS OTHERWISE SPECIFIED