QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1107
2-PHASE DUAL SYNCHRONOUS STEP-DOWN CONVERTER WITH OUTPUT TRACKING
LTC3836EUFD

DESCRIPTION

Demonstration circuit 1107 is a 2-phase dual high efficiency synchronous step-down DC/DC converter with 2.75V to 4.5V input range. It has two outputs: 1.8V (7A MAX) and 1.2V (7A MAX). The demo board features the LTC®3836EUFD controller. The constant frequency current mode architecture with MOSFET V_{DS} sensing, eliminates the need for sense resistors and improves efficiency. Out of phase operation significantly reduces input ripple current as well as the input capacitor size. One dual N-channel MOSFET is used for each output, making this board a low cost and compact design.

Switching frequency is internally set at 550KHz. For noise sensitive applications, the converter can be externally synchronized from 250KHz to 850KHz. The frequency can also be easily selected with PLLLPF pin. Tying PLLLPF pin to GND selects 300KHz operation; tying PLLLPF pin to VIN selects 750KHz operation.

The demo board has tracking function, allowing V_{OUT2} to track V_{OUT1} during start-up.

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

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

PARAMETER	CONDITION	VALUE
Input Voltage Range		2.75V to 4.5V
V_{OUT1}	V_{IN} = 2.75-4.5V, I_{OUT1} = 0A to 7A, I_{OUT2} = 0A to 7A	1.8V ±2.5%
V_{OUT2}	V_{IN} = 2.75-4.5V, I_{OUT1} = 0A to 7A, I_{OUT2} = 0A to 7A	1.2V ±2.5%
Typical Output Ripple V_{OUT1}	V_{IN} = 3.3V, I_{OUT1} = 7A (20MHz BW)	$25mV_{P-P}$
Typical Output Ripple V_{OUT2}	V_{IN} = 3.3V, I_{OUT2} = 7A (20MHz BW)	$20mV_{P-P}$
Typical Switching Frequency	PLLLPF Pin Floating	550kHz

QUICK START PROCEDURE

Demonstration circuit 1107 is easy to set up to evaluate the performance of LTC3836EUFD. 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. With power off, connect the input power supply to +Vin (2.75V-4.5V) and GND (input return).
2. Connect the 1.8V load (Load 1 in Figure 1) between Vout1 and GND; connect the 1.2V load (Load 2 in Figure 1) between Vout2 and GND. (Initial loads: no load.)
3. Connect the DVMs to the input and outputs.
4. Turn on the input power supply and check for the proper output voltages. Vout1 should be 1.8V+/-2.5%. Vout2 should be 1.2V+/-2.5%.

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

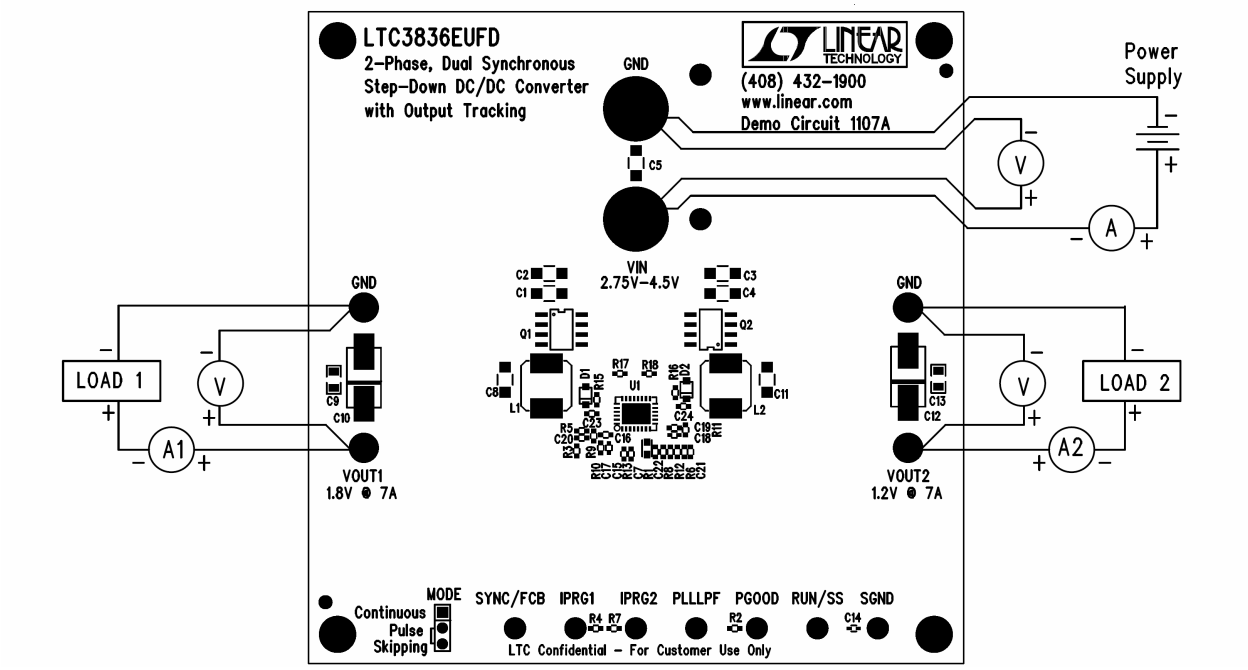


Figure 1. Proper Measurement Equipment Setup

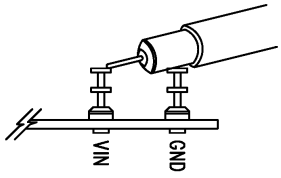


Figure 2. Measuring Input or Output Ripple

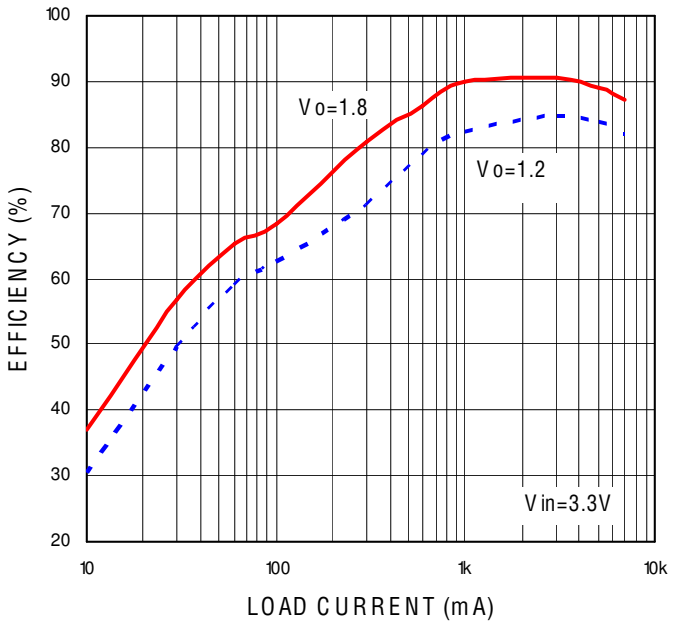
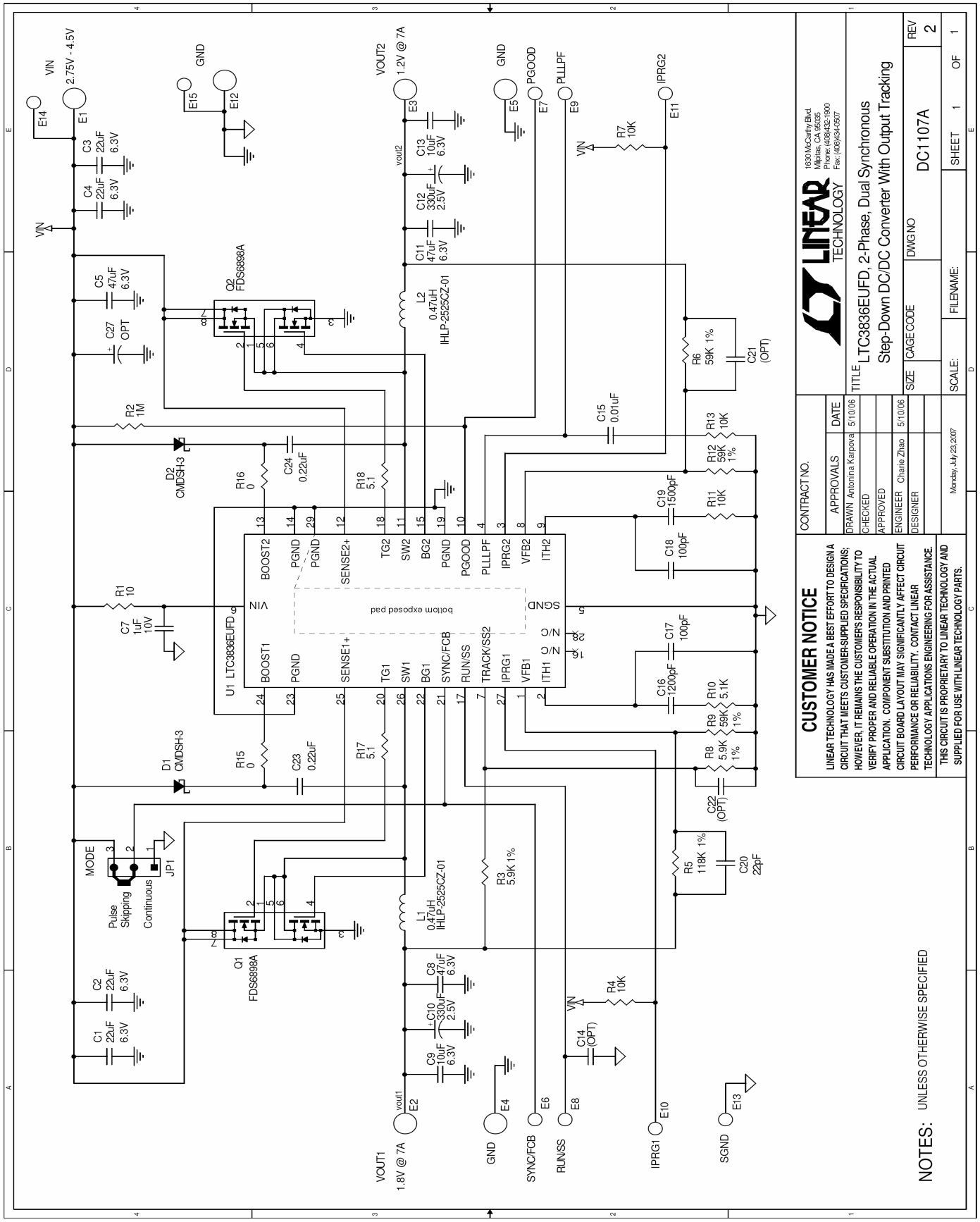


Figure 3. Efficiency vs load current (550KHz)


VIN
2.75V - 4.5V
VOUT2
1.2V @ 7A
VOUT1
1.8V @ 7A
U1 LTC3836EUFD
bottom exposed pad
Q1 FDS6898A
Q2 FDS6898A
D1 CMDSH-3
D2 CMDSH-3
L1 0.47uH IHLP-2525CZ-01
L2 0.47uH IHLP-2525CZ-01
MODE
Pulse Skipping
Continuous
JP1
GND
PGOOD
PLLLPF
IPRG2
SGND
SYNC/FCB
RUN/SS
IPRG1
CUSTOMER NOTICE
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.
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TITLE: LTC3836EUFD, 2-Phase, Dual Synchronous Step-Down DC/DC Converter With Output Tracking
SIZE
CAGE CODE
DWG NO
DC1107A
REV 2
SCALE:
FILENAME:
SHEET 1 OF 1
NOTES: UNLESS OTHERWISE SPECIFIED