DESCRIPTION

Demonstration circuit 769A is a high efficiency synchronous step-down DC/DC converter with output tracking and spread spectrum functions featuring the LTC3808EDE controller. The demo board is capable of providing 5A output current at 5V input. Burst mode/Pulse skipping/Forced continuous operation is selectable. The constant frequency current mode architecture with MOSFET V_{DS} sensing eliminates the need for sense resistor and improves efficiency. The maximum peak current sense threshold can be easily selected with IPRG pin (See the table on the board).

Switching frequency is internally set at 550KHz. The frequency can be adjusted using PLLLPF pin. Tying PLLLPF pin to GND selects 300KHz operation; tying PLLLPF pin to V_{IN} selects 750KHz operation. The switching frequency can also be externally synchronized from 250KHz to 850KHz using SYNC terminal (JP5 selected).

The demo board can be selected to operate in spread spectrum mode (JP2 selected) with significantly reduced EMI noise.

The demo board has tracking function, allowing Vout to track an external voltage signal at TRACK terminal during start-up (JP6: Track).

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		2.7V to 8V
V_{OUT}	V_{IN} = 2.7-8V, I_{OUT} = 0A to 5A	1.8V ±2.5%
Maximum load current I_{OUT}	V_{IN} = 5V, V_{OUT} = 1.8V	5A
Typical Output Ripple Voltage	V_{IN} = 3.3V, I_{OUT} = 3A, Fs=550KHz (20MHz BW)	23mV_{P-P}
Typical Switching Frequency	PLLLPF Pin Floating; JP4 selected	550kHz
Typical Spread Spectrum Frequency Range	JP2 selected (Spread Spectrum)	460kHz- 635kHz

QUICK START PROCEDURE

Demonstration circuit 769A is easy to set up to evaluate the performance of LTC3808. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below: (Initial jumper positions: JP3 selected; JP6: Soft Start)

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 (2.7V-8V) and GND (input return).
2. Connect the 1.8V load between Vout and GND (Initial load: 0 A).

3. Connect the DVMs to the input and output.
4. Turn on the input power supply and check for the proper output voltage. Vout should be 1.8V+/-2.5%.
5. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage and other parameters.

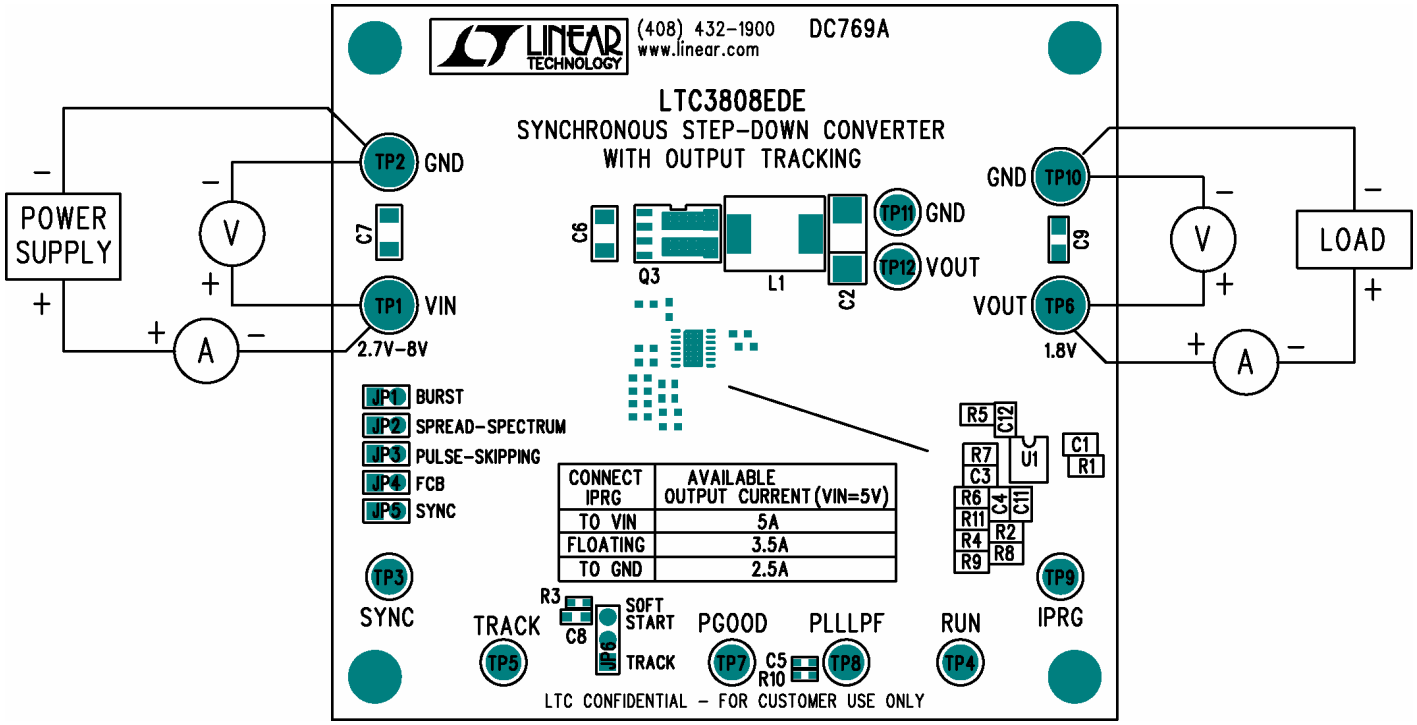


Figure 1. Proper Measurement Equipment Setup

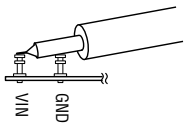


Figure 2. Measuring Input or Output Ripple

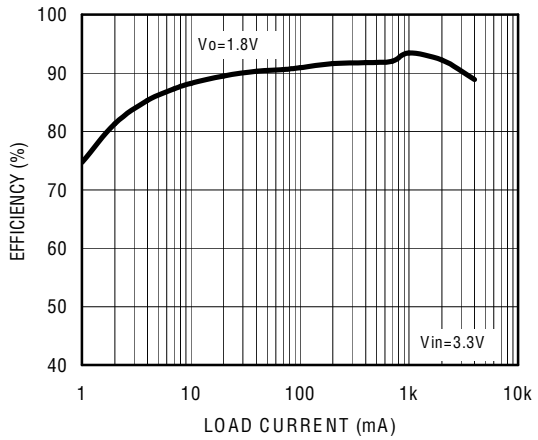
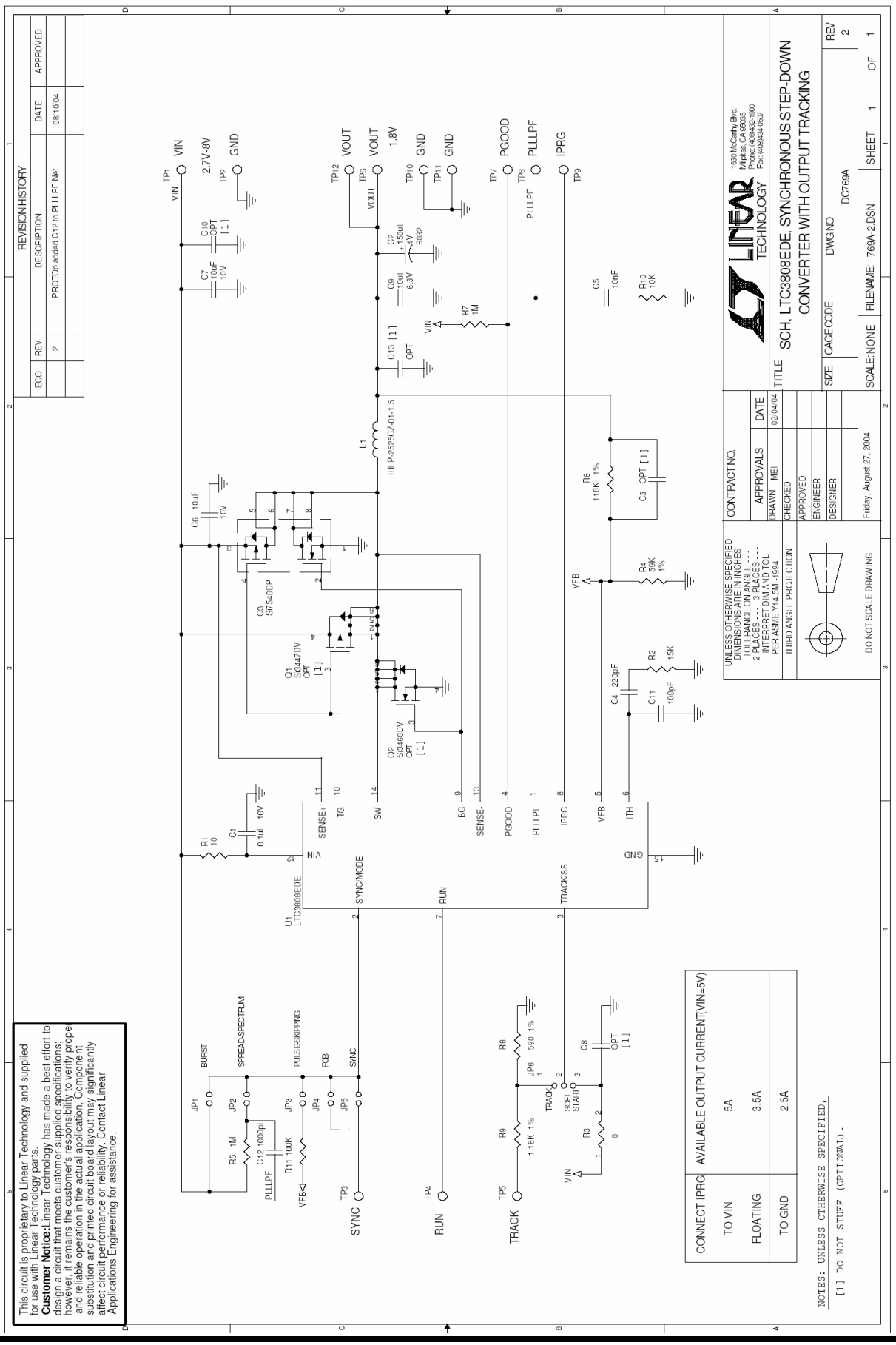


Figure 3. Efficiency vs load current (Burst mode, 550KHz)


REVISION HISTORY
ECO | REV | DESCRIPTION | DATE | APPROVED
2 | PROTOb added C12 to PLLLPF Net | 08/10/04
U1 LTC3808EDE
Q1 Si3447DV OPT [1]
Q2 Si3460DV OPT [1]
Q3 Si7540DP
L1 IHLP-2525CZ-01-1.5
VIN
SENSE+
TG
SW
BG
SENSE-
PGOOD
PLLLPF
IPRG
VFB
ITH
GND
SYNC/MODE
RUN
TRACK/SS
SOFT START
TRACK
BURST
SPREAD-SPECTRUM
PULSESKIPPING
FCB
SYNC
VOUT
1.8V
2.7V-8V
CONNECT IPRG | AVAILABLE OUTPUT CURRENT(VIN=5V)
TO VIN | 5A
FLOATING | 3.5A
TO GND | 2.5A
NOTES: UNLESS OTHERWISE SPECIFIED,
[1] DO NOT STUFF (OPTIONAL).
This circuit is proprietary to Linear Technology and supplied for use with Linear Technology parts.
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 Applications Engineering for assistance.
CONTRACT NO.
APPROVALS | DATE
DRAWN MEI | 02/04/04
CHECKED
APPROVED
ENGINEER
DESIGNER
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ON ANGLE - - - 2 PLACES - - - 3 PLACES - - - INTERPRET DIM AND TOL PER ASME Y14.5M -1994
THIRD ANGLE PROJECTION
DO NOT SCALE DRAWING
Friday, August 27, 2004
SCALE: NONE
FILENAME: 769A-2.DSN
SHEET 1 OF 1
TITLE SCH, LTC3808EDE, SYNCHRONOUS STEP-DOWN CONVERTER WITH OUTPUT TRACKING
SIZE | CAGECODE | DWG NO | REV
DC769A | 2
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