

## 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  $V_{out}$  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 ( $T_A = 25^\circ\text{C}$ )**

PARAMETER	CONDITION	VALUE
Input Voltage Range		2.7V to 8V
$V_{OUT}$	$V_{IN} = 2.7\text{-}8\text{V}$ , $I_{OUT} = 0\text{A to } 5\text{A}$	$1.8\text{V} \pm 2.5\%$
Maximum load current $I_{OUT}$	$V_{IN} = 5\text{V}$ , $V_{OUT} = 1.8\text{V}$	5A
Typical Output Ripple Voltage	$V_{IN} = 3.3\text{V}$ , $I_{OUT} = 3\text{A}$ , $F_s = 550\text{KHz}$ (20MHz BW)	23mV <sub>p-p</sub>
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  $V_{in}$  or  $V_{out}$  and GND terminals. See Figure 2 for proper scope probe technique.

1. With power off, connect the input power supply to + $V_{in}$  (2.7V-8V) and GND (input return).
2. Connect the 1.8V load between  $V_{out}$  and GND (Initial load: 0 A).

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## SYNCHRONOUS STEP-DOWN CONVERTER WITH OUTPUT TRACKING

3. Connect the DVMs to the input and output.
4. Turn on the input power supply and check for the proper output voltage.  $V_{out}$  should be  $1.8V \pm 2.5\%$ .
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.

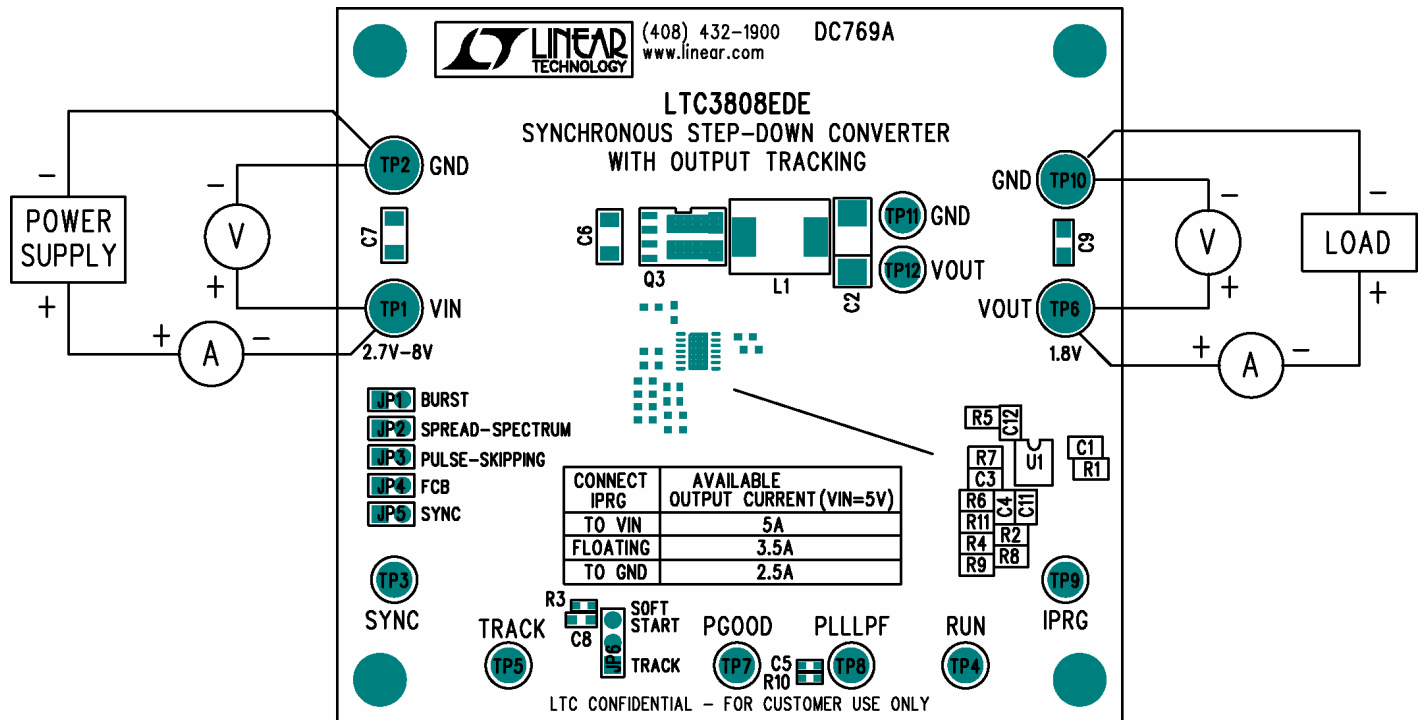


Figure 1. Proper Measurement Equipment Setup

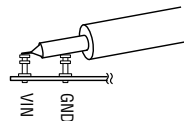
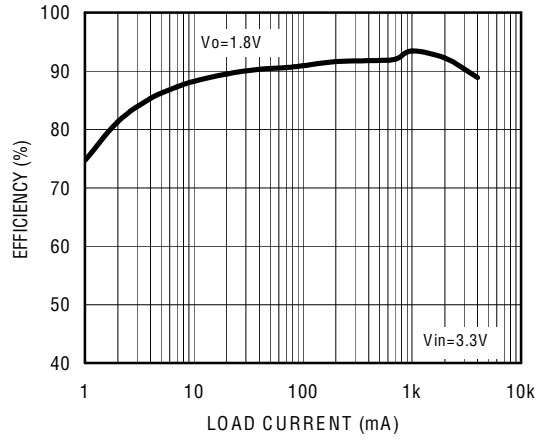


Figure 2. Measuring Input or Output Ripple

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## SYNCHRONOUS STEP-DOWN CONVERTER WITH OUTPUT TRACKING

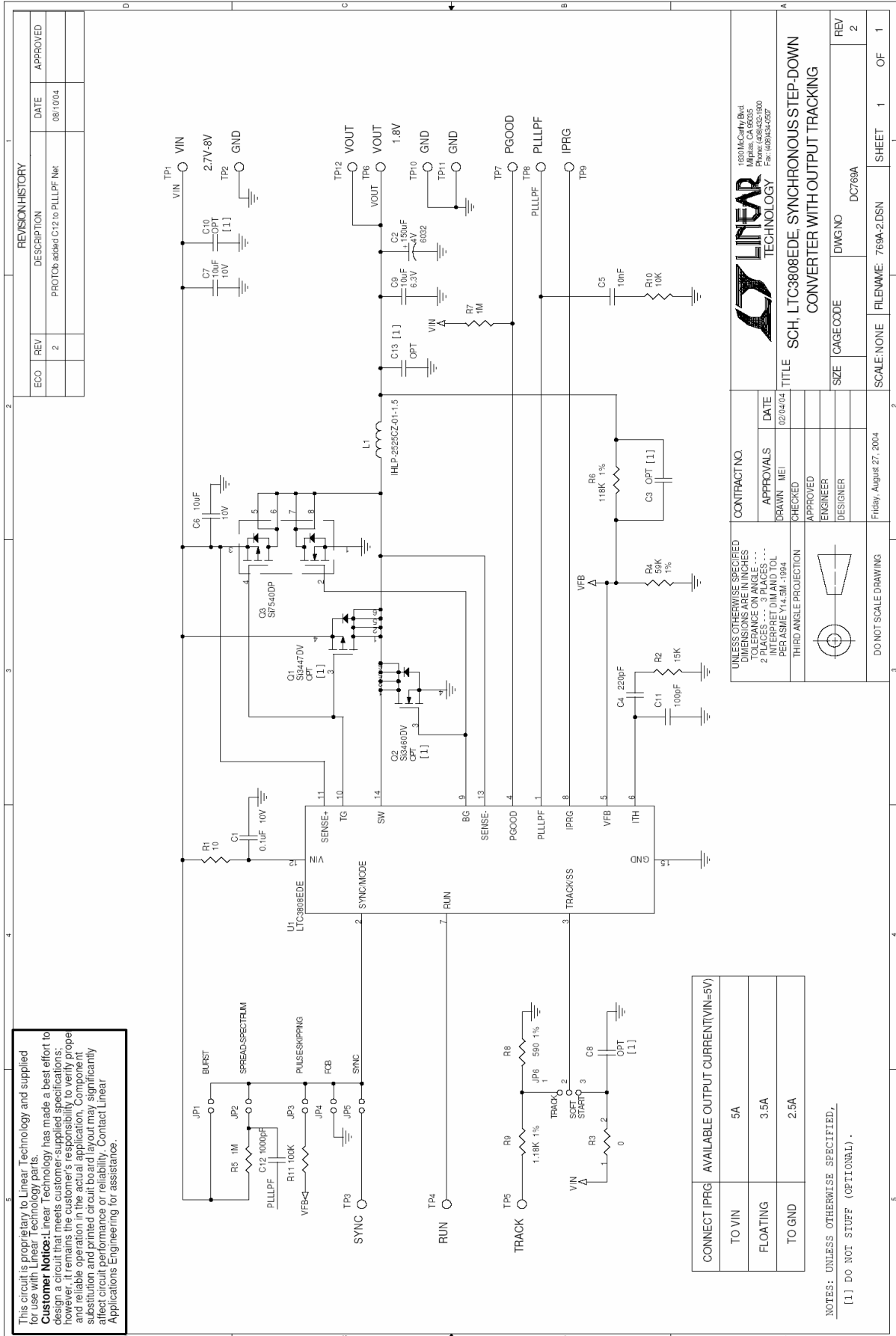
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**Figure 3. Efficiency vs load current (Burst mode, 550KHz)**

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 769

## SYNCHRONOUS STEP-DOWN CONVERTER WITH OUTPUT TRACKING



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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 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.

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