

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1105

## LOW VIN SYNCHRONOUS STEP-DOWN CONVERTER WITH TRACKING

### LTC3822EDD-1

## DESCRIPTION

Demonstration circuit 1105A is a high efficiency synchronous step-down DC/DC converter with output tracking featuring the LTC3822EDD-1 controller. The demo board is capable of providing 1.8V/8A from 2.75V to 4.5V 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 a sense resistor and improves efficiency. The maximum peak current sense threshold can easily be selected with the IPRG pin.

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 750KHz using SYNC terminal (JP1 should be selected for Sync).

The demo board has a tracking feature, allowing  $V_{out}$  to track an external voltage signal at TRACK terminal (JP2 selected for Track).

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

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**Table 1. Performance Summary ( $T_A = 25^\circ\text{C}$ )**

| PARAMETER                      | CONDITION                                                                         | VALUE               |
|--------------------------------|-----------------------------------------------------------------------------------|---------------------|
| Input Voltage Range            |                                                                                   | 2.75V to 4.5V       |
| $V_{OUT}$                      | $V_{IN} = 2.75\text{-}4.5\text{V}$ , $I_{OUT} = 0\text{A to }8\text{A}$           | 1.8V $\pm 2\%$      |
| Maximum load current $I_{OUT}$ | $V_{IN} = 2.75\text{-}4.5\text{V}$ , $V_{OUT} = 1.8\text{V}$                      | 8A                  |
| Typical Output Ripple Voltage  | $V_{IN} = 3.3\text{V}$ , $I_{OUT} = 4\text{A}$ , $F_s = 550\text{KHz}$ (20MHz BW) | 12mV <sub>P-P</sub> |
| Typical Switching Frequency    | PLLLPF Pin Floating                                                               | 550kHz              |

## QUICK START PROCEDURE

Demonstration circuit 1105A is easy to set up to evaluate the performance of the LTC3822-1. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below: (Initial jumper positions: JP1: PS; JP2: 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 +Vin (2.75V-4.5V) and GND (input return).
2. Connect the 1.8V load between  $V_{out}$  and GND (Initial load: 0 A).
3. Connect 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. Once the proper output voltage is established, adjust the load within the operating range and observe the

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output voltage regulation, ripple voltage and other parameters.

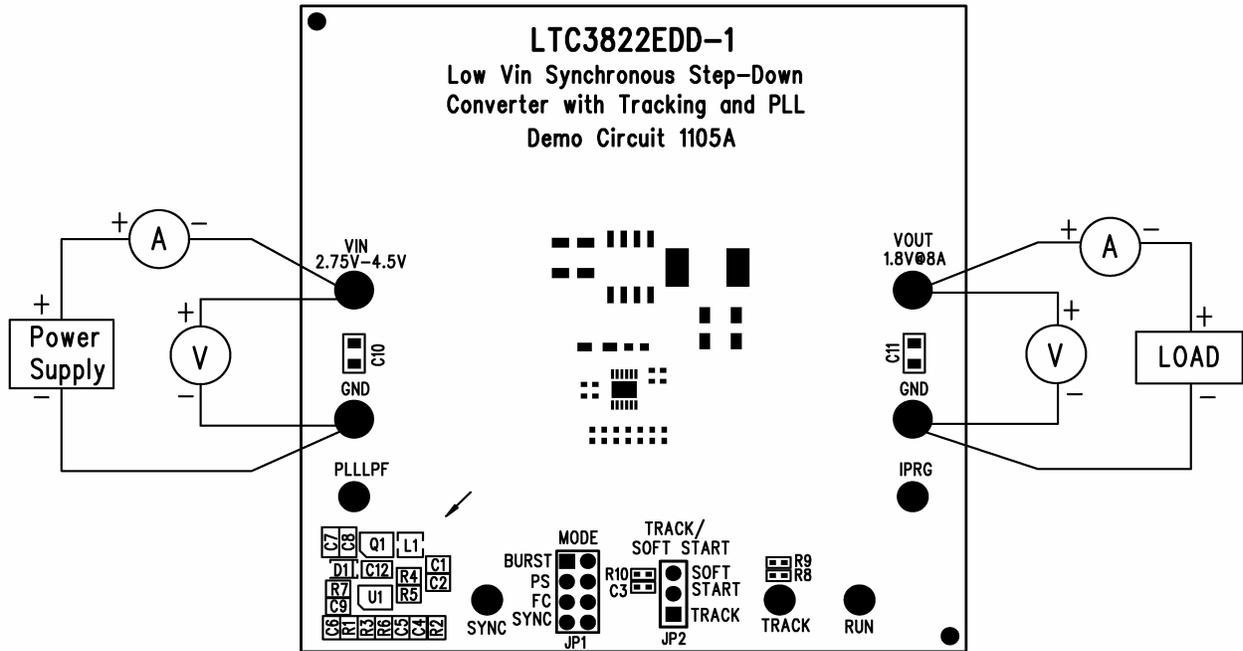


Figure 1. Proper Measurement Equipment Setup

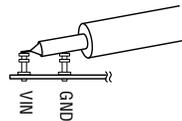


Figure 2. Measuring Input or Output Ripple

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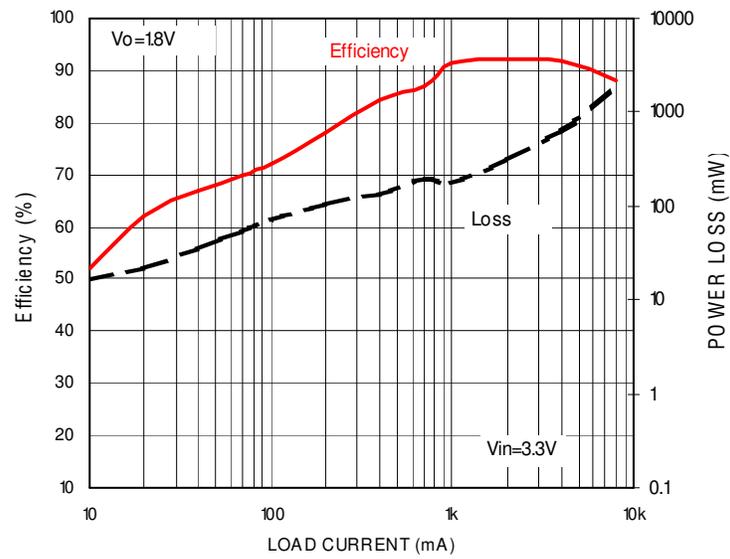
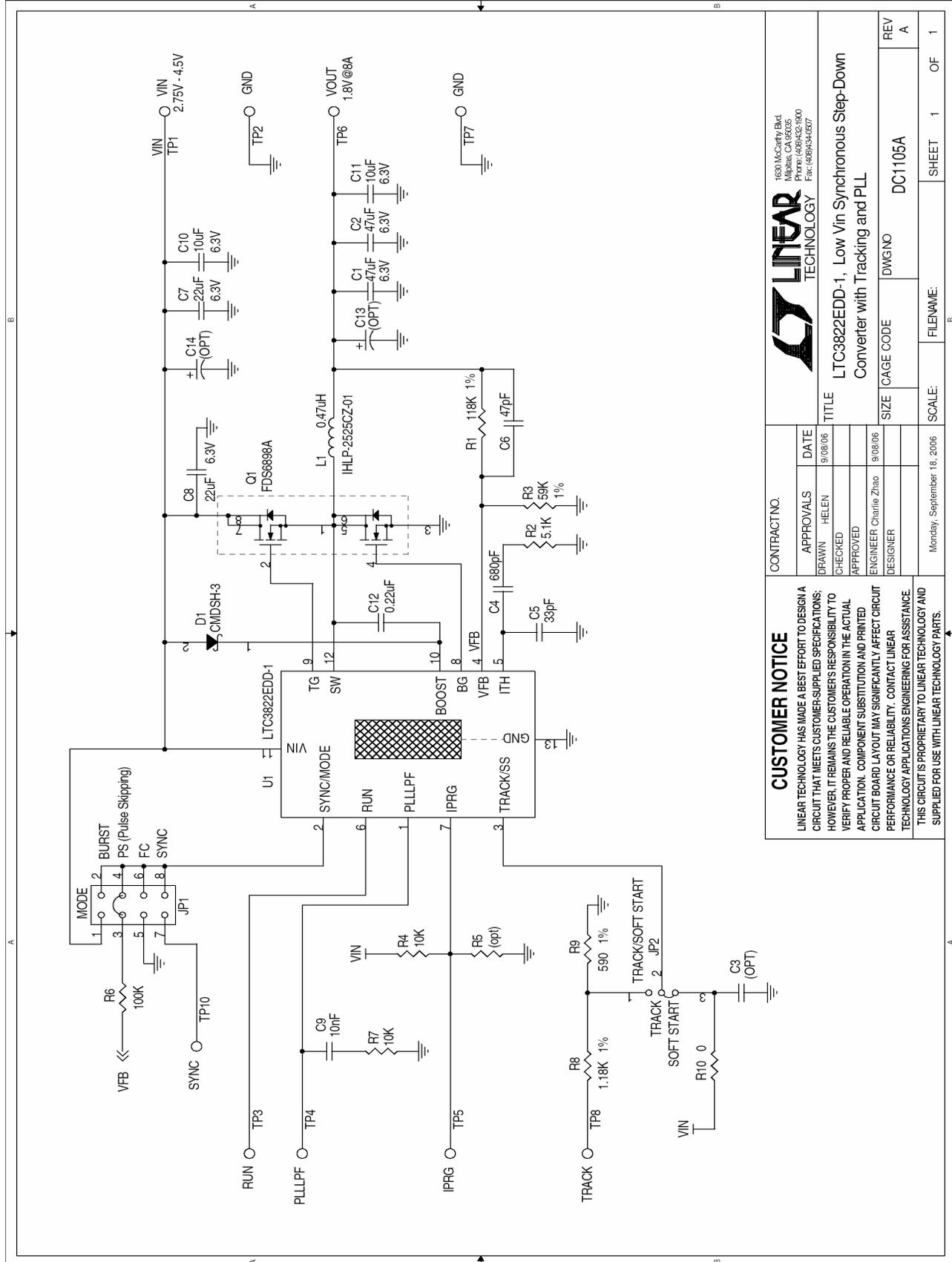


Figure 3. Efficiency and Power Loss vs Load Current (Pulse Skipping, 550KHz)

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------|----------------------------|
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| APPROVALS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | DATE      | APPROVED            | DESIGNER                   |
| DRAWN HELEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 9/08/06   | CHECKED             | ENGINEER CHARLIE ZHAO      |
| CHECKED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           | APPROVED            |                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           | DESIGNER            |                            |
| TITLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           | SIZE                | SCALE                      |
| LTC3822EDD-1, Low Vin Synchronous Step-Down Converter with Tracking and PLL                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | DWG NO              | Monday, September 18, 2006 |
| CAGE CODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | FILENAME: | SHEET               | OF                         |
| DC1105A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           | 1                   | 1                          |
| REV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |                     |                            |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |                     |                            |

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|----------------------------------------------------------------------------------------|-----------|
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| <b>LINEAR TECHNOLOGY</b>                                                               |           |
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| CAGE CODE                                                                              | FILENAME: |
| DC1105A                                                                                |           |
| REV                                                                                    |           |
| A                                                                                      |           |

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