

# **LTC3852EUDD** **LOW VIN, HIGH EFFICIENCY** **STEP-DOWN DC/DC CONVERTER**

## **DESCRIPTION**

Demonstration circuit 1270A is a low input voltage, high efficiency synchronous buck DC/DC converter with 2.7V to 5.5V input range. It can supply 15A maximum load current at 1.5V output. The demo board features the LTC®3852EUDD controller. The integrated charge pump provides 5V to the LTC3852's control logic and gate drives, supporting a wide selection of logic-level N-channel power MOSFETs with high efficiency. The constant frequency current mode architecture allows a phase-lockable frequency of up to 750kHz. The LTC3852 is ideal for general purpose 3.3V systems, lithium-ion powered devices and distributed DC power systems. The LTC3852EUDD is in a 3mm x 5mm 24-Lead QFN package.

The light load operation mode of the converter is determined with the FCB pin. Use JP2 jumper to select burst mode, discontinuous mode or forced continuous mode operation. Switching frequency is pre-set at about 400kHz. This frequency can be easily modified from 250kHz to 750kHz by changing the value of a resistor (R5). The converter can also be externally synchronized from 250kHz to 750kHz through MODE/PLLIN pin (PLLIN terminal on the board). To shut down the converter, one simple way is to force the RUN pin below 1.1V (JP1: OFF). The power good output (PGOOD terminal) is low when the output voltage exceeds the +/-10% regulation window.

**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 5.5V
Output Voltage, $V_{OUT}$	$V_{IN} = 2.7\text{-}5.5\text{V}$ , $I_{OUT} = 0\text{A to }15\text{A}$	$1.5\text{V} \pm 2\%$
Maximum Output Current, $I_{OUT}$	$V_{IN} = 2.7\text{-}5.5\text{V}$ , $V_{OUT} = 1.5\text{V}$	15A
Typical Output Ripple	$V_{IN} = 3.3\text{V}$ , $I_{OUT} = 15\text{A}$ (20MHz BW)	11mV <sub>P-P</sub>
Typical Efficiency	$V_{IN} = 3.3\text{V}$ , $V_{OUT} = 1.5\text{V}$ , $I_{OUT} = 15\text{A}$	90.4%
Typical Switching Frequency		400kHz

## QUICK START PROCEDURE

Demonstration circuit 1270A is easy to set up to evaluate the performance of the LTC3852EUDD. Refer to Figure 1 for the proper measurement equipment setup and follow the procedure below:

1. With power off, connect the input power supply to Vin (2.7V-5.5V) and GND (input return).
2. Connect the 1.5V output load between Vout and GND (Initial load: 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. Vout should be 1.5V $\pm$ 2%.
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.

Note: When measuring the output or input voltage ripple, do not use the long ground lead on the oscilloscope probe. See Figure 2 for the proper scope probe technique. Short, stiff leads need to be soldered to the (+) and (-) terminals of an output capacitor. The probe's ground ring needs to touch the (-) lead and the probe tip needs to touch the (+) lead.

## OPTIONAL HIGH INPUT VOLTAGE

### (4-38V) OPERATION

The LTC3852 can also be used for high input voltage application (4V-38V input), with the integrated charge pump bypassed:

1. Remove the 0 ohm resistor from R3 and put the resistor at R26 position (disconnect Vin1 from Vin, and connect Vin2 from Vin). Remove R22. The C1 flying cap can also be removed.
2. The related power components, such as input/output capacitors, MOSFETs, inductor, need to be changed to fit the new application specification.

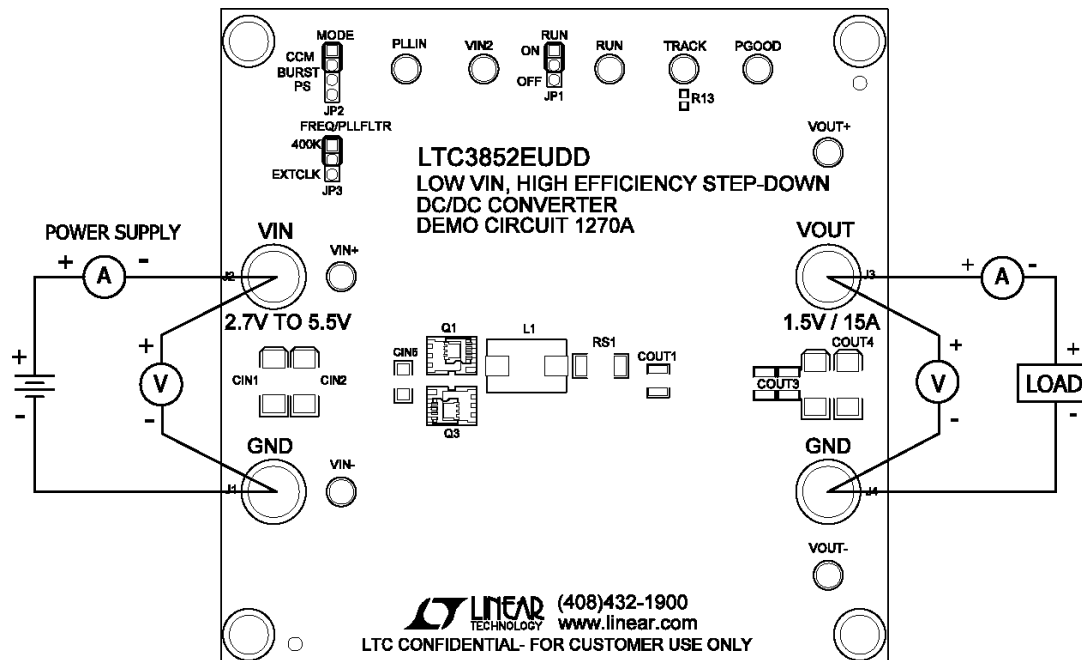


Figure 1. Proper Measurement Equipment Setup

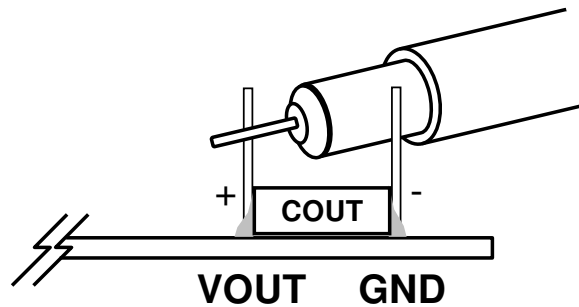


Figure 2. Measuring Output Voltage Ripple

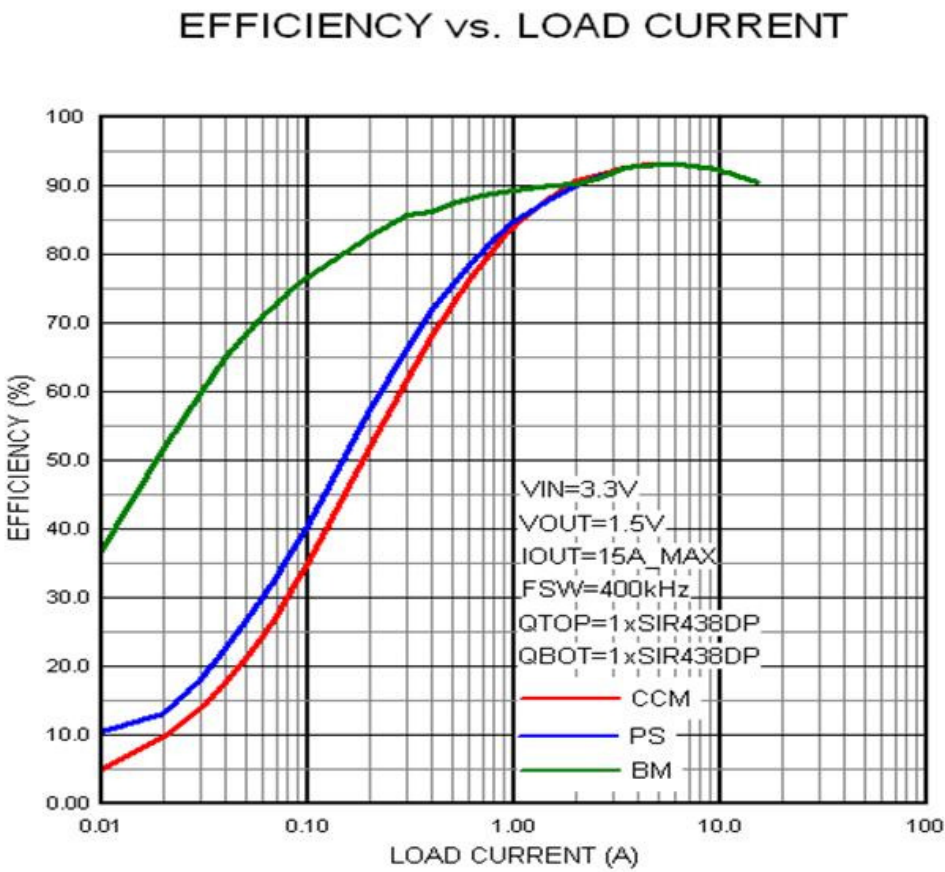


Figure 3. Efficiency vs load current

