

1A μ Power Step-down Switching Regulator

DESCRIPTION

Demonstration circuit 1222A is a monolithic step-down DC/DC switching regulator featuring LT3682. The demo board is designed for 5V output from a 6.9V to 36V input with transient up to 60V. The wide input range of the LT3682 allows a variety of input sources. The typical sources are automotive batteries, wall adaptors and industrial supplies. The switching frequency can be programmed either via oscillator resistor or external clock. The modes of operation (Burst Mode and fixed frequency) are jumper selectable. The Burst Mode operation increases the efficiency at light loads while fixed frequency mode maintains a constant switching frequency regardless of the load current. Note that the maximum load current depends on which mode is chosen (see "Inductor Selection and Maximum Output Current" section for detail).

The current mode control scheme creates fast transient response and good loop stability. The gate drive of the internal switch is boosted to a voltage that is higher than the V_{in} to ensure saturation of the switch.

The LT3682's integrated boost diode reduces the parts count. The RUN/SS pin can be used to set the part in micro power shutdown mode, reducing the supply current to less than 1 μ A. The RUN/SS pin can also be used to program soft start. In this mode, the RUN/SS pin is driven through an external RC filter to create a voltage ramp on this pin. The soft start function reduces the input current surge during start-up.

The LT3682 datasheet gives a complete description of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for demo circuit 1222A.

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

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Table 1. Performance Summary for Step-down Switching Regulator ($T_A = 25^{\circ}\text{C}$)

PARAMETER FOR BUCK REGULATOR	CONDITION	VALUE
Minimum Input Voltage		6.9V
Maximum Input Voltage		36V
Output Voltage V_{OUT}		5.0V +/- 4%
Maximum Output Current		1A (note1)
Typical Switching Frequency		800kHz

Note 1: Sync=0V, $V_{in} > 12\text{V}$. See Figure 1 and the datasheet for detail

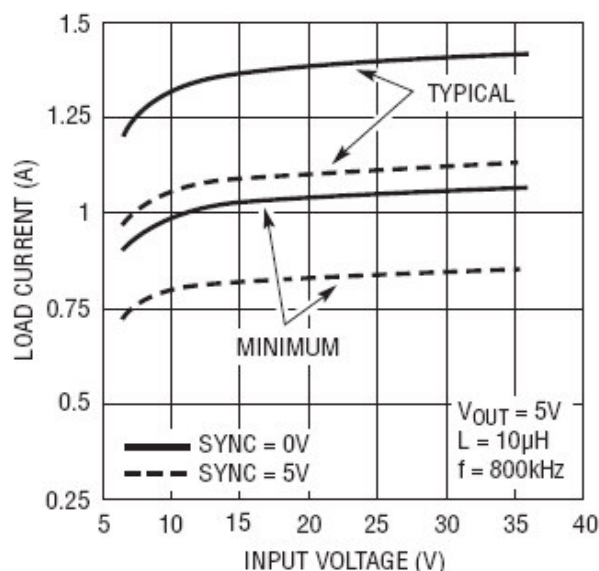


Figure 1. Maximum load current vs input voltage

QUICK START PROCEDURE

Demonstration circuit 1222A is easy to set up to evaluate the performance of the LT3682. Refer to Figure 2 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 3 for proper scope probe technique.

1. Place JP1 on the ON position, and place JP2 on the Burst Mode position.
2. With power off, connect the input power supply to Vin and GND.
3. Turn on the power at the input.

4. Check for the proper output voltage.

Note. If there is no output, temporarily disconnect the load to make sure that the load is not set too high.

5. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.
6. Place JP2 on the Sync position, apply 5V square wave signal to the SYNC pin, and observe the switching frequency as the SYNC frequency varies. PLS make sure that the SYNC frequency is around 20% higher than the set switching frequency and the output load is lower than 0.8A.

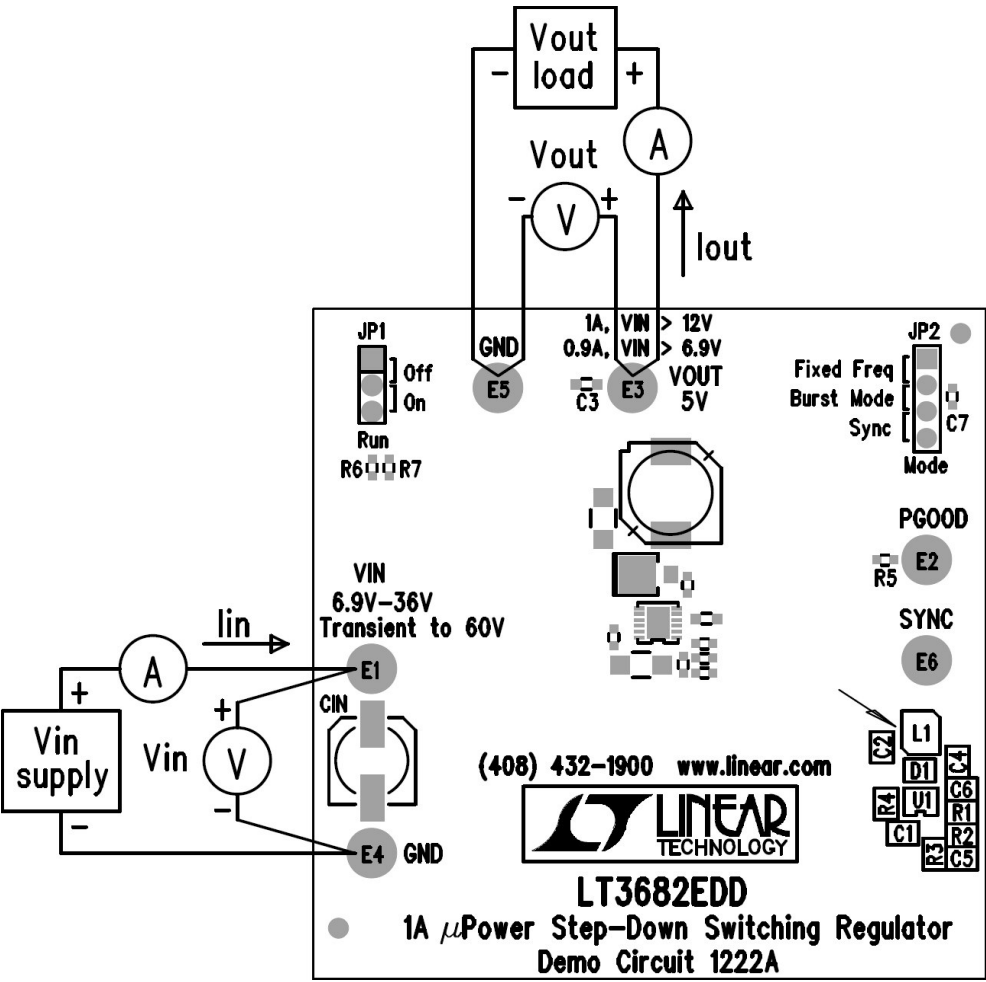


Figure 2. Proper Measurement Equipment Setup

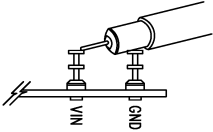
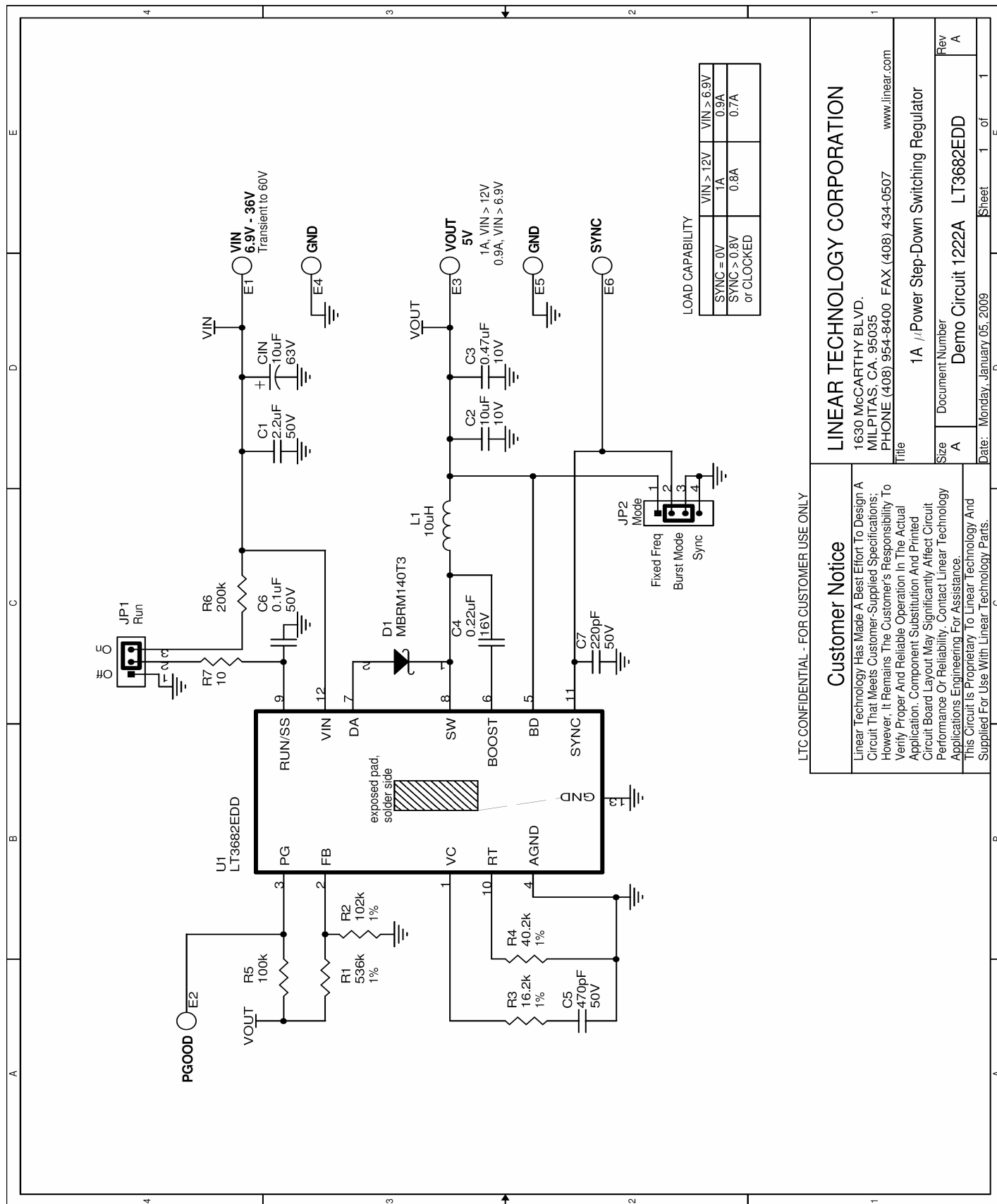


Figure 3. Measuring Input or Output Ripple



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