

DESCRIPTION

Demonstration circuit 1163A is a high efficiency synchronous buck-boost DC/DC converter with 6V to 32V input range. It can supply 12A maximum load current at 12V output. The demo board features the LTC®3780EG controller. The constant frequency current mode architecture allows a phase-lockable frequency of up to 400kHz. With a wide input range, output range and seamless transfers between operation modes, the LTC3780 is ideal for automotive, telecom and battery-powered systems.

The operation mode of the converter is determined through the FCB pin. Use JP1 jumper to select burst mode, discontinuous mode or forced continuous mode operation. Switching frequency is pre-set at 200kHz. This frequency can be easily modified from

200kHz to 400kHz by changing PLLFLTR pin DC voltage level (through optional R16 and R18). The converter can also be externally synchronized from 200kHz to 400kHz through PLLIN pin (SYNC terminal on the board). To shut down the converter, one simple way is to force the RUN pin (RUN terminal) below 1.5V. A power good output pin (PGOOD terminal) indicates when the output is within 7.5% of its designed set point.

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		6V to 32V
Output Voltage, V _{OUT}	V _{IN} = 6-32V, I _{OUT} = 0A to 12A	12V ±2%
Maximum Output Current, I _{OUT}	V _{IN} = 6-32V, V _{OUT} = 12V	12A
Typical Output Ripple	V _{IN} = 32V, I _{OUT} = 12A (20MHz BW)	110mV _{p-p}
Typical Switching Frequency	PLLLPF Pin Floating	200kHz

QUICK START PROCEDURE

Demonstration circuit 1163A is easy to set up to evaluate the performance of LTC3780. Refer to Figure 1 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 2 for proper scope probe technique.

1. With power off, connect the input power supply to Vin (6V-32V) and GND (input return).

2. Connect the 12V 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 12V±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.

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1163

HIGH EFFICIENCY SYNCHRONOUS BUCK-BOOST CONVERTER

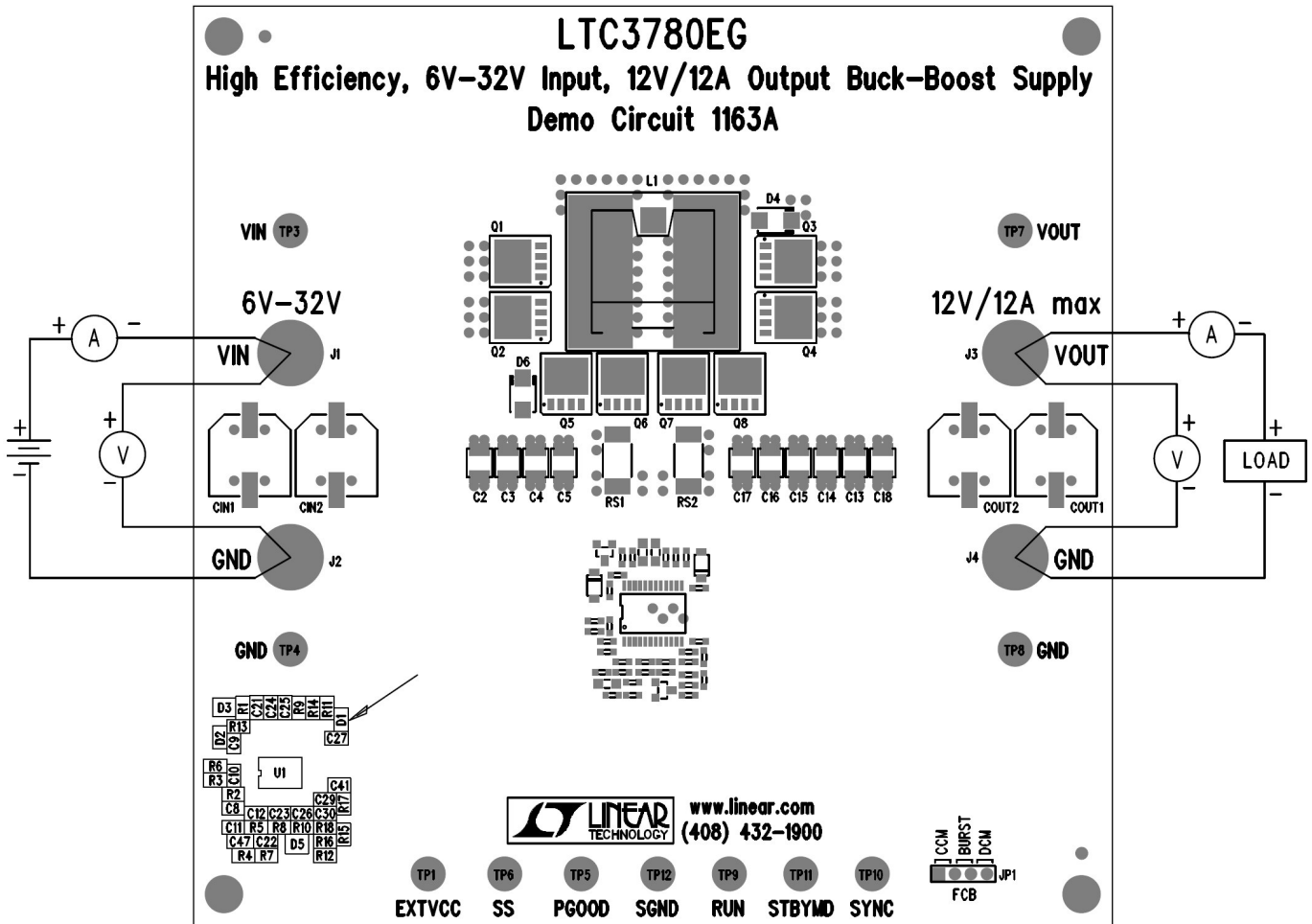


Figure 1. Proper Measurement Equipment Setup

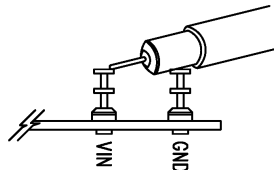


Figure 2. Measuring Input or Output Ripple

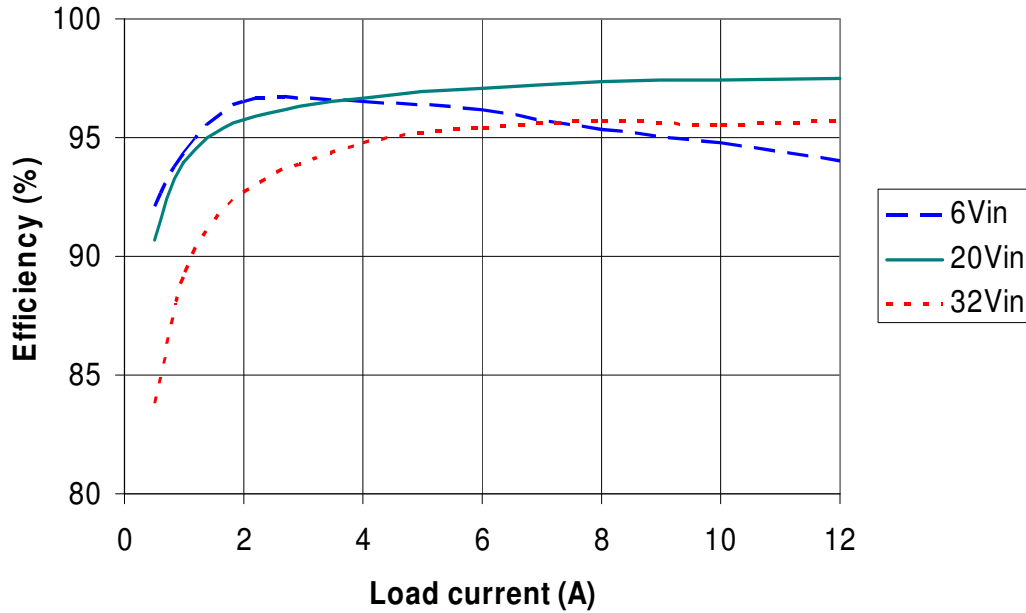


Figure 3. Efficiency vs load current (DCM)

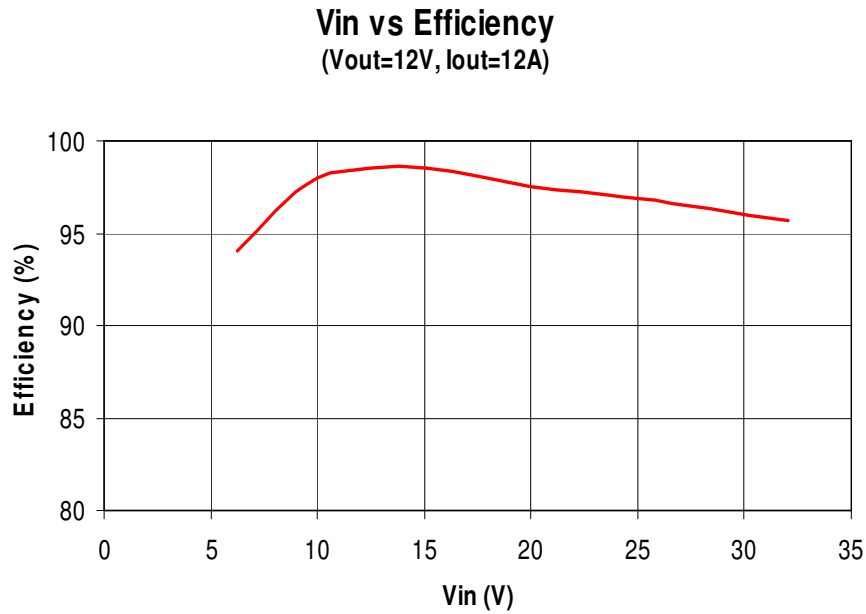
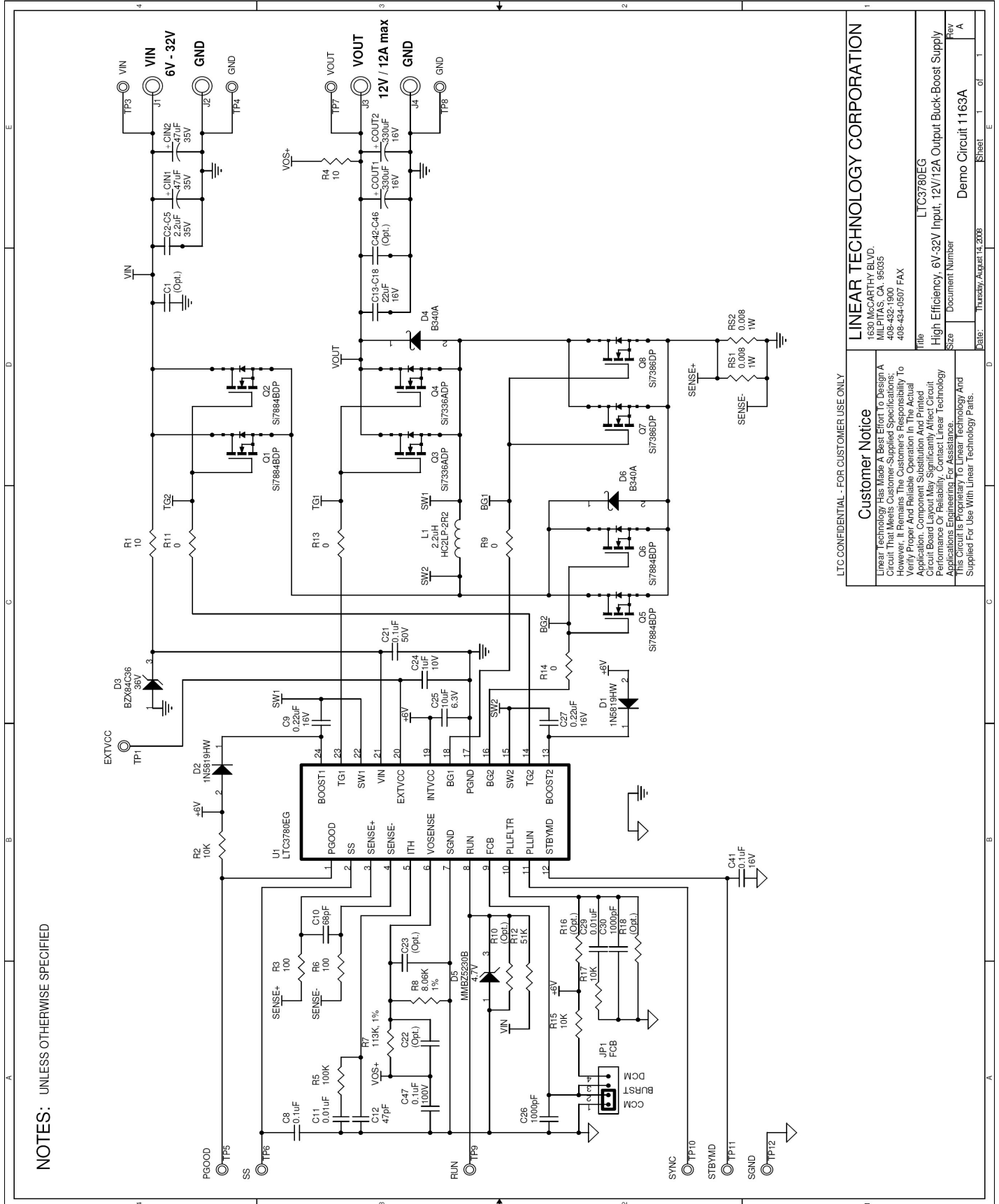


Figure 4. Efficiency vs Vin

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1163 HIGH EFFICIENCY SYNCHRONOUS BUCK-BOOST CONVERTER



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This Circuit Is Proprietary To Linear Technology And Supplied For Use With Linear Technology Parts.

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Title: **LTC3780EG**
High Efficiency, 6V-32V Input, 12V/12A Output Buck-Boost Supply

Size: Document Number
Revision: A

Date: Thursday, August 14, 2008
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