QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1046A

HIGH EFFICIENCY 48V BUCK BOOST DC/DC SUPPLY

LTC3780EG/LTC4440ES6

DESCRIPTION

Demonstration circuit 1046A is a non-isolated, high efficiency buck-boost DC/DC supply featuring LTC®3780EG and LTC®4440ES6. The LTC3780 is a high performance 4-switch synchronous buck boost regulator and the LTC4440 is a 100V-rated FET driver. The input voltage of the demo board is designed for 36V to 72V. The output voltage is 48V. At 25C° room temperature, the maximum output current is 5A without a cooling fan and 6A with 150LFM air flow for cooling. An optional 12V bias flyback supply using the LTC3803 is stuffed on the board to power the LTC3780 and LTC4440.

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	Min / Max	36V-72V
Output Voltage V_{OUT}	I_{OUT} = 0A to 6A	48V ± 2%
Maximum Output Current	VIN = 36V to 72V, no fan, at room T_A=25C°	5A
	VIN = 36V to 72V, 150LFM air flow, at room T_A=25C°	6A
Switching frequency	36V to 72V input, typical	300kHz
Full Load Efficiency	V_{IN} = 36V, V_{OUT} = 48V, I_{OUT} = 6A	96.8% Typical
	V_{IN} = 48V, V_{OUT} = 48V, I_{OUT} = 6A	96.6 % Typical
	V_{IN} = 72V, V_{OUT} = 48V, I_{OUT} = 6A	96.4 % Typical

QUICK START PROCEDURE

Demonstration circuit 1046A is easy to set up to evaluate the performance of the LTC3780EG. 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 and GND. Connect the load between VOUT, and GND. Preset the load current at 0A (minimum). Refer to Figure 1 for correct test set up. The default position of FCB jumper JP1 is CCM.
2. Turn on the input power.

   NOTE: Make sure that the input voltage does not exceed 72V.
3. Check for the proper output voltage in the range of 47.0V to 49.0V. If there is no output, temporarily disconnect the load to make sure that the load is not set too high.
4. Once the proper output voltages are established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

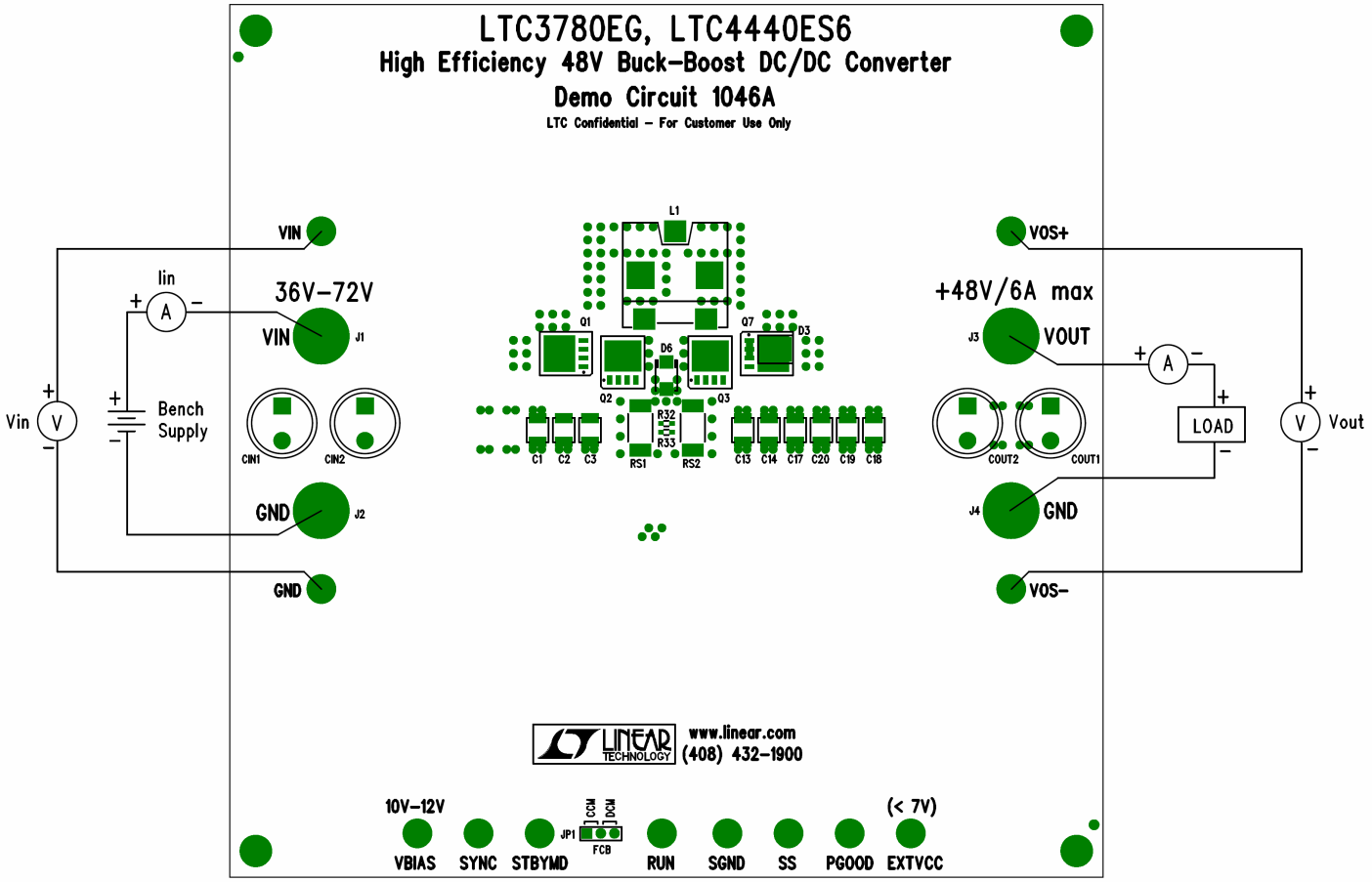


Figure 1. Proper Measurement Equipment Setup

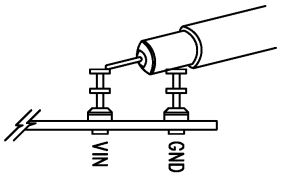


Figure 2. Measuring Input or Output Ripple

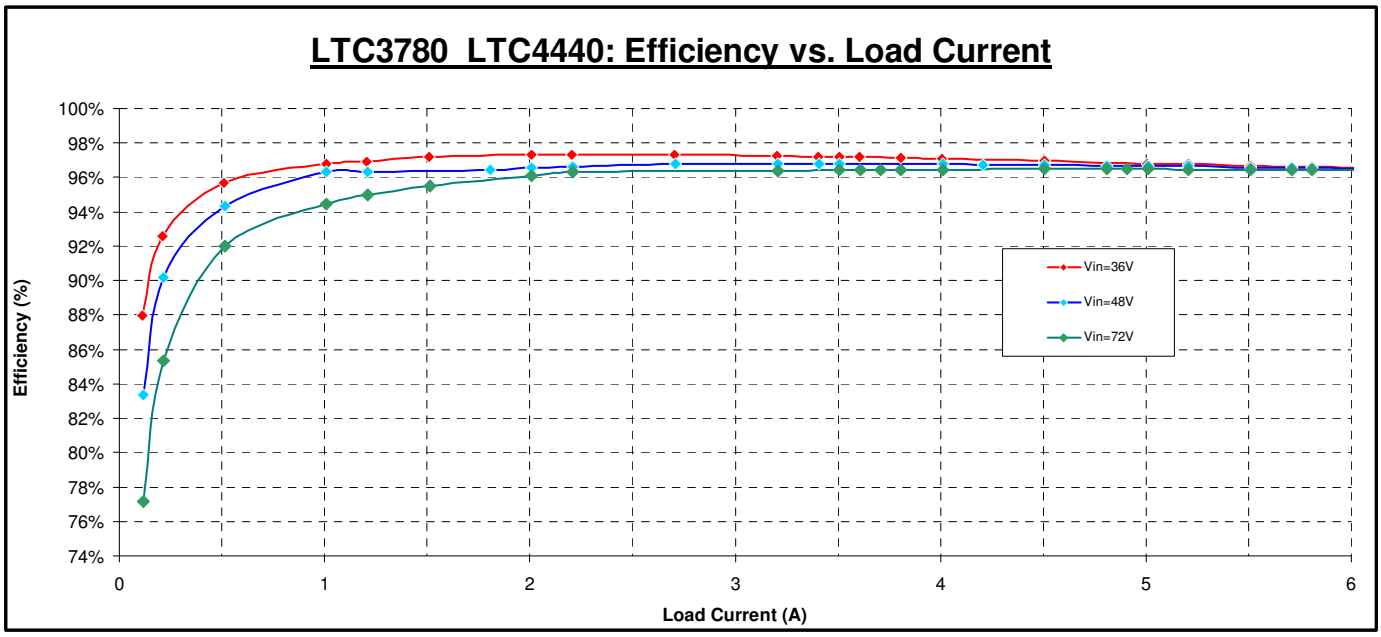
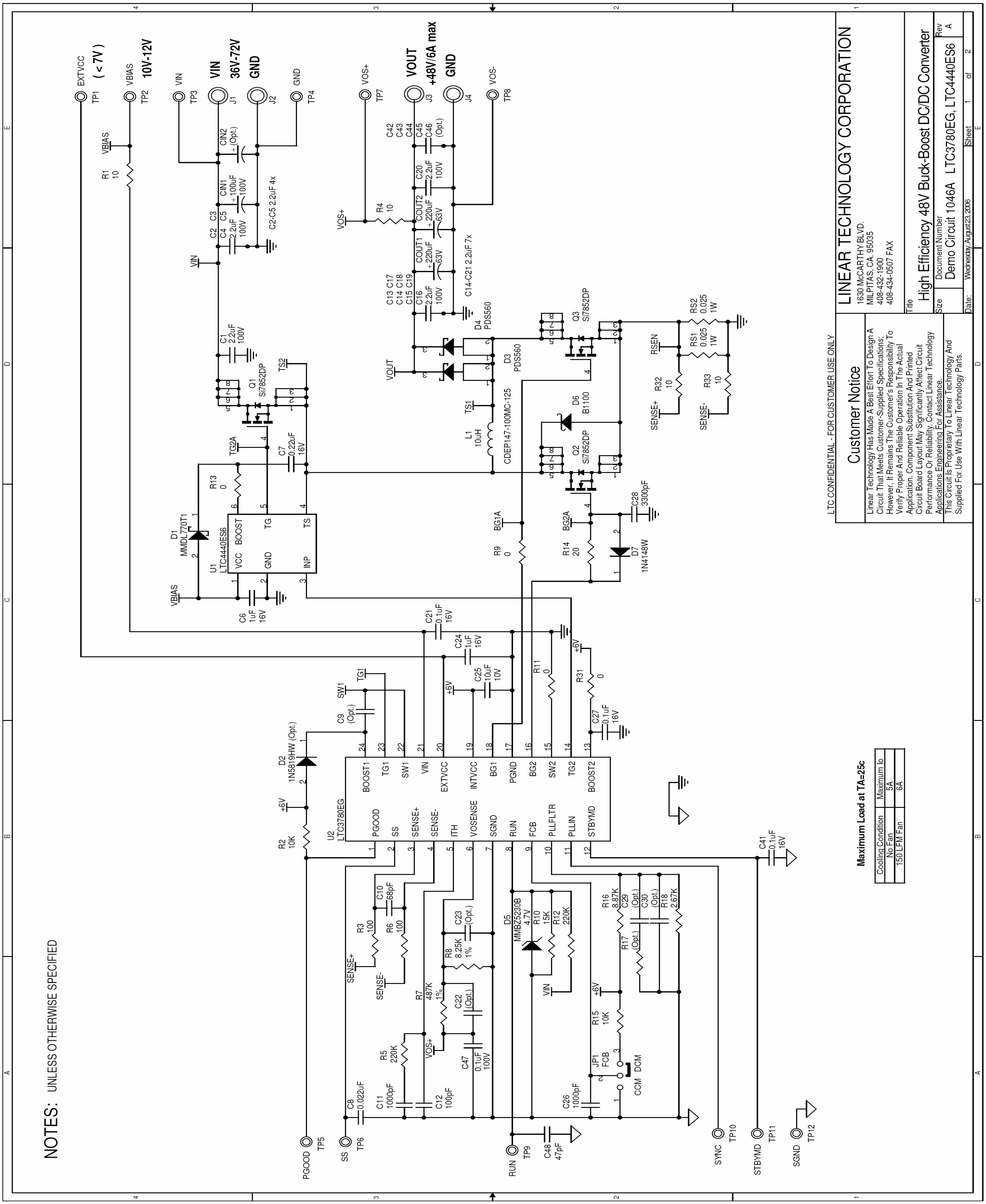


Figure 3. Typical Supply Efficiency vs Load Current at 36V, 48V and 72V input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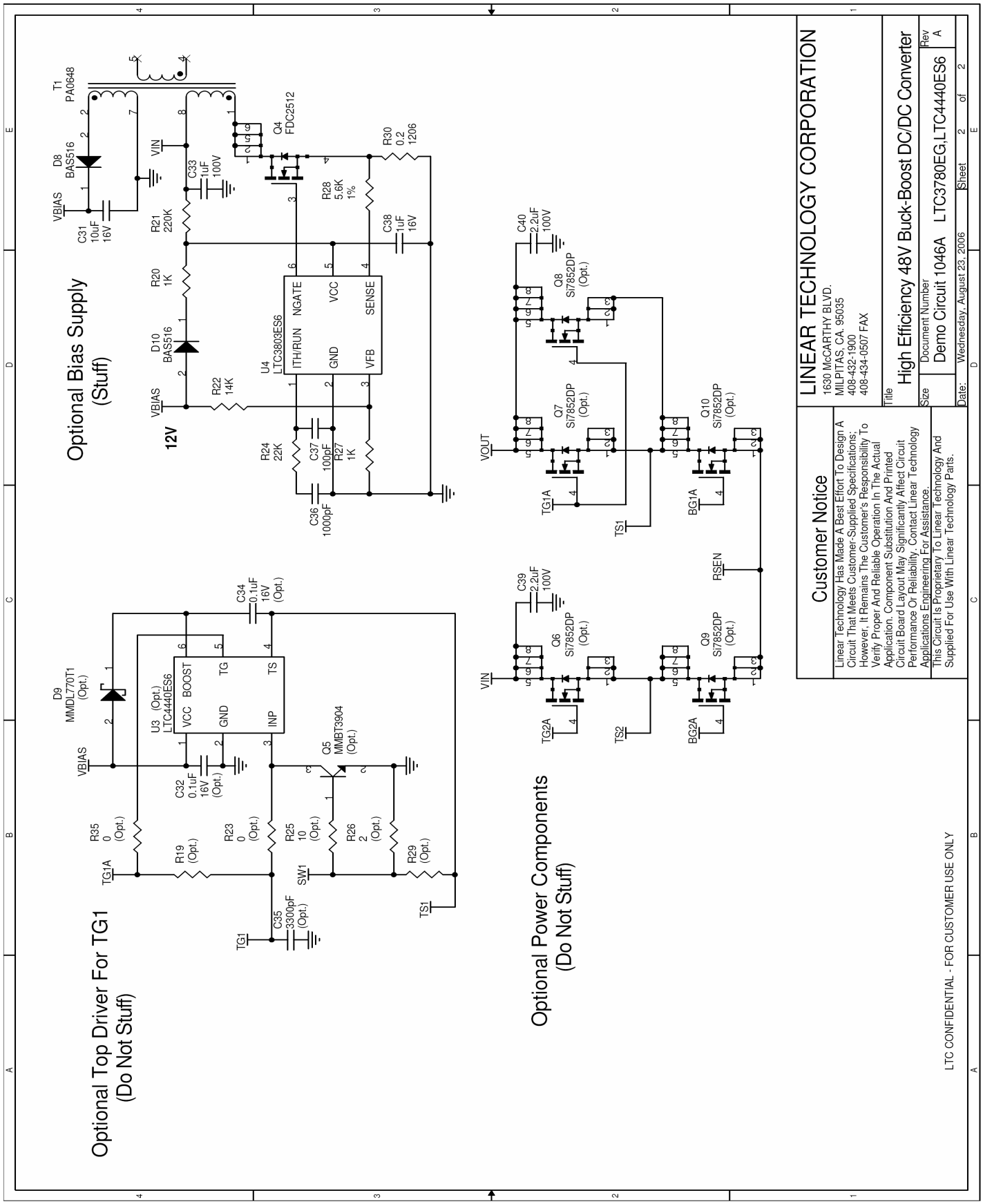
Title
High Efficiency 48V Buck-Boost DC/DC Converter
Size
Document Number
Demo Circuit 1046A LTC3780EG, LTC4440ES6
Rev
A
Date: Wednesday, August 23, 2006
Sheet 1 of 2
Maximum Load at TA=25c
Cooling Condition | Maximum Io
No Fan | 5A
150 LFM Fan | 6A
EXTVCC (< 7V)
VBIAS 10V-12V
VIN 36V-72V
GND
VOUT +48V/6A max
GND
U2 LTC3780EG
U1 LTC4440ES6
Q1 Si7852DP
Q2 Si7852DP
Q3 Si7852DP
L1 10uH CDEP147-100MC-125
D3 PDS560
D4 PDS560
D6 B1100
D7 1N4148W
D1 MMDL770T1
D2 1N5819HW (Opt.)
D5 MMBZ5230B 4.7V
RS1 0.025 1W
RS2 0.025 1W
JP1 FCB CCM DCM
PGOOD TP5
SS TP6
RUN TP9
SYNC TP10
STBYMD TP11
SGND TP12



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