DEMO CIRCUIT 1487A
QUICK START GUIDE

LTC3854EMSE
WIDE INPUT RANGE AND SMALL FOOTPRINT BUCK CONVERTER

DESCRIPTION

Demonstration circuit 1487A is a small foot print, wide input voltage range, high efficiency synchronous buck converter with 4.5V to 34V input range. It can supply 12A maximum load current at 2.5V output. The demo board features the LTC®3854EMSE controller. The controller features a 400kHz constant frequency current mode architecture. With a wide input range and output range, the LTC3854 is ideal for automotive, telecom, industrial and distributed DC power systems. The demo board uses a high density, two sided drop-in layout with a minimal amount of components. The package of LTC3854EMSE is a small, low thermal impedance 12-lead plastic MSOP.

The RUN/SS pin (JP1) provides both soft-start and enable features. To shut down the converter, one simple way is to force the RUN pin below 0.4V (JP1: OFF).

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		4.5V to 34V
Output Voltage, V_{OUT}	V_{IN} = 4.5-34V, I_{OUT} = 0A to 12A	2.5V ±2%
Maximum Output Current, I_{OUT}	V_{IN} = 4.5-34V, V_{OUT} = 2.5V	12A
Typical Efficiency	V_{IN} = 20V, V_{OUT} = 2.5V, I_{OUT} = 12A	92%
Typical Switching Frequency		400kHz

QUICK START PROCEDURE

Demonstration circuit 1487A is easy to set up to evaluate the performance of the LTC3854EMSE. 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 (4.5V-34V) and GND (input return).
2. Connect the 2.5V 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 2.5V+/-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.

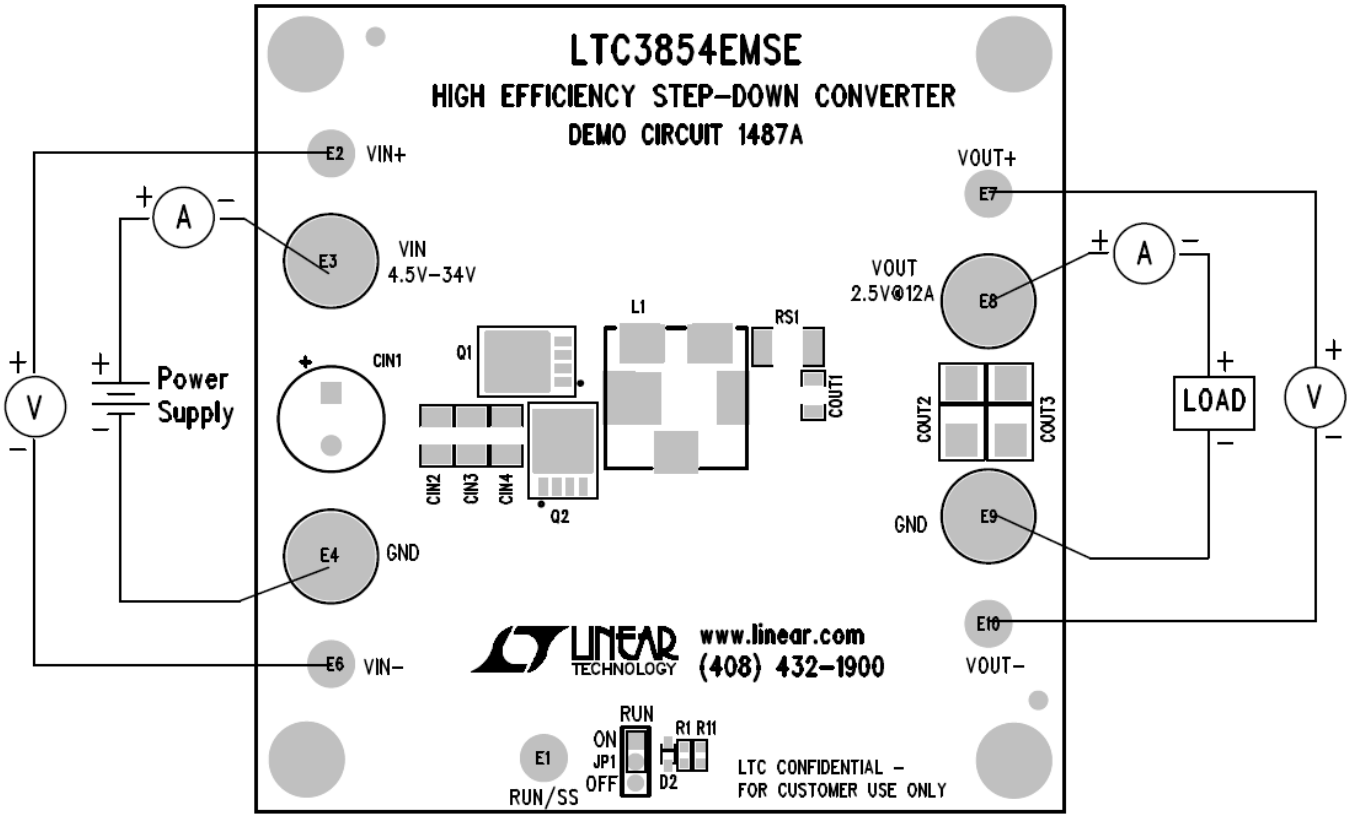


Figure 1. Proper Measurement Equipment Setup

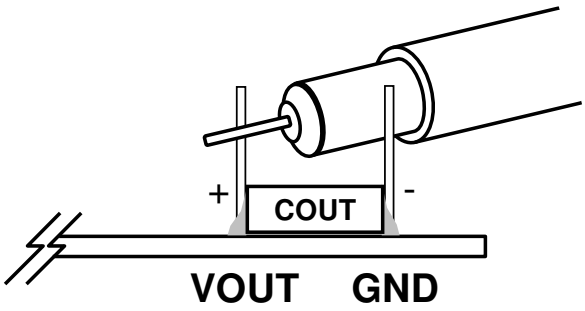


Figure 2. Measuring Output Voltage Ripple

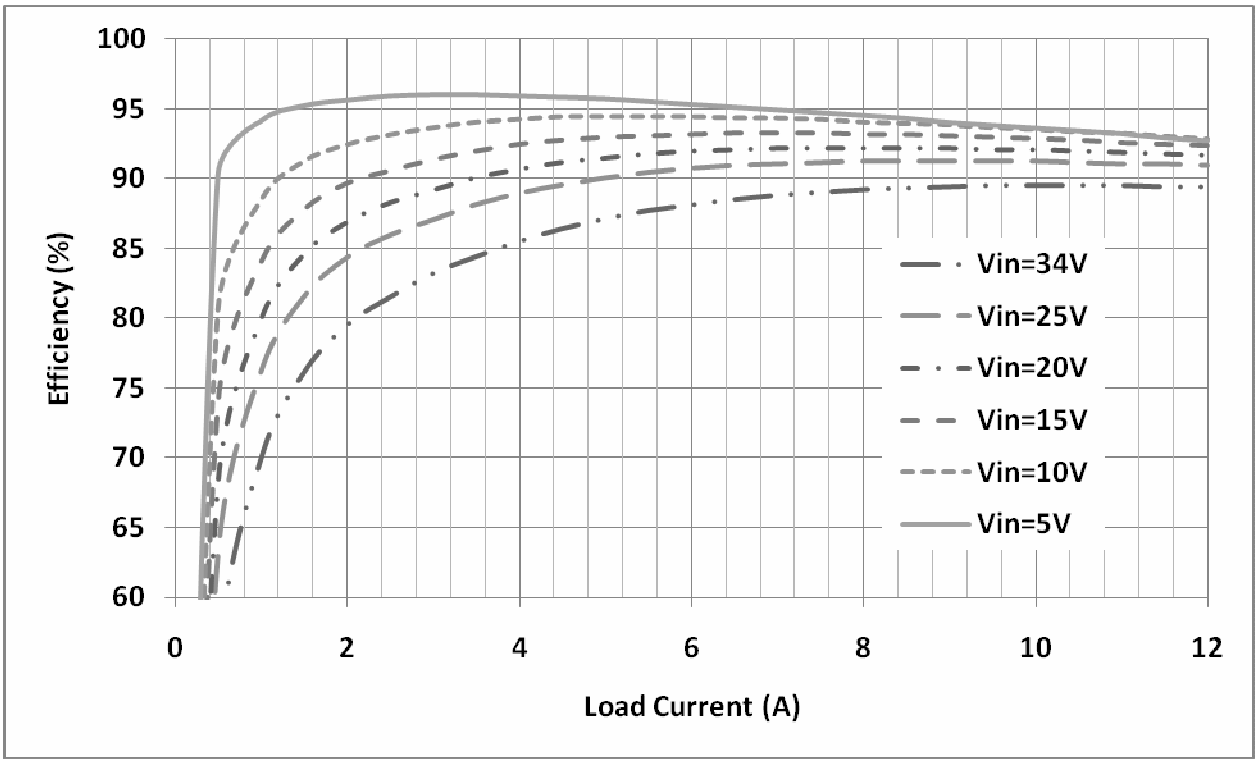
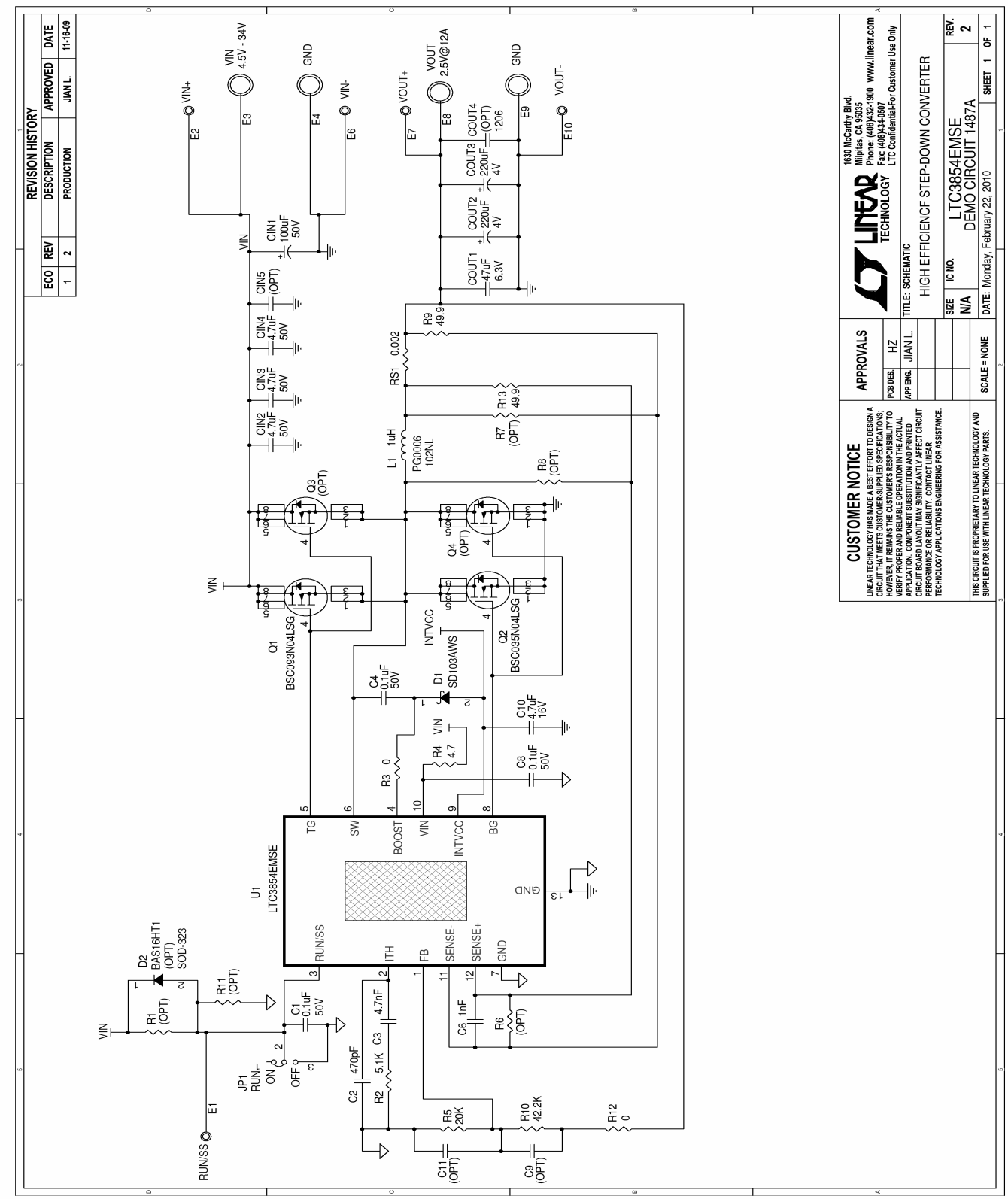


Figure 3. Efficiency vs load current


REVISION HISTORY
ECO REV DESCRIPTION APPROVED DATE
1 2 PRODUCTION JIAN L. 11-16-09
CUSTOMER NOTICE
LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.
APPROVALS
PCB DES. HZ
APP ENG. JIAN L.
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.
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LTC Confidential-For Customer Use Only
TITLE: SCHEMATIC
HIGH EFFICIENCF STEP-DOWN CONVERTER
SIZE IC NO. LTC3854EMSE REV. 2
N/A DEMO CIRCUIT 1487A
SCALE = NONE
DATE: Monday, February 22, 2010
SHEET 1 OF 1
U1 LTC3854EMSE
TG SW BOOST VIN INTVCC BG
RUN/SS ITH FB SENSE- SENSE+ GND
Q1 BSC093N04LSG
Q2 BSC035N04LSG
Q3 (OPT)
Q4 (OPT)
D1 SD103AWS
D2 BAS16HT1 (OPT) SOD-323
L1 1uH PG0006 102NL
RS1 0.002
R1 (OPT)
R2 5.1K
R3 0
R4 4.7
R5 20K
R6 (OPT)
R7 (OPT) 49.9
R8 (OPT)
R9 49.9
R10 42.2K
R11 (OPT)
R12 0
R13 49.9
C1 0.1uF 50V
C2 470pF
C3 4.7nF
C4 0.1uF 50V
C6 1nF
C8 0.1uF 50V
C9 (OPT)
C10 4.7uF 16V
C11 (OPT)
CIN1 100uF 50V
CIN2 4.7uF 50V
CIN3 4.7uF 50V
CIN4 4.7uF 50V
CIN5 (OPT)
COUT1 47uF 6.3V
COUT2 220uF 4V
COUT3 220uF 4V
COUT4 (OPT) 1206
JP1 RUN
ON OFF
VIN
VIN+
VIN- 4.5V - 34V
GND
VOUT+
VOUT- 2.5V@12A
RUN/SS
E1 E2 E3 E4 E6 E7 E8 E9 E10