QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1053A-A through 1053A-D

SYNCHRONOUS BOOST DC/DC CONVERTER

LTC3526/3526B/3526-2/3526B-2

DESCRIPTION

Demonstration circuits 1053A-A through 1053A-D are high efficiency synchronous boost converters capable of operating with an input voltage range from 0.9V to 5.5V. The 2X2 mm DFN thermally enhanced package with a 1MHz switching frequency (2MHz for LTC3526-2) and the 500mA internal switches provide a very tiny solution. The LTC3526 also features output disconnect and the input voltage can be greater or less than the output voltage.

This demonstration circuit allows the user to quickly evaluate the LTC3526 performance. Individual jumpers are provided for selecting several regulated output voltages and a low quiescent current shutdown. Terminals on the board allow easy hookup to an input supply and output load.

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

Table 1. Typical Specifications (25°C)

Input Voltage Range V_{IN}		1V to 5V
1.8V V_{OUT}	V_{IN} = 1V, I_{OUT} = 100mA	1.8V ± 2.5%
3.3V V_{OUT}	V_{IN} = 1.5V, I_{OUT} = 100mA	3.3V ± 2.5%
5V V_{OUT}	V_{IN} = 1.5V, I_{OUT} = 100mA	5.0V ± 2.5%
Output Ripple Voltage (burst mode)	V_{IN} = 1.2V, V_{OUT} = 1.8V I_{OUT} = 1mA	45mV p-p
Output Ripple Voltage (fixed frequency)	V_{IN} = 1.2V, V_{OUT} = 1.8V I_{OUT} = 100mA	10mV p-p
Efficiency	V_{IN} = 1.2V, V_{OUT} = 1.8V I_{OUT} = 50mA	85%
Efficiency	V_{IN} = 2.5V, V_{OUT} = 3.3V I_{OUT} = 50mA	92%

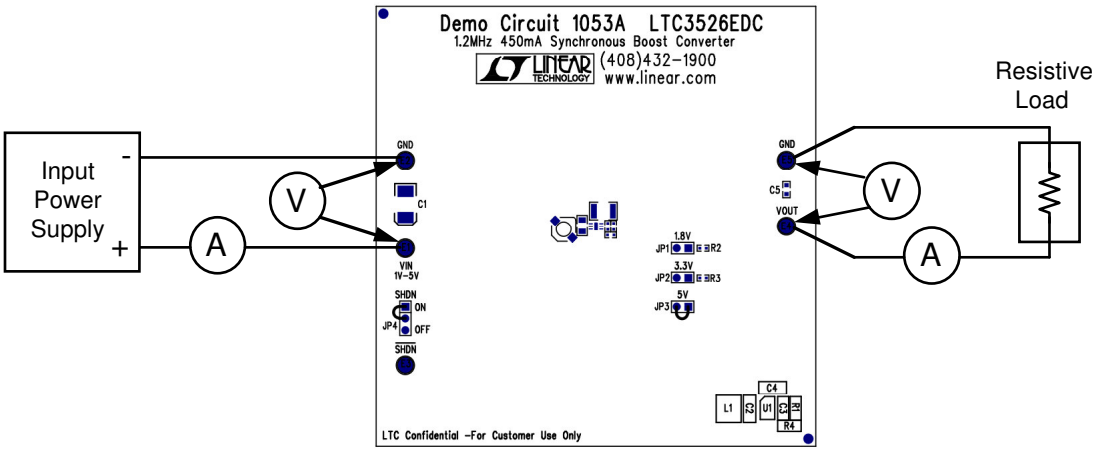


Figure 1. Demonstration Circuit Test Setup

Table 2. Demonstration Circuit Board Information

Board Number	LTC Part	Part Marking	Frequency	Mode
1053A-A	**LTC3526EDC**	**LCHW**	**1MHz**	**Burst**
1053A-B	**LTC3526BEDC**	**LCNN**	**1MHz**	**No Burst**
1053A-C	**LTC3526-2EDC**	**LCNM**	**2MHz**	**Burst**
1053A-D	**LTC3526B-2EDC**	**LCNP**	**2MHz**	**No Burst**

QUICK START PROCEDURE

There is one demonstration circuit board for all four LTC3526 versions. The boards are identified by the handwritten information on the top of the pc board.

The boost converter can be evaluated using the setup shown in Figure 1. Select one of the three output voltages using jumpers JP1 through JP3. (With no jumpers installed, the output voltage is 5V.) Set jumper JP4 in the ON position and connect voltmeters and ammeters as shown on the test setup. Connect a power supply to the V_{IN} and GND terminals and a suitable load resistor between VOUT and GND.

With a light load (1k resistor) at the output, begin increasing the input power supply voltage. At approximately 850mV, the output will rise to the selected regulated voltage. Increase the input voltage to approximately 1.5V and increase the load current.

Note the excellent load regulation when going from a light load current to a heavier load, but it is important to monitor the input voltage directly at the input terminals of the circuit board. At very low input voltages, voltage drops in the power supply wire, connections and Ammeter will result in the input voltage at the input terminals dropping below the minimum voltage required for operation.

Additional pc board pads are provided for an optional input bypass capacitor (C1). It may be necessary when using long wires between the power supply and circuit board, or for adding a tantalum capacitor to minimize input voltage transients that may occur when the input is hot-switched. Also, pads on the board backside are provided for adding a small Schottky diode (D1) which can increase the efficiency slightly under some conditions. But adding a diode defeats the output disconnect and short circuit protection features.

When verifying output ripple, it is important to use the scope probe connection as shown in Figure 3.

In Burst mode with light load current, the output ripple voltage is higher than in non-burst mode.

See LTC3526 Data Sheet for additional information

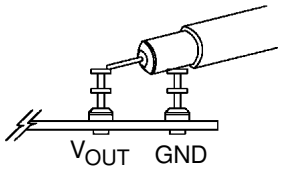
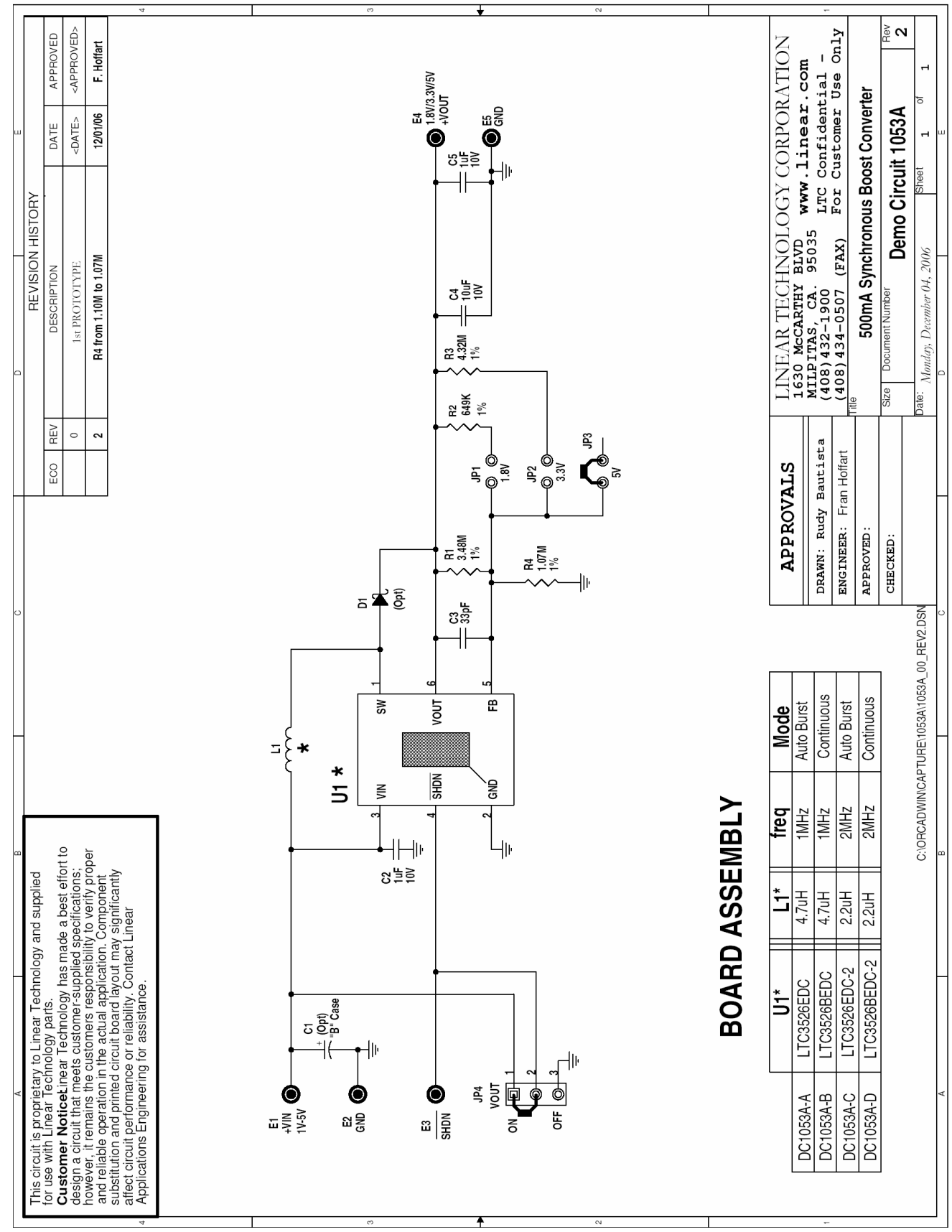


Figure 3. Scope Probe Placement for Measuring Output Ripple Voltage


REVISION HISTORY
ECO | REV | DESCRIPTION | DATE | APPROVED
0 | 1st PROTOTYPE | <DATE> | <APPROVED>
2 | R4 from 1.10M to 1.07M | 12/01/06 | F. Hoffart
This circuit is proprietary to Linear Technology and supplied for use with Linear Technology parts.
Customer Notice: Linear Technology has made a best effort to design a circuit that meets customer-supplied specifications; however, it remains the customers 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 Applications Engineering for assistance.
E1 +VIN 1V-5V
E2 GND
E3 SHDN
JP4 VOUT ON OFF
C1 (Opt) "B" Case
C2 1uF 10V
L1 *
U1 *
VIN
SHDN
GND
SW
VOUT
FB
D1 (Opt)
C3 33pF
R1 3.48M 1%
R2 649K 1%
R3 4.32M 1%
R4 1.07M 1%
JP1 1.8V
JP2 3.3V
JP3 5V
C4 10uF 10V
C5 1uF 10V
E4 1.8V/3.3V/5V +VOUT
E5 GND
BOARD ASSEMBLY
U1* | L1* | freq | Mode
DC1053A-A | LTC3526EDC | 4.7uH | 1MHz | Auto Burst
DC1053A-B | LTC3526BEDC | 4.7uH | 1MHz | Continuous
DC1053A-C | LTC3526EDC-2 | 2.2uH | 2MHz | Auto Burst
DC1053A-D | LTC3526BEDC-2 | 2.2uH | 2MHz | Continuous
C:\ORCADWIN\CAPTURE\1053A\1053A_00_REV2.DSN
APPROVALS
DRAWN: Rudy Bautista
ENGINEER: Fran Hoffart
APPROVED:
CHECKED:
LINEAR TECHNOLOGY CORPORATION
1630 McCARTHY BLVD MILPITAS, CA. 95035
(408)432-1900 (408)434-0507 (FAX)
www.linear.com
LTC Confidential - For Customer Use Only
Title: 500mA Synchronous Boost Converter
Size | Document Number | Demo Circuit 1053A | Rev 2
Date: Monday, December 04, 2006 | Sheet 1 of 1