DESCRIPTION

Demonstration circuit 1226A is a high efficiency synchronous boost converter capable of operating with an input voltage range from 1.8V to 5.25V with a fixed 5V output. The 8 lead LTC3529 in a 2X3 mm DFN thermally enhanced package with a 1.5MHz switching frequency and 1.5A internal switches provide a very tiny overall solution for USB On-The-Go hosting applications. The LTC3529 also feature output disconnect, resetting and latching fault detection, soft-start, low quiescent current shutdown and short circuit protection.

This demonstration circuit allows the user to quickly evaluate the LTC3529 performance. Jumpers are provided for shutdown, auto restart or latching of the fault detection and selectable LED or pull up resistor for fault indication. 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		0.5V to 5.25V
V_{OUT}	V_{IN} = 1V, I_{OUT} = 100mA	5V ± 2.5%
Output Ripple Voltage	V_{IN} = 2V, I_{OUT} = 300mA	15mV p-p
Efficiency	V_{IN} = 3V, I_{OUT} = 200mA	90%

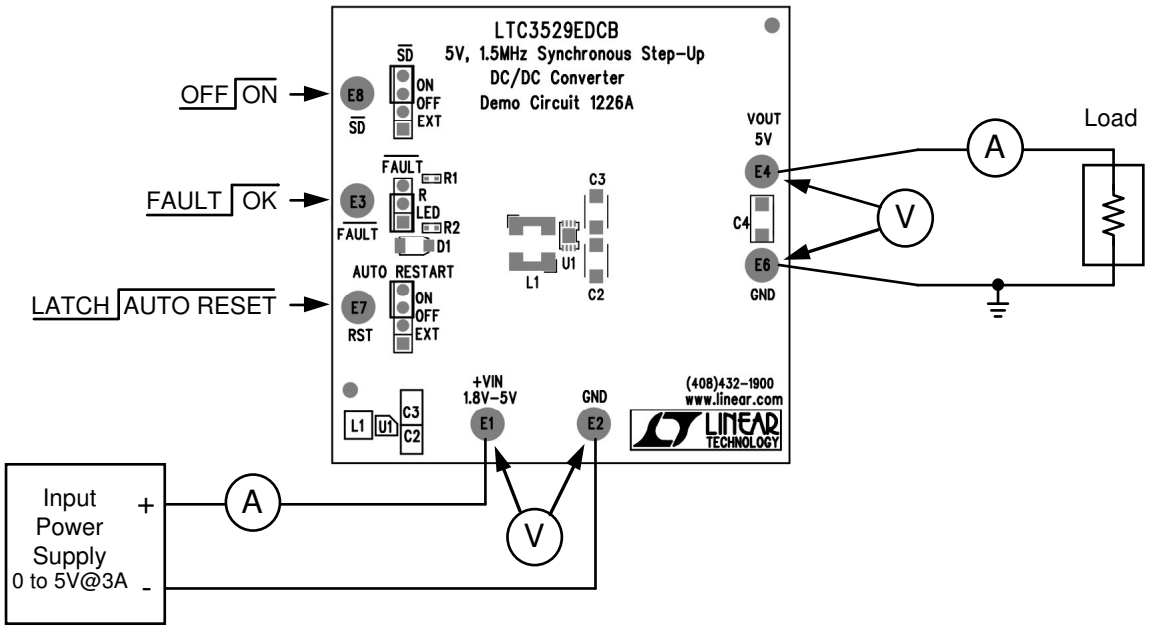


Figure 1. Demonstration Circuit Test Setup

Demo #	Part #	Part Marking
1226A	LTC3529EDCB	LCTZ

Table 2. Demonstration Circuit Board Information

QUICK START PROCEDURE

Begin the evaluation by placing the top and bottom jumpers in the upper position and the middle jumper in the lower position. Connect a suitable input power supply and output load as shown in Figure 1. With a light resistive load (1k), slowly increase the input voltage. At approximately 1.6V, the output voltage will quickly rise to a regulated 5V. Verify output voltage meets specifications shown in table 1.

The input voltage can exceed the output voltage and still maintain regulation, although the maximum output current is less and efficiency is lower. It should be noted that the output voltage ripple will increase as Vin approaches Vout. The increase will occur with an input voltage between 4V and 4.8 with a ripple voltage from 30mV to 100mV pp. Increasing output capacitance will reduce this ripple voltage.

Fault Detection

The LTC3529 features output over-current circuitry that will shut down the output if an overload persists for longer than 22ms. It also will attempt a restart every 22ms until the overload is removed or it can be programmed to latch off 22ms after an overload occurs. Figure 3 shows waveforms for a 3Ω load with the AUTO RESTART jumpers set to the ON position. Moving the jumper to OFF, the output will shutdown 22ms after the overload occurred and remain shutdown until reset by either removing and reapplying input power or by moving the SD jumper to OFF then back to ON.

The FAULT jumper selects either an LED for visual indication of the FAULT output or a 1M pull-up resistor to Vin to interface with a microcontroller.

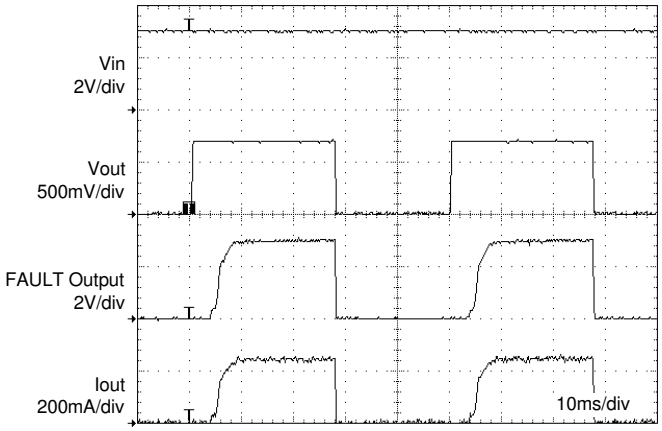


Figure 2. Auto Restart Overload Fault Detection Waveforms For a 3Ω Load.

At low input voltage, any voltage drop in the power supply wire, connections and Ammeter will result in the voltage at the input terminals dropping below the minimum voltage required for operation. A low impedance power source and wiring is necessary for maximum output current.

When verifying output ripple voltage, use the scope probe connection as shown in figure 4. Typical output voltage ripple with a 100mA and 400mA load are shown in figure 3.

Caution; Using an electronic load to evaluate this board can result in a relatively high input current surge which can produce an output voltage spike Output voltage spikes are also possible if the input connection is subject to contact bounce.

See LTC3529 Data Sheet for additional information

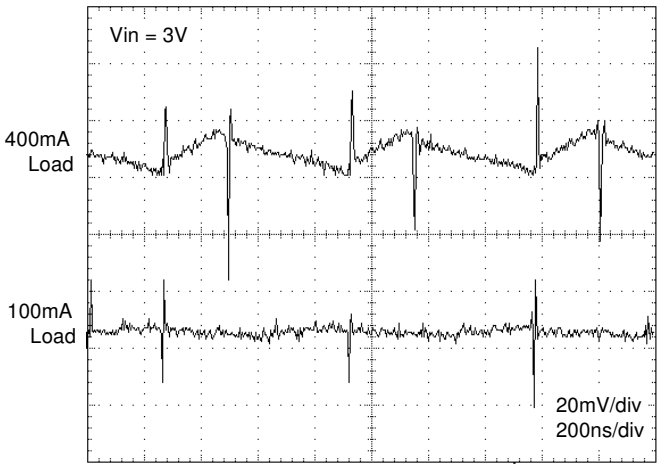


Figure 3. Typical Output Ripple Voltage

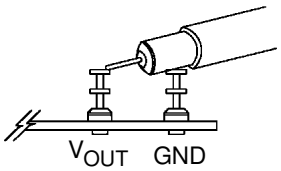
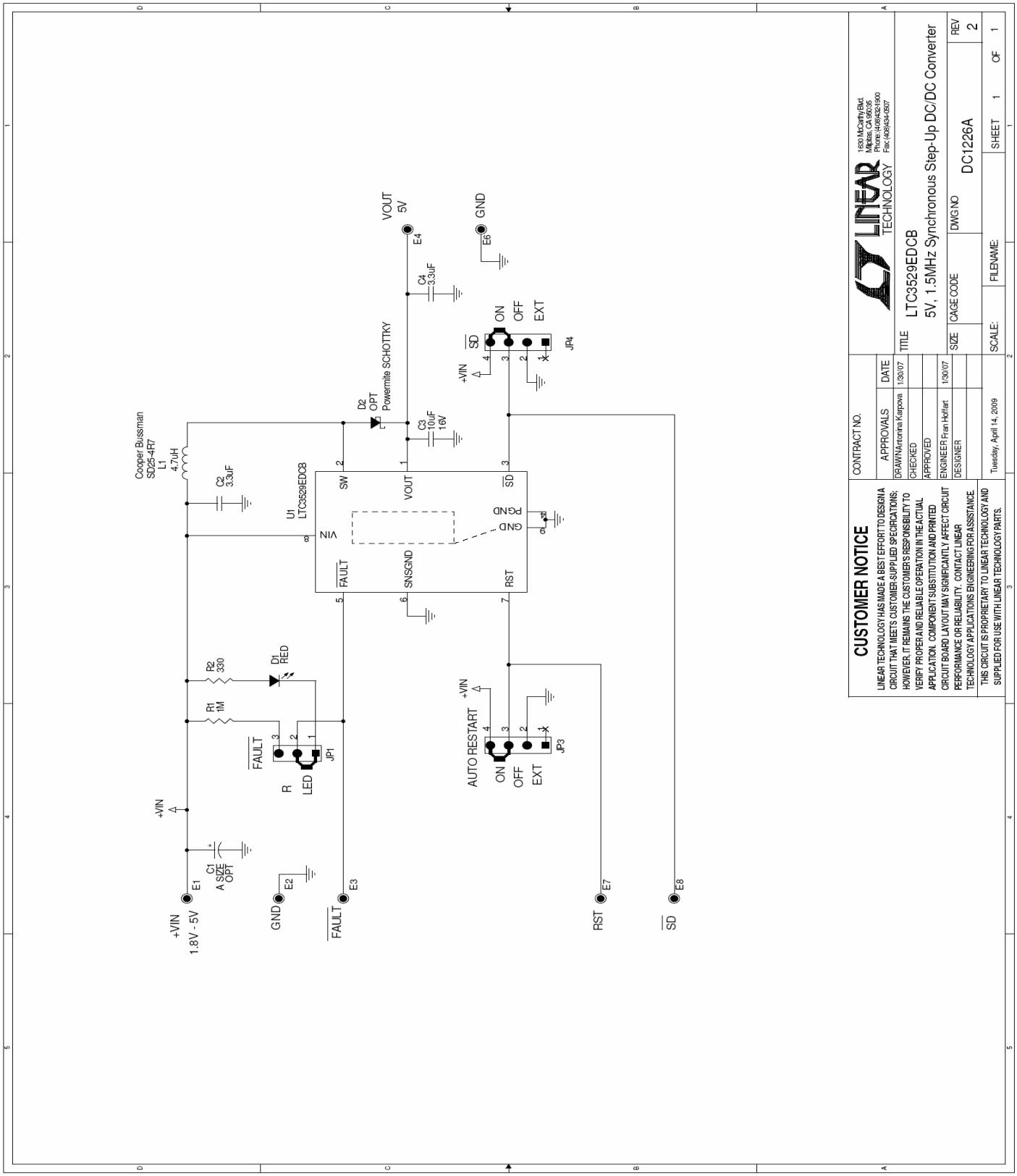


Figure 4. Scope Probe Placement for Measuring Output Ripple Voltage


VOUT
5V
E4
GND
E6
C4
3.3uF
ON
OFF
EXT
JP4
SD
+VIN
D2
OPT
Powermite SCHOTTKY
C3
10uF
16V
Cooper Bussman
SD25-4R7
L1
4.7uH
C2
3.3uF
U1
LTC3529EDCB
SW
VOUT
SD
VIN
PGND
GND
FAULT
SNSGND
RST
R2
330
D1
RED
R1
1M
FAULT
R
LED
JP1
AUTO RESTART
ON
OFF
EXT
JP3
+VIN
C1
A SIZE
OPT
+VIN
1.8V - 5V
E1
GND
E2
FAULT
E3
RST
E7
SD
E8
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TITLE
LTC3529EDCB
5V, 1.5MHz Synchronous Step-Up DC/DC Converter
SIZE
CAGE CODE
DWG NO
DC1226A
REV
2
SCALE:
FILENAME:
SHEET 1 OF 1