

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1211A-A/1211A-B 1A SYNCHRONOUS BOOST DC/DC CONVERTER LTC3528/3528B

## DESCRIPTION

Demonstration circuits 1211A-A and 1211A-B are high efficiency synchronous boost converters capable of operating with an input voltage range from 0.7V to 5.5V. The 3X2 mm DFN thermally enhanced package with a 1MHz switching frequency and the 1A internal switches provide a very tiny overall solution. The LTC3528/LTC3528B 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 LTC3528 performance. Individual jumpers are provided for selecting several regulated output voltages, a low quiescent

current shutdown jumper and an open drain output that indicates when the output voltage is within 10% of the programmed voltage. Terminals on the board allow easy hookup to an input supply and output load.

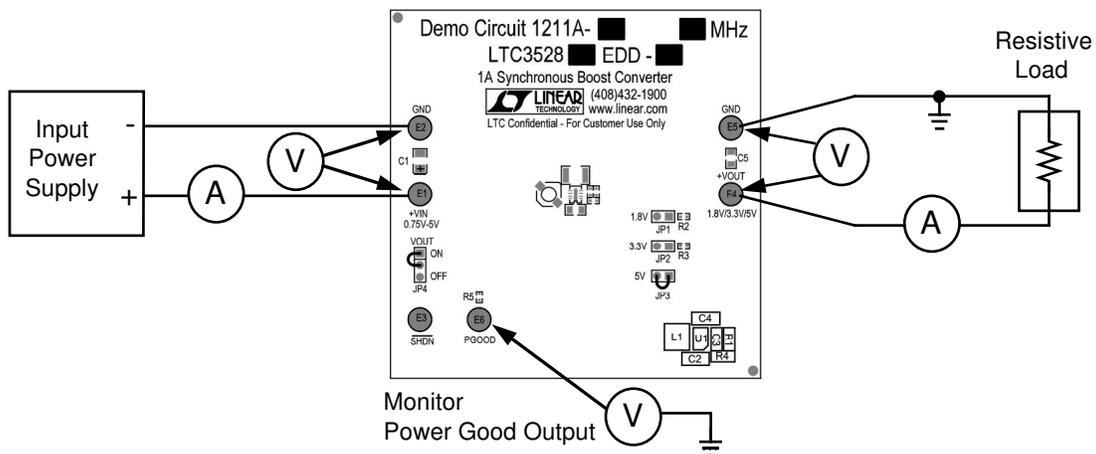
The LTC3528 has automatic Burst-Mode at low current levels and the LTC3528B is fixed frequency PWM operation.

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

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**Table 1. Typical Specifications (25 °C)**

Input Voltage Range $V_{IN}$		1V to 5V
1.8V $V_{OUT}$	$V_{IN} = 1V, I_{OUT} = 100mA$	$1.8V \pm 2.5\%$
3.3V $V_{OUT}$	$V_{IN} = 1.5V, I_{OUT} = 200mA$	$3.3V \pm 2.5\%$
5V $V_{OUT}$	$V_{IN} = 1.5V, I_{OUT} = 200mA$	$5.0V \pm 2.5\%$
Output Ripple Voltage (burst mode)	$V_{IN} = 1.5V, V_{OUT} = 3.3V, I_{OUT} = 15mA$	30mV p-p
Output Ripple Voltage (fixed frequency)	$V_{IN} = 1.5V, V_{OUT} = 3.3V, I_{OUT} = 200mA$	10mV p-p
Efficiency	$V_{IN} = 1.2V, V_{OUT} = 3.3V, I_{OUT} = 100mA$	90%



**Figure 1. Demonstration Circuit Test Setup**

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## 1A SYNCHRONOUS BOOST DC/DC CONVERTER

**Table 2. Demonstration Circuit Board Information**

Board Number	LTC Part Number	Part Marking	Mode
1211A-A	LTC3528EDDB	LCYD	Auto Burst
1211A-B	LTC3528BEDDB	LDDG	PWM

## QUICK START PROCEDURE

There is one demonstration circuit board for both LTC3528 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 700mV, the output will rise to the selected regulated voltage. When the output voltage exceeds the input voltage by at least 240mV, the converter powers itself from the output instead of the input. This feature allows the input voltage to drop as low as 500mV (at light loads) and still maintain a regulated output voltage.

Increase the input voltage to approximately 1.5V and increase the load current. The maximum load current depends on the input and output voltage settings.

The input voltage can exceed the output voltage and still maintain regulation, although the load current is less and efficiency is lower.

When evaluating the circuit at low input voltages, 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.

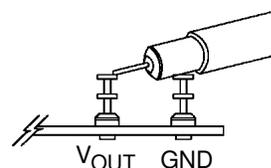
Additional pc board pads are provided for an optional input bypass capacitor (C1). It maybe necessary when using long wires between the power supply and circuit board, or for adding a tantalum capacitor to minimize input voltage transients that may occur when the input is hot-switched. Also, pads on the board back-side 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 2.

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

The PGOOD terminal is high when the output voltage is in regulation and pulls low when the output drops by approximately 10%.

See LTC3528 Data Sheet for additional information



**Figure 2. Scope Probe Placement for Measuring Output Ripple Voltage**

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