

LTC3122EDE

High Efficiency 15V 2.5A Synchronous Step-Up Converter

DESCRIPTION

Demonstration circuit 1764A is a 5.5V input, 12V output at 800mA DC/DC power supply featuring the LTC[®]3122. The IC includes internal high and low side 2.5A switches and features selectable PWM or Burst Mode[®] operation for high efficiency at low output current. The board operates from an input voltage as low as 1.8V and continues to operate down to 500mV once started. The output is fixed at 12V although other voltages between 2.2V and 15V can be selected by resistor changes.

The IC includes soft-start and input current limit, adjustable switching frequency with the ability to synchronize to an external clock, and output overvoltage protection with output disconnect.

Included on the board are jumpers for ON/OFF and operating MODE, PWM or BURST. Terminals are included for connecting V_{IN} and V_{OUT} as well as ON/OFF and SYNC.

The LTC3122 data sheet gives a complete description of the IC operation and application information. The data sheet must be read in conjunction with this quick start guide.

Design files for this circuit board are available at <http://www.linear.com/demo>

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PERFORMANCE SUMMARY

Specifications are at $T_A = 25^\circ\text{C}$

PARAMETER	CONDITION	VALUE
Input Voltage Range		1.8V to 5.5V
Output Voltage	$V_{IN} = 5V, V_{OUT} \text{ Load} = 800\text{mA}$	12V $\pm 3\%$
Output Current	$V_{IN} = 5V, V_{OUT} = 12V$	800mA
Output Voltage Ripple (PWM Mode)	$V_{IN} = 5V, V_{OUT} = 12V, V_{OUT} \text{ Load} = 500\text{mA}$	40mV _{p-p}
Output Voltage Ripple (Burst Mode Operation)	$V_{IN} = 5V, V_{OUT} = 12V, V_{OUT} \text{ Load} = 50\text{mA}$	200mV _{p-p}
Switching Frequency		1MHz $\pm 15\%$

QUICK START PROCEDURE

This Demonstration circuit 1764A can be evaluated using the setup shown in Figure 1.

1. Connect voltmeters to V_{IN} and V_{OUT} , select upper positions for jumper JP1 (ON) and JP2 (PWM).
2. With input power supply set for 0V, connect the supply to V_{IN} and GND terminals.
3. Slowly increase the input power supply to 1.8V. Observe output voltage and verify that it meets the specifications in the Performance Summary table.

4. Connect a suitable load resistor or active load to the output terminals and verify that it meets specifications in the Performance Summary table.
5. Use a scope to monitor the output voltage ripple in both PWM mode and Burst Mode operation by moving the mode jumper JP2 to the appropriate position. See Figure 4 for correct method for evaluating output ripple.
6. Note: If jumper JP2 is set for Burst Mode operation, maximum output current is limited to approximately 100mA at $5V_{IN}$.

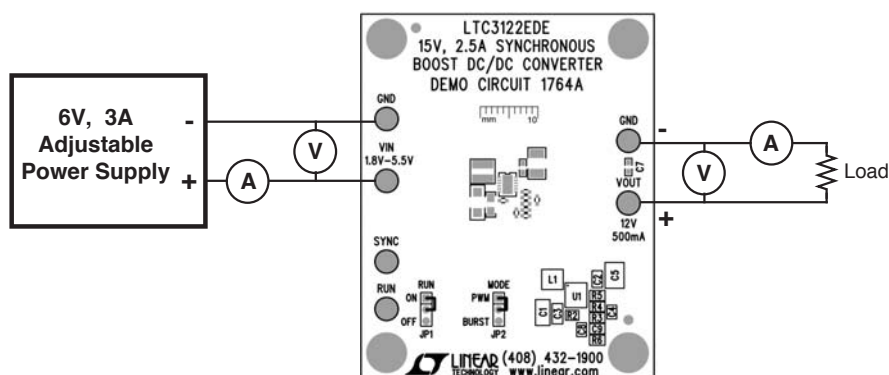


Figure 1. Proper Measurement Equipment Setup

QUICK START PROCEDURE

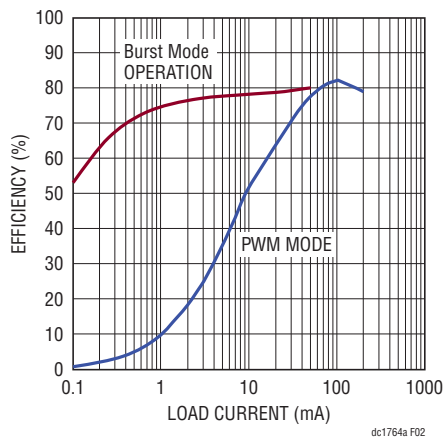


Figure 2. Efficiency $V_{IN} = 2V$

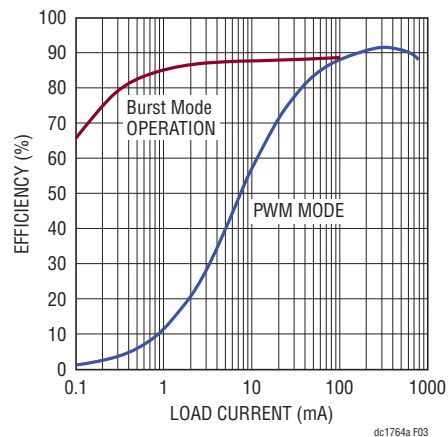


Figure 3. Efficiency $V_{IN} = 5V$

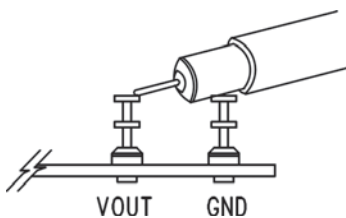


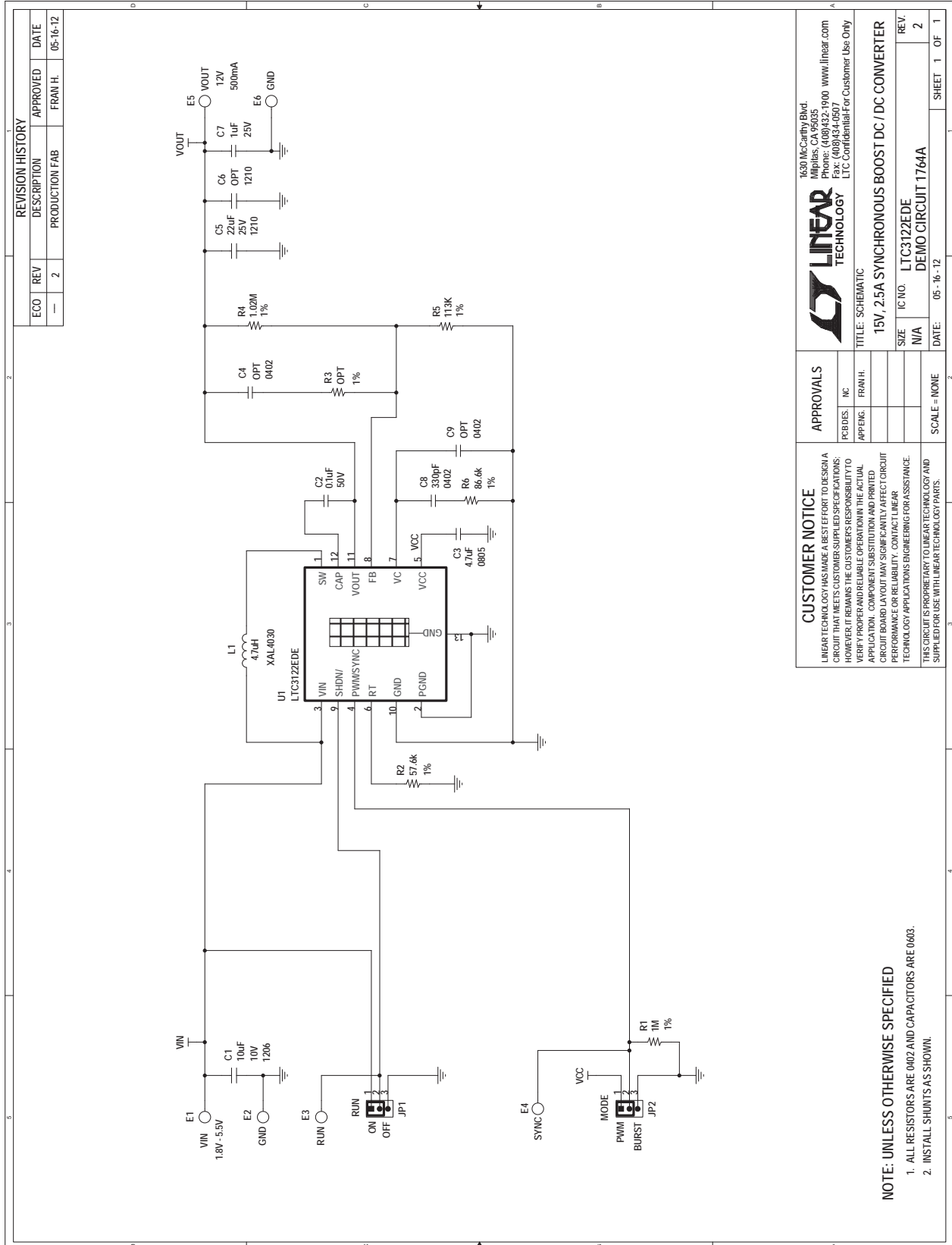
Figure 4. Measuring Output Voltage Ripple

DEMO MANUAL DC1764A

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP CER, 10 μ F 10V 10% X5R 1206	TDK, C3216X5R1A106K
2	1	C2	CAP CER, 10 μ F 50V X7R 10% 0603	TDK, CGA3E2X7R1H104K
3	1	C3	CAP CER, 4.7 μ F 25V X5R 0805	TDK, C2012X5R1E475K
4	1	C5	CAP CER, 22 μ F 25V X5R 1210	MURATA, GRM32ER61E226KE15L
5	1	C7	CAP CER, 1 μ F 25V 10% X7R 0603	TDK, CGA3E1X7R1E105K
6	1	C8	CAP CER, 330pF 50V X7R 10% 0402	TDK, C1005X7R1H331K
7	1	L1	INDUCTOR, 4.7 μ H	COILCRAFT, XAL4030-472MEB
8	1	R1	RES, 1.00M 1/16W 1% SMD 0402	PANASONIC, ERJ-2RKF1004X
9	1	R2	RES, 57.6k 1/10W 1% 0402 SMD	PANASONIC, ERJ-2RKF5762X
10	1	R4	RES, 1.02M 1/16W 1% 0402 SMD	VISHAY, CRCW04021M02FKTD
11	1	R5	RES, 113k 1/10W 1% 0402 SMD	PANASONIC, ERJ-2RKF1133X
12	1	R6	RES, 86.6k 1/10W 1% 0402 SMD	VISHAY, CRCW040286K6FKED
13	1	U1	15V, 2.5A SYNCHRONOUS BOOST DC/DC CONVERTER	LINEAR TECH,; LTC3122EDE
Additional Demo Board Circuit Components				
1	0	C4, C9	CAP CER, 0402	OPT
2	0	C6	CAP CER, 1210	OPT
3	0	R3	RES, 0402	OPT
Hardware: For Demo Board Only				
1	6	E1-E6	TURRET, 0.09 DIA	MILL-MAX, 2501-2-00-80-00-00-07-0
2	2	JP1, JP2	JMP, 3 PIN 1 ROW 0.079CC	SAMTEC, TMM-103-02-L-S
3	2	XJP1, XJP2	SHUNT, 0.079" CENTER	SAMTEC, 2SN-BK-G
4	4	STAND OFF	STAND-OFF, NYLON 0.50" Tall	KEYSTONE, 8832 (SNAP ON)

SCHEMATIC DIAGRAM



DEMO MANUAL DC1764A

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This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

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