

General Purpose Positive/ Negative Converters

DESCRIPTION

Demonstration circuit 765B is a general purpose 1MHz, positive and negative converters featuring the [LT3479EDE](#). The demo circuit demonstrates small size and low component count in a boost circuit and an inverting circuit. The boost converter is set up to convert a 2.5V to 4.2V input to 7V output at 600mA. The inverting circuit generates a -5V output at 600mA from an input of 2.5V to 12V.

Both circuits demonstrate the capacitor programmable soft-start feature, advantages of the 1MHz constant switching frequency and the internal 42V switches. Both

outputs on this demo circuit can be modified for higher voltages. These circuits are intended for space-conscious applications such as high power LED drivers, DSL modems and distributed power.

Design files for this circuit board are available at <http://www.linear.com/demo/DC765B>

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

PARAMETERS FOR BOOST CIRCUIT	CONDITION	VALUE
Minimum Input Voltage		2.5V
Maximum Input Voltage		4.2V
Output Voltage V_{OUT}	$V_{IN} = 2.5\text{V to } 4.2\text{V}$	7V $\pm 3\%$
Typical Efficiency	$V_{IN} = 3.3\text{V}, V_{OUT} = 7\text{V at } 600\text{mA}$	85%
Typical Output Ripple V_{OUT} as Regular Boost Converter	$V_{IN} = 3.3\text{V}, V_{OUT} = 7\text{V at } 600\text{mA}$	60mV
PARAMETERS FOR INVERTING CIRCUIT		VALUE
Output Voltage V_{OUT}	$V_{IN} = 2.5\text{V}, I_{OUT} = 0\text{mA to } 600\text{mA}$	-5V $\pm 3\%$
Output Voltage V_{OUT}	$V_{IN} = 12\text{V}, I_{OUT} = 0\text{mA to } 600\text{mA}$	-5V $\pm 3\%$
Typical Output Ripple V_{OUT}	$V_{IN} = 3.3\text{V}, I_{OUT} = 600\text{mA}$	10mV _{P-P}
Typical Efficiency	$V_{IN} = 7\text{V}, V_{OUT} = -5\text{ at } 600\text{mA}$	74%

Input capacitors C16 and C17 used only for operation with long inductive input leads.

QUICK START PROCEDURE

Demonstration circuit 765B is easy to set up to evaluate the performance of the LT3479EDE. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

- When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the V_{IN} or V_{OUT} and GND terminals. See Figure 1 for proper scope probe technique.

For boost converter circuit:

1. Place jumper in the ON position.
2. With power off, connect the input power supply to V_{IN} and GND.
3. Turn input supply on and apply 2.5V to 4.2V to the input.

4. Once the proper output voltages are established, adjust the input voltage within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

For inverter circuit:

1. Place jumper in the ON position.
2. With power off, connect the input power supply to V_{IN} and GND.
3. Turn input supply on and apply 2.5V to 12V to the input.
4. Once the proper output voltages are established, adjust the input and load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

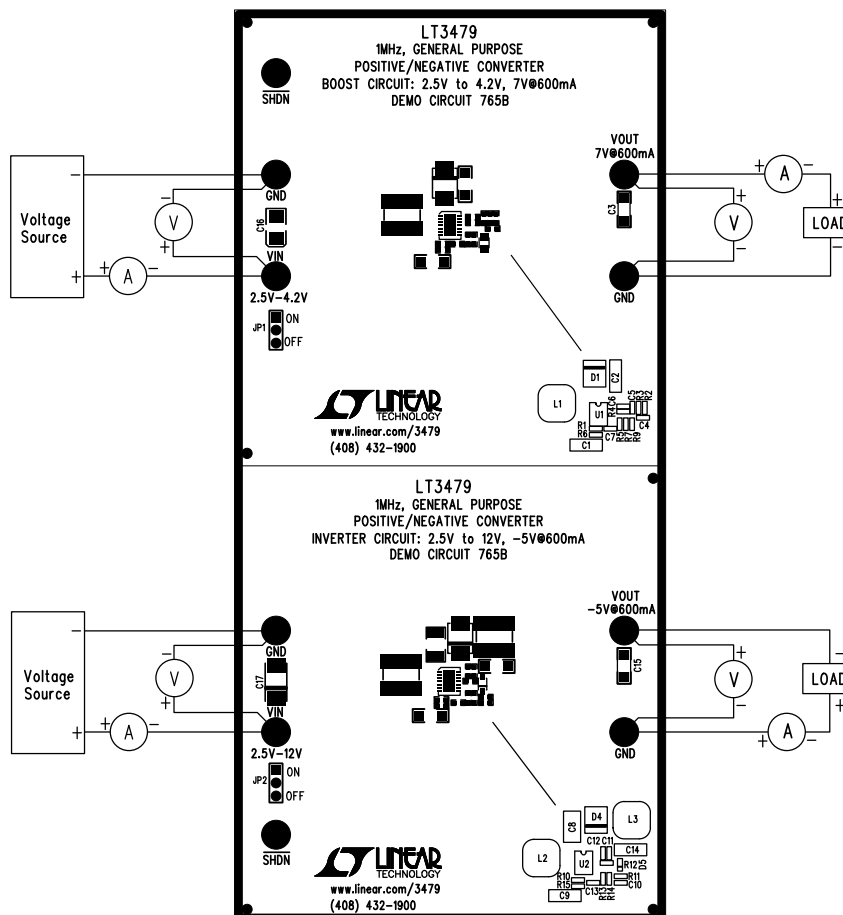


Figure 1. DC765B Proper Equipment Setup

QUICK START PROCEDURE

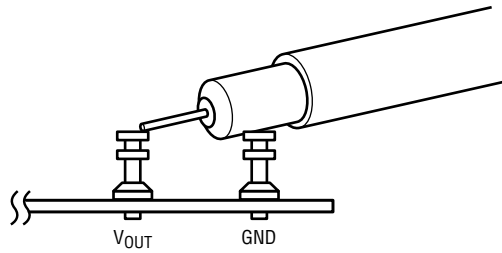


Figure 2. Measuring Input or Output Ripple

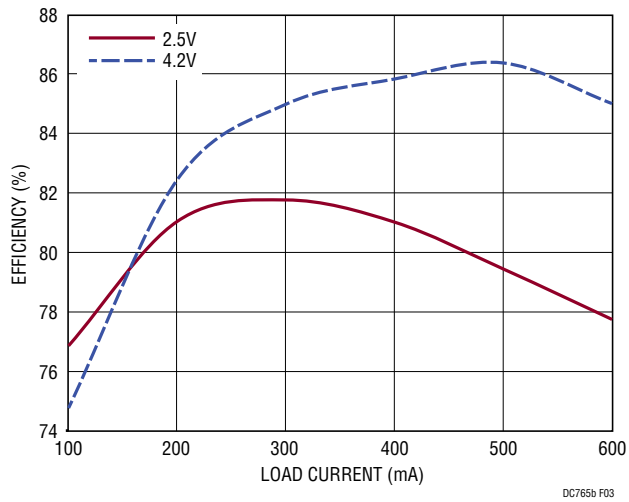


Figure 3. Efficiency vs Load Current (Boost Circuit)

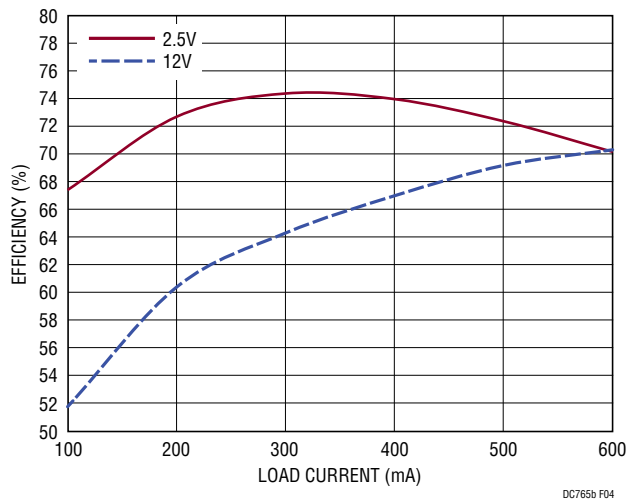


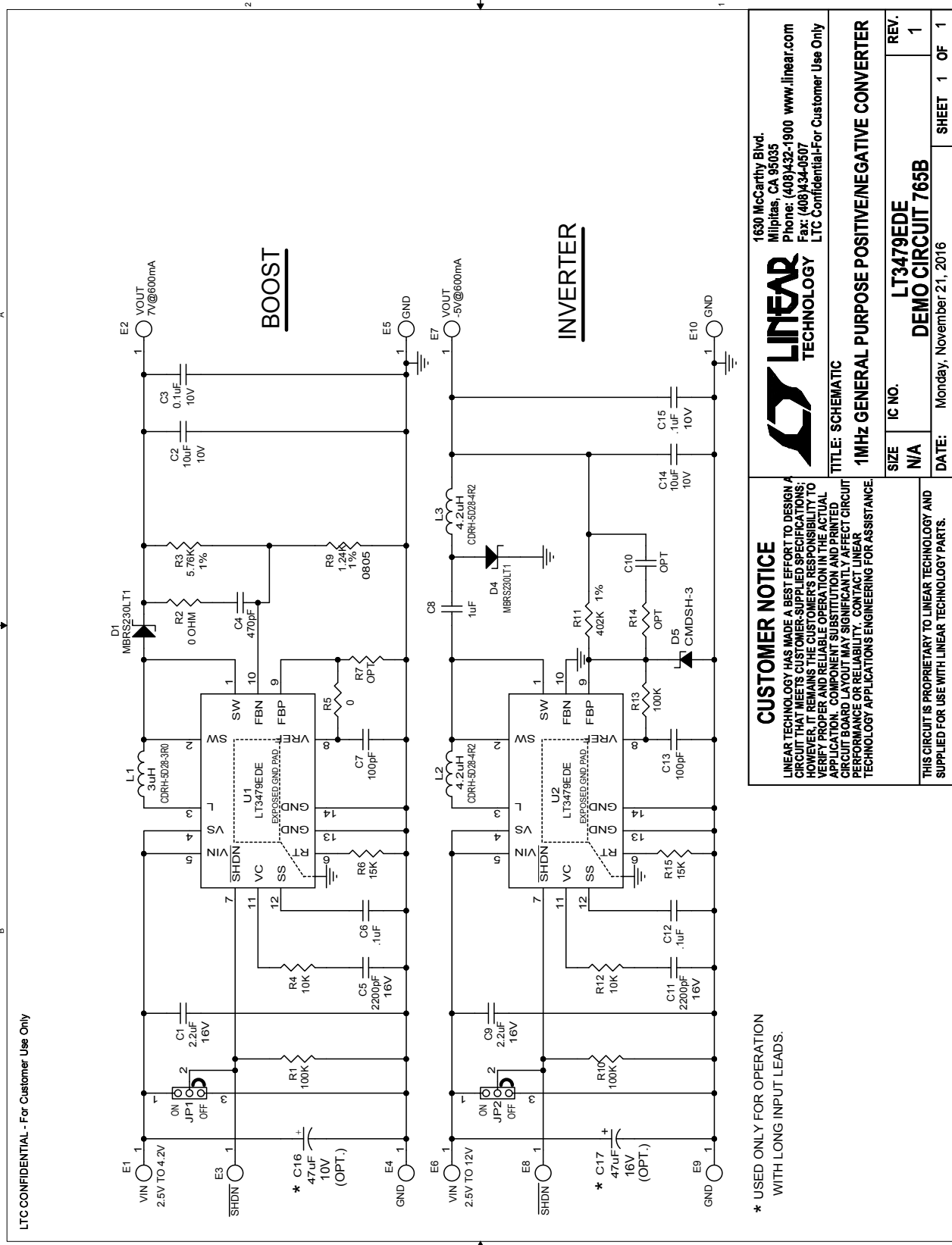
Figure 4. Efficiency vs Load Current (Inverter Circuit)

DEMO MANUAL DC765B

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C4	CAP, X7R, 470pF, 16V, 10%, 0402	AVX 0402YC471KAT2A
2	2	C2, C14	CAP, X5R, 10µF, 10V, 10%, 1206	AVX 1206ZD106KAT2A
3	2	C5, C11	CAP, X7R, 2200pF, 16V, 10%, 0402	AVX 0402YC222KAT2A
4	2	C3, C15	CAP, X7R, 0.1µF, 10V, 10%, 1206	AVX 1206ZC104KAT2A
5	2	C1, C9	CAP, X5R, 2.2µF, 16V, 10%, 1206	AVX 1206YD225KAT2A
6	2	C6, C12	CAP, X7R, 0.1µF, 16V, 10%, 0402	MURATA GRM155R71C104KA01
7	2	C7, C13	CAP, X7R, 100pF, 16V, 10%, 0402	AVX 0402YC101KAT2A
8	1	C8	CAP, X5R, 1µF, 25V, 10%, 1210	AVX 12103D105KAT2A
9	2	D1, D4	DIODE, MBRS230LT1	ONSEMI MBRS230LT1
10	1	D5	DIODE,	CENTRAL SEMI CMDSH-3-LTC
11	1	L1	INDUCTOR, 3µH	SUMIDA CDRH5D28-3R0
12	2	L2, L3	INDUCTOR, 4.2µH	SUMIDA CDRH5D28-4R2
13	3	R1, R10, R13	RES, CHIP, 100k, 1/16W, 5%, 0402	VISHAY, CRCW0402100KJNED
14	2	R2, R5	RES, CHIP, 0Ω 0402	VISHAY, CRCW04020000Z0ED
15	1	R3	RES, CHIP, 5.76k, 1/16W, 1%, 0402	VISHAY, CRCW04025K76FKED
16	2	R4, R12	RES, CHIP, 10k, 1/16W, 5%, 0402	VISHAY, CRCW040210K0JNED
17	1	R9	RES, CHIP, 1.24k, 1/16W, 1%, 0805	VISHAY, CRCW08051K24FKEA
18	1	R11	RES, CHIP, 402k, 1/16W, 1%, 0402	VISHAY, CRCW0402402KFKED
19	2	R6, R15	RES, CHIP, 15k, 1/16W, 1%, 0402	VISHAY CRCW040215K0FKED
20	2	U1, U2	IC, LT3479EDE, 14 PIN DFN	LINEAR LT3479EDE#PBF
Additional Demo Board Circuit Components				
1	0	C10 (OPT)	CAP, 0402	
2	1	C16 (OPT)	CAP, TANT, 47µF, 10V, 20%, (B-SIZE)	AVX, TAJB476M010R
3	1	C17 (OPT)	CAP, TANT, 47µF, 16V, 20%, (C-SIZE)	AVX, TAJC476M016R
4	0	R7, R14 (OPT)	RES, CHIP, 0402	OPT
Hardware: For Demo Board Only				
1	10	E1 TO E10	TURRETS, TERMINAL	MILL-MAX 2501-2
2	2	XJP1, XJP2	SHUNT, 2PIN, 3MM	COMM CON CCIJ2MM-138-GW
3	2	JP1, JP2	CONN, HDR, 3 PIN. 0.079 2MM	COMM CON CONN 2802S-03G2

SCHEMATIC DIAGRAM



DEMO MANUAL DC765B

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