

LT3579/LT3579-1: Boost/Inverting DC/DC Converter

DESCRIPTION

Demonstration circuit 1661A features the LT[®]3579 and LT3579-1 in a parallel boost regulator configuration. The circuit is designed to convert a 5V to 10V input source to 12V at 3.5A. DC1661A is designed to survive output short circuit events with an external disconnect MOSFET at the output as default. The circuit board includes an option to install the disconnect MOSFET at the input side. To use it, install Q1 and R2 on the back of the board, place a jumper from Q2 source to drain and cut top copper as shown in Figure 3. The circuit board can also be used to supply two separate output voltages. Cut trace as shown in Figure 3 remove R13 and R14, and set feedback and VC components as needed. The LT3579 includes a 42V master and slave switch combination with 6A total current and can be

used in many configurations such as boost, SEPIC, cuk and flyback. It has a 2.5V to 16V operating input range, UVLO, soft-start, programmable switching frequency and many other popular features. The LT3579 data sheet gives a complete description of the part, its operation and application information. The data sheet must be read in conjunction with this quick start guide for working on or modifying the demo circuit 1661A.

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

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PERFORMANCE SUMMARY (T_A = 25°C)

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V _{IN}	Input Supply Range		5		10	V
V _{OUT}	Output Voltage Accuracy	V _{IN} = 5V to 10V, I _{LOAD} = 3.5A	11.60	12	12.30	V
Efficiency		V _{IN} = 5V, I _{LOAD} = 3.5A		83		%
Efficiency		V _{IN} = 10V, I _{LOAD} = 3.5A		92		%
Ripple		V _{IN} = 5V, I _{LOAD} = 3.5A		50		mV
F _S	Switching Frequency			1		MHz

DEMO MANUAL DC1661A

QUICK START PROCEDURE

Demonstration circuit 1661A is easy to set up to evaluate the performance of the LT3579/LT3579-1. Refer to Figure 1 and Figure 2 for proper measurement equipment set-up and follow the procedure below:

To measure 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 2 for proper scope probe technique.

1. Place jumper in the following position:
JP1 On
2. With power off, connect the input power supply to V_{IN} and GND.

Apply 7.5V to input (source must have >12A capability).
Check for the proper output voltages.

NOTE. If there is no output, temporarily disconnect the load to make sure that the load is not set too high.

Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

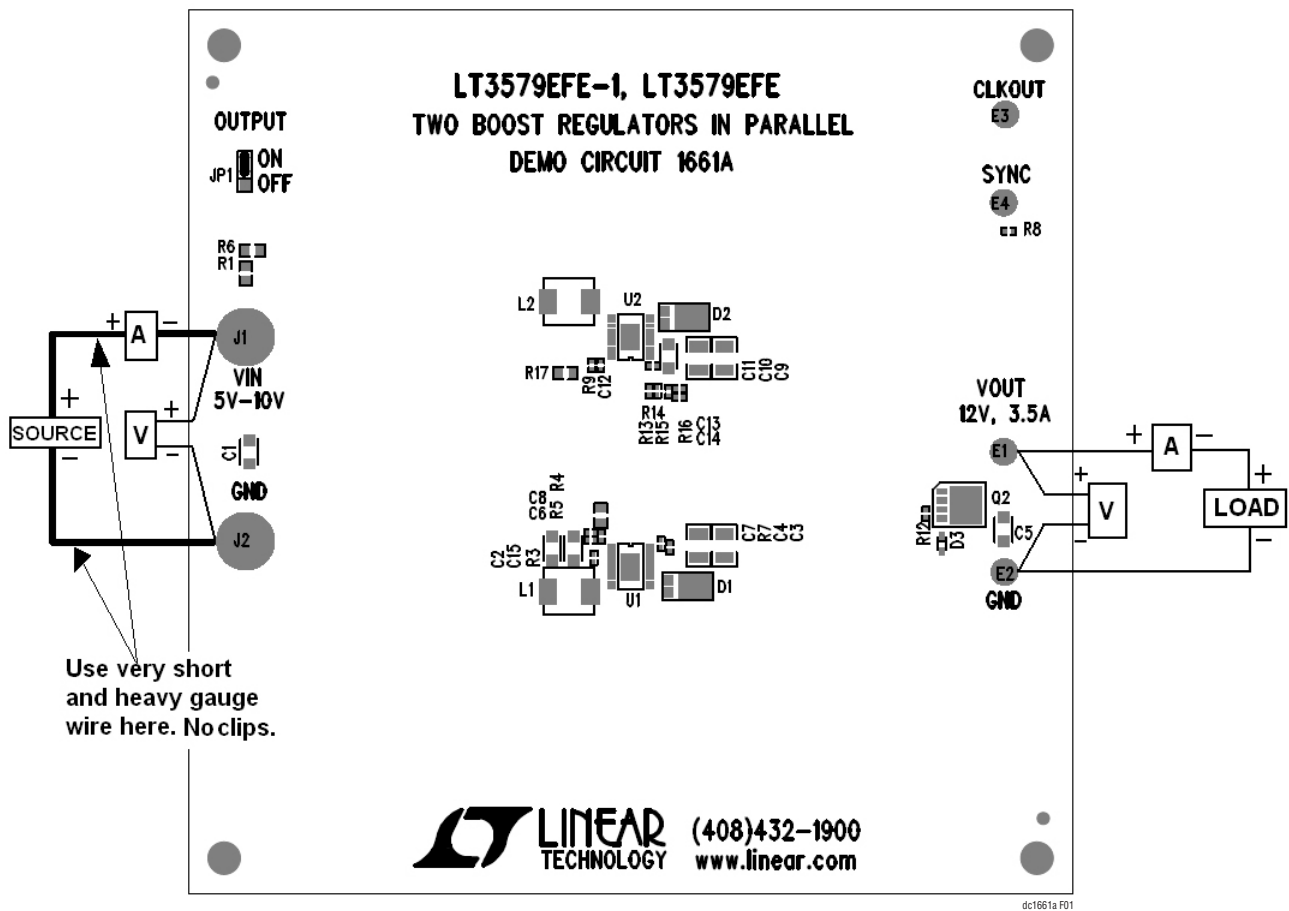


Figure 1. DC1661A Proper Equipment Set-Up

QUICK START PROCEDURE

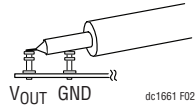


Figure 2. Proper Input/Output Ripple Measurement Technique

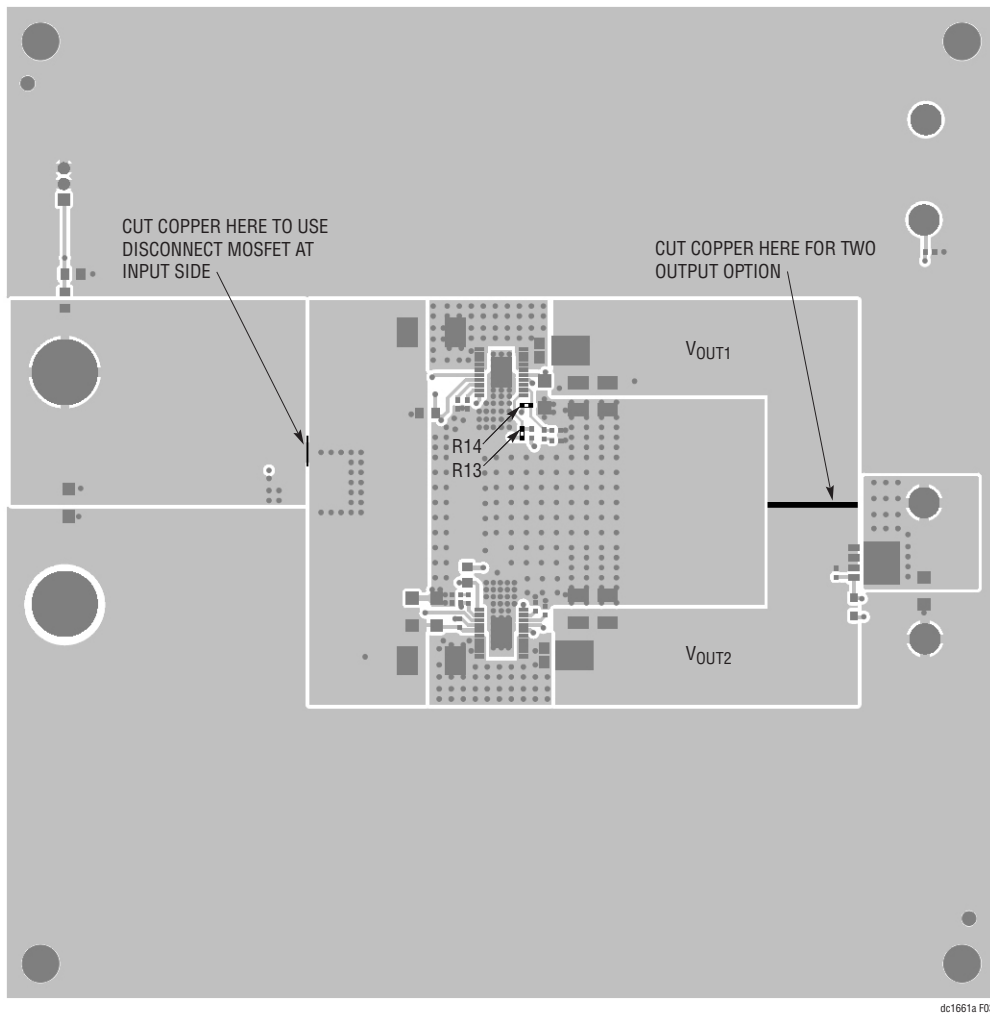


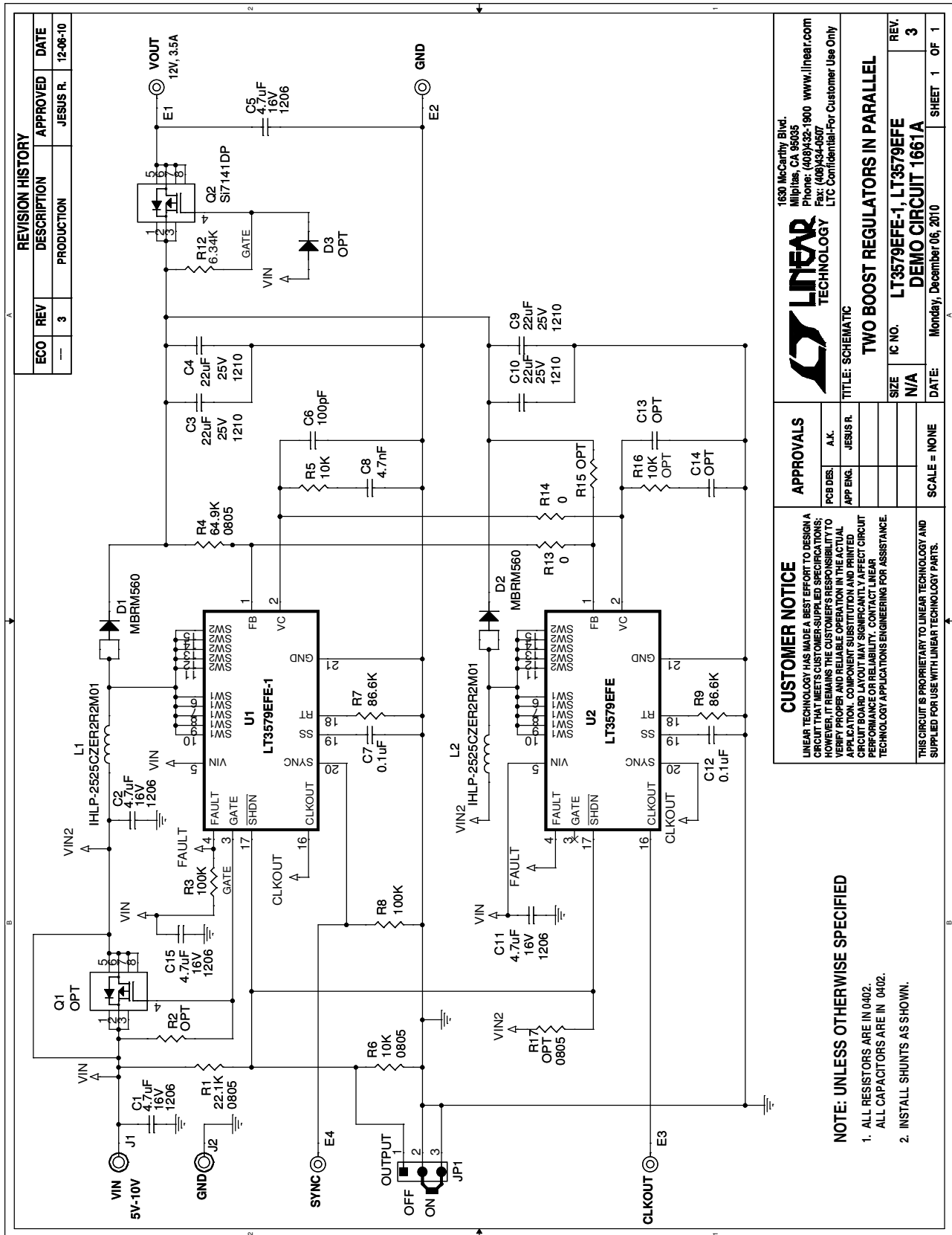
Figure 3. Using Demo Board Options

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PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components For DC1424A-A				
1	5	C1, C2, C5, C11, C15	CAP, X5R, 4.7 μ F, 16V, 20% 1206	AVX, 1206YD475MAT2A
2	4	C3, C4, C9, C10	CAP, X5R, 22 μ F, 25V, 10% 1210	AVX, 12103D226KAT2A
3	1	C6	CAP, NPO, 100pF, 25V, 10% 0402	AVX, 04023A101KAT2A
4	2	C7, C12	CAP, X5R, 0.1 μ F, 25V, 10% 0402	AVX, 04023D104KAT2A
5	1	C8	CAP, X7R, 4700pF, 25V, 10% 0402	AVX, 04023C472KAT2A
6	2	D1, D2	DIODE, SCHOTTKY, POWERMITE	DIODES, MBRM560-13-F
7	2	L1, L2	INDUCTOR, 2.2 μ H 8A POWER	VISHAY, IHLP2525CZER2R2M01
8	1	Q2,	MOSFET, P-CH 20V 25A 1212-8	VISHAY, Si7141DP-T1-GE3
9	1	R1	RES, CHIP, 22.1k, 1%, 0805	VISHAY, CRCW080522K1FKEA
10	2	R3, R8	RES, CHIP, 100k, 1%, 0402	VISHAY, CRCW0402100KFKED
11	1	R4	RES, CHIP, 64.9k, 1%, 0805	VISHAY, CRCW080564K9FKEA
12	1	R5	RES, CHIP, 10k, 1%, 0402	VISHAY, CRCW040210K0FKED
13	1	R6	RES, CHIP, 10k, 1%, 0805	VISHAY, CRCW080510K0FKEA
14	2	R7, R9	RES, CHIP, 86.6k, 1%, 0402	VISHAY, CRCW040286K6FKED
15	1	R12	RES, CHIP, 6.34k, 1%, 0402	VISHAY, CRCW04026K34FKED
16	1	U1	IC, LT3579EFE-1, 20 pin TSSOP-4.4mm	LINEAR TECHNOLOGY, LT3579EFE-1#PBF
17	1	U2	IC, LT3579EFE, 20 pin TSSOP-4.4mm	LINEAR TECHNOLOGY, LT3579EFE#PBF
18	1		FAB, PRINTED CIRCUIT BOARD	DEMO CIRCUIT 1661A
Additional Demo Board Circuit Components				
1	2	R13, R14	RES, CHIP, 0 Ω , 0402	VISHAY, CRCW04020000Z0ED
Hardware For Demo Board Only				
1	4	E1 to E4	TESTPOINT, TURRET, 0.91"	MILL-MAX, 2501-2-00-80-00-00-07-0
2	2	J1, J2	BANANA JACK	KEYSTONE, 575-4
3	1	JP1	HEADER, 0.079 SINGLE ROW 3 PIN	SAMTEC, TMM-103-02-L-S
4	1	XJP	SHUNT, MTGS AT 4	SAMTEC, 2SN-BK-G
5	4	CORNERS	STAND-OFF, NYLON 0.5" TALL	KEYSTONE, 8833(SNAP ON)

SCHEMATIC DIAGRAM



REVISION HISTORY		
ECO	REV	DESCRIPTION
---	3	PRODUCTION

APPROVED	DATE
JESUS R.	12-06-10

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LINEAR TECHNOLOGY

TITLE: SCHEMATIC

TWO BOOST REGULATORS IN PARALLEL

IC NO. LT3579EFE-1, LT3579EFE

REV. 3

SIZE N/A

DATE: Monday, December 06, 2010

SHEET 1 OF 1

APPROVALS	
PCB DES.	A.K.
APP ENG.	JESUS R.

SCALE = NONE

CUSTOMER NOTICE

LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SPECIFIED SPECIFICATIONS; HOWEVER, THE USER MUST VERIFY THE ACTUAL OPERATION OF THE APPLICATION COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.

THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.

NOTE: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN 0402.
2. ALL CAPACITORS ARE IN 0402.
3. INSTALL SHUNTS AS SHOWN.

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DEMONSTRATION BOARD IMPORTANT NOTICE

Linear Technology Corporation (LTC) provides the enclosed product(s) under the following **AS IS** conditions:

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Please read the DEMO BOARD manual prior to handling the product. Persons handling this product must have electronics training and observe good laboratory practice standards. **Common sense is encouraged.**

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

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