

LT8471EFE

Dual Output, Buck and Inverting Converter

DESCRIPTION

DC1854A is a dual output buck and inverting converter. It provides 5V and -5V power from 6V to 32V input. The 5V output can source up to 1.4A load current and the -5V output can source up to 800mA load current. See the load current versus input voltage figures inside this demo manual for more information. The internal skyhook supply is used to provide voltage to the internal npn switch and can be used for various topologies. Although they are assembled as a single inductor buck and a single inductor inverting converter on DC1854A, the two DC/DC converters can be altered for different topologies.

The **LT[®]8471** is a dual PWM DC/DC converter containing two internal 2A, 50V switches and an additional 500mA switch to facilitate step-down and inverting conversion. Each 2A channel can be independently configured as a buck, boost, SEPIC, flyback or inverting converter. Capable of generating positive and negative outputs from a single input rail, the LT8471 is ideal for many local power supply designs.

The LT8471 has an adjustable oscillator, set by a resistor placed from the RT pin to ground. Additionally, the LT8471 can be synchronized to an external clock. The free running or synchronized switching frequency range of the part can be set between 100kHz and 2MHz. DC1854A is set at 450kHz. Additional features such as frequency foldback, soft-start, and power good are integrated.

The LT8471 data sheet gives a complete description of the part, operation and applications information. The data sheet must be read in conjunction with this Demo Manual for DC1854A. The LT8471EFE is assembled in a 20-lead plastic TSSOP (FE) package with a thermally enhanced ground pad. Proper board layout is essential for maximum thermal performance. See the data sheet section Layout Considerations.

Design files for this circuit board are available at <http://www.linear.com/demo/DC1854A>

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PERFORMANCE SUMMARY

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

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
VIN Input Voltage Range			6 to 32		V
Switching Frequency	R1 = 187k		450		kHz
VOUT1	R2 = 316k, R3 = 59k		5		V
Maximum Load Current IOU1	VIN = 6V VIN = 12V VIN = 28V	1.5 1.45 1.2			A A A
VOUT2	R4 = 316k, R5 = 59k		-5		V
Maximum Load Current IOU2	VIN = 6V VIN = 12V VIN = 28V	550 840 1			mA mA A
Efficiency	VIN = 12V, IOU1 = 1.45A, IOU2 = 840mA		80.6		%
VOUT1 AC ripple	VIN = 12V, IOU1 = 1.45A		7		mVp-p
VOUT2 AC ripple	VIN = 12V, IOU2 = 840mA		13		mVp-p

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QUICK START PROCEDURE

DC1854A is easy to set up to evaluate the performance of the LT8471EFE. Follow the procedure below:

1. Connect the OV/UV terminal to GND to disable switching during power supply startup.
2. With power off, connect the input power supply to the VIN and GND terminals. Make sure that the VIN DC input voltage will not exceed 32V.
3. Connect resistive or electronic loads within the maximum parameters to outputs VOUT1 and VOUT2.
4. Release the OV/UV-to-GND connection.
5. Observe the VOUT1 and VOUT2 voltages as well as the PG1 and PG2 voltages. Observe the circuit efficiency or other operation while the input voltage is between 6V and 32V.

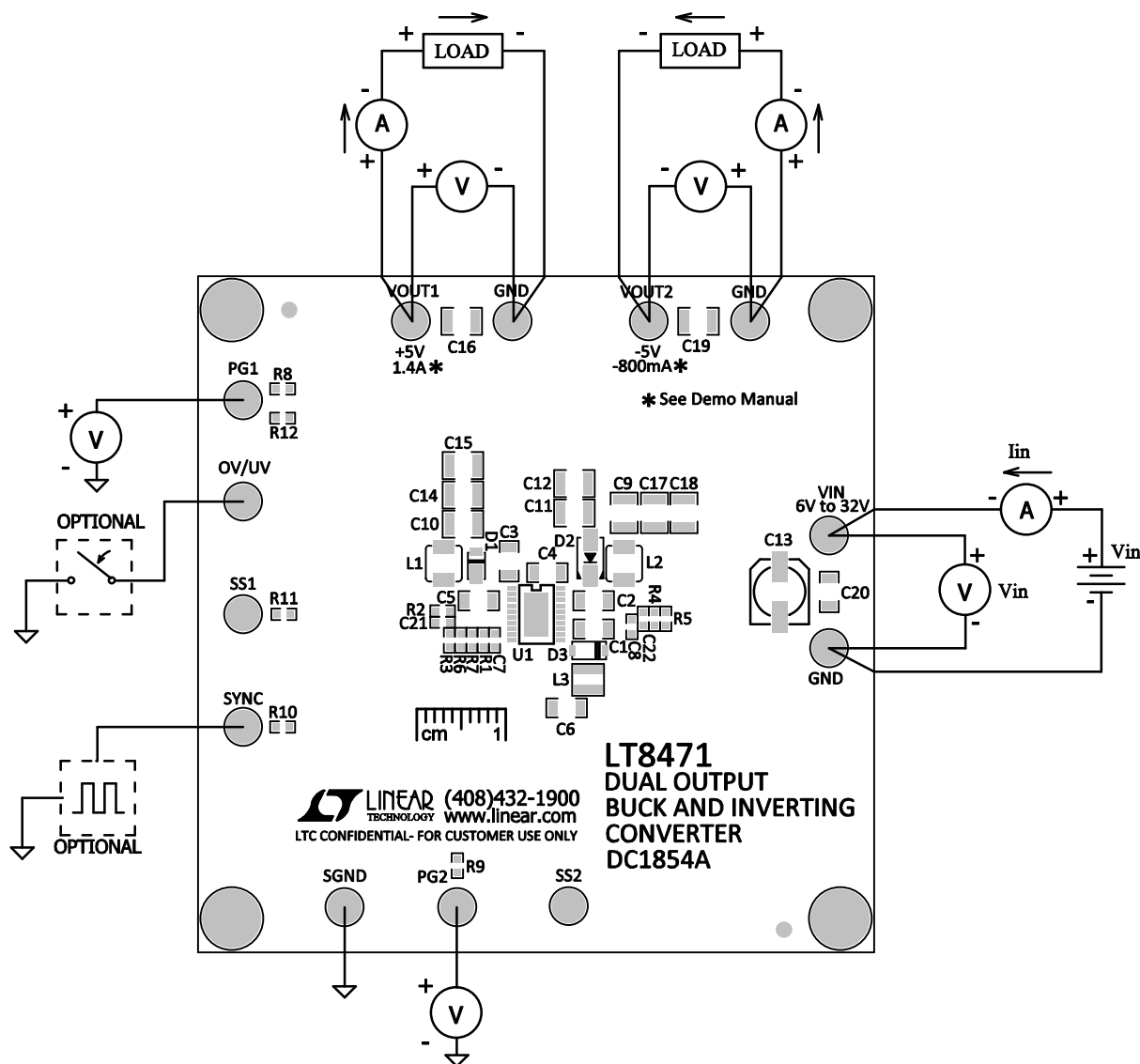


Figure 1. Test Procedure Setup Drawing for DC1854A

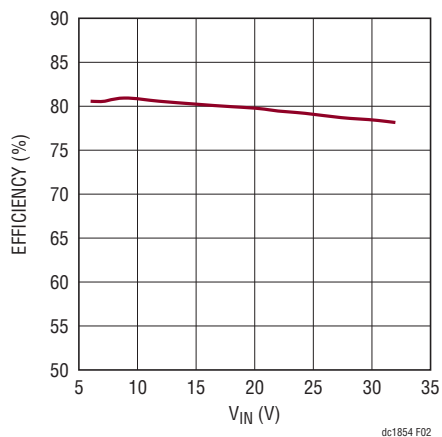


Figure 2. DC1854A Efficiency at $I_{OUT1,2}$ Max vs V_{IN} (see Figure 3)

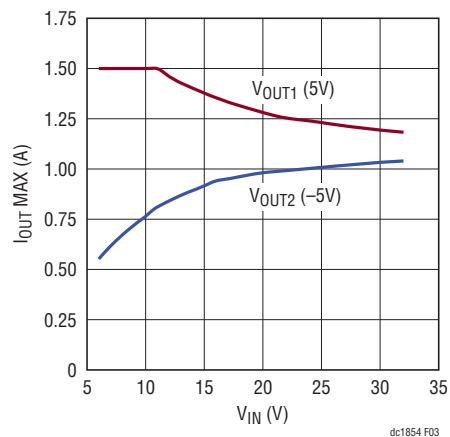


Figure 3. DC1854A CH1 and CH2 Maximum Load Current vs Input Voltage

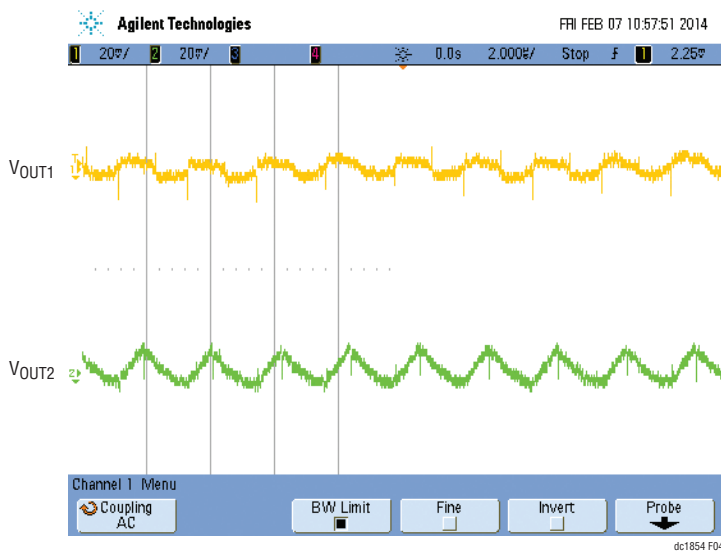


Figure 4. DC1854A Output Voltage Ripple 12VIN, $I_{OUT1} = 1.45A$, $I_{OUT2} = 840mA$ (Bandwidth Limit Enabled)

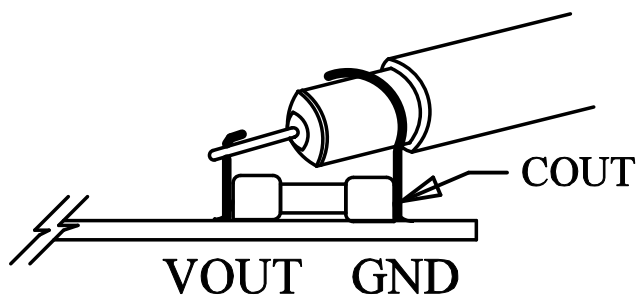


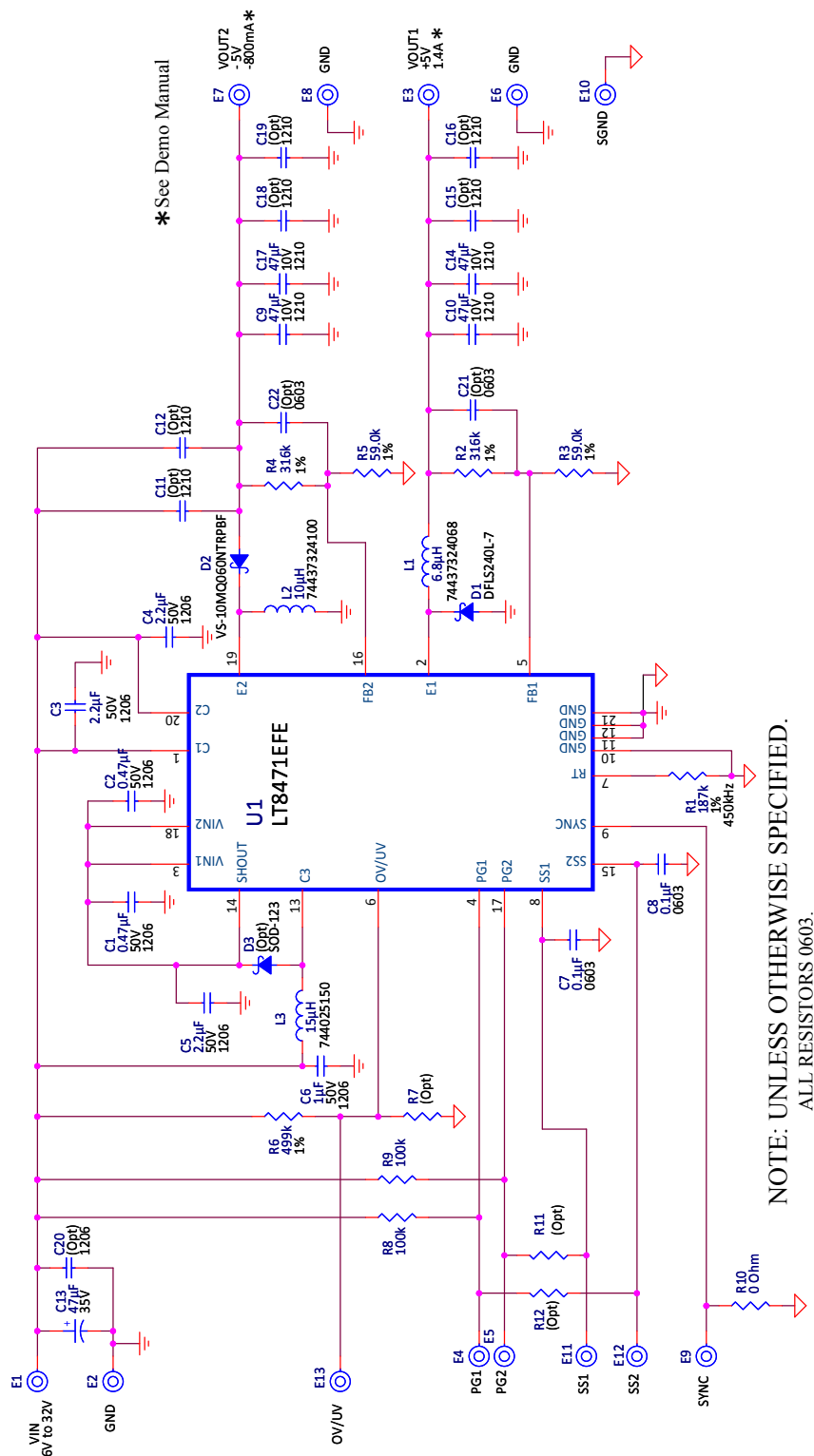
Figure 5. DC1854A Output Voltage Ripple Measurement Method

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PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	2	C1, C2	CAP., X7R 0.47 μ F 50V 10% 1206	MURATA, GRM31MR71H474KA01L
2	3	C3, C4, C5	CAP., X5R 2.2 μ F 50V 10% 1206	MURATA, GRM31CR61H225KA88L
3	1	C6	CAP., X5R 1 μ F 50V 10% 1206	TDK, C3216X5R1H105K 2 rls
4	2	C7, C8	CAP., X7R 0.1 μ F 16V 10% 0603	MURATA, GRM188R71C104KA01D
5	4	C9, C10, C14, C17	CAP., X5R 47 μ F 10V 10% 1210	MURATA, GRM32ER61A476KE20L
6	1	D1	DIODE, SCHOTTKY 40V 2A POWERDI123	DIODES INC., DFLS240L-7
7	1	D2	DIODE, SCHOTTKY 60V 2.1A DO214AC	VISHAY, VS-10MQ060NTRPBF
8	1	L1	INDUCTOR, 6.8 μ H 4020	WURTH ELECTRONIK, 74437324068
9	1	L2	INDUCTOR, 10 μ H 4020	WURTH ELECTRONIK, 74437324100
10	1	L3	INDUCTOR, 15 μ H $\pm$ 20%	WURTH ELECTRONIK, 744025150
11	1	R1	RES., CHIP 187k 0.1W 1% 0603	VISHAY, CRCW0603187KFKEA
12	2	R2, R4	RES., CHIP 316k 0.1W 1% 0603	VISHAY, CRCW0603316KFKEA
13	2	R3, R5	RES., CHIP 59k 0.1W 1% 0603	VISHAY, CRCW060359K0FKEA
14	1	U1	I.C., VOLTAGE REG. TSSOP20-FE/CB	LINEAR TECH., LT8471EFE#PBF
Additional Demo Board Circuit Components				
1	0	C11, C12, C15, C16, C18, C19 (Opt)	CAP., 1210	
2	1	C13	CAP., ALUM 47 μ F 35V 10%	SUN ELECT., 35CE47AX
3	0	C20	CAP., 1206	
4	0	C21, C22	CAP., 0603	
5	0	D3	SCHOTTKY DIODE SOD-123	
6	1	R6	RES., CHIP 499k 0.1W 1% 0603	VISHAY, CRCW0603499KFKEA
7	0	R7, R11, R12	RES., 0603	
8	2	R8, R9	RES., CHIP 100k 0.1W 5% 0603	VISHAY, CRCW0603100KFKEA
9	1	R10	RES/JUMPER, CHIP 0 Ω 0.25W 5A 0603	VISHAY, CRCW06030000Z0EA
Hardware: For Demo Board Only				
1	13	E1-E13	TURRET, TESTPOINT	MILL MAX, 2501-2-00-80-00-00-07-0
2	4	MH1-MH4	STAND-OFF, NYLON 0.25" TALL	KEYSTONE, 8831 (SNAP ON)

SCHEMATIC DIAGRAM



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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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