

# LT3645

## 0.5A, 36V Step-Down Regulator with LDO

### DESCRIPTION

Demonstration circuit 1428A features the LT<sup>®</sup>3645. The circuit is designed to convert a 5V to 36V input source to 3.3V at 300mA and 2.5V at 200mA. JP1 and JP2 enable and disable the 3.3V output and the 2.5V output respectively. LDO only operates if both, EN/UVLO and EN2 are greater than 1.2V. Demo board includes an optional resistor, R8, for easy implementation of UVLO. The LT3645 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 1428A.

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

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### PERFORMANCE SUMMARY (T<sub>A</sub> = 25°C)

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V <sub>IN</sub>	Input Supply Range		5		36	V
3.3V <sub>OUT</sub>	Buck Output Voltage Accuracy	V <sub>IN</sub> = 5V to 36V, I <sub>LOAD</sub> = 500mA	3.226	3.3	3.374	V
2.5V <sub>OUT</sub>	LDO Output Voltage Accuracy	V <sub>IN</sub> = 5V to 36V, I <sub>LOAD</sub> = 200mA	2.444	2.5	2.556	V
Efficiency		V <sub>IN</sub> = 5V, I <sub>LOAD</sub> = 500mA for Buck, 0mA for LDO		83		%
		V <sub>IN</sub> = 5V, I <sub>LOAD</sub> = 300mA for Buck, 200mA for LDO		75		%
Buck V <sub>OUT</sub> Ripple		V <sub>IN</sub> = 5V, I <sub>LOAD</sub> = 500mA		10		mV
LDO V <sub>OUT</sub> Ripple		V <sub>IN</sub> = 5V to 36V, I <sub>LOAD</sub> = 200mA		1		mV
f <sub>S</sub>	Switching Frequency			750		kHz

## QUICK START PROCEDURE

Demonstration circuit 1428A is easy to set up to evaluate the performance of the LT3645. Refer to Figures 1 and 2 for proper measurement equipment setup 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 jumpers in the following position:

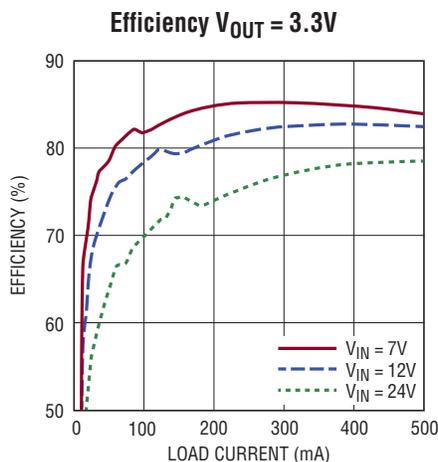
JP1 ON

JP2 ON

2. With power off, connect the input power supply to  $V_{IN}$  and GND. Apply 5V to input and 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.



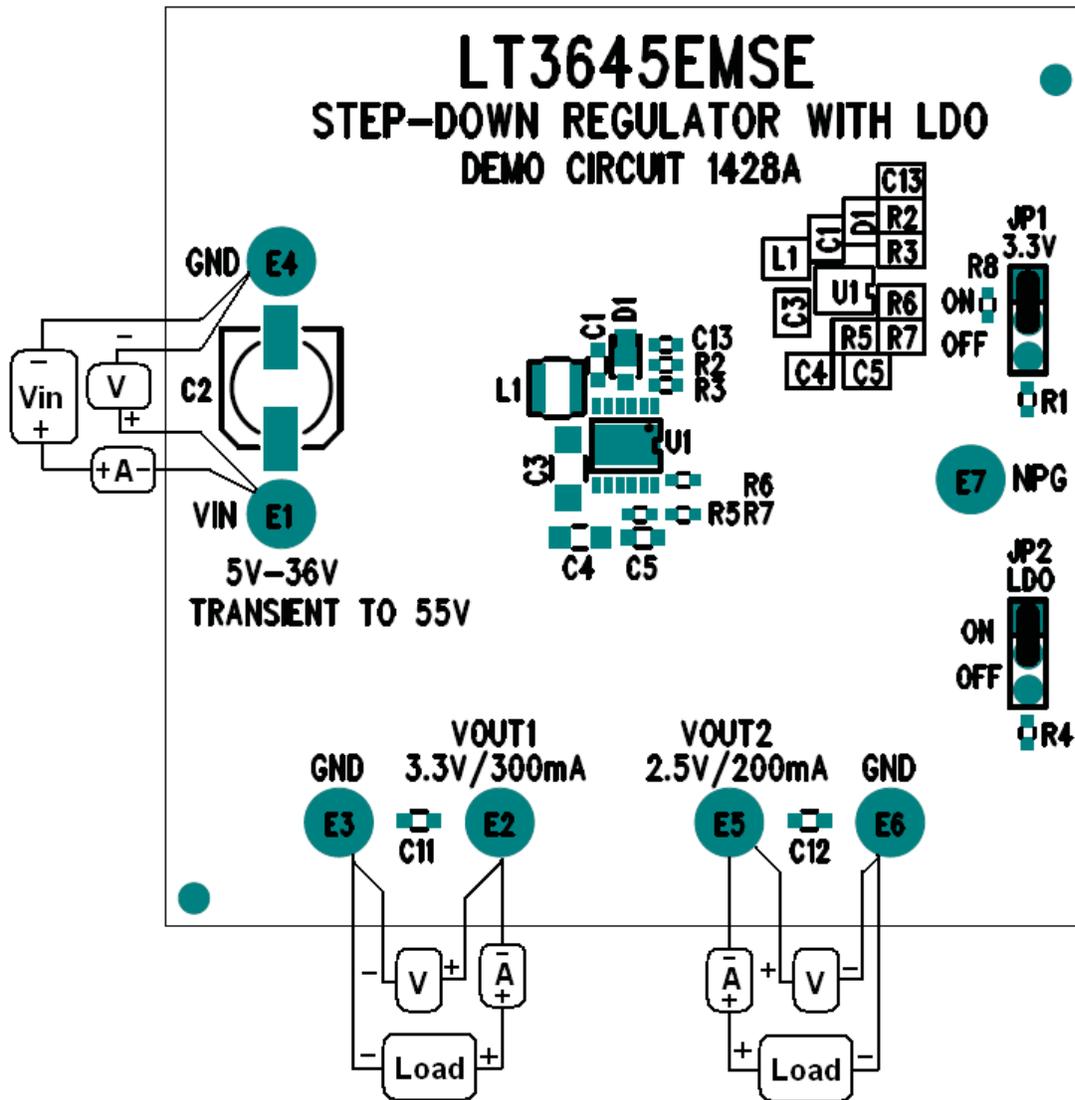


Figure 1. DC1428A Proper Equipment Set-Up

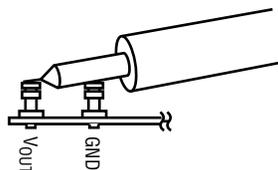


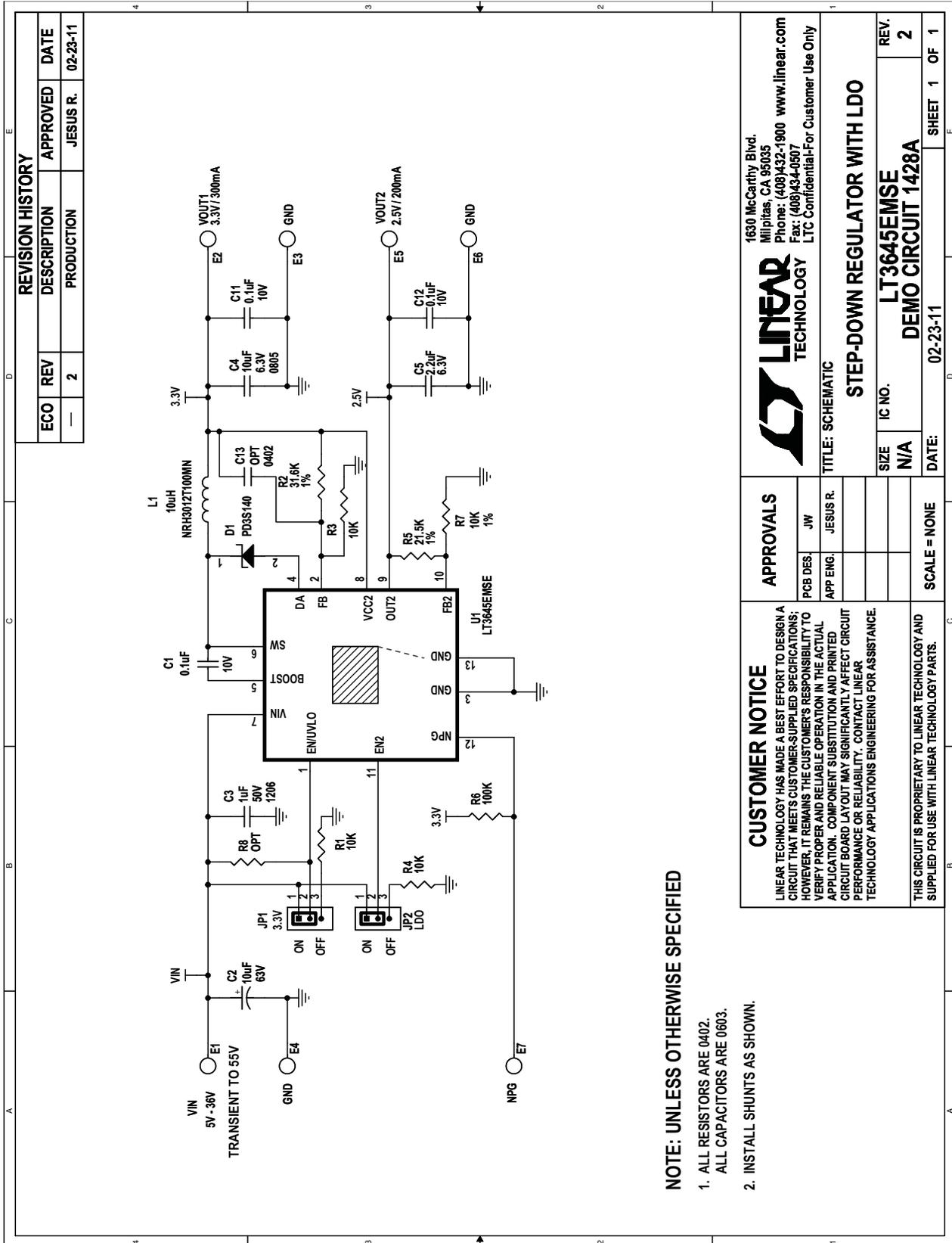
Figure 2. Proper Input/Output Ripple Measurement Technique

# DEMO MANUAL DC1428A

## PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
<b>Required Circuit Components</b>				
1	1	C1	Capacitor, X7R, 0.1 $\mu$ F, 10V, 10%, 0603	AVX, 0603ZC104KAT2A
2	1	C2	Capacitor, Tantalum, 10 $\mu$ F, 63V	Suncon, 63CE10BS
3	1	C3	Capacitor, X7R, 1 $\mu$ F, 50V, 10%, 1206	Murata, GCM31MR71H105KA55L
4	1	C4	Capacitor, X5R, 10 $\mu$ F, 6.3V, 0805	AVX, 08056D106MAT2A
5	1	C5	Capacitor, X5R, 2.2 $\mu$ F, 6.3V, 10%, 0603	AVX, 06036D225KAT2A
6	1	D1	Schottky Barrier Rect., 1A, power, DI323	Diodes Inc. PD3S140
7	1	L1	Inductor 10 $\mu$ H	Taiyo Yuden, NRH3012T100MN
8	2	R1, R4	Resistor, 10k, 1/16W, 5%, 0402	Vishay, CRCW040210K0JNED
9	1	R2	Resistor, 31.6k, 1/16W, 1%, 0402	Vishay, CRCW040231K6FKED
10	2	R3, R7	Resistor, 10k, 1/16W, 1%, 0402	Vishay, CRCW040210KFKED
11	1	R5	Resistor, 21.5k, 1/16W, 1%, 0402	Vishay, CRCW040221K5FKED
12	1	R6	Resistor, 100k, 1/16W, 5%, 0402	Vishay, CRCW04021003JKED
13	1	U1	IC, LT3645EMSE	Linear Technology, LT3645EMSE
14	1		Fab, Printed Circuit Board	Demo Circuit 1428A
<b>Additional Demo Board Circuit Components</b>				
1	2	C11, C12	Capacitor, X7R, 0.1 $\mu$ F, 10V, 10%, 0603	AVX, 0603ZC104KAT2A
2	0	C13 (OPT)	Capacitor, 0402	
3	0	R8 (OPT)	Resistor, 0402	
<b>Hardware/Components (For Demo Board Only)</b>				
1	7	E1-E7	Testpoint, Turret, 0.094"	Mill-Max, 2501-2-00-80-00-00-07-0
2	2	JP1, JP2	Header, 3-Pin, 1 Row, 0.079CC	Samtec, TMM-103-02-LS
3	2	XJP1, XJP2	Shunt, 0.079" Center	Samtec, 2SN-BK-G

SCHEMATIC DIAGRAM



NOTE: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE 0402.
- ALL CAPACITORS ARE 0603.
2. INSTALL SHUNTS AS SHOWN.

# DEMO MANUAL DC1428A

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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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