

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1343A

2.25MHZ, 1.25A MONOLITHIC SYNCHRONOUS BUCK REGULATOR

LTC3564

DESCRIPTION

Demonstration circuit DC1343A is a high efficiency monolithic synchronous buck regulator using a constant frequency, current mode architecture featuring LTC3564. Its high switching frequency of 2.25MHz allows the use of small surface mount inductors and capacitors. Supply current during operation is typically only 20uA, and drops to below 1uA in shutdown. The 2.5V to 5.5V input volt-

age range makes the LTC3564 ideally suited for single Li-Ion battery-powered or 3.3V to 5V input voltage applications. 100% duty cycle provides low dropout operation, extending battery life in portable systems. Automatic Burst Mode® operation increases efficiency at light loads, further extending battery runtime. **Gerber files for this circuit are available. Call the LTC Factory.**

Table 1. Performance Summary ($T_A = 25^\circ\text{C}$)

PARAMETER	CONDITION	VALUE
Input Voltage		2.5V to 5.5V
Output Voltage V_{OUT}	$I_{OUT}=0\text{A}$ to 1.25A	$V_{OUT} \pm 1\%$
Maximum Output Current		1.25A
DC Supply Current	$V_{IN} = 3.3\text{V}$, $V_{OUT} = 1.8\text{V}$, $I_{OUT} = 0\text{A}$	$<40\mu\text{A}$
Nominal Switching Frequency	$V_{IN} = 3.3\text{V}$, $V_{OUT} = 1.8\text{V}$, $I_{OUT} = 1.25\text{A}$	2.25MHz

QUICK START PROCEDURE

The DC1343A is easy to set up to evaluate the performance of the LTC3564. Refer to Figure 2 for the proper measurement equipment setup.

NOTE: 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 the measurement example diagram in Figure 1 for proper scope probe technique.

Please follow the procedure outlined below for proper operation.

1. Connect the input power supply to the V_{IN} and GND terminals. Connect the load between the V_{OUT} and GND terminals.

2. Before proceeding to operation, insert jumper shunt XJP1 into the OFF position and insert one jumper shunt into XJP2, XJP3 or XJP4 for voltages of 1.2V, 1.5V, or 1.8V respectively. Set the load output current to less than 1.25A. An optional output voltage can be set by populating resistor RFB6, removing RFB5, and moving the shunt to JP5.

3. Apply 5V at V_{IN} . Measure V_{OUT} ; it should read 0V. If desired, one can measure the shutdown supply current at this point. The supply current will be about 1 μA in shutdown.

4. Turn on V_{OUT} by changing shunt XJP1 from the OFF position to the ON position. The output voltage should measure according to the voltage set by the shunt in JP2, JP3, or JP4.

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5. Vary the input voltage between 2.5V and 5.5V and the output voltage should be within +/- 1% tolerance.

Warning - If the power for the demo board is carried in long leads, the input voltage at the part could "ring", which could affect the operation of the circuit or even exceed the maximum voltage rating of the IC. To eliminate the ringing, insert a small tantalum capacitor (for instance, AVX part

6. Vary the V_{OUT} load current from 0 to 1.25A, and the output voltage should be within a tolerance of +/- 1%.

TAJW686M010) on the pads between the input power and return terminals on the bottom of the demo board. The (greater) ESR of the tantalum will dampen the (possible) ringing voltage due to the use of long input leads. On a normal, typical PCB, with short traces, the capacitor is not needed.

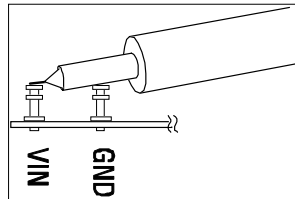


Figure 1. Measuring Input or Output Ripple

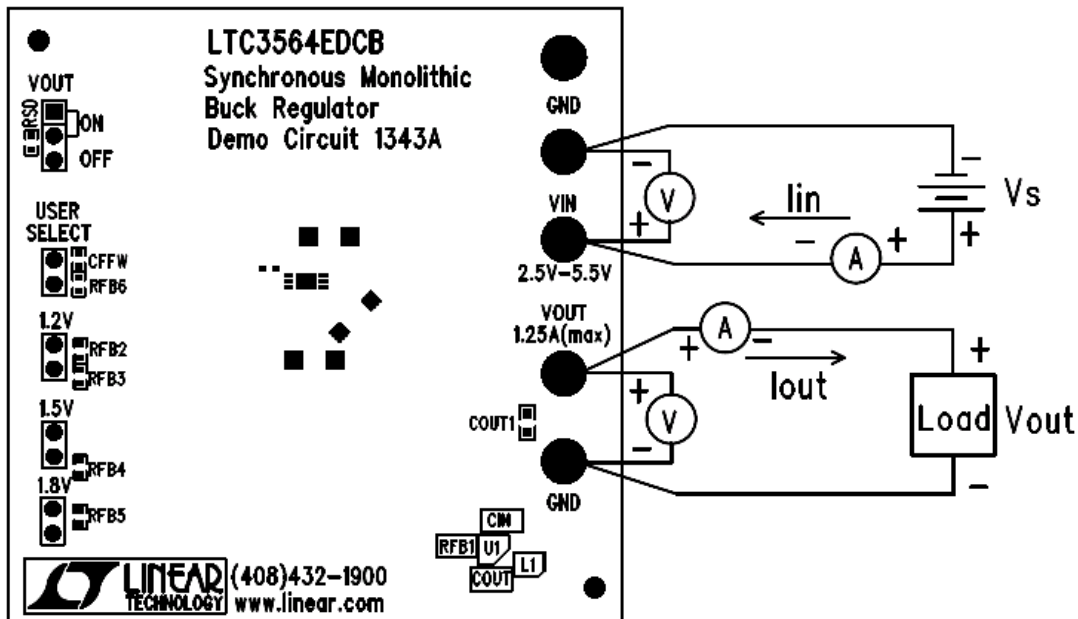


Figure 2. Proper Measurement Equipment Setup

Load Step Response

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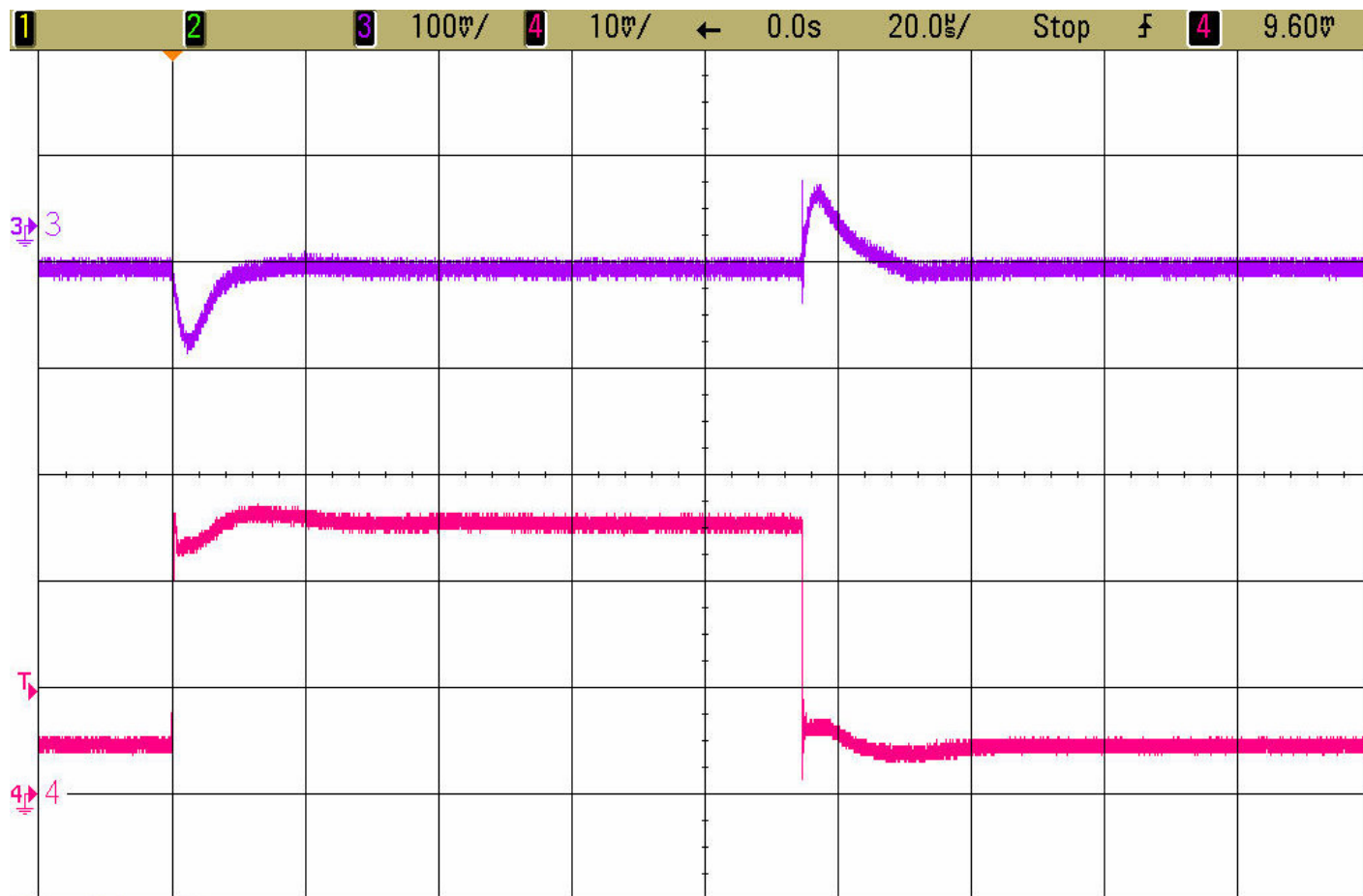


Figure 3. Load Step Response

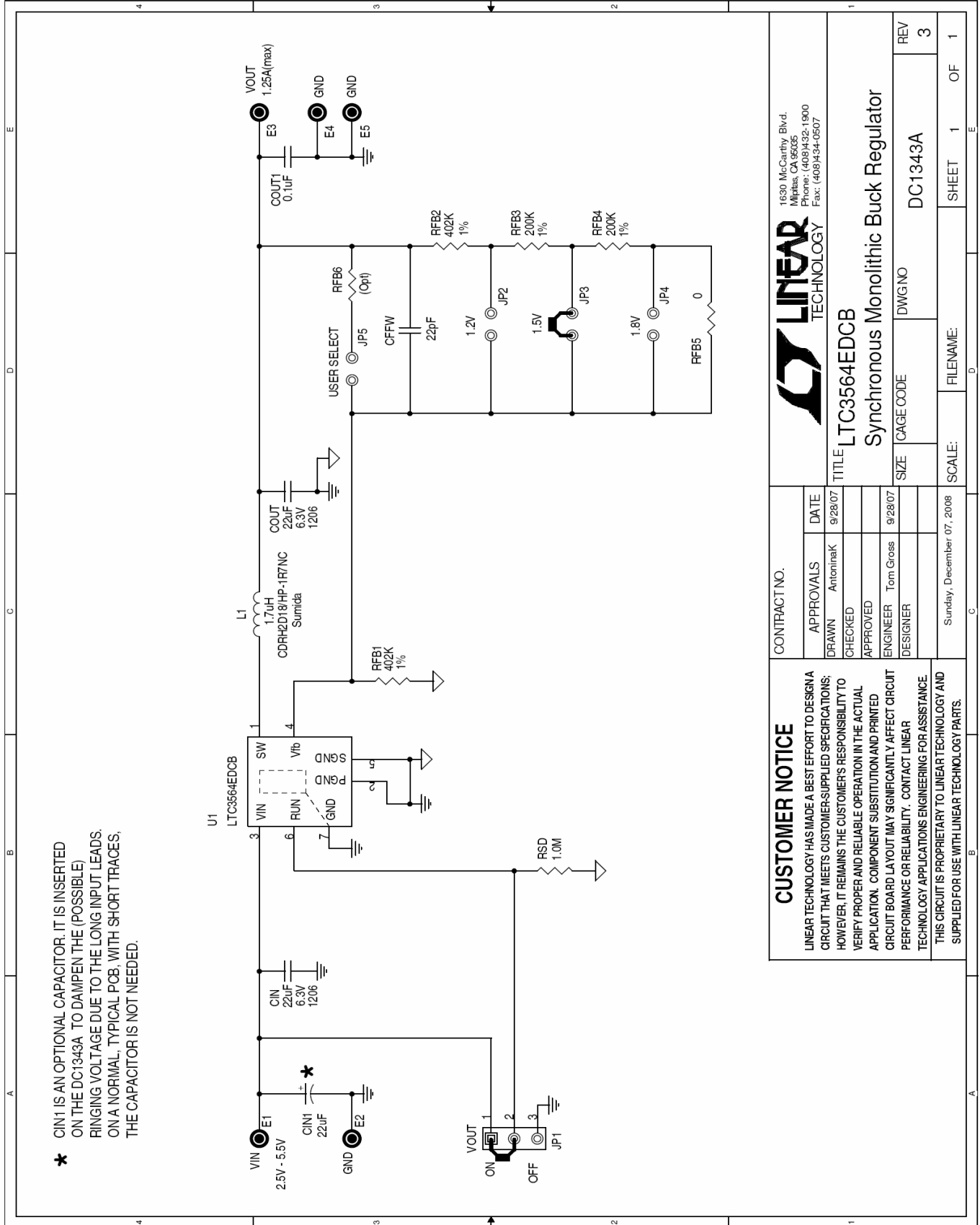
$V_{in} = 3.3V$, $V_{out} = 1.8V$, 1A Load Step (250mA \leftrightarrow 1.25A), $F_{sw} = 2.25$ MHz

Trace 3: Output Voltage (100mV/div – AC coupled)

Trace 4: Output Current (500mA/div)

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CUSTOMER NOTICE		CONTRACT NO.	
LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.		APPROVALS	
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.		DRAWN AntoninaK	DATE 9/28/07
		CHECKED	
		ENGINEER Tom Gross	DATE 9/28/07
		DESIGNER	
		SCALE: Sunday, December 07, 2008	
		FILENAME:	
		SHEET 1 OF 1	
		DWG NO DC1343A	REV 3
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