QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 870A-A
HIGH EFFICIENCY MONOLITHIC SYNCHRONOUS BUCK REGULATOR
LTC3410

DESCRIPTION

Demonstration circuit 870A-A is a high efficiency, high frequency buck converter, incorporating the LTC3410 monolithic synchronous regulator. The DC870 has an input voltage range of 2.25V to 5.5V, and is capable of delivering up to 300mA of output current. It has an output voltage range from 0.8V to 5V, and an operating frequency of 2.25MHz (allowing the exclusive use of low profile surface mount components). In Burst Mode™ operation, which is the mode of low load current operation offered by the LTC3410, the DC supply current is typically only 26uA at no load, and less than 1uA in shutdown The DC870 is a very efficient circuit: up to 96%. These features, plus the LTC3410 coming in a tiny, low-profile 6-pin SC70 package, make the DC870 demo board an ideal circuit for use in battery-powered, hand-held applications.

Design files for this circuit board are available. Call the LTC factory.

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Table 1.

Performance Summary (T_A = 25°C)

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		2.25V
Maximum Input Voltage		5.5V
Output Voltage V_{OUT}	V_{IN} = 2.25V to 5.5V, I_{OUT} = 0A to 0.3A	1.8V ±4%
Typical Output Ripple V_{OUT}	V_{IN} = 5V, I_{OUT} = 0.3A (20 MHz BW)	20mV_{P-P}
Output Regulation	Line	±1%
	Load	±1%
Nominal Switching Frequency		2.25 MHz

QUICK START PROCEDURE

The DC870A-A is easy to set up to evaluate the performance of the LTC3410. For proper measurement equipment configuration, set up the circuit according to the diagram in **Figure 1**. Before proceeding to test, insert shunt on jumper JP1 into the off position, connecting the RUN pin to ground (GND), which shuts down the circuit.

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 Vin or Vout and GND terminals. See Figure 2 for proper scope probe technique.

1. Connect the input power supply and the load to the board. Do not hot-plug Vin or increase Vin over the rated maximum supply voltage of 5.5V, or the part may be damaged. Refer to figure 1 for proper measurement equipment setup.

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2. Apply 3.3V at Vin. Measure Vout; it should read 0V. If desired, one can measure the shutdown supply current at this point. The supply current will be approximately 1uA in shutdown.
3. Turn on the circuit by inserting the shunt in jumper JP1 into the ON position. The output voltage should be regulating. Measure Vout; it should measure 1.8V +/- 2%.
4. Vary the input voltage from 2.25V to 5.5V and adjust the load current from 0 to 0.3A. Vout should read 1.8V +/- 3%.
5. Measure the output ripple voltage at any output current level; it should measure less than 20mVAC.
6. Observe the voltage waveform at the switch node (one pin of the inductor). Verify the switching frequency is between 1.8MHz and 2.7MHz (T = 0.56us and 0.37us), and that the switch node waveform is rectangular in shape.

The Burst-Mode™ capability of the LTC3410 can be observed now by reducing load current.

When finished, turn off the circuit by inserting the shunt in jumper JP1 into the OFF position.

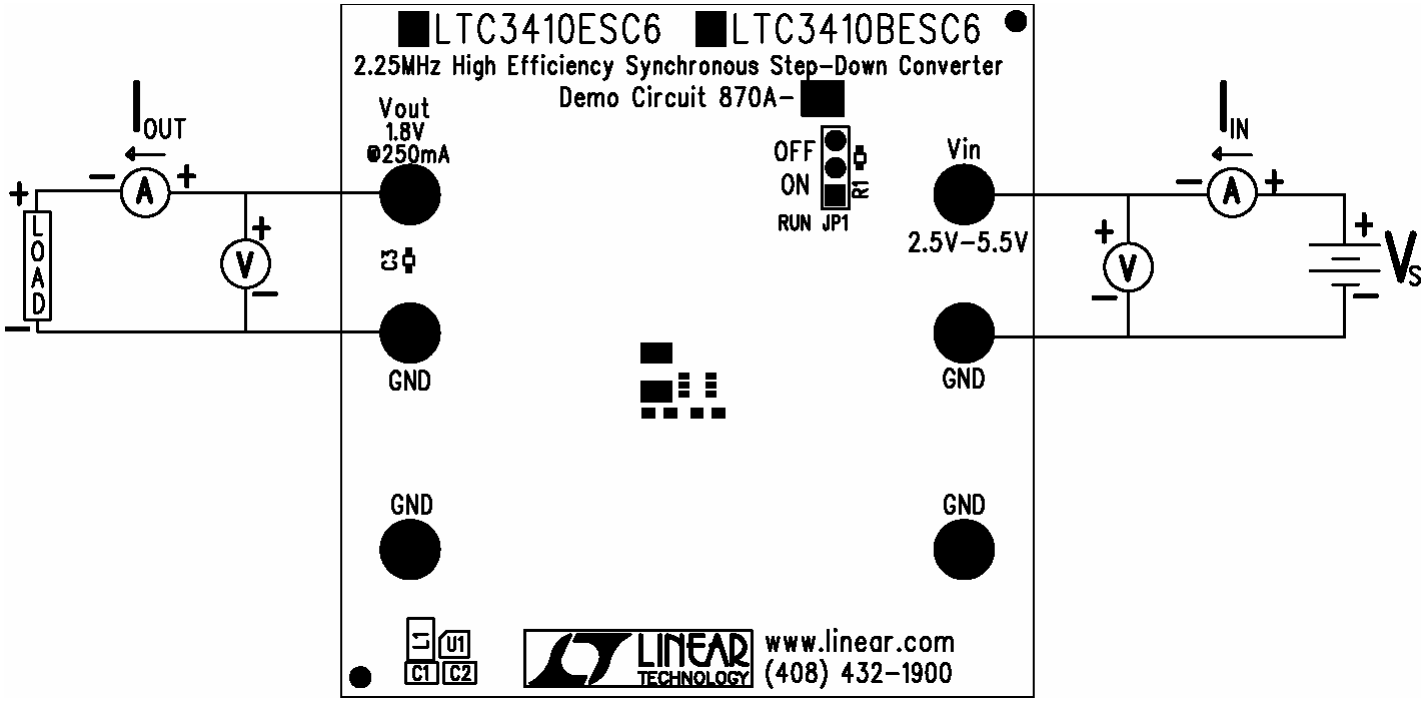

Figure 1. Proper Measurement Equipment Setup

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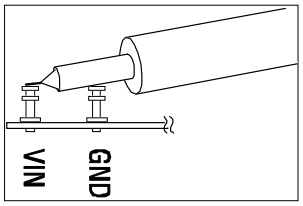

Figure 2. Measuring Input or Output Ripple

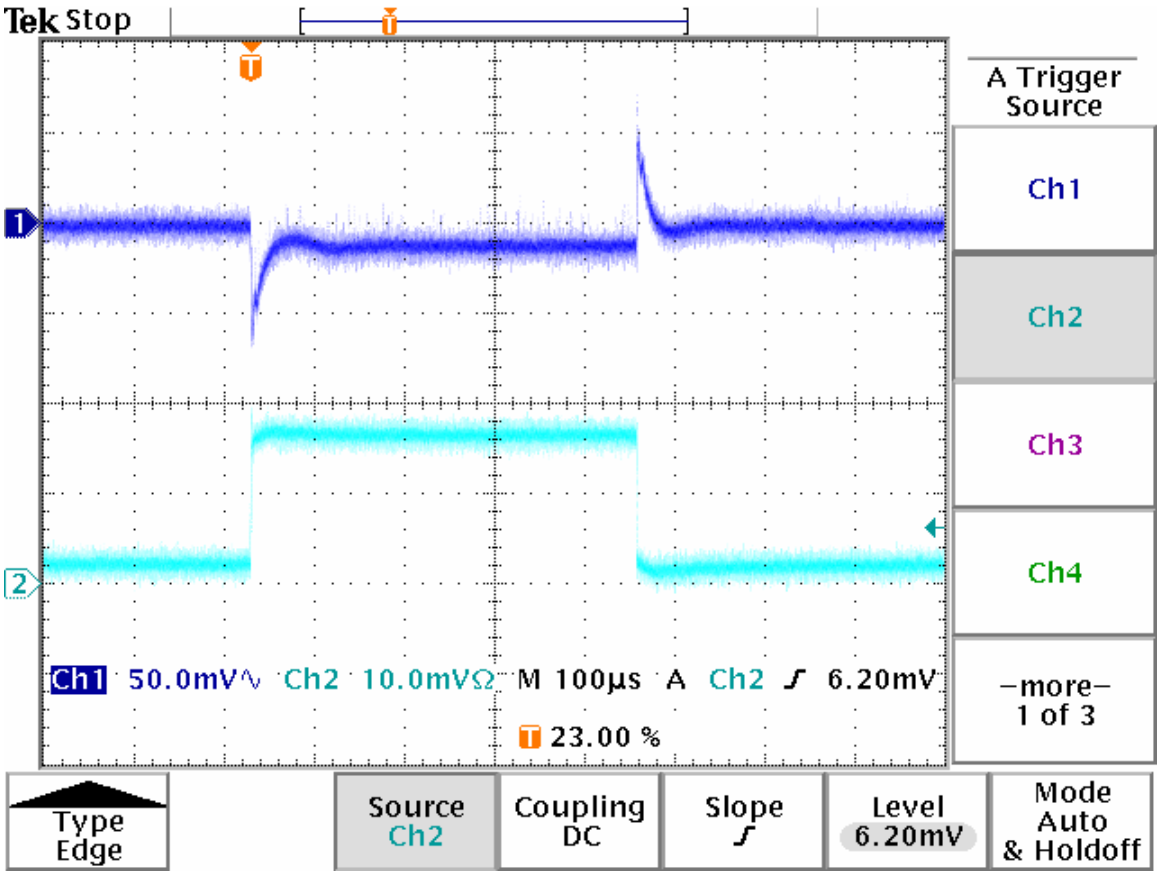

Figure 3. Load Step Response

Vin = 3.3V, Vout = 1.8V, Iout Step = 0.2A

Trace 1: Output Voltage (50 mV/div AC)

Trace 2: Output Current (0.1A/div)

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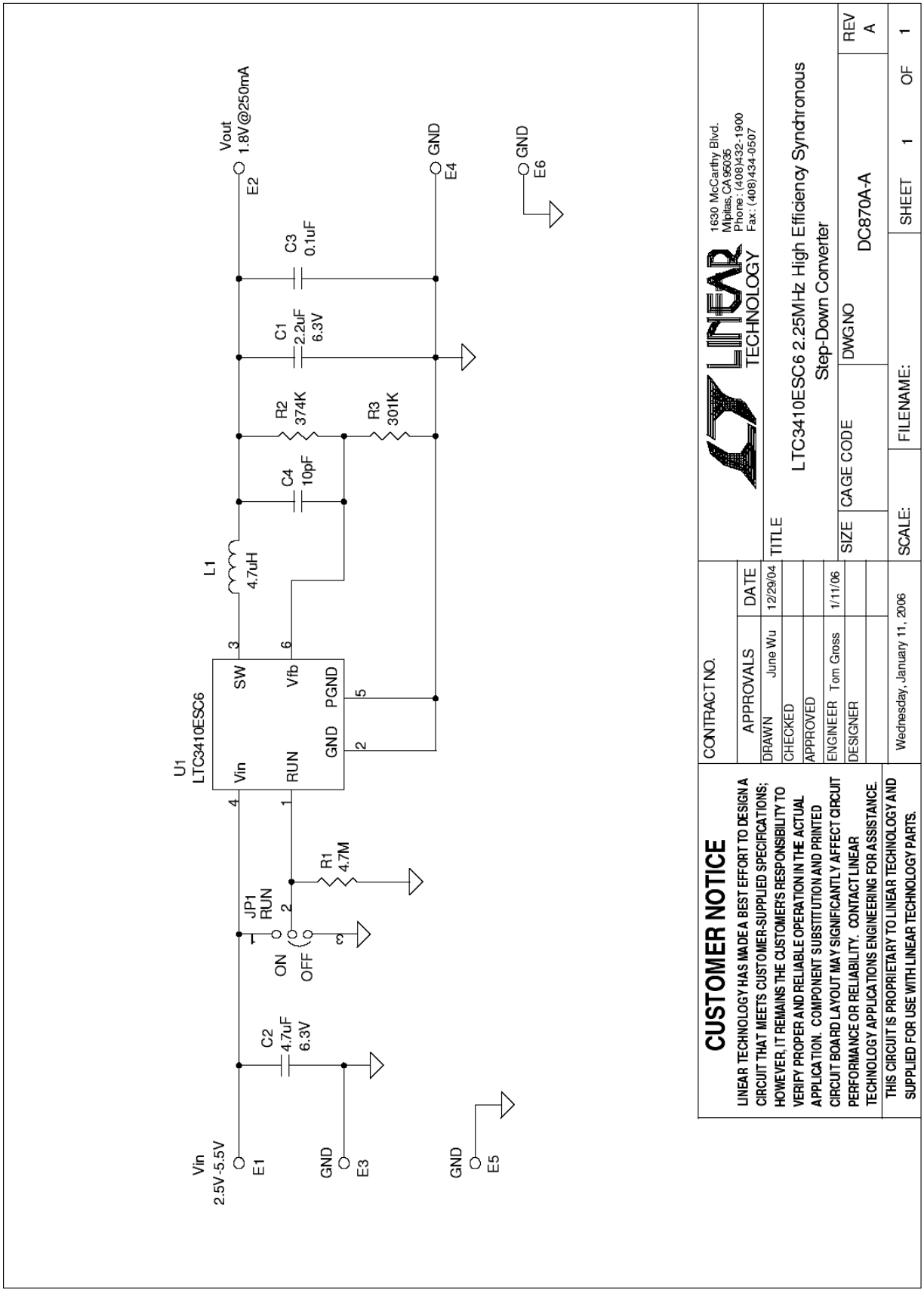

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LTC3410ESC6

Bill Of Material
Demo Bd. # 870A-A
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	Qty	Reference	Part Description	Manufacture / Part #
		REQUIRED CIRCUIT COMPONENTS:		
1	1	C1	CAP., X5R, 2.2uF, 6.3V, 10% 0603	Taiyo Yuden, JMK107BJ225KA
2	1	C2	CAP., X5R, 4.7uF, 6.3V, 20% 0603	Taiyo Yuden, JMK107BJ475MA
3	1	C4	CAP., C0G, 10pF, 50V, 5% 0402	AVX, 04025A100JAT2A
4	1	L1	INDUCTOR, 4.7uH, LQH32CN	MURATA, LQH32CN4R7M53L
5	1	R2	RES., CHIP, 374K, 1/16W, 1% 0402	AAC, CR05-3743FM
6	1	R3	RES., CHIP, 301K, 1/16W, 1% 0402	Vishay CRCW0402301KFKTD
7	1	U1	IC.,LTC3410ESC6, SC70	LINEAR TECH., LTC3410ESC6
		ADDITIONAL DEMO BOARD CIRCUIT COMPONENTS:		
1	1	C3	CAP., X5R, 0.1uF, 6.3V, 10% 0402	AVX, 04026D104KAT2A
2	1	R1	RES., CHIP, 4.7M, 1/16W, 5%, 0402	AAC, CR05-475JM

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