

LTC3812-5 Current Mode Synchronous Switching Regulator Controller

DESCRIPTION

Demonstration circuit 1035 is a current mode synchronous switching regulator featuring the LTC3812-5. The circuit is configured as a synchronous step-down regulator operating at 260kHz switching frequency. Output voltage is 3.3V at 6A maximum load. The input voltage range is 7V – 60V.

The operating mode can be selected with jumper JP1. Depending on the position of this jumper, at low load the circuit will operate in forced continuous mode (for best load transient response at low current) or in pulse skip mode (for best efficiency at low current).

A Power Good output is provided. The PGOOD output is normally high, with a pull up resistor to VCC (5.5V). If the output voltage is not within $\pm 10\%$ of nominal value the PGOOD signal will go low.

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

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PERFORMANCE SUMMARY Specifications are at TA = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V _{IN}	Input Supply Range		7		60	V
V _{OUT}	Output Voltage	V _{IN} = 12V, I _{LOAD} = 100mA	3.30	3.33	3.36	V
I _{OUT}	Output Current	V _{IN} = 12V	0		6	A
I _Q	Input Current In Shutdown	V _{IN} = 12V, RUN/SS = 0V		390	766	μ A
I _{IN}	V _{IN} Current In Pulse Skip Mode (No Load)	V _{IN} = 12V, V _{FCB} = VCC, No Load		3.8		mA
I _{IN}	V _{IN} Current In Forced Continuous Mode (No Load)	V _{IN} = 12V, V _{FCB} = 0V, No Load		20		mA
Efficiency	Efficiency	V _{IN} = 12V, I _{OUT} = 6A		89.5		%

OPERATING PRINCIPLES

The LTC3812-5 is a synchronous step-down switching regulator controller that can directly step down voltages from up to 60V input, making it ideal for telecom and automotive applications.

The LTC3812-5 uses a constant on-time valley current control architecture to deliver very low duty cycles with accurate cycle-by-cycle current limit without requiring a current sense resistor. The current limit is adjustable and the operating frequency is selected by an external resistor.

The LTC3812-5 has a precise (0.5%) internal reference, a 25MHz error amplifier, large gate drivers, programmable softstart, a shutdown pin, a Power Good output, and a flexible bias regulator circuit that can be configured in many different ways to fit the application. The 5.5V bias regulator controls an external series transistor to reduce internal power dissipation.

EQUIPMENT

- 4 DMMs
- 1 DC Supply 0-60V capable of delivering at least 25W
- 1 Adjustable load 0-6A

QUICK START PROCEDURE

Demonstration circuit 1035 is easy to set up to evaluate the performance of the LTC3812-5. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Place jumpers in the following positions:
 - JP1** ON (Forced continuous mode operation)
 - JP2** ON
2. With power off, connect the input power supply to V_{in} and GND.
3. Set the power supply to 12V and turn on the power at the input.
 - NOTE.** Make sure that the input voltage does not exceed 60V.
4. Check for the proper output voltage. $V_{out} = 3.30V$ to $3.36V$.
 - NOTE.** If there is no output, temporarily disconnect the load to make sure that the load is not set too high.
5. Once the proper output voltages are established, adjust input voltage and load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

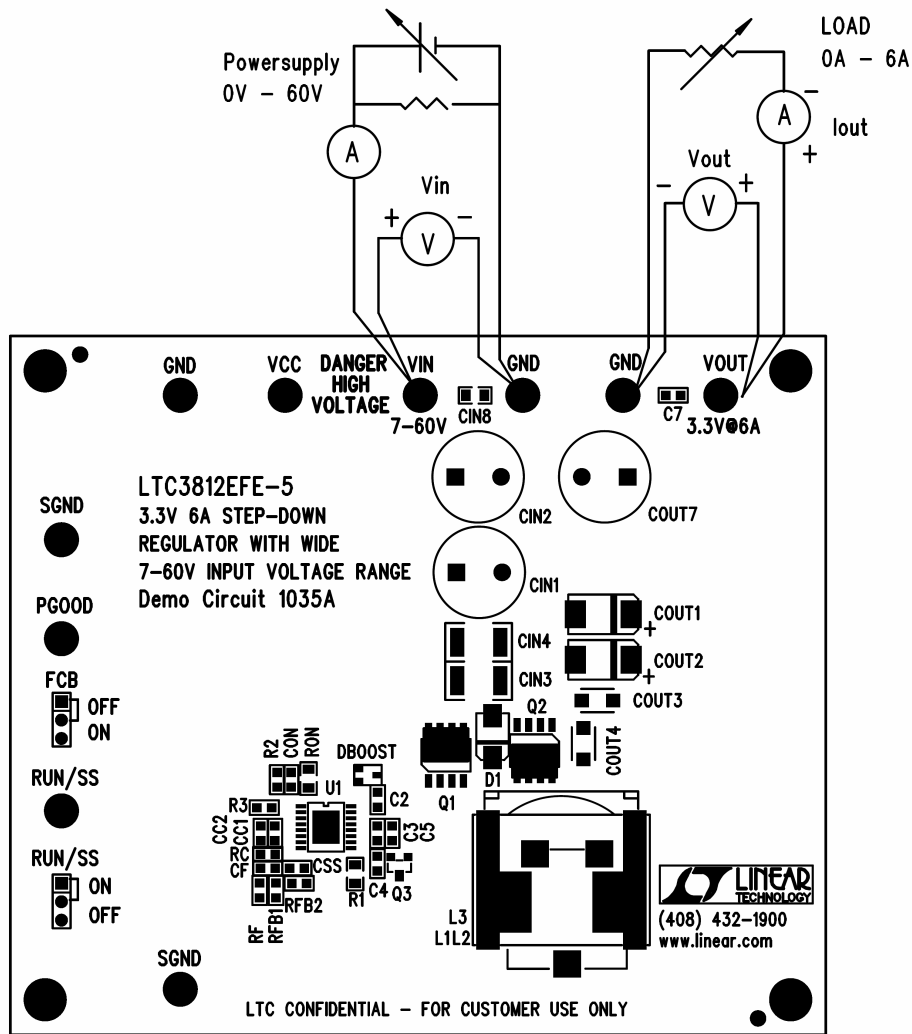
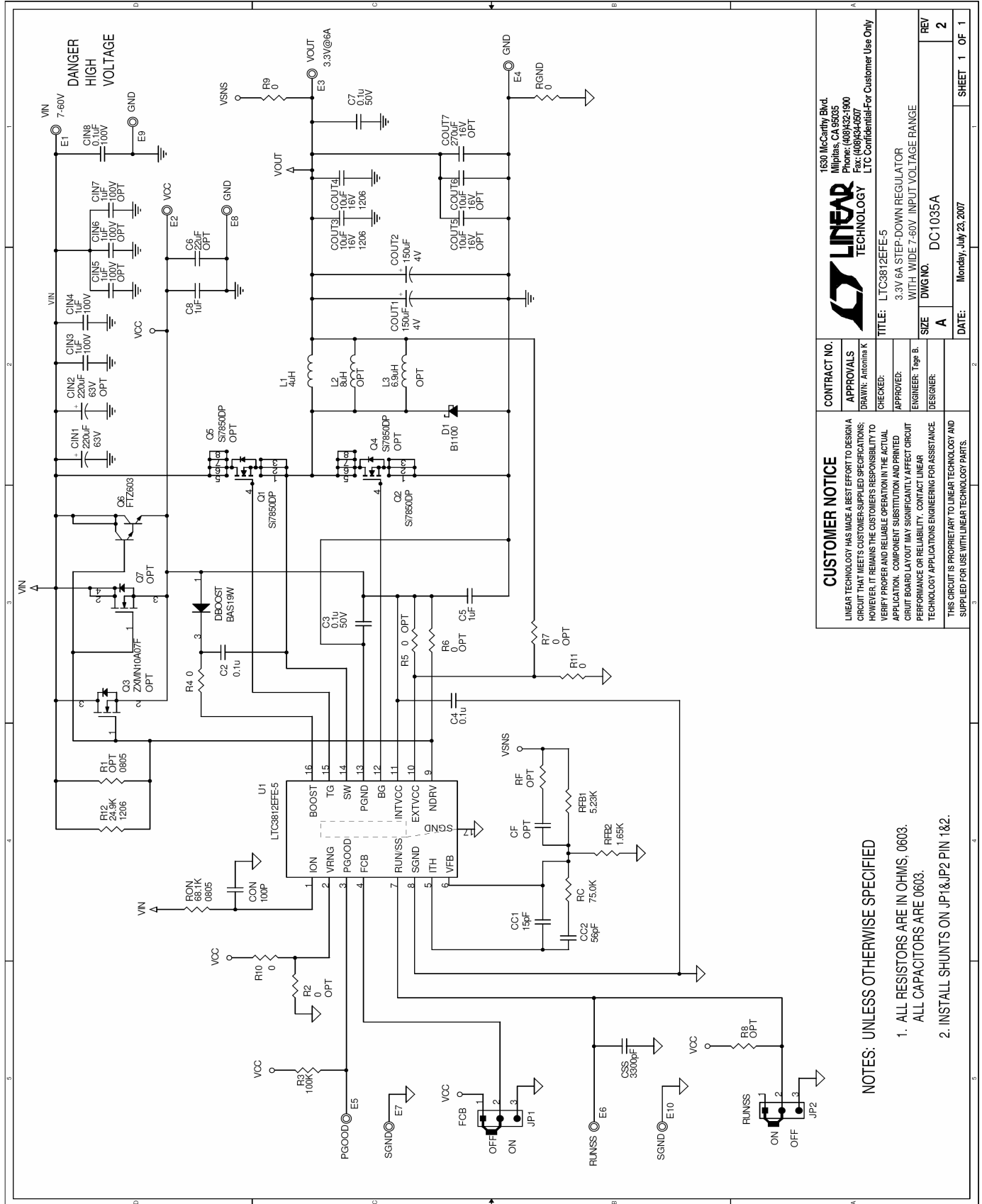


Figure 1. Proper Measurement Equipment Setup

LTC3812-5



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.		LTC3812EFE-5	
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.		APPROVALS	DATE: Monday, July 23, 2007
		DRAWN: Antonina K	
		CHECKED:	
		APPROVED:	
		ENGINEER: Tom B.	
		DESIGNER:	
		SIZE	DWG NO. DC1035A
		REV	1 OF 1
		2	

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE IN OHMS, 0603.
2. INSTALL SHUNTS ON JP1 & JP2 PIN 1 & 2.