TEXAS INSTRUMENTS

AN-1908 LM2842 Evaluation Board

1   Introduction

The LM2842 is a PWM DC/DC buck (step-down) regulator. With a wide input range from 4.5V to 42V, it is suitable for a wide range of applications from automotive to power conditioning from unregulated sources. The LM2842 evaluation board is designed to provide the design engineer with a fully functional power converter based on the buck topology to evaluate the LM2842 series of buck regulators. The evaluation board comes populated with the LM2842XMK-ADJL but can easily be modified to accommodate any of the LM2842 regulator ICs.

2   Features

- 4.5V to 42V Input Voltage Range
- 3.3V Output Voltage
- Up to 600 mA Output Current
- 89% Efficiency at 300 mA
- Switching Frequency of 550 kHz
- Frequency Foldback Current Limit of 1A
- Internal Compensation

3   Shutdown Operation

The evaluation board includes a 3 pin header and a jumper to select whether the device is on or off. Placing the jumper in the "ON" position ties $\overline{SHDN}$ to VIN and enables the device. Placing the jumper in the "OFF" position ties $\overline{SHDN}$ to GND and disables the device. The jumper may be removed and a logic signal may be applied to the center pin to test startup and shutdown of the device.

4   Adjusting the Output Voltage

The output voltage can be changed from 3.3V to another voltage by adjusting the feedback resistors using the following equation:

$$V_{OUT} = V_{FB}(1+(RFB1/RFB2)) \tag{1}$$

Where V_{FB} is 0.76V.

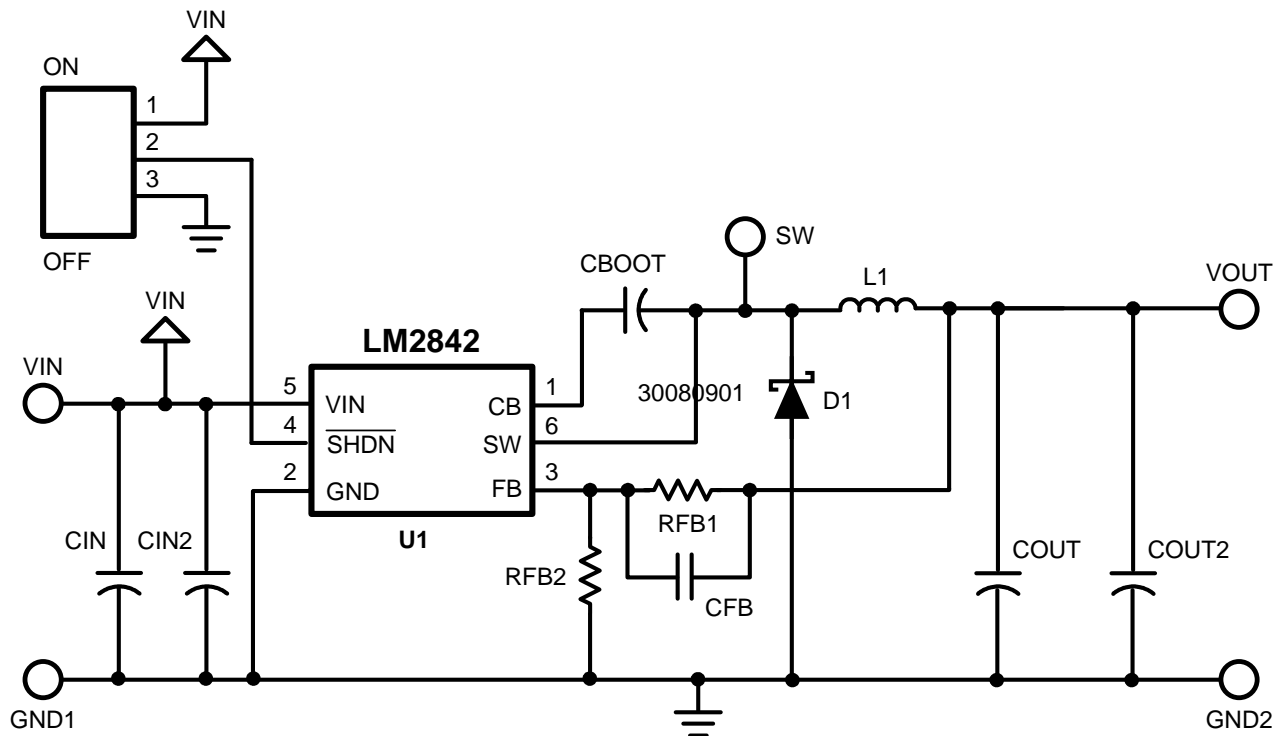## 5   Evaluation Board Schematic

Figure 1. LM2842 Evaluation Board Schematic

6   Bill of Materials

Table 1. Bill of Materials (BOM)

| ID	Part Number	Type	Size	Parameters	Qty	Vendor
U1	LM2842	Buck Regulator	SOT-6		1	Texas Instruments
L1	DO3308P-153MLD	Inductor	3308	15 µH, 2.0A	1	Coilcraft
D1	MA2YD2600L	Diode	SOD-123	60V, 800 mA	1	Panasonic
CIN	GRM31CR71H225KA88	Capacitor	1206	2.2 µF, 50V	1	Murata
CIN2	OPEN					
COUT	GRM32ER60J476ME20	Capacitor	1210	47 µF, 6.3V	1	Murata
COUT2	OPEN					
CFB	OPEN					
CBOOT	VJ0805Y154KXXA	Capacitor	0805	0.15 µF	1	Vishay/Vitramon
RFB1	CRCW08053K40FKEA	Resistor	0805	3.4 kΩ	1	Vishay
RFB2	CRCW08051K02FKEA	Resistor	0805	1.02 kΩ	1	Vishay
ON/OFF		1X3 header	HDR1X3	0.100 Spacing	1	
ON/OFF*	382811-6	Shunt			1	Tyco/Amp
VIN, VOUT, GND1, GND2, SW	1502-2	Test Post	TP 1502		5	Keystone

7   Typical Performance Characteristics
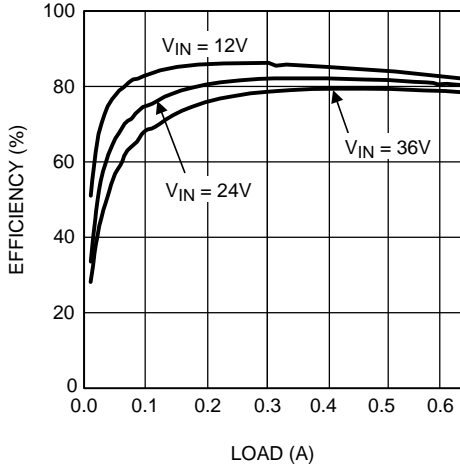
Figure 2. Efficiency vs. Load Current

VIN = 12V, VOUT = 3.3V, IOUT = 200 mA
Top Trace: VOUT, 10 mV/div, AC Coupled
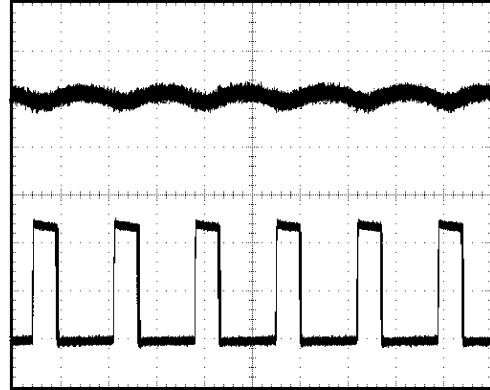**Bottom Trace: SW, 5V/div, DC Coupled**
T = 1 μs/div

Figure 3. Switching Node and Output Voltage Waveforms

VIN = 12V, VOUT = 3.3V, IOUT = 200 mA to 300 mA
Top Trace: VOUT, 20 mV/div, AC Coupled
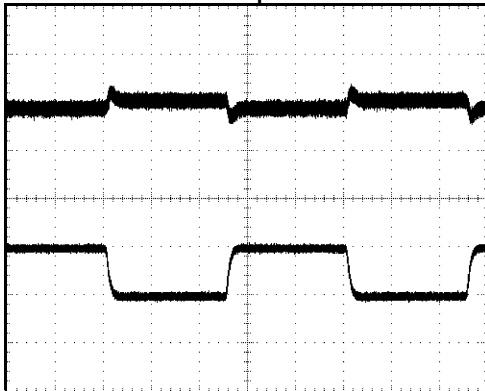**Bottom Trace: IOUT, 100 mA/div, DC Coupled**
T = 200 μs/div

Figure 4. Load Transient Waveforms

VIN = 12V, VOUT = 3.3V, IOUT = 50 mA
Top Trace: VOUT, 1V/div, DC Coupled
Bottom Trace: SHDN, 2V/div, DC Coupled
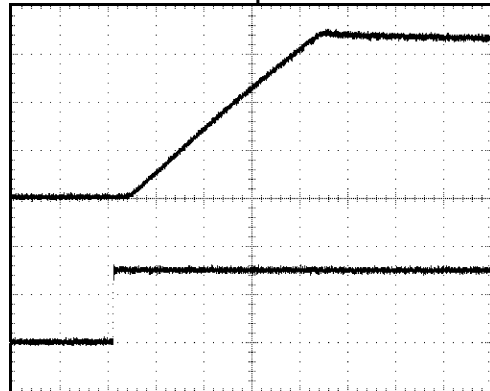**T = 40 μs/div**

Figure 5. Startup Waveform
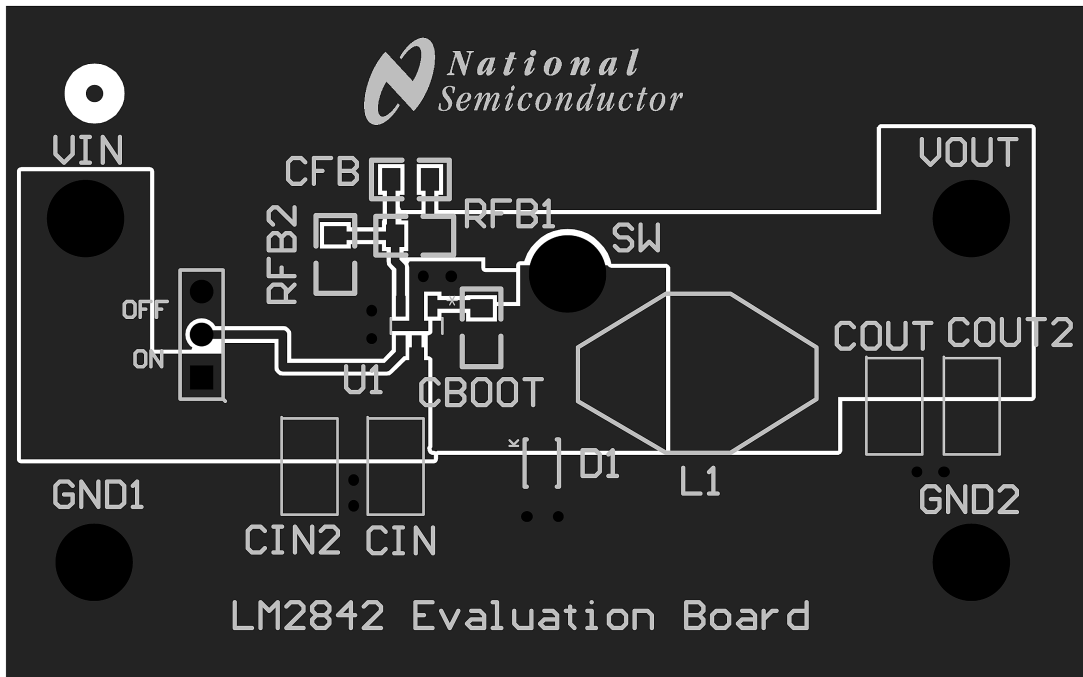
8   Layout
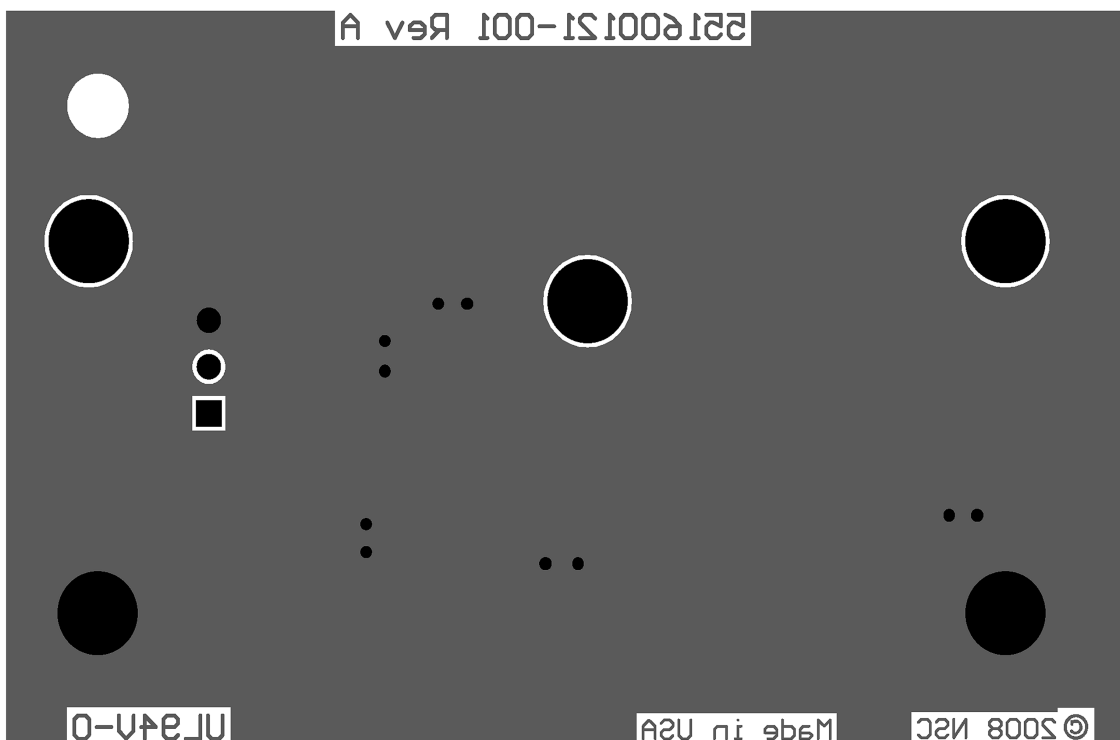

Figure 6. Top Layer and Top Overlay

Figure 7. Bottom Layer and Bottom Overlay

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