

AN-1876 LM2841 Evaluation Board

1 Introduction

The LM2841 is a PWM DC/DC buck (step-down) regulator. With a wide input range from 4.5V-42V, it is suitable for a wide range of applications from automotive to power conditioning from unregulated sources. The LM2841 evaluation board is designed to provide the design engineer with a fully functional power converter based on the buck topology to evaluate the LM2841 series of buck regulators. The evaluation board comes populated with the LM2841YMK-ADJL but can easily be modified to accommodate any of the LM2841 regulator ICs.

2 Features

- 4.5V to 42V Input Voltage Range
- 3.3V Output Voltage
- Up to 300 mA Output Current
- 89% Efficiency at 300 mA
- Switching Frequency of 1.25 MHz
- Frequency Foldback Current Limit of 550 mA
- 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 $\overline{\text{SHDN}}$ to VIN and enables the device. Placing the jumper in the "OFF" position ties $\overline{\text{SHDN}}$ 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:

$$V_{\text{OUT}} = V_{\text{FB}}(1 + (R1/R2)) \quad (1)$$

Where V_{FB} is 0.76V.

5 Evaluation Board Schematic

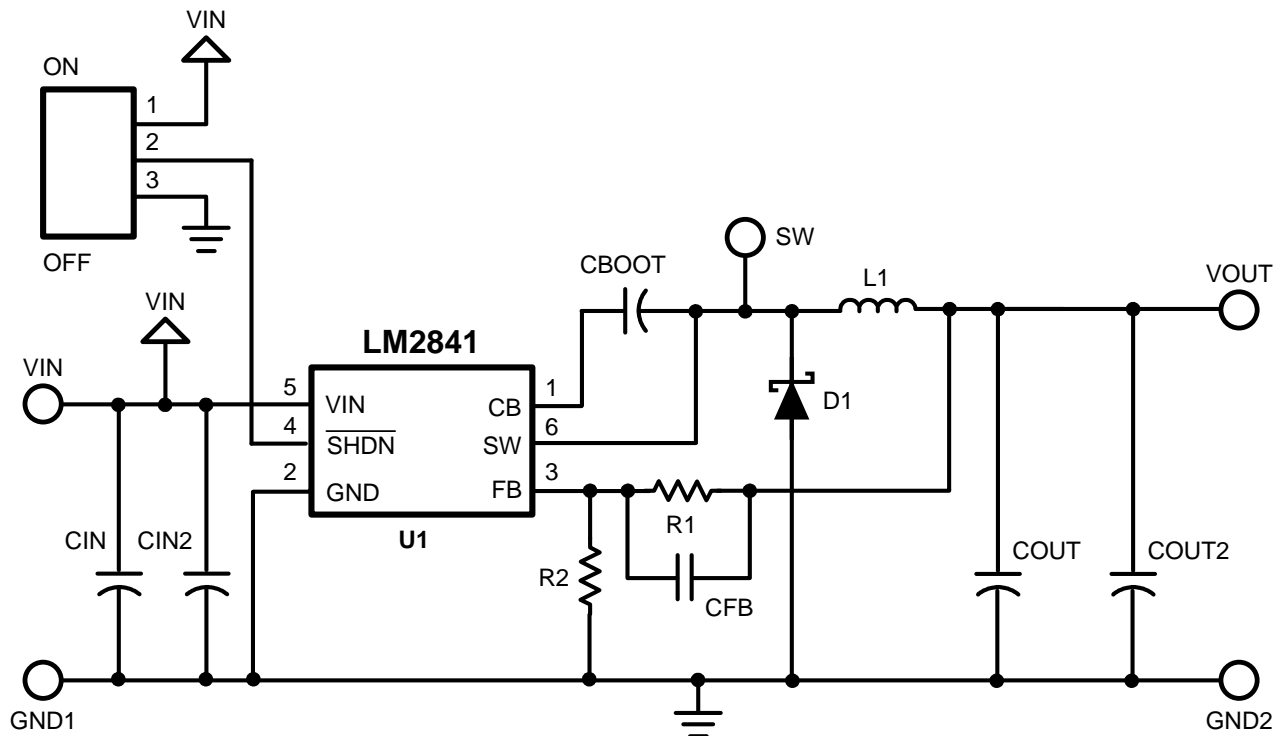


Figure 1. LM2841 Evaluation Board Schematic

6 Bill of Materials

Table 1. Bill of Materials (BOM)

ID	Part Number	Type	Size	Parameters	Qty	Vendor
U1	LM2841	Buck Regulator	SOT-6		1	Texas Instruments
L1	DO1608C-153MLC	Inductor	1608	15 μ H, 0.9A	1	Coilcraft
D1	MA2YD2600L	Diode	SOD-123	60V, 800 mA	1	Panasonic
CIN	GRM31CR71H225KA88	Capacitor	1206	2.2 μ F, 50V	1	Murata
CIN2	OPEN					
COUT	GRM32ER60J476ME20	Capacitor	1210	47 μ F, 6.3V	1	Murata
COUT2	OPEN					
CFB	OPEN					
CBOOT	VJ0805Y154KXXA	Capacitor	0805	0.15 μ F	1	Vishay/Vitramon
R1	CRCW08053K40FKEA	Resistor	0805	3.4 k Ω	1	Vishay
R2	CRCW08051K02FKEA	Resistor	0805	1.02 k Ω	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

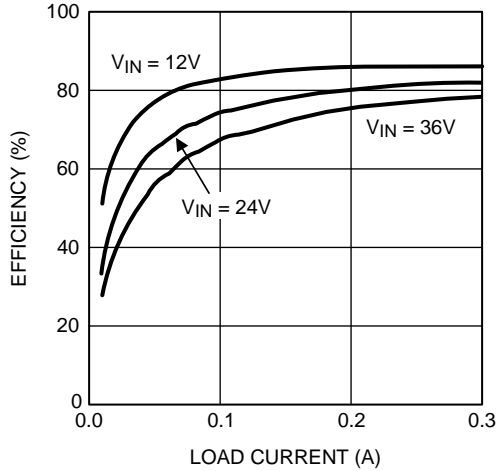


Figure 2. Efficiency vs. Load Current

$V_{IN} = 12V$, $V_{OUT} = 3.3V$, $I_{OUT} = 200\text{ mA}$
 Top Trace: V_{OUT} , 10 mV/div, AC Coupled
 Bottom Trace: SW, 5V/div, DC Coupled
 $T = 400\text{ ns/div}$

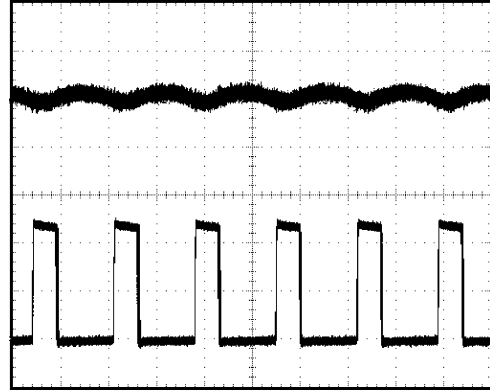


Figure 3. Switching Node and Output Voltage Waveforms

$V_{IN} = 12V$, $V_{OUT} = 3.3V$, $I_{OUT} = 200\text{ mA to }300\text{ mA}$
 Top Trace: V_{OUT} , 20 mV/div, AC Coupled
 Bottom Trace: I_{OUT} , 100 mA/div, DC Coupled
 $T = 200\text{ }\mu\text{s/div}$

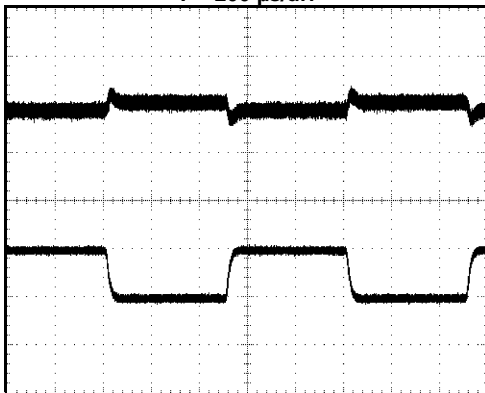


Figure 4. Load Transient Waveforms

$V_{IN} = 12V$, $V_{OUT} = 3.3V$, $I_{OUT} = 50\text{ mA}$
 Top Trace: V_{OUT} , 1V/div, DC Coupled
 Bottom Trace: SHDN, 2V/div, DC Coupled
 $T = 40\text{ }\mu\text{s/div}$

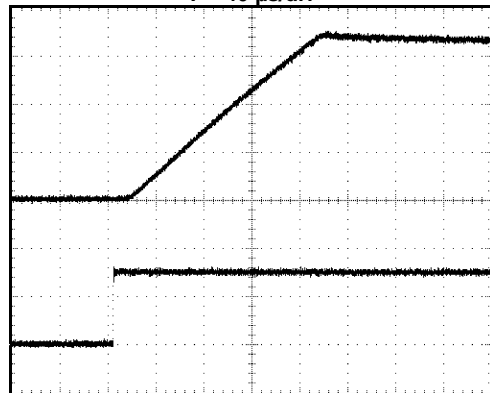


Figure 5. Startup Waveform

8 Layout

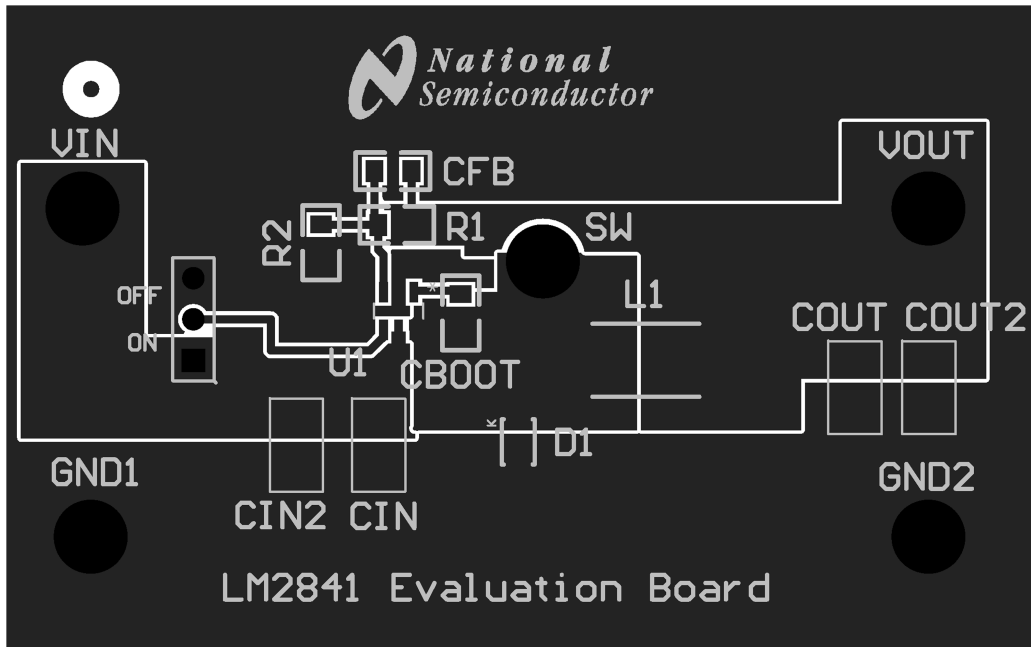


Figure 6. Top Layer and Top Overlay

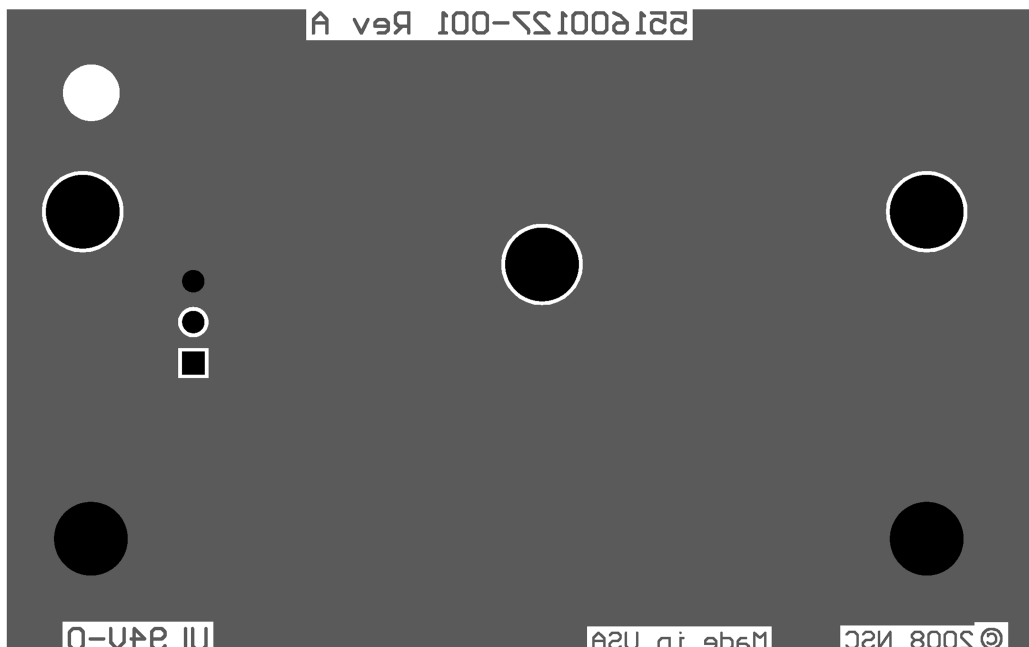


Figure 7. Bottom Layer and Bottom Overlay

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