LM2841 Evaluation Board

National Semiconductor
Application Note 1876
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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.

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

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.

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:

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

Where V_{FB} is 0.76V.

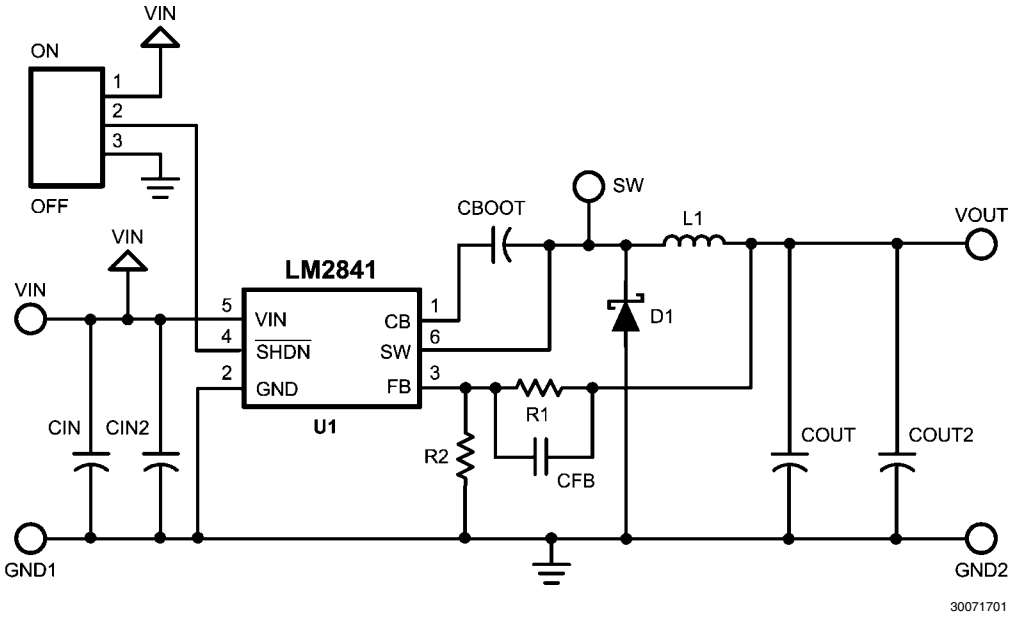


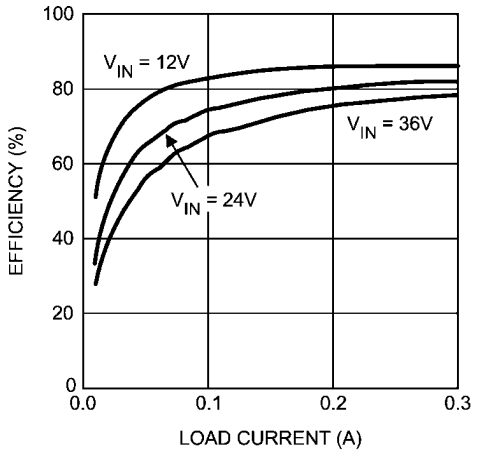
FIGURE 1. LM2841 Evaluation Board Schematic

Bill of Materials (BOM)

ID	Part Number	Type	Size	Parameters	Qty	Vendor
U1	LM2841YMK-ADJL	Buck Regulator	TSOT-6		1	NSC
L1	DO1608C-153MLC	Inductor	1608	15 µH, 0.9A	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
R1	CRCW08053K40FKEA	Resistor	0805	3.4 kΩ	1	Vishay
R2	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

Typical Performance Characteristics

Efficiency vs. Load Current



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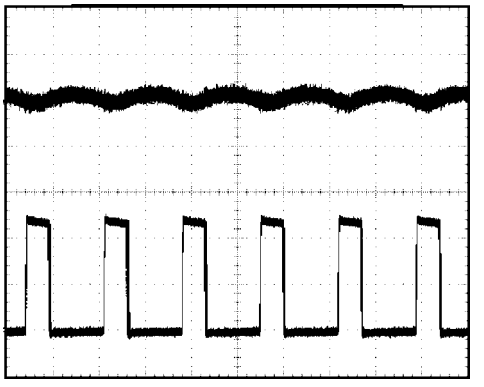
Switching Node and Output Voltage Waveforms



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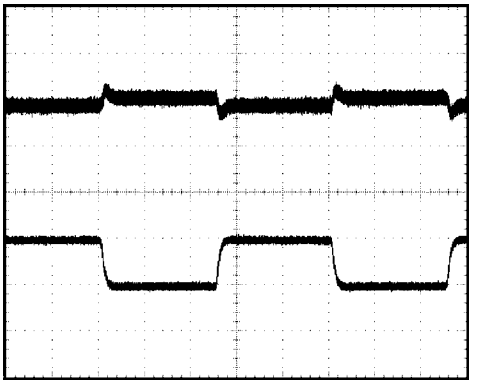
VIN = 12V, VOUT = 3.3V, IOUT = 200 mA
Top trace: VOUT, 10 mV/div, AC Coupled
Bottom trace: SW, 5V/div, DC Coupled
T = 200 ns/div

Load Transient Waveforms



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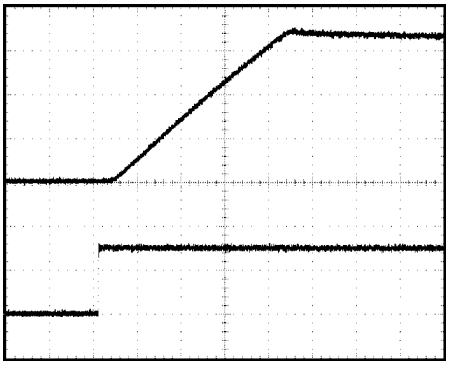
VIN = 12V, VOUT = 3.3V, IOUT = 300 mA to 200 mA to 300 mA
Top trace: VOUT, 20 mV/div, AC Coupled
Bottom trace: IOUT, 100 mA/div, DC Coupled
T = 200 µs/div

Startup Waveform



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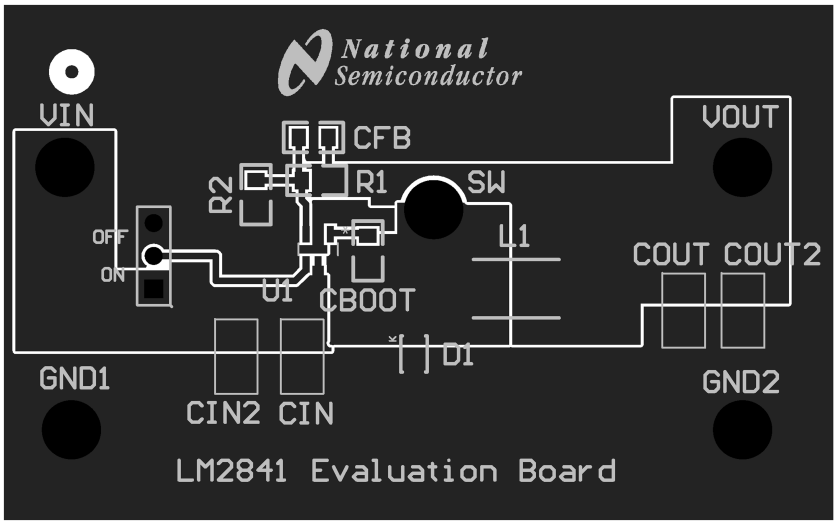
VIN = 12V, VOUT = 3.3V, IOUT = 50 mA
Top trace: VOUT, 1V/div, DC Coupled
Bottom trace: $\overline{\text{SHDN}}$, 2V/div, DC Coupled
T = 40 µs/div

Layout



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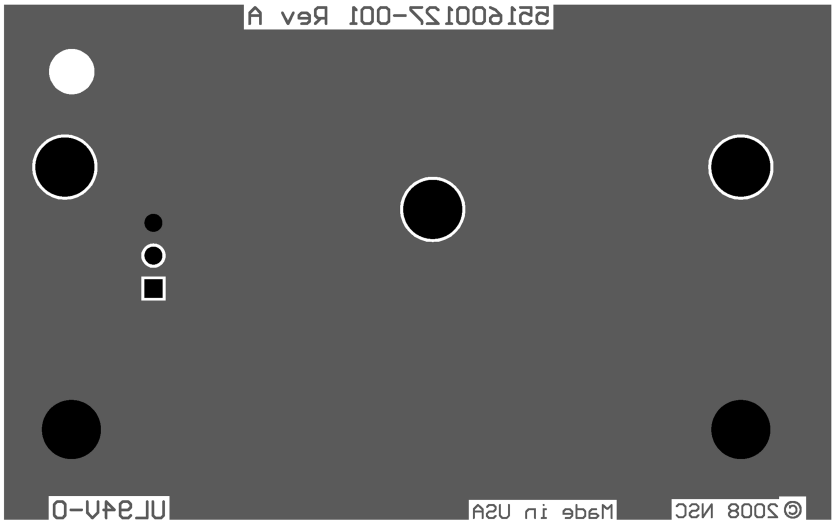
Top Layer and Top Overlay



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Bottom Layer and Bottom Overlay

Notes

Notes

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