

## ***AN-1876 LM2841 Evaluation Board***

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### **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  $V_{\text{FB}}$  is 0.76V.

## 5 Evaluation Board Schematic

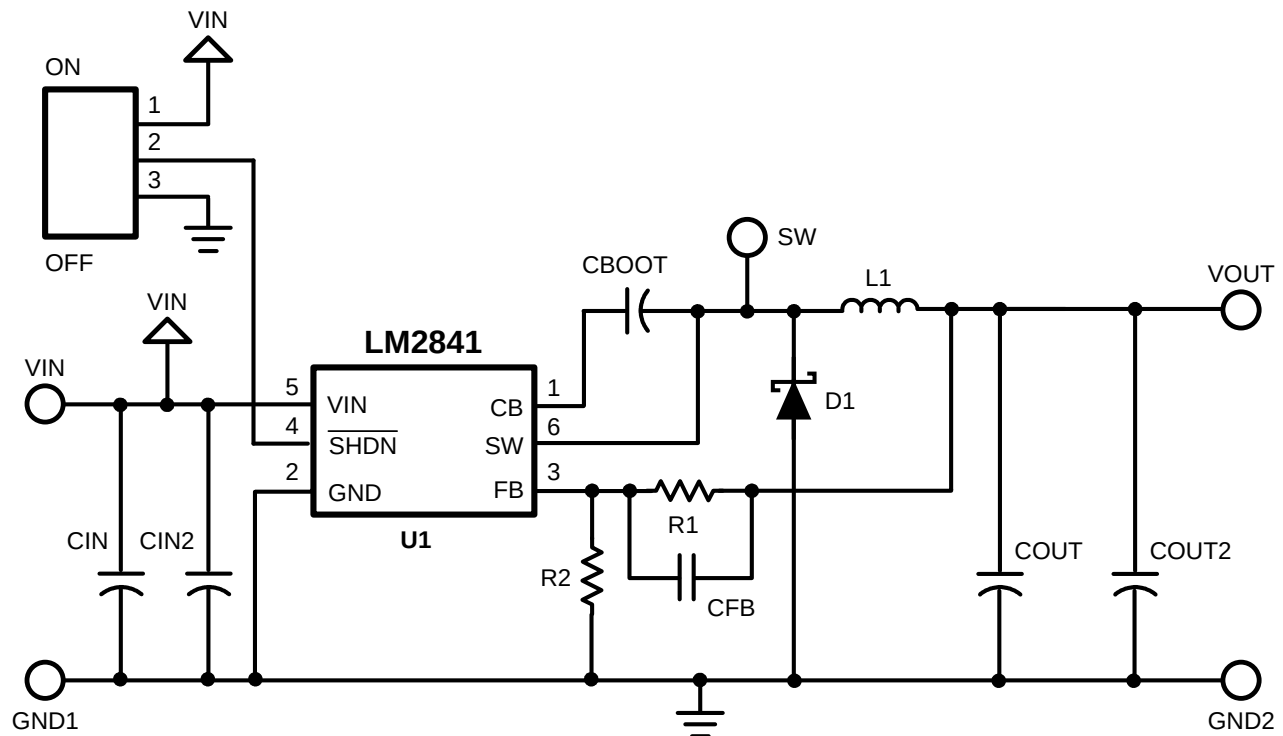


Figure 1. LM2841 Evaluation Board Schematic

## 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 $\mu$ H, 0.9A | 1   | Coilcraft         |
| D1                        | MA2YD2600L        | Diode          | SOD-123 | 60V, 800 mA      | 1   | Panasonic         |
| CIN                       | GRM31CR71H225KA88 | Capacitor      | 1206    | 2.2 $\mu$ F, 50V | 1   | Murata            |
| CIN2                      | OPEN              |                |         |                  |     |                   |
| COUT                      | GRM32ER60J476ME20 | Capacitor      | 1210    | 47 $\mu$ F, 6.3V | 1   | Murata            |
| COUT2                     | OPEN              |                |         |                  |     |                   |
| CFB                       | OPEN              |                |         |                  |     |                   |
| CBOOT                     | VJ0805Y154KXXA    | Capacitor      | 0805    | 0.15 $\mu$ F     | 1   | Vishay/Vitramon   |
| R1                        | CRCW08053K40FKEA  | Resistor       | 0805    | 3.4 k $\Omega$   | 1   | Vishay            |
| R2                        | CRCW08051K02FKEA  | Resistor       | 0805    | 1.02 k $\Omega$  | 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

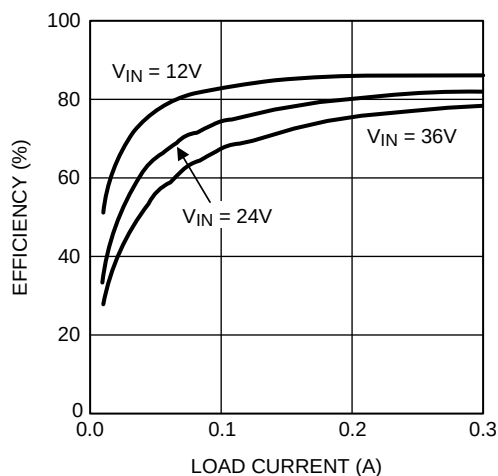


Figure 2. Efficiency vs. Load Current

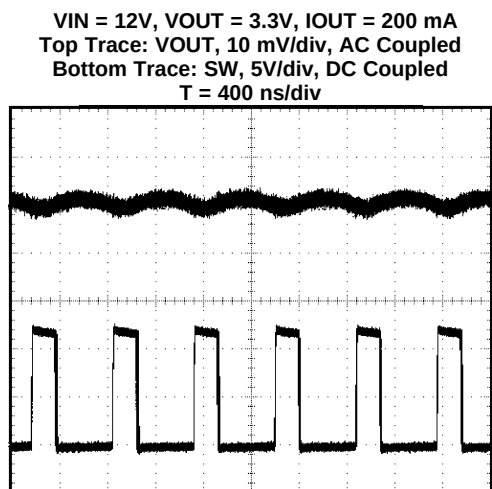


Figure 3. Switching Node and Output Voltage Waveforms

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  $\mu$ s/div

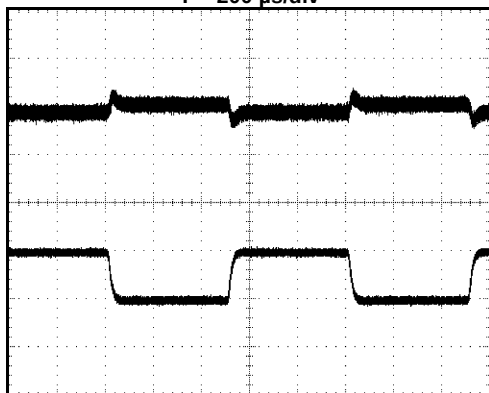


Figure 4. Load Transient Waveforms

VIN = 12V, VOUT = 3.3V, IOUT = 50 mA  
Top Trace: VOUT, 1V/div, DC Coupled  
Bottom Trace: SHDN, 2V/div, DC Coupled  
T = 40  $\mu$ s/div

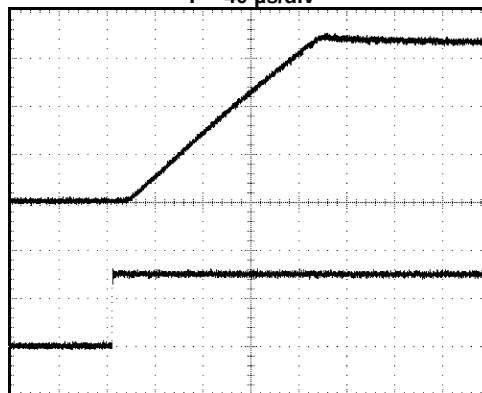


Figure 5. Startup Waveform

## 8 Layout

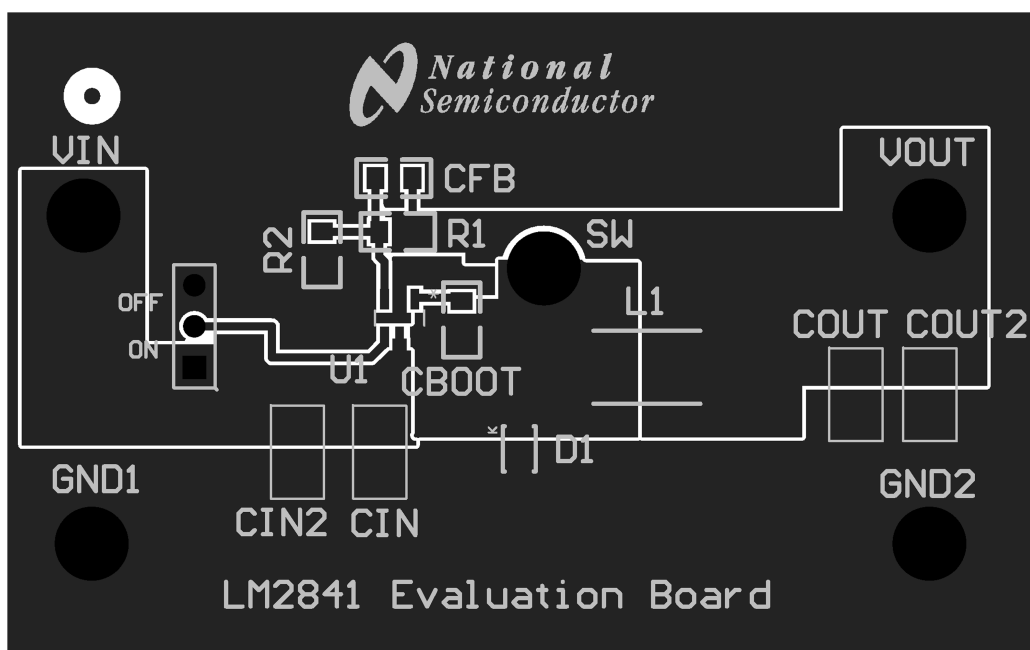


Figure 6. Top Layer and Top Overlay

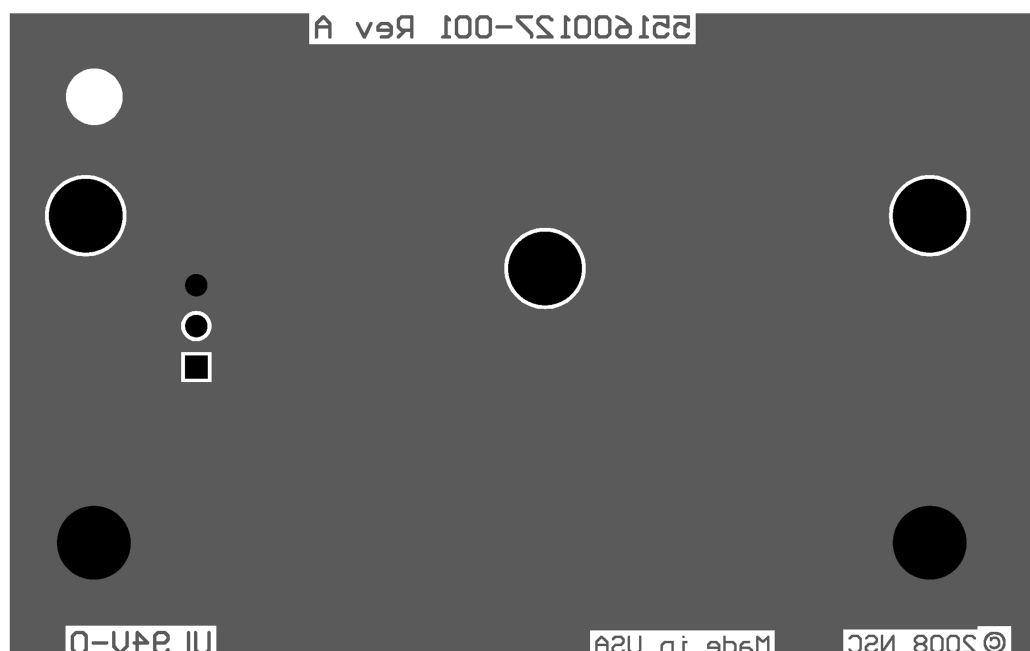


Figure 7. Bottom Layer and Bottom Overlay

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|                               |                                                                                          |
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