LMR14003Y/6YEVM Evaluation Board

1 Introduction

This document describes the setup and the input/output connections of the EVM. Included are the board layout, schematic, and bill of materials. The Texas Instruments LMR14003Y/6YEVM evaluation module (EVM) helps designers evaluate the operation and performance of the LMR14003Y and LMR14006Y switching mode power supply.

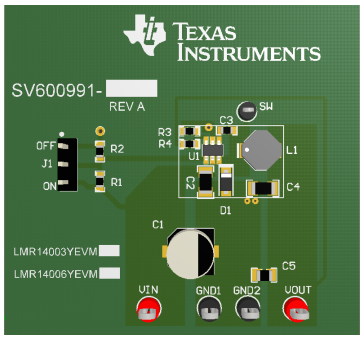

Figure 1. LMR14003Y/6YEVM Board

The LMR14003Y and LMR14006Y is a PWM DC/DC buck (step-down) regulator. With a wide input range from 4V to 40V, it is suitable for a wide range of applications from automotive to industry for power conditioning from unregulated sources. The LMR14003Y/6YEVM evaluation board is designed to provide the design engineer with a fully functional power converter based on the buck topology to evaluate the LMR14003Y/6Y series of buck regulators.

1.1 EVM Features

- 6V to 18V Input Voltage Range
- 5V Output Voltage
- Up to 300mA(LMR14003Y) or 600mA (LMR14006Y) Output Current
- Switching Frequency 2.1 MHz (1.1MHz for X version)
- Frequency Foldback Current Limit of 0.6A/1.1A
- Internal Compensation

The EVM contains one DC / DC converter (See Table 1)

Table 1. Device and Package Configurations

CONVERTER	EVM	IC	PACKAGE
U1	LMR14003YEVM	LMR14003YDDCR	SOT23-6
	LMR14006YEVM	LMR14006YDDCR	

2 Setup

This section describes the jumpers and connectors on the EVM and how to properly connect, set up and use the LMR14003Y/6YEVM.

2.1 Input/Output Connector Description

Vin – Input is the power input terminal for the device. Adjacent to it is the GND reference ground. Use those terminals to attach the EVM to a cable harness.

Vout – Output is the output terminal for the LMR14003Y/6Y switch-mode regulator. Adjacent to it is the GND reference ground.

EN is the jumper used to enable the switch-mode converter. The rail will be enabled when the respective jumper is high or floating, and disabled when low. External resistors can also be used to adjust the EN turn off trip point, and the jumper should not be used in that case.

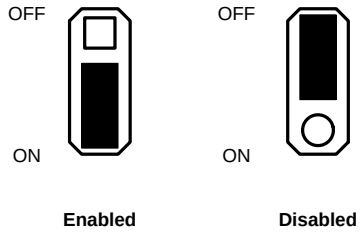

Figure 2. Enable Jumper Setting

2.2 Adjusting the Output Voltage

The output voltage can be changed from 5.0V to another voltage by adjusting the feedback resistors using the following equation:

$$VOUT = VFB (1+(R4/R3)) \quad (1)$$

Where VFB is 0.765V.

Test Points

- TP_GND (x2) Ground
- TP_Vin BUCK input
- TP_Vout BUCK output
- TP_SW Buck Phase pin

3 Board Layout

Figure 3 and Figure 4 show the board layout for the LMR14006YEVM. The EVM offers jumper to enable the regulator.

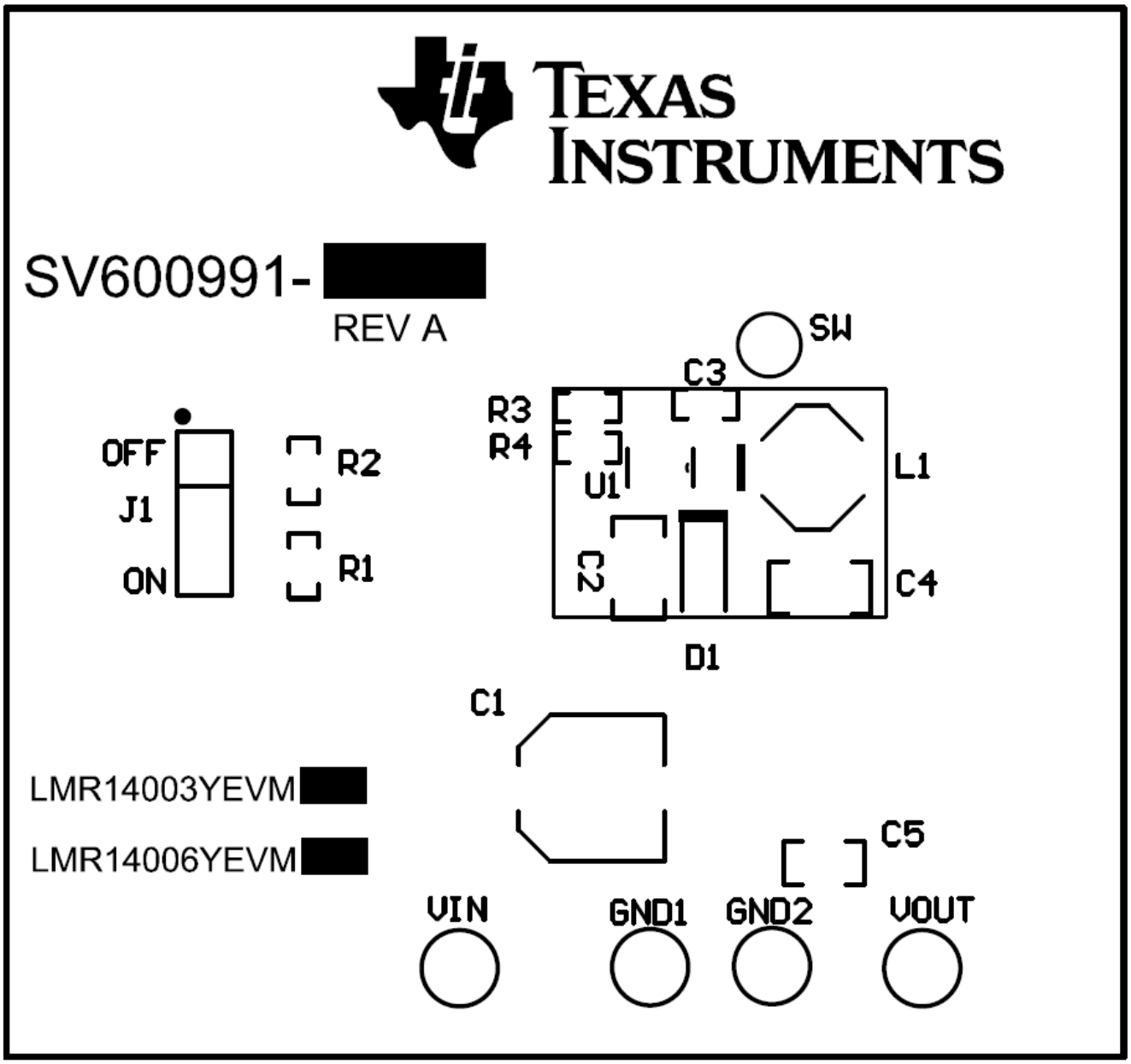

Figure 3. Top Layer

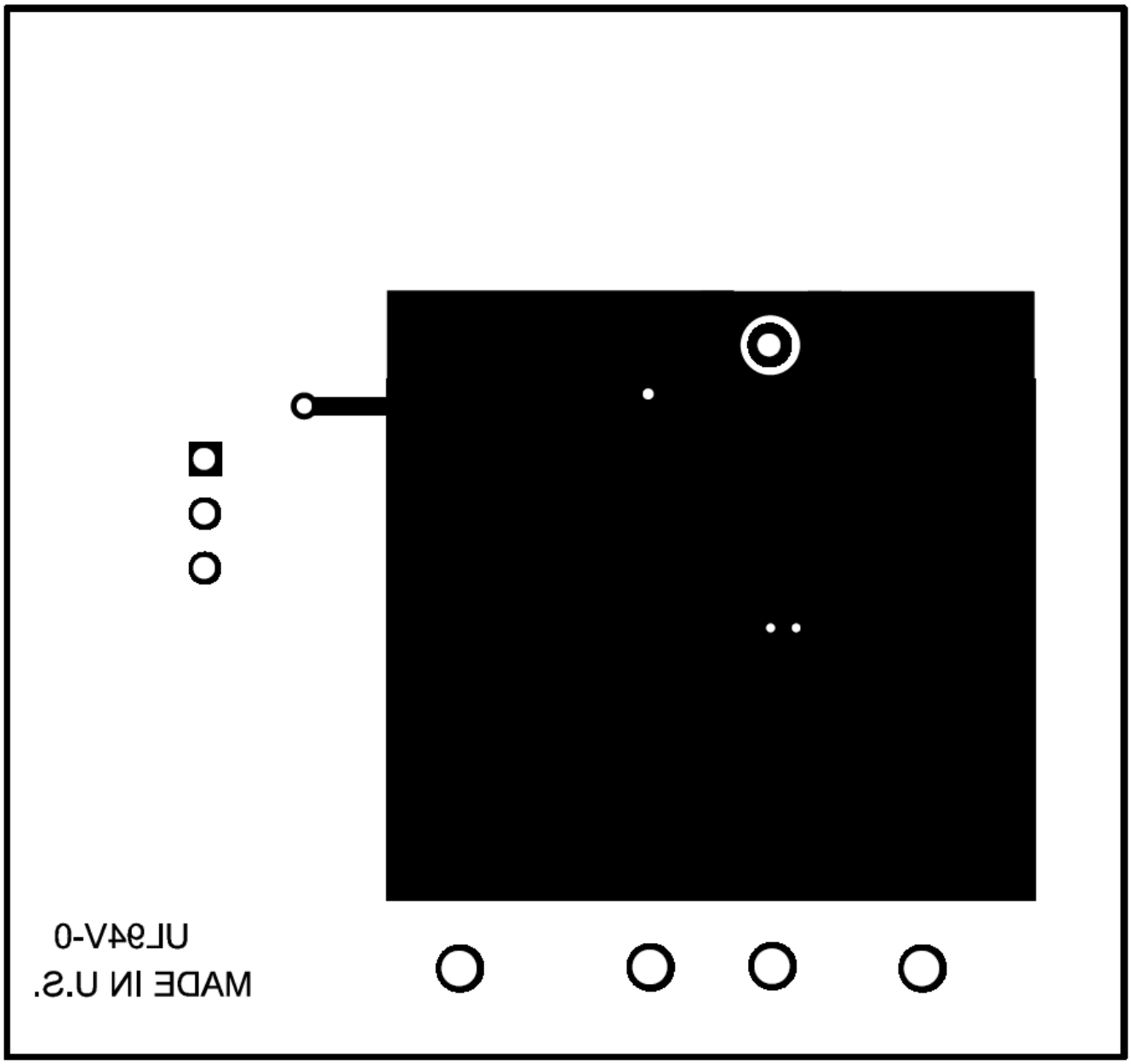

Figure 4. Bottom Layer

4 Schematic and Bill of Materials

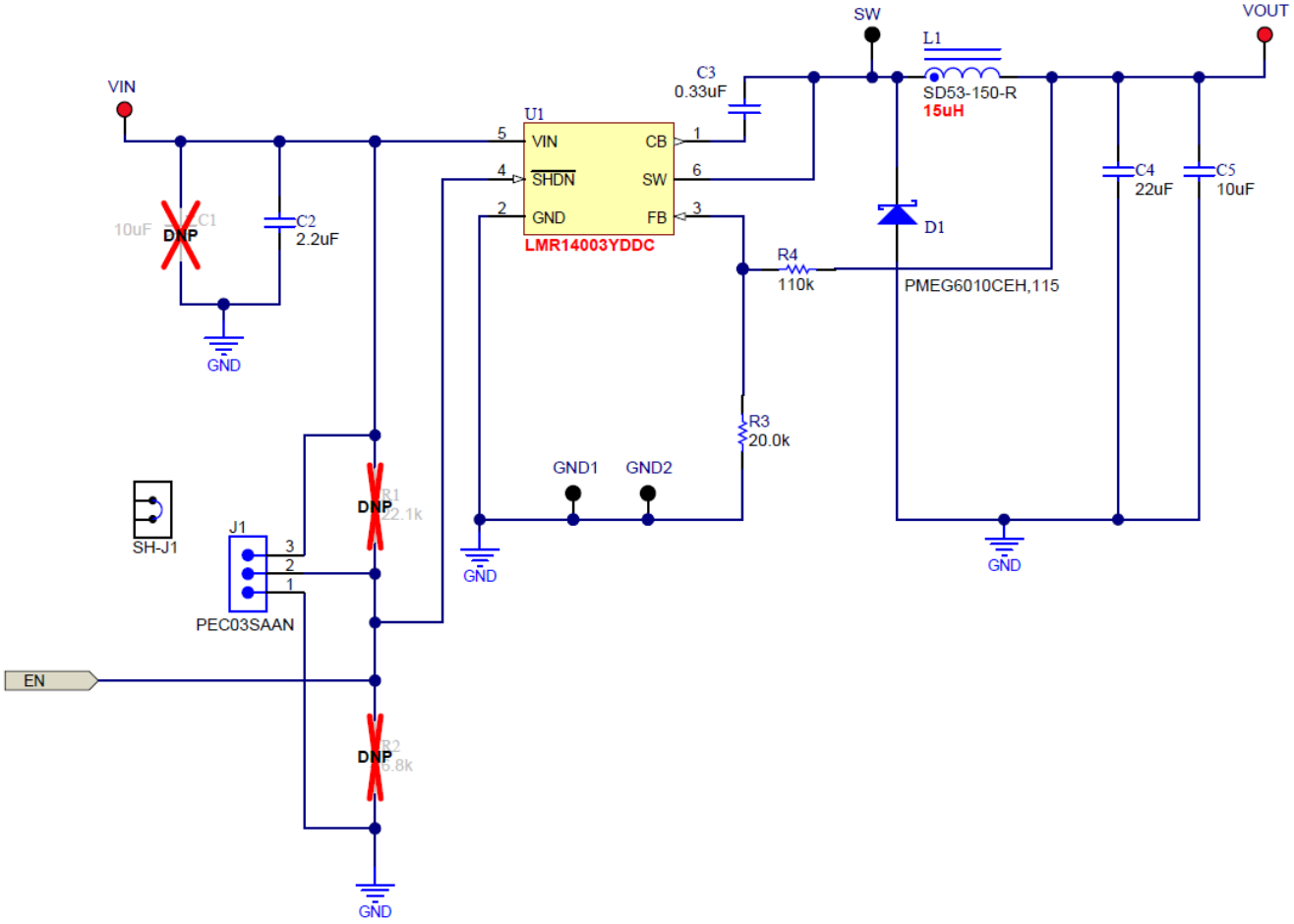

Figure 5. LMR14006YEVM Schematic

Table 2. LMR14003Y/6YEVM Bill of Materials (BOM)

Quantity		Designator	P/N	Description	Footprint	Manufacturer
LMR14003Y	LMR14006Y					
1	1	PCB	PCB	Printed Circuit Board, FR4, 1oz, 2 Layers, size 1922x2054mil	1922x2054mil	Any
0	0	C1	EEE-FC1H100P	CAP, AL, 10uF, 50V, +/-20%, 2 ohm, SMD	SM_RADIAL_D	Panasonic
1	1	C2	GRM31CR71H225KA88L	CAP, CERM, 2.2uF, 50V, +/-10%, X7R, 1206	1206	MuRata
1	1	C3	C0603C334K4RACTU	CAP, CERM, 0.33uF, 16V, +/-10%, X7R, 0603	0603	Kemet
1	1	C4	GRM31CR61C226KE15L	CAP, CERM, 22uF, 16V, +/-10%, X5R, 1206	1206	MuRata
1	1	C5	GRM21BR61C106KE15L	CAP, CERM, 10uF, 16V, +/-10%, X5R, 0805	0805	MuRata
1	1	R3	CRCW060320K0FKEA	RES, 20.0k ohm, 1%, 0.1W, 0603	0603	Vishay-Dale
1	1	R4	CRCW0603110KFKEA	RES, 110k ohm, 1%, 0.1W, 0603	0603	Vishay-Dale
1	1	D1	B260A-13-F	Diode, Schottky, 60V, 2A, SMA	SOD-123F	Diodes Inc.
1	0	L1	SD53-150-R	Inductor, Ferrite, 15uH, 1.1A, 0.122 ohm, SMD	5.2x5.2mm	Cooper Bussman
0	1	L1	SD53-6R8-R	Inductor, Ferrite, 6.8uH,1.65A, 0.059 ohm, SMD	5.2x5.2mm	Cooper Bussman
1	1	J1	PEC03SAAN	Header, 100mil, 3x1, Tin plated, TH	CONN_PEC03SAAN	Sullins
2	2	GND	5011	Test Point, Multipurpose, Black, TH	Keystone5011	Keystone
1	1	SW	5001	Test Point, TH, Miniature, Black	Keystone5001	Keystone
2	2	VIN, VOUT	5010	Test Point, Multipurpose, Red, TH	Keystone5010	Keystone
1	0	U1	LMR14003YDDC	IC, 300 mA 40V Step-Down Converter, SOT23-6	SOT23-6	TI
0	1	U1	LMR14006YDDC	IC, 600 mA 40V Step-Down Converter, SOT23-6	SOT23-6	TI

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