User's Guide

TPS62050 and TPS62052 Buck Converter Evaluation Module User's Guide

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1 Introduction

The Texas Instruments TPS62050 and TPS62052 evaluation modules (EVM) for low-power, high-efficiency, step-down converters help designers evaluate these devices. The EVMs make it possible to evaluate different modes of the devices as well as the device performance.

The TPS6205xEVM is available as the TPS62050 adjustable version set to 3.3 V and the TPS62052 1.5-V fixed version.

The TPS62050EVM can be easily set up to provide any output voltage between 0.7 V to 6 V (or Vin) by adjusting the external resistor divider. Refer to the data sheet (SLVS432) for various fixed voltage options available for the TPS6205x. The TPS6205x has an input voltage range between 2.7 V and 10 Vwith an output current up to 800 mA.

Any version of the TPS6205x can be evaluated by removing and replacing the IC on the EVM.

Table 1-1. EVM Ordering Information

EVM NUMBER	DESCRIPTION
TPS62050EVM–234	Adjustable output voltage version set to 3.3 V
TPS62052EVM–234	1.5-V fixed output voltage version

2 Evalulation with the TPS6205xEVM

This section details the evaluation process and features of the EVM. For this purpose, a load is connected to the output pins Vout and GND, which allows the load current to be adjusted between 0 mA and 800 mA.

For accurate output voltage and input voltage measurements, it is important to measure the voltage on the input and output voltage terminals with avoltmeter connected directly to the input voltage or output voltage terminals. This eliminates any measurement errors related to voltage drops along the input and output terminal wires connected to the power supply or load.

2.1 Enable (EN) Jumper

This jumper is used to enable the device. Connecting the EN pin to ON enables the part. Connecting the EN pin to OFF disables the device.

2.2 Synchronization (SYNC) Jumper

This jumper is used to choose between PWM and PFM/PWM modes of operation. Setting the jumper across PWM forces the device into the low-noise fixed-frequency pulse width modulation (PWM) mode. Setting the jumper across PWM/PFM enables the power save mode where the device enters apulse frequency modulation mode (PFM) at light to medium load currents, which reduces quiescent current and switching frequency to a minimum to achieve highest efficiency over the entire load current range.

Additionally an external clock between 600 kHz and 1200 kHz can be applied to pin 2 of J2 (SYNC) in order to synchronize the converter to an external clock.

2.3 Power Good (PG)

The PG pin is an open drain output capable of sinking typically 1 mA. A pullup resistor is required to use the PG. The pullup resistor should be placed between the Vout and PG. The PG pin becomes active high when the output voltage exceeds typically 98.5% of its nominal value. Leave the PG pin unconnected when not used.

2.4 Low Battery Out (LBO)

The LBO pin is an open drain output which goes low when the voltage at the low battery input (LBI) falls below the trip point of 1.21 V. An external pullup resistor which is placed between LBO and Vout is required to use the LBO.

3 PCB Layout

As for all switch mode power supplies, the PCB layout is a very important step in the power supply design process. The following figures show the layout for the adjustable and fixed output voltage EVMs.

3.1 SLVP234 EVM Schematic and Bill of Materials

Figure 3-1 shows the SLVP234 EVM schematic diagram. The bill of materials for the TPS62050EVM and TPS62052EVM is shown in Table 3-1. More details about the design and component selection for the dc-dc converter can be found in the data sheet.

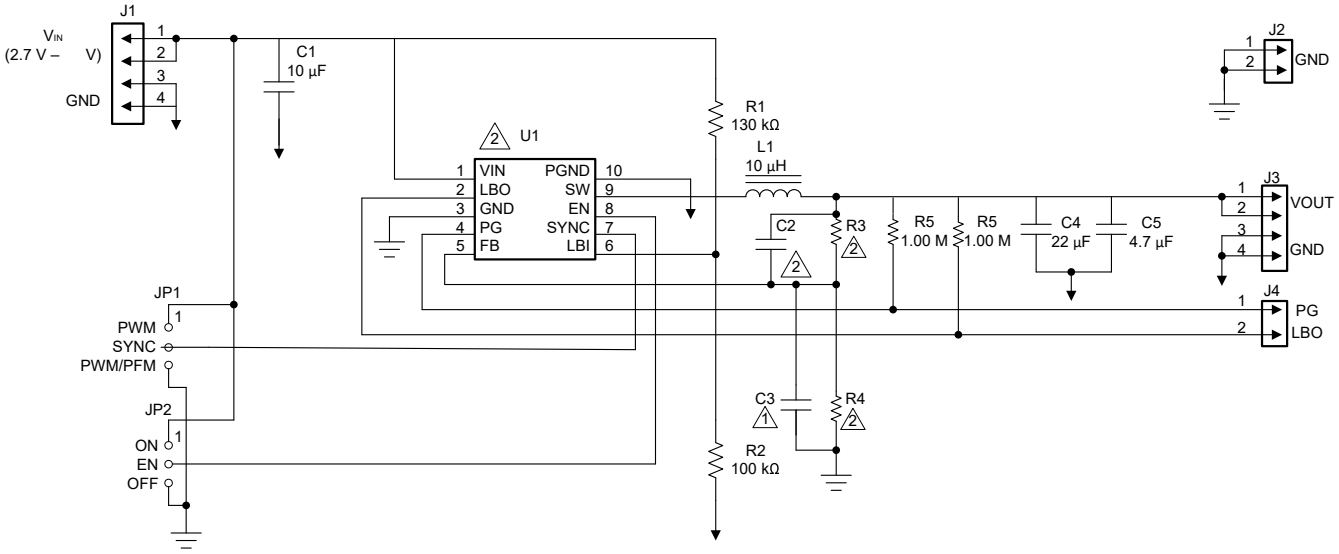

Figure 3-1. TPS6205xEVM Schematic

Table 3-1. TPS62050 and TPS62052 EVMs (SLVP234) Bill of Materials

COUNT		REF DES	DESCRIPTION	SIZE	MFR	PART NUMBER
TPS62050	TPS62052					
1	1	C1	Capacitor,Ceramic, 10 mF,16 V, X5R, 10%	1210	Murata	GRM32ER61C106KC31
1	open	C2	Capacitor,ceramic, 22 pF, 50 V, C0G, 5%	603	Murata	GRM1885C1H220JZ01
open	open	C3	Capacitor,ceramic, xx mF,xx mV	603		
1	1	C4	Capacitor, ceramic, 22 mF, 6.3–V, X5R,10%	1210	Murata	GRM32DR60J226KA01
1	1	C5	Capacitor,ceramic, 4.7 mF,6.3 V, X5R,10%	805	Murata	GRM219R60J475KE11
2	2	J1,J3	Header,4 pin, 100 mil spacing, (36-pin strip)	0.12	Sullins	PTC36SAAN
2	2	J2,J4	Header,2 pin, 100 mil spacing, (36-pin strip)	0.12	Sullins	PTC36SAAN
2	2	JP1,JP2	Jumper,3 pin, 100 mil spacing, (36-pin strip)	0.12	Sullins	PTC36SAAN

Table 3-1. TPS62050 and TPS62052 EVMs (SLVP234) Bill of Materials (continued)

COUNT		REF DES	DESCRIPTION	SIZE	MFR	PART NUMBER
TPS62050	TPS62052					
1	1	L1	Inductor,SMT, 10 mH,1.4 A, 63.6 mW	0.276sq	TDK	SLF7032T–100M1R4
1	1	R1	Resistor,chip, 130 kW,1/16 W, 1%	603	Std	Std
1	1	R2	Resistor,chip, 100 kW,1/16 W, 1%	603	Std	Std
1		R3	Resistor,chip, 562 kW,1/16 W, 1%	603	Std	Std
	1		Resistor,chip, 0 W,1/16 W, 5%	603	Std	Std
1	open	R4	Resistor,chip, 100 kW,1/16 W, 1%	603	Std	Std
1	1	R5	Resistor,chip, 1.00 MW,1/16 W, 1%	603	Std	Std
1	1	R6	Resistor,chip, 1.00 MW,1/16 W, 1%	603	Std	Std
1		U1	IC, high-efficiencystep-down converter, Adj V	DGS10	TI	TPS62050DGS
	1		IC, high-efficiencystep-down converter, 1.5 V	DGS10	TI	TPS62052DGS
1	1	—	PCB,1.6 In ´ 1.255In ´ 0.062In		Any	SLVP234
2	2	—	Shunt,100 mil, black	0.100	3M	929950–00

3.2 PCB Layout of the TPS62050EVM and TPS62052EVM

The following figures show the layout for the adjustable and fixed output voltage EVMS.

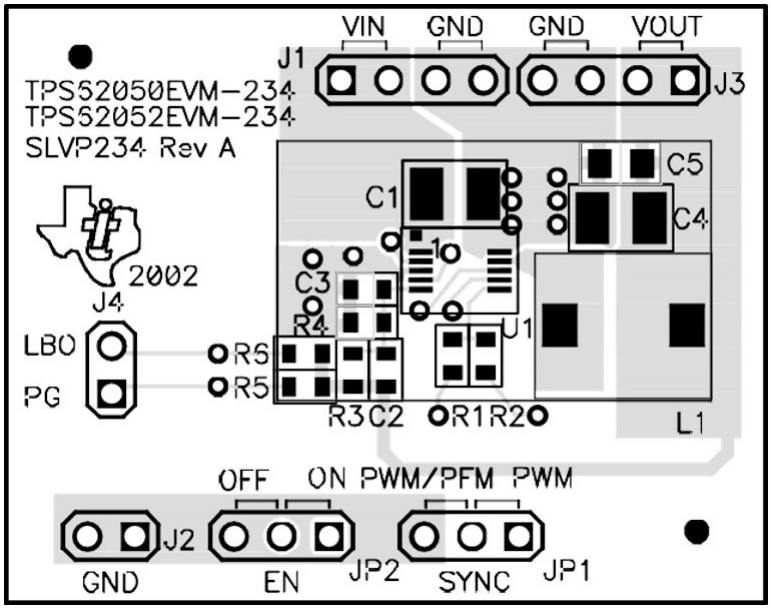

Figure 3-2. Component Placement

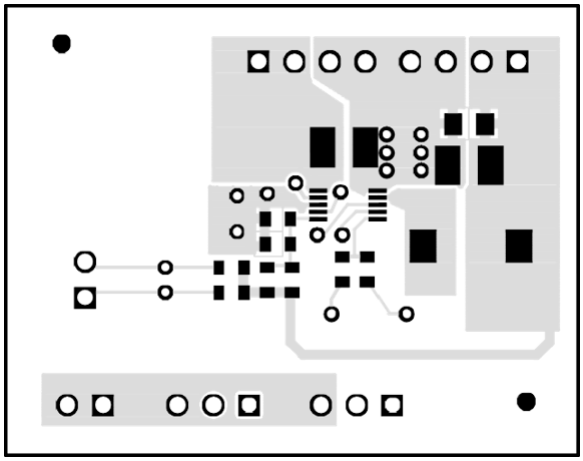

Figure 3-3. Top Layer

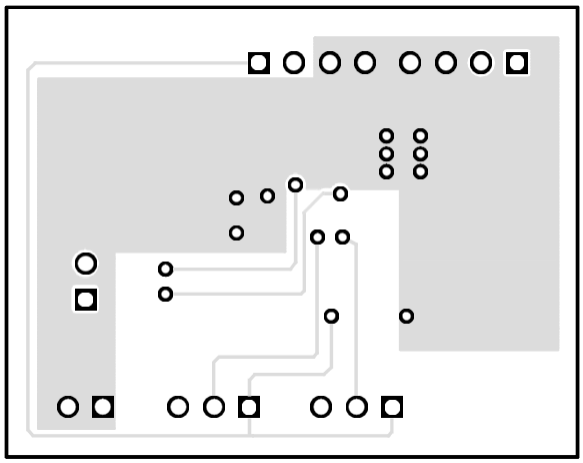

Figure 3-4. Bottom Layer

4 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision * (February 2003) to Revision A (July 2021)	Page
• Updated the numbering format for tables, figures, and cross-references throughout the document.	2
• Updated user's guide title	2

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