TEXAS INSTRUMENTS

TPS62020EVM

0.6-A High-Efficiency Step-Down Converters

User's Guide

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EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of 2.5 V to 6 V and the output voltage range of 0.7 V to VIN.

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 85°C. The EVM is designed to operate properly with certain components above 60°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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Read This First

About This Manual

This user's guide describes the operation of the TPS62020EVM low-power, dc-dc evaluation module for high-efficiency, step-down converters.

How to Use This Manual

- Chapter 1: Introduction
- Chapter 2: Evaluation with the TPS62020EVM
- Chapter 3: Schematic, BOM, and PCB layout

Related Documentation From Texas Instruments

- TPS62020 Data Sheet (SLVS076)

FCC Warning

This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

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Chapter 1

Introduction

The Texas Instruments TPS62020 evaluation module (EVM) for low-power, high-efficiency, step-down converters helps designers evaluate this device. The EVM enables evaluation of different device modes and device performance.

The TPS62020EVM is set to 1.5 V. The TPS62020EVM can be easily set up to provide any output voltage between 0.7 V and 6 V (or Vin) by adjusting the external resistor divider. See the TPS62020 data sheet (SLVS076) for the output voltage calculation. The TPS62020 has an input voltage range between 2.5 V and 6 V with an output current up to 0.6 A.

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1.1 EVM Ordering Information

Table 1-1 provides EVM ordering information.

Table 1-1. EVM Ordering Information

EVM Number	Description
TPS62020EVM-019	Adjustable output voltage version set to 1.5 V

Chapter 2

Evaluation With the TPS62020EVM

This chapter details the EVM evaluation process and features. A load is connected to the output pins Vout and GND, which allows the load current to be adjusted between 0 A and 0.6 A.

For accurate output voltage and input voltage measurements, it is important to measure the voltage on the input and output voltage terminals with a voltmeter 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.

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2.1 Enable (EN) Jumper

This jumper is used to enable the device. Connecting the EN pin to ENABLE enables the part. Connecting the EN pin to DISABLE disables the device.

2.2 Mode Selection Jumper

This jumper is used to choose between PWM and PFM/PWM modes of operation. Setting the jumper across FIXED FREQ forces the device into the low-noise fixed frequency pulse width modulation (PWM) mode. Setting the jumper across PWR SAVE enables the power save mode where the device enters a pulse 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.

Chapter 3

Schematic, BOM, and PCB Layout

This chapter illustrates the EVM schematic, bill of materials (BOM), and PCB layout.

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3.1 Schematic and Bill of Materials

Figure 3-1 shows the TPS62020EVM (HPA019) schematic diagram. The bill of materials for the TPS62020EVM is shown in Table 3-2. More details about the design and component selection for the dc-dc converter can be found in the datasheet.

Figure 3-1. TPS62020EVM (HPA019) Schematic

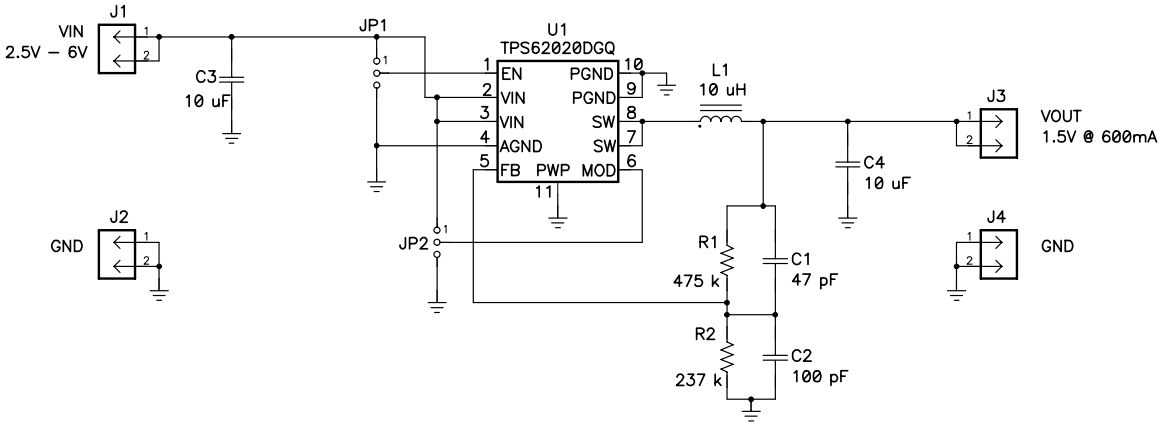

Table 3-2 lists the bill of materials.

Table 3-2. TPS62020EVM (HPA019) Bill of Materials

Count	RefDes	Description	Size	MFR	Part Number
1	C1	Capacitor, Ceramic, 47-pF, 50-V, C0G, 5%	805	TDK	C2012C0G1H470JT
1	C2	Capacitor, Ceramic, 100-pF, 50-V, C0G, 5%	805	TDK	C2012C0G1H100JT
1	C3	Capacitor, Ceramic, 10-uF, 6.3-V, X5R, 10%	805	TDK	C2012X5R0J106KT
1	C4	Capacitor, Ceramic, 10-uF, 6.3-V, X5R, +/-10%	1206	TDK	C3216X5R0J106KT
4	J1, J2, J3, J4	Header, 2-pin, 100mil spacing, (36-pin strip)	0.100 x 2	Sullins	PTC36SAAN
2	JP1, JP2	Header, 3-pin, 100mil spacing, (36-pin strip)	0.100 x 3"	Sullins	PTC36SAAN
1	L1	Inductor, SMT, 10-uH, 64-milliohms, ±20%	0.248” X 0.236”	TOKO	A920CY-100M
1	R1	Resistor, Chip, 475k-Ohms, 1/10-W, 1%	805	Std	Std
1	R2	Resistor, Chip, 237k-Ohms, 1/10-W, 1%	805	Std	Std
1	U1	IC,High-Effficiency Step-down low power DC-DC converter, Adj V	DGS10	TI	TPS62020DGQ
1	--	PCB, 1.75 In x 1 In x .062 In		Any	HPA019
2	--	Shunt, 100-mil, black	0.100	3M	929950-00

3.2 PCB Layout of the TPS62020EVM

Figure 3-2 shows the PCB layout component placement

Figure 3-2. Component Placement

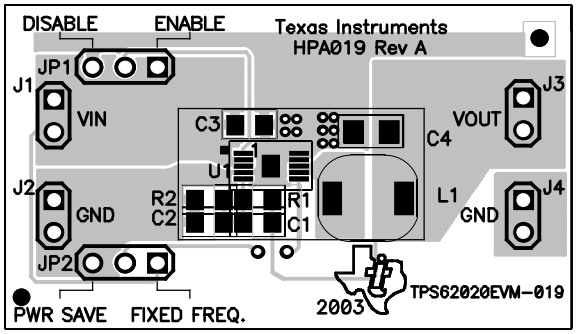

Figure 3-3 shows the PCB layout top layer

Figure 3-3. Top Layer

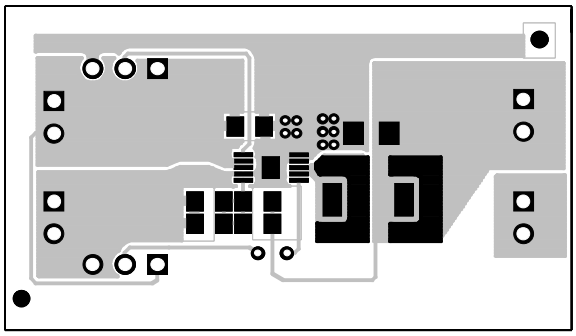

Figure 3-4 shows the PCB layout bottom layer

Figure 3-4. Bottom Layer