TEXAS INSTRUMENTS

TPS73633EVM

User's Guide

April 2004

PMP Portable Power

SLVU109

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EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of 1.8 V and 6.0 V and the output voltage range of 1.8 V and 6.0 V.

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 100°C. The EVM is designed to operate properly with certain components above 100°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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Preface

Read This First

About This Manual

This User's Guide describes the characteristics, operation, and use of the TPS73633EVM evaluation module (EVM). This EVM is designed to help the user easily evaluate and test the operation and functionality of the TPS73633. This User's Guide includes setup instructions for the hardware, a schematic diagram, a bill of materials (BOM), and PCB layout drawings for the evaluation module.

How to Use This Manual

This document contains the following chapters:

- ❏ Chapter 1 — Introduction
- ❏ Chapter 2 — Setup
- ❏ Chapter 3 — Board Layout
- ❏ Chapter 4 — Schematic and Bill of Materials

Related Documentation From Texas Instruments

TPS73633 data sheet (SBVS038)

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 TPS73633DRB is a low dropout regulator (LDO) in a 3×3-mm QFN package that provides output currents of up to 500 mA. This IC has an NMOS topology with a voltage-follower pass element that allows operation with either low-ESR ceramic output capacitors or no output capacitors at all.

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1.1 Background

The TPS73633EVM uses the TPS73633DRB in a 3×3-mm QFN package to provide 3.3 V at up to 500 mA. The EVM operates at full-rated performance with an input voltage between 3.5 V and 5.5 V. Although the IC does not require input or output capacitors, the EVM comes with these capacitors populated. A 2.2-µF input capacitor ensures that the EVM is stable in laboratory setups where the input supply is not located in close proximity to the EVM. The output capacitor helps stabilize the output voltage for loads that are not physically close to the EVM.

1.2 Performance Specification

Table 1−1 provides a summary of the TPS73633EVM performance specifications. All specifications are given for an ambient temperature of 25°C

Table 1−1. Performance Specification Summary

Specification	Test Conditions	Min	Typ	Max	Unit
Input voltage		3.5		5.5	V
Output voltage	I_O = 10 mA to 500 mA	3.267	3.3	3.333	V
Output current		0		500	mA

1.3 Modifications

The PWB for this EVM is designed to accommodate both the fixed and adjustable versions of this IC. At the time the EVM was released, only the fixed 3.3-V version was available.

1.3.1 Fixed Output IC Operation

For use with a fixed-output IC, R1 must be open. R2 may either be left open or populated with a noise-reduction capacitor. Placing a capacitor in the R2 position reduces noise that is generated by the internal bandgap reference and produces a low-noise output. Typical noise-reduction capacitors range from 1000 pF to 0.01 µF. See the TPS73633 data sheet for more information.

1.3.2 Adjustable Output IC Operation

For use with an adjustable output IC, R1 and R2 must be populated. These two resistors are the feedback resistors that set the output voltage for the regulator. See the TPS73633 data sheet for more information.

Chapter 2

Setup

This chapter describes how to properly use the TPS73633EVM.

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2.1 Input/Output Connector Descriptions EVM Connection

J1−VIN	Positive input connection from the input supply
J2−GND	Return connection from the input supply. Common with J4.
J3−VOUT	Output voltage from the EVM
J4−GND	Return connection from the load. Common with J2.
JP1−EN	Enable jumper for the EVM. Shorting EN to ON turns the EVM on. Shorting EN to OFF turns the EVM off.

2.2 Setup

To operate the EVM, simply connect an input supply to the appropriate pins, connect a load to the appropriate pins, and enable the EVM by shorting the EN to ON on JP1.

Chapter 3

Board Layout

This chapter provides the TPS73633EVM board layout and illustrations.

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3.1 Layout

Figure 1−3 shows the board layout for the TPS73633EVM PWB.

Figure 3−1. Assembly Layer

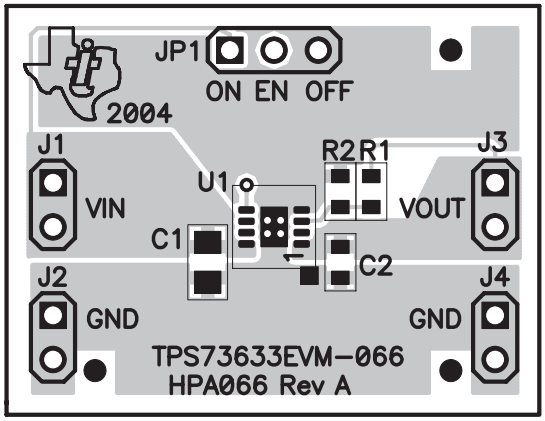


Figure 3−2. Top Layer Routing

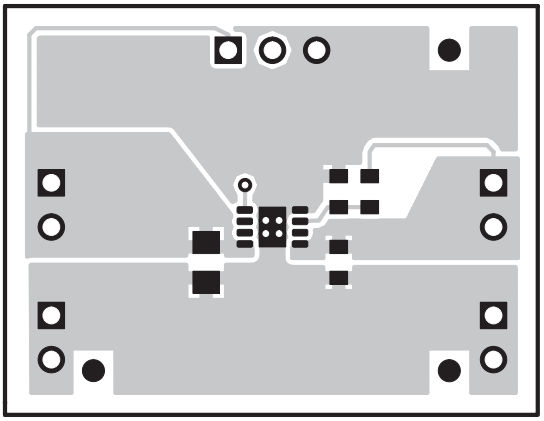
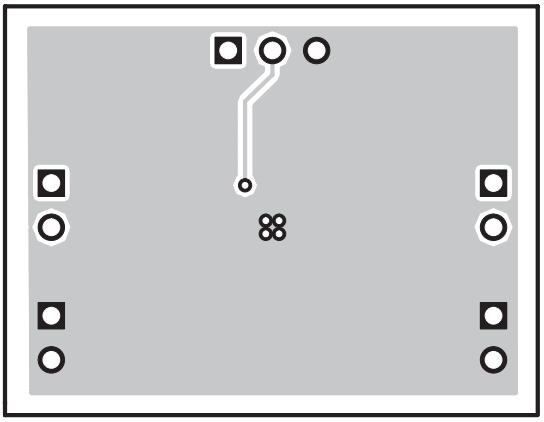


Figure 3−3. Bottom Layer Routing



Chapter 4

Schematic and Bill of Materials

This chapter provides the TPS73633EVM schematic and bill of materials.

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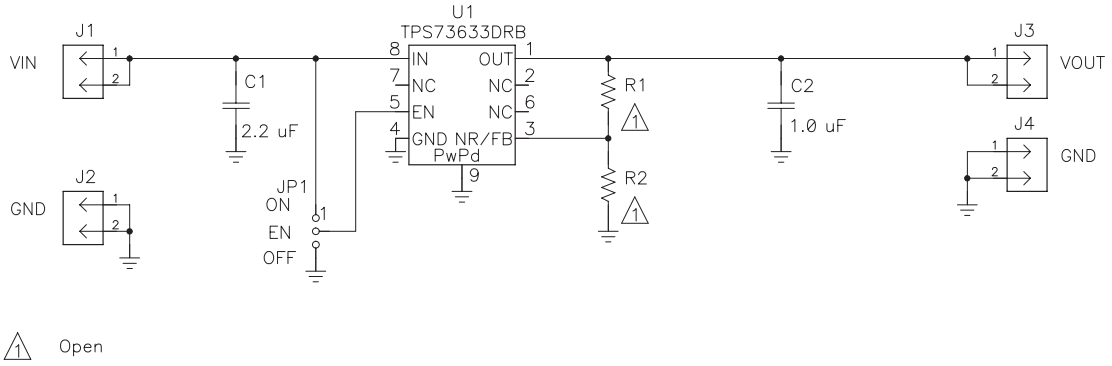
4.1 Schematic

Figure 4−1. TPS73633EVM Schematic



4.2 Bill of Materials

Table 4−1. TPS73633EVM Bill of Materials

Count	Ref Des	Description	SIZE	MFR	Part Number
1	C1	Capacitor, ceramic, 2.2 µF, 6.3 V, X5R, 10%	805	TDK	C2012X5R0J225KT
1	C2	Capacitor, ceramic, 1.0 µF, 6.3 V, X5R, 10%	603	TDK	C3216X5R0J105KT
4	J1−J4	Header, 2 pin, 100 mil spacing, (36-pin strip)	0.100 × 2	Sullins	PTC36SAAN
1	JP1	Header, 3 pin, 100 mil spacing, (36-pin strip)	0.100 × 3	Sullins	PTC36SAAN
0	R1, R2	Resistor, chip, xx Ω, 1/16 W	603		
1	U1	IC, Cap free, NMOS, 400 mA LDO regulator with reverse current protection		TI	TPS73633DRB
1	—	PCB, 1.205 In × 0.925 In × 0.062 In		Any	HPA066
1	—	Shunt, 100 mil, black	0.100	3M	929950−00