

TPS793xxYEQEVM

Evaluation Module

User's Guide

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Following are URLs where you can obtain information on other Texas Instruments products & application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
		Telephony	www.ti.com/telephony
		Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265

EVM IMPORTANT NOTICE

Texas Instruments (TI) provides the enclosed product(s) under the following conditions:

This evaluation kit being sold by TI is intended for use for **ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY** and is not considered by TI to be fit for commercial use. As such, the goods being provided may not be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including product safety measures typically found in the end product incorporating the goods. As a prototype, this product does not fall within the scope of the European Union directive on electromagnetic compatibility and therefore may not meet the technical requirements of the directive.

Should this evaluation kit not meet the specifications indicated in the EVM User's Guide, the kit may be returned within 30 days from the date of delivery for a full refund. **THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.**

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies TI from all claims arising from the handling or use of the goods. Please be aware that the products received may not be regulatory compliant or agency certified (FCC, UL, CE, etc.). Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge.

EXCEPT TO THE EXTENT OF THE INDEMNITY SET FORTH ABOVE, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

TI currently deals with a variety of customers for products, and therefore our arrangement with the user **is not exclusive**.

TI assumes **no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein**.

Please read the EVM User's Guide and, specifically, the EVM Warnings and Restrictions notice in the EVM User's Guide prior to handling the product. This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact the TI application engineer.

Persons handling the product must have electronics training and observe good laboratory practice standards.

No license is granted under any patent right or other intellectual property right of TI covering or relating to any machine, process, or combination in which such TI products or services might be or are used.

Mailing Address:

Texas Instruments
Post Office Box 655303
Dallas, Texas 75265

EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the specified input and output ranges described in the EVM User's Guide.

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 60°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.

Mailing Address:

Texas Instruments
Post Office Box 655303
Dallas, Texas 75265

Read This First

About This Manual

This user's guide describes the characteristics, operation, and use of the TPS793xxYEQEVM low drop-out (LDO) evaluation module (EVM). This EVM features a TI LDO that offers ultra low noise performance with high PSRR, and 200mA load current capability all in the chip-scale package. This user's guide includes setup instructions, 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

The following documents provide information regarding the TPS793xxYEQ EVM. These documents are available from the TI web site. The last character of the literature number corresponds to the document revision, which is current at the time of the writing of this User's Guide. Newer revisions may be available from the TI web site at <http://www.ti.com/> or call the Texas Instruments Literature Response Center at (800) 477-8924 or the Product Information Center at (972) 644-5580. When ordering, identify the item(s) by both title and literature number.

Data sheets	Literature number
TPS793xxYEQ Data Sheet	SLVS348
Wafer Chip-Scale Package Design Guide	SBVA016

If You Need Assistance

If you have questions regarding either the use of this evaluation module or the information contained in this documentation, please contact your local TI sales representative.

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.

Trademarks

All trademarks are the property of their respective owners.

Contents

1	Introduction	1-1
2	Setup	2-1
2.1	Input/Output Connector Descriptions	2-2
2.2	Set-Up	2-2
2.3	Operation	2-2
3	Printed Circuit Board Layout	3-1
3.1	Layout	3-2
4	Schematic and Bill of Materials	4-1
4.1	Schematic	4-2
4.2	Bill of Materials	4-2

Figures

3-1.	Assembly Layer	3-2
3-2.	Top Layer Routing	3-2
3-3.	Bottom Layer Routing	3-2
4-1.	TPS793xxYEQEVM Schematic Diagram	4-2

Tables

4-1.	Bill of Materials	4-2
------	-------------------------	-----

Introduction

The Texas Instruments TPS793xxYEQEVM evaluation module (EVM) helps designers evaluate the operation and performance of the TPS793 family of devices in the chip-scale package. These devices are ultra low noise, high PSRR low drop-outs (LDOs) suitable for RF applications.

This EVM is specifically designed and optimized to operate over the entire input voltage range of the TPS793xxYEQ LDO (2.7V to 5.5V). The default output voltage of this EVM is denoted by the checkbox on the back of the printed circuit board. The layout of this board can be used as a starting point for designs using the TPS793xxYEQ.

Setup

This chapter describes the jumpers and connectors on the EVM as well as how to properly connect, set up, and use the TPS793xxYEQEVM.

Topic	Page
2.1 Input/Output Connector Descriptions	2-2
2.2 Set-Up	2-2
2.3 Operation	2-2

2.1 Input/Output Connector Descriptions

2.1.1 J1 – VIN

This is the positive connection to the input power supply. For best performance this connection should have low inductance and be driven by a low-impedance source.

2.1.2 J2 – GND

This is the return connection for the input power supply.

2.1.3 J3 – VOUT

This is the positive connection from the output of the low dropout regulator. Connect this pin to the positive input of the load.

2.1.4 J4 – GND

This is the negative connection from the output of the low dropout regulator. Connect this pin to the negative input of the load.

2.1.5 J5 – EN

This jumper enables and disables the LDO output. Connecting EN to ON enables the device, while connecting EN to OFF disables the device.

2.2 Set-Up

Connect an input supply between J1 and J2. The voltage range on this supply should not exceed 5.5V. The load should be connected between J4 and J5. To enable the device, configure J3 so that the ON terminal is shorted to the EN terminal with the provided terminal post.

2.3 Operation

This EVM has been optimized to operate over the entire input voltage range of the TPS793xxYEQ LDO (2.7V to 5.5V). The output is a low-noise source capable of supplying 200mA. Only input and output ceramic capacitors are required for the LDO to function; however, an optional bypass capacitor is connected to BYP to further reduce output noise.

Printed Circuit Board Layout

This chapter provides the TPS793xxYEQEVM printed circuit board layout and illustrations.

Topic	Page
3.1 Layout	3-2

3.1 Layout

Board layout is critical for reliable and easy to assemble chip-scale designs. Figure 3–1, Figure 3–2, and Figure 3–3 show the board layout for the TPS793xxYEQEVM printed wiring board (PWB). Careful attention should be given to the routing to the chip-scale IC lands. Refer to the NanoStar™ Wafer Chip-Scale Package Design Guide for specific layout guidelines.

Figure 3–1. Assembly Layer

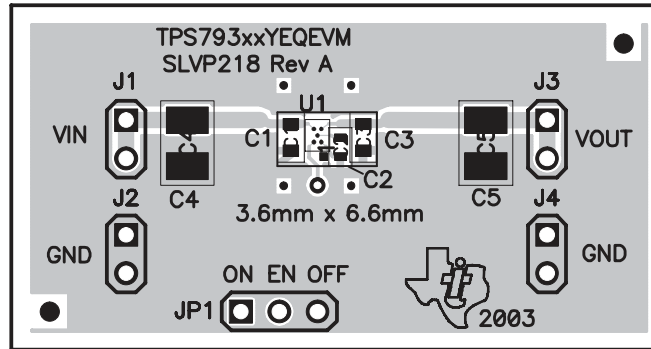


Figure 3–2. Top Layer Routing

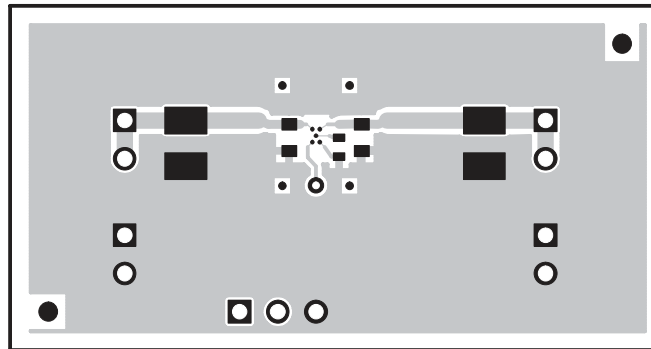
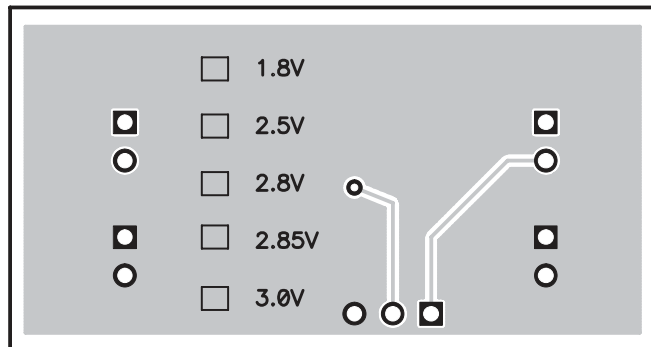


Figure 3–3. Bottom Layer Routing



Schematic and Bill of Materials

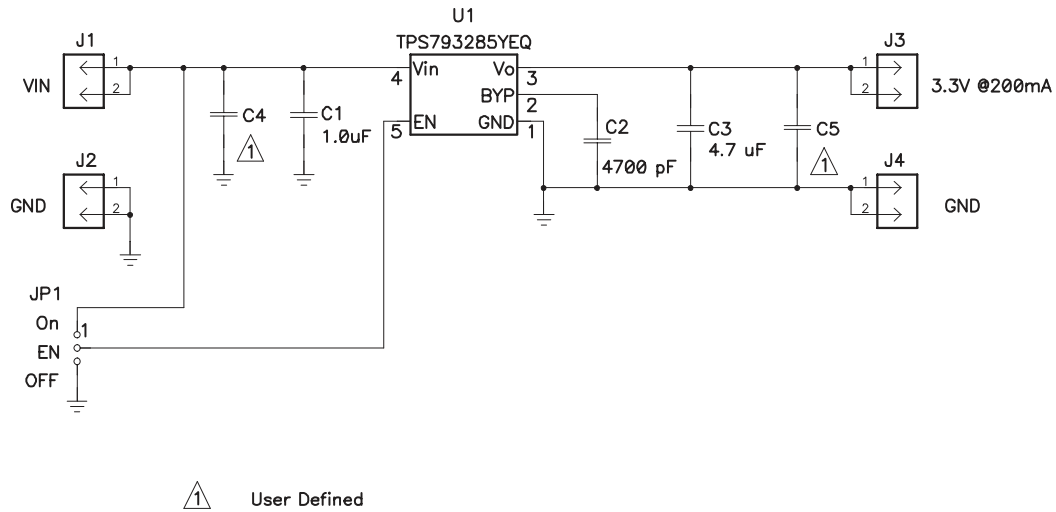
This chapter provides the schematic for the TPS793xxYEQEVM. The bill of materials is also included for component and manufacturer reference.

Topic	Page
4.1 Schematic	4-2
4.2 Bill of Materials	4-2

4.1 Schematic

The complete electrical schematic for the TPS793xxYEQEVM is shown in Figure 4-1.

Figure 4-1. TPS793xxYEQEVM Schematic Diagram



4.2 Bill of Materials

Table 4-1. Bill of Materials

Count	Reference Designator	Description	Size	Manufacturer	Mfg Part Number
1	C1	Capacitor, ceramic, 1.0µF, 10V, X5R, 10%	603	TDK	C1608X5R1A105KT
1	C2	Capacitor, 4700pF, 50V, X7R, 10%,	402	TDK	C1005X7R1H472KT
1	C3	Capacitor, ceramic, 4.7µF, 6.3V, X5R, 10%	603	TDK	C1608X5R0J475KT
0	C4, C5	Capacitor, ceramic, xxxµF, 6.3V	1210		
4	J1, J2, J3, J4	Header, 2-pin, 100 mil spacing (36-pin strip)		Sullins	PTC36SAAN
1	JP1	Header, 3-pin, 100 mil spacing (36-pin strip)		Sullins	PTC36SAAN
1	U1	IC, Ultralow-Noise, Fast RF 200 mA, LDO Regulator		Texas Instruments	TPS793xxYEQ
1		PC Board, 1.700 in. x .900 in. x .062 in.		Any	SLVP218
1		Shunt, 100 mil (black)		3M	929950-00