

# ***TPS72518EVM-207***

***1-Amp, Low Input Voltage, Low Dropout Linear  
Regulator EVM***

## *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.

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 input voltage range of 2.1 V to 5.5 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 125°C. The EVM is designed to operate properly with certain components above 125°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

## Preface

# Read This First

---

---

---

---

### ***About This Manual***

This user's guide describes the characteristics, operation and use of the TPS72518EVM-207 1-A low input voltage, low dropout linear regulator evaluation module (EVM). The user's guide includes a schematic diagram, printed-circuit board (PCB) layouts, and bill of materials. electronic PCB layout files are available upon request.

### ***How to Use This Manual***

This document contains the following chapters:

- ☐ Chapter 1 – Introduction
- ☐ Chapter 2 – Test Setup
- ☐ Chapter 3 – Board Layout
- ☐ Chapter 4 – Schematic and Bill of Materials

### ***Information About Cautions and Warnings***

This book may contain cautions and warnings.

**This is an example of a caution statement.**

**A caution statement describes a situation that could potentially damage your software or equipment.**

**This is an example of a warning statement.**

**A warning statement describes a situation that could potentially cause harm to you.**

The information in a caution or a warning is provided for your protection. Please read each caution and warning carefully.

***Related Documentation From Texas Instruments***

SLVS341 – TPS725xx data sheet, literature number

SLVS403 – TPS726xx data sheet, literature number

***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.

If your book does not discuss a product that creates radio frequency interference, delete this section from your preface. If your book does discuss a product that creates radio frequency interference, you must include this warning as it appears above.

# Contents

<b>1</b>	<b>Introduction</b>	<b>1-1</b>
1.1	Background	1-2
1.2	Performance Specification Summary	1-2
1.3	Modifications	1-2
<b>2</b>	<b>Test Setup</b>	<b>2-1</b>
2.1	Test Setup for DC Testing	2-2
<b>3</b>	<b>Board Layout</b>	<b>3-1</b>
3.1	Layout	3-2
<b>4</b>	<b>Schematic and Bill of Materials</b>	<b>4-1</b>
4.1	Schematic	4-2
4.2	Bill of Materials	4-2

# Figures

2-1	Test Setup for DC Testing	2-2
3-1	Top Side Assembly	3-2
3-2	Bottom Side Assembly	3-2
3-3	Top Side Layout	3-3
3-4	Bottom Side Layout	3-3
4-1	Schematic	4-2

# Tables

1-1	Performance Specification Summary	1-2
4-1	Bill of Materials	4-2



# Introduction

---

---

---

---

This chapter contains background information for the TPS725xx and TPS726xx families of devices and support documentation for the TPS72518EVM–207 evaluation module. The EVM performance specifications are also given.

Topic	Page
1.1 Background .....	1-2
1.2 Performance Specification Summary .....	1-2
1.3 Modifications .....	1-2

## 1.1 Background

The purpose of the TPS72518EVM is to facilitate evaluation of the TPS725xx and TPS726xx families of devices. The TPS72518EVM consists of the SLVP207 PCB, one TPS72518 1.8-V, 1-A linear regulator in a TO–263 package, and supporting passive components. The SLVP207 PCB is designed to accommodate multiple devices with similar pinouts in different packages (i.e., TO–220, TO–263, or SOT–223). Specifically, in addition to the TPS725xx and TPS726xx families, the SLVP207 can be used with the UCx82, UCx85, TPS755xx, TPS756xx, TPS757xx, TPS758xx, TPS759xx, TPS786xx, TPS795xx, and TPS796xx families as well as any other device in the same package with the same pinout.

The TPS725xx and TPS726xx family of parts feature 1-A output current, and an active high reset (RST) signal that goes high following a fixed delay when the output voltage reaches 95% of its regulated voltage. Additional features, as well as detailed specifications of the two families of regulators, can be found in the TPS725xx data sheet (SLVS341) and the TPS726xx data sheet (SLVS403).

## 1.2 Performance Specification Summary

Table 1–1 provides a summary of the TPS72518EVM performance specifications

*Table 1–1. Performance Specification Summary*

Specification	Test Conditions	Min	Typ	Max	Unit
Input voltage		2.1		5.5	V
Output voltage			1.8		V
Output current range		0		1	A

## 1.3 Modifications

The TPS72518EVM is designed to allow parts to be easily interchanged. Although the EVM is designed with a TPS72518 regulator in a TO–263 package, the SLVP207 EVM board also accommodates the SOT–223 packaged version of the device or any other fixed or adjustable voltage option of TPS725xx or TPS726xx. Passive elements such as the output capacitors (C4, C5, and C6) and the input capacitor (C3) are easily changed. The board accommodates the TPS72501 or TPS72601 adjustable versions with resistors R3 and R4 used as the feedback resistors. Capacitor C2 is used to reduce the inductance from long input supply leads and may or may not be necessary, depending on the specific test setup. With JP1 open, the device is enabled. Shorting JP1 disables the device.

# Test Setup

---

---

---

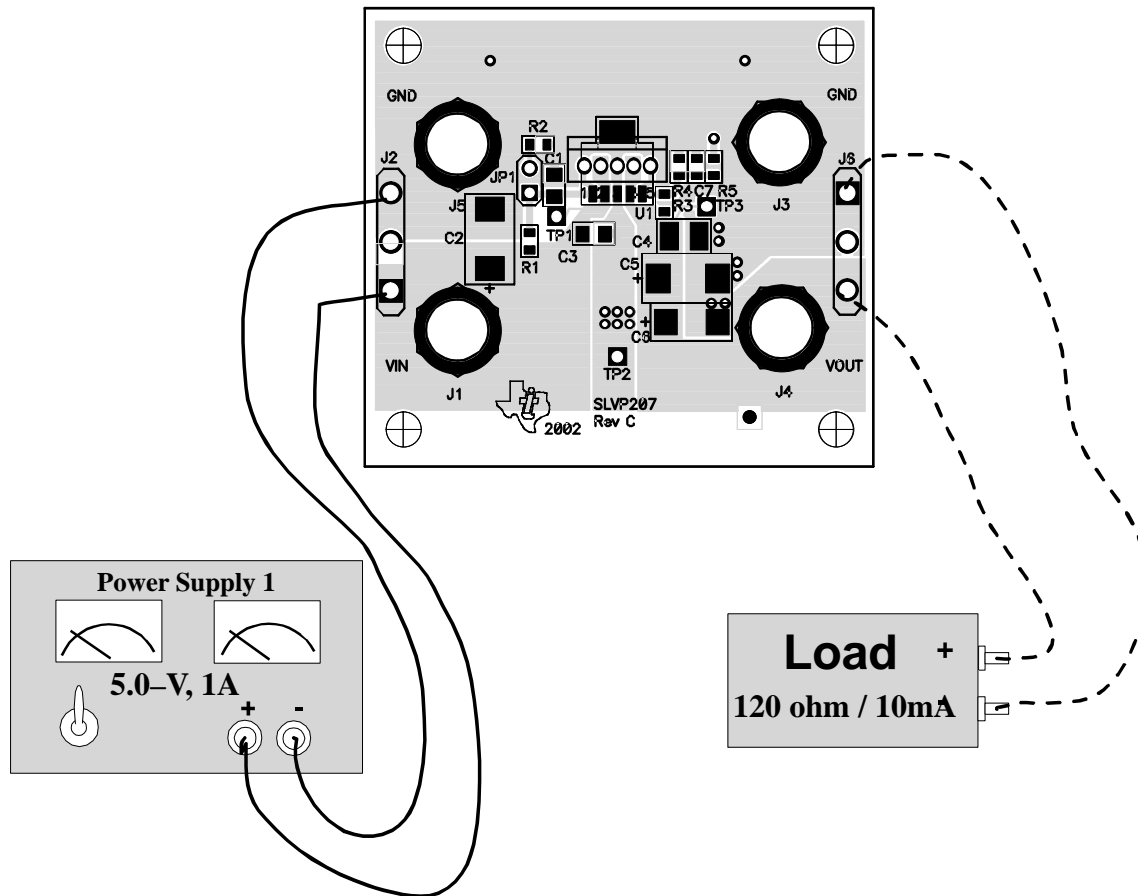
---

This chapter describes how to properly connect, and setup the TPS72518EVM.

Topic	Page
2.1 Test Setup for DC Testing .....	2-2

## 2.1 Test Setup for DC Testing

Figure 2–1. Test Setup for DC Testing



# Board Layout

---

---

---

---

This chapter provides a description of the SLVP207 board layout and layer illustrations used in the TPS72518EVM.

Topic	Page
3.1 Layout .....	3-2

### 3.1 Layout

The EVM PCB consists of two layers of 1.5 oz. copper. The top side (component) layout of the EVM is shown in Figure 3–1. Large power and ground planes are used to minimize trace resistance. The input capacitor (C3) is located close to the input pin. Proper board layout is critical to ensure the best noise and PSRR performance. The ground of the output capacitor (C4) is close to the board's ground connection for improved transient response, and the bypass capacitor's (C7) ground has a low impedance connection to the IC's ground connection. The top and bottom side layouts are shown in Figures 3–2 and 3–3 respectively.

Figure 3–1. Top Side Assembly

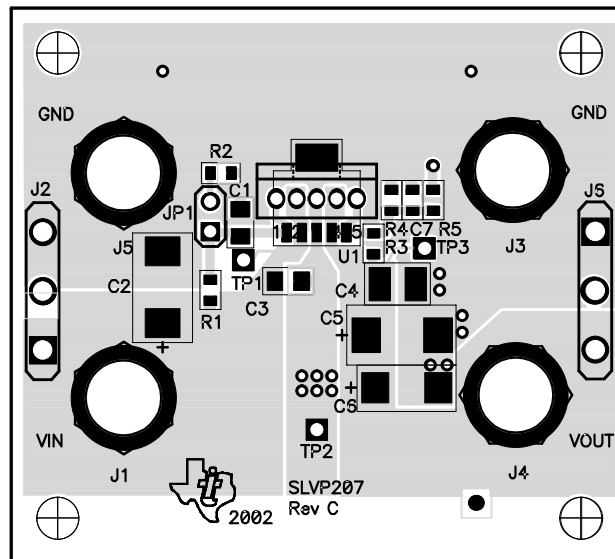


Figure 3–2. Bottom Side Assembly

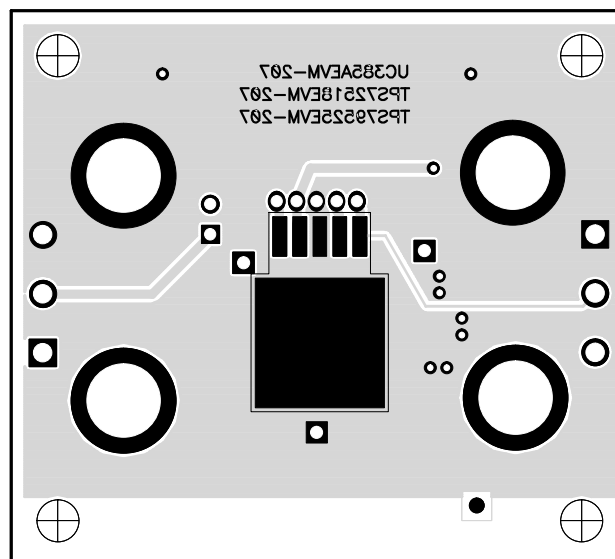


Figure 3–3. Top Side Layout

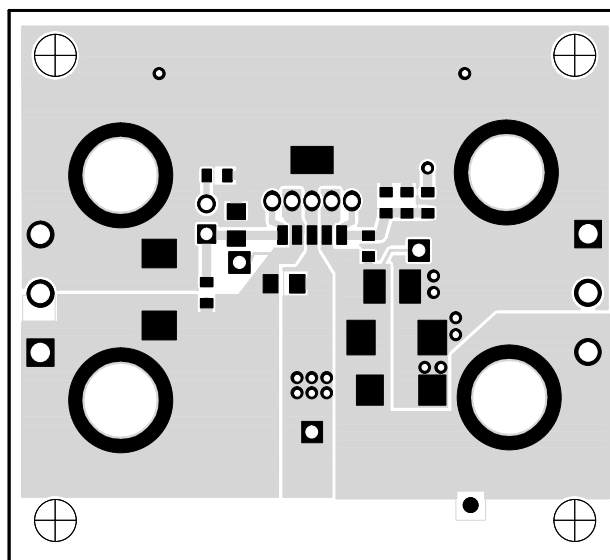
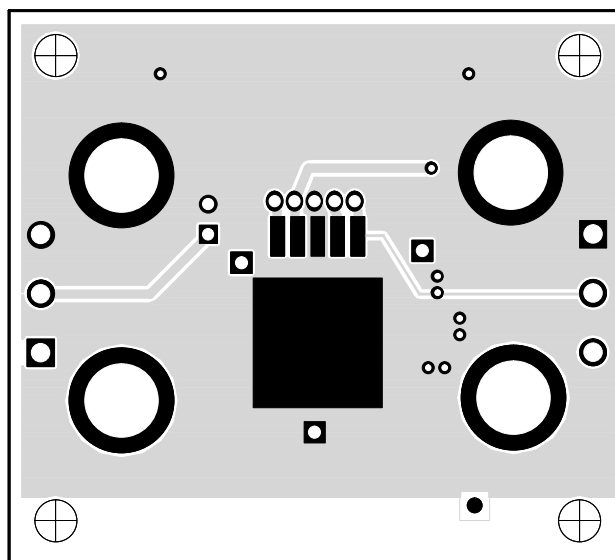


Figure 3–4. Bottom Side Layout



---

# Schematic and Bill of Materials

---

---

---

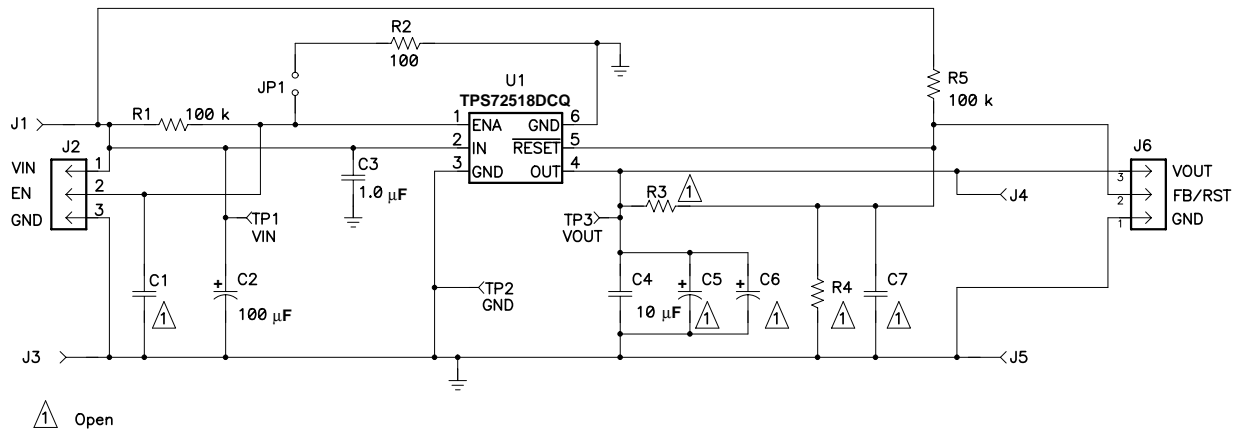
---

The EVM schematic and bill of materials are presented in this chapter.

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

## 4.1 Schematic

Figure 4–1. Schematic



## 4.2 Bill of Materials

Table 4–1. Bill of Materials

Qty	Ref Des	Description	Size	Mfr	Part Number
1	C1	Open	805		
1	C2	Capacitor, POSCAP, 100 μF, 10 V, 55 mΩ, 20%	7343 (D)	Sanyo	10TPB100M
1	C3	Capacitor, ceramic, 1 μF, 10 V, X7R, 10%	805	Murata	GRM21BR71C105KA01
1	C4	Capacitor, ceramic, 10 μF, 6.3 V, X5R, 20%	1210	Murata	GRM31CR60J106KC01
1	C5	Open	7343 (D)		
1	C6	Open	6032 (C)		
1	C7	Open	603		
4	J1, J3, J4, J5	Connector, mini banana jack, uninsulated, 4-mm inside diameter	0.300 OD	Hirschmann	B0 10
2	J2, J6	Header, 3 pin, 5-mm spacing	0.197 x 3"	OST	ED1661
1	JP1	Header, 2 pin, 100-mil spacing, (36-pin strip)	0.100 x 2"	Sullins	PTC36SAAN
2	R1, R5	Resistor, chip, 100 kΩ, 1/16 W, 1%	603	Std	Std
1	R2	Resistor, chip, 100 Ω, 1/16 W, 1%	603	Std	Std
2	R3, R4	Open	603		
2	TP1, TP3	Test point, red, 1 mm	0.038"	Farnell	240–345
1	TP2	Test point, black, 1 mm	0.038"	Farnell	240–333
1	U1	IC, LDO with supervisor, 1.8 V, 1 A	SOT–223	TI	TPS72518DCQ
1		PCB, 2.055" x 1.85" x 0.62"		Any	SLVP207
1		Shunt, black, 100 mm	0.100	3M	929950–00