

# TPS799xxEVM-105

This User's Guide describes the characteristics, operation, and use of the TPS799xxEVM-105 Evaluation Module (EVM). This EVM demonstrates three individual configurations of the Texas Instruments TPS799xx low quiescent current, ultra-low noise, high PSRR, low dropout linear regulator capable of supplying up to 200 mA of output current. This User's Guide includes setup instructions, a schematic diagram, a bill of materials (BOM), and PCB layout drawings for the evaluation module.

### Contents

1	Introduction .....	1
2	Setup .....	2
3	Board Layout .....	3
4	Schematic and Bill of Materials .....	7

### List of Figures

1	Assembly Layer .....	4
2	Top Layer Routing .....	5
3	Bottom Layer Routing .....	6
4	TPS799xxEVM-105 Schematic .....	7

### List of Tables

1	Device and Output Voltage Configurations .....	1
2	Minimum and Maximum Input Voltage .....	2
3	TPS799xxEVM-105 Bill of Materials .....	8

## 1 Introduction

The Texas Instruments TPS799xxEVM-105 evaluation module (EVM) helps designers evaluate the operation and performance of the TPS799xx family of linear regulators. These regulators are low quiescent current, high PSRR, ultra-low noise, low dropout linear regulators.

The EVM contains three independent linear regulator DC/DC converters. The default output voltages of the converters are listed in [Table 1](#).

**Table 1. Device and Output Voltage Configurations**

Converter	IC	Package	Output Voltage	Type
1	TPS79901DDC	TO/SOT	1.60	Adjustable
2	TPS79918YZU	CSP-5 chipscale	2.80	Fixed
3	TPS79901YZU	CSP-5 chipscale	3.30	Adjustable

If desired, converters 1 and 3 on this EVM can be easily modified to supply higher or lower output voltages. The converter can be adjusted to provide an output voltage between 1.217 V and 6.34 V. Output voltages other than the default values may be evaluated by adjusting the appropriate feedback resistors. Also, other fixed output voltage versions of the devices can be easily evaluated using this EVM. Refer to the TPS799xx data sheet ([SBVS056A](#)) for the various fixed output voltage options available in the TPS799xx device family as well as for more information on adjusting the output voltage.

## 2 Setup

This chapter describes the jumpers and connectors on the EVM as well as how to properly connect, setup, and use the TPS799xxEVM-105.

### 2.1 Input / Output Connector Descriptions

**J1, TP1 and TP3 – VIN** — This is the positive input connection to the corresponding converter. The leads to the input supply should be twisted and kept as short as possible to minimize EMI transmission.

**J2, TP2 and TP4 – GND** — This is the input return connection for the input power supply for the corresponding converter

**J3, TP5 and TP7 – VOUT** — This is the positive connection from the output of the corresponding converter. Connect this pin to the positive input of the load.

**J6, TP6 and TP8 – GND** — This is the return connection from the output of the corresponding converter. Connect this pin to the negative input of the load.

**JP1, JP2 and JP3 – EN** — This jumper enables or disables the corresponding converter. Connect the shorting jumper from the center EN pin to either the ON or OFF position. This pin should never be left floating.

### 2.2 Setup

There are two different package styles on the TPS799xxEVM-105. The thermal performance of each package style and ambient temperature may limit the input voltage or output current of the converters. Since the converter outputs are set, the power dissipated in the package relates only to the input voltage and output current. [Table 2](#) shows the maximum input voltage at full load current of 200 mA. Above this voltage, the output current must be reduced to keep the power dissipation of the package below the maximums stated in the datasheet. Output voltage or ambient temperature changes affect these values. [Table 2](#) also shows the minimum input voltage required to produce an output for each converter. The minimum input voltage is the output voltage plus the necessary dropout voltage.

**Table 2. Minimum and Maximum Input Voltage**

Converter	Output Voltage	Minimum Input Voltage	Max Input Voltage Before Current Derate (T <sub>A</sub> = 25°C, I <sub>O</sub> = 200 mA)
1	1.6	1.775	3.4
2	2.8	2.975	4.7
3	3.3	3.46	5.1

For converters number 1 and 3, the user can replace the factory supplied TPS79901 with other fixed voltage converters in the TPS799xx family. R1 and C5 should be removed and left open and a noise reduction capacitor installed in place of R2 when using a fixed voltage IC in converter 1. R3 and C7 should be removed and left open and a noise reduction capacitor installed in place of R4 for converter 3 when using a fixed voltage IC.

### **2.3 Operation**

JP1, JP2, and JP3 are the enables for the converters and must be configured for proper operation of the converter. Use a shorting block to set JP1, JP2, and JP3 to the desired configurations.

### **3 Board Layout**

This chapter provides the TPS799xxEVM-105 board layout and illustrations.

### 3.1 Layout

Figure 1, Figure 2, and Figure 3 show the board layout for the TPS799xxEVM-105 PWB.

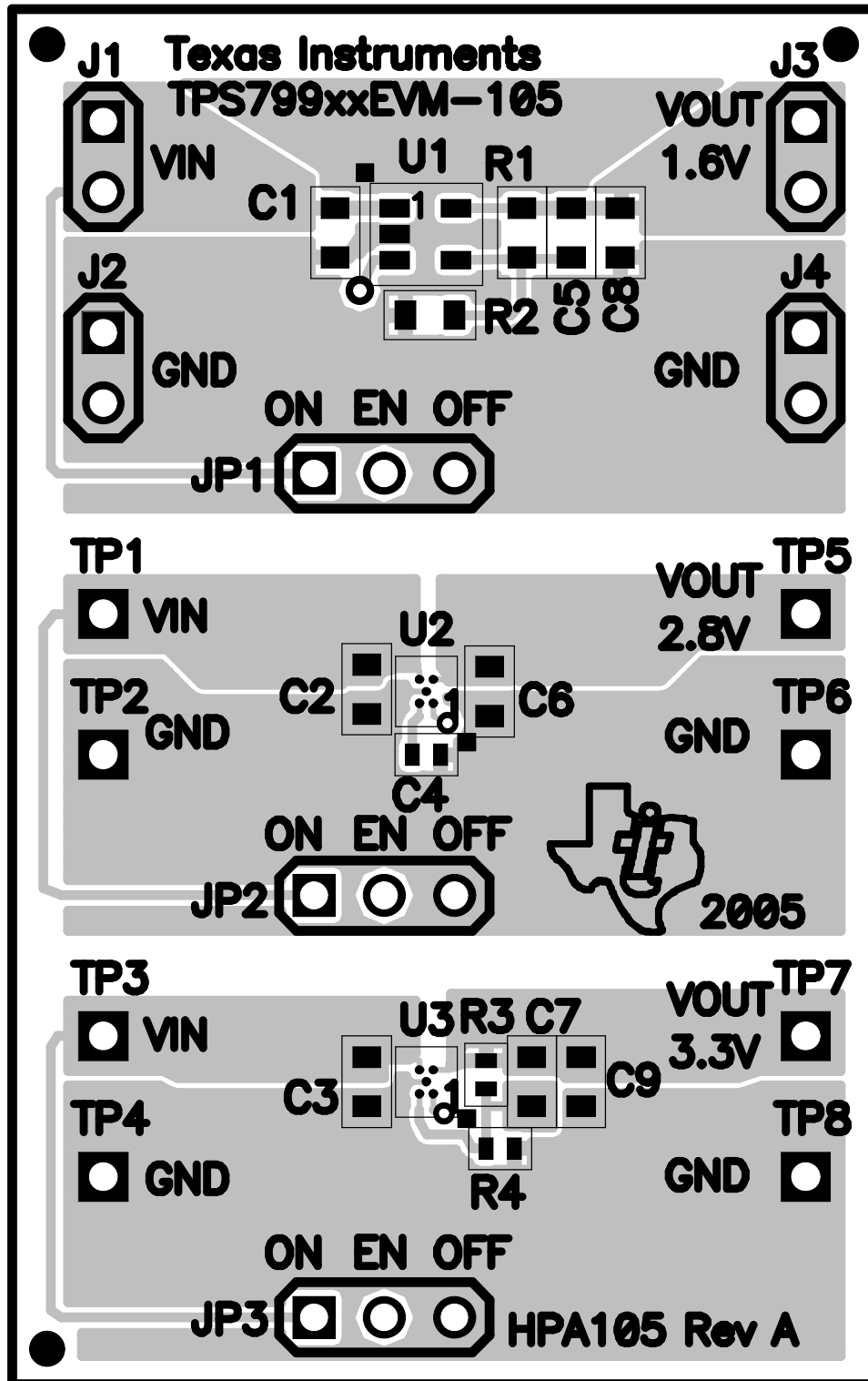


Figure 1. Assembly Layer

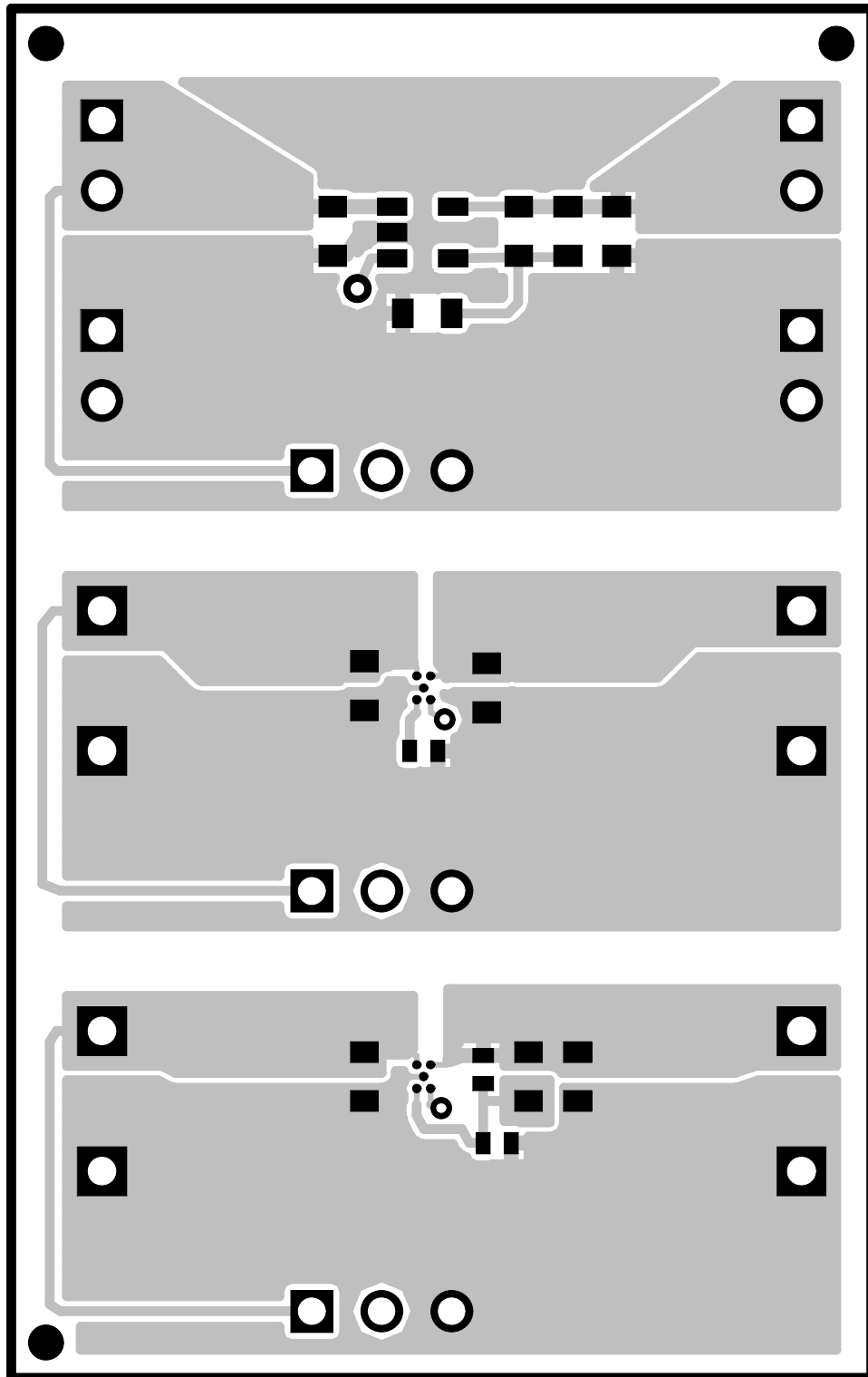


Figure 2. Top Layer Routing

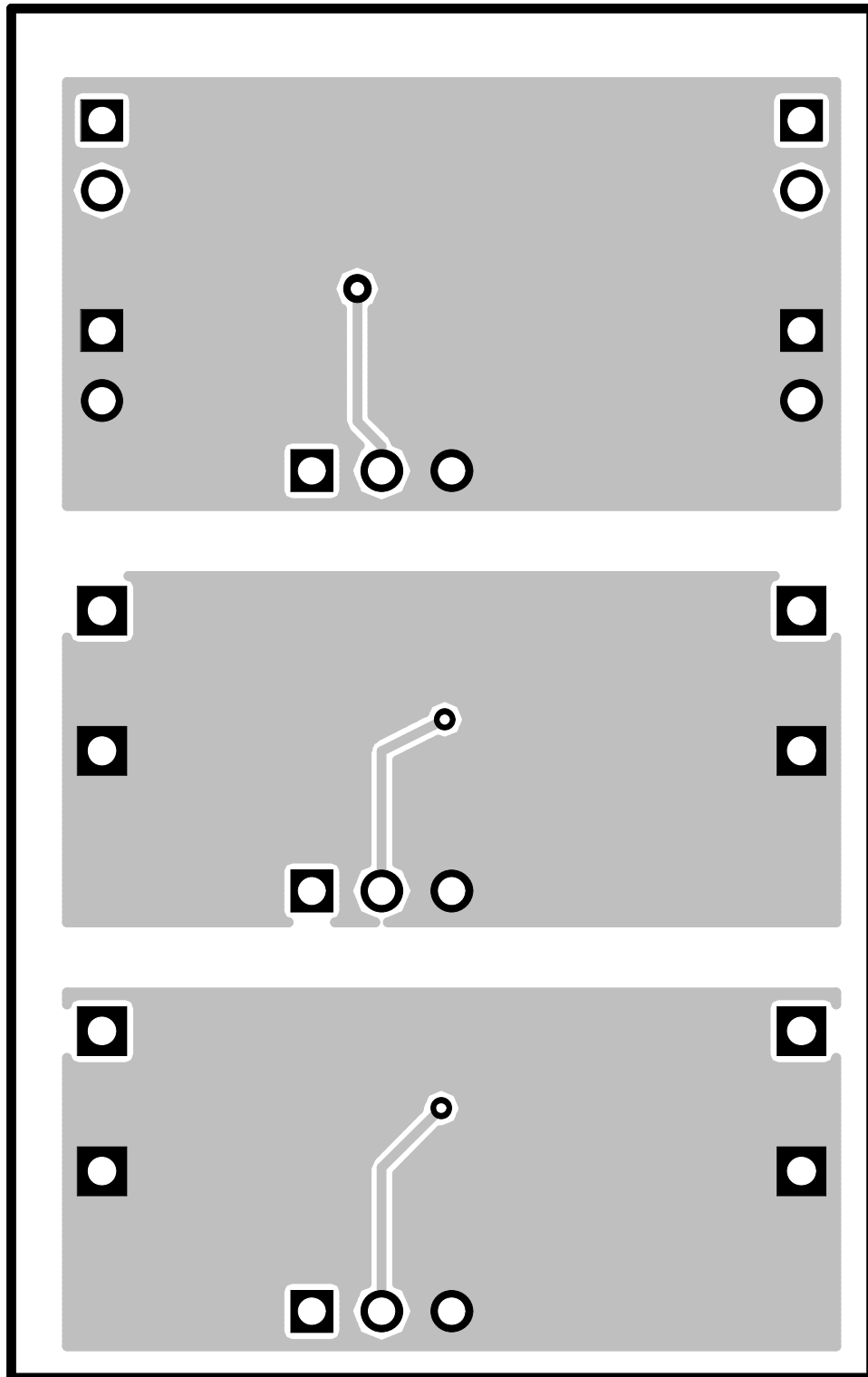


Figure 3. Bottom Layer Routing

## 4 Schematic and Bill of Materials

This chapter provides the TPS799xxEVM-105 schematic and bill of materials.

### 4.1 Schematic

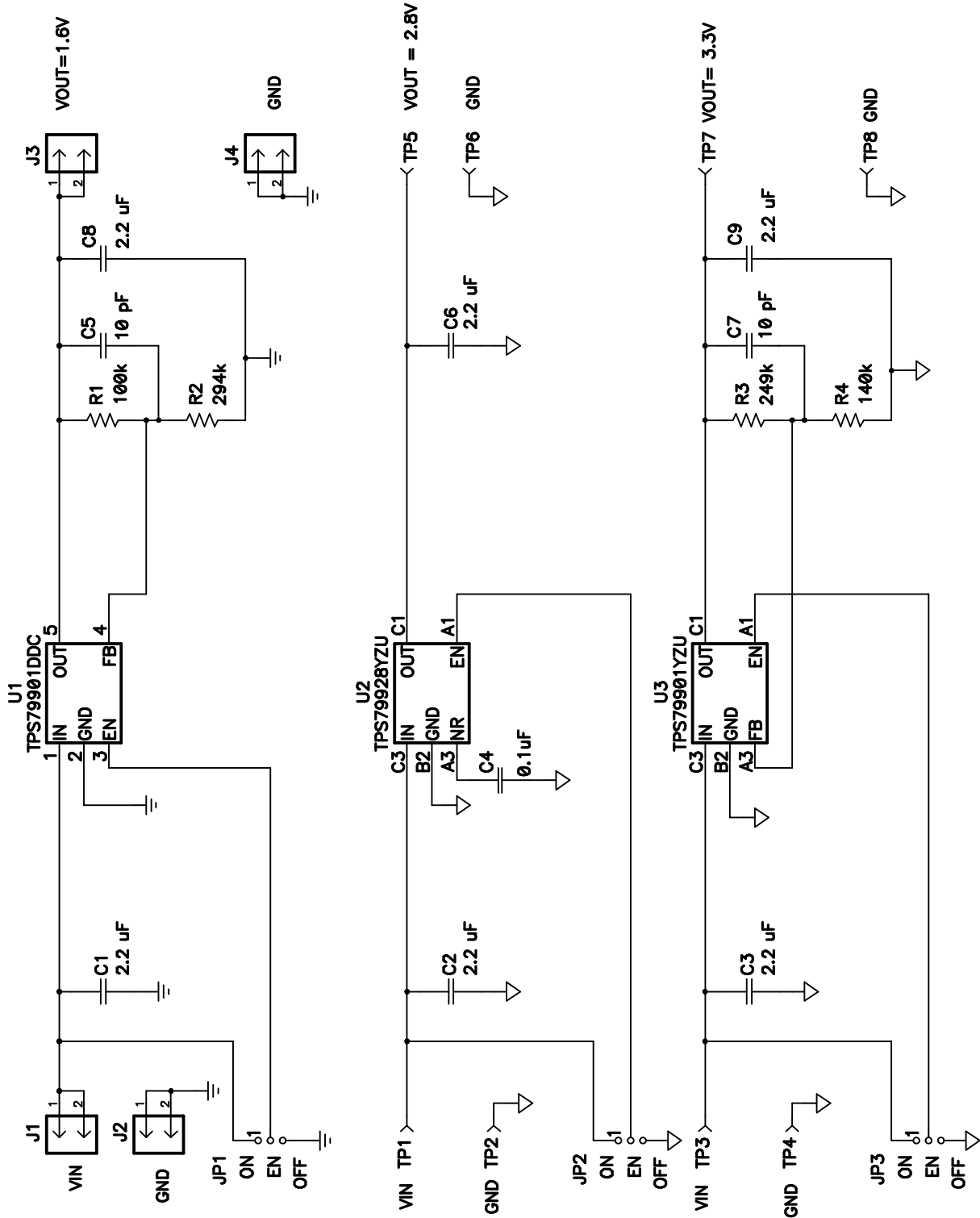


Figure 4. TPS799xxEVM-105 Schematic

## 4.2 Bill of Materials

**Table 3. TPS799xxEVM-105 Bill of Materials**

COUNT	Ref Des	Description	Size	Part Number	MFR
6	C1, C2, C3, C6, C8, C9	Capacitor, ceramic, 2.2- $\mu$ F, 10-V, X5R, $\pm$ 10%	0603	C1608X5R1A225KT	TDK
1	C4	Capacitor, 0.1- $\mu$ F, 10-V, X5R, $\pm$ 10%	0402	C1005X5R1A104K	TDK
2	C5, C7	Capacitor, ceramic, 10-pF, 50-V, C0G, 5%	0603	C1608C0G1H100D	TDK
4	J1, J2, J3, J4	Header, 2-pin, 100mil spacing, (36-pin strip)	0.100 x 2	PTC36SAAN	Sullins
3	JP1, JP2, JP3	Header, 3-pin, 100mil spacing, (36-pin strip)	0.100 x 3	PTC36SAAN	Sullins
1	R1	Resistor, chip, 100 k $\Omega$ , 1/16-W, 1%	0603	Std	Std
1	R2	Resistor, chip, 294 k $\Omega$ , 1/16-W, 1%	0603	Std	Std
1	R3	Resistor, chip, 249 k $\Omega$ , 1/16-W, 1%	0402	Std	Std
1	R4	Resistor, chip, 140 k $\Omega$ , 1/16-W, 1%	0402	Std	Std
4	TP1, TP3, TP5, TP7	Test point, red, 1 mm	0.038	240-345	Farnell
4	TP2, TP4, TP6, TP8	Test point, black, 1 mm	0.038	240-333	Farnell
1	U1	IC, Ultra-low noise, high PSRR 200 mA, LDO regulators	SOT23-5	TPS79901DDC	TI
1	U2	IC, Ultra-low noise, high PSRR 200 mA, LDO regulators	WCSP-05	TPS79928YZU	TI
1	U3	IC, Ultra-low noise, high PSRR 200 mA, LDO regulators	WCSP-05	TPS79901YZU	TI
1	–	PCB, 1.955 In x 1.23 In x 0.062 In		HPA105	Any
3	–	Shunt, 100-mil, black	0.100	929950-00	3M

## 4.3 Related Documentation From Texas Instruments

TPS799xx data sheet ([SBVS056A](#))



## FCC Warnings

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.

## 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.

## EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of 1.775 V to 5.10 V and the output voltage range of 1.60 V to 3.30 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 25°C. The EVM is designed to operate properly with certain components above 25°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  
Copyright © 2005, Texas Instruments Incorporated

## 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.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

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

<b>Products</b>		<b>Applications</b>	
Amplifiers	<a href="http://amplifier.ti.com">amplifier.ti.com</a>	Audio	<a href="http://www.ti.com/audio">www.ti.com/audio</a>
Data Converters	<a href="http://dataconverter.ti.com">dataconverter.ti.com</a>	Automotive	<a href="http://www.ti.com/automotive">www.ti.com/automotive</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>	Broadband	<a href="http://www.ti.com/broadband">www.ti.com/broadband</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>	Digital Control	<a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>	Military	<a href="http://www.ti.com/military">www.ti.com/military</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>	Optical Networking	<a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>	Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>	Telephony	<a href="http://www.ti.com/telephony">www.ti.com/telephony</a>
Low Power Wireless	<a href="http://www.ti.com/lpw">www.ti.com/lpw</a>	Video & Imaging	<a href="http://www.ti.com/video">www.ti.com/video</a>
		Wireless	<a href="http://www.ti.com/wireless">www.ti.com/wireless</a>

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2007, Texas Instruments Incorporated

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».



## JONHON

«**JONHON**» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«**FORSTAR**» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А