

# TPS715AxxEVM

This User's Guide describes the characteristics, operation, and use of the TPS715AxxEVM evaluation module (EVM). The EVM is designed to help the user easily evaluate and test the operation and functionality of the TPS715Axx. The User's Guide includes setup instructions for the hardware, a schematic diagram, a bill of materials (BOM), and PCB layout drawings for the EVM.

### Contents

1	Related Documentation From Texas Instruments.....	1
2	Introduction .....	1
3	Setup .....	2
4	Board Layout .....	2
5	Schematic and Bill of Materials .....	6

### List of Figures

1	Assembly Layer .....	3
2	Top Layer Routing .....	4
3	Bottom Layer Routing .....	5
4	TPS715AxxEVM Schematic.....	6

### List of Tables

1	Performance Specification Summary .....	2
2	TPS715AxxEVM Bill of Materials.....	6

## 1 Related Documentation From Texas Instruments

TPS715Axx data sheet ([SBVS047](#))

## 2 Introduction

The Texas Instruments TPS715AxxDRB is a low dropout regulator (LDO) in a 3x3-mm QFN package that provides output currents up to 80 mA. Both fixed and adjustable output voltage units are available.

### 2.1 Background

The TPS715AxxEVM uses the TPS715A01 and the TPS715A33 in a 3x3-mm QFN package to provide 3.3 V and 5 V at up to 80 mA. The EVM operates with full-rated performance with an input voltage between 3.5 V and 24 V.

### 2.2 Performance Specification

[Table 1](#) provides a summary of the TPS715AxxEVM performance specifications. All specifications are given for an ambient temperature of 25°C.

**Table 1. Performance Specification Summary**

Specification	Test Conditions	Min	Typ	Max	Unit
Input voltage		3		24	V
Output voltage U1	I <sub>out</sub> = 10 mA to 100 mA	3.133	3.3	3.465	V
Output voltage U2	I <sub>out</sub> = 10 mA to 100 mA	4.9	5	5.1	V
Output current		0		80	mA

## 2.3 Modifications

The PWB for this EVM is designed to accommodate both the fixed (U2) and adjustable (U1) versions of this IC.

### 2.3.1 Fixed Output IC U2 Operation

U2 is configured for operation of the fixed output version. No resistor adjustment is provided.

### 2.3.2 Adjustable Output IC U1 Operation

U1 is configured for evaluation of the adjustable output version. Resistors R1 and R2 are used to set the output voltage between 1.2 V and 15 V. This unit is configured for 5 V. See the data sheet for more information.

## 3 Setup

This section describes how to properly set up the TPS715AxxEVM.

### 3.1 Input/Output Connector Descriptions

**J1–VIN** Positive input connection from the input supply for U1.

**J2–GND** Return connection from the input supply for U1. Common with J4.

**J3–VOUT** Output voltage from U1.

**J4–GND** Output return connection for U1. Common with J2.

**J5–VIN** Positive input connection from the input supply for U2.

**J6–GND** Return connection from the input supply for U2. Common with J8.

**J7–VOUT** Output voltage from U2.

**J8–GND** Output return connection for U2. Common with J6.

### 3.2 Operation

To operate the EVM, connect an input supply to the appropriate pins, and connect a load to the appropriate pins.

## 4 Board Layout

This section provides the TPS715AxxEVM board layout and illustrations.

#### 4.1 Layout

Figure 1, Figure 2, and Figure 3 show the board layout for the TPS715AxxEVM PWB.

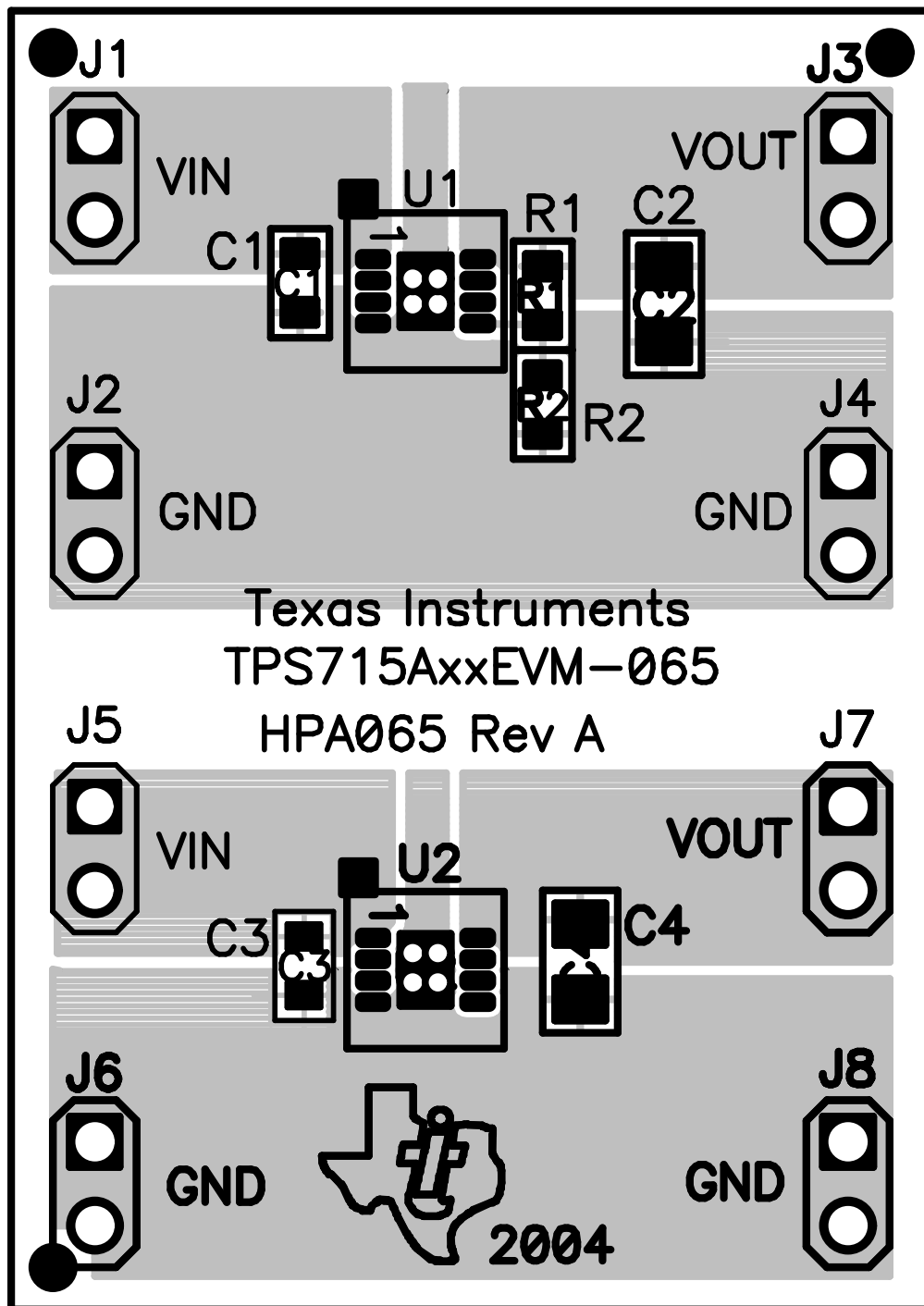


Figure 1. Assembly Layer

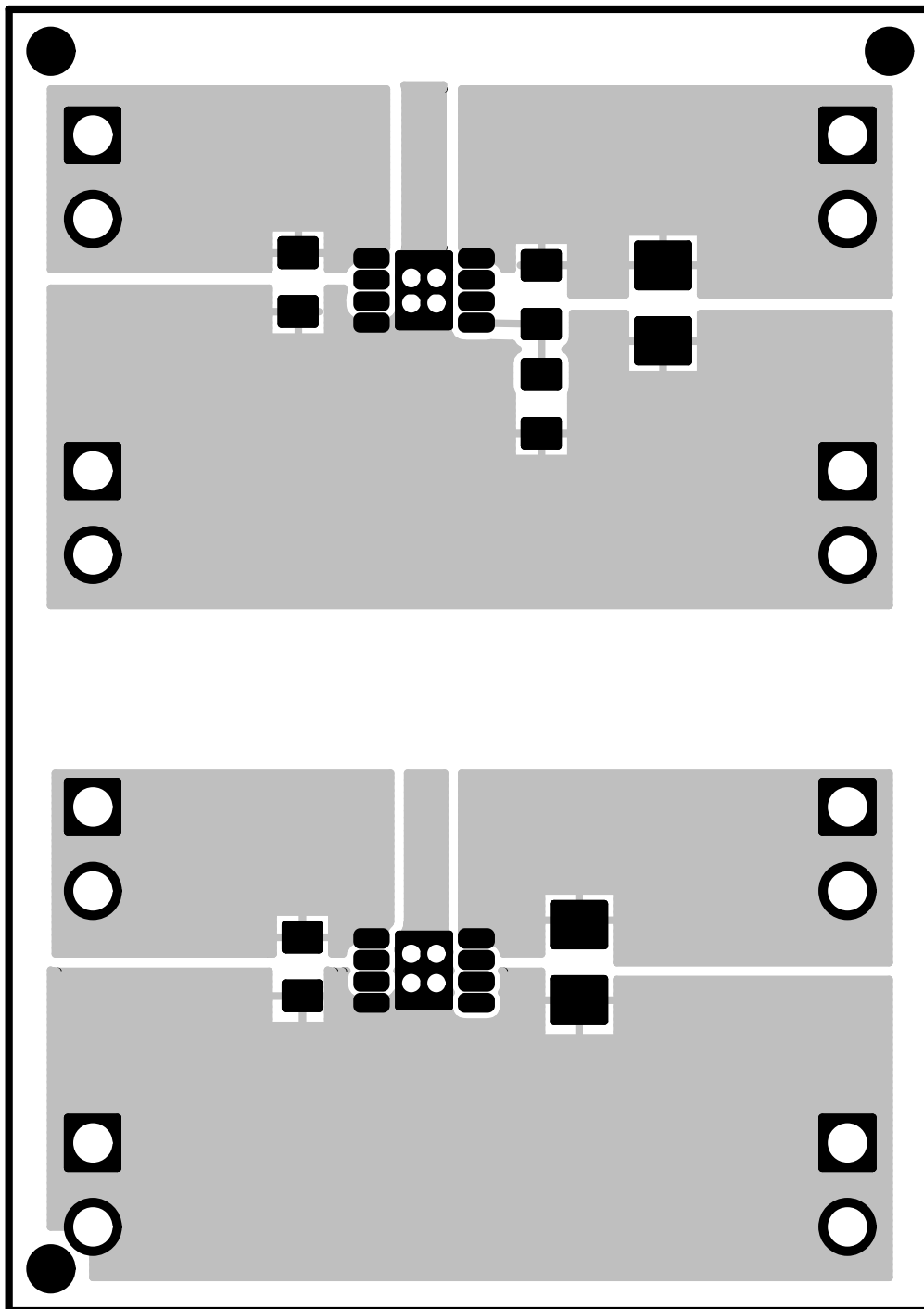


Figure 2. Top Layer Routing

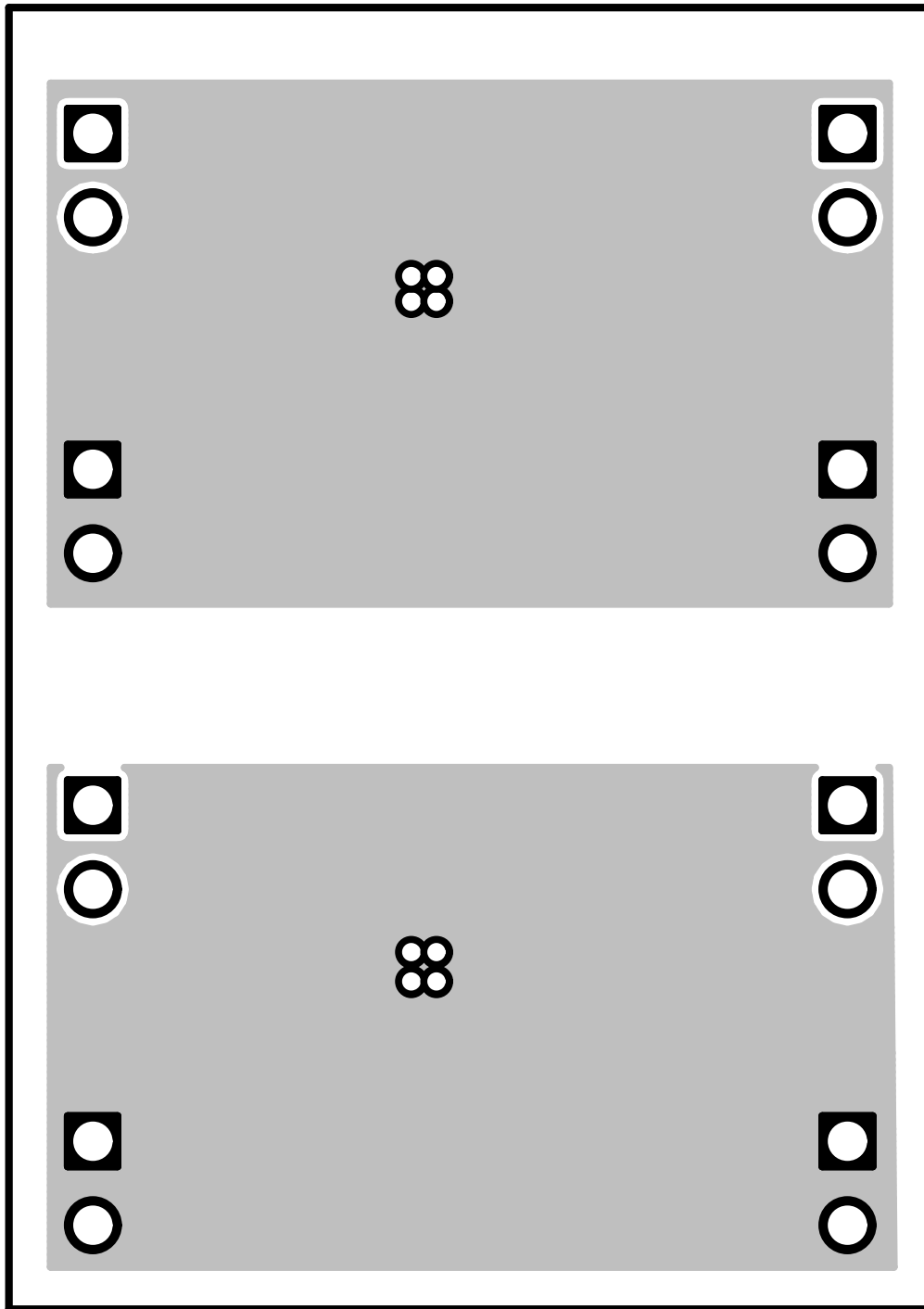


Figure 3. Bottom Layer Routing

## 5 Schematic and Bill of Materials

This chapter provides the TPS715AxxEVM schematic and bill of materials.

### 5.1 Schematic

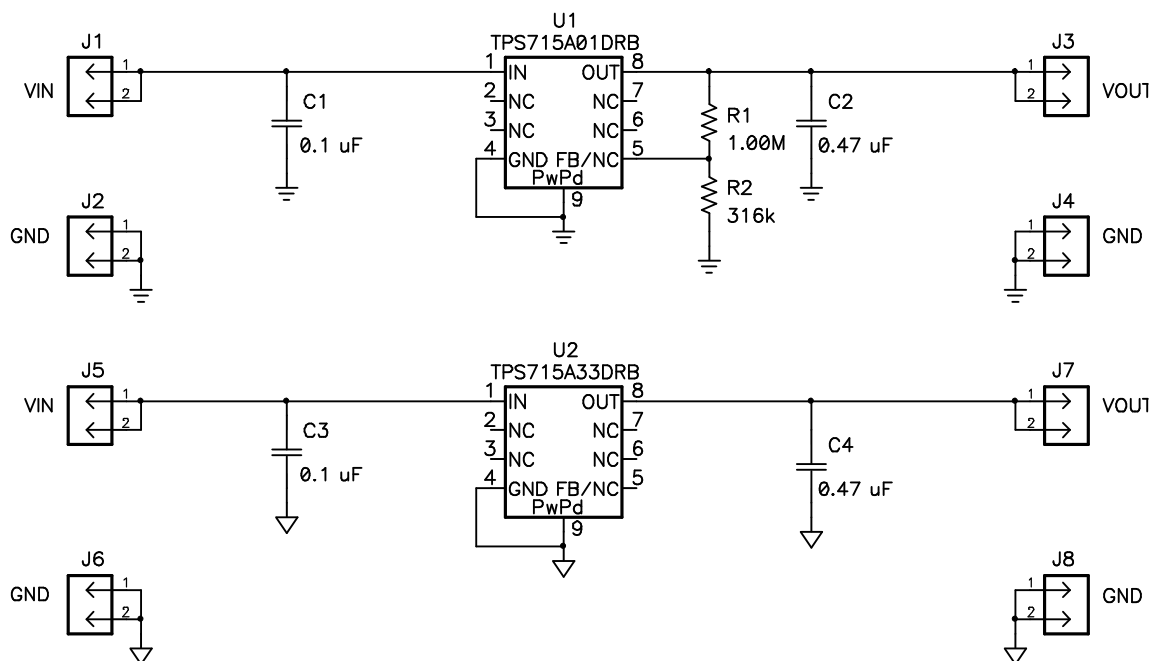


Figure 4. TPS715AxxEVM Schematic

### 5.2 Bill of Materials

Table 2. TPS715AxxEVM Bill of Materials

Count	Ref Des	Description	Size	Part Number	MFR
2	C1, C3	Capacitor, ceramic, 0.1- $\mu$ F, 25-V, X7R, 10%	0603	C1608X7R1E104K	TDK
2	C2, C4	Capacitor, ceramic, 0.47- $\mu$ F, 16-V, X5R, 10%	0805	C2012X7R1C474K	TDK
8	J1–J8	Header, 2-pin, 100 mil spacing, (36-pin strip)	0.100 $\times$ 2	PTC36SAAN	Sullins
1	R1	Resistor, chip, 1.00 M $\Omega$ , 1/16-W, 1%	0603	Std	Std
1	R2	Resistor, chip, 316 k $\Omega$ , 1/16-W, 1%	0603	Std	Std
1	U1	IC, high input voltage, micropower, 3.2 $\mu$ A at 80 mA LDO, Adj-V	QFN-8	TPS715A01DRB	TI
1	U2	IC, high input voltage, micropower, 3.2 $\mu$ A at 80 mA LDO, 3.3-V	QFN-8	TPS715A33DRB	TI
1	—	PCB, 1.55 In $\times$ 1.1 In $\times$ 0.062 In		HPA065	Any

## 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.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2004, Texas Instruments Incorporated

### **EVM WARNINGS AND RESTRICTIONS**

It is important to operate this EVM within the input voltage range of 3.5 V to 24 V and the output voltage range of 3.3 V to 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 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  
Copyright © 2004, 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