

## TAS2564YBGEVM-DC User's Guide

The TAS2564YBGEVM-DC is designed to demonstrate the performance of TAS2564 in a stereo configuration. The design utilizes the PPC3-EVM-MB hardware to provide an interface and supply voltages to the EVM. TAS2564 is a mono, digital-input, Class-D audio amplifier optimized for efficiently driving high peak power into small loudspeaker applications. The Class-D amplifier is capable of delivering 8 W of peak power into a 4  $\Omega$  load at a battery voltage of 3.6 V. Integrated speaker voltage and current sense provides real time monitoring of loud speakers. Up to four devices can share a common bus via I<sup>2</sup>S/TDM + I<sup>2</sup>C interfaces.

### Contents

1	Export Control Notice .....	3
2	Description .....	3
3	Specifications .....	3
4	Software .....	3
5	Device Configuration .....	4
6	3 Wire Speaker Connection .....	9
7	Digital Audio Interfaces .....	10
8	EVM Schematics .....	11
9	EVM Layer Plots .....	12
10	Bill of Materials .....	15

### List of Figures

1	Requesting PPC3 Access .....	4
2	Default Jumper Settings .....	4
3	Address Select .....	5
4	Mono Setup .....	5
5	Windows Playback Devices .....	6
6	Texas Instruments USB Audio Device Control Panel .....	6
7	Windows Playback device Sample Rate .....	7
8	Stereo Setup .....	7
9	Windows Playback Devices .....	8
10	Texas Instruments USB Audio Device Control Panel .....	8
11	Windows Playback device Sample Rate .....	9
12	.....	10
13	TAS2564 Three Wire connection .....	10
14	EVM Schematic .....	11
15	TAS2564YBGEVM-DC Top Silk Screen .....	12
16	TAS2564YBGEVM-DC Top Solder Mask .....	12
17	TAS2564YBGEVM-DC Top Copper .....	12
18	TAS2564YBGEVM-DC Copper Layer 2 .....	12
19	TAS2564YBGEVM-DC Copper Layer 3 .....	12
20	TAS2564YBGEVM-DC Copper Layer 4 .....	12
21	TAS2564YBGEVM-DC Copper Layer 5 .....	13
22	TAS2564YBGEVM-DC Bottom Copper .....	13

---

23	TAS2564YBGEVM-DC Bottom Solder .....	13
24	TAS2564YBGEVM-DC Bottom Silk Screen .....	13

#### List of Tables

1	Specifications.....	3
2	Default Jumper Settings .....	4
3	Address Select Jumpers.....	5
4	Bill of Materials .....	15

#### Trademarks

PurePath is a trademark of Texas Instruments.  
Microsoft, Windows are trademarks of Microsoft Corporation.  
All other trademarks are the property of their respective owners.

## 1 Export Control Notice

Recipient agrees to not knowingly export or re-export, directly or indirectly, any product or technical data (as defined by the U.S., EU, and other Export Administration Regulations) including software, or any controlled product restricted by other applicable national regulations, received from disclosing party under nondisclosure obligations (if any), or any direct product of such technology, to any destination to which such export or re-export is restricted or prohibited by U.S. or other applicable laws, without obtaining prior authorization from U.S. Department of Commerce and other competent Government authorities to the extent required by those laws.

## 2 Description

TAS2564YBGEVM-DC used in conjunction with PPC3-EVM-MB supports evaluation and development with the TAS2564 device through the following interfaces:

- USB Interface
- Software control via PurePath™ Console 3 (PPC 3) GUI, USB-HID
- USB-class audio device, compatible with Microsoft™ Windows™ 7+
- External 100 – mil headers
- PSIA - I2S/TDM interface
- I<sup>2</sup>C
- Hardware Shutdown Control
- Interrupt Output

---

**NOTE:** Please refer to PPC3-EVM-MB User's Guide ([SLEU120](#)) for detailed configuration details.

---

## 3 Specifications

**Table 1** lists the supply, input, and output requirements for TAS2564YBG.

**Table 1. Specifications**

Supply Voltage - VBAT	2.7 to 5.5 V
Supply Voltage - VDD	1.65 to 1.95 V
Supply Voltage - PVDD (external mode only)	VBAT to 16 V
Input Logic	VDD
Output Power	8 W
USB, USB class-audio	Micro-USB

---

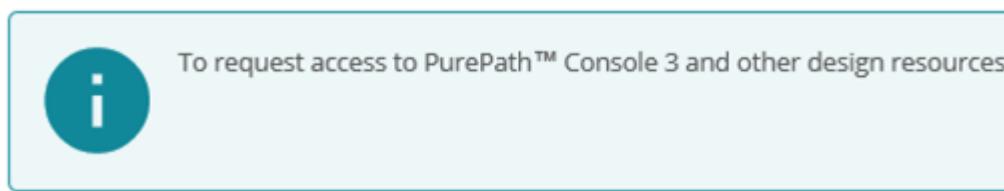
**NOTE:** PPC3-EVM-MB supports a VBAT range from 4.5 to 26 V. To apply a VBAT supply in the range of 2.7 to 4.5 V, it is highly recommended to remove Jumpers J3 and J6 and to apply this voltage directly to pin 2 of the respective header while simultaneously powering PPC3-EVM-MB with 5 V. Otherwise it is possible that on-board supplies may collapse.

---

## 4 Software

The TAS2564 can be easily configured with PPC3 running the TAS2564 plug-in. To request access to the software first request a myTI.com account [here](#).

After creating an account, navigate to the [TAS2564 product page](#) and follow the link in the information box to request access to the software.



**Figure 1. Requesting PPC3 Access**

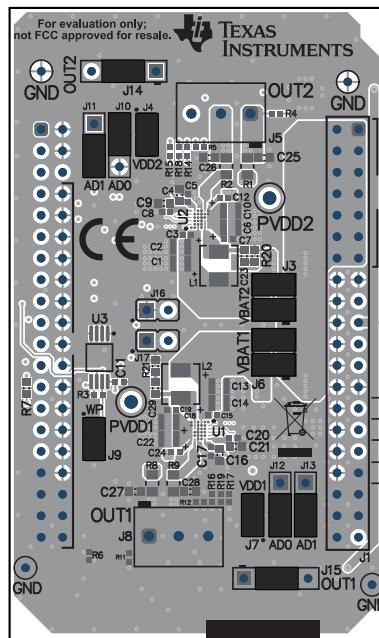
## 5 Device Configuration

The default configuration for the TAS2564 is described below in [Table 2](#) and [Figure 2](#).

### 5.1 Default Jumper Settings

**Table 2. Default Jumper Settings**

Jumper	Setting	Description
J11	L	Ch 2 ADDR 1
J10	H	Ch 2 ADDR 0
J4	Insert	Ch 2 VDD
J14	Pins 2-3	Output sense select
J3	Insert x2	Ch 2 VBAT
J9	Insert	EEPROM write protect
J6	Insert x2	Ch 1 VBAT
J15	Pins 2-3	Output sense select
J7	Insert	Ch 1 VDD
J12	L	Ch 1 ADDR0
J13	L	Ch 1 ADDR1

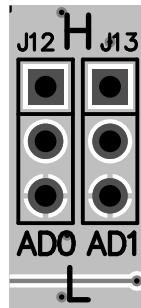


**Figure 2. Default Jumper Settings**

## 5.2 Address Select Jumpers

**Table 3. Address Select Jumpers**

Address	Pin A0	Pin A1
0x98	L	L
0x9A	H	L
0x9C	L	H
0x9E	H	H



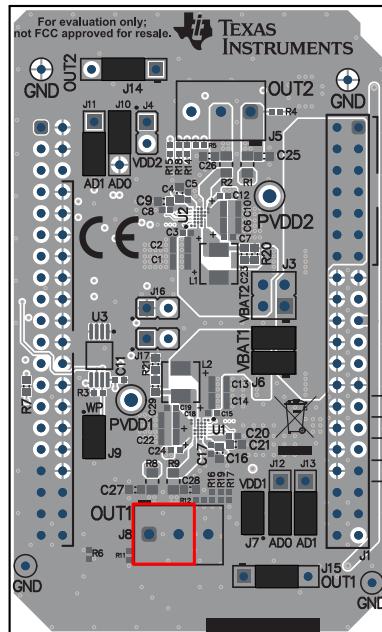
**Figure 3. Address Select**

TAS2564 supports 4 user configurable I<sup>2</sup>C addresses shown in [Section 5.2](#). Use J12 & J13 to configure Channel 1 and J10 & J11 to configure Channel 2 as shown in [Figure 3](#).

## 5.3 Mono Setup

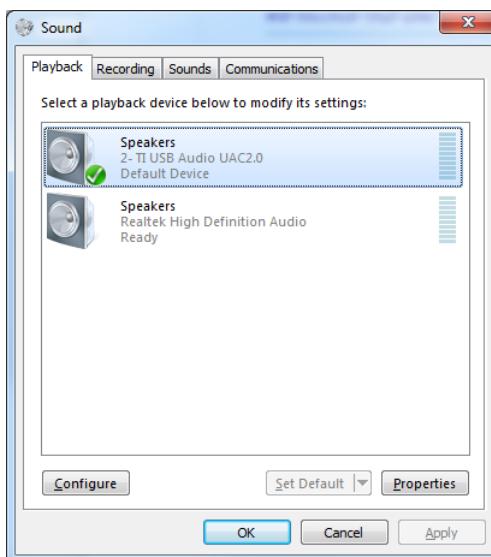
Use the following instructions to complete a mono setup:

1. Install PPC3 with the TAS2564 plug-in.
2. Connect a speaker to J8 on the TAS2564YBGEVM-DC.
3. Remove the jumpers at J3 and J4 as shown in [Figure 4](#).



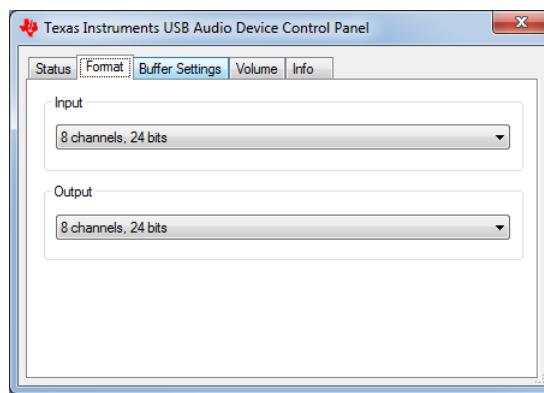
**Figure 4. Mono Setup**

4. Set the jumpers at J12 and J13 to the desired I<sup>2</sup>C address as shown in [Section 5.2](#).
5. Configure PPC3-EVM-MB as described in [SLEU120](#).
  - USB control for I<sup>2</sup>C
  - USB control for I<sup>2</sup>S
  - 3.3 V I<sup>2</sup>C
  - 3.3 V I<sup>2</sup>S
  - 1.8 V IOVDD
6. Connect a 5 V supply to connector J12 or J11 on PPC3-EVM-MB
7. Connect a Micro USB Cable from PC to PPC3-EVM-MB
8. Verify that TI USB Audio UAC2.0 is the default playback device by opening the sound dialog from the Windows Control Panel



**Figure 5. Windows Playback Devices**

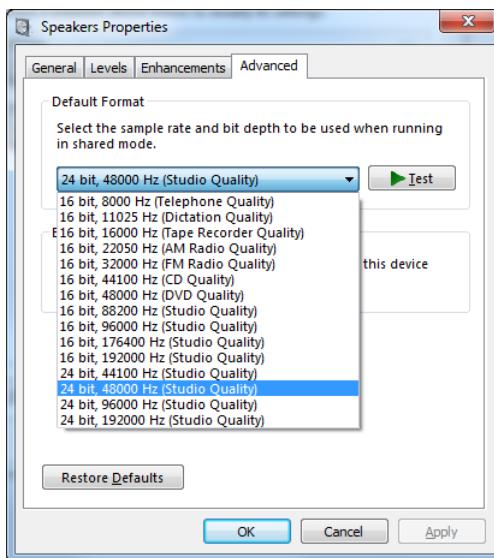
9. Set the maximum bit depth using the Texas Instruments USB Audio Device Control Panel found in the system tray



**Figure 6. Texas Instruments USB Audio Device Control Panel**

10. Set the sampling rate
  - Right click TI USB Audio UAC2.0
  - Select Properties
  - Click advanced tab

- Select Rate



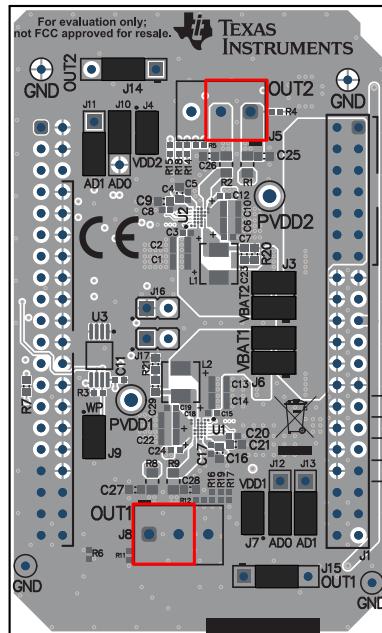
**Figure 7. Windows Playback device Sample Rate**

11. Configure the device using the TAS2564 PPC3 Plug-in

#### 5.4 Stereo Setup

Use the following instructions to complete a stereo setup:

1. Install PPC3 with the TAS2564 plug-in
2. Connect a speaker to both J8 and J5 on the TAS2564YBGEVM-DC
3. Set the jumpers at J12 & J13 and J11 & J10 to the unique I<sup>2</sup>C address as shown in [Section 5.2](#)

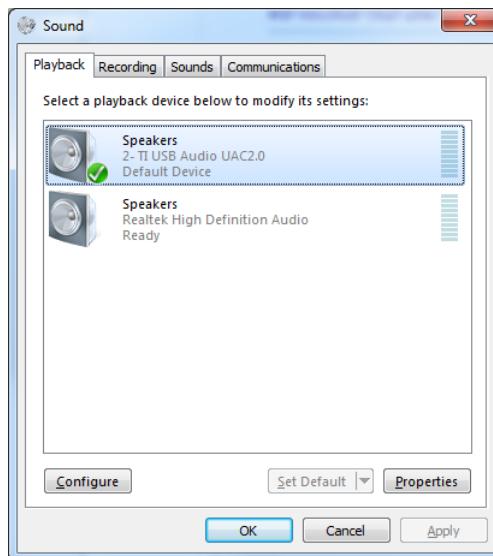


**Figure 8. Stereo Setup**

4. Configure PPC3-EVM-MB as described in
  - USB control for I<sup>2</sup>C

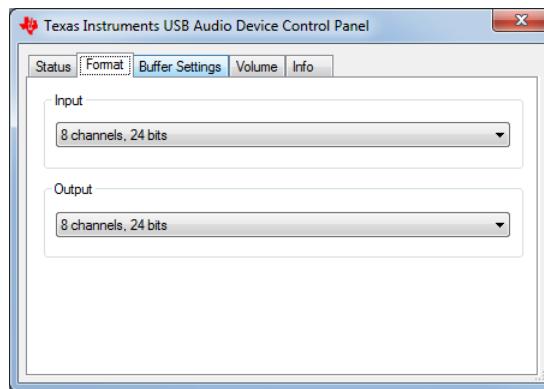
- USB control for I2S
- 3.3 V I<sup>2</sup>C
- 3.3 V I2S
- 1.8 V IOVDD

5. Connect a 5 V supply to connector J12 or J11 on PPC3-EVM-MB
6. Connect a Micro USB Cable from PC to PPC3-EVM-MB
7. Verify that TI USB Audio UAC2.0 is the default playback device by opening the sound dialog from the Windows Control Panel



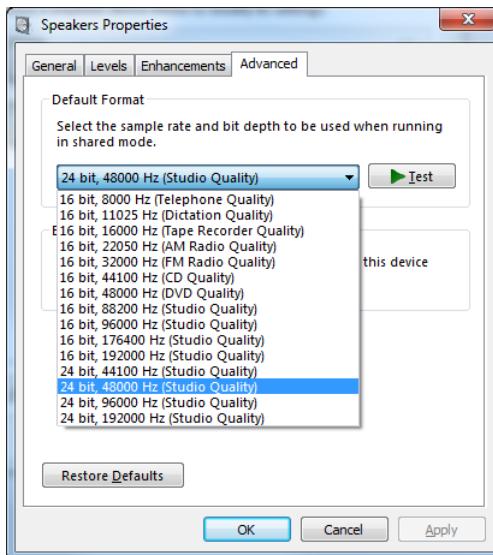
**Figure 9. Windows Playback Devices**

8. Set the maximum bit depth using the Texas Instruments USB Audio Device Control Panel found in the system tray



**Figure 10. Texas Instruments USB Audio Device Control Panel**

9. Set the sampling rate
  - Right click TI USB Audio UAC2.0
  - Select Properties
  - Click advanced tab
  - Select Rate



**Figure 11. Windows Playback device Sample Rate**

10. Configure the device using the TAS2564 PPC3 Plug-in

## 6 3 Wire Speaker Connection

TAS2564 supports a 3 wire speaker connection where an additional Voltage sense pin provides feedback for a center tap speaker coil voltage. This helps detect mechanical offset of the speaker to maximize cone excursion in both directions. Unless a 3 wire speaker is specifically being used to evaluate device performance, it is recommended to follow the standard 2 wire configuration.

To enable 3 wire mode on the EVM do the following:

1. Move the shunt on J15 and/or J14 to the 3W position. (Pins 3-4)
2. Connect the center speaker wire to the sense terminal of J8 and/or J5

Figure 12.

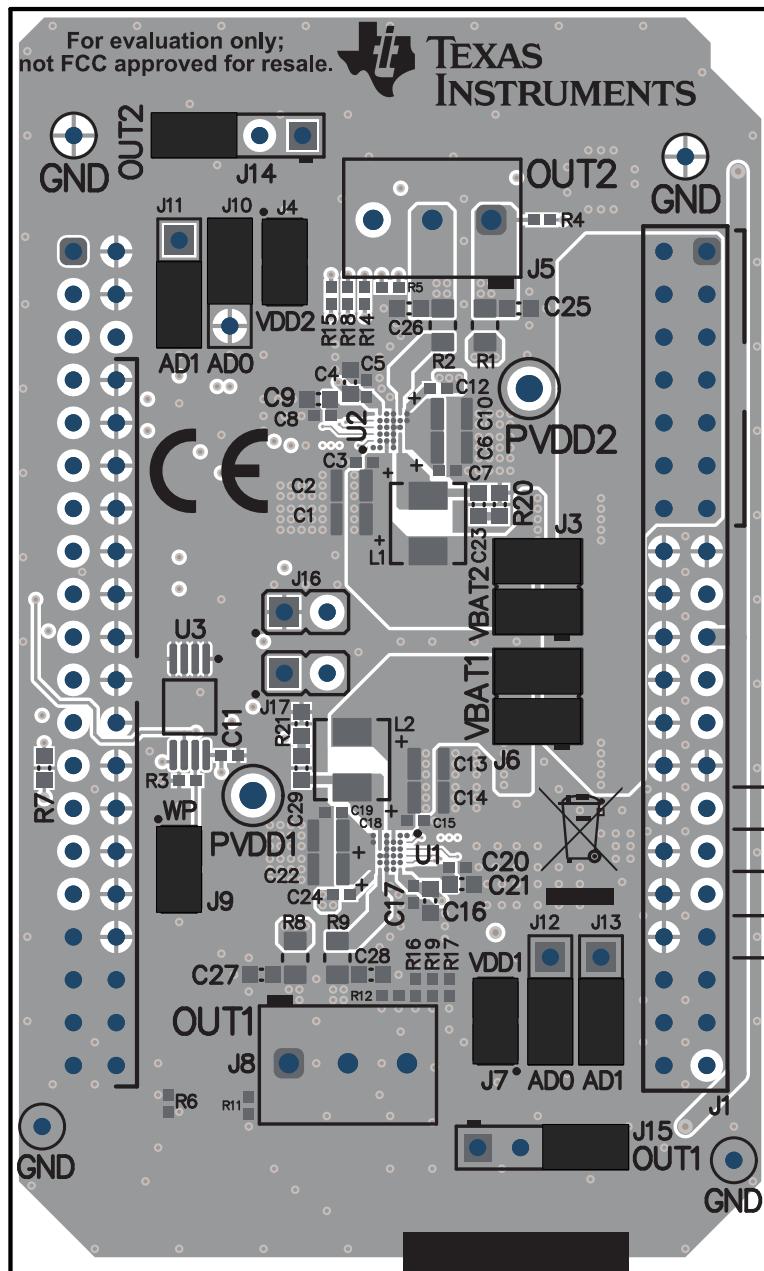


Figure 13. TAS2564 Three Wire connection

## 7 Digital Audio Interfaces

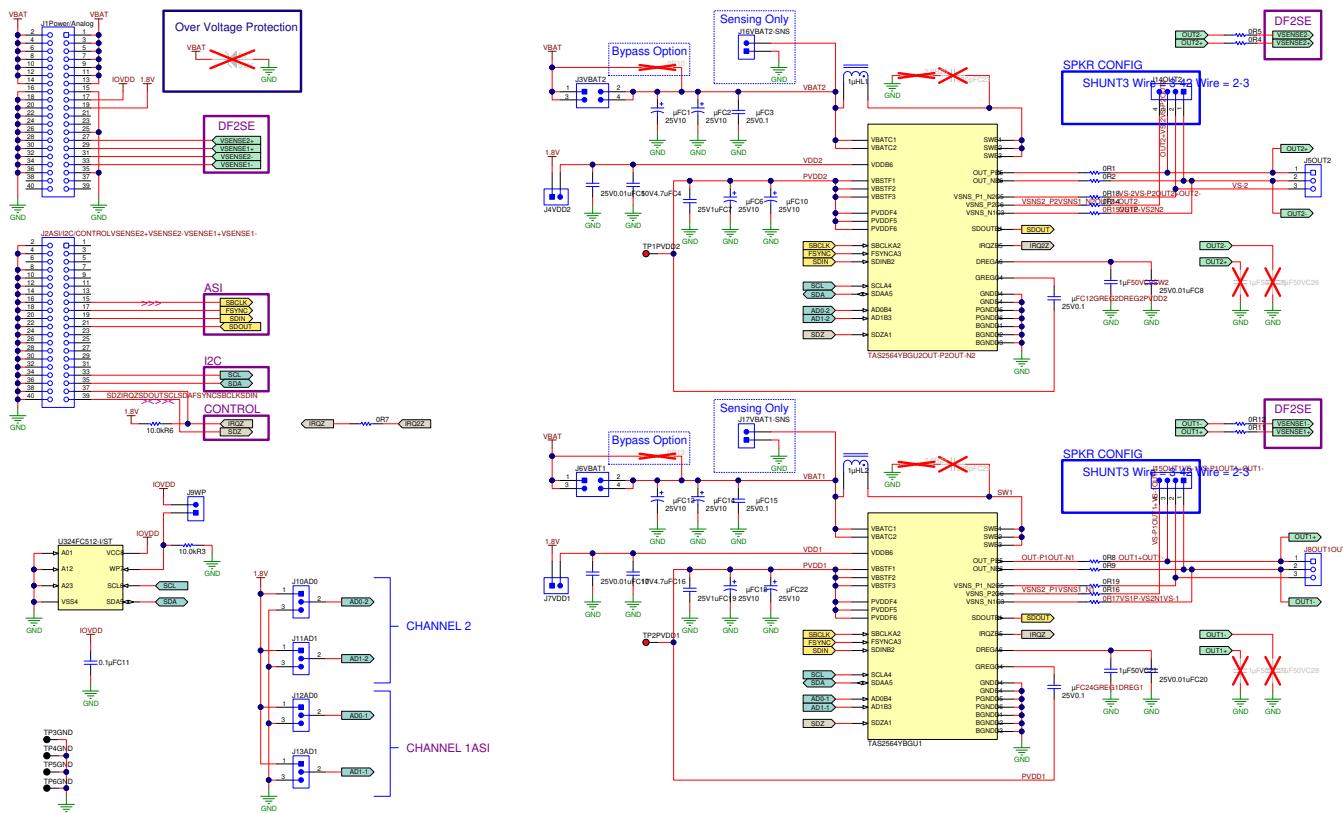
Select the various digital audio interfaces on the TAS2770EVM Reference Board through hardware settings and software settings. Several headers on PPC3-EVM-MB allow access to the following digital audio signals:

- I2S Data out (SDOUT) from the TAS2564 (for example, current and voltage sense data)
- I2S Data in (SDIN) to the TAS2564
- I2S Word clock or frame sync (FSYNC)
- I2S Bit clock (SBCLK)

- I<sup>2</sup>C Clock (SCLK)
- I<sup>2</sup>C Data (SDA) The selection between USB (internal) and external inputs is set using the control header on PPC3-EVM-MB.

Please refer to for detailed configuration settings.

## 8 EVM Schematics



**Figure 14. EVM Schematic**

## 9 EVM Layer Plots

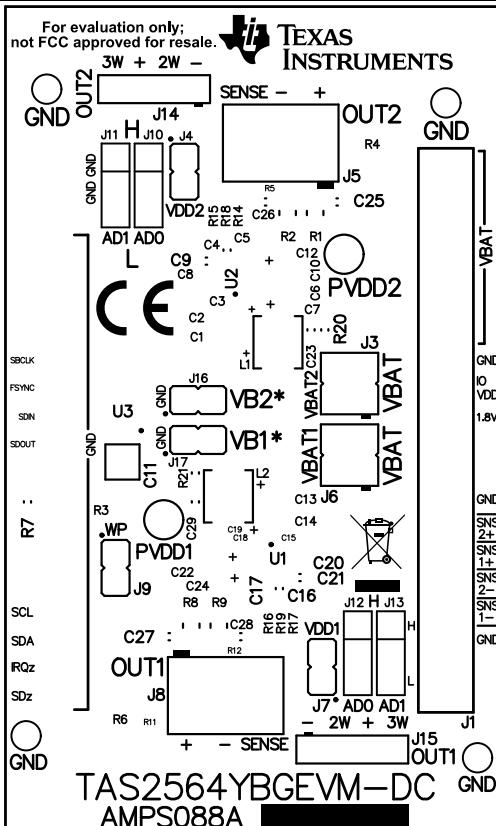


Figure 15. TAS2564YBGEVM-DC Top Silk Screen

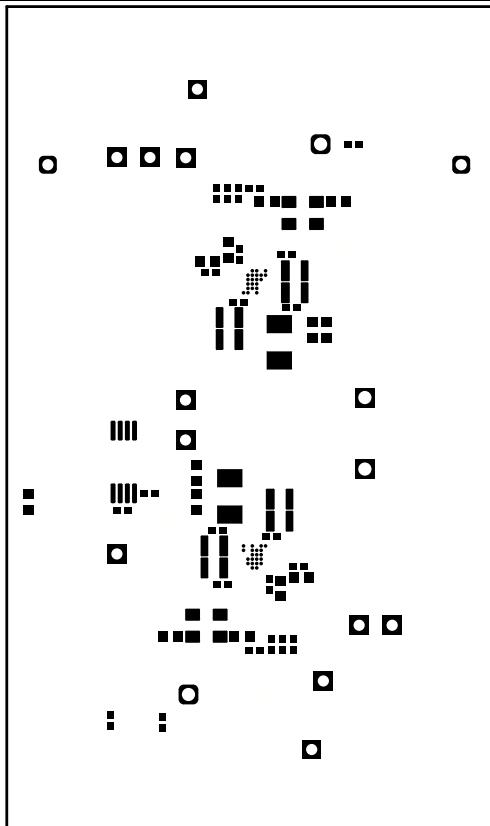


Figure 16. TAS2564YBGEVM-DC Top Solder Mask

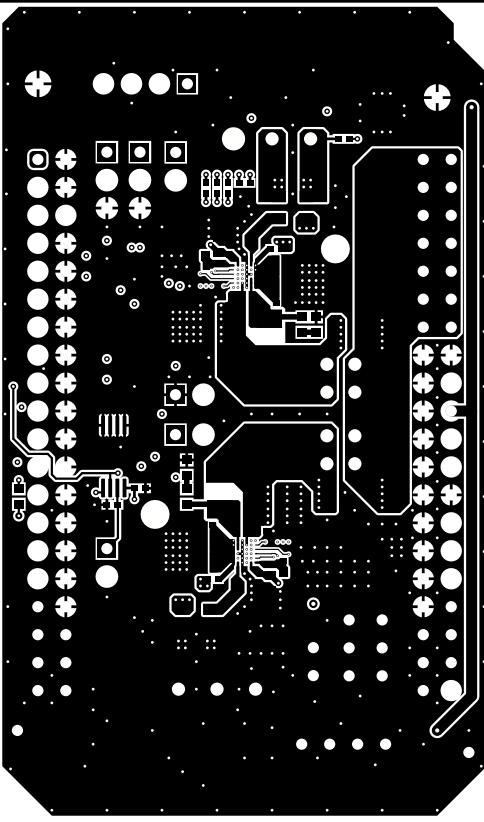


Figure 17. TAS2564YBGEVM-DC Top Copper

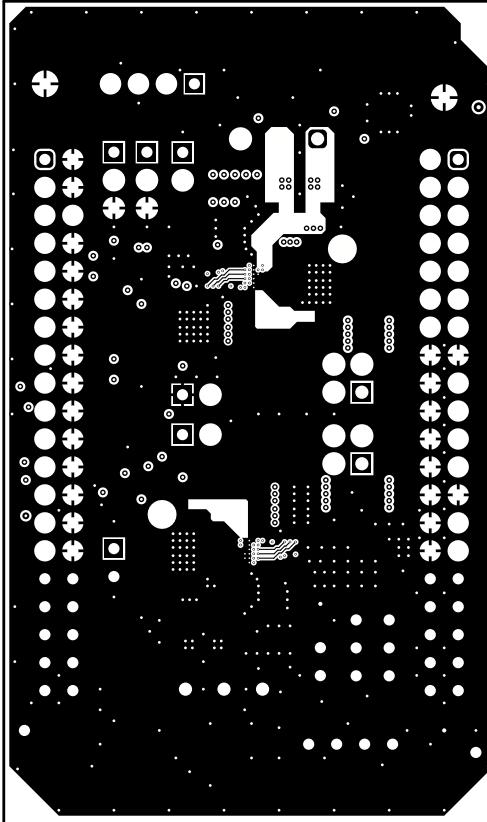


Figure 18. TAS2564YBGEVM-DC Copper Layer 2

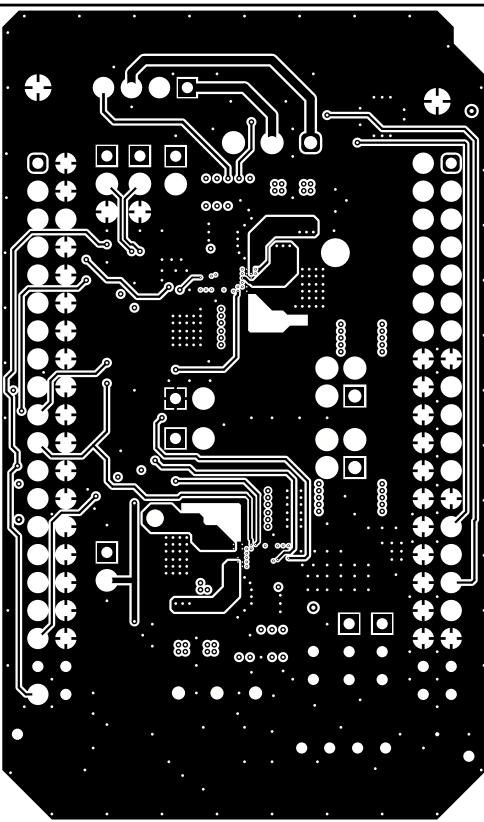


Figure 19. TAS2564YBGEVM-DC Copper Layer 3

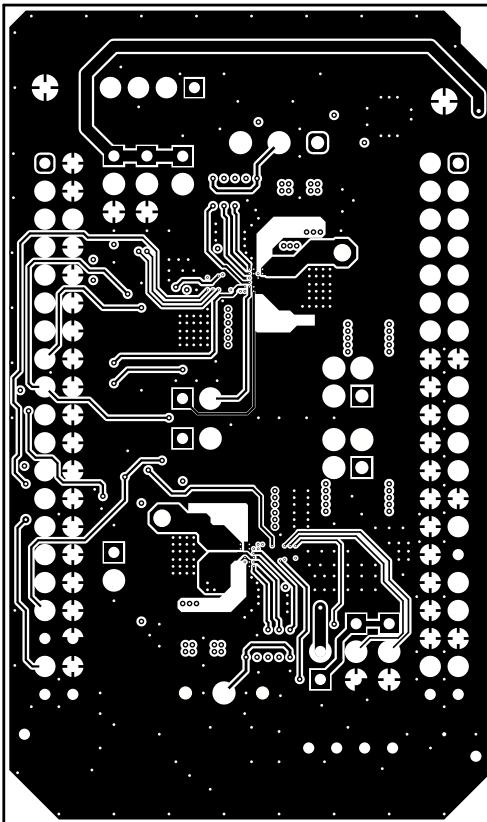


Figure 20. TAS2564YBGEVM-DC Copper Layer 4

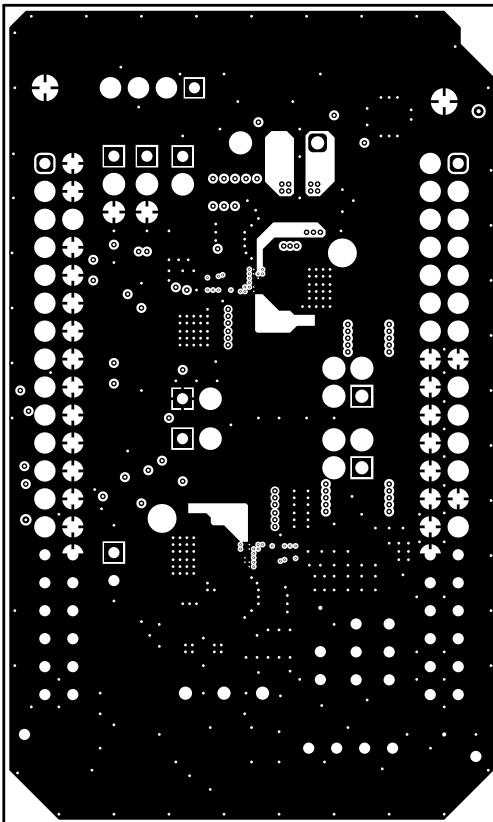


Figure 21. TAS2564YBGEVM-DC Copper Layer 5

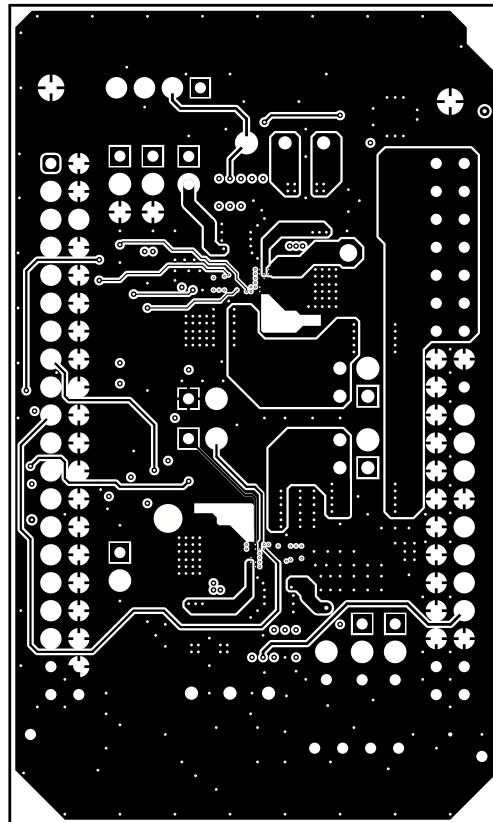
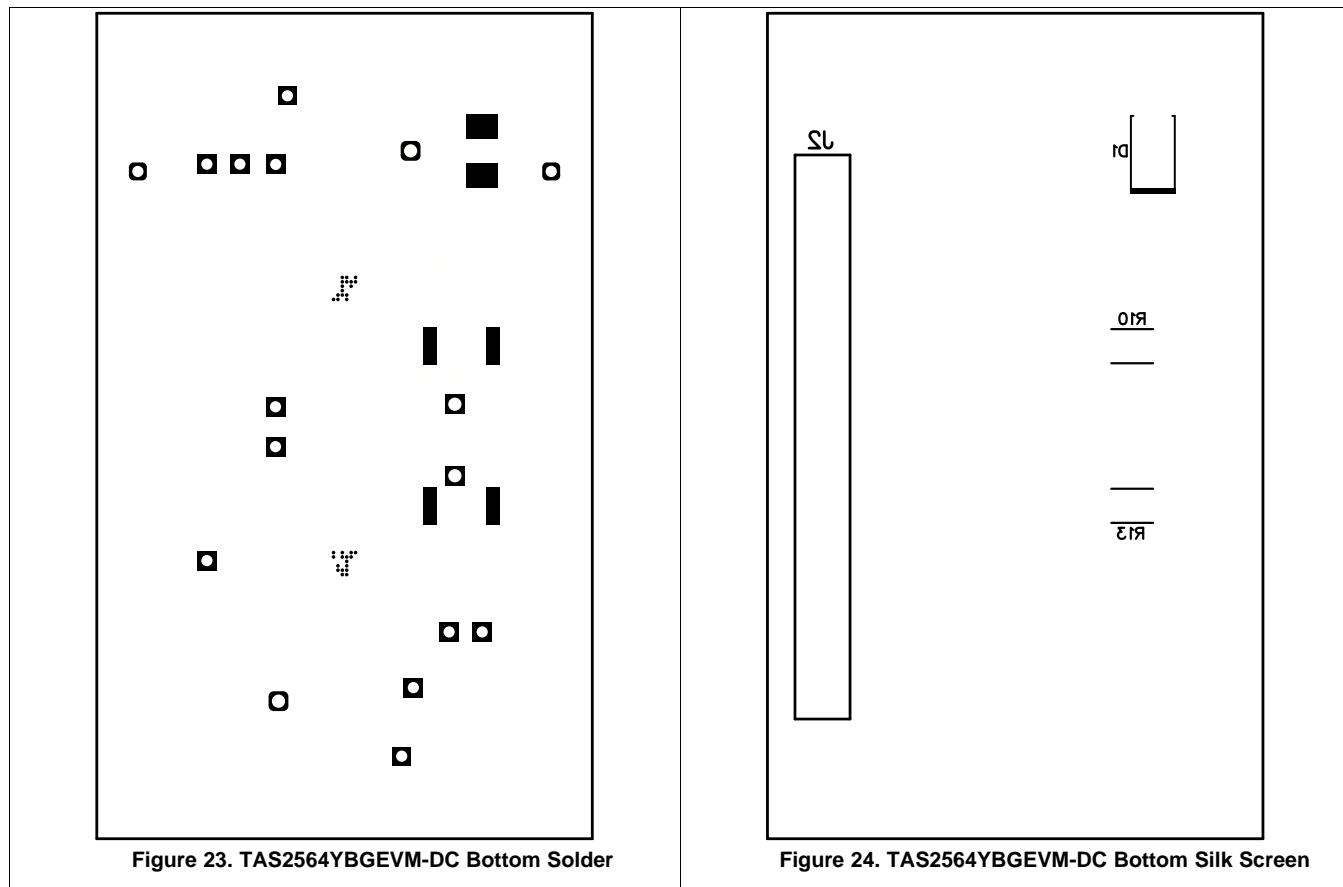


Figure 22. TAS2564YBGEVM-DC Bottom Copper



## 10 Bill of Materials

**Table 4. Bill of Materials**

Designator	Value	Description	PackageReference	PartNumber	Manufacturer	Alternate PartNumber	Alternate Manufacturer
!PCB1		Printed Circuit Board		AMPS043	Any		
C1, C2, C6, C10, C13, C14, C18, C22	10uF	CAP, CERM, 10 uF, 35 V, +/- 10%, X7R, AEC-Q200 Grade 1, 1206_190	1206_190	CGA5L1X7R1 V106K160AC	TDK		
C4, C16	4.7uF	CAP, CERM, 4.7 uF, 10 V, +/- 10%, X5R, 0603	0603	CGB3B1X5R1 A475K055AC	TDK		
C9, C21	1uF	CAP, CERM, 1 uF, 16 V, +/- 20%, X7R, 0603	0603	CL10B105MO 8NNWC	Samsung		
C12, C24, C29, C30	0.1uF	CAP, CERM, 0.1 uF, 25 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0402	0402	CGA2B3X7R1 E104K050BB	TDK		

Table 4. Bill of Materials (continued)

Designator	Value	Description	PackageReference	PartNumber	Manufacturer	Alternate PartNumber	Alternate Manufacturer
J1, J2		Receptacle, 2.54 mm, 20 x 2, Gold, TH	Receptacle, 2.54 1mm, 20 x 2, TH	SSQ-120-23-G-D	Samtec		
J3, J4, J6, J7, J14, J15, J16		Header, 100 mil, 2 x 1, Gold, TH	Sullins 100 mil, 1 x 2, 230 mil above insulator	PBC02SAAN	Sullins Connector Solutions		
J5, J8		Conn Term Block, 2POS, 3.81 mm, TH	2POS Terminal Block	1727010	Phoenix Contact		
J9		Header, 2.54 mm, 2 x 2, Gold, TH	Header, 2.5 4 mm, 2 x 2 TH	PBC02DAAN	Sullins Connector Solutions		
J10, J11, J12, J13		Header, 10 0mil, 3 x 1, Gold, TH	PBC03SAAN	PBC03SAAN	Sullins Connector Solutions		
L1, L2	1uH	Inductor, Shielded, Metal Composite, 1 uH, 3.3 A, 0.04 ohm, SMD	2.5 x 1.2 x 2 mm	DFE252012F-1R0M=P2	MuRata Toko		
R1, R2, R8, R9	0	RES, 0, 5%, 0.125 W, 0805	0805	RC0805JR-070RL	Yageo America		
R3, R6	10.0k	RES, 10.0 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	RMCF0402FT 10K0	Stackpole Electronics Inc		
R4, R5, R11, R12	0	RES, 0, 5%, 0.063 W, 0402	0402	ERJ-2GE0R00X	Panasonic		
R7	0	RES, 0, 5%, 0.1 W, 0603	0603	ERJ-3GEY0R00V	Panasonic		
SH-J1, SH-J2, SH-J3, SH-J4, SH-J5, SH-J6, SH-J7, SH-J8, SH-J9, SH-J10, SH-J11	1x2	Shunt, 100 mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec	969102-0000-DA	3M
TP1, TP11		Test Point, Compact, Red, TH	Red Compact Testpoint	5005	Keystone		
TP2, TP12, TP13, TP14		Test Point, Miniature, Black, TH	Black Miniature Testpoint	5001	Keystone		
TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10		Test Point, Miniature, Orange, TH	Orange Miniature Testpoint	5003	Keystone		
U1, U2		6W Boosted Class-D Audio Amplifier with IV-sense, YBG0036-C02 (DSBGA-36)	YBG0036-C02	TAS2564YBG R	Texas Instruments	TAS2564YBG T	Texas Instruments
U3		EEPROM, 512 KBIT, 400 KHZ, 8TSSOP	TSSOP-8	24FC512-I/ST	Microchip		

**Table 4. Bill of Materials (continued)**

Designator	Value	Description	PackageReference	PartNumber	Manufacturer	Alternate PartNumber	Alternate Manufacturer
U4		Single Bus Buffer Gate With 3-State Outputs, DCK0005A, LARGE T&R	DCK0005A	SN74LVC1G125DCKR	Texas Instruments		
C3, C15	0.1uF	CAP, CERM, 0.1 $\mu$ F, 25 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0402	0402	CGA2B3X7R1E104K050BB	TDK		
C5, C7, C8, C11, C17, C19, C20, C23	0.01uF	CAP, CERM, 0.01 $\mu$ F, 25 V, +/- 10%, X7R, 0402	0402	GCM155R71E103KA37D	MuRata		
C25, C26, C27, C28	1uF	CAP, CERM, 1 $\mu$ F, 16 V, +/- 20%, X7R, 0603	0603	CL10B105MO8NNWC	Samsung		
FID1, FID2, FID3, FID4, FID5, FID6		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A		
L3, L4	1uH	Inductor, 1 uH, 7 A, 0.014 ohm, SMD	4.15 x 4 mm	PCMB053T-1R0MS	Susumu Co Ltd		
R10, R13	0	RES, 0, 5%, 1 W, 2512	2512	RC6432J000CS	Samsung		

## STANDARD TERMS FOR EVALUATION MODULES

1. *Delivery:* TI delivers TI evaluation boards, kits, or modules, including any accompanying demonstration software, components, and/or documentation which may be provided together or separately (collectively, an "EVM" or "EVMs") to the User ("User") in accordance with the terms set forth herein. User's acceptance of the EVM is expressly subject to the following terms.
  - 1.1 EVMs are intended solely for product or software developers for use in a research and development setting to facilitate feasibility evaluation, experimentation, or scientific analysis of TI semiconductors products. EVMs have no direct function and are not finished products. EVMs shall not be directly or indirectly assembled as a part or subassembly in any finished product. For clarification, any software or software tools provided with the EVM ("Software") shall not be subject to the terms and conditions set forth herein but rather shall be subject to the applicable terms that accompany such Software
  - 1.2 EVMs are not intended for consumer or household use. EVMs may not be sold, sublicensed, leased, rented, loaned, assigned, or otherwise distributed for commercial purposes by Users, in whole or in part, or used in any finished product or production system.
- 2 *Limited Warranty and Related Remedies/Disclaimers:*
  - 2.1 These terms do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.
  - 2.2 TI warrants that the TI EVM will conform to TI's published specifications for ninety (90) days after the date TI delivers such EVM to User. Notwithstanding the foregoing, TI shall not be liable for a nonconforming EVM if (a) the nonconformity was caused by neglect, misuse or mistreatment by an entity other than TI, including improper installation or testing, or for any EVMs that have been altered or modified in any way by an entity other than TI, (b) the nonconformity resulted from User's design, specifications or instructions for such EVMs or improper system design, or (c) User has not paid on time. Testing and other quality control techniques are used to the extent TI deems necessary. TI does not test all parameters of each EVM. User's claims against TI under this Section 2 are void if User fails to notify TI of any apparent defects in the EVMs within ten (10) business days after delivery, or of any hidden defects with ten (10) business days after the defect has been detected.
  - 2.3 TI's sole liability shall be at its option to repair or replace EVMs that fail to conform to the warranty set forth above, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

### **WARNING**

**Evaluation Kits are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems.**

**User shall operate the Evaluation Kit within TI's recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI's recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI's instructions for electrical ratings of interface circuits such as input, output and electrical loads.**

**NOTE:**

EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGRADATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.

---

### 3 Regulatory Notices:

#### 3.1 United States

##### 3.1.1 Notice applicable to EVMs not FCC-Approved:

**FCC NOTICE:** This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

##### 3.1.2 For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:

#### CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### FCC Interference Statement for Class A EVM devices

*NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.*

#### FCC Interference Statement for Class B EVM devices

*NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:*

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

#### 3.2 Canada

##### 3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

#### Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

#### Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

#### Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

#### Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

#### 3.3 Japan

3.3.1 *Notice for EVMs delivered in Japan:* Please see [http://www.tij.co.jp/lsts/ti\\_ja/general/eStore/notice\\_01.page](http://www.tij.co.jp/lsts/ti_ja/general/eStore/notice_01.page) 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。

<https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-delivered-in-japan.html>

3.3.2 *Notice for Users of EVMs Considered "Radio Frequency Products" in Japan:* EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

【無線電波を送信する製品の開発キットをお使いになる際の注意事項】開発キットの中には技術基準適合証明を受けていないものがあります。技術適合証明を受けていないものご使用に際しては、電波法遵守のため、以下のいずれかの措置を取っていただく必要がありますのでご注意ください。

1. 電波法施行規則第6条第1項第1号に基づく平成18年3月28日総務省告示第173号で定められた電波暗室等の試験設備でご使用いただく。
2. 実験局の免許を取得後ご使用いただく。
3. 技術基準適合証明を取得後ご使用いただく。

なお、本製品は、上記の「ご使用にあたっての注意」を譲渡先、移転先に通知しない限り、譲渡、移転できないものとします。

上記を遵守頂けない場合は、電波法の罰則が適用される可能性があることをご留意ください。日本テキサス・インスツルメンツ株式会社

東京都新宿区西新宿6丁目24番1号

西新宿三井ビル

3.3.3 *Notice for EVMs for Power Line Communication:* Please see [http://www.tij.co.jp/lsts/ti\\_ja/general/eStore/notice\\_02.page](http://www.tij.co.jp/lsts/ti_ja/general/eStore/notice_02.page)  
電力線搬送波通信についての開発キットをお使いになる際の注意事項については、次のところをご覧ください。<https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-for-power-line-communication.html>

#### 3.4 European Union

3.4.1 *For EVMs subject to EU Directive 2014/30/EU (Electromagnetic Compatibility Directive):*

This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

4 *EVM Use Restrictions and Warnings:*

- 4.1 EVMS ARE NOT FOR USE IN FUNCTIONAL SAFETY AND/OR SAFETY CRITICAL EVALUATIONS, INCLUDING BUT NOT LIMITED TO EVALUATIONS OF LIFE SUPPORT APPLICATIONS.
- 4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.
- 4.3 *Safety-Related Warnings and Restrictions:*
  - 4.3.1 User shall operate the EVM within TI's recommended specifications and environmental considerations stated in the user guide, other available documentation provided by TI, and any other applicable requirements and employ reasonable and customary safeguards. Exceeding the specified performance ratings and specifications (including but not limited to input and output voltage, current, power, and environmental ranges) for the EVM may cause personal injury or death, or property damage. If there are questions concerning performance ratings and specifications, User should contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may also result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM user 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, even with the inputs and outputs kept within the specified allowable ranges, some circuit components may have elevated case temperatures. These components include but are not limited to linear regulators, switching transistors, pass transistors, current sense resistors, and heat sinks, which can be identified using the information in the associated documentation. When working with the EVM, please be aware that the EVM may become very warm.
  - 4.3.2 EVMs are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems. User assumes all responsibility and liability for proper and safe handling and use of the EVM by User or its employees, affiliates, contractors or designees. User assumes all responsibility and liability to ensure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard. User assumes all responsibility and liability for any improper or unsafe handling or use of the EVM by User or its employees, affiliates, contractors or designees.
- 4.4 User assumes all responsibility and liability to determine whether the EVM is subject to any applicable international, federal, state, or local laws and regulations related to User's handling and use of the EVM and, if applicable, User assumes all responsibility and liability for compliance in all respects with such laws and regulations. User assumes all responsibility and liability for proper disposal and recycling of the EVM consistent with all applicable international, federal, state, and local requirements.

5. *Accuracy of Information:* To the extent TI provides information on the availability and function of EVMs, TI attempts to be as accurate as possible. However, TI does not warrant the accuracy of EVM descriptions, EVM availability or other information on its websites as accurate, complete, reliable, current, or error-free.

6. *Disclaimers:*

- 6.1 EXCEPT AS SET FORTH ABOVE, EVMS AND ANY MATERIALS PROVIDED WITH THE EVM (INCLUDING, BUT NOT LIMITED TO, REFERENCE DESIGNS AND THE DESIGN OF THE EVM ITSELF) ARE PROVIDED "AS IS" AND "WITH ALL FAULTS." TI DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, REGARDING SUCH ITEMS, INCLUDING BUT NOT LIMITED TO ANY EPIDEMIC FAILURE WARRANTY OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF ANY THIRD PARTY PATENTS, COPYRIGHTS, TRADE SECRETS OR OTHER INTELLECTUAL PROPERTY RIGHTS.
- 6.2 EXCEPT FOR THE LIMITED RIGHT TO USE THE EVM SET FORTH HEREIN, NOTHING IN THESE TERMS SHALL BE CONSTRUED AS GRANTING OR CONFERRING ANY RIGHTS BY LICENSE, PATENT, OR ANY OTHER INDUSTRIAL OR INTELLECTUAL PROPERTY RIGHT OF TI, ITS SUPPLIERS/LICENSORS OR ANY OTHER THIRD PARTY, TO USE THE EVM IN ANY FINISHED END-USER OR READY-TO-USE FINAL PRODUCT, OR FOR ANY INVENTION, DISCOVERY OR IMPROVEMENT, REGARDLESS OF WHEN MADE, CONCEIVED OR ACQUIRED.

7. *USER'S INDEMNITY OBLIGATIONS AND REPRESENTATIONS.* USER WILL DEFEND, INDEMNIFY AND HOLD TI, ITS LICENSORS AND THEIR REPRESENTATIVES HARMLESS FROM AND AGAINST ANY AND ALL CLAIMS, DAMAGES, LOSSES, EXPENSES, COSTS AND LIABILITIES (COLLECTIVELY, "CLAIMS") ARISING OUT OF OR IN CONNECTION WITH ANY HANDLING OR USE OF THE EVM THAT IS NOT IN ACCORDANCE WITH THESE TERMS. THIS OBLIGATION SHALL APPLY WHETHER CLAIMS ARISE UNDER STATUTE, REGULATION, OR THE LAW OF TORT, CONTRACT OR ANY OTHER LEGAL THEORY, AND EVEN IF THE EVM FAILS TO PERFORM AS DESCRIBED OR EXPECTED.

8. *Limitations on Damages and Liability:*

8.1 *General Limitations.* IN NO EVENT SHALL TI BE LIABLE FOR ANY SPECIAL, COLLATERAL, INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES IN CONNECTION WITH OR ARISING OUT OF THESE TERMS OR THE USE OF THE EVMS, REGARDLESS OF WHETHER TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. EXCLUDED DAMAGES INCLUDE, BUT ARE NOT LIMITED TO, COST OF REMOVAL OR REINSTALLATION, ANCILLARY COSTS TO THE PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, RETESTING, OUTSIDE COMPUTER TIME, LABOR COSTS, LOSS OF GOODWILL, LOSS OF PROFITS, LOSS OF SAVINGS, LOSS OF USE, LOSS OF DATA, OR BUSINESS INTERRUPTION. NO CLAIM, SUIT OR ACTION SHALL BE BROUGHT AGAINST TI MORE THAN TWELVE (12) MONTHS AFTER THE EVENT THAT GAVE RISE TO THE CAUSE OF ACTION HAS OCCURRED.

8.2 *Specific Limitations.* IN NO EVENT SHALL TI'S AGGREGATE LIABILITY FROM ANY USE OF AN EVM PROVIDED HEREUNDER, INCLUDING FROM ANY WARRANTY, INDEMNITY OR OTHER OBLIGATION ARISING OUT OF OR IN CONNECTION WITH THESE TERMS, EXCEED THE TOTAL AMOUNT PAID TO TI BY USER FOR THE PARTICULAR EVM(S) AT ISSUE DURING THE PRIOR TWELVE (12) MONTHS WITH RESPECT TO WHICH LOSSES OR DAMAGES ARE CLAIMED. THE EXISTENCE OF MORE THAN ONE CLAIM SHALL NOT ENLARGE OR EXTEND THIS LIMIT.

9. *Return Policy.* Except as otherwise provided, TI does not offer any refunds, returns, or exchanges. Furthermore, no return of EVM(s) will be accepted if the package has been opened and no return of the EVM(s) will be accepted if they are damaged or otherwise not in a resalable condition. If User feels it has been incorrectly charged for the EVM(s) it ordered or that delivery violates the applicable order, User should contact TI. All refunds will be made in full within thirty (30) working days from the return of the components(s), excluding any postage or packaging costs.

10. *Governing Law:* These terms and conditions shall be governed by and interpreted in accordance with the laws of the State of Texas, without reference to conflict-of-laws principles. User agrees that non-exclusive jurisdiction for any dispute arising out of or relating to these terms and conditions lies within courts located in the State of Texas and consents to venue in Dallas County, Texas. Notwithstanding the foregoing, any judgment may be enforced in any United States or foreign court, and TI may seek injunctive relief in any United States or foreign court.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2023, Texas Instruments Incorporated

## IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you fully indemnify TI and its representatives against any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#), [TI's General Quality Guidelines](#), or other applicable terms available either on [ti.com](#) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products. Unless TI explicitly designates a product as custom or customer-specified, TI products are standard, catalog, general purpose devices.

TI objects to and rejects any additional or different terms you may propose.

Copyright © 2026, Texas Instruments Incorporated

Last updated 10/2025