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 Ω 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 devise can share a common bus via I2S/TDM + I^2C interfaces.

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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^2C
- 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 olnly)	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

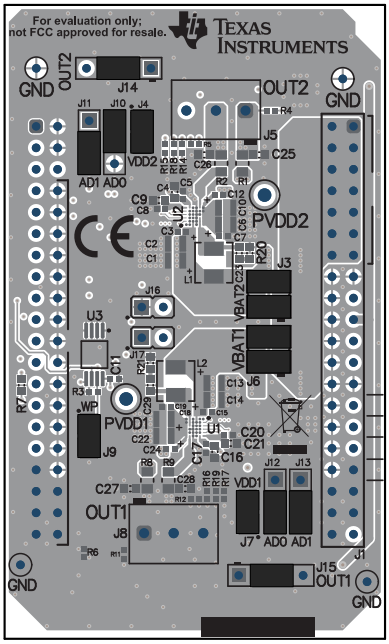

Figure 2. Default Jumper Settings

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

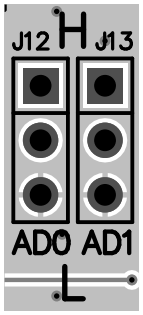

Figure 3. Address Select

TAS2564 supports 4 user configurable I^2C 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.

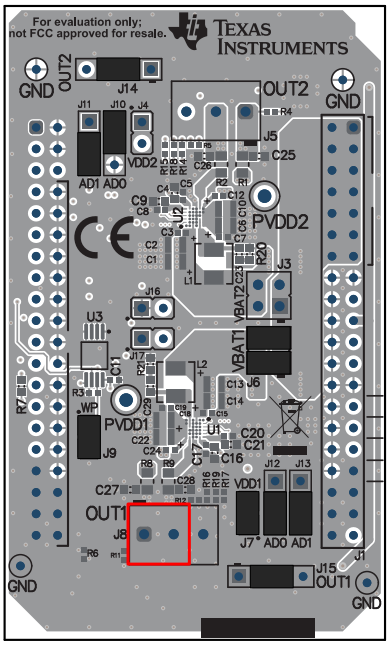

Figure 4. Mono Setup

4. Set the jumpers at J12 and J13 to the desired I²C address as shown in Section 5.2.
5. Configure PPC3-EVM-MB as described in SLEU120.
   - USB control for I²C
   - USB control for I2S
   - 3.3 V I²C
   - 3.3 V I2S
   - 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

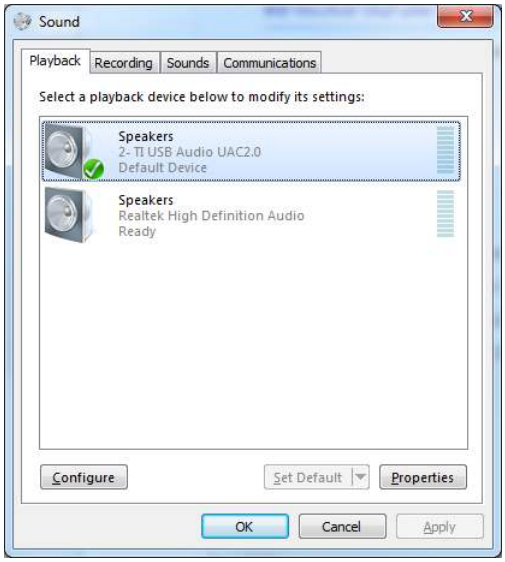

Figure 5. Windows Playback Devices

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

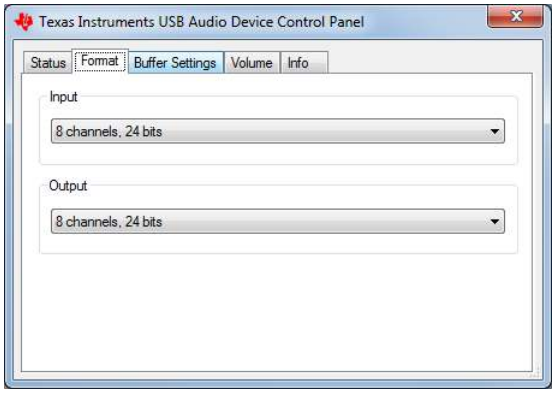

Figure 6. Texas Instruments USB Audio Device Control Panel

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

- Select Rate

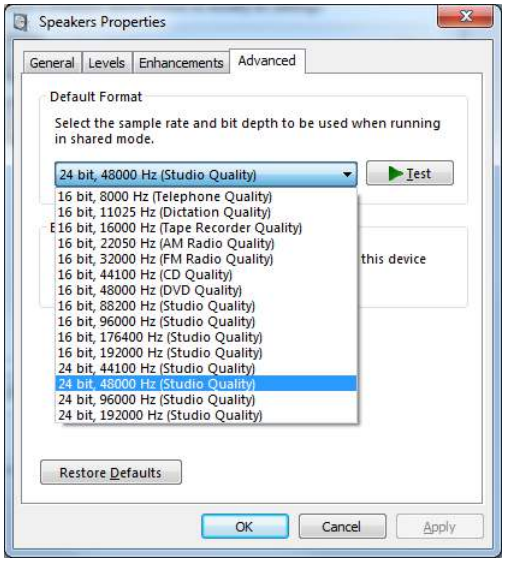

Figure 7. Windows Playback device Sample Rate

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 I²C address as shown in Section 5.2

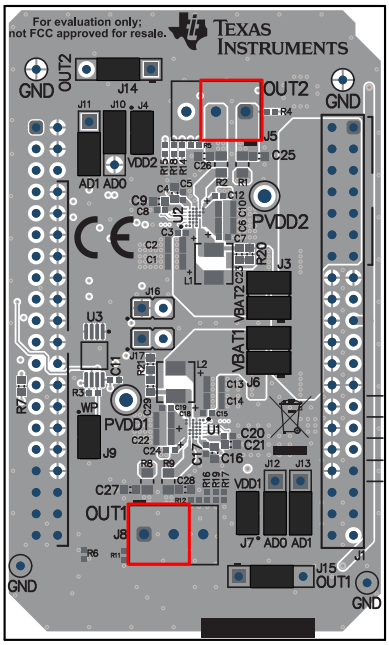

Figure 8. Stereo Setup

4. Configure PPC3-EVM-MB as described in
   - USB control for I²C

- USB control for I2S
- 3.3 V I^2C
- 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

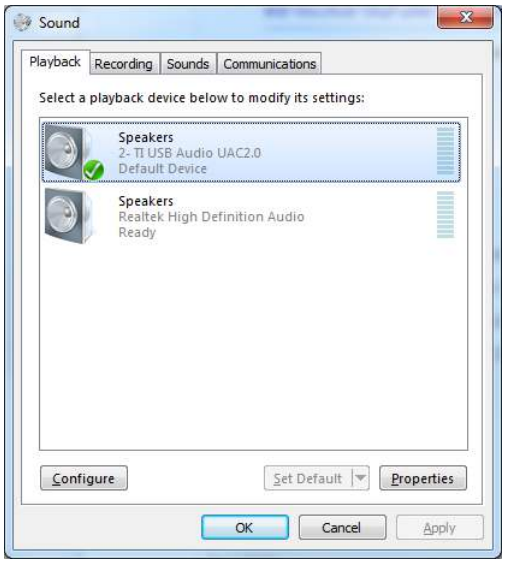

Figure 9. Windows Playback Devices

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

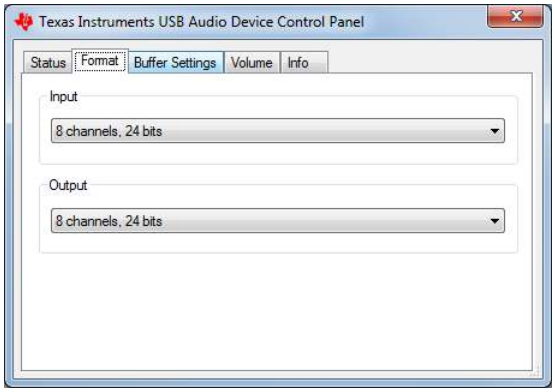

Figure 10. Texas Instruments USB Audio Device Control Panel

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

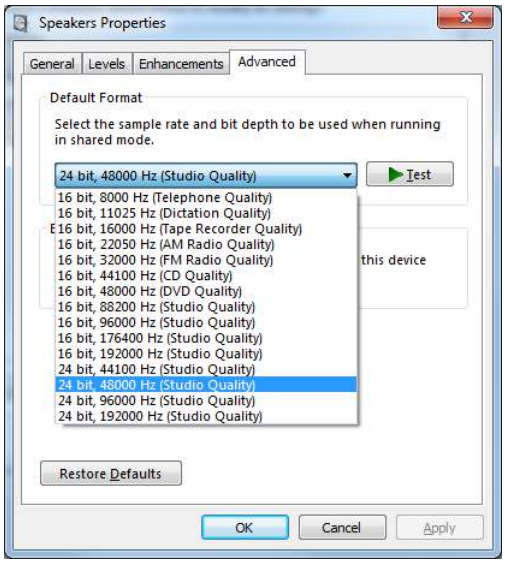

Figure 11. Windows Playback device Sample Rate

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.

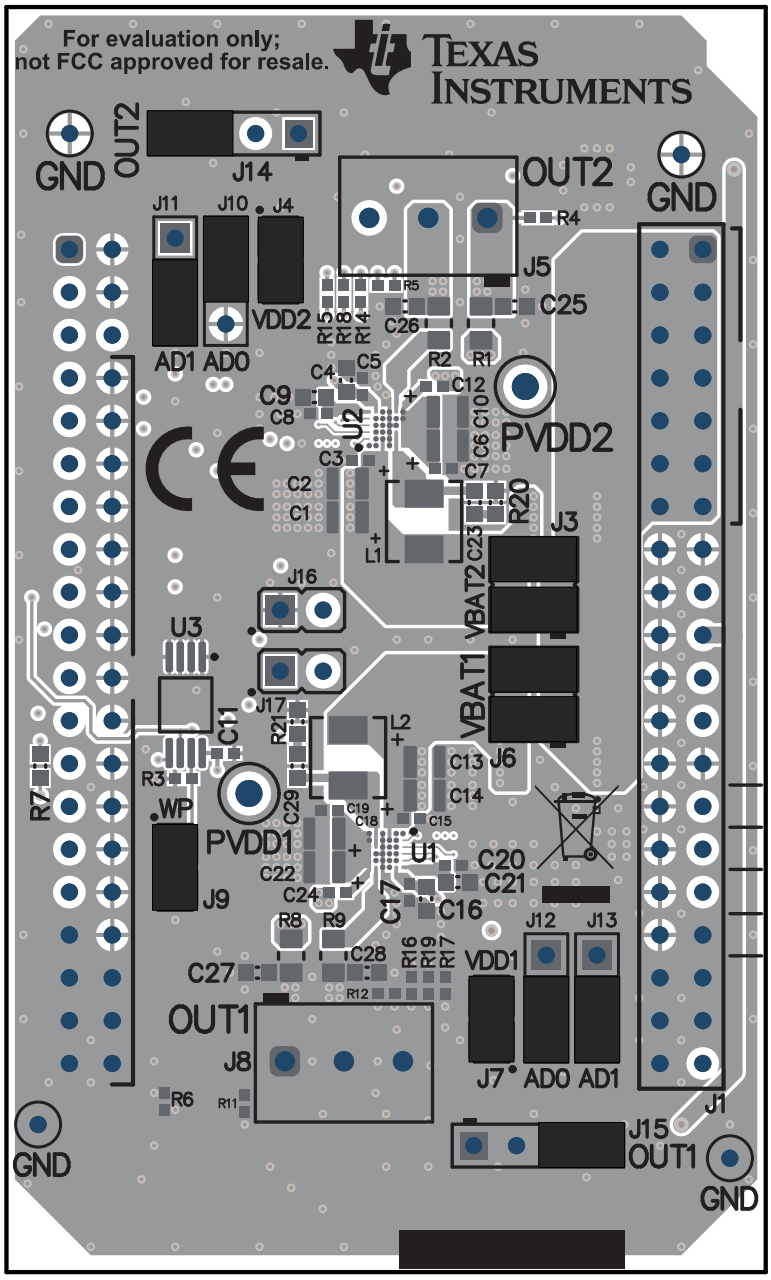

Figure 13. TAS2564 Three Wire connection

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)

- I²C Clock (SCLK)
- I²C 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

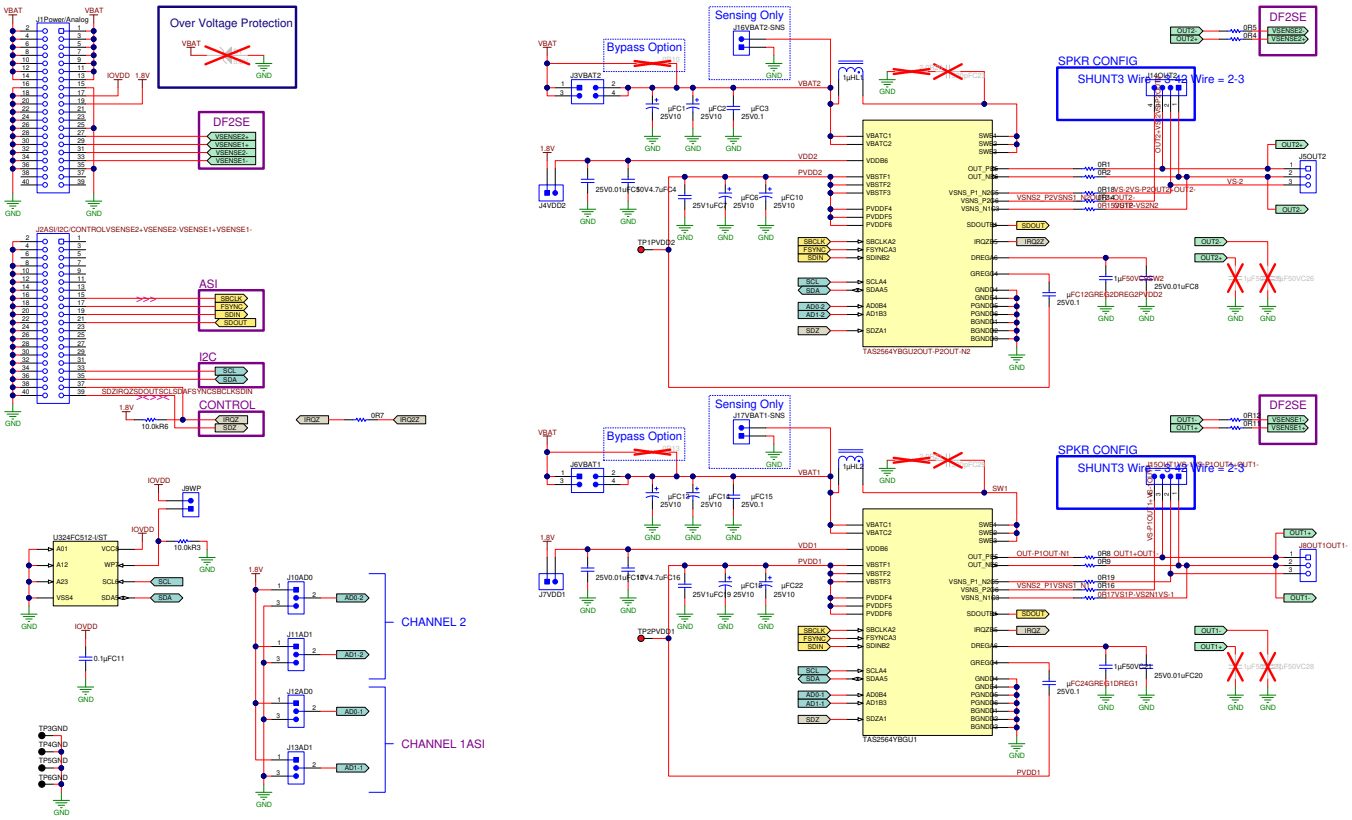

Figure 14. EVM Schematic

9 EVM Layer Plots

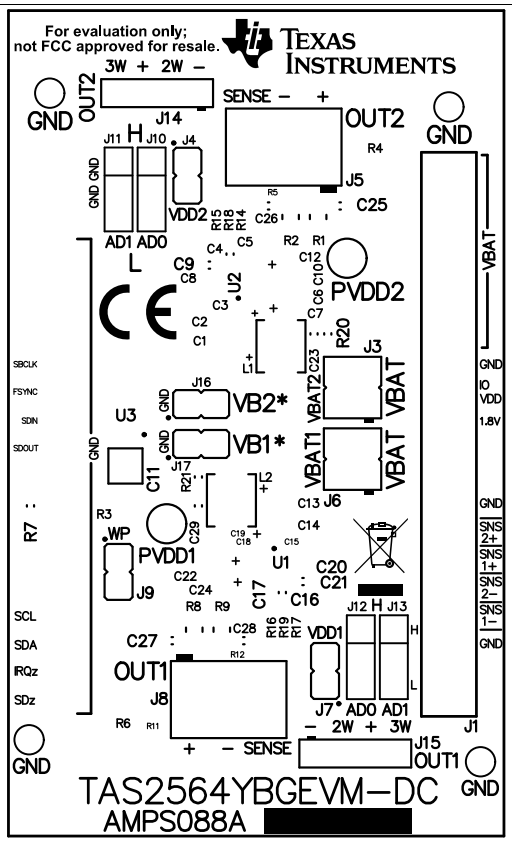

Figure 15. TAS2564YBGEVM-DC Top Silk Screen

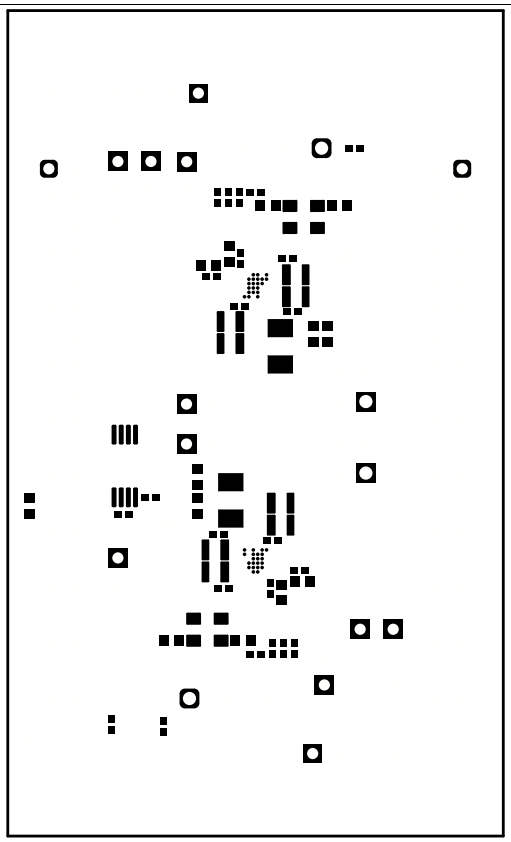

Figure 16. TAS2564YBGEVM-DC Top Solder Mask

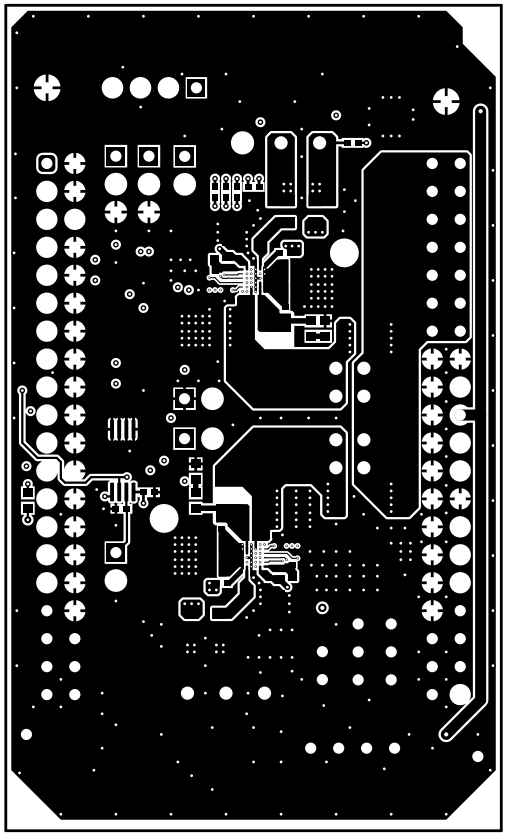

Figure 17. TAS2564YBGEVM-DC Top Copper

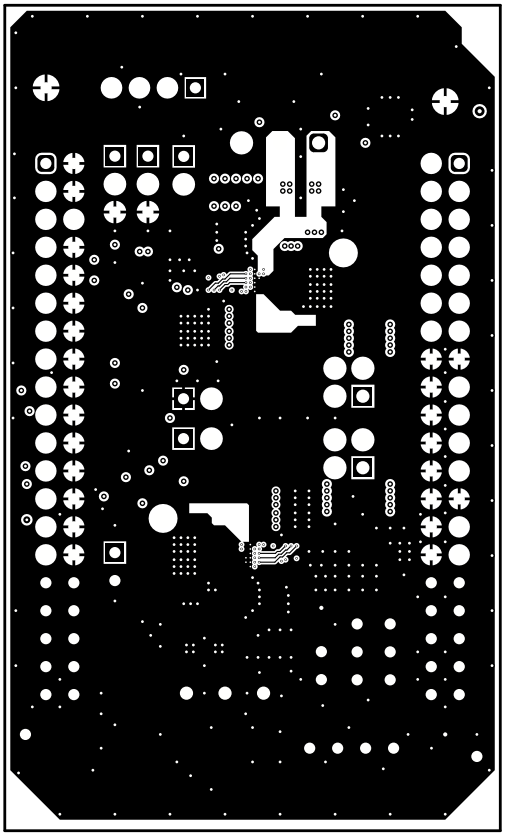

Figure 18. TAS2564YBGEVM-DC Copper Layer 2

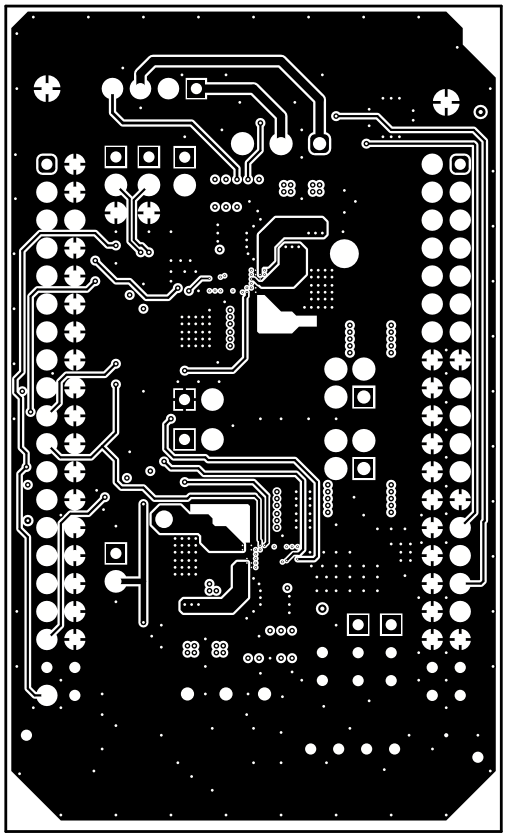

Figure 19. TAS2564YBGEVM-DC Copper Layer 3

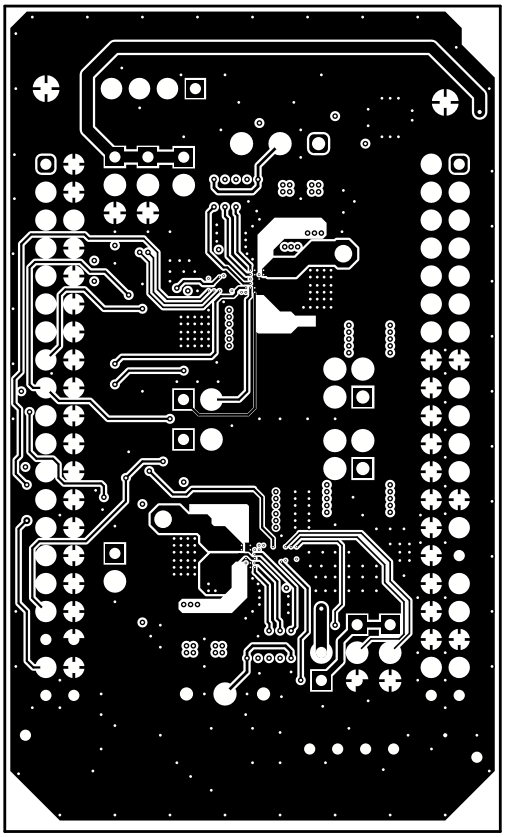

Figure 20. TAS2564YBGEVM-DC Copper Layer 4

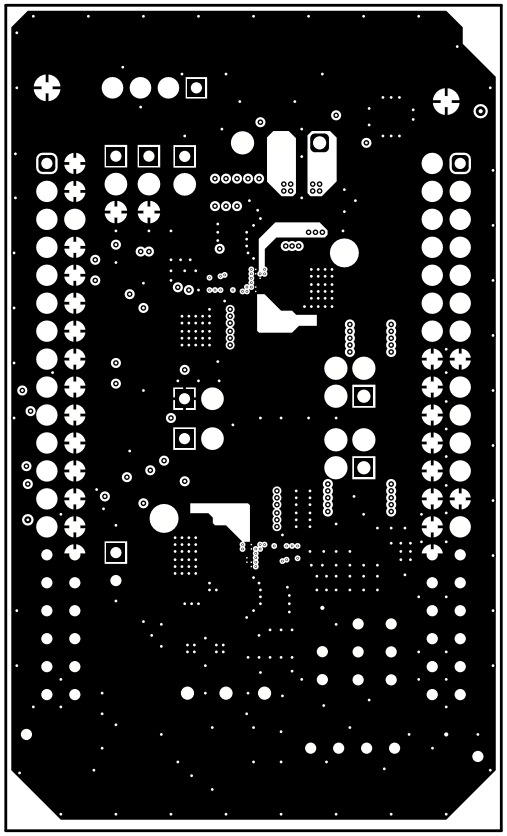

Figure 21. TAS2564YBGEVM-DC Copper Layer 5

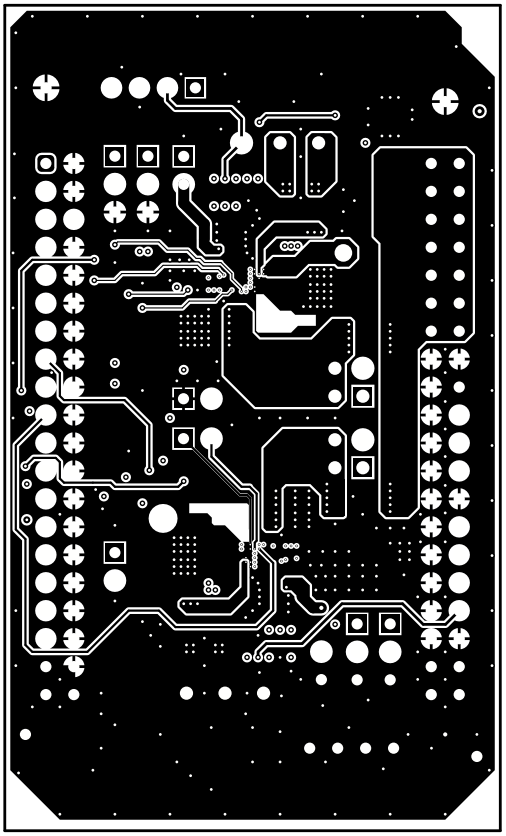

Figure 22. TAS2564YBGEVM-DC Bottom Copper

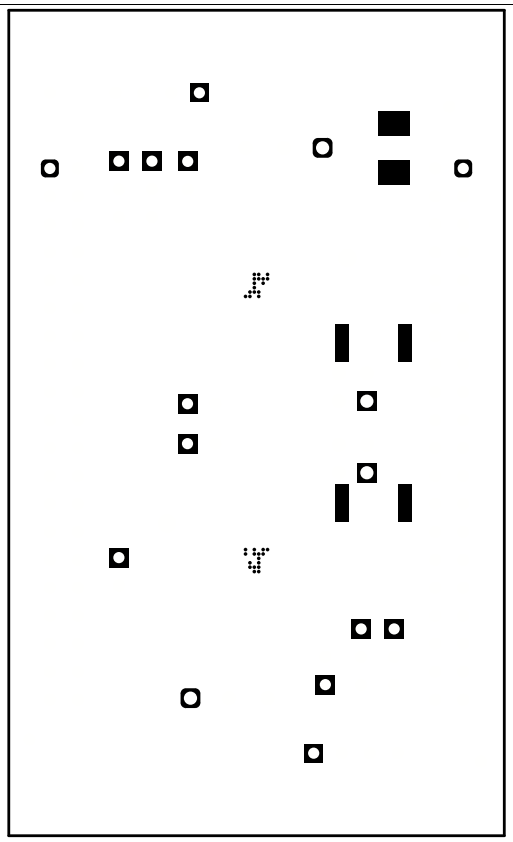

Figure 23. TAS2564YBGEVM-DC Bottom Solder

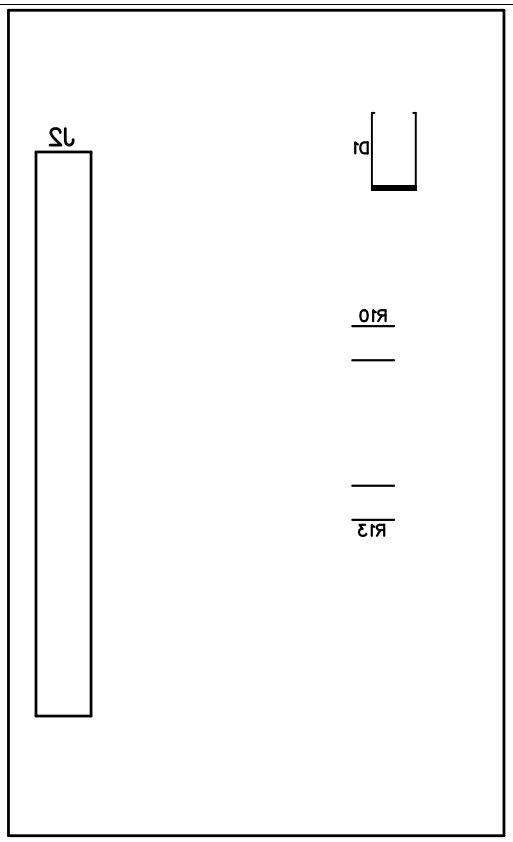

Figure 24. TAS2564YBGEVM-DC Bottom Silk Screen

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	CGA5L1X7R1V106K160AC	TDK		
C4, C16	4.7uF	CAP, CERM, 4.7 uF, 10 V, +/- 10%, X5R, 0603	0603	CGB3B1X5R1A475K055AC	TDK		
C9, C21	1uF	CAP, CERM, 1 µF, 16 V,+/- 20%, X7R, 0603	0603	CL10B105MO8NNWC	Samsung		
C12, C24, C29, C30	0.1uF	CAP, CERM, 0.1 µF, 25 V,+/- 10%, X7R, AEC-Q200 Grade 1, 0402	0402	CGA2B3X7R1E104K050BB	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	RMCF0402FT10K0	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	TAS2564YBGR	Texas Instruments	TAS2564YBGT	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 µF, 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 uF, 25 V, +/- 10%, X7R, 0402	0402	GCM155R71E103KA37D	MuRata		
C25, C26, C27, C28	1uF	CAP, CERM, 1 µF, 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		

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