

## **TAS2563YBGEVM-DC Evaluation module**

This user's guide describes the TAS2563 evaluation module (TAS2563YBGEVM-DC). The TAS2563YBGEVM-DC allows for evaluation of the TAS2563 device with end products.

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## 2 Description

The TAS2563YBGEVM-DC is designed to demonstrate the performance of TAS2563 in a stereo configuration. The design utilizes the PPC3-EVM-MB hardware to provide an interface and supply voltages to the EVM. TAS2563 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 6W of peak power into a 4 Ω load at a battery voltage of 4.2 V. Integrated speaker voltage and current sense provides real time monitoring of loud speakers. Up to four devices can share a common bus via I2S/TDM + I<sup>2</sup>C interfaces. TAS2563 also allows the user to generate speaker tuning profiles to achieve optimal sound while actively providing protection against over temperature and over excursion events.

TAS2563YBGEVM-DC used in conjunction with PPC3-EVM-MB supports evaluation and development with the TAS2563 device through the following interfaces:

- USB Interface
- Software control via PurePath™ TM 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

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

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## 3 Specifications

[Table 1](#) lists the supply, input, and output requirements for TAS2563YBG.

**Table 1. Specifications**

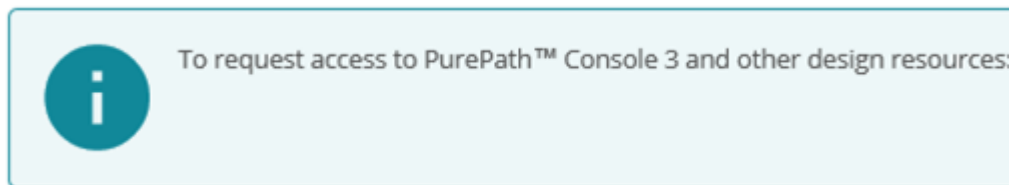
Parameter	Value
Supply Voltage - VBAT	2.7 to 5.5 V
Supply Voltage - VDD	1.65 to 1.95 V
Supply Voltage - PVDD (external mode only)	VBAT to 16 V
Input Logic	VDD
Output Power	6 W
USB, USB class-audio	Micro-USB

**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 J1 and J10 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 TAS2563 can be easily configured with PPC3 running the TAS2563 plug-in. To request access to the software first request a myTI.com account [here](#).

After creating an account, navigate to the [TAS2563 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 TAS2563 is described below in [Table 2](#) and [Figure 2](#).

### 5.1 Default Jumper Settings

**Table 2. Default Jumper Settings**

Jumper	Setting	Description
J3	Remove	Output 2 Sense
J11	Remove	Output 1 Sense
J16	Insert	EEPROM Write Protect
J18	I2C	Control Select
J17	0x9A	Ch 2 Address Select
J4	Insert	VDD 2
J5	Insert	IOVDD 2
J1	Insert	VBAT 2
J9 - Data	Remove	PDM Data 2
J9 - CLK	Remove	PDM Clock 2
J8 - 2	Insert	GPIO Select 2
J19	0x98	Ch 1 Address Select
J12	Insert	VDD 1
J13	Insert	IOVDD 1
J10	Insert	VBAT 1
J15 - Data	Remove	PDM Data 1
J15 - CLK	Remove	PDM Clock 1
J8 - 1	Insert	GPIO Select 1

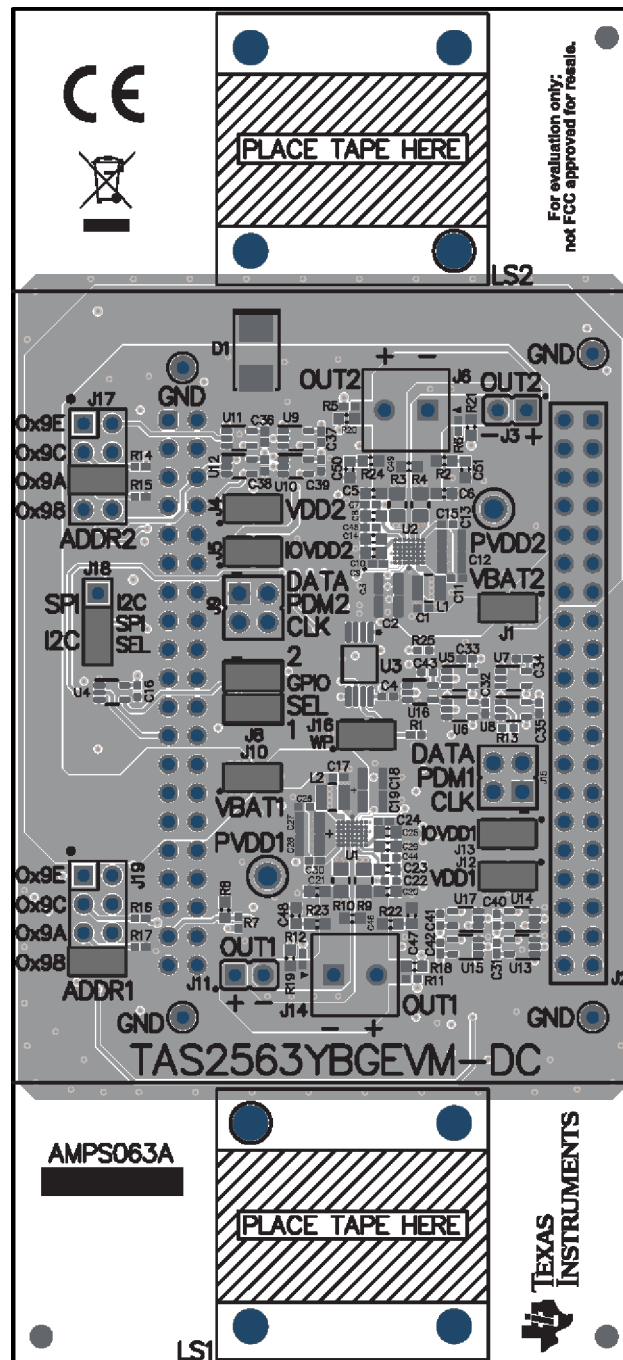


Figure 2. Default Jumper Settings

## 5.2 Mono Setup

Use the following instructions to complete a mono setup:

1. Install PPC3 with the TAS2563 plug-in.
2. Connect a speaker to J14 on the TAS2563YBGEVM-DC.
3. Remove the jumpers at J1, J4, and J5 as shown in [Figure 3](#).

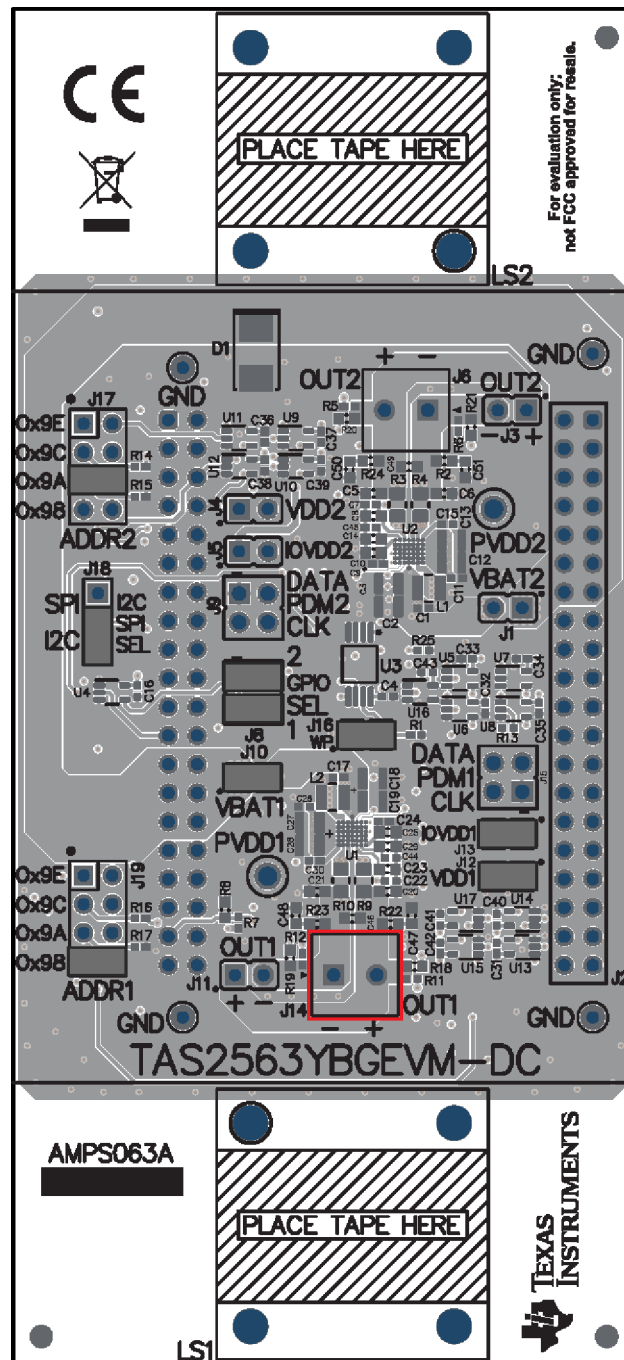
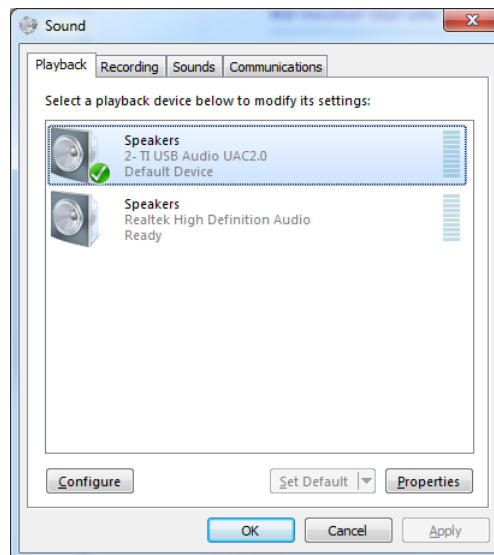


Figure 3. Mono Setup

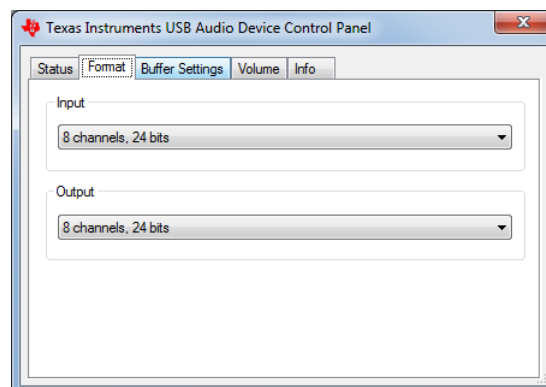
4. Set the jumper at J19 to the desired I<sup>2</sup>C address as shown in .
5. Configure PPC3-EVM-MB as described in [SLEU120](#).
  - USB control for I<sup>2</sup>C
  - USB control for I2S
  - 3.3 V I<sup>2</sup>C
  - 3.3 V I2S
  - 1.8 V IOVDD
6. Connect a 5V supply to connector J12 or J11 on PPC3-EVM-MB

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



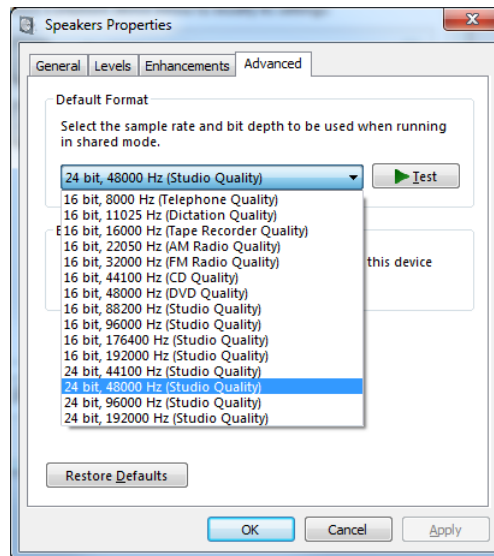
**Figure 4. Windows Playback Devices**

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



**Figure 5. 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 6. Windows Playback device Sample Rate**

11. Configure the device using the TAS2563 PPC3 Plug-in

### 5.3 Stereo Setup

Use the following instructions to complete a stereo setup:

1. Install PPC3 with the TAS2563 plug-in
2. Connect a speaker to both J14 and J6 on the TAS2563YBGEVM-DC
3. Set the jumpers at J19 and J17 to the unique I<sup>2</sup>C address as shown in

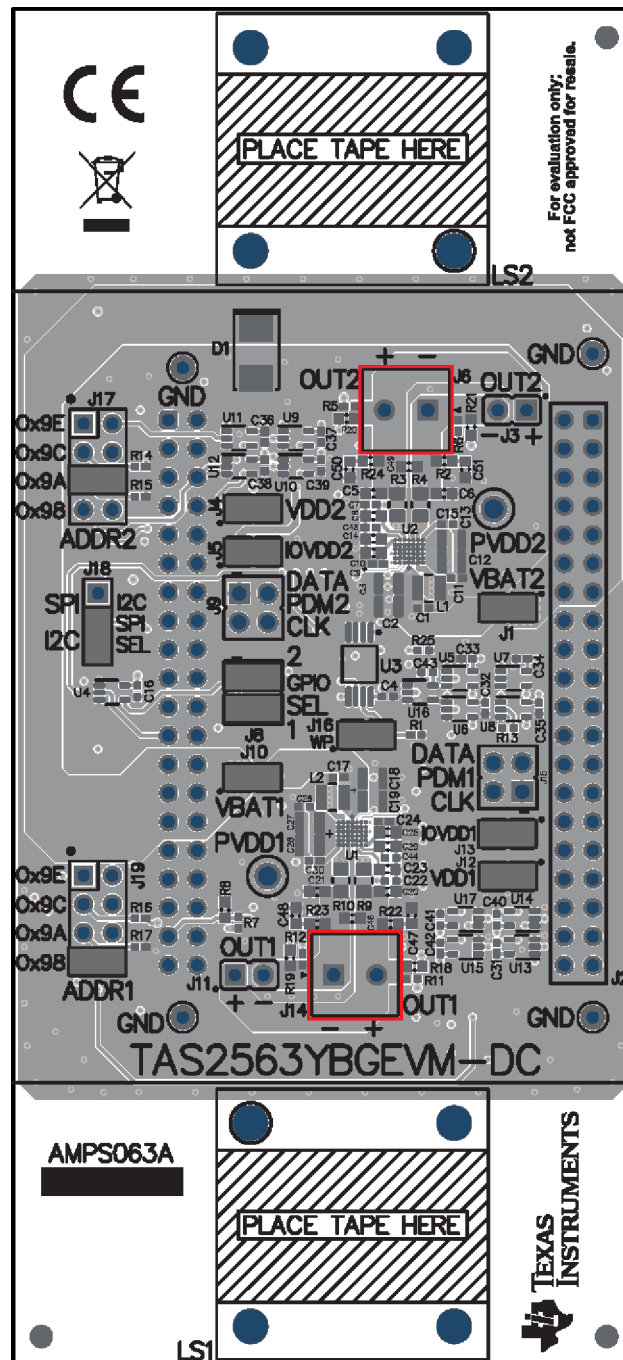
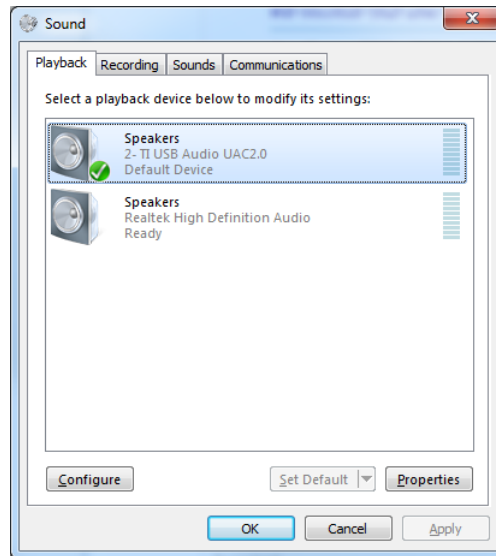


Figure 7. Stereo Setup

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 5V supply to connector J12 or J11 on PPC3-EVM-MB
6. Connect a Micro USB Cable from PC to PPC3-EVM-MB

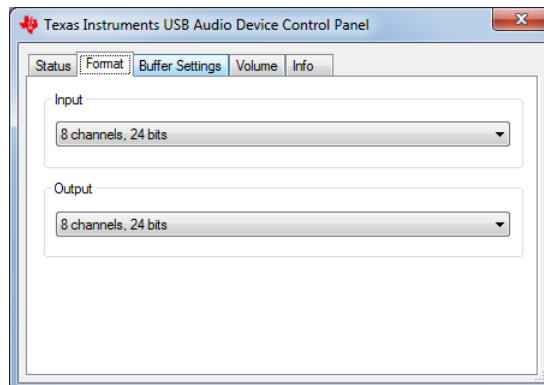


7. Verify that TI USB Audio UAC2.0 is the default playback device by opening the sound dialog from the Windows Control Panel



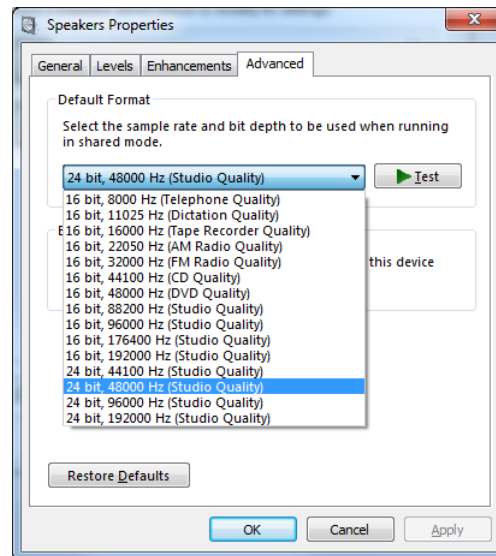
**Figure 8. Windows Playback Devices**

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



**Figure 9. 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 10. Windows Playback device Sample Rate**

10. Configure the device using the TAS2563 PPC3 Plug-in

## 6 Digital Audio Interfaces

Select the various digital audio interfaces on the TAS2563YBGEVM-DC 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 TAS2563 (for example, current and voltage sense data)
- I2S Data in (SDIN) to the TAS2563
- 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.

7 EVM Schematics

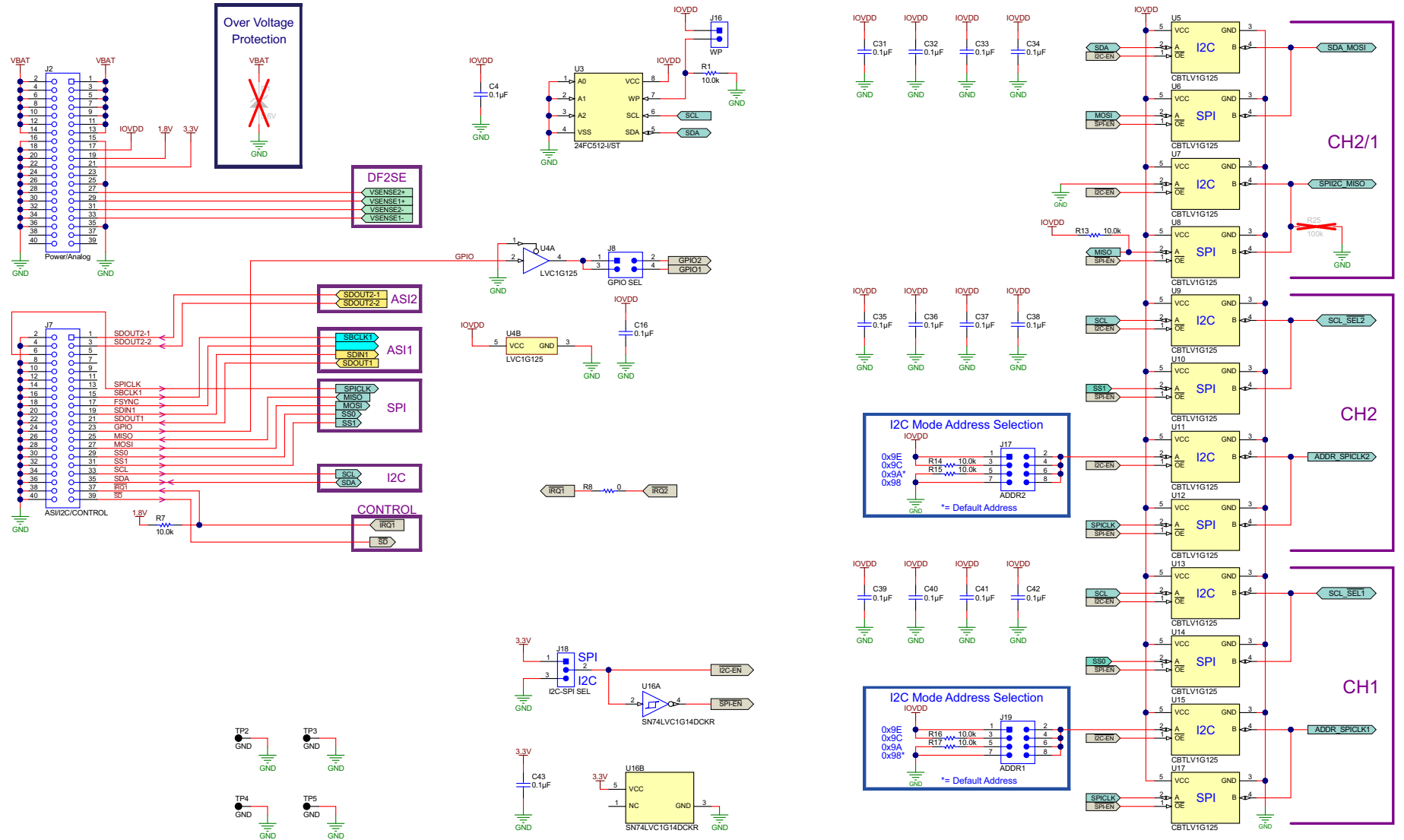


Figure 11. Mother Board Connections

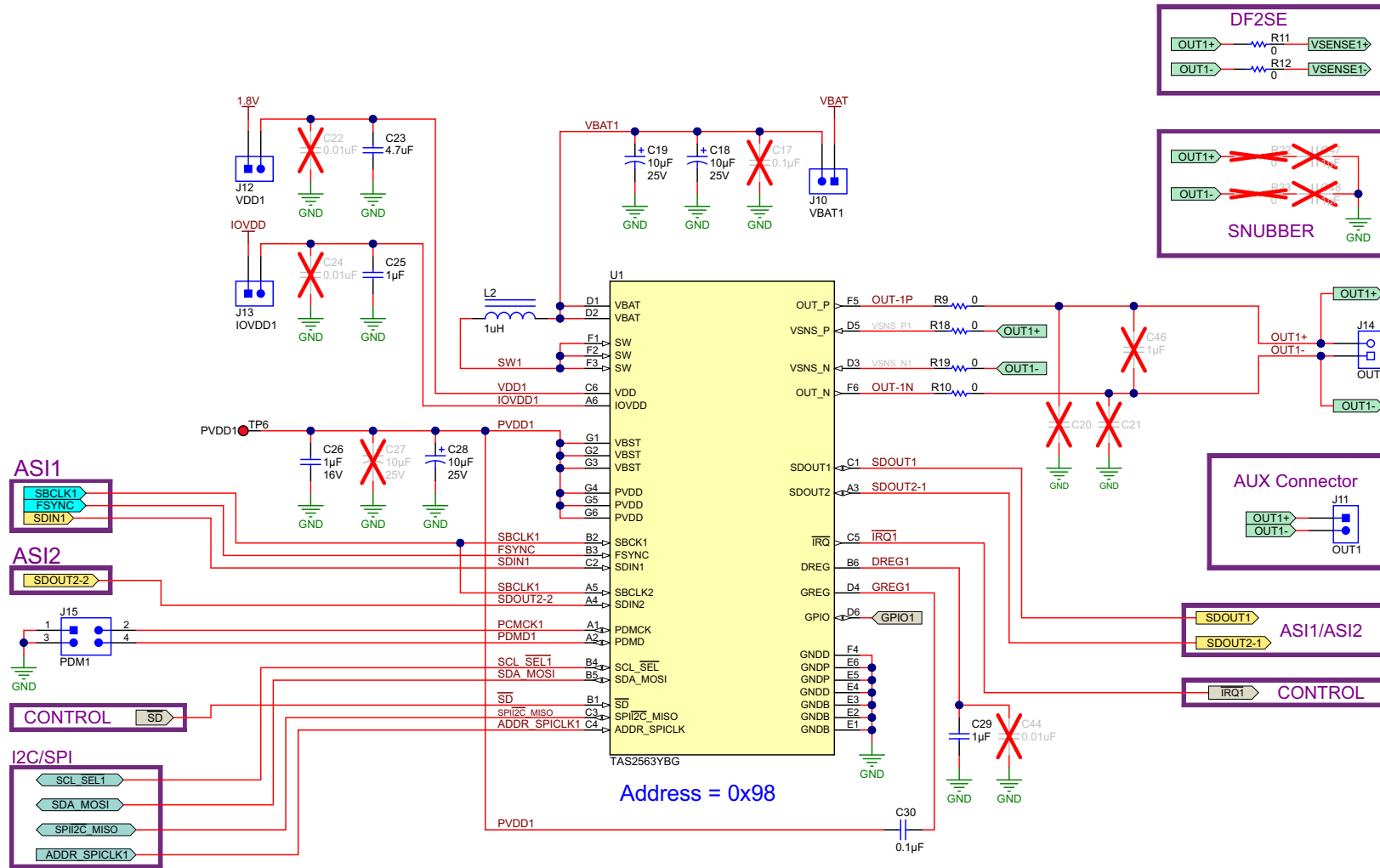


Figure 12. Channel 1

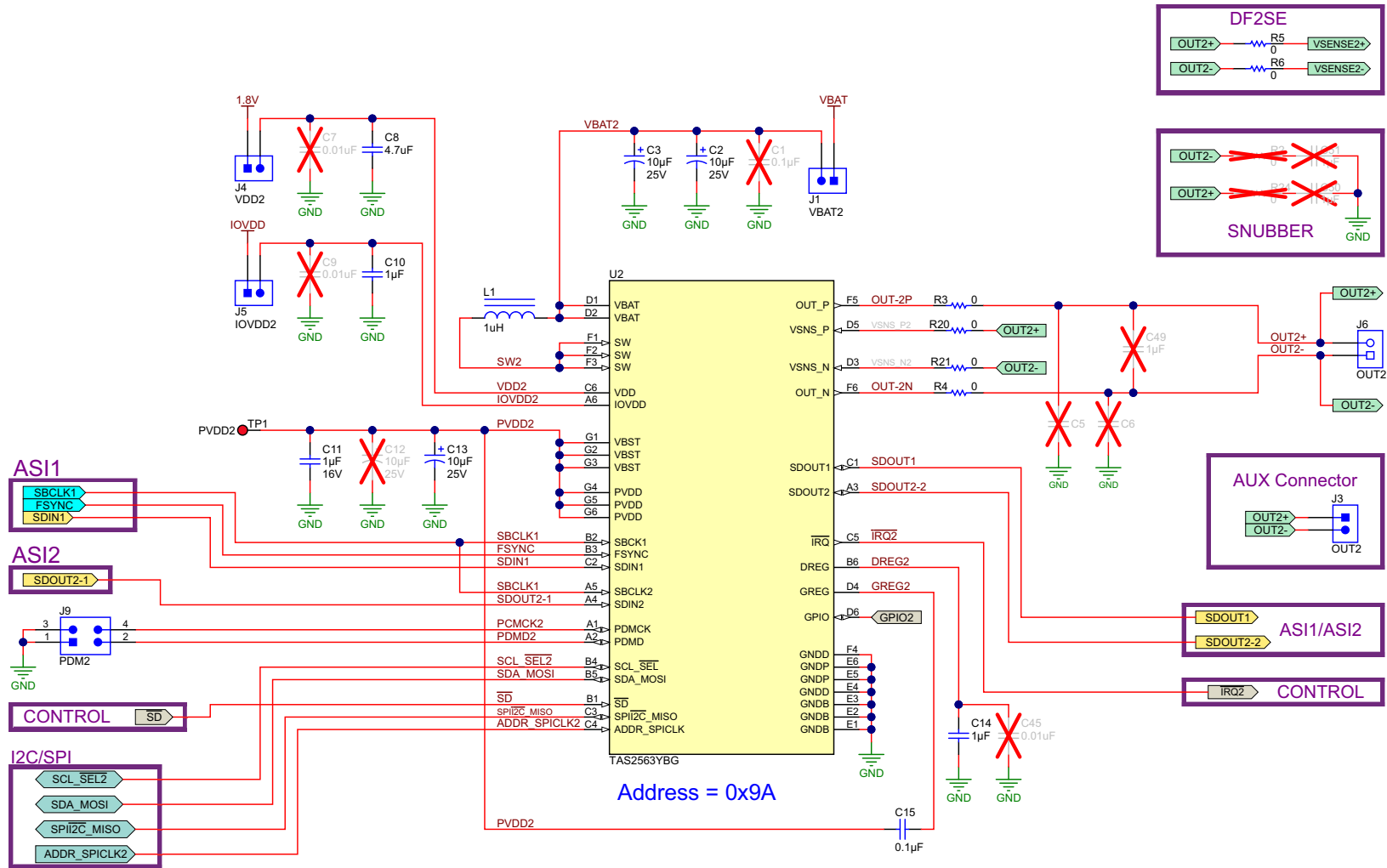


Figure 13. Channel 2

8 EVM Layer Plots

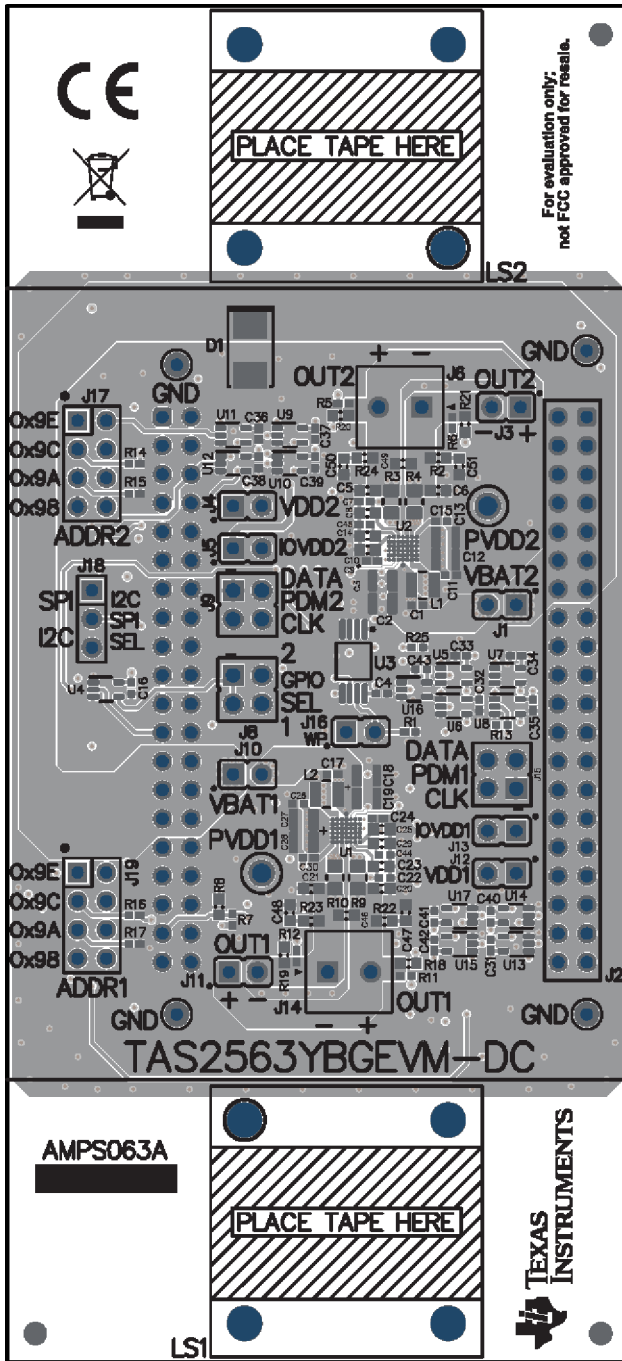


Figure 14. TAS2563YBGEVM-DC Top Assembly

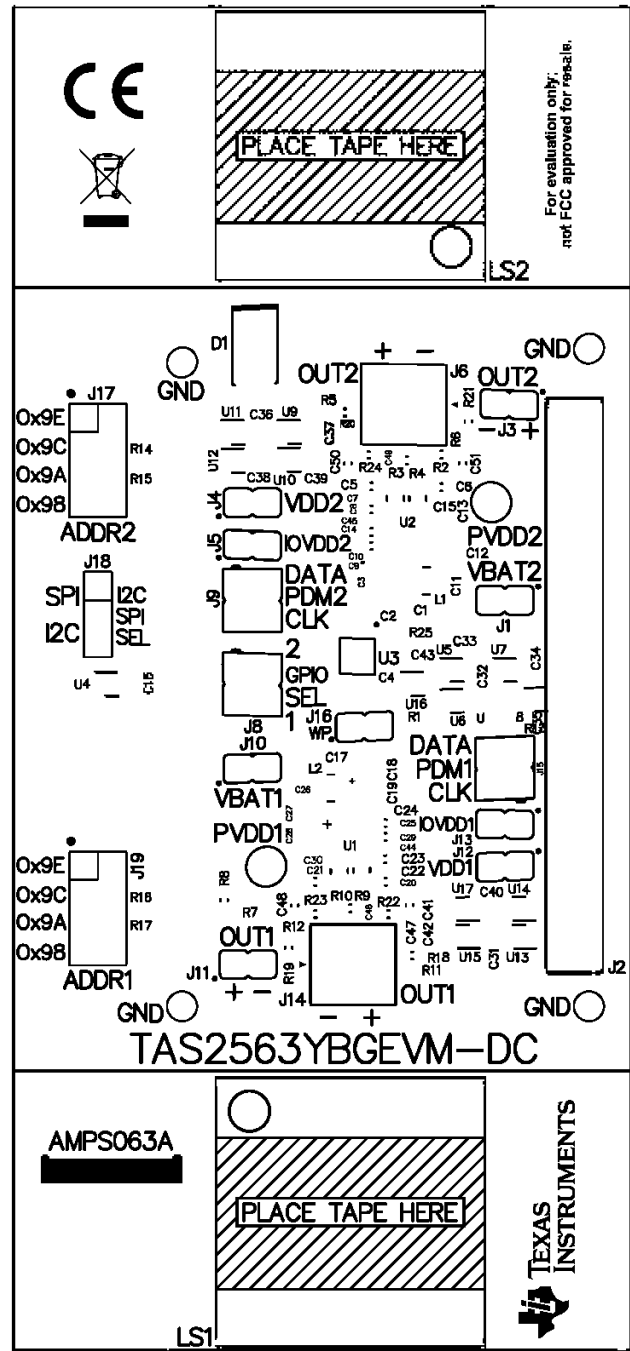


Figure 15. TAS2563YBGEVM-DC Top Silk Screen

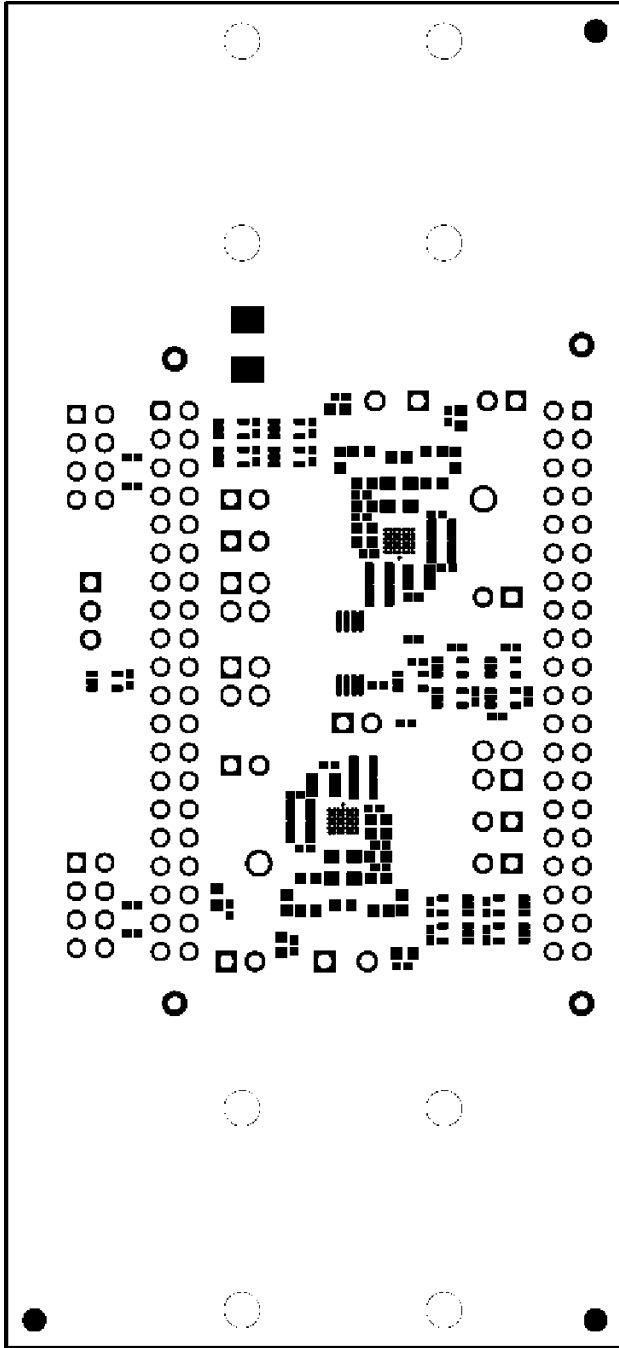


Figure 16. TAS2563YBGEVM-DC Top Solder Mask

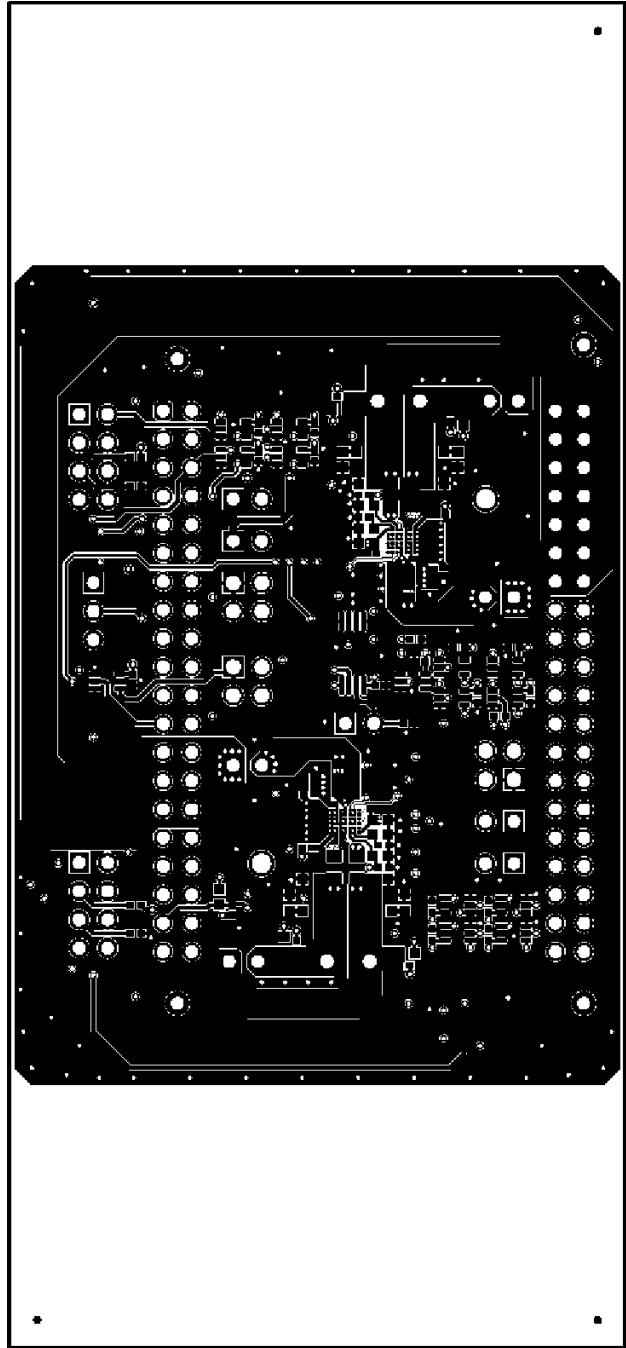


Figure 17. TAS2563YBGEVM-DC Top Copper

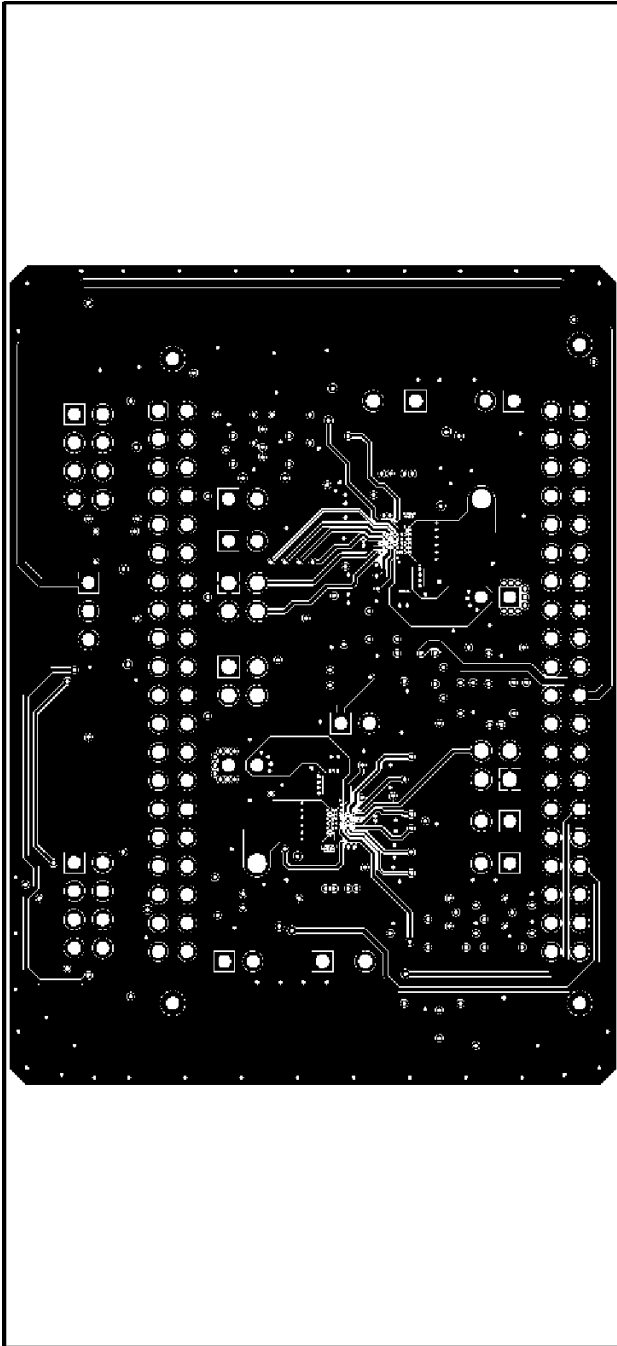


Figure 18. TAS2563YBGEVM-DC Copper Layer 2

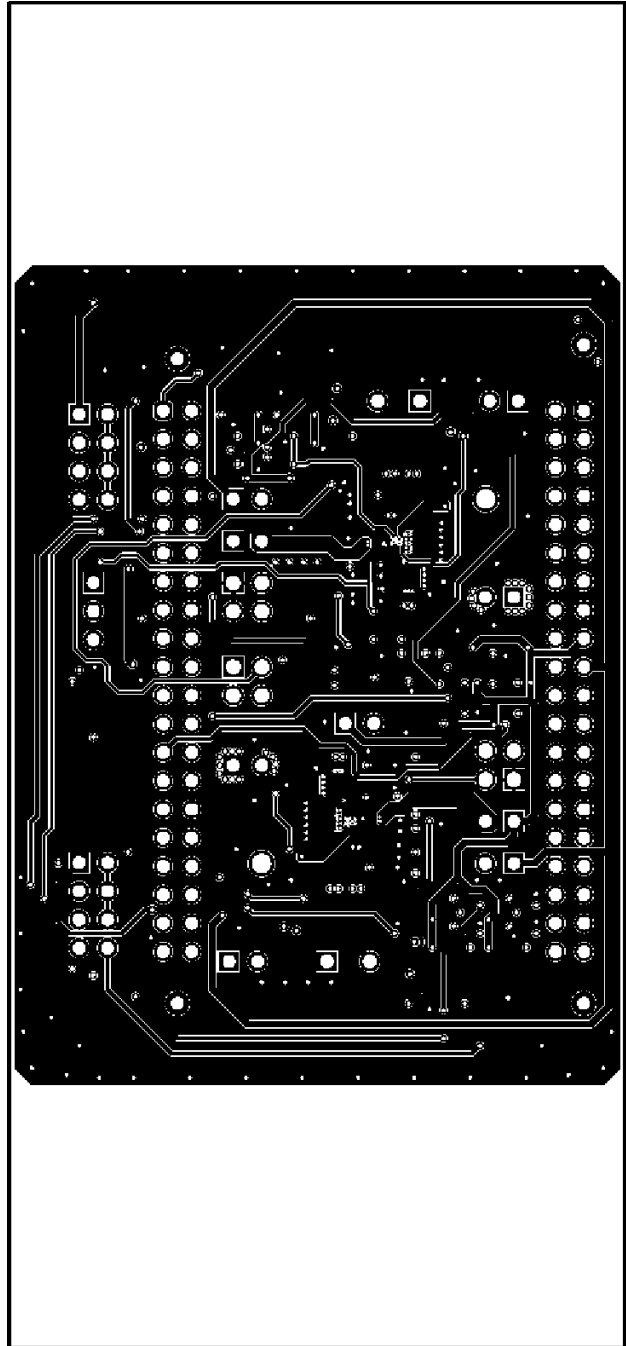


Figure 19. TAS2563YBGEVM-DC Copper Layer 3



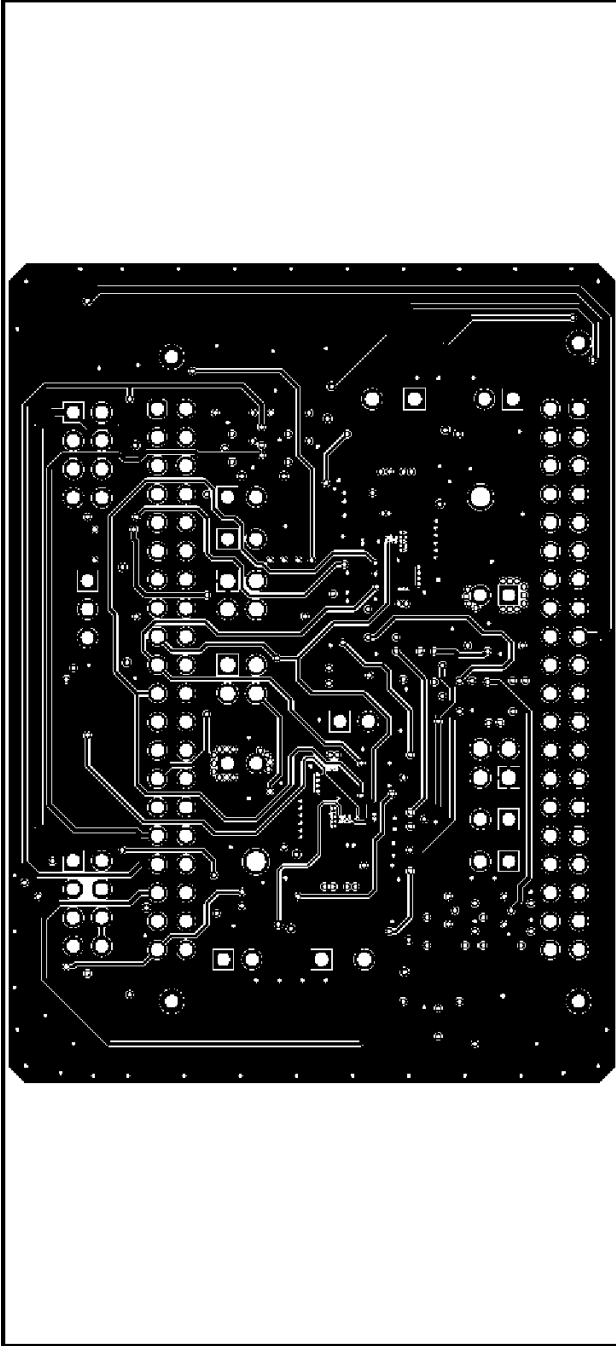


Figure 20. TAS2563YBGEVM-DC Copper Layer 4

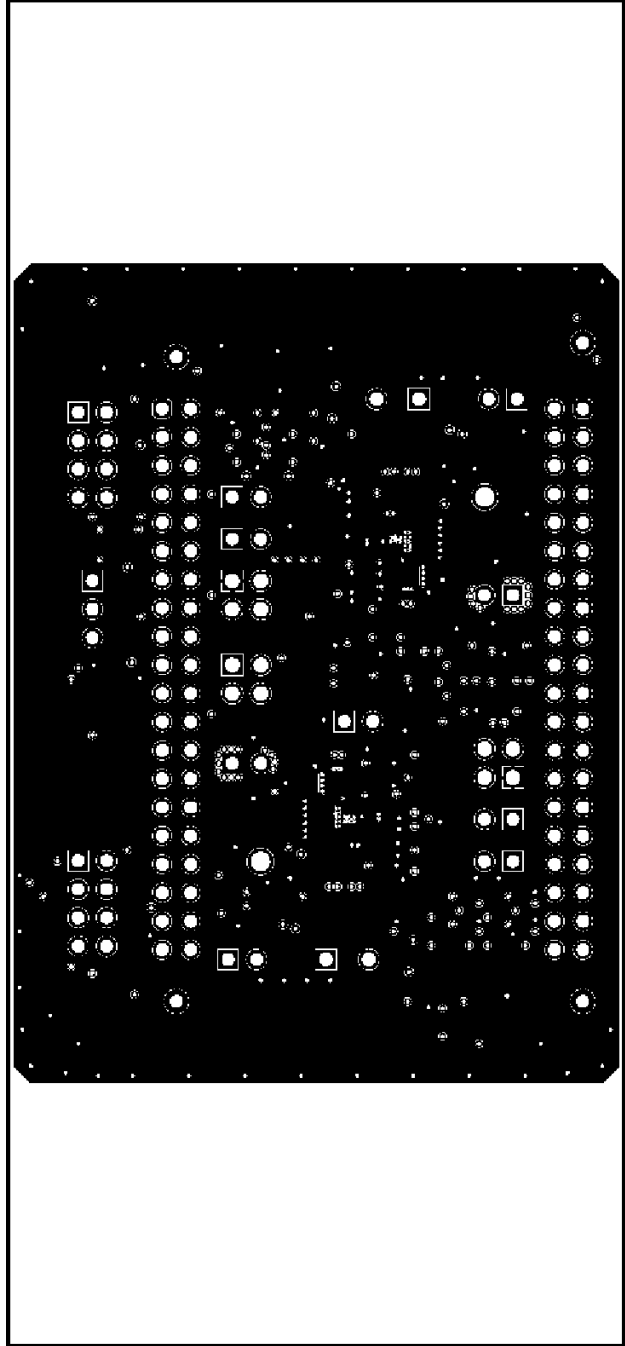


Figure 21. TAS2563YBGEVM-DC Copper Layer 5

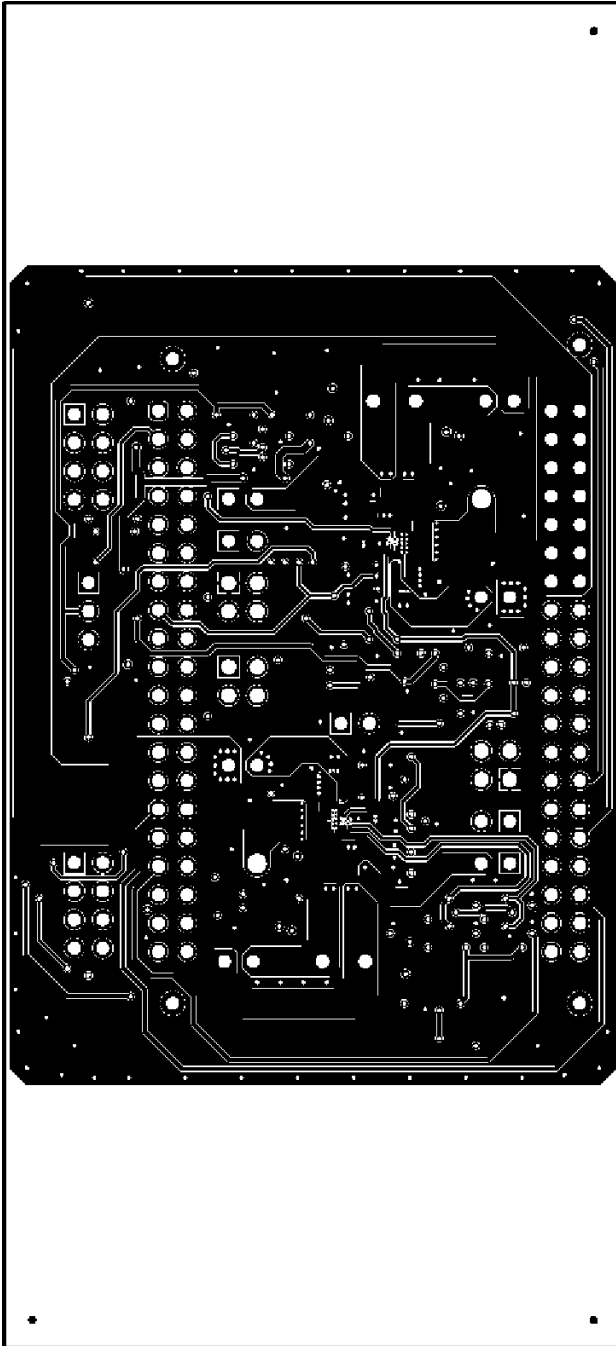


Figure 22. TAS2563YBGEVM-DC Bottom Copper

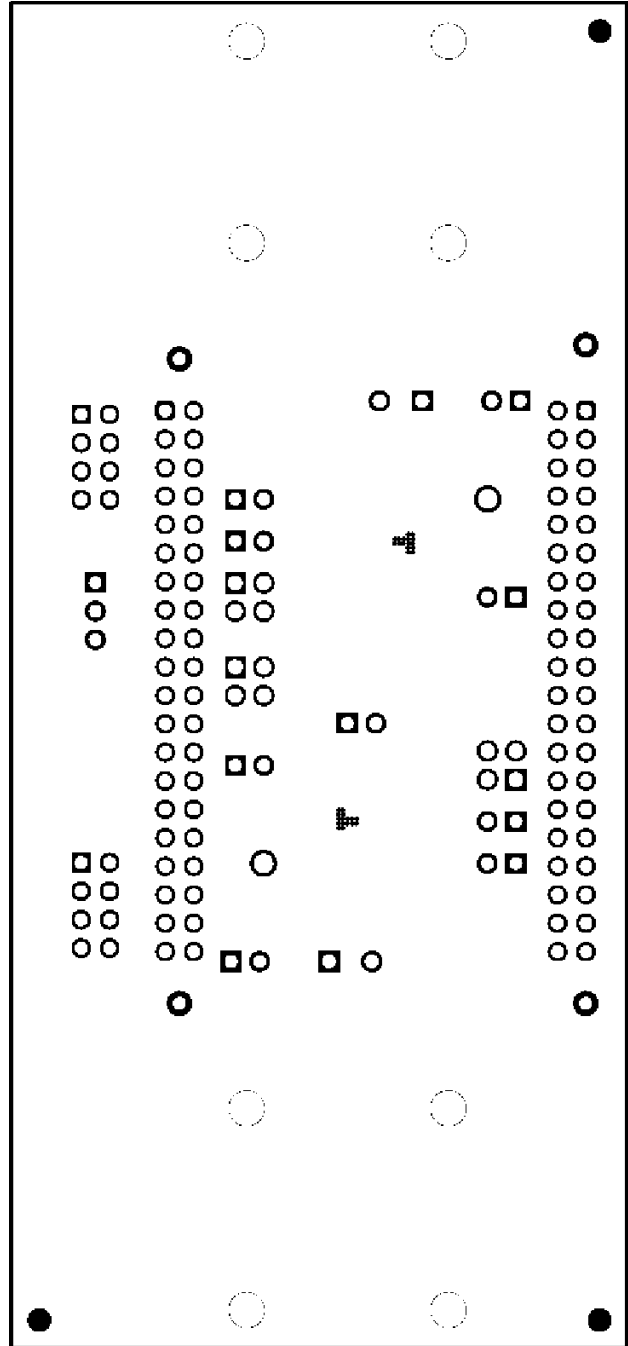


Figure 23. TAS2563YBGEVM-DC Bottom Solder

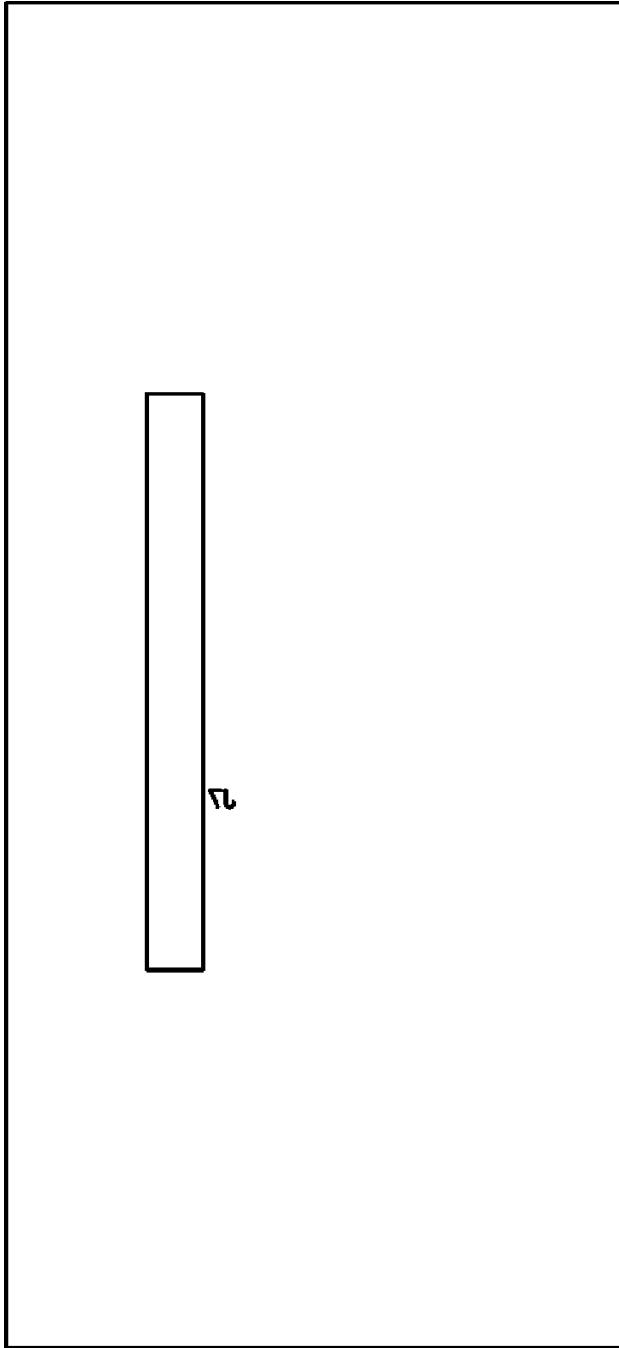


Figure 24. TAS2563YBGEVM-DC Bottom Silk Screen

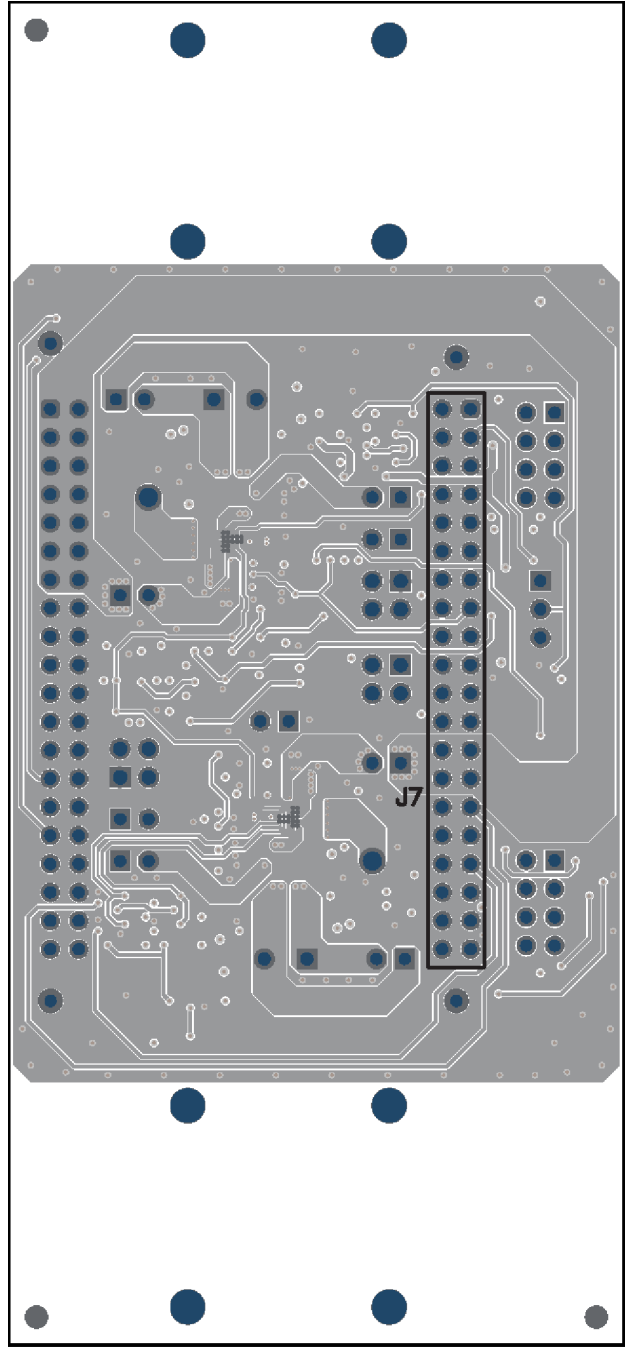


Figure 25. TAS2563YBGEVM-DC Bottom Assembly

**9 Bill of Materials**
**Table 3. TAS2563YBGEVM-DC Bill of Materials**

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer	Alternate Part Number <sup>(1)</sup>	Alternate Manufacturer <sup>(1)</sup>
!PCB1	1		Printed Circuit Board		AMPS063	Any		
C2, C3, C13, C18, C19, C28	6	10 $\mu$ F	CAP, TA, 10 $\mu$ F, 25 V, $\pm$ 10%, 2 ohm, SMD	3.2x1.7 mm	F951E106KAAAQ2	AVX		
C4, C15, C16, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43	17	0.1 $\mu$ F	CAP, CERM, 0.1 $\mu$ F, 25 V, $\pm$ 10%, X7R, AEC-Q200 Grade 1, 0402	0402	CGA2B3X7R1E104K050BB	TDK		
C8, C23	2	4.7 $\mu$ F	CAP, CERM, 4.7 $\mu$ F, 10 V, $\pm$ 10%, X5R, 0603	0603	CGB3B1X5R1A475K055AC	TDK		
C10, C14, C25, C29	4	1 $\mu$ F	CAP, CERM, 1 $\mu$ F, 16 V, $\pm$ 20%, X7R, 0603	0603	CL10B105MO8NNWC	Samsung		
C11, C26	2	1 $\mu$ F	CAP, CERM, 1 $\mu$ F, 16 V, $\pm$ 20%, X5R, 0402	0402	CL05A105MO5NNNC	Samsung Electro-Mechanics		
J1, J3, J4, J5, J10, J11, J12, J13, J16	9		Header, 100 mil, 2x1, Gold, TH	Sullins 100 mil, 1x2, 230 mil above insulator	PBC02 SAAN	Sullins Connector Solutions		
J2, J7	2		Receptacle, 2.54 mm, 20x2, Gold, TH	Receptacle, 2.54 mm, 20x2, TH	SSQ-120-23-G-D	Samtec		
J6, J14	2		Conn Term Block, 2POS, 3.81 mm, TH	2POS Terminal Block	1727010	Phoenix Contact		
J8, J9, J15	3		Header, 2.54 mm, 2x2, Gold, TH	Header, 2.54 mm, 2x2, TH	PBC02DAAN	Sullins Connector Solutions		
J17, J19	2		Header, 100 mil, 4x2, Tin, TH	Header, 4x2, 100 mil, Tin	PEC04DAAN	Sullins Connector Solutions		
J18	1		Header, 100 mil, 3x1, Gold, TH	PBC03 SAAN	PBC03 SAAN	Sullins Connector Solutions		
L1, L2	2	1 $\mu$ H	Inductor, Shielded, Metal Composite, 1 $\mu$ H, 3.3 A, 0.04 $\Omega$ , SMD	2.5x1.2x2 mm	DFE252012F-1R0M = P2	MuRata Toko		

<sup>(1)</sup> Unless otherwise noted in the Alternate PartNumber and/or Alternate Manufacturer columns, all parts may be substituted with equivalents

Table 3. TAS2563YBGEVM-DC Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer	Alternate Part Number <sup>(1)</sup>	Alternate Manufacturer <sup>(1)</sup>
LS1, LS2	2		Dynamic Speaker	24x24 mm	SPS0916B-J-01	AAC Technologies		
R1, R7, R13, R14, R15, R16, R17	7	10.0kΩ	RES, 10.0 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	RMCF0402FT10K0	Stackpole Electronics Inc		
R3, R4, R9, R10	4	0	RES, 0, 5%, 0.125 W, 0805	0805	RC0805 JR-070RL	Yageo America		
R5, R6, R11, R12	4	0	RES, 0, 5%, 0.063 W, 0402	0402	ERJ-2 GE0R00X	Panasonic		
R8, R18, R19, R20, R21	5	0	RES, 0, 5%, 0.1 W, 0603	0603	ERJ-3 GEY0R00V	Panasonic		
SH-J1, SH-J2, SH-J3, SH-J4, SH-J5, SH-J6, SH-J7, SH-J8, SH-J9, SH-J10, SH-J11, SH-J12	12	1x2	Shunt, 100 mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec	969102-0000-DA	3M
TP1, TP6	2		Test Point, Compact, Red, TH	Red Compact Testpoint	5005	Keystone		
TP2, TP3, TP4, TP5	4		Test Point, Miniature, Black, TH	Black Miniature Testpoint	5001	Keystone		
U1, U2	2		6 W BOOSTED CLASS-D AMPLIFIER WITH IV-SENSE, WCSP-42	WCSP 0.4 mm Pitch	TAS2563YBG	Texas Instruments		Texas Instruments
U3	1		512K I2C Serial EEPROM, TSSOP	TSSOP-8	24FC512-I/ST	Microchip		
U4	1		Single Bus Buffer Gate With 3-State Outputs, DCK0005A, LARGE T&R	DCK0005A	SN74 LVC1 G125DCKR	Texas Instruments		
U5, U6, U7, U8, U9, U10, U11, U12, U13, U14, U15, U17	12		Low-Voltage Single FET Bus Switch, DCK0005A, LARGE T&R	DCK0005A	SN74CBTLV1 G125DCKR	Texas Instruments		
U16	1		Single Schmitt-Trigger Inverter, DCK0005A (SOT-SC70-5)	DCK0005A	SN74 LVC1 G14DCKR	Texas Instruments	SN74 LVC1 G14DCKT	Texas Instruments

**Table 3. TAS2563YBGEVM-DC Bill of Materials (continued)**

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer	Alternate Part Number <sup>(1)</sup>	Alternate Manufacturer <sup>(1)</sup>
C1, C17	0	0.1 $\mu$ F	CAP, CERM, 0.1 $\mu$ F, 25 V, $\pm$ 10%, X7R, AEC-Q200 Grade 1, 0402	0402	CGA2B3X7R1E10 4K050BB	TDK		
C5, C6, C20, C21, C46, C47, C48, C49, C50, C51	0	1 $\mu$ F	CAP, CERM, 1 $\mu$ F, 16 V, $\pm$ 20%, X7R, 0603	0603	CL10B105MO8 NNWC	Samsung		
C7, C9, C22, C24, C44, C45	0	0.01 $\mu$ F	CAP, CERM, 0.01 $\mu$ F, 25 V, $\pm$ 10%, X7R, 0402	0402	GCM155R71E103 KA37D	MuRata		
C12, C27	0	10 $\mu$ F	CAP, TA, 10 $\mu$ F, 25 V, $\pm$ 10%, 2 $\Omega$ , SMD	3.2x1.7 mm	F951E106KAAAQ2	AVX		
D1	0	5.6 V	Diode, Zener, 5.6 V, 5 W, SMB	SMB	SMBJ5339B-TP	Micro Commercial Components		
FID1, FID2, FID3, FID4, FID5, FID6	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A		
R2, R22, R23, R24	0	0	RES, 0, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3 GEY0R00V	Panasonic		
R25	0	100k $\Omega$	RES, 100 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0402	0402	ERJ-2 GEJ104X	Panasonic		



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