

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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1 Export Control Notice

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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 + I²C 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
- I²C
- 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 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.

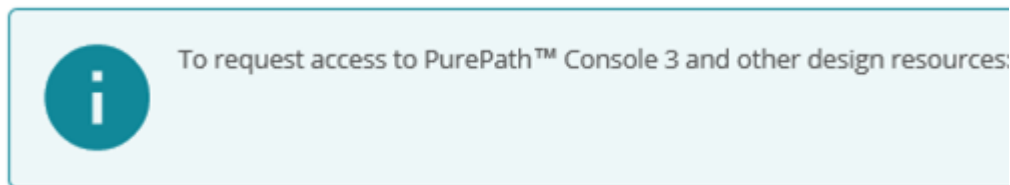


Figure 1. Requesting PPC3 Access

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

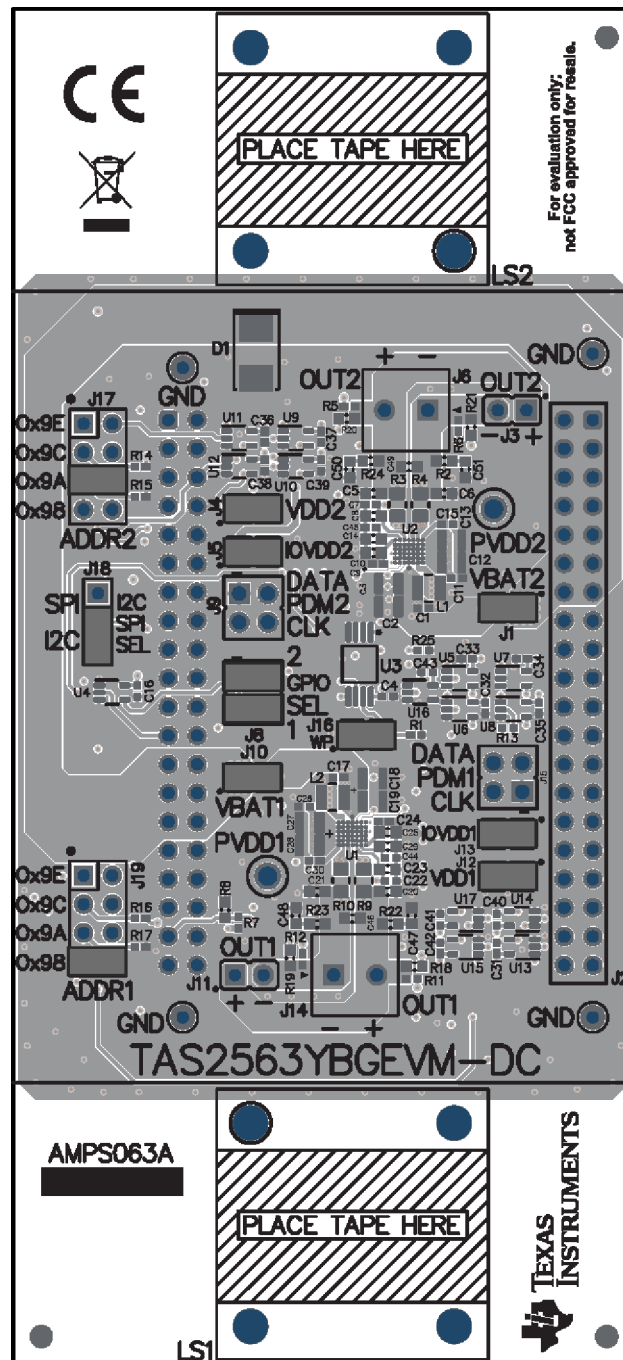


Figure 2. Default Jumper Settings

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](#).

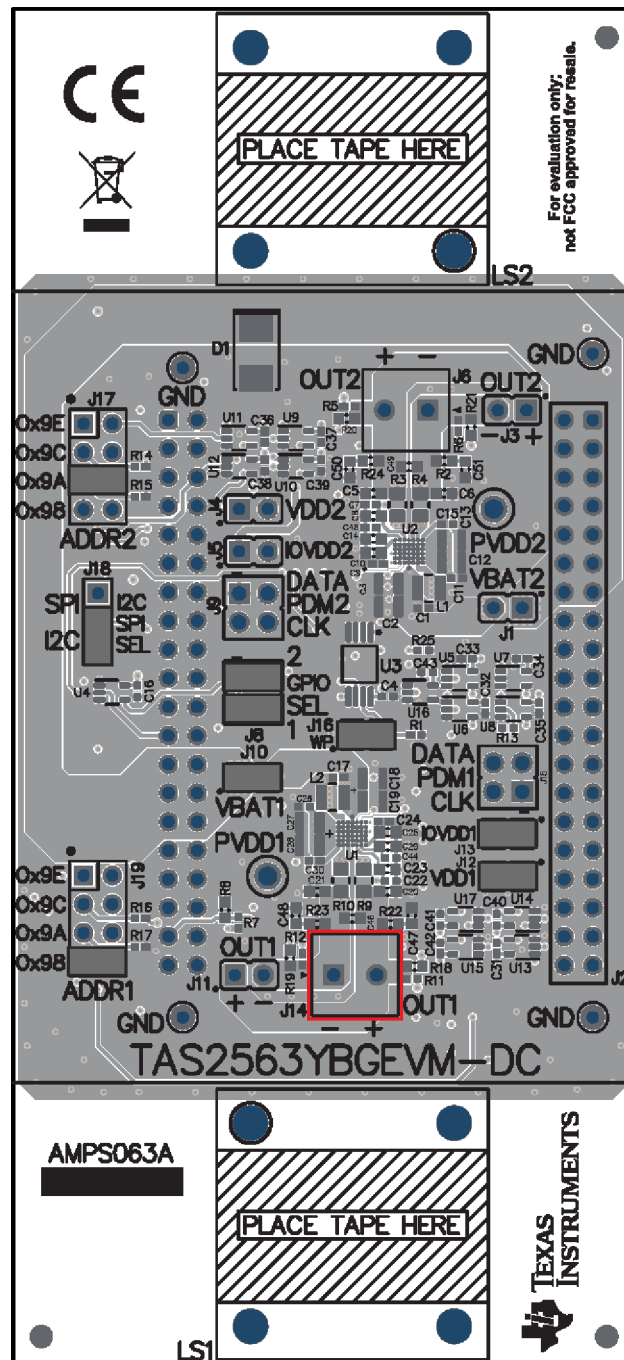


Figure 3. Mono Setup

4. Set the jumper at J19 to the desired I²C address as shown in .
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 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

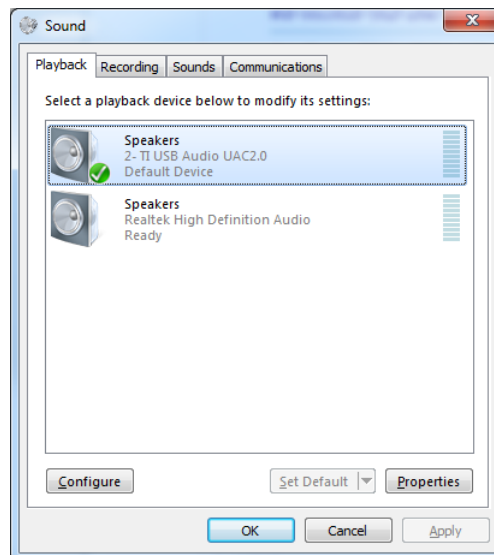


Figure 4. Windows Playback Devices

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

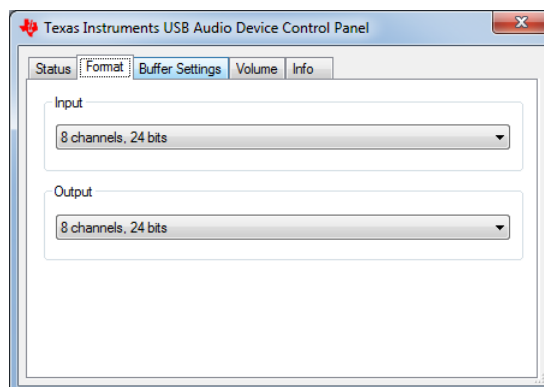


Figure 5. Texas Instruments USB Audio Device Control Panel

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

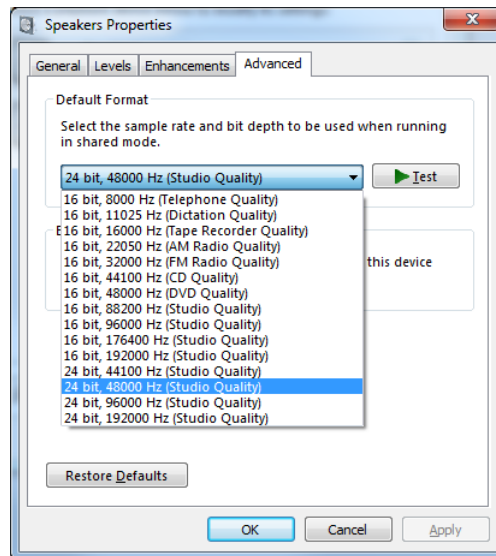


Figure 6. Windows Playback device Sample Rate

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 I²C address as shown in

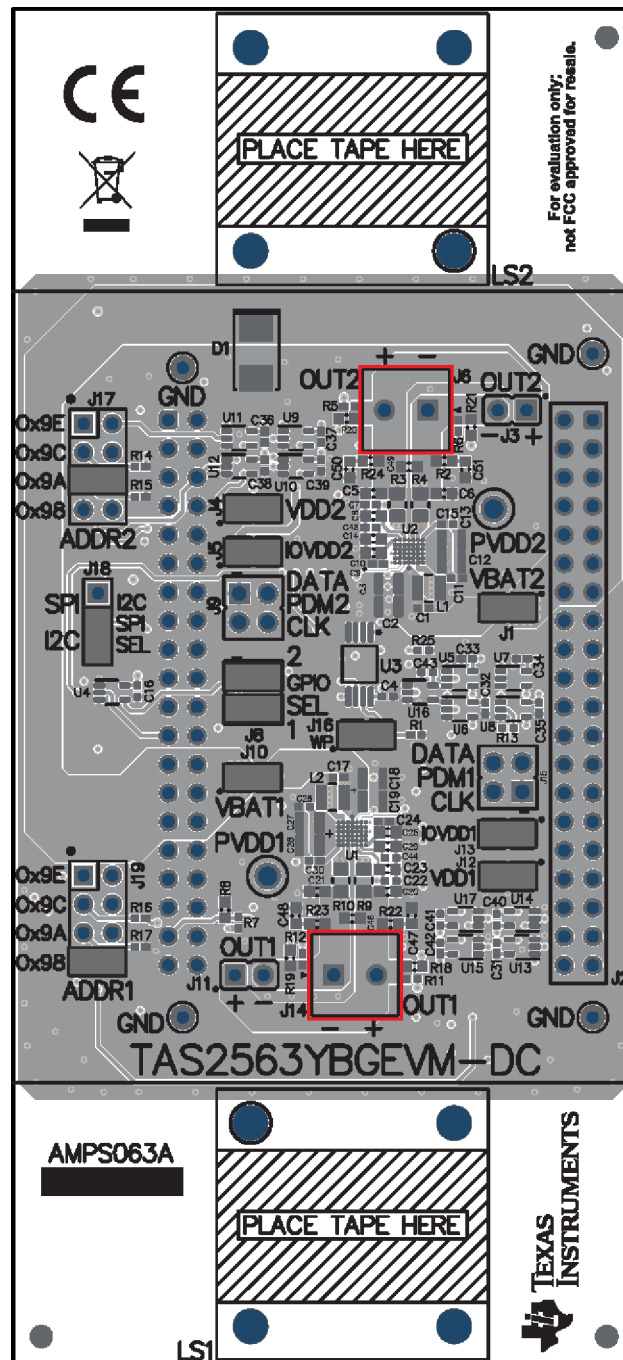


Figure 7. Stereo Setup

4. Configure PPC3-EVM-MB as described in
 - USB control for I²C
 - USB control for I2S
 - 3.3 V I²C
 - 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

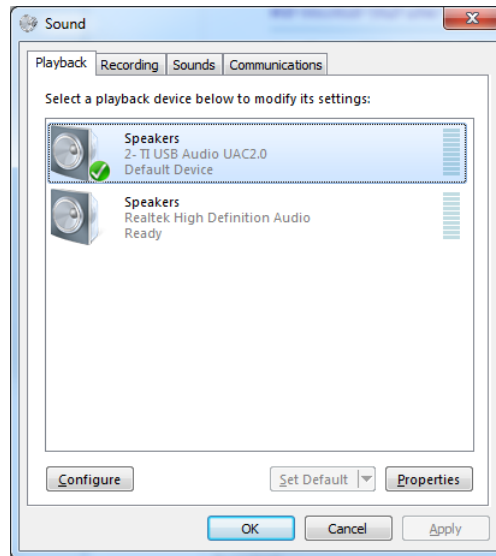


Figure 8. Windows Playback Devices

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

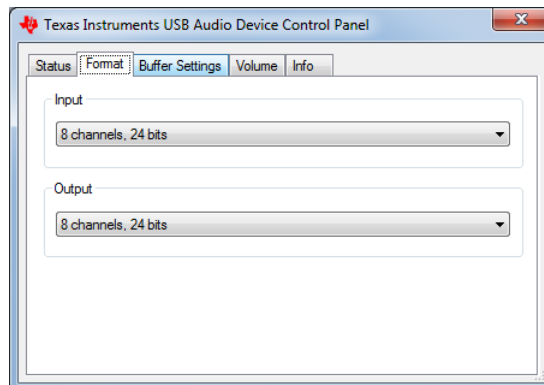


Figure 9. Texas Instruments USB Audio Device Control Panel

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

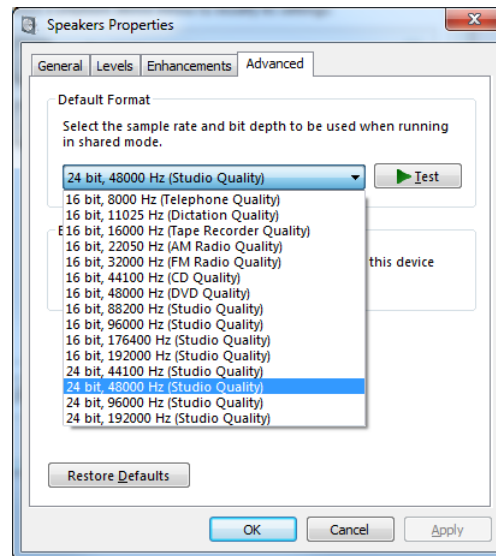


Figure 10. Windows Playback device Sample Rate

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)
- 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.

7 EVM Schematics

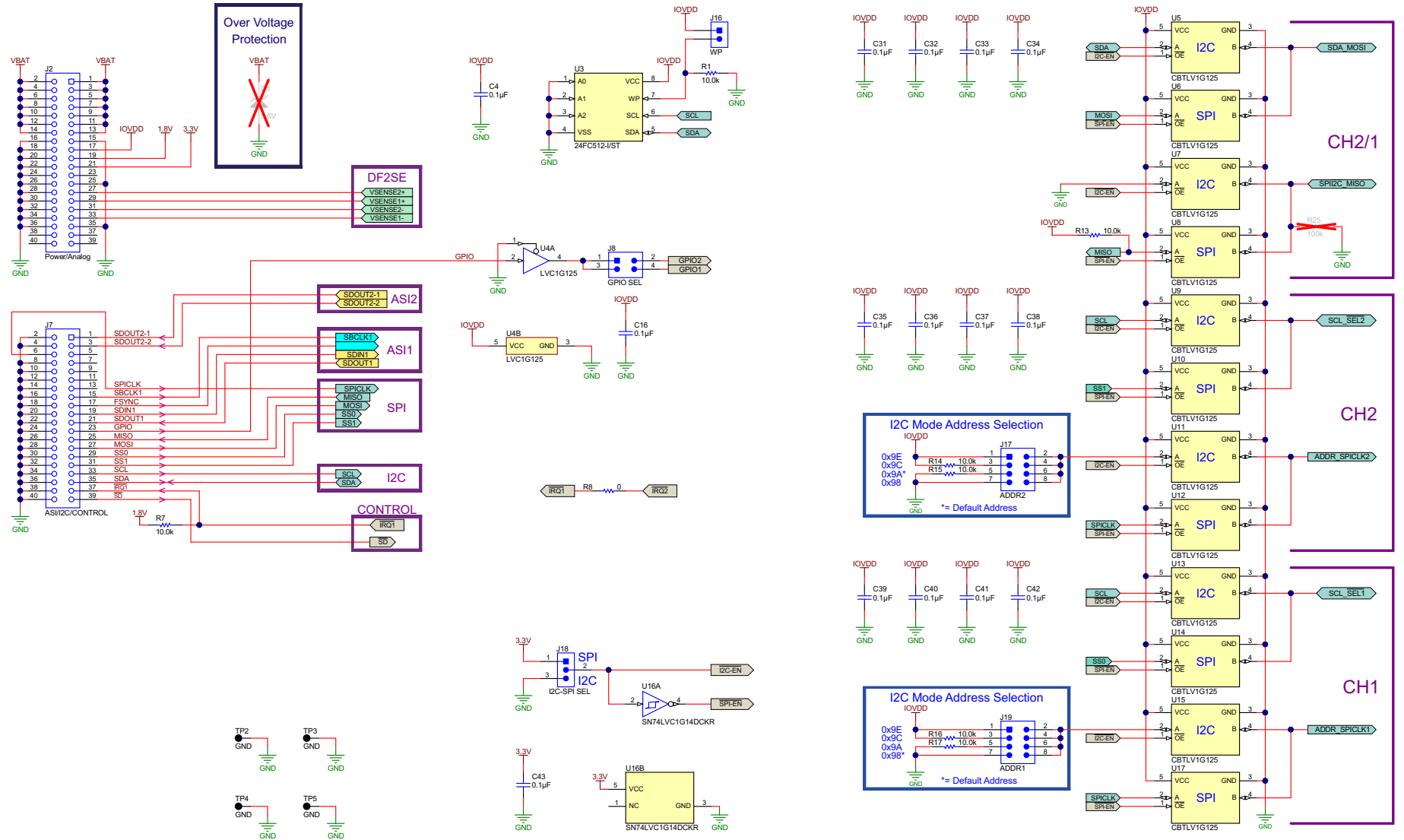


Figure 11. Mother Board Connections

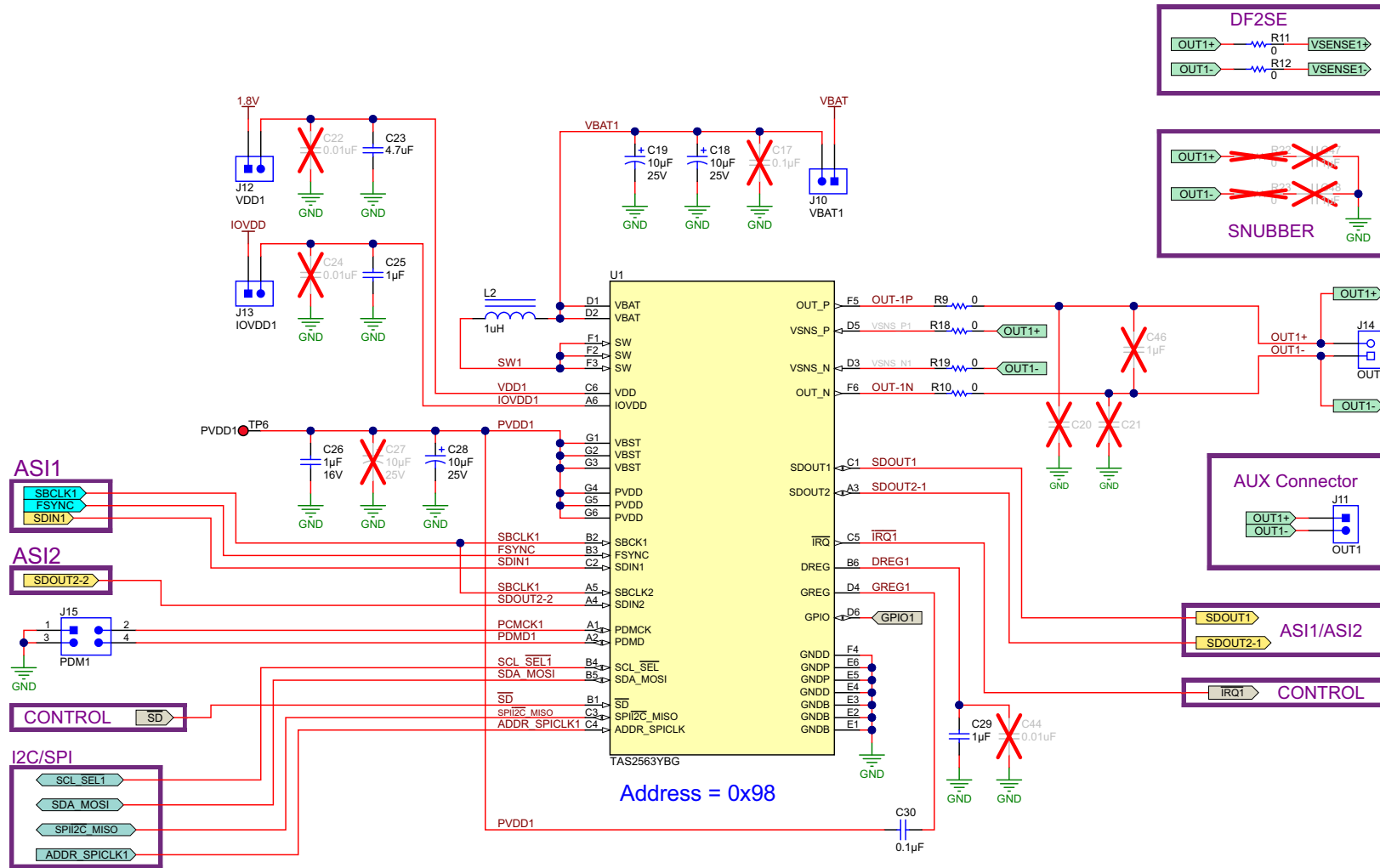


Figure 12. Channel 1

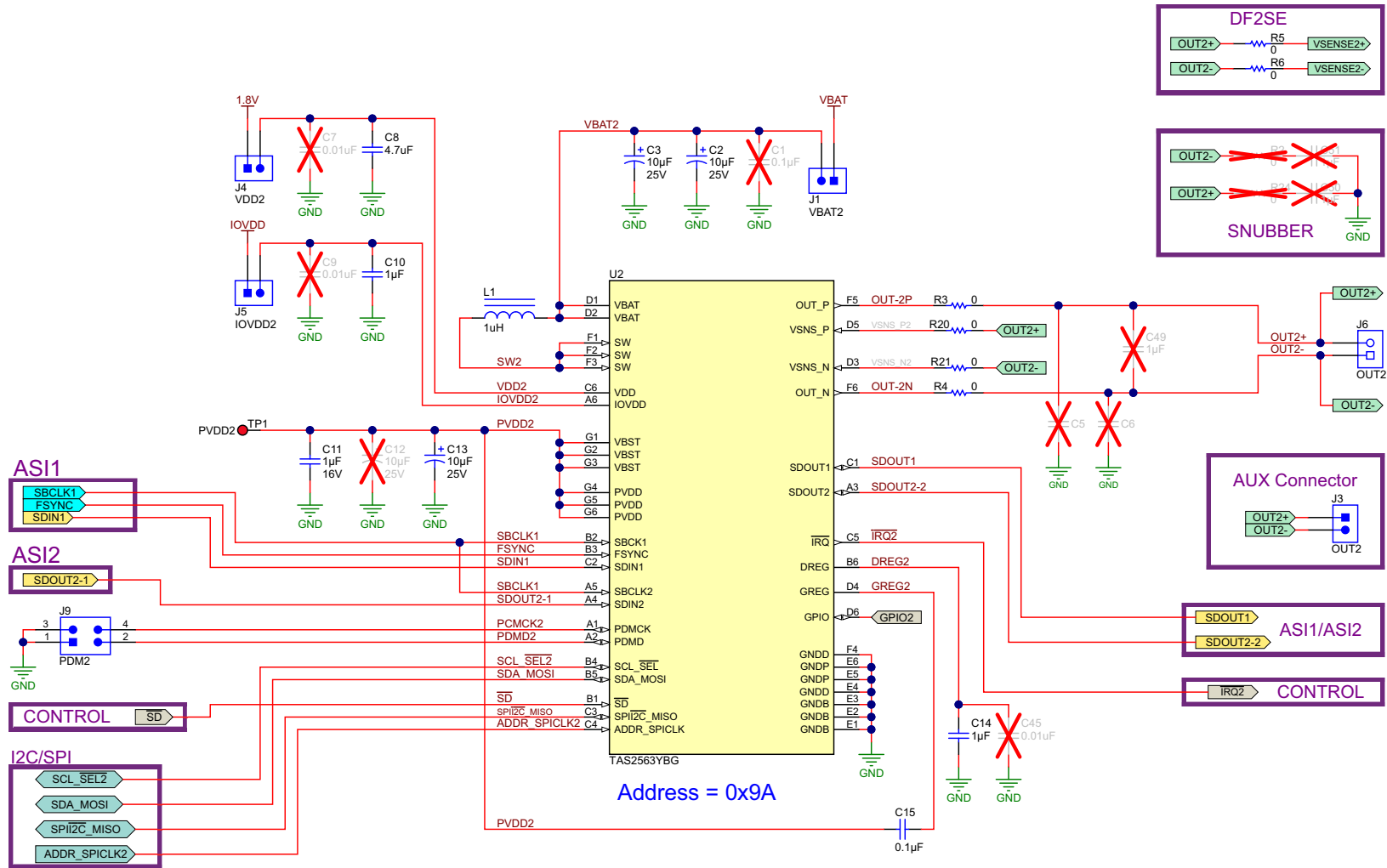


Figure 13. Channel 2

8 EVM Layer Plots

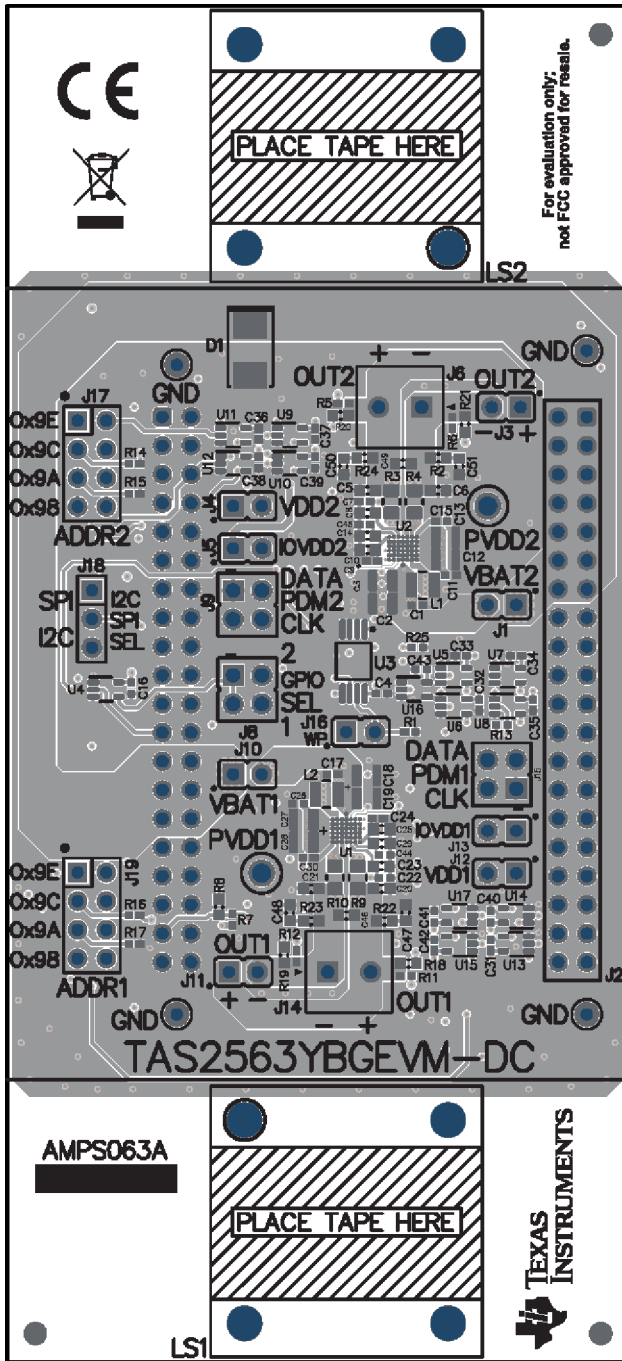


Figure 14. TAS2563YBGEVM-DC Top Assembly

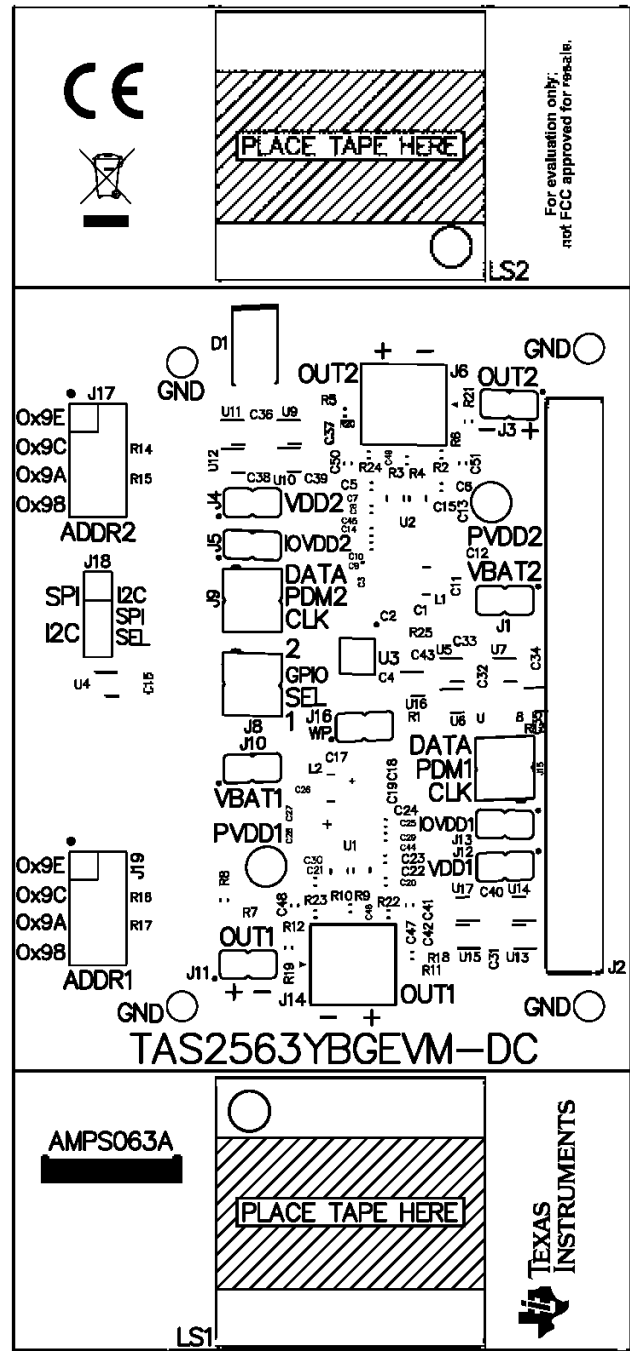


Figure 15. TAS2563YBGEVM-DC Top Silk Screen

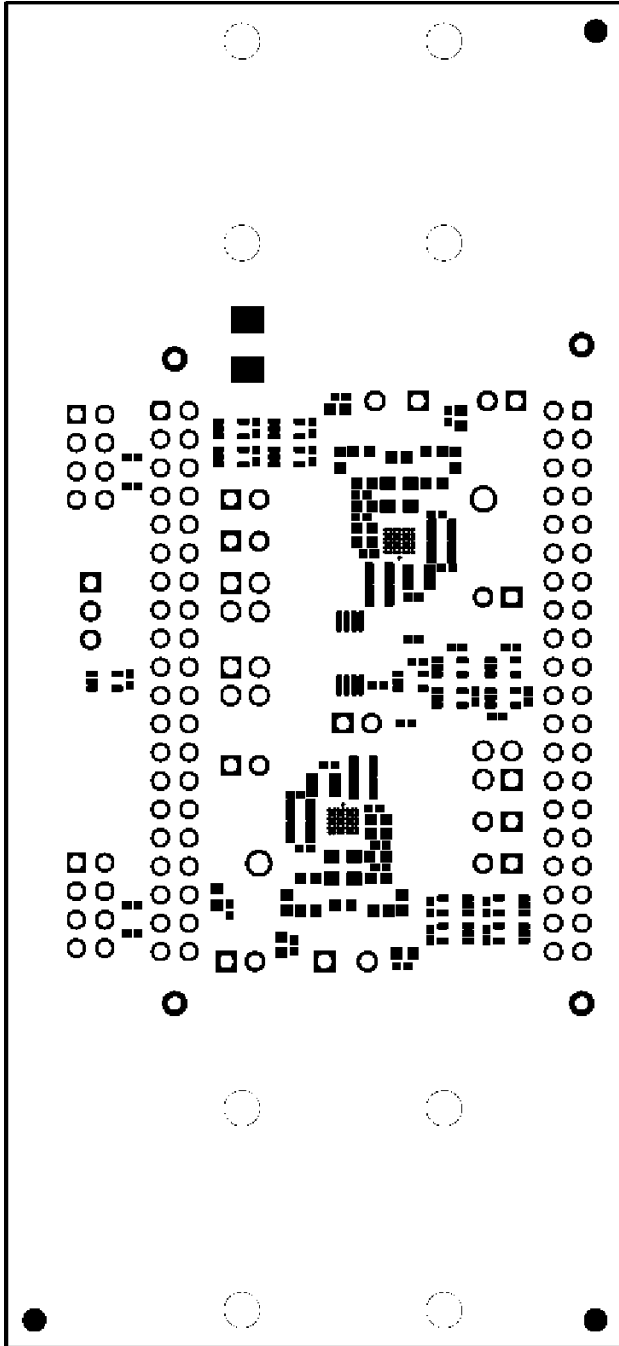


Figure 16. TAS2563YBGEVM-DC Top Solder Mask

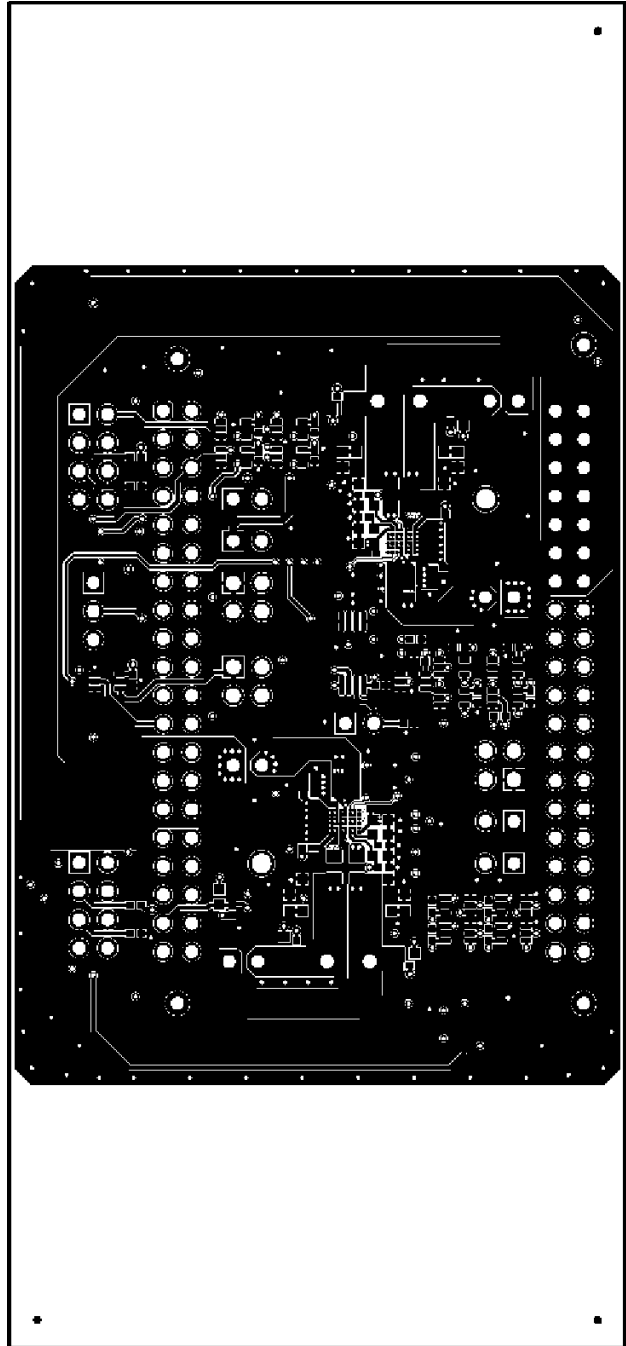


Figure 17. TAS2563YBGEVM-DC Top Copper

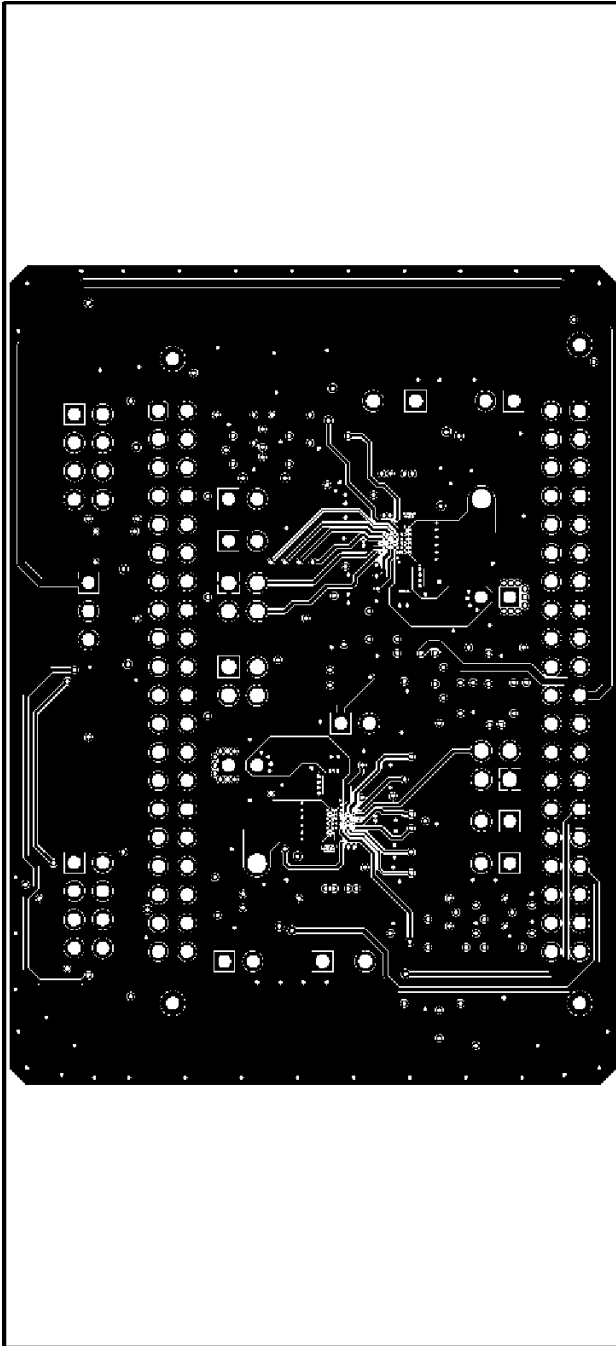


Figure 18. TAS2563YBGEVM-DC Copper Layer 2

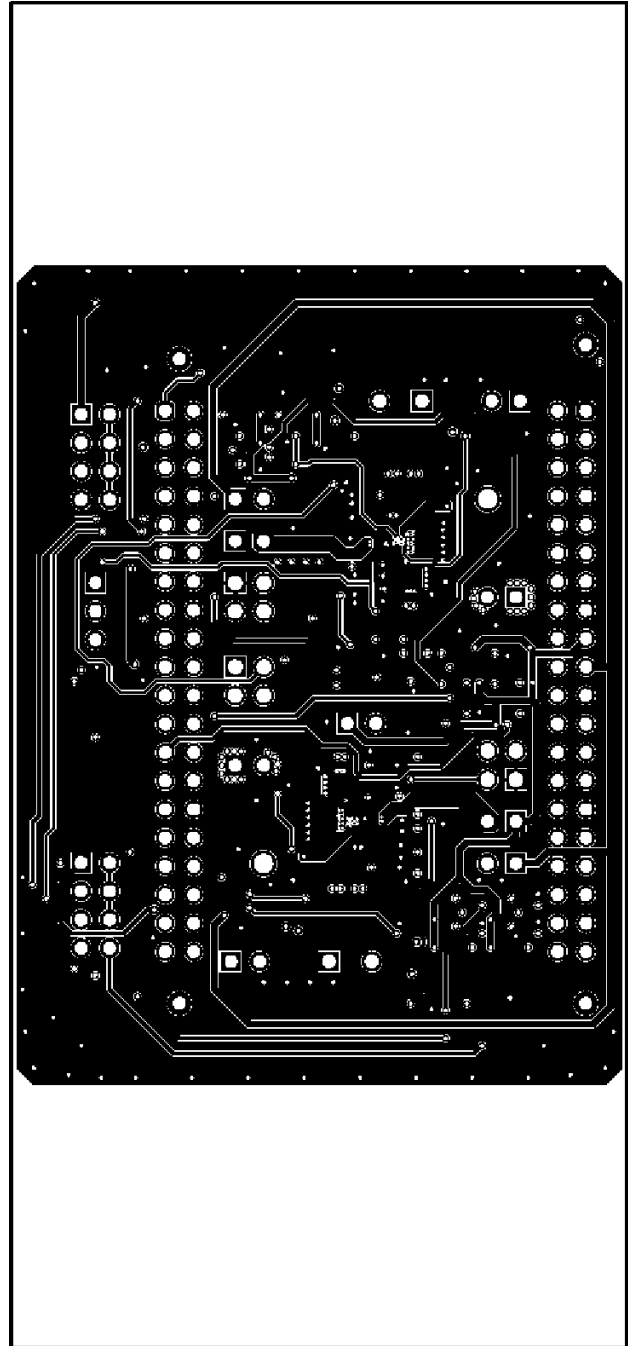


Figure 19. TAS2563YBGEVM-DC Copper Layer 3

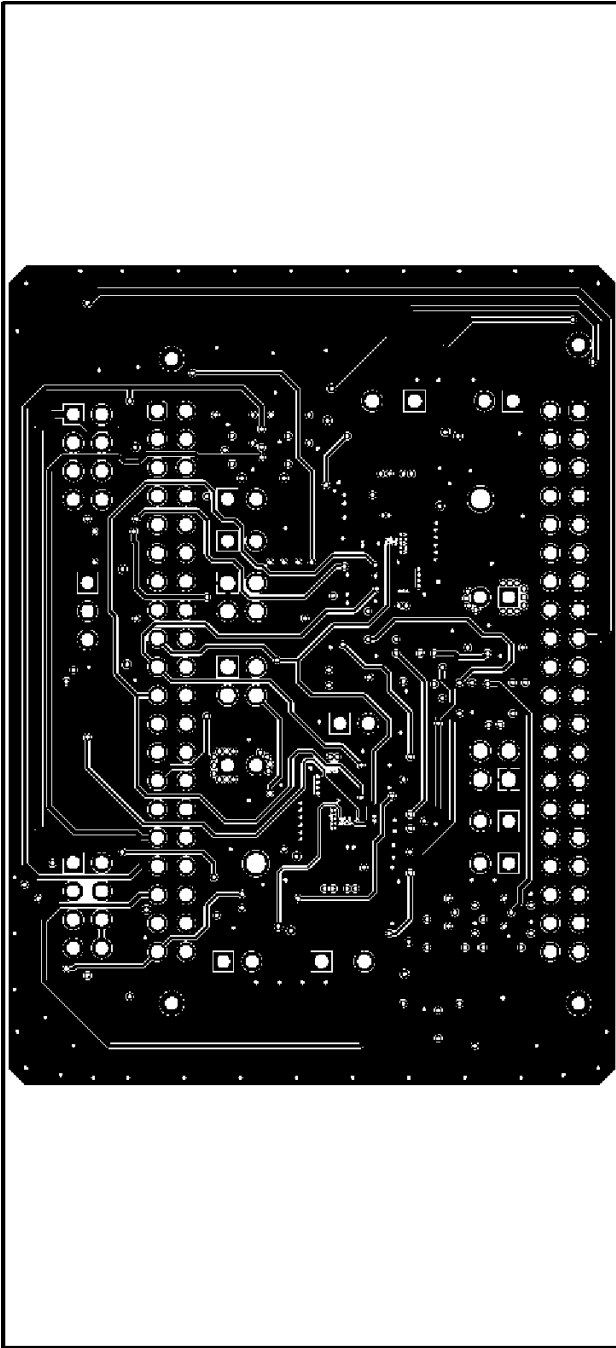


Figure 20. TAS2563YBGEVM-DC Copper Layer 4

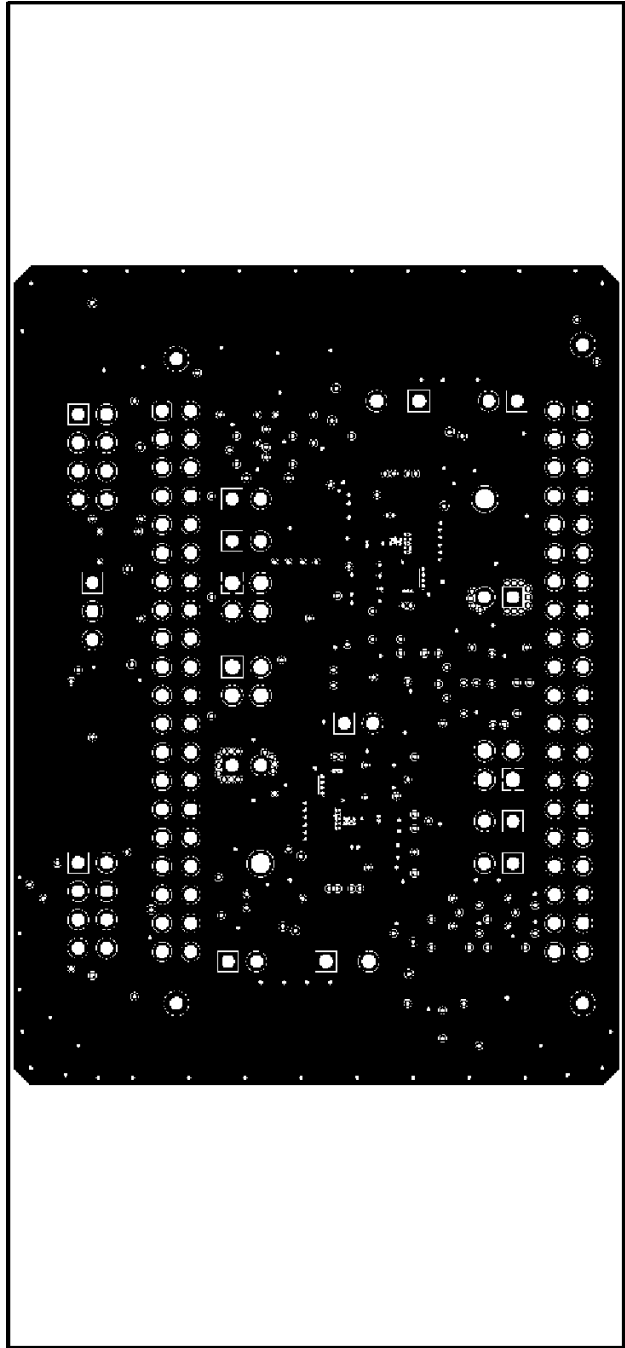


Figure 21. TAS2563YBGEVM-DC Copper Layer 5

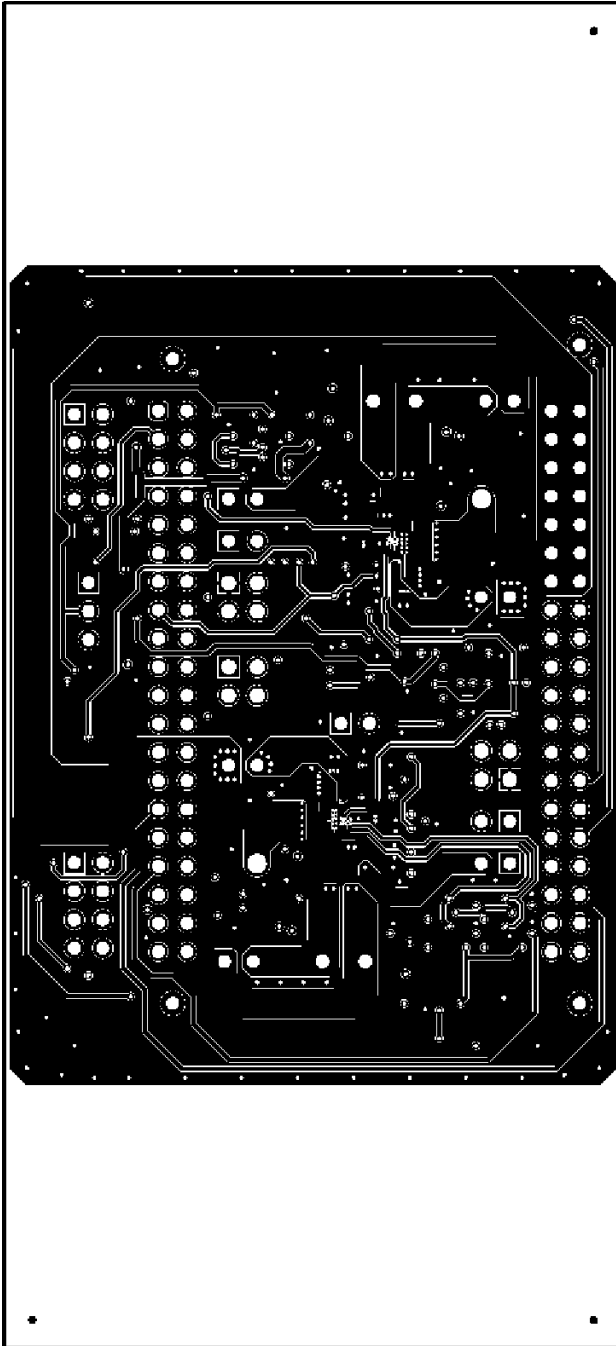


Figure 22. TAS2563YBGEVM-DC Bottom Copper

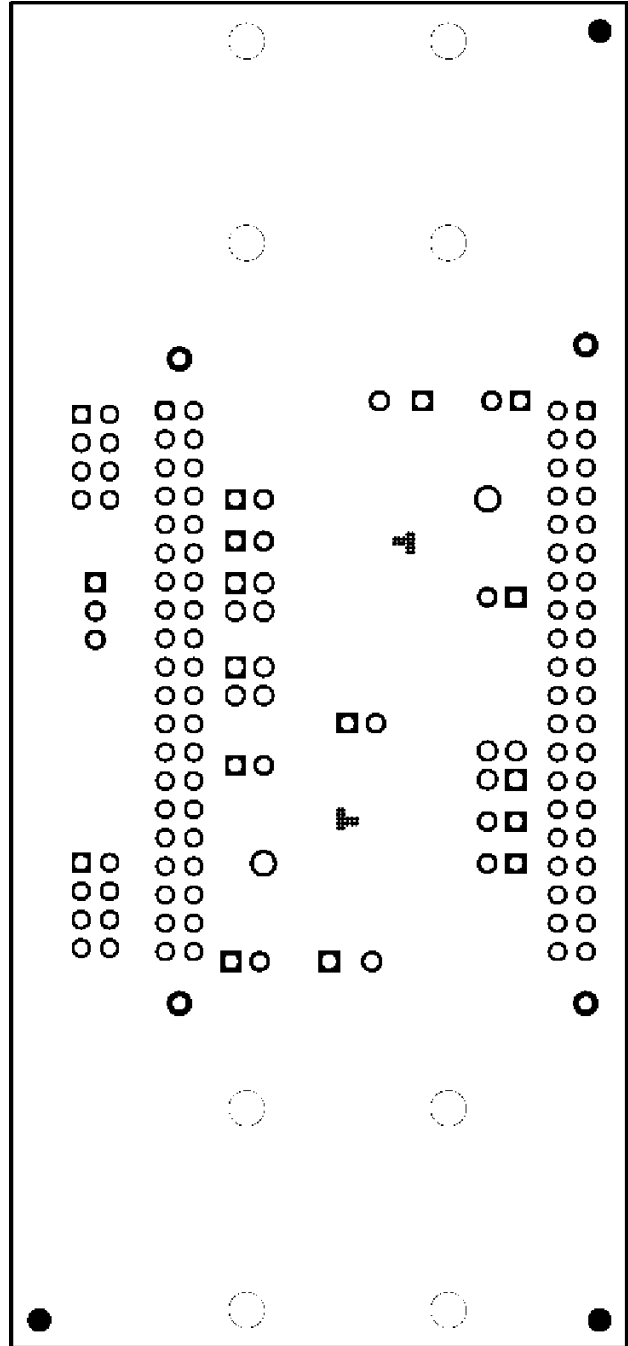


Figure 23. TAS2563YBGEVM-DC Bottom Solder

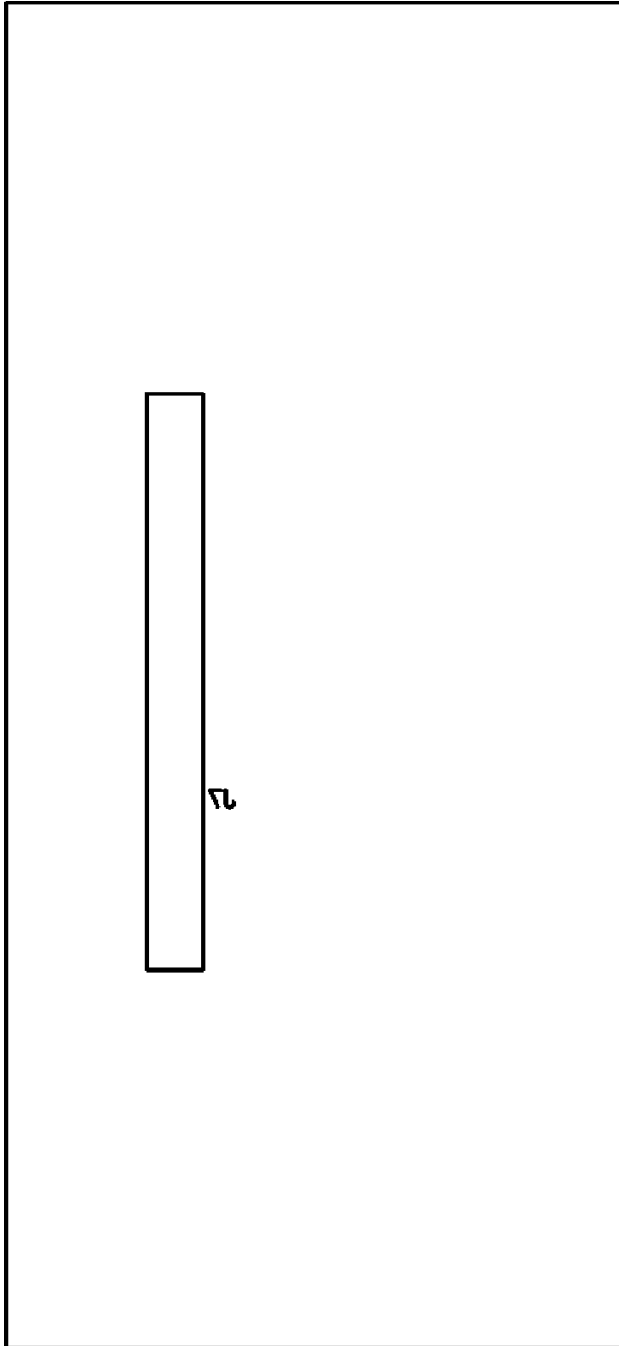


Figure 24. TAS2563YBGEVM-DC Bottom Silk Screen

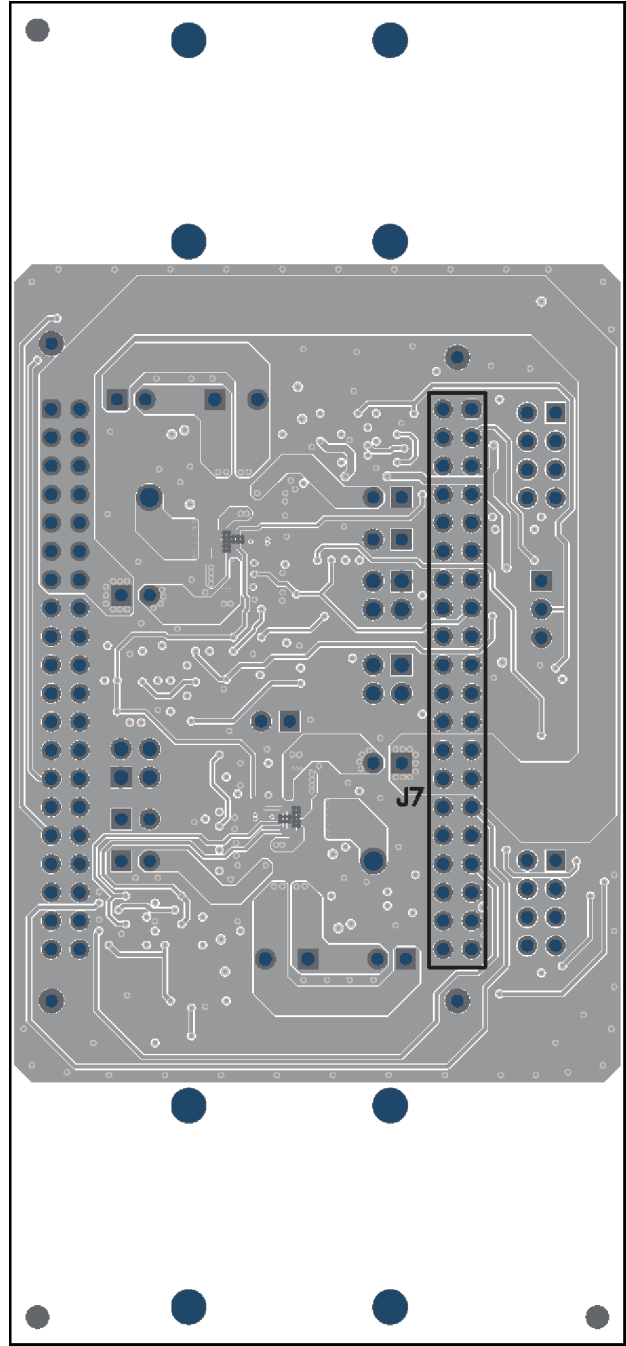


Figure 25. TAS2563YBGEVM-DC Bottom Assembly

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

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer	Alternate Part Number ⁽¹⁾	Alternate Manufacturer ⁽¹⁾
!PCB1	1		Printed Circuit Board		AMPS063	Any		
C2, C3, C13, C18, C19, C28	6	10 μ F	CAP, TA, 10 μ 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 μ F	CAP, CERM, 0.1 μ F, 25 V, \pm 10%, X7R, AEC-Q200 Grade 1, 0402	0402	CGA2B3X7R1E104K050BB	TDK		
C8, C23	2	4.7 μ F	CAP, CERM, 4.7 μ F, 10 V, \pm 10%, X5R, 0603	0603	CGB3B1X5R1A475K055AC	TDK		
C10, C14, C25, C29	4	1 μ F	CAP, CERM, 1 μ F, 16 V, \pm 20%, X7R, 0603	0603	CL10B105MO8NNWC	Samsung		
C11, C26	2	1 μ F	CAP, CERM, 1 μ 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 μ H	Inductor, Shielded, Metal Composite, 1 μ H, 3.3 A, 0.04 Ω , SMD	2.5x1.2x2 mm	DFE252012F-1R0M = P2	MuRata Toko		

⁽¹⁾ 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 ⁽¹⁾	Alternate Manufacturer ⁽¹⁾
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 ⁽¹⁾	Alternate Manufacturer ⁽¹⁾
C1, C17	0	0.1 μ F	CAP, CERM, 0.1 μ 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 μ F	CAP, CERM, 1 μ F, 16 V, \pm 20%, X7R, 0603	0603	CL10B105MO8 NNWC	Samsung		
C7, C9, C22, C24, C44, C45	0	0.01 μ F	CAP, CERM, 0.01 μ F, 25 V, \pm 10%, X7R, 0402	0402	GCM155R71E103 KA37D	MuRata		
C12, C27	0	10 μ F	CAP, TA, 10 μ F, 25 V, \pm 10%, 2 Ω , 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 Ω	RES, 100 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0402	0402	ERJ-2 GEJ104X	Panasonic		

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