User's Guide

TAS2781EVM User's Guide

ABSTRACT

This user's guide describes the TAS2781RYY evaluation module (TAS2781EVM). This EVM can be used to evaluate TAS2781RYY Audio Amplifier device.

Table of Contents

List of Figures

List of Tables

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1 Description

The TAS2781EVM is designed to demonstrate the performance of TAS2781 device in a mono configuration. The design utilizes onboard controller to provide connection interface and supply voltages. TAS2781 is a mono, digital-input, Class-D audio amplifier optimized for efficiently driving high peak power into a variety of loudspeakers for various audio applications. Y-Bridge technique is implemented at the output stage of the amplifier so that is can change from two different voltage rails depending on the amount of power required at the output, improving efficiency significantly at lower power. The Class-D amplifier is capable of delivering 25 W of output power into a 4 Ω load at source voltage of 16 V. Integrated speaker voltage and current sense provides real time monitoring of speaker parameters like DC resistance and resonant frequency to protect it from mechanical / electrical damage.real time monitoring of loud speakers. TAS2781 support I^{2}S/TDM, I^{2}C ans SPI interfaces.

TAS2781EVM supports evaluation and development with the TAS2781 device through the following interfaces:

- USB Interface
- Software control via PurePath™ Console 3 (PPC3) GUI, USB-HID
- USB-class audio device, compatible with Microsoft® Windows® 7+
- External 100-mil headers
- PSIA – I^{2}S/TDM interface
- I^{2}C or SPI
- Hardware Shutdown Control
- Interrupt Output

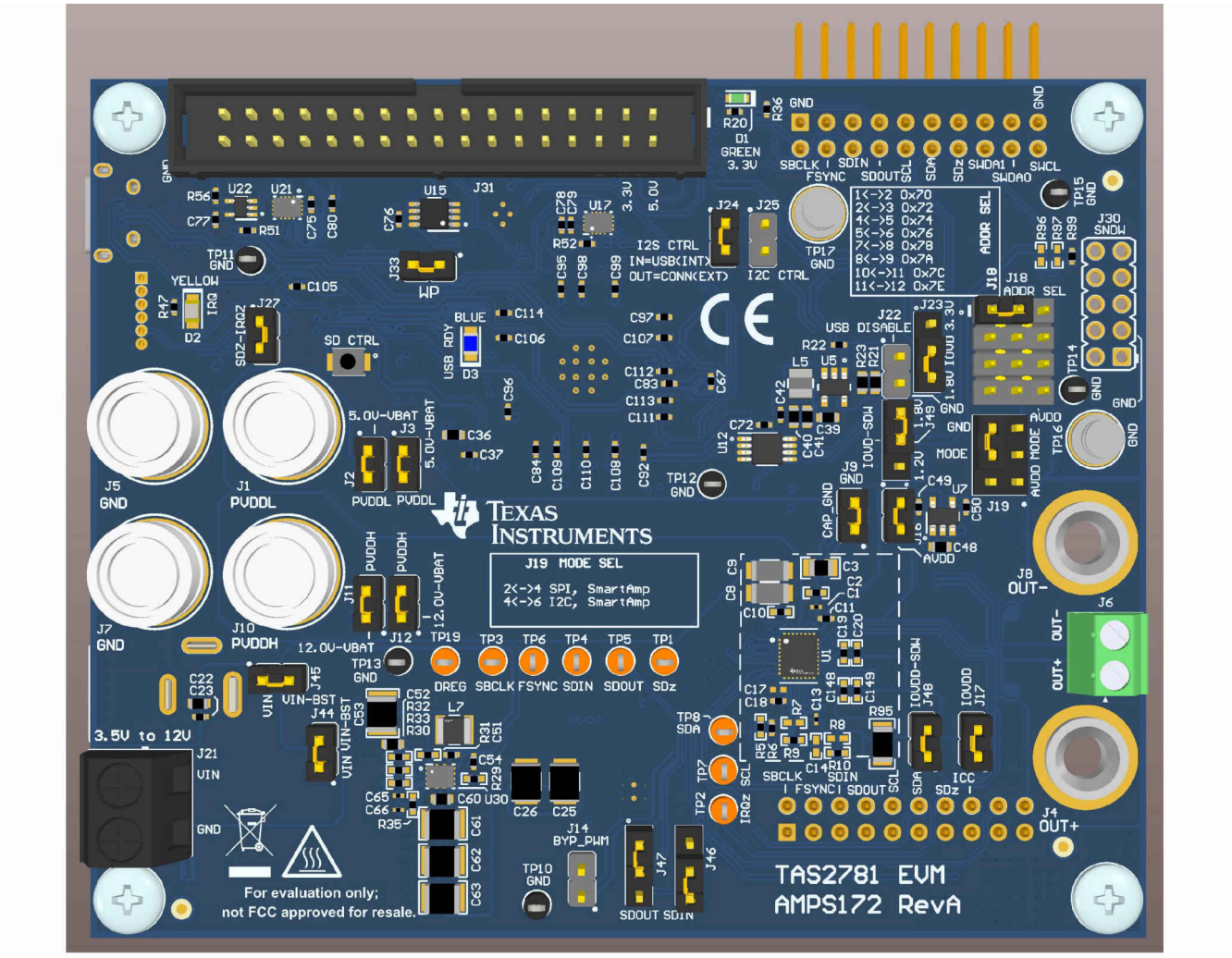

Figure 1-1. TAS2781EVM 3D View Top

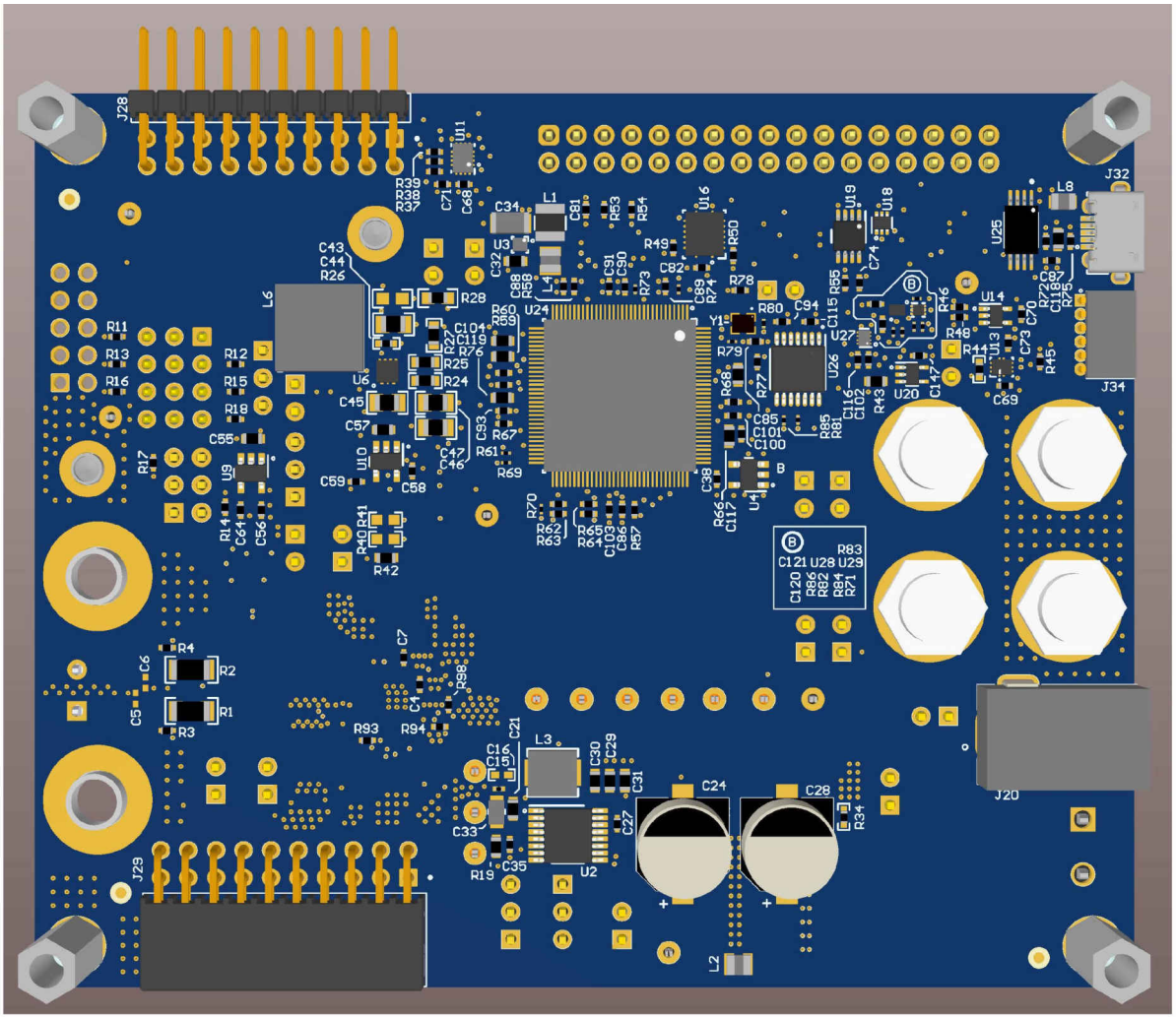

Figure 1-2. TAS2781EVM 3D View Bottom

2 Specifications

Table 2-1 lists the supply, input, and output requirements for TAS2781EVM.

Table 2-1. Specifications

Parameter	Value
Supply Voltage - PVDDL	2.7 to 5.5 V
Supply Voltage - AVDD	1.65 to 1.95 V
Supply Voltage - IOVDD	1.65 to 1.95 V or 3 to 3.6 V
Supply Voltage - PVDDH	4.5V to 23 V
Input Logic	IOVDD
Output Power	25 W
USB, USB class-audio	Micro-USB

2.1 Power Supply Configurations

TAS2781EVM provides flexible power supply configurations for different performance tests and use cases.

By default, the board is completely powered by VIN which can be supplied by J20 or J21 from 3.5 V to 12 V. This voltage is used to generate all the voltage rails: 5 V for PVDDL, 7 V for PVDDH, 3.3 V, 1.8 V, 1.2 V and 1 V for different logic levels.

Alternatively PVDDL and PVDDH can be supplied directly from an external supply using J1 and J10 connectors respectively. Remove J2 and J3 when using an external PVDDL voltage on J1. Remove J11 and J12 when using an external PVDDH voltage on J10. Make sure VIN is still being supplied to EVM as this voltage is used to generate different lower voltage rails on the board. Consider the voltage range for each supply rail as described in Table 2-1.

3 Device Configuration

This section describe configuration options of TAS2781EVM.

3.1 Jumper Settings

TAS2781 EVM provides multiple shunt or jumper configuration options that can be used to configure the EVM for different functionality options. Table 3-1 lists these shunt configuration options and lists their default values.

Table 3-1. Default Jumper Settings

Jumper	Setting	Description
J2	Insert	PVDDL Current Sense
J3	Insert	PVDDL Current Sense
J9	Insert	Additional PVDDL Decoupling
J11	Insert	PVDDH Current Sense
J12	Insert	PVDDH Current Sense
J14	DNI	Bypass PWM Control
J16	Insert	AVDD Current Sense
J17	Insert	IOVDD Current Sense
J18	Insert (1-2)	I2C Address 0x70
J19	Insert (4-6)	I2C, SmartAmp
J22	DNI	USB Disable
J23	Insert (2-3)	1.8V IOVDD Select
J24	Insert	I2S USB Control
J25	DNI	I2C USB Control
J27	Insert	SDz and IRQz USB Control
J33	Insert	EEPROM Write Protect
J44	Insert	Boost Current Sense
J45	Insert	Boost Current Sense
J46	Insert (1-2)	SDIN Crossbar Select
J47	Insert(1-2)	SDOUT Crossbar Select
J48	Insert	Pin17 Current Sense
J49	Insert (2-3)	1.8V Interface Select

3.2 Test Points

TAS2781EVM provides several test points for debugging and analysis purposes, Table 3-2 lists these test points along with a brief description of each signal.

Table 3-2. Test Points

Name	Signal Name	Description
TP1	SDz	Shutdown signal, pull-down externally to shutdown TAS2781
TP2	IRQz	Interrupt signal, pull-down by TAS2781 for signaling
TP3	SBCLK	Bit clock for TDM interface
TP4	SDIN	Data in for TDM interface
TP5	SDOUT	Data out for TDM interface
TP6	FSYNC	Frame sync for TDM interface
TP7	SCL	Clock for I^2C interface

Table 3-2. Test Points (continued)

Name	Signal Name	Description
TP8	SDA	Data for I²C interface
TP10 - TP17	GND	GND reference

4 Software

The TAS2781EVM can be easily configured with PPC3 GUI software.

4.1 PPC3 Overview

This section provides a general description of TAS2781EVM PPC3 GUI control that are needed for quick bring-up of the EVM.

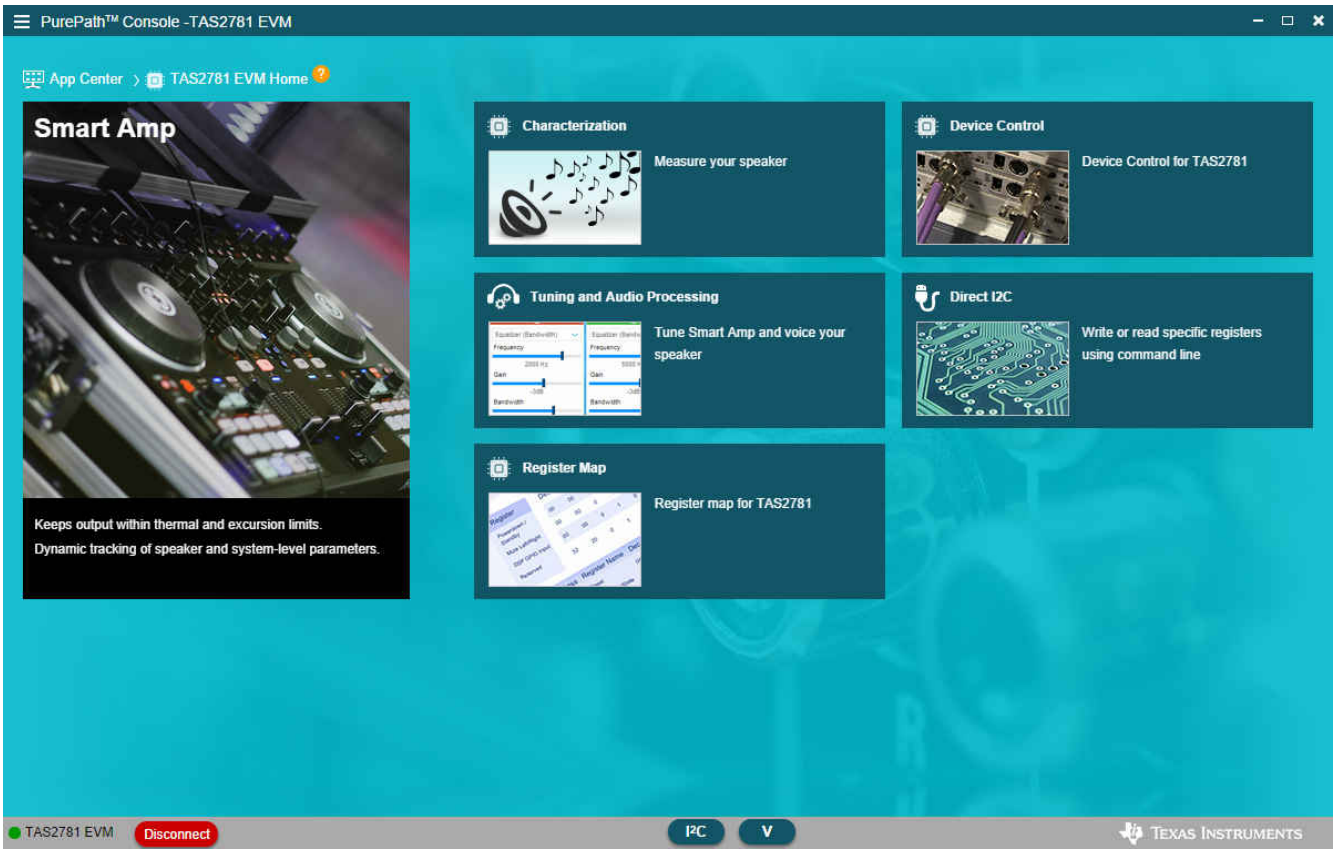

Figure 4-1. PPC3-TAS2781EVM Main Panel

4.2 Device Control Panel

This panel can be used to control all the features included in TAS2781. Default settings are ready for device evaluation. For any details on each specific feature please refer to TAS2781 data sheet.

The controls are displayed in Basic mode by default, which provides all controls in a simple way to adjust, although it can be toggled to Advanced mode which provides specific parameter settings in some of the features for more specific test modes.

Some important controls are located on the navigation bar at the top right:

1. Data Read button shows a pop up window with the data obtained from internal SAR ADC conversion such as PVDDL, PVDDH and Die Temperature, as well as the Sample Rate detected from the digital audio interface.
2. IRQ button is a useful tool during debug, this pop up window shows all the interrupt flags for both Live and Latched status.

3. Apply button must be used to configure the device with configuration options that are selected. It is important to use Apply button every time a change is done in the features shown in device control panel.

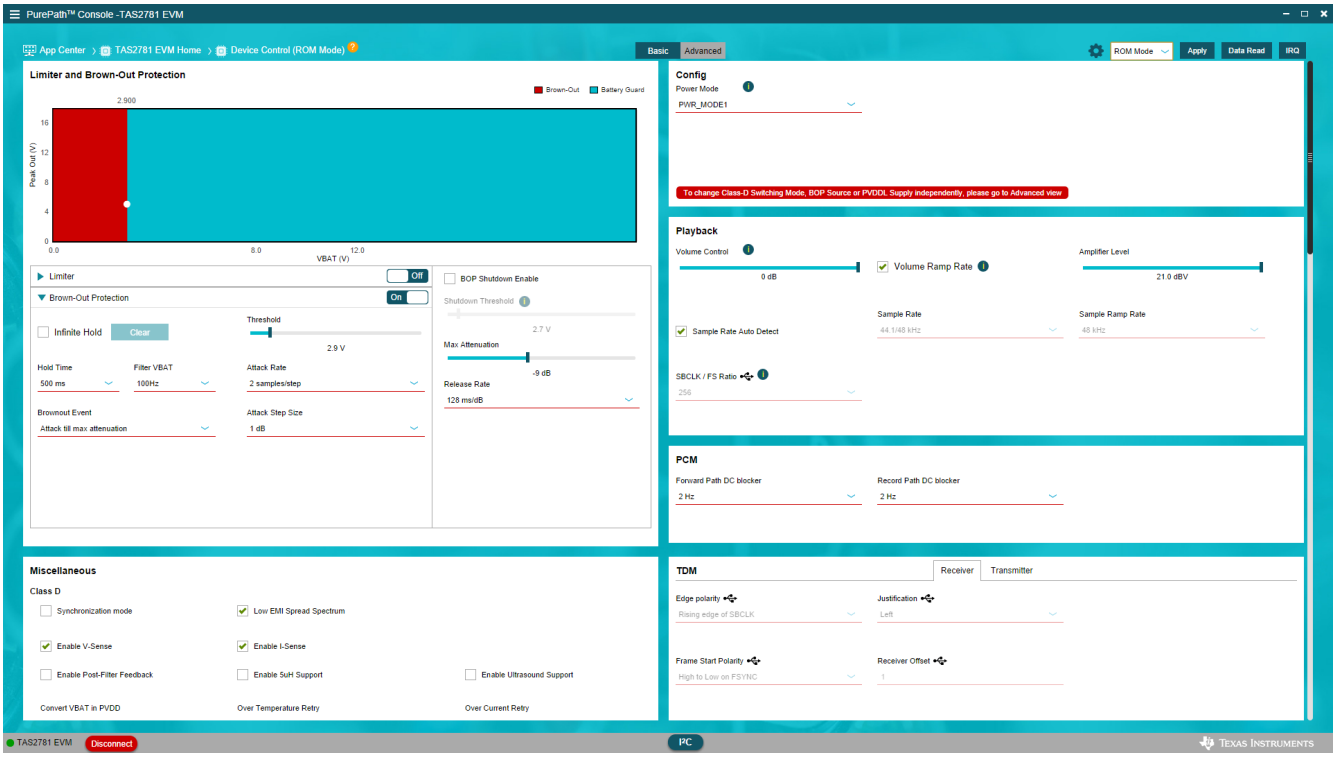

Figure 4-2. PPC3- Device Control Panel

4.3 Register Map

This panel shows the register values from TAS2781 device. It is similar information to what is included in the data sheet and it provides the ability to read the current values of all registers. The list can be sorted based on the register name or address.

Detailed description of each register is displayed on the right side when any specific register is selected on the left side.

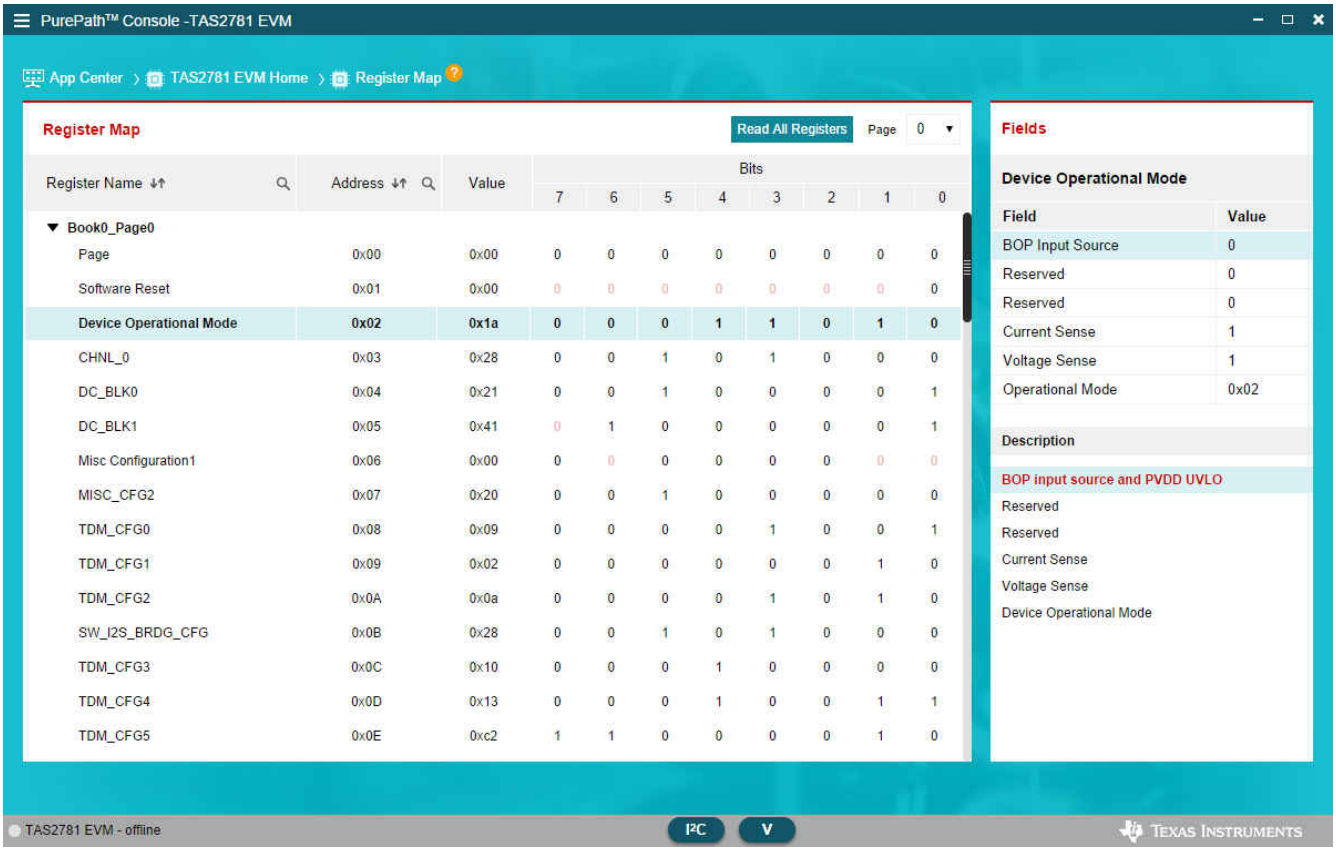

Figure 4-3. PPC3 - Register Map Panel

4.4 Direct I²C

There is a dedicated Direct I²C panel available which offers means to control the device on the evaluation board using configuration scripts in cfg format instead of GUI settings. The same panel also features a Log mode that can be used to record I²C transactions which is useful while debugging.

However the same panel is available in a pop up widow that can be used in any other panel by clicking the button in the bottom center of the PPC3 main window.

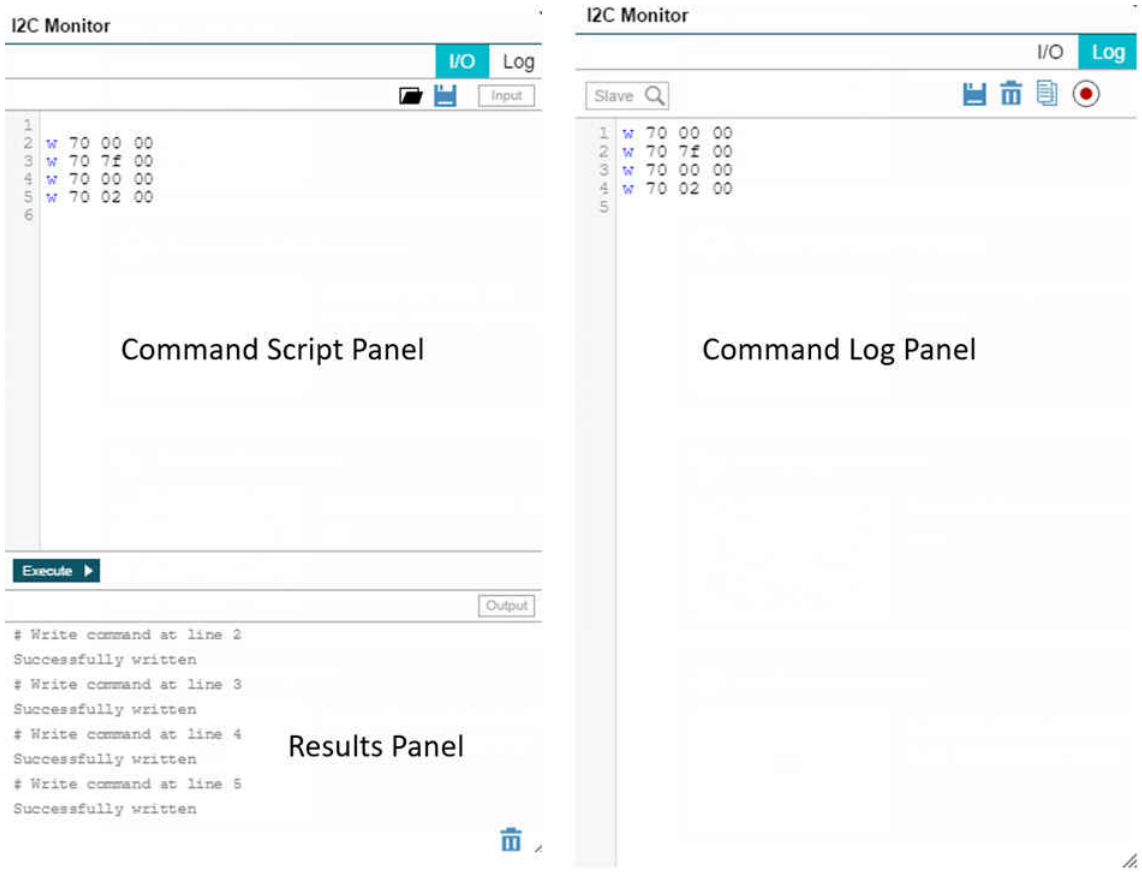

Figure 4-4. PPC3 - I²C Monitor

5 Mono Setup Quick Start

Use the following instructions to complete a mono setup using TAS2781EVM:

1. Install PPC3 with the TAS2781 plug-in.
2. Connect a speaker to J6.
3. Connect a 3.5 V to 12 V supply to connector J20 or J21.
4. Connect a Micro USB Cable from PC to TAS2781EVM.
5. Verify that TI USB Audio UAC2.0 is the default playback device by opening the sound dialog from the Windows Control Panel.

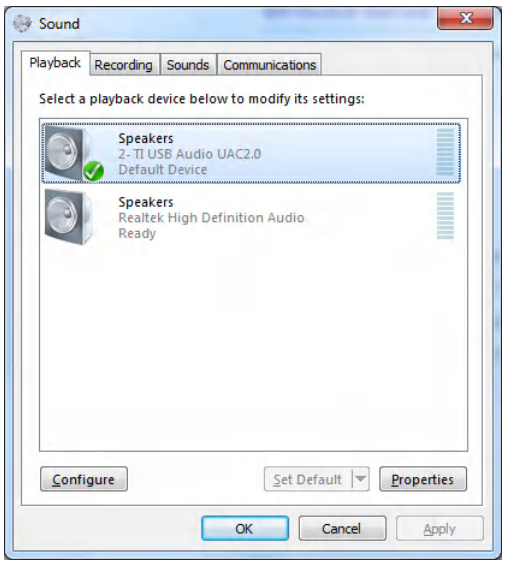

Figure 5-1. Windows Playback Devices

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

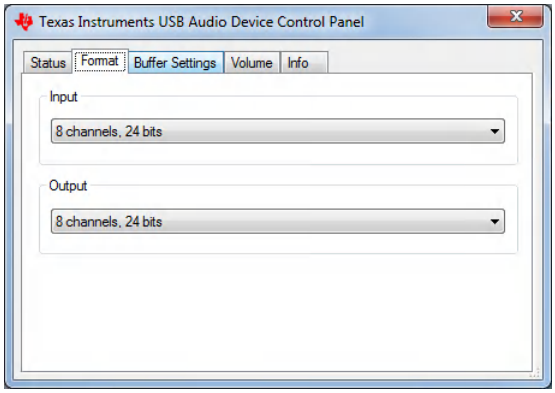

Figure 5-2. Texas Instruments USB Audio Device Control Panel

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

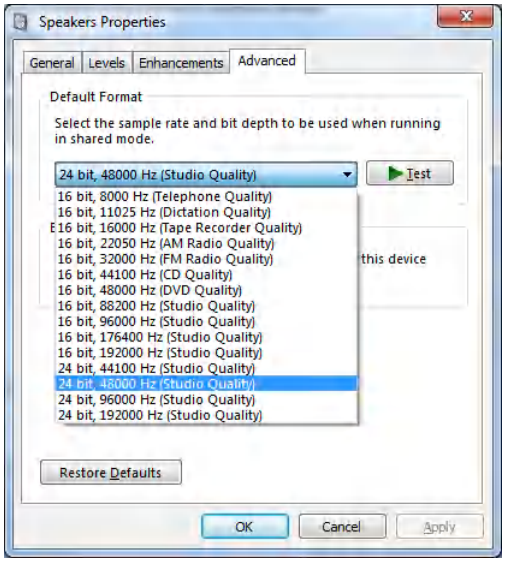

Figure 5-3. Windows Playback device Sample Rate

8. Open PPC3 and TAS2781 EVM plug in.
9. Select Mono is speaker configuration window.
10. Click Start button in top right corner.
11. Connect to EVM by clicking on the lower-left corner button.
12. Open Device Control panel from TAS2781 EVM Home.
13. Select ROM Mode from drop down menu.
14. Click Apply button to initialize the device to default settings.
15. At this point the device is ready to play audio content through USB, for example, any sound card.

6 Digital Audio Interfaces

Select the various digital audio interfaces on the TAS2781EVM through hardware and software settings. J28 header can be used to input signals from AP or other I2S signal sources, based on J24 shunt configuration.

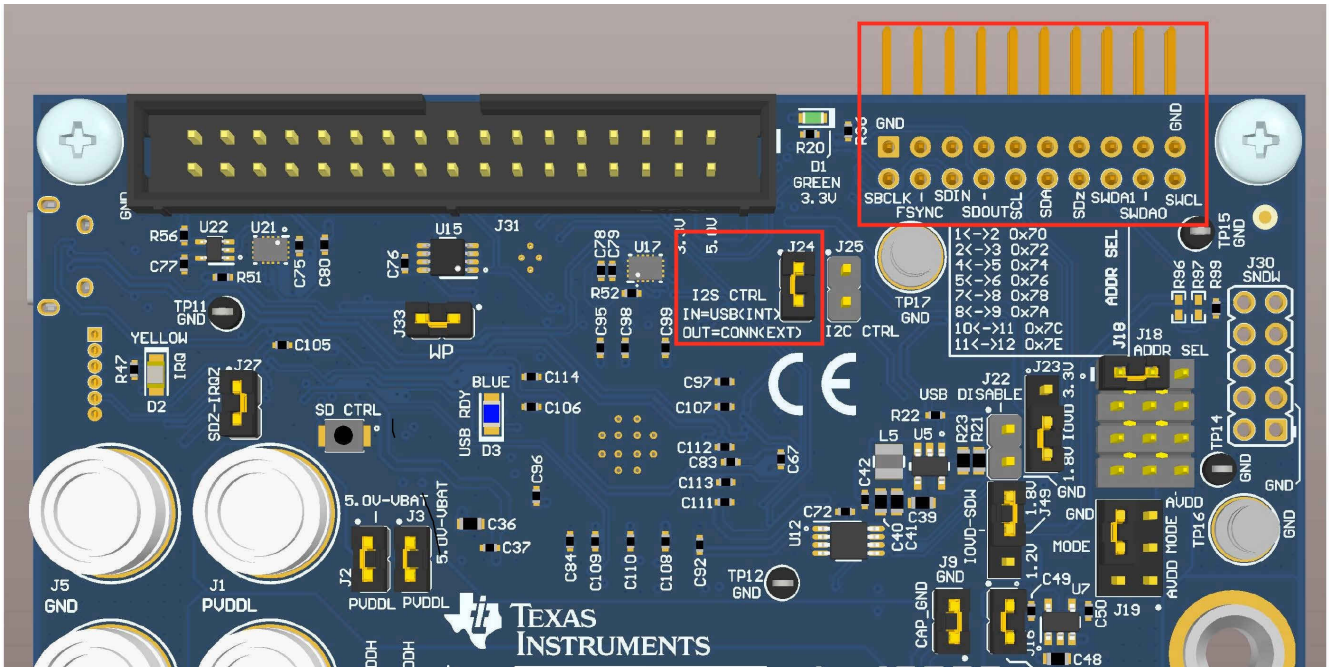

Figure 6-1. I²S Selector and Source

7 EVM Schematics

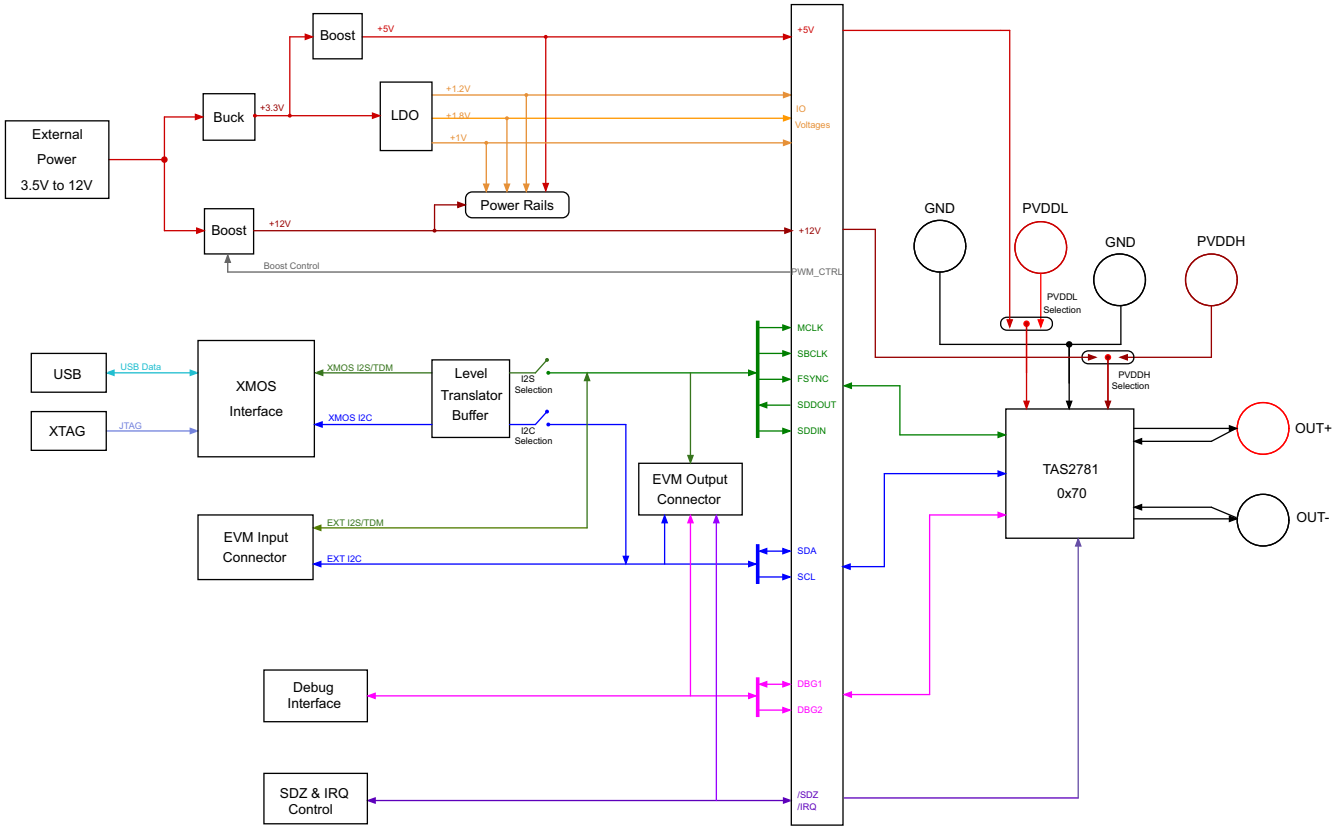

Figure 7-1. TAS2781EVM Schematic, Block Diagram

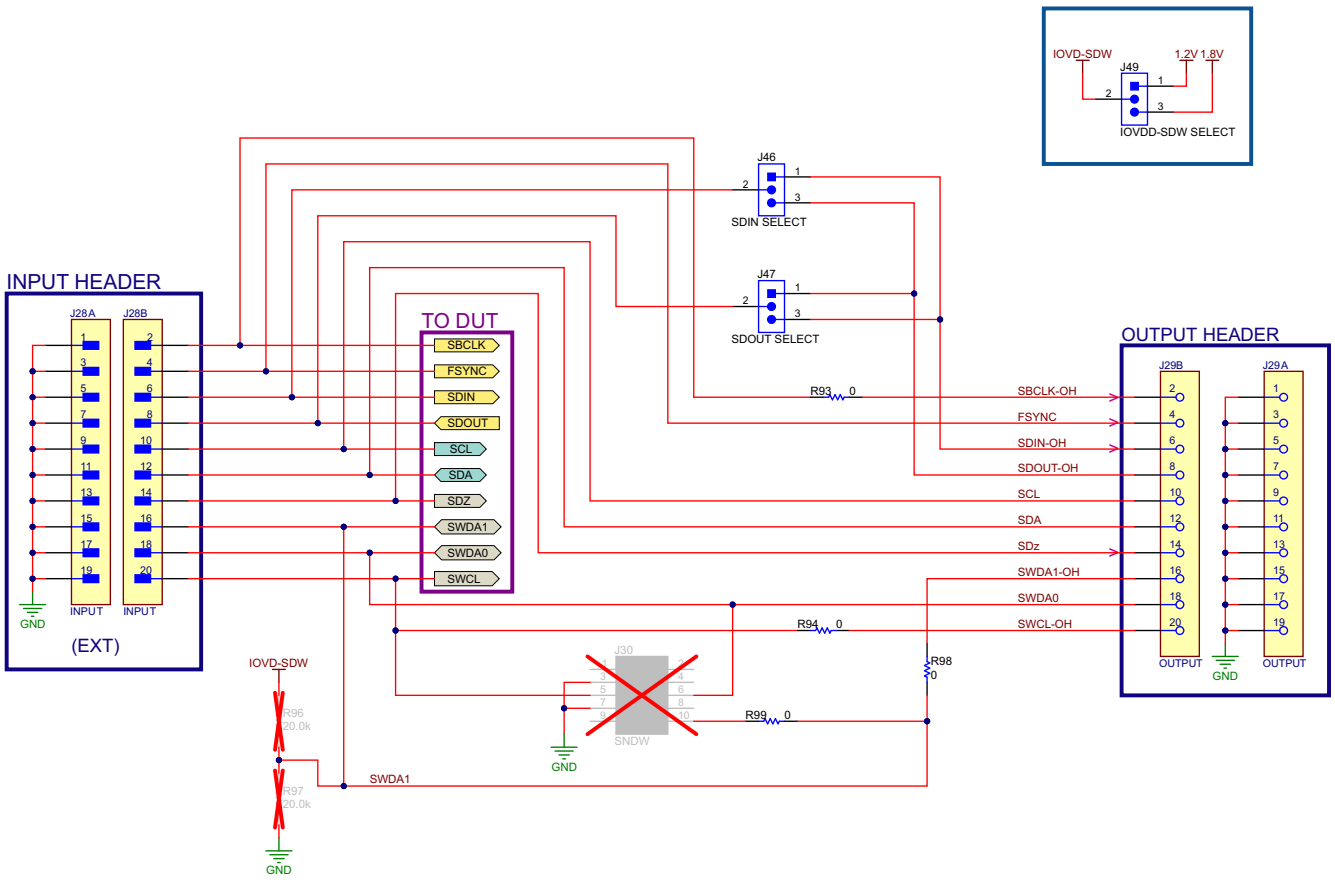

Figure 7-2. TAS2781EVM Schematic, Connectors

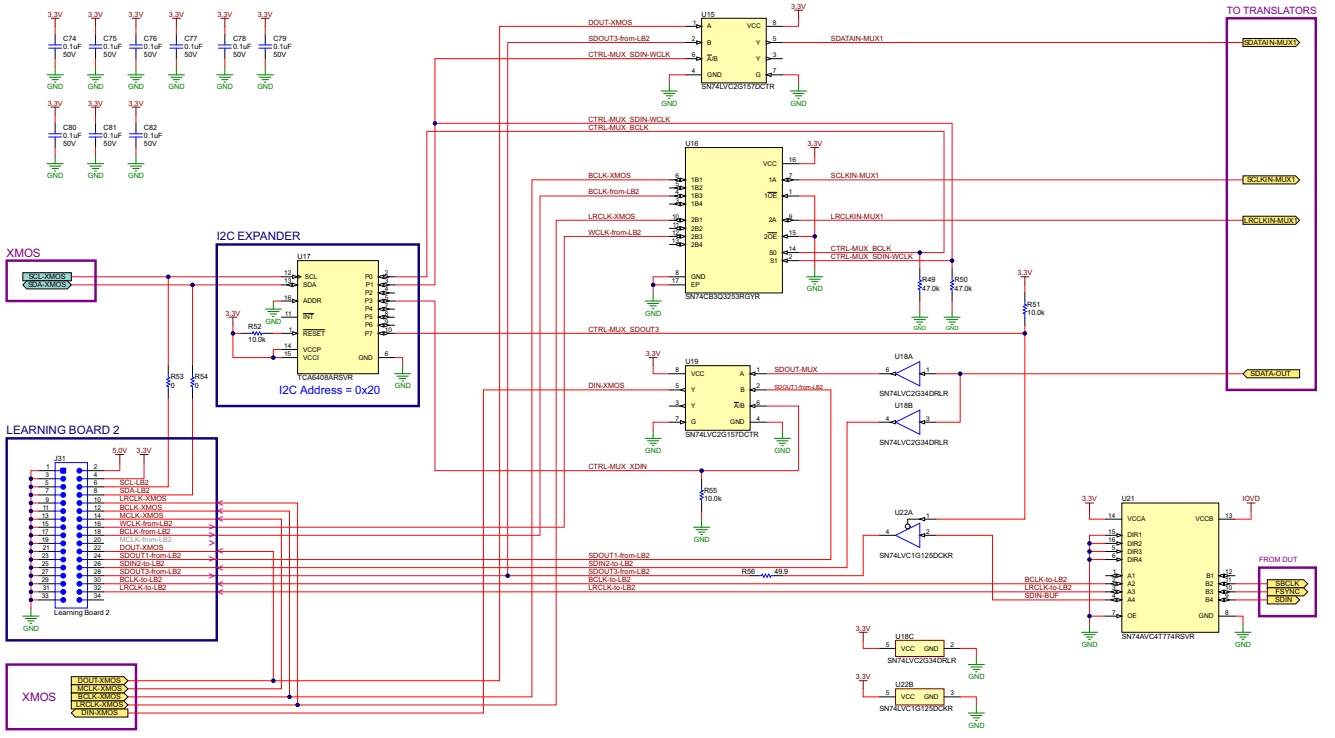

Figure 7-3. TAS2781EVM Schematic, Learning Board

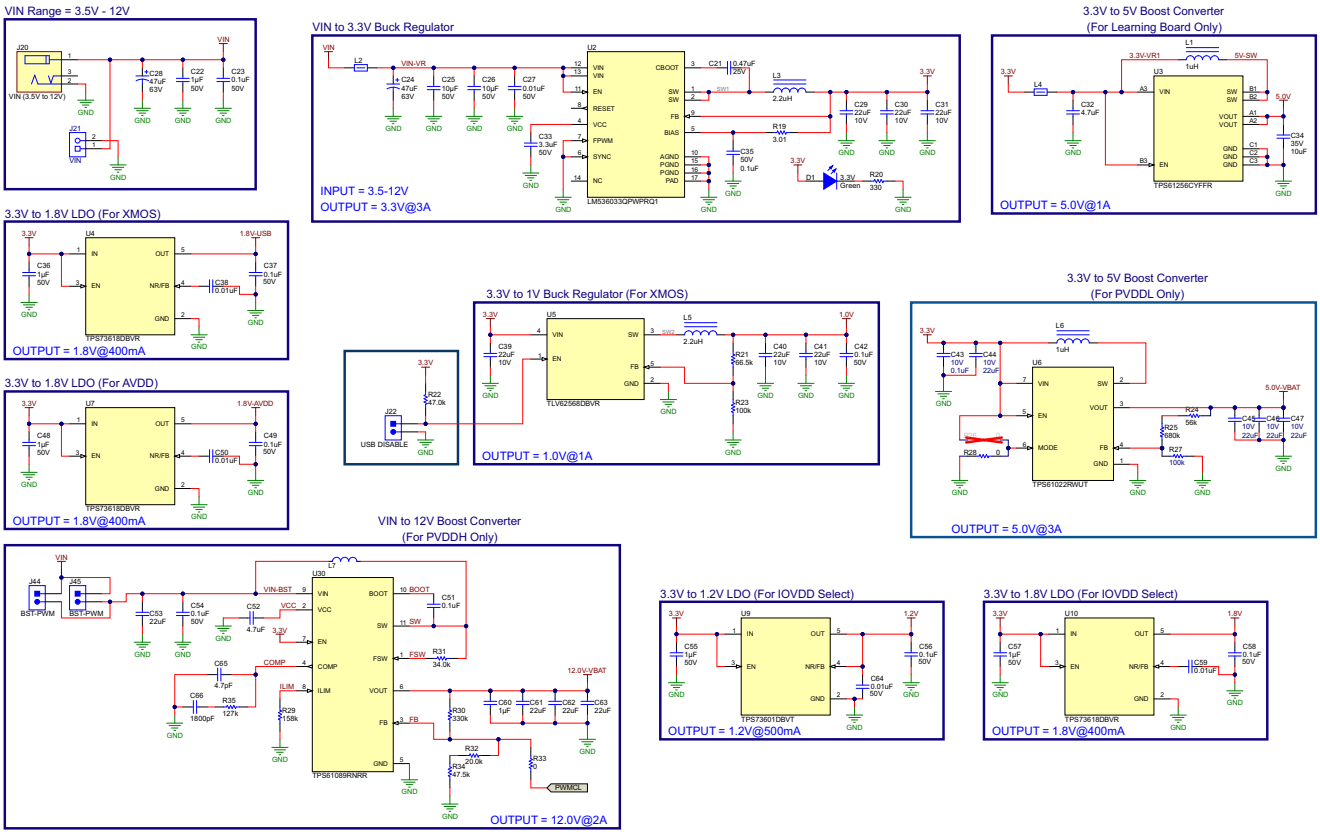

Figure 7-4. TAS2781EVM Schematic, Power Supplies

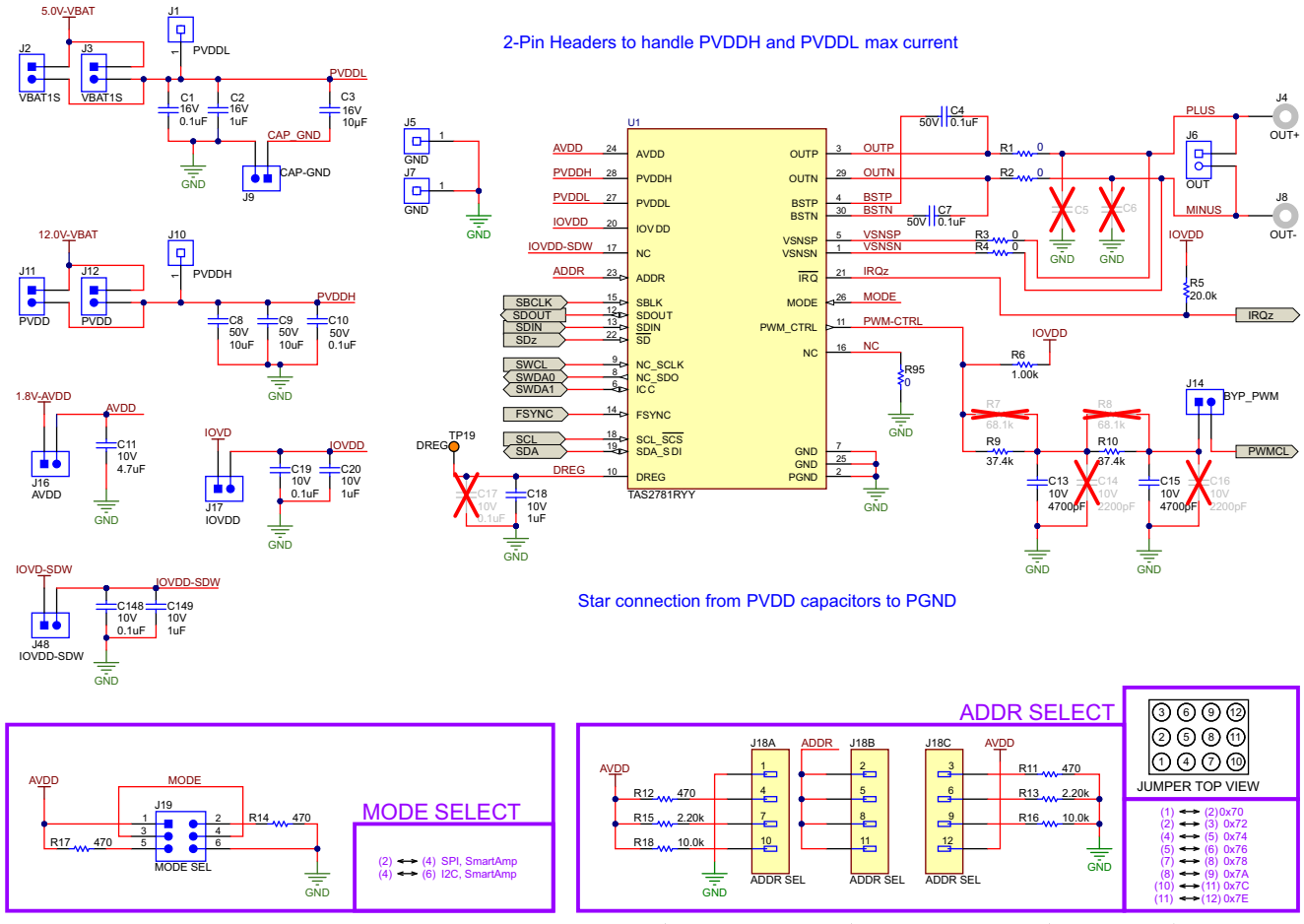

Figure 7-5. TAS2781EVM Schematic, DUT

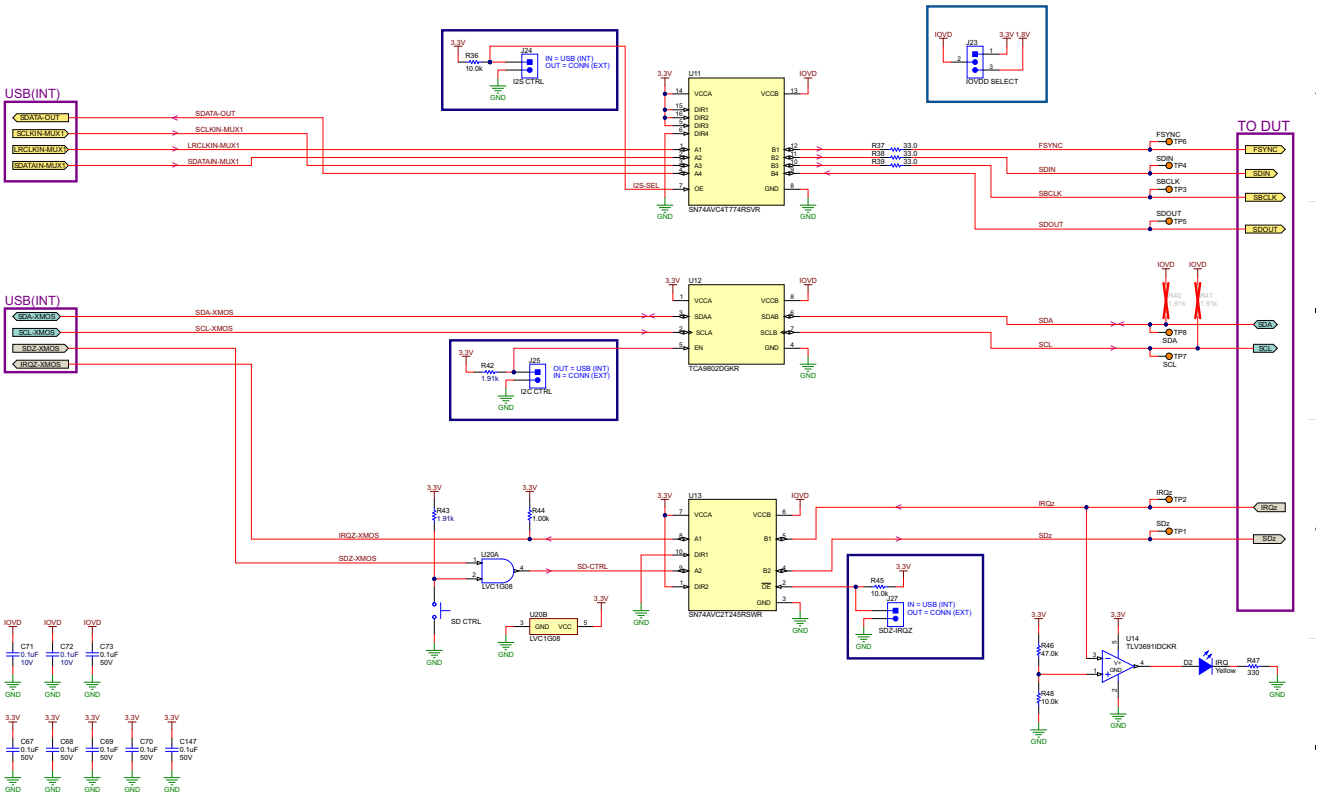

Figure 7-6. TAS2781EVM Schematic, Translators

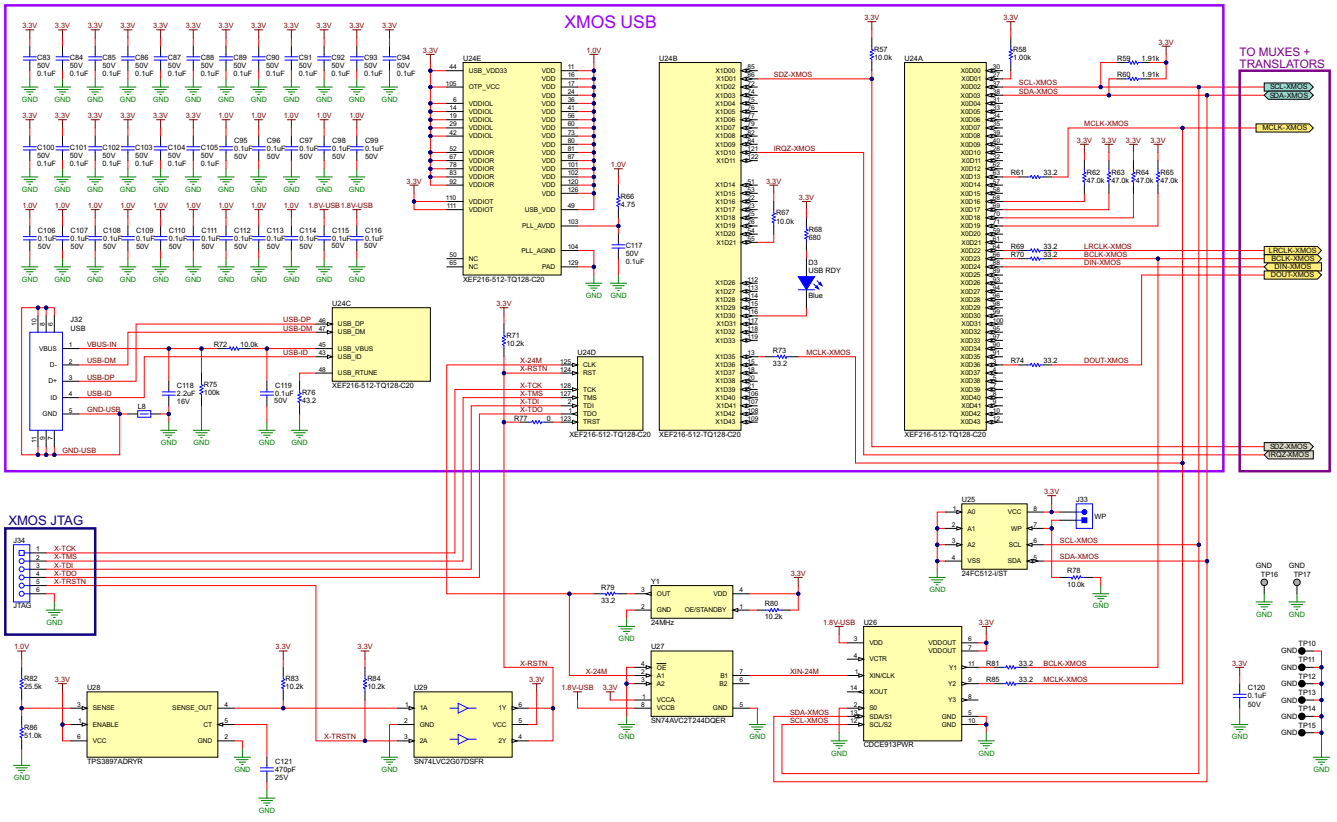

Figure 7-7. TAS2781EVM Schematic, XMOS USB

8 Schematic and Layout Guidelines

This section provides a list of important items to consider during component selection as well as layout. Following these guidelines help for proper device performance and operation.

1. All supply rails should be bypassed by low-ESR ceramic capacitors. Consider capacitance derating due to DC as this is considerably critical for higher power rails, a good rule of thumb is to select capacitors with rated voltage 2 or 3 times the supply rail voltage.

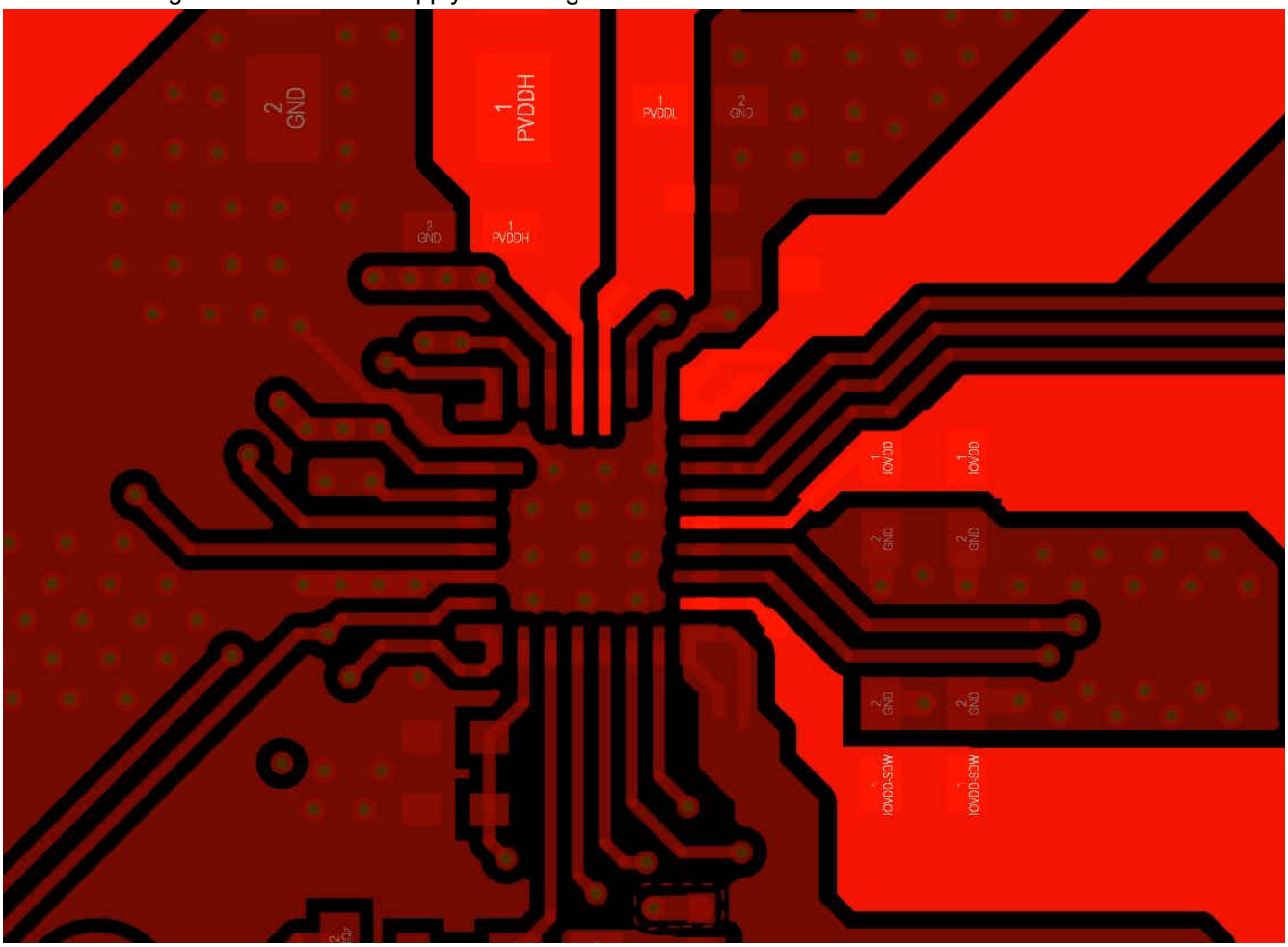

Figure 8-1. Supply Rails Layout

2. Use GND planes with multiple conductive epoxy filled vias to create a low impedance connection to PGND and GND, this also helps to minimize the GND noise. The layout design must target minimum parasitic loop inductance between PVDDH, PGND pins and decoupling capacitor.

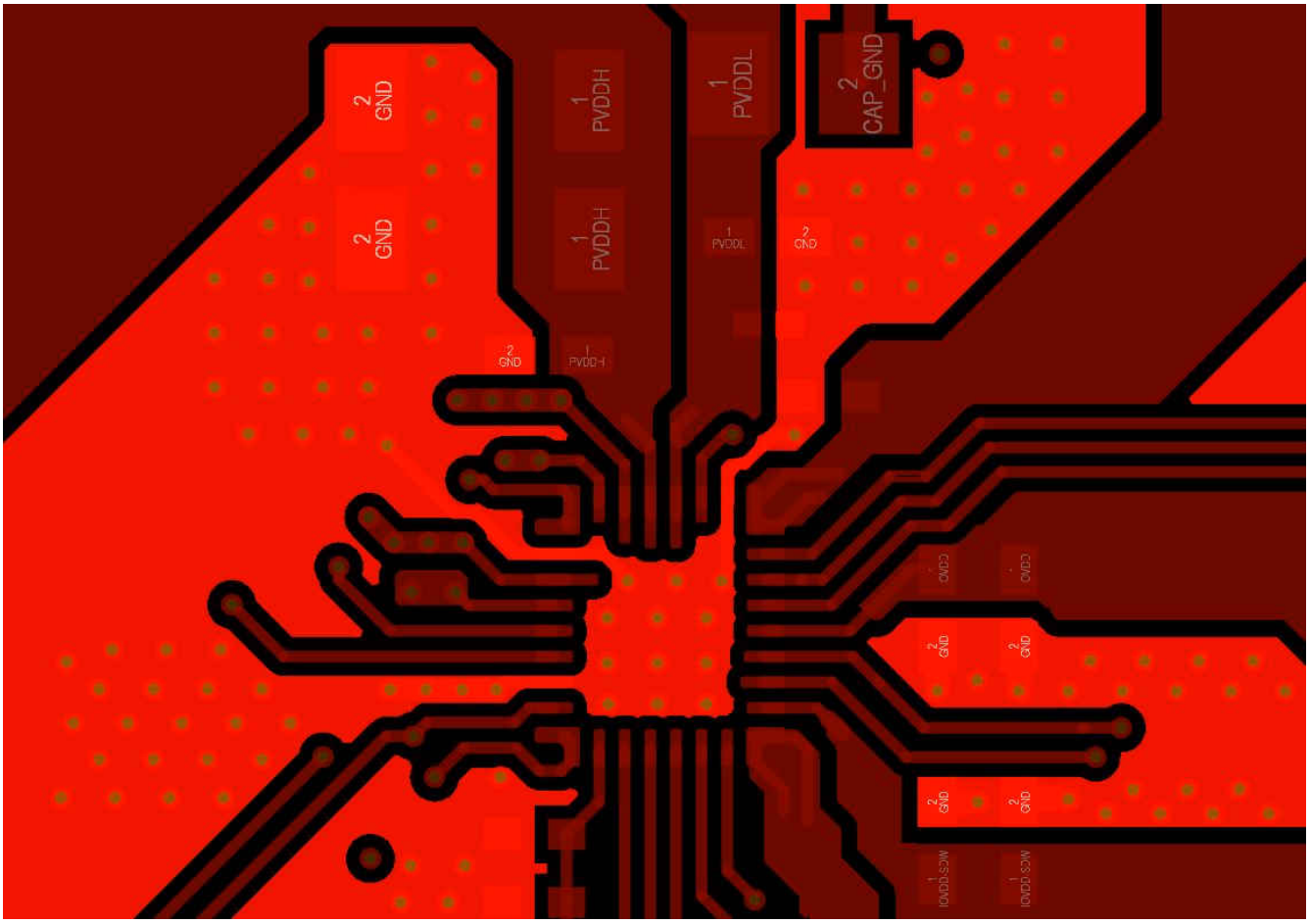

Figure 8-2. GND Layout

3. Use wider traces that carry high current such as PVDDH, PVDDL, OUT_P and OUT_N.
4. Connect VSNS_P and VSNS_N as close as possible to the speaker.
5. VSNS_P and VSNS_N should be connected between the EMI ferrite filter and the speaker if EMI ferrites are used at the outputs.
6. VSNS_P and VSNS_N routing should be separated and shielded from switching signals such as interface signals, speaker outputs and bootstrap pins.
7. Place bootstrap capacitors as close as possible to the BSTP/N pins.

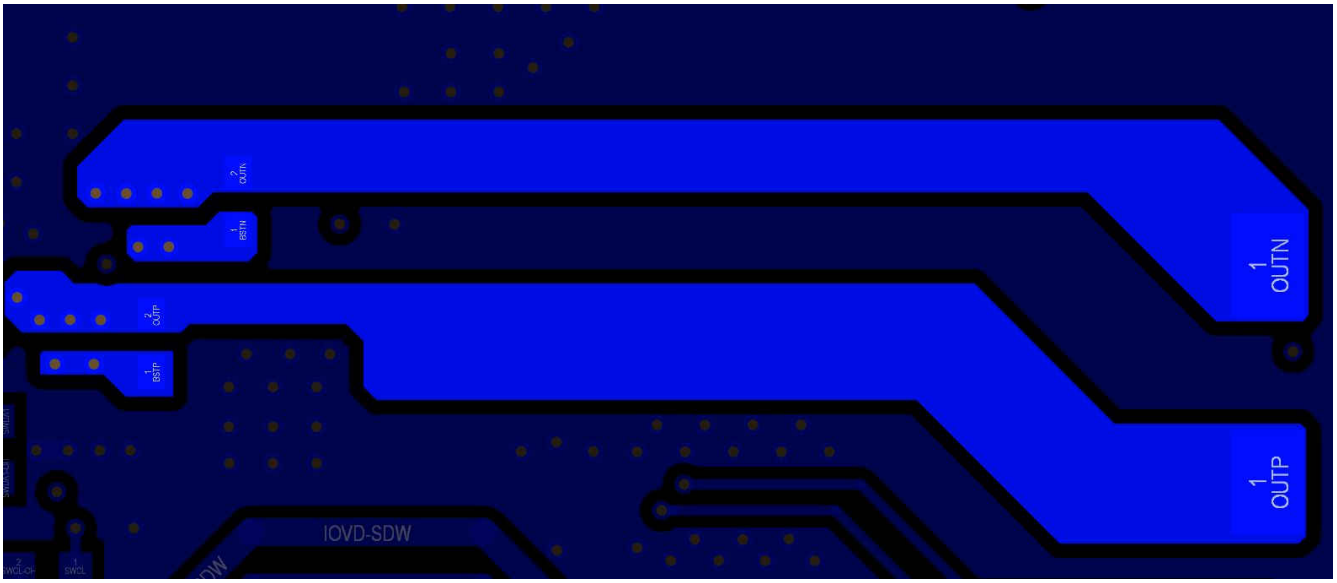

Figure 8-3. Bootstrap and Outputs Layout

9 Bill of Materials

Table 9-1. TAS2781EVM Bill of Materials

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	Printed Circuit Board	!PCB1	AMPS172	1	Any				
Fitted	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X5R, 0201	C1	GRM033R61C104KE84D	1	MuRata	0201	0.1uF		
Fitted	CAP, CERM, 1 uF, 16 V, +/- 10%, X5R, 0402	C2	C1005X5R1E105K050BC	1	TDK	0402	1uF		C1005X5R1C105K050BC
Fitted	CAP, CERM, 10 uF, 16 V, +/- 10%, X7R, 0805	C3	CL21B106KOQNNNE	1	Samsung Electro-Mechanics	0805	10uF		

Table 9-1. TAS2781EVM Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	CAP, CERM, 0.1 uF, 50 V, +/- 10%, X7R, 0402	C4, C7, C10, C23, C35, C37, C42, C49, C51, C54, C56, C58, C67, C68, C69, C70, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100, C101, C102, C103, C104, C105, C106, C107, C108, C109, C110, C111, C112, C113, C114, C115, C116, C117, C119, C120, C147	C1005X7R1H104K050BB	64	TDK	0402	0.1uF		
Fitted	CAP, CERM, 10 uF, 50 V, +/- 10%, X7R, 1206	C8, C9	CL31B106KBHNNNE	2	Samsung	1206	10uF		
Fitted	CAP, CERM, 4.7 uF, 10 V, +/- 20%, X5R, 0402	C11	GRM155R61A475M	1	MuRata	0402	4.7uF		

Table 9-1. TAS2781EVM Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	CAP, CERM, 4700 pF, 10 V, +/- 20%, X5R, 0201	C13, C15	GRM033R61A472MA01D	2	MuRata	0201	4700pF	MuRata	GRM033R61E472MA12D
Fitted	CAP, CERM, 1 uF, 10 V,+/- 10%, X6S, 0402	C18, C20, C149	GRM155C81A105KA12D	3	MuRata	0402	1uF		
Fitted	CAP, CERM, 0.1 uF, 10 V, +/- 10%, X7R, 0402	C19, C71, C72, C148	GRM155R71A104KA01D	4	MuRata	0402	0.1uF		
Fitted	CAP, CERM, 0.47 uF, 25 V, +/- 10%, X7R, 0603	C21	GRM188R71E474KA12D	1	MuRata	0603	0.47uF		
Fitted	CAP, CERM, 1 µF, 50 V,+/- 20%, X5R, AEC-Q200 Grade 3, 0603	C22, C36, C48, C55, C57, C60	CGA3E3X5R1H105M080AB	6	TDK	0603	1uF		
Fitted	CAP, AL, 47 uF, 63 V, +/- 20%, 0.65 ohm, AEC-Q200 Grade 2, SMD	C24, C28	EEE-FK1J470P	2	Panasonic	SMT Radial F	47uF	Vishay-Dale	MAL215099801E3
Fitted	CAP, CERM, 10 µF, 50 V,+/- 20%, JB, 1210	C25, C26	C3225JB1H106M250AB	2	TDK	1210	10uF	TDK	CNA6P1X7R1H106K250AE
Fitted	CAP, CERM, 0.01 uF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0402	C27, C38, C50, C59, C64	CGA2B3X7R1H103K050BB	5	TDK	0402	0.01uF		
Fitted	CAP, CERM, 22 uF, 10 V, +/- 20%, X5R, 0603	C29, C30, C31, C39, C40, C41	C1608X5R1A226M080AC	6	TDK	0603	22uF		
Fitted	CAP, CERM, 4.7 uF, 16 V, +/- 10%, X5R, 0603	C32, C52	GRM188R61C475KAAJ	2	MuRata	0603	4.7uF		
Fitted	CAP, CERM, 3.3 uF, 50 V, +/- 10%, X5R, 0805	C33	C2012X5R1H335K125AB	1	TDK	0805	3.3uF		
Fitted	CAP, CERM, 10 uF, 35 V, +/- 10%, X7R, 1206_190	C34	GMK316AB7106KL-TR	1	Taiyo Yuden	1206_190	10uF		
Fitted	CAP, CERM, 0.1 uF, 10 V, +/- 10%, X5R, 0402	C43	GRM155R61A104KA01D	1	MuRata	0402	0.1uF		
Fitted	CAP, CERM, 22 uF, 10 V, +/- 20%, X5R, 0805	C44, C45, C46, C47	GRM21BR61A226ME44L	4	MuRata	0805	22uF		
Fitted	CAP, CERM, 22 uF, 25 V, +/- 10%, X7R, 1210	C53, C61, C62, C63	GRM32ER71E226KE15L	4	MuRata	1210	22uF		
Fitted	CAP, CERM, 4.7 pF, 50 V, +/- 5%, C0G/NP0, 0201	C65	GRM0335C1H4R7CA01D	1	MuRata	0201	4.7pF		
Fitted	CAP, CERM, 1800 pF, 10 V, +/- 10%, X5R, 0201	C66	GRM033R61A182KA01D	1	MuRata	0201	1800pF		

Table 9-1. TAS2781EVM Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	CAP, CERM, 2.2 uF, 16 V,+/- 10%, X7R, 0603	C118	EMK107BB7225MA-T	1	Taiyo Yuden	0603	2.2uF		
Fitted	CAP, CERM, 470 pF, 25 V, +/- 5%, C0G/NP0, 0402	C121	GRM1555C1E471JA01D	1	MuRata	0402	470pF		
Fitted	LED, Green, SMD	D1	LTST-C191KGKT	1	Lite-On	LED_0603	Green		
Fitted	LED, Yellow , SMD	D2	LTST-C170KSKT	1	Lite-On	0805 LED	Yellow		
Fitted	LED, Blue, SMD	D3	LTST-C170TBKT	1	Lite-On	LED_0805	Blue		
Fitted	MACHINE SCREW PAN PHILLIPS M3	H1, H2, H3, H4	RM3X8MM 2701	4	APM HEXSEAL	M3 Screw			
Fitted	Standoff, Hex,25mm Length, M3, Aluminum	H5, H6, H7, H8	24438	4	Keystone	Standoff M3			
Fitted	Binding Post, Nickel, TH	J1, J5, J7, J10	111-2223-001	4	Cinch Connectivity	Receptacle, 1x1 Position, Dia 9.8mm, TH			
Fitted	Header, 100mil, 2x1, Gold, TH	J2, J3, J9, J11, J12, J14, J16, J17, J22, J24, J25, J27, J33, J44, J45, J48	PBC02SAAN	16	Sullins Connector Solutions	Sullins 100mil, 1x2, 230 mil above insulator			
Fitted	Standard Banana Jack, Uninsulated, 5.5mm	J4, J8	575-4	2	Keystone	Keystone_575-4			
Fitted	Conn Term Block, 2POS, 3.81mm, TH	J6	1727010	1	Phoenix Contact	2POS Terminal Block			
Fitted		J18	TSW-104-07-G-T	1	Samtec	HDR12			
Fitted	Header, 100mil, 3x2, Gold, TH	J19	TSW-103-07-G-D	1	Samtec	3x2 Header			
Fitted	Power Jack, mini, 2.5mm OD, R/A, TH	J20	RAPC712X	1	Switchcraft	Jack, 14.5x11x9mm			
Fitted	Terminal Block, 5.08mm, 2x1, TH	J21	0395443002	1	Molex	Terminal Block, 5.08mm, 2x1, TH			
Fitted	Header, 100mil, 3x1, Gold, TH	J23, J46, J47, J49	PBC03SAAN	4	Sullins Connector Solutions	PBC03SAAN			
Fitted		J28	TSW-110-08-G-D-RA	1	Samtec	HDR20			

Table 9-1. TAS2781EVM Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	20 Position Receptacle Connector Through Hole, Right Angle	J29	SSQ-110-02-G-D-RA	1	SAMTEC	HDR20			
Fitted	Header(shrouded), 2.54mm, 17x2, Gold, TH	J31	302-S341	1	On-Shore Technology	Header(shrouded), 2.54mm, 17x2, TH			
Fitted	Connector, Receptacle, Micro-USB Type AB, R/A, Bottom Mount SMT	J32	0475890001	1	Molex	Connector, USB Micro AB		JAE Electronics	DX4R205JJAR1800
Fitted	Receptacle, 50mil, 6x1, Gold, R/A, TH	J34	LPPB061NGCN-RC	1	Sullins Connector Solutions	6x1 Receptacle			
Fitted	Inductor, Flat Wire, 1 uH, 3.1 A, 0.045 ohm, SMD	L1	1277AS-H-1R0M=P2	1	MuRata Toko	3.2x1.2x2.5mm	1uH		
Fitted	Ferrite Bead, 300 ohm @ 100 MHz, 3.1 A, 0806	L2, L4	NFZ2MSM301SN10L	2	MuRata	0806	300 ohm		
Fitted	Inductor, Shielded, 2.2 uH, 4 A, 0.061 ohm, AEC-Q200 Grade 0, SMD	L3	SRP4020TA-2R2M	1	Bourns	4.45x1.8x4.06mm	2.2uH		
Fitted	Inductor, Multilayer, Ferrite, 2.2 uH, 1.3 A, 0.08 ohm, SMD	L5	LQM2HPN2R2MG0L	1	MuRata	SMD, Body 2.5x2mm, Height 1.2mm	2.2uH		
Fitted	Inductor, Shielded, Composite, 1 uH, 21.8 A, 0.00455 ohm, SMD	L6	XAL7030-102MEB	1	Coilcraft	XAL7030	1uH		
Fitted	1µH Shielded Wirewound Inductor 4.1A 22mOhm Max 1210 (3225 Metric)	L7	DFE322520FD-1R0M=P2	1	Murata	1210 (3225)	1uH		
Fitted	Ferrite Bead, 30 ohm @ 100 MHz, 6 A, 0805	L8	MPZ2012S300AT000	1	TDK	0805	30 ohm		
Fitted	RES, 0, 5%, 0.25 W, 1206	R1, R2, R95	RC1206JR-070RL	3	Yageo America	1206	0		
Fitted	RES, 0, 5%, 0.1 W, AEC-Q200 Grade 0, 0402	R3, R4, R53, R54, R77, R93, R94, R98, R99	ERJ-2GE0R00X	9	Panasonic	0402	0		
Fitted	RES, 20.0 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	R5, R32	CRCW040220K0FKED	2	Vishay-Dale	0402	20.0k		
Fitted	RES, 1.00 k, 1%, 0.1 W, 0402	R6, R44, R58	ERJ-2RKF1001X	3	Panasonic	0402	1.00k		

Table 9-1. TAS2781EVM Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	RES, 37.4 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	R9, R10	CRCW040237K4FKED	2	Vishay-Dale	0402	37.4k		
Fitted	RES, 470, 1%, 0.063 W, 0402	R11, R12, R14, R17	RC0402FR-07470RL	4	Yageo America	0402	470		
Fitted	RES, 2.20 k, 1%, 0.1 W, 0402	R13, R15	ERJ-2RKF2201X	2	Panasonic	0402	2.20k		
Fitted	RES, 10.0 k, 1%, 0.063 W, 0402	R16, R18, R36, R45, R48, R51, R52, R55, R57, R67, R72	RC0402FR-0710KL	11	Yageo America	0402	10.0k		
Fitted	RES, 3.01, 1%, 0.1 W, 0603	R19	RC0603FR-073R01L	1	Yageo	0603	3.01		
Fitted	RES, 330, 1%, 0.1 W, AEC-Q200 Grade 0, 0402	R20, R47	ERJ-2RKF3300X	2	Panasonic	0402	330		
Fitted	RES, 66.5 k, 1%, 0.1 W, 0603	R21	RC0603FR-0766K5L	1	Yageo	0603	66.5k		
Fitted	RES, 47.0 k, 1%, 0.0625 W, 0402	R22, R46, R49, R50, R62, R63, R64, R65	RC0402FR-0747KL	8	Yageo America	0402	47.0k		
Fitted	RES, 100 k, 1%, 0.1 W, 0603	R23	RC0603FR-07100KL	1	Yageo	0603	100k		
Fitted	RES, 56 k, 5%, 0.1 W, 0603	R24	RC0603JR-0756KL	1	Yageo	0603	56k		
Fitted	RES, 680 k, 1%, 0.1 W, 0603	R25	RC0603FR-07680KL	1	Yageo	0603	680k		
Fitted	RES, 100 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	R27	CRCW0603100KFKEA	1	Vishay-Dale	0603	100k		
Fitted	RES, 0, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	R28	ERJ-3GEY0R00V	1	Panasonic	0603	0		
Fitted	RES, 158 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	R29	CRCW0402158KFKED	1	Vishay-Dale	0402	158k		
Fitted	RES, 330 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	R30	CRCW0402330KFKED	1	Vishay-Dale	0402	330k		

Table 9-1. TAS2781EVM Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	RES, 34.0 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	R31	CRCW040234K0FKED	1	Vishay-Dale	0402	34.0k		
Fitted	RES, 0, 5%, 0.1 W, AEC-Q200 Grade 0, 0402	R33	ERJ-2GE0R00X	1	Panasonic	0402			
Fitted	RES, 47.5 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	R34	CRCW040247K5FKED	1	Vishay-Dale	0402	47.5k		
Fitted	RES, 127 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	R35	CRCW0402127KFKED	1	Vishay-Dale	0402	127k		
Fitted	RES, 33.0, 1%, 0.1 W, 0402	R37, R38, R39	ERJ-2RKF33R0X	3	Panasonic	0402	33.0		
Fitted	RES, 1.91 k, 1%, 0.1 W, 0603	R42, R43, R59, R60	RC0603FR-071K91L	4	Yageo	0603	1.91k		
Fitted	RES, 49.9, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	R56	RMCF0402FT49R9	1	Stackpole Electronics Inc	0402	49.9		
Fitted	RES, 33.2, 1%, 0.05 W, 0201	R61, R69, R70, R73, R74, R79, R81, R85	RC0201FR-0733R2L	8	Yageo America	0201	33.2		
Fitted	RES, 4.75, 1%, 0.1 W, 0603	R66	RC0603FR-074R75L	1	Yageo	0603	4.75		
Fitted	RES, 680, 1%, 0.1 W, 0603	R68	RC0603FR-07680RL	1	Yageo	0603	680		
Fitted	RES, 10.2 k, 1%, 0.05 W, 0201	R71, R80, R83, R84	RC0201FR-0710K2L	4	Yageo America	0201	10.2k		
Fitted	RES, 100 k, 1%, 0.1 W, 0402	R75	ERJ-2RKF1003X	1	Panasonic	0402	100k		
Fitted	RES, 43.2, 1%, 0.1 W, 0603	R76	RC0603FR-0743R2L	1	Yageo	0603	43.2		
Fitted	RES, 10.0 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	R78	RMCF0402FT10K0	1	Stackpole Electronics Inc	0402	10.0k		
Fitted	RES, 25.5 k, 1%, 0.05 W, 0201	R82	RC0201FR-0725K5L	1	Yageo America	0201	25.5k		
Fitted	RES, 51.0 k, 1%, 0.05 W, 0201	R86	RC0201FR-0751KL	1	Yageo America	0201	51.0k		

Table 9-1. TAS2781EVM Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	SWITCH TACTILE SPST-NO 0.05A 12V	SD CTRL	B3U-1000P	1	Omron Electronic Components	3x1.6x2.5mm		Omron Electronic Components	B3U-1000P-B
Fitted	Shunt, 100mil, Gold plated, Black	SH1, SH2, SH3, SH4, SH5, SH6, SH7, SH8, SH9, SH10, SH11, SH12, SH13, SH14, SH15, SH16, SH17, SH18, SH19	SNT-100-BK-G	19	Samtec	Shunt	1x2	3M	969102-0000-DA
Fitted	Test Point, Miniature, Orange, TH	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP19	5003	9	Keystone Electronics	Orange Miniature Testpoint			
Fitted	Test Point, Miniature, Black, TH	TP10, TP11, TP12, TP13, TP14, TP15	5001	6	Keystone Electronics	Black Miniature Testpoint			
Fitted	Terminal, Turret, TH, Double	TP16, TP17	1503-2	2	Keystone	Keystone1503-2			
Fitted	Class D Amplifier with Integrated DSP	U1	TAS2781RYY	1	Texas Instruments	VQFN-HR30			
Fitted	3.5 to 36Vin, 3 Ampere Synchronous DC-DC Converter for Automotive Applications, PWP0016D (TSSOP-16)	U2	LM536033QPWPRQ1	1	Texas Instruments	PWP0016D		Texas Instruments	LM536033QPWPTQ1
Fitted	3.5-MHz High Efficiency Step-Up Converter in Chip Scale Package, YFF0009ACAG (DSBGA-9)	U3	TPS61256CYFFR	1	Texas Instruments	YFF0009ACAG		Texas Instruments	TPS61256CYFFT

Table 9-1. TAS2781EVM Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	Single Output LDO, 400mA, Adj.(1.2 to 5.5V), Cap free, Low Noise, Reverse Current Protection, DBV0005A (SOT-23-5)	U4, U7, U10	TPS73618DBVR	3	Texas Instruments	DBV0005A			
Fitted	1-A High Efficiency Step-Down Converter in SOT23-5 Package, DBV005A, DBV0005A (SOT-5)	U5	TLV62568DBVR	1	Texas Instruments	DBV0005A		Texas Instruments	TLV62568DBVT
Fitted	8-A Boost Converter with 0.5-V Ultra-Low Input Voltage, RWU0007A (VQFN-HR-7)	U6	TPS61022RWUT	1	Texas Instruments	RWU0007A		Texas Instruments	TPS61022RWUR
Fitted	Single Output LDO, 400mA, Adj.(1.2 to 5.5V), Cap free, Low Noise, Reverse Current Protection, DBV0005A (SOT-23-5)	U9	TPS73601DBVT	1	Texas Instruments	DBV0005A			
Fitted	4-Bit Dual-Supply Bus Transceiver With Configurable Voltage-Level Shifting and 3-State Outputs, RSV0016A (UQFN-16)	U11, U21	SN74AVC4T774RSVR	2	Texas Instruments	RSV0016A		Texas Instruments	
Fitted	Level-Translating I2C Bus Buffer/Repeater, DGK0008A (VSSOP-8)	U12	TCA9802DGKR	1	Texas Instruments	DGK0008A		Texas Instruments	TCA9802DGKT
Fitted	Dual-Bit, 2-DIR pin Dual-Supply Bus Transceiver w/ Configurable Voltage Translation, 3-State Output, UQFN-10, RSW0010A (UQFN-10)	U13	SN74AVC2T245RSWR	1	Texas Instruments	RSW0010A		Texas Instruments	
Fitted	0.9V to 6.5V, Nano-Power Comparator, DCK0005A (SOT-SC70-5)	U14	TLV3691IDCKR	1	Texas Instruments	DCK0005A		Texas Instruments	TLV3691IDCKT
Fitted	Single 2-Line to 1-Line Data Selector/Multiplexer, DCT0008A, LARGE T&R	U15, U19	SN74LVC2G157DCTR	2	Texas Instruments	DCT0008A		Texas Instruments	SN74LVC2G157DCUT

Table 9-1. TAS2781EVM Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	Dual 1-of-4 FET Multiplexer/Demultiplexer 2.5-V/3.3-V Low-Voltage High-Bandwidth Bus Switch, RGY0016A (VQFN-16)	U16	SN74CB3Q3253RGYR	1	Texas Instruments	RGY0016A		Texas Instruments	
Fitted	Low-Voltage 8-Bit I2C and SMBus I/O Expander, 1.65 to 5.5 V, -40 to 85 degC, 16-pin UQFN (RSV), Green (RoHS & no Sb/Br)	U17	TCA6408ARSVR	1	Texas Instruments	RSV0016A			
Fitted	Dual Buffer Gate, DRL0006A, LARGE T&R	U18	SN74LVC2G34DRLR	1	Texas Instruments	DRL0006A		Texas Instruments	
Fitted	Single 2-Input Positive-AND Gate, DCK0005A, LARGE T&R	U20	SN74LVC1G08DCKR	1	Texas Instruments	DCK0005A			
Fitted	Single Bus Buffer Gate With 3-State Outputs, DCK0005A, LARGE T&R	U22	SN74LVC1G125DCKR	1	Texas Instruments	DCK0005A			
Fitted	IC MCU 512KB RAM, 128TQFP	U24	'XUF216-512-TQ128-C20	1	XMOS semiconductor	TQFP-128		XMOS semiconductor	XEF216-512-TQ128-C20
Fitted	512K I2C Serial EEPROM, TSSOP	U25	24FC512-I/ST	1	Microchip	TSSOP-8		onsemi	CAT24C512YI-GT3
Fitted	Programmable 1-PLL VCXO Clock Synthesizer with 2.5-V or 3.3-V LVCMOS Outputs, PW0014A (TSSOP-14)	U26	CDCE913PWR	1	Texas Instruments	PW0014A		Texas Instruments	CDCE913PW
Fitted	Dual-Bit Dual-Supply Bus Transceiver, DQE0008A, LARGE T&R	U27	SN74AVC2T244DQER	1	Texas Instruments	DQE0008A			
Fitted	Single-Channel Ultra-Small Adjustable Supervisory Circuit With Active-High Open-Drain Output, DRY0006A (USON-6)	U28	TPS3897ADRYR	1	Texas Instruments	DRY0006A			
Fitted	Enhanced Product Dual Buffer/Driver with Open-Drain Output, DCK0006A (SOT-SC70-6)	U29	SN74LVC2G07DSFR	1	Texas Instruments	DSF0006A			

Table 9-1. TAS2781EVM Bill of Materials (continued)

Fitted	Description	Designator	PartNumber	Quantity	Manufacturer	PackageReference	Value	Alternate Manufacturer	Alternate PartNumber
Fitted	12.6-V, 7-A Fully-Integrated Synchronous Boost Converters in 2.0-mm x 2.5-mm VQFN Package, RNR0011A (VQFN-HR-11)	U30	TPS61089RNRR	1	Texas Instruments	RNR0011A		Texas Instruments	TPS61089RNRT
Fitted	OSC, 24 MHz, 2.25 - 3.63 V, SMD	Y1	ASTMLPA-24.000MHZ-EJ-E-T	1	Abracon Corporation	2x1.6mm			
Not Fitted	CAP, CERM, 0.1 uF, 50 V, +/- 10%, X7R, 0402	C5, C6	C1005X7R1H104K050BB	0	TDK	0402	0.1uF		
Not Fitted	CAP, CERM, 2200 pF, 10 V, +/- 10%, X5R, 0402	C14, C16	GRM155R61A222KA01D	0	MuRata	0402	2200pF		
Not Fitted	CAP, CERM, 0.1 uF, 10 V, +/- 10%, X7R, 0402	C17	GRM155R71A104KA01D	0	MuRata	0402	0.1uF		
Not Fitted	Fiducial mark. There is nothing to buy or mount.	FID1, FID2, FID3, FID4, FID5, FID6	N/A	0	N/A	Fiducial			
Not Fitted	Header, 2.54 mm, 5x2, Gold, TH	J30	61301021121	0	Wurth Elektronik	Header, 2.54mm, 5x2, TH			
Not Fitted	RES, 68.1 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	R7, R8	CRCW040268K1FKED	0	Vishay-Dale	0402	68.1k		
Not Fitted	RES, 0, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	R26	ERJ-3GEY0R00V	0	Panasonic	0603	0		
Not Fitted	RES, 1.91 k, 1%, 0.1 W, 0603	R40, R41	RC0603FR-071K91L	0	Yageo	0603	1.91k		
Not Fitted	RES, 20.0 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	R96, R97	CRCW040220K0FKED	0	Vishay-Dale	0402	20.0k		

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Last updated 10/2025