User's Guide

TAS5828M Evaluation Module

ABSTRACT

This user's guide describes the operation of the TAS5828M Evaluation Modules (EVM). The TAS5828MEVM is a stand-alone EVM. Use the PurePath™ Control Console 3 GUI (PPC3) to initialize and operate this EVM. The main contents of this document are:

1. Hardware descriptions and implementation
2. TAS5828MEVM operations

Required equipment and accessories:

1. TAS5828MEVM
2. A USB micro type-B cable
3. Power Supply Unit (PSU)
4. Speakers and cables
5. Desktop or laptop running Windows 7, Windows 8 or Windows 10
6. Audio source: This can be a DVD player with an optical or analog cable or Playback Media from Windows 7, Windows 8, Windows 10.

Table of Contents

1 Trademarks

All trademarks are the property of their respective owners.

2 Hardware Overview

The TAS5828MEVM showcases the latest TI digital input Class-D closed loop amplifier. The TAS5828M is a digital input stereo high-efficiency Closed-Loop Class-D audio amplifier with an advanced Hybrid-Pro algorithm to improve system efficiency and reduce heat without clipping distortion. The TAS5828EVM is a stand-alone EVM, which has an optional battery power supply input with LM5155 boost or external power supply input bypassing the LM5155 boost, USB control via PurePath Control Console 3 (PPC3), and flexible audio input options. The TAS5828MEVM also can be configured using the Hardware control mode that supports setting switching frequency, analog gain, BTL/PBTL mode and Cycle by Cycle current limit threshold through pin configuration. This mode is especially designed to eliminate end system software driver integration efforts.

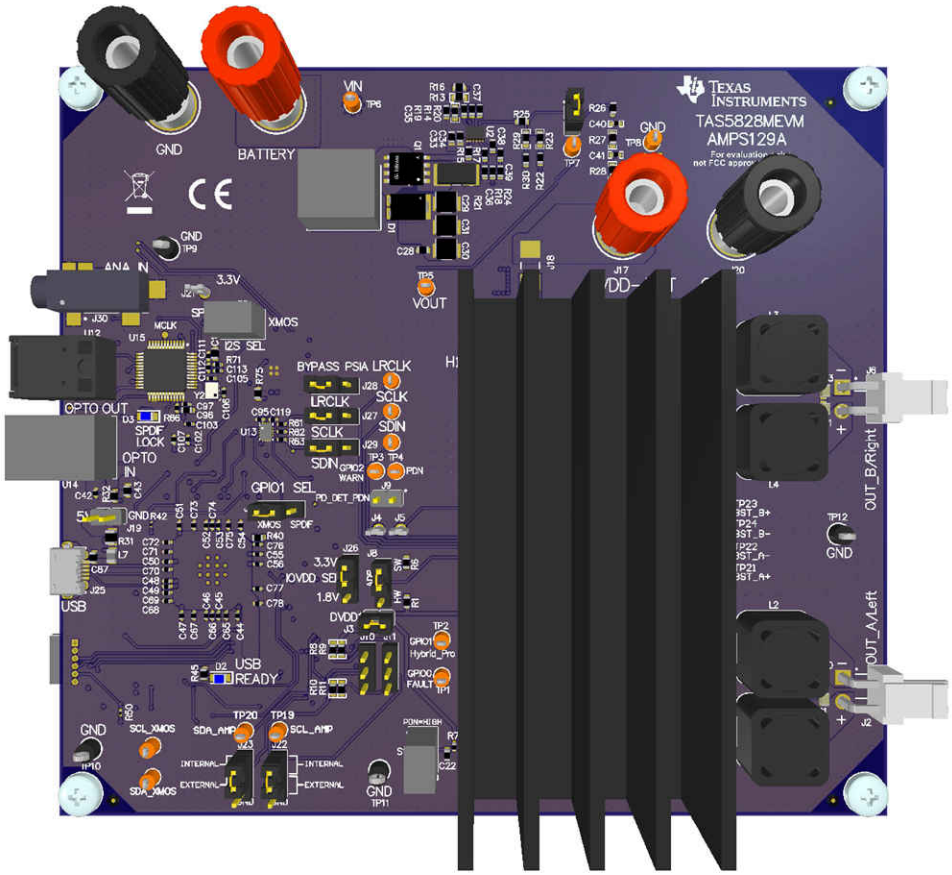


Figure 2-1. TAS5828MEVM

2.1 Features

- TAS5828M Hybrid-Pro algorithm for audio envelope tracking
- Integrates LM5155 boost to provide customer system design reference
- Default system configuration: 5 V battery input, boost to max 16 V power rail based on audio envelope tracking
- Flexible TAS5828M Hybrid-Pro output (HPFB pin) to customer system board capability
- 96-kHz Input Sample Rate Support
- Operates in BTL or PBTL
- Provides flexible input signal routing (USB, Analog, Optical and external I2S)
- Demonstration, Evaluation and Development environment via the PurePath Console 3 software (GUI)
- Optional Hardware control mode to set switching frequency, analog gain, BTL/PBTL mode and Cycle by Cycle current limit through pin configuration

2.2 Functions

The digital audio data input to the TAS5828MEVM is selectable from USB audio, analog, optical and PSIA (external I2S).

2.3 Detailed Operations

The TAS5828MEVM only requires a single supply to operate. Three different audio sources can be selected:

1. If XMOS is selected manually by toggling the S2 switch, the Windows Media Player can be used to stream audio.
2. If SPDIF is selected manually by toggling the S2 switch, a DVD player with an optical cable or an analog cable can be used to provide audio stream.
3. If external digital audio source such as Programmable Serial Interface Adapter (PSIA) from Audio Precision, jumpers can be used to insert external I2S signals.

Both 3.3 V and 1.8 V DVDD and IOVDD are supported with TAS5828MEVM. Jumper (J26) can be used to select accordingly based on requirement.

TAS5828MEVM provides optional onboard LM5155 boost Hybrid-Pro evaluation or external customer system boost with Hybrid-Pro feedback (HPFB pin) control:

1. Onboard LM5155 boost Hybrid-Pro evaluation
   - 5 V battery power input through J12 and J13. Bypass external PVDD through DNP J18
   - TAS5828M PVDD is from LM5155 boost output: J14 - IN, J18 - OUT
   - TAS5828M HPFB pin routes to LM5155 FB pin: J15 - IN, J16 - OUT
2. External customer system boost with Hybrid-Pro feedback (HPFB pin) control
   - TAS5828M HPFB pin routes for external customer system boost FB control through TP7 FB and TP8 GND: J15 - OUT, J16 - OUT
   - Customer system boost output for TAS5828M PVDD through J17 PVDD and J20 GND: J14 - OUT, J18 - IN

The USB connection is also used to provide I^2C communications with the two TAS5828M devices on the EVM. The Pure Path Console 3 (PPC3) is the software tool which can initialize and operate this EVM.

Alternatively, the TAS5828M has an optional Hardware Control Mode to set switching frequency, analog gain, BTL/PBTL mode and Cycle by Cycle current limit through pin configuration. Hardware Control Mode can be enable by modifying J8 ADR/HW to HW, J10 SDA/HW_SEL0 to desired mode according to Table 2-2, and J11 SCK/HW_SEL1 to the desired mode according to Table 2-1.

Table 2-1. Hardware Control - HW_SEL1 Pin6

R10(GND)	R8(DVDD)	F_{SW}&Class D Loop Bandwidth	Cycle By Cycle Current Limit Threshold	Spread Spectrum	Modulation
0 Ω	DNP	768 kHz F_{SW}, 175 kHz BW	CBC Threshold = 80% OCP	Disable	1SPW
1 kΩ	DNP	768 kHz F_{SW}, 175 kHz BW	CBC Disable	Disable	1SPW
4.7 kΩ	DNP	768 kHz F_{SW}, 175 kHz BW	CBC Threshold = 40% OCP	Disable	1SPW
15 kΩ	DNP	768 kHz F_{SW}, 175 kHz BW	CBC Threshold = 60% OCP	Disable	1SPW
DNP	33 kΩ	480 kHz F_{SW}, 100 kHz BW	CBC Disable	Enable	BD
DNP	6.8 kΩ	480 kHz F_{SW}, 100 kHz BW	CBC Threshold = 80% OCP	Enable	BD
DNP	1.5 kΩ	480 kHz F_{SW}, 100 kHz BW	CBC Threshold = 40% OCP	Enable	BD
DNP	0 Ω	480 kHz F_{SW}, 100 kHz BW	CBC Threshold = 60% OCP	Enable	BD

Table 2-2. Hardware Control - HW_SEL0 Pin5

R11(GND)	R9(DVDD)	Analog Gain	H-Bridge Output Configuration
0 Ω	DNP	29.5 V_P/FS	BTL
1 kΩ	DNP	20.9 V_P/FS	BTL
4.7 kΩ	DNP	14.7 V_P/FS	BTL

Table 2-2. Hardware Control - HW_SEL0 Pin5 (continued)

R11(GND)	R9(DVDD)	Analog Gain	H-Bridge Output Configuration
15 kΩ	DNP	7.4 V_P/FS	BTL
DNP	33 kΩ	7.4 V_P/FS	PBTL
DNP	6.8 kΩ	14.7 V_P/FS	PBTL
DNP	1.5 kΩ	20.9 V_P/FS	PBTL
DNP	0 Ω	29.5 V_P/FS	PBTL

3 Hardware Setup

Software Control Mode

1. Connect speakers to TAS5828MEVM.
2. Connect a PSU to the TAS5828MEVM and turn on the power.
3. Plug in a USB cable from the PC to the TAS5828MEVM. The USB READY LED (Blue) is also illuminated.
4. If an optical source is used, the blue SPDIF LOCK LED is illuminated.
5. Make sure jumpers configuration are correct with the appropriate mode:

Table 3-1. Boost Jumpers Configurations

Jumper	Name	LM5155 Boost Mode Configurations	External Customer Boost Mode Configurations
J12, J13	Battery, GND	IN - Battery input	OUT
J17, J20	PVDD, GND	OUT	IN - External PVDD
J14	PVDD_LM5155	IN	OUT
J18	PVDD_EXT	OUT	IN
J16	BST_Bypass	OUT	OUT
J15	Ext_BST	IN	OUT

Table 3-2. Control Mode Jumpers Configurations

Jumper	Name	Software Control Mode	Hardware Control Mode
J8	ADR/HW	2-3 - SW(Default 0xC0 Address)	1-2 - HW
J10	SDA/HW_SEL0	OUT	1-2 or 2-3 as needed
J11	SCL/HW_SEL1	OUT	1-2 or 2-3 as needed

Hardware Control Mode

1. Connect speakers to TAS5828MEVM.
2. Make sure jumpers configuration are correct with the appropriate mode: See Table 3-1 and Table 3-2.
3. Configure S2 to SPDIF input source.
4. Note in Hardware Control mode note for some configurations the appropriate resistors will need to be modified on the EVM. See Table 2-1 and Table 2-2 for more details.
5. Connect a PSU to the TAS5828MEVM and turn on the power.
6. If an optical source is used, the blue SPDIF LOCK LED is illuminated.

3.1 I²C Device Addresses

The default 7-bit I²C address on the EVM is set to 0xC0 for the only one TAS5828M device.

4 Schematics

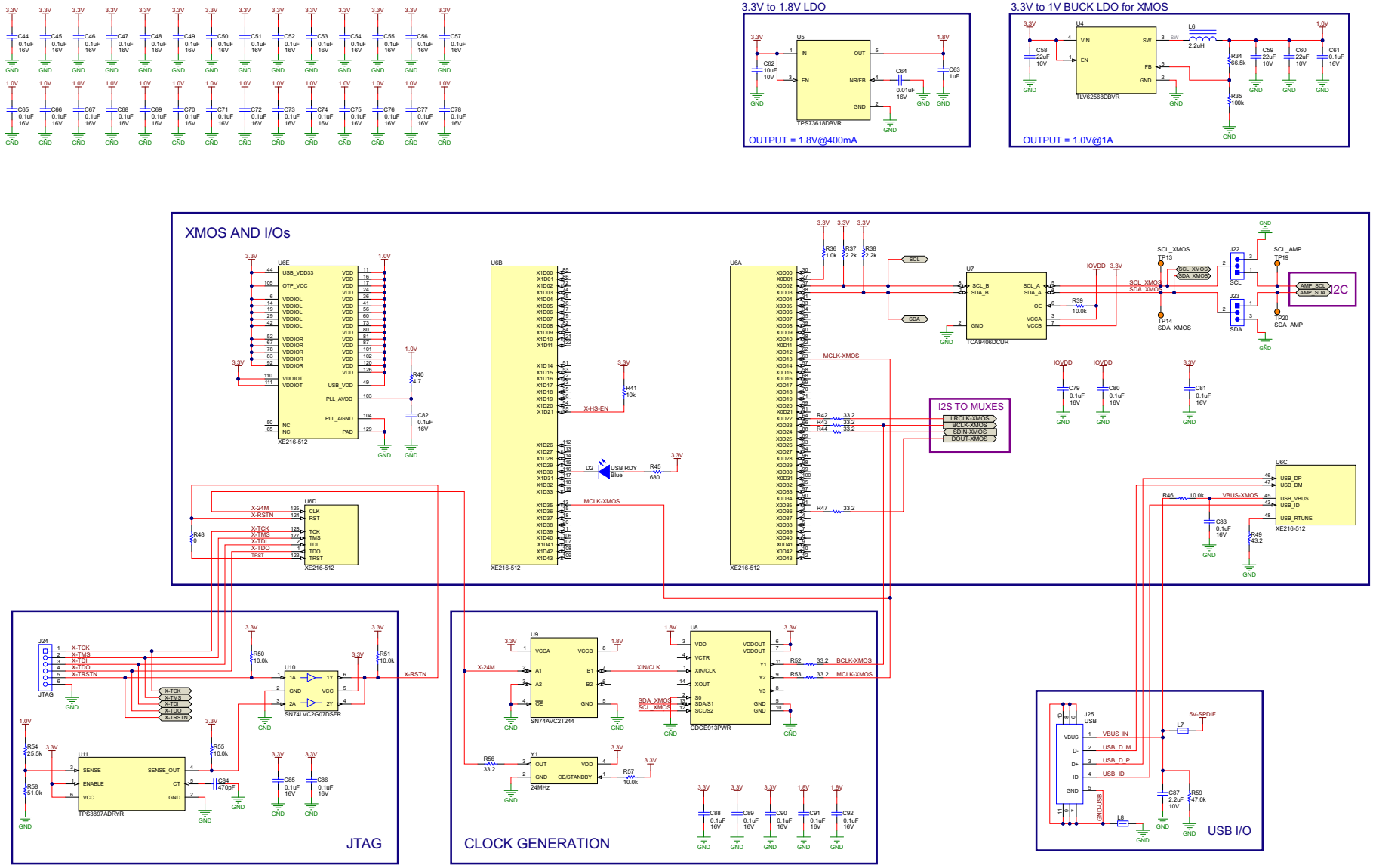


Figure 4-1. TAS5822MEVM Schematic (1 of 5)

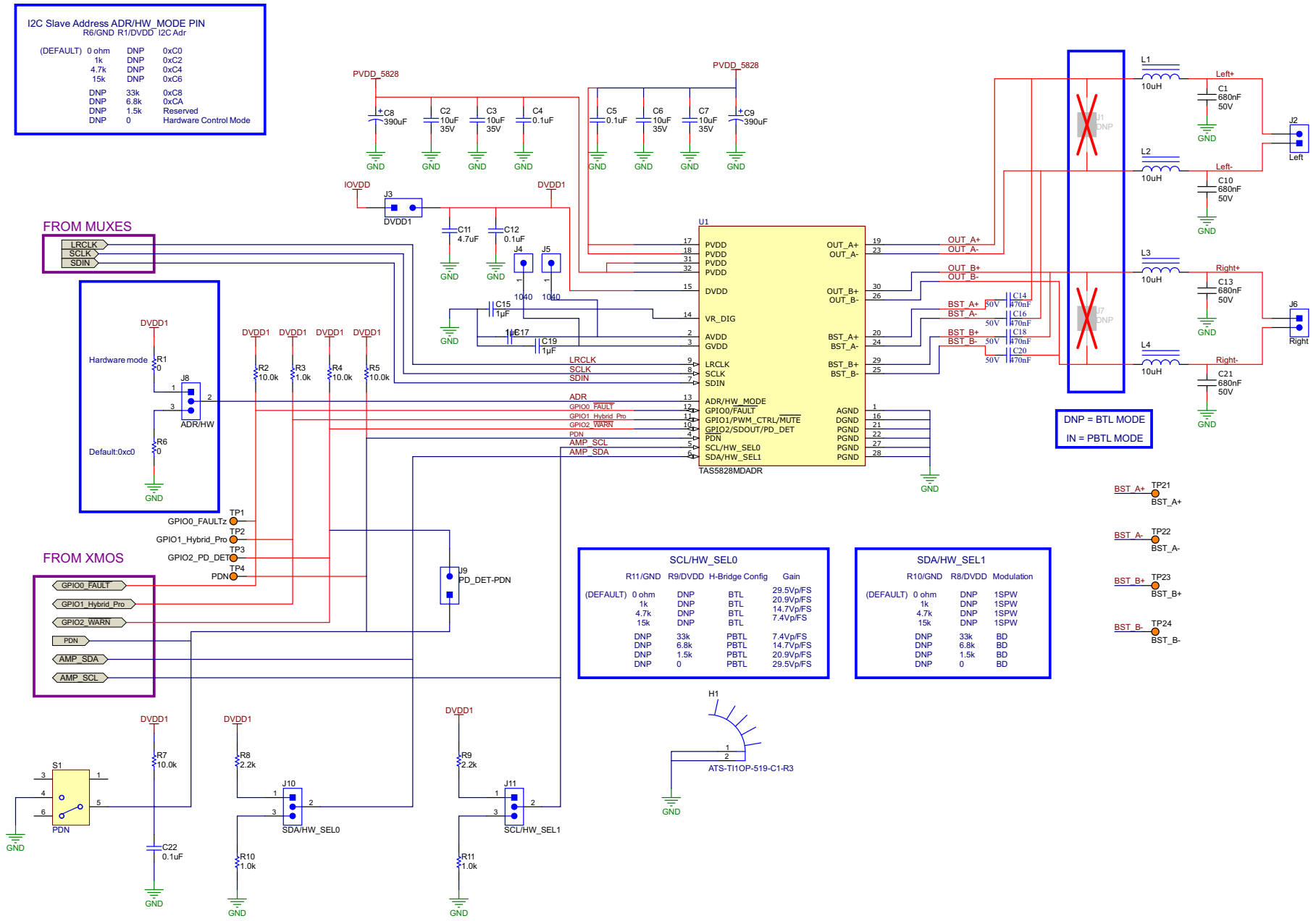


Figure 4-2. TAS5822MEVM Schematic (2 of 5)

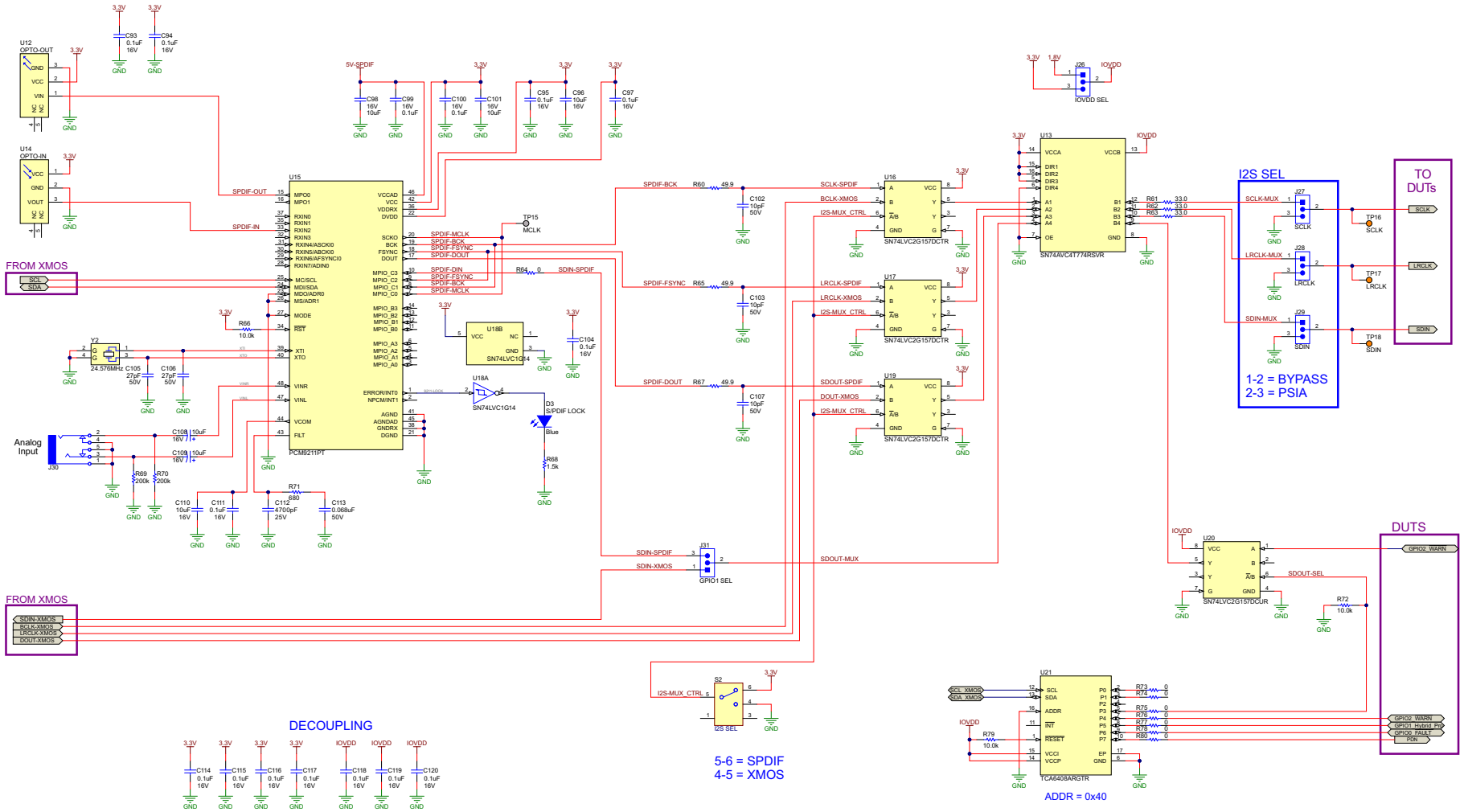


Figure 4-3. TAS5822MEVM Schematic (3 of 5)

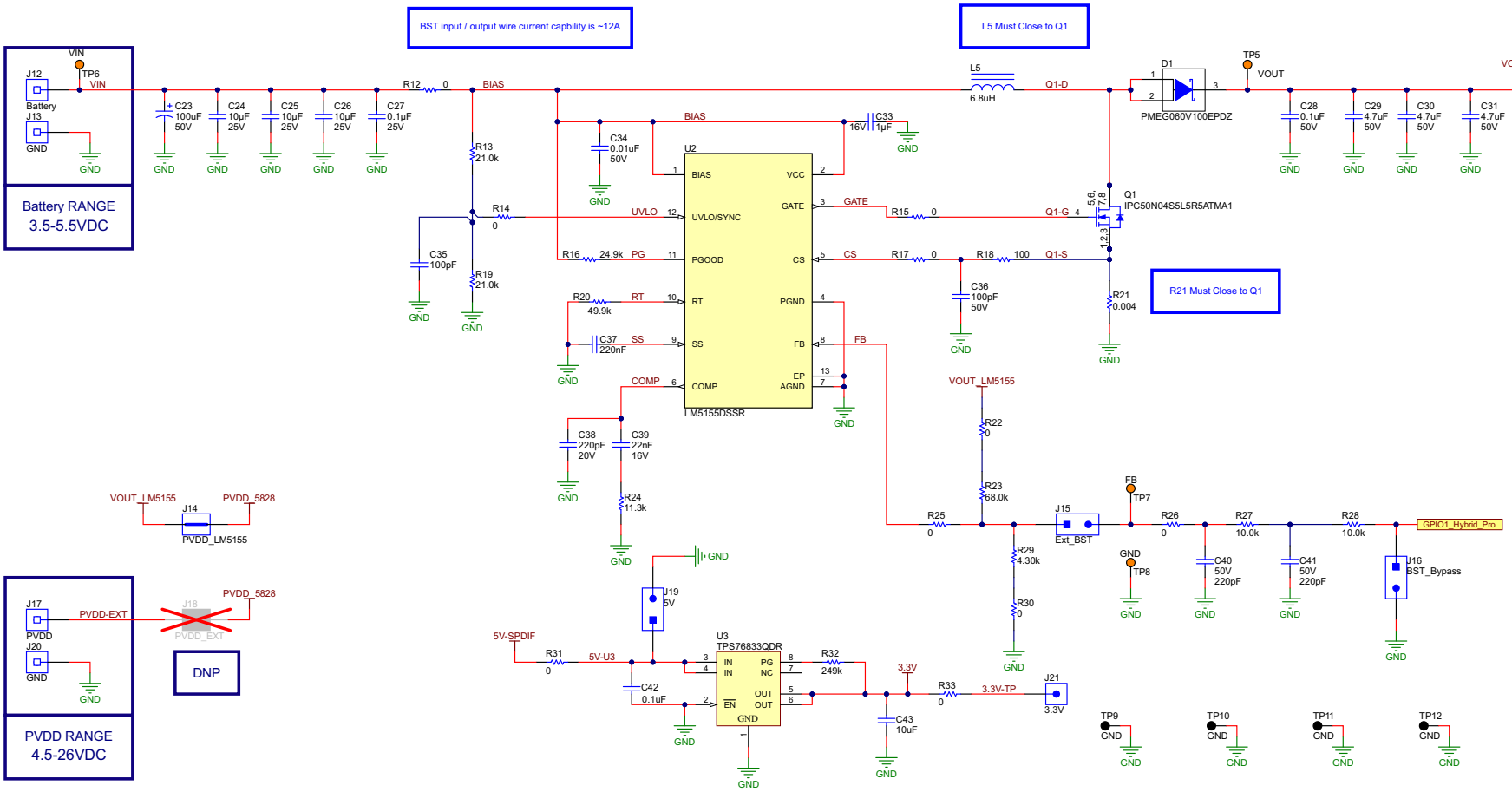
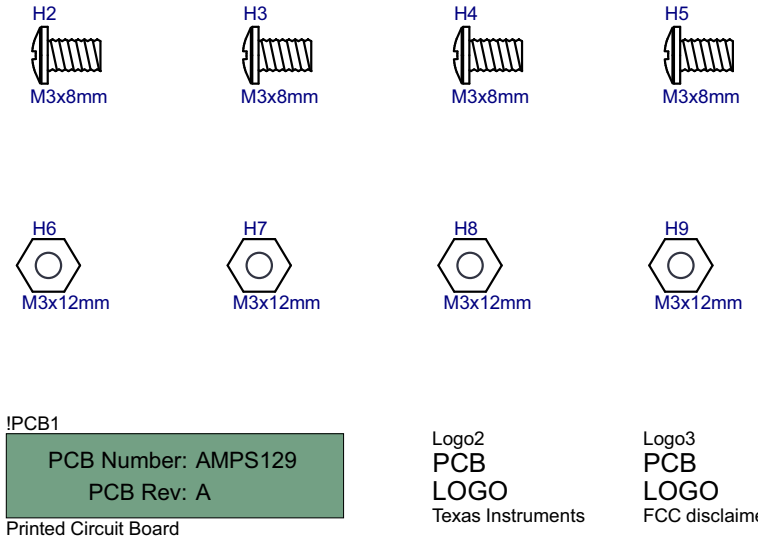


Figure 4-4. TAS5822MEVM Schematic (4 of 5)



ZZ1
Assembly Note
These assemblies are ESD sensitive, ESD precautions shall be observed.

ZZ2
Assembly Note
These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable.

ZZ3
Assembly Note
These assemblies must comply with workmanship standards IPC-A-610 Class 2, unless otherwise specified.

Figure 4-5. TAS5822MEVM Schematic (5 of 5)

5 Board Layouts

Figure 5-1 and Figure 5-2 illustrate the board layouts for the EVM.

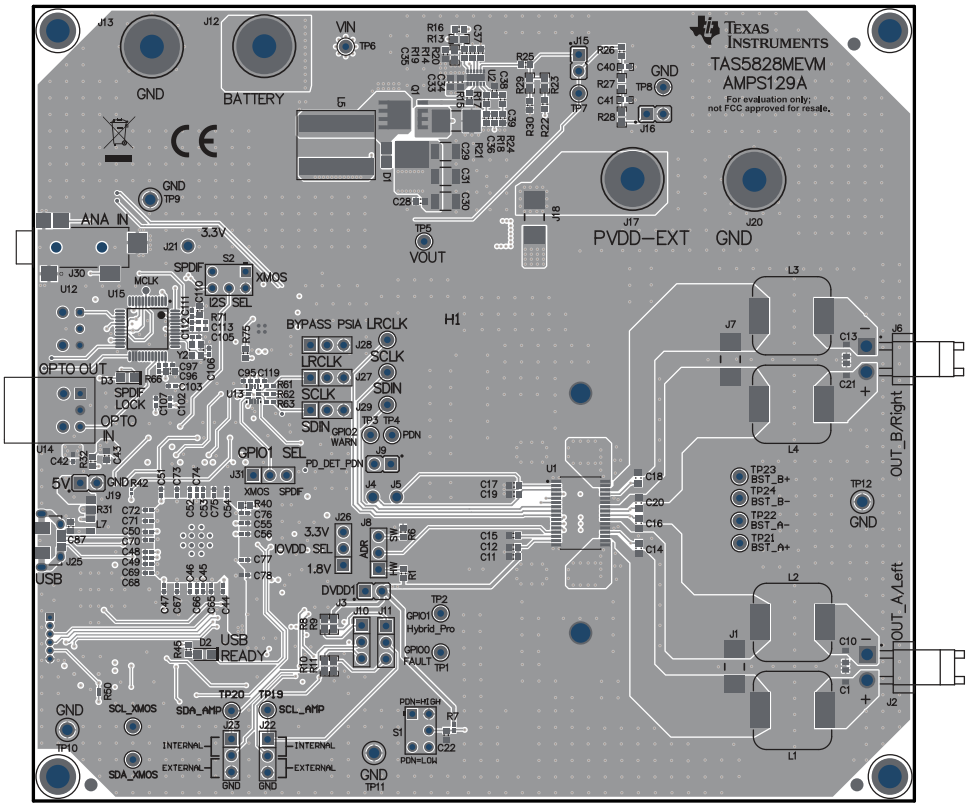


Figure 5-1. TAS5822MEVM Top Overlay

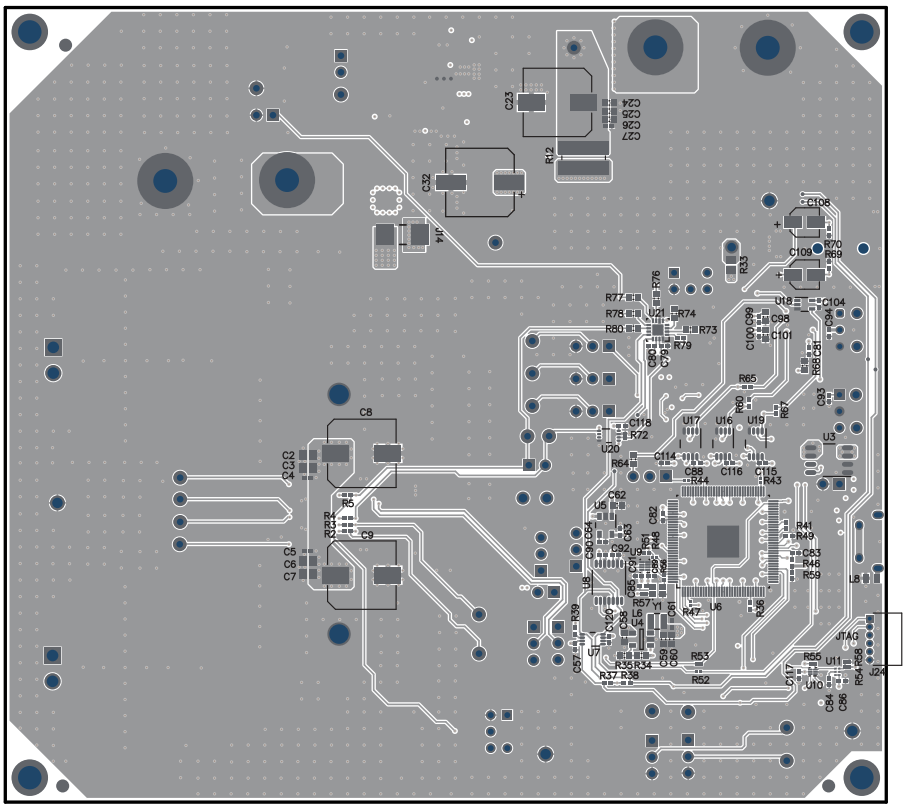


Figure 5-2. TAS5822MEVM Bottom Overlay

6 Bill of Materials

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
C1, C10, C13, C21	4	0.68uF	CAP CER 0.68UF 50V X7R 0805	0805	CGA4J3X7R1H684M125AB	TDK
C2, C3, C6, C7	4	10uF	CAP, CERM, 10 uF, 35 V, +/- 10%, X5R, 0805	0805	C2012X5R1V106K085AC	TDK
C4, C5	2	0.1uF	CAP, CERM, 0.1 uF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0402	0402	CGA2B3X7R1H104K050BB	TDK
C8, C9	2	390uF	CAP, AL, 390 uF, 35 V, +/- 20%, 0.08 ohm, SMD	10x10	UCL1V391MNL1GS	Nichicon
C11	1	4.7uF	CAP, CERM, 4.7 uF, 10 V, +/- 10%, X5R, 0603	0603	C0603C475K8PACTU	Kemet
C12, C22	2	0.1uF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0603	0603	C0603C104K4RACTU	Kemet
C14, C16, C18, C20	4	470nF	CAP 470nF 50V ±10%, X7R 0603	0603	C1608X7R1H474K080AC	TDK
C15, C17, C19	3	1uF	CAP, CERM, 1 µF, 16 V,+/- 20%, X7R, 0603	0603	CL10B105MO8NNWC	Samsung
C23	1	100uF	CAP, Polymer Hybrid, 100 uF, 50 V, +/- 20%, 28 ohm, 10x10 SMD	10x10	HZA107M050G24VT-F	Cornell Dubilier Electronics (CDE)
C24, C25, C26	3	10uF	CAP, CERM, 10 µF, 25 V,+/- 10%, X5R, 0603	0603	GRM188R61E106KA73D	MuRata
C27	1	0.1uF	CAP, CERM, 0.1 µF, 25 V,+/- 10%, X7R, AEC-Q200 Grade 1, 0402	0402	CGA2B3X7R1E104K050BB	TDK
C28	1	0.1uF	CAP, CERM, 0.1 uF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603	0603	CGA3E2X7R1H104K080AA	TDK
C29, C30, C31	3	4.7uF	CAP, CERM, 4.7 uF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 1210	1210	CGA6P3X7R1H475K250AB	TDK
C32	1	100uF	CAP, Aluminum Polymer, 100 uF, 50 V, +/- 20%, 0.025 ohm, AEC-Q200 Grade 2, D10xL10mm SMD	D10xL10mm	HZA107M050G24VT-F	Cornell Dubilier Electronics (CDE)
C33	1	1uF	CAP, CERM, 1 uF, 16 V, +/- 20%, X7R, AEC-Q200 Grade 1, 0603	0603	GCM188R71C105MA64D	MuRata
C34	1	0.01uF	CAP, CERM, 0.01 uF, 50 V, +/- 10%, X7R, 0603	0603	CL10B103KB8NCNC	Samsung Electro-Mechanics
C35, C36	2	100pF	CAP, CERM, 100 pF, 50 V,+/- 1%, C0G/NP0, 0603	0603	C0603C101F5GACTU	Kemet
C37	1	0.22uF	CAP, CERM, 0.22 uF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603	0603	CGA3E3X7R1H224K080AB	TDK
C38	1	220pF	CAP, CERM, 220 pF, 20 V, +/- 5%, C0G/NP0, AEC-Q200 Grade 1, 0603	0603	CGA3E2C0G1H221J080AA	TDK

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
C39	1	0.022uF	CAP, CERM, 0.022 uF, 16 V, +/- 10%, X7R, 0603	0603	C0603C223K4RACTU	Kemet
C40, C41	2	220pF	CAP, CERM, 220 pF, 50 V,+/- 5%, C0G/NP0, AEC-Q200 Grade 1, 0402	0402	CGA2B2C0G1H221J050BA	TDK
C42, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C61, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C85, C86, C88, C89, C90, C91, C92, C93, C94, C95, C97, C99, C100, C104, C111, C114, C115, C116, C117, C118, C119, C120	57	0.1uF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402	0402	885012205037	Wurth Elektronik
C43, C62	2	10uF	CAP, CERM, 10 uF, 10 V, +/- 20%, X5R, 0603	0603	C1608X5R1A106M080AC	TDK
C58, C59, C60	3	22uF	CAP, CERM, 22 uF, 10 V, +/- 20%, X5R, 0603	0603	C1608X5R1A226M080AC	TDK
C63	1	1uF	CAP, CERM, 1 uF, 6.3 V, +/- 20%, X5R, 0402	0402	GRM152R60J105ME15D	MuRata
C64	1	0.01uF	CAP, CERM, 0.01 uF, 16 V, +/- 10%, X7R, 0402	0402	885012205031	Wurth Elektronik
C84	1	470pF	CAP, CERM, 470 pF, 50 V, +/- 5%, C0G/NP0, 0402	0402	GRM1555C1H471JA01D	MuRata
C87	1	2.2uF	CAP, CERM, 2.2 uF, 10 V, +/- 10%, X7R, 0603	0603	GRM188R71A225KE15D	MuRata
C96, C98, C101, C110	4	10uF	CAP, CERM, 10 uF, 16 V, +/- 20%, X5R, 0603	0603	GMC10X5R106M16NT	CAL-CHIP ELECTRONICS, INC.
C102, C103, C107	3	10pF	CAP, CERM, 10 pF, 50 V, +/- 5%, C0G/NP0, 0402	0402	885012005055	Wurth Elektronik
C105, C106	2	27pF	CAP, CERM, 27 pF, 50 V, +/- 5%, C0G/NP0, 0402	0402	GJM1555C1H270JB01	MuRata
C108, C109	2	10uF	CAP, AL, 10 uF, 16 V, +/- 20%, SMD	D55	UWX1C100MCL1GB	Nichicon
C112	1	4700pF	CAP, CERM, 4700 pF, 25 V,+/- 10%, X7R, 0402	0402	CC0402KRX7R8BB472	Yageo
C113	1	0.068uF	CAP, CERM, 0.068 uF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0402	0402	CGA2B3X7R1H683K050BB	TDK

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
D1	1	60V	Diode, Schottky, 60 V, 10 A, AEC-Q101, CFP15	CFP15	PMEG060V100EPDZ	Nexperia
D2, D3	2	Blue	LED, Blue, SMD	LED_0805	LTST-C170TBKT	Lite-On
H1	1		Heat Sink, Vertical	Heatsink	ATS-TI1OP-519-C1-R3	Advanced Thermal Solutions
H2, H3, H4, H5	4		MACHINE SCREW PAN PHILLIPS M3	M3 Screw	RM3X8MM 2701	APM HEXSEAL
H6, H7, H8, H9	4		Standoff, Hex, 12mm, M3, Aluminum	Aluminum M3 12mm Hex Standoff	24434	Keystone
J2, J6	2		Header (friction lock), 3.96mm, 2x1, Tin, R/A, TH	Header, 2x1, 3.96mm, R/A	B2PS-VH(LF)(SN)	JST Manufacturing
J3, J9, J15, J16, J19	5		Header, 100mil, 2x1, Gold, TH	Sullins 100mil, 1x2, 230 mil above insulator	PBC02SAAN	Sullins Connector Solutions
J4, J5, J21	3			Test point, TH Slot Test point	1040	Keystone
J8, J10, J11, J22, J23, J26, J27, J28, J29, J31	10		Header, 100mil, 3x1, Gold, TH	PBC03SAAN	PBC03SAAN	Sullins Connector Solutions
J12, J17	2		Binding Post, RED, TH	11.4x27.2mm	7006	Keystone
J13, J20	2		Binding Post, BLACK, TH	11.4x27.2mm	7007	Keystone
J14	1		JUMPER TIN SMD	6.85x0.97x2.51 mm	S1911-46R	Harwin
J24	1		Receptacle, 50mil, 6x1, Gold, R/A, TH	6x1 Receptacle	LPPB061NGCN-RC	Sullins Connector Solutions
J25	1		Connector, Receptacle, Micro-USB Type AB, R/A, Bottom Mount SMT	Connector, USB Micro AB	DX4R205JJAR1800	JAE Electronics
J30	1		Audio Jack, 3.5mm, Stereo, R/A, SMT	Phone Jack, 6x5x17mm	35RASMT4BHNTRX	Switchcraft
L1, L2, L3, L4	4	10uH	Inductor, Shielded Drum Core, Ferrite, 10 uH, 7.1 A, 0.01294 ohm, SMD	SMD	7447709100	Wurth Elektronik
L5	1	6.8uH	Inductor, Shielded, Composite, 6.8 uH, 18.5 A, 0.01 ohm, SMD	Inductor, 11.3x10x10mm	XAL1010-682MEB	Coilcraft
L6	1	2.2uH	Inductor, Multilayer, Ferrite, 2.2 uH, 1.3 A, 0.08 ohm, SMD	SMD, Body 2.5x2mm, Height 1.2mm	LQM2HPN2R2MG0L	MuRata
L7, L8	2	600 ohm	Ferrite Bead, 600 ohm @ 100 MHz, 2 A, 0805	0805	MPZ2012S601AT000	TDK
Q1	1	40V	MOSFET, N-CH, 40 V, 50 A, AEC-Q101, SON-8	SON-8	CSD18510Q5B	Texas Instruments
R1, R6, R15, R17, R22, R25, R26, R30, R73, R74, R75, R76, R77, R78, R80	15	0	RES, 0, 5%, 0.1 W, 0603	0603	RC0603JR-070RL	Yageo
R2	1	15.0k	RES, 15.0 k, .1%, .063 W, AEC-Q200 Grade 0, 0402	0402	ERA-2AEB153X	Panasonic

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
R3, R36	2	1.0k	RES, 1.0 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04021K00JNED	Vishay-Dale
R4, R5, R7, R66, R79	5	10.0k	RES, 10.0 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040210K0FKED	Vishay-Dale
R8, R9	2	2.2k	RES, 2.2 k, 5%, 0.1 W, 0603	0603	RC0603JR-072K2L	Yageo
R10, R11	2	1.0k	RES, 1.0 k, 5%, 0.1 W, 0603	0603	RC0603JR-071KL	Yageo
R12	1	0	RES, 0, 5%, 2 W, 2512 WIDE	2512 WIDE	RCL12250000Z0EG	Vishay Draloric
R13, R19	2	21.0k	RES, 21.0 k, 1%, 0.1 W, 0603	0603	RC0603FR-0721KL	Yageo
R14, R64	2	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc
R16	1	24.9k	RES, 24.9 k, 1%, 0.1 W, 0603	0603	RC0603FR-0724K9L	Yageo
R18	1	100	RES, 100, 1%, 0.1 W, 0603	0603	RC0603FR-07100RL	Yageo
R20	1	49.9k	RES, 49.9 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW060349K9FKEA	Vishay-Dale
R21	1	0.004	RES, 0.004, 1%, 3 W, AEC-Q200 Grade 0, 6.4x3.2mm	6.4x3.2mm	TLRP3A30WR004FTE	TE Connectivity
R23	1	68.0k	RES, 68.0 k, 1%, 0.1 W, 0603	0603	RC0603FR-0768KL	Yageo
R24	1	11.3k	RES, 11.3 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW060311K3FKEA	Vishay-Dale
R27, R28	2	10.0k	RES, 10.0 k, 1%, 0.1 W, 0603	0603	RMCF0603FT10K0	TT Electronics/IRC
R29	1	4.30k	RES, 4.30 k, 1%, 0.1 W, 0603	0603	RC0603FR-074K3L	Yageo
R31, R33	2	0	RES, 0, 5%, 0.125 W, 0805	0805	RC0805JR-070RL	Yageo America
R32	1	249k	RES, 249 k, 1%, 0.1 W, 0603	0603	RC0603FR-07249KL	Yageo
R34	1	66.5k	RES, 66.5 k, 1%, 0.1 W, 0603	0603	RC0603FR-0766K5L	Yageo
R35	1	100k	RES, 100 k, 1%, 0.1 W, 0603	0603	RC0603FR-07100KL	Yageo
R37, R38	2	2.2k	RES, 2.2 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04022K20JNED	Vishay-Dale
R39, R46	2	10.0k	RES, 10.0 k, 1%, 0.1 W, 0402	0402	ERJ-2RKF1002X	Panasonic
R40	1	4.7	RES, 4.7, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW06034R70JNEA	Vishay-Dale
R41	1	10k	RES, 10 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040210K0JNED	Vishay-Dale
R42, R43, R44, R47, R52, R53, R56	7	33.2	RES, 33.2, 1%, 0.05 W, 0201	0201	RC0201FR-0733R2L	Yageo America
R45	1	680	RES, 680, 1%, 0.1 W, 0603	0603	RC0603FR-07680RL	Yageo
R48	1	0	RES, 0, 5%, 0.05 W, AEC-Q200 Grade 1, 0201	0201	ERJ-1GE0R00C	Panasonic
R49	1	43.2	RES, 43.2, 1%, 0.1 W, AEC-Q200 Grade 0, 0402	0402	ERJ2RKF43R2X	Panasonic

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
R50, R51, R55, R57, R72	5	10.0k	RES, 10.0 k, 1%, 0.05 W, 0201	0201	CRCW020110K0FKED	Vishay-Dale
R54	1	25.5k	RES, 25.5 k, 1%, 0.05 W, 0201	0201	RC0201FR-0725K5L	Yageo America
R58	1	51.0k	RES, 51.0 k, 1%, 0.05 W, 0201	0201	RC0201FR-0751KL	Yageo America
R59	1	47.0k	RES, 47.0 k, 1%, 0.0625 W, 0402	0402	RC0402FR-0747KL	Yageo America
R60, R65, R67	3	49.9	RES, 49.9, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040249R9FKED	Vishay-Dale
R61, R62, R63	3	33.0	RES, 33.0, 1%, 0.1 W, 0402	0402	ERJ-2RKF33R0X	Panasonic
R68	1	1.5k	RES, 1.5 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW06031K50JNEA	Vishay-Dale
R69, R70	2	200k	RES, 200 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402200KJNED	Vishay-Dale
R71	1	680	RES, 680, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402680RJNED	Vishay-Dale
S1, S2	2		Switch, Toggle, SPDT 1Pos, TH	7 X 11 X4.5 mm	G12JPCF	NKK Switches
SH-J1, SH-J2, SH-J3, SH-J4, SH-J5, SH-J6, SH-J7, SH-J8, SH-J9, SH-J10	10	1x2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP13, TP14, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP23, TP24	19		Test Point, Miniature, Orange, TH	Orange Miniature Testpoint	5003	Keystone
TP9, TP10, TP11, TP12	4		Test Point, Compact, Black, TH	Black Compact Testpoint	5006	Keystone
U1	1		50W Stereo, Digital Input, High Efficiency Closed-Loop Class-D Amplifier with Hybrid-Pro Algorithm	TSSOP32	TAS5828MDADR	Texas Instruments
U2	1		2.2-MHz Wide Input Nonsynchronous Boost, Sepic, Flyback Controller, DSS0012B (WSON-12)	DSS0012B	LM5155DSSR	Texas Instruments
U3	1		Single Output Fast Transient Response LDO, 1 A, Fixed 3.3 V Output, 2.7 to 10 V Input, with Low IQ, 8-pin SOIC (D), -40 to 125 degC, Green (RoHS & no Sb/Br)	D0008A	TPS76833QDR	Texas Instruments
U4	1		1-A High Efficiency Step-Down Converter in SOT23-5 Package, DBV005A, DBV0005A (SOT-5)	DBV0005A	TLV62568DBVR	Texas Instruments
U5	1		Single Output LDO, 400mA, Adj.(1.2 to 5.5V), Cap free, Low Noise, Reverse Current Protection, DBV0005A (SOT-23-5)	DBV0005A	TPS73618DBVR	Texas Instruments

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
U6	1		IC MCU 512KB RAM, 128TQFP	TQFP-128	XEF216-512-TQ128-C20	XMOS semiconductor
U7	1		2-Bit Bidirectional 1-MHz I2C Bus and SMBus Voltage-Level Shifter, DCU0008A (VSSOP-8)	DCU0008A	TCA9406DCUR	Texas Instruments
U8	1		Programmable 1-PLL VCXO Clock Synthesizer with 2.5-V or 3.3-V LVCMOS Outputs, PW0014A (TSSOP-14)	PW0014A	CDCE913PWR	Texas Instruments
U9	1		Dual-Bit Dual-Supply Bus Transceiver, DQM0008A (X2SON-8)	DQM0008A	SN74AVC2T244DQMR	Texas Instruments
U10	1		Enhanced Product Dual Buffer/Driver with Open-Drain Output, DCK0006A (SOT-SC70-6)	DSF0006A	SN74LVC2G07DSFR	Texas Instruments
U11	1		Single-Channel Ultra-Small Adjustable Supervisory Circuit With Active-High Open-Drain Output, DRY0006A (USON-6)	DRY0006A	TPS3897ADRYR	Texas Instruments
U12	1		Fiber Optic Transmitter, TH	9.7x13.5mm	EAPLTAA4	Everlight
U13	1		4-Bit Dual-Supply Bus Transceiver With Configurable Voltage-Level Shifting and 3-State Outputs, RSV0016A (UQFN-16)	RSV0016A	SN74AVC4T774RSVR	Texas Instruments
U14	1		Photolink- Fiber Optic Receiver, TH	13.5x10x9.7mm	PLR135/T10	Everlight
U15	1		216 kHz Digital Audio Interface Transceiver (DIX) with Stereo ADC and Routing, PCM, S / PDIF, ADC, 4.5 - 5.5V for Analog, 2.9 - 3.6V for DIX, -40 to 85 degC, 48-Pin LQFP (PT), Green (RoHS & no Sb/Br)	PT0048A	PCM9211PT	Texas Instruments
U16, U17, U19	3		Single 2-Line to 1-Line Data Selector/ Multiplexer, DCT0008A, LARGE T&R	DCT0008A	SN74LVC2G157DCTR	Texas Instruments
U18	1		Single Schmitt-Trigger Inverter, DCK0005A (SOT-SC70-5)	DCK0005A	SN74LVC1G14DCKR	Texas Instruments
U20	1		Single 2-Line to 1-Line Data Selector/ Multiplexer, DCU0008A, LARGE T&R	DCU0008A	SN74LVC2G157DCUR	Texas Instruments
U21	1		Low-Voltage 8-Bit I2C and SMBus I/O Expander, 1.65 to 5.5 V, -40 to 85 degC, 16-pin QFN (RGT), Green (RoHS & no Sb/Br)	RGT0016A	TCA6408ARGTR	Texas Instruments
Y1	1		OSC, 24 MHz, 2.25 - 3.63 V, SMD	2x1.6mm	ASTMLPA-24.000MHZ-EJ-E-T	Abracon Corporation
Y2	1		Crystal, 24.576 MHz, 10pF, SMD	2.5x0.5x2.0mm	ABM10-24.576MHZ-E20-T	Abracon Corporation
J1, J7, J18	0		JUMPER TIN SMD	6.85x0.97x2.51 mm	S1911-46R	Harwin

7 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision * (June 2021) to Revision A (November 2021)	Page
• Changed Figure 2-1	2
• Modifying the instructions for Hardware Control Mode	4
• Updated I2C address	4
• Changed Figure 4-1 to Figure 4-5	5
• Changed Figure 5-1 and Figure 5-2	10

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), 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 will 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 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.

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

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265