TPA3255EVM

This User's Guide describes the operation of the evaluation module (TPA3255EVM, rev A) for the TPA3255 315-W Stereo/600-W mono PurePath™ Ultra-HD Analog Input Power Stage. The user's guide also provides design information, which includes schematics, BOM, and PCB layout. For questions and support go to the E2E forums (e2e.ti.com).

The main contents of this document are:

- Hardware descriptions and implementation
- Design information

Related documents:

- TPA3255 Data Sheet (SLASEA8)

Topic **Page**

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1 Hardware Overview

The TPA3255EVM PurePath™ Ultra-HD evaluation module demonstrates the TPA3255DDV integrated circuit from Texas Instruments. The TPA3255DDV is a high-performance high-power class-D amplifier that enables true premium sound quality with high-efficiency class-D technology. It features an advance integrated feedback design and high-speed gate driver error correction (PurePath Ultra-HD), which enables ultra-low distortion across the audio band and superior audio quality. This EVM supports two BTL (stereo 2.0) output channels, one PBTL (mono 0.1) output channel, one BTL plus two SE (2.1) output channels, and four SE (4.0) output channels configurations. The NE5532 is a High Performance Audio Op Amp designed to allow TPA3255DDV operation with differential or single ended input signals to the EVM with differential inputs yielding the optimal performance. TPA3255EVM is a complete 2-Vrms analog input 2 × 315-W stereo/1 × 600-W mono high-power amplifier ready for evaluation and excellent listening experience.

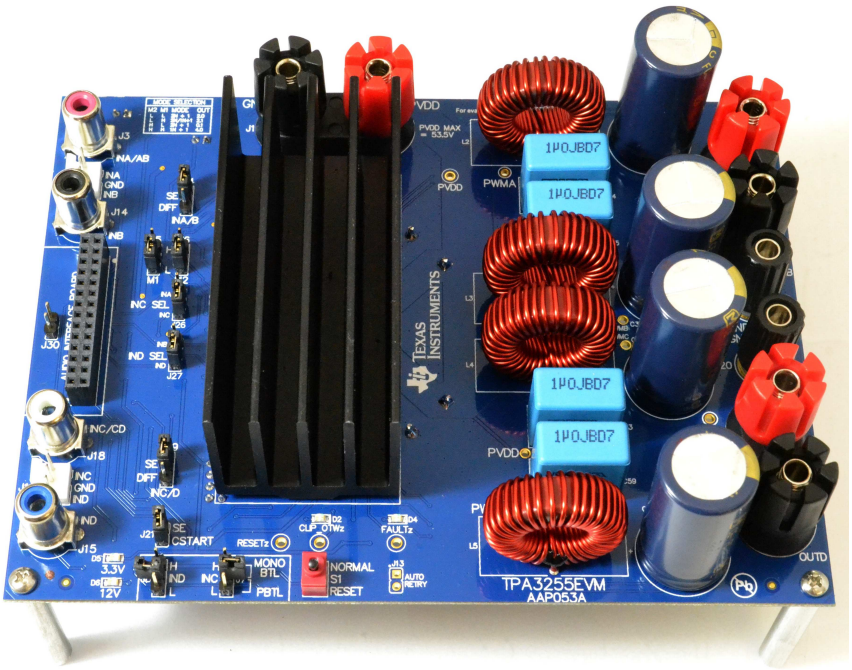

Figure 1. TPA3255EVM

1.1 TPA3255EVM Features

The TPA3255EVM has the following features:

- Stereo PurePath Ultra-HD evaluation module
- Self-contained protection system (short circuit, clip, and thermal)
- Standard 4-V_{RMS} differential input or single-ended line input
- BTL, PBTL, and SE output configuration support
- Frequency adjust and oscillator sync interface
- Single supply voltage range 14–53.5 V
- Double-sided, plated-through, 2-oz. Cu 2-layer PCB layout

1.2 TPA3255EVM Frequency Adjust

The TPA3255EVM offers hardware trimmed oscillator frequency by external control of the FREQ_ADJ pin. The Frequency adjust can be used to reduce interference problems while using a radio receiver tuned within the AM band, the switching frequency can be changed from nominal to lower values. These values should be chosen such that the nominal and the lower value switching frequencies together results in the fewest cases of interference throughout the AM band. The oscillator frequency can be selected by the value of the FREQ_ADJ resistor connected to GND in master mode according to Table 1.

Table 1. Frequency Adjust Master Mode Selection

Master Mode	Resistor to GND
Nominal	30 kΩ
AM1	20 kΩ
AM2	10 kΩ

For slave-mode operation, turn off the oscillator by pulling the FREQ_ADJ pin to DVDD. This configures the OSC_I/O pins as inputs to be slaved from an external differential clock. In a master/slave system inter-channel delay is automatically set up between the switching phases of the audio channels, which can be illustrated by no idle channels switching at the same time. This will not influence the audio output, but only the switch timing to minimize noise coupling between audio channels through the power supply. This will optimize audio performance and result in better operating conditions for the power supply. The inter-channel delay will be set up for a slave device depending on the polarity of the OSC_I/O connection such that slave mode 1 is selected by connecting the OSC_I/O of the master device with the OSC_I/O of the slave device with the same polarity (+ to + and – to –), while slave mode 2 is selected by connecting the OSC_I/O's with the inverse polarity (+ to – and – to +).

1.3 TPA3255EVM Single-Ended and Differential Input

The TPA3255EVM supports both differential and single-ended inputs. For single-ended inputs, J4 and/or J19 jumpers are set to the SE position, so that the TPA3255EVM uses the NE5532 to convert the single-ended input signal to differential to properly drive the differential inputs of the TPA3255. The input RCA jack, J3, is used to provide INA inputs and RCA jack J14 is used to provide INB inputs. RCA jack J18 is used to provide INC inputs and RCA jack J15 is used to provide IND inputs with differential inputs.

For differential input operation, J4 and/or J19 jumpers are set to the DIFF position, and the TPA3255EVM uses the NE5532 to buffer the differential input signal to the differential inputs of the TPA3255. The input RCA jack, J3, is used to provide INA, RCA jack J14 provides INB, RCA jack J18 provides INC, and RCA jack J15 provides IND with differential inputs.

NOTE: Single-ended input settings on the TPA3255EVM should only be used for channels with output configuration BTL or PBTL, not SE. For SE output configuration J4 and/or J19 jumpers for that channel must be set to the DIFF position, so the input signal INx is mapped directly to OUTx.

1.4 TPA3255EVM Clip Overtemperature and Fault Indicators

The TPA3255EVM is equipped with LED indicators that illuminate when the $\overline{\text{FAULT}}$ and/or $\overline{\text{CLIP\_OTW}}$ pin goes low. See Table 2 and (SLASEA8) for more details.

Table 2. Fault and Clip Overtemperature Status

$\overline{\text{FAULT}}$	$\overline{\text{CLIP\_OTW}}$	Description
0	0	Overtemperature (OTE) or overload (OLP) or undervoltage (UVP). Junction temperature higher than 125°C (overtemperature warning).
0	0	Overload (OLP) or undervoltage (UVP). Junction temperature higher than 125°C (overtemperature warning).
0	1	Overload (OLP) or undervoltage (UVP). Junction temperature lower than 125°C.
1	0	Junction temperature higher than 125°C (overtemperature warning)
1	1	Junction temperature lower than 125°C and no OLP or UVP faults (normal operation)

2 TPA3255EVM Setup

This section describes the TPA3255EVM hardware setup and connection.

2.1 TPA3255EVM Setup

Figure 2 illustrates the TPA3255EVM connection.

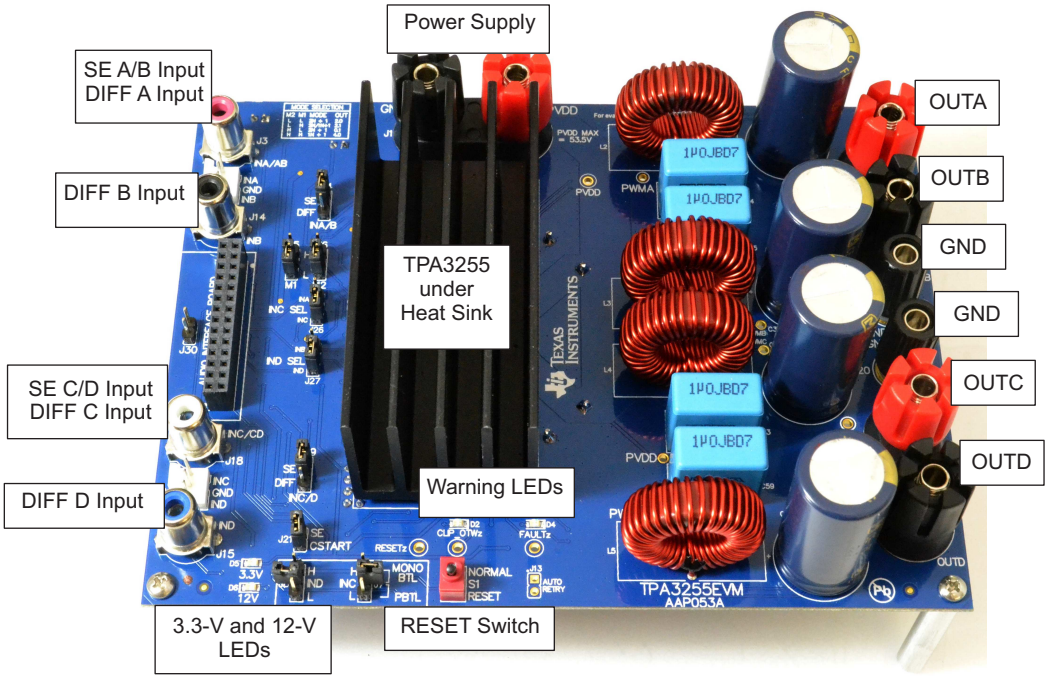

Figure 2. TPA3255EVM Connections

2.2 Hardware Requirements

The following hardware is required for this EVM:

- TPA3255EVM (AAP053-001)
- Power supply 5–14 A/18–53.5 V_{DC}
- Two 2–8 Ω (≈300 W) speakers/resistor loads
- Four speaker/banana cables
- RCA input cables
- Analog output audio source

2.3 Hardware Default Setup BTL (2.0)

BTL (2.0) default hardware setup is as follows:

- Remove the EVM from the ESD bag.
- Check that jumpers are in their default state as shown in Figure 1 and Table 3 for stereo **BTL** operation:

Table 3. Stereo BTL Default Jumper States

Jumper	Setting	Comment
J29	IN	PVDD to 15-V BUCK
J31	IN	12-V LDO to 12-V TERM
J32	IN	3.3-V LDO to 3.3-V TERM
J33	IN	3.3-V LDO to 3.3-V TERM
J21	IN	CSTART SE
J16	3 to 4	MASTER MODE
J5	2 to 3	M1 – BTL
J6	2 to 3	M2 – BTL
J22	IN	OUTA CAP SHUNT
J23	IN	OUTB CAP SHUNT
J24	IN	OUTC CAP SHUNT
J25	IN	OUTD CAP SHUNT
J26	2 to 3	INC SELECT
J27	2 to 3	IND SELECT
J7	OUT	PBTL SELECT INC
J8	OUT	PBTL SELECT IND
J10	OUT	INC/D DIFF INPUT
J12	OUT	INC/D DIFF INPUT
J4	1 to 2	INA/B SE INPUT
J19	1 to 2	INC/D SE INPUT

- Set **S1** to the **RESET** position.
- Set power supply to 51 V (14–53.5-V range) and current to 10 A (5–14-A range). Do not power up until all connections are completed.
- Connect power supply to TPA3255 EVM positive terminal to PVDD (**RED**) and negative terminal to GND (**BLACK**).
- Connect **left** channel speaker/power resistor load (4–8 Ω) to TPA3255 EVM positive output terminal to OUTA (**RED**) and AP analog input channel A positive terminal.
- Connect **left** channel speaker/power resistor load (4–8 Ω) to TPA3255 EVM negative output terminal to OUTB (**BLACK**) and AP analog input channel A negative terminal.
- Connect **right** channel speaker/power resistor load (4–8 Ω) to TPA3255 EVM positive output terminal to OUTC (**RED**) and AP analog input channel B positive terminal.
- Connect **right** channel speaker/power resistor load (4–8 Ω) to TPA3255 EVM negative output terminal to OUTD (**BLACK**) and AP analog input channel B negative terminal.
- Be careful not to mix up PVDD, OUTA, and OUTB terminals, since the colors are the same (**RED**).
- For **single-ended stereo inputs**, connect AP channel A XLR to RCA male jacks to female RCA jacks input A/AB (**RED**) and AP channel B XLR to RCA male jacks to female RCA jacks input C/CD (**WHITE**) and set **J4** and **J19** jumper positions to SE.
- For **differential stereo inputs,** connect positive RCA male jacks to female RCA jacks input A/AB (**RED**) and input C/CD (**WHITE**) and connect negative RCA male jacks to female RCA jacks input B (**BLUE**) and input D (**BLACK**) and set **J4** and **J19** jumper positions to DIFF.
- Power up power supply once all the connections are made correctly and the 3.3-V and12-V LEDs (**GREEN**) will illuminate.

- Set **S1** to the **NORMAL** position.
- CLIP_OTWz (**ORANGE**) and FAULTz (**RED**) LEDs should be off, if the audio source is off.

NOTE: **J3/J10** and **J18/J15** can be used for differential inputs to INA/INB and INC/IND, respectively.

Using a smart phone, tablet, or PC with headphone to RCA cable, audio streaming via headphone jack can begin once the EVM is powered up correctly with jumpers in their default state. Start the media player of your choice and enjoy the enhanced audio performance TPA3255 provides as a quick check of the setup.

3 Using TPA3255EVM in Different Output Configurations

The TPA3255EVM can be configured for four different output operations. The 2.0 BTL configuration is the default set up of the TPA3255EVM described in Section 2.3. The remaining three configurations are 2.1 BTL plus two single-ended (SE) outputs, 0.1 PBTL output, and 4.0 single-ended (SE) outputs.

Table 4. Mode Selection Pins

Mode Pins		Input Mode	Output Configuration	Description
M2	M1			
0	0	2N + 1	2 × BTL	Stereo BTL output configuration
0	1	2N/1N + 1	1 × BTL + 2 × SE	2.1 BTL + SE mode
1	0	2N + 1	1 × PBTL	Paralleled BTL configuration. Connect INPUT_C and INPUT_D to GND.
1	1	1N + 1	4 × SE	Single-ended output configuration

3.1 BTL Plus Two SE (2.1) Operation

Configure the EVM as follows for 2 SE + 1 BTL operation:

Table 5. 2 SE + 1 BTL Default Jumper States

Jumper	Setting	Comment
J29	IN	PVDD to 15-V BUCK
J31	IN	12-V LDO to 12-V TERM
J32	IN	3.3-V LDO to 3.3-V TERM
J33	IN	3.3-V LDO to 3.3-V TERM
J21	IN	CSTART SE
J16	3 to 4	MASTER MODE
J5	1 to 2	M1 – 2XSE + BTL
J6	2 to 3	M2 - 2XSE + BTL
J22	IN	OUTA CAP SHUNT
J23	IN	OUTB CAP SHUNT
J24	OUT	OUTC CAP SHUNT
J25	OUT	OUTD CAP SHUNT
J26	2 to 3	INC SELECT
J27	2 to 3	IND SELECT
J7	OUT	PBTL SELECT INC
J8	OUT	PBTL SELECT IND
J10	OUT	INC/D DIFF INPUT
J12	OUT	INC/D DIFF INPUT
J4	1 to 2	INA/B SE INPUT
J19	1 to 2	INC/D SE INPUT

- Set **J6** to L and **J5** to H.
- Connect left (stereo) speaker/power resistor load (2–4 Ω) positive terminal to OUTC and remove jumper **J24**.
- Connect right (stereo) speaker/power resistor load (2–4 Ω) positive terminal to OUTD and remove jumper **J25**.
- Connect subwoofer (mono) speaker/power resistor load (4–8 Ω) positive terminal to OUTA and negative terminal to OUTB.
- Set **J19** jumper position to DIFF.
- Connect **left** (stereo) channel input to female RCA jack input C/CD (**WHITE**) for OUTC speaker.

- Connect **right** (stereo) channel input to female RCA jack input D (**BLACK**) for OUTD speaker.
- For **single-ended subwoofer (mono) input**, connect RCA male jack to female RCA jack input A/AB (**RED**) and set **J4** jumper positions to SE.
- For **differential subwoofer (mono) inputs**, connect positive RCA male jack to female RCA jack input A/AB (**RED**) and connect negative RCA male jack to female RCA jack input B (**YELLOW**) and set **J4** jumper positions to DIFF.

NOTE: **OUTC** and **OUTD** are the single-ended output channels and **OUTA** and **OUTB** are the BTL channel for 2.1 operations.

3.2 PBTL (0.1) Output Operation

Configure the EVM as follows for PBTL operations:

Table 6. PBTL Default Jumper States

Jumper	Setting	Comment
J29	IN	PVDD to 15-V BUCK
J31	IN	12-V LDO to 12-V TERM
J32	IN	3.3-V LDO to 3.3-V TERM
J33	IN	3.3-V LDO to 3.3-V TERM
J21	IN	CSTART SE
J16	3 to 4	MASTER MODE
J5	2 to 3	M1 – PBTL
J6	1 to 2	M2 – PBTL
J22	IN	OUTA CAP SHUNT
J23	IN	OUTB CAP SHUNT
J24	IN	OUTC CAP SHUNT
J25	IN	OUTD CAP SHUNT
J26	2 to 3	INC SELECT
J27	2 to 3	IND SELECT
J7	2 to 3	PBTL SELECT INC – GND
J8	2 to 3	PBTL SELECT IND – GND
J10	OUT	INC/D DIFF INPUT
J12	OUT	INC/D DIFF INPUT
J4	1 to 2	INA/B SE INPUT
J19	1 to 2	INC/D SE INPUT

- Set **J6** to H and **J5** to L.
- Connect speaker/power resistor (2–4 Ω) positive terminal to OUTA and OUTC (OUT A and C shorted).
- Connect speaker/power resistor (2–4 Ω) negative terminal to OUTB and OUTD (OUT B and D shorted).
- Install PBTL jumpers **J7** and **J8** (pulls input C and input D to GND).
- For **single-ended mono input**, connect RCA male jack to female RCA jack input A/AB (**RED**) and set **J4** jumper positions to SE.
- For **differential mono inputs**, connect positive RCA male jack to female RCA jack input A/AB (**RED**) and connect negative RCA male jack to female RCA jack input B (**YELLOW**) and set **J4** jumper position to DIFF.

NOTE: **INA** and **INB** are the inputs for PBTL and **INC** and **IND** are grounded for PBTL operation.

3.3 Single-Ended (SE) Output (4.0) Operation

Configure the EVM as follows for 4 single-ended operations:

Table 7. SE 4.0 Default Jumper States

Jumper	Setting	Comment
J29	IN	PVDD to 15-V BUCK
J31	IN	12-V LDO to 12-V TERM
J32	IN	3.3-V LDO to 3.3-V TERM
J33	IN	3.3-V LDO to 3.3-V TERM
J21	IN	CSTART SE
J16	3 to 4	MASTER MODE
J5	1 to 2	M1 – 4XSE
J6	1 to 2	M2 – 4XSE
J22	OUT	OUTA CAP SHUNT
J23	OUT	OUTB CAP SHUNT
J24	OUT	OUTC CAP SHUNT
J25	OUT	OUTD CAP SHUNT
J26	2 to 3	INC SELECT
J27	2 to 3	IND SELECT
J7	OUT	PBTL SELECT INC
J8	OUT	PBTL SELECT IND
J10	OUT	INC/D DIFF INPUT
J12	OUT	INC/D DIFF INPUT
J4	2 to 3	INA/B DIFF INPUT
J19	2 to 3	INC/D DIFF INPUT

- Set **J6** to H and **J5** to H.
- Connect speaker/power resistor (2–4 Ω) positive terminal to OUTA and remove jumper **J22**.
- Connect speaker/power resistor (2–4 Ω) positive terminal to OUTB and remove jumper **J23**.
- Connect speaker/power resistor (2–4 Ω) positive terminal to OUTC and remove jumper **J24**.
- Connect speaker/power resistor (2–4 Ω) positive terminal to OUTD and remove jumper **J25**.
- Set both **J4** and **J19** jumpers position to DIFF.
- Connect input to female RCA jack input A/AB (**RED**) for OUTA speaker.
- Connect input to female RCA jack input B (**YELLOW**) for OUTB speaker.
- Connect input to female RCA jack input C/CD (**WHITE**) for OUTC speaker.
- Connect input to female RCA jack input D (**BLACK**) for OUTD speaker.

NOTE: The performance of the TPA3255EVM/TPA3255DDV is dependent on the power supply. Design the power supply with margins that can deliver the needed power. In low-frequency applications additional bulk capacitance may be needed. Replacing the bulk capacitors on the TPA3255EVM with more capacitance may be necessary, depending on the power supply used.

4 Board Layouts, Bill of Materials, and Schematic

4.1 TPA3255EVM Board Layouts

Figure 3 and Figure 4 illustrate the board layouts for the EVM.

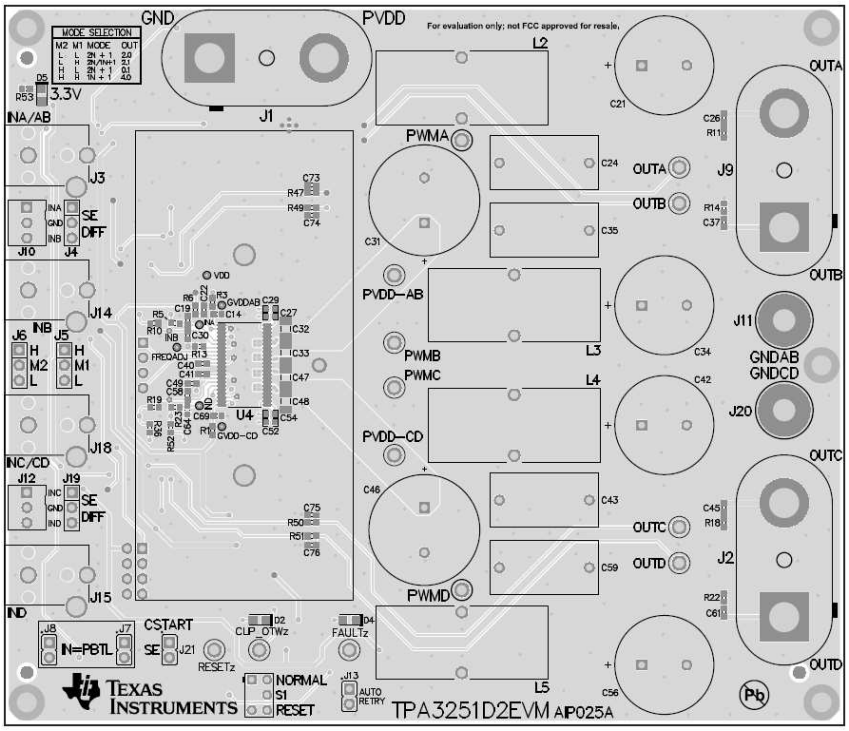

Figure 3. TPA3255EVM Top Composite Assembly

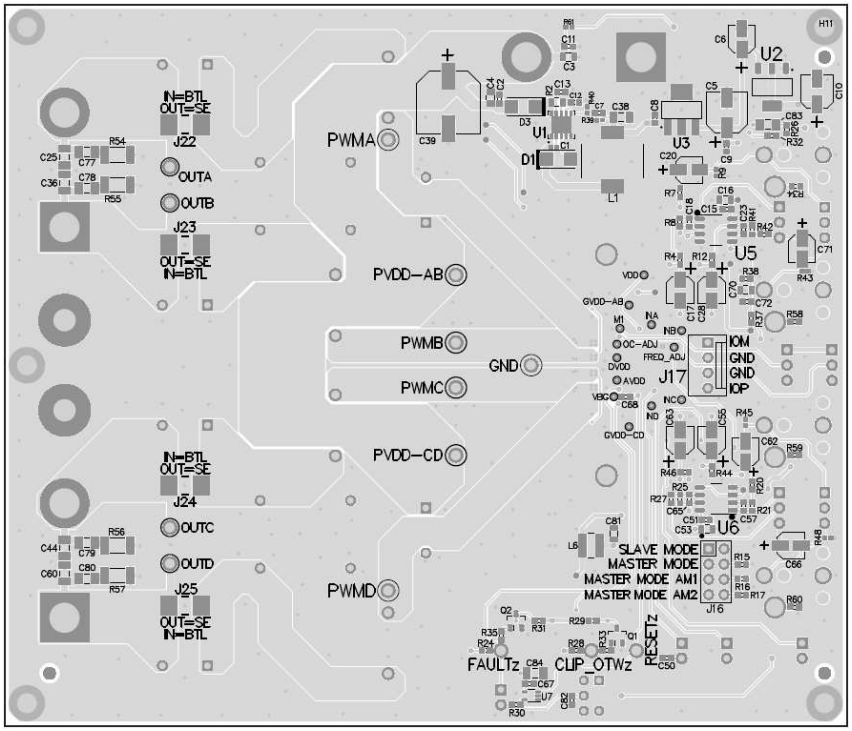

Figure 4. TPA3255EVM Bottom Composite Assembly

4.2 TPA3255EVM Board Dimension

Figure 5 illustrates the TPA3255EVM board dimensions, which are 140 mm × 120 mm.

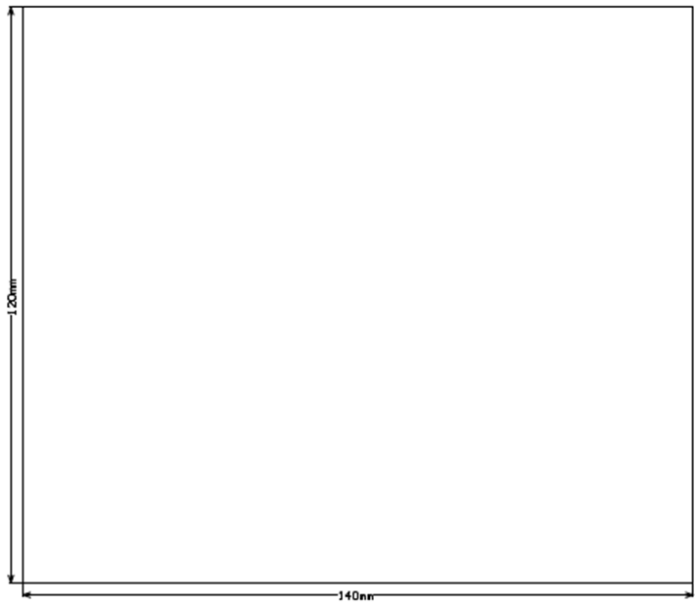

Figure 5. TPA3255EVM Board Dimension

4.3 Bill of Materials

Table 8 displays the BOM for this EVM.

Table 8. Bill of Materials

Designator	Quantity	Value	Description	Package Reference	Part NUmber	Manufacturer
!PCB1	1		Printed Circuit Board		AAP053	Any
C1	1	0.047 µf	CAP, CERM, 0.047 µF, 25 V, ± 10%, X7R, 0402	402	GRM155R71E473KA88D	MuRata
C2	1	0.1 µf	CAP, CERM, 0.1 µF, 100 V, ± 10%, X7R, 0603	603	GRM188R72A104KA35J	MuRata
C3, C32, C33, C47, C48, C83, C84	7	1 µf	CAP, CERM, 1 µF, 100 V, ± 10%, X7R, 1206	1206	GRM31CR72A105KA01L	MuRata
C4	1	2.2 µf	CAP, CERM, 2.2 µF, 100 V, ± 10%, X7R, 1210	1210	C1210C225K1RACTU	Kemet
C5	1	47µf	CAP, AL, 47 µF, 16 V, ± 20%, 0.36 Ω, SMD	SMT Radial D	EEE-FK1C470P	Panasonic
C6	1	4.7µf	CAP, CERM, 4.7 µF, 25 V, ± 10%, X7R, 1206	1206	GRM31CR71E475KA88L	MuRata
C7	1	5600 pF	CAP, CERM, 5600 pF, 50 V, ± 10%, X7R, 0603	603	GRM188R71H562KA01D	MuRata
C8, C50	2	0.47µf	CAP, CERM, 0.47 µF, 25 V, ± 10%, X7R, 0603	603	GRM188R71E474KA12D	MuRata
C9, C13, C14, C15, C22, C51, C67, C68, C69, C72, C82	11	0.1 µf	CAP, CERM, 0.1 µF, 50 V, ± 10%, X7R, 0603	603	C0603C104K5RACTU	Kemet
C10	1	100 µf	CAP, AL, 100 µF, 6.3 V, ± 20%, 0.7 Ω, SMD	SMT Radial C	EEE-FK0J101UR	Panasonic
C11, C26, C37, C45, C61	5	0.01 µf	CAP, CERM, 0.01 µF, 100 V, ± 10%, X7R, 0603	603	06031C103KAT2A	AVX
C12	1	4700 pF	CAP, CERM, 4700 pF, 50 V, ± 10%, X7R, 0603	603	C0603X472K5RACTU	Kemet
C16, C53, C70, C81	4	10 µf	CAP, CERM, 10 µF, 16 V, ± 10%, X5R, 0805	805	EMK212BJ106KG-T	Taiyo Yuden
C17, C20, C28, C38, C55, C62, C63, C66, C71	9	10 µf	CAP, AL, 10 µF, 16 V, ± 20%, 1.35 Ω, SMD	SMT Radial B	EEE-FK1C100R	Panasonic
C18, C23, C57, C65	4	22 pF	CAP, CERM, 22 pF, 50 V, ± 5%, C0G/NP0, 0603	603	GRM1885C1H220JA01D	MuRata
C19, C30, C58, C64	4	100 pF	CAP, CERM, 100 pF, 50 V, ± 5%, C0G/NP0, 0603	603	GRM1885C1H101JA01D	MuRata
C21, C34, C42, C56	4	1500 µf	CAP, AL, 1500 µF, 63 V, ± 20%, 0.03 Ω, AEC-Q200 Grade 2, TH	Dia 18 mm	EEU-FC1J152	Panasonic
C24, C35, C43, C59	4	1 µf	CAP, Film, 1 µF, 250 V, ± 5%, TH	18mm × 9.5mm × 17.5 mm	PHE426HB7100JR06	Kemet
C25, C36, C44, C60	4	1000 pF	CAP, CERM, 1000 pF, 100 V, ± 5%, C0G/NP0, 1206	1206	12061A102JAT2A	AVX
C27, C29, C52, C54	4	0.033 µf	CAP, CERM, 0.033 µF, 25 V, ± 10%, X7R, 0603	603	GRM188R71E333KA01D	MuRata
C31, C46	2	4700 µf	CAP, AL, 4700 µF, 80 V, ± 20%, 0.071 Ω, TH	D35 mm × L30 mm	SLPX472M080H3P3	Cornell Dubilier Electronics
C39	1	47 µf	CAP, AL, 47 µF, 63 V, ± 20%, 0.65 Ω, SMD	SMT Radial F	EEE-FK1J470P	Panasonic
C40, C41	2	1 µf	CAP, CERM, 1 µF, 16 V, ± 10%, X7R, 0603	603	GRM188R71C105KA12D	MuRata

Table 8. Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part NUmber	Manufacturer
C49	1	0.01 µf	CAP, CERM, 0.01 µF, 50 V, ± 10%, X7R, 0603	603	GRM188R71H103KA01D	MuRata
D1	1	100 V	Diode, Schottky, 100 V, 1 A, SMA	SMA	B1100-13-F	Diodes Inc.
D2	1	Orange	LED, Orange, SMD	LED_0805	LTST-C170KFKT	Lite-On
D3	1	100 V	Diode, Schottky, 100 V, 3 A, SMA	SMA	SK310A-TP	Micro Commercial Components
D4	1	Red	LED, Red, SMD	LED_0805	LTST-C170KRKT	Lite-On
D5	1	Green	LED, Green, SMD	LED_0805	LTST-C171GKT	Lite-On
H1	1		Heat Sink, Vertical	Heatsink	ATS-TI1OP-519-C1-R3	Advanced Thermal Solutions
H2, H3, H4, H5, H6, H12, H13	7		MACHINE SCREW PAN PHILLIPS M3 5mm	Screw M3 Phillips head	MPMS 003 0005 PH	B&F Fastener Supply
H7, H8, H9, H10, H11	5		Standoff, Hex, 25-mm Length, M3, Aluminum	Standoff M3	24438	Keystone
J1, J2, J9	3		Dual Binding Posts with Base, 2x1, TH	Dual Binding Posts with Base, 2 × 1, TH	6883	Pomona Electronics
J3	1		RCA Jack, Vertical, Red, TH	RCA JACK, RED	RCJ-022	CUI Inc.
J4, J5, J6, J7, J8, J19, J26, J27	8		Header, 100 mil, 3 × 1, Gold, TH	PBC03SAAN	PBC03SAAN	Sullins Connector Solutions
J10, J12	2		Header, 2.54 mm, 3 × 1, TH	Header, 2.54 mm, 3 × 1, TH	22-11-2032	Molex
J11, J20	2		Binding Post, BLACK, TH	11.4 mm × 27.2 mm	7007	Keystone
J14	1		RCA Jack, Vertical, Black, TH	RCA Jack, Vertical, Black, TH	RCJ-021	CUI Inc.
J15	1		RCA Jack, Vertical, Blue, TH	RCA Jack, Vertical, Blue, TH	RCJ-025	CUI Inc.
J16	1		Header, 100 mil, 4 × 2, Tin, TH	Header, 4 × 2, 100 mil, Tin	PEC04DAAN	Sullins Connector Solutions
J17	1		Header (friction lock), 100 mil, 4 × 1, Gold, TH	Header 4 × 1 keyed	22112042	Molex
J18	1		RCA Jack, Vertical, White, TH	RCA JACK, WHITE	RCJ-023	CUI Inc.
J21, J30	2		Header, 100 mil, 2 × 1, Gold, TH	Sullins 100 mil, 1 × 2, 230 mil above insulator	PBC02SAAN	Sullins Connector Solutions
J22, J23, J24, J25, J29	5		JUMPER TIN SMD	6.85 mm × 0.97 mm × 2.51 mm	S1911-46R	Harwin
J28	1		Receptacle, 100 mil, 8 × 2, Gold, TH	Receptacle, 8 × 2, Body 21.08 mm × 4.95 mm, Pitch 2.54 mm	SSQ-108-02-G-D	Samtec
L1	1	100 µH	Inductor, Shielded Drum Core, Ferrite, 100 µH, 1.5 A, 0.165 Ω, SMD	10 mm × 5 mm × 10 mm	7447714101	Wurth Elektronik
L2, L3, L4, L5	4	10 µH	Inductor, Toroid, Powdered Iron, 10 µH, 6.1 A, 0.026 Ω, TH	28.6 mm × 12.3 mm	MA5172-AE	Coilcraft
L6	1	10 µH	Inductor, Wirewound, 10 µH, 0.8 A, 0.204 Ω, SMD	2-Pin SMD, Body 4 mm × 4 mm, Height 1.2 mm	NRS4012T100MDGJV	Taiyo Yuden

Table 8. Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part NUmber	Manufacturer
L7	1	10 µH	Inductor, Wirewound, 10 µH, 0.08 A, 0.36 Ω, SMD	603	GLFR1608T100M-LR	TDK
Q1, Q2	2	60 V	MOSFET, N-CH, 60 V, 0.17 A, SOT-23	SOT-23	2N7002-7-F	Diodes Inc.
R1, R3, R4, R12, R30, R44, R46	7	0	RES, 0, 5%, 0.1 W, 0603	603	CRCW06030000Z0EA	Vishay-Dale
R2	1	182 k	RES, 182 k, 1%, 0.125 W, 0805	805	ERJ-6ENF1823V	Panasonic
R5, R10, R19, R23, R33, R35	6	100	RES, 100, 1%, 0.1 W, 0603	603	CRCW0603100RFKEA	Vishay-Dale
R6	1	100 k	RES, 100 k, 1%, 0.1 W, 0603	603	CRCW0603100KFKEA	Vishay-Dale
R7, R8, R20, R21, R25, R27, R37, R38, R41, R42	10	10.0 k	RES, 10.0 k, 0.1%, 0.1 W, 0603	603	RT0603BRD0710KL	Yageo America
R9, R43, R45, R48	4	100 k	RES, 100 k, 1%, 0.063 W, 0402	402	CRCW0402100KFKED	Vishay-Dale
R11, R14, R18, R22	4	3.3	RES, 3.3, 5%, 0.1 W, 0603	603	CRCW06033R30JNEA	Vishay-Dale
R13	1	22.0 k	RES, 22.0 k, 1%, 0.1 W, 0603	603	RC0603FR-0722KL	Yageo America
R15, R36, R52	3	10.0 k	RES, 10.0 k, 1%, 0.1 W, 0603	603	CRCW060310K0FKEA	Vishay-Dale
R16	1	20.0 k	RES, 20.0 k, 1%, 0.1 W, 0603	603	RC0603FR-0720KL	Yageo America
R17	1	30.0 k	RES, 30.0 k, 1%, 0.1 W, 0603	603	RC0603FR-0730KL	Yageo America
R24, R28	2	47 k	RES, 47 k, 5%, 0.1 W, 0603	603	RC0603JR-0747KL	Yageo America
R26	1	3.30 k	RES, 3.30 k, 1%, 0.1 W, 0603	603	RC0603FR-073K3L	Yageo America
R29, R31	2	1.00 k	RES, 1.00 k, 1%, 0.1 W, 0603	603	CRCW06031K00FKEA	Vishay-Dale
R32	1	12.0 k	RES, 12.0 k, 1%, 0.1 W, 0603	603	ERJ-3EKF1202V	Panasonic
R34	1	360	RES, 360, 5%, 0.063 W, 0402	402	CRCW0402360RJNED	Vishay-Dale
R39	1	4.99 k	RES, 4.99 k, 1%, 0.063 W, 0402	402	CRCW04024K99FKED	Vishay-Dale
R40	1	1.00 k	RES, 1.00 k, 1%, 0.063 W, 0402	402	CRCW04021K00FKED	Vishay-Dale
S1	1		Switch, SPDT, On-On, 2 Pos, TH	Switch, 7 mm × 4.5 mm	200USP1T1A1M2RE	E-Switch
SH1, SH2, SH3, SH4, SH5, SH6, SH7, SH8	8	1 × 2	Shunt, 100 mil, Gold plated, Black	Shunt	969102-0000-DA	3M
U1	1		High Voltage 1A Step Down Switching Regulator, 10-pin LLP, Pb-Free	SDC10A	LM5010ASD/NOPB	Texas Instruments
U2	1		1A Low Dropout Regulator, 4-pin SOT-223, Pb-Free	MP04A	LM2940IMP-12/NOPB	Texas Instruments
U3	1		FIXED LOW-DROPOUT VOLTAGE REGULATOR, DCY0003A	DCY0003A	TLV1117-33IDCY	Texas Instruments

Table 8. Bill of Materials (continued)

Designator	Quantity	Value	Description	Package Reference	Part NUmber	Manufacturer
U4	1		150W Stereo/300W MONO PurePath HD Analog-input Power Stage, DDV0044D	DDV0044D	TPA3255D2DDVR	Texas Instruments
U5, U6	2		Dual Low-Noise Operational Amplifier, 10 to 30 V, 0 to 70 degC, 8-pin SOIC (D0008A), Green (RoHS& no Sb/Br)	D0008A	NE5532ADR	Texas Instruments
U7	1		ULTRA-SMALL SUPPLY VOLTAGE SUPERVISORS, DCK0005A	DCK0005A	TPS3802K33DCKR	Texas Instruments
C73, C74, C75, C76	0	22 pF	CAP, CERM, 22 pF, 50 V, ± 5%, C0G/NP0, 0603	603	GRM1885C1H220JA01D	MuRata
C77, C78, C79, C80	0	1 µf	CAP, CERM, 1 µF, 50 V, ± 10%, X7R, 1206	1206	GRM31MR71H105KA88L	MuRata
FID1, FID2, FID3, FID4, FID5, FID6	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
J13	0		Header, 100 mil, 2 × 1, Gold, TH	Sullins 100 mil, 1 × 2, 230 mil above insulator	PBC02SAAN	Sullins Connector Solutions
R47, R49, R50, R51	0	10.0 k	RES, 10.0 k, 1%, 0.1 W, 0603	603	CRCW060310K0FKEA	Vishay-Dale
R53, R54, R55, R56	0	3.3	RES, 3.3, 5%, 0.75 W, 2010	2010	CRCW20103R30JNEF	Vishay-Dale
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14	0		Test Point, Multipurpose, Grey, TH	Grey Multipurpose Testpoint	5128	Keystone

4.4 TPA3255EVM Schematics

The schematics for TPA3255EVM is illustrated in Figure 6, Figure 7, and Figure 8.

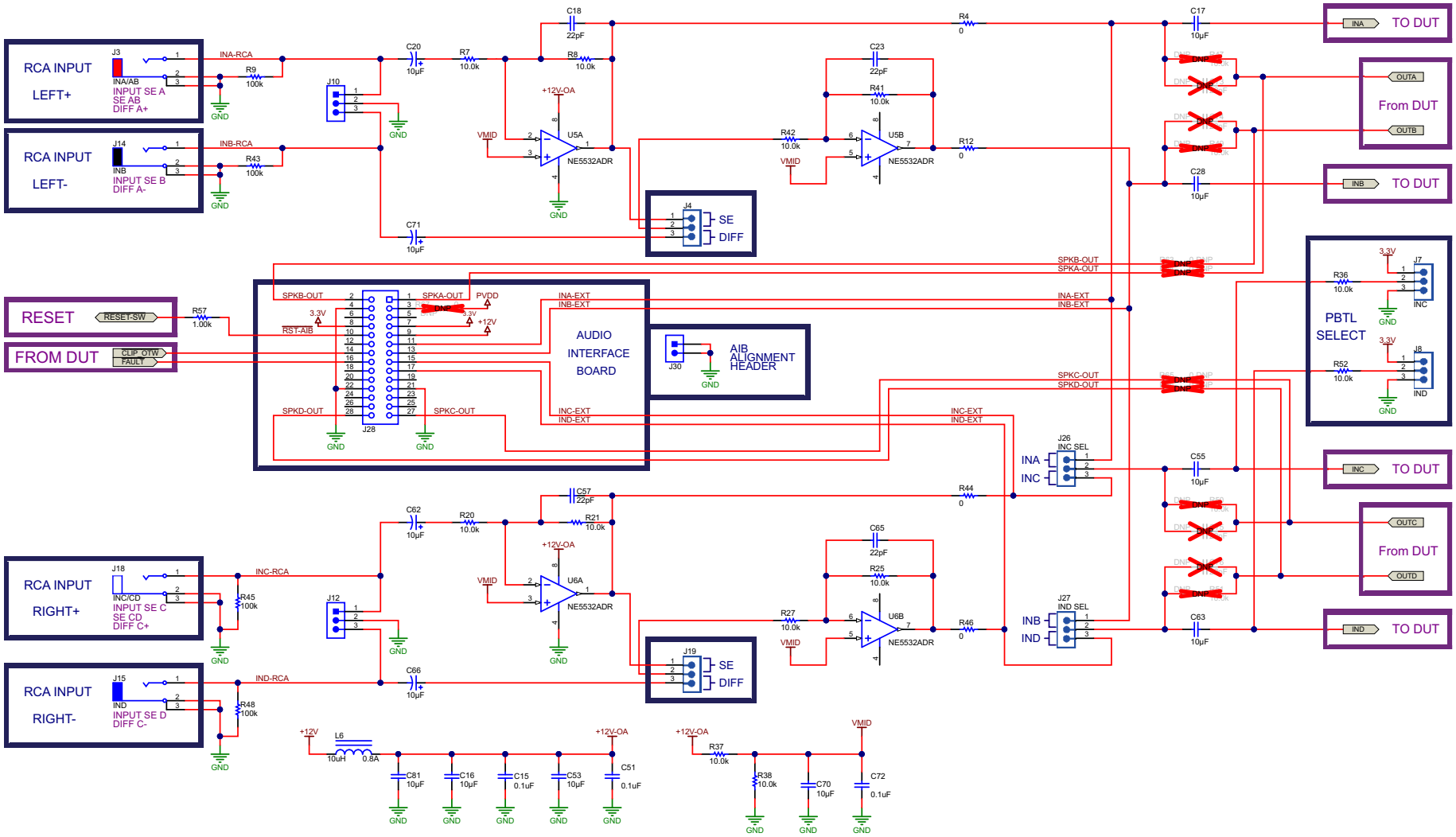

Figure 6. TPA3255EVM Schematic 1

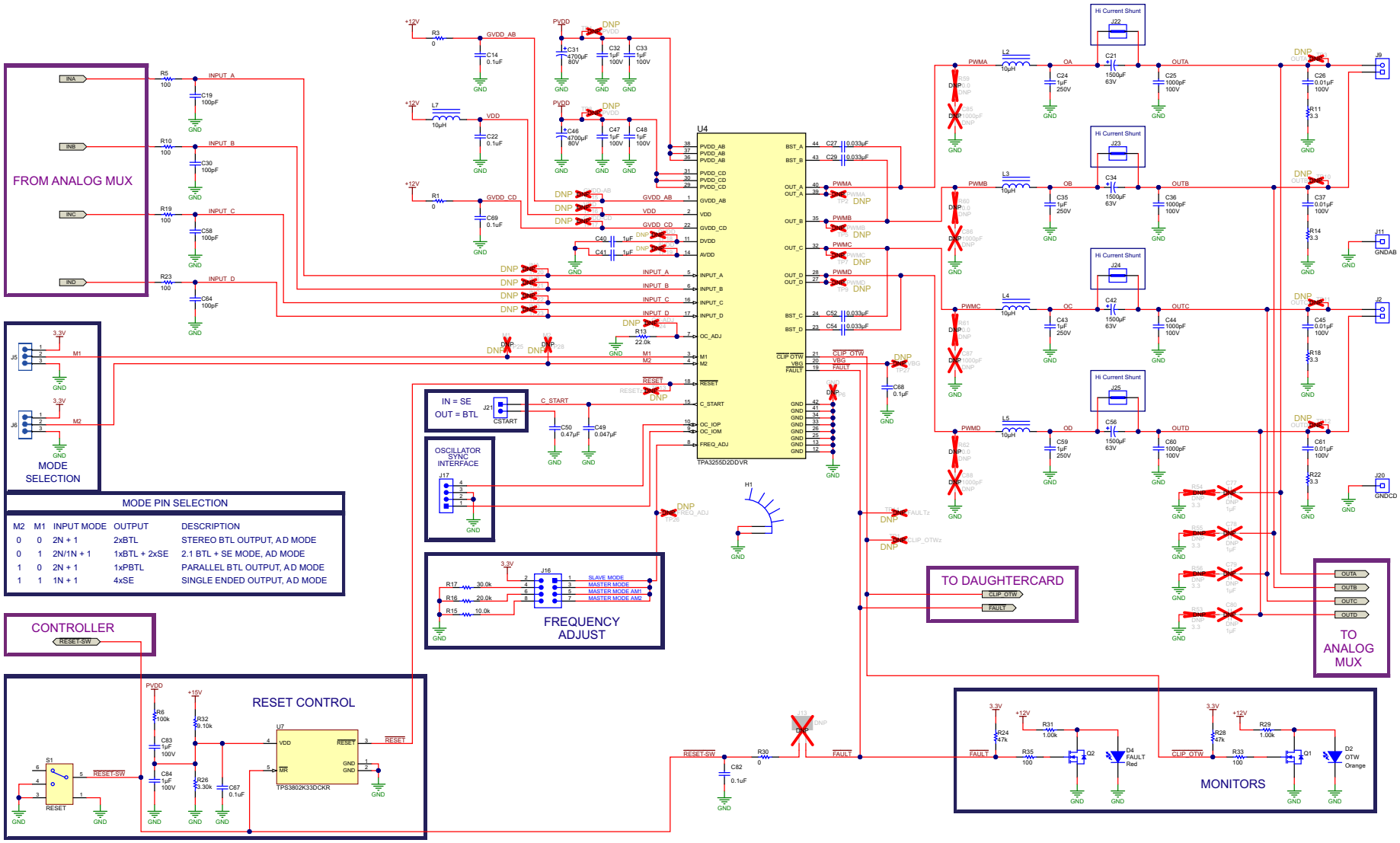

Figure 7. TPA3255EVM Schematic 2

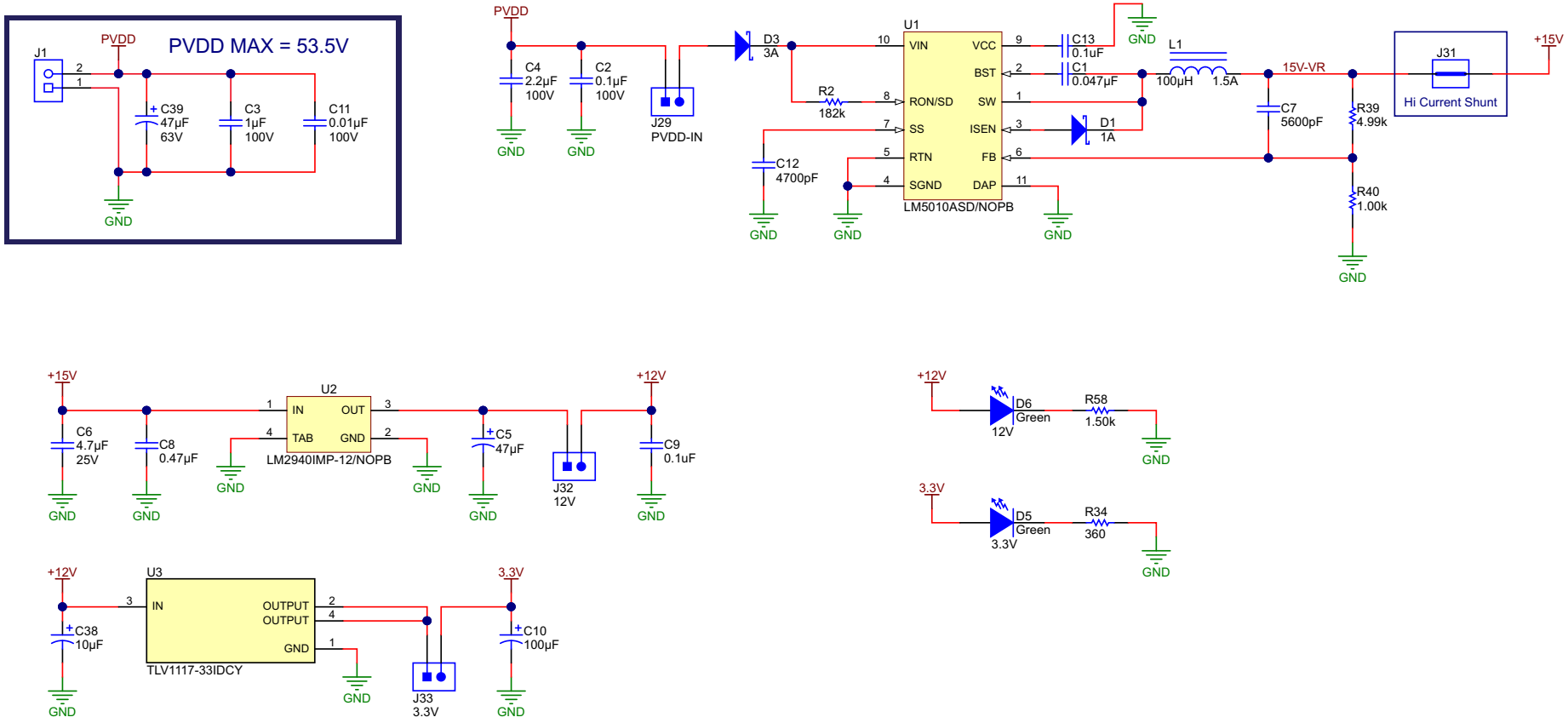

Figure 8. TPA3255EVM Schematic 3

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2 *Limited Warranty and Related Remedies/Disclaimers*:

   2.1 These terms and conditions do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.

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   2.3 If any EVM fails to conform to the warranty set forth above, TI's sole liability shall be at its option to repair or replace such EVM, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

3 *Regulatory Notices:*

   3.1 *United States*

      3.1.1 *Notice applicable to EVMs not FCC-Approved:*

      This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

      3.1.2 *For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:*

      CAUTION

      This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

      Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

      FCC Interference Statement for Class A EVM devices

      NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
- *Consult the dealer or an experienced radio/TV technician for help.*

3.2 *Canada*

3.2.1 *For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210*

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

3.3 *Japan*

3.3.1 *Notice for EVMs delivered in Japan:* Please see http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_01.page 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。
http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_01.page

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If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required by Radio Law of Japan to follow the instructions below with respect to EVMs:

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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4.1 EVMS ARE NOT FOR USE IN FUNCTIONAL SAFETY AND/OR SAFETY CRITICAL EVALUATIONS, INCLUDING BUT NOT LIMITED TO EVALUATIONS OF LIFE SUPPORT APPLICATIONS.

4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.

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Only those TI components which TI has specifically designated as military grade or “enhanced plastic” are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have ***not*** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

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