

TPA6135A2 EVM

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1 Introduction

This section provides an overview of the Texas Instruments (TI) TPA6135A2 DirectPath™ stereo headphone amplifier evaluation module (EVM). It includes a brief description of the module and a list of EVM specifications.

1.1 Description

The TPA6135A2 is a DirectPath™ stereo headphone amplifier capable of delivering 25 mW/Ch into 16 Ω and requires no output DC blocking capacitors.

The TPA6135A2 EVM is a complete, stand-alone audio board. It contains the TPA6135A2 QFN (RTE) DirectPath™ stereo headphone amplifier. All components are Pb-free.

1.2 EVM Specifications

| | |
|-------------------------------------------------------------------------------------|----------------|
| Supply voltage range, V_{DD} | 2.5 V to 5.5 V |
| Supply current, I_{DD} | 0.5 A, maximum |
| Continuous output power, P_O , $V_{DD} = 5\text{ V}$, $16\ \Omega$, THD+N = 1 % | 25 mW |

2 Operation

This section describes how to operate the TPA6135A2EVM.

2.1 Quick-Start List for Stand-Alone Operation

Use the following steps when operating the TPA6135A2EVM stand alone or when connecting the EVM into an existing circuit.

2.1.1 Power and Ground

1. Verify that the external power sources are set to OFF.
2. Set the power supply voltage between 2.5 V and 5.5 V. When connecting the power supply to the EVM, first connect the ground connection to the GND connector, and then connect the positive supply to the V_{DD} connector. Verify that the connections are made to the correct banana jacks.

2.1.2 Inputs and Outputs

2.1.2.1 Audio

1. Verify that the audio source is set to the minimum level.
2. Connect the audio source to the inputs, INL and INR. Shunt JP1 and JP2 for single-ended input.
3. Connect a headset or other load to the headphone jack.

2.1.2.2 Shutdown Controls

1. Shutdown is controlled by pushbutton S1. Press and hold S1 to place the TPA6135A2 in shutdown. Release S1 to reactivate the TPA6135A2.

2.1.3 Gain Setting

Set the gain of the TPA6135A2 at GAIN. Set GAIN = 0 for -6dB. Set GAIN = 1 for 6 dB.

2.1.4 Hi-Z Control

Output will be in Hi-Z state when HIZ = 1. Set HIZ = 0 to disable the Hi-Z mode.

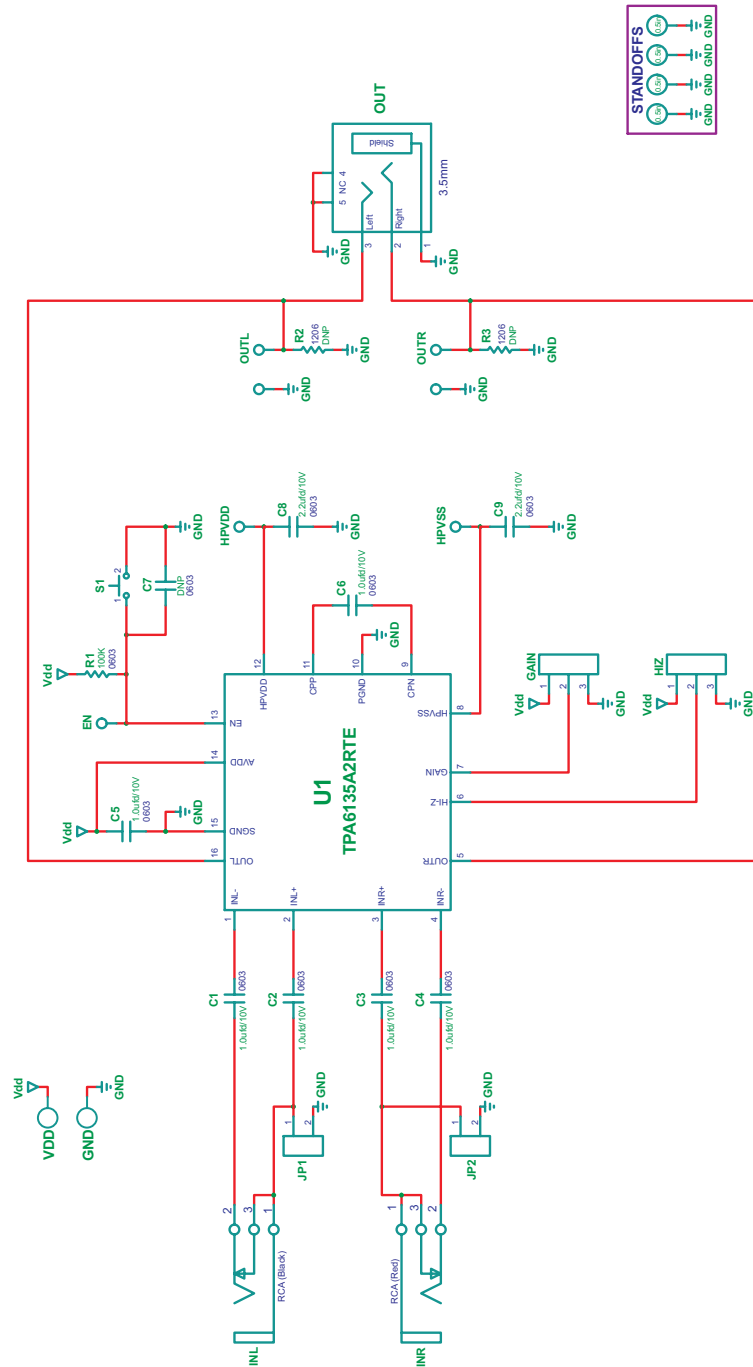
2.1.5 Power Up

1. Verify the correct connections as described in Sections 2.1.1 and 2.1.2.
2. Verify the correct voltage setting of the power supply and turn ON the power supply. Proper operation of the EVM should begin.
3. Adjust the audio signal source as needed.

3 Reference

This section includes the EVM schematic, board layout reference, and parts list.

3.1 TPA6135A2EVM Schematic



3.2 TPA6135A2EVM PCB Layers

Figure 1. Top Layer

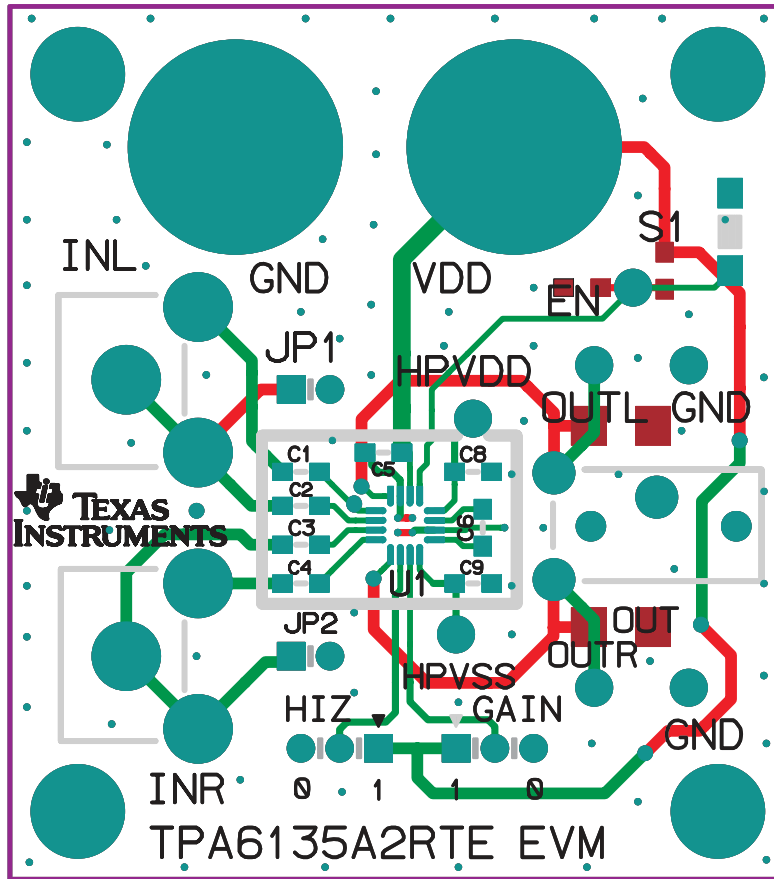
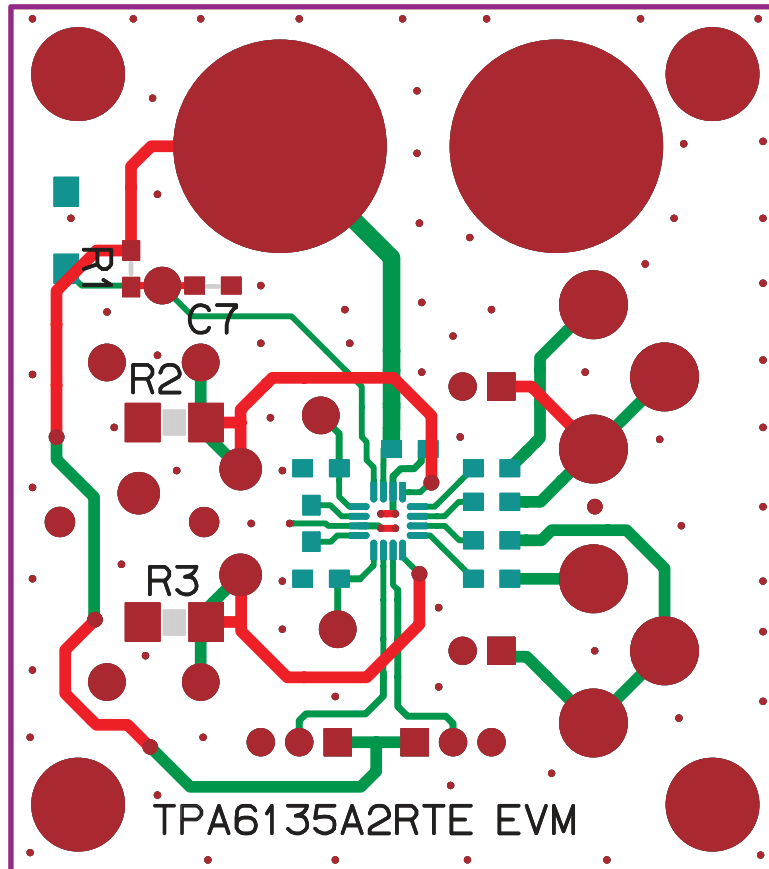


Figure 2. Bottom Layer



4 TPA6135A2EVM Bill of Materials
Table 1. TPA6135A2EVM Bill of Materials

| Qty. | Reference | Description | SND Size | Manufacturer/ Part Number |
|------|--------------------------------------------|--------------------------------------------------|--------------|------------------------------------|
| 6 | C1, C2, C3, C4, C5, C6 | Capacitor, ceramic, 1 μ F, 10 V, X5R | 0603 | Panasonic ECJ-1VB1A105K |
| 1 | C7 | Capacitor, ceramic, 0.1 μ F, 16 V, X7R | 0603 | Panasonic ECJ-1VB1C104K |
| 2 | C8, C9 | Capacitor, ceramic, 2.2 μ F, 10 V, X7R | 0603 | muRata GRM188R71A225KE15D |
| 7 | EN, GND, HPVDD, HPVSS, OUTL, OUTR | PC test point, white | | Keystone 5002 |
| 2 | GND, VDD | Binding post, 15a, uninsulated | | Johnson Components 111-2223-001 |
| 2 | GAIN, HIZ | Header, 3 pin, PCB 2.0mm ROHS | | Norcomp 26630301RP2 |
| 4 | GAIN, HIZ JP1, JP2 | Shunt, black au flash 2 mm | | Norcomp 800-002-SP2-001 |
| 4 | HW1, HW2, HW3, HW4 | Hex nut, 4-40, zinc/steel | | Building Fasteners HNZ440 |
| 4 | HW1, HW2, HW3, HW4 | Standoff, 4-40 threaded M/F 0.50 in. ALUM-HEX | | Keystone Electronics 8401 |
| 2 | INL, INR | Jack, RCA black, PCB-ra ROHS | | Switchcraft PJRAN1X1U01X |
| 4 | JP1, JP2, G1, G0 | Header, 2 pin, PCB 2 mm ROHS | | Norcomp 26630201RP2 |
| 1 | OUT | Jack, mini-stereo, PCB-ra, 3.5 mm ROHS | | Kycon, Inc., P/N STX-3000 |
| 1 | R1 | Resistor, 100 k Ω , 1/10 W, 5%, SMD, ROHS | 0603 | Panasonic ERJ-3GEYJ104V |
| 1 | S1 | Momentary switch, SMT-short, black tab, 160g | | Panasonic EVQ-PPBA25 |
| 1 | U1 | DirectPath headphone amplifier | QFN 16 (RTE) | Texas Instruments TPA6135A2RTE |

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EVM WARNINGS AND RESTRICTIONS

It is important to operate this EVM within the input voltage range of $HPVSS - 0.3\text{ V}$ to $HPVDD + 0.3\text{ V}$ and the output voltage range of $HPVSS$ to $HPVDD$.

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 85°C . The EVM is designed to operate properly with certain components above 85°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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