

TPA6203A1 Audio Power Amplifier Evaluation Module

The TPA6203A1 audio amplifier evaluation module is a complete, low-power single-channel audio power amplifier. It consists of the TI TPA6203A1 1.25-W low-voltage audio power amplifier IC in a very small MicroStar Junior™ BGA package, along with a small number of other parts mounted on a circuit board that is approximately one and a quarter inches square.

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1 Introduction

This chapter provides an overview of the Texas Instruments (TI) TPA6203A1 MicroStar Junior™ BGA audio amplifier evaluation module. It includes a list of EVM features, a brief illustrated description of the module, and a list of EVM specifications.

1.1 Feature Highlights

The TI TPA6203A1 Low-Voltage Audio Power Amplifier Evaluation Module includes the following features:

- TPA6203A1 Low-Voltage Audio Power Amplifier Evaluation Module
- 2 mm × 2 mm MicroStar Junior™ BGA
- Fully differential amplifier
- Single-channel, bridge-tied load (BTL)
- 2.5-V to 5.5-V operation
- 1.25-W @ 10% THD output power into 8 Ω at 5 V, BTL
- Internal depop and quick start-up circuitry
- Internal thermal and short-circuit protection
- Module gain is set at 2 V/V

1.2 Description

The TPA6203A1 audio power amplifier evaluation module is a complete, low-power single-channel audio power amplifier. It consists of the TI TPA6203A1 1.25-W low-voltage audio power amplifier IC in a very small MicroStar Junior™ BGA package, along with a small number of other parts mounted on a circuit board that is approximately one and a quarter inches square.

1.3 TPA6203A1 EVM Specifications

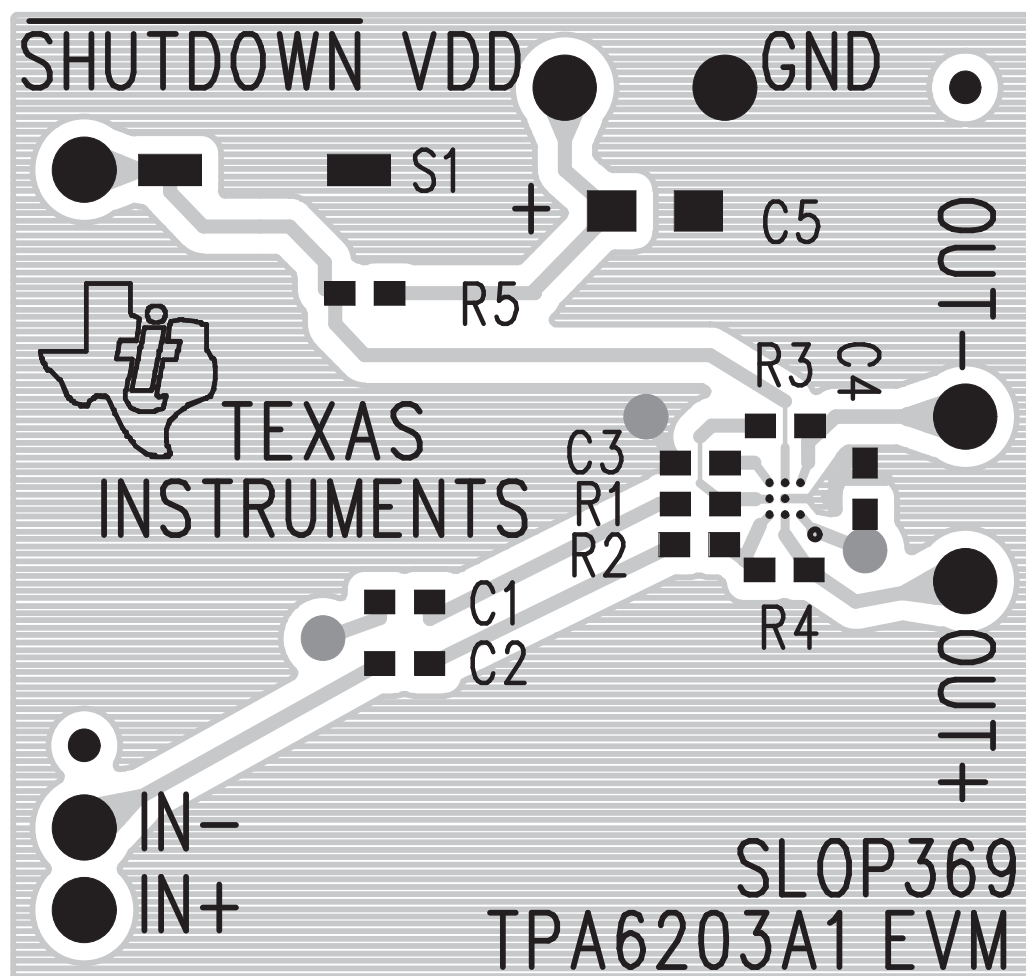
		VALUE	UNIT
V_{DD}	Supply voltage range	2.5 to 5.5	V
I_{DD}	Power supply current rating required	450	mA
P_O	Continuous output power, 8Ω BTL, $V_{DD} = 5$ V	1.25	W
V_I	Audio input voltage	0 V to V_{DD} , max	V
Z_L	Minimum load impedance	8	Ω

2 Operation

Follow the steps in this chapter to prepare the TPA6203A1 audio amplifier EVM for use. The audio amplifier evaluation module is a stand-alone unit and can be used by making connections directly to the module pins, and it can be wired directly into existing circuits or equipment.

2.1 Quick-Start List

Follow these steps to use the TPA6203A1 EVM stand-alone or when connecting it into existing circuits or equipment. Connections to the TPA6203A1 module header pins can be made via individual sockets, wire-wrapping, or soldering to the pins, either on the top or the bottom of the module circuit board.



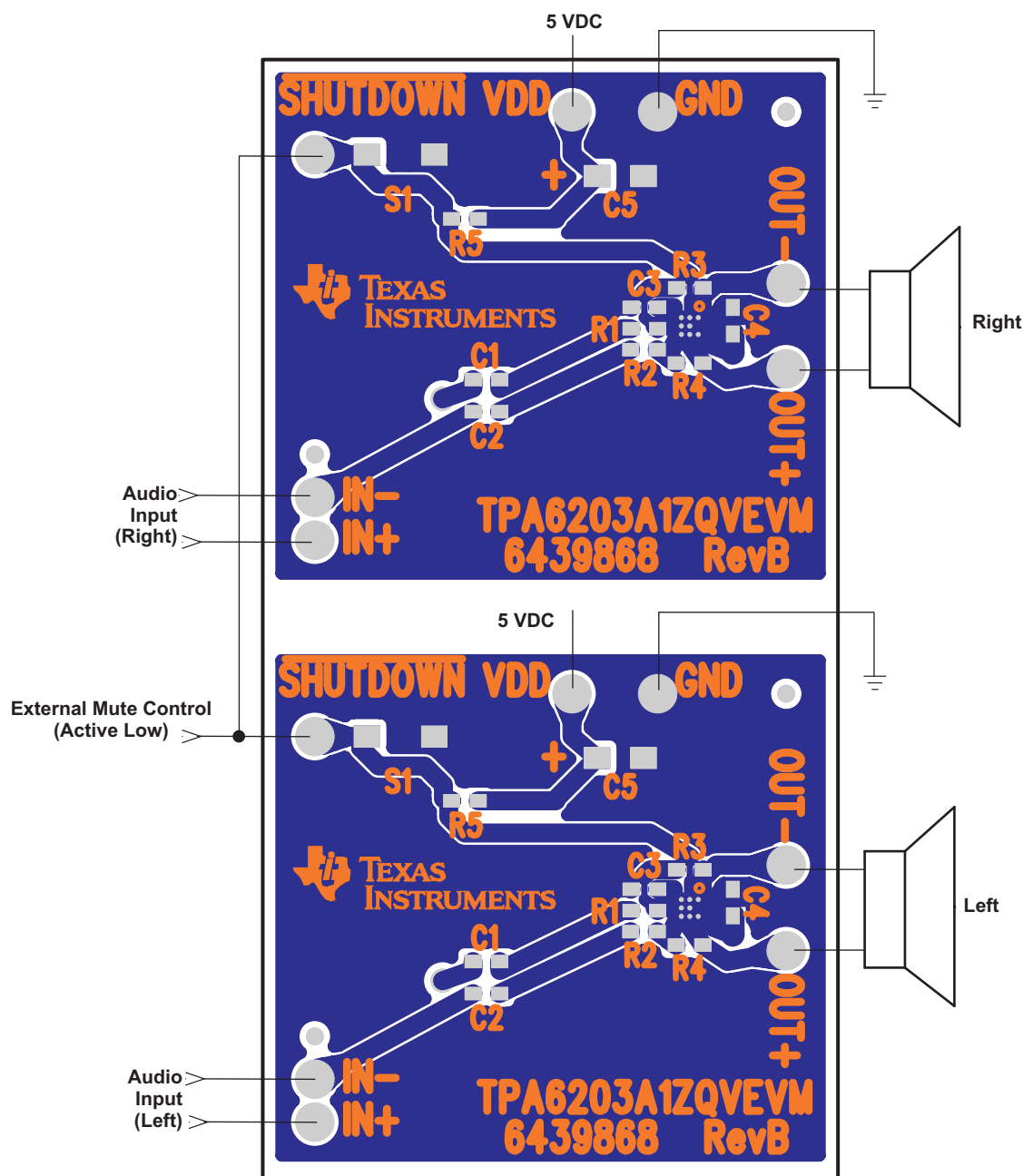
NOTE: Due to the very small size of the MicroStar Junior™ BGA IC package, the standard part number TPA6203A1 is replaced with the code AADI.

Figure 1. Quick-Start Module Map

- Power Supply
 1. Ensure that all external power sources are set to off.
 2. Connect an external regulated power supply set to 5 V to the module V_{DD} and GND pins, taking care to observe marked polarity.
- Inputs and Outputs
 1. Ensure that the signal source level is set to minimum.
 2. Connect the positive lead from the audio source to the module IN+ pin and the negative lead to the IN- pin.
 3. Connect the $\overline{\text{SHUTDOWN}}$ pin through a normally open switch to GND.
 4. Connect an 8Ω–32Ω speaker to the module OUT+ and OUT- pins.
- Power Up
 1. Verify correct voltage and input polarity and set the external power supply to on. The EVM begins operation.
 2. Adjust the signal source level as needed.

2.2 References

2.2.1 TPA6203A1 EVM Connected for Stereo BTL Output



NOTE: Due to the very small size of the MicroStar Junior™ BGA IC package, the standard part number TPA6203A1 is replaced with the code AADI.

Figure 2. TPA6203A1 EVM Connected for Stereo BTL Output

2.2.2 TPA6203A1 EVM Schematic Diagram

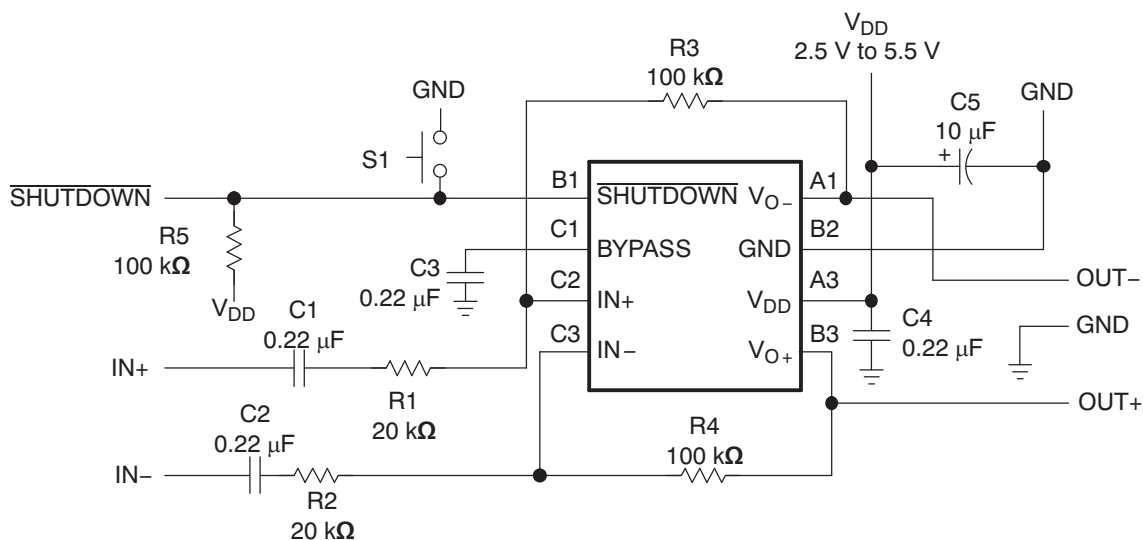


Figure 3. TPA6203A1 EVM Schematic Diagram

NOTE: Figure 3 is for both Revision A and Revision B EVMs.

2.2.3 TPA6203A1 Audio Power Amplifier Evaluation Module Parts List

Table 1. TPA6203A1ZQVEVM Parts List

MANU Part No.	QTY	RefDes	Vendor Part No.	Description	Vendor	MANU
TI-SEMICONDUCTORS						
TPA6203A1ZQVR	1	U1	296-17902-1	1.25W MONO DIFFERENTIAL AUDIO POWER AMP BGA8-ZQV ROHS	DIGI-KEY	TEXAS INSTRUMENTS
CAPACITORS						
ECJ-1VF1C224Z	4	C1, C2, C3, C4	PCC1790CT	CAP CERM SMD0603 22UF 16V Y5V -20%/+80% ROHS	DIGI-KEY	PANASONIC
TAJA106K006RNJ	1	C5	478-1653-1	CAP TANT SMD1206 10UF 6.3V 10 ROHS	DIGI-KEY	AVX CORP.
RESISTORS						
ERJ-3EKF2002V	2	R1, R2	P20.0KHCT	RESISTOR SMD0603 20KΩ 1% 1/10W ROHS	DIGI-KEY	PANASONIC
ERJ-3GEYJ104V	3	R3, R4, R5	P100KGCT	RESISTOR SMD0603 100KΩ 1% 1/10W ROHS	DIGI-KEY	PANASONIC
HEADERS AND JACKS						
PBC01SAAN	7	VDD, GND, IN-, IN+, OUT-, OUT+, SHUTDOWN	S1011E-01	SINGLE PIN HEADER GOLD ROHS	DIGI-KEY	SULLINS
TESTPOINTS AND SWITCHES						
TL1015AF160QG	1	S1	EG4344CT	SWITCH, MOM, 160G SMT 4X3MM ROHS	DIGI-KEY	E-SWITCH
COMPONENT COUNT	19					

2.2.4 TPA6203A1 EVM PCB Layers

The following illustrations depict the TPA6203A1 EVM PCB layers and silkscreen. These drawings are not to scale. Gerber plots can be obtained from any TI sales office.

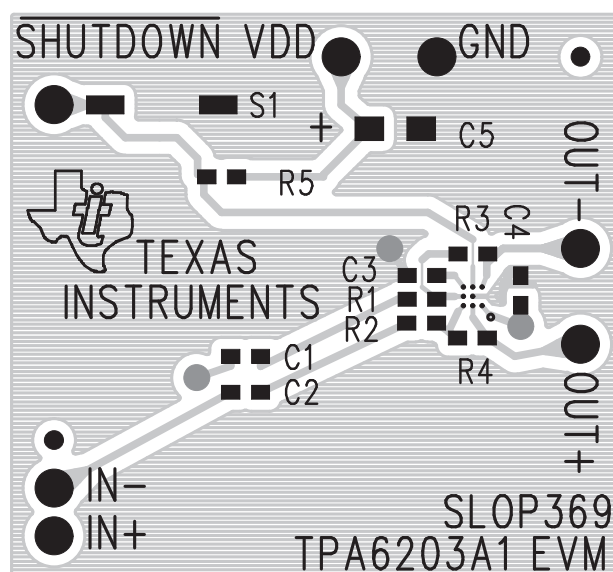


Figure 4. TPA6203A1 EVM Top Layer, Revision A

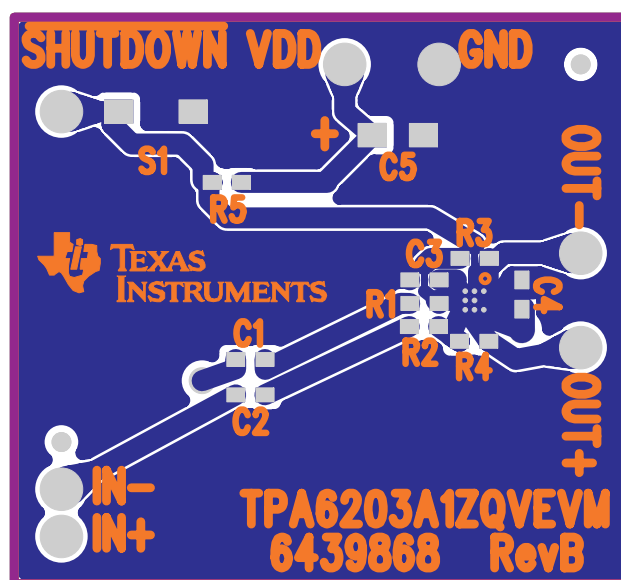


Figure 5. TPA6203A1 EVM Top Layer, Revision B

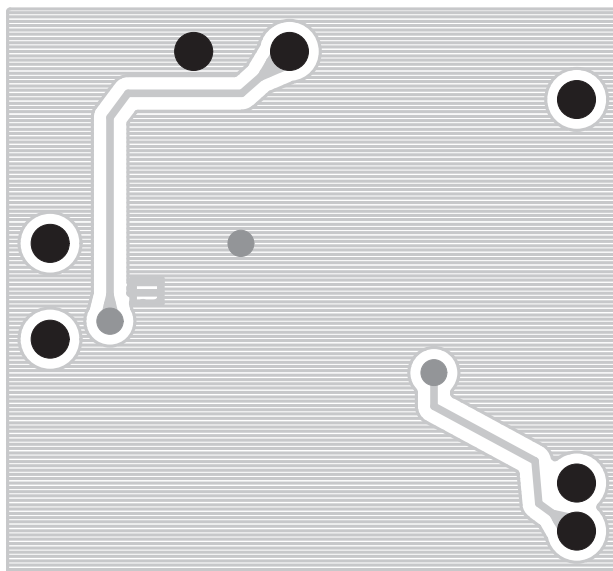


Figure 6. TPA6203A1 EVM Bottom Layer, Revision A

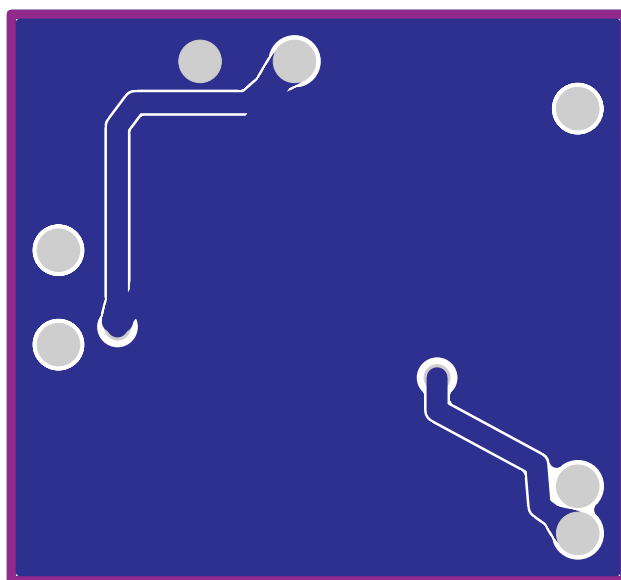


Figure 7. TPA6203A1 EVM Bottom Layer, Revision B

3 Related Documentation From Texas Instruments

- *TPA6203A1, 1.25-W Mono Fully Differential Audio Power Amplifier* data sheet ([SLOS364](#))

4 Addendum

This is a list of modification made to the TPA6203A1ZQV EVM Rev. A and appearing on Rev. B. The modifications do not affect the performance of the board.

Modification	Description
Pin 1 Marker	Moved to top right corner
Text	Updated with new TI logo, EVM identifier, board number, revision letter
Schematic R5	Changed to a pullup resistor
Schematic S1	Modified to pass ground when active

This user's guide contains layouts for both Revision A and Revision B, so use the document accordingly.

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EVM Warnings and Restrictions

It is important to operate this EVM within the input voltage range of 2.5 V to 5.5 V and the output voltage range of 0 V to 5 V .

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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