TS3A226AE Evaluation Board

This user guide describes the TS3A226AE evaluation module (EVM) usage. This guide contains the EVM schematics, evaluation examples, and bill of materials to evaluate the performance of the TS3A226AE device.

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1 Introduction

The TS3A226AE is an audio headset switch that detects 3- or 4-pole 3.5mm accessories. For a 4-pole accessory with a microphone, the TS3A226AE also detects the MIC location and routes the microphone and ground signals automatically. The ground signal is routed through a pair of low-impedance ground FETs (60mΩ typical), resulting minimal impact on audio cross-talk performance. The autonomous detection feature allows end users to plug in accessories with different audio pole configurations into the mobile device and have them operate properly with no added software control and complexity. The ground FETs of the device are designed to allow FM signal pass-through, making it possible to use the ground line of the headset as an FM antenna in mobile audio application.

The TS3A226AE EVM is an evaluation module for the Texas Instruments TS3A226AE switch and it provides the basic functionality evaluation for the device.

2 EVM Setuup

2.1 Boards

One TS3A226AE Evaluation board is provided per EVM kit:

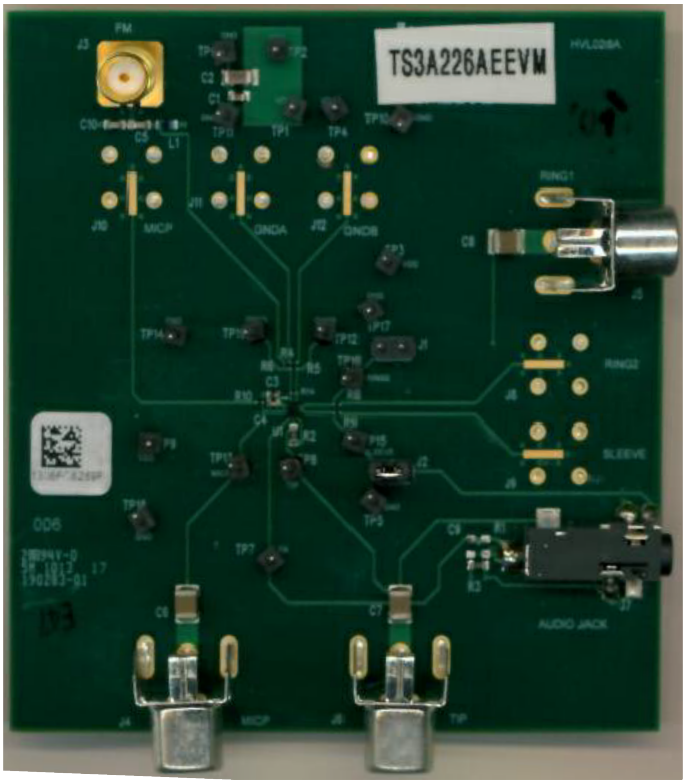


Figure 1. TS3A226AE Evaluation board

Table 1. TS3A226AE Evaluation Module Signal Connections

	Type	Description	Purpose
J3	SMA Connector	FM signal output	If GND is used for FM signal transmission, FM receiver can be connected to this connector for sensitivity test.
J4	RCA Connector	For MIC signal output	Can be connected to Codec for microphone testing.
J5	RCA Connector	RING1 connection	Can be connected to Audio Amplifier (right channel) output for audio testing.
J6	RCA Connector	TIP connection	Can be connected to Audio Amplifier (left channel) output for audio testing.
J7	Audio Jack Connector	Audio Jack for Headset plug in	Plug in different Headset for TS3A226AE function verification

Test Point headers are placed throughout the board to provide testing capability for each pin of the device and are labeled with the corresponding pin name beside the header pins.

2.2 Setup Procedure

2.2.1 Equipment Required

- Power supply which can provide 2.6V to 4.7V
- Multi-meter

2.2.2 Power up

To provide the VDD to the TS3A226AE. Add the jumper for J1 and J2.

External power supply input are supplied to the VDD test point (TP6) for VDD and GND test points (TP12) for GND.

3 Evaluating TS3A226AE

3.1 Test with Different Types of Headsets

To evaluate the capability of headset detection for TS3A226AE, plug in different types of headsets (4-pole standard, 4-pole OMTP, or regular TRS) to the headset jack J7, and check the detection result.

(1) 4-Pole Standard/ North American Headsets:

If a 4-pole standard/North American headset is plugged-in, below table can be used to check the detection result by measuring the resistor through the hand multi-meter.

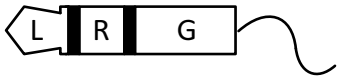
	Negative Pole	Positive Pole	Measured Value(Ω)
TEST POINTS	TP13(MICP)	TP15(SLEEVE)	≤10
	TP13(MICP)	TP16(RING2)	>1K
	TP21(GNDA)	TP15(SLEEVE)	>1K
	TP12(GNDB)	TP16(RING2)	≤2

(2) 4-Pole OMTP Headsets:

If a 4-pole OMTP headset is plugged-in, below table can be used to check the detection result by measuring the resistor through the hand multi-meter.

	Negative Pole	Positive Pole	Measured Value(Ω)
TEST POINTS	TP13(MICP)	TP15(SLEEVE)	>1K
	TP13(MICP)	TP16(RING2)	≤10
	TP21(GNDA)	TP15(SLEEVE)	≤2
	TP12(GNDB)	TP16(RING2)	>1K

(3) RS Audio Headset:



If a regular TRS headset without integrated microphone is plugged-in, below table can be used to check the detection result by measuring the resistor through the hand multi-meter.

	Negative Pole	Positive Pole	Measured Value(Ω)
TEST POINTS	TP13(MICP)	TP15(SLEEVE)	<20
	TP13(MICP)	TP16(RING2)	<20
	TP21(GNDA)	TP15(SLEEVE)	≤2
	TP12(GNDB)	TP16(RING2)	≤2

Note: These measured resistor values cannot be used to check the Switch R_{ON} since the multi-meter has the internal output resistor.

4 EVM Schematics

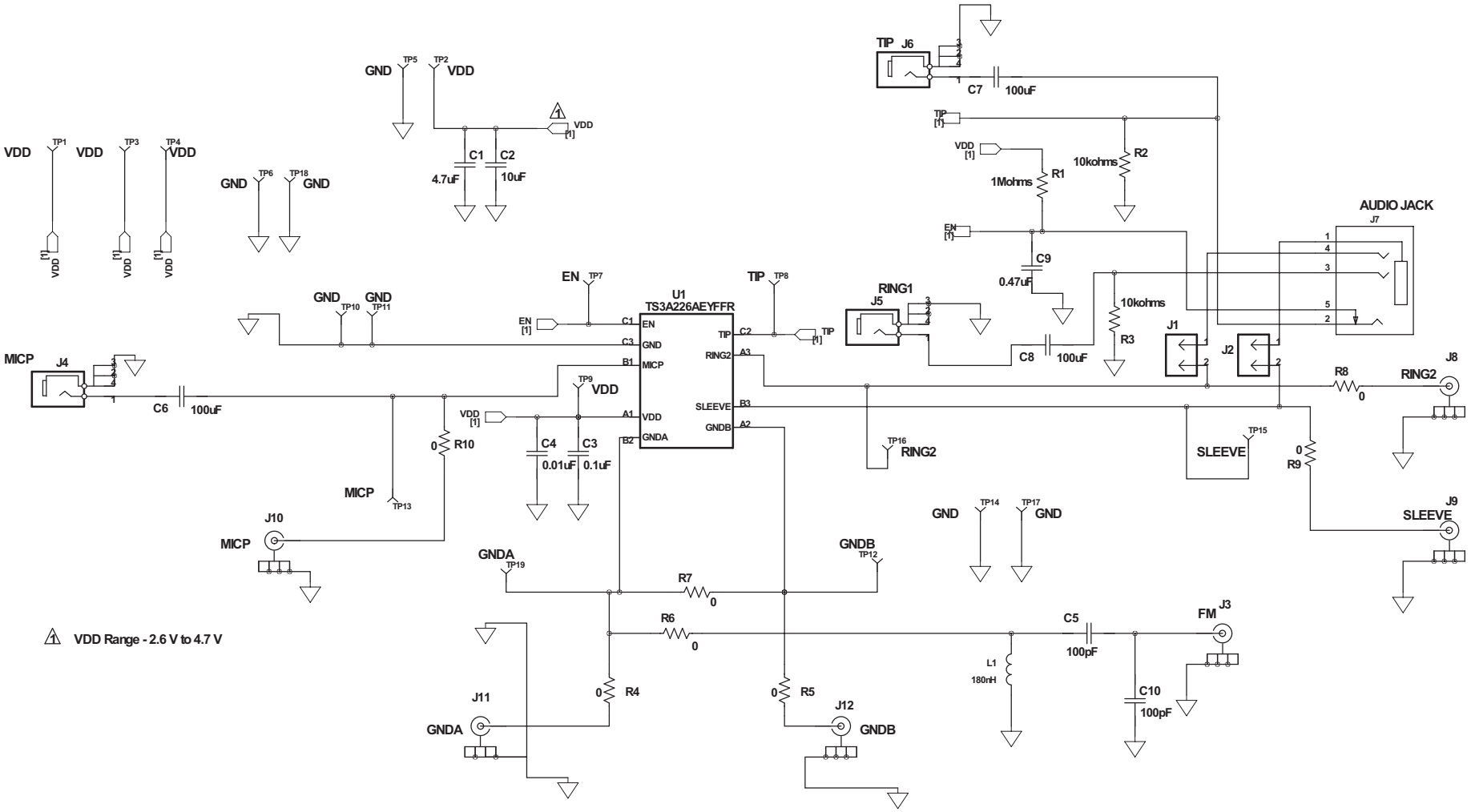


Figure 2. TS3A226AE EVM Schematic

5 Bill of Materials

Table 2. Bill of Materials

Count	RefDes	Value	Description	Size	Part Number
1	C1	4.7 µF	Capacitor, Ceramic,Chip,16V, X7R, ±10%	603	STD
1	C2	10 µF	Capacitor, Ceramic Chip, 16V,X7R, ±10%	1206	STD
1	C3	0.1 µF	Capacitor, Ceramic Chip,16V, X7R, ±10%	402	STD
1	C4	0.01 µF	Capacitor, Ceramic Chip,16V, X7R, ±10%	402	STD
2	C5, C10	100pF	Capacitor, Ceramic, Chip,10V, X7R, ±10%	603	STD
3	C6, C7, C8	100 µF	Capacitor, Ceramic Chip, 10V,X5R, ±10%	1210	STD
1	C9	0.47 µF	Capacitor, Ceramic,Chip,10V, X7R, ±10%	603	STD
2	J1, J2	PEC02SAAN	Header, Male 2-pin, 100mil spacing,	0.100 inch x 2	PEC02SAAN
1	J3	32K141-40ML5	Connector, SMA, Straight, 50 Ohm, DC to 12.4 GHz	7.6X7.6 mm	32K141-40ML5
3	J4, J5, J6	RCA,161-0350-E	Connector, Phono Jack 3.6 mm, Right Angle	0.571 x 0.471 inch	161-0350-E
1	J7	SJ-43515TS-SMT	Connector, Audio Stereo Jack 3.5 mm	5x17.5 mm	SJ-43515TS-SMT
0 (1)	J8, J9, J10, J11, J12	32K141-40ML5	Connector, SMA, Straight, 50 Ohm, DC to 12.4 GHz	7.6X7.6 mm	32K141-40ML5
1	L1	180 nH	Inductor, SMT, 180nH,5%,140mA,2.2ohms, 100MHz 25Q-Factor,SRF with 1300MHz	603	LQW18ANR18J00D
1	R1	1 Mohms	Resistor, Chip, 1/16W, ±5%	603	STD
2	R2, R3	10 kohms	Resistor, Chip, 1/16W, ±5%	603	STD
0 (1)	R4, R5, R8, R9, R10	0	Resistor, Chip, 1/16W,±5%	201	STD
2	R6, R7	0	Resistor, Chip, 1/16W,±5%	201	STD
19	TP1-TP19	PEC01SAAN	CONN HEADER .100 SINGL STR 1POS	0.100 inch x 1	PEC01SAAN

(1) The count with '0' means no assembly.

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