TDK-InvenSense EV_IIM-42653
Evaluation Board (EVB)
User Guide

1 PURPOSE

This document describes the hardware and circuitry on the TDK-InvenSense EV_IIM-42653 evaluation board for TDK motion sensor IIM-42653.

This user guide also covers the key signals, circuit functions, hardware jumper settings, and interface connections.

1.1 USAGE

The IIM-42653 is a 6-axis SmartIndustrial™ MotionTracking device that supports an extended operating temperature range.

The IIM-42653 combines a 3-axis gyroscope, and a 3-axis accelerometer in a small 2.5 mm x 3 mm x 0.91 mm (14-pin LGA) package. It also features a 2 KB FIFO that can lower the traffic on the serial bus interface and reduce power consumption by allowing the system processor to burst read sensor data and then go into a low-power mode.

The EV_IIM-42653 may be connected to a TDK-InvenSense DK board (development kit MCU host board) to use the TDK-InvenSense MotionLink software.

The EV_IIM-42653 evaluation board is lead-free and RoHS compliant.

1.2 RELATED DOCUMENTS

Please refer to the product specification of the IIM-42653 for mechanic, electrical characteristics, pinout, sensor configuration registers, and applications details. The datasheet can be found at invensense.tdk.com.
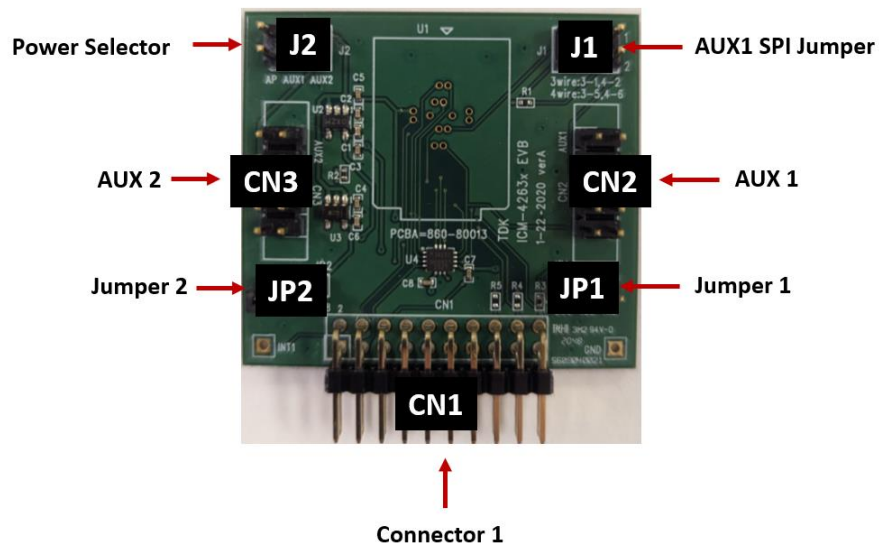

Figure 1. IIM-42653 EVB

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2   EV_IIM-42653 EVALUATION BOARD OVERVIEW

The EV_IIM-42653 evaluation board hosts the IIM-42653 TDK-InvenSense motion sensor which is in a small 2.5 x 3 mm 14-Pin LGA package.

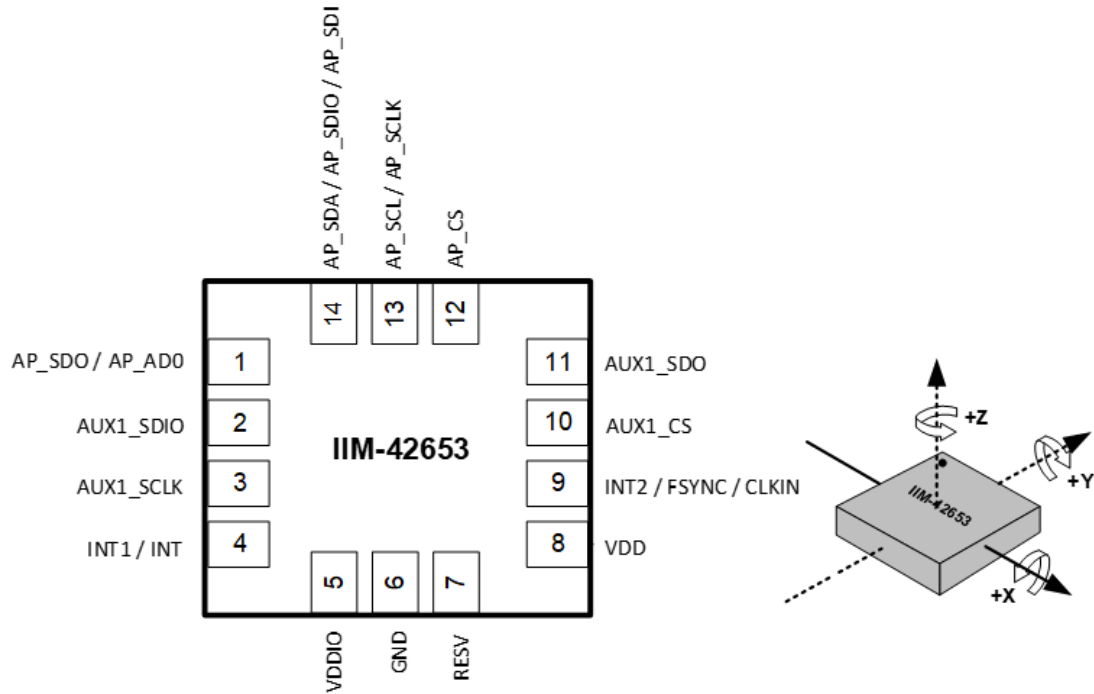The digital signal IO voltage (VDDIO) and chip operation voltage (VDD) can be selected between 1.8V and 3.0V.

Figure 2. Pin Out Diagram for IIM-42653 2.5x3.0x0.91 mm LGA

The EV_IIM-42653 evaluation board is populated with components only on its top side to achieve ease of jumper setting access. Board name, code, and date are printed on the top side too. There is no component and silkscreen print on the bottom side.

Please note, the same PCB fab may be used for TDK-InvenSense other motion sensors.
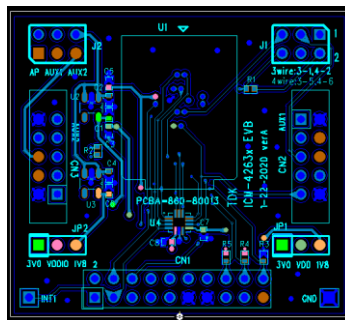

Figure 3. Evaluation board top side

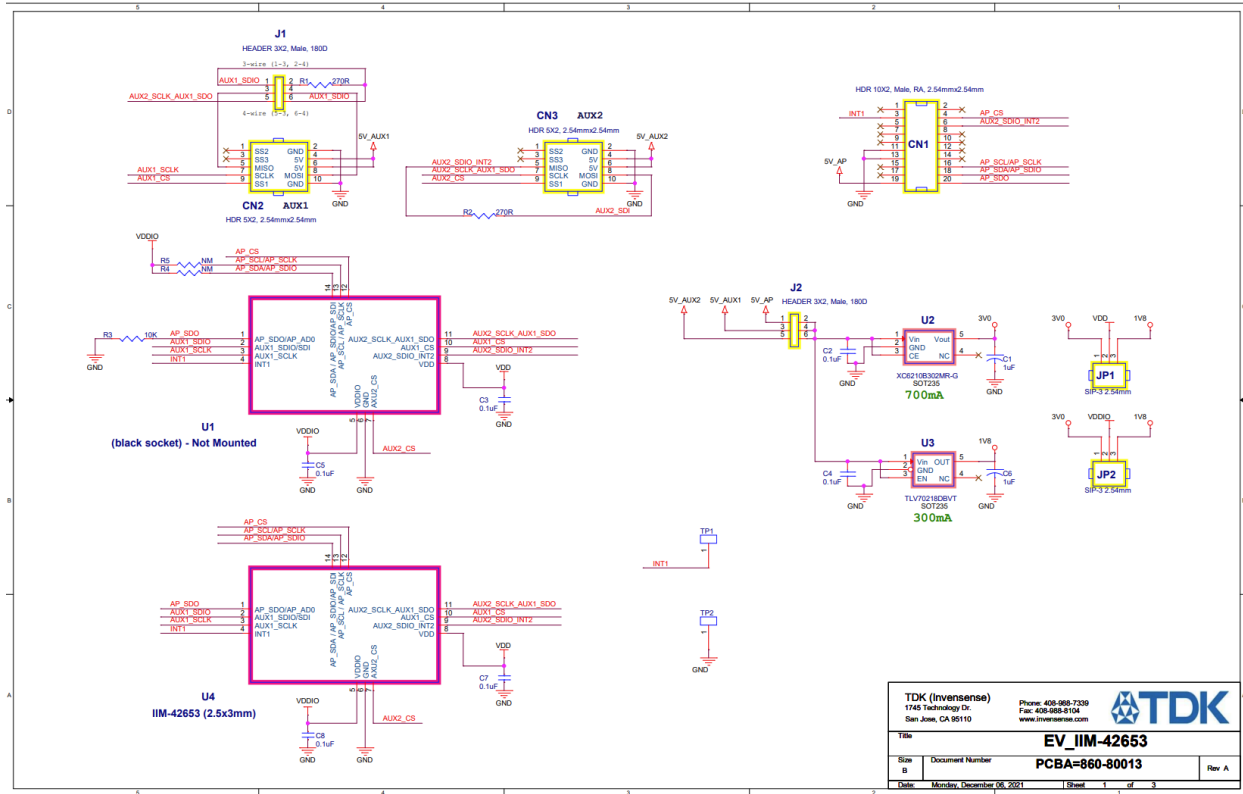# 3 EV_IIM-42653 EVALUTION BOARD SCHEMATICS

Figure 4. EV_IIM-42653 Evaluation Board Schematics

4 BILL OF MATERIALS (BOM)

The BOM the evaluation board is provided below for reference.

QUANTITY	REFERENCE	PART	MANUFACTURER	MANUFACTURER'S PART NUMBER
1	CN1	HDR 10X2, Male, RA, 2.54mmx2.54mm	Wurth	61302021021
2	CN2,CN3	HDR 5X2, 2.54mmx2.54mm	FCI	67997-210HLF
2	JP1,JP2	SIP-3 2.54mm	FCI	68000-103HLF
2	J1,J2	HEADER 3X2, Male, 180D	FCI	67997-206HLF
2	C1,C6	1uF	Murata	GRM155R61A105KE15D
6	C2,C3,C4,C5,C7,C8	0.1uF	Yageo	CC0402KRX5R6BB104
2	R1,R2	270R	Yageo	RC0402FR-07270RL
1	R3	10K	Yageo	RC0402JR-0710KL
1	U1	Socket – Not Mounted	N/A	N/A
1	U2	XC6210B302MR-G	Torex	XC6210B302MR-G
1	U3	TLV70218DBVT	TI	TLV70218DBVT
1	U4	IIM-42653 (2.5x3mm)	TDK	YOK-C1 LGA

Table 1. Bill of Materials

5 CONNECTOR AND JUMPERS

CN1 is used for I²C/I3C/SPI host communication, IRQ, and power supply connection.

CONNECTOR REF. NAME	PIN #	SIGNALS
CN1	3	INT1
	4	AP_CS
	6	INT2
	11	GND
	13	GND
	16	AP_SCL/AP_SCLK
	17	FSYNC
	18	AP_SDA/AP_SDIO
	19	5V
	20	AP_SDO
	1,2,5,7,8,9,10,12,14,15	NC

Table 2. CN1 Signals

JP1 and JP2 are jumpers to set VDD and VDDIO voltage level.

CONNECTOR REF. NAME	PIN #	SIGNALS	DESCRIPTION
Jumper 1 (JP1)	1	3.0V	Jumper short on pin 1/2: VDD = 3.0V
	2	VDD	
	3	1.8V	Jumper short on pin 2/3: VDD = 1.8V
Jumper 2 (JP2)	1	3.0V	Jumper close on pin 1/2: VDDIO = 3.0V
	2	VDDIO	
	3	1.8V	Jumper close on pin 2/3: VDDIO = 1.8V

Table 3. JP1 and JP2 Signals

CN2 and CN3 is used for multiple interface communication.

CONNECTOR REF. NAME	PIN #	SIGNALS
AUX 1 (CN2) AUX 2 (CN3)	2,10	GND
	4,6	5V
	5	MISO
	7	SCLK
	8	MOSI
	9	CS
	1,3	NC

Table 4. CN2 and CN3 Signals

J1 is used for either 3 wire or 4 wire SPI communications on AUX 1.

CONNECTOR REF. NAME	PIN #	SIGNALS	DESCRIPTION
AUX1 SPI Jumper (J1)	1	AUX1 SDIO	Short 1-3, 2-4 for 3 wire SPI
	2	AUX1 SDIO	
	3	MISO	
	4	MOSI	
	5	AUX2 SCLK/AUX1 SDO	Short 5-3, 6-4 for 4 wire SPI
	6	AUX1 SDIO	

Table 5. J1 Signals

J2 is used to select the 5V voltage from one, either AP, AUX1, or AUX2.

CONNECTOR REF. NAME	PIN #	SIGNALS	DESCRIPTION
Power Selector (J2)	1	5V AP	Short 1-2 for 5V from AP
	3	5V AUX1	Short 3-4 for 5V from AUX1*
	5	5V AUX2	Short 5-6 for 5V from AUX2*

Table 6. J2 Signals

*when AP interface is not connected

6 HOST INTERFACE OPTIONS

EV_IIM-42653 sensor data can be read using the jump wires or by soldering the required pins from CN1 to the external host CPU.

The evaluation board can be directly plugged in via CN1 to a TDK InvenSense SmartMotion Host Interface board (e.g., DK-UNIVERSAL-I) ordered separately.

7 ELECTROSTATIC DISCHARGE SENSITIVITY

The IMU sensor can be permanently damaged by electrostatic discharge (ESD). ESD precautions for handling and storage must be taken to avoid damage to the devices.

8 REVISION HISTORY

DATE	REVISION	DESCRIPTION
08/20/2024	1.0	Initial release
09/25/24	1.1	Updated Figure2 with correct package height

TDK InvenSense