TDK-InvenSense EV_ICM-42605 Evaluation Board (EVB) User Guide

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1 PURPOSE

This document describes the hardware and circuitry on the TDK-InvenSense EV_ICM-42605 evaluation board for TDK motion sensor ICM-42605.

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

1.1 USAGE

The ICM-42605 is a 6-axis MEMS MotionTracking device that combines a 3-axis gyroscope and a 3-axis accelerometer. It has a configurable host interface that supports I3C^{SM}, I^{2}C and SPI serial communication, features a 2 kB FIFO and 2 programmable interrupts with ultra-low-power wake-on-motion support to minimize system power consumption.

The EV_ICM-42605 may be connected to a TDK-InvenSense DK board (development kit MCU host board) to use the TDK-InvenSense MotionLink software.

The EV_ICM-42605 evaluation board is lead-free and RoHS compliant.

1.2 RELATED DOCUMENTS

Please refer to the product specification of the ICM-42605 for mechanic, electrical characteristics, pinout, sensor configuration registers, and applications details. The datasheet can be found at invensense.tdk.com.

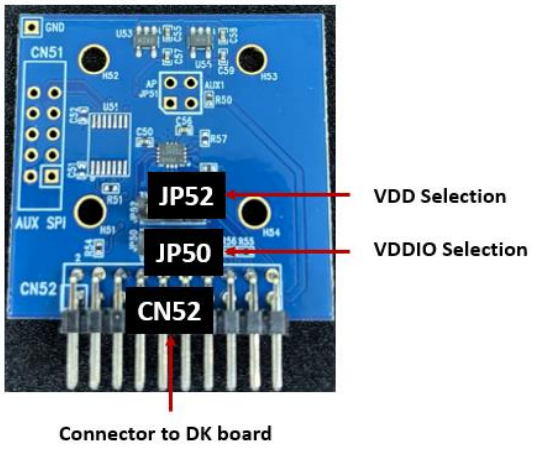

Figure 1. ICM-42605 EVB

TABLE OF CONTENTS

2 EV_ICM-42605 EVALUATION BOARD OVERVIEW

The EV_ICM-42605 evaluation board hosts the ICM-42605 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.

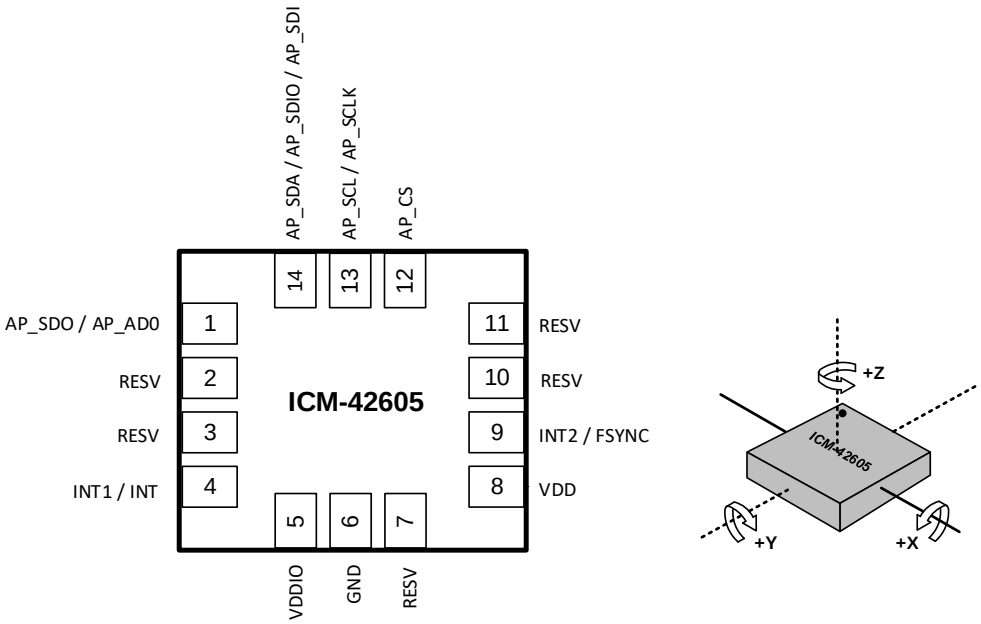

Figure 2. Pin Out Diagram for ICM-42605 2.5x3.0x0.91 mm LGA

The EV_ICM-42605 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.

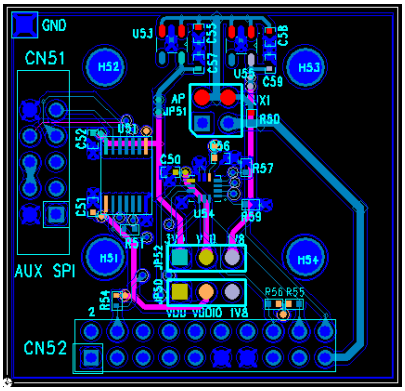

Figure 3. Evaluation board top side

3 EV_ICM-42605 EVALUTION BOARD SCHEMATICS

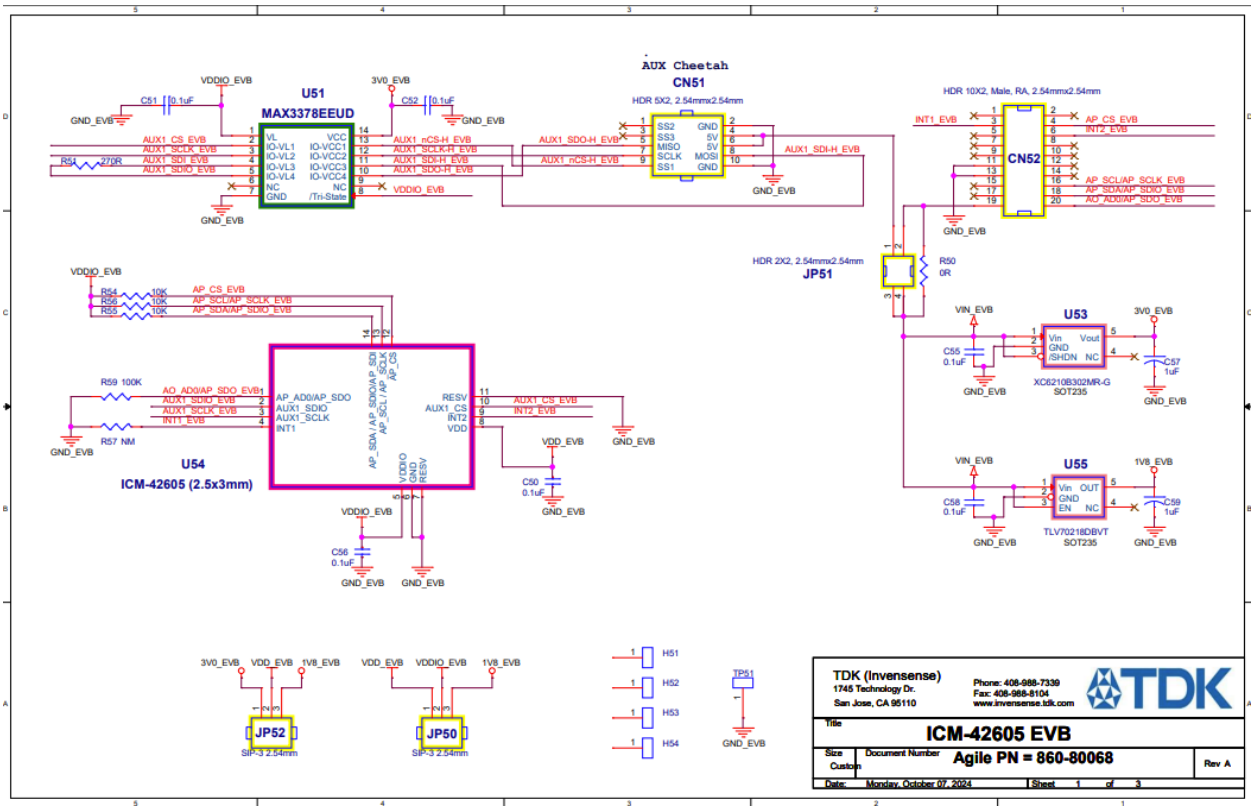

Figure 4. EV_ICM-42605 Evaluation Board Schematics

4 BILL OF MATERIALS (BOM)

The BOM the evaluation board is provided below for reference.

QUANTITY	REFERENCE	PART	MANUFACTURER	MANUFACTURER'S PART NUMBER
1	CN52	HDR 10X2, Male, RA, 2.54mmx2.54mm	Wurth	61302021021
2	JP50,JP52	SIP-3 2.54mm	FCI	68000-103HLF
4	C50,C55,C56,C58	0.1uF	Yageo	CC0402KRX5R6BB104
2	C57,C59	1uF	Murata	GRM155R61A105KE15D
1	R50	0R	Yageo	RC0402JR-070RL
3	R54,R55,R56	10K	Yageo	RC0402JR-0710KL
1	R59	100K	Yageo	RC0402FR-07100KL
1	U53	XC6210B302MR-G	Torex	XC6210B302MR-G
1	U54	ICM-42605 (2.5x3mm)	InvenSense	ICM-42605 (2.5x3mm)
1	U55	TLV70218DBVT	TI	TLV70218DBVT

Table 1. Bill of Materials

5 CONNECTOR AND JUMPERS

CN52 is used for I^2C/I3C/SPI host communication, IRQ, and power supply connection.

CONNECTOR REF. NAME	PIN #	SIGNALS
Connector to DK Board (CN52)	3	INT1
	4	AP_CS
	6	INT2
	11,13	GND
	16	AP_SCL/AP_SCLK
	18	AP_SDA/AP_SDIO
	20	AP_AD0/AP_SDO
	1,2,5,7,8,9,10,12,14,15,17	NC

Table 2. CN1 Signals

JP52 and JP50 are jumpers to set VDD and VDDIO voltage level.

CONNECTOR REF. NAME	PIN #	SIGNALS	DESCRIPTION
VDD Selection (JP52)	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
VDDIO Selection (JP50)	1	VDD_EVB	Jumper close on pin 1/2: VDDIO = VDD
	2	VDDIO	
	3	1.8V	Jumper close on pin 2/3: VDDIO = 1.8V

Table 3. JP1 and JP2 Signals

6 HOST INTERFACE OPTIONS

EV_ICM-42605 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
09/25/2024	1.1	Updated Figure 2 with correct package height
10/10/2024	1.2	Updated schematics, BOM, board picture, and connection descriptions