TMF8806-SHIELD

Quick Start Guide

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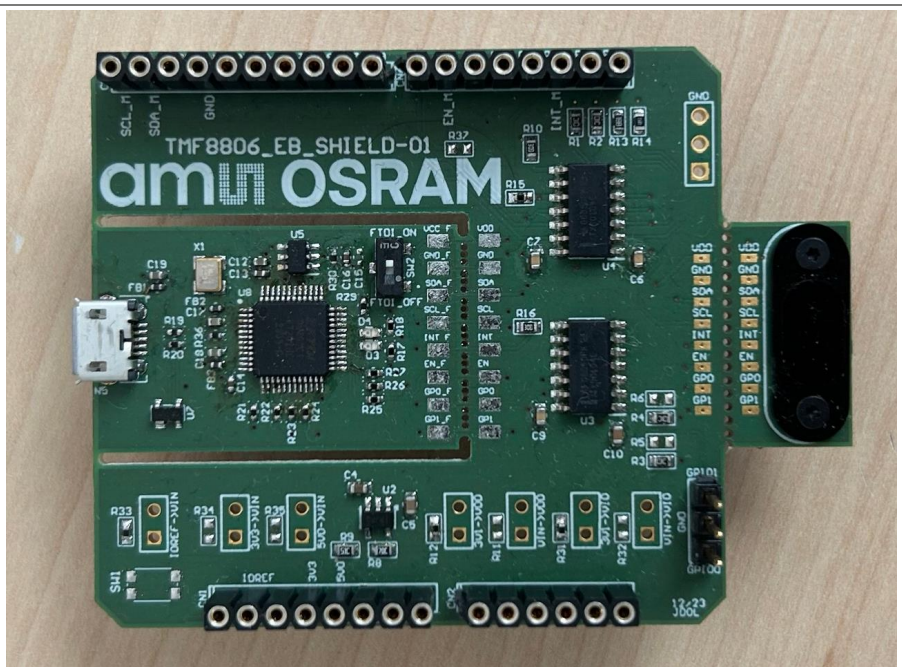
1 Out of the box

The TMF8806-Shield board is an Arduino Uno R3 form factor development platform for quick evaluation of the TMF8806 single-zone dToF sensors.

Featuring a small (20 mm x 12 mm) sensor breakaway board, this kit can be easily integrated into custom, prototype hardware.

Several cover glass and air gap spacers are provided. This helps to evaluate the system for optimal optical performance.

Figure 1: TMF8806 shield board



No.	Item	Description
1	TMF8806_EVM_EB_SHIELD	Main PCB with TMF8806 sensor breakaway board

2 Software installation

2.1 Basics

The TMF8806_EVM_EB_SHIELD is designed to operate standalone (with the integrated FTDI controller chip) or attached to an Arduino Uno R3.

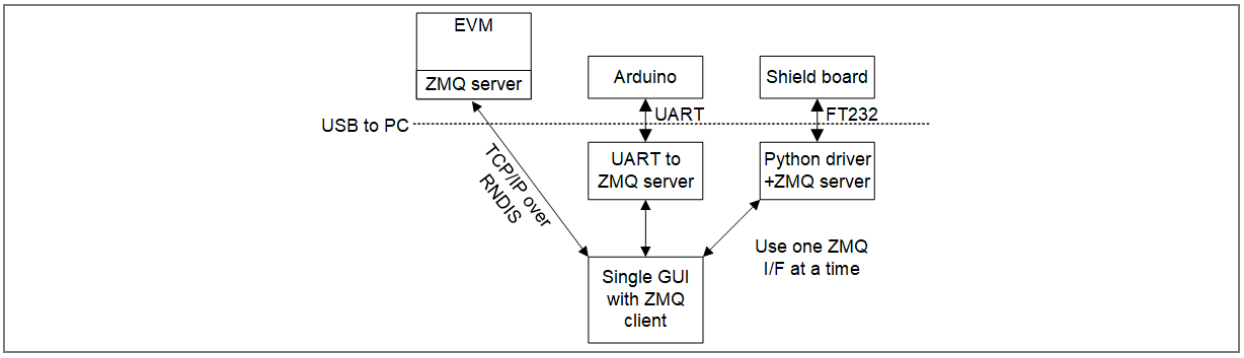
Usually, you will use the Arduino Firmware as reference if you want to port the driver software to another microcontroller platform. If you just want to evaluate the sensor performance with shield board hardware, please use the FTDI setup as it provides better performance.

Please download the latest revision of the Arduino Firmware with matching ZeroMQ server software from the ams OSRAM website. As an alternative, please download the FTDI ZeroMQ server software from the ams OSRAM website.

Both ZeroMQ servers are designed to work together with the TMF8806 EVM GUI or the TMF8806 logging software.

2.2 TMF8806 EVM components

Figure 2: EVM components



The abbreviation ZMQ in Figure 2 stands for ZeroMQ. ZeroMQ is used as central communication technology for the EVM software stack.

The ZeroMQ server provides sensor data and offers an interface for sensor configuration. The ZeroMQ client consumes the sensor data and either displays it (EVM GUI) or logs it (active or passive logger).

Information:

Please refer to https://zeromq.org/ for more information about ZeroMQ.

The TMF8806 EVM software stack comprises these components:

- The EVM hardware with the mobile phone form factor – see Figure 2. It contains the TMF8806 sensor controlled by a Raspberry Pi Zero W. The ZeroMQ server runs directly on the Raspberry Pi.
- Or the TMF8806 sensor on a shield board controlled by an Arduino Uno R3 (or compatible). In this case the ZeroMQ server retrieves sensor data via UART from the Arduino and provides the same interface as the ZeroMQ on the Raspberry Pi. The ZeroMQ server in this case is a program that runs on your Windows computer.
- Or the TMF8806 sensor on a shield board controlled by the integrated FT232 USB to I²C controller. The ZeroMQ server in this case is a program that runs on your Windows computer and directly interacts with the TMF8806 sensor with I²C transfers.
- The TMF8806 EVM GUI that works with all three setups described above.
- The TMF8806 ZeroMQ sensor data loggers that can either run standalone (active logger that also configures the sensor for measurements) or in parallel to the EVM GUI (passive logger that only captures the sensor data, use the GUI for sensor configuration).

2.3 Running the demo software

To run the demo software with the shield board hardware:

- Set up the demo system as explained in chapter 3.2
- Choose the ZeroMQ server matching your setup (Arduino or FDTI)
- Run the ZeroMQ server
- Start the TMF8806 EVM GUI

3 Hardware overview

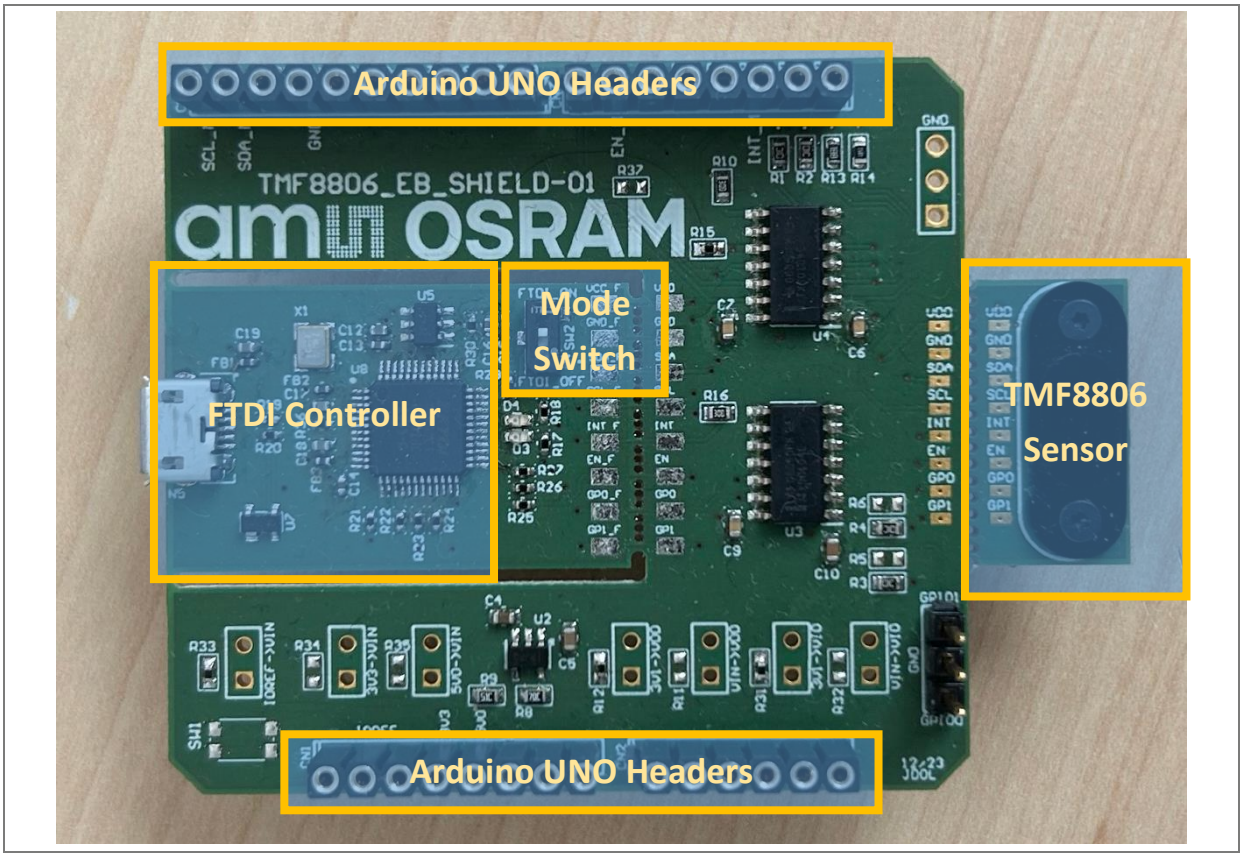
The TMF8806-SHIELD board is an Arduino UNO form factor development platform for quick evaluation of the TMF8806 single-zone dToF sensor.

Featuring a small sensor breakaway board, this EVM can be integrated into custom, prototype hardware. The EVM includes an I²C level shifter and supply voltage regulator to allow the EVM to be used with input voltages up to 5 V.

Key features

1. Arduino UNO form factor development board
2. Integrated FTDI controller, direct USB connection possible
3. TMF8806 sensor mounted on a breakaway board
4. Cover glass and air gap spacer already assembled
5. Onboard LDO and I²C level shifter
6. Operation mode selector switch

Figure 3: TMF8806-SHIELD hardware overview



Attention:

Please check the latest TMF8806 datasheet for maximum supply and IO voltages. Failure to adhere to these voltage levels may result in permanent damage to the TMF8806-SHIELD.

3.1 Operation mode selector switch

The TMF8806-SHIELD can either operate standalone with the help of the integrated FTDI controller or in combination with an Arduino Uno R3.

For standalone operation select FTDI_ON with the operation mode switch, otherwise select FTDI_OFF.

3.2 Demo system setup

In standalone mode connect the FTDI controller (integrated into the shield board) to your PC with a USB 2.0 type A to micro-USB cable.

If you want to run the TMF8806 Arduino Firmware attach the TMF8806-SHIELD on top of your Arduino Uno R3 and connect the Arduino to your PC with a USB 2.0 Cable Type A/B.

4 Schematic

Figure 4: TMF8806-SHIELD schematic 1

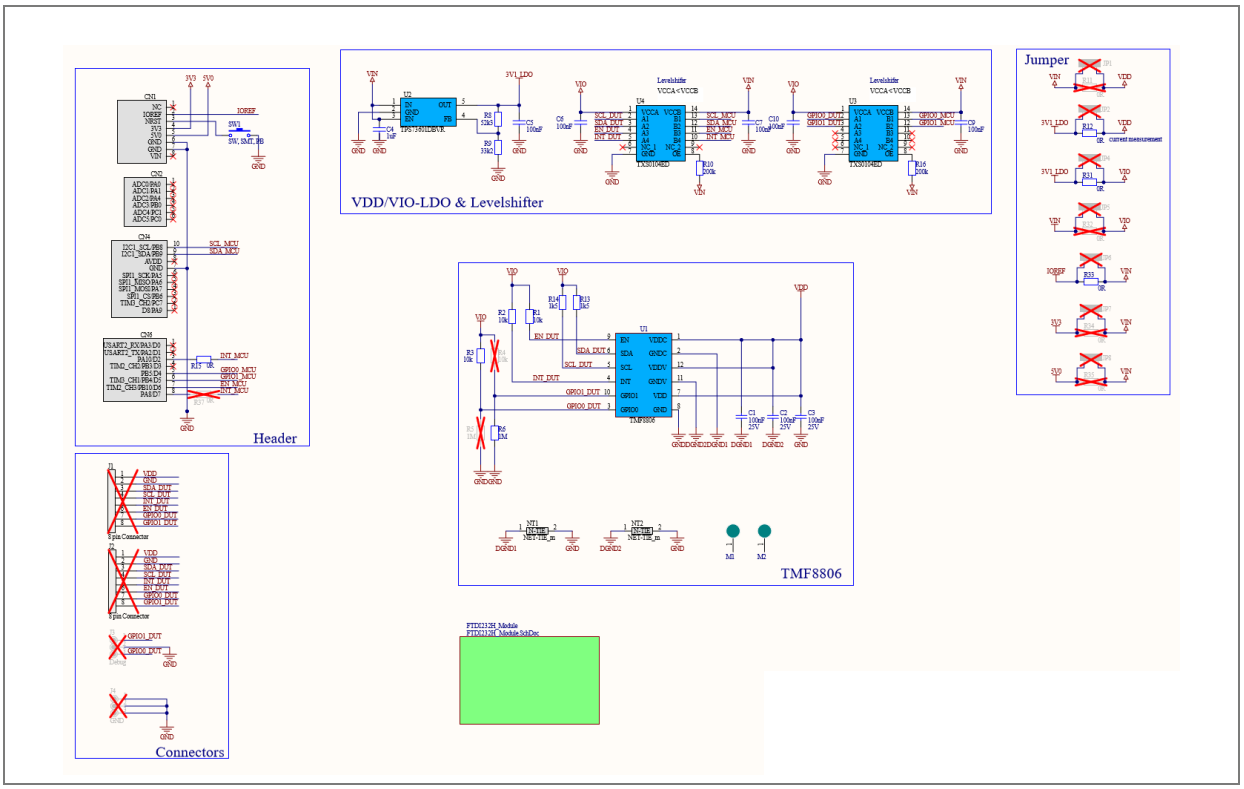
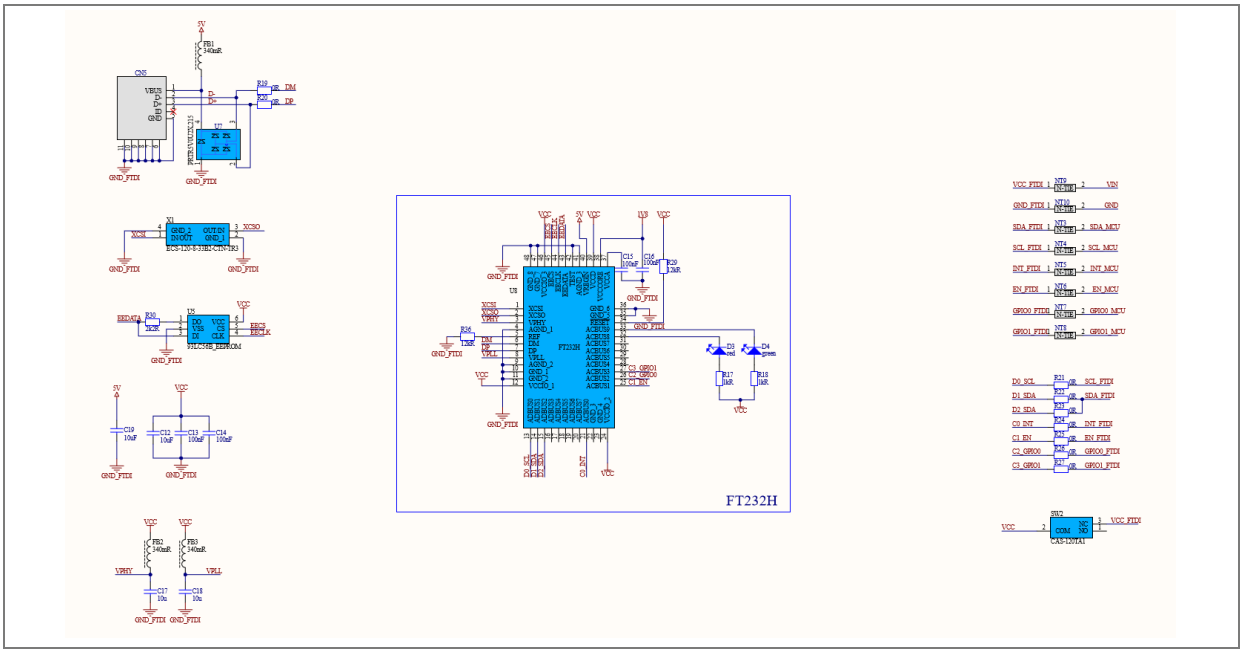
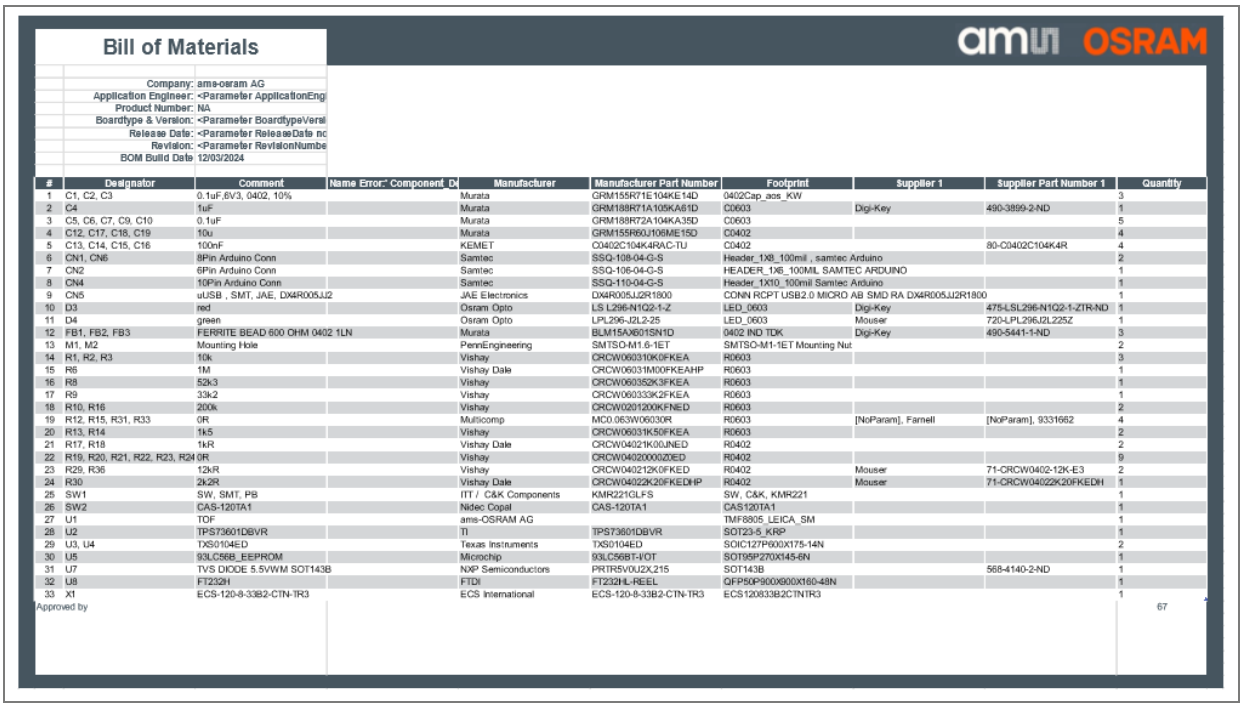


Figure 5: TMF8806-SHIELD schematic 2



5 Bill of materials

Figure 6: Bill of materials



Bill of Materials

Company:	ams-osram AG
Application Engineer:	<Parameter ApplicationEng
Product Number:	NA
Boardtype & Version:	<Parameter BoardtypeVersi
Release Date:	<Parameter ReleaseDate no
Revision:	<Parameter RevisionNumbe
BOM Build Date	12/03/2024

#	Designator	Comment	Name Error:' Component_De	Manufacturer	Manufacturer Part Number	Footprint	Supplier 1	Supplier Part Number 1	Quantity
1	C1, C2, C3	0.1uF,6V3, 0402, 10%		Murata	GRM155R71E104KE14D	0402Cap_aos_KW			3
2	C4	1uF		Murata	GRM188R71A105KA61D	C0603	Digi-Key	490-3899-2-ND	1
3	C5, C6, C7, C9, C10	0.1uF		Murata	GRM188R72A104KA35D	C0603			5
4	C12, C17, C18, C19	10u		Murata	GRM155R60J106ME15D	C0402			4
5	C13, C14, C15, C16	100nF		KEMET	C0402C104K4RAC-TU	C0402		80-C0402C104K4R	4
6	CN1, CN6	8Pin Arduino Conn		Samtec	SSQ-108-04-G-S	Header_1X8_100mil , samtec Arduino			2
7	CN2	6Pin Arduino Conn		Samtec	SSQ-106-04-G-S	HEADER_1X6_100MIL SAMTEC ARDUINO			1
8	CN4	10Pin Arduino Conn		Samtec	SSQ-110-04-G-S	Header_1X10_100mil Samtec Arduino			1
9	CN5	uUSB , SMT, JAE, DX4R005JJ2		JAE Electronics	DX4R005JJ2R1800	CONN RCPT USB2.0 MICRO AB SMD RA DX4R005JJ2R1800			1
10	D3	red		Osram Opto	LS L296-N1Q2-1-Z	LED_0603	Digi-Key	475-LSL296-N1Q2-1-ZTR-ND	1
11	D4	green		Osram Opto	LPL296-J2L2-25	LED_0603	Mouser	720-LPL296J2L225Z	1
12	FB1, FB2, FB3	FERRITE BEAD 600 OHM 0402 1LN		Murata	BLM15AX601SN1D	0402 IND TDK	Digi-Key	490-5441-1-ND	3
13	M1, M2	Mounting Hole		PennEngineering	SMTSO-M1.6-1ET	SMTSO-M1-1ET Mounting Nut			2
14	R1, R2, R3	10k		Vishay	CRCW060310K0FKEA	R0603			3
15	R6	1M		Vishay Dale	CRCW06031M00FKEAHP	R0603			1
16	R8	52k3		Vishay	CRCW060352K3FKEA	R0603			1
17	R9	33k2		Vishay	CRCW060333K2FKEA	R0603			1
18	R10, R16	200k		Vishay	CRCW0201200KFNED	R0603			2
19	R12, R15, R31, R33	0R		Multicomp	MCD 063W06030R	R0603	[NoParam], Farnell	[NoParam], 9331662	4
20	R13, R14	1k5		Vishay	CRCW06031K50FKEA	R0603			2
21	R17, R18	1kR		Vishay Dale	CRCW04021K00JNED	R0402			2
22	R19, R20, R21, R22, R23, R24	0R		Vishay	CRCW04020000Z0ED	R0402			9
23	R29, R36	12kR		Vishay	CRCW040212K0FKED	R0402	Mouser	71-CRCW0402-12K-E3	2
24	R30	2k2R		Vishay Dale	CRCW04022K20FKEDHP	R0402	Mouser	71-CRCW04022K20FKEDH	1
25	SW1	SW, SMT, PB		ITT / C&K Components	KMR221GLFS	SW, C&K, KMR221			1
26	SW2	CAS-120TA1		Nidec Copal	CAS-120TA1	CAS120TA1			1
27	U1	TOF		ams-OSRAM AG		TMF8805_LEICA_SM			1
28	U2	TPS73601DBVR		TI	TPS73601DBVR	SOT23-5_KRP			1
29	U3, U4	TXS0104ED		Texas Instruments	TXS0104ED	SOIC127P600X175-14N			2
30	U5	93LC56B_EEPROM		Microchip	93LC56BT-I/OT	SOT95P270X145-6N			1
31	U7	TVS DIODE 5.5VWM SOT143B		NXP Semiconductors	PRTR5V0U2X,215	SOT143B		568-4140-2-ND	1
32	U8	FT232H		FTDI	FT232HL-REEL	QFP50P900X900X160-48N			1
33	X1	ECS-120-8-33B2-CTN-TR3		ECS International	ECS-120-8-33B2-CTN-TR3	ECS120833B2CTNTR3			1

Approved by

67

6 Layout

Figure 7: Layer 1

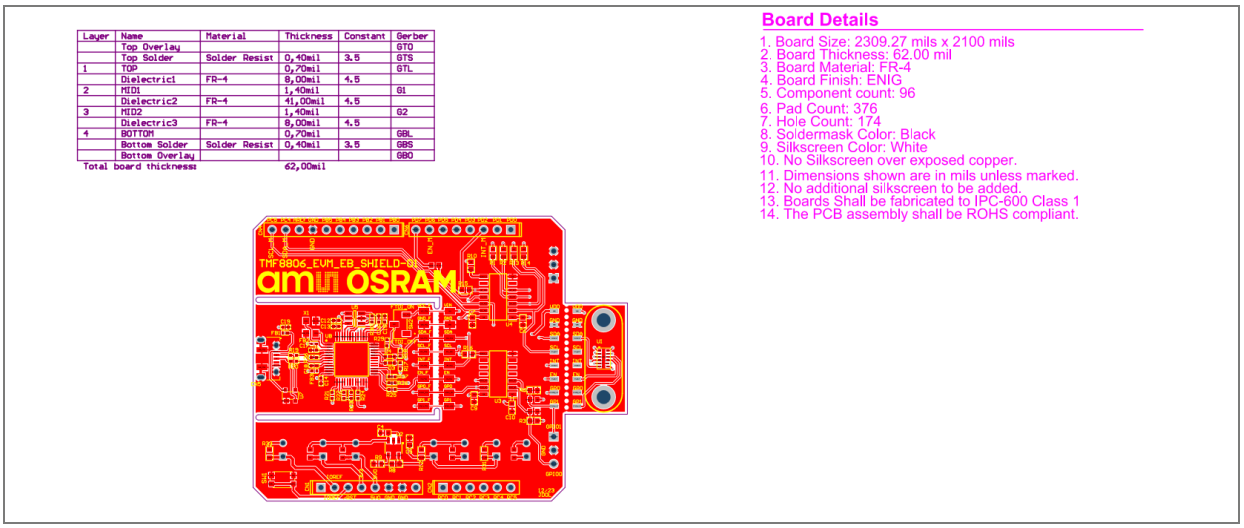
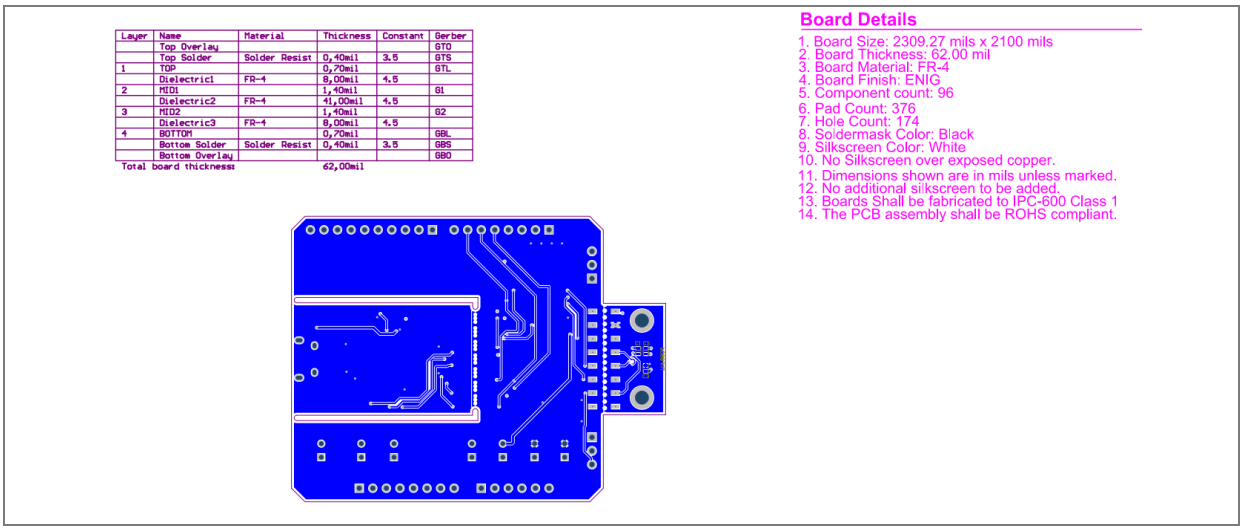
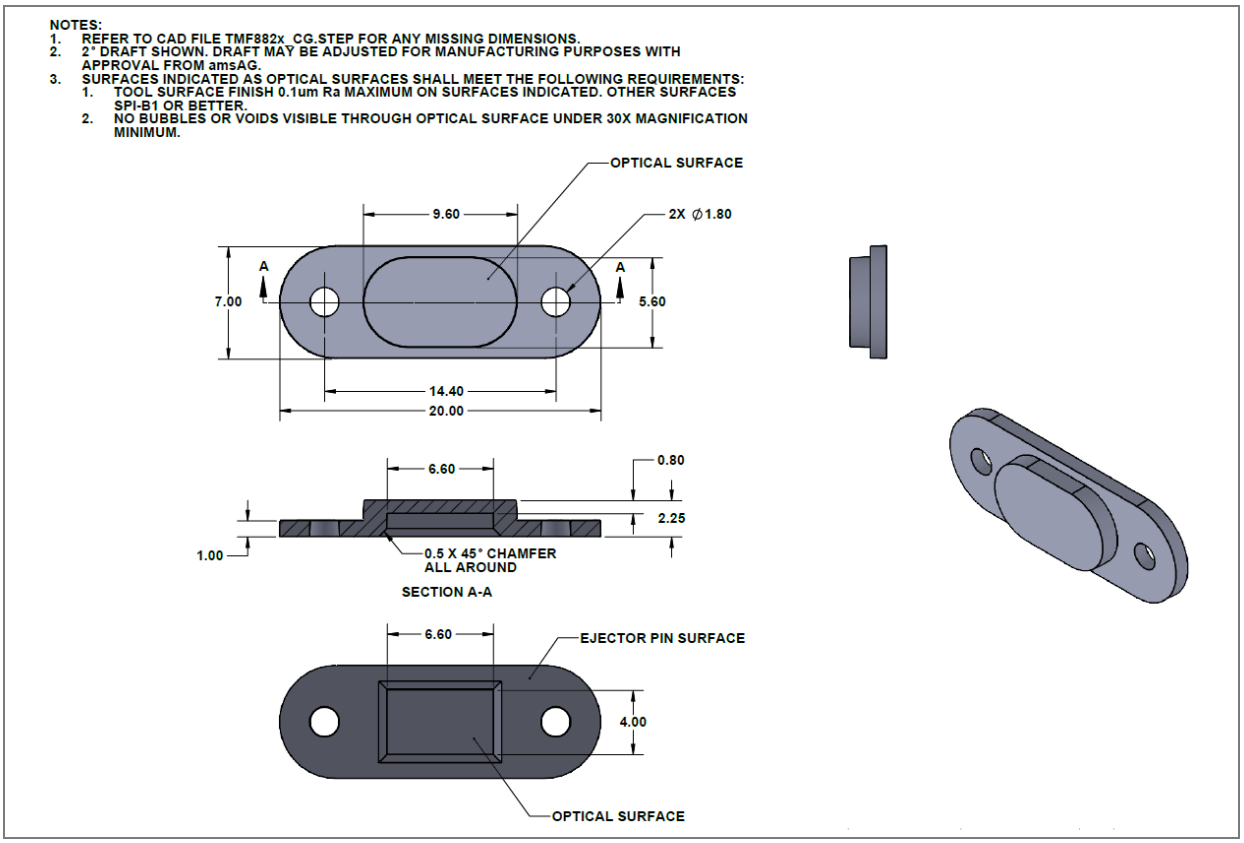


Figure 8: Layer 4



7 Cover glass drawing

Figure 9: Cover glass mechanical drawing



8 Revision information

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Changes from previous released version to current revision v1-00	Page
Initial production version	

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- Correction of typographical errors is not explicitly mentioned.

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