TLV55624-1O evaluation kit user guide

XENSIV™ magnetic switches

About this document

Scope and purpose

This user guide describes the XENSIV™ TLV55624-1O magnetic switch evaluation kit (TLV55624-1O_EVALKIT), its functional blocks, operating controls, magnetic switching demonstration, visual output indication, and current-measurement options. The evaluation kit enables early design-in activities for space- and energy-constrained battery-powered products. It is suitable for demonstrating magnetic activation concepts similar to those used in continuous glucose monitoring (CGM) devices.

Intended audience

This document is intended for application engineers, system designers, technical sales teams, and laboratory users who evaluate ultra-low-power magnetic switching in battery-powered products.

About this product group

Target applications

- Healthcare wearables
- Smart home and building
- AR and smart glasses

Product family

Infineon's XENSIV™ magnetic switches and latches are employed within the automotive, industrial, and commercial sectors to usher in the next generation of smart technology capable of efficiently understanding and reacting to its environment.

Evaluation board

This board is to be used during the design-in process for evaluating and measuring characteristic curves, and for checking datasheet specifications.

Note: PCB and auxiliary circuits are NOT optimized for final customer design.

Safety precautions

Note: *Please note the following warnings regarding the hazards associated with development systems.*

Table 1 Safety precautions

	**Caution:** *The evaluation or reference board contains parts and assemblies sensitive to electrostatic discharge (ESD). Electrostatic control precautions are required when installing, testing, servicing or repairing the assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with electrostatic control procedures, refer to the applicable ESD protection handbooks and guidelines.*

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1 The board at a glance

The XENSIV™ TLV55624-1O evaluation kit (TLV55624-1O_EVALKIT) provides a compact standalone platform for demonstrating the main functions of the XENSIV™ TLV55624-1O ultra-low-power magnetic switch. The evaluation kit supports repeatable magnetic activation, immediate visual output feedback, and separate evaluation of the sensor and LED current paths. It supports first application tests and demonstrations without an additional PCB or external visualization circuit. An overview of all components of the evaluation kit is provided in Figure 1.

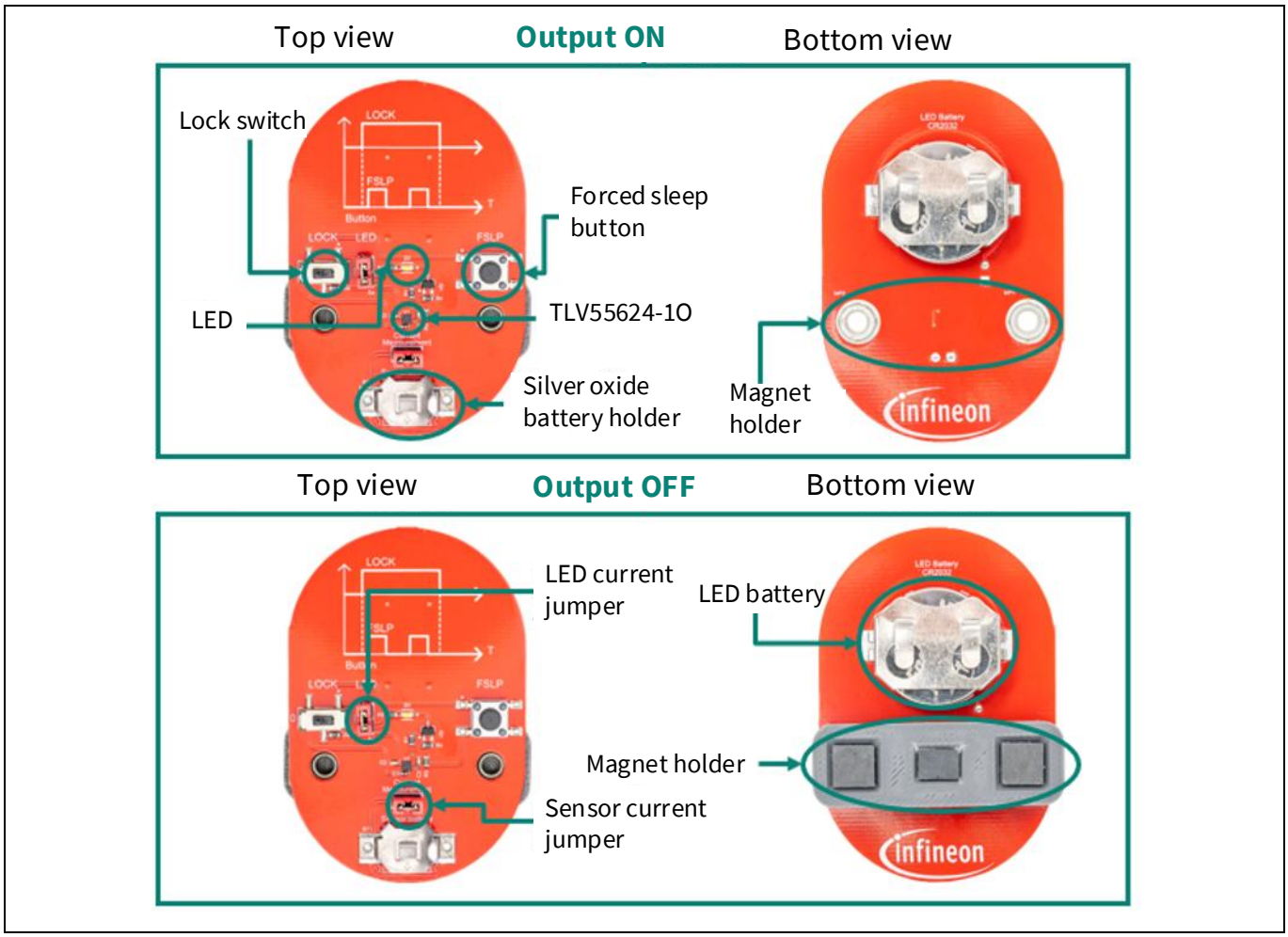

Figure 1 XENSIV™ TLV55624-1O evaluation kit overview

2 System and functional description

2.1 Getting started

- Place the board on a clean, dry, ESD-protected work surface
- Verify that the 1.55 V sensor cell and the 3 V CR2032 LED cell are installed with correct polarity
- Install both current jumpers for normal standalone operation
- Set the Lock switch to the unlocked position and ensure that the Forced Sleep button is released
- Attach the magnet holder and move the magnet between the defined positions while observing the LED

2.2 Description of the functional blocks

The evaluation kit is organized into functional blocks that separate magnetic sensing, user control, visual indication, power supply, and current measurement. Together, these blocks provide a self-contained platform for demonstrating the XENSIV™ TLV55624 output behavior, its low-power operating modes, and the effect of a defined magnetic field. The purpose of each block and its role during evaluation are described as follows:

- **XENSIV™ TLV55624:** It is a tunnel magnetoresistance (TMR)-based omnipolar ultra-low-power magnetic switch that detects magnetic fields and controls the output state accordingly. Dedicated control pins enable output-state locking and sleep-mode activation, providing greater flexibility during storage, production, and normal operation
- **LED visualization:** Indicates whether the output is ON or OFF without loading the sensor supply domain
- **Forced Sleep button:** Forces the sensor into Sleep mode, pulls the output to a defined LOW state, and minimizes current consumption
- **Lock switch:** Holds the last output state so that subsequent magnetic-field changes do not alter the output
- **Current jumpers:** Enables separate current measurements for the sensor and LED paths

2.3 Basic operation

Move the magnet holder between the defined ON and OFF positions. In the output ON configuration, the LED illuminates and confirms the active output state. In the output OFF configuration, the magnetic arrangement keeps the output inactive and the LED remains off. The holder provides a repeatable magnet position without an additional mechanical fixture. Figure 2 shows the timing of the XENSIV™ TLV55624-1O during basic operation.

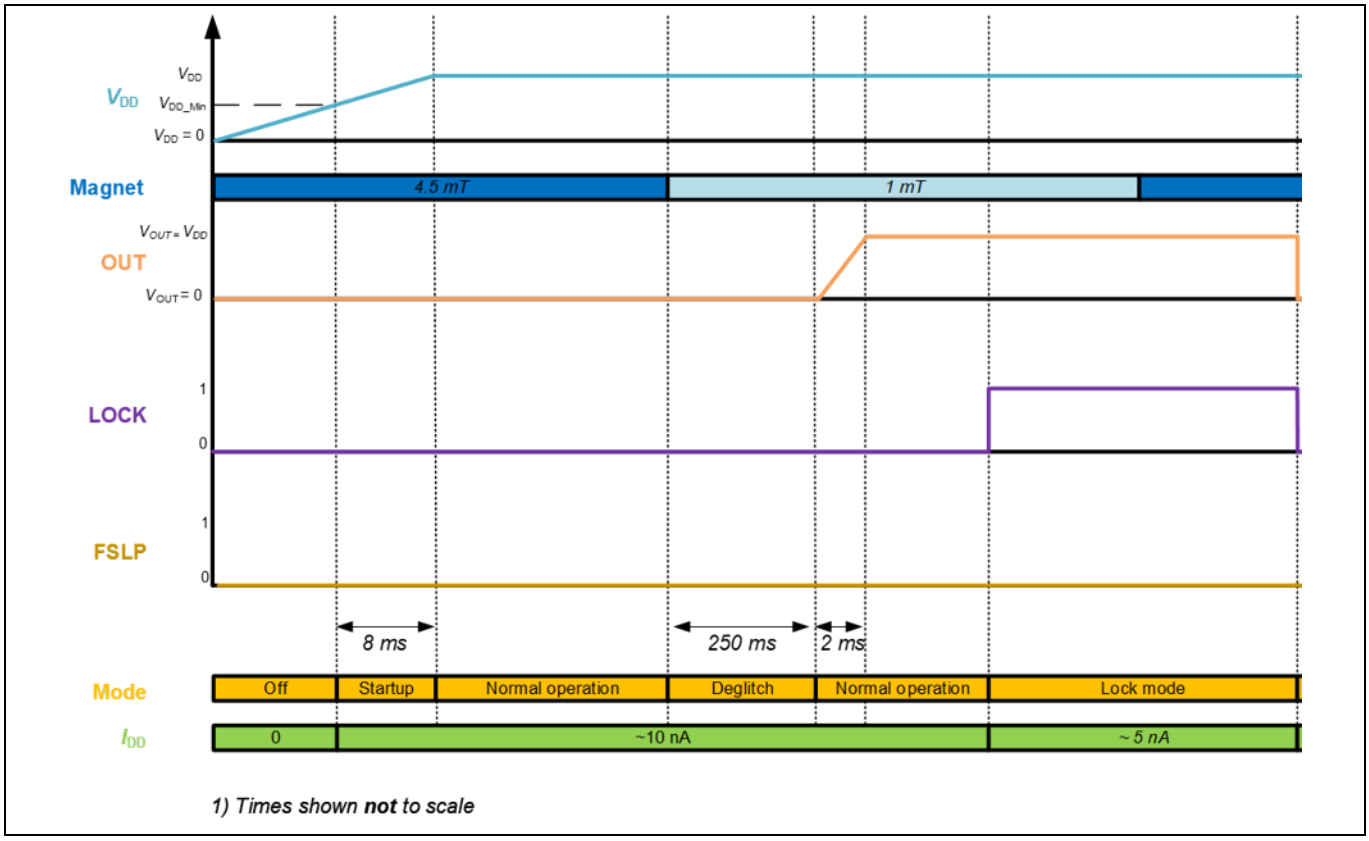

Figure 2 XENSIV™ TLV55624-1O switch – timing in basic operation mode

2.4 Special operation modes

In addition to normal magnetic switching, the evaluation kit provides two special operating modes that support low-power evaluation and controlled handling scenarios. Forced Sleep mode places the sensor in a defined low-current state, while Lock mode retains the current output independently of subsequent magnetic-field changes.

The following explains how each mode is activated and how it affects the sensor output.

- **Forced Sleep mode:** Press and hold the Forced Sleep button to place the device in Sleep mode. The output is forced LOW and sensor current is minimized. Release the button to return to normal operation
- **Lock mode:** Set the Lock switch while the desired output state is present. Subsequent changes in the magnetic field do not change the output until the Lock control is released. This function can demonstrate defined storage, production-handling, and electrical-test conditions

Figure 3 illustrates the timing behavior of the XENSIV™ TLV55624-1O when the Lock and Forced Sleep functions are activated, including their effect on the sensor output as the magnetic field changes.

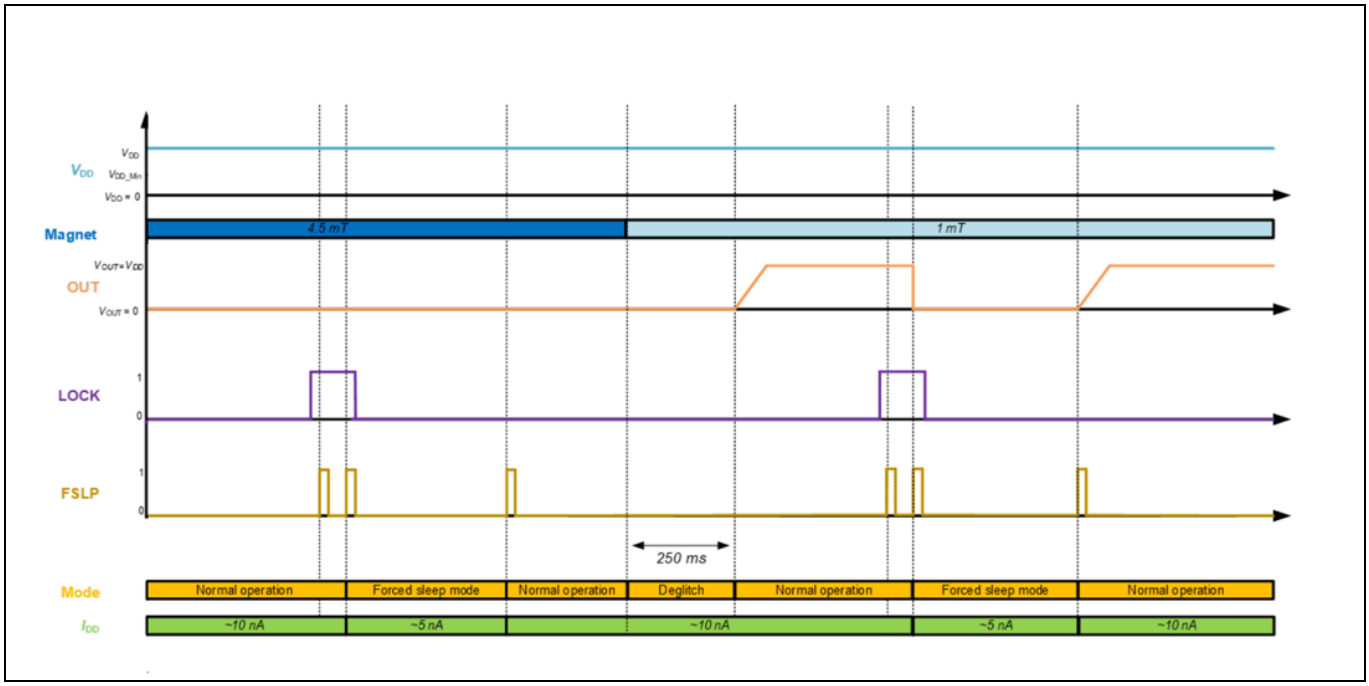

Figure 3 XENSIV™ TLV55624-1O switch – timing during Lock and Forced Sleep modes

2.5 Current measurement and application guidance

To measure the sensor path, remove the sensor current jumper and connect a suitable low-current instrument across the open jumper position. Use this path to compare normal operation with Forced Sleep mode. To measure the visualization path, remove the LED current jumper and connect the instrument across that position. Restore each jumper after measurement.

Attention: ***The LED current is much higher than the magnetic-switch current. Keep both measurements separate and do not interpret LED-path current as sensor consumption.***

Figure 4 shows an example current measurement using the sensor current jumpers. The captured waveform exhibits a peak current of approximately 13 µA once per second, corresponding to the device's periodic transition activity.

Figure 5 shows the discharge of a charged capacitor with a capacity of 1.5 nC in approximately 600 µs with the XENSIV™ TLV55624-1O switch connected as the load. The decreasing capacitor voltage illustrates that the device can continue operating from a small, finite energy reservoir as the stored energy is consumed. This measurement is particularly relevant for energy-harvesting concepts, in which harvested energy is buffered in a capacitor and subsequently used to power an ultra-low-power sensor during periods when the harvesting source provides little or no energy.

For reliable results, use an instrument with sufficient resolution and dynamic range for the expected current levels, and keep the connection leads as short as practical. The peak transition current and the sleep current differ significantly. Consequently, a measurement range optimized for the sleep current can clip the transition peak, whereas a range selected for the peak can provide insufficient resolution for the sleep current. Select the measurement range accordingly or perform separate measurements for the two operating conditions. Allow the reading to stabilize before recording a value, especially when comparing normal operation with Forced Sleep mode. Repeating the measurement under identical magnetic and control conditions helps ensure that the observed differences are attributable to the selected operating mode.

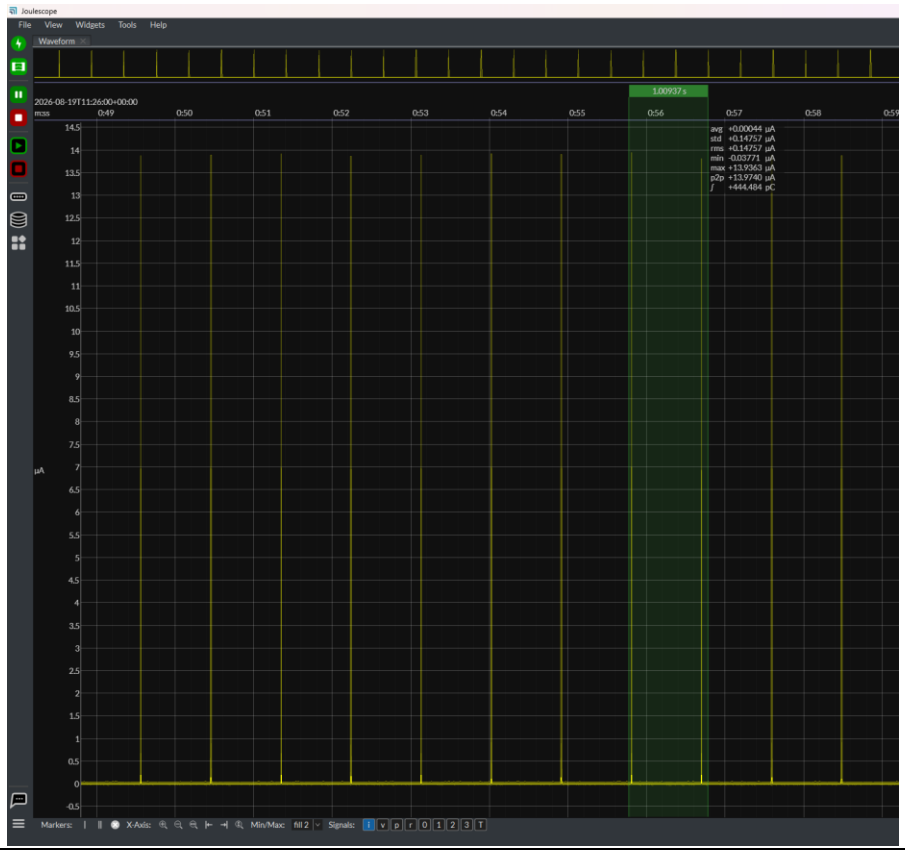

Figure 4 XENSIV™ TLV55624-1O switch – current measurement

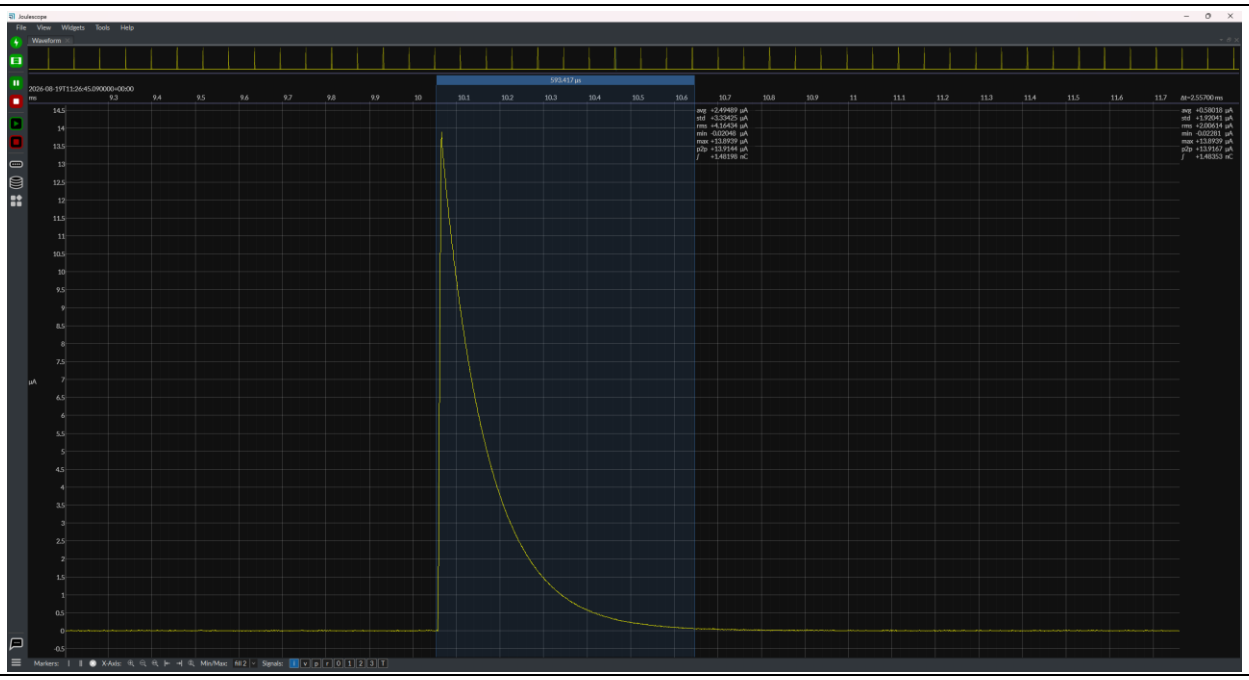

Figure 5 XENSIV™ TLV55624-1O switch – discharge of 1.5 nC capacitor

3 System design

3.1 Schematics

The schematic in Figure 6 shows the electrical connections of the evaluation kit. It includes the XENSIV™ TLV55624 sensor circuit, the separate 1.55 V sensor and 3 V LED supply domains, the output visualization path, the Lock and Forced Sleep modes controls, and the dedicated jumper positions for measuring sensor and LED current independently. The circuit organization supports standalone operation while preventing the LED load from influencing sensor-current measurements.

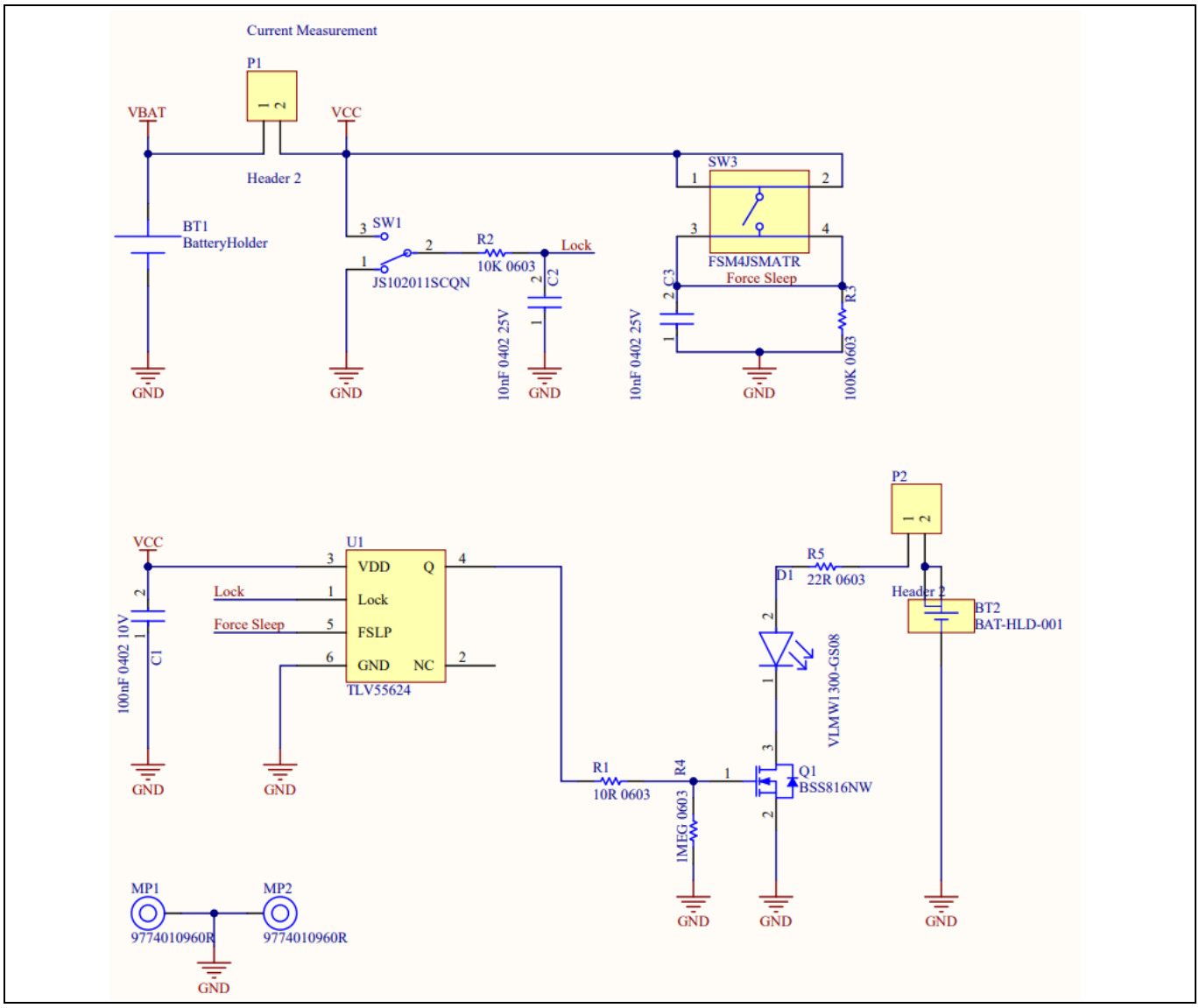

Figure 6 XENSIV™ TLV55624-1O evaluation kit schematics

3.2 Layout

The PCB layout in Figure 7 shows the component placement and routing on the top and bottom sides of the evaluation kit. The functional areas are arranged to keep the sensor path, LED visualization path, user controls, battery holders, and measurement jumpers clearly accessible. The layout also provides a defined position for the magnetic switching demonstration and supports convenient probing during laboratory evaluation.

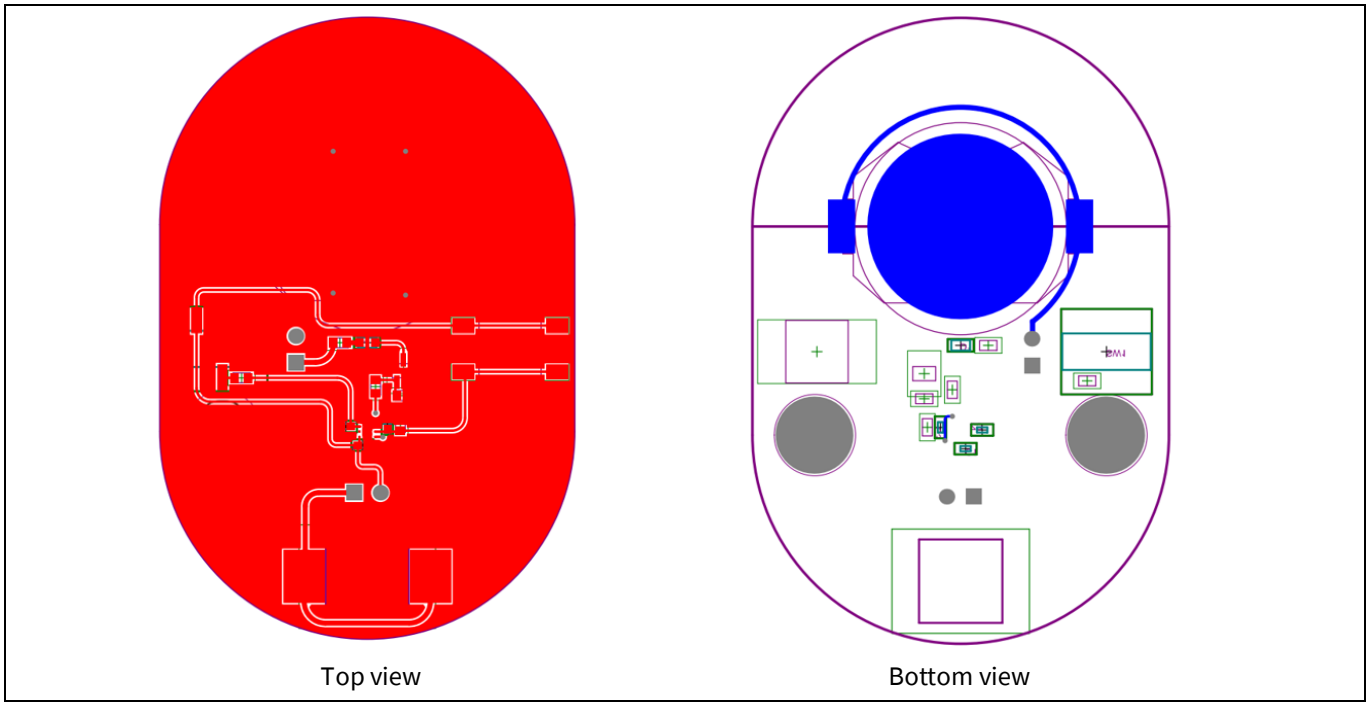

Figure 7 XENSIV™ TLV55624-1O evaluation kit PCB layout

The PCB footprint for the XENSIV™ TLV55624-1O is available from the Infineon website. The device datasheet [1] also contains dimensional drawings for both the recommended PCB footprint and the PG-XQFN-7-1 package. When creating or importing the land pattern, verify the pad geometry, pin-1 orientation, exposed-pad arrangement, and solder-mask and paste-mask definitions against the latest datasheet revision. The package measures only 1.50 mm × 1.50 mm × 0.38 mm, so accurate library data, suitable PCB fabrication tolerances, and placement capability are particularly important. A consistent copper and paste layout also supports reliable solder-joint formation and helps avoid assembly variation in this compact package.

3.3 Bill of materials

Table 2 Bill of materials

Quantity	Ref designator	Description	Manufacturer	Populated
1	BT1	534-3030TR	Keystone Electronics	Yes
1	BT2	BAT-HLD-001	–	Yes
1	C1	100 nF, 0402, 10 V	–	Yes
2	C2, C3	10 nF, 0402, 25 V	–	Yes
1	D1	VLMW1300-GS08	Vishay	Yes
2	MP1, MP2	9774010960R	Würth Elektronik	Yes
2	P1, P2	Header 2	–	Yes

Quantity	Ref designator	Description	Manufacturer	Populated
1	Q1	BSS816NW	Infineon Technologies	Yes
1	R1	10R 0603	–	Yes
1	R2	10K 0603	–	Yes
1	R3	100K 0603	–	Yes
1	R4	1MEG 0603	–	Yes
1	R5	22R 0603	–	Yes
1	SW1	JS102011SCQN	Littelfuse	Yes
1	SW3	FSM4JSMATR	TE Connectivity ALCOSWITCH	Yes
1	U1	TLV55624-1O	Infineon Technologies	Yes

4 Related resources

- Webpage: XENSIV™ magnetic switches and latches
- Infineon Developer Community: XENSIV™ switches and latches forum

References

[1] Infineon Technologies AG: *XENSIV™ TLV55624-1O magnetic switch datasheet;* Available online

Glossary

AR
augmented reality (AR)

BOM
bill of materials (BOM)

CGM
continuous glucose monitoring (CGM)

ESD
electrostatic discharge (ESD)

LED
light-emitting diode (LED)

PCB
printed circuit board (PCB)

TMR
tunnel magnetoresistance (TMR)

Revision history

Document revision	Date	Description of changes
1.00	2026-09-10	Initial release

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Customer shall not touch the Evaluation Board during operation and keep a safe distance.

Customer shall not touch the Evaluation Board after disconnecting the power supply, several components may still store electrical voltage and can discharge through physical contact. Several parts, like heat sinks and transformers, may still be very hot. Allow the components to cool before touching or servicing.

The electrical installation must be completed in accordance with the appropriate safety requirements.