Smart Power Switches - Motherboard Lite description

User guide

About this document

Scope and purpose

This user guide provides a comprehensive overview of the motherboard, its schematic, and a detailed description of its features. Engineers can use the document to assess the behavior of the component under different operating conditions, interface it with other hardware, and verify its suitability for a particular application.

Intended audience

This user guide is intended for engineers and potential customers who want to evaluate Infineon's Smart Power Switches for their target application.

Evaluation Board

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

Warnings

***Note**:* *printed circuit board (PCB) and auxiliary circuits are not optimized for final customer designs.*

Table of contents

1 The board at a glance

The smart power switches (SPS) evaluation kit consists of a *motherboard (MB)* and a *daughterboard (DB)*. The figure below shows the MB with black connectors in the middle for the DB. Depending on the device's features, the DB provides additional functionalities. For more information, refer to the documentation on the DB for the relevant product family.

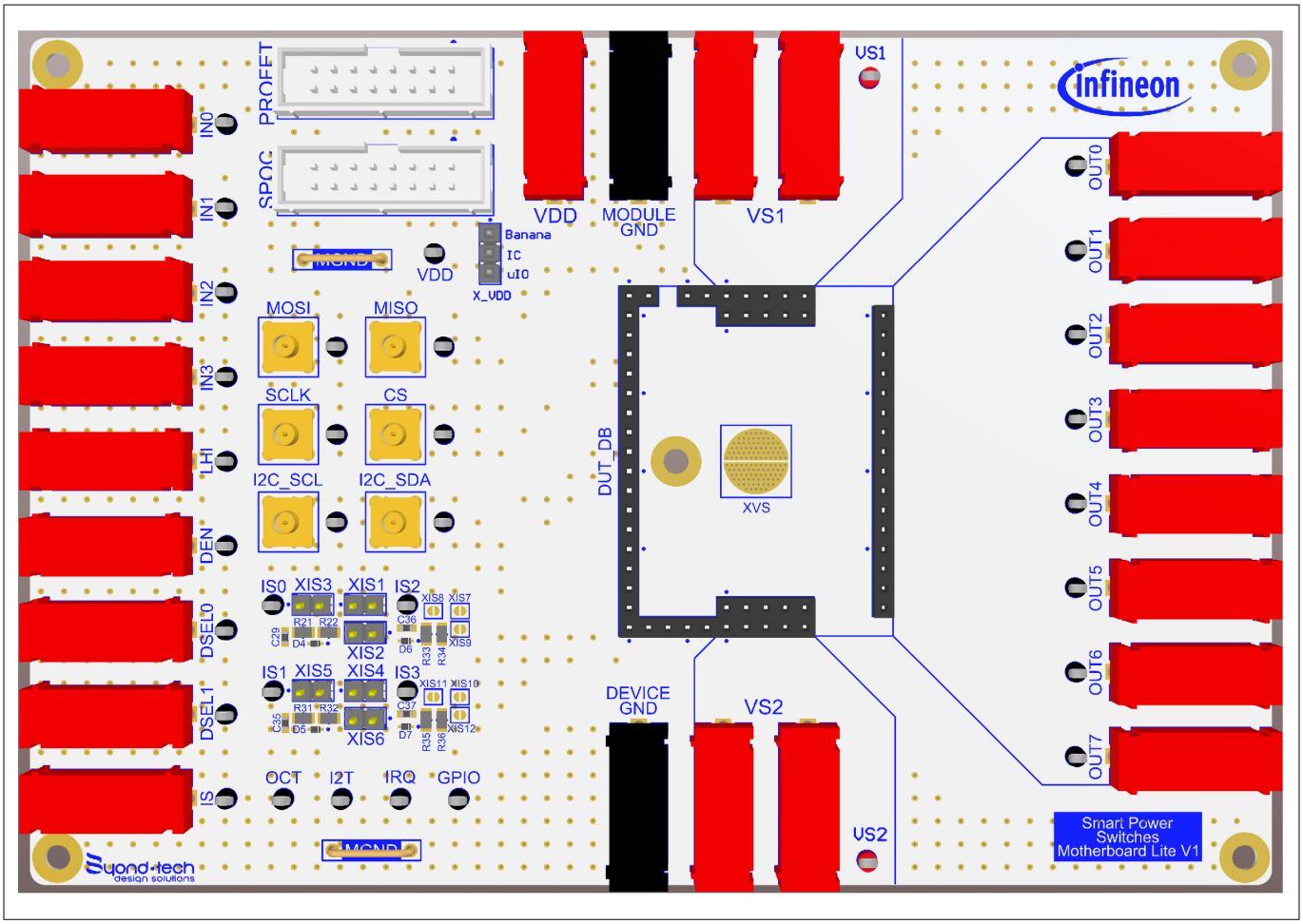

Figure 1 SPS evaluation kit

The MB is designed to handle devices of the following product families:

- PROFET™ + 12 V
- PROFET™ + 24 V
- PROFET™ + 48 V
- PROFET™ +2 12 V
- PROFET™ Wire Guard 12 V
- Power PROFET™ + 12/24/48 V
- SPOC™ +2

The equipment is suitable for evaluating resistive, capacitive, and inductive loads, as well as for driving devices with an *serial peripheral interface (SPI)*.

However, the board is not designed for *electromagnetic compatibility (EMC)* characterization, including ISO pulses, nor optimized for thermal performance characterization. For this, use the Infineon Smart Power Switches Configuration Wizard (Config Wizard) from the Infineon Developer Center.

2 Schematic

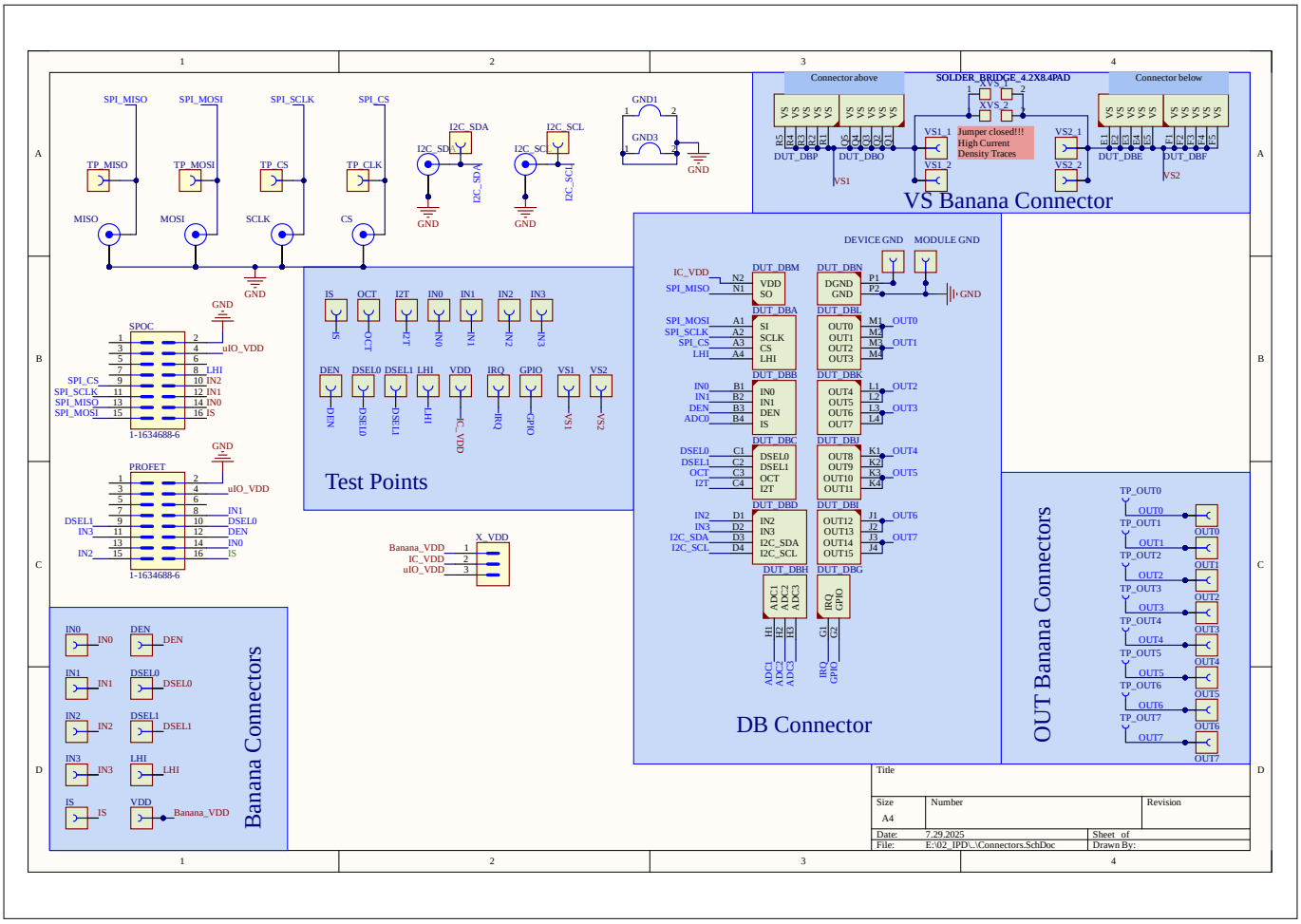

Figure 2 Schematic sheet 1

2 Schematic

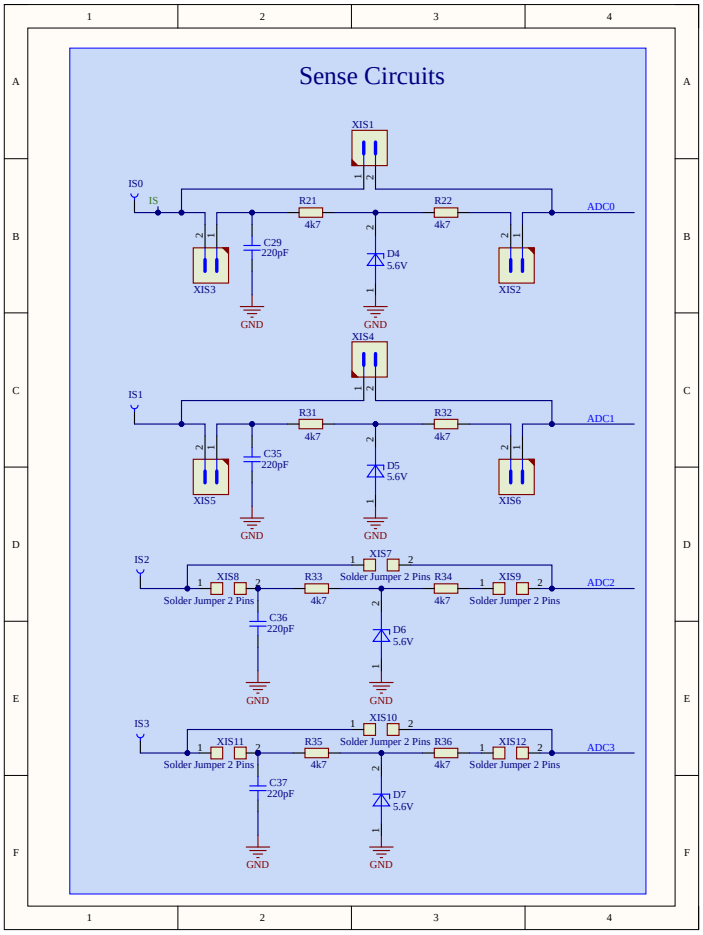

Figure 3 Schematic sheet 2

3 Getting started

The following additional equipment is required:

- A voltage source for the supply voltage V_S
- A voltage source for the logic supply voltage V_{IN}, V_{DEN}, etc
- Banana cables for connecting:
  - All supply voltages, including their dedicated ground to the *MB*
  - The target load to the output OUT
- XGND: Close the header on the *DB* with a jumper (refer to Ground design)
- X_VDD: Close the mid "IC" and top "Banana" header with a jumper for the usage of the banana connector V_{DD}

Optional steps for software usage

1. Connect the *uIO-Stick* into the provided MB connector (SPOC™ or PROFET™)
2. Connect the uIO-Stick into the computer
3. Start the Configuration Wizard from the Infineon Developer Center
4. Header X_VDD: Close the mid and bottom headers usage of the supply, from the uIO-Stick

4 System and functional description

4.1 OUT connector

Based on the number of channels and the targeted load current of the device, it is necessary to use various OUT banana connectors. For more information, refer to the documentation on the *DB* for the relevant product family.

4.2 Ground design

There are two options for setting up the *ground (GND)* with the evaluation kit. Depending on the requirement, you can use either "MODULE GND" or "DEVICE GND" as the ground reference. Both are indicated by black banana sockets on the *MB*. The ground resistor specific to the product is placed on the *DB*.

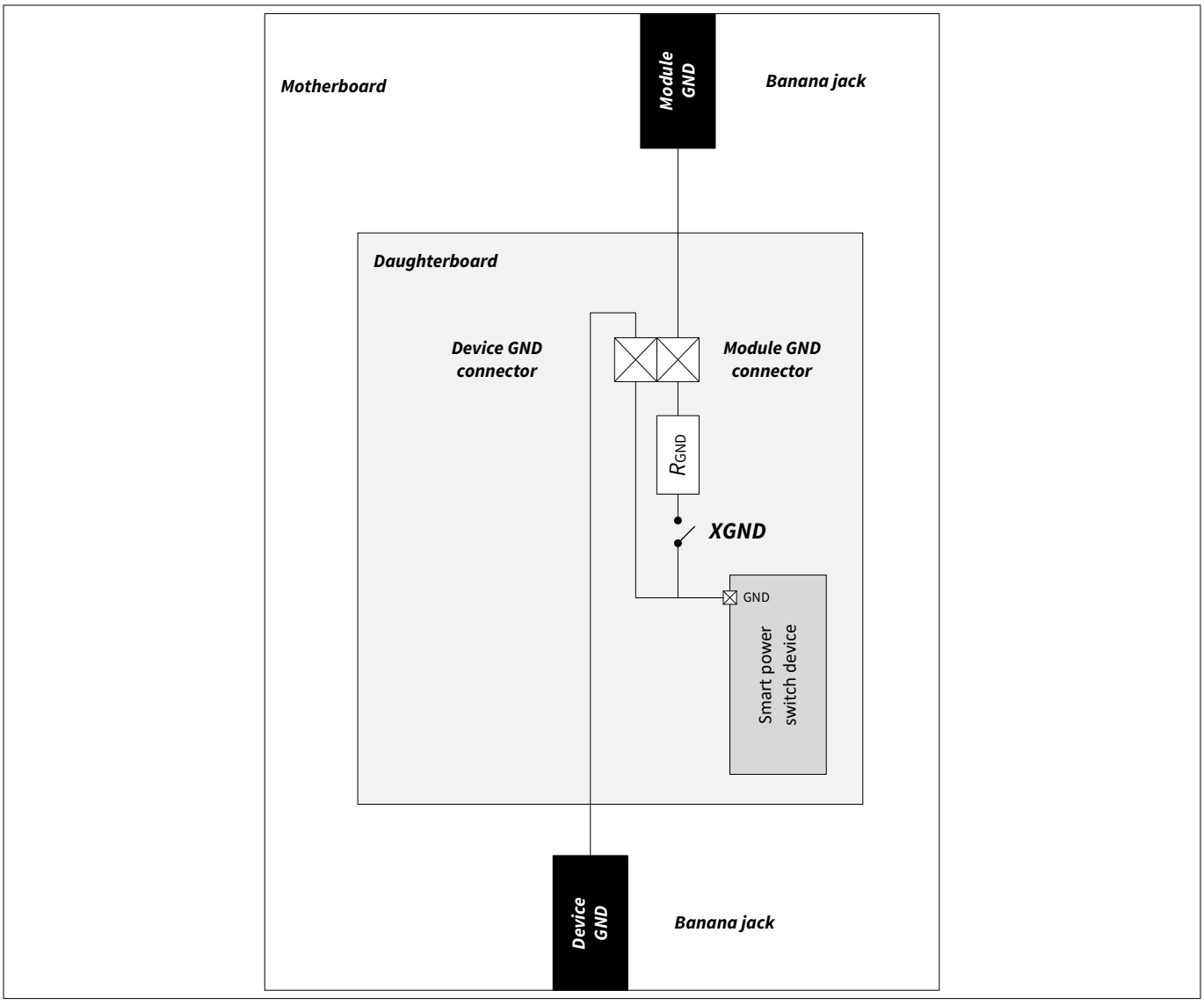

Figure 4 Ground design: motherboard and daughterboard

Use with integrated RGND value

It is advisable to use a ground resistor RGND, which is placed on the DB and aligned with the application information in the datasheet. Consequently, it is recommended to close the jumper XGND on the DB. Subsequently, the banana socket "MODULE GND" is to be used as the ground reference.

Use with individual RGND value

For advanced evaluation, the XGND connector can be left open, and the banana socket "DEVICE GND" is to be used as the ground reference. It is important to note that this setup results in the absence of a ground resistor RGND, which provides additional protection. An additional resistor can be placed outside the evaluation kit. Be aware that the module GND must be reconnected to the "MODULE GND" banana socket.

4.3 Sense circuit

Figure 5 Sense circuit location on PCB

The sense resistor specific to the device is located on the respective *DB*. The rest of the sense circuit is located on the *MB*. The MB offers up to four current sense circuits, depending on the device's sense current output. Among these current sense circuits, IS0 and IS1 can be configured using standard jumpers, while IS2 and IS3 can be configured using solder jumpers.

Table 1 Sense circuit usage overview

Jumper type	Sense circuit number	use complete sense circuit (recommended)	use sense resistor only
Header jumper	IS0	Close XIS2 and XIS3	Close XIS1
	IS1	Close XIS5 and XIS6	Close XIS4
Solder jumper	IS2	Close XIS8 and XIS9	Close XIS7
	IS3	Close XIS11 and XIS12	Close XIS10

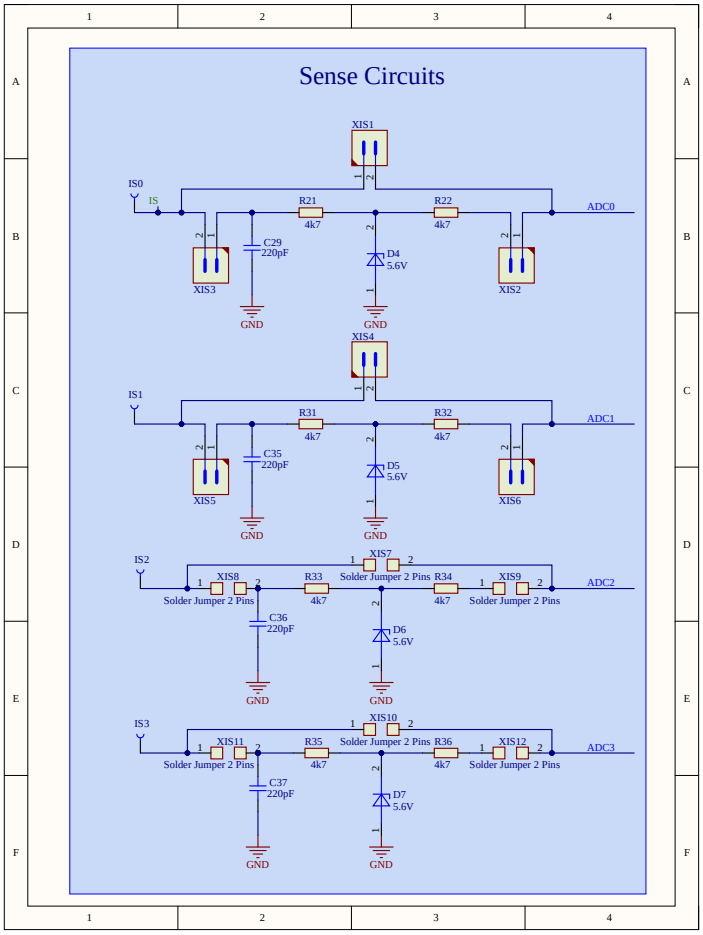

Figure 6 Sense circuit schematic

4.4 Header X_VDD

***Note**: This feature is relevant for the evaluation of devices containing the SPI feature.*

Depending on the customers setup, there is the possibility to supply the digital supply voltage V_{DD} via two options:

- Close the mid "IC" and top "Banana" header, using the banana connector V_{DD}
- Close the mid "IC" and bottom "uIO" header, using the supply from the *uIO-Stick*

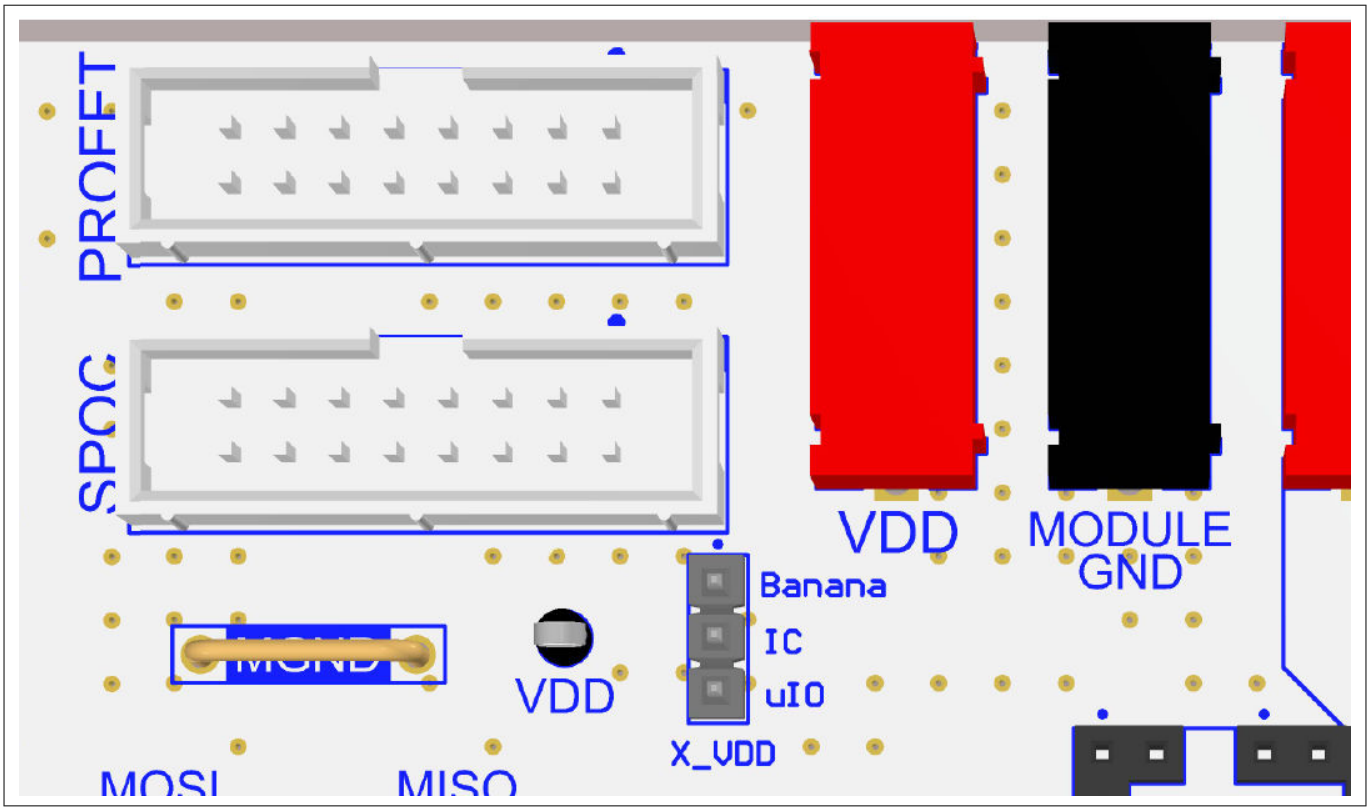

Figure 7 X_VDD location on PCB

Glossary

DB

daughterboard (DB)
An expansion circuit card connected to a motherboard.

EMC

electromagnetic compatibility (EMC)
The ability of electrical equipment and systems to function acceptably in their electromagnetic environment, by limiting the unintentional generation, propagation and reception of electromagnetic energy which may cause unwanted effects such as electromagnetic interference (EMI) or even physical damage in operational equipment.

GND

ground (GND)

MB

motherboard (MB)
The main printed circuit board (PCB) in general-purpose computers and other expandable systems. It holds and allows communication between many of the crucial electronic components of a system, such as the central processing unit (CPU) and memory, and provides connectors for other peripherals.

PCB

printed circuit board (PCB)

A board that mechanically supports and electrically connects electronic components using conductive tracks, pads, and other features etched from copper sheets laminated onto a non-conductive substrate.

SPI

serial peripheral interface (SPI)

A synchronous serial communication interface specification used for inter-chip communication, primarily in embedded systems.

uIO-Stick

uIO-Stick

An interface device for controlling Infineon boards or kits during runtime.

5 Revision history

Document version	Date of release	Description of changes
Rev 1.00	2025-10-23	Initial document release

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Edition 2025-10-23

Published by

Infineon Technologies AG

81726 Munich, Germany

Do you have a question about any aspect of this document?

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Document reference
IFX-qkj1757009336853

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