Getting started with the Infineon door control evaluation board

User guide

Door control
MOTIX™ Bridge
MOTIX™ SBC
Z8F80481275

About this document

Scope and purpose

This user guide provides instructions for using the evaluation board, which is designed to evaluate the associated system solution for door control. Moreover, this user guide provides an overview on the whole system offering for door control and extensive technical information on the board.
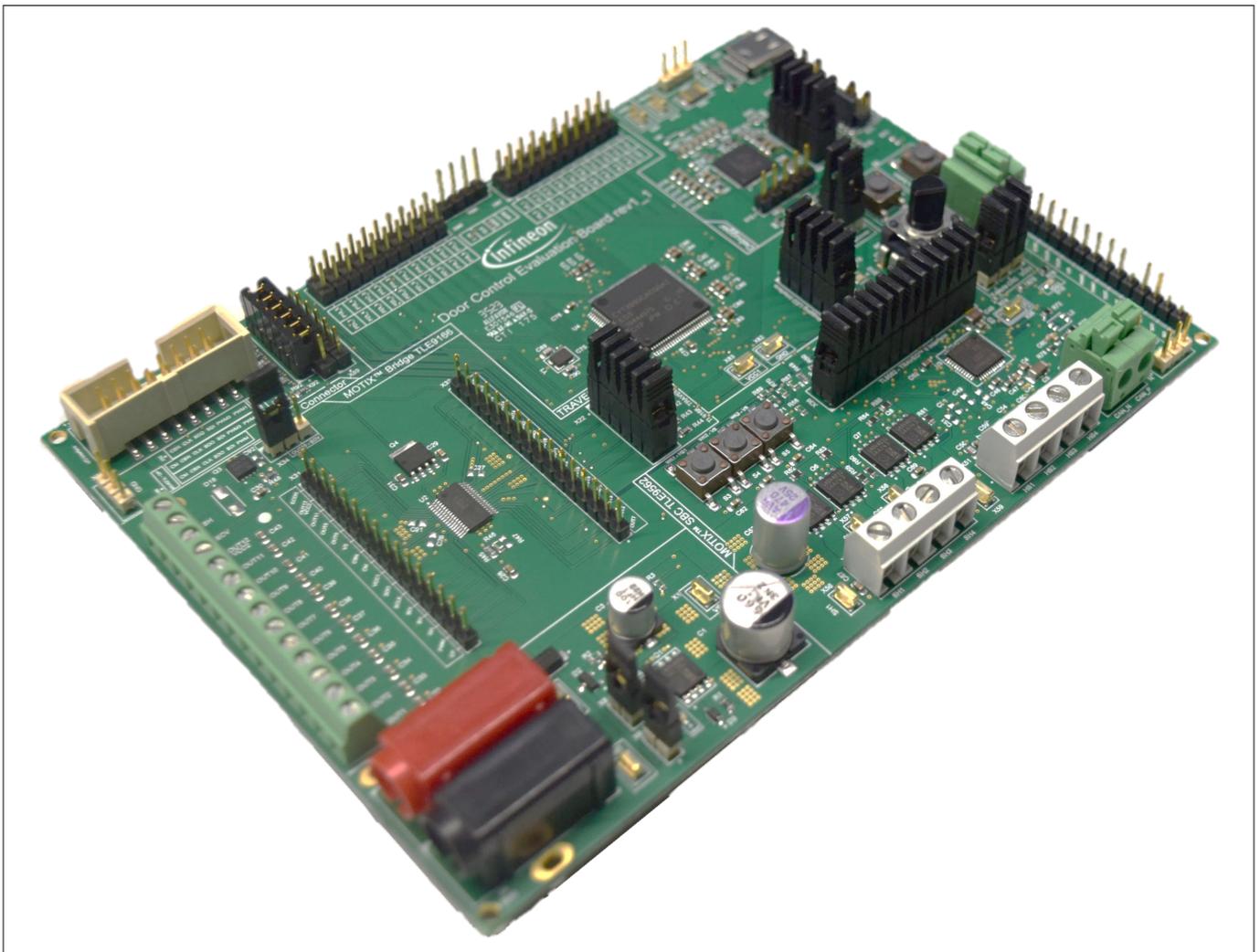
Figure 1   Door control evaluation board

About this document

Intended audience

This document is intended for anyone using Infineon's Door control evaluation board.

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

Important notice

"Evaluation Boards and Reference Boards" shall mean products embedded on a printed circuit board (PCB) for demonstration and/or evaluation purposes, which include, without limitation, demonstration, reference and evaluation boards, kits and design (collectively referred to as "Reference Board").

Environmental conditions have been considered in the design of the Evaluation Boards and Reference Boards provided by Infineon Technologies. The design of the Evaluation Boards and Reference Boards has been tested by Infineon Technologies only as described in this document. The design is not qualified in terms of safety requirements, manufacturing and operation over the entire operating temperature range or lifetime.

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Safety precautions

Table 1   **Safety precautions**

⚠️	**Caution:** *The heat sink and device surfaces of the evaluation or reference board may become hot during testing. Hence, necessary precautions are required while handling the board. Failure to comply may cause injury.*
⚠️	**Caution:** *Only personnel familiar with the drive, power electronics and associated machinery should plan, install, commission and subsequently service the system. Failure to comply may result in personal injury and/or equipment damage.*
⚠️	**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.*
⚠️	**Caution:** *A drive that is incorrectly applied or installed can lead to component damage or reduction in product lifetime. Wiring or application errors such as undersizing the motor, supplying an incorrect or inadequate AC supply, or excessive ambient temperatures may result in system malfunction.*
⚠️	**Caution:** *The evaluation or reference board is shipped with packing materials that need to be removed prior to installation. Failure to remove all packing materials that are unnecessary for system installation may result in overheating or abnormal operating conditions.*

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1 System offering

1.1 Introduction to the system offering

Infineon's system offering for door control encompasses a range of components that work together to provide a comprehensive solution.

Key Components:

- **Infineon door control evaluation board**: A robust hardware foundation for efficient integration and connectivity with a TRAVEO™ II microcontroller, a MOTIX™ SBC TLE9562 a MOTIX™ Bridge TLE9166EQ, MOSFETs and several interfaces. For more information, refer to Introduction to the Infineon door control evaluation board

- **MOTIX™ device drivers**: Microcontroller-independent embedded software for configuring and controlling the:

  - MOTIX™ TLE9166EQ; for more information, refer to Introduction to the MOTIX™ TLE9166EQ device driver

  - MOTIX™ TLE9562; for more information, refer to Introduction to the MOTIX™ TLE9562 device driver

- **Application software**: An embedded software project for IAR embedded work bench which includes the device drivers and the Traveo™ II sample driver library (SDL). There are two application software projects offered:

  - **Infineon door control evaluation board application software - basic :** In this application software, the Traveo™ II initializes the MOTIX™ SBC TLE9562 and the MOTIX™ Bridge TLE9166EQ over SPI and start the cyclic status check function. Moreover, this application provides a glance at the integration of the device driver. For more information, refer to Introduction to the Infineon door control evaluation board application software - basic

  - **Infineon door control evaluation board application software - advanced:** This application software extends the functionality of the basic software. Apart from all the initializations, the advanced software application contains a routine to operate various loads of the door control module such as the window lift operation, mirror features, and the door lock function. For more information, refer to Introduction to the Infineon door control evaluation board application software - advanced

- **MOTIX™ multi half-bridge IC configuration wizard**: A PC tool consisting of a *graphical user interface (GUI)* for configuring and visualizing the state of the MOTIX™ SBC TLE9562 and MOTIX™ bridge TLE9166EQ. For more information, refer to Introduction to the MOTIX™ multi half-bridge IC configuration wizard

Infineon Door Control evaluation board	MOTIX™ Multi Half-Bridge IC Configuration Wizard
Infineon Door Control evaluation board application software	
MOTIX™ TLE9562 device driver	
MOTIX™ TLE9166EQ device driver	
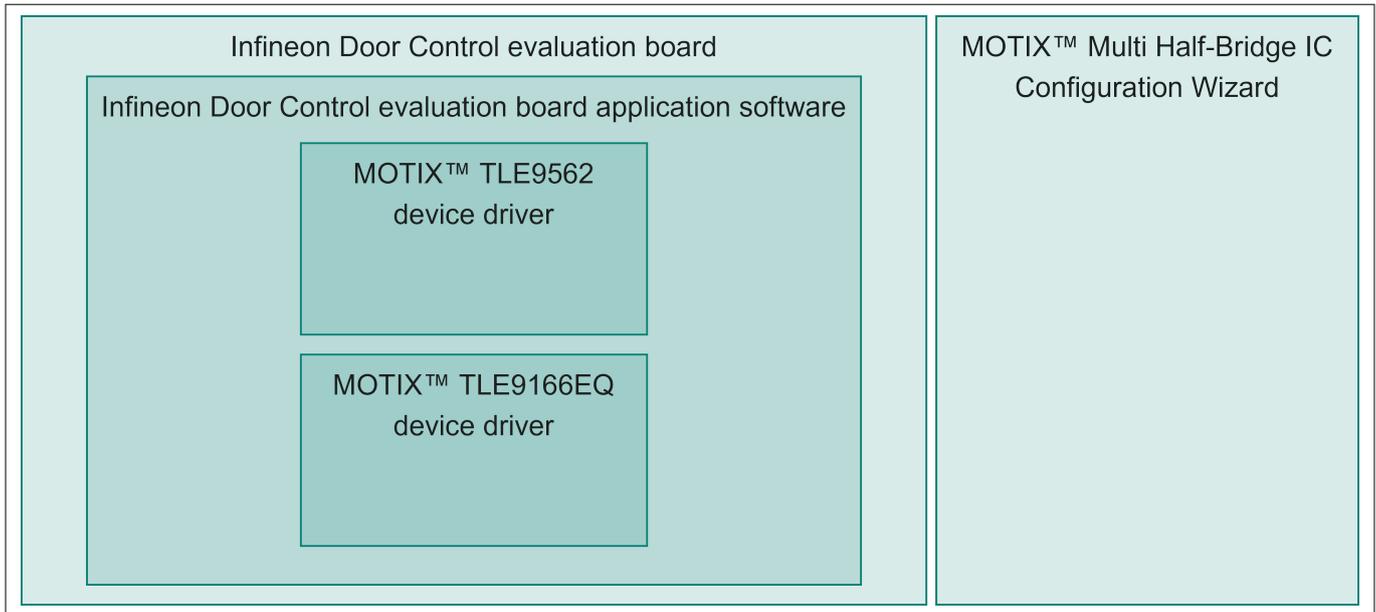
Figure 2   **Infineon's door control system offerings**

1.1.1 Introduction to the Infineon door control evaluation board

The evaluation board combines a TRAVEO™ II microcontroller with a MOTIX™ SBC TLE9562 and MOTIX™ bridge TLE9166EQ. Every pin of the MOTIX™ bridge TLE9166EQ and most pins of the MOTIX™ SBC TLE9562 can be accessed via pin headers.

The evaluation board can be supplied over banana jacks with 12 Vdc. The board is protected against reverse polarity of the input voltage supply. The logic power supply for the microcontroller, MOTIX™ Bridge TLE9166EQ and the charge pump voltage for the MOTIX™ bridge TLE9166EQ is provided by the MOTIX™ SBC TLE9562.

All the OptiMOS™ MOSFET half-bridges are placed on the board to drive BDC motors. The board has a USB-C port to use the on-board *serial wire debug (SWD)*. The *controller area network (CAN)* and *local interconnect network (LIN)* interfaces are available at a push-in connector.

To get the evaluation board, refer to How to get the system offering.

1 System offering
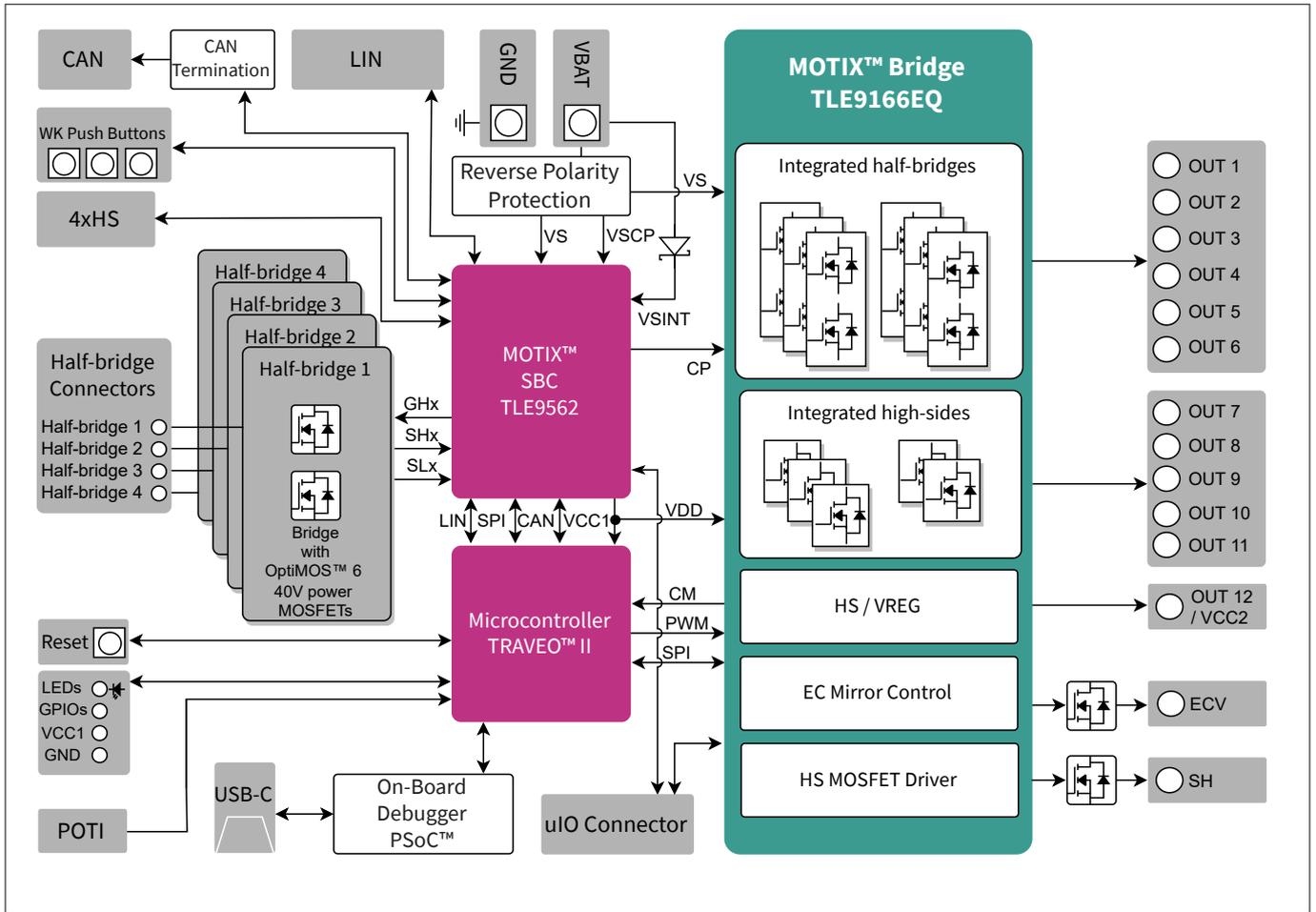
Figure 3   Block diagram
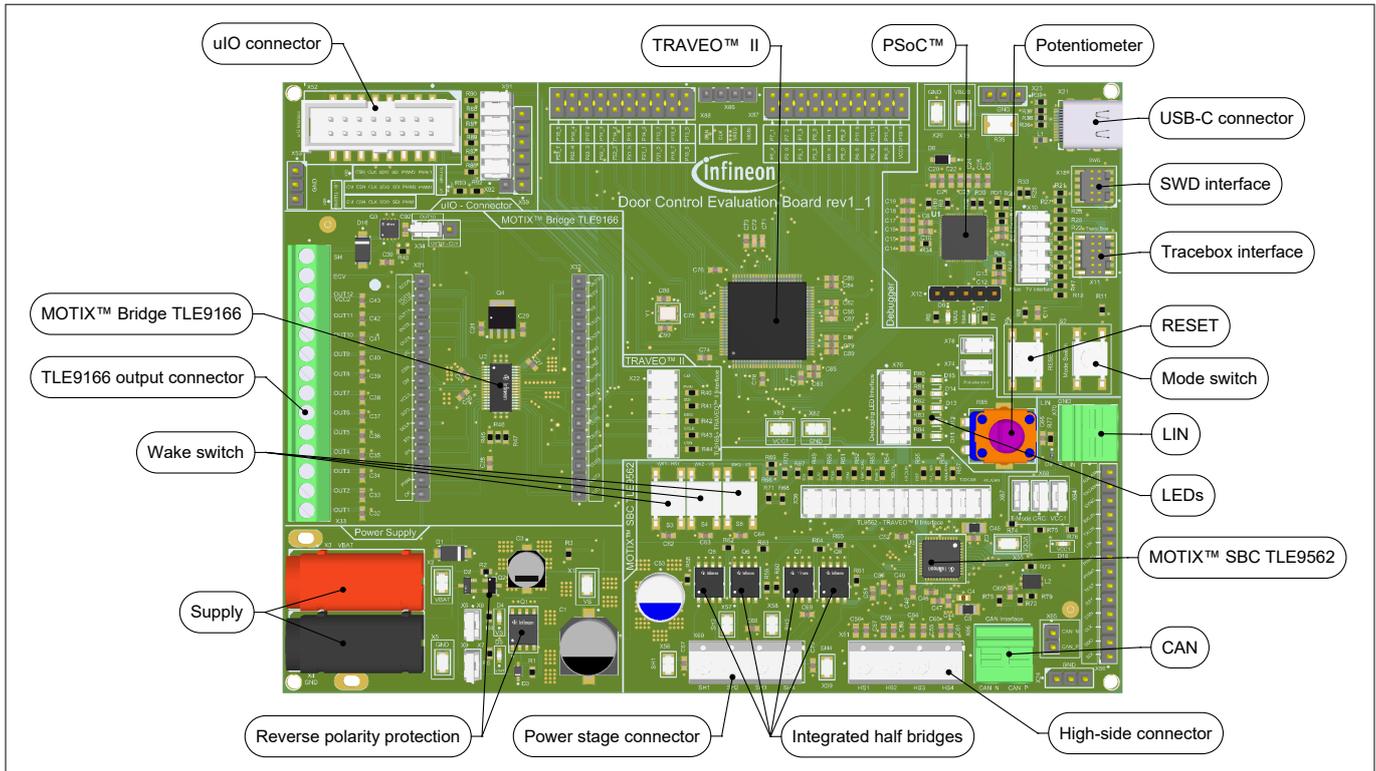
Figure 4   **Board description**

1.1.2   Introduction to the MOTIX™ TLE9166EQ device driver

The MOTIX™ TLE9166EQ device driver is a microcontroller-independent embedded software library that provides an easy-to-use *application programming interface (API)* for configuring the TLE9166 half-bridge driver *integrated circuit (IC)*. The device driver is designed to be integrated into various microcontroller platforms and provides a set of functions to configure the TLE9166EQ and read its status registers. The device driver is available in the Infineon Developer Center.

1.1.3   Introduction to the MOTIX™ TLE9562 device driver

The MOTIX™ TLE9562 device driver is a microcontroller-independent embedded software library that provides an easy-to-use *API* for configuring the TLE9562 multifunctional system *IC*. The device driver is designed to be integrated into various microcontroller platforms and provides a set of functions to configure the TLE9562 and read its status registers. The device driver is available in the Infineon Developer Center.

1.1.4   Introduction to the Infineon door control evaluation board application software - basic

The application software is designed to provide users with an initial insight into the capabilities of our devices. It serves as an example guide for integrating device drivers into software projects. It consists of an embedded software example tailored for the Infineon door control evaluation board. The application software:

- Is executed by the Traveo™ II microcontroller
- Initializes the TLE9166 and TLE9562, activating their outputs and high sides

- Periodically reads the status register of these devices, with errors indicated via *light-emitting diode (LED)*s on the board
- Integrates and uses the *API* provided in the embedded software libraries, including:
  - Traveo™ II Sample Driver Library
  - TLE9166 device driver
  - TLE9562 device driver

This approach ensures that developers can seamlessly incorporate the devices into their projects, optimizing functionality.

1.1.5 Introduction to the Infineon door control evaluation board application software - advanced

This application software enhances the capabilities of the basic software by incorporating additional functionalities. It not only encompasses all the features of the basic software but also includes routines specifically designed to manage various loads in the door control module. These loads include window lift motors, mirror folding, mirror glass movement, mirror *LED*s, and door locks.

The software is configured to use the necessary peripherals of the Traveo™ II microcontroller such as *serial peripheral interface (SPI)*, *pulse-width modulation (PWM)*, and timers. Within the software, a state machine routine manages various configurations of Traveo™ II, MOTIX™ SBC TLE9562 and MOTIX™ bridge TLE9166EQ, by enabling or disabling various output stages to control specific loads within the door control module.

For access to this software and comprehensive documentation, refer to How to get the system offering.

1.1.6 Introduction to the MOTIX™ multi half-bridge IC configuration wizard

The MOTIX™ multi-half-bridge *IC* configuration wizard is a PC tool consisting of a *GUI* within the Infineon Developer Center Launcher.

The GUI enables you to configure the charge pump of MOTIX™ SBC TLE9562 and to configure the MOTIX™ bridge TLE9166EQ during runtime. In addition, it monitors the values of the device register and the CM pin of the device.

This tool works together with the evaluation board and the uIO-stick, which sends the corresponding *SPI* messages, drives the digital inputs of the device, and monitors the CM analog pin of the device.

To get the configuration wizard, refer to How to get the system offering.

1.2 How to get the system offering

How to get the Infineon door control evaluation board

To order a board:
1. Go to https://www.infineon.com
2. In the search bar, enter your required product, for example, `Door control evaluation board`
3. Once you have found the product page, navigate to the order section
4. To order the product from Infineon directly or from the distribution partner, click **Order online**

1 System offering
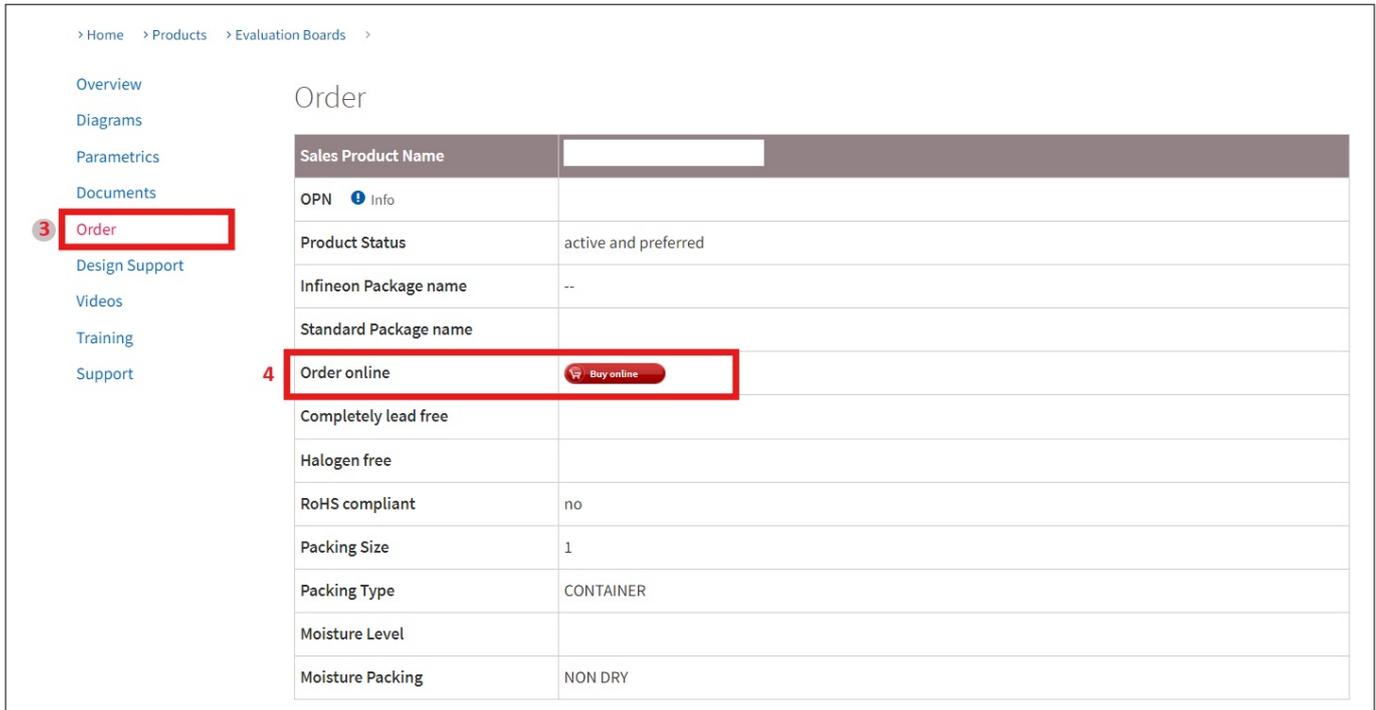
Figure 5   Navigation on the web page to order the board

How to get the application software examples and device drivers

To download an embedded software package:

1.   Go to https://softwaretools.infineon.com/software
2.   In the search field, enter the name of the embedded software package
3.   Click **Request**, as shown in Figure 6
4.   Click the cart
5.   Click **Request**
6.   Fill the questionnaire, accept the license terms, and click **Submit request**, as shown in Figure 7
7.   A few minutes later, the software package is available for download in the **My Space** tab page under **My Software**. There, click **Details** and then **Download**

1 System offering
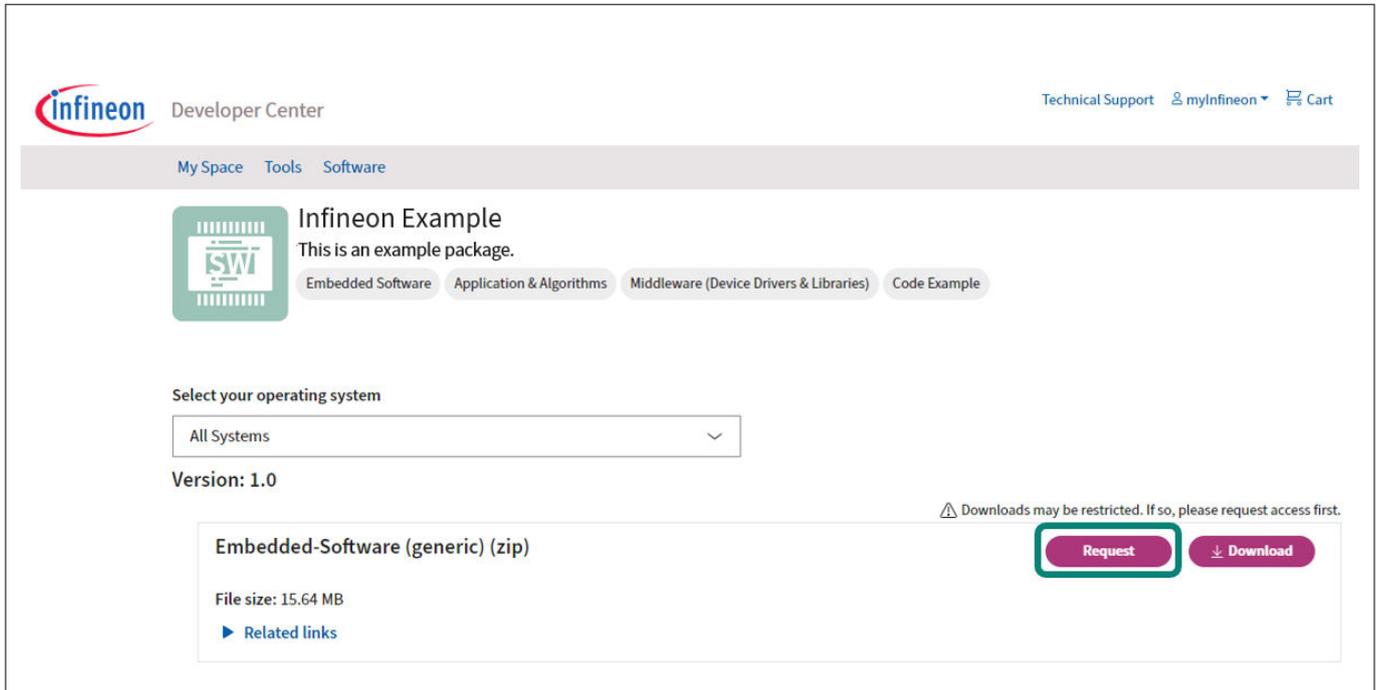
Figure 6   **Software package within the Infineon Developer Center**

Figure 7   **Requesting download of software package**

How to get the MOTIX™ Multi half-bridge IC configuration wizard

You can install the tool from the Infineon Developer Center Launcher, which you can download here.

From there, in Step 3, under **Tools**, search for MOTIX™ Multi half-bridge IC configuration wizard.

Once installed, in Step 5, under **Manage Tools** and hovering over the MOTIX™ Multi half-bridge IC configuration wizard box, click **Start**. In the new window that appears, to start the tool, click TLE9166EQ EVALBOARD.
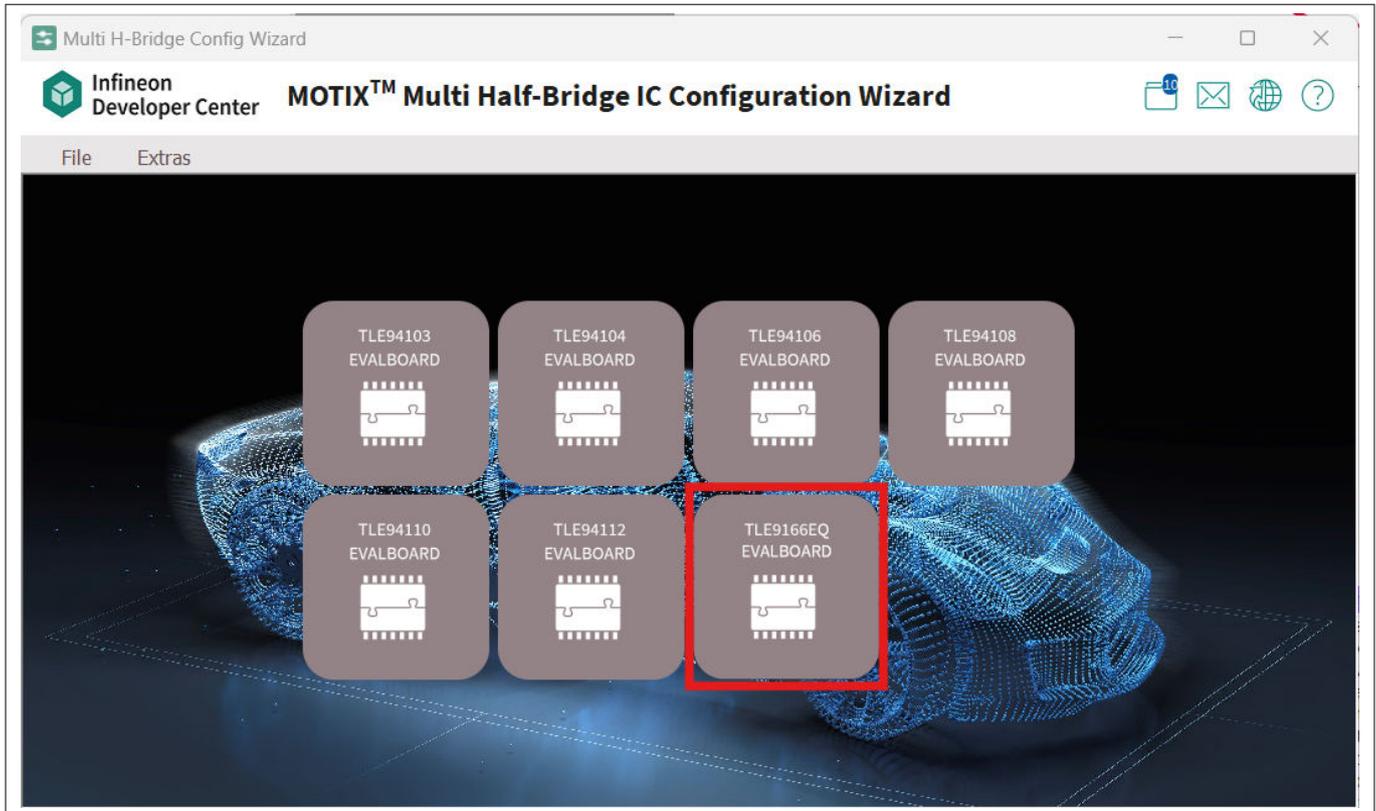
Figure 8   **MOTIX™ Multi half-bridge IC configuration wizard**

1.3   Benefits of the system offering

This integrated platform is designed to streamline the evaluation process, providing the necessary tools to effectively test, analyze, and harness the capabilities of Infineon's system solution for door control. The following explains how to combine components for maximum benefit.

- **Evaluation board + application software**: Enables rapid prototyping and development. The application software examples have been developed to run on this evaluation board, so they only have to be compiled and flashed into the Traveo™ II. All the required microcontroller peripherals (*general purpose input output (GPIO)*, *PWM*, *SPI*)* are configured for the correct pin mapping and functionality. The Infineon products on the evaluation board are the best fit for a door control application. The application software examples have been developed so that the correct application load type is connected to the correct output stage*. This serves as an inspiration for door modules system partitioning. Moreover, the application software examples showcase how the device drivers can be integrated in a bigger project and how their functions can be used to control the hardware.

     Note: ** = Infineon door control evaluation board application software - Advanced*
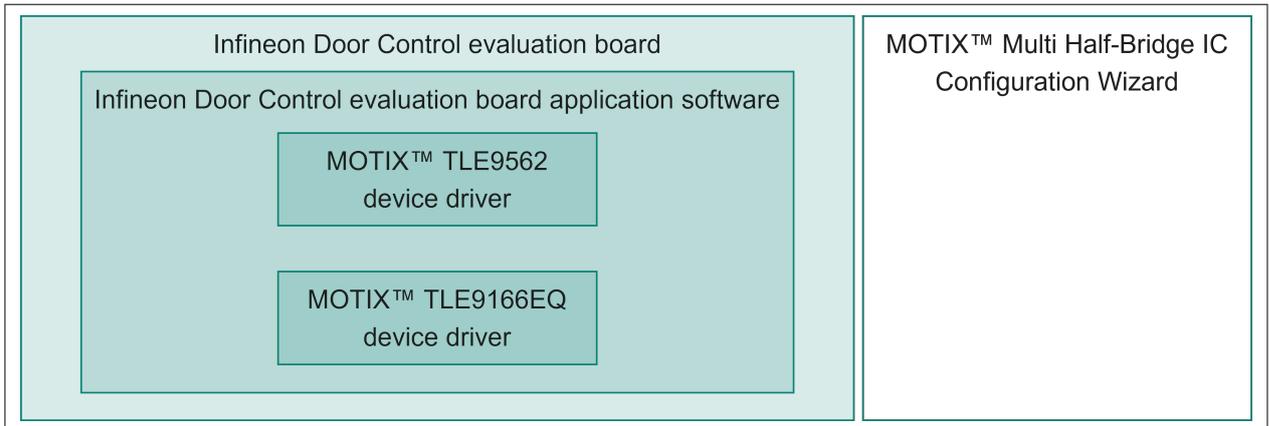
Figure 9   **Evaluation board + Application software**

- **Evaluation board + configuration wizard**: Enables run-time evaluation. The *GUI* enables you to configure the charge pump of MOTIX™ SBC TLE9562 and configure the MOTIX™ Bridge TLE9166EQ with the uIO-stick. The configuration of the MOTIX™ Bridge TLE9166EQ can be changed during run-time to monitor the values of the device registers. There is no need to re-flash or reboot any microcontroller to make any changes
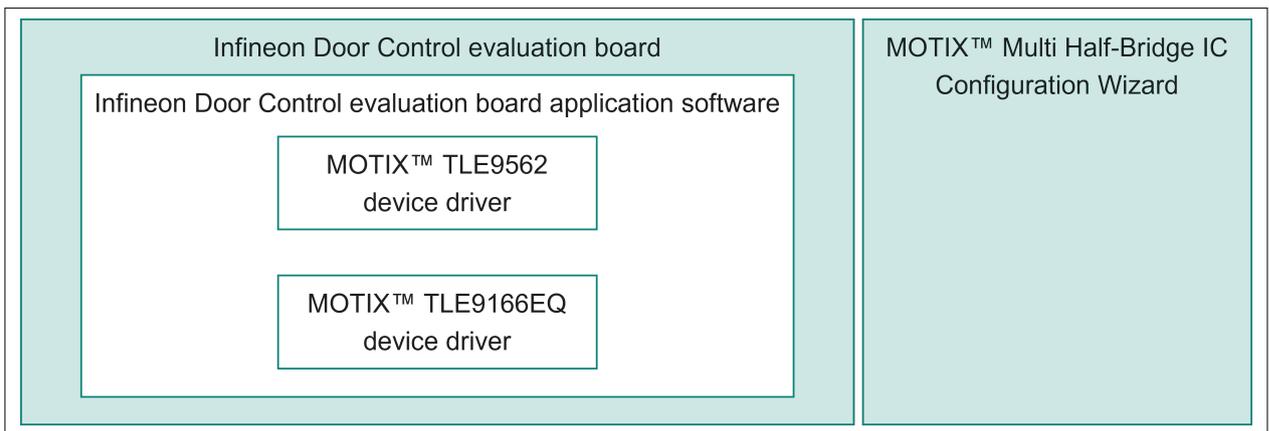
Figure 10   **Evaluation board + configuration wizard**

- **Device driver + other microcontroller platform**:The MOTIX™ TLE9166EQ and MOTIX™ TLE9562 device drivers are a microcontroller-independent software library that provides an easy-to-use *API* to control the MOTIX™ Bridge TLE9166EQ and MOTIX™ SBC TLE9562. The device drivers are designed to be integrated into various microcontroller platforms and provide a set of functions to configure and read the status of the TLE9166EQ and TLE9562
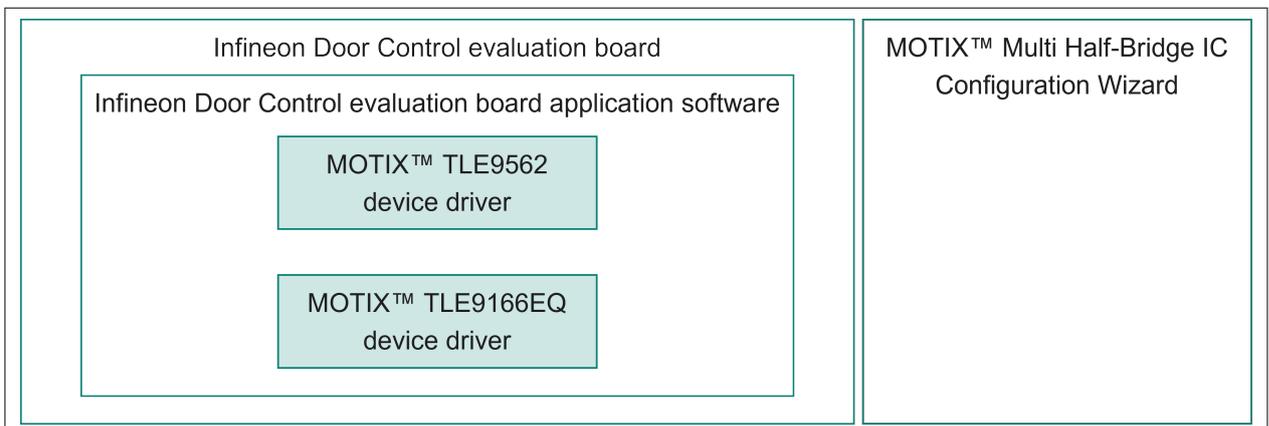
Figure 11   **Device driver + other microcontroller platform**

2 Setting up the Infineon door control evaluation board

Box delivery content

The Door control evaluation board is delivered together with a USB-C cable to connect the board to a PC, and a QR code on the box to access exclusive content for the board, such as *PCB* design files

Initial board setup

The door control evaluation board comes with a pre-flashed Introduction to the Infineon door control evaluation board application software - basic. To ensure that the initial setup works as expected, follow these steps:

1. Check whether the default jumper position is set. The default jumper position is highlighted in purple in the figure below
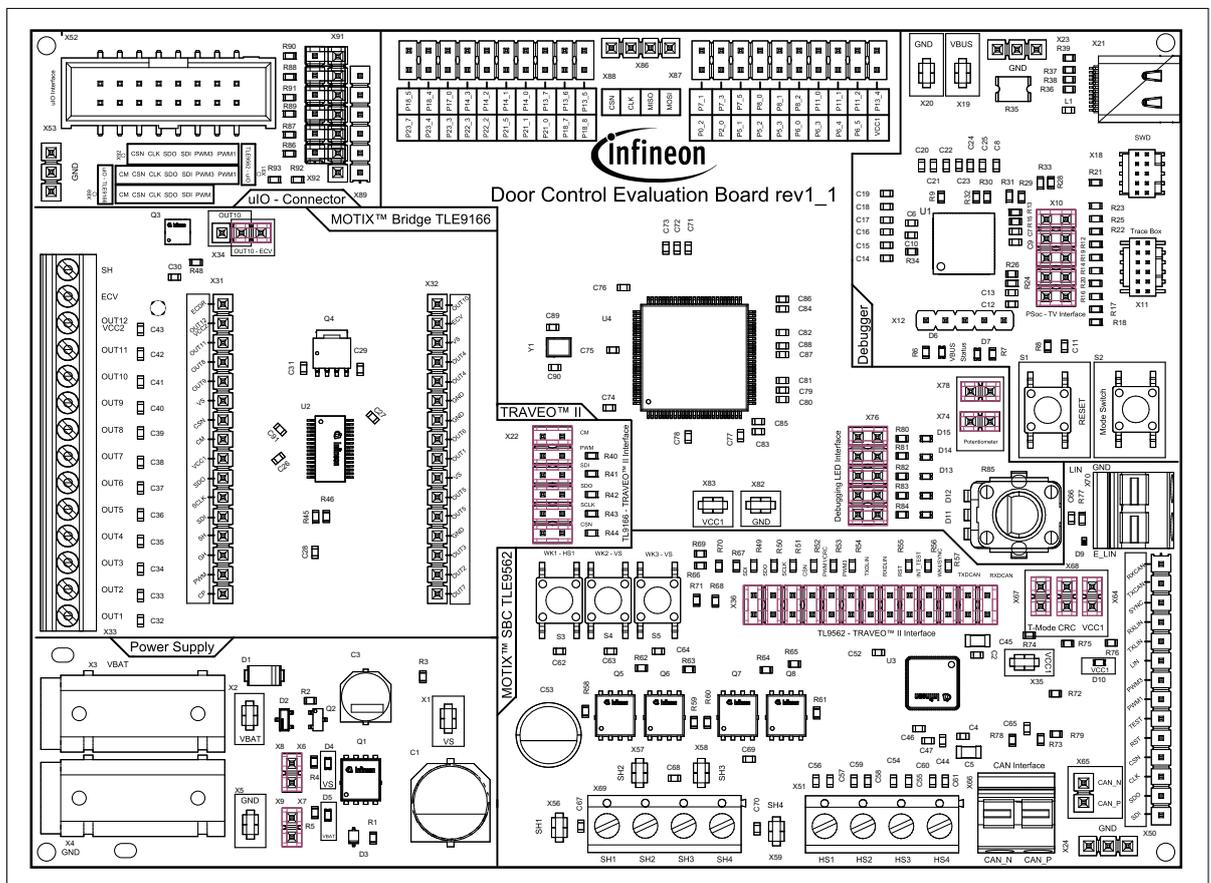
Figure 12   Default jumper position

2. After checking the default jumper position, follow the steps given in the table and relevant components as highlighted in the figure below:

Table 2   Steps for setting up the evaluation board

Steps	Designator	Label	Description
a	X3, X4	V_{BAT}, GND	Connect the board to a 12 V power supply using banana connectors (X3, X4) on the board.

(table continues…)

Table 2   **(continued) Steps for setting up the evaluation board**

Steps	Designator	Label	Description
b	D5	V_{BAT}	V_{BAT} supply LED D5 indicated that positive supply voltage has been applied on the board
c	D4	V_S	V_S LED D4 indicates that there is a positive voltage after the reverse polarity protection, which is applied to the devices of the board
d	D10	V_{CC1}	V_{CC1} LED D10 indicated that MOTIX™ SBC TLE9562 device is active and LDO of the MOTIX™ SBC TLE9562 is supplying the 5 V supply for Traveo™ II and MOTIX™ Bridge TLE9166EQ
e	D14, D15	Debugging LED interface	If the above supply indication are observed as described then, now you can see the LEDs D15, D14 permanently ON. For more information on the functionality of the pre-flashed application software, refer to Introduction to the Infineon door control evaluation board application software - basic
f	D13, D12	Debugging LED Interface	LED D13, D12 blinking, which indicates that pre-flashed application software is working correctly. For more information on the functionality of the pre-flashed application software, refer to Introduction to the Infineon door control evaluation board application software - basic

2 Setting up the Infineon door control evaluation board
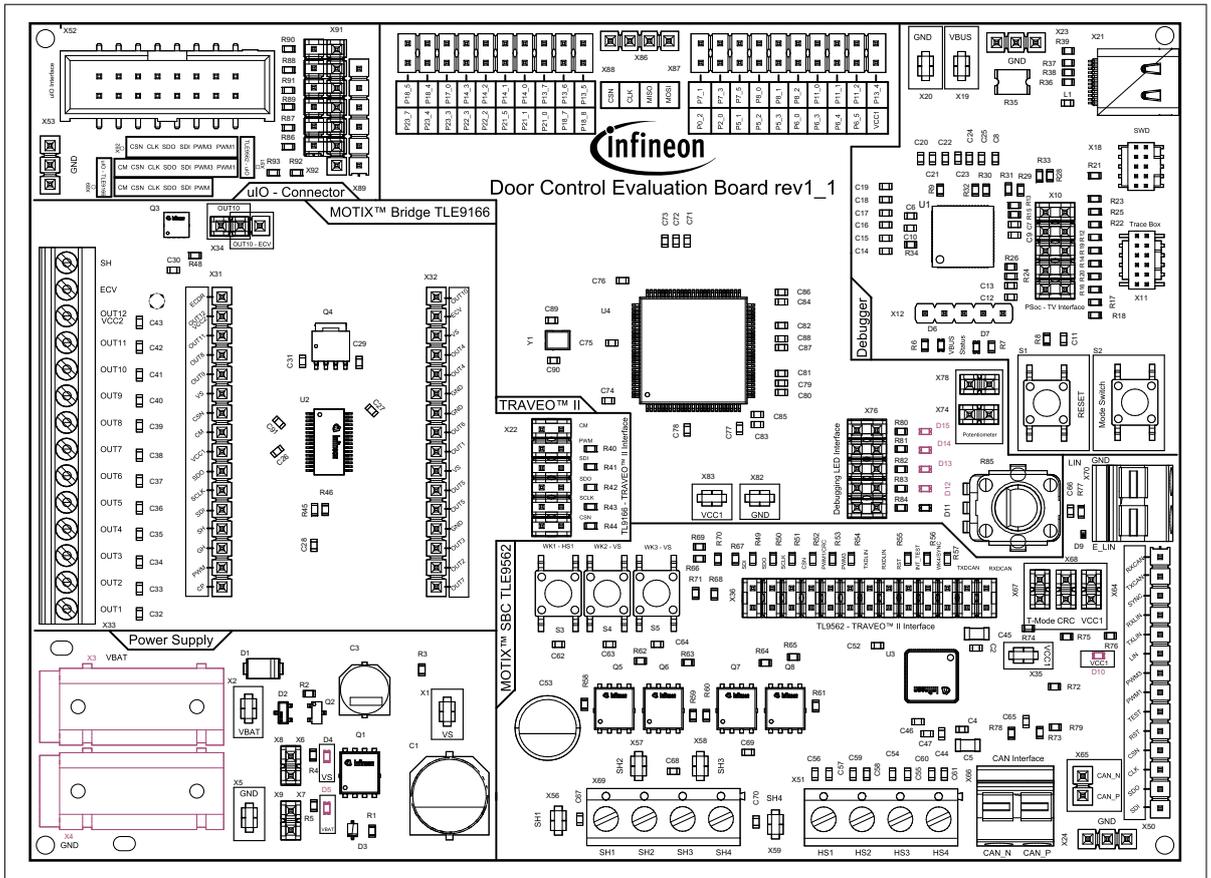
Figure 13   **Supply connector and LEDs**

Exclusive content

To access exclusive content, click https://softwaretools.infineon.com/projects/create.

3 In detail: Infineon door control evaluation board

3.1 Technical data

Technical data is specified in the table below. The current capability for supply and motor phases is limited by the default assembly of banana plugs for battery supply and the motor phase connector. Higher current capability can be reached by adjusting the battery and motor connectors.

If working with higher currents than the specified maximum ratings, the relevant safety measures must be applied.

Table 3   **Technical data**

Parameter	Value
Supply voltage	Specified by design Typ. 12 V (max. 28 V)
Supply current	Max. 10 A
Pin ports	5 V
Board size	150 mm x 110 mm

3.2 Functional description

3.2.1 MOTIX™ bridge TLE9166EQ

3.2.1.1 Power stage of MOTIX™ bridge TLE9166EQ

The integrated power stages of MOTIX™ bridge TLE9166EQ are connected to the output screw connector X33. The high-side MOSFET driver is connected to X33 via Q3 and EC mirror control driver via Q4. The drain of the Q4 MOSFET can be connected to OUT10 using jumper X34. For more information, refer to Jumpers. Additionally, the placement option for D16 at SH to GND and gate source capacitance C92 is available for the high-side MOSFET driver.
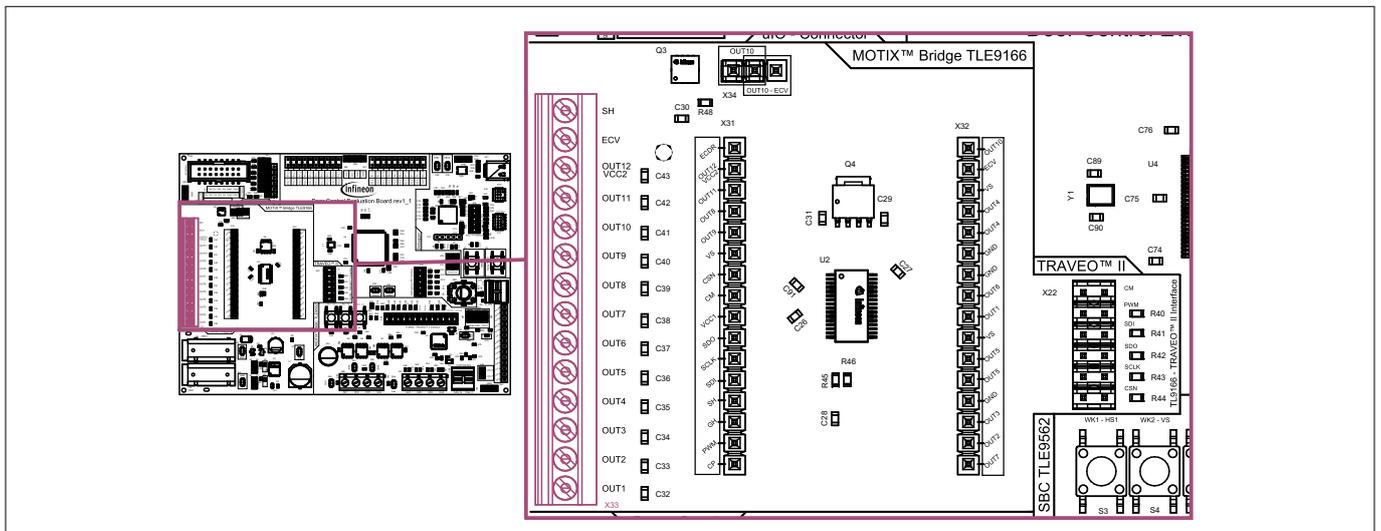
Figure 14   **Power stage of MOTIX™ bridge TLE9166EQ**

3.2.1.2 Jumpers
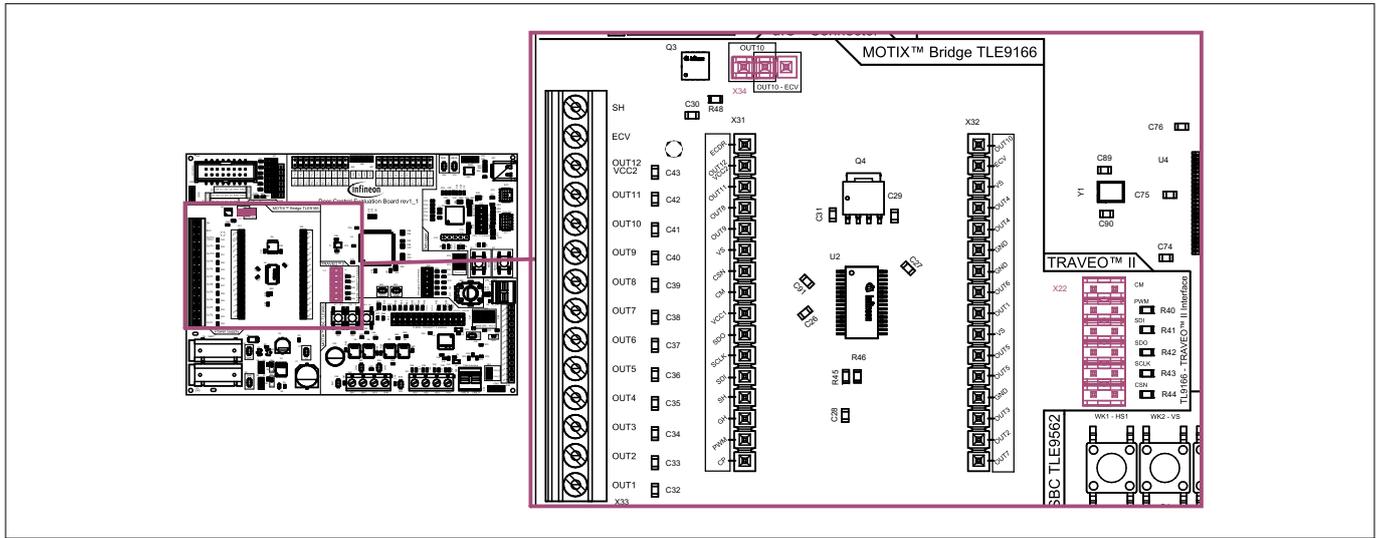
Figure 15   Jumpers

Table 4   Jumpers

Designator	Label	Description
X34	OUT10 configuration	Set jumper to connect the OUT10 signal of MOTIX™ Bridge TLE9166EQ either to the output connector X33 or input of Q4. The jumper is set to output connector X33 by default.
X22	CM	Set jumper to connect MOTIX™ Bridge TLE9166EQ CM signal to TRAVEO™ II microcontroller port P6_2 (pin 20). The jumper is set by default.
X22	PWM	Set jumper to connect MOTIX™ Bridge TLE9166EQ PWM signal to TRAVEO™ II microcontroller port P7_4 (pin 33). The jumper is set by default.
X22	SDO	Set jumper to connect MOTIX™ Bridge TLE9166EQ SDO signal to TRAVEO™ II microcontroller port P13_0 (pin 52). The jumper is set by default.
X22	SDI	Set jumper to connect MOTIX™ Bridge TLE9166EQ SDI signal to TRAVEO™ II microcontroller port P13_1 (pin 53). The jumper is set by default.
X22	SCLK	Set jumper to connect MOTIX™ Bridge TLE9166EQ SCLK signal to TRAVEO™ II microcontroller port P13_2 (pin 54). The jumper is set by default.
X22	CSN	Set jumper to connect MOTIX™ Bridge TLE9166EQ CSN signal to TRAVEO™ II microcontroller port P13_3 (pin 55). The jumper is set by default.

3.2.1.3 Signal pin headers

Different measurement signals of MOTIX™ Bridge TLE9166EQ are routed to X31 and X32 pin headers for the easy access of measurement.
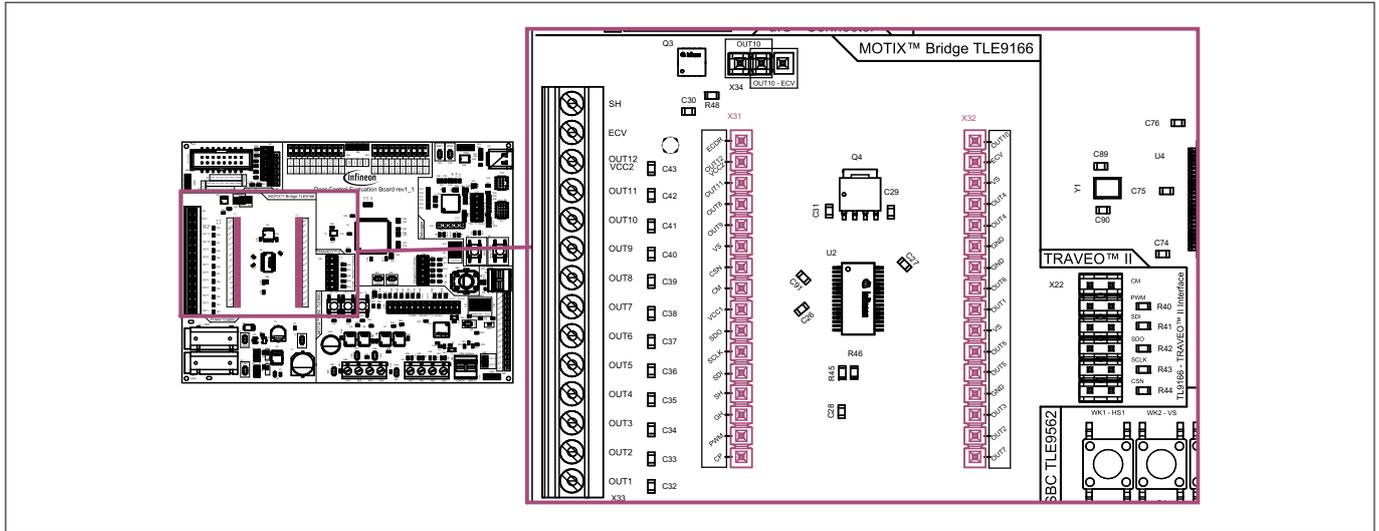
Figure 16   **Signal pin headers**

3.2.1.4   Assembly options

Values for these optional additional placements must be determined depending on the application. The typical components and values can be found in Chapter 3.3.3.
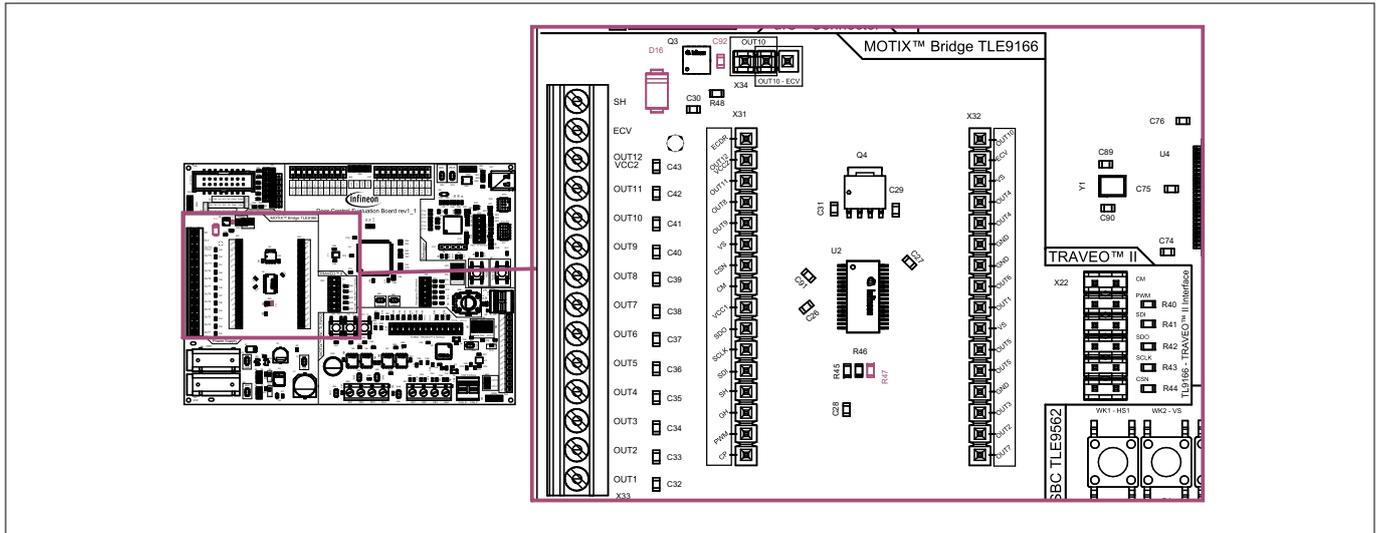
Figure 17   **Assembly options**

Table 5   **Additional placements**

Designator	Description
C92	Gate-drain capacitor high-side MOSFET
D16	Clamping diode at SH of the high-side driver
R47	To avoid measurement voltage saturation on the CM pin

3.2.2 MOTIX™ SBC TLE9562

3.2.2.1 Power stage of MOTIX™ SBC TLE9562

Four MOSFET half bridges are controlled by MOTIX™ SBC TLE9562 and are connected to the X69 screw connector. Every HBx (Q5, Q6, Q7 and Q8) integrates a half bridge, consisting of two N-channel MOSFETS inside the package.

Externally to each HBx: Gate resistors (R59,…,R65) on GHx and GLx are connected. Additionally, the placement option for the SH to GND capacitor is available for each HBx. The outputs of the half bridges Q5, Q6, Q7 and Q8 are routed respectively to SH1, SH2, SH3, SH4 at the screw connector.

Along with the HBx, MOTIX™ SBC TLE9562 also has four high-side switches, which can be used over the X51 connector.
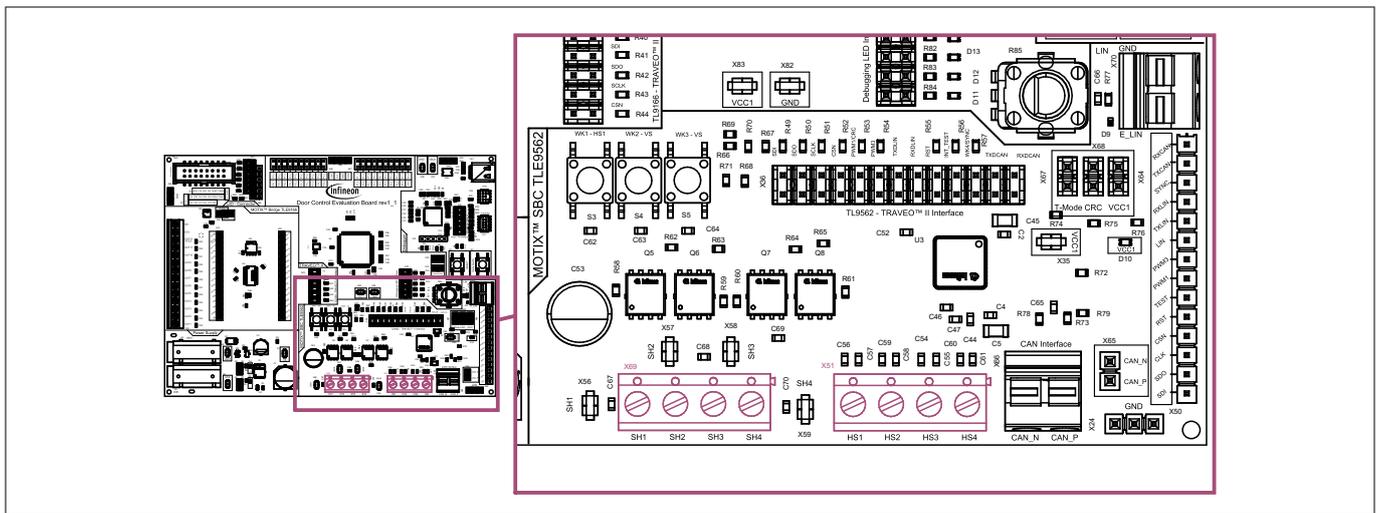
Figure 18   **Power stage of MOTIX™ SBC TLE9562**

3.2.2.2 Jumpers
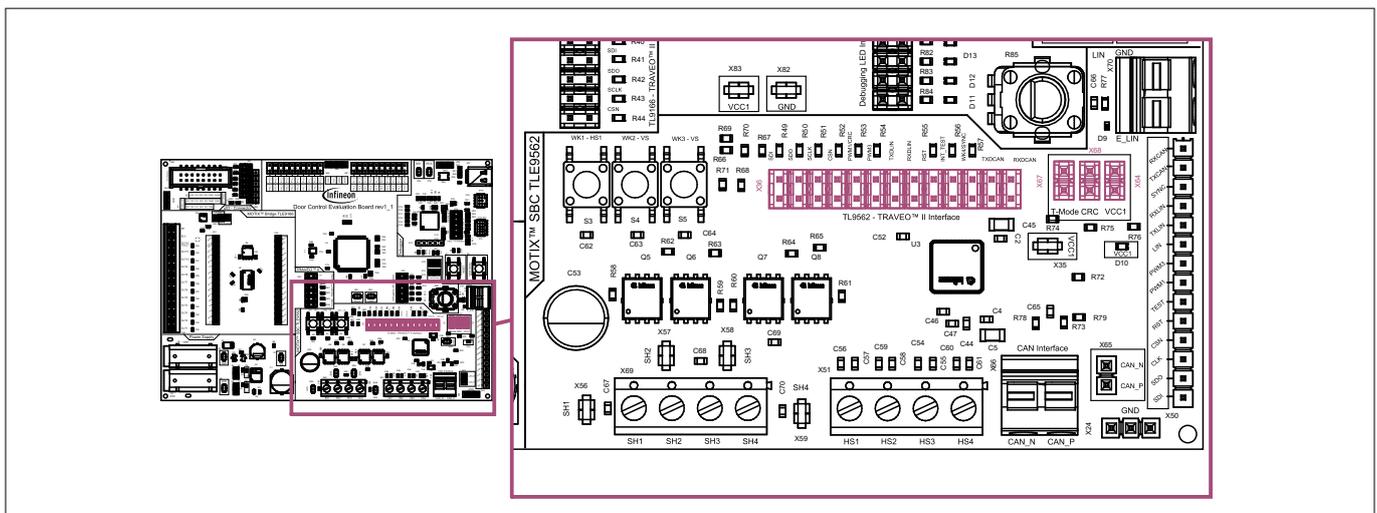
Figure 19   **Jumpers**

3 In detail: Infineon door control evaluation board

Table 6   **Jumpers**

Designator	Label	Description
X64	V_{CC1}	Set jumper to connect supply to V_{CC1} indication LED. Jumper is set by default
X68	CRC	Set jumper to pull down the CRC pin of MOTIX™ SBC TLE9562 to activate CRC functionality. Jumper is set by default
X67	INT_N/TEST	Set jumper to pull down the INT_N/Test pin of MOTIX™ SBC TLE9562 to activate software development mode. Jumper is set by default
X36	SDO	Set jumper to connect MOTIX™ SBC TLE9562 SDO signal to Traveo™ microcontroller port P18_0 (pin 67). Jumper is set by default
X36	SDI	Set jumper to connect MOTIX™ SBC TLE9562 SDI signal to Traveo™ microcontroller port P18_1 (pin 68). Jumper is set by default
X36	SCLK	Set jumper to connect MOTIX™ SBC TLE9562 SCLK signal to Traveo™ microcontroller port P18_2 (pin 69). Jumper is set by default
X36	CSN	Set jumper to connect MOTIX™ SBC TLE9562 CSN signal to Traveo™ microcontroller port P18_3 (pin 70). Jumper is set by default
X36	PWM1/CRC	Set jumper to connect MOTIX™ SBC TLE9562 PWM1/CRC signal to Traveo™ microcontroller port P7_0 (pin 29). Jumper is set by default
X36	PWM3	Set jumper to connect MOTIX™ SBC TLE9562 PWM3 signal to Traveo™ microcontroller port P7_2 (pin 31). Jumper is set by default
X36	TXDLIN	Set jumper to connect MOTIX™ SBC TLE9562 TXDLIN signal to Traveo™ microcontroller port P0_0 (pin 2). Jumper is set by default
X36	RXDLIN	Set jumper to connect MOTIX™ SBC TLE9562 RXDLIN signal to Traveo™ microcontroller port P0_1 (pin 3). Jumper is set by default
X36	RST	Set jumper to connect MOTIX™ SBC TLE9562 RST signal to Traveo™ microcontroller port P2_3 (pin 9). Jumper is set by default
X36	INT_TEST	Set jumper to connect MOTIX™ SBC TLE9562 INT_TEST signal to Traveo™ microcontroller port P0_3 (pin 5). Jumper is set by default
X36	WK4/SYNC	Set jumper to connect MOTIX™ SBC TLE9562 WK4/SYNC signal to Traveo™ microcontroller port P5_0 (pin 14). Jumper is set by default
X36	TXDCAN	Set jumper to connect MOTIX™ SBC TLE9562 TXDCAN signal to Traveo™ microcontroller port P3_0 (pin 11). Jumper is set by default
X36	RXDCAN	Set jumper to connect MOTIX™ SBC TLE9562 RXDCAN signal to Traveo™ microcontroller port P3_1 (pin 10). Jumper is set by default
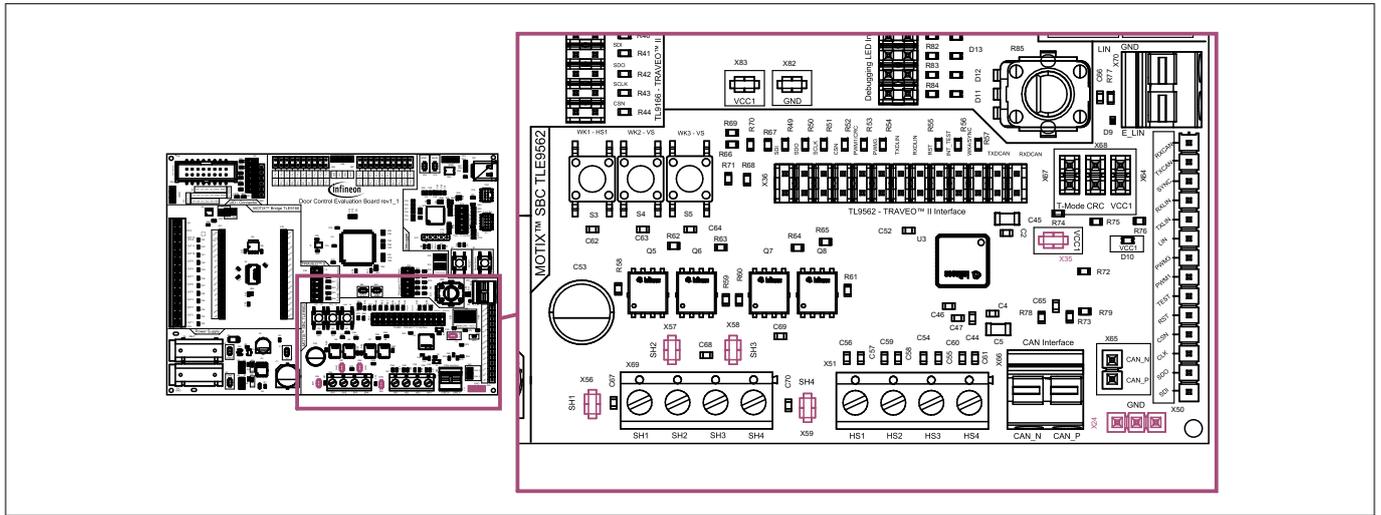
3.2.2.3 Test points

Figure 20 Test points

Table 7 Test points

Signal	Designator	Description
V_{CC1}	X35	Test points to measure the digital supply voltage of TRAVEO™ II and MOTIX™ Bridge TLE9166EQ
GND	X24	Test points to connect to ground
SH1, SH2, SH3, SH4	X56, X57, X58, X59	Test points to measure the motor phase voltages

3.2.2.4 Signal pin headers

Various measurement signals of MOTIX™ SBC TLE9562 are routed to X50 pin headers for the easy access of measurement.
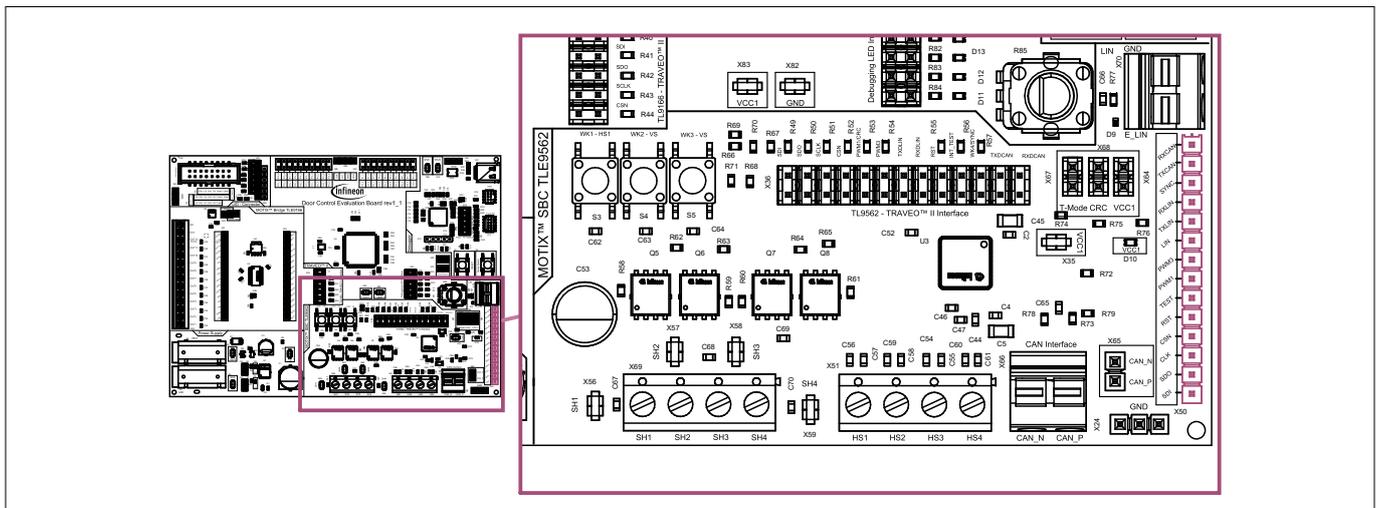
Figure 21 Signal pin headers
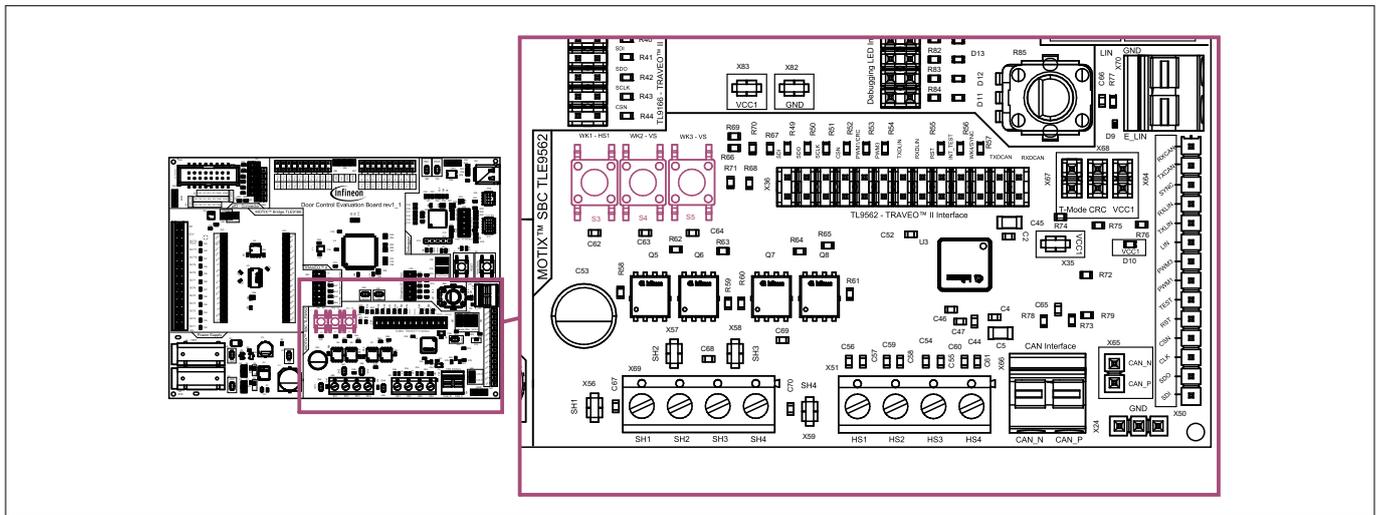
3.2.2.5 Pushbuttons

Figure 22 Pushbuttons

Table 8 Push buttons

Designator	Description
S3	WK1: Wake input trigger push button for MOTIX™ SBC TLE9562, Trigger is connected to the HS1 of the MOTIX™ SBC TLE9562
S4	WK2: Wake input trigger push button for MOTIX™ SBC TLE9562, Trigger is connected to the V_S of the MOTIX™ SBC TLE9562
S5	WK3: Wake input trigger push button for MOTIX™ SBC TLE9562, Trigger is connected to the V_S of the MOTIX™ SBC TLE9562

3.2.2.6 LEDs
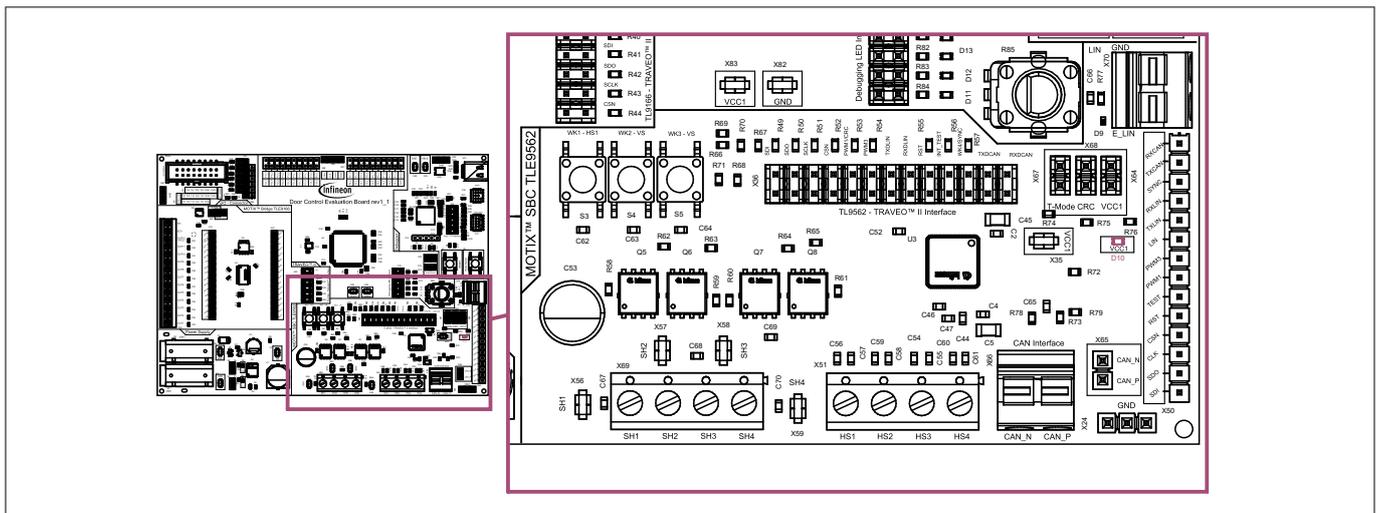
Figure 23 LEDs

Table 9 **LEDs**

Designator	Description
D10	Indicates the digital supply V_{CC1} of TRAVEO™ II and MOTIX™ bridge TLE9166EQ is active

3.2.2.7 LIN

The integrated *LIN* transceiver of MOTIX™ SBC TLE9562 is connected to a X70 PCB terminal block. To connect the Traveo™ II lines with the transceiver, refer to MOTIX™ SBC TLE9562 and TRAVEO™ II connections
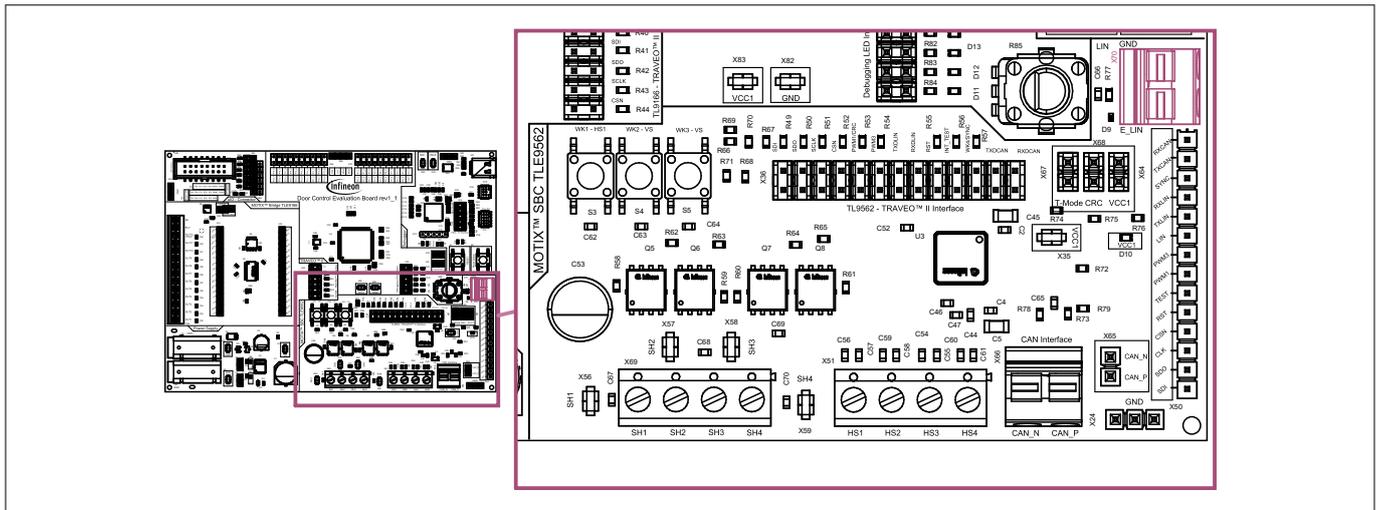
Figure 24 **LIN Connector**

3.2.2.8 CAN

The X66 PCB terminal block can be used to connect the CAN_P and CAN_N cables. To connect the Traveo™ II lines with the transceiver, refer to MOTIX™ SBC TLE9562 and TRAVEO™ II connections. The *CAN* termination resistors R78 and R73 are mounted by default.

Additionally, the capacitor C65 is mounted between the resistors. A placement option is available to solder a common mode choke L2. If L2 is placed, the 0 Ω resistors R72 and R79 must be removed.
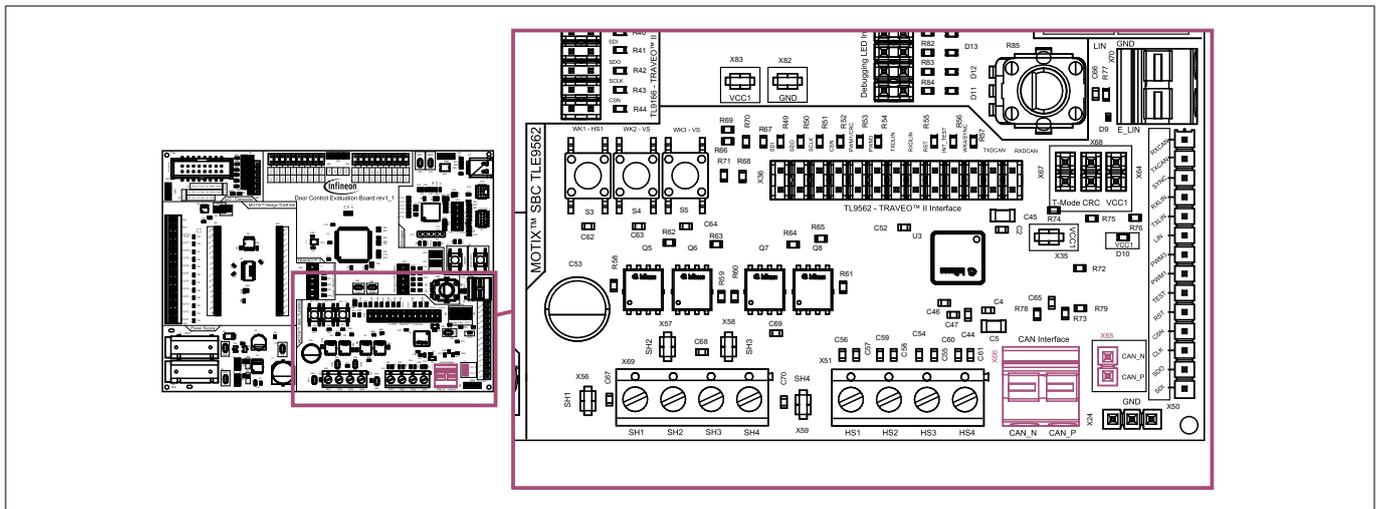
Figure 25 **CAN connector and pinout**

3.2.2.9   Assembly options

Values for these optional additional placements must be determined depending on the application. The typical components and values can be found in Chapter 3.3.3.
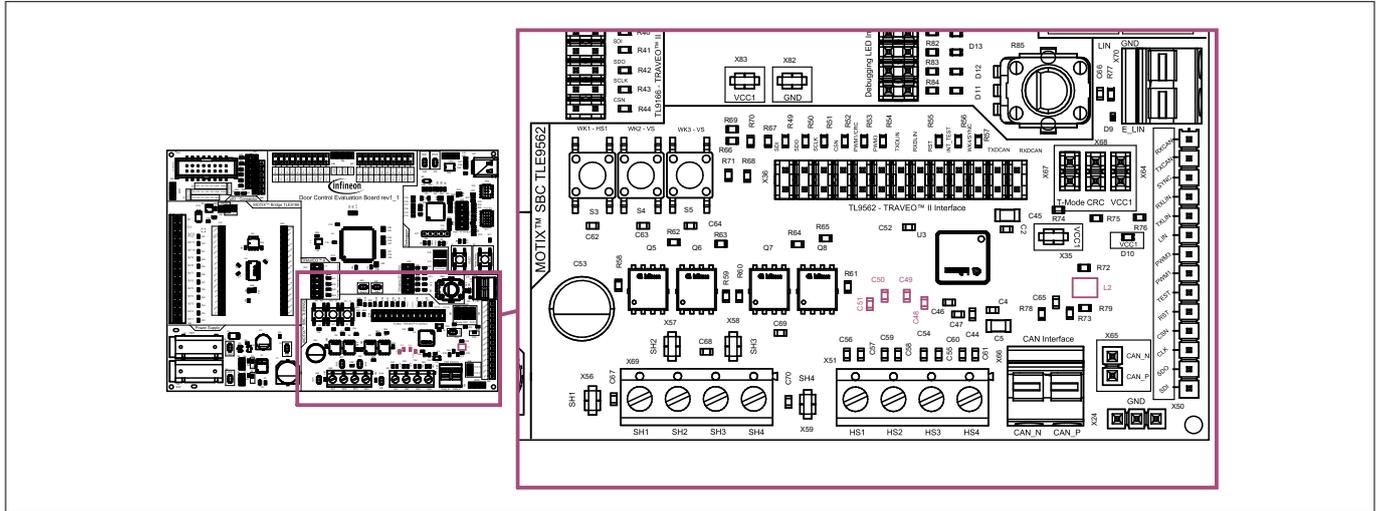
Figure 26   **Assembly options**

Table 10   **Additional placements**

Designator	Description
C48, C49, C50, C51	SH-GND capacitor
L2	CAN common mode choke. If placed, remove R72 and R79

3.2.3   TRAVEO™ II

3.2.3.1   Jumpers
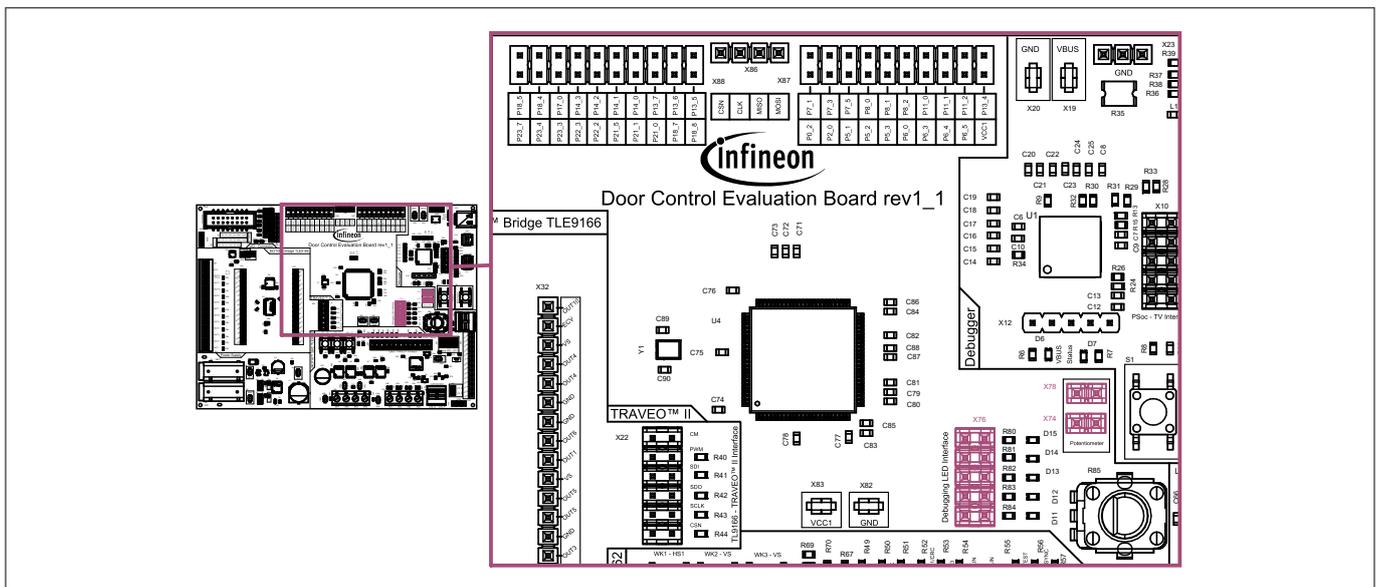
Figure 27   **Jumpers**

Table 11   **Jumpers**

Designator	Description
X78	Set jumper to connect the potentiometer to V_{CC1} supply. Jumper is set by default. For more information, refer to Potentiometer
X74	Set jumper to connect the potentiometer output to the analog pin P6_1 of the TRAVEO™ II microcontroller. Jumper is set by default. For more information, refer to Potentiometer
X76	Set jumpers to connect *GPIO*s to *LED*s. Jumpers are set by default. For more information, refer to LEDs

3.2.3.2   Test points
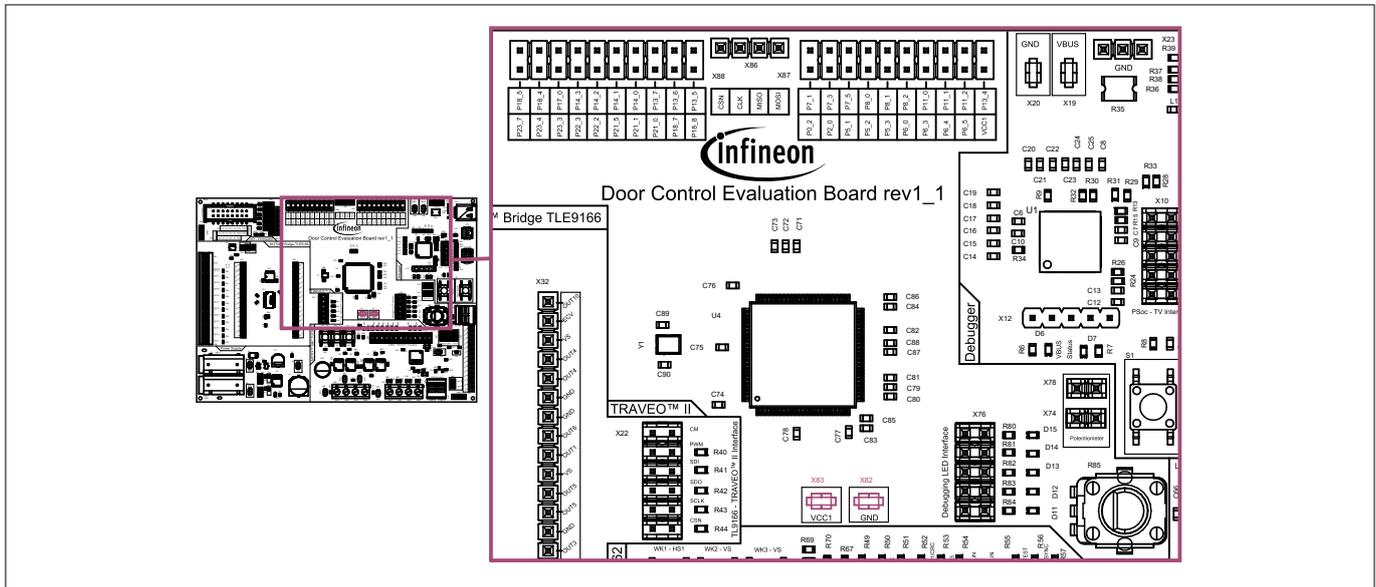
Figure 28   **Test points**

Table 12   **Test points**

Signal	Designator	Description
V_{CC1}	X85	Test points to measure the digital supply voltage of TRAVEO™ II and MOTIX™ bridge TLE9166EQ
GND	X82	Test points to connect to ground
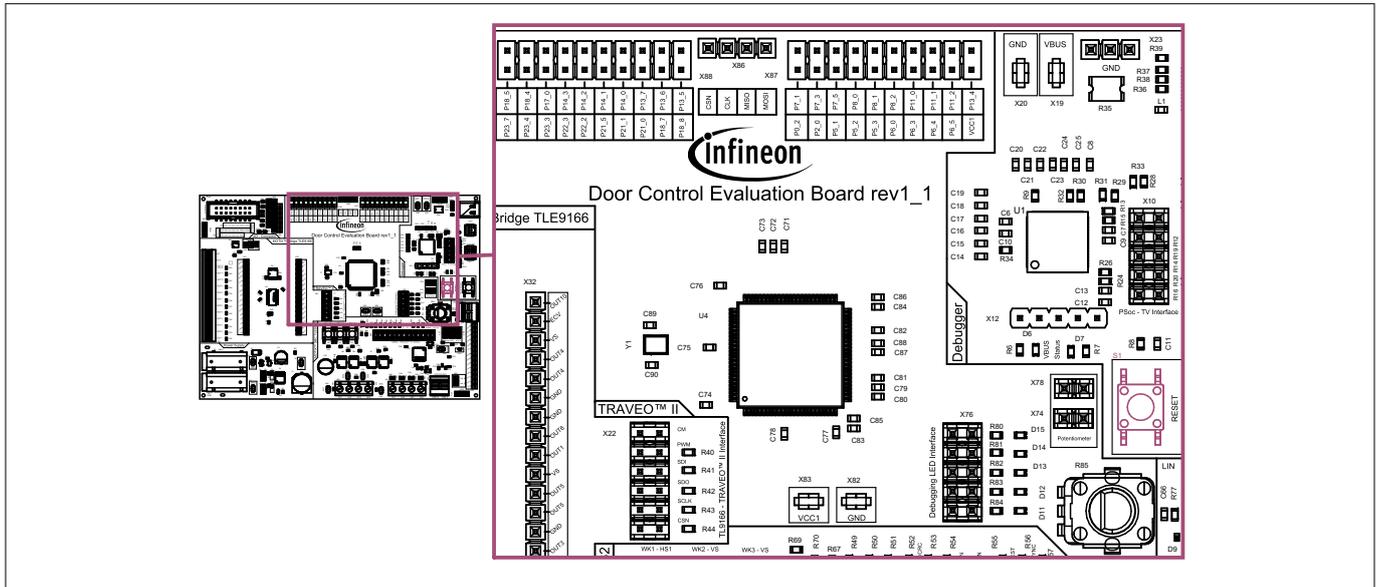
3.2.3.3 Push button

Figure 29 Push button

Table 13 Push button

Designator	Description
S1	RESET: Reset push button for TRAVEO™ II microcontroller

3.2.3.4 LEDs
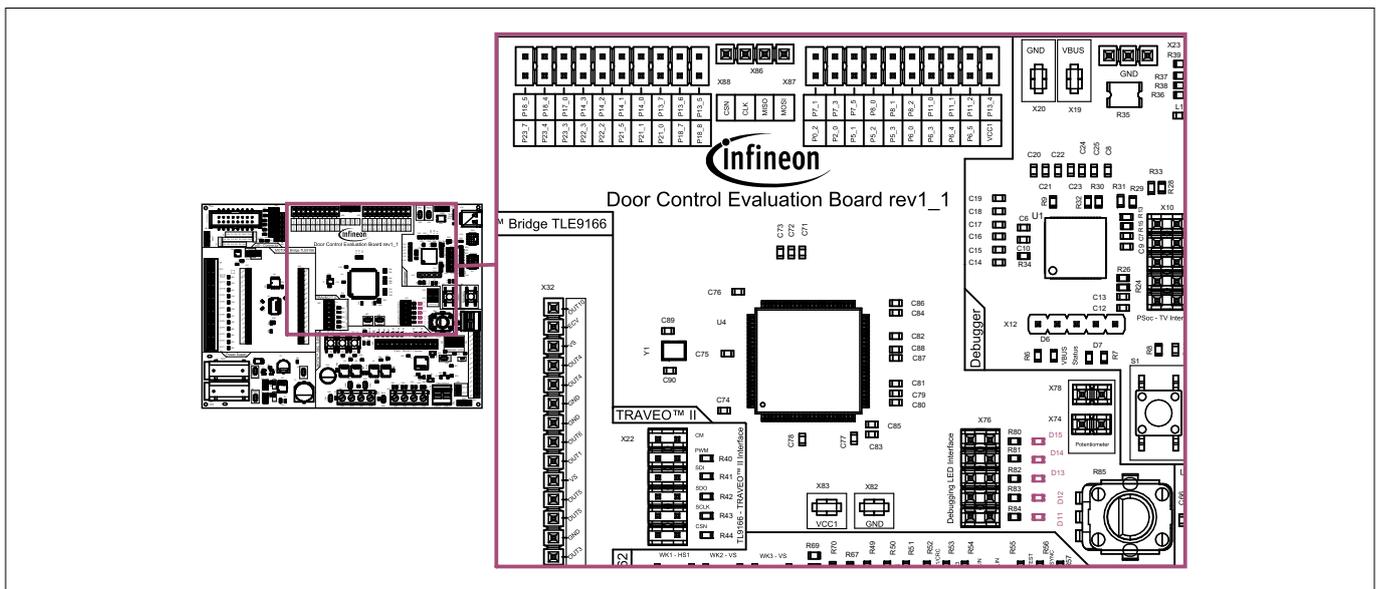
Figure 30 LEDs

Table 14   **LEDs**

Designator	Description
D11	Can be connected to GPIO P12_4 (pin 49) with jumper X76, as described in Jumpers
D12	Can be connected to GPIO P12_3 (pin 48) with jumper X76, as described in Jumpers
D13	Can be connected to GPIO P12_2 (pin 47) with jumper X76, as described in Jumpers
D14	Can be connected to GPIO P12_1 (pin 46) with jumper X76, as described in Jumpers
D15	Can be connected to GPIO P12_0 (pin 45) with jumper X76, as described in Jumpers

3.2.3.5   Potentiometer

A potentiometer is available on the board. It is supplied via V_{CC1} over jumper X78 . The output of the potentiometer is connected to the port P6_1 (pin 19) of the TRAVEO™ II over jumper X74.
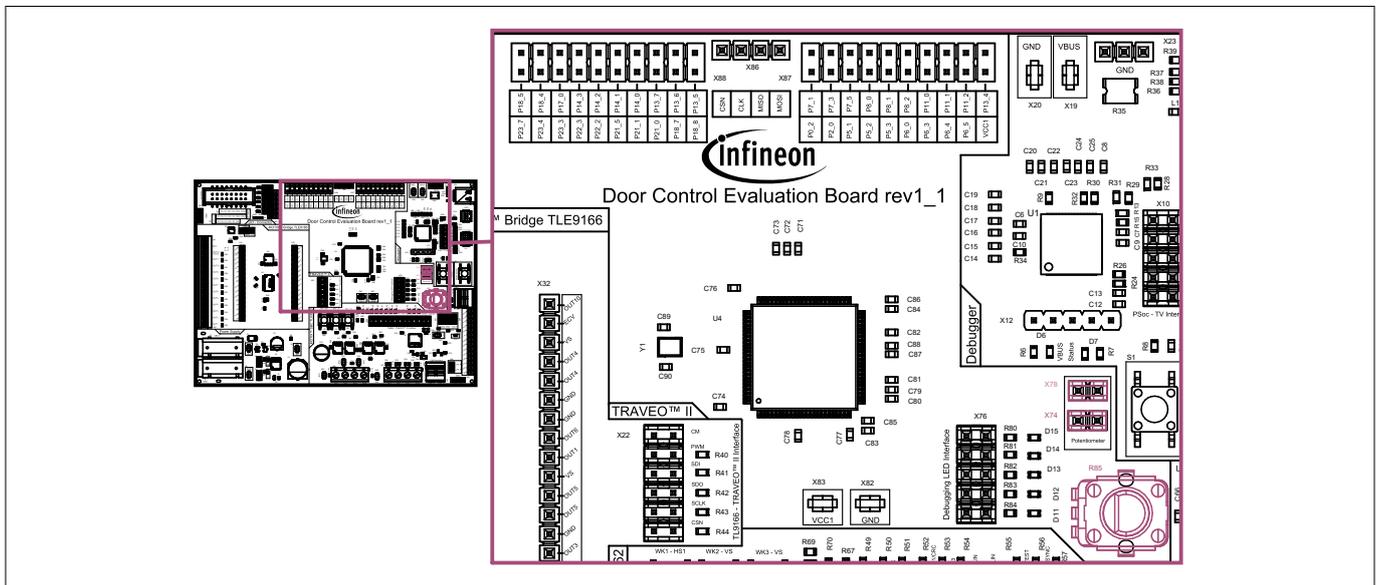
Figure 31   **Placement and pinout of the potentiometer**

3.2.3.6   Traveo™ pin headers

Additional unused pins of the TRAVEO™ II are routed to X88, X86 and X87 pin headers for the easy access of measurement.

Figure 32   **Signal pin headers**

3.2.4   Power supply

3.2.4.1   Supply connectors

Figure 33   **Supply connector**

Table 15   **Connectors**

Functionality	Designator	Description
V_{BAT}, GND	X3, X4	Banana jacks for power supply (red) and ground (black)

3.2.4.2 Jumpers
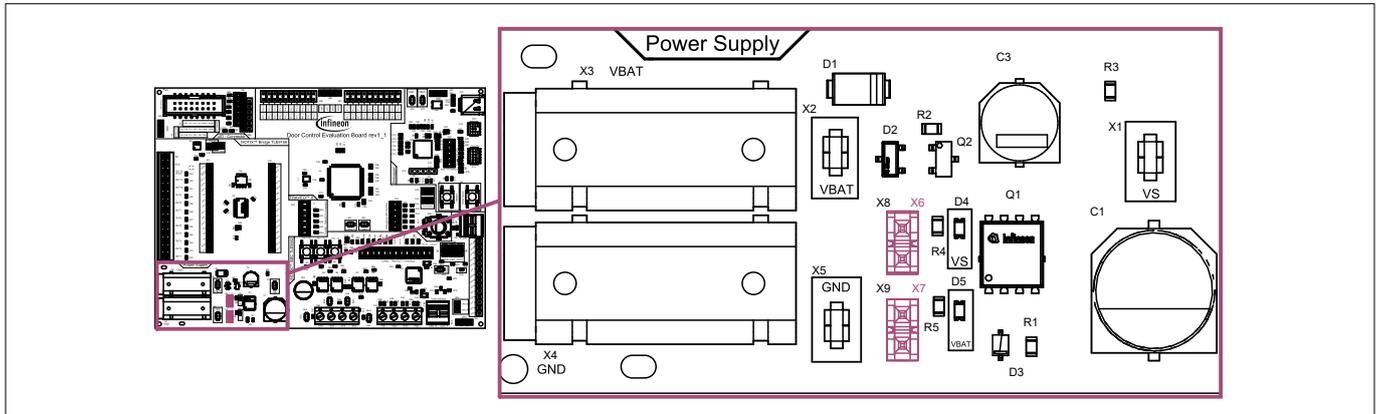
Figure 34 Jumpers

Table 16 Jumpers

Designator	Description
X6	Set jumper to connect supply to V_S indication LED. Jumper is set by default
X7	Set jumper to connect supply to V_{BAT} indication LED. Jumper is set by default

3.2.4.3 Test points
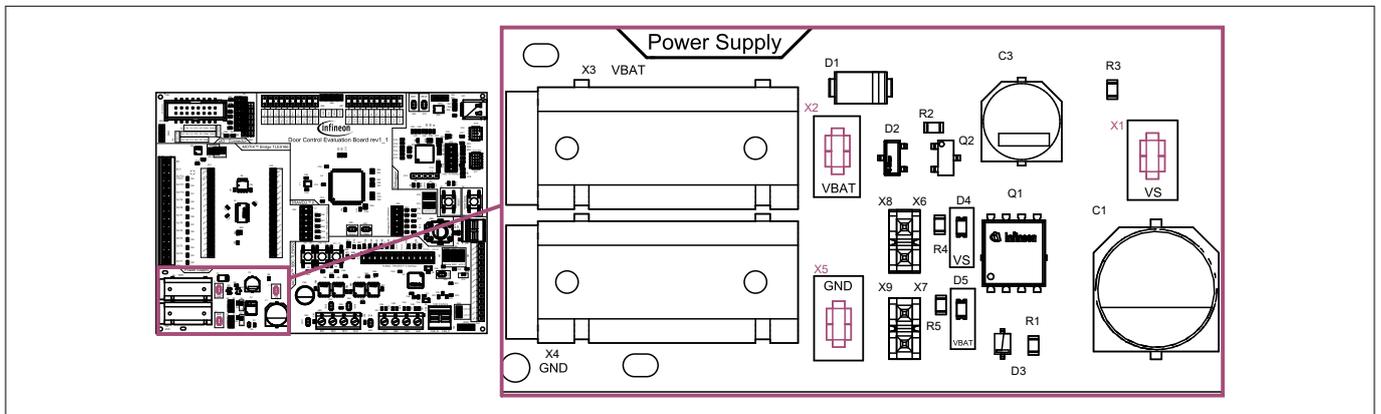
Figure 35 Test points

Table 17 Test points

Signal	Designator	Description
V_{BAT}	X2	Test point to measure supply voltage
V_S	X1	Test point to measure supply voltage of MOTIX™ Bridge TLE9166EQ and MOTIX™ SBC TLE9562 after the reverse polarity protection
GND	X5	Test points to connect to ground

3.2.4.4   LEDs
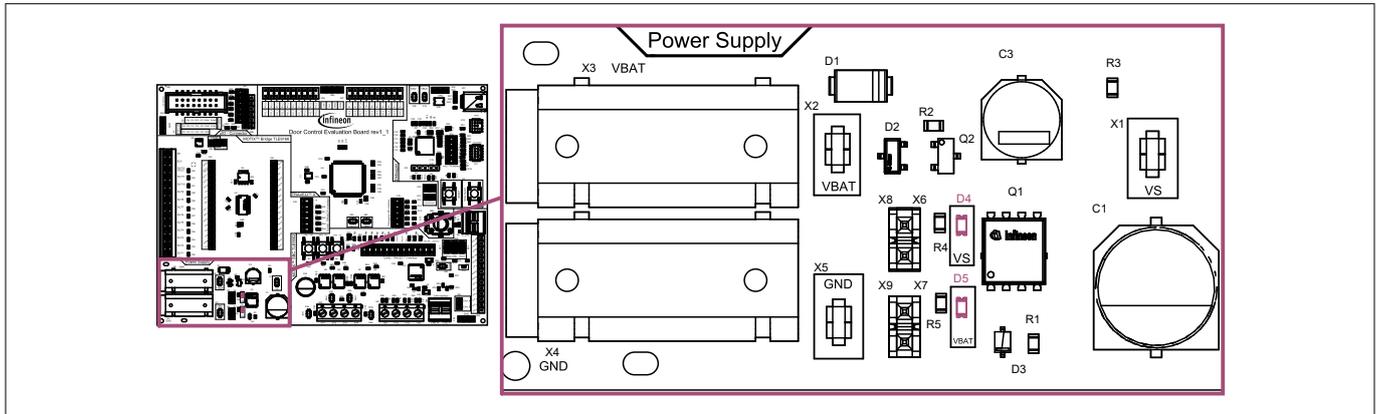
Figure 36   LEDs

Table 18   LEDs

Designator	Description
D4	Indicates that supply voltage, V_S is active for the board after reverse recovery protection
D5	Indicates that there is a positive voltage at V_{BAT}

3.2.5   uIO-stick

3.2.5.1   uIO connector
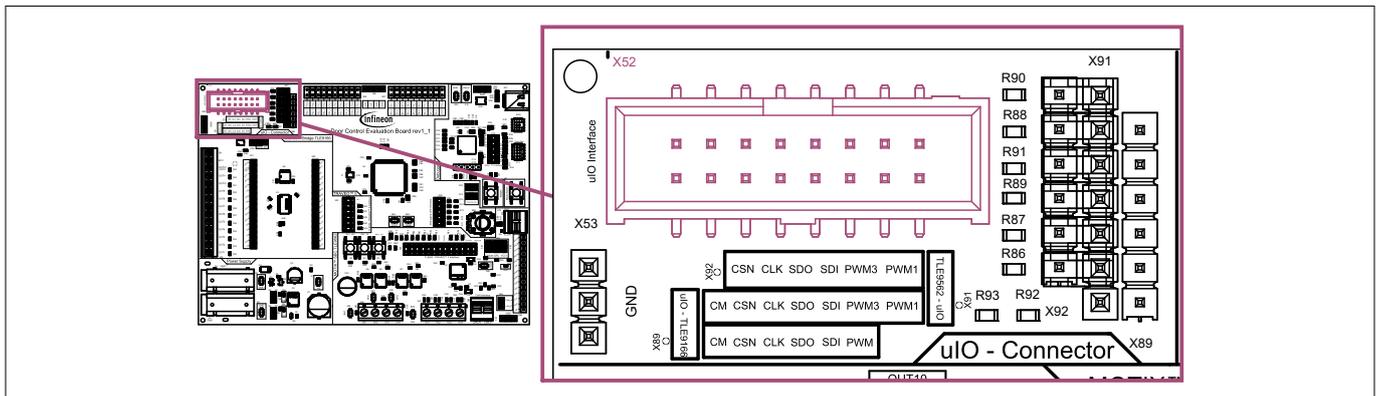
Figure 37   uIO connector

Table 19   Connectors

Functionality	Designator	Description
uIO	X52	Connector for uIO stick, direct interface of MOTIX™ bridge TLE9166EQ and MOTIX™ SBC TLE9562 to the PC configuration tool. For more information, refer to uIO-stick Interface

3.2.5.2 Jumper

MOTIX™ Bridge TLE9166EQ and MOTIX™ SBC TLE9562 can be configured using available configuration wizard over uIO-stick interface without involving TRAVEO™ II microcontroller. Use the following available jumpers to connect the uIO-stick to either MOTIX™ SBC TLE9562 or MOTIX™ bridge TLE9166.

To use this interface for MOTIX™ bridge TLE9166EQ , first disconnect the device from the microcontroller by removing X36 jumpers. Now, connect jumper between X89 and X91 pin header. Information on the different signals on the pin header is shown on the picture below or on the board. Use the connector X52 to connect the board to the PC using the uIO-stick.
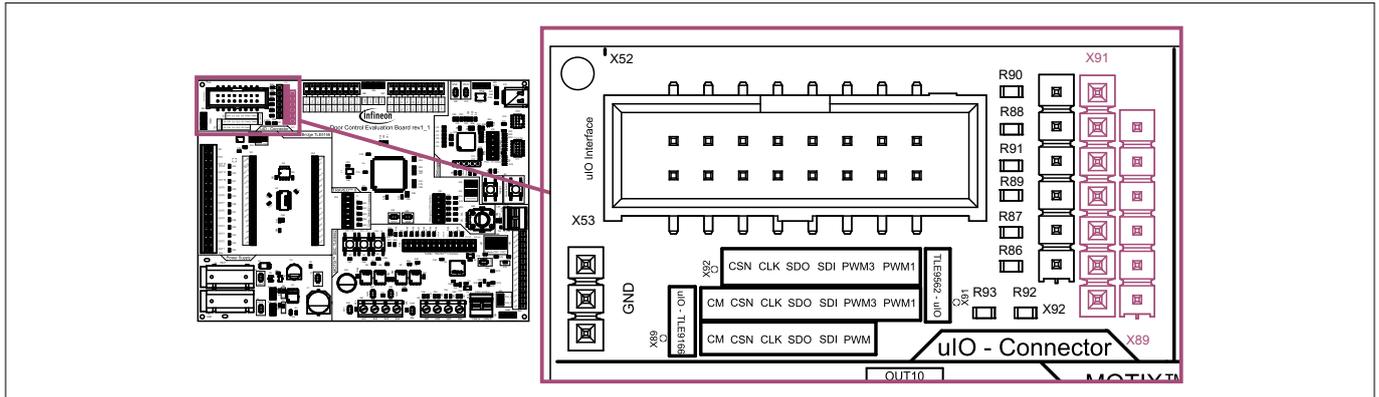
Figure 38 Using the uIO-Stick connector to configure MOTIX™ devices over the configuration wizard

To use this interface for the MOTIX™ SBC TLE9562 device, first disconnect device from microcontroller by removing X22 jumpers. Then, connect the jumper between X91 and X92 pin headers. The information of the different signals on the pin header is given on the picture below or on the board. Use the connector X52 to connect board to the PC over the uIO-stick.

3.2.5.3 Test point
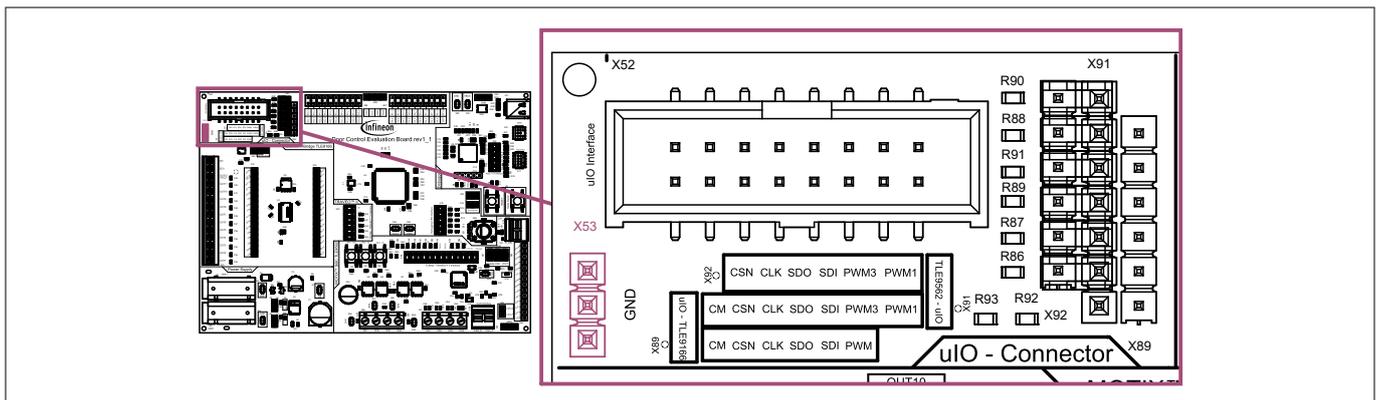
Figure 39 Test points

Table 20 Test points

Signal	Designator	Description
GND	X53	Test points to connect to ground

3.2.6   Debugger

3.2.6.1   Connector

The on-board debug circuit (CY8C5868LTI-LP039) connects the PC with the TRAVEO™ II using a USB-C connector. The debug circuit can be used for flashing and debugging embedded software, as in the application software examples. When connected to a PC, it connects as KitProg3 USB-UART, provides an *SWD* interface and a virtual COM port. KitProg3 supports CMSIS-DAP Bulk and HID mode, as well as arm DAPLink mode, the mode can be switched with push button S2, push to button will cycle through the different modes

The board can be used with other SWD linkers using the SWD connector. For that, the jumper bridges X10 must be removed to disconnect the on-board debug circuit from the TRAVEO™ II.

The tracebox connector can only be used while the on-board circuit is disconnected.

Tip: *If the KitProg3 is not recognized by the PC, click* **MODE** *to switch the debug circuit to CMSIS-DAP mode.*
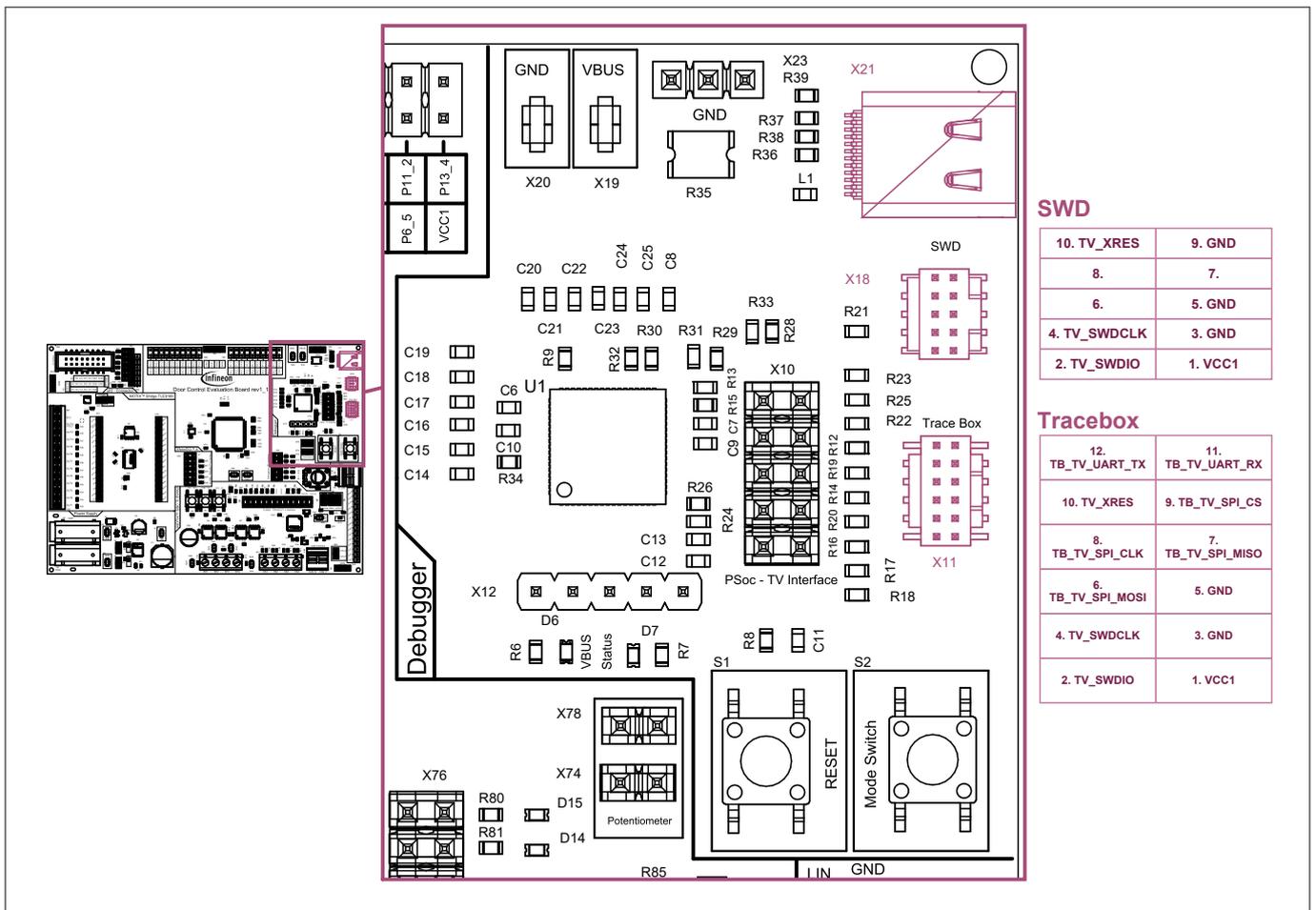
Figure 40   Connectors and available signals

Table 21   Connectors

Functionality	Designator	Description
SWD	X18	Debugging interface to connect external debugger.
Tracebox	X11	Connector for the tracebox.

(table continues...)

Table 21   **(continued) Connectors**

Functionality	Designator	Description
USB	X21	USB-C connector to connect the on-board debugger to a PC for debugging and virtual COM port

The table below provides the information of the TRAVEO™ II microcontroller pinout for signals connected to SWD, tracebox, and PSoC™ connectors.

Table 22   **TRAVEO™ II microcontroller pinout for debuggers interface**

Signal	TRAVEO™ II Port (pin)
TV_XRES	XRES_L_N (Pin 85)
TV_SWDCLK	P23_5 (pin 97)
TV_SWDIO	P23_6 (pin 98)
TV_UART_TX	P17_1 (pin 65)
TV_UART_RX	P17_2 (pin 66)
TB_TV_UART_TX	P22_0 (pin 91)
TB_TV_UART_RX	P22_1 (pin 92)
TB_TV_SPI_MOSI (X86 - MOSI)	P19_0 (pin 77)
TB_TV_SPI_MISO (X86 - MISO)	P19_1 (pin 78)
TB_TV_SPI_CLK (X86 - CLK)	P19_2 (pin 79)
TB_TV_SPI_CS (X86 - CSN)	P19_3 (pin 80)

3.2.6.2   Jumpers

Use these jumpers to connect PSoC™ based on-board debugger to flash Traveo™II microcontroler.

Note: *If you are using an external debugger with the SWD connector, these jumpers must be removed*

3 In detail: Infineon door control evaluation board
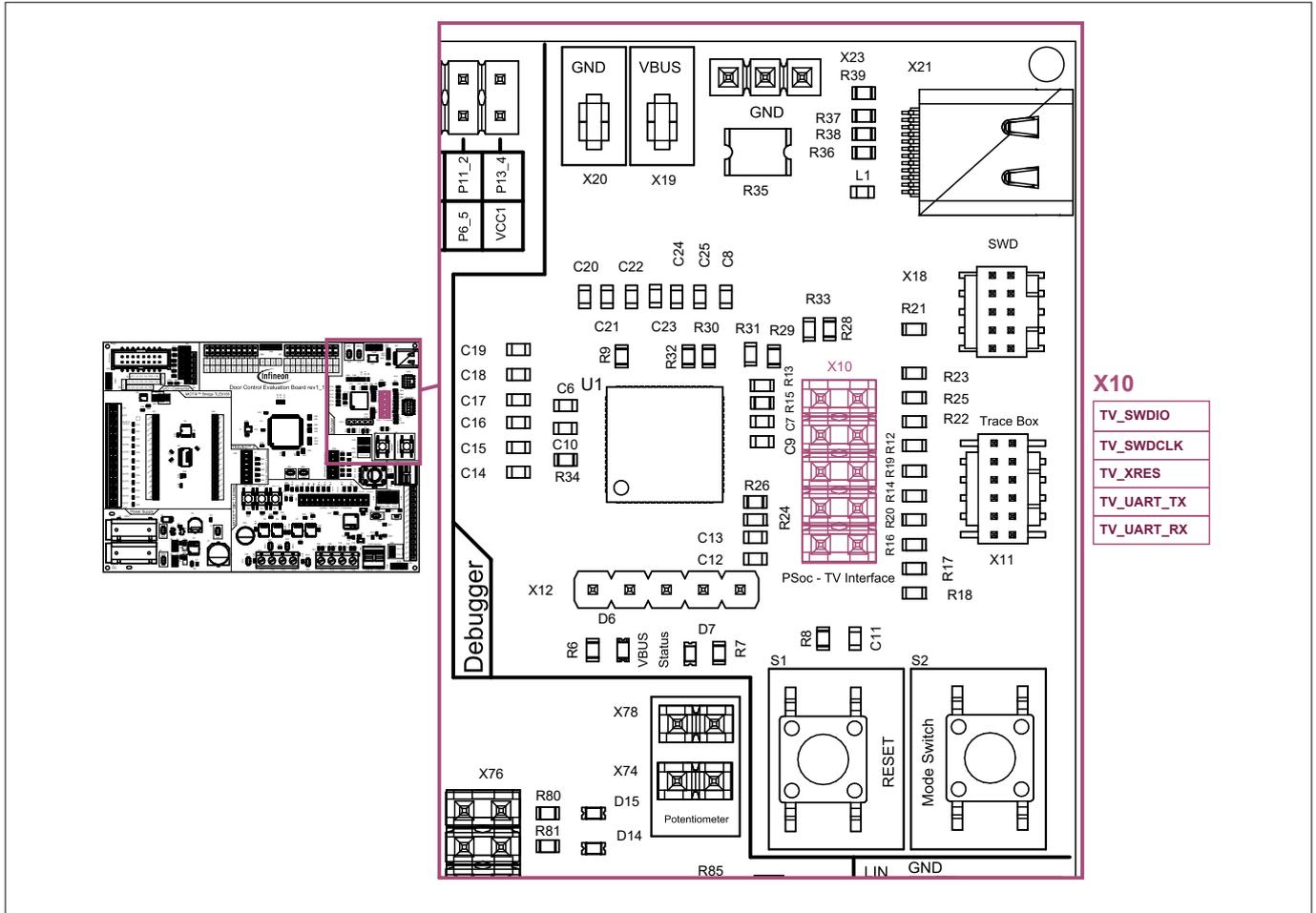
Figure 41   Jumpers

Table 23   Jumpers

Designator	Signal	Description
X10	TV_SWDIO	Set jumper to connect PSoC™ signal SWDIO to TRAVEO™ II microcontroller port P23_6 (pin 98). Jumper is set by default.
X10	TV_SWDCLK	Set jumper to connect PSoC™ signal SWDCLK to TRAVEO™ II microcontroller port P23_5 (pin 97). Jumper is set by default.
X10	TV_XRES	Set jumper to connect PSoC™ signal XRES to TRAVEO™ II microcontroller port XRES_L_N (Pin 85). Jumper is set by default.
X10	TV_UART_TX	Set jumper to connect PSoC™ signal UART_TX to TRAVEO™ II microcontroller port P17_1 (pin 65). Jumper is set by default.
X10	TV_UART_RX	Set jumper to connect PSoC™ signal UART_RX to TRAVEO™ II microcontroller port P17_2 (pin 66). Jumper is set by default.
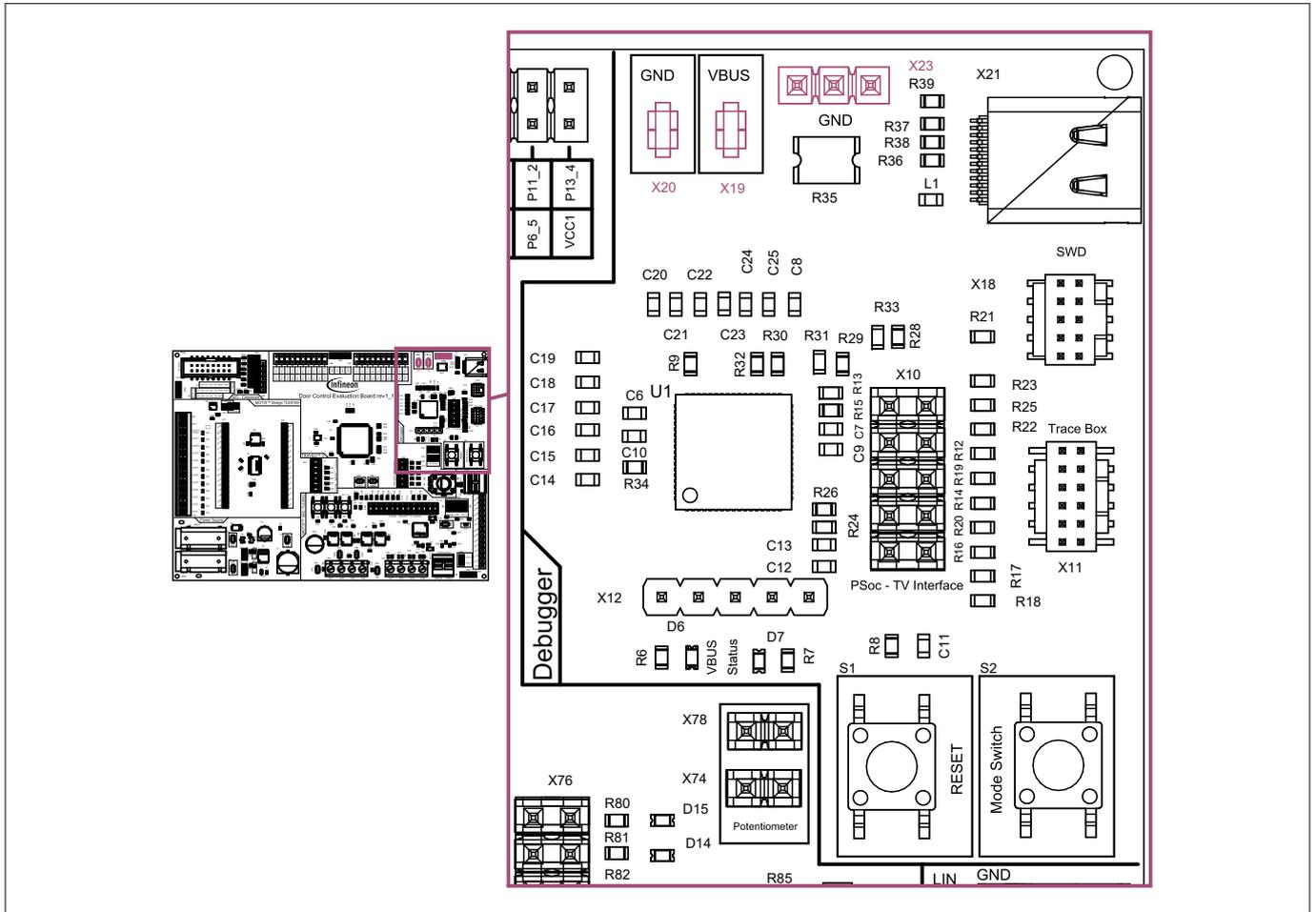
3.2.6.3 Test point

Figure 42   Test points

Table 24   Test points

Signal	Designator	Description
V_{BUS}	X19	Test point to measure supply voltage of on-board debugger circuit
GND	X20, X23	Test points to connect to ground

3.2.6.4 Signal pin headers

Different measurement signals of PSoC™ are routed to X12 pin headers for the easy access of measurement.

3 In detail: Infineon door control evaluation board

Figure 43   Signal pin headers
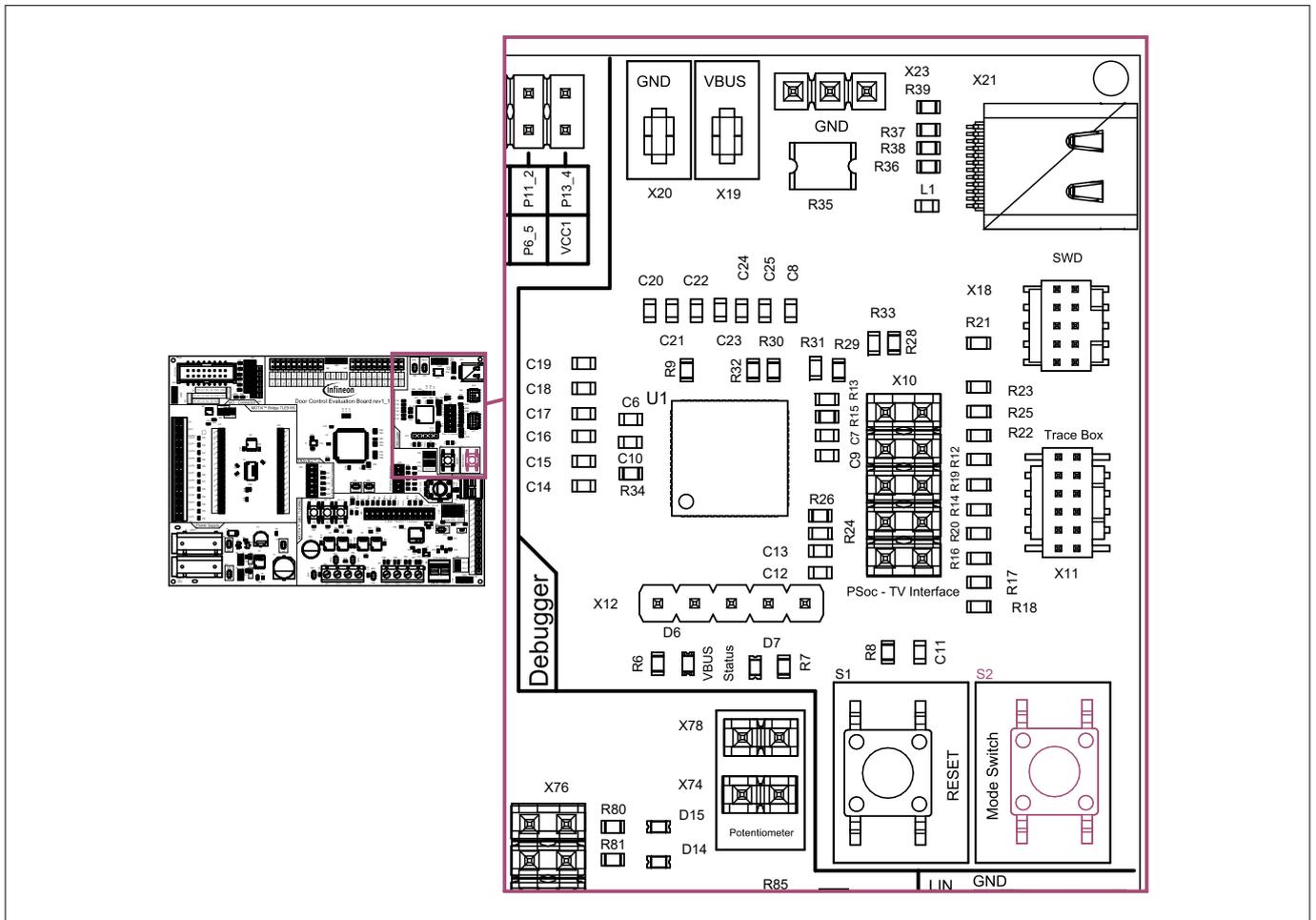
3.2.6.5   Pushbutton

Figure 44   **Push button**

Table 25   **Push buttons**

Designator	Description
S2	Mode switch: Push button to switch the debug circuit to CMSIS-DAP mode

3.2.6.6 LEDs
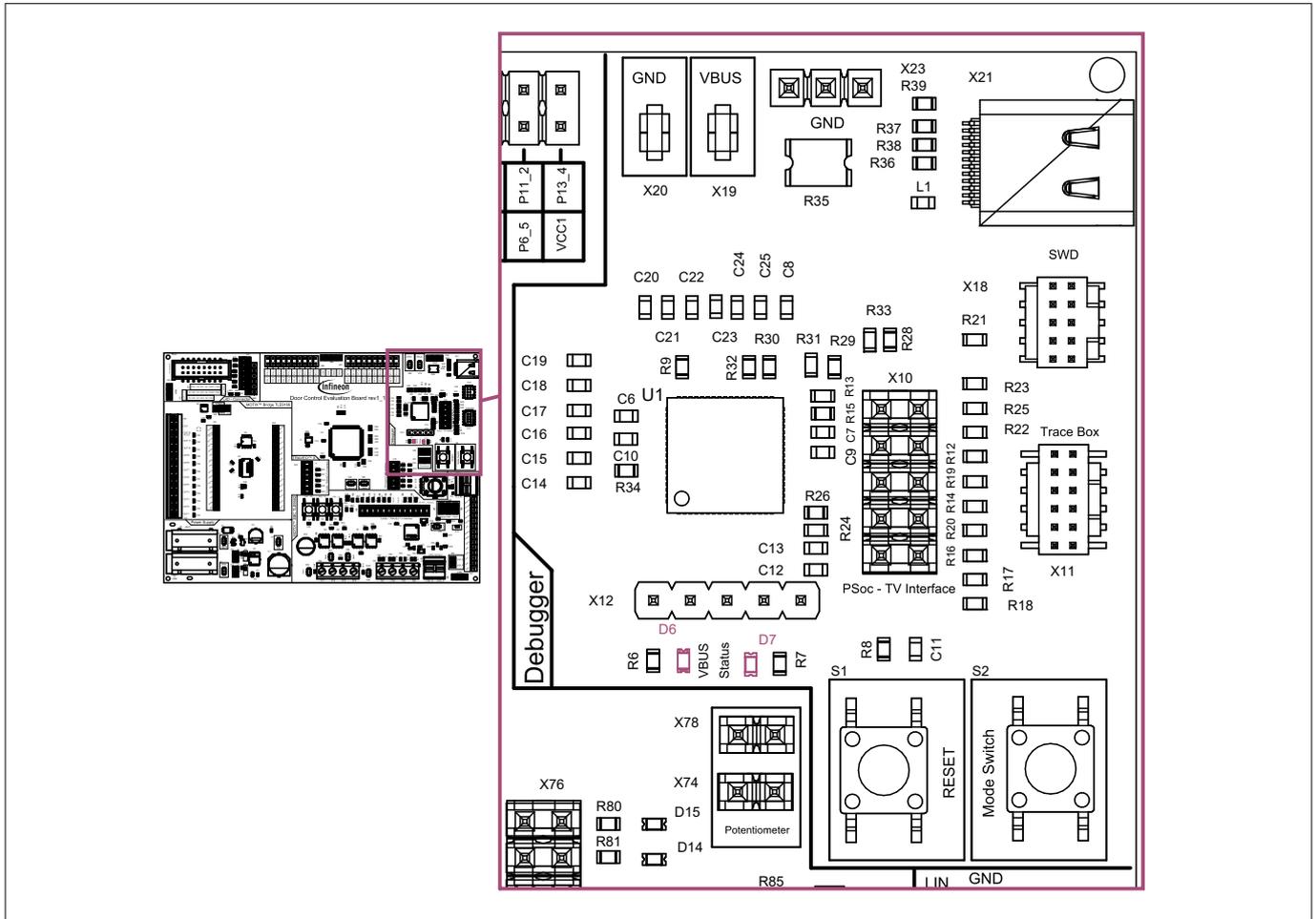
Figure 45 LEDs

Table 26 LEDs

Designator	Description
D6	Indicates the supply of the on-board debugger circuit, V_{BUS} is active
D7	Status of the KitProg3

3.2.6.7 Assembly option

Values for these optional additional placements must be determined depending on the application. The typical components and values can be found in the BOM in Chapter 3.3.3.

3 In detail: Infineon door control evaluation board
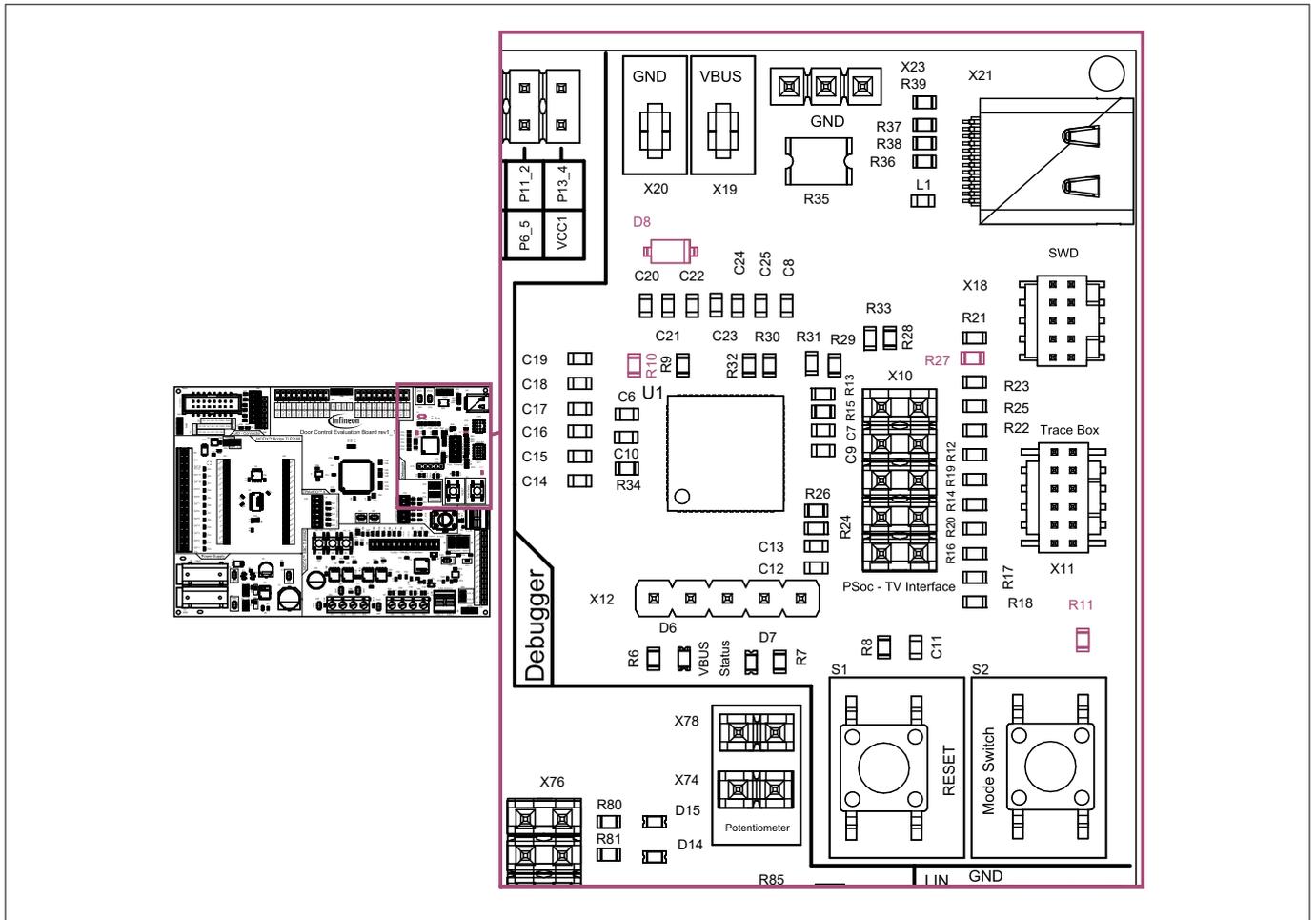
Figure 46   **Assembly options**

Table 27   **Additional placements**

Designator	Description
D8	Diode to supply debugger circuit from V_{CC1}
R10	Resistor to pull down SWDIO to GND
R11	Resistor to pull up TRAVEO™ II XRES to V_{CC1}
R27	Resistor to pull down P5LP_SIO_VREF signal to ground

3.3 Design Files

3.3.1 Schematics Door control evaluation board

Figure 47 Door control evaluation board, sheet 2

3 In detail: Infineon door control evaluation board
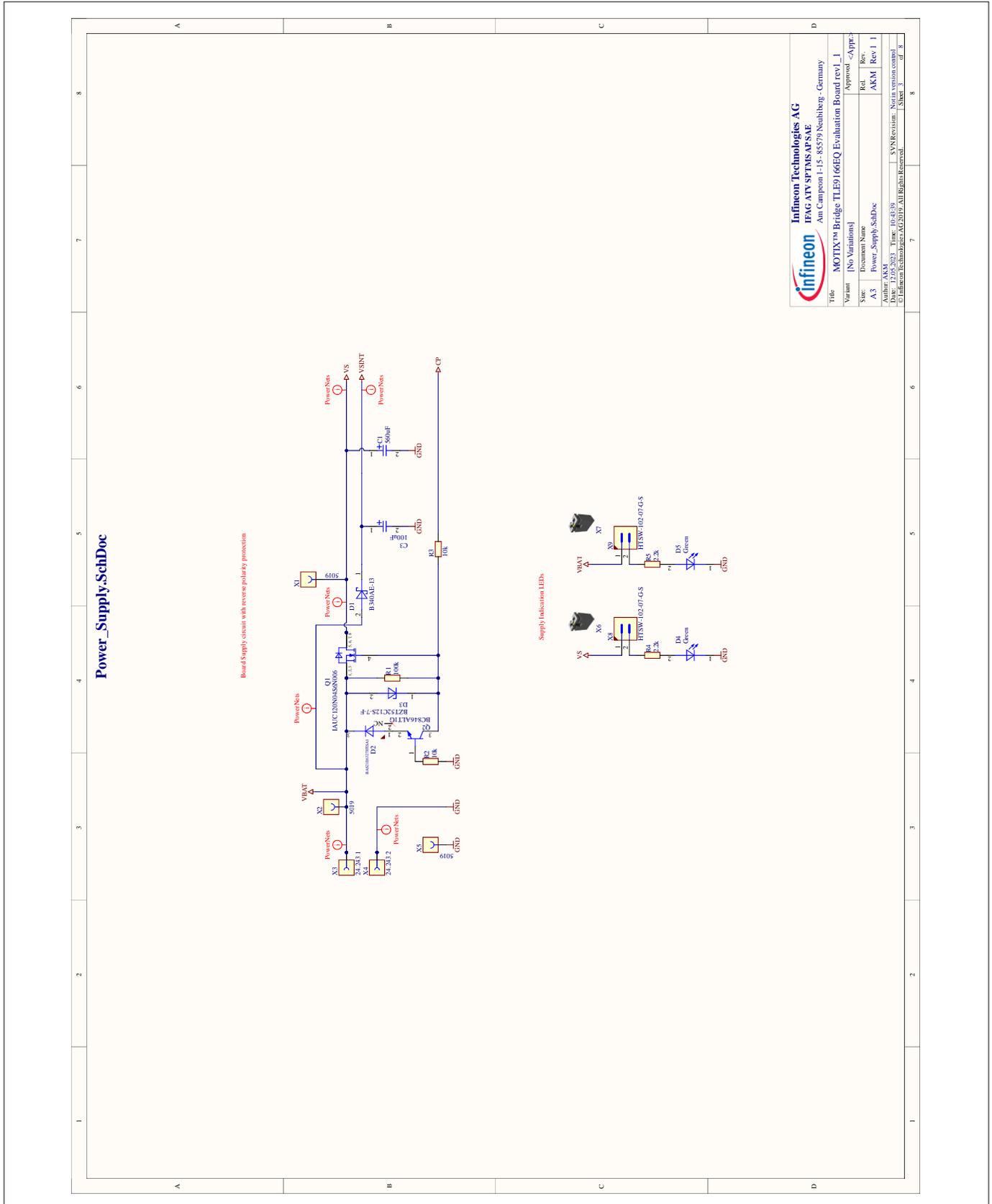
Figure 48   Door control evaluation board, sheet 3

3 In detail: Infineon door control evaluation board
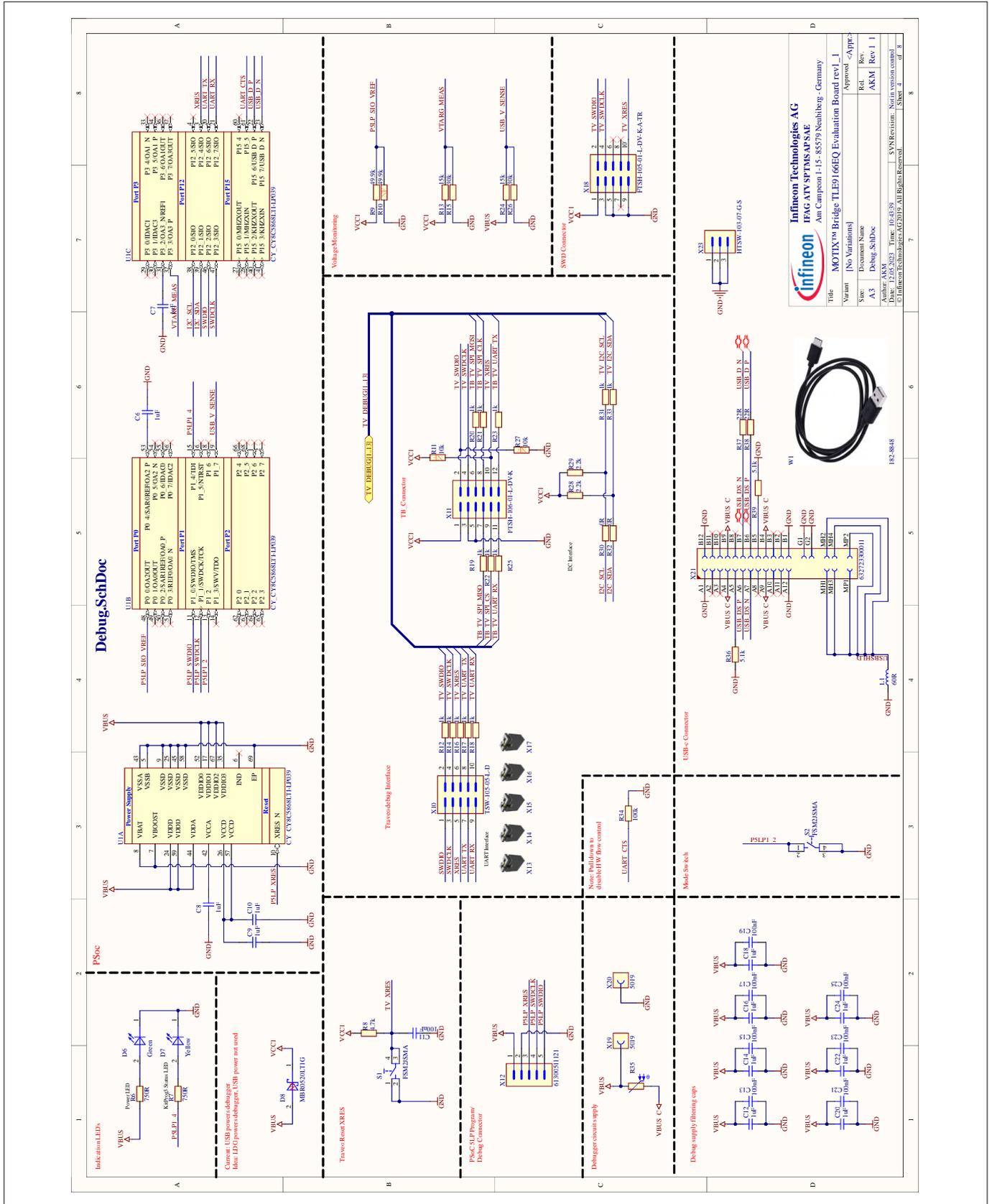
Figure 49   Door control evaluation board, sheet 4

3 In detail: Infineon door control evaluation board

Figure 50   **Door control evaluation board, sheet 5**

3 In detail: Infineon door control evaluation board
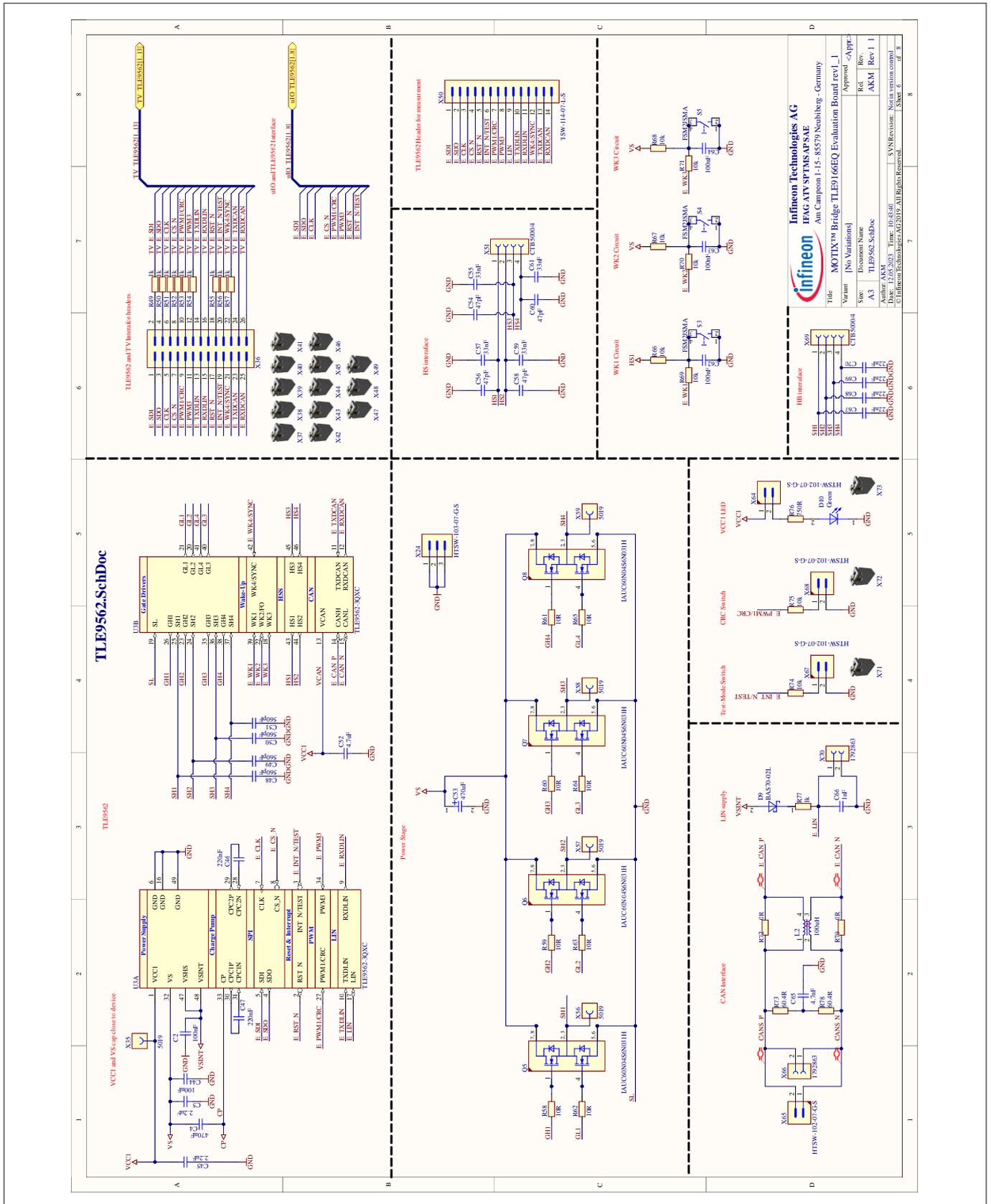
Figure 51   Door control evaluation board, sheet 6

3 In detail: Infineon door control evaluation board

Figure 52 Door control evaluation board, sheet 7

3 In detail: Infineon door control evaluation board
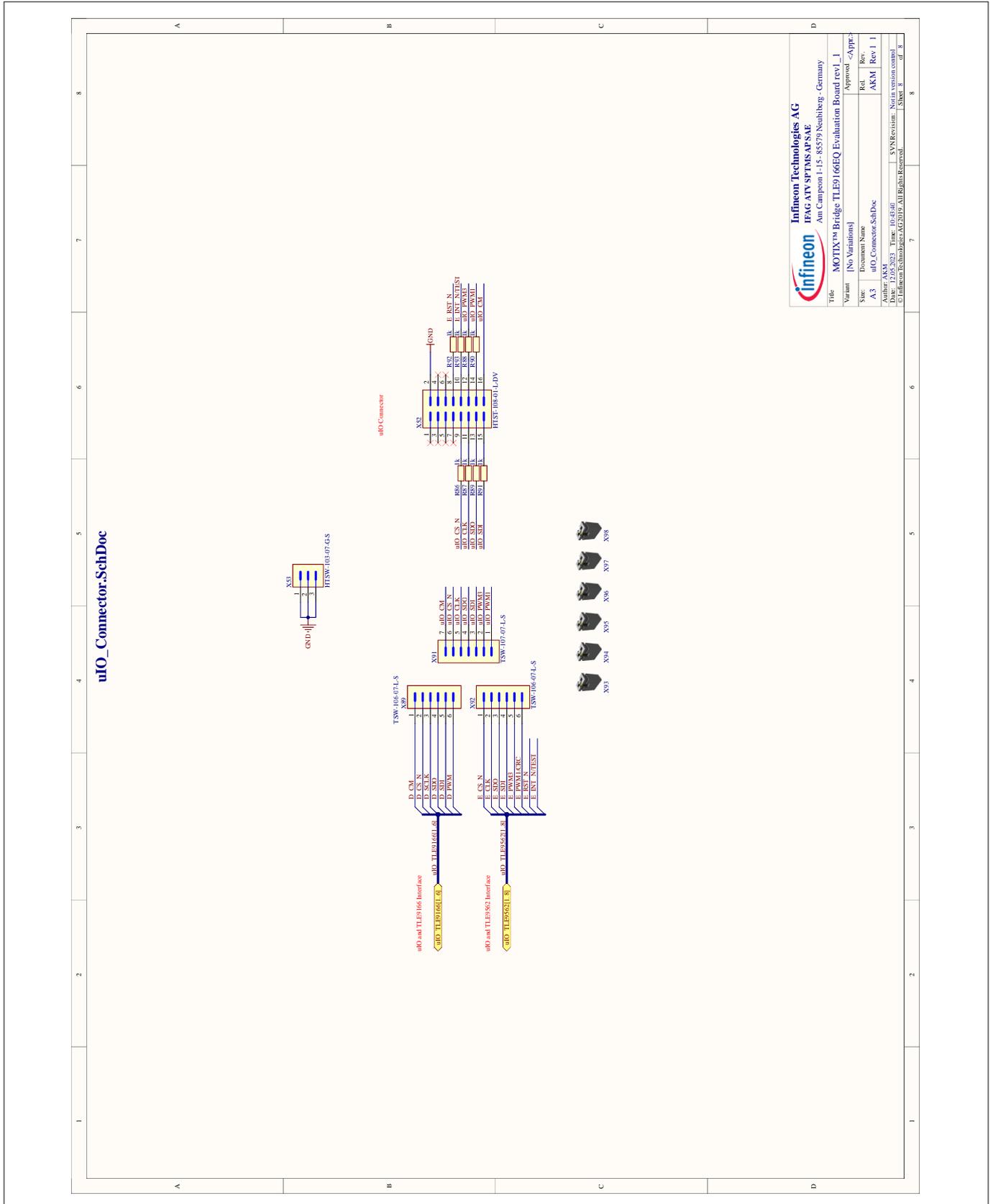
Figure 53 Door control evaluation board, sheet 8

3.3.2 Layout Door control evaluation board
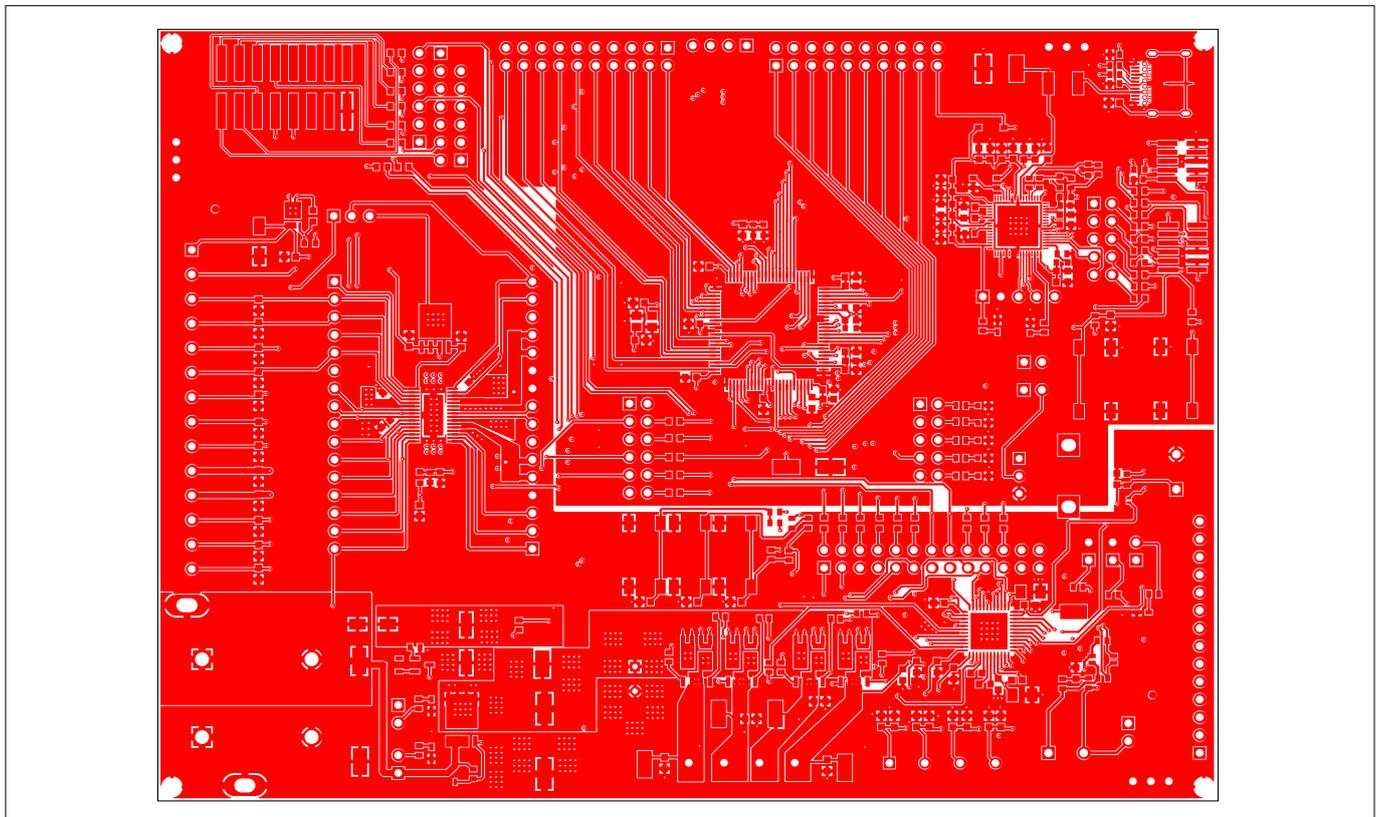
Figure 54 Door control evaluation board layer 1 (top layer, signal)
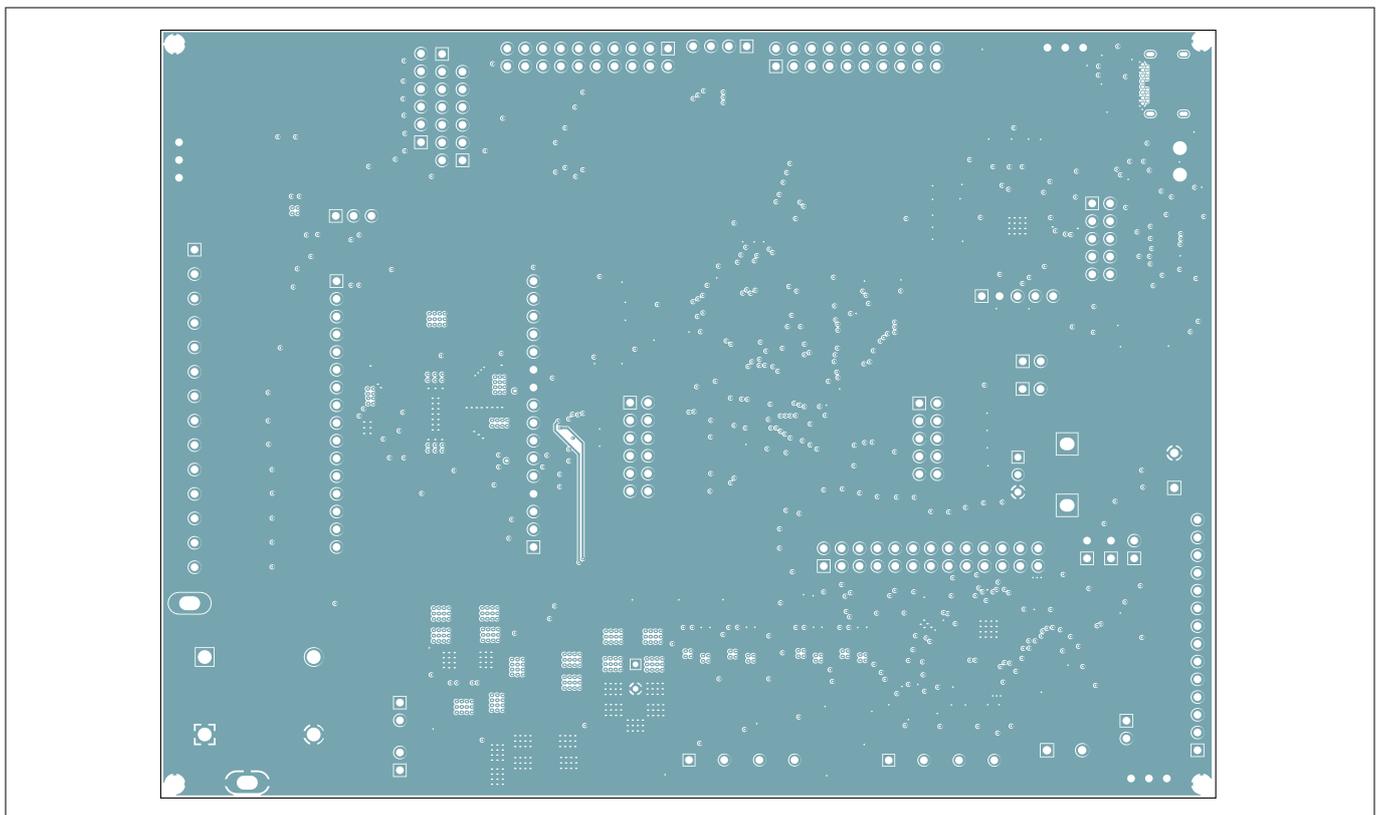
Figure 55 Door control evaluation board layer 2 (middle layer, GND)

3 In detail: Infineon door control evaluation board
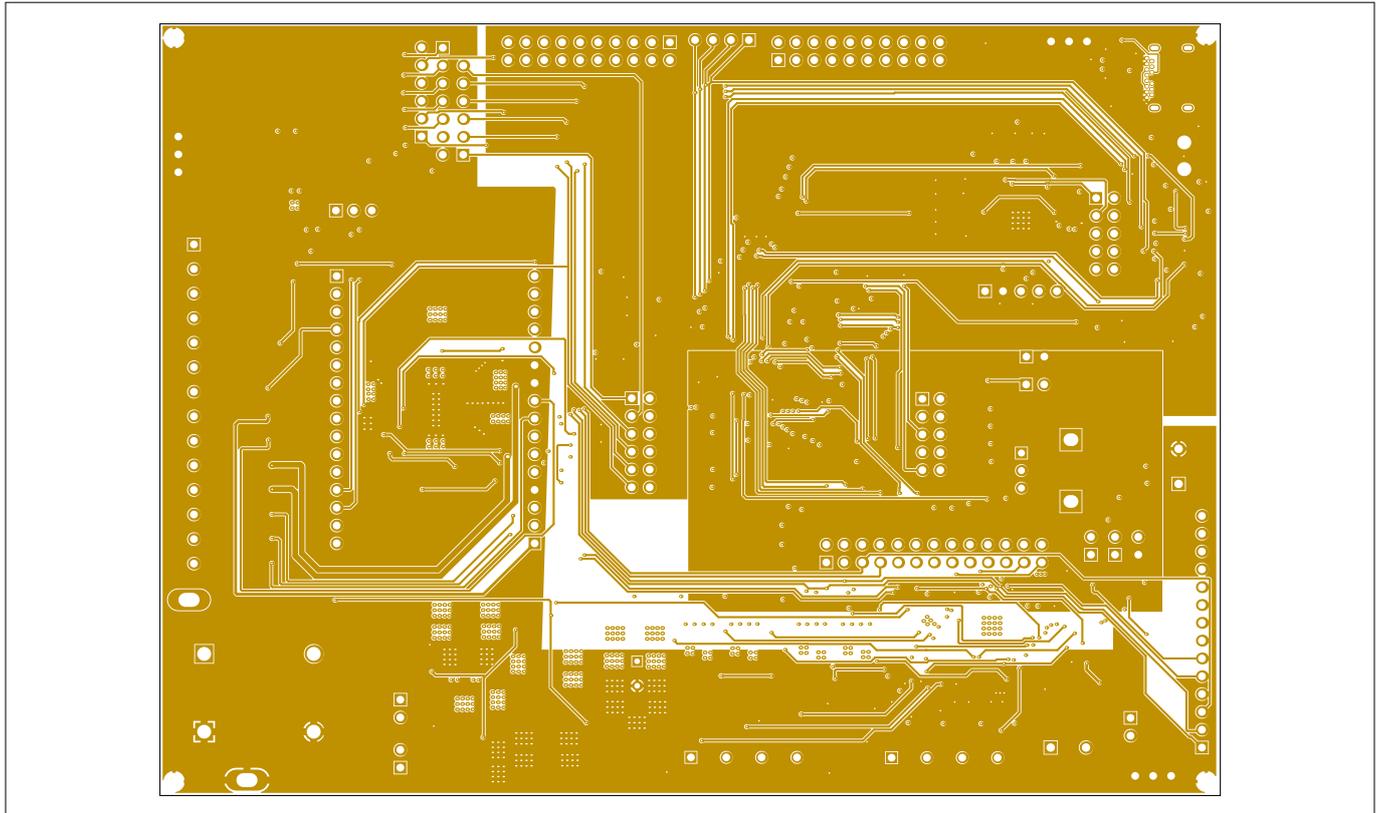
Figure 56   Door control evaluation board layer 3 (middle layer, signal)
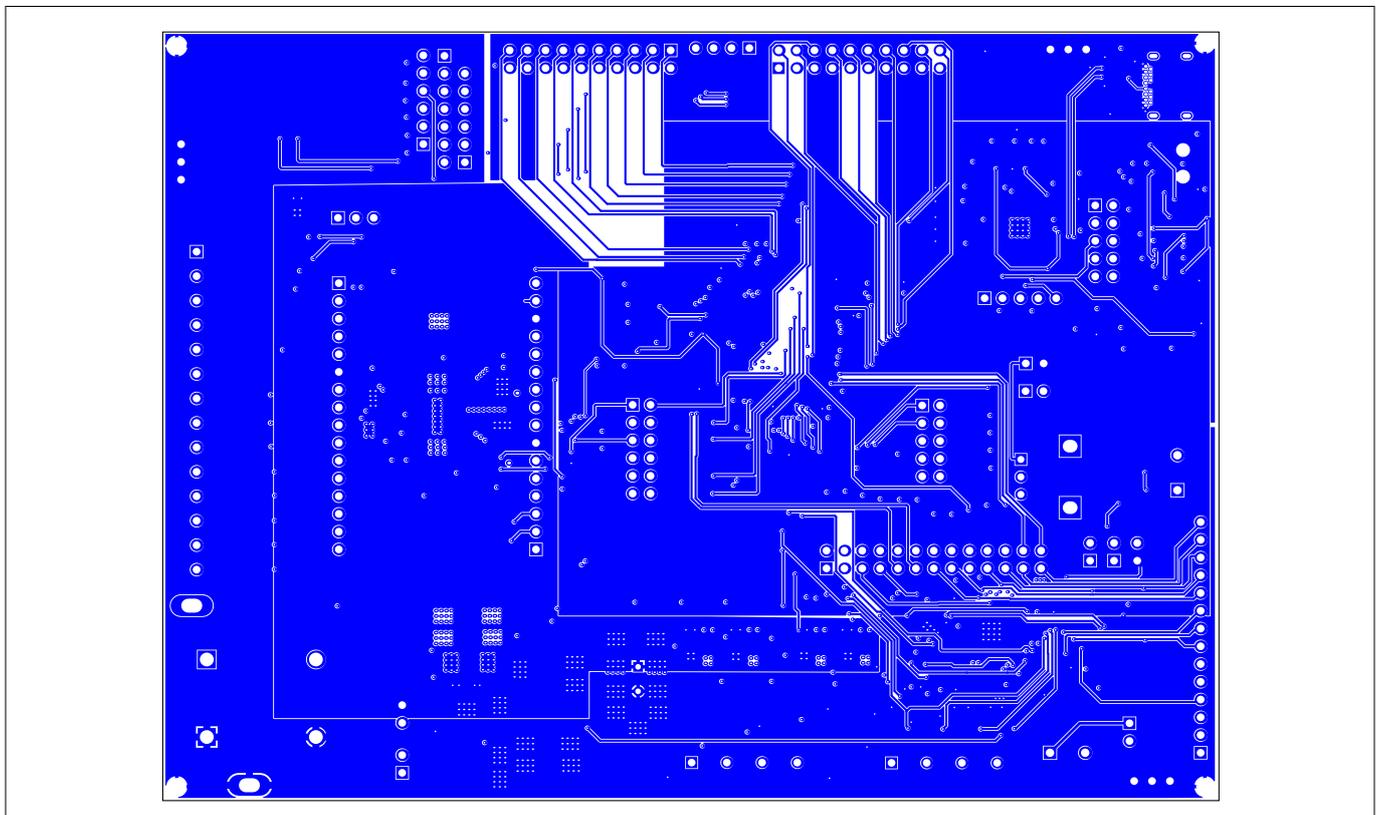
Figure 57   Door control evaluation board layer 4 (bottom layer, power)

3.3.3   Bill of material Door control evaluation board

Mostly automotive-qualified components are used for the Door control evaluation board. The complete bill of material (BOM) is shown below and includes non-mounted components.

Note: *Due to a shortage of components, some of the components listed might differ slightly from those mounted.*

Table 28   BOM Door control evaluation board

Designator	Description	Quantity	Manufacturer order number	Manufacturer
C1	CAP/ELCO/560uF/35V/20%/-/-55°C to 105°C/10.30mm L X 10.30mm W X 10.50mm H/SMD/-	1	EEEFT1V561AP	Panasonic
C2, C11, C13, C15, C17, C19, C21, C23, C25, C26, C27, C44, C62, C63, C64, C73, C74, C75, C76, C77, C78, C80, C81, C82, C85, C86, C88, C91	CAP/CERA/100nF/50V/10% / X7R (EIA) / -55°C to 125°C/0603(1608) / SMD / -	28	06035C104K4Z 2A	AVX
C3	CAP/ELCO/100uF/50V/20% / Aluminiumelectrolytic / -55°C to 105°C/6.60mm L X 6.60mm W X 8.00mm H/SMD / -	1	EEEFTH101XAP	Panasonic
C4	CAP/CERA/470nF/50V/10% / X7R (EIA) / -55°C to 125°C/0603/SMD / -	1	CGA3E3X7R1H4 74K080AE	TDK Corporation
C5, C45	CAP/CERA/2.2uF/50V/10% / X7R (EIA) / -55°C to 125°C/1206/SMD / -	2	CGA5L3X7R1H2 25K160AB	TDK Corporation
C6, C7, C8, C9, C10, C12, C14, C16, C18, C20, C22, C24	CAP/CERA/1uF/25V/10% / X7R (EIA) / -55°C to 125°C/0603(1608) / SMD / -	12	GCM188R71E10 5KA64	MuRata
C28	CAP/CERA/10nF/50V/10% / X7R (EIA) / -55°C to 125°C/0603(1608) / SMD / -	1	06035C103K4Z 2A	AVX
C29, C65	CAP/CERA/4.7nF/50V/5% / X7R (EIA) / -55°C to 125°C/0603(1608) / SMD / -	2	GCM188R71H4 72JA37	MuRata
C30, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C67, C68, C69, C70	CAP/CERA/22nF/25V/5% / X7R (EIA) / -55°C to 125°C/0603(1608) / SMD / -	17	GCM188R71E22 3JA37	MuRata
C31, C46, C47	CAP/CERA/220nF/50V/10% / X7R (EIA) / -55°C to 125°C/0603(1608) / SMD / -	3	GCM188R71H2 24KA64	MuRata
C48, C49, C50, C51	CAP/CERA/560pF/50V/5% / X8G (Murata) / -55°C to 150°C/0603(1608) / SMD / -	4	GCM1885G1H5 61JA16	MuRata
C52, C79, C83, C84	CAP/CERA/4.7uF/25V/10% / X6S (EIA) / -55°C to 105°C/0603(1608) / SMD / -	4	GRT188C81E47 5KE13D	MuRata

(table continues…)

Table 28   (continued) BOM Door control evaluation board

Designator	Description	Quantity	Manufacturer order number	Manufacturer
C53	CAP/FILM/470uF/25V/20% / - / -55°C to 125°C/3.50mm C X 0.60mm W 8.50mm Dia X 13.50mm H/THT / -	1	477AVG025MFBJ	Cornell Dubilier
C54, C56, C58, C60	CAP/CERA/47pF/50V/1% / X8G (Murata) / -55°C to 150°C/0603(1608) / SMD / -	4	GCM1885G1H470FA16	MuRata
C55, C57, C59, C61	CAP/CERA/33nF/50V/10% / X7R (EIA) / -55°C to 125°C/0603(1608) / SMD / -	4	GCM188R71H333KA55	MuRata
C66	CAP/CERA/1nF/50V/10% / X7R (EIA) / -55°C to 125°C/0603(1608) / SMD / -	1	GRM188R71H102KA01	MuRata
C71, C72, C87	CAP/CERA/10uF/10V/10% / X7T (EIA) / -55°C to 125°C/0603(1608) / SMD / -	3	ZRB18AD71A106KE01L	MuRata
C89, C90	CAP/CERA/10pF/50V/5% / C0G (EIA) / NP0 / -55°C to 125°C/0603(1608) / SMD / -	2	GCM1885C1H100JA16	MuRata
C92	CAP/CERA/470nF/50V/10% / X5R (EIA) / -55°C to 85°C/0603(1608) / SMD / -	1	GRM188R61H474KA12	MuRata
D1, D16	3.0A Surface Mount Schottky Barrier Rectifier	2	B340AE-13	Diodes Incorporated
D2	Silicon Switching Diode	1	BAS21E6327HTSA1	Infineon Technologies
D3	Surface Mount Zener Diode	1	BZT52C12S-7-F	Diodes Incorporated
D4, D5, D6, D10	EXCELED Series Chip LED, Green, 560nm	4	SML-D12P8WT86C	ROHM Semiconductors
D7, D11, D12, D13, D14, D15	Chip LED, 589nm, Yellow, Electronic Equipment Applications	6	LY Q396-P1Q2-36	OSRAM Opto Semiconductors
D8	Surface Mount Schottky Power Rectifier,0.5A/20V	1	MBR0520LT1G	ON Semiconductor
D9	Silicon Schottky Diode	1	BAS70-02L	Infineon Technologies
L1	IND/FERR/60R/1A / - / -55°C to 125°C/ 100mR/0603(1608) / Inductor,Chip; 1.60mm L X 0.80mm W X 0.95mm H/SMD / -	1	BLM18PG600SN1D	MuRata

(table continues...)

Table 28   **(continued) BOM Door control evaluation board**

Designator	Description	Quantity	Manufacturer order number	Manufacturer
L2	IND/STD/100uH/150mA/50% / -55°C to 150°C/1.5R/1210(3225) / Filter SMD, 4-Leads, Molded Body 3.20mm L X 2.50mm W X 2.5mm H/SMD / -	1	ACT1210-101-2 P-TL00	TDK Corporation
Q1	OptiMOS™ - power MOSFET for automotive applications, N-channel - Enhancement mode - Normal Level	1	IAUC120N04S6 N006	Infineon Technologies
Q2	General Purpose Transistors NPN Silicon	1	BC846ALT1G	ON Semiconductor
Q3	OptiMOS-5 N-Channel Enhancement Mode Power-Transistor, VDS 40V	1	IPZ40N04S5L-7 R4	Infineon Technologies
Q4	Standard level N-channel MOSFET,	1	BUK7Y7R6-40E X	Nexperia
Q5, Q6, Q7, Q8		4	IAUC60N04S6N 031H	Infineon Technologies
R1, R34	RES/STD/100k/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603(1608) / SMD / -	2	CRCW0603100K FK	Vishay
R2, R3, R11, R27, R46, R66, R67, R68, R69, R70, R71, R74, R75	RES/STD/10k/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603(1608) / SMD / -	13	CRCW060310K0 FKEA	Vishay
R4, R5, R28, R29	RES/STD/2.2k/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603(1608) / SMD / -	4	CRCW06032K20 FK	Vishay
R6, R7, R76, R80, R81, R82, R83, R84	RES/STD/750R/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603/SMD / -	8	CRCW0603750 RFK	Vishay
R8	RES/STD/4.7k/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603(1608) / SMD / -	1	CRCW06034K70 FK	Vishay
R9, R10	RES/STD/49.9k/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603(1608) / SMD / -	2	CRCW060349K9 FK	Vishay
R12, R14, R16, R17, R18, R19, R20, R21, R22, R23, R25, R31, R33, R40, R41, R42, R43, R44, R45, R47, R49, R50, R51, R52, R53, R54, R55, R56, R57, R77, R86, R87, R88, R89, R90, R91, R92, R93	RES/STD/1k/100mW/1% / 100ppm/K / -55°C to 155°C/0603(1608) / SMD / -	38	RC0603FR-071K L	Yageo

(table continues...)

Table 28 **(continued) BOM Door control evaluation board**

Designator	Description	Quantity	Manufacturer order number	Manufacturer
R13, R24	RES/STD/15k/100mW/5% / 100ppm/K / -55°C to 155°C/ 0603(1608) / SMD / -	2	RC0603JR-0715KL	Yageo
R15, R26	RES/STD/30k/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603(1608) / SMD / -	2	CRCW060330K0FK	Vishay
R30, R32, R72, R79	RES/STD/0R / - / 0% / - / -55°C to 155°C/0603(1608) / SMD / -	4	CRCW06030000Z0EA	Vishay
R35	RES/PTC / - / 800mW / - / - / - / 1812/SMD / -	1	MF-MSMF030-2	Bourns
R36, R39	RES/STD/5.1k/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603(1608) /SMD/-	2	CRCW06035K10FK	Vishay
R37, R38	RES/STD/22R/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603(1608)/SMD/ -	2	CRCW060322R0FK	Vishay
R48	RES/STD/47R/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603(1608)/SMD/ -	1	RC0603FR-0747RL	Yageo
R58, R59, R60, R61, R62, R63, R64, R65	RES/STD/10R/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603(1608)/SMD/ -	8	CRCW060310R0FKEA	Vishay
R73, R78	RES/STD/60.4R/100mW/1% / 100ppm/K / -55°C to 155°C/ 0603(1608)/SMD / -	2	CRCW060360R4FK	Vishay
R85	RES/VAR/10k/50mW/20% / - / -10°C to 70°C/THT, 2.5 mm pitch, 5 Pins, 11.80 mm L X 11.40 mm W X 15 mm H body/THT / -	1	RK09K1130A6S	ALPS
S1, S2, S3, S4, S5	Micro Miniature Push button Switch	5	FSM2JSMA	Tyco Electronics
U1	Programmable System-on-Chip (PSoC)	1	CY8C5868LTI-LP039	Cypress Semiconductor
U2	MOTIX™ bridge	1		
U3	Bridge SBC Family, PLGM	1	TLE9562-3QXC	Infineon Technologies
U4	Family of TRAVEO™ T2G microcontrollers targeted at automotive systems	1	CYT2B95CACQ0AZEGS	Infineon Technologies

(table continues...)

Table 28 (continued) BOM Door control evaluation board

Designator	Description	Quantity	Manufacturer order number	Manufacturer
W1	Test Point, Compact, Surface Mount, Finish- Silver Plate	1	182-8848	RS Pro
X1, X2, X5, X19, X20, X35, X56, X57, X58, X59, X82, X83	Banana Test Connector, 4 mm, Socket, PCB Mount, 24 A, 60 VDC, Silver Plated Contacts, Red	12	5019	Keystone Electronics Corp.
X3	Banana Test Connector, 4 mm, Socket, PCB Mount, 24 A, 60 VDC, Silver Plated Contacts, Black	1	24.243.1	Multicomp
X4	Jumper, 1x2-Positions, Pitch 2,54mm, Body 5, 08x2, 54mm, black, Au, with handle	1	24.243.2	Multicomp
X6, X7, X13, X14, X15, X16, X17, X25, X26, X27, X28, X29, X30, X37, X38, X39, X40, X41, X42, X43, X44, X45, X46, X47, X48, X49, X54, X71, X72, X73, X75, X77, X79, X80, X81, X84, X85, X93, X94, X95, X96, X97, X98	Through hole .025 SQ Post Header, 2.54mm pitch, 2 pin, vertical, single row	43	SNT-100-BK-G-H	Samtec
X8, X9, X64, X65, X67, X68, X74, X78	Through hole .025 SQ Post Header, 2.54mm pitch, 10 pin, vertical, double row	8	HTSW-102-07-G-S	Samtec
X10	Connector Header Surface Mount 12 position 0.050 (1.27mm)	1	TSW-105-05-L-D	Samtec
X11	WR-PHD 2.54 mm Pitch, 5Pins, THT Pin Header	1	FTSH-106-01-L-DV-K	Samtec
X12	SMT Micro Header, 1.27mm pitch, 10 pin, Vertical, Double Row, Keying Shroud with Alignment pin, DAP	1	61300511121	Wurth Elektronik
X18	WR-COM USB 3.1 Type C Horizontal, 20V Working Voltage and 5A Rated Current	1	FTSH-105-01-L-DV-K-A-TR	Samtec
X21	Through hole .025 SQ Post Header, 2.54mm pitch, 12 pin, vertical, double row	1	632723300011	Wurth Elektronik
X22	Through hole .025 SQ Post Header, 2.54mm pitch, 3 pin, vertical, single row	1	TSW-106-07-L-D	Samtec
X23, X24, X34, X53	Through hole .025 SQ Post Header, 2.54mm pitch, 16 pin, vertical, single row	4	HTSW-103-07-G-S	Samtec

(table continues...)

Table 28 (continued) BOM Door control evaluation board

Designator	Description	Quantity	Manufacturer order number	Manufacturer
X31, X32	PCB Terminal Block, Nominal Current 13.5 A, Nominal Voltage 200V, 3.5mm Pitch, 14 Pins	2	TSW-116-07-L-S	Samtec
X33	Through hole .025 SQ Post Header, 2.54mm pitch, 26 pin, vertical, double row	1	1751361	Phoenix Contact
X36	Through hole .025 SQ Post Header, 2.54mm pitch, 14 pin, vertical, single row	1	TSW-113-07-L-D	Samtec
X50	Terminal Block, 4 Pole, 5mm Pitch, Low Profile Screw Terminal	1	TSW-114-07-L-S	Samtec
X51, X69	SMT, .025 Shrouded SQ POST IDC Headers , 2.54mm pitch, 16-pin Vertical, Double row	2	CTB5000/4	Camden Boss
X52	PCB terminal block, nominal current: 16 A, rated voltage : 400 V, 2 Positions	1	HTST-108-01-L-DV	Samtec
X66, X70	Through hole .025 SQ Post Header, 2.54mm pitch, 10 pin, vertical, double row	2	1792863	Phoenix Contact
X76	Through hole .025 SQ Post Header, 2.54mm pitch, 4 pin, vertical, single row	1	TSW-105-08-G-D	Samtec
X86	Through hole .025 SQ Post Header, 2.54mm pitch, 20 pin, vertical, double row	1	TSW-104-07-L-S	Samtec
X87, X88	Through hole .025 SQ Post Header, 2.54mm pitch, 6 pin, vertical, single row	2	TSW-110-07-L-D	Samtec
X89, X92	Through hole .025 SQ Post Header, 2.54mm pitch, 7 pin, vertical, single row	2	TSW-106-07-L-S	Samtec
X91	Surface Mount Compact Crystal Unit	1	TSW-107-07-L-S	Samtec
Y1	CAP/ELCO/560uF/35V/20%/-/-55°C to 105°C/10.30mm L X 10.30mm W X 10.50mm H/SMD/-	1	NX3225GA-16.000M-STD-CRG-2	Nihon Dempa Kogyo

4   Additional information

- IAR Embedded Workbench for ARM: https://www.iar.com/products/architectures/arm/iar-embedded-workbench-for-arm/
- Infineon developer center: https://softwaretools.infineon.com/welcome
- Infineon MOTIX™ Bridge TLE9166EQ datasheet. Refer to product page: https://www.infineon.com/cms/de/product/power/motor-control-ics/brushed-dc-motor-control-ics/multi-half-bridge-ics/tle9166eq/
- Infineon MOTIX™ TLE9562-3QX datasheet: https://www.infineon.com/dgdl/Infineon-TLE9562-3QX-DataSheet-v01_00-EN.pdf?fileId=5546d4627883d7e00178ca35b1603873
- Infineon PSoC® 5LP: CY8C58LP Family Datasheet: https://www.infineon.com/dgdl/Infineon-PSOC(R)_5LP_CY8C52LP_FAMILY_DATASHEET_PROGRAMMABLE_SYSTEM-ON-CHIP_(PSOC(R))-DataSheet-v16_00-EN.pdf?fileId=8ac78c8c7d0d8da4017d0ec56e153b1a
- Infineon TRAVEO™ T2G 32-bit Automotive MCU: https://www.infineon.com/dgdl/Infineon-TRAVEO_T2G_CYT2B9_Series-DataSheet-v10_00-EN.pdf?fileId=5546d462749a7c2d01749d90a2e34dbc

Glossary

API
application programming interface (API)

A set of defined rules that enables various software components to communicate with each other.

CAN
controller area network (CAN)

GPIO
general purpose input output (GPIO)

GUI
graphical user interface (GUI)

An interface that enables users to interact with electronic devices through icons and visual indicators.

IC
integrated circuit (IC)

A miniature electronic circuit built on the surface of a thin substrate of a semiconductor material.

LED
light-emitting diode (LED)

A semiconductor circuit that emits light when activated.

LIN
local interconnect network (LIN)

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.

PWM
pulse-width modulation (PWM)

A technique to encode an analog value into the duty cycle of a pulsing signal with arbitrary amplitude.

SPI
serial peripheral interface (SPI)

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

SWD
serial wire debug (SWD)

A communication interface and protocol used for debugging and programming embedded systems, particularly microcontrollers and other integrated circuits.

5 Abbreviations

Table 29 **Abbreviations**

Abbreviation	Meaning
A	Ampere
BDC	Brushed direct current
BOM	Bill of material
CM	Current measurement
CMSIS	Common microcontroller software interface standard
COM	Communication
DAP	Debug access port
EC	Electrochromatic
EWARM	Embedded workbench ARM
GH	Gate-high
GND	Ground
HB	Half bridge
HS	High-side
LS	Low-side
PC	Personal computer
SDL	Sample driver library
TB	Tracebox
UART	Universal asynchronous receiver transmitter
uIO	Universal input output
USB-C	Universal serial bus type-c
V	Voltage
V_{CC}	Voltage common collector
V_S	Supply voltage
V_{BAT}	Battery voltage
WK	Wake

Revision history

Document version	Date of release	Description of changes
Rev. 2.00	2024-10-15	• Document updated; content restructured; chapters on system offering included • Document renamed from "Door control evaluation board user guide"
Rev. 1.10	2024-03-01	• Chapters Implementation of an Device Driver into IAR Embedded Workbench and Application software added • Typos corrected
Rev. 1.00	2023-08-11	• Initial release

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