

Customer evaluation kit description

PROFET™

About this document

Scope and purpose

This document provides an overview of the latest high-side switches evaluation boards. The user manual is intended as guidance for the Configuration Wizard and its usage related to the customer evaluation kit. The information given in this document is intended only as an implementation guide and not as a description or warranty of a certain functionality, condition or quality of the device.

Intended audience

This document is intended for anyone using boards of IPD with or without the IPD Configuration Wizard.

Table of contents

	About this document	1
	Table of contents	1
1	Evaluation kit overview [MB & DB]	2
2	Motherboards [MB]	4
2.1	Detailed information	5
2.2	PROFET™ +2 12V motherboard V2.0 (PROFET PLUS2 MOTH BRD)	6
2.3	PROFET™ +2 12V motherboard V3.0 (PROFET ONE4ALL MB V1)	9
3	Daughterboards [DB]	13
3.1	PROFET™ +2 12V 2-channel daughterboard	13
3.2	PROFET™ +2 12V 4-channel daughterboard	13
3.3	PROFET™ Load Guard daughterboard	13
3.4	PROFET™ +2 12V daughterboard 14/24 pin	15
4	Evaluation boards [EB]	17
4.1	PROFET™ +2 12V Arduino H-bridge evaluation board	17
4.2	PROFET™ +2 12V Grade0 customer evaluation board	22
5	Software (optional)	27
5.1	GUI description	27
5.1.1	μIO-Stick	27
5.1.2	Start screen	28
5.1.3	PROFET™ +2 12V GUI	29
6	Appendix	32
7	Revision history	33
	Disclaimer	34

1 Evaluation kit overview [MB & DB]

1 Evaluation kit overview [MB & DB]

The PROFET™ +2 12V customer evaluation kit consists of a motherboard (MB) and a daughterboard (DB).
Figure 1 below shows the DB [2] plugged onto the MB [1].

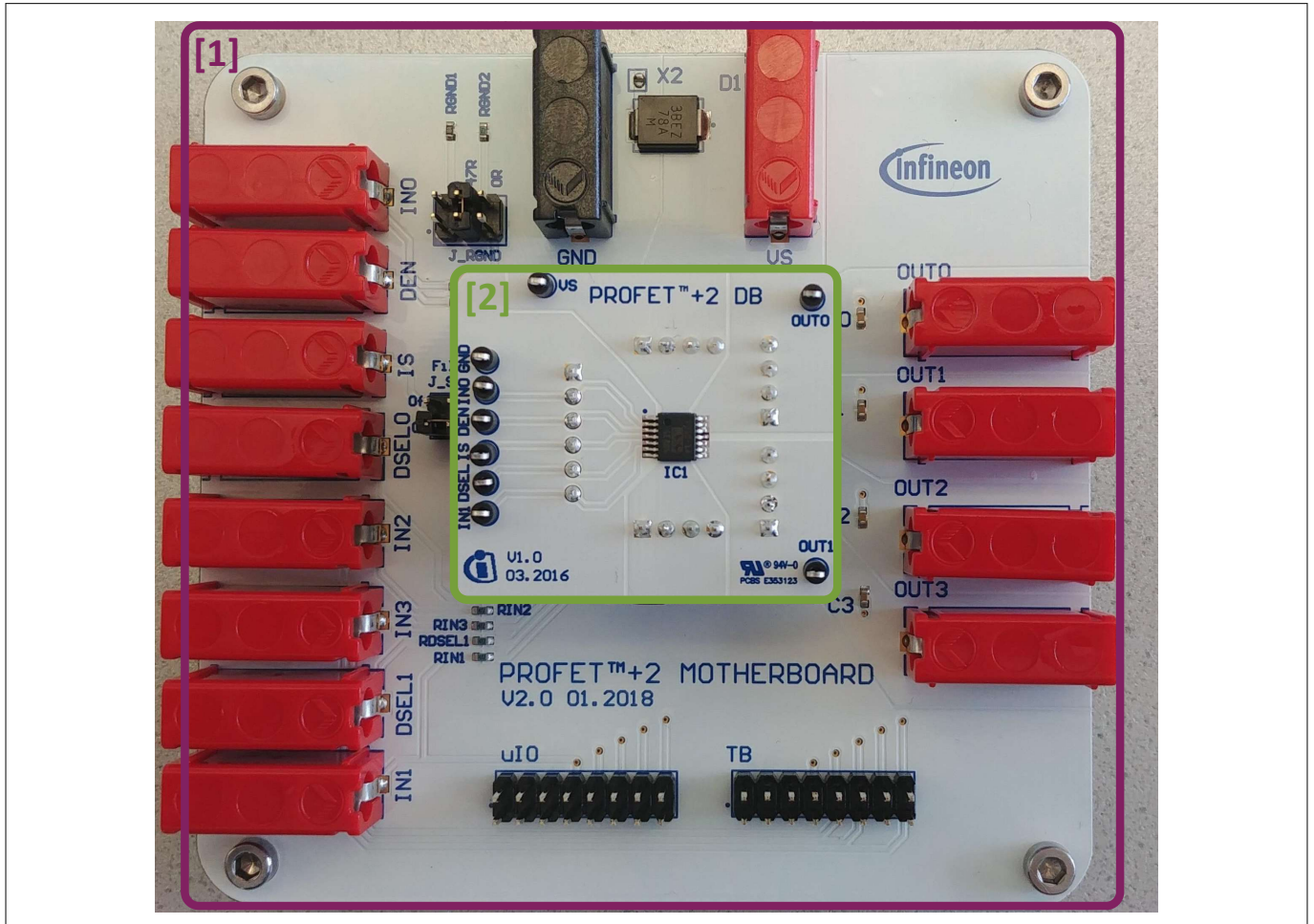


Figure 1 PROFET™ +2 12V MB [1] and DB [2]

Application description

- The MB is designed to handle all devices within the PROFET™ +2 12V family
 - 1-channel, 2-channel or 4-channel PROFET™ +2 12V devices (DBs) can be plugged onto the MB
- It is suitable for the evaluation of resistive, capacitive and/or inductive loads
- The evaluation can either be done directly or with the Config Wizard for IPD (see Chapter 5)

Note:

- The board is **not** designed for **EMC characterization**, including ISO pulses
- The board design is **not** optimized for **thermal performance characterization**

1 Evaluation kit overview [MB & DB]

Table 1 Available daughterboards

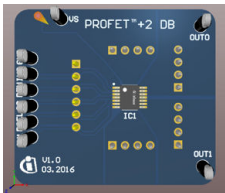
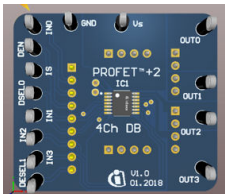
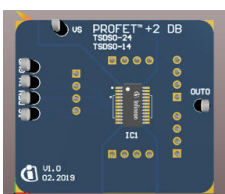
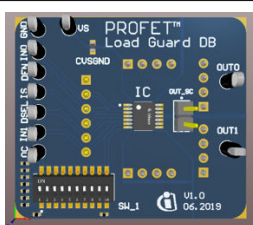
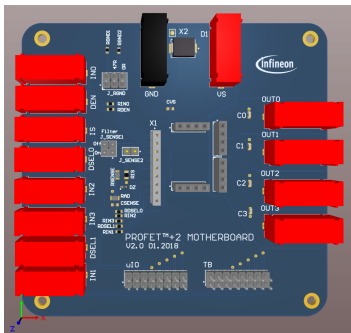
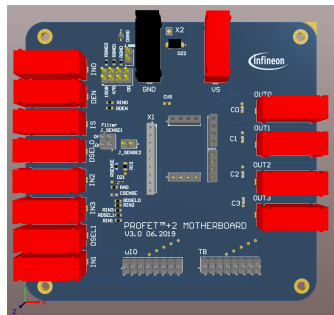
Name	Picture	TSDSO-14: 1-channel	TSDSO-14: 2-channel	TSDSO-14: 4-channel	TSDSO-24: 1-channel	
PROFET™ +2 12V (2-channel)		YES	YES	NO	NO	
PROFET™ +2 12V (4-channel)		NO	NO	YES	NO	
PROFET™ +2 12V 14/24 pin		YES	NO	NO	YES	
PROFET™ Load Guard		YES	YES	NO	NO	only PROFET™ Load Guard devices

Table 2 Recommended MB depending on DB

Naming	Motherboard V2.0	Motherboard V3.0
ISaR	PROFET PLUS2 MOTH BRD	PROFET ONE4ALL MB V1
Picture		
PROFET™ +2 12V (1-channel and 2-channel)	YES	YES
PROFET™ +2 12V (4-channel)	YES	YES
PROFET™ +2 12V 14/24 pin	YES	YES

2 Motherboards [MB]

2 Motherboards [MB]

Figure 2 and Table 3 below illustrate the location of the connectors and jumpers. The names of the jumpers are printed next to them. Chapter 2.1 provides detailed information.

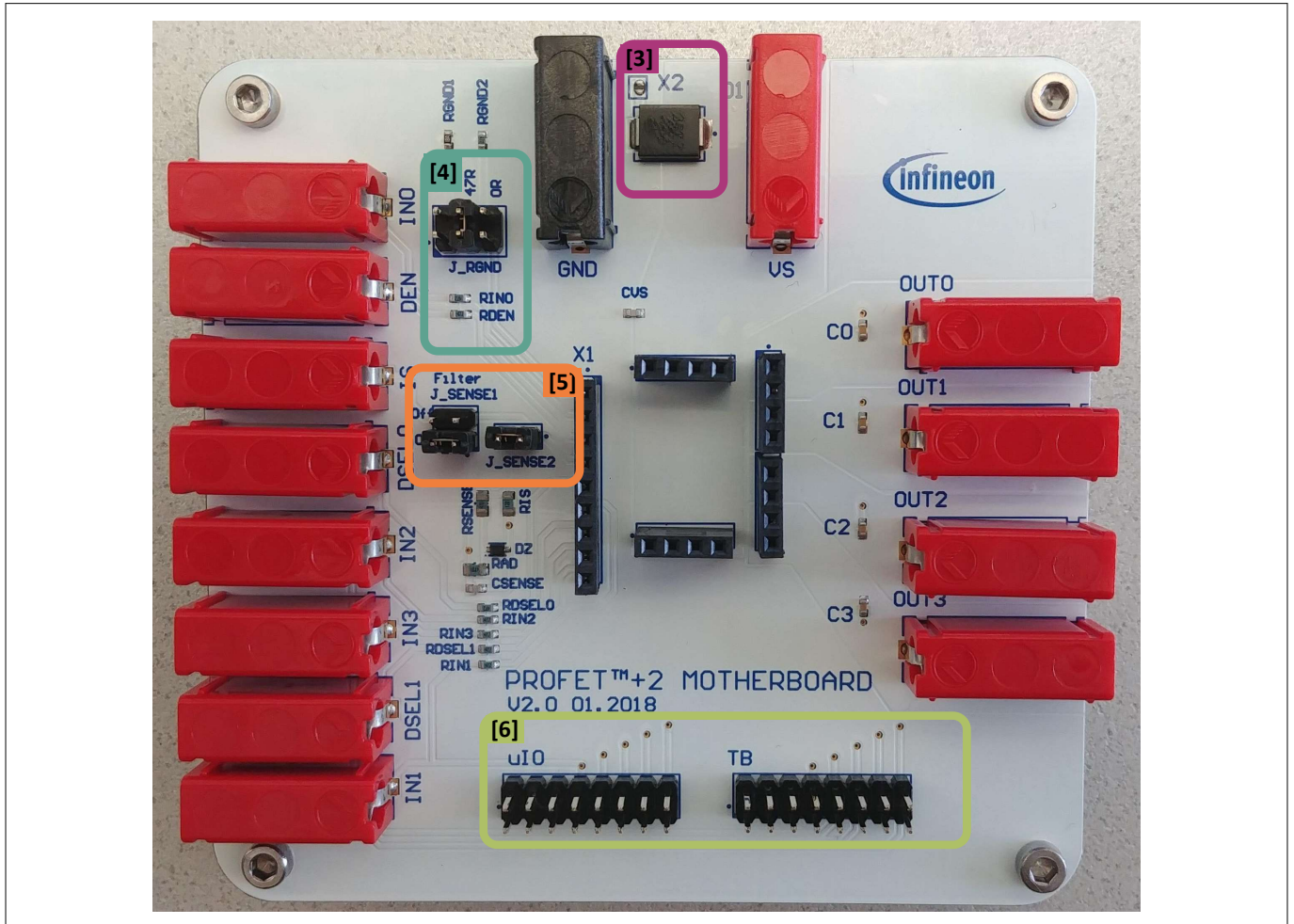


Figure 2 PROFET™ +2 12V MB - connectors and jumpers

Table 3 PROFET™ +2 12V MB connectors and jumpers

#	Description
1	PROFET™ +2 12V motherboard (see Figure 1)
2	PROFET™ +2 12V daughterboard (see Figure 1)
3	TVS Diode (device protection)
4	J_RGND (GND resistor selection)
5	J_SENSE1, J_SENSE2 (sense configuration)
6	µIO connectors of the PROFET™ +2 12V MB (optional: microcontroller)

2 Motherboards [MB]

2.1 Detailed information

The two μ IO connectors of the PROFET™ +2 12V MB [6] are used to connect the motherboard with the μ IO-Stick ¹⁾ (for further information see Chapter 5). The connector marked as **μ IO** can only be used for 1-channel and 2-channel devices, whereas the connector marked with **TB** also can be used for 4-channel devices. The yellow circles illustrated in Figure 3 and Figure 4 indicate the position of the pin 1 indicator. In order to avoid overvoltages on the MB it is possible to close the solder bridge **X2** which connects a TVS diode between VS and GND. Figure 3 and Table 4 show the solder bridge X2, the TVS diode [3] and the two μ IO connectors of the PROFET™ +2 12V MB.

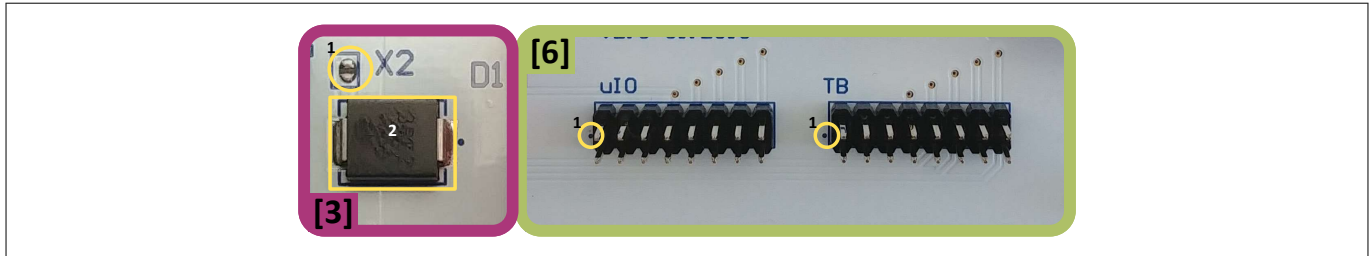


Figure 3 Position of X2, μ IO and TB

Table 4 TVS diode [3]

Position	Description
yellow circle	Solder bridge X2, opened by default, close to enable overvoltage protection
yellow square	TVS diode

Figure 4 and the tables below illustrate the jumpers, as well as the positions of the jumpers. The description of the positions is given in Table 5 (J_RGND [4]) and Table 6 (J_SENSE1, J_SENSE2 [5]).

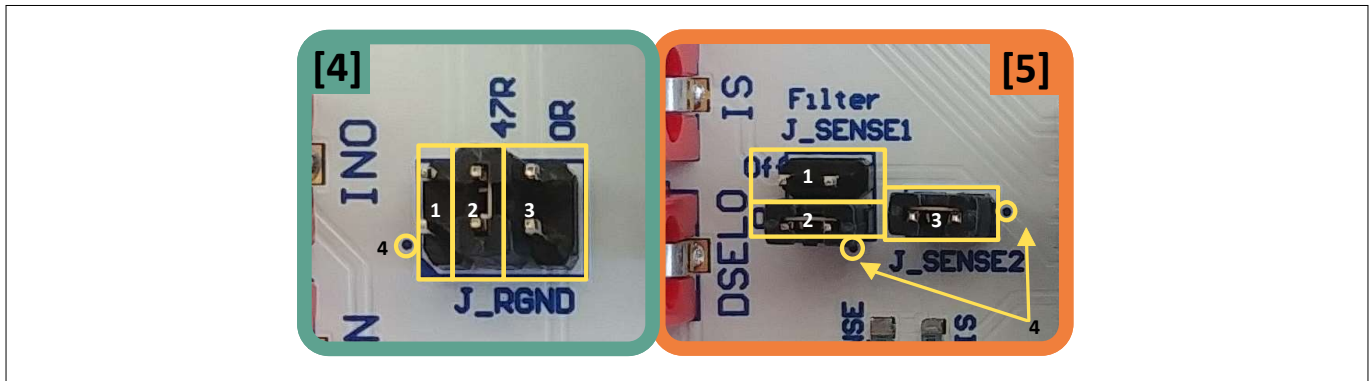


Figure 4 Jumper positions

Table 5 below lists the description of the three jumper positions of J_RGND [4]. All jumpers are open by default.

Table 5 J_RGND [4] jumper positions

#	Description
1	The PROFET™ +2 12V DB ground is connected to the MB module ground via 150 Ω resistor
2	The PROFET™ +2 12V DB ground is connected to the MB module ground via 47 Ω resistor
3	The PROFET™ +2 12V DB ground is connected to the MB module ground via 0 Ω resistor

¹⁾ The Infineon μ IO-Stick can be ordered at <https://www.ehitex.de/en/>.

2 Motherboards [MB]

Table 6 below lists the description of J_SENSE1 and J_SENSE2 jumpers [5], as well as their positions and the position of pin 1.

In order to convert the IS current into a voltage, J_SENSE2 [3] needs to be closed. In case of using a different sense resistor, either replace RIS or use an external resistor. Therefore, remove J_SENSE2 [3] and close JSENSE [1] to enable a direct path from the IS pin of the device to the banana connector. All jumpers are open by default.

Table 6 J_SENSE1/J_SENSE2 [5] jumper positions

#	Description
J_SENSE1 [1]	It connects the IS pin of the device directly to the banana connector of the MB and disables the on-board filter of the IS
J_SENSE1 [2]	It connects the IS pin of the device after the on-board filter to the banana connector of the MB
J_SENSE2 [3]	It connects the IS pin of the device to the 1.2 kΩ sense resistor RIS and to the μIO connectors

2.2 PROFET™ +2 12V motherboard V2.0 (PROFET PLUS2 MOTH BRD)

Figure 5 shows the block diagram of the PROFET™ +2 12V MB. It provides an overview of the locations of jumpers and connectors.

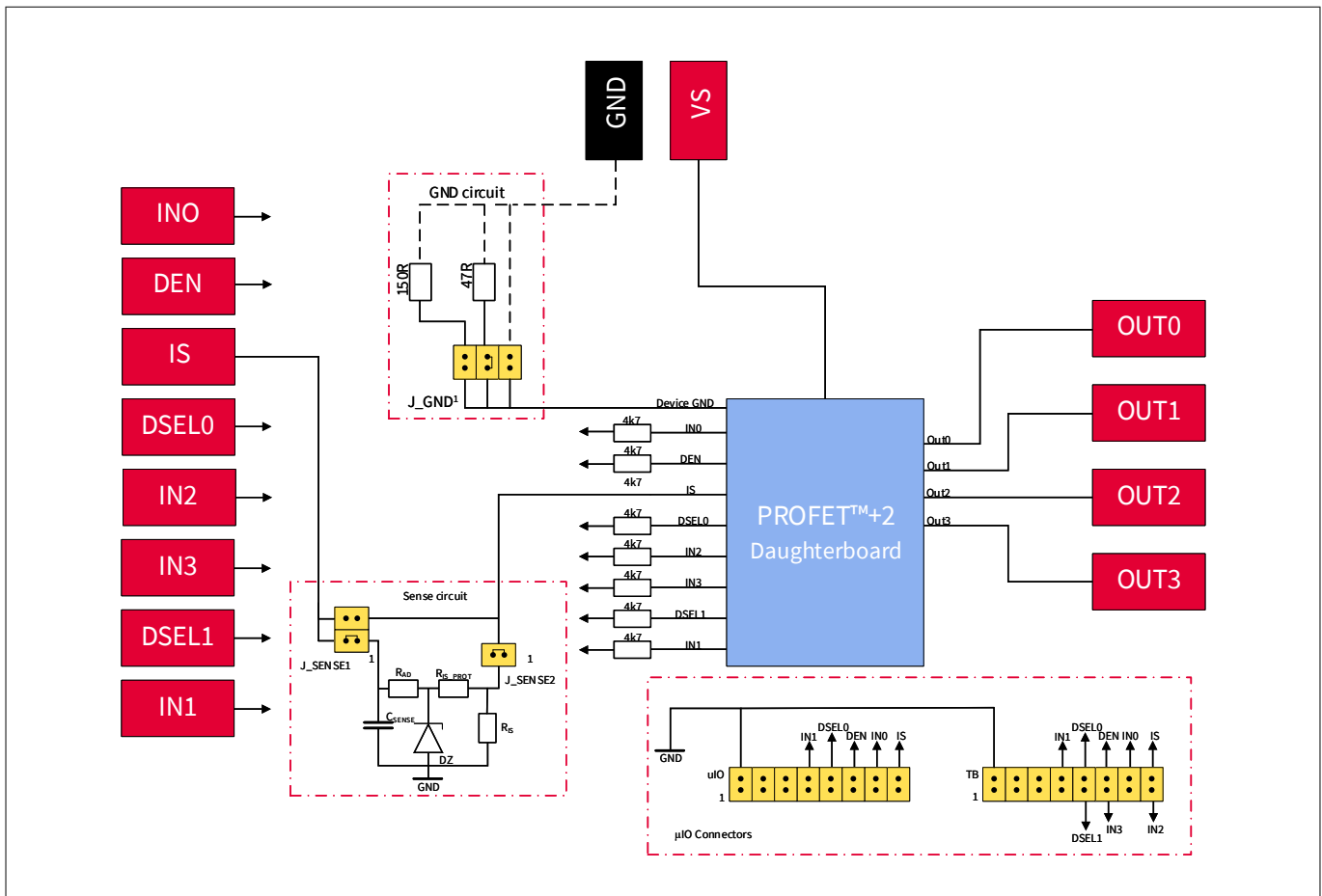


Figure 5 Block diagram of the PROFET™ +2 12V MB V2.0

2 Motherboards [MB]

The device can be controlled with or without the μ IO-Stick (see [Chapter 2.1](#), [Chapter 5](#)). [Table 7](#) below explains the functionality of all jumpers as well as the purpose of the connectors shown in the block diagram above ([Figure 5](#)).

Table 7 PROFET™ +2 12V MB connectors and jumpers

Name	Description
VS	Connection of the supply voltage
GND	Connection of the GND module
OUT0	OUT0 from the PROFET™ +2 12V
OUT1	OUT0/OUT1 ¹⁾ from the PROFET™ +2 12V
OUT2	OUT1/OUT2 ²⁾ from the PROFET™ +2 12V
OUT3	OUT1/OUT3 ²⁾ from PROFET™ +2 12V
IN0, IN1, IN2, IN3	External input control of the PROFET™ +2 12V device with serial 4.7 k Ω resistors
DEN	External control of DEN pin with serial 4.7 k Ω resistor; enables/disables the diagnosis functions of the device
DSEL0, DSEL1	External control of DSELx pins with serial 4.7 k Ω resistor to select a dedicated channel for diagnosis feedback
IS	Sense output of the PROFET™ +2 12V (see Chapter 2.1)
J_GND	J_GND is used to connect the PROFET™ +2 12V to the motherboard's GND network. It is also possible to choose between three ground resistors (150 Ω , 47 Ω , 0 Ω) (see Chapter 2.1)
J_SENSE1	Used to enable/disable the sense filtering (see Chapter 2.1)
J_SENSE2	J_SENSE2 either enables the connection to a 1.2 k Ω onboard-resistor or a direct connection to the IS connector on the motherboard to add an external RSENSE with different values (see Chapter 2.1)
μ IO-Connectors	The PROFET™ +2 12V demoboard can either be used with external sources or with the μ IO-stick by means of the Infineon Config Wizard (see Chapter 2.1 , Chapter 5)

- 1) If a 1-channel or 2-channel device is used, OUT0 and OUT1 are connected to OUT0 of the device connector.
 2) If a 2-channel device is used, OUT3 and OUT4 are connected to OUT1 of the device connector.

2 Motherboards [MB]

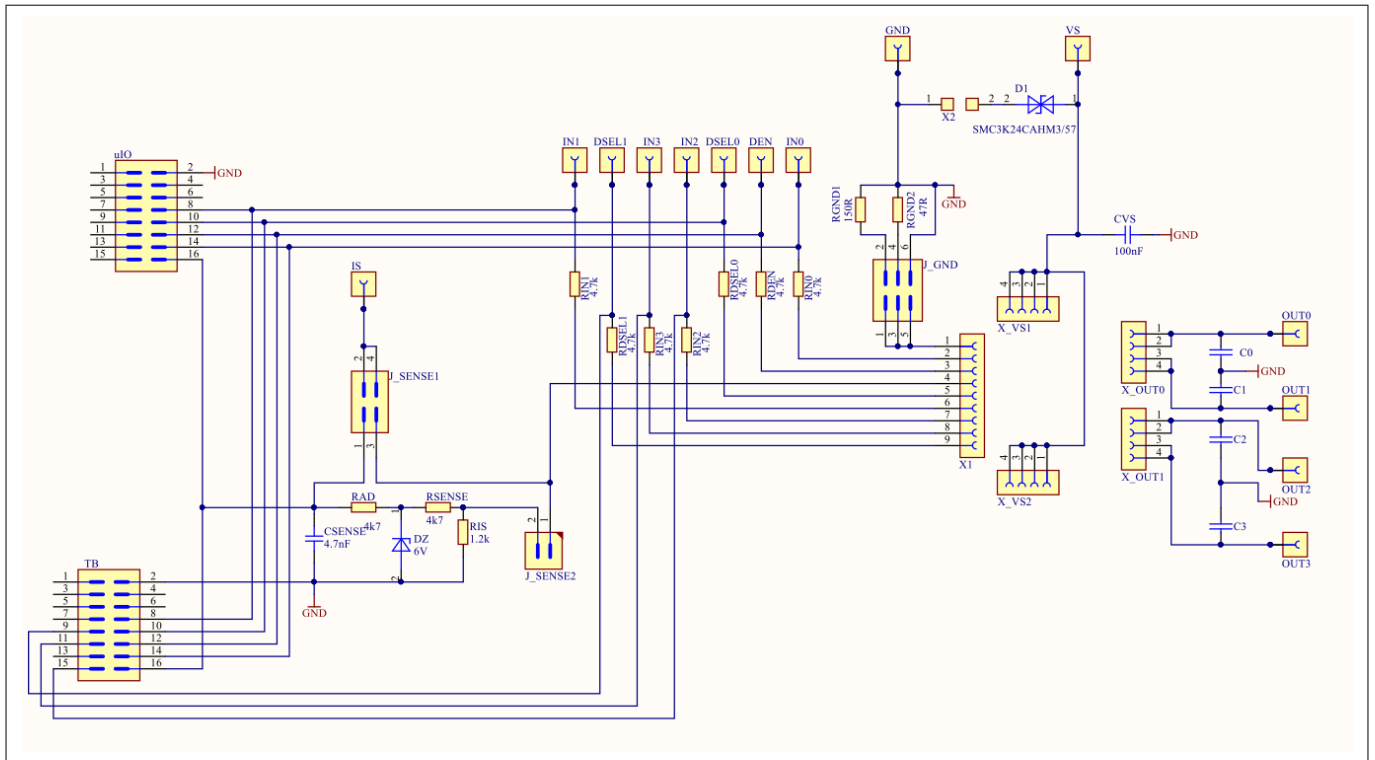


Figure 6 Motherboard V2.0 schematic

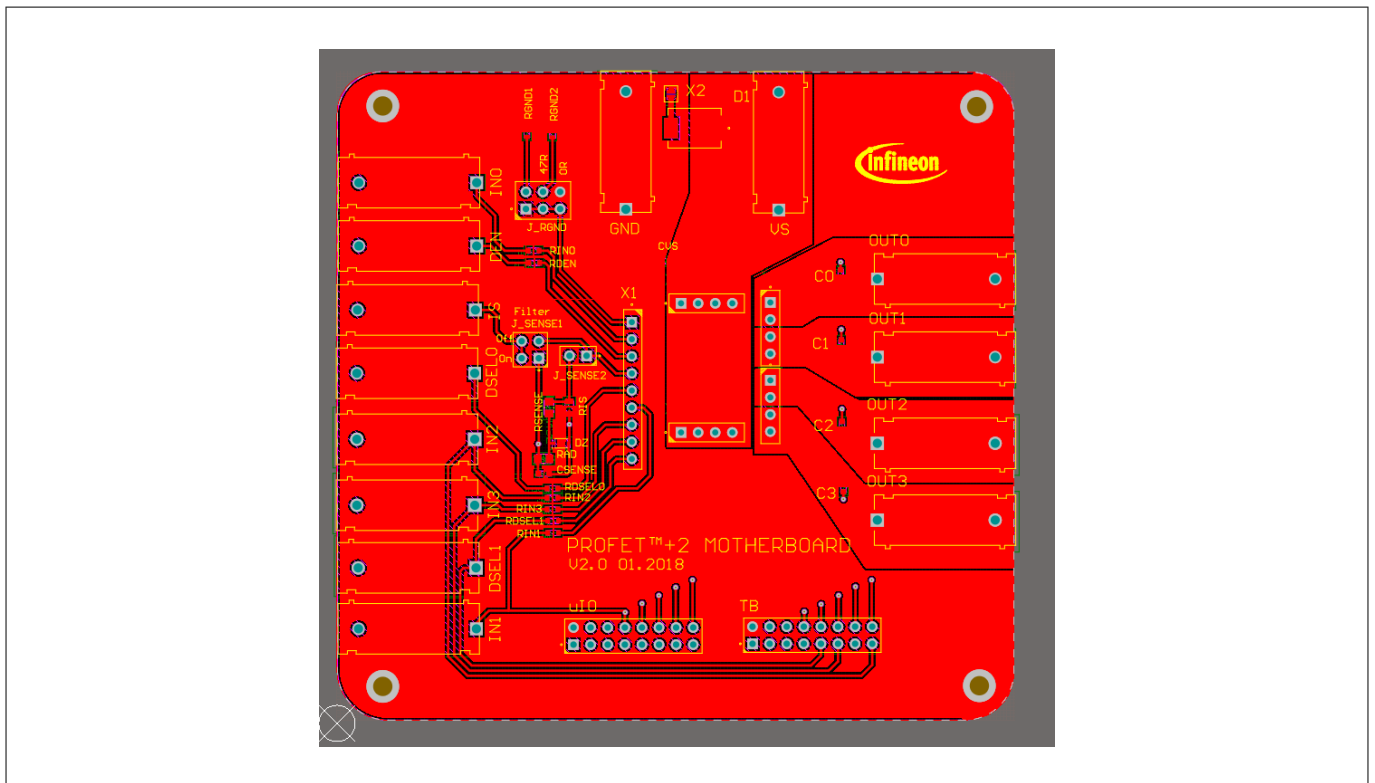


Figure 7 Motherboard V2.0 PCB top view

2 Motherboards [MB]

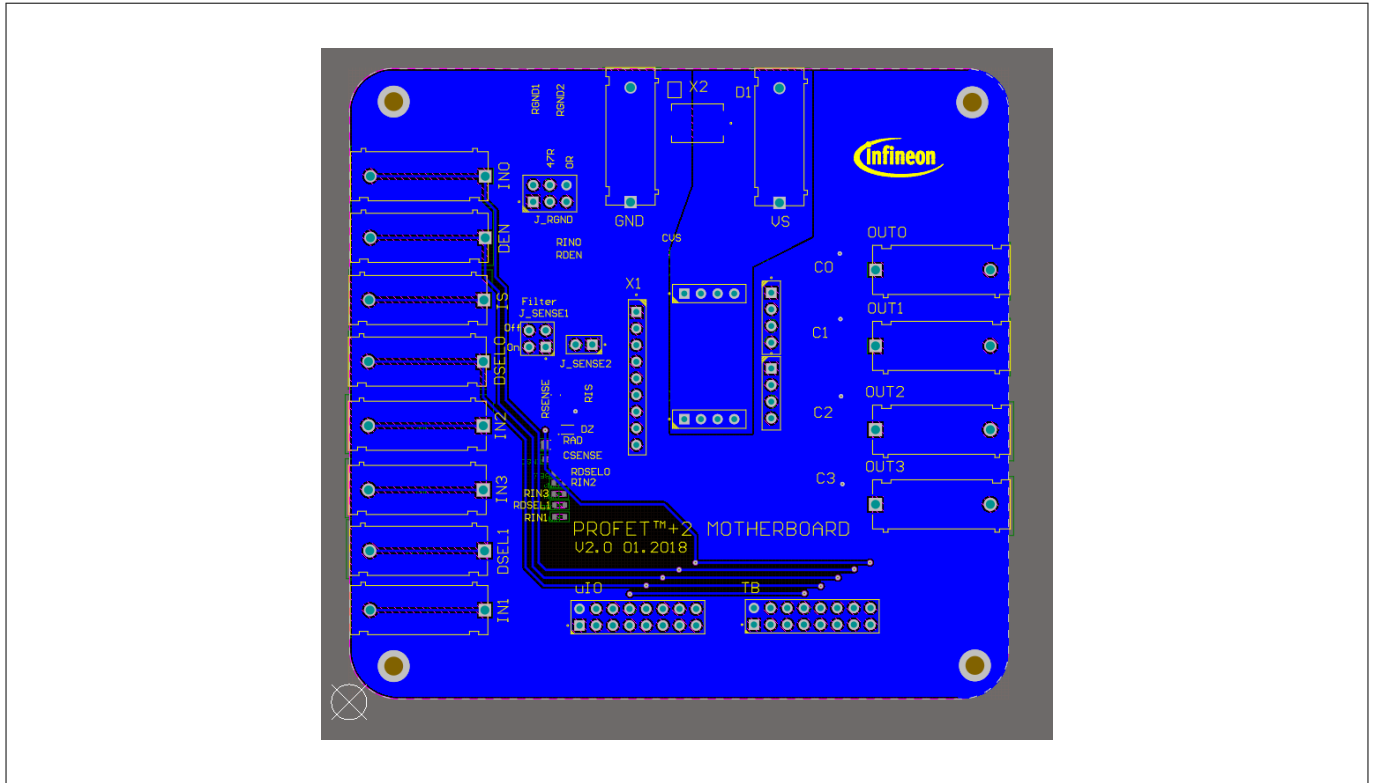


Figure 8 Motherboard V2.0 PCB bottom view

2.3 PROFET™ +2 12V motherboard V3.0 (PROFET ONE4ALL MB V1)

As a new option, the PROFET™ +2 12V motherboard V3.0 provides the possibility to easily plug in further PROFET™ devices with a DB. In comparison to the PROFET™ +2 12V motherboard V2.0, this improvement allows the use of more PROFET™ devices.

Figure 9 shows the changes of the GND path. There are two jumpers: J_GND and J_RGND. Using J_GND enables modification of the ground resistor value at four different positions. Figure 10 shows the possible jumper positions and Table 8 contains the description of the four possible jumper positions and their values.

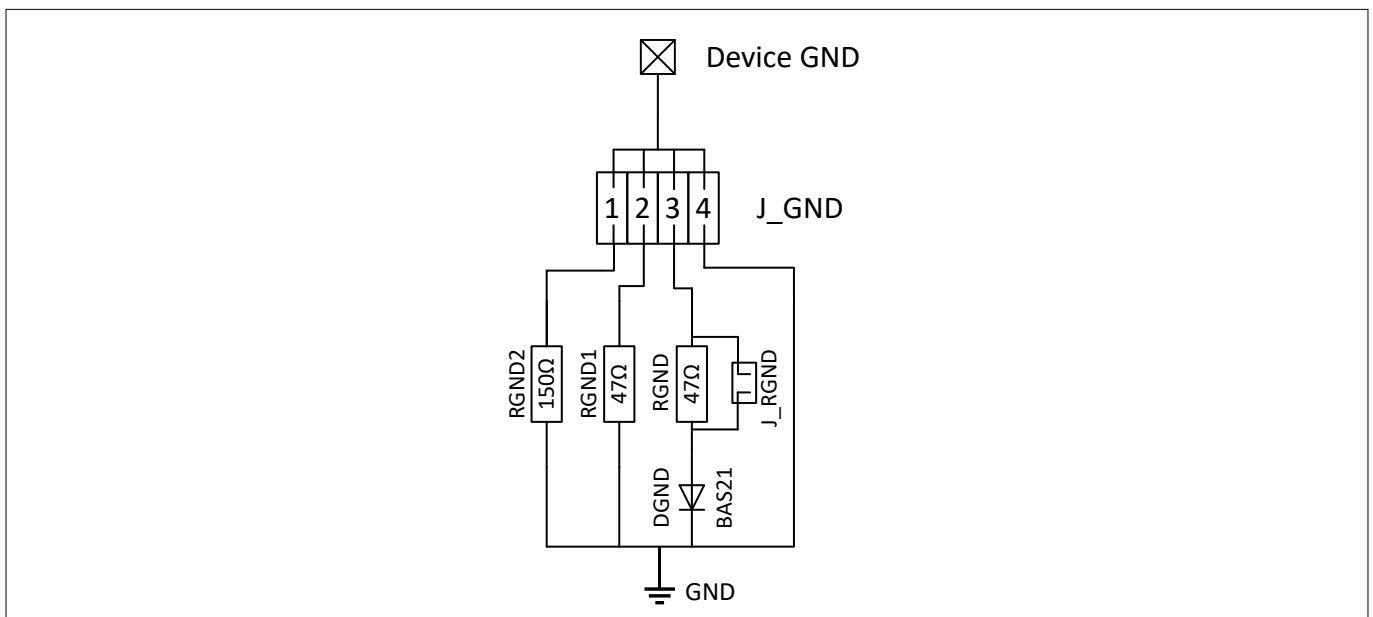


Figure 9 Motherboard V3.0 GND schematic

2 Motherboards [MB]

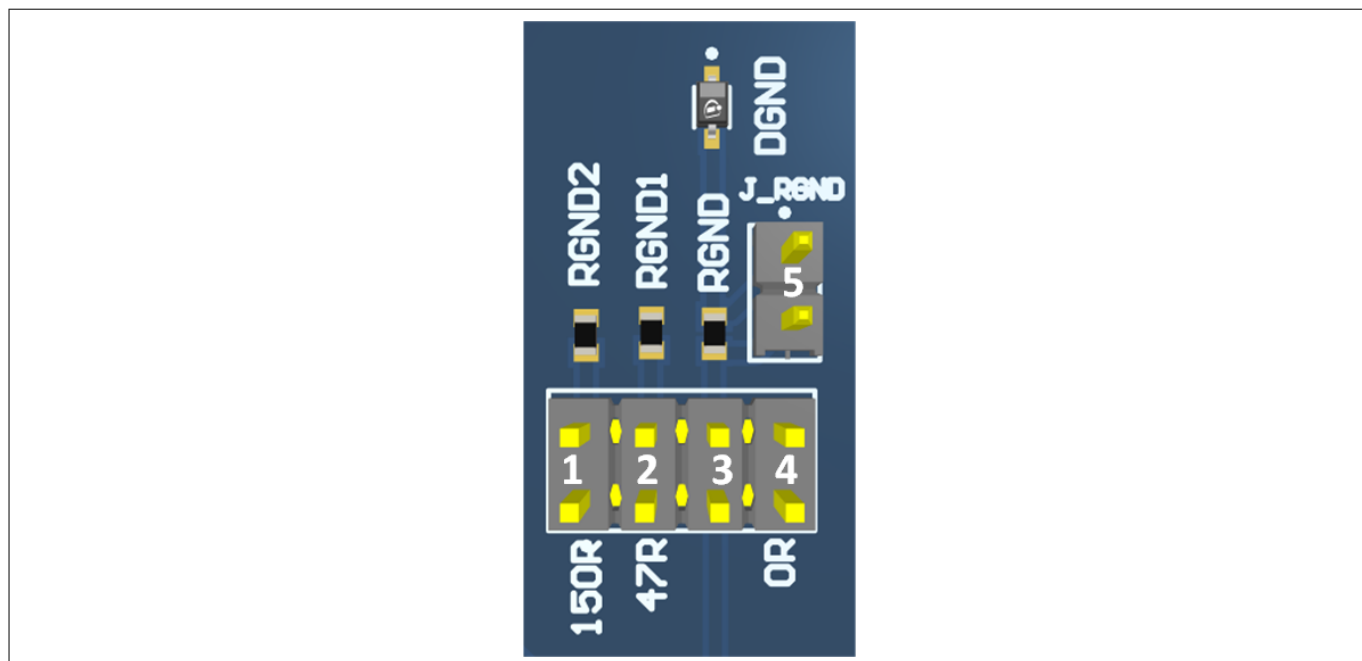


Figure 10 Motherboard V3.0 GND path layout

Table 8 Motherboard V3.0 J_GND jumper positions

#	Description
1	The PROFET™ +2 12V DB ground is connected to the MB module ground via a 150 Ω resistor
2	The PROFET™ +2 12V DB ground is connected to the MB module ground via a 47 Ω resistor
3	The PROFET™ +2 12V DB ground is connected to the MB module ground via a 47 Ω resistor and a serial diode (BAS21-03W)
4	The PROFET™ +2 12V DB ground is connected to the MB module ground via a 0 Ω resistor
3 + 5	The PROFET™ +2 12V DB ground is connected to the MB module ground via a serial diode (BAS21-03W)

2 Motherboards [MB]

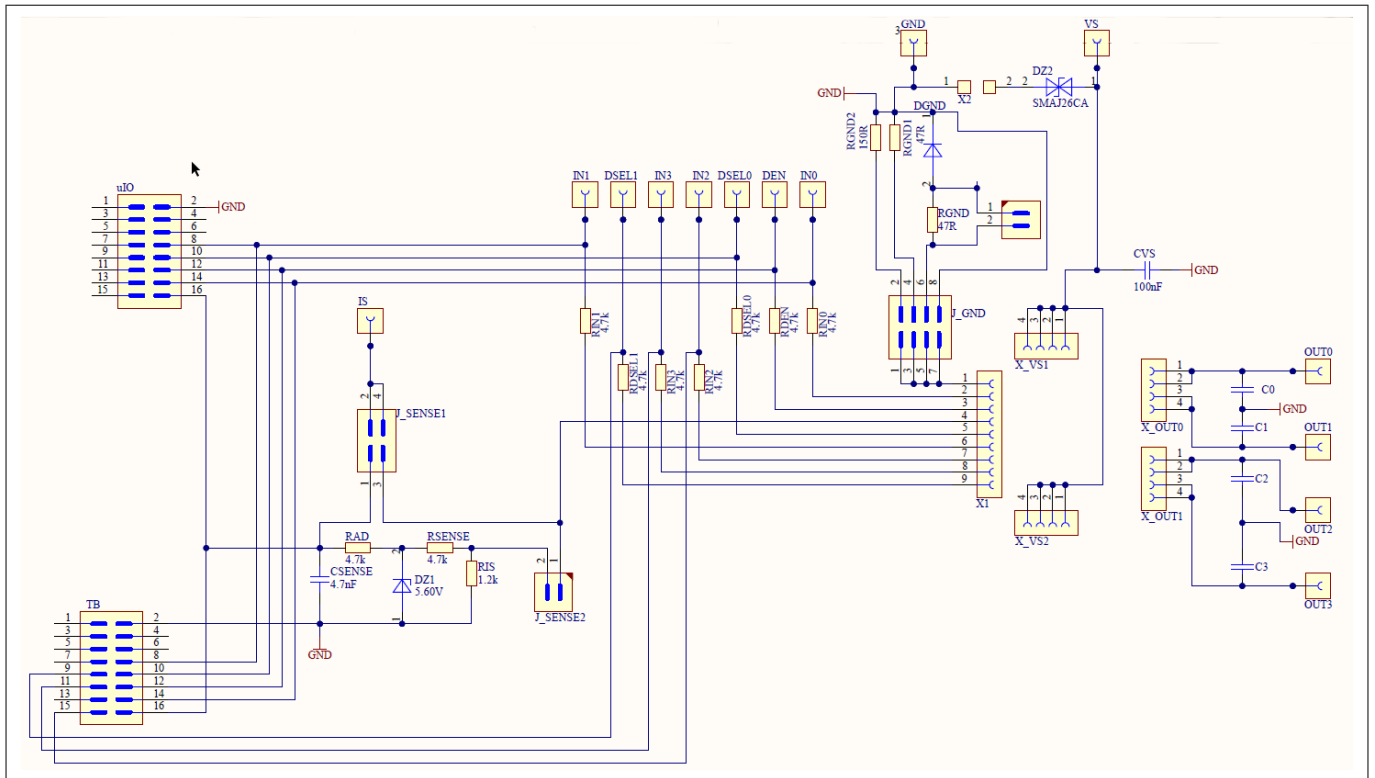


Figure 11 Motherboard V3.0 schematic

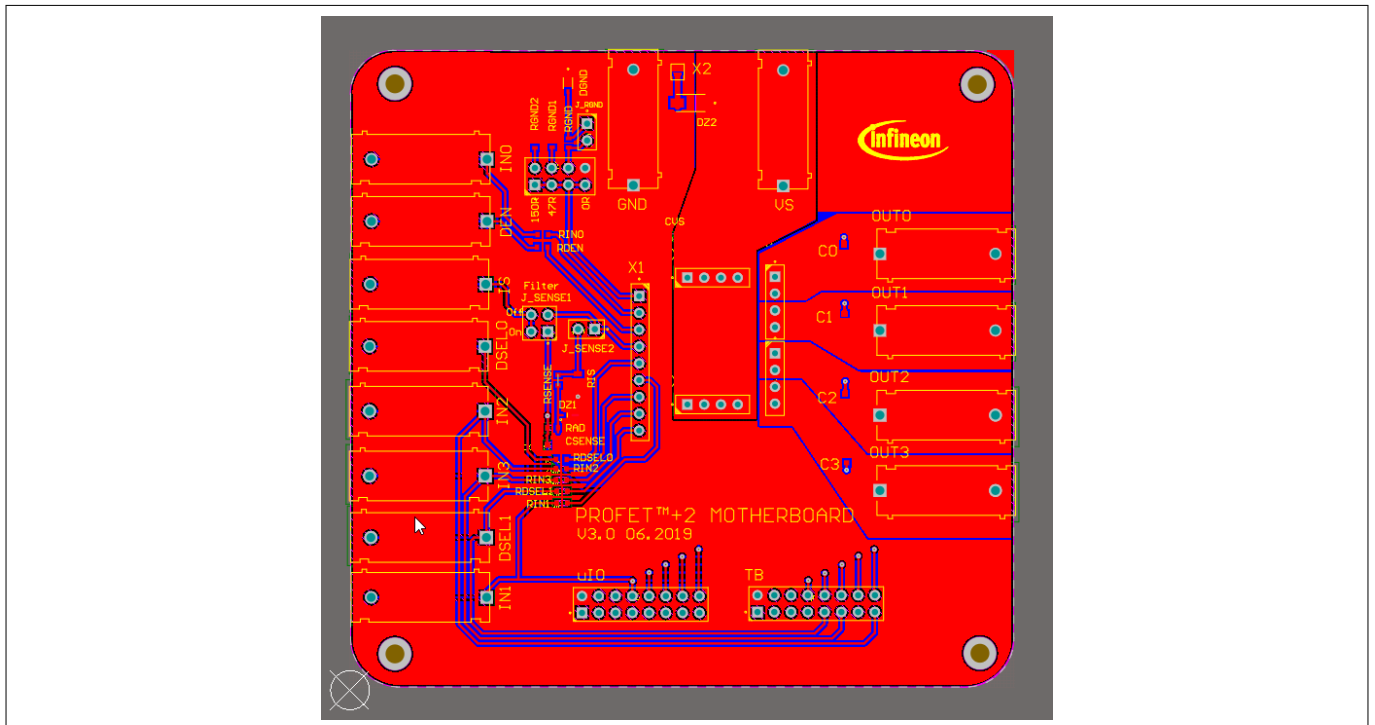


Figure 12 Motherboard V3.0 PCB top view

2 Motherboards [MB]

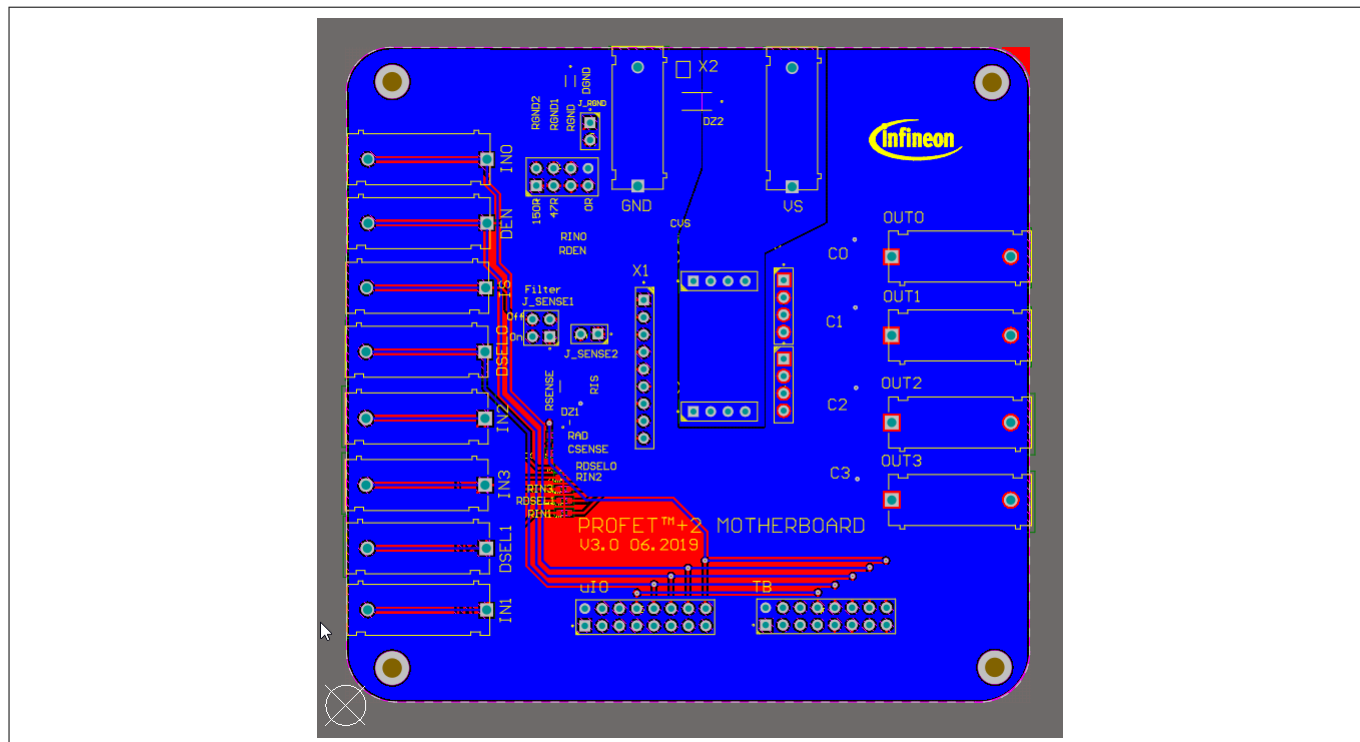


Figure 13 Motherboard V3.0 PCB bottom view

3 Daughterboards [DB]

3 Daughterboards [DB]

3.1 PROFET™ +2 12V 2-channel daughterboard

Figure 14 below shows the PROFET™ +2 12V DB in top and bottom view. As can be seen, depending on the required product (1-channel or 2-channel), this device is located on the DB. The DB is plugged onto the MB.

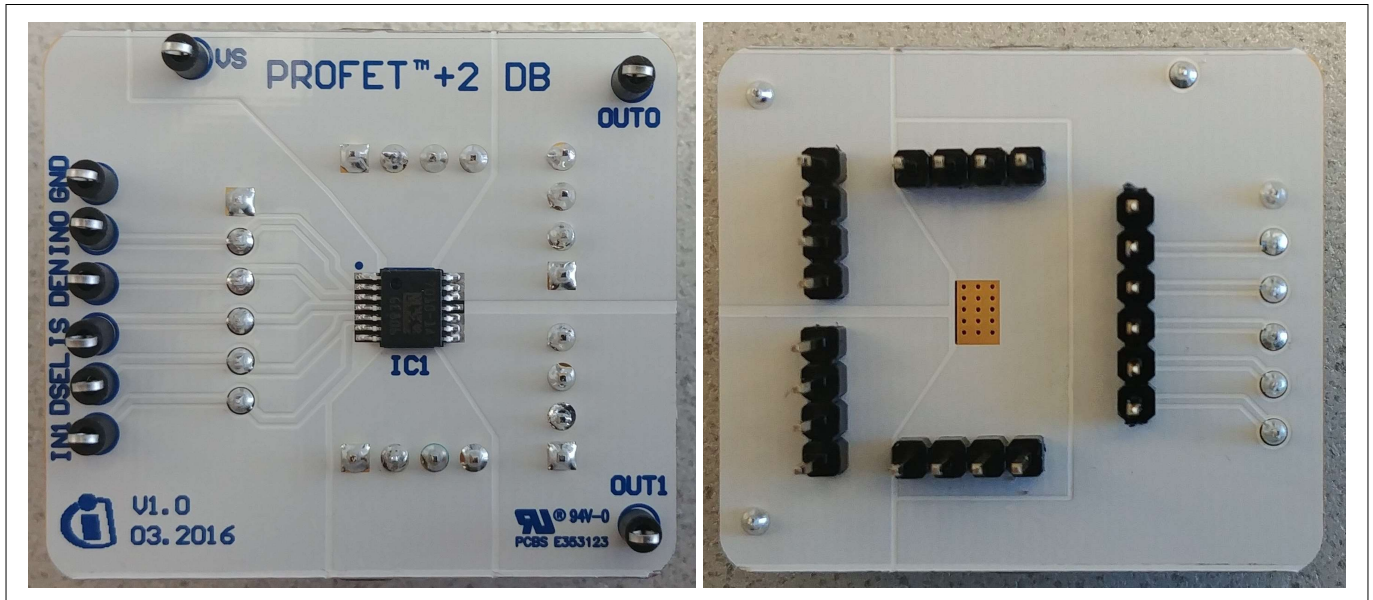


Figure 14 PROFET™ +2 12V 2-channel daughterboard top and bottom view

3.2 PROFET™ +2 12V 4-channel daughterboard

Figure 15 below shows the PROFET™ +2 12V DB in top view. As can be seen, depending on the required product (4-channel), this device is located on the DB. The DB is plugged onto the MB.

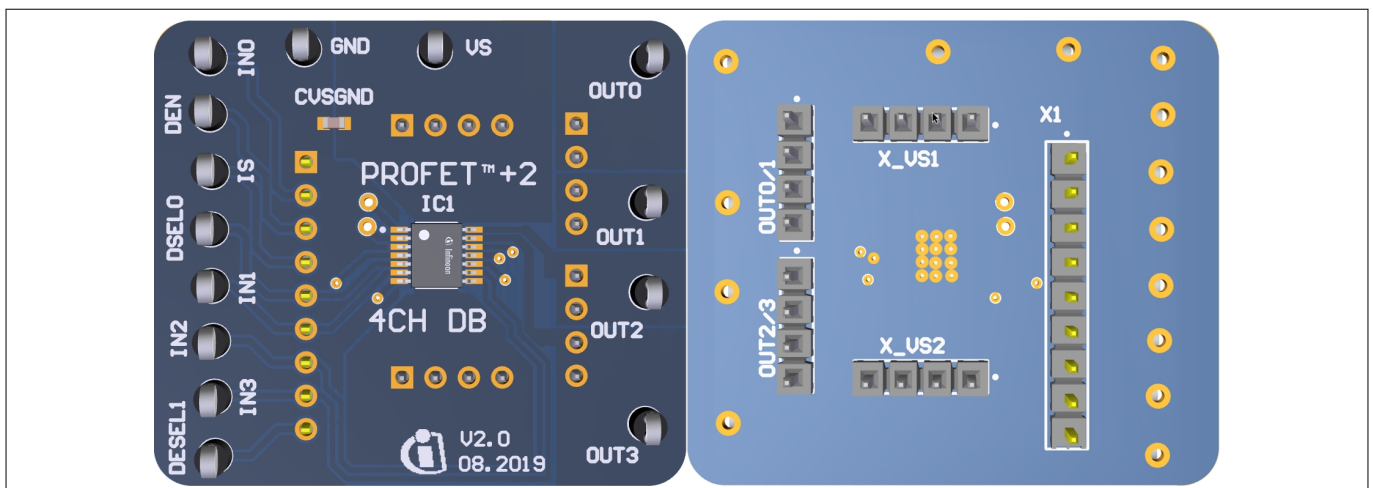


Figure 15 PROFET™ +2 12V 4-channel daughterboard top and bottom view

3.3 PROFET™ Load Guard daughterboard

The PROFET™ Load Guard daughterboard includes the device (PROFET™ Load Guard). The DB is plugged onto the MB.

3 Daughterboards [DB]

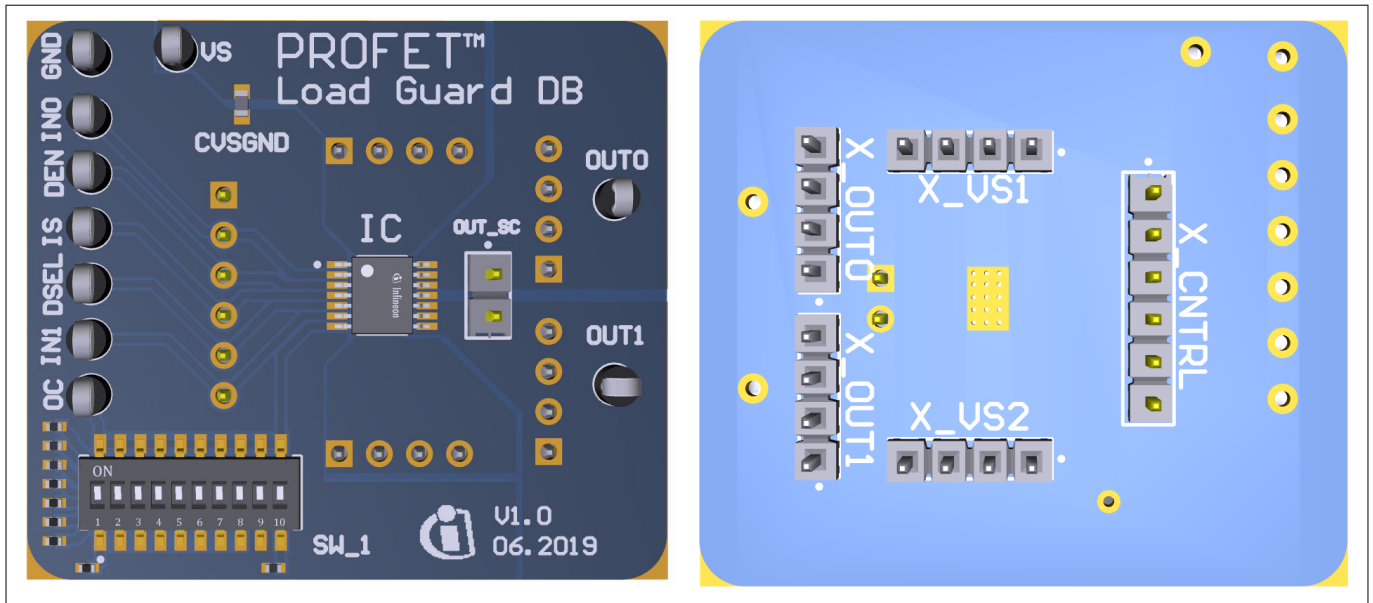


Figure 16 PROFET™ Load Guard daughterboard top and bottom view

Note: Due to redesigns, daughterboards with different dip switch resistor values have been produced. It is recommended to check the resistor values.

Using the PROFET™ Load Guard daughterboard, please be aware, that the board is designed for and can only be used in combination with 1-channel and 2-channel devices. Additionally pin 7 is connected to the dip switch with different values. See [Figure 17](#).

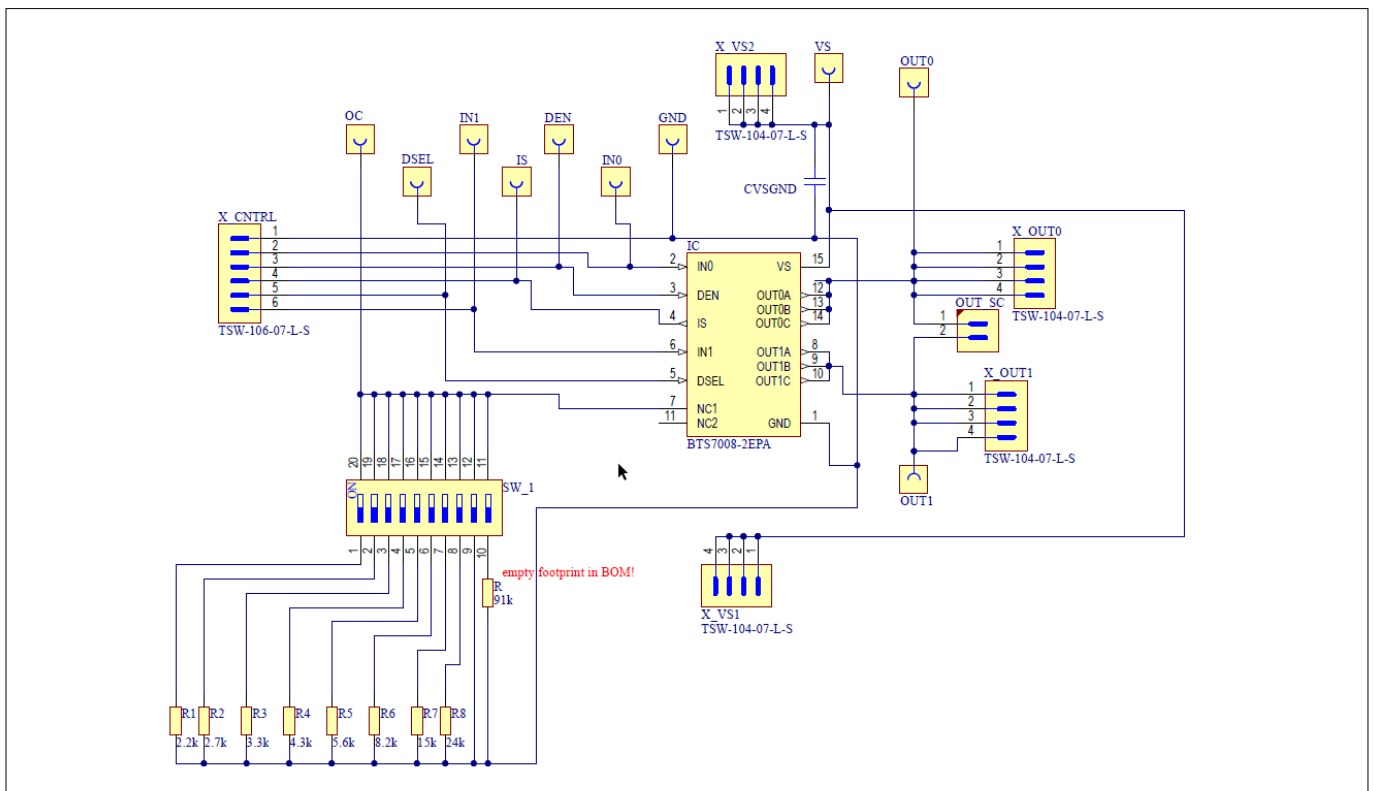


Figure 17 PROFET™ Load Guard schematic

3 Daughterboards [DB]

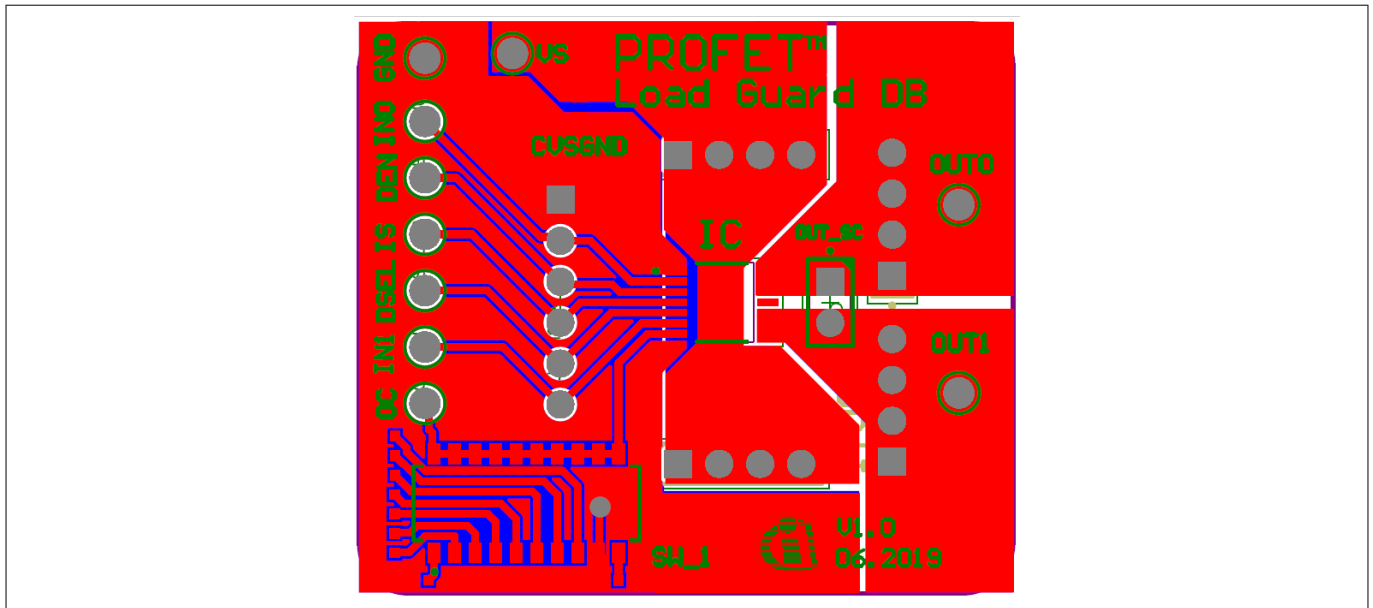


Figure 18 PROFET™ Load Guard PCB design

3.4 PROFET™ +2 12V daughterboard 14/24 pin

The PROFET™ +2 12V daughterboard 14/24 pin includes the device (PROFET™ +2 12V). The DB is plugged onto the MB.

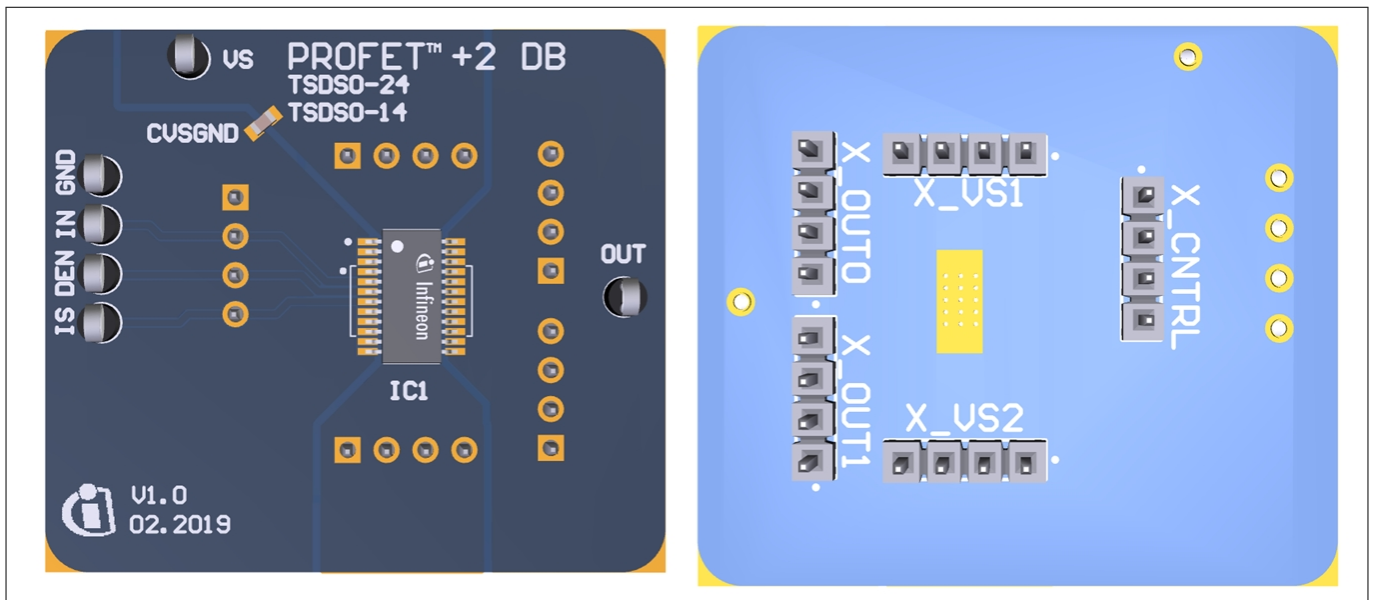


Figure 19 PROFET™ +2 12V daughterboard 14/24 pin top and bottom view

Using the PROFET™ +2 12V daughterboard 14/24 pin, please note, that the board is designed for 1-channel devices and can only be used in combination with 1-channel devices. Additionally the following points need to be considered:

- The correct position of a 14-pin device is indicated by the white lines on both sides of the footprint and the dot marking the GND pin position
- The correct position of the 24-pin device is marked by the dot in the upper left corner of the footprint for the GND pin
- Between the VS pin and the GND pin of the DB is an additional 100 nF capacitor

3 Daughterboards [DB]

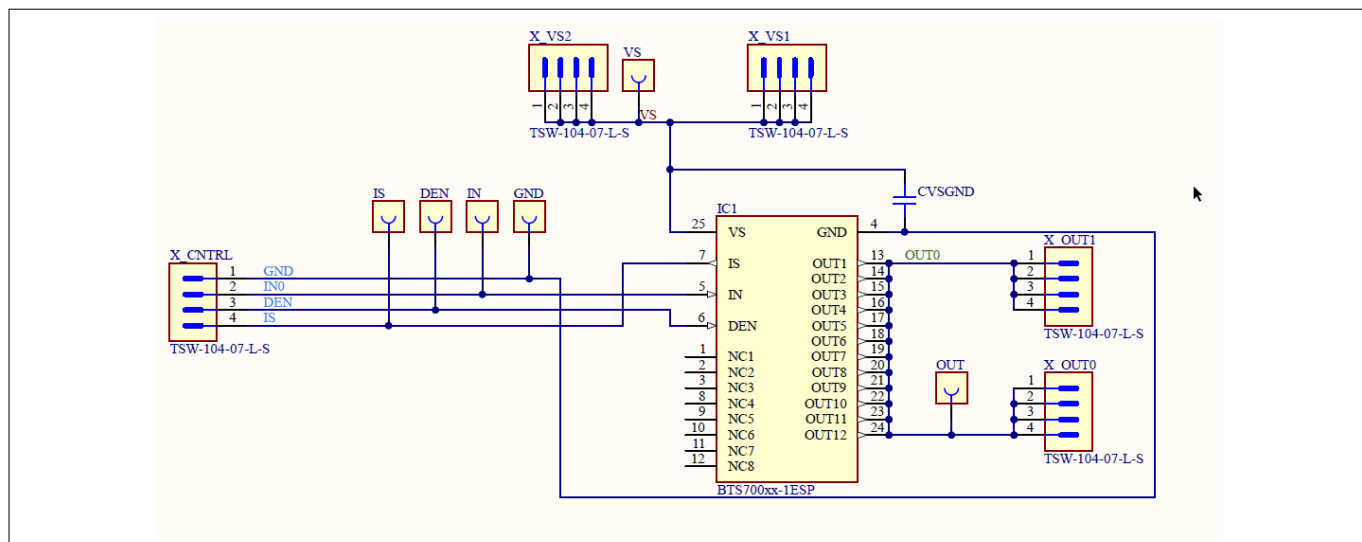


Figure 20 PROFET™ +2 12V daughterboard 14/24 pin schematic

4 Evaluation boards [EB]

4 Evaluation boards [EB]

Note: Depending on the evaluation board, compatibility with the Infineon Toolbox and Config Wizard can not be guaranteed. Please check the availability of software for each board.

4.1 PROFET™ +2 12V Arduino H-bridge evaluation board

This chapter provides a quick introduction to the Arduino H-bridge evaluation board, which is designed to handle the H-bridge configuration of all 2-channel devices in the PROFET™ +2 12V family. The intention of the evaluation board is to give customers a quick start for lab evaluation of the performance of this board.

Note: Its recommended to use the Arduino H-bridge evaluation board with 5 V compatible Arduino microcontroller boards.

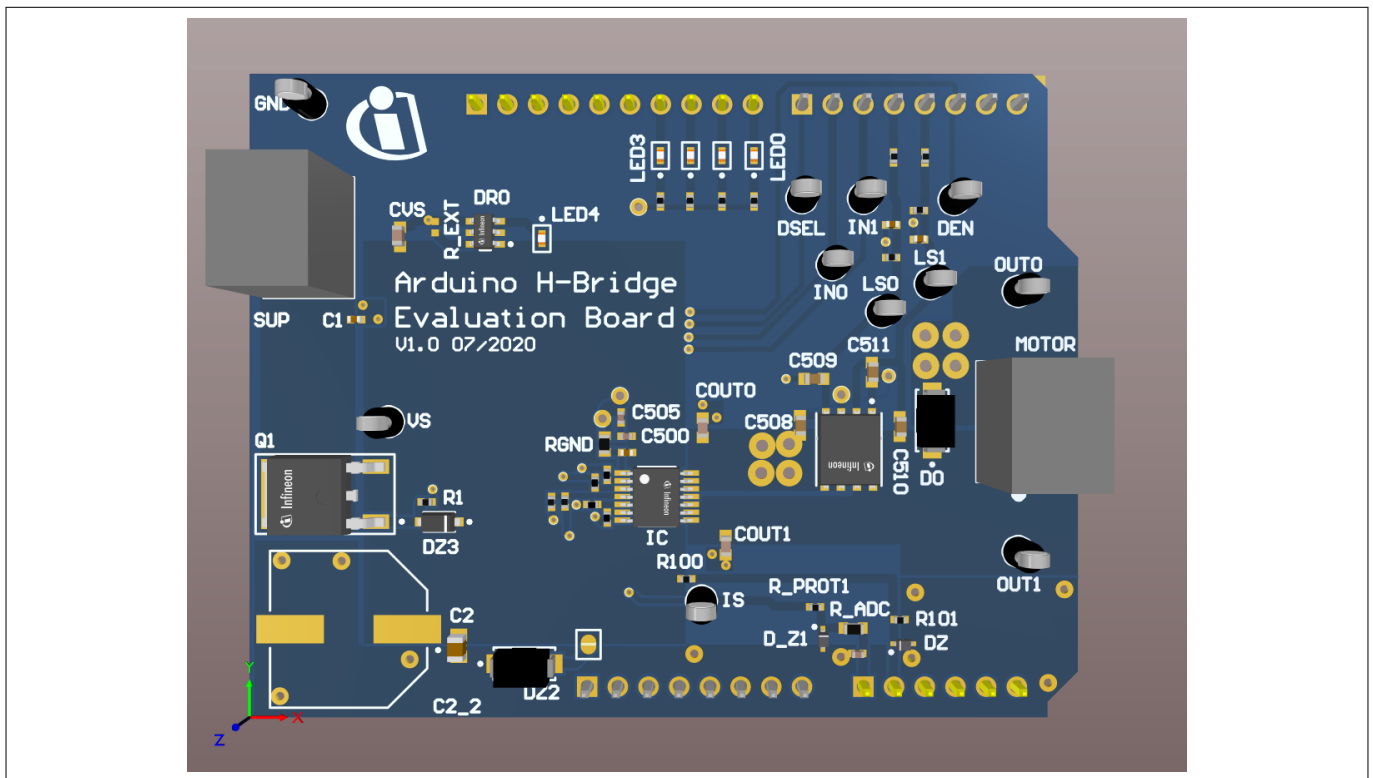


Figure 21 Arduino H-bridge evaluation board

Default assembly

As seen in Figure 21 and Figure 24 some parts are not mounted on default assembling. The following parts are not mounted:

- C2_2 with 470 μ F
- R_EXT of the BCR320U circuit

BCR320U circuit

This circuit includes a red LED, an LED driver (BCR320U) and a footprint for the R_EXT resistor. The BCR320U circuit is placed in parallel to the IC. The LED indicates if the PROFET™ +2 12V device is supplied. With the additional external resistor the current flow can be adjusted. The higher the current flow, the brighter the LED4 shines. For more information see the [datasheet](#) of the BCR320U LED driver.

4 Evaluation boards [EB]

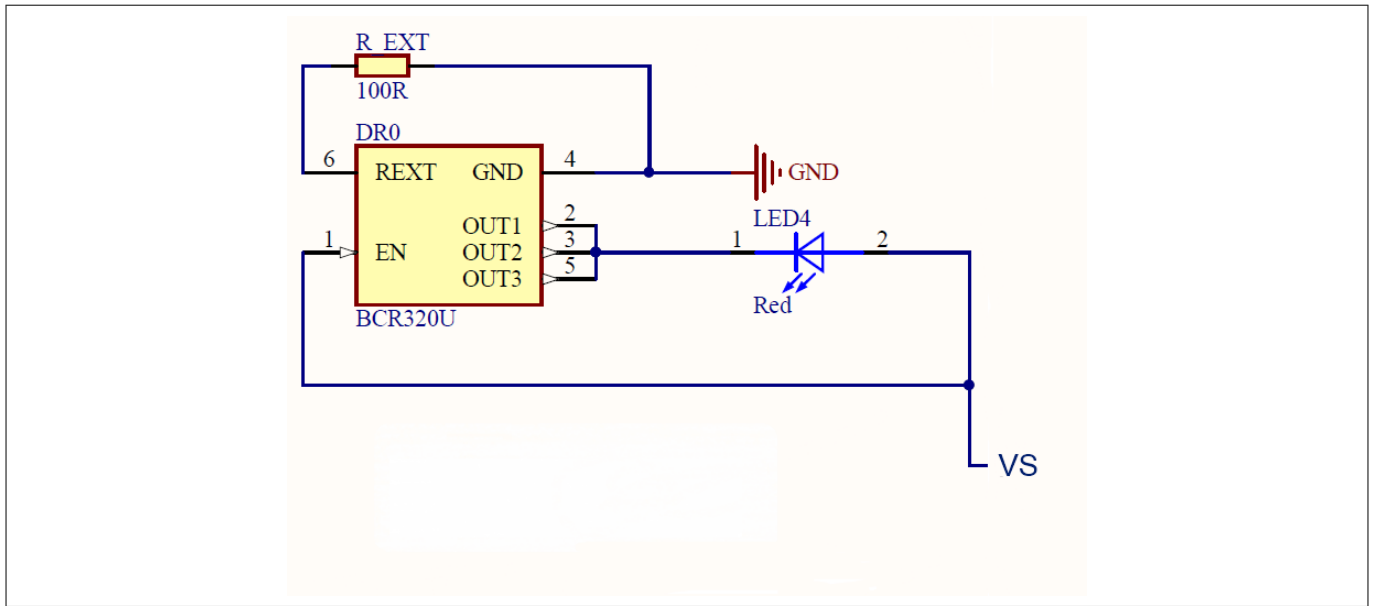


Figure 22 BCR320U circuit

Arduino pinout

The Arduino H-bridge evaluation board can be controlled via Arduino board. See [Figure 23](#) and [Figure 24](#) of the pinout for the Arduino board. The Arduino pin connections are written in cyan font color.

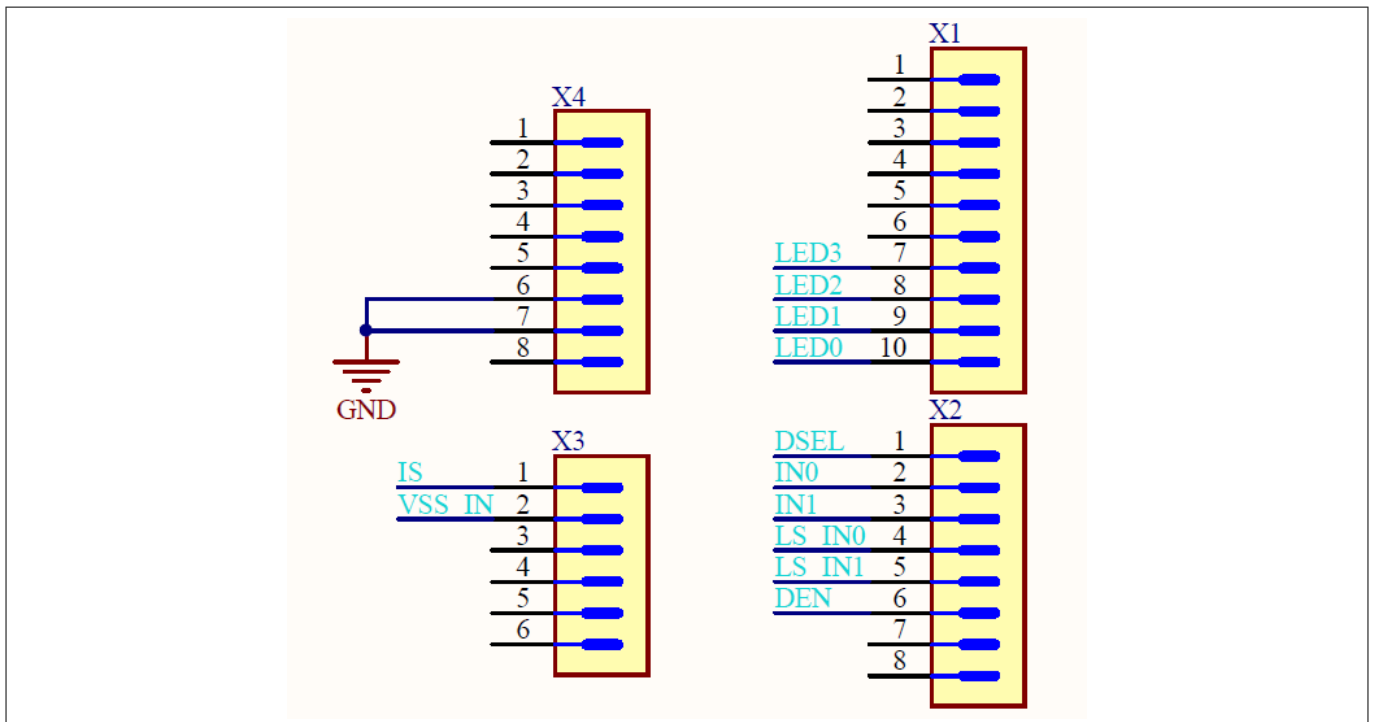


Figure 23 Arduino H-bridge pinout

4 Evaluation boards [EB]

Table 9 Board connectors and functions

Connector	Function
VS	Supply pin connects the positive supply voltage to this pin
GND	Ground pin connects the supply ground to this pin
IN0	Input signal of channel 0 of IC turns the device on/off and resets the fault if triggered 3.3 V or 5 V logical input
IN1	Input signal of channel 1 of IC turns the device on/off and resets the fault if triggered 3.3 V or 5 V logical input
DEN	Sense enable signal of IC measurements at the IS pin are now possible and in addition it resets the counter if a fault is triggered 3.3 V or 5 V logical input
DSEL	Diagnostic select signal selects the channel to be diagnosed 3.3 V or 5 V logical input
IS	Sense output of IC
OUT0	Output 0 of IC connects a grounded load to this pin, such as a power resistor, a bulb or 12 V heating elements
OUT1	Output 1 of IC connects a grounded load to this pin, such as a power resistor, a bulb or 12 V heating elements
LS0	Low side pin 0 enables the low-side 0, input signal of channel 0 of IC T500/T501
LS1	Low side pin 1 enables the low side 1, input signal of channel 1 of IC T500/T501
MOTOR	2 pins for connecting the motor

4 Evaluation boards [EB]

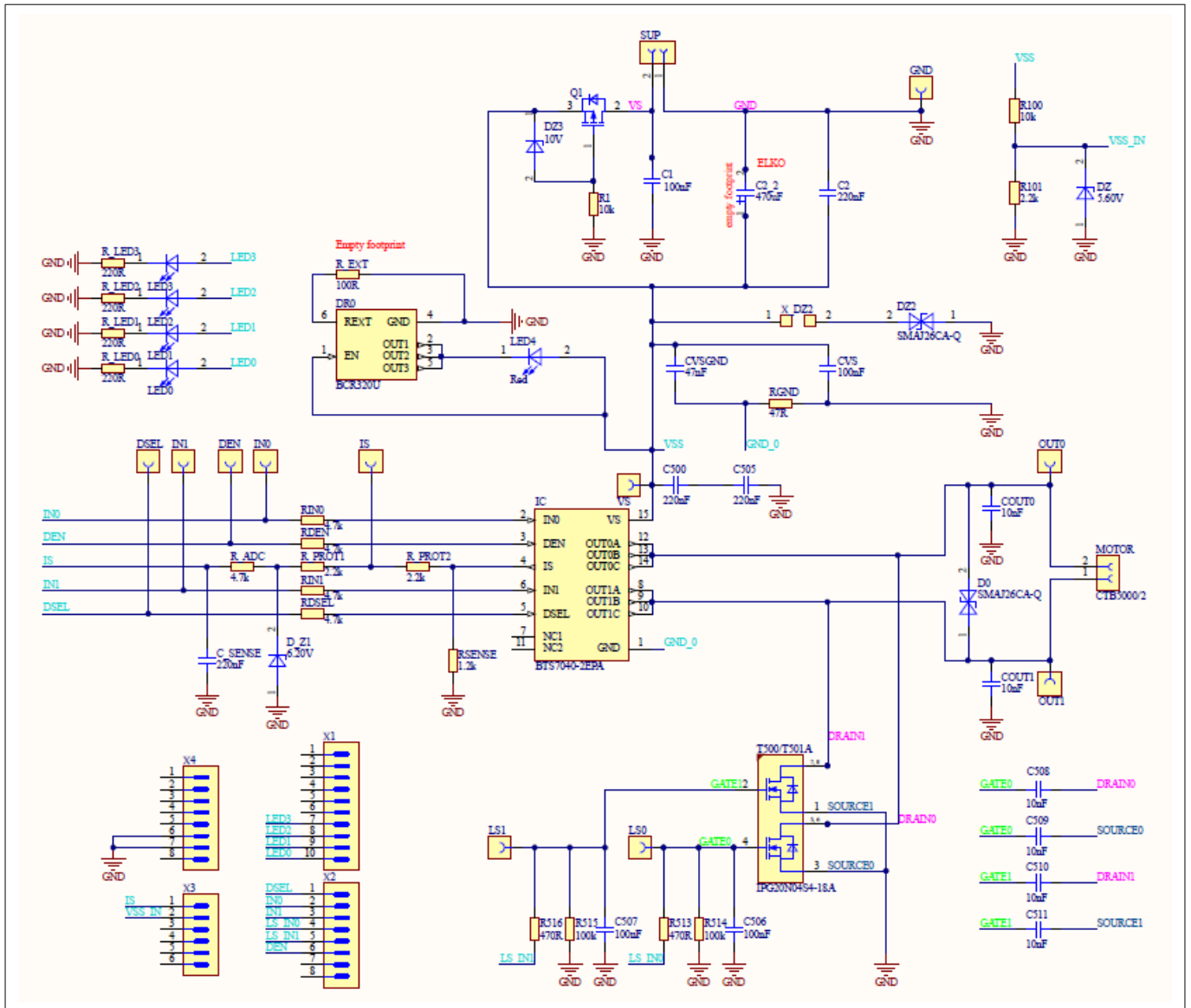


Figure 24 PROFET™ +2 12V Arduino H-bridge evaluation board schematic

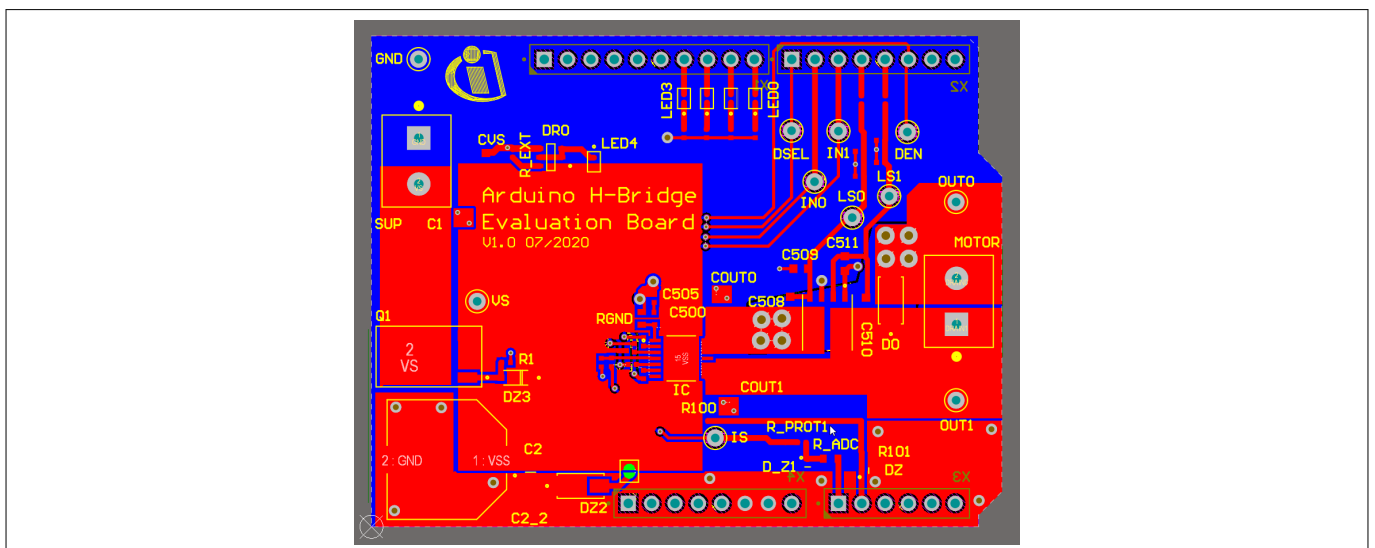


Figure 25 Arduino H-bridge top layout

4 Evaluation boards [EB]

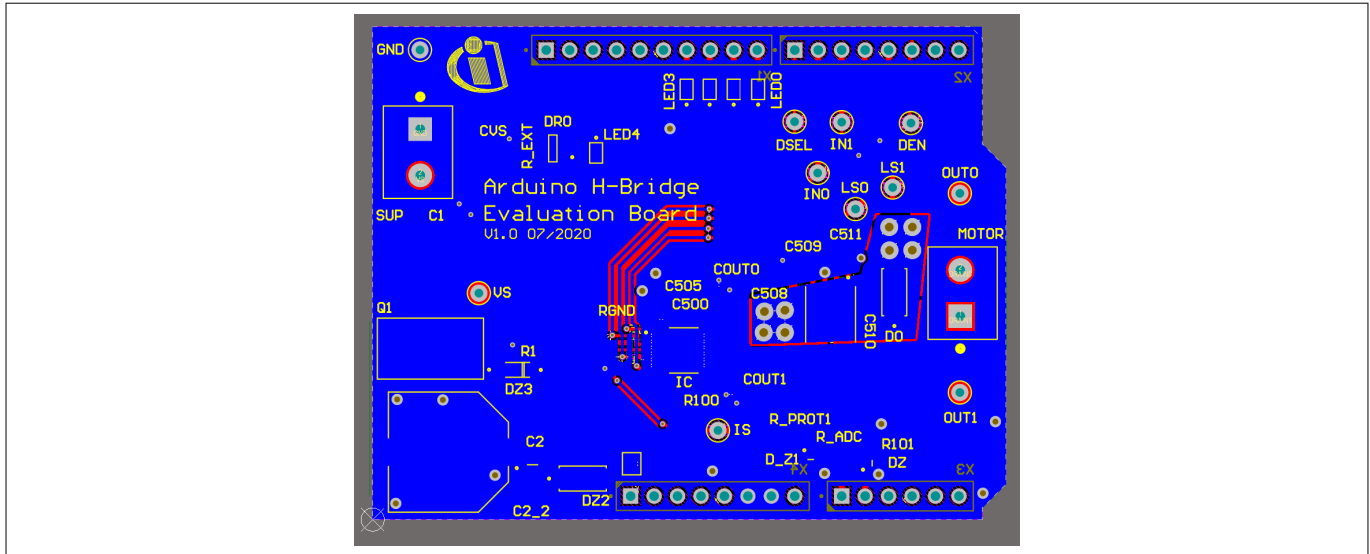


Figure 26 Arduino H-bridge bottom layout

Bill of materials

Table 10 Arduino H-bridge evaluation board BOM

Designator	Comment	Manufacturer	Manufacturer order number
C1, C506, C507	100 nF	TDK Corporation	C1005X7R1H104K050BE
C2	220 nF	MuRata	GRM21BR71H224KA01
C2_2	470 μ F	Nippon Chemi-Con	EMHS500ARA471MKG5S
C500, C505, C_SENSE	220 nF	TDK Corporation	CGA2B3X7R1E224K050BB
C508, C509, C510, C511	10 nF	AVX	06035F103K4Z2A
COUT0, COUT1	10 nF	AVX	06035C103K4Z2A
CVS	100 nF	AVX	06035C104K4Z2A
CVSGND	47 nF	MuRata	GRM155R61H473KE19
D0, DZ2		Bourns	SMAJ26CA-Q
D_Z1	6.20 V	Vishay	BZX584C6V2-V-G-08
DEN, DSEL, GND, IN0, IN1, IS, LS0, LS1, OUT0, OUT1, VS	-	Vero Technologies	20-2137
DR0	-	Infineon Technologies	BCR320U
DZ	5.60 V	Vishay	BZX584C5V6-V-G
DZ3	10 V	Nexperia	BZT52H-B10,115
IC	-	Infineon Technologies	BTS7040-2EPA
LED0, LED1, LED2, LED3	Yellowish green	ROHM Semiconductors	SML-P12MTT86R
LED4	Red	ROHM Semiconductors	SML-P12UTT86R
MOTOR, SUP	-	Camden Boss	CTB5000/2

(table continues...)

4 Evaluation boards [EB]

Table 10 (continued) Arduino H-bridge evaluation board BOM

Designator	Comment	Manufacturer	Manufacturer order number
Q1	–	Infineon Technologies	IPD90P03P4L-04
R1, R100	10 kΩ	Vishay	CRCW040210K0FK
R101, R_PROT1, R_PROT2	2.2 kΩ	Vishay	CRCW04022K20FK
R513, R516	470 Ω	Vishay	CRCW0402470RFK
R514, R515	100 kΩ	Vishay	CRCW0402100KFK
R_ADC	4.7 kΩ	Yageo	RC0603FR-074K7L
R_EXT			
R_LED0, R_LED1, R_LED2, R_LED3	220 Ω	Vishay	CRCW0402220RFK
RDEN, RDSEL, RIN0, RIN1	4.7 kΩ	Yageo	RC0402FR-074K7L
RGND	47 Ω	Vishay	CRCW060347R0FK
RSENSE	1.2 kΩ	Vishay	CRCW04021K20FK
T500/T501	–	Infineon Technologies	IPG20N04S4-18A
X1	–	Samtec	TSW-110-07-L-S
X2, X4	–	Samtec	TSW-108-23-F-S
X3	–	Samtec	TSW-106-07-L-S
X_DZ2	Solder jumper 2 pins		

4.2 PROFET™ +2 12V Grade0 customer evaluation board

Scope and purpose

This chapter provides a quick introduction to the Grade0 PROFET™ +2 12V customer evaluation board, which is designed to handle all devices of the PROFET™ +2 12V Grade0 family. The intention of the evaluation board is to provide customers with a quick start for lab evaluation of the performance offered by this product family. PROFET™ +2 12V family consists of six different high-side switches (from 4 mΩ to 80 mΩ) and offers an extended junction temperature range up to 175°C that allows partitioning at high ambient temperature with high ohmic parts.

The PROFET™ +2 12V Grade0 portfolio is designed to provide extended lifetime at elevated temperatures based on the AEC-Q100 Grade0 qualification. The PROFET™ +2 12V Grade0 devices are suitable to drive resistive, inductive and capacitive loads. They are the perfect fit for applications with extended and high temperature mission profiles, such as under the hood, powertrain and transmission applications.

4 Evaluation boards [EB]

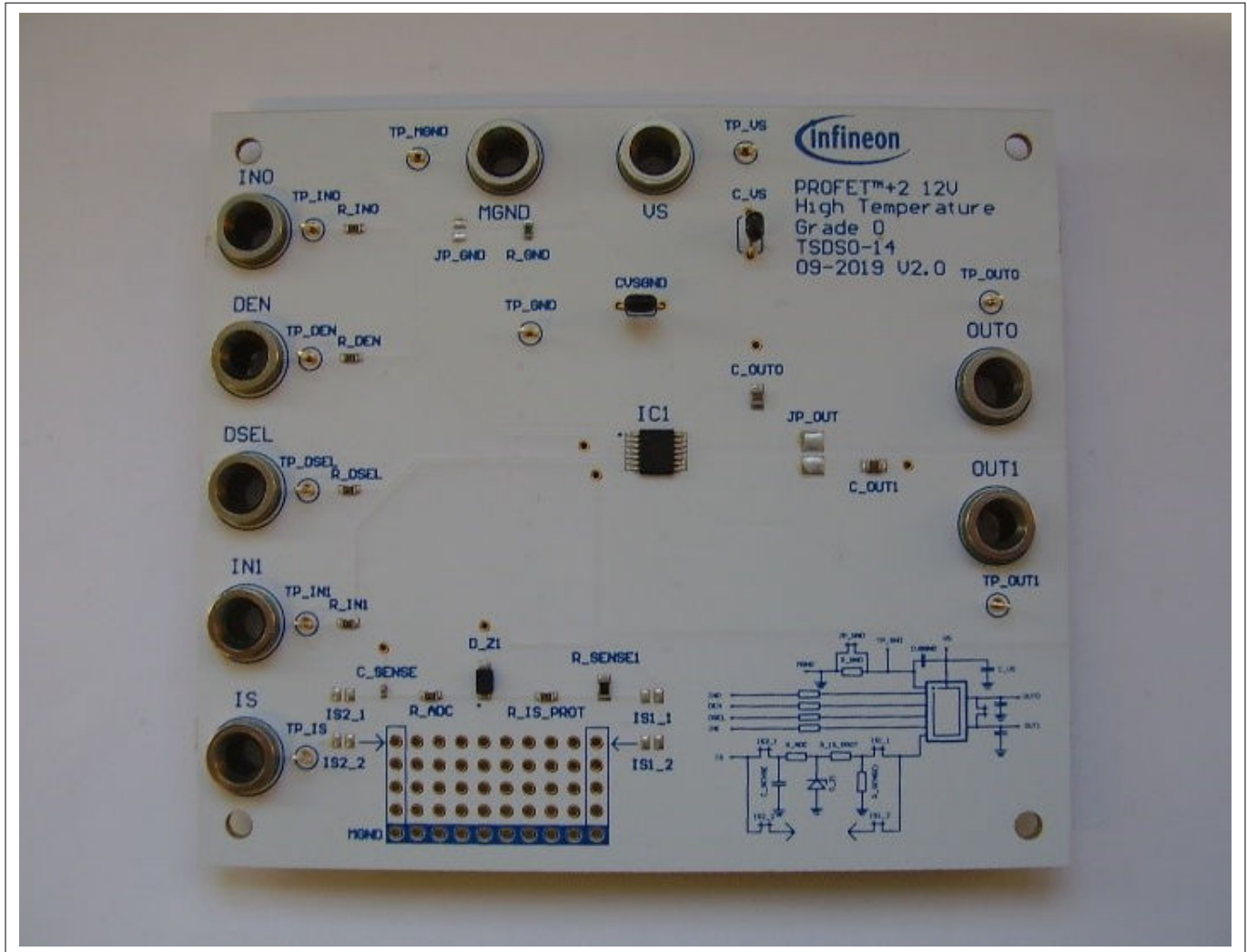


Figure 27 Grade0 customer evaluation board

GND resistor selection

The jumper JP_GND is open by default. If the jumper is open, the integrated 49.9 Ω resistor is selected. If the jumper is closed, no ground resistor is selected within the PCB. It is recommended to use the Grade0 evaluation board with the integrated or an external connected ground resistor.

Sense configuration

The Grade0 evaluation board offers two different possibilities for selecting a sense configuration. One is the standard configuration, while the other option is the flexible breadboard.

The standard configuration is identical to the application information given in the datasheet of the Grade0 products. For more information, refer to the datasheets of the device. This sense configuration has to be used by setting the jumpers IS2_1 and IS2_2.

The voltage at IS can be measured with a voltmeter. If IN=DEN="high" the load current can be calculated with this formula:

$$I_{LOAD} = \frac{V_{IS} \times k_{LLIS}}{1.2 \text{ k}\Omega} \tag{1}$$

The second configuration is a 10 x 5 hole breadboard with a connection to module ground at the blue marked holes in the bottom row. There it is possible to design a custom sense configuration with through-hole devices. To use this sense configuration set the jumpers IS1_1 and IS1_2.

4 Evaluation boards [EB]

Table 11 Board connectors and functions

Connector	Function
VS	Supply pin connects the positive supply voltage to this pin (4.1 V to 28 V, typical 12 V DC)
MGND	Ground pin connects the supply ground to this pin connection for the module X_GND to the device GND
IN0	Input signal of channel 0 of IC turns the device ON/OFF and resets the fault if triggered 3.3 V or 5 V logical input
IN1	Input signal of channel 1 of IC turns the device ON/OFF and resets the fault if triggered 3.3 V or 5 V logical input
DEN	Sense enable signal of IC turns measurements signaled at the IS pin ON/OFF and resets the fault if triggered 3.3 V or 5 V logical input
DSEL	Diagnostic select signal selects the channel to be diagnosed 3.3 V or 5V logical input
IS	Sense output of IC
OUT0	Output 0 of IC connects a grounded load to this pin, such as a bulb, a power resistor or 12 V heating elements
OUT1	Output 1 of IC connects a grounded load to this pin, such as a bulb, a power resistor or 12 V heating elements
JP_GND	Ground resistor closes the jumper to short-circuit the 47 Ω default ground resistor
JP_OUT	Output connection closes the jumper to increase the current capability performance in case of a single channel device

Table 12 Component values of PROFET™ +2 12V Grade0 customer evaluation board

Designator	Value
C_VSGND	47 nF
R_ADC, R_DEN, R_DSEL, R_IN0, R_IN1, R_IS_PROT	4.7 kΩ
R_SENSE1	1.21 kΩ

(table continues...)

4 Evaluation boards [EB]

Table 12 (continued) Component values of PROFET™ +2 12V Grade0 customer evaluation board

Designator	Value
C_VS	68 nF
C_SENSE	220 pF
R_GND	49.9 Ω
C_OUT0, C_OUT1	10 nF
D_Z1	VZ = 6.2 V

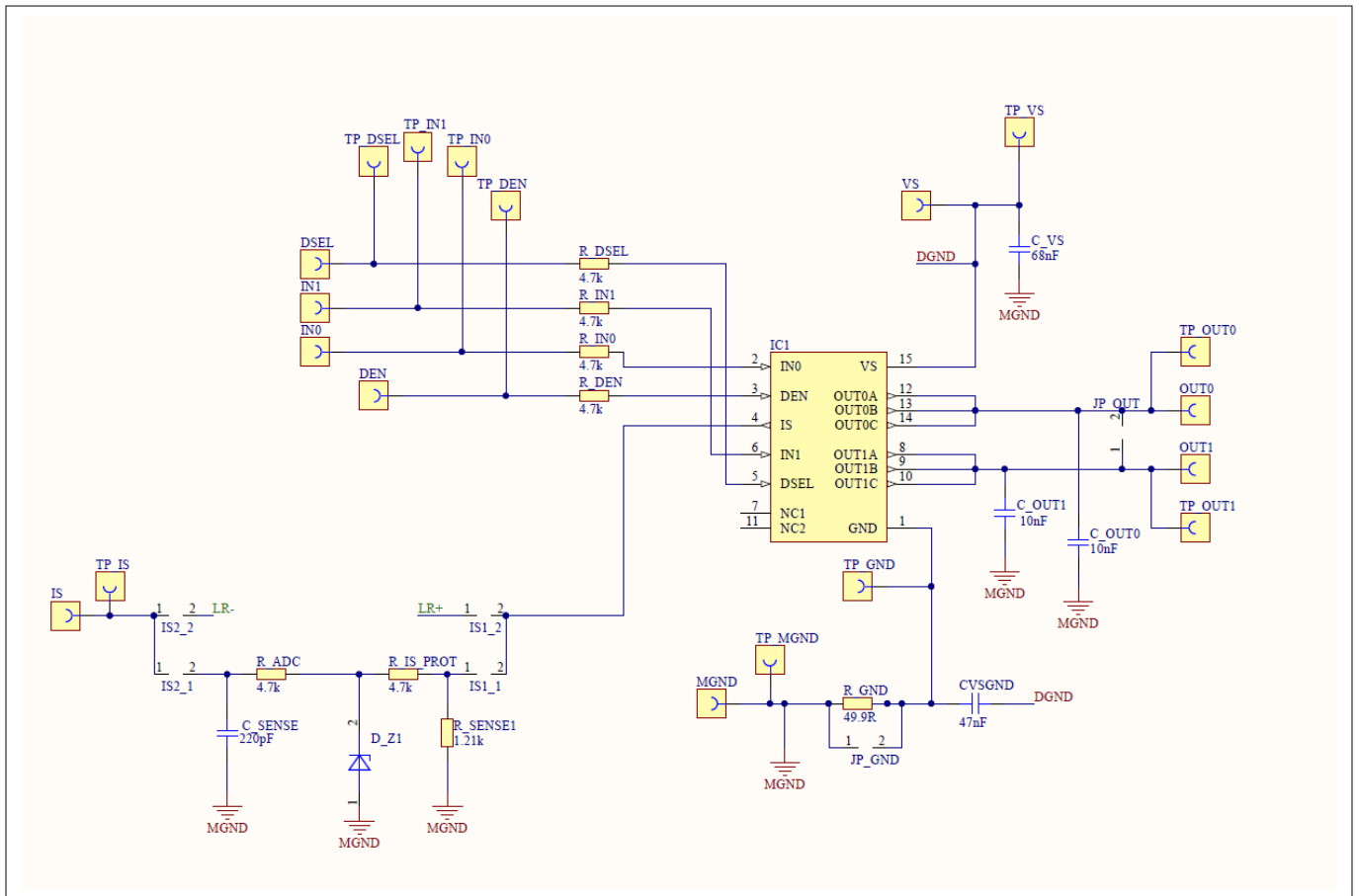


Figure 28 PROFET™ +2 12V Grade0 customer evaluation board schematic

4 Evaluation boards [EB]

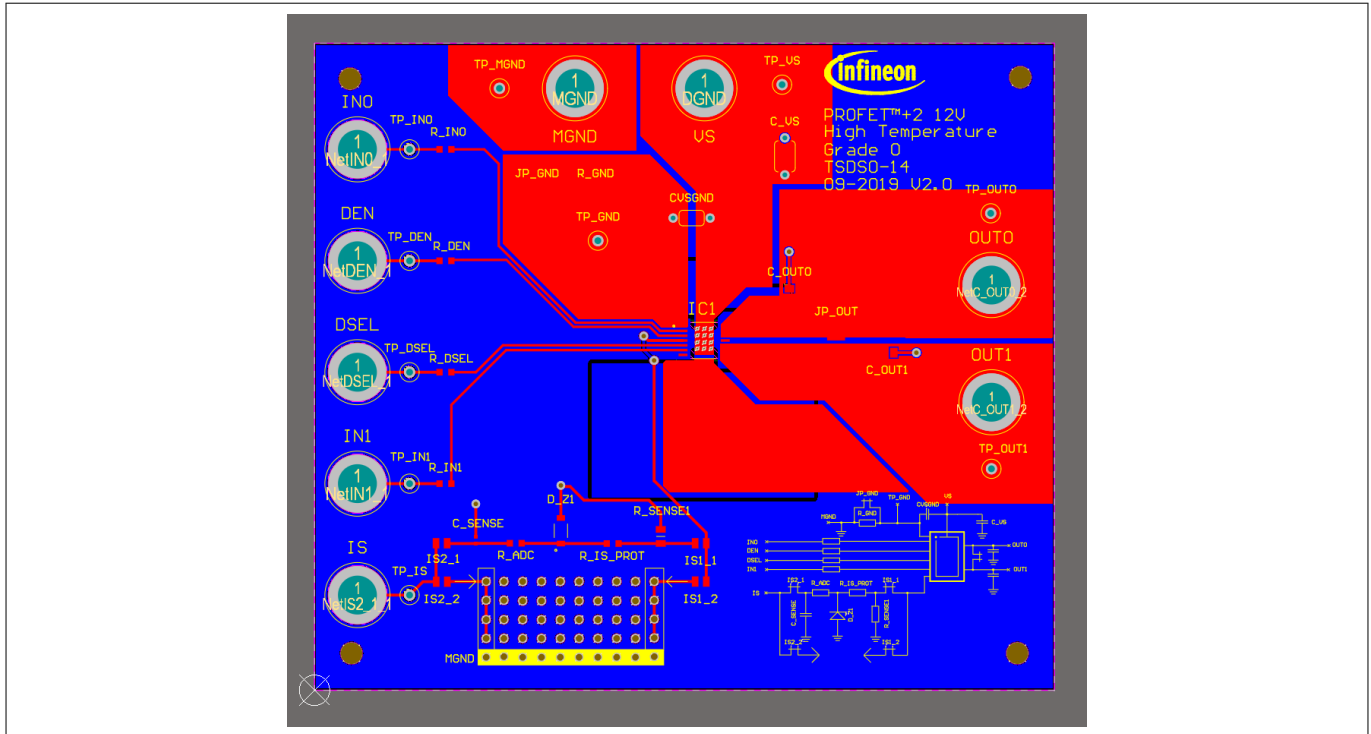


Figure 29 PROFET™ +2 12V Grade0 customer evaluation board top layout

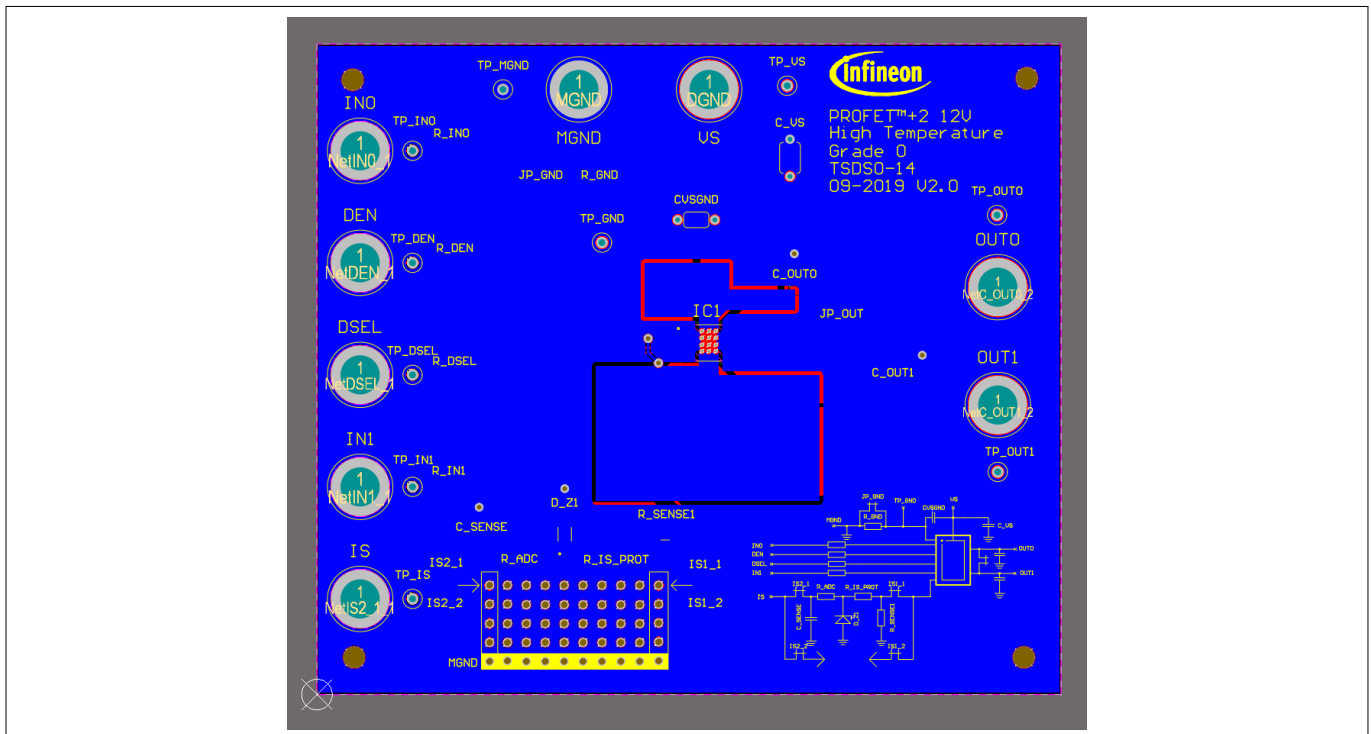


Figure 30 PROFET™ +2 12V Grade0 customer evaluation board bottom layout

5 Software (optional)

5 Software (optional)

The PROFET™ +2 12V MB can either be used directly or with the ConfigWizard for IPD. Accessing the software requires the Infineon Toolbox to be installed. [Download the Infineon Toolbox](#).

5.1 GUI description

The Infineon Config Wizard is designed to support an easy configuration of Infineon devices. configure Infineon devices easily. The graphical user interfaces (GUI) are product specific and not intended for detailed evaluation (use).

5.1.1 μ IO-Stick

The Infineon μ IO-Stick is the required tool to connect the Config Wizard to a device. [Figure 31](#) shows the μ IO-Stick which is delivered with a 16-pin ribbon cable that enables to connect the μ IO-Stick to the MB.



Figure 31 Infineon μ IO-Stick with ribbon cable

To connect the MB with the μ IO-Stick please refer to μ IO connector μ IO and μ IO connector TB. [Figure 32](#) below illustrates the μ IO-Stick connected to the PROFET™ +2 12V MB.

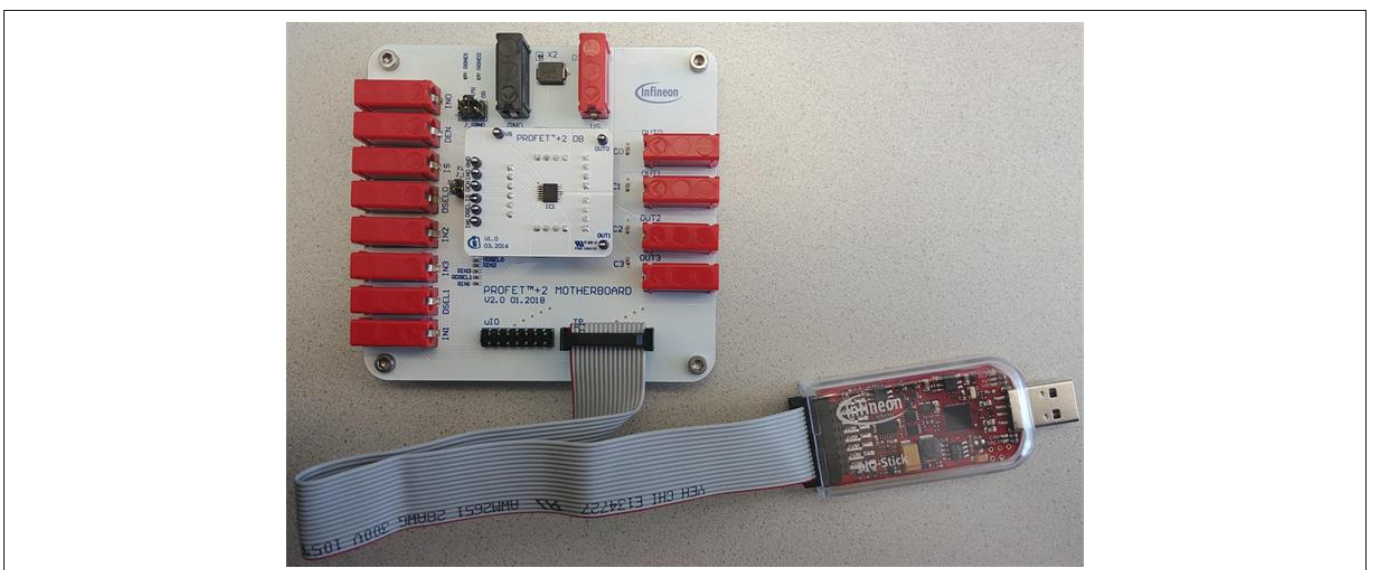


Figure 32 Infineon μ IO-Stick connected to the PROFET™ +2 12V MB

5 Software (optional)

5.1.2 Start screen

Figure 33 shows the start screen of the Config Wizard for IPD. It provides tile-like buttons named according to the product families.

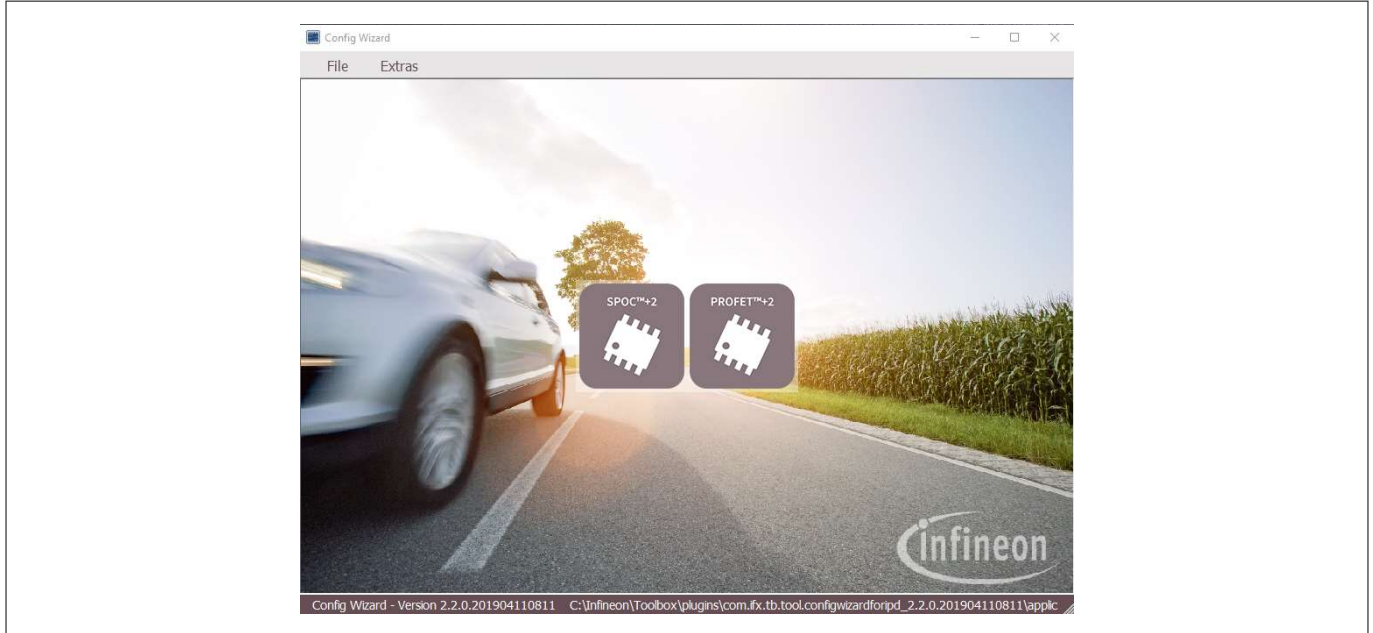


Figure 33 Config Wizard for IPD start screen

Note: The number of tiles shown to users can vary depending on product extensions such as for example new product families or types.

Clicking on the tile with the product family of choice leads to a rearrangement of the GUI, allowing users to select the required type of product. Figure 34 shows the type selection screen for the different product types (1-channel, 2-channel, 4-channel) of the PROFET™ +2 12V family. In the upper left corner a back button is available that enables going one step backwards.

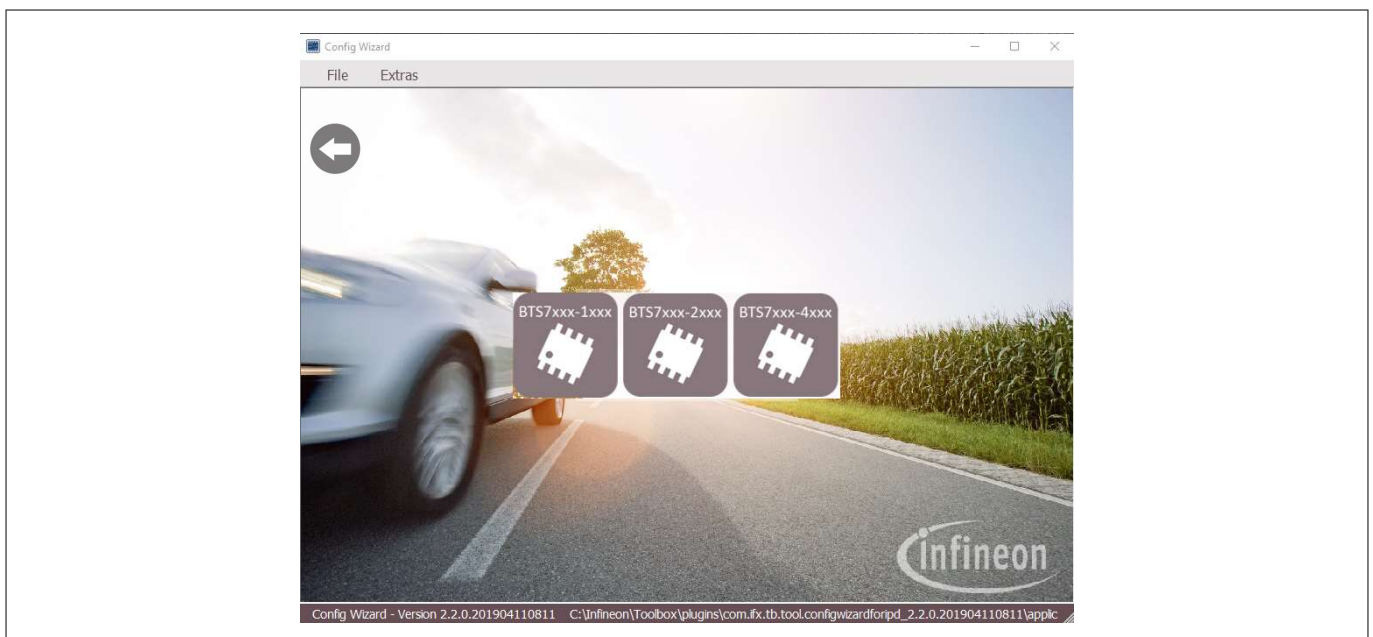


Figure 34 Config Wizard for IPD type-selection screen of PROFET™ +2 12V

5 Software (optional)

Clicking on the tile with the product type of choice leads again to a rearrangement of the GUI (see [Chapter 5.1.3](#)).

5.1.3 PROFET™ +2 12V GUI

The GUI for PROFET™ +2 12V provides buttons to control the GPIOs of the μIO-Stick. The GPIOs are connected to the pins of the device (as INx, DEN and DSELx). As such, the buttons control the logic state applied to the pins of the device. [Figure 35](#) shows the device screen of the PROFET™ +2 12V GUI for a 2-channel device.

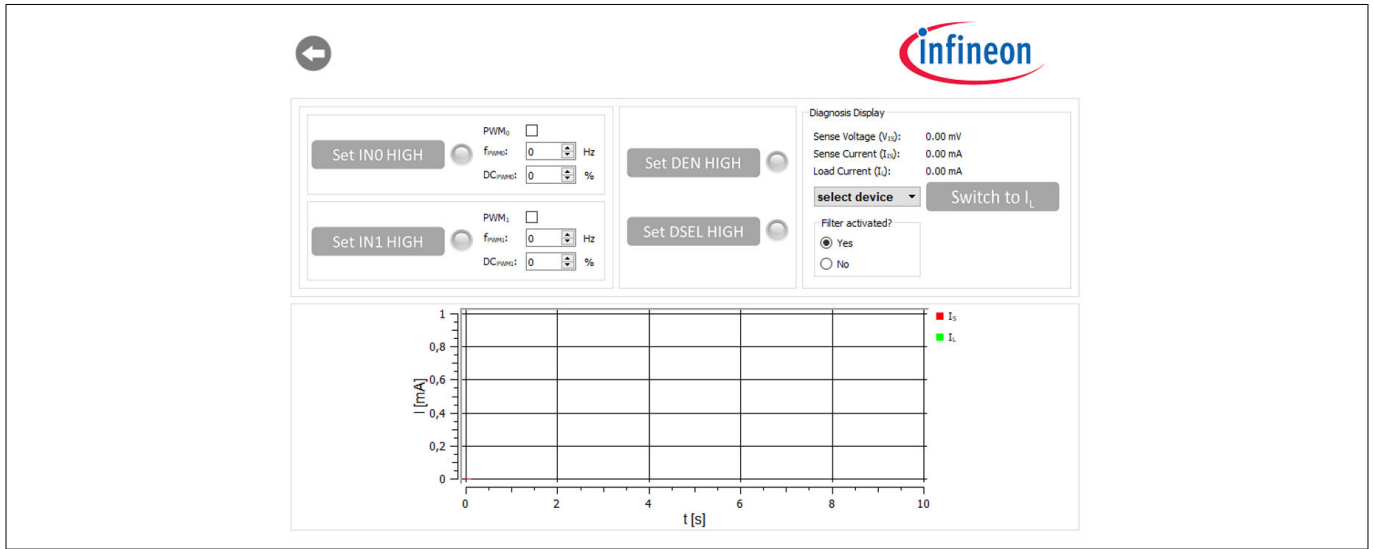


Figure 35 PROFET™ +2 12V device screen (2-channel)

The state of the buttons is visualized by alternating icons and lamp elements. The names of the buttons reflect the actions they perform, such as *Set IN0 HIGH* or once a button has been clicked, *Set IN1 LOW*. In addition, as shown in [Figure 36](#), a lamp element indicates whether a button has been clicked or not. Once the lamp element is green, the corresponding pin is activated.

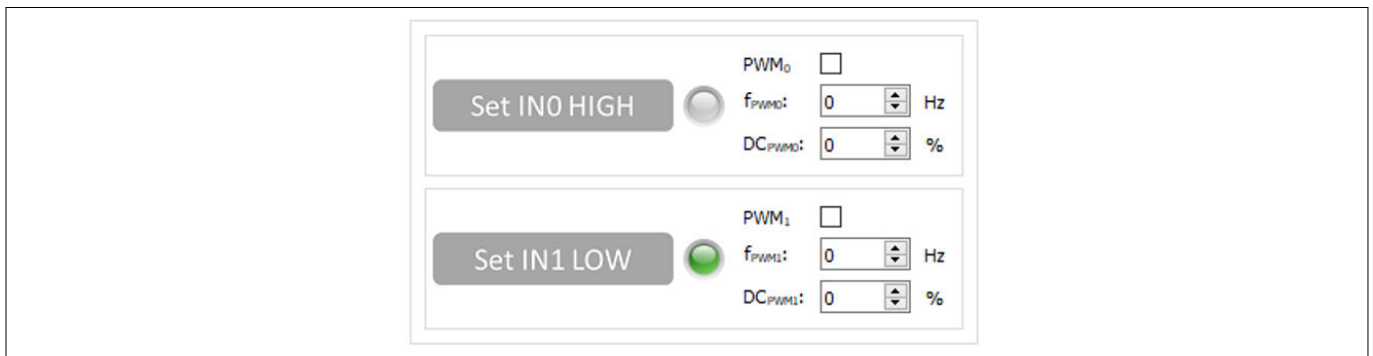


Figure 36 PROFET™ +2 12V functional view – GPIO controlling toggle-buttons

As seen in [Figure 36](#) and [Figure 37](#), also PWM functionality is given for channels 0 and 1. It can be activated by ticking the PWM checkbox. The button then adapts to *PWM1 ON* and the lamp-element will stay grey. PWM frequency and PWM duty-cycle can be set via the two spinboxes below the checkbox.

5 Software (optional)

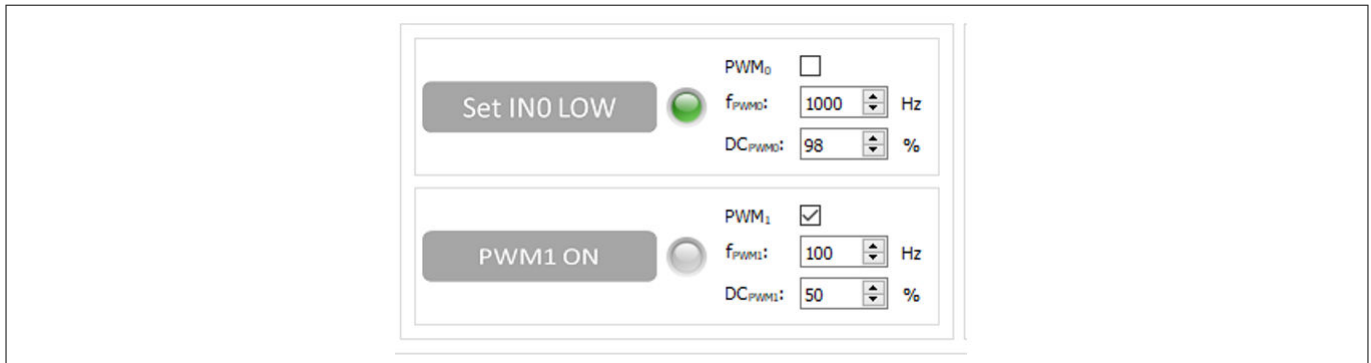


Figure 37 PROFET™ +2 12V functional view: – IN0 as logic input, IN1 as PWM input

The possibility to display the sense current I_S is also given, it is converted into a measurable voltage via a resistor. This voltage is measured by an analog-to-digital converter (ADC) on the μ IO-stick and visualized by the GUI. [Figure 37](#) displays the GUI plot of the digitalized data set imported. As shown in [Figure 38](#), clicking the *Set DEN HIGH* button, displays the sense current automatically and the button changes to *Set DEN LOW* while the color of the lamp element turns green.

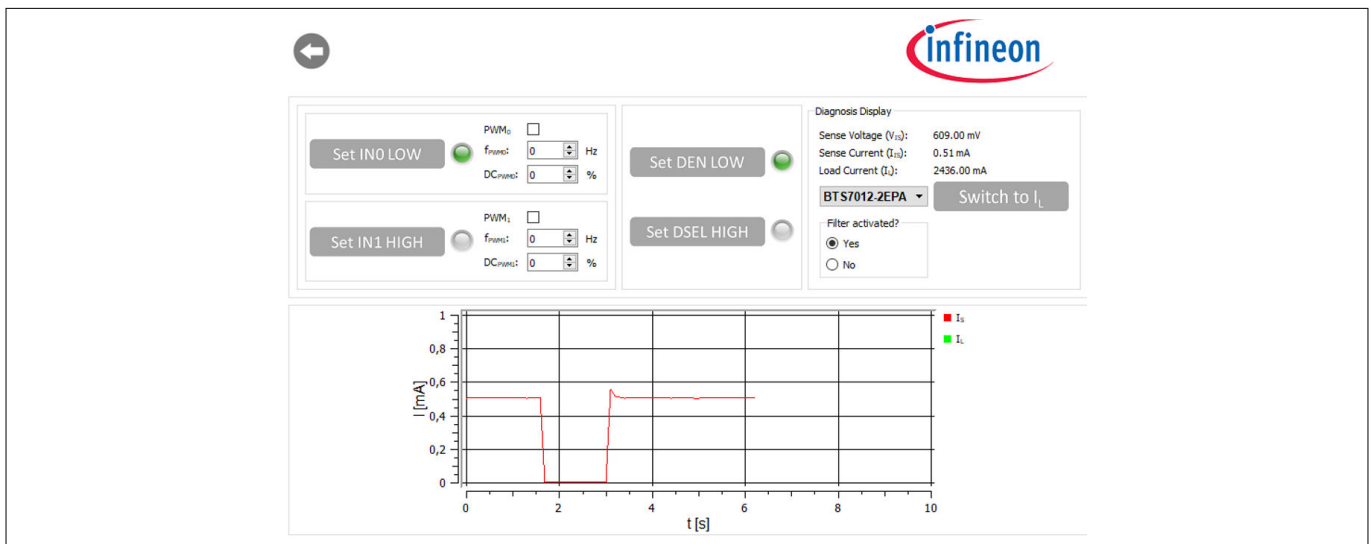


Figure 38 PROFET™ +2 12V functional view – Sense current display for OUT0

It is also possible to switch between the sense and load current display. As shown in [Figure 39](#), by selecting a device in the display section, the corresponding factor $k_{I_{LIS}}$ is mapped and the load current is calculated with the defaults of the PROFET™ +2 12V MB. Next to the device selection is the *Switch to I_L* button, which can be used to switch between sense and load current. After clicking this button, *Switch to I_S* is displayed. [Figure 38](#) illustrates this.

5 Software (optional)

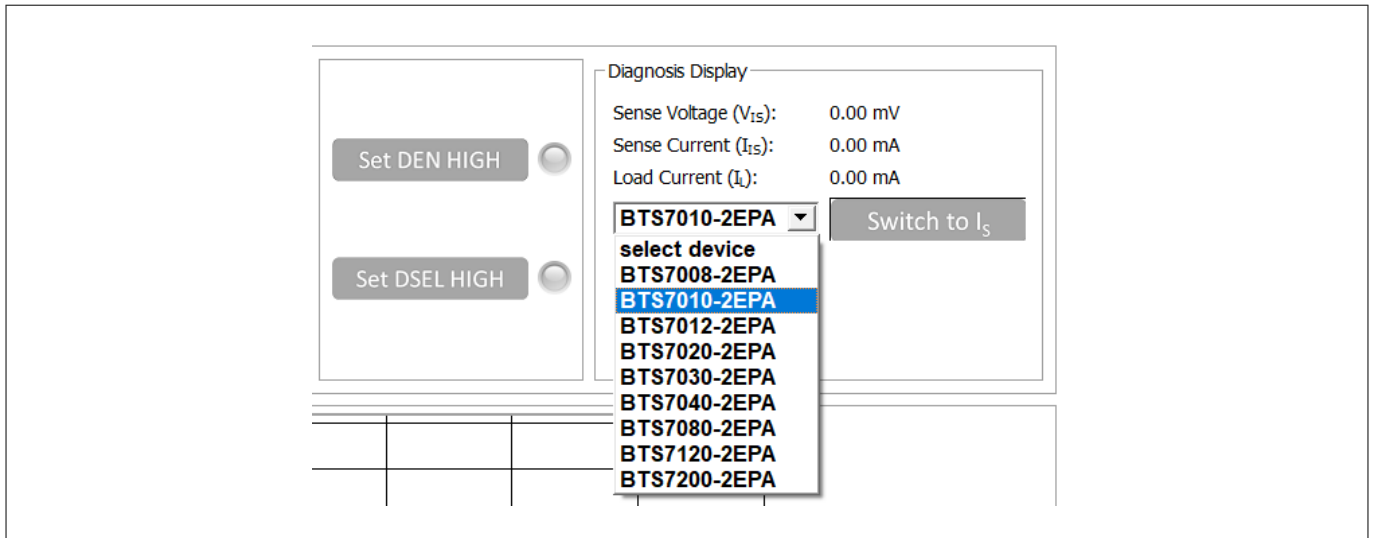


Figure 39 PROFET™ +2 12V functional view – Device selection

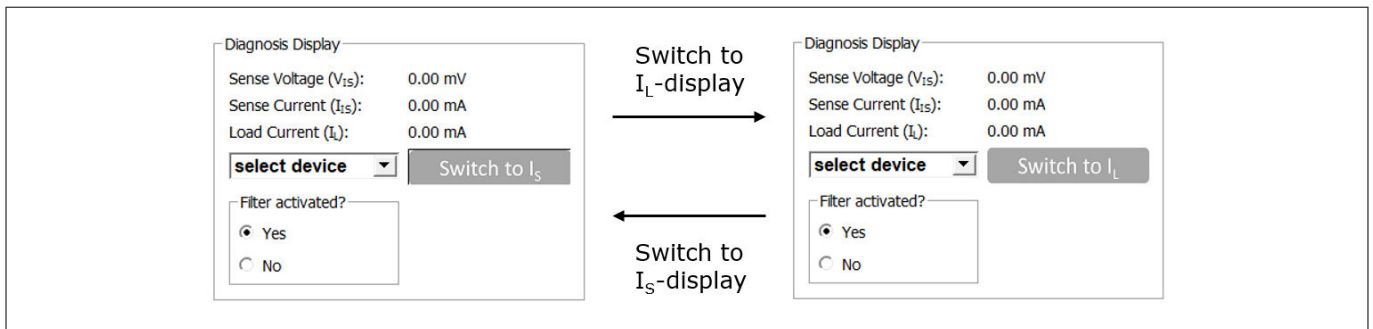


Figure 40 PROFET™ +2 12V functional view – Switching from I_S to I_L

Figure 41 shows the small box titled *Filter activated?* included in the diagnosis display section. It is used to specify whether sense filtering on the MB is activated (see Chapter 2.1 for further information). This setting serves to display the sense/load current and the sense voltage correctly.

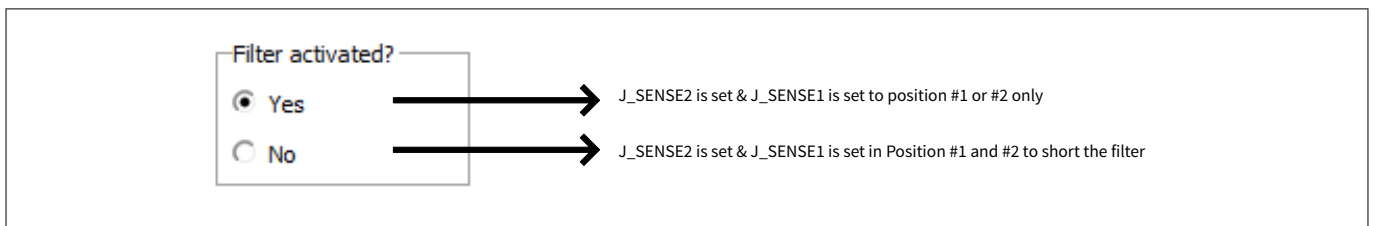


Figure 41 “Filter activated?”- box in diagnosis display section – Meaning of “Yes”/”No”

6 Appendix

6 Appendix

Table 13 Available demoboards: PROFET™ +2 12V

Product	ISaR name	Internet link
PROFET™ +2 12V motherboard V2	PROFET™ PLUS2 MOTH BRD	https://www.infineon.com/profet-plus2-moth-brd
PROFET™ +2 12V motherboard V3	PROFET™ ONE4ALL MB V1	https://www.infineon.com/profet-one4all-mb-v1
BTS7008-1EPA	BTS7008-1EPA DAUGH BRD	https://www.infineon.com/bts7008-1epa-daugh-brd
BTS7010-1EPA	BTS7010-1EPA DAUGH BRD	https://www.infineon.com/bts7010-1epa-daugh-brd
BTS7012-1EPA	BTS7012-1EPA DAUGH BRD	https://www.infineon.com/bts7012-1epa-daugh-brd
BTS7040-1EPA	BTS7040-1EPA DAUGH BRD	https://www.infineon.com/bts7040-1epa-daugh-brd
BTS7008-2EPA	BTS7008-2EPA DAUGH BRD	https://www.infineon.com/bts7008-2epa-daugh-brd
BTS7010-2EPA	BTS7010-2EPA DAUGH BRD	https://www.infineon.com/bts7010-2epa-daugh-brd
BTS7012-2EPA	BTS7012-2EPA DAUGH BRD	https://www.infineon.com/bts7012-2epa-daugh-brd
BTS7020-2EPA	BTS7020-2EPA DAUGH BRD	https://www.infineon.com/bts7020-2epa-daugh-brd
BTS7030-2EPA	BTS7030-2EPA DAUGH BRD	https://www.infineon.com/bts7030-2epa-daugh-brd
BTS7040-2EPA	BTS7040-2EPA DAUGH BRD	https://www.infineon.com/bts7040-2epa-daugh-brd
BTS7080-2EPA	BTS7080-2EPA DAUGH BRD	https://www.infineon.com/bts7080-2epa-daugh-brd
BTS7120-2EPA	BTS7120-2EPA DAUGH BRD	https://www.infineon.com/bts7120-2epa-daugh-brd
BTS7200-2EPA	BTS7200-2EPA DAUGH BRD	https://www.infineon.com/bts7200-2epa-daugh-brd
BTS7200-4EPA	BTS7200-4EPA DAUGH BRD	https://www.infineon.com/bts7200-4epa-daugh-brd
BTS7200-2EPC	BTS7200-2EPC DAUGH BRD	https://www.infineon.com/bts7200-2epc-daugh-brd

Table 14 Available demoboards: PROFET™ Load Guard

Product	ISaR name	Internet link
PROFET™ +2 12V motherboard V3	PROFET™ ONE4ALL MB V1	https://www.infineon.com/profet-one4all-mb-v1
BTG7090-2EPL	BTG7090-2EPL DAUGH BRD	in development

7 Revision history

7 Revision history

Document version	Date of release	Description of changes
Rev.1.10	2022-06-24	Added PROFET™ Load Guard 12V daughterboards
Rev.1.00	2021-05-19	PROFET™ customer evaluation kit description available

Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

Edition 2022-06-24

Published by

Infineon Technologies AG

81726 Munich, Germany

© 2022 Infineon Technologies AG

All Rights Reserved.

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

Email: erratum@infineon.com

Document reference

IFX-rgj1553757446915

Important notice

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffheitsgarantie").

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

Warnings

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.