XDP™ XDP700-002 EVB: MOSFET adapter board setup user guide

About this document

Scope and purpose

This document describes how to connect the MOSFET adapter board with the XDP™ XDP700-002 Evaluation Board (EVB).

Intended audience

This document is intended for test engineers who want to evaluate the performance of the XDP700-002 hot-swap controller.

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Safety precautions

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

Table 1 Safety precautions

	**Warning**: *The evaluation or reference board contains DC bus capacitors which take time to discharge after removal of the main supply. Before working on the drive system, wait five minutes for capacitors to discharge to safe voltage levels. Failure to do so may result in personal injury or death.*
	**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:** *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:** *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.*

Table of contents

1 Introduction

Infineon's XDP™ XDP7x0-002 family, which includes the XDP700-002 and XDP710-002, are highly integrated, wide-input voltage systems designed to monitor and protect devices. These systems are digitally configurable and utilize a power management bus (PMBus) communication interface to access their register map and configure all their features.

The EVAL_XDP700 Evaluation Board allows the user to evaluate these devices extensively and to test different FETs and power levels the MOSFET adapter board can be connected with this evaluation board.

This document describes how to connect the MOSFET adapter board kit with EVAL_XDP700 Evaluation Board and discusses the different ways in which the MOSEFT board can be configured.

2 Hardware requirements

The MOSFET kit can be ordered online from the order code shown in Table 2.

Table 2 Ordering code

Order code	Evaluation board compatibility	Components included
EVAL_XDP700_FET_BD	EVAL_XDP700	Three MOSFET adapter boards without MOSFET
		Eight screws for mounting on copper bus bar
		Two copper bus bars

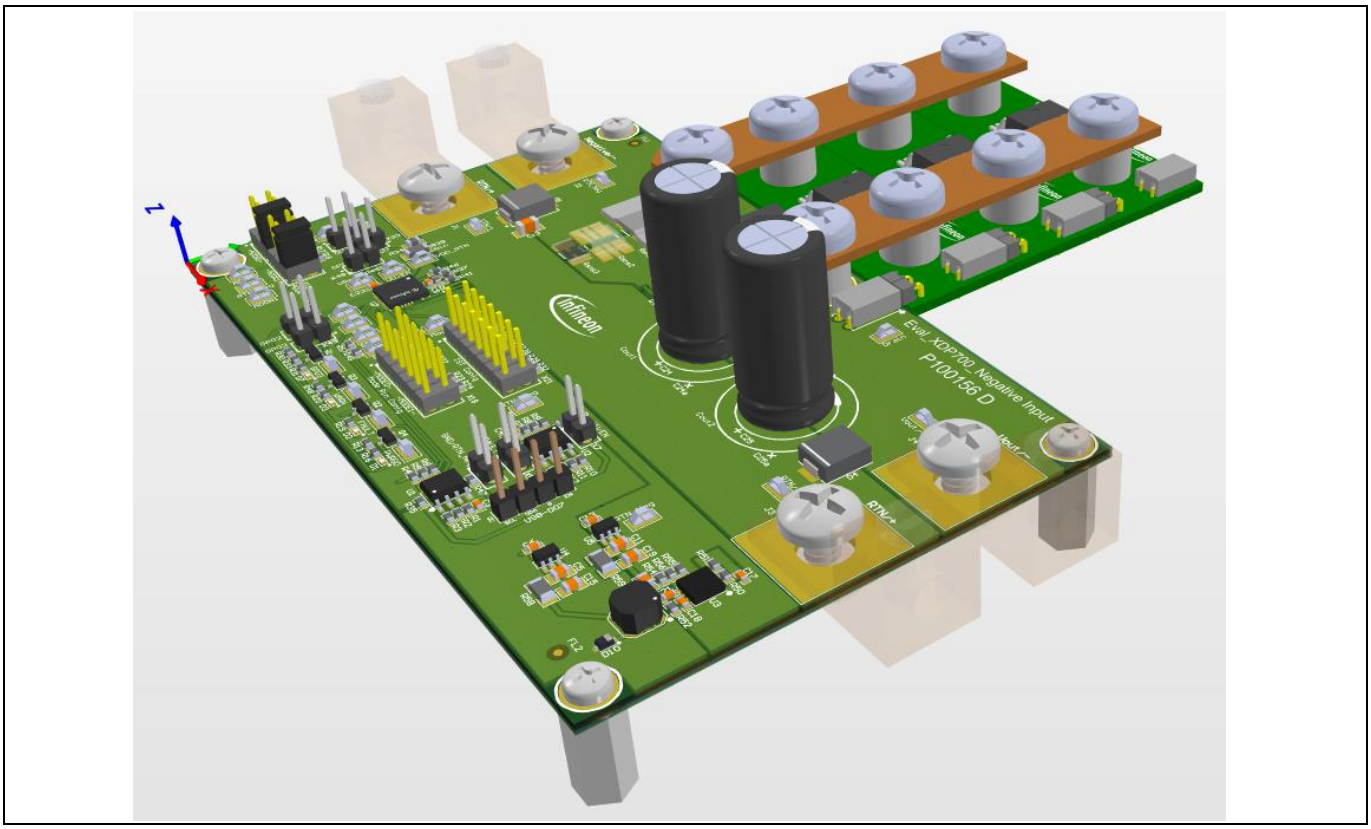

Figure 1 XDP700-002 Evaluation Board

Hardware requirements

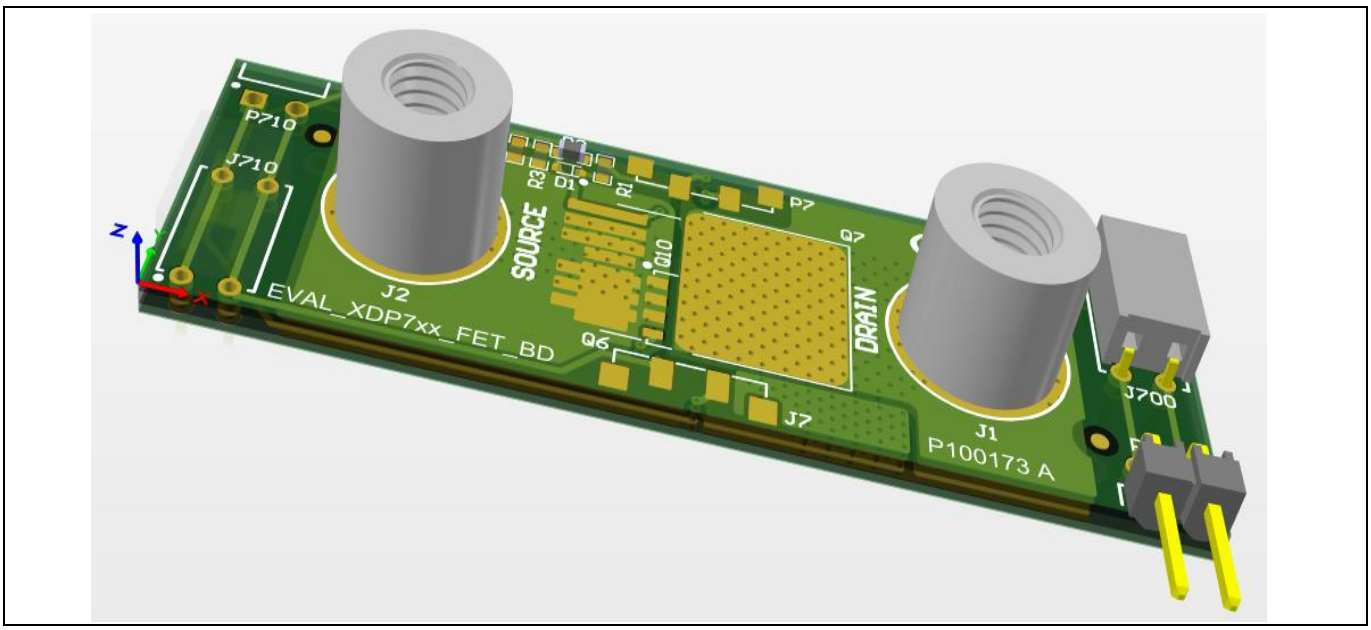

Figure 2 XDP700-002 MOSFET adapter board

3 XDP700-002 MOSFET adapter board

The following sections describe the XDP700-002 FET Evaluation Board and highlight the specifications, schematics, layout, bill of materials (BOM), and different FET footprints that can be supported on these MOSFET adapter board.

3.1 Electrical specifications

- Input and output voltage range is –12 V DC to –80 V DC
- A maximum up to three MOSFET adapter boards can be mounted on the copper bar

The MOSFET adapter boards can be added/removed to the evaluation board based on the required current level.

3.2 XDP700-002 MOSFET Adapter Board schematics

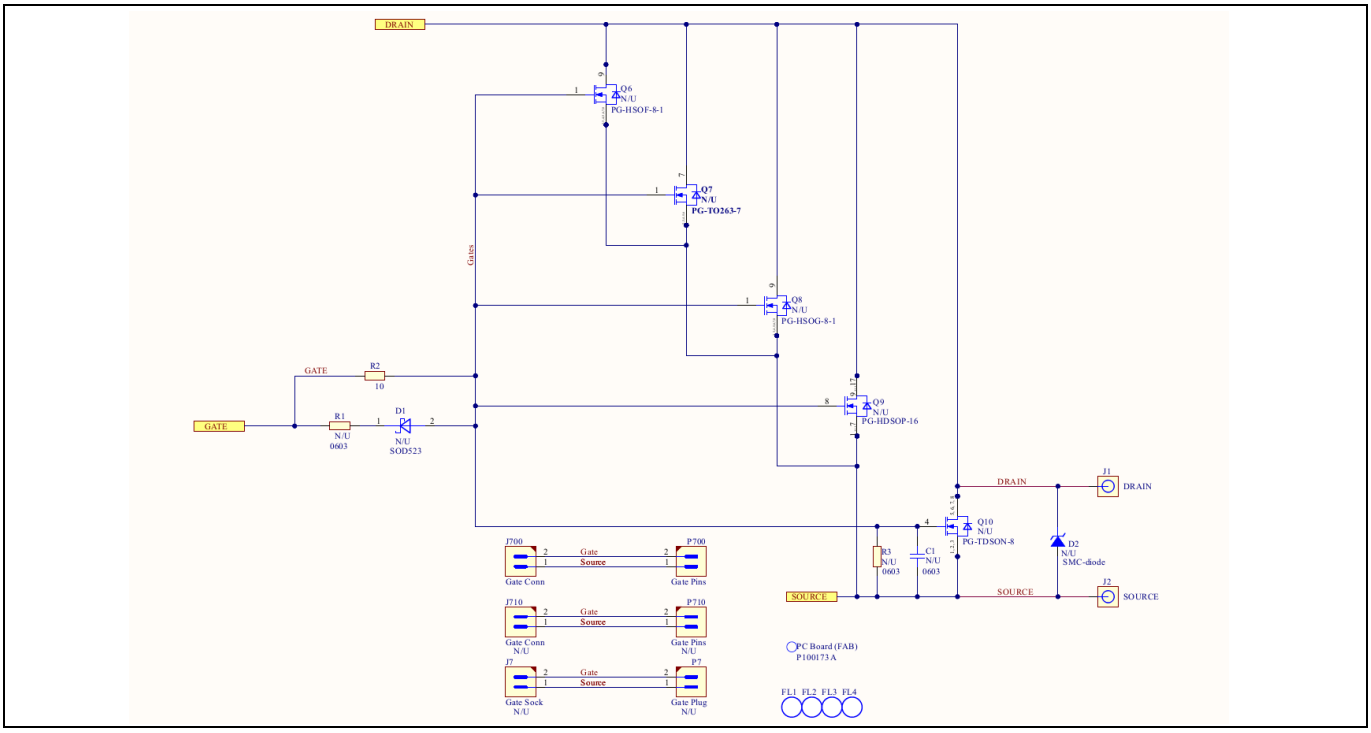

Figure 3 XDP700-002 MOSFET PCBA schematic

3.3 XDP700-002 MOSFET PCB layouts

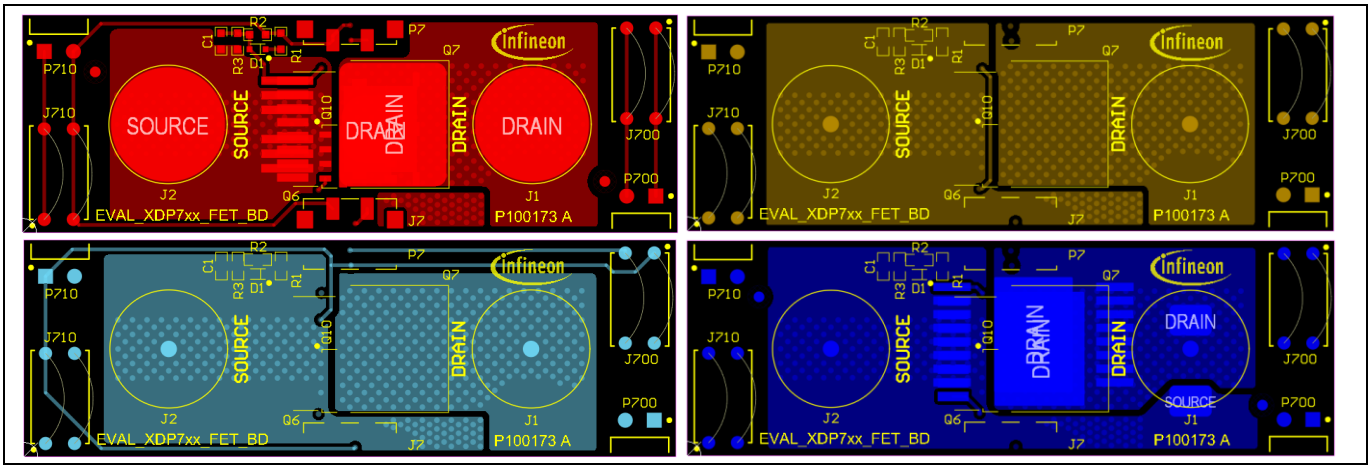

Figure 4 Top, mid 1, mid 2, and bottom layer layouts of MOSFET PCB

3.4 Bill of material

Table 3 BOM for MOSFET PCBA

Item	Qty	Reference designator	Value	Footprint	Manufacturer	Part number
1	1	BRD1	PC Board (FAB)	–	–	P100173 A
2	2	J1, J2	SO-SMD-M5-FEMALE	CON-MOSFET	Würth Elektronik	7466105R
3	1	J700	CON4-H	CON2_HZ_BCS-102-X-S-HE	Samtec	BCS-102-F-S-HE
4	1	P700	CON2	CON2_RA_TSW-102-08-F-S-RA	Samtec	TSW-102-08-F-S-RA
5	1	Q7	N/U	PG-TO263-7	Infineon Technologies	Not Used
6	1	R2	10	R0603	Panasonic	ERJ-3EKF10R0V
7	1	C1	N/U	C0603	TDK	Not used
8	1	D1	N/U	SOD523	On	Not used
9	1	D2	N/U	SMC-diode	Littelfuse	Not used
10	1	J7	N/U	CON2_SMD_AVX-20-9159	KYOCERA AVX	Not used
11	1	J710	N/U	CON2_HZ_BCS-102-X-S-HE	Samtec	Not used
12	1	P7	N/U	CON2_SMD_AVX-10-9159	KYOCERA AVX	Not used
13	1	P710	N/U	CON2_RA_TSW-102-08-F-S-RA	Samtec	Not used
14	1	Q6	N/U	PG-HSOF-8-1	Infineon Technologies	Not used

Item	Qty	Reference designator	Value	Footprint	Manufacturer	Part number
15	1	Q8	N/U	PG-HSOG-8-1	Infineon Technologies	Not used
16	1	Q9	N/U	PG-HDSOP-16	Infineon Technologies	Not used
17	1	Q10	N/U	PG-TDSON-8_1	Infineon Technologies	Not used
18	1	R1	N/U	R0603	Panasonic	Not used
19	1	R3	N/U	R0603	Panasonic	Not used

3.5 Different FET footprint options

The FET footprint supports D^2PAK, TOLL, and TDSON packages in the following positions:

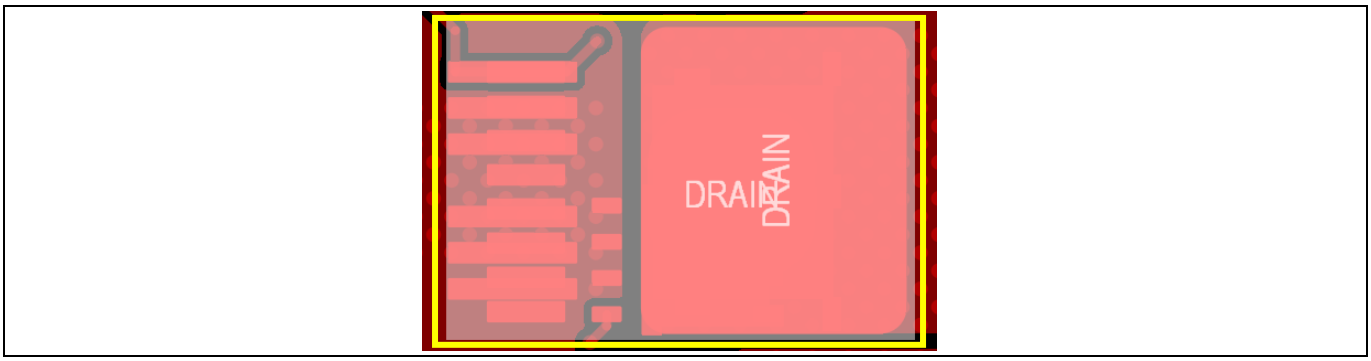

Figure 5 D^2PAK7 position (top side)

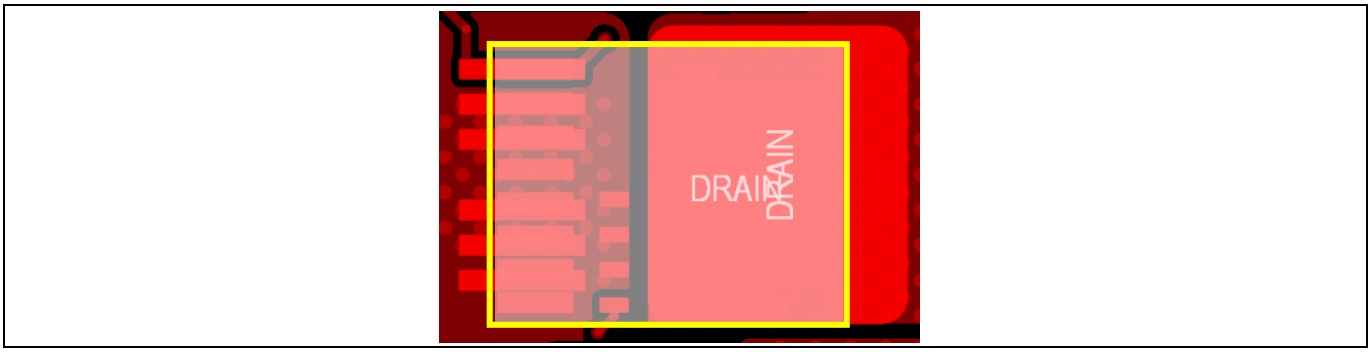

Figure 6 TOLL position (top side)

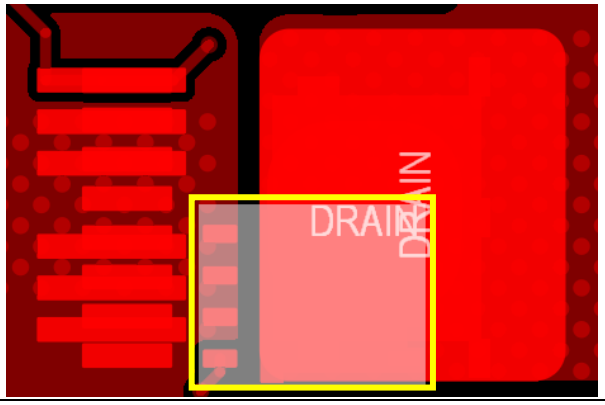

Figure 7 PG-TDSON-8-1 position (top side)

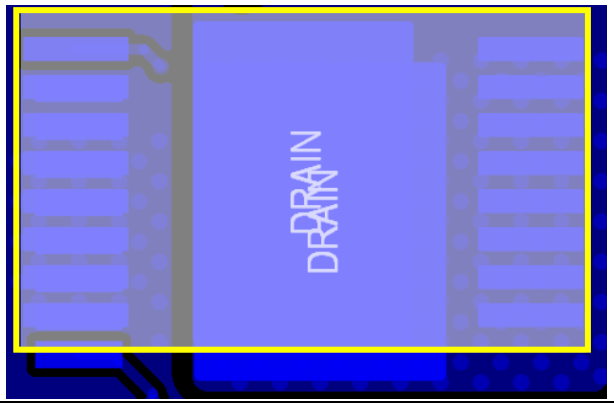

Figure 8 PG-HDSOP-16 position (bottom side)

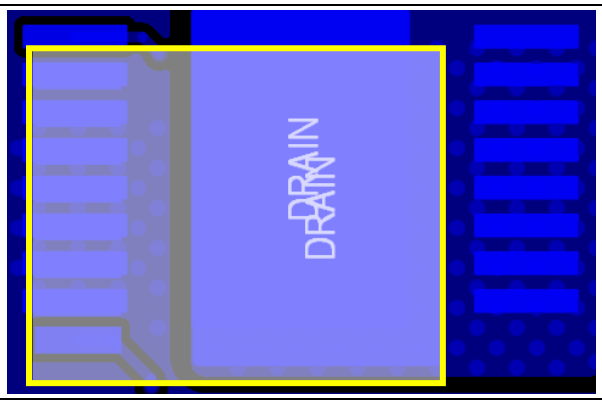

Figure 9 PG-HSOG-8-1 position (bottom side)

3.6 Connections of the MOSFET adapter board to the EVAL_XDP700 Evaluation Board

To connect the adapter board with the EVAL_XDP700 board, the following components are needed:

- **MOSFET adapter board:** Comes without the FET populated on it, suitable FET can be populated
- **A pair of copper bus bars:** Comes with the MOSFET adapter board kit
- **A pair of screws for mounting each MOSFET adapter board:** Comes with MOSFET adapter board kit

Figure 10 shows the connections for installing the MOSFET adapter board, while Figure 11 shows the complete interface when using the EVAL_XDP700 board. It can be observed that a maximum of three MOSFET adapter boards can be mounted onto the evaluation board with the help of copper bus bar and screws.

Note: Secure the screws are tightly otherwise, a loose connection can result in improper heatsinking of the FET and increased impedance.

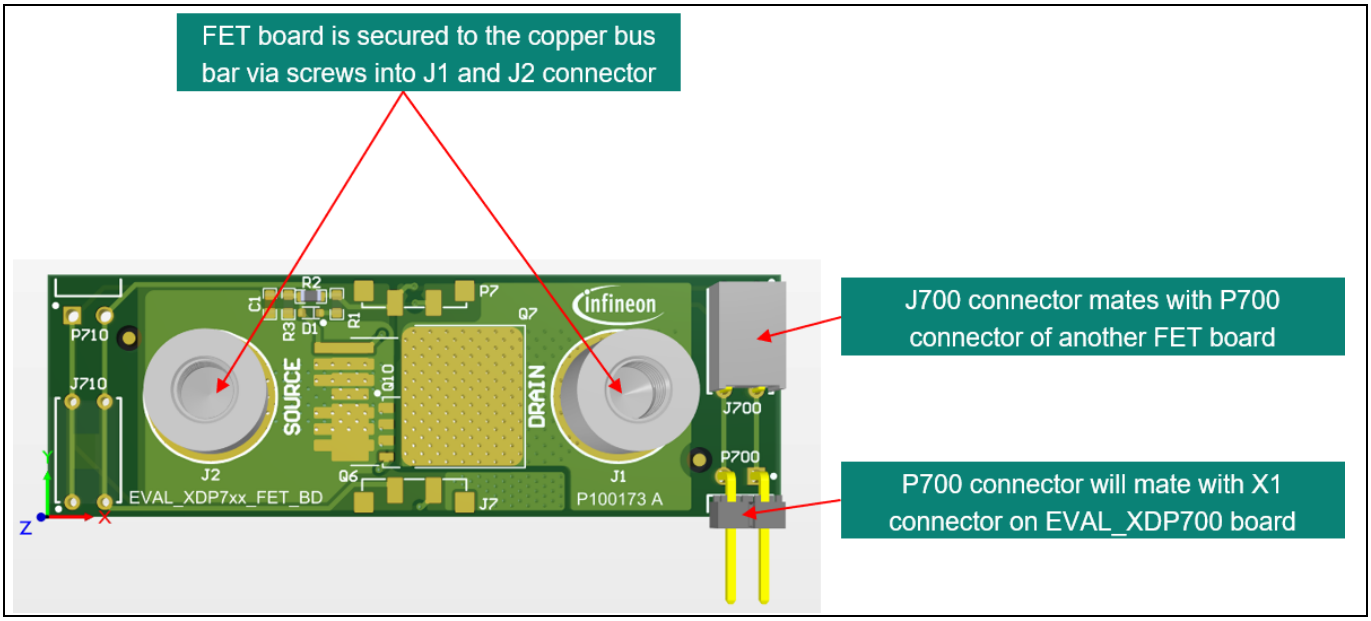

Figure 10 MOSFET adapter board connections

XDP700-002 MOSFET adapter board

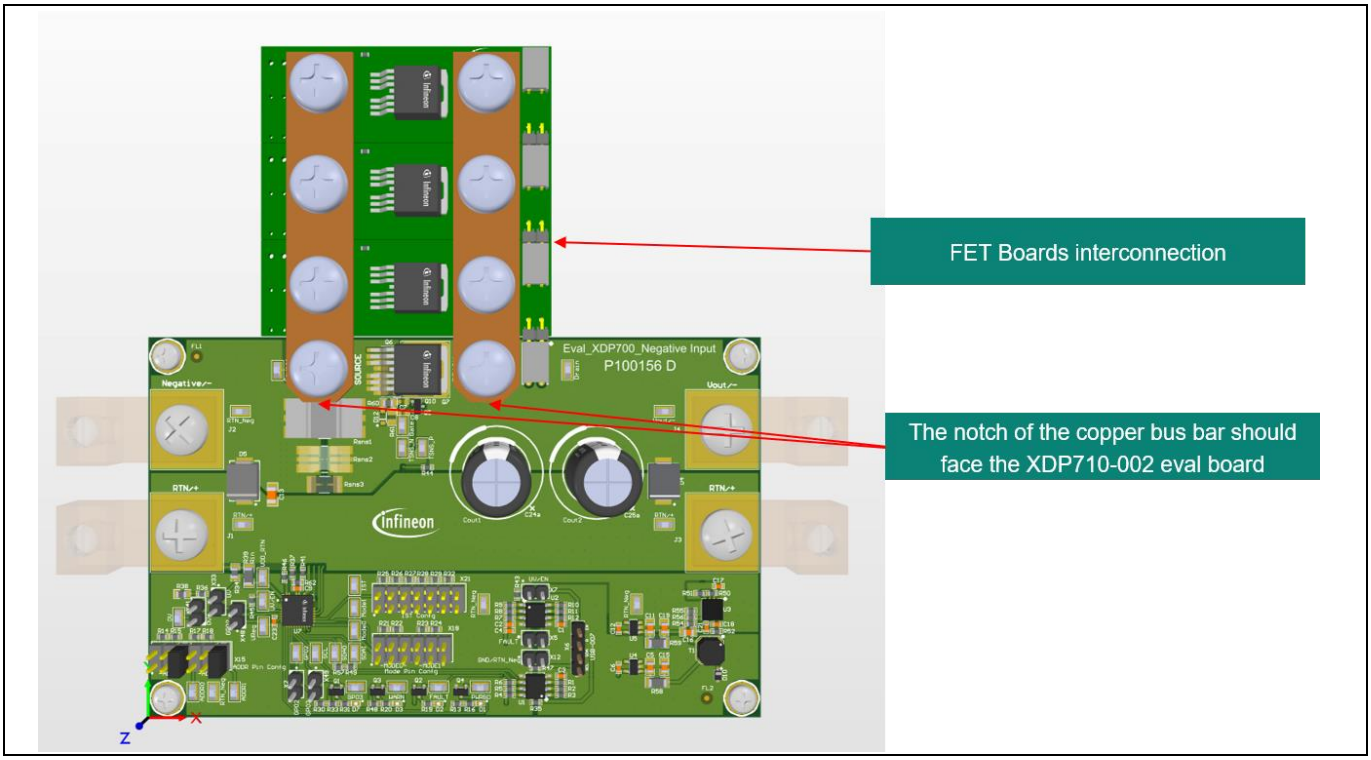

Figure 11 MOSFET adapter board interface with XDP700-002 Evaluation Board

References

[1] Infineon Technologies AG: *XDP700-002 hot-swap controller datasheet;* Available online

[2] Infineon Technologies AG: *XDP700-002 Evaluation Board webpage*; Available online

[3] Infineon Technologies AG: *XDP™ XDP700-002 evaluation PCBA user guide*; Available online

Revision history

Document revision	Date	Description of changes
V 1.0	2023-08-11	Initial release
V 1.1	2024-07-09	Added XDP710-002 evaluation section Updated configuration file

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