

XDP™ XDP712-001 hot-swap controller reference board user guide

About this document

Scope and purpose

This document describes how to set up the XDP™ XDP712-001 Reference Board and configure the internal registers to evaluate the performance of the XDP712 hot-swap controller.

Intended audience

This document is intended for test engineers who want to evaluate the performance of the XDP712-001 hot-swap controller.

About this product group

Target applications

- [Telecommunications infrastructure](#)
- [Data center and AI data center solutions](#)
- [Power conversion](#)

Product family

XDP™ is a high-performance digital power controller designed for a wide range of applications. They feature digital algorithms for high power efficiency and minimal standby power, digital parameter configuration for increased flexibility and lower development effort, and optimized bill of materials (BOM), making these controllers ideal for different applications.

Reference board

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

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

Reference board

Product(s) embedded on a PCB with a focus on specific applications and defined use cases that may include software. PCB and auxiliary circuits are optimized for the requirements of the target application.

Note: Boards do not necessarily meet safety, EMI, quality standards (for example UL, CE) requirements

Safety precautions

Safety precautions

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

Table 1 Safety precautions

	Warning: The Reference 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.
	Caution: The heat sink and device surfaces of the Reference 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 Reference 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 Reference 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 Introduction

1 Introduction

XDP™ XDP712-001 is the latest hot-swap controller from the XDP™ protection IC family, featuring an integrated digital hot-swap controller designed for wide input voltage applications. This controller is designed to drive single or multiple parallel external N-channel MOSFETs for controlled power switching operations.

This user guide describes the XDP712-001 Reference platform (P100226) and provides the information required to set up, configure, and evaluate the device using the Reference Board and the XDP™ Designer GUI.

Key reference areas for the XDP712-001 include:

- Hot-swap control and inrush current management
- Output ramp and turn-on or turn-off sequencing behavior
- Fault detection and protection response under abnormal conditions
- Fault reporting and diagnostics via pins or alerts and PMBus® status
- PMBus® communication robustness and digital configurability
- Telemetry performance and validation (V/I/P/T/E as configured)
- Current-sense implementation impact (R_{SNS} selection and noise immunity)
- Multi-MOSFET drive capability and parallel stage behavior
- Startup behavior across VIN range, load conditions, and temperature
- Stress testing with large C_{out} , fast load steps, and input transients

2 Hardware and software requirements

2 Hardware and software requirements

The following hardware and software are required for the setup:

- XDP712-001 Reference Board shown in [Figure 1](#)
- XDP™ Designer USB dongle USB0010 shown in [Figure 2](#)
- XDP™ Designer graphical user interface (GUI) shown in [Figure 3](#)

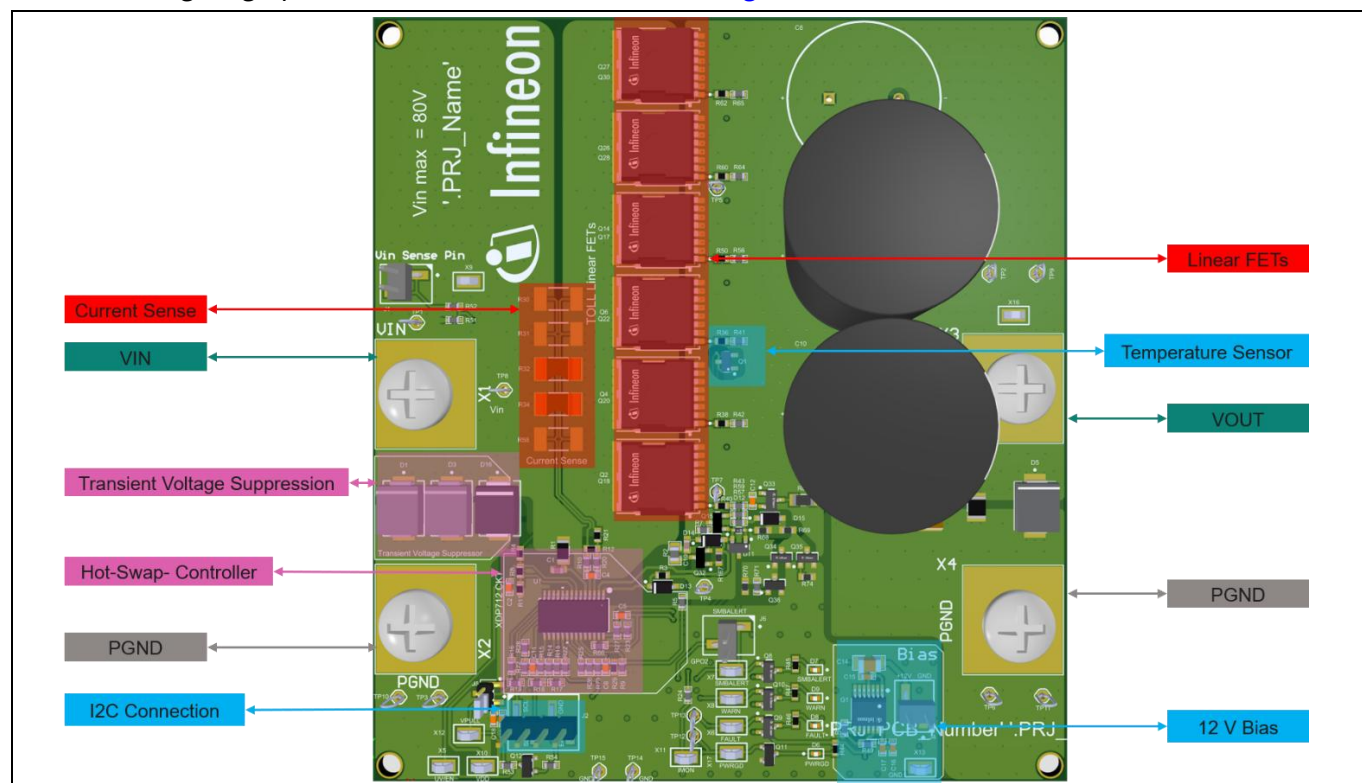


Figure 1 XDP712-001 Reference Board



Figure 2 USB0010 dongle

2 Hardware and software requirements

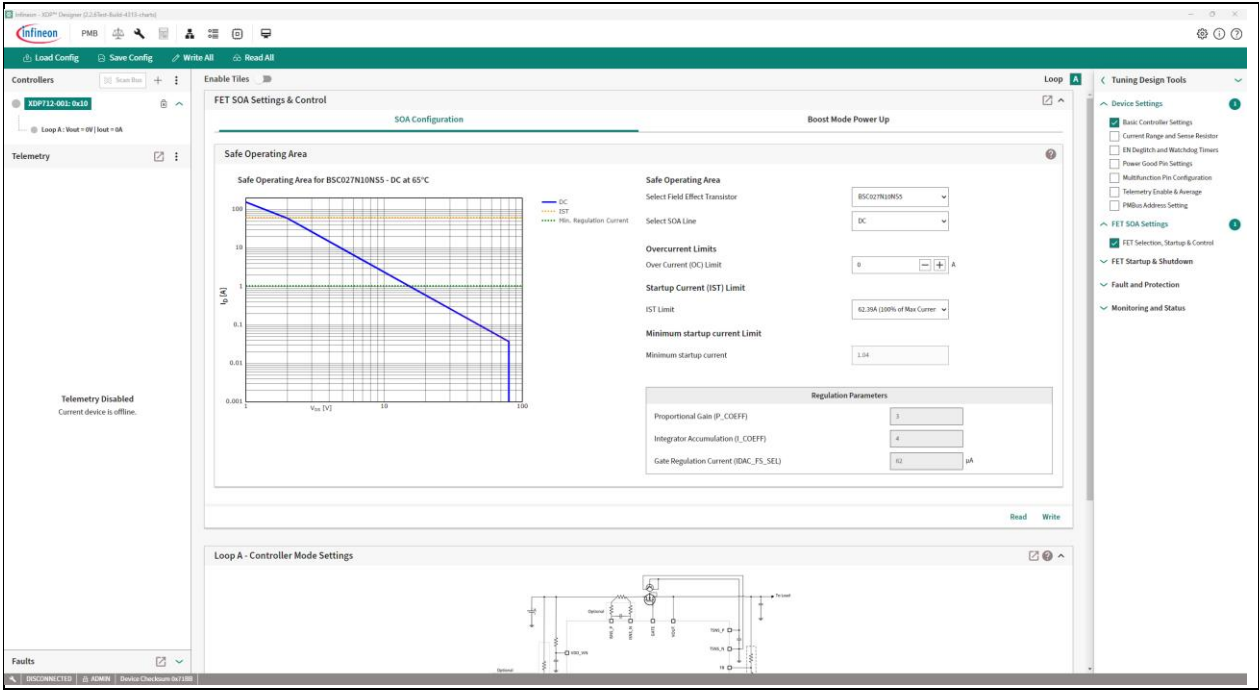


Figure 3 XDP™ Designer GUI

3 XDP712-001 Reference platform

3 XDP712-001 Reference platform

The following sections describe the XDP712-001 Reference Board highlighting the electrical specifications, block diagram, schematics, layout, bill of materials (BOM), and different configuration settings that could be used on this Reference Board.

3.1 Electrical specifications

- Input and output voltage range: 7 V_{DC} to 80 V_{DC}
- Maximum continuous current: 150 A_{DC}
- Auxiliary supply voltage: 12 V_{DC}

3.2 Block diagram

The XDP712-001 Reference platform consists of:

- **XDP712-001 Reference Board:** Consists of the hot-swap controller and circuitry designed to run multiple linear FETs in parallel. Additionally, communication, control, and protection circuitry are included in the package
- **USB0010 dongle:** The interface between the PC and XDP712-001 that communicates via the USB dongle. The commands are sent by the XDP™ Designer GUI to the XDP712-001 device, which are received via PMBus® communication. The USB0010 dongle translates these commands from USB to PMBus®
- **XDP™ Designer GUI:** Software GUI tool for XDP712-001 PMBus® communication that provides commands for configuration and general control

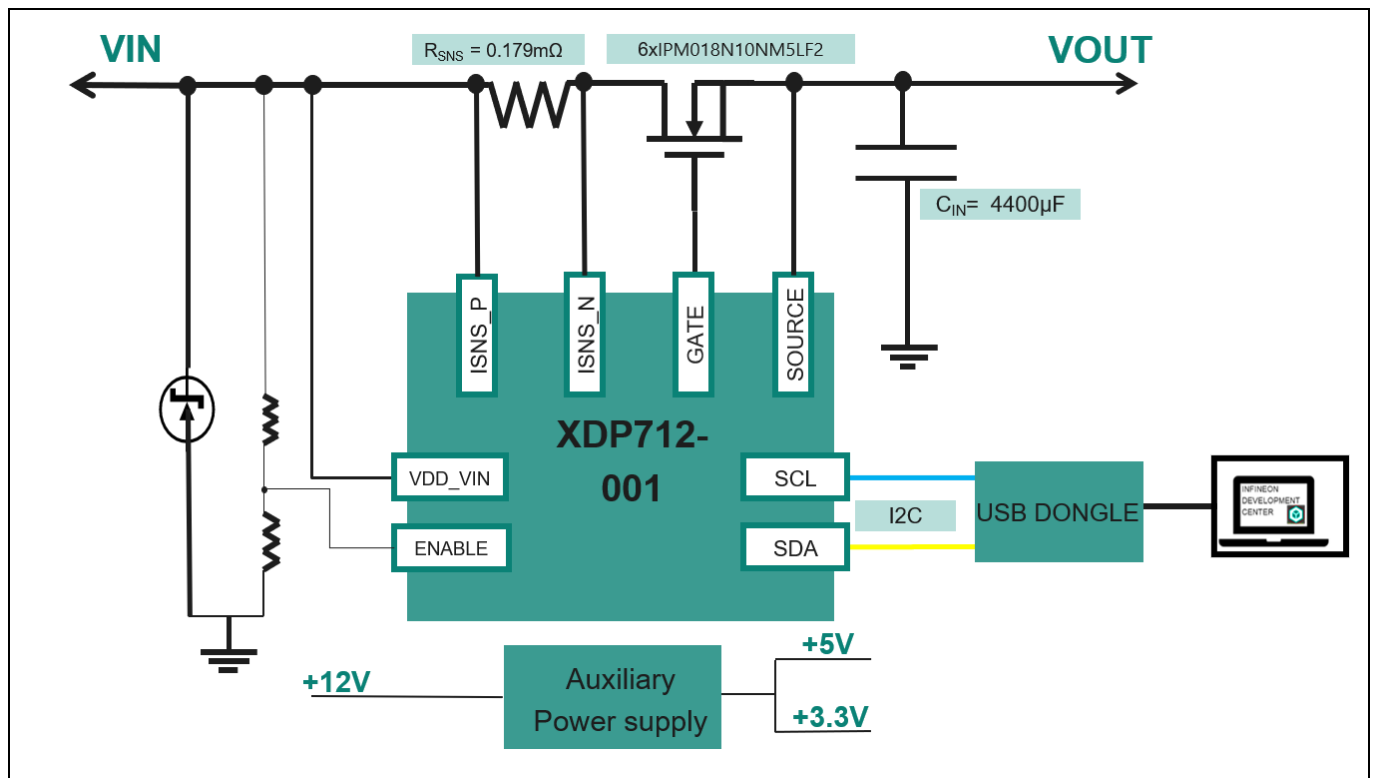


Figure 4 XDP712-001 block diagram

3 XDP712-001 Reference platform

3.3 XDP712-001 Reference Board variants

This reference board is offered in two power levels configuration i.e. 4 kW and 6 kW. The 6 kW board comes in two variants:

- Variant 1 has a dv/dt circuitry to maintain stable charging of the output capacitance which controls dv/dt in startup
- Variant 2 has circuitry with high output capacitance that allows the FETs to cool in pulses to enable higher inrush currents and the use of FETs with lower safe operating area (SOA)

3.4 XDP712-001 Reference Board schematics

Sections 3.4.1 and 3.4.2 show the schematics for the two variants of the XDP712-001 Reference board. Variant 1 includes a dv/dt circuitry which maintains consistent startup times. Variant 2 includes the circuitry needed to operate the boost mode which allows for a controlled pulse startup. [Figure 6](#) and [Figure 8](#) show the difference in schematics, at the bottom of each power rail schematic.

3.4.1 XDP712-001 6 kW Reference Board variant 1 schematic

Figure 5 shows the schematic for variant 1 of the XDP712-001 Reference Board, which is a 6 kW variant with one XDP712-001 (with PMBus®) and dv/dt mode.

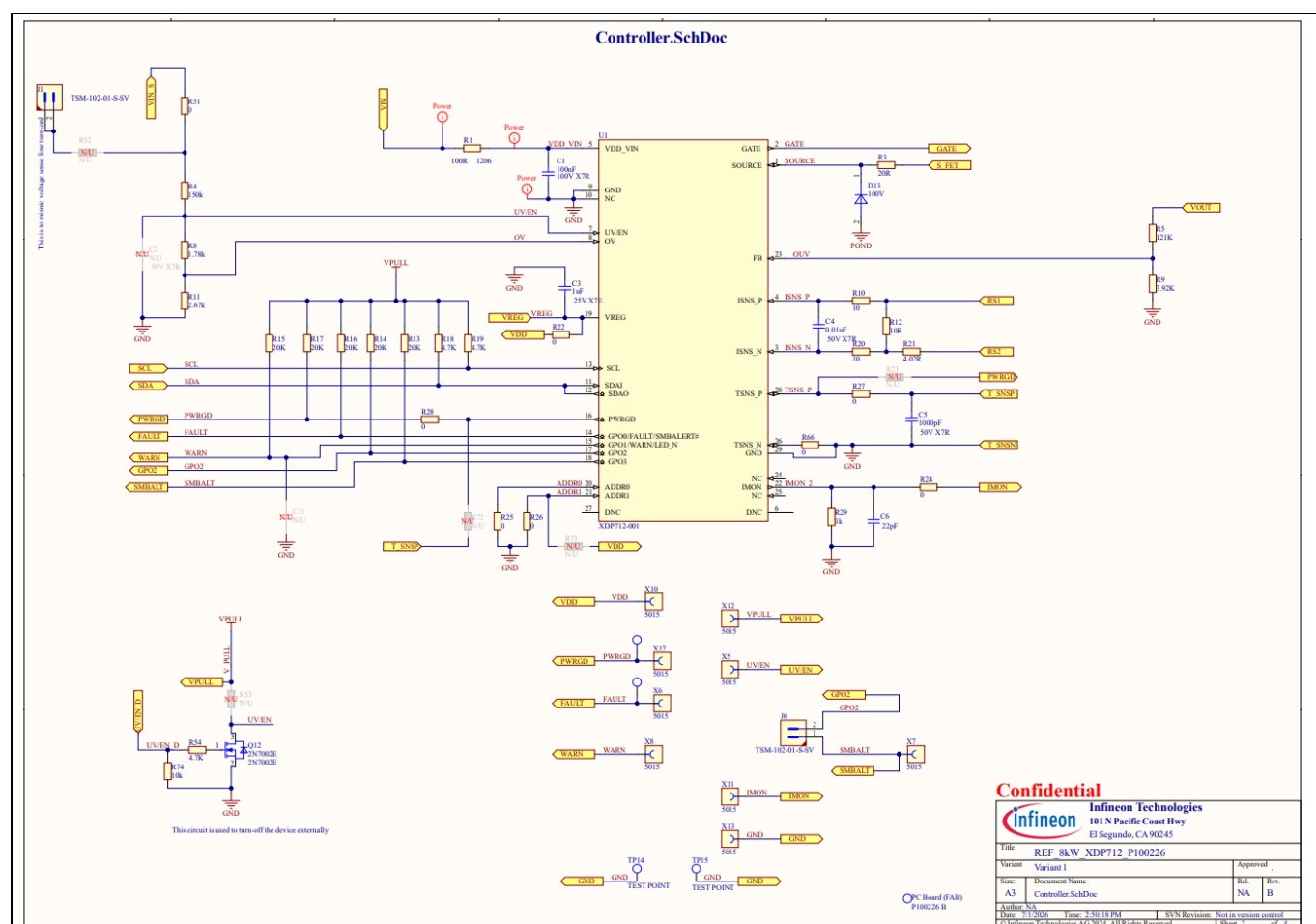


Figure 5 XDP712-001 Reference Board variant 1 schematics

3 XDP712-001 Reference platform

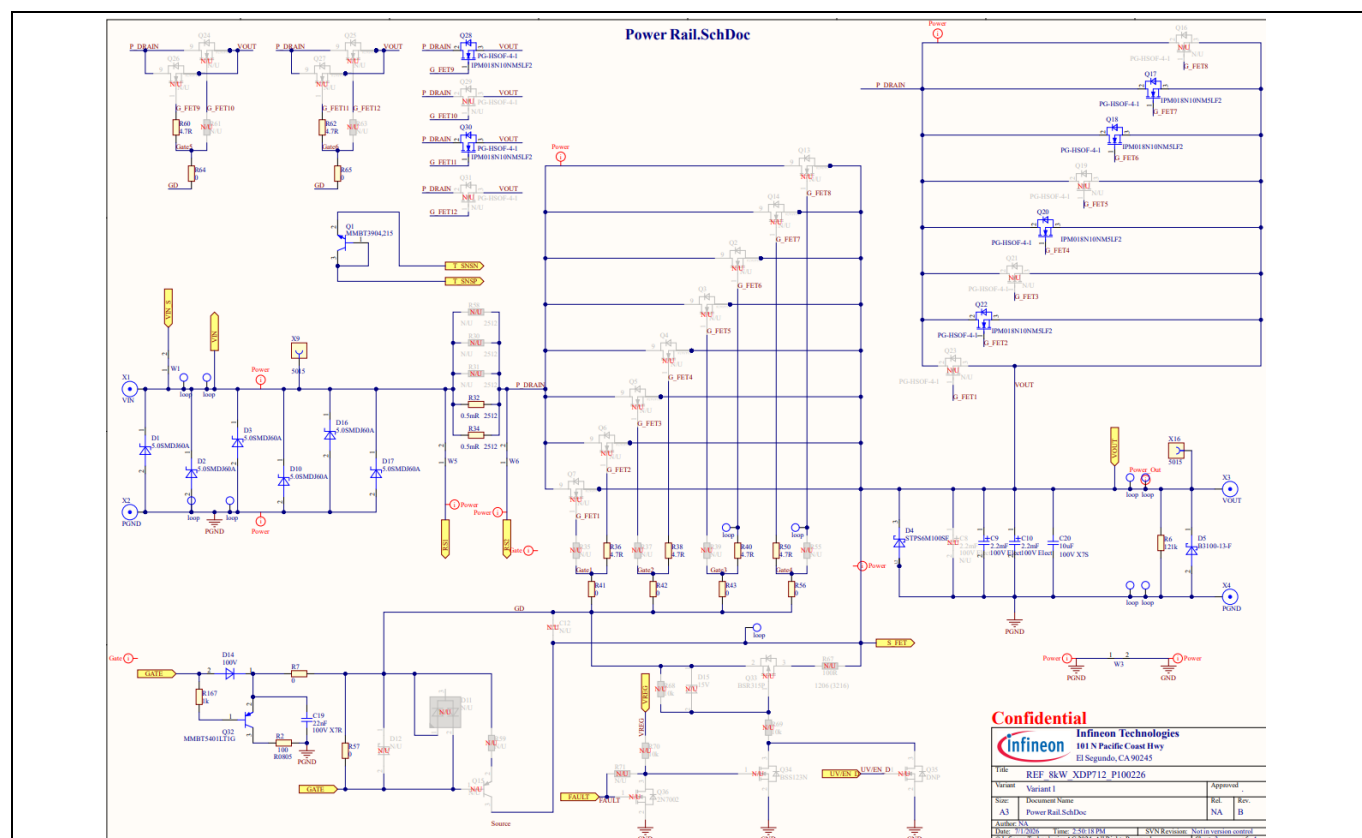


Figure 6 XDP712-001 variant 1 power rail

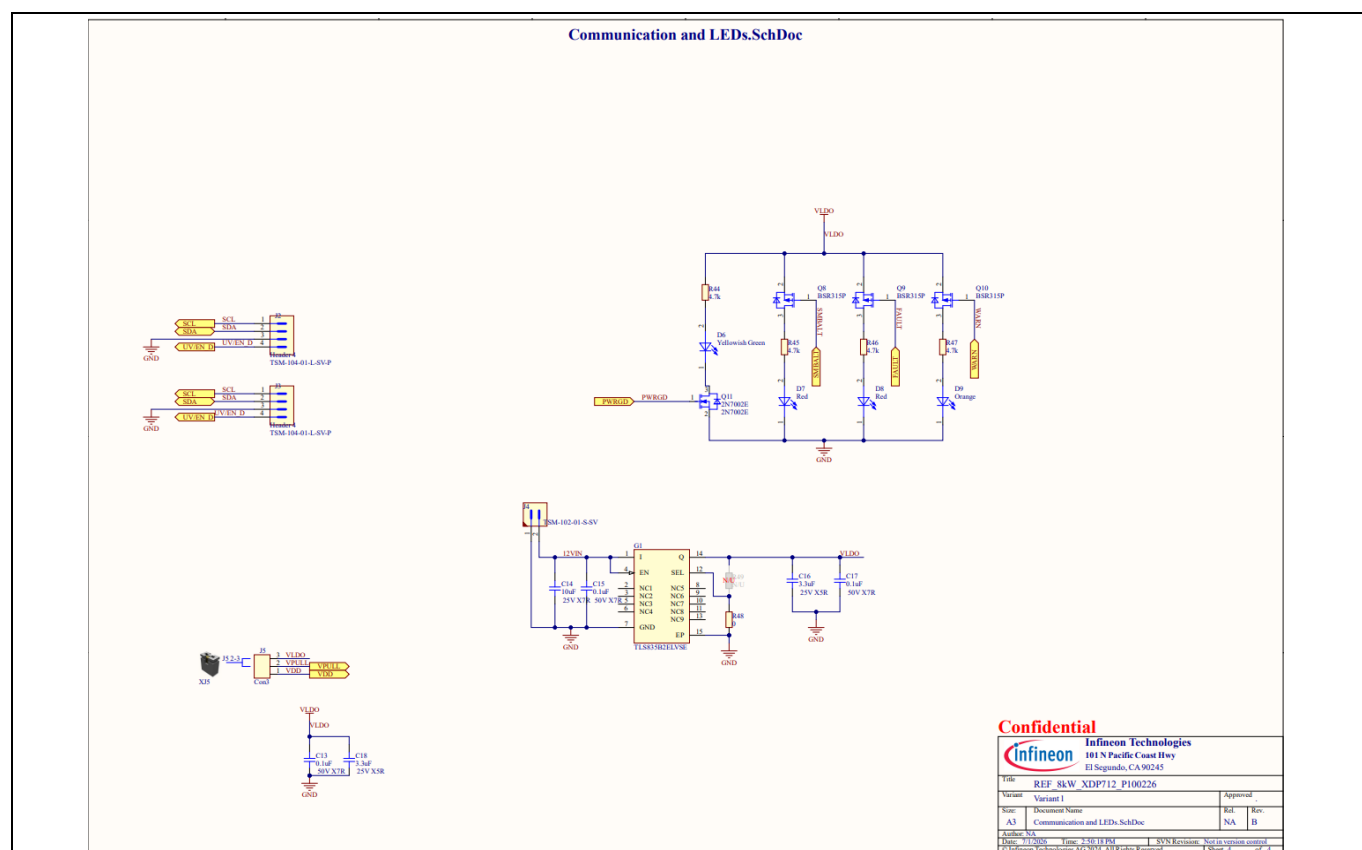


Figure 7 XDP712-001 variant 1 communications and LEDs

3 XDP712-001 Reference platform

3.4.2 XDP712-001 6 kW Reference Board variant 2 schematic

Figure 8 shows the schematic for variant 2 reference, which is a 6 kW variant with one XDP712-001 (with PMBus®) and boost mode capability.

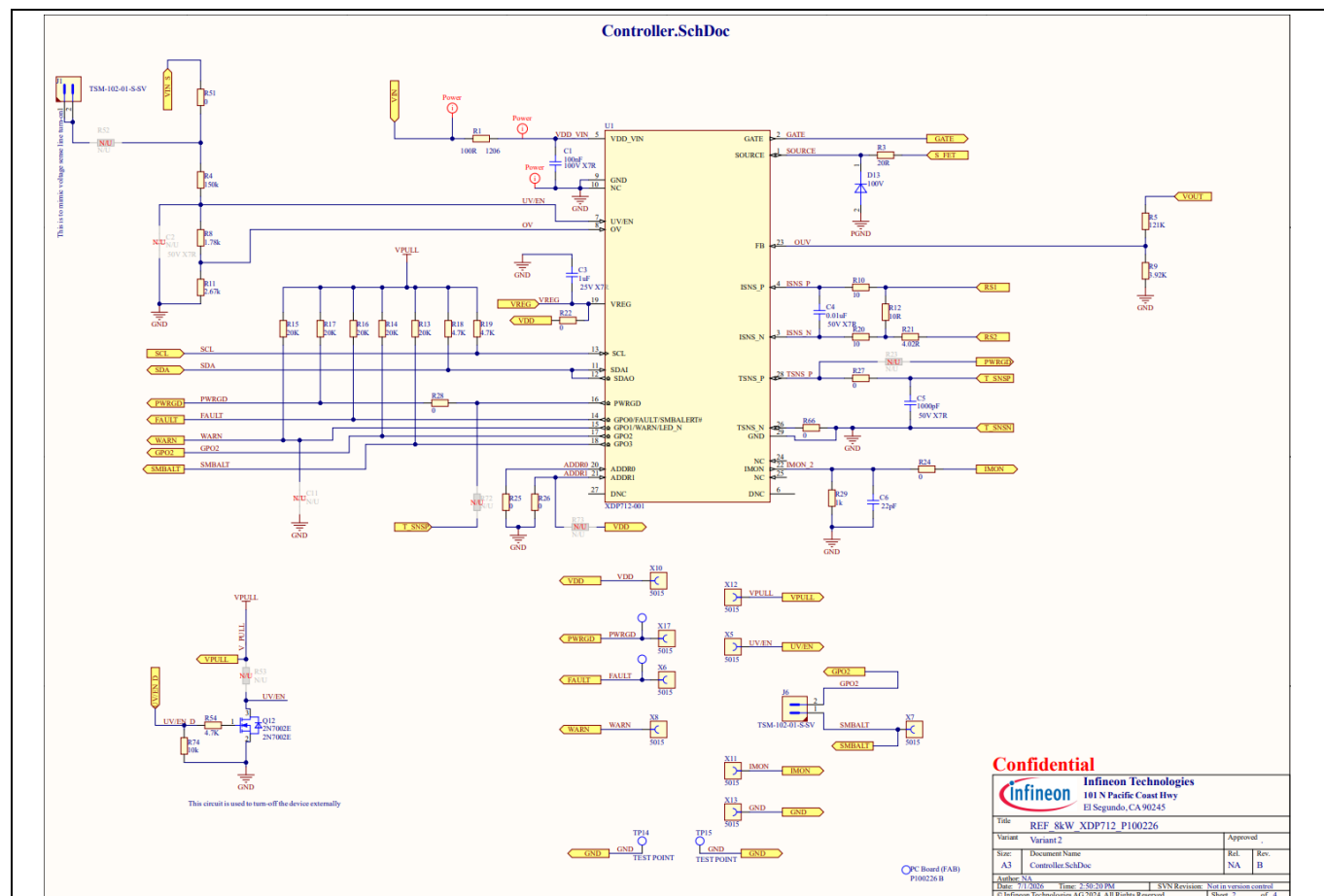


Figure 8 XDP712-001 Reference Board variant 2 schematics

3 XDP712-001 Reference platform

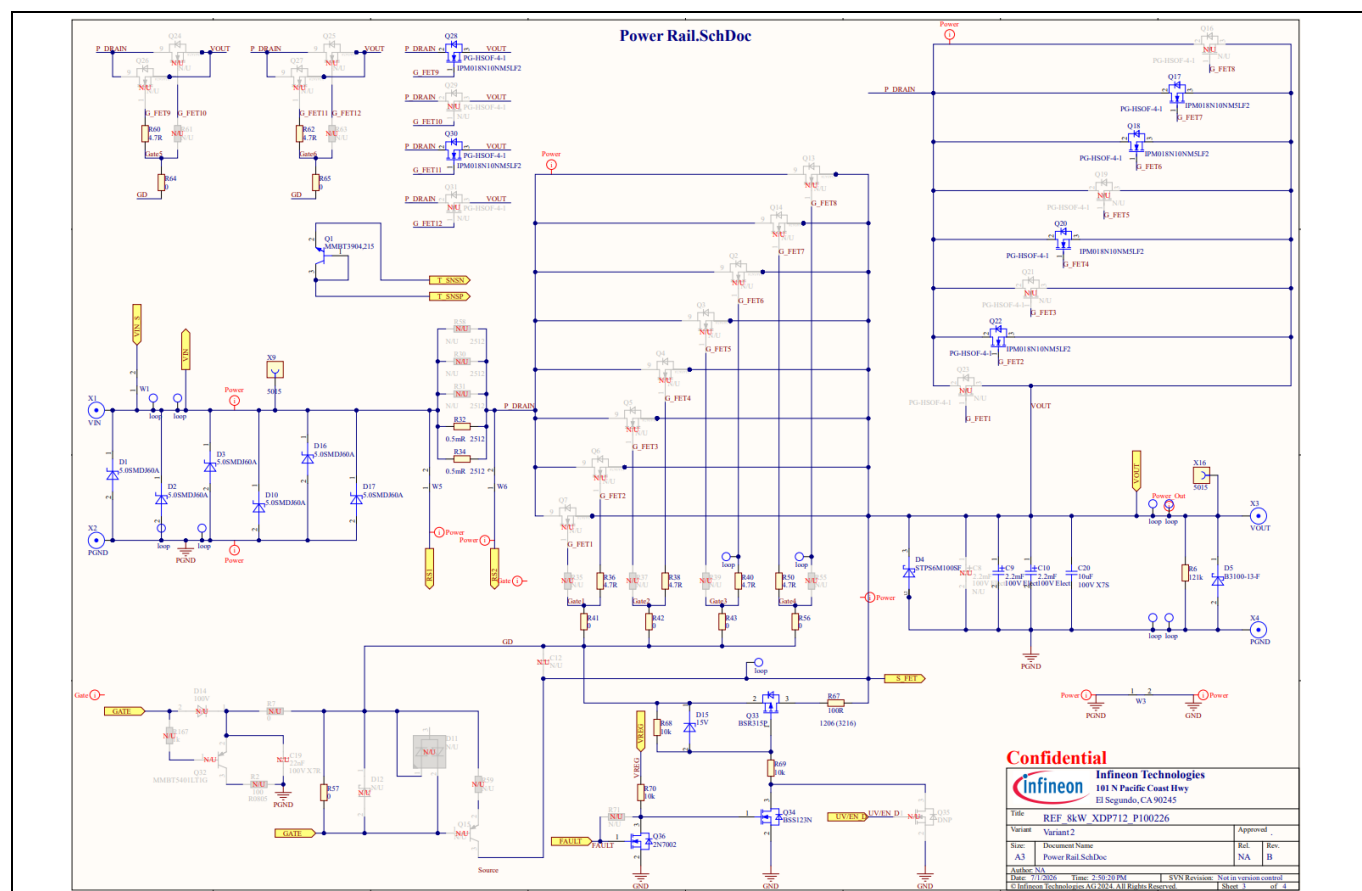


Figure 9 XDP712-001 variant 2 power rail

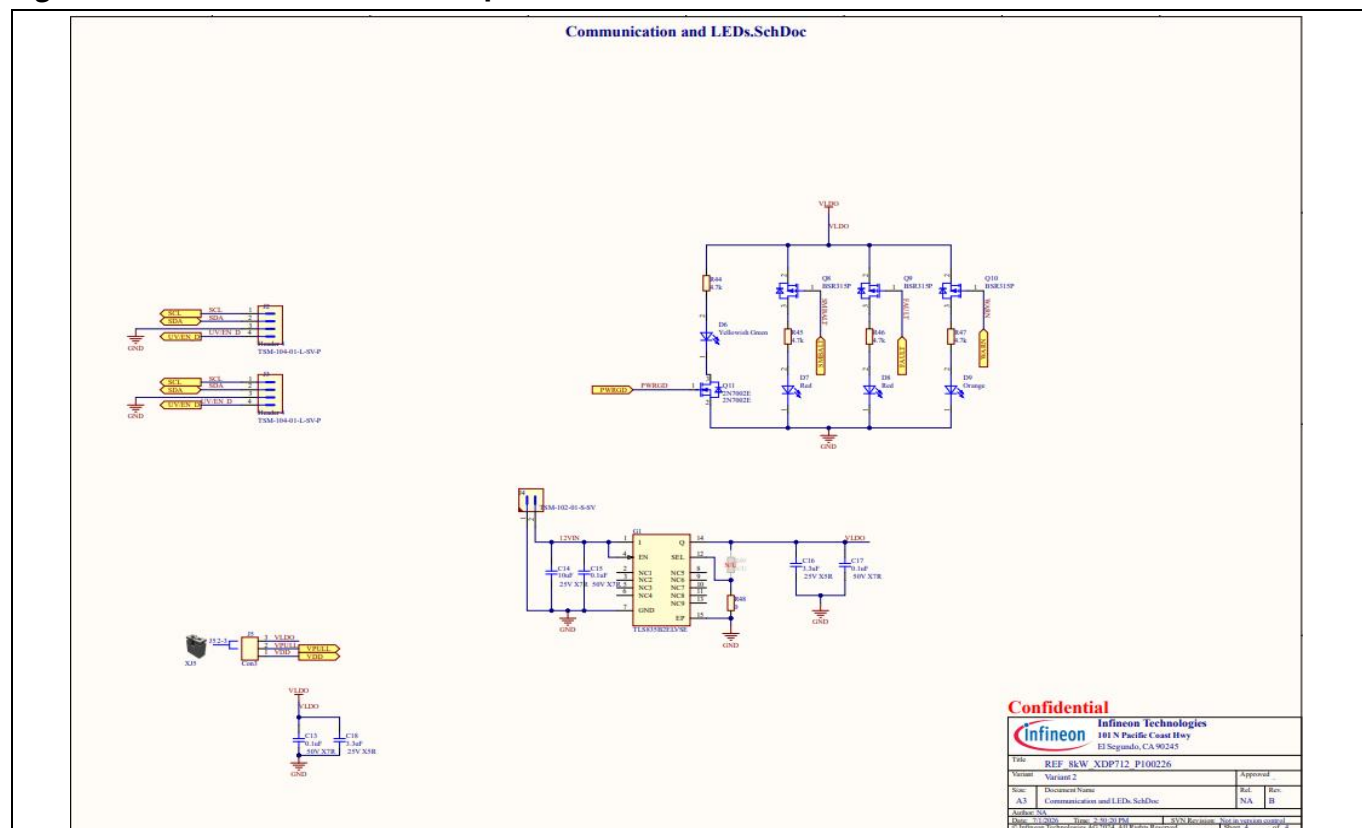


Figure 10 XDP712-001 variant 2 communications and LEDs

3 XDP712-001 Reference platform

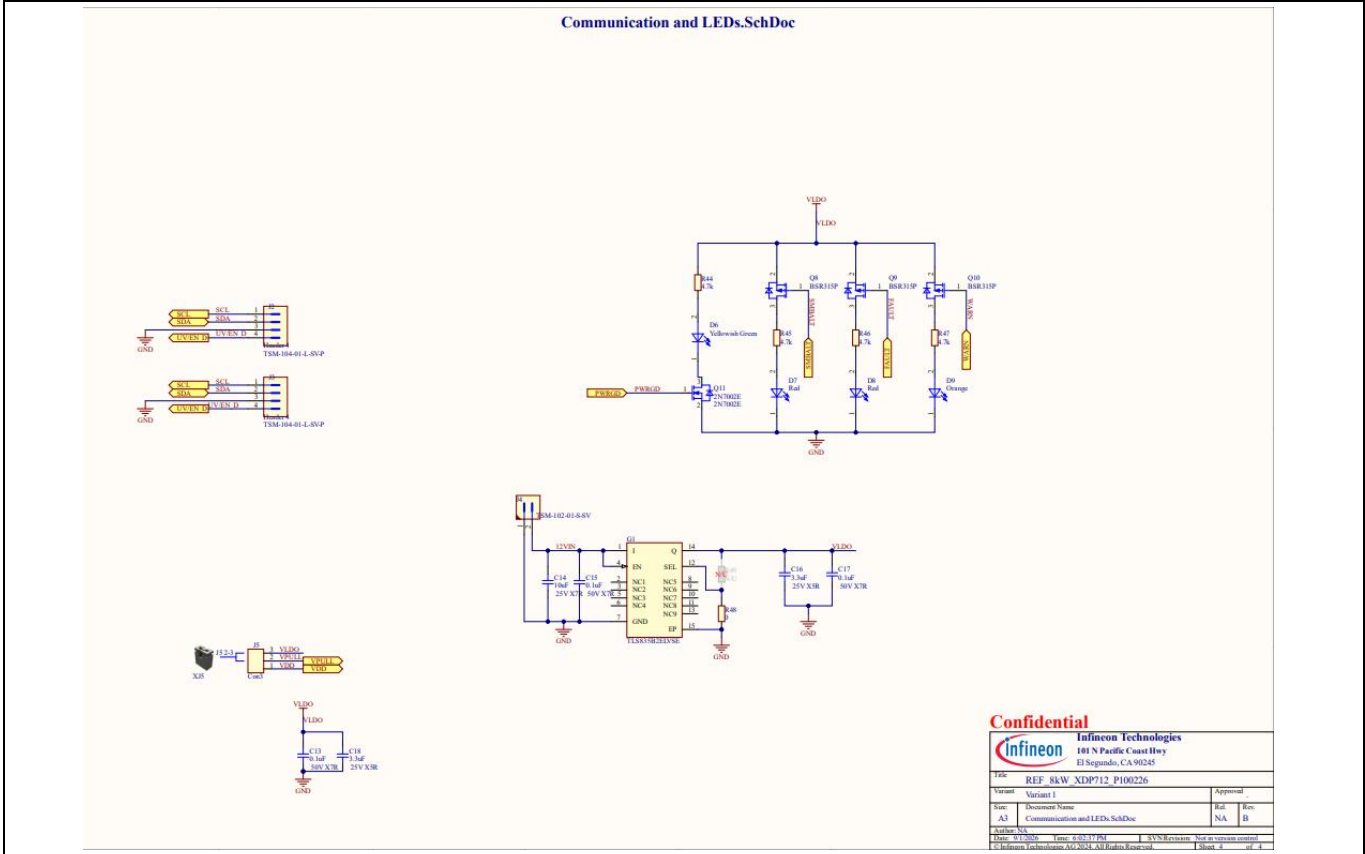


Figure 13 XDP712-001 4 kW communications and LEDs

3 XDP712-001 Reference platform

3.5 XDP712-001 Reference Board layout

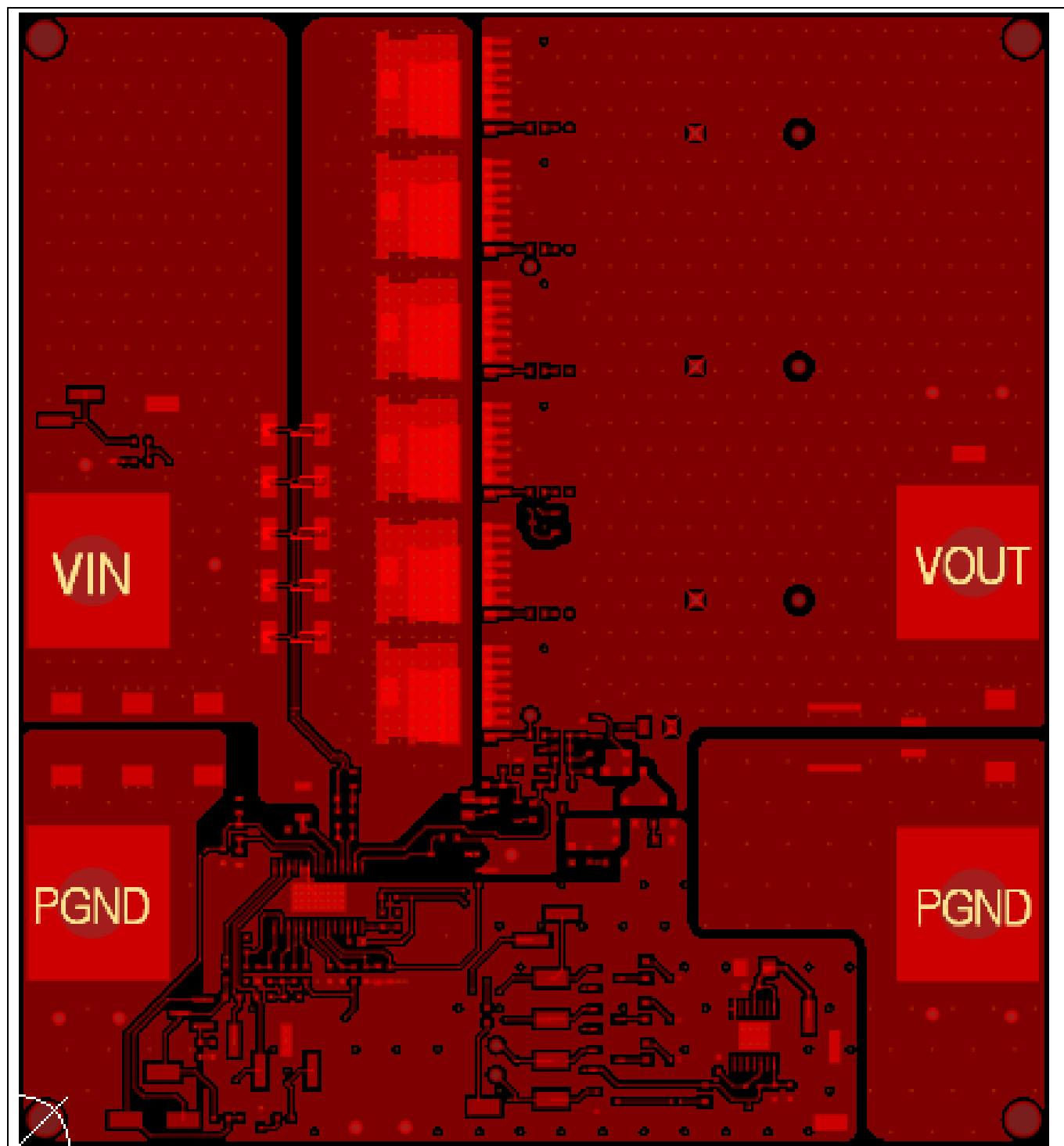


Figure 14 Top layer layout

3 XDP712-001 Reference platform

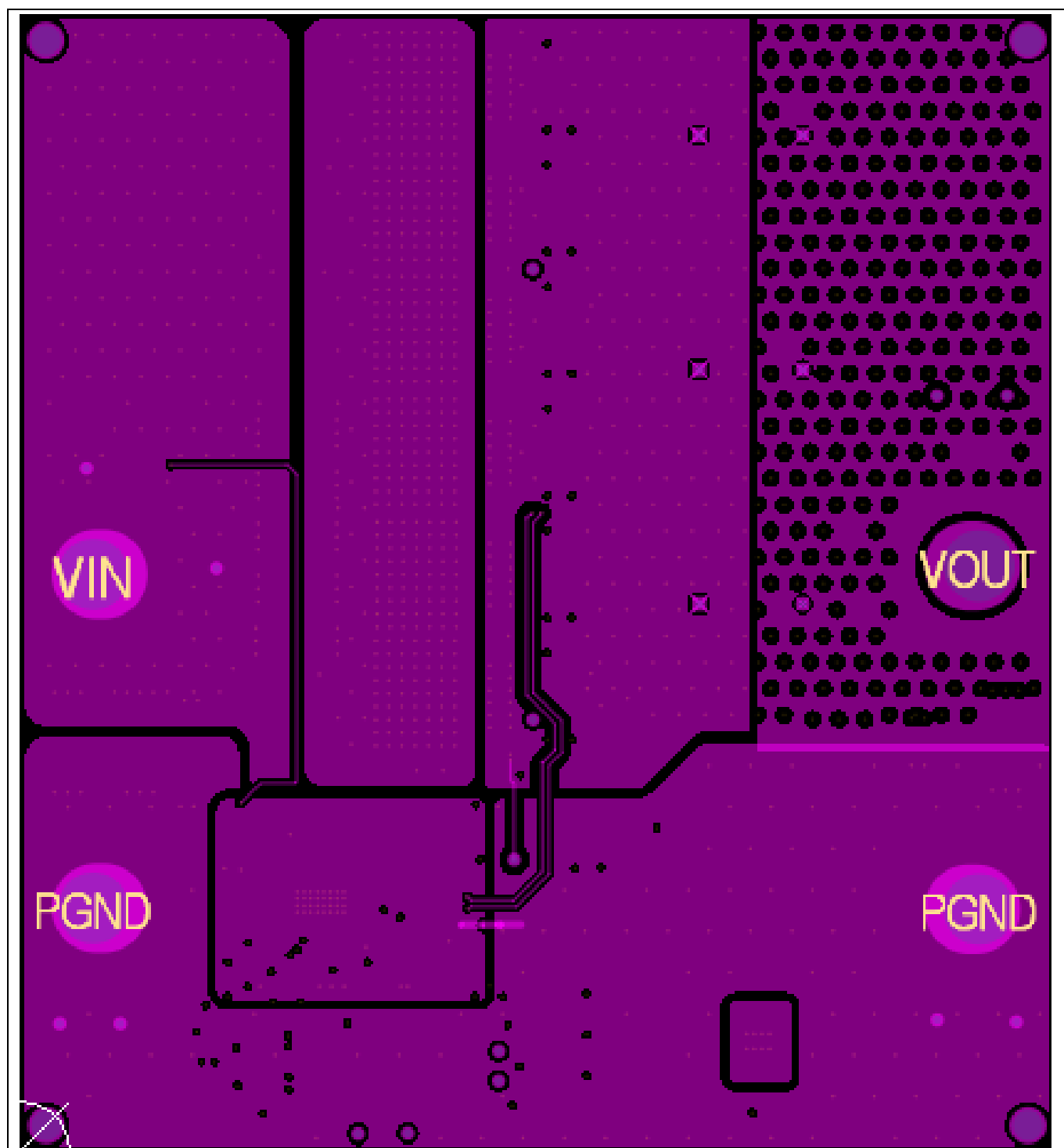


Figure 15 **Mid 1 layer layout**

3 XDP712-001 Reference platform

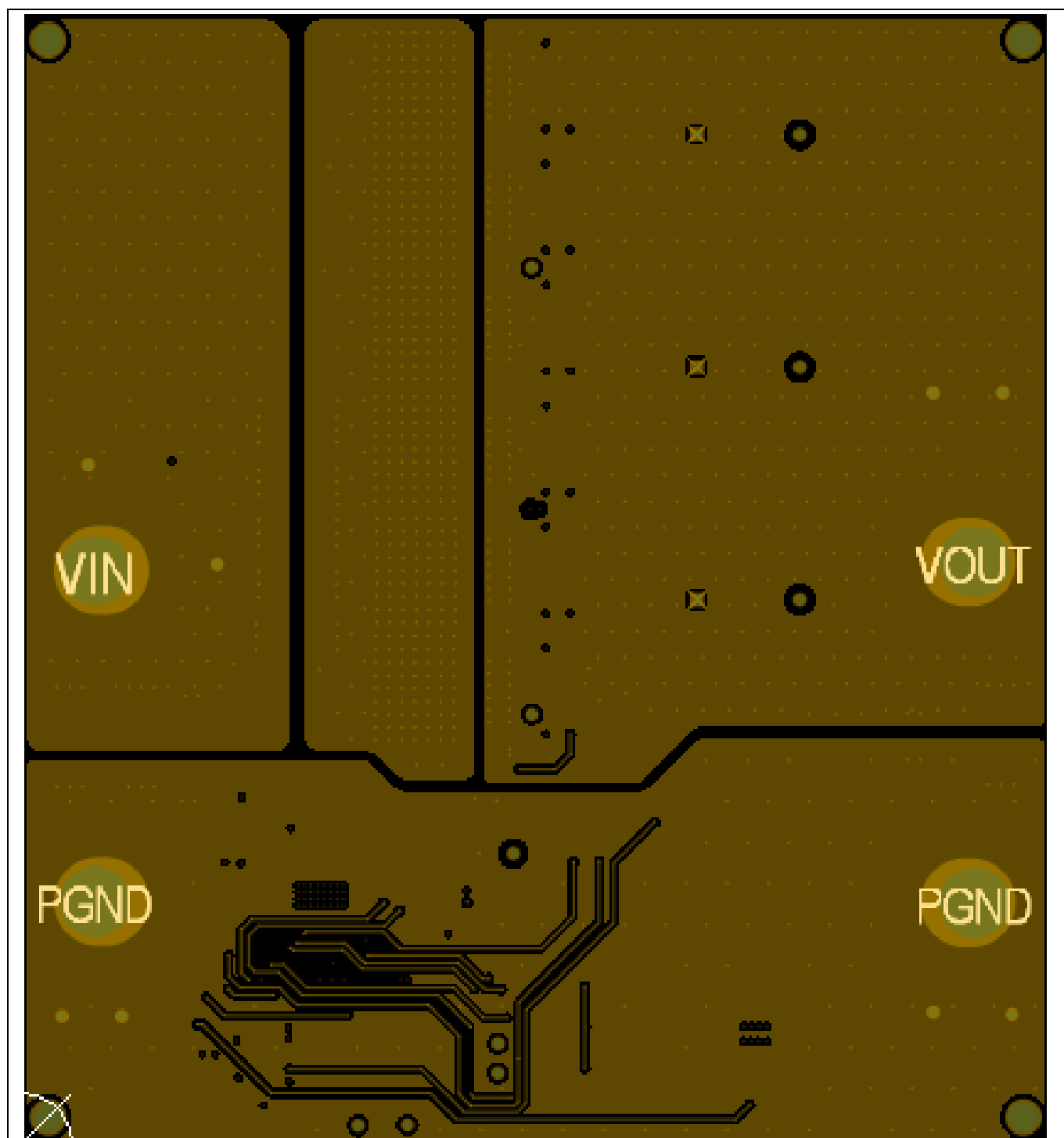


Figure 16 Mid 2 layer layout

3 XDP712-001 Reference platform

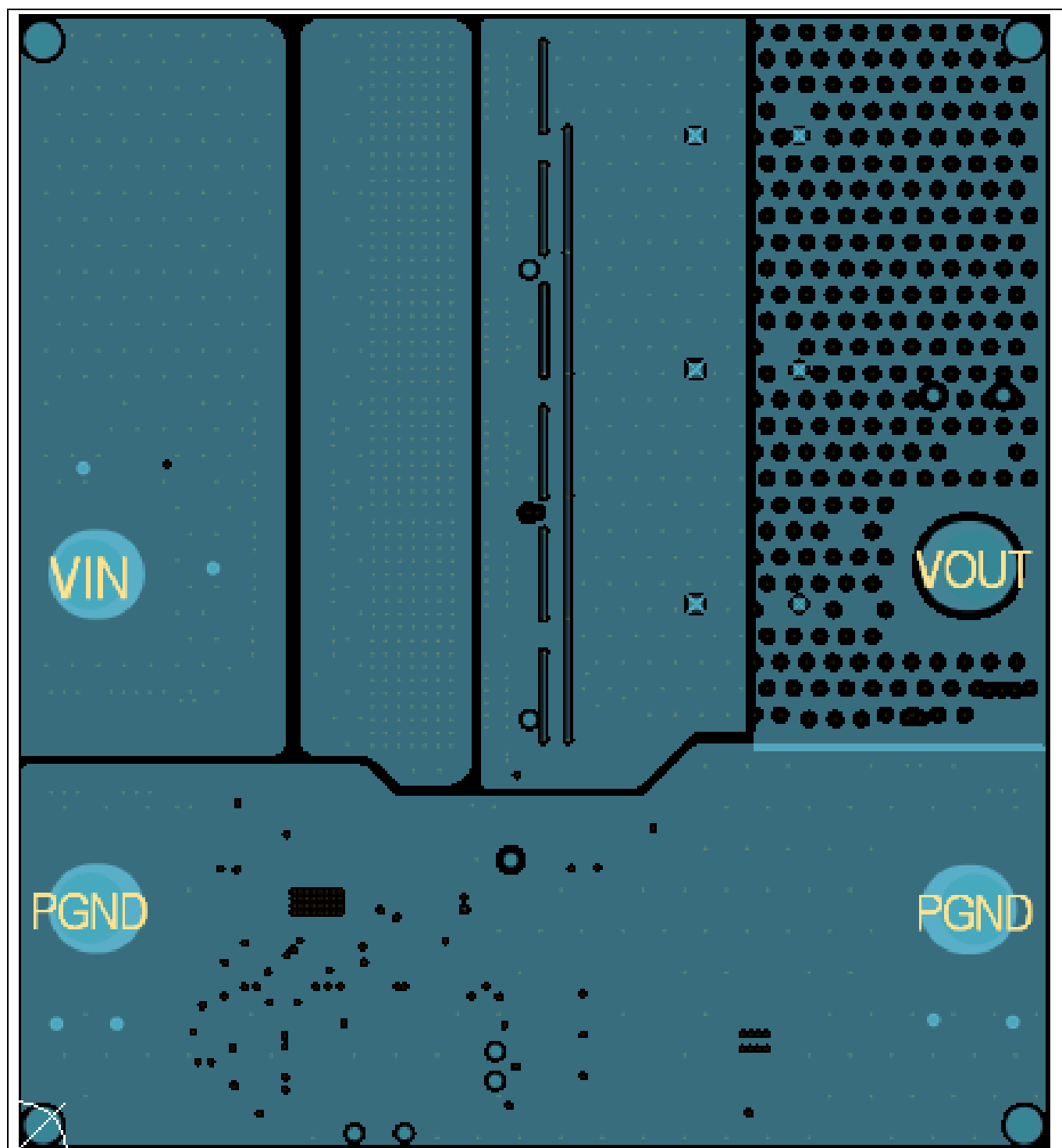


Figure 17 Mid 3 layer layout

3 XDP712-001 Reference platform

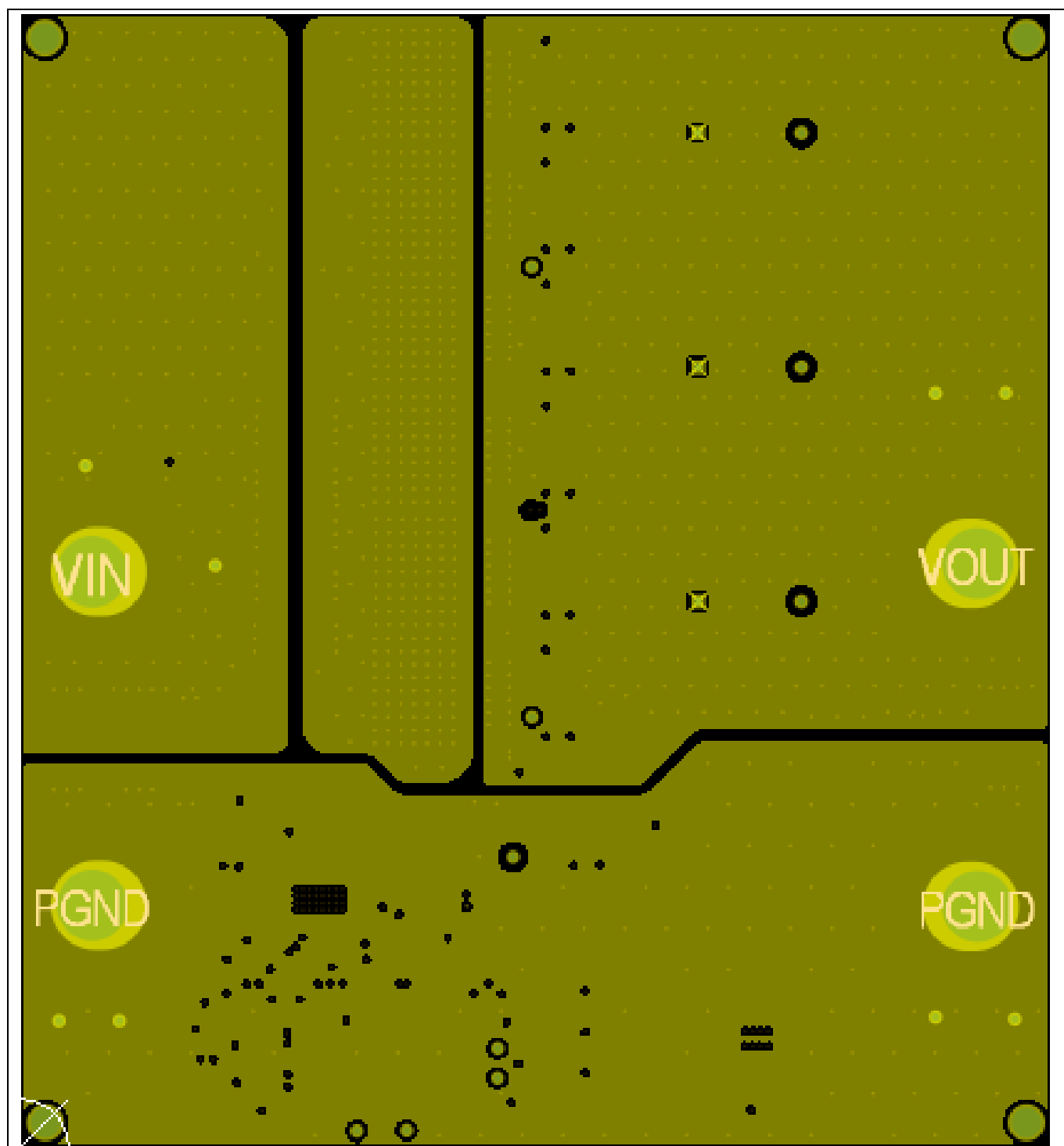


Figure 18 Mid 4 layer layout

3 XDP712-001 Reference platform

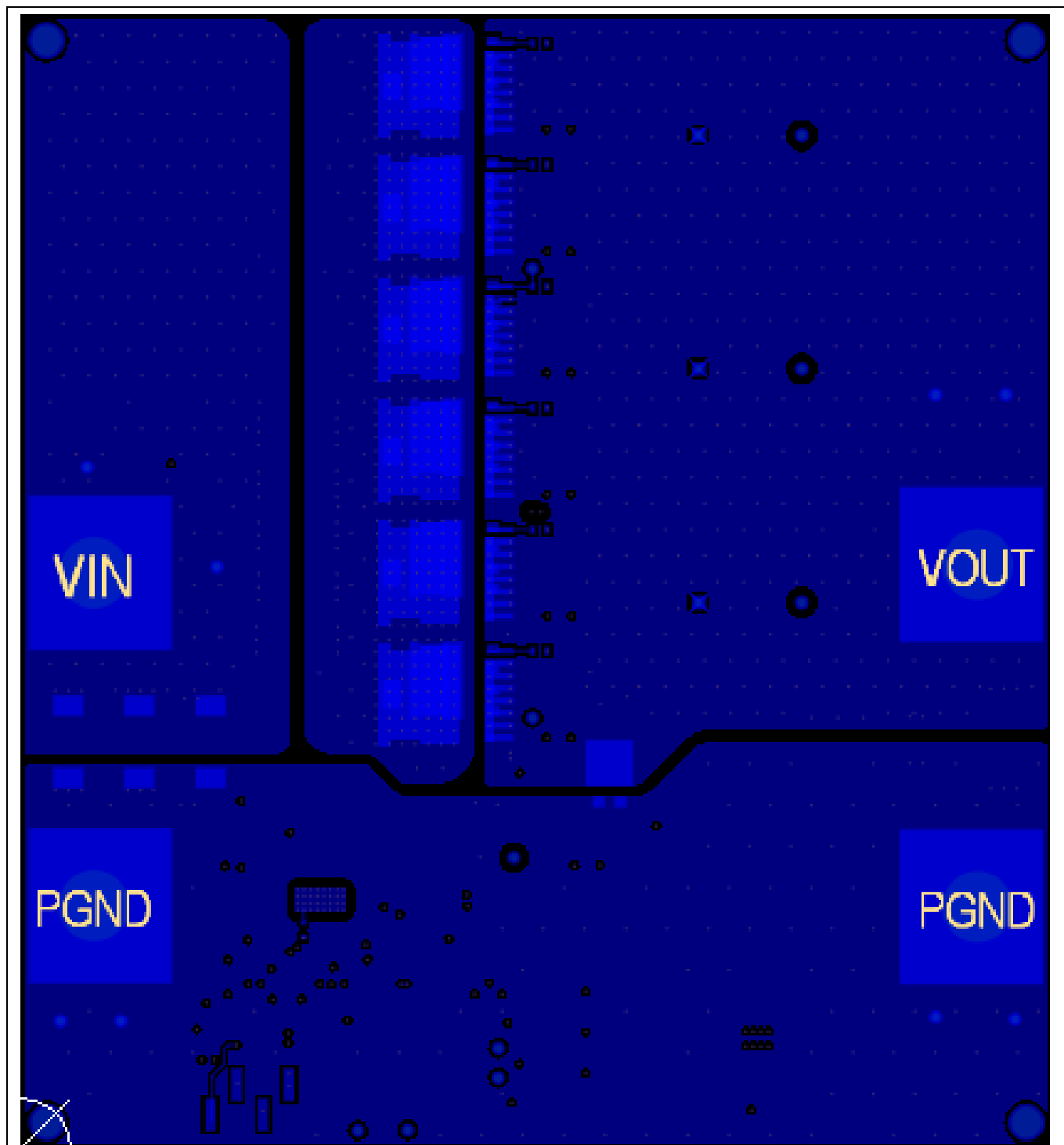


Figure 19 Bottom layer layout

3 XDP712-001 Reference platform

3.6 XDP712-001 Reference Board bill of materials

3.6.1 XDP712-001 Reference Board variant 1 bill of materials

Table 2 XDP712-001 Reference Board bill of materials

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
1	BRD1	PC board (FAB)	Part number	–	P100226 B
1	C1	100 nF	C0602	Murata	GRM188R72A104K A35D
1	C3	1 µF	C0603	TDK	C1608X7R1E105K0 80AB
1	C4	0.01 µF	C0603	TDK	C1608X7R1H103K0 80AA
1	C5	1000 pF	C0603	TDK	C1608X7R1H102M 080AE
1	C6	22 pF	C0603	TDK	C1608C0G1H220J0 80AA
2	C9, C10	2.2 mF	10mm × 22mm × 42mm	Kemet	ESK228M100AQ4A A
3	C13, C15, C17	0.1 µF	C0603	TDK	C1608X7R1H104K0 80AA
1	C14	10 µF	C1206	TDK	CGA5L1X7R1E106K 160AC
2	C16, C18	3.3 µF	C0603	TDK	C1608X5R1E335M 080AC
1	C19	22 nF	C0604	Murata	GRM188R72A223K AC4
1	C20	10 µF	C2220	TDK	C5750X7S2A106K2 30KB
6	D1, D2, D3, D10, D16, D17	5.0SMDJ60 A	DIOM7959X262N	Littelfuse	5.0SMDJ60A
1	D4	STPS10H60 SF	V10PL45-M3	STMicro	STPS10H60SF
1	D5	B3100-13-F	DIOM7959X250N	Diodes Incorporated	B3100-13-F
1	D6	Yellowish Green	LED-SMD-SMLP13BC8T	ROHM Semiconductors	SML-P11MTT86R
2	D7, D8	Red	LED-SMD-SMLP13BC8T	ROHM Semiconductors	SML-P11UTT86R
1	D9	Orange	LED-SMD-SMLP13BC8T	ROHM Semiconductors	SML-P11DTT86R
2	D13, D14	100 V	SOD3715X145N	Diodes Incorporated	BAV16W-7-F

3 XDP712-001 Reference platform

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
1	G1	TLS835B2ELVSE	SOP65P600X170-15N	Infineon Technologies	TLS835B2ELVSEXUMA1
3	J1, J4, J6	TSM-102-01-S-SV	CON-M-SMD-TSM-102-01-S-SV	Samtec	TSM-102-01-S-SV
2	J2, J3	TSM-104-01-L-SV-P	CON-M-SMD-TSM-104-01-L-SV-P	Samtec	TSM-104-01-L-SV-P
1	J5	Con3	Con3_3x1_GRPB031VWTC-RC	Sullins	GRPB031VWTC-RC
1	Q1	MMBT3904,215	SOT95P230X110-3N	Nexperia	MMBT3904,215
3	Q8, Q9, Q10	BSR315P	SOT95P285X135-3N	Infineon Technologies	BSR315P
2	Q11, Q12	2N7002E	sot23	onsemi	2N7002ET1G
6	Q17, Q18, Q20, Q22, Q28, Q30	IPM018N10NM5LF2	PG-HSOG-4	Infineon Technologies	IPM018N10NM5LF2
1	Q32	MMBT5401LT1G	SOT95P237X111-3N-1	onsemi	MMBT3906LT1G
1	R1	100 R	R1206	Vishay	CRCW1206100RFK
1	R2	100	R0805	Panasonic	ERJ-6ENF1000V
1	R3	20 R	R0603	Vishay	CRCW060320R0FK
1	R4	150 k	R0603	Vishay	CRCW0603150KFK
1	R5	121 K	R0603	Panasonic	ERJ-3EKF1213V
1	R6	121 k	R1210	Vishay	CRCW1210121KFK
13	R7, R22, R25, R26, R27, R28, R41, R42, R43, R48, R51, R56, R66	0	R0603	Panasonic	ERJ-3GEY0R00V
1	R8	1.78 k	R0603	Vishay	CRCW06031K78FK
1	R9	3.92 K	R0603	Panasonic	ERJ-3EKF3921V
2	R10, R20	10	R0603	Panasonic	ERJ-3EKF10R0V
1	R11	2.67 k	R0603	Vishay	CRCW06032K67FK
1	R12	10 R	R0603	Yageo	RC0603FR-0710RL
5	R13, R14, R15, R16, R17	20 K	R0603	Panasonic	ERJ-3EKF2002V
3	R18, R19, R54	4.7 K	R0603	Panasonic	ERJ-3EKF4701V
1	R21	4.02 R	R0603	Vishay	CRCW06034R02FK
3	R24, R64, R65	0	R0603	Panasonic	ERJ-3GEY0R00V
1	R29	1 k	R0603	Yageo	RT0603BRD071KL
2	R32, R34	0.5 mR	R2512	Bourns	CSS2H-2512R-L500F
4	R36, R38, R40, R50	4.7 R	R0603	Vishay	CRCW06034R70FK

3 XDP712-001 Reference platform

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
4	R44, R45, R46, R47	4.7 k	R0603	Yageo	RC0603FR-074K7L
2	R60, R62	4.7 R	R0603	Vishay	CRCW06034R70FK
1	R74	10 k	R0603	Panasonic	ERJ3EKF1002V
1	R167	1 k	R0603	Panasonic	ERJ-3EKF1001V
15	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15	loop	TP_5020_loop	Keystone Electronics Corp.	5020
1	U1	XDP712-001	MXA28A_TEX	Infineon Technologies	XDP712-001
4	X1, X2, X3, X4	VIN, PGND, VOUT	Screw&Nut for JACK1	Penn Eng	KF2-832-ET
11	X5, X6, X7, X8, X9, X10, X11, X12, X13, X16, X17	5015	CON-SMD-TP-5015	Keystone Electronics Corp.	5015
1	XJ5	NPB02SVFN-RC	CON-SOC-JMP-NPB02SVFN-RC	Sullins	NPB02SVFN-RC
N/ U	C2	1000 pF	C0603	TDK	C1608X7R1H102M080AE
N/ U	C8	2.2 mF	10mm × 22mm × 42mm	Kemet	ESK228M100AQ4A A
N/ U	D11	BAV99	SOT95P230X110-3N	Nexperia	BAV99
N/ U	D12	BAS3005A-02V	SODFL1608X59N	Infineon Technologies	BAS3005A-02V
N/ U	D15	15 V	SOD3716X135N	onsemi	MMSZ5245BT1G
N/ U	Q15	MMBT3906 LT1G	SOT95P237X111-3N-1	onsemi	MMBT3906LT1G
N/ U	Q33	BSR315P	SOT95P285X135-3N	Infineon Technologies	BSR315P
N/ U	Q36	2N7002	INF-PG-SOT23_N-0	Infineon Technologies	2N7002
N/ U	R35, R37, R39, R55	4.7 R	RESC1609X50N	Vishay	CRCW06034R70FK
N/ U	R53	20 K	R0603	Panasonic	ERJ-3EKF2002V
N/ U	R59	7.5	R0603	Panasonic	ERJ-U03F7R50V
N/ U	R67	100 R	R1206	Stackpole	RNCP1206FTD100 R

3 XDP712-001 Reference platform

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
N/ U	C11, C12	0.1 μ F	C0603	TDK	C1608X7R1H104K080AA
N/ U	Q34, Q35	BSS123N	SOT95P240X110-3N-1-V1	Infineon Technologies	BSS123N
N/ U	R30, R31, R58	0.5 mR	R2512	Bourns	CSS2H-2512R-L500F
N/ U	R68, R69, R70	10 k	R0603	Panasonic	ERJ3EKF1002V
N/ U	R61, R63	4.7 R	R0604	Vishay	CRCW06034R70FK
N/ U	Q16, Q19, Q21, Q23, Q29, Q31	N/U	PG-HSOG-4	Infineon Technologies	IPM018N10NM5LF2
N/ U	R23, R49, R52, R57, R71, R72, R73	0	R0603	Panasonic	ERJ-3GEY0R00V
N/ U	Q2, Q3, Q4, Q5, Q6, Q7, Q13, Q14, Q24, Q25, Q26, Q27	IPT017N10NM5LF2	PG-HSOF-8	Infineon Technologies	IPT017N10NM5LF2

3 XDP712-001 Reference platform

3.6.2 XDP712-001 Reference Board variant 2 bill of materials

Table 3 XDP712-001 Reference Board bill of materials

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
1	BRD1	PC board (FAB)	Part number	–	P100226 B
1	C1	100 nF	CAPC1608X90N-3	Murata	GRM188R72A104KA35D
1	C3	1 µF	C0603	TDK	C1608X7R1E105K080AB
1	C4	0.01 µF	C0603	TDK	C1608X7R1H103K080AA
1	C5	1000 pF	C0603	TDK	C1608X7R1H102M080AE
1	C6	22 pF	C0603	TDK	C1608C0G1H220J080AA
2	C9, C10	2.2 mF	10mm × 22mm × 42mm	Kemet	ESK228M100AQ4AA
3	C13, C15, C17	0.1 µF	C0603	TDK	C1608X7R1H104K080AA
1	C14	10 µF	C1206	TDK	CGA5L1X7R1E106K160AC
2	C16, C18	3.3 µF	C0603	TDK	C1608X5R1E335M080AC
1	C20	10 µF	CAPC5750X250N	TDK Corporation	C5750X7S2A106K230KB
1	D15	15 V	SOD3716X135N	onsemi	MMSZ5245BT1G
6	D1, D2, D3, D10, D16, D17	5.0SMDJ60A	DIOM7959X262N	Littelfuse	5.0SMDJ60A
1	D4	STPS10H60SF	V10PL45-M3	STMicroelectronics	STPS10H60SF
1	D5	B3100-13-F	DIOM7959X250N	Diodes Incorporated	B3100-13-F
1	D6	Yellowish Green	LED-SMD-SMLP13BC8T	ROHM Semiconductors	SML-P11MTT86R
2	D7, D8	Red	LED-SMD-SMLP13BC8T	ROHM Semiconductors	SML-P11UTT86R
1	D9	Orange	LED-SMD-SMLP13BC8T	ROHM Semiconductors	SML-P11DTT86R
1	D13	100 V	SOD3715X145N	Diodes Incorporated	BAV16W-7-F
1	G1	TLS835B2ELVSE	SOP65P600X170-15N	Infineon Technologies	TLS835B2ELVSEXUMA1
3	J1, J4, J6	TSM-102-01-S-SV	CON-M-SMD-TSM-102-01-S-SV	Samtec	TSM-102-01-S-SV

3 XDP712-001 Reference platform

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
2	J2, J3	TSM-104-01-L-SV-P	CON-M-SMD-TSM-104-01-L-SV-P	Samtec	TSM-104-01-L-SV-P
1	J5	Con3	Con3_3x1_GRPB031VWT C-RC	Sullins	GRPB031VWTC-RC
1	Q1	MMBT3904,215	SOT95P230X110-3N	Nexperia	MMBT3904,215
3	Q8, Q9, Q10	BSR315P	SOT95P285X135-3N	Infineon Technologies	BSR315P
2	Q11, Q12	2N7002E	SOT23	onsemi	2N7002ET1G
6	Q17, Q18, Q20, Q22, Q28, Q30	IPM018N10N M5LF2	PG-HSOG-4	Infineon Technologies	IPM018N10NM5LF2
1	R1	100 R	RESC3216X60N	Vishay	CRCW1206100RFB
1	R3	20 R	RESC1609X50N	Vishay	CRCW060320R0FB
1	R4	150 k	RESC1609X50N	Vishay	CRCW0603150KFB
1	R5	121 K	R0603	Panasonic	ERJ-3EKF1213V
1	R6	121 k	RESC3225X60N	Vishay	CRCW1210121KFB
12	R22, R25, R26, R27, R28, R41, R42, R43, R48, R51, R56, R57, R66	0	R0603	Panasonic	ERJ-3GEY0R00V
1	R8	1.78 k	RESC1609X50N	Vishay	CRCW06031K78FB
1	R9	3.92 K	R0603	Panasonic	ERJ-3EKF3921V
2	R10, R20	10	R0603	Panasonic	ERJ-3EKF10R0V
1	R11	2.67 k	RESC1609X50N	Vishay	CRCW06032K67FB
1	R12	10 R	RESC1608X55N-1	Yageo	RC0603FR-0710RL
5	R13, R14, R15, R16, R17	20 K	R0603	Panasonic	ERJ-3EKF2002V
3	R18, R19, R54	4.7 K	R0603	Panasonic	ERJ-3EKF4701V
1	R21	4.02 R	RESC1609X50N	Vishay	CRCW06034R02FB
1	R29	1 k	RESC1608X55N-1	Yageo	RT0603BRD071KL
2	R32, R34	0.5 mR	RES-SMD-CSS2H-2512K-3L00x	Bourns	CSS2H-2512R-L500F
4	R36, R38, R40, R50	4.7 R	RESC1609X50N	Vishay	CRCW06034R70FB
4	R44, R45, R46, R47	4.7 k	RESC1608X55N-1	Yageo	RC0603FR-074K7L
1	R74	10 k	RESC1608X55N-5	Panasonic	ERJ3EKF1002V
15	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9,	loop	TP_5020_loop	Keystone Electronics Corp.	5020

3 XDP712-001 Reference platform

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
	TP10, TP11, TP12, TP13, TP14, TP15				
1	U1	XDP712-001	MXA28A_TEX	Infineon Technologies	XDP712-001
4	X1, X2, X3, X4	VIN, PGND, VOUT	Screw&Nut for JACK1	Penn Eng	KF2-832-ET
11	X5, X6, X7, X8, X9, X10, X11, X12, X13, X16, X17	5015	CON-SMD-TP-5015	Keystone Electronics Corp.	5015
1	XJ5	NPB02SVFN-RC	CON-SOC-JMP-NPB02SVFN-RC	Sullins	NPB02SVFN-RC
1	Q33	BSR315P	SOT95P285X135-3N	Infineon Technologies	BSR315P
1	Q36	2N7002	INF-PG-SOT23_N-0	Infineon Technologies	2N7002
1	R67	100 R	RESC3115X65N	Stackpole Electronics	RNCP1206FTD100R
1	Q34	BSS123N	SOT95P240X110-3N-1-V1	Infineon Technologies	BSS123N
3	R68, R69, R70	10 k	RESC1608X55N-5	Panasonic	ERJ3EKF1002V
2	R60, R62	4.7 R	RESC1609X50N	Vishay	CRCW06034R70FK
3	R24, R64, R65	0	R0603	Panasonic	ERJ-3GEY0R00V
N/U	C2	1000 pF	C0603	TDK	C1608X7R1H102M080AE
N/U	C11, C12	0.1 µF	C0603	TDK	C1608X7R1H104K080AA
N/U	C19	22 nF	CAPC1608X90N	Murata	GRM188R72A223KAC4
N/U	C8	2.2 mF	10mm × 22mm × 42mm	Kemet	ESK228M100AQ4AA
N/U	D11	BAV99	SOT95P230X110-3N	Nexperia	BAV99
N/U	D12	BAS3005A-02V	SODFL1608X59N	Infineon Technologies	BAS3005A-02V
N/U	D14	100 V	SOD3715X145N	Diodes Incorporated	BAV16W-7-F
N/U	Q15	MMBT3906LT1G	SOT95P237X111-3N-1	onsemi	MMBT3906LT1G
N/U	Q16, Q19, Q21, Q23, Q29, Q31	N/U	PG-HSOG-4	Infineon Technologies	IPM018N10NM5LF2
N/U	Q2, Q3, Q4, Q5, Q6, Q7, Q13, Q14, Q24, Q25, Q26, Q27	IPT017N10NM5LF2	PG-HSOF-8	Infineon Technologies	IPT017N10NM5LF2

3 XDP712-001 Reference platform

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
N/U	Q32	MMBT5401LT 1G	SOT95P237X111-3N-1	onsemi	MMBT3906LT1G
N/U	Q35	BSS123N	SOT95P240X110-3N-1-V1	Infineon Technologies	BSS123N
N/U	R167	1 k	RESC1608X55N-5	Panasonic	ERJ-3EKF1001V
N/U	R2	100	R0805	Panasonic	ERJ-6ENF1000V
N/U	R23, R49, R52, R71, R72, R73	0	R0603	Panasonic	ERJ-3GEY0R00V
N/U	R30, R31, R58	0.5 mR	RES-SMD-CSS2H-2512K- 3L00x	Bourns	CSS2H-2512R-L500F
N/U	R35, R37, R39, R55	4.7 R	RESC1609X50N	Vishay	CRCW06034R70FK
N/U	R53	20 K	R0603	Panasonic	ERJ-3EKF2002V
N/U	R59	7.5	R0603	Panasonic	ERJ-U03F7R50V
N/U	R61, R63	4.7 R	RESC1609X50N	Vishay	CRCW06034R70FK
N/U	R7	0	R0603	Panasonic	ERJ-3GEY0R00V

3.6.3 XDP™ XDP712-001 4 kW Reference Board bill of materials

Table 4 XDP712-001 Reference Board bill of materials

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
1	BRD1	PC board (FAB)	Part number	–	P100226 B
1	C1	100 nF	C0602	Murata	GRM188R72A104KA 35D
1	C3	1 µF	C0603	TDK	C1608X7R1E105K08 0AB
1	C4	0.01 µF	C0603	TDK	C1608X7R1H103K08 0AA
1	C5	1000 pF	C0603	TDK	C1608X7R1H102M0 80AE
1	C6	22 pF	C0603	TDK	C1608C0G1H220J08 0AA
1	C9	2.2 mF	10mm × 22mm × 42mm	Kemet	ESK228M100AQ4AA
3	C13, C15, C17	0.1 µF	C0603	TDK	C1608X7R1H104K08 0AA
1	C14	10 µF	C1206	TDK	CGA5L1X7R1E106K1 60AC
2	C16, C18	3.3 µF	C0603	TDK	C1608X5R1E335M08 0AC
1	C19	22 nF	C0604	Murata	GRM188R72A223KA C4

3 XDP712-001 Reference platform

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
1	C20	10 µF	C2220	TDK	C5750X7S2A106K23 0KB
4	D1, D2, D3, D10	5.0SMDJ6 0A	DIOM7959X262N	Littelfuse	5.0SMDJ60A
1	D4	STPS10H6 0SF	V10PL45-M3	STMicro	STPS10H60SF
1	D5	B3100-13-F	DIOM7959X250N	Diodes Incorporated	B3100-13-F
1	D6	Yellowish Green	LED-SMD-SMLP13BC8T	ROHM Semiconductors	SML-P11MTT86R
2	D7, D8	Red	LED-SMD-SMLP13BC8T	ROHM Semiconductors	SML-P11UTT86R
1	D9	Orange	LED-SMD-SMLP13BC8T	ROHM Semiconductors	SML-P11DTT86R
2	D13, D14	100 V	SOD3715X145N	Diodes Incorporated	BAV16W-7-F
1	G1	TLS835B2 ELVSE	SOP65P600X170-15N	Infineon Technologies	TLS835B2ELVSEXUM A1
3	J1, J4, J6	TSM-102-01-S-SV	CON-M-SMD-TSM-102-01-S-SV	Samtec	TSM-102-01-S-SV
2	J2, J3	TSM-104-01-L-SV-P	CON-M-SMD-TSM-104-01-L-SV-P	Samtec	TSM-104-01-L-SV-P
1	J5	Con3	Con3_3x1_GRPB031VW TC-RC	Sullins	GRPB031VWTC-RC
1	Q1	MMBT39 04,215	SOT95P230X110-3N	Nexperia	MMBT3904,215
3	Q8, Q9, Q10	BSR315P	SOT95P285X135-3N	Infineon Technologies	BSR315P
2	Q11, Q12	2N7002E	SOT23	onsemi	2N7002ET1G
4	Q17, Q18, Q20, Q22	IPM018N 10NM5LF 2	PG-HSOG-4	Infineon Technologies	IPM018N10NM5LF2
1	Q32	MMBT54 01LT1G	SOT95P237X111-3N-1	onsemi	MMBT3906LT1G
1	R1	100 R	R1206	Vishay	CRCW1206100RFK
1	R2	100	R0805	Panasonic	ERJ-6ENF1000V
1	R3	20 R	R0603	Vishay	CRCW060320R0FK
1	R4	150 k	R0603	Vishay	CRCW0603150KFK
1	R5	121 K	R0603	Panasonic	ERJ-3EKF1213V
1	R6	121 k	R1210	Vishay	CRCW1210121KFK
13	R7, R22, R25, R26, R27, R28, R41, R42, R43, R48, R51, R56, R66	0	R0603	Panasonic	ERJ-3GEY0R00V

3 XDP712-001 Reference platform

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
1	R8	1.78 k	R0603	Vishay	CRCW06031K78FK
1	R9	3.92 K	R0603	Panasonic	ERJ-3EKF3921V
2	R10, R20	10	R0603	Panasonic	ERJ-3EKF10R0V
1	R11	2.67 k	R0603	Vishay	CRCW06032K67FK
5	R13, R14, R15, R16, R17	20 K	R0603	Panasonic	ERJ-3EKF2002V
3	R18, R19, R54	4.7 K	R0603	Panasonic	ERJ-3EKF4701V
3	R24, R64, R65	0	R0603	Panasonic	ERJ-3GEY0R00V
1	R29	1 k	R0603	Yageo	RT0603BRD071KL
2	R32, R34	0.3 mR	R2512	Bourns	CSS2H-2512R-L300F
4	R36, R38, R40, R50	4.7 R	R0603	Vishay	CRCW06034R70FK
4	R44, R45, R46, R47	4.7 k	R0603	Yageo	RC0603FR-074K7L
2	R60, R62	4.7 R	R0603	Vishay	CRCW06034R70FK
1	R74	10 k	R0603	Panasonic	ERJ3EKF1002V
1	R167	1 k	R0603	Panasonic	ERJ-3EKF1001V
15	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15	loop	TP_5020_loop	Keystone Electronics Corp.	5020
1	U1	XDP712-001	MXA28A_TEX	Infineon Technologies	XDP712-001
4	X1, X2, X3, X4	VIN, PGND, VOUT	Screw&Nut for JACK1	Penn Eng	KF2-832-ET
11	X5, X6, X7, X8, X9, X10, X11, X12, X13, X16, X17	5015	CON-SMD-TP-5015	Keystone Electronics Corp.	5015
1	XJ5	NPB02SVFN-RC	CON-SOC-JMP-NPB02SVFN-RC	Sullins	NPB02SVFN-RC
N/U	C2	1000 pF	C0603	TDK	C1608X7R1H102M080AE
N/U	C8, C10	2.2 mF	CAPPRD1000W80D2200H4200B	Kemet	ESK228M100AQ4AA
N/U	D16, D17	5.0SMDJ60A	DIOM7959X262N	Littelfuse	5.0SMDJ60A
N/U	D11	BAV99	SOT95P230X110-3N	Nexperia	BAV99
N/U	D12	BAS3005A-02V	SODFL1608X59N	Infineon Technologies	BAS3005A-02V
N/U	D15	15 V	SOD3716X135N	onsemi	MMSZ5245BT1G
N/U	Q15	MMBT3906LT1G	SOT95P237X111-3N-1	onsemi	MMBT3906LT1G
N/U	Q33	BSR315P	SOT95P285X135-3N	Infineon Technologies	BSR315P

3 XDP712-001 Reference platform

Qty	Reference designator	Value	Footprint	Manufacturer	Part number
N/U	Q36	2N7002	INF-PG-SOT23_N-0	Infineon Technologies	2N7002
N/U	R12	10 R	R0603	Yageo	RC0603FR-0710RL
N/U	R21	4.02 R	R0603	Vishay	CRCW06034R02FK
N/U	R35, R37, R39, R55	4.7 R	RESC1609X50N	Vishay	CRCW06034R70FK
N/U	R53	20 K	R0603	Panasonic	ERJ-3EKF2002V
N/U	R59	7.5	R0603	Panasonic	ERJ-U03F7R50V
N/U	R67	100 R	R1206	Stackpole	RNCP1206FTD100R
N/U	C11,	0.1 μ F	C0603	TDK	C1608X7R1H104K080AA
N/U	Q34, Q35	BSS123N	SOT95P240X110-3N-1-V1	Infineon Technologies	BSS123N
N/U	R30, R31, R58	0.5 mR	R2512	Bourns	CSS2H-2512R-L500F
N/U	R68, R69, R70	10 k	R0603	Panasonic	ERJ3EKF1002V
N/U	R61, R63	4.7 R	R0604	Vishay	CRCW06034R70FK
N/U	Q16, Q19, Q21, Q23, Q29, Q31, Q28, Q30	N/U	PG-HSOG-4	Infineon Technologies	IPM018N10NM5LF2
N/U	R23, R49, R52, R57, R71, R72, R73	0	R0603	Panasonic	ERJ-3GEY0R00V
N/U	Q2, Q3, Q4, Q5, Q6, Q7, Q13, Q14, Q24, Q25, Q26, Q27	IPT017N10NM5LF2	PG-HSOF-8	Infineon Technologies	IPT017N10NM5LF2

3.7 Reference Board component functions

Table 5 XDP712-001 functions of the reference Board components

Reference Designator	Component/value	Function on the reference board	Notes
U1	XDP712-001	Main digital hot-swap	Protection, control, telemetry, PMBus®
G1	TLS835B2ELVSE	Generates VLDO logic rail	Requires external ~12 V at J4
Q17, Q18, Q20, Q22, Q28, Q30	IPM018N10NM5LF2	Integrated high-current pass devices	Parallel MOSFET stage mTOLL (8×8) footprint
Q19, Q21, Q23, Q29, Q31	MOSFET footprints	Alternate MOSFET locations	DNI
R1	100 R	Limit inrush/ prevent short-circuit current to damage due to high DV/DT on VDD	–
R4, R8, R11	150 k Ω / 2.1 k Ω / 2.67 k Ω	UV/OV / EN threshold divider	Startup or fault thresholds

3 XDP712-001 Reference platform

Reference Designator	Component/value	Function on the reference board	Notes
R15, R17, R16, R14, R13	20 k	Pull-up resistors connected to either VLDO or VIN for I2C and fault pins	–
R18, R19	4.7 k	Pull-up resistors connected to either VLDO or VIN for I2C and fault pins	–
R10, R20	10 R	Protect IC from voltage surges above 100 V	–
R12, R21	10 R, 4.02 R	Used to adjust the R_{SNS} value	–
R25, R26	0	Used to change the PMBus® address of the controller	–
R36, R38, R40, R50, R60, R62	4.7 Ω	Gate damping for populated MOSFETs	Controls ringing
R35, R37, R39, R55, R61, R63	4.7 Ω	Gate damping for alternate MOSFETs	DNI
R41, R42, R43, R56, R64, R65	0 Ω	Gate routing or grouping selection	–
R32, R34	0.5 m Ω (2512)	Current sense (R_{SNS})	Defines protection and telemetry scaling
R30, R31, R58	Shunt footprints	Optional R_{SNS} modification	DNI
C4	0.1 μ F	Current-sense filtering	Noise suppression on ISNS
C5	1000 pF	Temperature sense filtering	Stabilizes TSNS input
R5, R9	121 k Ω / 3.92 k Ω	VOUT Sensing divider	VIN scaling
R6	121 k Ω	VOUT sensing divider leg	Output monitoring
D1, D2	5.0SMDJ64A	VIN surge or ESD protection	Clamps fast transients
D4	STPS6M100SF	Reverse or transient support	–
D5	B3100-13-F	output protection diodes	–
D6, D7, D8, D9	LEDs	Status indication (PWRGD, SYNC, WARN, FAULT)	Visual feedback
D3, D10, D16, D17	TVS footprints	Optional surge protection	DNI
D13	100 V diode	Clamp negative voltage transient at source node	–

3 XDP712-001 Reference platform

Reference Designator	Component/value	Function on the reference board	Notes
C9, C10	2.2 mF	Input/output energy storage	Supports inrush + load steps
C8,	Bulk capacitor footprints	Optional added bulk	DNI
C1	100 nF	Mandatory HF decoupling	–
C3	1 μ F	Mandatory for stabilizing internal regulator	–
C13, C15, C17	0.1 μ F	LDO HF decoupling	Noise suppression
R44, R45, R46, R47	4.7 k Ω	Pull-ups for digital status lines	Powered from VLDO
J1	2-pin header	mimic voltage sense line turn on	–
J2, J3	4-pin headers	PMBus®/I ² C interface	SCL, SDA, GND, EN
J4	2-pin Header	External AUX (~12 V) input	Enables VLDO
J5	3-pin Header	VPULL config	Switches VPULL voltage from VIN-VLDO
J6	2-pin header	Shorts GPO2 to SMBALERT	–
Q1	MMBT3904,215	temperature sense with external NPN BJT transistor	–
Q8, Q9, Q10	BSR315P	LED switching devices	SMBALERT, FAULT, WARN
Q11	2N7002E	LED control / buffering	PWRGD
Q12	2N7002E	External OFF control for EN/UV	Forces UV/EN low
R54	4.7 k Ω	Bias for external OFF path	Default enable behavior
TP, X1-13	Test points	Scope/DMM probing Points	–
C19	22 nF	Capacitor is charged at the same rate as output capacitors maintain dv/dt	–
R2	100 Ω	Used to help dissipate the gate charge and C19 Cap	–
D14	BAV16W-7-F	Prevents a return path for the C19 capacitor	–
Q32	MMBT3906LT1G	Maintains stable gate voltage for dv/dt control	–

3 XDP712-001 Reference platform

Reference Designator	Component/value	Function on the reference board	Notes
D15	MMSZ5245BT1G	Used to clamp the gate-to-source voltage to prevent damage	–
Q33	BSR315P	P-channel MOSFET connecting GATE to SOURCE through a 100 R resistor	Controlled by FAULT signal
Q34	BSS123N	FAULT signal-controlled FET pulling Q33 gate low	When Q33 and Q34 are both off MOSFETs are controlled by XDP712
Q36	2N7002	Inverts FAULT signal if configured as active LOW	–

3.8 Ordering information

Table 6 XDP712 Reference Board ordering information

Basic part number	Orderable part number	Description
REF XDP712	REF_6 kW_XDP712	6 kW XDP712-001 reference board with dv/dt circuitry. Reference board comes as variant 1 by default
REF XDP712	REF_4 kW_XDP712	4 kW XDP712-001 reference board

3 XDP712-001 Reference platform

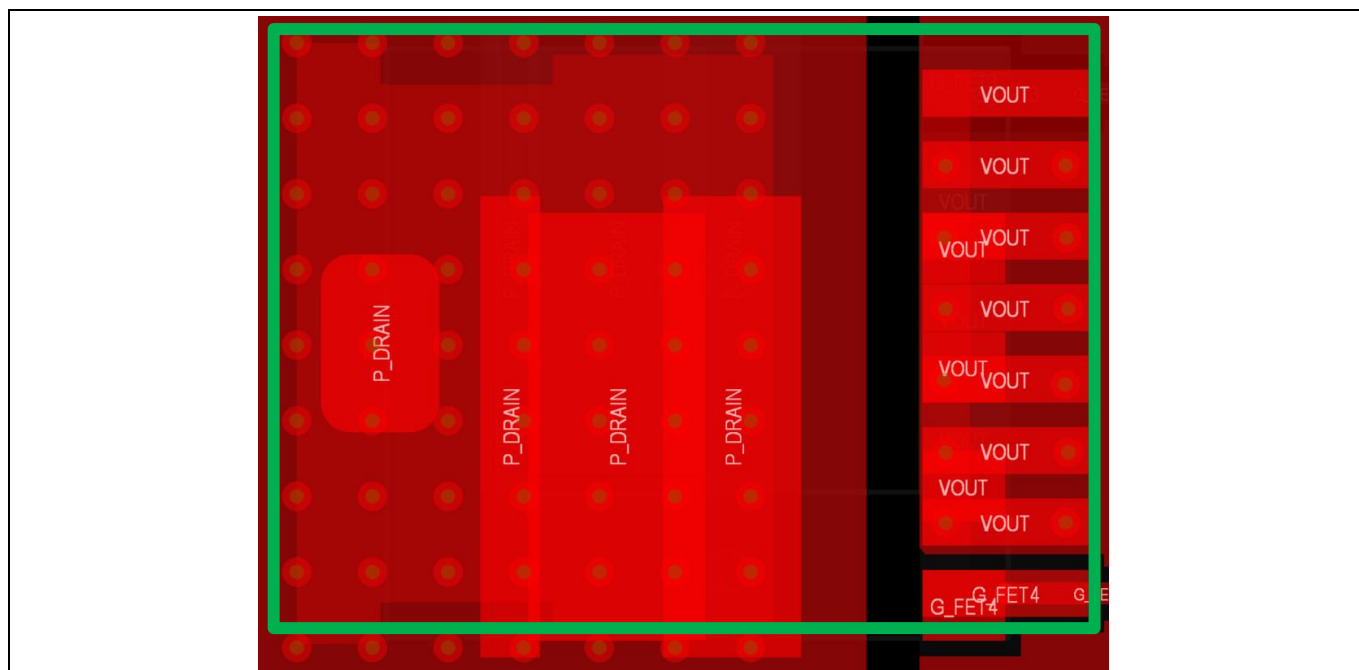


Figure 21 PG_HSOG-4 footprint top side

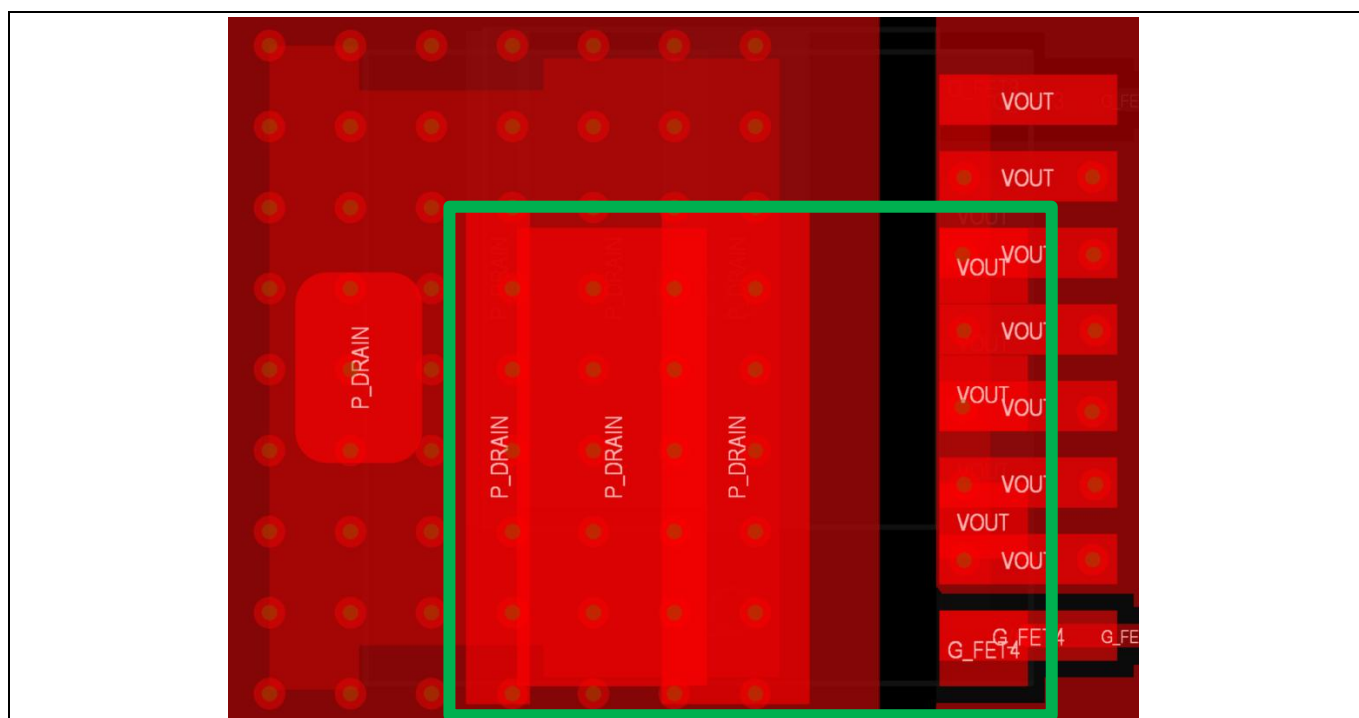


Figure 22 PG-HSOF-8 footprint top side

3.11 R_{SNS}

Five current sense resistors of size 2512 can be placed in parallel on R58, R30, R31, R32, and R34. For the reference board to get 0.25 mΩ sense value, two 0.5 mΩ resistors are populated on R58 and R34.

4 Programming, setup, and turn-on instructions

4 Programming, setup, and turn-on instructions

Set up the system as follows:

1. Connect the USB0010 dongle to the XDP712-001 Reference Board as shown in [Figure 23](#)
2. Connect the USB0010 dongle to a PC USB port
3. Ensure that the jumpers are connected properly
4. Connect 40 V to 60 V, 48 V typical from VIN to the PGND on the left side of the board

XDP712-001 powers up as soon as VIN is equal to or greater than 7 V. At this point, communication and programming is possible but the FET full enhancement is not guaranteed. To turn on the FET, a minimum of 9 V is required, after which at least the following registers must be programmed to turn on the device.

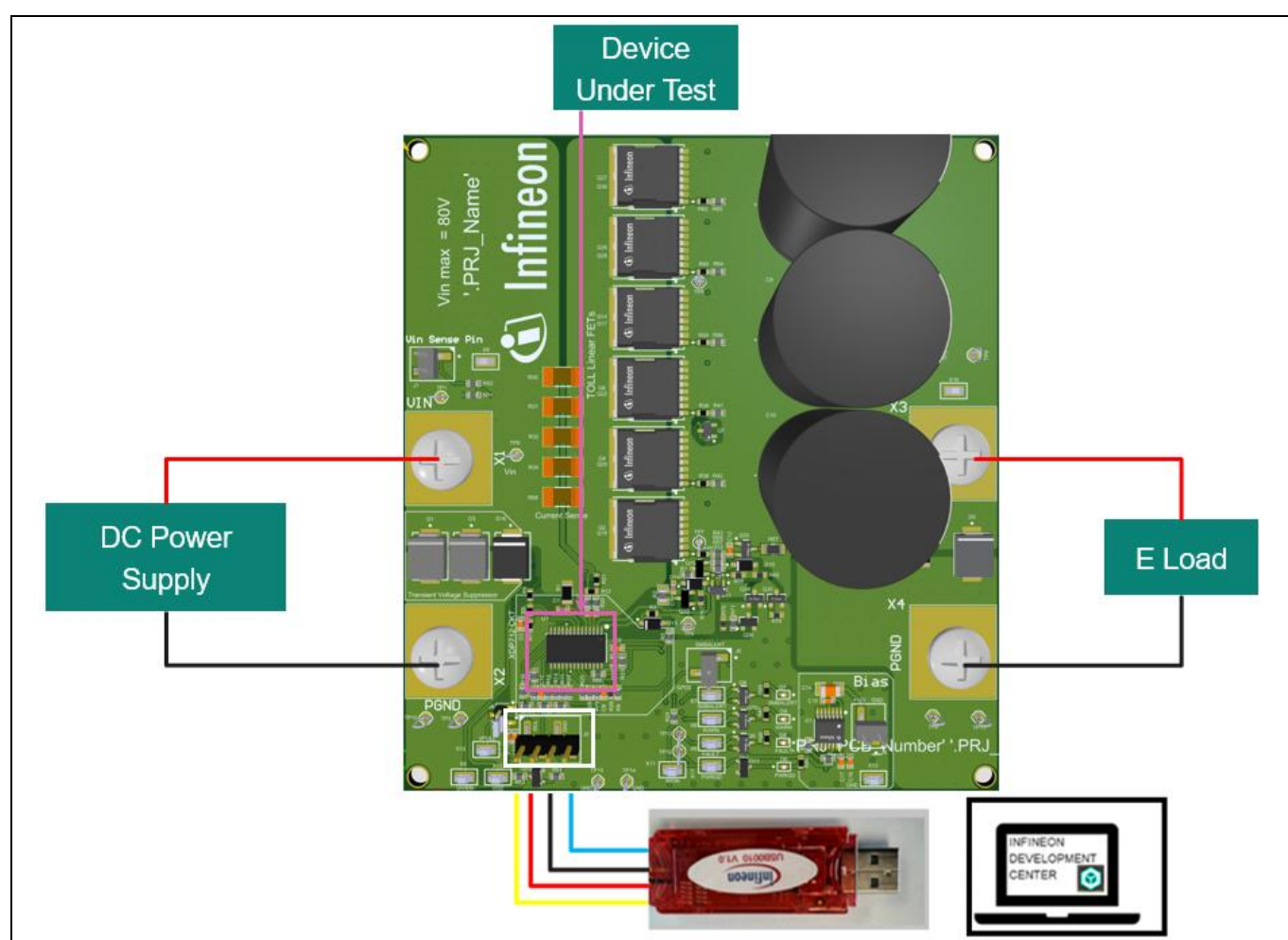


Figure 23 XDP712-001 Reference Board and dongle setup

4.1 XDP™ Designer communication setup

Install the XDP™ Designer software from the [Infineon Development Center](#).

The following sections explain how to configure and test the Reference Board and dongle using the XDP™ Designer software.

4.1.1 Dongle connection in XDP™ Designer

1. Open the XDP™ Designer GUI

4 Programming, setup, and turn-on instructions

2. Wait for a few seconds and check the bottom status bar for the dongle connection.
If the highlighted area, as shown in [Figure 24](#), turns green and displays **USB010**, the dongle has been successfully detected by the GUI
3. Ensure that the EN pin is pulled HIGH externally

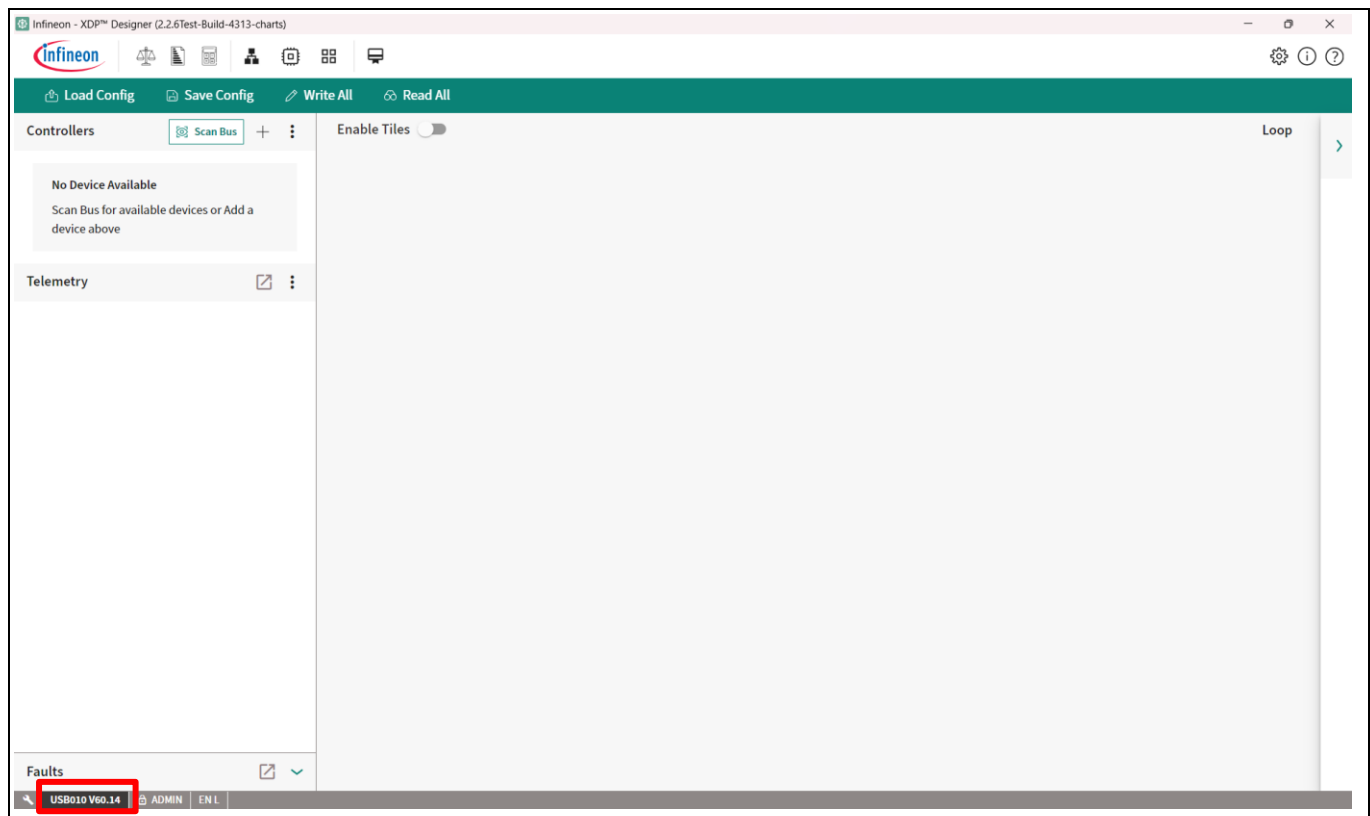


Figure 24 USB0010 detection on XDP™ Designer

4.1.2 Detecting XDP712-001

1. Click **Scan Bus**, as shown in [Figure 25](#)
2. Wait for a few seconds for the device to be detected by the GUI automatically. If the device is not detected automatically, click **Scan Bus** again

4 Programming, setup, and turn-on instructions

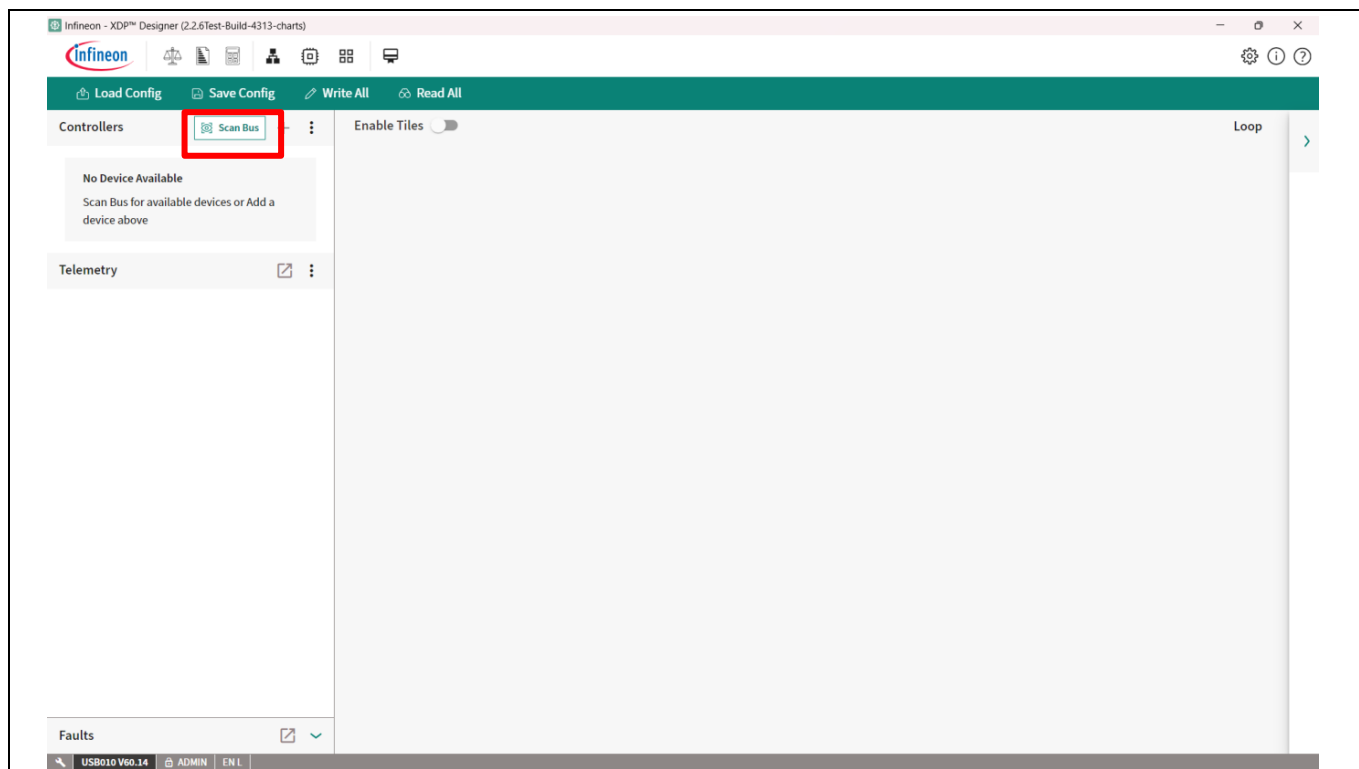


Figure 25 XDP712-001 detection

The detected device is XDP712-001, with the telemetry displayed on the left, as shown [Figure 26](#):

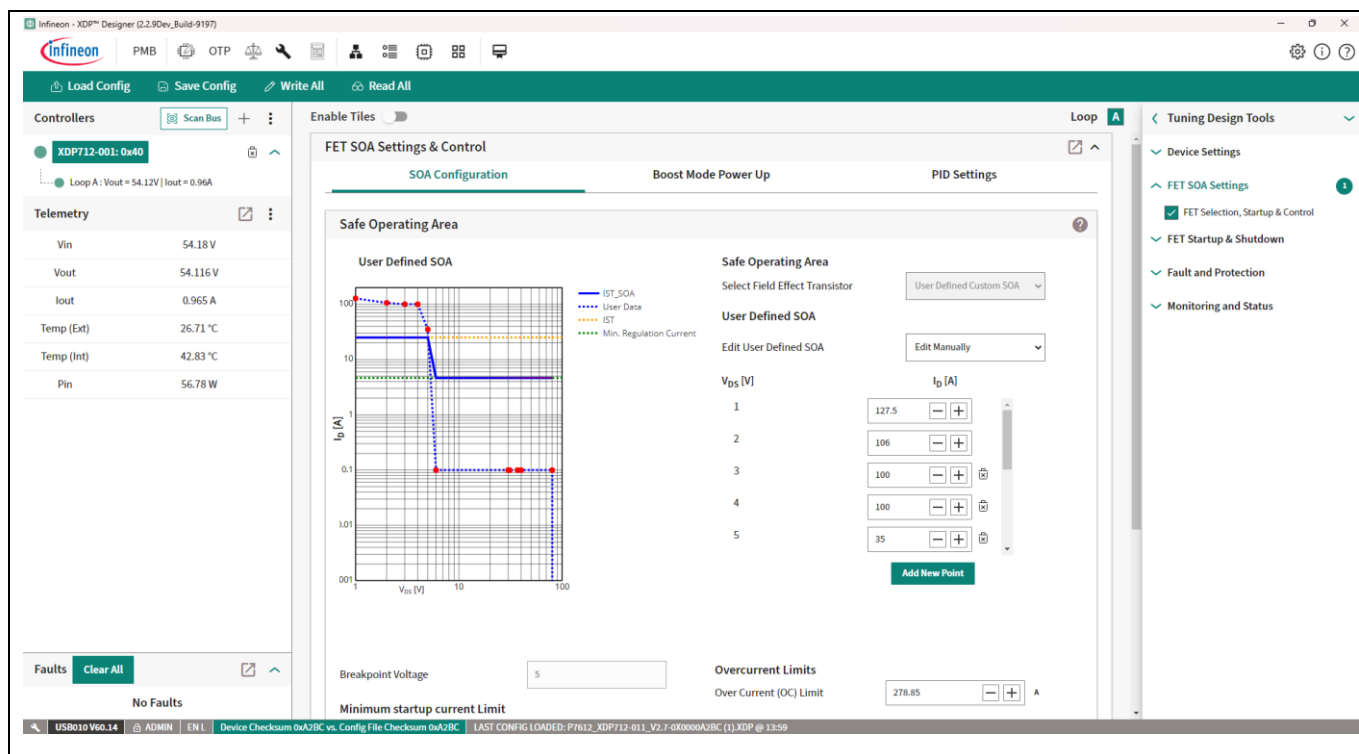


Figure 26 Live telemetry of the connected XDP712-001

- Click **PMB** to view the PMBus® registers and the values stored in them

4 Programming, setup, and turn-on instructions

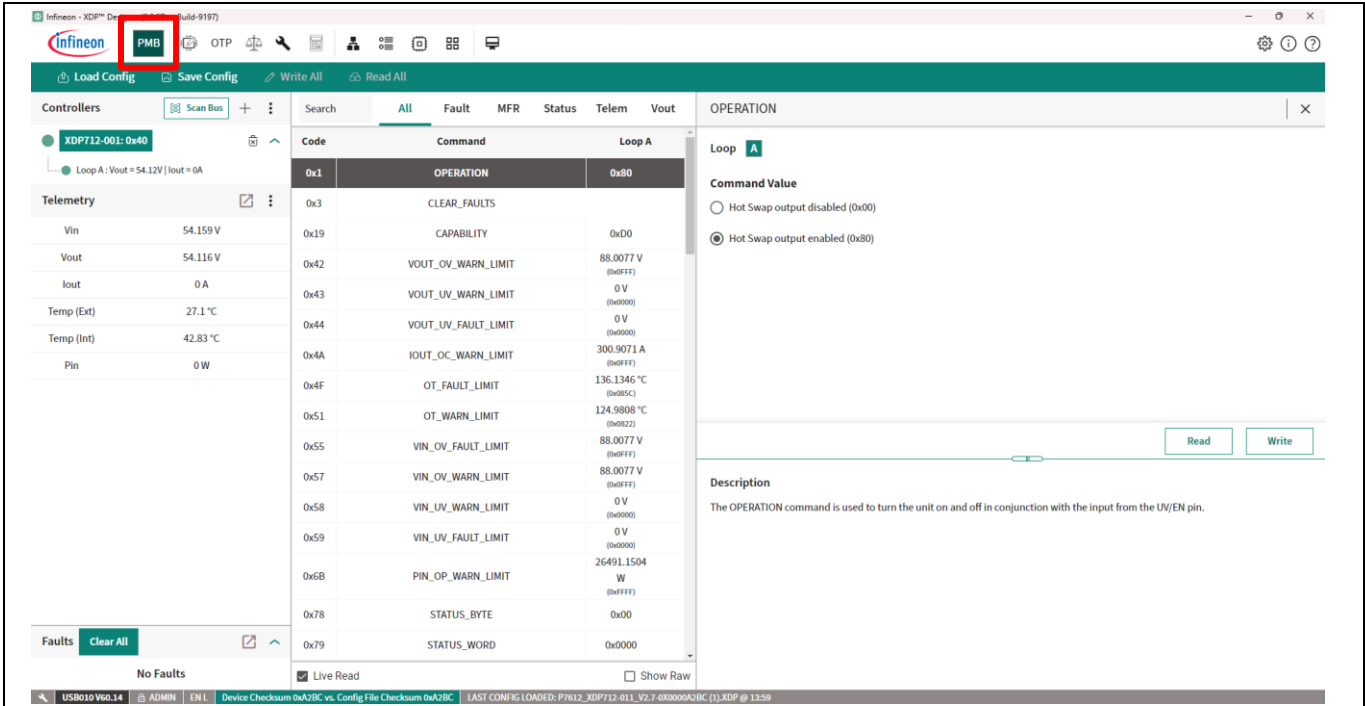


Figure 27 XDP™ Designer displaying all the PMBus® registers of the connected XDP712-001

4.1.3 Reading and writing registers

1. To edit a register individually, click on the corresponding PMBus® register, make the necessary changes, and then click **Write**

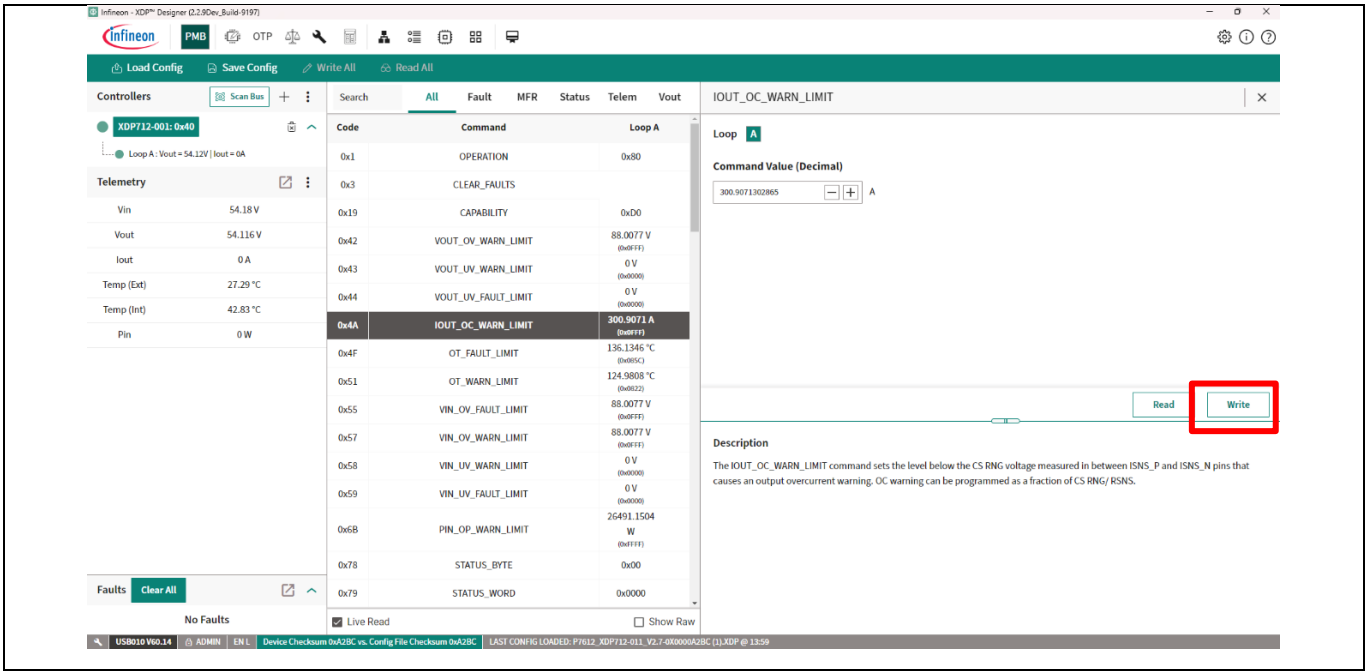


Figure 28 Editing IOUT_OC_WARN_LIMIT

2. Most of the registers are updated automatically. Click **Read** to read the corresponding register values

4 Programming, setup, and turn-on instructions

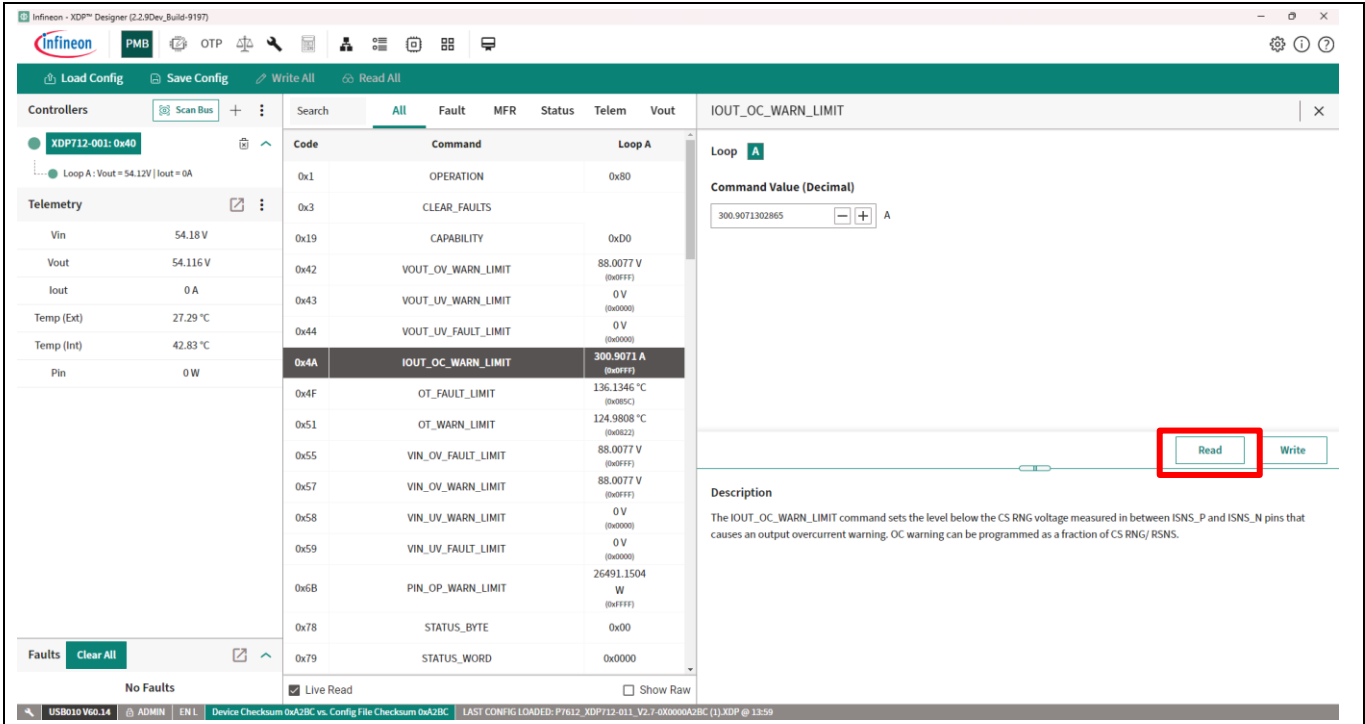


Figure 29 Reading IOUT_OC_WARN_LIMIT

4.1.4 Programming the FET

In the XDP™ Designer GUI, FET_SELECT is used to select the MOSFET safe operating area (SOA) profile that the controller uses during startup SOA regulation and current regulation. For XDP712, operation is fully digital: you either select a pre-programmed MOSFET profile using FET_SELECT bits or manually program a custom SOA curve via the SOA PMBus® command.

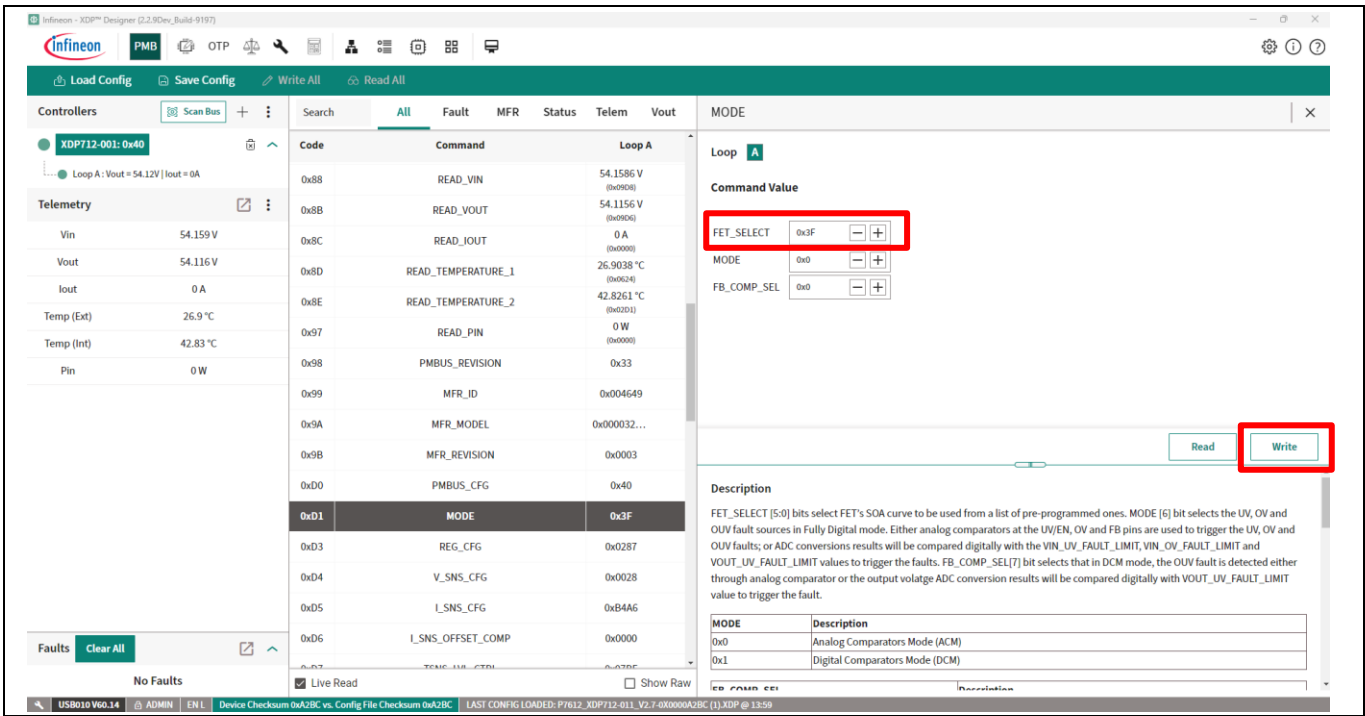


Figure 30 Programming the FET

4 Programming, setup, and turn-on instructions

4.1.5 Choosing current sense range (CS_RNG) and program the startup current limit (IST)

Program the required current sense range and startup current limit in the I_SNS_CFG (0xD5) register. Modify the register CS_RNG bit, and then click **Write**.

Note: The current sense ADC is designed to sense a maximum current of 83.3 A. Care must be taken when selecting the sense resistor value so that this limit is not exceeded. Refer to the datasheet for limits and bit details.

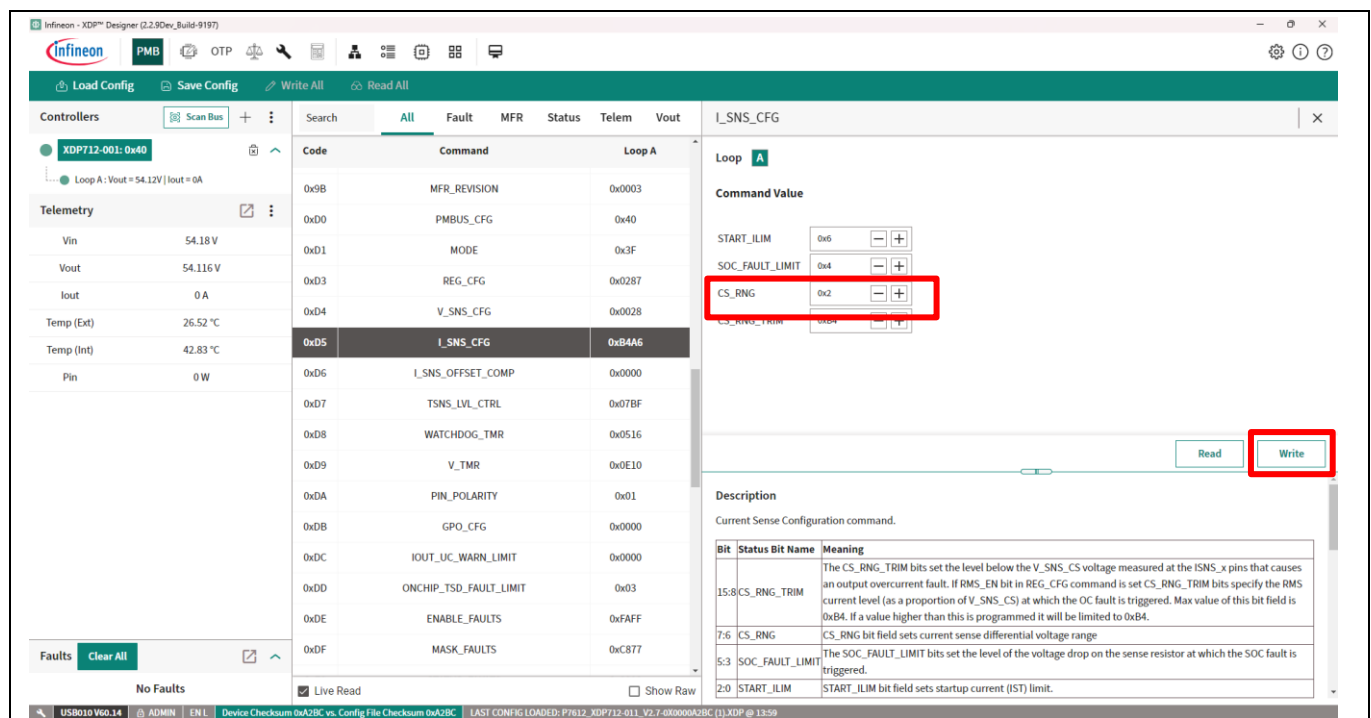


Figure 31 Startup current limit and current sense range

4.1.6 Program the R_{SNS} resistor

The R_{SNS} bit field is used to set the ratio of the voltage at the current sense pins to the sensed current, the value of the sense resistor.

Program the required current sense resistor in the REG_CFG (0xD3), as shown in [Figure 32](#). Modify the REG_CFG register bit, and then click **Write**.

4 Programming, setup, and turn-on instructions

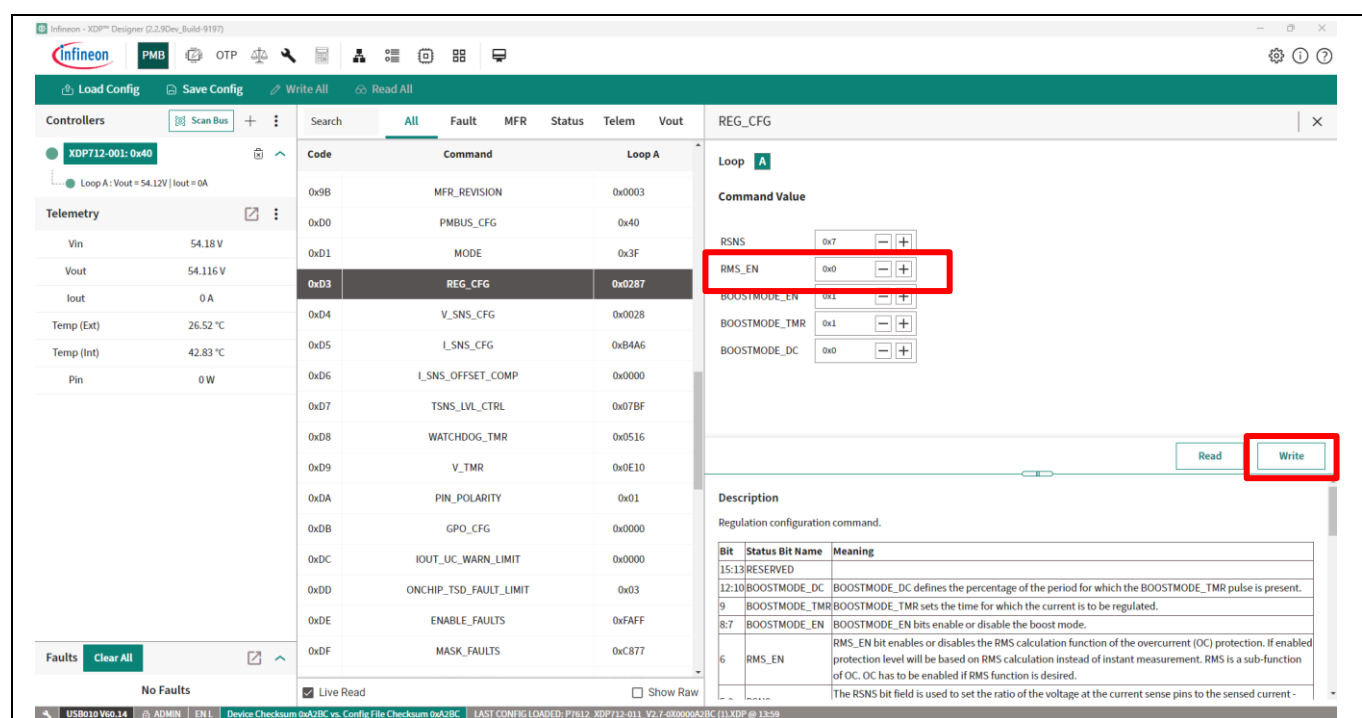


Figure 32 **R_{SNS} selection**

4.1.7 Select the watchdog timer

WATCHDOG_TMR programs the watchdog timer. Use this register to limit how long the device is allowed to stay in the startup/SOA-controlled ramp before it must reach a “fully enhanced” FET condition. If startup takes too long (for example, due to excessive load capacitance, a short, or a wrong SOA/FET selection), the watchdog prevents the FET from sitting in a high-dissipation region for an unsafe amount of time.

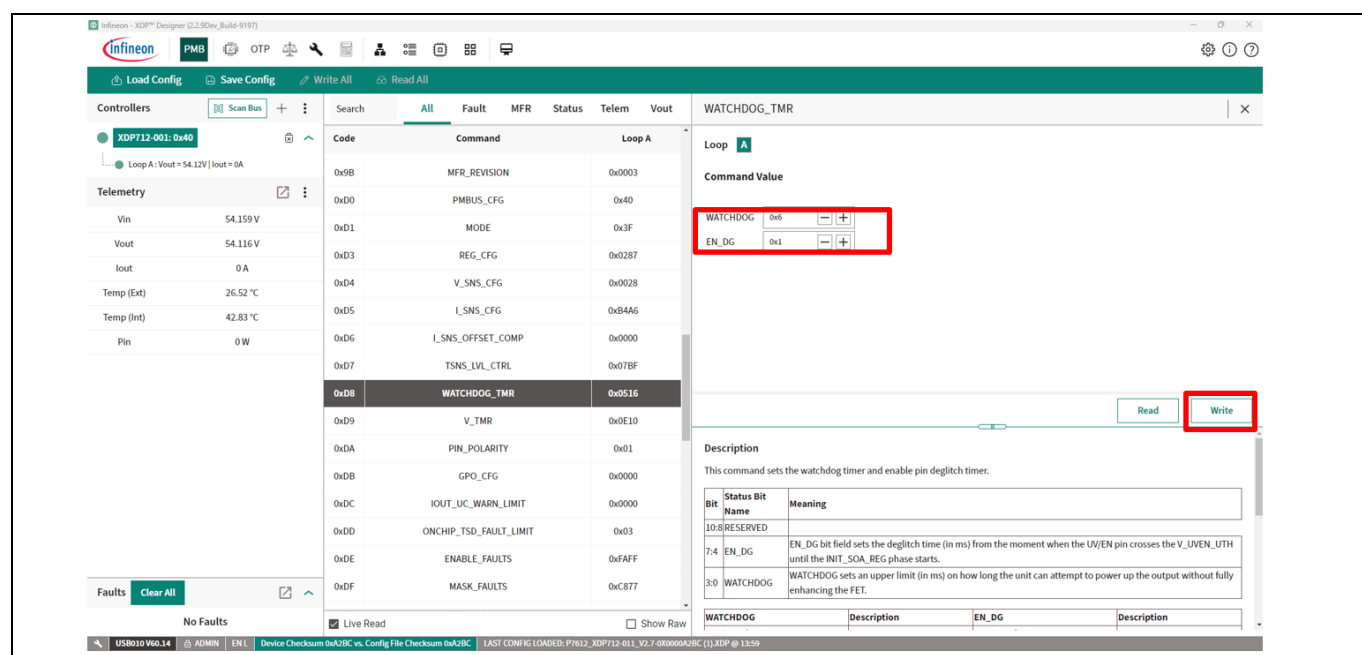


Figure 33 **Watchdog timer selection**

4 Programming, setup, and turn-on instructions

4.1.8 Programming VIN_OV_FAULT_LIMIT

This command sets the value of the input voltage measured at the ISNS_P pin that causes an input overvoltage fault. Program the required overvoltage (OV) fault limit in the VIN_OV_FAULT_LIMIT register (0x55). If the fault is not used, the register can be set to the maximum value of 0 V, or the fault can be disabled in the GUI.

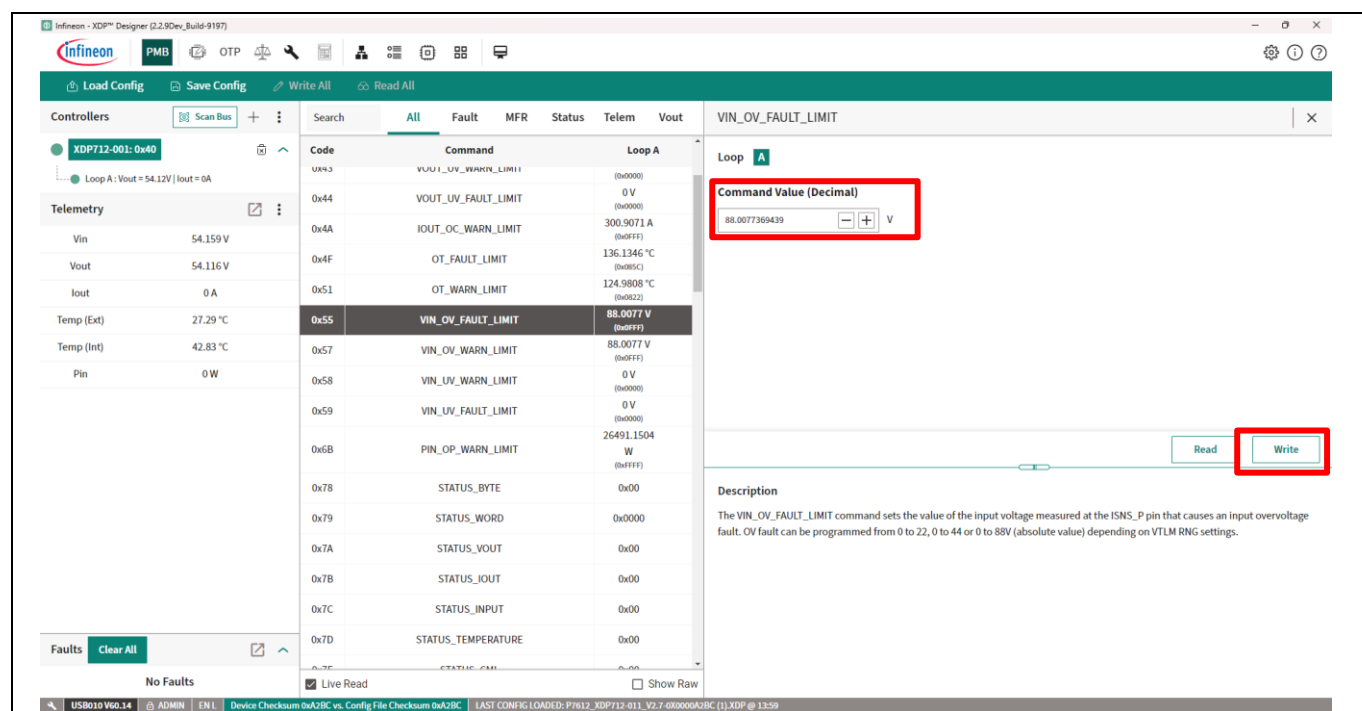


Figure 34 Programming input overvoltage fault

4.1.9 Programming VIN_UV_FAULT_LIMIT

This command sets the value of the input voltage measured at the ISNS_P pin that causes an input undervoltage fault. Program the required undervoltage (UV) fault limit in the VIN_UV_FAULT_LIMIT register (0x59). If the fault is not used, the register can be set to 0 V, or the fault can be disabled in the GUI.

4 Programming, setup, and turn-on instructions

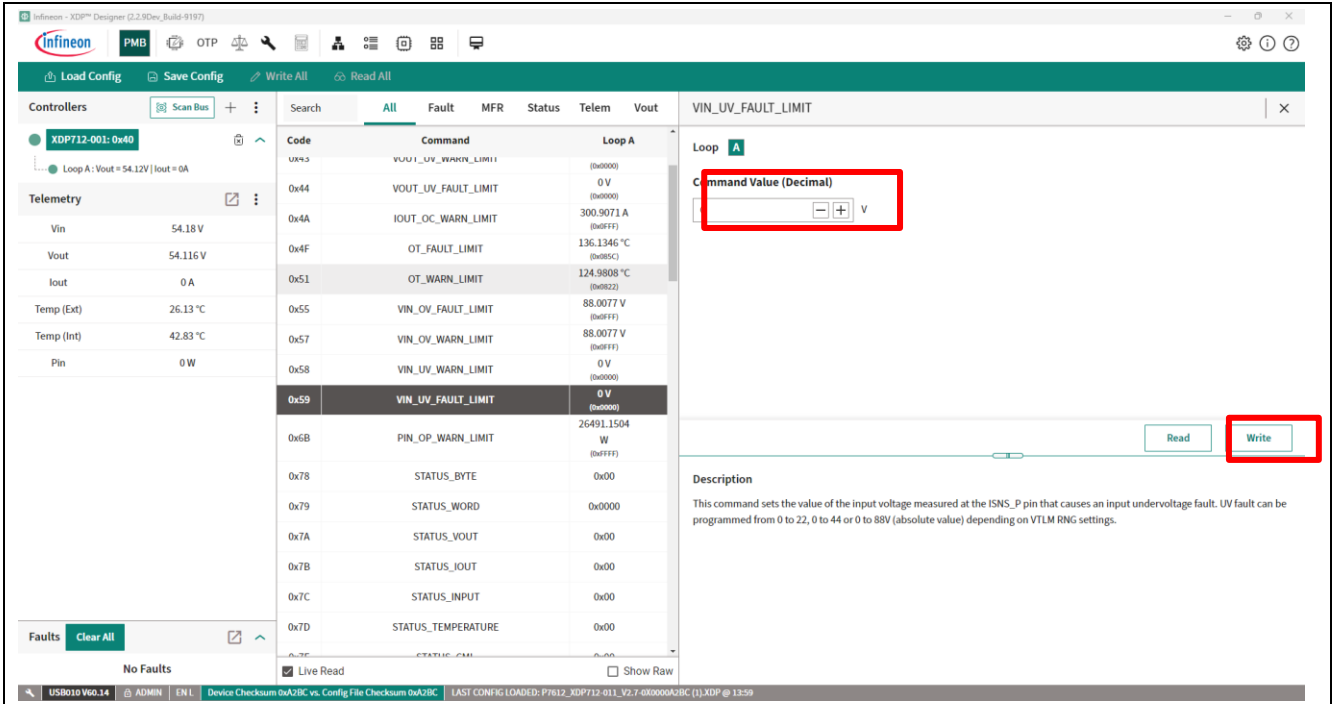


Figure 35 Programming input undervoltage fault

4.1.10 Programming VOUT_UV_FAULT_LIMIT

This command sets the value of the output voltage measured at the ISNS_P pin that causes an output undervoltage fault. Program the required undervoltage (UV) fault limit in the VOUT_UV_FAULT_LIMIT register (0x44). If the fault is not used, the register can be set to 0 V, or the fault can be disabled in the GUI.

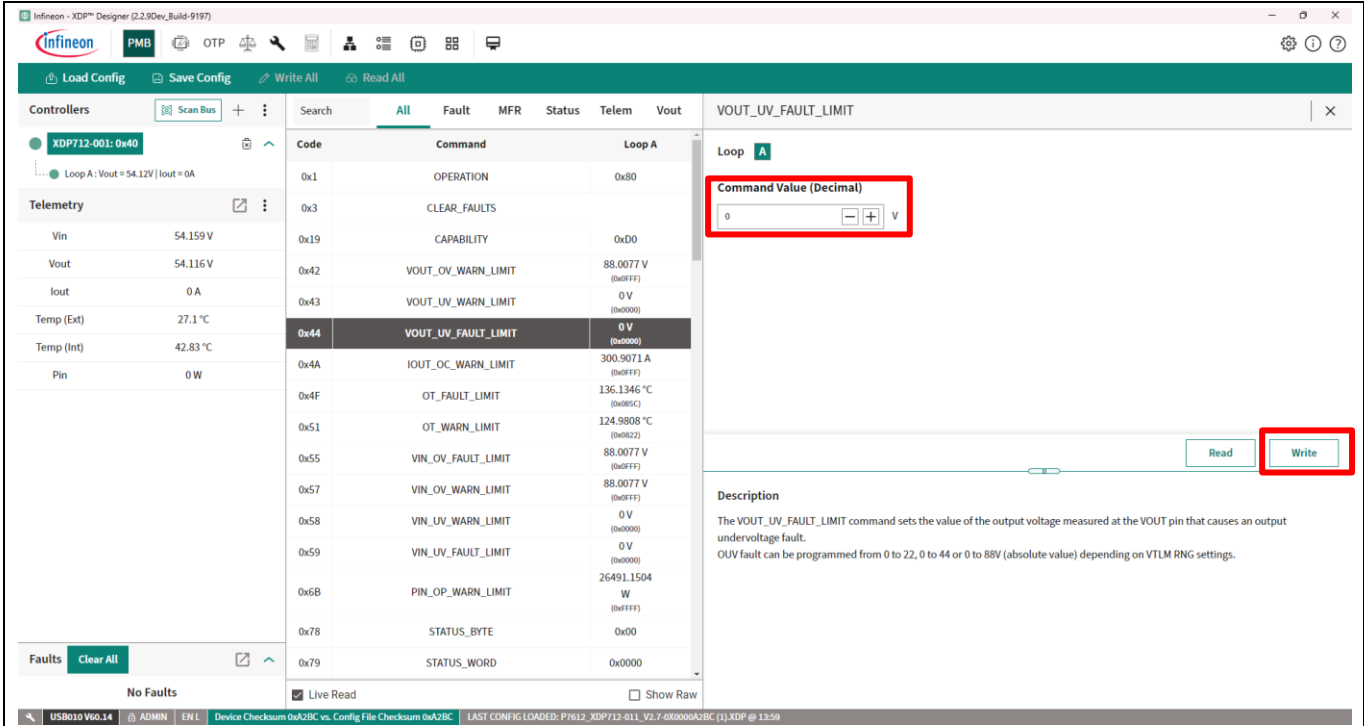


Figure 36 Programming output undervoltage fault

4 Programming, setup, and turn-on instructions

4.2 Loading the configuration file

This section describes how to load the configuration file directly into the device, which eliminates the need to manually modify the required register. Do the following to load the configuration file into the device:

1. Click **Load Config**, as shown in [Figure 37](#)

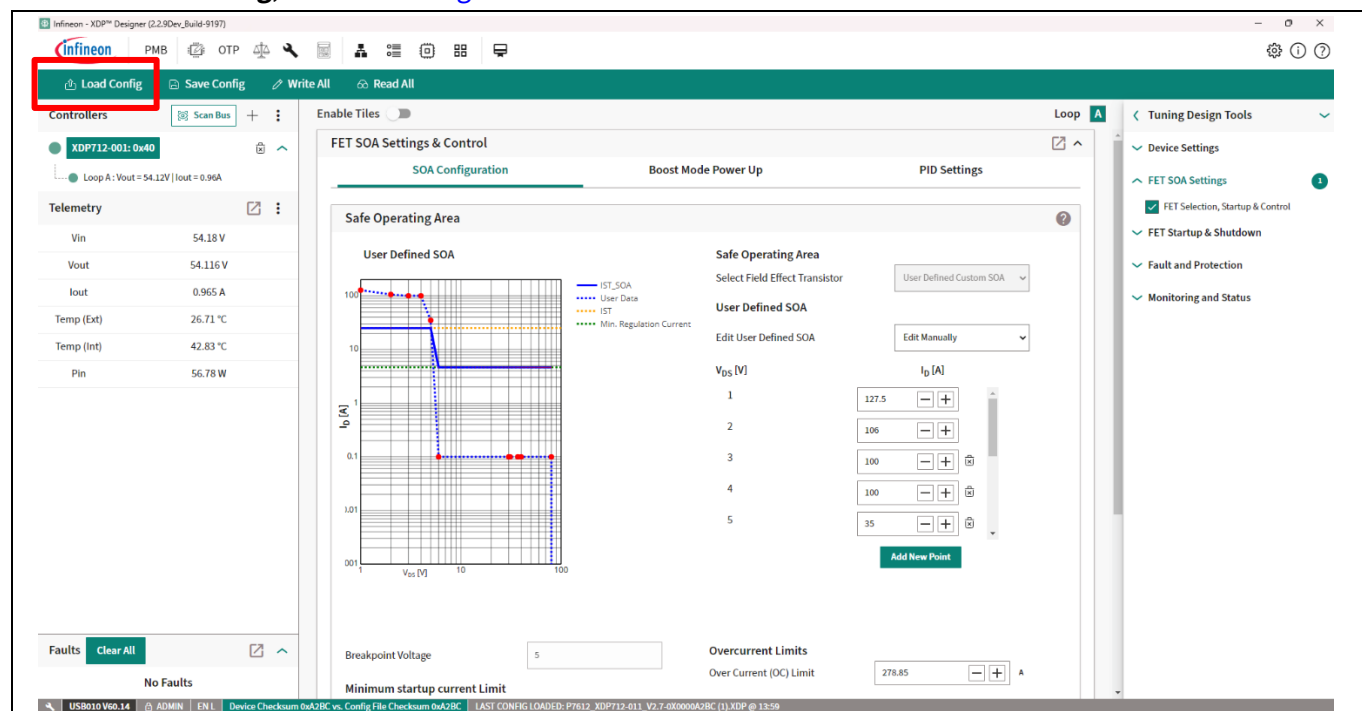


Figure 37 Select Load Config option

2. Click **Browse** and select the `.xdp` file that needs to be loaded onto the device, as shown in [Figure 38](#)

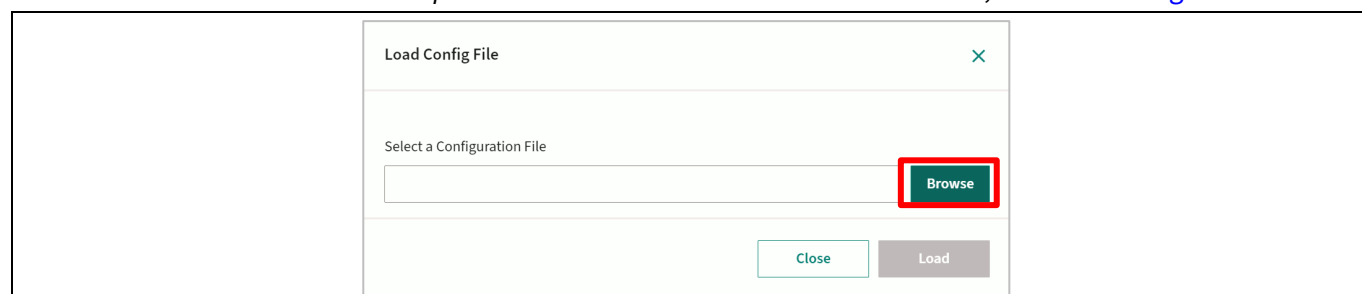


Figure 38 Browse to select the necessary configuration file

3. Click **Load** to load the necessary configuration onto the device, as shown in [Figure 39](#)

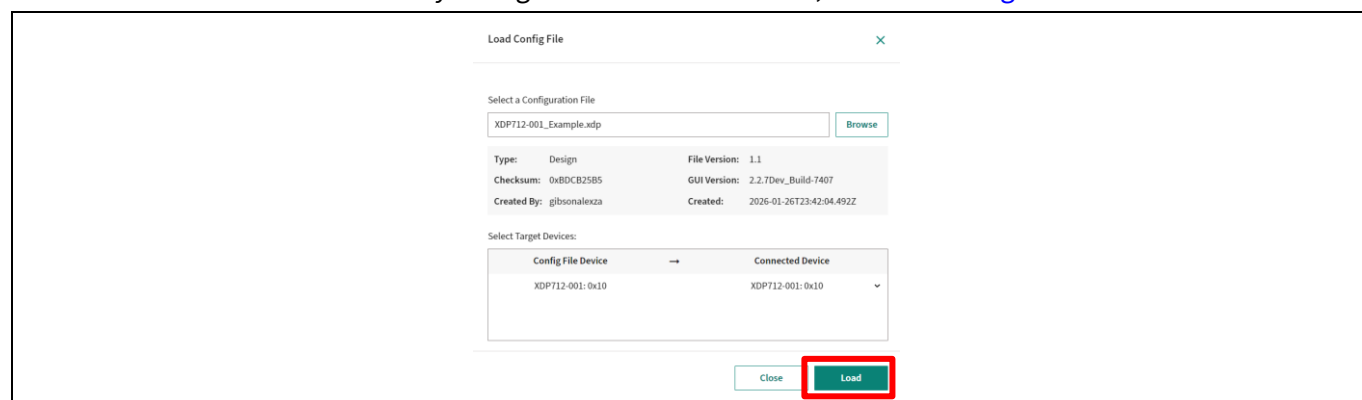


Figure 39 Load the selected configuration file

5 Programming OTP

5 Programming OTP

As specified in the XDP712-001 datasheet, to program the desired settings in internal commands or OTP at power-up, follow these steps:

1. Apply a voltage at the VDD_VIN & ISNS_P pins:
 - At least 9 V to program commands into volatile memory
 - At least 20 V to program OTP
2. Keep the UV/EN pin at chip GND potential
 - Communication via PMBus® is possible as soon as STANDBY state is entered. At this point, commands and OTP can be programmed
3. To ensure successful programming, ensure that the internal temperature of the device stays below 125°C

To program the OTP section:

1. Program the commands in volatile memory as required
2. Click the button highlighted as shown in [Figure 40](#)

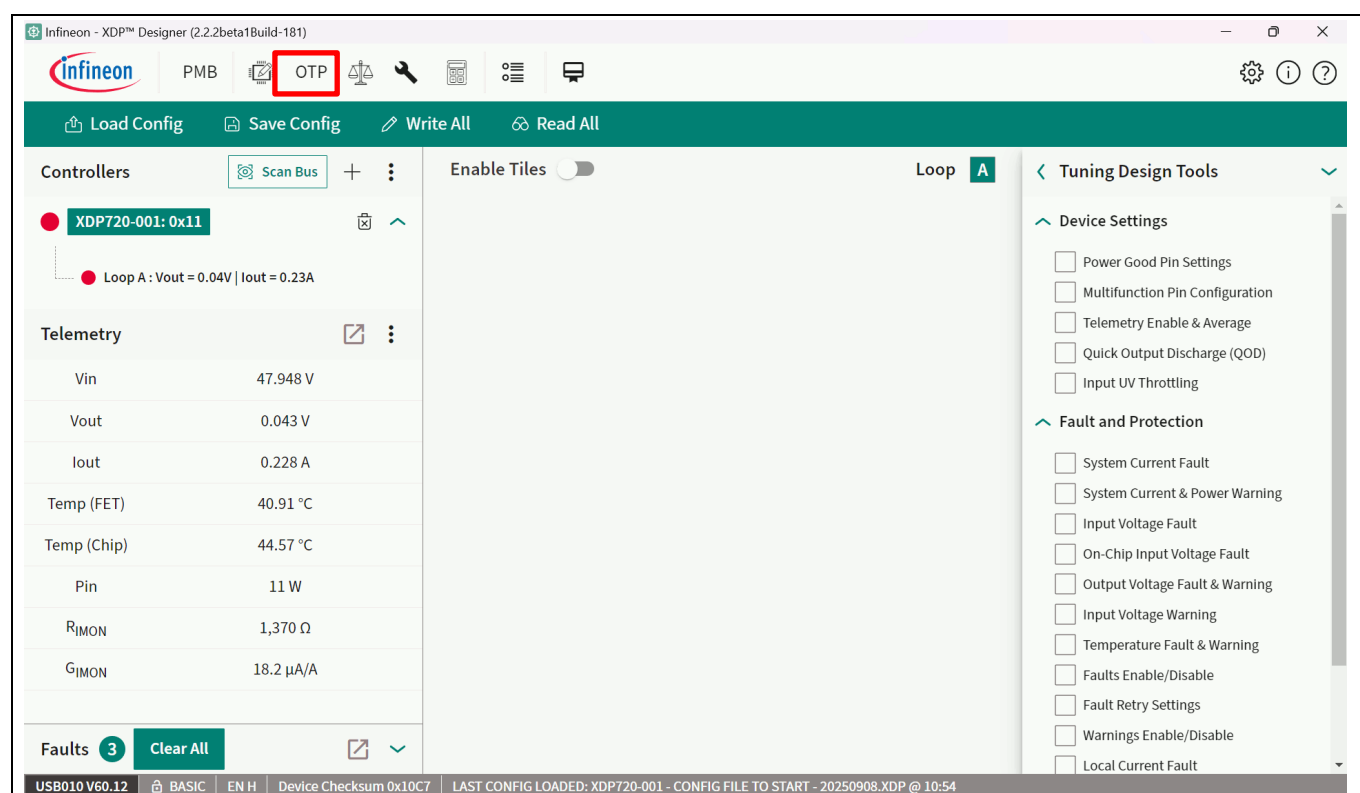


Figure 40 Programming tab

5 Programming OTP

- Set the program from **Registers**, select the memory section **Program to OTP** that needs to be programmed and then click **Program**, as shown in [Figure 41](#)

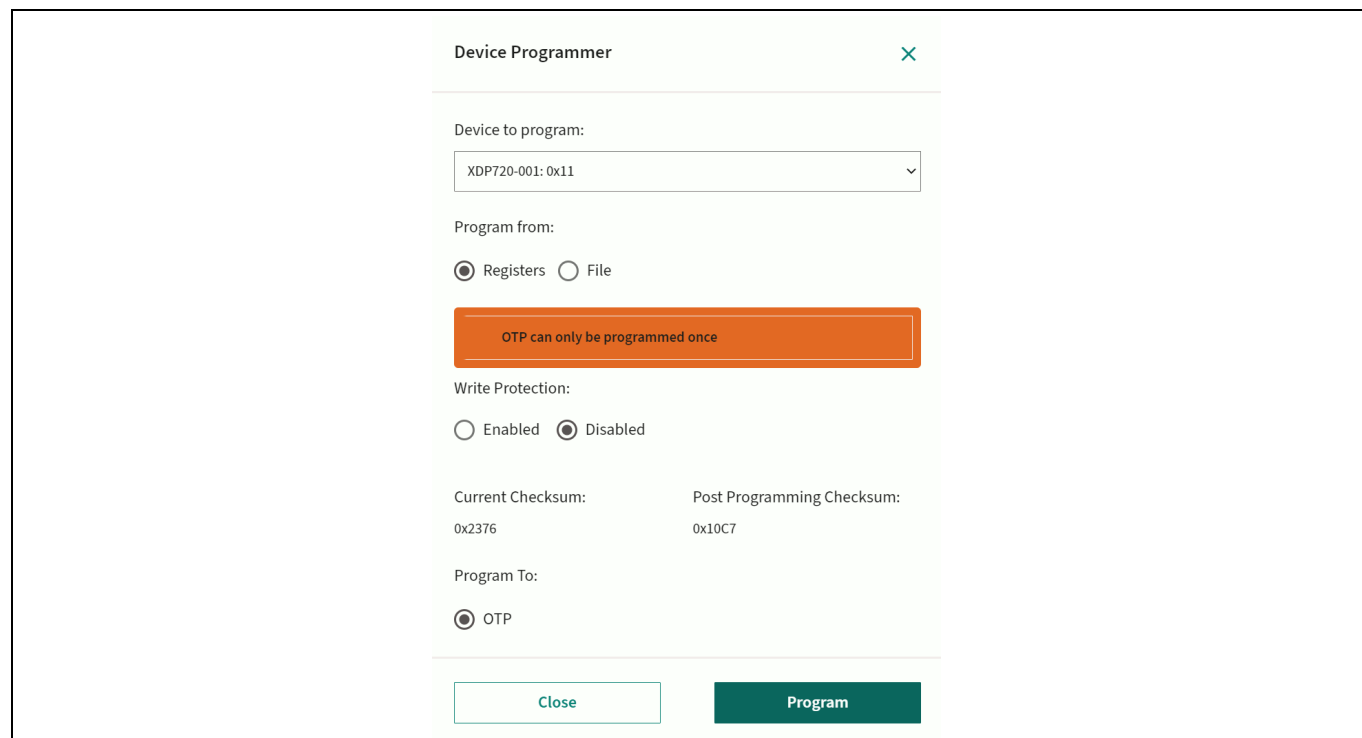


Figure 41 **OTP programming**

The command configuration will be automatically copied to the selected memory section.

6 Board features

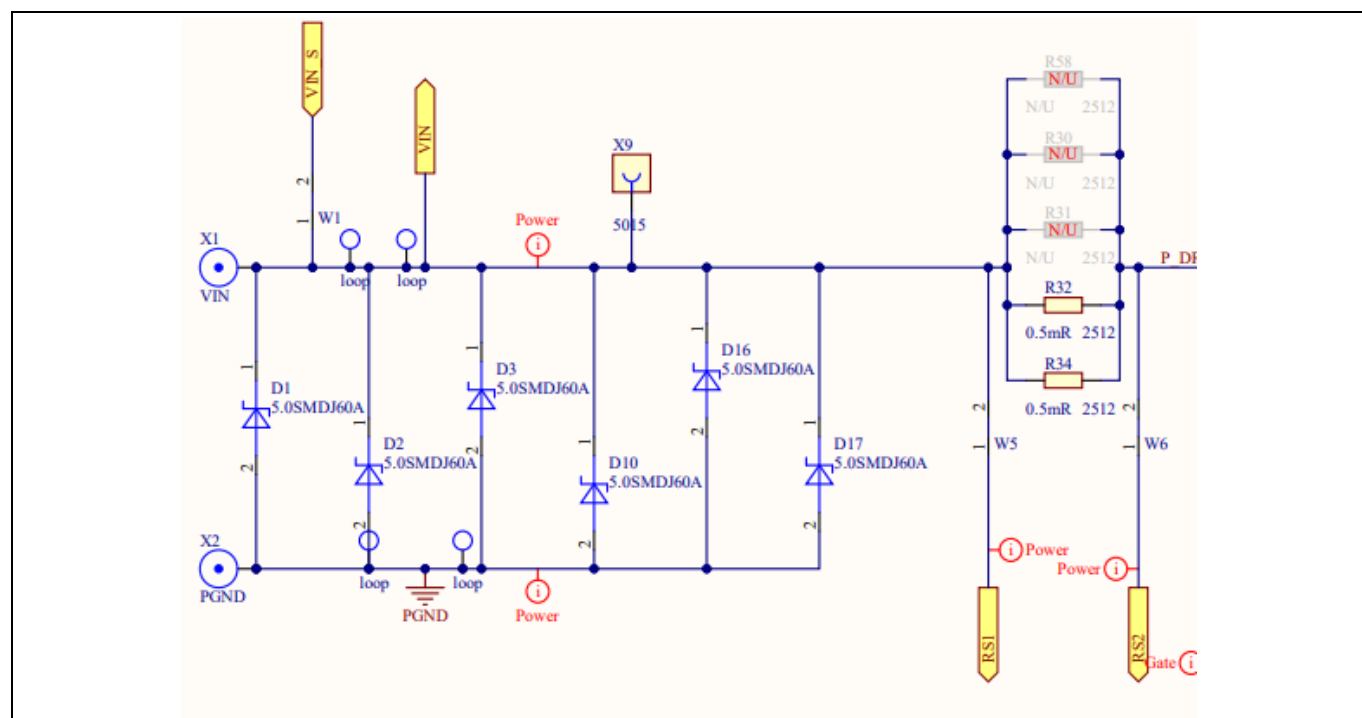
6 Board features

6.1 TVS and R_{SNS}

Figure 42 shows the VIN protection and current-sense circuitry. The input rail is protected against fast transients using TVS diodes D1/D2, which clamp the surge energy before it reaches the hot-swap controller and MOSFETs. Optional protection footprints (for example, D3, D10) provide flexibility for alternate surge environments.

Note: Ensure the selected TVS rating matches the intended operating VIN and surge environment

Current measurement is realized using shunt resistors R34 and R32, which define the effective R_{SNS} used for device current scaling (protection limits and telemetry reporting). Optional sense resistors slots (R30, R31, R58) are provided for modification. If multiple shunt positions are populated, confirm the effective R_{SNS} (parallel combination) and update the device current scaling accordingly.

Figure 42 TVS and R_{SNS}

6.2 I²C connections

Figure 43 shows the PMBus®/I²C interface brought out on headers **J2/J3**. The board provides two independent 4-pin I²C headers. This connector is for: SCL (clock), SDA (data), EN (enable), and GND (ground). SCL and SDA are open-drain signals and require pull-up resistors to the VPULL supplied either by VLDO or VREG. Use this header to connect the USB-to-PMBus® dongle or external controller for register access, telemetry reading, and configuration.

6 Board features

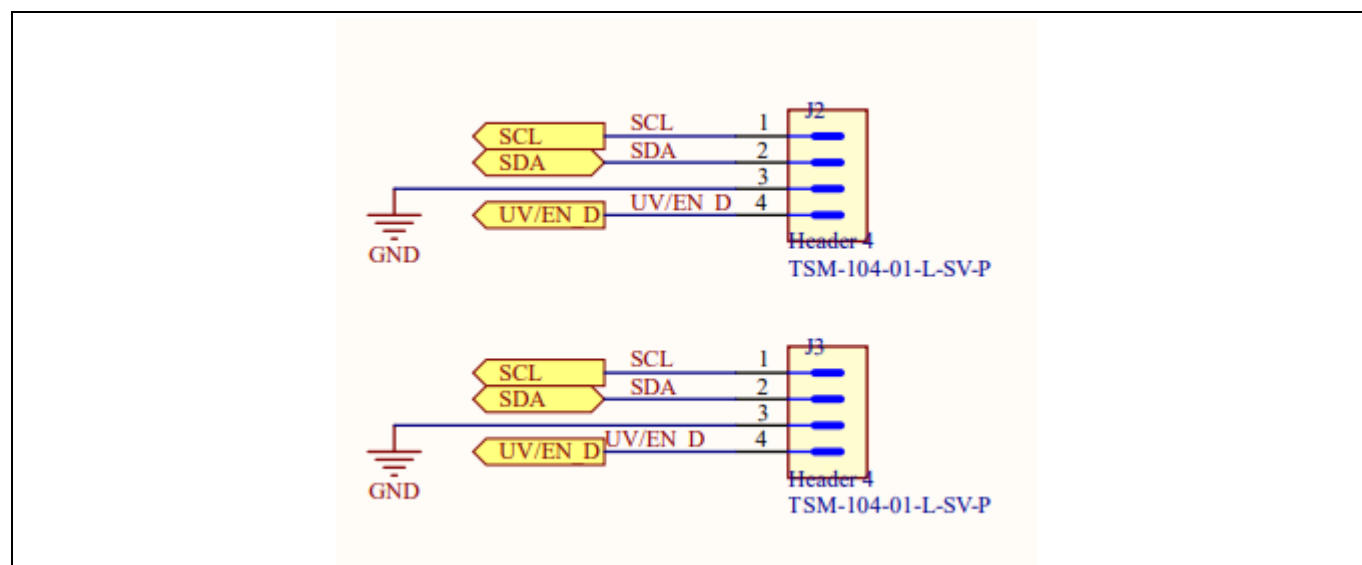


Figure 43 I²C connections

6.3 External power supply

Figure 44 shows the auxiliary supply that generates the local logic rail VLDO using LDO G1. The LDO input is provided from an external ~12 V auxiliary supply (applied at J4), which is regulated down to VLDO for the board's low-voltage functions. VLDO powers the digital interface pull-ups and the indicator circuitry, so PMBus®/I²C communication and LEDs require the external auxiliary input to be present.

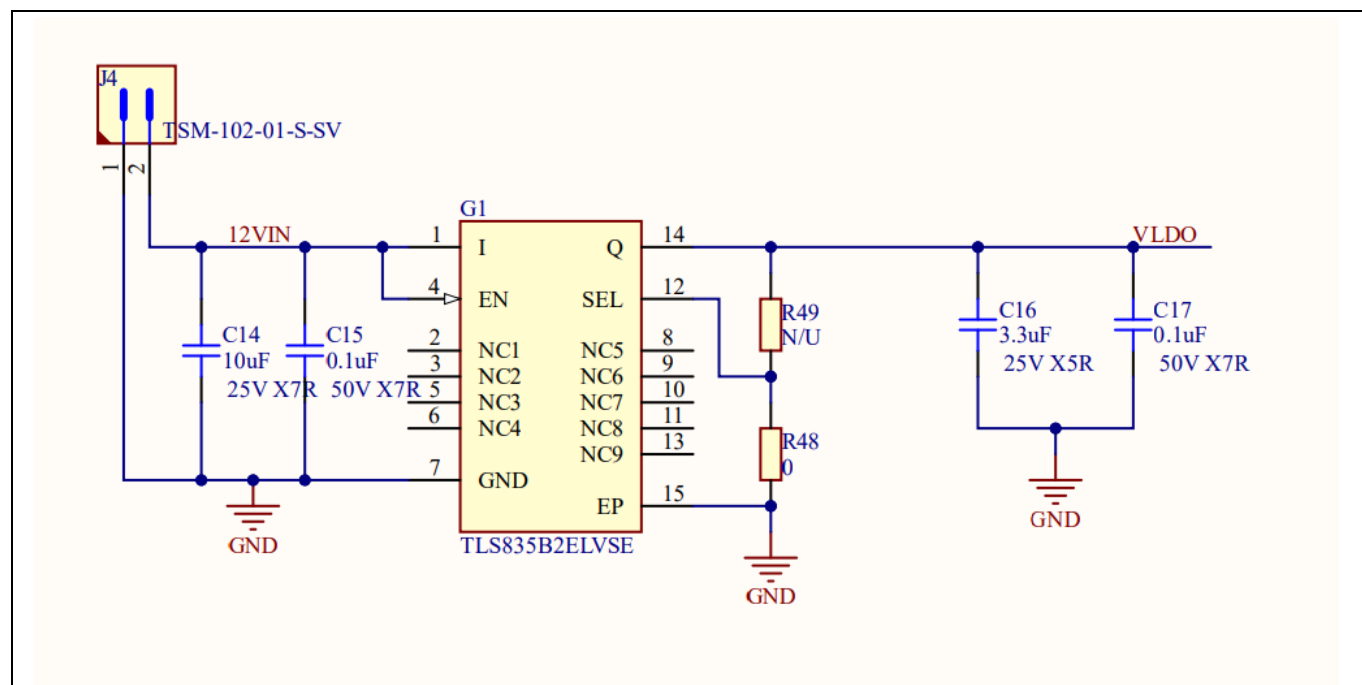


Figure 44 LDO and external AUX supply

6 Board features

6.4 LED indicators

Figure 45 shows the status LED indicator circuits D6–D9 driven from the VLDO rail: PWRGD, SYNC, WARN, and FAULT. The LEDs are switched using small MOSFET devices Q8–Q11 to avoid loading device pins and to provide clean logic-level drive.

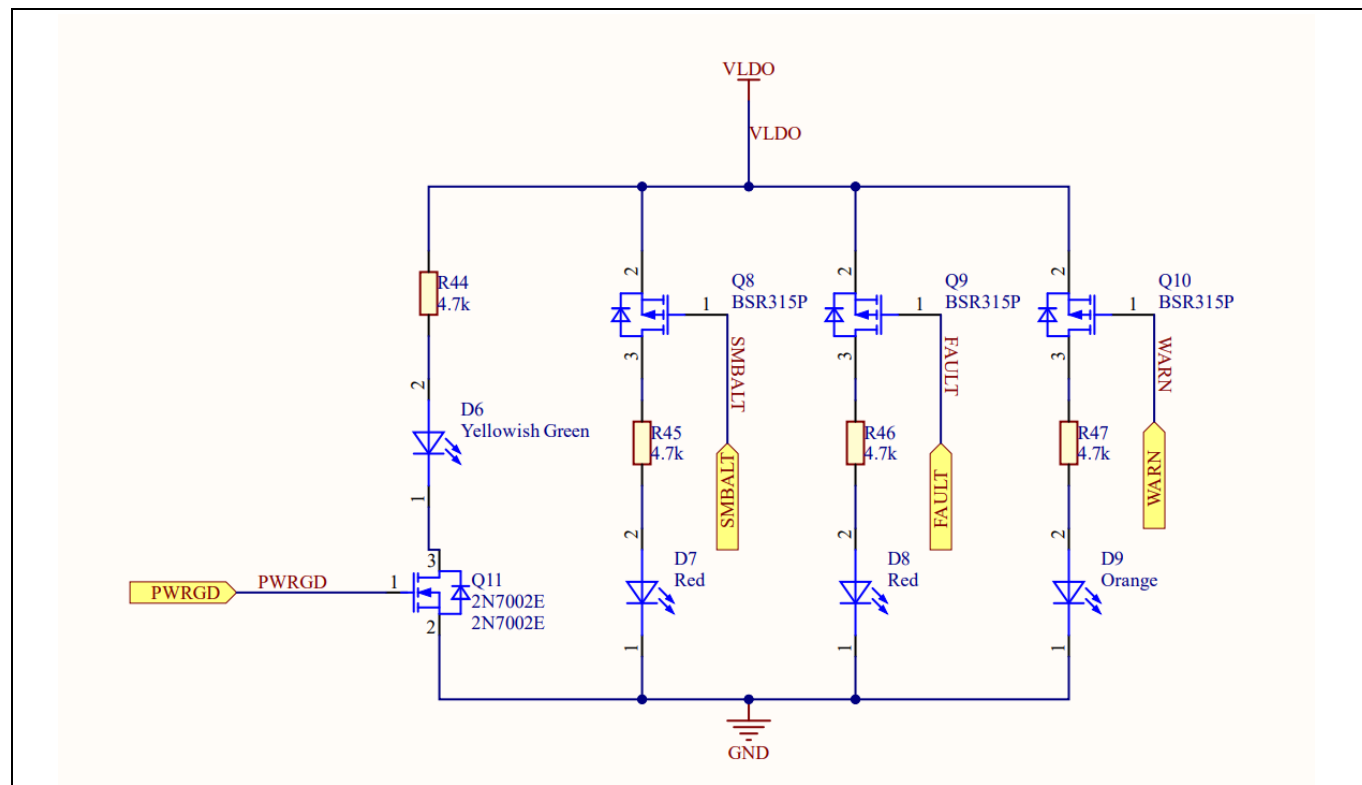


Figure 45 LED indicators

7 Test results

7 Test results

7.1 Test setup

Figure 46 shows the test setup connections. The connectors on the left are input while those on the right are output connections. The header marked white is for I²C communication and programming of the XDP712-001 hot-swap controller. The red wires on the left represent positive terminal input and, on the right, represents output positive terminal. The black wires represent the ground connections.

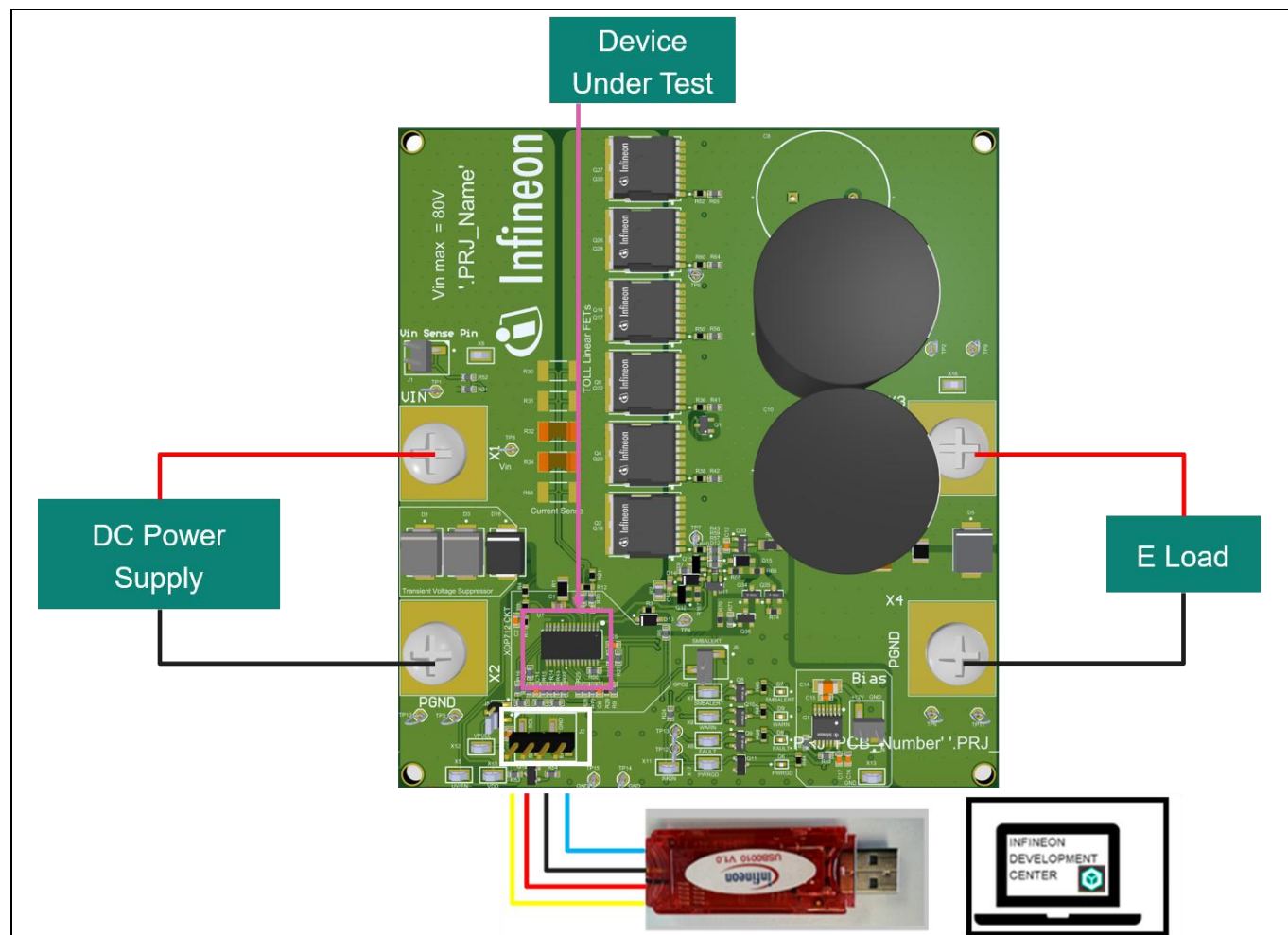


Figure 46 Test setup

7 Test results

7.2 Basic startup waveform

Figure 47 shows a standard startup waveform for the XDP712-001 Reference board.

Note: *If the power supply has poor regulation, you may observe some ripple in the input voltage at the end of the startup. This causes the output capacitors to be peak charging which causes the current spikes at the end of the startup.*

Test condition: Ambient $T_a = 25^\circ\text{C}$, $V_{IN} = 54\text{ V}$, Load 0 A .



Figure 47 Reference board startup waveform

8 Related resources

8 Related resources

- [XDP™ digital power controllers](#) webpage
- [Power Management ICs](#) forum from Infineon Developer Community

References

References

Contact [Infineon Support](#) to obtain these documents.

- [1] Infineon Technologies AG: *XDP712 hot-swap controller datasheet*
- [2] Infineon Technologies AG: *XDP712 hot-swap controller datasheet*
- [3] Infineon Technologies AG: *XDP712-001 Reference Board webpage*
- [4] Infineon Technologies AG: *XDP712-001 PMBus® commands user guide*

Revision history

Revision history

Document revision	Date	Description of changes
V.1.0	2026-09-15	Initial release

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

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