

ISLUSPLUS-UC2DEMO1Z

User's Manual: Demonstration Board

Industrial Analog and Power

1. Overview

The ISLUSPLUS-UC2DEMO1Z design provides a power supply reference solution for the Xilinx Zynq Ultrascale+™ MPSoC. The power supply rail consolidation used in the design is based on the Use Case 2 configuration (always on, optimized for power and/or efficiency). A significant amount of power rail consolidation is possible in this configuration.

The ISLUSPLUS-UC2DEMO1Z reference design is suitable for the Zynq Ultrascale+ ZU11EG, ZU15EG, ZU17EG, and ZU19EG devices. [Figure 1](#) shows the power supply rails for the Zynq US+ MPSoC in the Use Case 2 configuration.

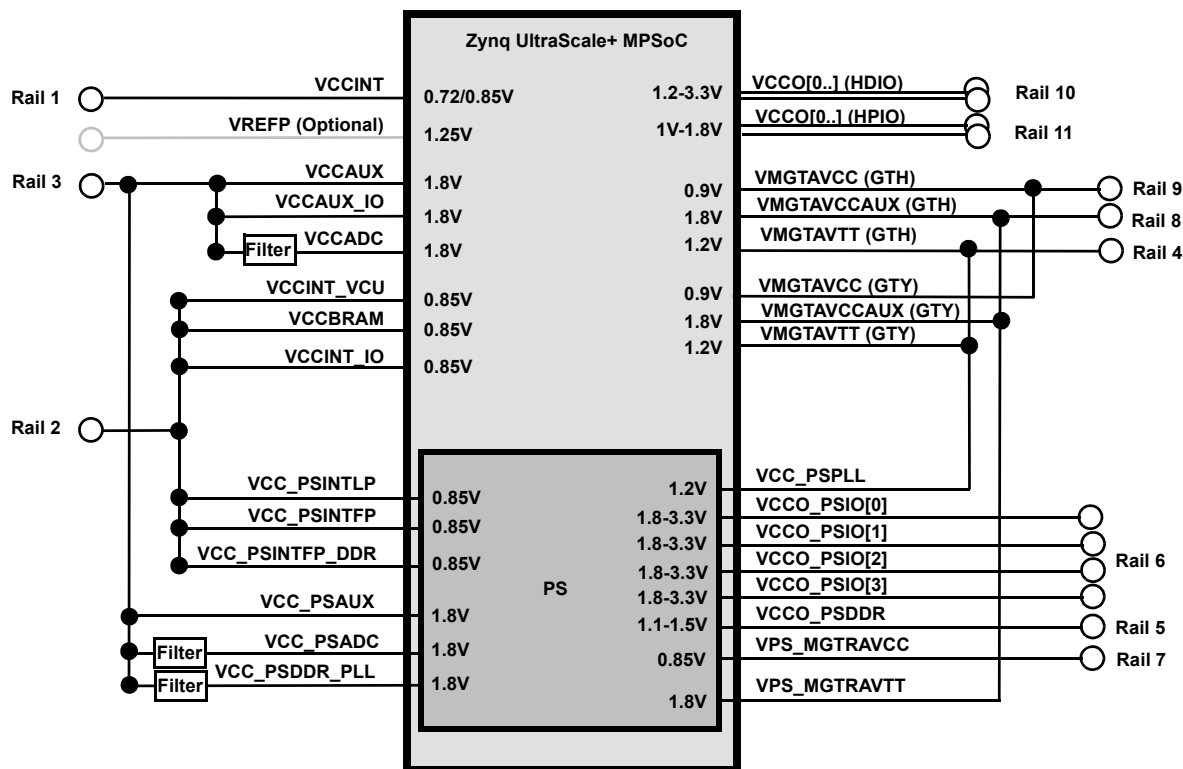


Figure 1. Power Rail Consolidation for the Xilinx Zynq US+ MPSoc, Use Case 2

1.1 Key Features

- Complete power supply solution for the Xilinx Zynq Ultrascale+ MPSoC
- Power up and power down sequence
- PMBus interface

1.2 Specifications

The ISLUSPLUS-UC2DEMO1Z is designed for 8V to 13.2V input voltage. [Table 1](#) lists the specifications for each output.

Table 1. Output Specifications

Rail Name	Zynq US+ Power Supply Rails	Voltage	Current	Devices
Rail 1	VCCINT	0.85V	31A	ISL8271M
Rail 2	VCCINT_VCU, VCCBRAM, VCCINT_IO, VCC_PSINTLP, VCC_PSINTFP, VCC_PSINTFP_DDR	0.85V	4.35A	ZL9006M
Rail 3	VCCAUX, VCCAUX_IO, VCCADC, VCC_PSAUX, VCC_PSDDR_PLL, VCC_PSADC	1.8V	2.04A	ISL85003
Rail 4	VMGTAVTT(GTH), VMGTAVTT(GTY), VCC_PSPLL	1.2V	10.6A	ISL8277M
Rail 5	VCCO_PSDDR	1.5V	0.5A	ISL85415
Rail 6	VCCO_PSIO	1.8V	0.4A	ISL85415
Rail 7	VPS_MGTRAVCC	0.85V	0.3A	ISL85415
Rail 8	VMGTVCCAUX(GTH), VMGTVCCAUX(GTY), VPS_MGTRAVTT	1.8V	0.3A	ISL85415
Rail 9	VMGTAVCC(GTH), VMGTAVCC(GTY)	0.9V	7.5A	ZL9010M
Rail 10	HDIO VCCO	1.8V	0.5A	ISL85415
Rail 11	HPIO VCCO	1.0V	1.0A	ISL85410

1.3 Ordering Information

Part Number	Description
ISLUSPLUS-UC2DEMO1Z	Xilinx's Zynq UltraScale+ Use Case 2 demonstration board

1.4 Related Literature

For a full list of related documents, visit our website

- [ISL8271M](#), [ZL9006M](#), [ZL9010M](#), [ISL8277M](#), [ISL85003](#), [ISL85412](#), [ISL85415](#), [ISL85410](#), [ISL8702A](#) product pages

2. Functional Description

The ISLUSPLUS-UC2DEMO1Z provides a reference design for the Xilinx Zynq Ultrascale+ MPSoC in the Use Case 2 configuration. Most of the output rails in this reference design are directly converted from the 8V to 13.2V input voltage. The block diagram for the demonstration board is shown in [Figure 2](#).

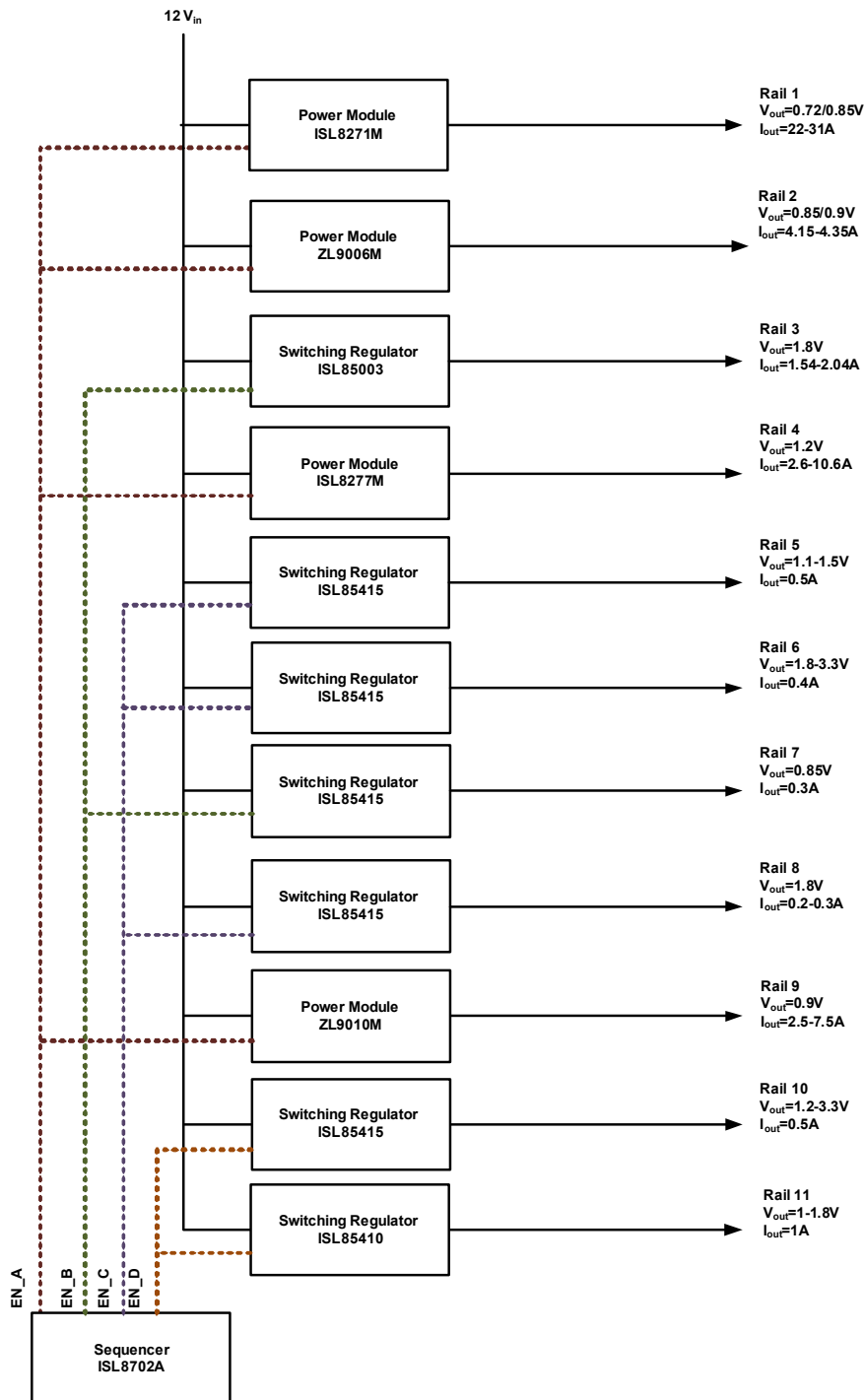


Figure 2. ISLUSPLUS-UC2DEMO1Z Block Diagram

[Table 2](#) lists all the connectors on the demonstration board.

Table 2. Demonstration Board Connectors

Connector	Description
J1	Terminal block for Enable input signal
J2	Terminal block for Input voltage
J3	Terminal block for output rail 1
J4	Terminal block for output rail 2
J6	Terminal block for output rail 4
J7	Terminal block for output rail 5
J8	Terminal block for output rail 6
J9	Terminal block for output rail 7
J10	Terminal block for output rail 8
J11	Terminal block for output rail 9
J12	Terminal block for output rail 10
J13	Terminal block for output rail 11
J14	Terminal block for output rail 3
XS1	2x5 Connector for PMBus signals

2.1 Operating Range

The input voltage range for the demonstration board is 8V to 13.2V. The default output voltage for each rail is listed in [Table 1 on page 3](#). Depending on the user requirements, the output voltages for some rails can be adjusted to different levels, namely Rail 1, Rail 2, Rail 5, Rail 9, and Rail 10.

To change the output voltage of Rail 1 to 0.72V, change the output voltage through the PMBus. Refer to the [ISL8171M](#) datasheet for more details.

To change the output voltage of Rail 2 to 0.9V, change the resistor RVSET2 to 17.8kΩ. The output voltage for this rail can also be changed through PMBus. Refer to the ISL8171M datasheet for more details.

To change the output voltage of Rail 5, change the resistor R45 by using [\(EQ. 1\)](#).

$$(EQ. 1) \quad R_{45} = R_{42} / (V_{OUT5} / 0.6 - 1)$$

To change the output voltage of Rail 6, change the resistor R56 by using [\(EQ. 2\)](#).

$$(EQ. 2) \quad R_{56} = R_{53} / (V_{OUT6} / 0.6 - 1)$$

To change the output voltage of Rail 10, change the resistor R85 by using [\(EQ. 3\)](#).

$$(EQ. 3) \quad R_{85} = R_{78} / (V_{OUT10} / 0.6 - 1)$$

To change the output voltage of Rail 11, change the resistor R70 by using [\(EQ. 4\)](#).

$$(EQ. 4) \quad R_{70} = R_{72} / (V_{OUT11} / 0.6 - 1)$$

2.2 Quick Start Guide

- (1) Ensure that the circuit is correctly connected to the supply and loads before applying any power.
- (2) Connect the 12V bias supply to VIN at the terminal block J2.
- (3) Connect the respective output load to the terminal blocks J3 to J14.
- (4) Turn on the power supply.
- (5) Verify the output voltages are correct for all output voltage rails.

3. ISLUSPLUS-UC2DEMO1Z Board

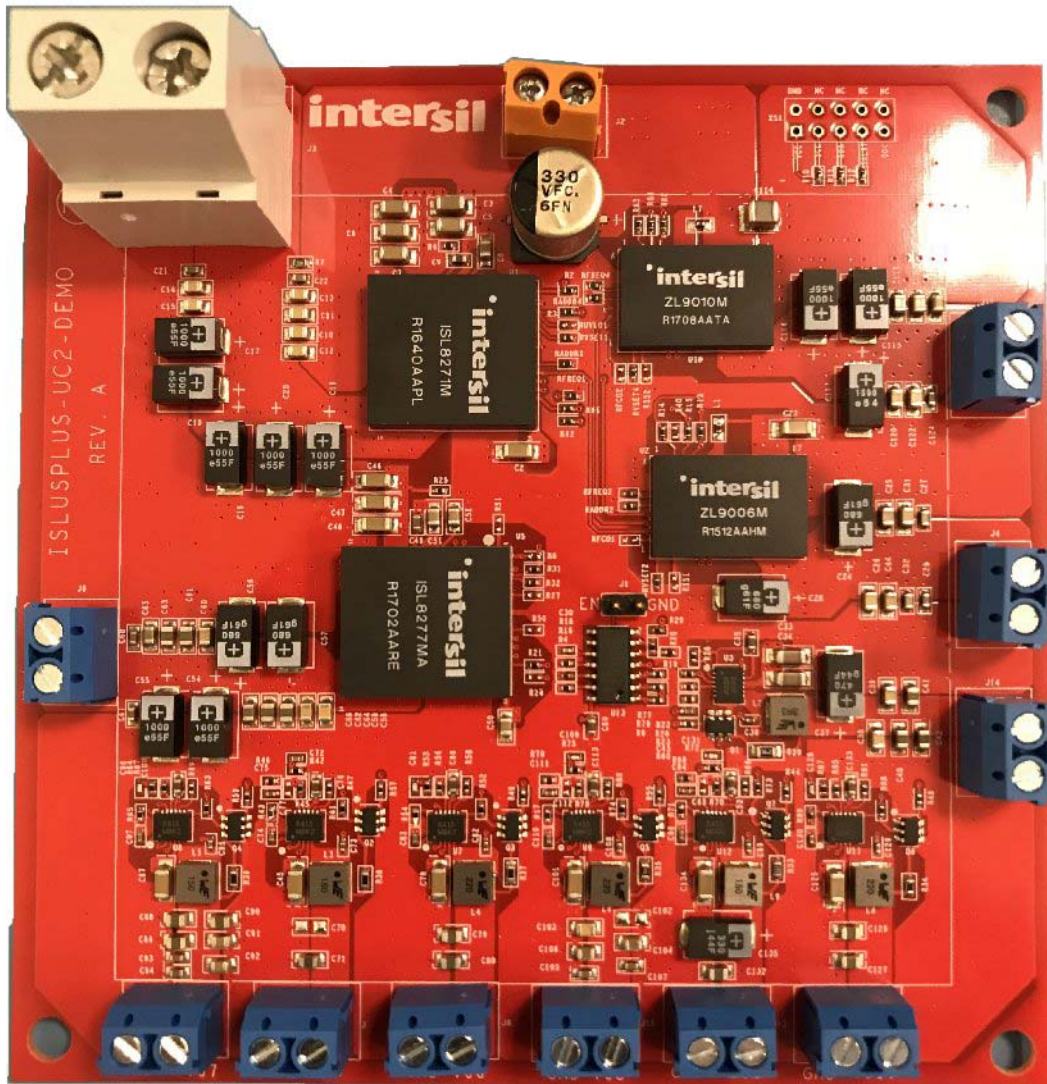


Figure 3. ISLUSPLUS-UC2DEMO1Z Board (Top)

3.1 ISLUSPLUS-UC2DEMO1Z Circuit Schematic

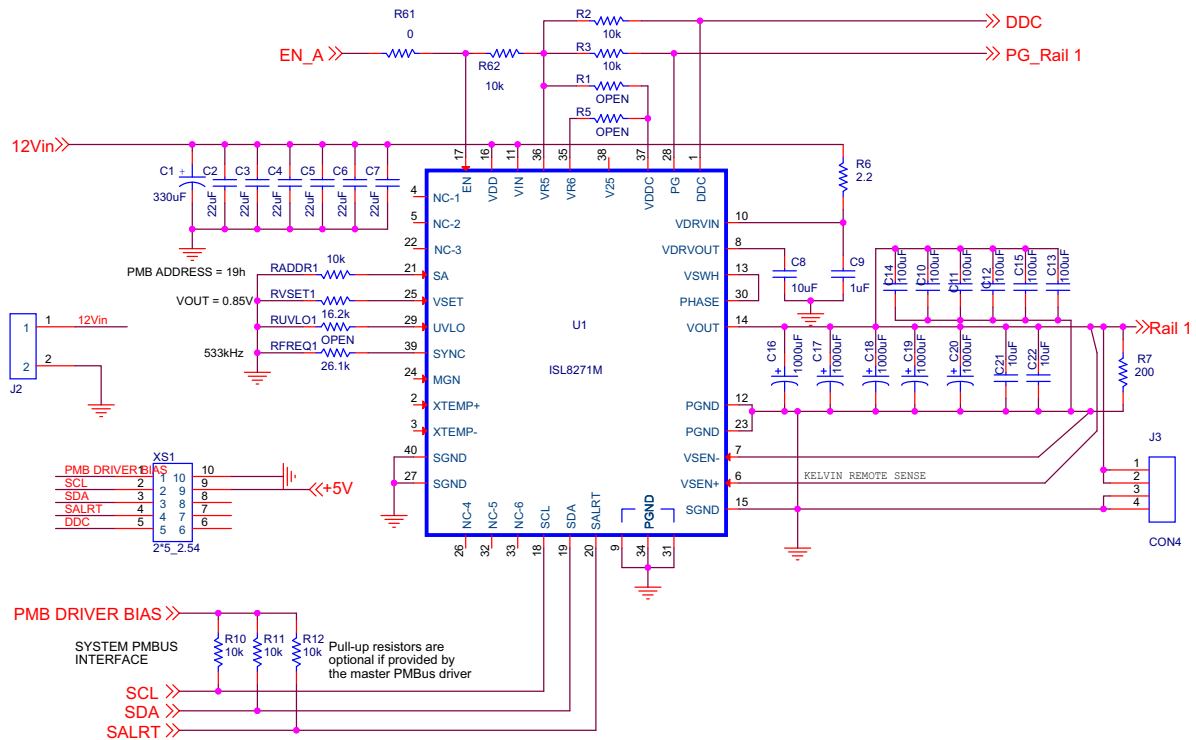


Figure 4. Schematic 1

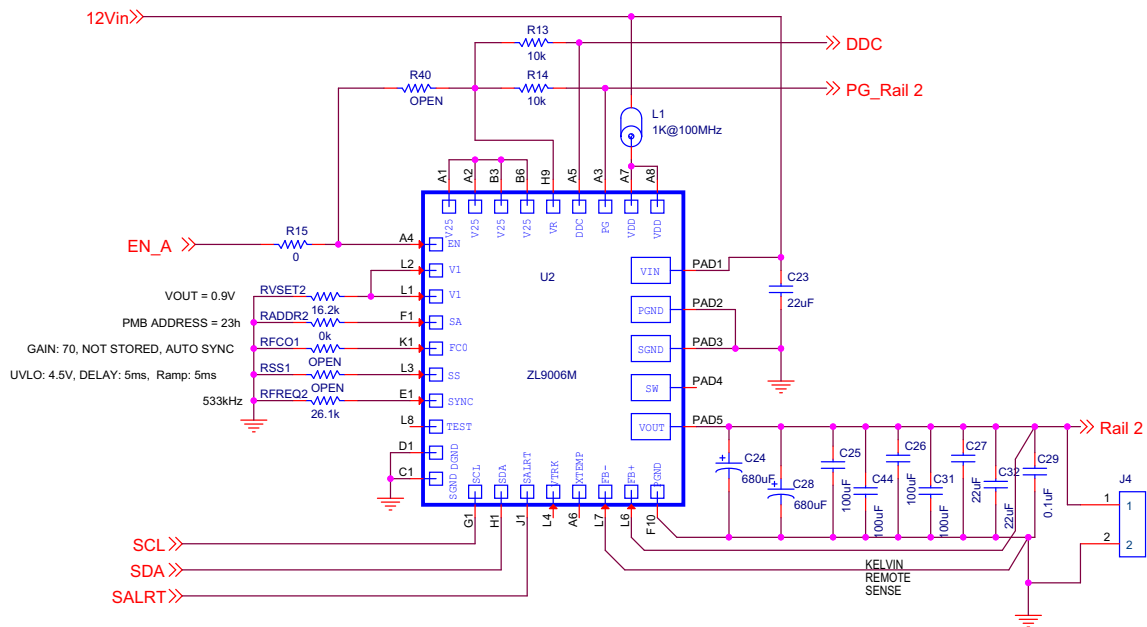


Figure 5. Schematic 2

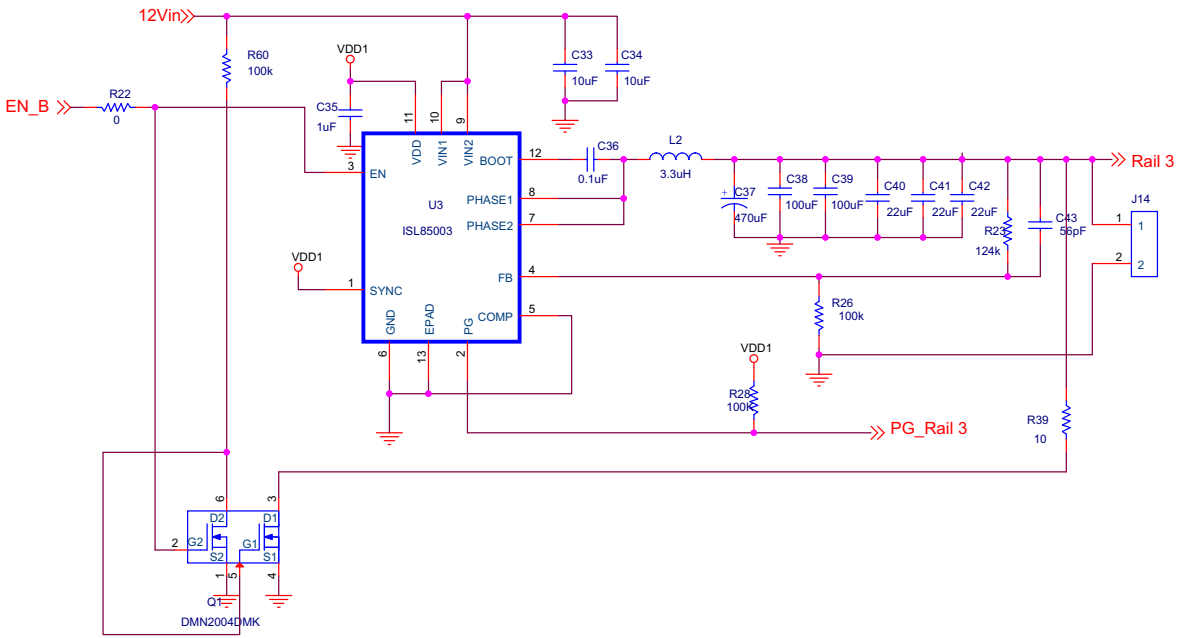


Figure 6. Schematic 3

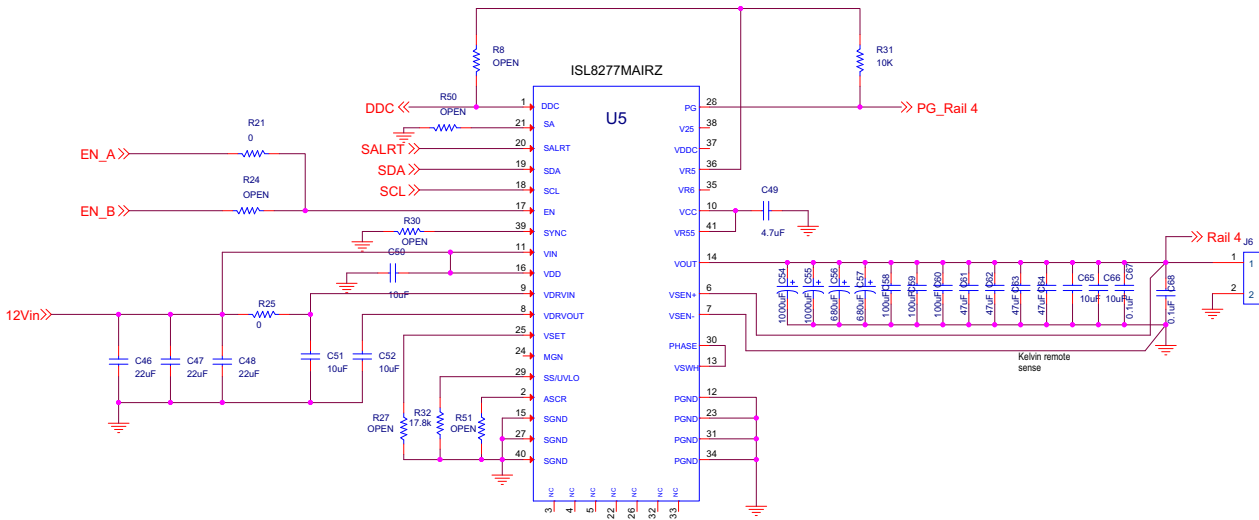


Figure 7. Schematic 4

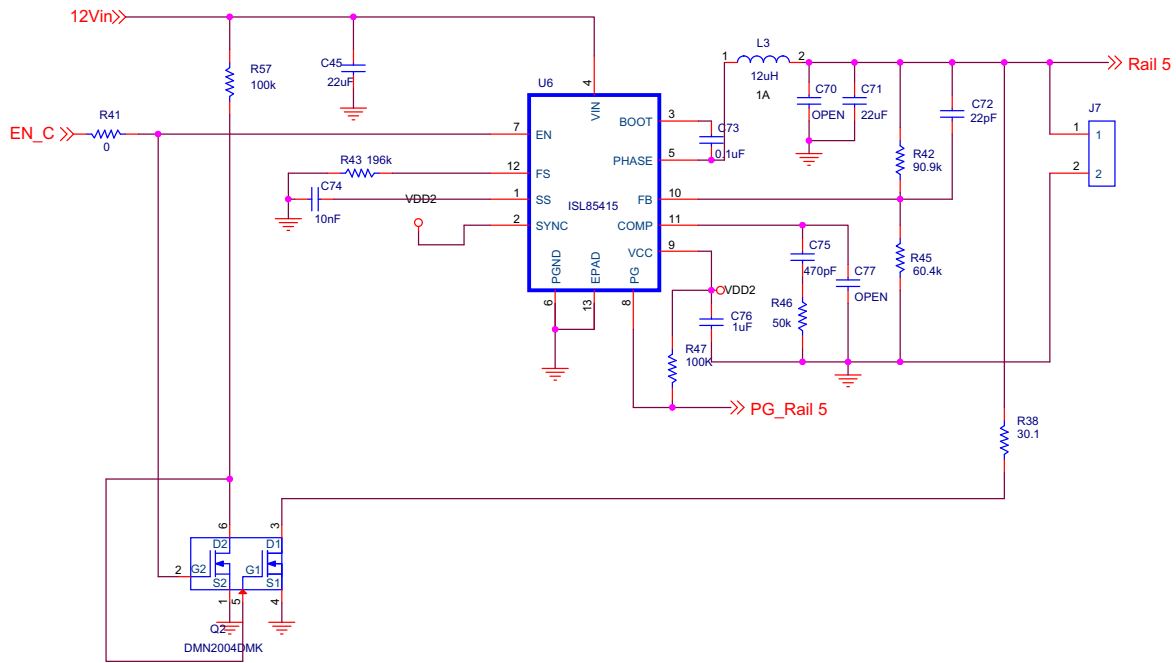


Figure 8. Schematic 5

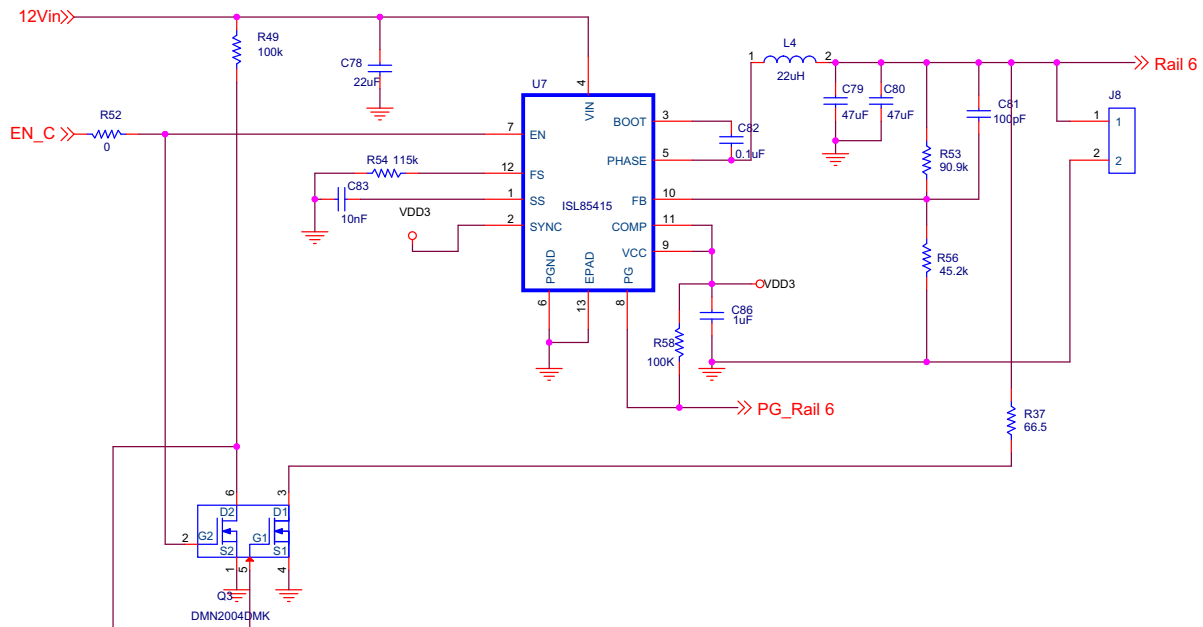


Figure 9. Schematic 6

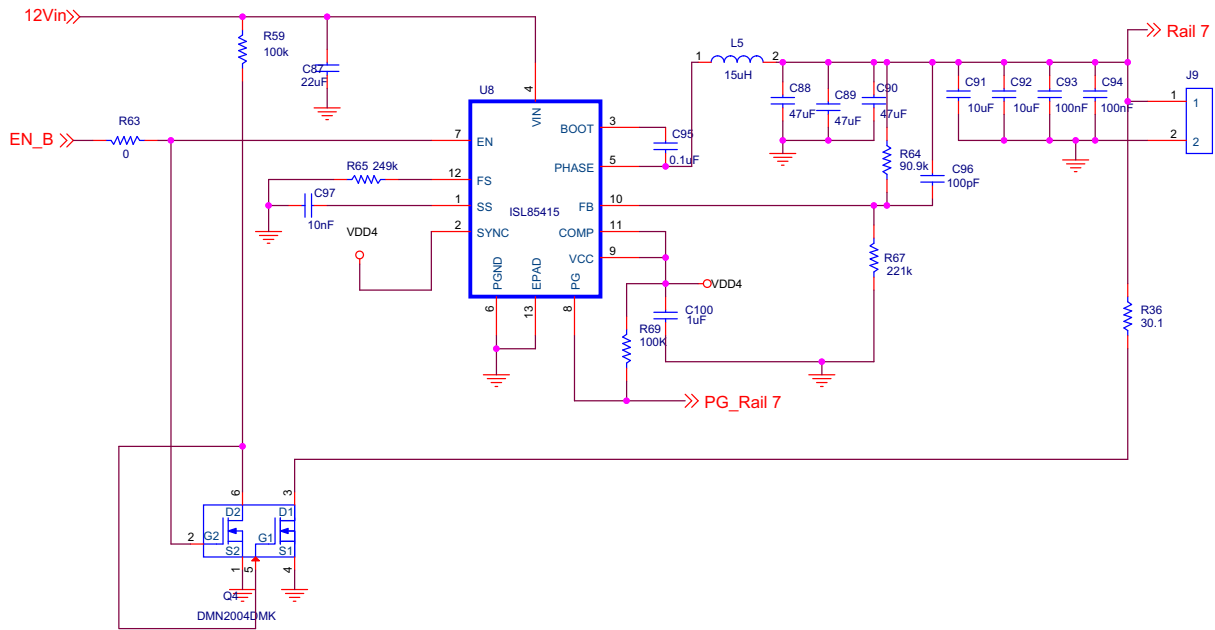


Figure 10. Schematic 7

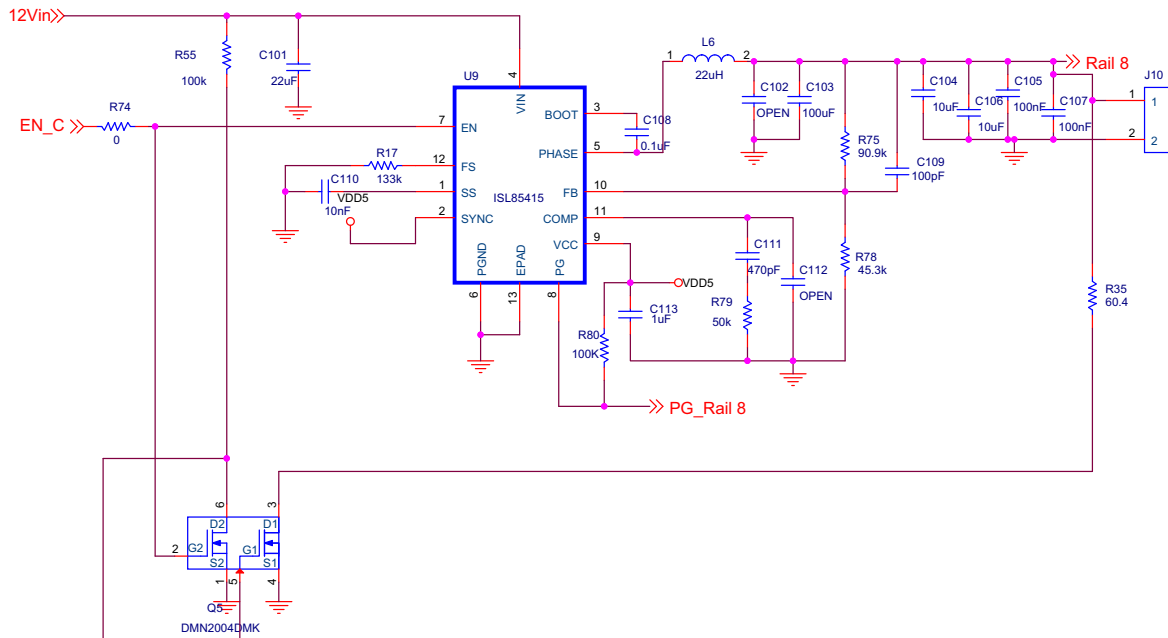


Figure 11. Schematic 8

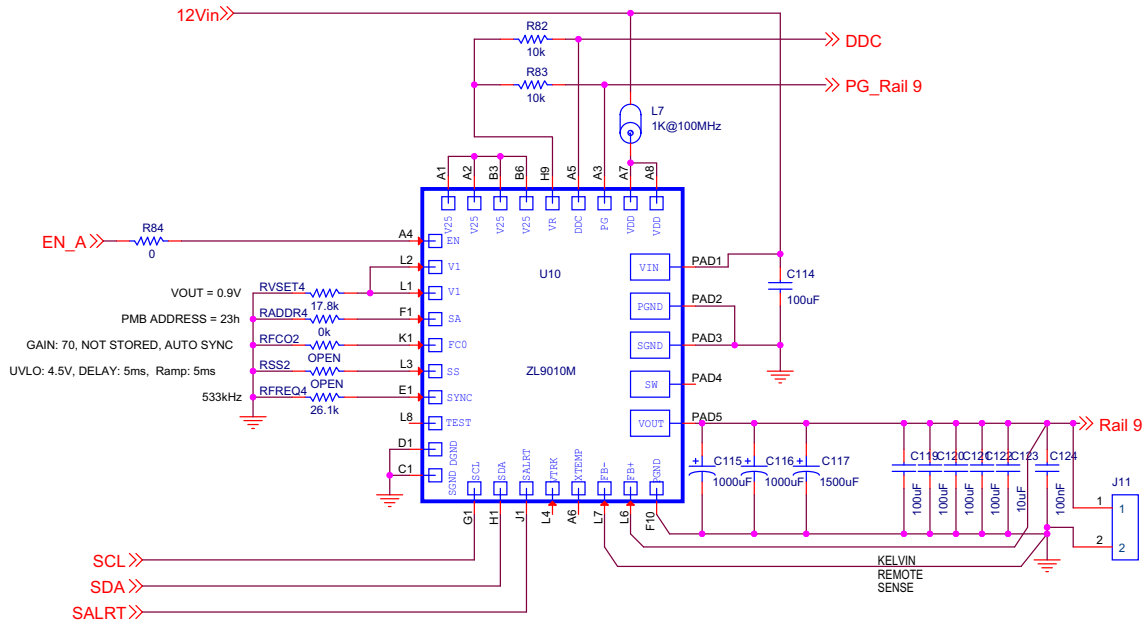


Figure 12. Schematic 9

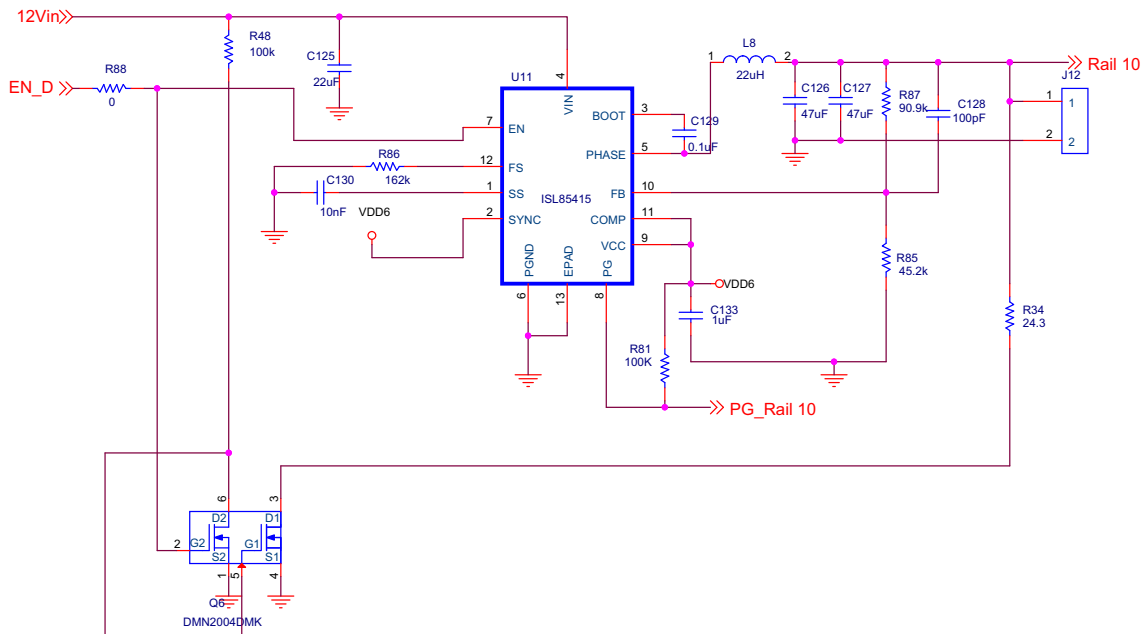


Figure 13. Schematic 10

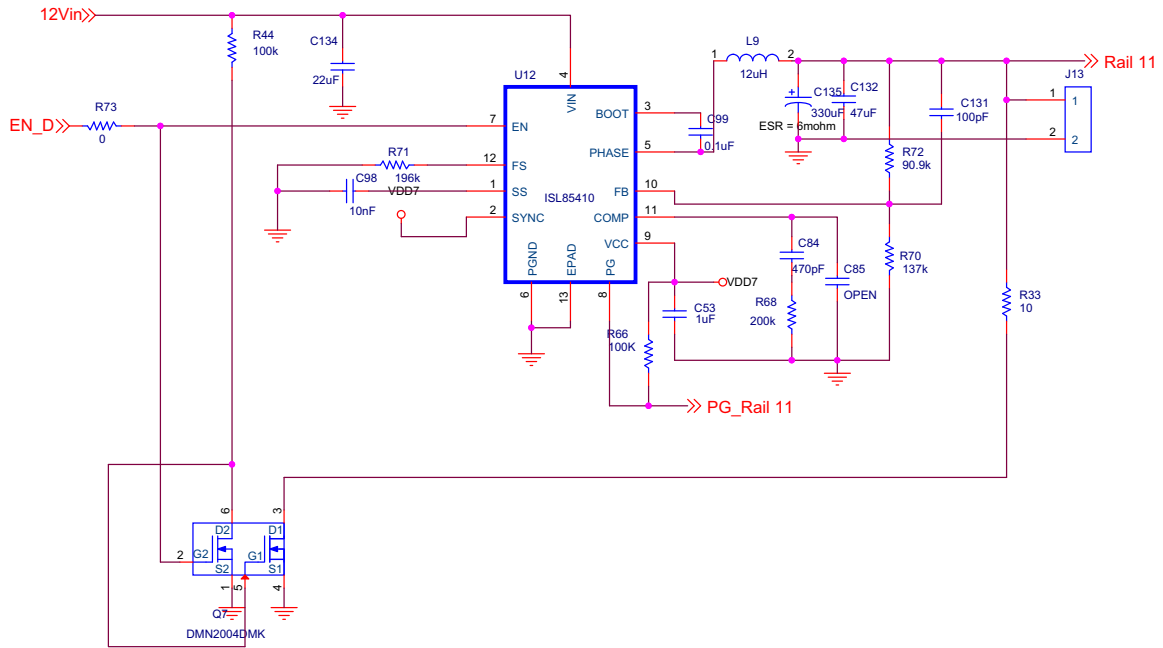


Figure 14. Schematic 11

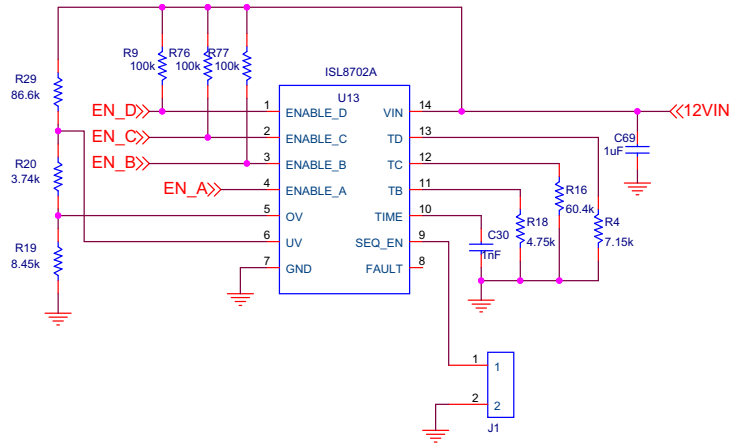


Figure 15. Schematic 12

3.2 Bill of Materials

Qty	Reference Designator	Description	Mfr	Manufacturer Part Number
Rail 1				
6	C2-C7	CAP, SMD, 1206, 22 μ F, 25V, 10%, X5R, ROHS	Murata	GRM31CR61E226KE15L
1	C8	CAP, SMD, 0805, 10 μ F, 25V, 10%, X5R, ROHS	TDK	C2012X5R1E106K
1	C9	CAP, SMD, 0603, 1.0 μ F, 25V, 10%, X7R, ROHS	Taiyo Yuden	TMK107B7105KA-T
6	C10-C15	CAP, SMD, 1206, 100 μ F, 6.3V, 20%, X5R, ROHS	Murata	GRM31CR60J107ME39L
5	C16-C20	CAP-POSCAP, SMD, 7.3x4.3, 1000 μ F, 2.5V, 20%, 6m Ω , ROHS	Panasonic	ETPF1000M6H
2	C21, C22	CAP, SMD, 0603, 10 μ F, 6.3V, 20%, X5R, ROHS	TDK	C1608X5R0J106M
7	R2, R3, R10, R11, R12, R62, RADDR1	RES, SMD, 0402, 10k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF1002X
1	R6	RES, SMD, 0402, 2.2 Ω , 1/16W, 1%, TF, ROHS	Yageo	RC0402FR-072R2L
1	R7	RES, SMD, 0603, 200 Ω , 1/16W, 1%, TF, ROHS	Venkel	CR0603-16W-2000FTT
1	R61	RES, SMD, 0402, 0 Ω , 1/16W, 5%, TF, ROHS	Venkel	CR0402-16W-00T
1	RFREQ1	RES, SMD, 0402, 26.1k, 1/16W, 1%, TF, ROHS	Venkel	CR0402-16W-2612FT
1	RVSET1	RES, SMD, 0402, 16.2k, 1/16W, 1%, TF, ROHS	Yageo	RC0402FR-0716K2L
1	U1	IC-33A DC/DC PWR SUPPLY MODULE, 40P, HDA, 17x19, ROHS	Renesas	ISL8271MBIRZ
0	R1, R5, RUVLO1	Do Not Populate		
Rail 2				
1	C23	CAP, SMD, 1206, 22 μ F, 25V, 10%, X5R, ROHS	Murata	GRM31CR61E226KE15L
2	C24, C28	CAP-POSCAP, SMD, 7.3x4.3, 680 μ F, 4V, 20%, 10m Ω , ROHS	Panasonic	4TPF680MAH
4	C25, C26, C31, C44	CAP, SMD, 1206, 100 μ F, 6.3V, 20%, X5R, ROHS	Murata	GRM31CR60J107ME39L
2	C27, C32	CAP, SMD, 0603, 22 μ F, 6.3V, 20%, X5R, ROHS	TDK	C1608X5R0J226M
1	C29	CAP, SMD, 0603, 0.1 μ F, 25V, 10%, X7R, ROHS	Murata	GRM188R71E104KA01D
1	L1	FERRITE CHIP, SMD, 0402, 1000 Ω , 200mA, ROHS	Murata	BLM15BD102SN1D
2	RADDR2, R15	RES, SMD, 0402, 0 Ω , 1/16W, 5%, TF, ROHS	Venkel	CR0402-16W-00T
1	RFREQ2	RES, SMD, 0402, 26.1k, 1/16W, 1%, TF, ROHS	Venkel	CR0402-16W-2612FT
1	RVSET2	RES, SMD, 0402, 16.2k, 1/16W, 1%, TF, ROHS	Yageo	RC0402FR-0716K2L
2	R13, R14	RES, SMD, 0402, 10k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF1002X
1	U2	IC-6A DC/DC PMBUS MODULE, 31P, HDA, 11x17, ROHS	Renesas	ZL9006MIRZ
0	RSS1, RFCO1, R40	Do Not Populate		
Rail 3				
2	C33, C34	CAP, SMD, 1206, 10 μ F, 25V, 10%, X7R, ROHS	Venkel	C1206X7R250-106KNE
1	C35	CAP, SMD, 0603, 1.0 μ F, 25V, 10%, X7R, ROHS	Taiyo Yuden	TMK107B7105KA-T
1	C36	CAP, SMD, 0402, 0.1 μ F, 16V, 10%, X7R, ROHS	Venkel	C0402X7R160-104KNE
1	C37	CAP-POSCAP, SMD, 7.3x4.3, 470 μ F, 4V, 20%, 10m Ω , ROHS	Sanyo	4TPF470ML
2	C38, C39	CAP, SMD, 1206, 100 μ F, 6.3V, 20%, X5R, ROHS	Murata	GRM31CR60J107ME39L
3	C40, C41, C42	CAP, SMD, 0805, 22 μ F, 6.3V, 10%, X5R, ROHS	Johanson Dielectrics Inc	6R3R15X226KV4E

Qty	Reference Designator	Description	Mfr	Manufacturer Part Number
1	C43	CAP, SMD, 0402, 56pF, 50V, 5%, NP0, ROHS	Murata	GRP1555C1H560JD01E
1	L2	INDUCTOR, SMD, 4.10mmSQ, 3.3µH, 20%, 3.6A, ROHS	Würth Elektronik	74438356033
1	Q1	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	Diodes Inc.	DMN2004DMK-7
1	R22	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	Venkel	CR0402-16W-00T
1	R23	RES, SMD, 0402, 124k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF1243X
3	R26, R28, R60	RES, SMD, 0402, 100k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ2RKF1003
1	R39	RES, SMD, 0805, 10Ω, 1/8W, 1%, TF, ROHS	Venkel	CR0805-8W-10R0FT
1	U3	IC-3A BUCK REGULATOR, 12P, DFN, 4x3, ROHS	Renesas	ISL85003FRZ
Rail 4				
3	C46, C47, C48	CAP, SMD, 1206, 22µF, 25V, 10%, X5R, ROHS	Murata	GRM31CR61E226KE15L
1	C49	CAP, SMD, 0603, 4.7µF, 10V, 10%, X5R, ROHS	Venkel	CR0603-16W-4701FT
5	C50, C51, C52, C65, C66	CAP, SMD, 0805, 10µF, 25V, 10%, X5R, ROHS	TDK	C2012X5R1E106K
2	C54, C55	CAP-POSCAP, SMD, 7.3x4.3, 1000µF, 2.5V, 20%, 6mΩ, ROHS	Panasonic	ETPF1000M6H
1	C56, C57	CAP-POSCAP, SMD, 7.3x4.3, 680µF, 4V, 20%, 10mΩ, ROHS	Panasonic	4TPF680MAH
3	C58, C59, C60	CAP, SMD, 1206, 100µF, 6.3V, 20%, X5R, ROHS	Murata	GRM31CR60J107ME39L
4	C61, C62, C63, C64	CAP, SMD, 0805, 47µF, 6.3V, 20%, X5R, ROHS	Kemet	C0805C476M9PACTU
2	C67, C68	CAP, SMD, 0603, 0.1µF, 25V, 10%, X7R, ROHS	Murata	GRM188R71E104KA01D
2	R21, R25	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	Venkel	CR0402-16W-00T
1	R31	RES, SMD, 0402, 10k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF1002X
1	R32	RES, SMD, 0402, 17.8k, 1/16W, 1%, TF, ROHS	KOA	RK73H1ETTP1782F
1	U5	IC-25A DC/DC, PWR MODULE, 40P, HDA, 17x19, ROHS	Renesas	ISL8277MAIRZ
0	R8, R24, R27, R30, R50, R51	Do Not Populate		
Rail 5				
1	C45	CAP, SMD, 1206, 22µF, 25V, 10%, X5R, ROHS	Murata	GRM31CR61E226KE15L
1	C71	CAP, SMD, 0805, 22µF, 6.3V, 10%, X5R, ROHS	Johanson Dielectrics Inc	6R3R15X226KV4E
1	C72	CAP, SMD, 0402, 22pF, 50V, 10%, NP0, ROHS	Murata	GRM36COG220K050AQ
1	C73	CAP, SMD, 0402, 0.1µF, 16V, 10%, X7R, ROHS	Venkel	C0402X7R160-104KNE
1	C74	CAP, SMD, 0402, 0.01µF, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C103K
1	C75	CAP, SMD, 0402, 470pF, 50V, 10%, X7R, ROHS	Panasonic	ECJ-0EB1H471K
1	C76	CAP, SMD, 0603, 1.0µF, 25V, 10%, X7R, ROHS	Taiyo Yuden	TMK107B7105KA-T
1	L3	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 15µH, 20%, 1.9A, ROHS	Würth Elektronik	74438356150
1	Q2	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	Diodes Inc.	DMN2004DMK-7
1	R38	RES, SMD, 0603, 30.1Ω, 1/10W, 1%, TF, ROHS	Yageo	RC0603FR-0730R1L
1	R41	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	Venkel	CR0402-16W-00T
1	R42	RES, SMD, 0402, 90.9k, 1/16W, 1%, TF, ROHS	Vishay/Dale	CRCW040290K9FKED
1	R43	RES, SMD, 0402, 196k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF1963X

Qty	Reference Designator	Description	Mfr	Manufacturer Part Number
1	R45	RES, SMD, 0402, 60.4k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF6042X
1	R46	RES, SMD, 0402, 49.9k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF4992
2	R47, R57	RES, SMD, 0402, 100k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ2RKF1003
1	U5	IC-25A DC/DC, PWR MODULE, 40P, HDA, 17x19, ROHS	Renesas	ISL8277MAIRZ
0	C70, C77	Do Not Populate		
Rail 6				
1	C78	CAP, SMD, 1206, 22 μ F, 25V, 10%, X5R, ROHS	Murata	GRM31CR61E226KE15L
2	C79, C80	CAP, SMD, 0805, 47 μ F, 6.3V, 20%, X5R, ROHS	Kemet	C0805C476M9PACTU
1	C81	CAP, SMD, 0402, 100pF, 50V, 10%, C0G, ROHS	Kemet	C0402C101K5GACTU
1	C82	CAP, SMD, 0402, 0.1 μ F, 16V, 10%, X7R, ROHS	Venkel	C0402X7R160-104KNE
1	C83	CAP, SMD, 0402, 0.01 μ F, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C103K
1	C86	CAP, SMD, 0603, 1.0 μ F, 25V, 10%, X7R, ROHS	Taiyo Yuden	TMK107B7105KA-T
1	L4	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 22 μ H, 20%, 1.7A, ROHS	Würth Elektronik	74438356220
1	Q3	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	Diodes Inc.	DMN2004DMK-7
1	R37	RES, SMD, 0603, 66.5 Ω , 1/10W, 1%, TF, ROHS	Yageo	RC0603FR-0766R5L
2	R49, R58	RES, SMD, 0402, 100k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ2RKF1003
1	R52	RES, SMD, 0402, 0 Ω , 1/16W, 5%, TF, ROHS	Venkel	CR0402-16W-00T
1	R53	RES, SMD, 0402, 90.9k, 1/16W, 1%, TF, ROHS	Vishay/Dale	CRCW040290K9FKED
1	R54	RES, SMD, 0402, 115k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF1153X
1	R56	RES, SMD, 0402, 45.3k, 1/16W, 1%, TF, ROHS	Venkel	CR0402-16W-4532FT
1	U7	IC-500mA BUCK REGULATOR, 12P, DFN, 3x4, ROHS	Renesas	ISL85415FRZ
Rail 7				
1	C87	CAP, SMD, 1206, 22 μ F, 25V, 10%, X5R, ROHS	Murata	GRM31CR61E226KE15L
3	C88, C89, C90	CAP, SMD, 0805, 47 μ F, 6.3V, 20%, X5R, ROHS	Kemet	C0805C476M9PACTU
2	C91, C92	CAP, SMD, 0805, 10 μ F, 25V, 10%, X5R, ROHS	TDK	C2012X5R1E106K
2	C93, C94	CAP, SMD, 0603, 0.1 μ F, 25V, 10%, X7R, ROHS	Murata	GRM188R71E104KA01D
1	C95	CAP, SMD, 0402, 0.1 μ F, 16V, 10%, X7R, ROHS	Venkel	C0402X7R160-104KNE
1	C96	CAP, SMD, 0402, 100pF, 50V, 10%, C0G, ROHS	Kemet	C0402C101K5GACTU
1	C97	CAP, SMD, 0402, 01 μ F, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C103K
1	L5	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 15 μ H, 20%, 1.9A, ROHS	Würth Elektronik	74438356150
1	Q4	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	Diodes Inc.	DMN2004DMK-7
1	R36	RES, SMD, 0603, 30.1 Ω , 1/10W, 1%, TF, ROHS	Yageo	RC0603FR-0730R1L
1	R59, R69	RES, SMD, 0402, 100k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ2RKF1003
1	R63	RES, SMD, 0402, 0 Ω , 1/16W, 5%, TF, ROHS	Venkel	CR0402-16W-00T
1	R64	RES, SMD, 0402, 90.9k, 1/16W, 1%, TF, ROHS	Vishay/Dale	CRCW040290K9FKED
1	R65	RES, SMD, 0402, 249k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF2493X
1	R67	RES, SMD, 0402, 221k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF2213X
1	U8	IC-500mA BUCK REGULATOR, 12P, DFN, 3x4, ROHS	Renesas	ISL85415FRZ

Qty	Reference Designator	Description	Mfr	Manufacturer Part Number
Rail 8				
1	C101	CAP, SMD, 1206, 22µF, 25V, 10%, X5R, ROHS	Murata	GRM31CR61E226KE15L
1	C103	CAP, SMD, 1206, 100µF, 6.3V, 20%, X5R, ROHS	Murata	GRM31CR60J107ME39L
2	C104, C106	CAP, SMD, 0805, 10µF, 25V, 10%, X5R, ROHS	TDK	C2012X5R1E106K
2	C105, C107	CAP, SMD, 0603, 0.1µF, 25V, 10%, X7R, ROHS	Murata	GRM188R71E104KA01D
1	C108	CAP, SMD, 0402, 0.1µF, 16V, 10%, X7R, ROHS	Venkel	C0402X7R160-104KNE
1	C109	CAP, SMD, 0402, 100pF, 50V, 10%, C0G, ROHS	Kemet	C0402C101K5GACTU
1	C110	CAP, SMD, 0402, 0.01µF, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C103K
1	C111	CAP, SMD, 0402, 470pF, 50V, 10%, X7R, ROHS	Panasonic	ECJ-0EB1H471K
1	C113	CAP, SMD, 0603, 1.0µF, 25V, 10%, X7R, ROHS	Taiyo Yuden	TMK107B7105KA-T
1	L6	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 22µH, 20%, 1.7A, ROHS	Würth Elektronik	74438356220
1	Q5	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	Diodes Inc.	DMN2004DMK-7
1	R17	RES, SMD, 0402, 133k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF1333X
1	R35	RES, SMD, 0603, 60.4Ω, 1/10W, 1%, TF, ROHS	Panasonic	ERJ-3EKF60R4V
2	R55, R80	RES, SMD, 0402, 100k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ2RKF1003
1	R74	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	Venkel	CR0402-16W-00T
1	R75	RES, SMD, 0402, 90.9k, 1/16W, 1%, TF, ROHS	Vishay/Dale	CRCW040290K9FKED
1	R78	RES, SMD, 0402, 45.3k, 1/16W, 1%, TF, ROHS	Venkel	CR0402-16W-4532FT
1	R79	RES, SMD, 0402, 49.9k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF4992
1	U9	IC-500mA BUCK REGULATOR, 12P, DFN, 3x4, ROHS	Renesas	ISL85415FRZ
0	C102, C112	Do Not Populate		
Rail 9				
1	C114	CAP, SMD, 1210, 100µF, 16V, 20%, X5R, ROHS	Taiyo Yuden	EMK325ABJ107MM-T
2	C115, C116	CAP-POSCAP, SMD, 7.3x4.3, 1000µF, 2.5V, 20%, 6mΩ, ROHS	Panasonic	ETPF1000M6H
1	C117	CAP-POSCAP, SMD, 7.3x4.3, 1500µF, 2.5V, 20%, 12mΩ, ROHS	Panasonic	2R5TPE1500MC
4	C119, C120, C121, C122	CAP, SMD, 1206, 100µF, 6.3V, 20%, X5R, ROHS	Murata	GRM31CR60J107ME39L
1	C123	CAP, SMD, 0805, 10µF, 25V, 10%, X5R, ROHS	TDK	C2012X5R1E106K
1	C124	CAP, SMD, 0603, 0.1µF, 25V, 10%, X7R, ROHS	Murata	GRM188R71E104KA01D
1	L7	FERRITE CHIP, SMD, 0402, 1000Ω, 200mA, ROHS	Murata	BLM15BD102SN1D
2	RADDR4, R84	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	Venkel	CR0402-16W-00T
1	RFREQ4	RES, SMD, 0402, 26.1k, 1/16W, 1%, TF, ROHS	Venkel	CR0402-16W-2612FT
1	RVSET4	RES, SMD, 0402, 17.8k, 1/16W, 1%, TF, ROHS	KOA	RK73H1ETTP1782F
2	R82, R83	RES, SMD, 0402, 10k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF1002X
1	U10	IC-10A DC/DC PMBUS MODULE, 31P, HDA, 11x17, ROHS	Renesas	ZL9010MIRZ
0	RSS2, FCO2	Do Not Populate		
Rail 10				
1	C125	CAP, SMD, 1206, 22µF, 25V, 10%, X5R, ROHS	Murata	GRM31CR61E226KE15L
2	C126, C127	CAP, SMD, 0805, 47µF, 6.3V, 20%, X5R, ROHS	Kemet	C0805C476M9PACTU

Qty	Reference Designator	Description	Mfr	Manufacturer Part Number
1	C128	CAP, SMD, 0402, 100pF, 50V, 10%, C0G, ROHS	Kemet	C0402C101K5GACTU
1	C129	CAP, SMD, 0402, 0.1µF, 16V, 10%, X7R, ROHS	Venkel	C0402X7R160-104KNE
1	C130	CAP, SMD, 0402, 0.01µF, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C103K
1	C133	CAP, SMD, 0603, 1.0µF, 25V, 10%, X7R, ROHS	Taiyo Yuden	TMK107B7105KA-T
1	L8	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 22µH, 20%, 1.7A, ROHS	Würth Elektronik	74438356220
1	Q6	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	Diodes Inc.	DMN2004DMK-7
1	R34	RES, SMD, 0603, 24.3Ω, 1/10W, 1%, TF, ROHS	Panasonic	ERJ-3EKF24R3V
2	R48, R81	RES, SMD, 0402, 100k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ2RKF1003
1	R85	RES, SMD, 0402, 45.3k, 1/16W, 1%, TF, ROHS	Venkel	CR0402-16W-4532FT
1	R86	RES, SMD, 0402, 162k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF1623X
1	R87	RES, SMD, 0402, 90.9k, 1/16W, 1%, TF, ROHS	Vishay/Dale	CRCW040290K9FKED
1	R88	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	Venkel	CR0402-16W-00T
1	U11	IC-500mA BUCK REGULATOR, 12P, DFN, 3x4, ROHS	Renesas	ISL85415FRZ
Rail 11				
1	C53	CAP, SMD, 0603, 1.0µF, 25V, 10%, X7R, ROHS	Taiyo Yuden	TMK107B7105KA-T
1	C84	CAP, SMD, 0402, 470pF, 50V, 10%, X7R, ROHS	Panasonic	ECJ-0EB1H471K
1	C98	CAP, SMD, 0402, .01µF, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C103K
1	C99	CAP, SMD, 0402, 0.1µF, 16V, 10%, X7R, ROHS	Venkel	C0402X7R160-104KNE
1	C131	CAP, SMD, 0402, 100pF, 50V, 10%, C0G, ROHS	Kemet	C0402C101K5GACTU
1	C132	CAP, SMD, 0805, 47µF, 6.3V, 20%, X5R, ROHS	Kemet	C0805C476M9PACTU
1	C134	CAP, SMD, 1206, 22µF, 25V, 10%, X5R, ROHS	Murata	GRM31CR61E226KE15L
1	C135	CAP, POSCAP, SMD, D3L, 330µF, 6.3V, 20%, ROHS	Sanyo	6TPF330M9L
1	L9	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 15µH, 20%, 1.9A, ROHS	Würth Elektronik	74438356150
1	Q7	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	Diodes Inc.	DMN2004DMK-7
1	R33	RES, SMD, 0603, 10Ω, 1/10W, 1%, TF, ROHS	KOA	RK73H1JT10R0F
2	R44, R66	RES, SMD, 0402, 100k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ2RKF1003
1	R68	RES, SMD, 0402, 200k, 1/16W, 1%, TF, ROHS	Rohm	MCR01MZPF2003
1	R70	RES, SMD, 0402, 137k, 1/16W, 1%, TF, ROHS	Yageo	RC0402FR-07137KL
1	R71	RES, SMD, 0402, 196k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF1963X
1	R72	RES, SMD, 0402, 90.9k, 1/16W, 1%, TF, ROHS	Vishay/Dale	CRCW040290K9FKED
1	R73	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	Venkel	CR0402-16W-00T
1	U12	IC-1A BUCK REGULATOR, 12P, DFN, 3x4, ROHS	Renesas	ISL85410FRZ
0	C85	Do Not Populate		
Sequencer				
1	C30	CAP, SMD, 0402, 1000pF, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C102K
1	C69	CAP, SMD, 0603, 1.0µF, 25V, 10%, X7R, ROHS	Taiyo Yuden	TMK107B7105KA-T
1	R4	RES, SMD, 0402, 7.15k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF7151X
1	R16	RES, SMD, 0402, 60.4k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF6042X

Qty	Reference Designator	Description	Mfr	Manufacturer Part Number
1	R18	RES, SMD, 0402, 4.75k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF4751X
1	R19	RES, SMD, 0402, 8.45k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF8451X
1	R20	RES, SMD, 0402, 3.74k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF3741X
1	R29	RES, SMD, 0402, 86.6k, 1/16W, 1%, TF, ROHS	Yageo	RC0402FR-0786K6L
3	R9, R76, R77	RES, SMD, 0402, 100k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ2RKF1003
1	U13	IC-ADJUSTABLE QUAD SEQUENCER, 14P, NSOIC, ROHS	Renesas	ISL8702AIBZ
Misc				
1	C1	CAP, SMD, 12.5mmSQ, 330µF, 25V, 20%, ALUM.ELEC., ROHS	United Chemi-Con	EMVH250ARA331MKE0S
3	R10, R11, R12	RES, SMD, 0402, 10k, 1/16W, 1%, TF, ROHS	Panasonic	ERJ-2RKF1002X
1	J2	CONN-TERM BLOCK, TH, 2P, 5.08mmPITCH, 14-26AWG, M2.5 SCREW, ROHS	Weidmuller	1760490000
1	J3	CONN-TERM.BLOCK, TH, 2P, 10.16mmPITCH, 6-20AWG, ROHS	Wurth Elektronik	691256610002
10	J4, J6, J7, J8, J9, J10, J11, J12, J13, J14	CONN-TERM BLOCK, TH, 2P, 5.08mmPITCH, 14-22AWG, M2.6 SCREW, ROHS	On Shore Technology	OSTTC022162
1	XS1	CONN-HEADER, 2x10, BRKAWY-2x36, 2.54mm, ROHS	Berg/FCI	67996-272HLF
1	J1	CONN-HEADER, 1x2, BRKAWY 1x36, 2.54mm, ROHS	Berg/FCI	68000-236HLF

3.3 Board Layout

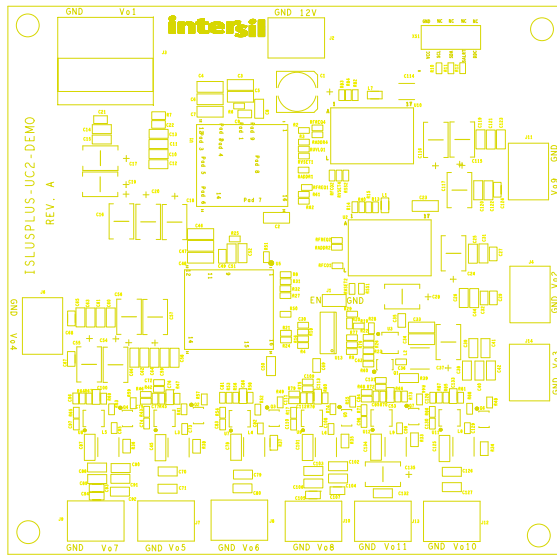


Figure 16. Silk Screen Top

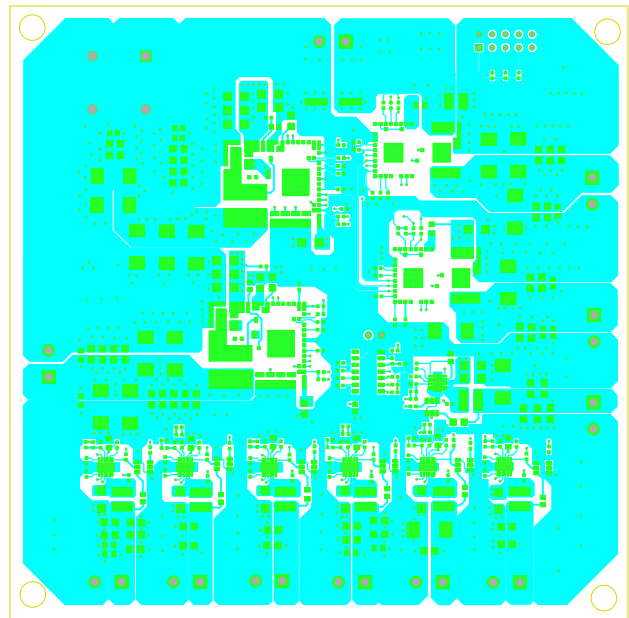


Figure 17. Top Layer

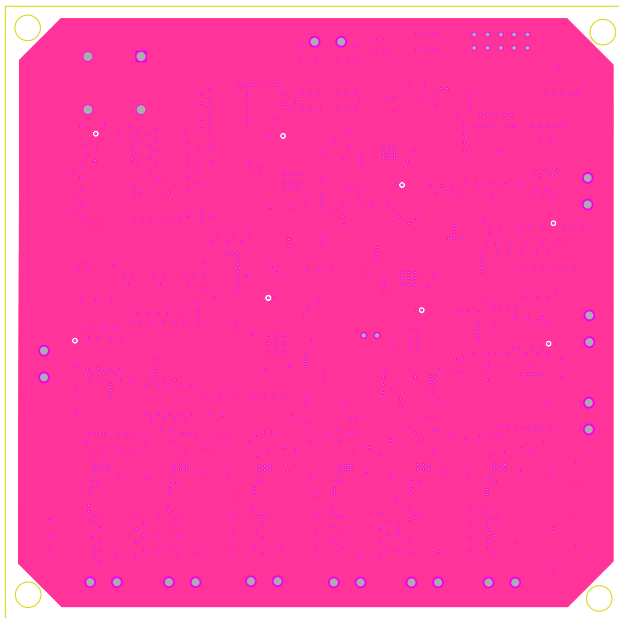


Figure 18. Layer 2

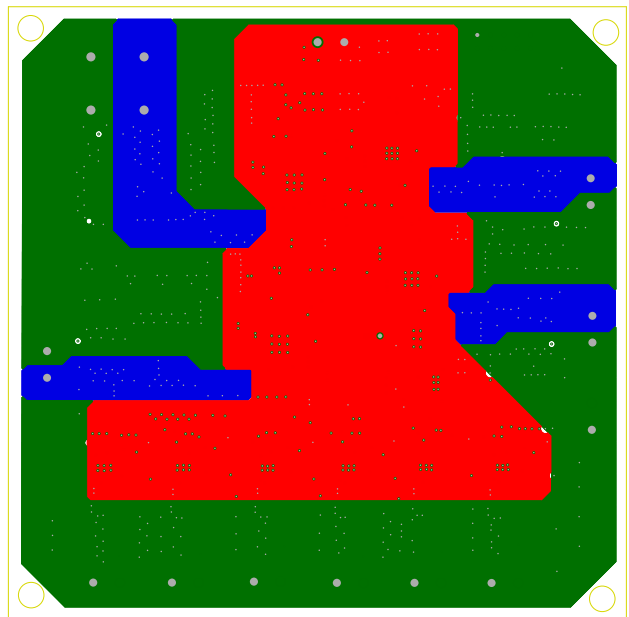


Figure 19. Layer 3

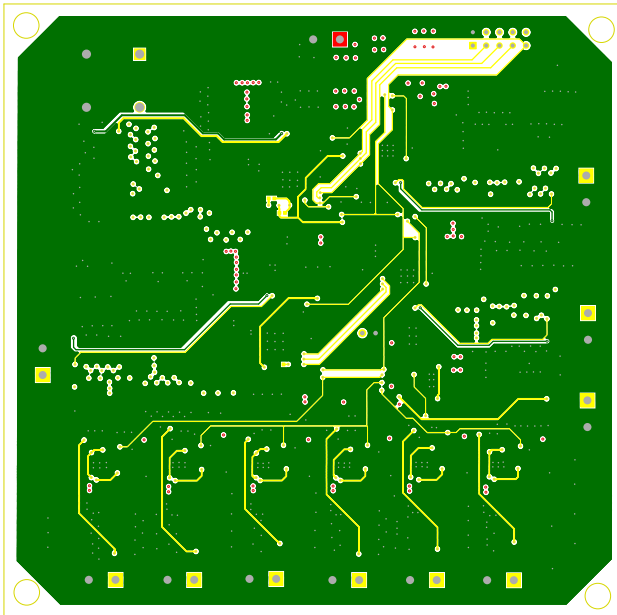


Figure 20. Bottom Layer

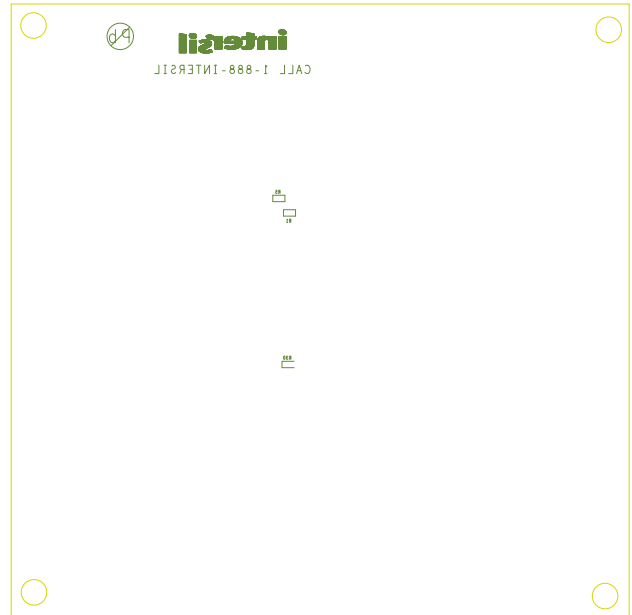


Figure 21. Silkscreen Bottom

4. Typical Performance Curves

Unless noted: $V_{IN} = 12V$

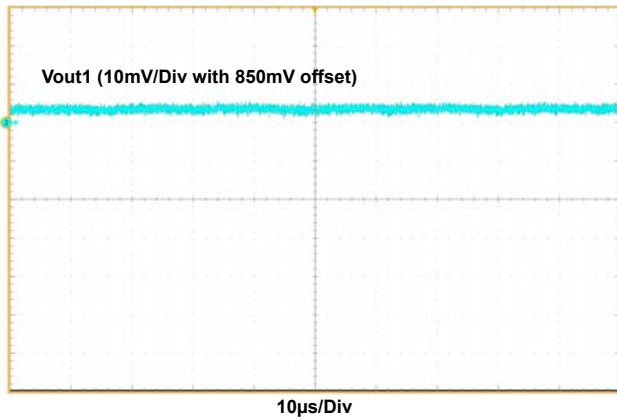


Figure 22. Rail 1 (0.85V) Output Ripple at Full Load

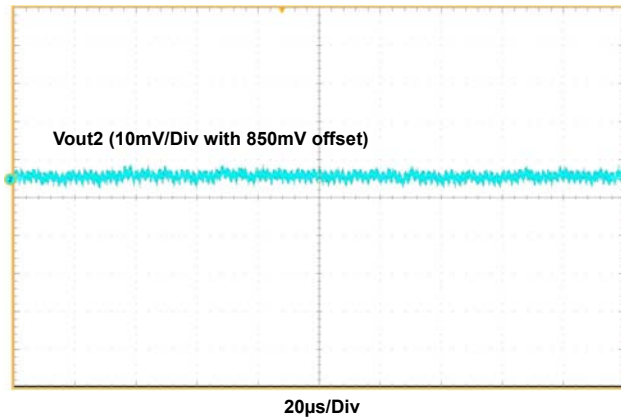


Figure 23. Rail 2 (0.85V) Output Ripple at Full Load

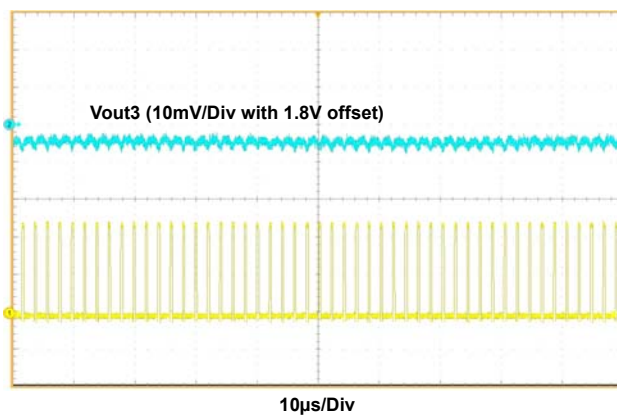


Figure 24. Rail 3 (1.8V) Output Ripple at Full Load

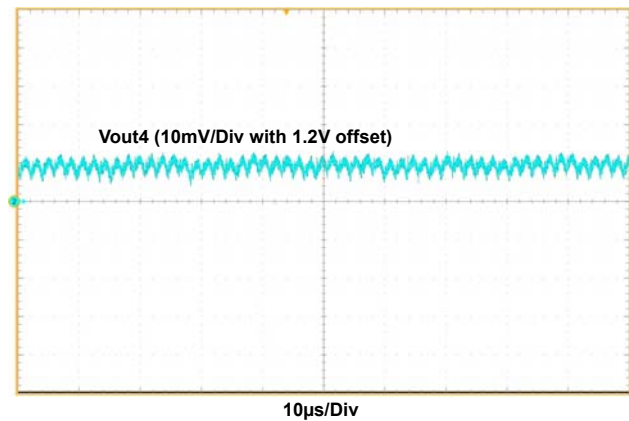


Figure 25. Rail 4 (1.2V) Output Ripple at Full Load

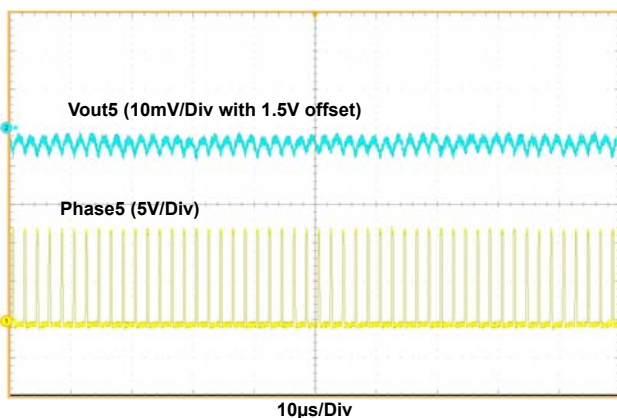


Figure 26. Rail 5 (1.5V) Output Ripple at Full Load

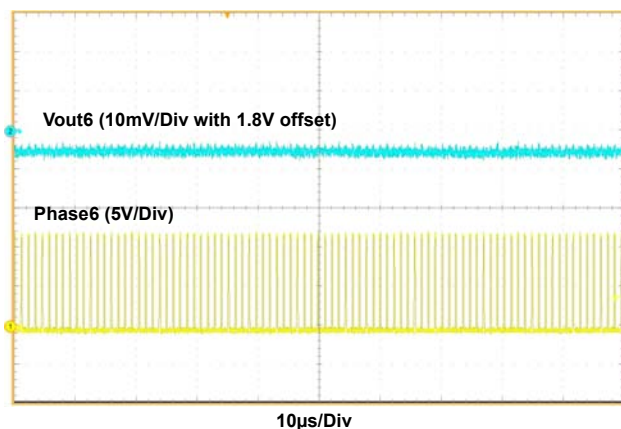


Figure 27. Rail 6 (1.8V) Output Ripple at Full Load

Unless noted: $V_{IN} = 12V$ (Continued)

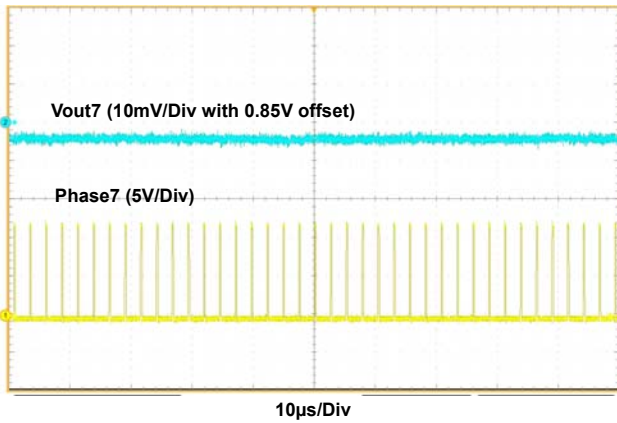


Figure 28. Rail 7(0.85V) Output Ripple at Full Load

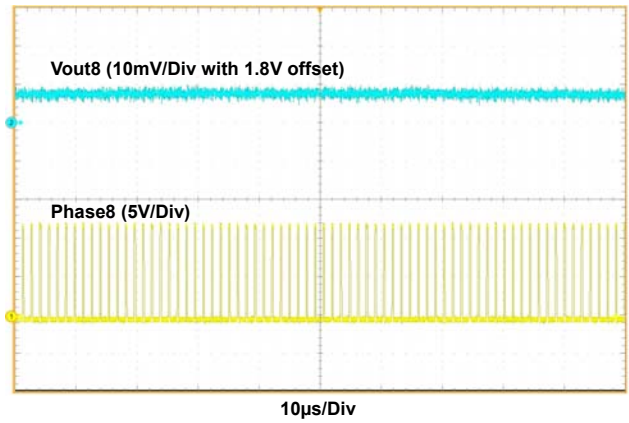


Figure 29. Rail 8(1.8V) Output Ripple at Full Load

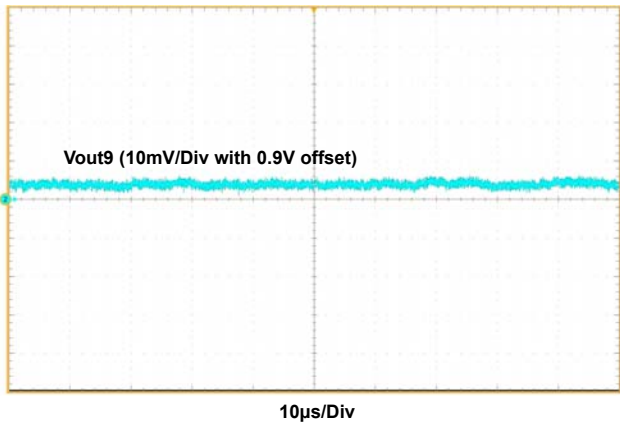


Figure 30. Rail 9(0.85V) Output Ripple at Full Load

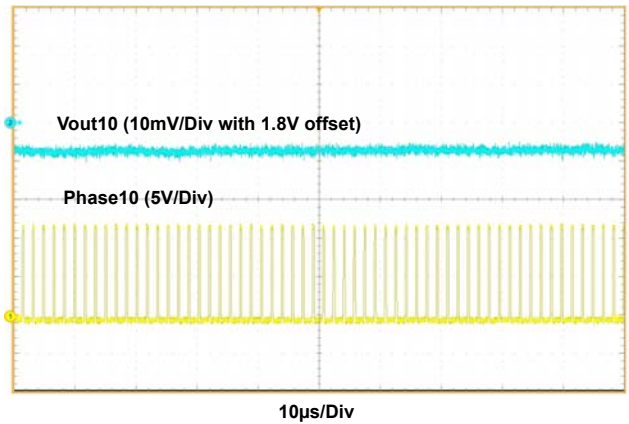


Figure 31. Rail 10(1.8V) Output Ripple at Full Load

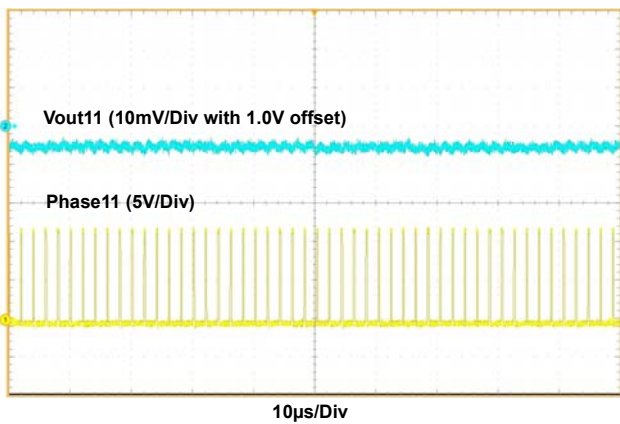


Figure 32. Rail 11 (1.0V) Output Ripple at Full Load

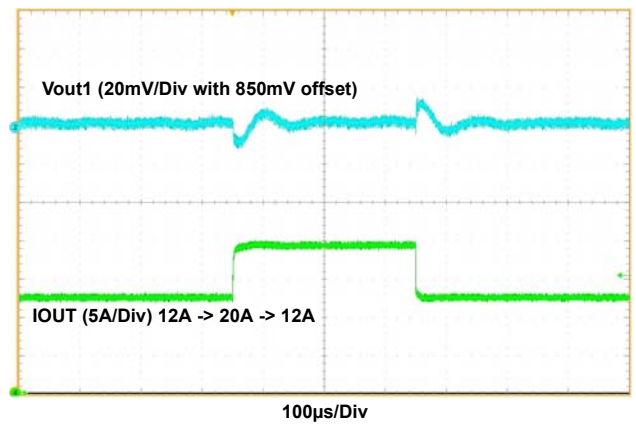


Figure 33. Rail 1 (0.85V) Load Transient

Unless noted: $V_{IN} = 12V$ (Continued)

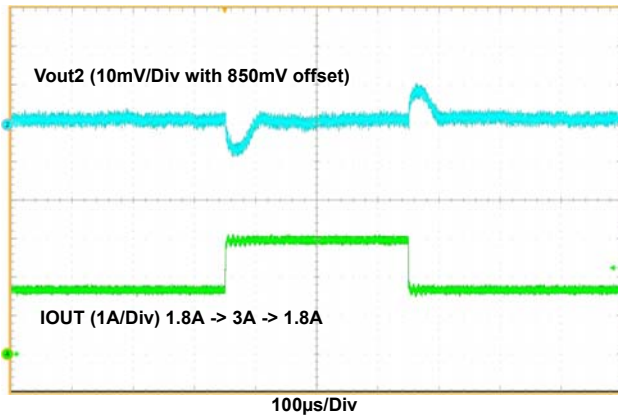


Figure 34. Rail 2 (0.85V) Load Transient

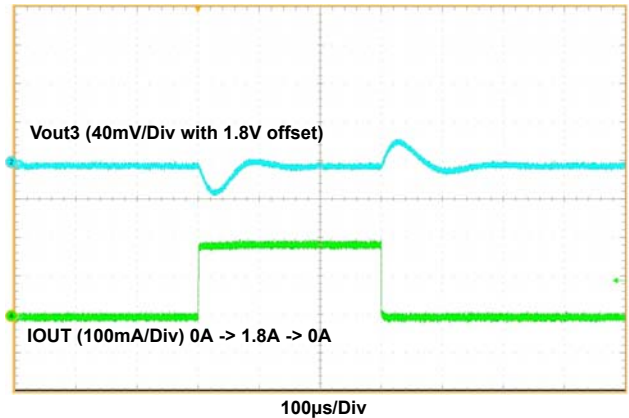


Figure 35. Rail 3 (1.8V) Load Transient

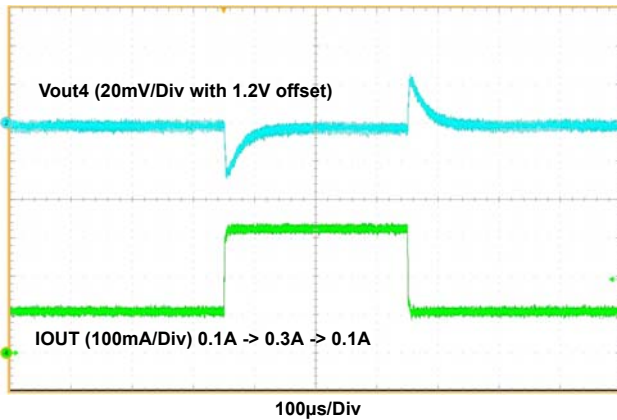


Figure 36. Rail 4 (1.2V) Load Transient

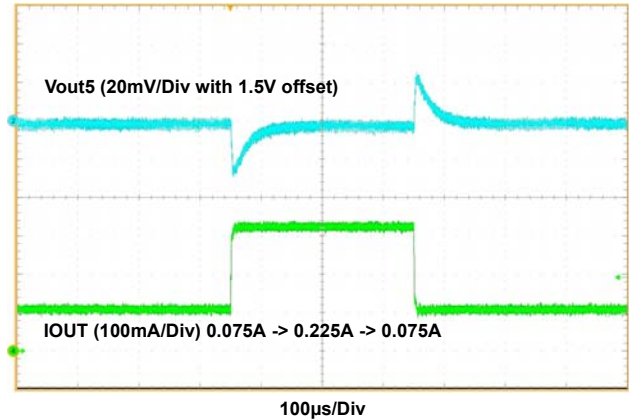


Figure 37. Rail 5 (1.5V) Load Transient

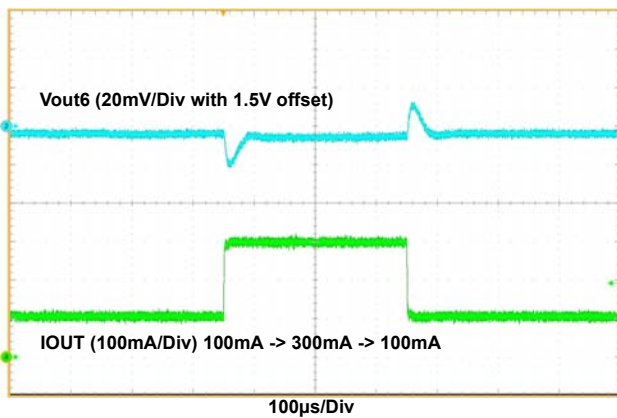


Figure 38. Rail 6 (1.5V) Load Transient

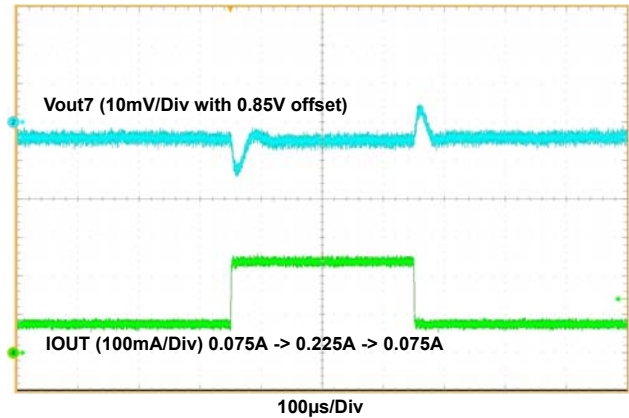


Figure 39. Rail 7 (0.85V) Load Transient

Unless noted: $V_{IN} = 12V$ (Continued)

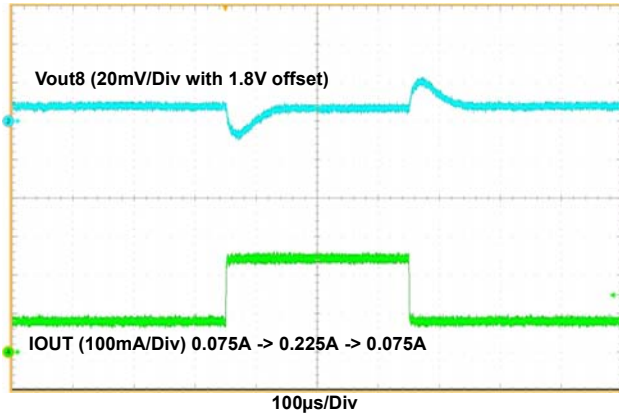


Figure 40. Rail 8 (1.8V) Load Transient

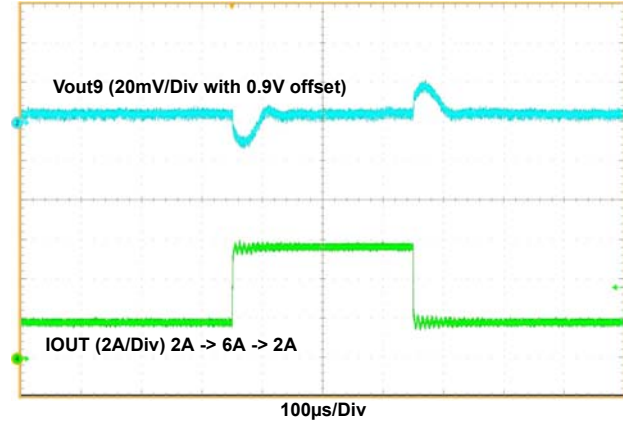


Figure 41. Rail 9 (0.9V) Load Transient

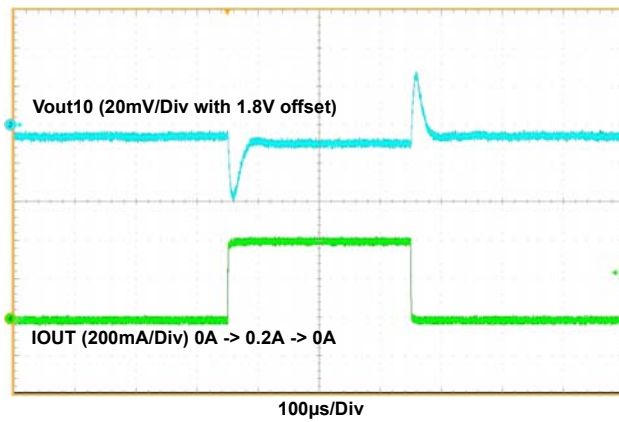


Figure 42. Rail 10 (1.8V) Load Transient

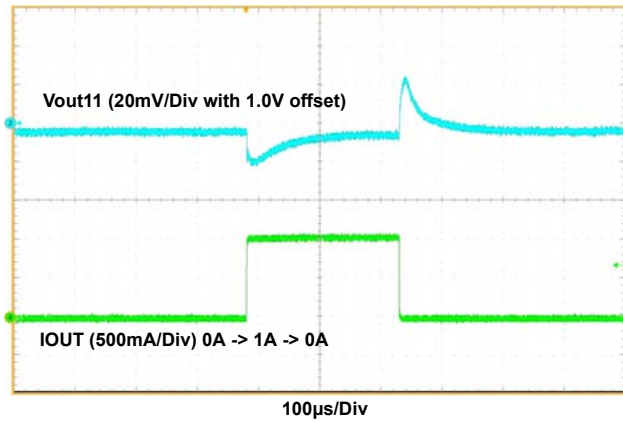


Figure 43. Rail 11 (1.0V) Load Transient

5. Revision History

Rev.	Date	Description
0.00	Feb 1, 2018	Initial release

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(Rev.4.0-1 November 2017)



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