

ISLUSPLUS-UC1DEMO1Z

User's Manual: Demonstration Board

Industrial Analog and Power

ISLUSPLUS-UC1DEMO1Z

Demonstration Board

UG153
Rev.0.00
Jan 25, 2018

1. Overview

The ISLUSPLUS-UC1DEMO1Z design provides a power supply reference solution for the Xilinx Zynq UltraScale+™ MPSoC. The power supply rail consolidation in the design is based on the Use Case 1 configuration (always on, optimized for cost). In this configuration a significant amount of power rail consolidation is possible.

The ISLUSPLUS-UC1DEMO1Z reference design is suitable for the Zynq UltraScale+ ZU2CG, ZU2EG(A), ZU3CG, and ZU3EG devices. [Figure 1](#) shows the power supply rails for the Zynq US+ MPSoC in the Use Case 1 configuration.

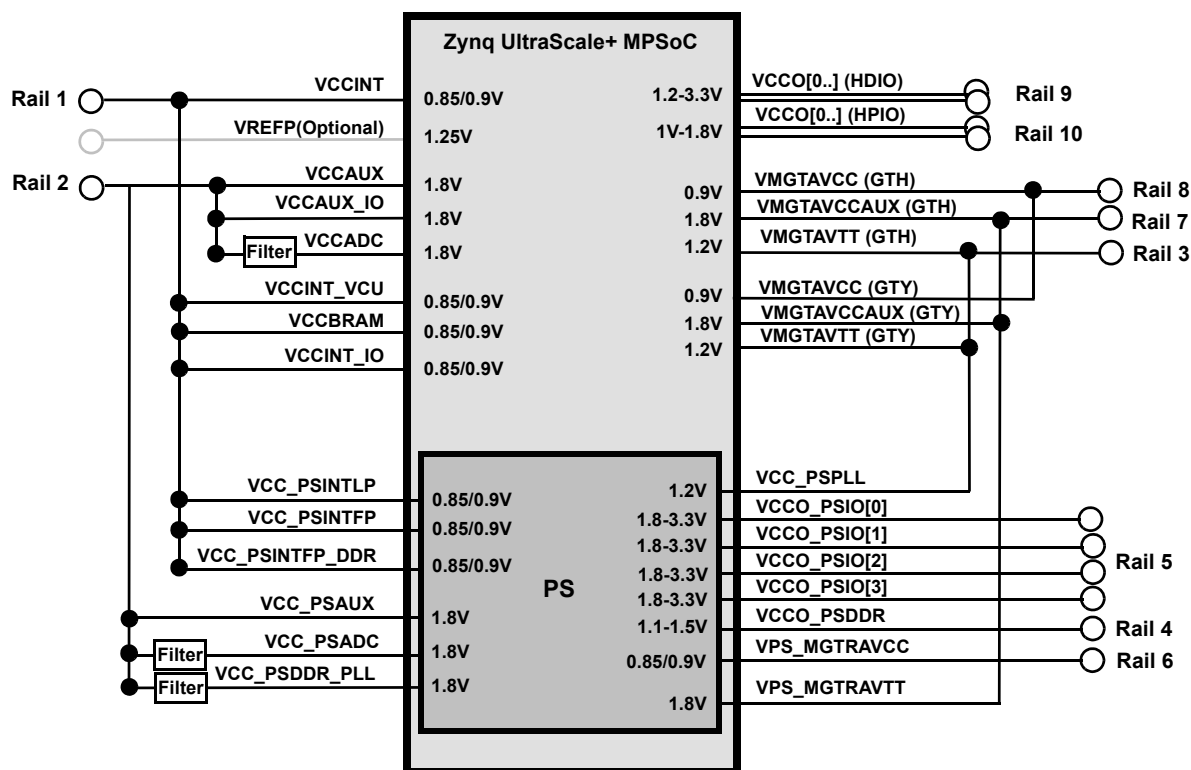


Figure 1. Power Rail Consolidation for the Xilinx Zynq US+ MPSoC, Use Case 1

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-UC1DEMO1Z is designed for 8-13.2V 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, VCCINT_VCU, VCCBRAM, VCCINT_IO, VCC_PSINTLP, VCC_PSINTFP, VCC_PSINTFP_DDR	0.85V	7.75A	ZL9010M
Rail 2	VCCAUX, VCCAUX_IO, VCCADC, VCC_PSAUX, VCC_PSDDR_PLL, VCC_PSADC	1.8V	1.04A	ISL85003
Rail 3	VMGTAVTT(GTH), VMGTAVTT(GTY), VCC_PSPLL	1.2V	0.1A	ISL9021A
Rail 4	VCCO_PSDDR, DDR_VDD2, DDR_VDDQ	1.2V	0.5A	ISL85415
Rail 5	VCCO_PSIO	3.3V	0.4A	ISL85415
Rail 6	VPS_MGTRAVCC	0.85V	0.3A	ISL85415
Rail 7	VMGTVCCAUX(GTH), VMGTVCCAUX(GTY), VPS_MGTRAVTT	1.8V	0.1A	ISL85412
Rail 9	HDIO VCCO	3.3V	0.5A	ISL85415
Rail 10	HPIO VCCO	1.8V	0.5A	ISL85415

1.3 Ordering Information

Part Number	Description
ISLUSPLUS-UC1DEMO1Z	Xilinx Zynq UltraScale+ Use Case 1 demonstration board

1.4 Related Literature

- For a full list of related documents, visit our website

- [ZL9010M](#) product page
- [ISL85003](#) product page
- [ISL85412](#) product page
- [ISL85415](#) product page
- [ISL9021A](#) product page
- [ISL8702A](#) product page

2. Functional Description

The ISLUSPLUS-UC1DEMO1Z provides a reference design for the Xilinx Zynq UltraScale+ MPSoC in the Use Case 1 configuration. Most of the output rails in this reference design are directly converted from the 8-13.2V input voltage. The block diagram for the demonstration board is shown in [Figure 2](#).

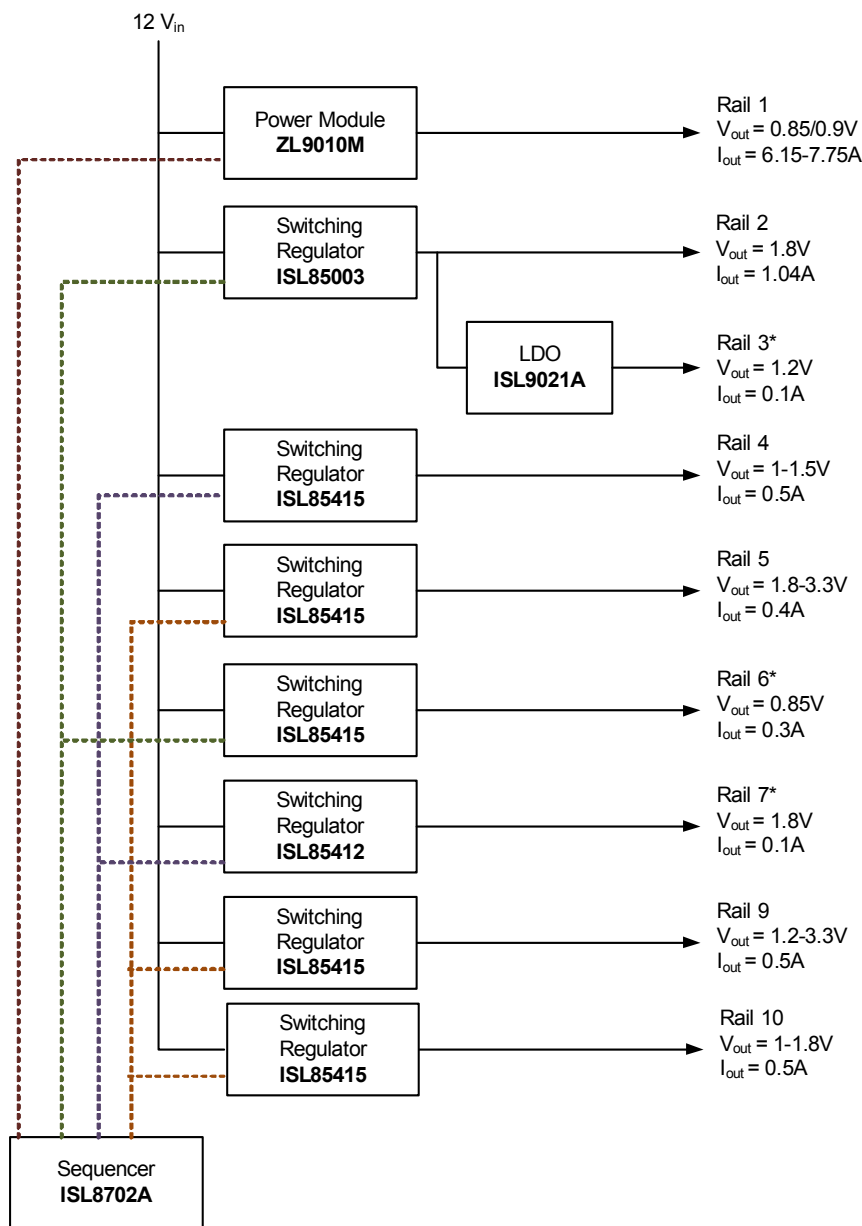


Figure 2. ISLUSPLUS-UC1DEMO1Z Block Diagram

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

Table 2. Demonstration Board Connectors

Connector	Description
J1	Terminal block for input voltage
J2	Terminal block for output rail 1
J3	Terminal block for output rail 2
J5	Jumper for enable input signal
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 10
J10	Terminal block for output rail 7
J11	Terminal block for output rail 3
J12	Terminal block for output rail 9
XS1	2x5 connector for PMBus signals

2.1 Operating Range

The input voltage range for the demonstration board is 8-13.2V. 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 can be adjusted to different levels, namely Rail 1, Rail 4, Rail 5, Rail 9, and Rail 10.

To change the output voltage of Rail 1 to 0.9V, change the resistor R5 to 17.8kΩ. The output voltage for this rail can also be changed through PMBus. Refer to the [ISL9010M](#) datasheet for more details.

To change the output voltage of Rail 4, change the resistor R26 by using [\(EQ. 1\)](#).

$$(EQ. 1) \quad R_{26} = R_{23} / (V_{OUT4} / 0.6 - 1)$$

To change the output voltage of Rail 5, change the resistor R37 by using [\(EQ. 2\)](#).

$$(EQ. 2) \quad R_{37} = R_{43} / (V_{OUT5} / 0.6 - 1)$$

To change the output voltage of Rail 9, change the resistor R67 by using [\(EQ. 3\)](#).

$$(EQ. 3) \quad R_{67} = R_{74} / (V_{OUT9} / 0.6 - 1)$$

To change the output voltage of Rail 10, change the resistor R68 by using [\(EQ. 4\)](#).

$$(EQ. 4) \quad R_{68} = R_{72} / (V_{OUT10} / 0.6 - 1)$$

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 J1.
- (3) Connect the respective output load to the terminal blocks J2 to J10.
- (4) Turn on the power supply.
- (5) Verify the output voltages are correct for all output voltage rails.

3. ISLUSPLUS-UC1DEMO1Z Board

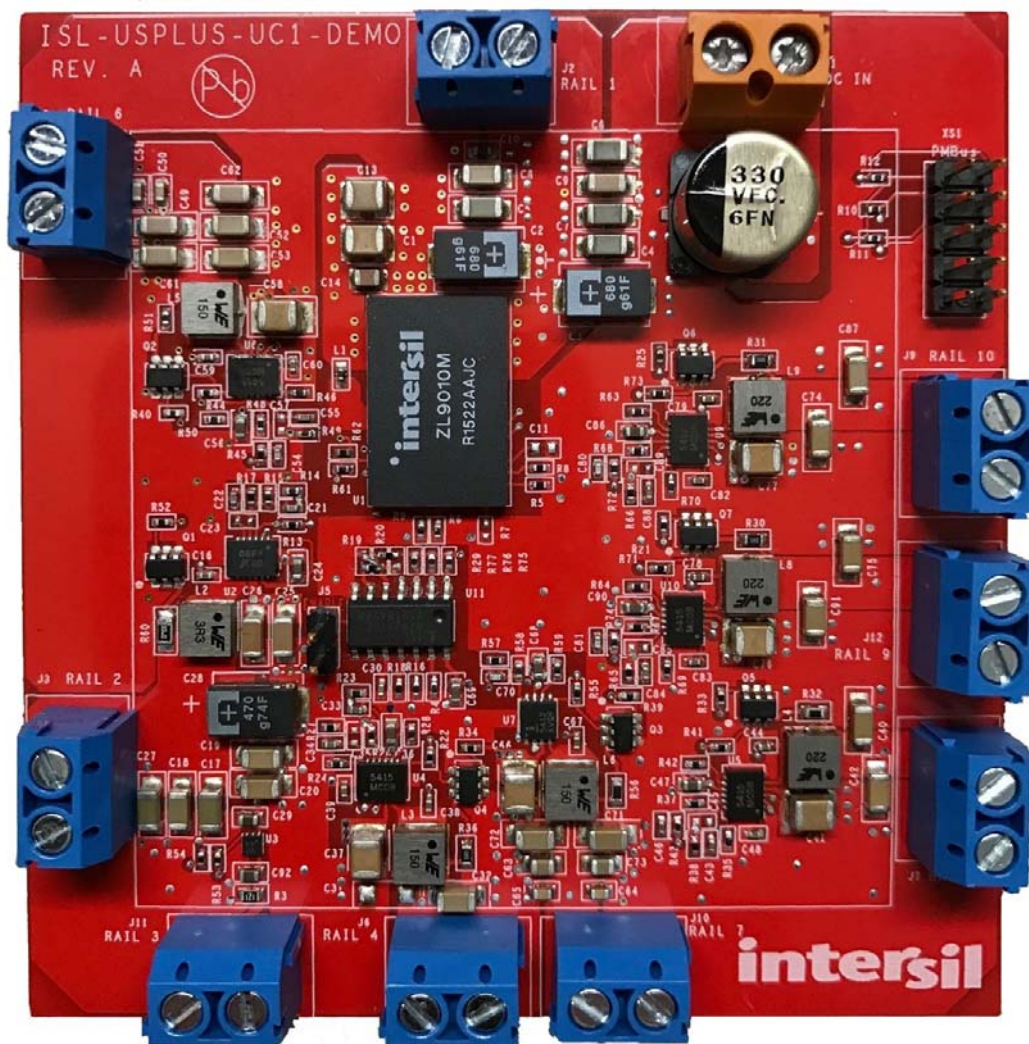


Figure 3. ISLUSPLUS-UC1DEMO1Z Demonstration Board (Top)

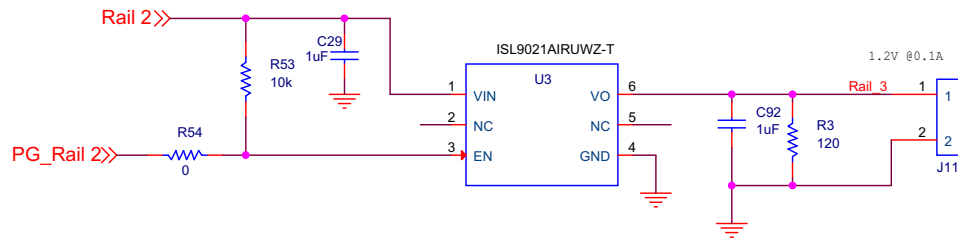


Figure 6. Schematic 3

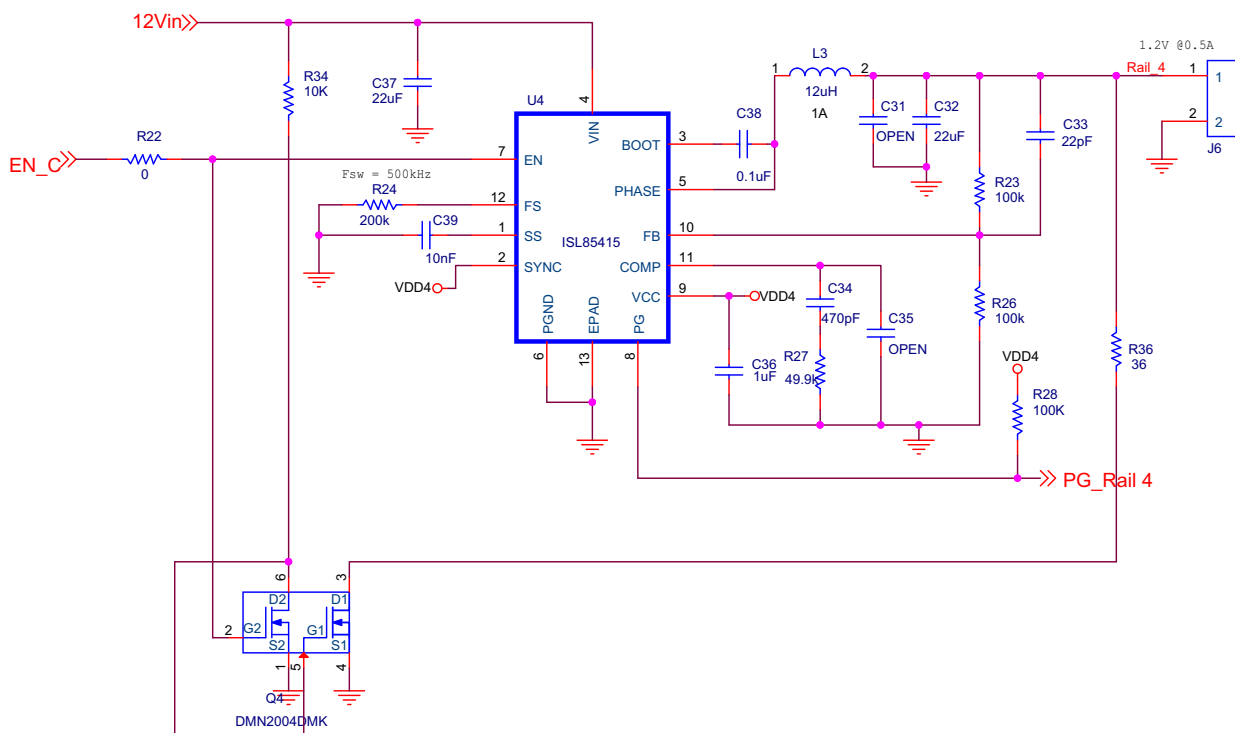


Figure 7. Schematic 4

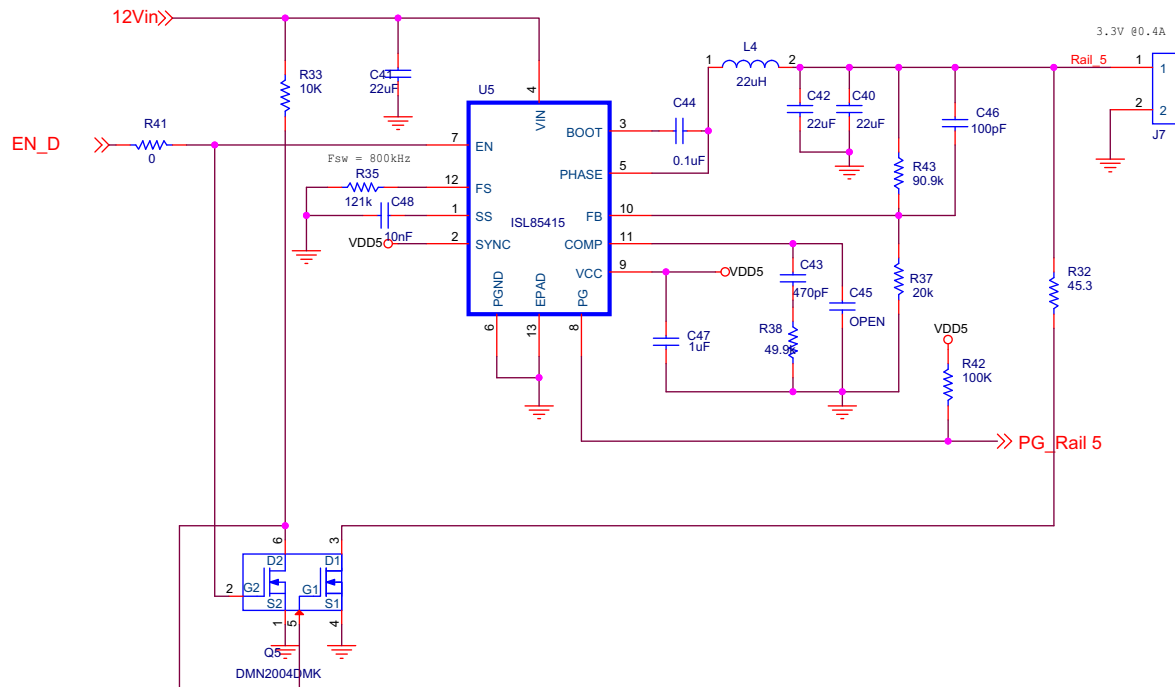


Figure 8. Schematic 5

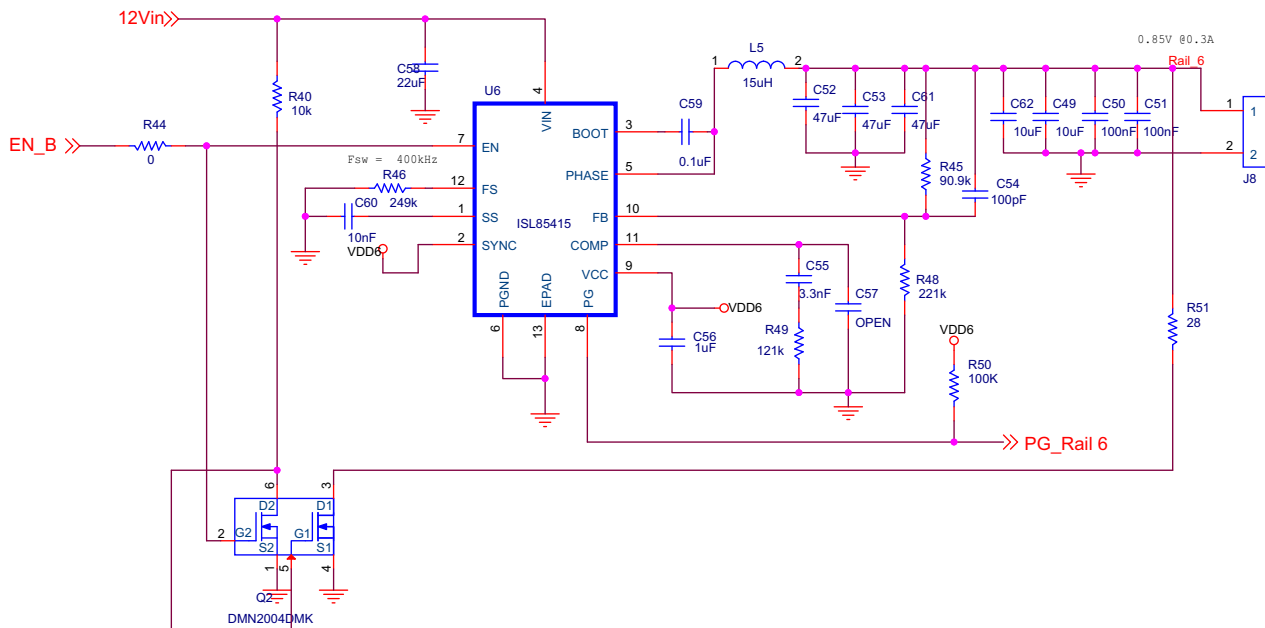


Figure 9. Schematic 6

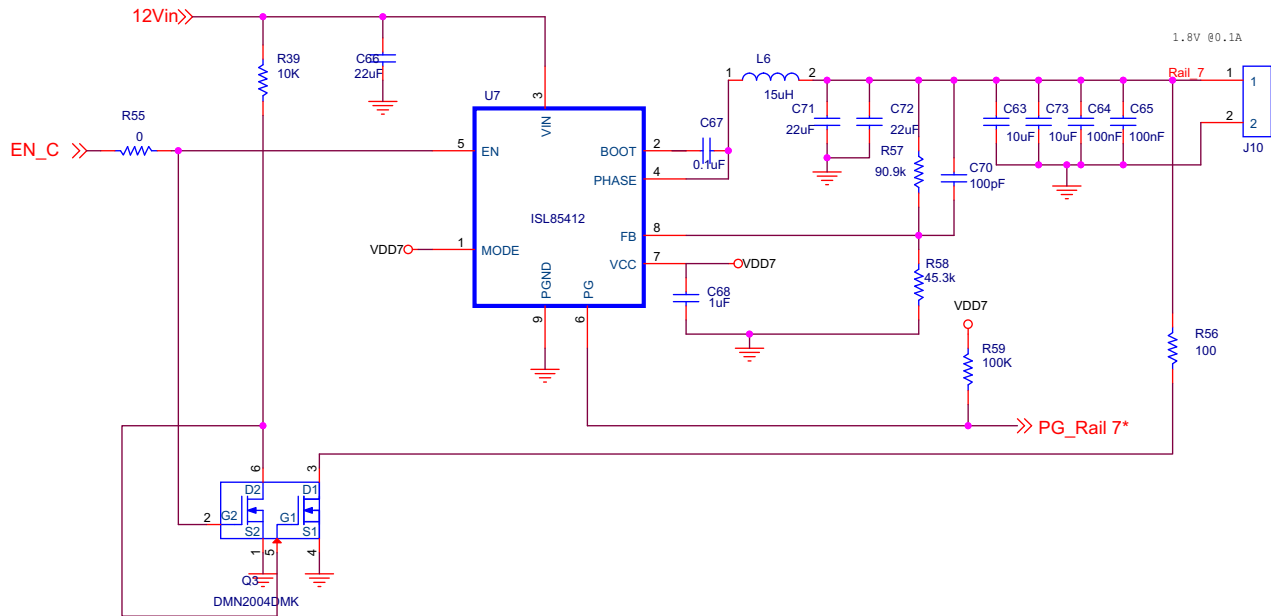


Figure 10. Schematic 7

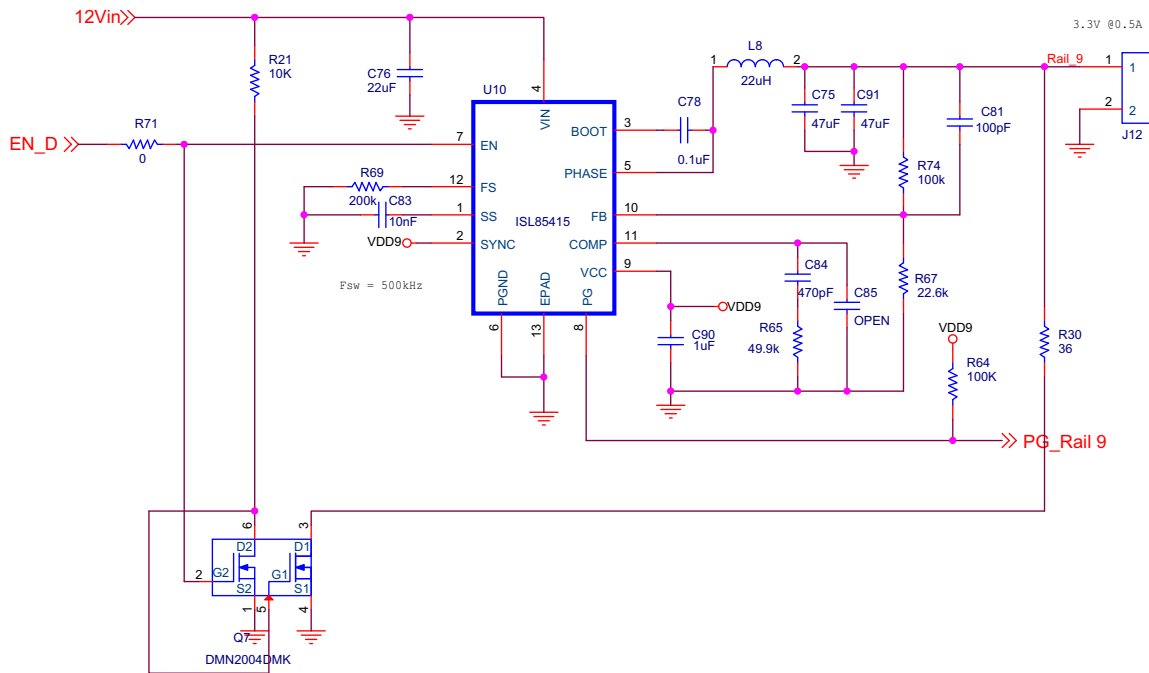
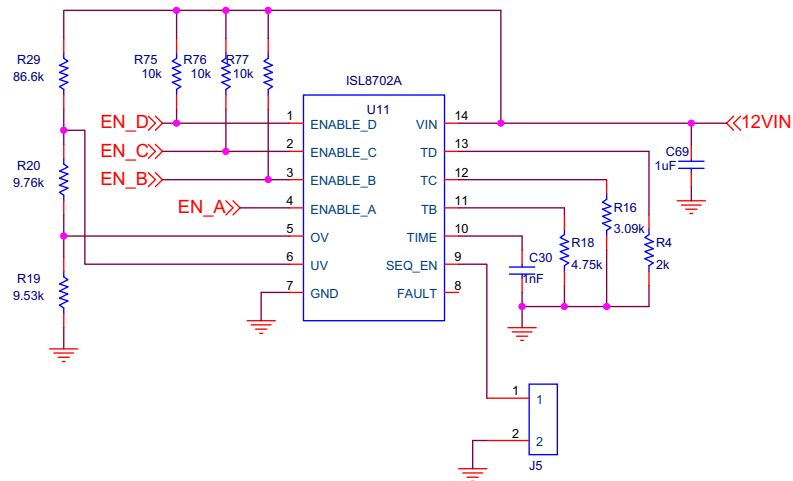
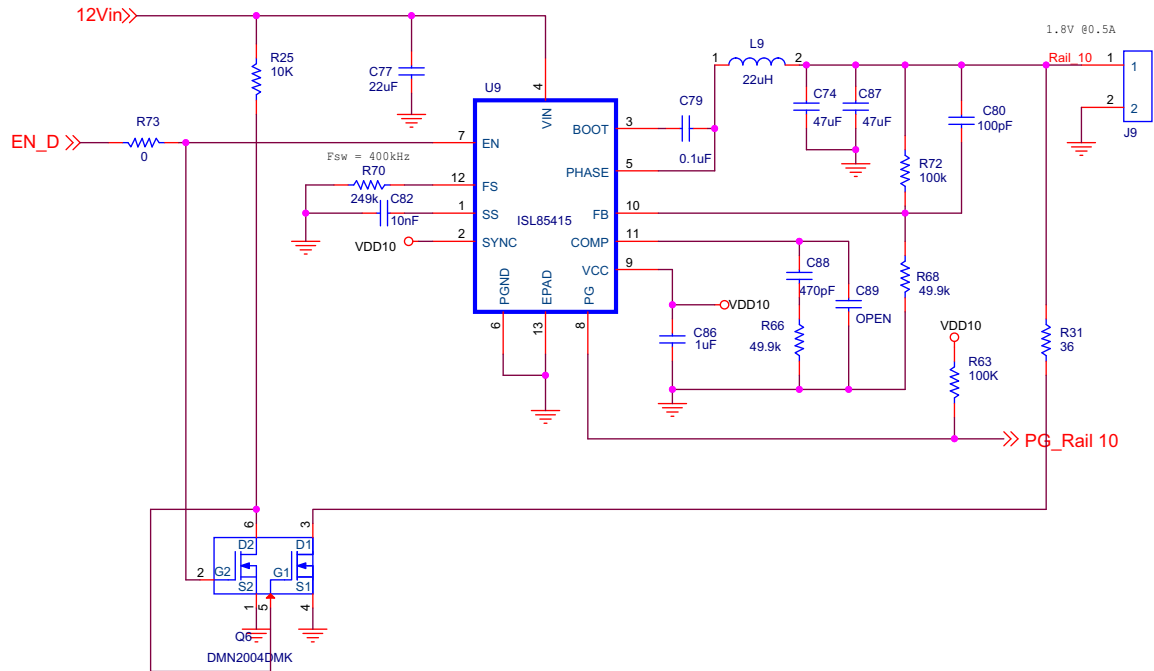


Figure 11. Schematic 8



3.2 Bill of Materials

Qty	Reference Designator	Description	Manufacturer	Manufacturer Part Number
Rail 1				
2	C1, C13	CAP, SMD, 1210, 22 μ F, 25V, 10%, X5R, ROHS		
2	C2, C3	CAP-POSCAP, SMD, 7.3X4.3, 680 μ F, 4V, 20%, 10m Ω , ROHS	PANASONIC	4TPF680MAH
4	C4, C5, C6, C7	CAP, SMD, 1206, 100 μ F, 6.3V, 20%, X5R, ROHS	MURATA	GRM31CR60J107ME39L
1	C8	CAP, SMD, 1206, 22 μ F, 6.3V, 10%, X5R, ROHS	MURATA	GRM31CR60J226KE19L
1	C9	CAP, SMD, 1206, 10 μ F, 6.3V, 10%, X5R, ROHS	PANASONIC	ECJ-3YB0J106K
2	C10, C12	CAP, SMD, 0603, 1.0 μ F, 25V, 10%, X7R, ROHS	TAIYO YUDEN	TMK107B7105KA-T
1	C14	CAP-AEC-Q200, SMD, 0805, 4.7 μ F, 25V, 10%, X7R, ROHS	TDK	CGA4J1X7R1E475K125AC
1	L1	FERRITE CHIP, SMD, 0402, 1000 Ω , 200mA, ROHS	MURATA	BLM15BD102SN1D
3	R1, R2, R62	RES, SMD, 0402, 10K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1002X
1	R5	RES, SMD, 0402, 16.2K, 1/16W, 1%, TF, ROHS	YAGEO	RC0402FR-0716K2L
1	R6	RES, SMD, 0402, 0 Ω , 1/16W, 5%, TF, ROHS	VENKEL	CR0402-16W-00T
2	R8, R9	RES, SMD, 0402, 19.6K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1962
1	R61	RES, SMD, 0402, 0 Ω , 1/16W, 5%, TF, ROHS	VENKEL	CR0402-16W-00T
1	U1	IC-10A DIGITAL DC/DC PWR MODULE, 32P, HDA, ROHS	INTERSIL	ZL9010MAIRZ
0	R7, C11	Do Not Populate		
Rail 2				
1	C16	CAP, SMD, 0402, 0.1 μ F, 16V, 10%, X7R, ROHS	VENKEL	C0402X7R160-104KNE
2	C17, C27	CAP, SMD, 1206, 100 μ F, 6.3V, 20%, X5R, ROHS	MURATA	GRM31CR60J107ME39L
3	C18, C19, C20	CAP, SMD, 1206, 22 μ F, 6.3V, 10%, X5R, ROHS	MURATA	GRM31CR60J226KE19L
1	C21	CAP, SMD, 0402, 56pF, 50V, 5%, NP0, ROHS	MURATA	GRP1555C1H560JD01E
1	C22	CAP, SMD, 0402, 27pF, 50V, 5%, NP0, ROHS	MURATA	GRM36COG270J050AQ
1	C24	CAP, SMD, 0603, 1.0 μ F, 25V, 10%, X7R, ROHS	TAIYO YUDEN	TMK107B7105KA-T
2	C25, C26	CAP, SMD, 1206, 10 μ F, 25V, 10%, X7R, ROHS	VENKEL	C1206X7R250-106KNE
1	C28	CAP-POSCAP, SMD, 7.3X4.3, 470 μ F, 4V, 20%, 10m Ω , ROHS	PANASONIC	4TPF470ML
1	L2	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 3.3uH, 20%, 3.6A, ROHS	WURTH ELEKTRONIK	74438356033
1	Q1	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	DIODES INC.	DMN2004DMK-7
1	R13	RES, SMD, 0402, 0 Ω , 1/16W, 5%, TF, ROHS	VENKEL	CR0402-16W-00T
1	R14	RES, SMD, 0402, 124K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1243X
1	R15	RES, SMD, 0402, 100K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ2RKF1003
1	R17	RES, SMD, 0402, 470K, 1/16W, 1%, TF, ROHS	ROHM	MCR01MZPF4703
1	R52	RES, SMD, 0402, 10K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1002X
1	R60	RES, SMD, 0805, 10 Ω , 1/8W, 1%, TF, ROHS	YAGEO	RC0805FR-0710RL
1	U2	IC-3A BUCK REGULATOR, 12P, DFN, 4X3, ROHS	INTERSIL	ISL85003FRZ
0	C23	Do Not Populate		

Qty	Reference Designator	Description	Manufacturer	Manufacturer Part Number
Rail 3				
2	C29, C92	CAP, SMD, 0603, 1.0µF, 25V, 10%, X7R, ROHS	TAIYO YUDEN	TMK107B7105KA-T
1	R3	RES, SMD, 0603, 120Ω, 1/10W, 1%, TF, ROHS	YAGEO	RC0603FR-07120RL
1	R53	RES, SMD, 0402, 10K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1002X
1	R54	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	VENKEL	CR0402-16W-00T
1	U3	IC-1.2V SINGLE LDO, 6P, uTDFN, 1.6x1.6, ROHS	INTERSIL	ISL9021AIRUWZ
Rail 4				
1	C32	CAP, SMD, 1206, 22µF, 6.3V, 10%, X5R, ROHS	MURATA	GRM31CR60J226KE19L
1	C33	CAP, SMD, 0402, 22pF, 50V, 5%, NP0, ROHS	MURATA	GRM36COG220J050AQ
1	C34	CAP, SMD, 0402, 470pF, 50V, 10%, X7R, ROHS	PANASONIC	ECJ-0EB1H471K
1	C36	CAP, SMD, 0603, 1.0µF, 25V, 10%, X7R, ROHS	TAIYO YUDEN	TMK107B7105KA-T
1	C37	CAP, SMD, 1210, 22µF, 25V, 10%, X5R, ROHS		
1	C38	CAP, SMD, 0402, 0.1µF, 16V, 10%, X7R, ROHS	VENKEL	C0402X7R160-104KNE
1	C39	CAP, SMD, 0402, 0.01µF, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C103K
1	L3	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 15uH, 20%, 1.9A, ROHS	WURTH ELEKTRONIK	74438356150
1	Q4	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
3	R23, R26, R28	RES, SMD, 0402, 100K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ2RKF1003
1	R24	RES, SMD, 0402, 200K, 1/16W, 1%, TF, ROHS	ROHM	MCR01MZPF2003
1	R27	RES, SMD, 0402, 49.9K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF4992
1	R34	RES, SMD, 0402, 10K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1002X
1	R36	RES, SMD, 0603, 36Ω, 1/10W, 1%, TF, ROHS	VENKEL	CR0603-10W-36R0FT
1	U4	IC-500mA BUCK REGULATOR, 12P, DFN, 3X4, ROHS	INTERSIL	ISL85415FRZ
0	C31, C35	Do Not Populate		
Rail 5				
2	C40, C42	CAP, SMD, 1206, 22µF, 6.3V, 10%, X5R, ROHS	MURATA	GRM31CR60J226KE19L
1	C41	CAP, SMD, 1210, 22µF, 25V, 10%, X5R, ROHS		
1	C43	CAP, SMD, 0402, 470pF, 50V, 10%, X7R, ROHS	PANASONIC	ECJ-0EB1H471K
1	C44	CAP, SMD, 0402, 0.1µF, 16V, 10%, X7R, ROHS	VENKEL	C0402X7R160-104KNE
1	C46	CAP, SMD, 0402, 100pF, 50V, 5%, NP0, ROHS	MURATA	GRM36COG101J050AQ
1	C47	CAP, SMD, 0603, 1.0µF, 25V, 10%, X7R, ROHS	TAIYO YUDEN	TMK107B7105KA-T
1	C48	CAP, SMD, 0402, 0.01µF, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C103K
1	L4	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 22uH, 20%, 1.7A, ROHS	WURTH ELEKTRONIK	74438356220
1	Q5	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	DIODES INC.	DMN2004DMK-7
1	R32	RES, SMD, 0603, 45.3Ω, 1/10W, 1%, TF, ROHS	VENKEL	CR0603-10W-45R3FT
1	R33	RES, SMD, 0402, 10K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1002X
1	R35	RES, SMD, 0402, 121K, 1/16W, 1%, TF, ROHS	SAMSUNG	RC1005F1213CS
1	R37	RES, SMD, 0402, 20K, 1/16W, 1%, TF, ROHS	VENKEL	CR0402-16W-2002FT

Qty	Reference Designator	Description	Manufacturer	Manufacturer Part Number
1	R38	RES, SMD, 0402, 49.9K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF4992
1	R41	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	VENKEL	CR0402-16W-00T
1	R42	RES, SMD, 0402, 100K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ2RKF1003
1	R43	RES, SMD, 0402, 90.9K, 1/16W, 1%, TF, ROHS	VISHAY/DALE	CRCW040290K9FKED
1	U5	IC-500mA BUCK REGULATOR, 12P, DFN, 3X4, ROHS	INTERSIL	ISL85415FRZ
0	C45	Do Not Populate		
Rail 6				
2	C49, C62	CAP, SMD, 1206, 10μF, 6.3V, 10%, X5R, ROHS	PANASONIC	ECJ-3YB0J106K
2	C50, C51	CAP, SMD, 0603, 0.1μF, 16V, 10%, X7R, ROHS	MURATA	GRM39X7R104K016AD
3	C52, C53, C61	CAP, SMD, 1206, 47μF, 6.3V, 10%, X5R, ROHS	MURATA	GRM31CR60J476KE19L
1	C54	CAP, SMD, 0402, 100pF, 16V, 10%, NP0, ROHS	AVX	0402YA101KAT2A
1	C55	CAP, SMD, 0402, 3300pF, 50V, 10%, X7R, ROHS	TDK	C1005X7R1H332K050BA
1	C56	CAP, SMD, 0603, 1.0μF, 25V, 10%, X7R, ROHS	TAIYO YUDEN	TMK107B7105KA-T
1	C58	CAP, SMD, 1210, 22μF, 25V, 10%, X5R, ROHS		
1	C59	CAP, SMD, 0402, 0.1μF, 16V, 10%, X7R, ROHS	VENKEL	C0402X7R160-104KNE
1	C60	CAP, SMD, 0402, 0.1μF, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C103K
1	L5	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 15uH, 20%, 1.9A, ROHS	WURTH ELEKTRONIK	74438356150
1	Q2	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	DIODES INC.	DMN2004DMK-7
1	R40	RES, SMD, 0402, 10K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1002X
1	R44	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	VENKEL	CR0402-16W-00T
1	R45	RES, SMD, 0402, 90.9K, 1/16W, 1%, TF, ROHS	VISHAY/DALE	CRCW040290K9FKED
1	R46	RES, SMD, 0402, 249K, 1/16W, 1%, TF, ROHS	ROHM	MCR01MZPF2493
1	R48	RES, SMD, 0402, 221K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF2213X
1	R49	RES, SMD, 0402, 121K, 1/16W, 1%, TF, ROHS	SAMSUNG	RC1005F1213CS
1	R50	RES, SMD, 0402, 100K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ2RKF1003
1	R51	RES, SMD, 0402, 28Ω, 1/16W, 1%, TF, ROHS	VENKEL	CR0402-16W-28R0FT
1	U6	IC-500mA BUCK REGULATOR, 12P, DFN, 3X4, ROHS	INTERSIL	ISL85415FRZ
0	C57	Do Not Populate		
Rail 7				
2	C63, C73	CAP, SMD, 0805, 10μF, 10V, 10%, X5R, ROHS	MURATA	GRM21BR61A106KE19L
2	C64, C65	CAP, SMD, 0603, 0.1μF, 16V, 10%, X7R, ROHS	MURATA	GRM39X7R104K016AD
3	C66, C71, C72	CAP, SMD, 1210, 22μF, 25V, 10%, X5R, ROHS		
1	C67	CAP, SMD, 0402, 0.1μF, 16V, 10%, X7R, ROHS	VENKEL	C0402X7R160-104KNE
1	C68	CAP, SMD, 0603, 1.0μF, 25V, 10%, X7R, ROHS	TAIYO YUDEN	TMK107B7105KA-T
1	C70	CAP, SMD, 0402, 100pF, 16V, 10%, NP0, ROHS	AVX	0402YA101KAT2A
1	L6	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 15uH, 20%, 1.9A, ROHS	WURTH ELEKTRONIK	74438356150
1	Q3	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	DIODES INC.	DMN2004DMK-7
1	R39	RES, SMD, 0402, 10K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1002X

Qty	Reference Designator	Description	Manufacturer	Manufacturer Part Number
1	R55	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	VENKEL	CR0402-16W-00T
1	R56	RES, SMD, 0603, 100Ω, 1/10W, 1%, TF, ROHS	YAGEO	RC0603FR-07100RL
1	R57	RES, SMD, 0402, 90.9K, 1/16W, 1%, TF, ROHS	VISHAY/DALE	CRCW040290K9FKED
1	R58	RES, SMD, 0402, 45.3K, 1/16W, 1%, TF, ROHS	VENKEL	CR0402-16W-4532FT
1	R59	RES, SMD, 0402, 100K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ2RKF1003
0	U7	IC-150mA BUCK REGULATOR, 8LD, TDFN, 3X3, ROHS	INTERSIL	ISL85412FRTZ
Rail 9				
2	C75, C91	CAP, SMD, 1206, 47μF, 6.3V, 10%, X5R, ROHS	MURATA	GRM31CR60J476KE19L
1	C76	CAP, SMD, 1210, 22μF, 25V, 10%, X5R, ROHS		
1	C78	CAP, SMD, 0402, 0.1μF, 16V, 10%, X7R, ROHS	VENKEL	C0402X7R160-104KNE
1	C81	CAP, SMD, 0402, 100pF, 16V, 10%, NP0, ROHS	AVX	0402YA101KAT2A
1	C83	CAP, SMD, 0402, .01μF, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C103K
1	C84	CAP, SMD, 0402, 470pF, 50V, 10%, X7R, ROHS	PANASONIC	ECJ-0EB1H471K
1	C90	CAP, SMD, 0603, 1.0μF, 25V, 10%, X7R, ROHS	TAIYO YUDEN	TMK107B7105KA-T
1	L8	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 22uH, 20%, 1.7A, ROHS	WURTH ELEKTRONIK	74438356220
1	Q7	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	DIODES INC.	DMN2004DMK-7
1	R21	RES, SMD, 0402, 10K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1002X
1	R30	RES, SMD, 0603, 36Ω, 1/10W, 1%, TF, ROHS	VENKEL	CR0603-10W-36R0FT
2	R64, R74	RES, SMD, 0402, 100K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ2RKF1003
1	R65	RES, SMD, 0402, 49.9K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF4992
1	R67	RES, SMD, 0402, 22.6K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ2RKF2262
1	R69	CAP, SMD, 0603, 1.0μF, 25V, 10%, X7R, ROHS	TAIYO YUDEN	TMK107B7105KA-T
1	R71	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	VENKEL	CR0402-16W-00T
1	U10	IC-500mA BUCK REGULATOR, 12P, DFN, 3X4, ROHS	INTERSIL	ISL85415FRZ
0	C85	Do Not Populate		
Rail 10				
2	C74, C87	CAP, SMD, 1206, 47μF, 6.3V, 10%, X5R, ROHS	MURATA	GRM31CR60J476KE19L
1	C77	CAP, SMD, 1210, 22μF, 25V, 10%, X5R, ROHS		
1	C79	CAP, SMD, 0402, 0.1μF, 16V, 10%, X7R, ROHS	VENKEL	C0402X7R160-104KNE
1	C80	CAP, SMD, 0402, 100pF, 16V, 10%, NP0, ROHS	AVX	0402YA101KAT2A
1	C82	CAP, SMD, 0402, .01μF, 16V, 10%, X7R, ROHS	TDK	C1005X7R1C103K
1	C86	CAP, SMD, 0603, 1.0μF, 25V, 10%, X7R, ROHS	TAIYO YUDEN	TMK107B7105KA-T
1	C88	CAP, SMD, 0402, 470pF, 50V, 10%, X7R, ROHS	PANASONIC	ECJ-0EB1H471K
1	L9	COIL-PWR INDUCTOR, SMD, 4.10mmSQ, 22uH, 20%, 1.7A, ROHS	WURTH ELEKTRONIK	74438356220
1	Q6	TRANSISTOR-MOS, DUAL N-CHANNEL, SMD, 6P, SOT26-6, 20V, 540mA, ROHS	DIODES INC.	DMN2004DMK-7
1	R25	RES, SMD, 0402, 10K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1002X
1	R31	RES, SMD, 0603, 36Ω, 1/10W, 1%, TF, ROHS	VENKEL	CR0603-10W-36R0FT
2	R63, R72	RES, SMD, 0402, 100K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ2RKF1003

Qty	Reference Designator	Description	Manufacturer	Manufacturer Part Number
2	R66, R68	RES, SMD, 0402, 49.9K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF4992
1	R70	RES, SMD, 0402, 249K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF2493X
1	R73	RES, SMD, 0402, 0Ω, 1/16W, 5%, TF, ROHS	VENKEL	CR0402-16W-00T
1	U9	IC-500mA BUCK REGULATOR, 12P, DFN, 3X4, ROHS	INTERSIL	ISL85415FRZ
0	C89	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, 2K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF2001
1	R16	RES, SMD, 0402, 3.09K, 1/16W, 1%, TF, ROHS	YAGEO	RC0402FR-073K09L
1	R18	RES, SMD, 0402, 4.75K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF4751X
1	R19	RES, SMD, 0402, 9.53K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF9531
1	R20	RES, SMD, 0402, 9.76K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF9761
1	R29	RES, SMD, 0402, 86.6K, 1/16W, 1%, TF, ROHS	YAGEO	RC0402FR-0786K6L
3	R75, R76, R77	RES, SMD, 0402, 10K, 1/16W, 1%, TF, ROHS	PANASONIC	ERJ-2RKF1002X
1	U11	IC-ADJUSTABLE QUAD SEQUENCER, 14P, NSOIC, ROHS	INTERSIL	ISL8702AIBZ
Misc				
1	C15	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		ERJ-2RKF1002X
1	J1	CONN-TERM BLOCK, TH, 2P, 5.08mmPITCH, 14-26AWG, M2.5 SCREW, ROHS	WEIDMULLER	1760490000
9	J2, J3, J6, J7, J8, J9, J10, J11, J12	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	J5	CONN-HEADER, 1x2, BRKAWY 1X36, 2.54mm, ROHS	BERG/FCI	68000-236HLF

3.3 Board Layout

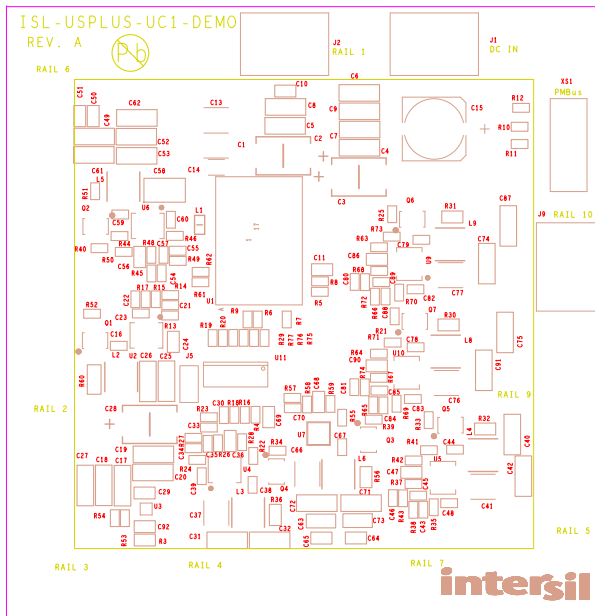


Figure 14. Silkscreen Top

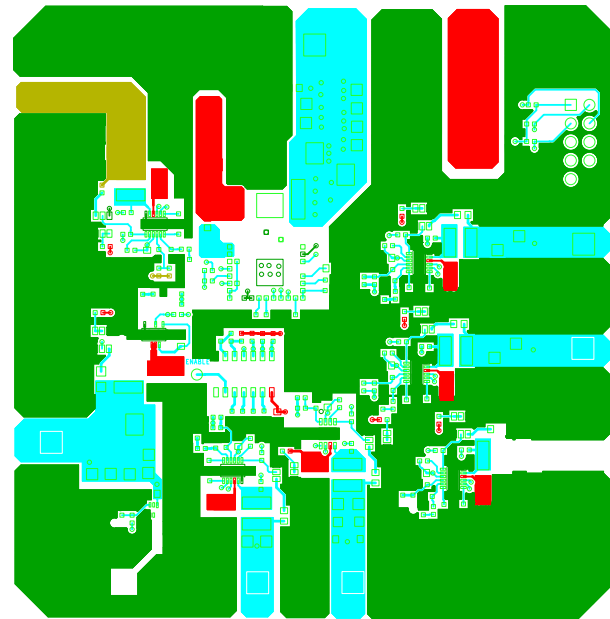


Figure 15. Top Layer

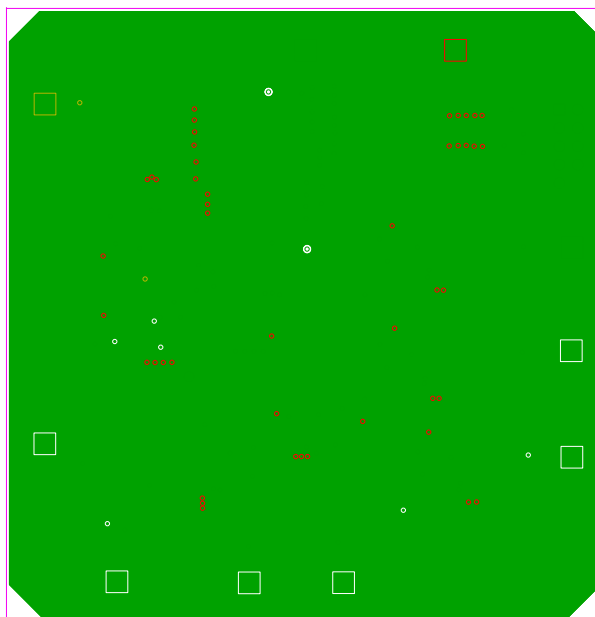


Figure 16. Layer 2

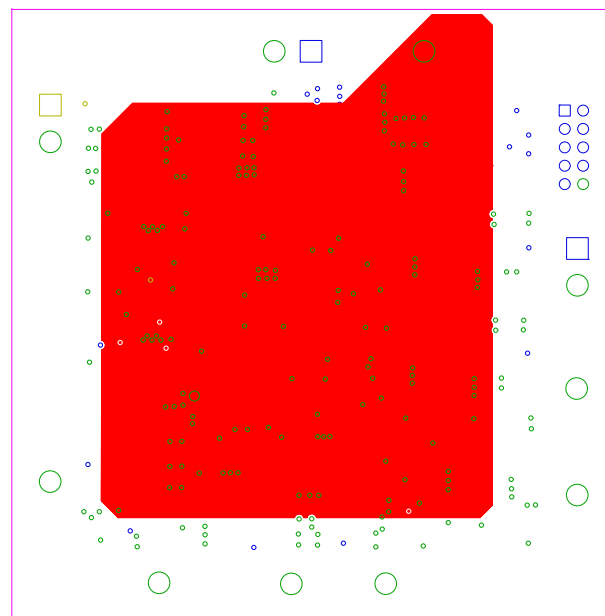


Figure 17. Layer 3

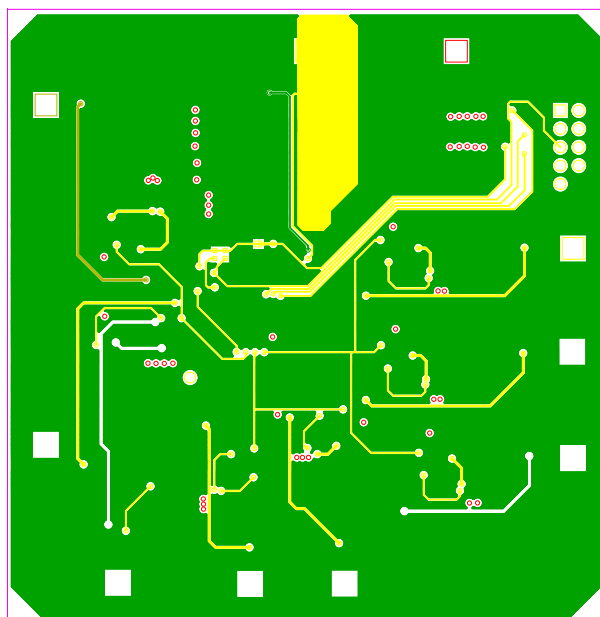


Figure 18. Bottom Layer

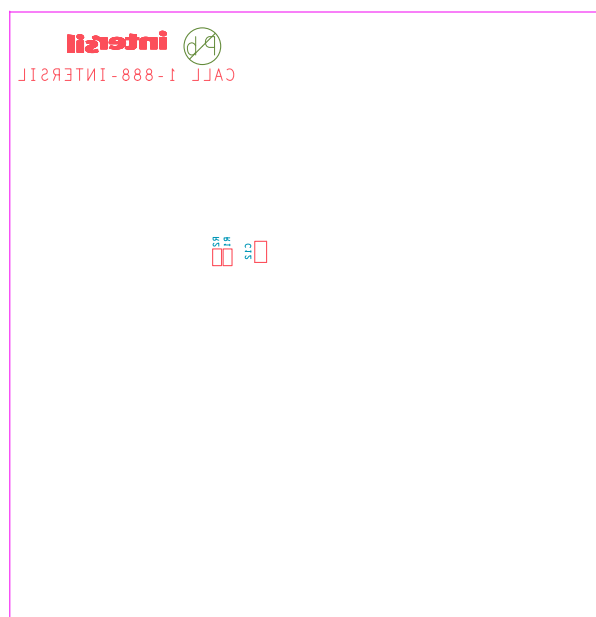


Figure 19. Silkscreen Bottom

4. Typical Performance Curves

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

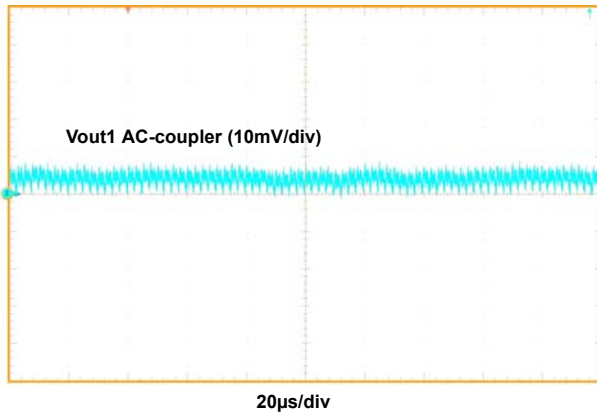


Figure 20. Rail 1 (0.85V) Output Ripple at Full Load

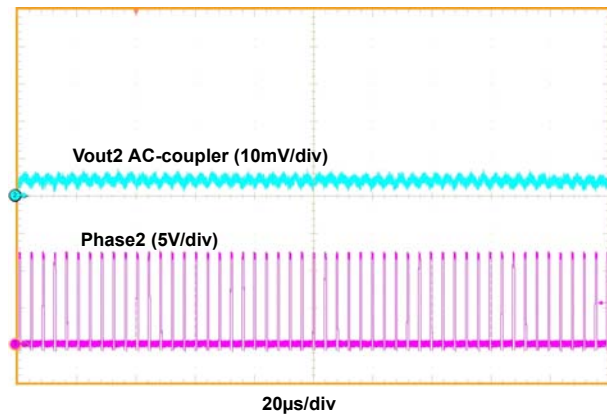


Figure 21. Rail 2 (1.8V) Output Ripple at Full Load

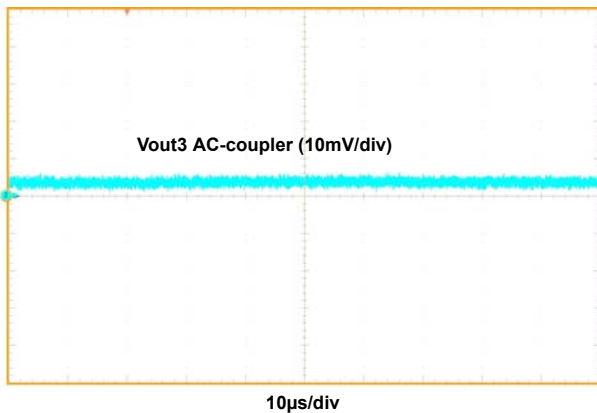


Figure 22. Rail 3 (1.2V) Output Ripple at Full Load

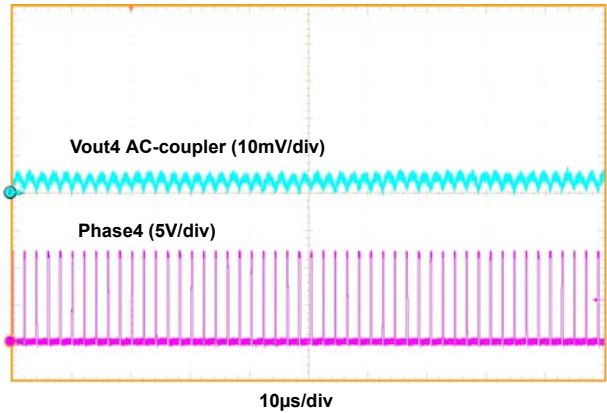


Figure 23. Rail 4 (1.5V) Output Ripple at Full Load

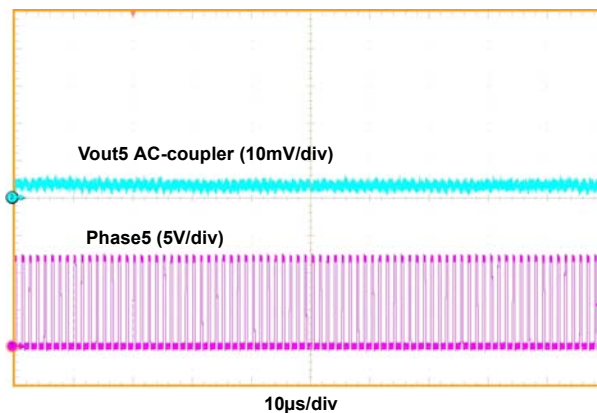


Figure 24. Rail 5 (3.3V) Output Ripple at Full Load

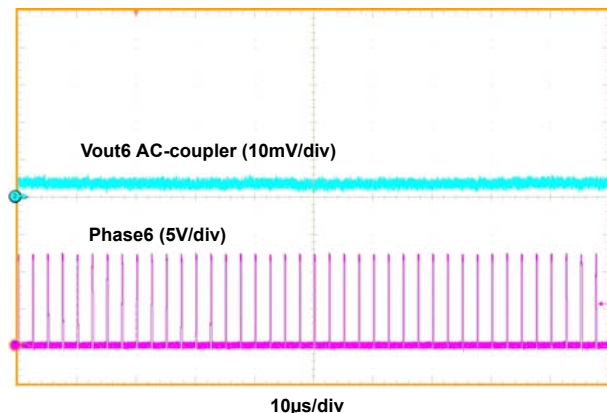


Figure 25. Rail 6 (0.85V) Output Ripple at Full Load

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

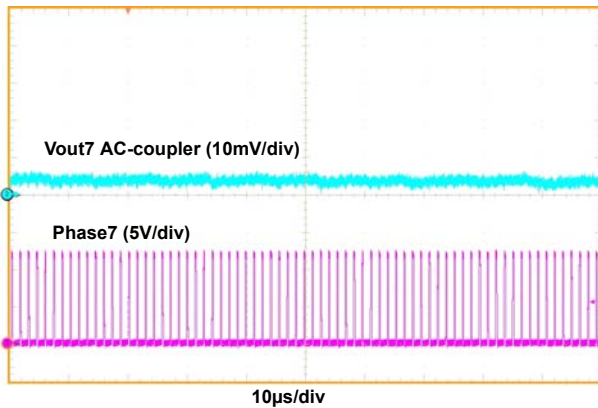


Figure 26. Rail 7(1.8V) Output Ripple at Full Load

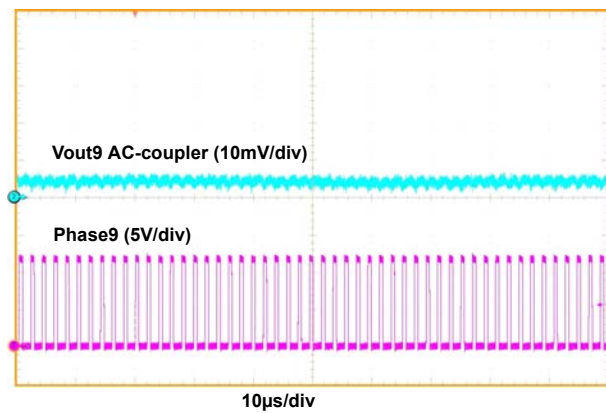


Figure 27. Rail 9(3.3V) Output Ripple at Full Load

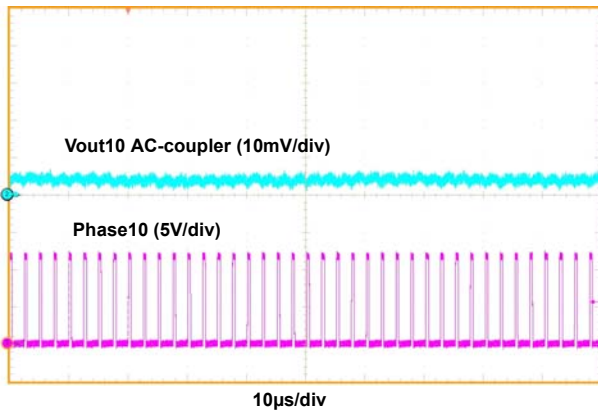


Figure 28. Rail 10 (1.8V) Output Ripple at Full Load

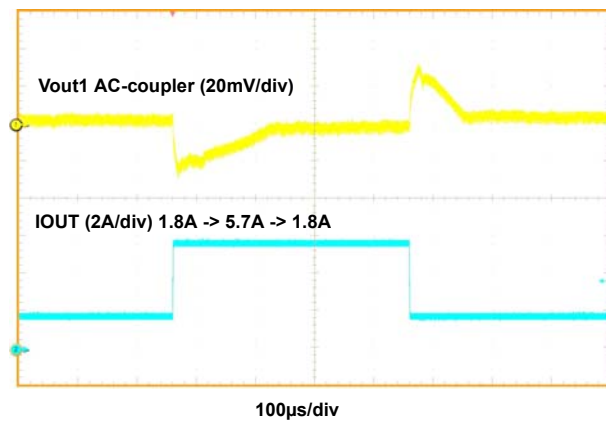


Figure 29. Rail 1 (0.85V) Load Transient

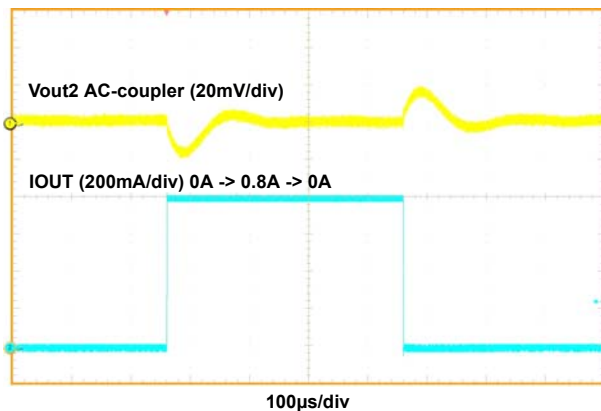


Figure 30. Rail 2 (1.8V) Load Transient

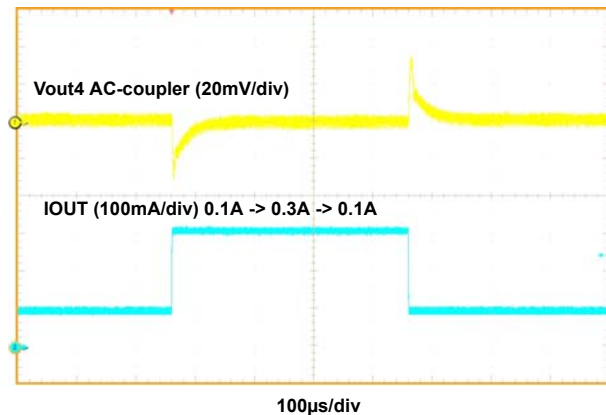


Figure 31. Rail 4 (1.5V) Load Transient

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

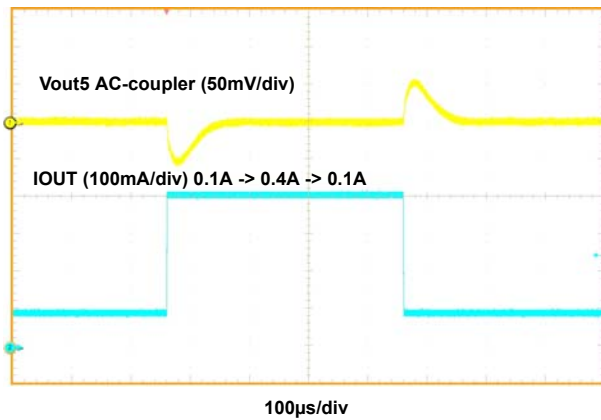


Figure 32. Rail 5 (3.3V) Load Transient

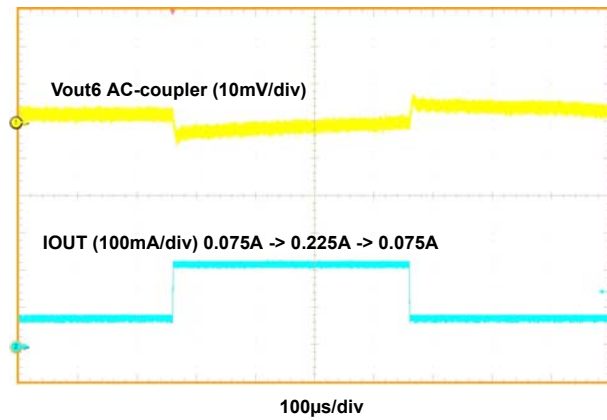


Figure 33. Rail 6 (0.85V) Load Transient

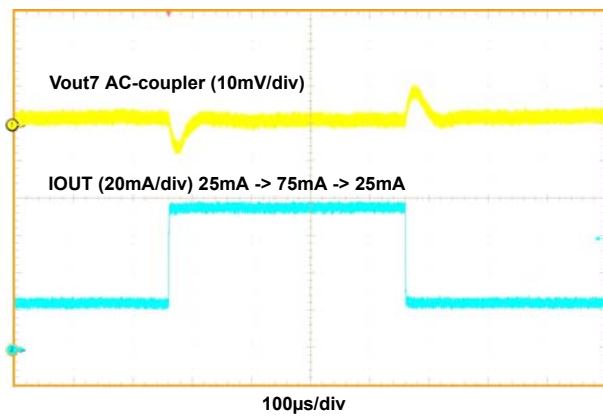


Figure 34. Rail 7 (1.8V) Load Transient

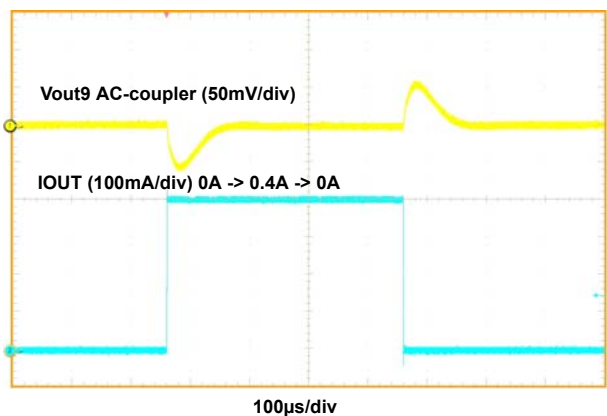


Figure 35. Rail 9 (3.3V) Load Transient

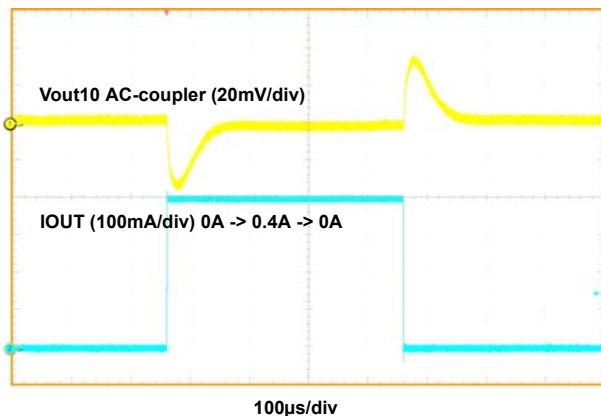


Figure 36. Rail 10 (1.8V) Load Transient

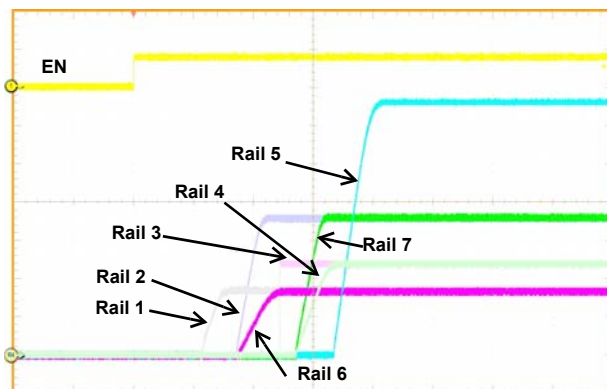


Figure 37. Power Up Sequence

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

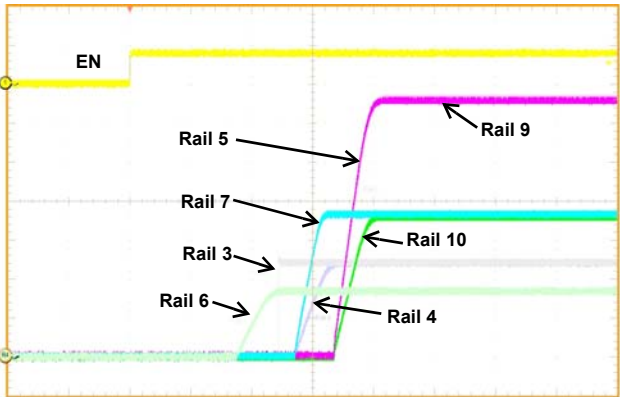


Figure 38. Power Up Sequence

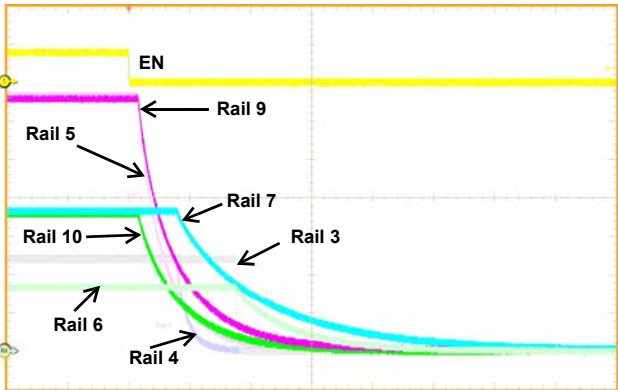


Figure 39. Power Down Sequence

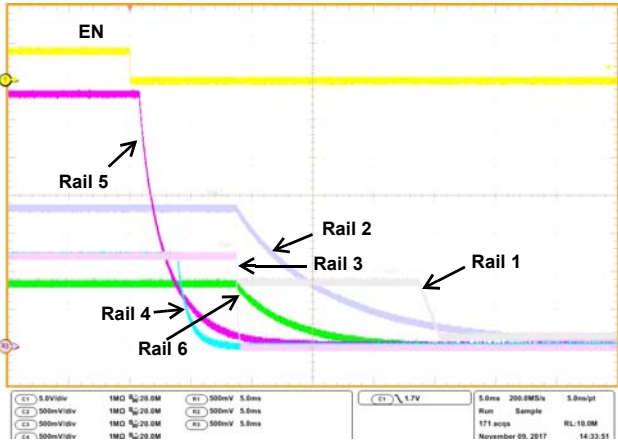


Figure 40. Power Down Sequence

5. Revision History

Rev.	Date	Description
0.00	Jan 25, 2018	Initial release

Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
 2. Renesas Electronics hereby expressly disclaims any warranties against liability for infringement or any other claims involving patents, copyrights, or other intellectual property rights of third parties, by or arising from the use of Renesas Electronics products or technical information described in this document, including but not limited to, the product data, drawings, charts, programs, algorithms, and application examples.
 3. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
 4. You shall not alter, modify, copy, or reverse engineer any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copying or reverse engineering.
 5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The intended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.

"Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; industrial robots; etc.

"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.

Unless expressly designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not intended or authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems; surgical implantations; etc.), or may cause serious property damage (space system; undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or any third parties arising from the use of any Renesas Electronics product that is inconsistent with any Renesas Electronics data sheet, user's manual or other Renesas Electronics document.
 6. When using Renesas Electronics products, refer to the latest product information (data sheets, user's manuals, application notes, "General Notes for Handling and Using Semiconductor Devices" in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat dissipation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions, failure or accident arising out of the use of Renesas Electronics products outside of such specified ranges.
 7. Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics, such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Unless designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not subject to radiation resistance design. You are responsible for implementing safety measures to guard against the possibility of bodily injury, injury or damage caused by fire, and/or danger to the public in the event of a failure or malfunction of Renesas Electronics products, such as safety design for hardware and software, including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult and impractical, you are responsible for evaluating the safety of the final products or systems manufactured by you.
 8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. You are responsible for carefully and sufficiently investigating applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive, and using Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
 9. Renesas Electronics products and technologies shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You shall comply with any applicable export control laws and regulations promulgated and administered by the governments of any countries asserting jurisdiction over the parties or transactions.
 10. It is the responsibility of the buyer or distributor of Renesas Electronics products, or any other party who distributes, disposes of, or otherwise sells or transfers the product to a third party, to notify such third party in advance of the contents and conditions set forth in this document.
 11. This document shall not be reprinted, reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
 12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products.
- (Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its directly or indirectly controlled subsidiaries.
- (Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

(Rev.4.0-1 November 2017)



SALES OFFICES

Renesas Electronics Corporation

<http://www.renesas.com>

Refer to "<http://www.renesas.com/>" for the latest and detailed information.

Renesas Electronics America Inc.

1001 Murphy Ranch Road, Milpitas, CA 95035, U.S.A.
Tel: +1-408-432-8888, Fax: +1-408-434-5351

Renesas Electronics Canada Limited

9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

Renesas Electronics Europe Limited

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: +44-1628-651-700, Fax: +44-1628-651-804

Renesas Electronics Europe GmbH

Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.

Room 1709 Quantum Plaza, No.27 ZhichunLu, Haidian District, Beijing, 100191 P. R. China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.

Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai, 200333 P. R. China
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited

Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2265-6688, Fax: +852 2886-9022

Renesas Electronics Taiwan Co., Ltd.

13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.

80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.

Unit 1207, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics India Pvt. Ltd.

No.777C, 100 Feet Road, HAL 2nd Stage, Indiranagar, Bangalore 560 038, India
Tel: +91-80-67208700, Fax: +91-80-67208777

Renesas Electronics Korea Co., Ltd.

17F, KAMCO Yangjae Tower, 262, Gangnam-daero, Gangnam-gu, Seoul, 06265 Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5338

ISLUSPLUS-UC1DEMO1Z

