

FEATURES

Low cost

Meet's Specification for AVNET Mini Module Plus for Xilinx 7 series Kintex FPGA

Hard wired turn on sequence

High Efficiency (>93% at full load)

12 V input +/-10%

Eight regulated outputs (4 dual output ADP1850 devices)

3.3 V @ 8 A output, 2% tolerance (<5% required)

2.5 V @ 8 A output, 2% tolerance (<5% required)

2.0 V @ 2 A output, 2% tolerance (<3% required)

1.8 V @ 6 A output, 2% tolerance (<5% required)

1.5 V/1.35 V @ 4 A jumper selectable output, 2% (<5% required)

1.2 V @ 4 A output, 2% tolerance (<2.5% required)

1.0 V @ 6 A output, 2% tolerance (<3% required)

Second 1.0 V @ 6 A output, 2% tolerance (<3% required)

DESCRIPTION

The Analog Devices Power Module provides a proven robust design for powering Xilinx 7 series devices. Designed to meet the tolerance and sequencing guidelines set forth by Xilinx, the Analog Devices Power Module provides a highly optimized controller based design utilizing the ADP1850 dual output synchronous buck controller. This design uses four dual channel ADP1850 controllers to achieve 8 independent outputs. It utilizes an innovative clocking scheme deriving the clock signal from the switchnodes of the first rails to power up. This reduces channel interaction and beat frequencies that would be present without synchronization and eliminates a costly external clock source. It meets recommended start up sequencing for Xilinx 7 series devices: Vccint -> Vccaux -> Vccaux_io -> Vcco

Table 1. Measured results

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Total Loss (Iout =max all rails)	6.0	W
Power delived	84	W
Vout ripple	10	mVppk on each rail

Rev. 2

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Table 2. Basic Specifications

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Vout	1.35-1.5V	Volts
Iout	4	Amps
Tamb	55	degC
Vinmin	10.8	Volts
Vinmax	13.2	Volts

Table 3. Basic Specifications

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Vout	1.8 V	Volts
Iout	6	Amps
Tamb	55	degC
Vinmin	10.8	Volts
Vinmax	13.2	Volts

Table 4. Basic Specifications

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Vout	2 V	Volts
Iout	2	Amps
Tamb	55	degC
Vinmin	10.8	Volts
Vinmax	13.2	Volts

Table 5. Basic Specifications

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Vout	3.3 V	Volts
Iout	8	Amps
Tamb	55	degC
Vinmin	10.8	Volts
Vinmax	13.2	Volts

Table 6. Basic Specifications

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Vout	1 V	Volts
Iout	6	Amps
Tamb	55	degC
Vinmin	10.8	Volts
Vinmax	13.2	Volts

Table 7. Basic Specifications

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Vout	1 V	Volts
Iout	6	Amps
Tamb	55	degC
Vinmin	10.8	Volts
Vinmax	13.2	Volts

Table 8. Basic Specifications

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Vout	1.2 V	Volts
Iout	4	Amps
Tamb	55	degC
Vinmin	10.8	Volts
Vinmax	13.2	Volts

Table 9. Basic Specifications

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Vout	2.5 V	Volts
Iout	8	Amps
Tamb	55	degC
Vinmin	10.8	Volts
Vinmax	13.2	Volts

Table 10. Dissipation Estimates

<i>Spec</i>	<i>Value</i>	<i>Units</i>
<i>ADP1850(total)</i>	0.711	W
Highside FETs	2.06	W
Lowside FETs	1.78	W
Inductors	1.37	W
Total	6.0	W

Table 11. Temperature Estimates

<i>Spec</i>	<i>Value</i>	<i>Units</i>
<i>Ambient Temp</i>	55	degC
<i>ADP1850</i>	65	degC
Highside FET	71	degC
Lowside FET	71	degC
Inductors	65	degC

Table 12. Operational Estimates

<i>Spec</i>	<i>Value</i>	<i>Units</i>
Iin (simulation)	0.22	A
Irms L1	0.346	A
Ipk L1	0.8	A
Irms Fet	0.33	A
Pk Voltage FET	75	V

TABLE OF CONTENTS

Features	1
Description	1
Revision History	5
Bill of Materials.....	10
Layout.....	17
Measurements.....	19

TABLE OF FIGURES

Figure 1. Schematic page1 1v2@4A, 2v5@8A	6
Figure 2. Schematic page2 1v8@6A, 1v5@4A	7
Figure 3. Schematic page3 1v0@6A, 1v0@6A	8
Figure 4. Schematic page4 3v3@8A, 2v0@2A	9
Figure 5. Top Layer Layout.....	17
Figure 6. Bottom Layer Layout.....	18
Figure 7. Measured Efficiency over Load	19
Figure 8. Load Regulation.....	19
Figure 9. Turn on 50Ohm load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5	20
Figure 10. Turn on 50Ohm load: Ch1=1V5,Ch2=1V8,Ch3=2V0,Ch4=3V3	20
Figure 11. Turn off 50Ohm load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5.....	21
Figure 12. Turn off 50Ohm load: Ch1=1V5,Ch2=1V8,Ch3=2V0,Ch4=3V3	21
Figure 13. Ripple No load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5	22
Figure 14. Ripple No load: Ch1=1V5,Ch2=1V8,Ch3=2V0,Ch4=3V3	22
Figure 15. Ripple half load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5	23
Figure 16. Ripple half load: Ch1=1V5,Ch2=1V8,Ch3=2V0,Ch4=3V3	23
Figure 17. Ripple full load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5.....	24
Figure 18. Ripple full load: Ch1=1V5,Ch2=1V8,Ch3=2V0,Ch4=3V3	24
Figure 19. Load release 100% to 50% load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5.....	25
Figure 20. Load release 100% to 50% load: Ch1=1V5,Ch2=1V8,Ch3=2V0,Ch4=3V3	25
Figure 21. Load step 50% to 100% load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5	26
Figure 22. Load step 50% to 100% load: Ch1=1V5,Ch2=1V8,Ch3=2V0,Ch4=3V3	26

REVISION HISTORY

11/18/2011—Revision 0: Initial Version r0 board

1/27/2012—Revision 1: Update Schematic and BOM for r1 board

SCHEMATIC

Figure 1. Schematic page1 1v2@4A, 2v5@8A

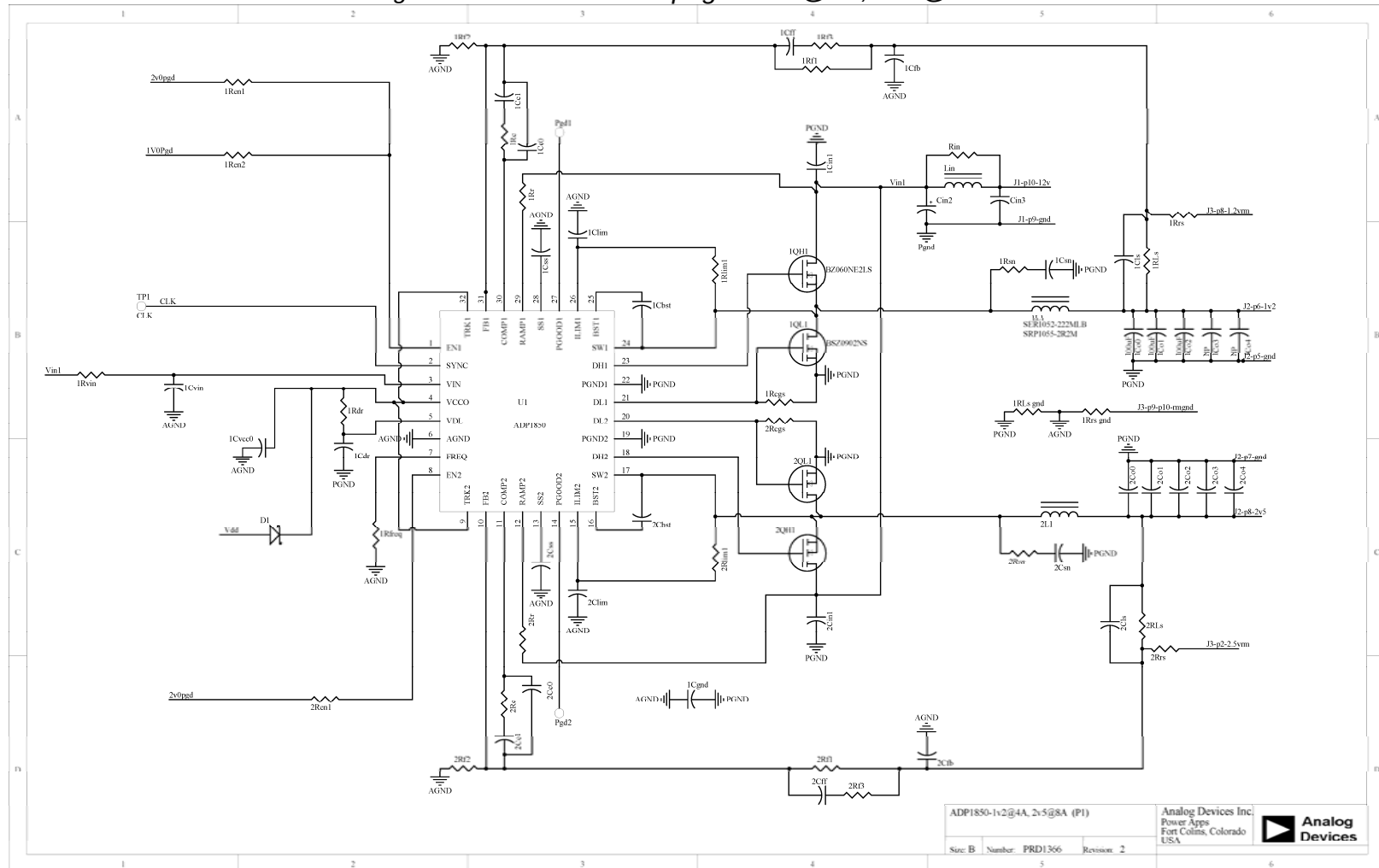


Figure 2. Schematic page2 1v8@6A, 1v5@4A

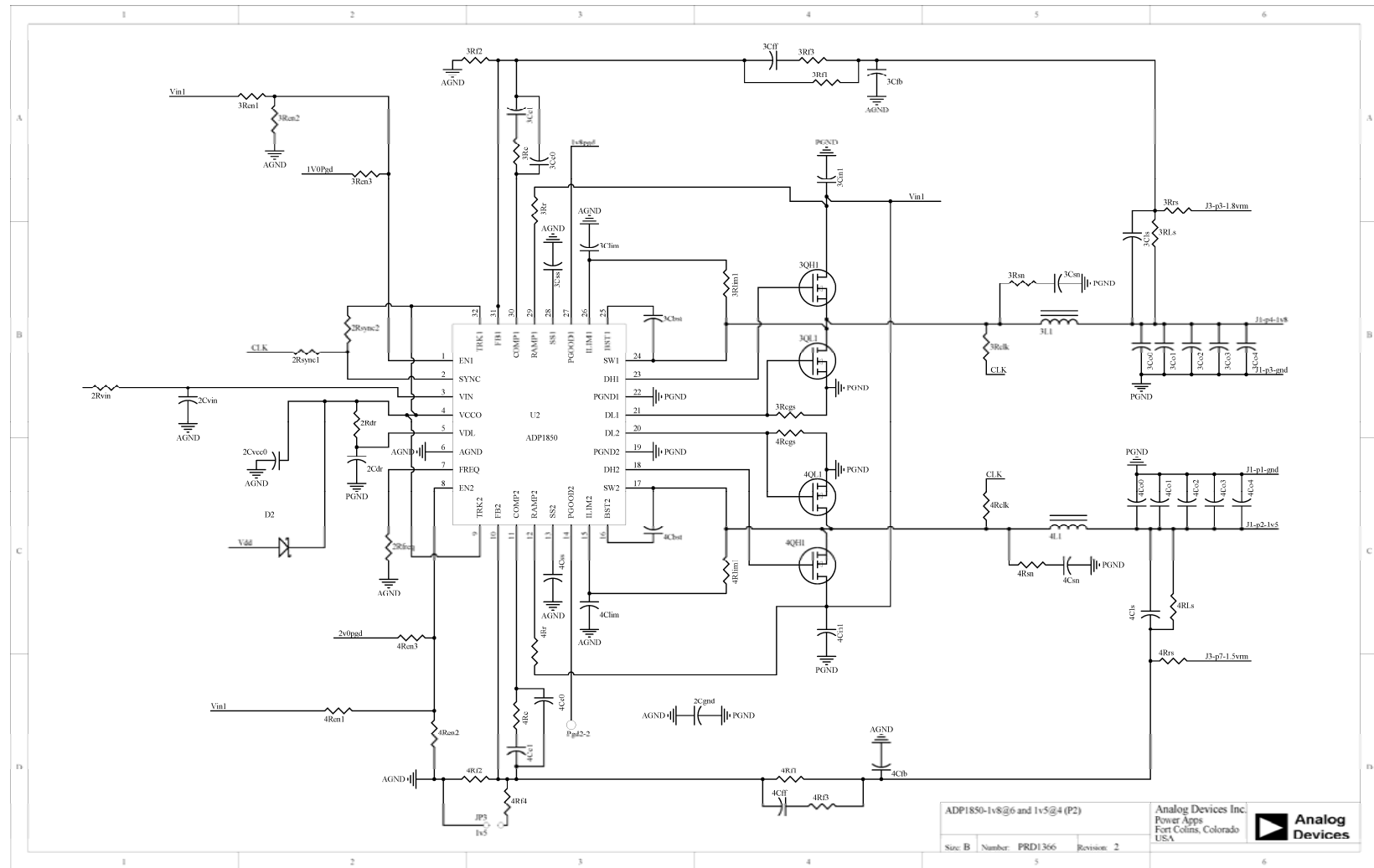


Figure 3. Schematic page3 1v0@6A, 1v0@6A

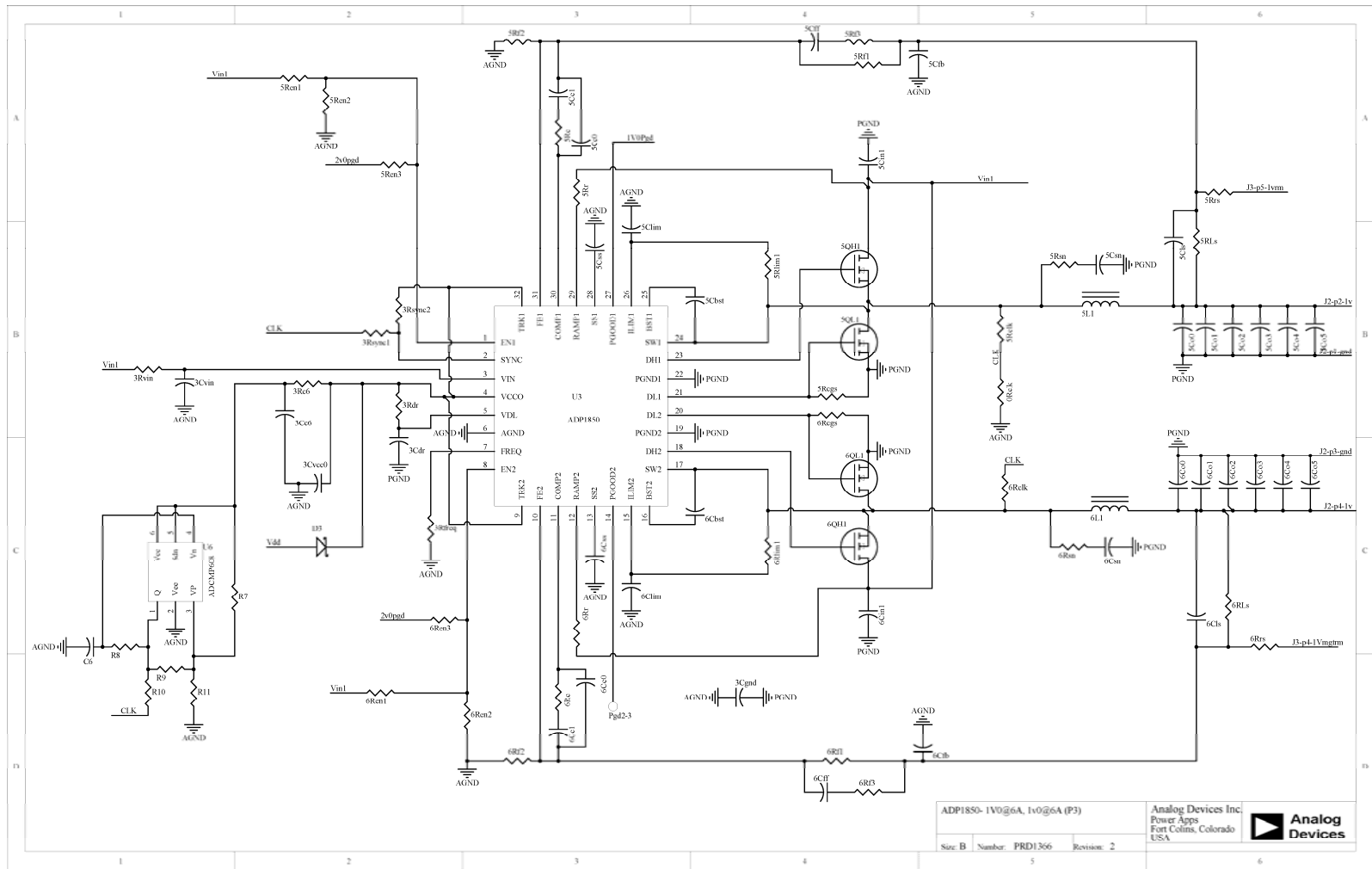
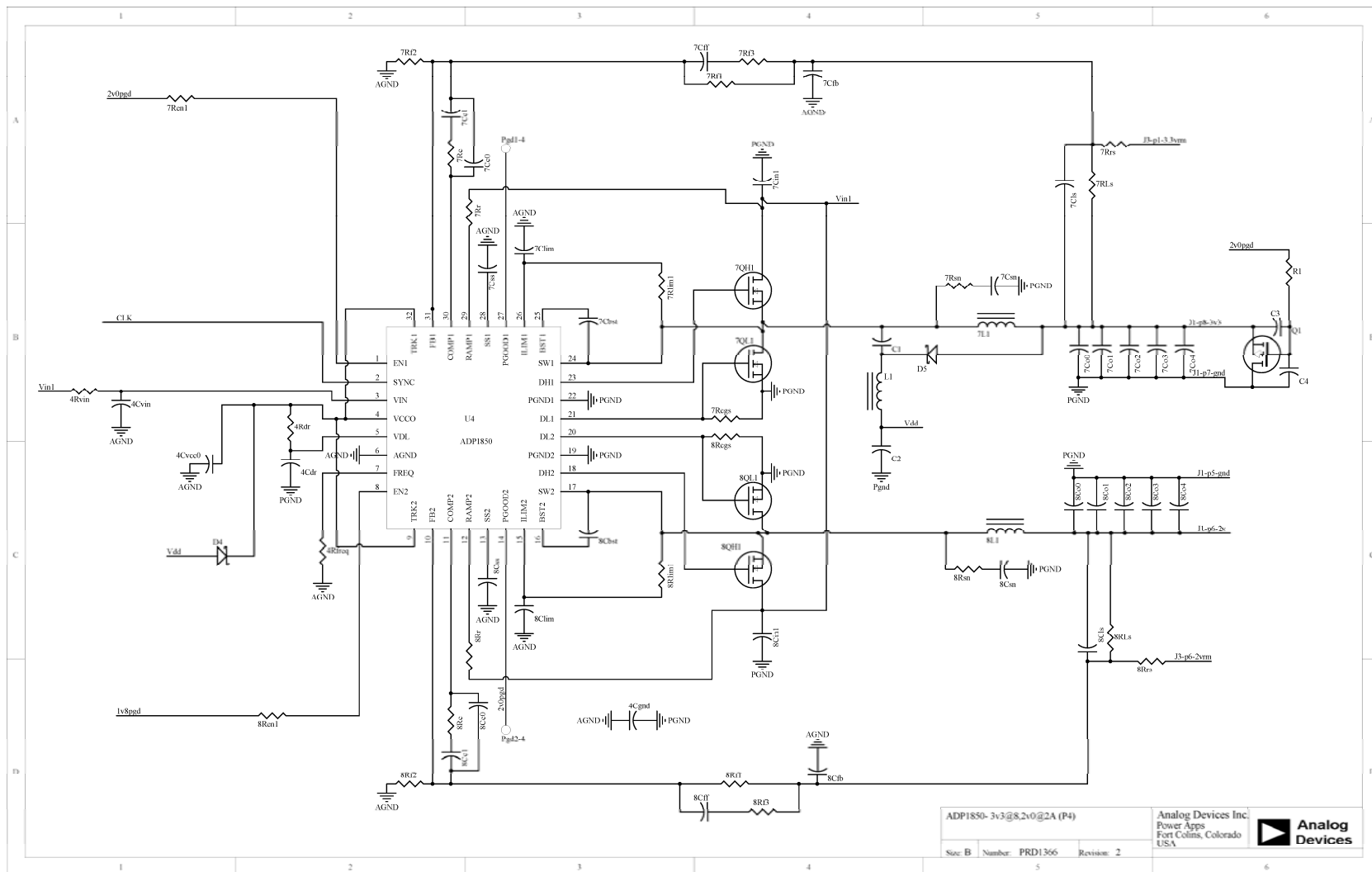


Figure 4. Schematic page4 3v3@8A, 2v0@2A



BILL OF MATERIALS

Table 13. Bill of Materials

Des	MFG	Part Number	Component Specs	Pkg	Qty	Area (mm ²)	Hgt (mm)
U1	ADI	ADP1850ACPZ	Controller	LFCSP32	1	26.0	1.0
1L1	Coilcraft	SER1052-222MLB	2.2uH,6mΩ	12 x 11	1	117.0	5.2
	Bourns	SRP1055-2R2M	2.2uH,5.8mΩ	11.3x9.4			
1QH1	Infineon	BSZ060NE2LS	8.1mΩ, 25V	PP8-3x3	1	11.6	1.1
1QL1	Infineon	BSZ0902NS	3.5mΩ, 30V	PP8-3x3	1	11.6	1.1
1Co0...1Co2	Murata	GRM32ER60J107M	100uF, 6.3V, X5R	1210	3	24.0	2.0
1Co3...1Co4		No Pop		1210	0	0.0	0.0
1Cin1	Murata	GRM31CR61E106K	10uF, 25V, X5R	1206	1	5.1	1.6
1Rr	Vishay	1% Metal Film	150KΩ	0402	1	0.5	0.5
1Rcgs	Vishay	1% Metal Film	22.1KΩ	0402	1	0.5	0.5
1Rlim1	Vishay	1% Metal Film	619Ω	0402	1	0.5	0.5
1Rc	Vishay	1% Metal Film	40.2KΩ	0402	1	0.5	0.5
1Rrs	Vishay	5% Metal Film	1.0Ω	0402	1	0.5	0.5
1RLs	Vishay	1% Metal Film	100Ω	0402	1	0.5	0.5
1Rf3	Vishay	1% Metal Film	750Ω	0402	1	0.5	0.5
1Rf1	Vishay	0.1% Metal Film	35.7KΩ	0402	1	0.5	0.5
1Rf2	Vishay	0.1% Metal Film	35.7KΩ	0402	1	0.5	0.5
1Ren1	Vishay	1% Metal Film	10.0KΩ	0402	1	0.5	0.5
1Ren2		No Pop		0402	0	0.0	0.0
1Rsn		No Pop		0805	0	0.0	0.0
1Csn		No Pop		0402	0	0.0	0.0
1Cls		No Pop		0402	0	0.0	0.0
1Cbst	Murata	X5R or X7R	100nF, >6v	0402	1	0.5	0.5
D1		No Pop		SOD323	1	3.8	1.1
1Clim	Murata	10% NPO or COG	22pF, >20v	0402	1	0.5	0.5
1Css	Murata	10% NPO or COG	56nF, >6v	0402	1	0.5	0.5
1Cc1	Murata	10% NPO or COG	470pF, >6v	0402	1	0.5	0.5
1Cc0	Murata	10% NPO or COG	4.7pF, >6v	0402	1	0.5	0.5
1Cfb	Murata	X5R or X7R	100nF>6v	0402	1	0.5	0.5
1Cff	Murata	10% NPO or COG	560pF	0402	1	0.5	0.5
2L1	Coilcraft	SER1052-222MLB	2.2uH,6mΩ	12 x 11	1	117.0	5.2
	Bourns	SRP1055-2R2M	2.2uH,5.8mΩ	11.3x9.4			
2QH1	Infineon	BSZ060NE2LS	8.1mΩ, 25V	PP8-3x3	1	11.6	1.1
2QL1	Infineon	BSZ018NE2LS	2.4mΩ, 25V	PP8-3x3	1	11.6	1.1
2Co0...2Co2	Murata	GRM32ER60J107M	100uF, 6.3V, X5R	1210	3	24.0	2.0
2Co3...2Co4		No Pop		1210	0	0.0	0.0
2Cin1	Murata	GRM32ER61C226K	22uF, 16V, X5R	1210	1	8.0	2.0
2Rr	Vishay	1% Metal Film	120KΩ	0805	1	3.1	0.5
2Rcgs		No Pop		0402	0	0.0	0.0
2Rlim1	Vishay	1% Metal Film	806Ω	0402	1	0.5	0.5
2Rc	Vishay	1% Metal Film	133KΩ	0402	1	0.5	0.5
2Rrs	Vishay	5% Metal Film	1.0Ω	0402	1	0.5	0.5
2RLs	Vishay	1% Metal Film	100Ω	0402	1	0.5	0.5
2Rf3	Vishay	1% Metal Film	1.91kΩ	0402	1	0.5	0.5

Des	MFG	Part Number	Component Specs	Pkg	Qty	Area (mm^2)	Hgt (mm)
2Rf1	Vishay	1% Metal Film	93.1KΩ	0402	1	0.5	0.5
2Rf2	Vishay	1% Metal Film	29.4KΩ	0402	1	0.5	0.5
2Ren1	Vishay	1% Metal Film	10.0KΩ	0402	1	0.5	0.5
2Rsn		No Pop		0805	0	0.0	0.0
2Csn		No Pop		0402	0	0.0	0.0
2Cls		No Pop		0402	0	0.0	0.0
2Cbst	Murata	X5R or X7R	100nF, >6v	0402	1	0.5	0.5
2Clim	Murata	10% NPO or COG	18pF, >20v	0402	1	0.5	0.5
2Css	Murata	10% NPO or COG	56nF, >6v	0402	1	0.5	0.5
2Cc1	Murata	10% NPO or COG	150pF, >6v	0402	1	0.5	0.5
2Cc0	Murata	10% NPO or COG	3.3pF, >6v	0402	1	0.5	0.5
2Cfb	Murata	X5R or X7R	100nF>6v	0402	1	0.5	0.5
2Cff	Murata	10% NPO or COG	220pF	0402	1	0.5	0.5
1Cvin	Murata	X5R or X7R	1uF, 25v	0603	1	3.1	0.5
1Cvcc0	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5
1Cgnd	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5
1Rdr	Vishay	1% Metal Film	10Ω	0805	1	3.1	0.5
1Cdr	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5
1Rfreq	Vishay	1% Metal Film	165KΩ	0402	1	0.5	0.5
1Rvin	Vishay	5% Metal Film	1.0Ω	0402	1	0.5	0.5
1Rrsgnd	Vishay	Zero Ohm Jumper	0Ω	0402	1	0.5	0.5
1RLsgnd	Vishay	5% Metal Film	1.0Ω	0402	1	0.5	0.5
Cin2	Nichicon	PCV1D271MCL1GS	270uF, 20V, Poly	10mm	1	100.0	10.0
Lin	Cooper	FP1007R1-R30-R	300nH, 0.29mΩ	8 x 10	1	83.2	7.0
Cin3	Taiyo	EMK212 BJ106KG-T	10uF, 16V, X5R	0805	1	2.5	1.3
Rin		No Pop		0805	0	0.0	0.0
U2	ADI	ADP1850ACPZ	Controller	LFCSP32	1	26.0	1.0
3L1	Coilcraft	SER1052-222MLB	2.2uH, 6mΩ	12 x 11	1	117.0	5.2
	Bourns	SRP1055-2R2M	2.2uH, 5.8mΩ	11.3x9.4			
3QH1	Infineon	BSZ060NE2LS	8.1mΩ, 25V	PP8-3x3	1	11.6	1.1
3QL1	Infineon	BSZ0902NS	3.5mΩ, 30V	PP8-3x3	1	11.6	1.1
3Co0...3Co2	Murata	GRM32ER60J107M	100uF, 6.3V, X5R	1210	3	24.0	2.0
3Co3...3Co4		No Pop		1210	0	0.0	0.0
3Cin1	Murata	GRM32DR71C106K	10uF, 16V, X7R	1210	1	8.0	2.0
3Rr	Vishay	1% Metal Film	100KΩ	0402	1	0.5	0.5
3Rcgs		No Pop		0402	0	0.0	0.0
3Rlim1	Vishay	1% Metal Film	866Ω	0402	1	0.5	0.5
3Rc	Vishay	1% Metal Film	191KΩ	0402	1	0.5	0.5
3Rrs	Vishay	5% Metal Film	1.0Ω	0402	1	0.5	0.5
3RLs	Vishay	1% Metal Film	100Ω	0402	1	0.5	0.5
3Rf3	Vishay	1% Metal Film	1.82KΩ	0402	1	0.5	0.5
3Rf1	Vishay	1% Metal Film	46.4KΩ	0402	1	0.5	0.5
3Rf2	Vishay	1% Metal Film	23.2KΩ	0402	1	0.5	0.5
3Ren1		No Pop		0402	0	0.0	0.0
3Ren2		No Pop		0402	0	0.0	0.0
3Ren3	Vishay	1% Metal Film	10.0KΩ	0402	1	0.5	0.5
3Rclk		No Pop		0402	0	0.0	0.0

Des	MFG	Part Number	Component Specs	Pkg	Qty	Area (mm^2)	Hgt (mm)
3Rsn		No Pop		0805	0	0.0	0.0
3Csn		No Pop		0402	0	0.0	0.0
3Cls		No Pop		0402	0	0.0	0.0
3Cbst	Murata	X5R or X7R	100nF, >6v	0402	1	0.5	0.5
D2		No Pop		SOD323	1	3.8	1.1
3Clim	Murata	10% NPO or COG	18pF, >20v	0402	1	0.5	0.5
3Css	Murata	10% NPO or COG	56nF, >6v	0402	1	0.5	0.5
3Cc1	Murata	10% NPO or COG	270pF, >6v	0402	1	0.5	0.5
3Cc0	Murata	10% NPO or COG	3.3pF, >6v	0402	1	0.5	0.5
3Cfb	Murata	X5R or X7R	100nF>6v	0402	1	0.5	0.5
3Cff	Murata	10% NPO or COG	150pF	0402	1	0.5	0.5
4L1	Coilcraft Bourns	SER1052-222MLB SRP1055-2R2M	2.2uH,6mΩ 2.2uH,5.8mΩ	12 x 11 11.3x9.4	1	117.0	5.2
4QH1	Infineon	BSZ060NE2LS	8.1mΩ, 25V	PP8-3x3	1	11.6	1.1
4QL1	Infineon	BSZ036NE2LS	5.1mΩ, 25V	PP8-3x3	1	11.6	1.1
4Co0..4Co1	Murata	GRM32ER60J107M	100uF, 6.3V, X5R	1210	2	16.0	2.0
4Co2..4Co4		No Pop		1210	0	0.0	2.0
4Cin1	Murata	GRM31CR71C106K	10uF, 16V, X7R	1206	1	5.1	1.6
4Rr	Vishay	1% Metal Film	66.5KΩ	0805	1	3.1	0.5
4Rcgs		No Pop		0402	0	0.0	0.0
4Rlim1	Vishay	1% Metal Film	909Ω	0402	1	0.5	0.5
4Rc	Vishay	1% Metal Film	110KΩ	0402	1	0.5	0.5
4Rrs	Vishay	5% Metal Film	1.0Ω	0402	1	0.5	0.5
4RLs	Vishay	1% Metal Film	100Ω	0402	1	0.5	0.5
4Rf3	Vishay	1% Metal Film	806Ω	0402	1	0.5	0.5
4Rf1	Vishay	1% Metal Film	35.7KΩ	0402	1	0.5	0.5
4Rf2	Vishay	1% Metal Film	28.7KΩ	0402	1	0.5	0.5
4Rf4	Vishay	1% Metal Film	140KΩ	0402	1	0.5	0.5
4Ren1		No Pop		0402	0	0.0	0.0
4Ren2		No Pop		0402	0	0.0	0.0
4Ren3	Vishay	1% Metal Film	10.0KΩ	0402	1	0.5	0.5
4Rclk		No Pop		0402	0	0.0	0.0
4Rsn		No Pop		0805	0	0.0	0.0
4Csn		No Pop		0402	0	0.0	0.0
4Cls		No Pop		0402	0	0.0	0.0
4Cbst	Murata	X5R or X7R	100nF, >6v	0402	1	0.5	0.5
4Clim	Murata	10% NPO or COG	18pF, >20v	0402	1	0.5	0.5
4Css	Murata	10% NPO or COG	56nF, >6v	0402	1	0.5	0.5
4Cc1	Murata	10% NPO or COG	180pF, >6v	0402	1	0.5	0.5
4Cc0	Murata	10% NPO or COG	3.9pF, >6v	0402	1	0.5	0.5
4Cfb	Murata	X5R or X7R	100nF>6v	0402	1	0.5	0.5
4Cff	Murata	10% NPO or COG	270pF	0402	1	0.5	0.5
2Cvin	Murata	X5R or X7R	1uF, 25v	0603	1	3.1	0.5
2Cvcc0	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5
2Cgnd	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5
2Rdr	Vishay	1% Metal Film	10Ω	0805	1	3.1	0.5
2Cdr	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5

Des	MFG	Part Number	Component Specs	Pkg	Qty	Area (mm ²)	Hgt (mm)
2Rfreq	Vishay	1% Metal Film	165K Ω	0402	1	0.5	0.5
2Rvin	Vishay	1% Metal Film	1 Ω	0402	1	0.5	0.5
2Rsync1	Vishay	1% Metal Film	10.0K Ω	0402	1	0.5	0.5
2Rsync2		No Pop		0402	0	0.0	0.0
U3	ADI	ADP1850ACPZ	Controller	LFCSP32	1	26.0	1.0
5L1	Coilcraft	SER1052-132MLB	1.3uH,4m Ω	12 x 11	1	117.0	5.2
	Bourns	SRP1055-1R4M	1.4uH,3.2m Ω	11.3x9.4			
5QH1	Infineon	BSZ060NE2LS	8.1m Ω , 25V	PP8-3x3	1	11.6	1.1
5QL1	Infineon	BSZ0902NS	3.5m Ω , 30V	PP8-3x3	1	11.6	1.1
5Co0...5Co5	Murata	GRM32ER60J107M	100uF, 6.3V, X5R	1210	6	48.0	2.0
5Cin1	Murata	GRM32DR71C106K	10uF, 16V, X7R	1210	1	8.0	2.0
5Rr	Vishay	1% Metal Film	100K Ω	0402	1	0.5	0.5
5Rcgs	Vishay	1% Metal Film	22.1K Ω	0402	1	0.5	0.5
5Rlim1	Vishay	1% Metal Film	866 Ω	0402	1	0.5	0.5
5Rc	Vishay	1% Metal Film	42.2K Ω	0402	1	0.5	0.5
5Rrs	Vishay	5% Metal Film	1.0 Ω	0402	1	0.5	0.5
5RLs	Vishay	1% Metal Film	100 Ω	0402	1	0.5	0.5
5Rf3	Vishay	1% Metal Film	511 Ω	0402	1	0.5	0.5
5Rf1	Vishay	0.1% Metal Film	16.2K Ω	0402	1	0.5	0.5
5Rf2	Vishay	0.1% Metal Film	24.3K Ω	0402	1	0.5	0.5
5Ren1	Vishay	1% Metal Film	154K Ω	0402	1	0.5	0.5
5Ren2	Vishay	1% Metal Film	10.0K Ω	0402	1	0.5	0.5
5Ren3		No Pop		0402	0	0.0	0.0
5Rclk	Vishay	1% Metal Film	2.0K Ω	0402	1	0.5	0.5
0Rclk	Vishay	1% Metal Film	5.11K Ω	0402	1	0.5	0.5
5Rsn		No Pop		0805	0	0.0	0.0
5Csn		No Pop		0402	0	0.0	0.0
5Cls		No Pop		0402	0	0.0	0.0
5Cbst	Murata	X5R or X7R	100nF, >6v	0402	1	0.5	0.5
D3		No Pop		SOD323	1	3.8	1.1
5Clim	Murata	10% NPO or COG	18pF, >20v	0402	1	0.5	0.5
5Css	Murata	10% NPO or COG	56nF, >6v	0402	1	0.5	0.5
5Cc1	Murata	10% NPO or COG	680pF, >6v	0402	1	0.5	0.5
5Cc0	Murata	10% NPO or COG	10pF, >6v	0402	1	0.5	0.5
5Cfb	Murata	X5R or X7R	100nF>6v	0402	1	0.5	0.5
5Cff	Murata	10% NPO or COG	1.0nF	0402	1	0.5	0.5
6L1	Coilcraft	SER1052-132MLB	1.3uH,4m Ω	12 x 11	1	117.0	5.2
	Bourns	SRP1055-1R4M	1.4uH,3.2m Ω	11.3x9.4			
6QH1	Infineon	BSZ060NE2LS	8.1m Ω , 25V	PP8-3x3	1	11.6	1.1
6QL1	Infineon	BSZ0902NS	3.5m Ω , 30V	PP8-3x3	1	11.6	1.1
6Co0...6Co5	Murata	GRM32ER60J107M	100uF, 6.3V, X5R	1210	6	48.0	2.0
6Cin1	Murata	GRM32DR71C106K	10uF, 16V, X7R	1210	1	8.0	2.0
6Rr	Vishay	1% Metal Film	100K Ω	0805	1	3.1	0.5
6Rcgs	Vishay	1% Metal Film	22.1K Ω	0402	1	0.5	0.5
6Rlim1	Vishay	1% Metal Film	866 Ω	0402	1	0.5	0.5
6Rc	Vishay	1% Metal Film	42.2K Ω	0402	1	0.5	0.5
6Rrs	Vishay	5% Metal Film	1.0 Ω	0402	1	0.5	0.5

Des	MFG	Part Number	Component Specs	Pkg	Qty	Area (mm ²)	Hgt (mm)
6RLs	Vishay	1% Metal Film	100Ω	0402	1	0.5	0.5
6Rf3	Vishay	1% Metal Film	511Ω	0402	1	0.5	0.5
6Rf1	Vishay	0.1% Metal Film	16.2KΩ	0402	1	0.5	0.5
6Rf2	Vishay	0.1% Metal Film	24.3KΩ	0402	1	0.5	0.5
6Ren1	Vishay	1% Metal Film	154KΩ	0402	1	0.5	0.5
6Ren2	Vishay	1% Metal Film	10.0KΩ	0402	1	0.5	0.5
6Ren3		No Pop		0402	0	0.0	0.0
6Rclk	Vishay	1% Metal Film	2.0KΩ	0402	1	0.5	0.5
6Rsn		No Pop		0805	0	0.0	0.0
6Csn		No Pop		0402	0	0.0	0.0
6Cls		No Pop		0402	0	0.0	0.0
6Cbst	Murata	X5R or X7R	100nF, >6v	0402	1	0.5	0.5
6Clim	Murata	10% NPO or COG	18pF, >20v	0402	1	0.5	0.5
6Css	Murata	10% NPO or COG	56nF, >6v	0402	1	0.5	0.5
6Cc1	Murata	10% NPO or COG	680pF, >6v	0402	1	0.5	0.5
6Cc0	Murata	10% NPO or COG	10pF, >6v	0402	1	0.5	0.5
6Cfb	Murata	X5R or X7R	100nF>6v	0402	1	0.5	0.5
6Cff	Murata	10% NPO or COG	1.0nF	0402	1	0.5	0.5
3Cvin	Murata	X5R or X7R	1uF, 25v	0603	1	3.1	0.5
3Cvcc0	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5
3Cgnd	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5
3Rdr	Vishay	1% Metal Film	10Ω	0805	1	3.1	0.5
3Cdr	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5
3Rfreq	Vishay	1% Metal Film	165KΩ	0402	1	0.5	0.5
3Rvin	Vishay	1% Metal Film	1Ω	0402	1	0.5	0.5
3Rsync1		No Pop		0402	0	0.0	0.0
3Rsync2	Vishay	1% Metal Film	1Ω	0402	1	0.5	0.5
3Rc6		No Pop		0402	0	0.0	0.0
3Cc6		No Pop		0402	0	0.0	0.0
R7		No Pop		0402	0	0.0	0.0
R8		No Pop		0402	0	0.0	0.0
R9		No Pop		0402	0	0.0	0.0
R10		No Pop		0402	0	0.0	0.0
R11		No Pop		0402	0	0.0	0.0
C6		No Pop		0402	0	0.0	0.0
U6		No Pop		SC-70	0	0.0	0.0
U4	ADI	ADP1850ACPZ	Controller	LFCSP32	1	26.0	1.0
7L1	Coilcraft	SER1360-272KLB	2.7uH, 2.4mΩ	13 x 13	1	168.0	5.8
	Cooper	HCF1305-3R0-R	3.0uH, 4.9mΩ	12.5x12.5			
7QH1	Infineon	BSZ060NE2LS	8.1mΩ, 25V	PP8-3x3	1	11.6	1.1
7QL1	Infineon	BSZ018NE2LS	2.4mΩ, 25V	PP8-3x3	1	11.6	1.1
7Co0...7Co2	Murata	GRM32ER60J107M	100uF, 6.3V, X5R	1210	3	24.0	2.0
7Co3...7Co4		No Pop		1210	0	0.0	0.0
7Cin1	Murata	GRM32DR71C106K	10uF, 16V, X7R	1210	1	8.0	2.0
7Rr	Vishay	1% Metal Film	200KΩ	0402	1	0.5	0.5
7Rcgs		No Pop		0402	0	0.0	0.0
7Rlim1	Vishay	1% Metal Film	787Ω	0402	1	0.5	0.5

Des	MFG	Part Number	Component Specs	Pkg	Qty	Area (mm ²)	Hgt (mm)
7Rc	Vishay	1% Metal Film	102K Ω	0402	1	0.5	0.5
7Rrs	Vishay	5% Metal Film	1.0 Ω	0402	1	0.5	0.5
7RLs	Vishay	1% Metal Film	100 Ω	0402	1	0.5	0.5
7Rf3	Vishay	1% Metal Film	3.01K Ω	0402	1	0.5	0.5
7Rf1	Vishay	1% Metal Film	115K Ω	0402	1	0.5	0.5
7Rf2	Vishay	1% Metal Film	25.5K Ω	0402	1	0.5	0.5
7Ren1	Vishay	1% Metal Film	100K Ω	0402	1	0.5	0.5
7Rsn		No Pop		0805	0	0.0	0.0
7Csn		No Pop		0402	0	0.0	0.0
7Cls		No Pop		0402	0	0.0	0.0
7Cbst	Murata	X5R or X7R	100nF, >6v	0402	1	0.5	0.5
D4		No Pop		SOD323	1	3.8	1.1
7Clim	Murata	10% NPO or COG	18pF, >20v	0402	1	0.5	0.5
7Css	Murata	10% NPO or COG	56nF, >6v	0402	1	0.5	0.5
7Cc1	Murata	10% NPO or COG	270pF, >6v	0402	1	0.5	0.5
7Cc0	Murata	10% NPO or COG	8.2pF, >6v	0402	1	0.5	0.5
7Cfb	Murata	X5R or X7R	100nF>6v	0402	1	0.5	0.5
7Cff	Murata	10% NPO or COG	120pF	0402	1	0.5	0.5
8L1	Coilcraft Cooper	MSS1048-472NLB DR1050-4R7-R	4.7uH, 12.3m Ω 4.7uH, 11.9m Ω	11 x 11 10.3x10.5	1	109.0	5.1
8QH1	Infineon	BSZ060NE2LS	8.1m Ω , 25V	PP8-3x3	1	11.6	1.1
8QL1	Infineon	BSZ060NE2LS	8.1m Ω , 25V	PP8-3x3	1	11.6	1.1
8Co0	Murata	GRM32ER60J107M	100uF, 6.3V, X5R	1210	1	8.0	2.0
8Co1..8Co4		No Pop		1210	0	0.0	2.0
8Cin1	Murata	GRM31CR71C475K	4.7uF, 16V, X7R	1206	1	5.1	1.6
8Rr	Vishay	1% Metal Film	100K Ω	0805	1	3.1	0.5
8Rcgs		No Pop		0402	0	0.0	0.0
8Rlim1	Vishay	1% Metal Film	750 Ω	0402	1	0.5	0.5
8Rc	Vishay	1% Metal Film	43.2K Ω	0402	1	0.5	0.5
8Rrs	Vishay	5% Metal Film	1.0 Ω	0402	1	0.5	0.5
8RLs	Vishay	1% Metal Film	100 Ω	0402	1	0.5	0.5
8Rf3	Vishay	1% Metal Film	909 Ω	0402	1	0.5	0.5
8Rf1	Vishay	0.1% Metal Film	38.3K Ω	0402	1	0.5	0.5
8Rf2	Vishay	0.1% Metal Film	16.5K Ω	0402	1	0.5	0.5
8Ren1	Vishay	1% Metal Film	100K Ω	0402	1	0.5	0.5
8Rsn		No Pop		0805	0	0.0	0.0
8Csn		No Pop		0402	0	0.0	0.0
8Cls		No Pop		0402	0	0.0	0.0
8Cbst	Murata	X5R or X7R	100nF, >6v	0402	1	0.5	0.5
8Clim	Murata	10% NPO or COG	22pF, >20v	0402	1	0.5	0.5
8Css	Murata	10% NPO or COG	56nF, >6v	0402	1	0.5	0.5
8Cc1	Murata	10% NPO or COG	390pF, >6v	0402	1	0.5	0.5
8Cc0	Murata	10% NPO or COG	18pF, >6v	0402	1	0.5	0.5
8Cfb	Murata	X5R or X7R	100nF>6v	0402	1	0.5	0.5
8Cff	Murata	10% NPO or COG	470pF	0402	1	0.5	0.5
4Cvin	Murata	X5R or X7R	1uF, 25v	0603	1	3.1	0.5
4Cvcc0	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5

Des	MFG	Part Number	Component Specs	Pkg	Qty	Area (mm ²)	Hgt (mm)
4Cgnd	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5
4Rdr	Vishay	1% Metal Film	10Ω	0805	1	3.1	0.5
4Cdr	Murata	X5R or X7R	1uF, 6.3v	0603	1	3.1	0.5
4Rfreq	Vishay	1% Metal Film	165KΩ	0402	1	0.5	0.5
4Rvin	Vishay	1% Metal Film	1Ω	0402	1	0.5	0.5
C1		No Pop		0603	1	3.1	0.5
C2		No Pop		0603	1	3.1	0.5
L1		No Pop		3 x 3	1	9.0	5.1
D5		No Pop		SOD323	1	3.8	1.1
Q1		No Pop		SC70-6	1	4.6	0.8
R1		No Pop		0402	1	0.5	0.5
C3		No Pop		0402	1	0.5	0.5
C4		No Pop		0402	1	0.5	0.5

LAYOUT

Figure 5. Top Layer Layout

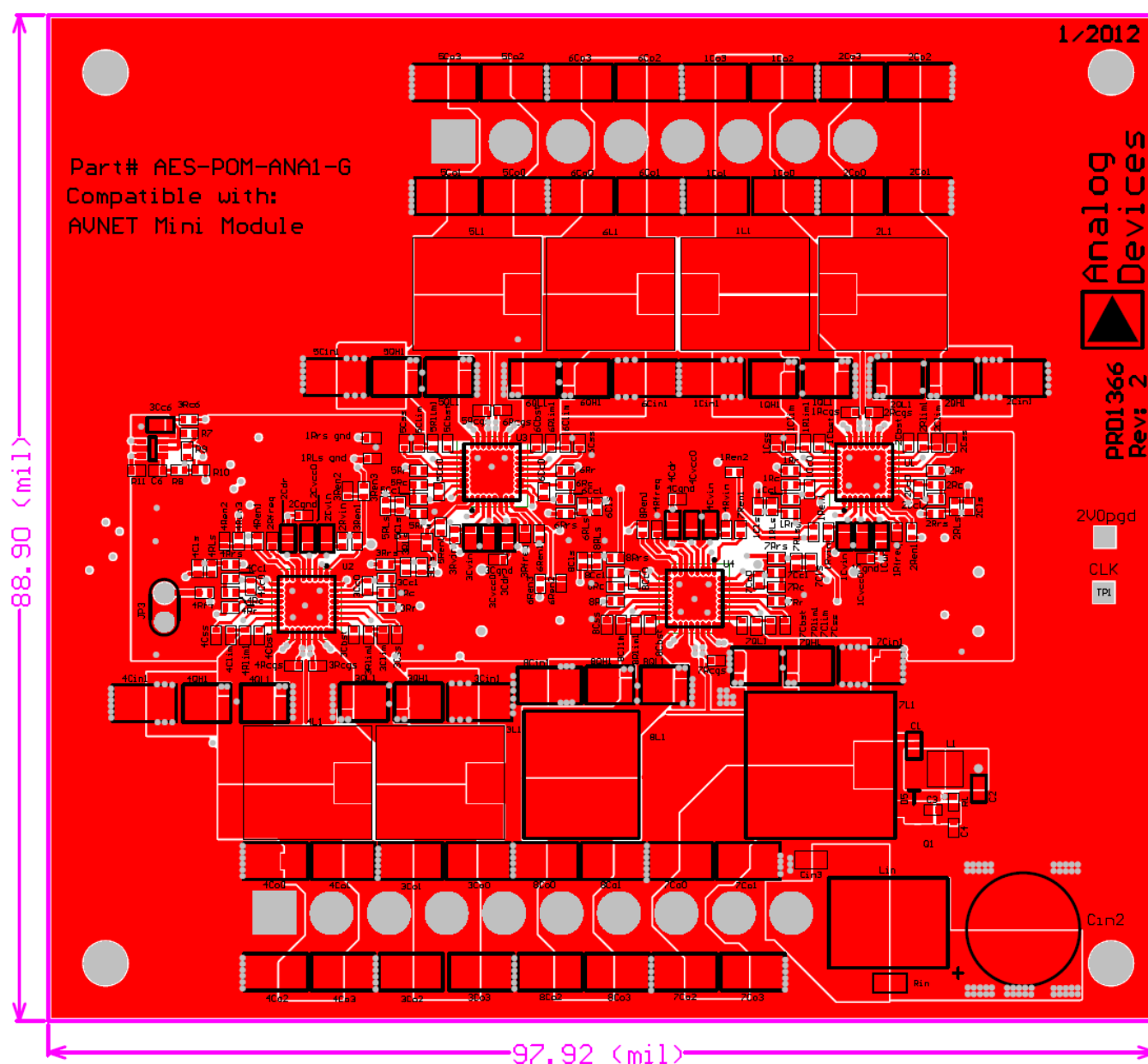
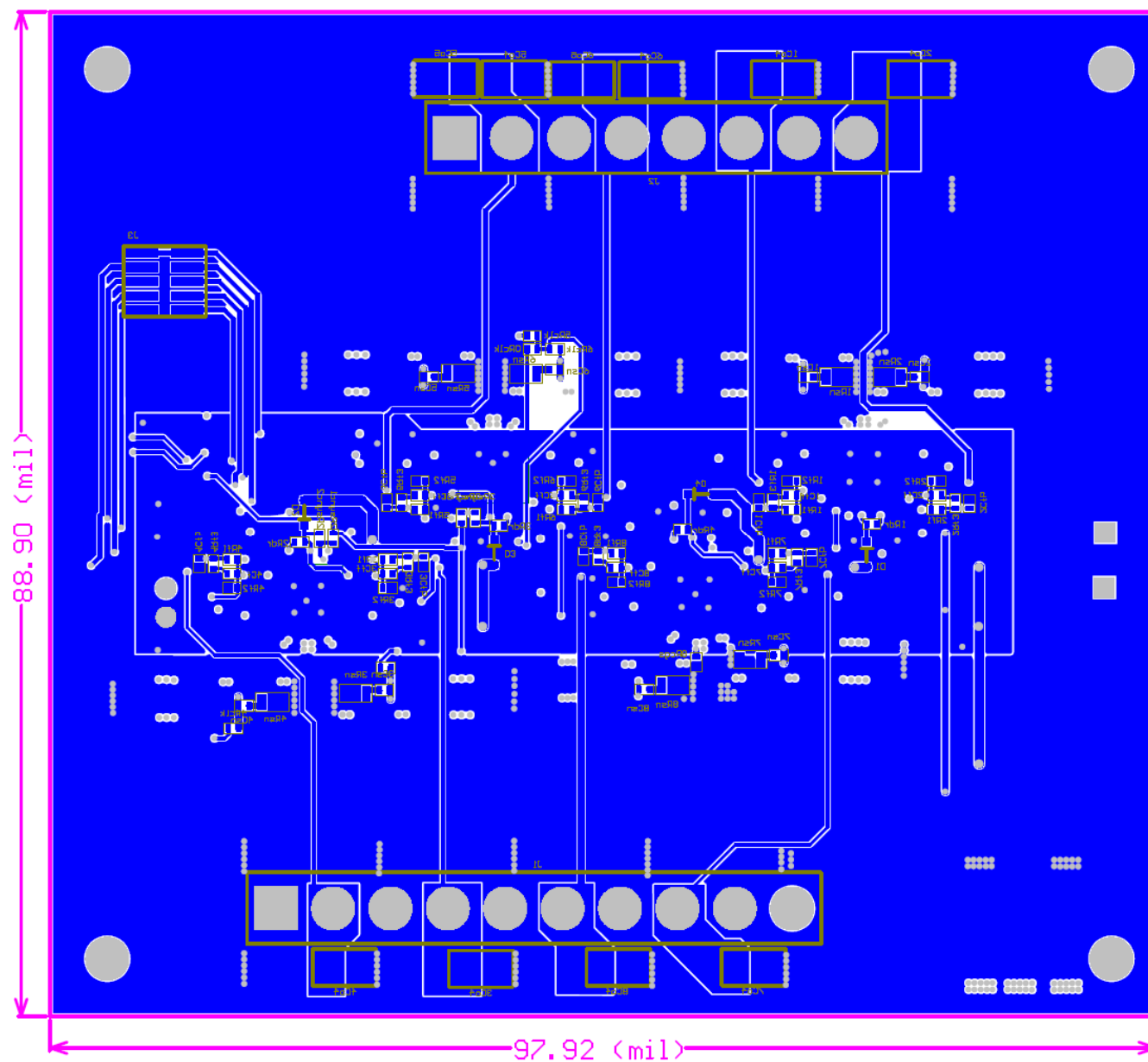


Figure 6. Bottom Layer Layout



MEASUREMENTS

Figure 7. Measured Efficiency over Load

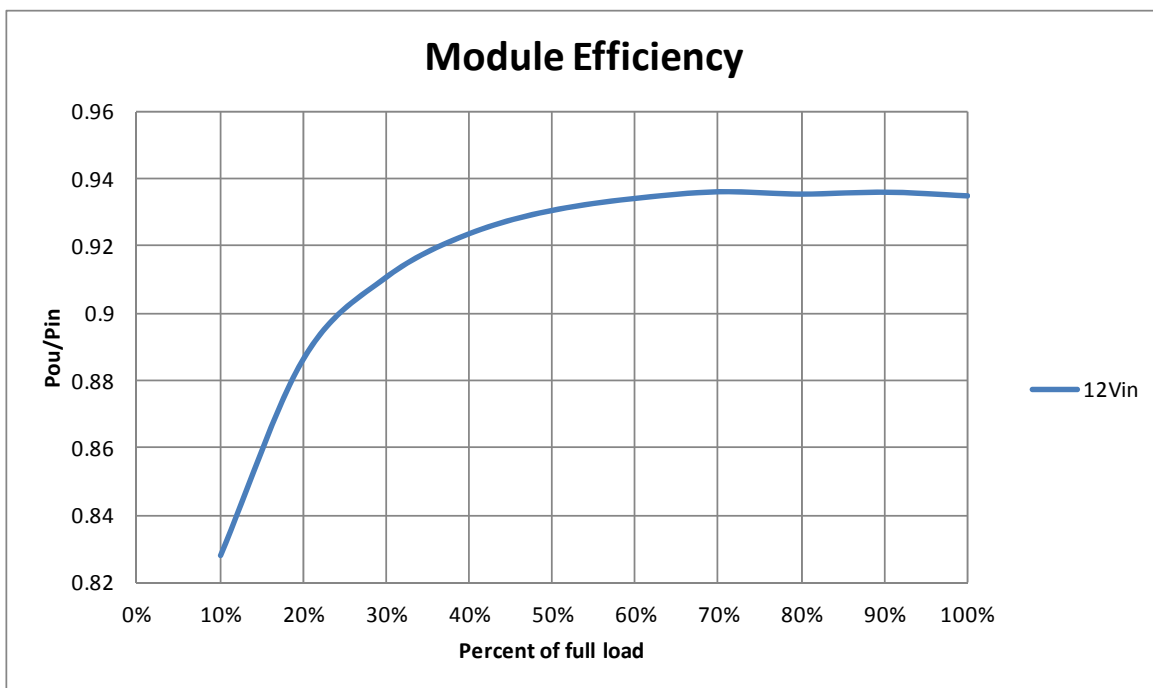


Figure 8. Load Regulation

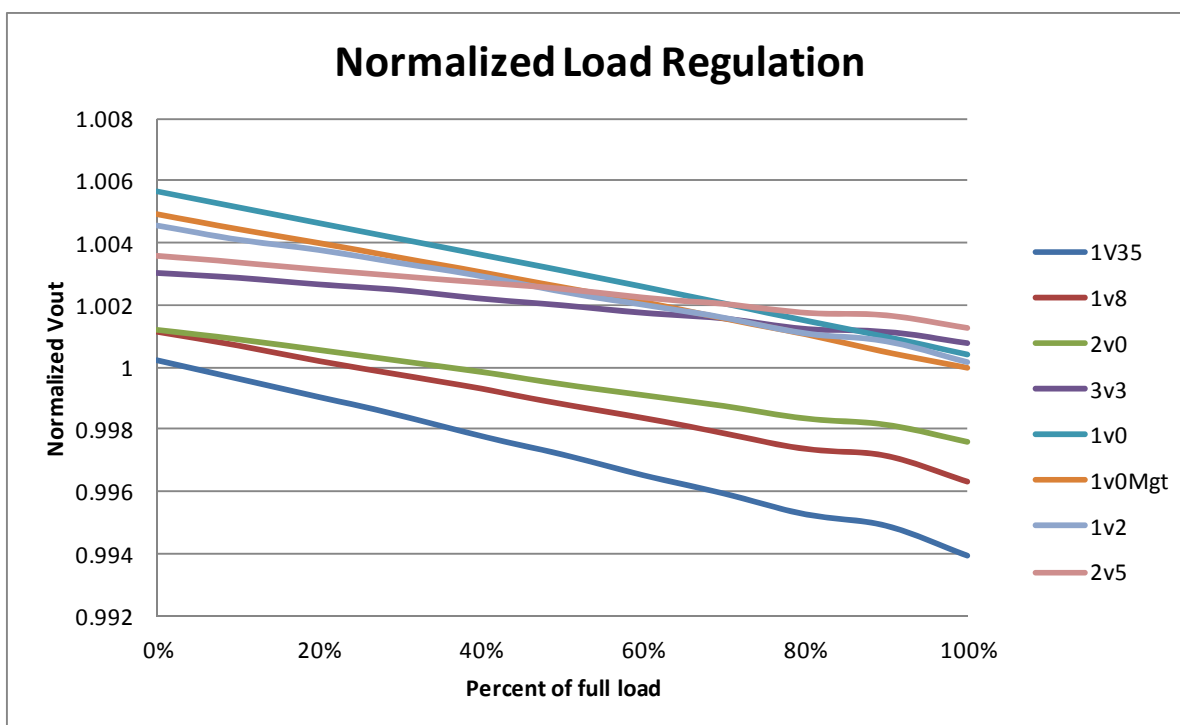


Figure 9. Turn on 50Ohm load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5

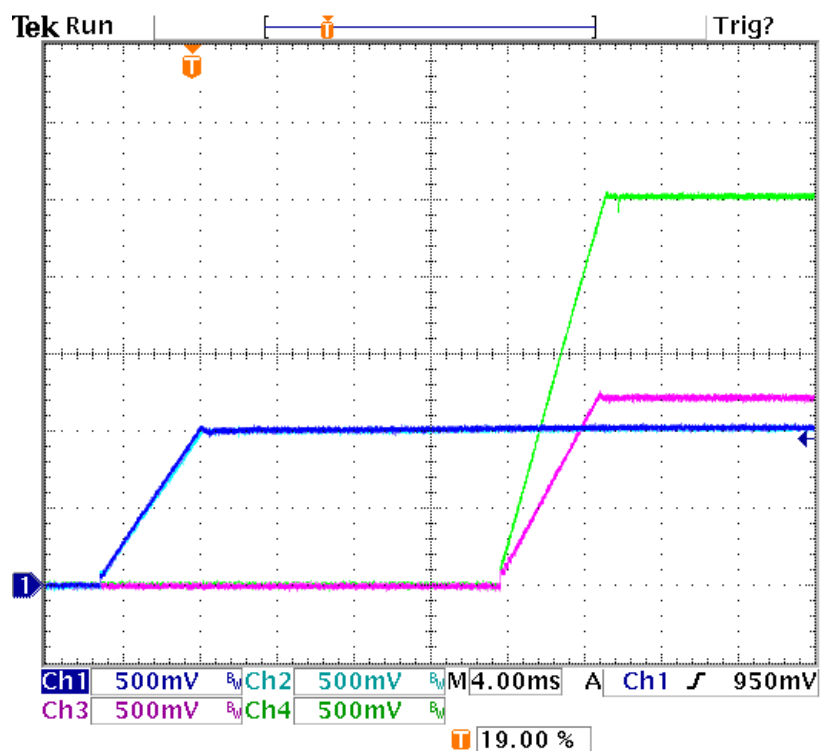


Figure 10. Turn on 50Ohm load: Ch1=1V5, Ch2=1V8, Ch3=2V0, Ch4=3V3

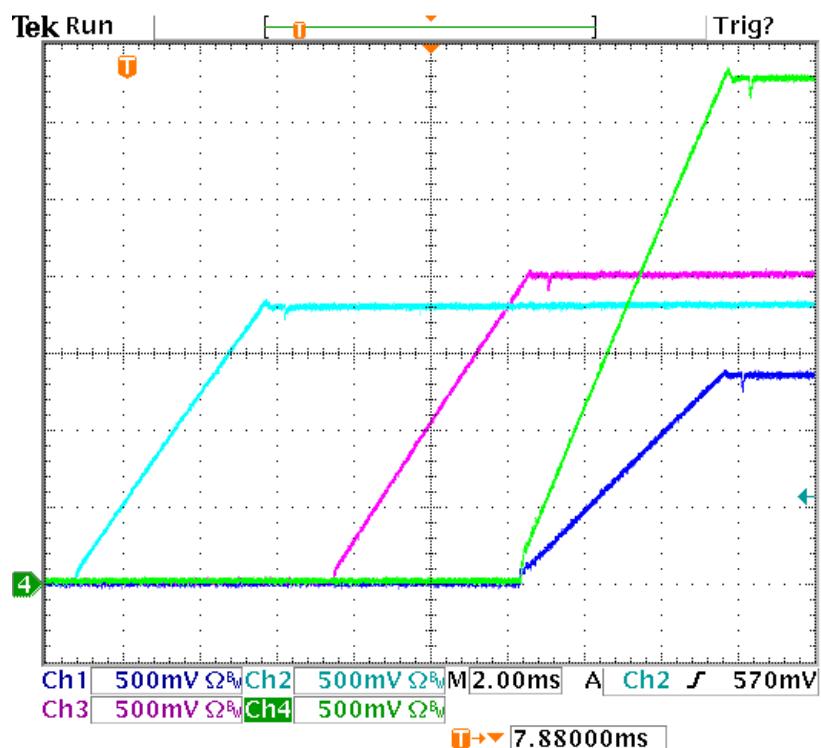


Figure 11. Turn off 50Ohm load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5

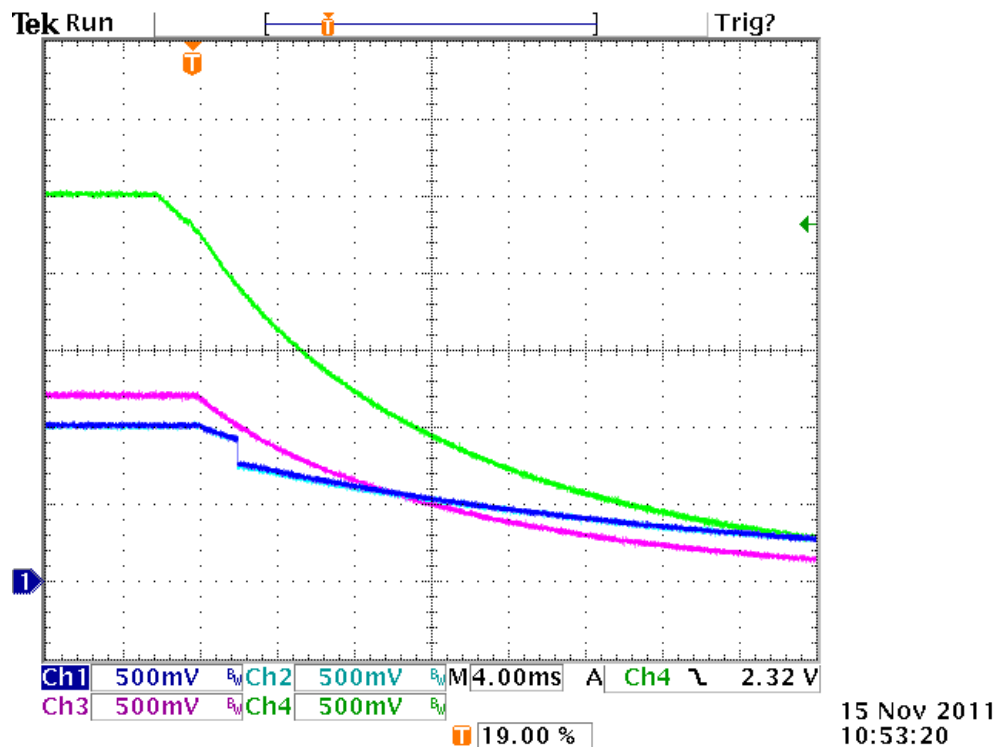


Figure 12. Turn off 50Ohm load: Ch1=1V5, Ch2=1V8, Ch3=2V0, Ch4=3V3

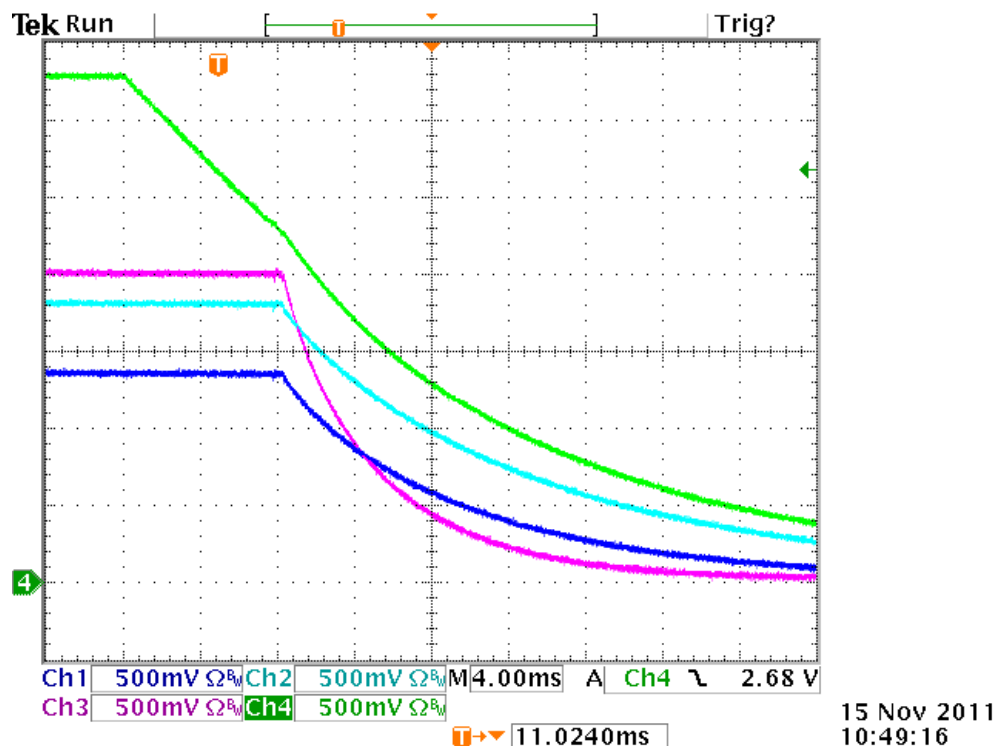


Figure 13. Ripple No load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5

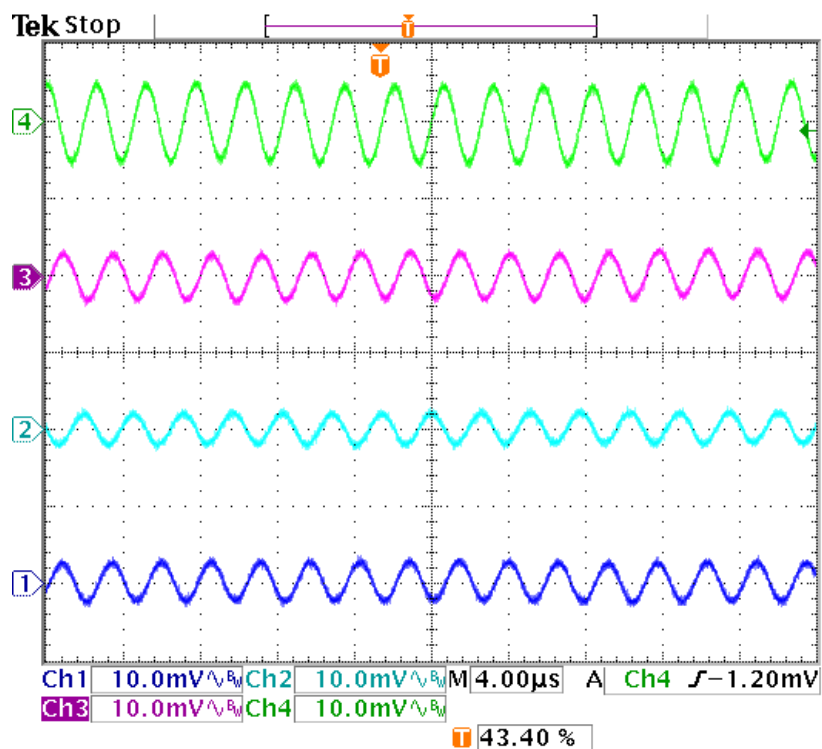
15 Nov 2011
11:34:45

Figure 14. Ripple No load: Ch1=1V5, Ch2=1V8, Ch3=2V0, Ch4=3V3

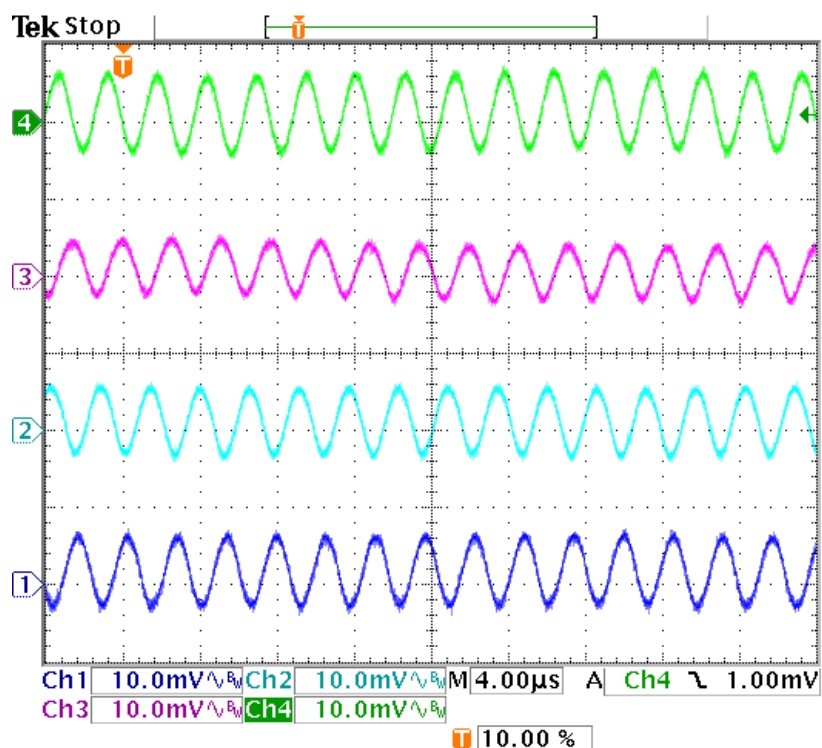
15 Nov 2011
11:28:35

Figure 15. Ripple half load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5

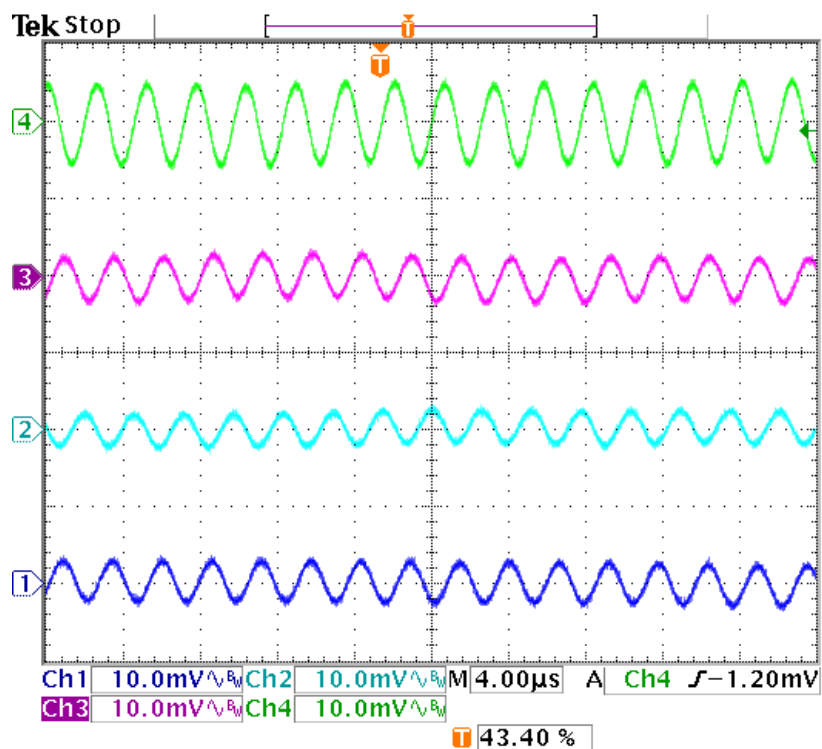
15 Nov 2011
11:37:06

Figure 16. Ripple half load: Ch1=1V5, Ch2=1V8, Ch3=2V0, Ch4=3V3

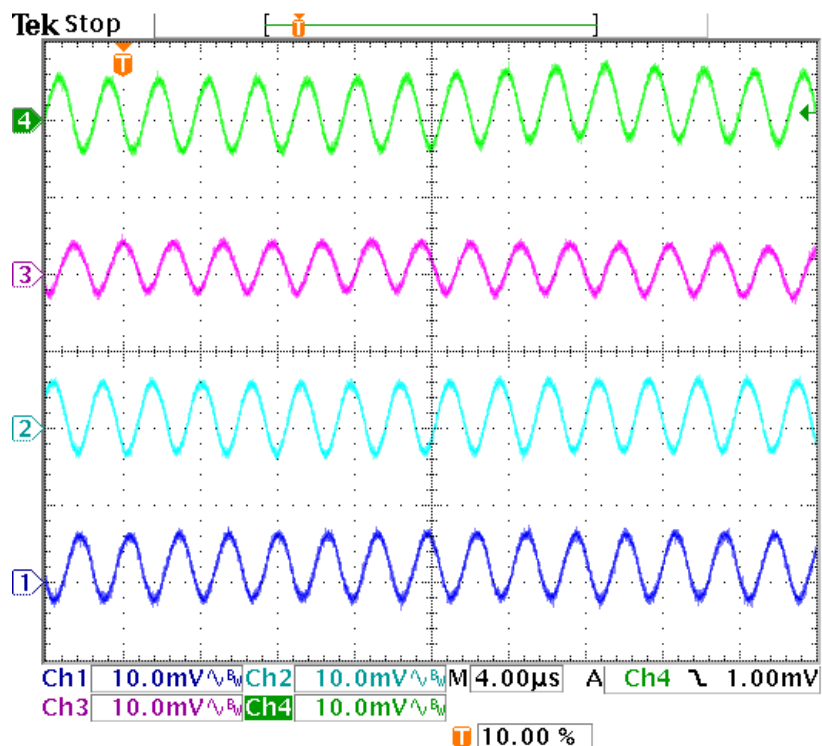
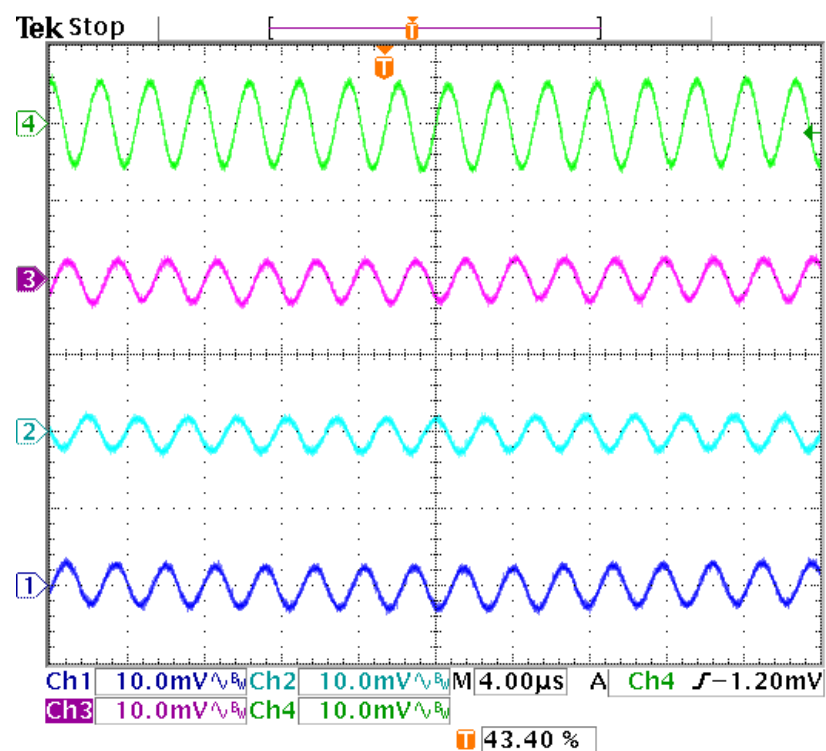
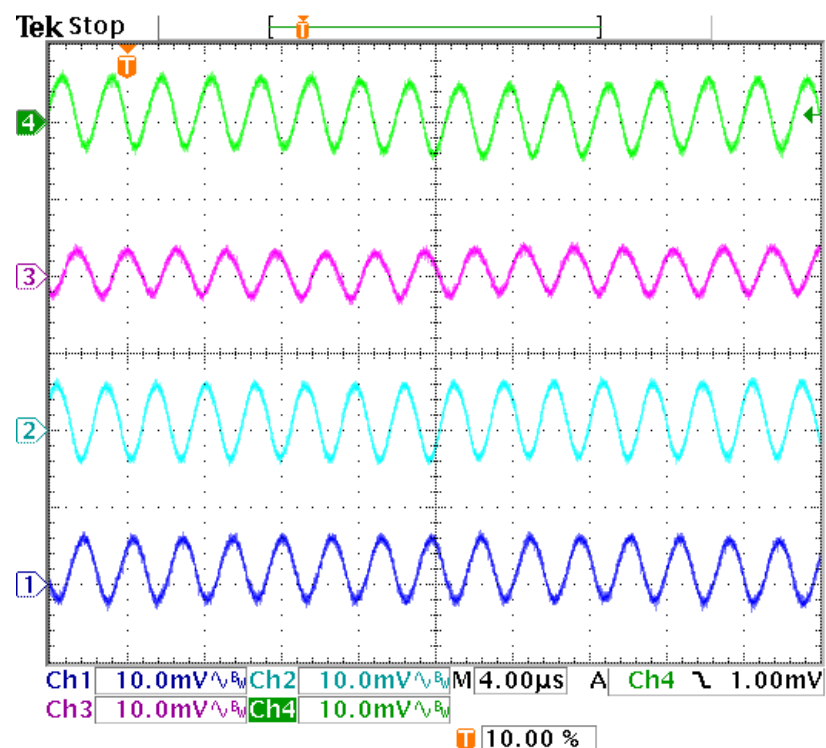
15 Nov 2011
11:30:52

Figure 17. Ripple full load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5



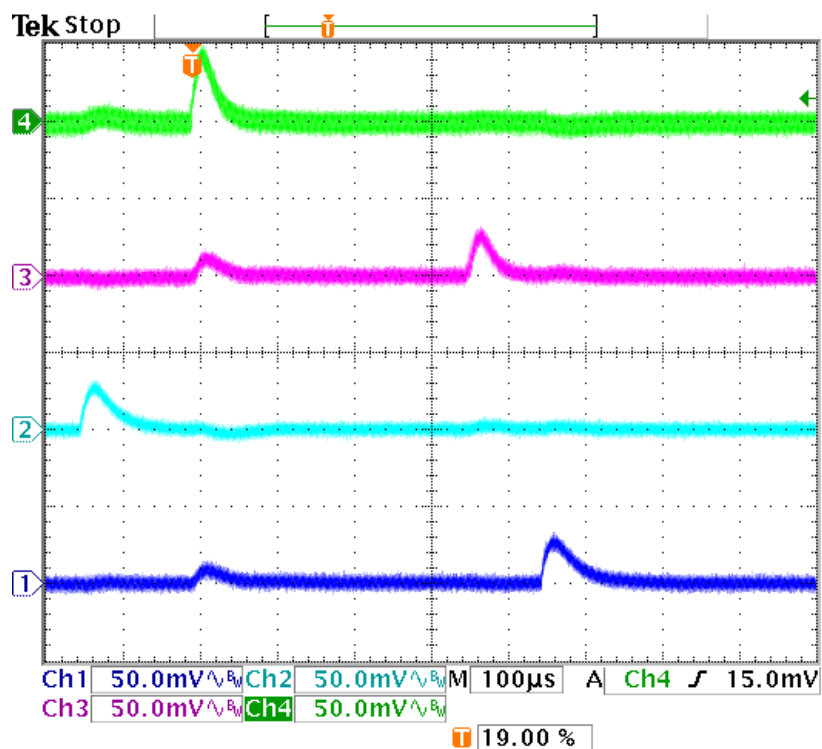
15 Nov 2011
11:38:34

Figure 18. Ripple full load: Ch1=1V5, Ch2=1V8, Ch3=2V0, Ch4=3V3



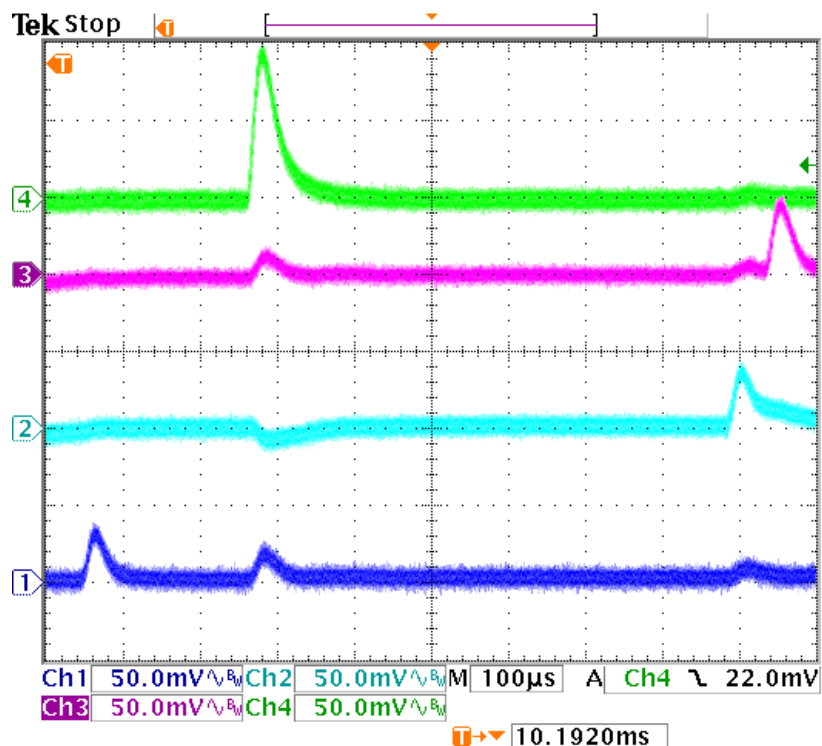
15 Nov 2011
11:32:21

Figure 19. Load release 100% to 50% load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5



15 Nov 2011
11:26:00

Figure 20. Load release 100% to 50% load: Ch1=1V5, Ch2=1V8, Ch3=2V0, Ch4=3V3



15 Nov 2011
11:19:47

Figure 21. Load step 50% to 100% load: Ch1=1V0, Ch2=1V0Mgt, Ch3=1V2, Ch4=2V5

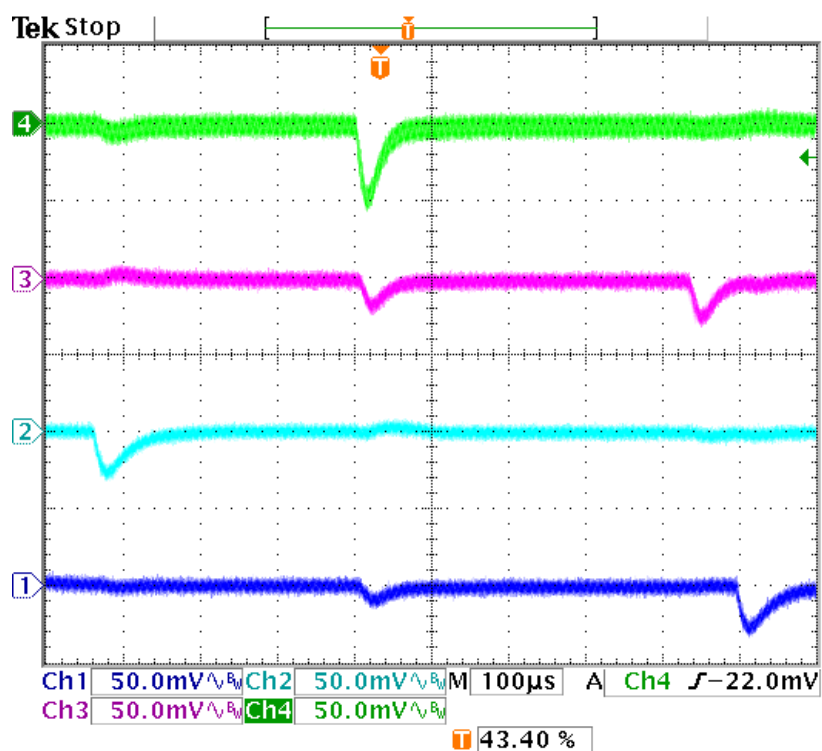
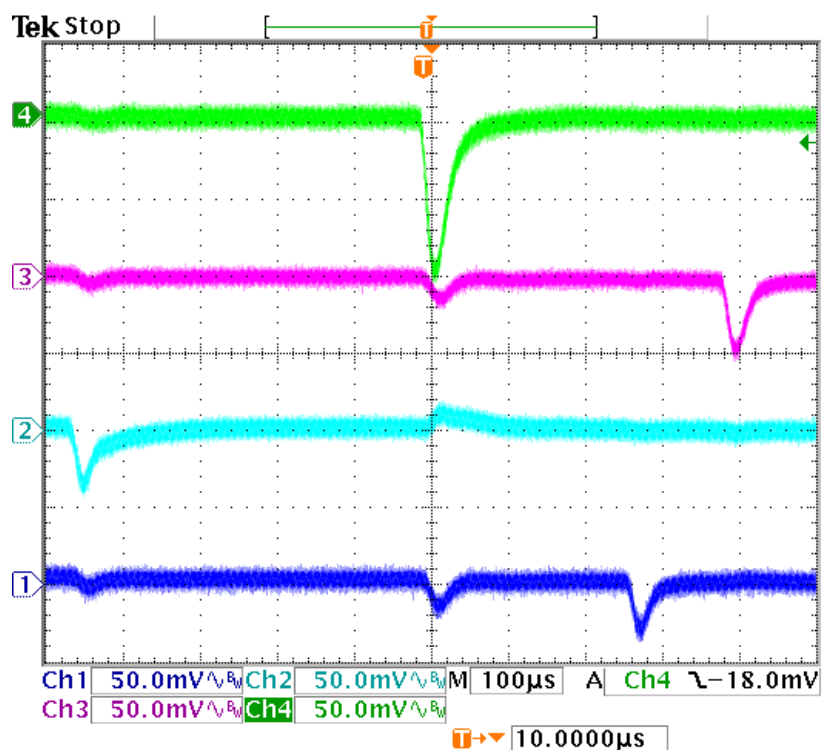
15 Nov 2011
11:30:13

Figure 22. Load step 50% to 100% load: Ch1=1V5, Ch2=1V8, Ch3=2V0, Ch4=3V3

15 Nov 2011
11:22:04

NOTES

The sequencing is designed to meet Xilinx requirements for Kintex 7.

ADI module part number: AES-POM-ANA1-G