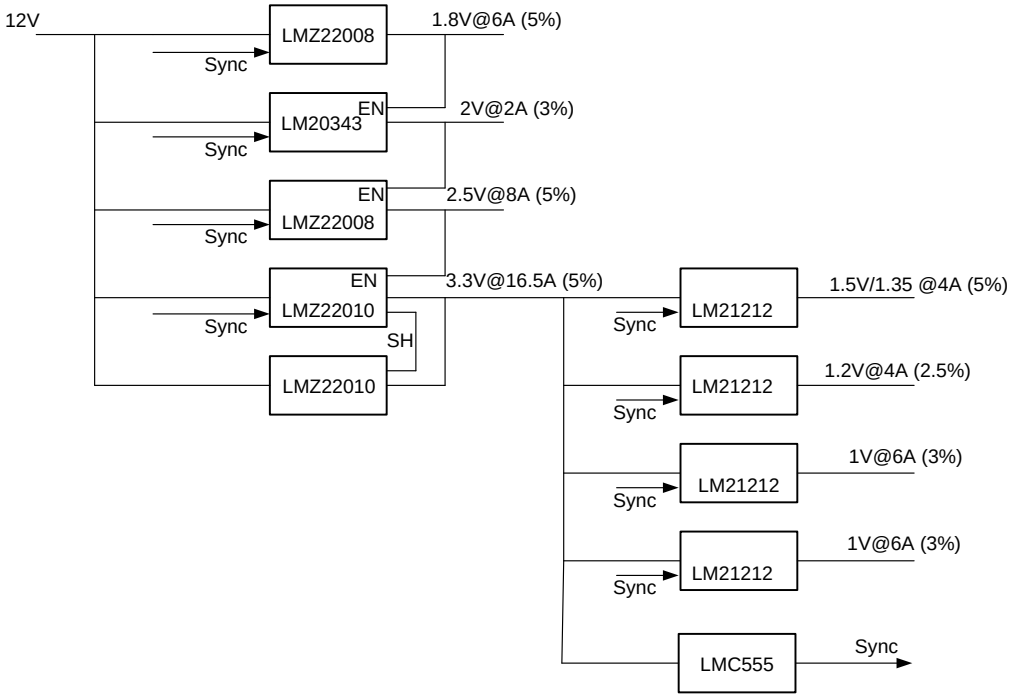
Test Results
for
PMP7804 Multiple Output Power Module for an FPGA Application

Test Report Contents

Power Architecture Block Diagram (total Tolerance in brackets shown); sync Frequency ~430kHz



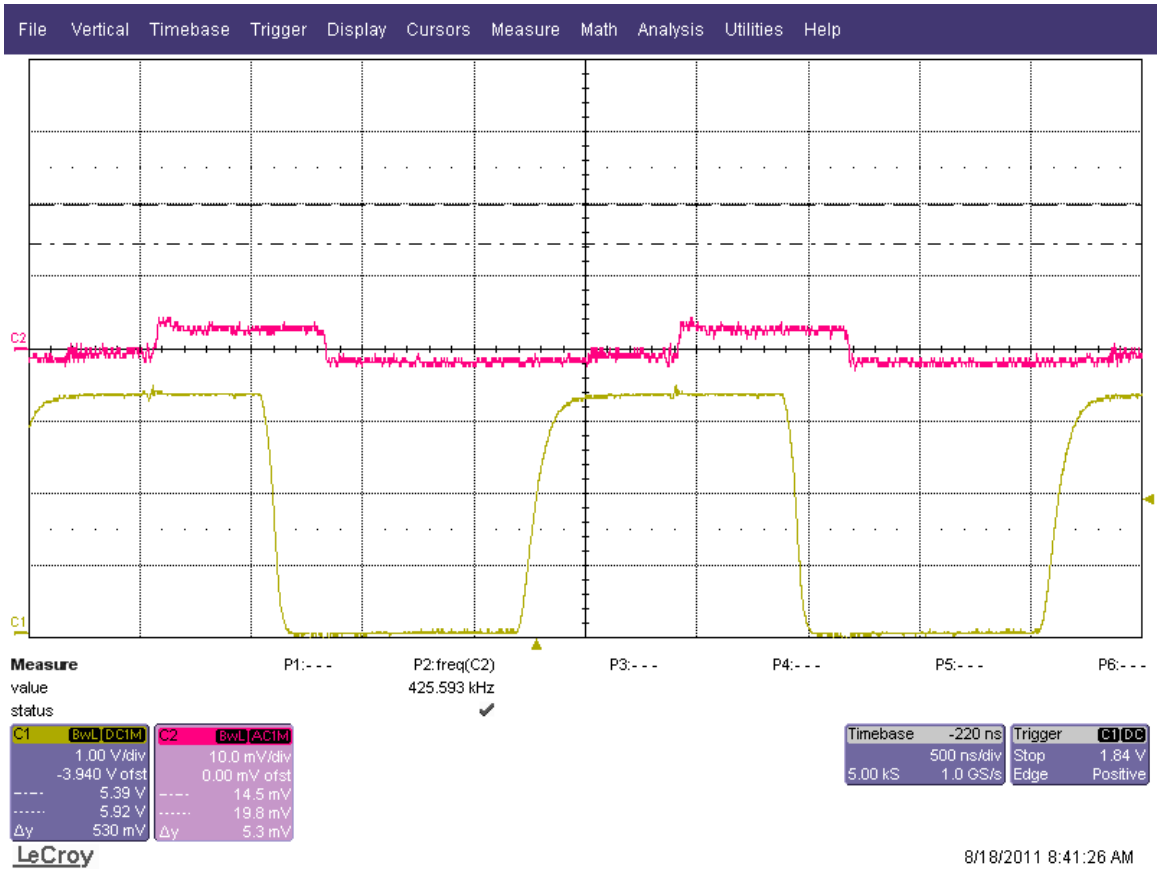
Results

Output Ripple Voltage

Load Conditions are Maximum
3.3 8 (Totaling 16A)
1.8V 6A
2.0V 2A
1.3V 4A
2.5V 8A
1.0V 6A
1.0V 6A
1.2V 4A

Comment
Channel one for all output ripple scope shots are the sync in pulse.

Vout Ripple 3.3V
(U6 and U7) Across Output Capacitor
Downstream Regulator Loads and 8A Load; total 16A
Output Capacitor = 4 X 470uF



Comment
Output ripple on the 3.3V rail at the input to downstream converters will be worse due to the input ripple requirements for a buck converter.

Ripple out load will be determine by the types and how much capacitance is present at load.

Result

Vout out ripple on is less than **10mV** peak to peak

3.3V Output Ripple (U6 and U7) measured across J Pins
Downstream Regulator Loads and 8A Load
Output Capacitor = 4 X 470uF

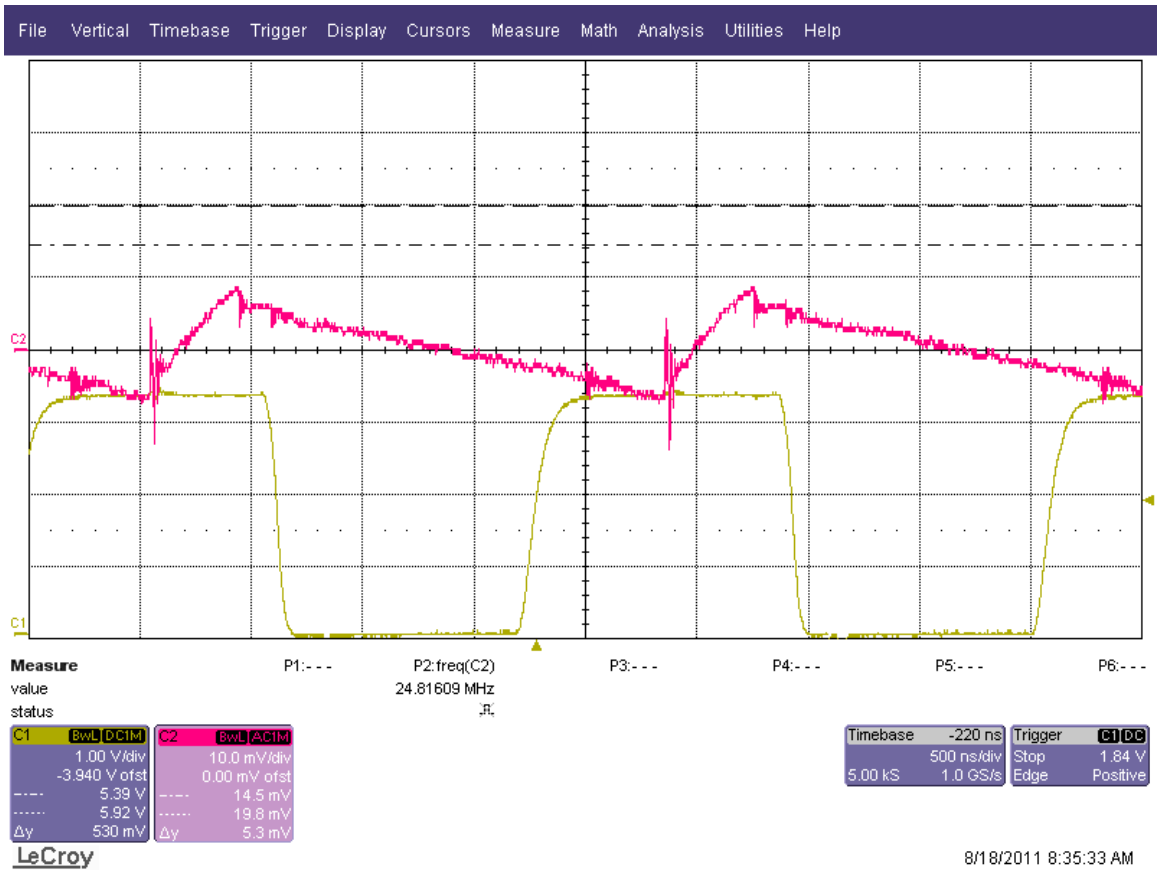
Comment

Voltage ripple seen here is much worse due to the input ripple current for the downstream buck converters. As mentioned, the 3.3V rail is off the board and is expected and is advised to install extra capacitance at load.

Result

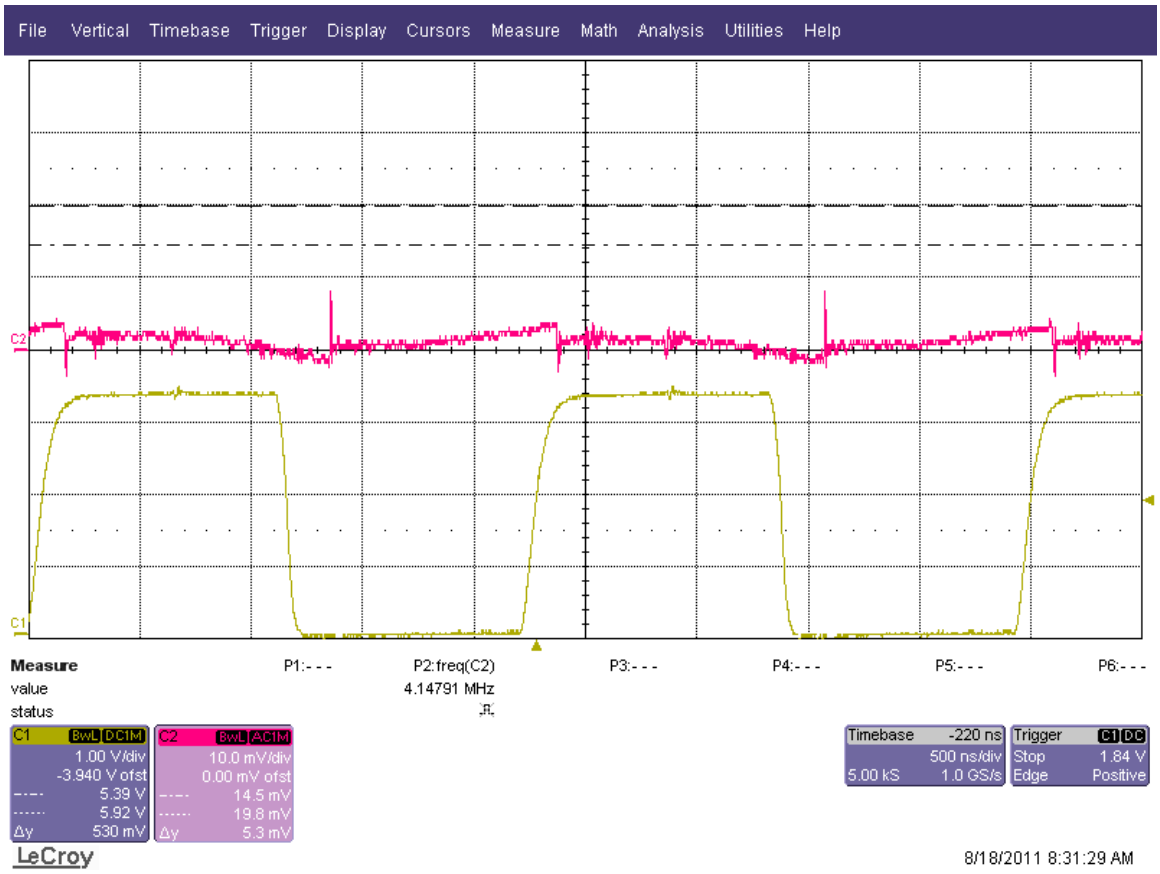
Vout ripple **~ 100mV** peak to peak at the J pins on connector.

Vout Ripple 1.8V
(U1) Across Output Capacitor
1.8V @ 6A



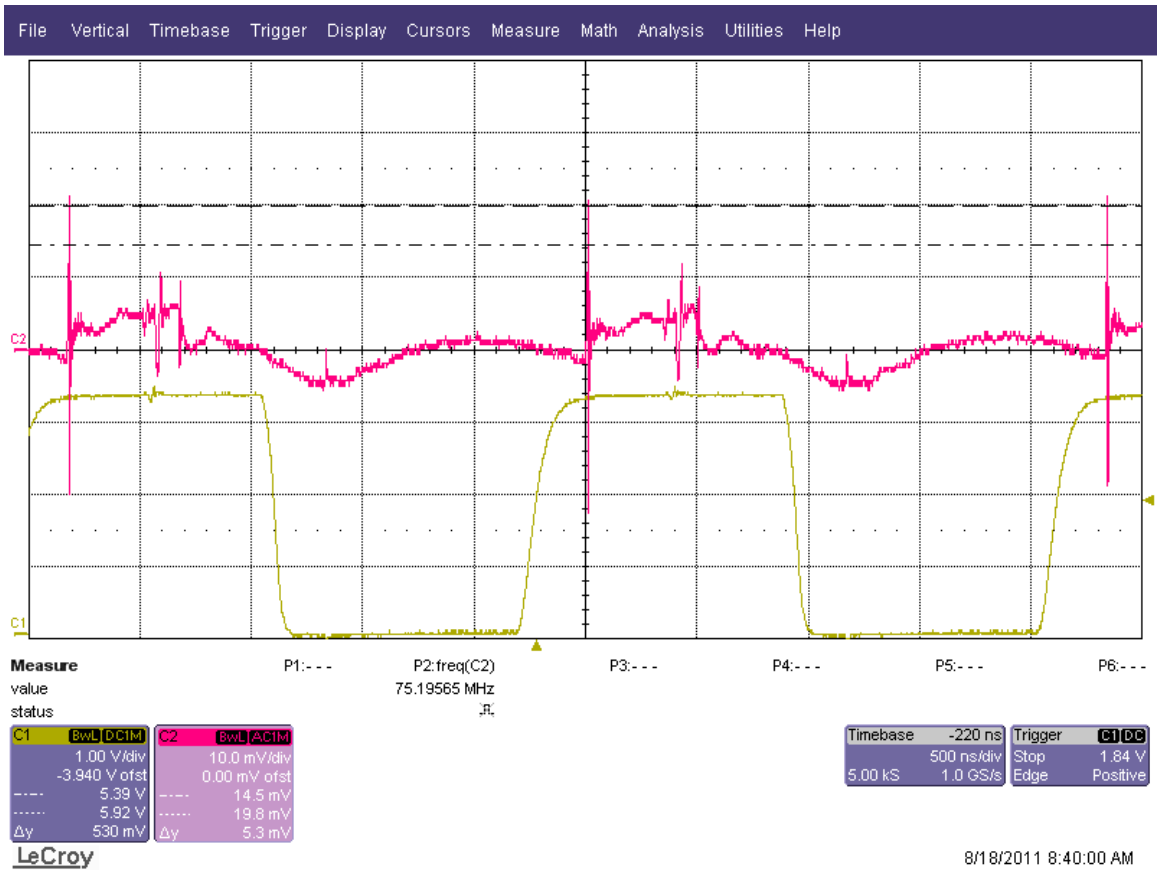
Result
~16mV Peak to peak

Vout Ripple 1.35V
(U3) Across Output Capacitor
1.35V @ 4A



Result
Less than **10mV** peak to peak

Vout Ripple 2V
(U2) Across Output Capacitor
2.0V @ 2A



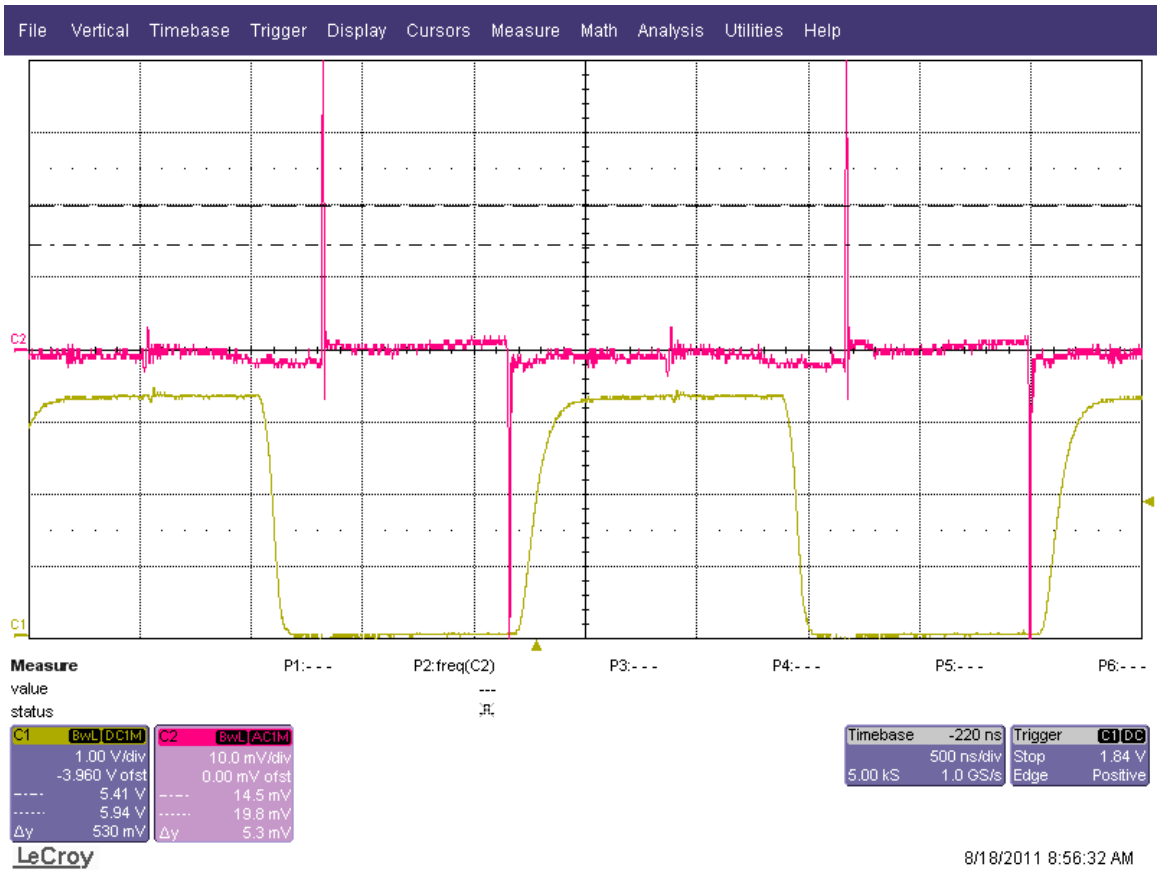
Result
~12mV peak to peak

Vout Ripple 1V
(U10) Across Output Capacitor
1.0V @ 6A

Comment
Spikes on output is due to noise pick up (see Switch node results)

Result
Less than **10mV** peak to peak

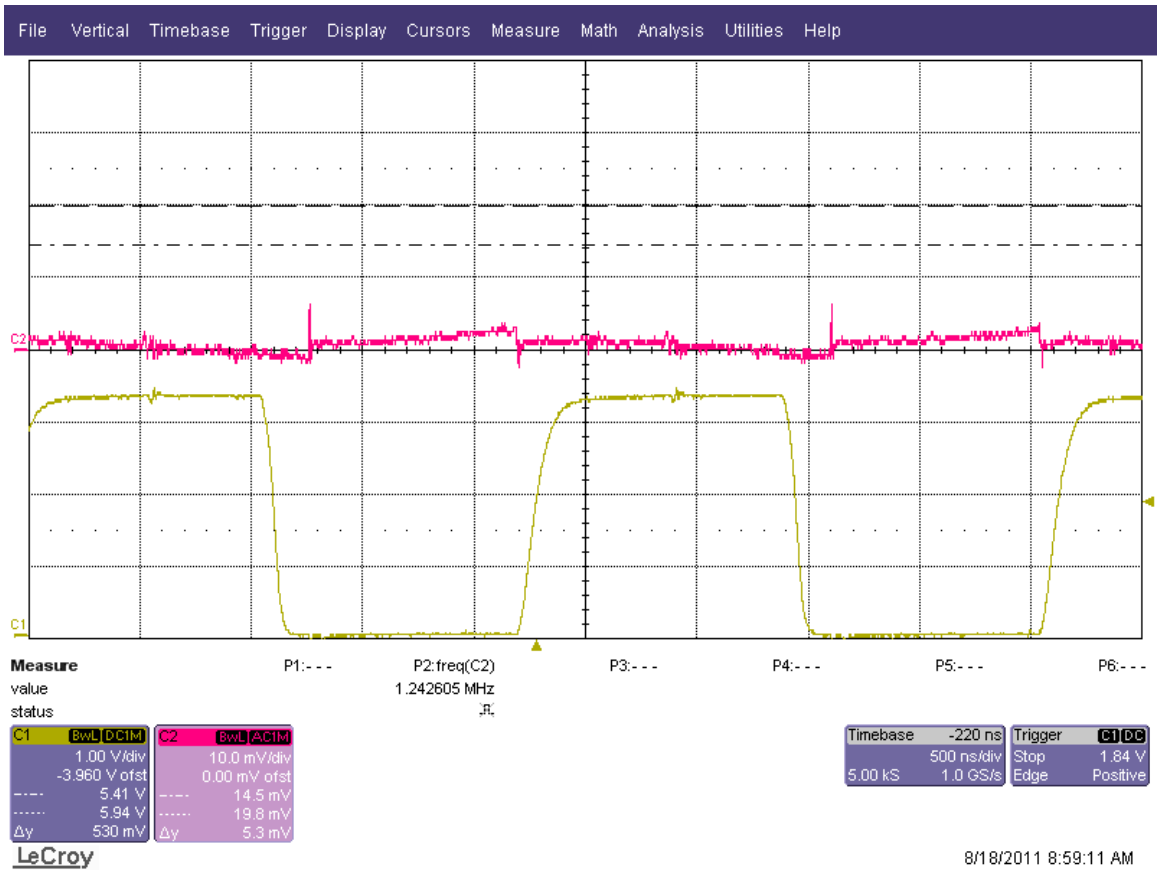
Vout Ripple 1V
(U8) Across Output Capacitor
1.0V @ 6A



Comment
Spikes on output is due to noise pick up (see Switch node results)

Result
Less than **10mV** peak to peak

Vout Ripple 1.2V
(U5) Across Output Capacitor
1.2V @ 4A



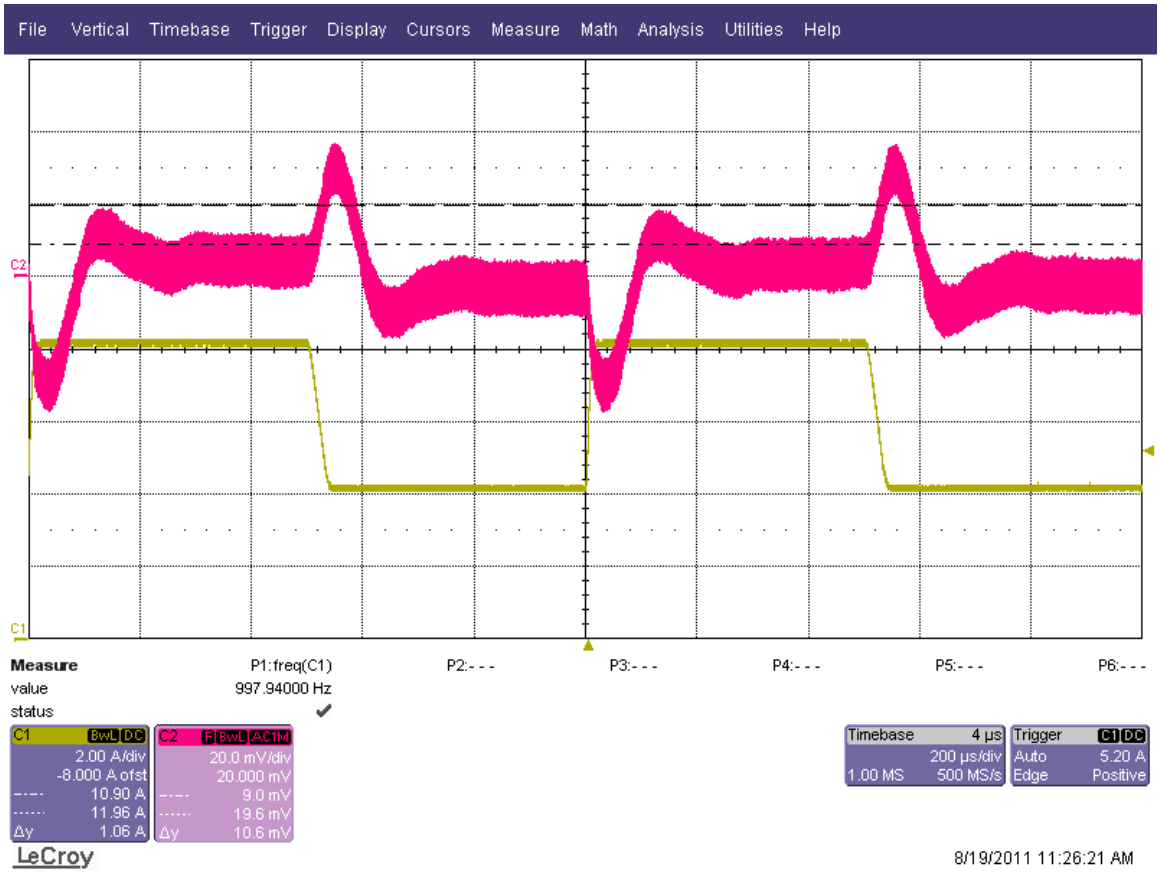
Result
Less than **10mV** peak to peak

Vout Ripple 2.5V
(U4) Across Output Capacitor
2.5V @ 8A

Result
Less than **20mV** peak to peak

Load Transient Performance

3.3V (U6 & U7) 4A to 8A; Slew Rate:1275mA/us

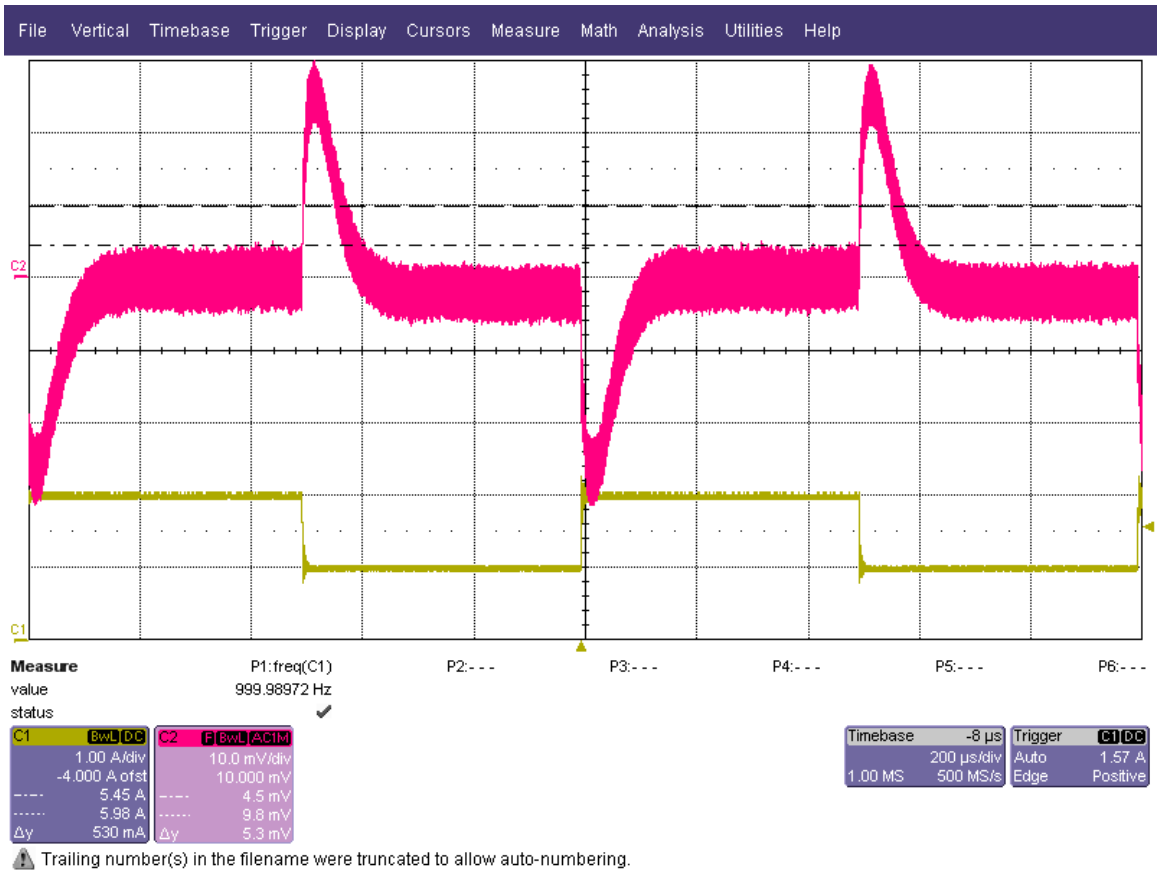


Result
~**40mV** undershoot/Overshoot

1.8V (U1) 3A to 6A, Slew rate 200mA/us

Result
~**30mV** undershoot/Overshoot

2.0V (U2) 1A to 2A, Slew rate 2500mA/us

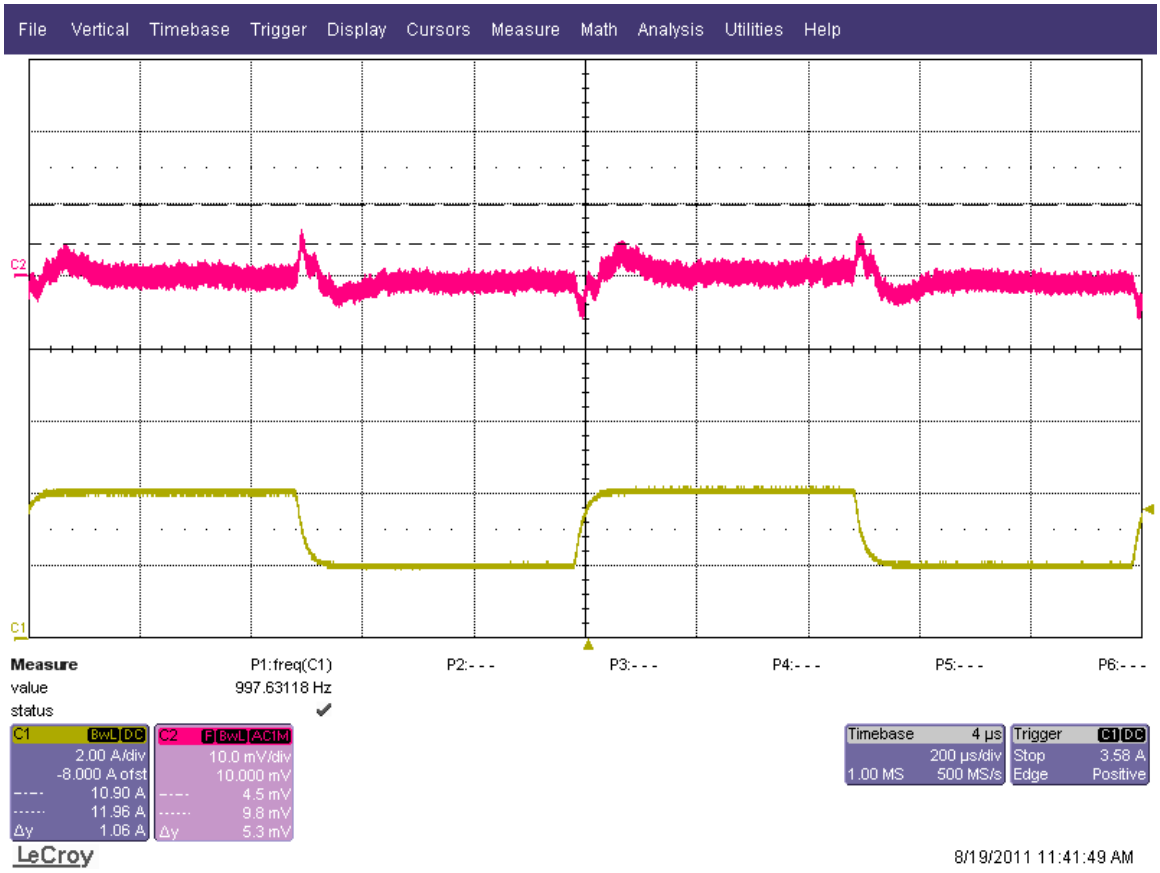


Result
~**30mV** undershoot/Overshoot

2.5V (U4) 4A to 8A, Slew rate 1275A/us

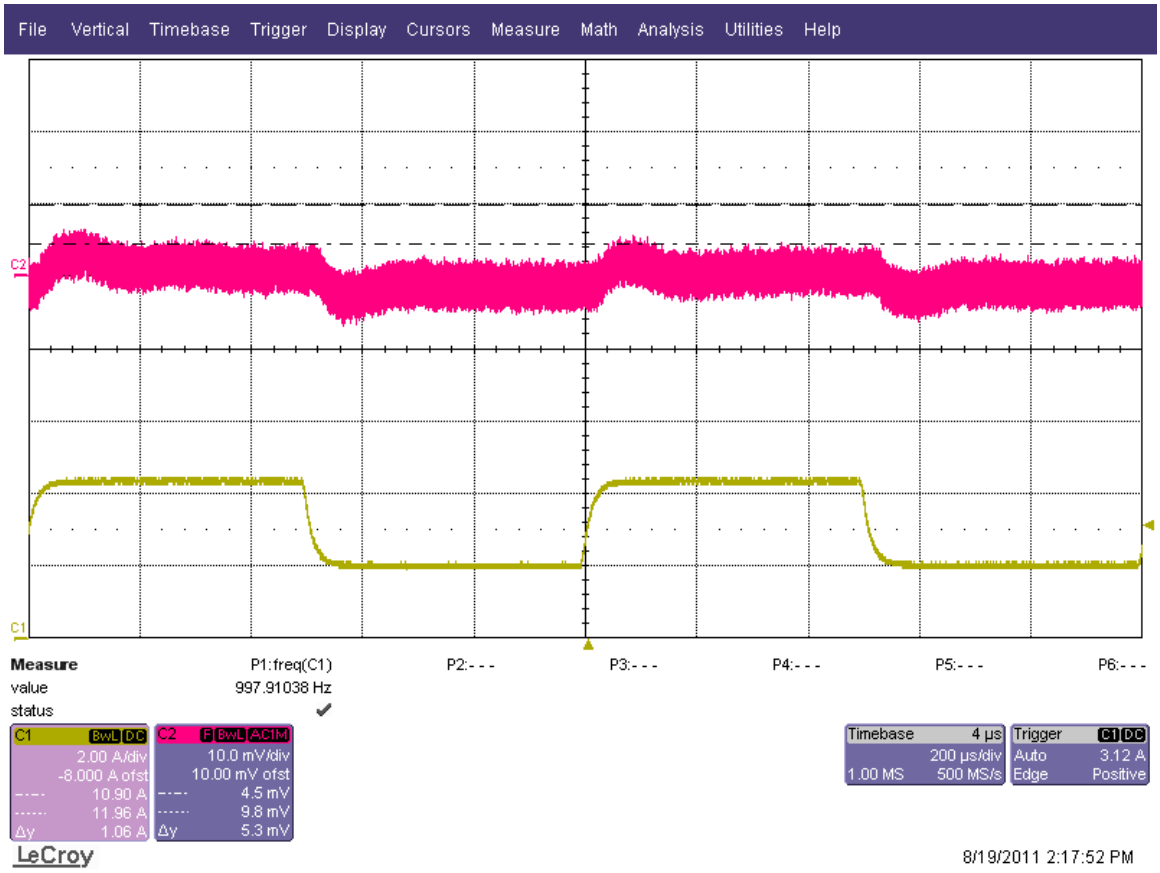
Results
Less than **50mV** Overshoot/undershoot.

1.2V (U2) 2A to 4A, Slew rate 255mA/us



Result
Less than 10mV undershoot/overshoot.

1.35V (U3) 2A to 4A, Slew rate 255mA/us

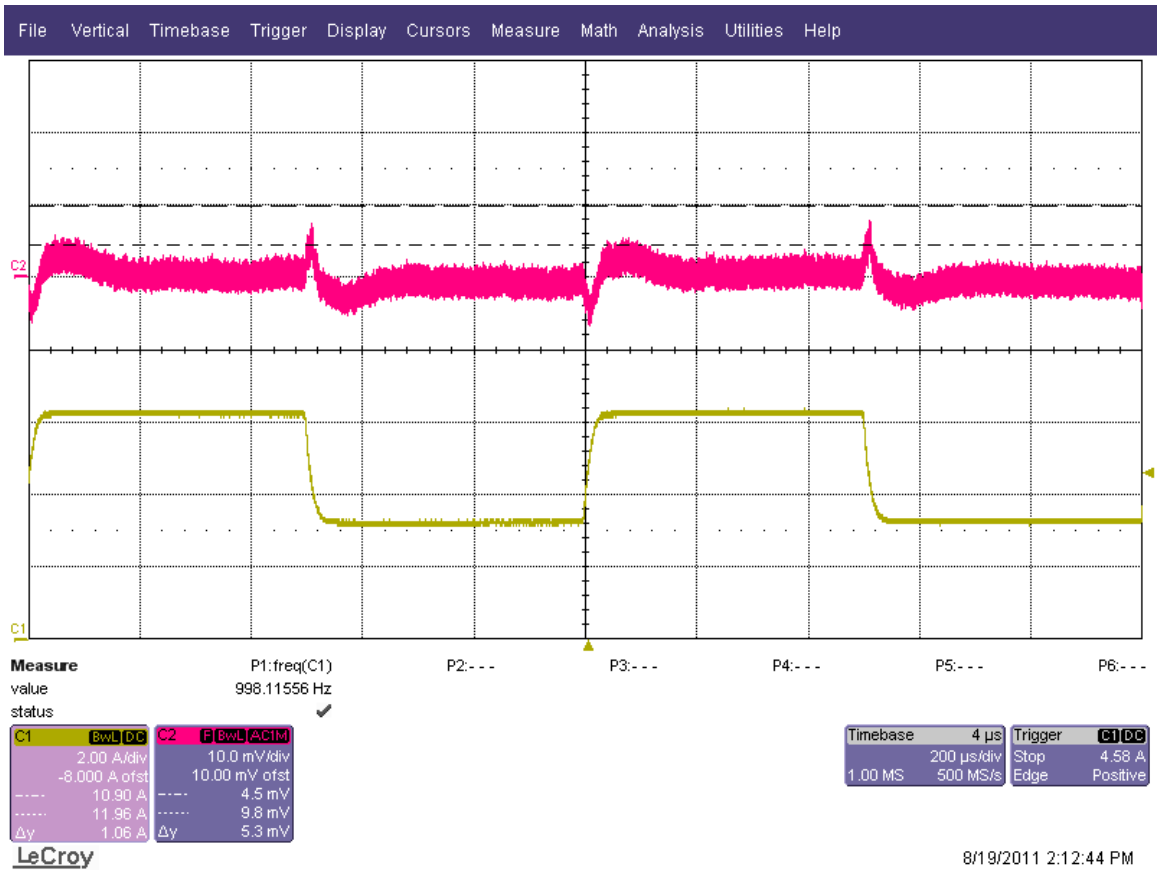


Result
Less than **10mV** overshoot/undershoot

1.0V MGT (U8) 3A to 6A, Slew rate 200mA/us

Result
~**10mV** overshoot/Undershoot

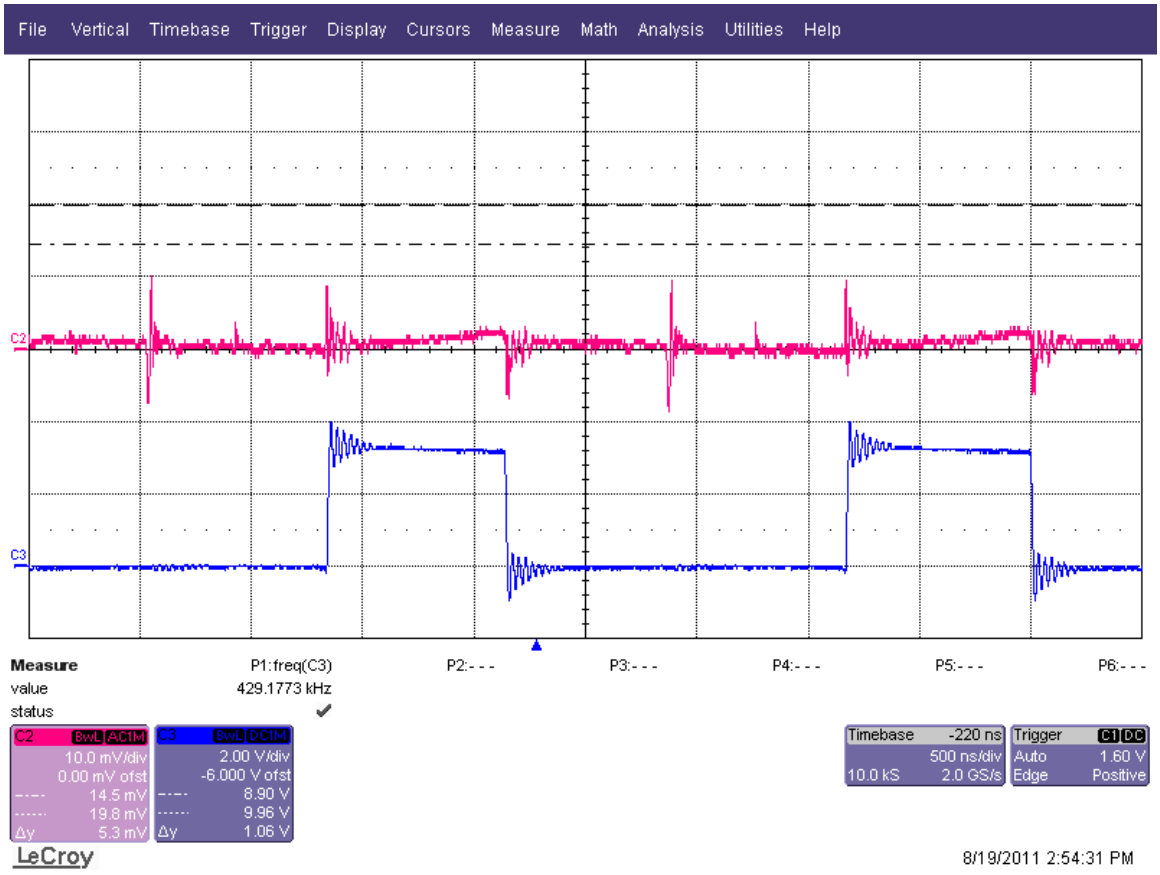
1.0V (U10) 3A to 6A, Slew rate 200mA/us



Result
~**10mV** overshoot/Undershoot

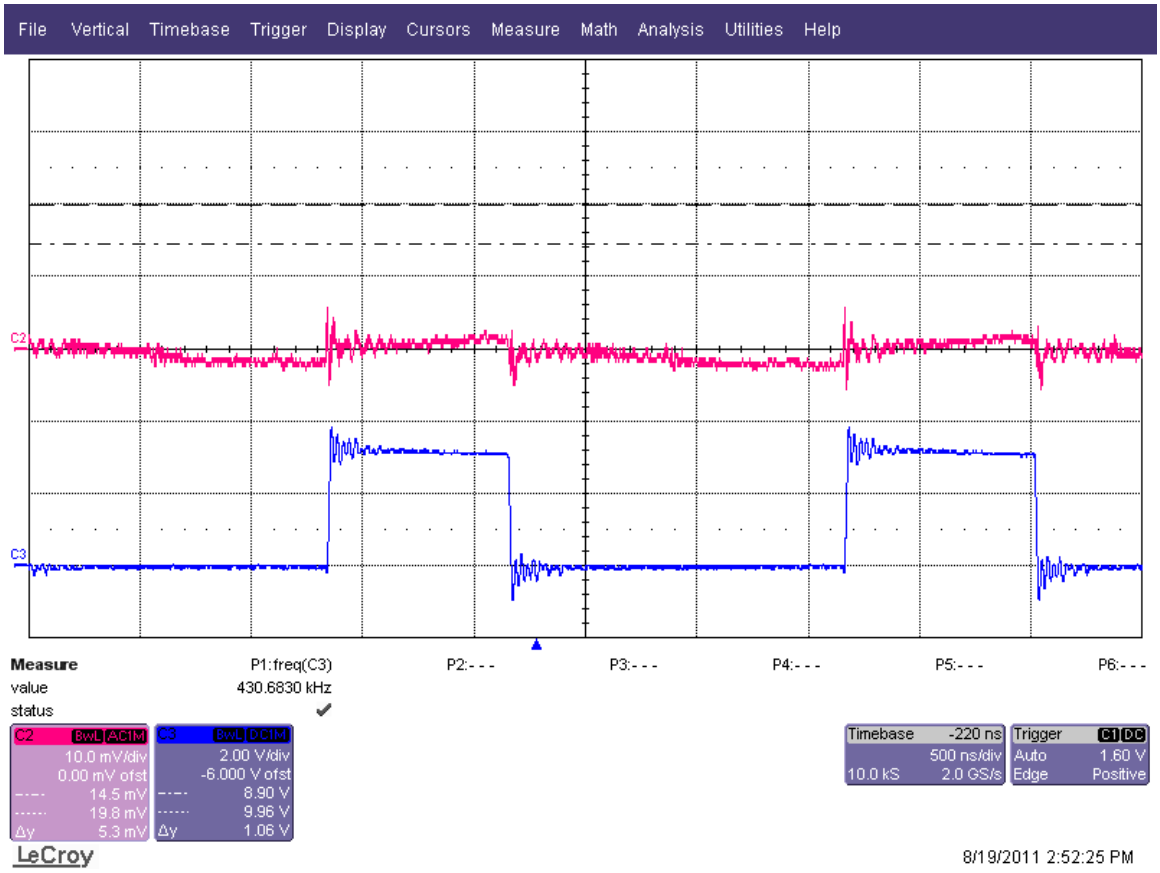
Switch Node Scope Shots

1.0V MGT IL = 6A



Switch Node Scope Shots

1.0V IL = 6A

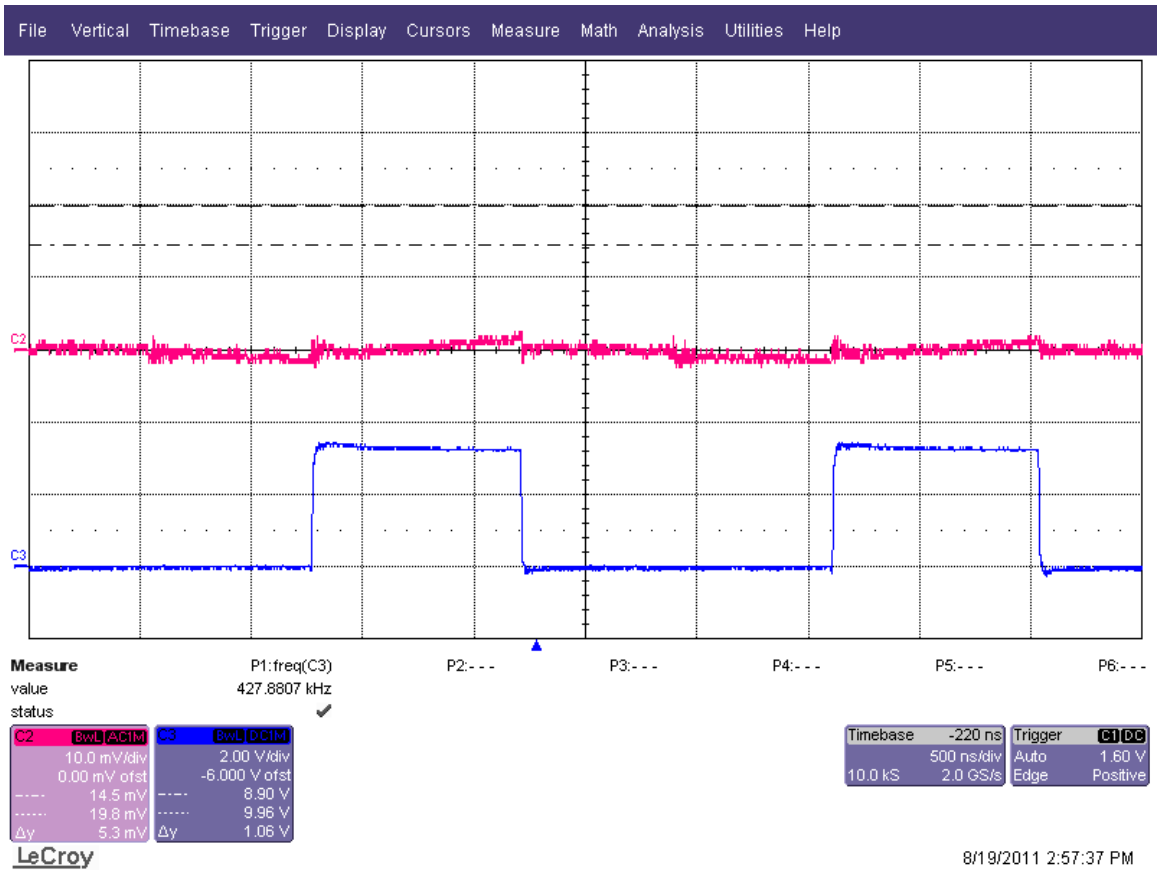


Note:

Channel 2, Vout ripple lower noise spikes…

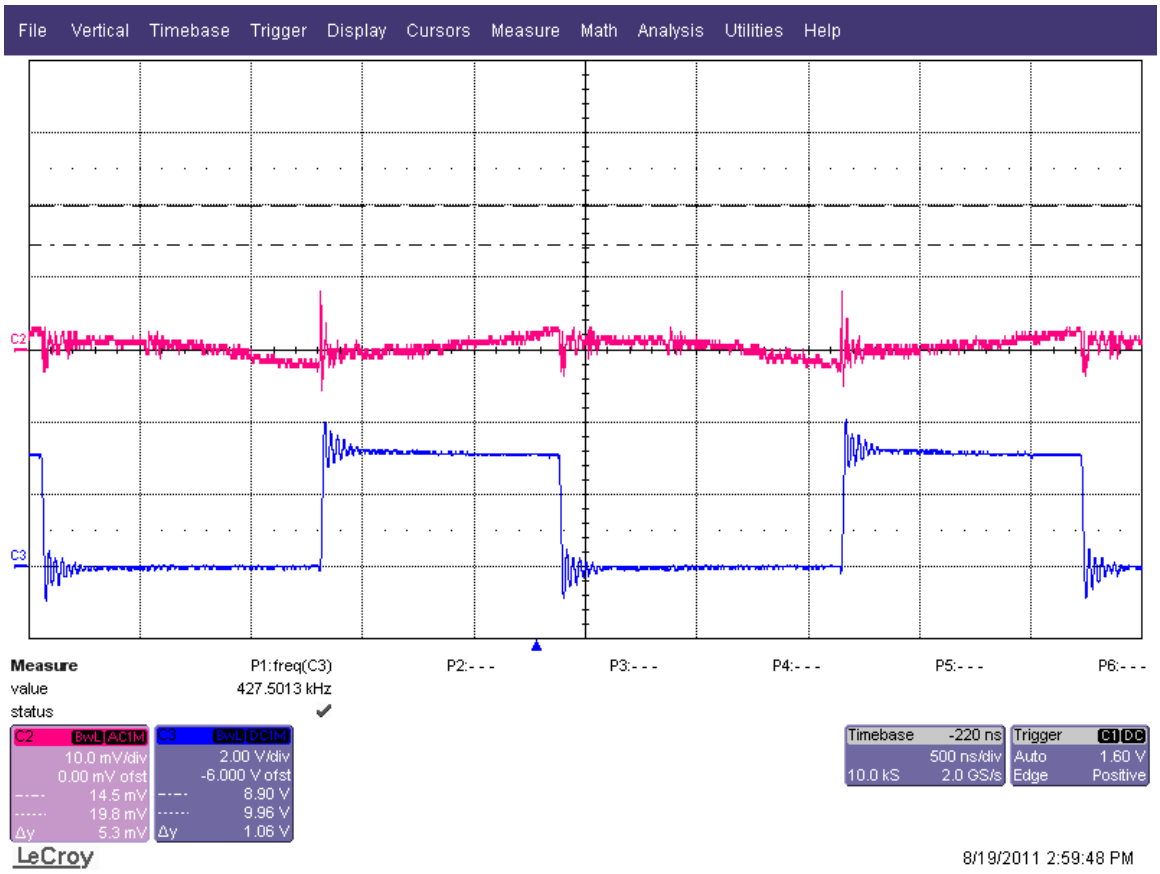
Switch Node Scope Shots

1.2V IL = 4A



Switch Node Scope Shots

1.35V MGT IL = 4A



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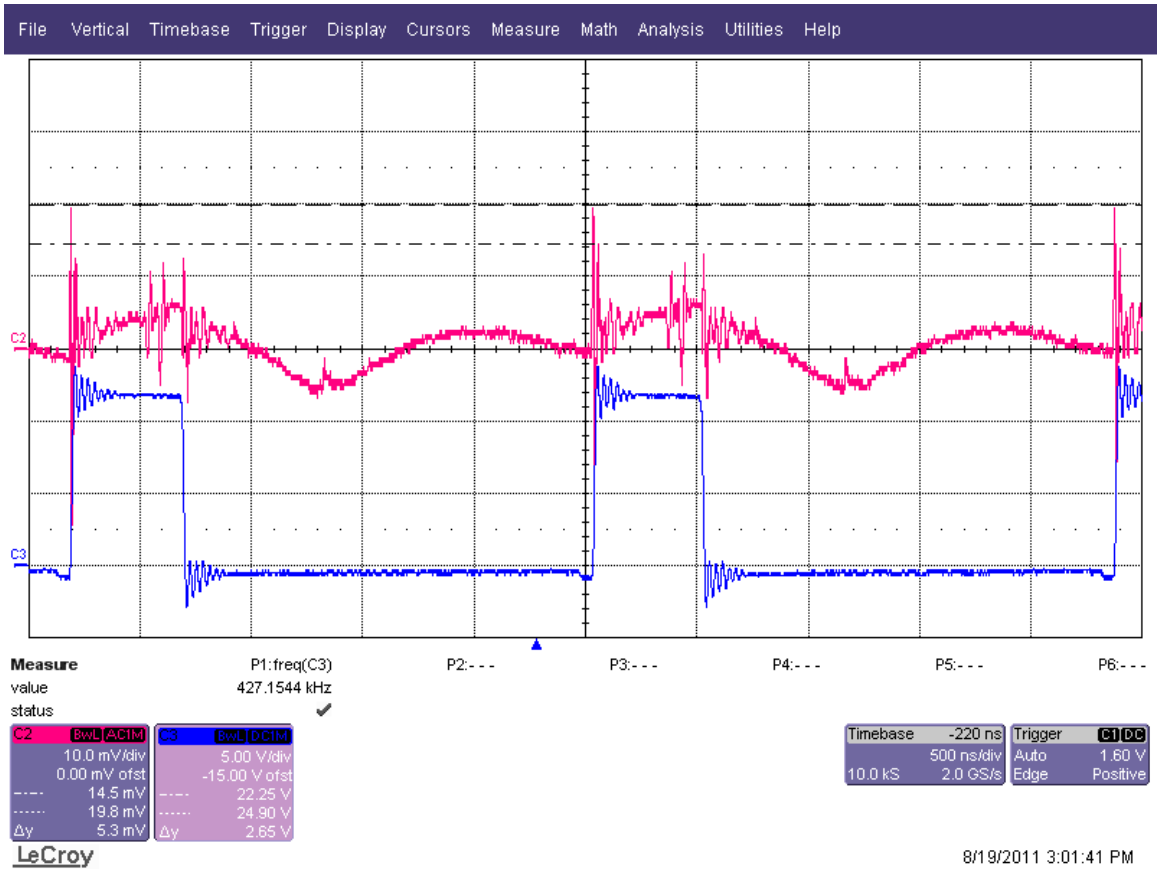
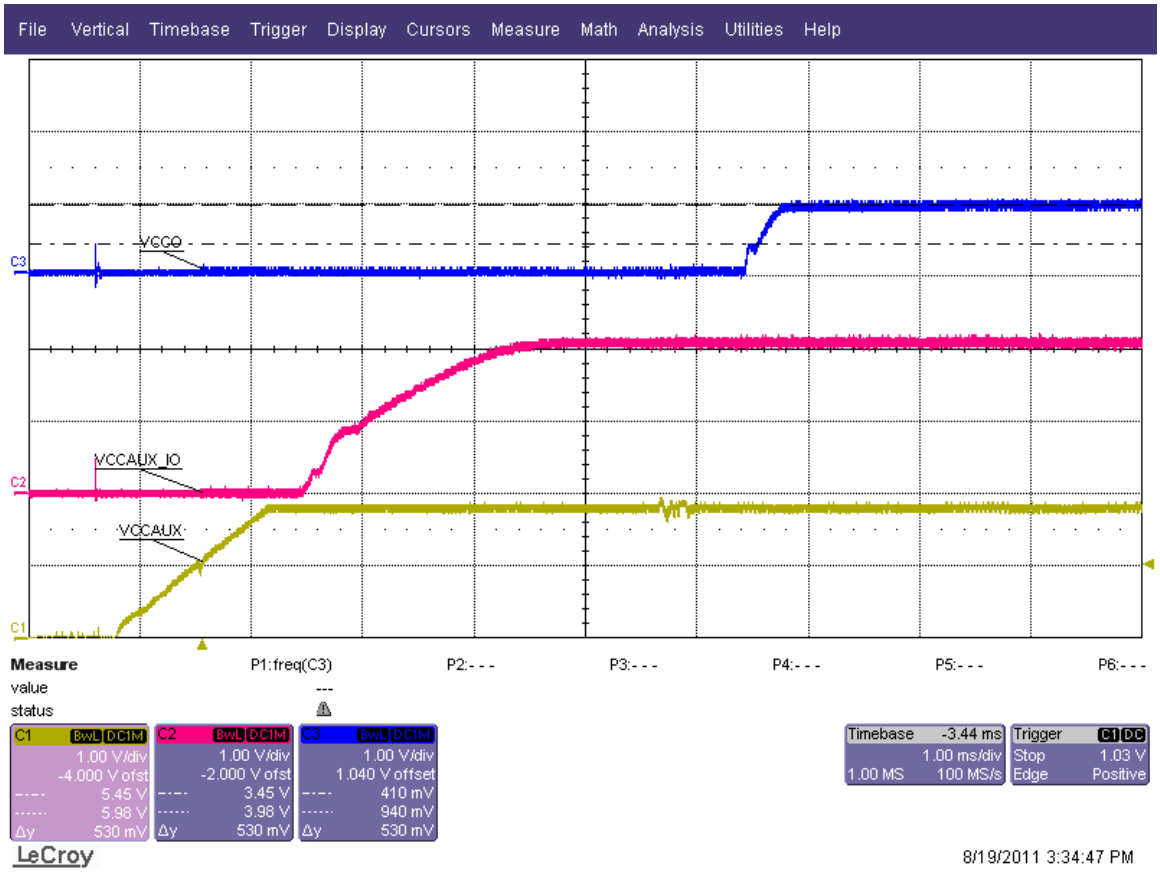
Switch Node Scope Shots

2.0V IL = 2A



Start Up Sequence



Efficiency Data

		V Measured	Iload	Power	Power	Efficiency
10%	Input	12.006	0.939		11.273634	**76.08 %**
	Output					
	1.8V	1.7914	0.600	1.075		
	1.0V	1.0602	0.600	0.636		
	1.0V	1.0622	0.606	0.644		
	1.35V	1.4046	0.400	0.562		
	2.5V	2.5028	0.801	2.005		
	2.0V	2.0859	0.200	0.417		
	3.3V	3.4023	0.801	2.725		
	1.2V	1.2605	0.407	0.513		
					8.5766638	
	Ploss					**2.6969702 W**

		V Measured	Iload	Power	Power	Efficiency
50%	Input	12.008	4.334		52.042672	**82.18 %**
	Output					
	1.8V	1.7934	3.000	5.380		
	1.0V	1.0591	2.992	3.169		
	1.0V	1.0607	3.000	3.182		
	1.35V	1.4040	2.002	2.811		
	2.5V	2.5019	4.005	10.020		
	2.0V	2.0852	1.000	2.085		
	3.3V	3.4005	4.003	13.612		
	1.2V	1.2547	1.999	2.508		
					42.7677313	
	Ploss					**9.2749407 W**

		V Measured	Iload	Power	Power	Efficiency
100%	Input	12.002	8.980		107.77796	**79.27**
	Output					
	1.8V	1.7944	6.010	10.784		
	1.0V	1.0577	5.997	6.343		
	1.0V	1.0584	6.005	6.356		
	1.35V	1.4043	4.000	5.617		
	2.5V	2.4980	8.000	19.984		
	2.0V	2.0819	2.000	4.164		
	3.3V	3.3967	8.000	27.174		
	1.2V	1.2543	3.999	5.016		
					85.43764882	
	Ploss					**22.3403112 W**

Thermal Data at room temp all loads running at max Iout

IC	Output Voltage	Load Current	Temperature (Deg C)
U1	1.80	6	75.5
U2	2.00	2	91.4
U3	1.35	4	60
U4	2.50	4	104
U5	1.20	4	70.5
U6, U7	3.30	16	104.1
U7			104.2
U8	1.00	6	58.2
U10	1.00	6	62.1

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