Test Data
For PMP9333
1/15/2014
Rev. 2

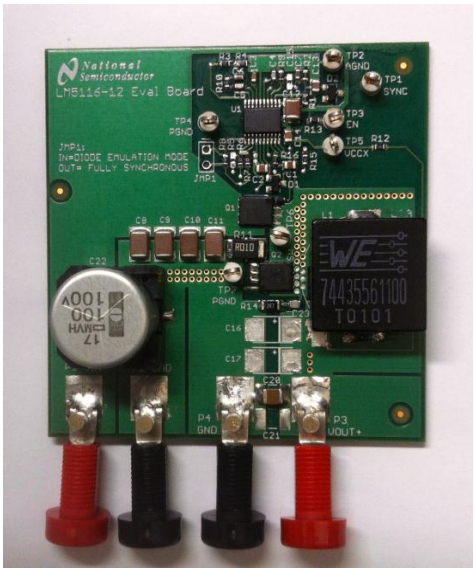
1. Circuit Description

PMP9333 is a Wide-Vin, synchronous buck regulator. This test report was performed on a modified LM5116-12 EVM in compliance with the below specifications. The circuit has an operating input voltage range of 50V to 60V max. The output is set at 12V at 4A continuous, with a 7A peak transient. All tests were performed at room temperature on an open bench.

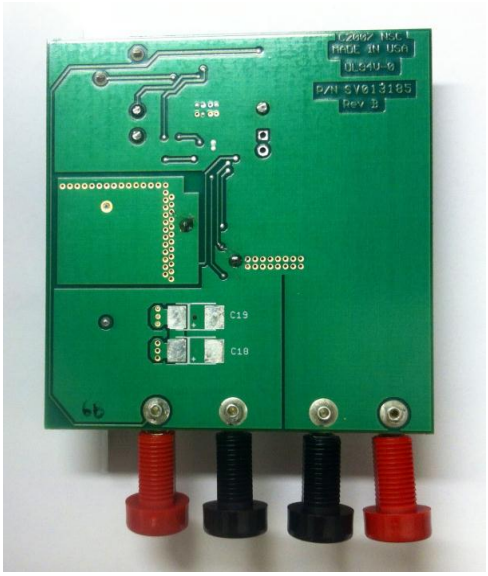
Vin	Operational 50V & 57V +/-10%
Vout(s)	12V
Iout Max	4A
FSW	200kHz

2. Photos

Top Side: (Modified LM5116-12 EVM)

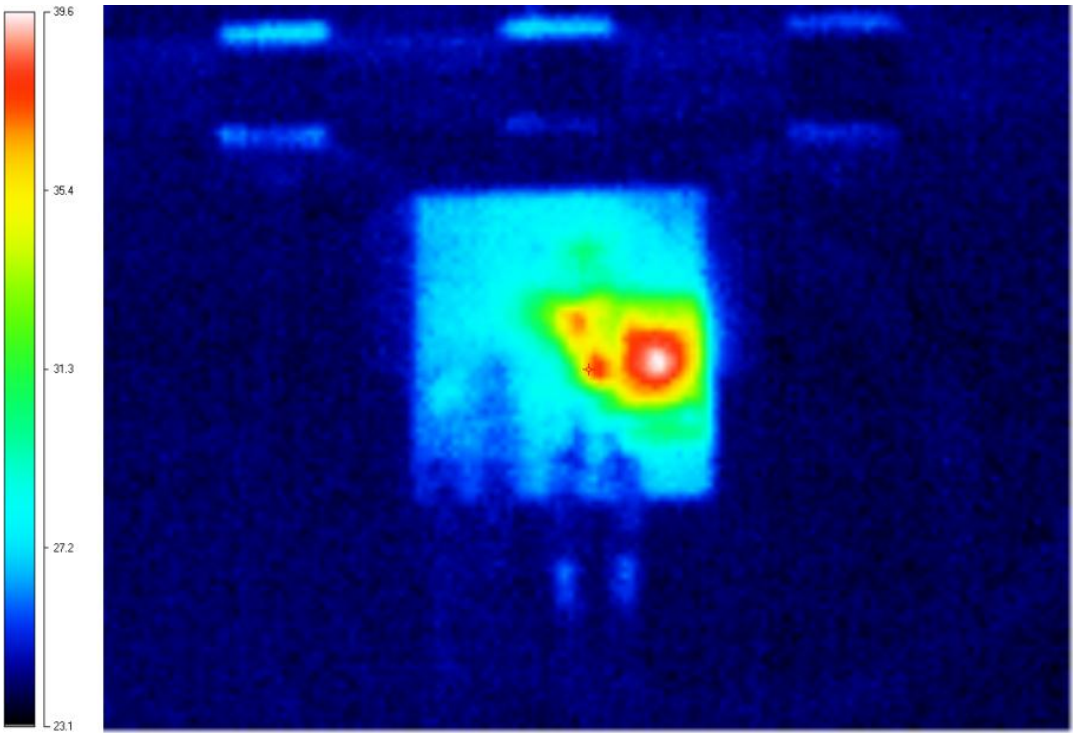


Bottom Side:



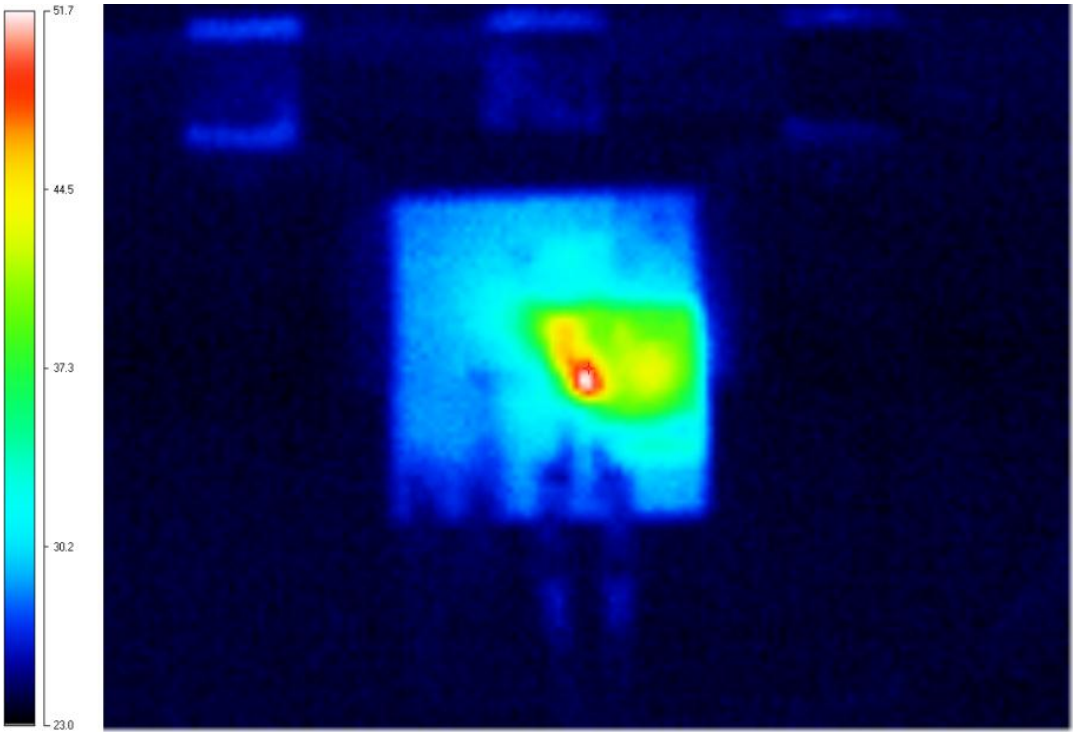
3. Thermal Image.

Steady State Temp - 50Vin, 12 Vout at 4A. (15min settling time, with a 200LFM fan blowing air across the PCB)



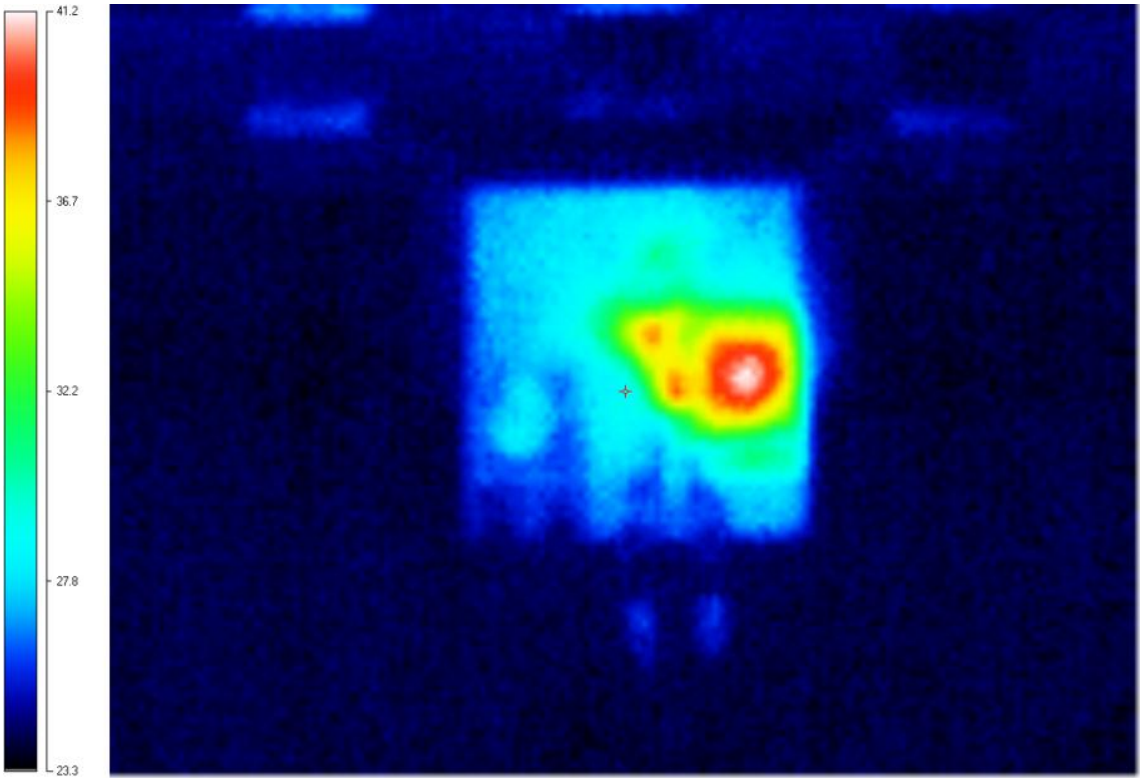
The Mosfets and inductor are the hottest items shows a~16oC Temp Rise.

Steady State Temp - 50Vin, 12 Vout at 7A. (15min settling time, with a 200LFM fan blowing air across the PCB)



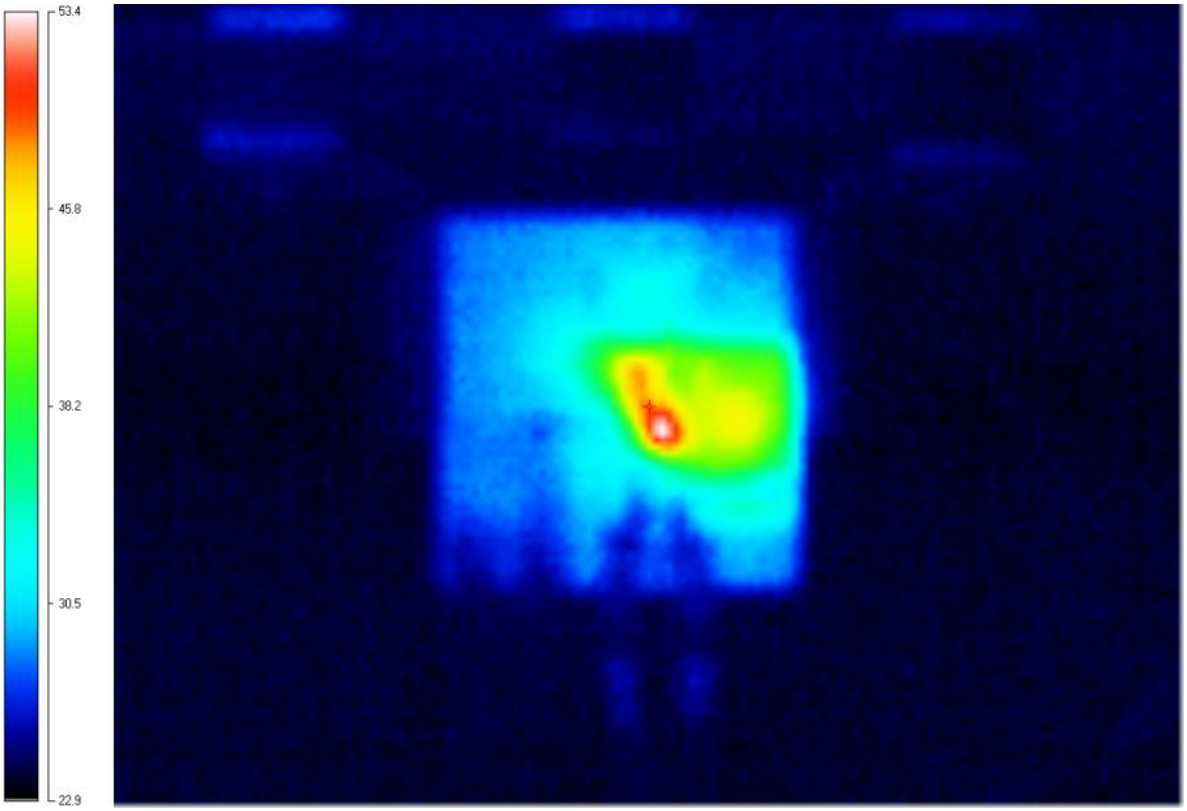
The Mosfets and inductor are the hottest items shows a~28oC Temp Rise.

Steady State Temp - 57Vin, 12 Vout at 4A. (15min settling time, with a 200LFM fan blowing air across the PCB)



The Mosfets and inductor are the hottest items shows a~17oC Temp Rise.

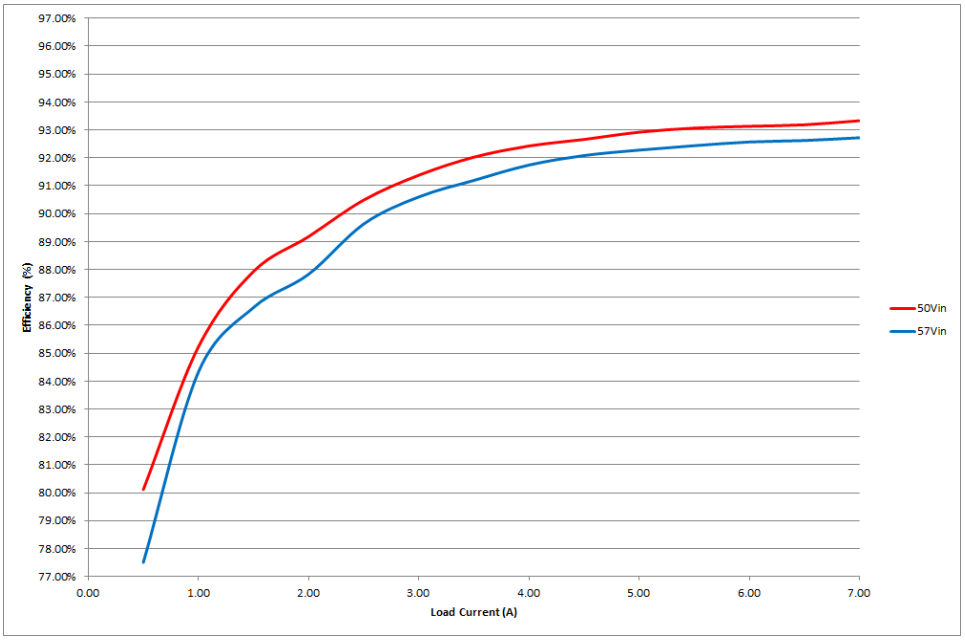
Steady State Temp - 57Vin, 12 Vout at 7A. (15min settling time, with a 200LFM fan blowing air across the PCB)



The Mosfets and inductor are the hottest items shows a~30oC Temp Rise.

4. Efficiency Data

Efficiency Curve



Efficiency Curve Data

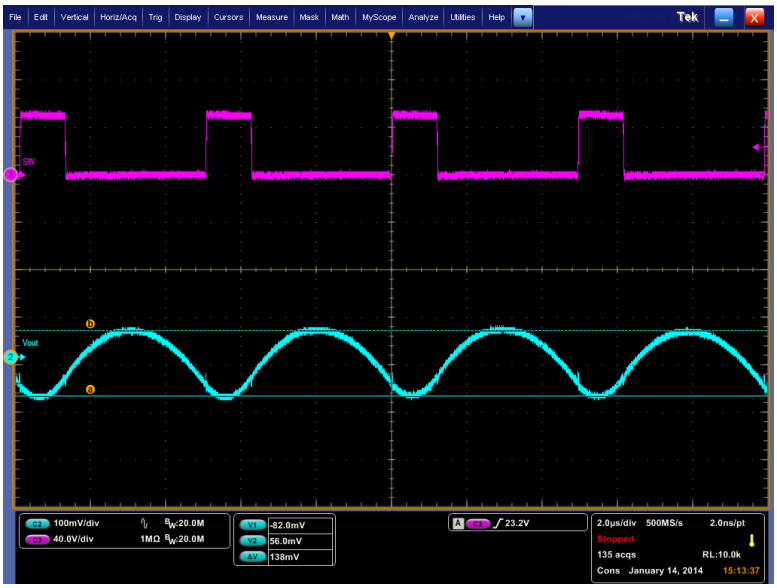
(V_{IN})	(I_{IN})	(V_{OUT})	(I_{OUT})	(P_{IN})	(P_{OUT})	(P_{LOSS})	(Eff%)
50.00	0.150	12.018	0.50	7.50	6.01	1.49	80.12%
50.00	0.282	12.018	1.00	14.10	12.02	2.08	85.23%
50.00	0.410	12.017	1.50	20.50	18.03	2.47	87.93%
50.00	0.539	12.017	2.00	26.95	24.03	2.92	89.18%
50.00	0.664	12.017	2.50	33.20	30.04	3.16	90.49%
50.00	0.789	12.016	3.00	39.45	36.05	3.40	91.38%
50.00	0.914	12.016	3.50	45.70	42.06	3.64	92.02%
50.00	1.040	12.015	4.00	52.00	48.06	3.94	92.43%
50.00	1.167	12.015	4.50	58.35	54.07	4.28	92.66%
50.00	1.293	12.015	5.00	64.65	60.07	4.58	92.92%
50.00	1.420	12.014	5.50	71.00	66.08	4.92	93.07%
50.00	1.548	12.014	6.00	77.40	72.08	5.32	93.13%
50.00	1.676	12.014	6.50	83.80	78.09	5.71	93.18%
50.00	1.802	12.013	7.00	90.10	84.09	6.01	93.33%

(V_{IN})	(I_{IN})	(V_{OUT})	(I_{OUT})	(P_{IN})	(P_{OUT})	(P_{LOSS})	(Eff%)
57.00	0.136	12.017	0.50	7.75	6.01	1.74	77.51%
57.00	0.250	12.017	1.00	14.25	12.02	2.23	84.33%
57.00	0.365	12.017	1.50	20.81	18.03	2.78	86.64%
57.00	0.480	12.015	2.00	27.36	24.03	3.33	87.83%
57.00	0.588	12.016	2.50	33.52	30.04	3.48	89.63%
57.00	0.698	12.016	3.00	39.79	36.05	3.74	90.60%
57.00	0.809	12.015	3.50	46.11	42.05	4.06	91.19%
57.00	0.919	12.014	4.00	52.38	48.06	4.33	91.74%
57.00	1.030	12.014	4.50	58.71	54.06	4.65	92.08%
57.00	1.142	12.014	5.00	65.09	60.07	5.03	92.28%
57.00	1.254	12.013	5.50	71.48	66.07	5.41	92.44%
57.00	1.366	12.013	6.00	77.86	72.08	5.79	92.57%
57.00	1.479	12.013	6.50	84.30	78.08	6.22	92.62%
57.00	1.591	12.012	7.00	90.69	84.09	6.60	92.72%

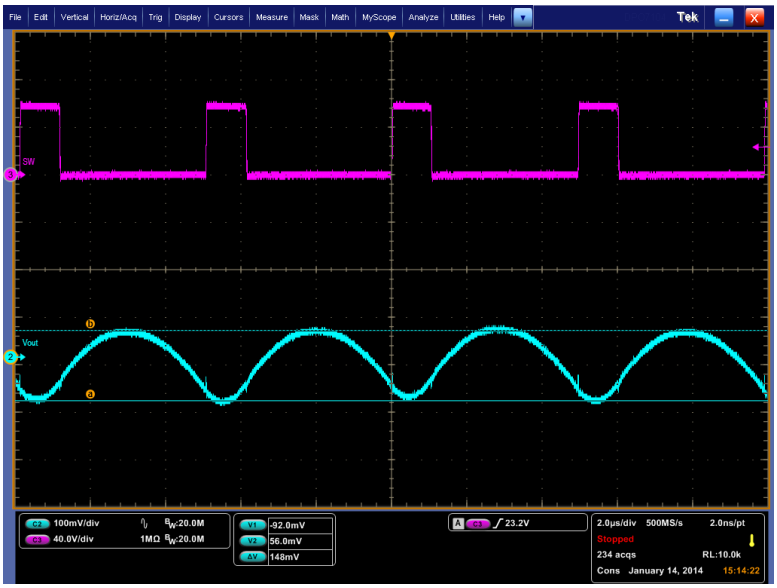
5. Waveforms

Switch-Node Voltage and Output Ripple Voltage

50Vin, 12Vout @ 4A load current.
(~138.0mV p-p Ripple)

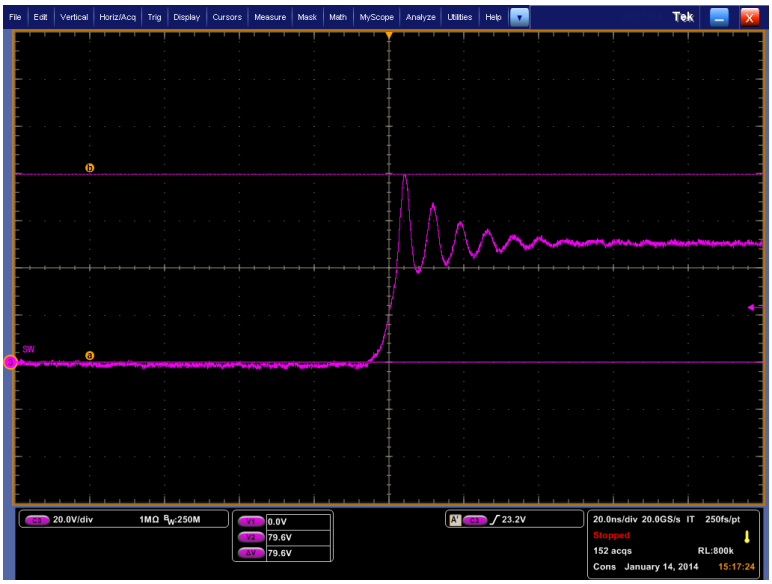


57Vin, 12Vout @ 4A load current.
(~148.0mV p-p Ripple)

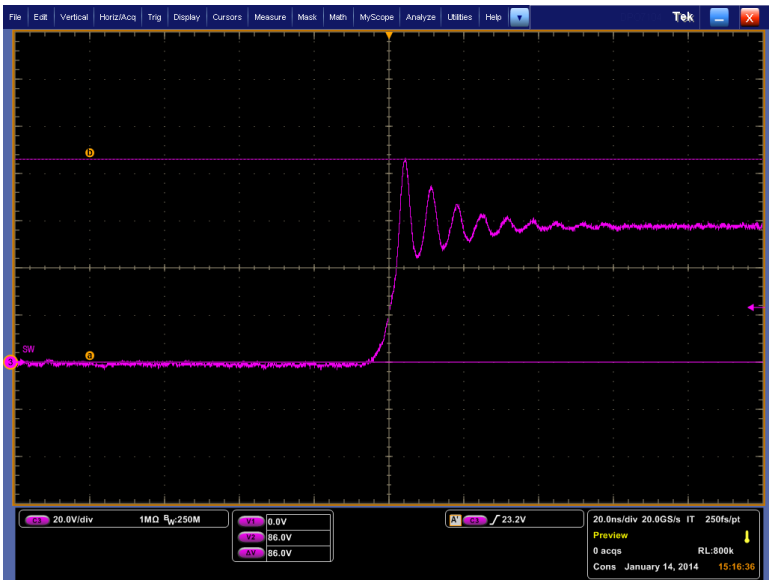


Switch-Node Ringing Voltage

50Vin, 12Vout @ 4A load current.
(~79.6V)

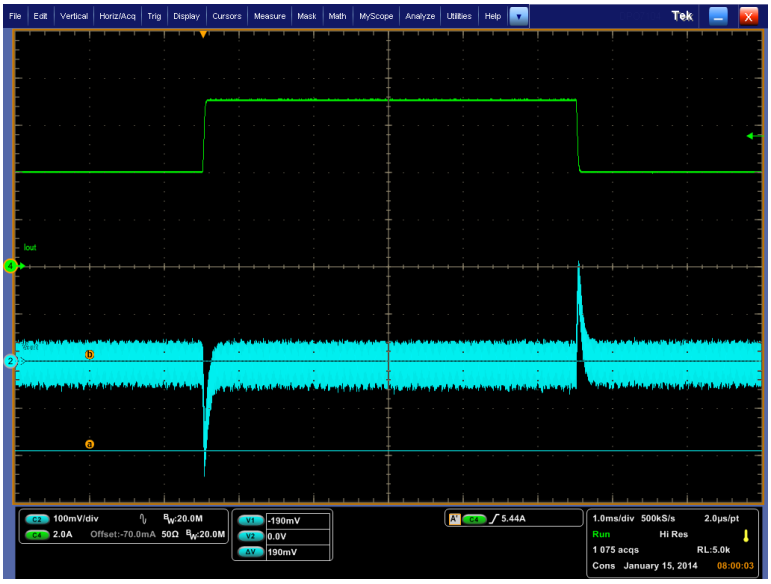


57Vin, 12Vout @ 4A load current.
(~86.0V)

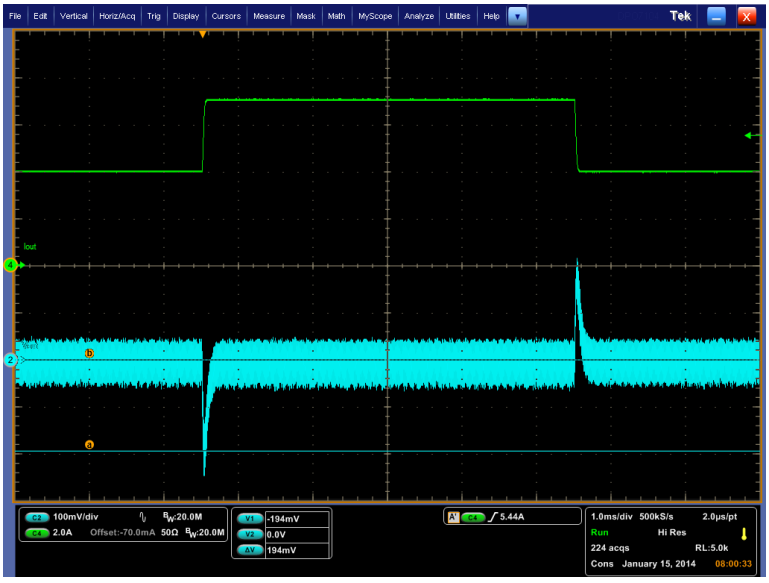


Transient Response Test

50Vin @ 4A to 7A, 100mA/µs, Pulse ƒ @ 100 Hz,
50% duty cycle, 12V out. Load Step on/off.

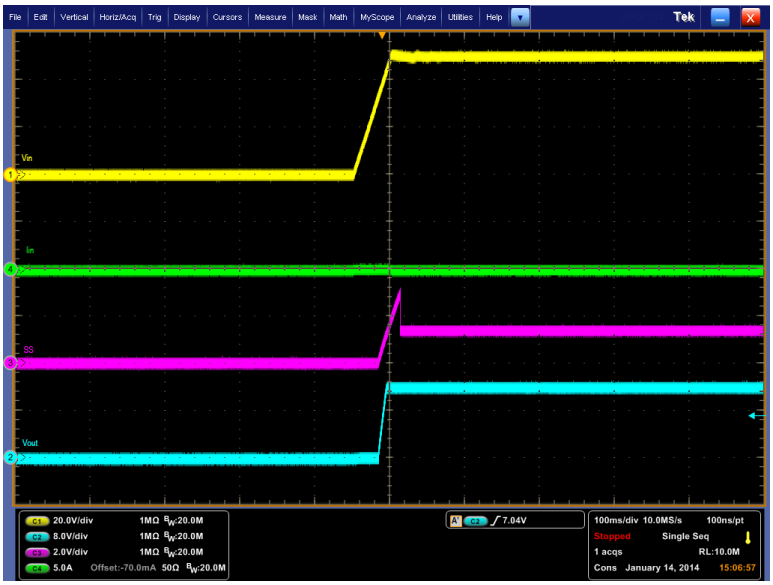


57Vin @ 4A to 7A, 100mA/µs, Pulse ƒ @ 100 Hz,
50% duty cycle, 12V out. Load Step on/off.

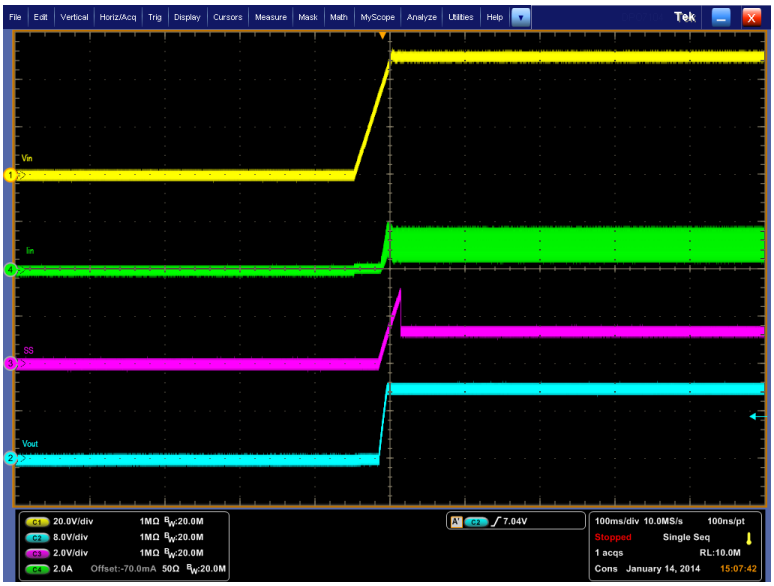


Startup Test

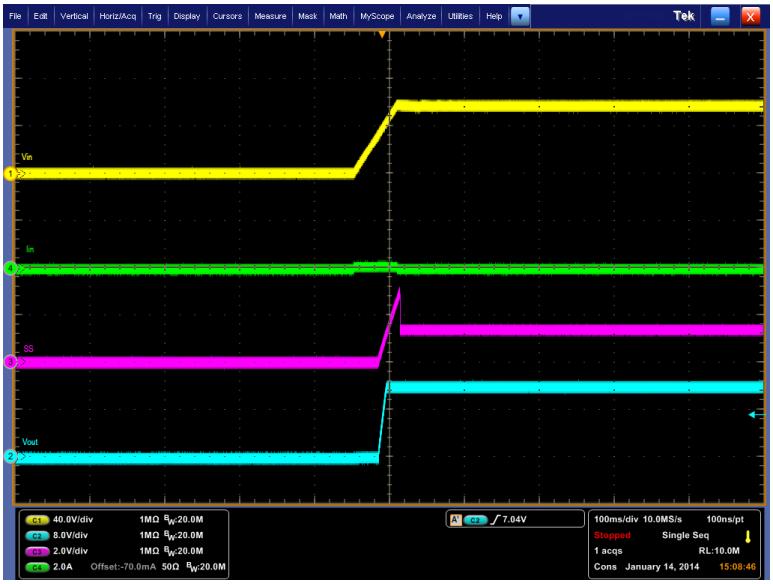
50Vin, 12Vout @ no load current.



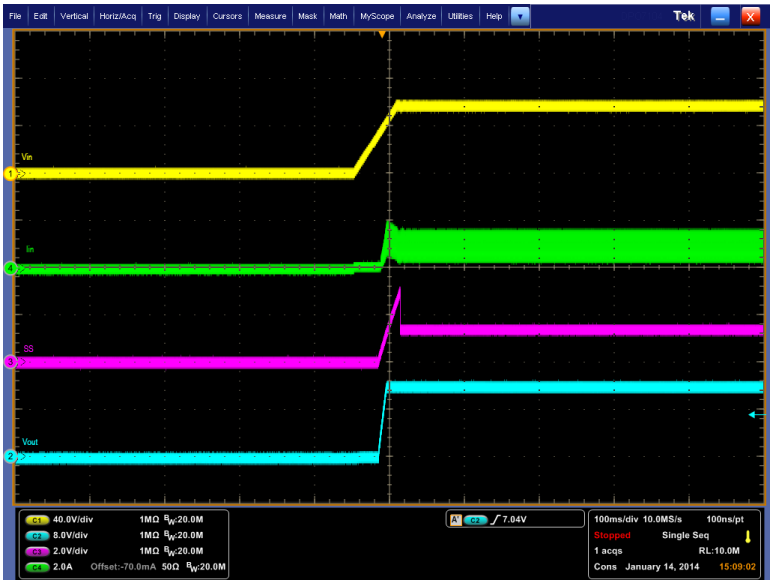
50Vin, 12Vout @ 2.95Ω Load.



57Vin, 12Vout @ no load current.



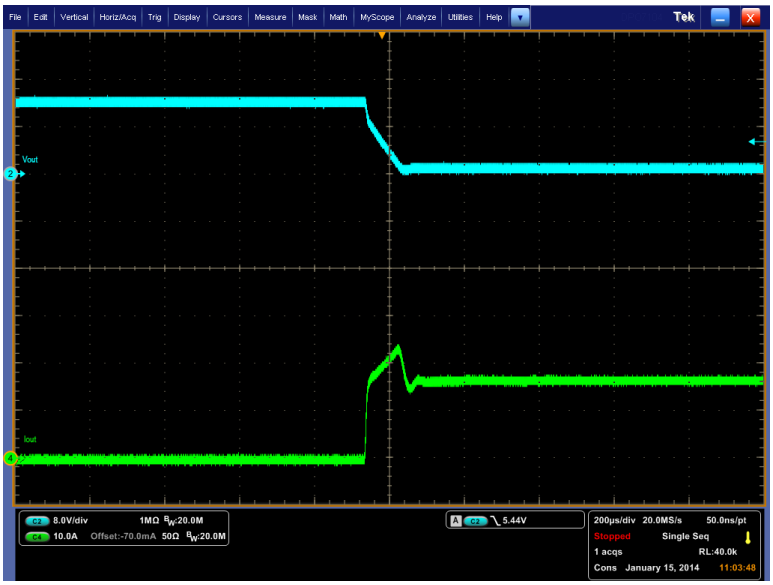
57Vin, 12Vout @ 2.95Ω Load.



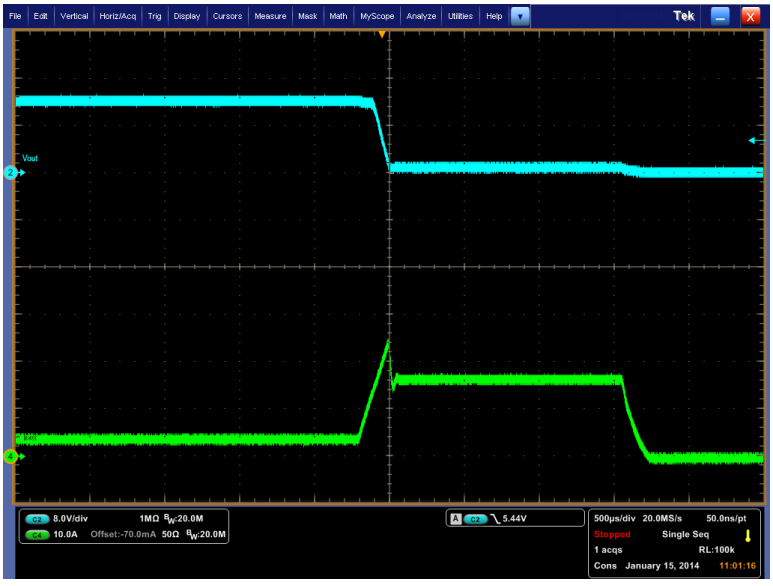
Short-Circuit Test

Applied to board under the following conditions:

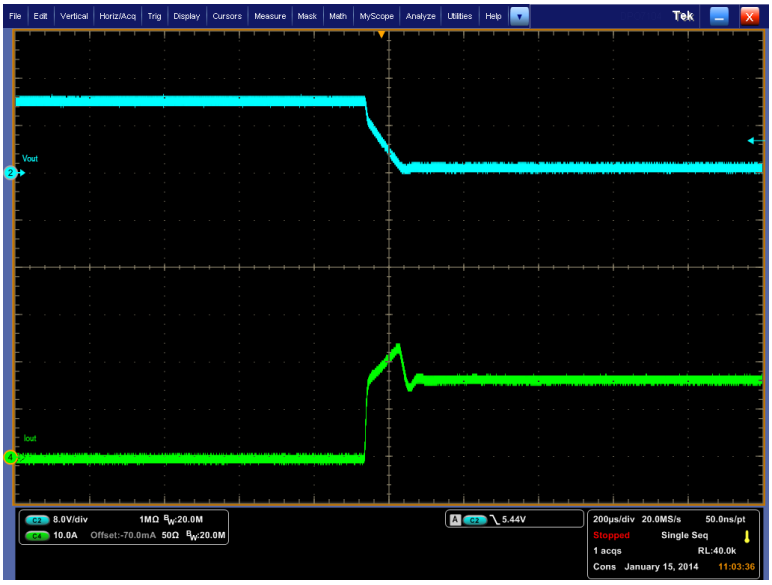
50Vin, 12Vout @ no load current.



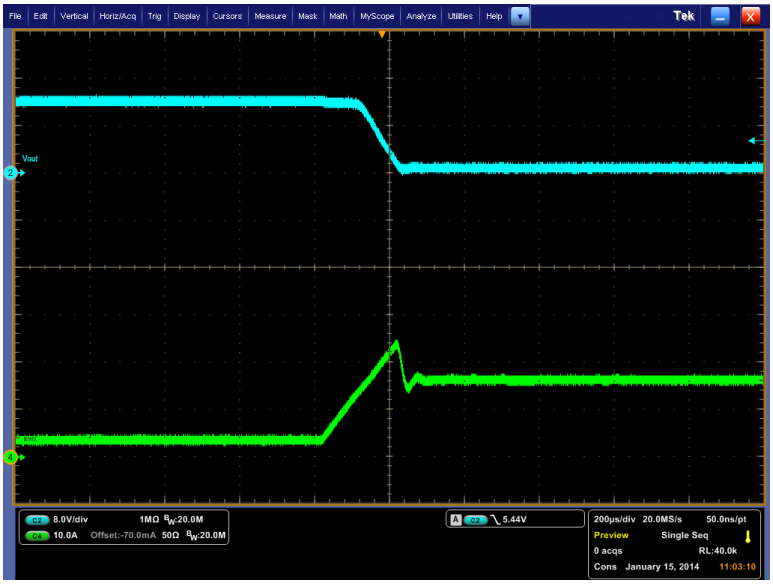
50Vin, 12Vout @ 4A Load.



57Vin, 12V out @ no load current.

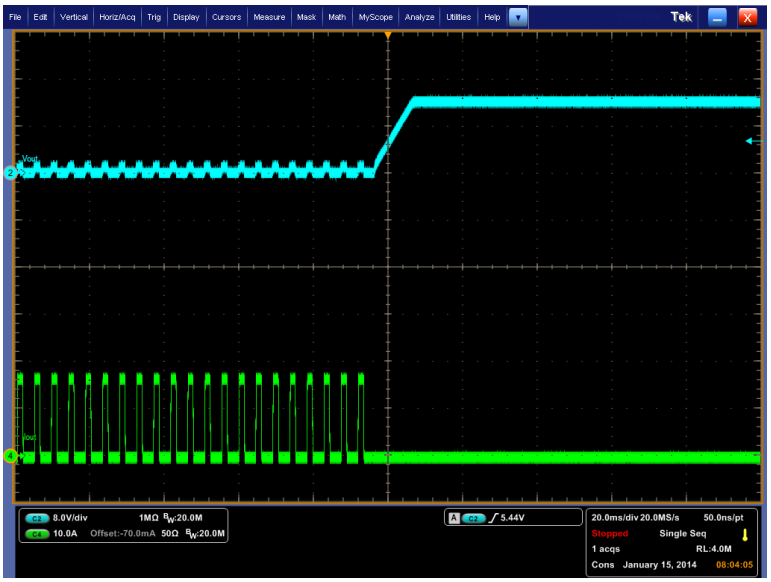


57Vin, 12Vout @ 4A Load.

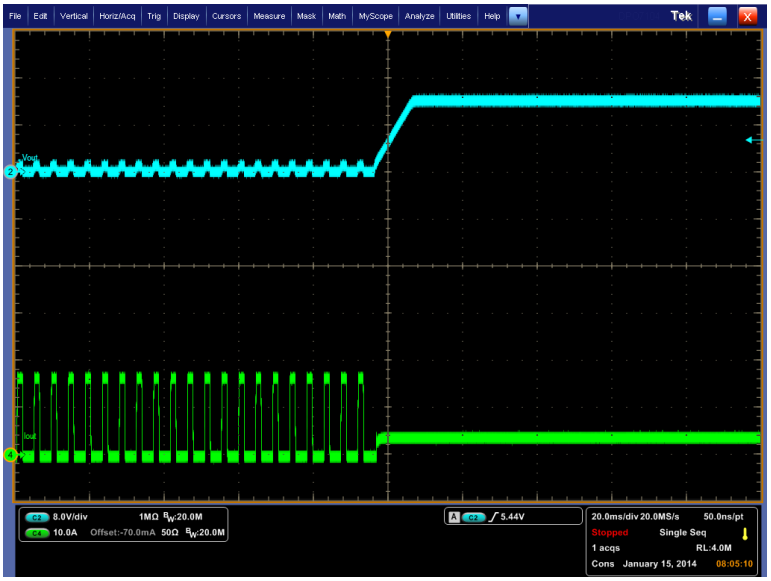


Short-Circuit Recovery Test

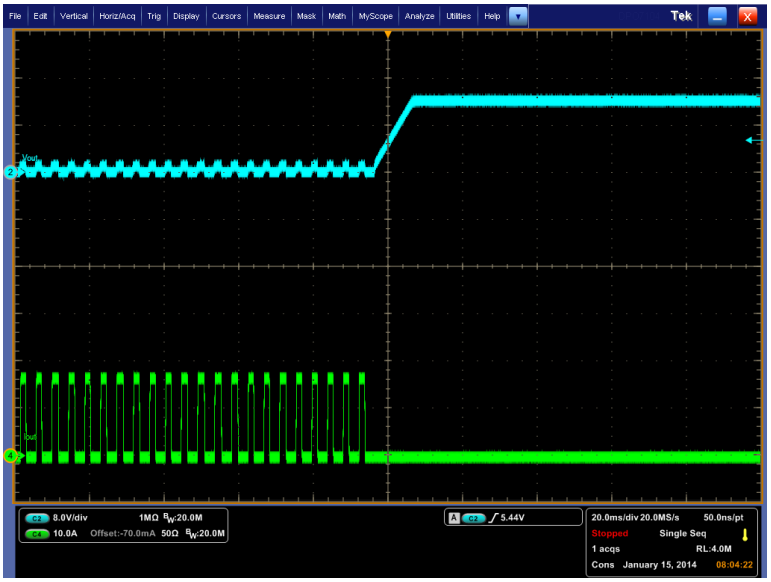
50Vin, 12Vout @ no load current.



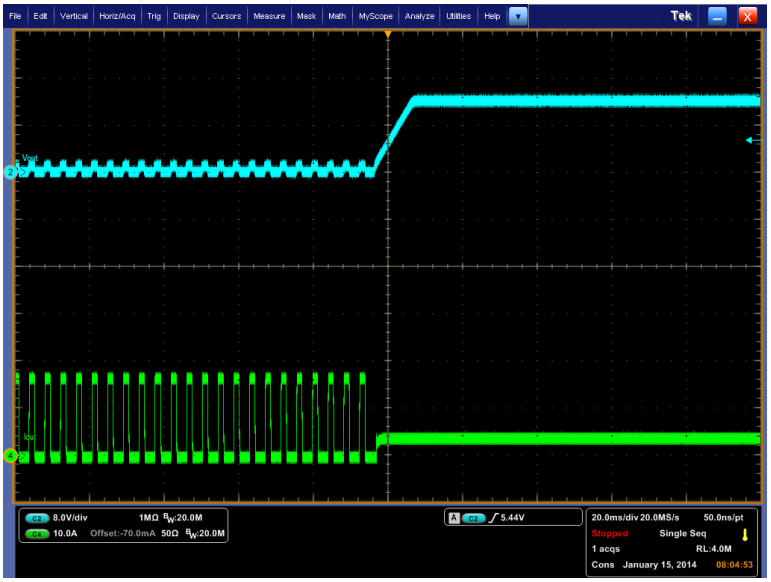
50Vin, 12V out @ 4A Load.



57Vin, 12Vout @ no load current.



57Vin, 12Vout @ 4A Load.



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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265