

**Test Data
For PMP9385
3/26/2014**



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1. Design Specifications

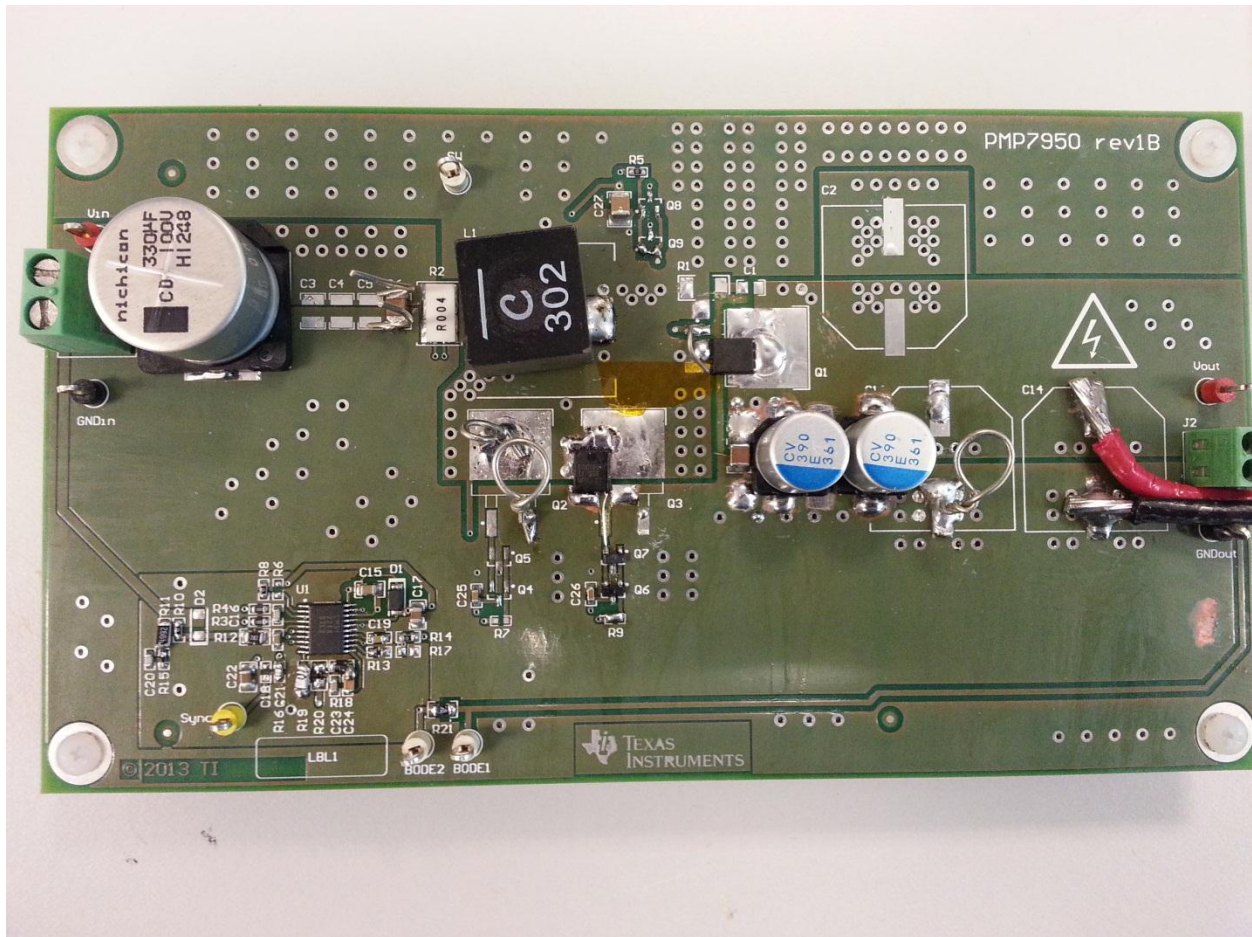
Vin Minimum	12.5VDC
Vin Maximum	15.5VDC
Vout	24VDC
Iout	8A Max.
Approximate Switching Frequency	250KHz

2. Circuit Description

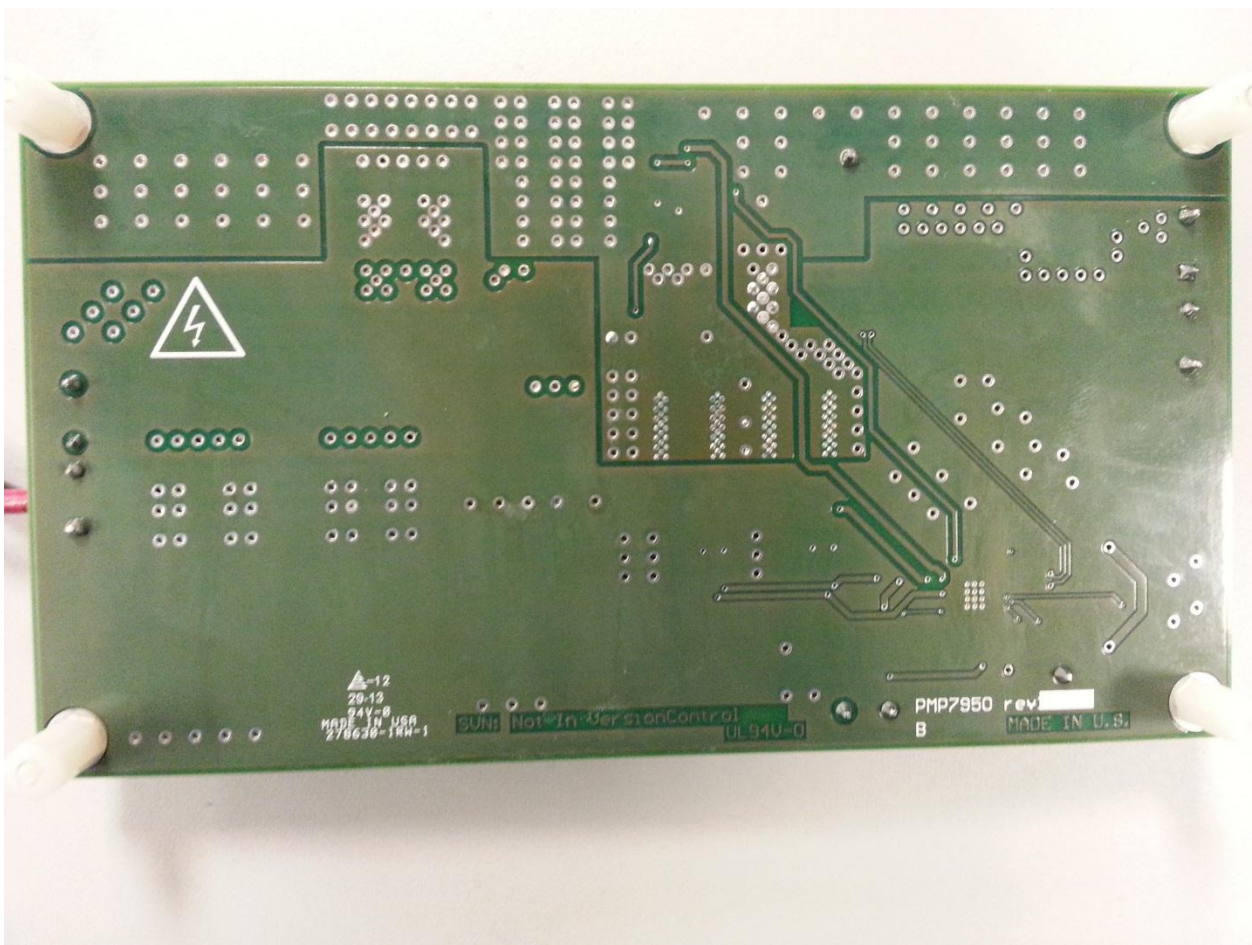
PMP9385 is a Single-Phase Synchronous Boost Converter which accepts an input voltage of 12.5Vin to 15.5Vin and provides an output of 24Vout capable of supplying a maximum of 8A of current to the load. This design was built on the PMP7950 REV1B PCB (4-layered board; 2 oz. Copper on Top and Bottom layers, 1 oz. Copper on two inner layers). Design uses an LM5122 Synchronous Boost controller and CSD18531Q5A FETs. All tests in this report were performed at 14Vin.

3. PMP9385 Board Photos

Board Dimensions: 6.3" x 3.5"

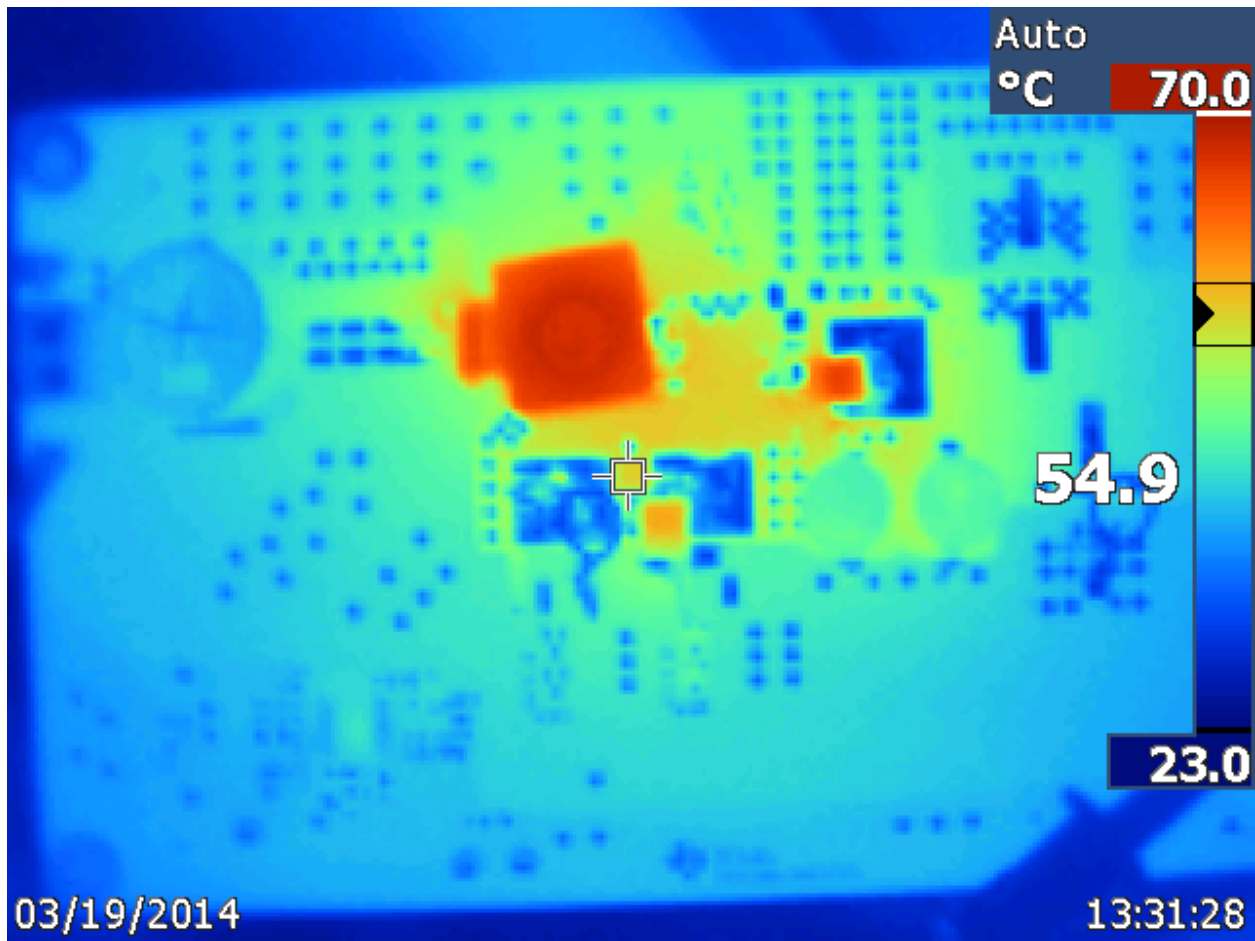


Board Photo (Top)



Board Photo (Bottom)

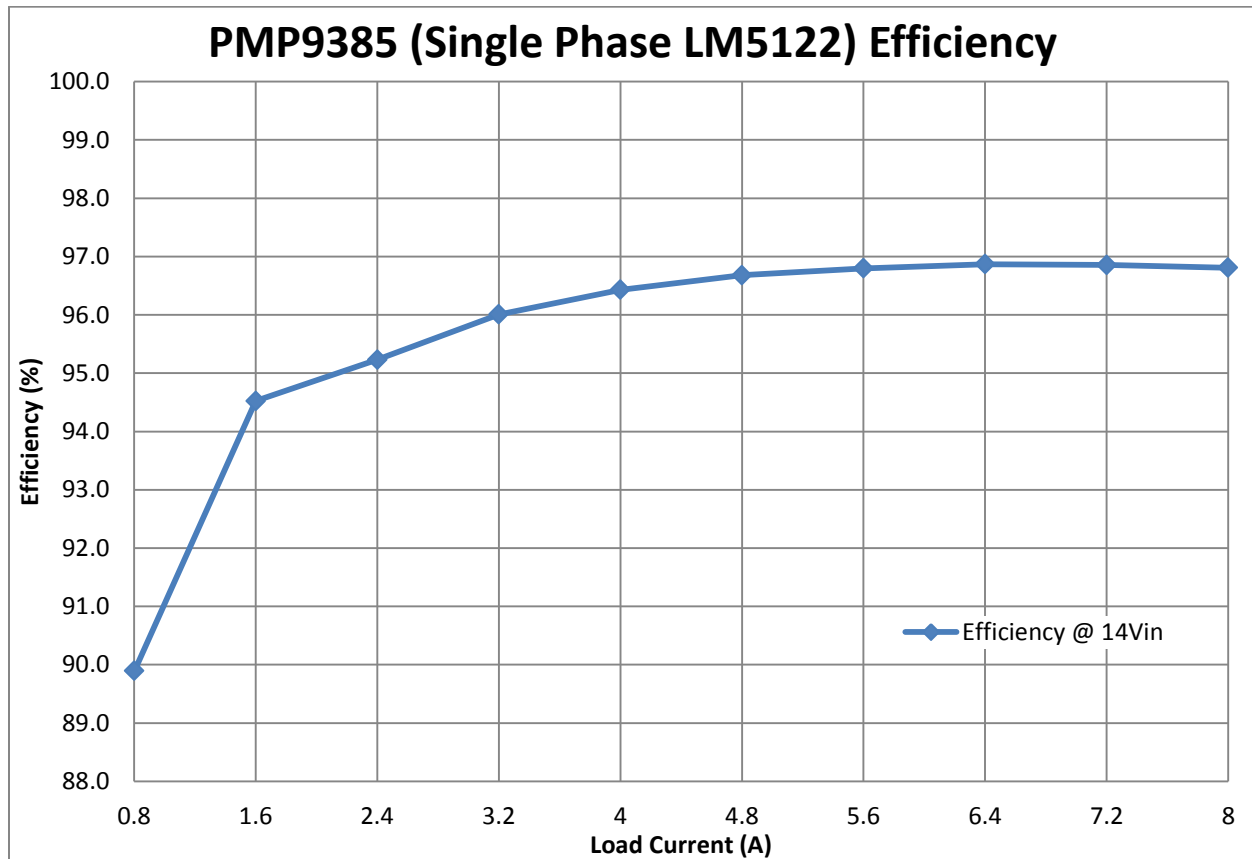
4. Thermal Data



IR thermal image taken at steady state with 14Vin and 8A load (no airflow)

5. Efficiency

5.1 Efficiency Chart

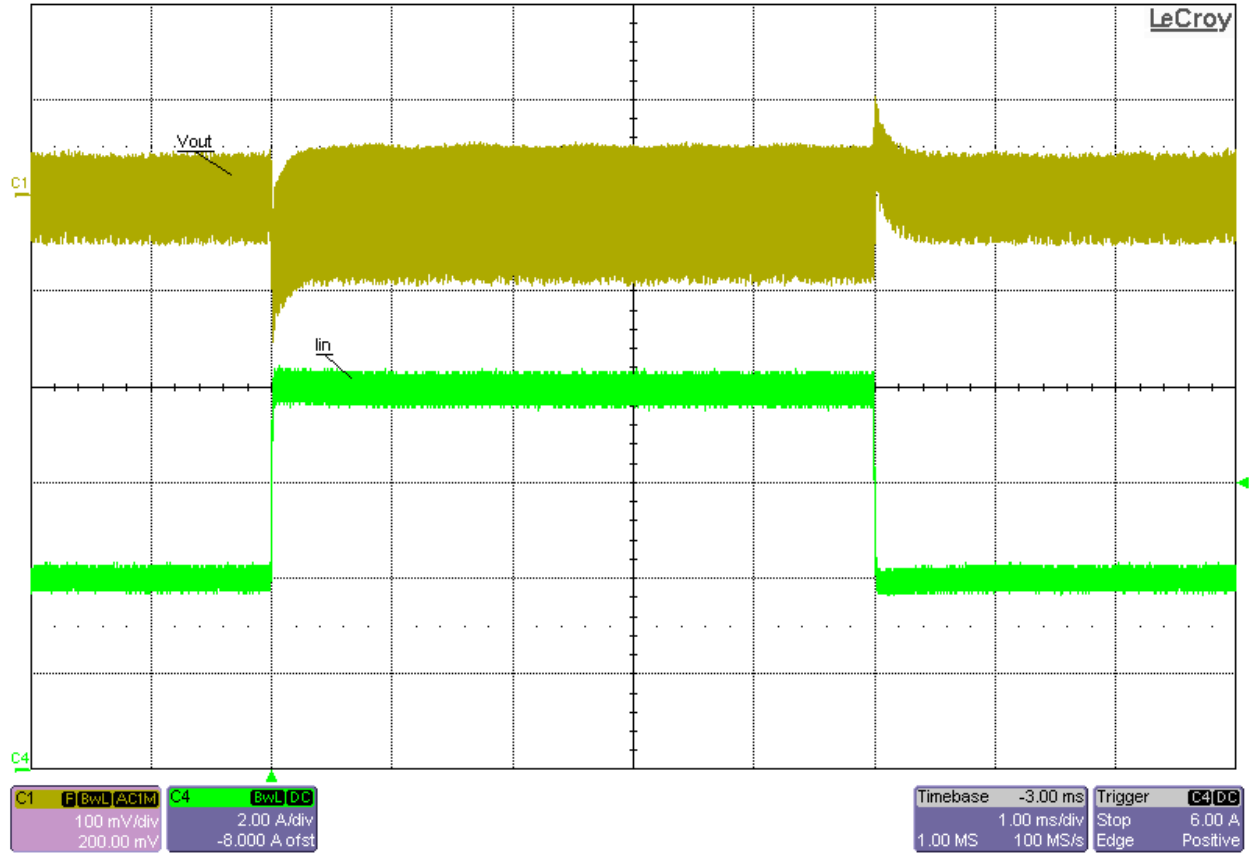


5.2 Efficiency Data

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Efficiency (%)
13.989	1.53	24.017	0.8011	21.40317	19.24002	89.9
13.989	2.907	24.018	1.6004	40.66602	38.43841	94.5
13.988	4.328	24.018	2.4004	60.54006	57.65281	95.2
13.988	5.723	24.018	3.2	80.05332	76.8576	96.0
13.988	7.122	24.018	3.9998	99.62254	96.0672	96.4
13.988	8.525	24.018	4.8001	119.2477	115.2888	96.7
13.988	9.934	24.019	5.6001	138.9568	134.5088	96.8
13.987	11.346	24.019	6.4002	158.6965	153.7264	96.9
13.987	12.766	24.02	7.2	178.558	172.944	96.9
13.987	14.191	24.021	7.9994	198.4895	192.1536	96.8

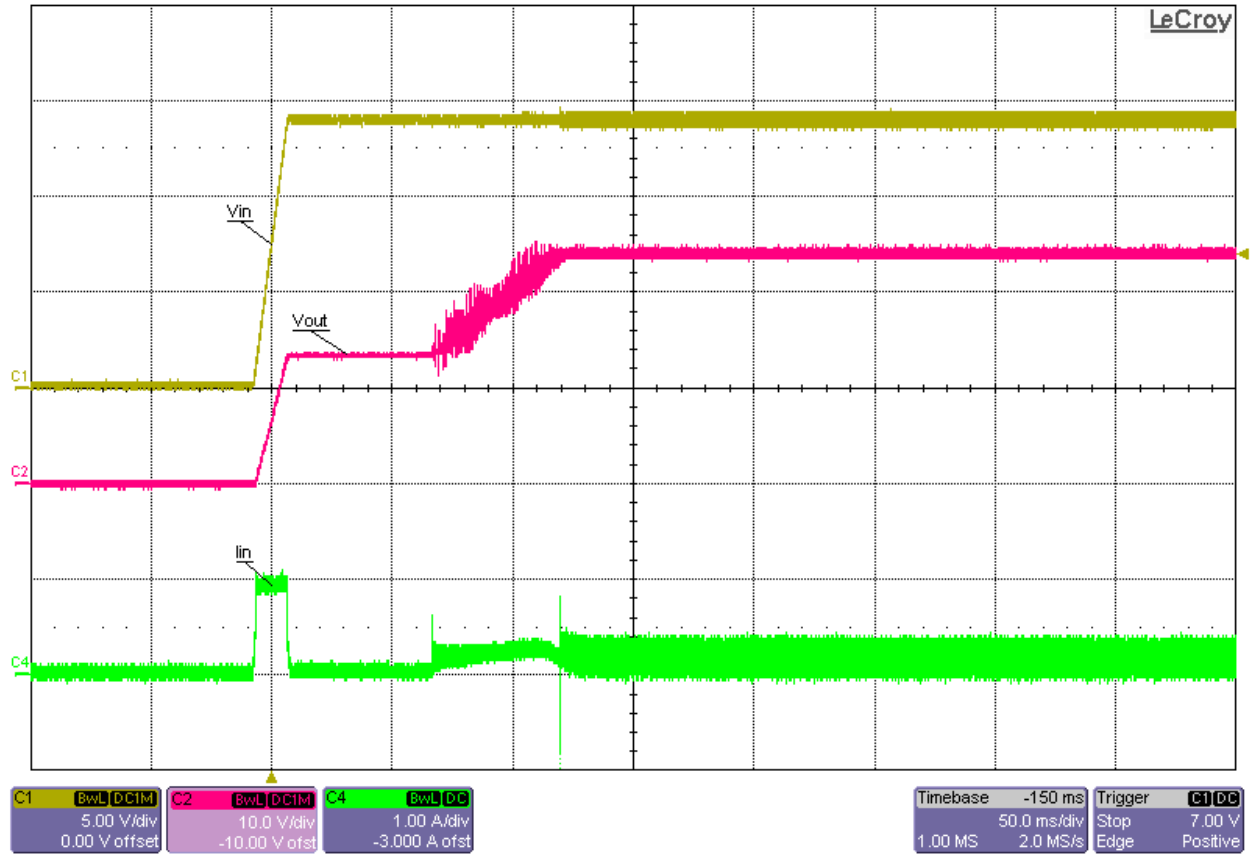
6 Waveforms

6.1 Load Transient Response

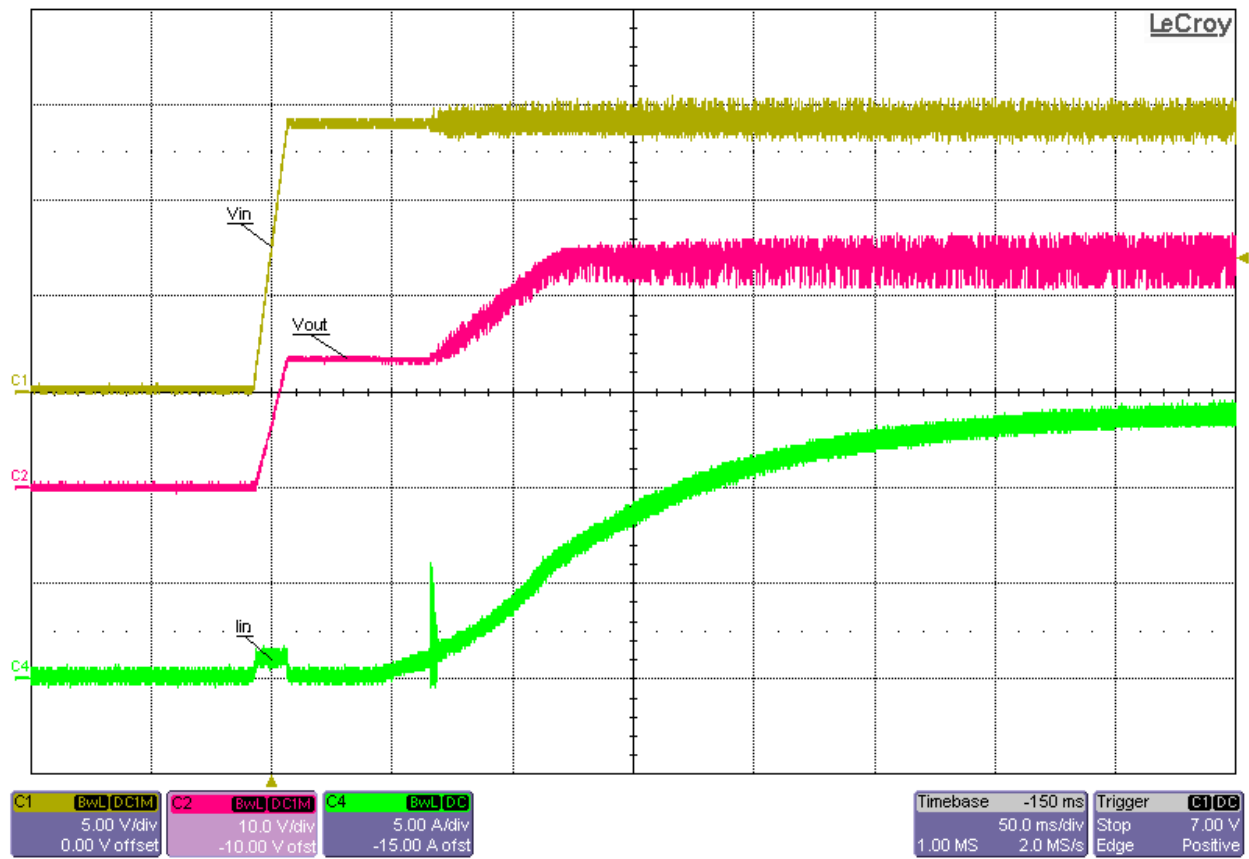


Load Transient Response at 14Vin and 50%-to-100% (4A-to-8A) Load Step

6.2 Startup

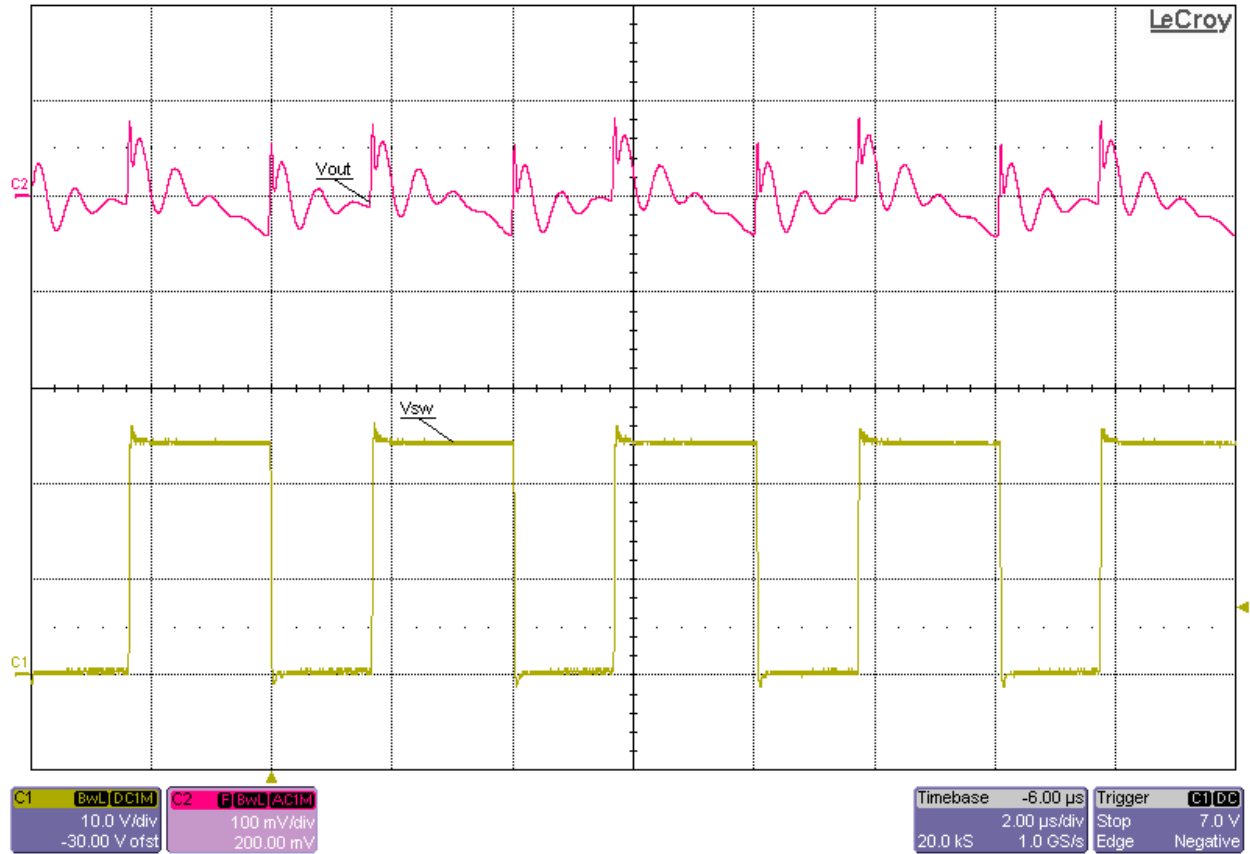


Startup into No Load at 14Vin

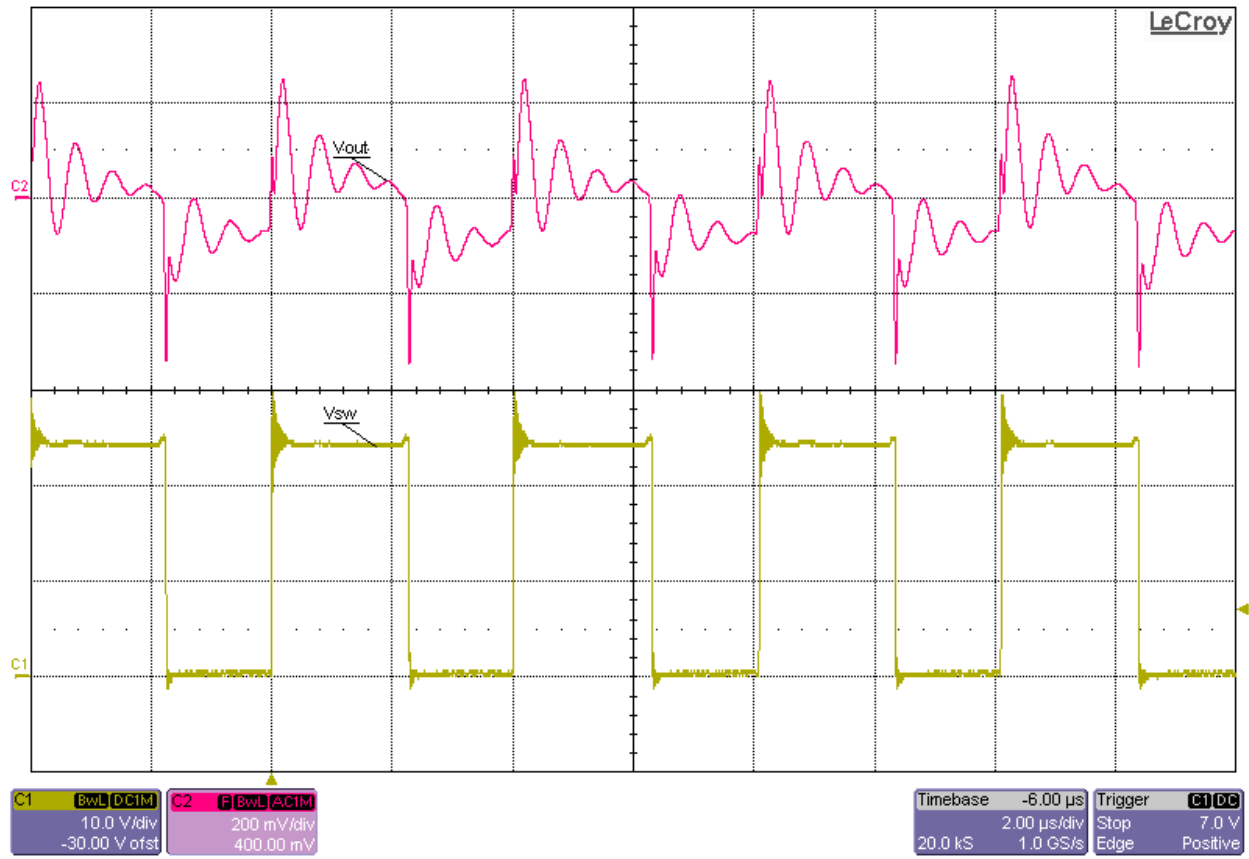


Startup into Full (8A) Load at 14Vin

6.3 Output Voltage Ripple and Switch Node Voltage

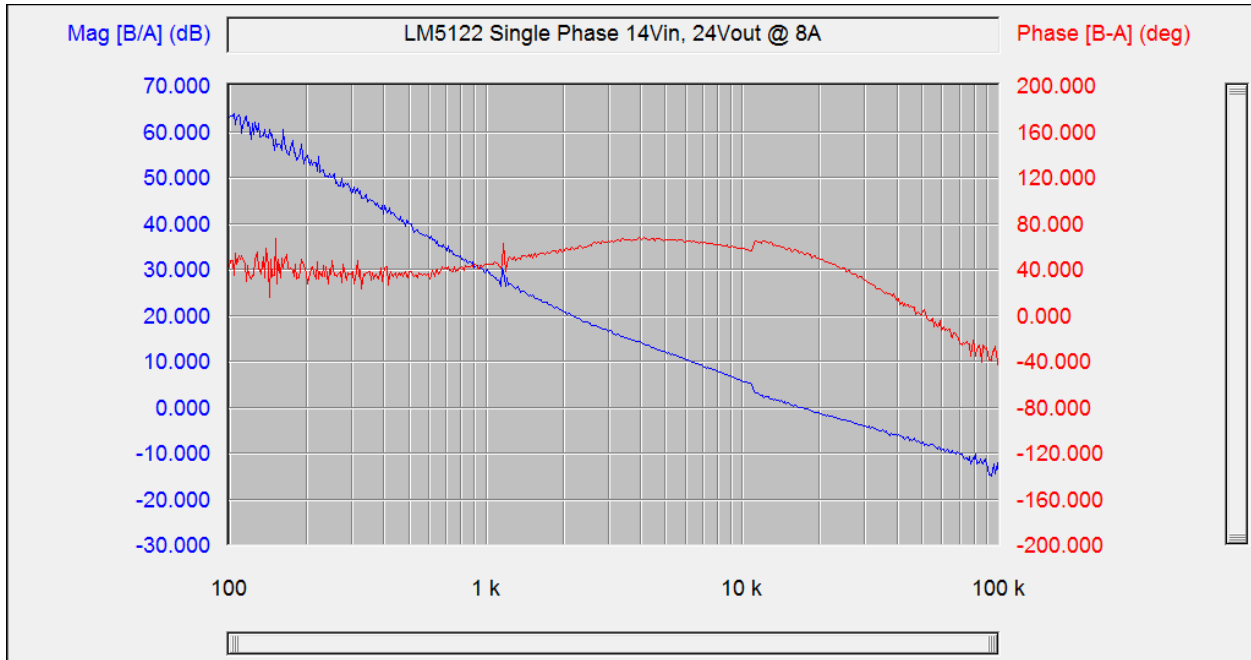


Switch Node Voltage and Output Voltage Ripple at 14Vin and No Load ($V_{ripple} \approx 100\text{mV}_{p-p}$)



Switch Node Voltage and Output Voltage Ripple at 14Vin and Full (8A) Load (Vripple ≈ 400mVp-p)

7 Loop Frequency Response



Loop Frequency Response at 14Vin and Full (8A) Load

(Phase Margin \approx 40 degrees; Gain Margin \approx - 8dB; Cutoff Frequency \approx 9.5KHz)

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