Test Data
For PMP9386
3/24/2014

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1. Design Specifications

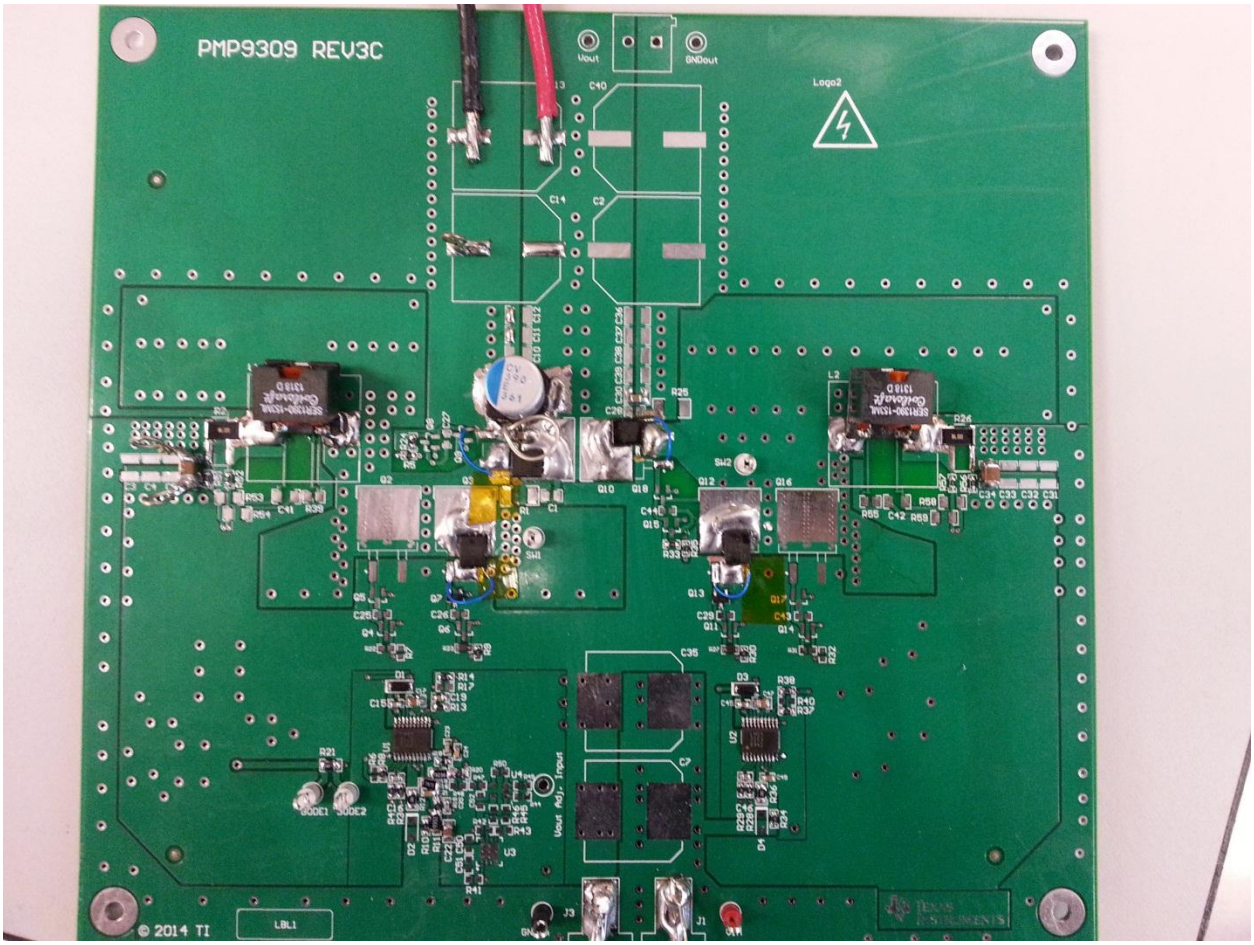
Vin Minimum	**14VDC**
Vin Maximum	**15.5VDC**
Vout	**24VDC**
Iout	**8A Max.**
Approximate Switching Frequency	**125KHz per Phase (250KHz Effective)**

2. Circuit Description

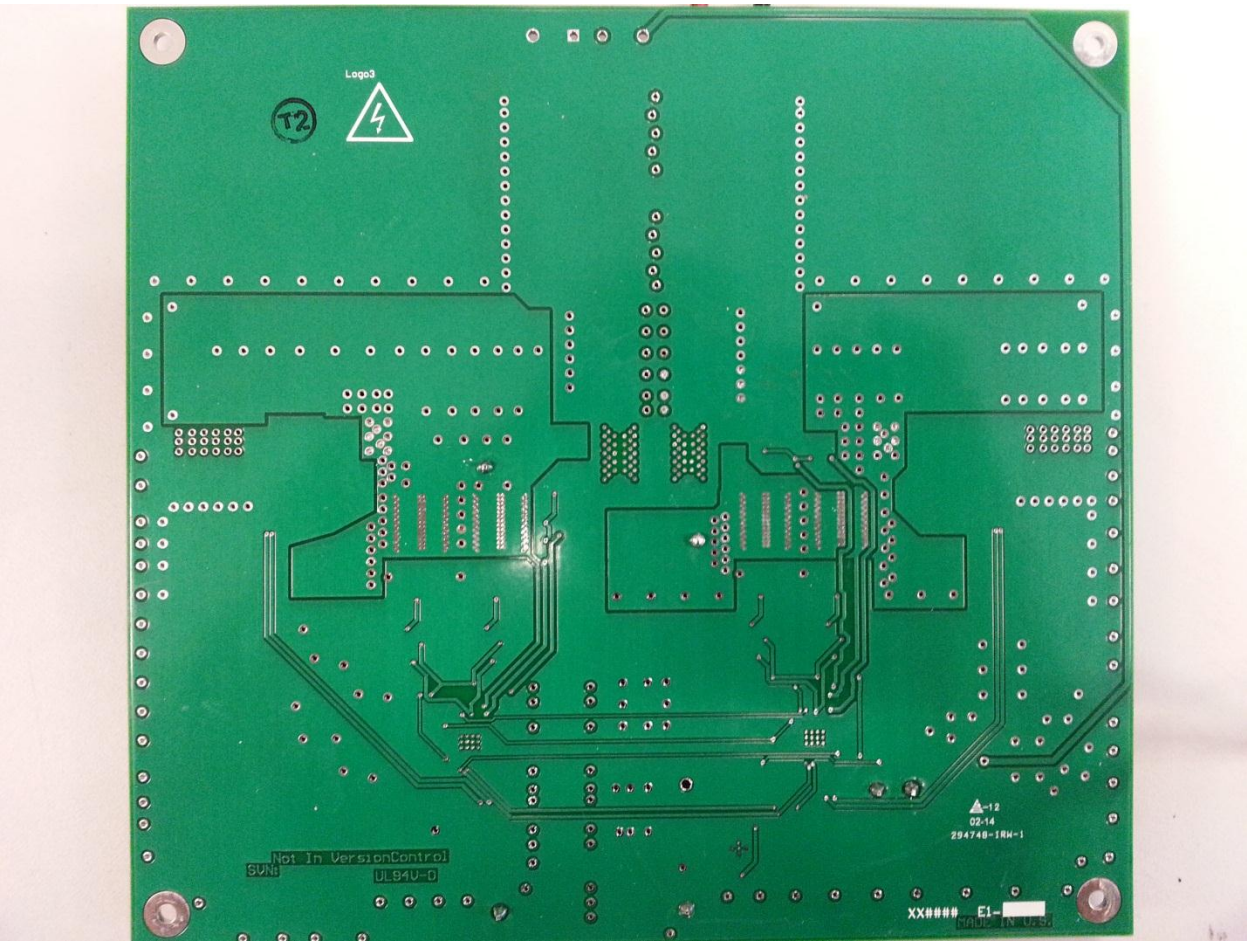
PMP9386 is a Dual-Phase Synchronous Boost Converter which accepts an input voltage of 14Vin to 15.5Vin and provides an output of 24Vout capable of supplying a maximum of 8A of current to the load. This design was built on the PMP9309 REVC PCB (4-layered board; 2 oz. Copper on Top and Bottom layers, 1 oz. Copper on two inner layers). Design uses two LM5122 Synchronous Boost controllers and CSD18531Q5A FETs. All tests in this report were performed at the highest input current condition of 14Vin.

3. PMP9386 Board Photos

Board Dimensions: 7” x 6.5”

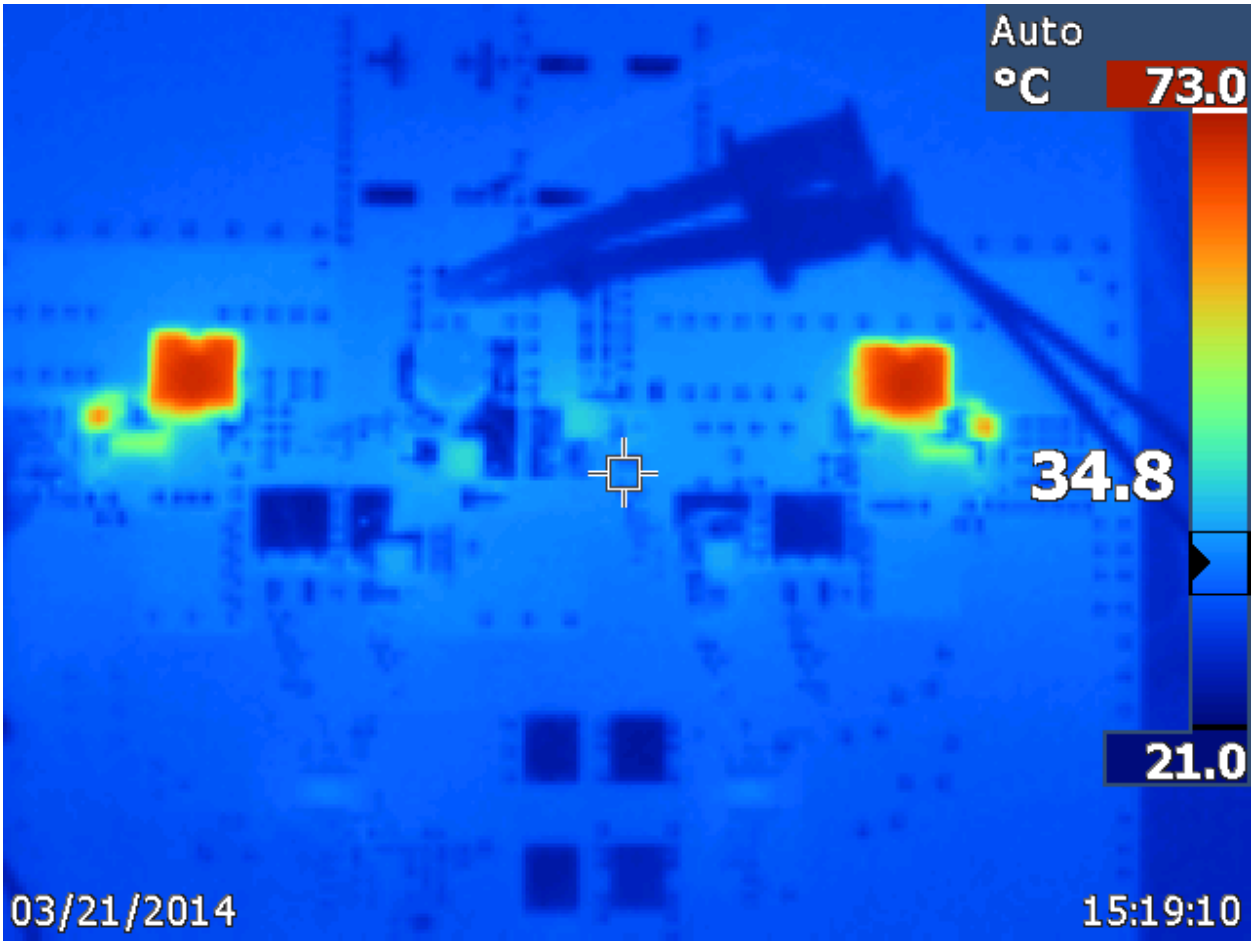


Board Photo (Top)



Board Photo (Bottom)

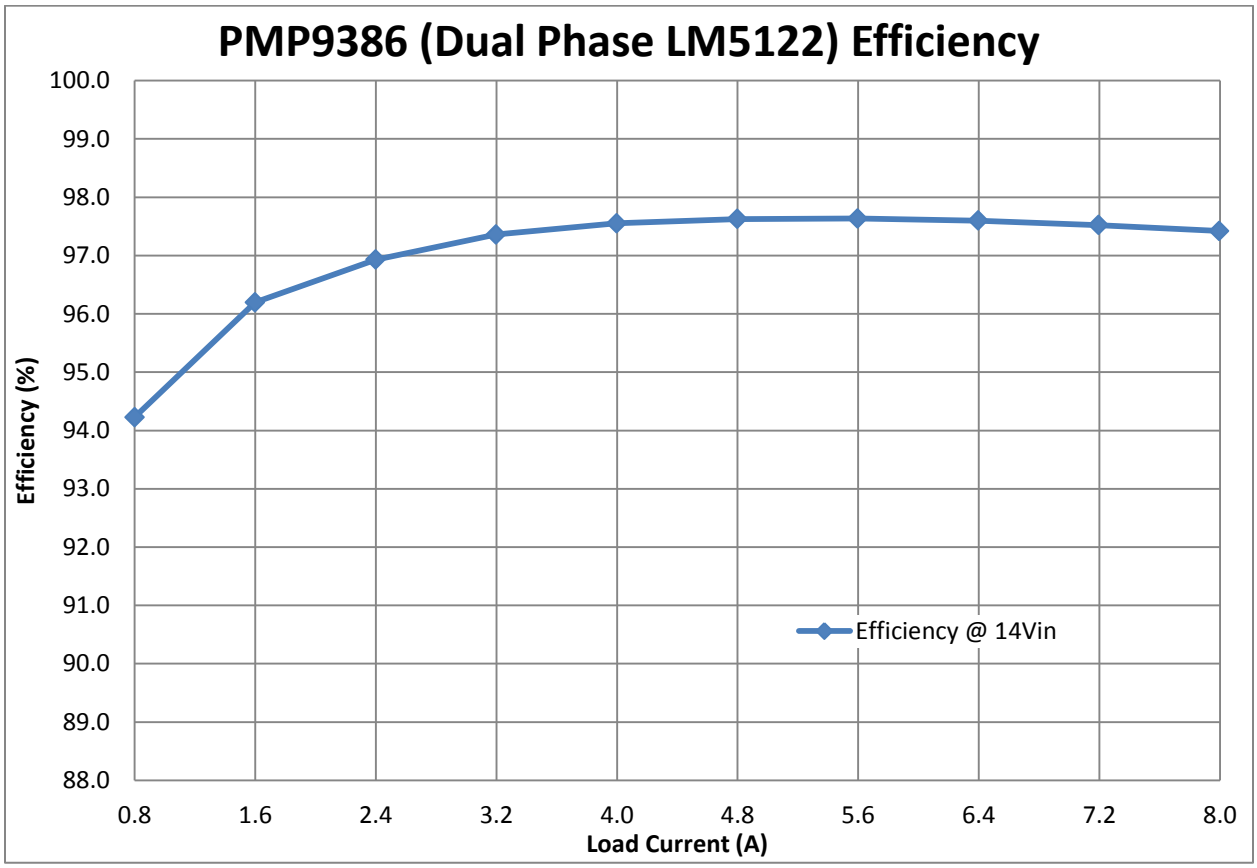
4. Thermal Data



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

5. Efficiency

5.1 Efficiency Chart

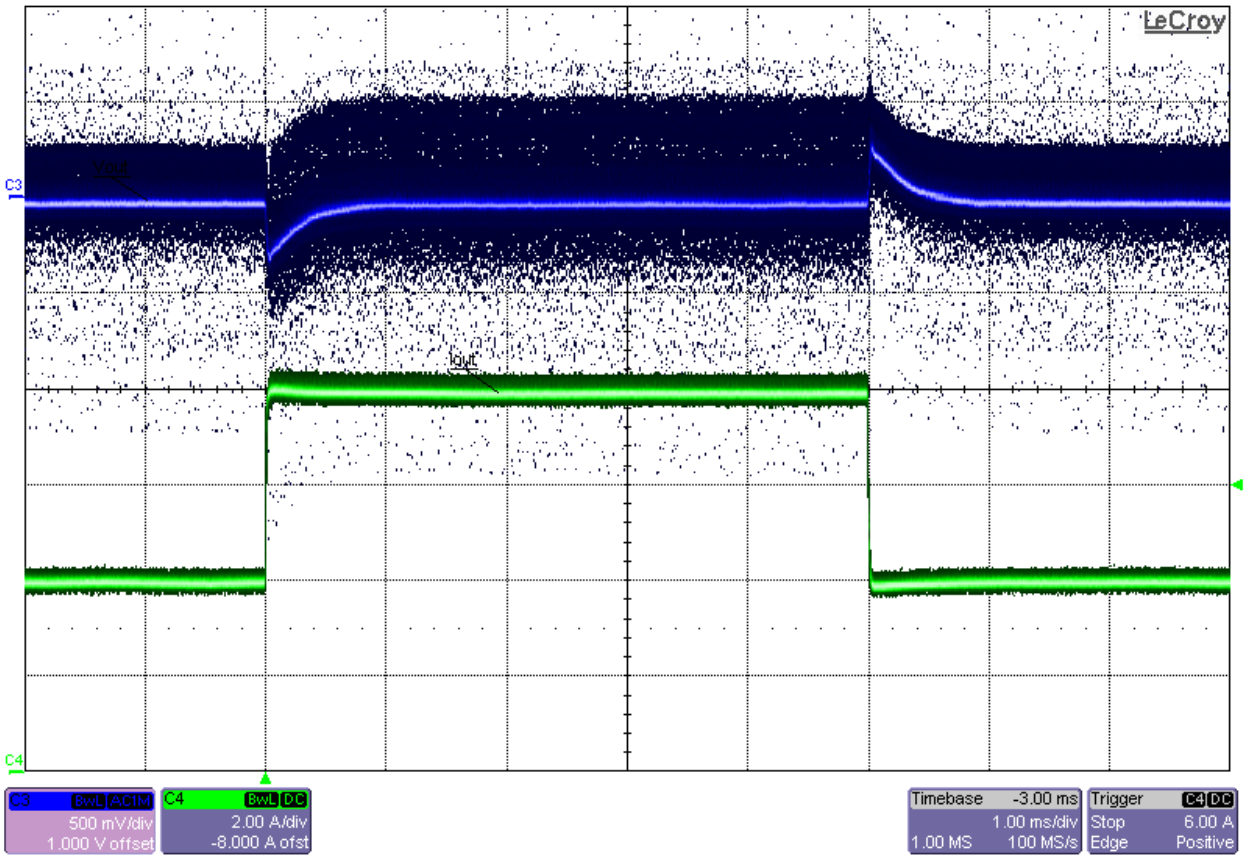


5.2 Efficiency Data

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Efficiency (%)
14.081	1.457	24.201	0.7988	20.51602	19.33176	94.2
14.056	2.86	24.195	1.5983	40.20016	38.67087	96.2
14.031	4.265	24.193	2.3976	59.84222	58.00514	96.9
14.005	5.672	24.193	3.1968	79.43636	77.34018	97.4
13.98	7.089	24.192	3.9963	99.10422	96.67849	97.6
13.955	8.516	24.192	4.7958	118.8408	116.02	97.6
13.929	9.953	24.192	5.5951	138.6353	135.3567	97.6
13.903	11.401	24.192	6.3948	158.5081	154.703	97.6
13.877	12.86	24.191	7.1942	178.4582	174.0349	97.5
13.861	14.32	24.191	7.9935	198.4895	193.3708	97.4

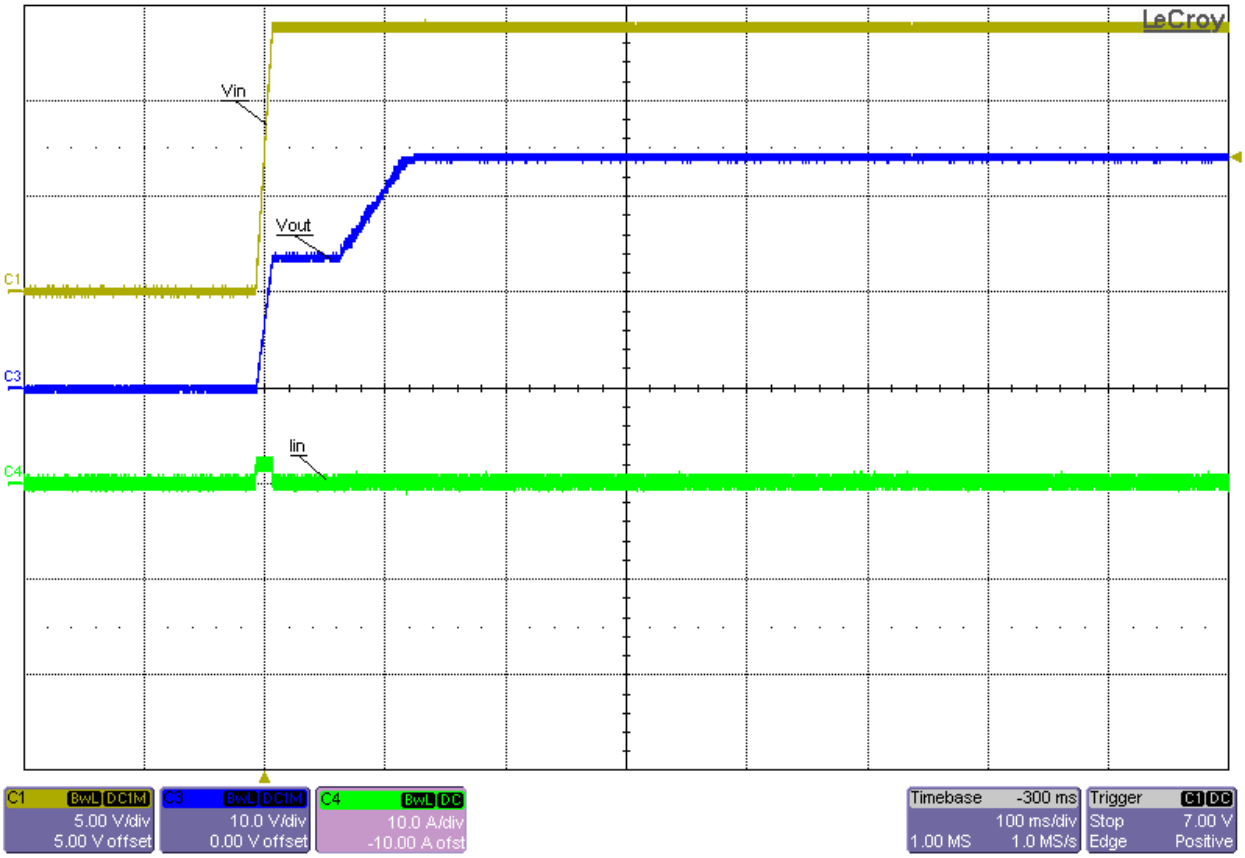
6 Waveforms

6.1 Load Transient Response

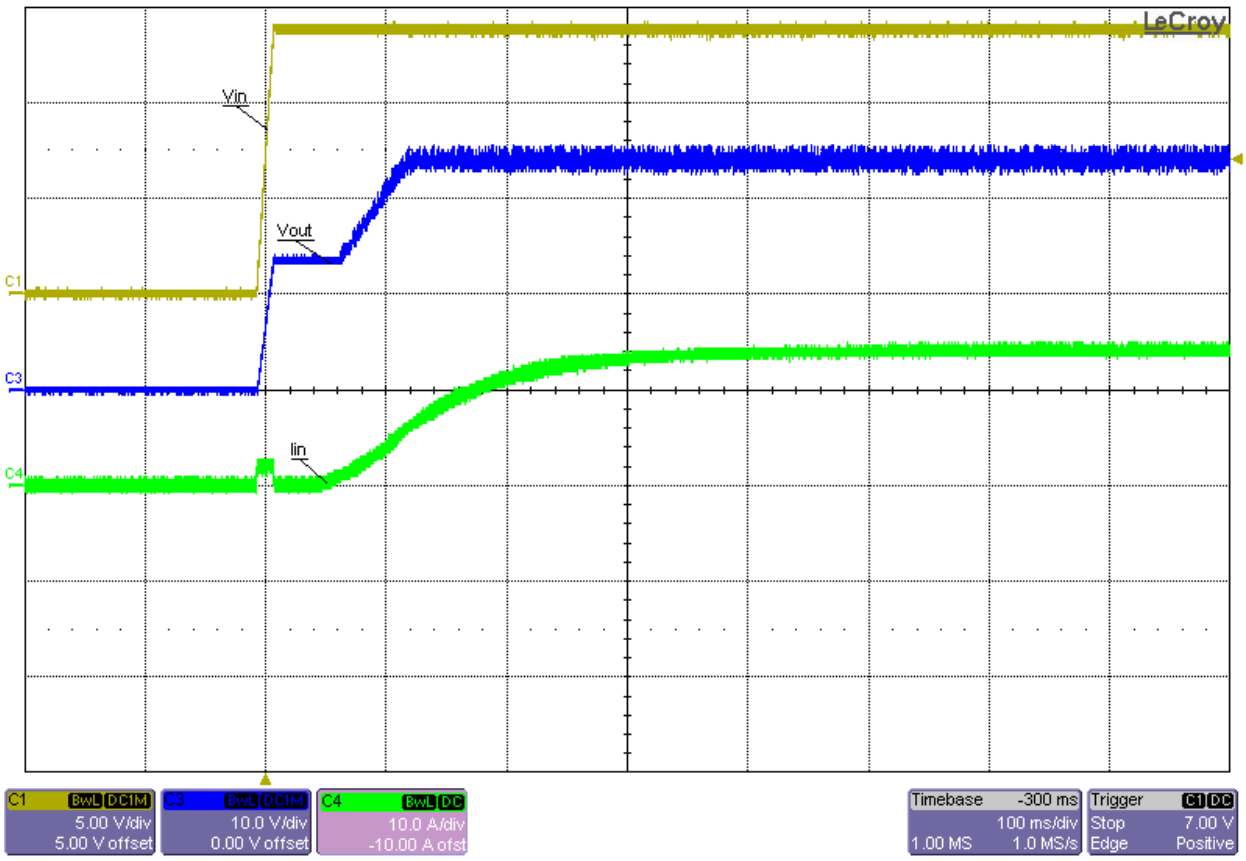


Load Transient Response at 14Vin and 50%-to-100% (4A-to-8A) Load Step

6.2 Startup

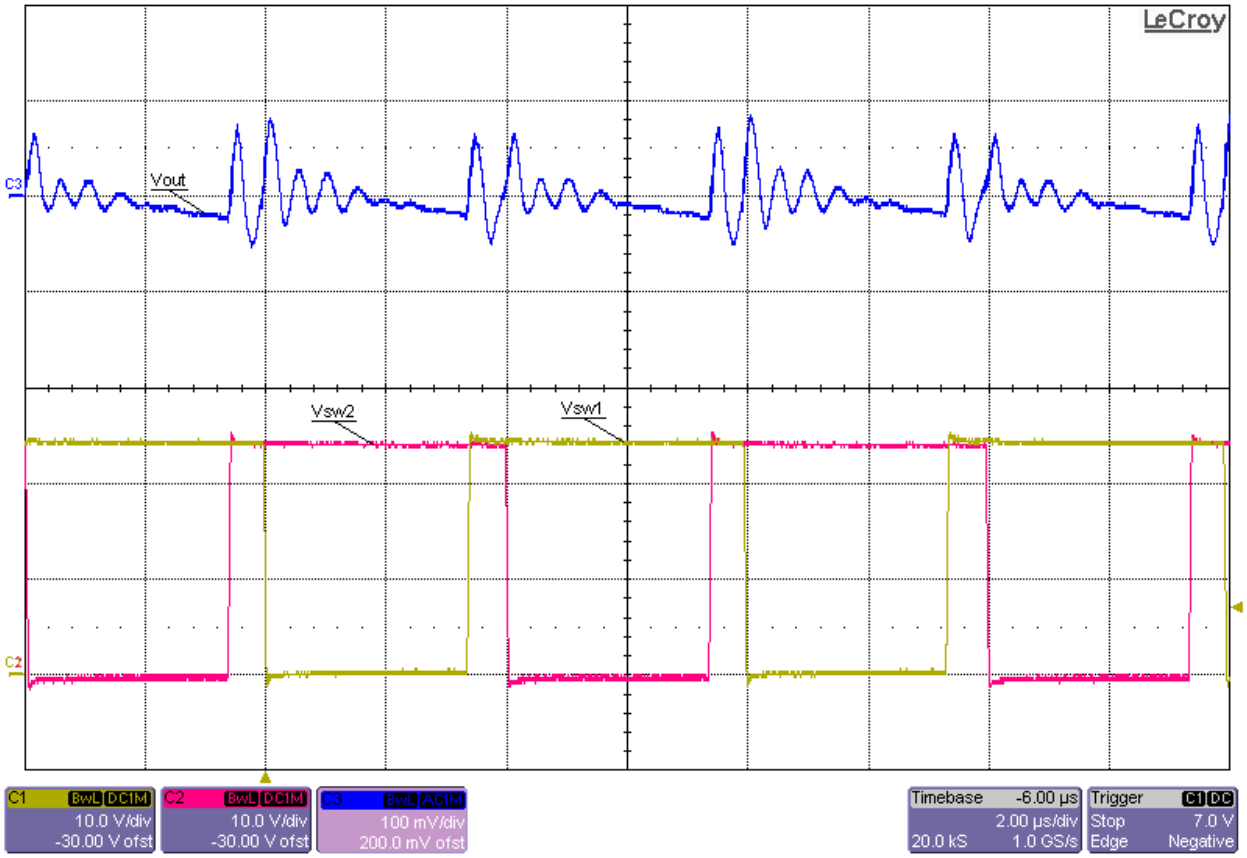


Startup into No Load at 14Vin

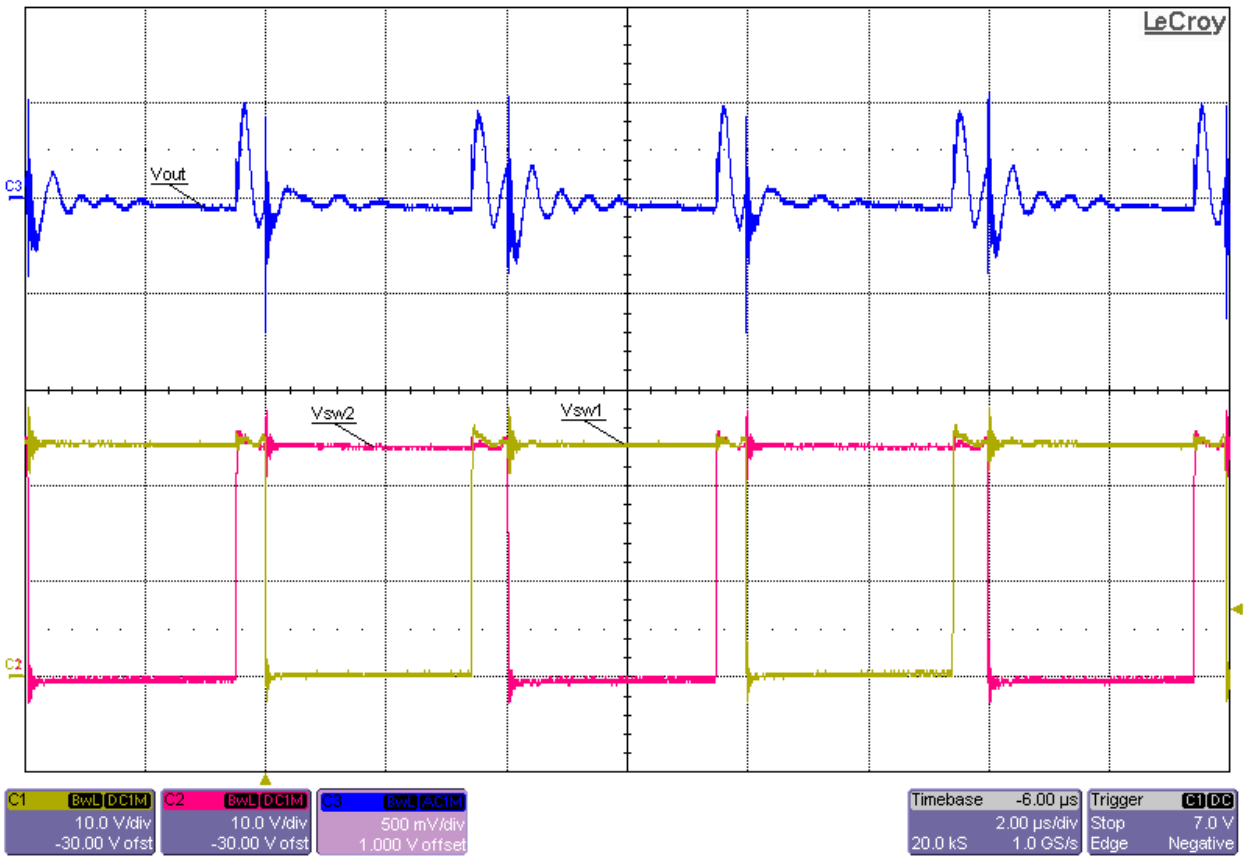


Startup into Full (8A) Load at 14Vin

6.3 Output Voltage Ripple and Switch Node Voltage

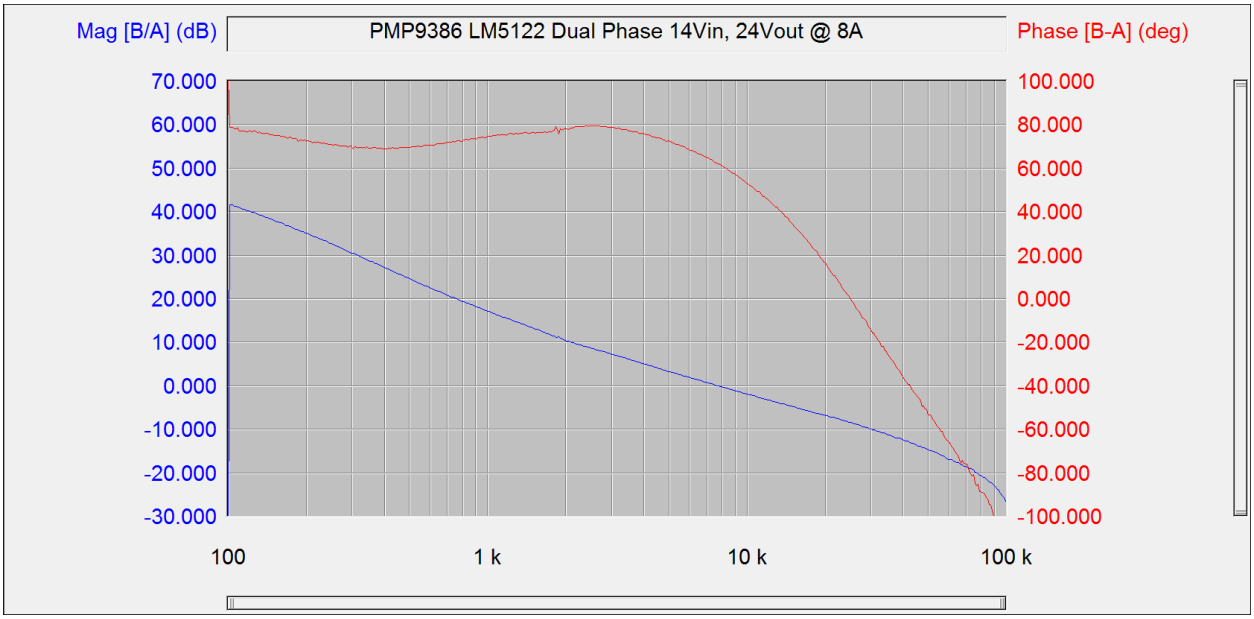


Switch Node Voltage and Output Voltage Ripple at 14Vin and No Load (Vripple ≈ 130mVp-p)



Switch Node Voltage and Output Voltage Ripple at 14Vin and Full (8A) Load (Vripple ≈ 700mVp-p)

7 Loop Frequency Response



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

(Phase Margin ≈ 65 degrees; Gain Margin ≈ -8 dB; Cutoff Frequency ≈ 8KHz)

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