

**Test Data
For PMP9403
4/11/2014**



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1. Design Specifications

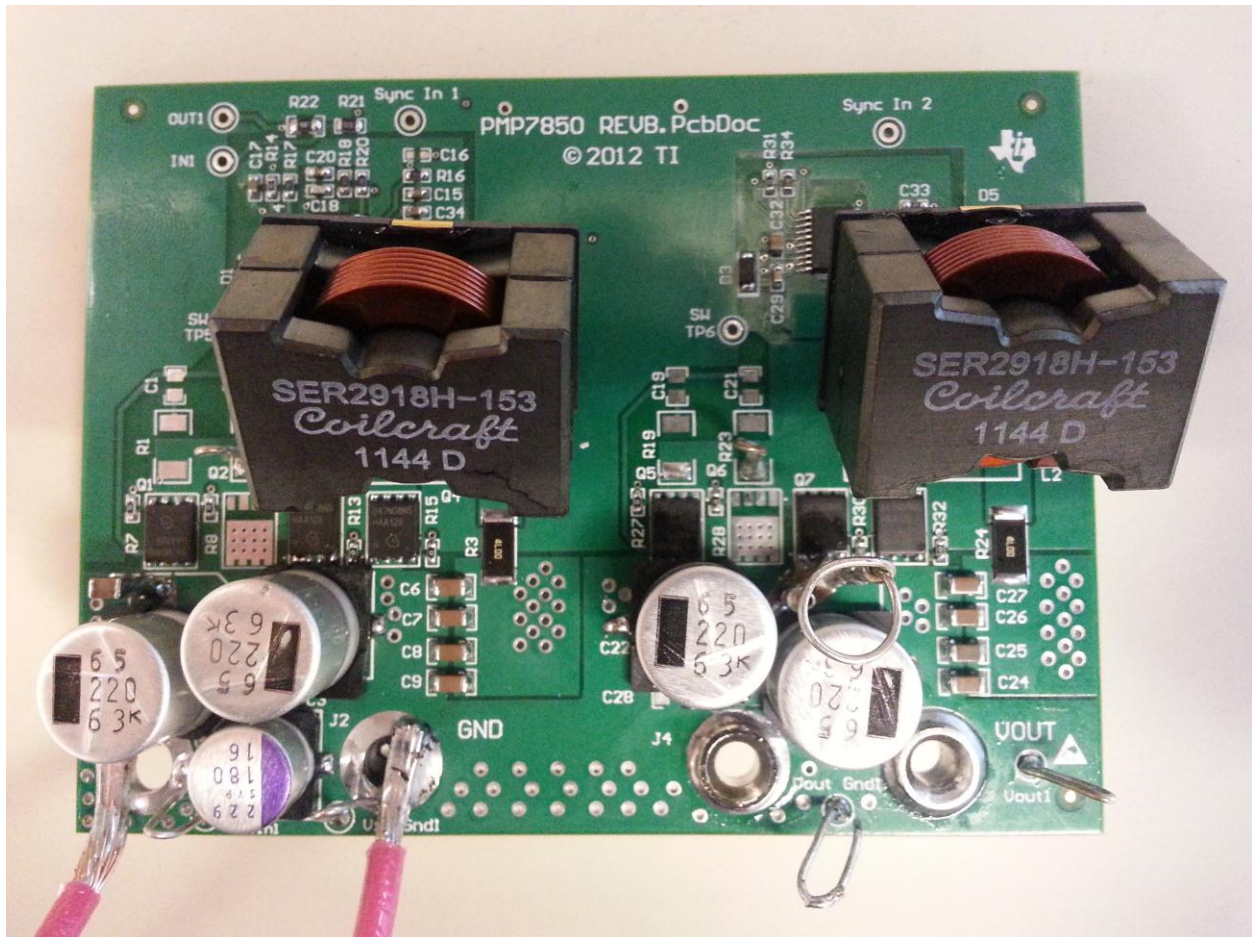
Vin Minimum	9VDC
Vin Maximum	15VDC
Vout	48VDC
Iout	4A Max.
Approximate Switching Frequency	≈ 180KHz per Phase (≈ 360KHz Effective)

2. Circuit Description

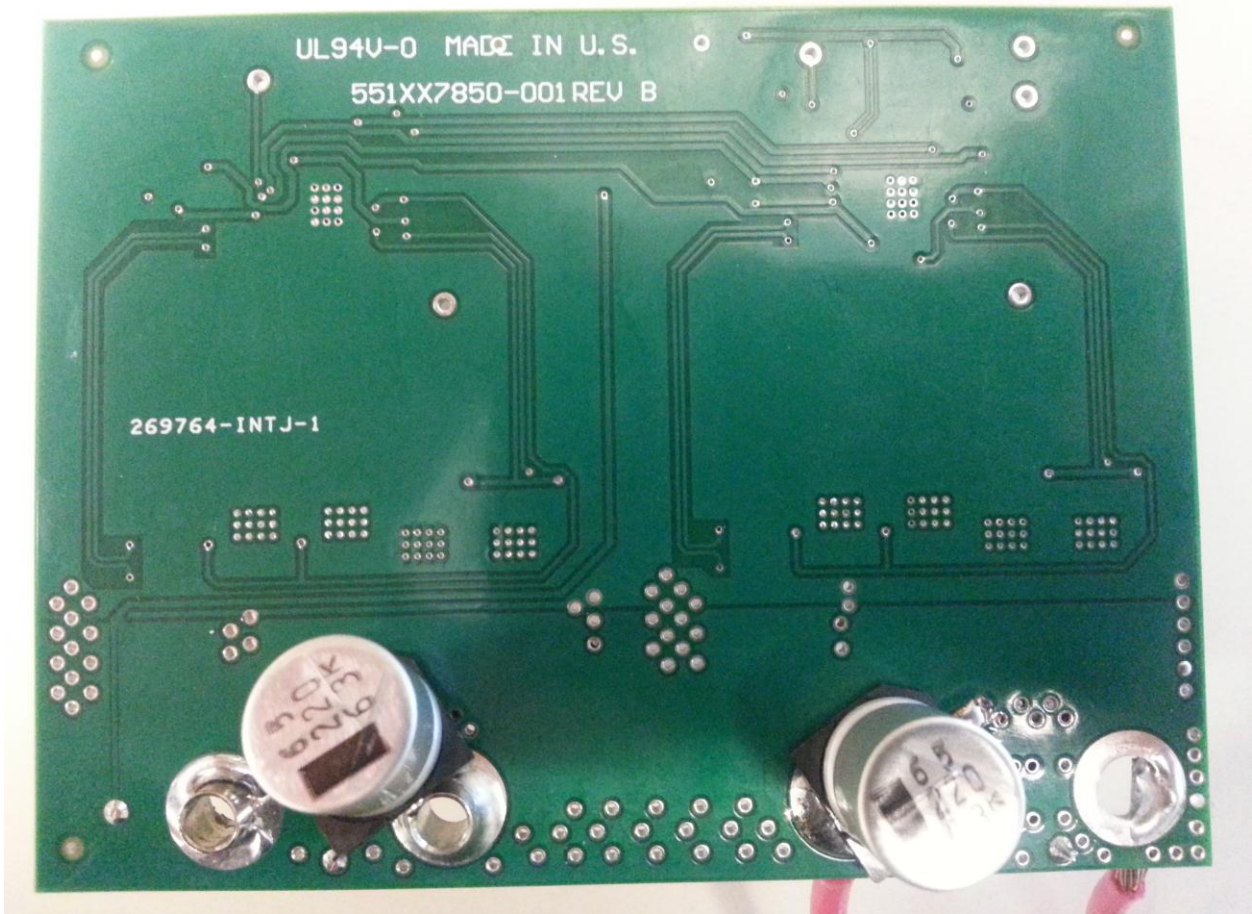
PMP9403 is a Dual-Phase Synchronous Boost Converter using the LM5122 controller IC. The design accepts an input voltage of 9Vin to 15Vin and provides an output of 48Vout capable of supplying a maximum of 4A of current to the load. This design was built on the PMP7850 REVB PCB. All tests in this report were performed at 9Vin, 12Vin, and 15Vin.

3. PMP9403 Board Photos

Board Dimensions: 4" x 3"

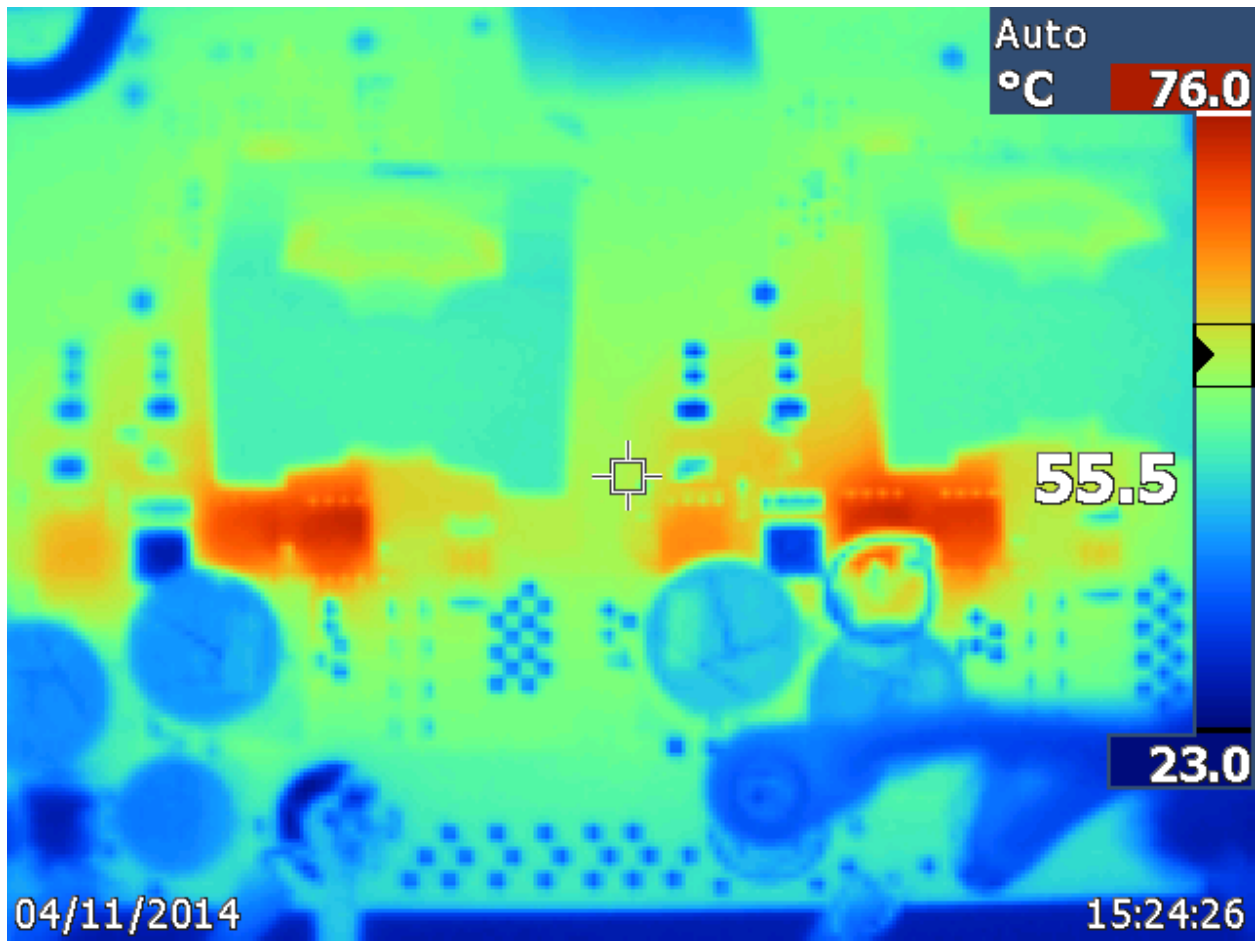


Board Photo (Top)

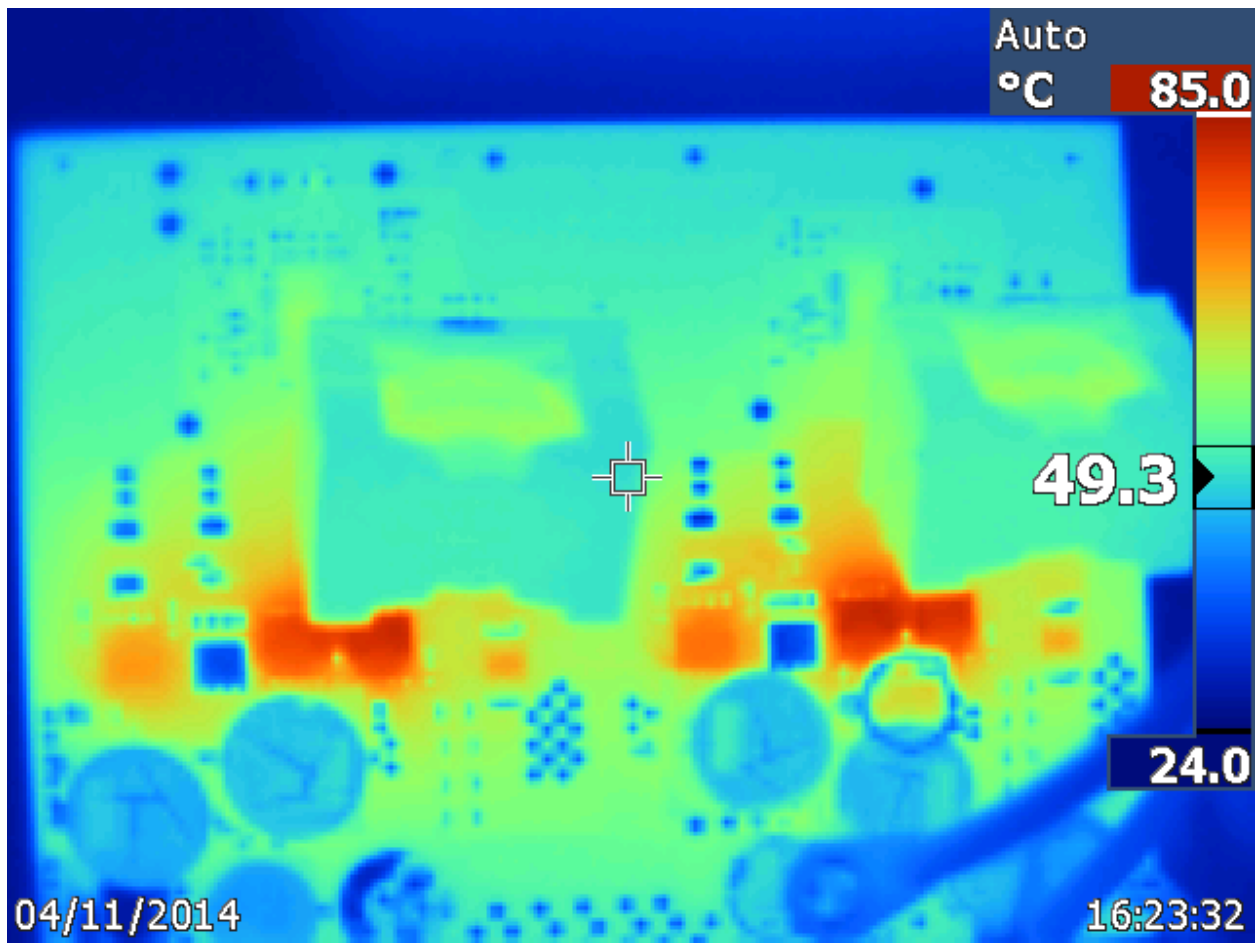


Board Photo (Bottom)

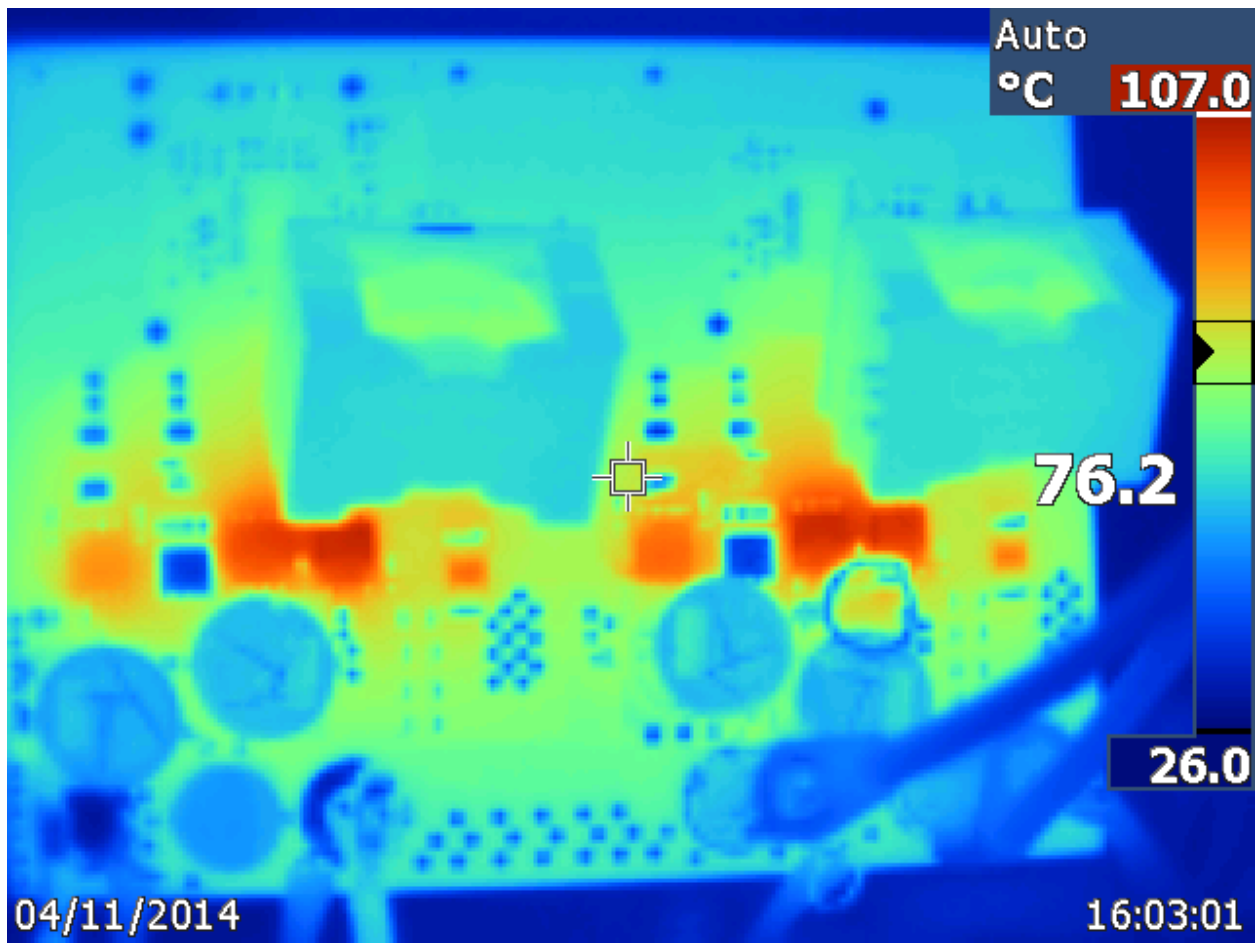
4. Thermal Data



IR thermal image taken at steady state with 15Vin and 4A load (no airflow)



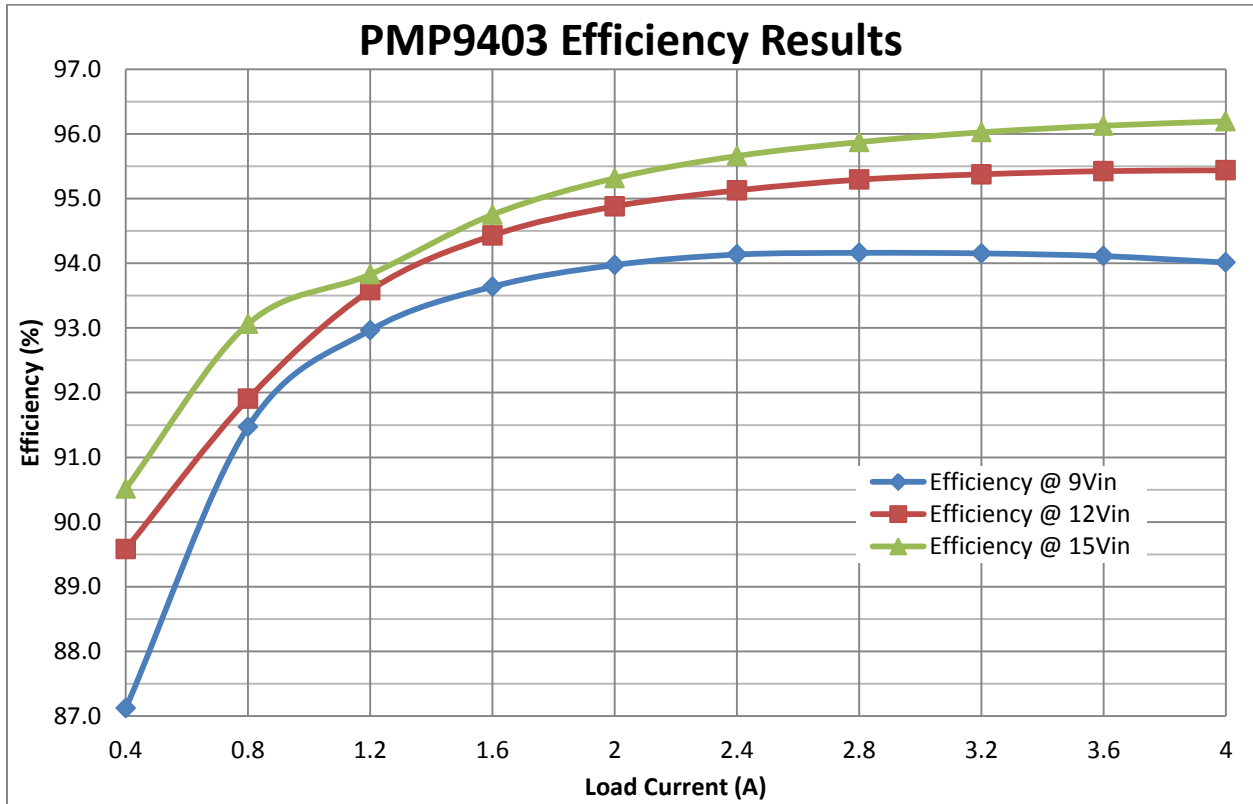
IR thermal image taken at steady state with 12Vin and 4A load (no airflow)



IR thermal image taken at steady state with 9Vin and 4A load (no airflow)

5. Efficiency

5.1 Efficiency Chart



5.2 Efficiency Data

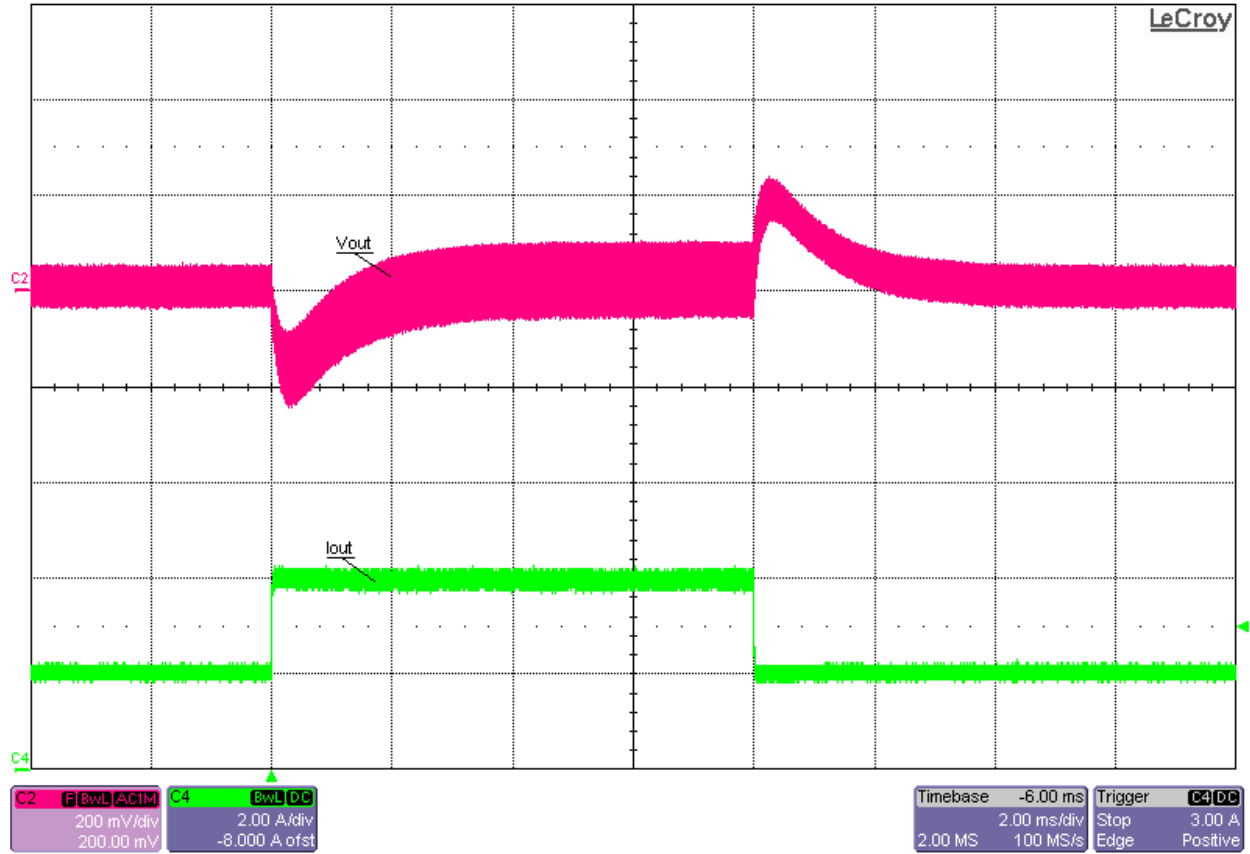
Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Efficiency (%)
9	2.469	48.397	0.4	22.22	19.36	87.1
9	4.703	48.396	0.8	42.33	38.72	91.5
9	6.941	48.396	1.2	62.47	58.08	93.0
9	9.188	48.395	1.6	82.69	77.43	93.6
9	11.444	48.395	2	103.00	96.79	94.0
9	13.709	48.394	2.4	123.38	116.15	94.1
9	15.989	48.393	2.8	143.90	135.50	94.2
9	18.274	48.391	3.2	164.47	154.85	94.2
9	20.567	48.39	3.6	185.10	174.20	94.1
9	22.875	48.387	4	205.88	193.55	94.0

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Efficiency (%)
12	1.801	48.401	0.4	21.61	19.36	89.6
12	3.511	48.401	0.8	42.13	38.72	91.9
12	5.172	48.401	1.2	62.06	58.08	93.6
12	6.834	48.401	1.6	82.01	77.44	94.4
12	8.502	48.401	2	102.02	96.80	94.9
12	10.176	48.401	2.4	122.11	116.16	95.1
12	11.851	48.4	2.8	142.21	135.52	95.3
12	13.532	48.399	3.2	162.38	154.88	95.4
12	15.215	48.397	3.6	182.58	174.23	95.4
12	16.903	48.396	4	202.84	193.58	95.4

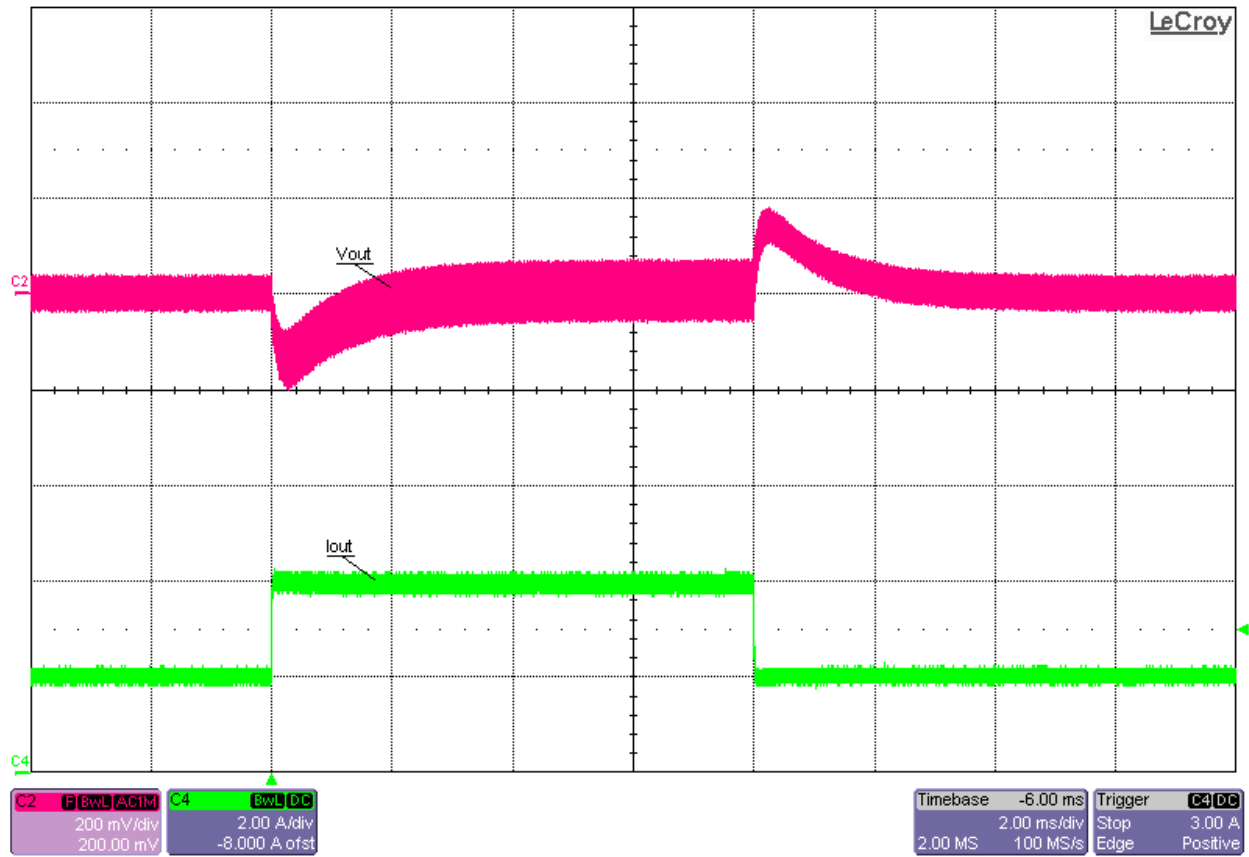
Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Efficiency (%)
15	1.426	48.404	0.4	21.39	19.36	90.5
15	2.774	48.404	0.8	41.61	38.72	93.1
15	4.127	48.404	1.2	61.91	58.08	93.8
15	5.449	48.404	1.6	81.74	77.45	94.8
15	6.771	48.404	2	101.57	96.81	95.3
15	8.096	48.404	2.4	121.44	116.17	95.7
15	9.424	48.403	2.8	141.36	135.53	95.9
15	10.753	48.402	3.2	161.30	154.89	96.0
15	12.084	48.401	3.6	181.26	174.24	96.1
15	13.417	48.4	4	201.26	193.60	96.2

6 Waveforms

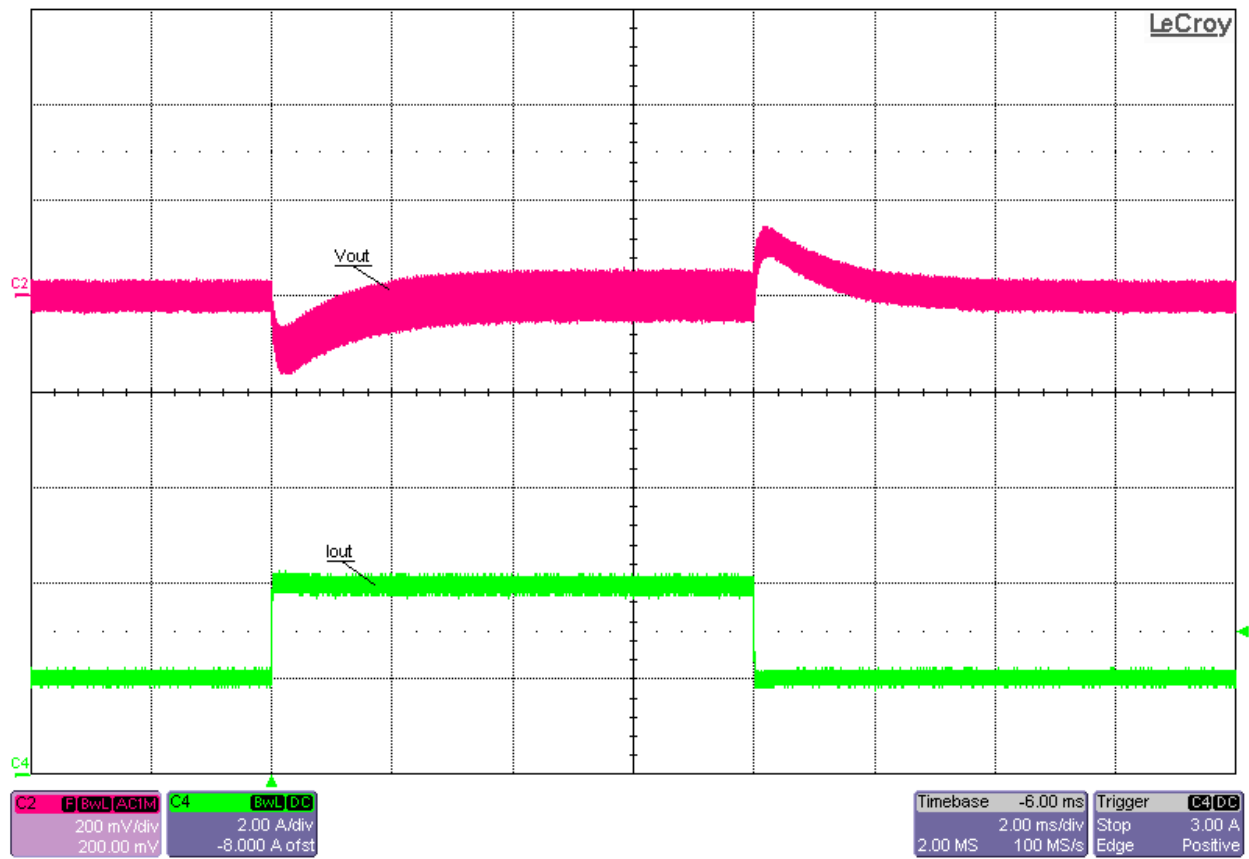
6.1 Load Transient Response



Load Transient Response at 9Vin and 50%-to-100% (2A-to-4A) Load Step

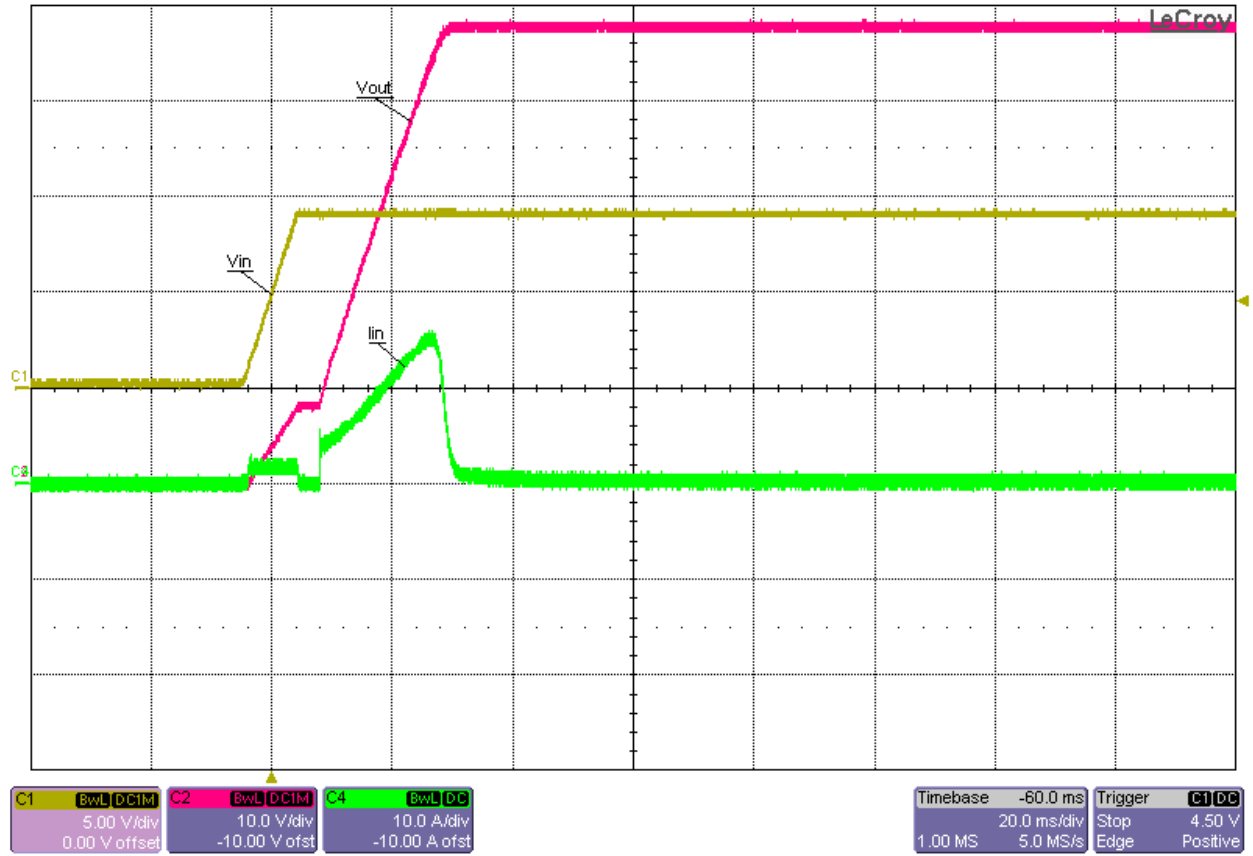


Load Transient Response at 12Vin and 50%-to-100% (2A-to-4A) Load Step

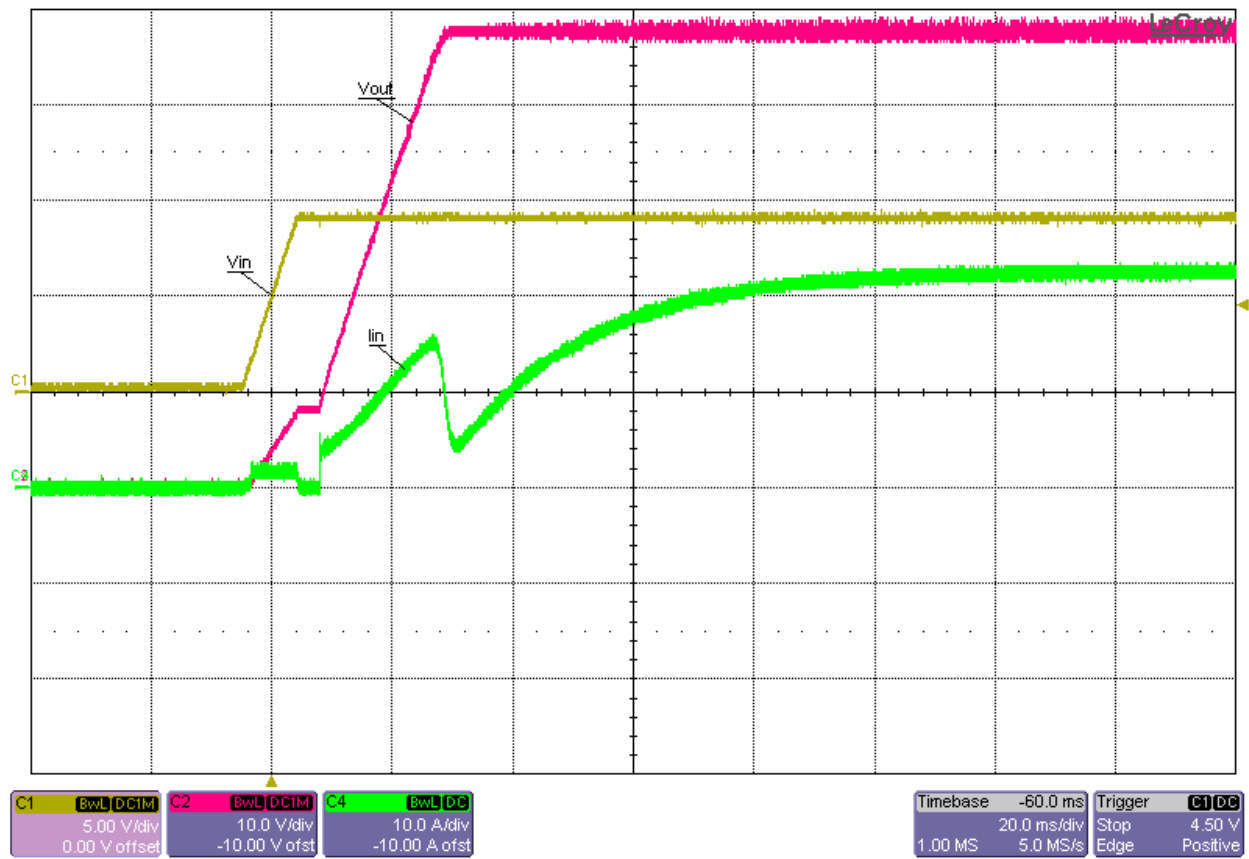


Load Transient Response at 15Vin and 50%-to-100% (2A-to-4A) Load Step

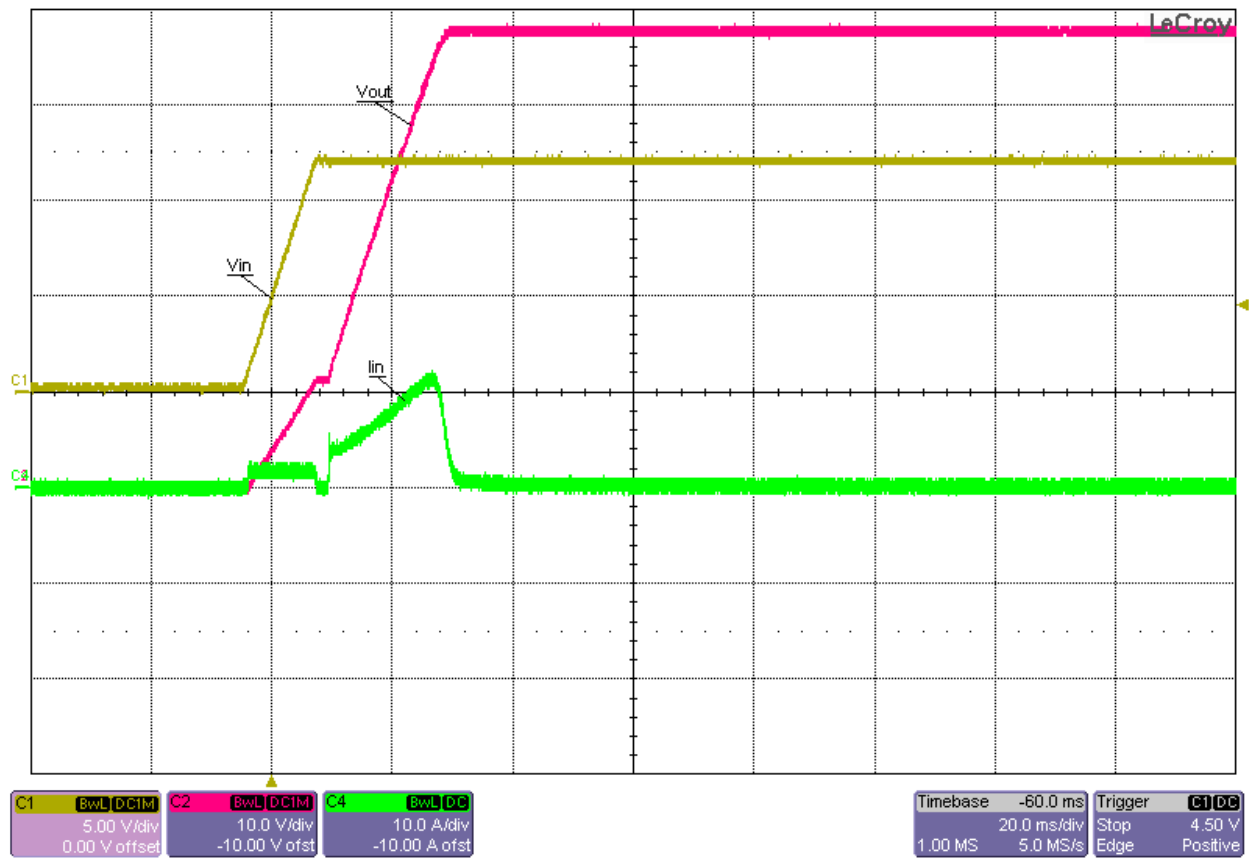
6.2 Startup



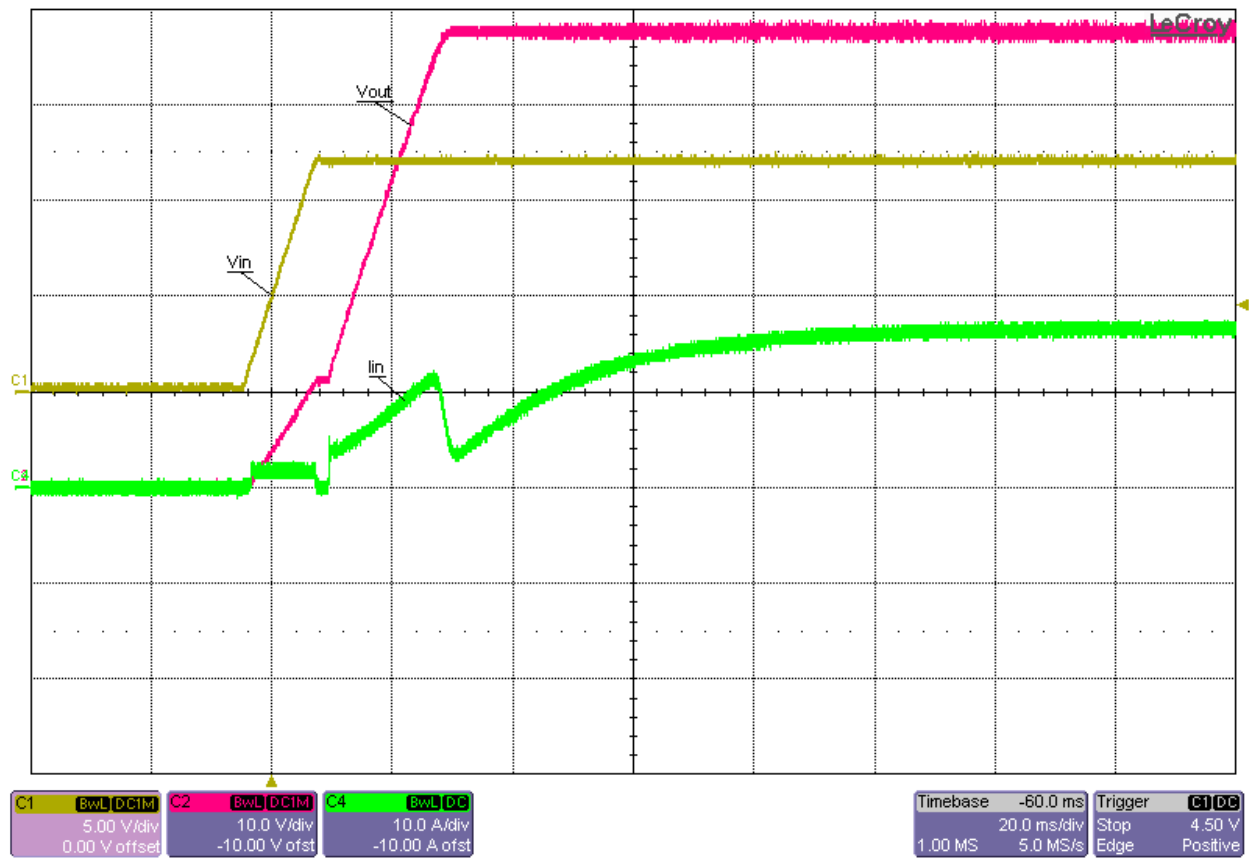
Startup into No Load at 9Vin



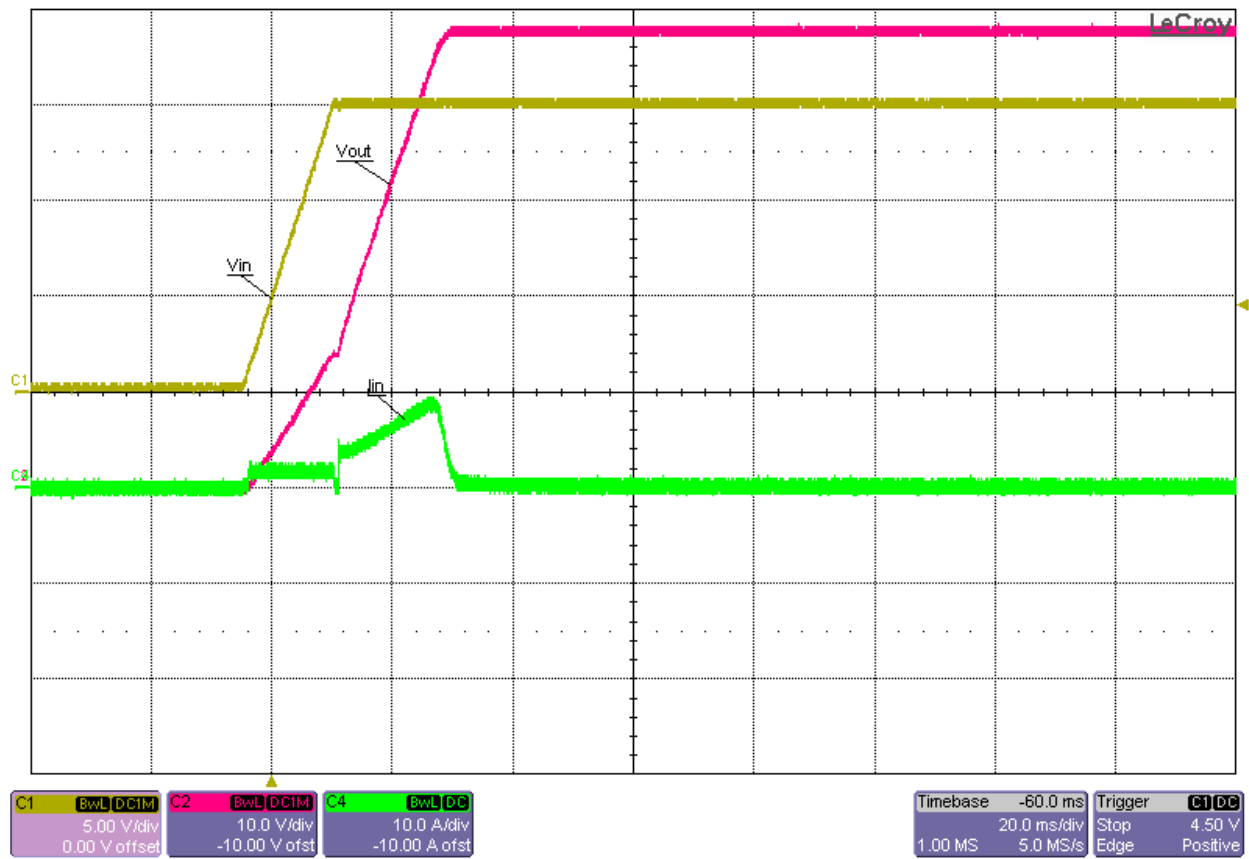
Startup into Full (4A) Load at 9Vin



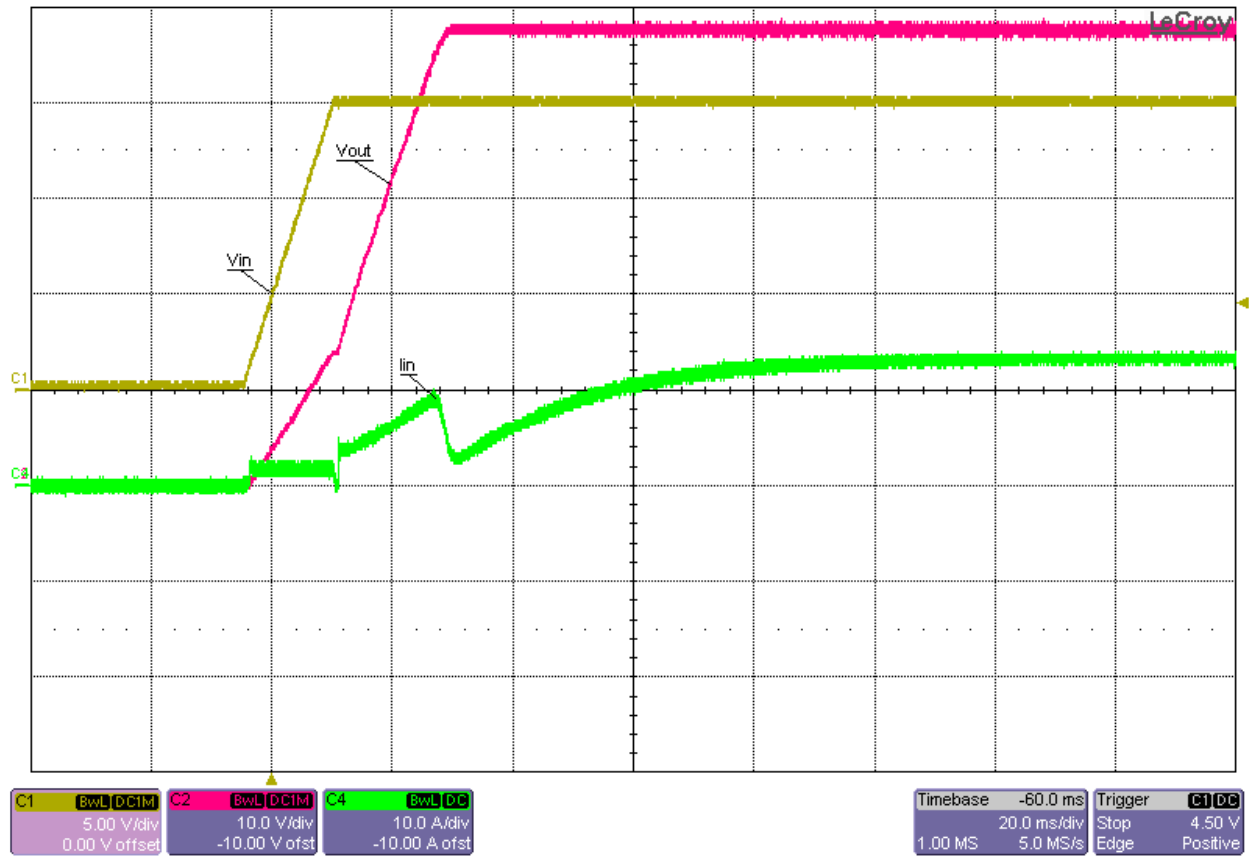
Startup into No Load at 12Vin



Startup into Full (4A) Load at 12Vin

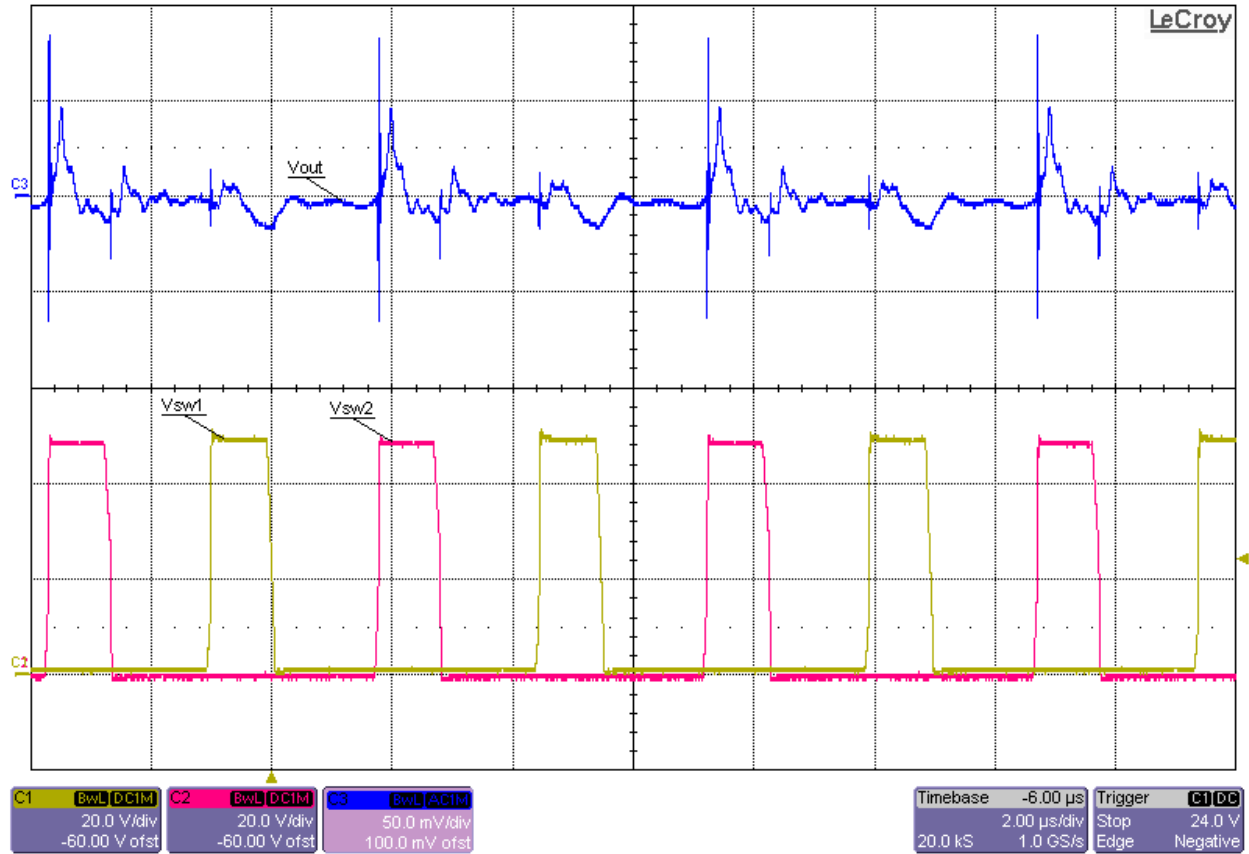


Startup into No Load at 15Vin

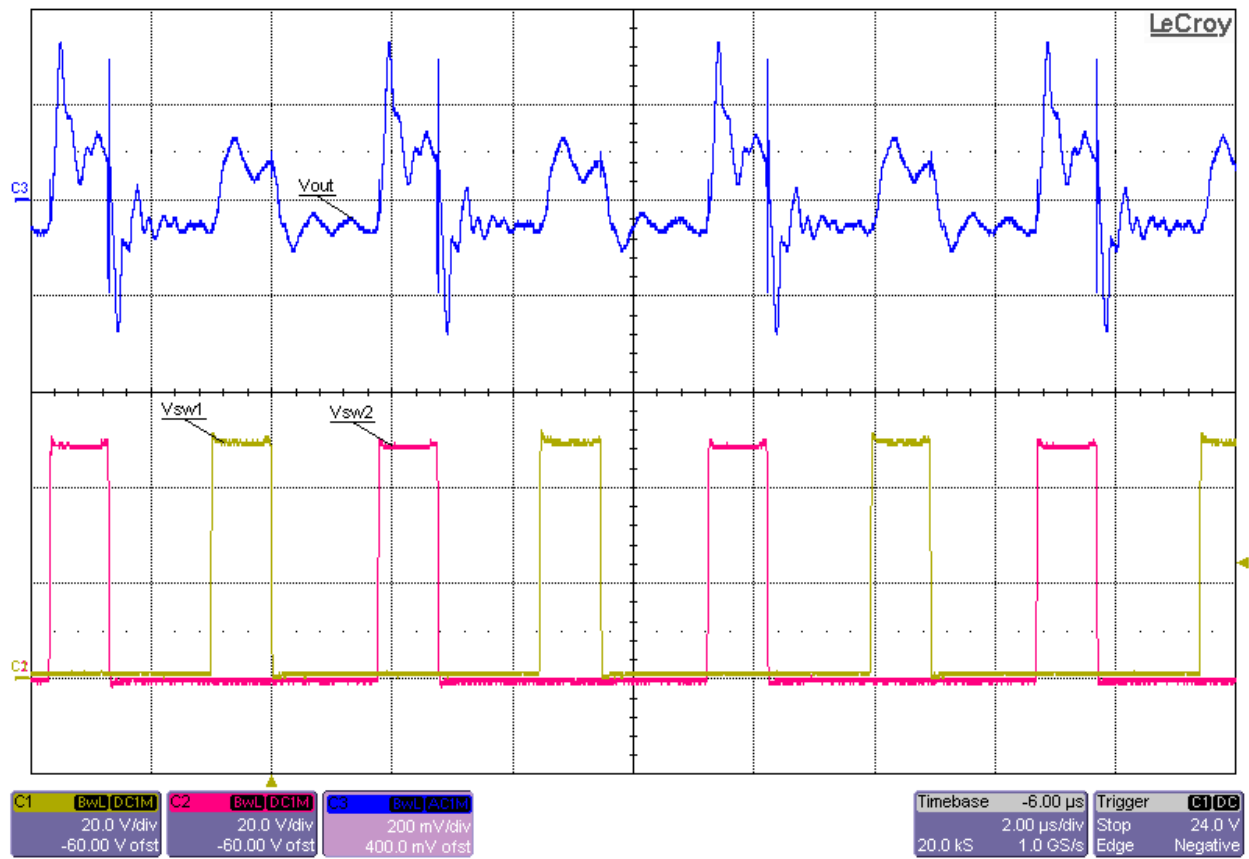


Startup into Full (4A) Load at 15Vin

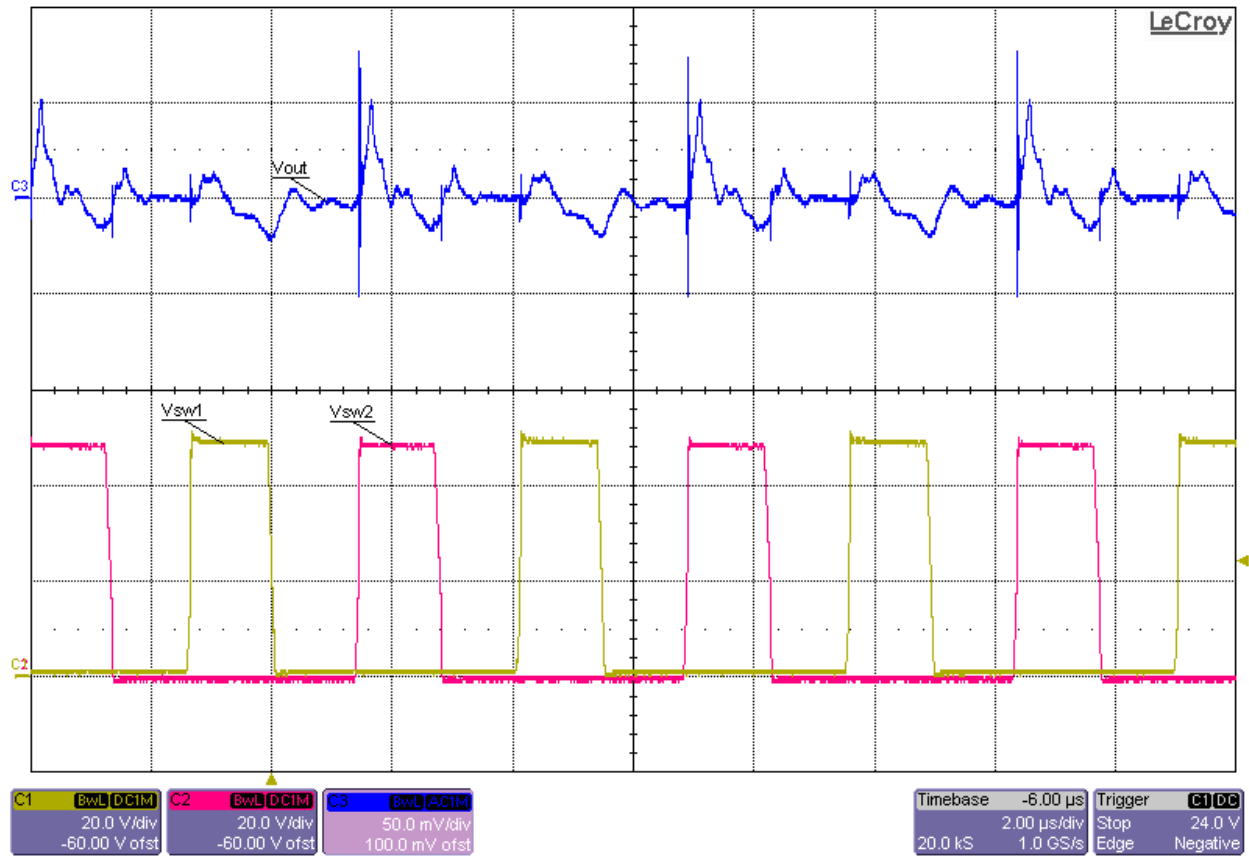
6.3 Output Voltage Ripple and Switch Node Voltage



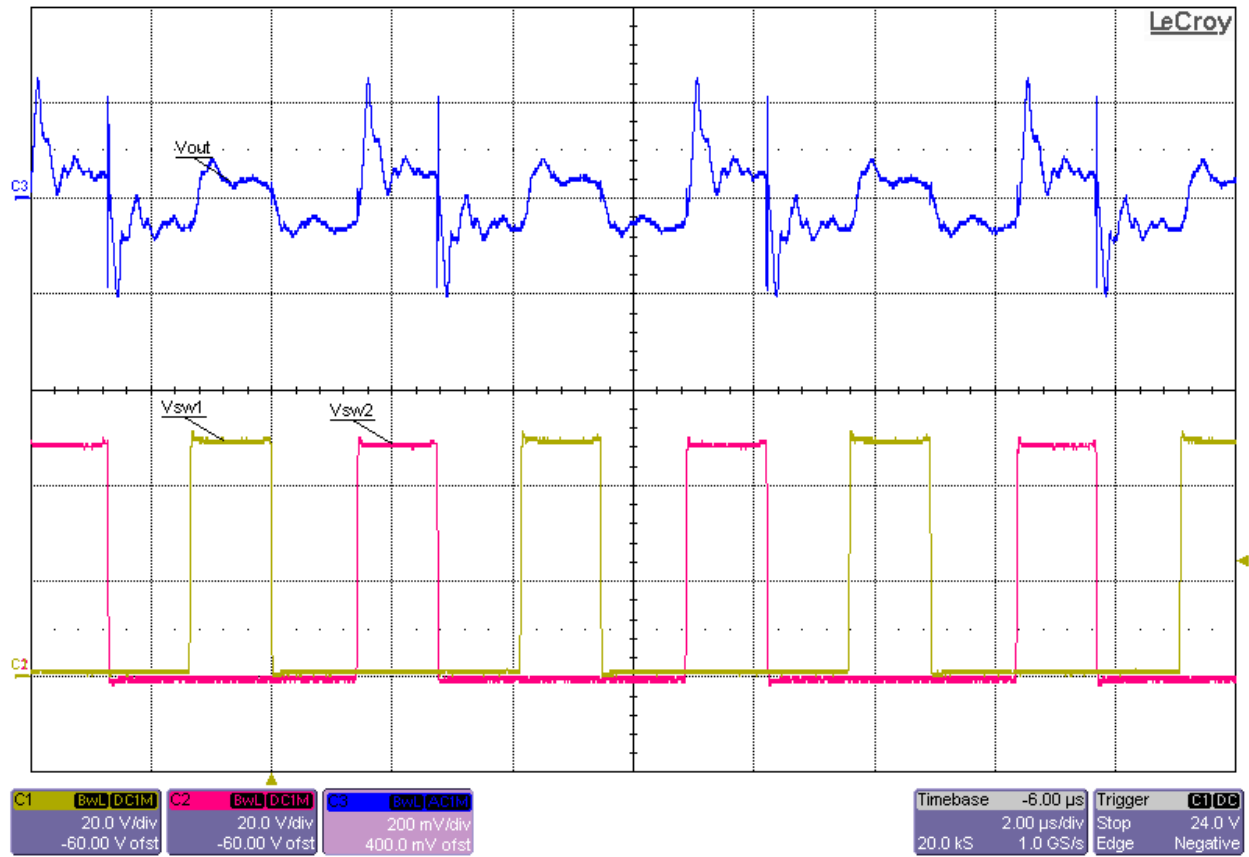
Switch Node Voltage and Output Voltage Ripple at 9Vin and No Load (Vripple \approx 60mVp-p)



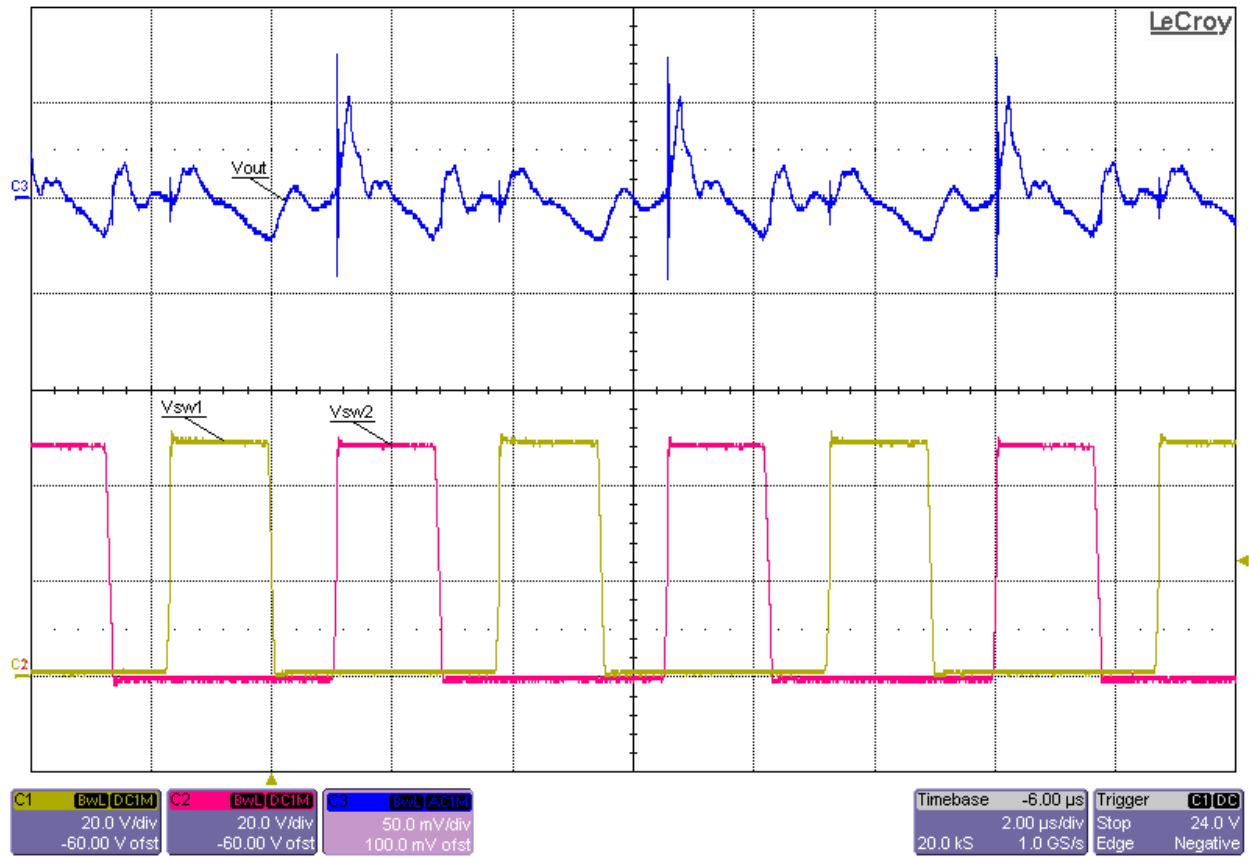
Switch Node Voltage and Output Voltage Ripple at 9Vin and Full (4A) Load (Vripple \approx 600mVp-p)



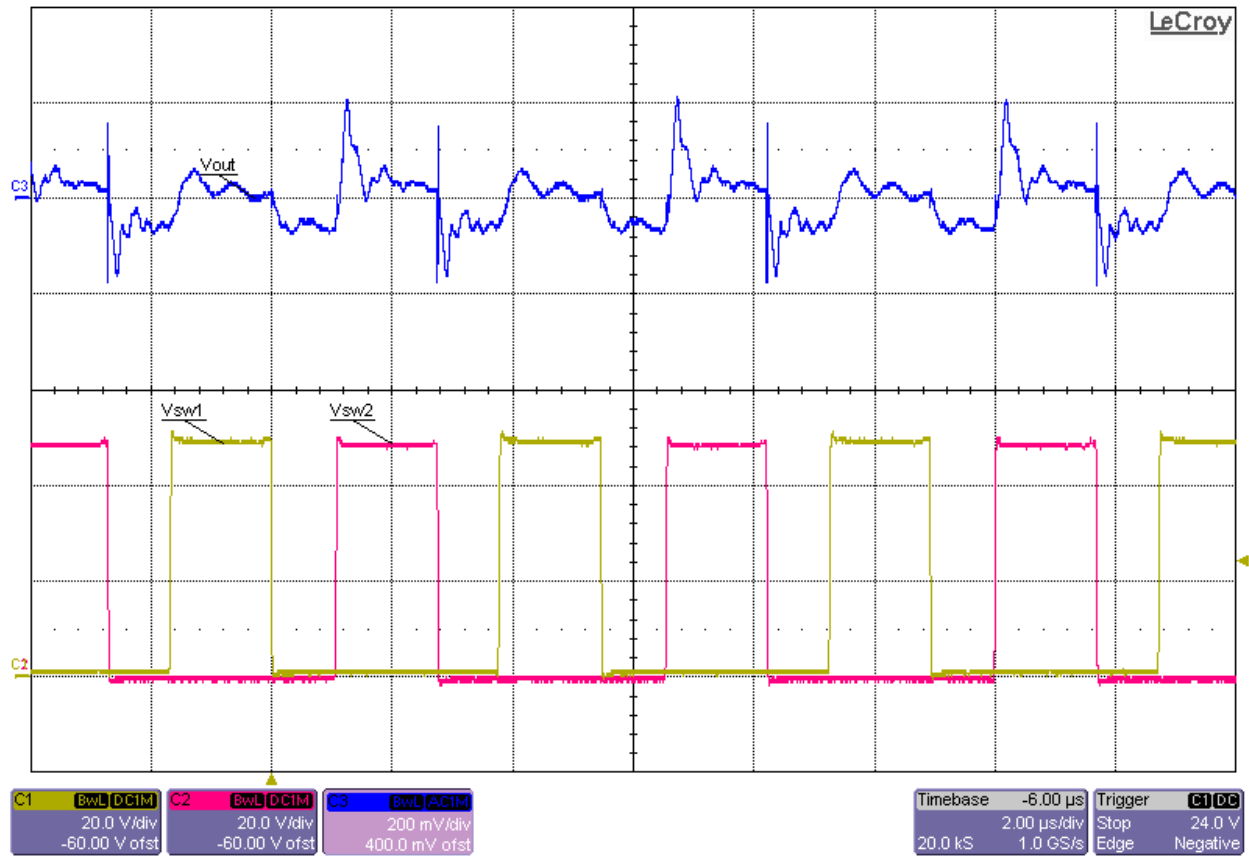
Switch Node Voltage and Output Voltage Ripple at 12Vin and No Load ($V_{ripple} \approx 70mV_{p-p}$)



Switch Node Voltage and Output Voltage Ripple at 12Vin and Full (4A) Load (Vripple \approx 450mVp-p)



Switch Node Voltage and Output Voltage Ripple at 15Vin and No Load (Vripple \approx 70mVp-p)



Switch Node Voltage and Output Voltage Ripple at 15Vin and Full (4A) Load (Vripple \approx 380mVp-p)

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