Test Data
For PMP7899
4/17/2015

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1. Design Specifications

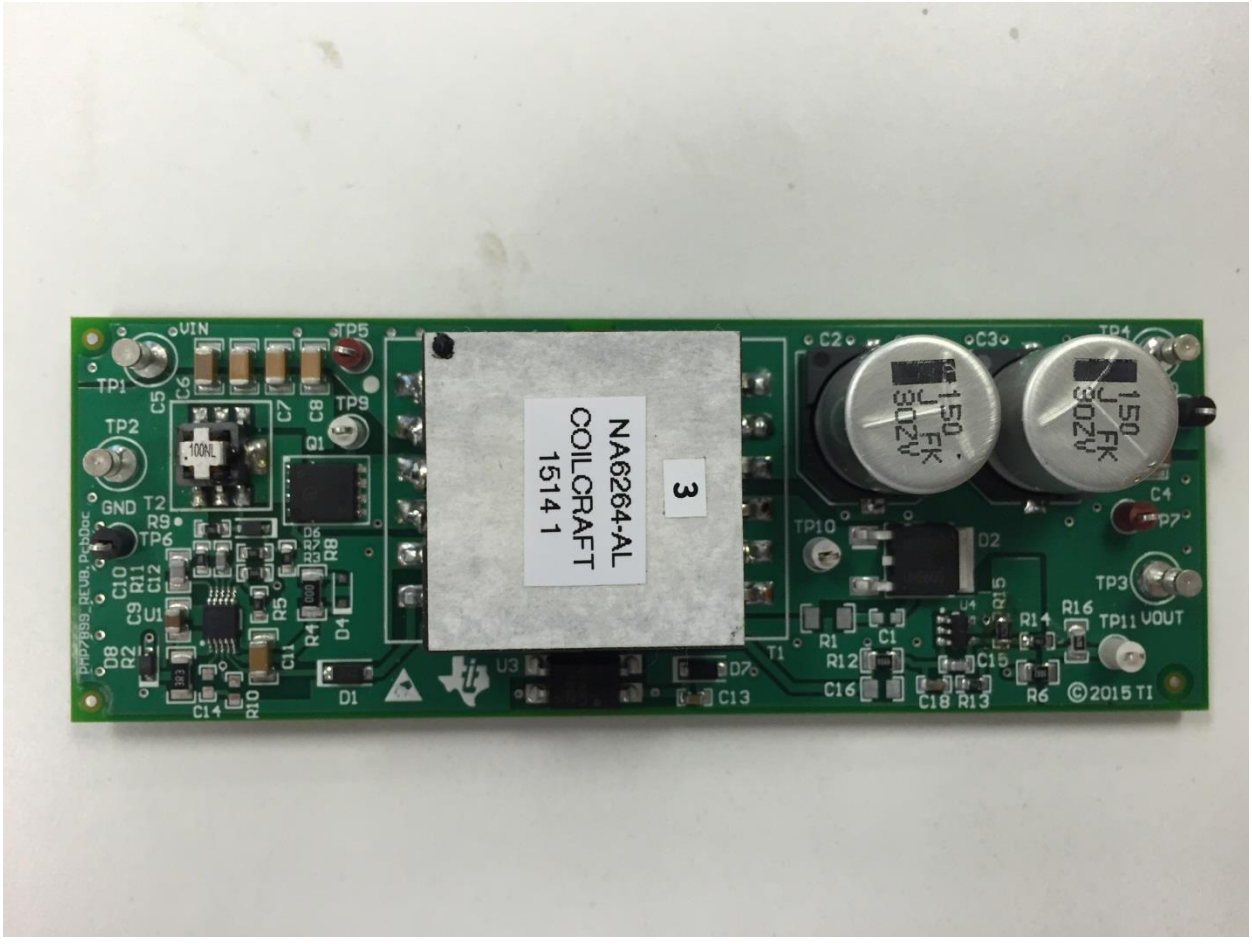
Vin Minimum	**8VDC**
Vin Maximum	**18VDC**
Vout	**+48VDC @ 1A**
Nominal Switching Frequency	**≈ 340KHz**

2. Circuit Description

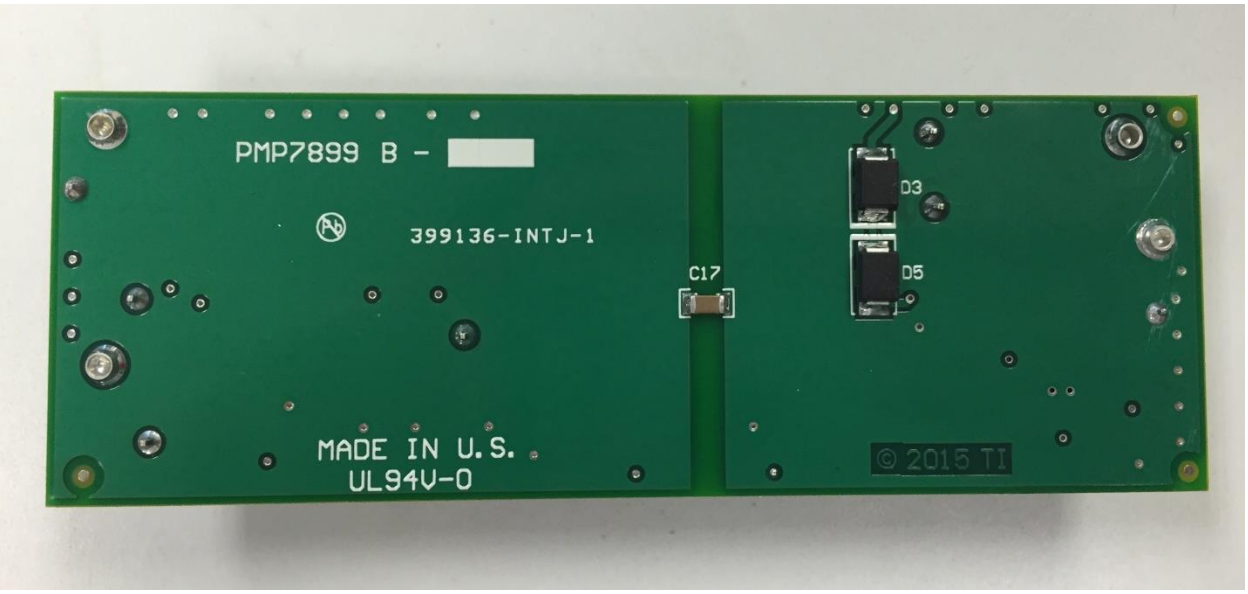
PMP7899 is an isolated flyback converter utilizing the LM5022 for industrial applications. This design has a minimum operating input voltage of 8V and a maximum input voltage of 18V. The test report here is for 8V, 12V and 18Vin/~48V out @ 1A of load current. Switching frequency is set to 340kHz. A custom flyback transformer from Coilcraft is used in this design.

3. PMP7899 Board Photos

Board Dimensions: 101.6mm x 35.56mm



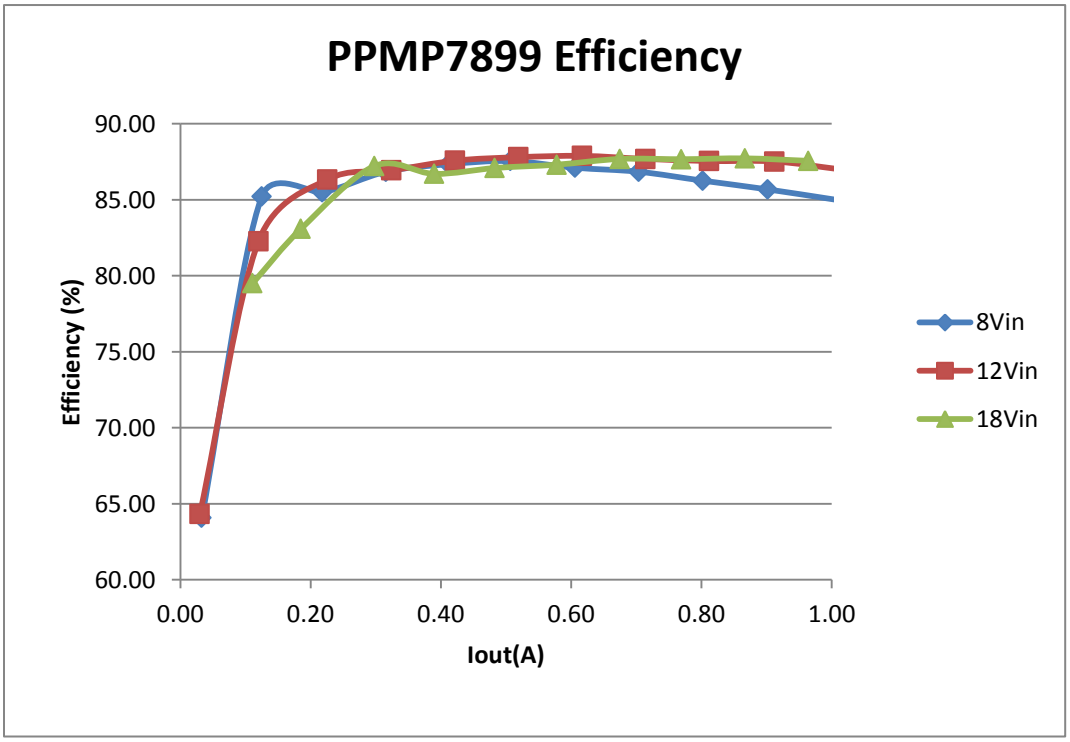
Board Photo (Top)



Board Photo (Bottom)

4. Efficiency

4.1 Efficiency Chart



4.2 Efficiency Data

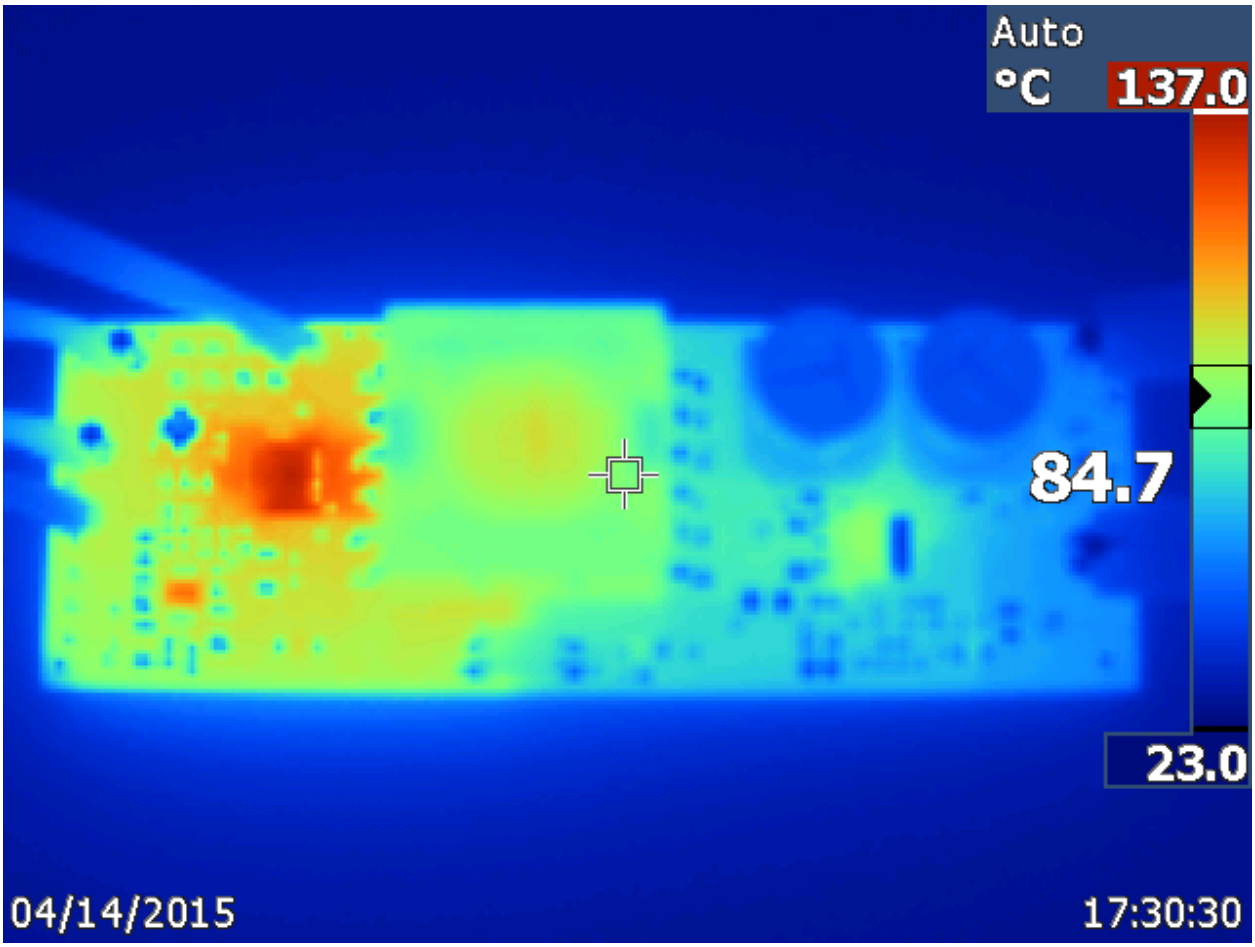
Vin(V)	Iin(A)	Pin (W)	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency(%)
8.00	0.09	0.74	48.18	0.00	0.00	0.74	0.00
8.00	0.31	2.48	48.17	0.03	1.59	0.89	64.09
8.00	0.88	7.07	48.17	0.13	6.02	1.04	85.22
8.00	1.54	12.28	48.17	0.22	10.50	1.78	85.49
8.00	2.19	17.52	48.17	0.32	15.22	2.30	86.85
8.00	2.84	22.72	48.16	0.41	19.84	2.88	87.34
8.00	3.49	27.89	48.16	0.51	24.42	3.47	87.55
8.00	4.19	33.50	48.15	0.61	29.18	4.32	87.11
8.00	4.88	39.03	48.15	0.70	33.89	5.13	86.84
8.00	5.59	44.76	48.14	0.80	38.61	6.15	86.26
8.00	6.33	50.67	48.13	0.90	43.42	7.25	85.68
8.00	7.12	56.95	48.12	1.01	48.41	8.54	85.01

Vin(V)	Iin(A)	Pin (W)	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency(%)
12.00	0.06	0.72	48.12	0.00	0.00	0.72	0.00
12.00	0.19	2.24	48.13	0.03	1.44	0.80	64.34
12.00	0.59	7.02	48.13	0.12	5.78	1.24	82.28
12.00	1.05	12.60	48.13	0.23	10.88	1.72	86.34
12.00	1.50	17.94	48.13	0.32	15.60	2.34	86.94
12.00	1.93	23.19	48.13	0.42	20.31	2.88	87.58
12.00	2.37	28.45	48.13	0.52	24.98	3.47	87.81
12.00	2.82	33.78	48.12	0.62	29.69	4.09	87.89
12.00	3.27	39.18	48.12	0.71	34.36	4.82	87.69
12.00	3.72	44.62	48.12	0.81	39.07	5.55	87.55
12.00	4.18	50.13	48.11	0.91	43.88	6.25	87.52
12.00	4.66	55.95	48.11	1.01	48.68	7.27	87.01

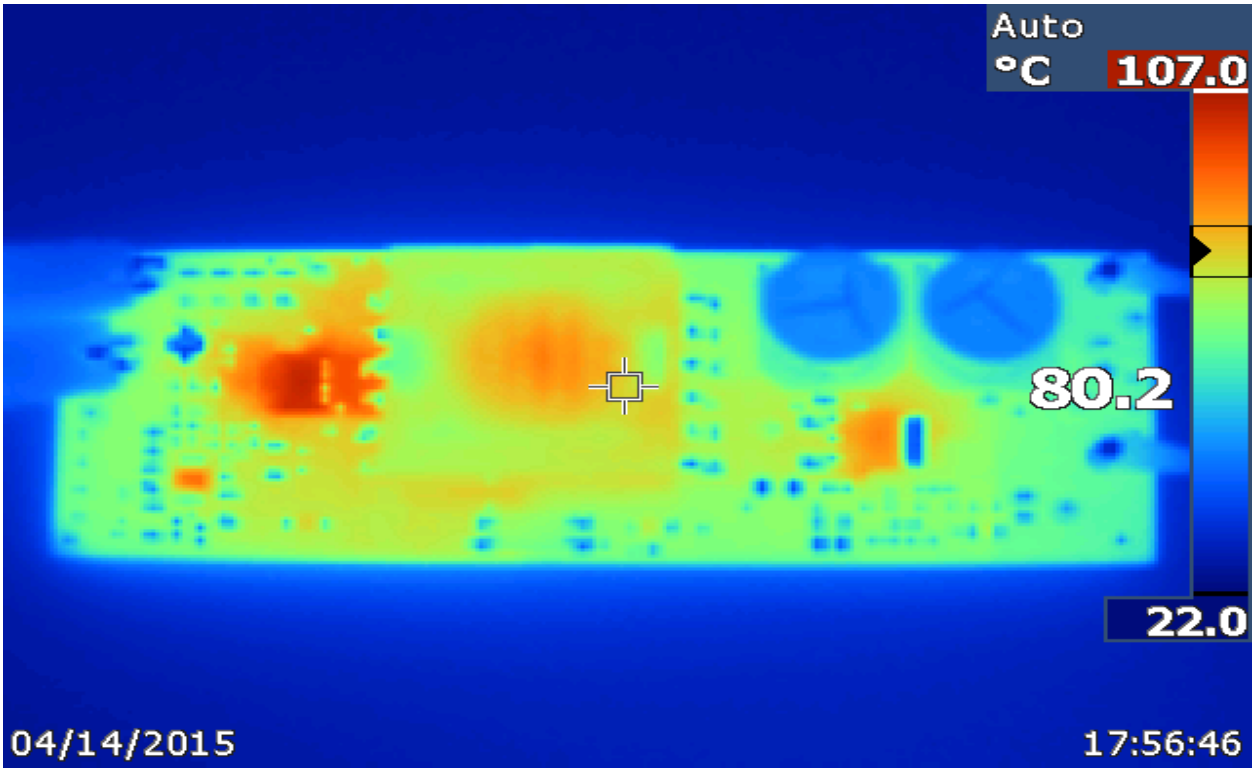
Vin(V)	Iin(A)	Pin (W)	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency(%)
18.01	0.05	0.83	48.11	0.00	0.00	0.83	0.00
18.01	0.08	1.40	48.11	0.01	0.43	0.97	30.83
18.01	0.37	6.72	48.12	0.11	5.34	1.38	79.51
18.01	0.60	10.71	48.12	0.19	8.90	1.81	83.08
18.01	0.91	16.44	48.12	0.30	14.34	2.10	87.22
18.01	1.20	21.64	48.12	0.39	18.77	2.88	86.71
18.01	1.48	26.68	48.12	0.48	23.24	3.44	87.09
18.00	1.77	31.85	48.11	0.58	27.81	4.04	87.31
18.00	2.06	37.03	48.11	0.68	32.47	4.56	87.69

18.00	2.34	42.19	48.11	0.77	36.99	5.20	87.67
18.00	2.64	47.54	48.10	0.87	41.70	5.83	87.73
18.00	2.94	52.95	48.10	0.96	46.37	6.58	87.57

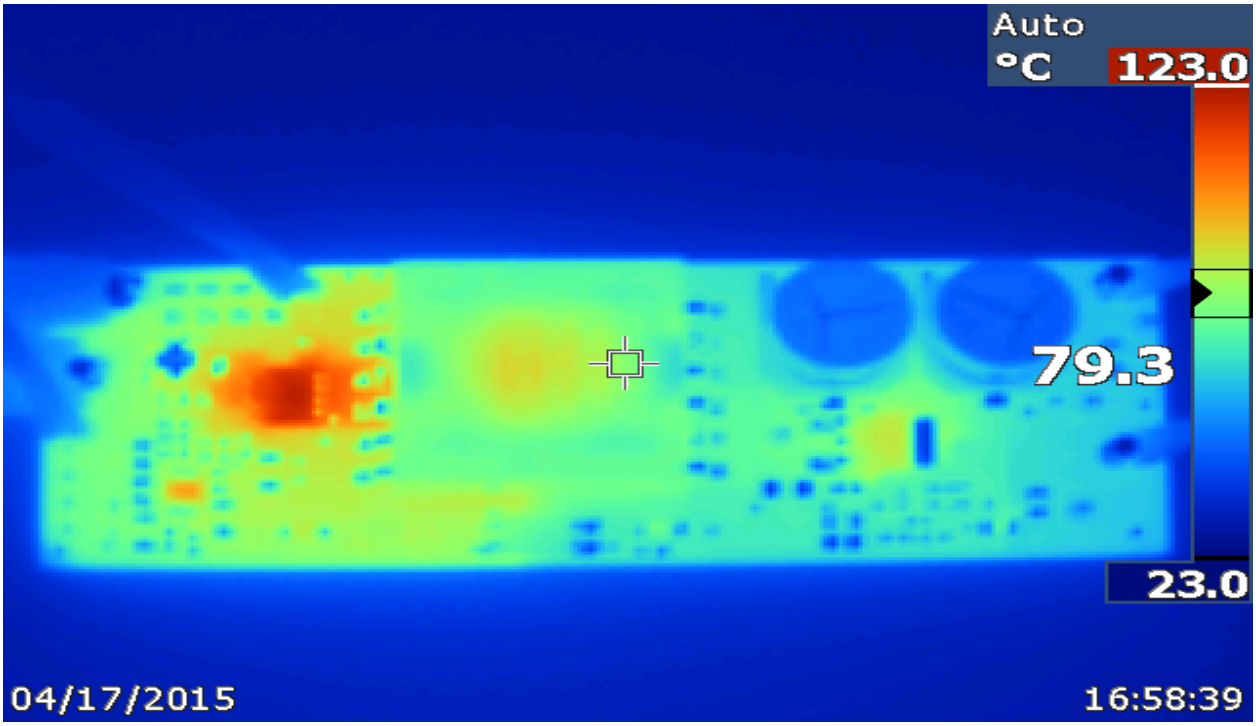
5 Thermal Images



Thermal image was taken at 12Vin, 1A load when the board reaches equilibrium.



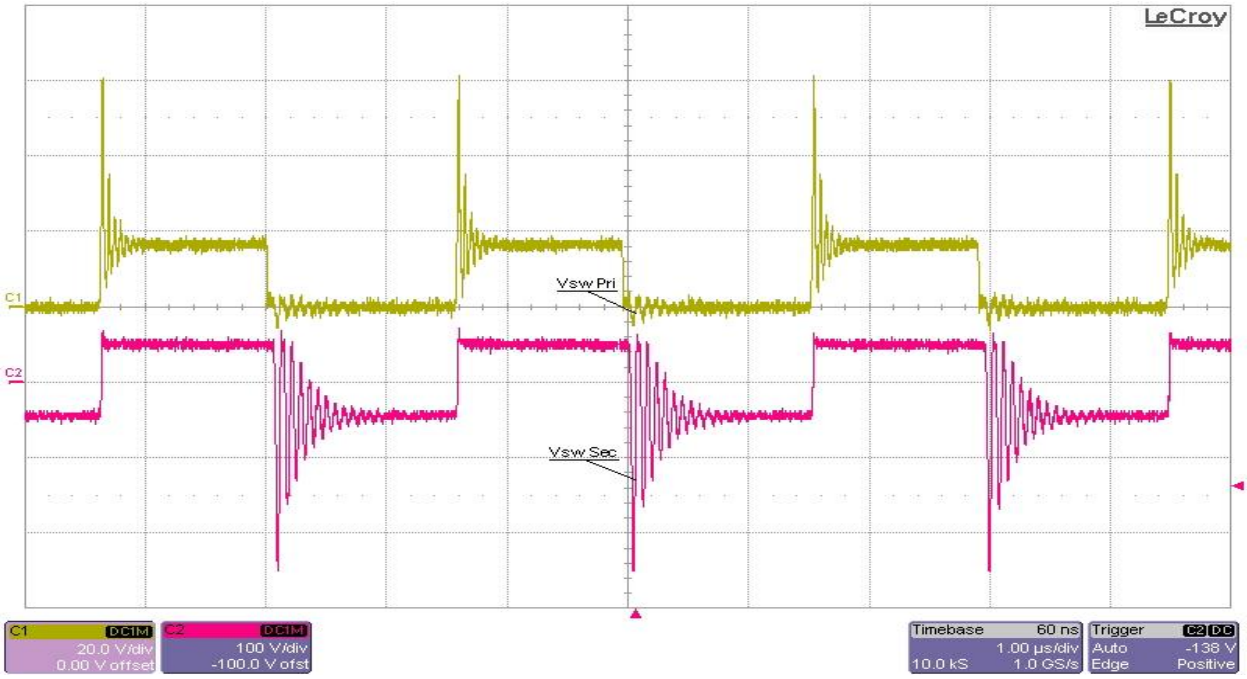
Thermal image was taken at 18Vin, 1A load when the board reaches equilibrium.



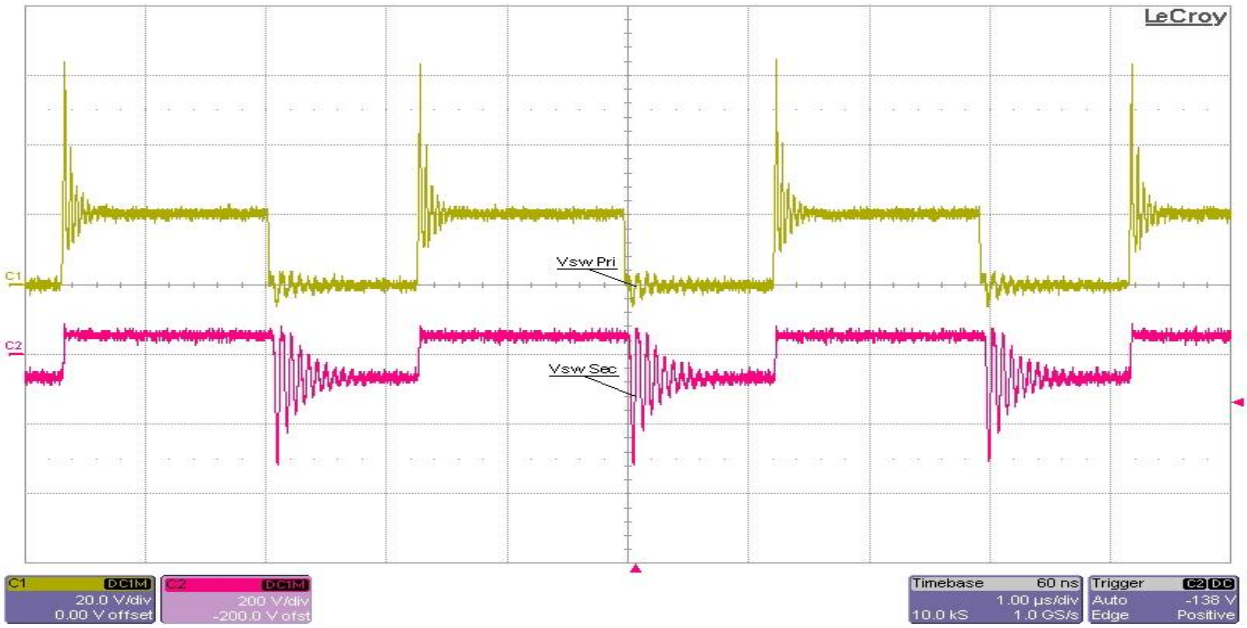
Thermal image was taken at 8Vin, 0.9A load when the board reaches equilibrium. Heat sink or air flow is required if intended to run continuous at 8Vin/0.9A full load.

6 Waveform

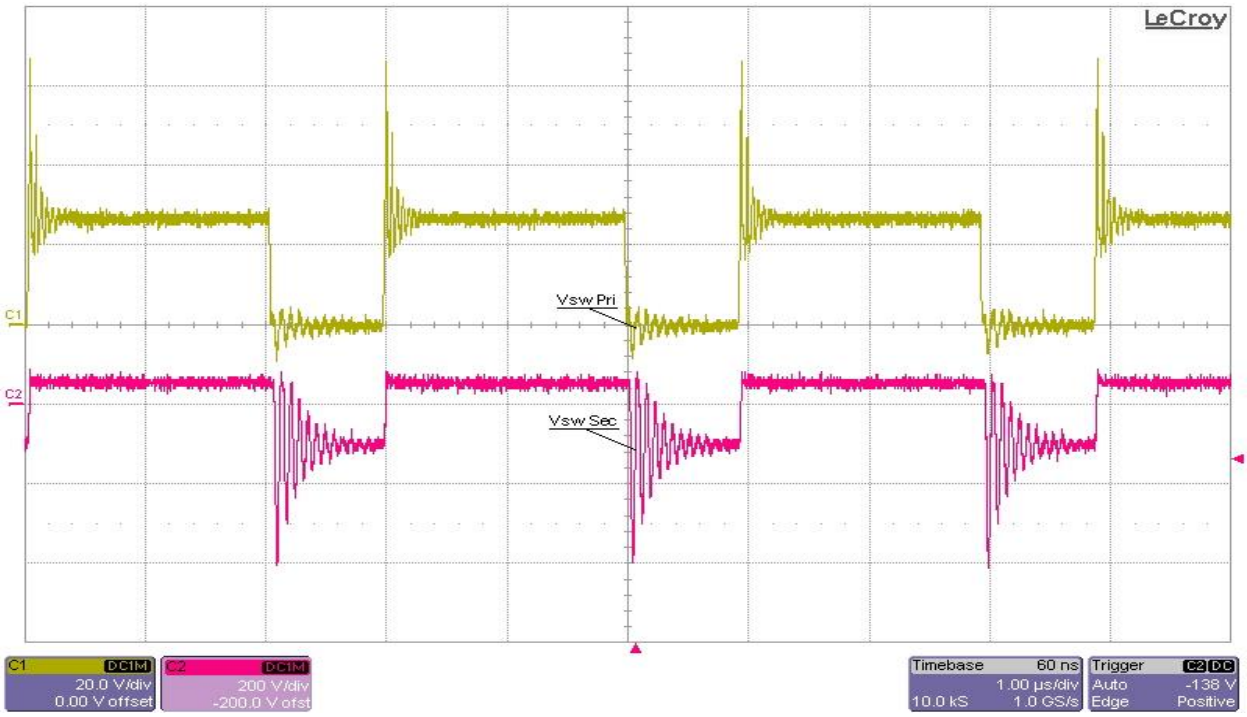
6.1 Switching Waveform



8Vin, 1A load. Ch1 measures primary switching waveform, Ch2 measures secondary switching waveform.

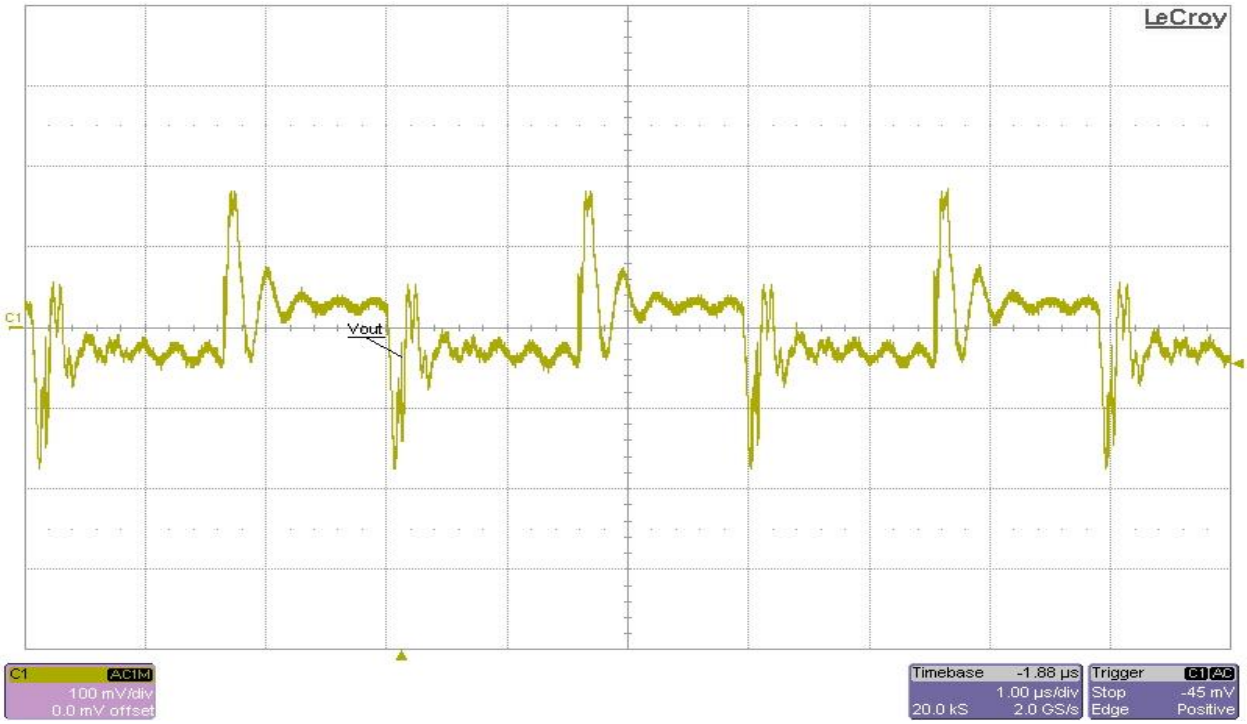


12Vin, 1A load. Ch1 measures primary switching waveform, Ch2 measures secondary switching waveform.

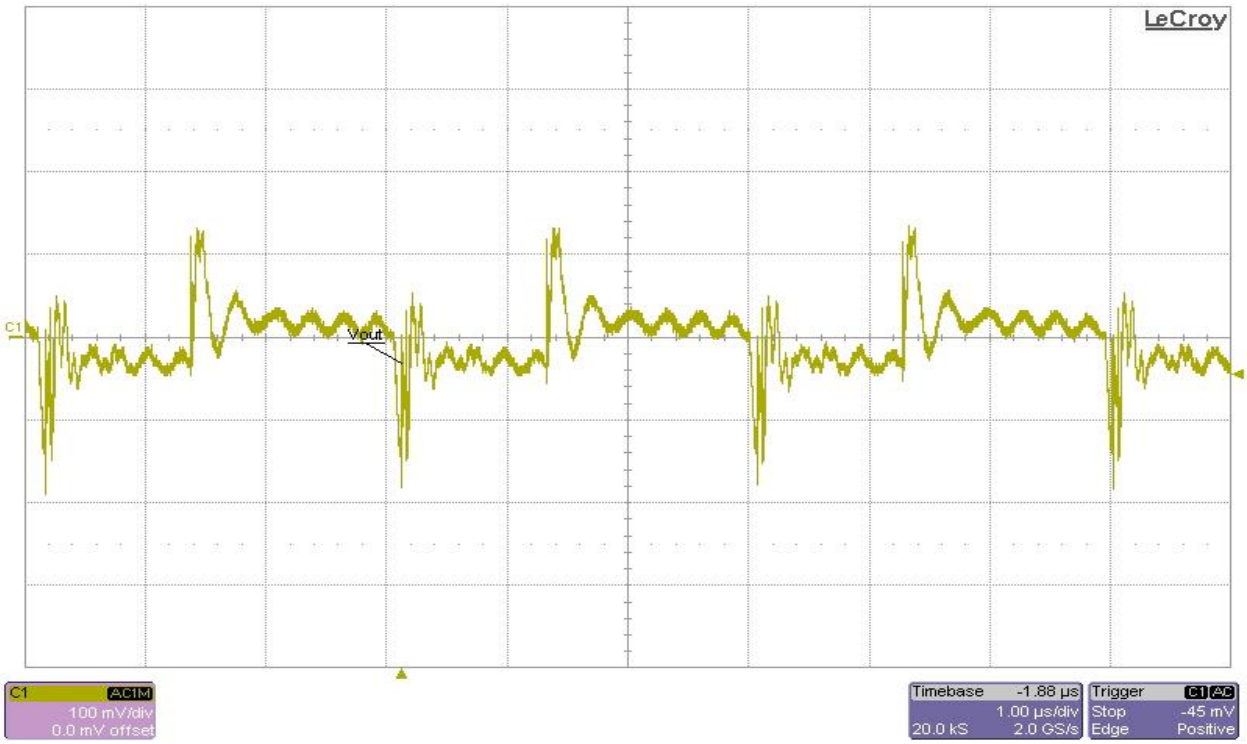


18Vin, 1A load. Ch1 measures primary switching waveform, Ch2 measures secondary switching waveform.

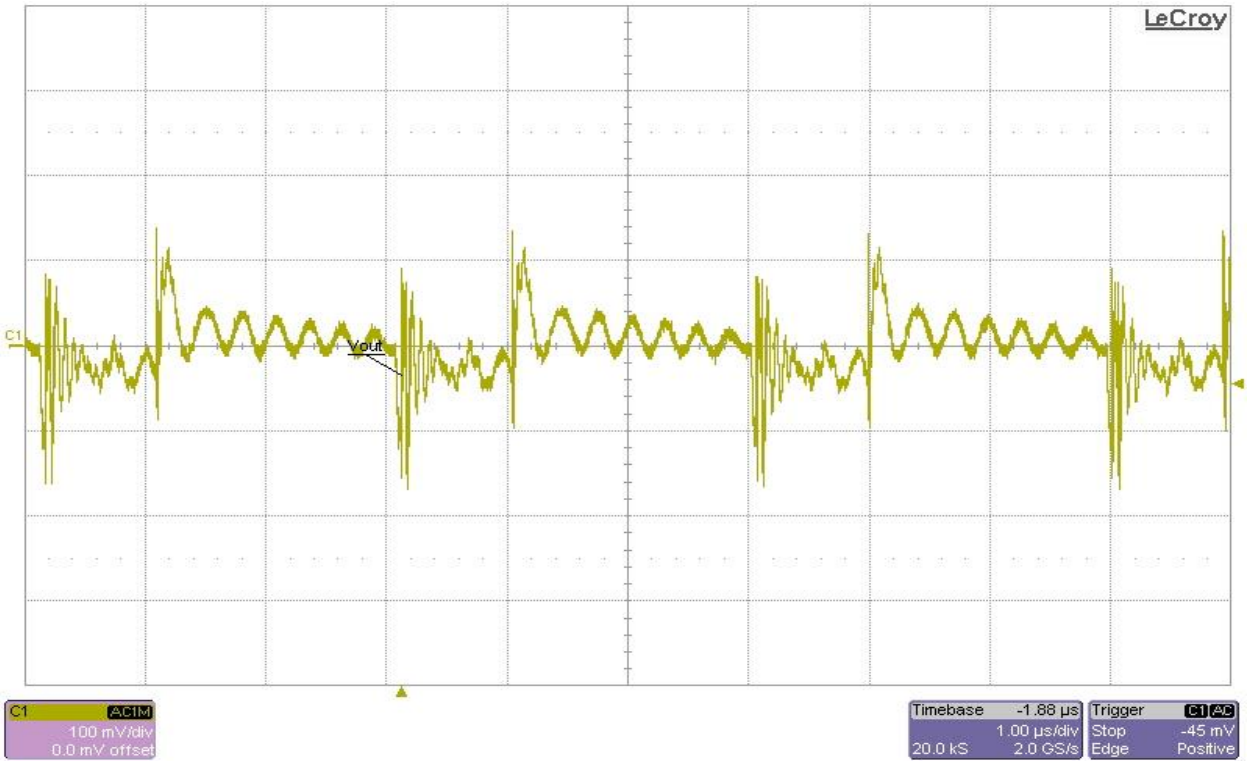
6.2 Output Ripple



8Vin, 1A load. Ch1 measures output ripple.

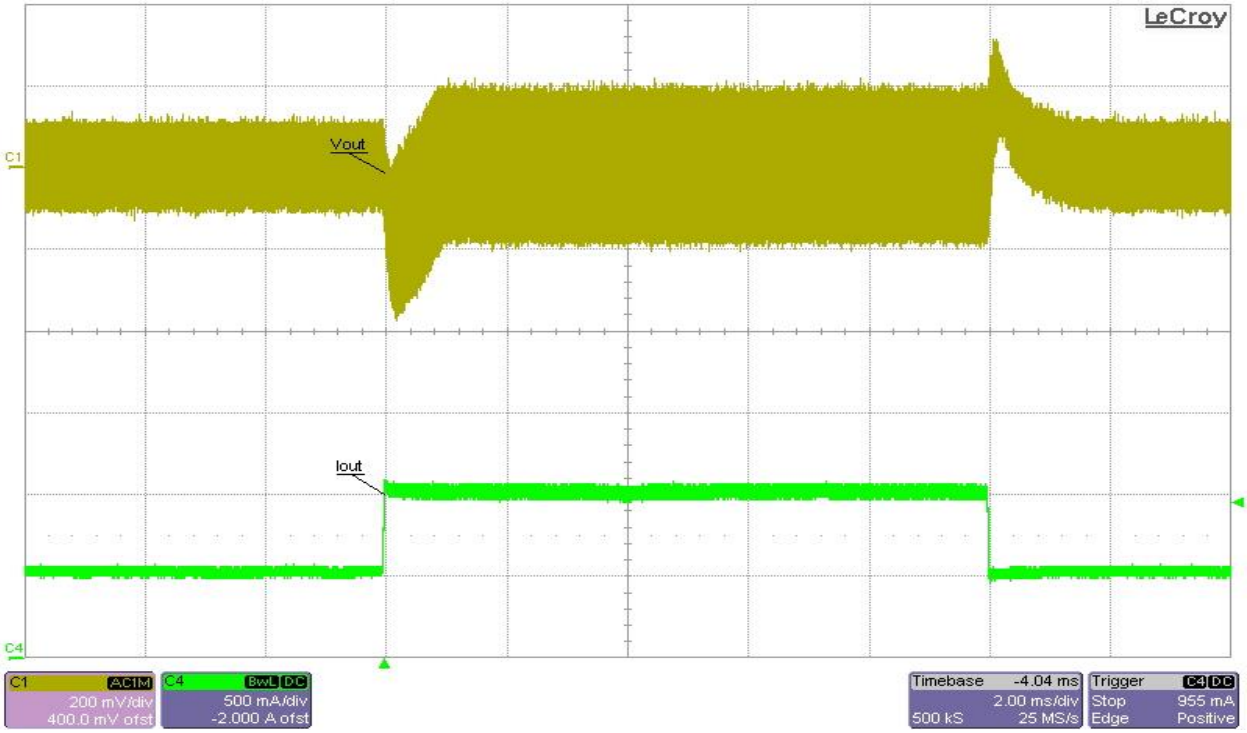


12Vin, 1A load. Ch1 measures output ripple.

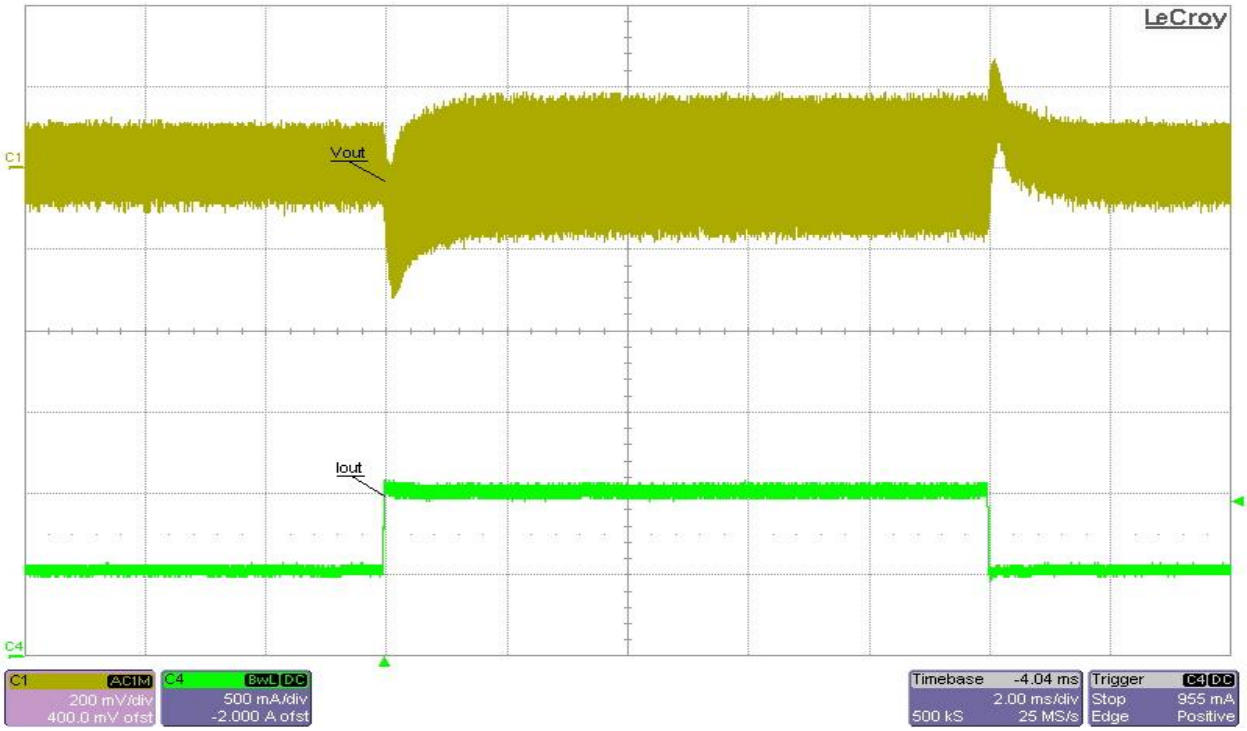


18Vin, 1A load. Ch1 measures output ripple.

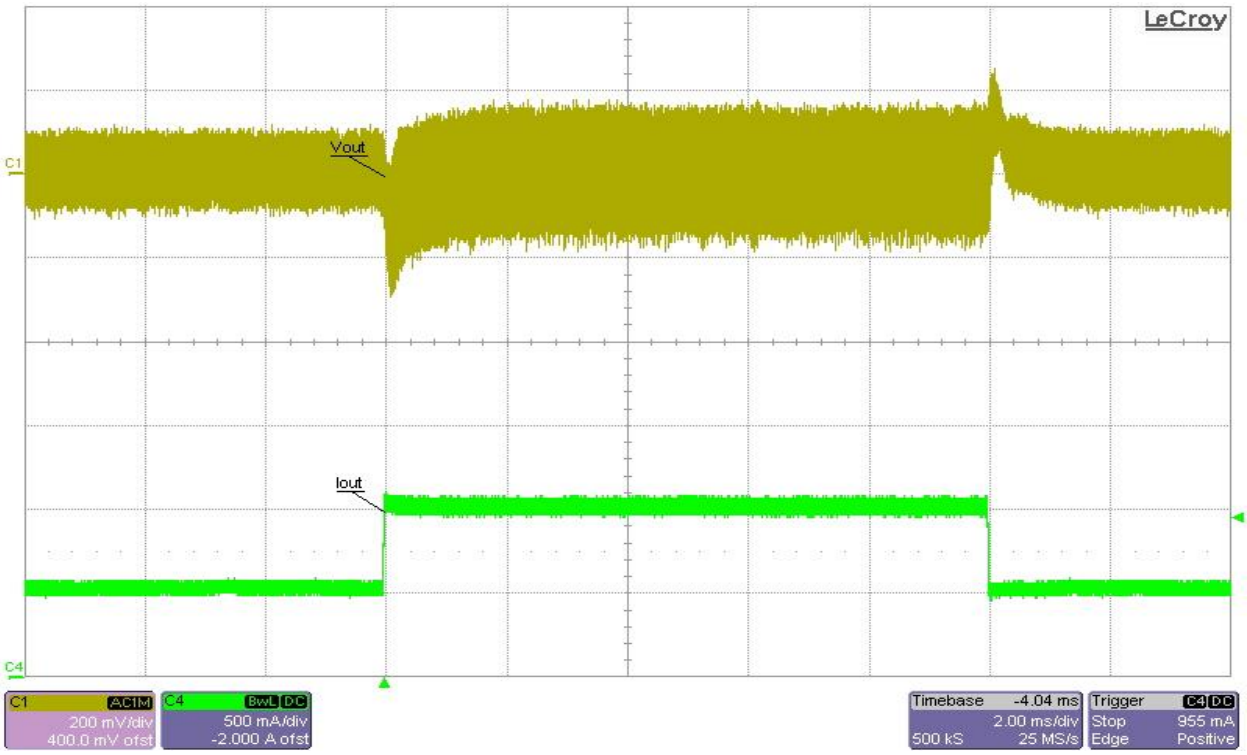
6.3 Load Transient



8Vin, 0.5A-1A load step. Ch1 measures output voltage, Ch4 measures output load current.

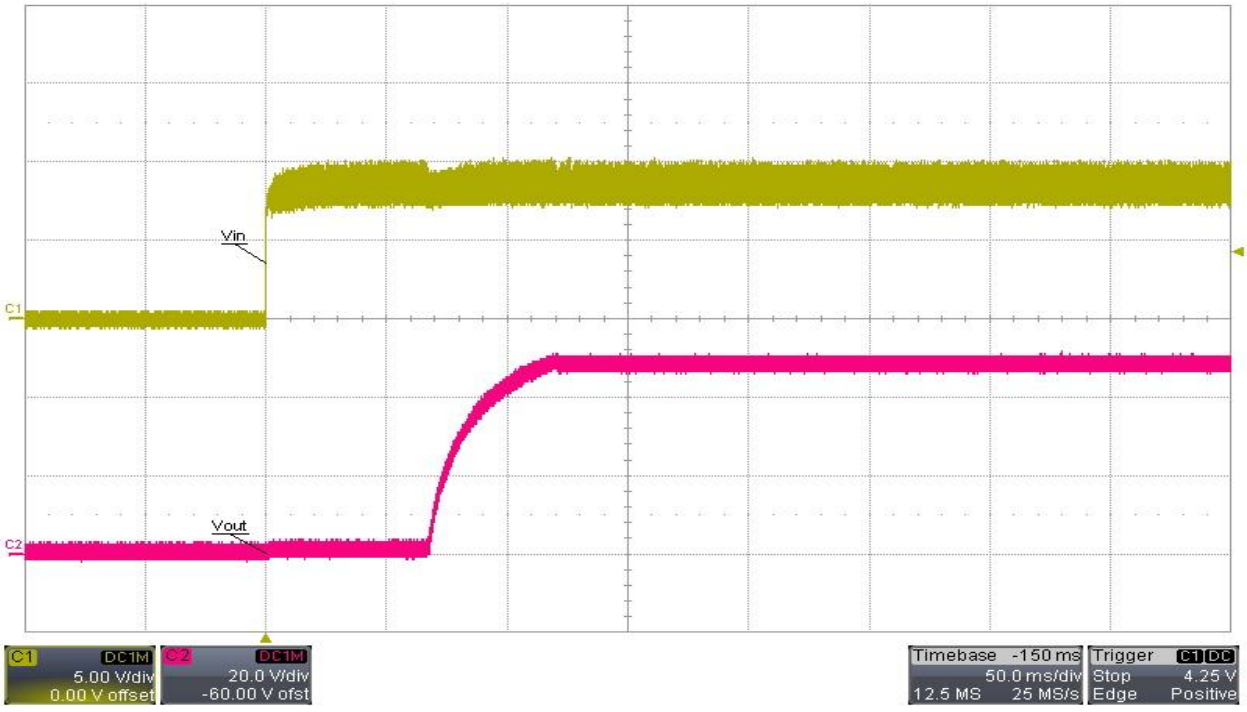


12Vin, 0.5A-1A load step. Ch1 measures output voltage, Ch4 measures output load current.

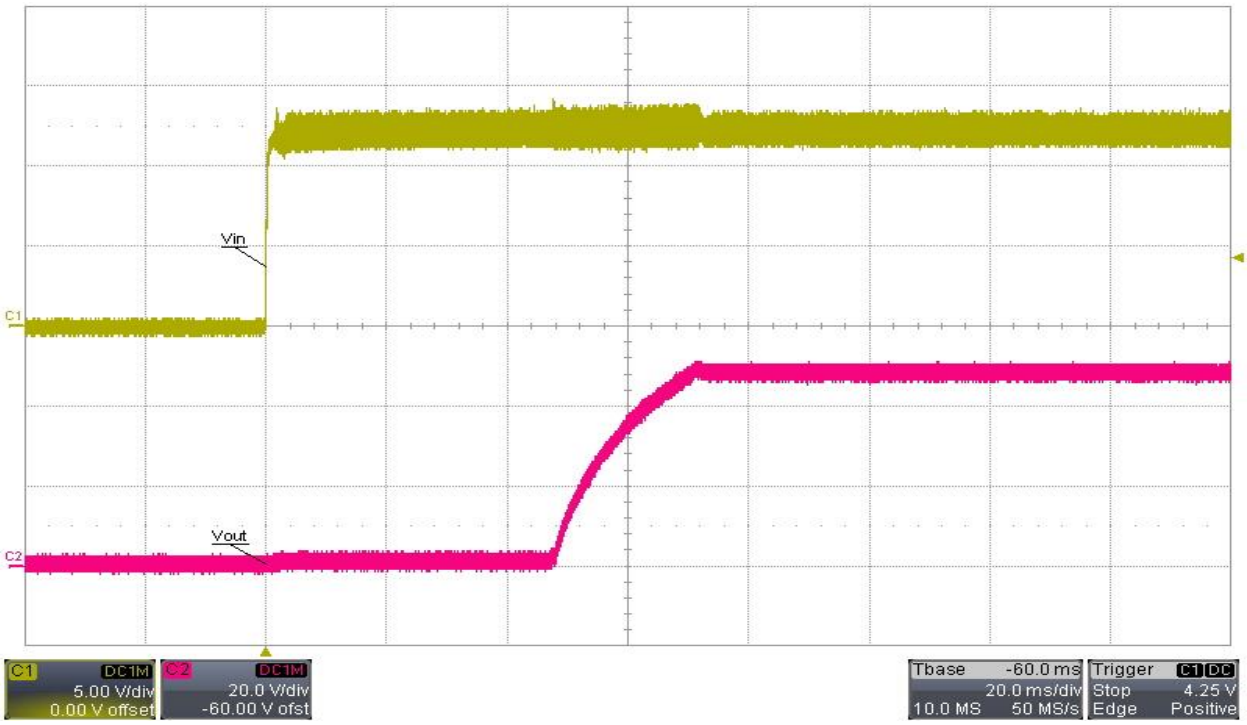


18Vin, 0.5A-1A load step. Ch1 measures output voltage, Ch4 measures output load current.

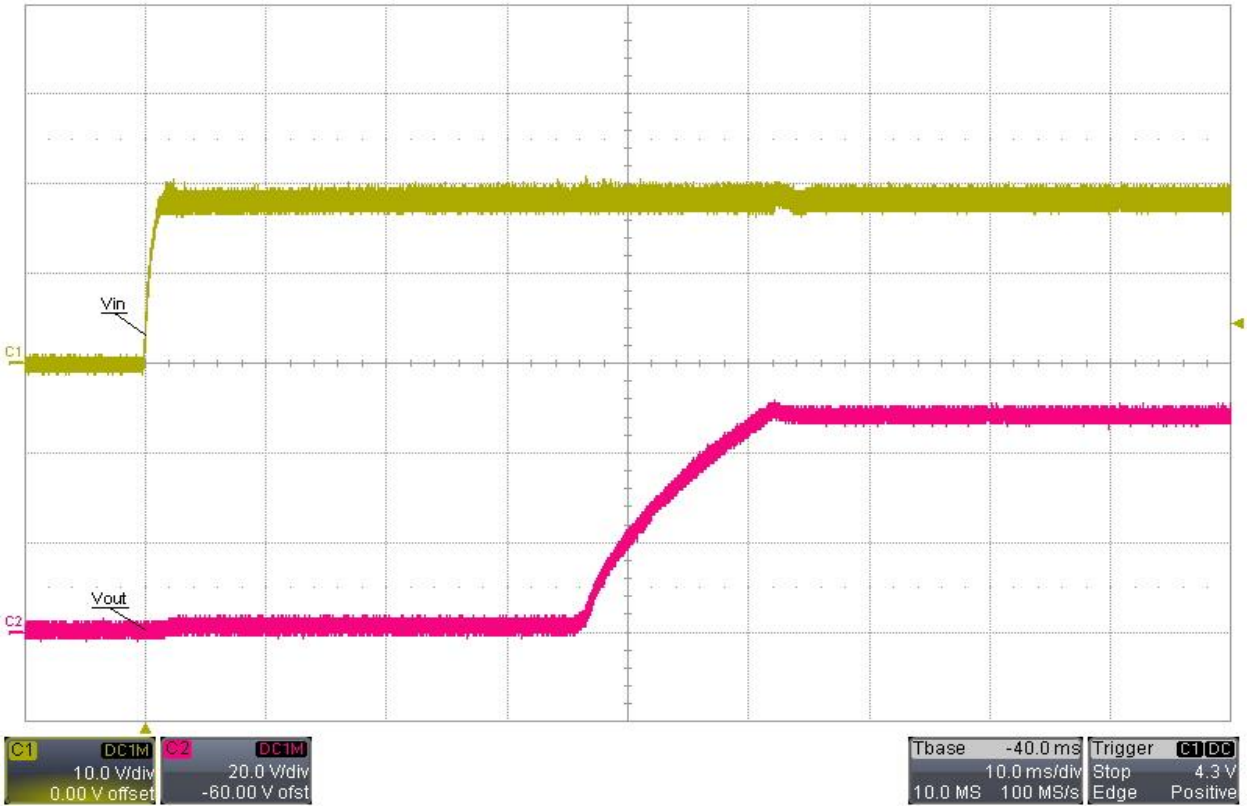
6.4 Start Up



8Vin, 1A load. Ch1 measures input voltage, Ch2 measures output voltage.

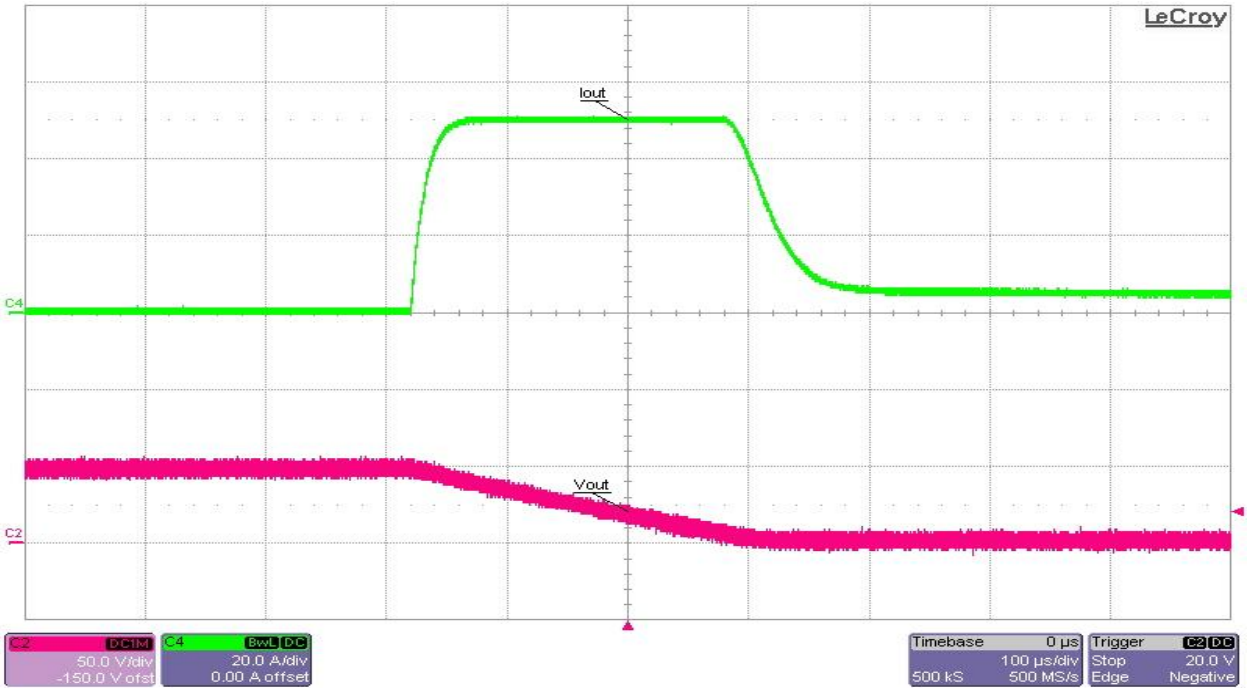


12Vin, 1A load. Ch1 measures input voltage, Ch2 measures output voltage.

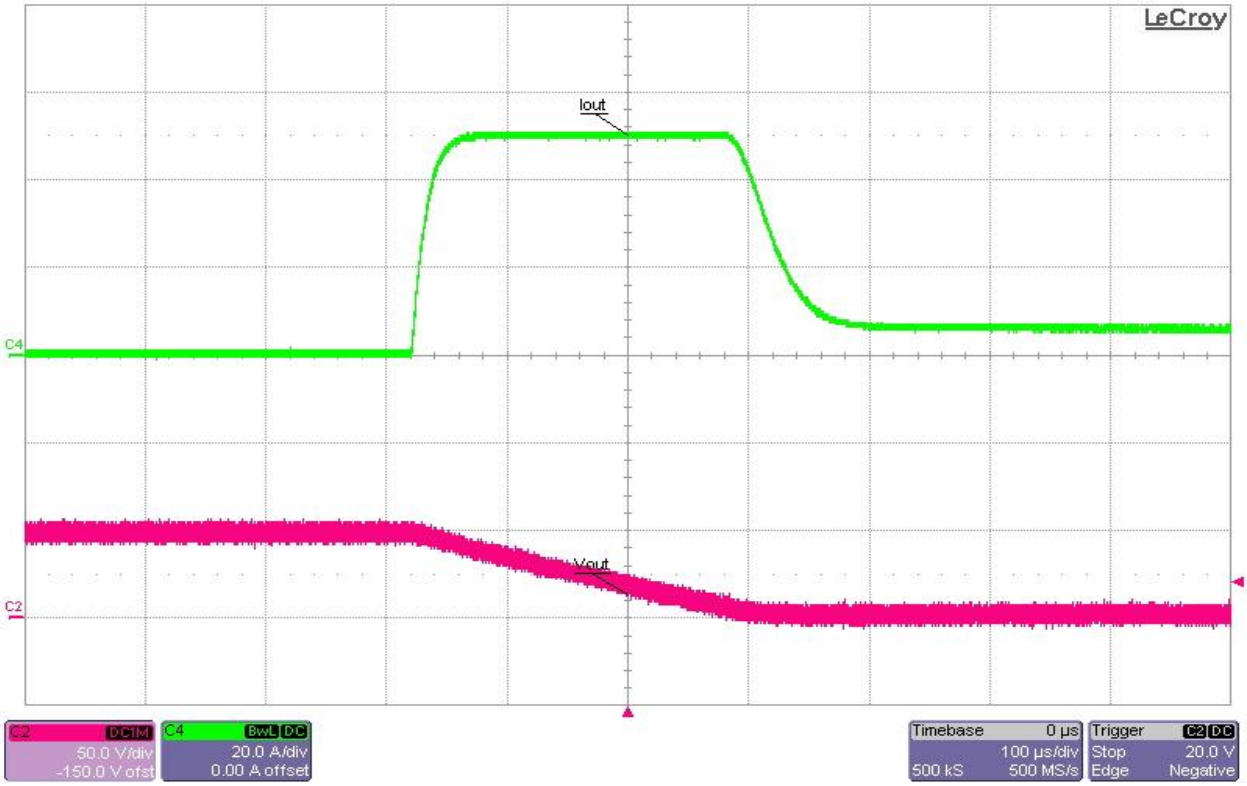


18Vin, 1A load. Ch1 measures input voltage, Ch2 measures output voltage.

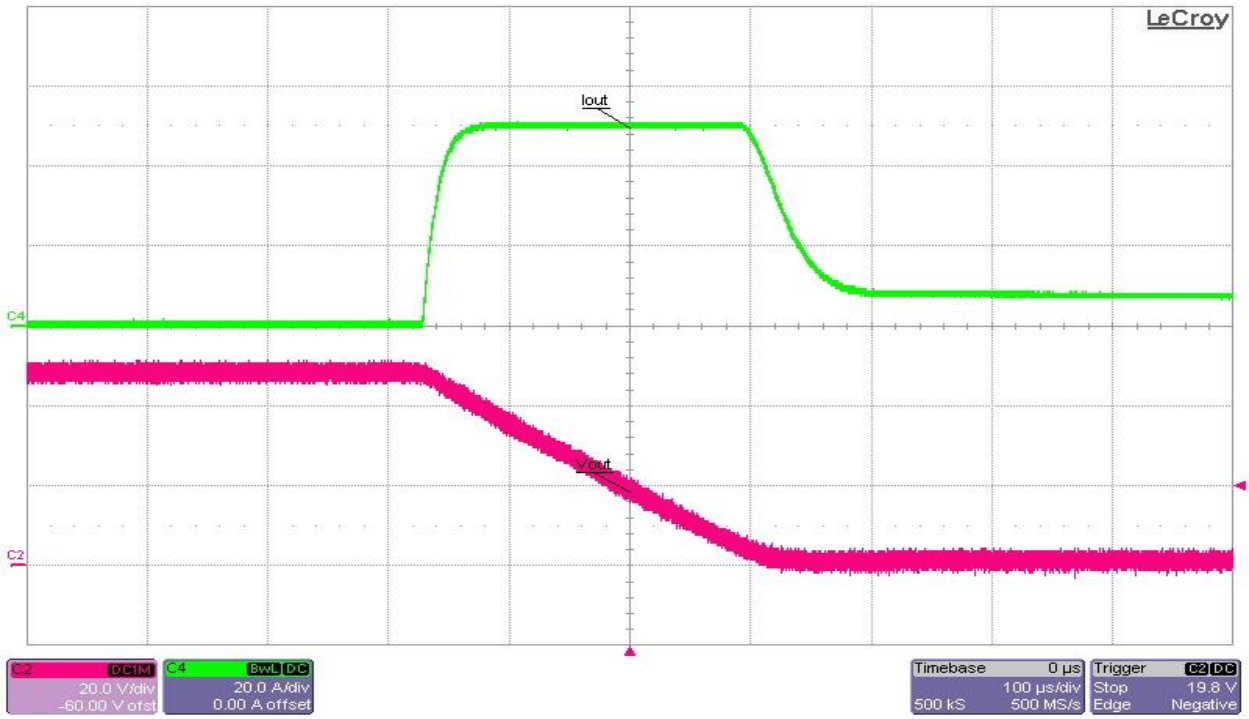
6.5 Short Circuit



8Vin, 0A load. Ch2 measures output voltage, Ch4 measures output current.

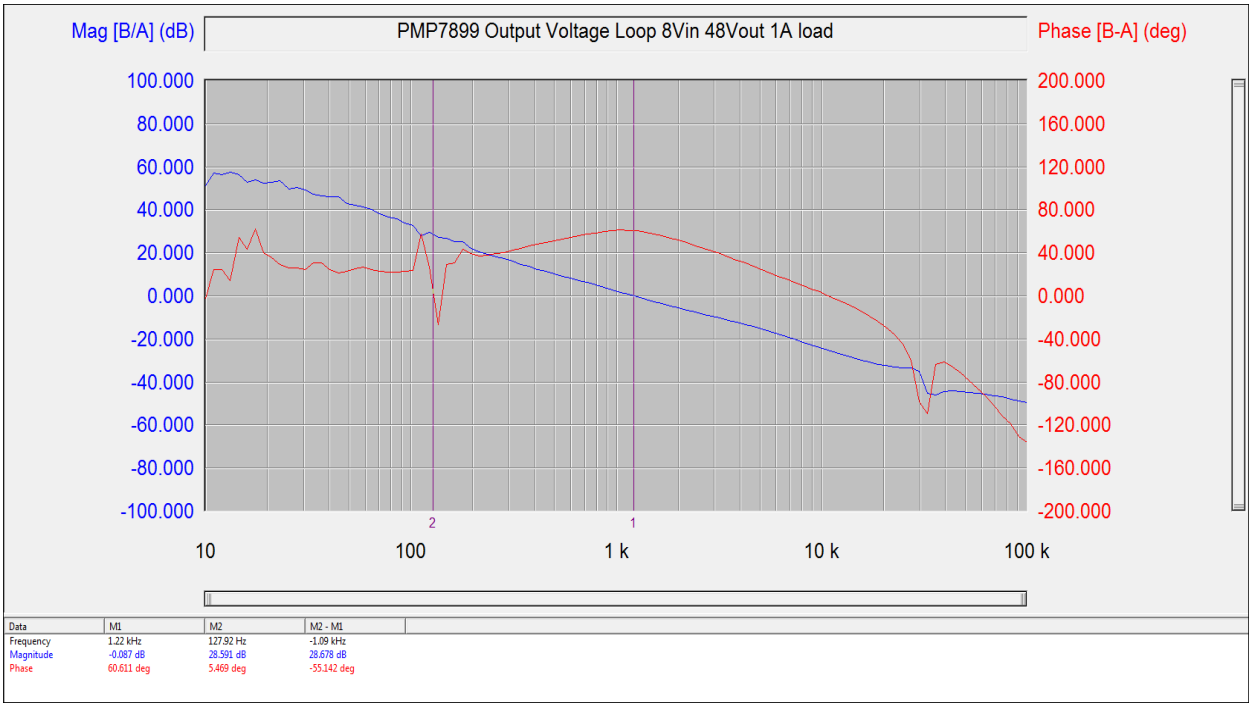


12Vin, 0A load. Ch2 measures output voltage, Ch4 measures output current.

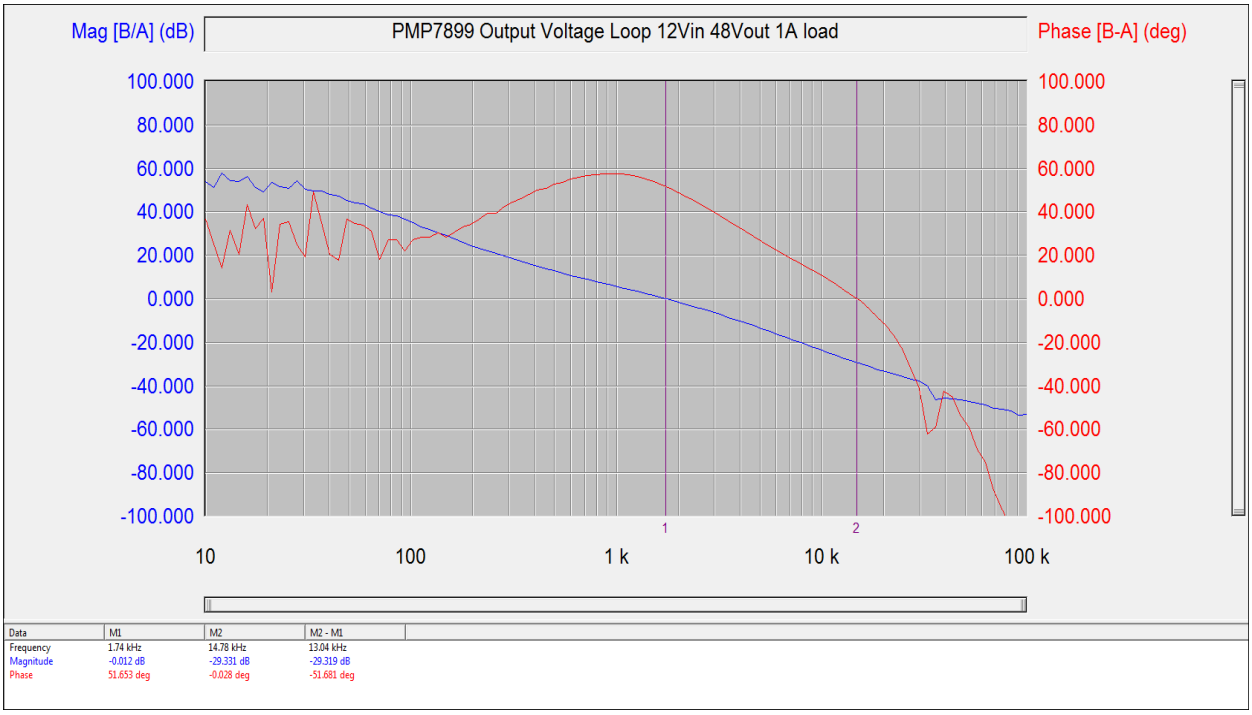


60Vin, 0A load. Ch2 measures output voltage, Ch4 measures output current.

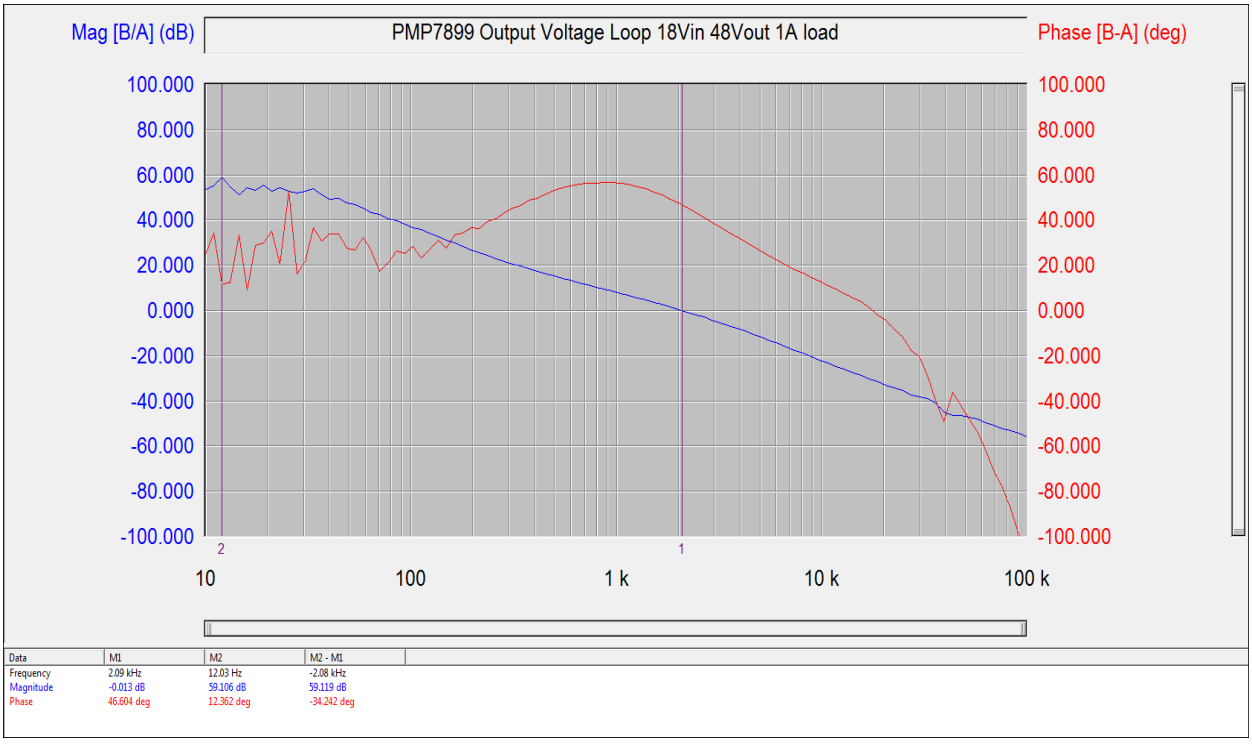
6.7 Bode Plot



8Vin, 1A load bode plot, 60.6 degrees phase margin, and 28.6dB gain margin.



12Vin, 1A load bode plot, 51.6 degrees phase margin, and 29.33dB gain margin.



18Vin, 1A load bode plot, 46.6 degrees phase margin, and 59dB gain margin.

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