Test Data
For PMP20692
1/25/2017

Table of Contents

1. Design Specifications

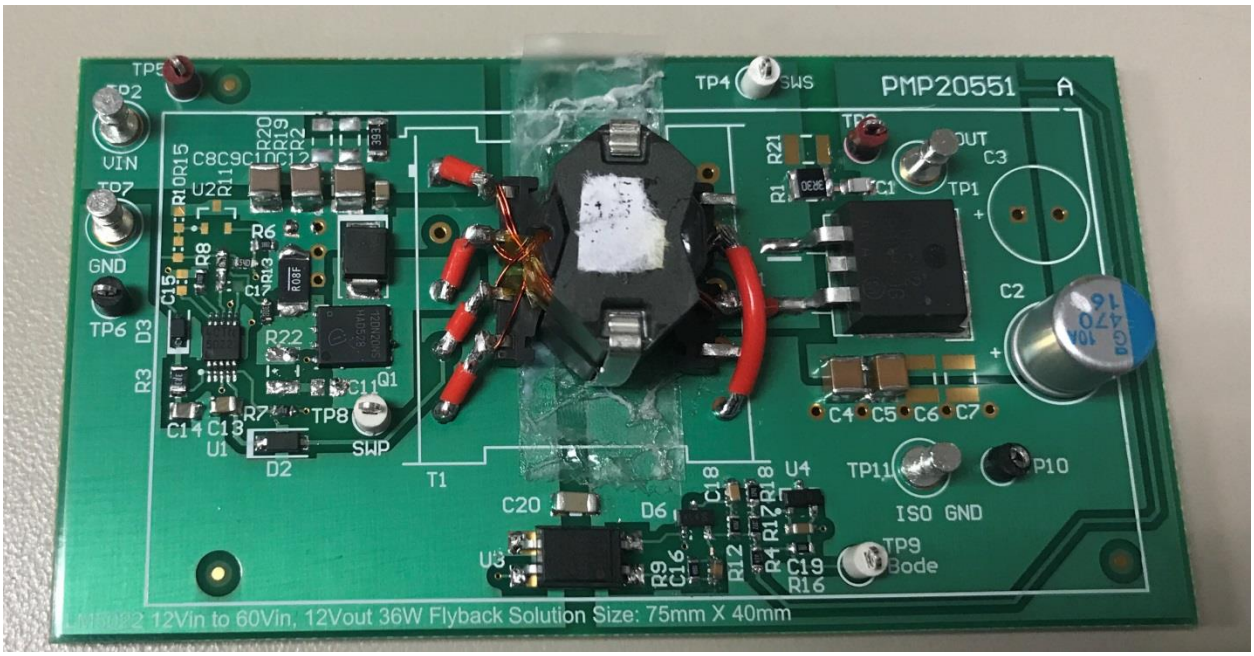
Vin Minimum	**48VDC**
Vin Maximum	**60VDC**
Vout	**+12VDC @ 3A**
Nominal Switching Frequency	**≈ 250KHz**

2. Circuit Description

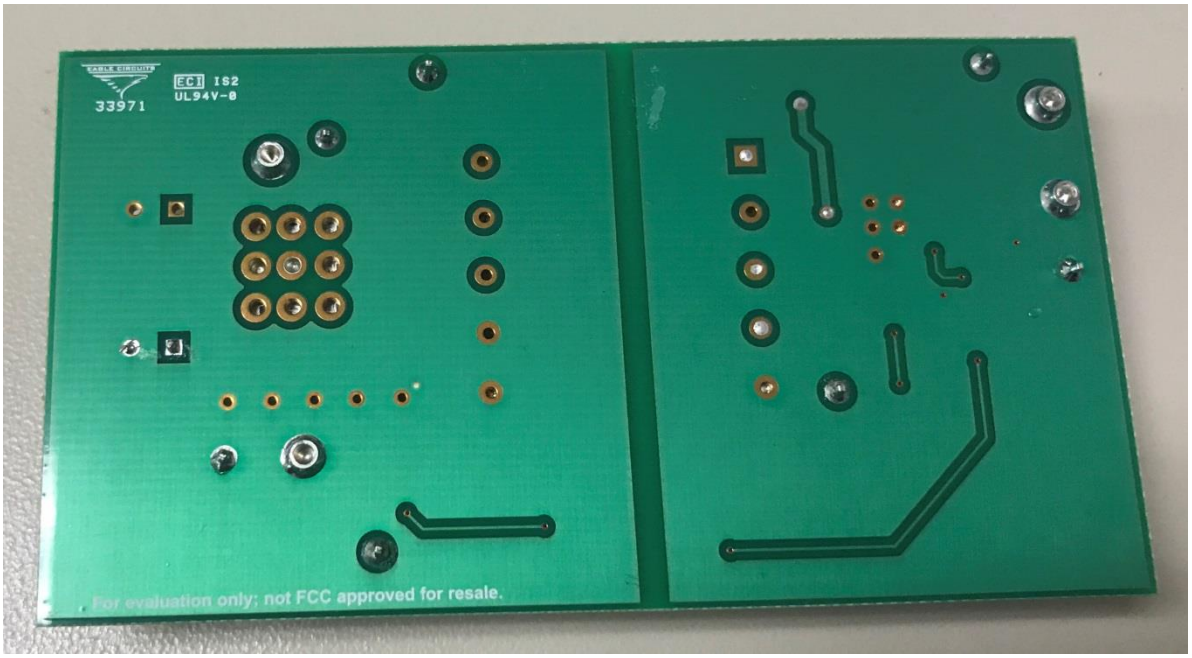
PMP20692 is an isolated flyback converter utilizing the LM5022 for industrial applications. This design accepts PoE input voltage of 54V ± 10%. The test report here is 54V in ± 10, 12V out @ 3A of load current. Switching frequency is set to 250kHz. A custom transformer is used in this test report for all the scope capture.

3. PMP20692 Board Photos

Board Dimensions: 3.5inches x 1.9inches



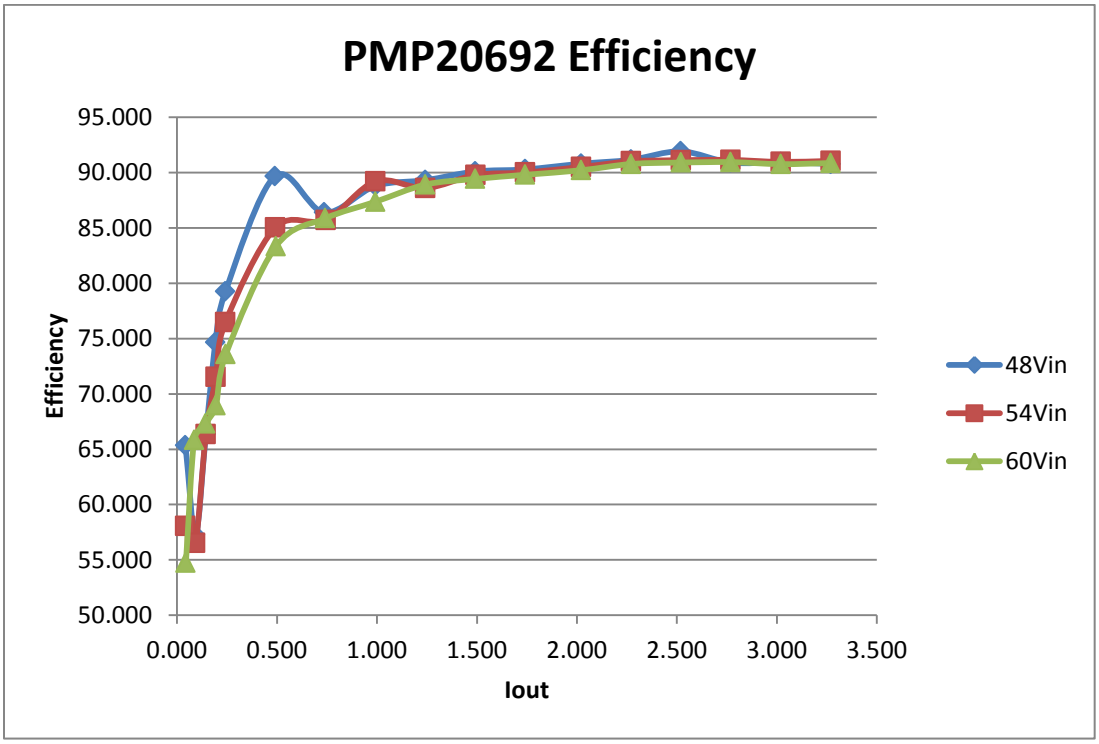
Board Photo (Top)



Pulse Board Photo (Bottom)

4. Efficiency

4.1 Efficiency Chart

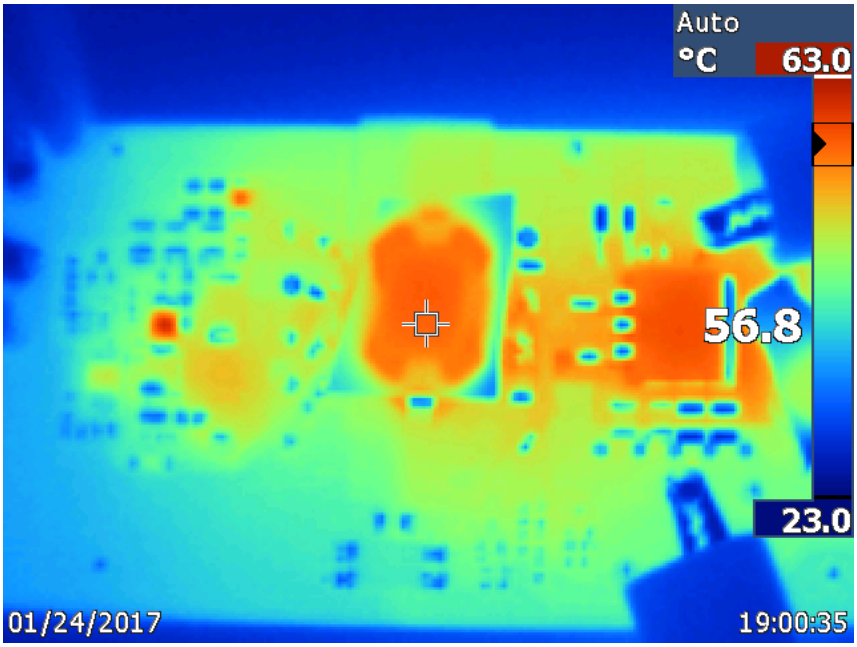


4.2 Efficiency Data

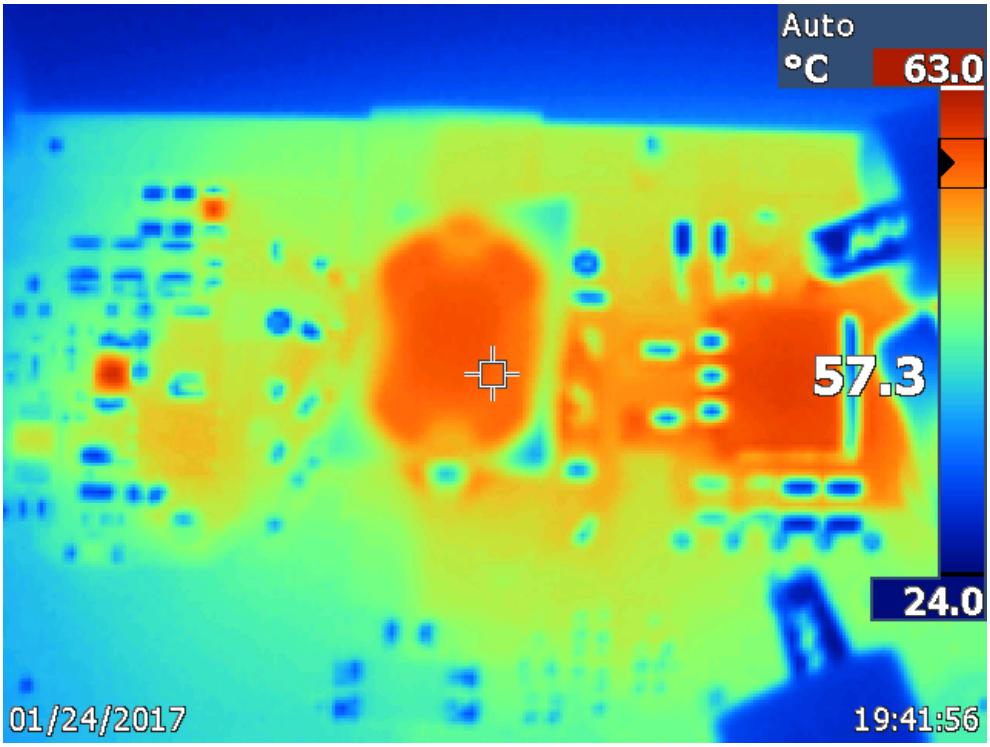
Vin(V)	Iin(A)	Vout(V)	Iout(A)	Pin(W)	Pout(W)	Losses(W)	Efficiency
48.018	0.010	11.953	0.000	0.480	0.000	0.480	0.000
48.019	0.016	11.952	0.042	0.768	0.502	0.266	65.339
48.018	0.040	11.951	0.092	1.921	1.099	0.821	57.243
48.018	0.054	11.950	0.144	2.593	1.721	0.872	66.365
48.019	0.064	11.951	0.192	3.073	2.295	0.779	74.664
48.019	0.076	11.951	0.242	3.649	2.892	0.757	79.247
48.018	0.136	11.950	0.490	6.530	5.855	0.675	89.662
48.018	0.212	11.948	0.736	10.180	8.794	1.386	86.382
48.018	0.278	11.947	0.992	13.349	11.851	1.498	88.780
48.018	0.346	11.946	1.242	16.614	14.836	1.778	89.299
48.018	0.412	11.945	1.492	19.783	17.822	1.961	90.088
48.017	0.480	11.945	1.742	23.048	20.808	2.240	90.279
48.017	0.554	11.944	2.022	26.602	24.151	2.450	90.789
48.017	0.620	11.944	2.272	29.770	27.136	2.634	91.151
48.017	0.682	11.943	2.520	32.747	30.097	2.651	91.906
48.016	0.758	11.942	2.770	36.396	33.080	3.316	90.889
48.016	0.826	11.942	3.020	39.661	36.064	3.597	90.930
48.015	0.896	11.941	3.270	43.022	39.048	3.974	90.762
48.015	0.966	11.941	3.520	46.382	42.031	4.351	90.619
54.014	0.010	11.952	0.000	0.540	0.000	0.540	0.000
54.014	0.016	11.950	0.042	0.864	0.502	0.362	58.076
54.014	0.036	11.950	0.092	1.944	1.099	0.845	56.540
54.014	0.048	11.949	0.144	2.593	1.721	0.872	66.366
54.014	0.060	11.948	0.194	3.241	2.318	0.923	71.525
54.014	0.070	11.949	0.242	3.781	2.892	0.889	76.479
54.014	0.128	11.947	0.492	6.914	5.878	1.036	85.020
54.014	0.192	11.946	0.744	10.371	8.888	1.483	85.701
54.013	0.246	11.947	0.992	13.287	11.851	1.436	89.190
54.013	0.310	11.944	1.242	16.744	14.834	1.910	88.594
54.013	0.368	11.944	1.494	19.877	17.844	2.033	89.771
54.013	0.428	11.943	1.742	23.118	20.805	2.313	89.996
54.013	0.494	11.943	2.022	26.682	24.148	2.534	90.502
54.012	0.552	11.942	2.272	29.815	27.133	2.682	91.004
54.012	0.612	11.942	2.522	33.056	30.117	2.939	91.110
54.012	0.672	11.941	2.770	36.296	33.076	3.219	91.130
54.012	0.734	11.940	3.020	39.645	36.060	3.585	90.958
54.011	0.794	11.940	3.270	42.884	39.043	3.841	91.043

54.010	0.858	11.939	3.520	46.341	42.027	4.314	90.690
60.019	0.010	11.958	0.000	0.600	0.000	0.600	0.000
60.019	0.016	11.948	0.044	0.960	0.526	0.435	54.745
60.019	0.026	11.948	0.086	1.560	1.028	0.533	65.848
60.019	0.042	11.948	0.142	2.521	1.697	0.824	67.304
60.019	0.056	11.947	0.194	3.361	2.318	1.043	68.957
60.019	0.066	11.947	0.244	3.961	2.915	1.046	73.587
60.019	0.118	11.945	0.494	7.082	5.901	1.181	83.320
60.019	0.172	11.945	0.742	10.323	8.863	1.460	85.858
60.019	0.226	11.944	0.992	13.564	11.849	1.715	87.354
60.019	0.278	11.943	1.242	16.685	14.834	1.852	88.902
60.018	0.332	11.942	1.492	19.926	17.817	2.109	89.417
60.018	0.386	11.942	1.742	23.167	20.802	2.365	89.792
60.018	0.446	11.941	2.022	26.768	24.145	2.623	90.201
60.017	0.498	11.941	2.272	29.889	27.129	2.759	90.768
60.017	0.552	11.940	2.522	33.129	30.113	3.016	90.896
60.016	0.606	11.940	2.770	36.370	33.073	3.297	90.935
60.016	0.662	11.939	3.020	39.731	36.057	3.674	90.753
60.016	0.716	11.939	3.270	42.971	39.040	3.931	90.852
60.016	0.720	11.141	3.520	43.211	39.216	3.995	90.754

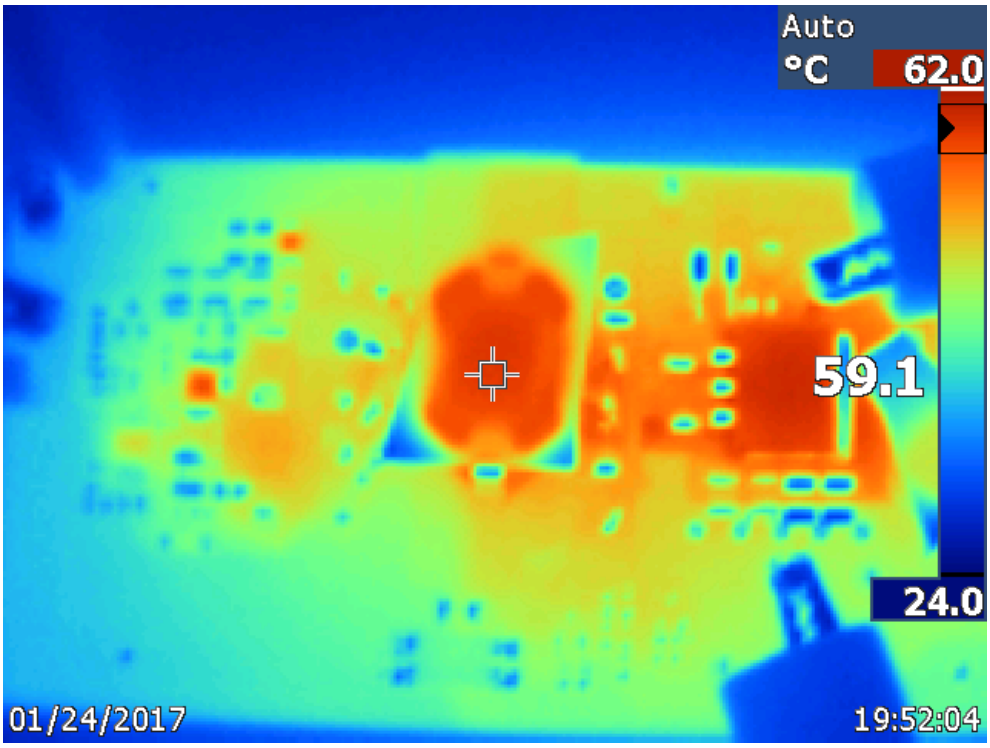
5 Thermal Images



Thermal image was taken at 48Vin, 3A load after thermal equilibrium without airflow.



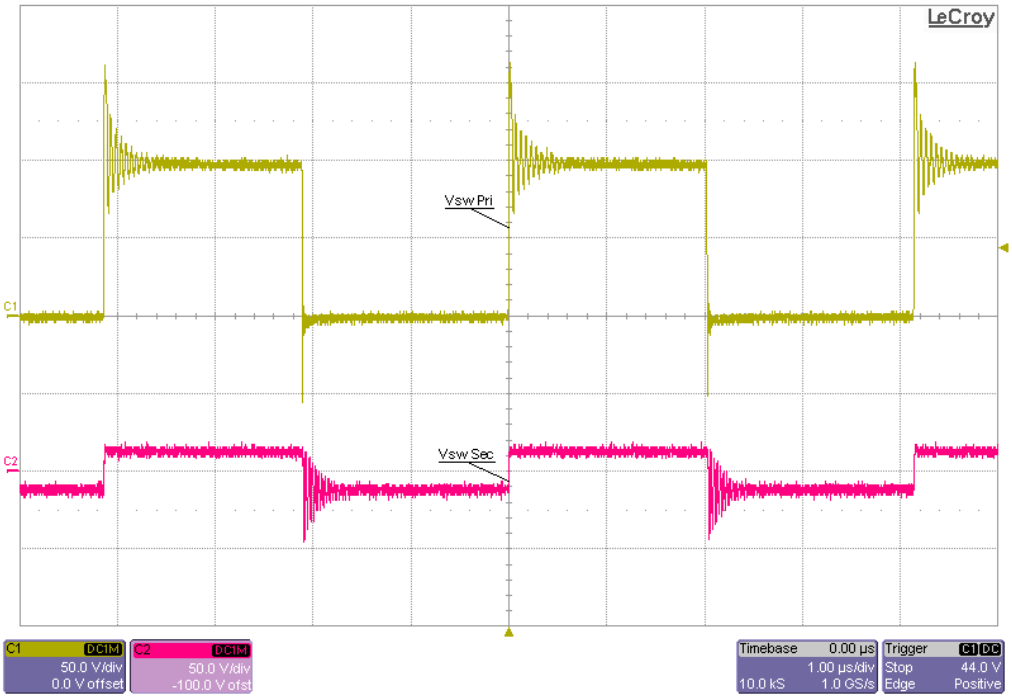
Thermal image was taken at 48Vin, 3A load after thermal equilibrium without airflow.



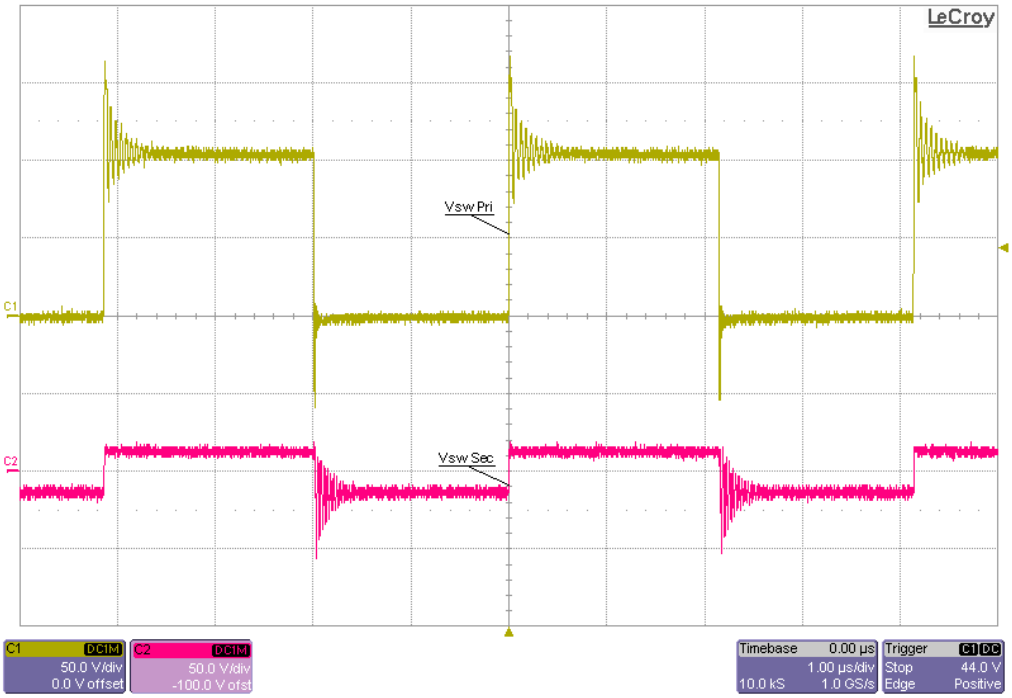
Thermal image was taken at 48Vin, 3A load after thermal equilibrium without airflow.

6 Waveform

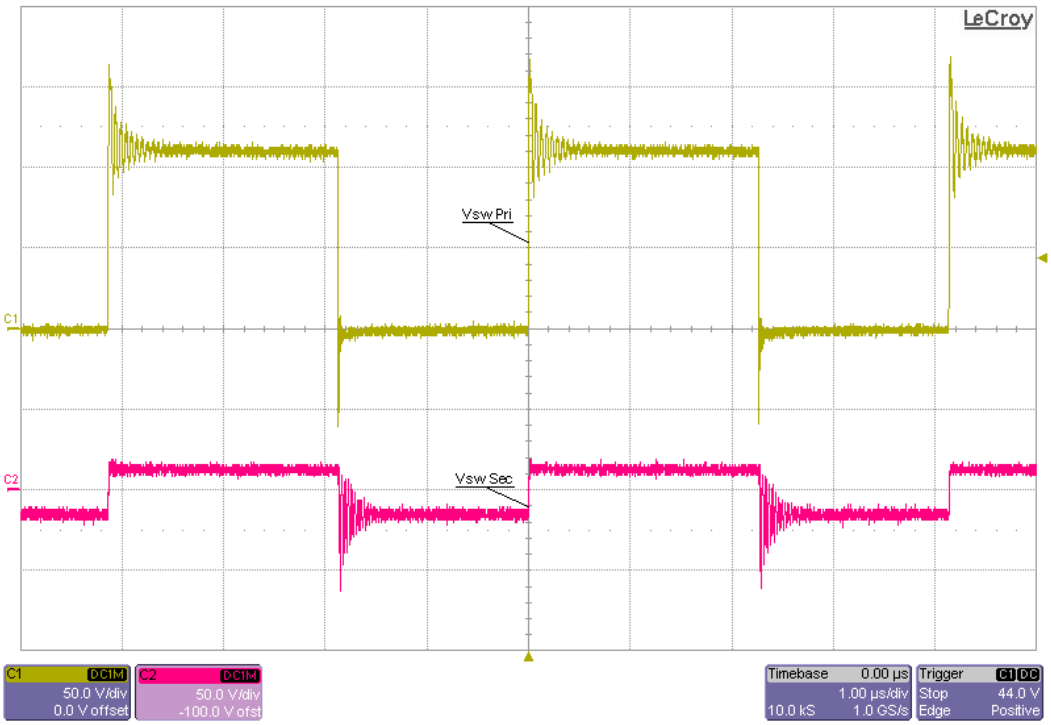
6.1 Switching Waveform



48Vin, 3A load. Ch1 measures primary switching, Ch2 measures secondary switching waveform.

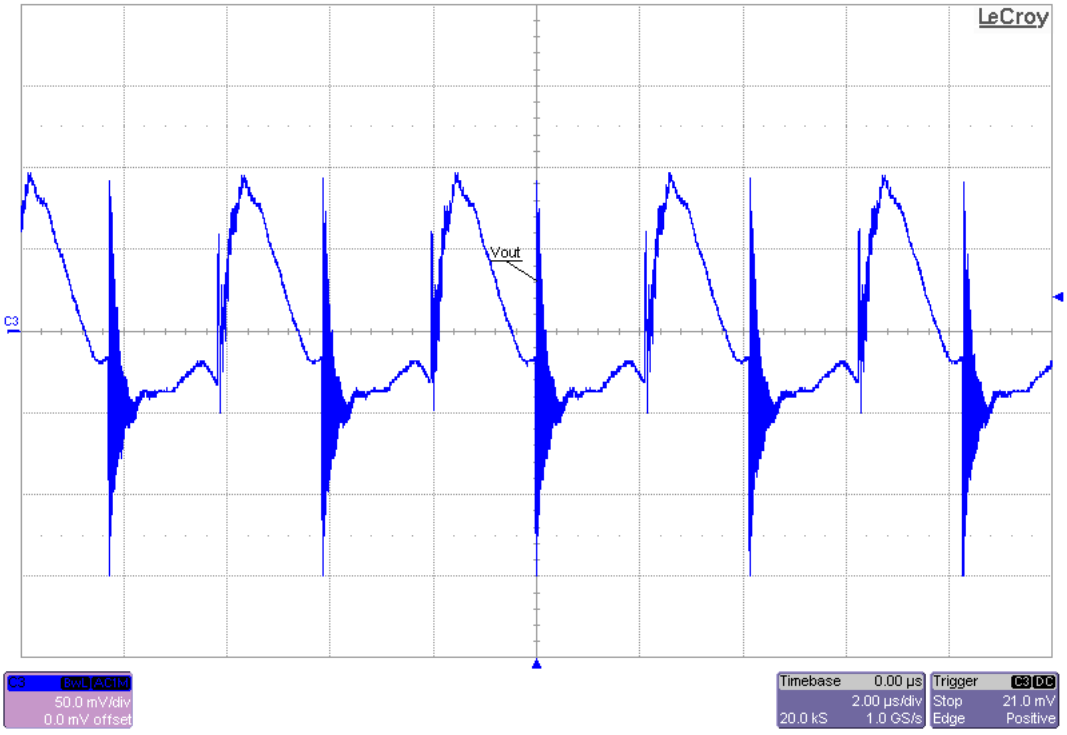


54Vin, 3A load. Ch1 measures primary switching, Ch2 measures secondary switching waveform.

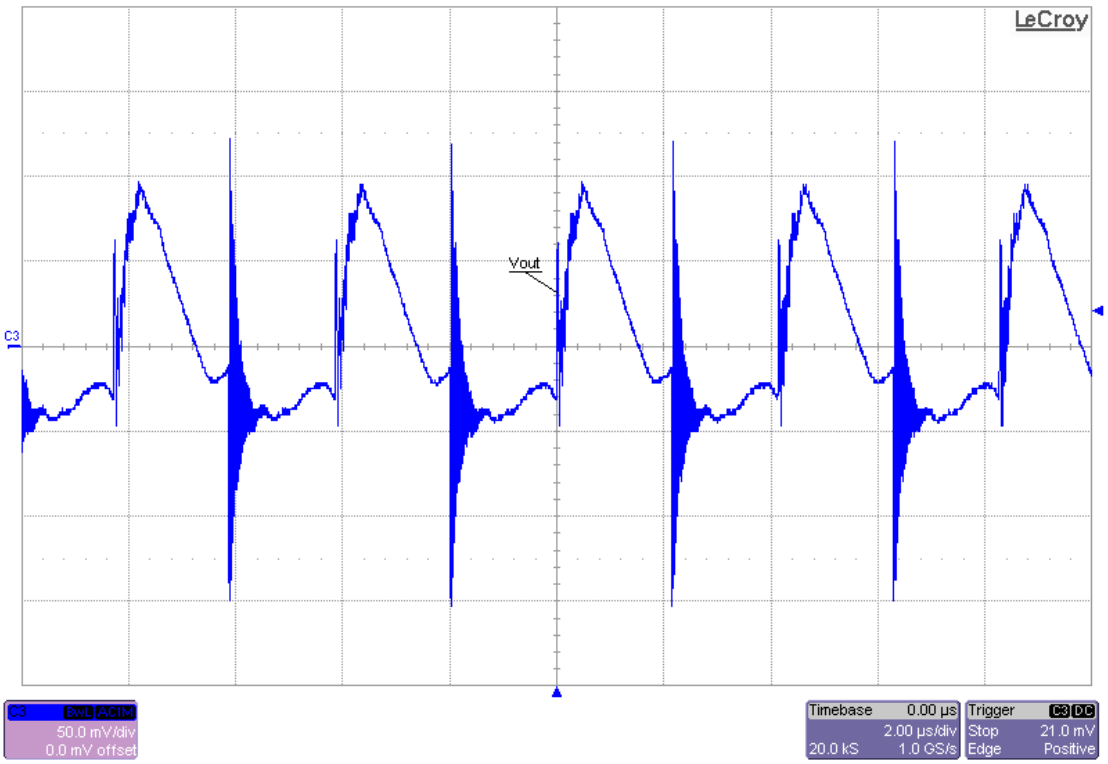


60Vin, 3A load. Ch1 measures primary switching, Ch2 measures secondary switching waveform.

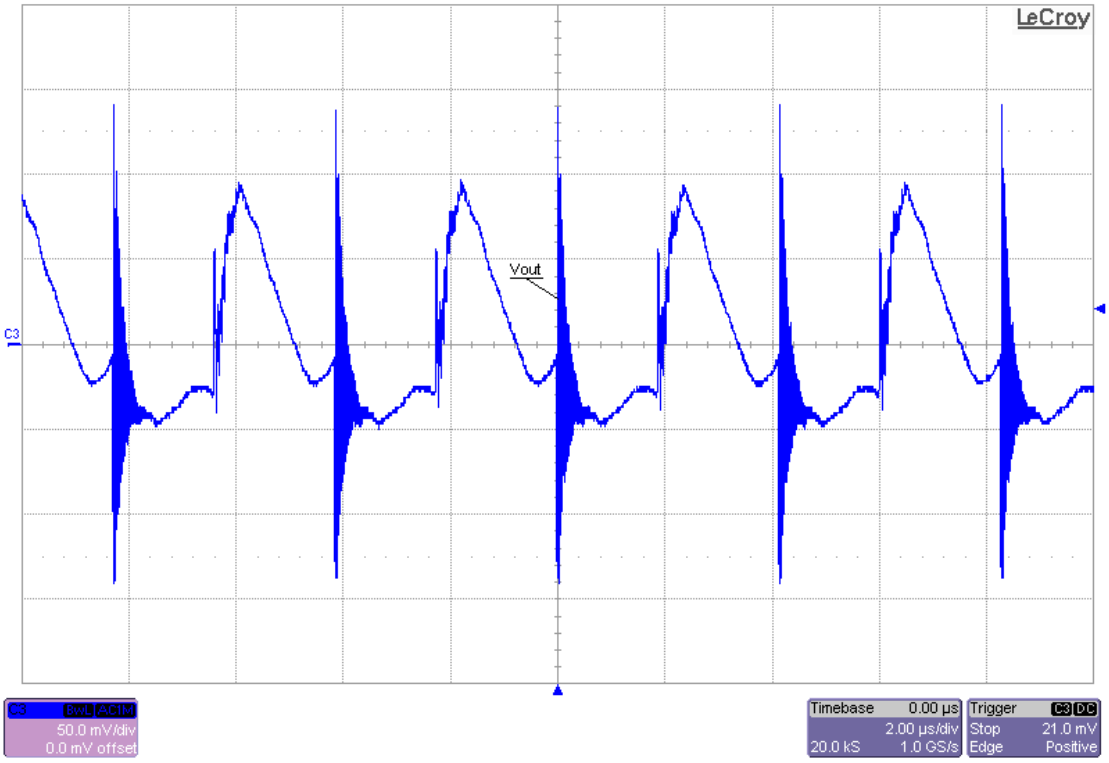
6.2 Output Ripple



48Vin, 3A load. Ch3 measures output switching ripple.

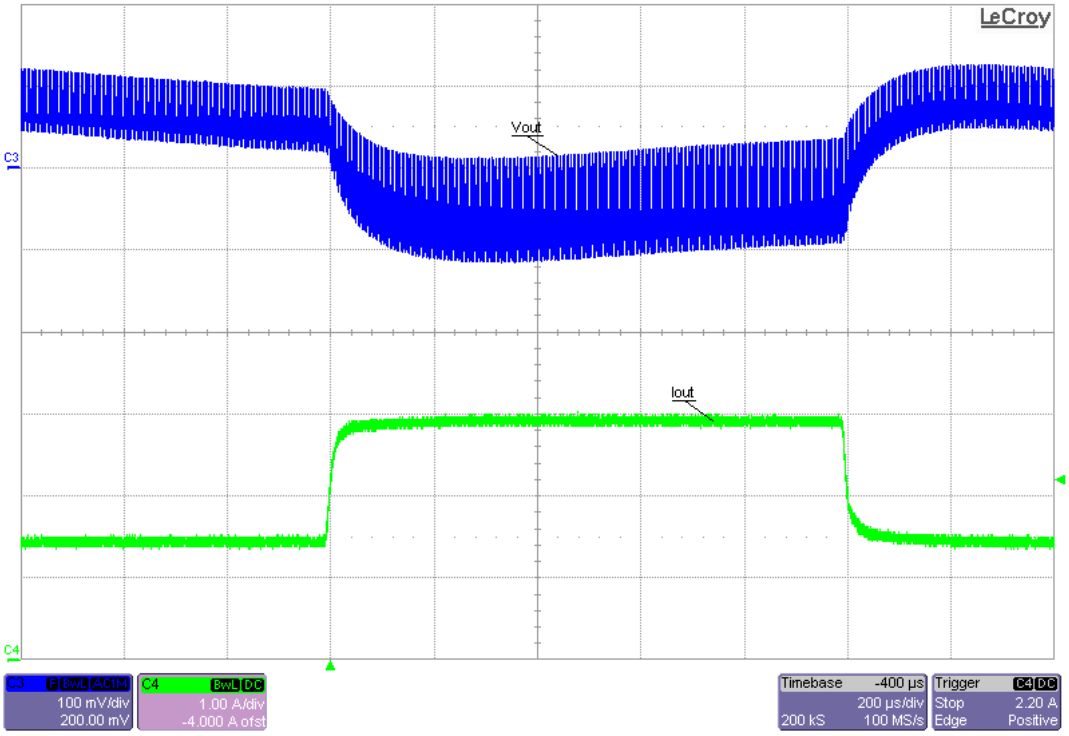


54Vin, 3A load. Ch3 measures output switching ripple.

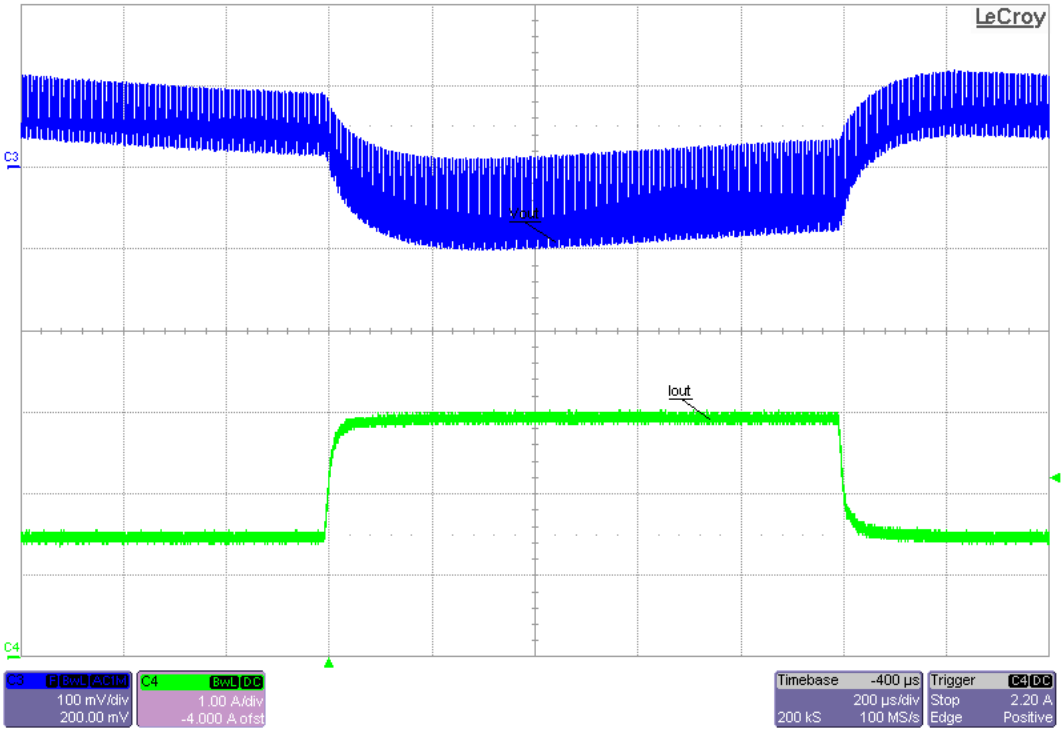


60Vin, 3A load. Ch3 measures output switching ripple.

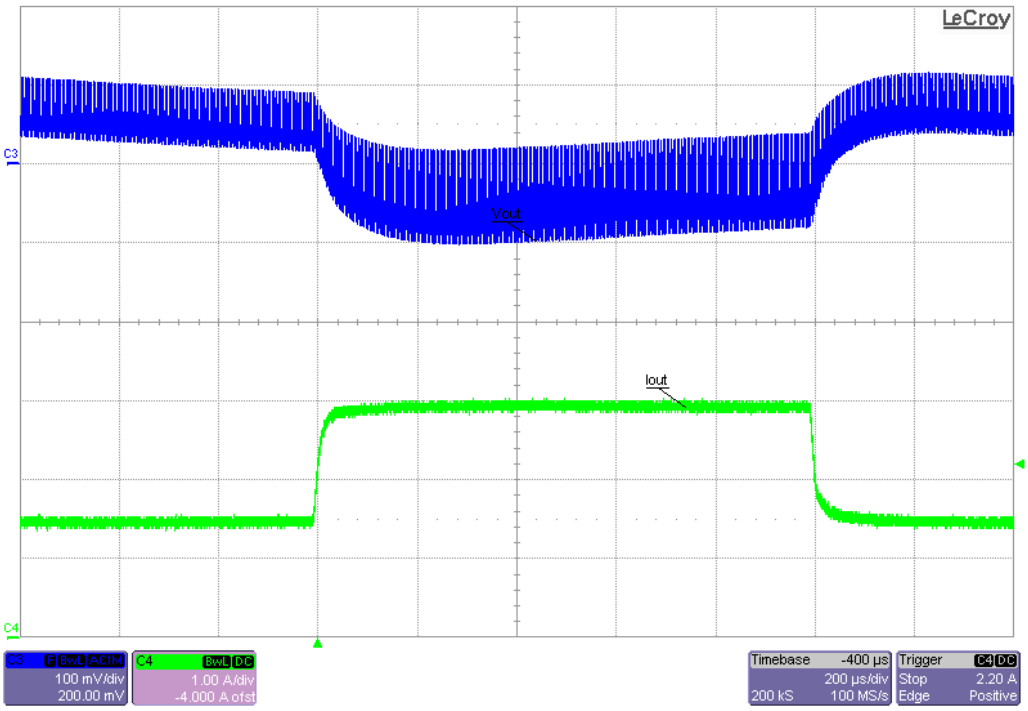
6.3 Load Transient



48Vin, 1.5A-3A load step. Ch3 measures output voltage, Ch4 measures output load current.

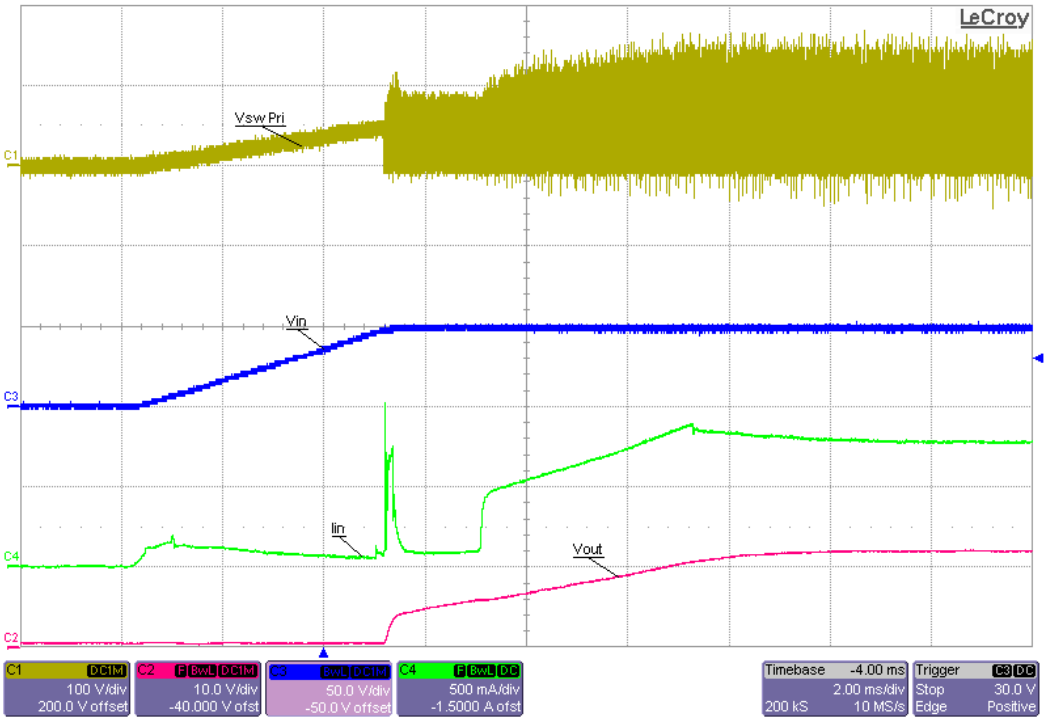


54Vin, 1.5A-3A load step. Ch3 measures output voltage, Ch4 measures output load current.

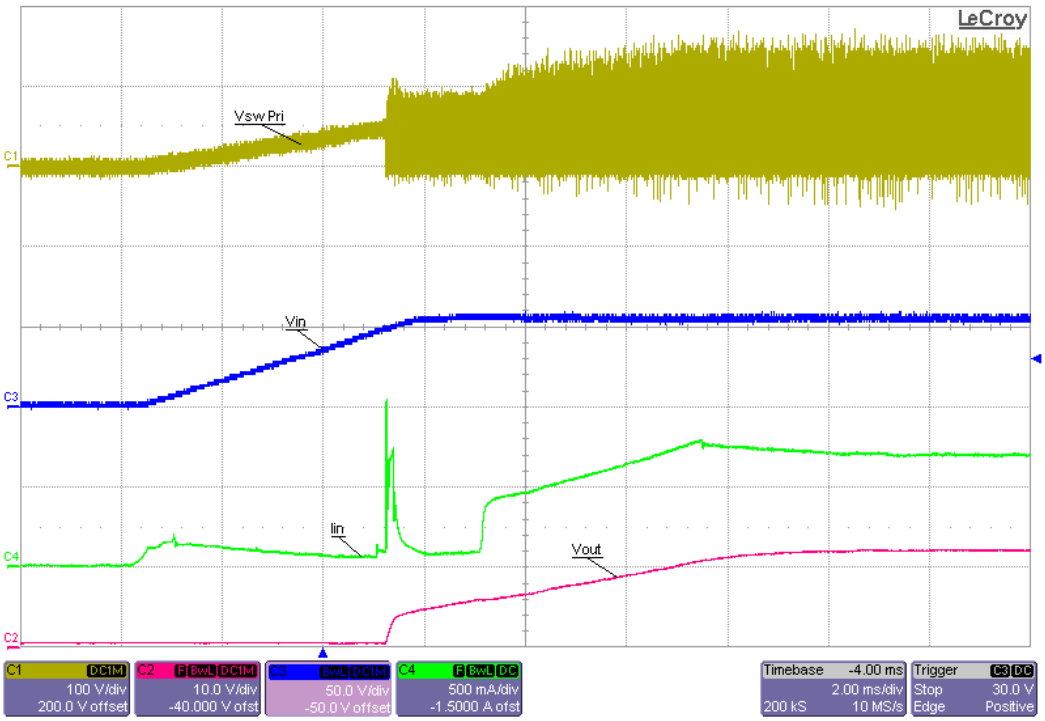


60Vin, 1.5A-3A load step. Ch3 measures output voltage, Ch4 measures output load current.

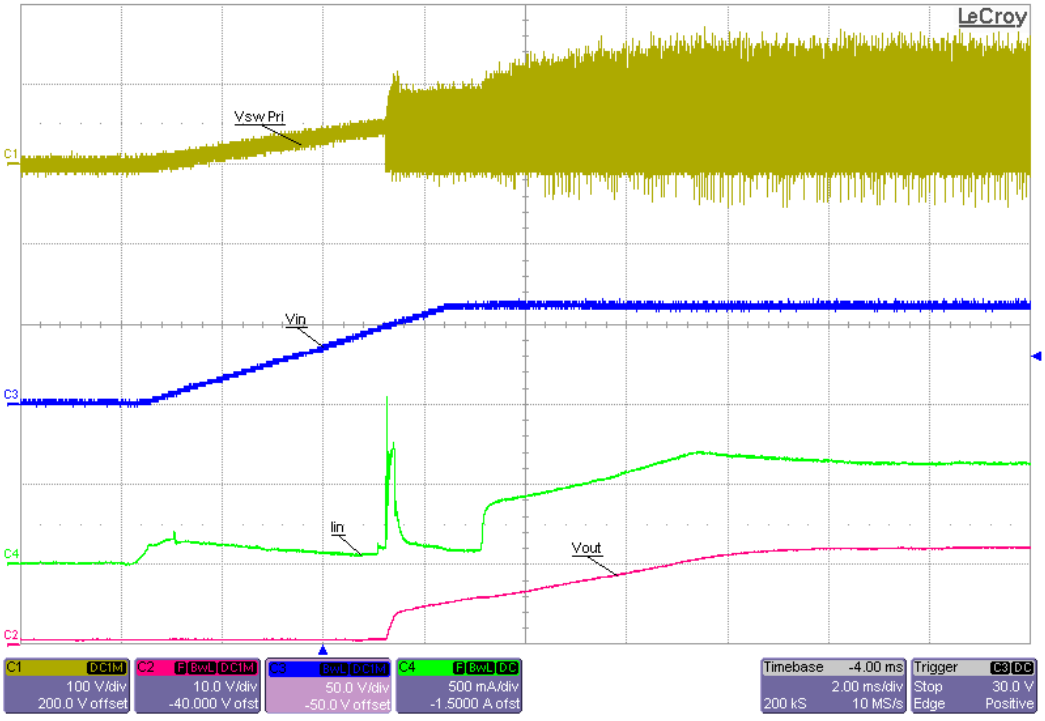
6.4 Start Up



48Vin, 0A load. Ch1 measures primary switching, Ch3 measures input voltage, Ch2 measures output voltage, Ch4 measures input current.

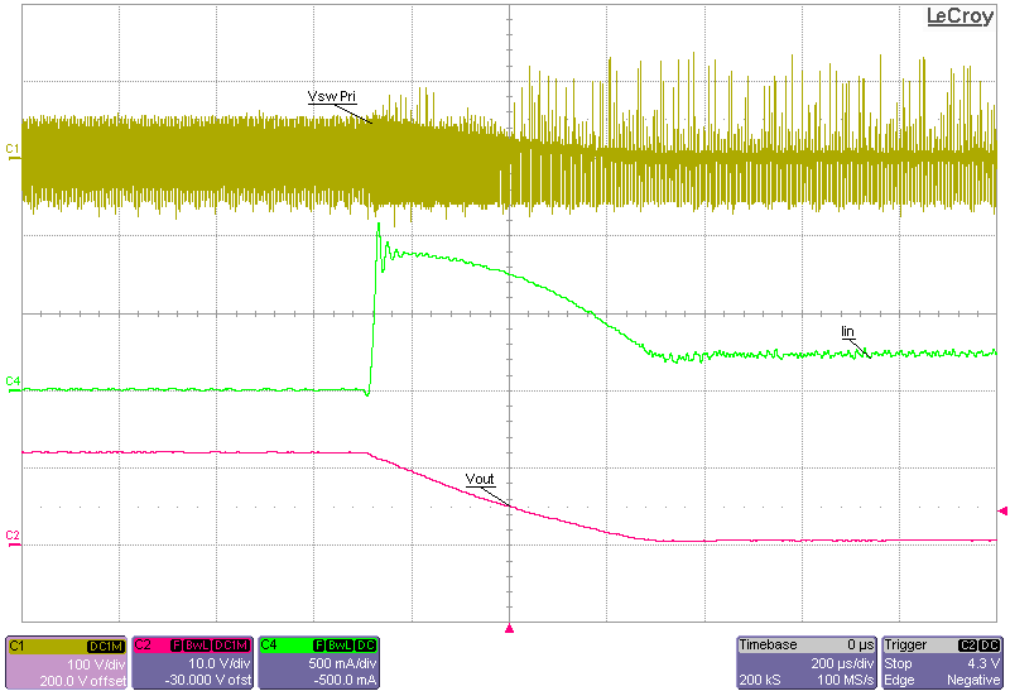


54Vin, 0A load. Ch1 measures primary switching, Ch3 measures input voltage, Ch2 measures output voltage, Ch4 measures input current.

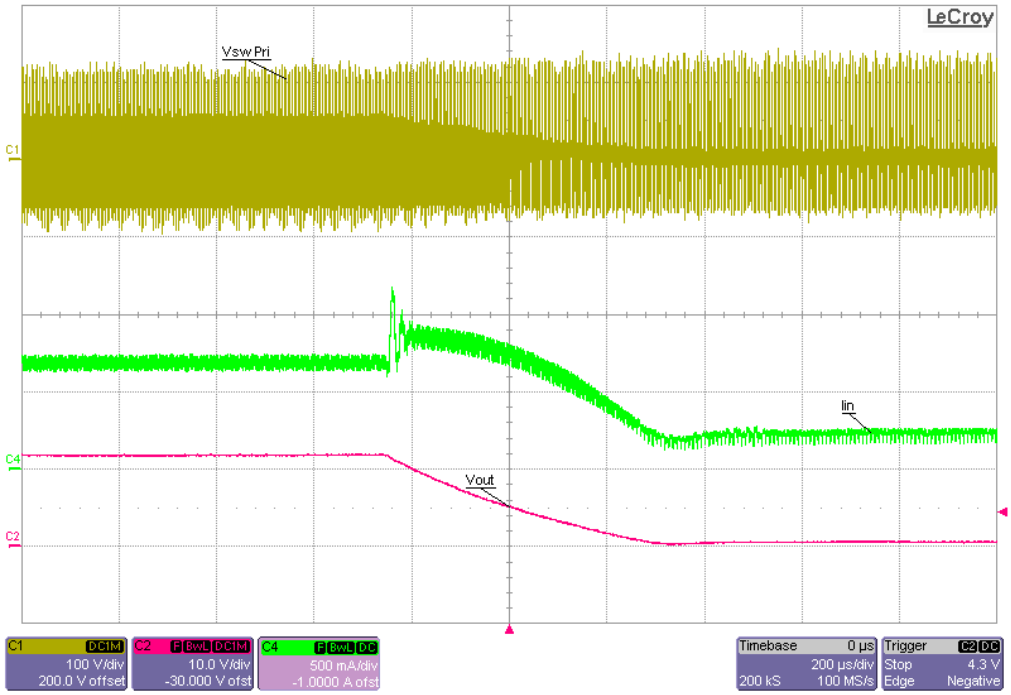


60Vin, 0A load. Ch1 measures primary switching, Ch3 measures input voltage, Ch2 measures output voltage, Ch4 measures input current.

6.5 Short Circuit

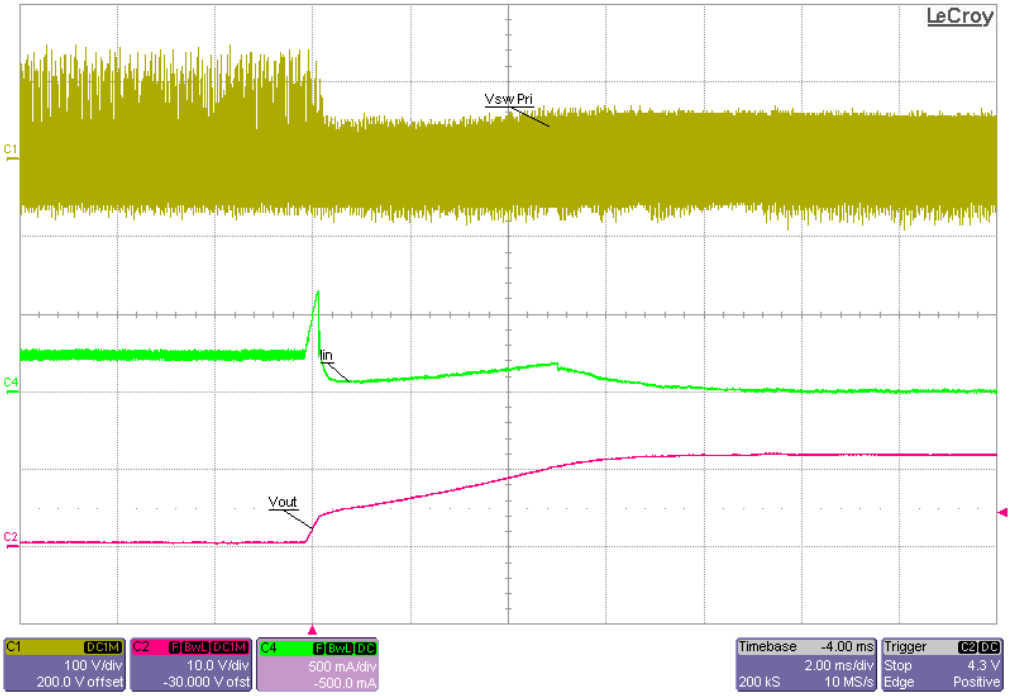


54Vin, 0A load. Ch1 measures primary switching, Ch2 measures output voltage, Ch4 measures input current.

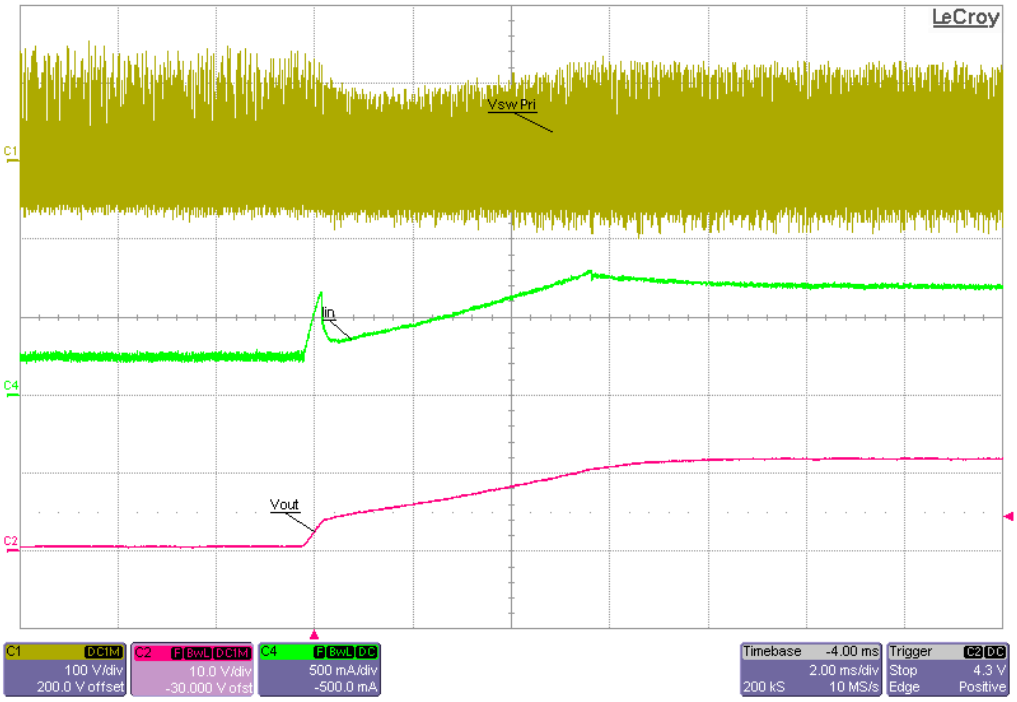


54Vin, 3A load. Ch1 measures primary switching, Ch2 measures output voltage, Ch4 measures input current.

6.6 Short Circuit Recovery

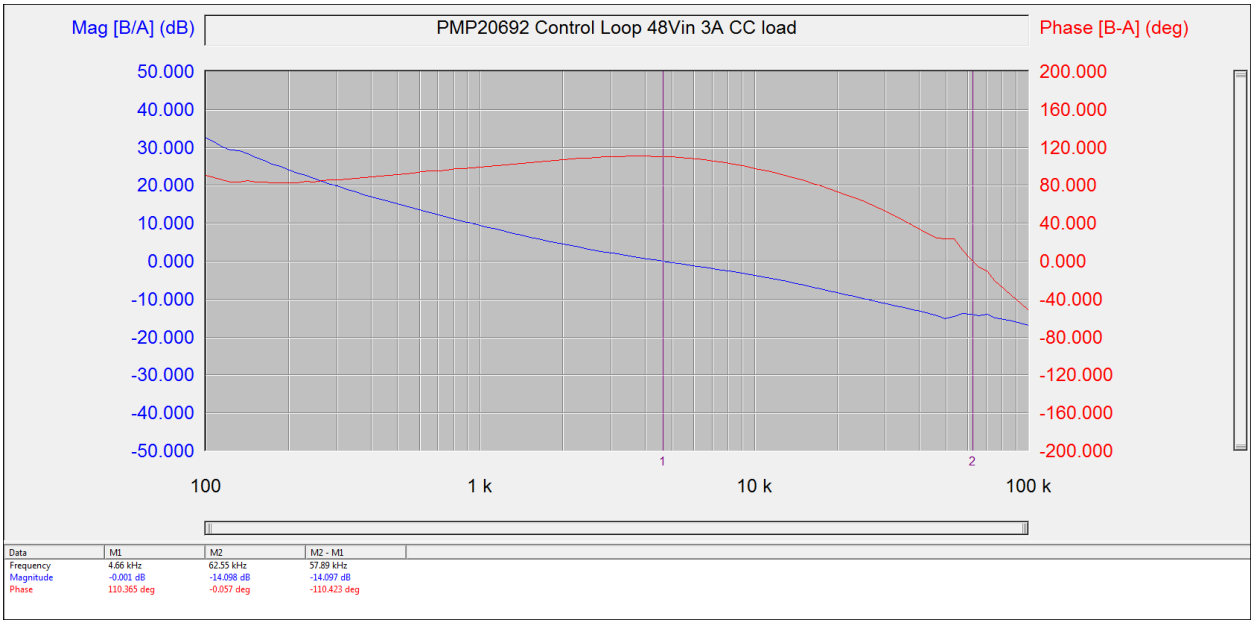


54Vin, 0A load. Ch1 measures primary switching, Ch2 measures output voltage, Ch4 measures input current.

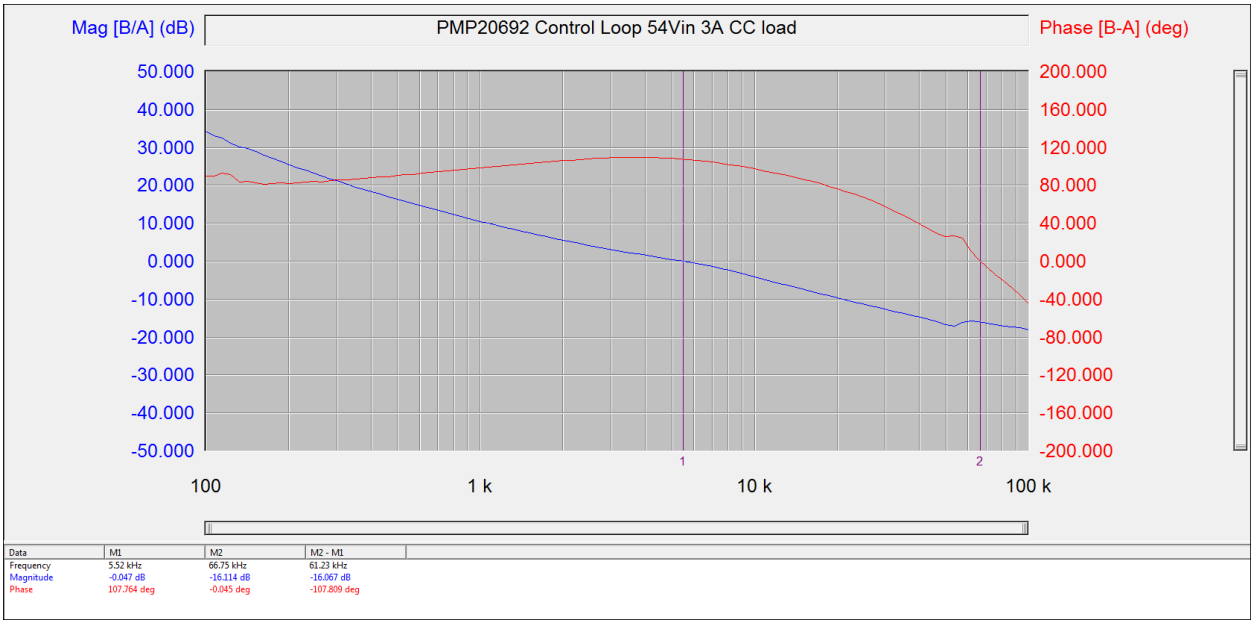


54Vin, 3A load. Ch1 measures primary switching, Ch2 measures output voltage, Ch4 measures input current.

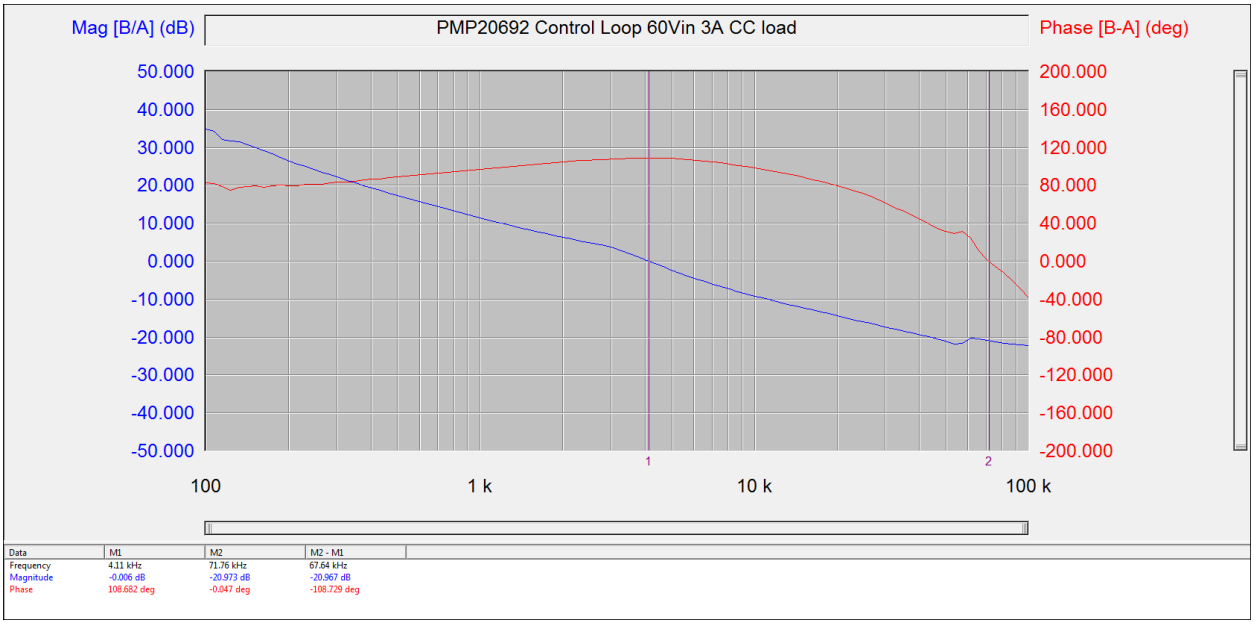
6.7 Bode Plot



48Vin, 3A load bode plot, 110 degrees phase margin, and 14dB gain margin.



54Vin, 3A load bode plot, 107 degrees phase margin, and 16dB gain margin.



60Vin, 3A load bode plot, 108 degrees phase margin, and 21dB gain margin.

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