Test Data
For PMP20551
3/7/2017

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1. Design Specifications

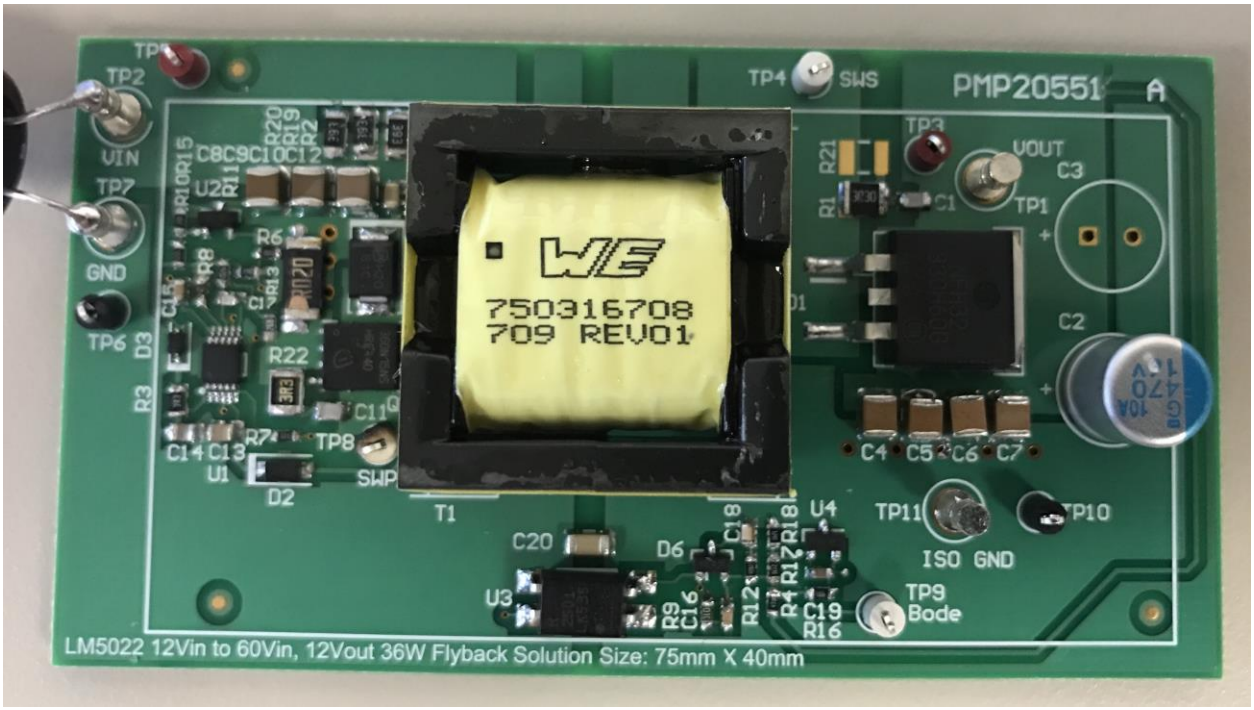
Vin Minimum	**12VDC**
Vin Maximum	**60VDC**
Vout	**+12VDC @ 3A**
Nominal Switching Frequency	**≈ 100KHz**

2. Circuit Description

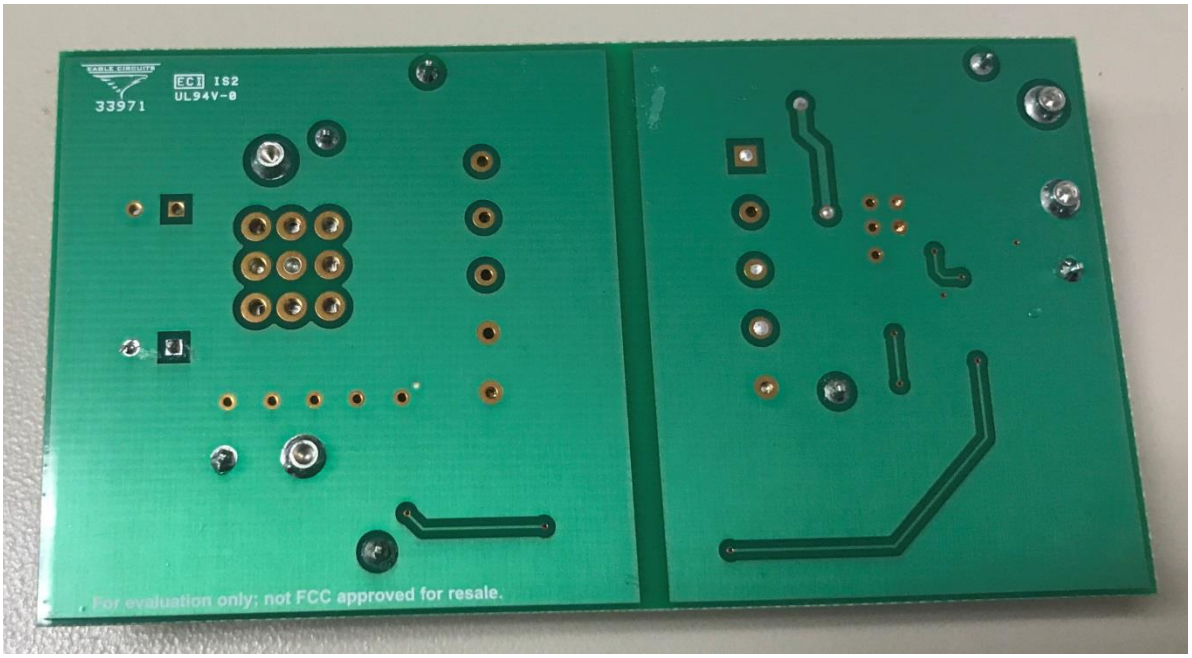
PMP20551 is an isolated flyback converter utilizing the LM5022 for industrial applications. This design accepts PoE input voltage of 12V to 60V The test report here is tested at 12V out @ 3A of load current. Switching frequency is set to 100kHz. A custom transformer is used in this test report for all the scope capture.

3. PMP20551 Board Photos

Board Dimensions: 3.5inches x 1.9inches



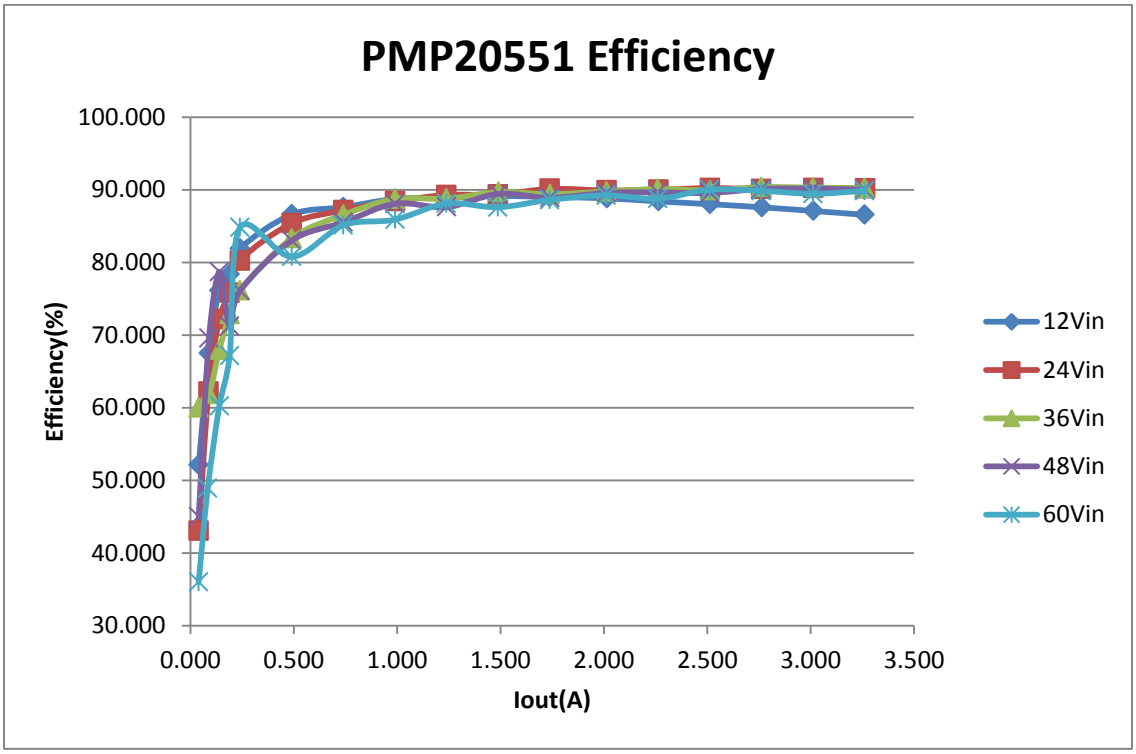
Board Photo (Top)



Pulse Board Photo (Bottom)

4. Efficiency

4.1 Efficiency Chart



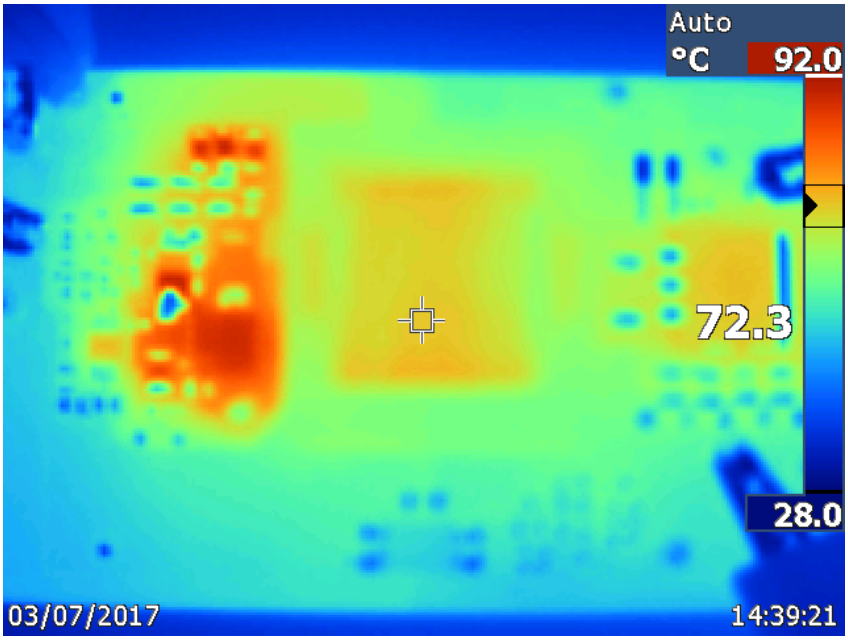
4.2 Efficiency Data

Vin(V)	Iin(A)	Vout(V)	Iout(A)	Pin(W)	Pout(W)	Ploss(W)	Efficiency
12.006	0.022	11.886	0.000	0.264	0.000	0.359	0.000
12.006	0.076	11.885	0.040	0.912	0.475	0.437	52.103
12.006	0.132	11.885	0.090	1.585	1.070	0.515	67.492
12.006	0.182	11.884	0.140	2.185	1.664	0.521	76.143
12.006	0.240	11.884	0.190	2.881	2.258	0.624	78.361
12.006	0.290	11.884	0.240	3.482	2.852	0.630	81.915
12.006	0.560	11.882	0.490	6.723	5.822	0.901	86.597
12.006	0.836	11.881	0.740	10.037	8.792	1.245	87.595
12.006	1.104	11.880	0.990	13.254	11.762	1.493	88.738
12.006	1.376	11.880	1.236	16.520	14.684	1.836	88.885
12.005	1.652	11.880	1.488	19.833	17.677	2.156	89.129
12.005	1.932	11.879	1.738	23.194	20.646	2.548	89.014
12.006	2.246	11.879	2.016	26.964	23.947	3.017	88.811
12.005	2.534	11.878	2.264	30.421	26.892	3.529	88.399
12.005	2.826	11.877	2.514	33.927	29.860	4.067	88.012
12.005	3.122	11.876	2.764	37.481	32.827	4.654	87.582
12.005	3.424	11.876	3.014	41.105	35.793	5.312	87.076
12.005	3.728	11.874	3.262	44.754	38.735	6.019	86.550
12.005	4.038	11.873	3.514	48.475	41.723	6.752	86.071
24.014	0.018	11.885	0.000	0.432	0.000	0.527	0.000
24.014	0.046	11.883	0.040	1.105	0.475	0.629	43.030
24.014	0.070	11.883	0.088	1.681	1.046	0.635	62.208
24.014	0.096	11.882	0.140	2.305	1.664	0.642	72.160
24.013	0.124	11.882	0.190	2.978	2.258	0.720	75.816
24.014	0.148	11.882	0.240	3.554	2.852	0.702	80.236
24.014	0.284	11.881	0.490	6.820	5.822	0.998	85.364
24.014	0.420	11.880	0.740	10.086	8.791	1.295	87.164
24.014	0.554	11.880	0.990	13.304	11.761	1.543	88.403
24.014	0.686	11.879	1.238	16.473	14.707	1.767	89.276
24.014	0.824	11.878	1.488	19.787	17.675	2.112	89.326
24.013	0.954	11.879	1.738	22.909	20.645	2.264	90.118
24.013	1.108	11.877	2.014	26.607	23.921	2.686	89.905
24.013	1.244	11.877	2.264	29.873	26.890	2.983	90.014
24.014	1.378	11.877	2.514	33.091	29.858	3.233	90.231
24.013	1.516	11.876	2.762	36.404	32.803	3.602	90.107
24.013	1.652	11.876	3.014	39.670	35.795	3.875	90.232
24.013	1.790	11.876	3.264	42.984	38.762	4.222	90.178

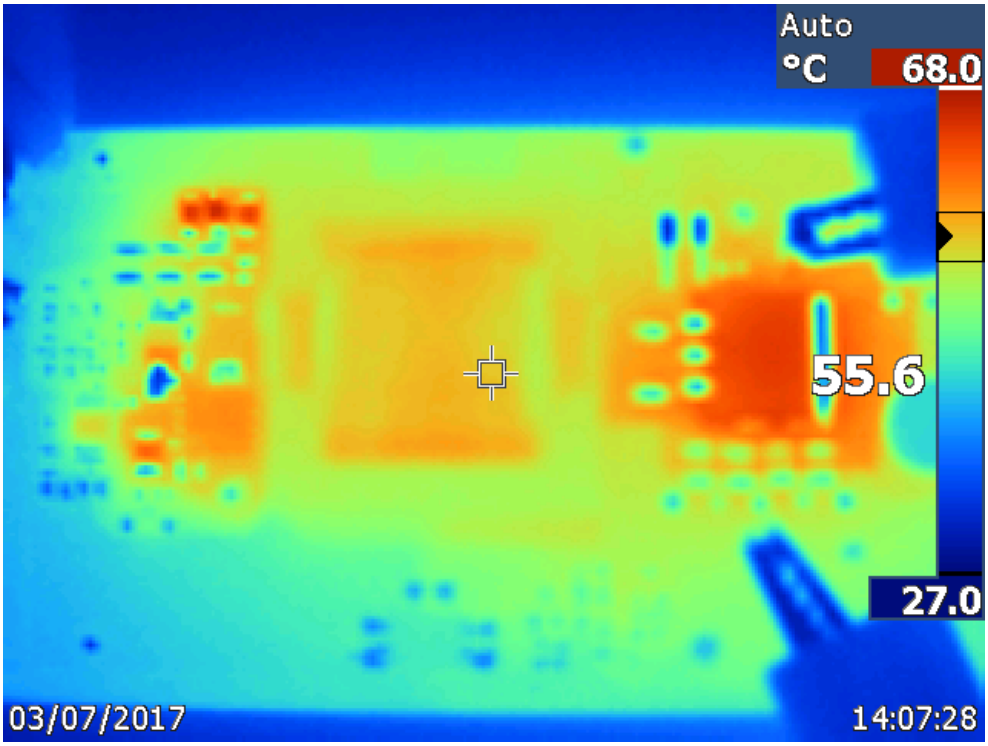
24.013	1.930	11.875	3.514	46.346	41.730	4.616	90.041
36.011	0.014	11.883	0.000	0.504	0.000	0.599	0.000
36.011	0.022	11.880	0.040	0.792	0.475	0.317	59.984
36.011	0.048	11.880	0.090	1.729	1.069	0.659	61.858
36.011	0.068	11.880	0.140	2.449	1.663	0.786	67.918
36.011	0.086	11.879	0.190	3.097	2.257	0.840	72.880
36.011	0.104	11.879	0.240	3.745	2.851	0.894	76.126
36.011	0.194	11.878	0.490	6.986	5.820	1.166	83.315
36.011	0.282	11.878	0.740	10.155	8.790	1.365	86.555
36.011	0.368	11.878	0.990	13.252	11.759	1.493	88.735
36.010	0.460	11.877	1.238	16.565	14.704	1.861	88.765
36.010	0.548	11.877	1.490	19.734	17.697	2.037	89.679
36.011	0.642	11.876	1.740	23.119	20.665	2.454	89.385
36.011	0.740	11.876	2.014	26.648	23.919	2.729	89.759
36.010	0.828	11.876	2.262	29.817	26.863	2.954	90.094
36.010	0.922	11.875	2.514	33.202	29.854	3.348	89.918
36.010	1.008	11.875	2.762	36.299	32.800	3.499	90.361
36.010	1.100	11.875	3.012	39.611	35.766	3.845	90.293
36.010	1.192	11.874	3.262	42.924	38.732	4.192	90.234
36.010	1.282	11.874	3.512	46.165	41.700	4.465	90.328
48.018	0.016	11.884	0.000	0.768	0.000	0.863	0.000
48.018	0.022	11.879	0.040	1.056	0.475	0.581	44.979
48.018	0.032	11.877	0.090	1.537	1.069	0.468	69.567
48.018	0.044	11.877	0.140	2.113	1.663	0.450	78.700
48.018	0.066	11.877	0.190	3.169	2.257	0.913	71.206
48.018	0.078	11.877	0.240	3.745	2.850	0.895	76.104
48.018	0.146	11.876	0.490	7.011	5.819	1.191	83.007
48.019	0.214	11.875	0.740	10.276	8.788	1.488	85.517
48.018	0.278	11.875	0.990	13.349	11.757	1.592	88.072
48.018	0.350	11.875	1.240	16.806	14.725	2.082	87.613
48.018	0.412	11.875	1.490	19.784	17.694	2.090	89.436
48.018	0.484	11.874	1.740	23.241	20.661	2.580	88.899
48.018	0.556	11.874	2.014	26.698	23.914	2.784	89.574
48.018	0.624	11.874	2.262	29.963	26.858	3.105	89.638
48.018	0.694	11.873	2.514	33.325	29.849	3.476	89.569
48.018	0.758	11.873	2.762	36.398	32.794	3.604	90.099
48.018	0.826	11.873	3.012	39.663	35.761	3.902	90.162
48.018	0.896	11.872	3.262	43.024	38.726	4.298	90.010

48.018	0.962	11.872	3.512	46.193	41.694	4.499	90.260
60.019	0.014	11.887	0.000	0.840	0.000	0.935	0.000
60.019	0.022	11.877	0.040	1.320	0.475	0.845	35.980
60.019	0.034	11.876	0.084	2.041	0.998	1.043	48.886
60.019	0.046	11.875	0.140	2.761	1.662	1.098	60.216
60.019	0.056	11.874	0.190	3.361	2.256	1.105	67.125
60.019	0.056	11.874	0.240	3.361	2.850	0.511	84.787
60.019	0.120	11.873	0.490	7.202	5.818	1.384	80.779
60.019	0.172	11.873	0.740	10.323	8.786	1.537	85.112
60.019	0.228	11.872	0.990	13.684	11.754	1.931	85.892
60.019	0.278	11.873	1.238	16.685	14.698	1.987	88.093
60.019	0.336	11.872	1.488	20.166	17.665	2.501	87.598
60.019	0.388	11.872	1.738	23.287	20.633	2.654	88.603
60.019	0.446	11.872	2.012	26.768	23.886	2.882	89.232
60.018	0.504	11.871	2.262	30.249	26.852	3.397	88.769
60.019	0.552	11.871	2.512	33.130	29.820	3.310	90.009
60.019	0.608	11.871	2.762	36.491	32.787	3.704	89.850
60.018	0.666	11.870	3.012	39.972	35.753	4.220	89.443
60.019	0.718	11.870	3.262	43.093	38.720	4.374	89.851
60.019	0.770	11.870	3.512	46.214	41.688	4.526	90.206

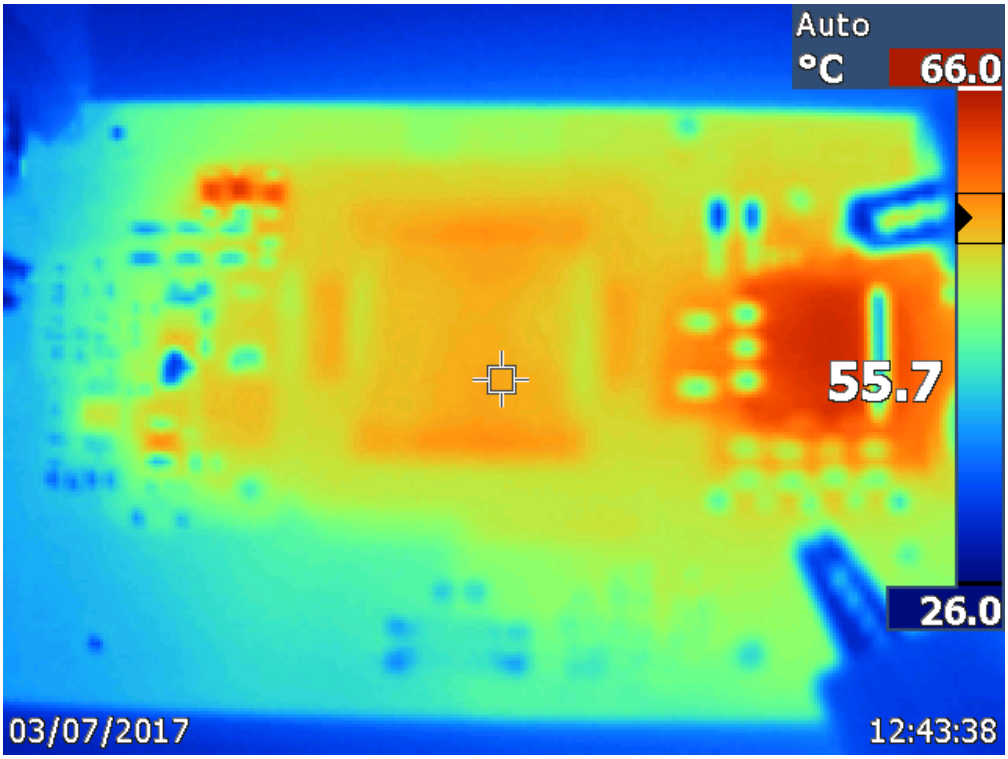
5 Thermal Images



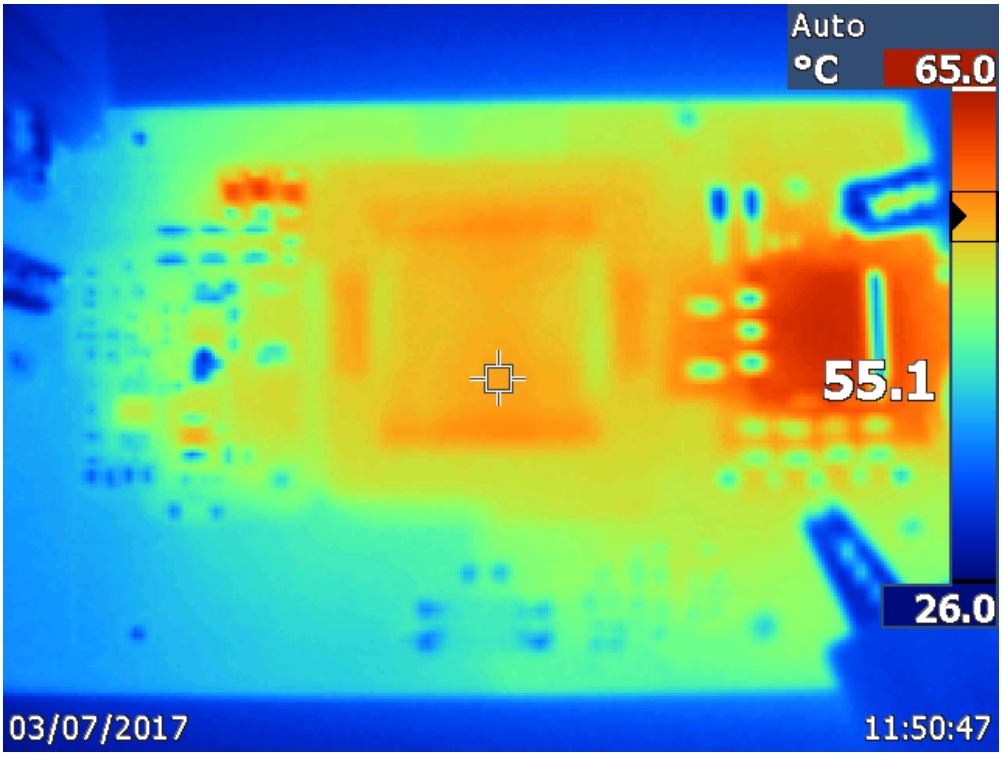
Thermal image was taken at 12Vin, 3A load after thermal equilibrium without airflow.



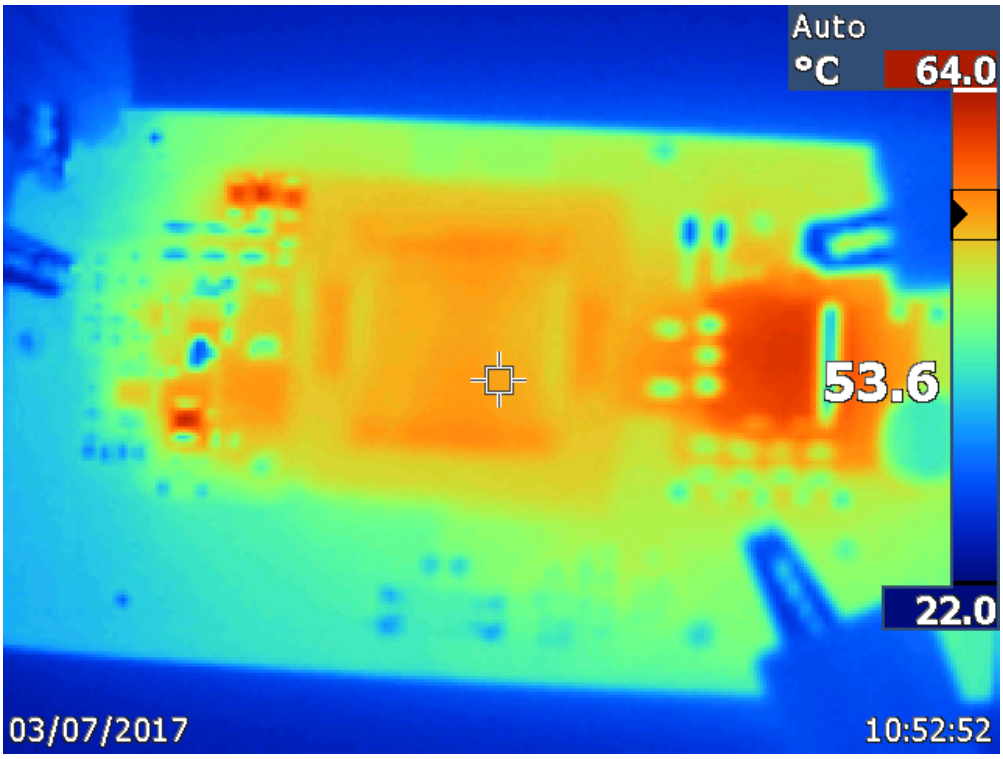
Thermal image was taken at 24Vin, 3A load after thermal equilibrium without airflow.



Thermal image was taken at 36Vin, 3A load after thermal equilibrium without airflow.



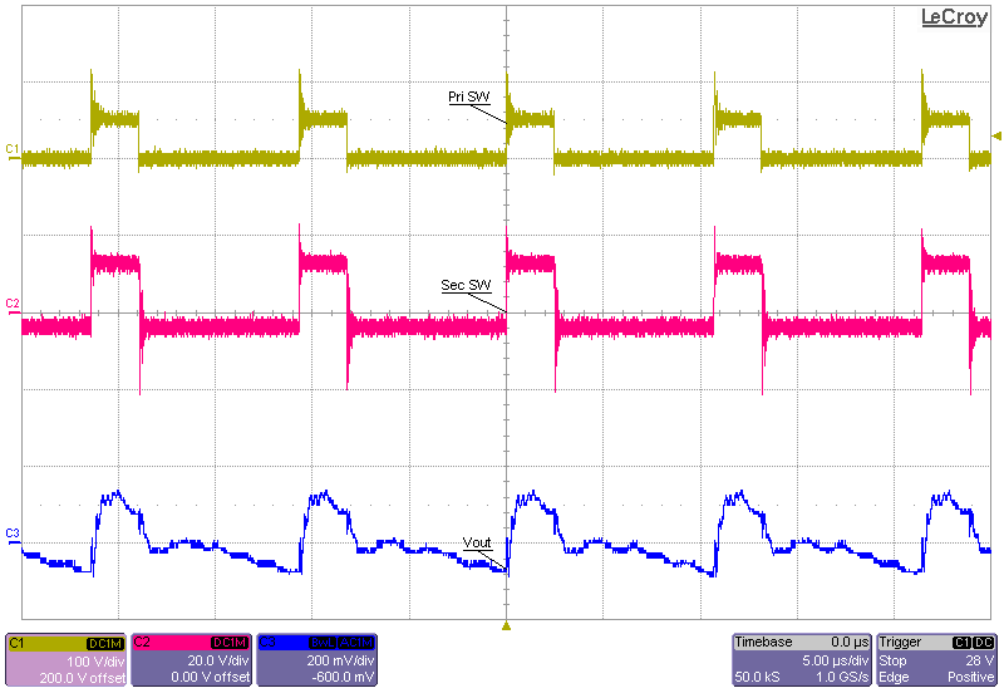
Thermal image was taken at 48Vin, 3A load after thermal equilibrium without airflow.



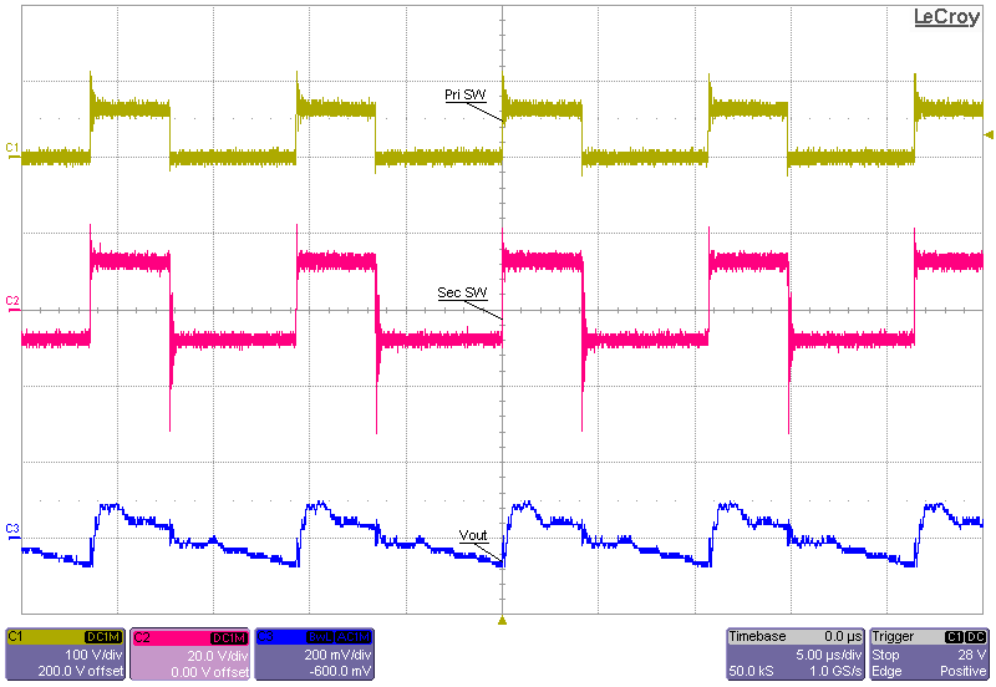
Thermal image was taken at 48Vin, 3A load after thermal equilibrium without airflow.

6 Waveform

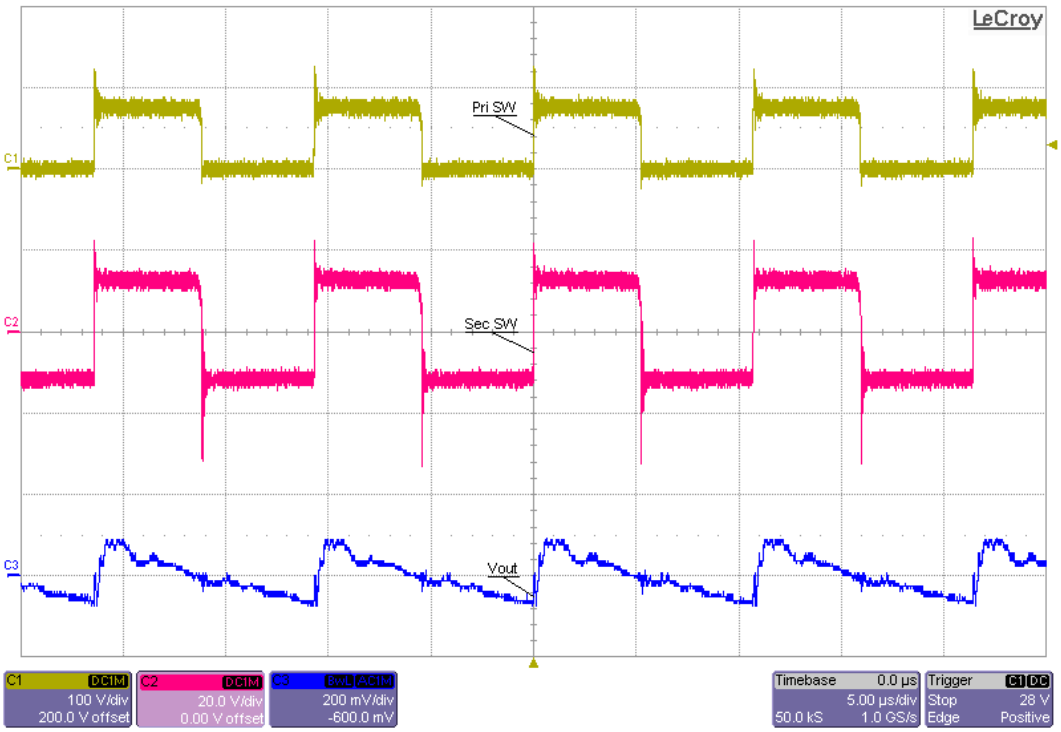
6.1 Switching Waveform and Output Ripple



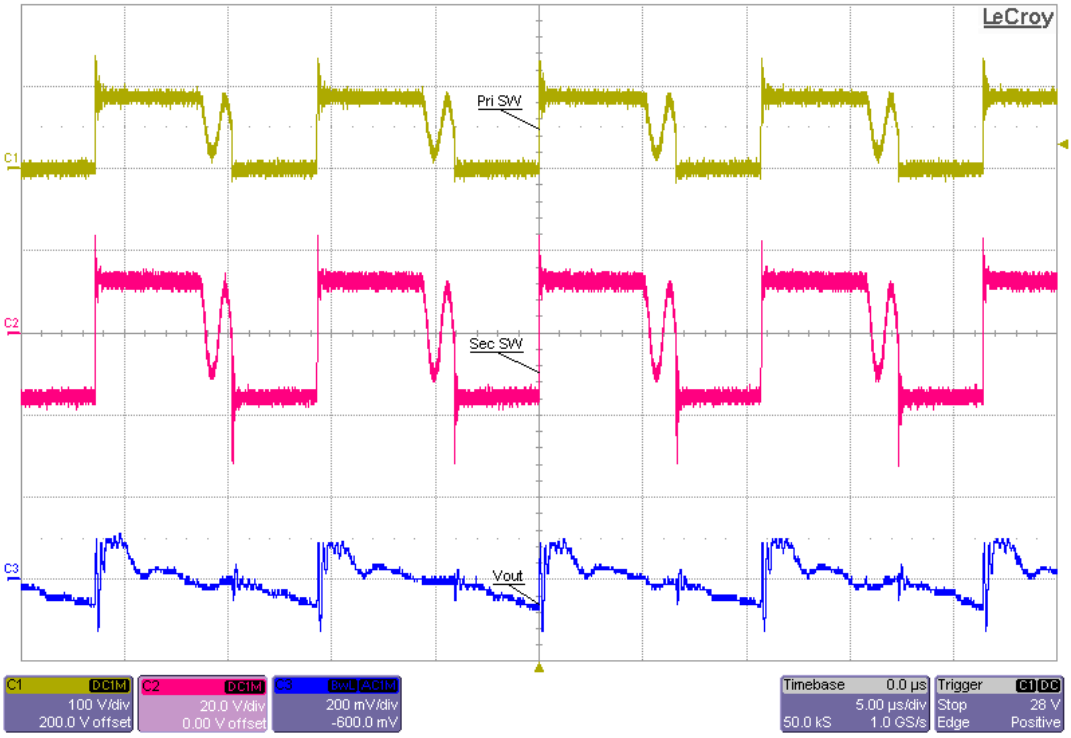
12Vin, 3A load. Ch1 measures pri switching, Ch2 measures sec switching, Ch3 measures output ripple.



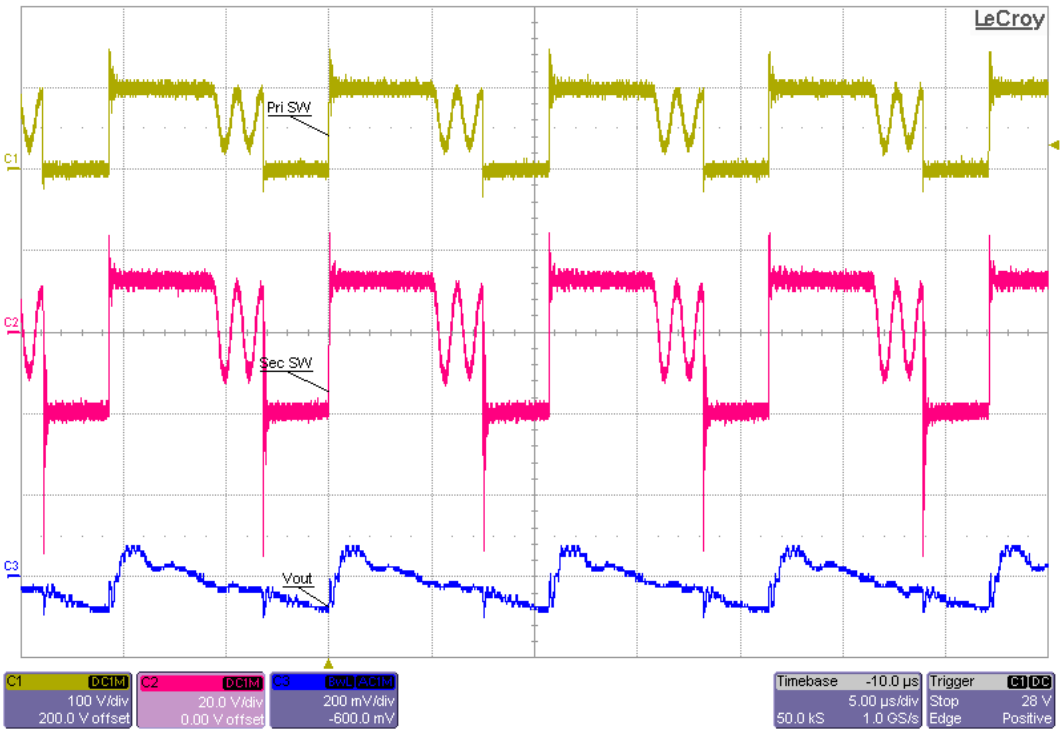
24Vin, 3A load. Ch1 measures pri switching, Ch2 measures sec switching, Ch3 measures output ripple.



36Vin, 3A load. Ch1 measures pri switching, Ch2 measures sec switching, Ch3 measures output ripple.

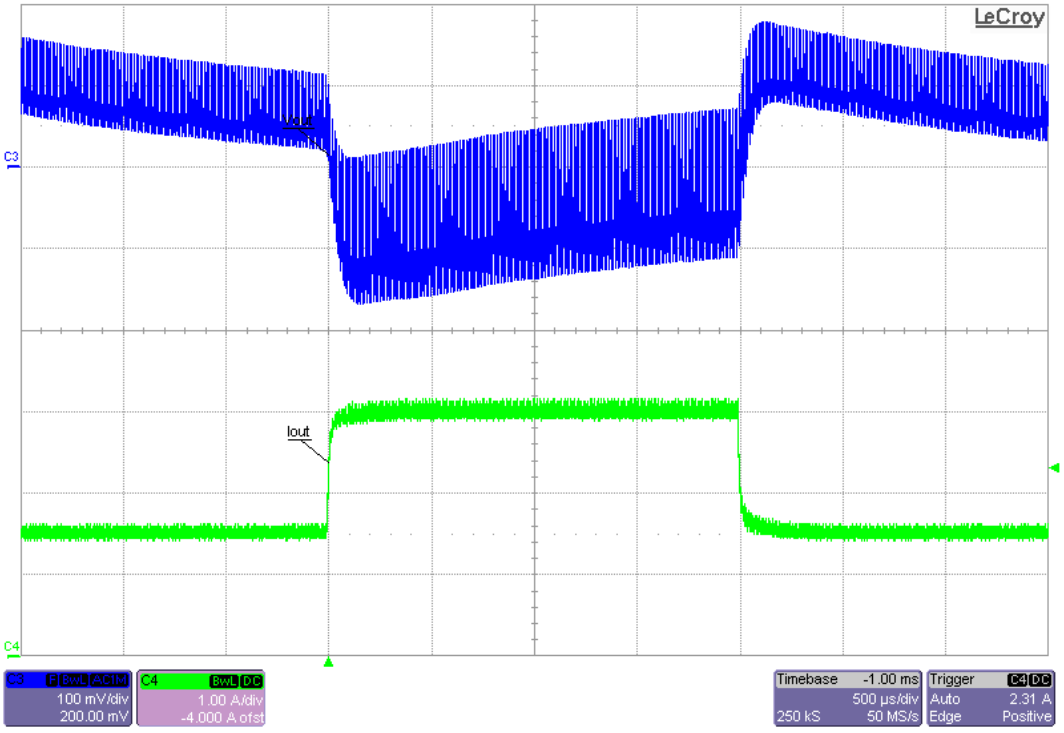


48Vin, 3A load. Ch1 measures pri switching, Ch2 measures sec switching, Ch3 measures output ripple.

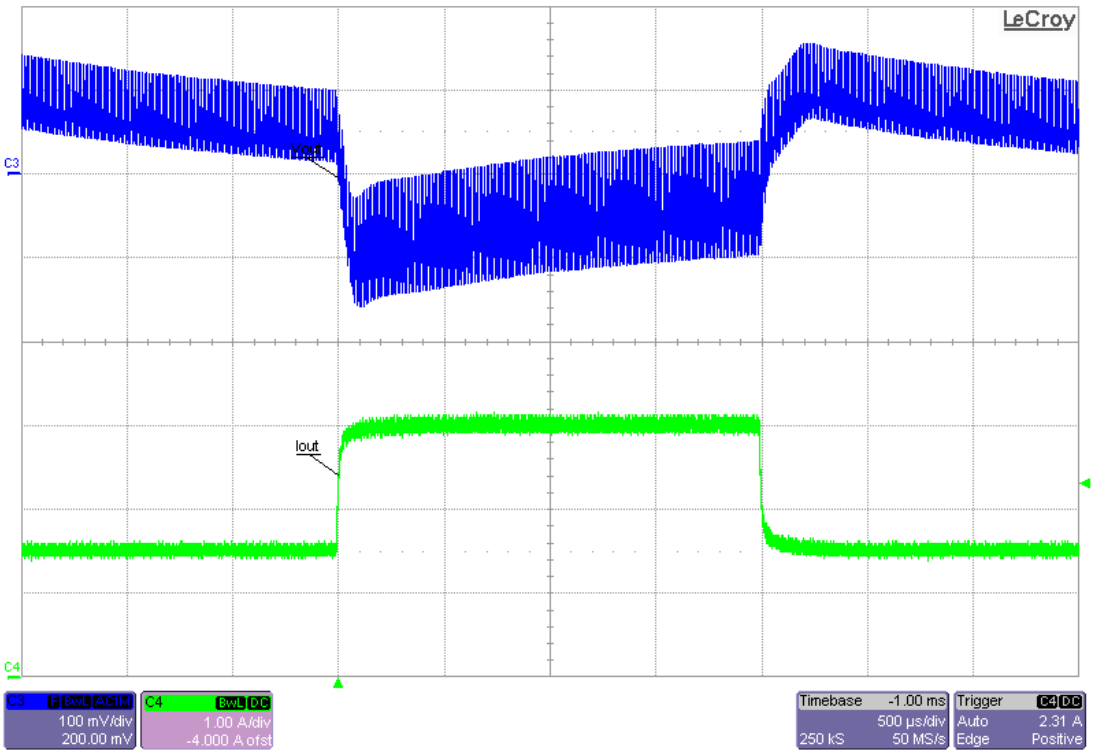


60Vin, 3A load. Ch1 measures pri switching, Ch2 measures sec switching, Ch3 measures output ripple.

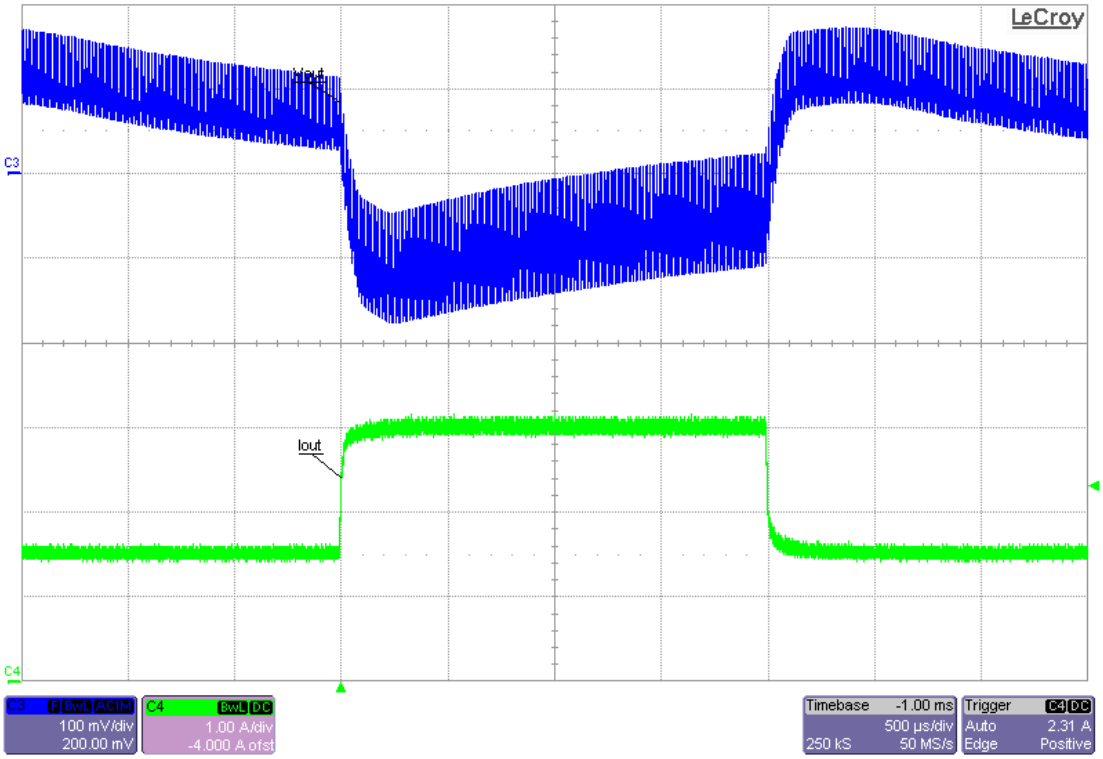
6.2 Load Transient



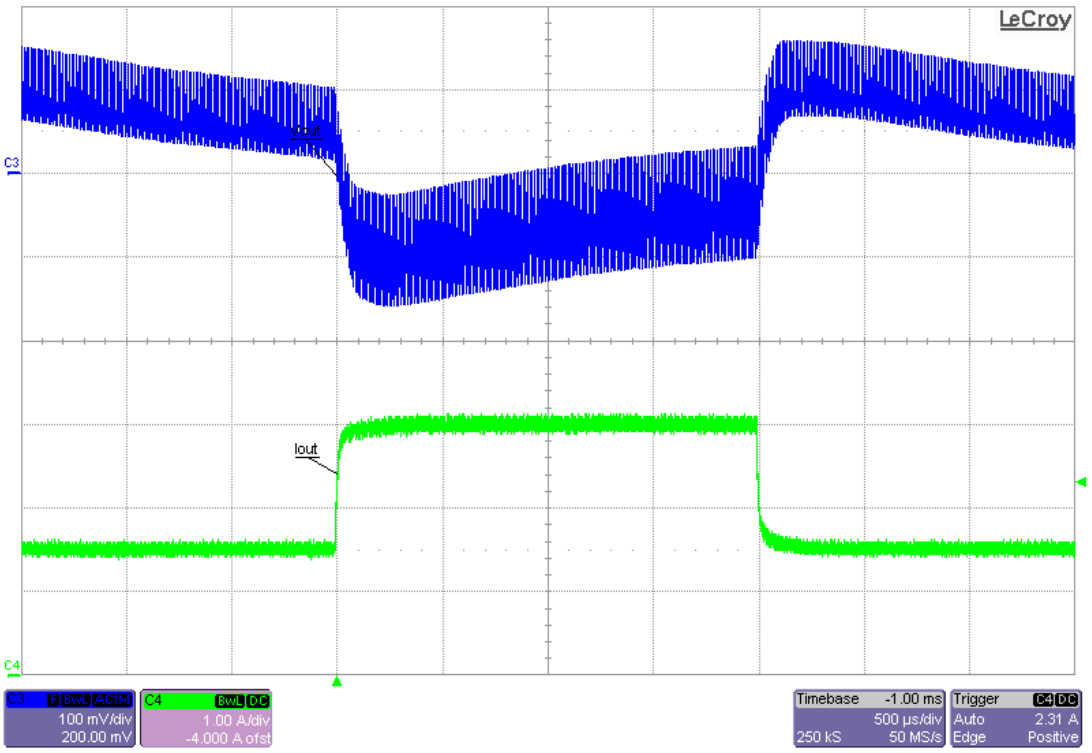
12Vin, 1.5A-3A load step. Ch3 measures output voltage, Ch4 measures output load current.



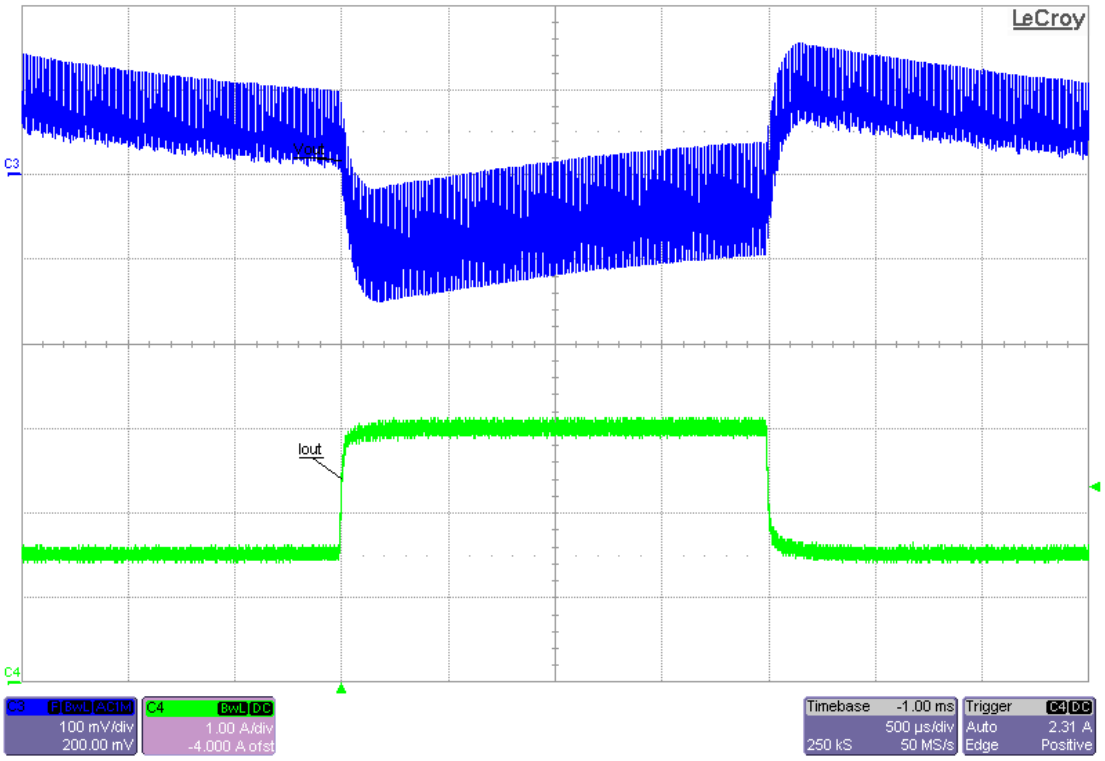
24Vin, 1.5A-3A load step. Ch3 measures output voltage, Ch4 measures output load current.



36Vin, 1.5A-3A load step. Ch3 measures output voltage, Ch4 measures output load current.

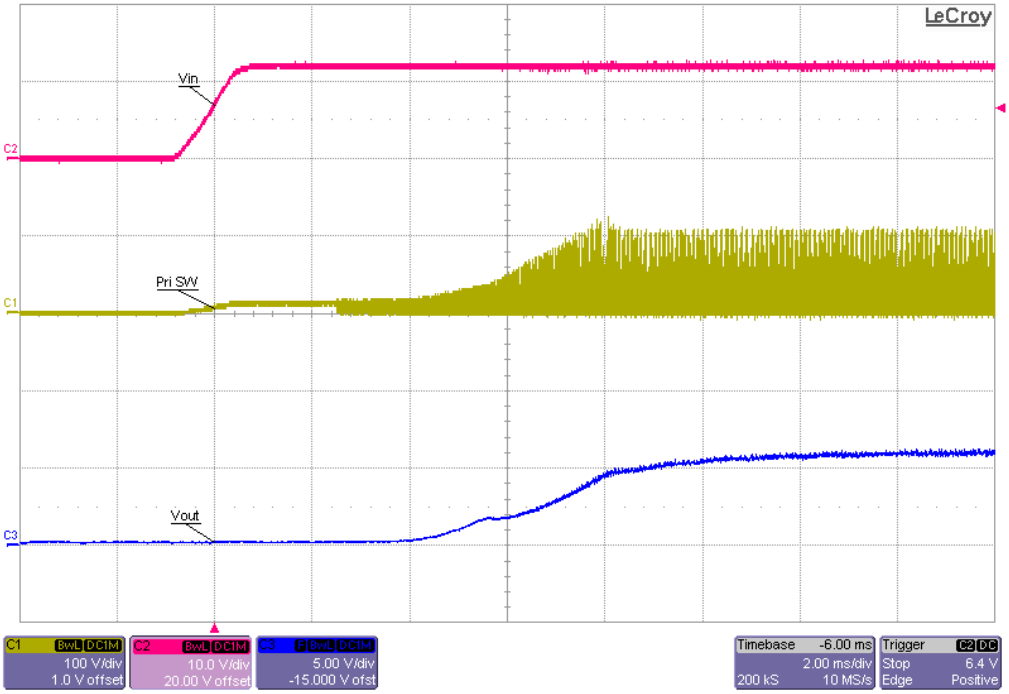


48Vin, 1.5A-3A load step. Ch3 measures output voltage, Ch4 measures output load current.

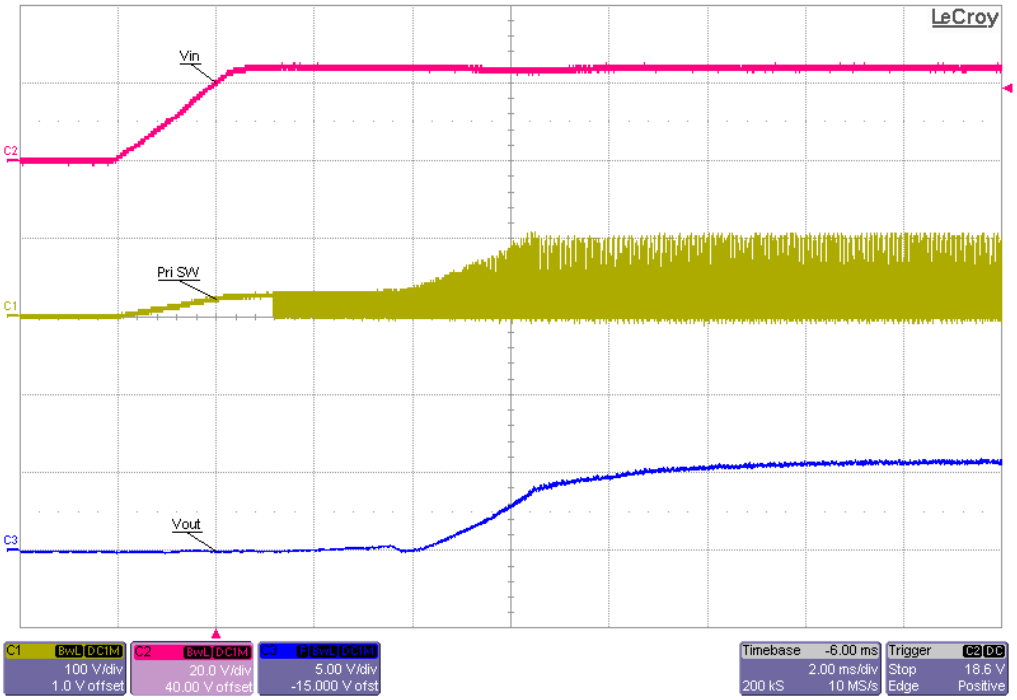


60Vin, 1.5A-3A load step. Ch3 measures output voltage, Ch4 measures output load current.

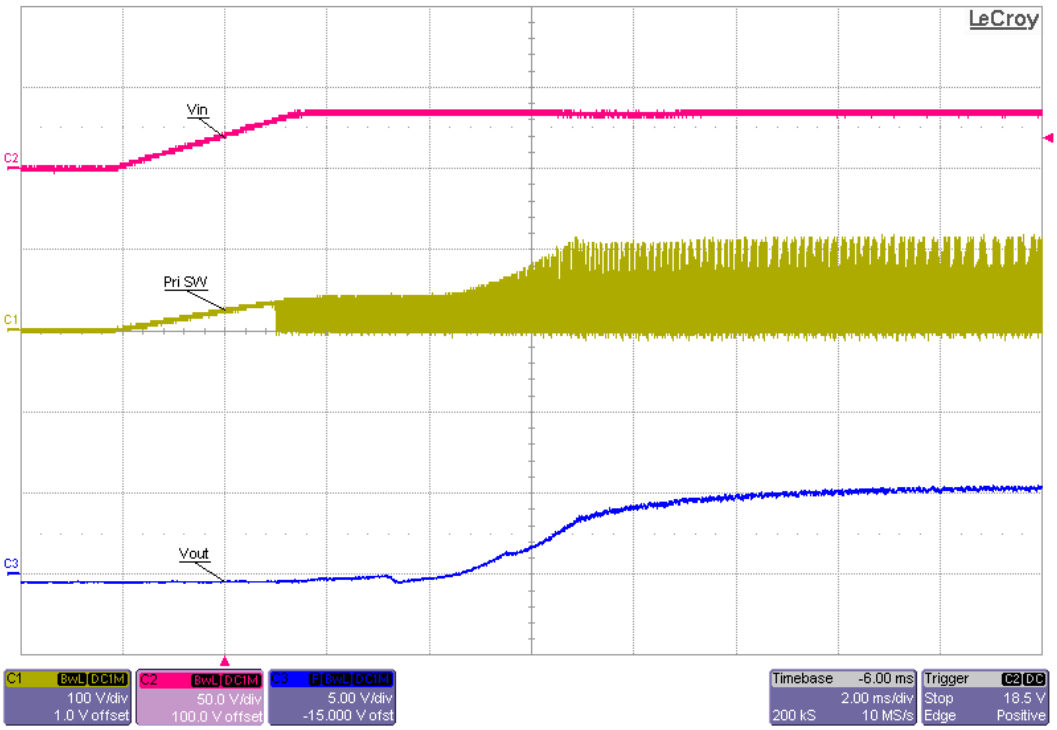
6.3 Start Up



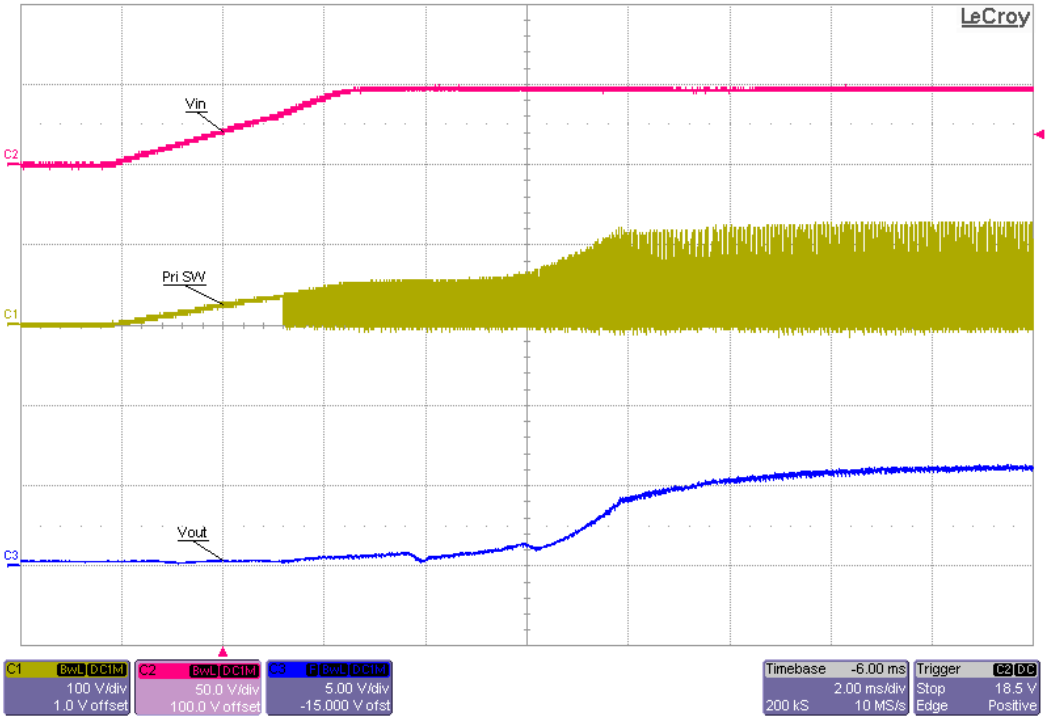
12Vin, 3A load. Ch1 measures primary switching, Ch3 measures output voltage, Ch2 measures input voltage, Ch4 measures input current.



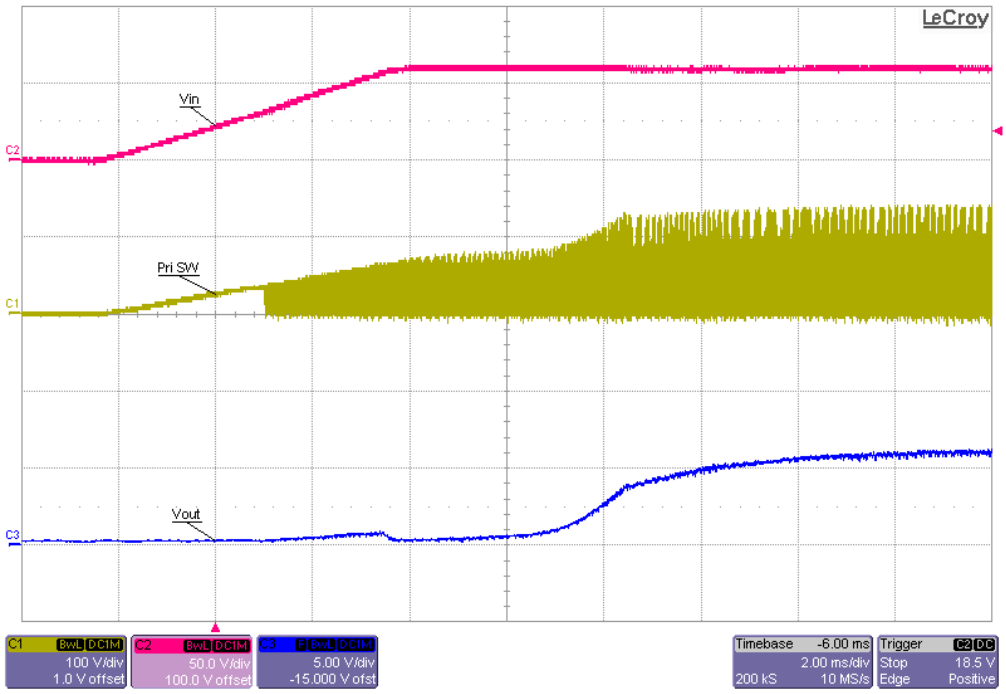
24Vin, 3A load. Ch1 measures primary switching, Ch3 measures output voltage, Ch2 measures input voltage, Ch4 measures input current.



36Vin, 3A load. Ch1 measures primary switching, Ch3 measures output voltage, Ch2 measures input voltage, Ch4 measures input current.

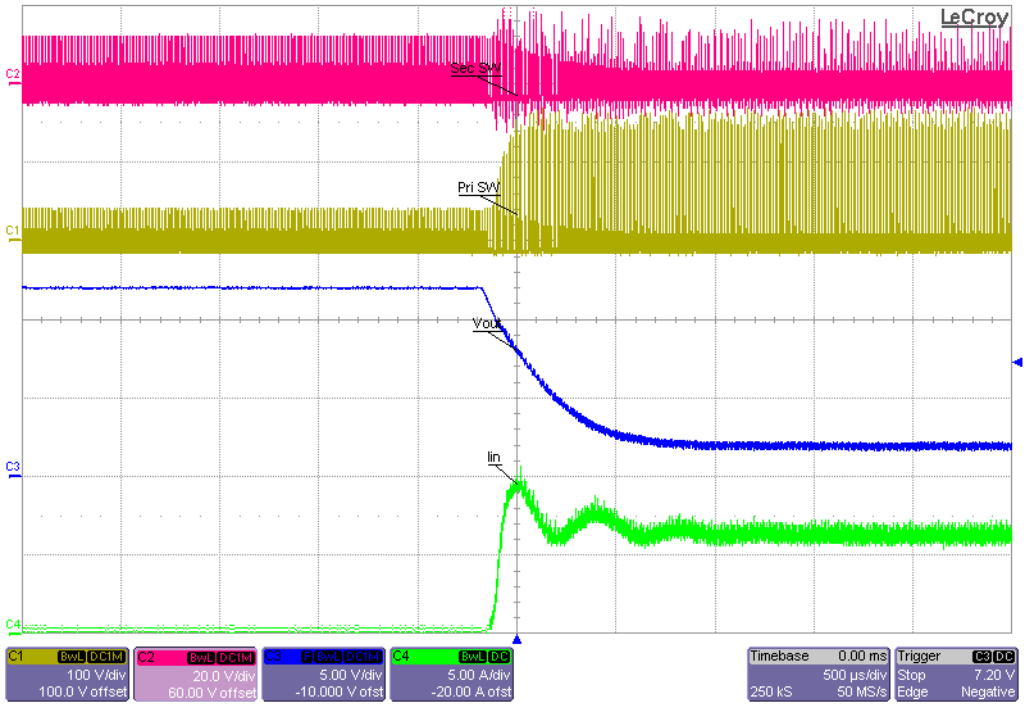


48Vin, 3A load. Ch1 measures primary switching, Ch3 measures output voltage, Ch2 measures input voltage, Ch4 measures input current.

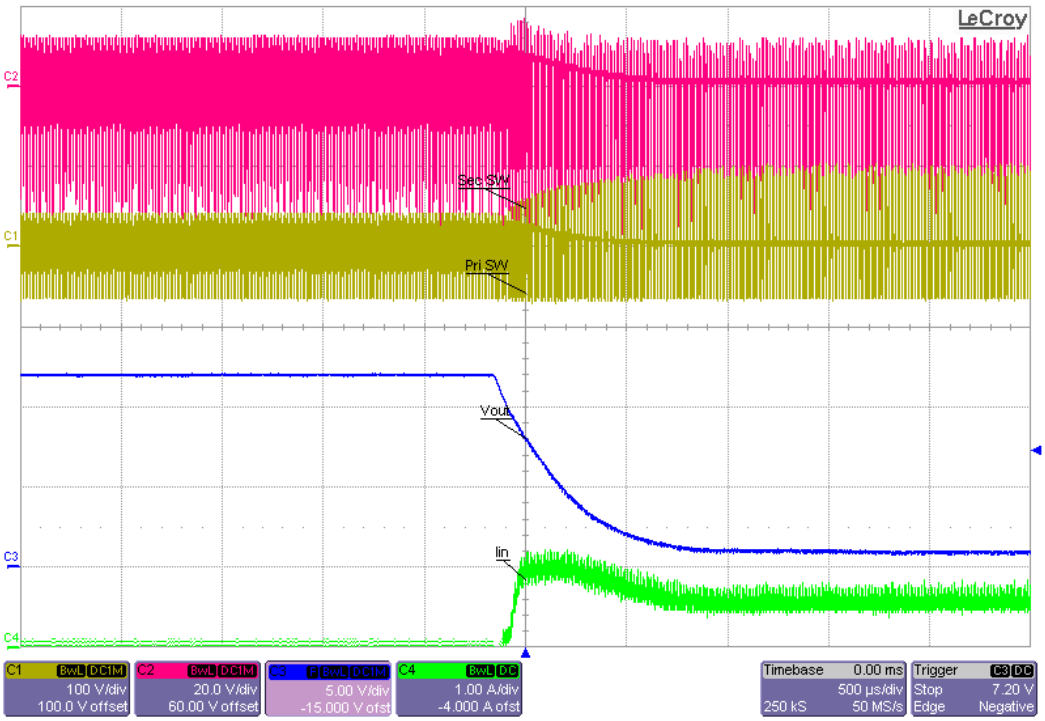


60Vin, 3A load. Ch1 measures primary switching, Ch3 measures output voltage, Ch2 measures input voltage, Ch4 measures input current.

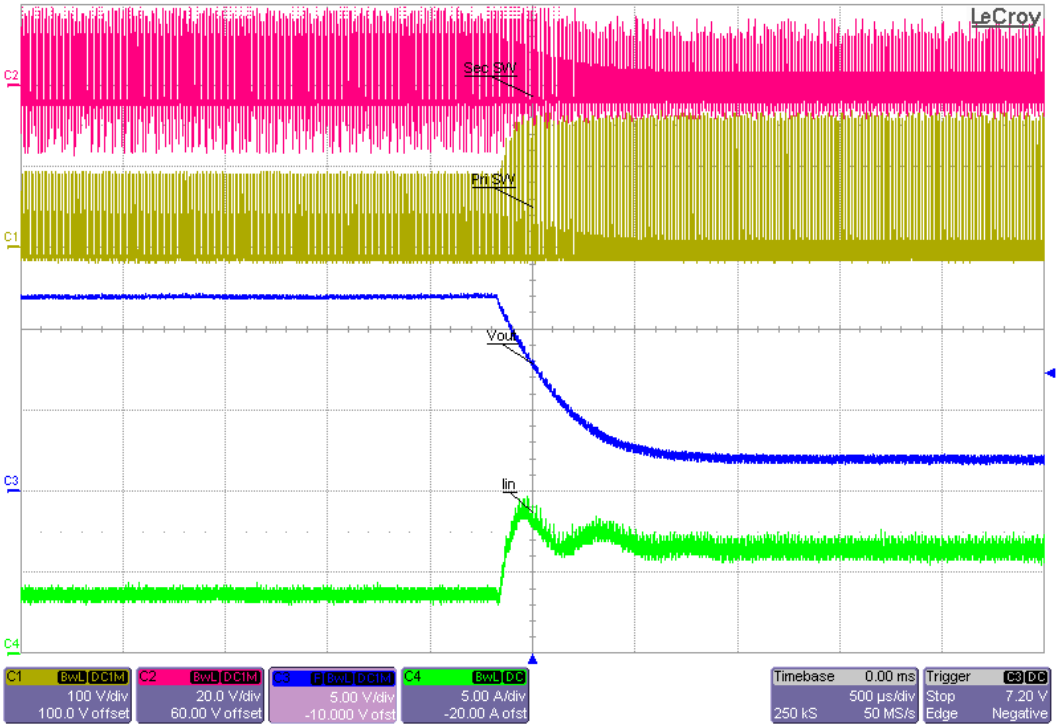
6.4 Short Circuit



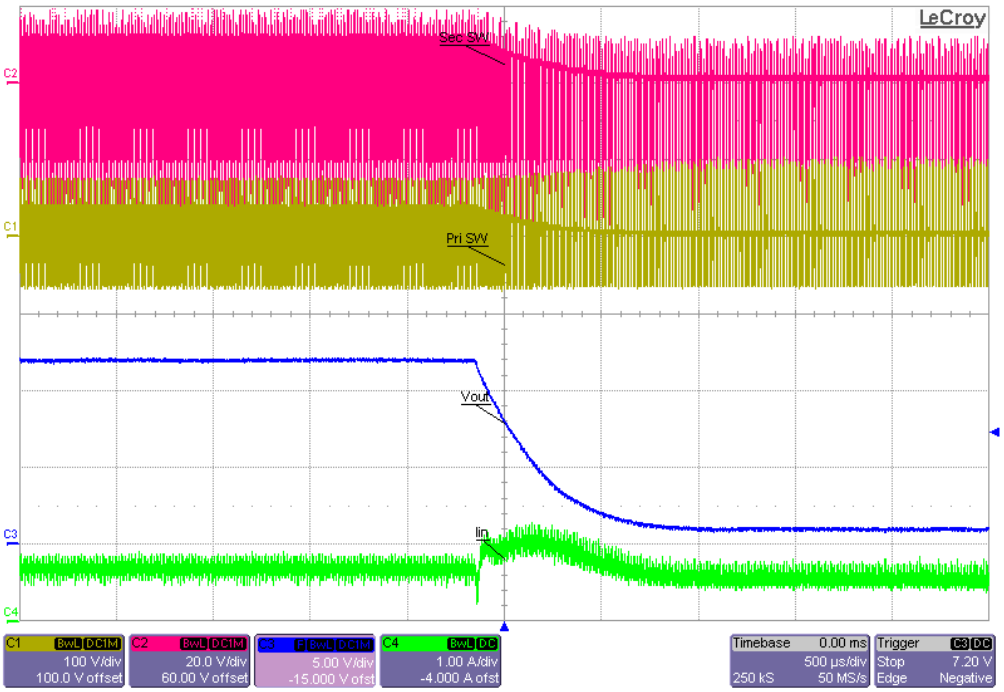
12Vin, 0A load. Ch1 measures primary switching, Ch2 measures secondary switching, Ch3 measures output voltage, Ch4 measures input current.



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

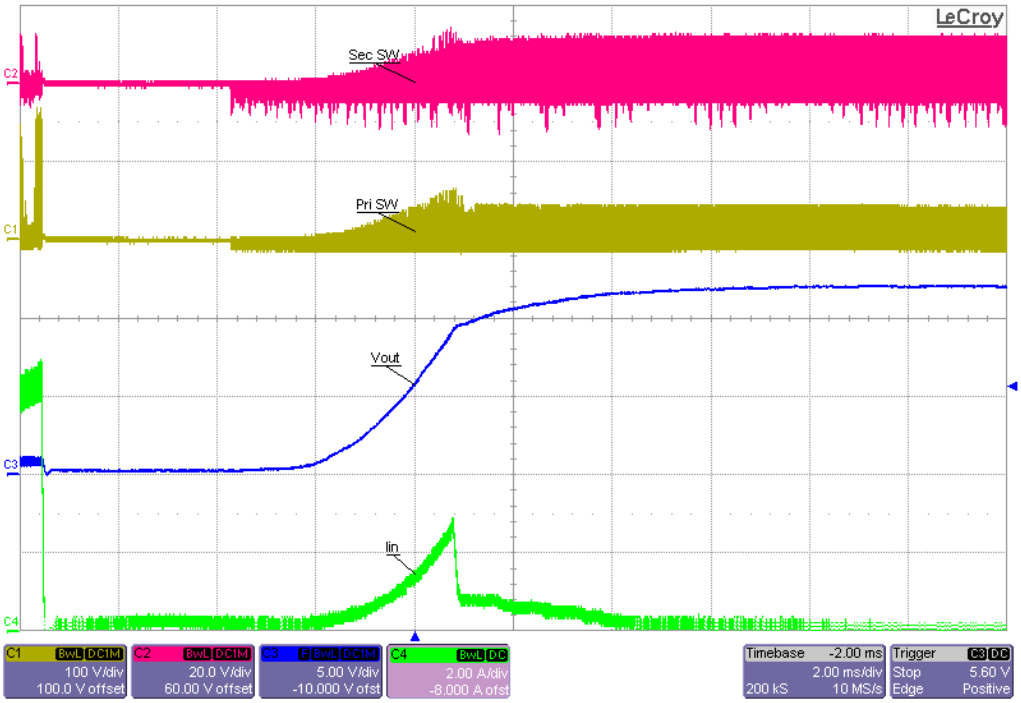


12Vin, 3A load. Ch1 measures primary switching, Ch2 measures secondary switching, Ch3 measures output voltage, Ch4 measures input current.

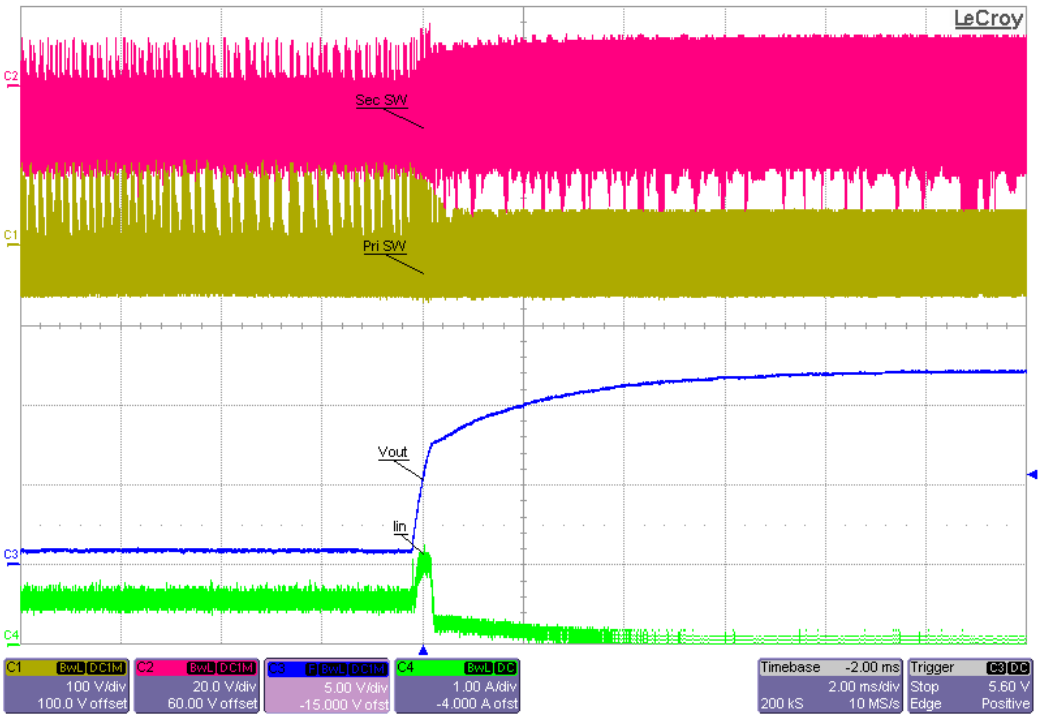


60Vin, 3A load. Ch1 measures primary switching, Ch2 measures secondary switching, Ch3 measures output voltage, Ch4 measures input current.

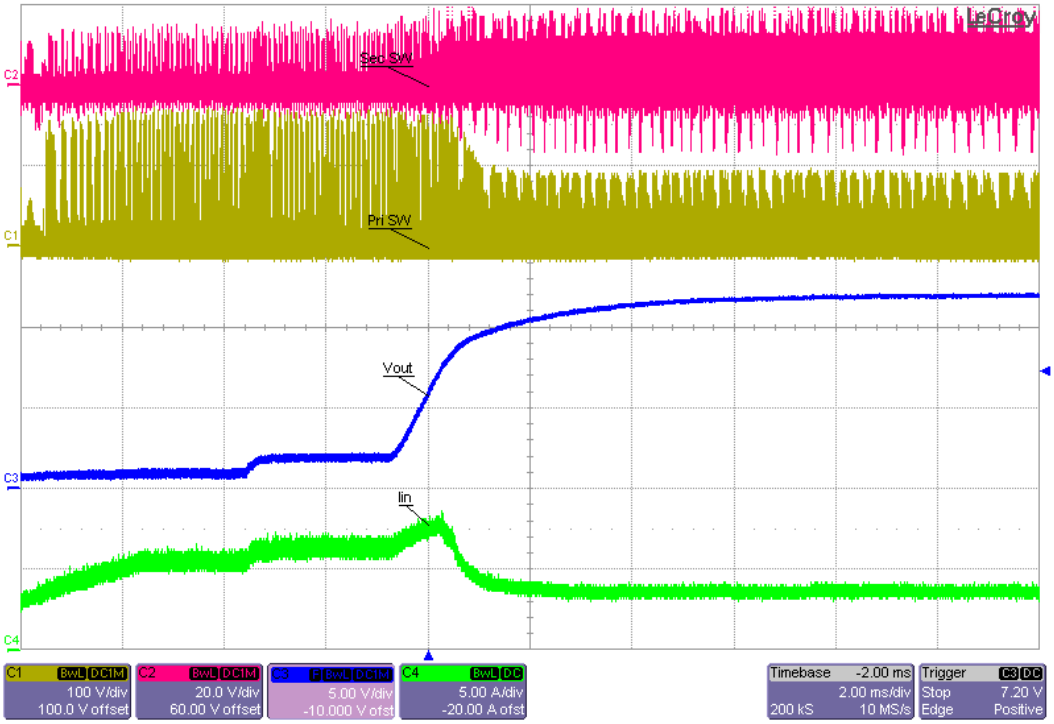
6.5 Short Circuit Recovery



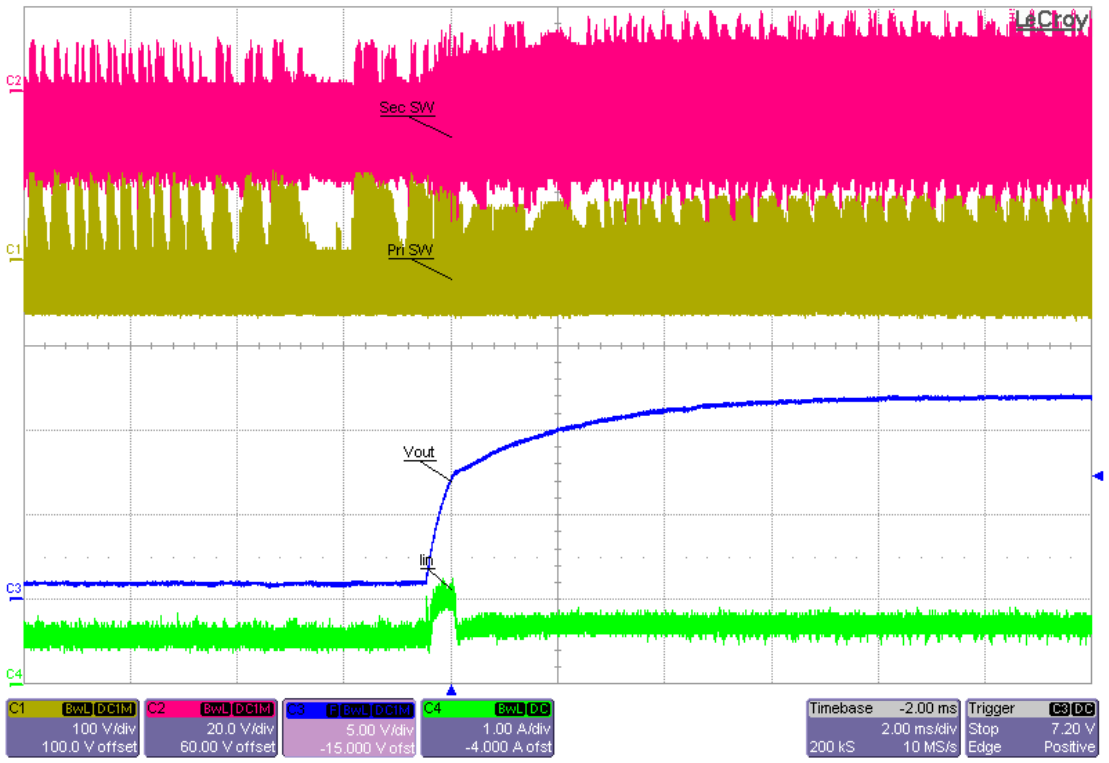
12Vin, 0A load. Ch1 measures primary switching, Ch2 measures secondary switching, Ch3 measures output voltage, Ch4 measures input current.



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

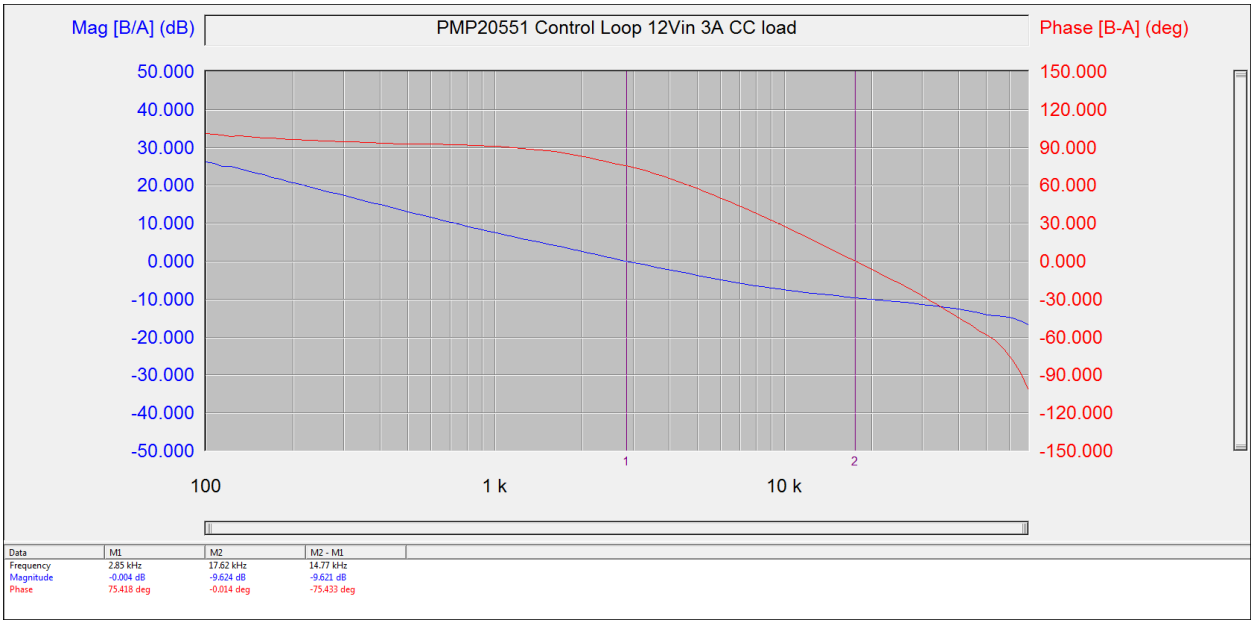


12Vin, 3A load. Ch1 measures primary switching, Ch2 measures secondary switching, Ch3 measures output voltage, Ch4 measures input current.

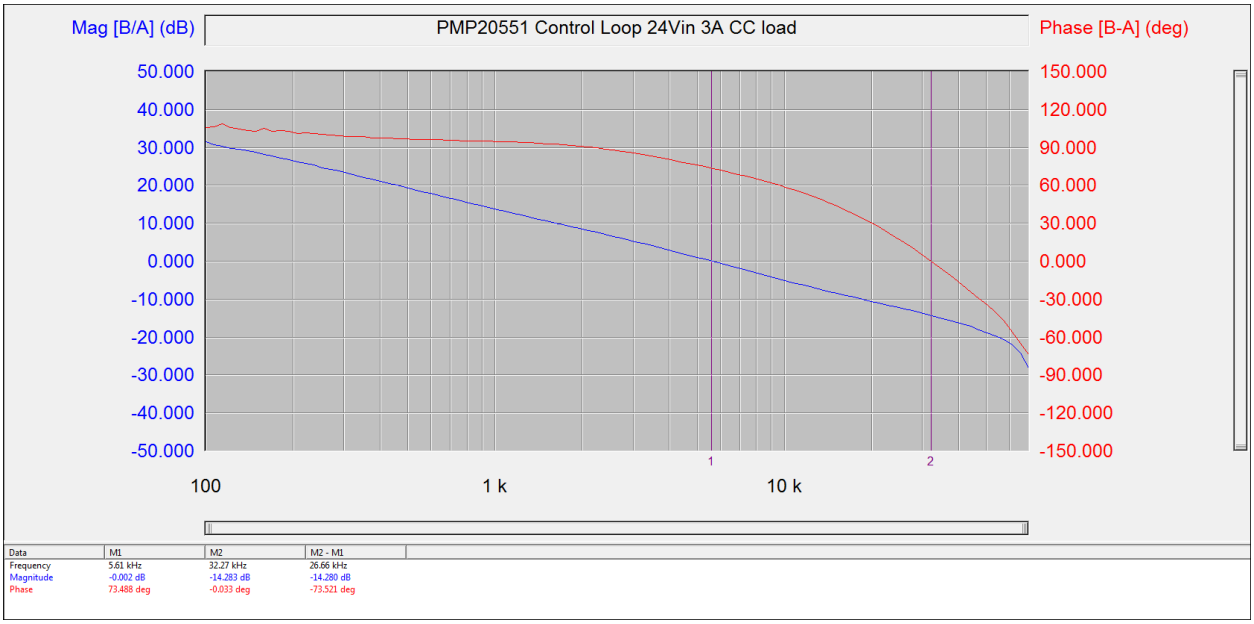


60Vin, 3A load. Ch1 measures primary switching, Ch2 measures secondary switching, Ch3 measures output voltage, Ch4 measures input current.

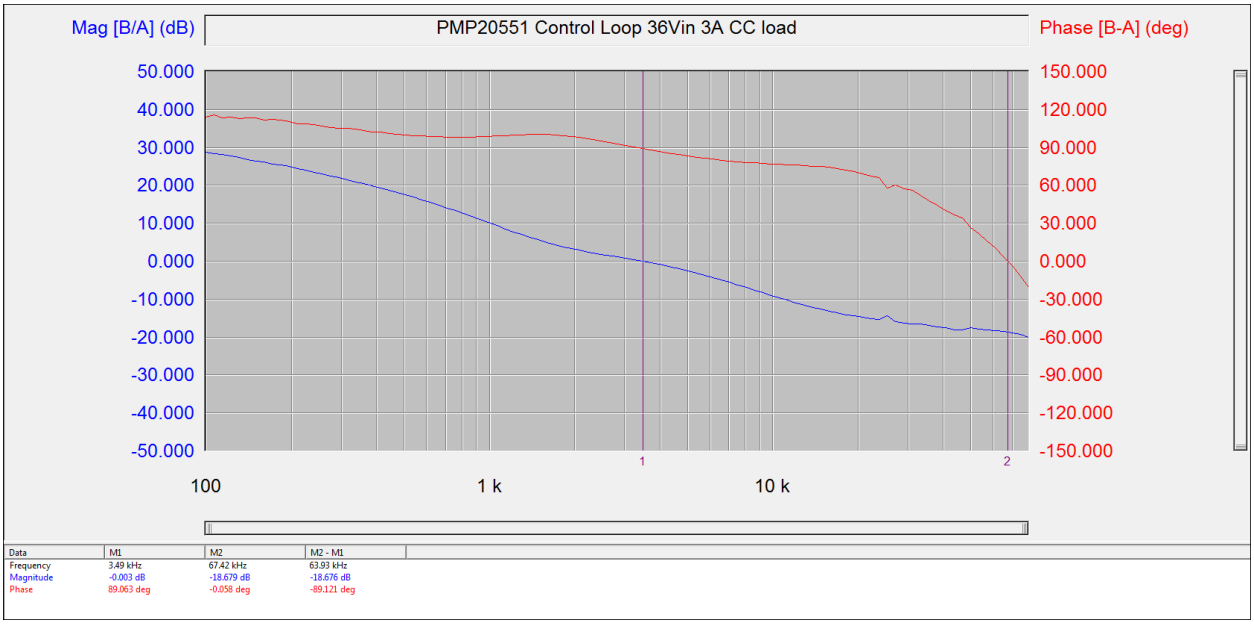
6.6 Bode Plot



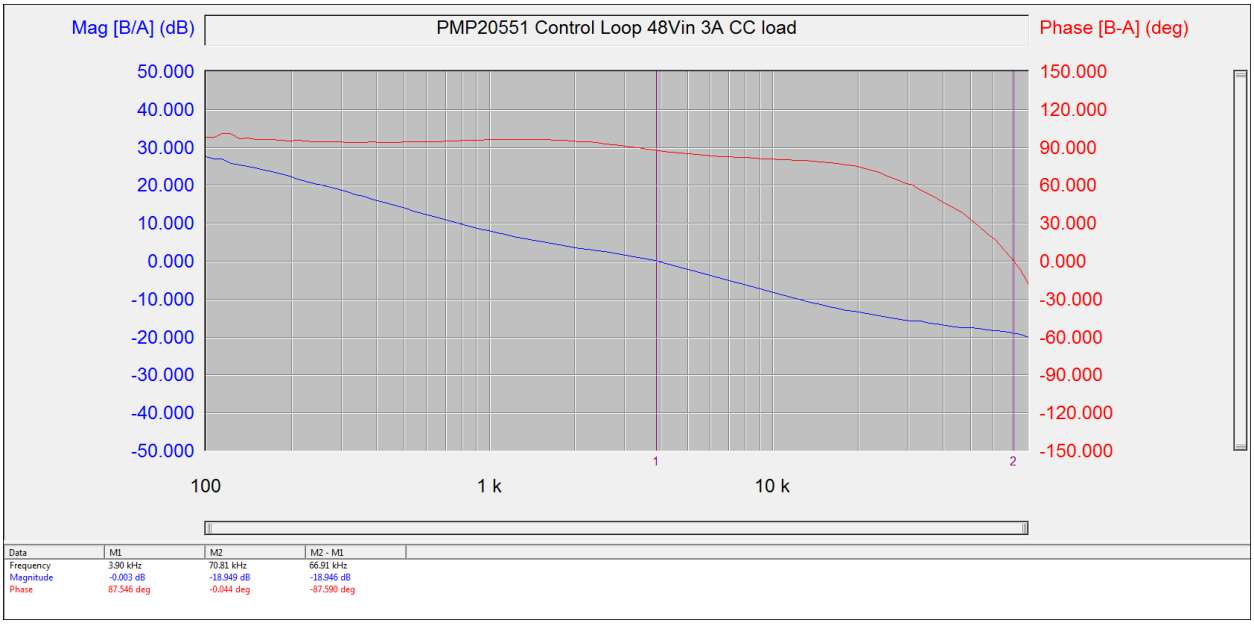
12Vin, 3A load bode plot, 75.418 degrees phase margin, and 9.624dB gain margin.



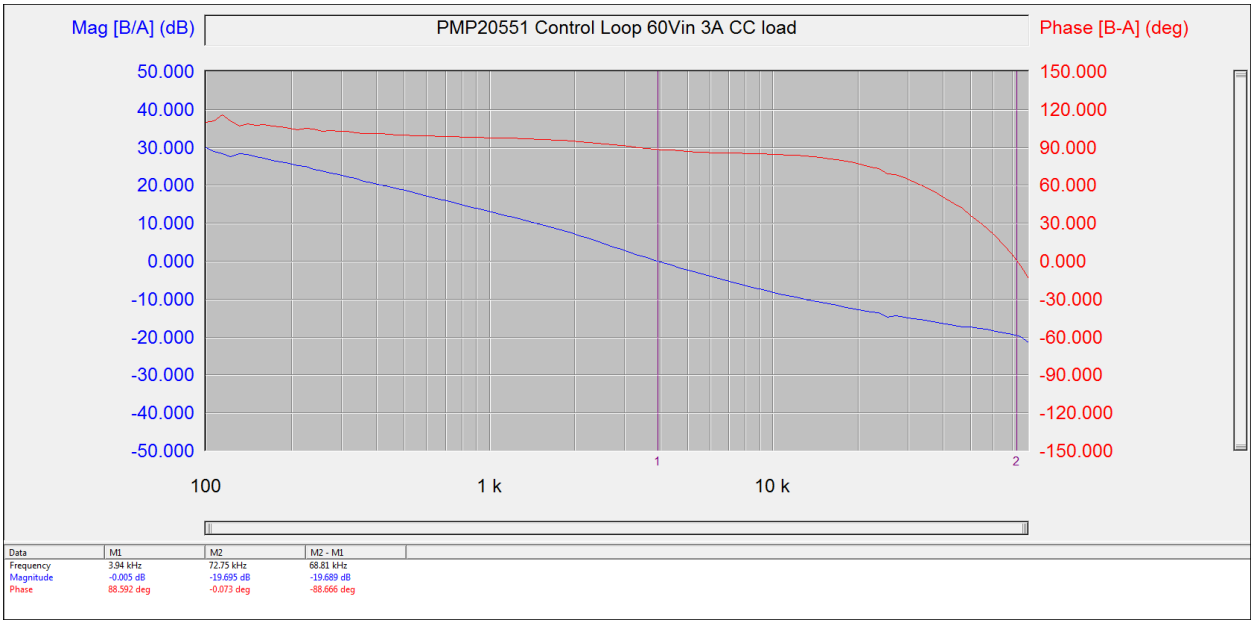
24Vin, 3A load bode plot, 73.488 degrees phase margin, and 14.283dB gain margin.



36Vin, 3A load bode plot, 89.063 degrees phase margin, and 18.679dB gain margin.



48Vin, 3A load bode plot, 87.546 degrees phase margin, and 18.949dB gain margin.



60Vin, 3A load bode plot, 88.592 degrees phase margin, and 19.695dB gain margin.

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