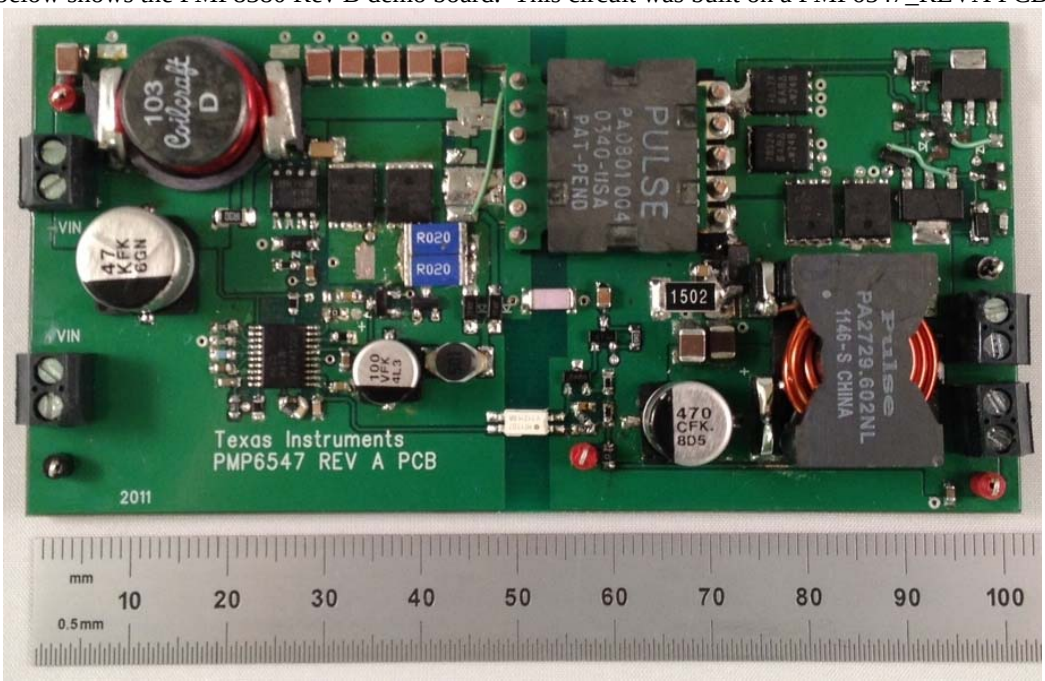
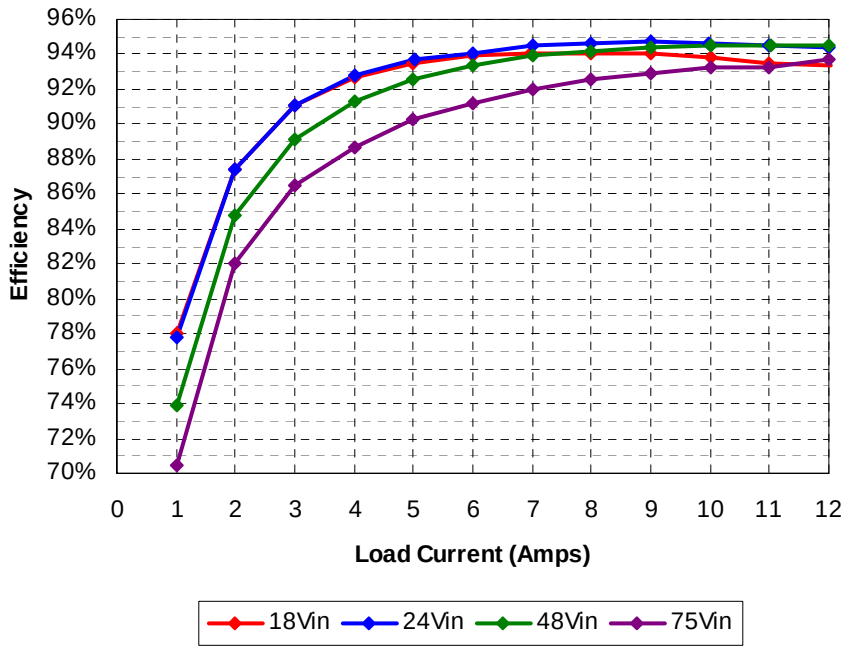
1 Photo

The photo below shows the PMP8380 Rev B demo board. This circuit was built on a PMP6547_REVA PCB.



2 Efficiency

The efficiency data is shown in the tables and graph below.



Vin	Iin	Iout	Vout	Pout	Losses	Efficiency
18.01	0.195	0.000	12.01	0.00	3.512	0.0%
18.07	0.853	1.002	12.01	12.03	3.380	78.1%
18.01	1.521	1.995	12.01	23.96	3.433	87.5%
18.01	2.201	3.005	12.01	36.09	3.550	91.0%
18.03	2.871	3.995	12.01	47.98	3.784	92.7%
18.00	3.569	5.00	12.01	60.05	4.192	93.5%
18.01	4.26	6.00	12.01	72.06	4.663	93.9%
17.99	4.96	6.99	12.01	83.95	5.280	94.1%
18.01	5.67	8.00	12.01	96.08	6.037	94.1%
18.00	6.39	9.01	12.01	108.21	6.810	94.1%
18.03	7.10	10.01	12.00	120.12	7.893	93.8%
18.00	7.84	11.00	12.00	132.00	9.120	93.5%
18.01	8.58	12.02	12.00	144.24	10.286	93.3%

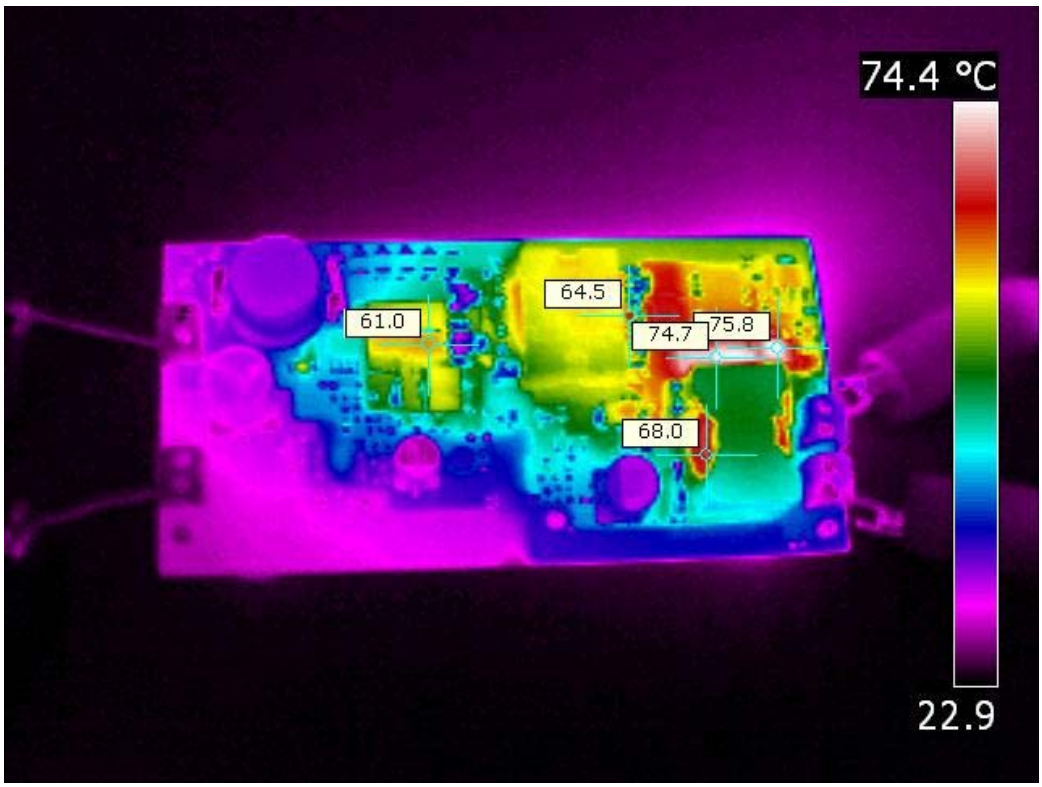
Vin	Iin	Iout	Vout	Pout	Losses	Efficiency
24.00	0.149	0.000	12.01	0.00	3.576	0.0%
23.99	0.644	1.000	12.01	12.01	3.440	77.7%
24.01	1.143	1.998	12.01	24.00	3.447	87.4%
23.98	1.649	3.000	12.01	36.03	3.513	91.1%
24.01	2.160	4.006	12.01	48.11	3.750	92.8%
23.99	2.677	5.01	12.01	60.17	4.051	93.7%
24.00	3.197	6.01	12.01	72.18	4.548	94.1%
24.00	3.717	7.02	12.01	84.31	4.898	94.5%
24.00	4.23	8.00	12.01	96.08	5.440	94.6%
24.00	4.76	9.01	12.01	108.21	6.030	94.7%
24.00	5.28	9.99	12.01	119.98	6.740	94.7%
24.00	5.82	11.00	12.00	132.00	7.680	94.5%
24.00	6.36	12.01	12.00	144.12	8.520	94.4%

Vin	Iin	Iout	Vout	Pout	Losses	Efficiency
48.01	0.091	0.000	12.02	0.00	4.369	0.0%
48.01	0.340	1.005	12.01	12.07	4.253	73.9%
48.01	0.588	1.994	12.01	23.95	4.282	84.8%
48.01	0.842	3.000	12.01	36.03	4.394	89.1%
48.01	1.098	4.007	12.01	48.12	4.591	91.3%
48.00	1.352	5.00	12.01	60.05	4.846	92.5%
48.00	1.607	6.00	12.01	72.06	5.076	93.4%
48.00	1.865	7.00	12.01	84.07	5.450	93.9%
48.00	2.125	8.00	12.01	96.08	5.920	94.2%
48.00	2.386	9.00	12.01	108.09	6.438	94.4%
48.00	2.648	10.00	12.01	120.08	7.028	94.5%
48.00	2.915	11.01	12.01	132.23	7.690	94.5%
47.99	3.177	12.00	12.01	144.12	8.344	94.5%

Vin	Iin	Iout	Vout	Pout	Losses	Efficiency
75.0	0.069	0.000	12.02	0.00	5.175	0.0%
75.0	0.229	1.007	12.02	12.10	5.071	70.5%
75.0	0.390	1.997	12.01	23.98	5.266	82.0%
75.0	0.555	2.997	12.01	35.99	5.631	86.5%
75.0	0.723	4.005	12.01	48.10	6.125	88.7%
75.0	0.887	5.00	12.01	60.05	6.475	90.3%
75.0	1.053	6.00	12.01	72.06	6.915	91.2%
75.0	1.218	7.00	12.01	84.07	7.280	92.0%
75.0	1.384	8.00	12.01	96.08	7.720	92.6%
75.0	1.551	9.00	12.01	108.09	8.235	92.9%
75.0	1.719	10.01	12.01	120.22	8.705	93.2%
75.0	1.888	11.00	12.01	132.11	9.490	93.3%
75.0	2.057	12.01	12.03	144.50	9.775	93.7%

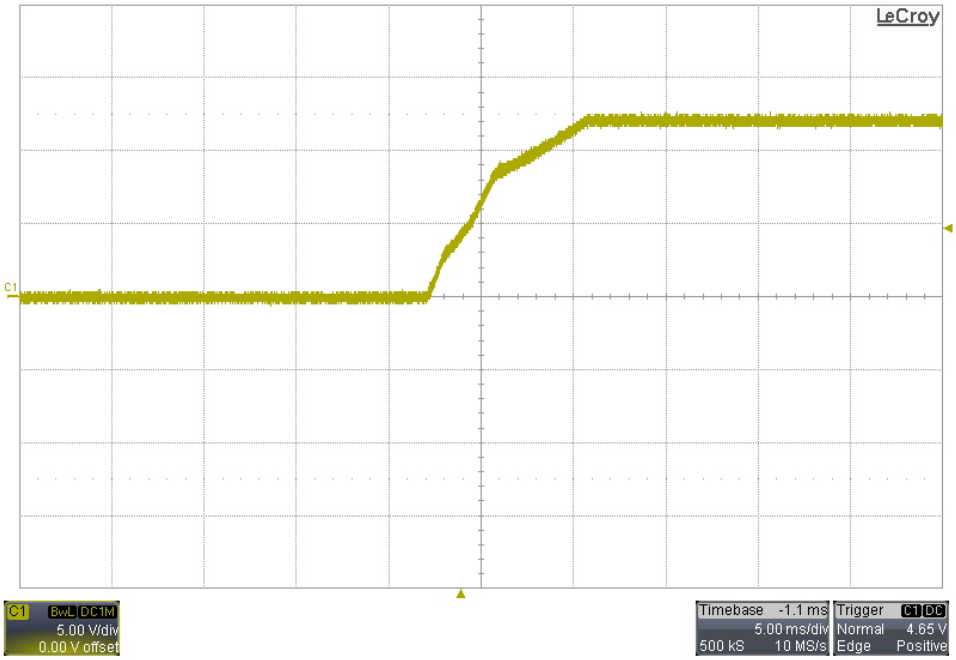
3 Thermal Images

The thermal images below show a top of the board with a 12A load and 200LFM of forced air flow. The ambient temperature was 25ºC. The input was 24V for the top image and 48V for the bottom image.

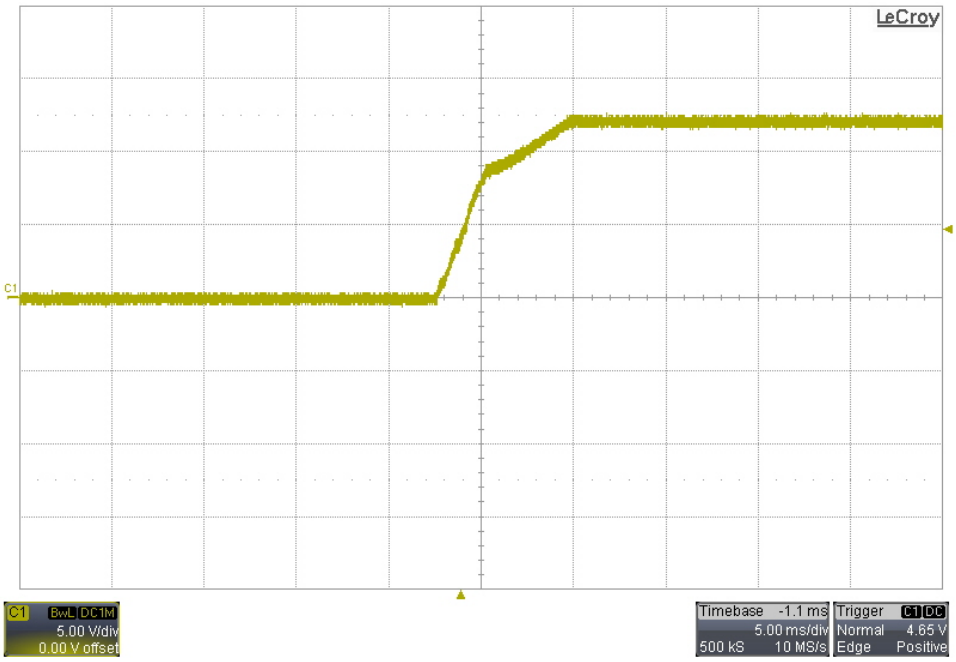


4 Startup

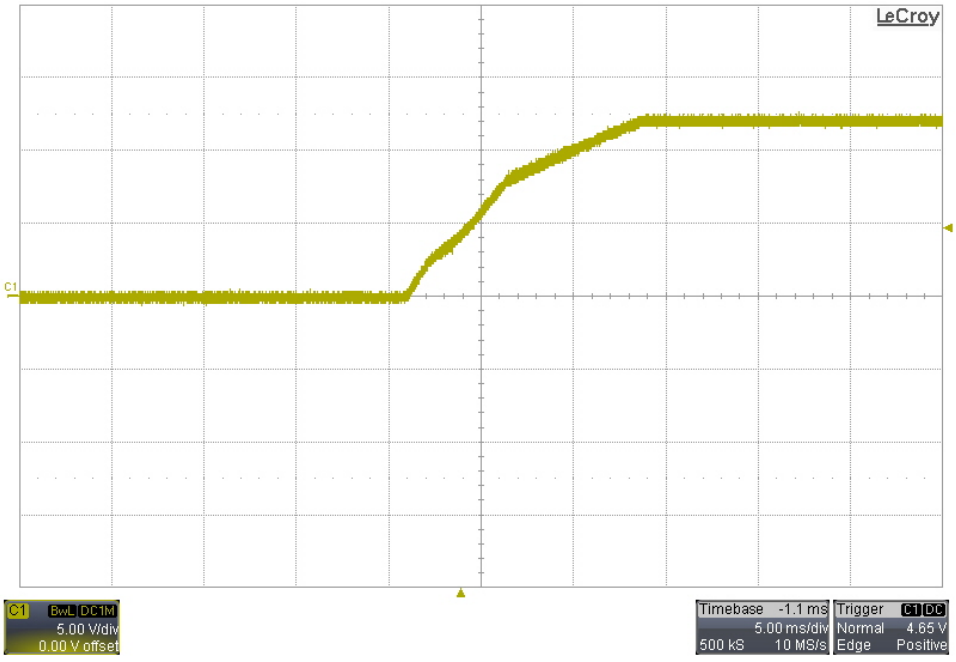
4.1 Startup – 24V Input, No Load



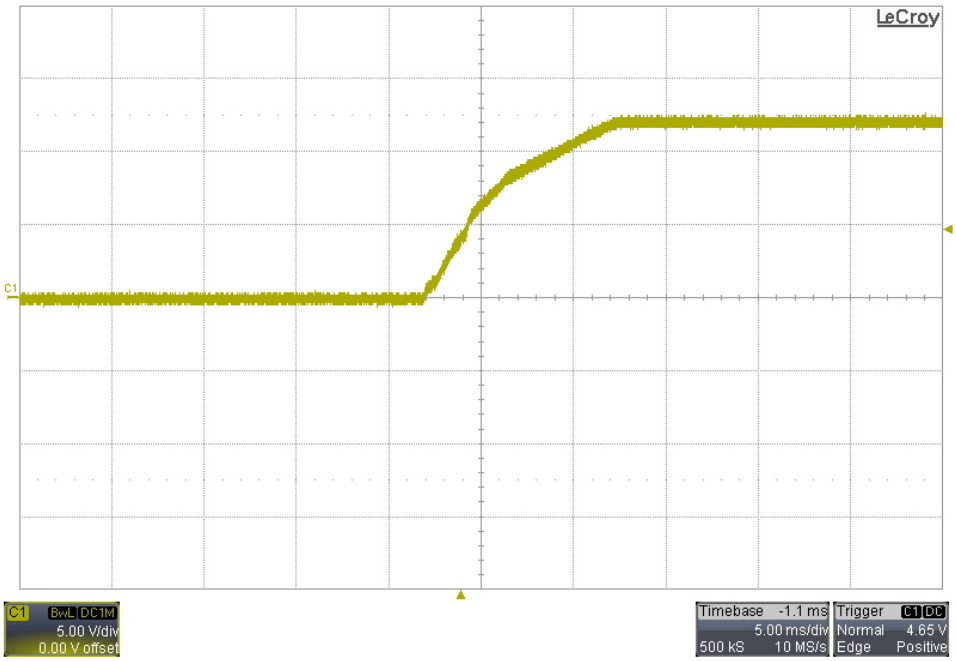
4.2 Startup – 48V Input, No Load



4.3 Startup – 24V Input, 1Ω Load

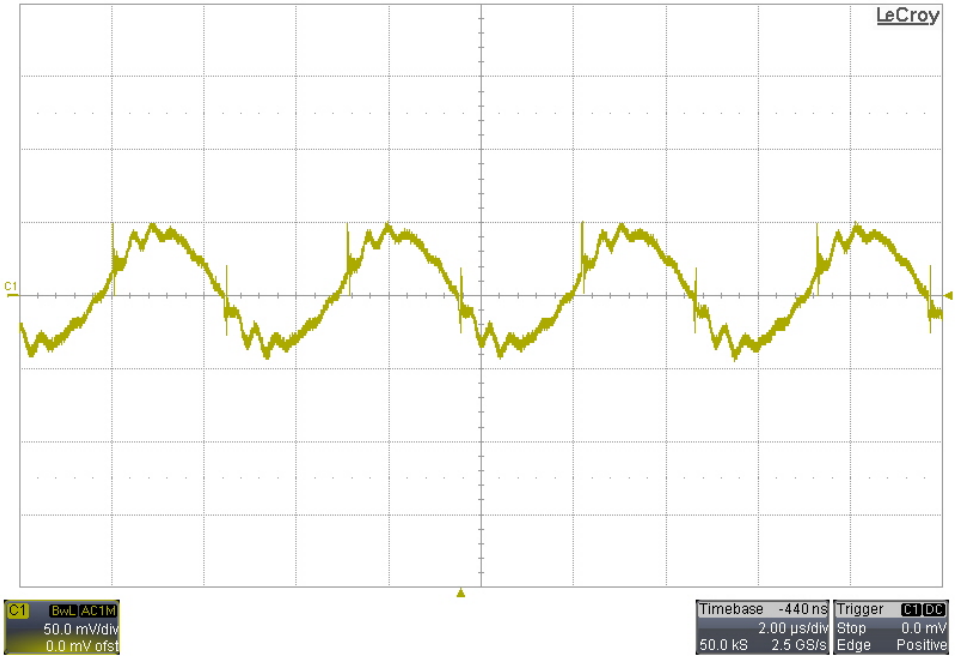


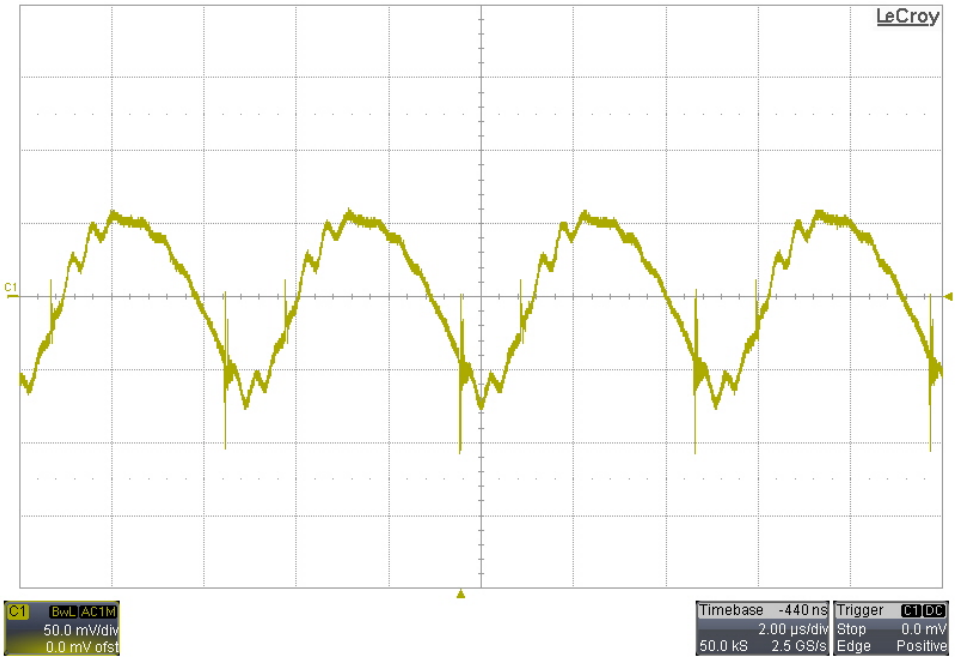
4.4 Startup – 48V Input, 1Ω Load



5 Output Ripple Voltage

The output ripple voltage during full load operation (12A load) is shown in the images below. The top image was captured with a 24V input, and the bottom image was captured with a 48V input.

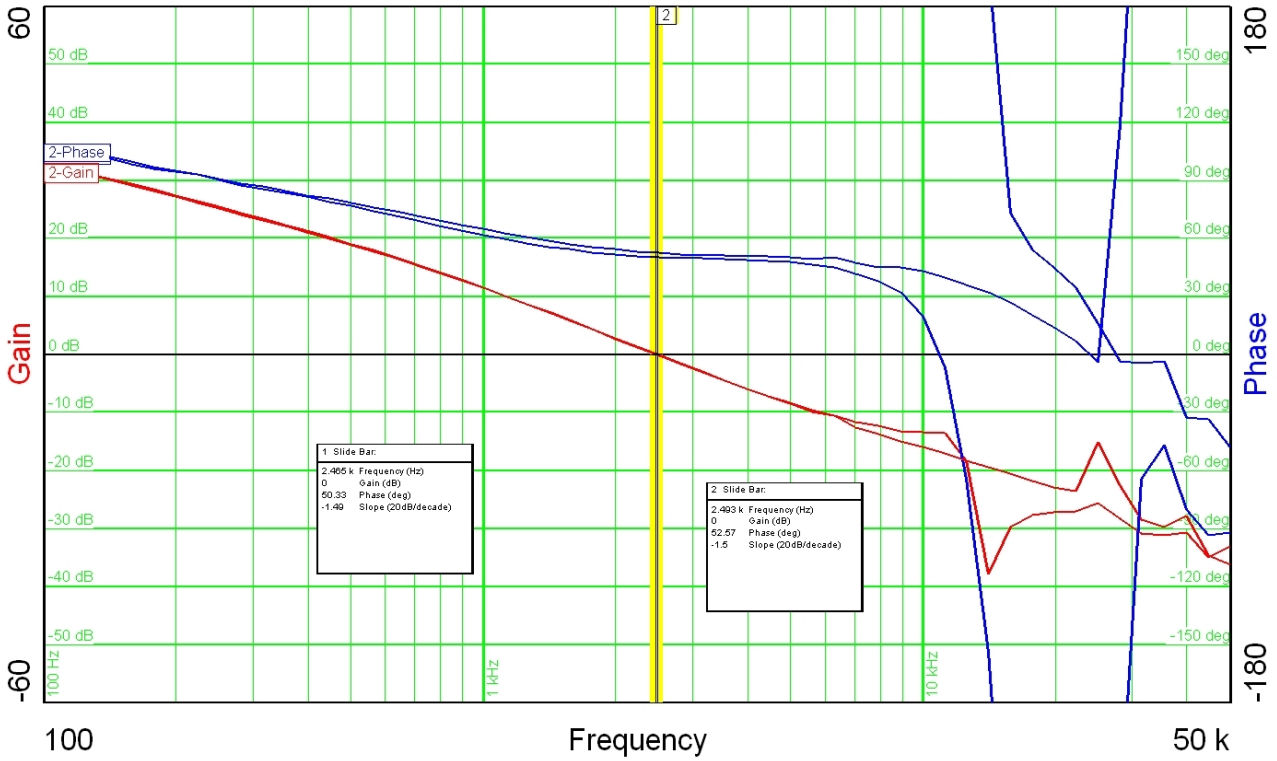




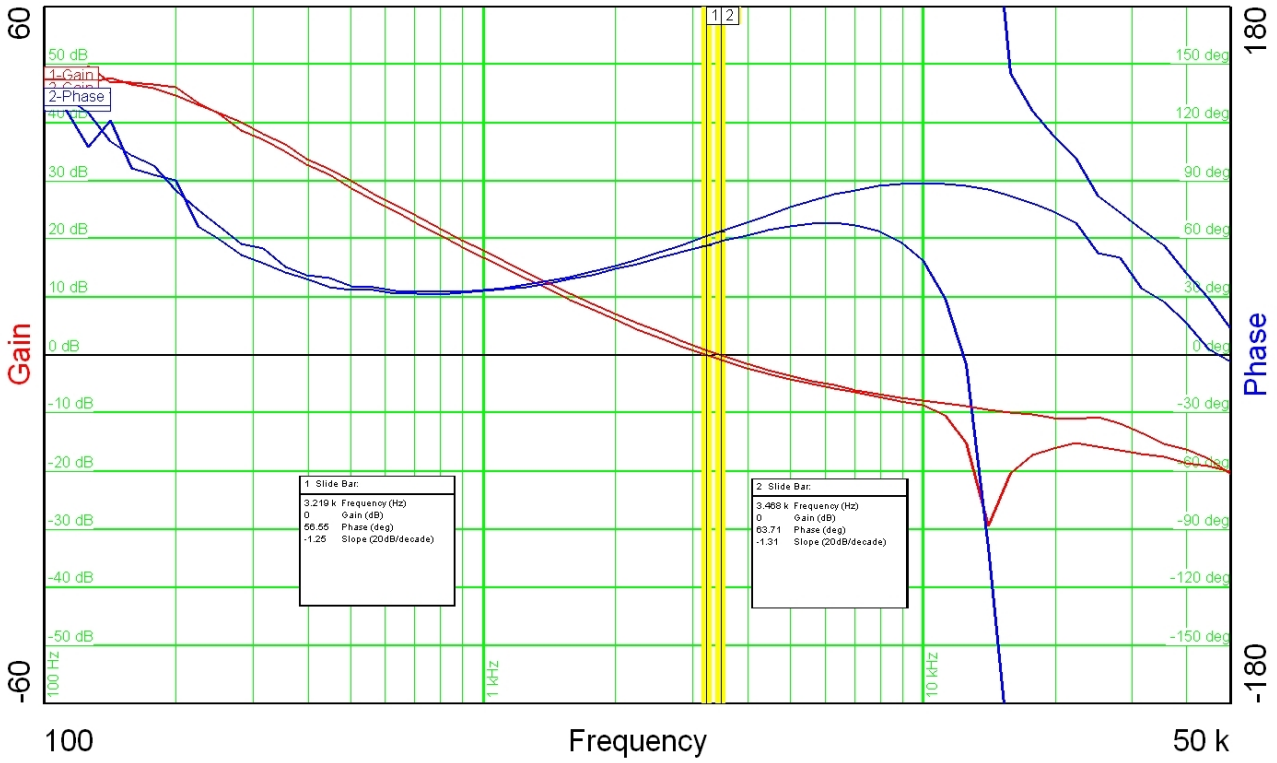
6 Loop Response

The images below show the loop response of the converter. For gain/phase plot #1, the input was 18Vdc. For gain/phase plot #2, the input was 75Vdc. The output was loaded with 12A.

6.1 Loop Broken at R15

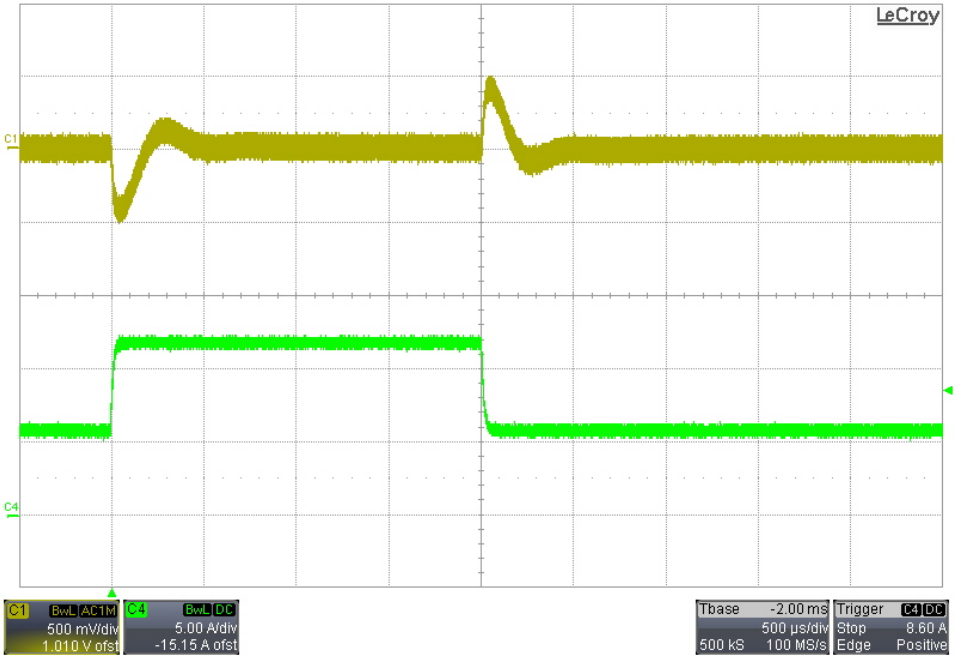


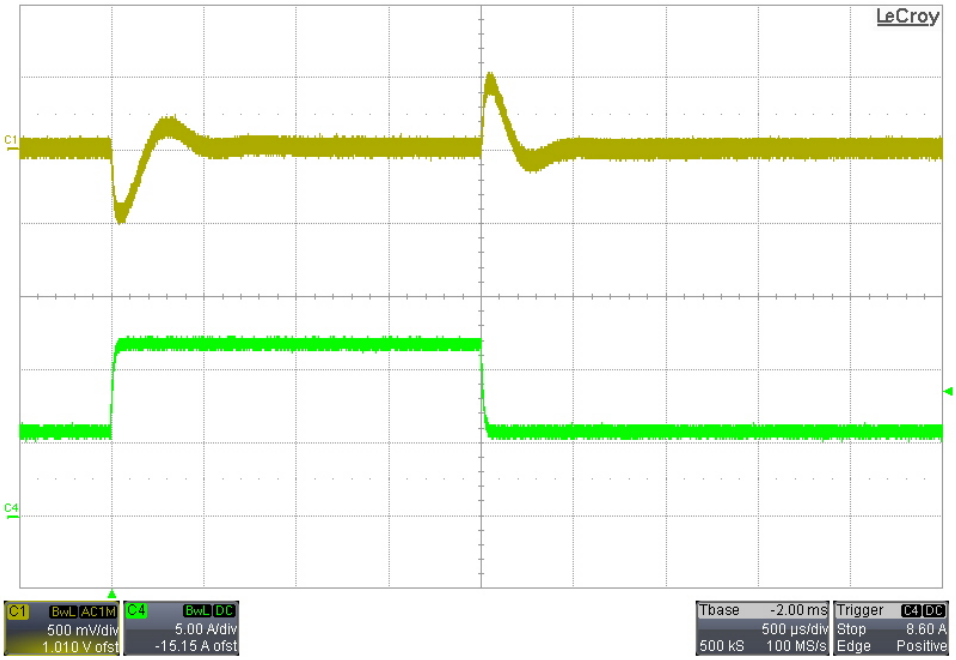
6.2 Loop Broken at R16



7 Load Transients

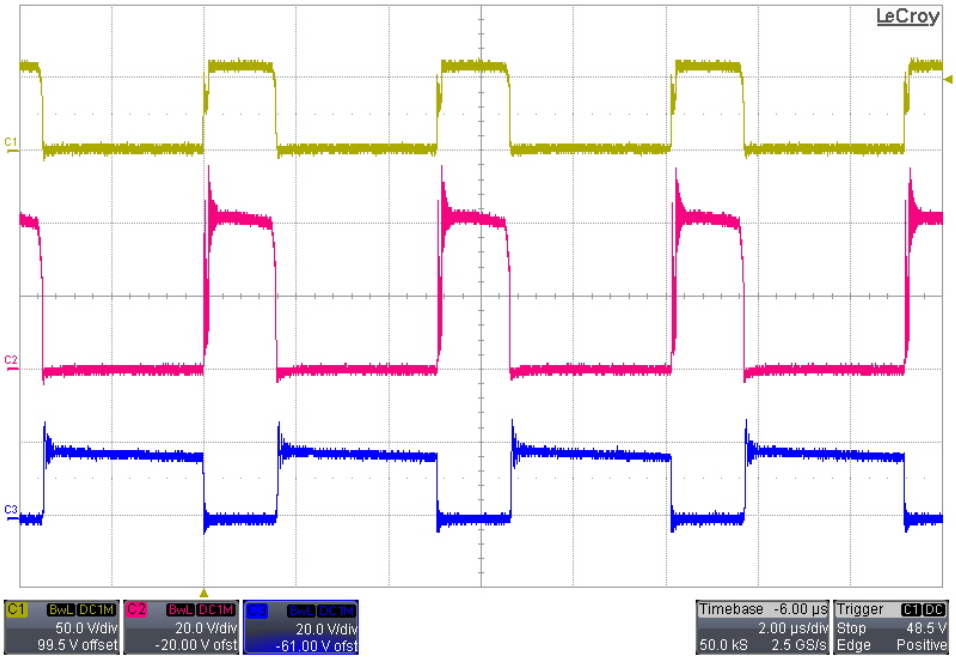
The images below show the response to a 6A to 12A load transient. For the top image, the input voltage was set to 24VDC. For the bottom image, the input voltage was set to 48VDC. Channel 1 displays the output voltage (ac coupled). Channel 4 displays the load current.

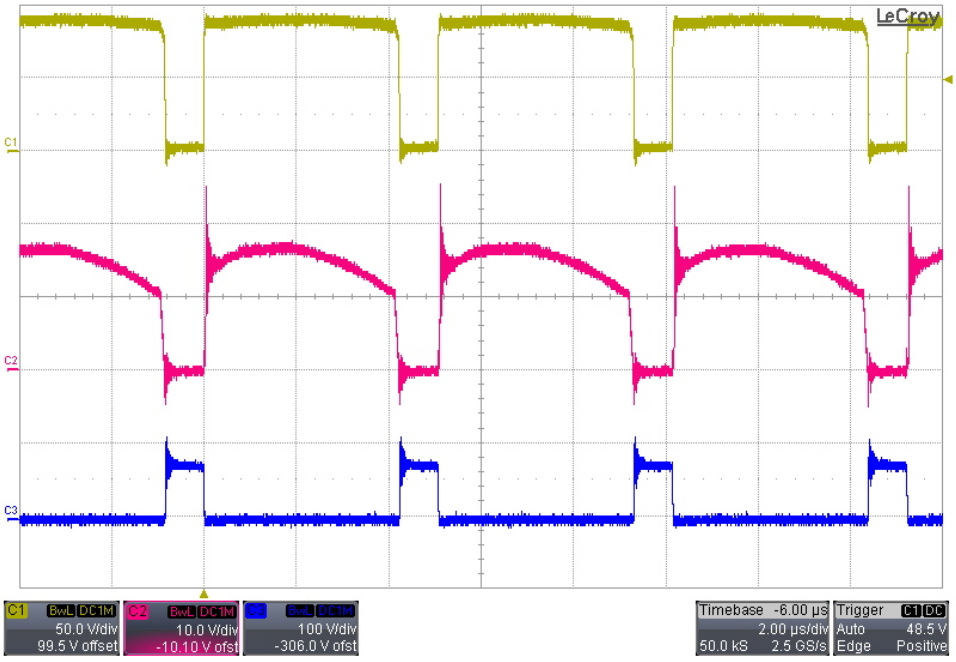




8 Switching Waveforms

The images below show the drain-to-source voltage waveforms on the switching MOSFETs. The output was loaded with 12A. For the top image, the input was set to 18V. For the bottom image, the input was set to 75V. Channel 1 shows the drain voltage on Q1 and Q2. Channel 2 shows the drain voltage on Q6 and Q7. Channel 3 shows the drain voltage on Q4 and Q5.




LeCroy
C1
C2
C3
C1 BwL DC1M
50.0 V/div
99.5 V offset
C2 BwL DC1M
10.0 V/div
-10.10 V ofst
C3 BwL DC1M
100 V/div
-306.0 V ofst
Timebase -6.00 µs
2.00 µs/div
50.0 kS 2.5 GS/s
Trigger C1 DC
Auto 48.5 V
Edge Positive

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