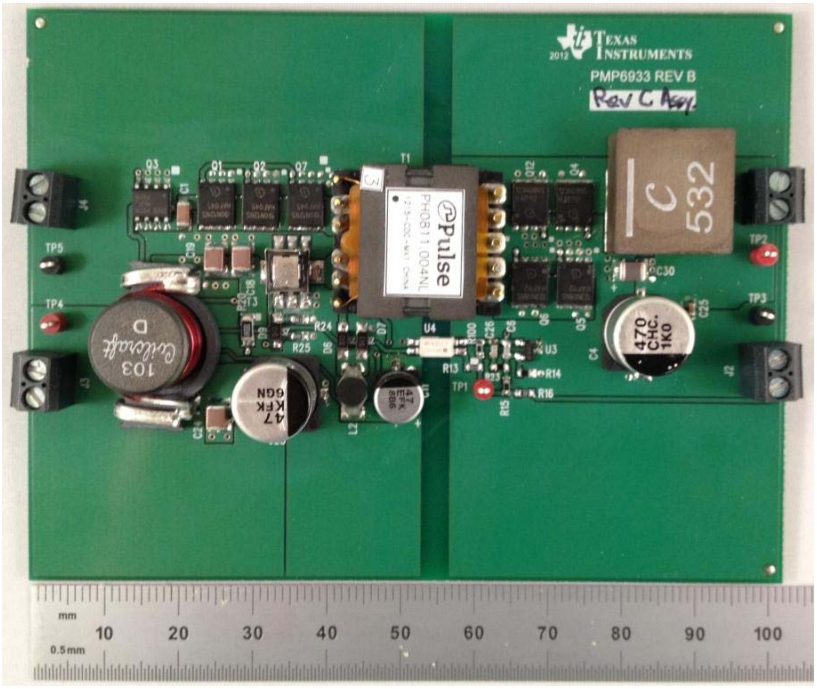
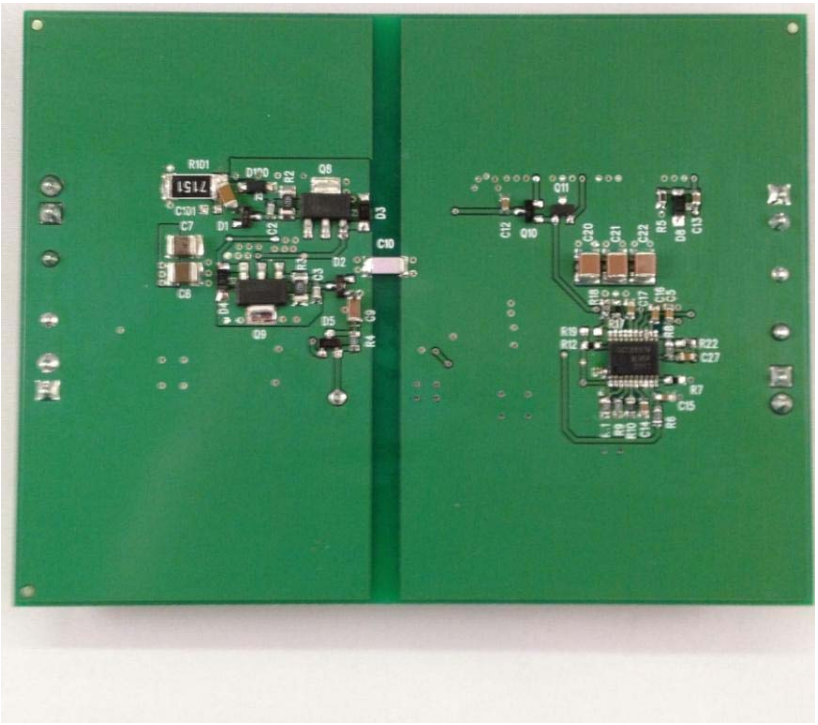
1 Photo

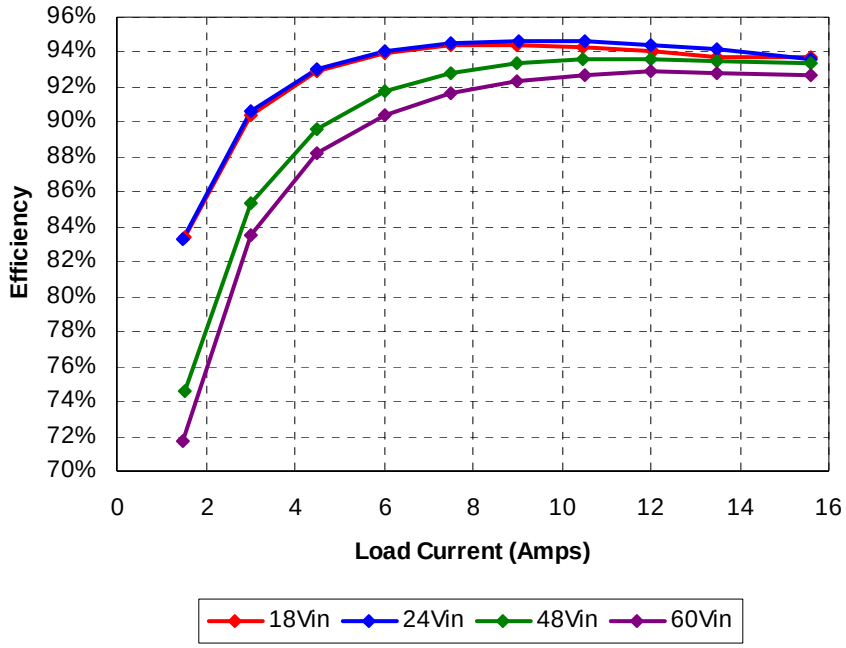
The photos below show the PMP6933 Rev C demo board. This circuit was built on a PMP6933_REVB PCB.





2 Efficiency

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

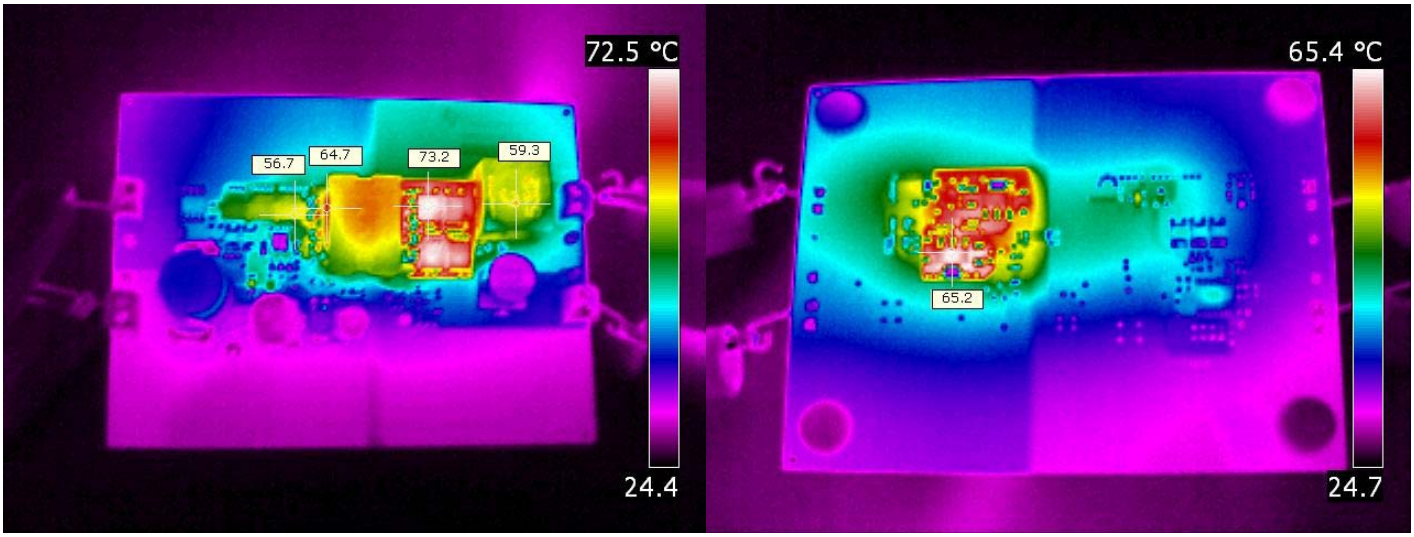


Vin	Iin	Iout	Vout	Pout	Losses	Efficiency	Vin	Iin	Iout	Vout	Pout	Losses	Efficiency
18.00	0.170	0.000	9.63	0.00	3.060	0.0%	24.00	0.123	0.000	9.63	0.00	2.952	0.0%
17.99	0.991	1.543	9.63	14.86	2.969	83.3%	24.04	0.721	1.500	9.63	14.45	2.888	83.3%
18.02	1.772	2.998	9.63	28.87	3.061	90.4%	23.99	1.325	2.992	9.63	28.81	2.974	90.6%
18.00	2.595	4.506	9.63	43.39	3.317	92.9%	24.02	1.941	4.503	9.63	43.36	3.259	93.0%
18.00	3.419	6.000	9.63	57.78	3.762	93.9%	24.00	2.562	6.003	9.63	57.81	3.679	94.0%
18.00	4.253	7.50	9.63	72.23	4.329	94.3%	24.02	3.182	7.50	9.63	72.23	4.207	94.5%
18.00	5.097	8.99	9.63	86.57	5.172	94.4%	24.01	3.828	9.03	9.63	86.96	4.951	94.6%
18.00	5.953	10.49	9.63	101.02	6.135	94.3%	24.03	4.449	10.50	9.63	101.12	5.794	94.6%
18.00	6.840	12.03	9.63	115.85	7.271	94.1%	24.00	5.105	12.01	9.63	115.66	6.864	94.4%
17.99	7.700	13.48	9.63	129.81	8.711	93.7%	24.00	5.751	13.49	9.63	129.91	8.115	94.1%
17.99	8.91	15.59	9.63	150.13	10.159	93.7%	24.02	6.68	15.59	9.63	150.13	10.322	93.6%
Vin	Iin	Iout	Vout	Pout	Losses	Efficiency	Vin	Iin	Iout	Vout	Pout	Losses	Efficiency
47.9	0.107	0.000	9.64	0.00	5.125	0.0%	60.0	0.097	0.000	9.64	0.00	5.820	0.0%
48.0	0.406	1.507	9.64	14.53	4.961	74.5%	60.0	0.336	1.500	9.64	14.46	5.700	71.7%
48.0	0.703	2.989	9.64	28.81	4.930	85.4%	60.0	0.575	2.990	9.64	28.82	5.676	83.5%
48.0	1.009	4.501	9.64	43.39	5.042	89.6%	60.0	0.820	4.502	9.64	43.40	5.801	88.2%
48.0	1.315	6.006	9.64	57.90	5.222	91.7%	60.0	1.065	6.000	9.63	57.78	6.120	90.4%
48.0	1.622	7.49	9.64	72.20	5.652	92.7%	60.0	1.312	7.49	9.63	72.13	6.591	91.6%
48.0	1.936	9.00	9.64	86.76	6.168	93.4%	60.0	1.562	8.99	9.63	86.57	7.146	92.4%
48.0	2.252	10.49	9.64	101.12	6.972	93.5%	60.0	1.818	10.50	9.63	101.12	7.965	92.7%
48.0	2.577	12.01	9.64	115.78	7.920	93.6%	60.0	2.074	12.00	9.63	115.56	8.880	92.9%
48.0	2.895	13.49	9.63	129.91	9.051	93.5%	60.0	2.332	13.49	9.63	129.91	10.011	92.8%
48.0	3.352	15.60	9.63	150.23	10.668	93.4%	60.0	2.703	15.61	9.63	150.32	11.856	92.7%

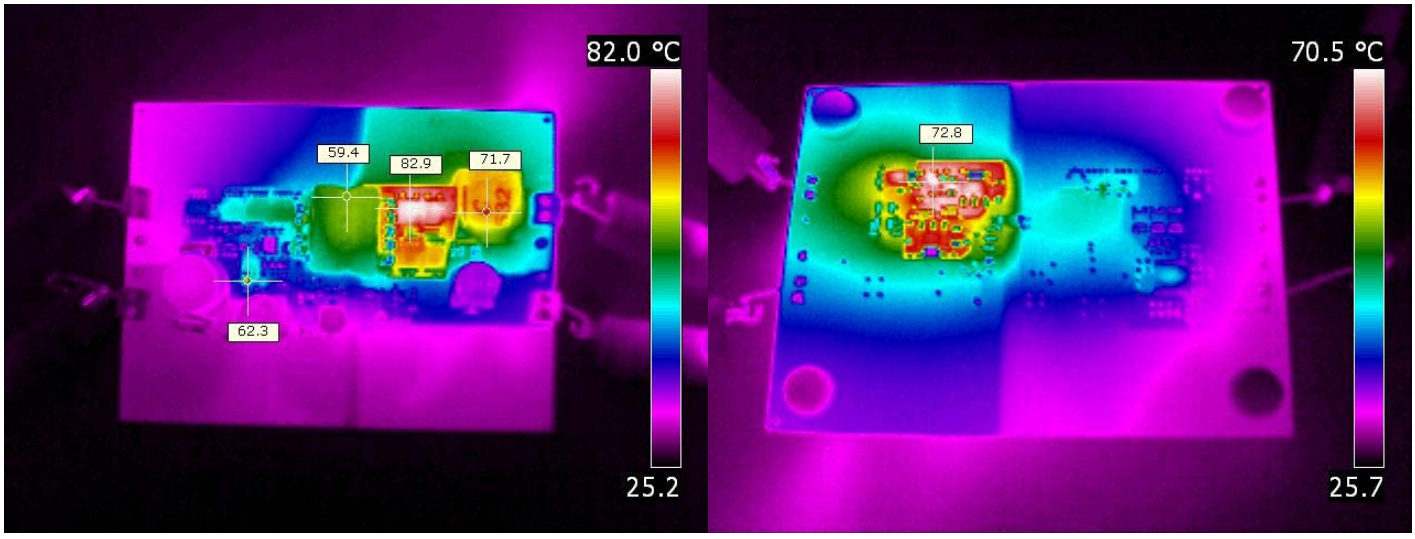
3 Thermal Images

The thermal images below show a top view (left) and bottom view (right) of the board with a 15.6A load and 200LFM of forced air flow. The ambient temperature was 25ºC.

3.1 24V Input

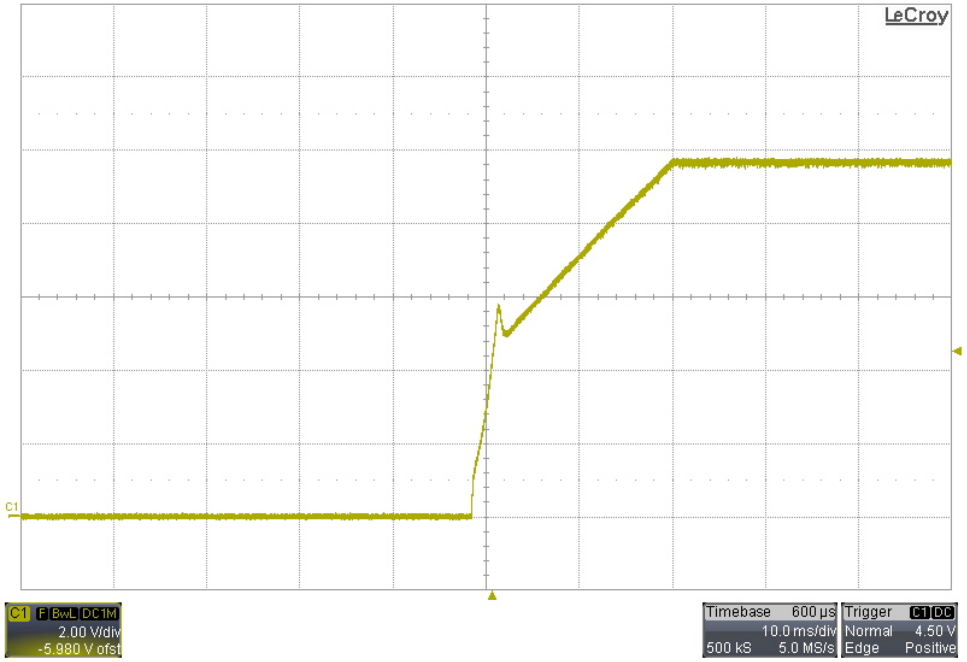


3.2 48V Input

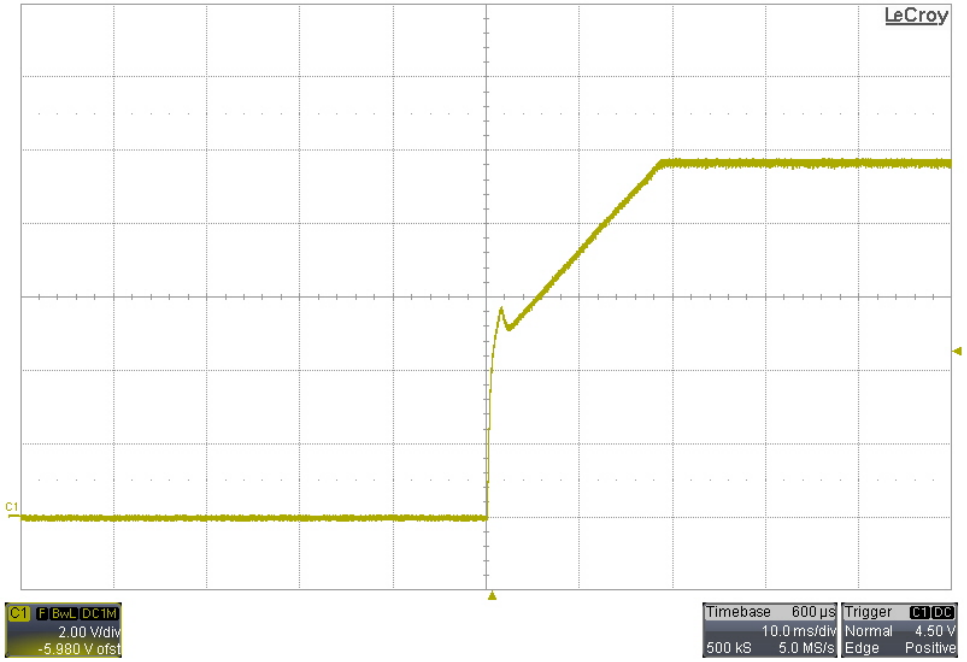


4 Startup

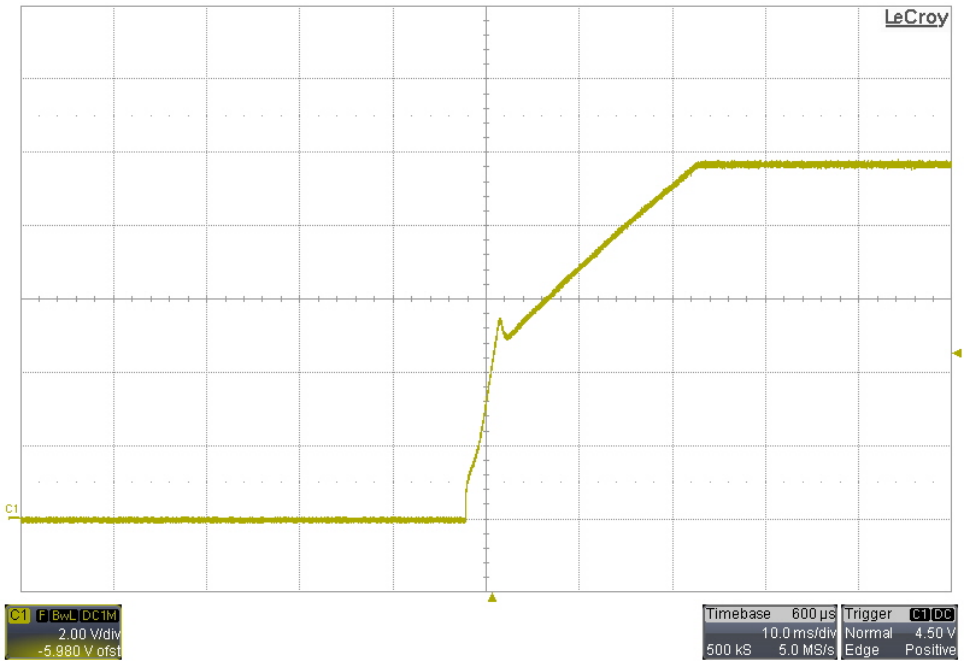
4.1 18V Input – No Load



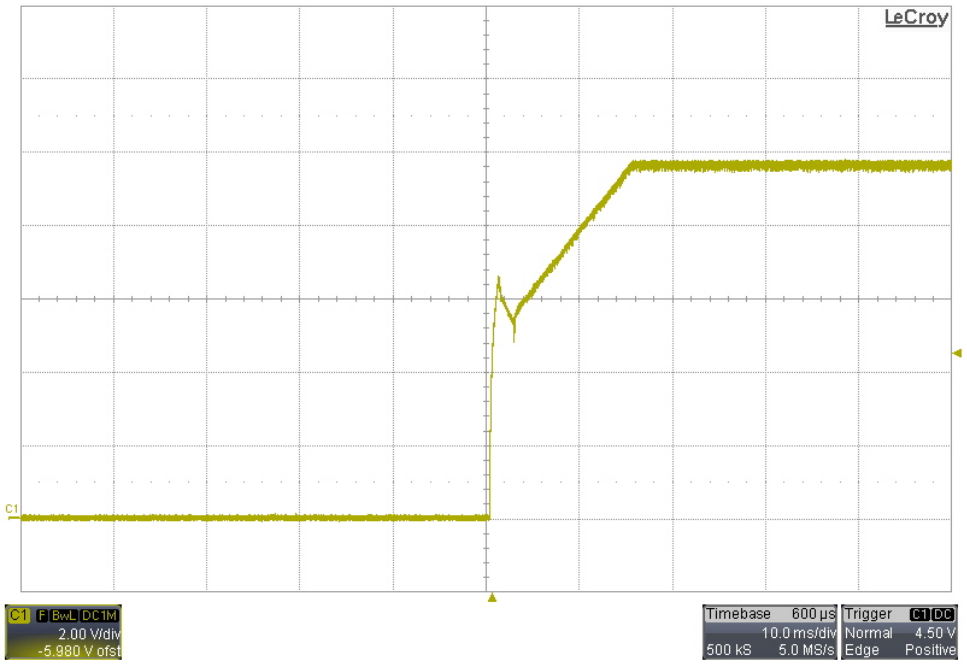
4.2 60V Input – No Load



4.3 18V Input – 1Ω Load

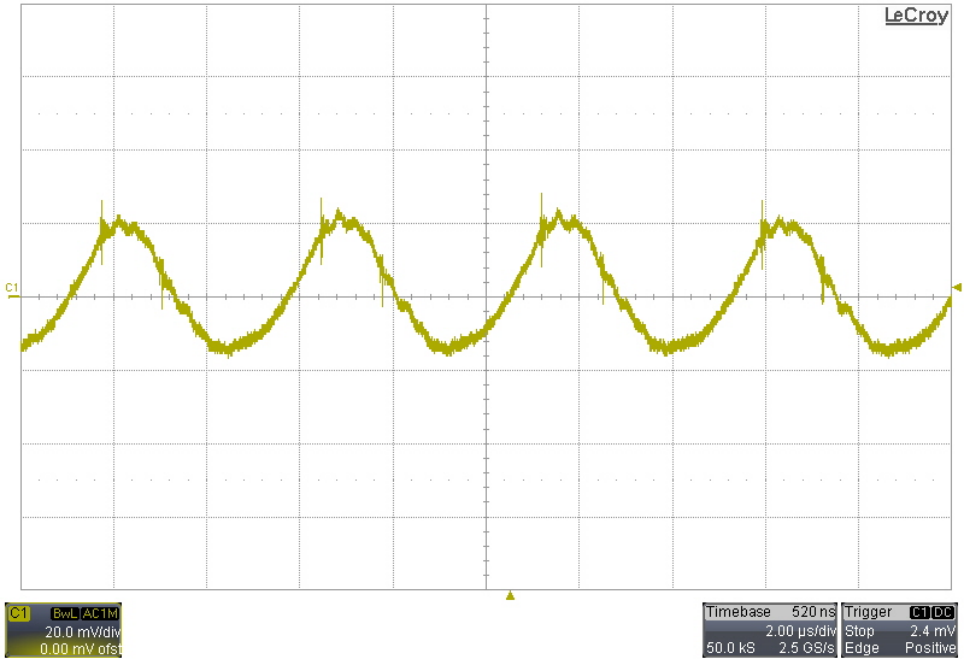


4.4 60V Input - 1Ω Load

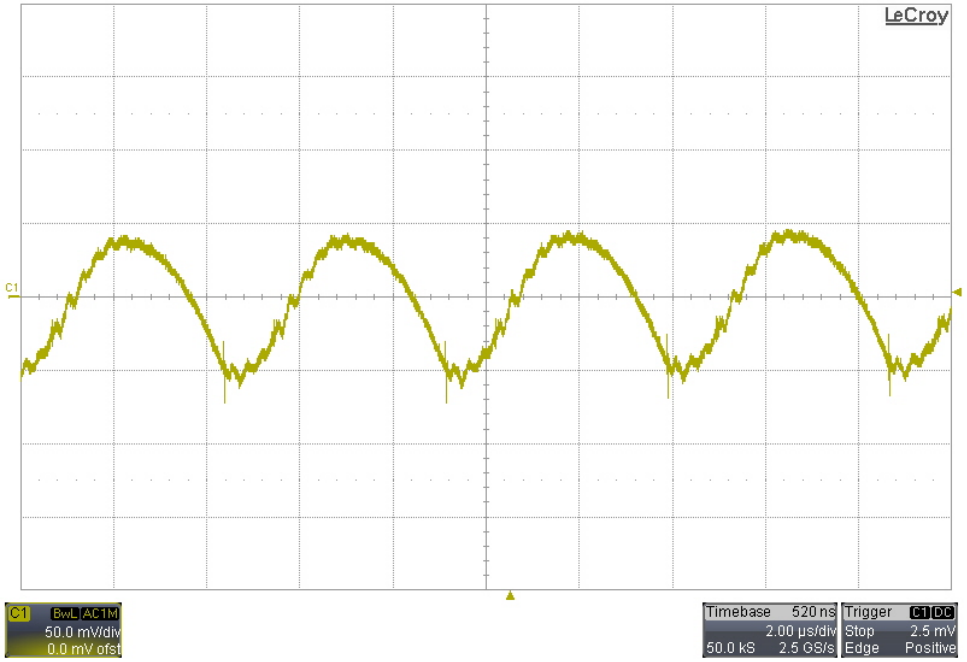


5 Output Ripple Voltage

5.1 18V Input – 15.6A Load



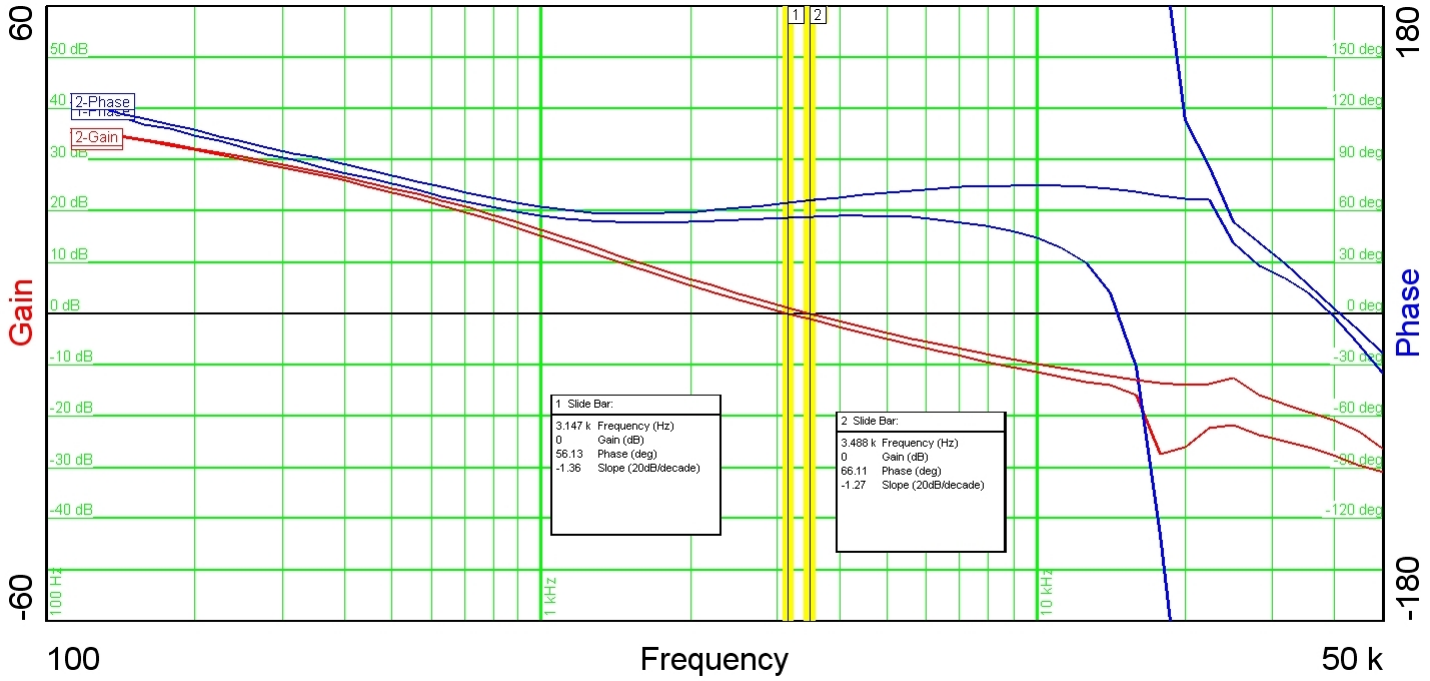
5.2 60V Input – 15.6A Load



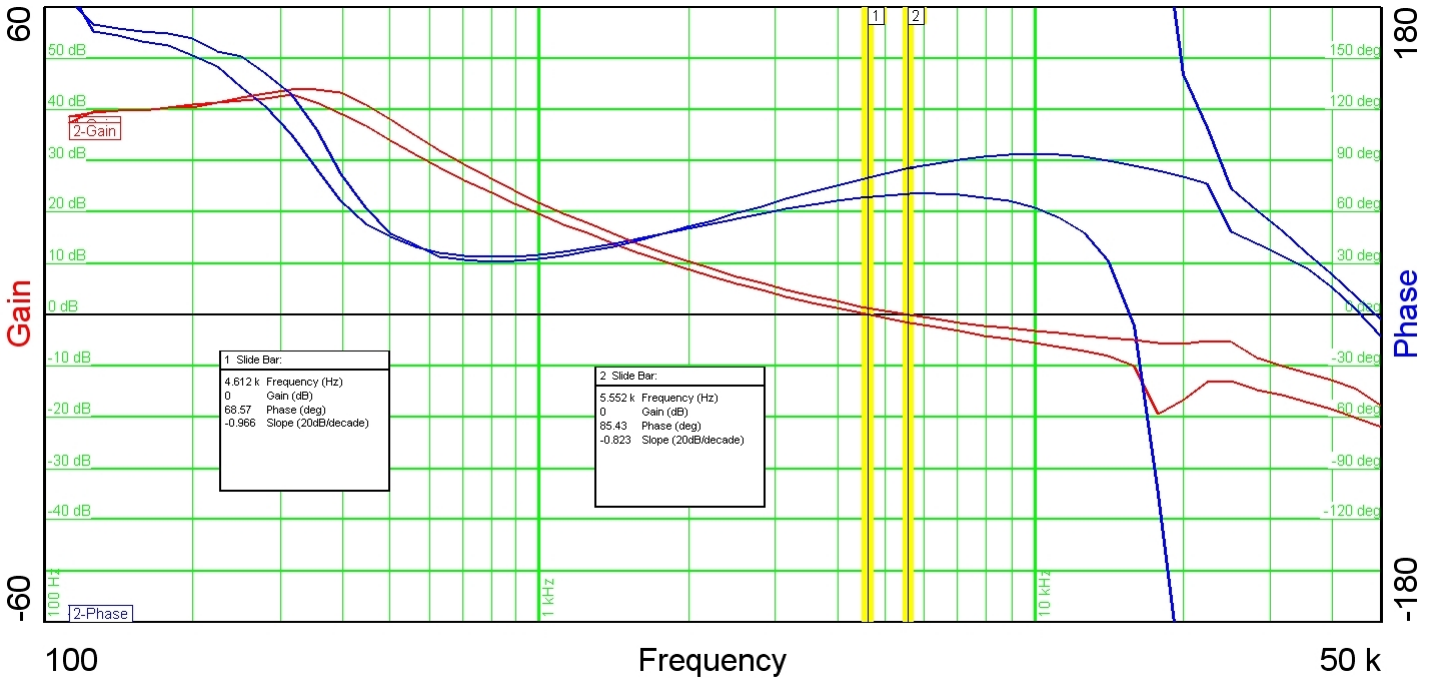
6 Loop Response

The images below show the loop response of the converter. For gain/phase plot #1, the input was 18V. For gain/phase plot #2, the input was 60Vdc. The output was loaded with 15.6A.

6.1 Loop Broken at R15



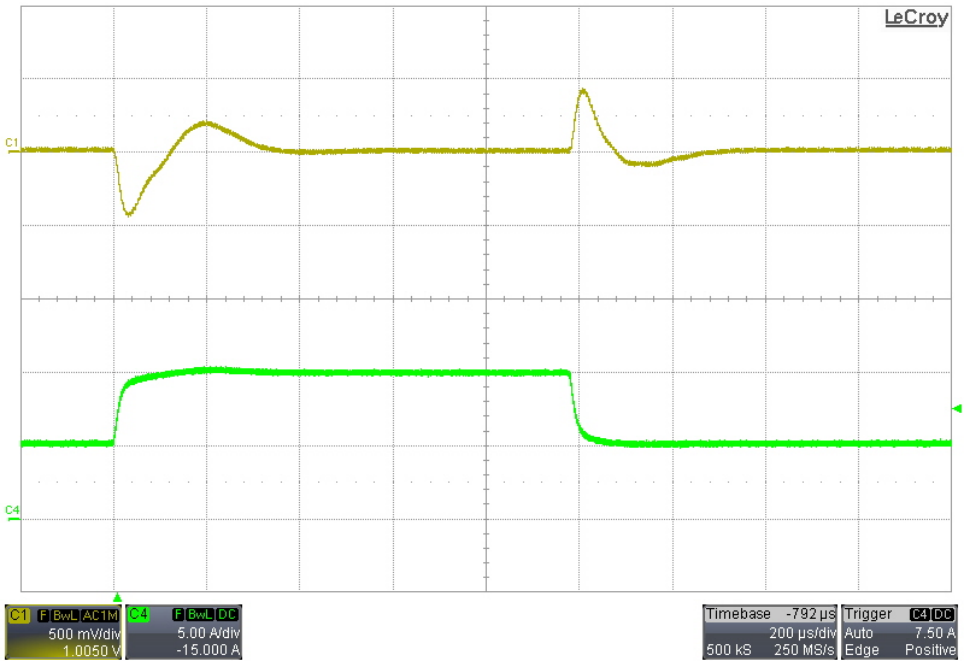
6.2 Loop Broken at R16



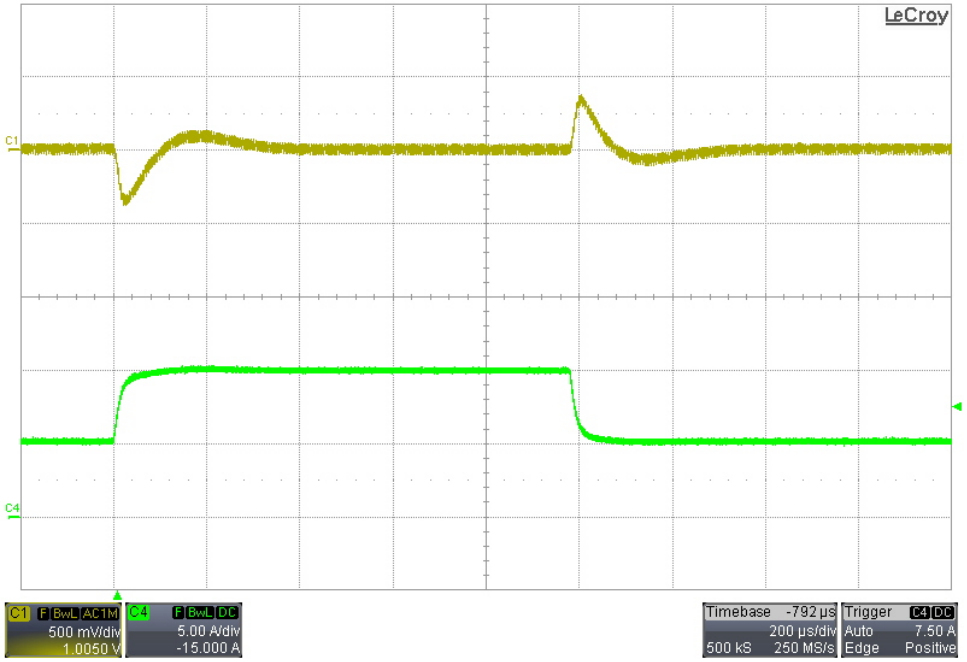
7 Load Transients

The images below show the response to a 5A to 10A load transient. Channel 1 shows the output voltaged, ac coupled. Channel 4 shows the output current.

7.1 18V Input



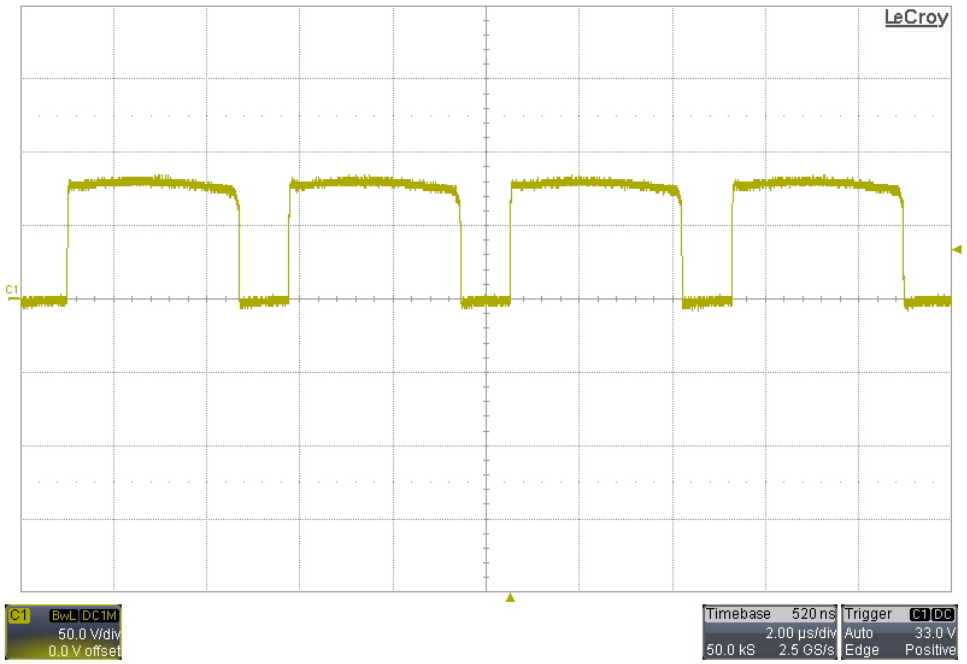
7.2 60V Input



8 Switching Waveforms

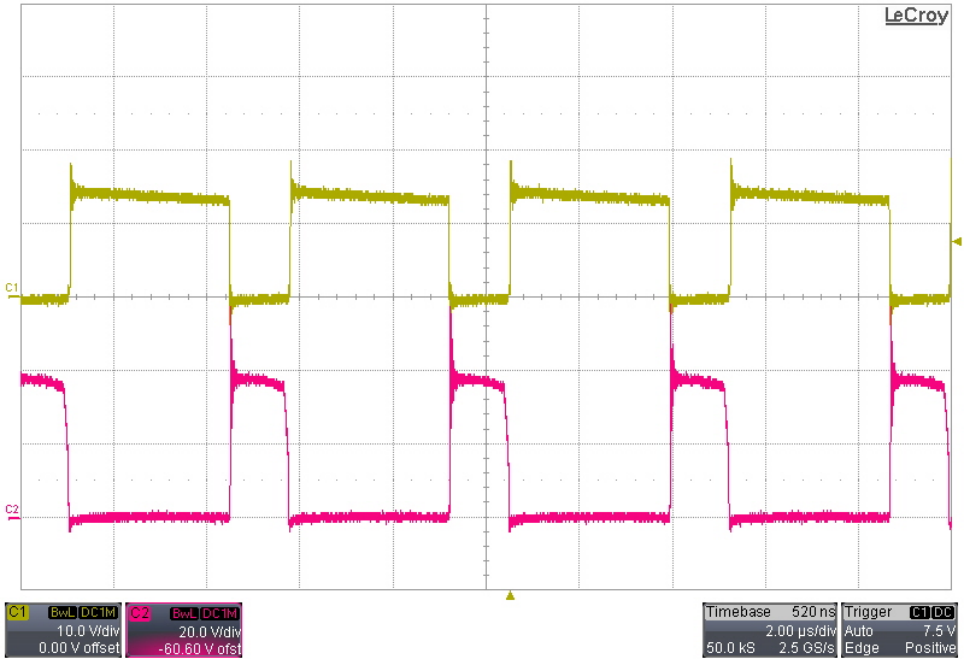
8.1 Primary FETs

The image below shows the drain-to-source voltage on the primary MOSFETs Q1, Q2, and Q7. The input was 60V. The output was loaded with 15.6A.



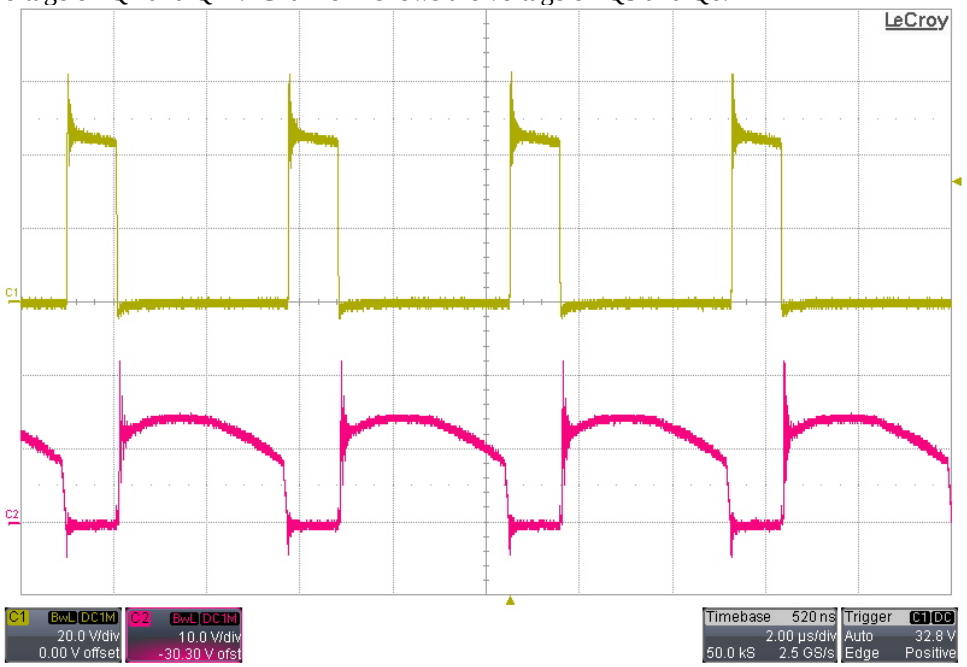
8.2 Synchronous Rectifiers – 18V Input

The image below shows the drain-to-source voltages on the synchronous rectifier MOSFETs. The output was loaded with 15.6A. Channel 1 shows the voltage on Q4 and Q12. Channel 2 shows the voltage on Q5 and Q6.



8.3 Synchronous Rectifiers – 60V Input

The image below shows the drain-to-source voltages on the synchronous rectifier MOSFETs. The output was loaded with 15.6A. Channel 1 shows the voltage on Q4 and Q12. Channel 2 shows the voltage on Q5 and Q6.



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