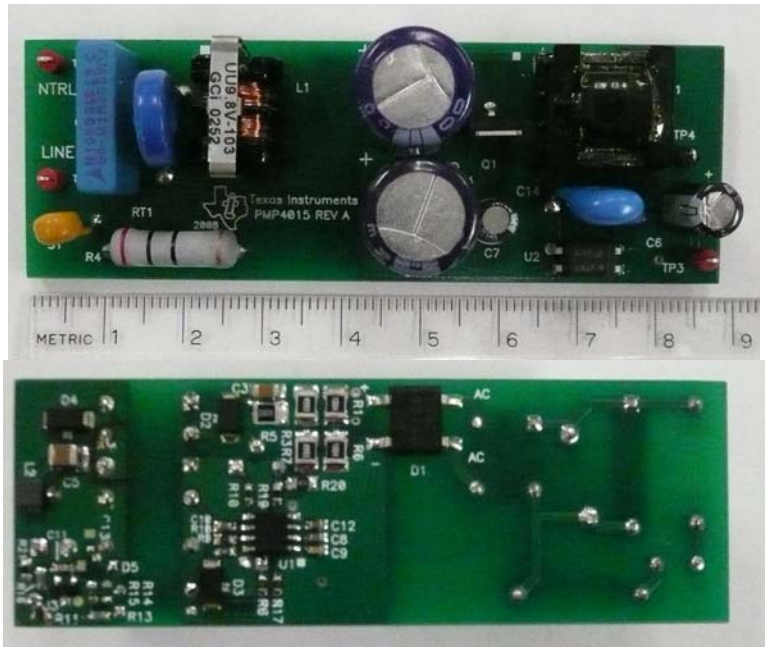
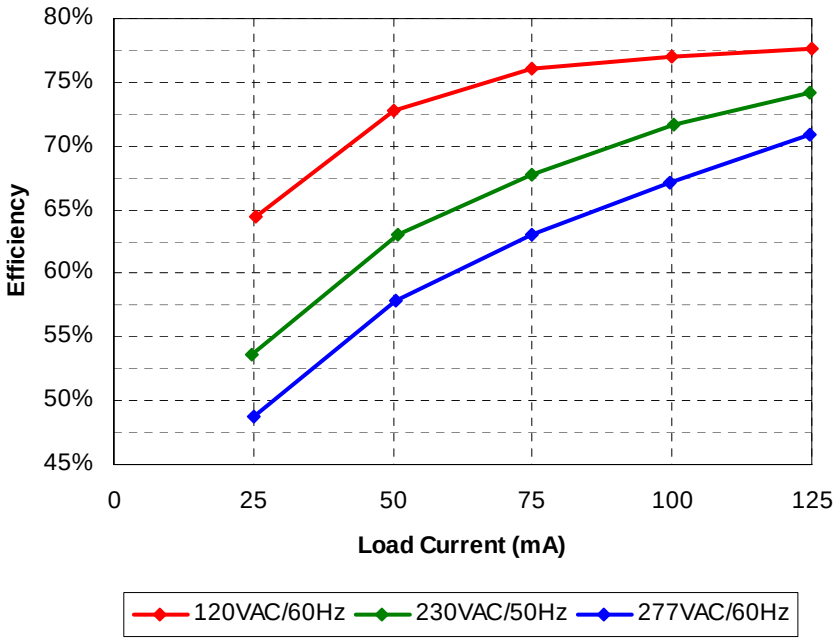
1 Photo

The photographs below show the top and bottom views of the PMP5394 Rev A demo board. The circuit is built on a PMP4015 Rev A PWB.



2 Efficiency

The efficiency across the entire load range is shown in the tables and graph below.



120VAC/60Hz

Iout (mA)	Vout	Vin	Iin (mA)	Pin	PF	Pout	Losses	Efficiency
25.4	24.10	119.5	17.3	0.95	0.46	0.61	0.34	64.4%
50.1	24.10	119.5	26.8	1.66	0.52	1.21	0.45	72.7%
74.8	24.10	119.5	36.1	2.37	0.55	1.80	0.57	76.1%
100.1	24.10	119.5	45.5	3.13	0.58	2.41	0.72	77.1%
125.0	24.11	119.4	54.4	3.88	0.60	3.01	0.87	77.7%

230VAC/50Hz

Iout (mA)	Vout	Vin	Iin (mA)	Pin	PF	Pout	Losses	Efficiency
24.7	24.11	231.0	13.6	1.11	0.35	0.60	0.51	53.7%
50.7	24.11	231.0	20.3	1.94	0.41	1.22	0.72	63.0%
74.7	24.11	231.0	26.0	2.66	0.44	1.80	0.86	67.7%
100.4	24.11	231.0	31.4	3.38	0.47	2.42	0.96	71.6%
124.6	24.11	231.0	36.3	4.05	0.48	3.00	1.05	74.2%

277VAC/60Hz

Iout (mA)	Vout	Vin	Iin (mA)	Pin	PF	Pout	Losses	Efficiency
24.9	24.11	278.4	15.1	1.23	0.29	0.60	0.63	48.8%
50.4	24.11	278.3	20.7	2.10	0.37	1.22	0.88	57.9%
75.0	24.11	278.3	25.7	2.87	0.40	1.81	1.06	63.0%
99.6	24.11	278.3	30.3	3.58	0.42	2.40	1.18	67.1%
124.6	24.11	278.3	34.6	4.24	0.44	3.00	1.24	70.9%

3 Light Load Power Consumption

The tables below show the input power and efficiency during light load operation. U1, D3, D4, D6 and R2 were depopulated during this test.

120VAC/60Hz

Iout (mA)	Vout	Vin	Iin (mA)	Pin	PF	Pout	Losses	Efficiency
0.0	24.11	120.6	5.8	0.17	0.25	0.00	0.17	0.0%
4.7	24.11	120.6	7.9	0.32	0.34	0.11	0.21	35.4%
9.7	24.11	120.6	10.2	0.48	0.39	0.23	0.25	48.7%
14.6	24.11	120.6	12.4	0.62	0.42	0.35	0.27	56.8%
20.0	24.11	120.6	14.9	0.79	0.44	0.48	0.31	61.0%

230VAC/50Hz

Iout (mA)	Vout	Vin	Iin (mA)	Pin	PF	Pout	Losses	Efficiency
0.0	24.11	230.9	8.0	0.33	0.18	0.00	0.33	0.0%
4.5	24.11	230.9	8.9	0.47	0.23	0.11	0.36	23.1%
9.7	24.11	230.9	10.1	0.63	0.27	0.23	0.40	37.1%
15.0	24.11	230.9	11.4	0.80	0.30	0.36	0.44	45.2%
20.0	24.11	230.9	12.6	0.95	0.33	0.48	0.47	50.8%

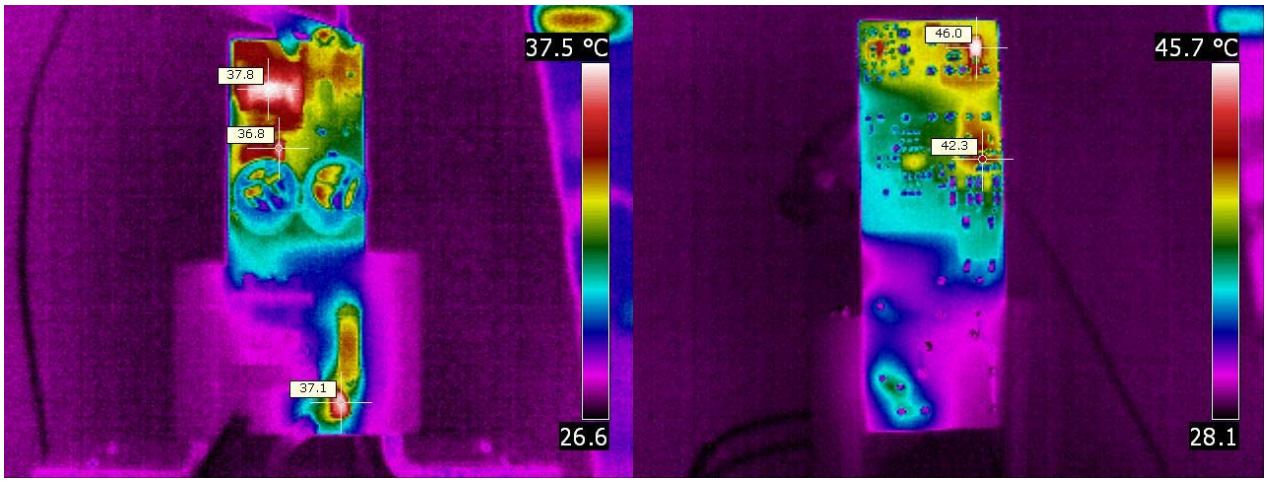
277VAC/60Hz

Iout (mA)	Vout	Vin	Iin (mA)	Pin	PF	Pout	Losses	Efficiency
0.0	24.11	278.4	11.0	0.43	0.14	0.00	0.43	0.0%
4.9	24.11	278.4	11.7	0.58	0.18	0.12	0.46	20.4%
10.1	24.11	278.3	12.5	0.75	0.22	0.24	0.51	32.5%
15.1	24.11	278.3	13.4	0.91	0.24	0.36	0.55	40.0%
20.0	24.11	278.3	14.3	1.07	0.27	0.48	0.59	45.1%

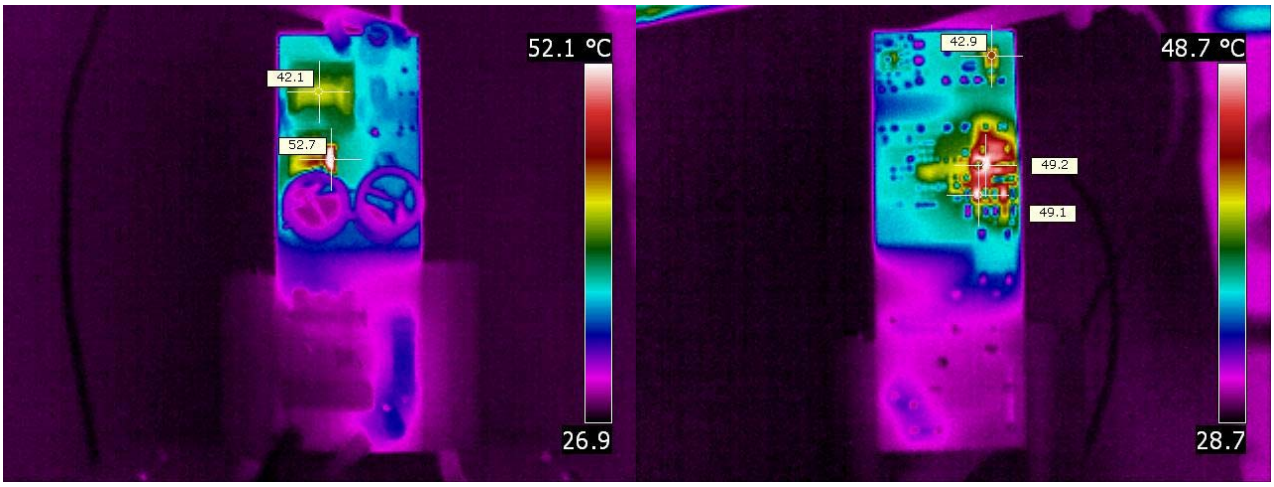
4 Thermal Images

The thermal images below show a top view (left) and bottom view (right) of the board. The ambient temperature was 26ºC with no forced air flow. The output was loaded with 125mA.

4.1 120VAC, 60Hz Input

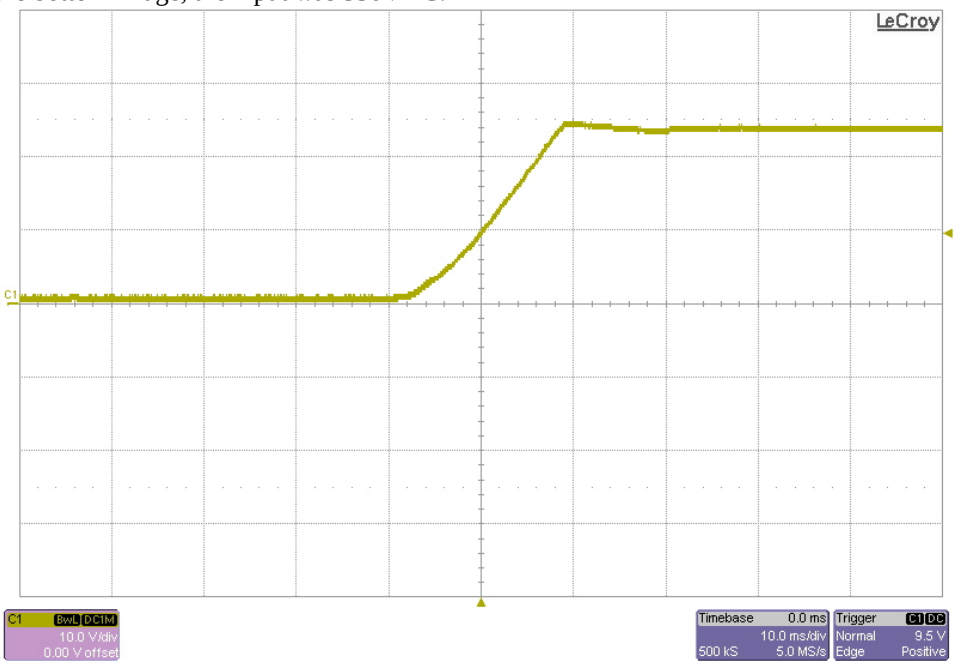


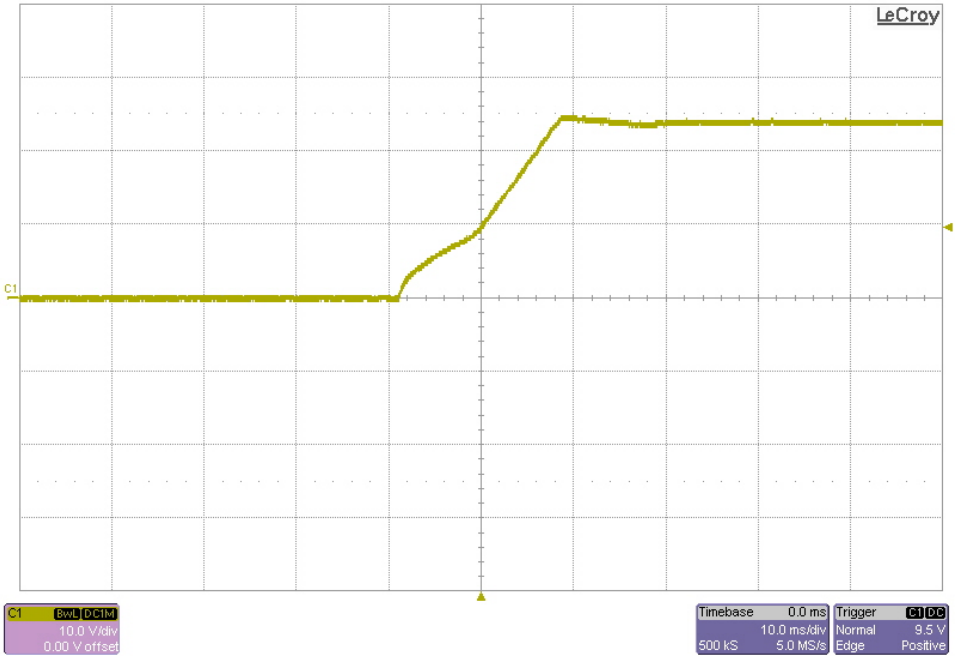
4.2 277VAC, 60Hz Input



5 Startup – No Load

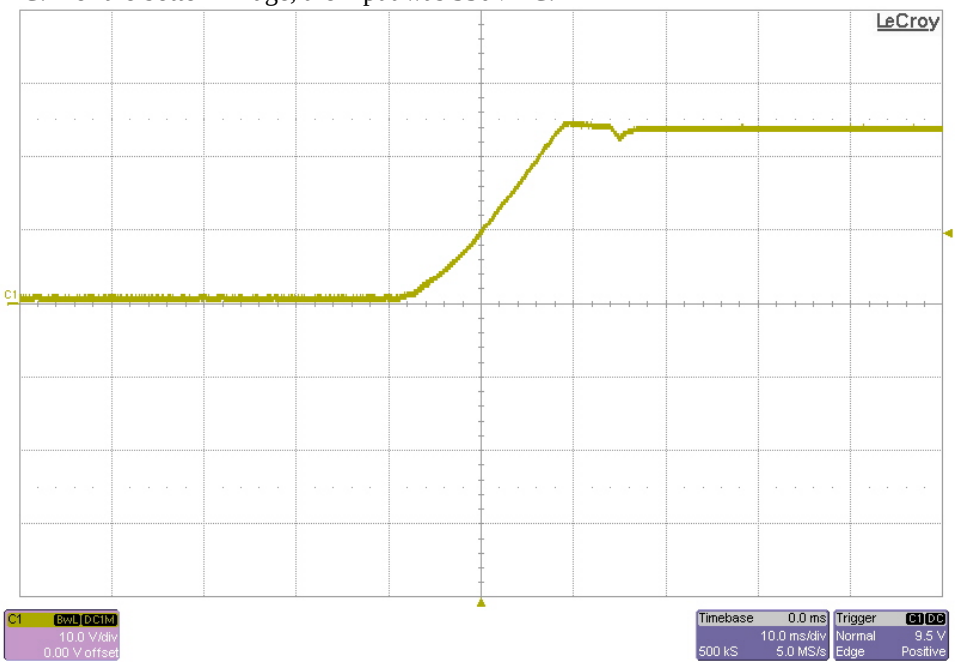
The output voltage at startup is shown in the images below. The output was unloaded. For the top image, the input was 100VDC. For the bottom image, the input was 550VDC.

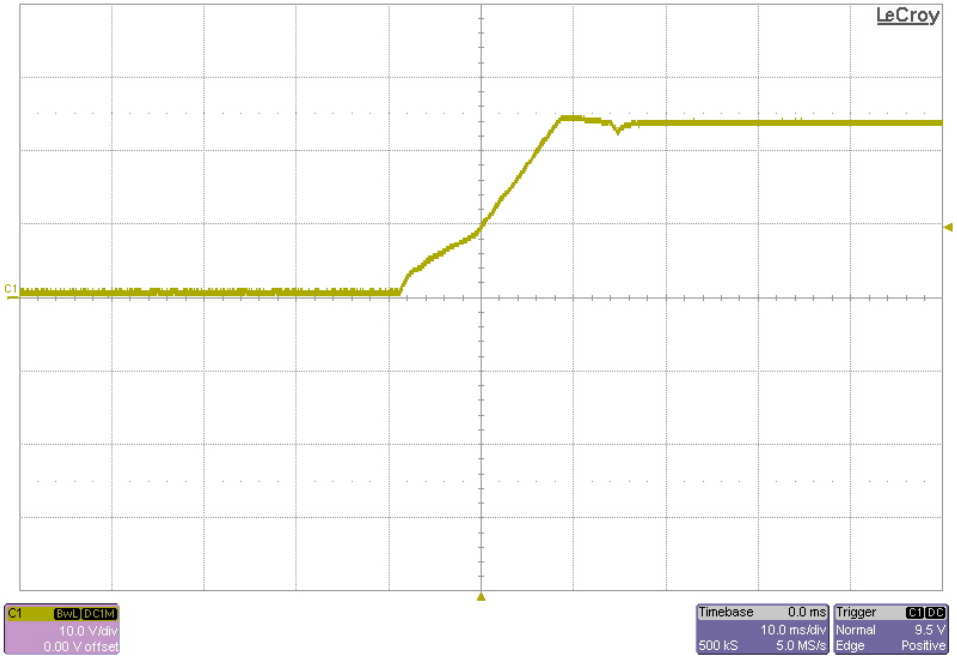




6 Startup – Full Load

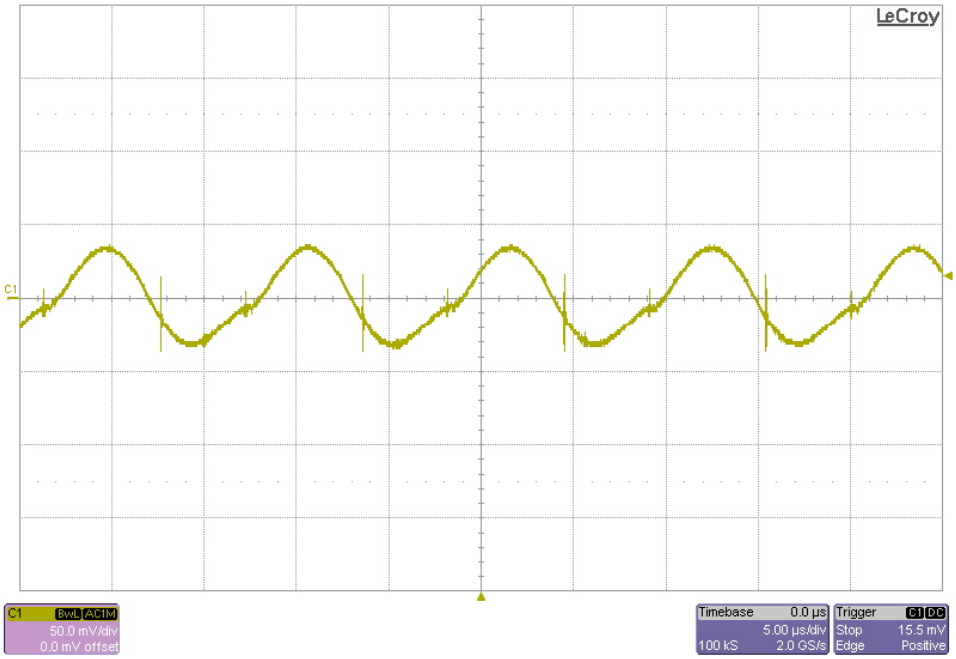
The output voltage at startup is shown in the images below. The output was loaded with 125mA. For the top image, the input was 100VDC. For the bottom image, the input was 550VDC.

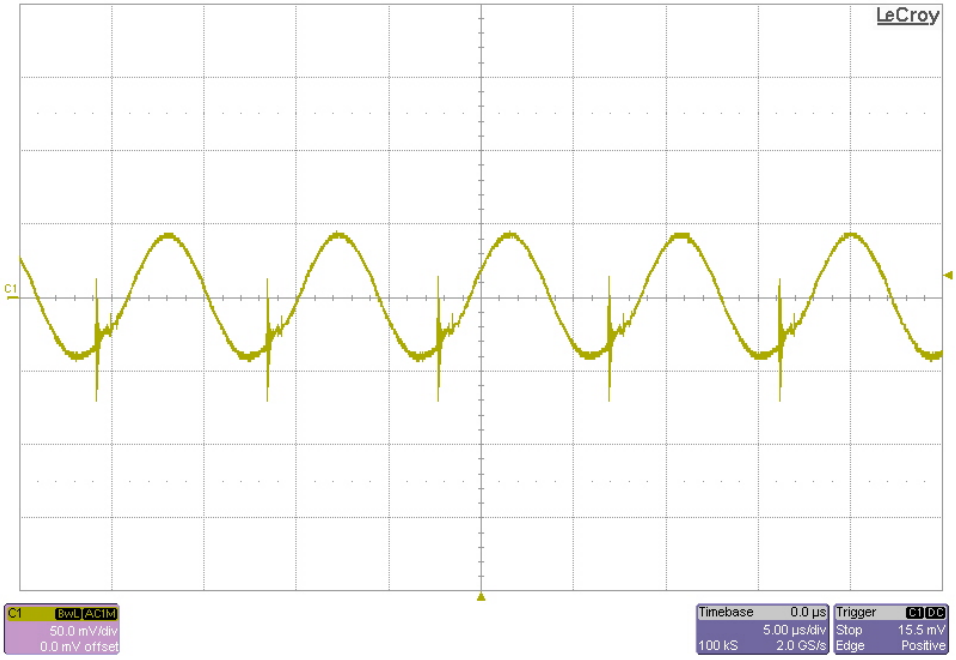




7 Output Ripple Voltage – Full Load

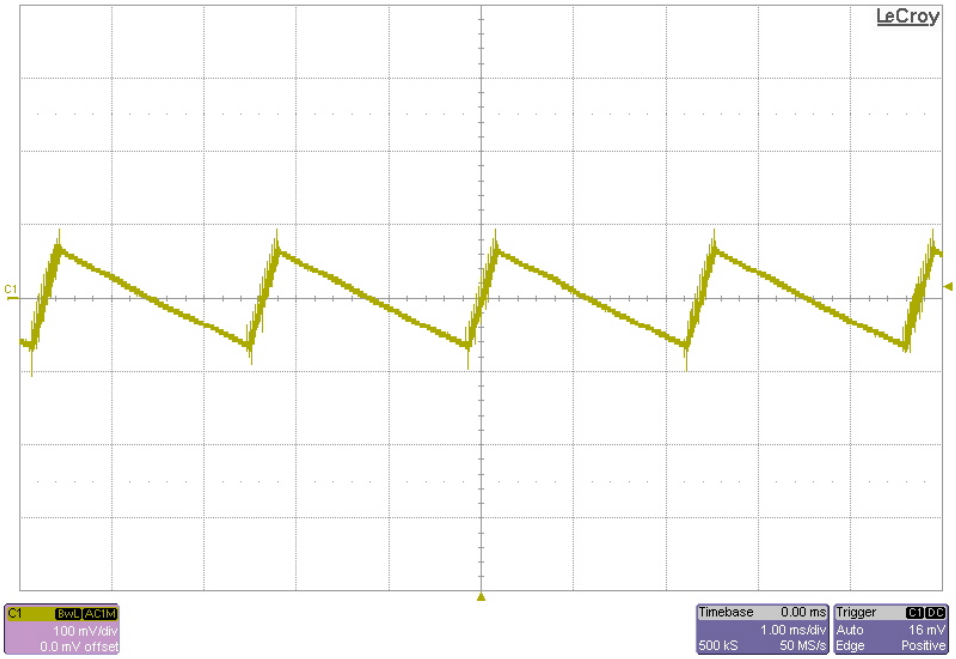
The output ripple voltage during full load (125mA) operation is shown in the plots below. The top image shows the ripple with a 100VDC input. The bottom image shows the ripple with a 550VDC.

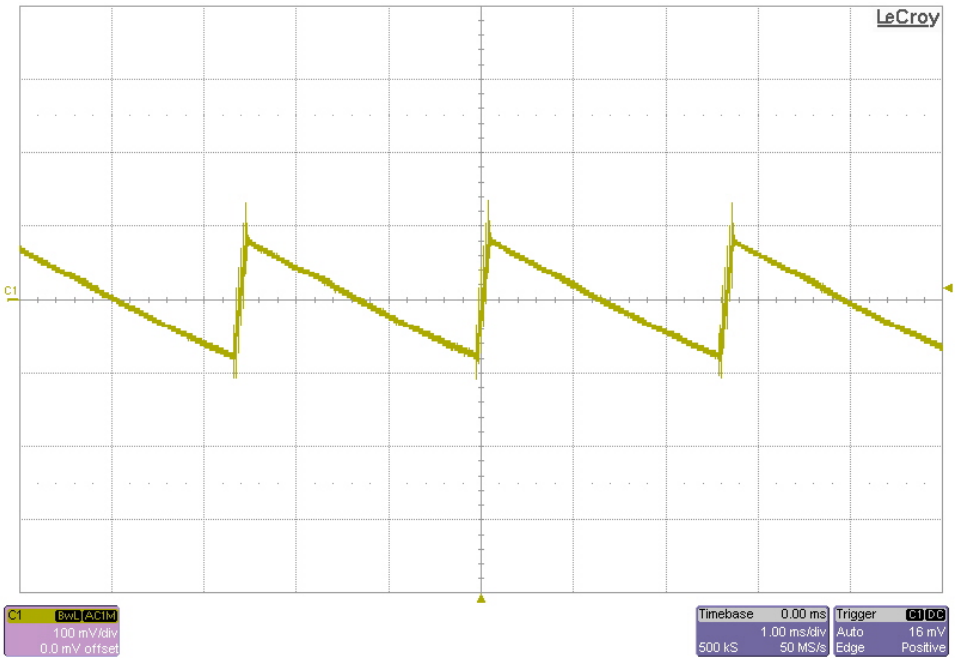




8 Output Ripple Voltage – No Load

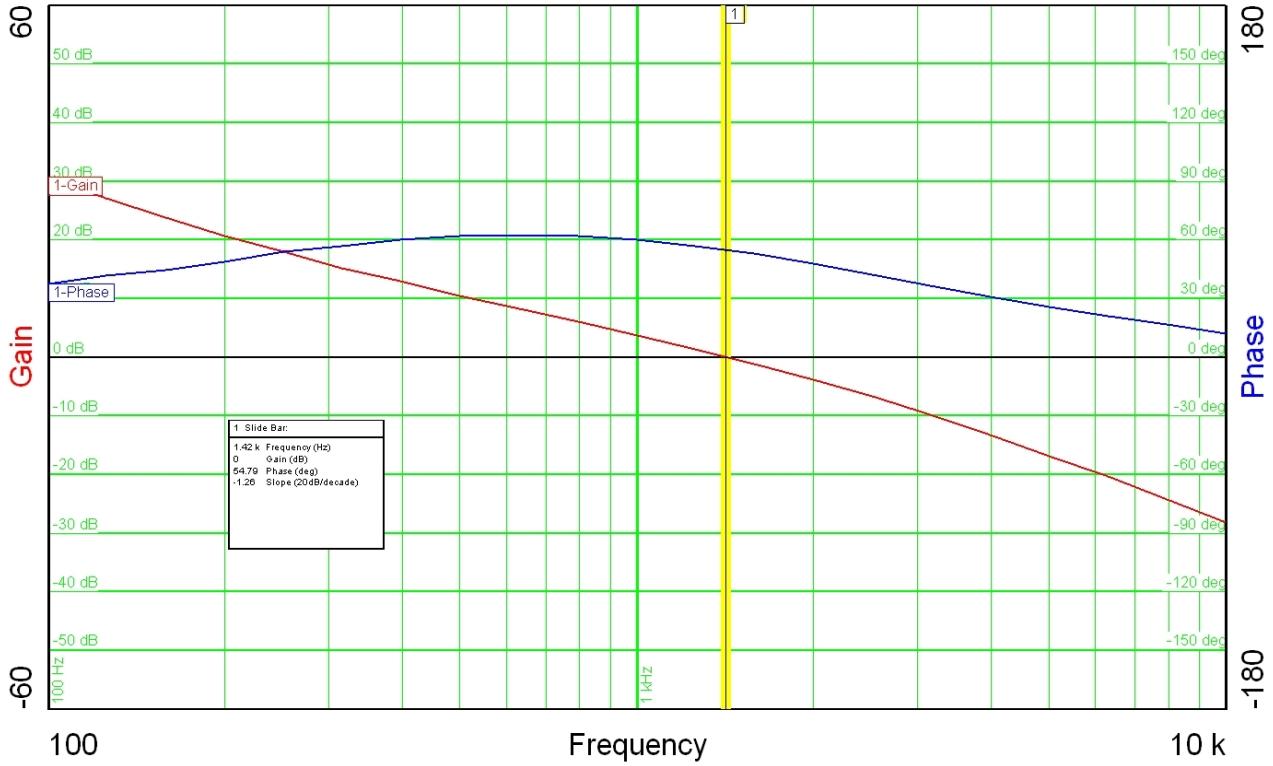
The output ripple voltage during no load operation is shown in the plots below. The top image shows the ripple with a 100VDC input. The bottom image shows the ripple with a 550VDC.





9 Frequency Response

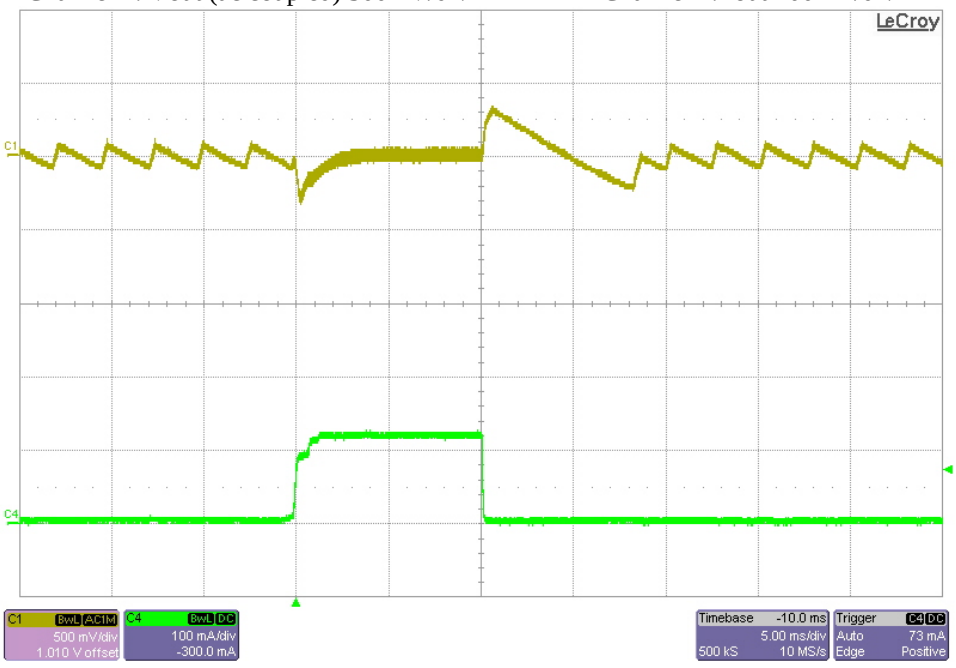
The frequency response of the feedback loop is shown in the plot below. The output was loaded with 125mA. The input was 150VDC.

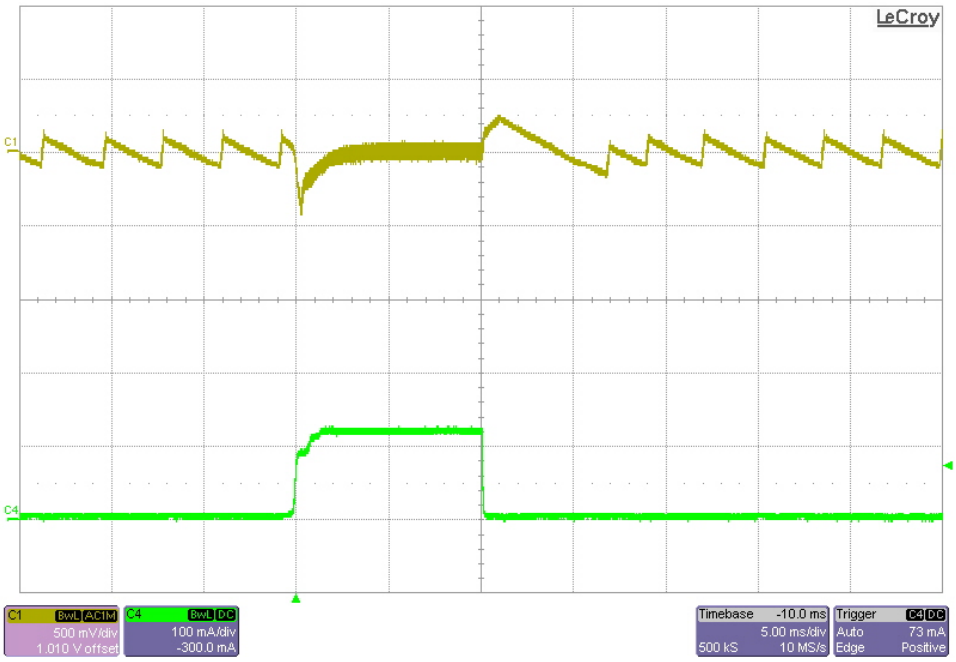


10 Load Transients

The images below show the response to a 0A to 125mA load transient. For the top image, the input voltage was set to 100VDC. For the bottom image, the input was set to 550VDC.

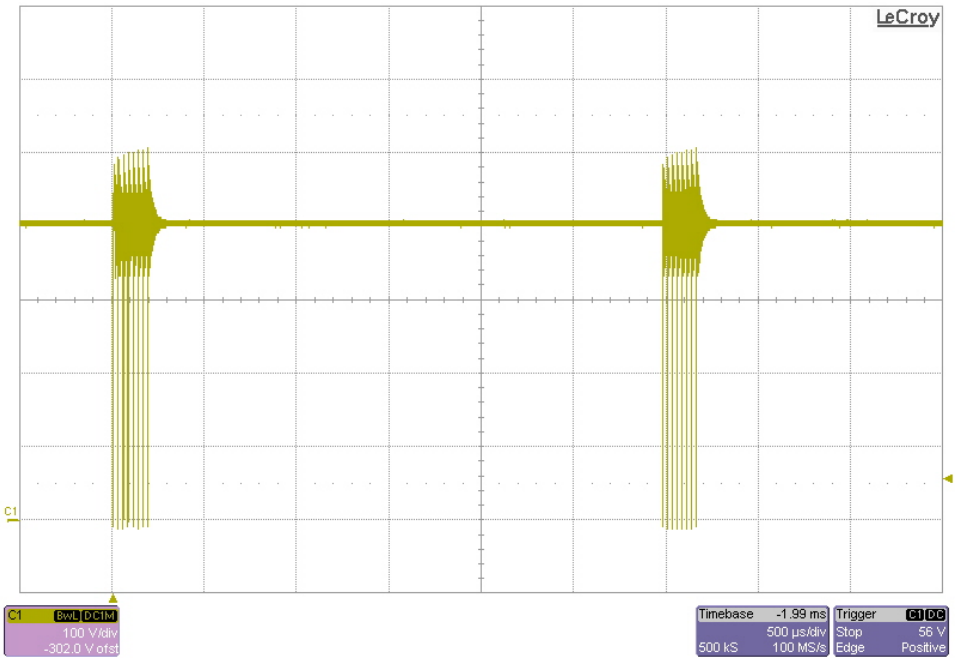
Channel 1: Vout (ac coupled) 500mV/div Channel 4: Iout 100mA/div

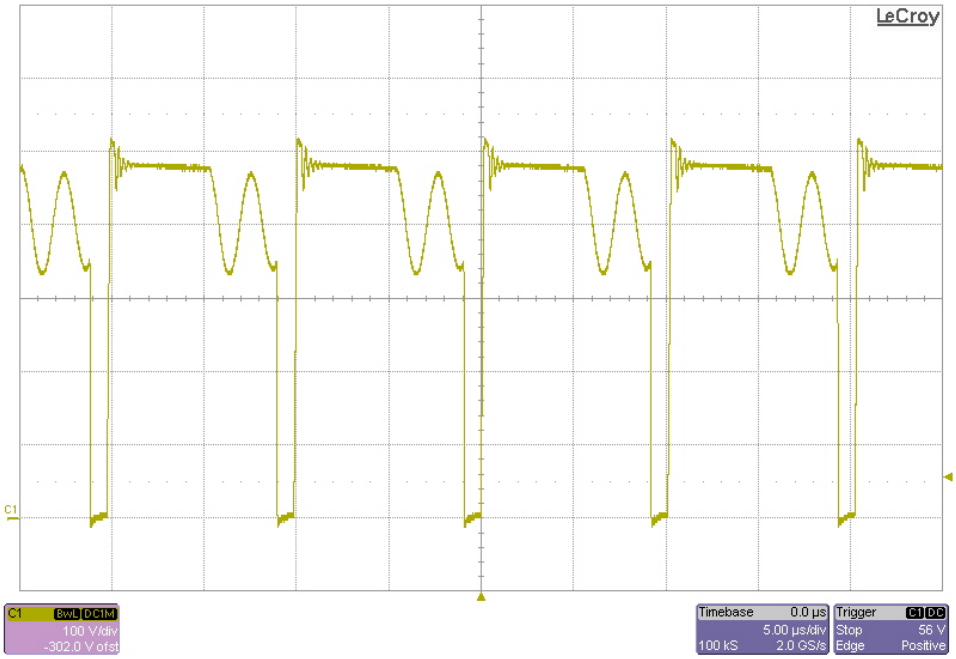




11 Switching Waveforms

The images below show the drain-to-source voltage waveform on the primary MOSFET (Q1). For the top image, the output was unloaded. In the bottom image, the load was 125mA. The input was 400VDC.




LeCroy
C1
C1 BwL DC1M
100 V/div
-302.0 V ofst
Timebase 0.0 µs
5.00 µs/div
100 kS 2.0 GS/s
Trigger C1 DC
Stop 56 V
Edge Positive

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