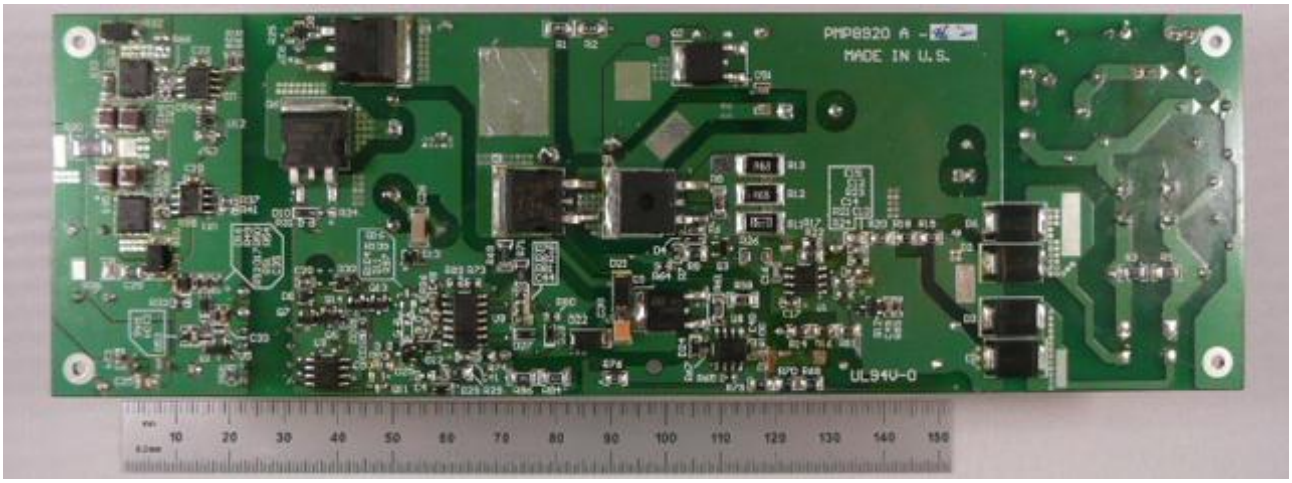
1 Photo

The photographs below show the top and bottom views of the PMP8920 Rev B demo board, which is built on PMP8920 Rev A PCB.

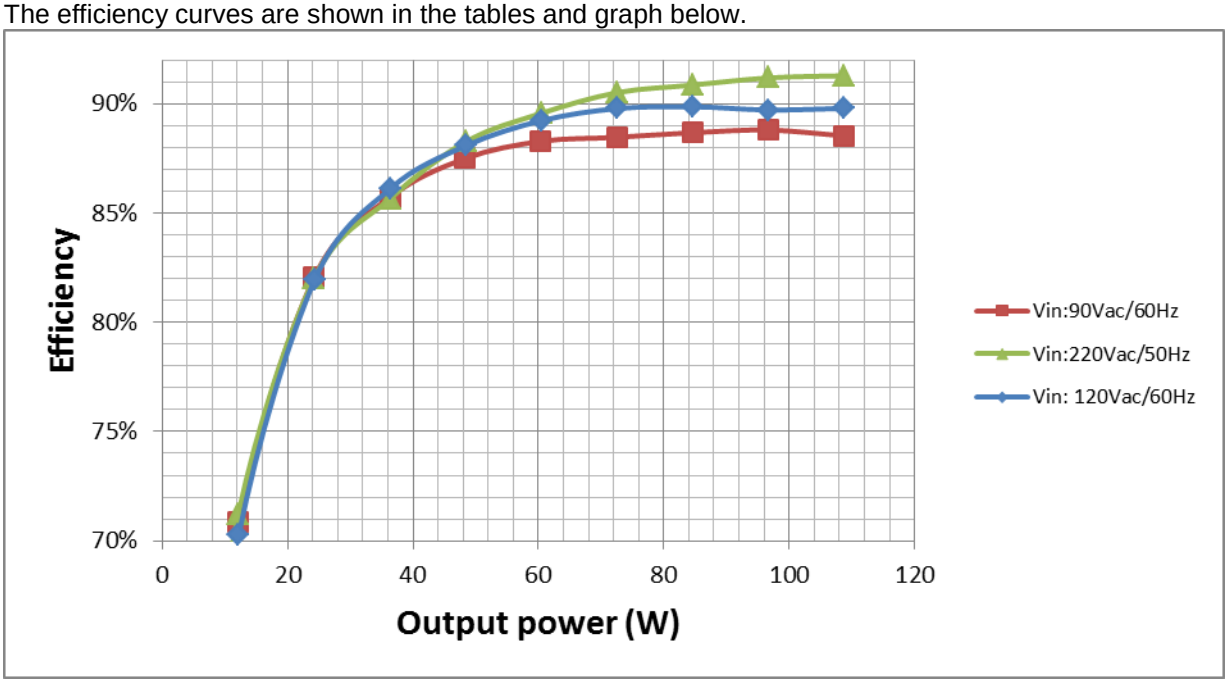
Top Side

Bottom Side



2 Efficiency

The efficiency curves are shown in the tables and graph below.



90V_{AC}/60Hz

Vin(ac)	Iin(A)	Pin(W)	PF	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency (%)
90.4	0.06	4	0.73	12.09	0	0	4	0.00%
90.04	0.1283	10.888	0.942	12.09	0.505	6.10545	4.78255	56.08%
90.09	0.19655	17.148	0.968	12.09	1.005	12.15045	4.99755	70.86%
90.02	0.3324	29.54	0.987	12.09	2.005	24.24045	5.29955	82.06%
90.1	0.4738	42.37	0.993	12.09	3.004	36.31836	6.05164	85.72%
90.1	0.618	55.25	0.996	12.08	4.002	48.34416	6.90584	87.50%
90	0.7624	68.43	0.998	12.08	5.001	60.41208	8.01792	88.28%
90.07	0.912	81.93	0.998	12.08	6	72.48	9.45	88.47%
90.1	1.061	95.49	0.999	12.08	7.01	84.6808	10.8092	88.68%
90.1	1.209	108.83	0.999	12.08	8	96.64	12.19	88.80%
90.12	1.364	122.8	0.999	12.08	9	108.72	14.08	88.53%

120V_{AC}/60Hz

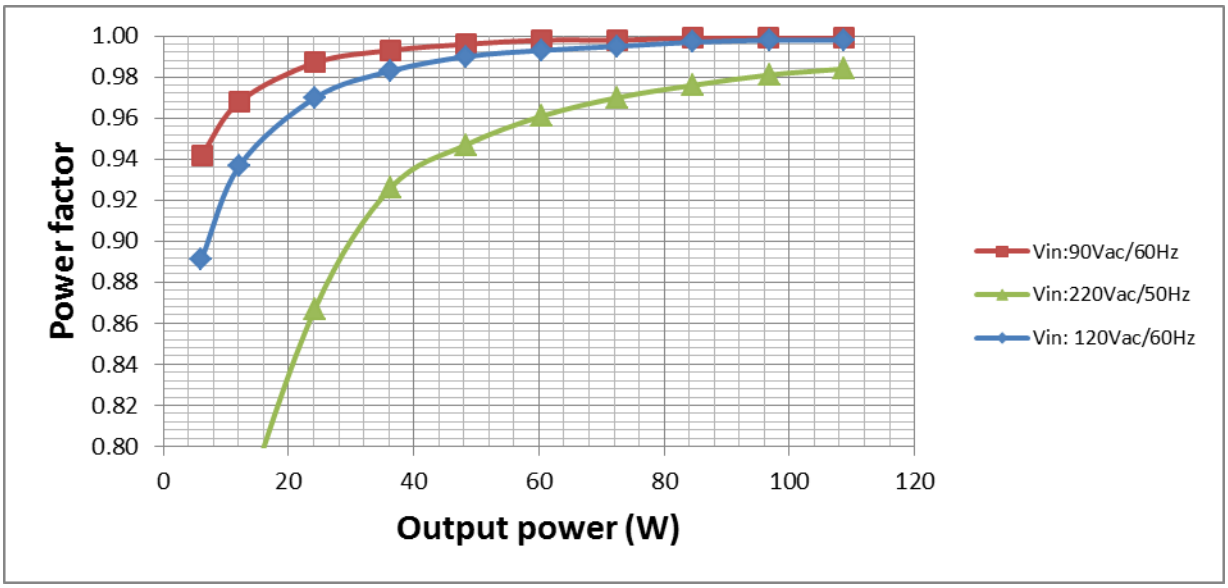
Vin(ac)	Iin(A)	Pin(W)	PF	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency (%)
120.42	0.054	4.2	0.63	12.1	0	0	4.2	0.00%
120.1	0.10145	10.85	0.891	12.09	0.5	6.045	4.805	55.71%
120.08	0.1543	17.361	0.937	12.09	1.009	12.19881	5.16219	70.27%
120.13	0.2544	29.66	0.97	12.09	2.01	24.3009	5.3591	81.93%
120.08	0.3577	42.23	0.983	12.09	3.008	36.36672	5.86328	86.12%
120	0.463	55	0.99	12.09	4.007	48.44463	6.55537	88.08%
120.1	0.568	67.8	0.993	12.09	5.004	60.49836	7.30164	89.23%
120.12	0.676	80.73	0.995	12.08	6	72.48	8.25	89.78%
120.12	0.787	94.23	0.997	12.08	7.01	84.6808	9.5492	89.87%
120.05	0.9	107.85	0.998	12.08	8.01	96.7608	11.0892	89.72%
120.13	1.01	121.08	0.998	12.08	9	108.72	12.36	89.79%

220V_{AC}/50Hz

Vin(ac)	Iin(A)	Pin(W)	PF	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency (%)
220.2	0.04	3.8	0.432	12.09	0	0	3.8	0.00%
220.1	0.07	10.5	0.67	12.09	0.501	6.05709	4.44291	57.69%
220	0.1	17	0.76	12.09	1.001	12.10209	4.89791	71.19%
220	0.1545	29.52	0.867	12.09	2.002	24.20418	5.31582	81.99%
220.1	0.2081	42.4	0.926	12.09	3.004	36.31836	6.08164	85.66%
220	0.263	54.81	0.947	12.09	4.001	48.37209	6.43791	88.25%
220	0.3194	67.54	0.961	12.08	5.008	60.49664	7.04336	89.57%
220	0.3758	80.21	0.97	12.08	6.01	72.6008	7.6092	90.51%
220	0.4334	93.07	0.976	12.08	7	84.56	8.51	90.86%
220	0.492	106.11	0.981	12.08	8.01	96.7608	9.3492	91.19%
220	0.55	119.1	0.984	12.08	9	108.72	10.38	91.28%

3 Power Factor

The power factor is shown in the plot below.

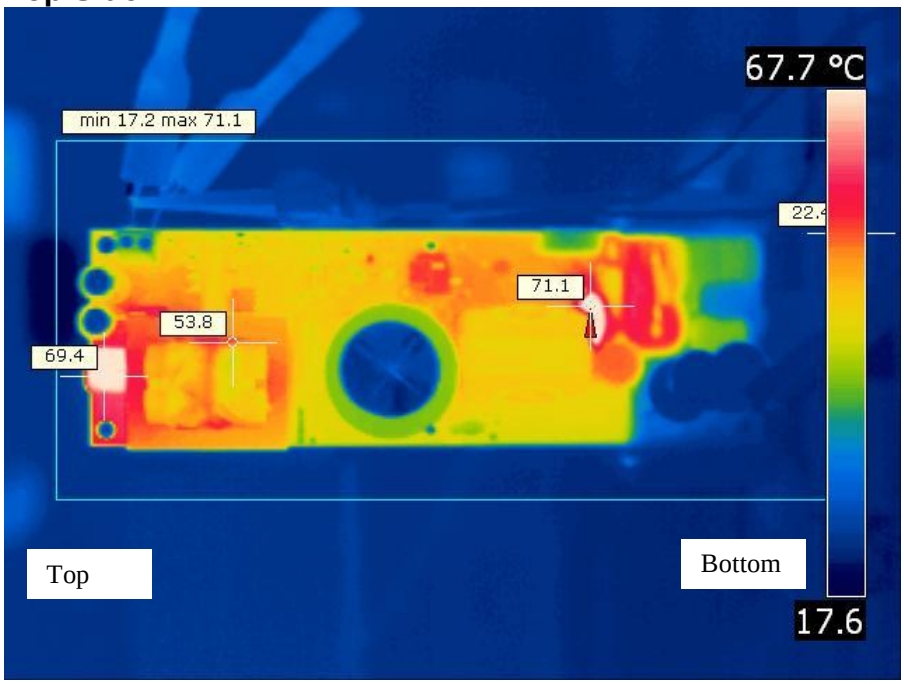


4 Thermal Images

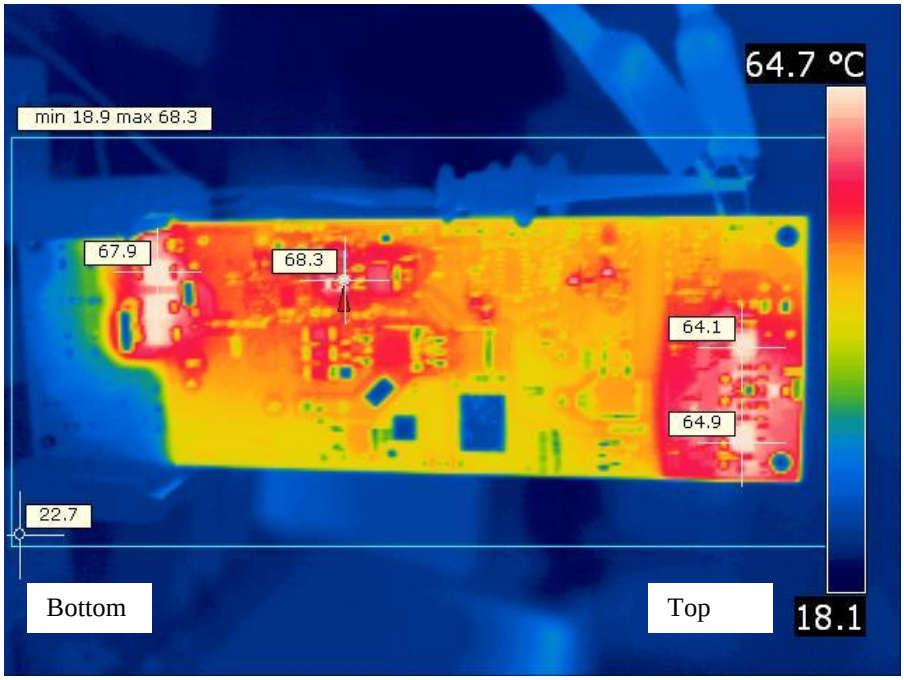
The thermal images below show a top view and bottom view of the board. The ambient temperature was 20ºC with no forced air flow. The output was loaded with 12V/9A.

4.1 90V/60Hz

Top Side

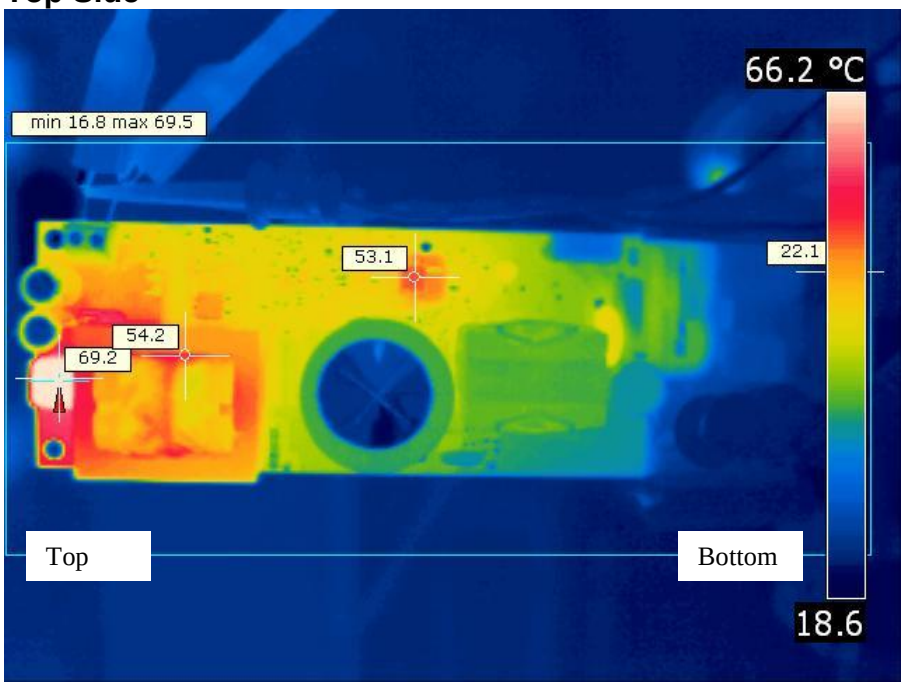


Bottom Side

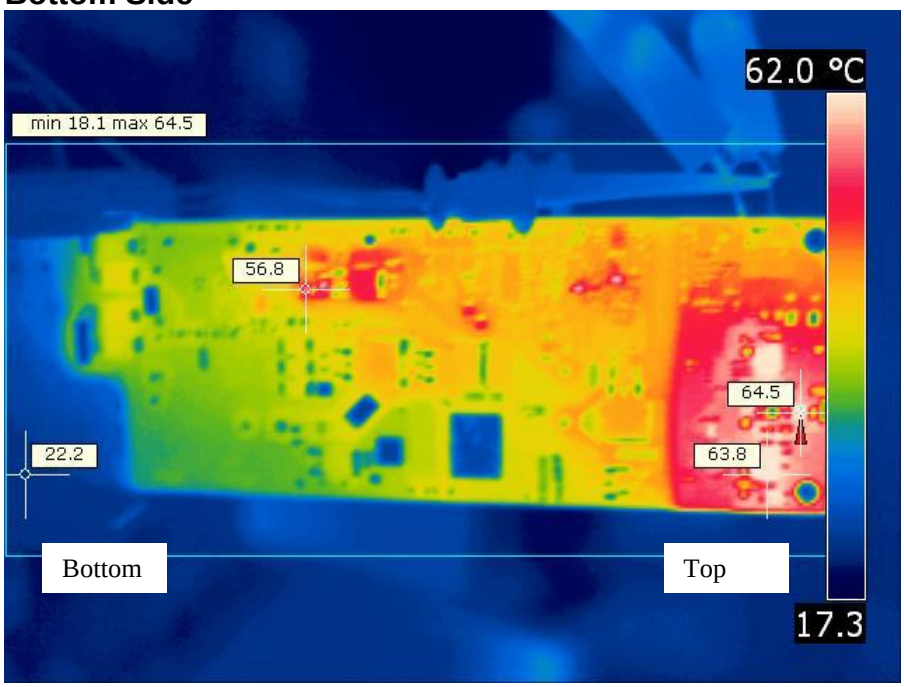


4.2 220V/50Hz

Top Side



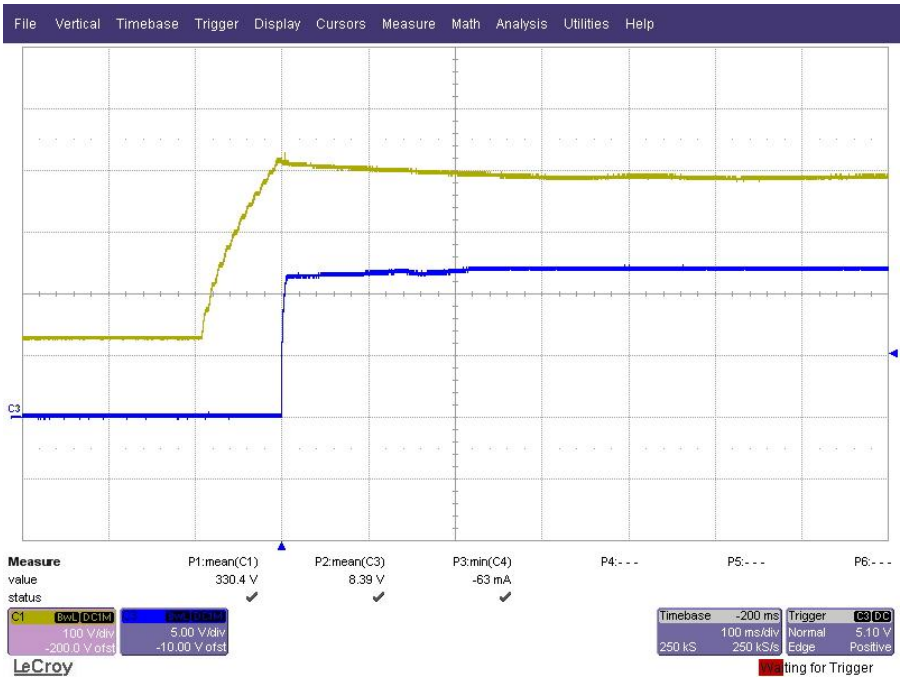
Bottom Side



5 Startup

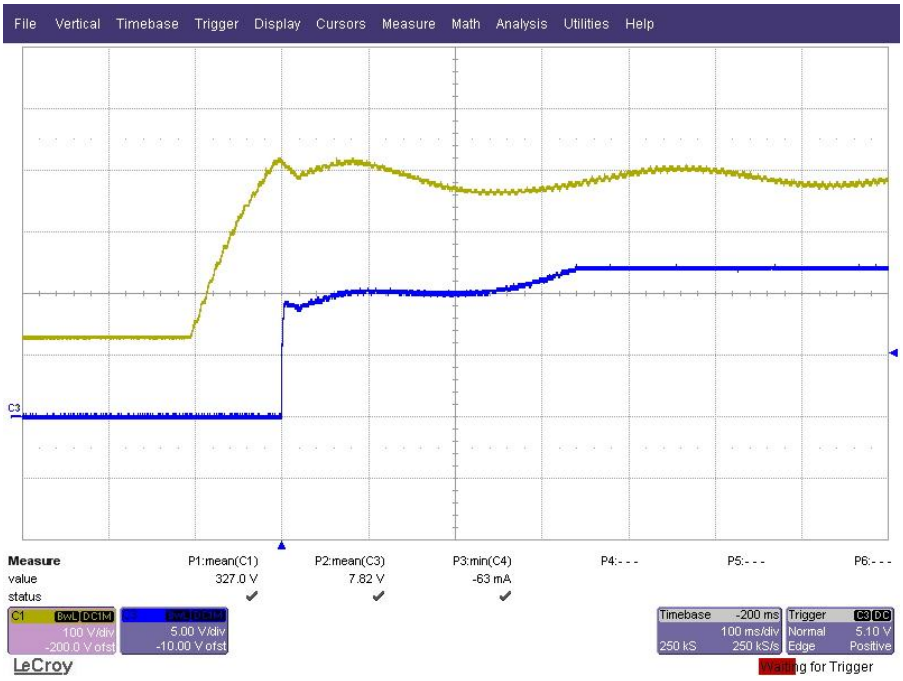
The voltages at startup are shown in the images below. The 12V output is shown on channel 3. The PFC output is shown on channel 1.

5.1 85VAC/60Hz – No Load

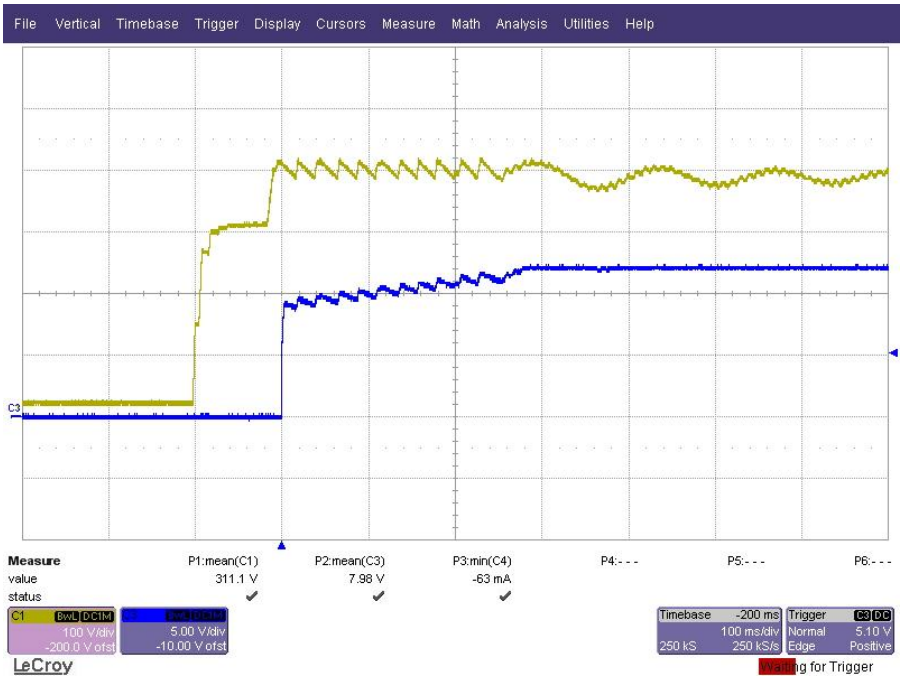


5.2 220VAC/50Hz – No Load

5.3 85VAC/60Hz – 12V/9A



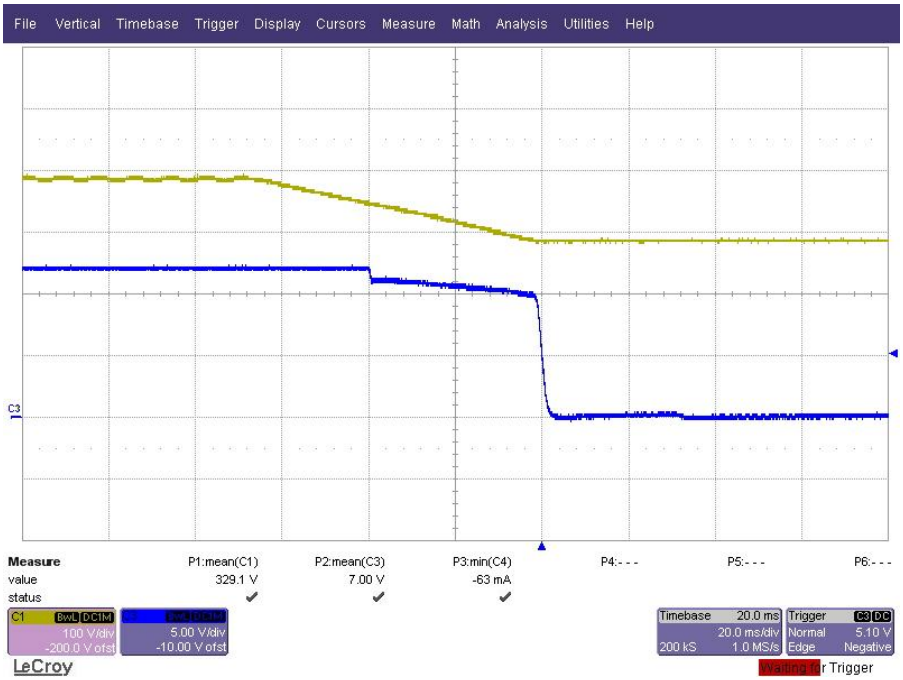
5.4 220VAC/50Hz – 12V/9A



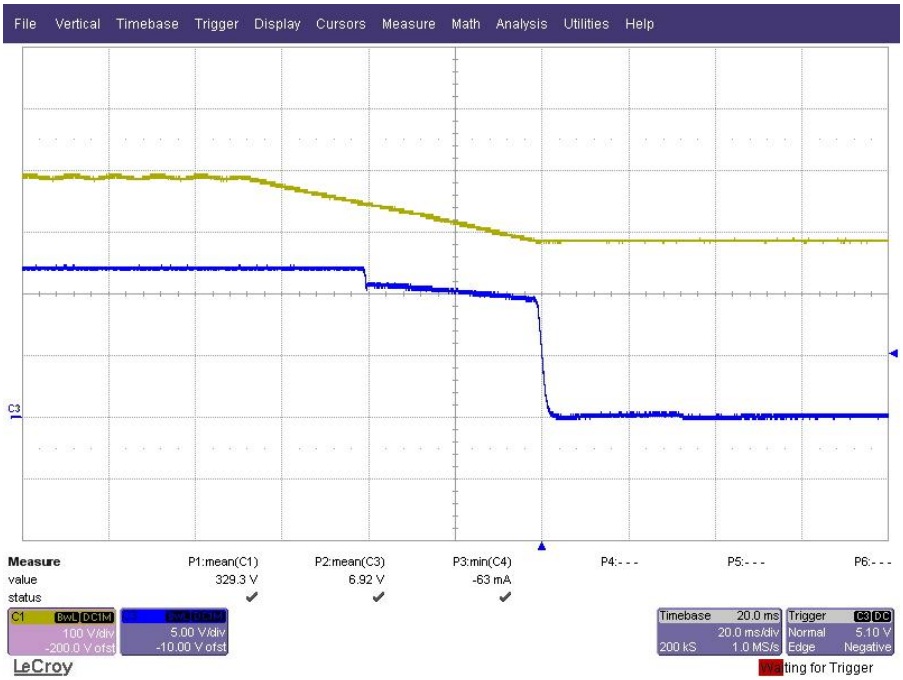
6 Turn-off

The voltages at turn-off are shown in the images below. The 12V output is shown on channel 1. The PFC output is shown on channel 3.

6.1 85VAC/60Hz – 12V/9A

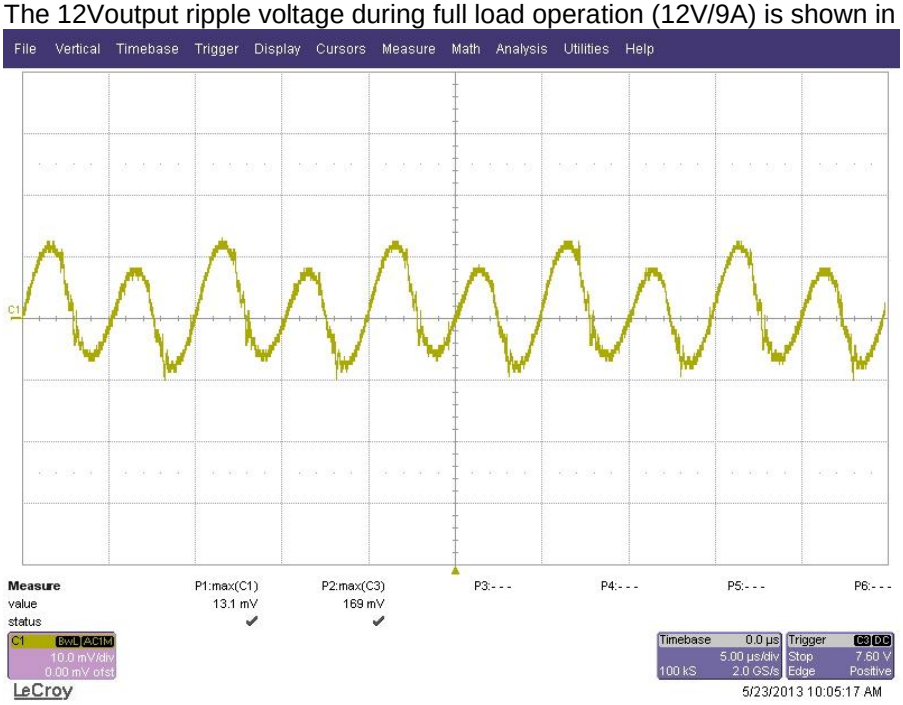


6.2 220VAC/50Hz –12V/9A



7 12V Output Ripple Voltage

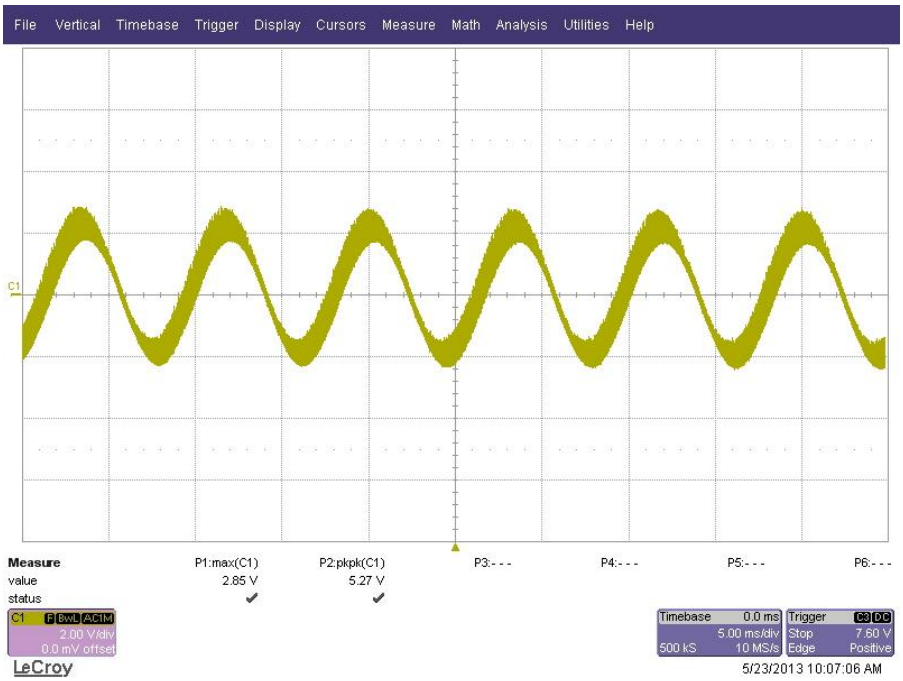
The 12Voutput ripple voltage during full load operation (12V/9A) is shown in the plot below.



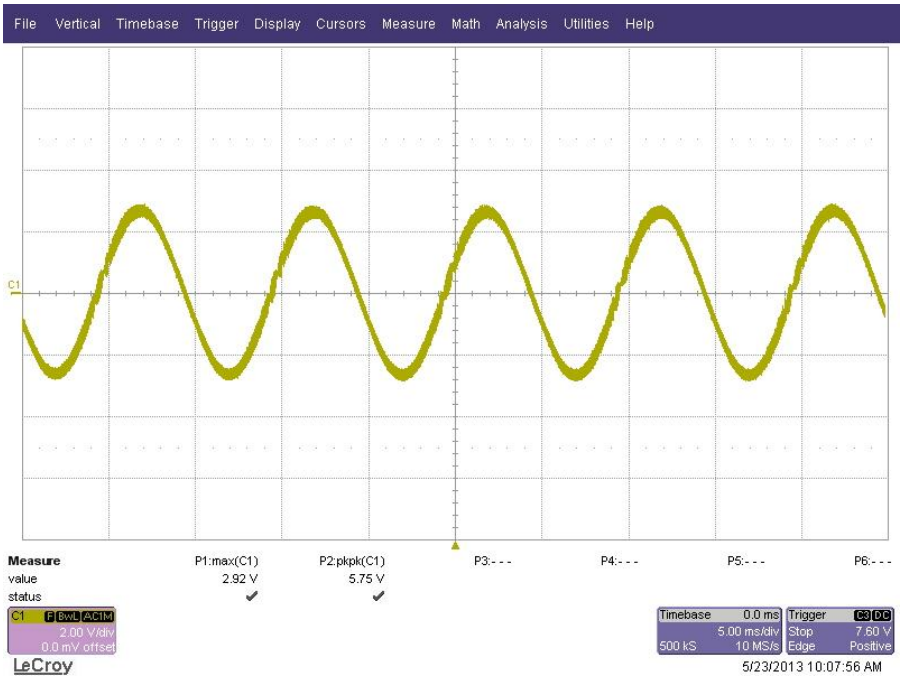
8 PFC Output Ripple Voltage

The PFC output ripple voltage during full load operation (12V/9A) is shown in the plots below.

8.1 85VAC/60Hz

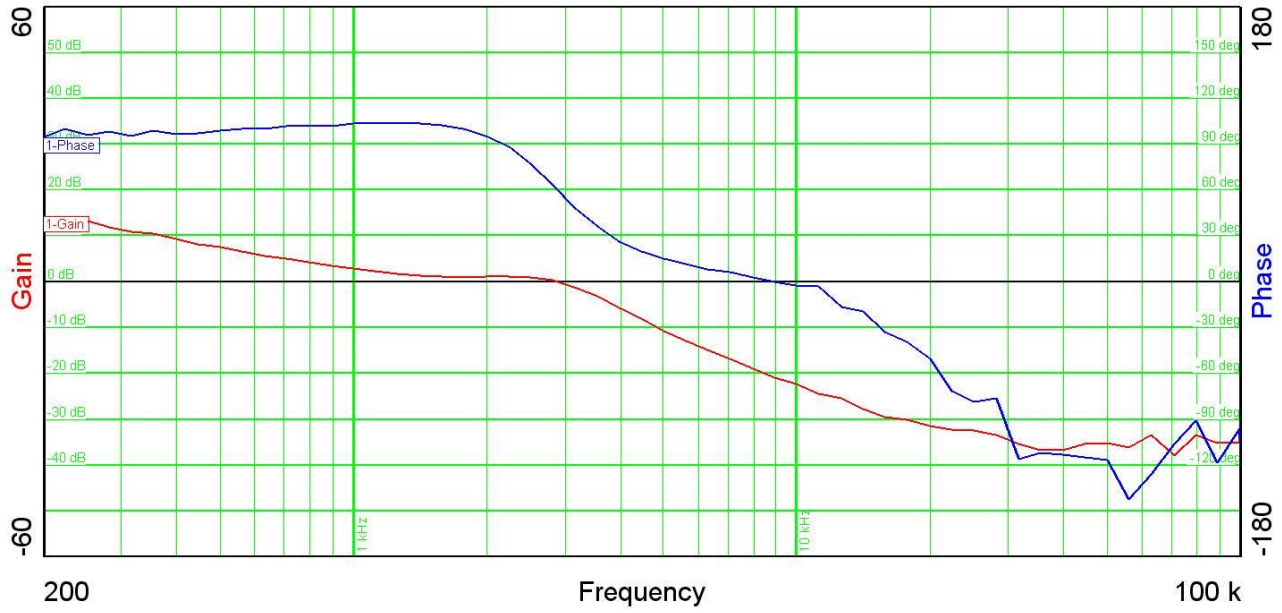


8.2 220VAC/50Hz



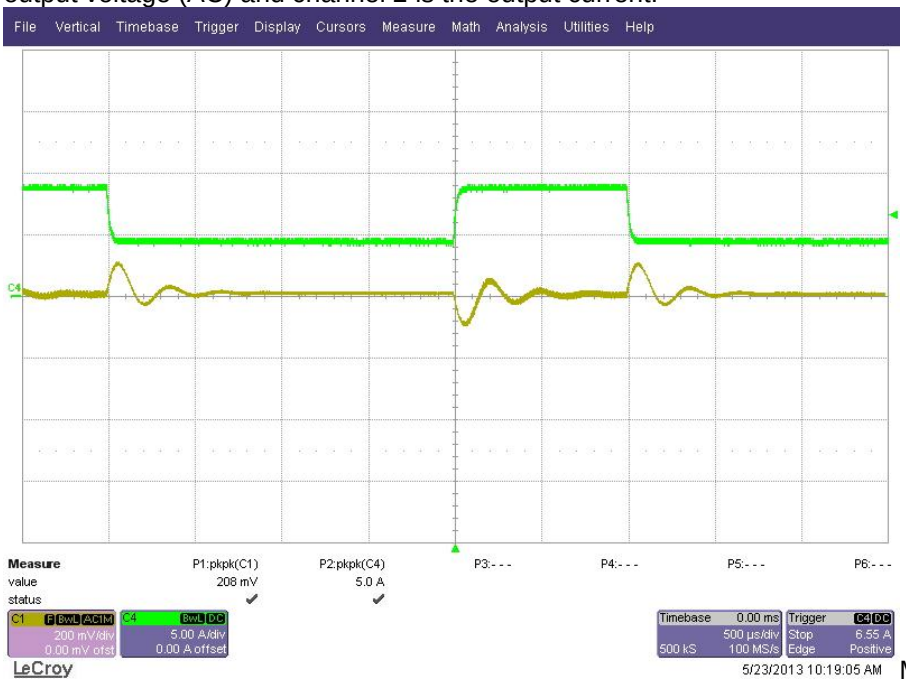
9 LLC Half Bridge Frequency Response

The frequency response of the feedback loop is shown in the plot below, where AC signal is injected from TP5 and TP6. The output was loaded with 12V/9A.



10 LLC Half Bridge Load Transient Response

The image below shows the response to a 4.5A to 9A load transient at 85Vac/60Hz, where channel 1 is the output voltage (AC) and channel 2 is the output current.



MISEPIC62.jpg

11 Synchronous Rectifier Switching Waveforms

The image below shows the LLC half-bridge converter synchronous rectifier waveforms, where channel 1 is V_{ds}(Q10), channel 2 is V_{gs}(Q10), and CH3 is V_{gs}(Q15).

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