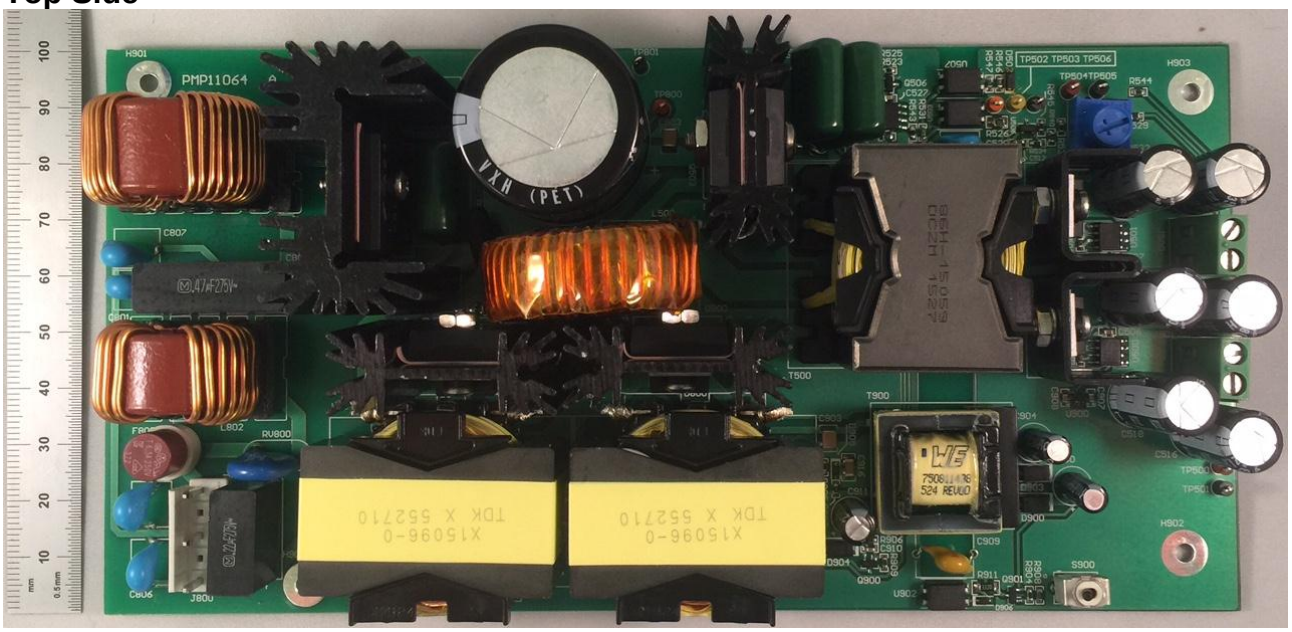
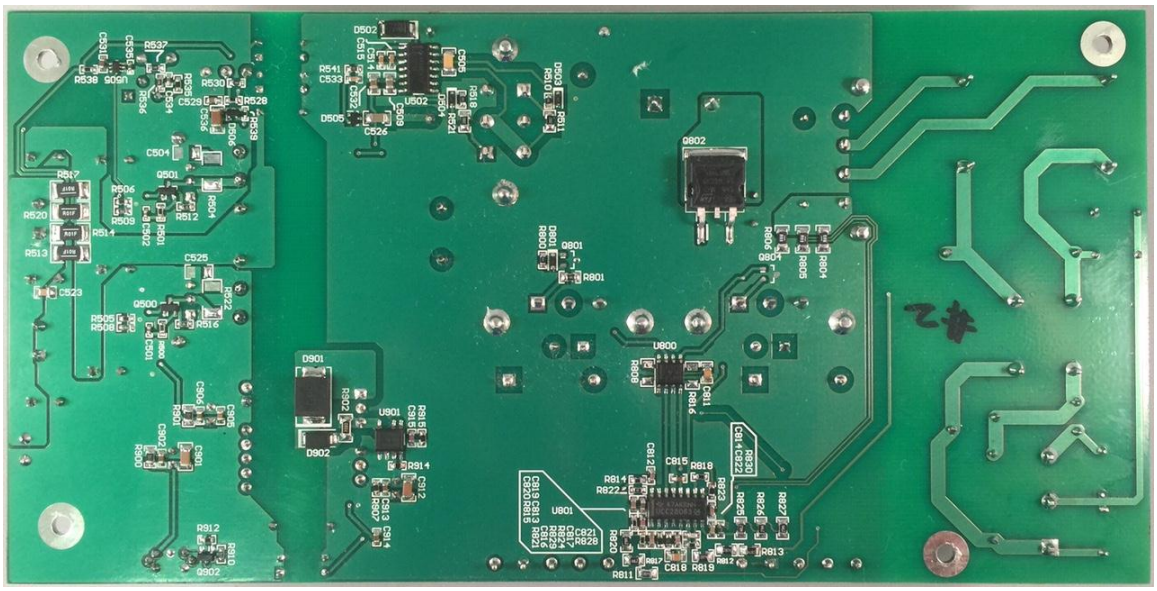
1 Photo

The photographs below show the top and bottom views of the PMP11064 Rev A board, which is built on PMP11064 Rev A PCB.

Top Side



Bottom Side

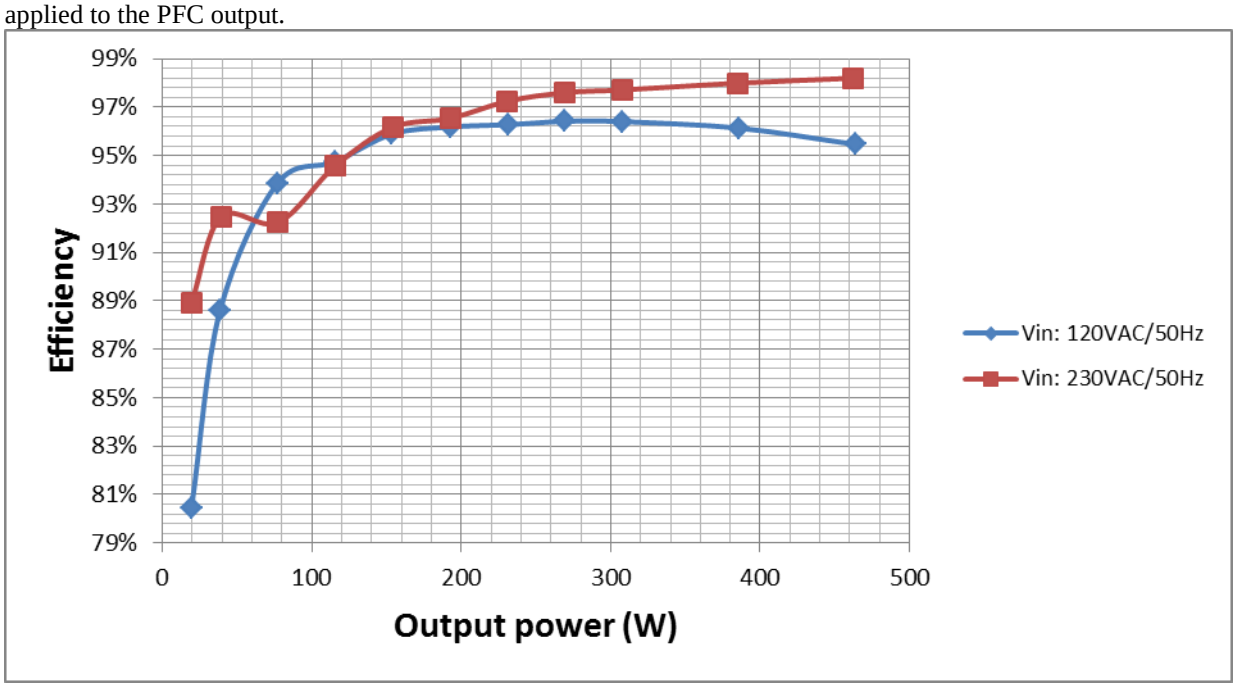


2 Efficiency

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

2.1 AC-DC Efficiency: PFC and Bias supply

In the test, R524 and R527 are removed to test the efficiency of PFC and Bias supply. Constant current load is directly applied to the PFC output.



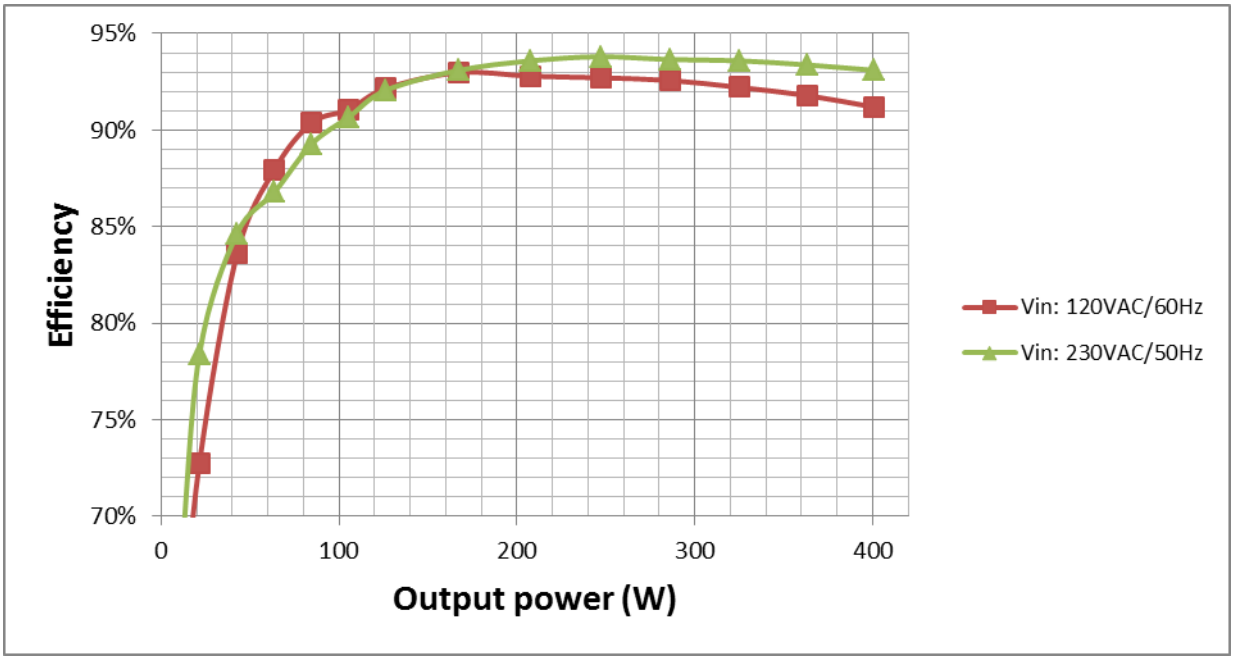
120V_{AC}/60Hz

Vin(AC)	Iin(A)	Pin(W)	PF	V_B+(V)	I_B+(A)	Pout(W)	Losses(W)	Eff. (%)
120.05	4.054	485.6	0.998	384.7	1.205	463.5635	22.0365	95.46%
119.96	3.358	401.6	0.997	384.9	1.003	386.0547	15.5453	96.13%
120.17	2.67	319.1	0.995	385	0.799	307.615	11.485	96.40%
120.05	2.345	279.6	0.993	385.1	0.7	269.57	10.03	96.41%
120.16	2.019	240.4	0.991	385.1	0.601	231.4451	8.9549	96.28%
120.08	1.69	200.2	0.987	385.1	0.5	192.55	7.65	96.18%
120.09	1.361	160.24	0.98	385.1	0.399	153.6549	6.5851	95.89%
120.29	1.049	121.94	0.966	385.1	0.3	115.53	6.41	94.74%
120.09	0.7327	82.06	0.933	385.1	0.2	77.02	5.04	93.86%
120.2	0.4421	43.49	0.819	385.3	0.1	38.53	4.96	88.60%
120.25	0.3085	24.09	0.649	387.5	0.05	19.375	4.715	80.43%

230V_{AC}/50Hz

Vin(AC)	Iin(A)	Pin(W)	PF	V_B+(V)	I_B+(A)	Pout(W)	Losses(W)	Eff. (%)
230	2.078	471	0.986	385.1	1.201	462.5051	8.4949	98.20%
230.1	1.741	393	0.981	385.1	1	385.1	7.9	97.99%
230.1	1.406	314.9	0.974	385.1	0.799	307.6949	7.2051	97.71%
230.1	1.24	276.2	0.968	385.1	0.7	269.57	6.63	97.60%
230.2	1.076	237.6	0.96	385.1	0.6	231.06	6.54	97.25%
230.2	0.917	199.85	0.947	385.1	0.501	192.9351	6.9149	96.54%
229.9	0.7525	160.22	0.926	385.2	0.4	154.08	6.14	96.17%
229.9	0.5963	122.25	0.892	385.4	0.3	115.62	6.63	94.58%
230	0.4387	83.94	0.832	387.1	0.2	77.42	6.52	92.23%
230	0.2477	42.4	0.744	388.2	0.101	39.2082	3.1918	92.47%
230.1	0.19998	21.85	0.475	388.6	0.05	19.43	2.42	88.92%

2.2 Total Efficiency



120V$_{AC}$/60Hz

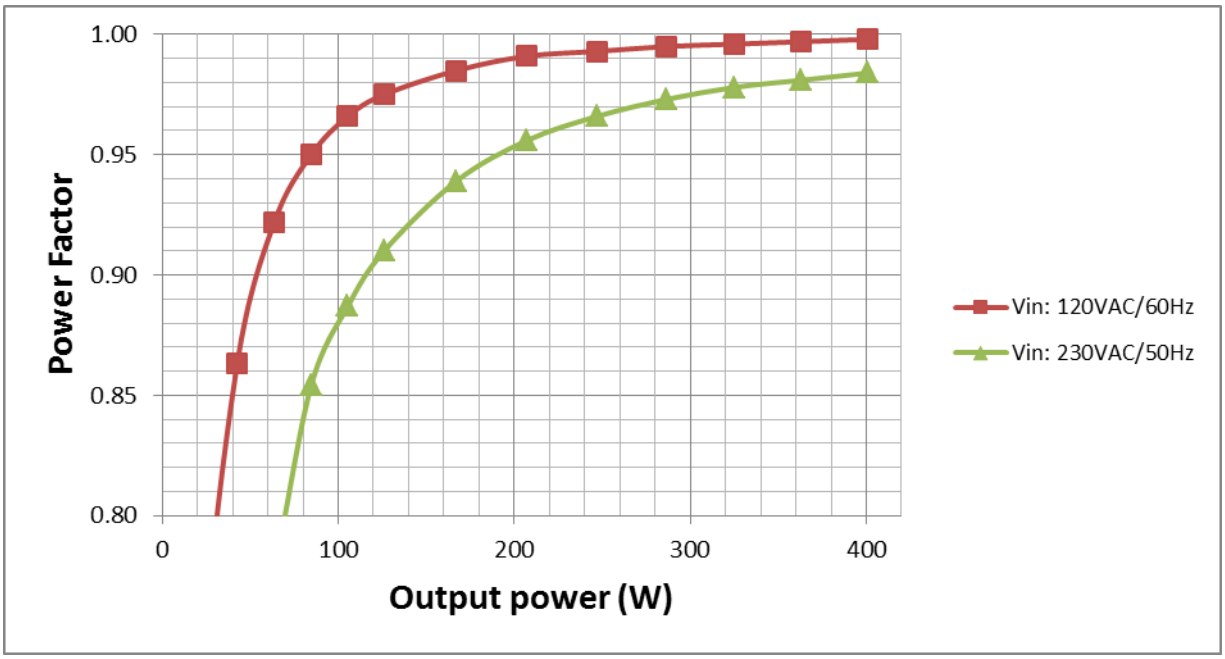
Vin(AC)	Iin(A)	Pin(W)	PF	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Eff. (%)
120.09	3.669	439.5	0.998	20.03	20.01	400.8003	38.6997	91.19%
120.19	3.3	395.5	0.997	20.17	18	363.06	32.44	91.80%
120.09	2.945	352.4	0.996	20.31	16	324.96	27.44	92.21%
119.98	2.593	309.5	0.995	20.45	14.01	286.5045	22.9955	92.57%
119.99	2.236	266.5	0.993	20.59	12	247.08	19.42	92.71%
120.09	1.878	223.4	0.991	20.73	10	207.3	16.1	92.79%
120.04	1.52	179.79	0.985	20.87	8.01	167.1687	12.6213	92.98%
120.15	1.168	136.79	0.975	21.01	6	126.06	10.73	92.16%
120.09	0.998	115.75	0.966	21.08	5	105.4	10.35	91.06%
120.14	0.82	93.61	0.95	21.15	4	84.6	9.01	90.37%
120	0.6538	72.37	0.922	21.22	3	63.66	8.71	87.96%
120.05	0.4911	50.91	0.863	21.28	2	42.56	8.35	83.60%
120.1	0.3395	29.36	0.72	21.35	1	21.35	8.01	72.72%
120.13	0.2829	17.124	0.504	21.4	0.5	10.7	6.424	62.49%
120.16	0.048	1.5	0.26	22.94	0	0	1.5	0.00%

230V_{AC}/50Hz

Vin(AC)	Iin(A)	Pin(W)	PF	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Eff. (%)
230	1.902	430.5	0.984	20.03	20.01	400.8003	29.6997	93.10%
230.1	1.722	388.8	0.981	20.17	18	363.06	25.74	93.38%
230.1	1.543	347.2	0.978	20.31	16	324.96	22.24	93.59%
230.2	1.365	305.7	0.973	20.45	14	286.3	19.4	93.65%
230.2	1.184	263.4	0.966	20.59	12	247.08	16.32	93.80%
230	1.007	221.5	0.956	20.73	10	207.3	14.2	93.59%
230	0.83	179.35	0.939	20.87	8	166.96	12.39	93.09%
230.1	0.654	136.88	0.91	21	6	126	10.88	92.05%
230.1	0.5694	116.18	0.887	21.07	5	105.35	10.83	90.68%
230.1	0.4817	94.71	0.854	21.14	4	84.56	10.15	89.28%
230.1	0.4099	73.31	0.777	21.21	3	63.63	9.68	86.80%
230.2	0.306	50.28	0.71	21.28	2	42.56	7.72	84.65%
230.2	0.2134	27.25	0.554	21.36	1	21.36	5.89	78.39%
230.2	0.176	15.961	0.394	21.4	0.5	10.7	5.261	67.04%
230.2	0.0529	1.315	0.108	23.08	0	0	1.315	0.00%

3 Power Factor

The power factor is shown in the plot below.

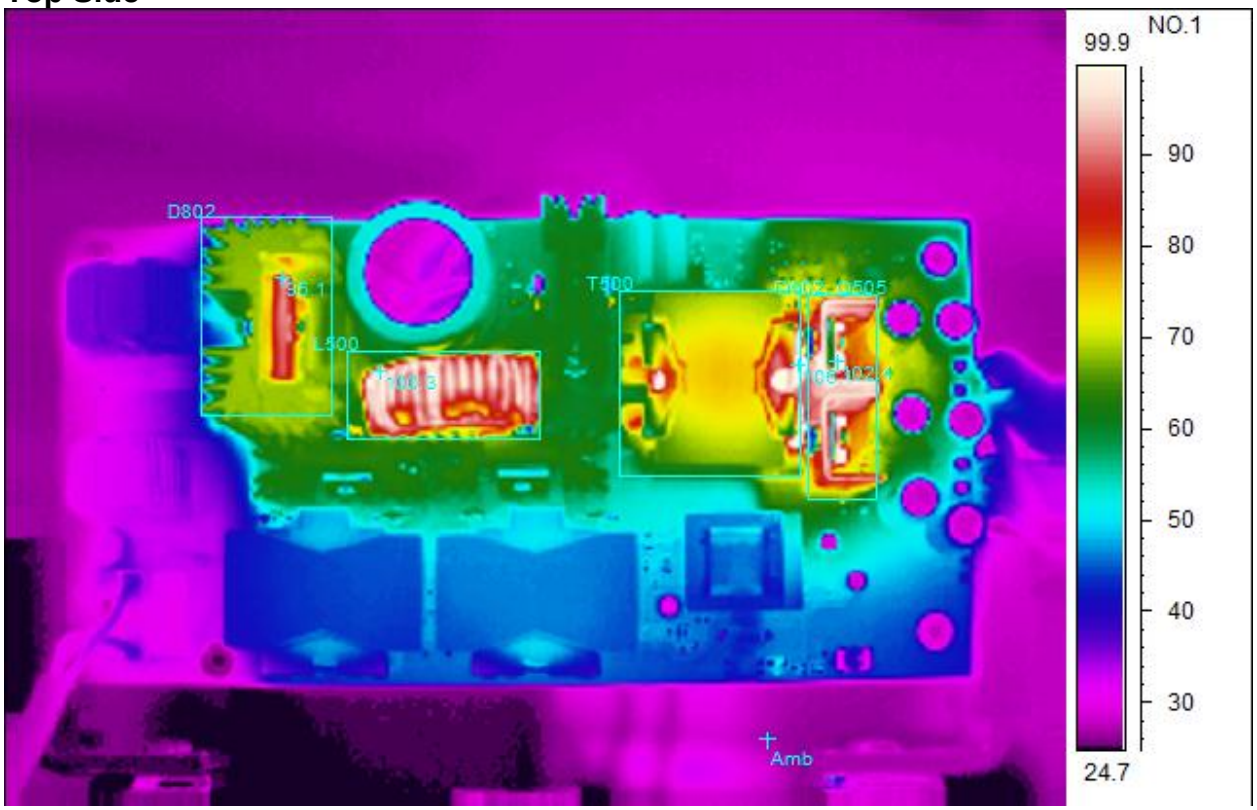


4 Thermal Images

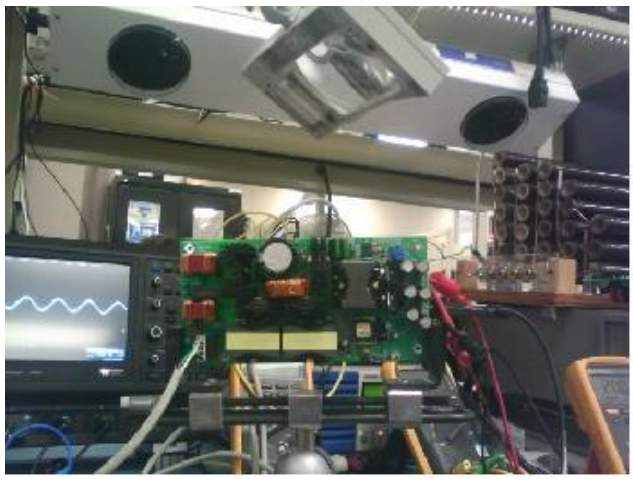
The thermal images below show a top view and bottom view of the board. The board is placed vertically during the test, where the input and output connecters are at the bottom side. The ambient temperature was 25ºC with no air flow. The output was loaded with 20V/20A.

4.1 120V/60Hz

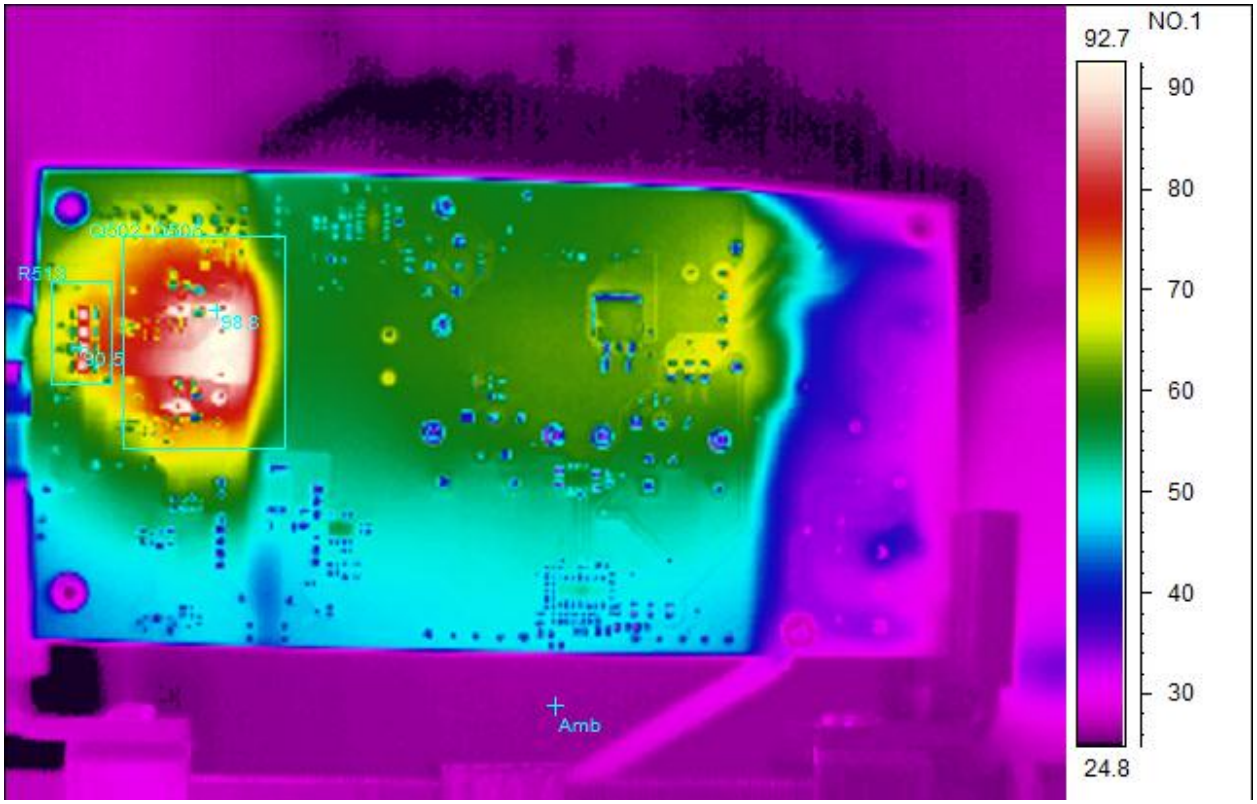
Top Side



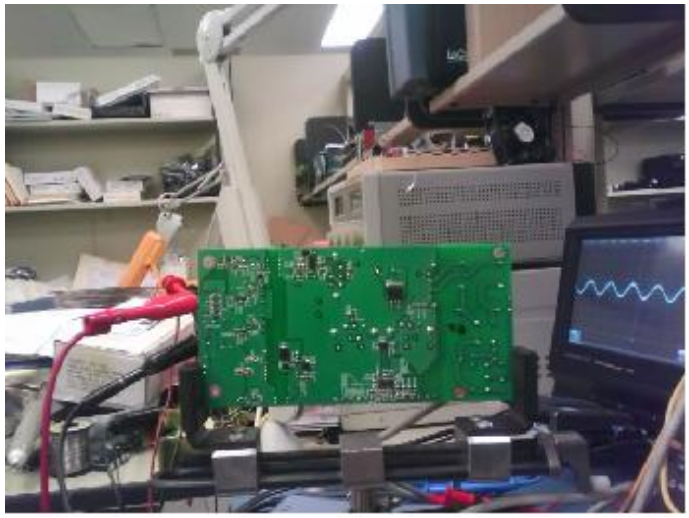
Spot analysis	Value
AmbTemperature	27.6°C
Area analysis	**Value**
D802Max	95.1°C
L500Max	100.3°C
T500Max	106.1°C
Q502, Q505 Max	102.4°C



Bottom Side

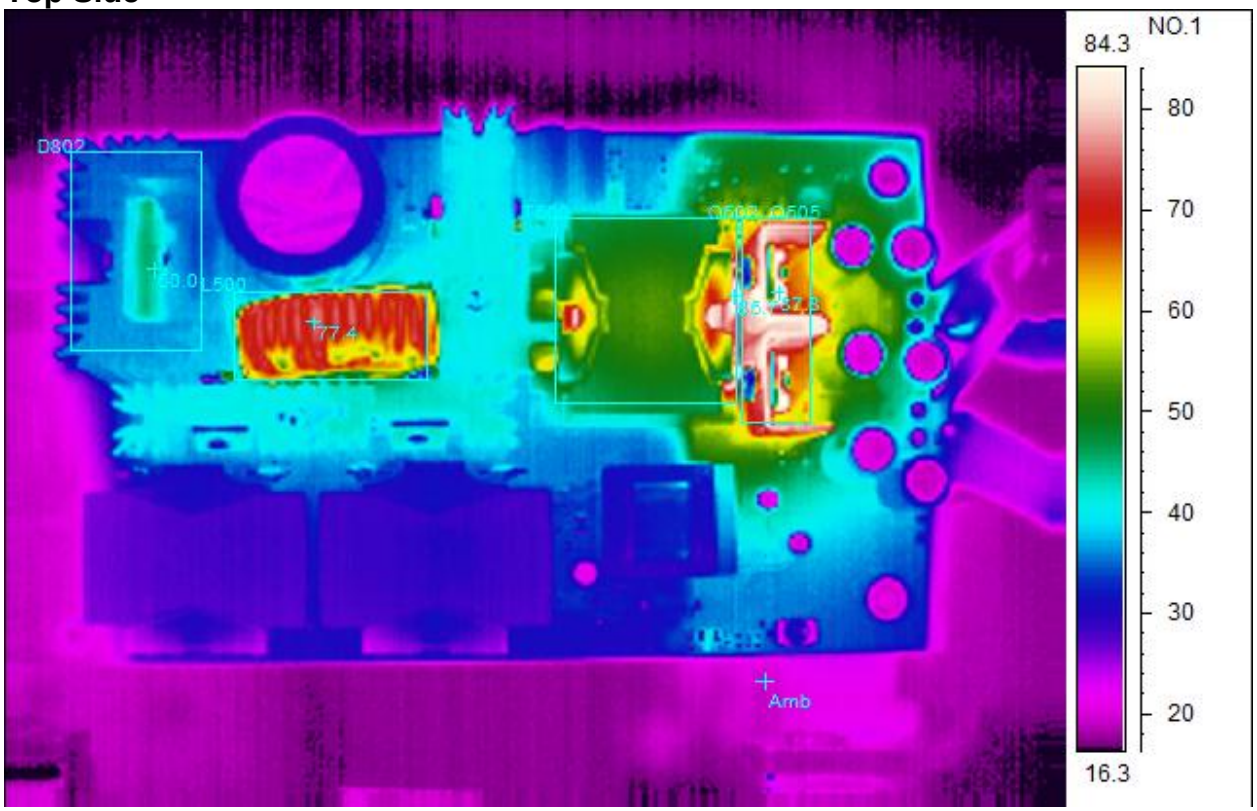


Spot analysis	Value
Amb Temperature	26.6°C
Area analysis	**Value**
Q502, Q505Max	98.8°C
R513Max	90.5°C

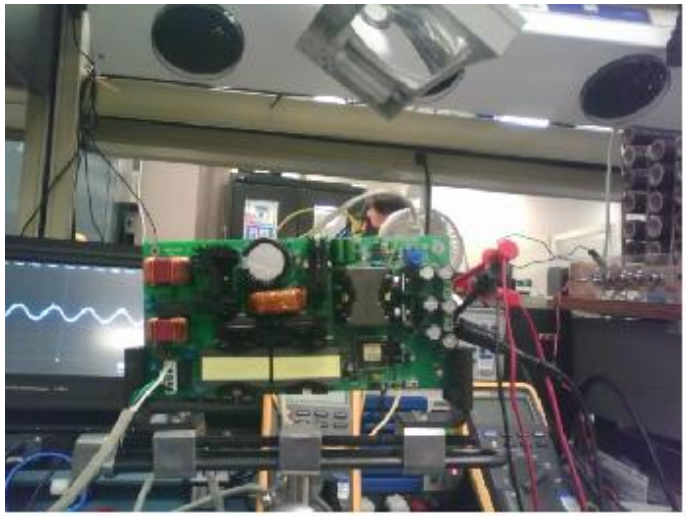


4.2 230V/50Hz

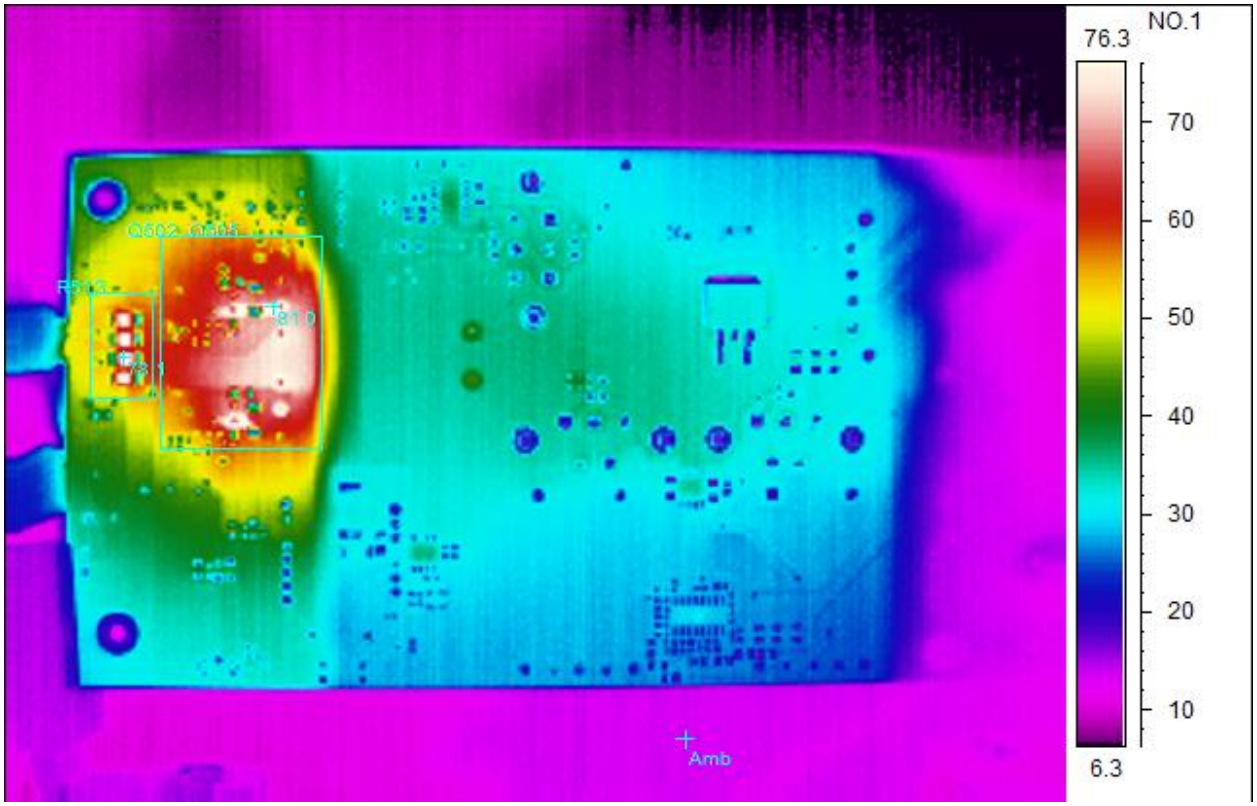
Top Side



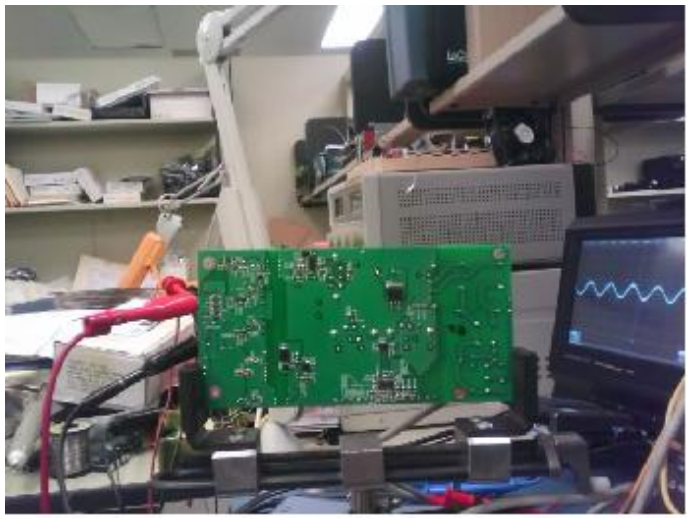
Spot analysis	Value
AmbTemperature	20.6°C
Area analysis	**Value**
D802Max	50.0°C
L500Max	77.4°C
T500Max	85.7°C
Q502, Q505 Max	87.8°C



Bottom Side



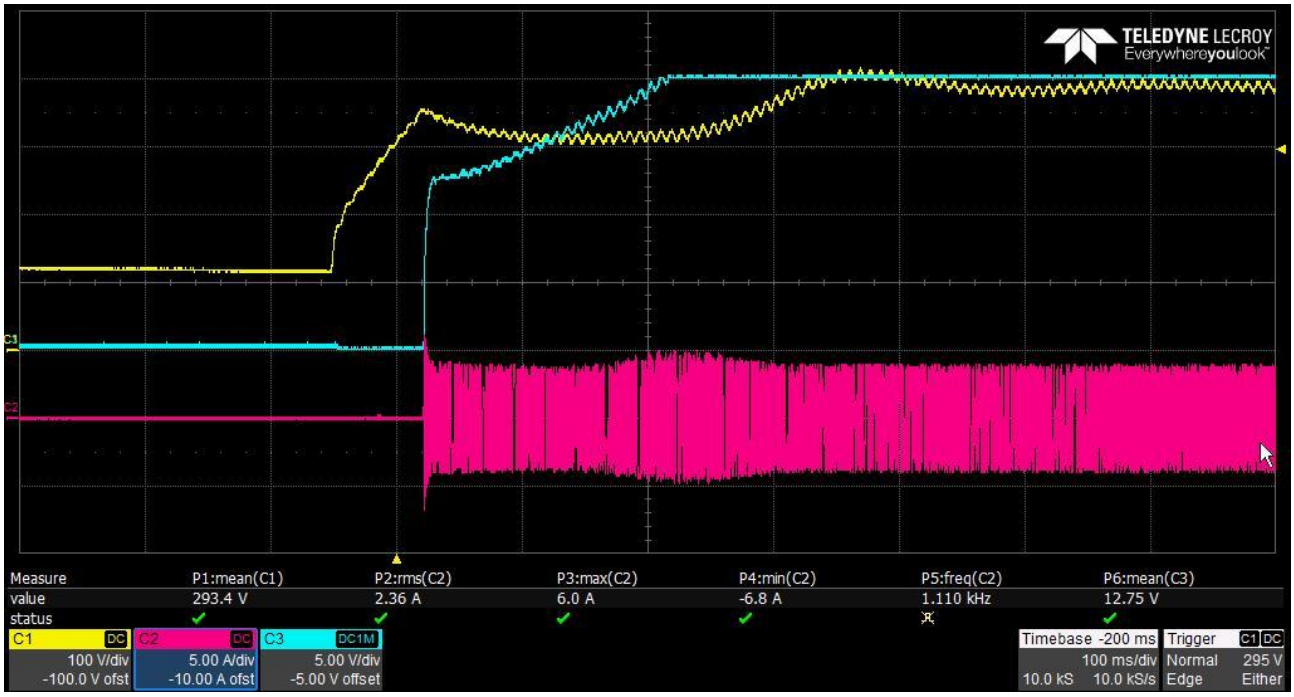
Spot analysis	Value
Amb Temperature	15.0°C
Area analysis	**Value**
Q502, Q505Max	81.0°C
R513Max	78.1°C



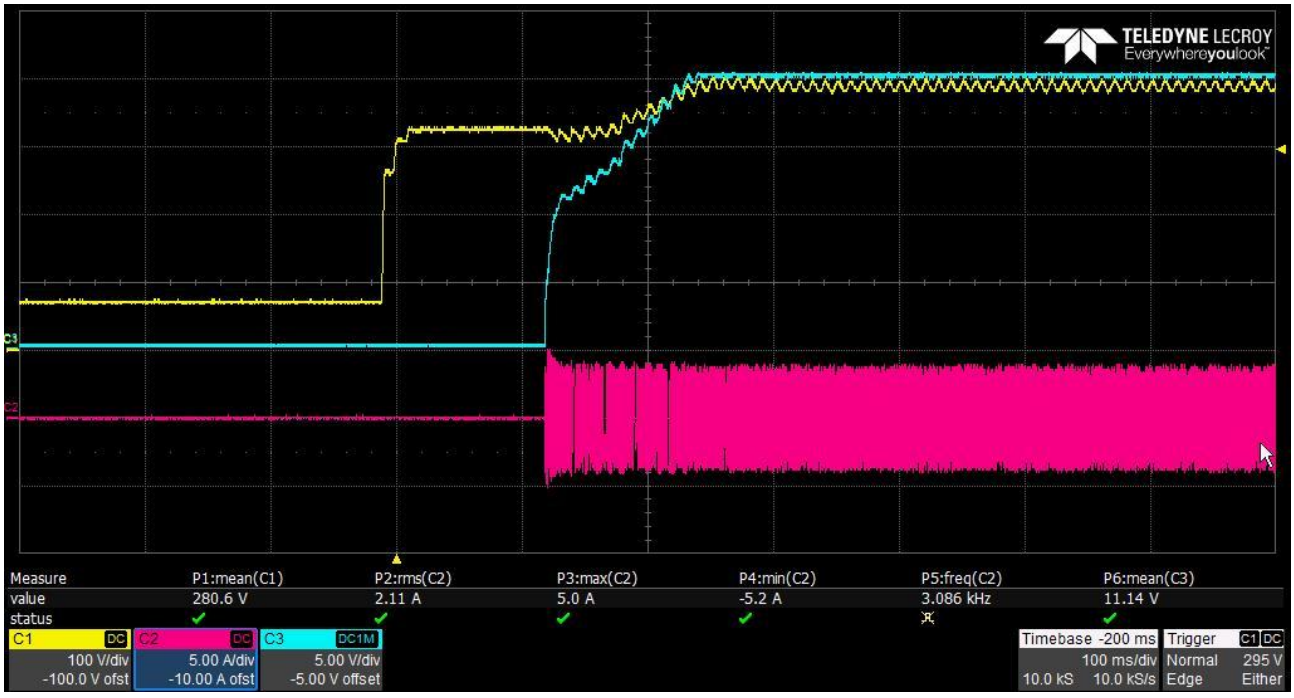
5 Startup

The voltages at startup are shown in the images below, where CH1 is the voltage across C808, CH2 is the inductor current of L500, and CH3 is the output voltage.

5.1 120VAC/60Hz – Full Load (20V/20A at output)



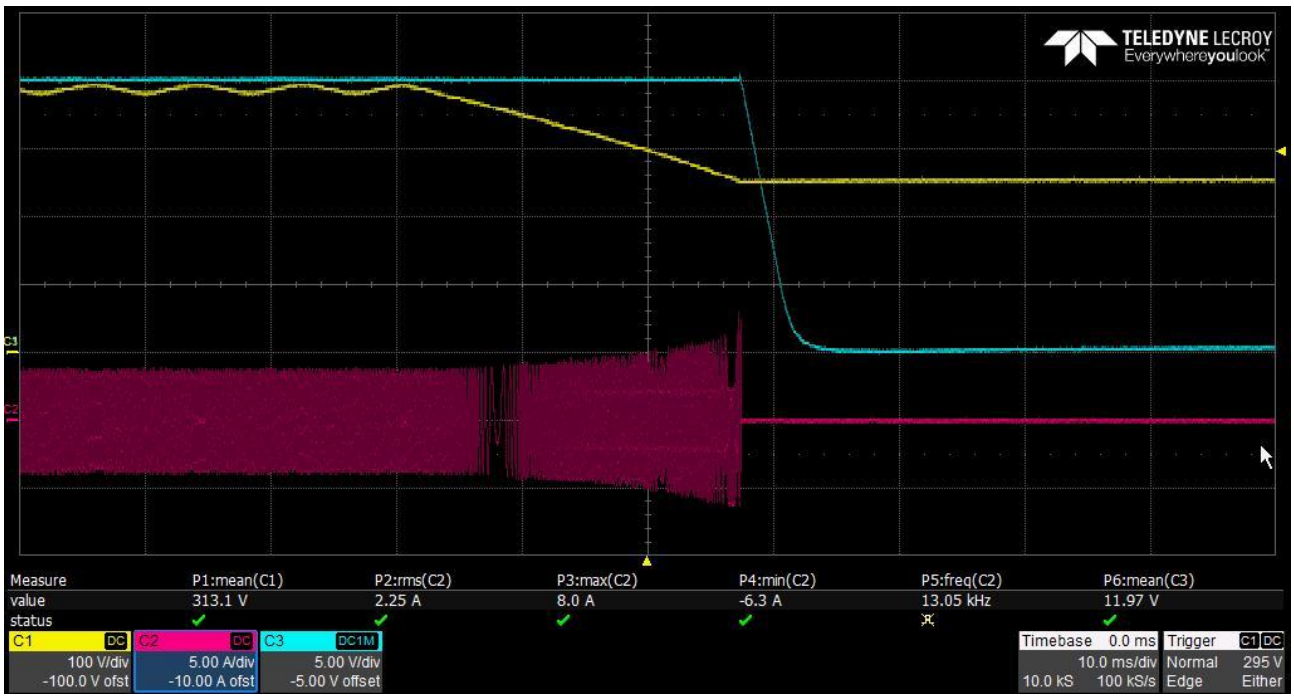
5.2 230VAC/50Hz – Full Load (20V/20A at output)



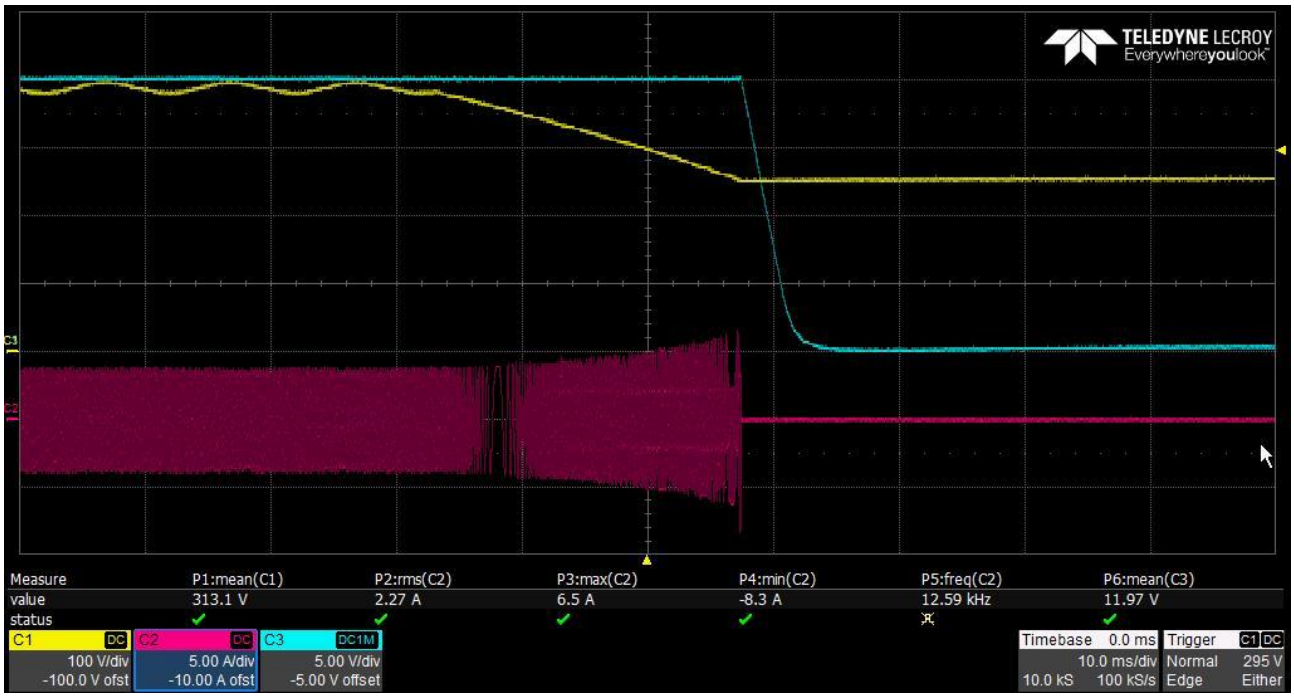
6 Turn-off

The voltages at turn-off are shown in the images below, where CH1 is the voltage across C808, CH2 is the inductor current of L500, and CH3 is the output voltage.

6.1 120VAC/60Hz – Full Load (20V/20A at output)



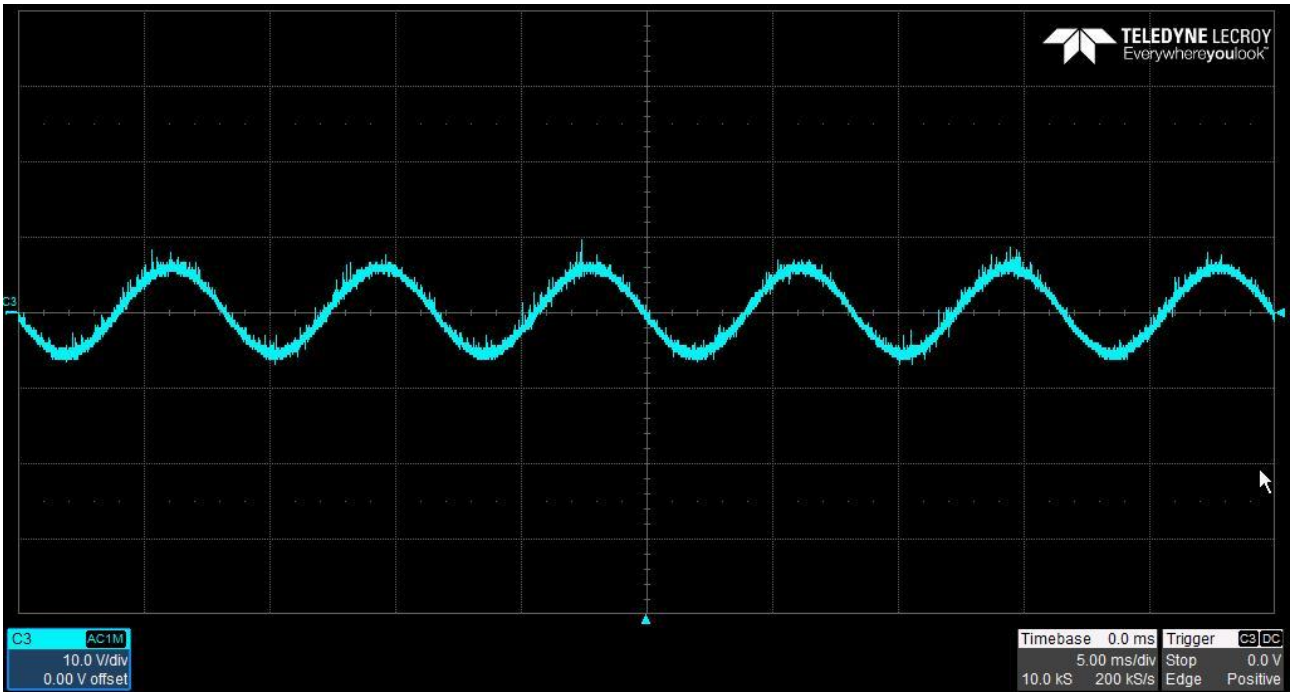
6.2 230VAC/50Hz – Full Load (20V/20A at output)



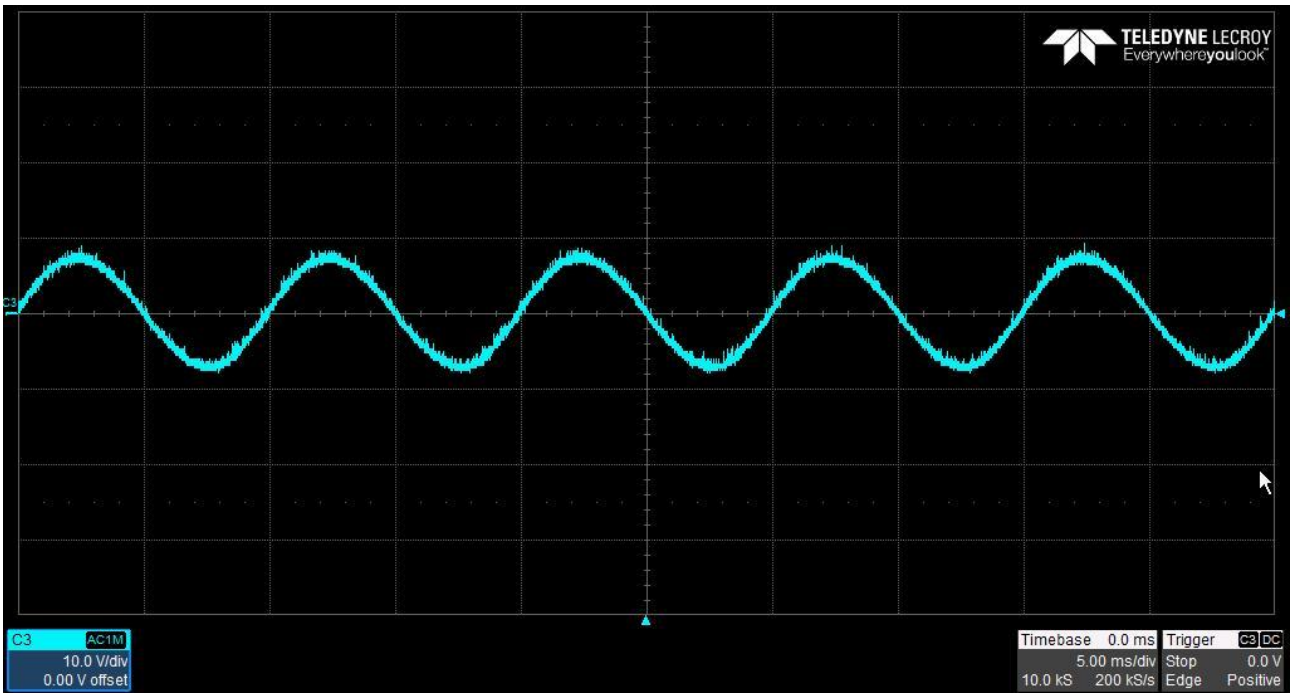
7 PFC Output Ripple Voltage

The PFC output ripple voltage during full load operation (20V/20A at output) is shown in the plots below.

7.1 120VAC/60Hz

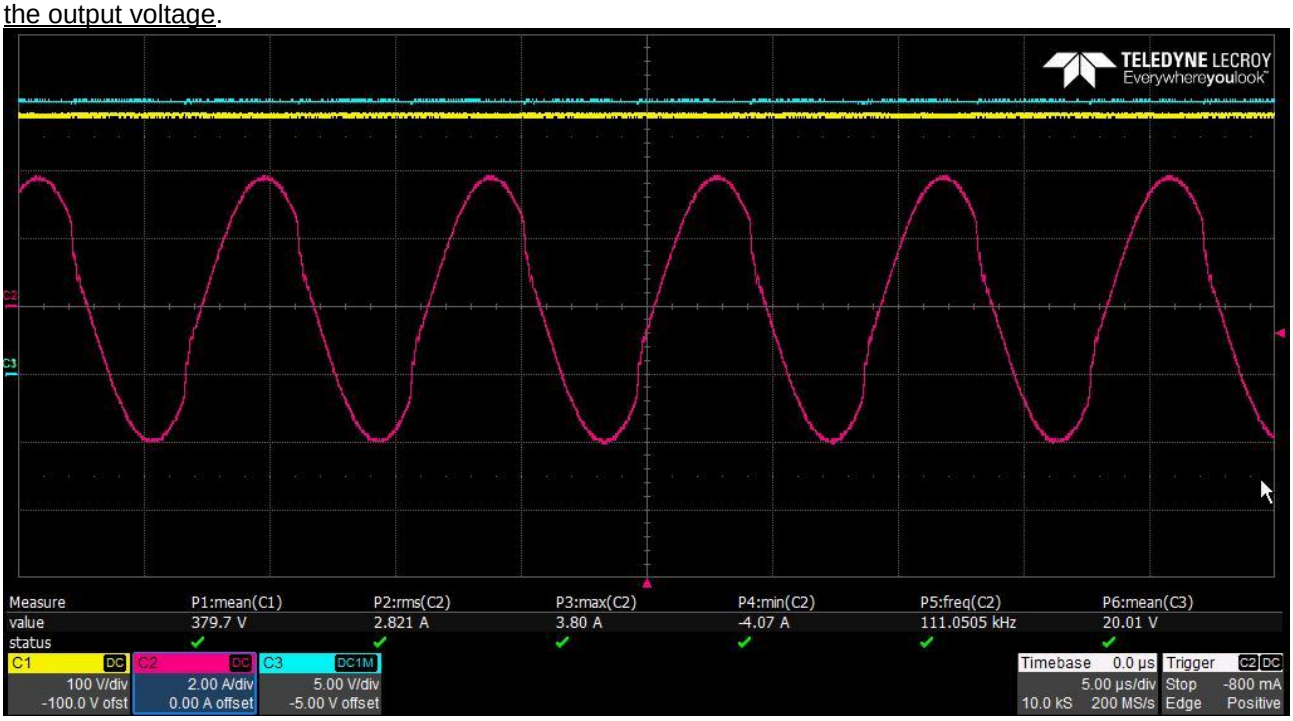


7.2 230VAC/50Hz



8 Resonant Inductor Current

The image below shows the LLC-SRC resonant inductor (L500) current waveform at 20V/20A load at 230V_{AC}/50Hz input, where CH1 is the voltage across C808, CH2 is the inductor current of L500, and CH3 is the output voltage.



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