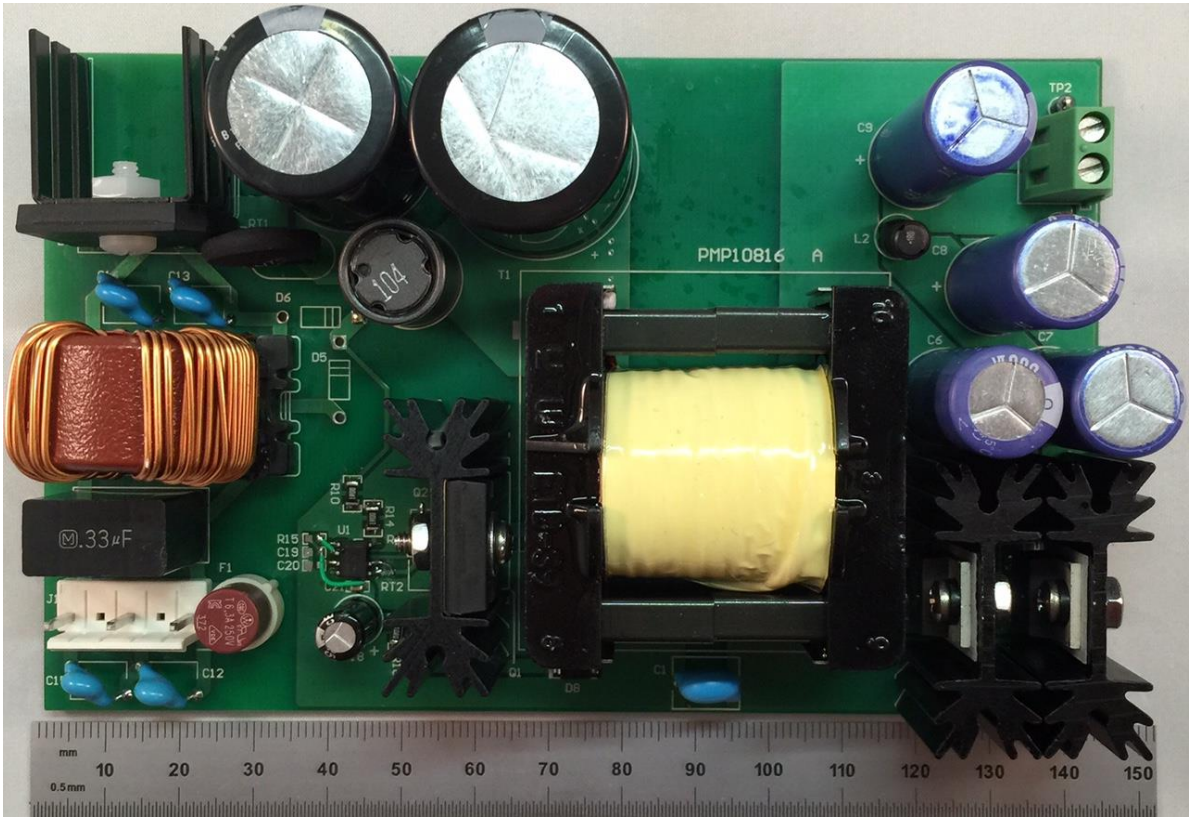
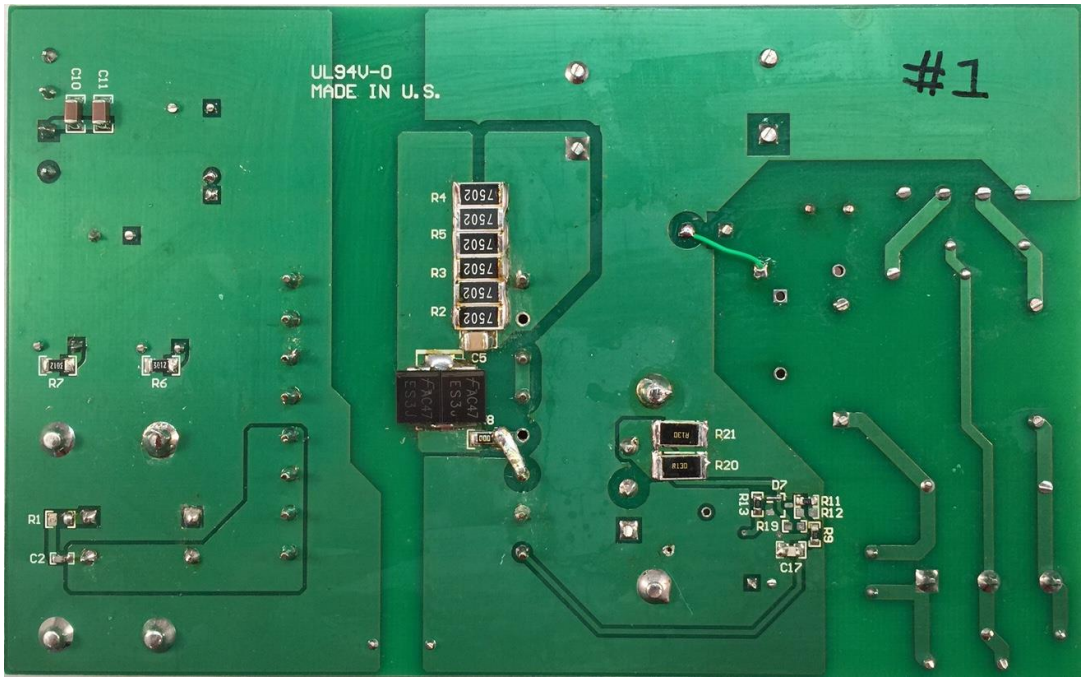
1 Photo

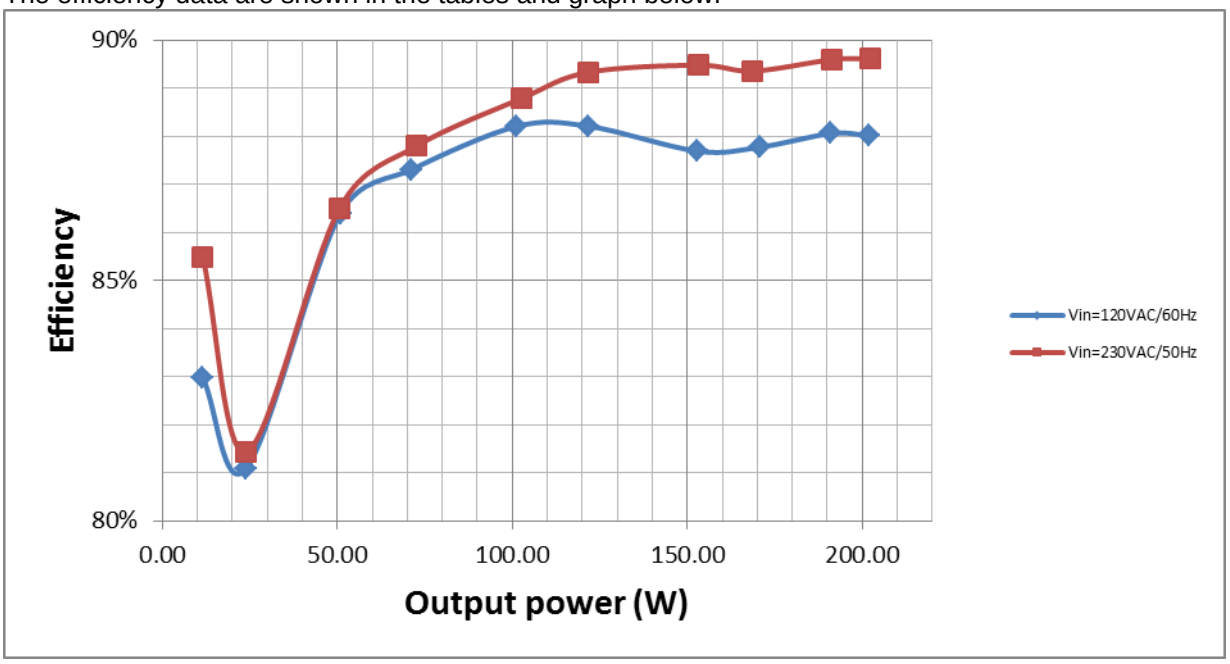
The photographs below show the PMP10816 Rev A assembly. This circuit was built on a PMP10816 Rev A PCB.





2 Converter Efficiency

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



V_{IN}=120V_{AC}/60Hz

Vin(AC)	Iin(A)	Pin(W)	PF	Vout(V)	Iout(A)	Pout(W)	Eff (%)
119.96	2.71	229.500	0.706	48.35	4.18	201.99	88.01%
119.98	2.58	217.000	0.702	48.35	3.95	191.08	88.06%
120.04	2.34	194.410	0.693	48.36	3.53	170.64	87.77%
120.04	2.12	174.440	0.686	48.33	3.17	152.96	87.69%
120.00	1.72	137.900	0.67	48.27	2.52	121.64	88.21%
120.08	1.45	114.670	0.658	48.25	2.10	101.14	88.20%
120.10	1.07	81.620	0.636	48.23	1.48	71.26	87.31%
119.99	0.80	58.850	0.614	48.25	1.05	50.84	86.39%
120.07	0.43	29.460	0.567	48.26	0.50	23.89	81.08%
120.09	0.23	14.0	0.513	48.37	0.24	11.61	82.97%
120.00	0.02	0.7	0.277	48.36	0.00	0.00	0.00%

V_{IN}=230V_{AC}/50Hz

Vin(AC)	Iin(A)	Pin(W)	PF	Vout(V)	Iout(A)	Pout(W)	Eff (%)
230.00	1.64	225.800	0.6	48.40	4.18	202.35	89.61%
230.00	1.56	213.400	0.596	48.37	3.95	191.19	89.59%
230.00	1.40	188.810	0.588	48.33	3.49	168.71	89.36%
230.00	1.28	171.090	0.582	48.31	3.17	153.09	89.48%
230.00	1.04	136.210	0.567	48.29	2.52	121.68	89.33%
230.00	0.90	115.630	0.558	48.29	2.13	102.67	88.79%
230.00	0.67	82.720	0.537	48.30	1.50	72.62	87.80%
230.00	0.49	58.590	0.517	48.27	1.05	50.69	86.51%
229.90	0.27	29.560	0.475	48.27	0.50	24.07	81.44%
230.00	0.14	13.535	0.419	48.21	0.24	11.57	85.48%
230.00	0.02	0.746	0.132	48.03	0.00	0.00	0.00%

Average Efficiency

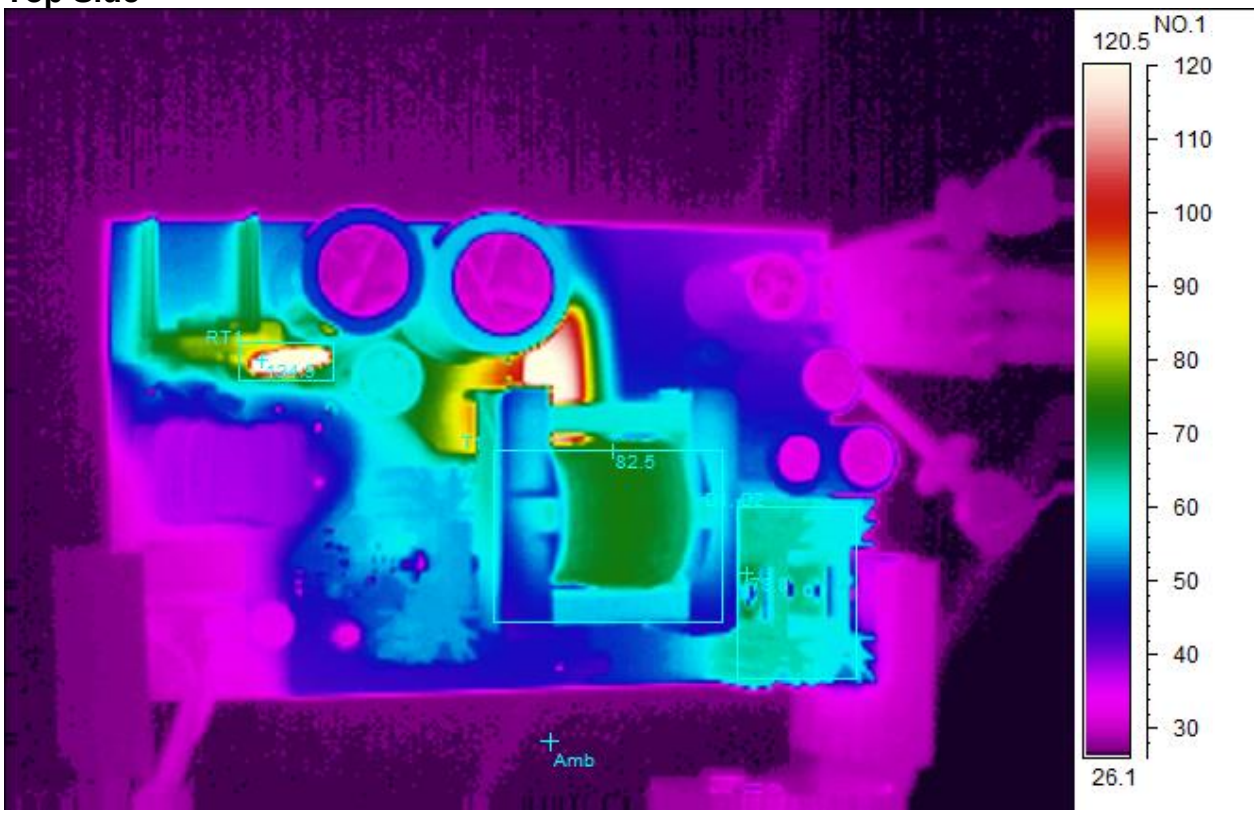
Vin	Pin(W)	Vout(V)	Iout(A)	Load	Avg Eff.
120VAC/60Hz	58.85	48.25	1.05	25%	87.58%
	114.67	48.25	2.1	50%	
	174.44	48.33	3.17	75%	
	229.5	48.35	4.18	100%	
230VAC/50Hz	58.59	48.27	1.05	25%	88.64%
	115.63	48.29	2.13	50%	
	171.09	48.31	3.17	75%	
	225.8	48.4	4.18	100%	

3 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 at 48V/4.2A full load.

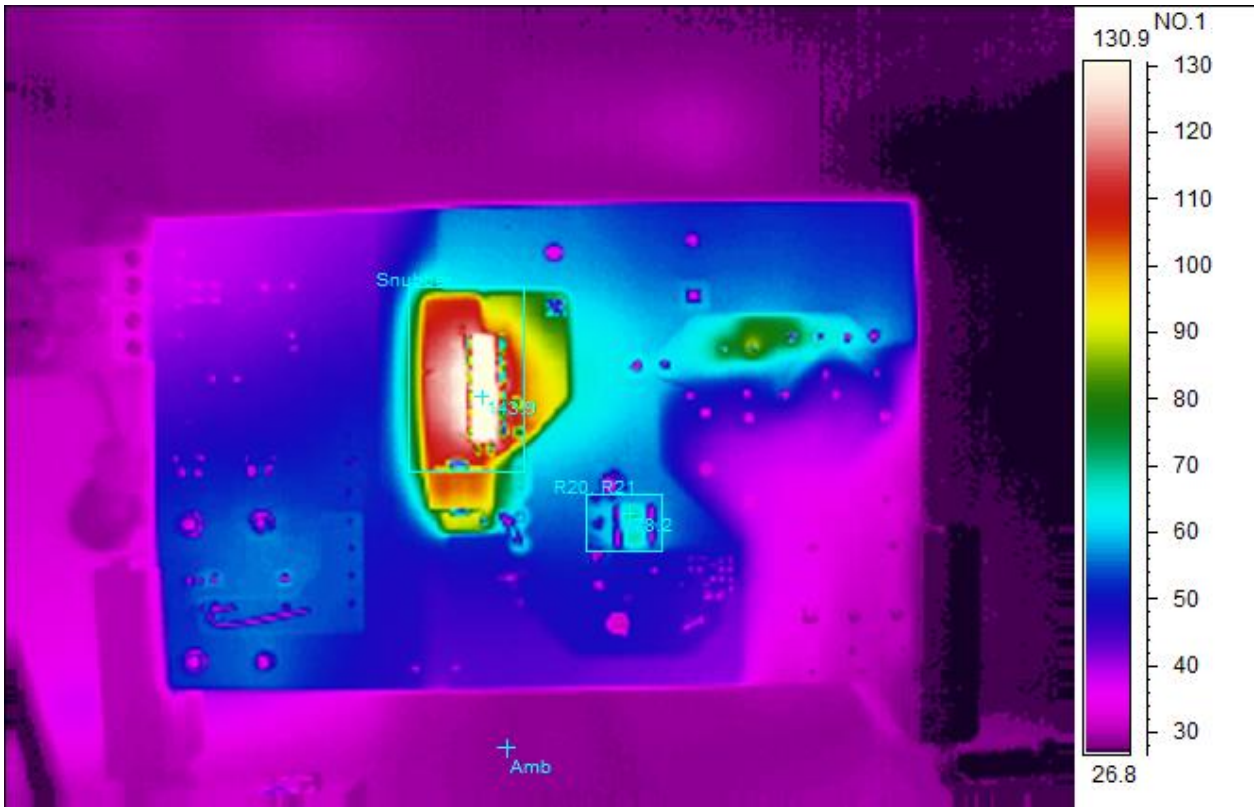
120V_{AC}/60Hz

Top Side



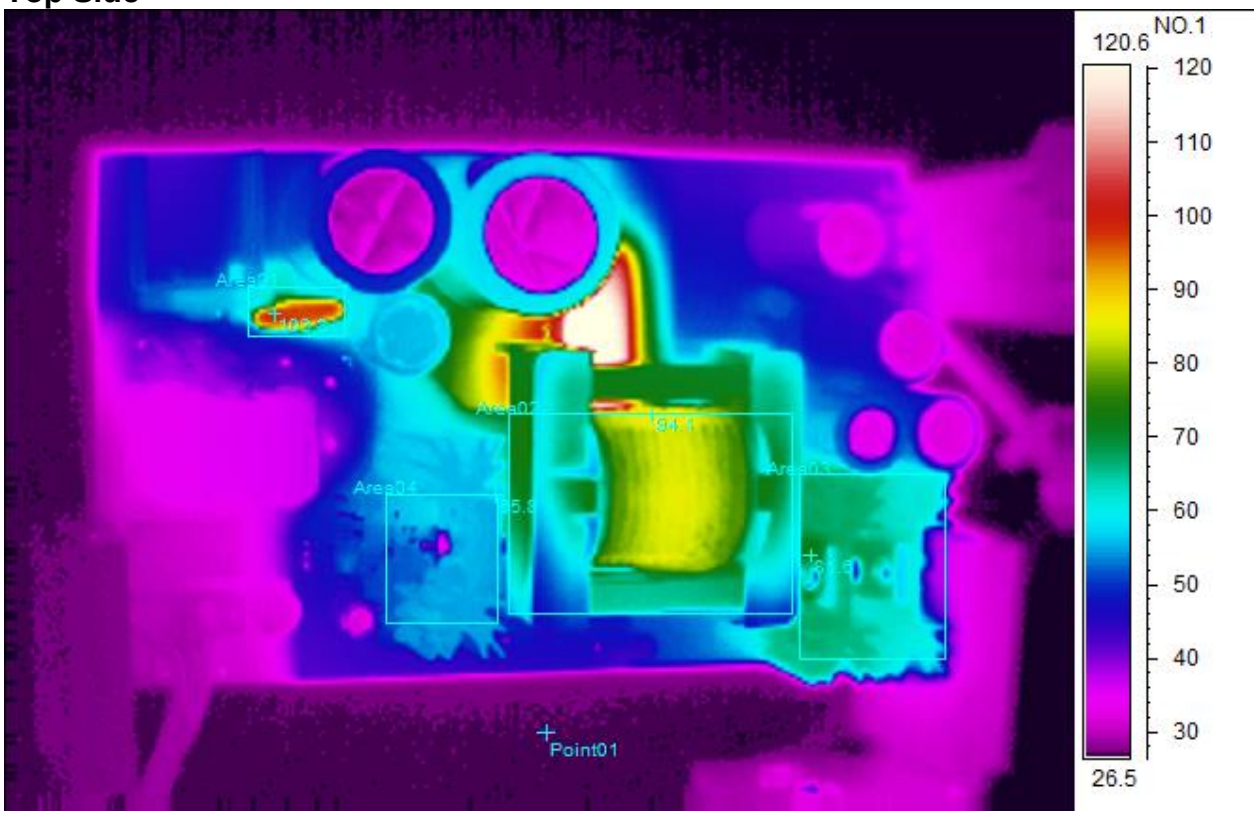
Spot analysis	Value
Amb Temperature	27.1°C
Area analysis	**Value**
RT1Max	134.9°C
T1Max	82.5°C
D1, D2Max	78.8°C

120V_{AC}/60Hz
Bottom Side



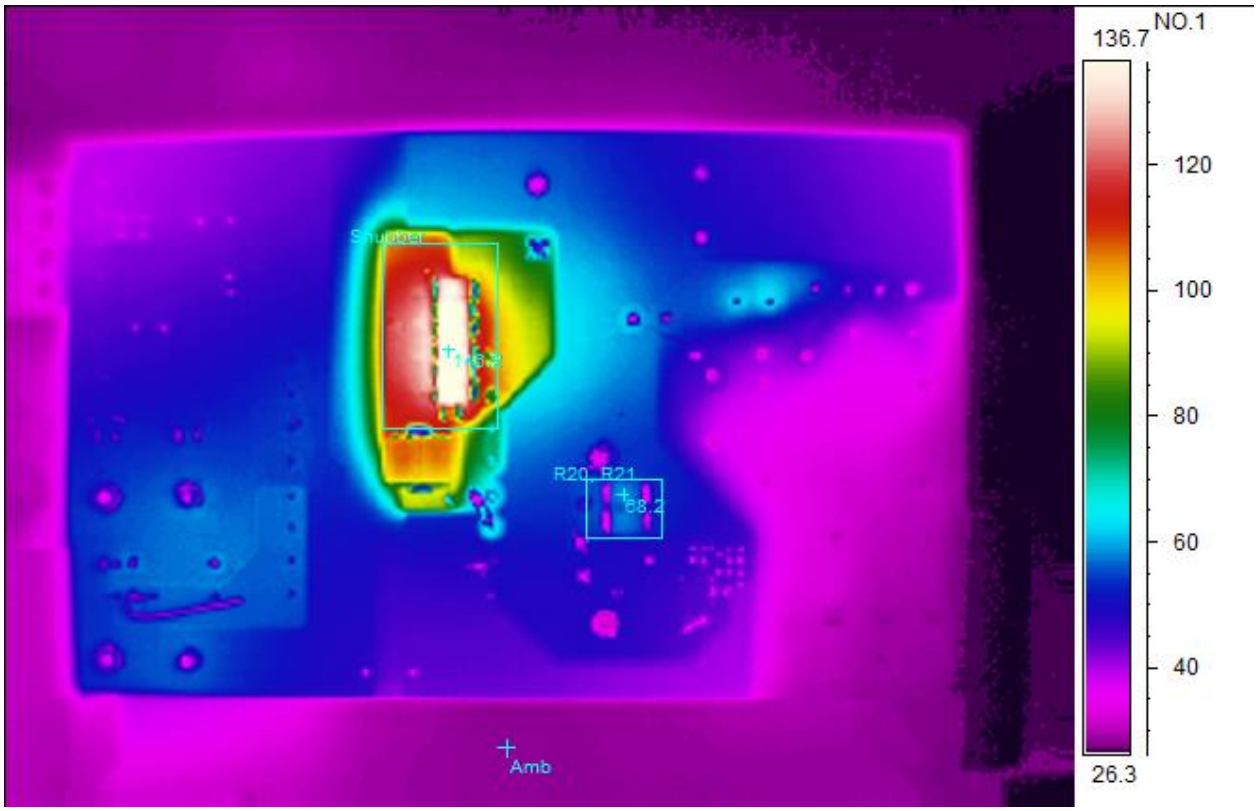
Spot analysis	Value
Amb Temperature	29.4°C
Area analysis	**Value**
SnubberMax	143.9°C
R20, R21Max	78.2°C

230V_{AC}/50Hz
Top Side



Spot analysis	Value
Point01Temperature	27.4°C
Area analysis	**Value**
Area01Max	103.8°C
Area02Max	94.1°C
Area03Max	81.6°C
Area04Max	65.8°C

230V_{AC}/50Hz
Bottom Side

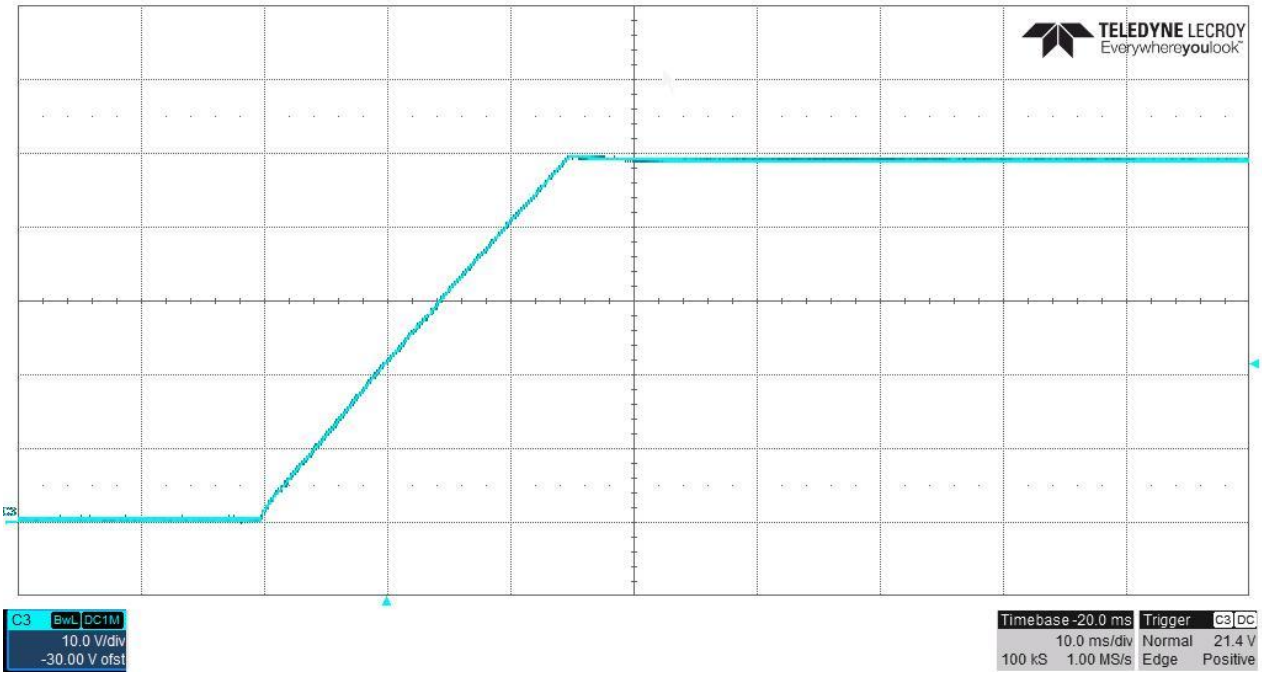


Spot analysis	Value
Amb Temperature	29.4°C
Area analysis	**Value**
SnubberMax	146.2°C
R20, R21Max	68.2°C

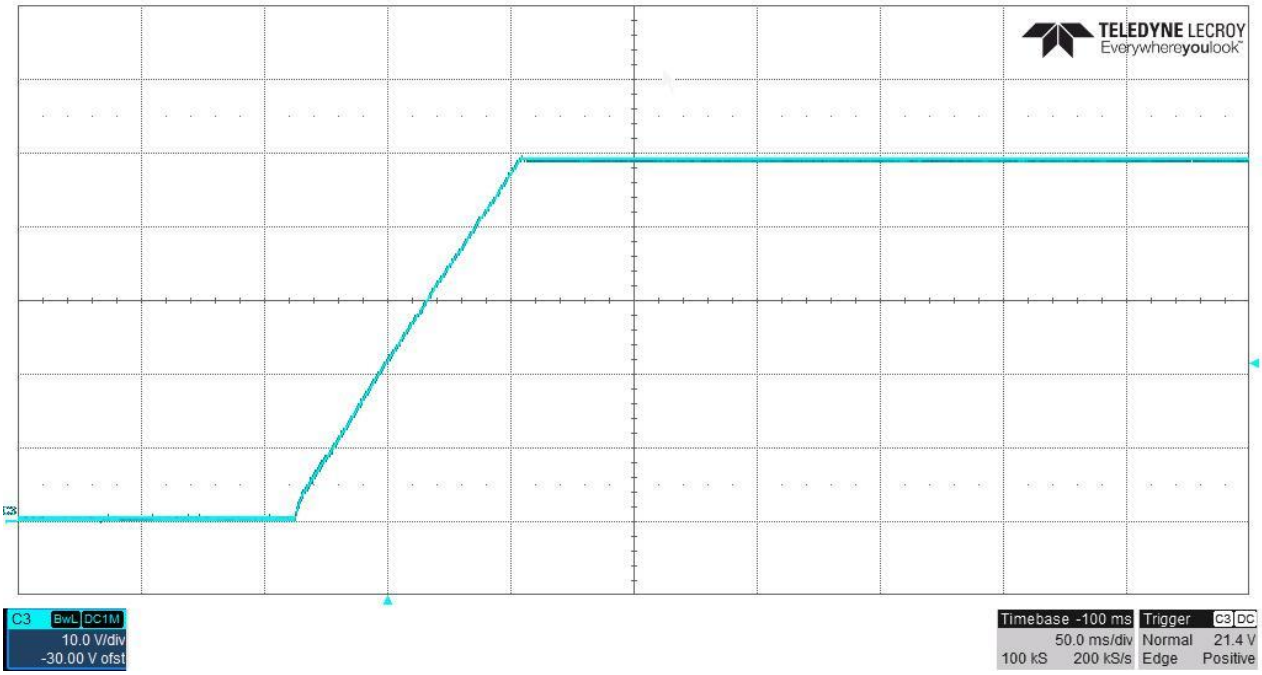
4 Startup

The output voltages at startup are shown in the images below.

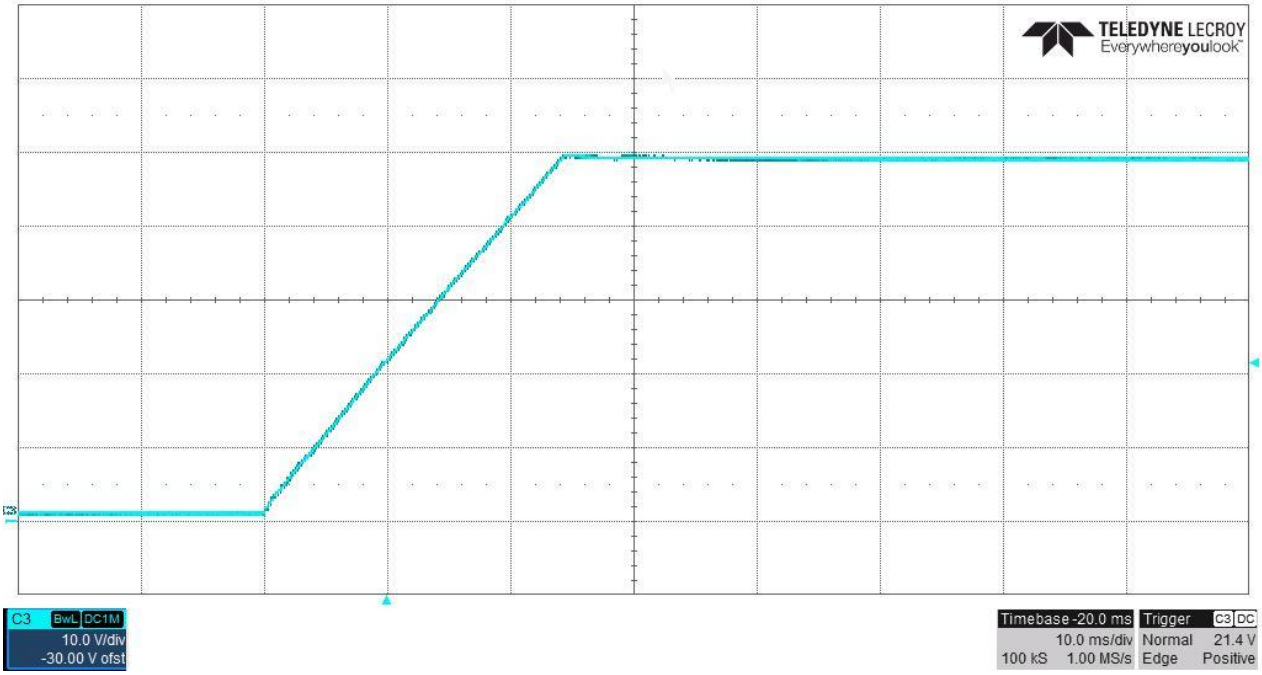
4.1 Startup @ 120V_{AC}/60Hz: no load.



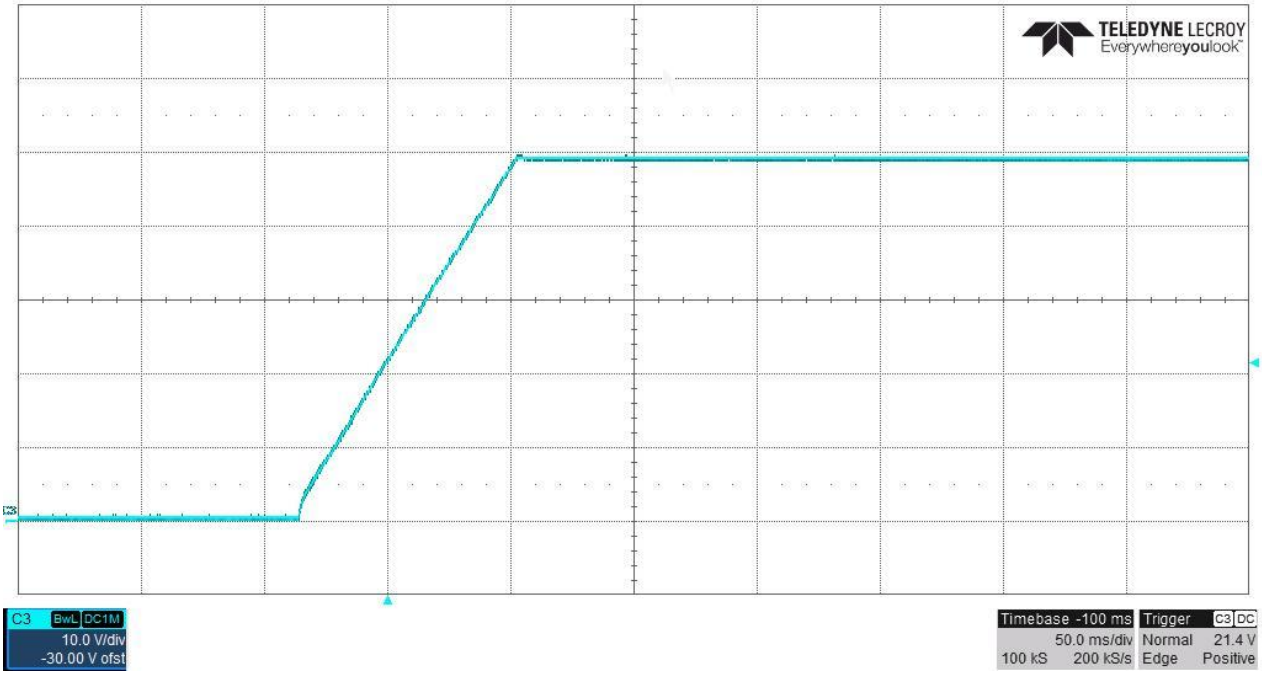
4.2 Startup @ 120V_{AC}/60Hz: 48V/4A.



4.3 Startup @ 230V_{AC}/50Hz: no load.



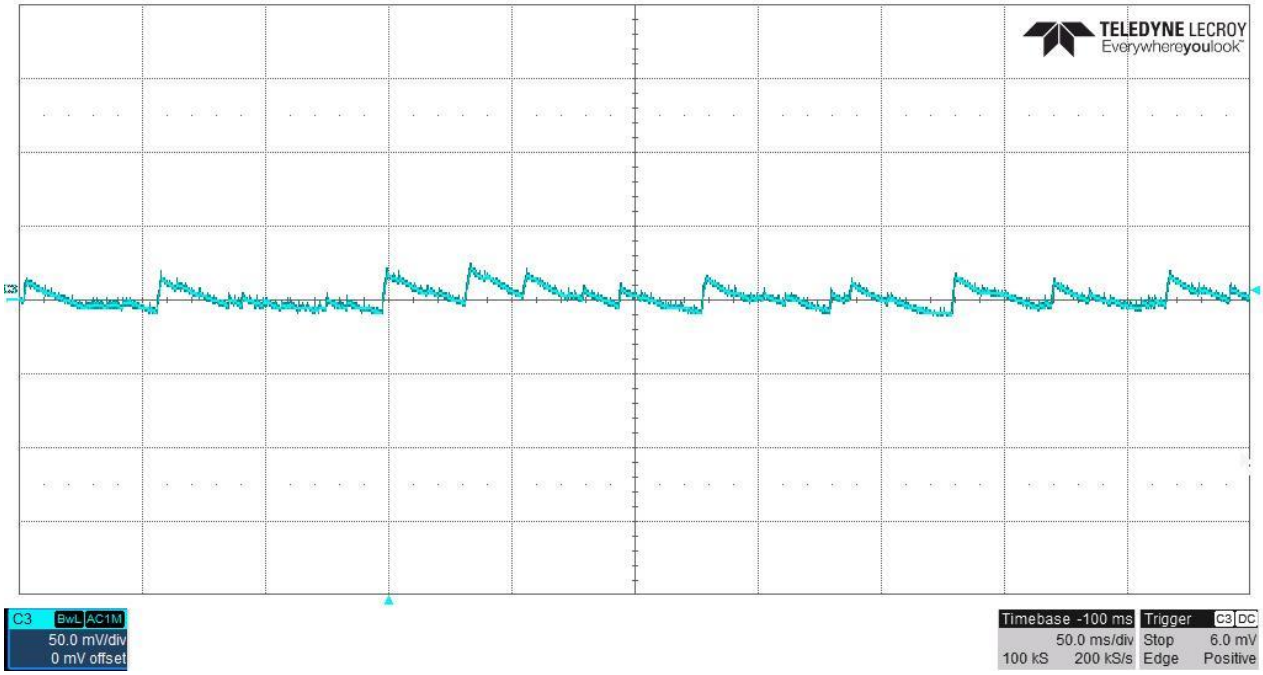
4.4 Startup @ 230V_{AC}/50Hz: 48V/4A.



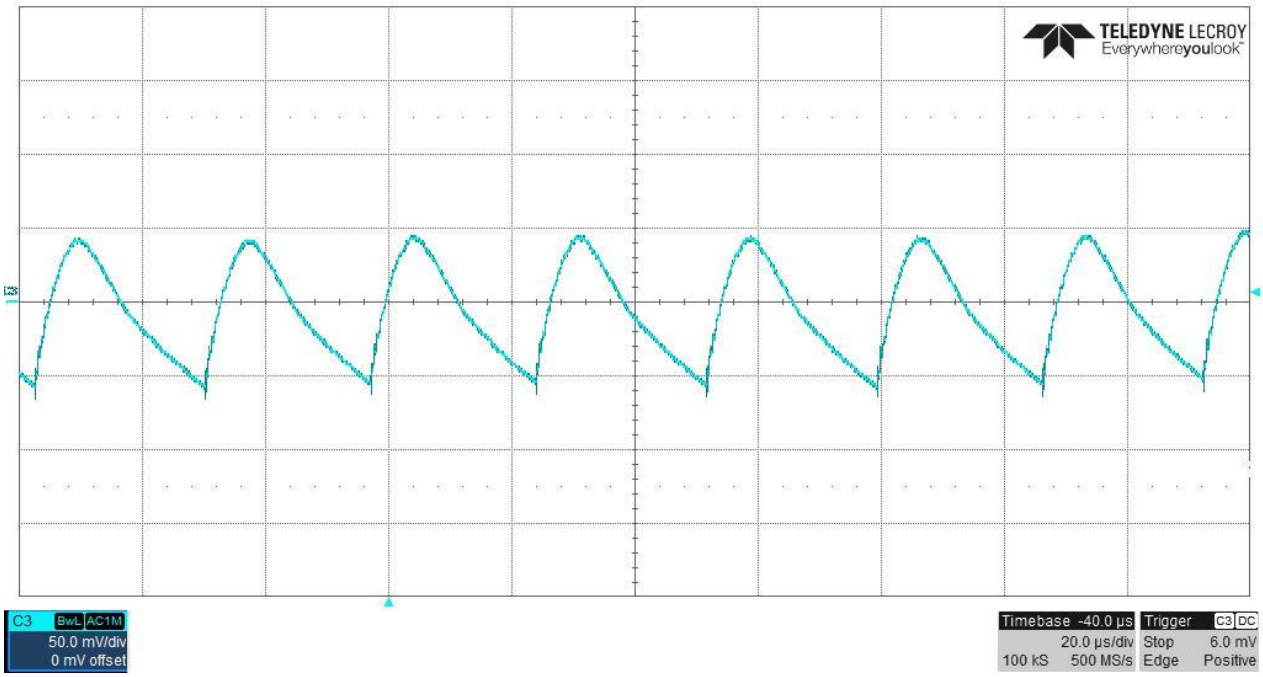
5 Output Ripple Voltages

The output ripple voltage is shown in the plots below.

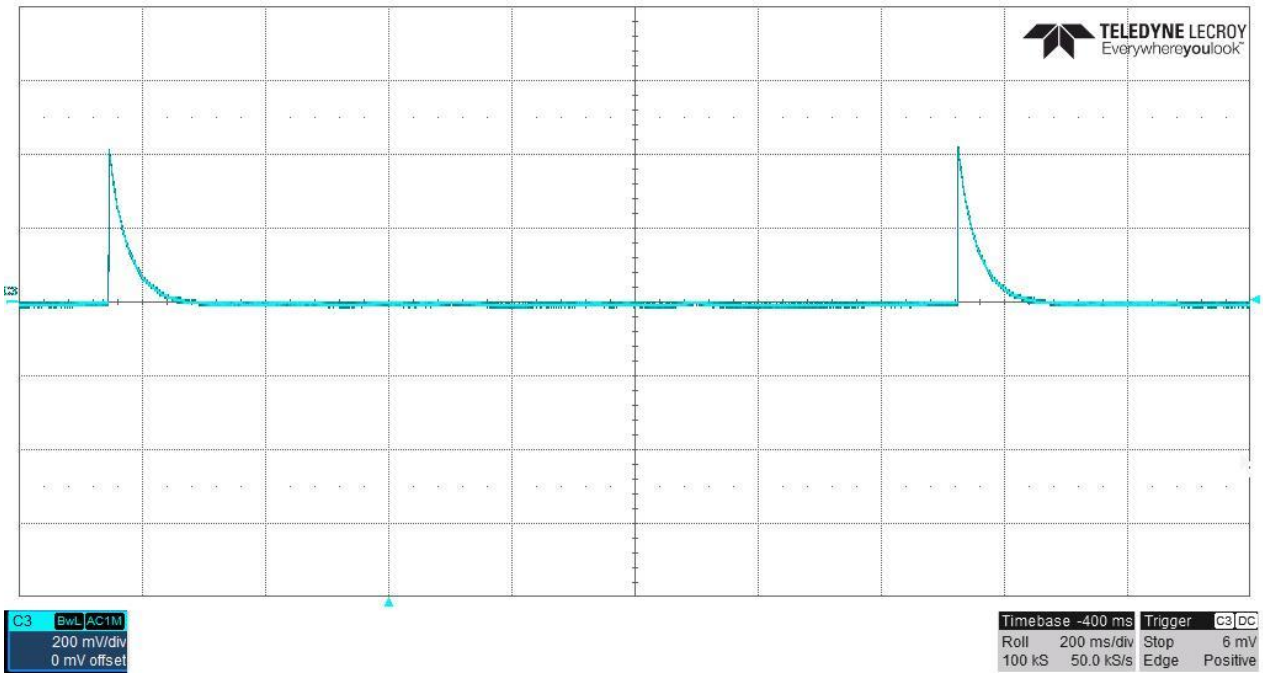
5.1 120V_{AC}/60Hz: no Load.



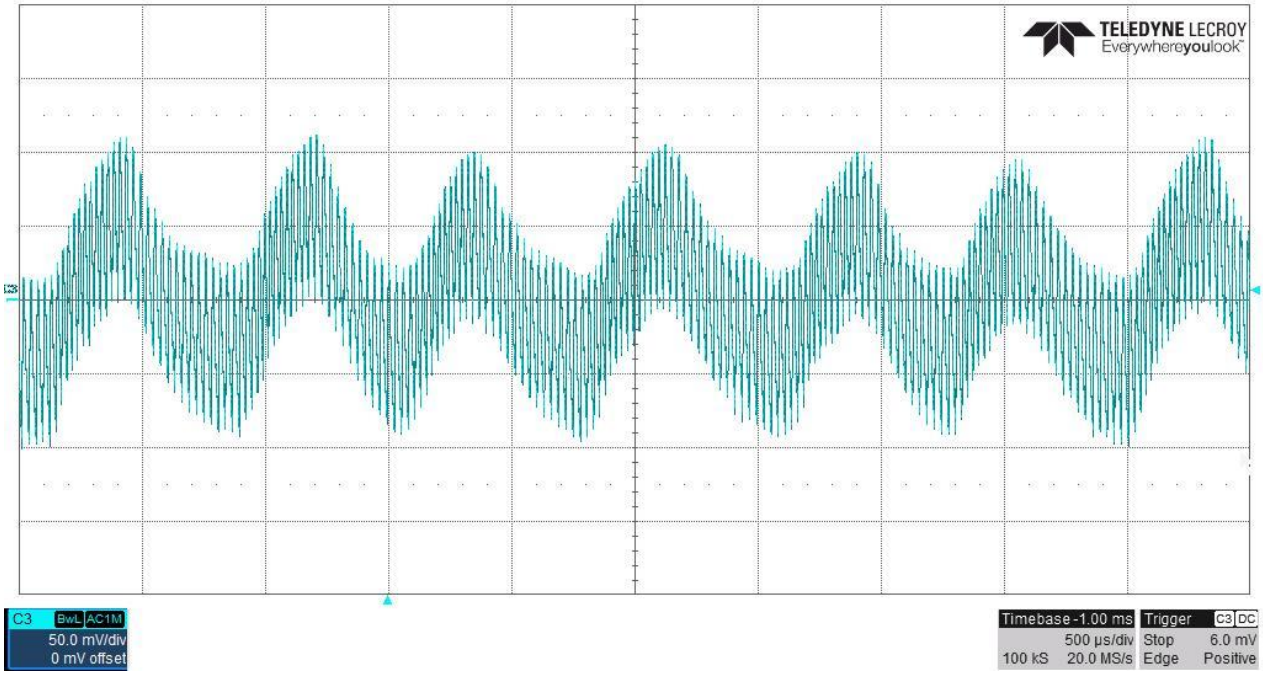
5.2 120V_{AC}/60Hz: 48V/4A.



5.3 230V_{AC}/50Hz: no Load.



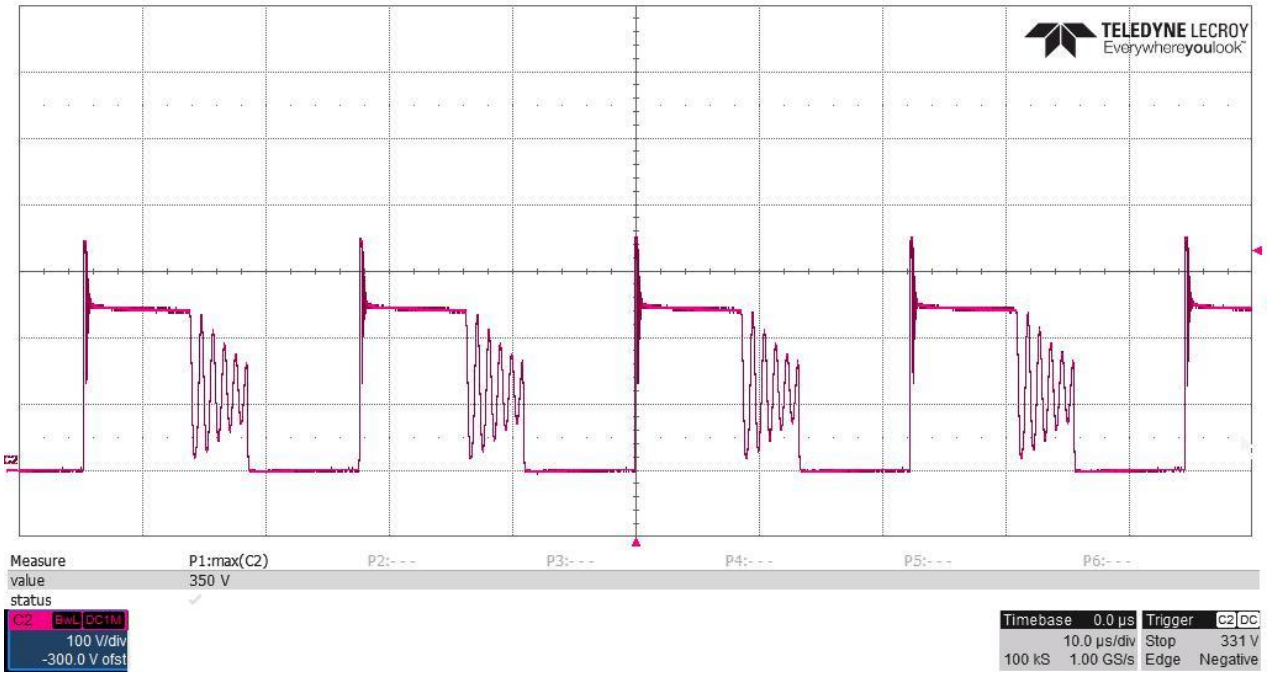
5.4 230V_{AC}/50Hz: 48V/4A.



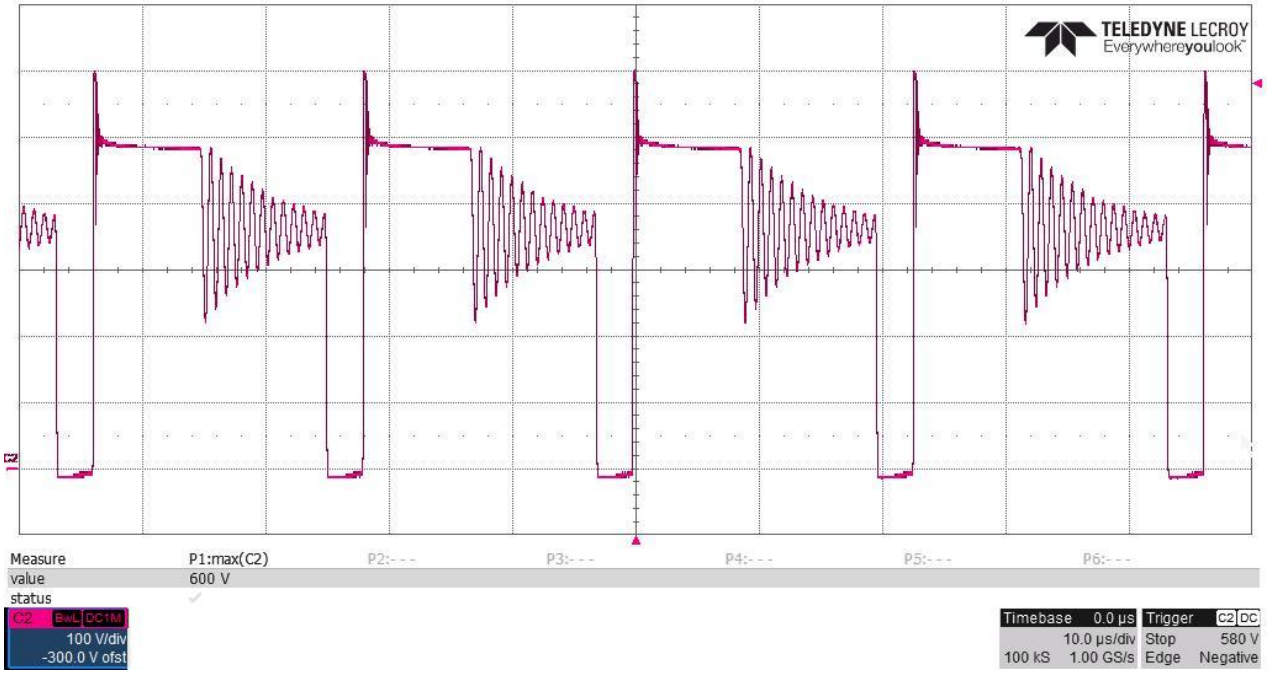
6 Switching Waveforms

The images below show key switching waveforms of this board. The waveforms are measured with 48V/4.2A full load. CH1: V_D to GND (Q1), CH3: V_{D1}.

6.1 $90V_{AC}$/60Hz



6.2 $264V_{AC}$/50Hz



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