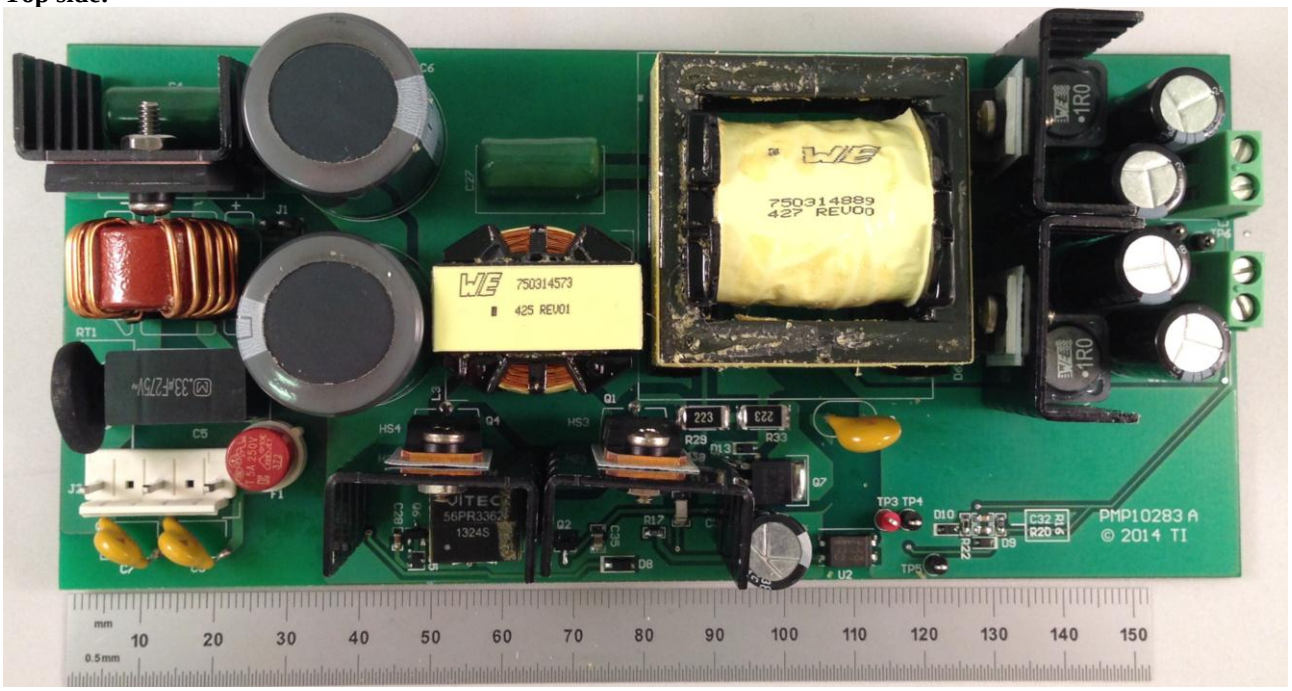
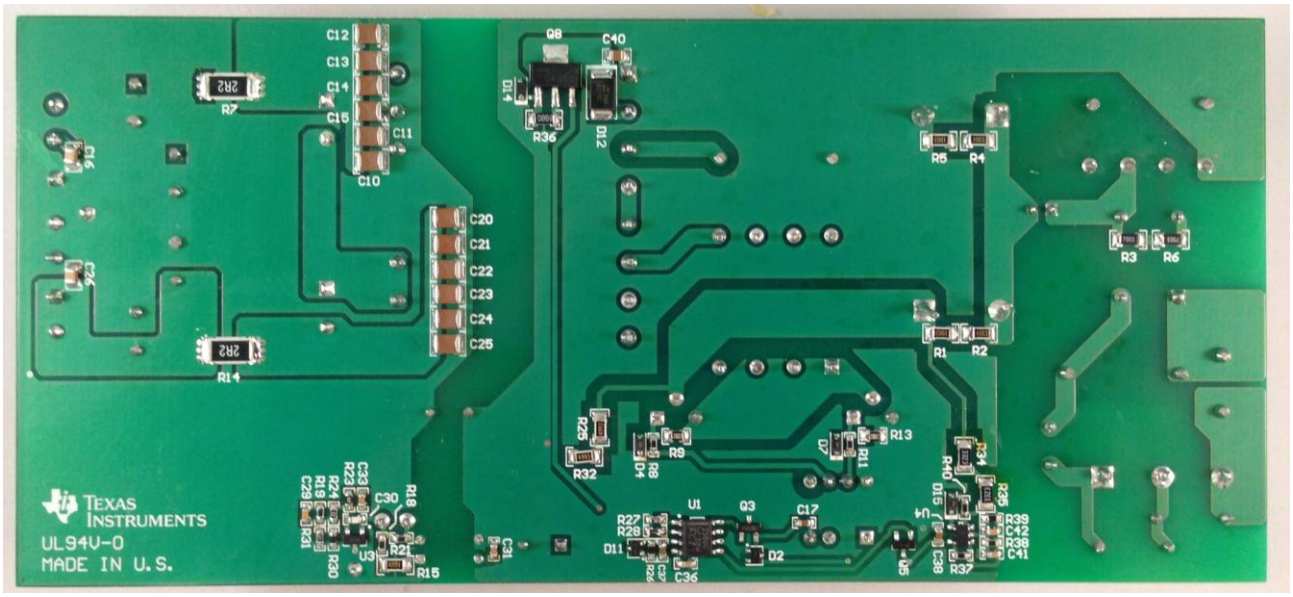
1 Photo

The photographs below show the PMP10283 Rev A assembly. This circuit was built on a PMP10283 Rev A PCB.

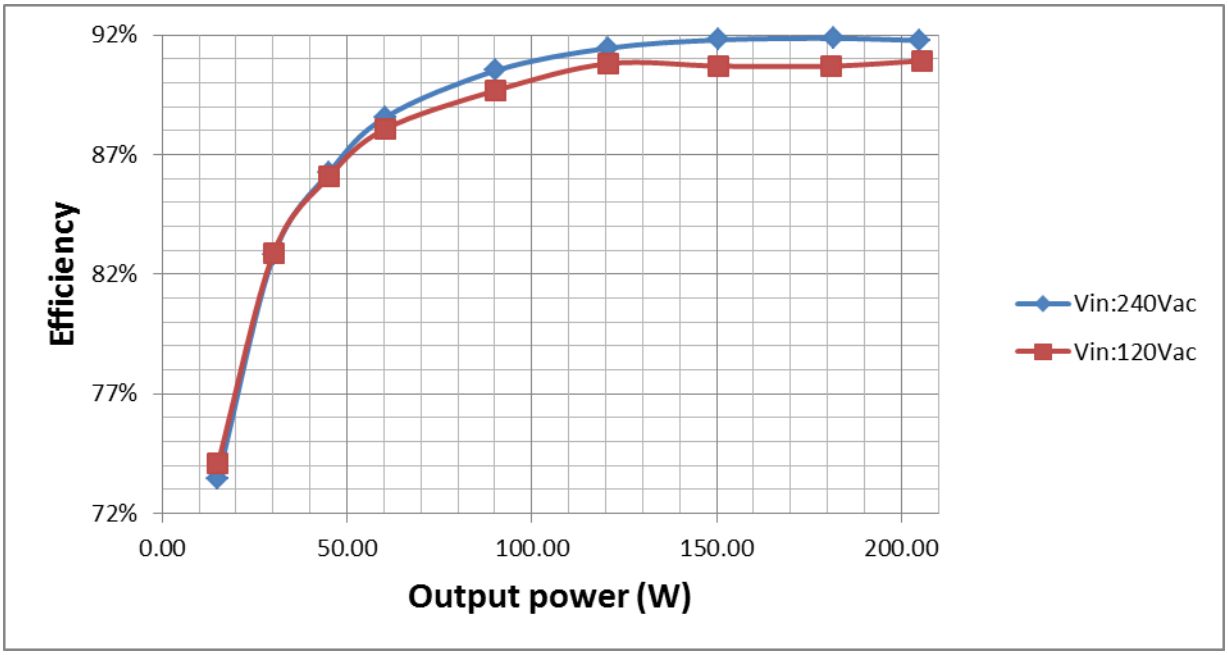
Top side:



Bottom side:



2 Efficiency



120V_{AC}/60Hz

Vin(ac)	Iin(A)	Pin(W)	PF	Vo1(V)	Io1(A)	Vo2(V)	Io2(A)	Pout(W)	Eff (%)
119.99	2.68	226.2	0.704	30.06	3.40	-29.86	3.47	205.67	90.92%
120.01	2.39	199.4	0.695	30.07	3.00	-30.02	3.02	180.87	90.70%
120.00	2.02	165.9	0.683	30.07	2.50	-30.09	2.50	150.43	90.70%
120.59	1.65	132.9	0.669	30.07	2.00	-30.07	2.01	120.64	90.80%
119.99	1.28	100.8	0.656	30.07	1.50	-30.09	1.50	90.36	89.69%
120.00	0.90	68.5	0.634	30.08	1.00	-30.10	1.00	60.30	88.07%
119.99	0.70	52.4	0.62	30.08	0.75	-30.11	0.75	45.11	86.08%
119.97	0.51	36.4	0.598	30.08	0.50	-30.10	0.50	30.15	82.90%
120.35	0.30	20.3	0.561	30.09	0.25	-30.09	0.25	15.05	74.08%
120.84	0.08	4.3	0.452	30.09	0.00	-30.48	0.00	0.00	0.00%

240V_{AC}/50Hz

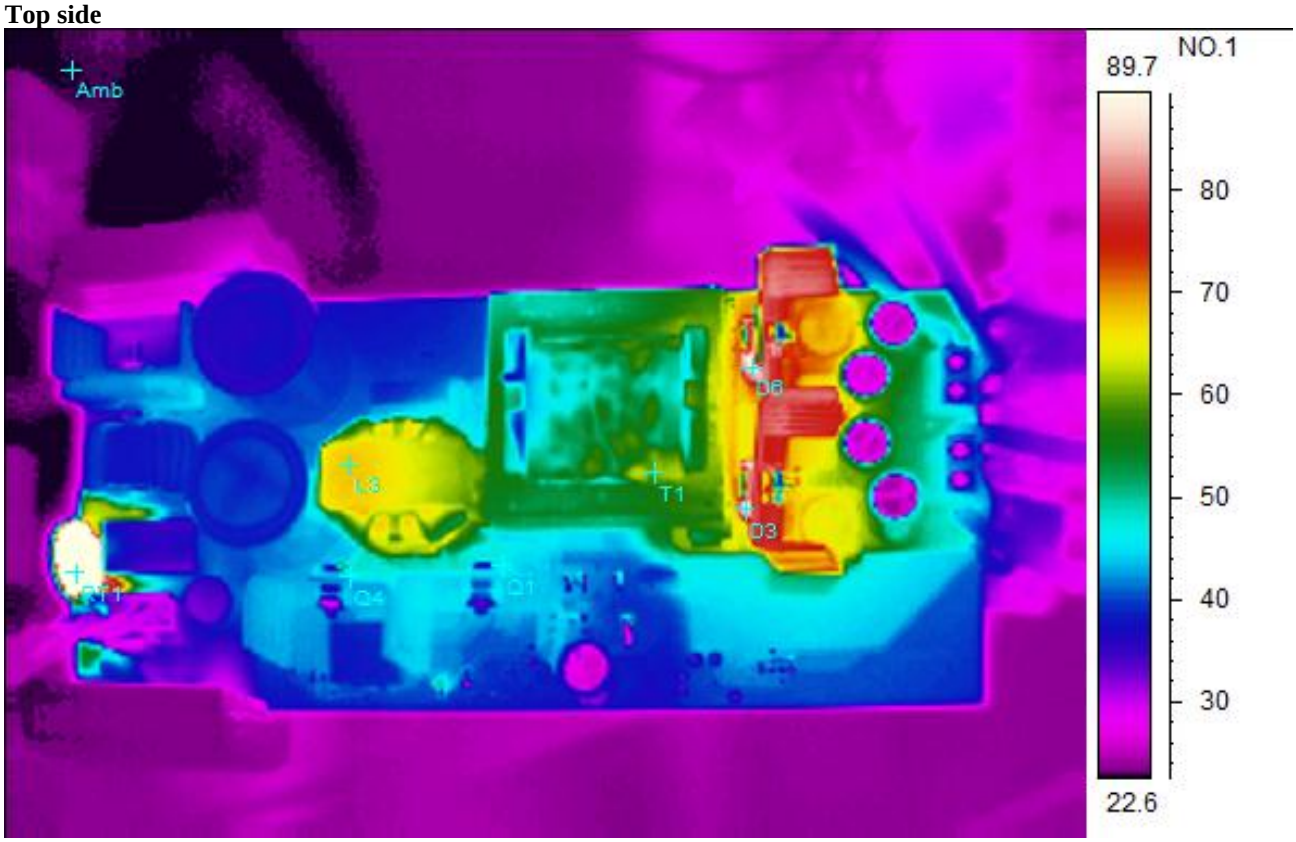
Vin(ac)	Iin(A)	Pin(W)	PF	Vo1(V)	Io1(A)	Vo2(V)	Io2(A)	Pout(W)	Eff (%)
240.30	1.59	223.2	0.586	30.07	3.41	30.14	3.40	204.83	91.77%
240.50	1.42	197.8	0.578	30.07	3.01	30.05	3.04	181.65	91.86%
240.80	1.20	163.9	0.567	30.08	2.50	30.12	2.50	150.47	91.79%
240.10	0.99	131.9	0.555	30.07	2.00	30.08	2.01	120.63	91.45%
240.40	0.77	99.8	0.541	30.08	1.50	30.09	1.50	90.32	90.51%
240.60	0.55	68.2	0.52	30.08	1.00	30.12	1.00	60.41	88.57%
240.80	0.43	52.3	0.508	30.09	0.75	30.09	0.75	45.14	86.25%
240.90	0.31	36.4	0.487	30.09	0.50	30.10	0.50	30.16	82.80%
240.10	0.19	20.5	0.456	30.09	0.25	30.10	0.25	15.05	73.44%
240.30	0.05	4.5	0.343	30.09	0.00	30.53	0.00	0.00	0.00%

3 Thermal Images

The ambient temperature was 25ºC with no forced air flow. The outputs were loaded with 30V/3.4A and -30V/3.4A.

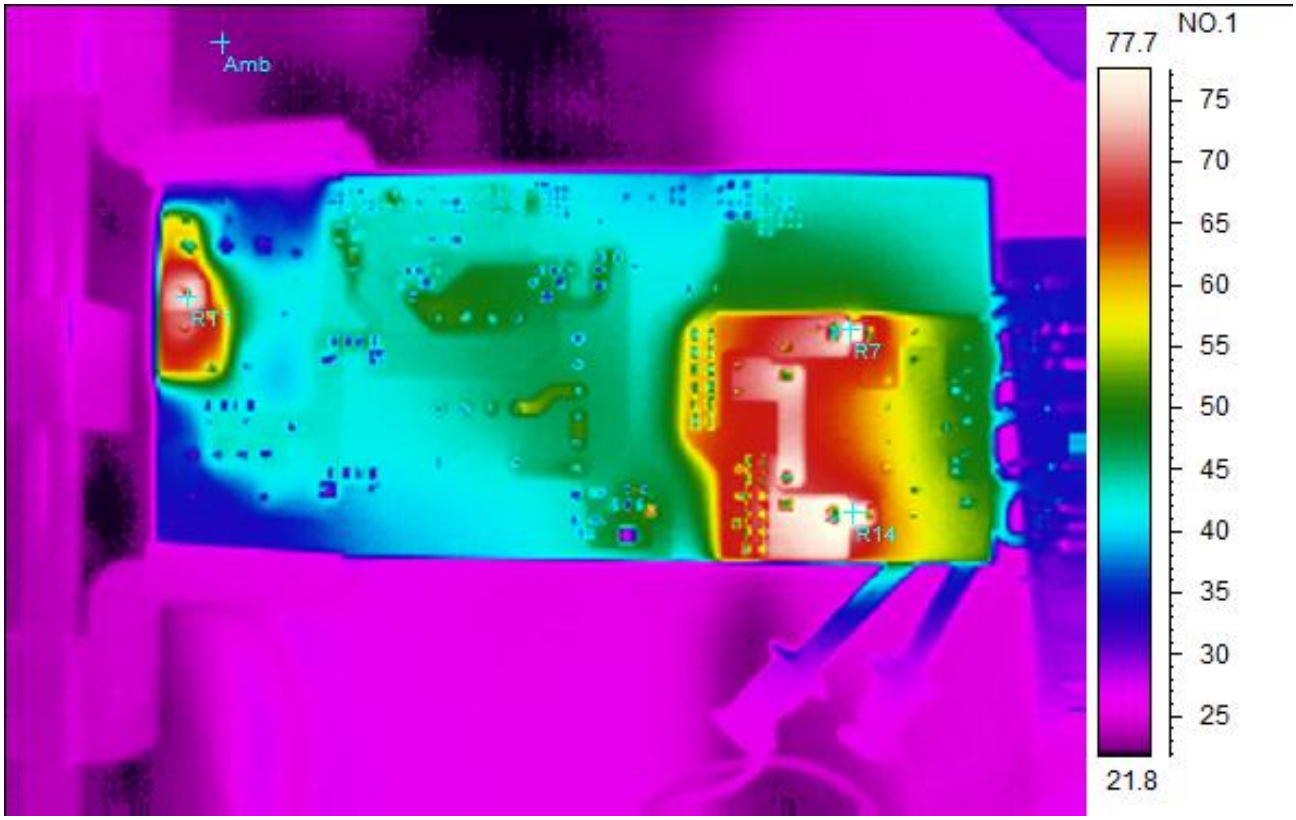
3.1 $120V_{AC}$/60Hz

Top side



Spot analysis	Value
RT1 Temperature	119.5°C
L3 Temperature	71.3°C
Q4 Temperature	49.2°C
Q1 Temperature	50.3°C
T1 Temperature	64.4°C
D6 Temperature	88.0°C
D3 Temperature	86.9°C
Amb Temperature	22.9°C

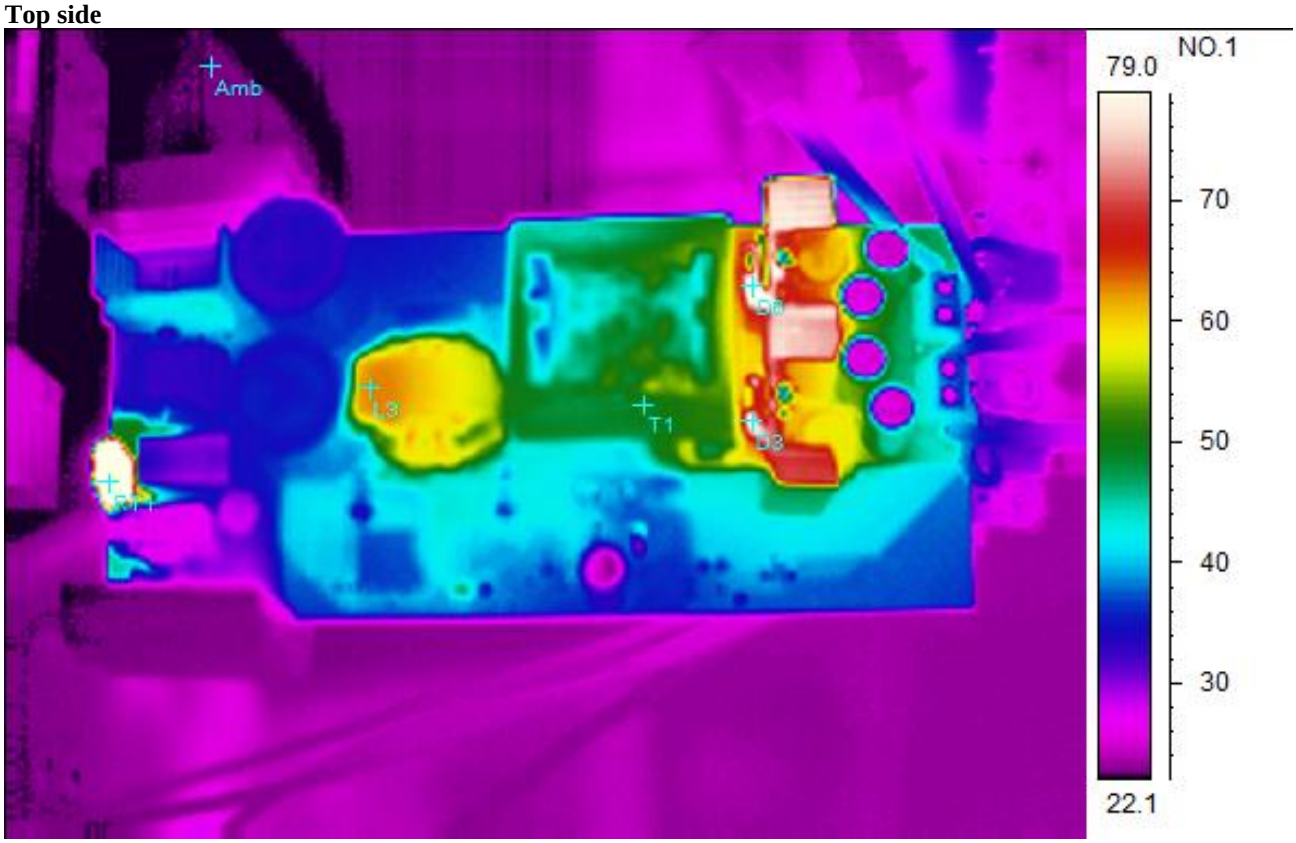
Bottom side



Spot analysis	Value
RT1Temperature	75.8°C
AmbTemperature	23.2°C
R7Temperature	89.9°C
R14 Temperature	97.1°C

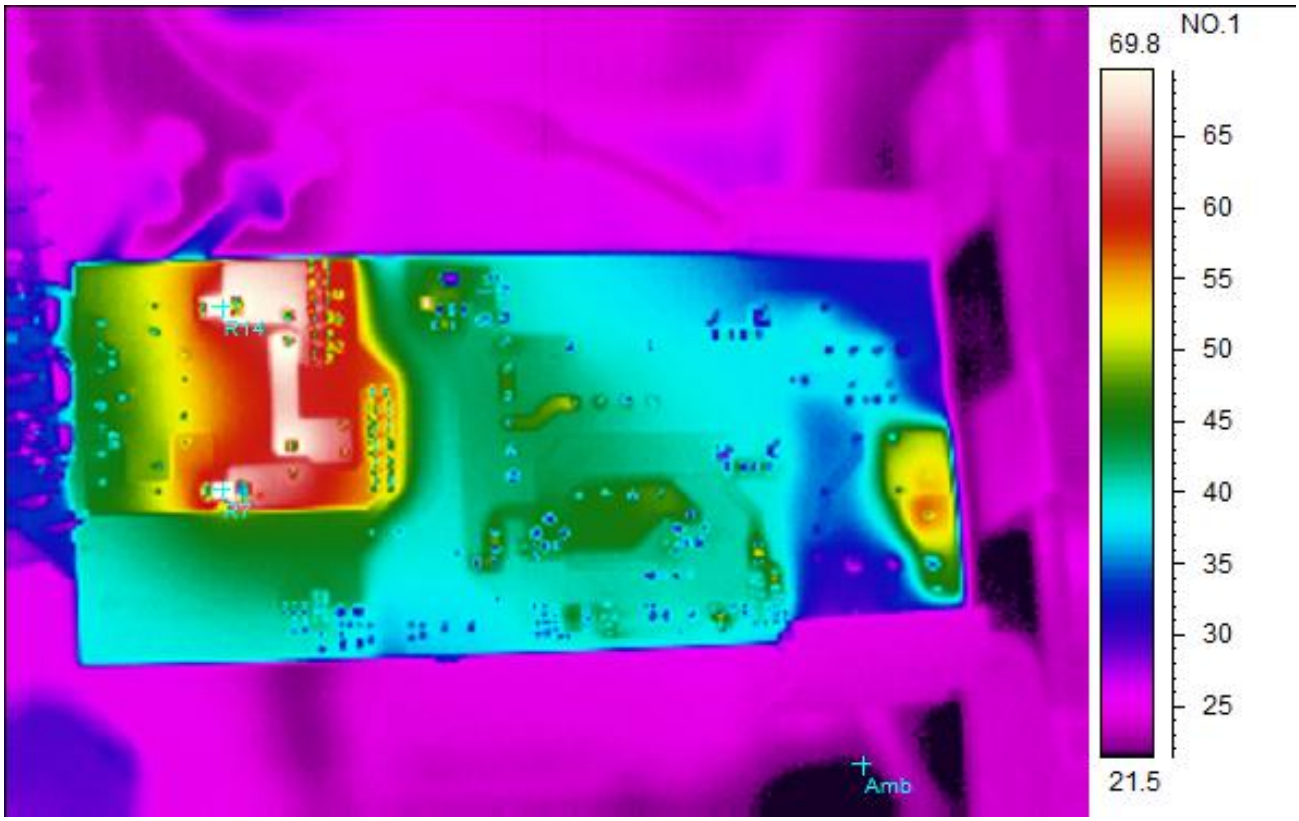
3.2 $240V_{AC}/50Hz$

Top side



Spot analysis	Value
Amb Temperature	22.9°C
RT1 Temperature	90.5°C
L3 Temperature	64.8°C
D6 Temperature	83.4°C
D3 Temperature	79.9°C
T1 Temperature	51.5°C

Bottom side



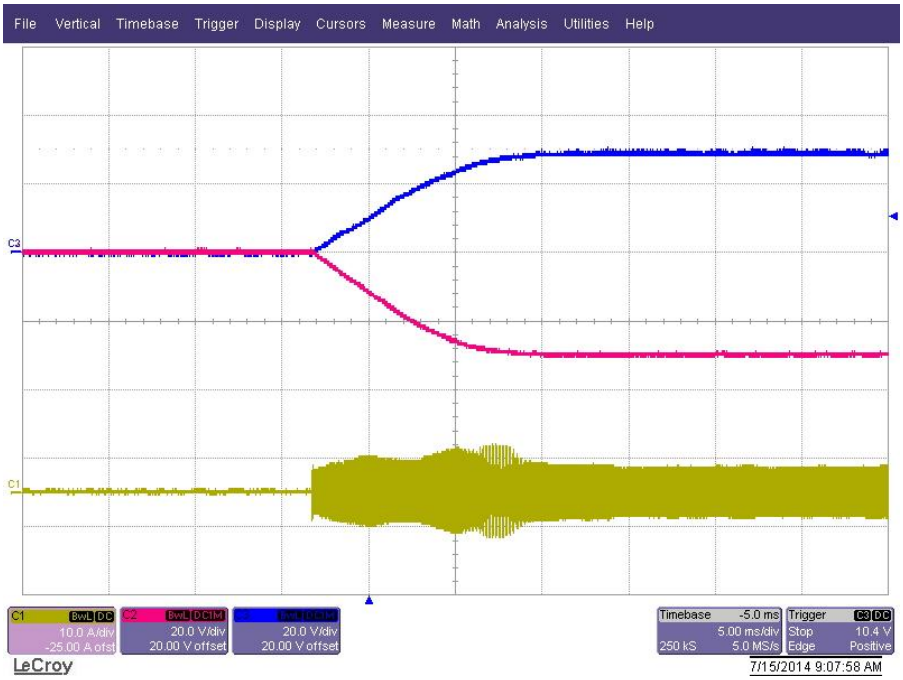
Spot analysis	Value
Amb Temperature	21.8°C
R14 Temperature	81.4°C
R7 Temperature	77.8°C

4 Startup

The output voltages at startup are shown in the images below. CH1: Current on C27, CH2: -30V_{out}, CH3: 30V_{out}.

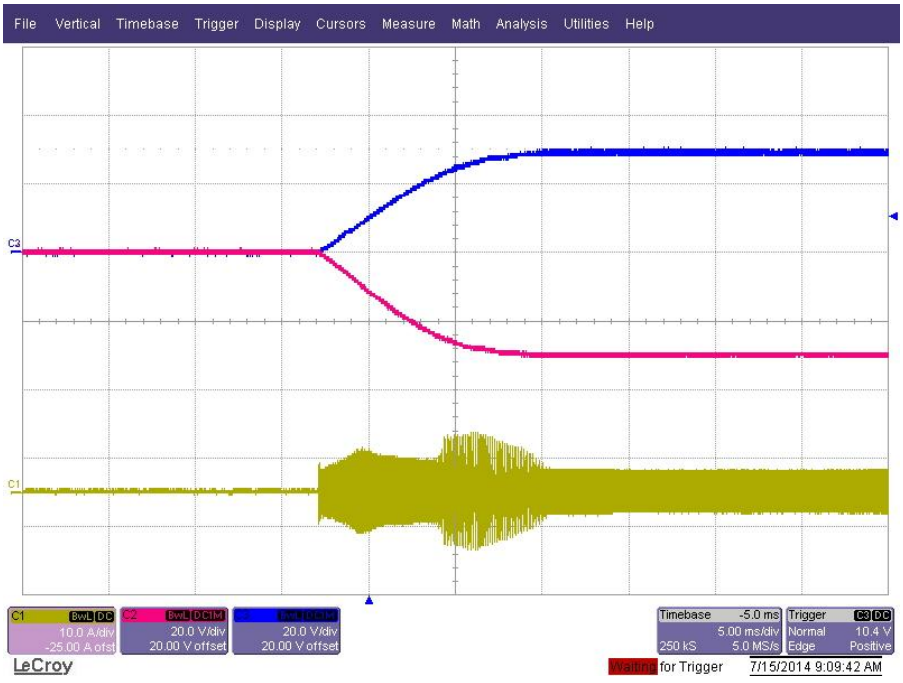
4.1 No Load @ 176V_{AC}

4.2 30V/3.4A, -30V/3.4A @ 176V_{AC}



4.3 No Load @ 240V_{AC}

4.4 30V/3.4A, -30V/3.4A @ 240V_{AC}



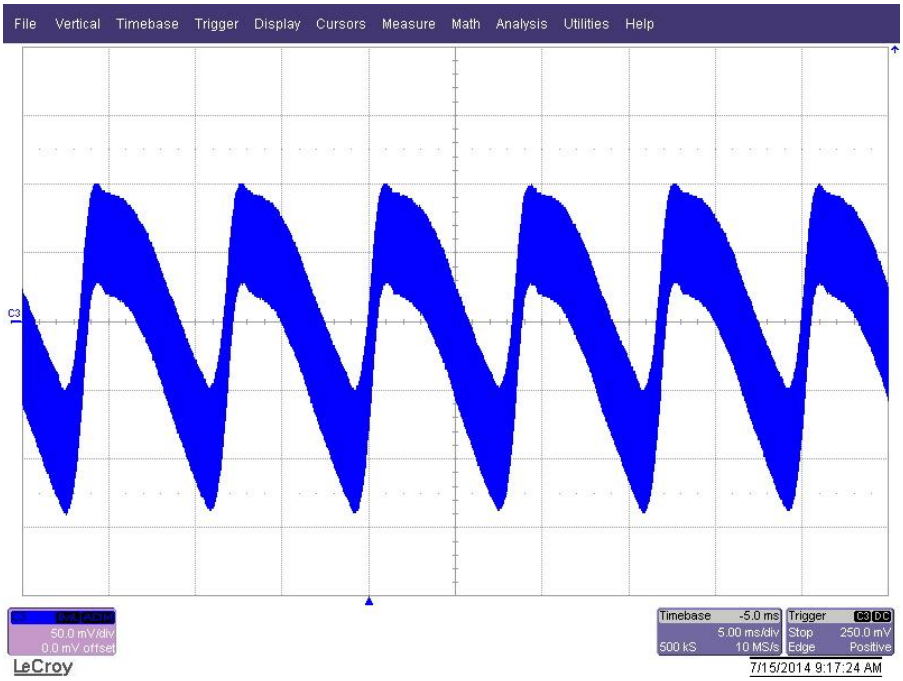
4.5 No Load @ 264V_{AC}

4.6 30V/3.4A, -30V/3.4A @ 264V_{AC}

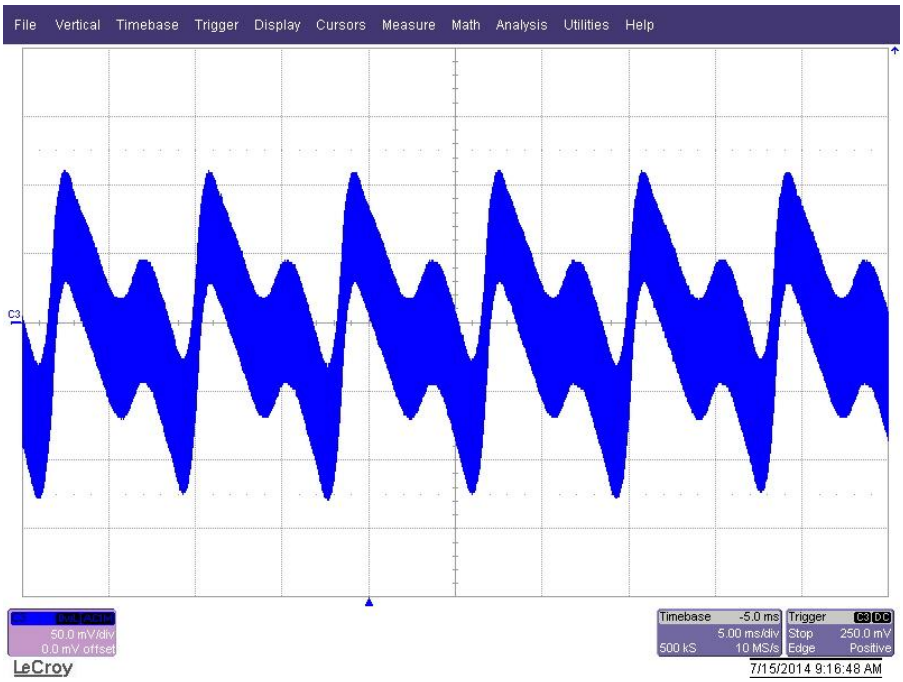
5 Output Ripple Voltage

The output ripple voltages at full load (30V/3.4A and -30V/3.4A) are shown in the plots below.

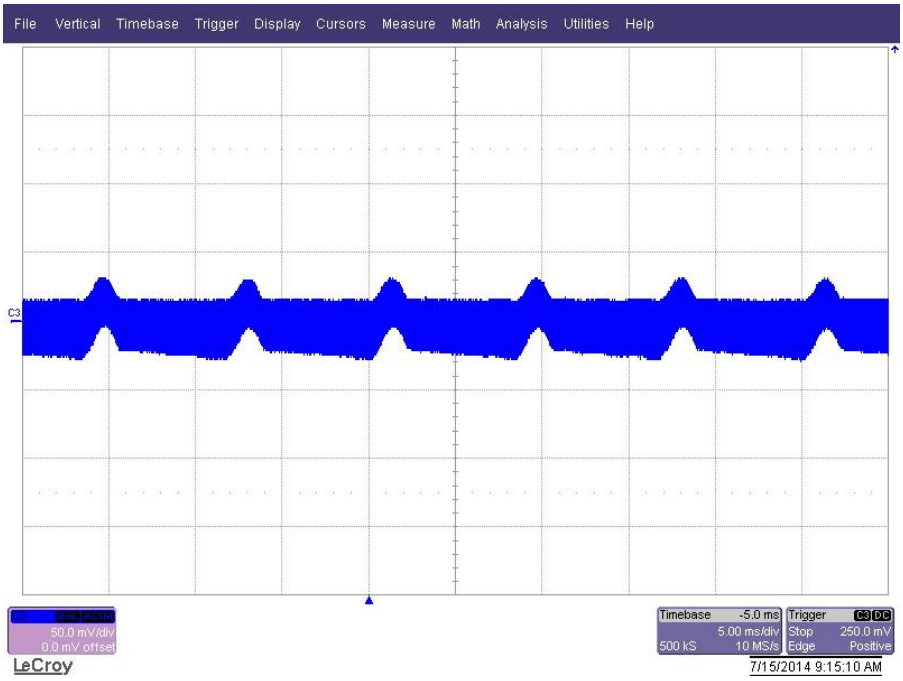
5.1 30V @ V_{in}=176V_{AC}



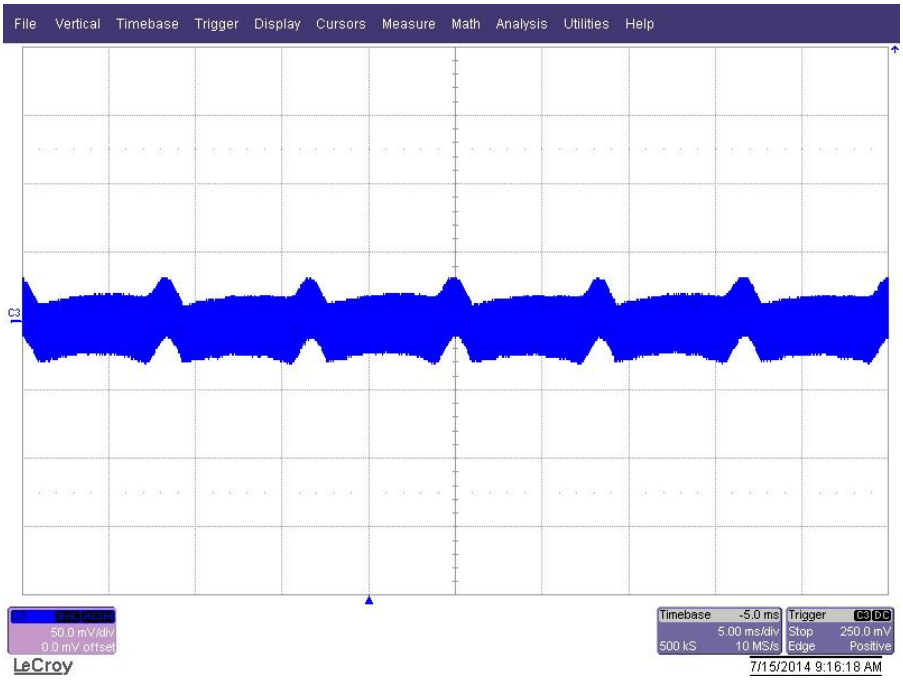
5.2 -30V @ V_{in}=176V_{AC}



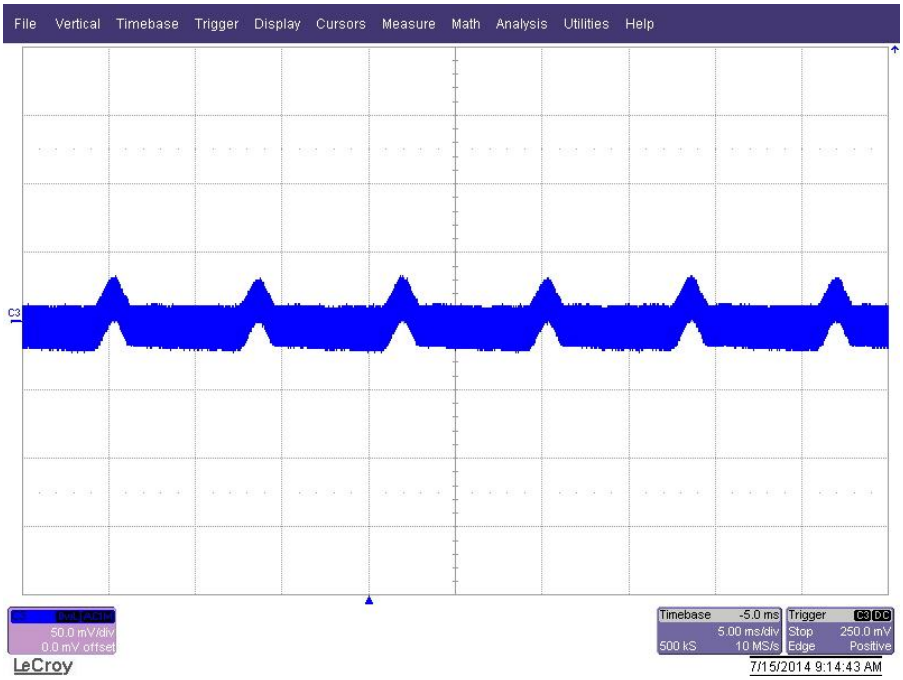
5.3 30V @ V_{in}=240V_{AC}



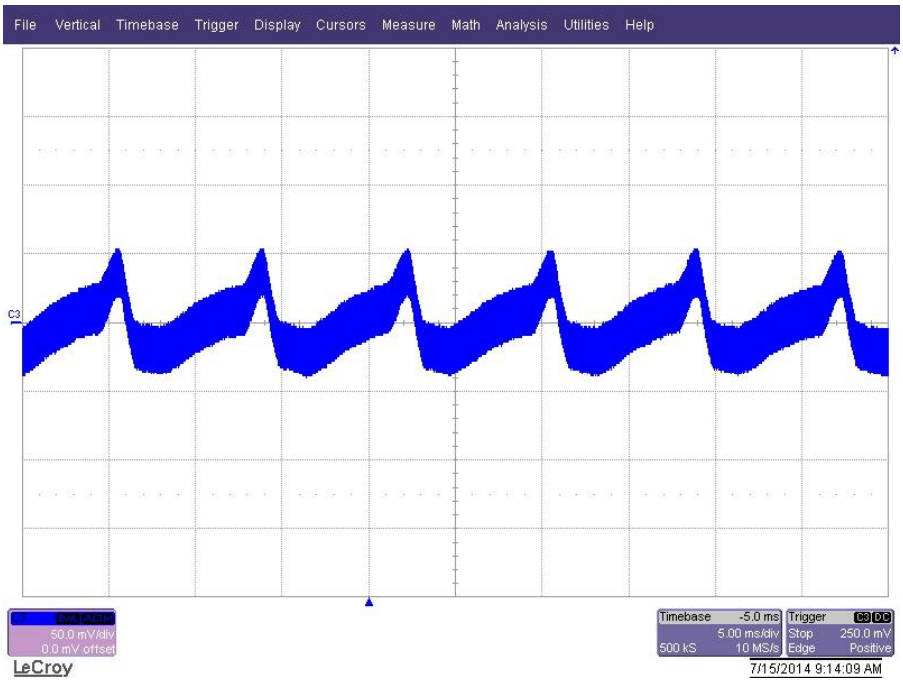
5.4 -30V @ V_{in}=240V_{AC}



5.5 30V @ V_{in}=264V_{AC}



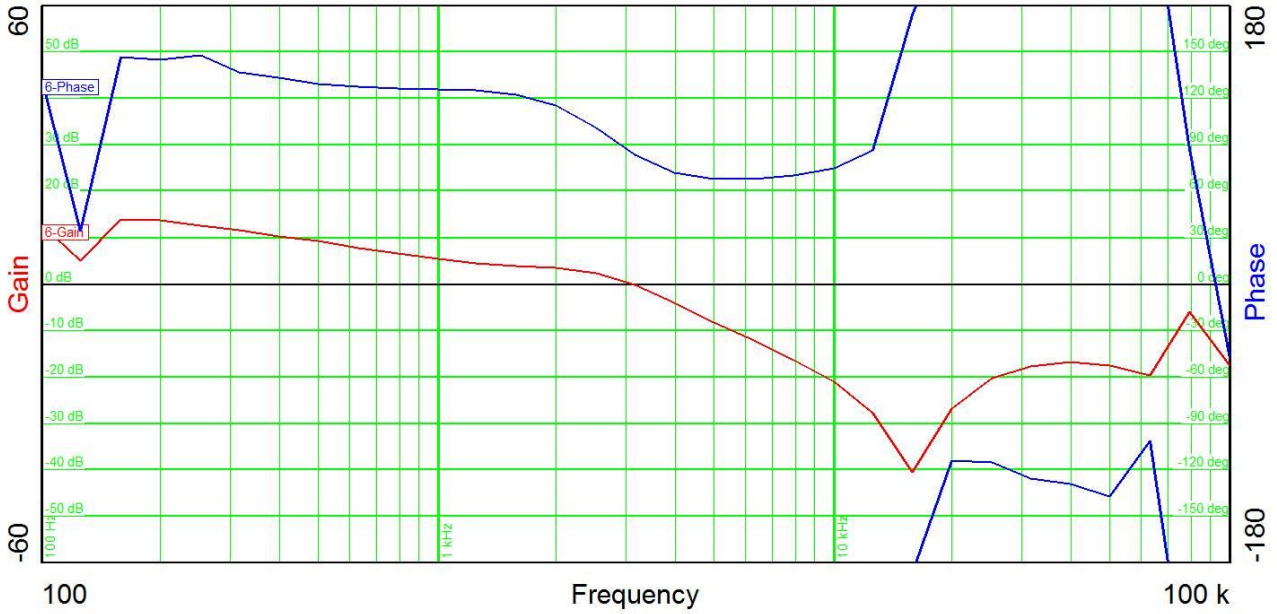
5.6 -30V @ V_{in}=264V_{AC}



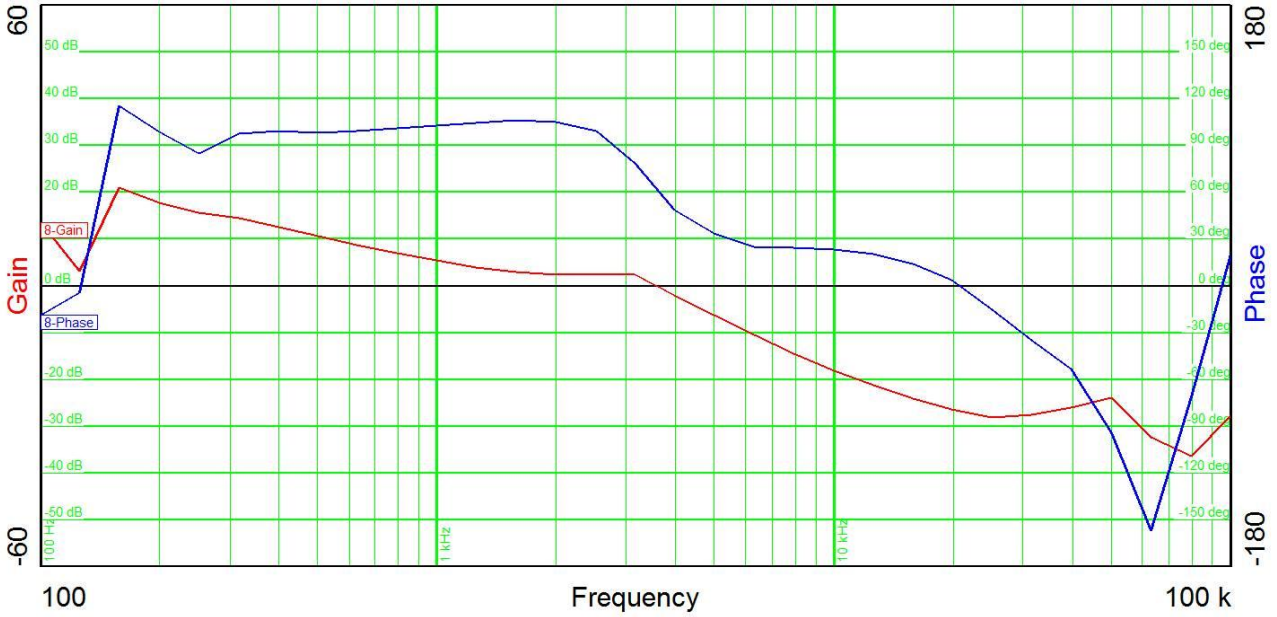
6 Loop Response

The frequency response of the feedback loop is shown in the image below. The frequency response was measured by inserting small signal from TP3 and TP4. The outputs were at peak load (30V/3.4A and -30V/3.4A).

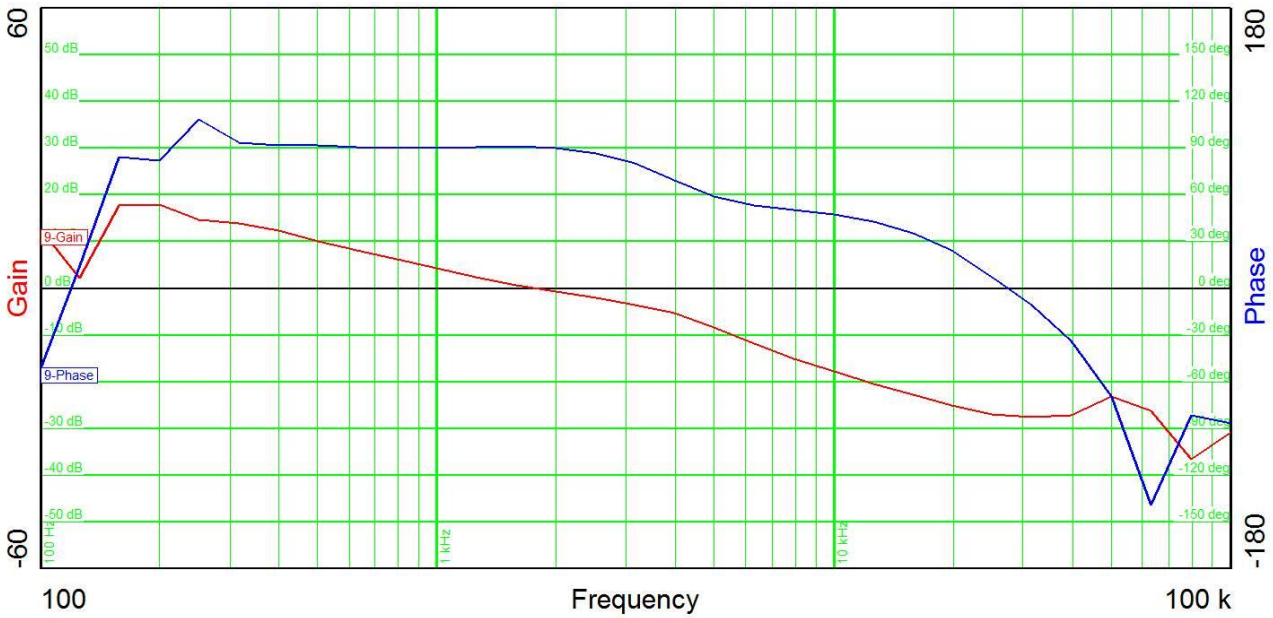
6.1 176V_{AC}



6.2 240 V_{AC}



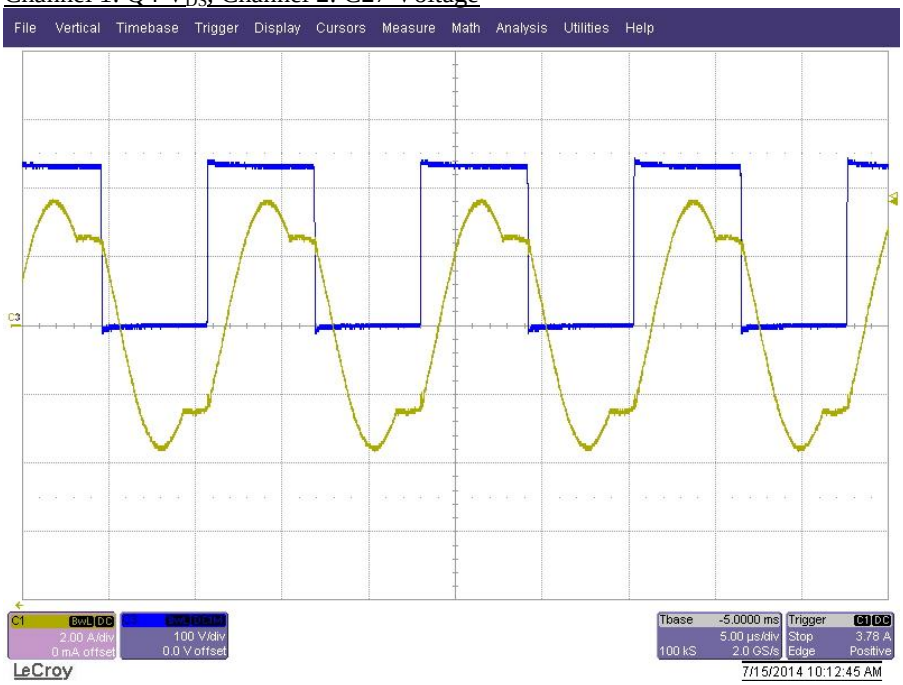
6.3 264V V_{AC}


60
50 dB
40 dB
30 dB
20 dB
9-Gain
0 dB
9-Phase
-30 dB
-40 dB
-50 dB
-60
Gain
100 Hz
1 kHz
10 kHz
180
150 deg
120 deg
90 deg
60 deg
30 deg
0 deg
-30 deg
-60 deg
-120 deg
-150 deg
-180
Phase
100
Frequency
100 k

7 Switching Waveforms

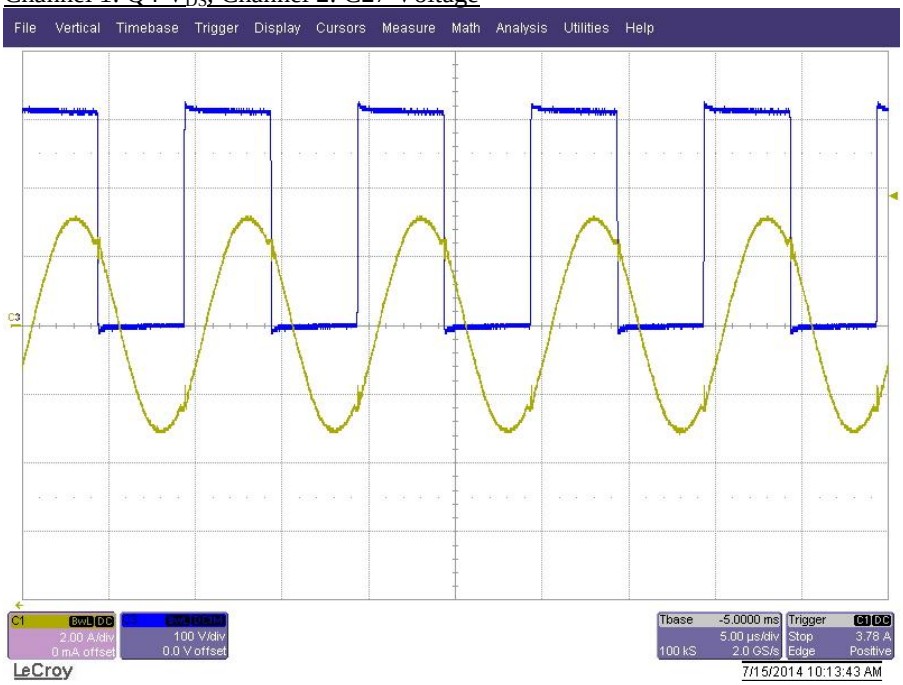
7.1 Q4 V_{DS} and C27 voltage @ 176V_{AC}, 30V_{out}/3.4A, and -30V_{out}/3.4A

Channel 1: Q4 V_{DS}, Channel 2: C27 Voltage



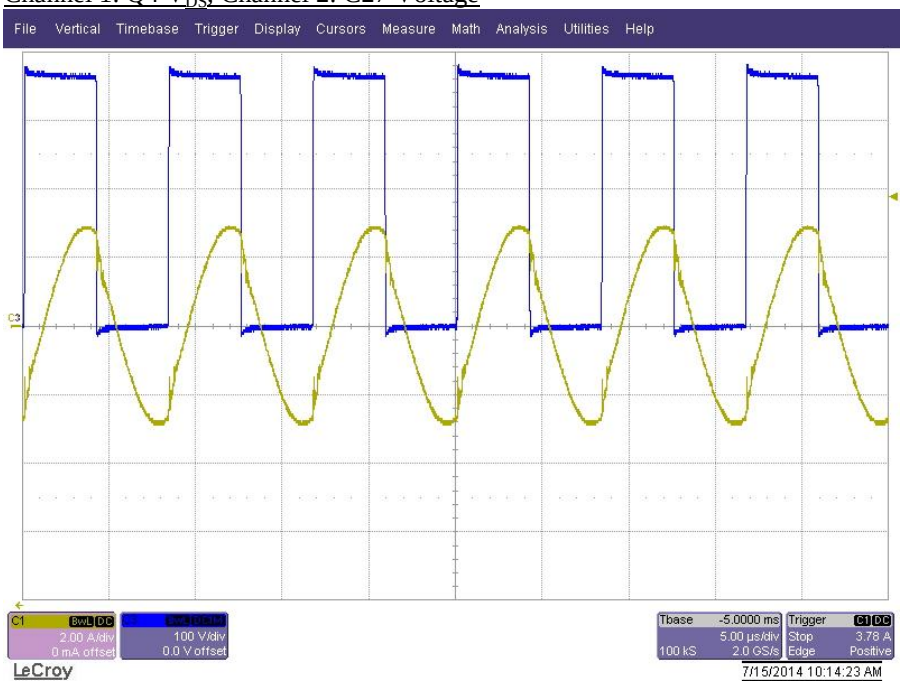
7.2 Q4 V_{DS} and C27 voltage @ 240V_{AC}, 30V_{out}/3.4A, and -30V_{out}/3.4A

Channel 1: Q4 V_{DS}, Channel 2: C27 Voltage



7.3 Q4 V_{DS} and C27 voltage @ 264V_{AC}, 30V_{out}/3.4A, and -30V_{out}/3.4A

Channel 1: Q4 V_{DS}, Channel 2: C27 Voltage



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