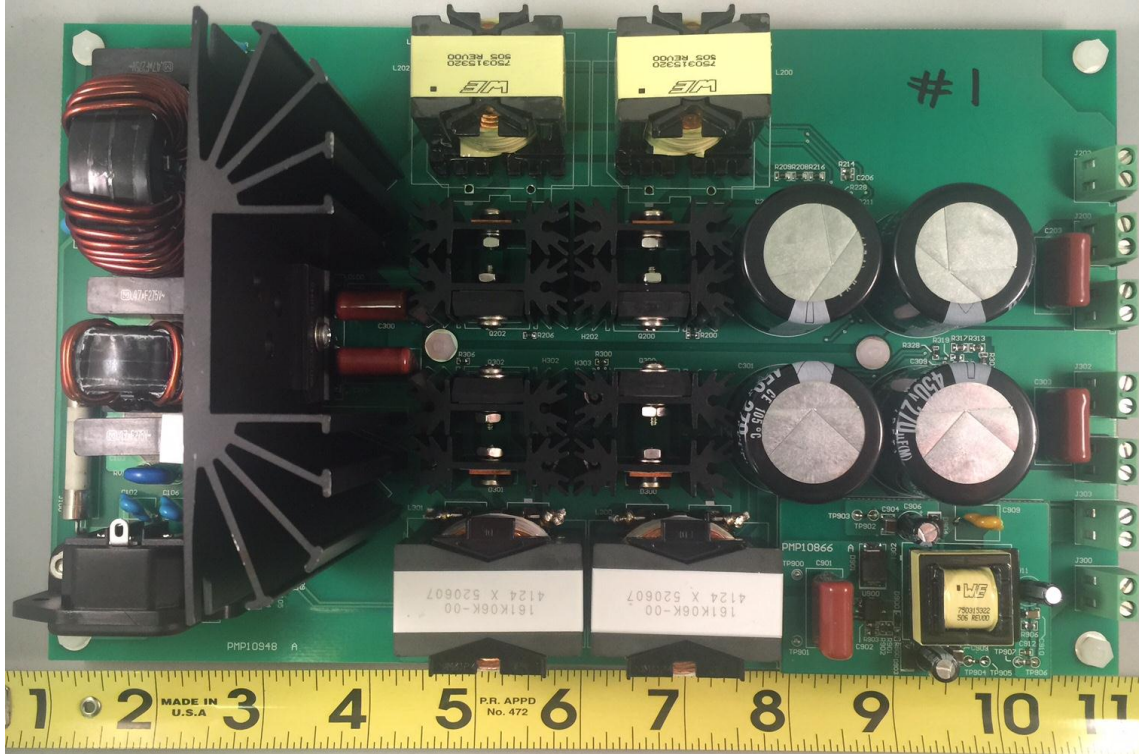


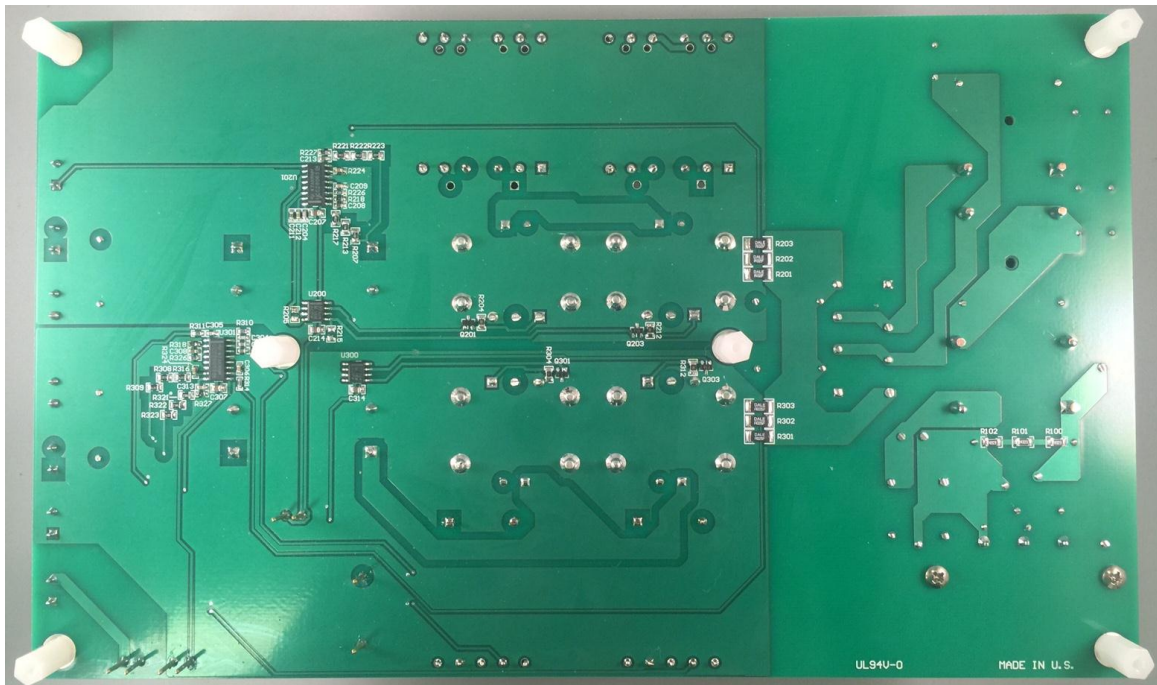
## 1 Photo

The photographs below show the PMP10948 Rev A assembly. This circuit was built on a PMP10948 Rev A PCB.

### Top side

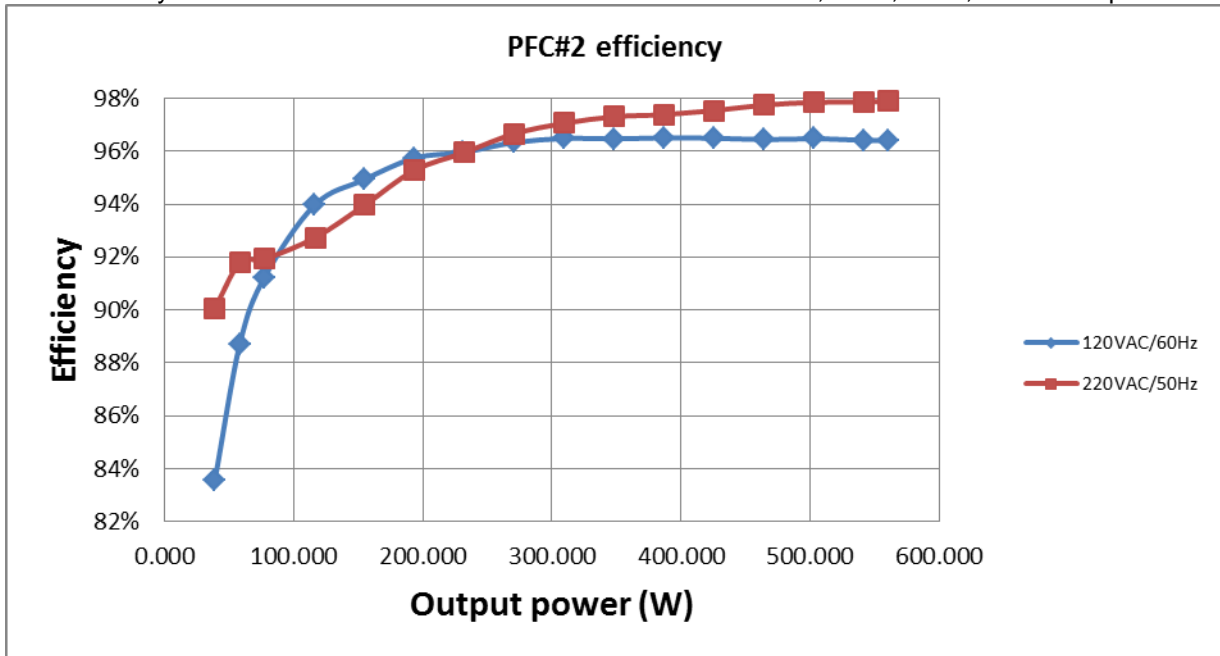


### Bottom side



## 2 Efficiency on PFC #2:

The efficiency on PFC #2 was tested with PFC #1 disabled. I.e. L200, L201, L202, L203 are open..



### 120V<sub>AC</sub>/60Hz

Vin,rms(V)	Iin,rms(A)	Pin(W)	P.F.	Vout(V)	Iout(A)	Pout(W)	Eff. (%)
120.07	4.852	581.20	0.998	386.4	1.450	560.280	96.40%
119.93	4.693	561.50	0.998	386.4	1.401	541.346	96.41%
120.02	4.354	521.10	0.997	386.4	1.301	502.706	96.47%
120.03	4.019	480.80	0.997	386.4	1.200	463.680	96.44%
120.03	3.685	440.50	0.996	386.4	1.100	425.040	96.49%
120.04	3.355	400.80	0.995	386.4	1.001	386.786	96.50%
120.05	3.020	360.50	0.994	386.4	0.900	347.760	96.47%
120.05	2.692	320.80	0.993	386.4	0.801	309.506	96.48%
120.05	2.361	280.80	0.991	386.4	0.700	270.480	96.32%
120.06	2.033	241.20	0.988	386.4	0.599	231.454	95.96%
120.06	1.713	202.20	0.983	386.4	0.501	193.586	95.74%
120.08	1.391	162.83	0.975	386.4	0.400	154.560	94.92%
120.08	1.074	123.81	0.960	386.5	0.301	116.337	93.96%
120.08	0.763	84.75	0.925	386.5	0.200	77.300	91.21%
120.13	0.617	65.82	0.888	386.6	0.151	58.377	88.69%
120.08	0.470	46.86	0.831	387.7	0.101	39.158	83.56%

**220V<sub>AC</sub>/50Hz**

Vin,rms(V)	Iin,rms(A)	Pin(W)	P.F.	Vout(V)	Iout(A)	Pout(W)	Eff. (%)
220	2.643	572.40	0.984	386.4	1.450	560.280	97.88%
220	2.555	552.80	0.984	386.4	1.400	540.960	97.86%
220	2.378	513.80	0.982	386.4	1.301	502.706	97.84%
220	2.199	474.40	0.980	386.4	1.200	463.680	97.74%
220	2.026	435.80	0.978	386.4	1.100	425.040	97.53%
220	1.850	396.80	0.975	386.4	1.000	386.400	97.38%
220	1.676	357.80	0.971	386.4	0.901	348.146	97.30%
220	1.501	318.90	0.966	386.4	0.801	309.506	97.05%
220	1.329	280.30	0.959	386.5	0.701	270.937	96.66%
220	1.158	241.70	0.949	386.5	0.600	231.900	95.95%
220	0.986	202.90	0.935	386.6	0.500	193.300	95.27%
220	0.816	164.80	0.918	387.1	0.400	154.840	93.96%
220	0.675	125.97	0.849	389.4	0.300	116.820	92.74%
220	0.521	84.82	0.739	389.9	0.200	77.980	91.94%
220	0.372	63.74	0.780	390	0.150	58.500	91.78%
220	0.338	43.33	0.583	390.2	0.100	39.020	90.05%

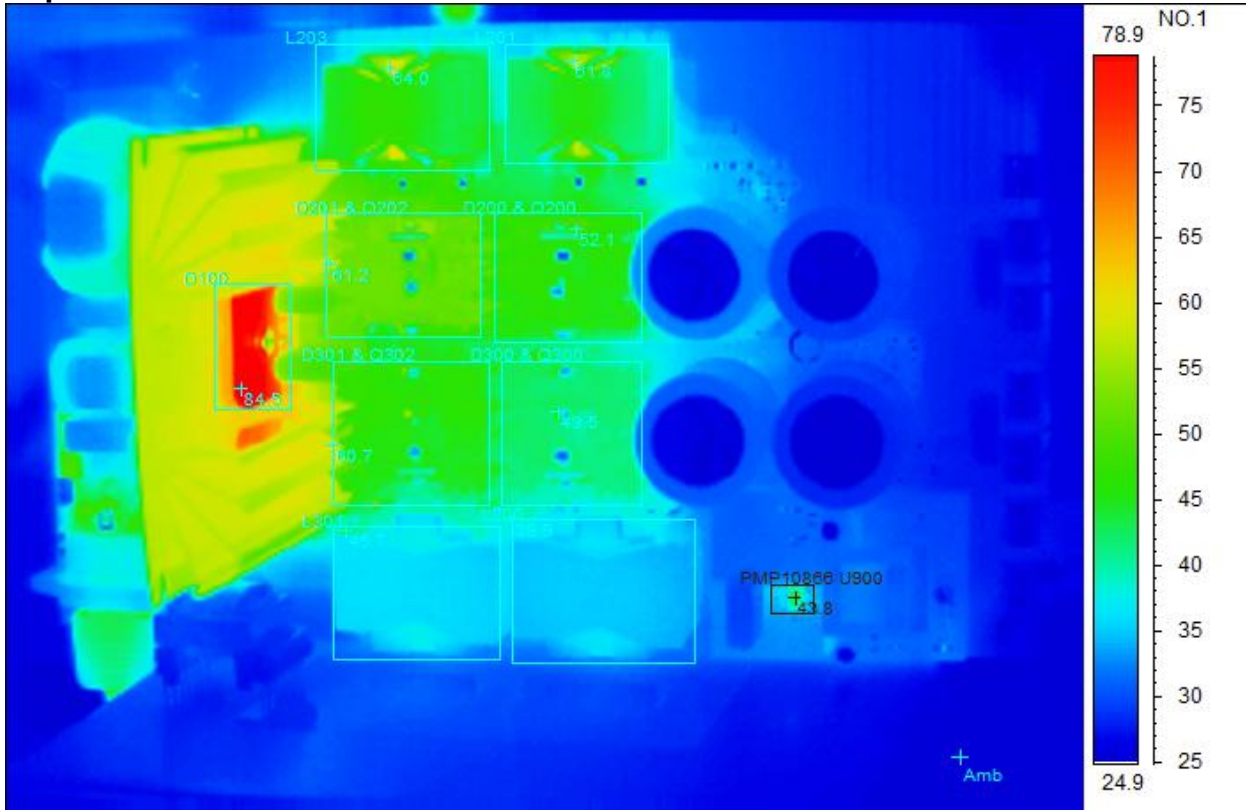
### 3 Thermal Images

The thermal images below show a top view and bottom view of the board. The ambient temperature was 20°C with no forced air flow. The outputs were at 1300W full load (750W to  $V_{BULK}$  and 550W to B+).

#### 120V<sub>AC</sub>/60Hz

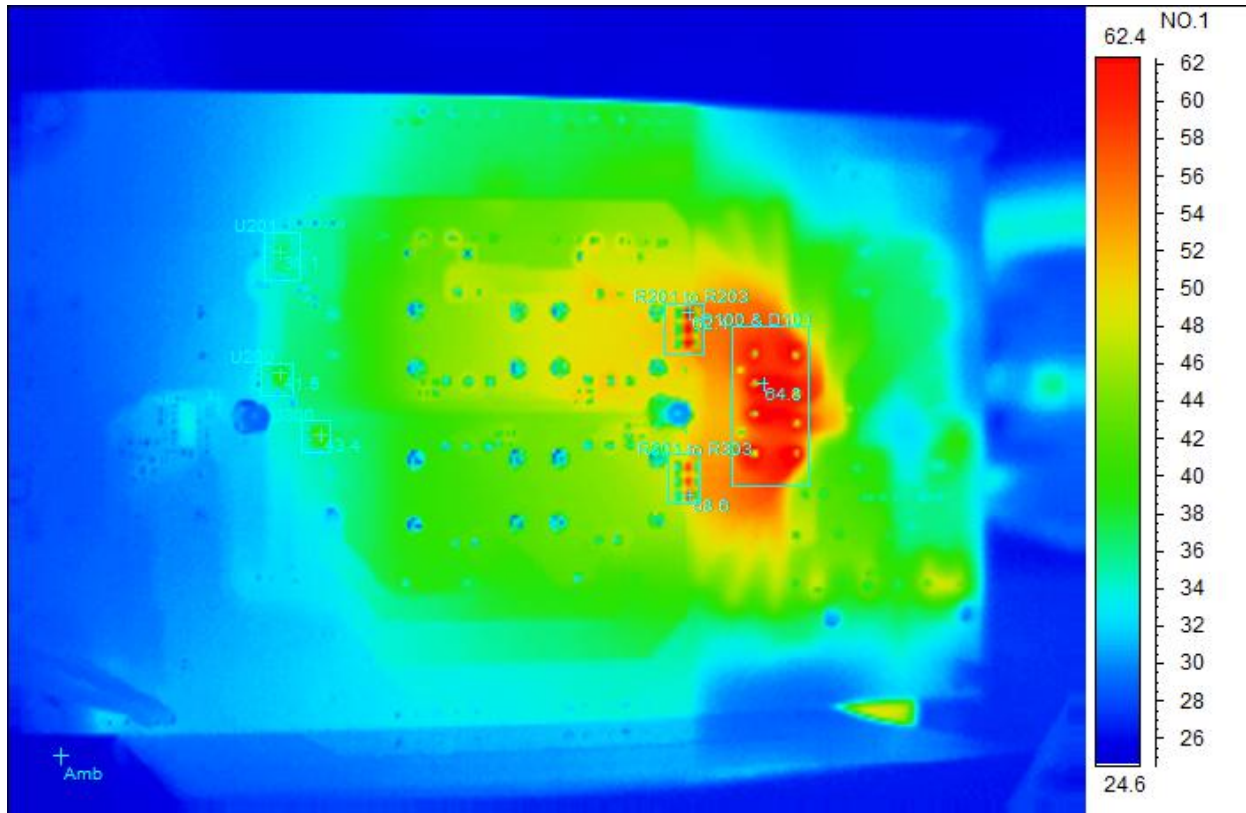
-  $P_{in}$ =1348W, P.F. 0.999, B+:386.3V/1.451A,  $V_{BULK}$ :387.2V/1.879A, Efficiency: 95.6%

#### Top Side



Spot analysis	Value
Amb Temperature	25.5°C
Area analysis	Value
D100Max	84.5°C
L203Max	64.0°C
L201Max	61.8°C
D201 & Q202Max	61.2°C
D200 & Q200Max	52.1°C
L301Max	45.7°C
L300Max	39.9°C
D301 & Q302Max	60.7°C
D300 & Q300Max	49.5°C
PMP10866 U900 Max	43.8°C

**Bottom Side**

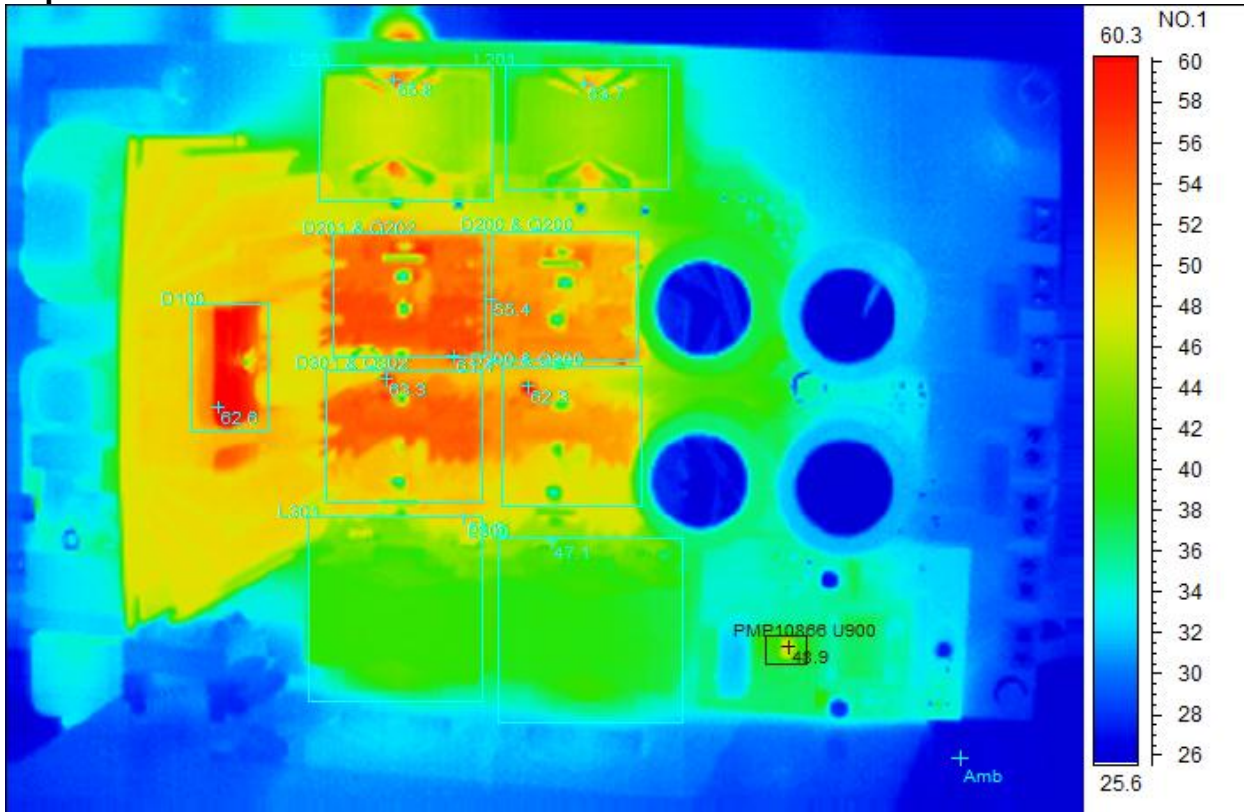


Spot analysis	Value
Amb Temperature	24.2°C
Area analysis	Value
R201 to R203Max	62.4°C
R301 to R303Max	58.6°C
D100 & D101Max	64.8°C
U300Max	43.4°C
U200Max	41.5°C
U201 Max	38.1°C

**220V<sub>AC</sub>/50Hz**

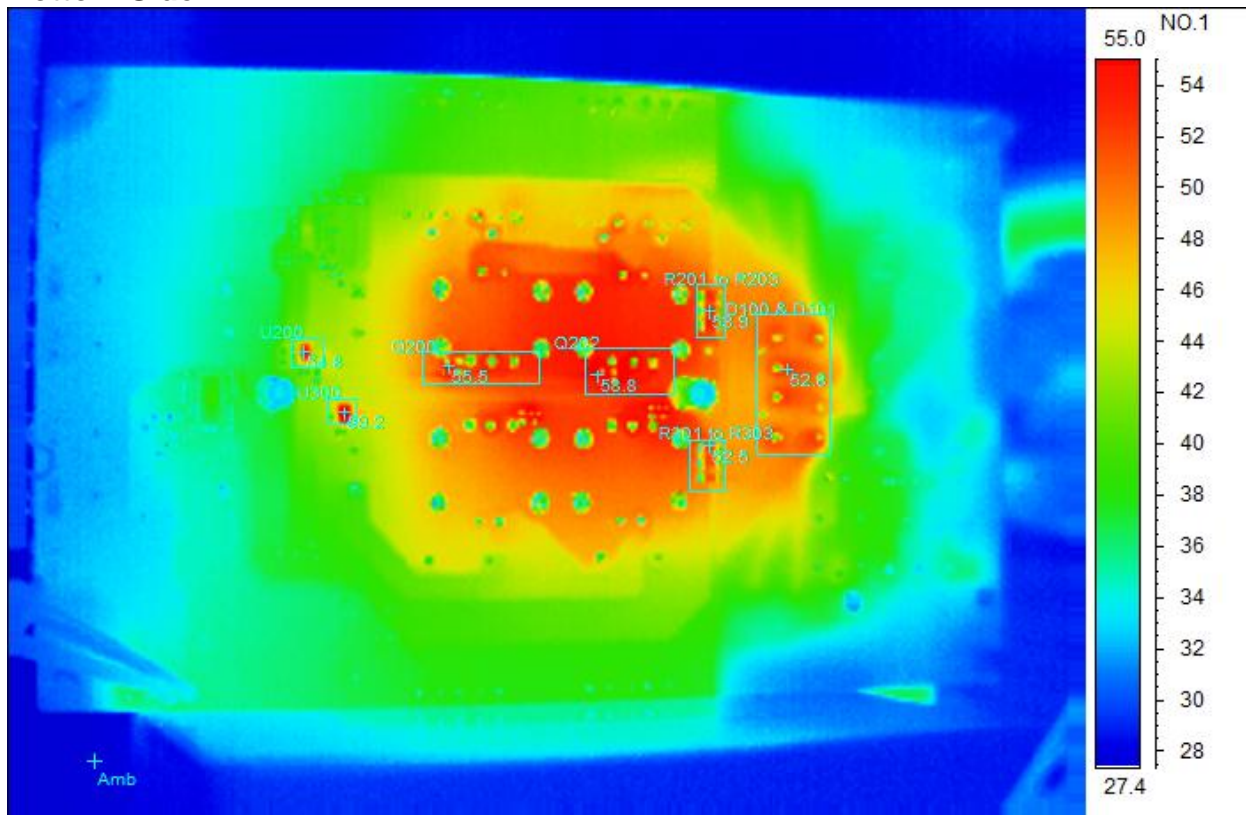
- P<sub>in</sub>=1316W, P.F. 0.992, B+:386.3V/1.451A, V<sub>BULK</sub>:387.4V/1.881A, Efficiency: 98%

**Top Side**



Spot analysis	Value
Amb Temperature	25.9°C
Area analysis	Value
D100Max	62.6°C
L203Max	55.8°C
L201Max	53.7°C
D201 & Q202Max	61.4°C
D200 & Q200Max	55.4°C
L301Max	51.3°C
L300Max	47.1°C
D301 & Q302Max	63.3°C
D300 & Q300Max	62.3°C
PMP10866 U900 Max	48.9°C

**Bottom Side**

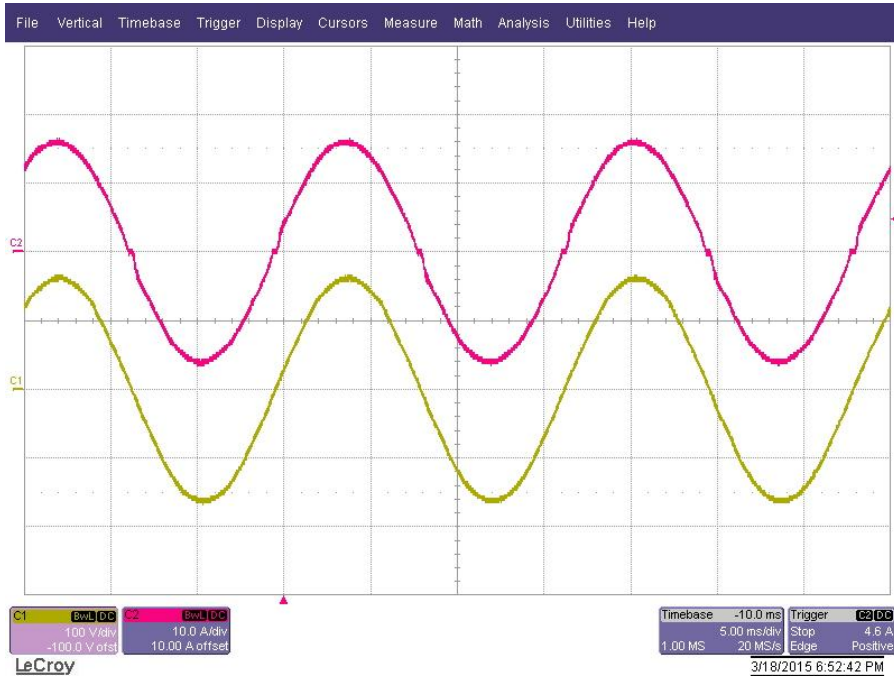


Spot analysis	Value
Amb Temperature	27.7°C
Area analysis	Value
R201 to R203Max	53.9°C
R301 to R303Max	52.5°C
D100 & D101Max	52.8°C
Q200Max	55.5°C
Q202Max	58.8°C
U300Max	59.2°C
U200 Max	54.8°C

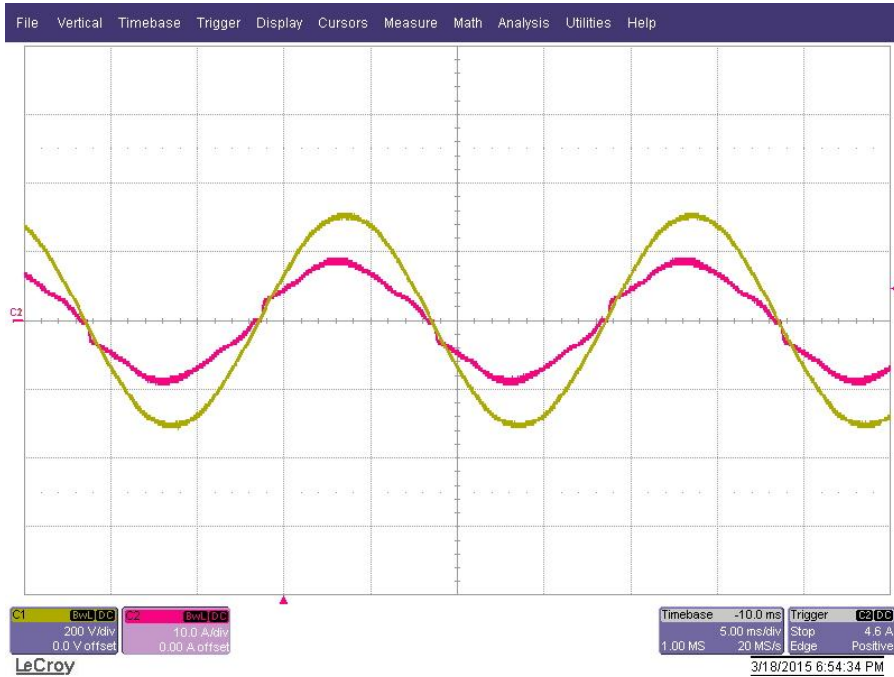
## 4 Input current and voltage

The input current and voltage waveforms are shown in the plots below at 1300W full load (750W to  $V_{BULK}$  and 550W to B+).

### 4.1 120V<sub>AC</sub>/60Hz input.



### 4.2 220V<sub>AC</sub>/50Hz input.





## 5 PFC inductor currents

The PFC inductor currents are shown in the images below.

### 5.1 L201, L203 @ 120V<sub>AC</sub>/60Hz: V<sub>BULK</sub>: 386V/0.75A, B+:386V/0.1A.

CH1: I<sub>L201</sub>, CH2: I<sub>L203</sub>



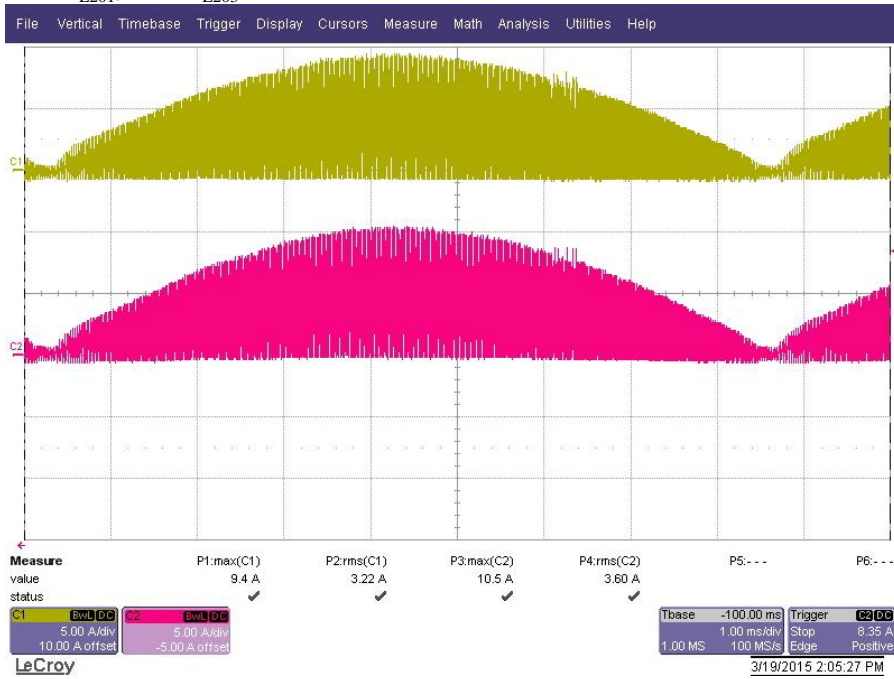
## 5.2 L300, L301 @ 120V<sub>AC</sub>/60Hz: V<sub>BULK</sub>: 386V/0.75A, B+:386V/0.1A.

CH1: I<sub>L300</sub>, CH2: I<sub>L301</sub>



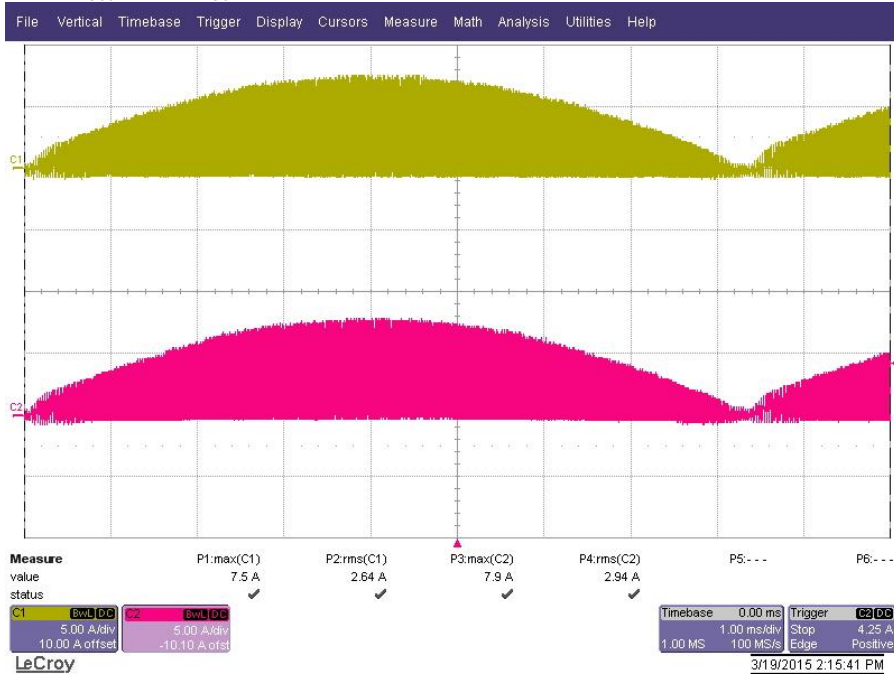
## 5.3 L201, L203 @ 120V<sub>AC</sub>/60Hz: V<sub>BULK</sub>: 386V/1.9A, B+:386V/1.4A.

CH1: I<sub>L201</sub>, CH2: I<sub>L203</sub>



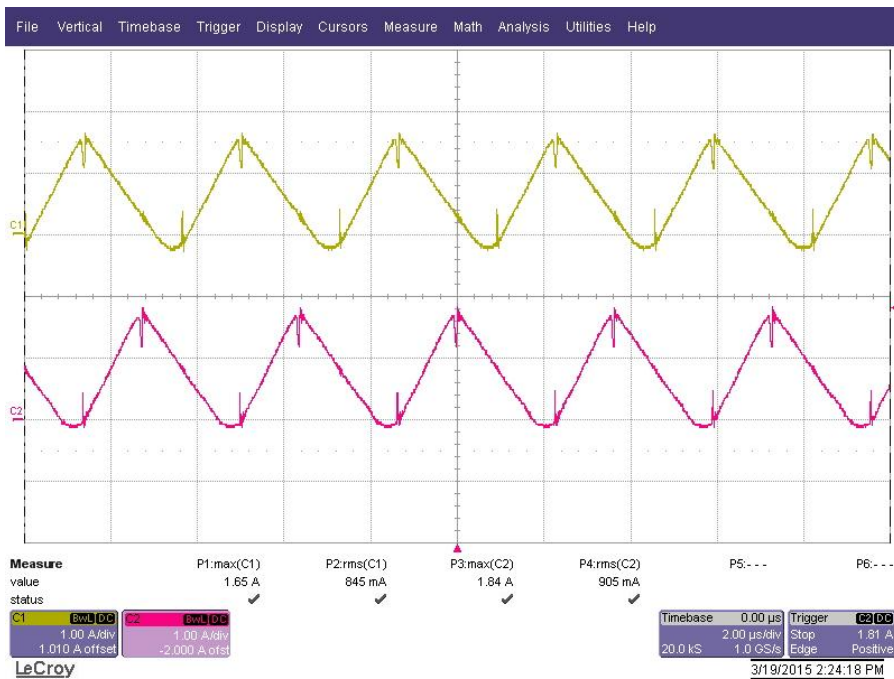
## 5.4 L300, L301 @ 120V<sub>AC</sub>/60Hz: V<sub>BULK</sub>: 386V/1.9A, B+:386V/1.4A.

CH1: I<sub>L300</sub>, CH2: I<sub>L301</sub>



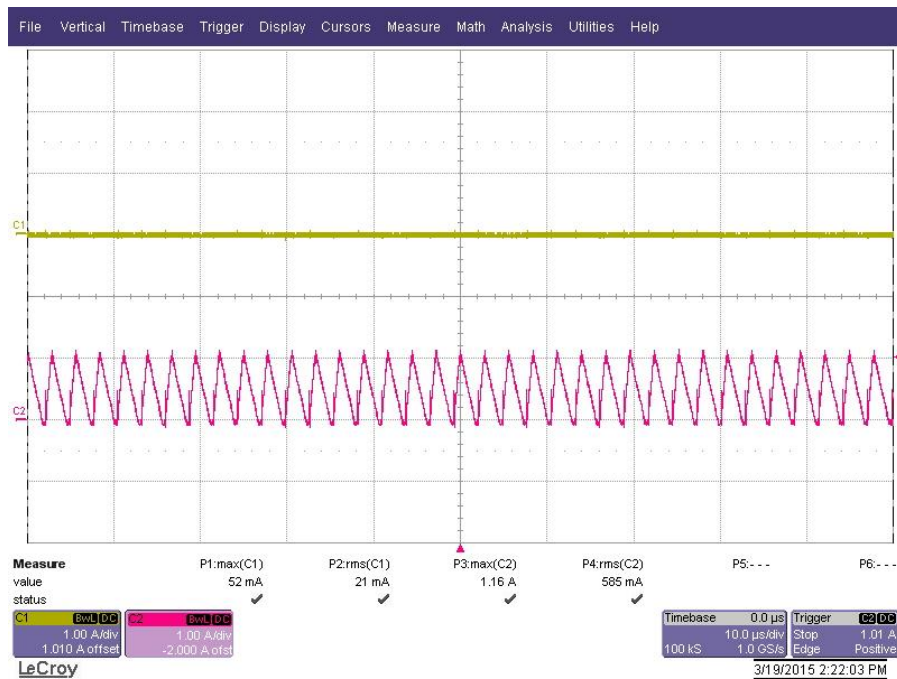
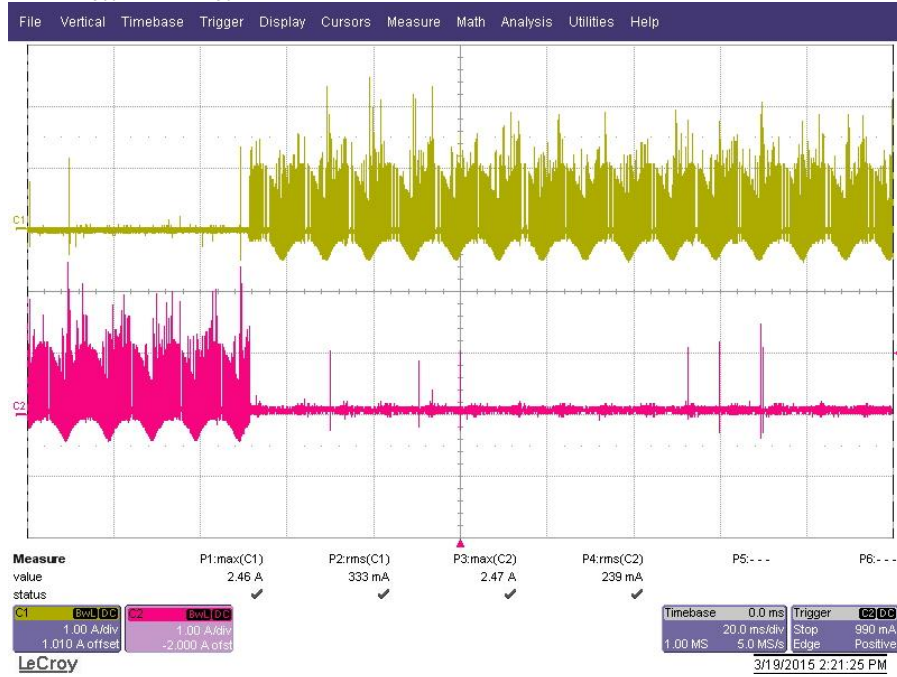
## 5.5 L201, L203 @ 220V<sub>AC</sub>/50Hz: V<sub>BULK</sub>: 386V/0.75A, B+:386V/0.1A.

CH1: I<sub>L201</sub>, CH2: I<sub>L203</sub>



## 5.6 L300, L301 @ 220V<sub>AC</sub>/50Hz: V<sub>BULK</sub>: 386V/0.75A, B+:386V/0.1A.

CH1: I<sub>L300</sub>, CH2: I<sub>L301</sub>



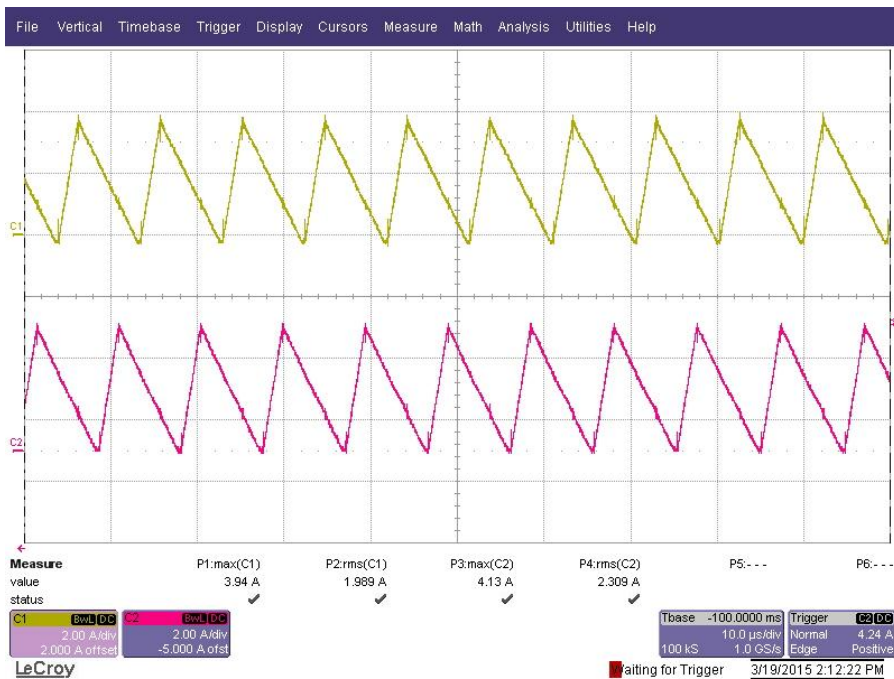
## 5.7 L201, L203 @ 220V<sub>AC</sub>/50Hz: V<sub>BULK</sub>: 386V/1.9A, B+:386V/1.4A.

CH1: I<sub>L201</sub>, CH2: I<sub>L203</sub>



## 5.8 L300, L301 @ 220V<sub>AC</sub>/50Hz: V<sub>BULK</sub>: 386V/1.9A, B+:386V/1.4A.

CH1: I<sub>L300</sub>, CH2: I<sub>L301</sub>

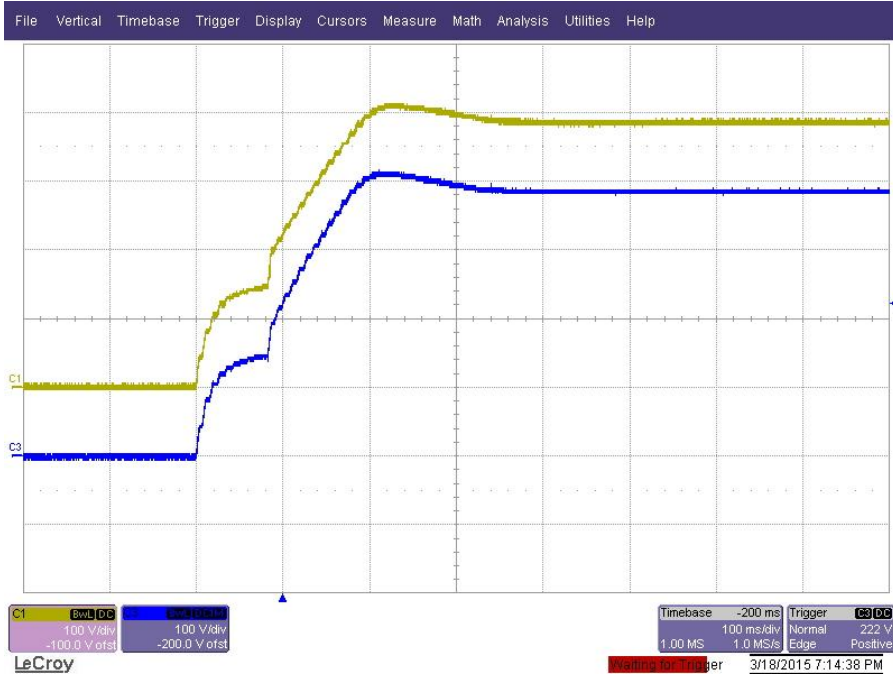




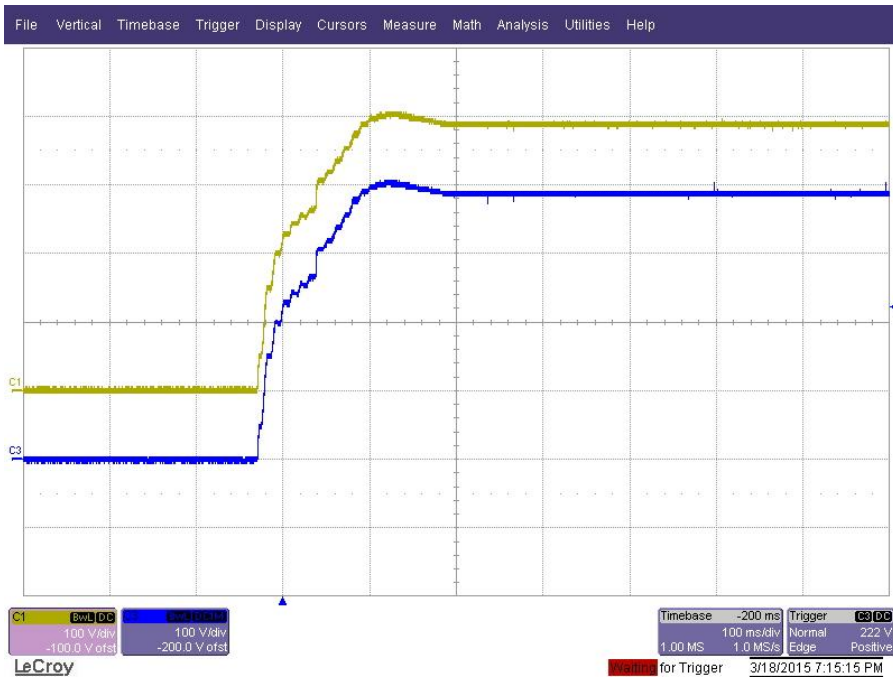
## 6 Startup

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

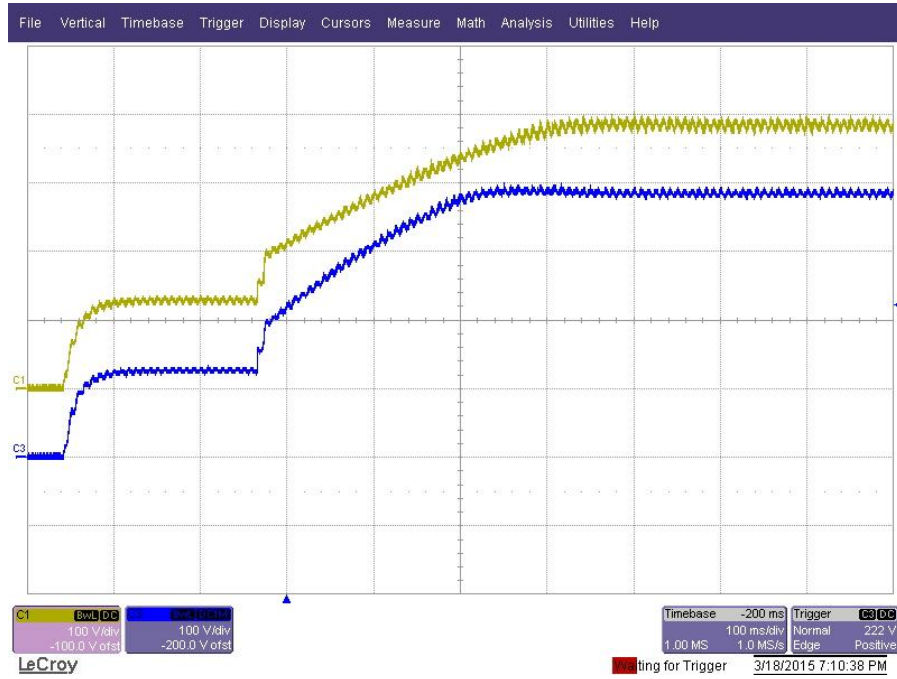
### 6.1 Start Up @ 120V<sub>AC</sub>/60Hz: V<sub>BULK</sub>: 386V/0.1A, B+:386V/0.1A.



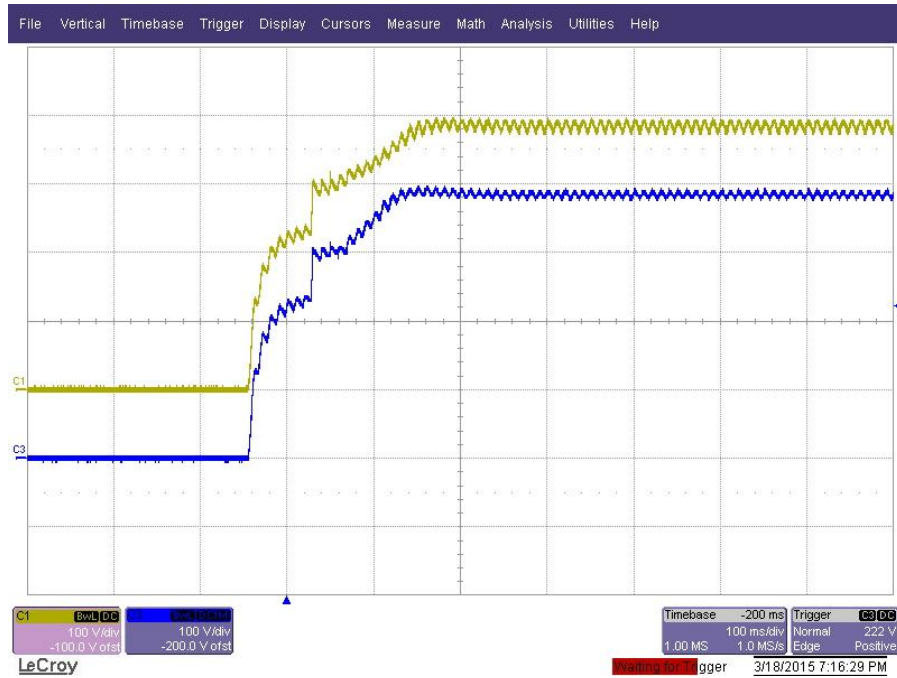
### 6.2 Start Up @ 220V<sub>AC</sub>/50Hz: V<sub>BULK</sub>: 386V/0.1A, B+:386V/0.1A.



### 6.3 Start Up @ 120V<sub>AC</sub>/60Hz: V<sub>BULK</sub>: 386V/1.9A, B+:386V/1.4A. (Notice that resistive loads are applied here.)



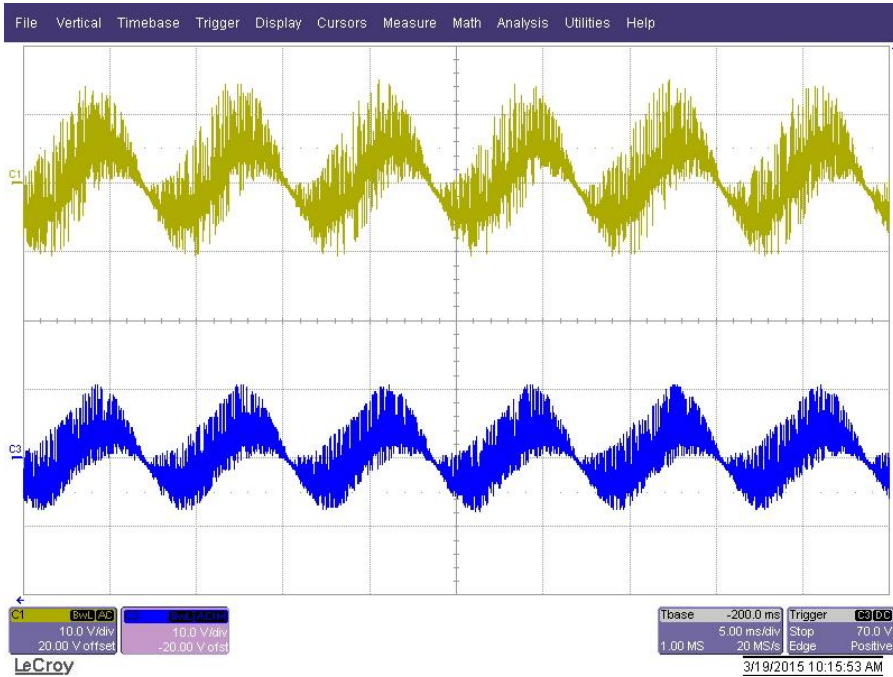
### 6.4 Start Up @ 220V<sub>AC</sub>/50Hz: V<sub>BULK</sub>: 386V/1.9A, B+:386V/1.4A. (Notice that resistive loads are applied here.)



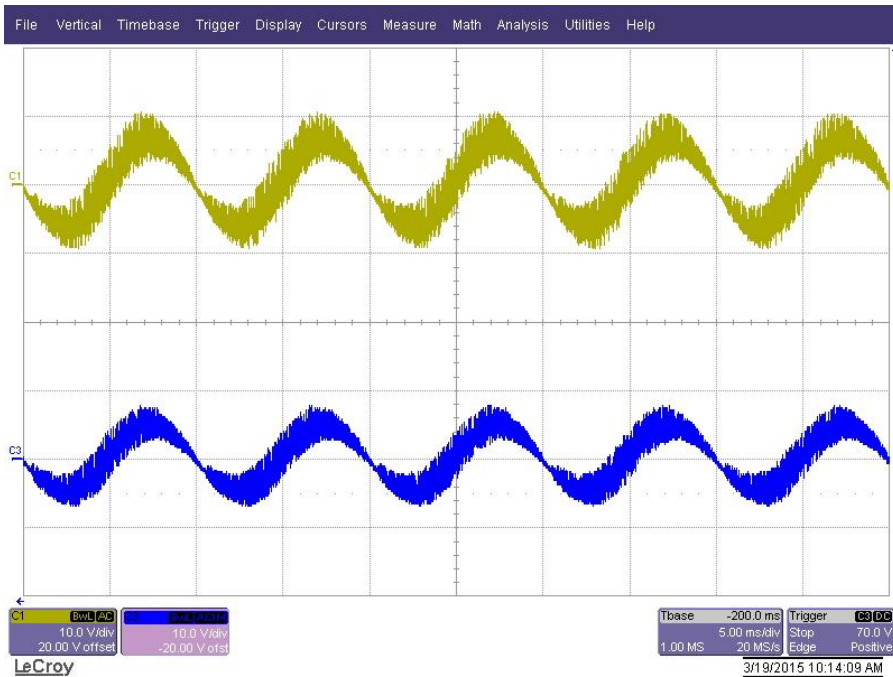
## 7 Output Ripple Voltages

The output ripple voltages are shown in the plots below at 1300W full load (750W to  $V_{BULK}$  and 550W to B+).  
CH1:  $V_{BULK}$ , CH3: B+

### 7.1 Output ripples @ 120V<sub>AC</sub>/60Hz input.



### 7.2 Output ripples @ 220V<sub>AC</sub>/50Hz input.

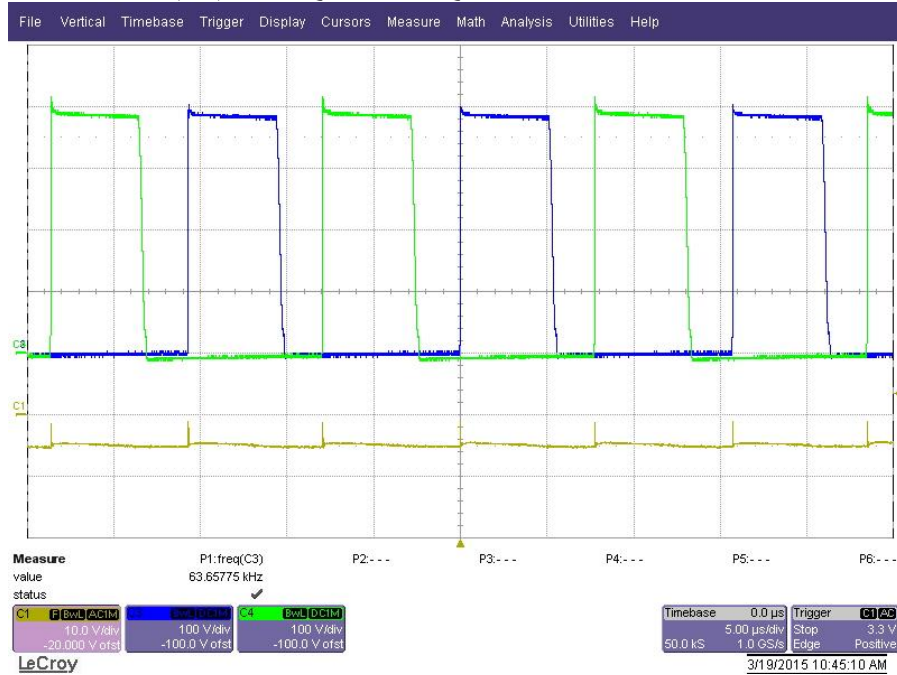


## 8 Switching Waveforms

The images below show key switching waveforms of PMP10948RevA. The waveforms are measured with 1300W full load (750W to  $V_{BULK}$  and 550W to B+).

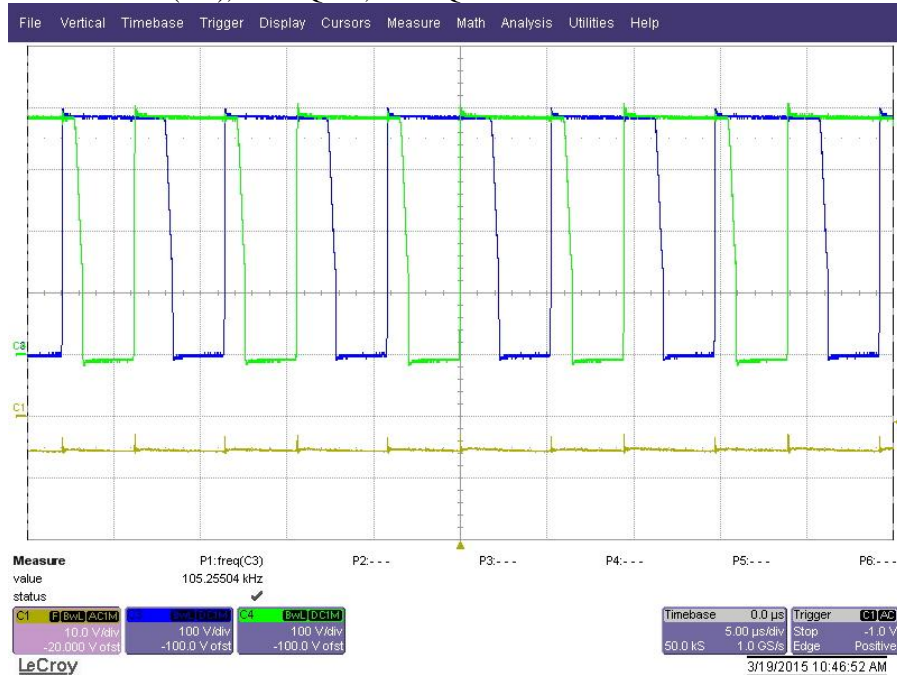
### 8.1 Q200, Q202 @ 120V<sub>AC</sub>/60Hz

CH1: VBULK (AC), CH3: Q200, CH4: Q202



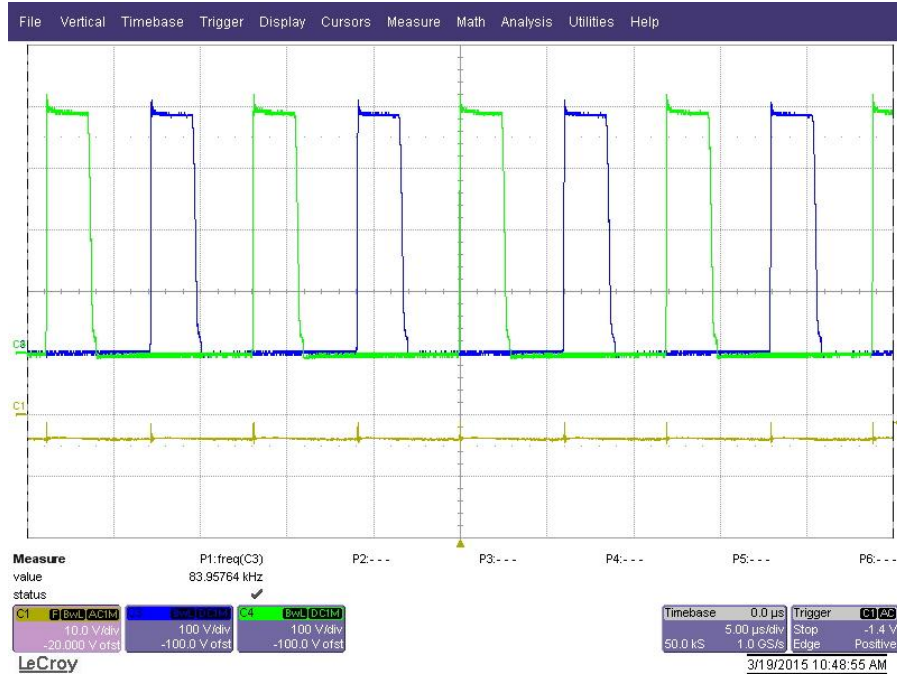
### 8.2 Q200, Q202 @ 220V<sub>AC</sub>/50Hz

CH1: VBULK (AC), CH3: Q200, CH4: Q202



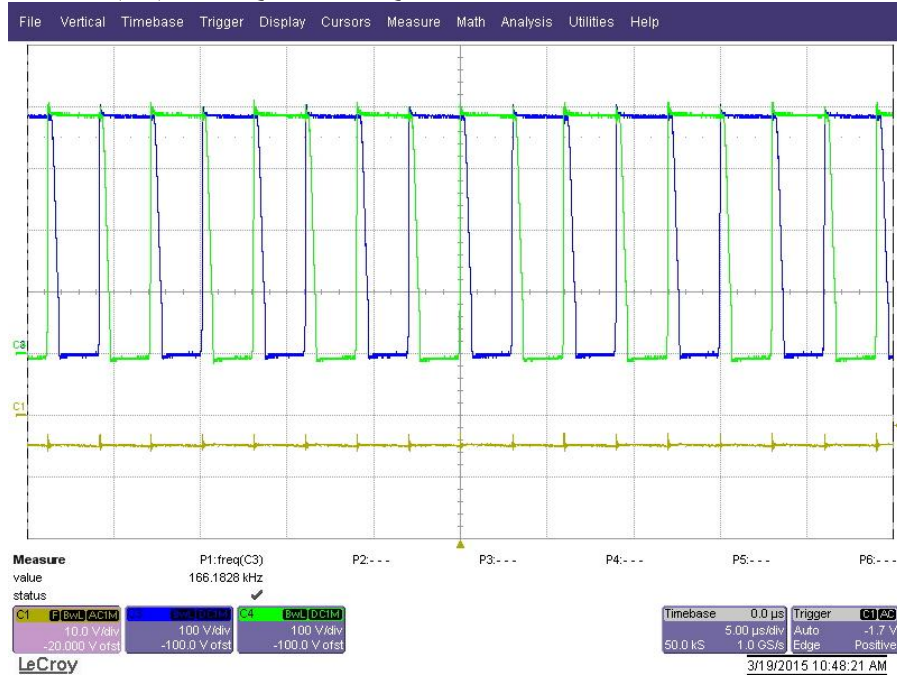
## 8.3 Q300, Q302 @ 120V<sub>AC</sub>/60Hz

CH1: B+ (AC), CH3: Q200, CH4: Q202



## 8.4 Q300, Q302 @ 220V<sub>AC</sub>/50Hz

CH1: B+ (AC), CH3: Q200, CH4: Q202



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