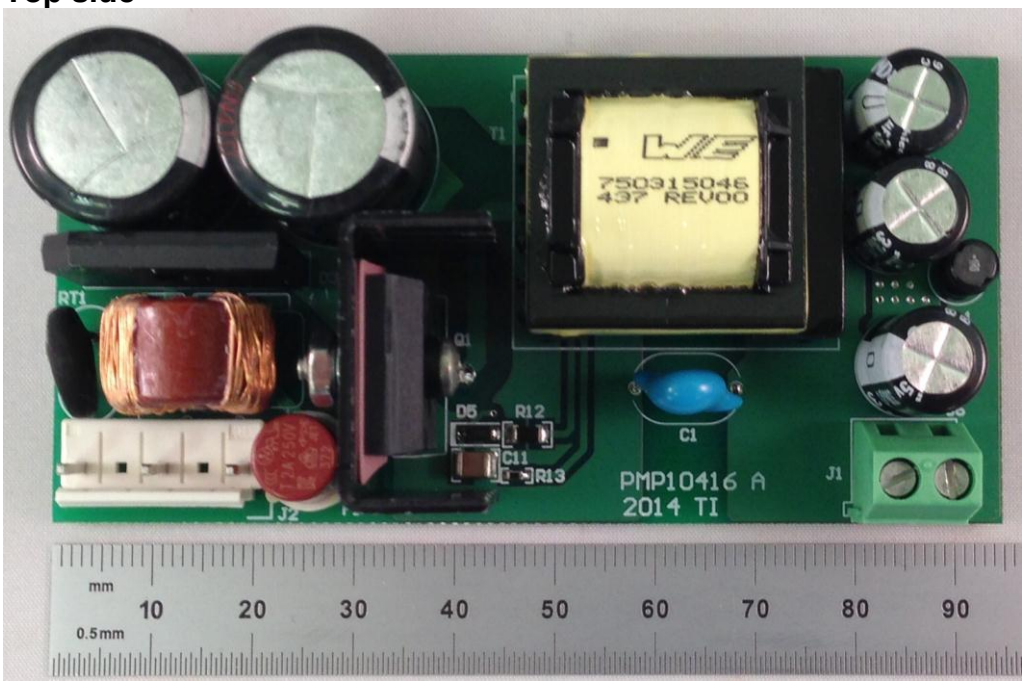
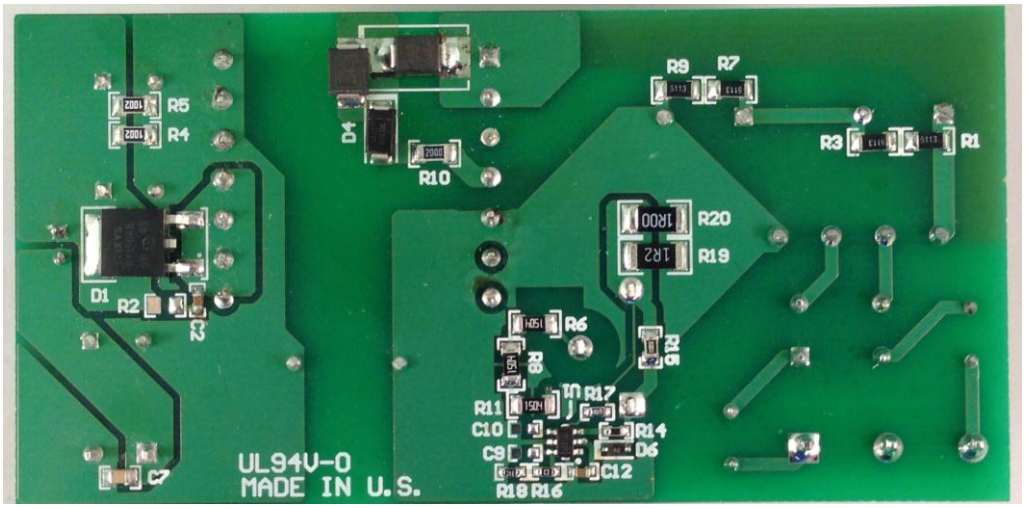
1 Photo

The photographs below show the PMP10416 Rev A assembly. This circuit was built on a PMP10416 Rev A PCB.

Top side

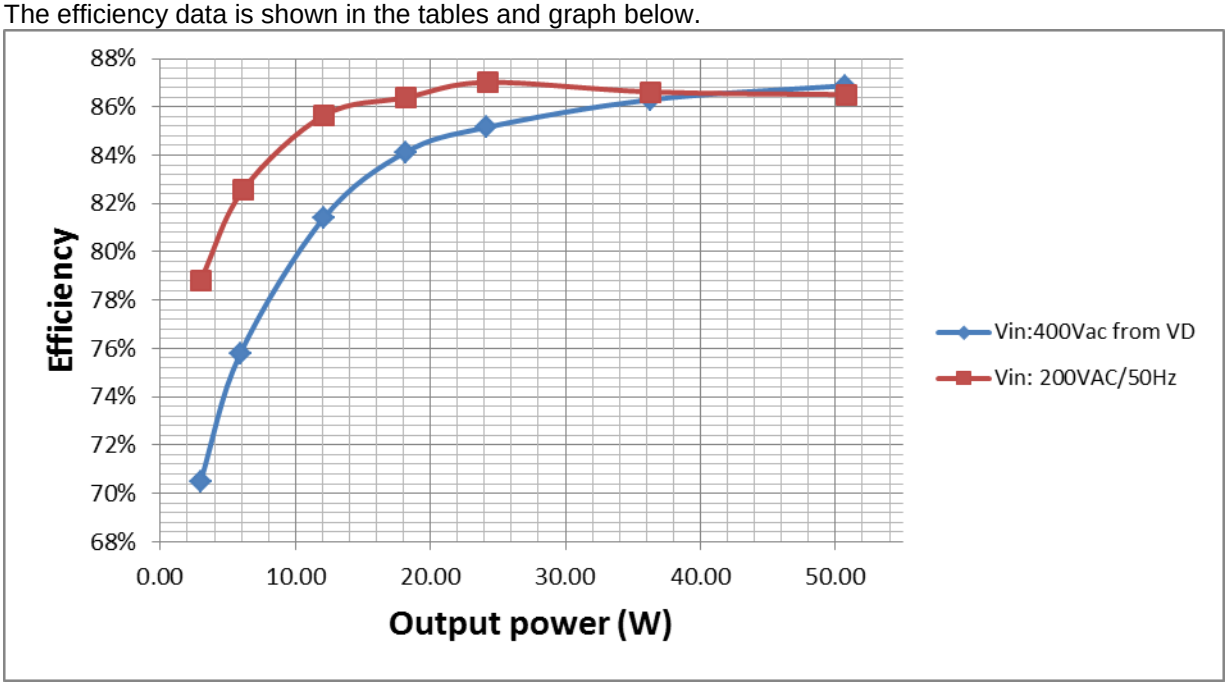


Bottom side



2 Converter Efficiency

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



V_{in}=200V_{AC}/50Hz

Vin(AC)	Iin(A)	Pin(W)	Vo(V)	Io(A)	Pout(W)	Eff. (%)
200.50	0.5745	58.40	24.15	2.10	50.74	86.88%
200.60	0.4288	42.03	24.10	1.51	36.27	86.30%
200.80	0.3030	28.37	24.11	1.00	24.16	85.15%
200.90	0.2379	21.59	24.12	0.75	18.16	84.12%
201.00	0.1715	14.88	24.13	0.50	12.11	81.41%
201.10	0.0970	7.79	24.18	0.24	5.90	75.78%
201.10	0.0563	4.20	24.23	0.12	2.96	70.47%
201.20	0.0071	0.42	24.37	0.00	0.00	0.00%

V_{in}=400V_{AC} (200VAC/50Hz input with a voltage doubler circuit is applied here.)

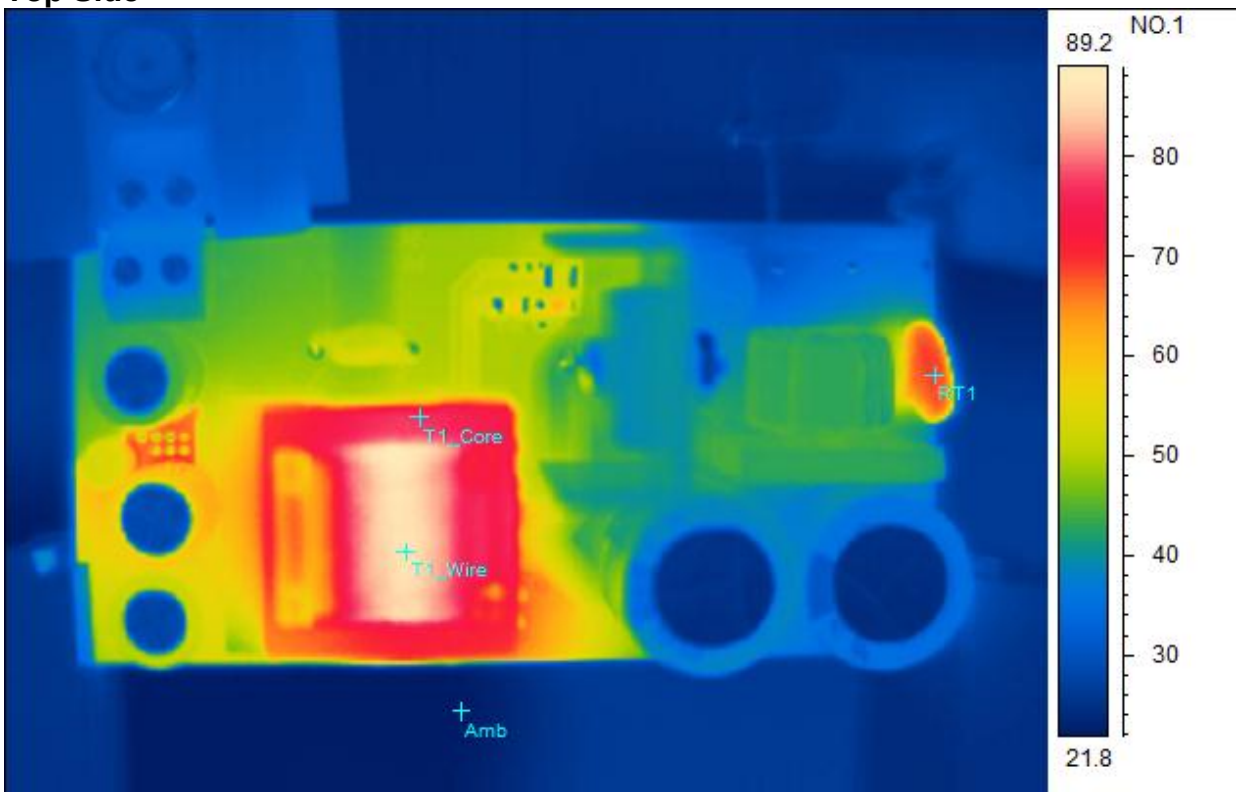
Vin(AC)	Iin(A)	Pin(W)	Vo(V)	Io(A)	Pout(W)	Eff. (%)
200.00	0.4999	58.75	24.19	2.10	50.82	86.51%
200.20	0.3712	41.96	24.15	1.51	36.35	86.62%
200.40	0.2632	27.82	24.16	1.00	24.21	87.02%
200.40	0.2096	21.05	24.15	0.75	18.18	86.39%
200.50	0.1528	14.16	24.16	0.50	12.13	85.66%
200.50	0.0902	7.42	24.21	0.25	6.13	82.57%
200.60	0.0502	3.77	24.32	0.12	2.97	78.81%
200.60	0.0040	0.24	24.49	0.00	0.00	0.00%

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 24V/2.1A.

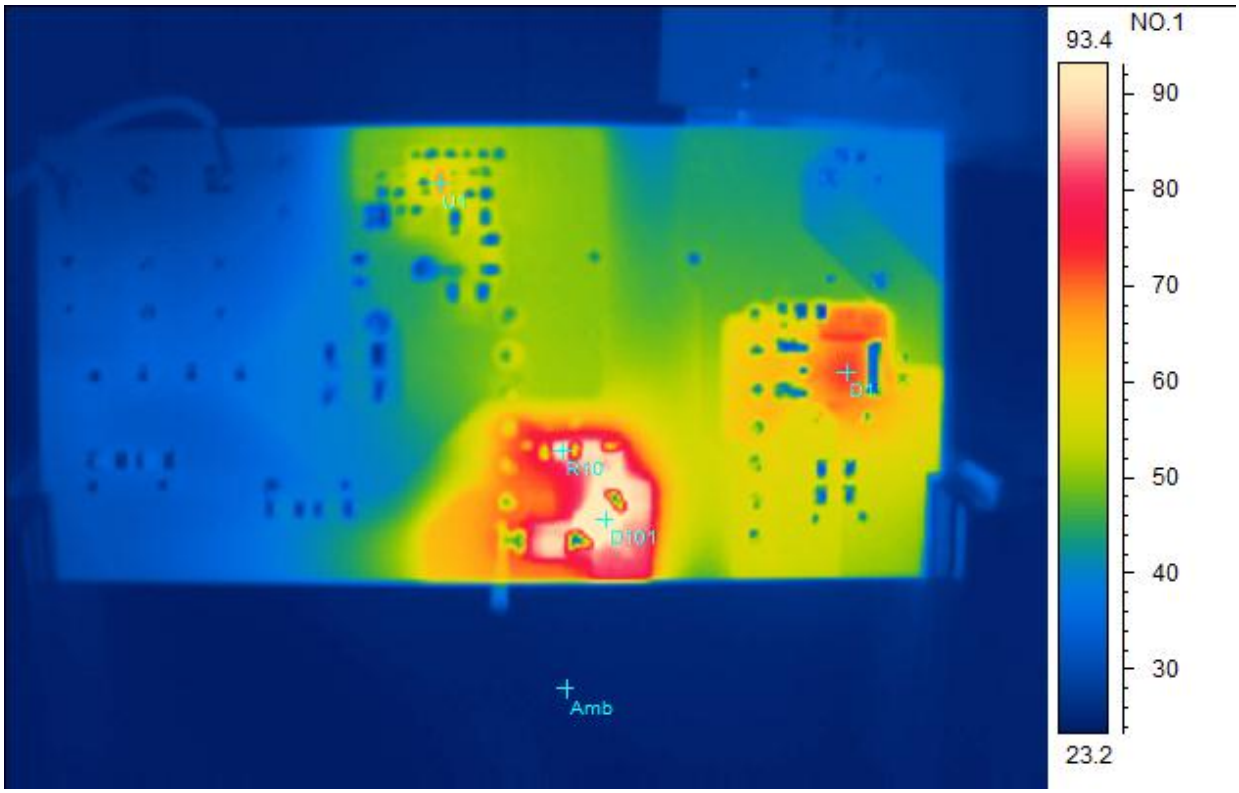
200V_{AC}/50Hz

Top Side



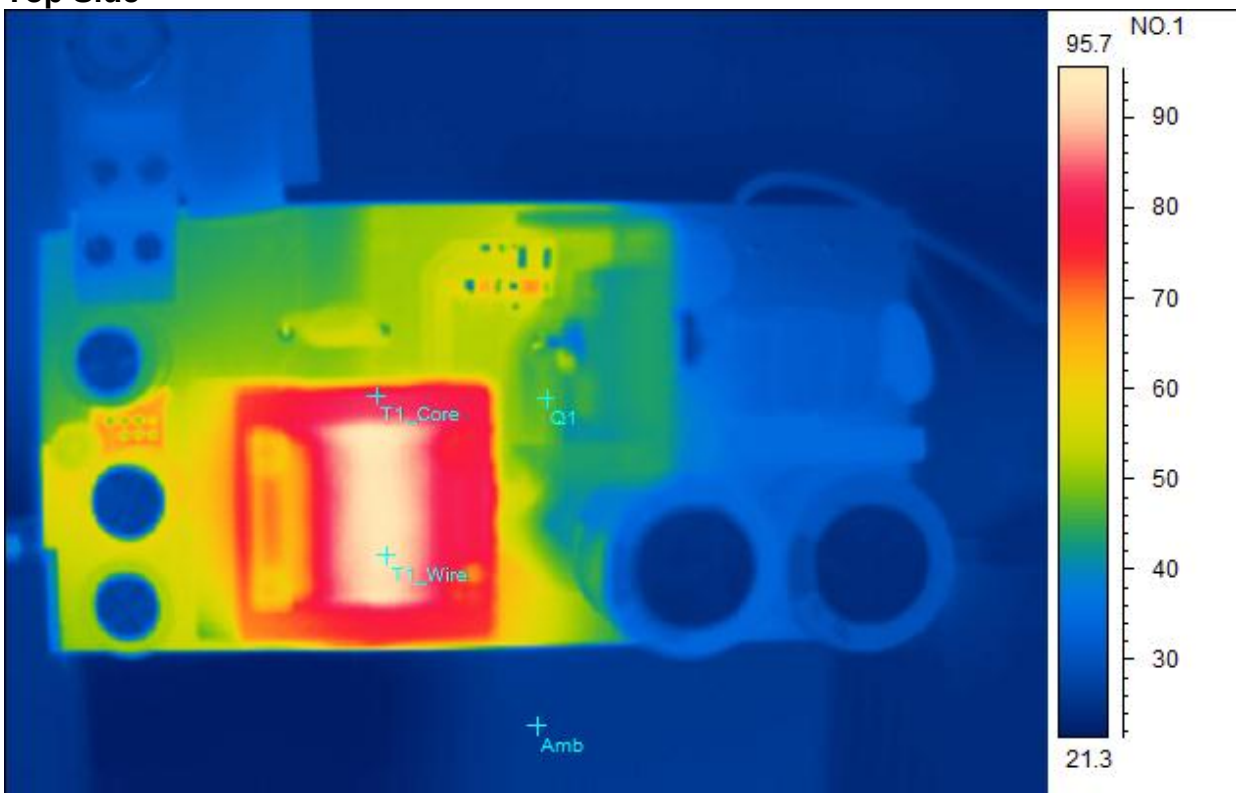
Spot analysis	Value
T1_WireTemperature	87.3°C
T1_CoreTemperature	79.5°C
RT1Temperature	71.9°C
Amb Temperature	22.1°C

200V_{AC}/50Hz
Bottom Side



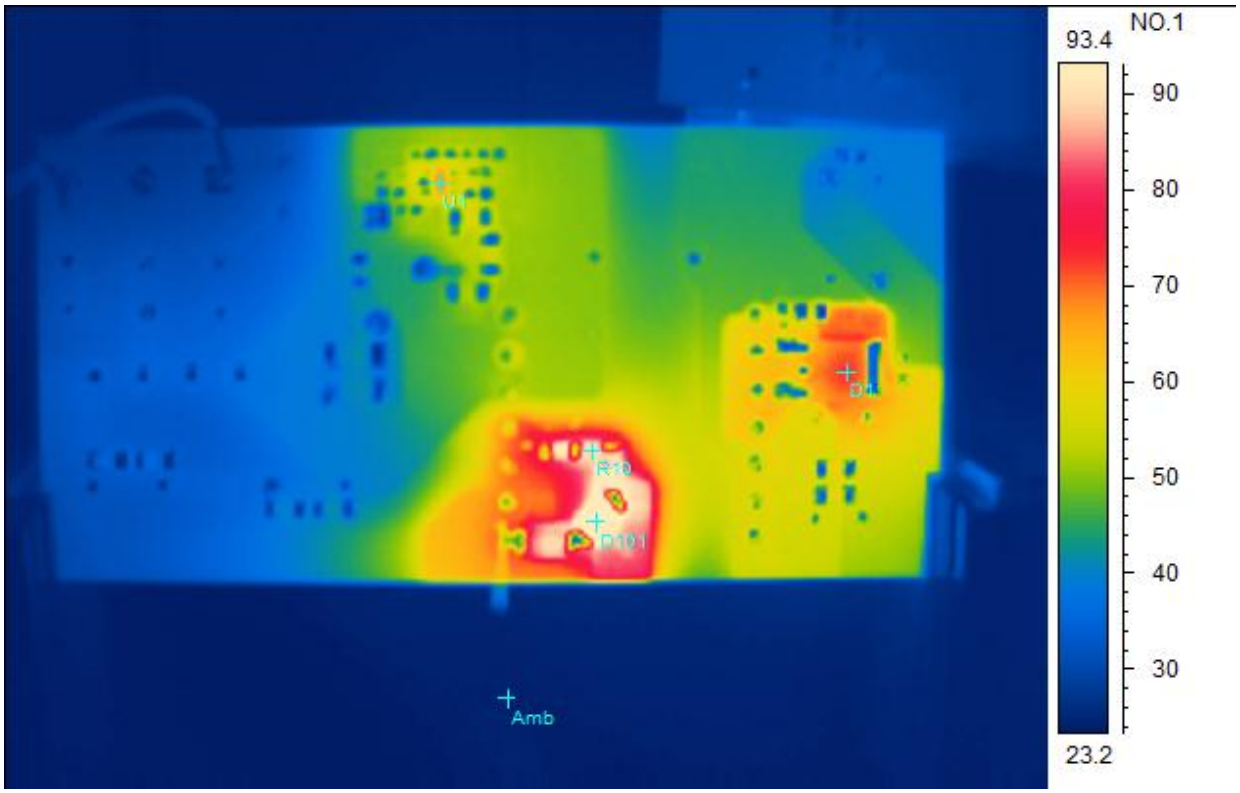
Spot analysis	Value
D101Temperature	97.1°C
R10Temperature	94.0°C
U1Temperature	71.4°C
D1Temperature	76.0°C
Amb Temperature	24.5°C

V_{in}=400V_{AC} (200VAC/50Hz input with a voltage doubler circuit is applied here.)
Top Side



Spot analysis	Value
T1_WireTemperature	93.9°C
T1_CoreTemperature	85.1°C
Q1Temperature	51.7°C
Amb Temperature	26.7°C

V_{in}=400V_{AC} (200VAC/50Hz input with a voltage doubler circuit is applied here.)
Bottom Side

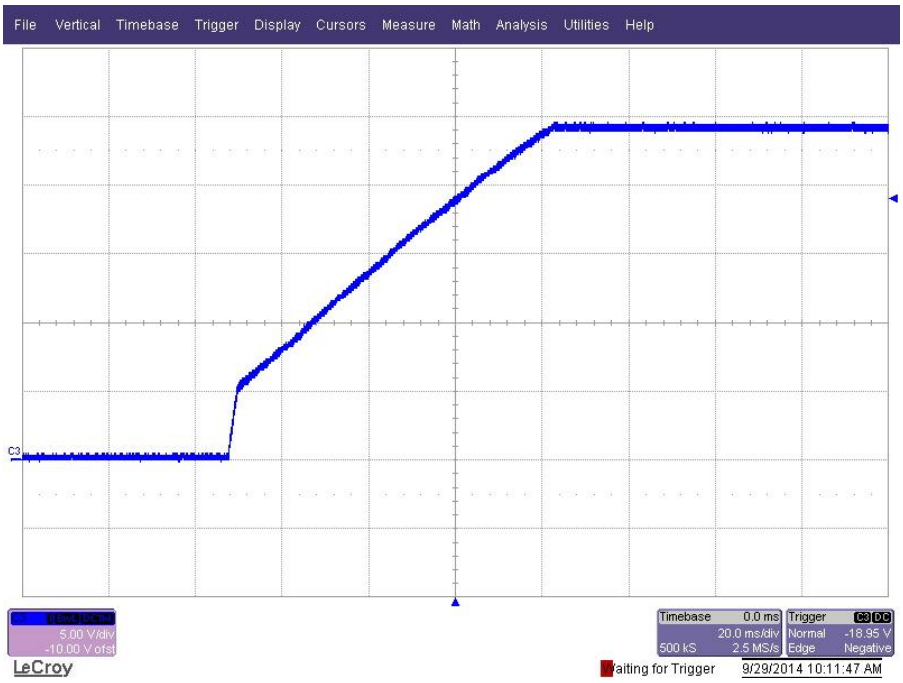


Spot analysis	Value
D101Temperature	97.4°C
R10Temperature	91.3°C
U1Temperature	71.4°C
D1Temperature	76.0°C
Amb Temperature	24.3°C

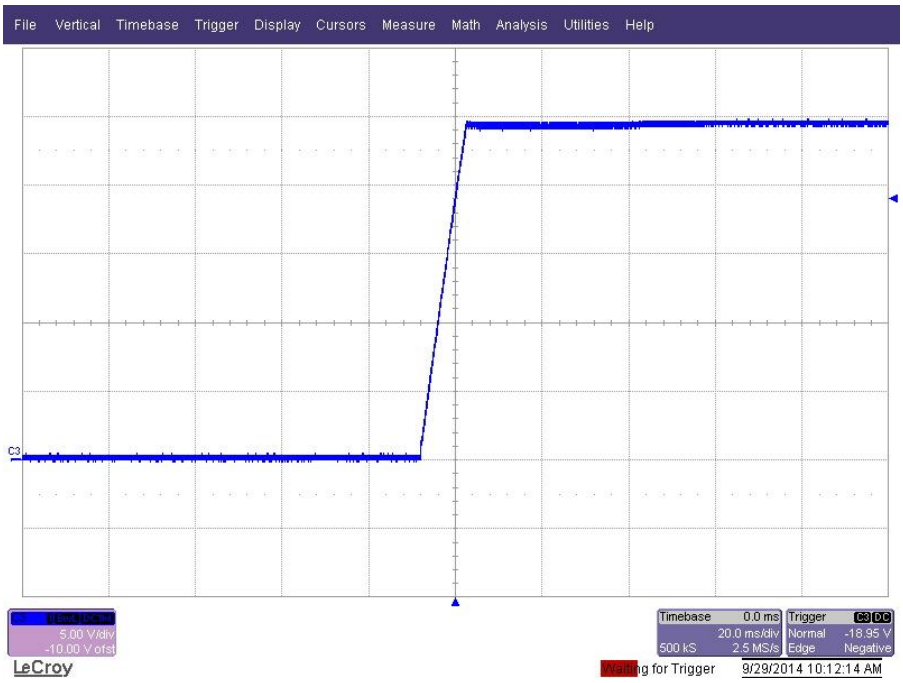
4 Startup

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

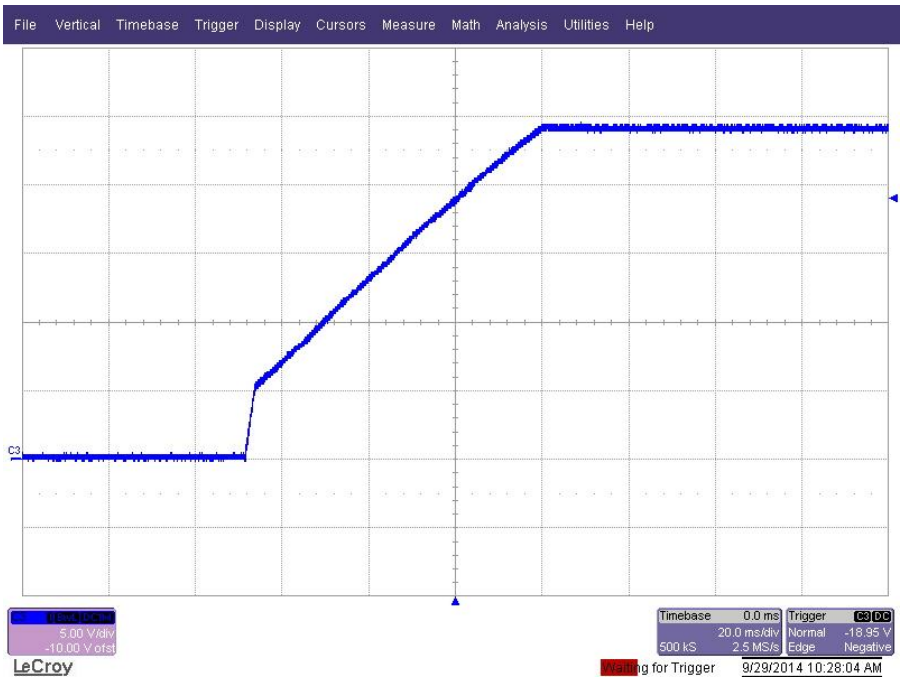
4.1 Start Up @ 200V_{AC}/50Hz: 24V/2.1A.



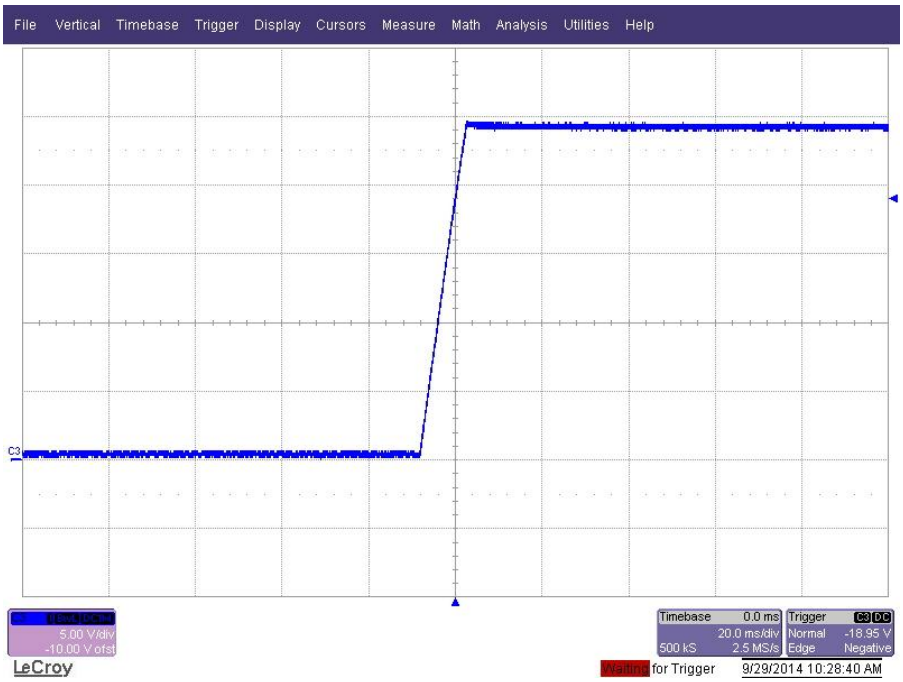
4.2 Start Up @ 200V_{AC}/50Hz: no load.



4.3 Start Up @ 400V_{AC}: 24V/2.1A (200VAC/50Hz input with a voltage doubler circuit is applied here.).



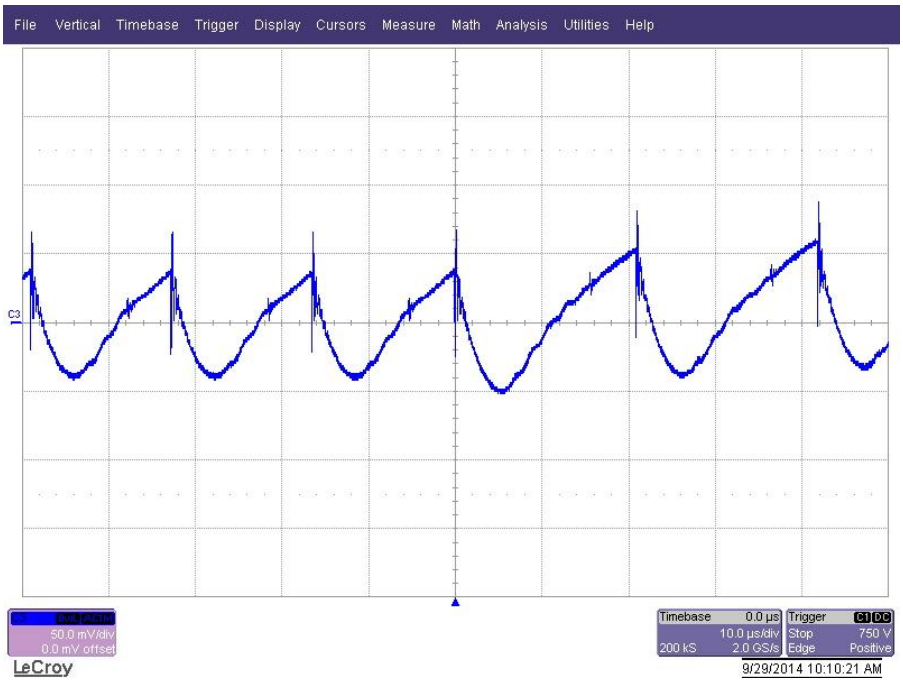
4.4 Start Up @ 400V_{AC}: no load (200VAC/50Hz input with a voltage doubler circuit is applied here.).



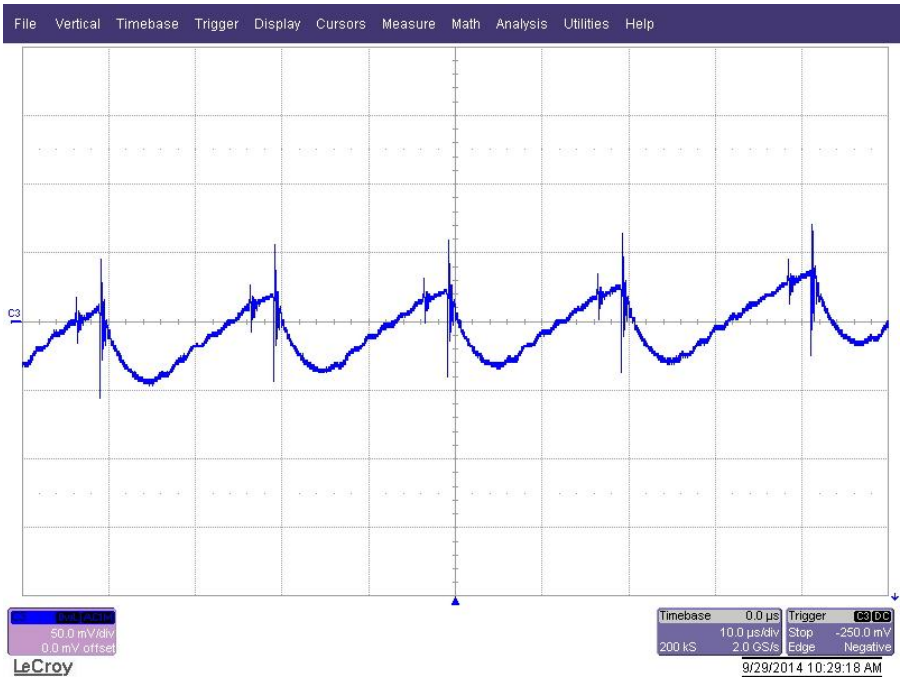
5 Output Ripple Voltages

The output ripple voltage is shown in the plots below at 24V/2.1A full load.

5.1 $24V_{ripple}$ at $200V_{AC}$/50Hz



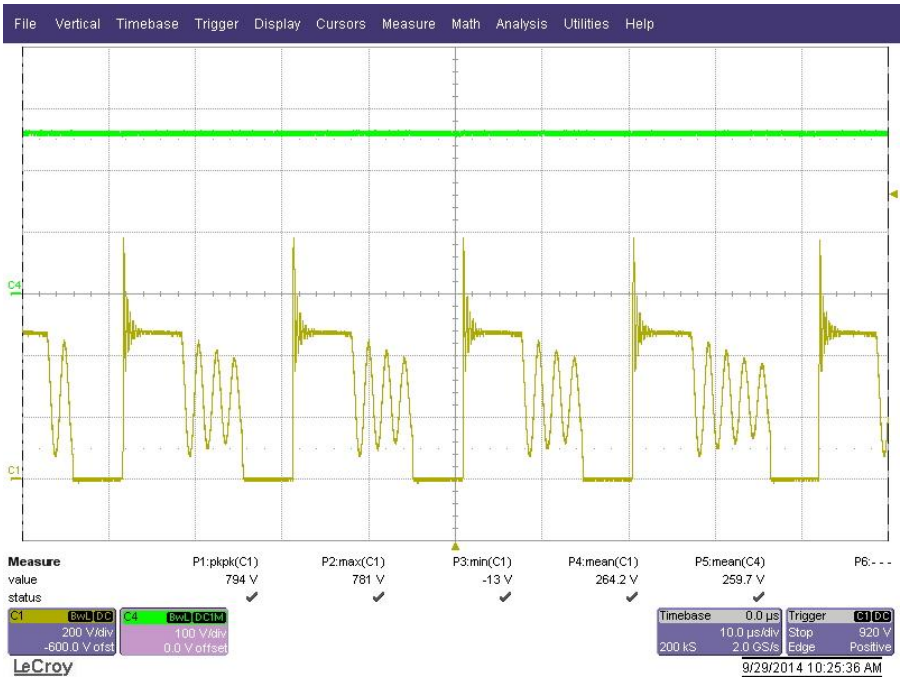
5.2 $24V_{ripple}$ at $400V_{AC}$ ($200V_{AC}$/50Hz input with a voltage doubler circuit is applied here.)



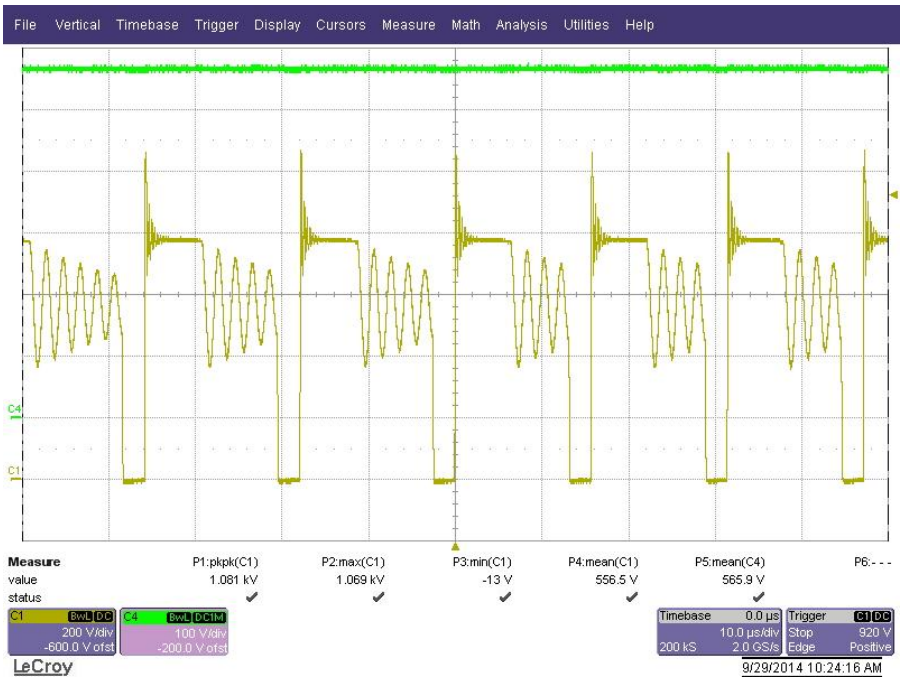
6 Switching Waveforms

The images below show key switching waveforms of PMP10416RevA. The waveforms are measured with 24V/2.1A load.

6.1 Primary MOSFET Q1 @ 200V_{AC}/50Hz



6.2 Primary MOSFET Q1 @ 400V_{AC} (200VAC/50Hz input with a voltage doubler circuit is applied here.)



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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265