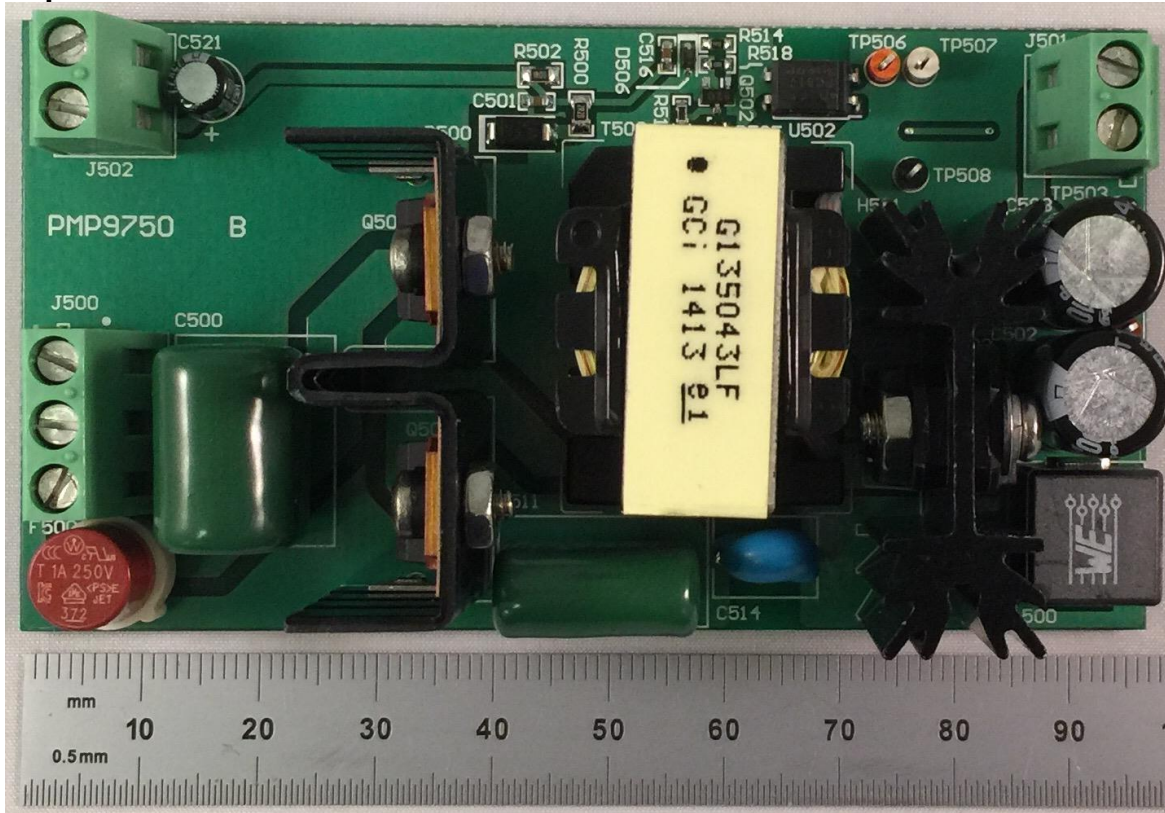


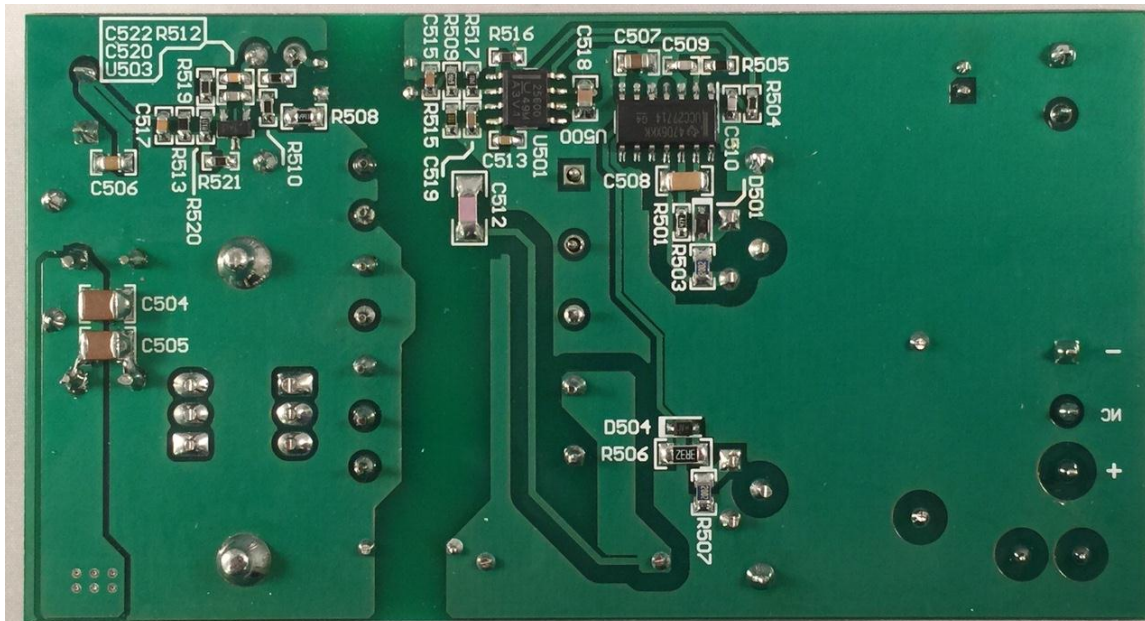
## 1 Photo

The photographs below show the PMP9750 Rev B assembly. This circuit was built on a PMP9750 Rev B PCB.

### Top side



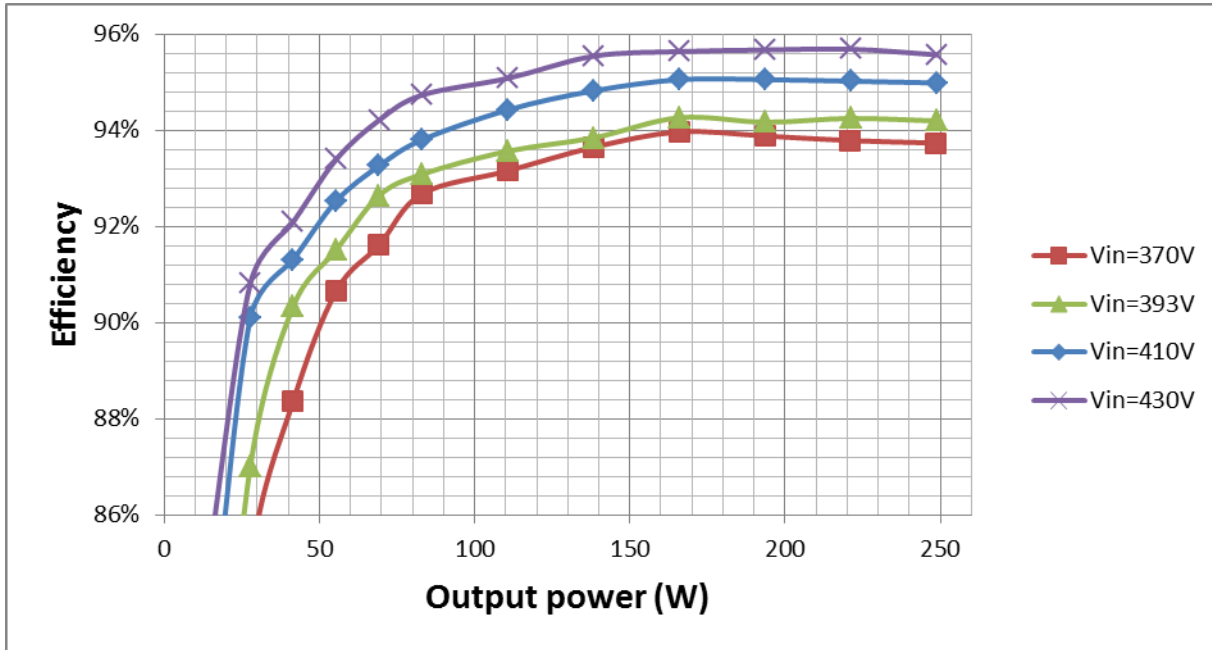
### Bottom side



## 2 Converter Efficiency:

The efficiency curve is shown in the tables and graph below. Driving losses and controller losses from Bias supply are not included here.

### 2.1 Efficiencies with 28Vout and various input voltages:



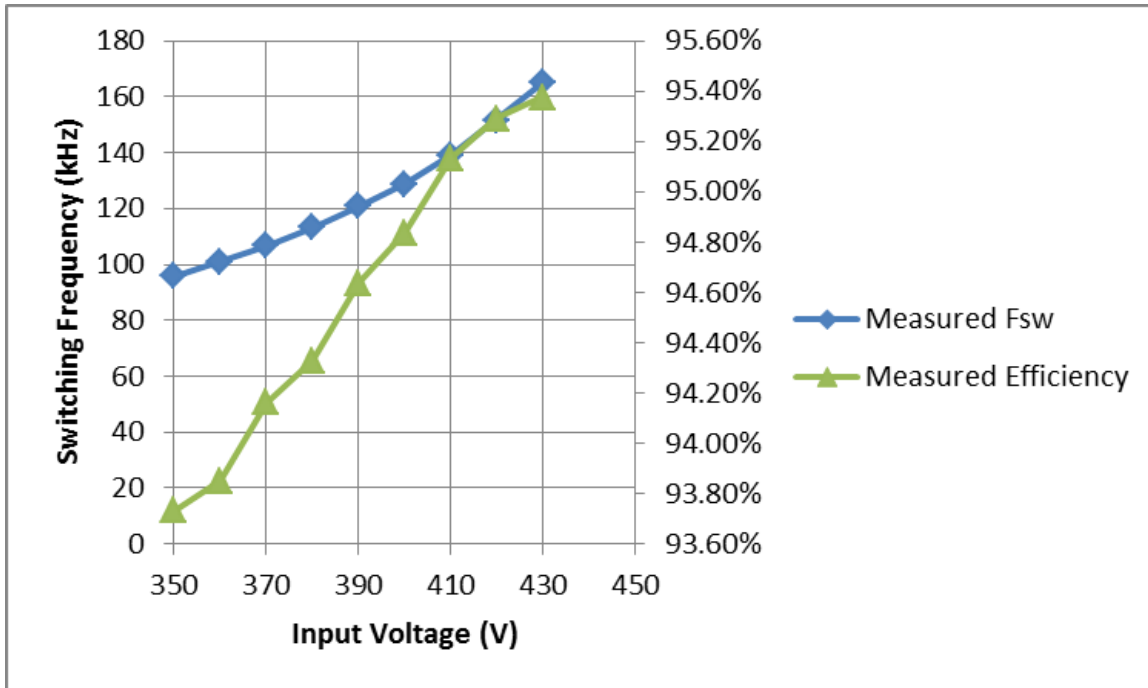
Vin(V)	Iin(A)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency (%)
370	0.717	265.29	27.63	9	248.67	16.62	93.74%
370	0.637	235.69	27.63	8	221.04	14.65	93.78%
370	0.557	206.09	27.64	7	193.48	12.61	93.88%
370	0.477	176.49	27.64	6	165.84	10.65	93.97%
370	0.399	147.63	27.65	5	138.25	9.38	93.65%
370	0.321	118.77	27.66	4	110.64	8.13	93.15%
370	0.242	89.54	27.67	2.999	82.98233	6.55767	92.68%
370	0.204	75.48	27.67	2.499	69.14733	6.33267	91.61%
370	0.165	61.05	27.67	2	55.34	5.71	90.65%
370	0.127	46.99	27.68	1.5	41.52	5.47	88.36%
370	0.088	32.56	27.68	1	27.68	4.88	85.01%
370.1	0.049	18.1349	27.69	0.501	13.87269	4.26221	76.50%
370	0.01	3.7	27.69	0	0	3.7	0.00%

Vin(V)	Iin(A)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency (%)
393	0.672	264.096	27.64	9	248.76	15.336	94.19%
393	0.597	234.621	27.64	8	221.12	13.501	94.25%
393	0.523	205.539	27.65	7	193.55	11.989	94.17%
393	0.448	176.064	27.66	6	165.96	10.104	94.26%
393	0.375	147.375	27.66	5	138.3	9.075	93.84%
393	0.301	118.293	27.67	4	110.68	7.613	93.56%
393	0.227	89.211	27.68	3	83.04	6.171	93.08%
393	0.19	74.67	27.68	2.499	69.17232	5.49768	92.64%
393	0.154	60.522	27.69	2	55.38	5.142	91.50%
393	0.117	45.981	27.69	1.5	41.535	4.446	90.33%
393.1	0.081	31.8411	27.7	1	27.7	4.1411	86.99%
393.1	0.045	17.6895	27.7	0.5	13.85	3.8395	78.30%
393.1	0.005	1.9655	27.74	0	0	1.9655	0.00%

Vin(V)	Iin(A)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency (%)
410	0.639	261.99	27.65	9	248.85	13.14	94.98%
410	0.568	232.88	27.66	8	221.28	11.6	95.02%
410	0.497	203.77	27.67	7	193.69	10.08	95.05%
410	0.426	174.66	27.67	6	166.02	8.64	95.05%
410	0.356	145.96	27.68	5	138.4	7.56	94.82%
410	0.286	117.26	27.68	4	110.72	6.54	94.42%
410	0.216	88.56	27.69	3	83.07	5.49	93.80%
410.1	0.181	74.2281	27.69	2.5	69.225	5.0031	93.26%
410.1	0.146	59.8746	27.7	2	55.4	4.4746	92.53%
410.1	0.111	45.5211	27.71	1.5	41.565	3.9561	91.31%
410.1	0.075	30.7575	27.71	1	27.71	3.0475	90.09%
410.1	0.041	16.8141	27.71	0.501	13.88271	2.93139	82.57%
410.1	0.005	2.0505	27.79	0	0	2.0505	0.00%

Vin(V)	Iin(A)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency (%)
430	0.606	260.58	27.67	9	249.03	11.55	95.57%
430	0.538	231.34	27.67	8	221.36	9.98	95.69%
430	0.471	202.53	27.68	7	193.76	8.77	95.67%
430	0.404	173.72	27.69	6	166.14	7.58	95.64%
430	0.337	144.91	27.69	5	138.45	6.46	95.54%
430	0.271	116.53	27.7	4	110.8	5.73	95.08%
430	0.204	87.72	27.7	3	83.1	4.62	94.73%
430	0.171	73.53	27.71	2.5	69.275	4.255	94.21%
430	0.138	59.34	27.71	2	55.42	3.92	93.39%
430	0.105	45.15	27.72	1.5	41.58	3.57	92.09%
430.1	0.071	30.5371	27.73	1	27.73	2.8071	90.81%
430.1	0.038	16.3438	27.74	0.5	13.87	2.4738	84.86%
430.1	0.002	0.8602	27.84	0	0	0.8602	0.00%

**2.2 Efficiencies and switching frequencies with 28Vout/9A and various input voltages:**

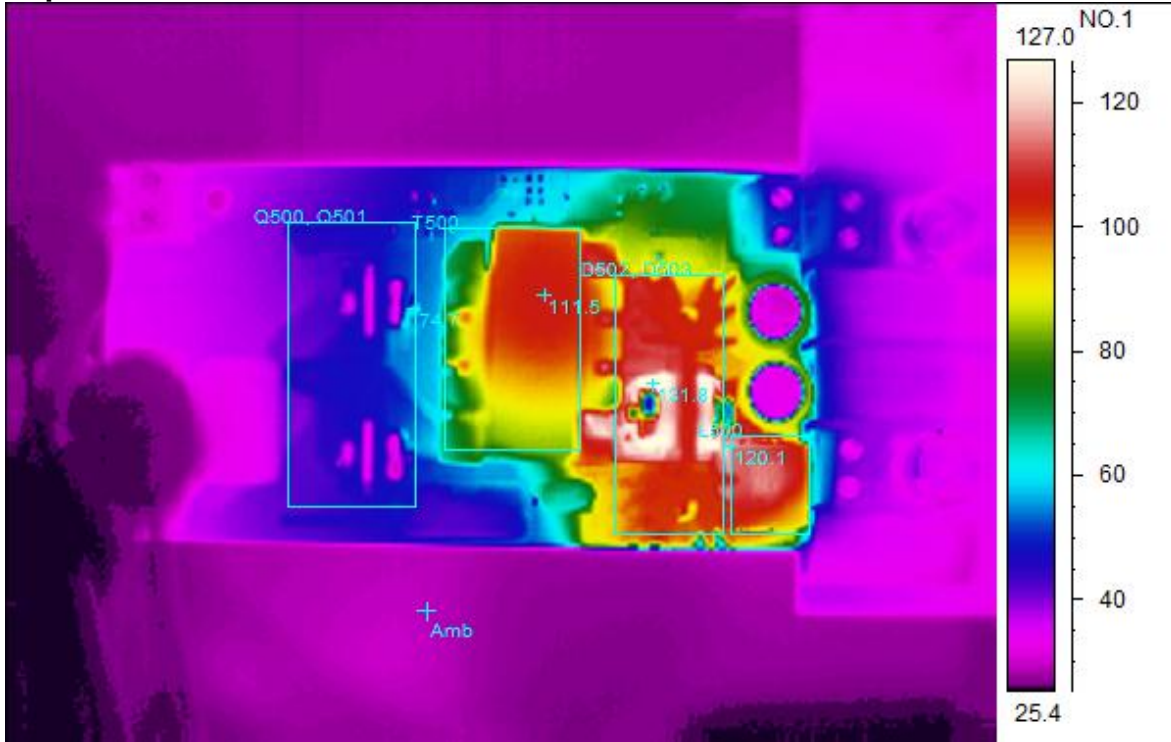


Vin(V)	Iin(A)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency (%)
430	0.607	261.01	27.66	9	248.94	12.07	95.38%
420	0.622	261.24	27.66	9	248.94	12.3	95.29%
410	0.638	261.58	27.65	9	248.85	12.73	95.13%
400	0.656	262.4	27.65	9	248.85	13.55	94.84%
390	0.674	262.86	27.64	9	248.76	14.1	94.64%
380	0.694	263.72	27.64	9	248.76	14.96	94.33%
370	0.714	264.18	27.64	9	248.76	15.42	94.16%
360	0.736	264.96	27.63	9	248.67	16.29	93.85%
350	0.758	265.3	27.63	9	248.67	16.63	93.73%

### 3 Thermal Images

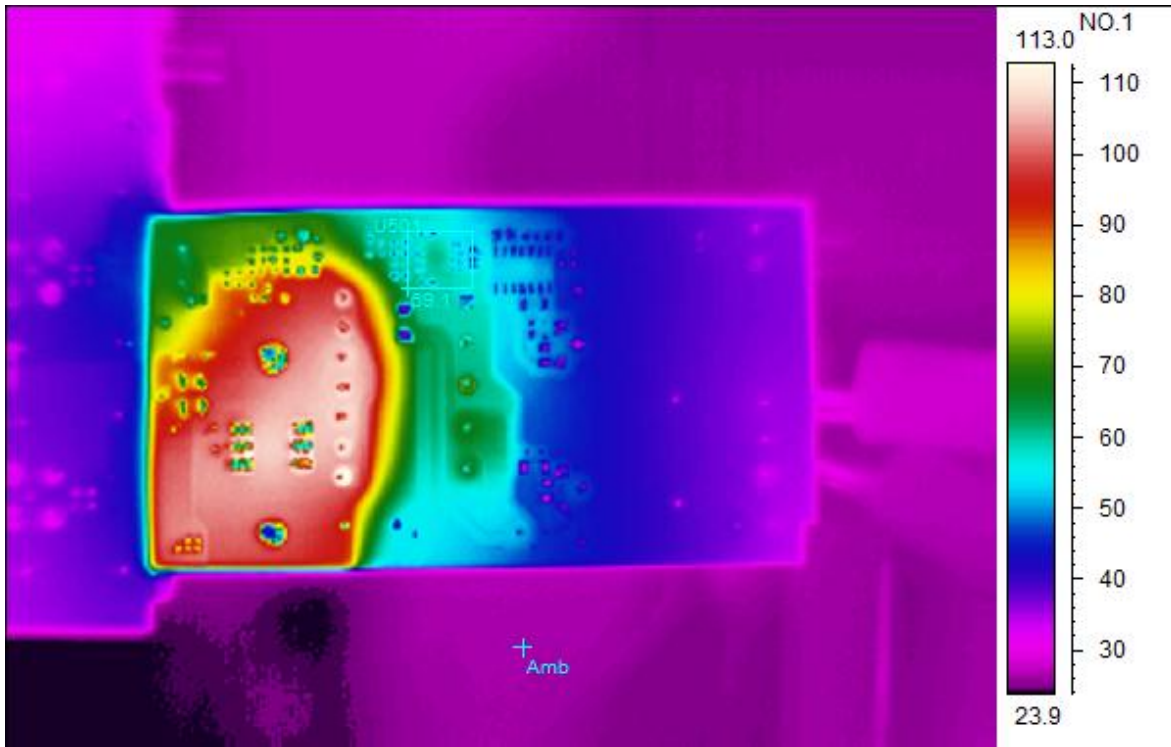
The thermal images below show a top view and bottom view of the board. The thermal images are taken after the board was powered for over 30min. with 20°C ambient temperature and no forced air flow. The input voltage is at 380V and output was loaded with 28V/9A.

#### Top Side



Spot analysis	Value
Amb Temperature	30.8°C
Area analysis	Value
T500Max	111.5°C
D502, D503Max	131.8°C
L500Max	120.1°C
Q500, Q501Max	74.7°C

**Bottom Side**

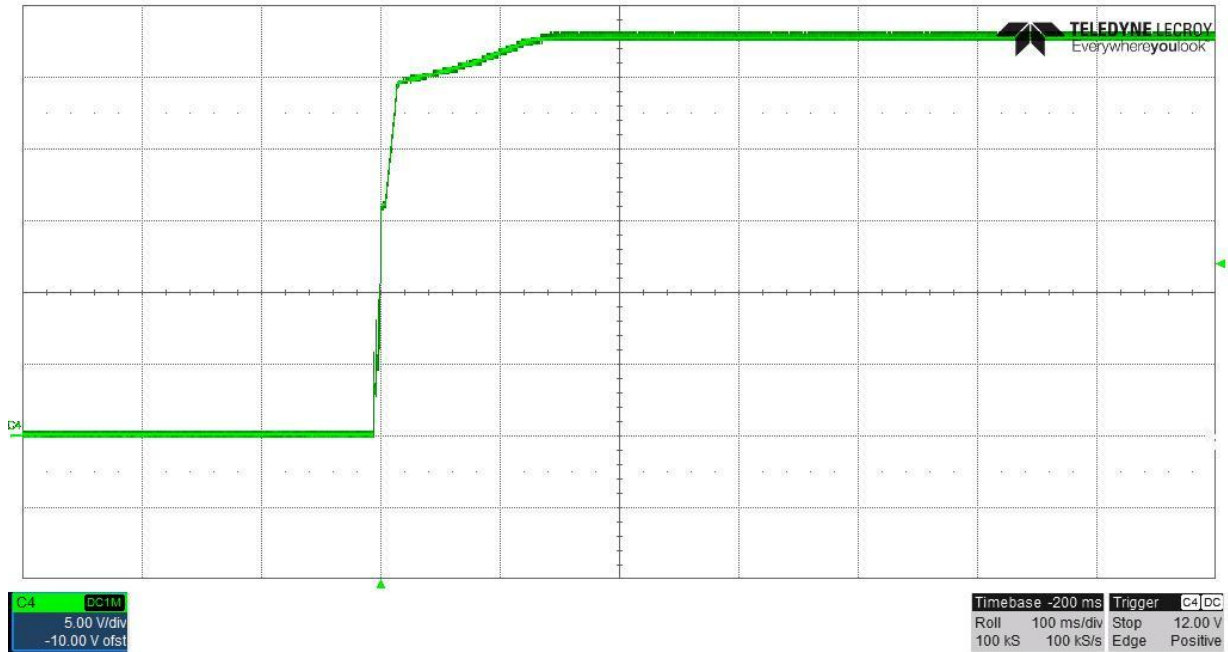


Spot analysis	Value
Amb Temperature	27.3°C
Area analysis	Value
U501Max	69.1°C

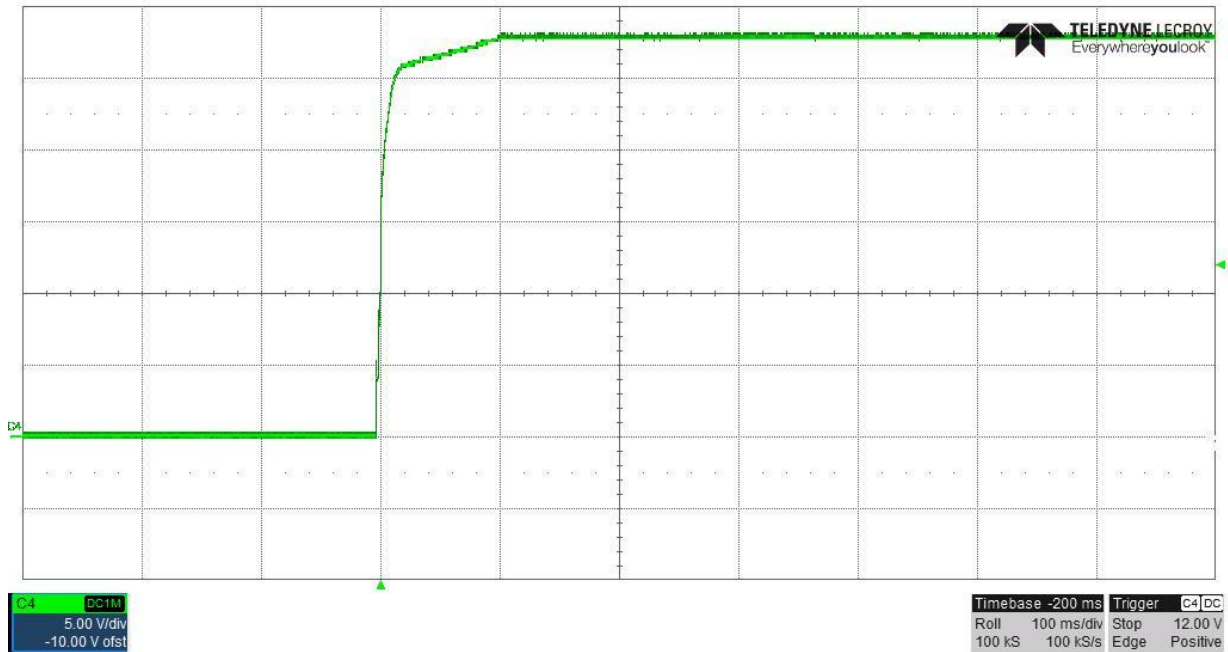
## 4 Startup

The input/output voltages at startup are shown in the images below, where CH2:  $V_{in}$ , CH3:  $85V_{OUT}$ , CH4:  $28V_{OUT}$ .

### 4.1 Start Up @ $380V_{in}$ , $28V/9A$ :



### 4.2 Start Up @ $380V_{in}$ , $28V/0A$ :

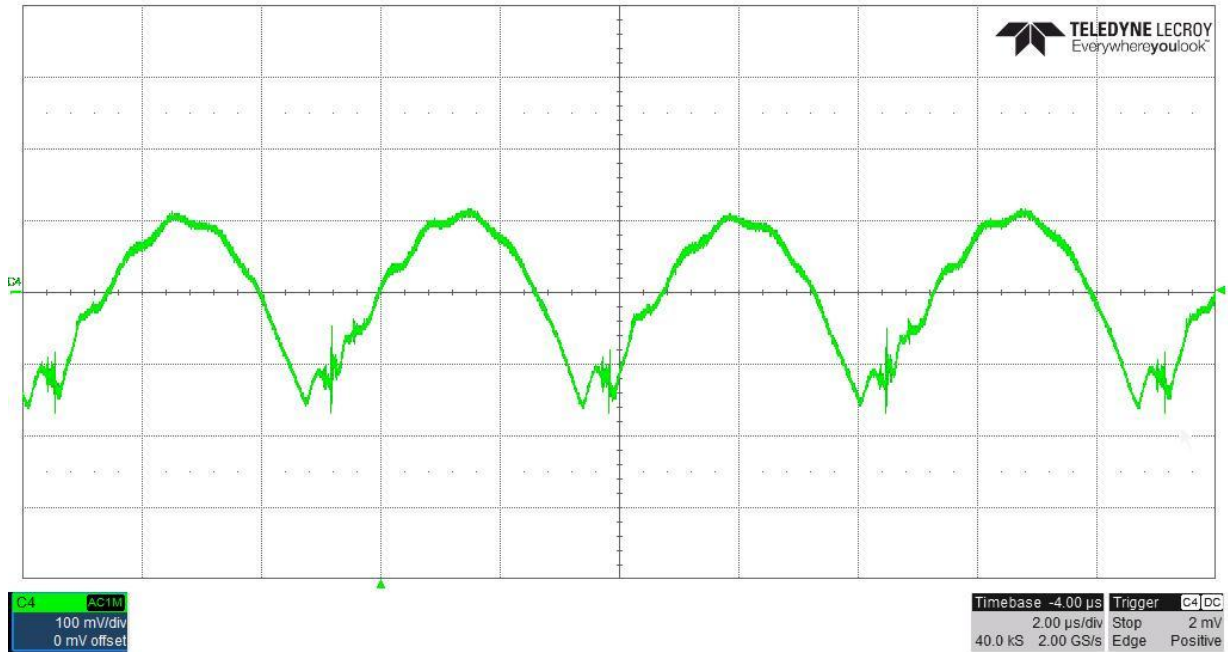




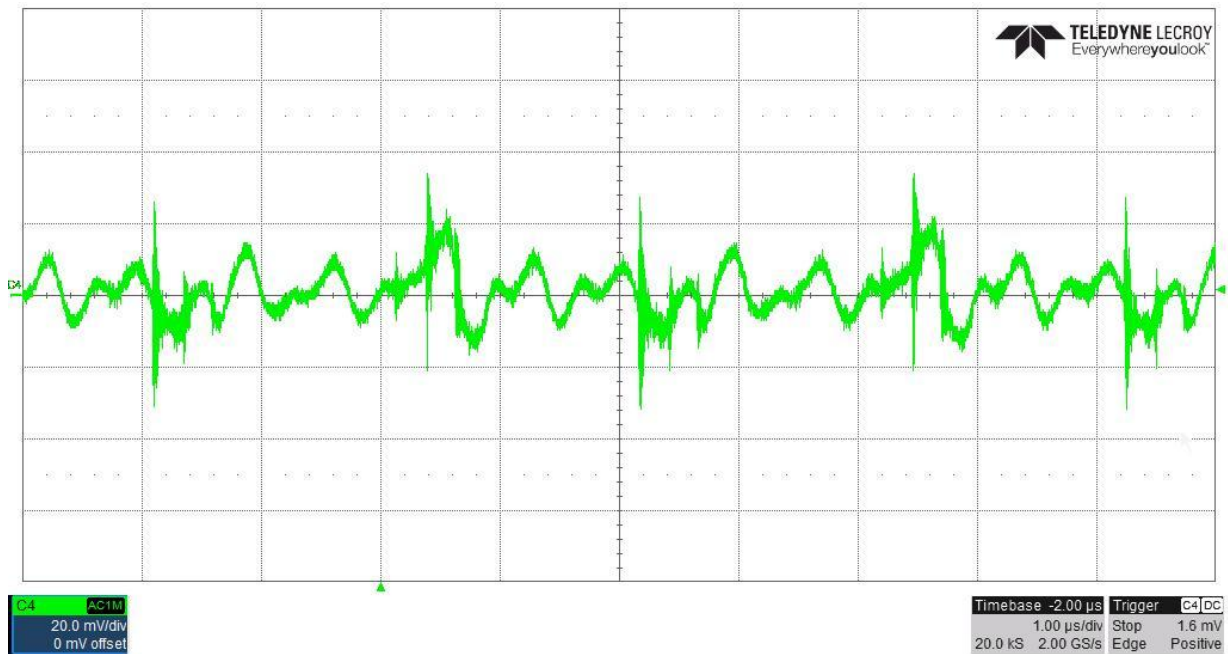
## 5 Output Ripple Voltages

The output ripple voltages are shown in the plots below with 380V<sub>DC</sub> input.  
CH4: 28V.

### 5.1 Output ripples @ 28V/9A

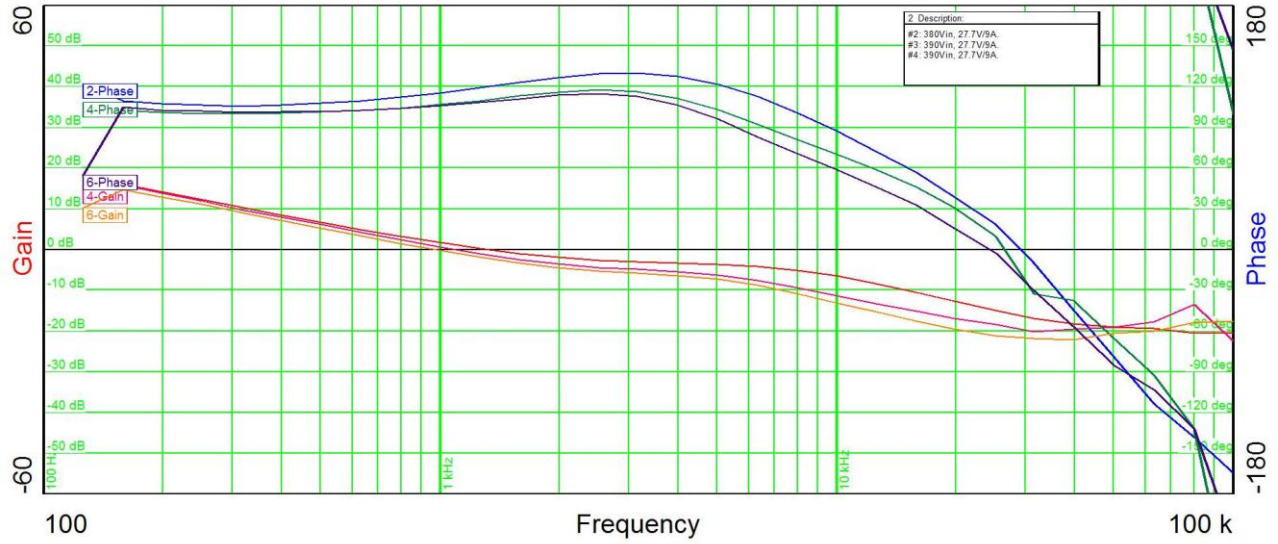


### 5.2 Output ripples @ 28V/0A



## 6 Frequency Response

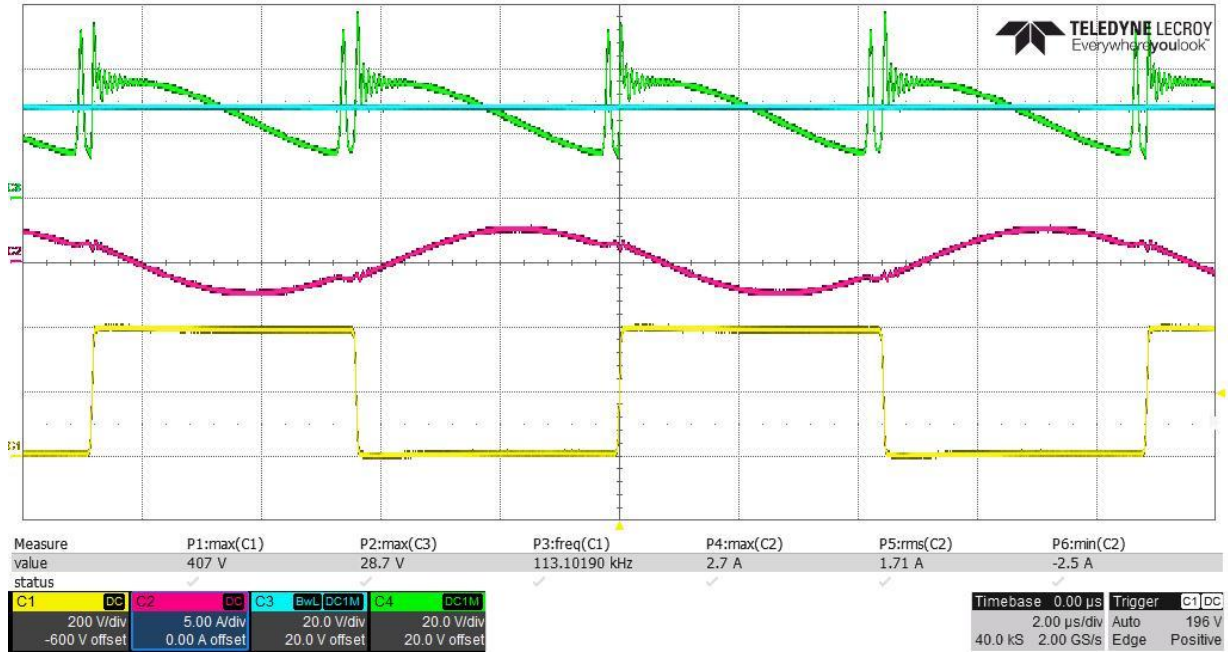
Frequency responses of PMP9750 were measured at 28V/9A output.



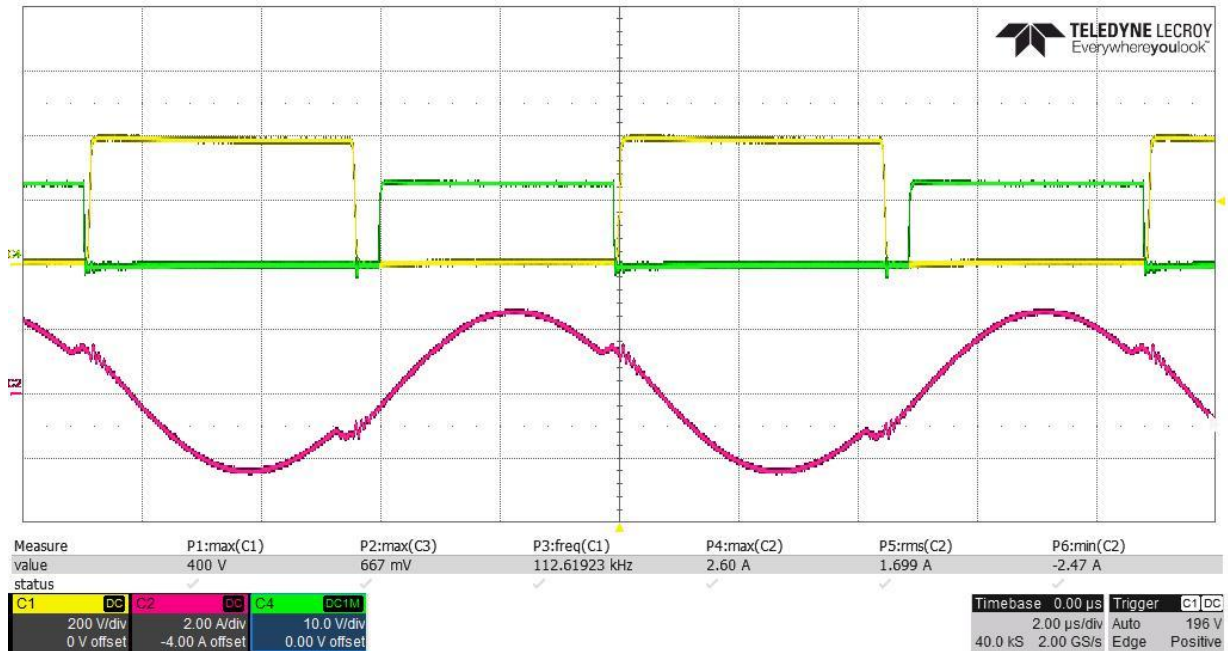
## 7 Switching Waveforms

The switching waveforms are shown in the plots below with 380V<sub>DC</sub> input and 28V/9A output.

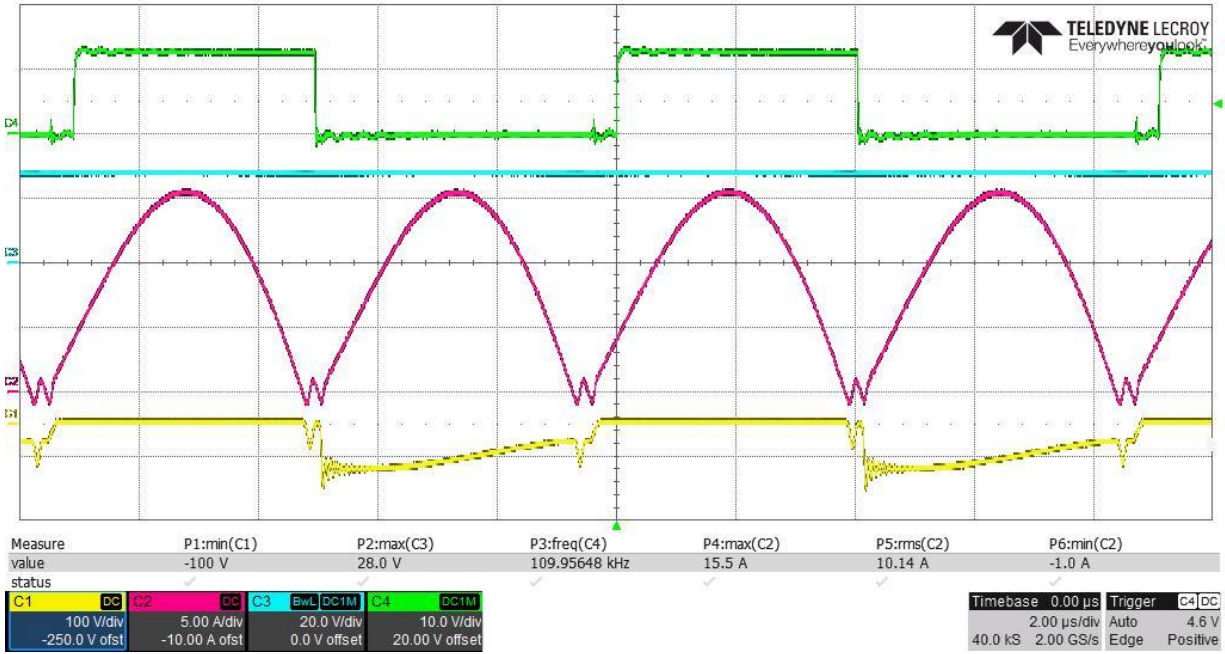
### 7.1 CH1: Q501 V<sub>DS</sub>, CH2: C511 Current, CH3: V<sub>out</sub>, CH4: V<sub>sec to GND</sub> (Voltage after D502 & D503 rectifier).



### 7.2 CH1: Q501 V<sub>DS</sub>, CH2: C511 Current, CH4: Q501 V<sub>GS</sub>.



**7.3 CH1: D502 ( $V_{CA}$ ), CH2: L500 Current, CH3:  $V_{out}$  CH4: Q501  $V_{GS}$**



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