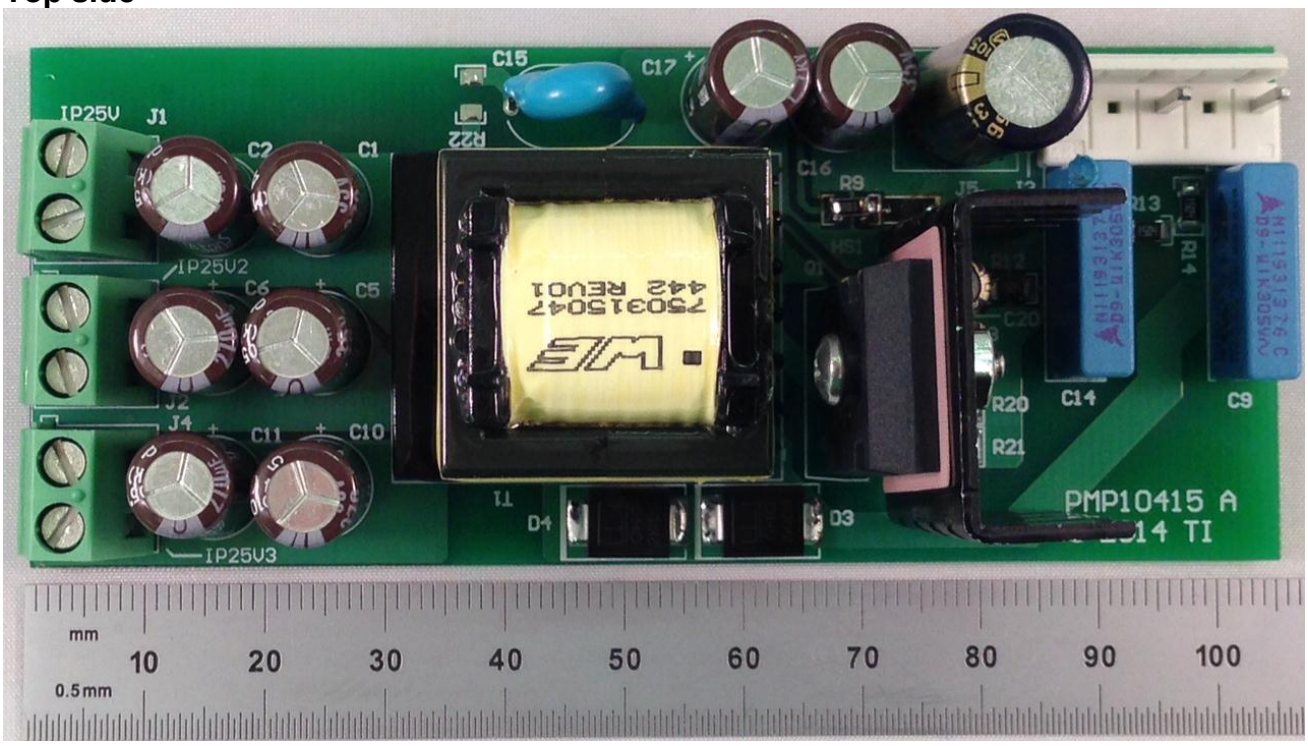
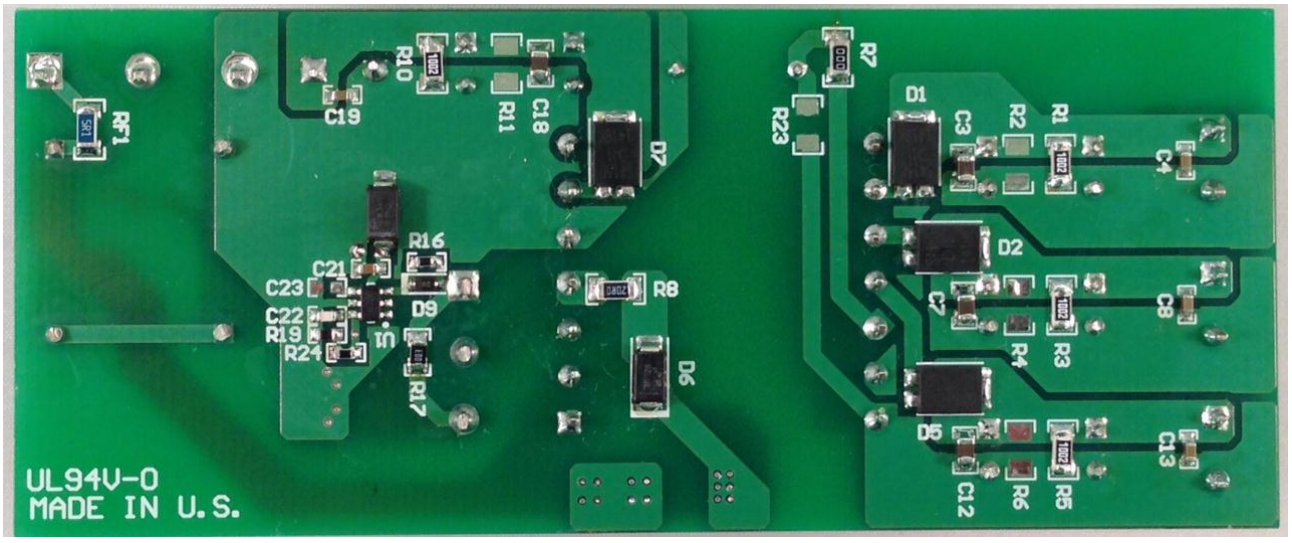
1 Photo

The photographs below show the PMP10415 Rev B assembly. This circuit was built on a PMP10415 Rev A PCB.

Top side

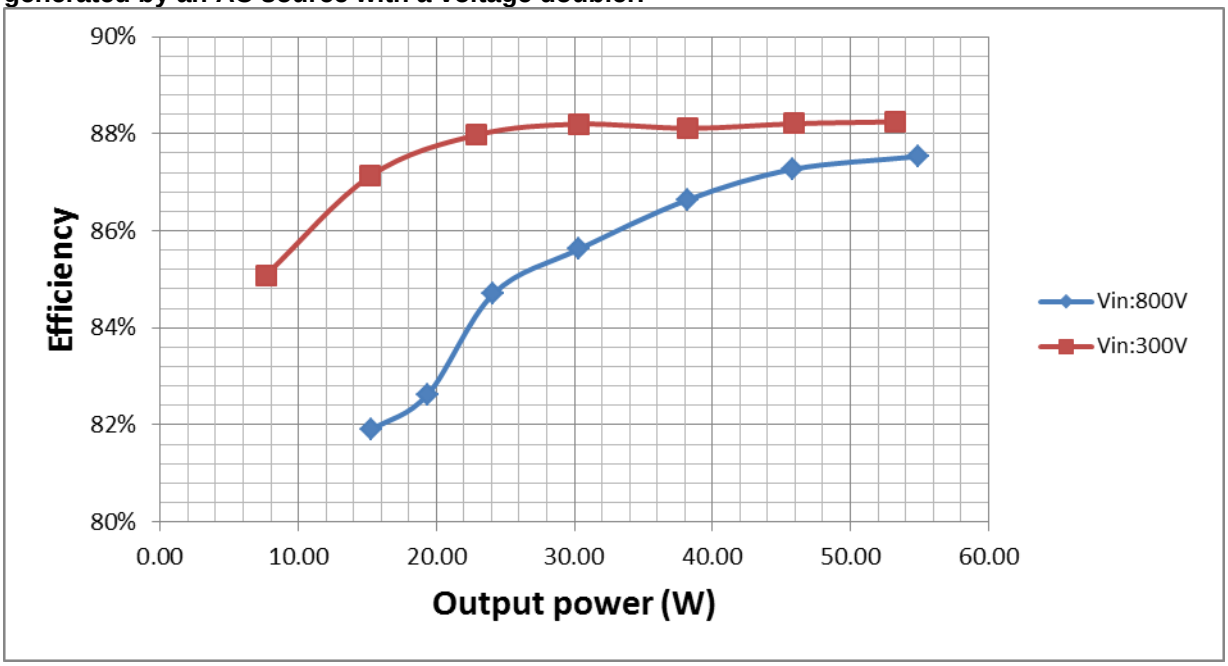


Bottom side



2 Converter Efficiency

The efficiency data is shown in the tables and graph below. **Notice that 300V_{DC} and 800V_{DC} were generated by an AC source with a voltage doubler.**



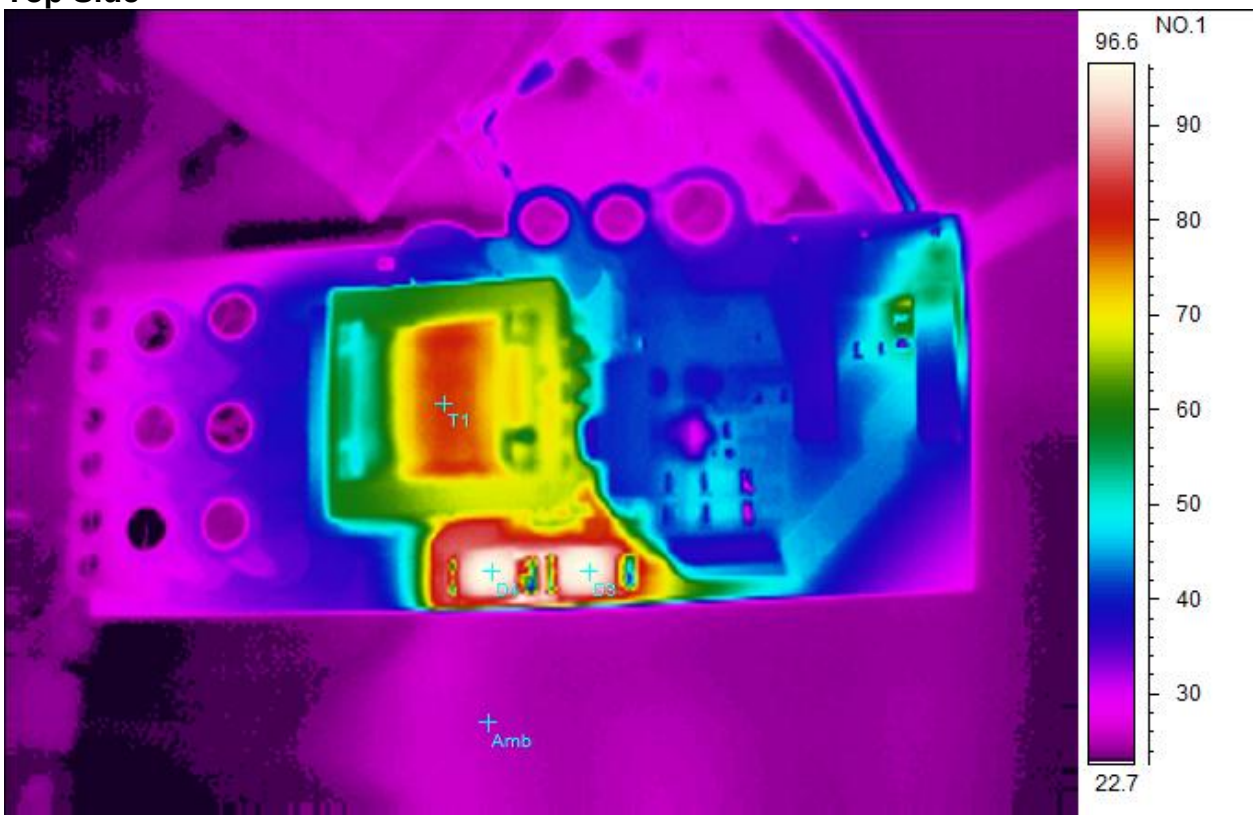
AC voltage with a voltage double is used to supply the reference board											
Vin(V)	Pin(W)	+25V(V)	+25V(A)	IP25V(V)	IP25V(A)	IP25V2(V)	IP25V2(A)	IP25V3(V)	IP25V3(A)	Pout(W)	Eff. (%)
800	62.76	26.11	0.759	25.06	0.699	25.31	0.292	25.21	0.405	54.94	87.53%
801	52.52	26.13	0.601	25.03	0.597	25.24	0.293	25.21	0.309	45.83	87.27%
802	44.12	26.13	0.500	25.01	0.502	25.21	0.254	25.21	0.246	38.23	86.64%
804	35.42	26.13	0.400	25.00	0.399	25.20	0.196	25.18	0.197	30.33	85.62%
801	28.50	26.16	0.301	24.98	0.303	25.12	0.196	25.16	0.150	24.14	84.70%
802	23.43	27.97	0.100	25.56	0.106	25.72	0.052	25.03	0.500	19.36	82.62%
803	18.65	25.51	0.203	24.53	0.205	24.72	0.103	24.72	0.102	15.27	81.90%
809	0.56	25.95	0.000	24.98	0.000	24.99	0.000	24.98	0.000	0.00	0.00%

AC voltage with a voltage double is used to supply the reference board											
Vin(V)	Pin(W)	+25V(V)	+25V(A)	IP25V(V)	IP25V(A)	IP25V2(V)	IP25V2(A)	IP25V3(V)	IP25V3(A)	Pout(W)	Eff. (%)
300	60.33	25.97	0.746	25.04	0.628	25.24	0.315	25.16	0.405	53.24	88.25%
300	52.10	26.09	0.600	25.07	0.600	25.28	0.295	25.25	0.309	45.96	88.21%
303	43.40	26.08	0.501	25.05	0.503	25.26	0.252	25.24	0.246	38.24	88.11%
300	34.34	26.05	0.400	25.02	0.400	25.23	0.194	25.20	0.197	30.29	88.20%
301	26.02	26.05	0.300	24.99	0.303	25.19	0.148	25.17	0.150	22.89	87.97%
303	17.47	25.70	0.201	24.60	0.206	24.84	0.099	24.82	0.102	15.22	87.13%
300	8.97	25.64	0.100	24.53	0.102	24.69	0.050	24.66	0.054	7.63	85.09%
301	0.33	25.99	0.000	24.78	0.000	24.80	0.000	24.79	0.000	0.00	0.00%

3 Thermal Images

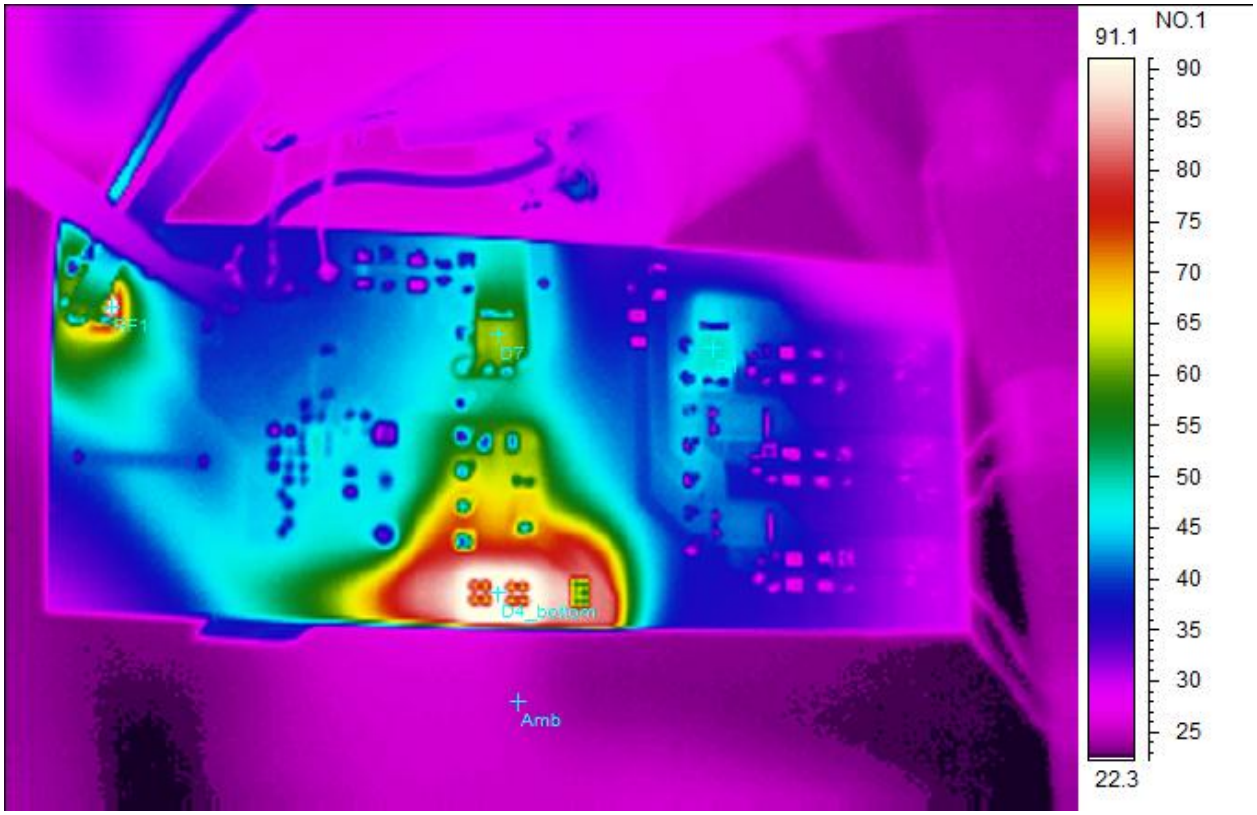
The thermal images below show a top view and bottom view of the board. The ambient temperature was 20ºC with no forced air flow.

300V_{DC} (300V_{DC} was generated by an AC source with a voltage doubler)
Load conditions: +25V: , IP25V:, IP25V2:, IP25V3:
Top Side



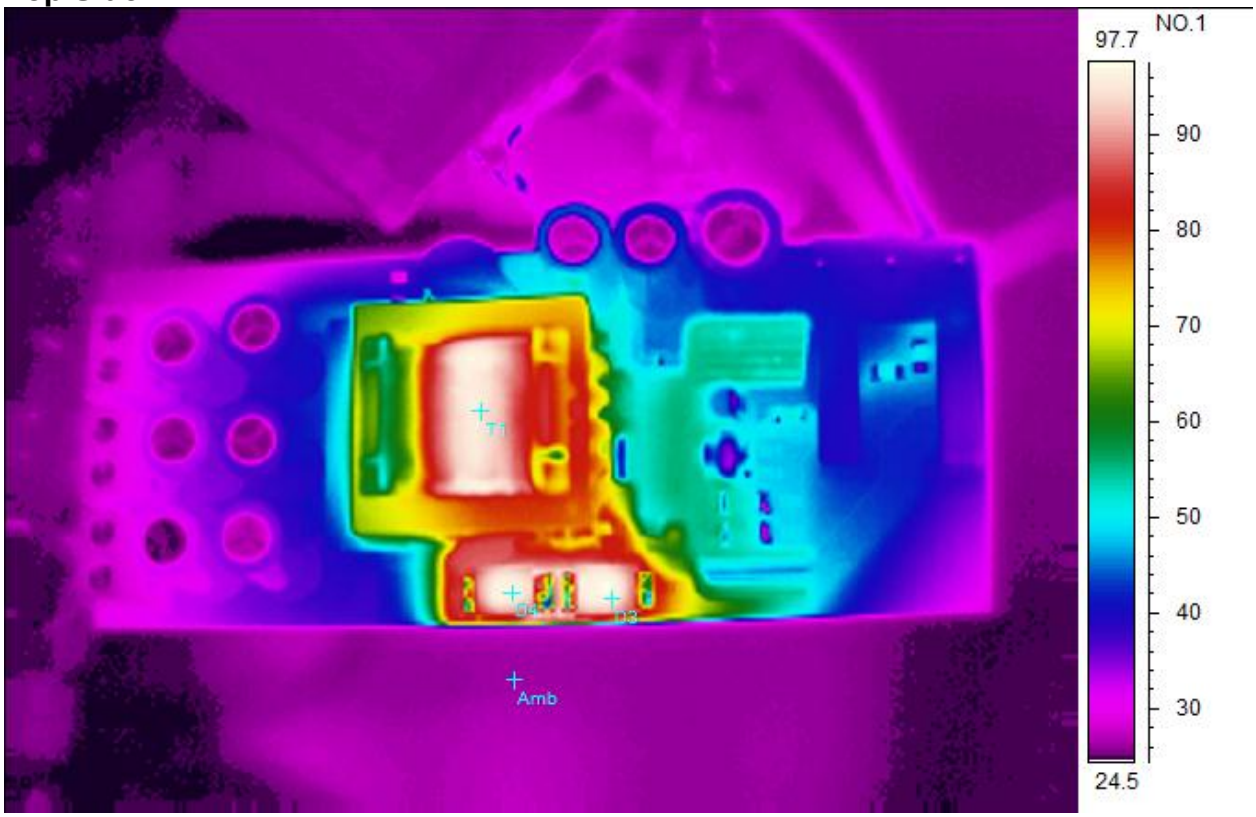
Spot analysis	Value
D4Temperature	96.8°C
D3Temperature	96.6°C
T1Temperature	82.5°C
Amb Temperature	26.0°C

300V_{DC} (300V_{DC} was generated by an AC source with a voltage doubler)
Load conditions: +25V: , IP25V:, IP25V2:, IP25V3:
Bottom Side



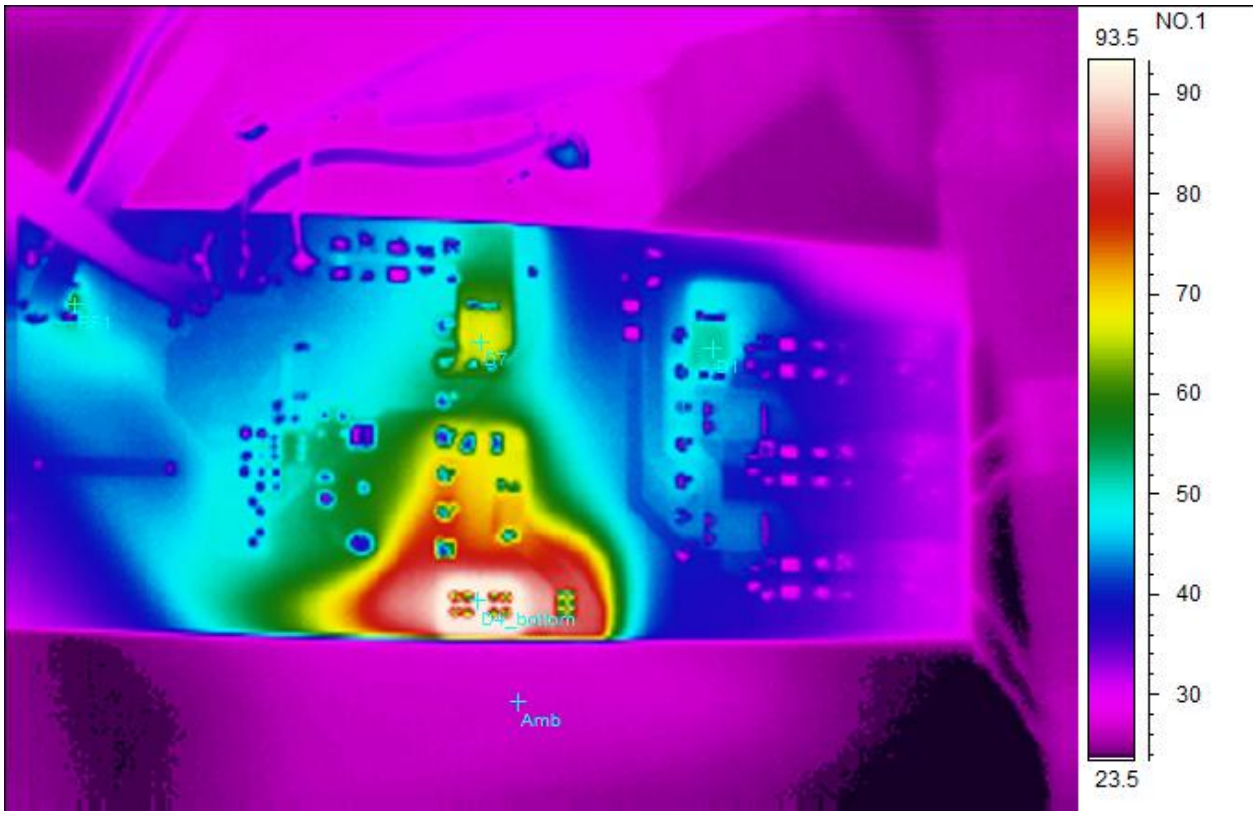
Spot analysis	Value
RF1Temperature	112.9°C
D4_bottomTemperature	91.8°C
D7Temperature	66.5°C
D1Temperature	52.3°C
Amb Temperature	25.6°C

800V_{DC} (800V_{DC} was generated by an AC source with a voltage doubler)
Top Side



Spot analysis	Value
D4Temperature	97.0°C
D3Temperature	96.6°C
T1Temperature	95.6°C
Amb Temperature	26.8°C

800V_{DC} (800V_{DC} was generated by an AC source with a voltage doubler) Bottom Side



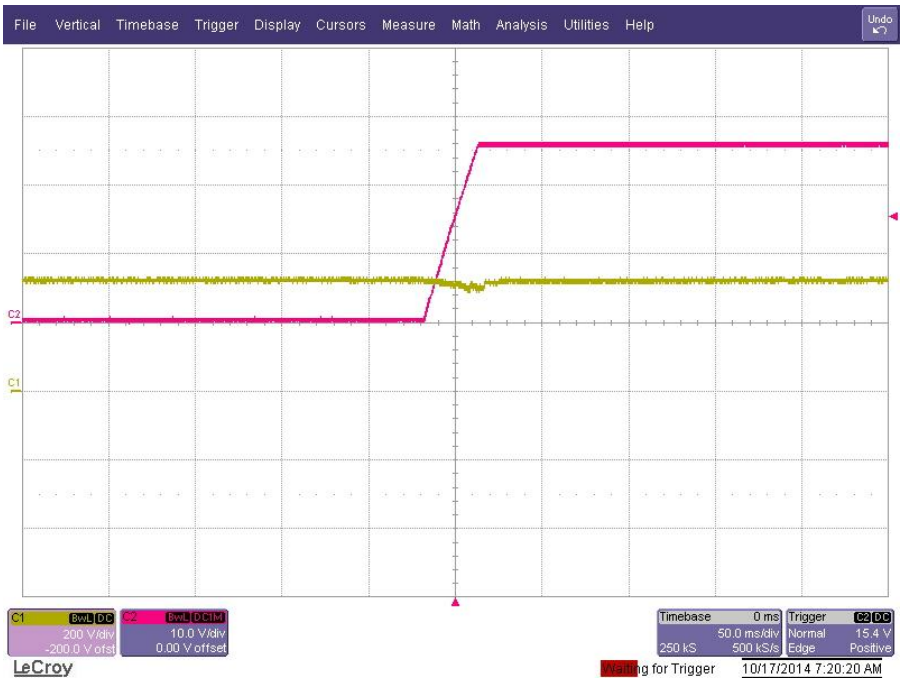
Spot analysis	Value
RF1Temperature	62.3°C
D4_bottomTemperature	92.6°C
D7Temperature	71.1°C
D1Temperature	56.0°C
Amb Temperature	27.5°C

4 Startup

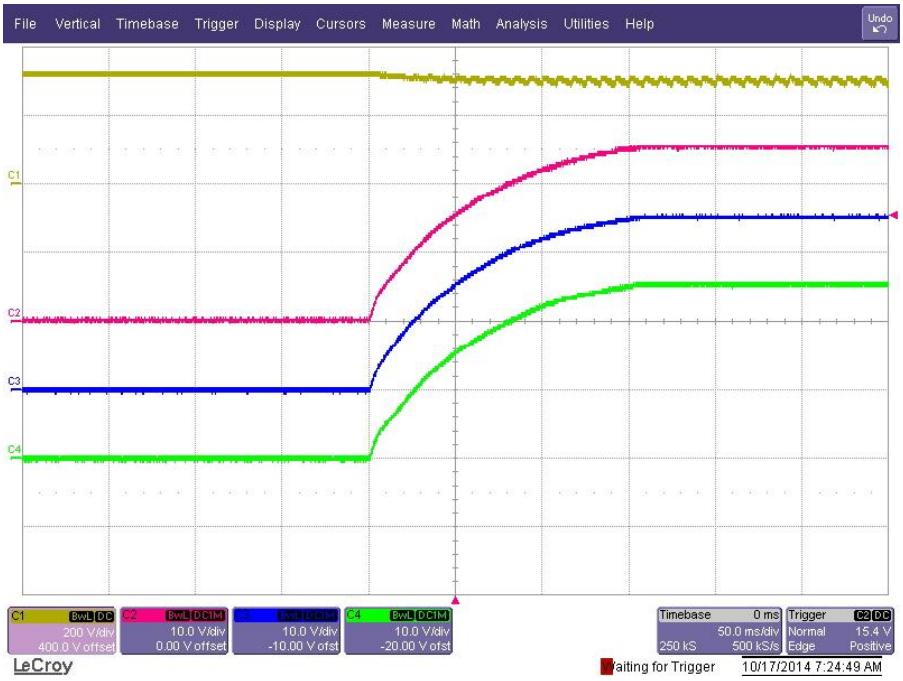
The output voltages at startup are shown in the images below.

4.1 +25V @ 300V_{DC}: 45W full load.

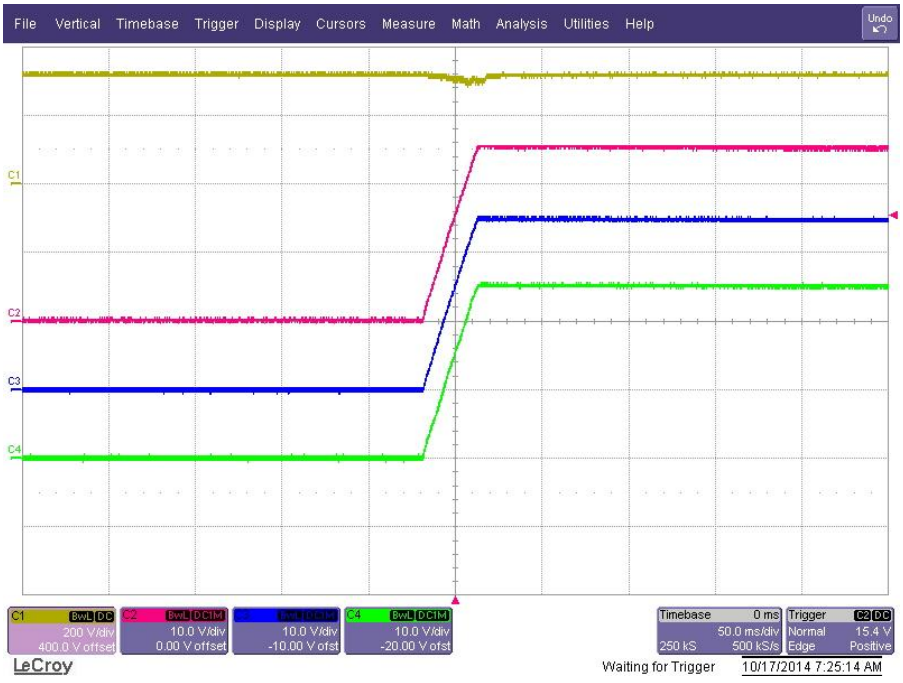
4.2 +25V @ 300V_{DC}: no load.



4.3 IP25V, IP25V2, IP25V3 @ 300V_{DC}: 45W full load.

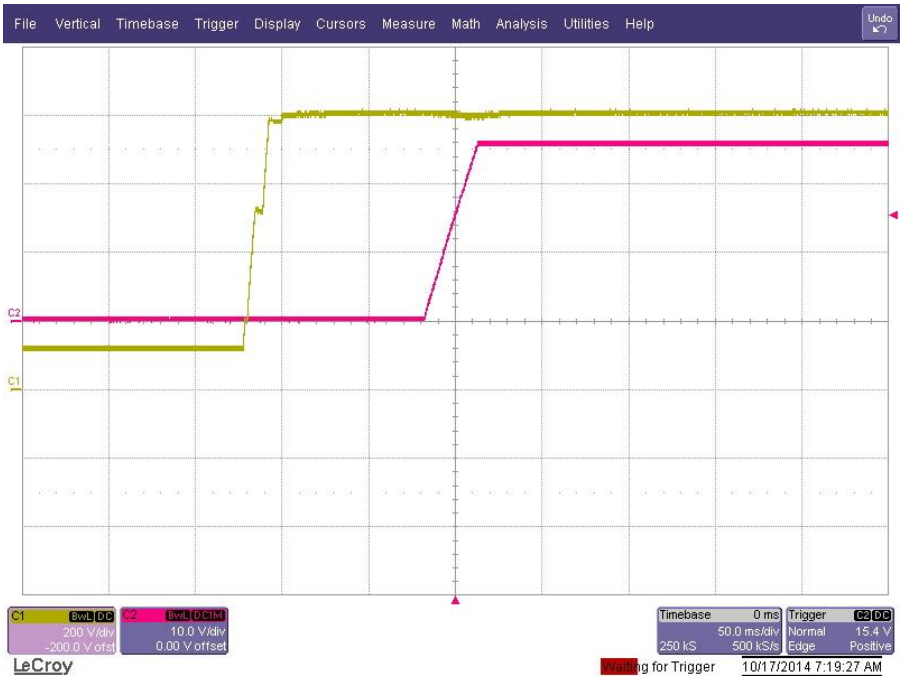


4.4 IP25V, IP25V2, IP25V3 @ 300V_{DC}: no load.

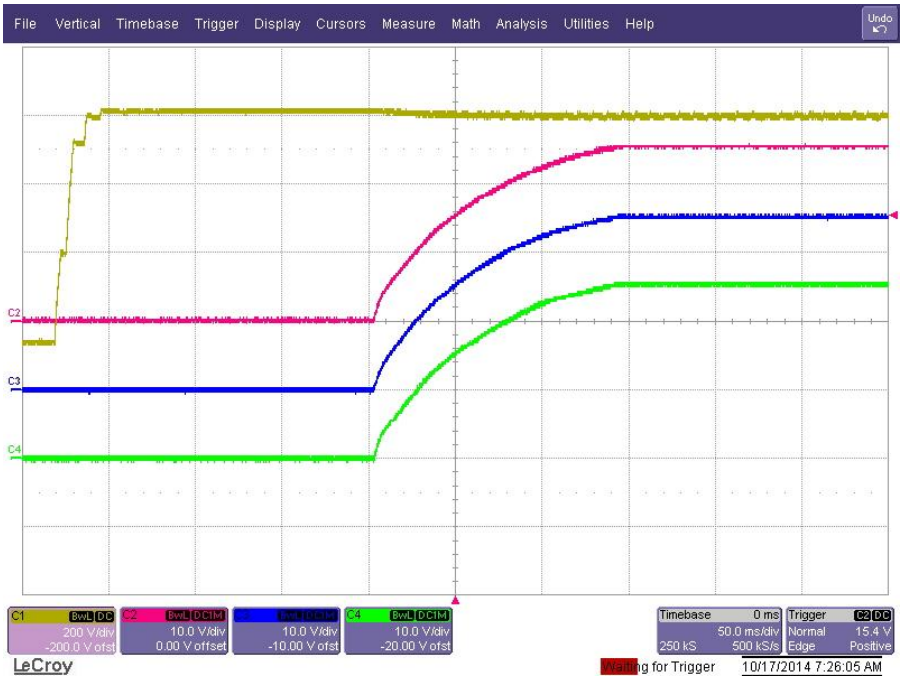


4.5 +25V @ 800V_{DC}: 45W full load.

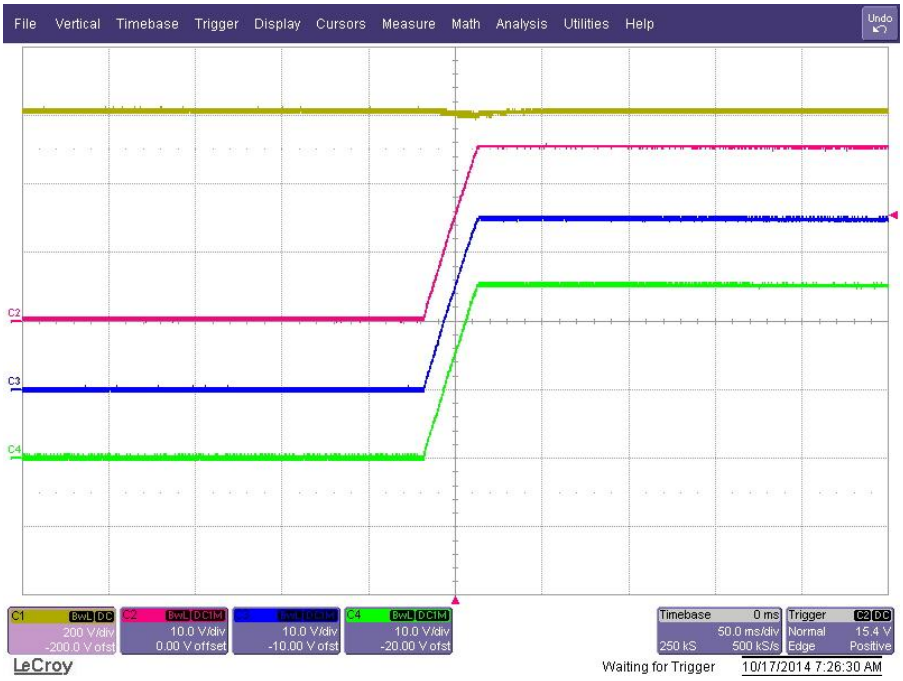
4.6 +25V @ 800V_{DC}: no load.



4.7 IP25V, IP25V2, IP25V3 @ 800V_{DC}: 45W full load.



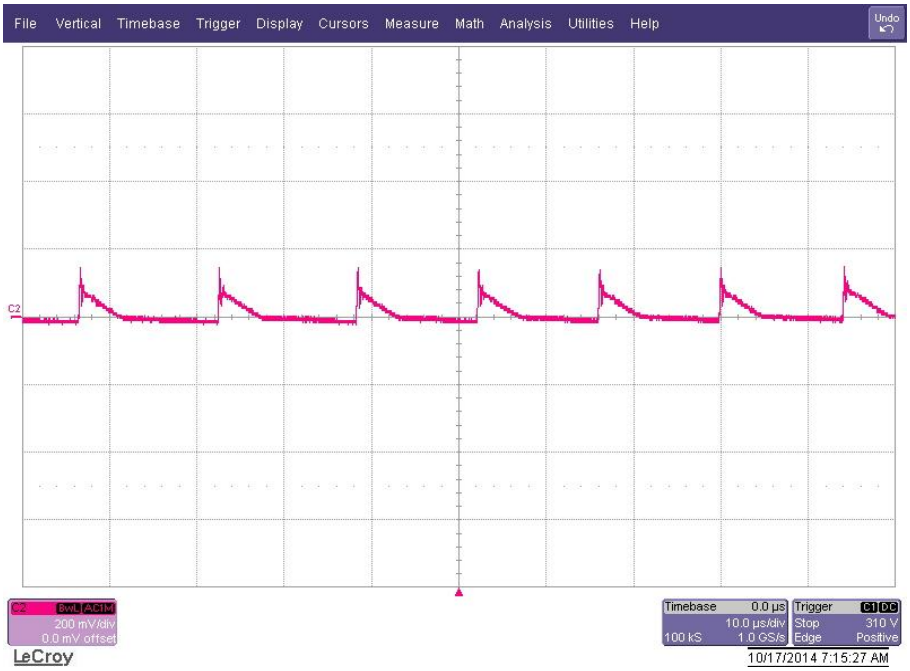
4.8 IP25V, IP25V2, IP25V3 @ 800V_{DC}: no load.



5 Output Ripple Voltages

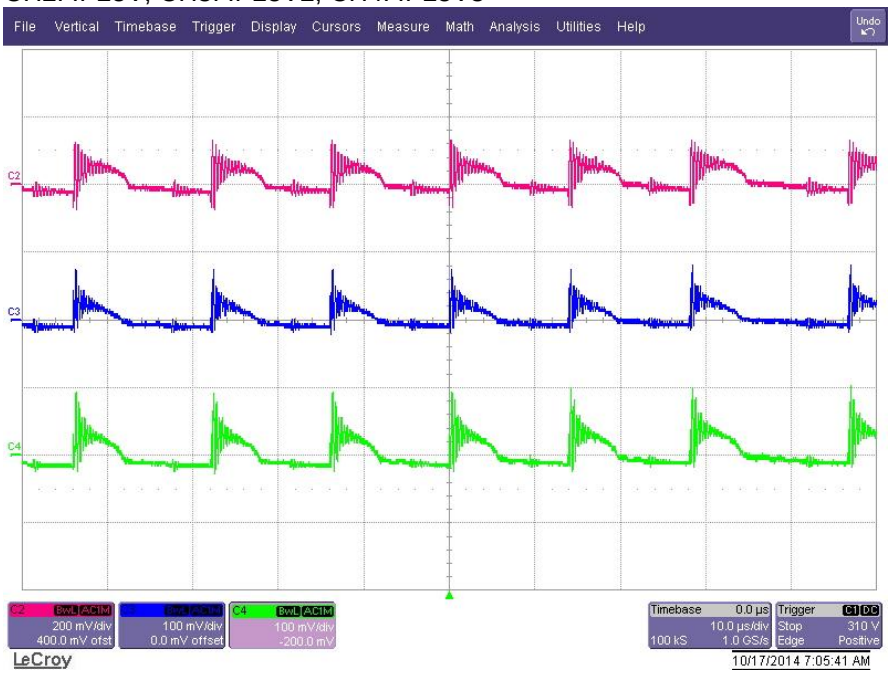
The output ripple voltages are shown in the plots below at 45W full load. **Notice that +25V and IP25V3 were connected to electronic loads with a constant current mode and other outputs are connected to resistor loads.**

5.1 +25V$_{ripple}$ at 300V$_{DC}$

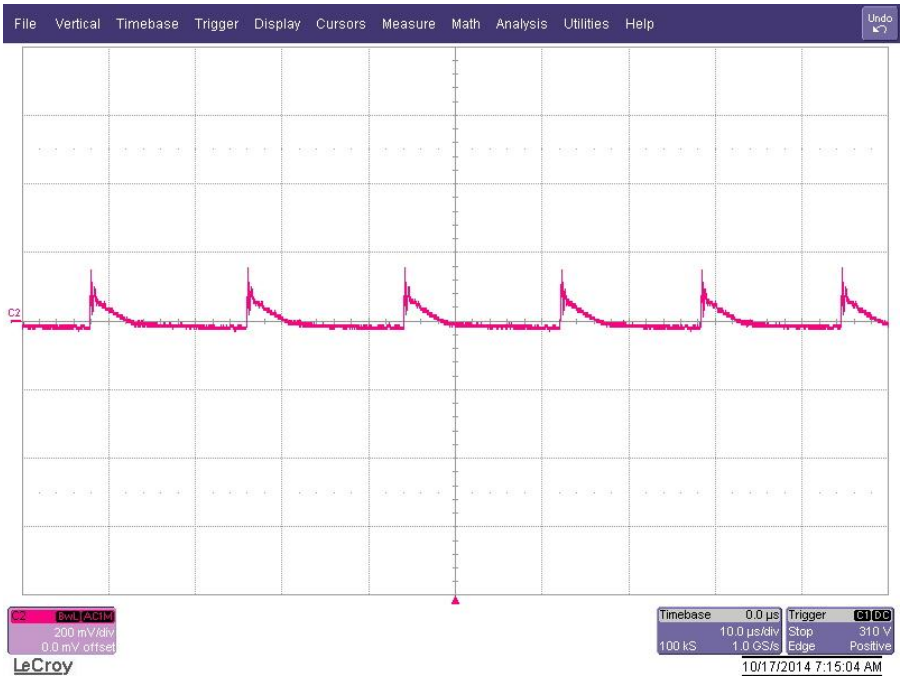


5.2 IP25V$_{ripple}$, IP25V2$_{ripple}$, IP25V3$_{ripple}$ at 300V$_{DC}$

CH2: IP25V, CH3: IP25V2, CH4: IP25V3

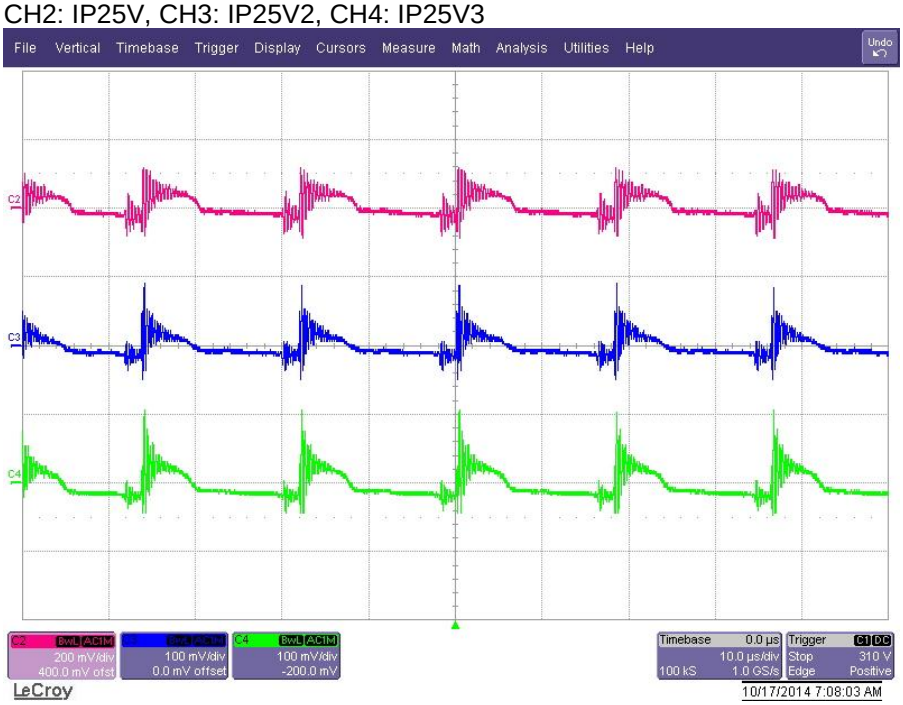


5.3 +25V$_{ripple}$ at 800V$_{DC}$



5.4 IP25V$_{ripple}$, IP25V2$_{ripple}$, IP25V3$_{ripple}$ at 800V$_{DC}$

CH2: IP25V, CH3: IP25V2, CH4: IP25V3



6 Switching Waveforms

The images below show key switching waveforms of PMP10415RevB. The waveforms are measured with 55W load. CH1: Q1 Drain to ground, CH2: V_{IN}.

6.1 $300V_{DC}$ input

6.2 $800V_{DC}$ input

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