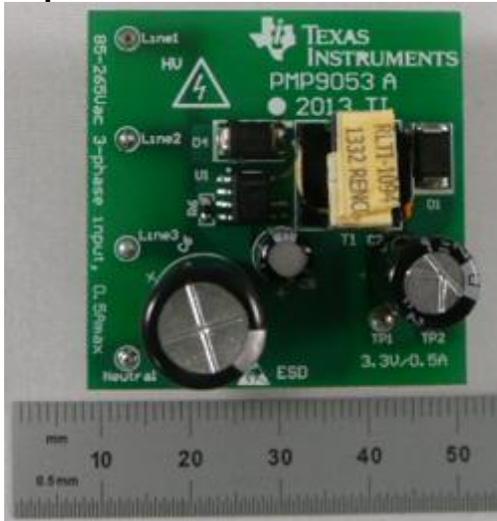


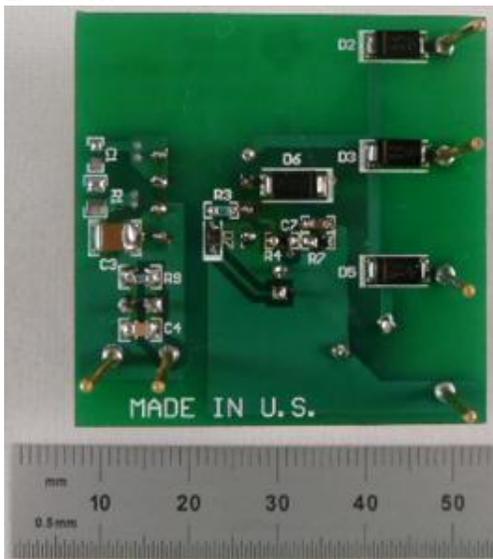
1 Photo

The photographs below show the PMP9053 Rev A assembly. This circuit was built on a PMP9053 Rev A PCB.

Top side

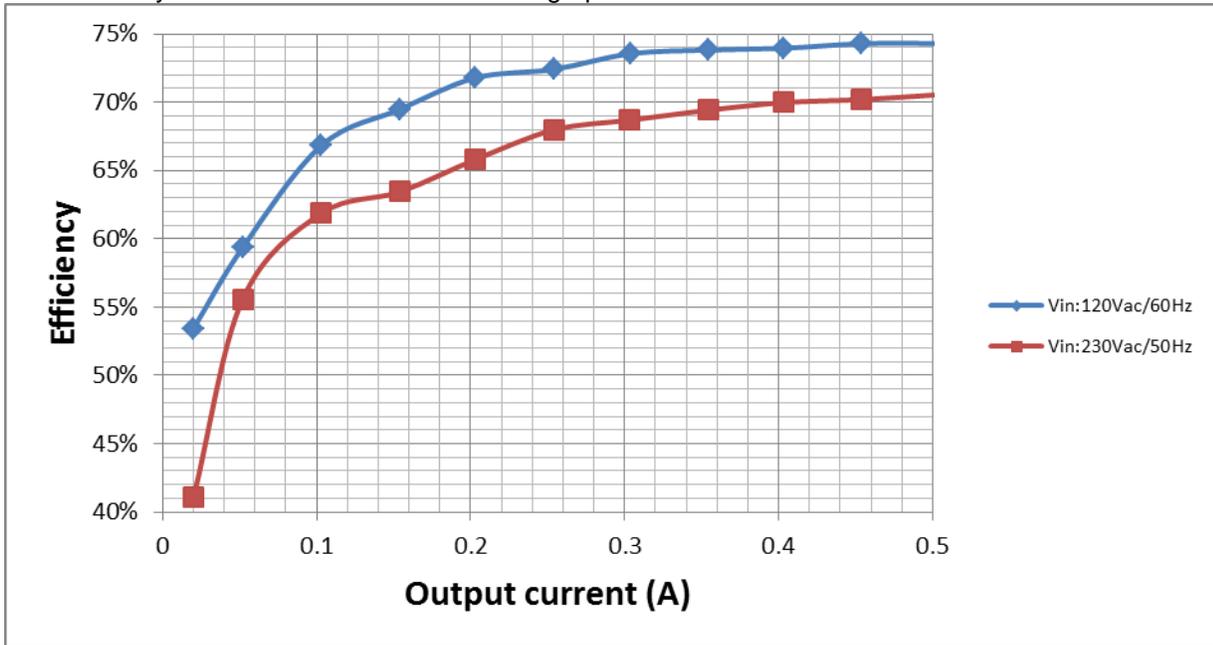


Bottom side



2 Converter Efficiency

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



V_{in}=120V_{AC}/60Hz, single phase

V _{in} (V)	I _{in} (mA)	P _{in} (W)	V _{out} (V)	I _{out} (A)	P _{out} (W)	Losses(W)	Efficiency (%)
120.06	58.4	2.254	3.33	0.503	1.67499	0.57901	74.31%
120.07	53.95	2.035	3.33	0.454	1.51182	0.52318	74.29%
120.08	49.34	1.809	3.32	0.403	1.33796	0.47104	73.96%
120.09	44.98	1.592	3.32	0.354	1.17528	0.41672	73.82%
120.1	40.17	1.372	3.32	0.304	1.00928	0.36272	73.56%
120.1	35.15	1.161	3.31	0.254	0.84074	0.32026	72.42%
120.1	29.3	0.936	3.31	0.203	0.67193	0.26407	71.79%
120.1	23.52	0.7336	3.31	0.154	0.50974	0.22386	69.48%
120.1	16.904	0.5086	3.3	0.103	0.3399	0.1687	66.83%
120.12	9.925	0.289	3.3	0.052	0.1716	0.1174	59.38%
120.12	4.4	0.12352	3.3	0.02	0.066	0.05752	53.43%
120.12	0.7398	0.02739	3.36	0	0	0.02739	0.00%

$V_{in}=230V_{AC}/50Hz$, single phase

Vin(V)	Iin(mA)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency (%)
230	41	2.367	3.32	0.503	1.66996	0.69704	70.55%
230	37.8	2.147	3.32	0.454	1.50728	0.63972	70.20%
230	34.11	1.912	3.32	0.403	1.33796	0.57404	69.98%
230	30.56	1.688	3.31	0.354	1.17174	0.51626	69.42%
230	26.8	1.46	3.31	0.303	1.00293	0.45707	68.69%
230	22.88	1.233	3.3	0.254	0.8382	0.3948	67.98%
230	19.193	1.018	3.3	0.203	0.6699	0.3481	65.81%
230.1	15.305	0.801	3.3	0.154	0.5082	0.2928	63.45%
230.1	10.58	0.5494	3.3	0.103	0.3399	0.2095	61.87%
230.1	5.826	0.3087	3.3	0.052	0.1716	0.1371	55.59%
230.1	2.716	0.16032	3.29	0.02	0.0658	0.09452	41.04%
230.1	0.4944	0.0606	3.35	0	0	0.0606	0.00%

3 Thermal Images

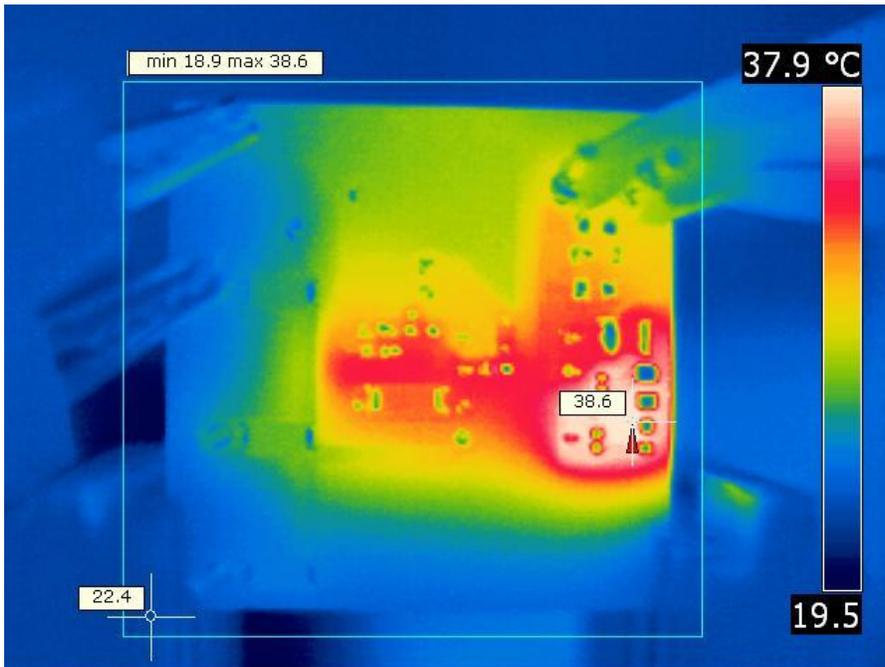
The thermal images below show a top view and bottom view of the board. The ambient temperature was 20°C with no forced air flow. The output was at full load: 3.3V/0.5A.

V_{in}=120V_{AC}/60Hz, single phase

Top Side



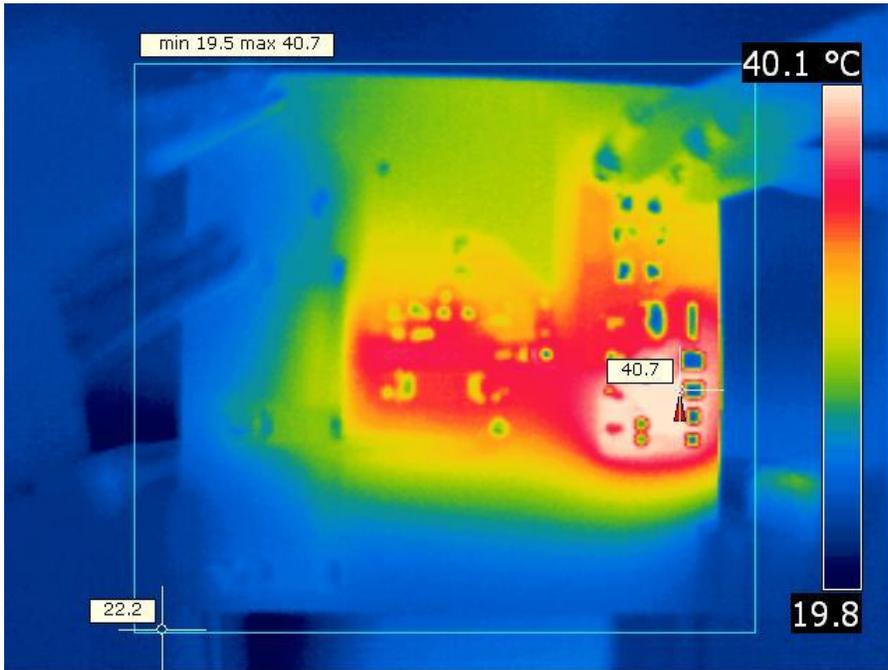
Bottom Side



$V_{in}=230V_{AC}/50Hz$, single phase
Top Side



Bottom Side



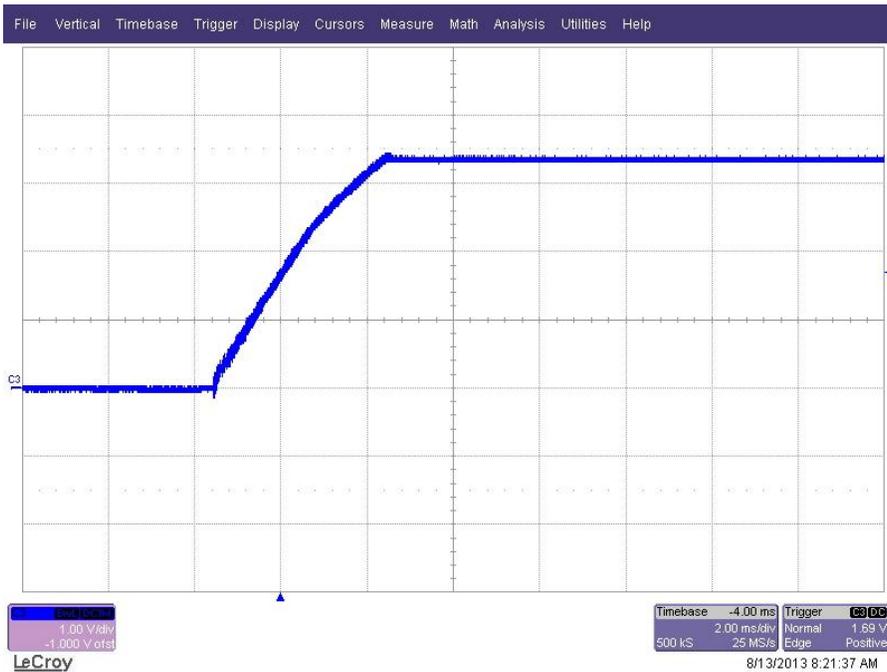
4 Startup

The output voltages at startup are shown in the images below with single phase input voltage.

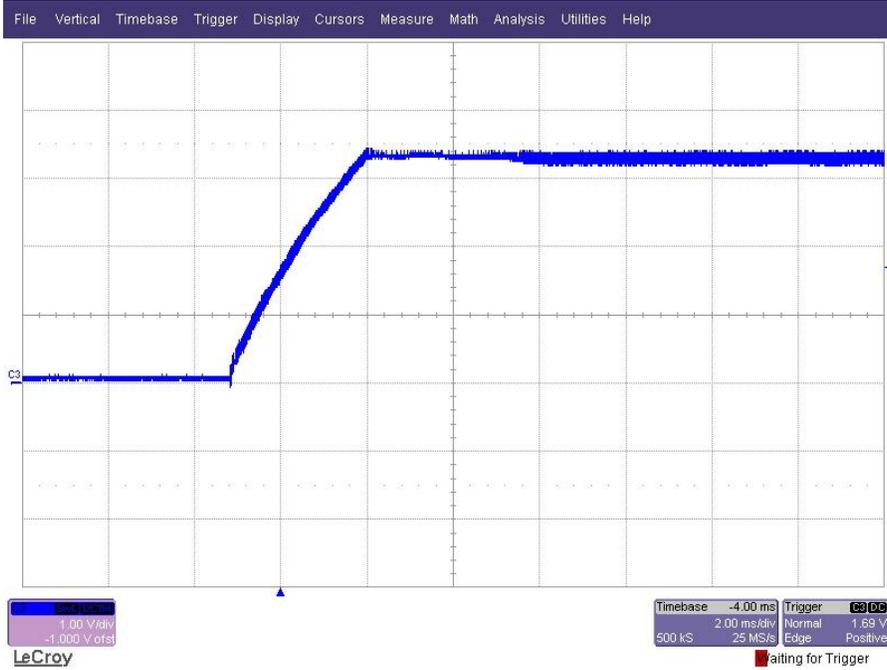
4.1 Start Up @ 85V_{ac}: 3.3V/0.5A.



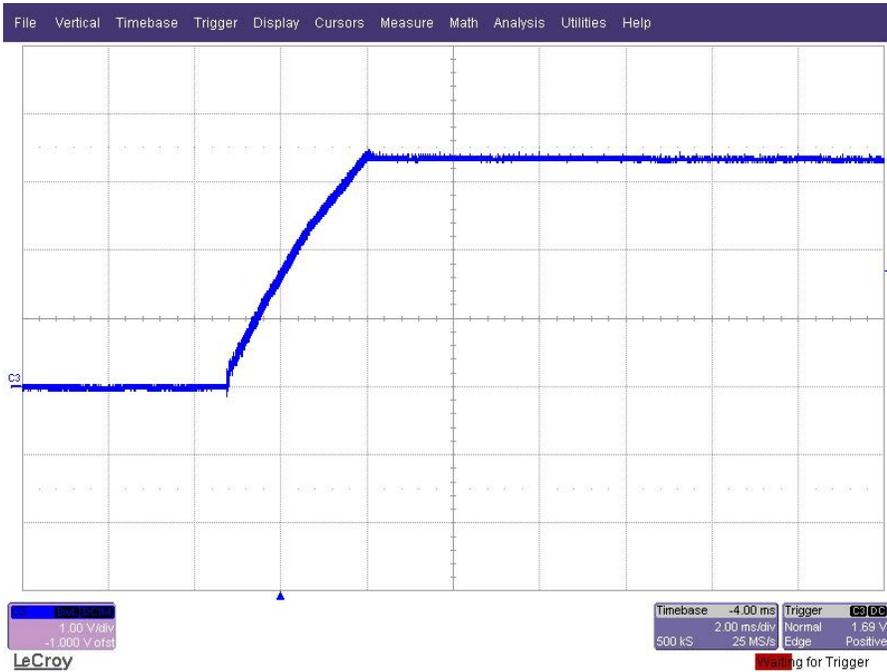
4.2 Start Up @ 85V_{ac}: no load.



4.3 Start Up @ 230V_{ac}: 3.3V/0.5A.



4.4 Start Up @ 230V_{ac}: no load.



5 Turn off

The output voltage at turn off transient is shown in the image below at full load (3.3V/0.5A) and a single phase 85V_{ac}/60Hz input.



6 Output Ripple Voltages

The output ripple voltages are shown in the plots below with single phase input voltage.

6.1 120V/60Hz – 3.3V/0.5A



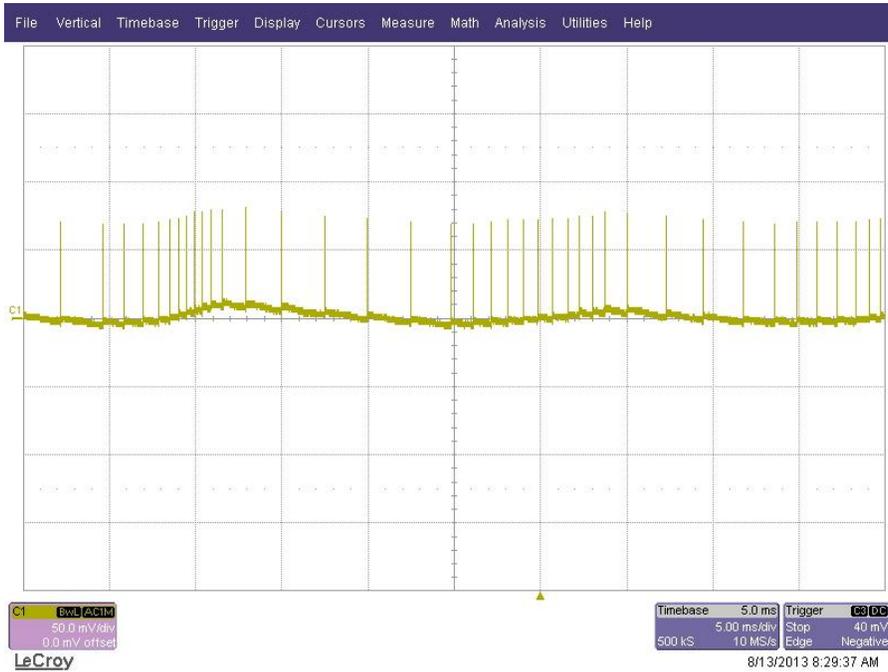
6.2 230V/50Hz – 3.3V/0.5A



6.3 120V/60Hz – 3.3V/0A



6.4 230V/50Hz – 3.3V/0A



7 Load Transient

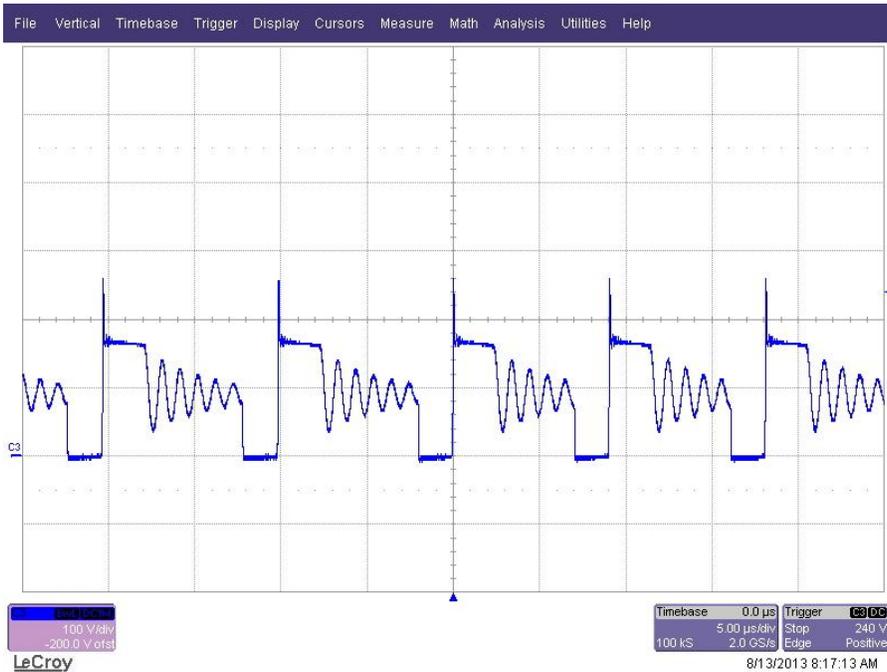
The image below shows 3.3V_{out} voltage response to a 0.25A to 0.5A load transient at a single phase 120V_{ac}/60Hz input.



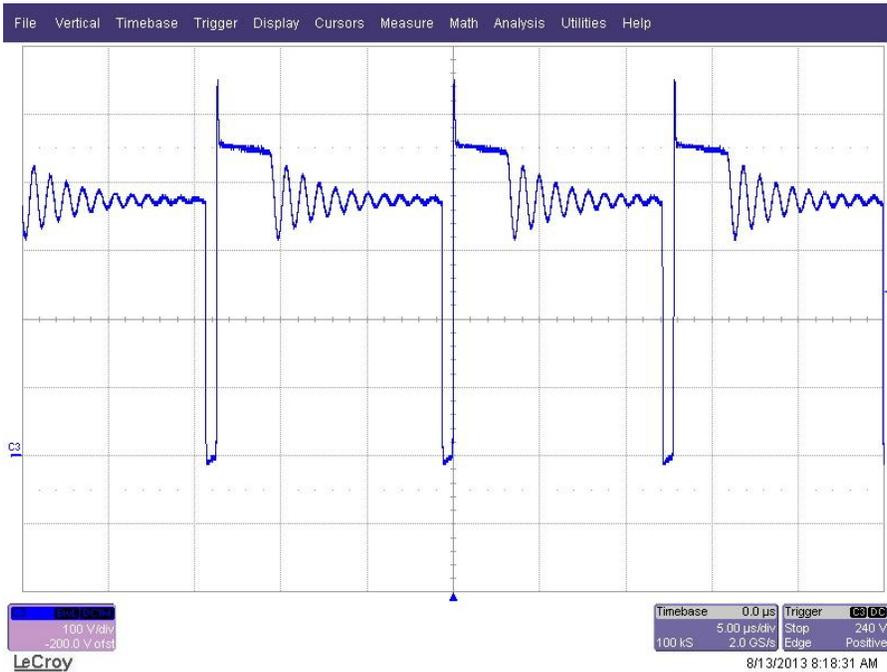
8 Switching Waveforms

The images below show key switching waveforms of PMP9053RevA. The waveforms are measured with 0.5A full load.

8.1 Primary MOSFET U1 pin8 @ single phase 85V_{ac}/60Hz



8.2 Primary MOSFET U1 pin8 @ single phase 265V_{ac}/50Hz



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