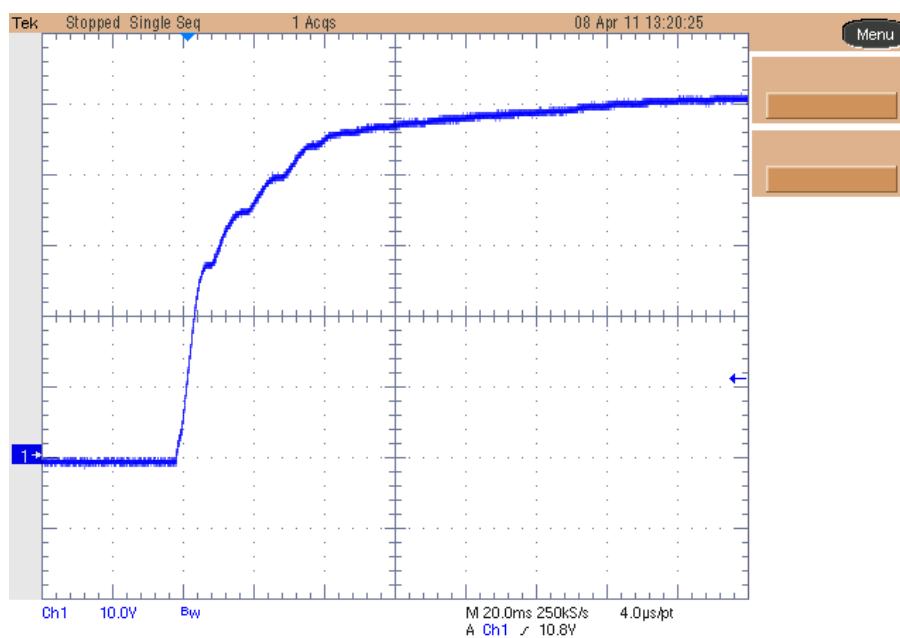


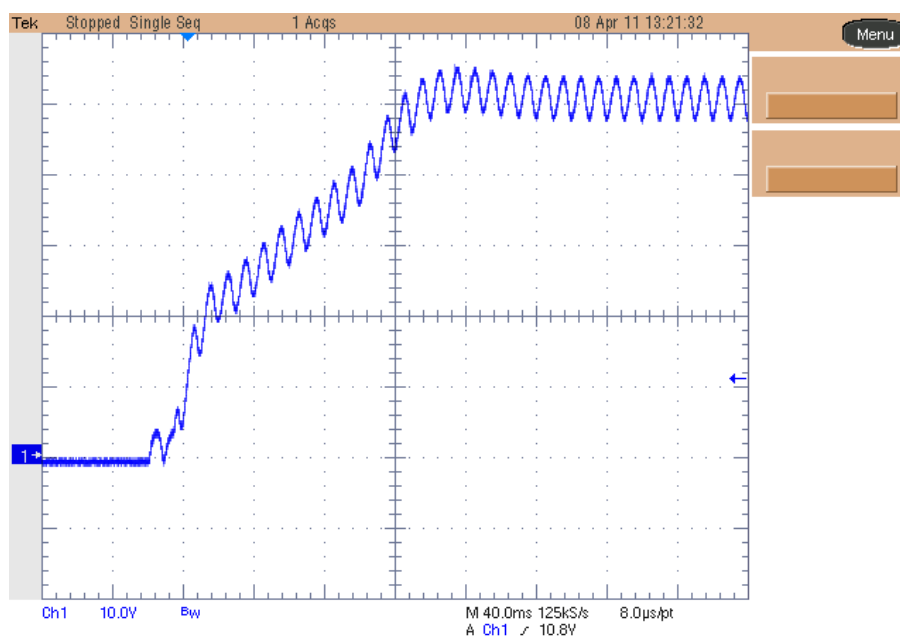
1 Startup

The output voltage at startup is shown in the images below. Input voltage was 230Vac. Channel 1 shows the output voltage (10V/div, 20ms/div, 20MHz BWL).

No Load:

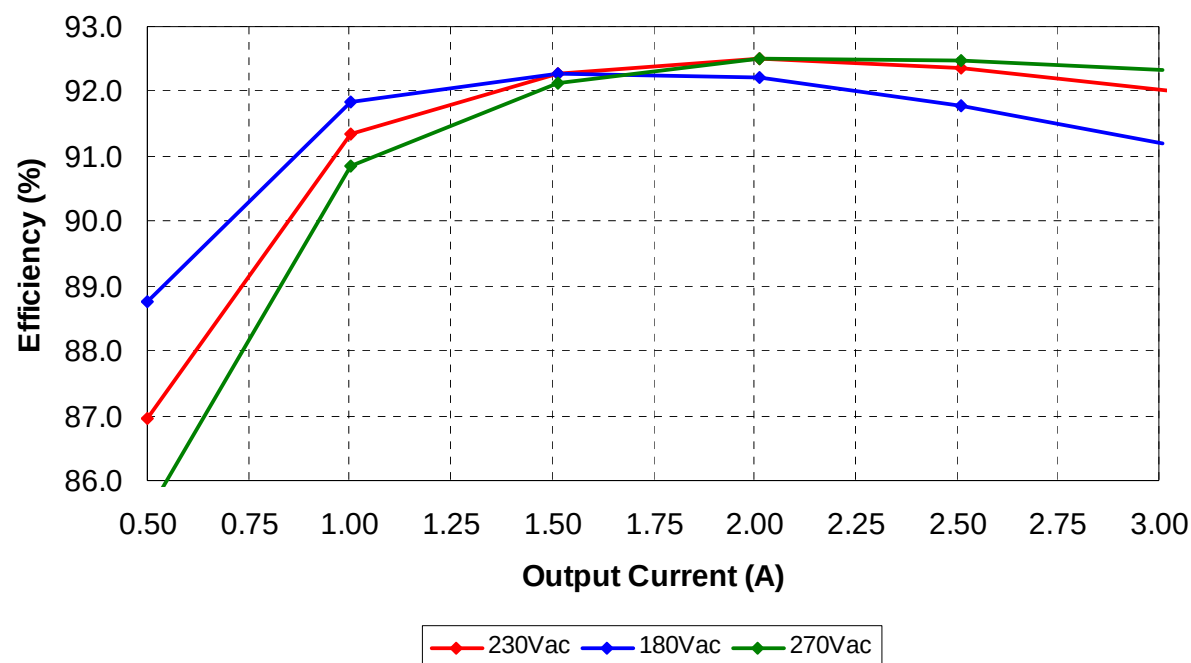


Full Load:



2 Efficiency

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



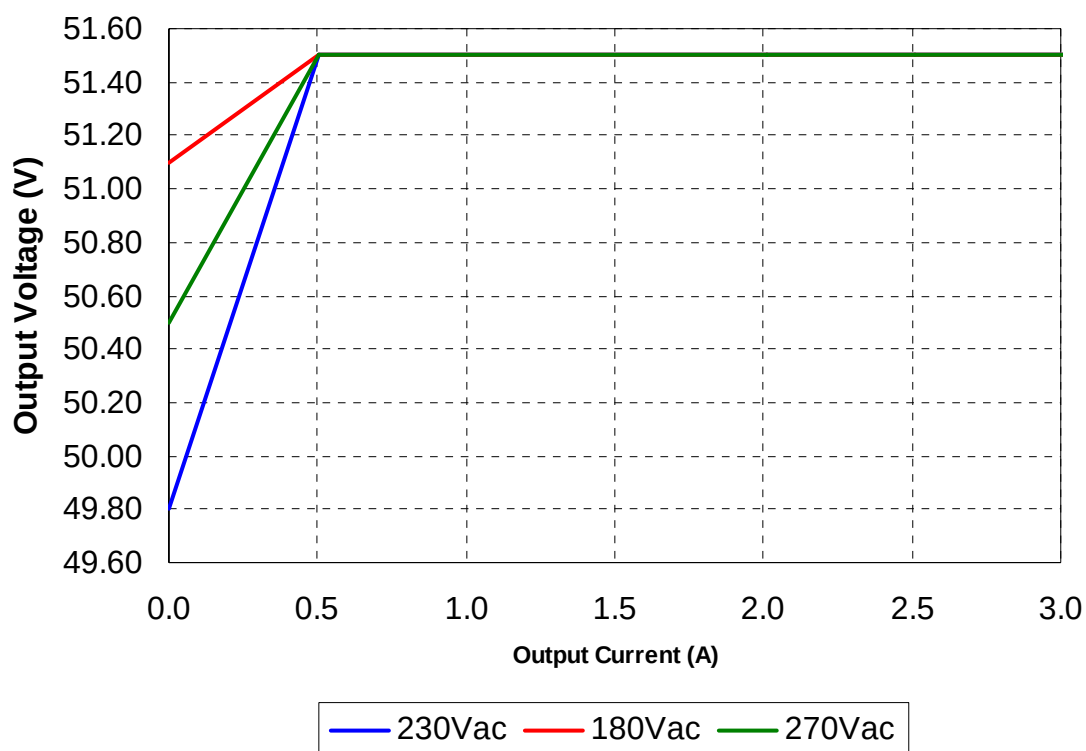
Iout (A)	Vout (Vdc)	Pout (W)	Vin (Vac)	Pin (W)	Ploss (W)	Eff (%)	PF
0.0000	49.8	0.00	230	0.61	0.61	0.00	0
0.5019	51.5	25.85	230	29.72	3.87	86.97	0.7798
1.0006	51.5	51.53	230	56.41	4.88	91.35	0.8887
1.514	51.5	77.97	230	84.49	6.52	92.28	0.9237
2.012	51.5	103.62	230	112.00	8.38	92.52	0.9389
2.511	51.5	129.32	230	140.03	10.71	92.35	0.9468
3.025	51.5	155.79	230	169.32	13.53	92.01	0.9517

Iout (A)	Vout (Vdc)	Pout (W)	Vin (Vac)	Pin (W)	Ploss (W)	Eff (%)	PF
0.0000	51.1	0.00	180	0.46	0.46	0.00	0
0.5021	51.5	25.86	180	29.13	3.27	88.77	0.8461
1.0008	51.5	51.54	180	56.13	4.59	91.82	0.9261
1.514	51.5	77.97	180	84.50	6.53	92.27	0.9464
2.012	51.5	103.62	180	112.38	8.76	92.20	0.9535
2.511	51.5	129.32	180	140.92	11.60	91.77	0.9556
3.009	51.5	154.96	180	169.94	14.98	91.19	0.9548

I _{out} (A)	V _{out} (V _{dc})	P _{out} (W)	V _{in} (V _{ac})	P _{in} (W)	P _{loss} (W)	Eff (%)	PF
0.0000	50.5	0.00	270	0.77	0.77	0.00	0
0.5024	51.5	25.87	270	30.25	4.38	85.53	0.6992
1.001	51.5	51.55	270	56.75	5.20	90.84	0.8419
1.515	51.5	78.02	270	84.70	6.68	92.12	0.8955
2.012	51.5	103.62	270	112.02	8.40	92.50	0.9194
2.511	51.5	129.32	270	139.82	10.50	92.49	0.9332
3.010	51.5	155.02	270	167.89	12.88	92.33	0.9411

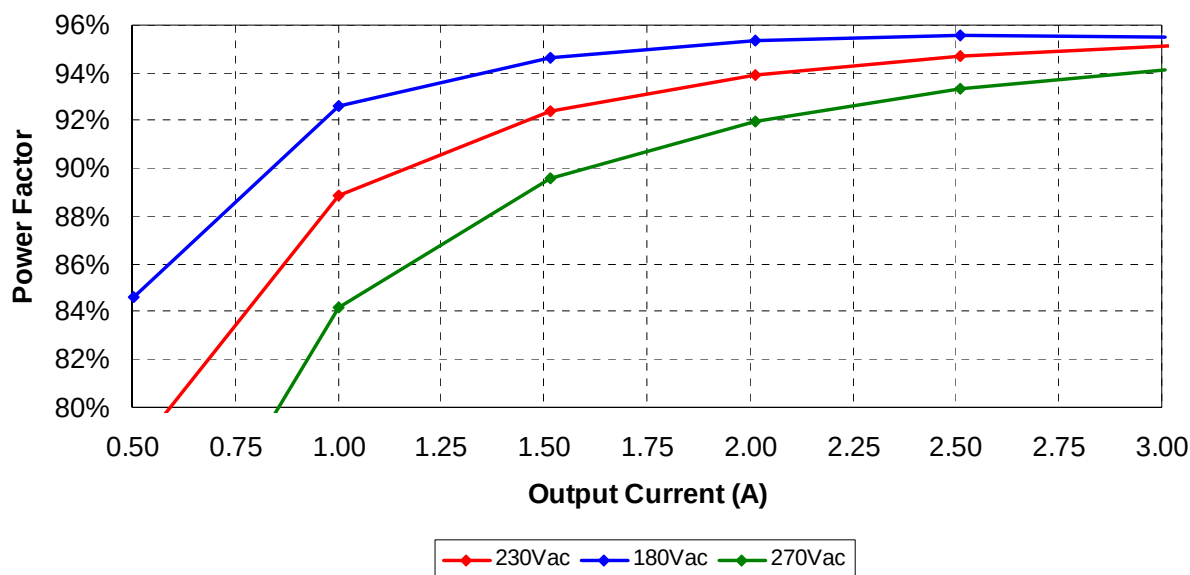
3 Output Voltage Regulation

The output voltage versus output current graph is plotted below.



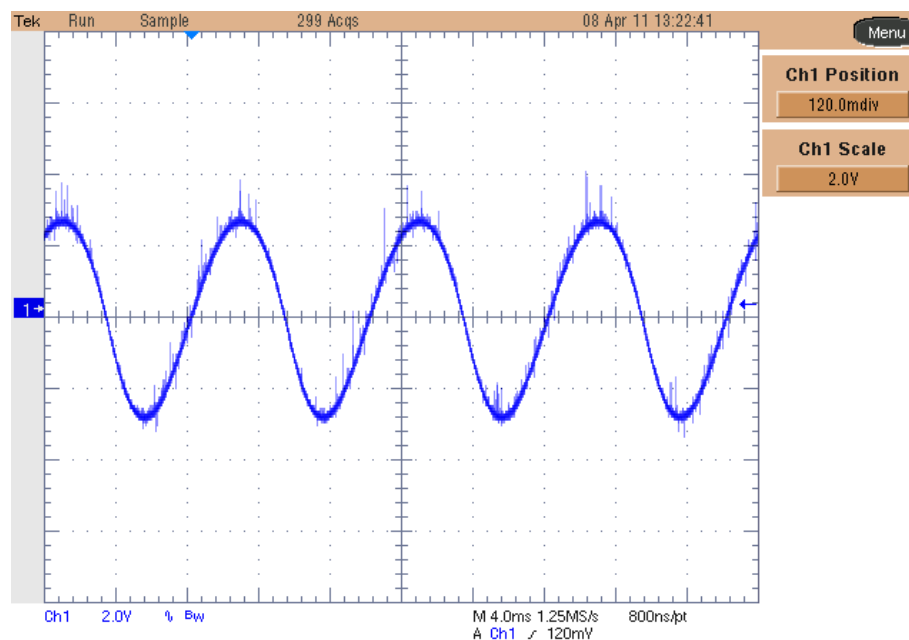
4 Power Factor

The Power Factor graph for the three input voltages is shown below:



5 Output Ripple Voltage

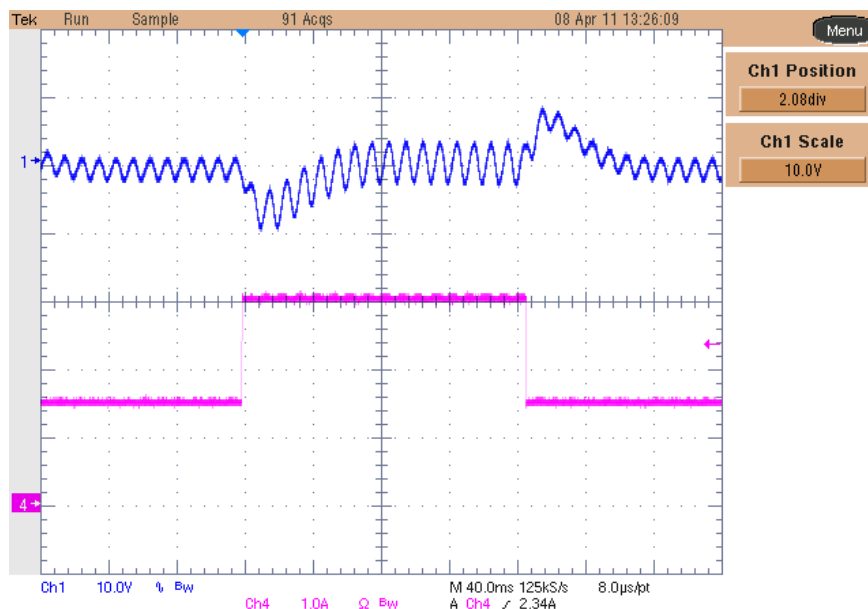
The output ripple voltage is shown in the plot below. The input was set to 230Vac and the load was set to 3A. Channel 3 shows the output ac voltage (2 V/div, 4ms/div, 20MHz BWL).



6 Transient Response

The output voltage transient response is shown in the plot below. The input was set to 230Vac and the load switched between 1.5A and 3A.

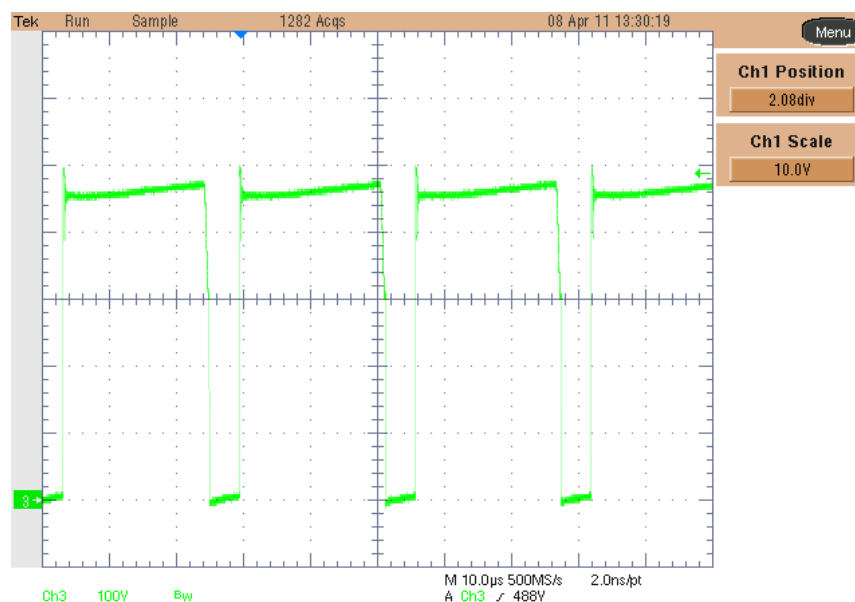
Channel 1: Output voltage (10 V/div, ac coupled, 40ms/div), Channel 4: output current (1A/div, dc coup.)



7 Switching Node Waveform

The image below shows the voltage on the drain of Q4, with a 271Vac input, and full load.

Channel 3 shows the drain voltage (100V/div, 10us/div, 20MHz BWL).

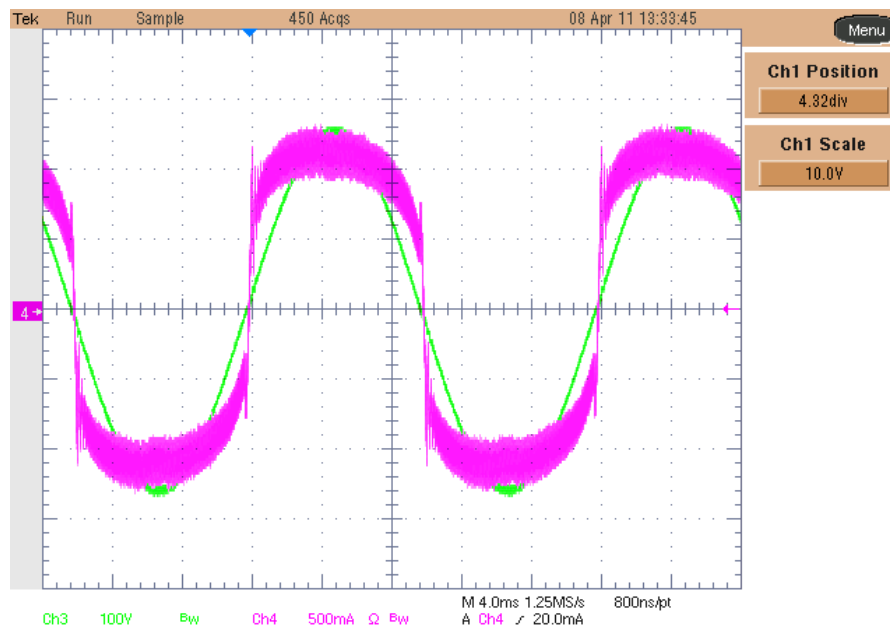


8 Input Voltage and Current Waveforms

The images below show the input voltage and current while the source was set to the three different input voltages and the converter was fully loaded.

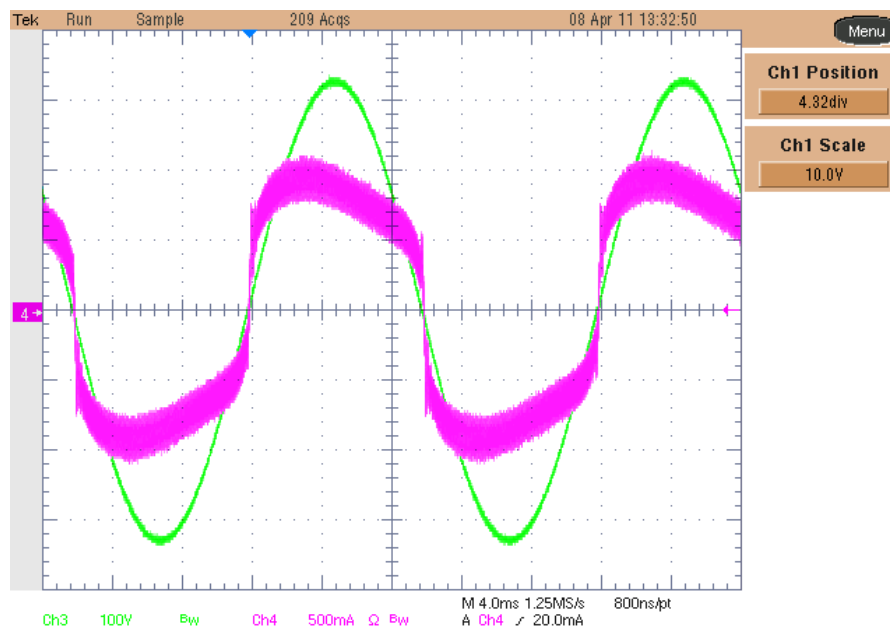
$V_{in} = 180V_{ac}$

Channel 3: Input voltage (100V/div, 4ms/div); Channel 4: Input current (500mA/div)



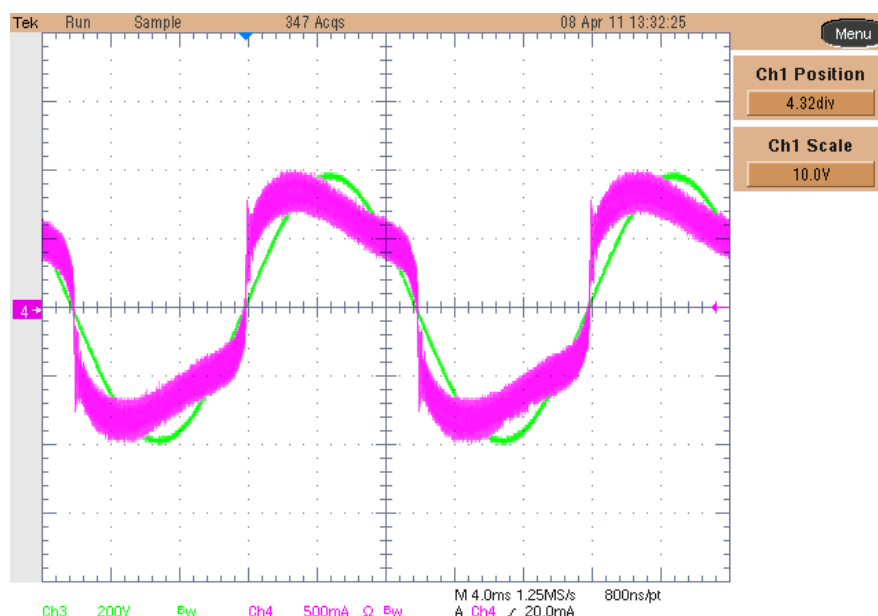
$V_{in} = 230V_{ac}$

Channel 3: Input voltage (100V/div, 4ms/div); Channel 4: Input current (500mA/div)



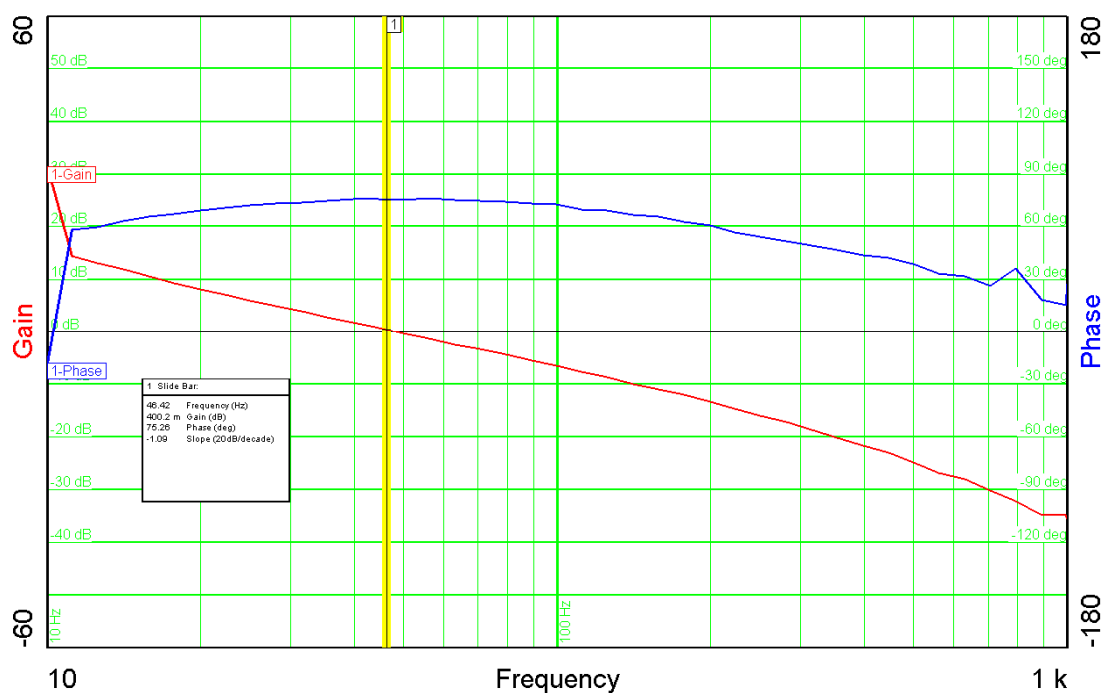
$V_{in} = 271V_{ac}$

Channel 3: Input voltage (200V/div, 4ms/div); Channel 4: Input current (500mA/div)

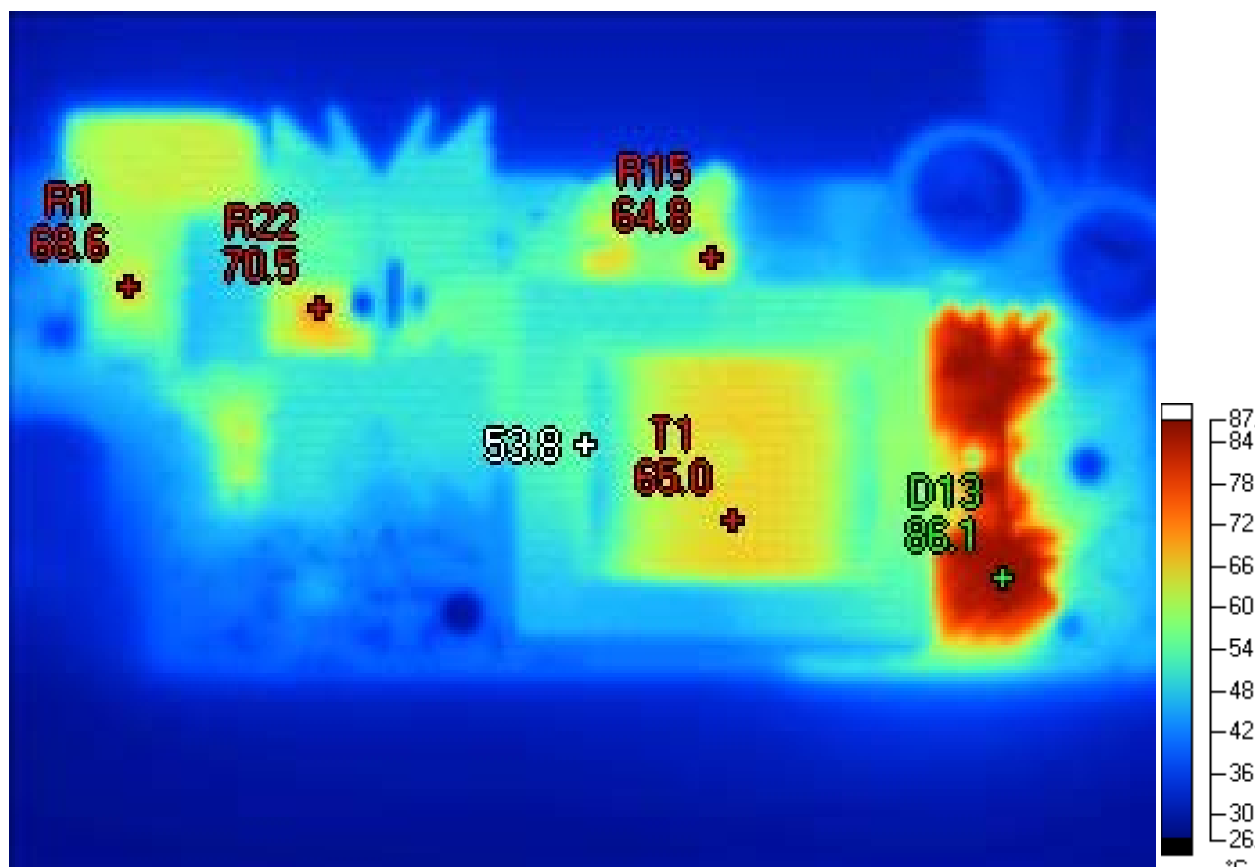


9 Loop Response

The image below shows the loop response of the converter measured with a 300Vdc input and 0.5A load. Phase margin is 75.26 deg. and crossover frequency is 46.42 Hz.



10 Thermal Analysis



4/8/2011 10:09:45 AM

Image Info

Emissivity	0.95
Background	20.0 °C
Average Temperature	42.9 °C
Calibration Range	-20.0 °C to 100.0 °C
Camera Model	Ti40FT
Image Range	26.9 °C to 86.4 °C
Image Time	4/8/2011 10:09:45 AM
Lens Description	20mm/F0.8
Lens Serial #	40948-4409
Manufacturer	Fluke
OCA Version	3.0.6.12
DSP Version	4.7.0.0
Camera Serial Number	Ti40FT-070263

Markers

Label	Temperature	Emissivity	Background
Center Point	53.8 °C	0.95	20.0 °C
D13	86.1 °C	0.95	20.0 °C
T1	65.0 °C	0.95	20.0 °C
R15	64.8 °C	0.95	20.0 °C
R22	70.5 °C	0.95	20.0 °C
R1	68.6 °C	0.95	20.0 °C

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