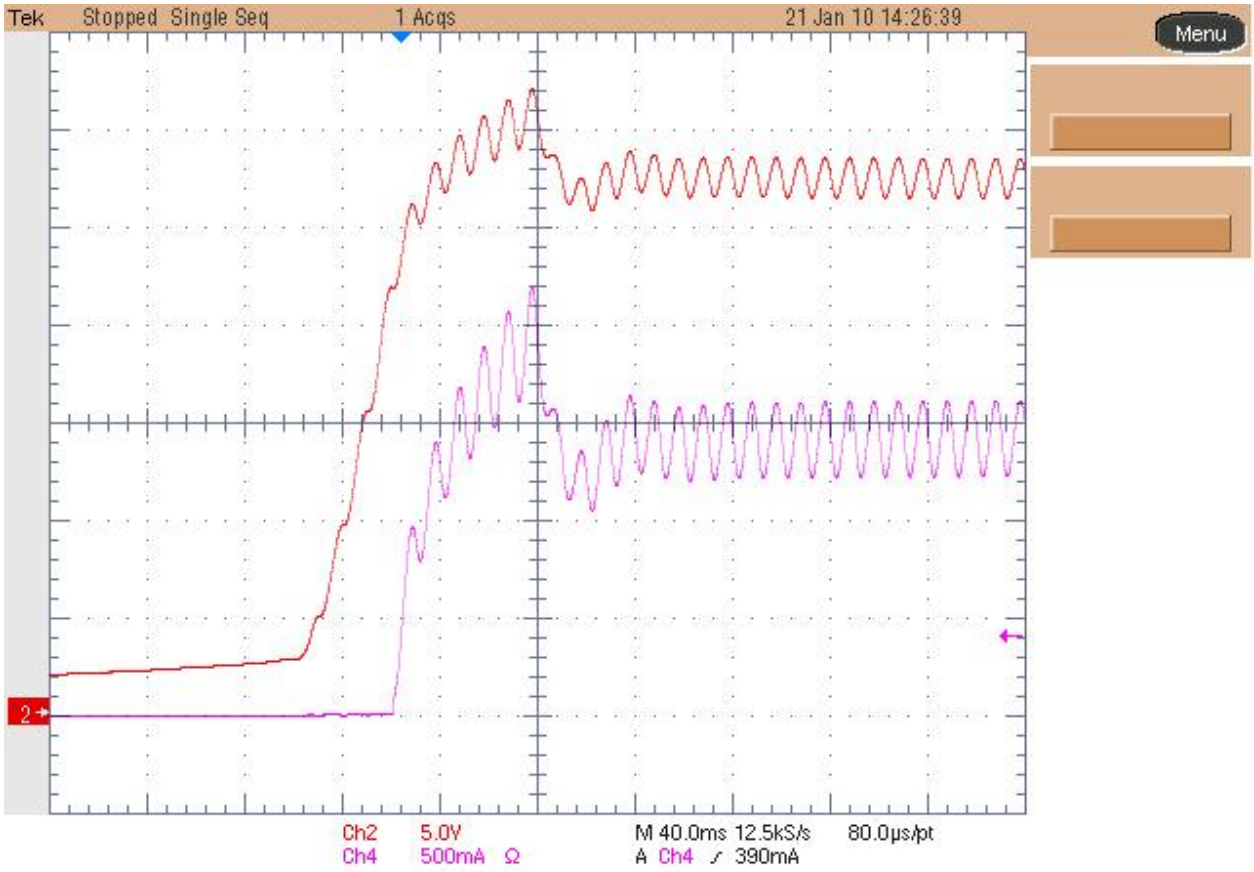
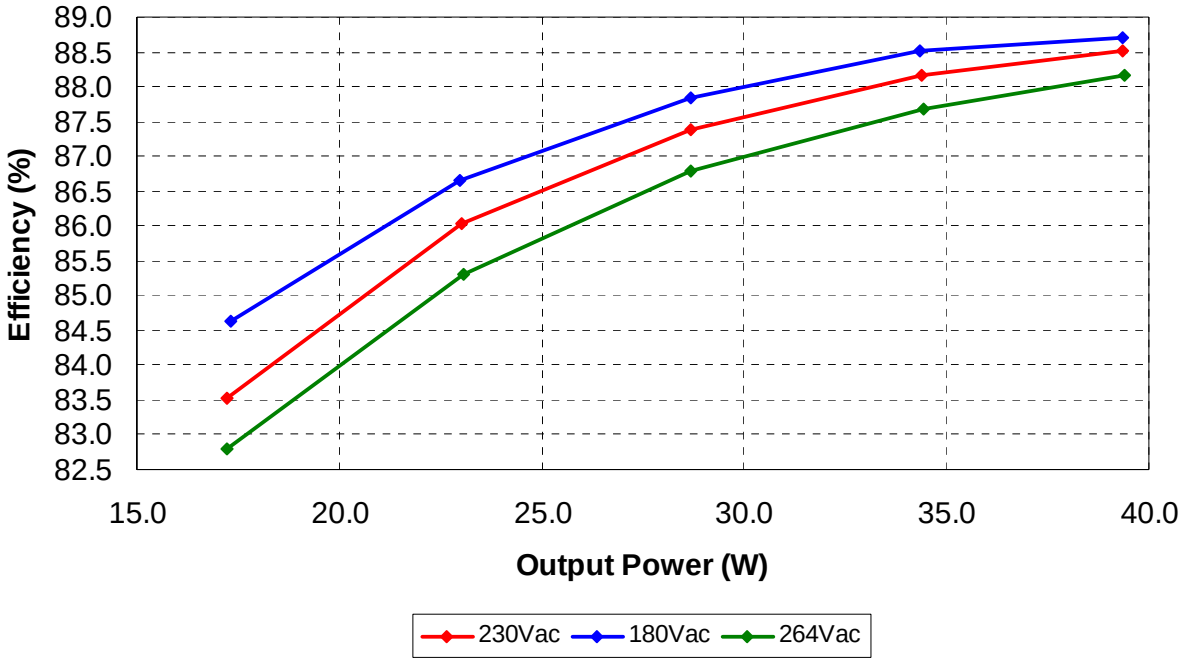
1 Startup

The output voltage and current at startup are shown in the image below. Input voltage is 230Vac. The output was loaded with a constant voltage load, set to 20Vdc, and a 5 Ohm resistor in series with the load. The measured current was 1.4A and the total voltage 27.5V.
Channel 2 shows the output voltage (5 V/div, 40ms/div).
Channel 4 shows the output current (500 mA/div).



2 Efficiency

The efficiency data are shown in the tables and graph below. The power source is a 2KW California Instruments AC generator set to 180Vac, 230Vac and 264Vac. The current was set to 1.4A and a variable output power performed by modifying the output constant voltage load.



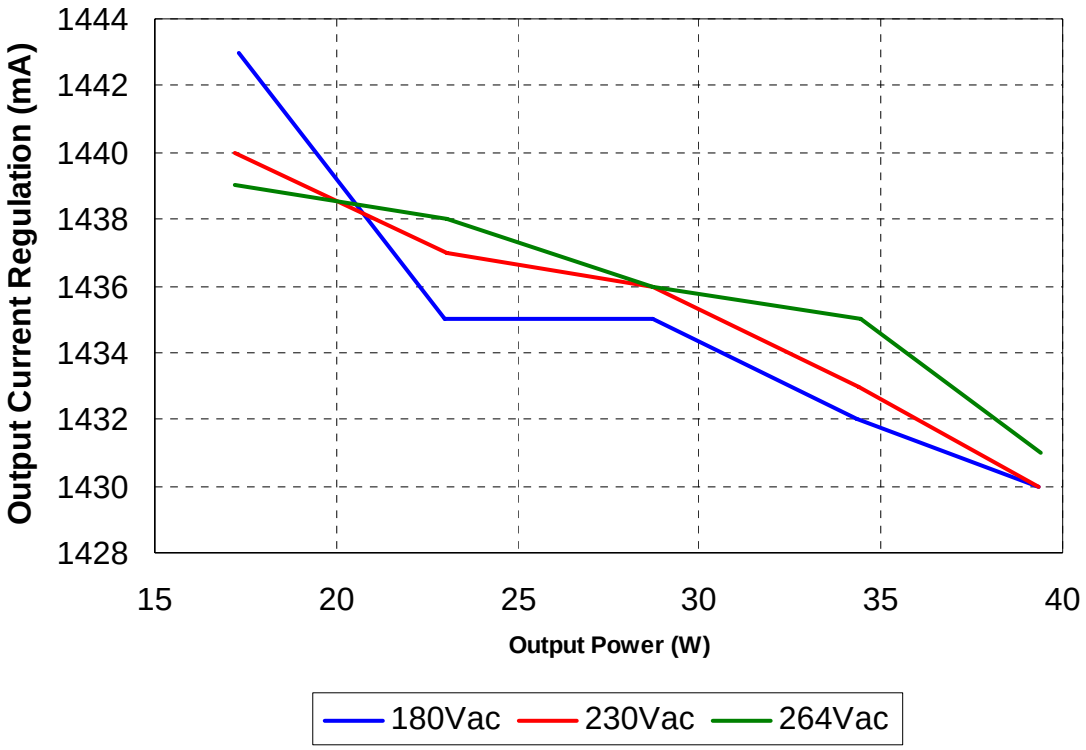
Iout (mA)	Vout (V)	Pout (W)	Pin(W)	Vin (Vac)	PF (%)	Ploss (W)	Eff (%)
1443	11.99	17.30	20.446	180	94.63	3.14	84.62
1435	16.02	22.99	26.528	180	95.75	3.54	86.66
1435	20.00	28.70	32.670	180	96.43	3.97	87.85
1432	23.98	34.34	38.796	180	96.97	4.46	88.51
1430	27.51	39.34	44.350	180	97.28	5.01	88.70

Iout (mA)	Vout (V)	Pout (W)	Pin(W)	Vin (Vac)	PF (%)	Ploss (W)	Eff (%)
1440	11.96	17.22	20.620	230	92.85	3.40	83.52
1437	16.02	23.02	26.757	230	94.69	3.74	86.04
1436	19.99	28.71	32.848	230	95.75	4.14	87.39
1433	23.99	34.38	38.993	230	96.54	4.62	88.16
1430	27.51	39.34	44.440	230	96.98	5.10	88.52

Iout (mA)	Vout (V)	Pout (W)	Pin(W)	Vin (Vac)	PF (%)	Ploss (W)	Eff (%)
1439	11.97	17.22	20.801	264	90.46	3.58	82.81
1438	16.03	23.05	27.018	264	93.37	3.97	85.32
1436	19.99	28.71	33.073	264	95.10	4.37	86.79
1435	24.00	34.44	39.280	264	96.05	4.84	87.68
1431	27.52	39.38	44.668	264	96.63	5.29	88.16

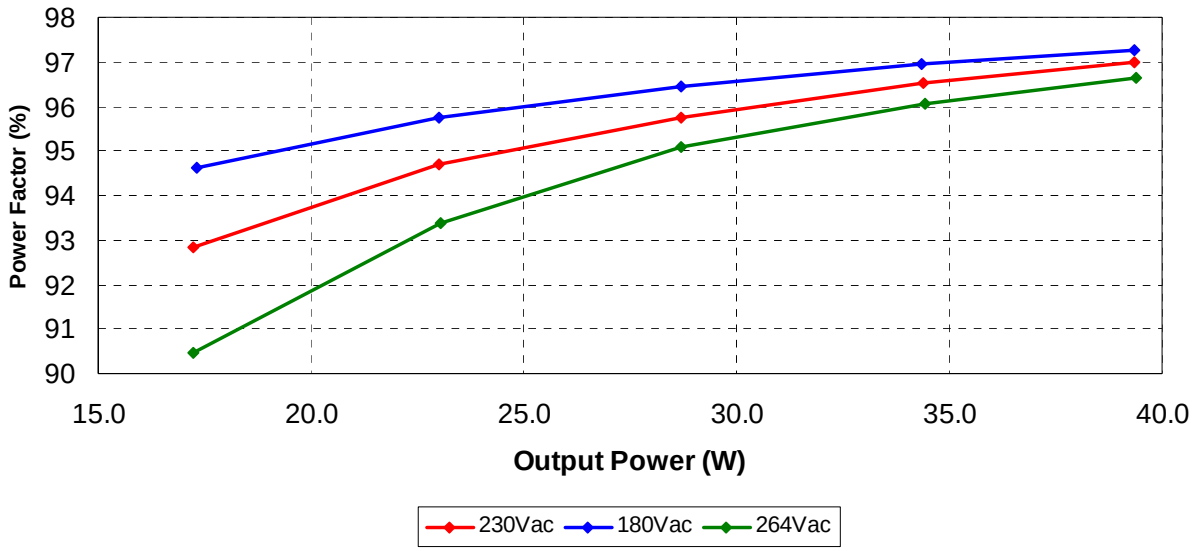
3 Output Current Regulation

The output current versus output power graph is plotted below.



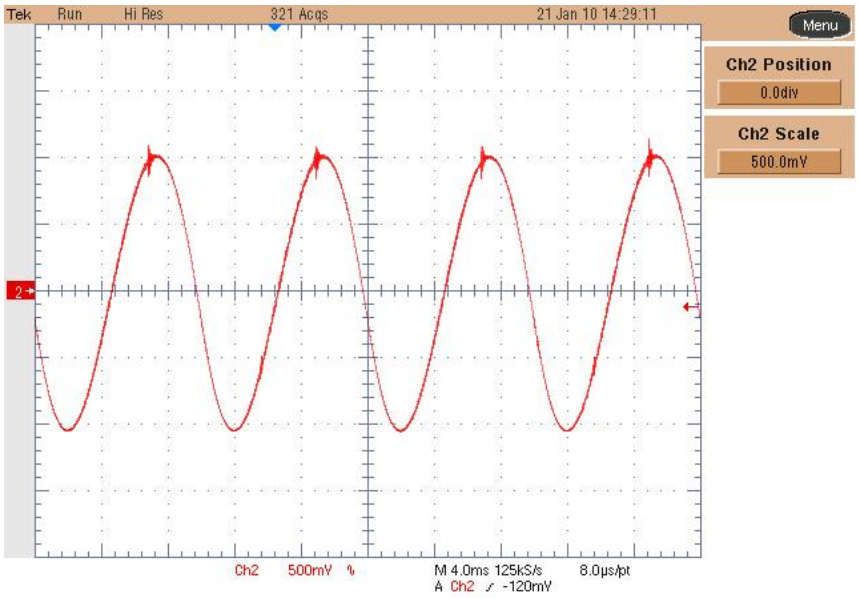
4 Power Factor

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



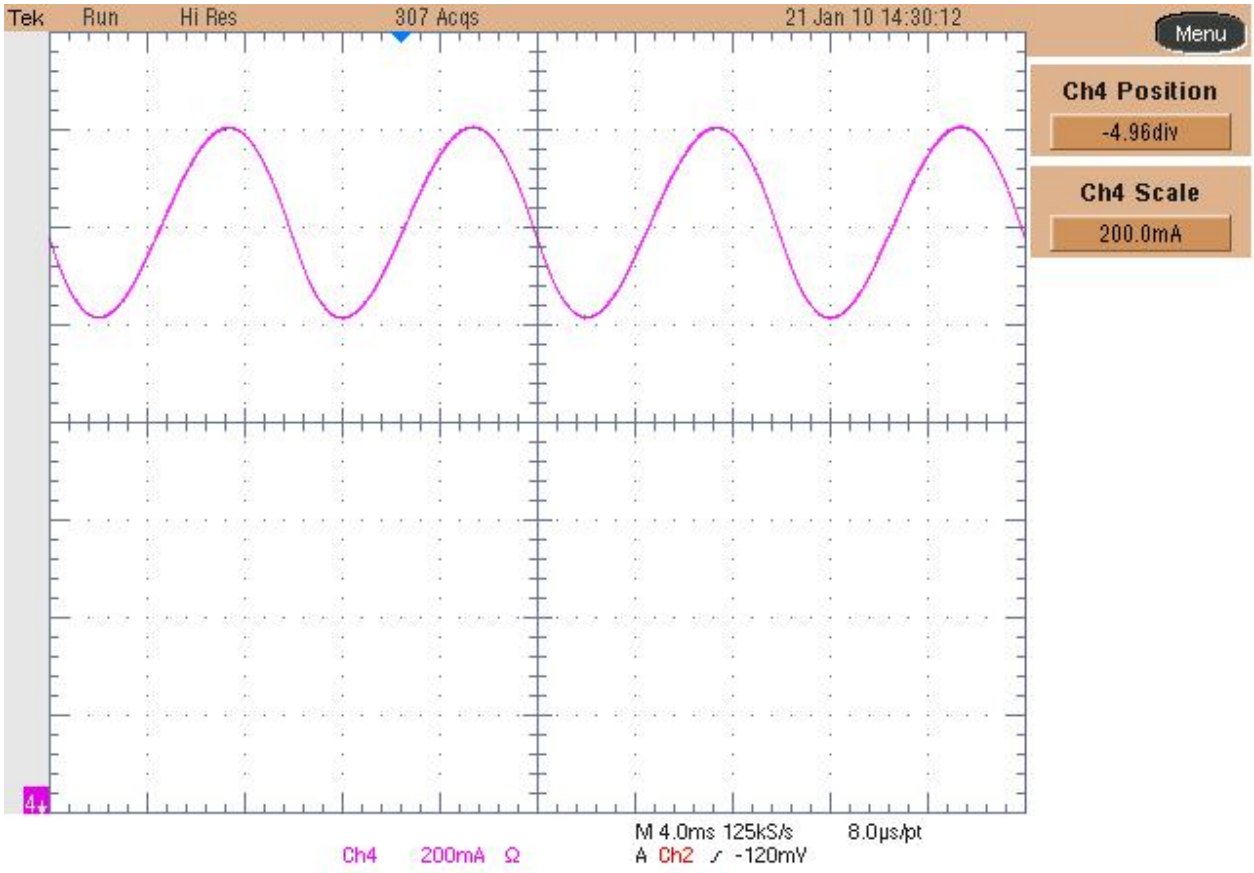
5 Output Ripple Voltage

The output ripple voltage is shown in the plot below. The input was set at 230Vac and the load was set to 1.4A, 27.5Vdc. Channel 1 shows the output ac voltage (0.5 V/div, 4ms/div).



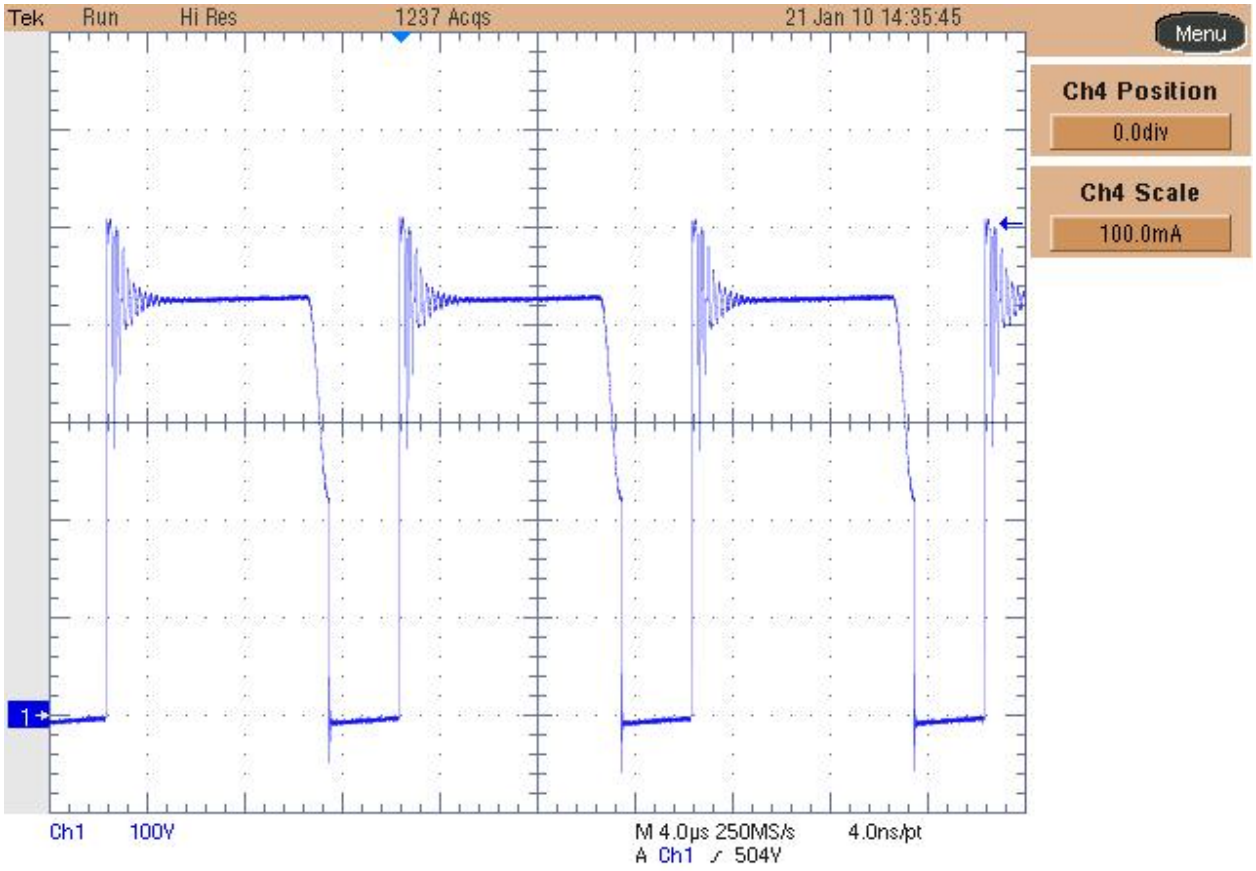
6 Output Ripple Current

The output ripple current is shown in the plot below. The input was set to 230Vac and the load was set to 1.4A, 27.5Vdc. Channel 1 shows the output current (0.2 A/div, 4ms/div).

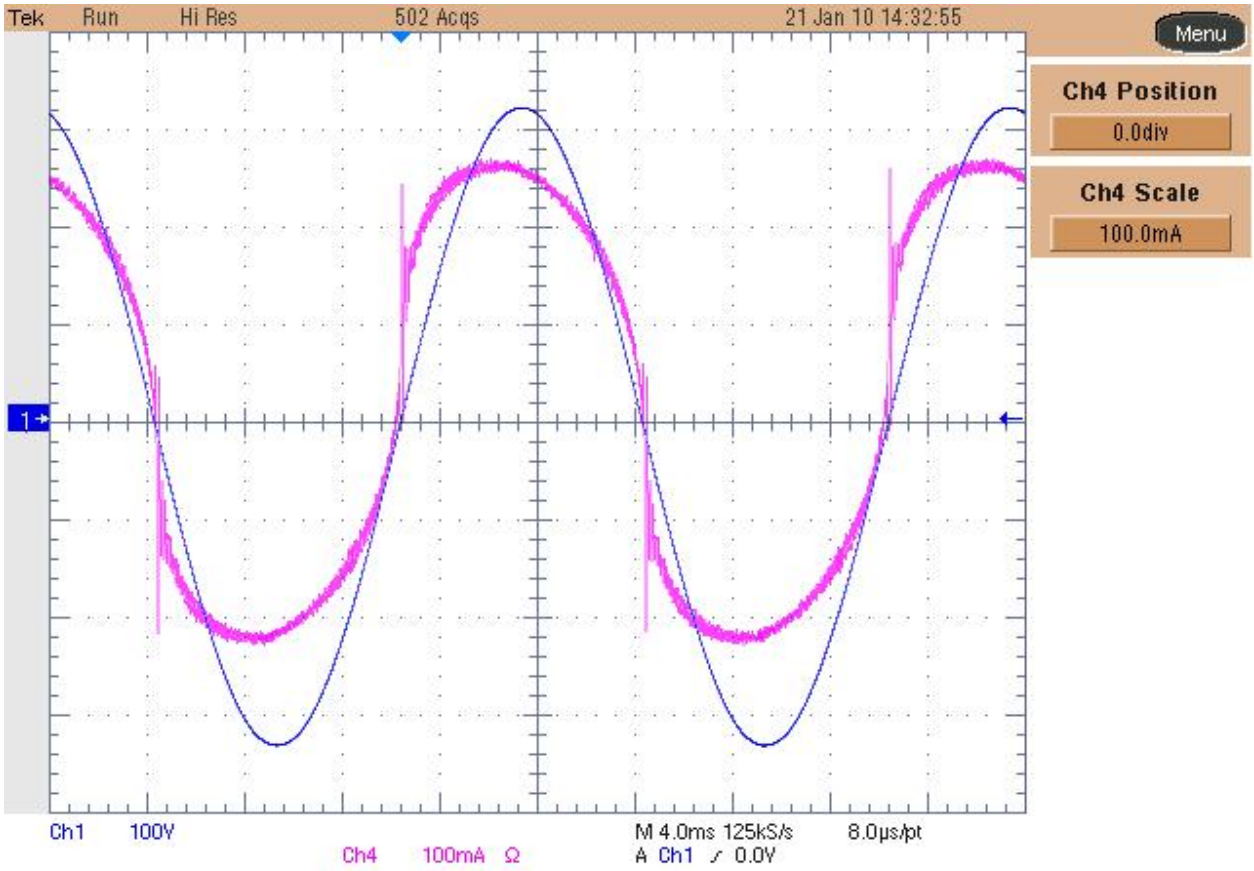


7 Switching Node Waveform

The image below shows the voltage on the drain of the switching node, with a 230Vac input, and a 1.4A, 27.5Vdc load.

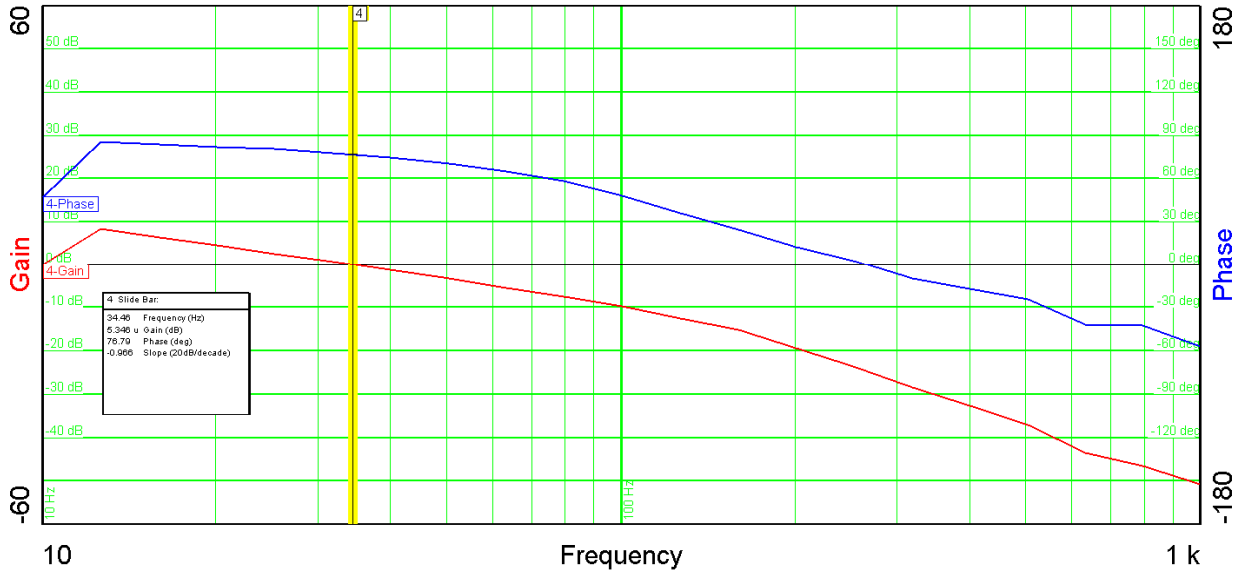


8 Input Voltage and Current Waveforms (same conditions)



9 Loop Response

The image below shows the loop response of the converter measured with a 230Vdc input, and full load (1.4A, 27.5V, 38.5W). Phase margin is 76.79 deg. and crossover frequency is 34.46 Hz.



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