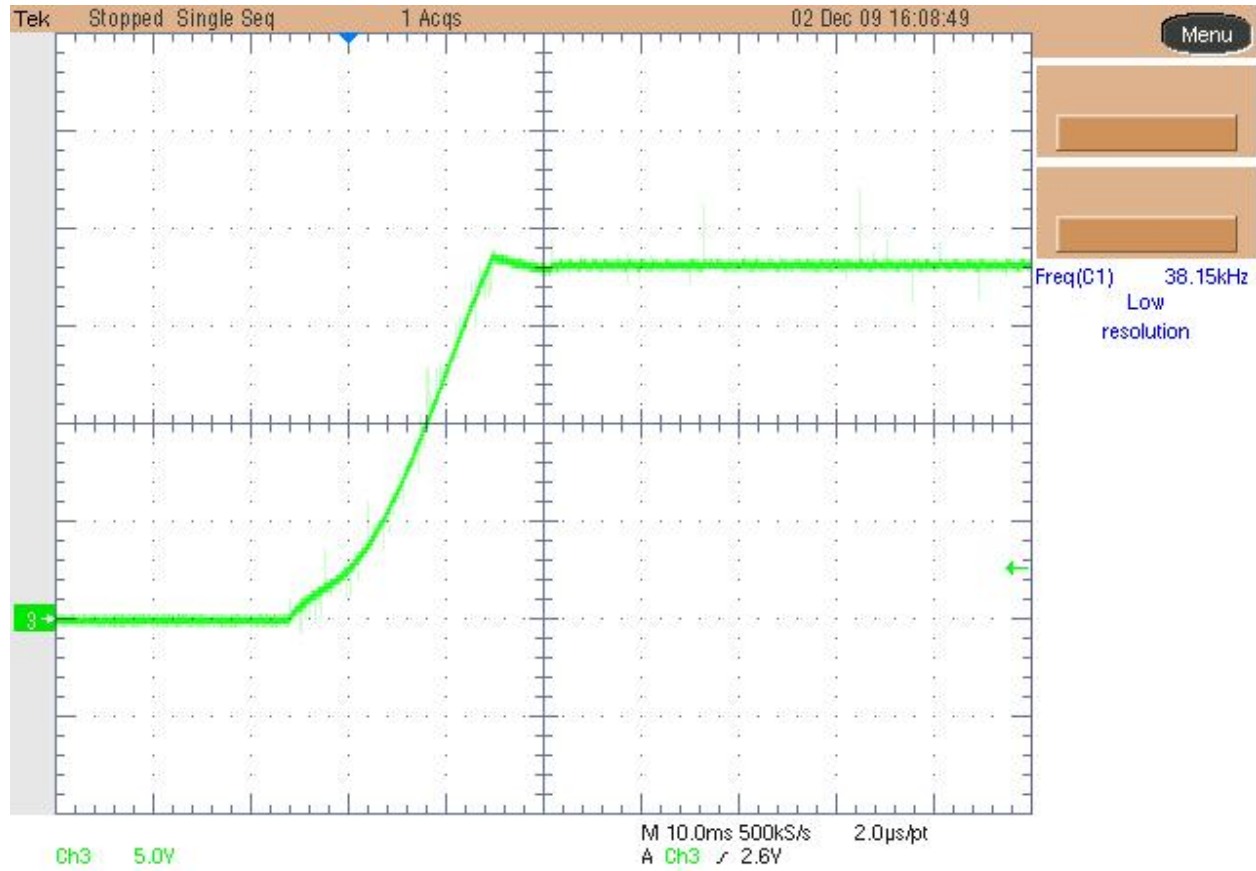


## 1 Startup

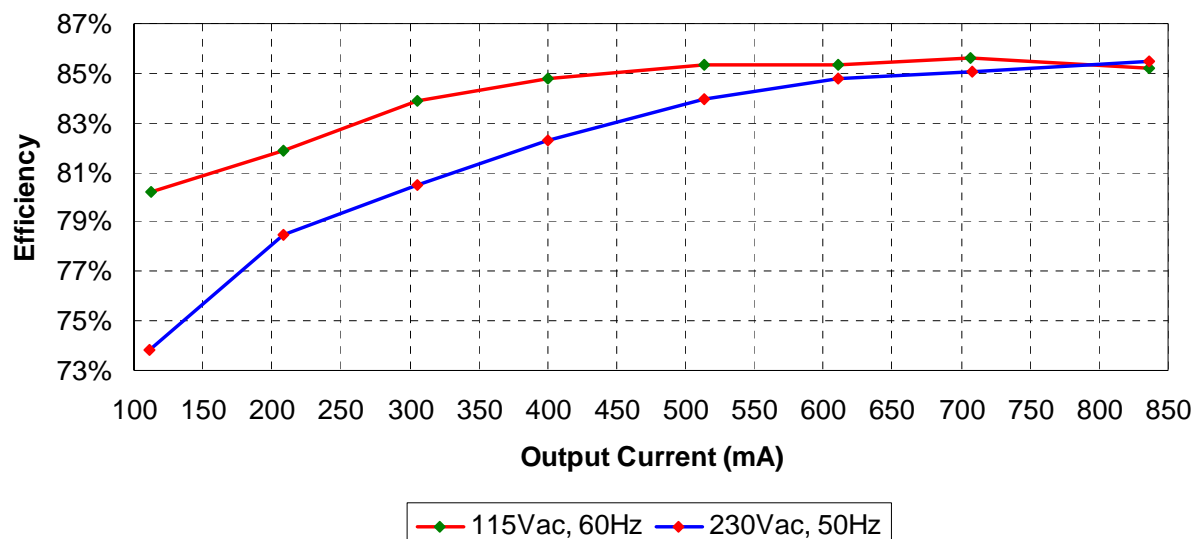
The output voltage at startup is shown in the images below. Input voltage was set to 320Vdc. The output was unloaded.

Channel 3 shows the output voltage (5 V/div, 10ms/div).



## 2 Efficiency

The efficiency data is shown in the tables and graph below. An AC source was set to 115Vrms, 60Hz and 230Vrms 50Hz. The input power was measured with a digital power meter Yokogawa WT210.



I <sub>out</sub> (mA)	V <sub>out</sub> (V)	P <sub>out</sub> (W)	V <sub>in</sub> (V)	P <sub>in</sub> (W)	P <sub>loss</sub> (W)	Eff
112.0	18.14	2.03	115	2.53	0.500	80.2%
207.8	18.15	3.77	115	4.61	0.833	81.9%
305.6	18.15	5.55	115	6.61	1.066	83.9%
400.0	18.15	7.26	115	8.57	1.306	84.8%
513.4	18.15	9.32	115	10.92	1.602	85.3%
610.4	18.15	11.08	115	12.98	1.901	85.4%
707.2	18.15	12.84	115	14.99	2.154	85.6%
836.4	18.15	15.18	115	17.82	2.639	85.2%

I <sub>out</sub> (mA)	V <sub>out</sub> (V)	P <sub>out</sub> (W)	V <sub>in</sub> (V)	P <sub>in</sub> (W)	P <sub>loss</sub> (W)	Eff
111.5	18.15	2.02	230	2.74	0.716	73.9%
207.9	18.15	3.77	230	4.81	1.037	78.4%
305.8	18.15	5.55	230	6.90	1.348	80.5%
400.2	18.15	7.26	230	8.83	1.566	82.3%
513.6	18.15	9.32	230	11.10	1.778	84.0%
610.8	18.15	11.09	230	13.08	1.994	84.8%
707.4	18.15	12.84	230	15.09	2.251	85.1%
836.6	18.15	15.18	230	17.76	2.576	85.5%

### 3 Standby Mode Power Consumption

The tables below show the input power and efficiency during light load operation

Iout (mA)	Vout (V)	Pout (W)	Vin (V)	Pin (W)	Ploss (W)	Eff
0.0	18.15	0.00	115	0.140	0.140	0.0%
32.1	18.15	0.58	115	0.825	0.242	70.6%
47.8	18.15	0.87	115	1.162	0.294	74.7%
63.5	18.15	1.15	115	1.502	0.349	76.7%

Iout (mA)	Vout (V)	Pout (W)	Vin (V)	Pin (W)	Ploss (W)	Eff
0.0	18.16	0.00	230	0.195	0.195	0.0%
32.2	18.16	0.58	230	0.877	0.292	66.7%
47.7	18.15	0.87	230	1.210	0.344	71.6%
63.5	18.15	1.15	230	1.550	0.397	74.4%

### 4 Alternative Transformer 2219SEO-U01

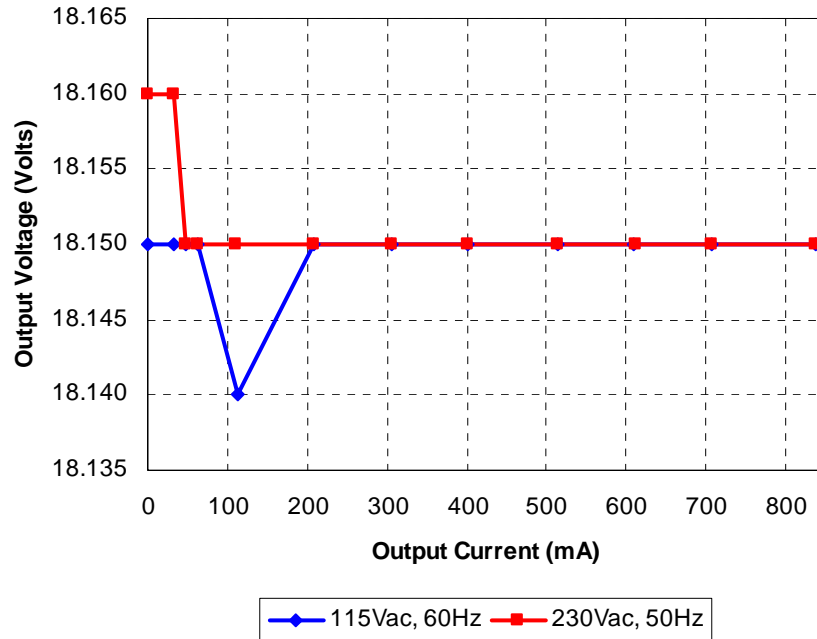
The new measurement with the smaller transformer shows the efficiency at full load and 115Vrms, 230Vrms:

Iout (mA)	Vout (V)	Pout (W)	Vin (V)	Pin (W)	Ploss (W)	Eff
840.1	18.16	15.26	115	17.88	2.624	85.3%
843.2	18.15	15.30	230	17.98	2.676	85.1%

At 115Vin the efficiency increases from 85.2% to 85.3%, while at 230Vin the efficiency reduces from 85.5% down to 85.1%.

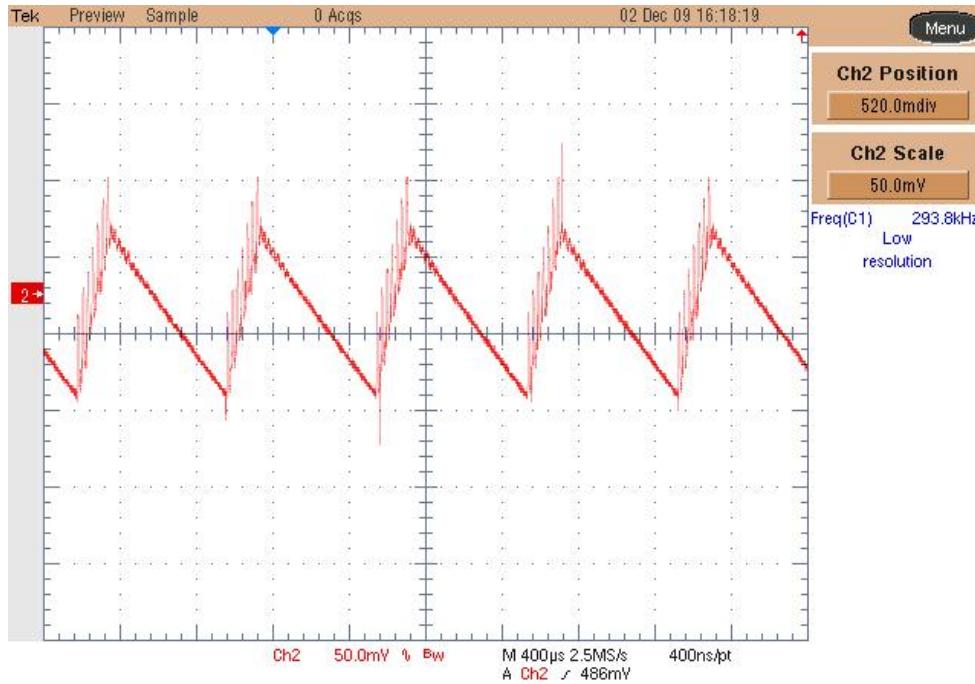
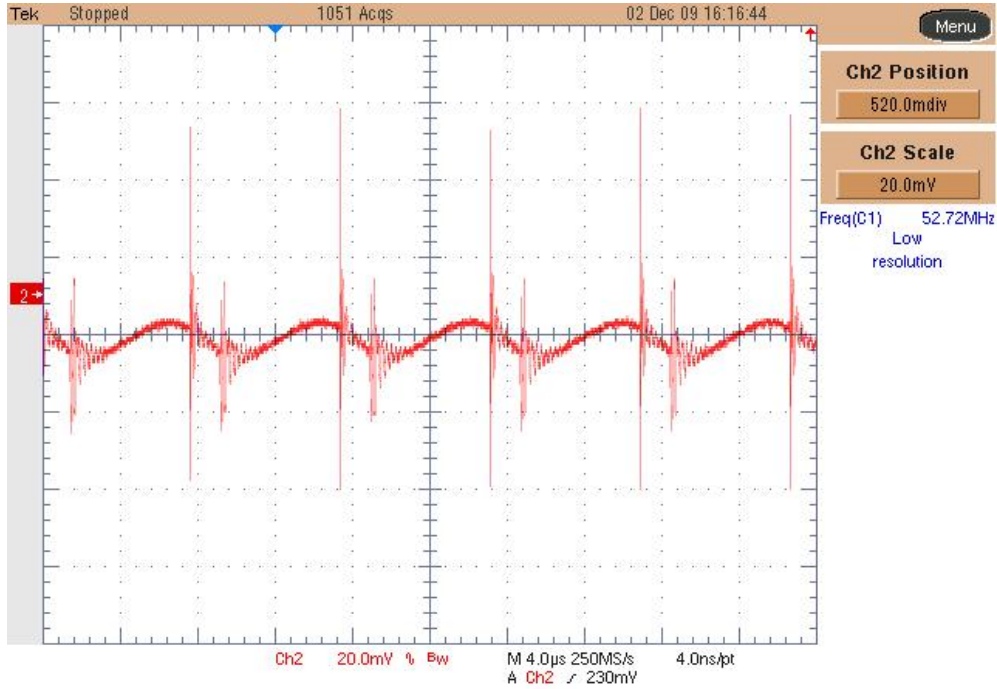
## 5 Output Voltage Regulation

The output voltage versus load current is plotted below.



## 6 Output Ripple Voltage

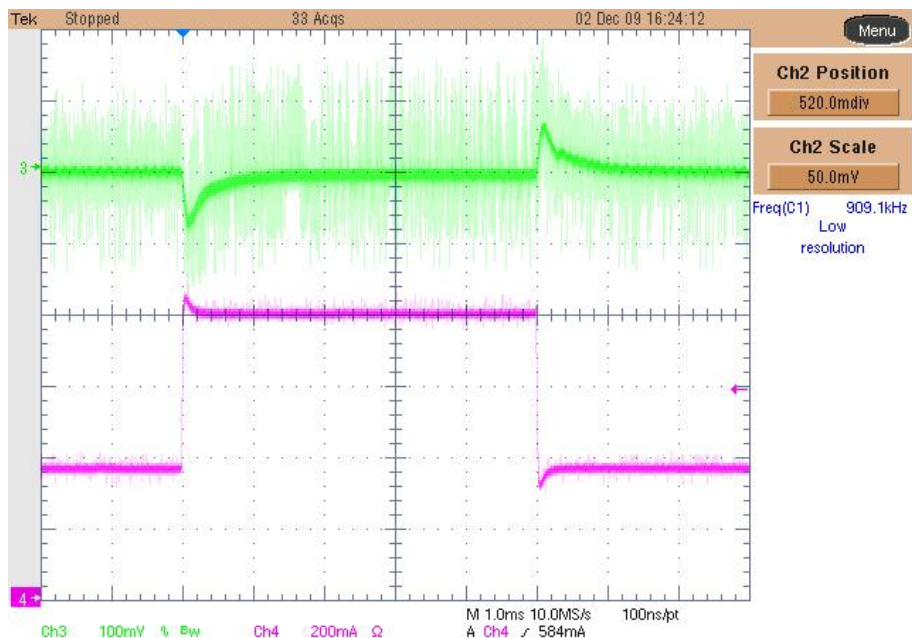
The output ripple voltage is shown in the plots below. The input was set at 320Vdc and the load was set to 0.83A (upper picture) and 80mA (lower picture).



## 7 Load Transient

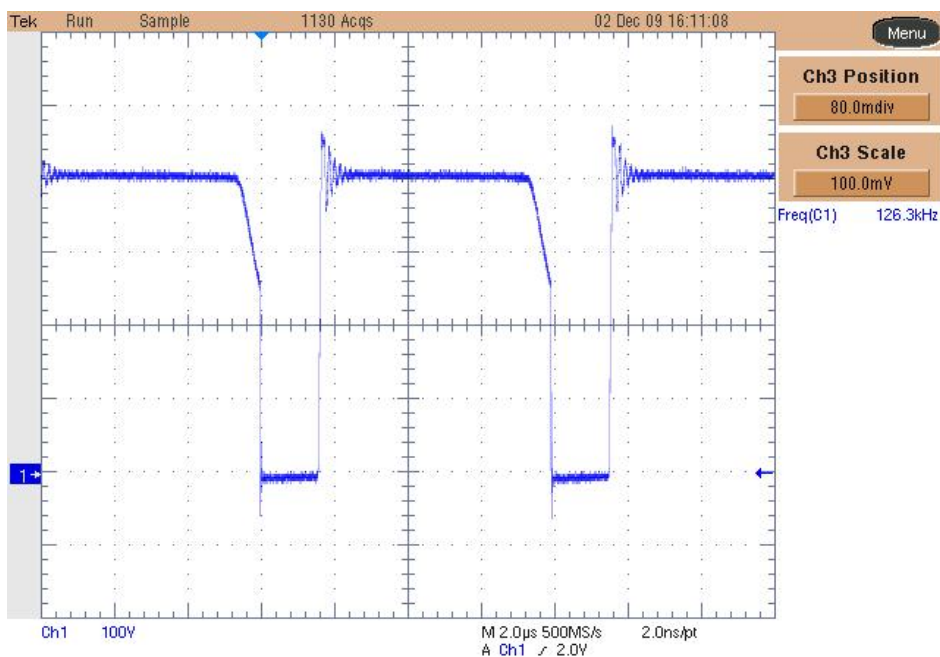
The image below shows the response to 0.4A to 0.8A load transient on the output voltage. The input voltage was set to 320Vdc.

Channel 3: Vout (ac coupled) 100mV/div, Channel 4: Iout 200mA/div, 1ms/div.



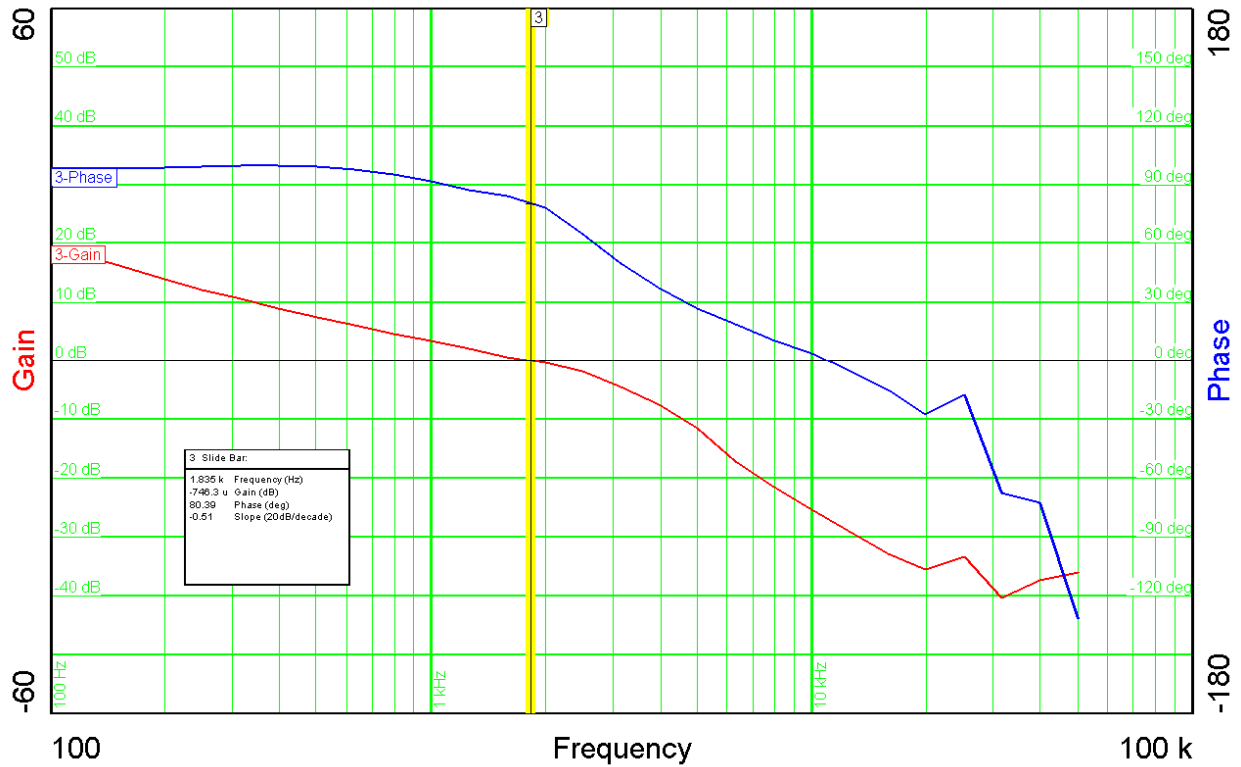
## 8 Switch-node

The image below shows the switch-node waveform. The input voltage was set to 320Vdc during a full load condition. Channel 1: Vds, 100V/div, 2us/div.



## 9 Loop Response

The image below shows the loop response of the converter measured with a 320Vdc input, and full load. Phase margin is 80.39 deg. and crossover frequency is 1.835 KHz.



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