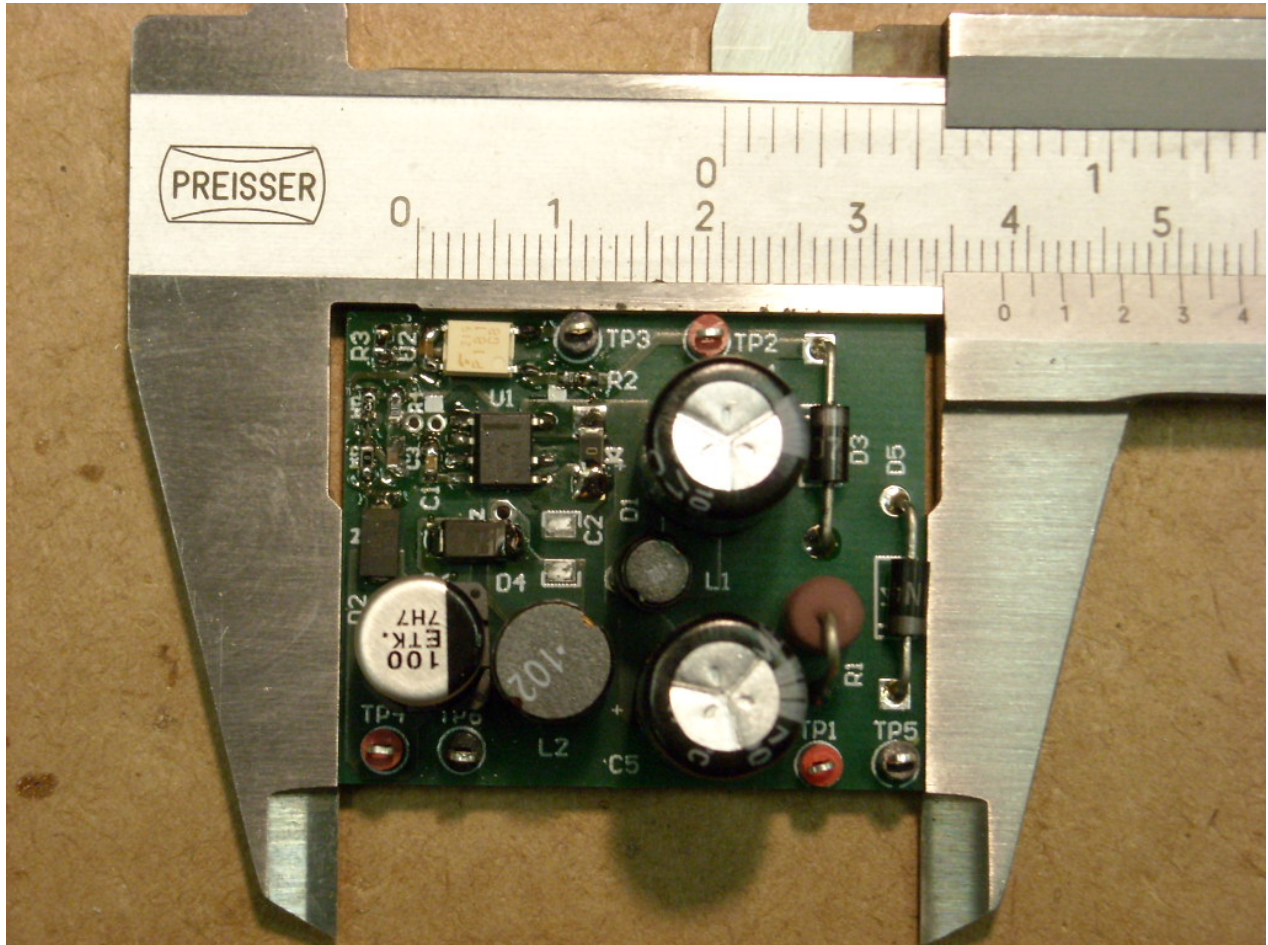


Photo of the prototype

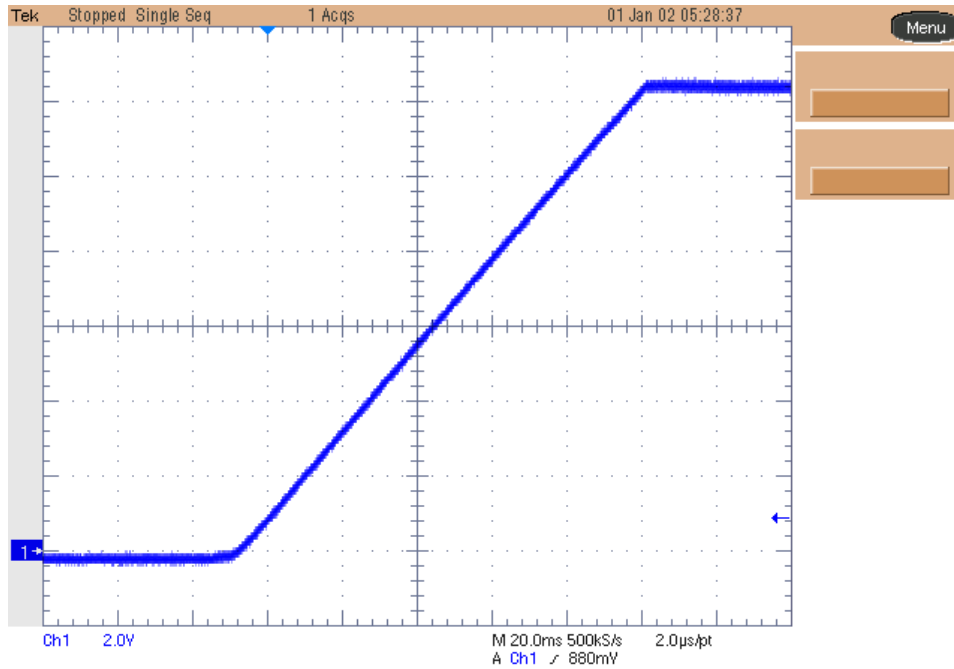


1. Startup

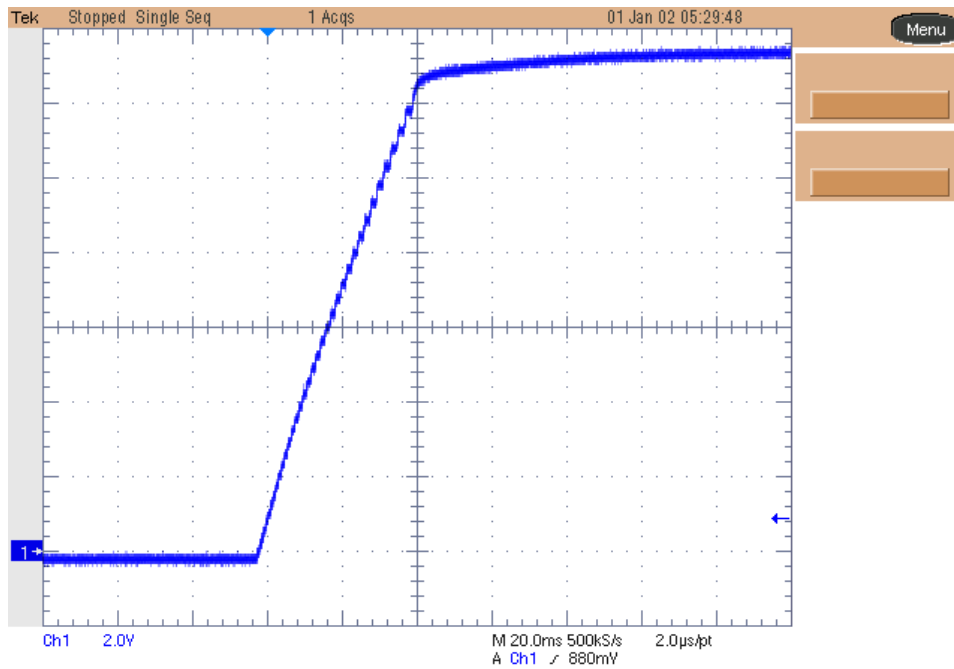
The input and output voltage waveforms at startup are shown in the images below. The input voltage has been set at 320Vdc. The output was loaded with 120mA constant current for the upper picture and with no load for the bottom one.

Channel 1: Output Voltage (2V/div, 20msec/div, DC coupling, no BWL).

Load = 120mA

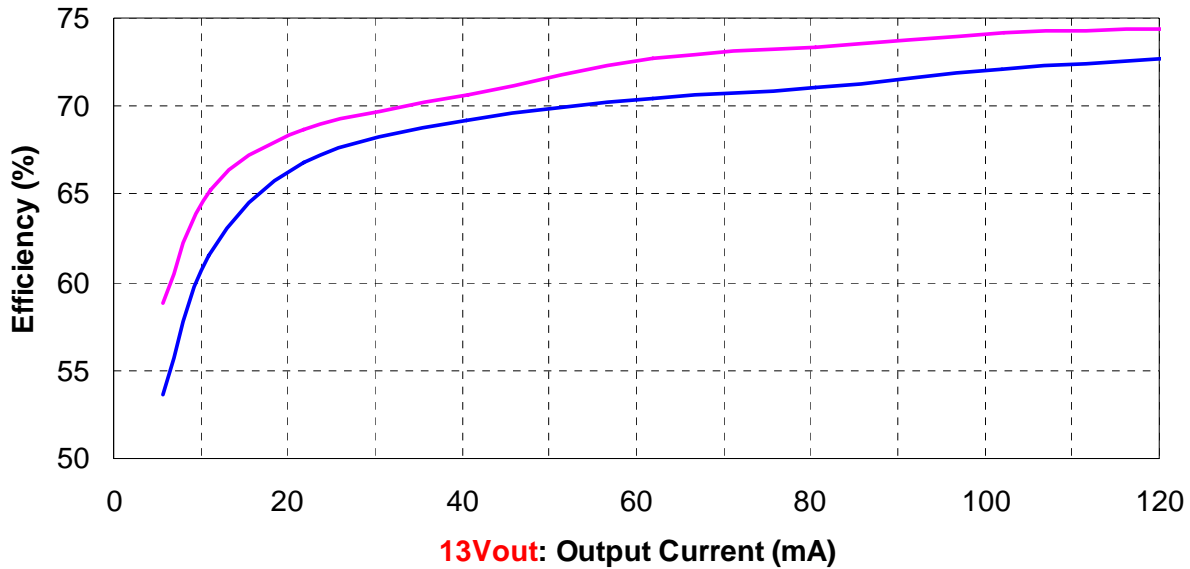


Load = 0

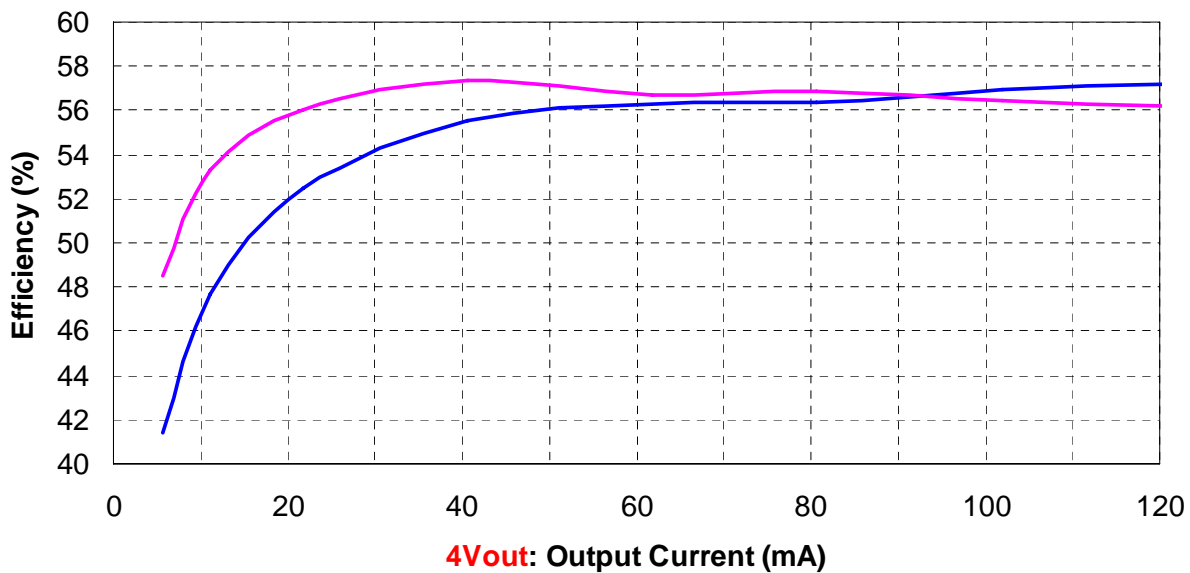


2. Efficiency

The efficiency data versus output current is shown in the tables and graphs below. The converter has been supplied with 320Vdc and 160Vdc source. The output voltage has been switched between 13V and 4V by applying 5V on the “Vcontrol” terminals.



— 320Vdc — 160Vdc



— 320Vdc — 160Vdc

Iout (mA)	Vout (Vdc)	Pout (W)	Iin (mA)	Vin (Vdc)	Pin (W)	Ploss (W)	Eff (%)
0.0	13.70	0.00	0.1221	320	0.039	0.039	0.0
5.60	12.87	0.072	0.420	320	0.134	0.062	53.6
11.0	12.73	0.140	0.711	320	0.228	0.087	61.5
21.8	12.63	0.275	1.288	320	0.412	0.137	66.8
40.5	12.56	0.509	2.296	320	0.735	0.226	69.2
61.8	12.52	0.774	3.432	320	1.098	0.325	70.5
80.6	12.50	1.008	4.43	320	1.418	0.410	71.1
102.0	12.48	1.273	5.52	320	1.766	0.493	72.1
120.8	12.45	1.504	6.46	320	2.067	0.563	72.8

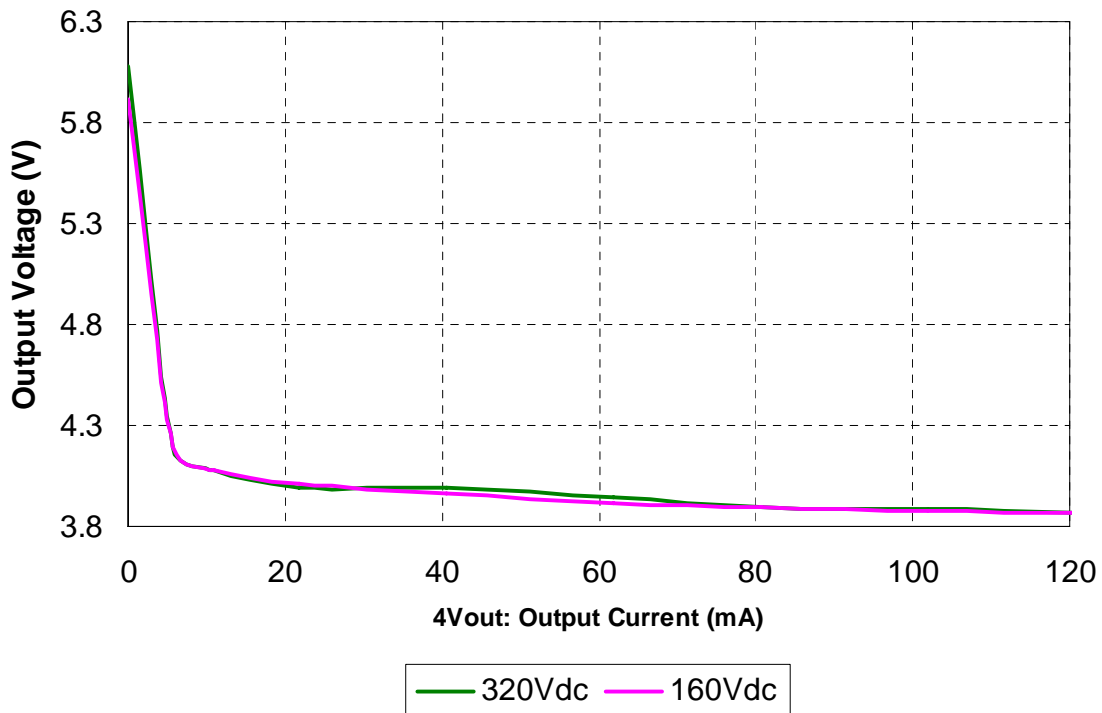
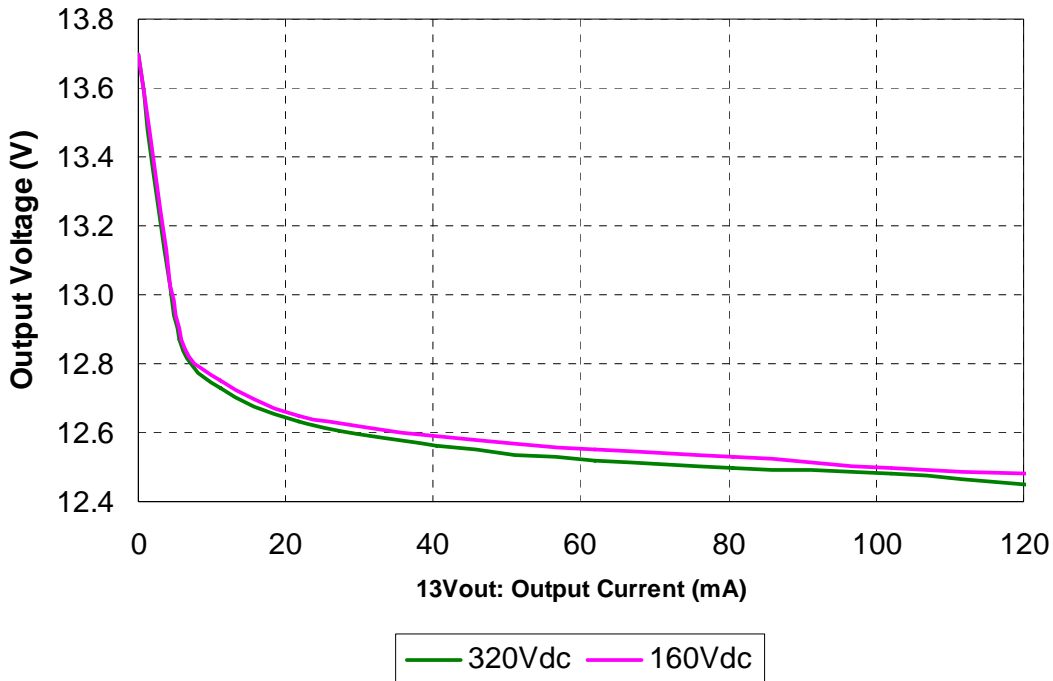
Iout (mA)	Vout (Vdc)	Pout (W)	Iin (mA)	Vin (Vdc)	Pin (W)	Ploss (W)	Eff (%)
0.0	13.70	0.00	0.1806	160	0.029	0.029	0.0
5.70	12.87	0.073	0.779	160	0.125	0.051	58.9
11.1	12.75	0.142	1.356	160	0.217	0.075	65.2
21.8	12.65	0.276	2.509	160	0.401	0.126	68.7
40.6	12.59	0.511	4.520	160	0.723	0.212	70.7
61.9	12.55	0.777	6.680	160	1.069	0.292	72.7
80.6	12.53	1.010	8.61	160	1.378	0.368	73.3
102.1	12.50	1.276	10.76	160	1.722	0.445	74.1
120.8	12.48	1.508	12.67	160	2.027	0.520	74.4

Iout (mA)	Vout (Vdc)	Pout (W)	Iin (mA)	Vin (Vdc)	Pin (W)	Ploss (W)	Eff (%)
0.0	6.077	0.00	0.0652	320	0.021	0.021	0.0
5.70	4.195	0.024	0.180	320	0.058	0.034	41.4
11.0	4.076	0.045	0.294	320	0.094	0.049	47.7
21.8	3.996	0.087	0.519	320	0.166	0.079	52.5
40.6	3.994	0.162	0.913	320	0.292	0.130	55.5
61.8	3.946	0.244	1.354	320	0.433	0.189	56.3
80.6	3.898	0.314	1.741	320	0.557	0.243	56.4
102.0	3.882	0.396	2.172	320	0.695	0.299	57.0
120.8	3.868	0.467	2.554	320	0.817	0.350	57.2

Iout (mA)	Vout (Vdc)	Pout (W)	Iin (mA)	Vin (Vdc)	Pin (W)	Ploss (W)	Eff (%)
0.0	5.920	0.00	0.0746	160	0.012	0.012	0.0
5.60	4.194	0.023	0.303	160	0.048	0.025	48.5
11.0	4.083	0.045	0.527	160	0.084	0.039	53.3
21.8	4.008	0.087	0.974	160	0.156	0.068	56.1
40.6	3.959	0.161	1.752	160	0.280	0.120	57.3
61.8	3.917	0.242	2.670	160	0.427	0.185	56.7
80.6	3.900	0.314	3.454	160	0.553	0.238	56.9
102.0	3.879	0.396	4.380	160	0.701	0.305	56.5
120.8	3.865	0.467	5.190	160	0.830	0.364	56.2

3. Output voltage regulation

The output voltage versus output current is plotted below. A 14mW constant load has been connected to the output (12KOhm resistor).

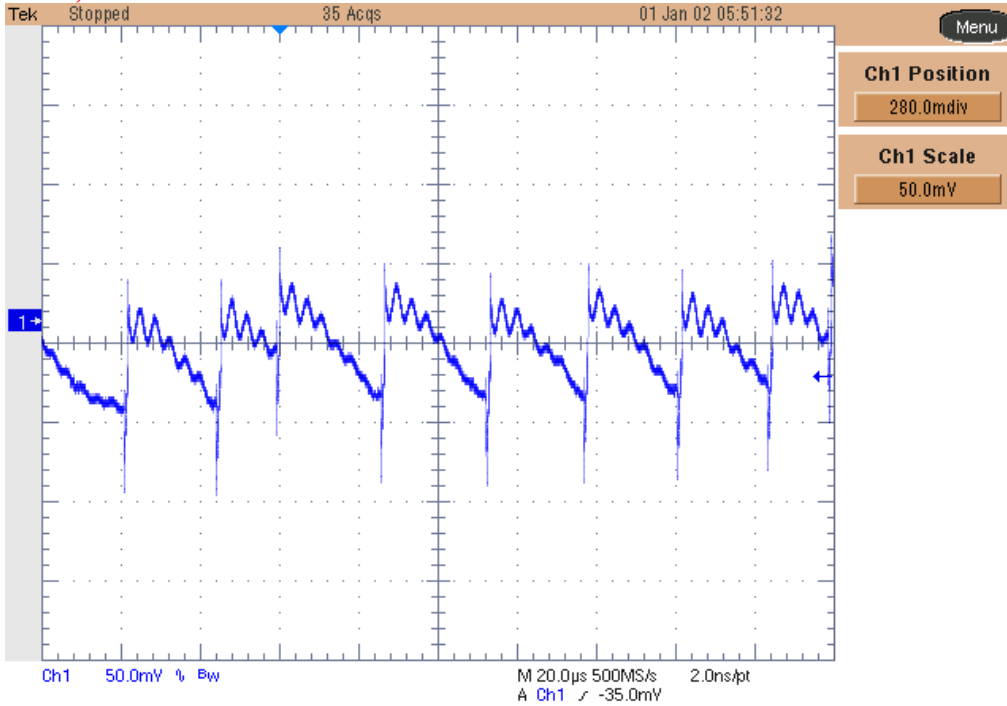


4. Output ripple voltage

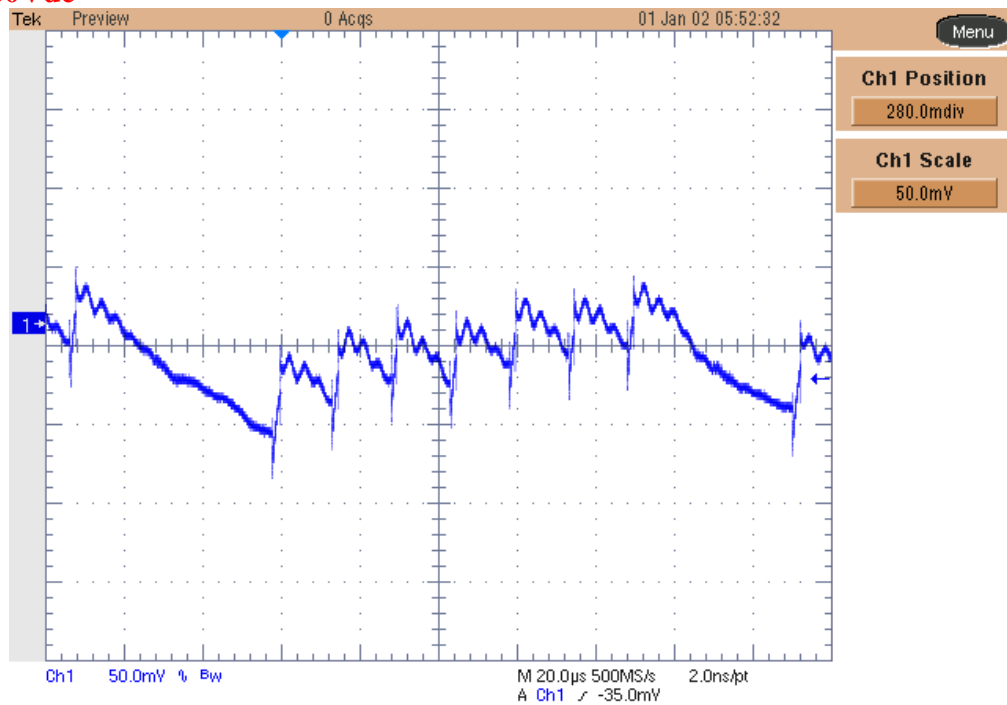
The output ripple voltage plots are shown below. A DC source, set to 320Vdc and 160Vdc has been connected to input terminals, while the load was set to 120mA.

Ch1: Output Voltage (50mV/div, 20us/div, 20MHz BWL, AC coupling)

Vin = 320Vdc, Vout = 13V

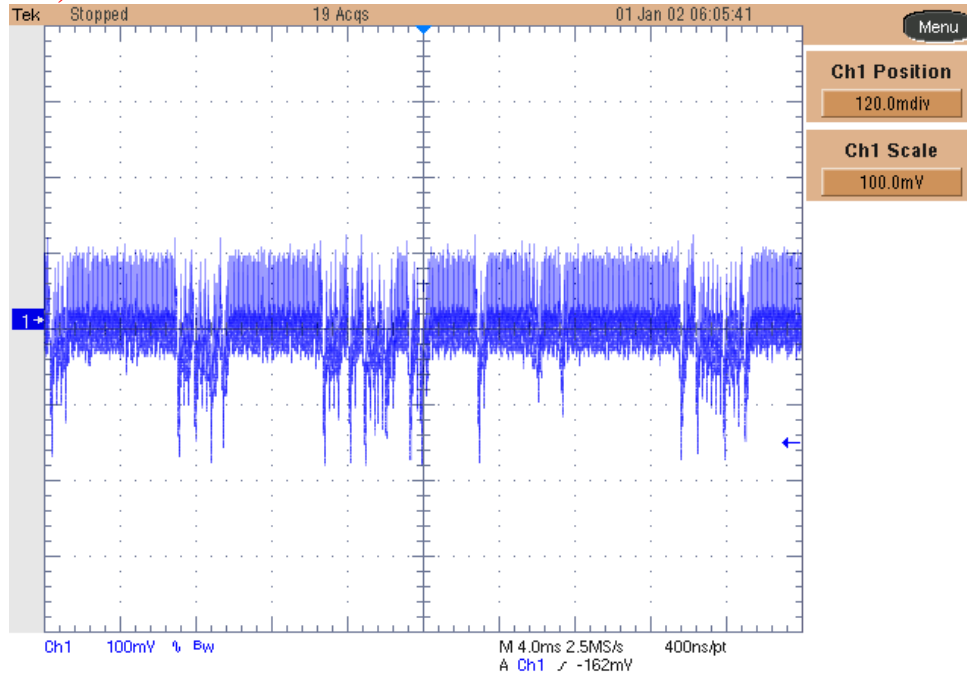


Vin = 160Vdc



Ch1: Output Voltage (100mV/div, 4ms/div, 20MHz BWL, AC coupling)

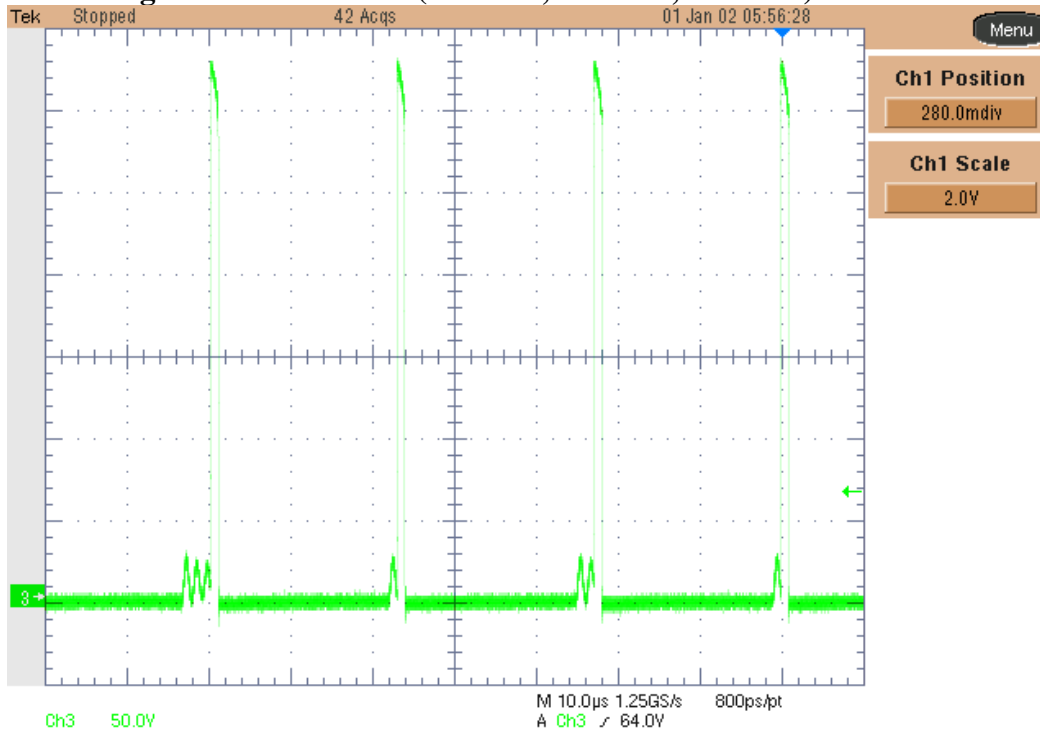
Vin = 320Vdc, Vout = 4V



5. Switching Node Waveform

The image below shows the voltage on the cathode of D4 with a 320Vdc input, and 120mA load.

Channel 3: Voltage on cathode of D4 (50 V/div, 10us/div, no BWL).

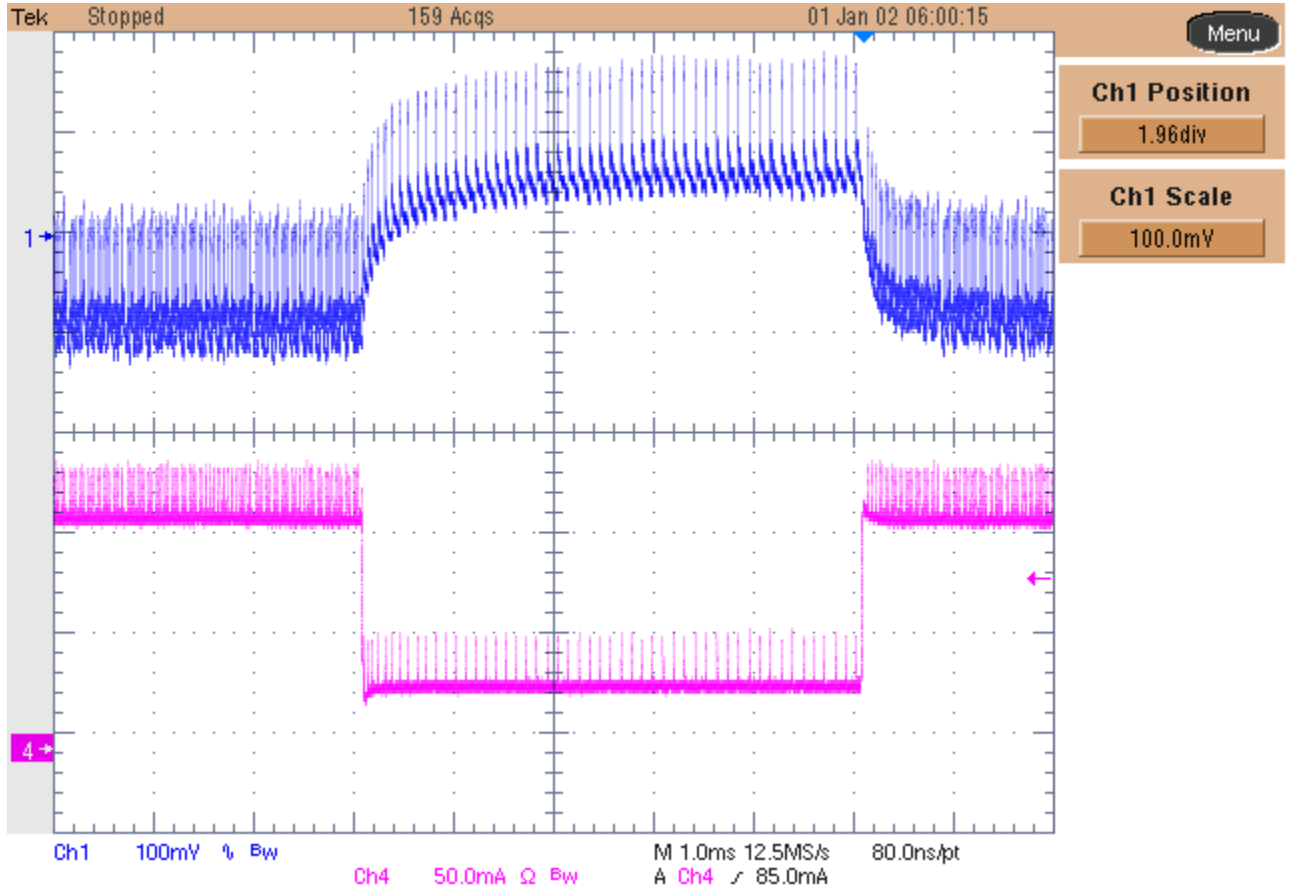


6. Transient Response

The image below shows the transient response of the output voltage while the load has been switched from 20mA to 120mA (16.7% to 100% of nominal load), @ 320Vdc in.

Channel 1: Output Voltage (100mV/div, 1ms/div, 20MHz BWL, AC coupling).

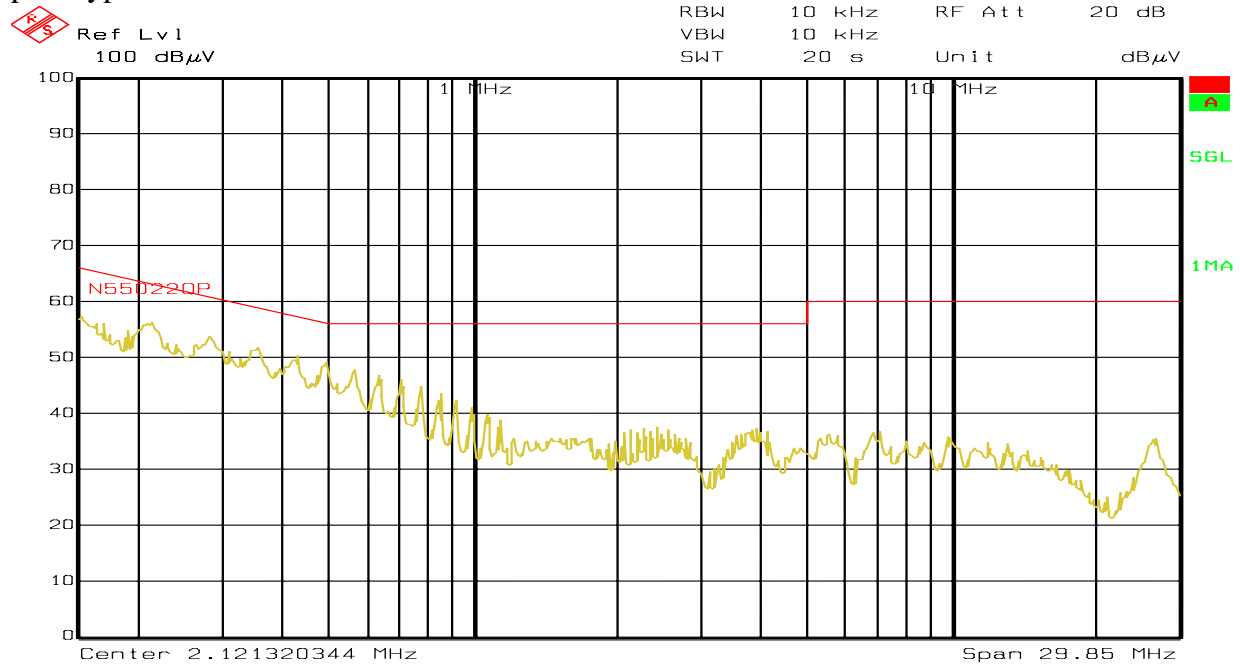
Channel 4: Output Current (50mA/div, 20MHz BWL, DC coupling).



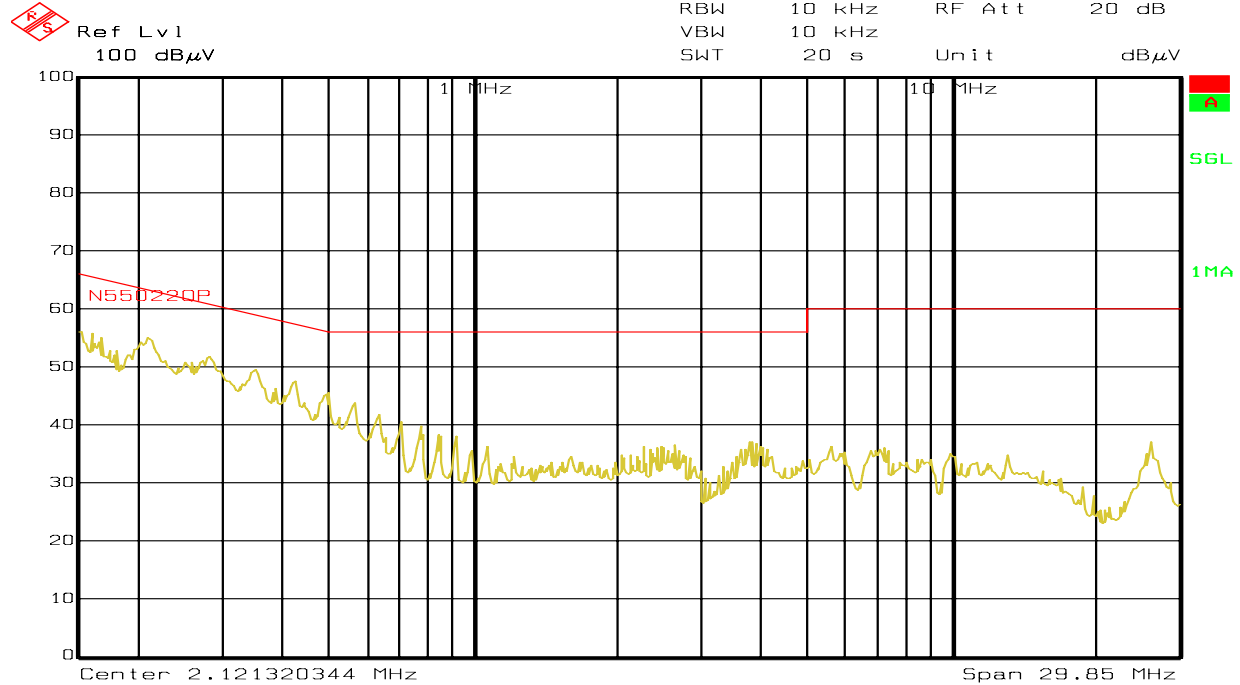
7.

EMI Measurement

The plots below show the EMI measurement taken at 230Vac (Phase and Neutral). An Ameg HM6050-2 LISN has been inserted between the AC source (an isolation transformer) and the prototype.



Date: 5.FEB.2013 14:40:56



Date: 5.FEB.2013 14:46:16

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