

PICTURE OF THE BOARD:

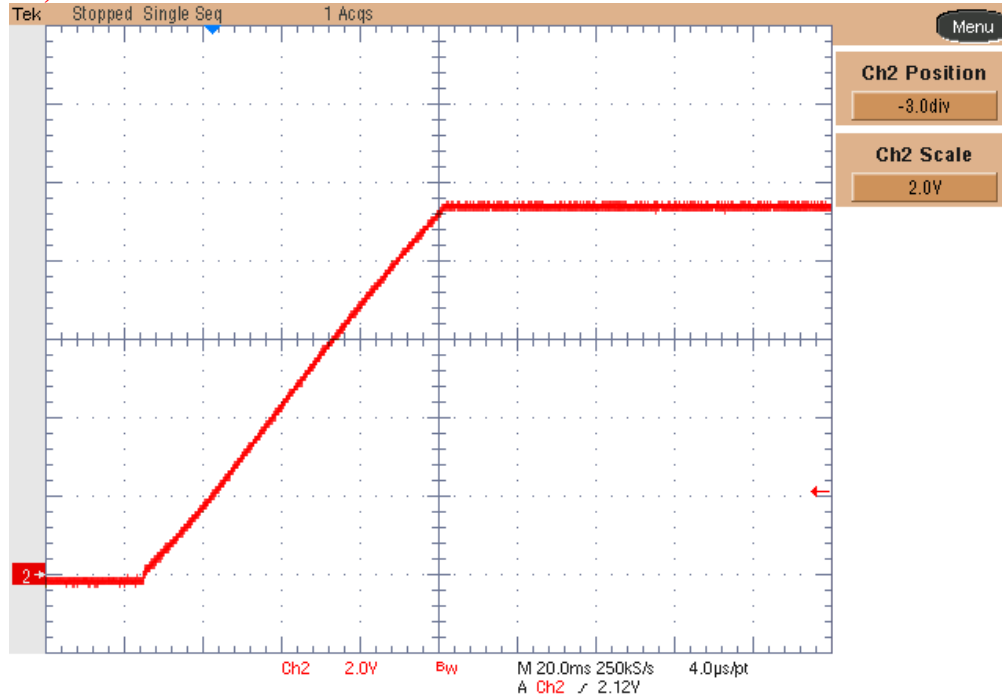


1. Startup

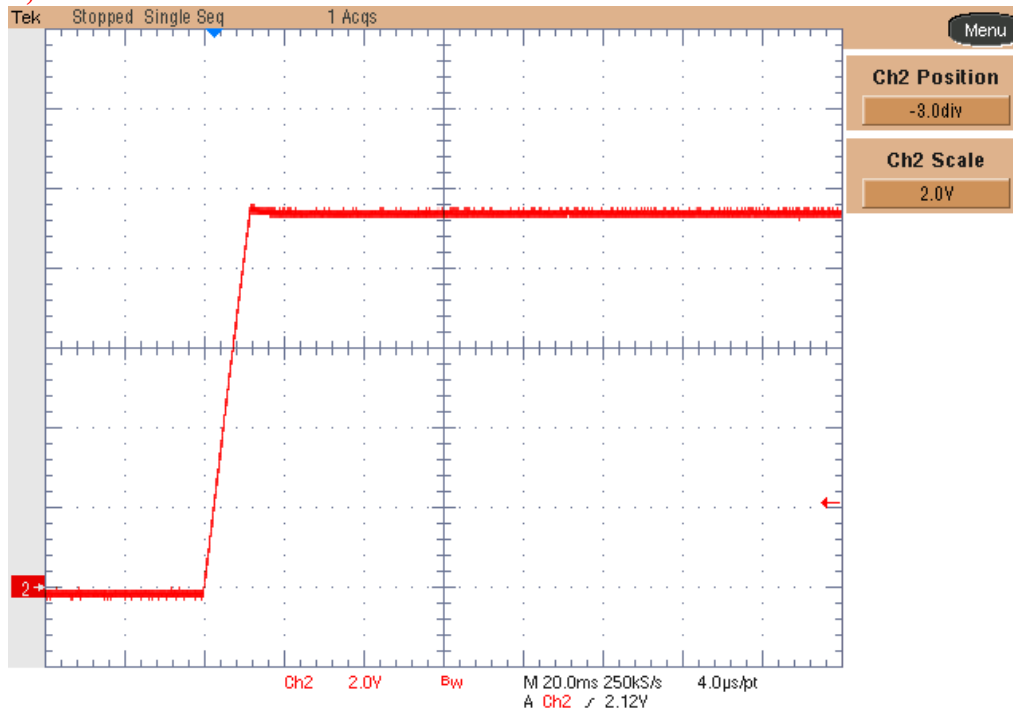
The output voltage behavior at startup is shown in the images below. The input voltage was set to 320Vdc. The output fully loaded in the upper picture and unloaded for the bottom one.

Ch.2: Output voltage (2V/div, 20ms/div, DC coupling, 20MHz bandwidth)

$I_{out} = 1.6A$;

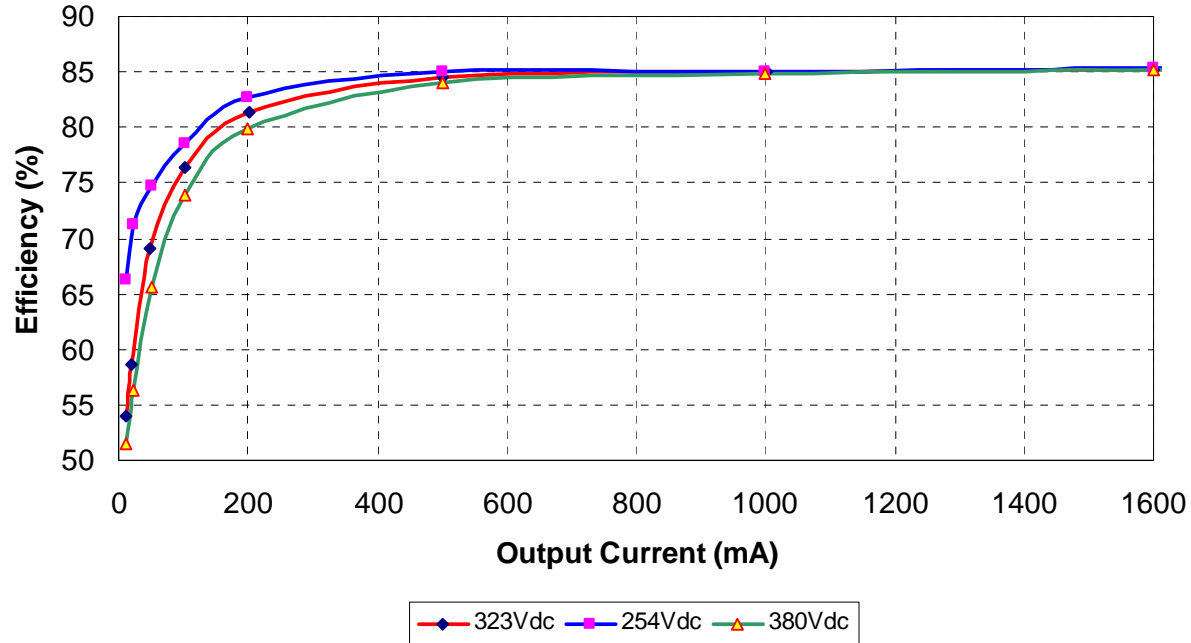


$I_{out} = 0A$;



1 Efficiency

Due to the non-isolated nature of this power supply, the converter has been tested with a DC input voltage source, set to the equivalent peak AC voltages, therefore 254V, 323V and 380V DC..



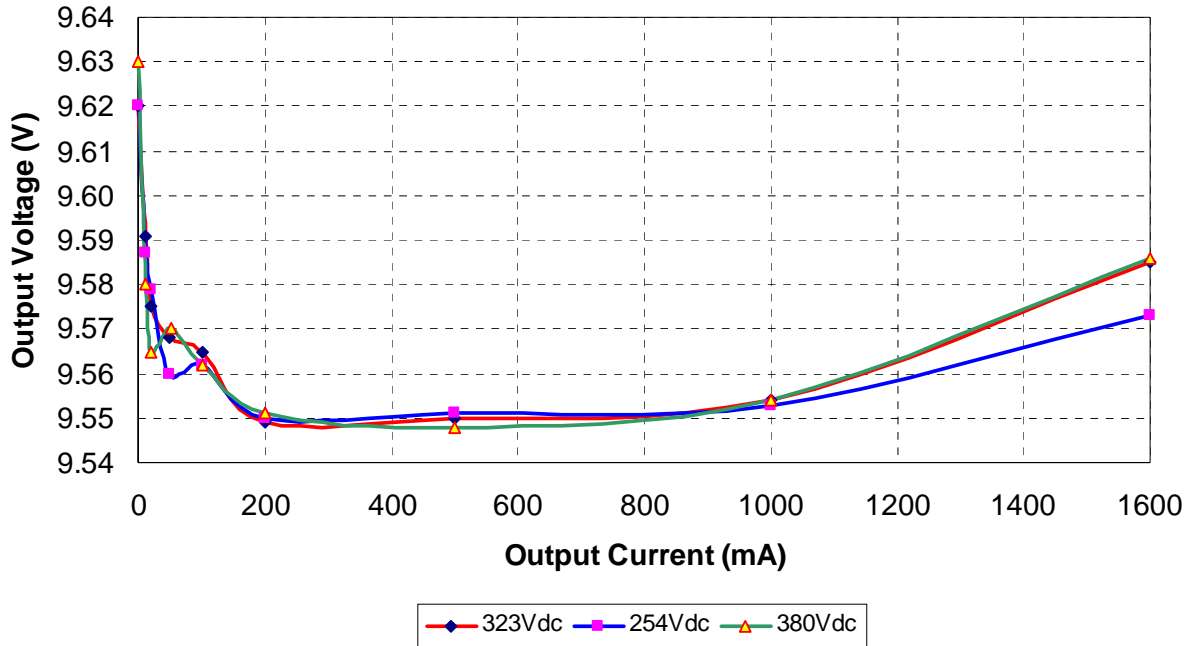
Iout (mA)	Vout (V)	Pout (W)	Iin (mA)	Pin (W)	Vin (Vdc)	Ploss (W)	Eff (%)
0	9.620	0	0.082	0.026	323	0.026	0.00
11.8	9.591	0.113	0.65	0.210	323	0.097	53.91
20.0	9.575	0.192	1.01	0.326	323	0.135	58.70
49.2	9.568	0.471	2.11	0.682	323	0.211	69.07
102.7	9.565	0.982	3.98	1.286	323	0.303	76.41
201.4	9.549	1.923	7.32	2.364	323	0.441	81.34
501.2	9.550	4.786	17.53	5.662	323	0.876	84.53
1001	9.554	9.565	34.85	11.257	323	1.692	84.97
1600	9.585	15.336	55.70	17.991	323	2.655	85.24
1760	9.576	16.854	60.90	19.671	323	2.817	85.68

Iout (mA)	Vout (V)	Pout (W)	Iin (mA)	Pin (W)	Vin (Vdc)	Ploss (W)	Eff (%)
0	9.620	0	0.081	0.021	254	0.021	0.00
10.7	9.587	0.103	0.610	0.155	254	0.052	66.21
21.5	9.579	0.206	1.138	0.289	254	0.083	71.25
50.9	9.560	0.487	2.566	0.652	254	0.165	74.66
101.7	9.562	0.972	4.87	1.237	254	0.265	78.62
200.4	9.550	1.914	9.12	2.316	254	0.403	82.62
500.2	9.551	4.777	22.13	5.621	254	0.844	84.99
1000	9.553	9.553	44.2	11.227	254	1.674	85.09
1600	9.573	15.317	70.7	17.958	254	2.641	85.29
1756	9.585	16.831	77.6	19.710	254	2.879	85.39
1864	8.863						
1869	8.400						

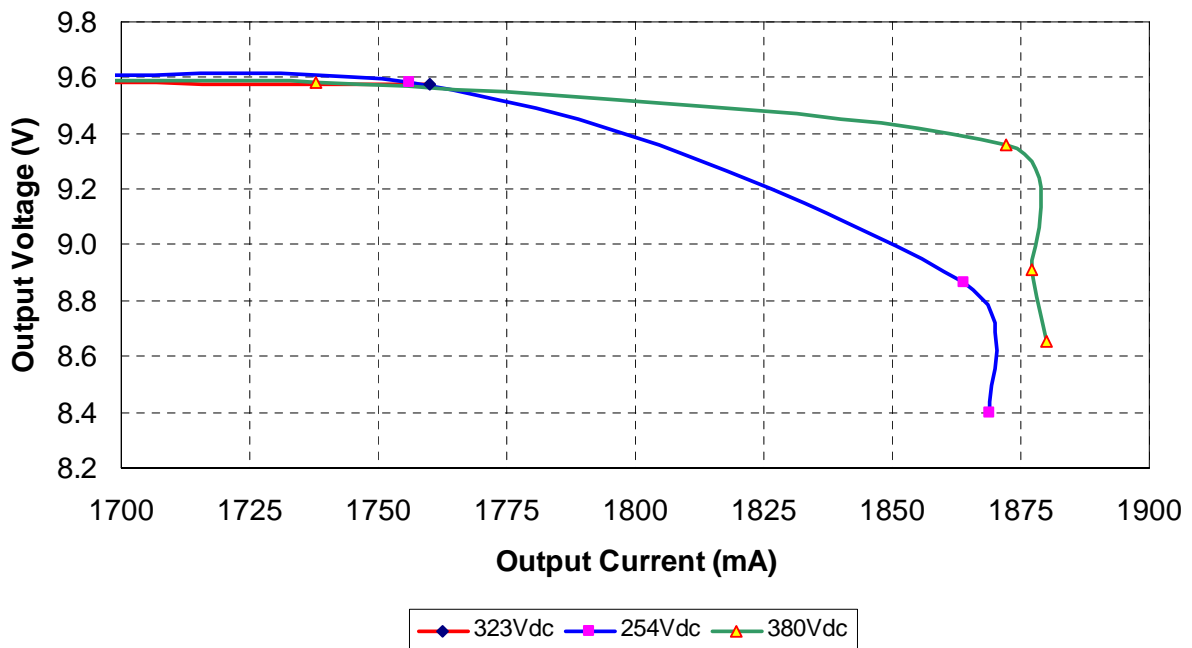
Iout (mA)	Vout (V)	Pout (W)	Iin (mA)	Pin (W)	Vin (Vdc)	Ploss (W)	Eff (%)
0	9.630	0	0.085	0.032	380	0.032	0.00
10.8	9.580	0.103	0.529	0.201	380	0.098	51.47
21.6	9.565	0.207	0.965	0.367	380	0.160	56.34
51.0	9.570	0.488	1.958	0.744	380	0.256	65.60
101.8	9.562	0.973	3.47	1.319	380	0.345	73.82
200.5	9.551	1.915	6.31	2.398	380	0.483	79.86
500.2	9.548	4.776	14.97	5.689	380	0.913	83.96
1000	9.554	9.555	29.7	11.267	380	1.712	84.80
1600	9.586	15.338	47.4	18.012	380	2.674	85.15
1738	9.584	16.657	51.4	19.532	380	2.875	85.28
1872	9.361						
1877	8.911						
1880	8.652						

2 Output Voltage Regulation

The output voltage variation as function of load and input voltage is shown below:



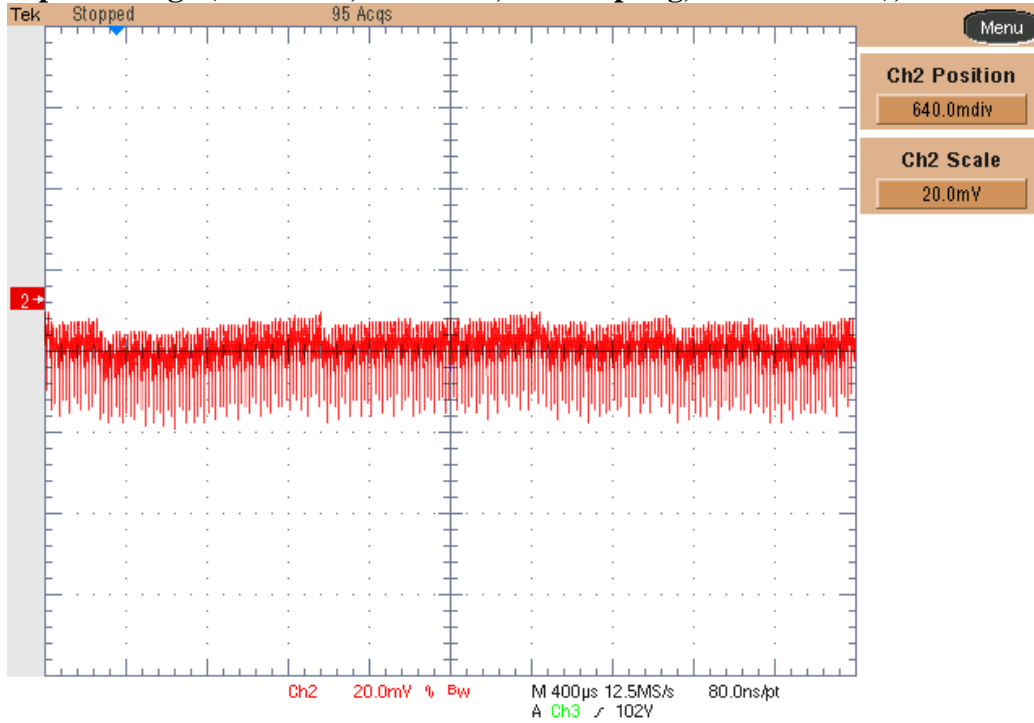
The converter has been loaded with higher current than nominal load in order to measure the current limit curve, for each input DC voltage:



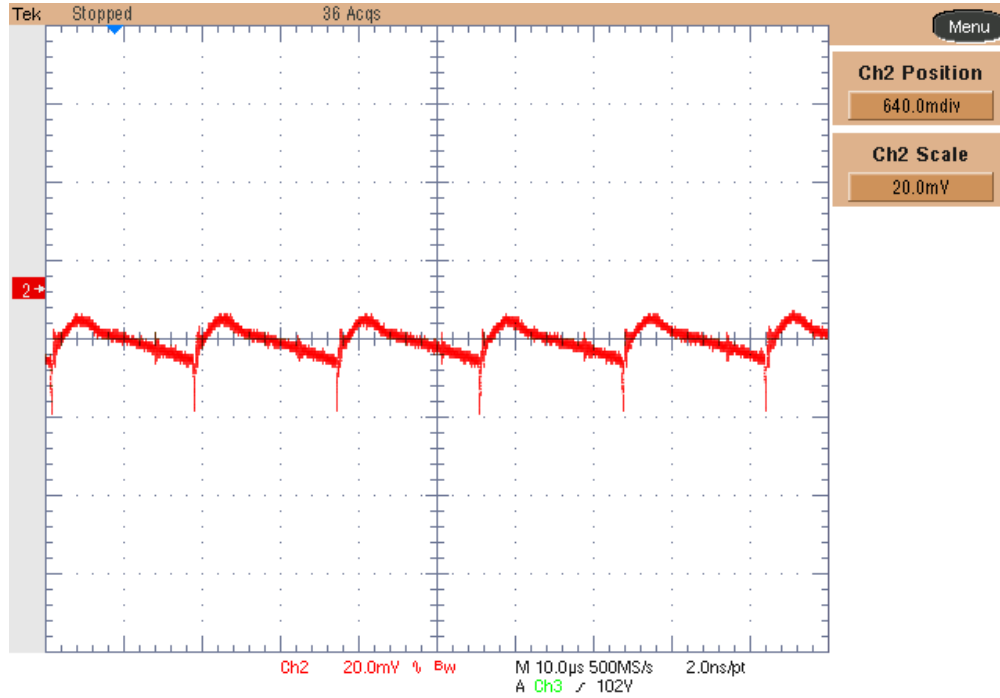
3 Output Ripple Voltage

The output ripple voltage is shown in the plots below. The input was set to 230Vdc and the output fully loaded.

Ch.2: Output Voltage (20mV/div, 400us/div, AC coupling, 20MHz BWL), $I_{out} = 1.5A$



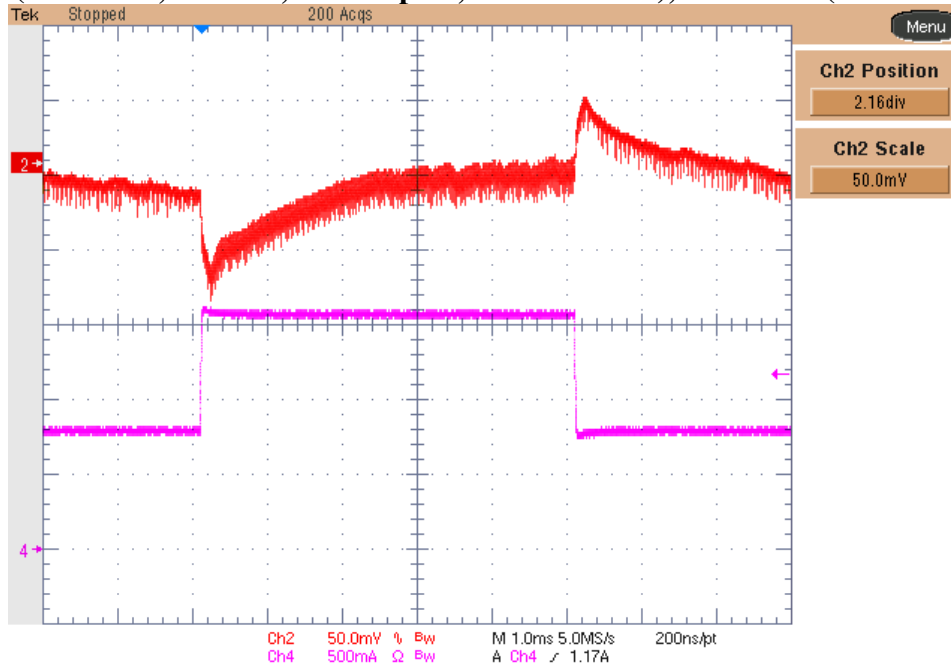
Same waveform but zoomed: time base = 10us/div.



4 Transient Response

The image below shows the transient response on the output voltage when the load has been switched between 800mA and 1.6A, at 320Vdc.

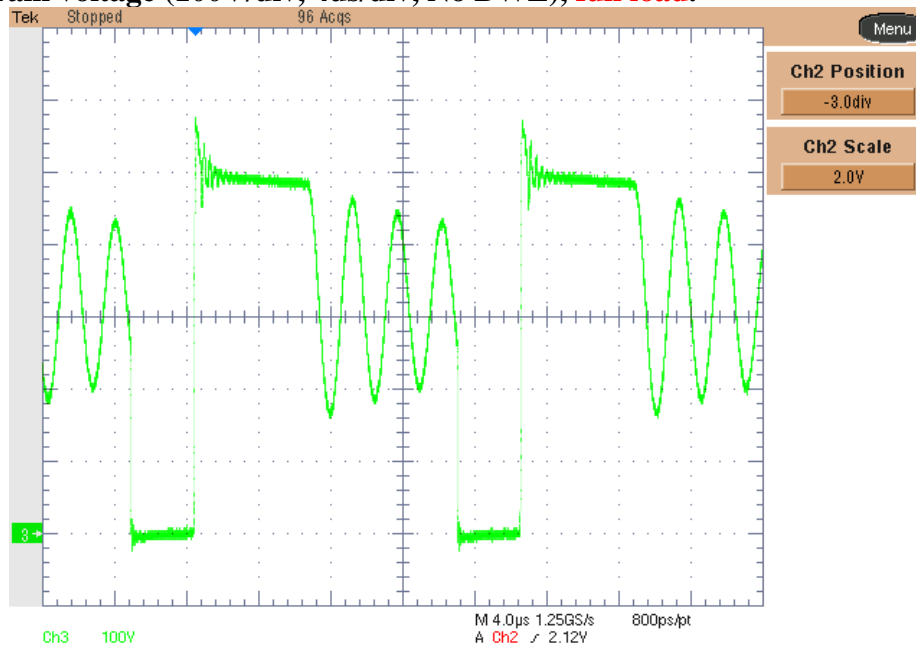
Ch2: Vout (50mV/div, 1ms/div, AC coupled, 20MHz BWL), Ch4: Iout (500mA/div)



5 Switching Node Waveform

The image below shows the peak voltage on the drain of the Mosfet Q1 with a 320Vdc and full load.

Ch3: Q1 Drain voltage (100V/div, 4us/div, No BWL), full load.



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