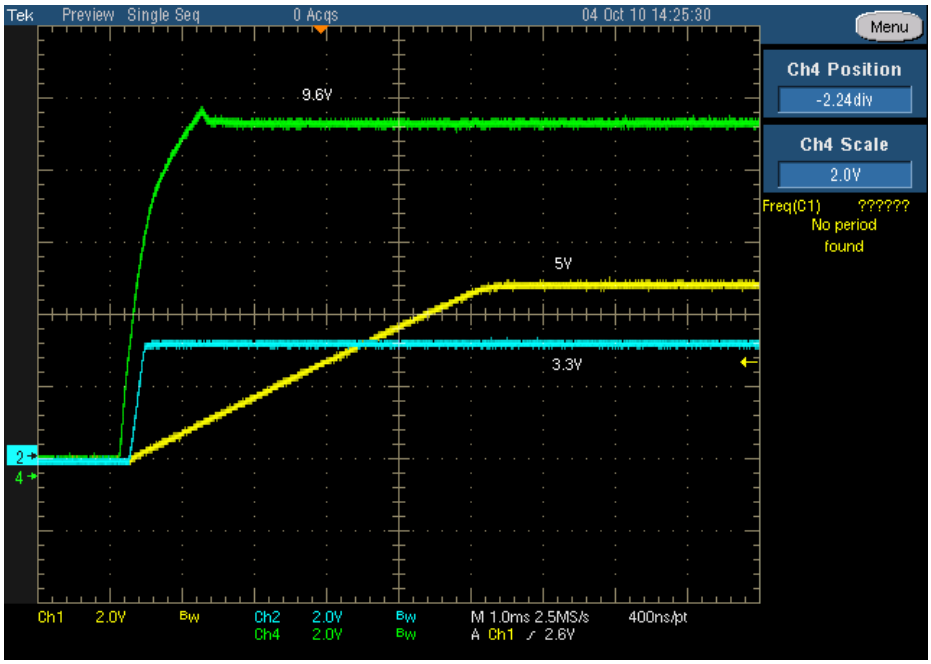
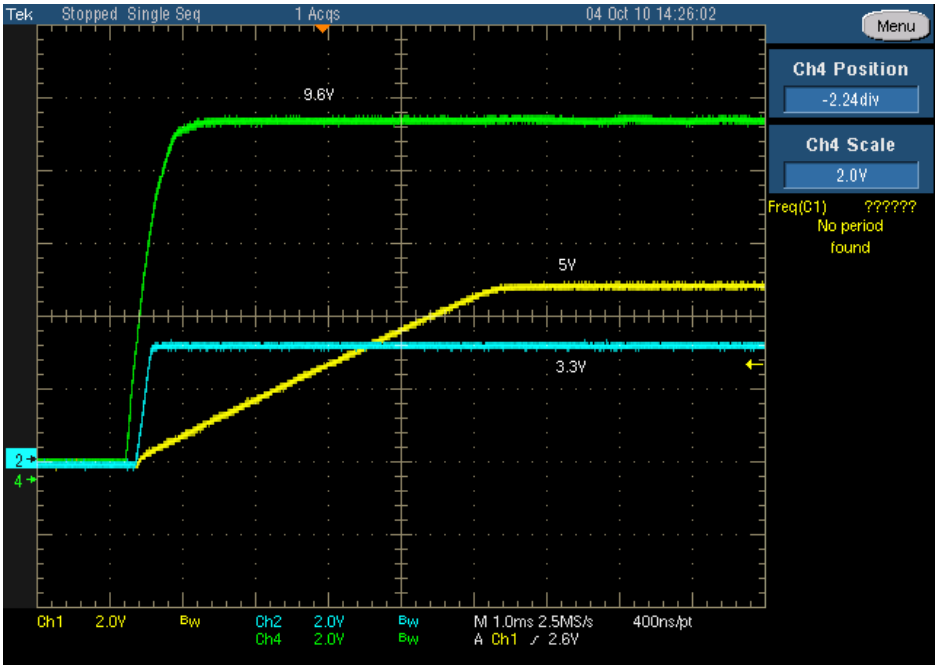
1. Startup

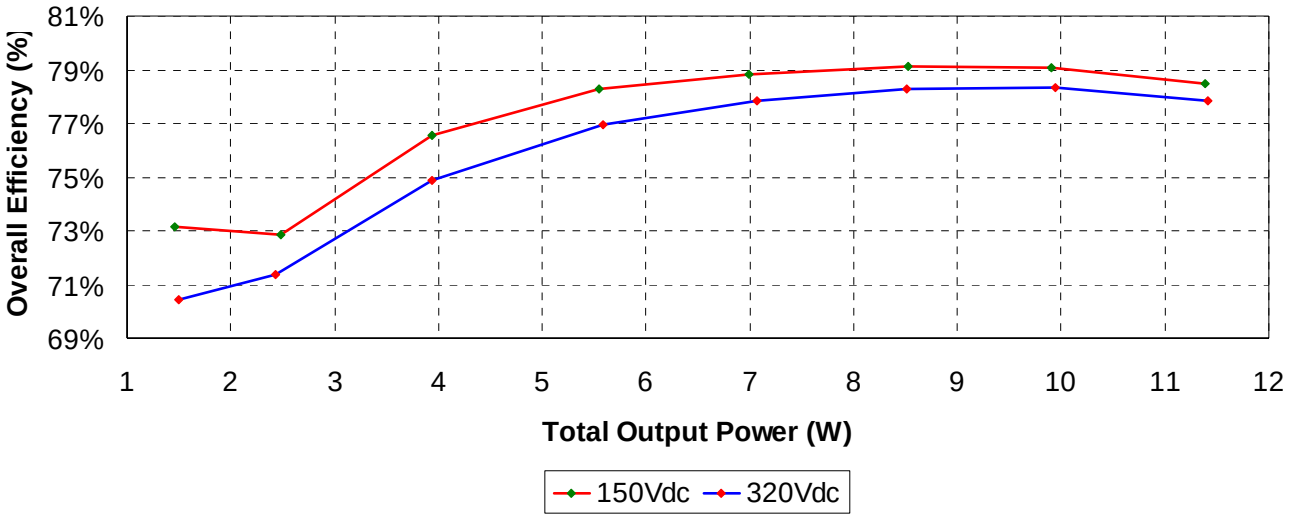
The output voltage at startup is shown in the images below. Input voltage was set to 150Vdc. All outputs were fully loaded (upper picture) and unloaded (lower picture).
Channel 1: 5V output (2 V/div, 1ms/div, DC coupled, 20MHz BW).
Channel 2: 3.3V output (2 V/div, 20MHz BW).
Channel 4: 9.6V output (2 V/div, 20MHz BW).





2. Efficiency

The efficiency data is shown in the tables and graph below. A DC source was set to 150Vdc and 320Vdc to obtain the best light load efficiency measurement. The output load was increased for all outputs at the same time.



Vin (V)	Iin (mA)	Pin (W)	9V6 (V)	9V6 load (mA)	5V0 (V)	5V0 load (mA)	3V3 (V)	3V3 load (mA)	Pout (W)	Ploss (W)	Eff
150	0.449	0.067	9.695	0.0	4.917	0.0	3.294	0.0	0.00	0.067	0.00%
150	13.35	2.00	9.694	100.4	4.911	100.0	3.295	0.0	1.46	0.538	73.13%
150	22.77	3.42	9.694	154.2	4.907	202.4	3.295	0.0	2.49	0.928	72.84%
150	34.3	5.15	9.694	202.9	4.906	402.1	3.295	0.0	3.94	1.205	76.57%
150	47.3	7.10	9.693	257.7	4.906	599.3	3.284	35.0	5.55	1.542	78.27%
150	59.1	8.87	9.693	303.1	4.906	801.7	3.284	35.0	6.99	1.879	78.80%
150	71.8	10.77	9.692	358.9	4.906	1004.1	3.284	35.0	8.52	2.250	79.10%
150	83.5	12.53	9.692	401.9	4.906	1201.0	3.283	35.0	9.90	2.623	79.06%
150	96.7	14.51	9.692	401.9	4.905	1503.0	3.283	35.0	11.38	3.123	78.47%

Vin (V)	Iin (mA)	Pin (W)	9V6 (V)	9V6 load (mA)	5V0 (V)	5V0 load (mA)	3V3 (V)	3V3 load (mA)	Pout (W)	Ploss (W)	Eff
320	0.308	0.099	9.695	0.0	4.917	0.0	3.295	0.0	0.00	0.099	0.00%
320	6.63	2.12	9.694	103.5	4.911	100.0	3.295	0.0	1.49	0.627	70.44%
320	10.63	3.40	9.694	149.3	4.907	199.7	3.295	0.0	2.43	0.974	71.36%
320	16.46	5.27	9.693	203.4	4.906	402.2	3.295	0.0	3.94	1.322	74.89%
320	22.69	7.26	9.693	259.9	4.906	601.9	3.285	35.0	5.59	1.674	76.95%
320	28.37	9.08	9.693	308.7	4.906	807.0	3.285	35.0	7.07	2.012	77.84%
320	33.97	10.87	9.692	356.4	4.906	1006.8	3.284	35.0	8.51	2.362	78.27%
320	39.67	12.69	9.692	404.7	4.906	1204.0	3.283	35.0	9.94	2.750	78.33%
320	45.80	14.66	9.691	404.7	4.905	1503.0	3.283	35.0	11.41	3.247	77.85%

3. Light Load Losses

The light load losses and efficiency data are shown in the two rows below.
The 5V output as well as the 9.6V was unloaded. Only the 3.3V output was loaded with 35mA.

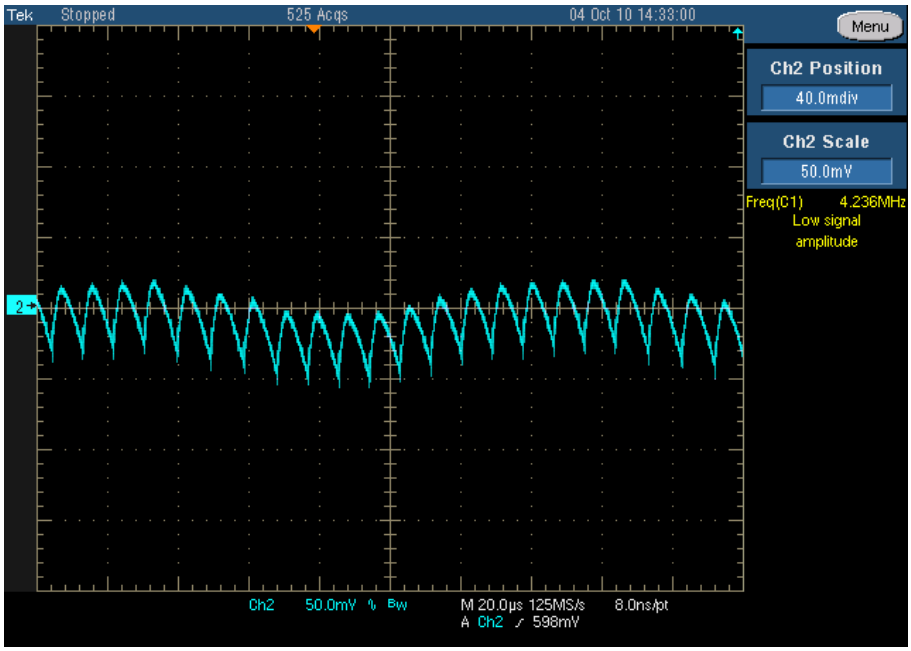
Iout 3.3V (mA)	Vout 3.3V (V)	Pout (W)	Vin (V)	Iin (mA)	Pin (W)	Ploss (W)	Eff
35.0	3.286	0.115	150	1.709	0.256	0.141	44.86%

Iout 3.3V (mA)	Vout 3.3V (V)	Pout (W)	Vin (V)	Iin (mA)	Pin (W)	Ploss (W)	Eff
35.0	3.286	0.115	320	0.907	0.290	0.175	39.63%

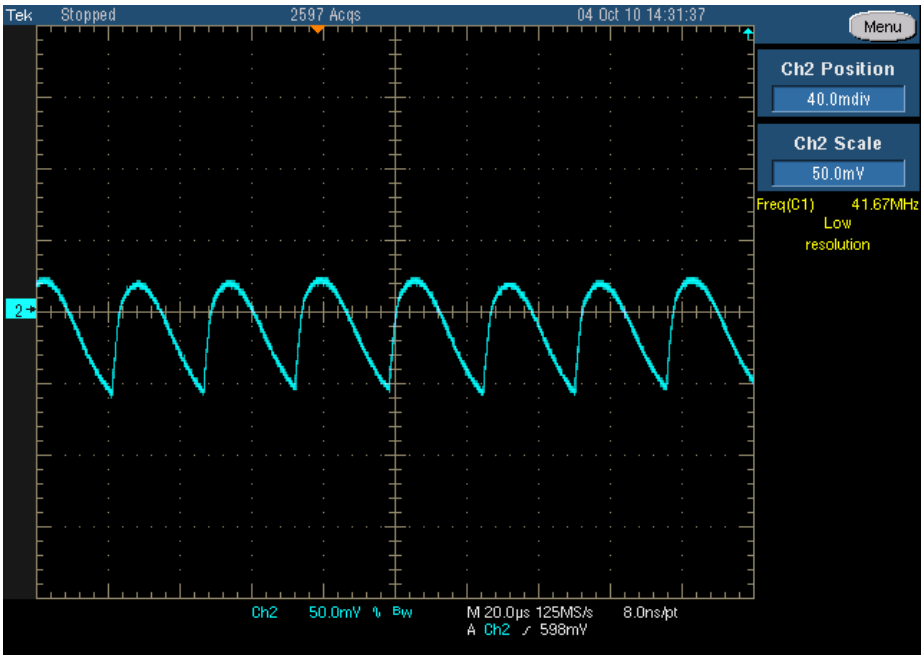
4. Output Ripple Voltage

The output ripple voltage for the three outputs is shown in the plots below. The input was set to 150Vdc.

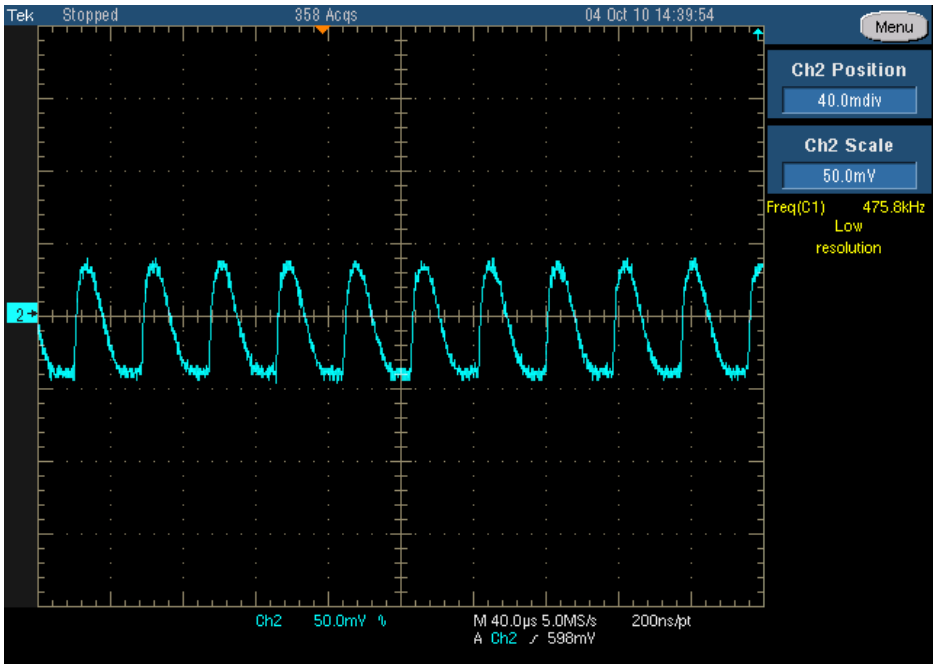
9.6V output ripple voltage in full load condition for all outputs.
Channel 2: 50mV/div, 20us/div, AC coupled, 20MHz BW



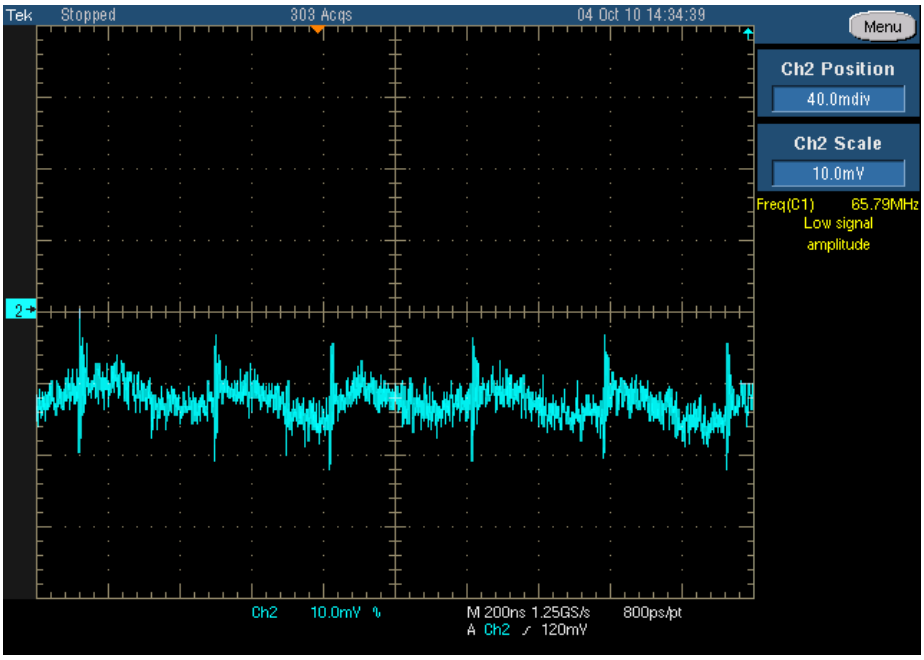
9.6V output ripple voltage in @ 400mA load and no load on 5V.



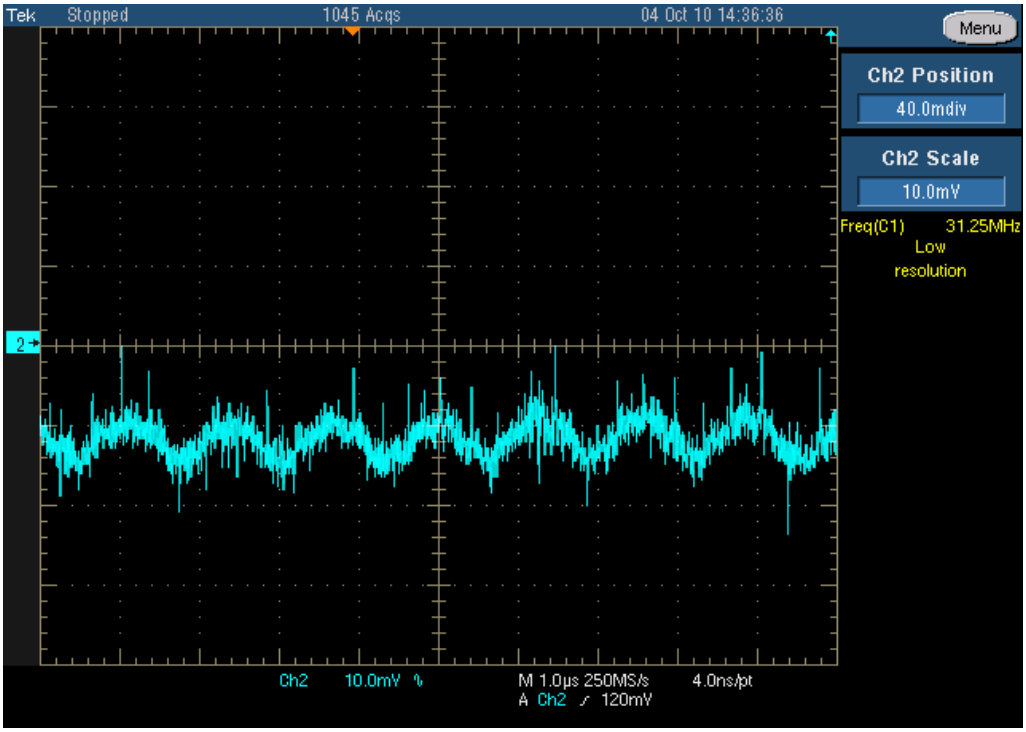
9.6V output ripple voltage WORST CASE @ 240mA load condition only, 320V DC input.
Channel 2: 50mV/div, 40us/div, AC coupled, 20MHz BW



5V output ripple voltage @ full load.
Channel 2: 10mV/div, 200ns/div, AC coupled, no BW limit.

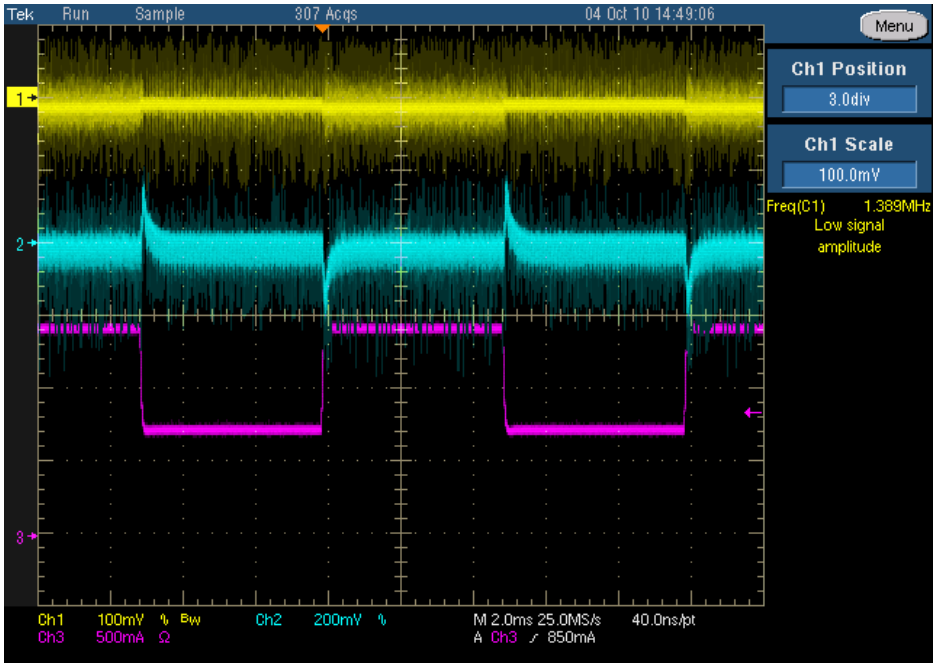


3.3V output ripple voltage @ full load.
Channel 2: 10mV/div, 1us/div, AC coupled, no BW limit.



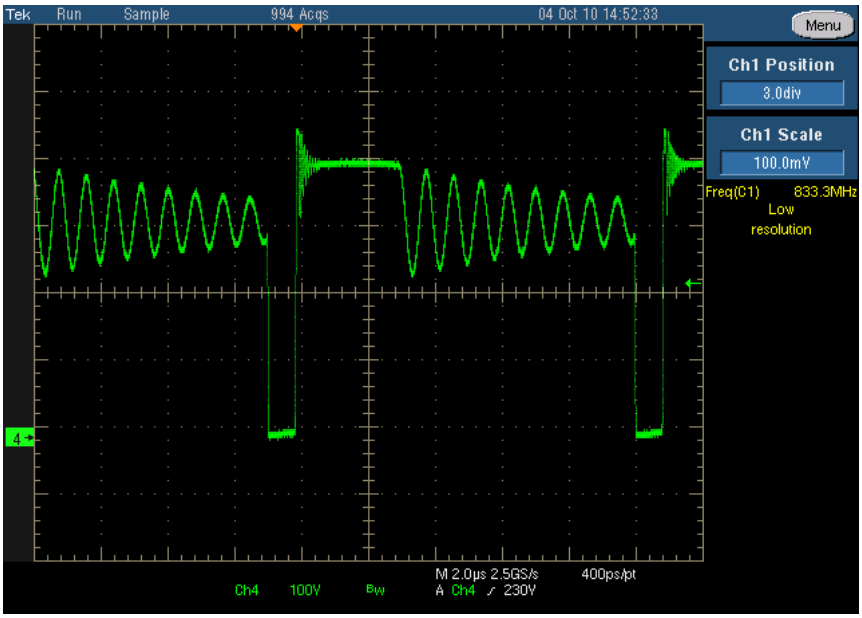
5. Load Transient

The image below shows the response of the 5V and 9.6V outputs due to a 50% to 100% load transient on the 5V output. The input voltage was set to 150Vdc.
Channel 1: 5Vout (ac coupled), 100mV/div, 2ms/div.
Channel 2: 9.6Vout, 200mV/div, Channel 3: Iout_5V, 500mA/div.

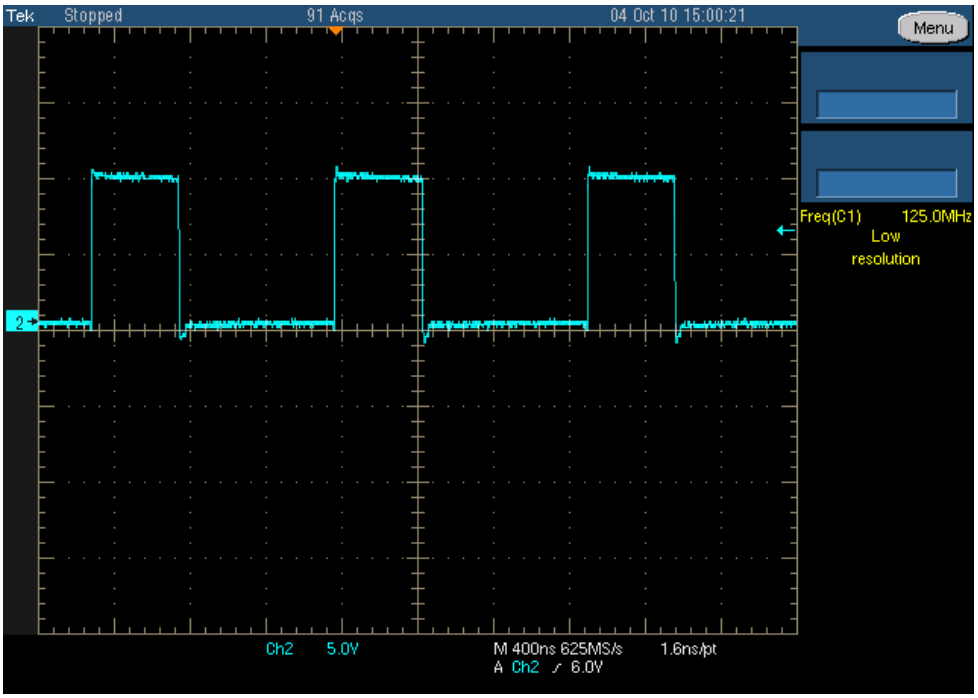


6. Switch-node

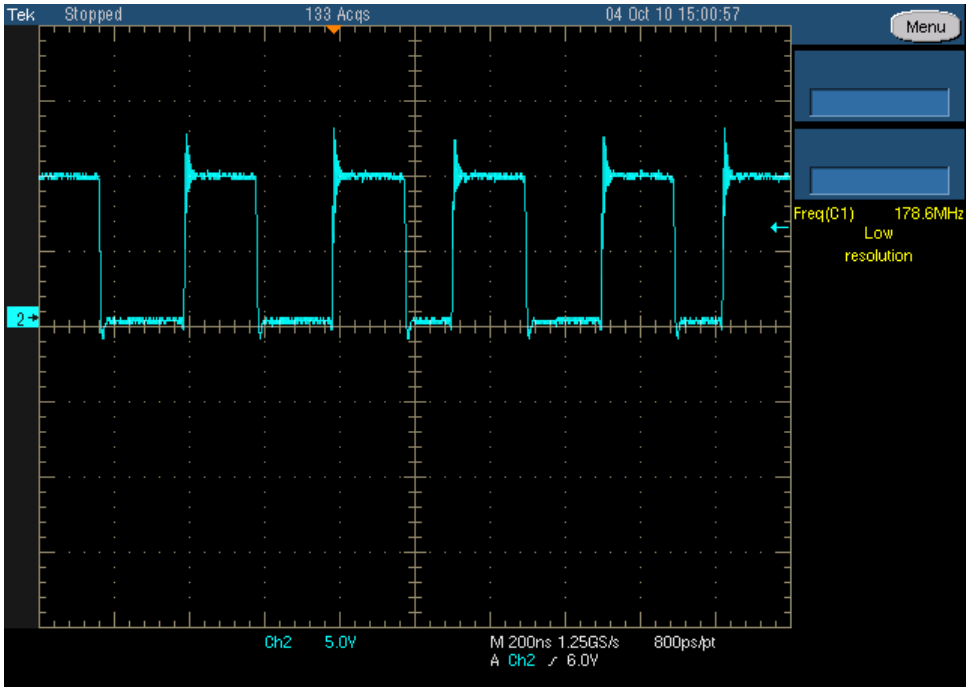
The image below shows the switch-node waveform at 320Vdc input and full load.
Channel 1: Vds (Q1) (100V/div, 2usec/div, 20MHz BW).



U1 Switch node (pin 7) @ full load.
Channel 2: 5V/div, 400ns/div, DC coupled, no BW limit.

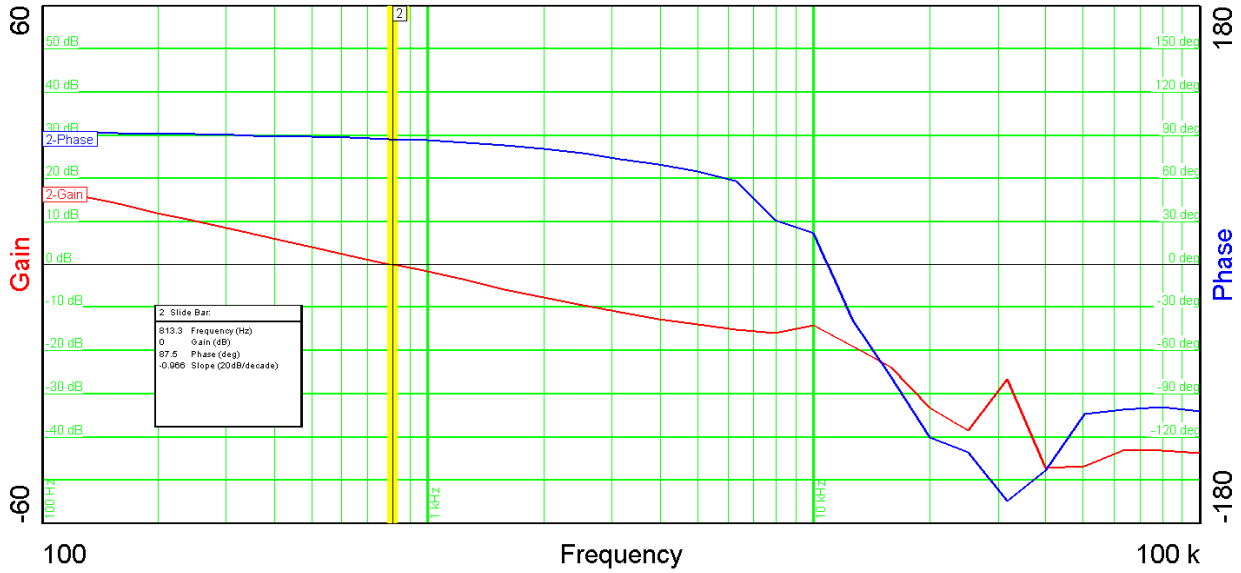


U3 Switch node (pin 1,2,3) @ full load.
Channel 2: 5V/div, 200ns/div, DC coupled, no BW limit.



7. Loop Response

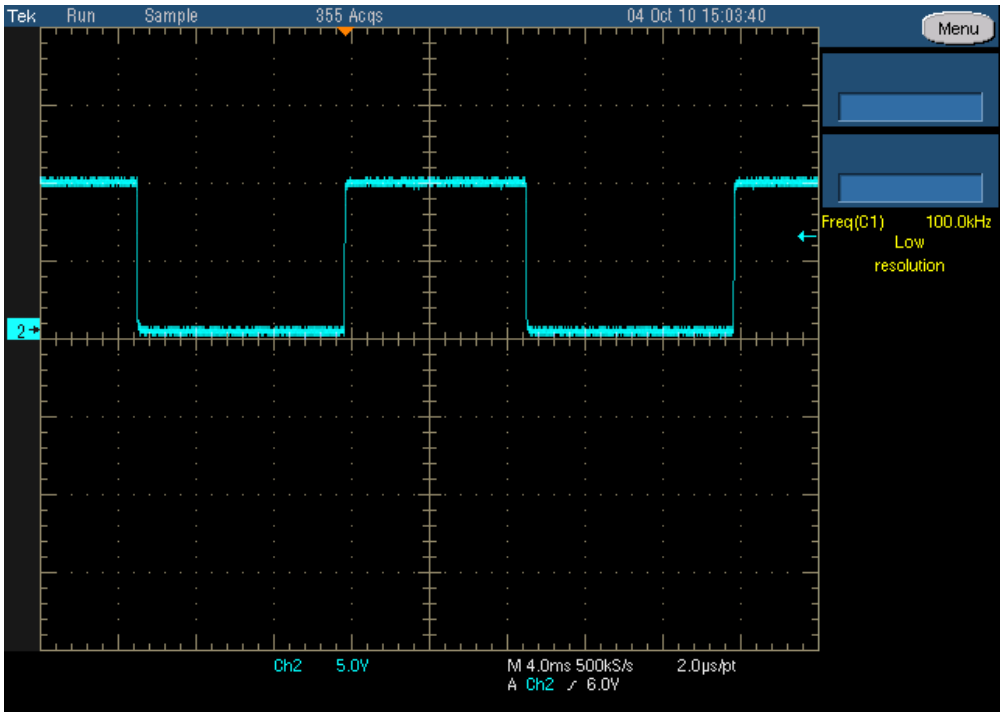
The image below shows the loop response of the converter measured with a 320Vdc input, and half load. Phase margin is 87.5 deg., the crossover frequency is 813.3 KHz and the gain margin is 17.72 dB.



8. AC Frequency Detection

The AC frequency detection was measured at 85VAC input and 265Vac.
The image below shows the TP22 signal at full load, and 230Vac input.

Channel 2: 5V/div, 4ms/div, DC coupled.



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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265