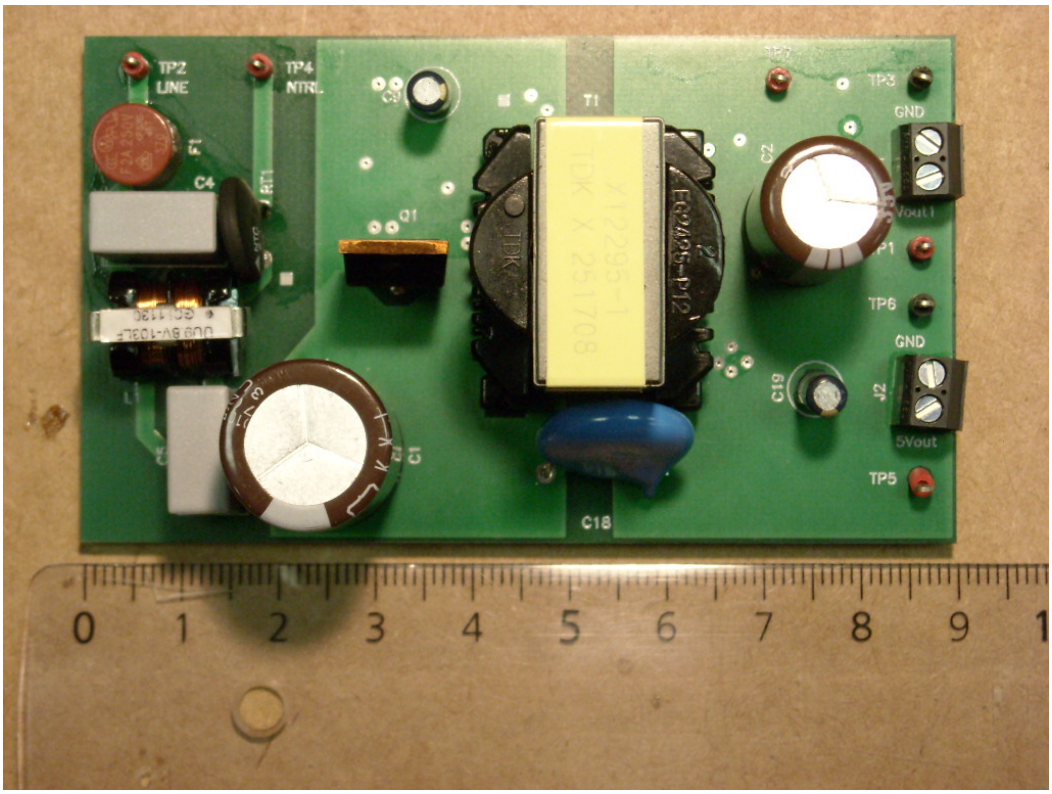
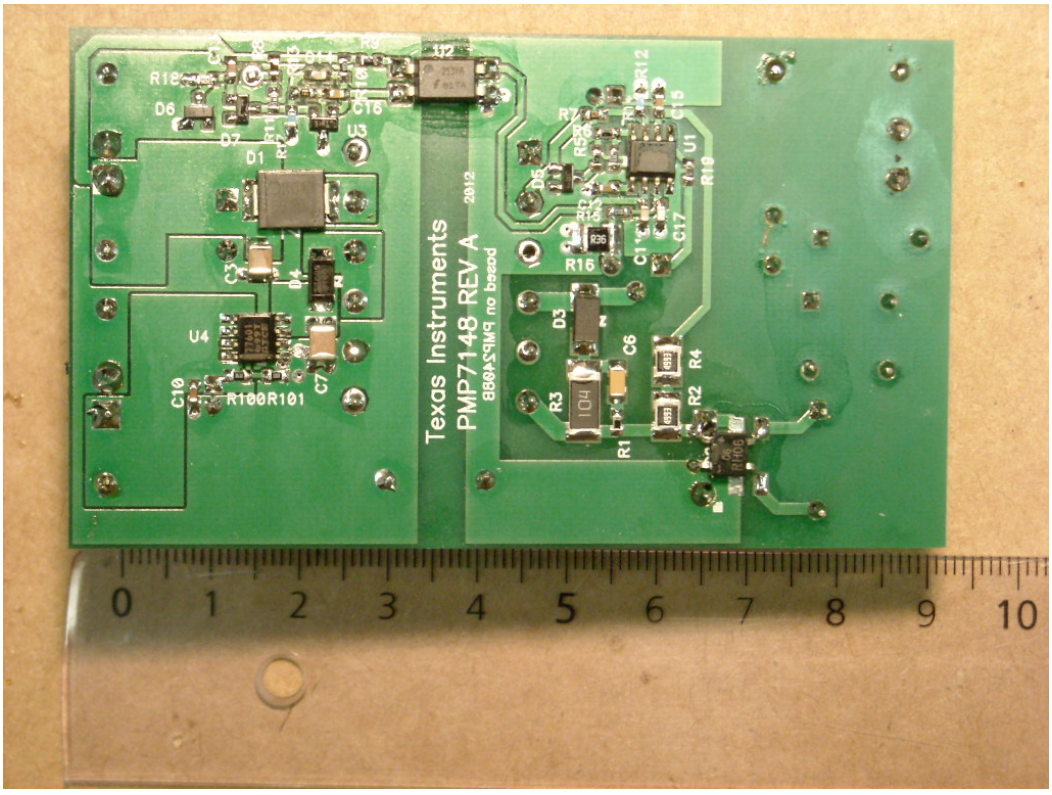
PHOTO OF THE PROTOTYPE

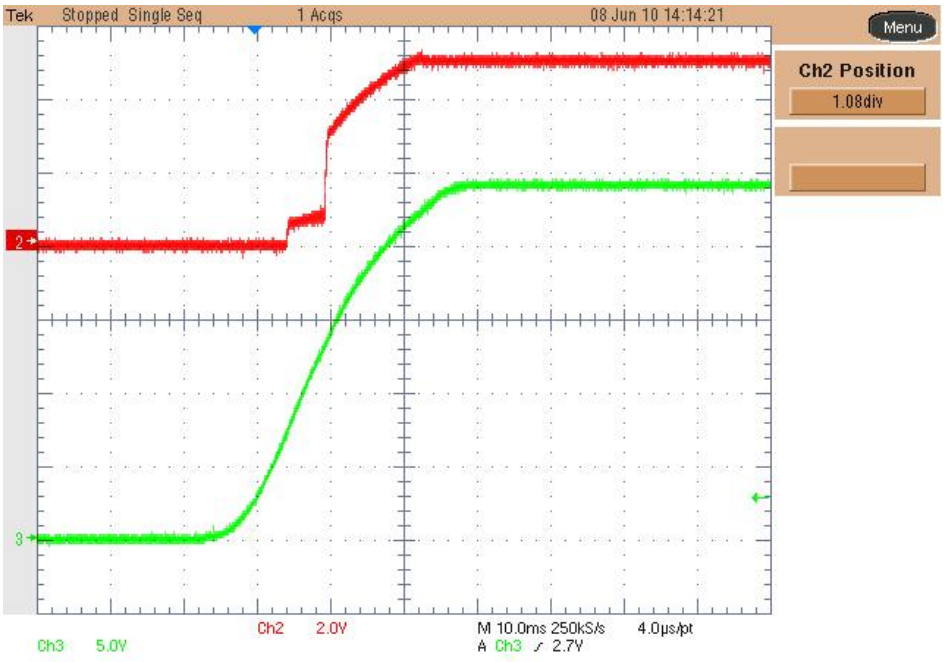


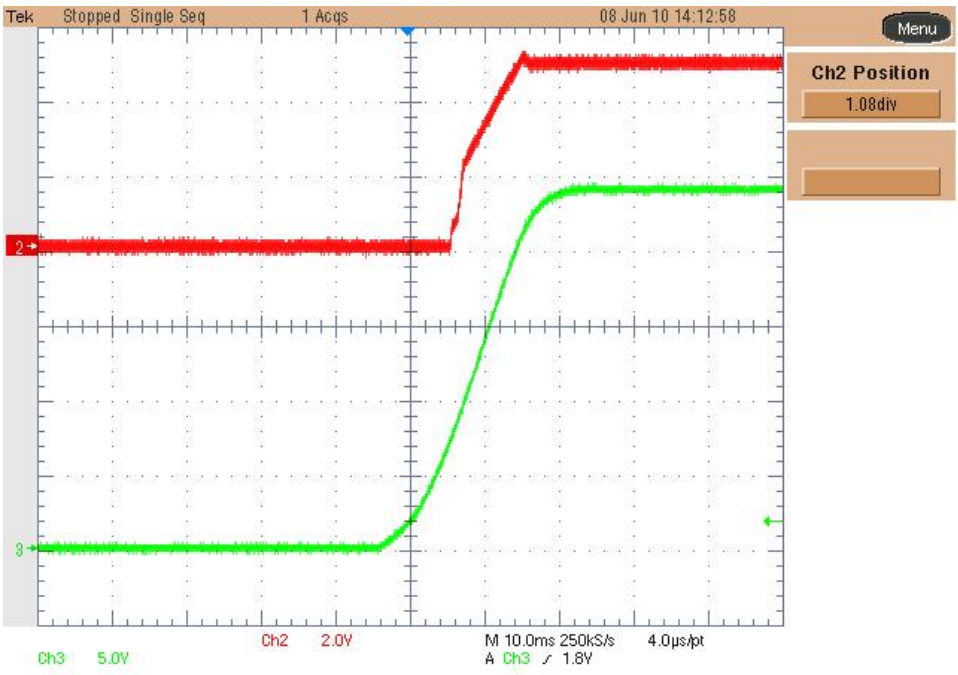


Data taken from PMP5536 Rev_A Test Report

1 Startup

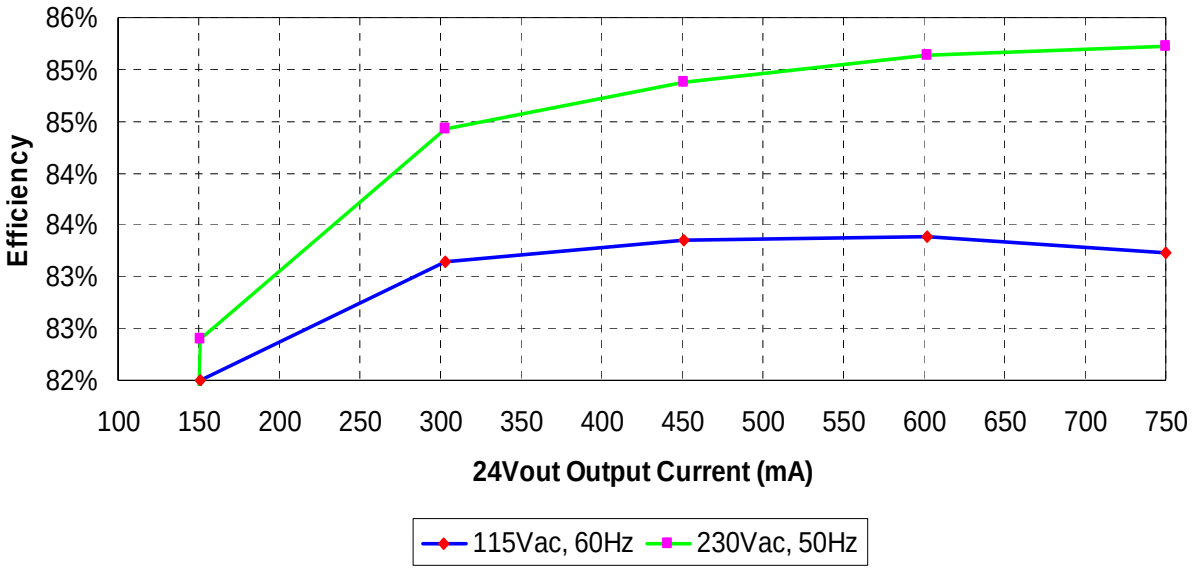
The output voltage at startup is shown in the images below. Input voltage was set to 230Vac. The output was loaded with full load (upper picture) and no load (lower picture).
Channel 2: 5V output (2 V/div, 10ms/div)
Channel 3: 24V output (5 V/div).





2 Efficiency

The efficiency data is shown in the tables and graph below. The power source was a California Instruments 2000 generator, supplying 115Vac, 60Hz and 230Vac, 50Hz. The power consumption was measured with a Yokogawa WT210 digital power meter.
The load has been changed evenly for the two outputs.

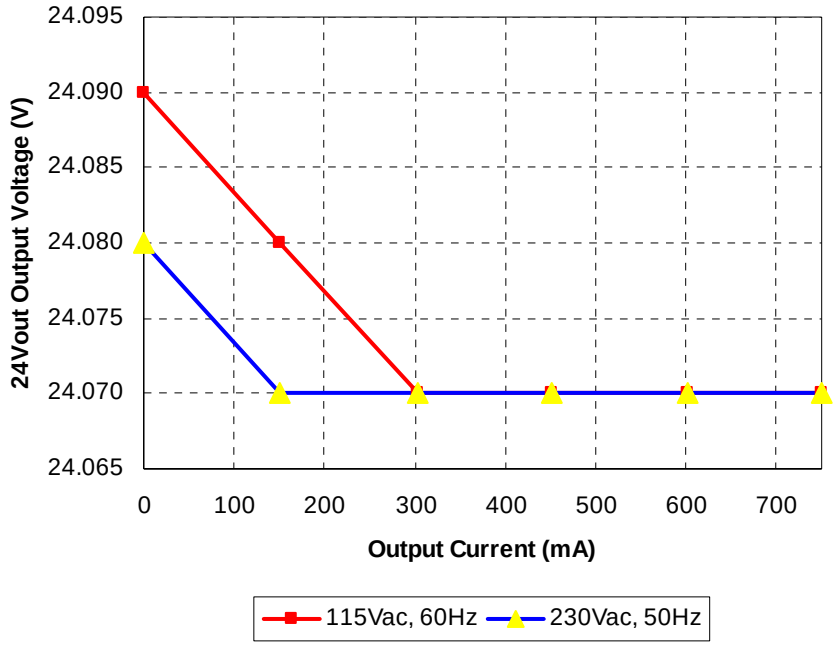


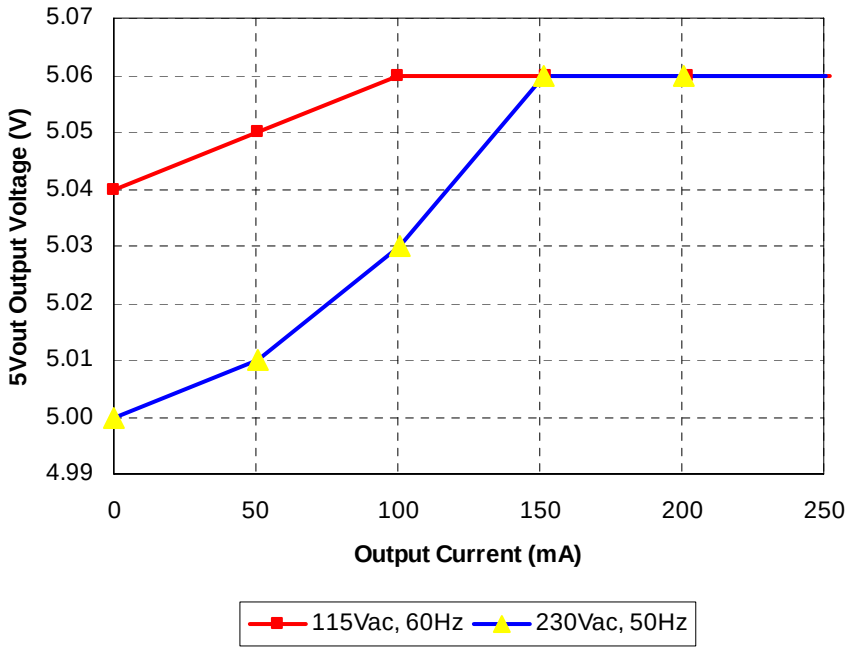
Pin (W)	Vin (Vac)	Vo_24 (V)	Io_24 (mA)	Vo_5 (V)	Io_5 (mA)	Pout (W)	Ploss (W)	Eff (%)
0.164	115	24.09	0.0	5.04	0.0	0.00	0.16	0.0%
4.756	115	24.08	151.3	5.05	50.8	3.90	0.86	82.0%
9.366	115	24.07	302.5	5.06	100.0	7.79	1.58	83.1%
13.942	115	24.07	450.8	5.06	152.2	11.62	2.32	83.4%
18.599	115	24.07	601.9	5.06	202.0	15.51	3.09	83.4%
23.231	115	24.07	750.3	5.06	251.8	19.33	3.90	83.2%

Pin (W)	Vin (Vac)	Vo_24 (V)	Io_24 (mA)	Vo_5 (V)	Io_5 (mA)	Pout (W)	Ploss (W)	Eff (%)
0.237	230	24.08	0.0	5.00	0.0	0.00	0.24	0.0%
4.729	230	24.07	151.3	5.01	50.8	3.90	0.83	82.4%
9.225	230	24.07	302.5	5.03	100.8	7.79	1.44	84.4%
13.687	230	24.07	450.8	5.06	151.4	11.62	2.07	84.9%
18.210	230	24.07	601.9	5.06	201.0	15.50	2.71	85.1%
22.680	230	24.07	750.3	5.06	250.5	19.33	3.35	85.2%

3 Output Voltage Regulation

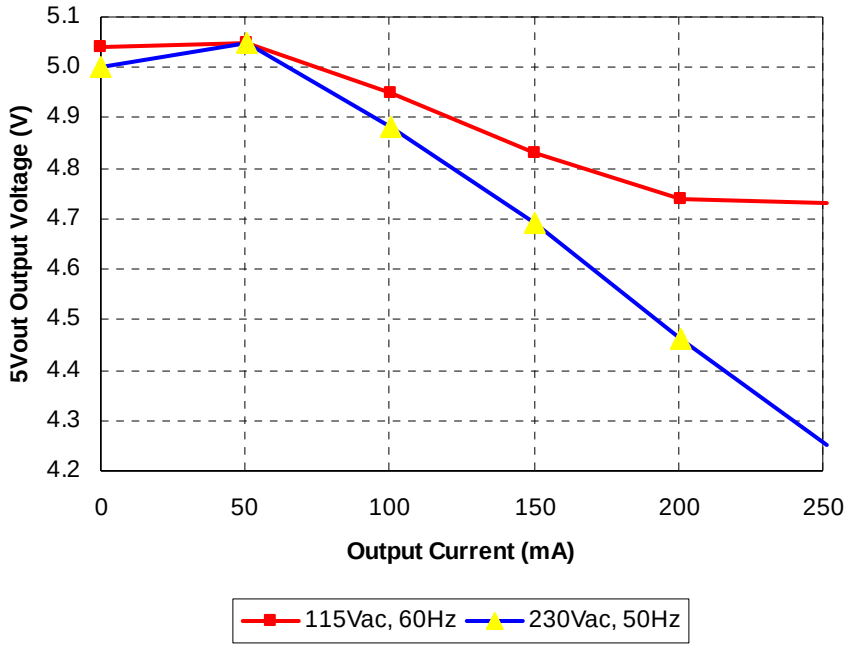
The output voltage versus load current is described in the following graphs and tables. The load has been increased for both outputs at the same time.





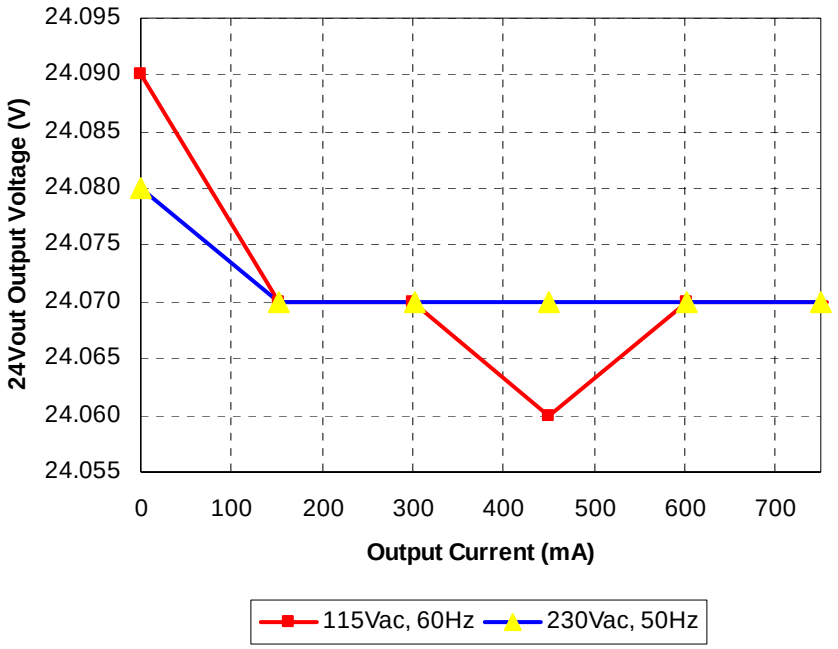
4 Cross Regulation

The output voltage versus load current and the cross regulation is described in the following graphs and tables. The graph that shows the 5Vout behavior was taken at the minimum load that must be present to the 24V output. If this load is higher (for example in the last row it is 240mA) than 200mA, then there was no drop on the 5Vout.



Vin (Vac)	Vo_24 (V)	Io_24 (mA)	Vo_5 (V)	Io_5 (mA)
115	24.09	0.0	5.04	0.0
115	24.07	205.4	5.05	50.8
115	24.07	205.4	4.95	100.7
115	24.07	205.4	4.83	150.5
115	24.07	205.4	4.74	200.8
115	24.07	205.4	4.73	251.7

Vin (Vac)	Vo_24 (V)	Io_24 (mA)	Vo_5 (V)	Io_5 (mA)
230	24.08	0.0	5.00	0.0
230	24.07	202.6	5.05	50.8
230	24.07	202.6	4.88	100.7
230	24.07	202.6	4.69	150.5
230	24.07	202.6	4.46	200.8
230	24.07	202.6	4.25	251.7
230	24.07	240.0	5.06	252.0

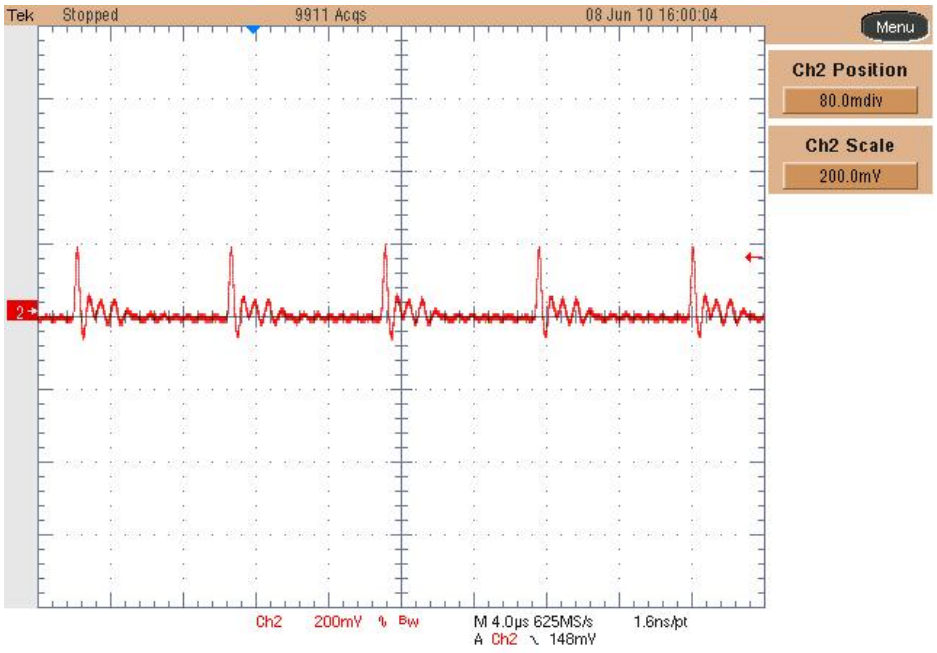


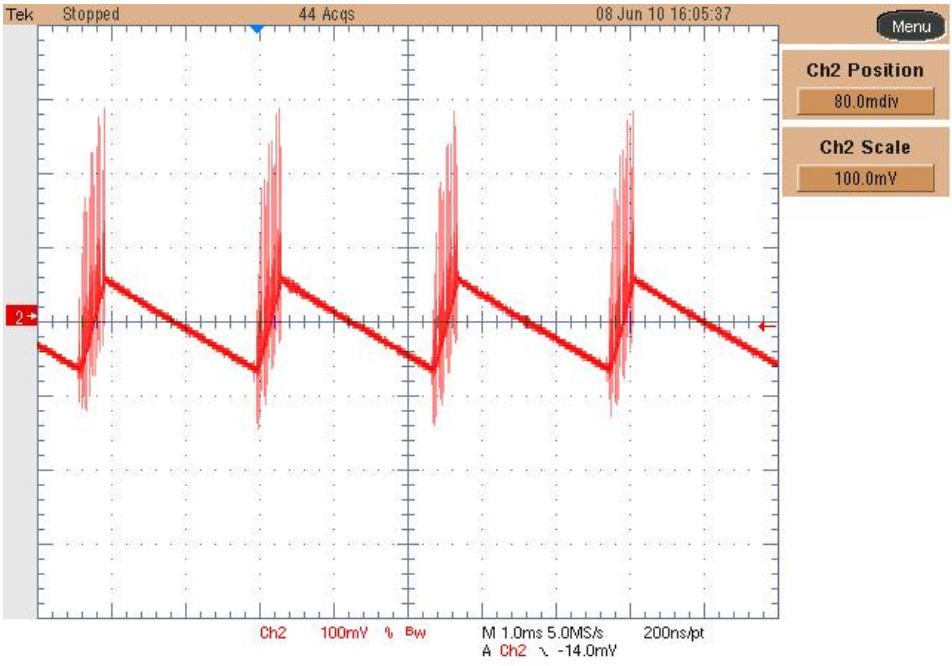
Vin (Vac)	Vo_24 (V)	Io_24 (mA)	Vo_5 (V)	Io_5 (mA)
115	24.09	0.0	5.06	0.0
115	24.07	151.4	5.06	0.0
115	24.07	300.0	5.06	0.0
115	24.06	451.0	5.06	0.0
115	24.07	602.2	5.06	0.0
115	24.07	756.0	5.06	0.0

Vin (Vac)	Vo_24 (V)	Io_24 (mA)	Vo_5 (V)	Io_5 (mA)
230	24.08	0.0	5.06	0.0
230	24.07	151.3	5.06	0.0
230	24.07	302.5	5.06	0.0
230	24.07	450.8	5.06	0.0
230	24.07	602.0	5.06	0.0
230	24.07	750.3	5.06	0.0

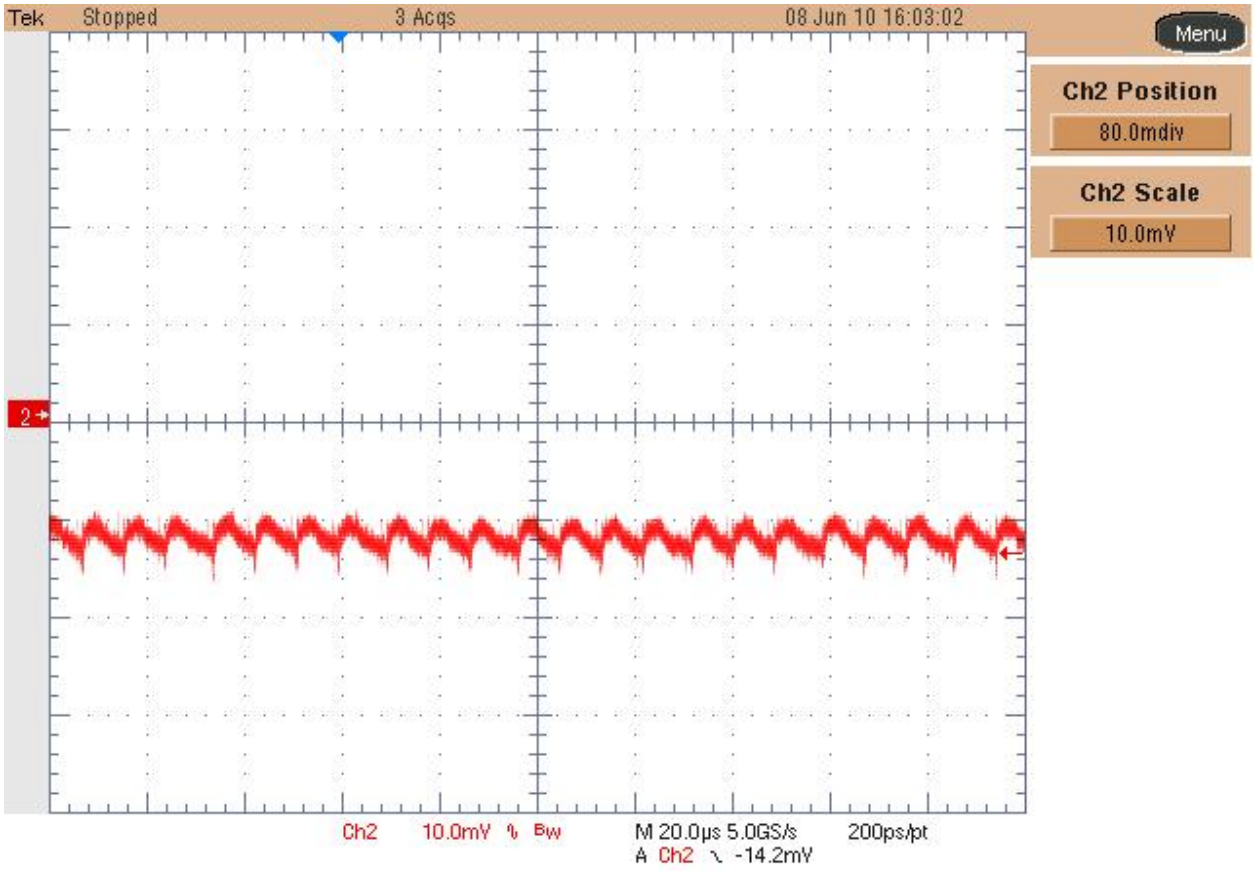
Output Ripple Voltage

The output ripple voltage is shown in the plots below. The input was set at 230Vac, 50Hz; the 5V was fully loaded, the 24Vout was loaded with 0.7A (upper picture) and 50mA (lower picture).
Channel 2: 24V output (200mV/div, top, 100mV, bottom, AC coupled, Bw=20MHz)



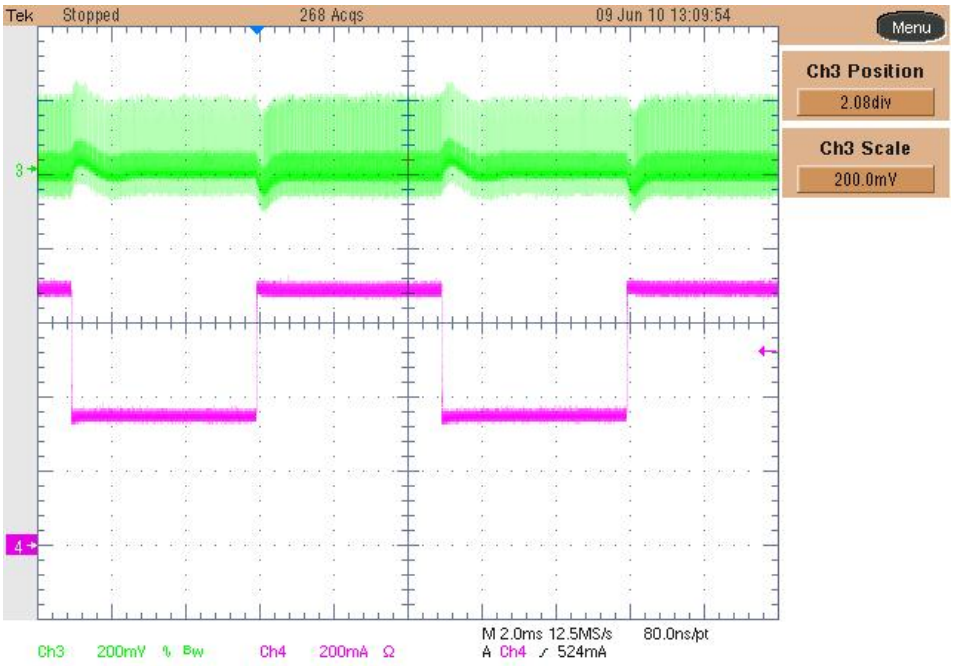


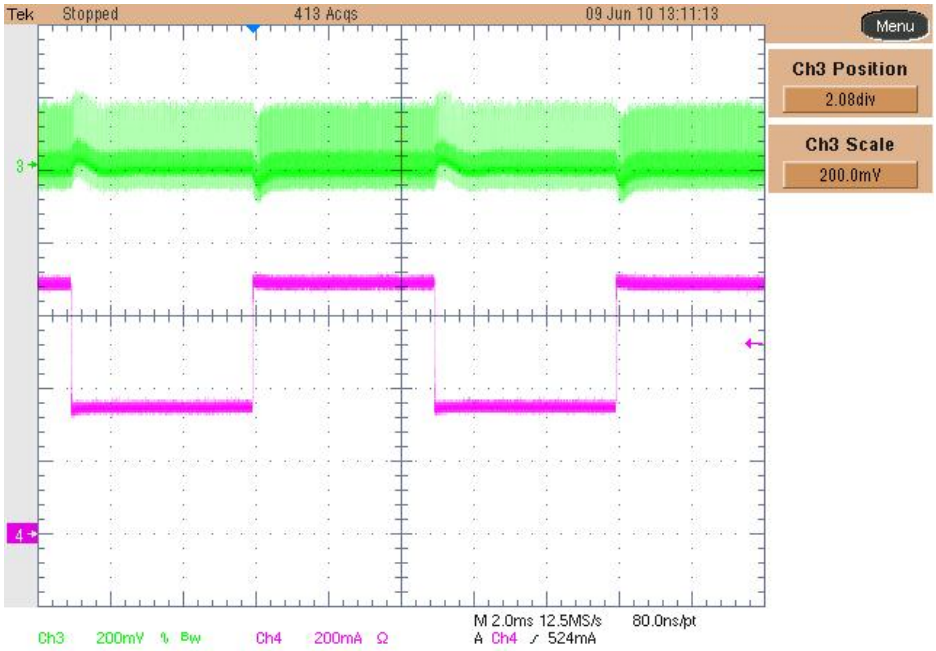
The output ripple voltage on the 5V output has been measured with the 24Vout fully loaded, and with Vin=230Vac, 50Hz.
Channel 2: 5V output (10mV/div, AC coupled, Bw=20MHz, 20us/div)



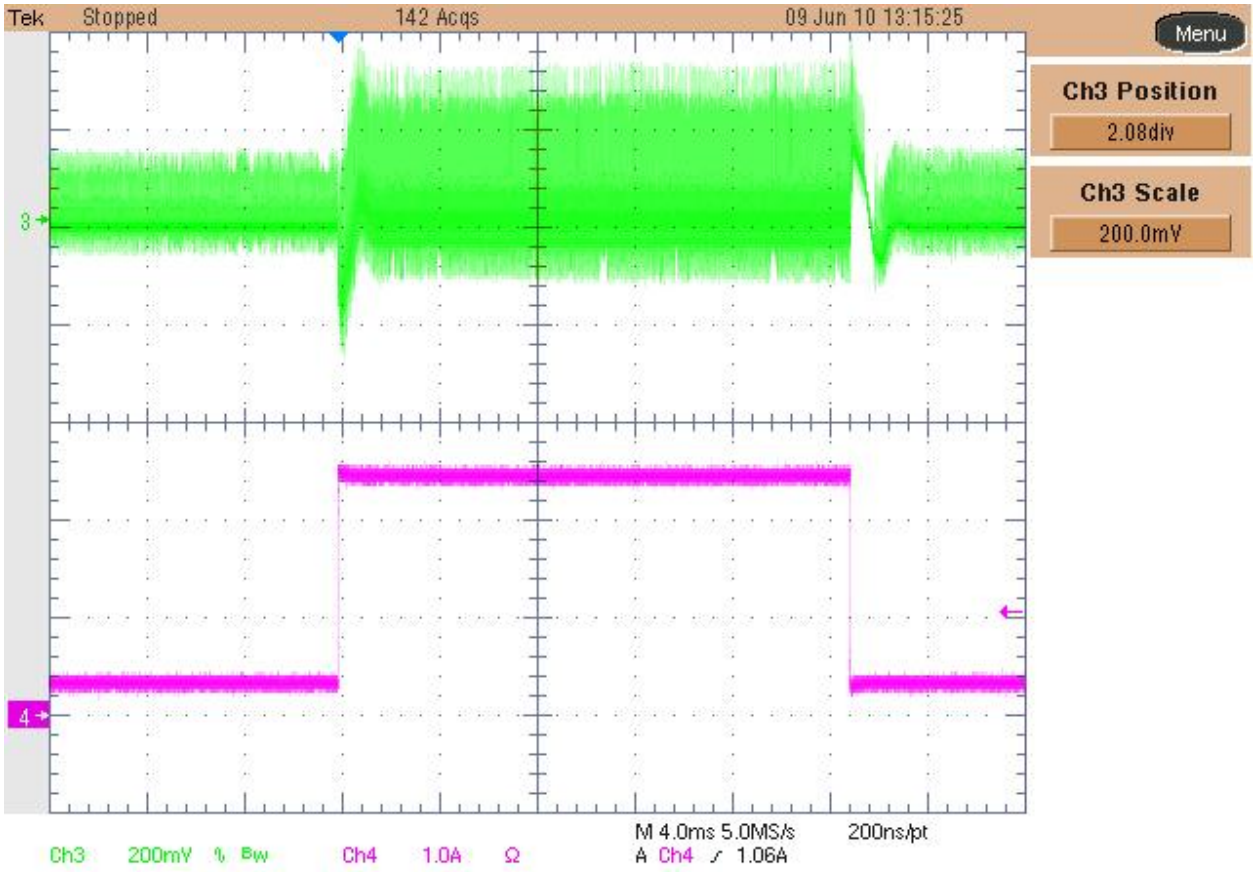
5 Load Transient

The images below show the response of a 50% to 100% load transient on the 24V output voltage. Vin was set to 115Vac, 60Hz for the upper picture and 230Vac, 50Hz for the lower one. Channel 3: 24Vout (ac coupled) 200mV/div, Channel 4: Iout 200mA/div, 2ms/div.



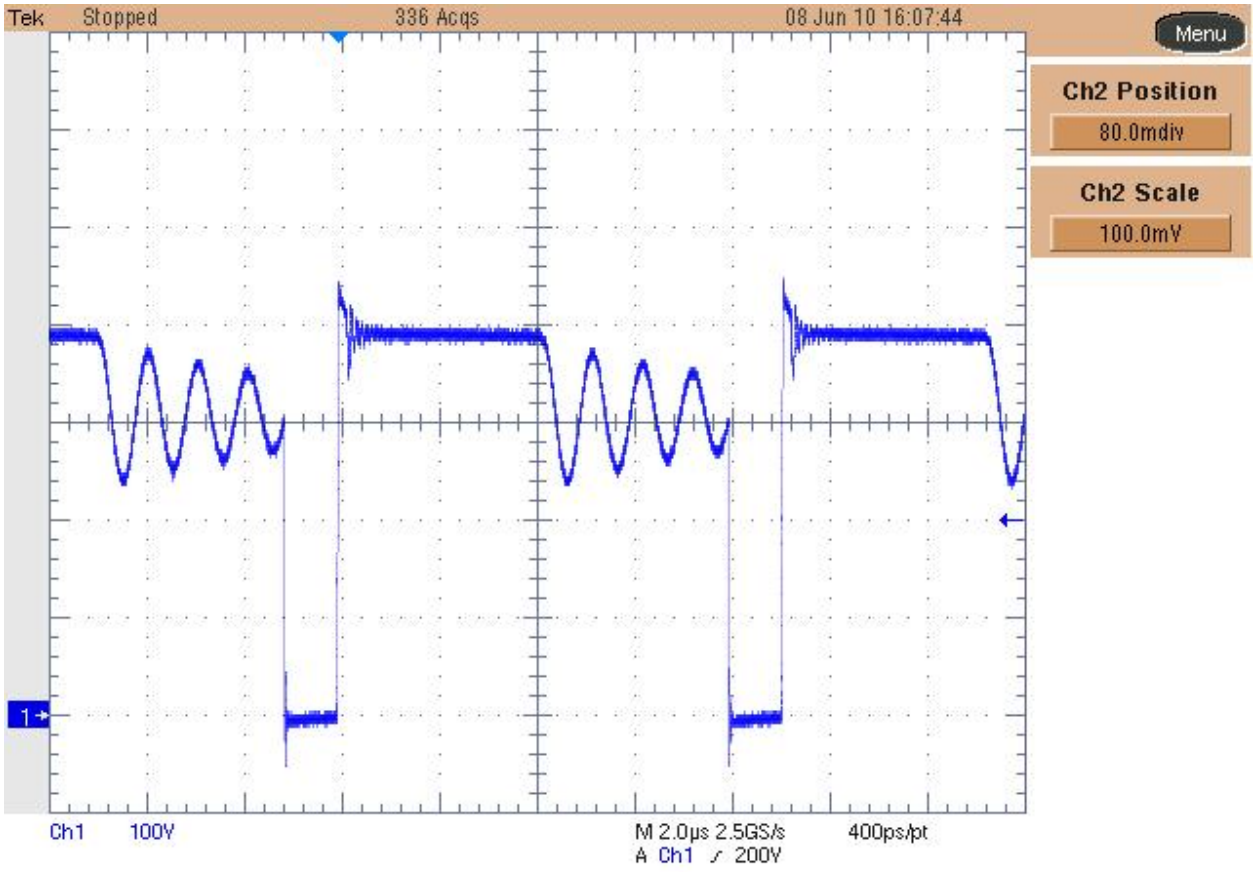


Here the transient current was increased to 2.5A, starting from 350mA, while the 5Vout was loaded with 250mA. The input voltage was 230Vac. The transient time was set to 20msec with a duty cycle of 10%.
Channel 3: 24Vout (ac coupled) 200mV/div, Channel 4: Iout 1A/div, 4ms/div.



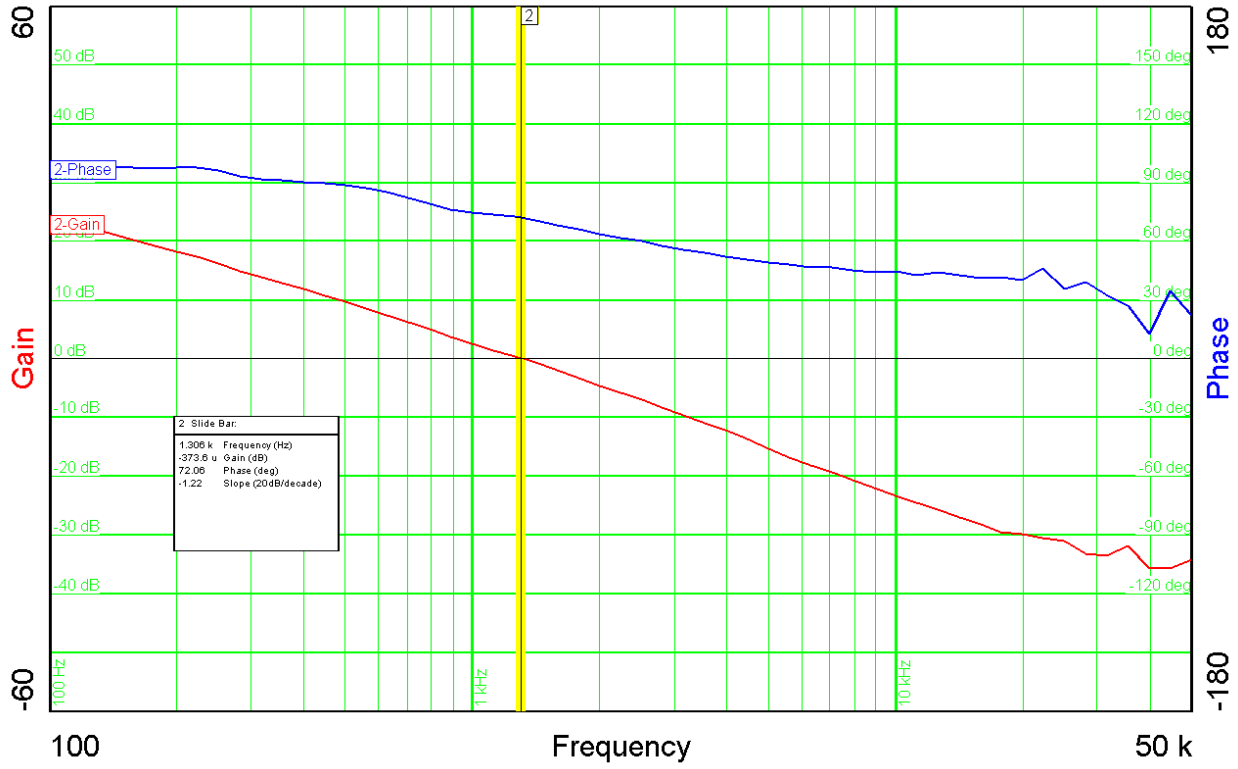
6 Switch-node

The image below shows the switch-node waveform (Q1 Mosfet's drain). The input voltage was set to 230Vac during a full load condition on both outputs.
Channel 1: Vds, 100V/div, 2us/div, no bandwidth limit.



7 Loop Response

The image below shows the loop response of the converter measured with a 320Vdc input, and full load. Phase margin is 72.06 deg. and crossover frequency is 1.306 KHz.



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