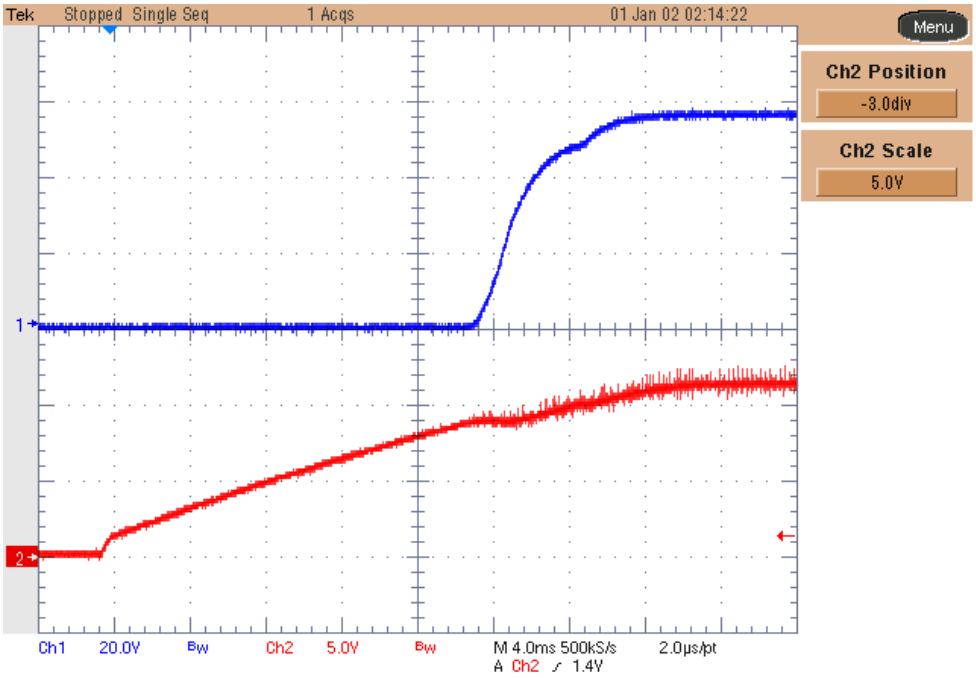
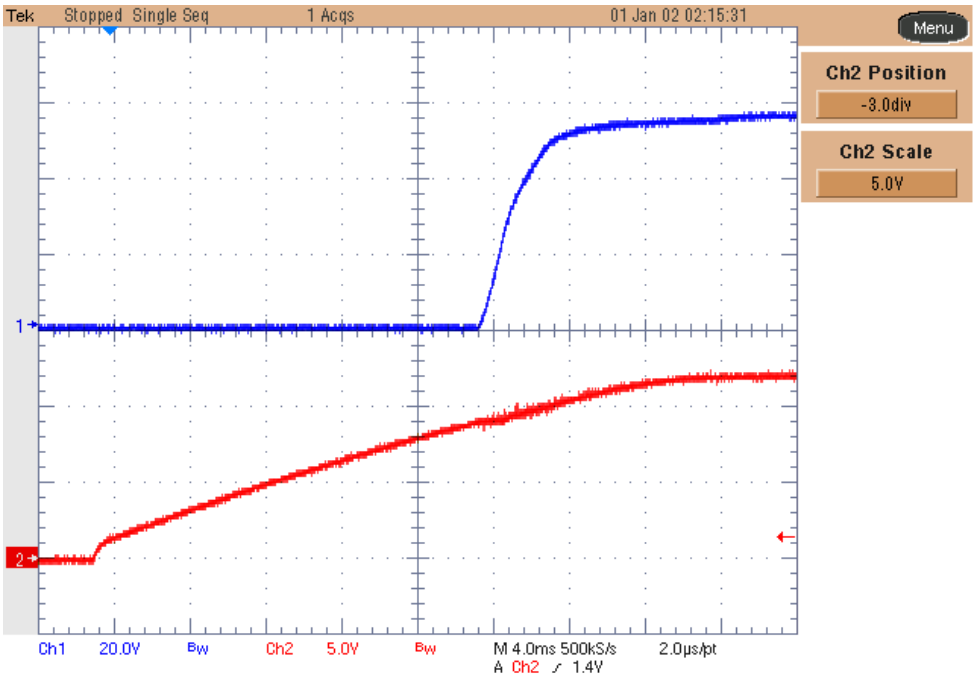
1. Startup

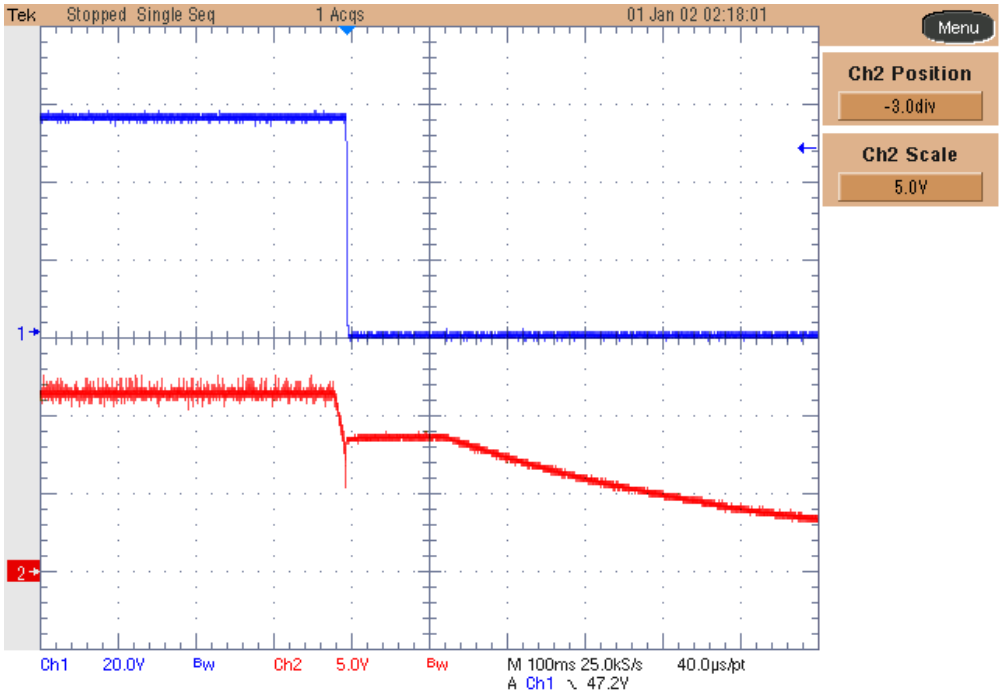
The output and input voltages at startup are shown in the images below. The input voltage was set to 12V. The load was set to full power (upper picture) and no power (lower picture).
Channel 1: Output Voltage (20 V/div, 4msec/div, 20MHz BWL).
Channel 2: Input Voltage (5 V/div, 20MHz BWL).

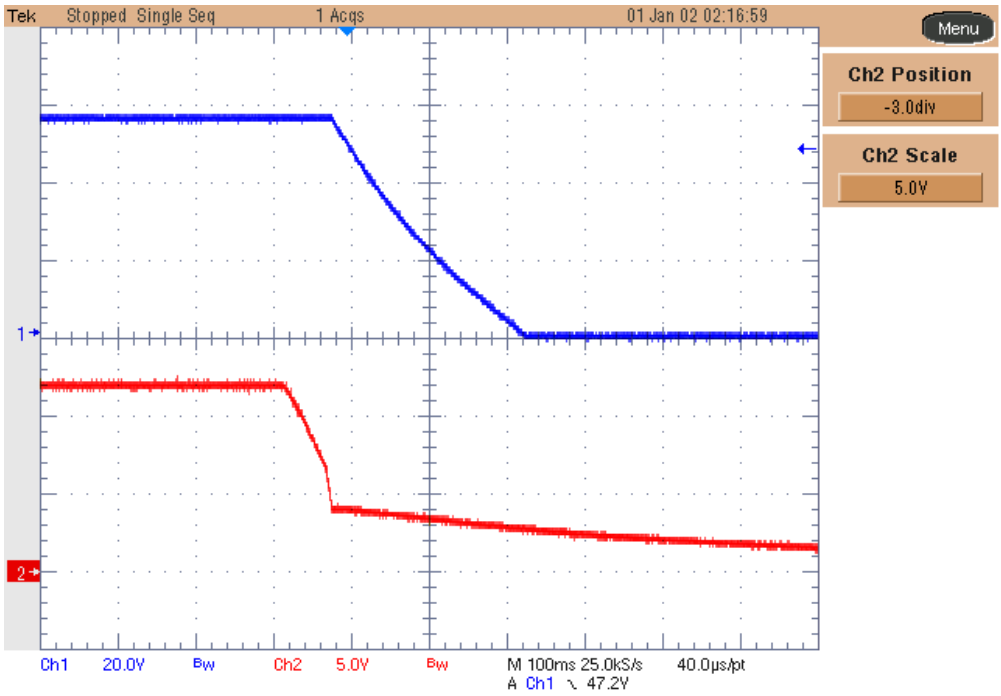




2. Shutdown

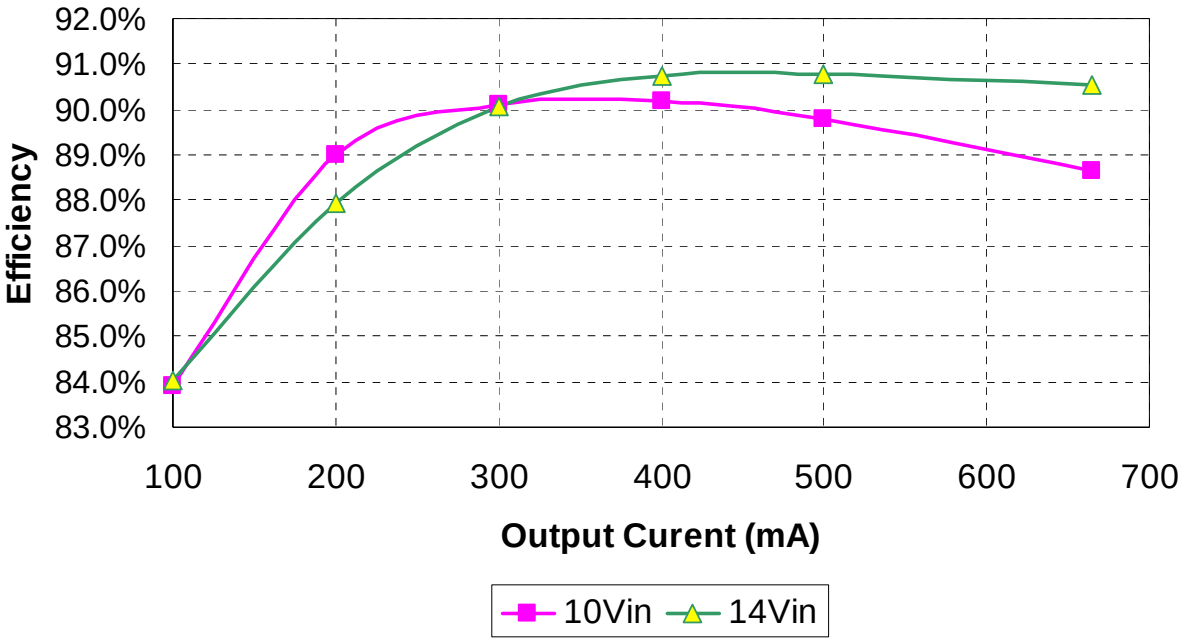
The main supply has been turned OFF, resulting in the behavior below. The input voltage was unmodified. The load was set to full power (upper picture) and no power (lower picture).
Channel 1: Output Voltage (20 V/div, 100msec/div, 20MHz BWL).
Channel 2: Input Voltage (5 V/div, 20MHz BWL).





3. Efficiency

The efficiency data is shown in the tables and graph below.
The measurements were taken at 10Vin and 14Vin.

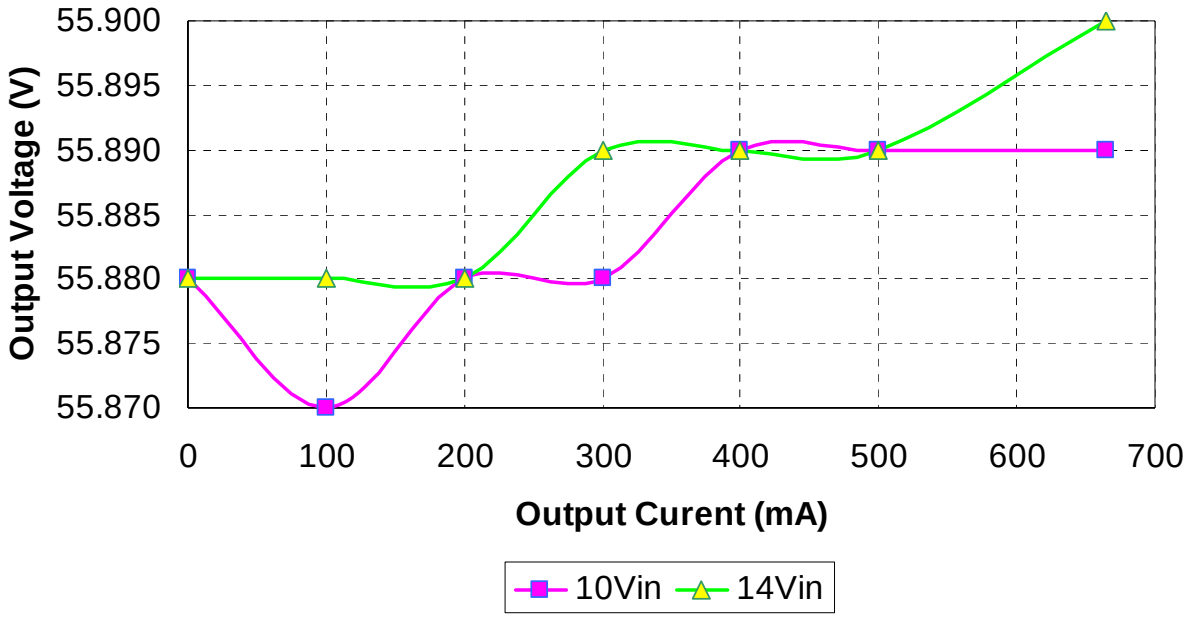


Iout (mA)	Vout (V)	Pout (W)	Iin (mA)	Vin (V)	Pin (W)	Ploss (W)	Eff. (%)
0.0	55.88	0.00	56.2	10.064	0.57	0.57	0.0%
100.3	55.87	5.60	665.9	10.030	6.68	1.08	83.9%
200.2	55.88	11.19	1256	10.009	12.57	1.38	89.0%
300.1	55.88	16.77	1860	10.007	18.61	1.84	90.1%
400.0	55.89	22.36	2479	10.000	24.79	2.43	90.2%
499.8	55.89	27.93	3110	10.002	31.11	3.17	89.8%
664.4	55.89	37.13	4182	10.016	41.89	4.75	88.7%

Iout (mA)	Vout (V)	Pout (W)	Iin (mA)	Vin (V)	Pin (W)	Ploss (W)	Eff. (%)
0.0	55.88	0.00	46.7	14.00	0.65	0.65	0.0%
100.5	55.88	5.62	477.0	14.01	6.68	1.07	84.0%
200.3	55.88	11.19	909	14.01	12.73	1.54	87.9%
300.2	55.89	16.78	1329	14.02	18.63	1.85	90.0%
400.0	55.89	22.36	1760	14.00	24.64	2.28	90.7%
499.8	55.89	27.93	2198	14.00	30.77	2.84	90.8%
664.5	55.90	37.15	2929	14.01	41.04	3.89	90.5%

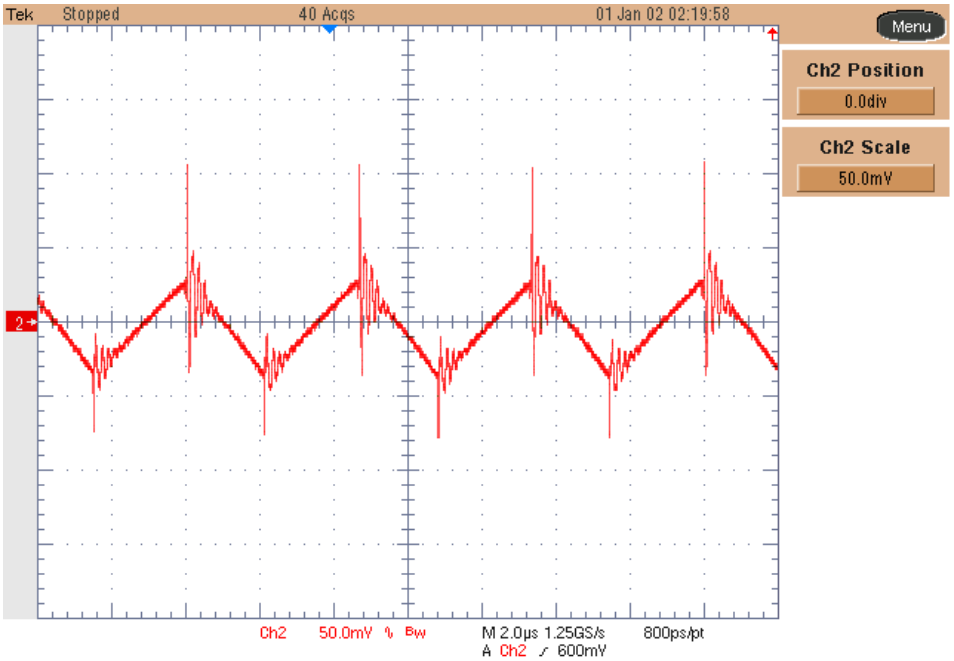
4. Output Voltage Regulation

The output voltage regulation versus load at 10V and 14V input voltage is shown in the graph below.

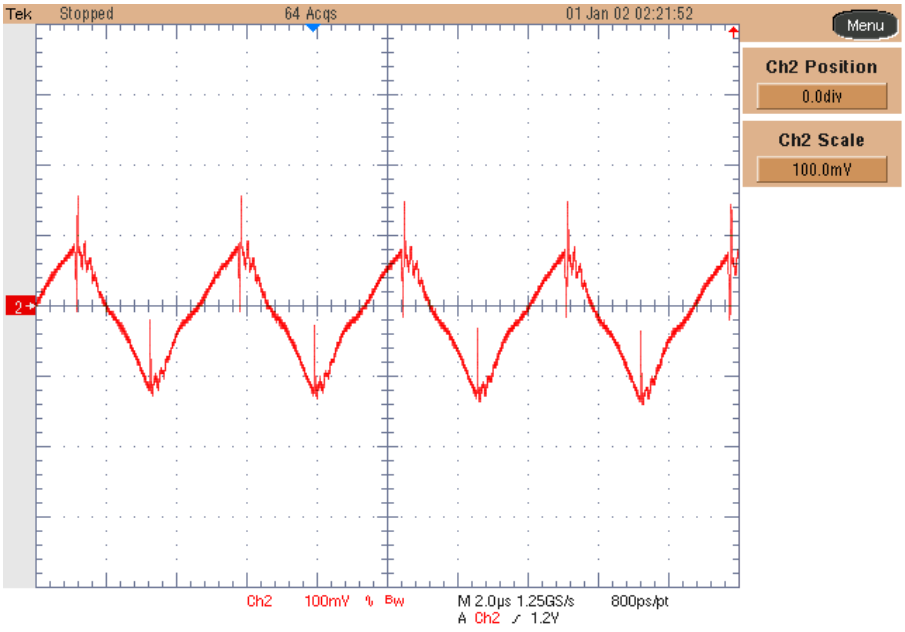


5. Input and Output Ripple Voltage

The ripple voltage waveforms measured at the terminal blocks are shown in the plots below. The input was set to 12V and the output fully loaded.
Channel 2: Output Ripple Voltage (50 mV/div, 2usec/div, AC coupled, 20MHz BW limit).



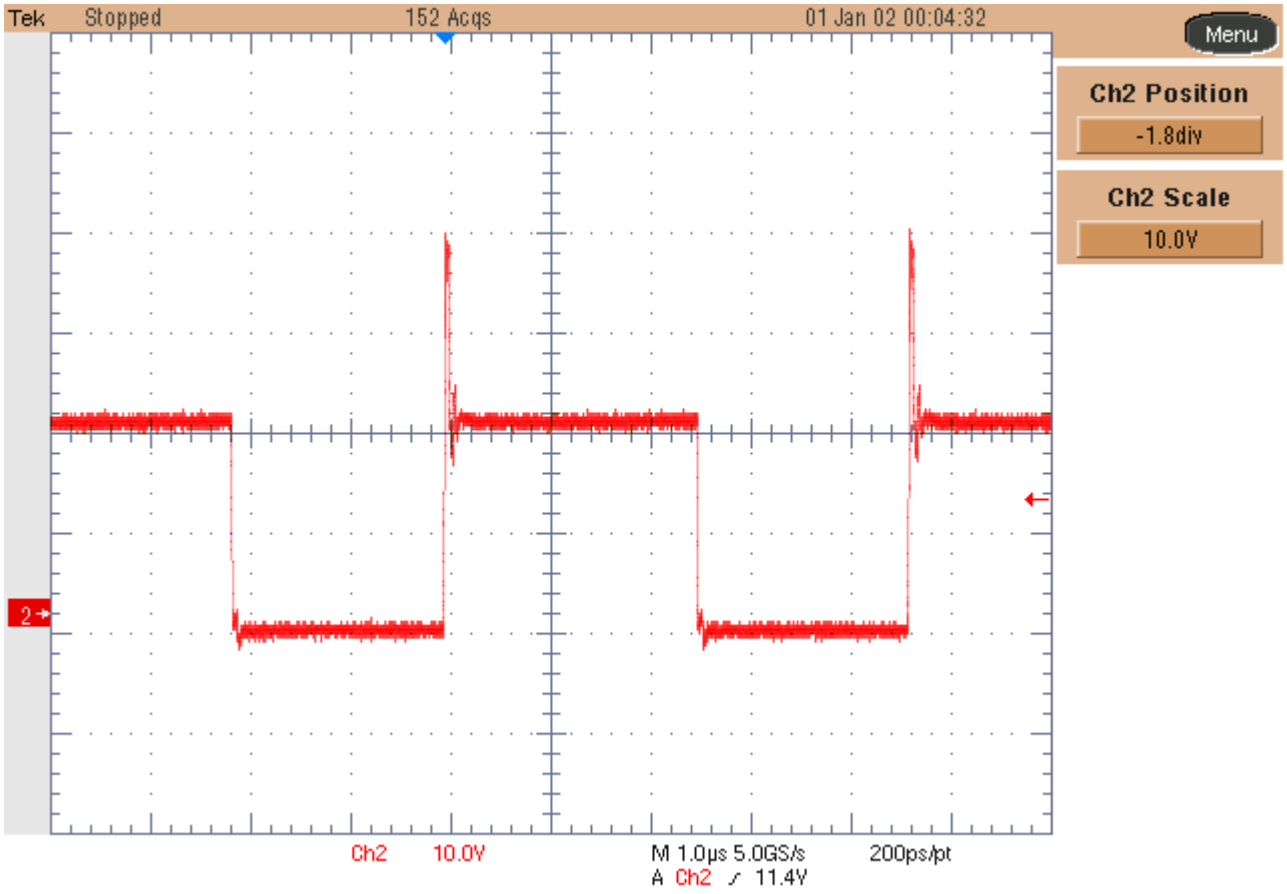
Channel 2: Input Ripple Voltage (100 mV/div, 2usec/div, AC coupled, 20MHz BW limit).



6. Switching Waveforms

The image below shows the drain-to-source waveforms of the power MOSFETs at full load.

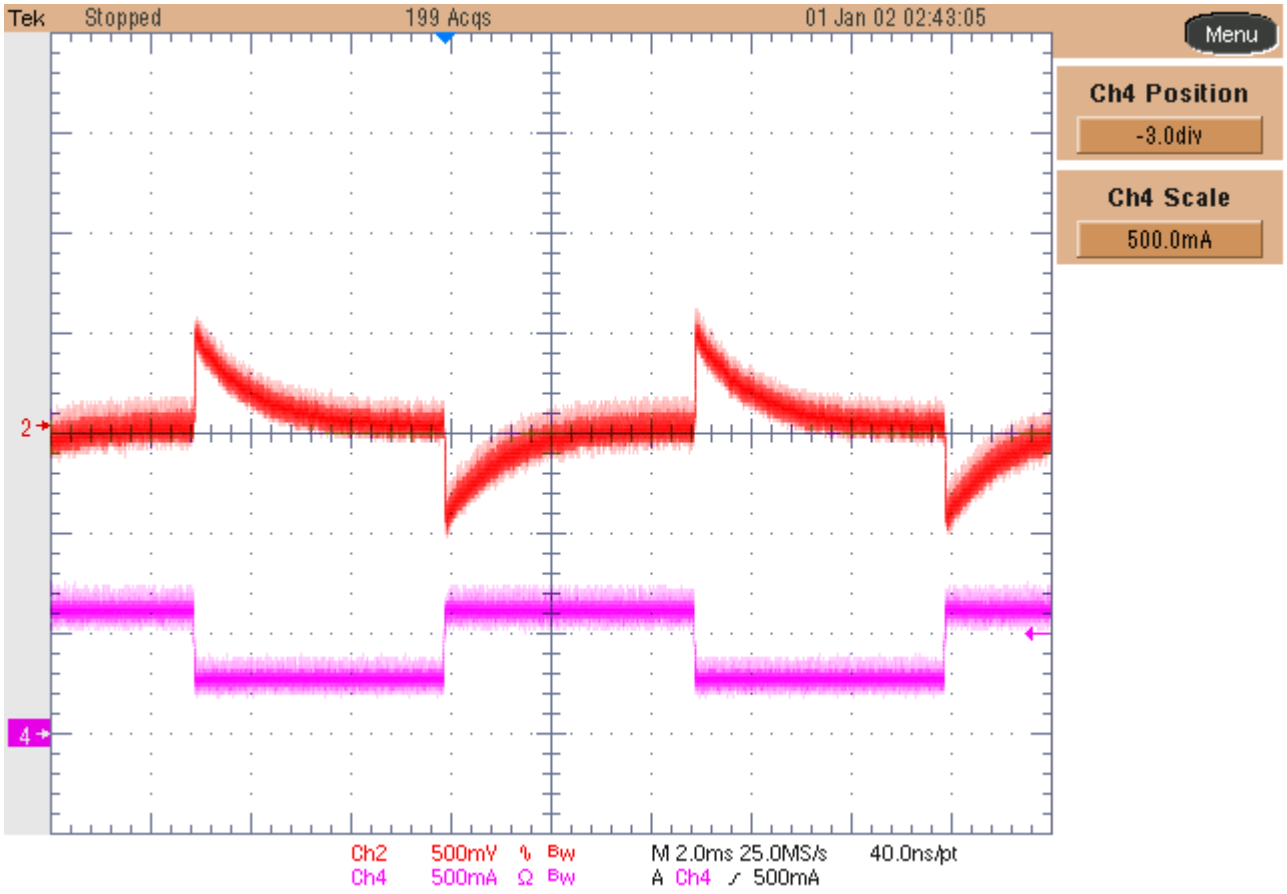
Channel 2: "**Q13** Vds", (10V/div, 1usec/div), no bandwidth reduction, **@ 12Vin**



7. Transient Response

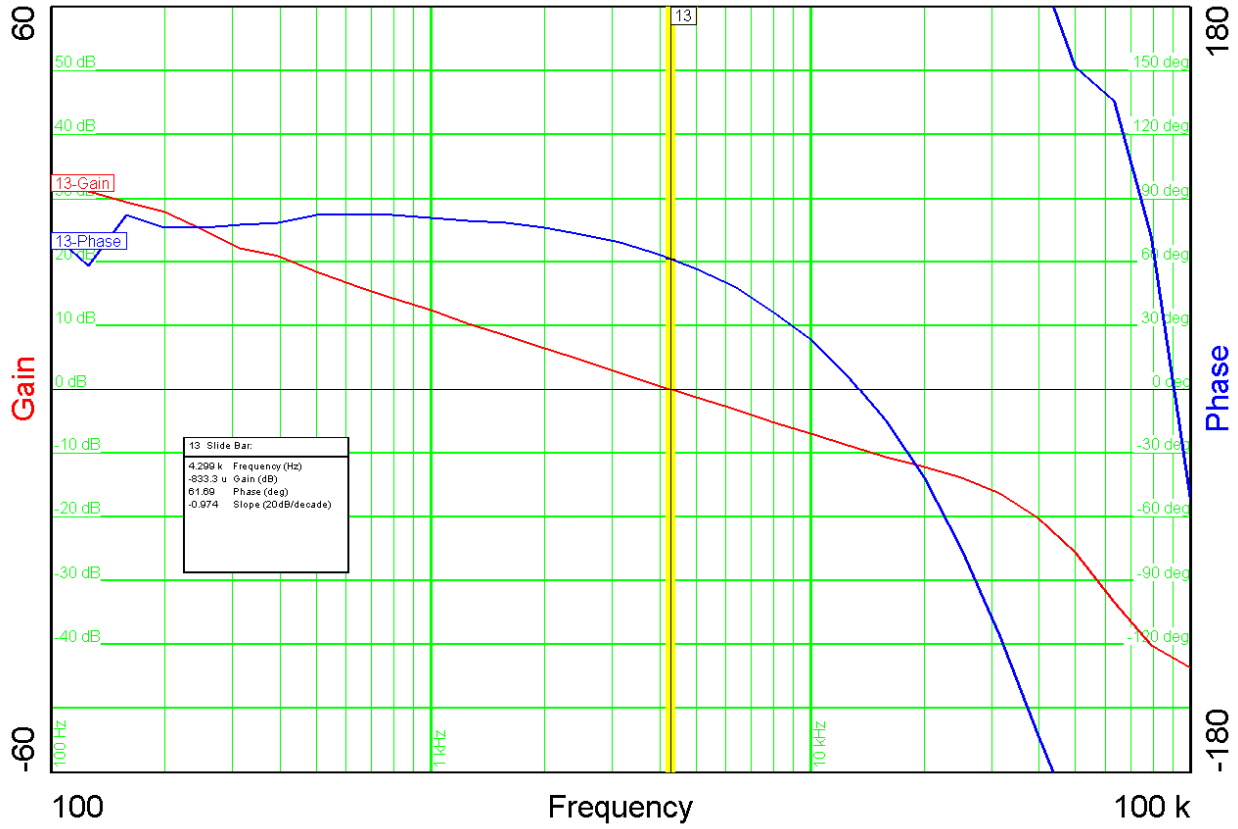
The image below shows the transient response behavior. The input voltage was set to the nominal voltage (12V) and the load switched between 300mA and 660mA.

Channel 2: Output Voltage (500mV/div, AC coupled, 2msec/div, 20MHz BWL)
Channel 4: Switched current on the output (500mA/div, DC coupled, 20MHz BWL)



8. Loop Analysis

The graph below shows the loop measurement at 12Vin and full load.
The crossover frequency was 4.299 KHz and the phase margin 61.69deg, while the gain margin was 9.292dB.



9. Thermal Analysis

The image and table below describe the thermal behavior of the board, supplied with 10Vin and fully loaded. The thermal shot has been taken 20 minutes after power on.

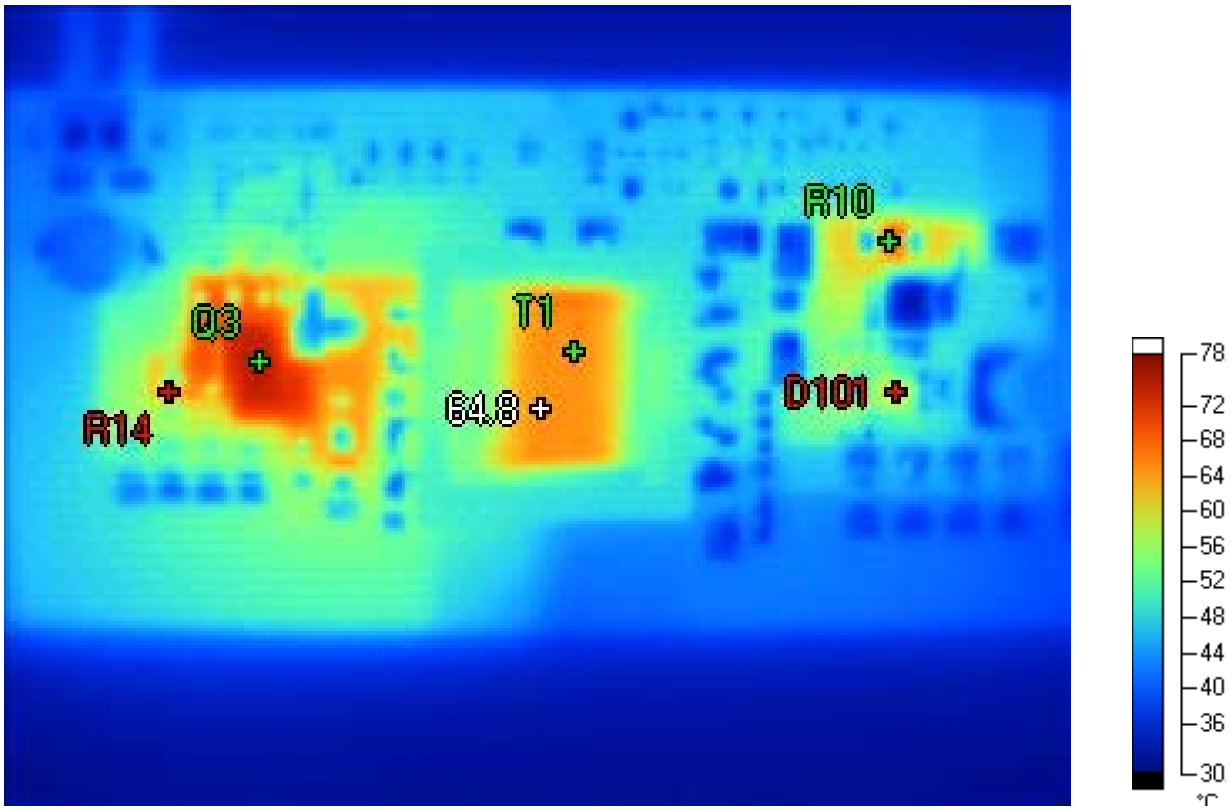


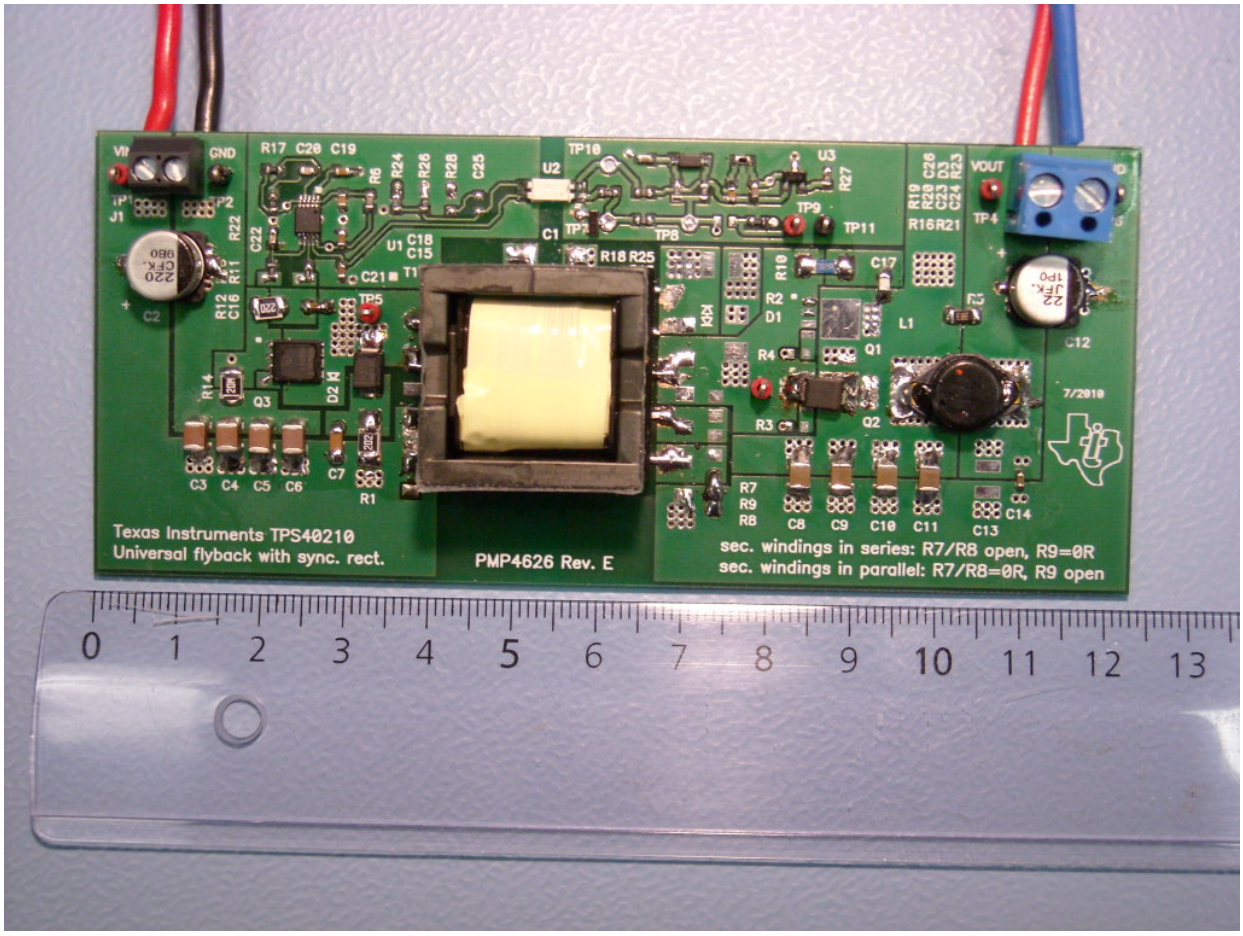
Image Info:

Emissivity	0.95
Background	23.0 °C
Average Temperature	43.8 °C
Calibration Range	-20.0 °C to 350.0 °C
Camera Model	Ti40FT
Image Range	30.8 °C to 75.4 °C
Image Time	3/6/2012 6:08:23 PM
Lens Description	20mm/F0.8
Lens Serial #	40948-4409
Manufacturer	Fluke
Camera Serial Number	Ti40FT-070263

Markers

Label	Temperature	Emissivity	Background
Center Point	64.8 °C	0.95	23.0 °C
Q3	74.9 °C	0.95	23.0 °C
R14	61.9 °C	0.95	23.0 °C
T1	65.3 °C	0.95	23.0 °C
D101	58.5 °C	0.95	23.0 °C
R10	75.4 °C	0.95	23.0 °C

10. Photo of the prototype



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