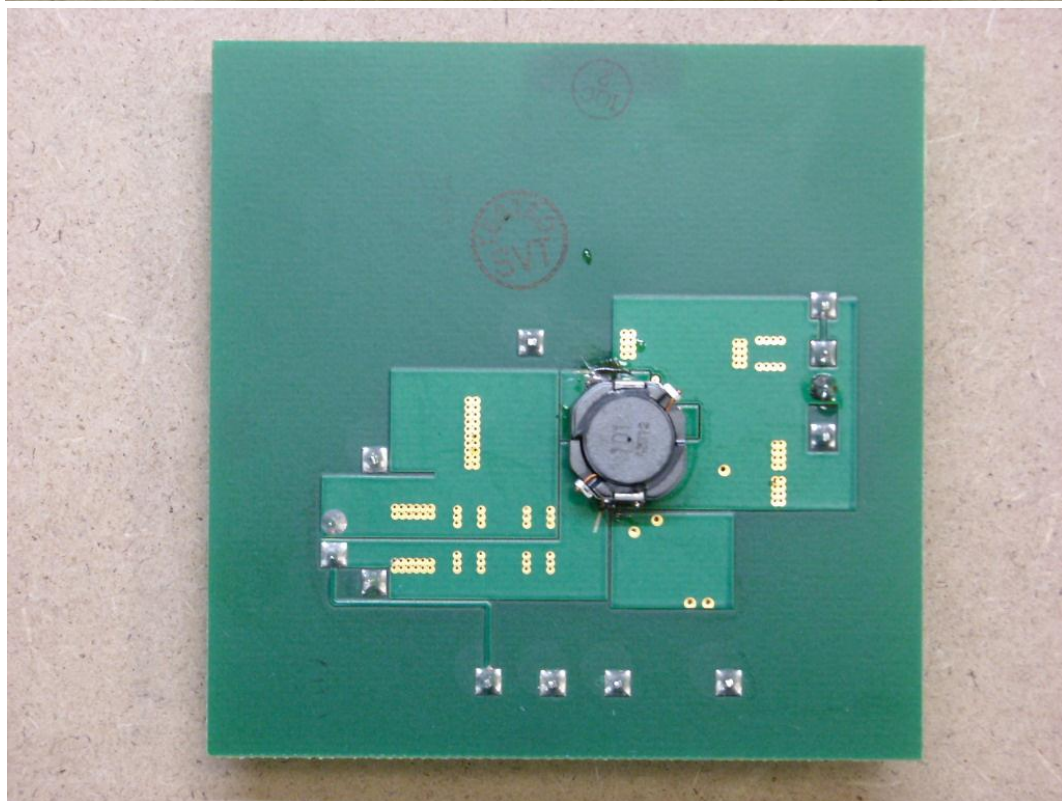
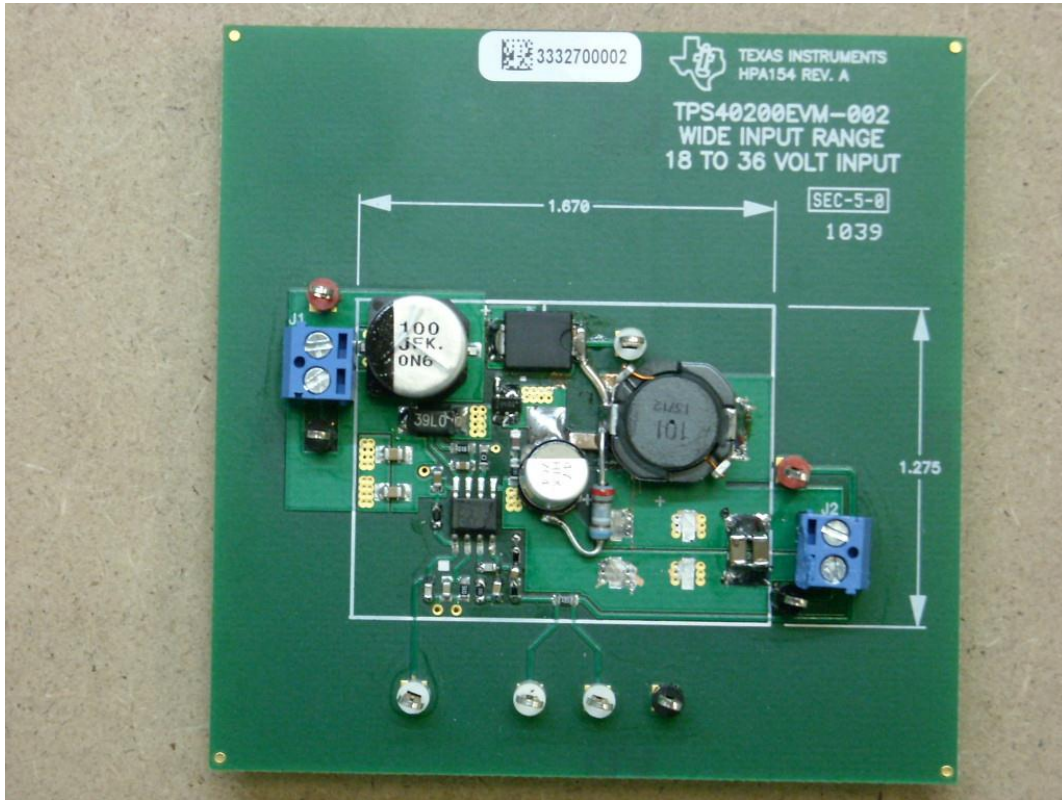


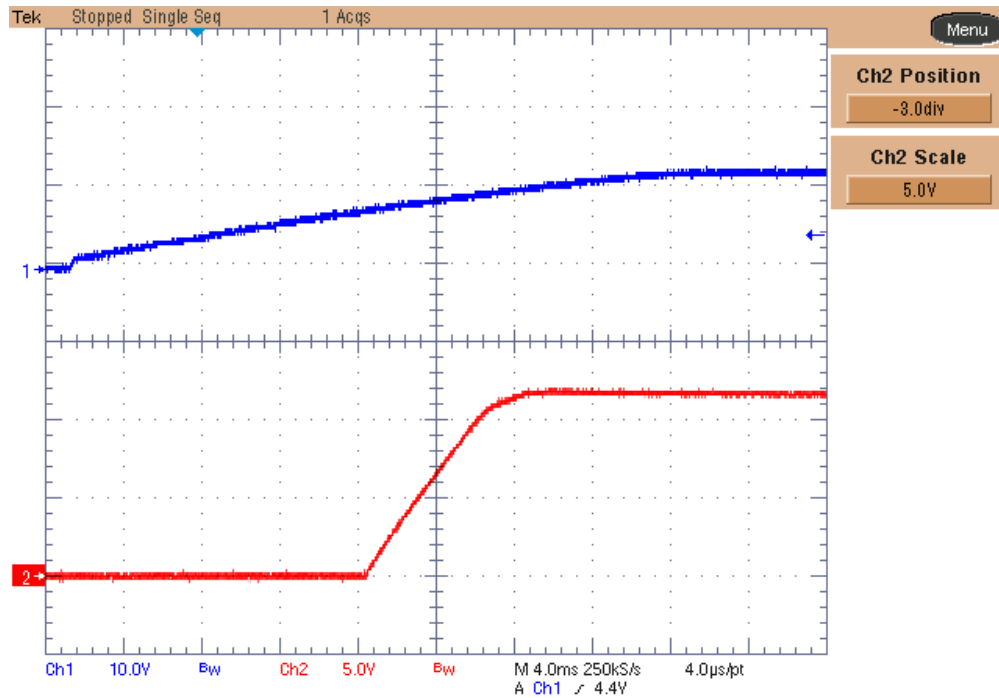
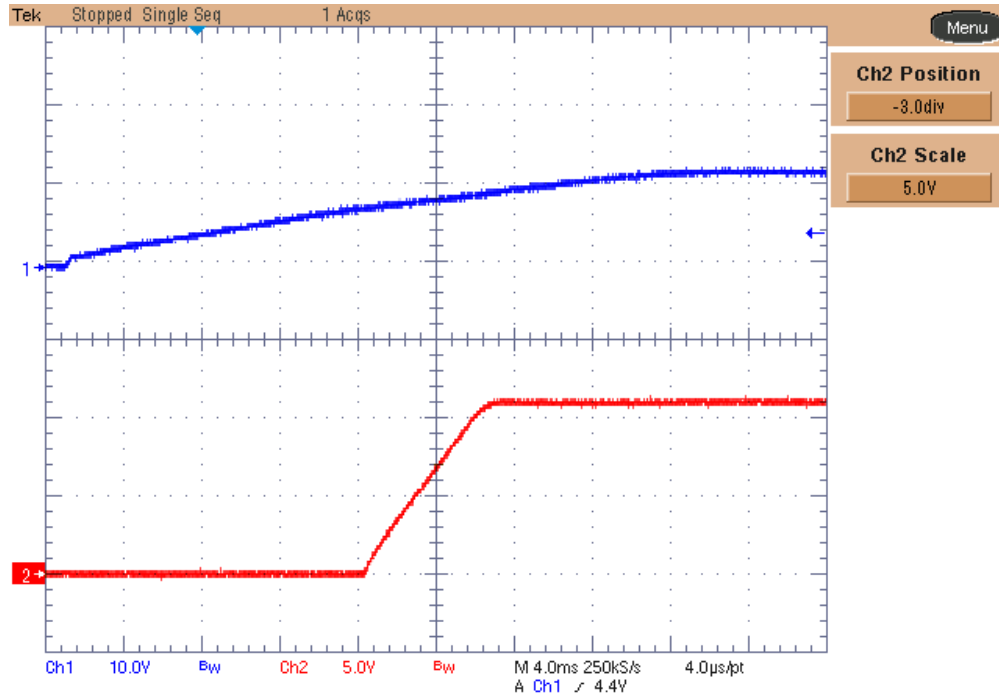
PHOTO OF THE PROTOTYPE:



1 Startup

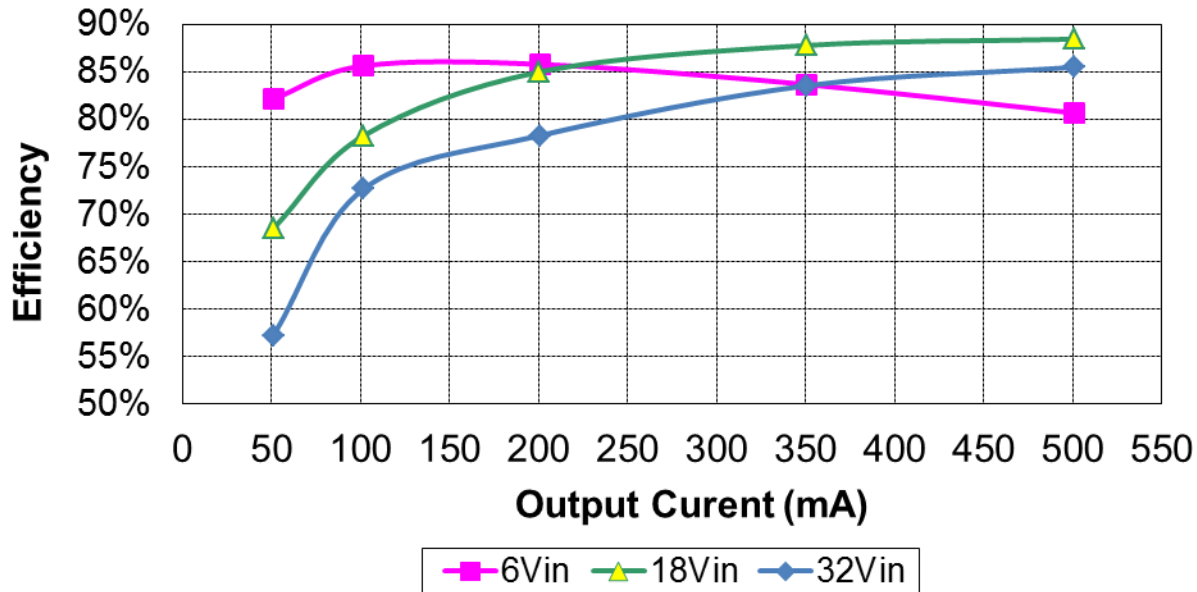
The input (12Vdc) and output voltage behavior at startup is shown in the images below. The output was fully loaded for the top picture and unloaded for the bottom one.

Ch.1: Input voltage (10V/div, 4ms/div, 20MHz BWL), Ch.2: Output voltage (5V/div, BWL)



2 Efficiency

The efficiency data are shown in the tables and graph below. The dc input source has been set to 6V, 12V and 32V, while the load has been varied between 0 and 500mA.



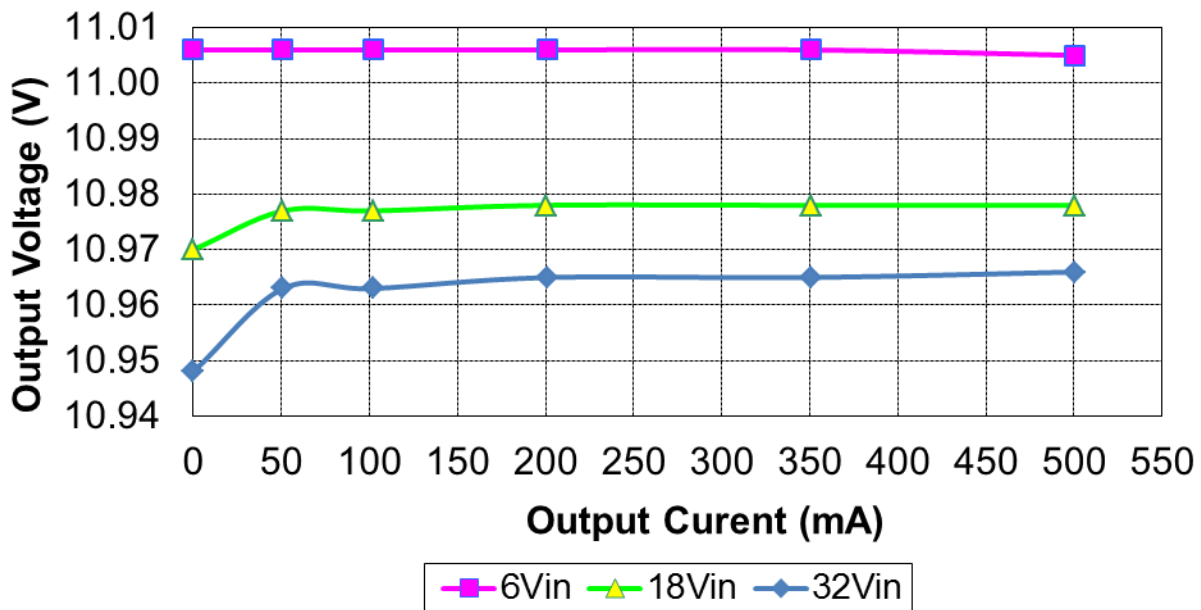
Iout (mA)	Vout (V)	Pout (W)	Iin (mA)	Vin (V)	Pin (W)	Ploss (W)	Eff. (%)
0.0	11.006	0.00	8.2	6.024	0.05	0.05	0.0%
51.0	11.006	0.56	113.8	6.006	0.68	0.12	82.1%
101.9	11.006	1.12	218.1	6.006	1.31	0.19	85.6%
200.7	11.006	2.21	429.2	6.000	2.58	0.37	85.8%
350.5	11.006	3.86	766.4	6.017	4.61	0.75	83.7%
500.6	11.005	5.51	1138.3	6.001	6.83	1.32	80.6%

Iout (mA)	Vout (V)	Pout (W)	Iin (mA)	Vin (V)	Pin (W)	Ploss (W)	Eff. (%)
0.0	10.970	0.00	2.6	18.00	0.05	0.05	0.0%
51.0	10.977	0.56	45.4	18.01	0.82	0.26	68.5%
101.9	10.977	1.12	79.4	18.00	1.43	0.31	78.3%
200.6	10.978	2.20	143.9	18.01	2.59	0.39	85.0%
350.5	10.978	3.85	243.3	18.02	4.38	0.54	87.8%
500.6	10.978	5.50	345.3	18.00	6.22	0.72	88.4%

I _{out} (mA)	V _{out} (V)	P _{out} (W)	I _{in} (mA)	V _{in} (V)	P _{in} (W)	P _{loss} (W)	Eff. (%)
0.0	10.948	0.00	3.7	31.97	0.12	0.12	0.0%
51.0	10.963	0.56	30.6	31.96	0.98	0.42	57.2%
101.9	10.963	1.12	48.1	31.96	1.54	0.42	72.7%
200.7	10.965	2.20	88.0	31.95	2.81	0.61	78.3%
350.5	10.965	3.84	144.1	31.93	4.60	0.76	83.5%
500.6	10.966	5.49	201.3	31.91	6.42	0.93	85.5%

3 Output voltage regulation vs. load

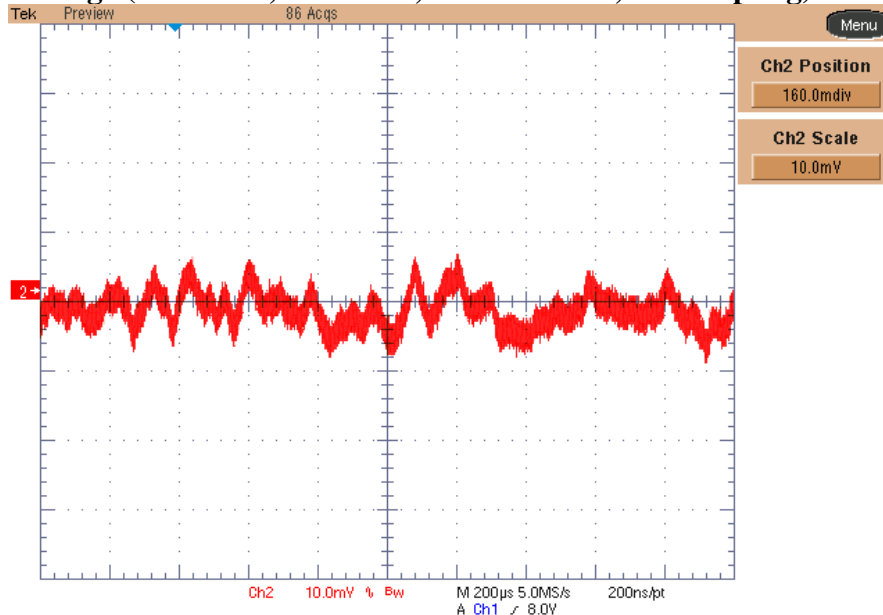
The output voltage variation versus load current, for the three input voltages, is plotted below.



4 Output ripple voltage

The output ripple voltage has been measured by supplying the converter @ 12Vdc, while the load has been set to 500mA.

Ch.2: Output voltage (10mV/div, 200us/div, 20MHz BWL, AC coupling)

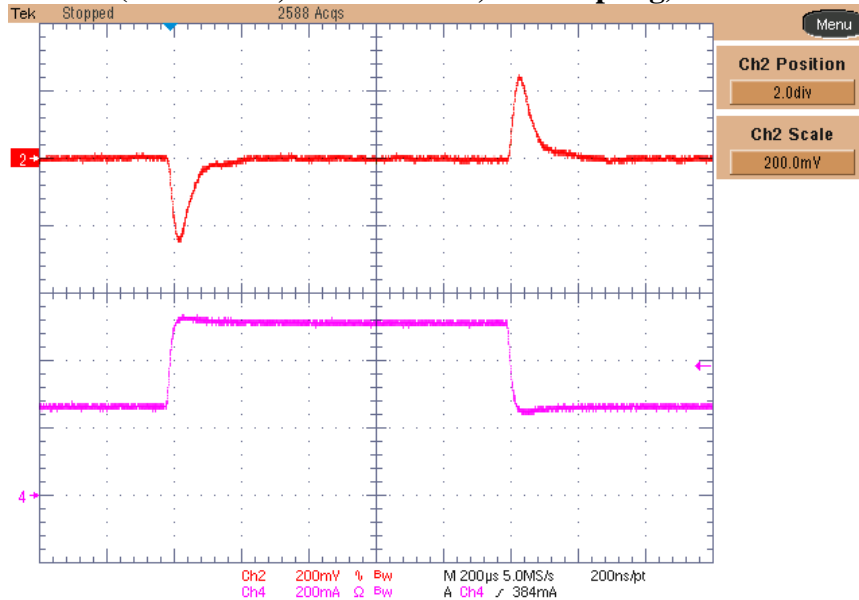


5 Load Transient

The image below shows the response of the converter to 50% - 100% (250mA to 500mA) transient on the load, while the converter was supplied @ 12Vdc.

Ch.2: Output voltage (200mV/div, 200us/div, 20MHz BWL, AC coupling)

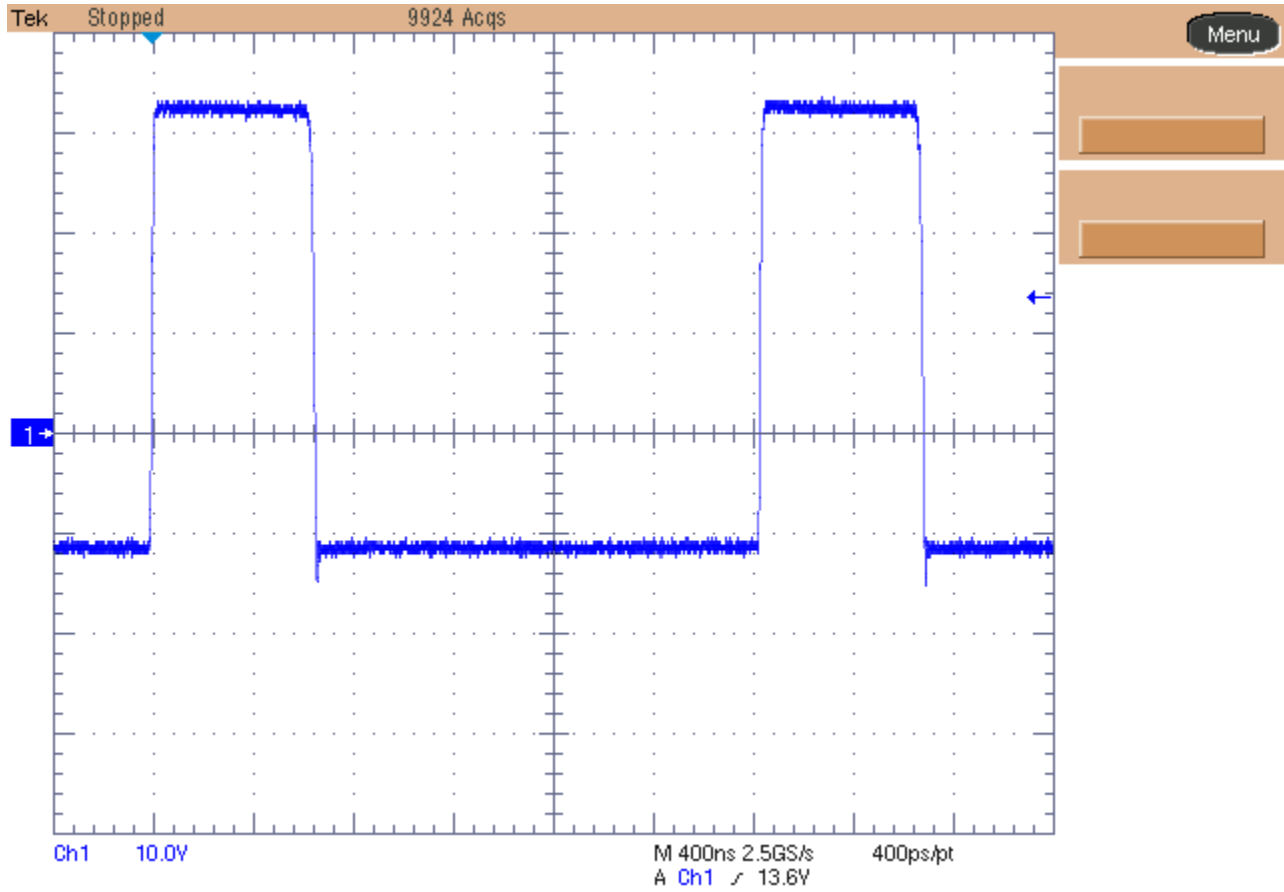
Ch.4: Output current (200mA/div, 20MHz BWL, DC coupling)



6 Switch-node

The image below shows the switch-node (Q1 drain to ground voltage) waveform at 32Vdc input and full load condition.

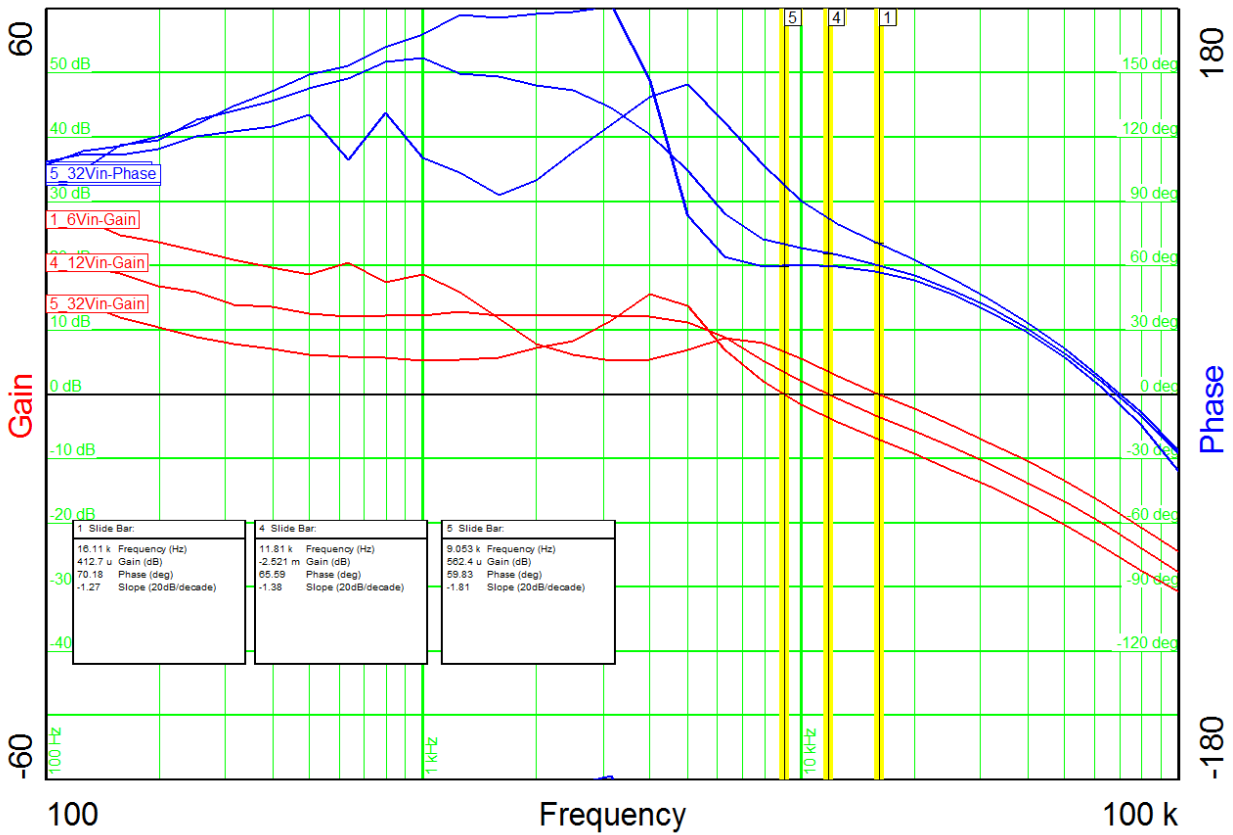
Ch.1: Q1 Drain-ground voltage (10V/div, 400ns/div, no BWL, DC coupling)



7 Loop Response

The picture below shows the loop response of the converter measured at 6V, 12V and 32V input voltage and full load. Here is in detail the result regarding crossover frequency, phase and gain margin:

Vin	Crossover frequency	Phase Margin	Gain Margin
6V	16.11 KHz	70.18 deg.	18.6 dB
12V	11.81 KHz	65.59 deg.	21.1 dB
32V	9.05 KHz	59.83 deg.	24.29 dB



8 Thermal Image

The thermal images below show a top and bottom view of the board. The ambient temperature was 24C with no forced air flow.

The output was fully loaded, while the input voltage was set to 8Vdc (worst case condition).

TOP SIDE:

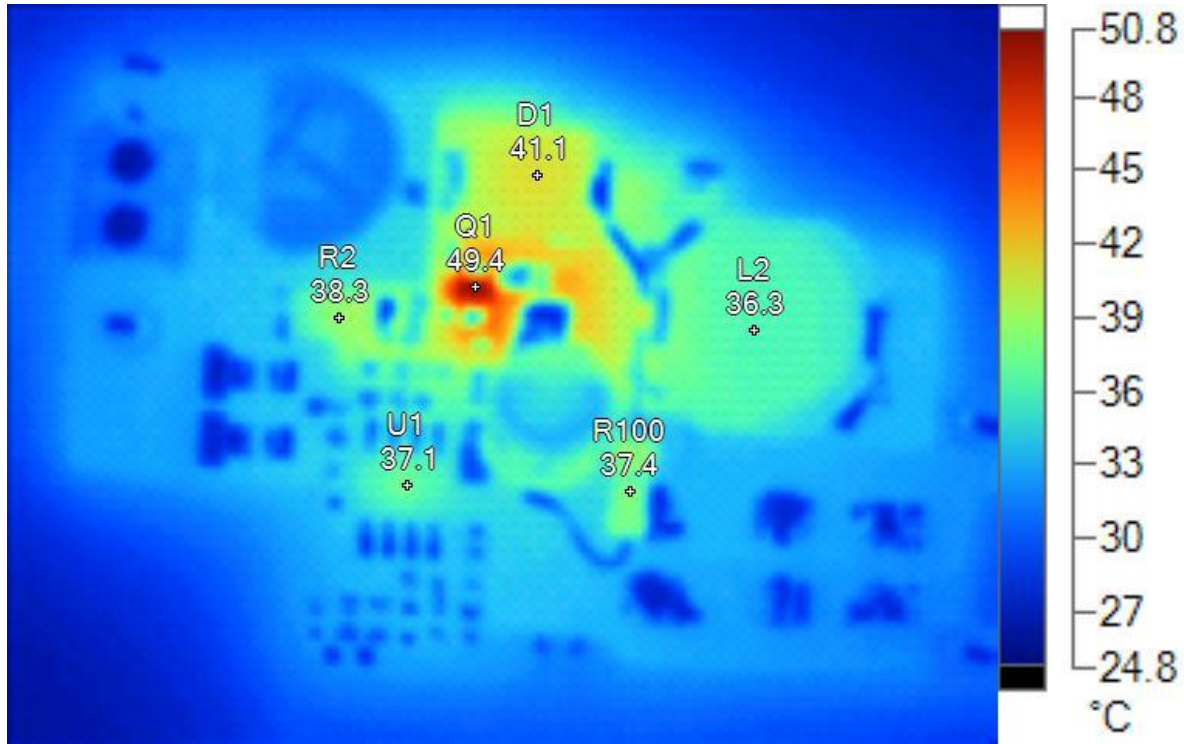


Image Info

Background temperature	24.0°C
Average Temperature	32.2°C
Image Range	25.5°C to 49.8°C
Camera Model	Ti40FT
Camera Manufacturer	Fluke
Image Time	7/8/2014 11:47:25 AM

Main Image Markers

Name	Temperature
Q1	49.4°C
U1	37.1°C
R2	38.3°C
D1	41.1°C
L2	36.3°C
R100	37.4°C

BOTTOM SIDE:

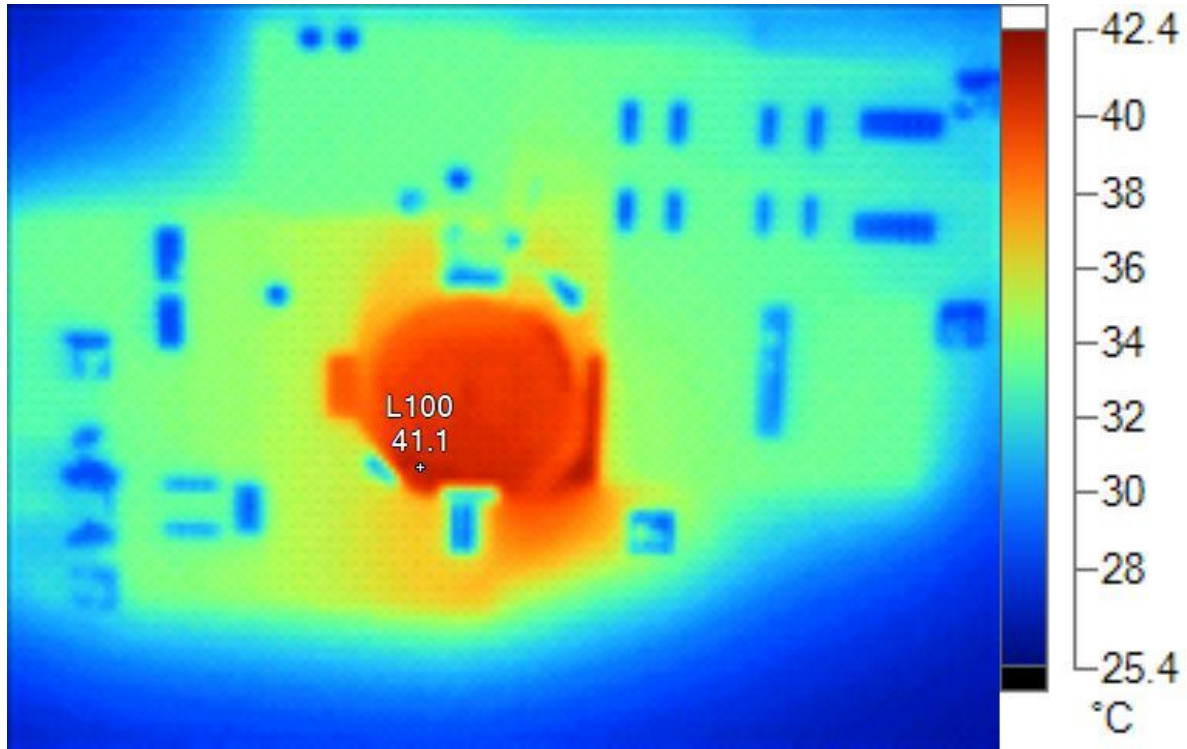


Image Info

Background temperature	24.0°C
Average Temperature	32.5°C
Image Range	25.9°C to 41.4°C
Camera Model	Ti40FT
Camera Manufacturer	Fluke
Image Time	7/8/2014 11:47:57 AM

Main Image Markers

Name	Temperature
L100	41.1°C

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