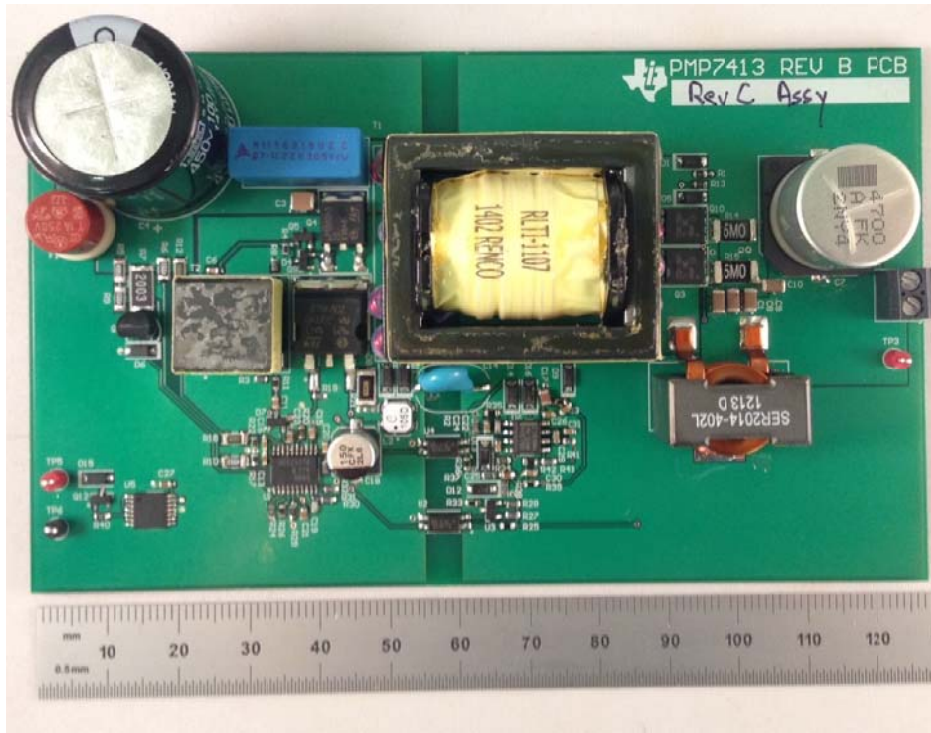
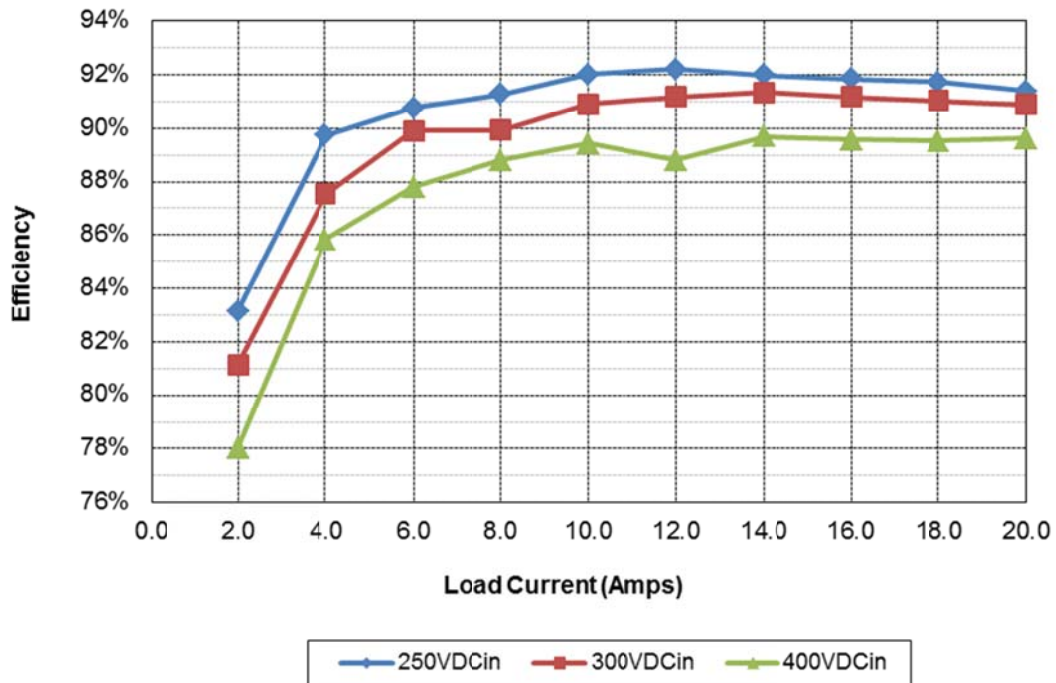


## 1 Photo

The photograph below shows the PMP7413 Rev C demo board. This circuit was build using a PMP7413 Rev B PCB.



## 2 Efficiency



250VDCin							
Iout	Vout	Vin	Iin	Pin	Pout	Losses	Efficiency
0.00	4.99	250.0	0.007	1.75	0.00	1.75	0.0%
2.00	4.99	250.0	0.048	12.00	9.98	2.02	83.2%
4.00	4.99	249.9	0.089	22.24	19.96	2.28	89.7%
6.00	4.99	249.9	0.132	32.99	29.94	3.05	90.8%
8.00	4.99	249.9	0.175	43.73	39.92	3.81	91.3%
10.00	4.99	249.9	0.217	54.23	49.90	4.33	92.0%
12.00	4.99	249.8	0.260	64.95	59.88	5.07	92.2%
14.0	4.99	249.8	0.304	75.94	69.86	6.08	92.0%
16.0	4.99	249.8	0.348	86.93	79.84	7.09	91.8%
18.0	4.99	249.8	0.392	97.92	89.82	8.10	91.7%
20.0	5.00	249.8	0.438	109.41	100.00	9.41	91.4%

300VDCin							
Iout	Vout	Vin	Iin	Pin	Pout	Losses	Efficiency
0.00	4.99	300.0	0.007	2.10	0.00	2.10	0.0%
2.00	4.99	300.0	0.041	12.30	9.98	2.32	81.1%
4.00	4.99	300.0	0.076	22.80	19.96	2.84	87.5%
6.00	4.99	300.0	0.111	33.30	29.94	3.36	89.9%
8.00	4.99	299.9	0.148	44.39	39.92	4.47	89.9%
10.00	4.99	299.9	0.183	54.88	49.90	4.98	90.9%
12.00	4.99	299.9	0.219	65.68	59.88	5.80	91.2%
14.0	4.99	299.9	0.255	76.47	69.86	6.61	91.4%
16.0	4.99	299.9	0.292	87.57	79.84	7.73	91.2%
18.0	4.99	299.9	0.329	98.67	89.82	8.85	91.0%
20.0	5.00	299.8	0.367	110.03	100.00	10.03	90.9%

400VDCin							
Iout	Vout	Vin	Iin	Pin	Pout	Losses	Efficiency
0.00	4.99	387.6	0.007	2.71	0.00	2.71	0.0%
2.00	4.99	387.6	0.033	12.79	9.98	2.81	78.0%
4.00	4.99	387.5	0.060	23.25	19.96	3.29	85.8%
6.00	4.99	387.5	0.088	34.10	29.94	4.16	87.8%
8.00	4.99	387.5	0.116	44.95	39.92	5.03	88.8%
10.00	4.99	387.5	0.144	55.80	49.90	5.90	89.4%
12.00	4.99	387.5	0.174	67.43	59.88	7.54	88.8%
14.0	4.99	387.5	0.201	77.89	69.86	8.03	89.7%
16.0	4.99	387.5	0.230	89.13	79.84	9.29	89.6%
18.0	4.99	387.4	0.259	100.34	89.82	10.52	89.5%
20.0	5.00	387.4	0.288	111.57	100.00	11.57	89.6%

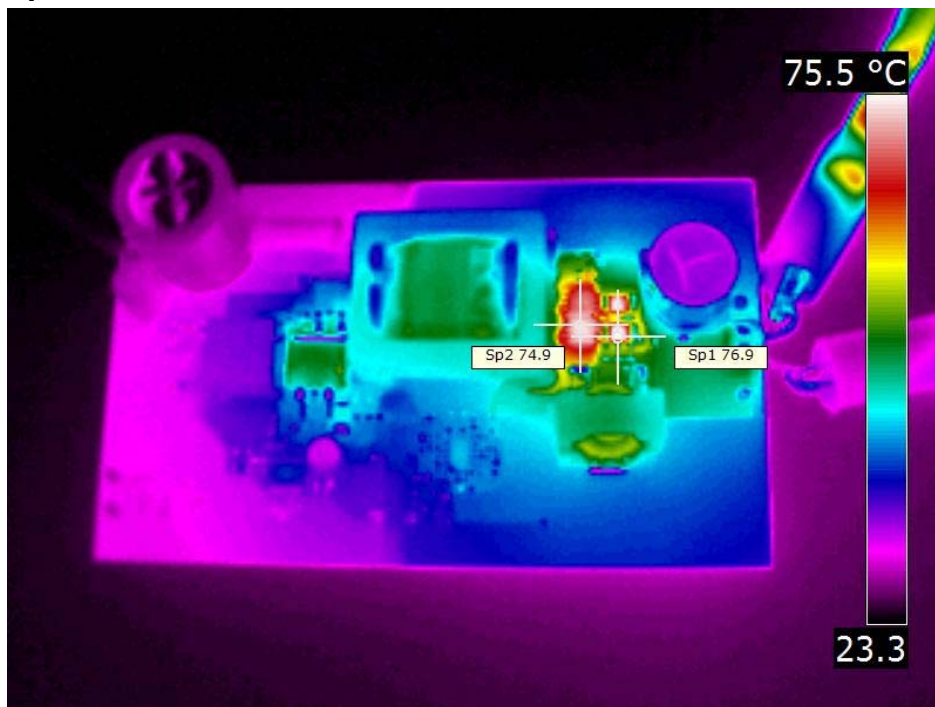
## 3 Thermal Images

The ambient temperature was 25C with 200LFM of forced air flow. The output was loaded with 20A.

### 3.1 400VDC Input

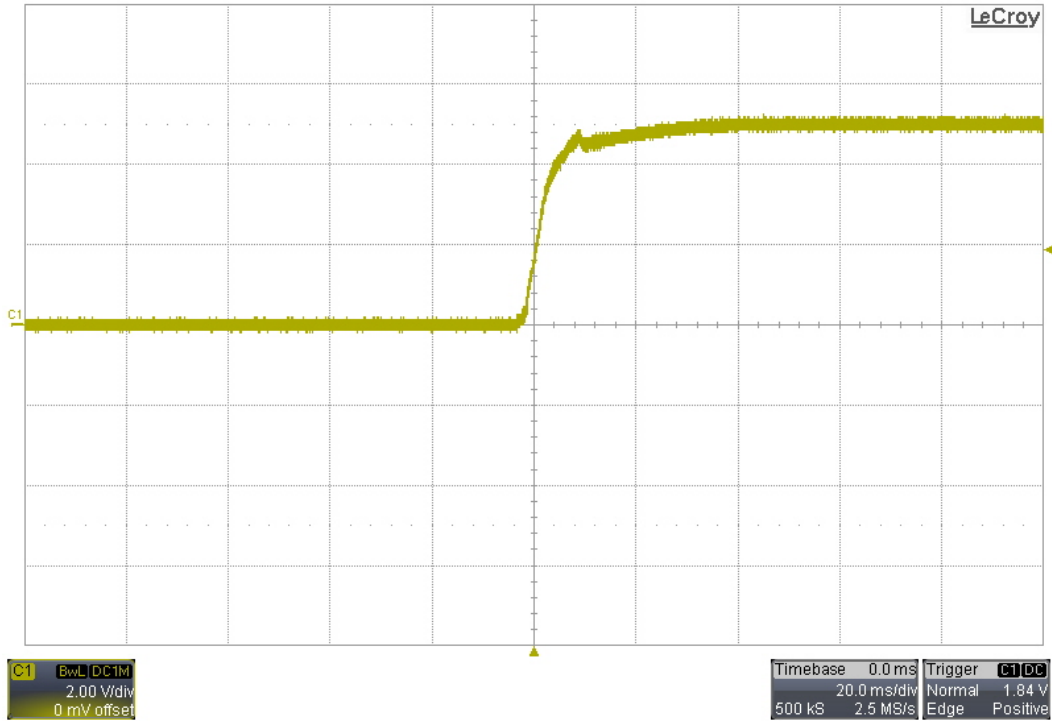


### 3.2 250VDC Input

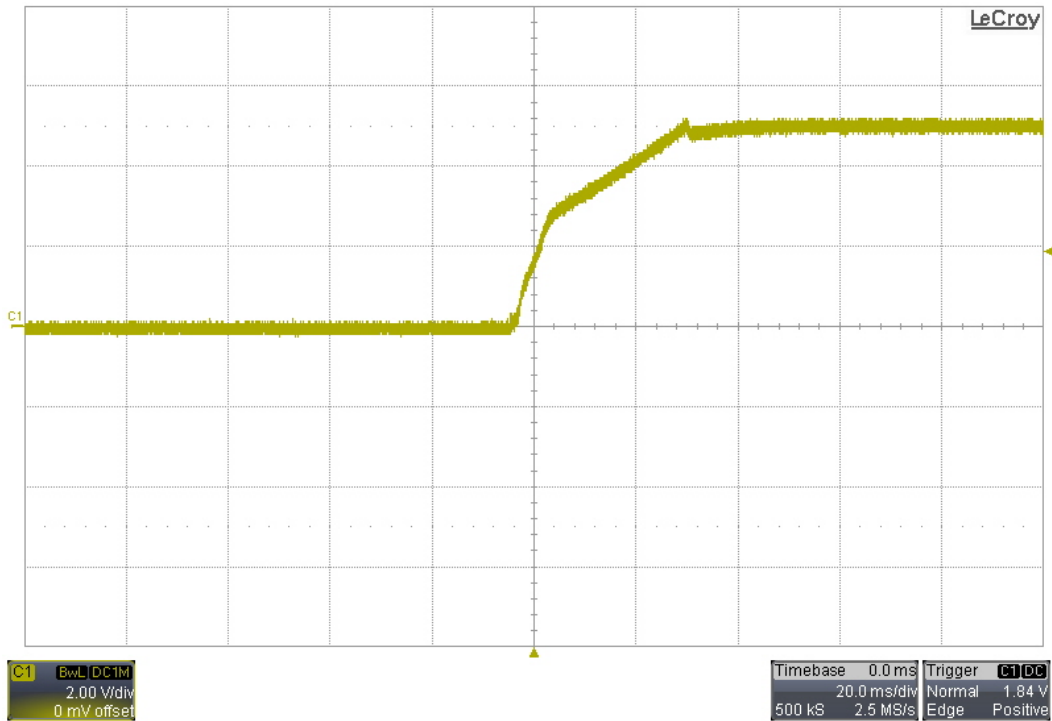


## 4 Startup

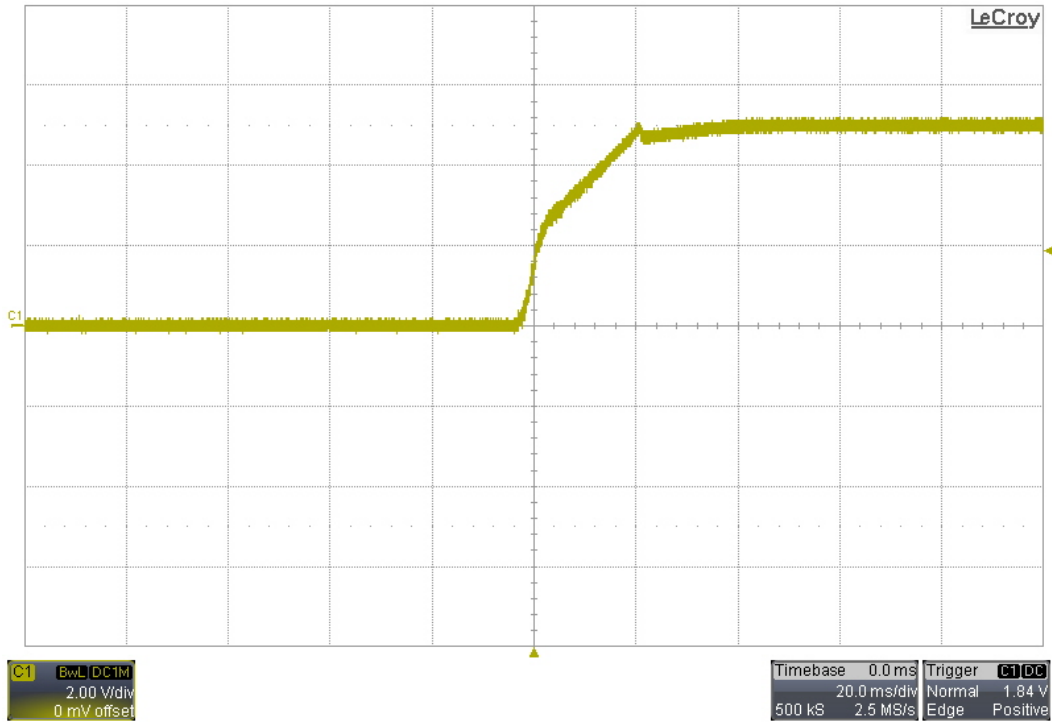
### 4.1 400VDC Input Startup, No Load



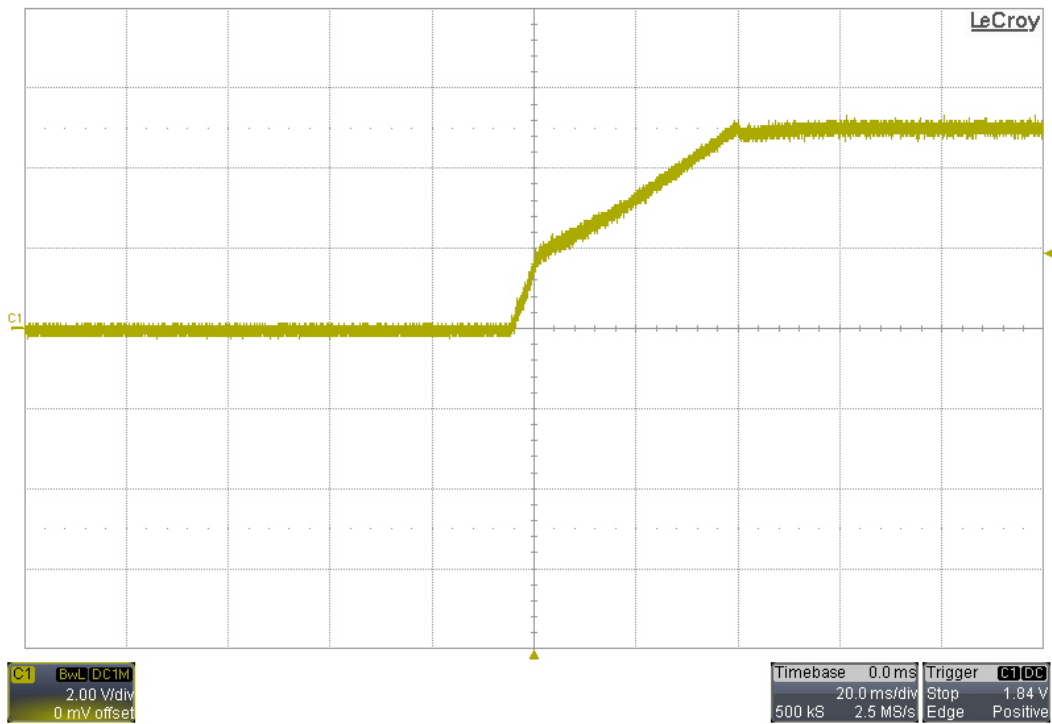
### 4.2 400VDC Input Startup, 0.5Ω Load



## 4.3 250VDC Input Startup, No Load

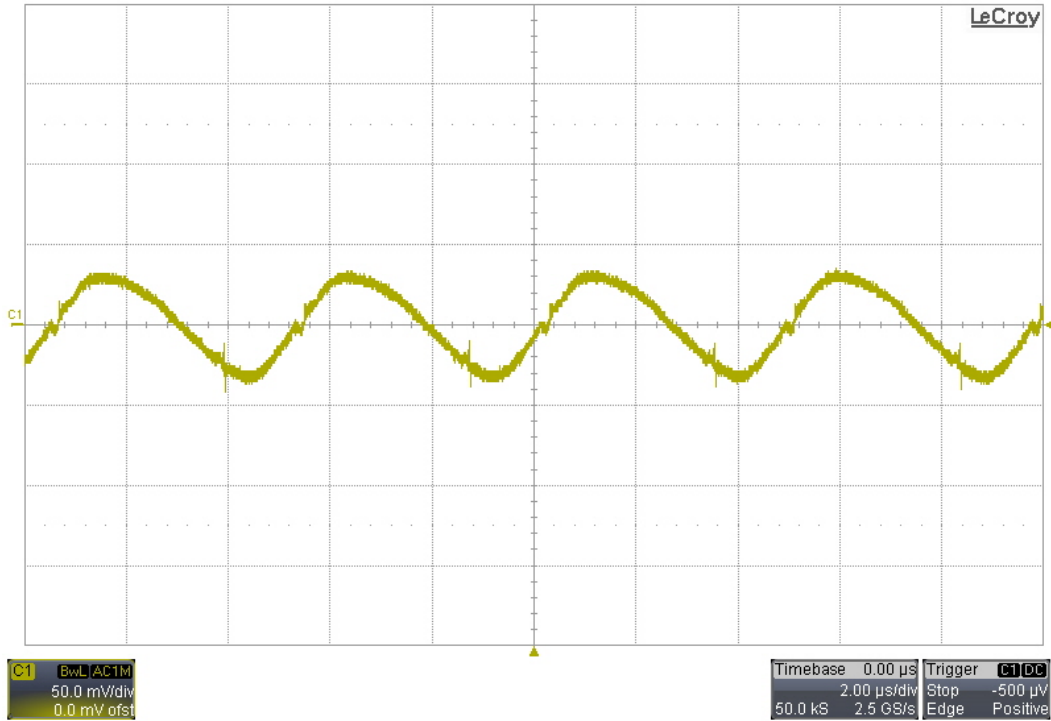


## 4.4 250VDC Input Startup, 0.5Ω Load

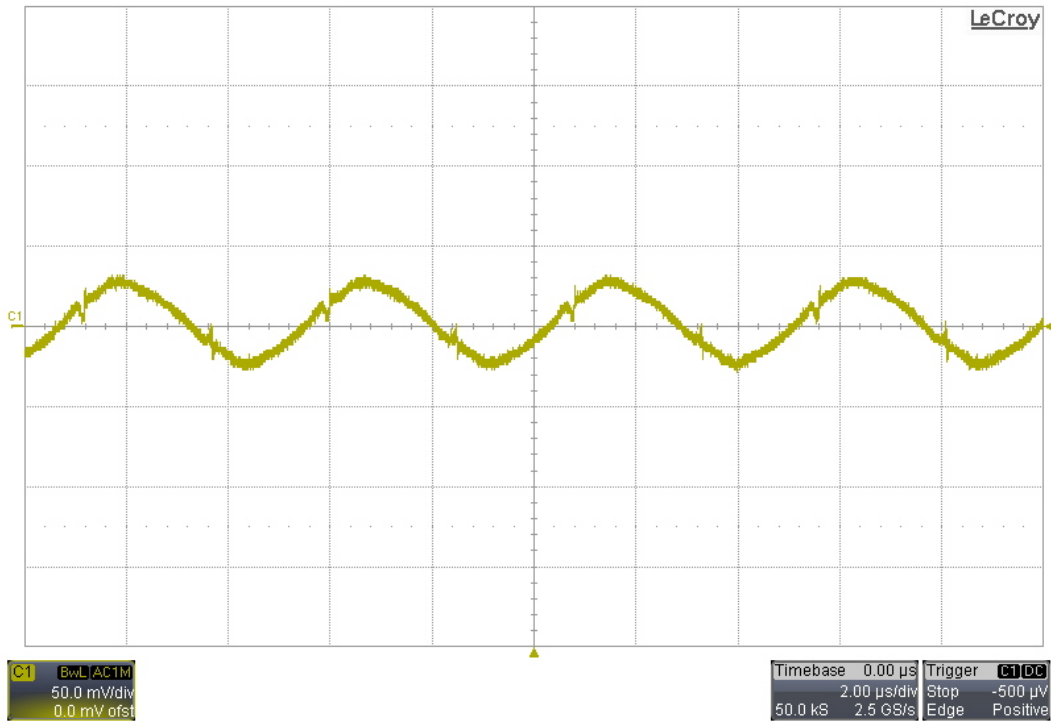


## 5 Output Ripple Voltage

### 5.1 400VDC Input, 20A Ripple Voltage

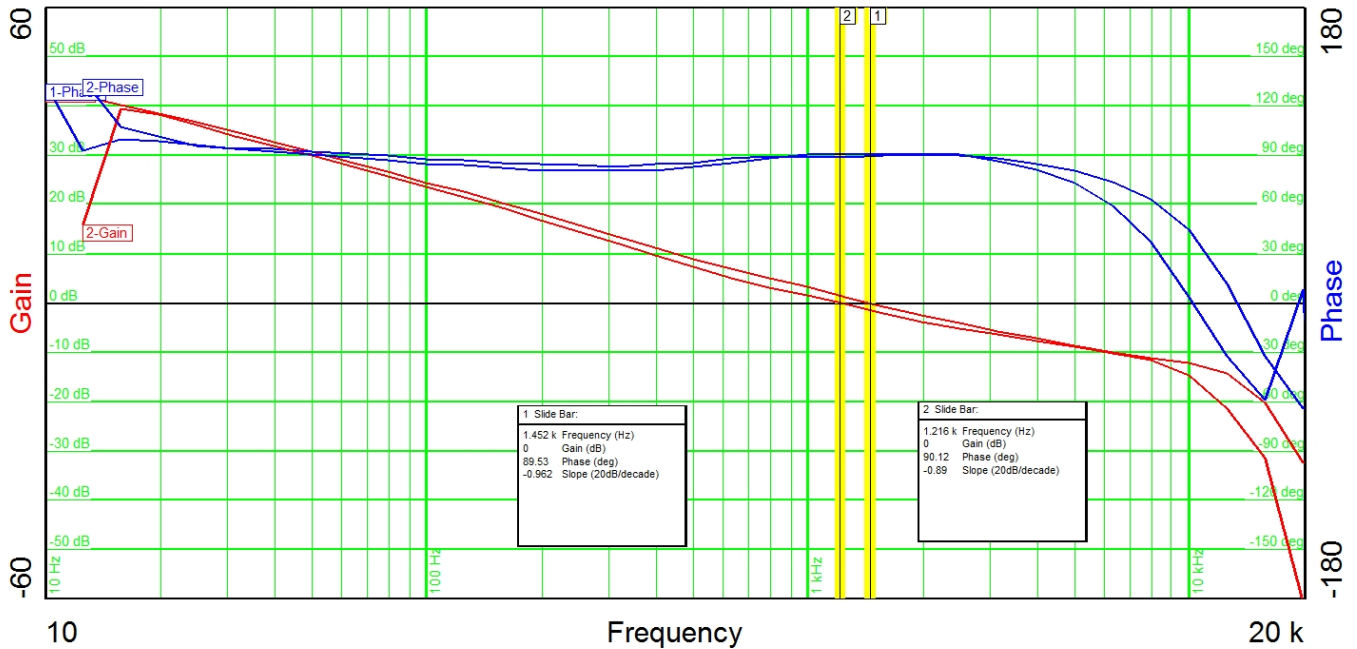


### 5.2 250VDC Input, 20A Ripple Voltage



## 6 Voltage Loop Response

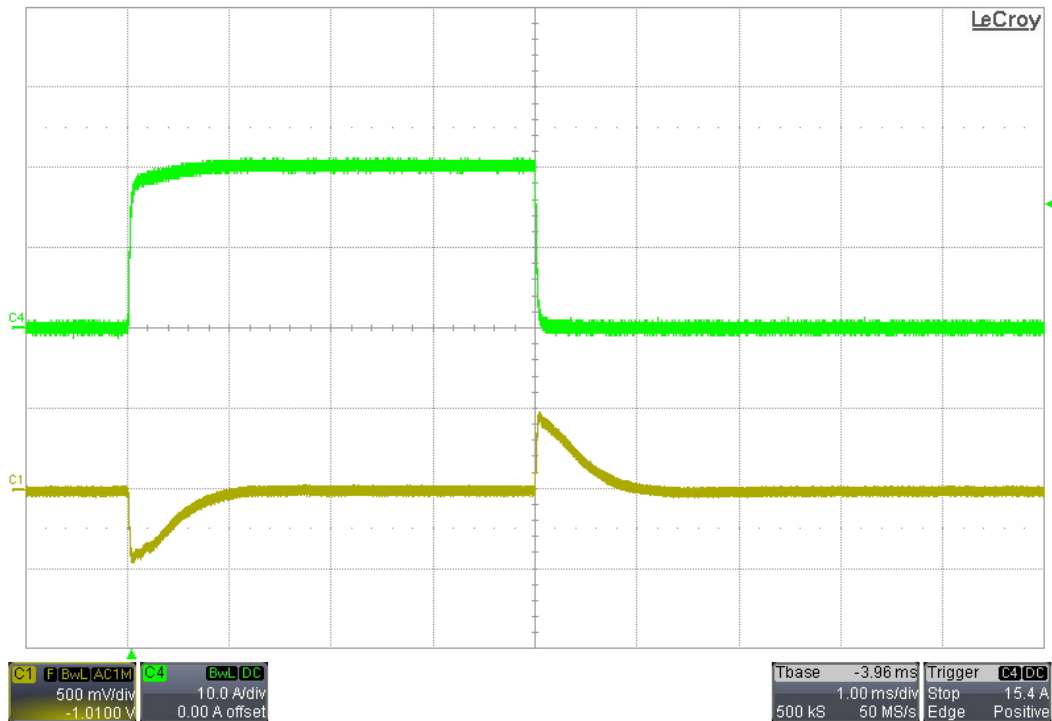
The frequency response of the voltage feedback loop is shown in the image below. The output was loaded with 20A. For gain/phase plot #1, the input was 400VDC and for gain/phase plot #2, the input was 250VDC.



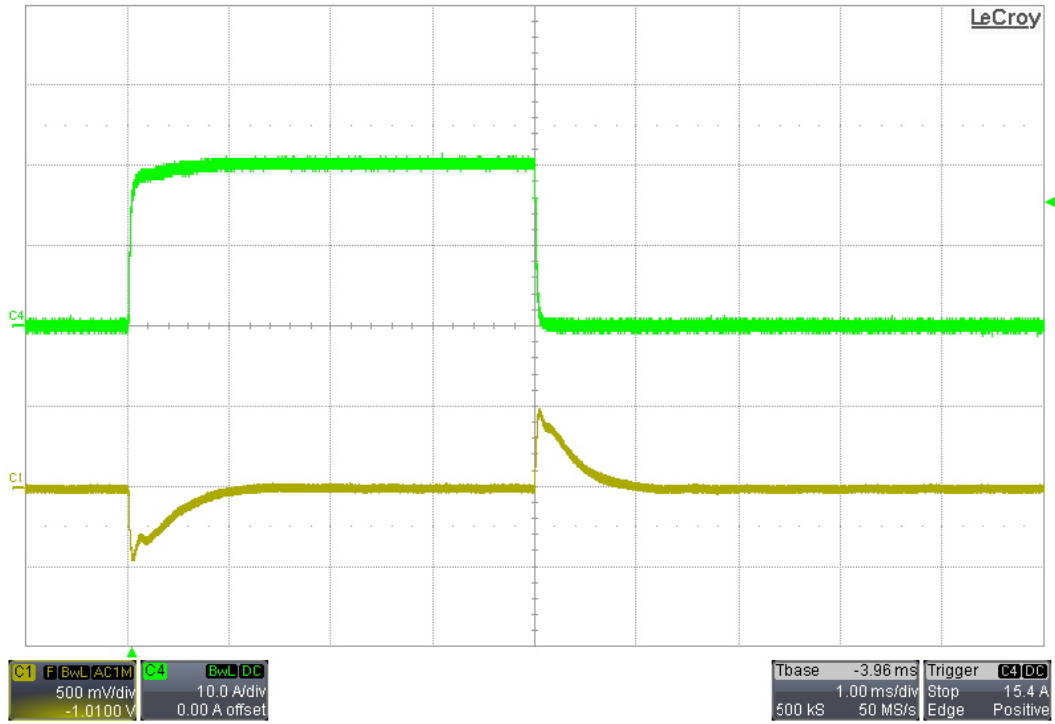
## 7 Load Transients

The response to a load step from 0A to 20A is shown in the images below. Channel 1: Vout (ac coupled); Channel 4: Iout

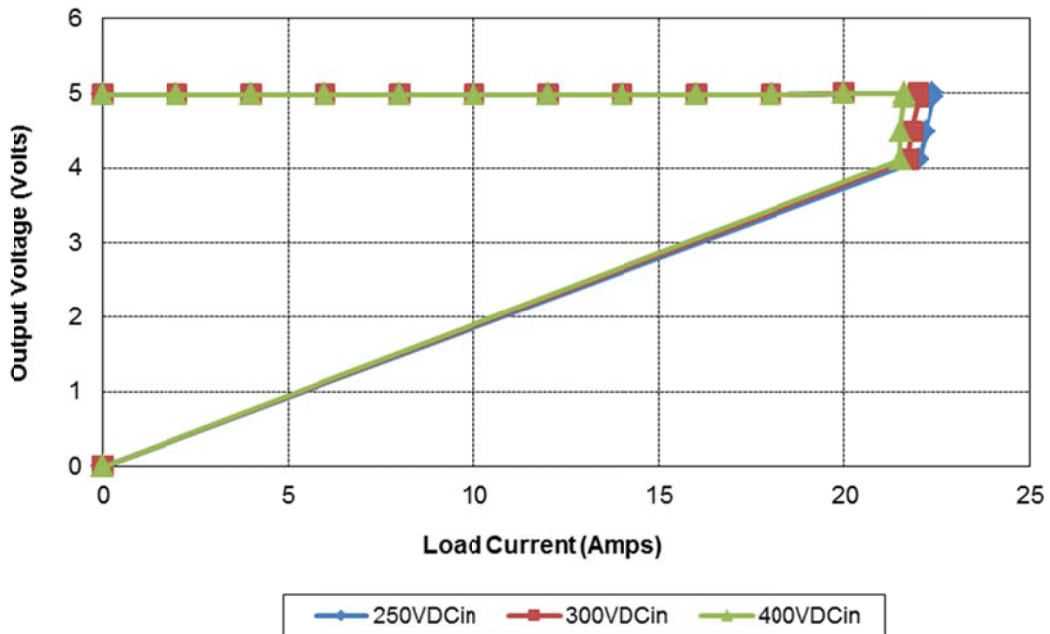
### 7.1 400VDC Input



## 7.2 250VDC Input

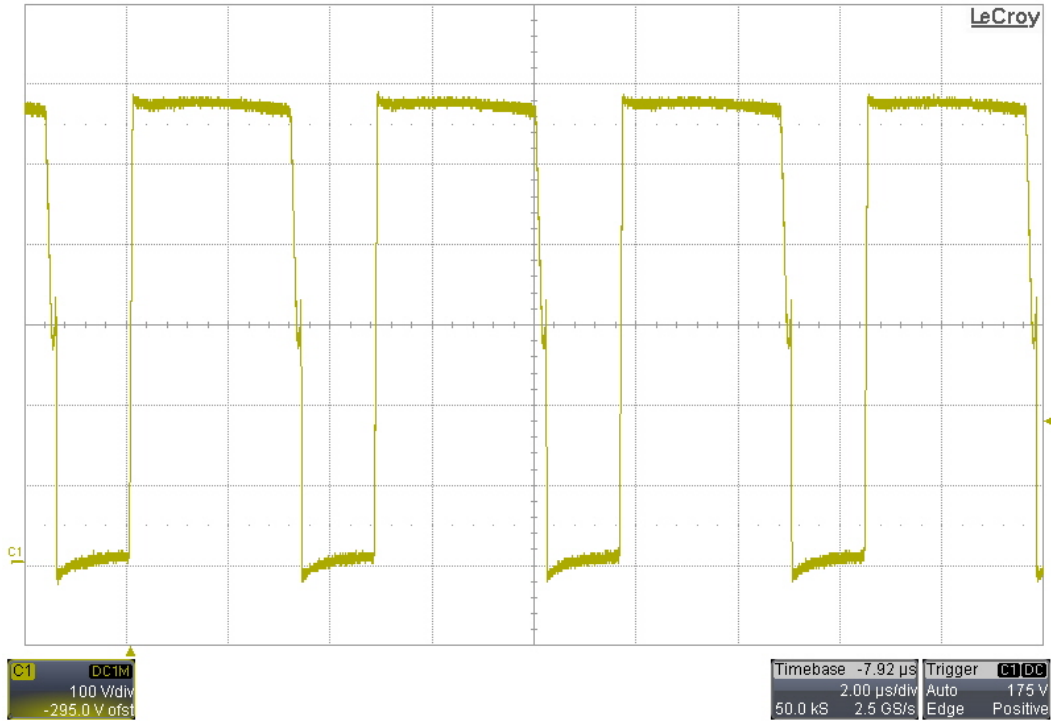


## 8 Overload V-I Characteristics

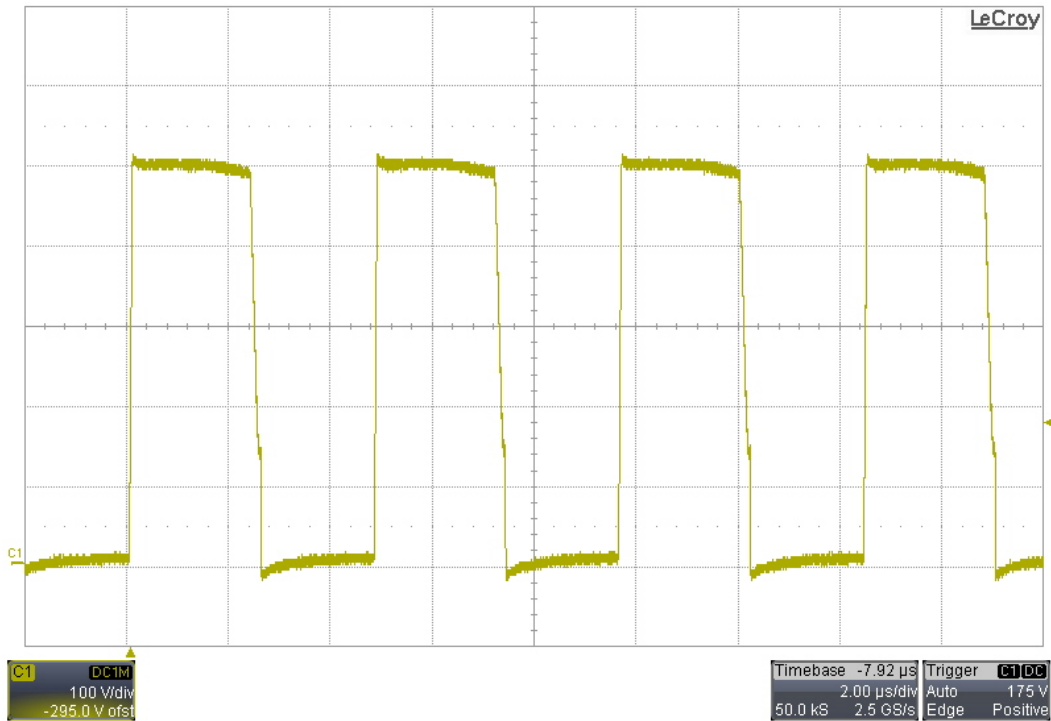


## 9 Primary Drain Waveforms

### 9.1 Primary FET (Q9) Vds – 400VDC Input, 20A Load

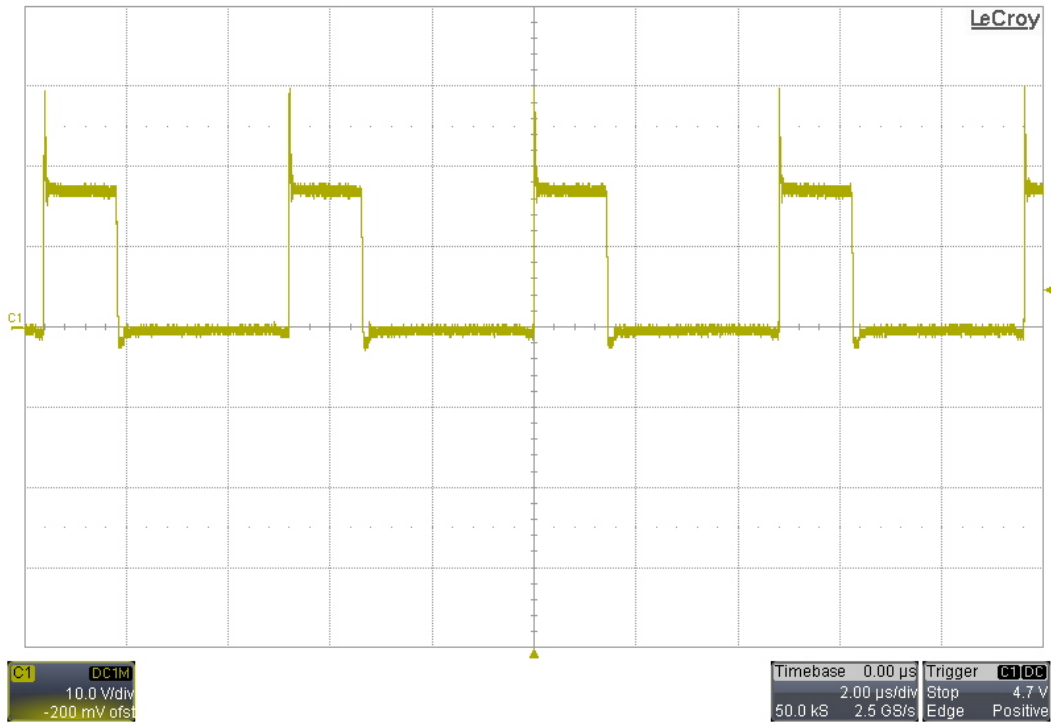


### 9.2 Primary FET (Q9) Vds – 250VDC Input, 20A Load

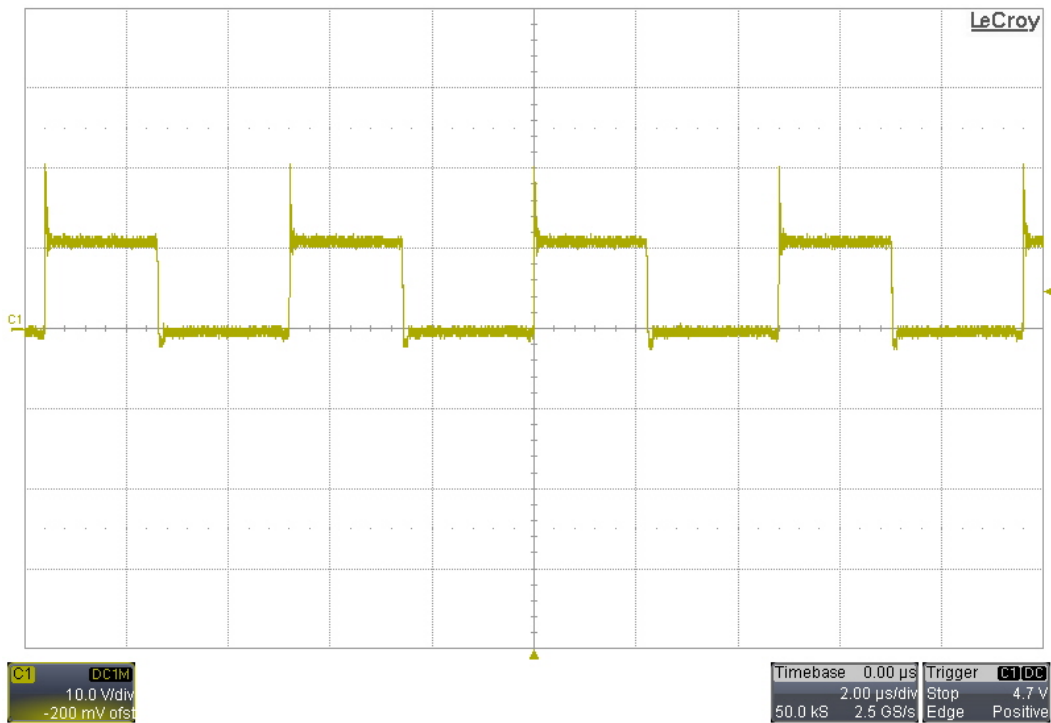


## 10 Synchronous FET Drain Waveforms

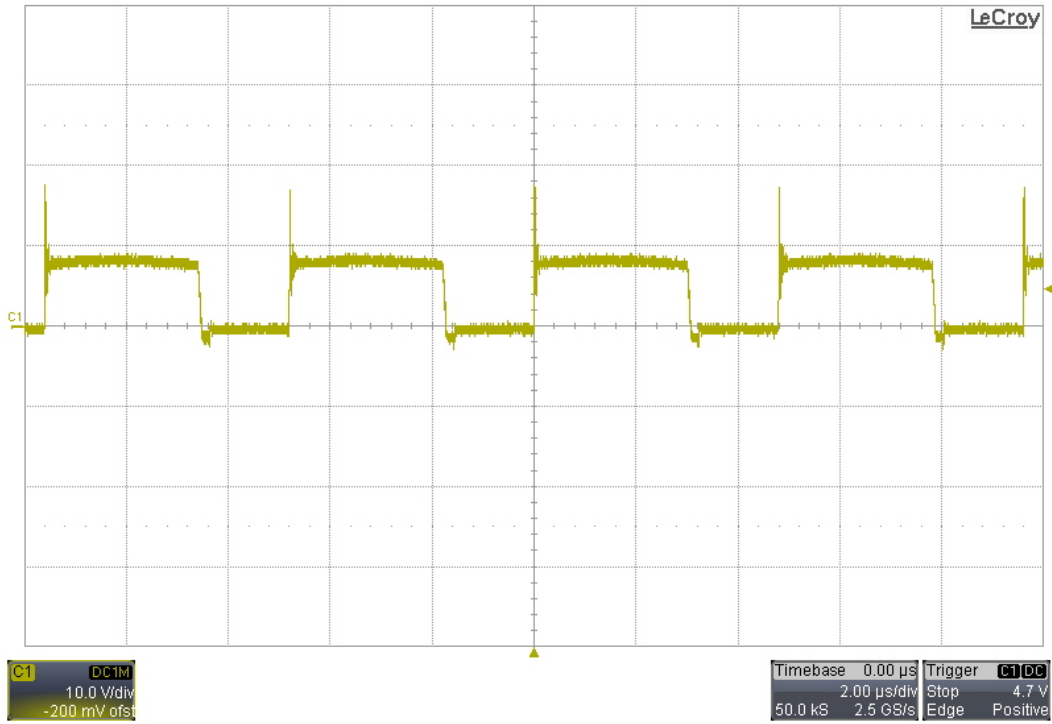
### 10.1 Q3 Synchronous FET Vds – 400VDC Input, 20A Load



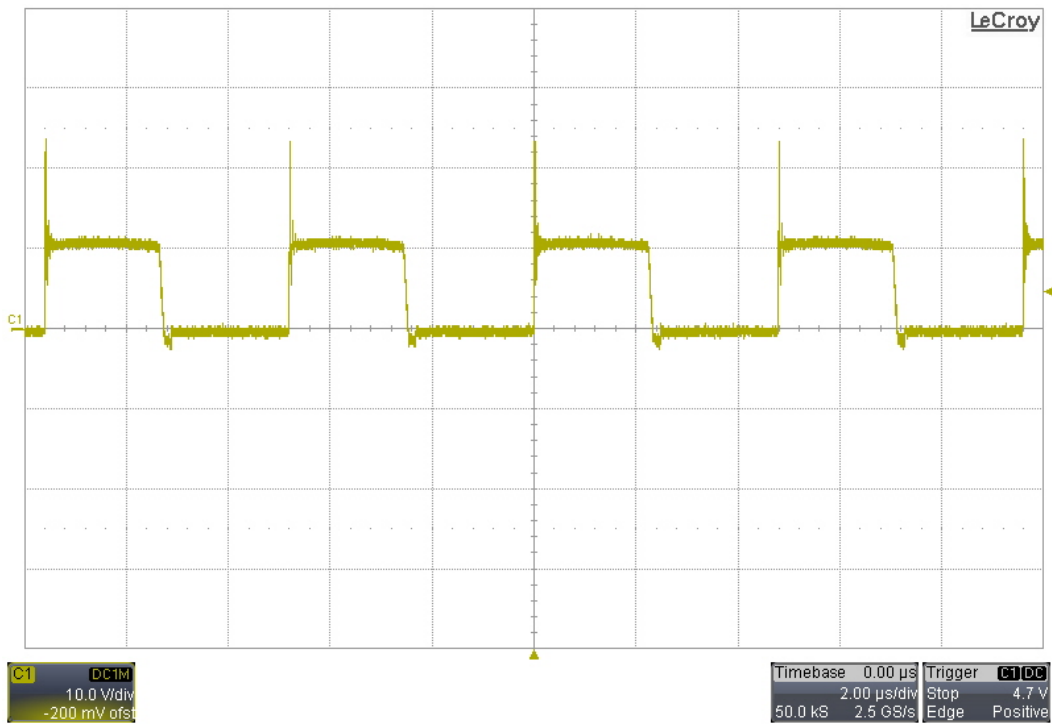
### 10.2 Q3 Synchronous FET Vds – 250VDC Input, 20A Load



## 10.3 Q10 Synchronous FET Vds – 400VDC Input, 20A Load



## 10.4 Q10 Synchronous FET Vds – 250VDC Input, 20A Load



## 11 Synchronization Output

Channel 1 shows the voltage on the gate of the primary FET (Q9). Channel 2 shows the sync output (TP5). The sync output signal was pulled up to an external 20V source through a 30k resistor.

