Test Report
For PMP10739
09/16/2015

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1. Design Specifications

Vin Minimum	**90VDC**
Vin Maximum	**110VDC**
Vout	**12 VDC**
Iout	**0.3A**
Approximate Switching Frequency	**~150KHz**

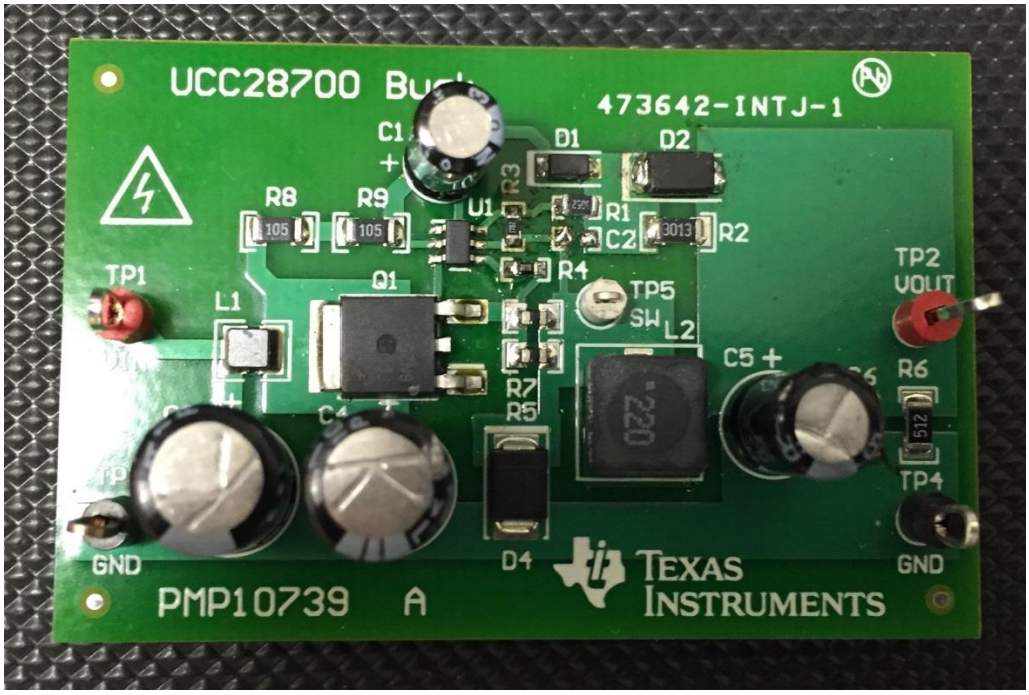
2. Circuit Description and PCB details

PMP10739 is a 3.6W buck converter using the UCC28700 controller IC. The design accepts an input voltage of 90Vin to 110Vin and provides an output of 12Vout capable of supplying 0.3A of current to the load. The UCC28700 has a frequency dithering feature for reduced EMI.

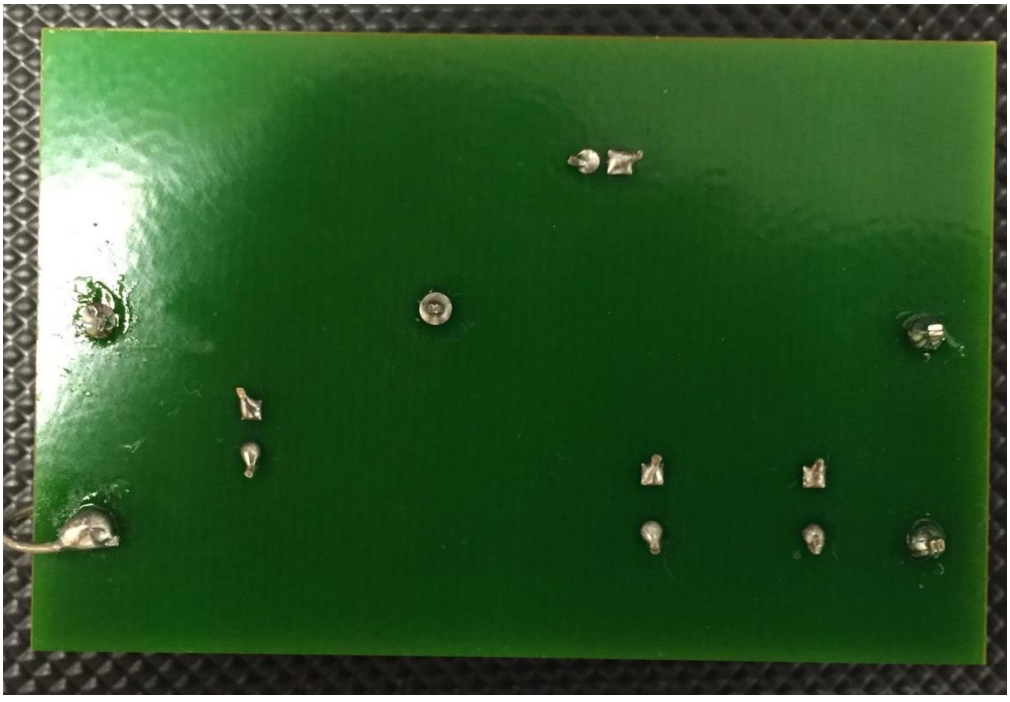
The design was built on PMP10739 with a dimension of 58.4mm * 38.1mm. One layer PCB was used for the design, 1oz copper on top layer.

3. PMP10739 Board Photos

Board Dimensions: 58.4mm x 38.1mm

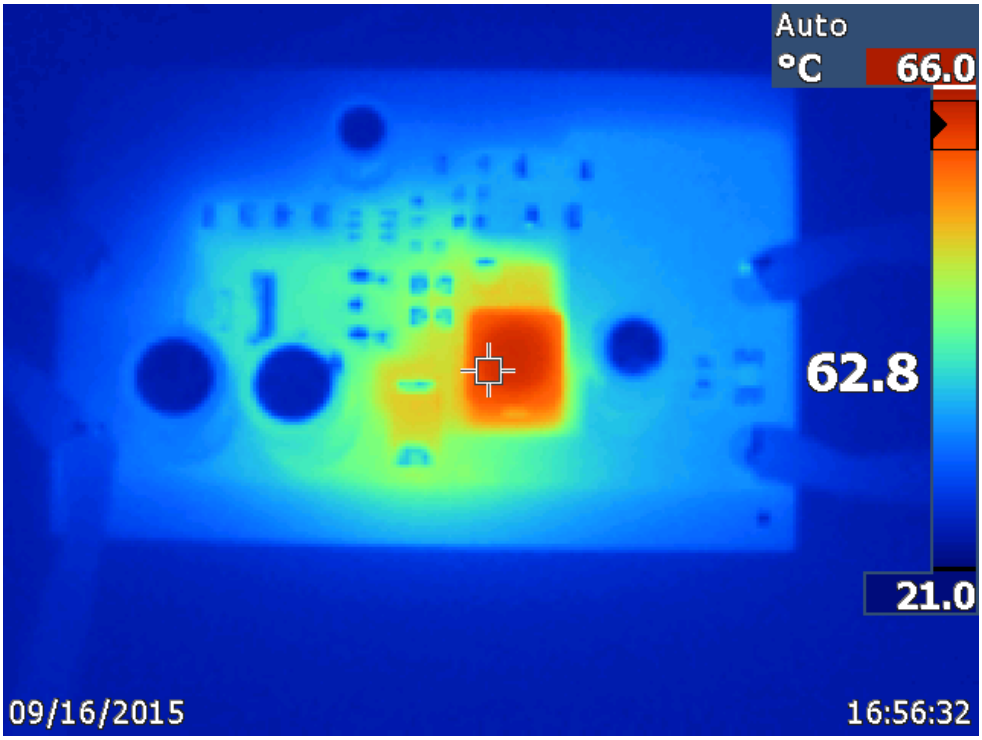


Board Photo (Top)

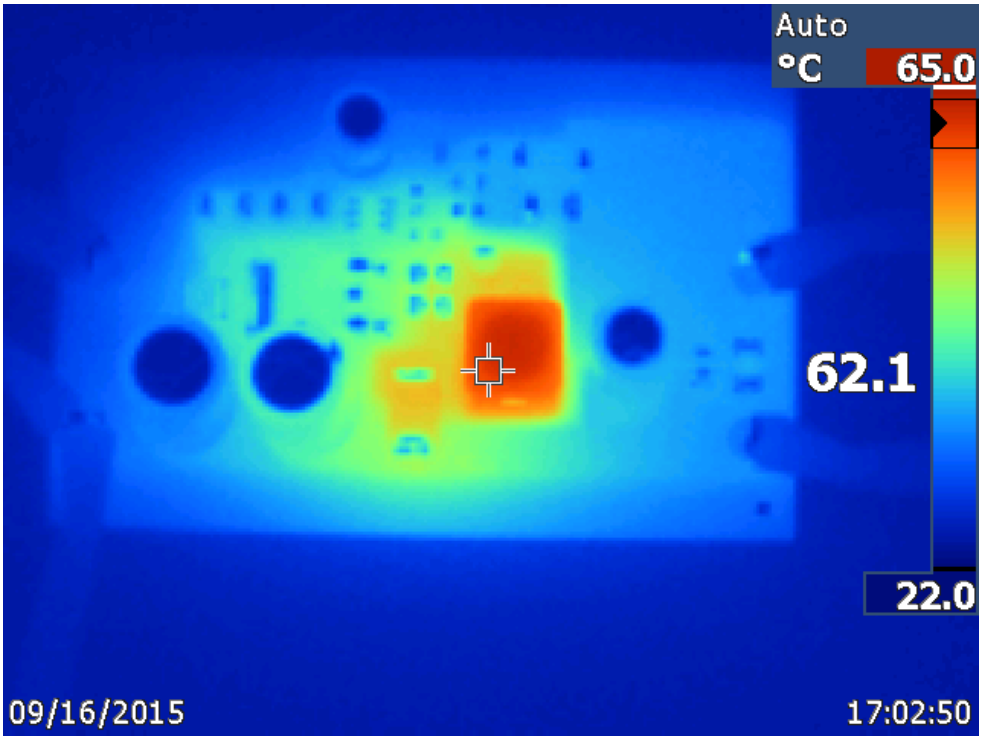


Board Photo (Bottom)

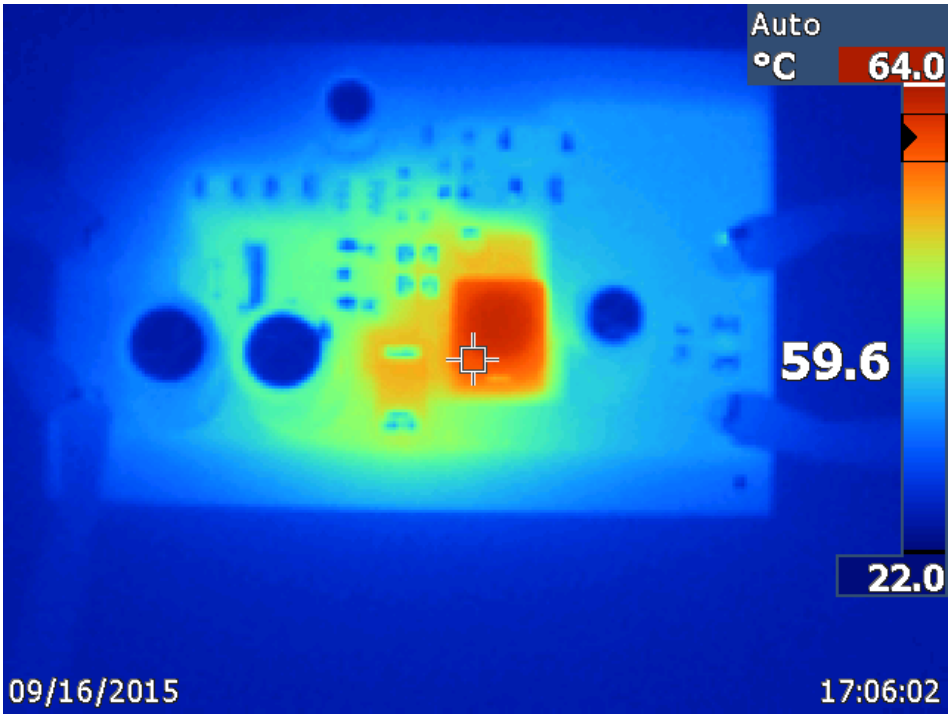
4. Thermal Data



IR thermal image taken at steady state with 110Vin and 0.3A load (no airflow)



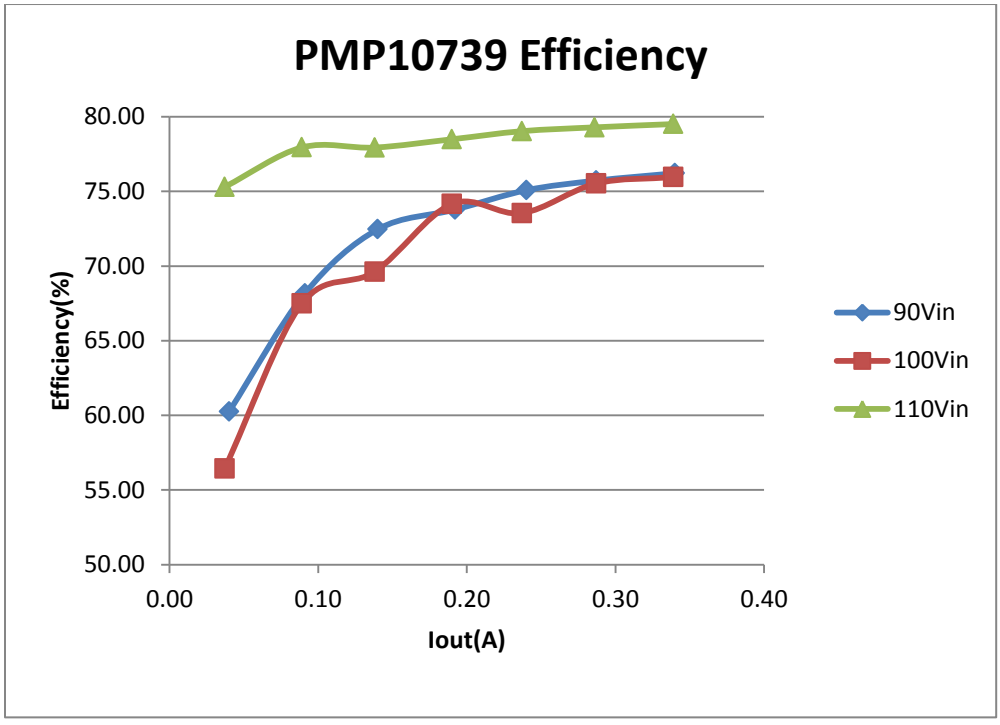
IR thermal image taken at steady state with 100Vin and 0.3A load (no airflow)



IR thermal image taken at steady state with 110Vin and 0.3A load (no airflow)

5. Efficiency

5.1 Efficiency Chart

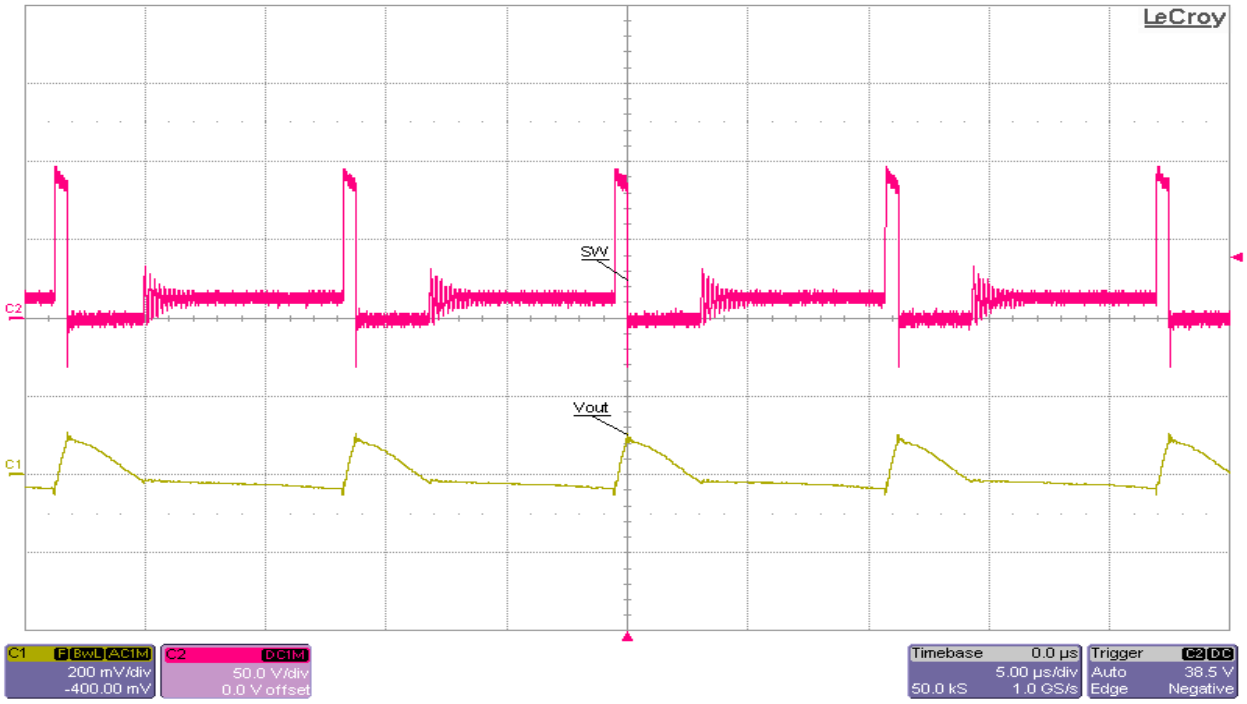


5.2 Efficiency Data

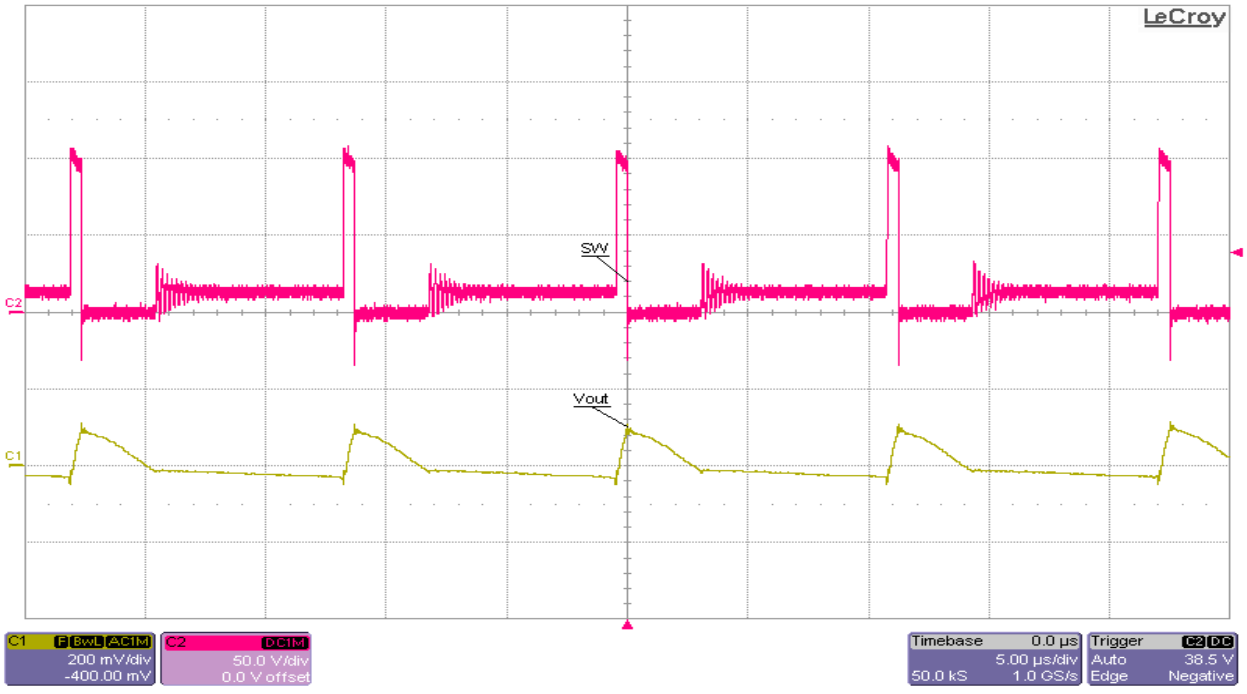
Vin(V)	Iin(A)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Losses(W)	Efficiency(%)
90.046	0.002	0.180	12.184	0.000	0.000	0.180	0.000
90.046	0.009	0.810	12.207	0.040	0.488	0.322	60.251
90.046	0.018	1.621	12.140	0.091	1.105	0.516	68.159
90.046	0.026	2.341	12.117	0.140	1.696	0.645	72.458
90.046	0.035	3.152	12.110	0.192	2.325	0.826	73.776
90.045	0.043	3.872	12.112	0.240	2.907	0.965	75.076
90.045	0.051	4.592	12.116	0.287	3.477	1.115	75.720
90.045	0.060	5.403	12.111	0.340	4.118	1.285	76.216
90.045	0.064	5.763	11.188	0.388	4.341	1.422	75.326
90.045	0.061	5.493	9.451	0.438	4.140	1.353	75.364
100.049	0.002	0.200	12.175	0.000	0.000	0.200	0.000
100.049	0.008	0.800	12.206	0.037	0.452	0.349	56.425
100.049	0.016	1.601	12.138	0.089	1.080	0.521	67.485
100.049	0.024	2.401	12.114	0.138	1.672	0.729	69.621
100.049	0.031	3.102	12.106	0.190	2.300	0.801	74.162
100.049	0.039	3.902	12.108	0.237	2.870	1.032	73.543
100.049	0.046	4.602	12.112	0.287	3.476	1.126	75.531
100.049	0.054	5.403	12.105	0.339	4.104	1.299	75.955
100.049	0.057	5.703	11.066	0.388	4.294	1.409	75.290
100.048	0.055	5.503	9.244	0.440	4.067	1.435	73.917
110.000	0.001	0.064	12.160	0.000	0.000	0.064	0.000
110.000	0.005	0.600	12.200	0.037	0.451	0.148	75.296
110.000	0.013	1.386	12.138	0.089	1.080	0.306	77.942
110.000	0.020	2.145	12.114	0.138	1.672	0.473	77.936
110.000	0.027	2.930	12.106	0.190	2.300	0.630	78.492
110.000	0.033	3.630	12.105	0.237	2.869	0.761	79.033
110.000	0.040	4.367	12.107	0.286	3.463	0.904	79.290
110.000	0.047	5.159	12.100	0.339	4.102	1.057	79.510
110.000	0.050	5.456	11.111	0.388	4.311	1.145	79.015
110.000	0.048	5.280	9.300	0.440	4.092	1.188	77.500

6 Waveforms

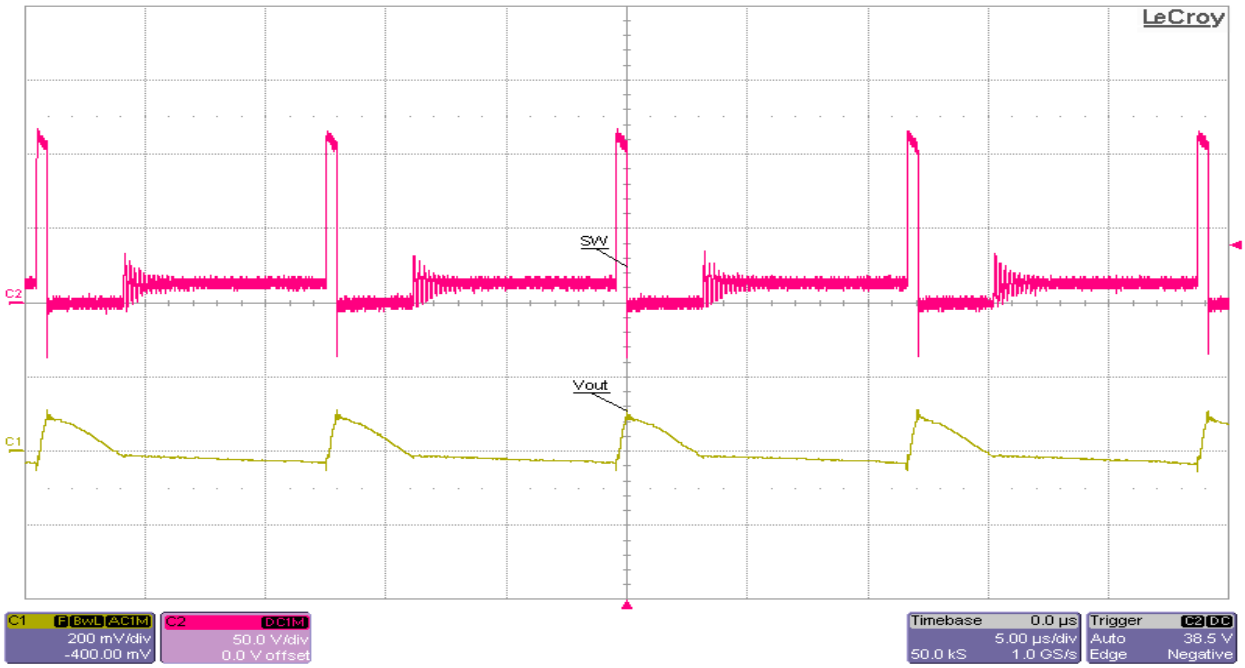
6.1 Switch Node Voltage and Ripple



Switch Node Voltage at 90Vin and Full (0.3A) Load. Ch2-Primary SW, Ch1-Vout (AC Coupled).



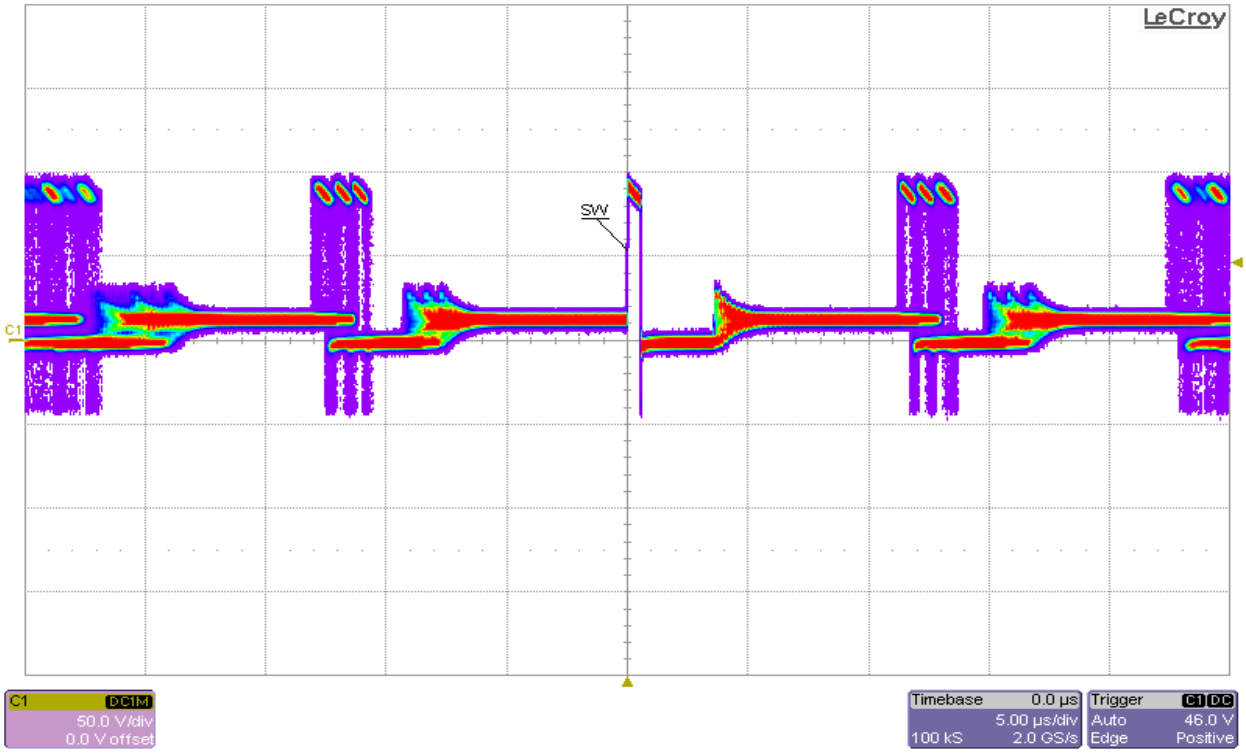
Switch Node Voltage at 100Vin and Full (0.3A) Load. Ch2-Primary SW, Ch1-Vout (AC Coupled).



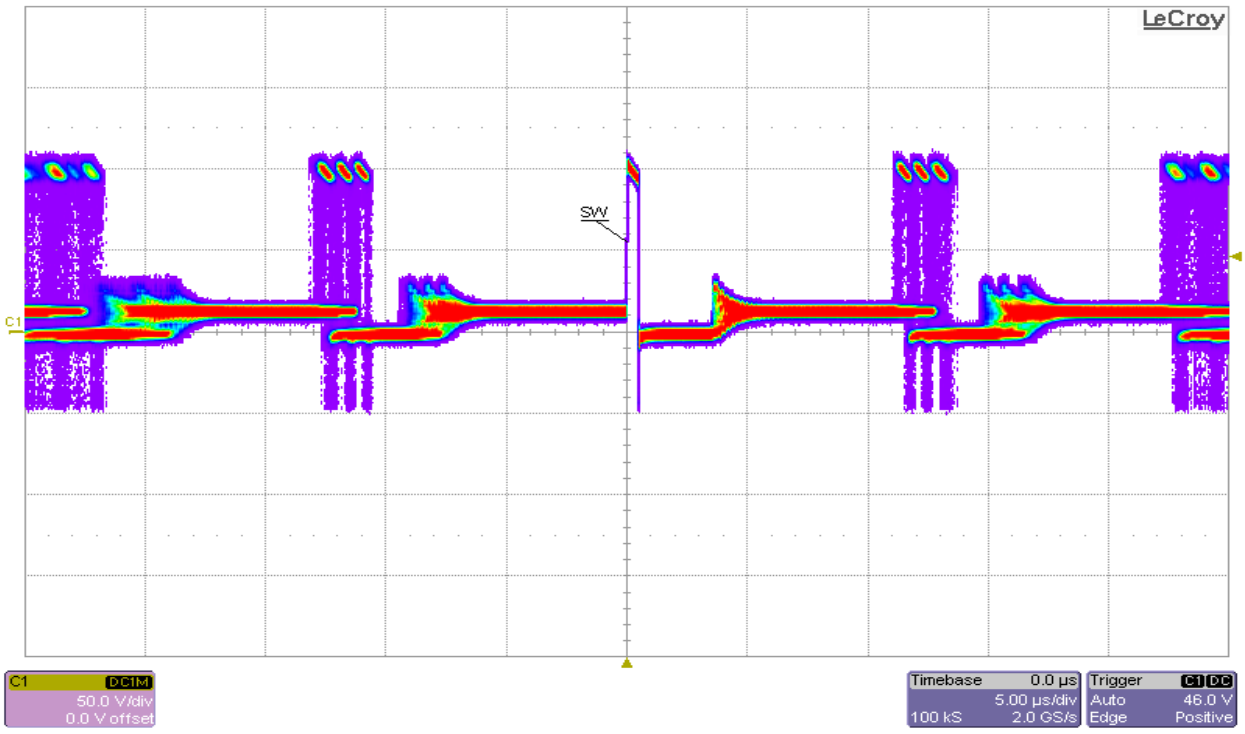
Switch Node Voltage at 110Vin and Full (0.3A) Load. Ch2-Primary SW, Ch1-Vout (AC Coupled).

6.2 Frequency Dither

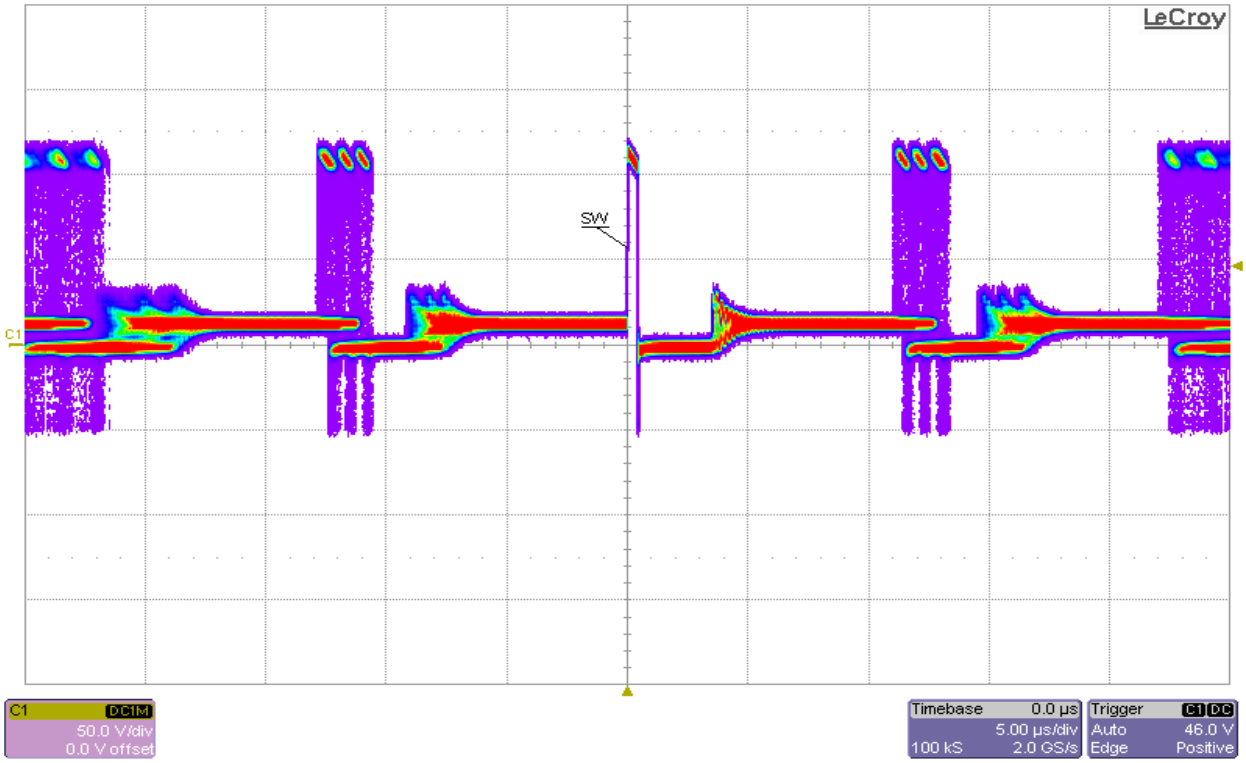
The UCC287xx PSR controller uses a frequency dithering scheme to reduce EMI.



Switch Node Frequency Dither at 90Vin and Full (0.3A) Load. Ch1-Primary SW.

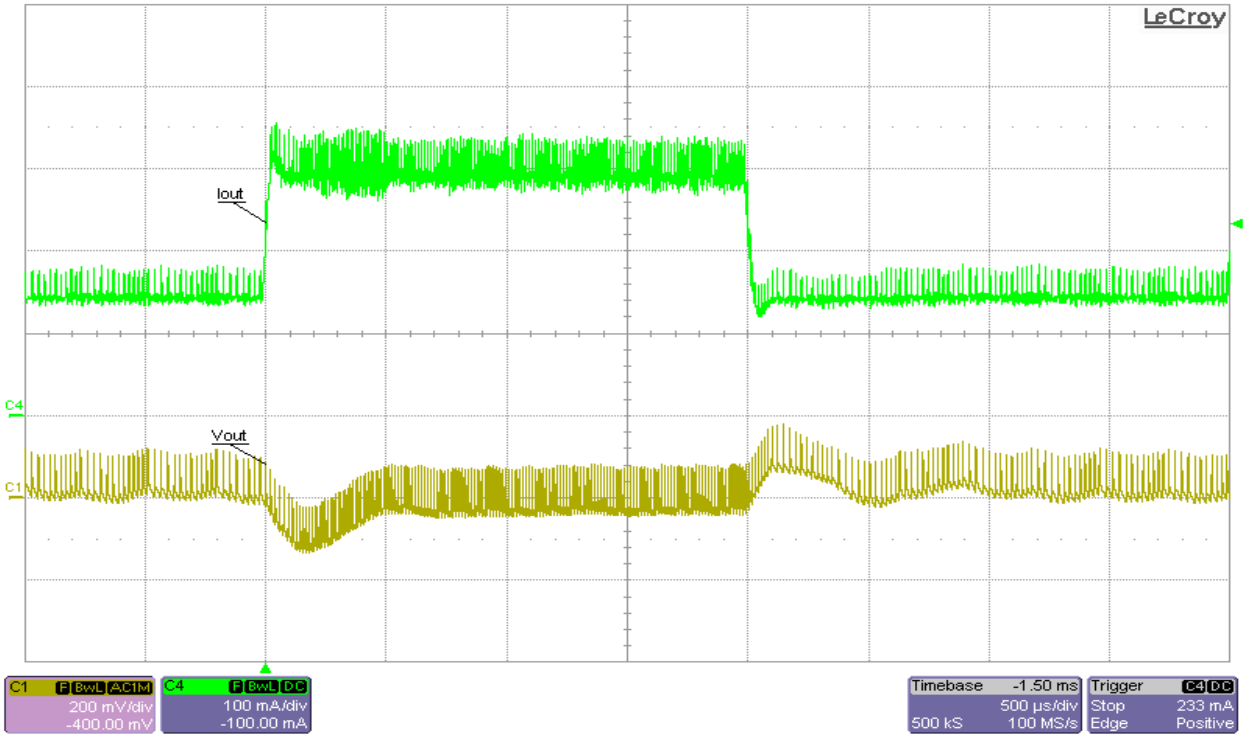


Switch Node Frequency Dither at 100Vin and Full (0.3A) Load. Ch1-Primary SW.

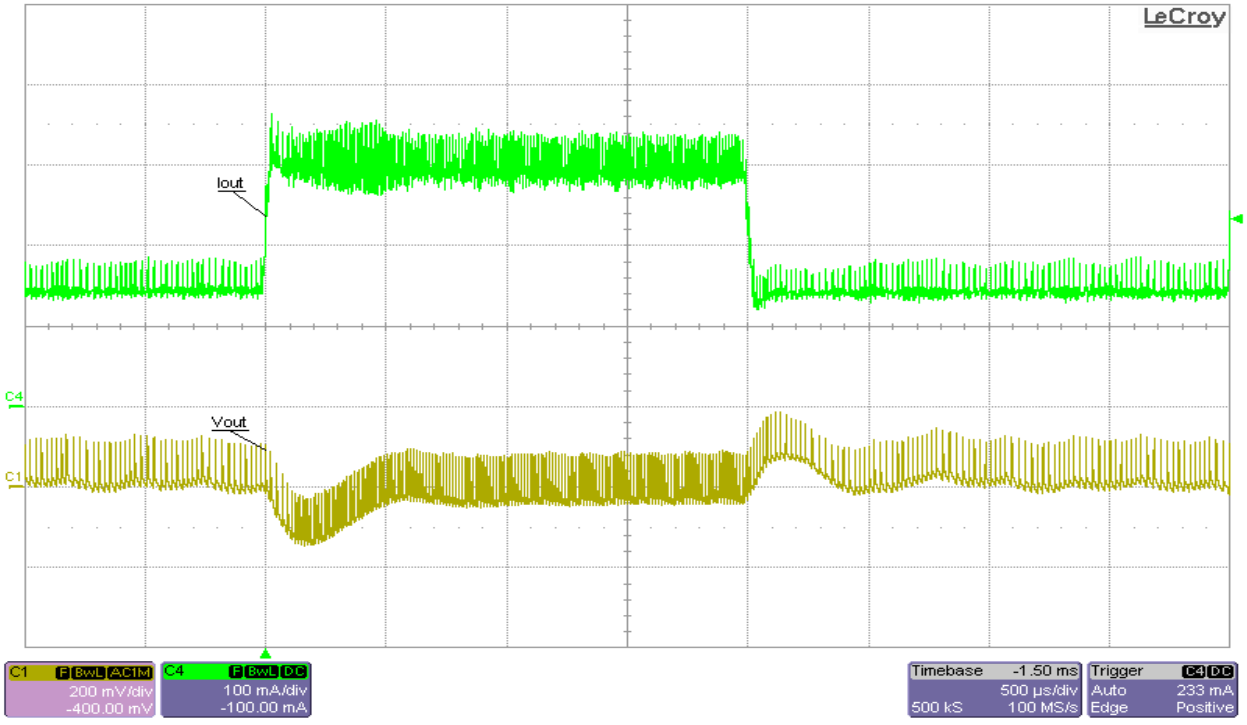


Switch Node Frequency Dither at 110Vin and Full (0.3A) Load. Ch1-Primary SW.

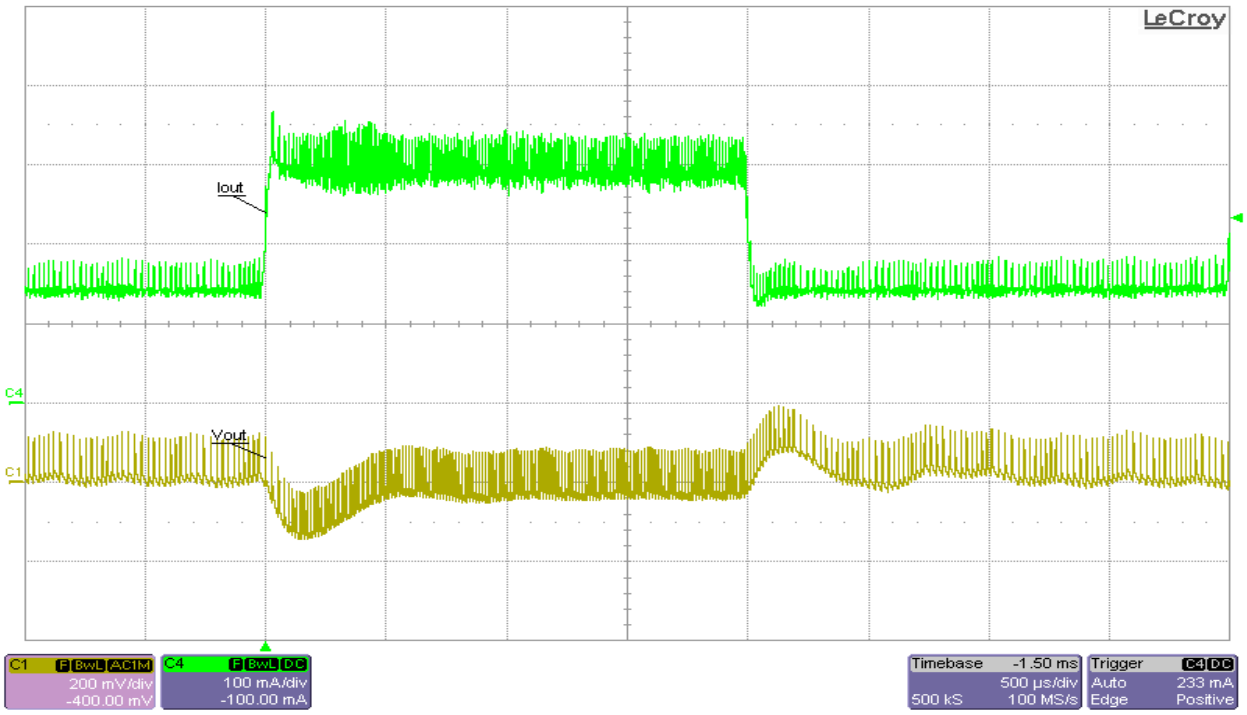
6.3 Load Transient



Load Transient from 50% Load to 100% Load at 90Vin. Ch1-Vout, Ch4-Iout.



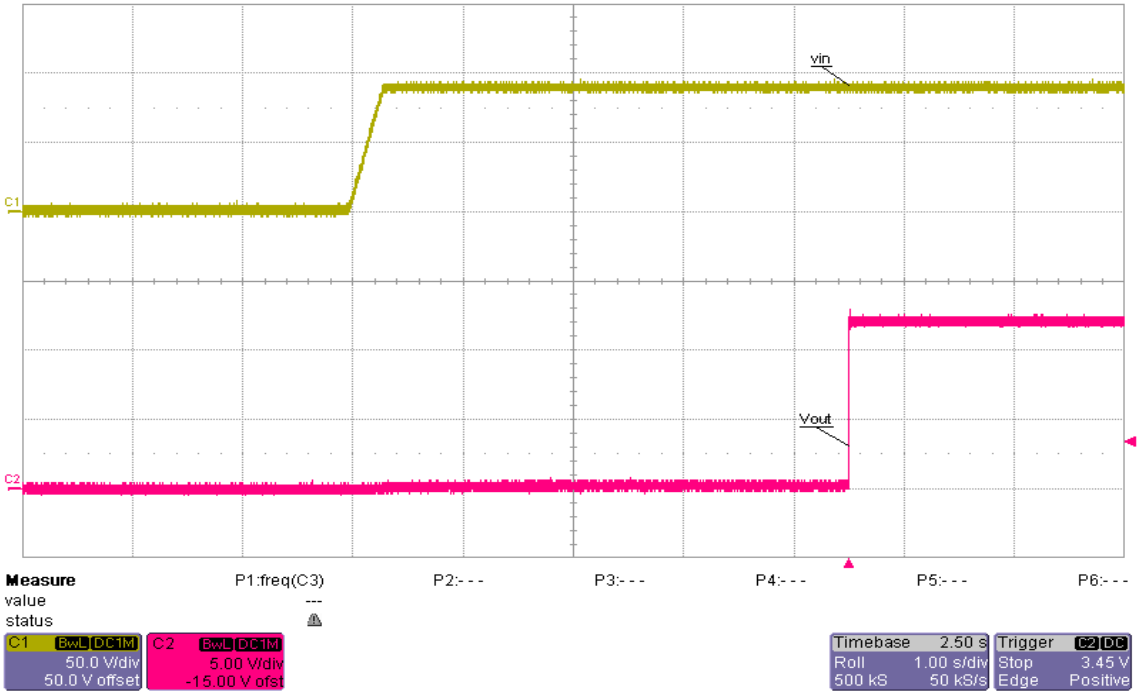
Load Transient from 50% Load to 100% Load at 100Vin. Ch1-Vout, Ch4-Iout.



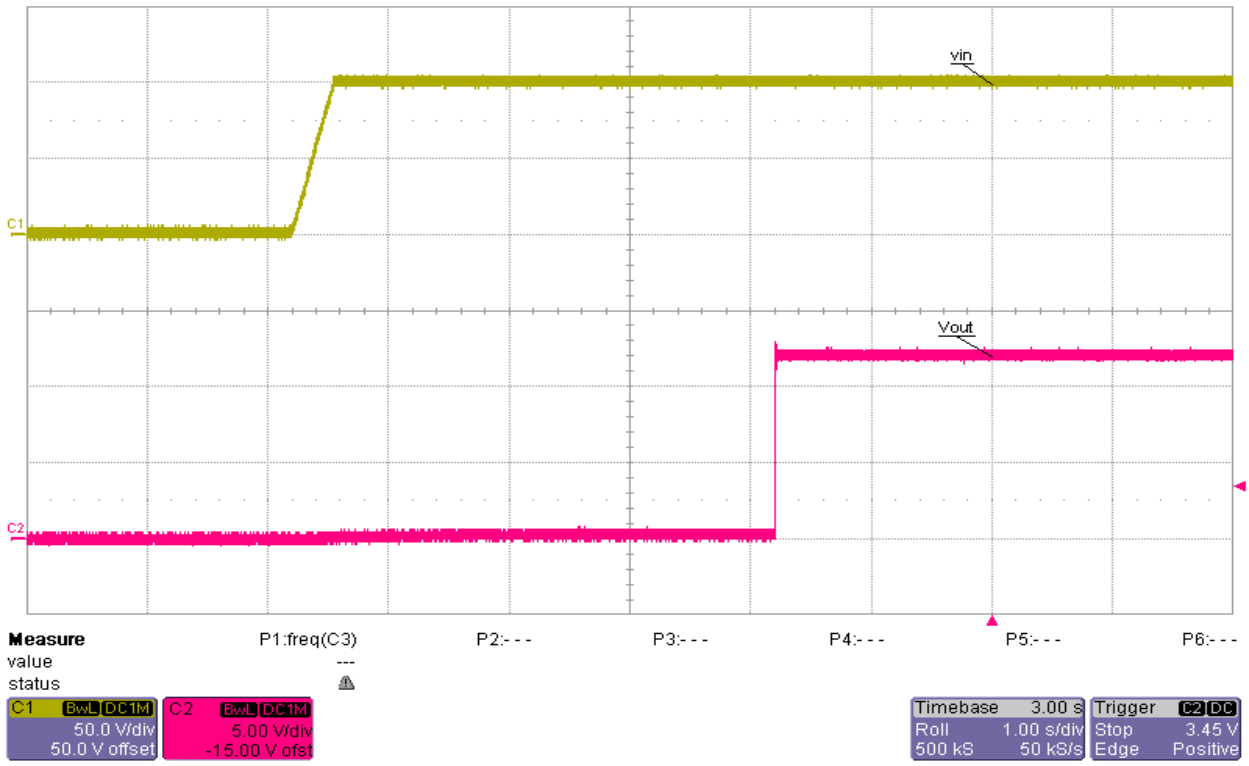
Load Transient from 50% Load to 100% Load at 110Vin. Ch1-Vout, Ch4-Iout.

6.4 Start-up

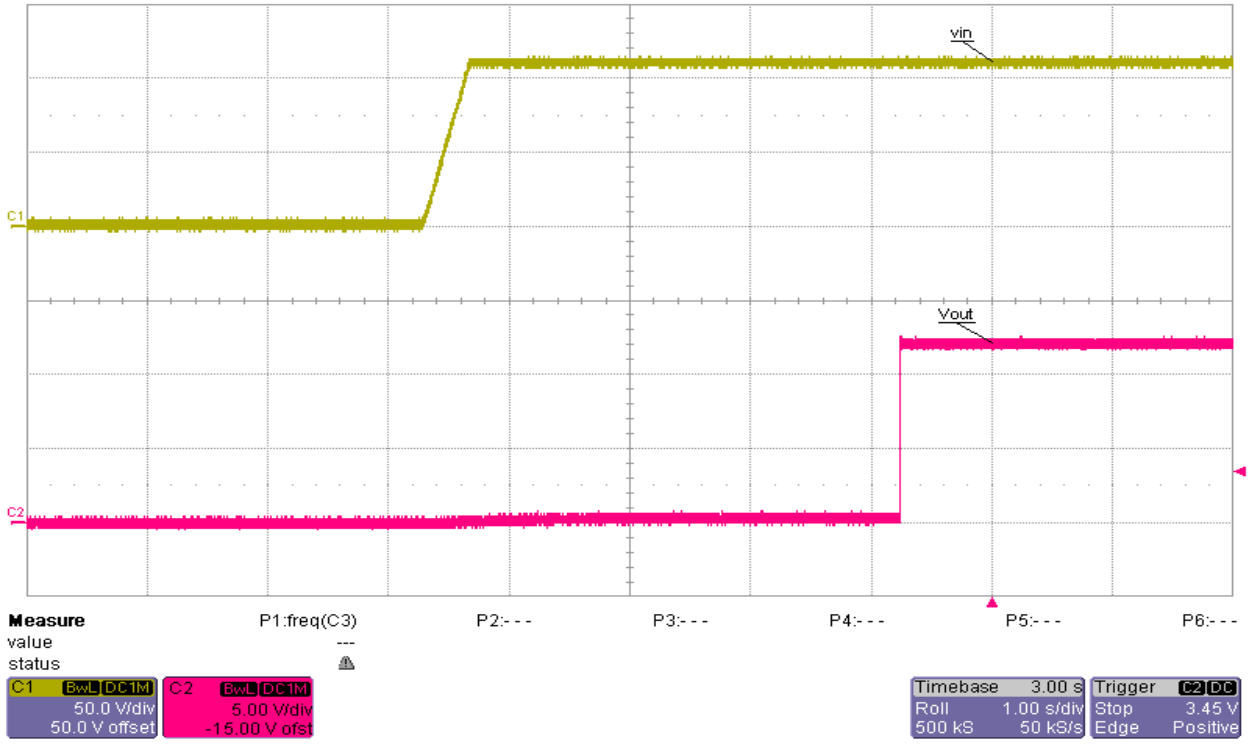
Startup delay time is controlled by 2MΩ VIN to VDD resistor charging 10µF bias capacitor.



Start-up into Full Load at 90Vin. Ch1-Vin, Ch2-Vout. ~4.5s Start-up Delay Time.

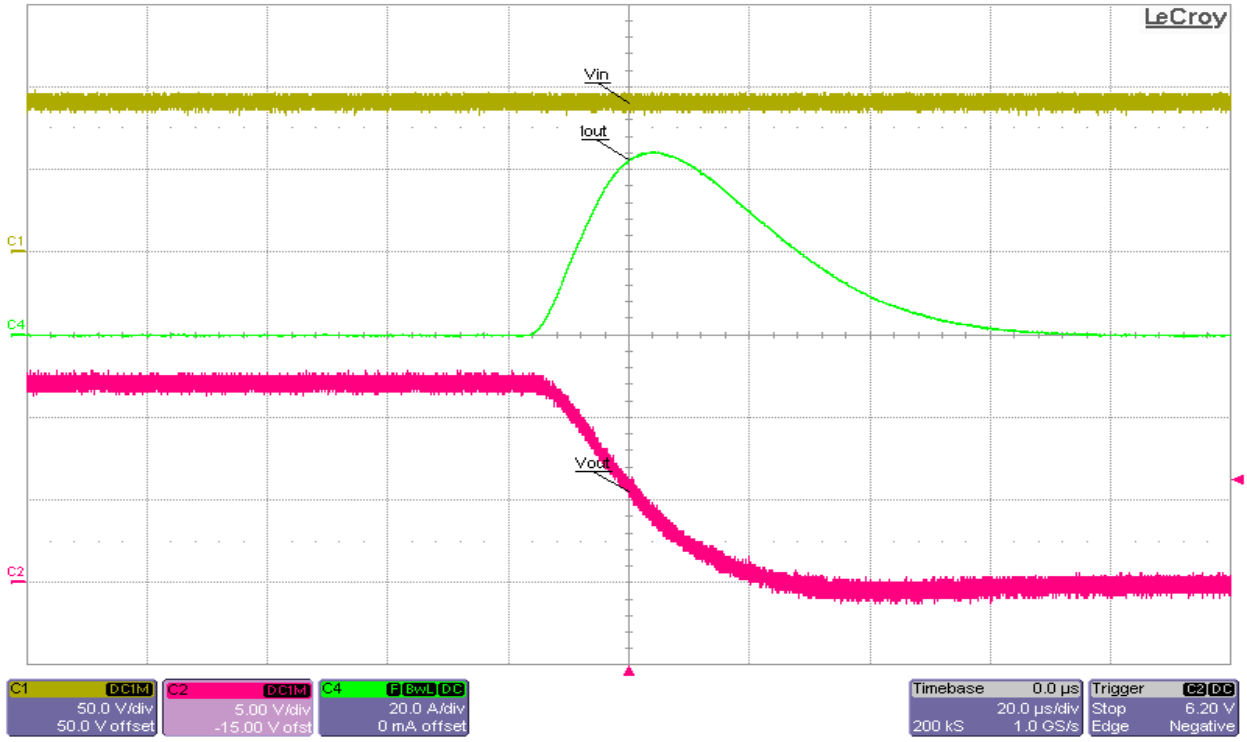


Start-up into Full Load at 100Vin. Ch1-Vin, Ch2-Vout. ~4s Start-up Delay Time.

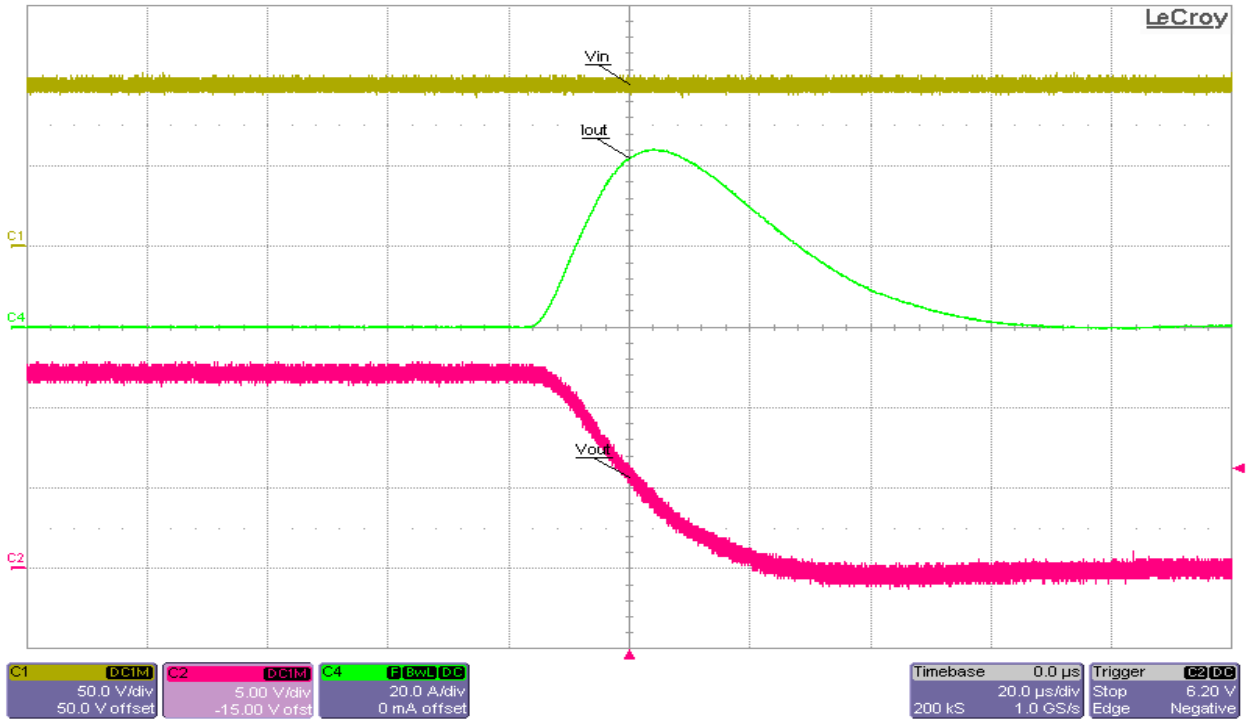


Start-up into Full Load at 110Vin. Ch1-Vin, Ch2-Vout. ~4s Start-up Delay Time.

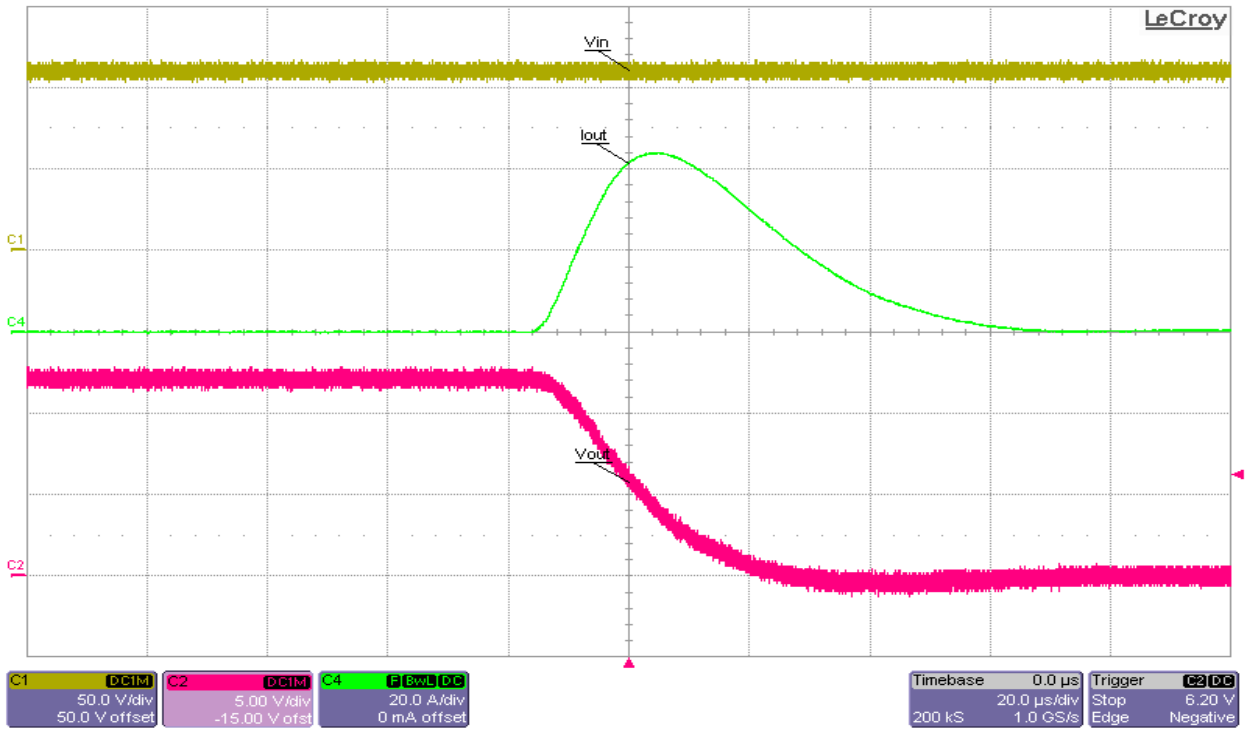
6.5 Short Circuit



No Load Short Circuit at 90Vin. Ch1-Vin, Ch2-Vout, Ch4-Iout.

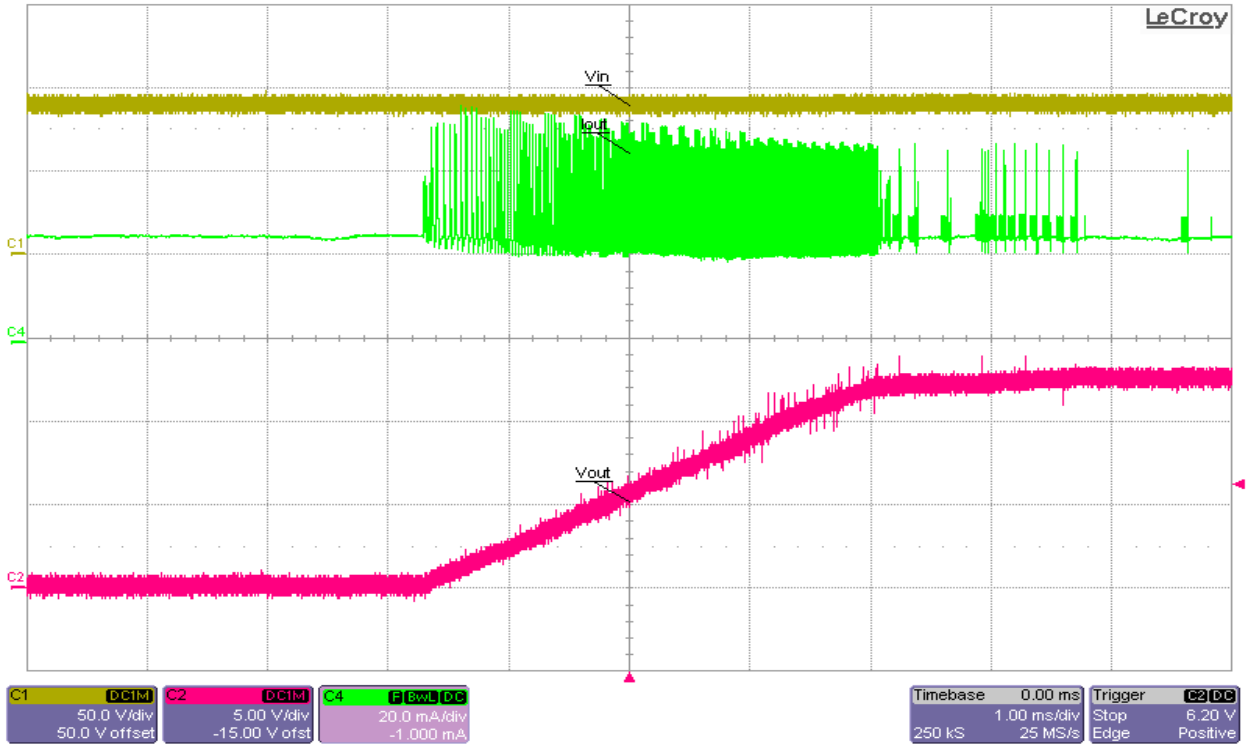


No Load Short Circuit at 100Vin. Ch1-Vin, Ch2-Vout, Ch4-Iout.

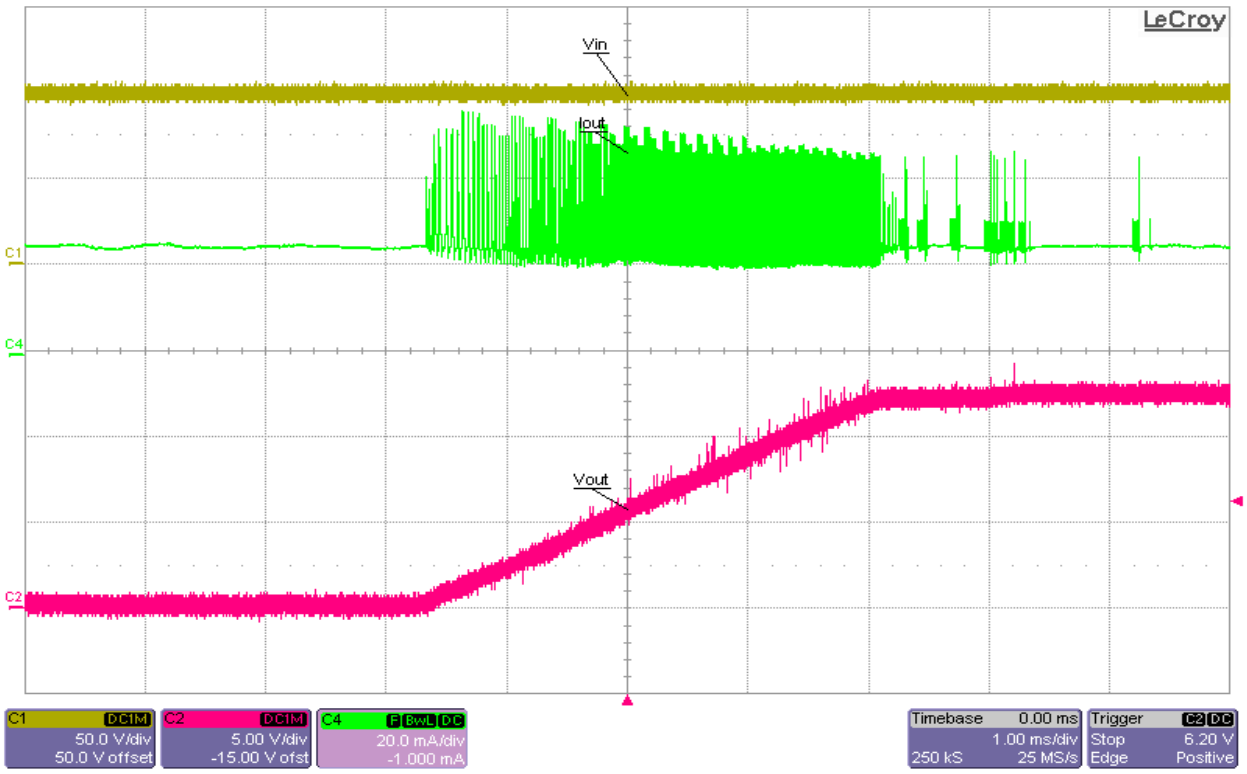


No Load Short Circuit at 110Vin. Ch1-Vin, Ch2-Vout, Ch4-Iout.

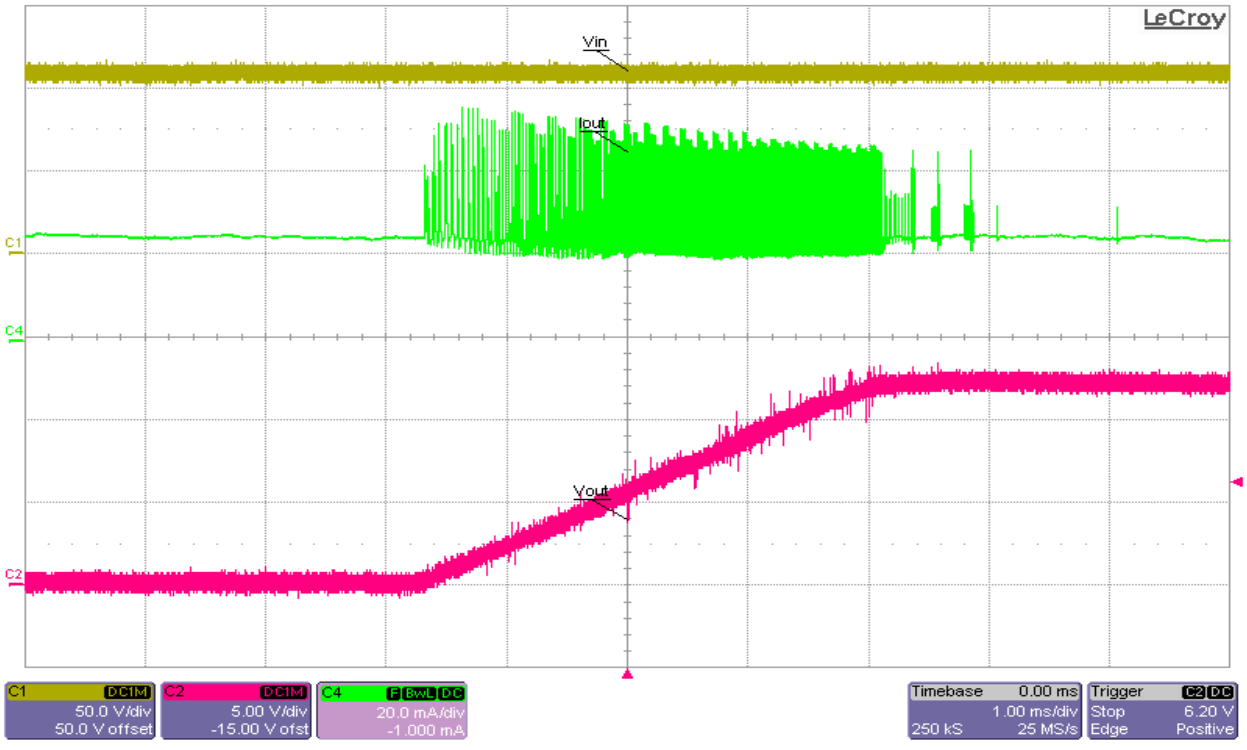
6.6 Short Circuit Recovery



No Load Short Circuit Recovery at 90Vin. Ch1-Vin, Ch2-Vout, Ch4-Iout.



No Load Short Circuit Recovery at 100Vin. Ch1-Vin, Ch2-Vout, Ch4-Iout.



No Load Short Circuit Recovery at 110Vin. Ch1-Vin, Ch2-Vout, Ch4-Iout.

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