Test Data
For PMP20330 Flybuck
12/20/2016

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1. Design Specifications

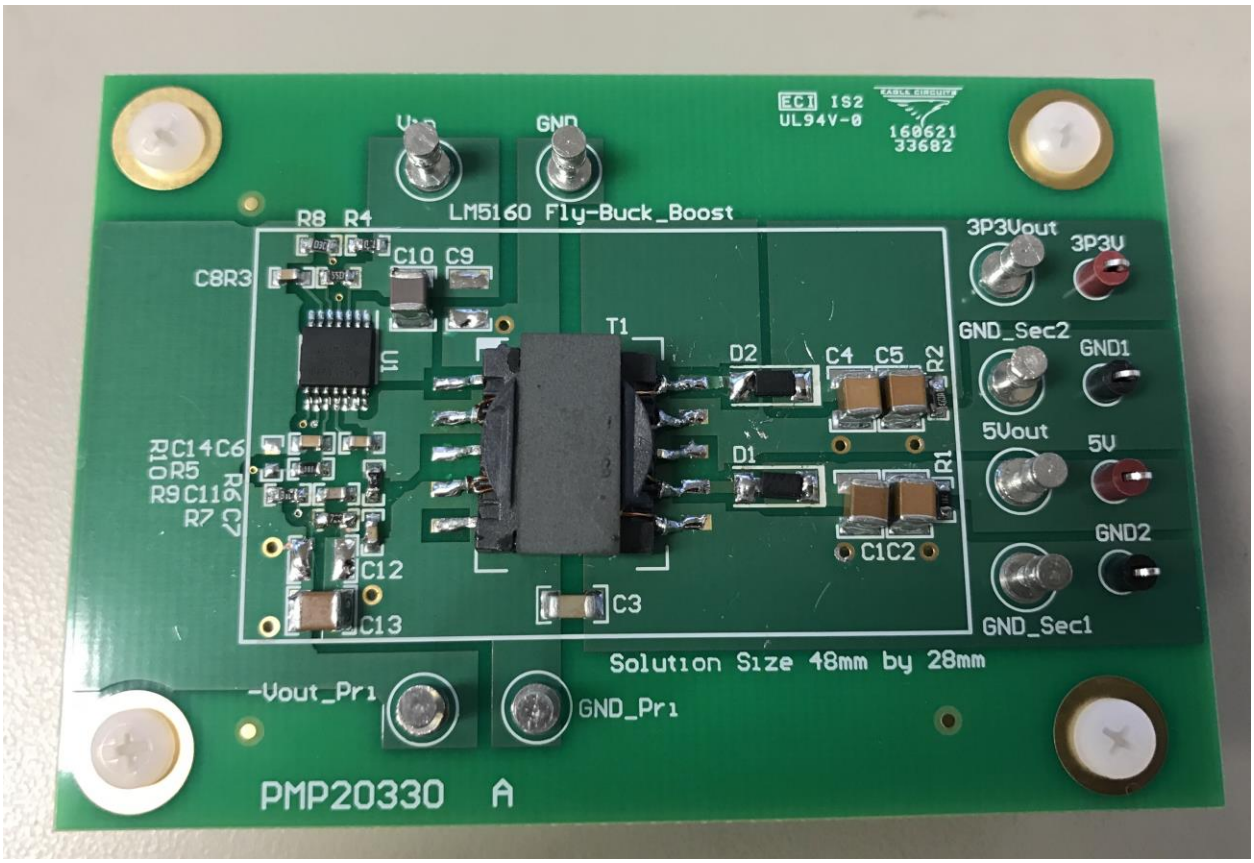
Vin Minimum	**18VDC**
Vin Maximum	**31VDC**
Vout	**+3.3VDC @ 1A and +5VDC @ 0.5A**
Nominal Switching Frequency	**≈ 200KHz**

2. Circuit Description

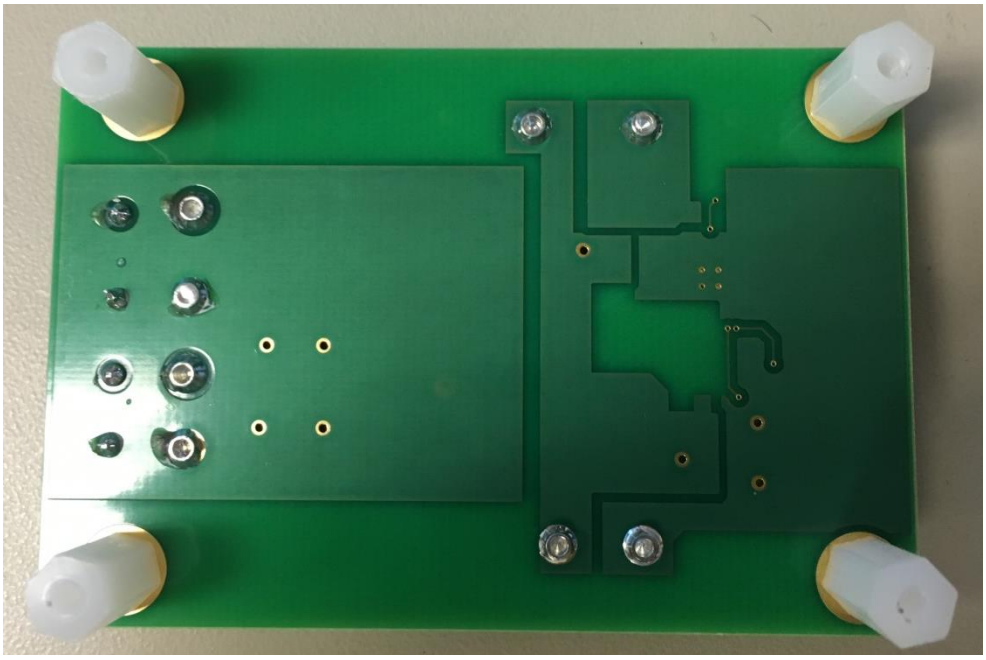
PMP20330 is an isolated Flybuck converter utilizing the LM5160 for industrial applications. This design has a minimum operating input voltage of 18V and a maximum input voltage of 31V. The design is capable of sourcing 1A continuous current at 3.3Vout and 0.5A current at 5Vout. Switching frequency is set to 200kHz. A custom transformer from Wurth is used.

3. PMP20330 Board Photos

Board Dimensions: 79mm x 107mm



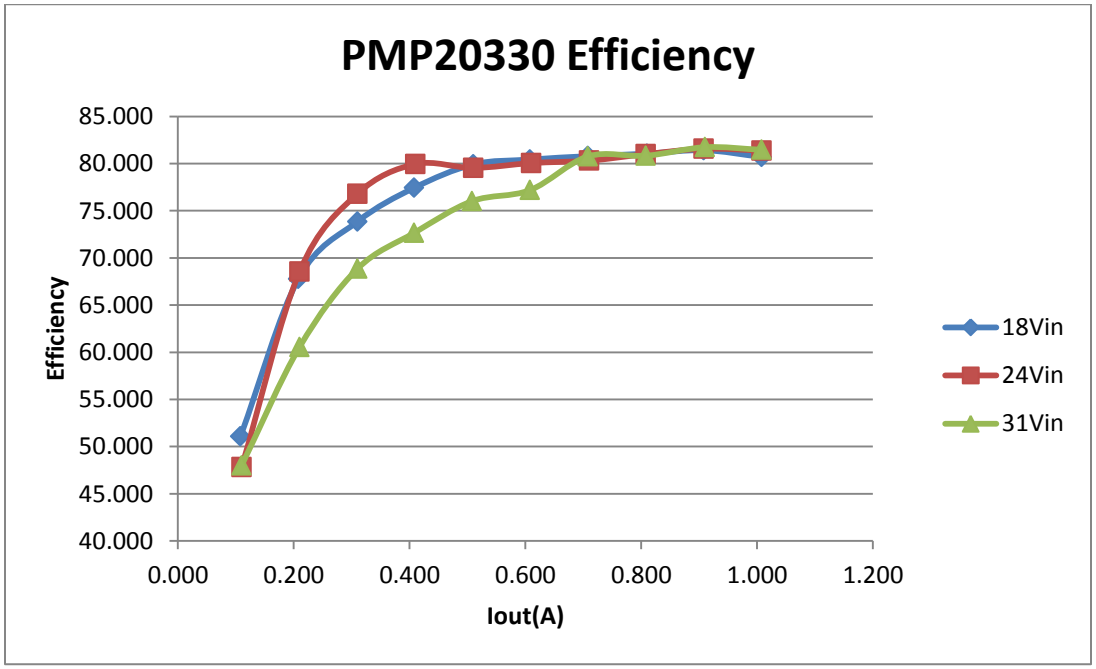
Board Photo (Top)



Board Photo (Bottom)

4 Efficiency

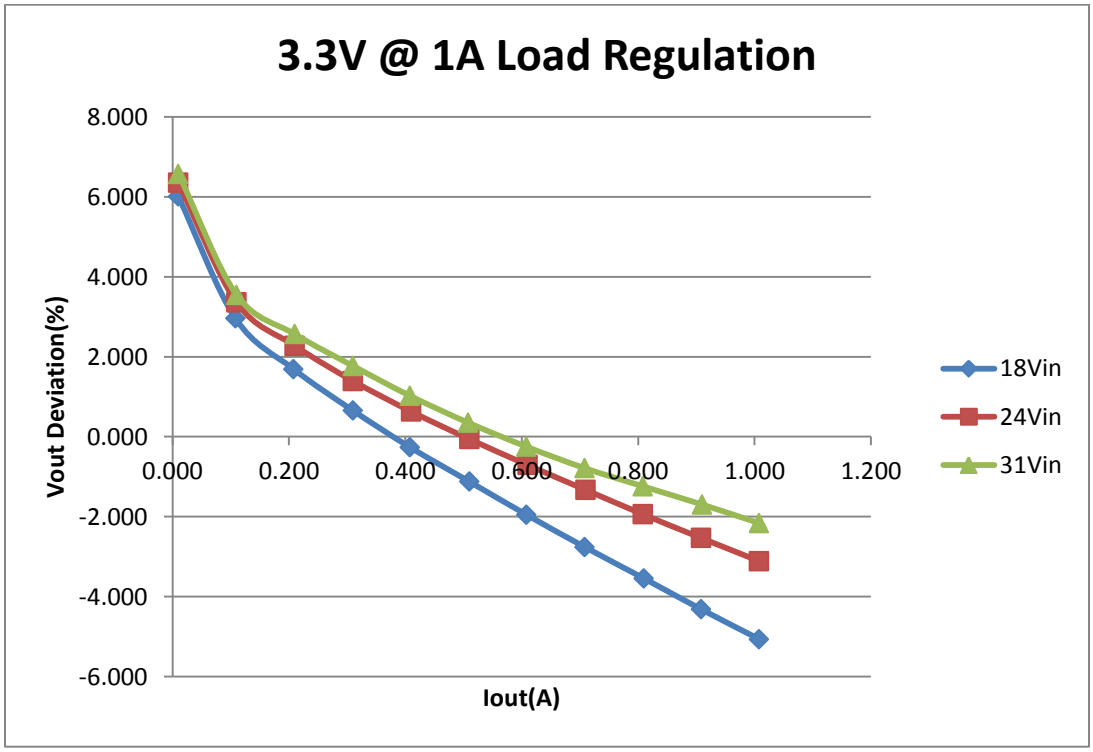
4.1 Efficiency Chart

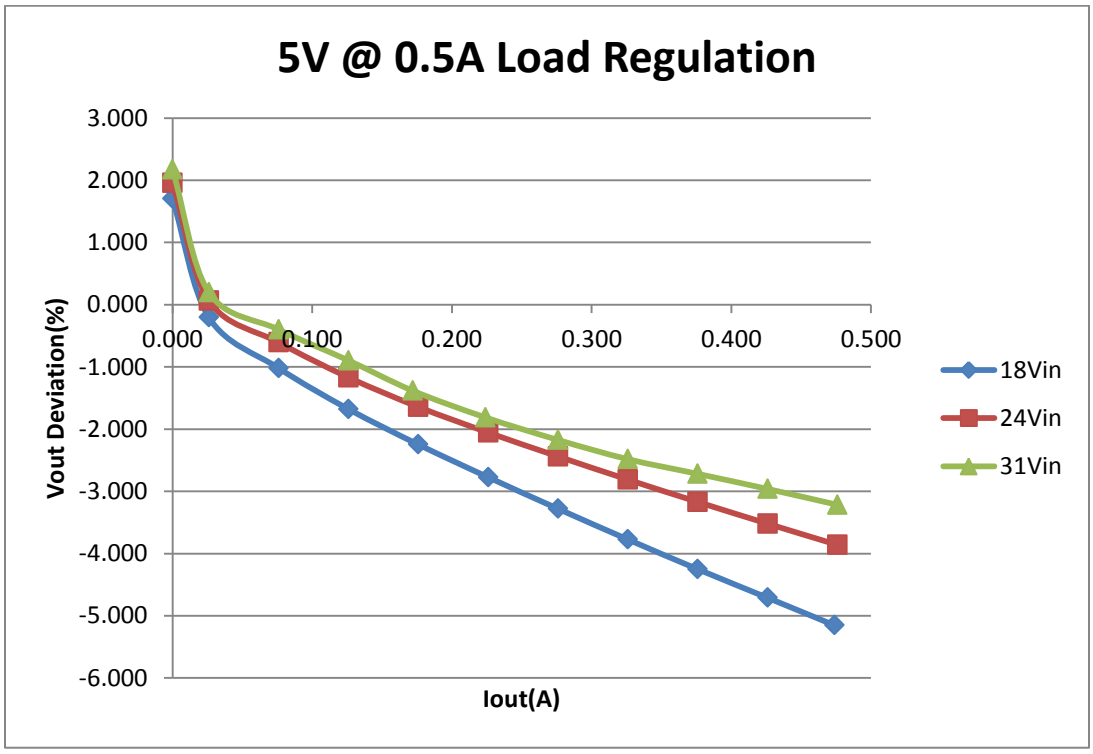


4.2 Efficiency Data

Vin (V)	Iin (A)	Vout1 (V)	Iout (A)	Vout2 (V)	Iout2 (A)	Pin (W)	Pout(W)	Losses (W)	Efficiency
18.007	0.018	5.085	0.000	3.498	0.010	0.324	0.035	0.289	10.802
18.007	0.054	4.990	0.026	3.398	0.108	0.972	0.497	0.476	51.081
18.007	0.088	4.949	0.076	3.356	0.208	1.585	1.074	0.510	67.786
18.007	0.124	4.916	0.126	3.322	0.310	2.233	1.649	0.584	73.858
18.007	0.158	4.888	0.176	3.291	0.408	2.845	2.203	0.642	77.435
18.006	0.192	4.861	0.226	3.263	0.510	3.457	2.763	0.694	79.913
18.006	0.228	4.836	0.276	3.236	0.608	4.105	3.302	0.803	80.429
18.006	0.264	4.811	0.326	3.209	0.708	4.754	3.840	0.913	80.790
18.006	0.300	4.787	0.376	3.183	0.810	5.402	4.378	1.024	81.052
18.006	0.334	4.764	0.426	3.158	0.908	6.014	4.897	1.117	81.423
18.007	0.372	4.742	0.474	3.133	1.008	6.698	5.406	1.293	80.704
24.014	0.018	5.098	0.000	3.510	0.010	0.432	0.035	0.397	8.100
24.014	0.044	5.003	0.026	3.411	0.110	1.057	0.505	0.551	47.820
24.014	0.066	4.970	0.076	3.375	0.210	1.585	1.086	0.498	68.551
24.014	0.090	4.942	0.126	3.346	0.310	2.161	1.660	0.501	76.802
24.014	0.116	4.918	0.176	3.321	0.410	2.786	2.227	0.559	79.949
24.014	0.146	4.897	0.226	3.298	0.510	3.506	2.789	0.717	79.543
24.014	0.174	4.878	0.276	3.277	0.610	4.178	3.345	0.833	80.056
24.014	0.202	4.859	0.326	3.256	0.710	4.851	3.896	0.955	80.317
24.014	0.228	4.841	0.376	3.236	0.808	5.475	4.435	1.040	81.005
24.014	0.254	4.824	0.426	3.216	0.908	6.099	4.976	1.124	81.574
24.014	0.282	4.807	0.476	3.197	1.008	6.772	5.511	1.261	81.381
31.013	0.018	5.109	0.000	3.517	0.010	0.558	0.035	0.523	6.272
31.012	0.034	5.010	0.026	3.417	0.110	1.054	0.506	0.548	48.001
31.012	0.058	4.980	0.076	3.385	0.210	1.799	1.089	0.709	60.557
31.012	0.078	4.955	0.126	3.358	0.310	2.419	1.665	0.754	68.850
31.012	0.098	4.931	0.172	3.334	0.408	3.039	2.208	0.831	72.660
31.012	0.118	4.909	0.224	3.312	0.508	3.659	2.782	0.877	76.022
31.012	0.140	4.891	0.276	3.292	0.608	4.342	3.351	0.990	77.191
31.012	0.156	4.876	0.326	3.274	0.708	4.838	3.908	0.930	80.771
31.012	0.178	4.864	0.376	3.259	0.808	5.520	4.462	1.058	80.835
31.012	0.198	4.852	0.426	3.244	0.910	6.140	5.019	1.121	81.738
31.012	0.220	4.839	0.476	3.229	1.008	6.823	5.558	1.265	81.464

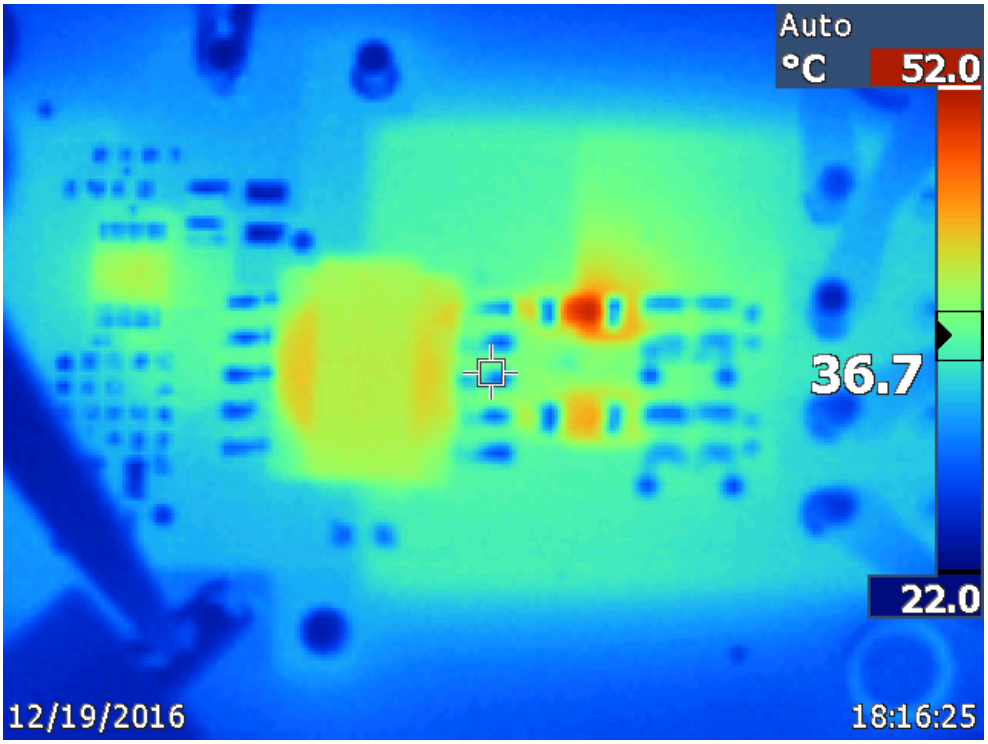
4.3 Load Regulation



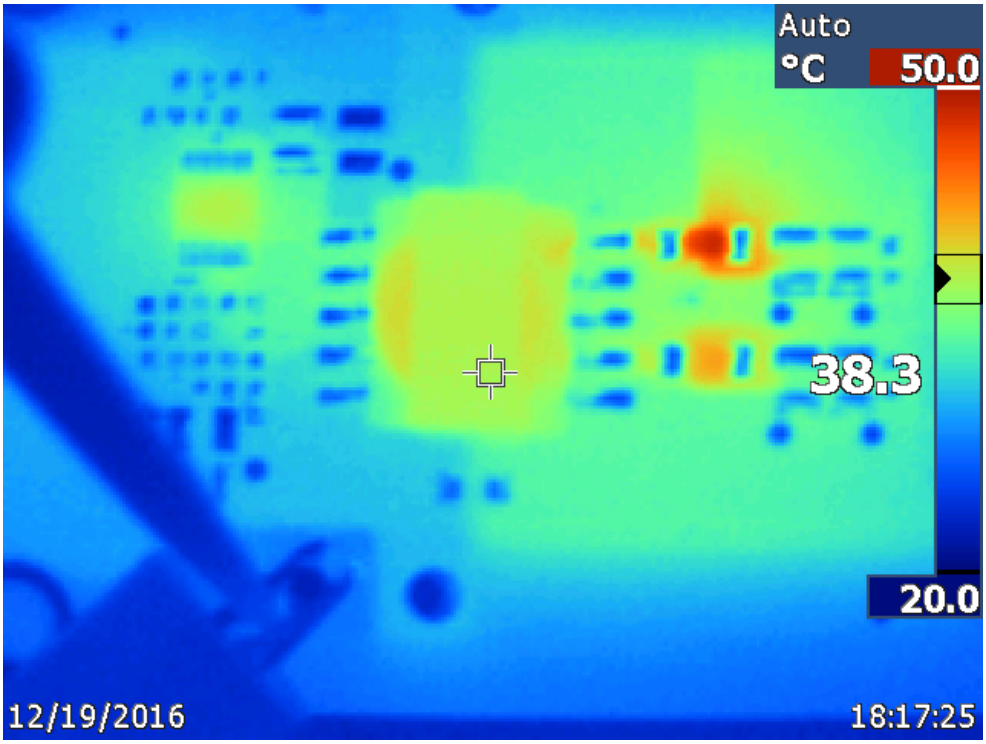


-40oC

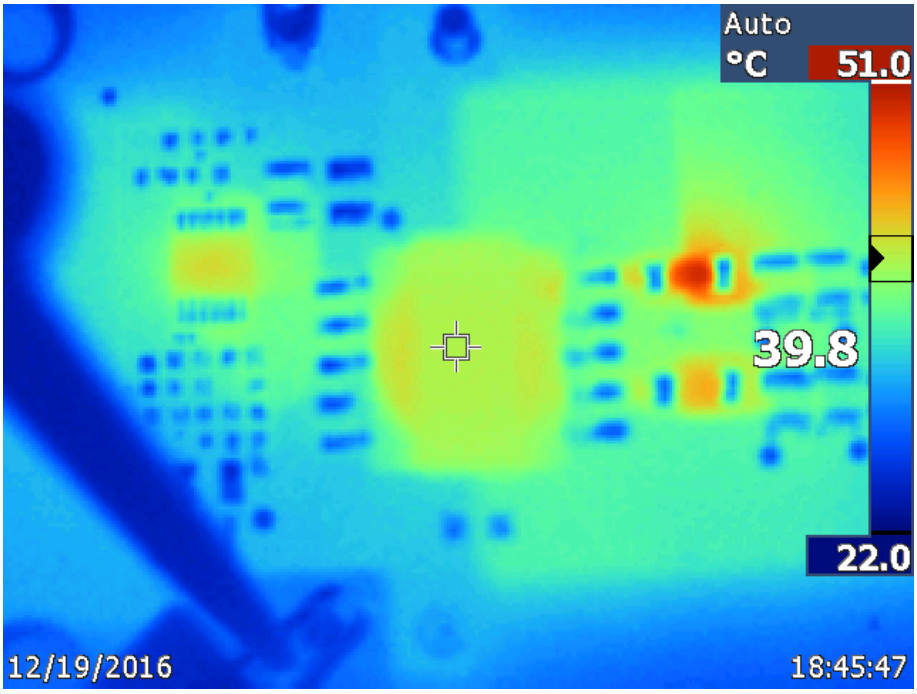
5 Thermal



Thermal equilibrium was taken at 18Vin, full load on both 3.3V and 5V rails. No air flow.



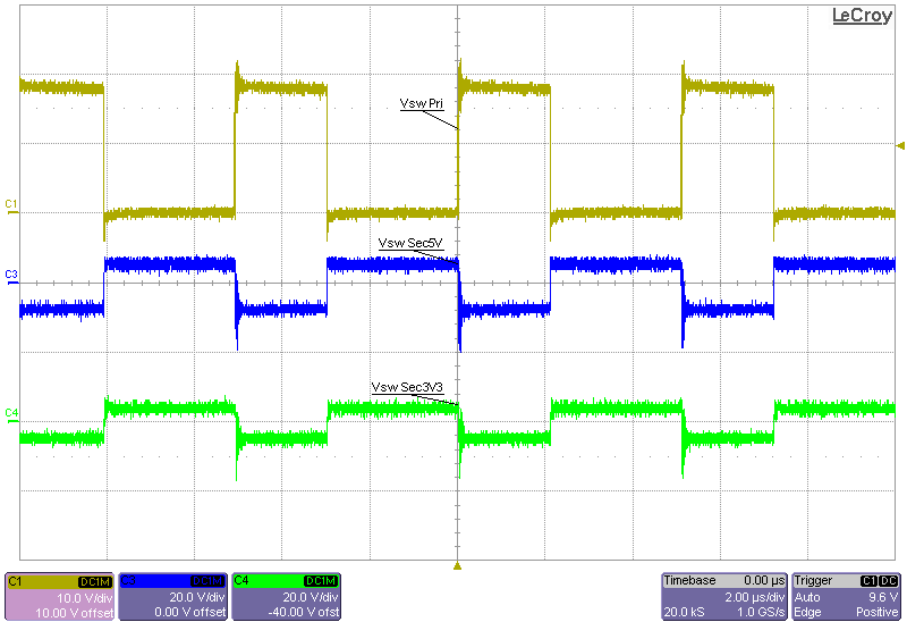
Thermal equilibrium was taken at 24Vin, full load on both 3.3V and 5V rails. No air flow.



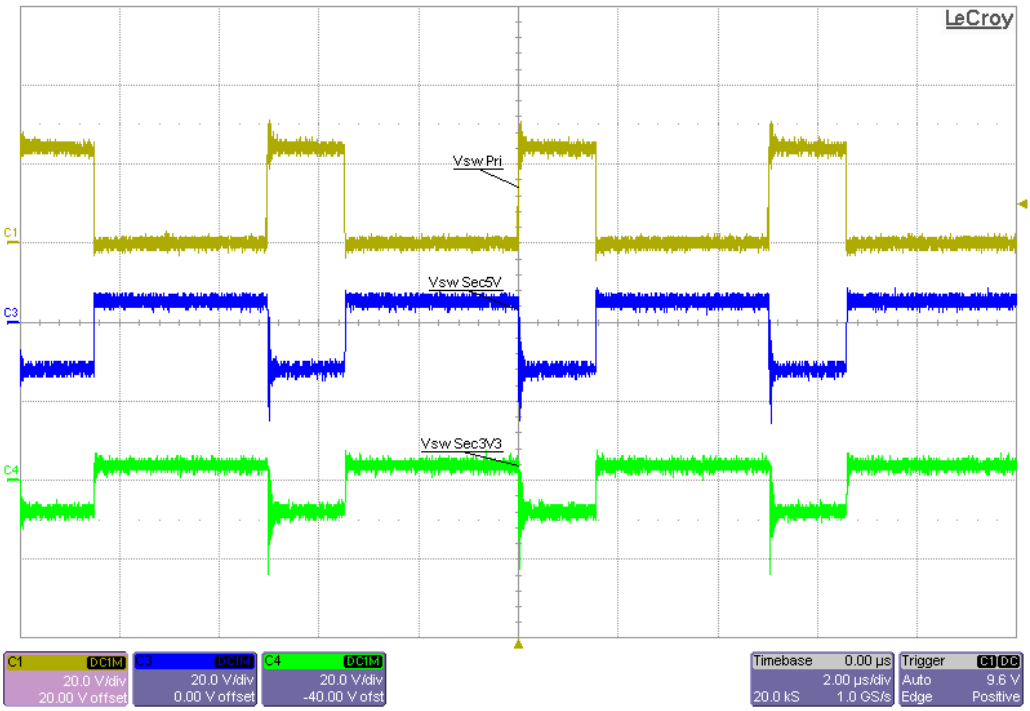
Thermal equilibrium was taken at 31Vin, full load on both 3.3V and 5V rails. No air flow.

6 Waveform

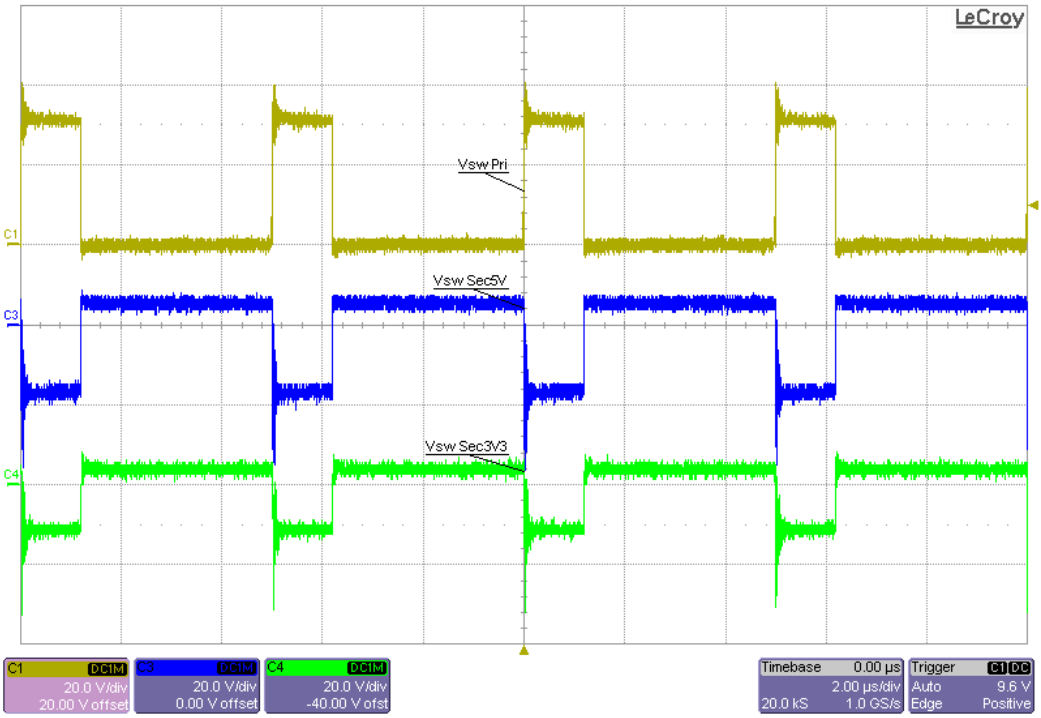
6.1 Switching Waveform



18Vin, full load on both 3.3V and 5V rails. Ch1 measures primary switch, Ch4 measures 3.3V secondary switch, Ch3 measures 5V secondary switch.

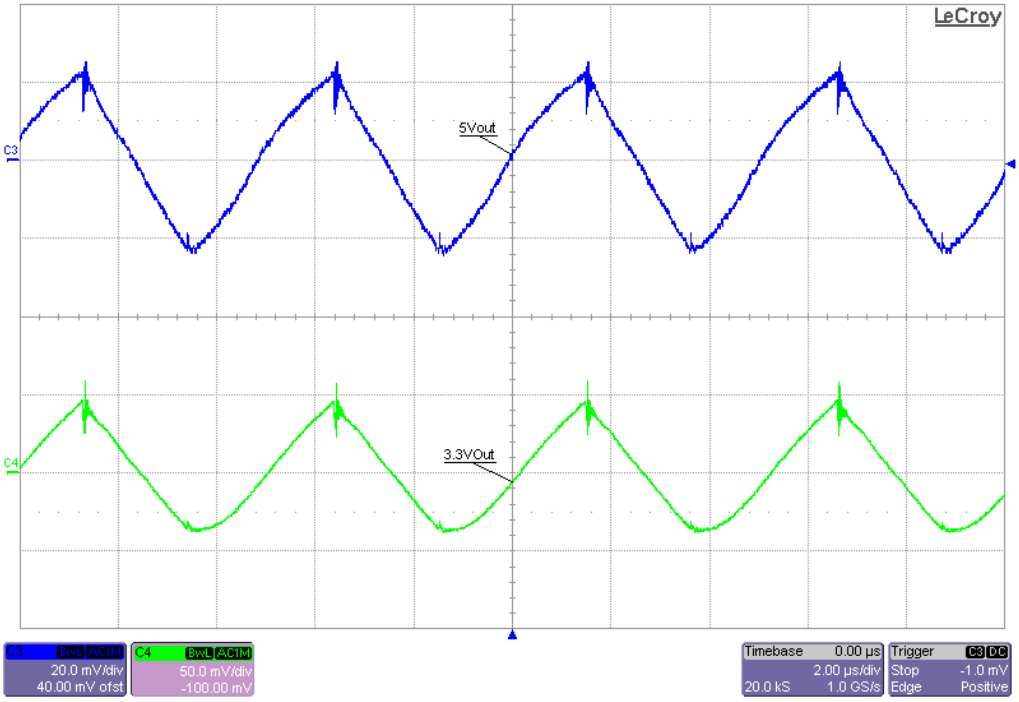


24Vin, full load on both 3.3V and 5V rails. Ch1 measures primary switch, Ch4 measures 3.3V secondary switch, Ch3 measures 5V secondary switch.

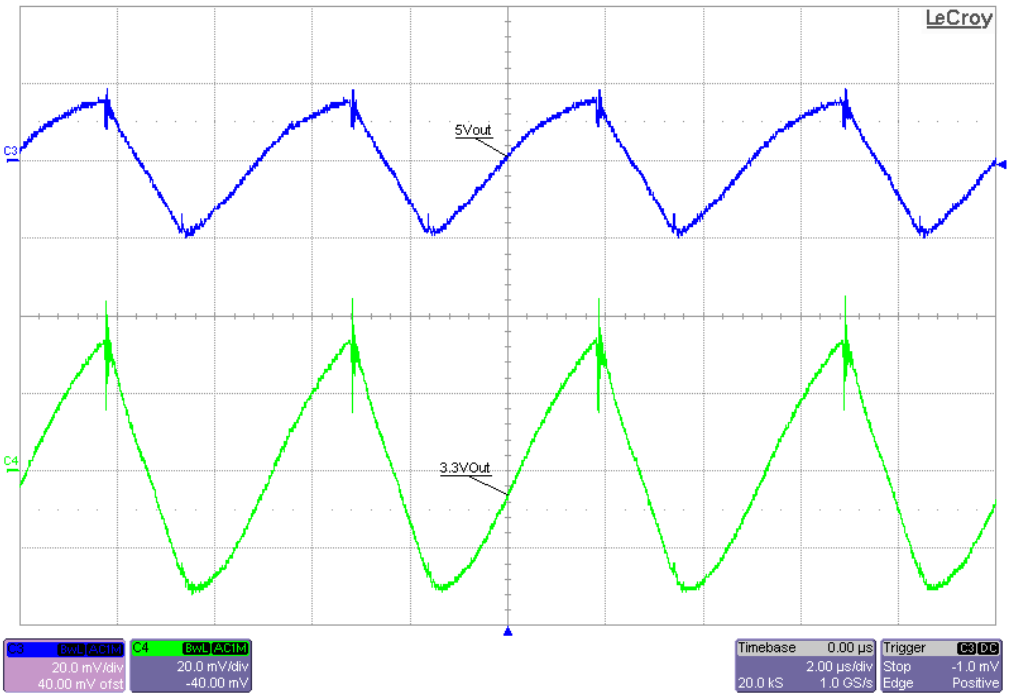


31Vin, full load on both 3.3V and 5V rails. Ch1 measures primary switch, Ch4 measures 3.3V secondary switch, Ch3 measures 5V secondary switch.

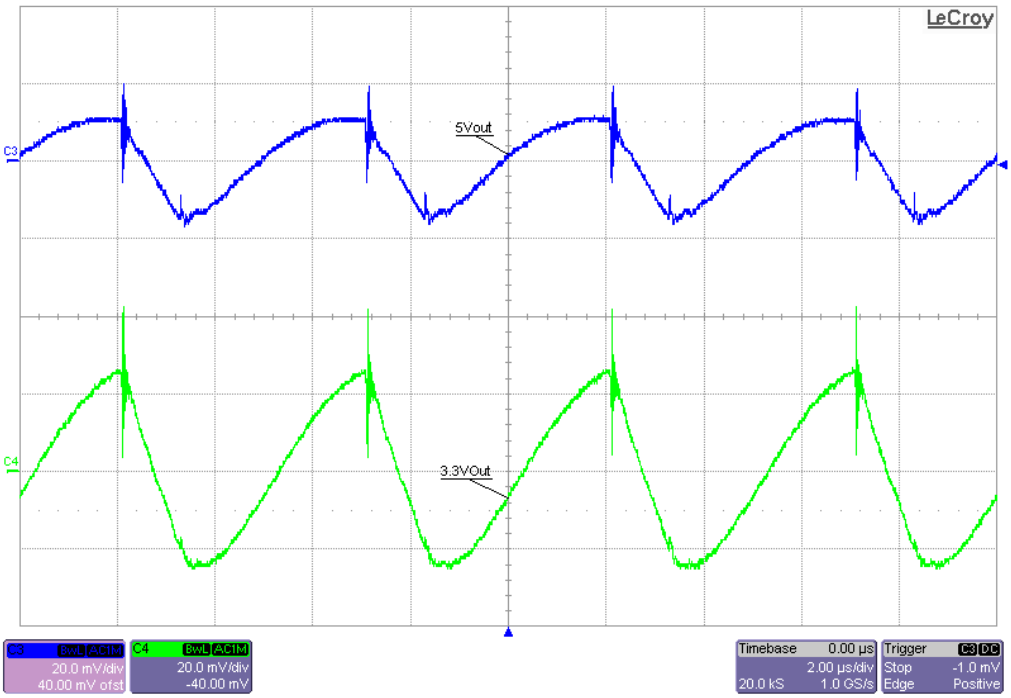
6.2 Switching Output Ripple



18Vin, full load on both 3.3V and 5V rails. Ch4 measures 3.3V switching output ripple, Ch3 measures 5V switching output ripple.

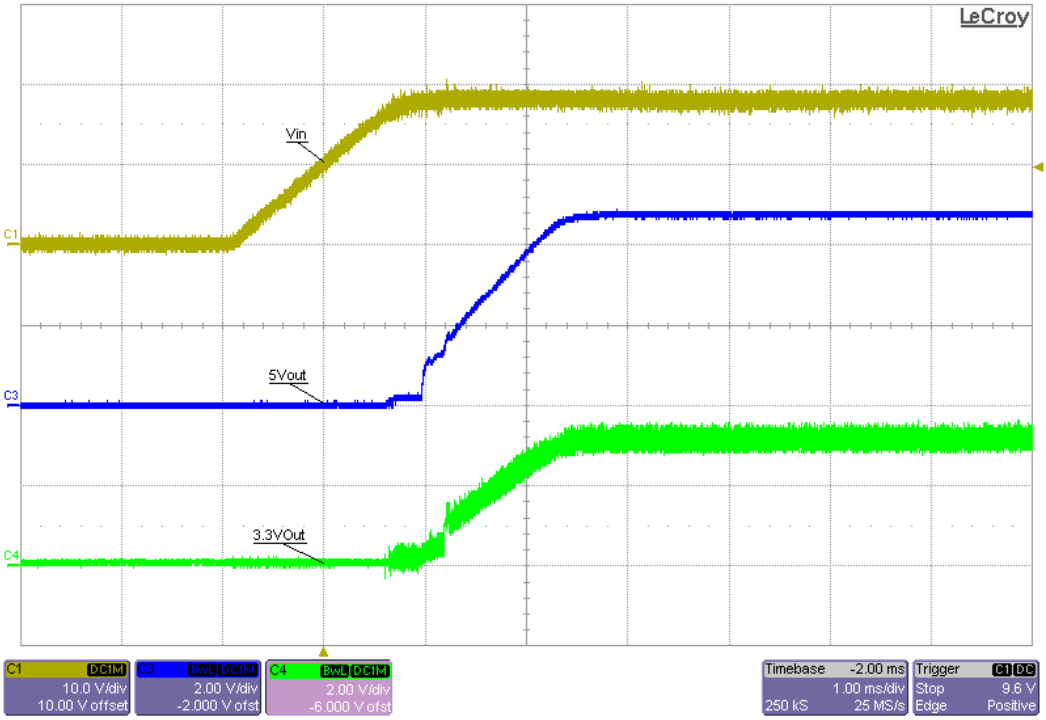


24Vin, full load on both 3.3V and 5V rails. Ch4 measures 3.3V switching output ripple, Ch3 measures 5V switching output ripple.

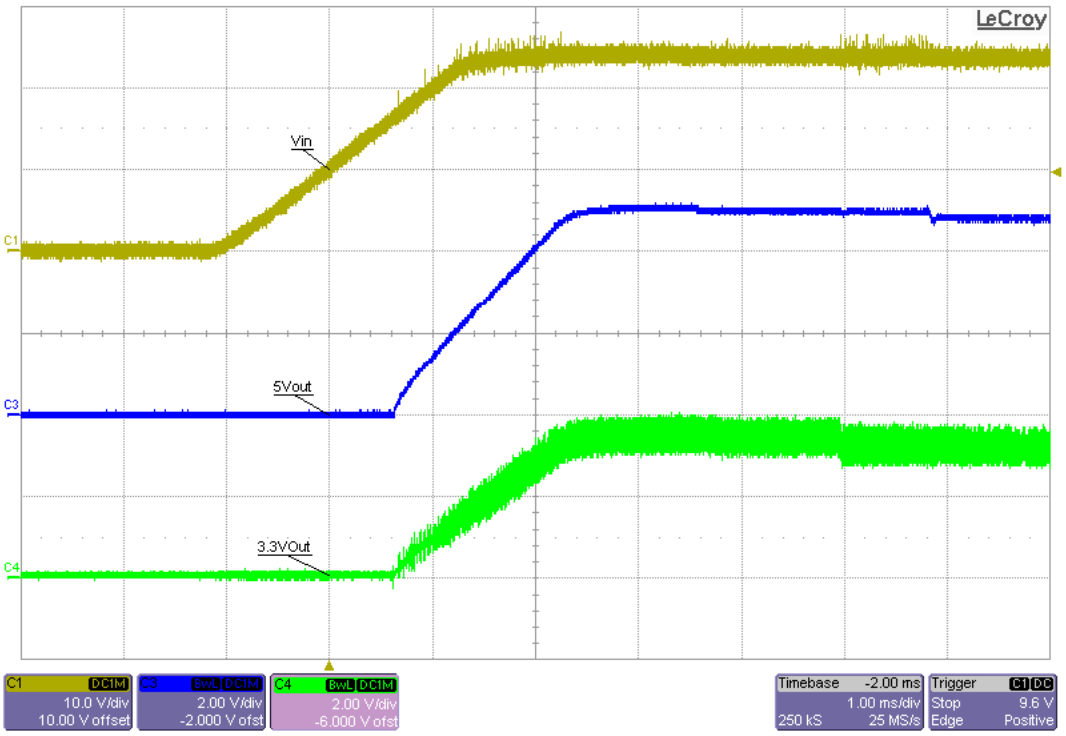


31Vin, full load on both 3.3V and 5V rails. Ch4 measures 3.3V switching output ripple, Ch3 measures 5V switching output ripple.

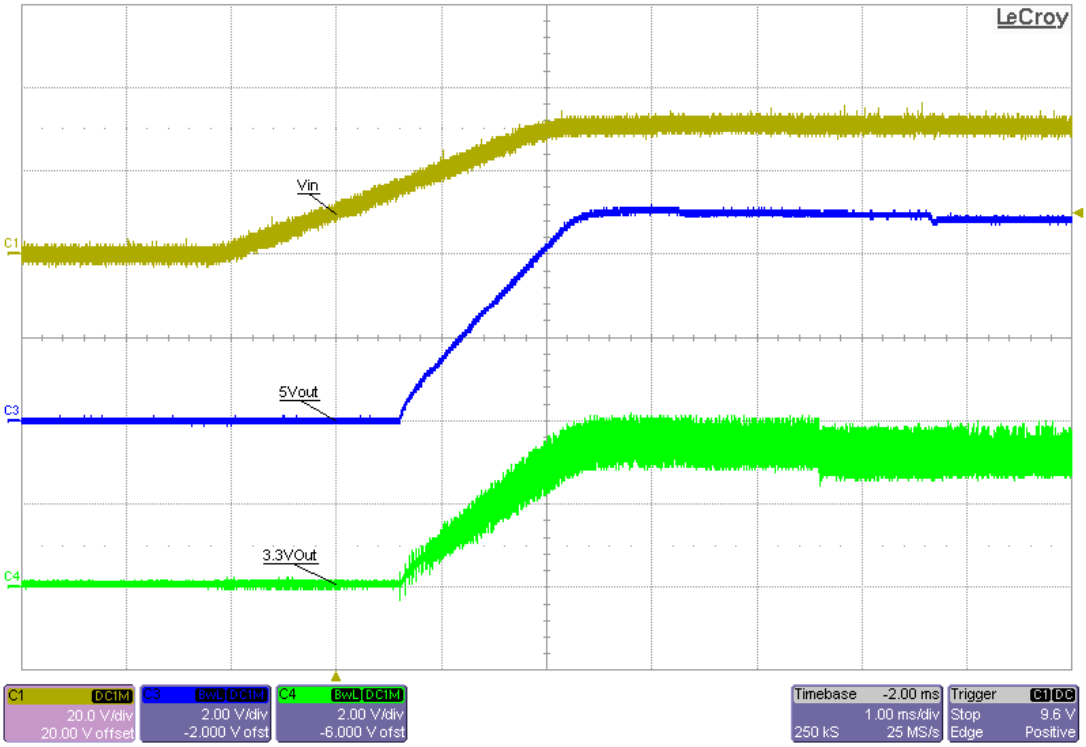
6.3 Start Up



18Vin, full load start up from Vin. Ch1 measures Vin, Ch3 measures 5V, and Ch4 measures 3.3V.

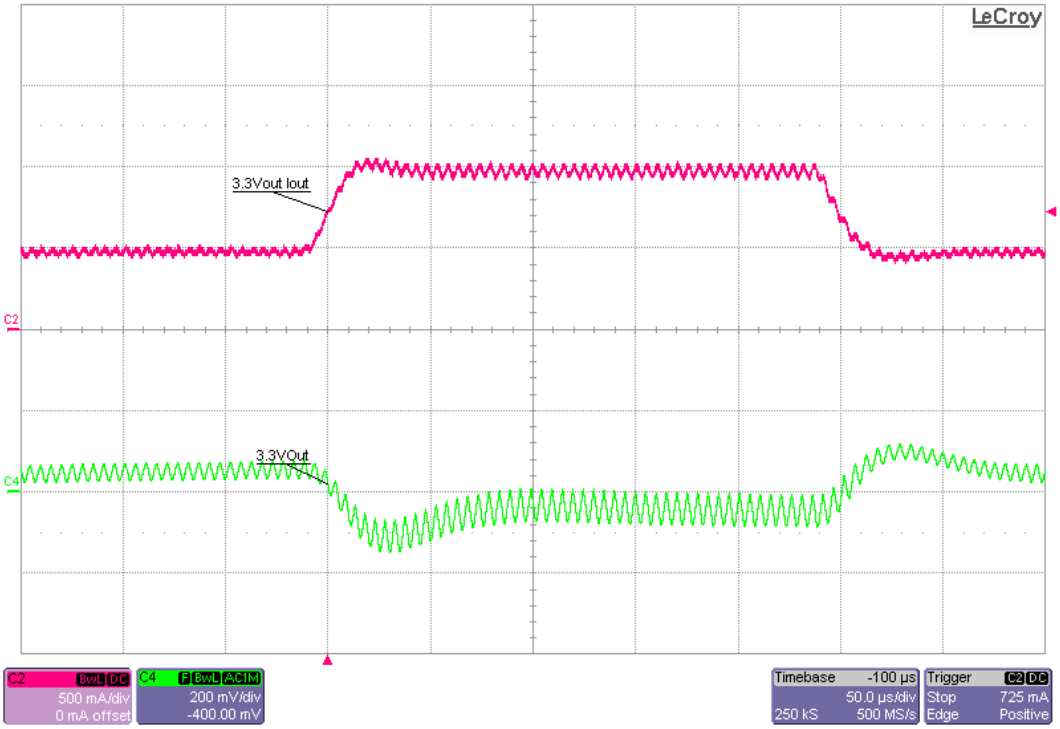


24Vin, full load start up from Vin. Ch1 measures Vin, Ch3 measures 5V, and Ch4 measures 3.3V.

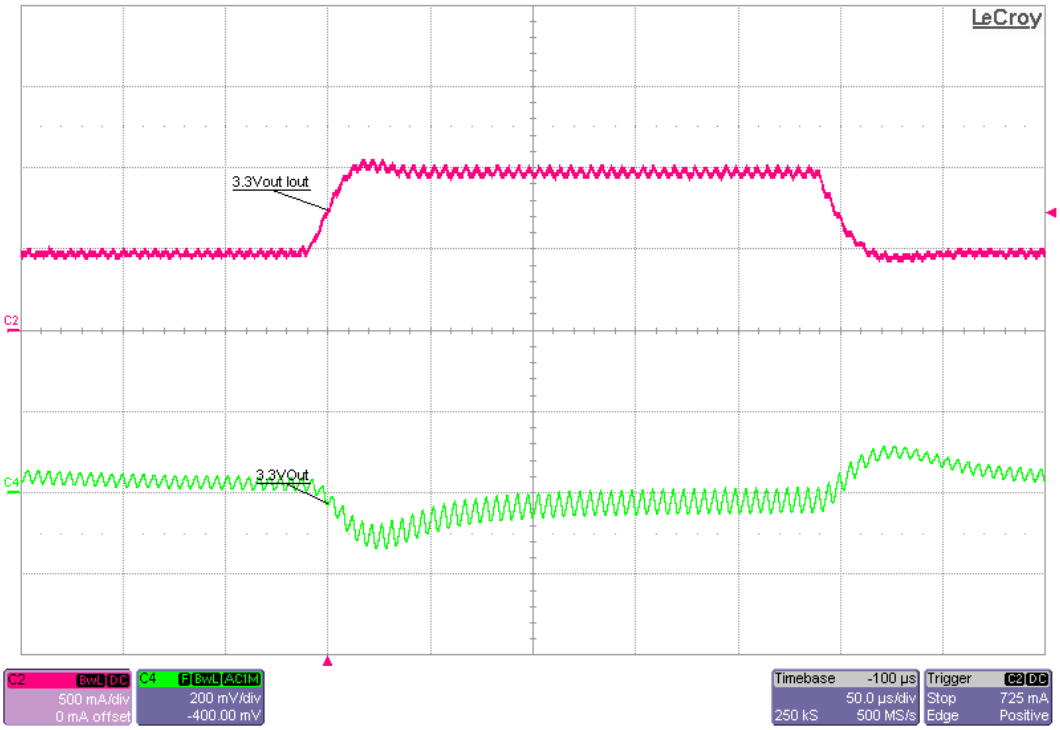


31Vin, full load start up from Vin. Ch1 measures Vin, Ch3 measures 5V, and Ch4 measures 3.3V.

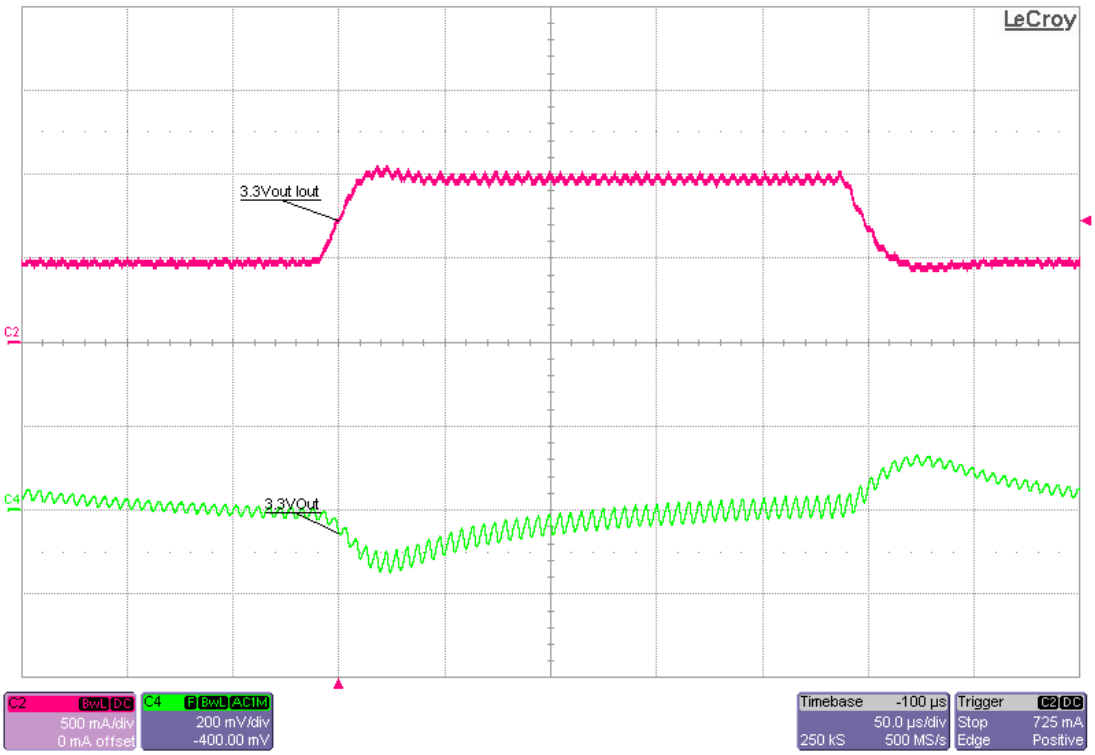
6.4 Transient Response



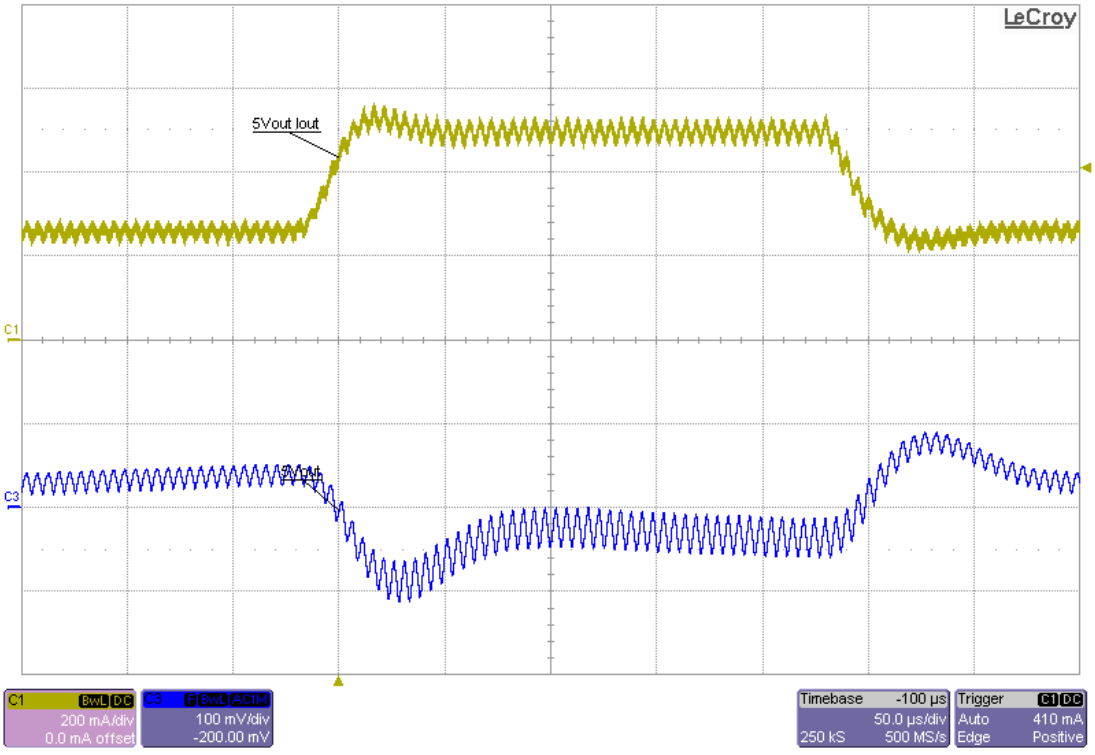
18Vin, 3.3Vout 0.5A to 1A load transient while 5V loaded. Ch2 measures Iout, and Ch4 measures 3.3V.



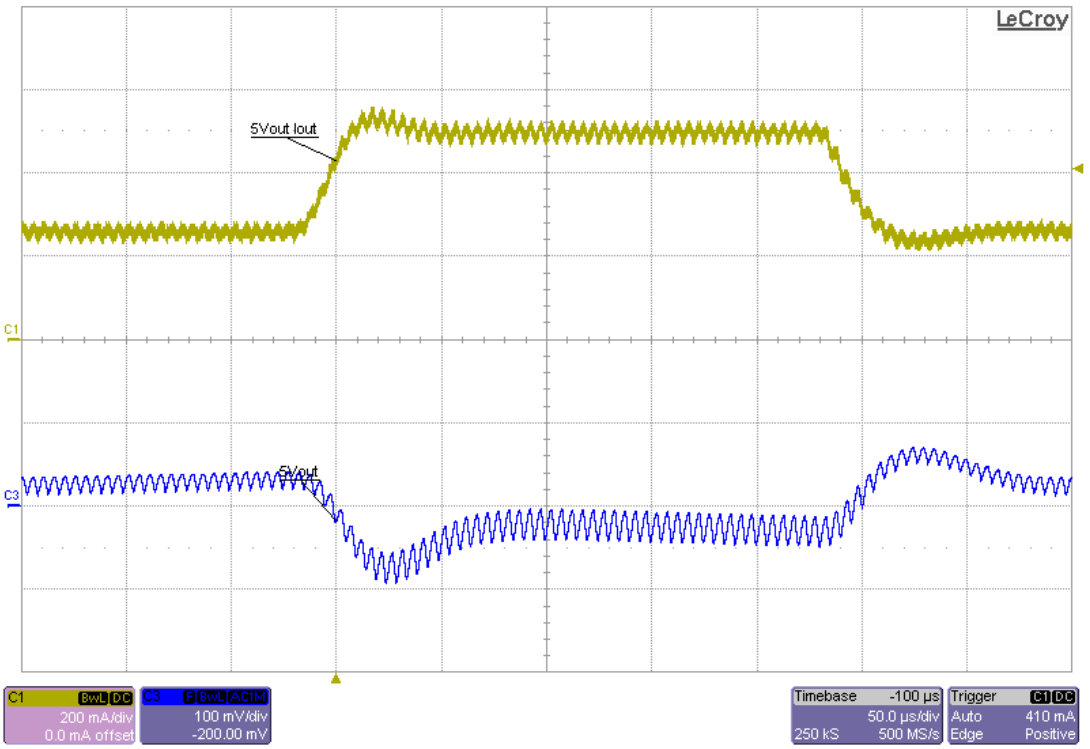
24Vin, 3.3Vout 0.5A to 1A load transient while 5V loaded. Ch2 measures Iout, and Ch4 measures 3.3V.



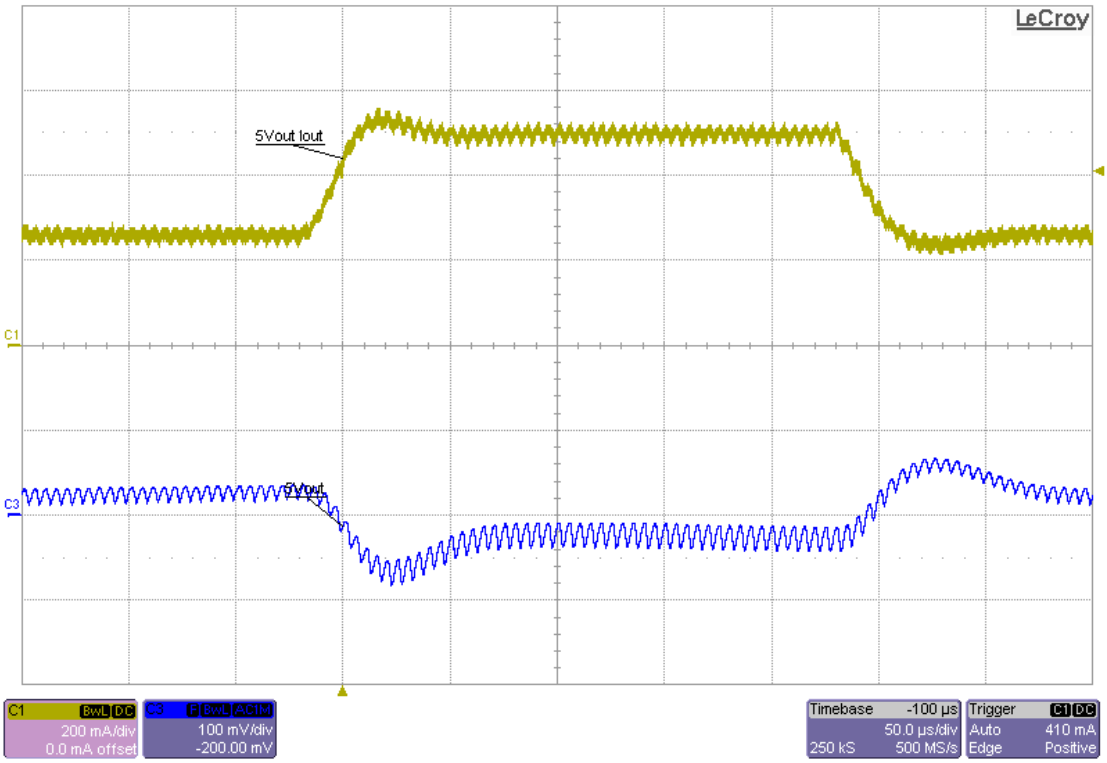
31Vin, 3.3Vout 0.5A to 1A load transient while 5V loaded. Ch2 measures Iout, and Ch4 measures 3.3V.



18Vin, 5Vout 0.25A to 0.5A load transient while 3.3V loaded. Ch1 measures Iout, Ch3 measures 5V.



24Vin, 5Vout 0.25A to 0.5A load transient while 3.3V loaded. Ch1 measures Iout, Ch3 measures 5V.



31Vin, 5Vout 0.25A to 0.5A load transient while 3.3V loaded. Ch1 measures Iout, Ch3 measures 5V.

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