

**Test Data
For PMP9374
3/5/2014**



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1. Design Specifications

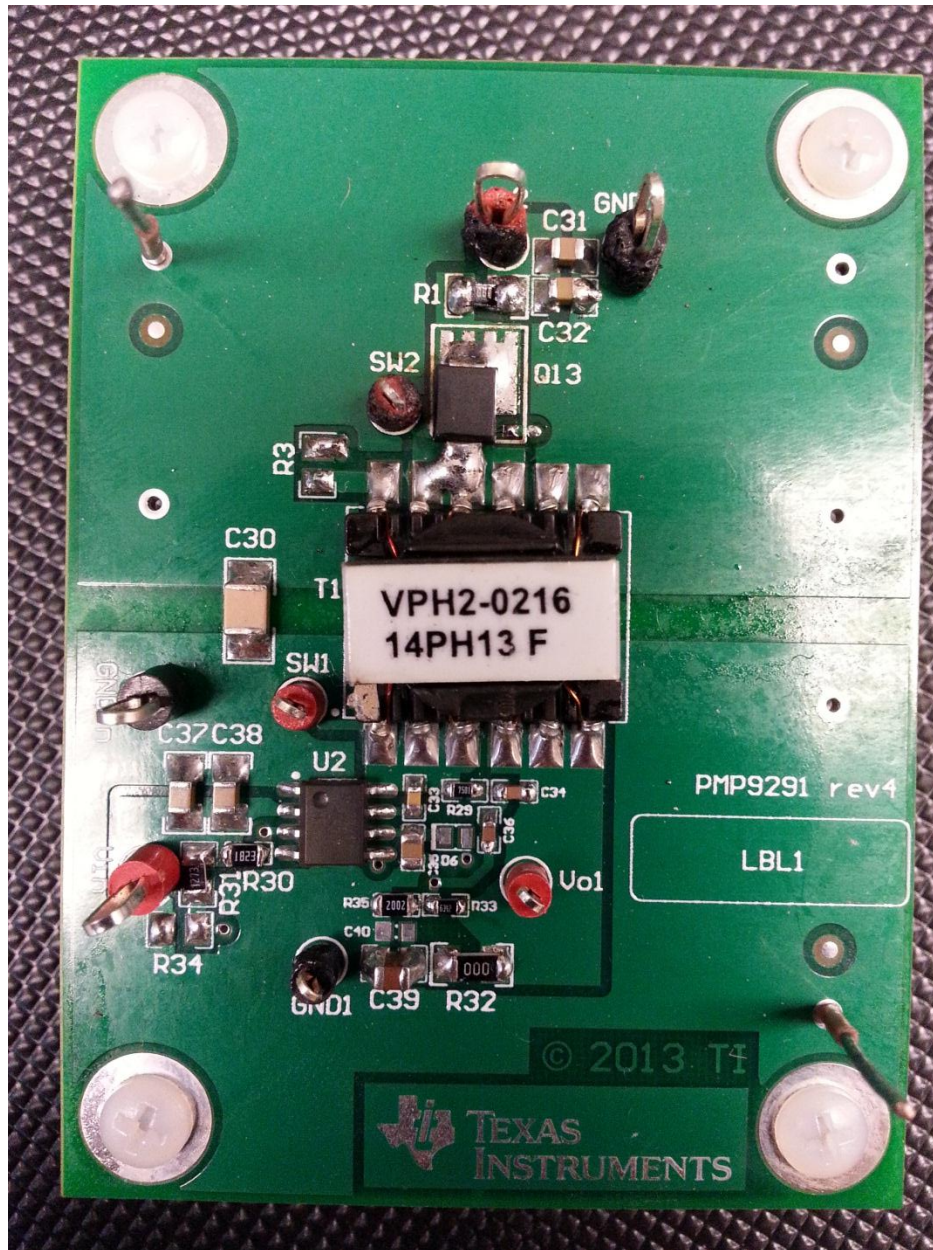
Vin	21.6VDC to 26.4VDC (24VDC Nominal)
Vout	5VDC
Iout	0.3A Max.
Approximate Switching Frequency	≈323KHz

2. Circuit Description

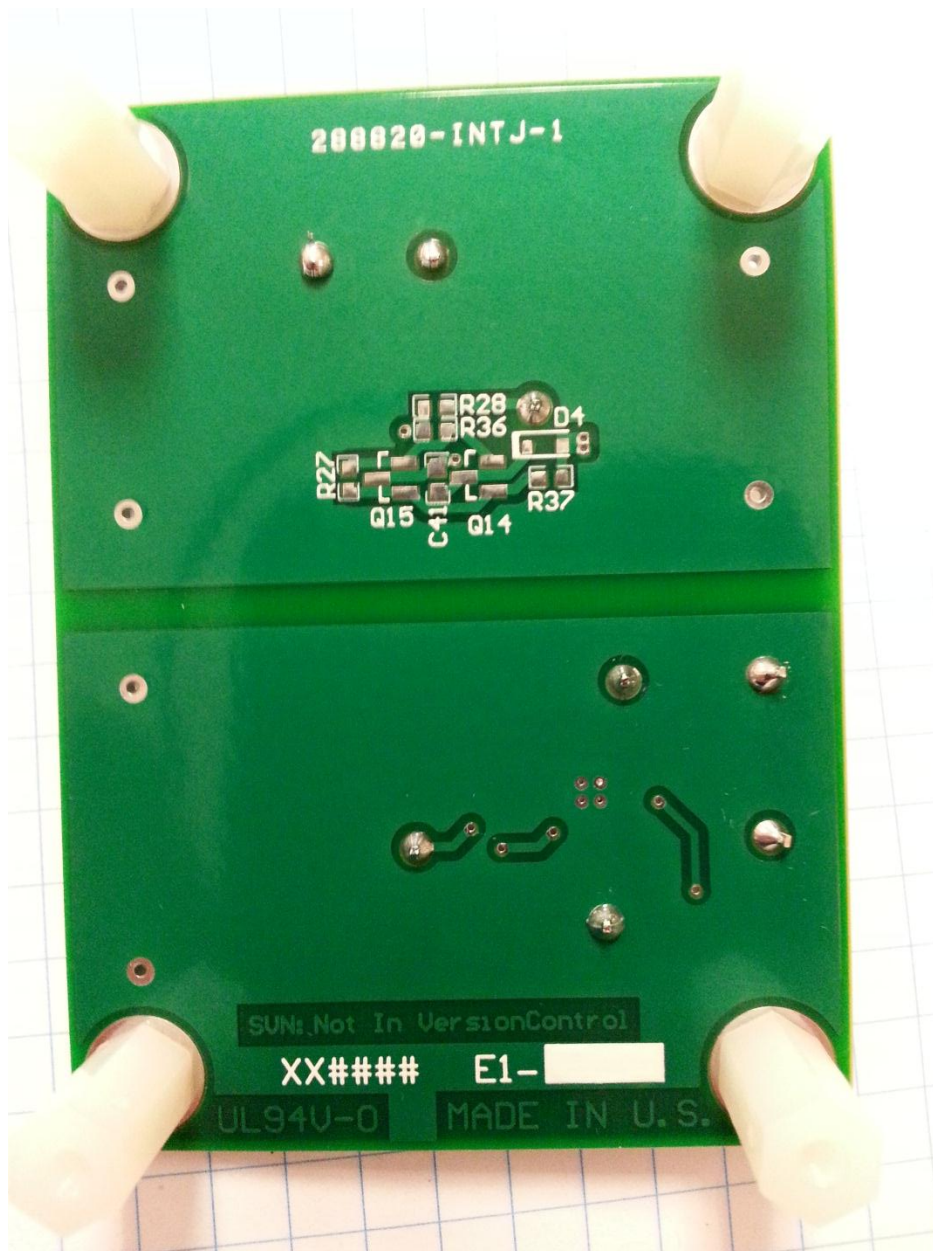
PMP9374 is an Isolated Flybuck Converter which accepts an input voltage of 21.6Vin to 26.4Vin and provides an isolated output of 5Vout capable of supplying a maximum of 0.3A of current to the load. This design was built on the PMP9291 PCB (4-layered board). This is a simple, low-BOM-count, and low-cost design providing an isolated output using a readily-available off-the-shelf VERSA-PAC series transformer.

3. PMP9374 Board Photos

Board Dimensions: 2" x 2.7"

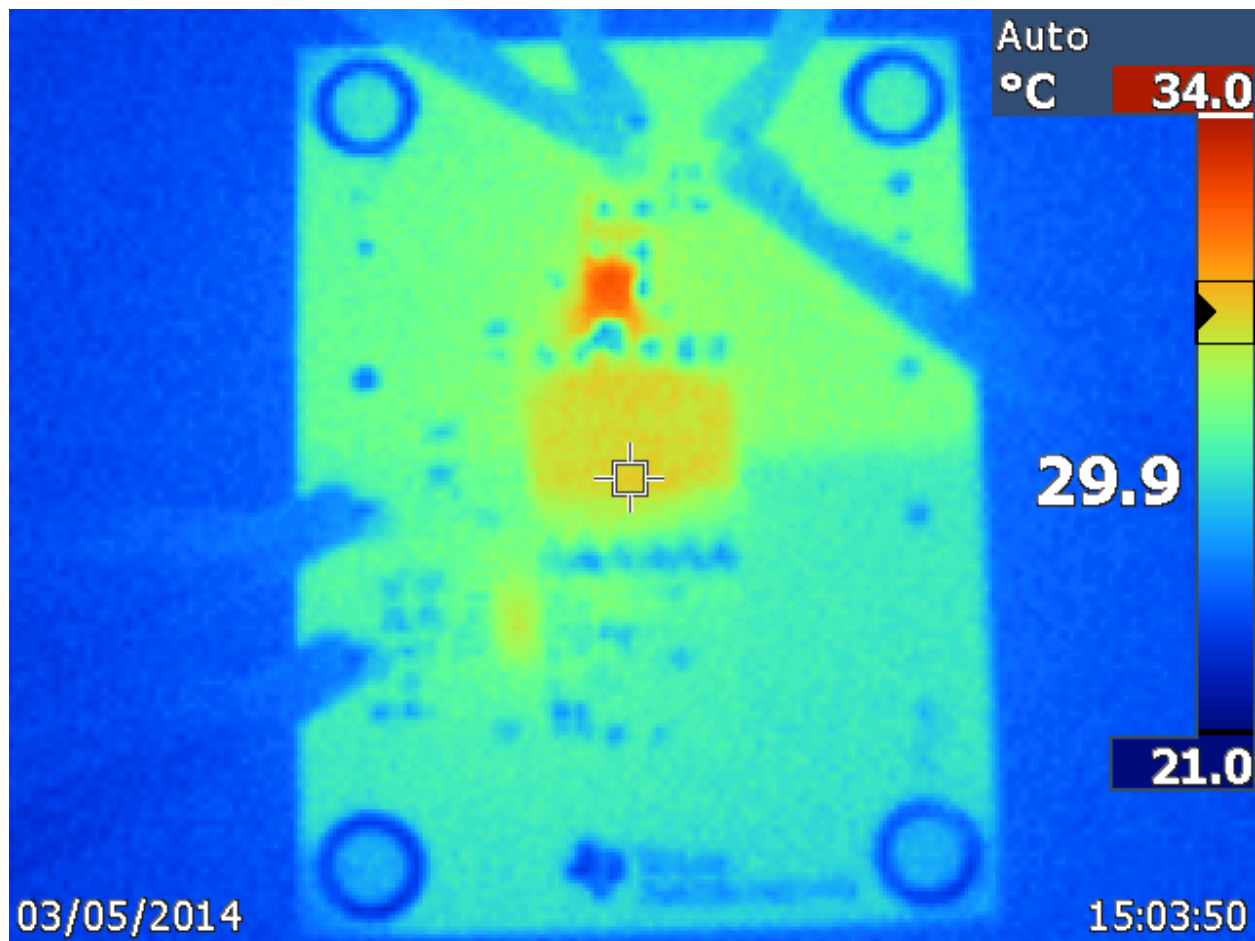


Board Photo (Top)



Board Photo (Bottom)

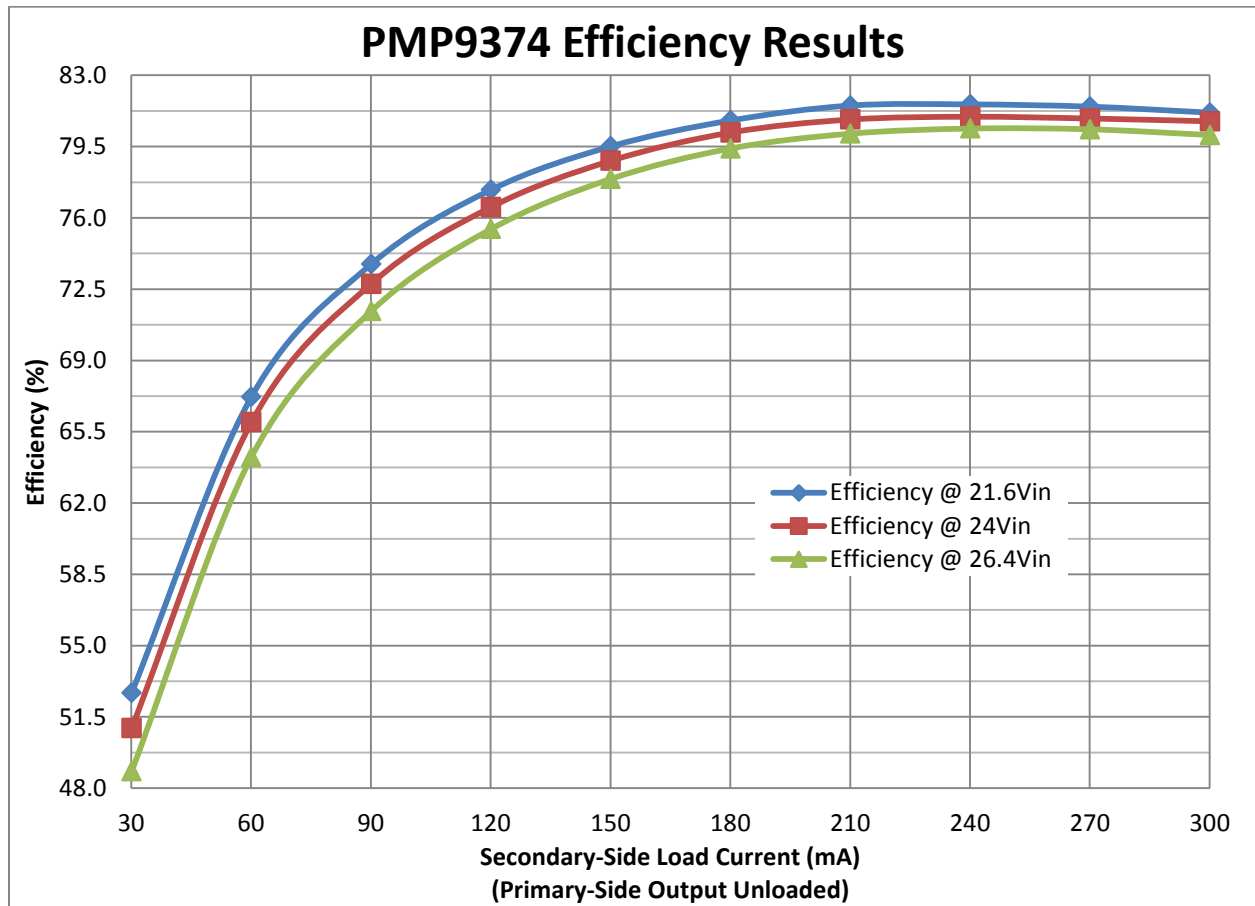
4. Thermal Data



IR thermal image taken at steady state with 24Vin and 0.3A load (no airflow)

5. Efficiency and Line/Load Regulation

5.1 Efficiency Chart



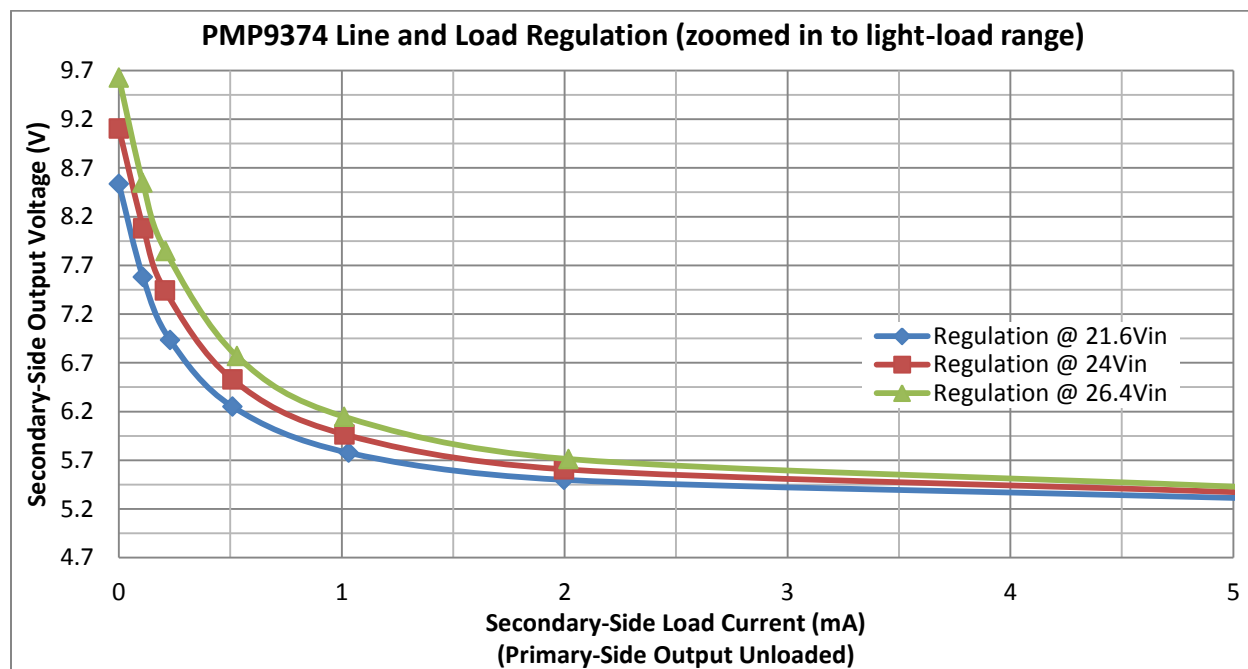
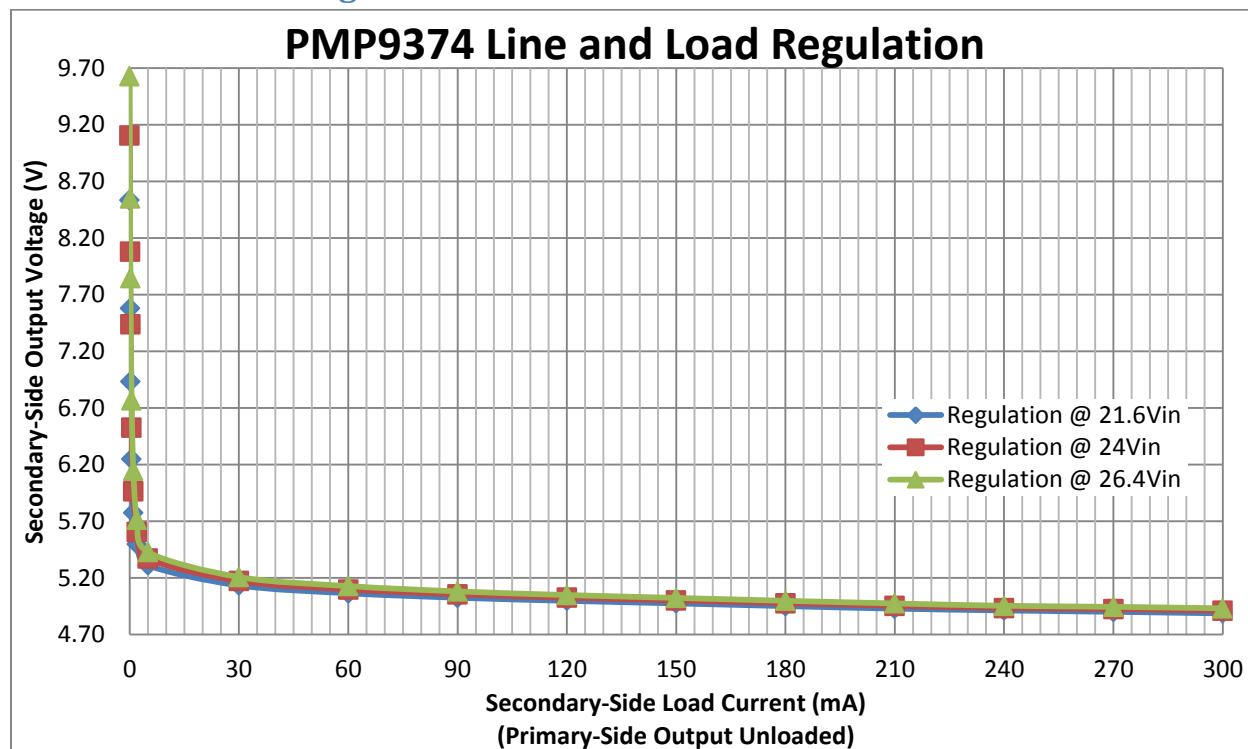
5.2 Efficiency and Line/Load Regulation Data

Vin (V)	Iin (mA)	Vout (V)	Iout (mA)	Pin (W)	Pout (W)	Efficiency (%)
21.6	6.2425	8.536	0	0.134838	0	
21.6	6.266	7.58	0.108	0.135346	0.000819	
21.6	6.295	6.934	0.2298	0.135972	0.001593	
21.6	6.3623	6.25	0.51	0.137426	0.003188	
21.6	6.4878	5.776	1.032	0.140136	0.005961	
21.6	6.7186	5.499	1.998	0.145122	0.010987	
21.6	7.4438	5.313	5.0145	0.160786	0.026642	
21.6	13.538	5.1342	30	0.292421	0.154026	52.7
21.6	20.934	5.0653	60	0.452174	0.303918	67.2
21.6	28.404	5.0258	90	0.613526	0.452322	73.7
21.6	35.888	4.9986	120	0.775181	0.599832	77.4
21.6	43.459	4.9758	150	0.938714	0.74637	79.5
21.6	51.084	4.952	180	1.103414	0.89136	80.8
21.6	58.793	4.9294	210	1.269929	1.035174	81.5
21.6	66.93	4.9136	240	1.445688	1.179264	81.6
21.6	75.213	4.9015	270	1.624601	1.323405	81.5
21.6	83.632	4.8875	300	1.806451	1.46625	81.2

Vin (V)	Iin (mA)	Vout (V)	Iout (mA)	Pin (W)	Pout (W)	Efficiency (%)
24	6.1907	9.104	0	0.148577	0	
24	6.2129	8.08	0.11	0.14911	0.000889	
24	6.2348	7.44	0.2076	0.149635	0.001545	
24	6.3011	6.528	0.51	0.151226	0.003329	
24	6.4095	5.9649	1.0132	0.153828	0.006044	
24	6.6203	5.6072	1.998	0.158887	0.011203	
24	7.2652	5.3723	5.0129	0.174365	0.026931	
24	12.694	5.1733	30	0.304656	0.155199	50.9
24	19.323	5.0984	60	0.463752	0.305904	66.0
24	26.054	5.0553	90	0.625296	0.454977	72.8
24	32.836	5.0259	120	0.788064	0.603108	76.5
24	39.669	5.0017	150	0.952056	0.750255	78.8
24	46.55	4.9771	180	1.1172	0.895878	80.2
24	53.633	4.9544	210	1.287192	1.040424	80.8
24	60.951	4.9349	240	1.462824	1.184376	81.0
24	68.514	4.9256	270	1.644336	1.329912	80.9
24	76.042	4.9118	300	1.825008	1.47354	80.7

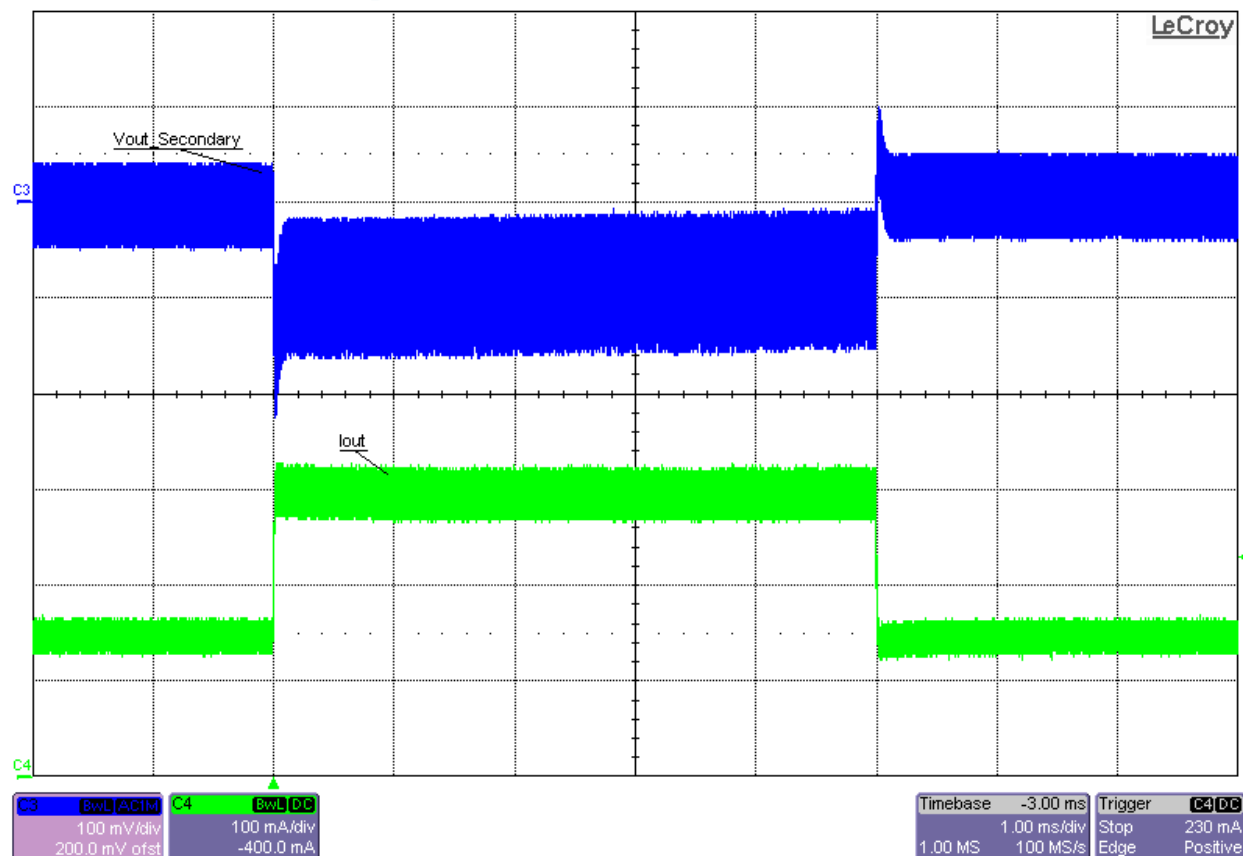
Vin (V)	Iin (mA)	Vout (V)	Iout (mA)	Pin (W)	Pout (W)	Efficiency (%)
26.4	6.2374	9.627	0	0.164667	0	
26.4	6.2597	8.55	0.107	0.165256	0.000915	
26.4	6.2802	7.845	0.21	0.165797	0.001647	
26.4	6.3448	6.767	0.53	0.167503	0.003587	
26.4	6.4403	6.146	1.012	0.170024	0.00622	
26.4	6.6355	5.7124	2.0185	0.175177	0.01153	
26.4	7.2141	5.4285	5.0133	0.190452	0.027215	
26.4	12.122	5.2081	30	0.320021	0.156243	48.8
26.4	18.139	5.1285	60	0.47887	0.30771	64.3
26.4	24.256	5.0816	90	0.640358	0.457344	71.4
26.4	30.42	5.0495	120	0.803088	0.60594	75.5
26.4	36.639	5.0242	150	0.96727	0.75363	77.9
26.4	42.92	4.9986	180	1.133088	0.899748	79.4
26.4	49.388	4.9754	210	1.303843	1.044834	80.1
26.4	56.032	4.9546	240	1.479245	1.189104	80.4
26.4	62.947	4.9453	270	1.661801	1.335231	80.3
26.4	70	4.9322	300	1.848	1.47966	80.1

5.3 Line and Load Regulation

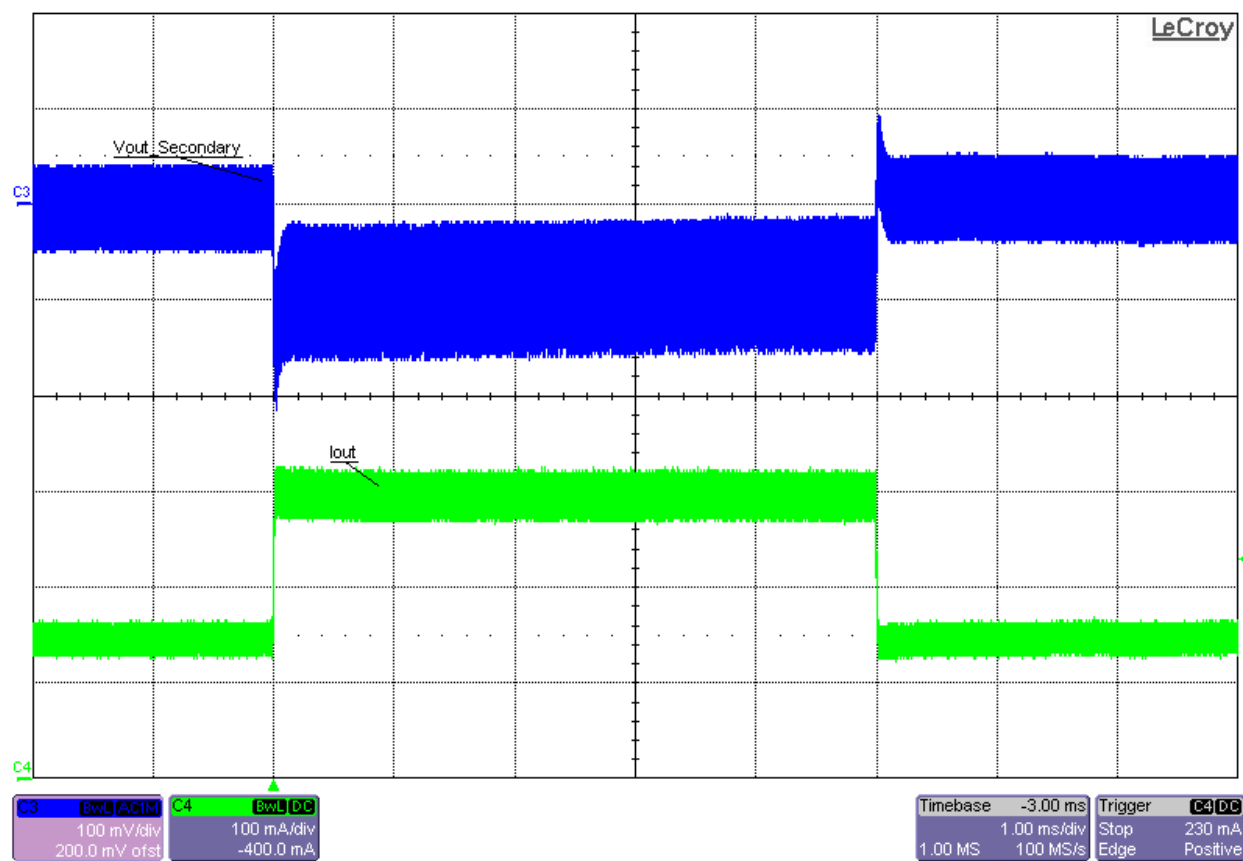


6 Waveforms

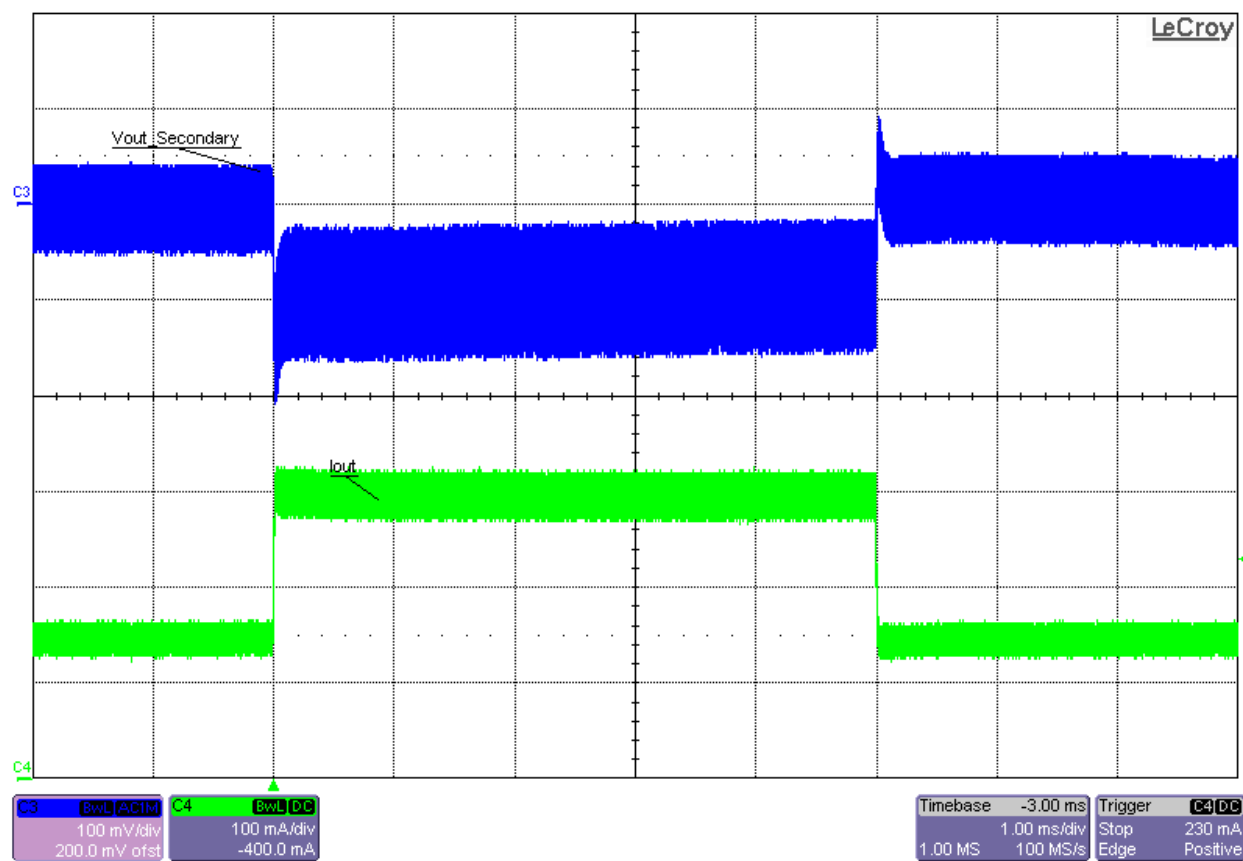
6.1 Load Transient Response



Load Transient Response at 21.6Vin and 50%-to-100% (150mA-to-300mA) Load Step

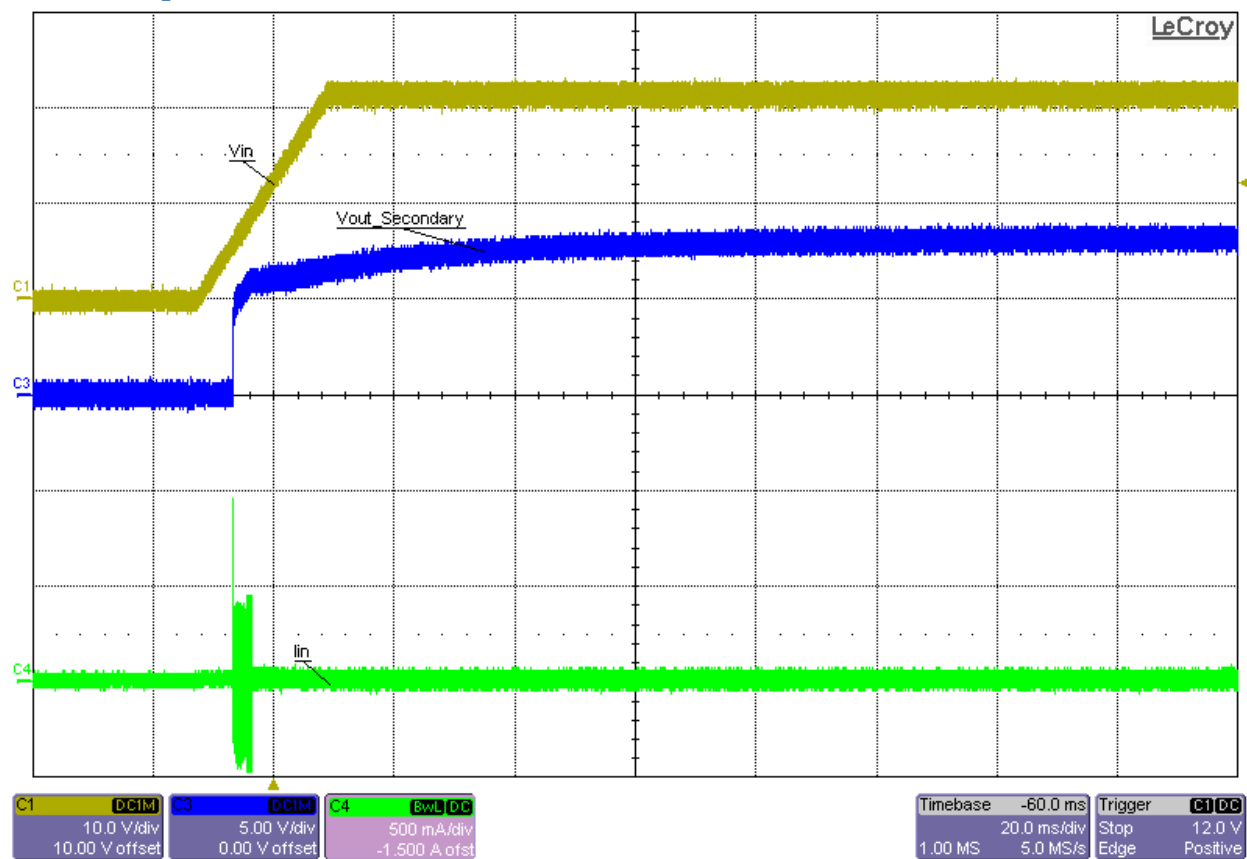


Load Transient Response at 24Vin and 50%-to-100% (150mA-to-300mA) Load Step

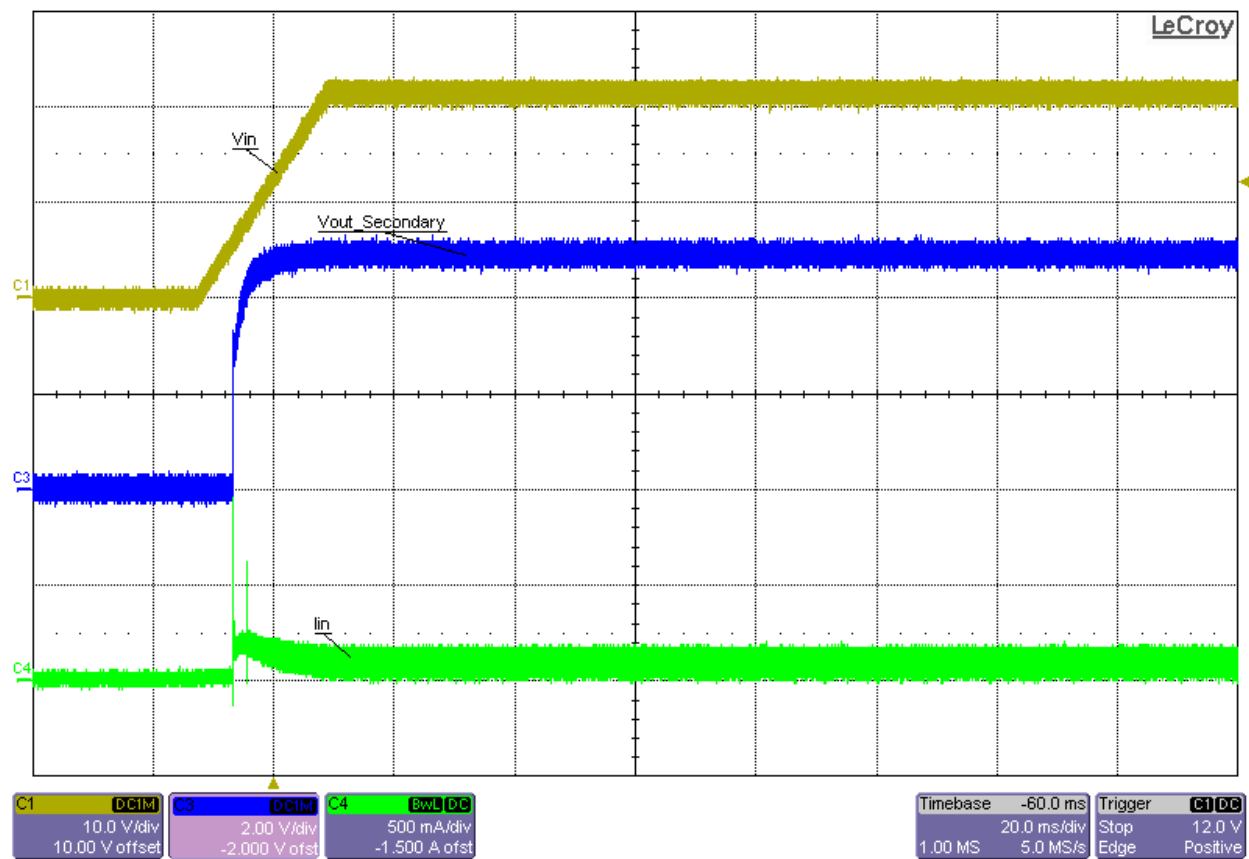


Load Transient Response at 26.4Vin and 50%-to-100% (150mA-to-300mA) Load Step

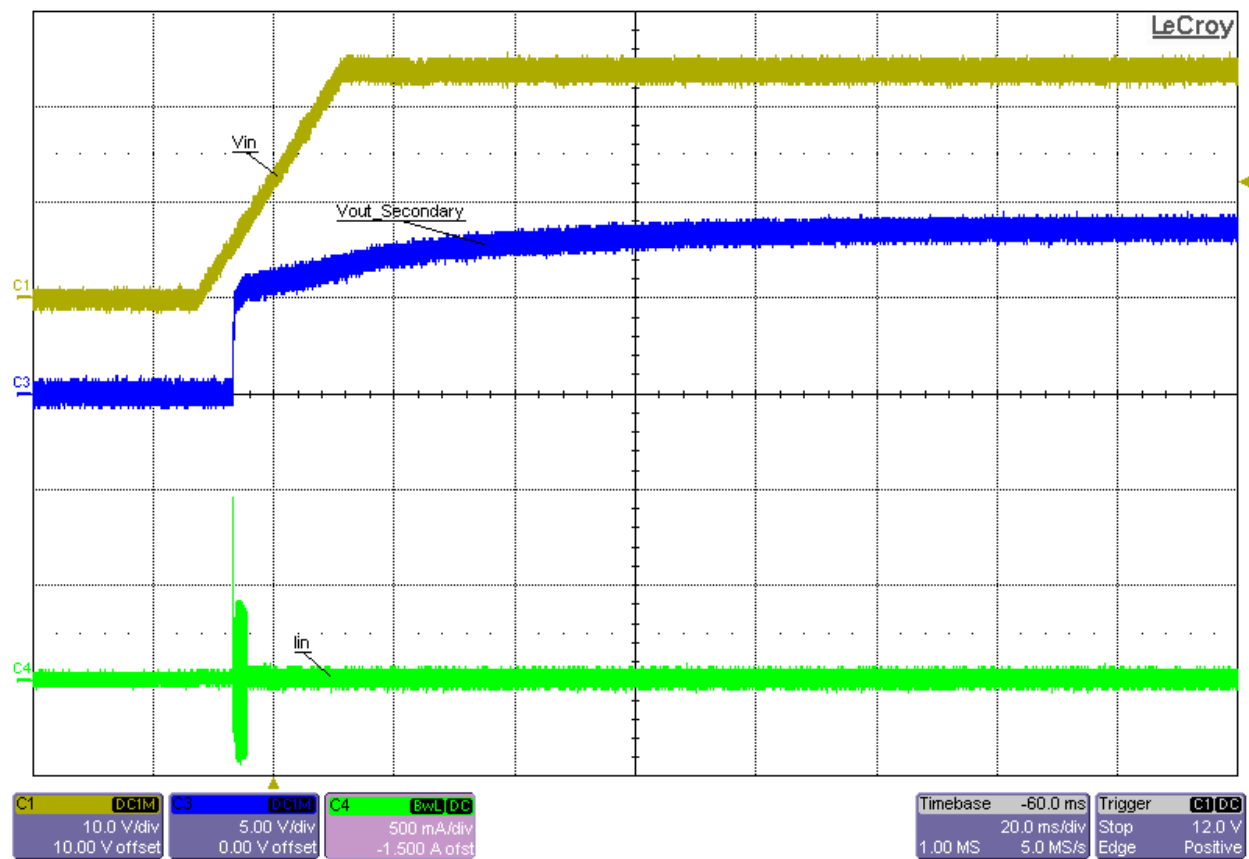
6.2 Startup



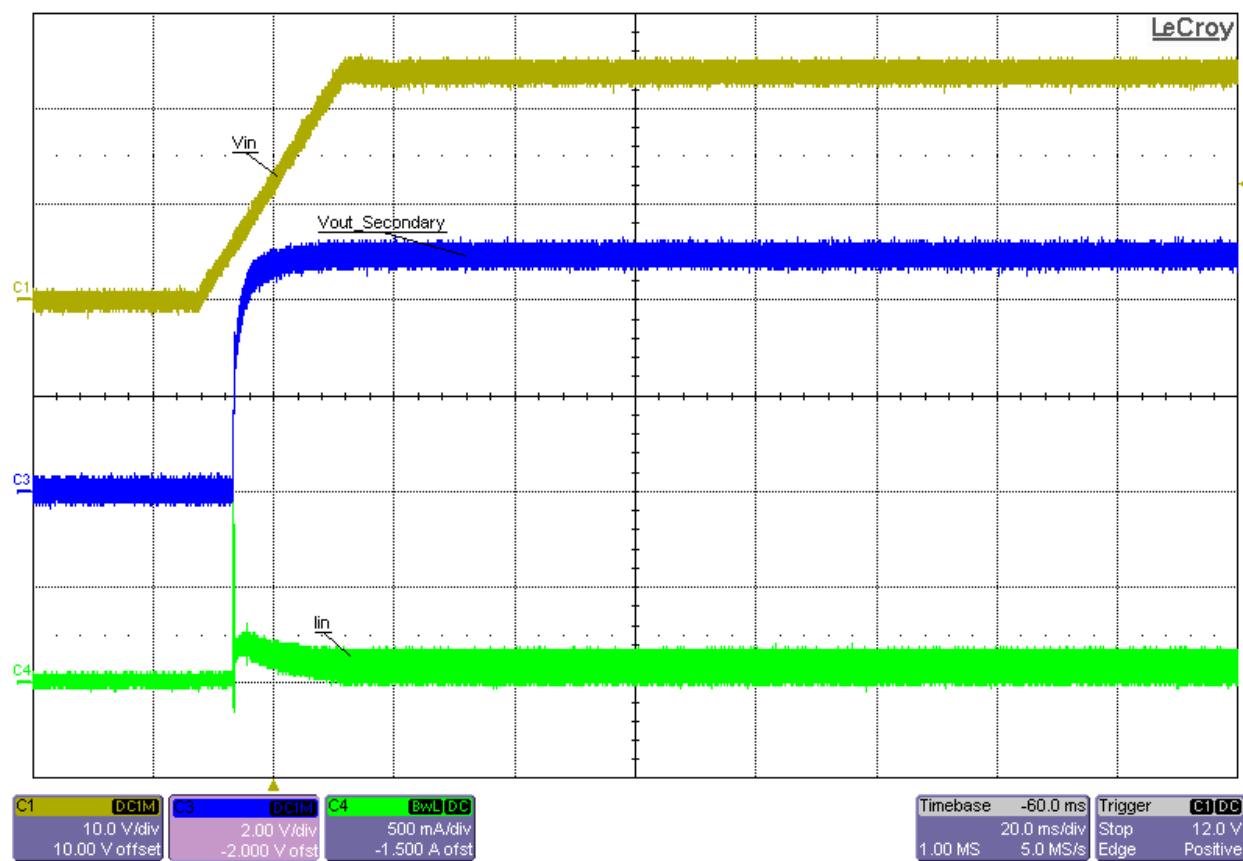
Startup into No Load at 21.6Vin



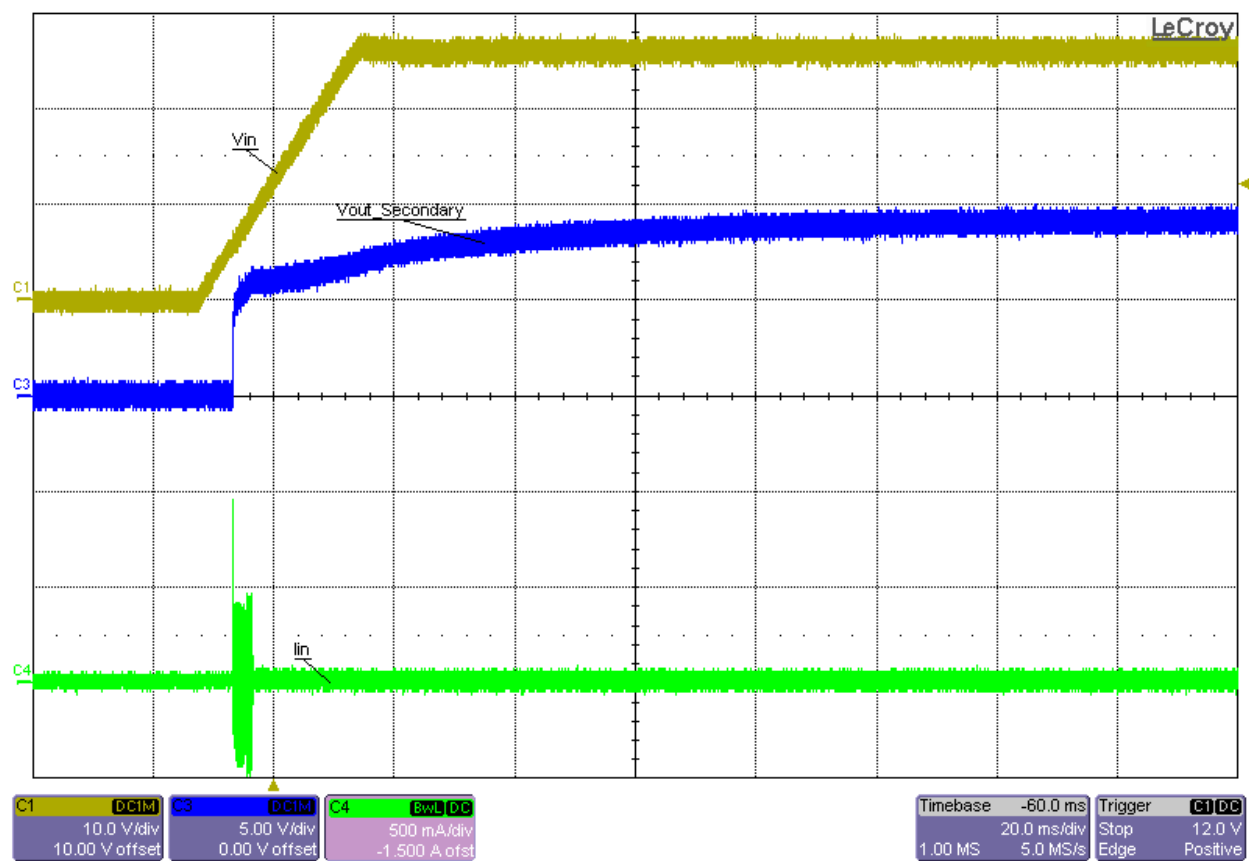
Startup into Full (300mA) Resistive Load at 21.6Vin



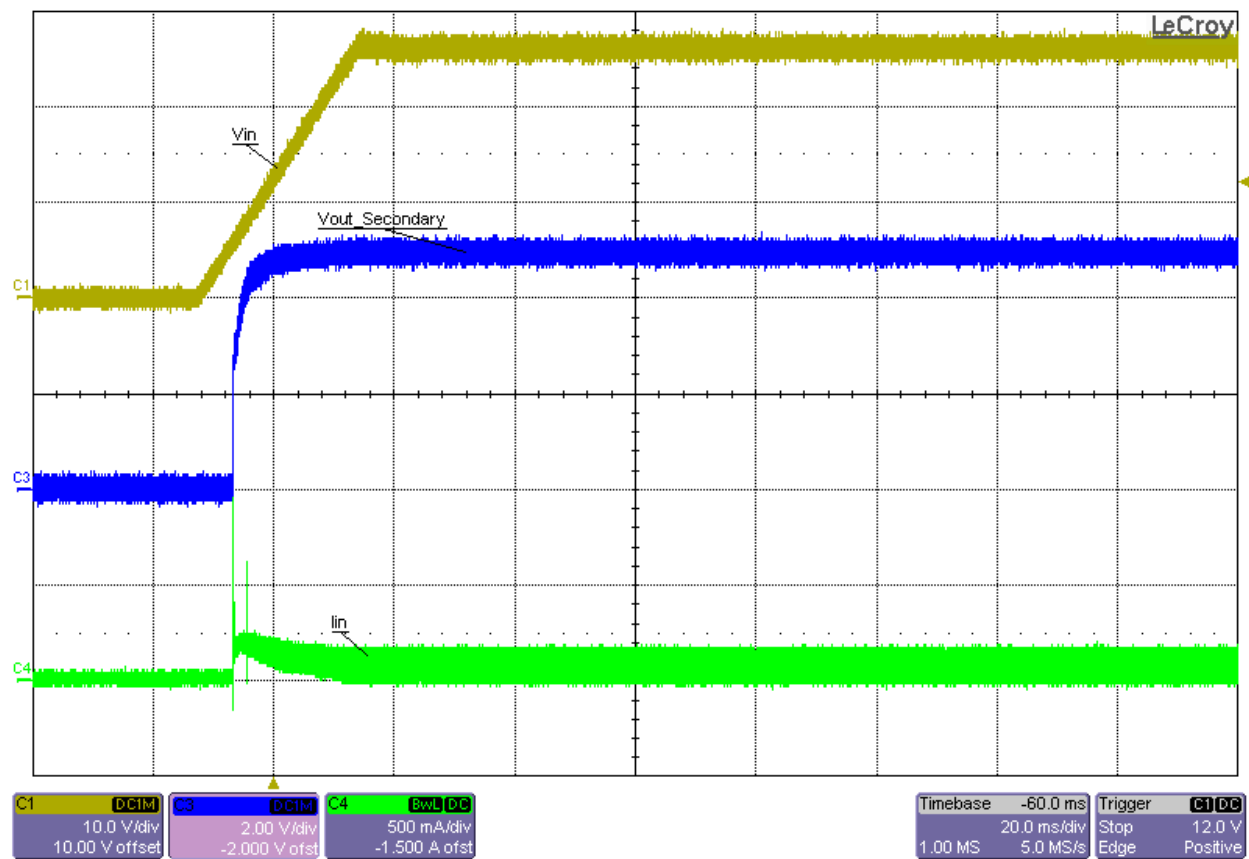
Startup into No Load at 24Vin



Startup into Full (300mA) Resistive Load at 24Vin

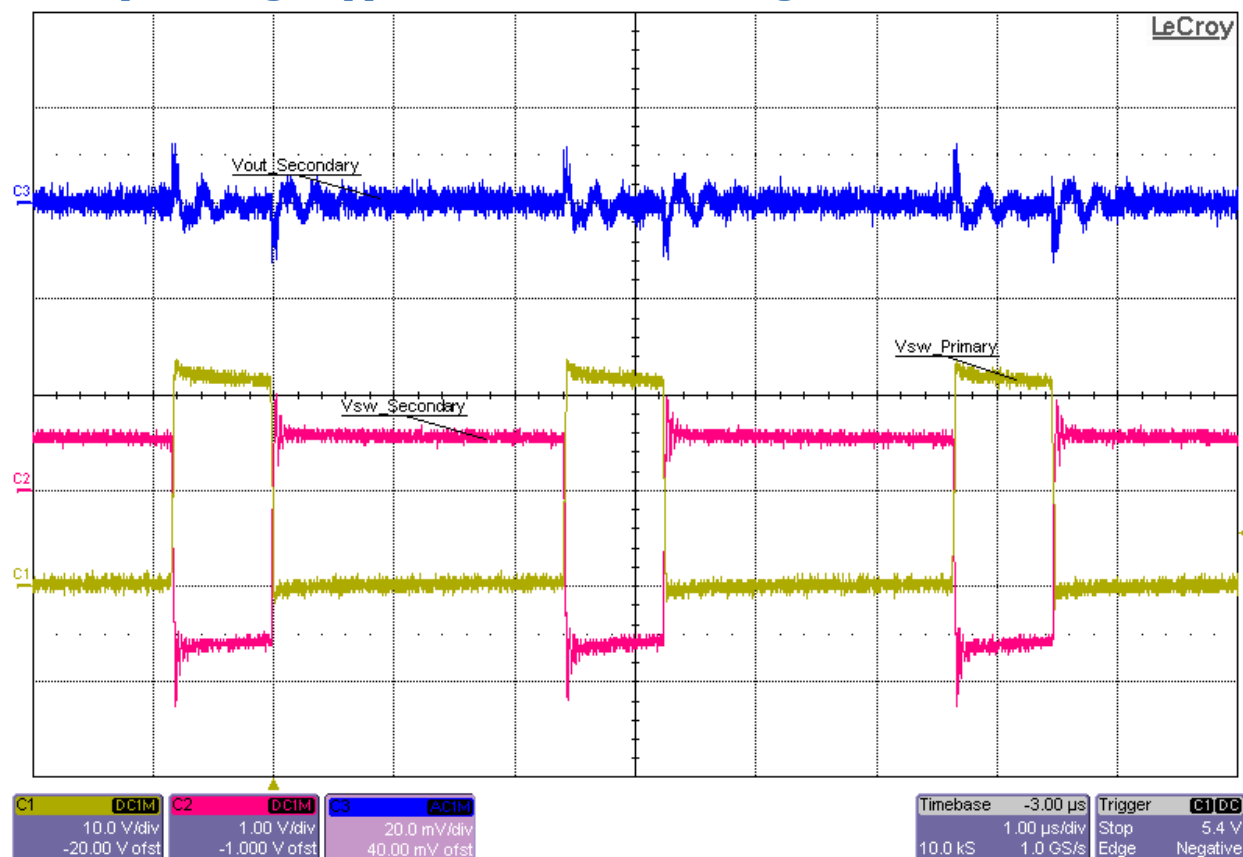


Startup into No Load at 26.4V_{in}

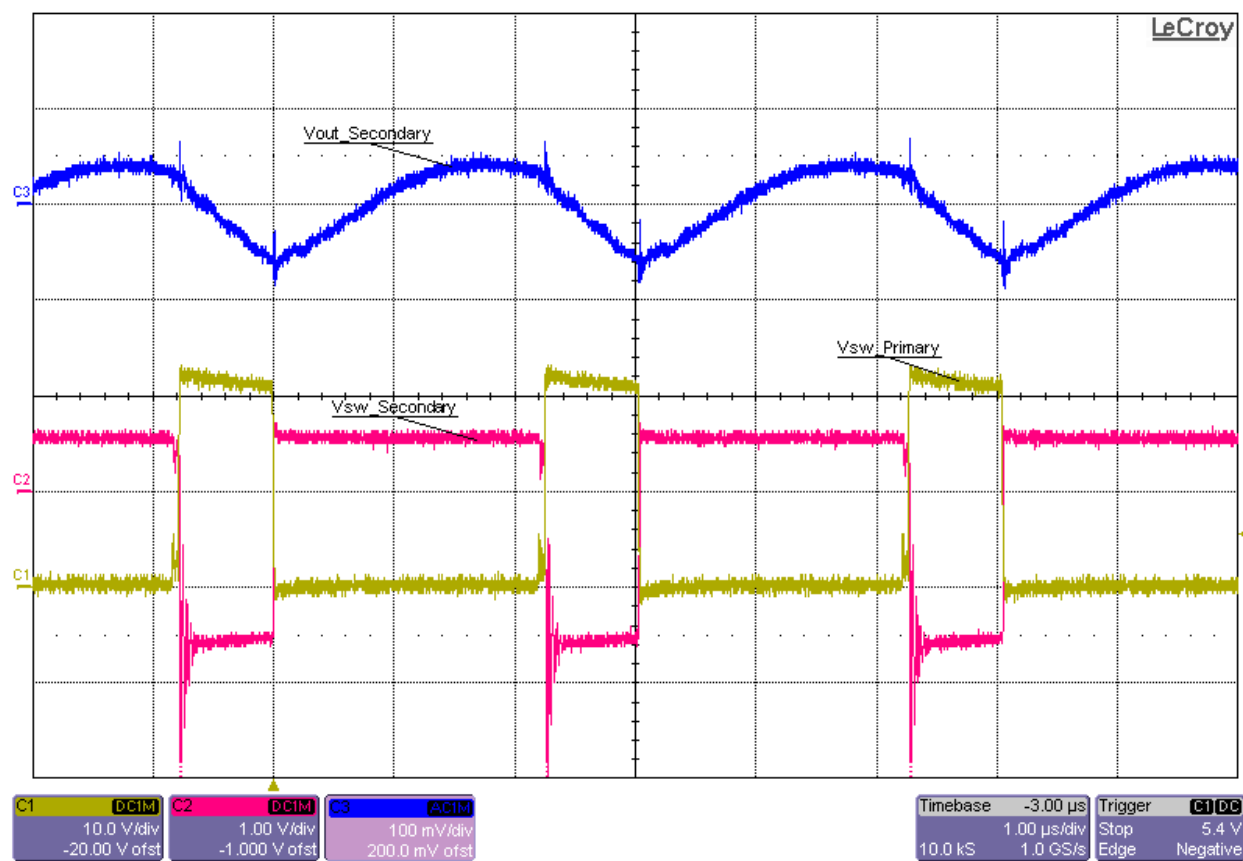


Startup into Full (300mA) Resistive Load at 26.4Vin

6.3 Output Voltage Ripple and Switch Node Voltage

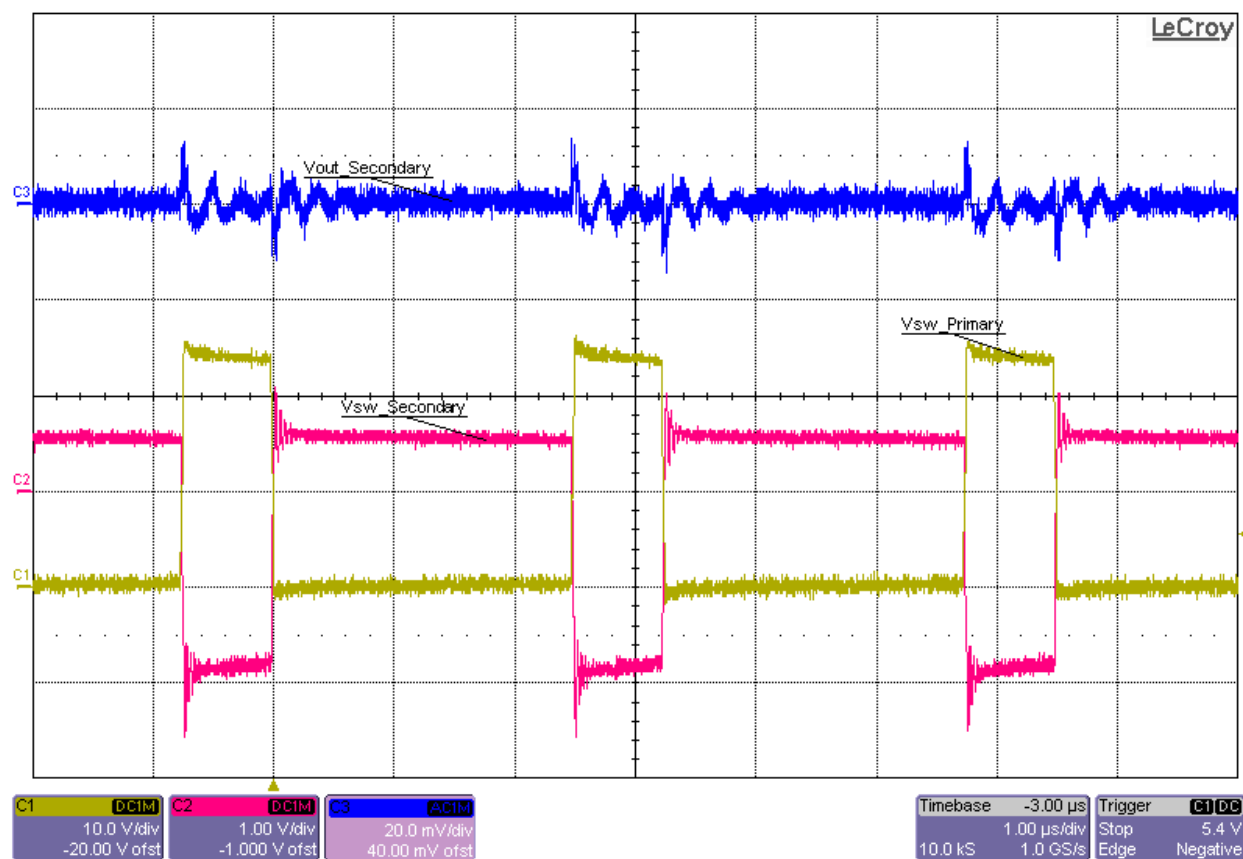


Switch Node and Secondary-Side Output Voltage Ripple at 21.6Vin and No Load ($V_{\text{ripple}} \approx 12\text{mVp-p}$)

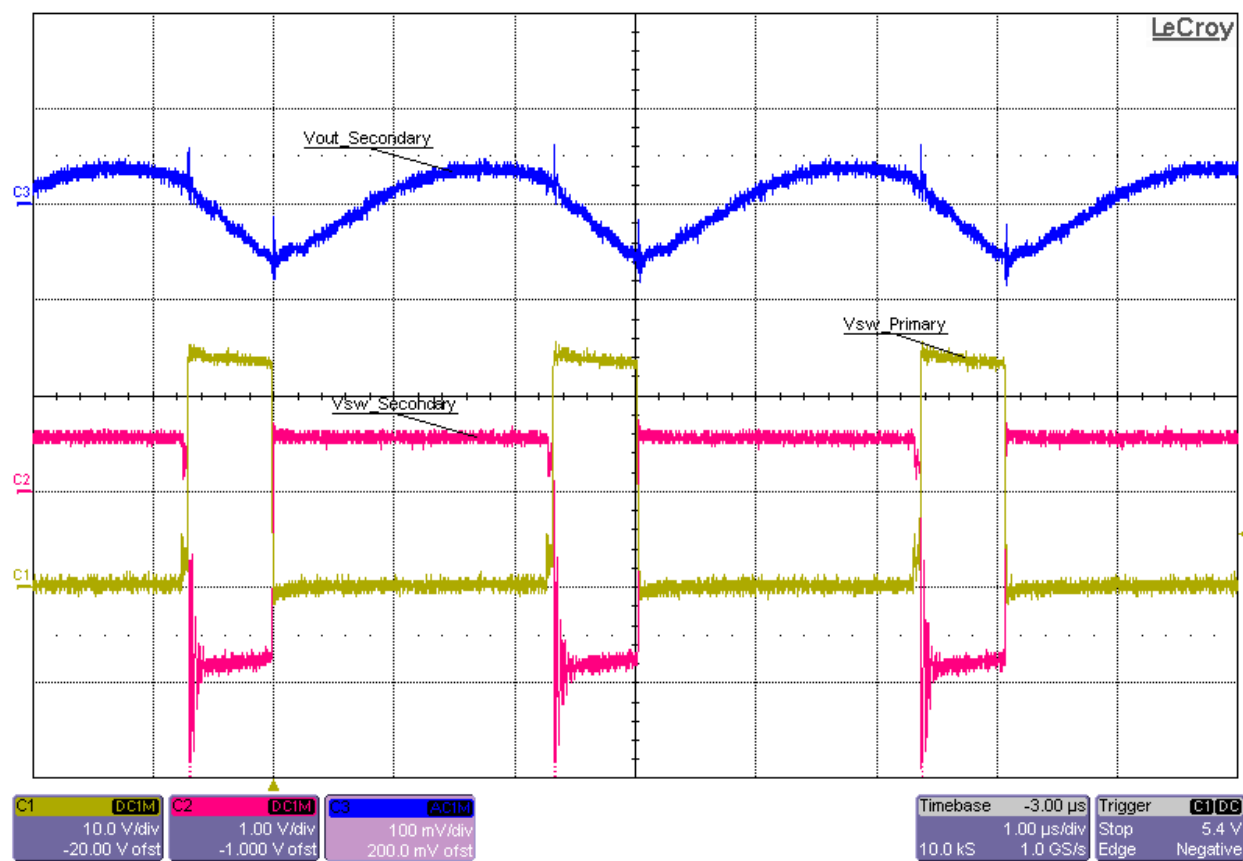


Switch Node and Secondary-Side Output Voltage Ripple at 21.6Vin and Full (300mA) Load

(Vripple $\approx$ 100mVp-p)

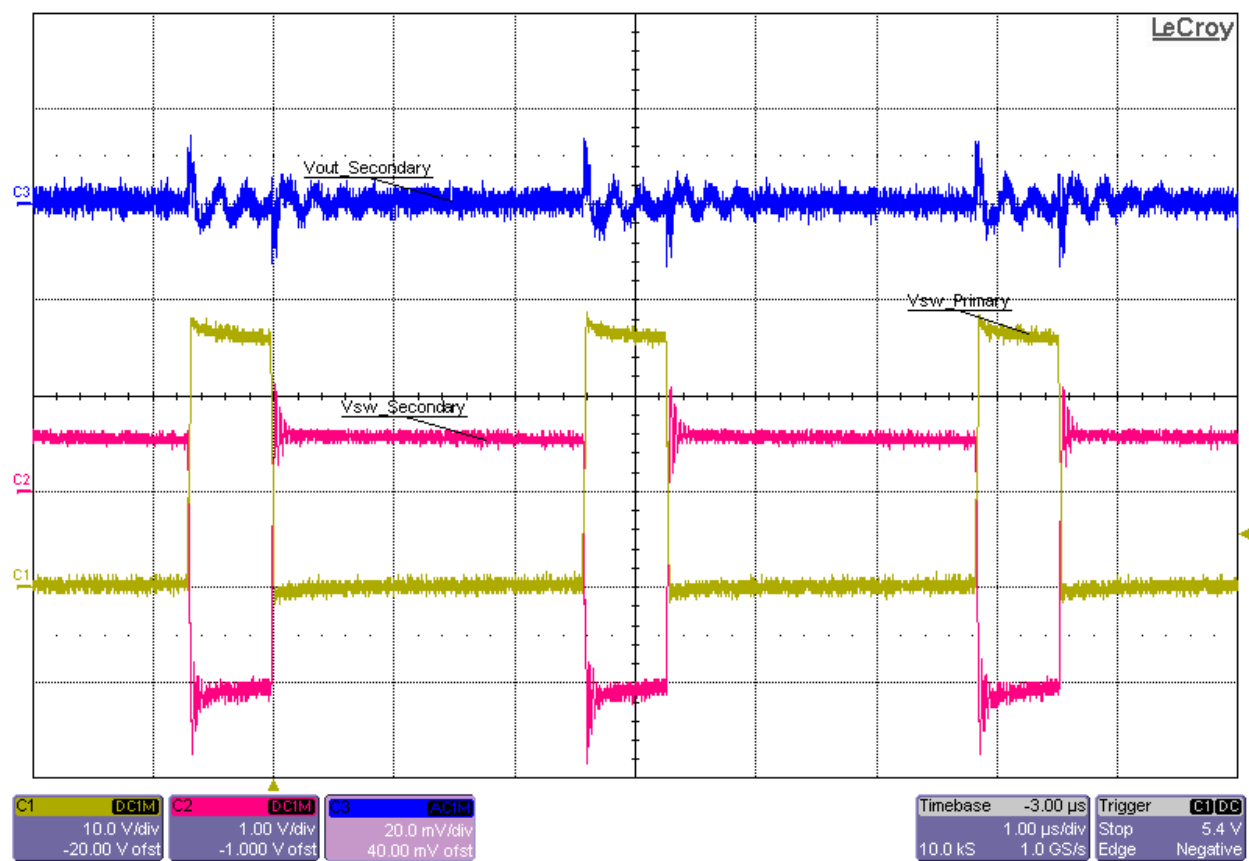


Switch Node and Secondary-Side Output Voltage Ripple at 24Vin and No Load ($V_{ripple} \approx 12\text{mVp-p}$)

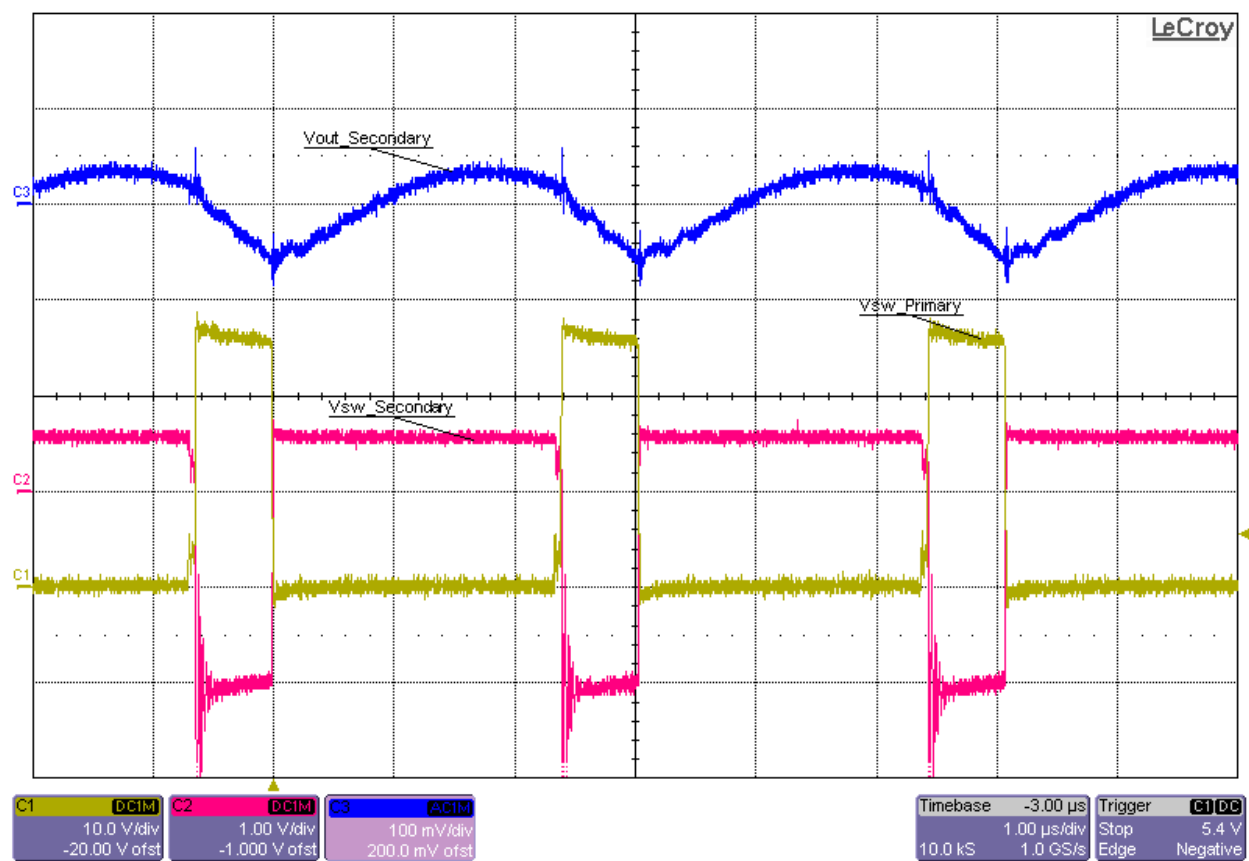


Switch Node and Secondary-Side Output Voltage Ripple at 24Vin and Full (300mA) Load

(Vripple $\approx$ 100mVp-p)



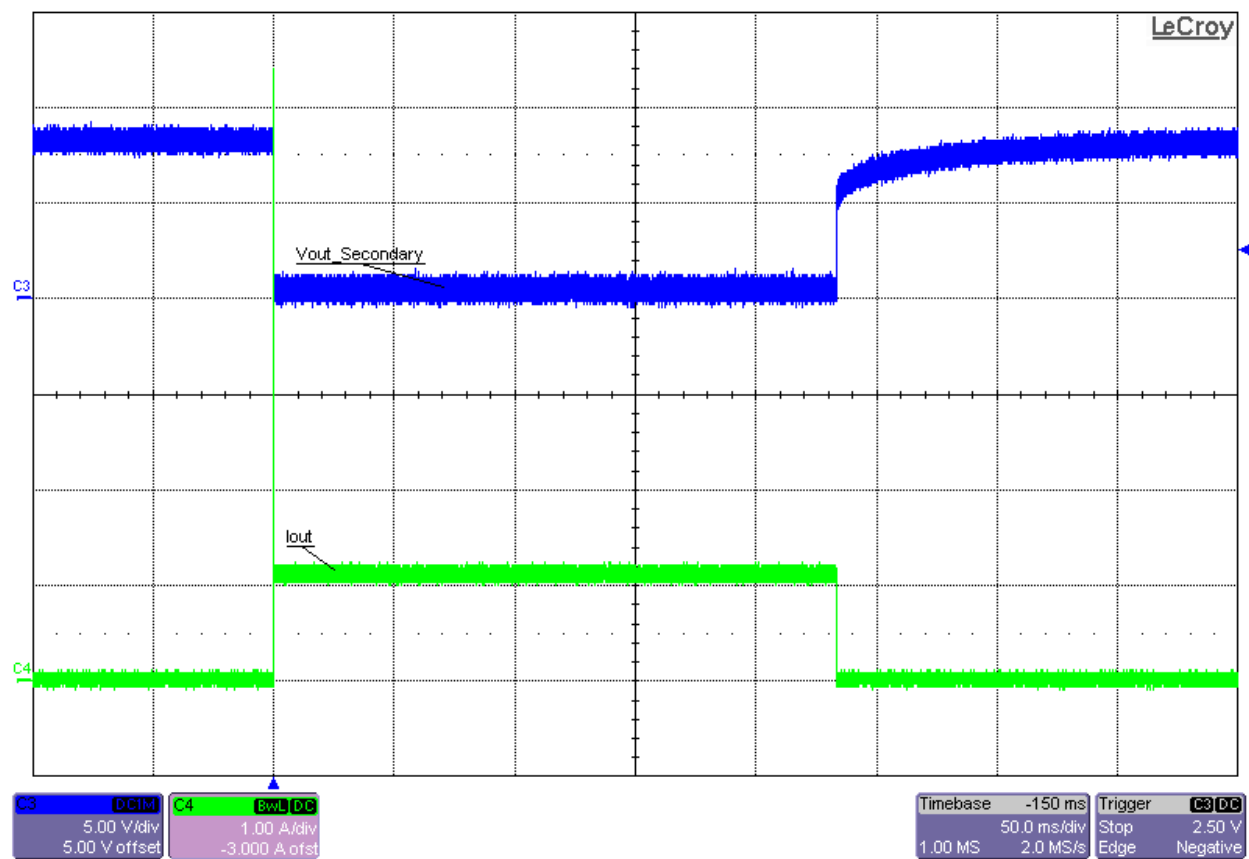
Switch Node and Secondary-Side Output Voltage Ripple at 26.4Vin and No Load ($V_{ripple} \approx 16\text{mVp-p}$)



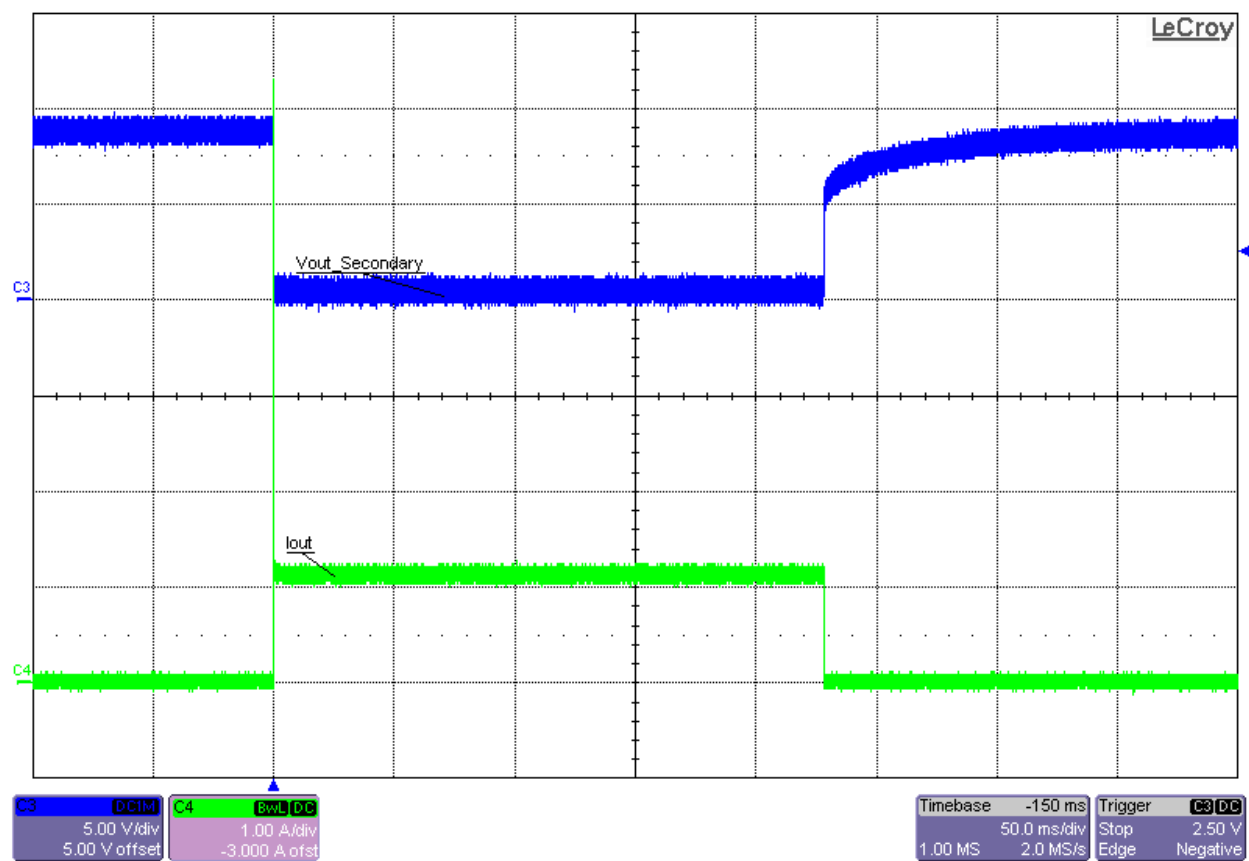
Switch Node and Secondary-Side Output Voltage Ripple at 26.4Vin and Full (300mA) Load

(Vripple $\approx$ 90mVp-p)

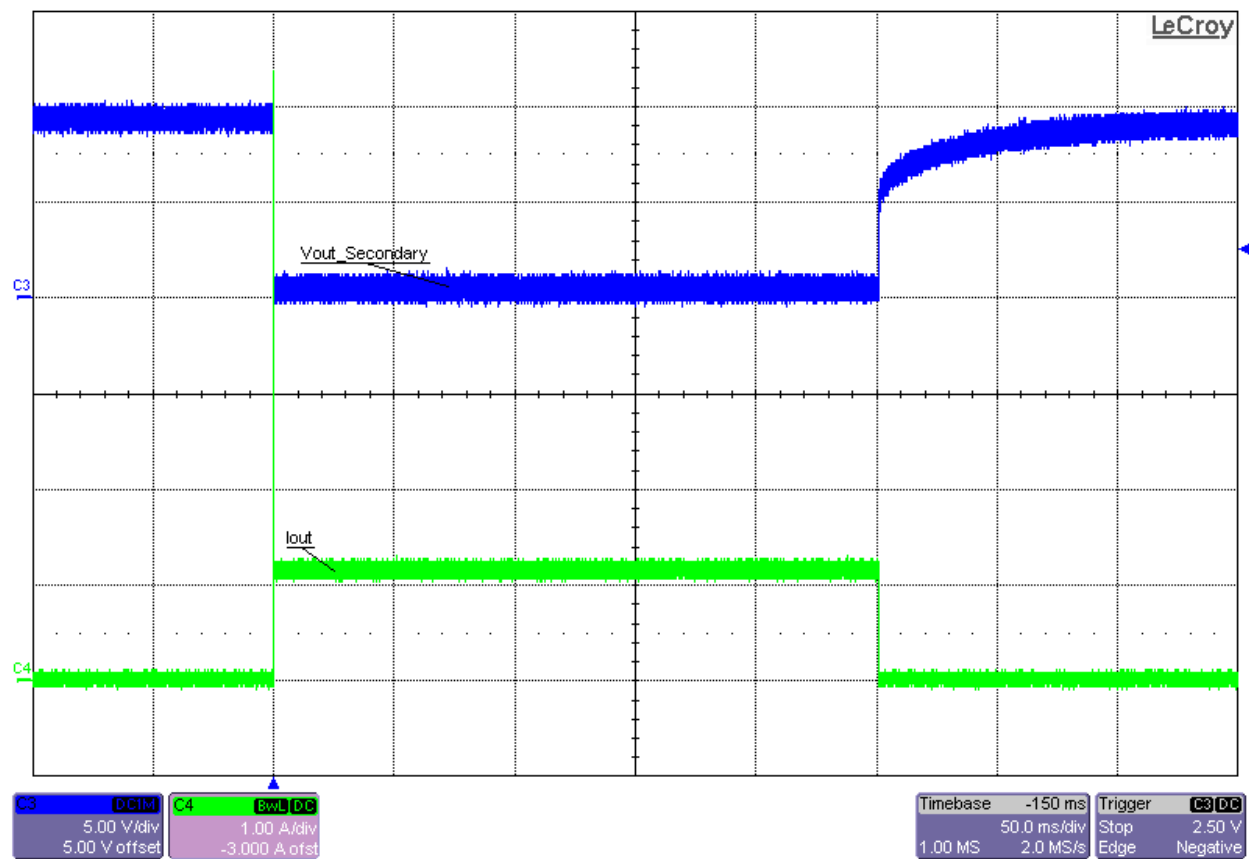
7 Short Circuit Testing



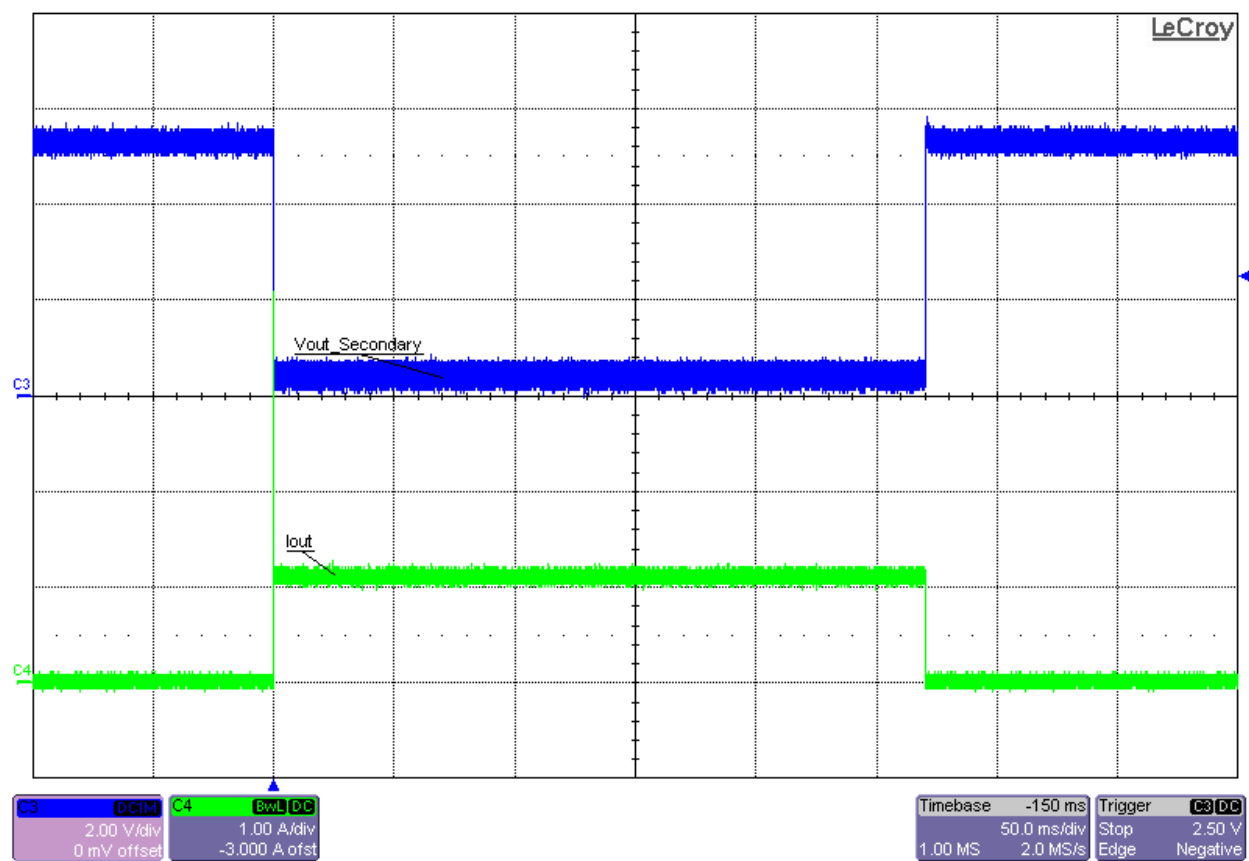
Short Circuit Application and Recovery at 21.6Vin (applied from no load, recovered into no load)



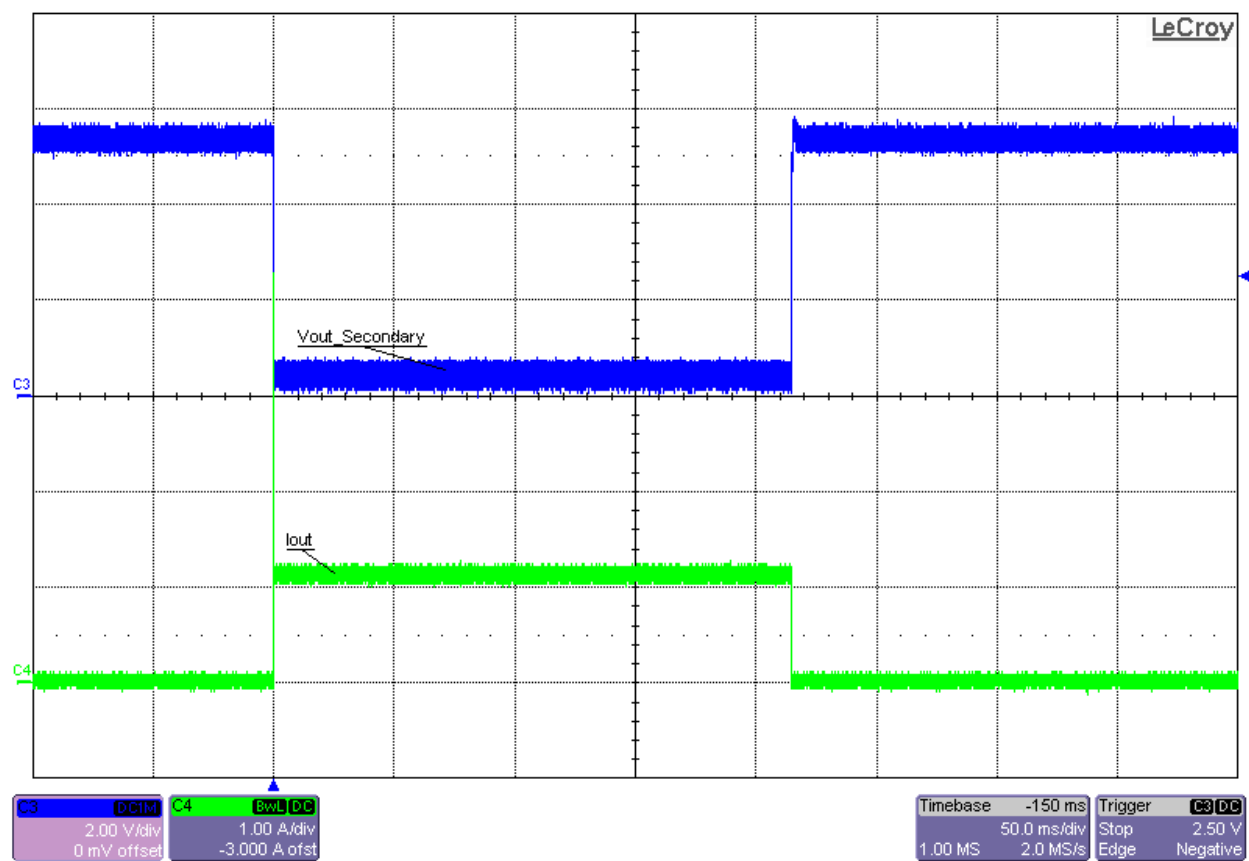
Short Circuit Application and Recovery at 24Vin (applied from no load, recovered into no load)



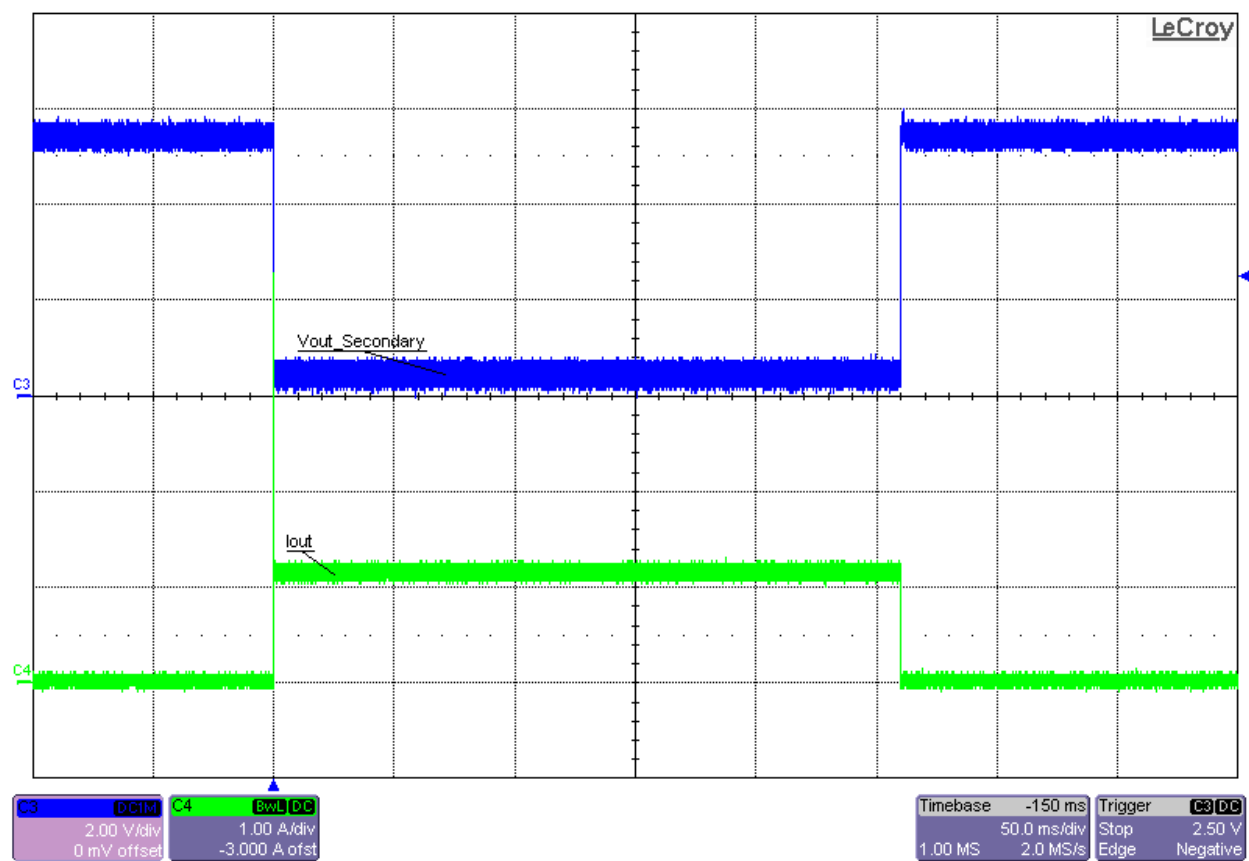
Short Circuit Application and Recovery at 26.4Vin (applied from no load, recovered into no load)



Short Circuit Application and Recovery at 21.6Vin (applied from 5mA load, recovered into 5mA load)



Short Circuit Application and Recovery at 24Vin (applied from 5mA load, recovered into 5mA load)



Short Circuit Application and Recovery at 26.4Vin (applied from 5mA load, recovered into 5mA load)

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