Test Data
For PMP10514
7/28/2014

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1. Design Specifications

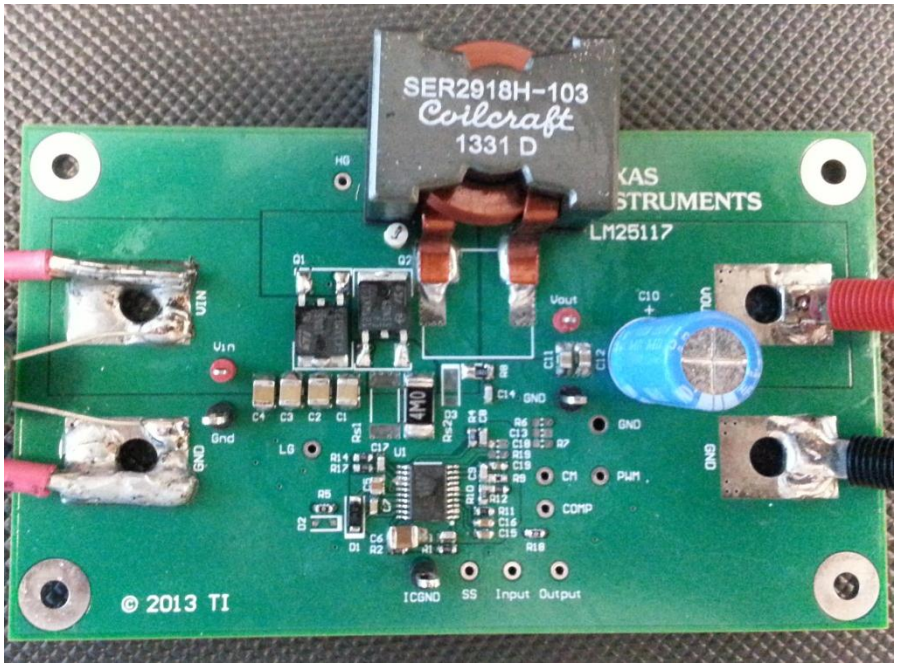
Vin Minimum	**30.4VDC**
Vin Maximum	**33.6VDC**
Vin Nominal	**32VDC**
Vout	**20VDC**
Iout	**15A Max.**
Switching Frequency	**200KHz**

2. Circuit Description

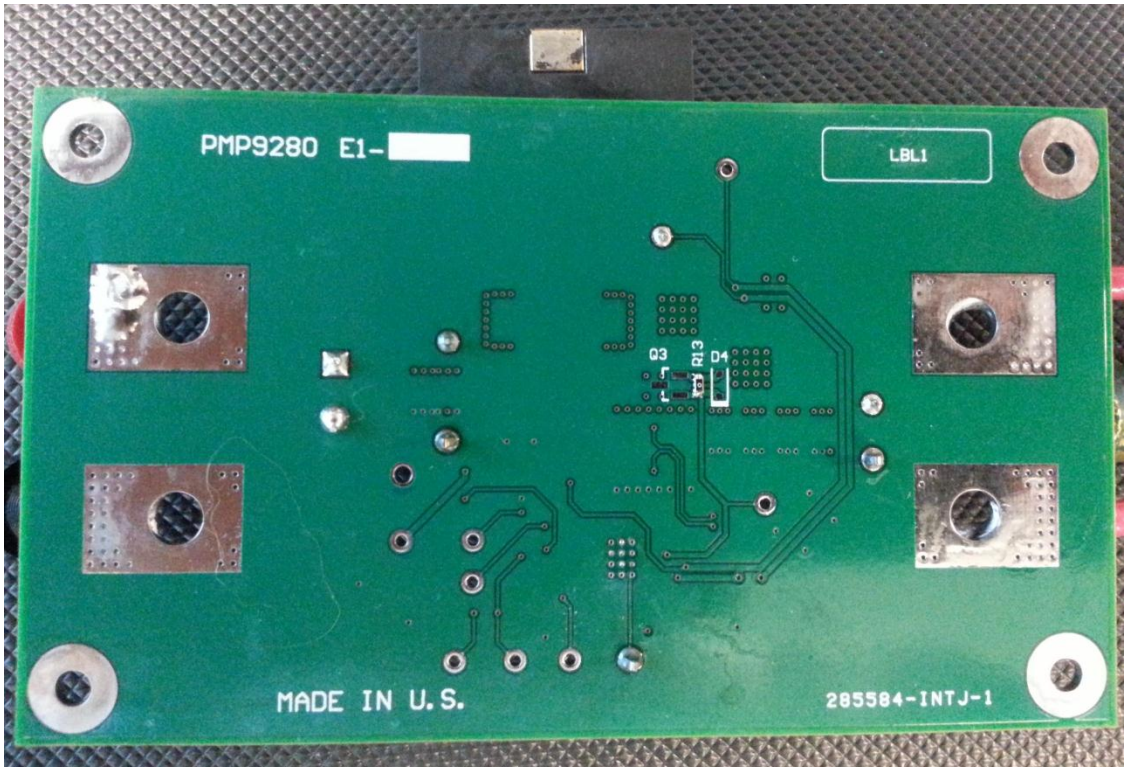
PMP10514 is a Single-Phase Synchronous Buck Converter using the LM25117 controller IC. The design accepts an input voltage of 30.4Vin to 33.6Vin (32Vin Nominal) and provides an output of 20Vout capable of supplying 15A of continuous current to the load. The design was built on the PMP9280 PCB, which was modified to the PMP10514 design configuration and requirements. Please note, that Cx1 (see schematic) is a bulk capacitor that was used to dampen the input supply. When building this design please ensure to use input bulk capacitor(s) that can handle a total of 7.5Arms.

3. PMP10514 Board Photos

Board Dimensions: 2.36” x 4.05”

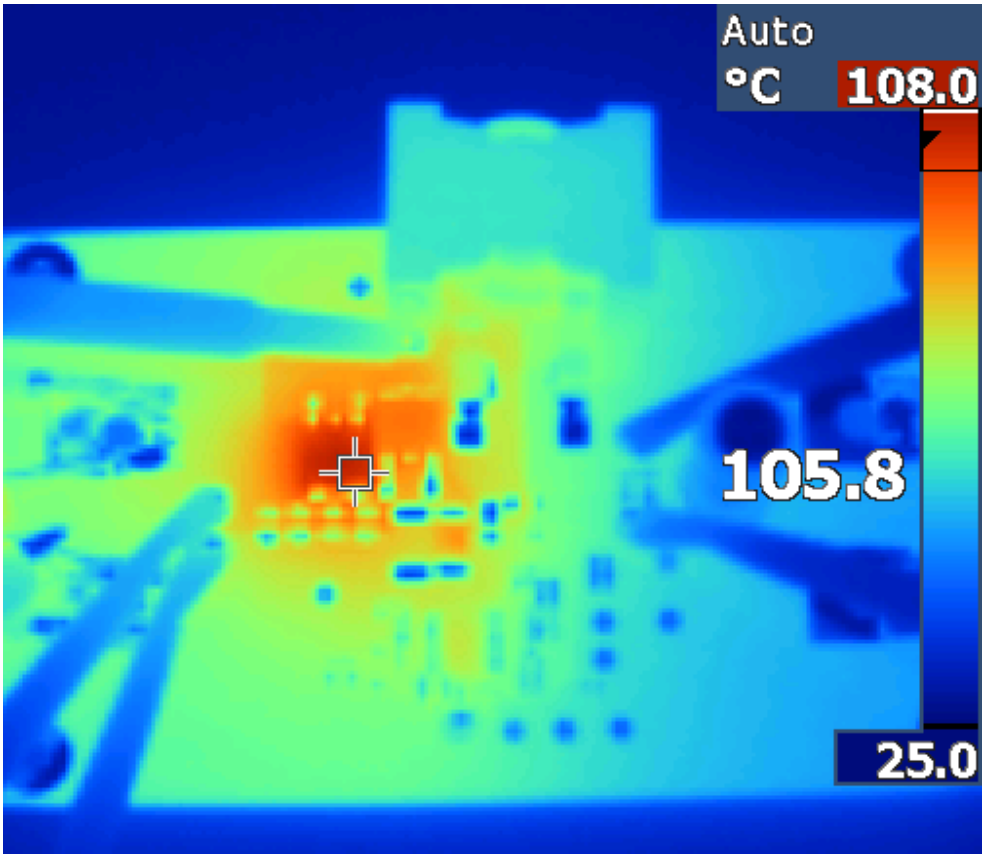


Board Photo (Top)



Board Photo (Bottom)

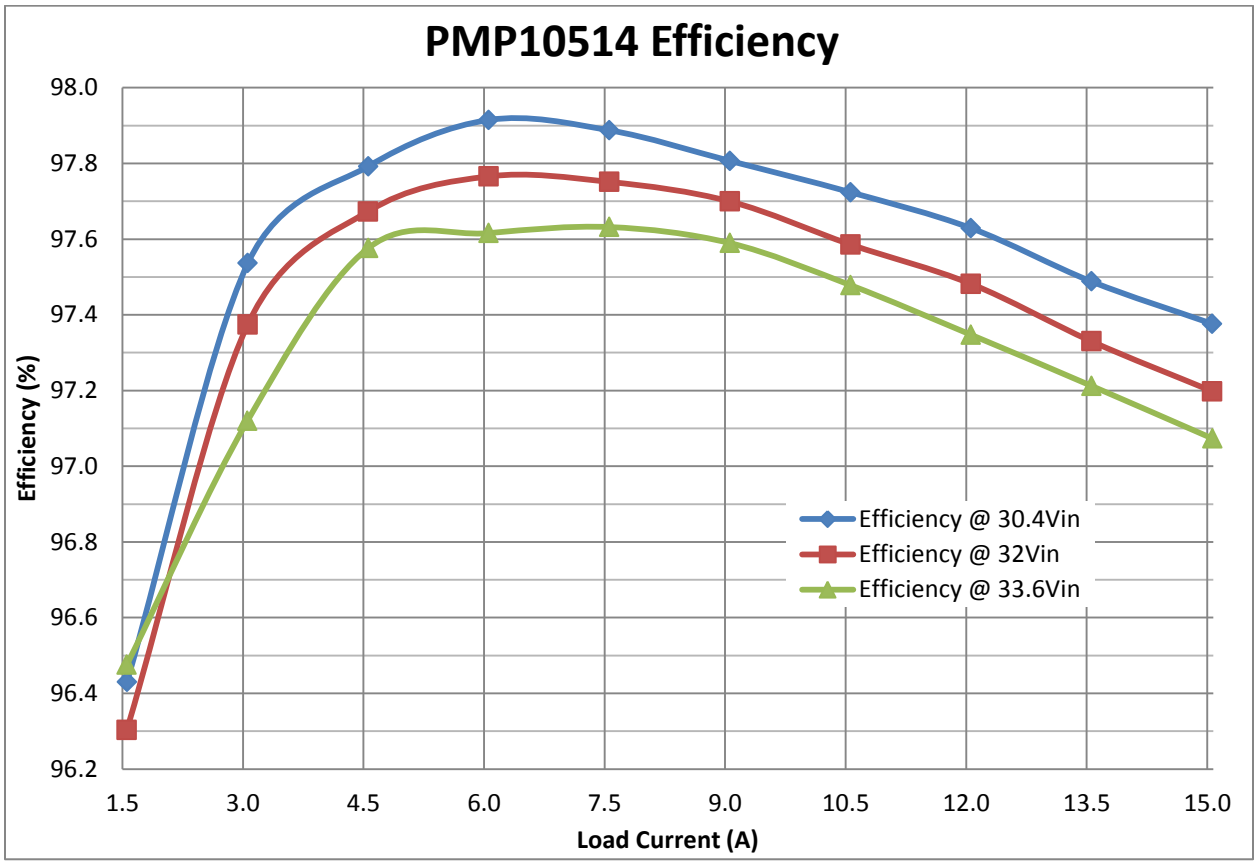
4. Thermal Data



IR thermal image taken at steady state with 32Vin and 15A load (no airflow; Ambient at room temp.)

5. Efficiency

5.1 Efficiency Chart



5.2 Efficiency Data

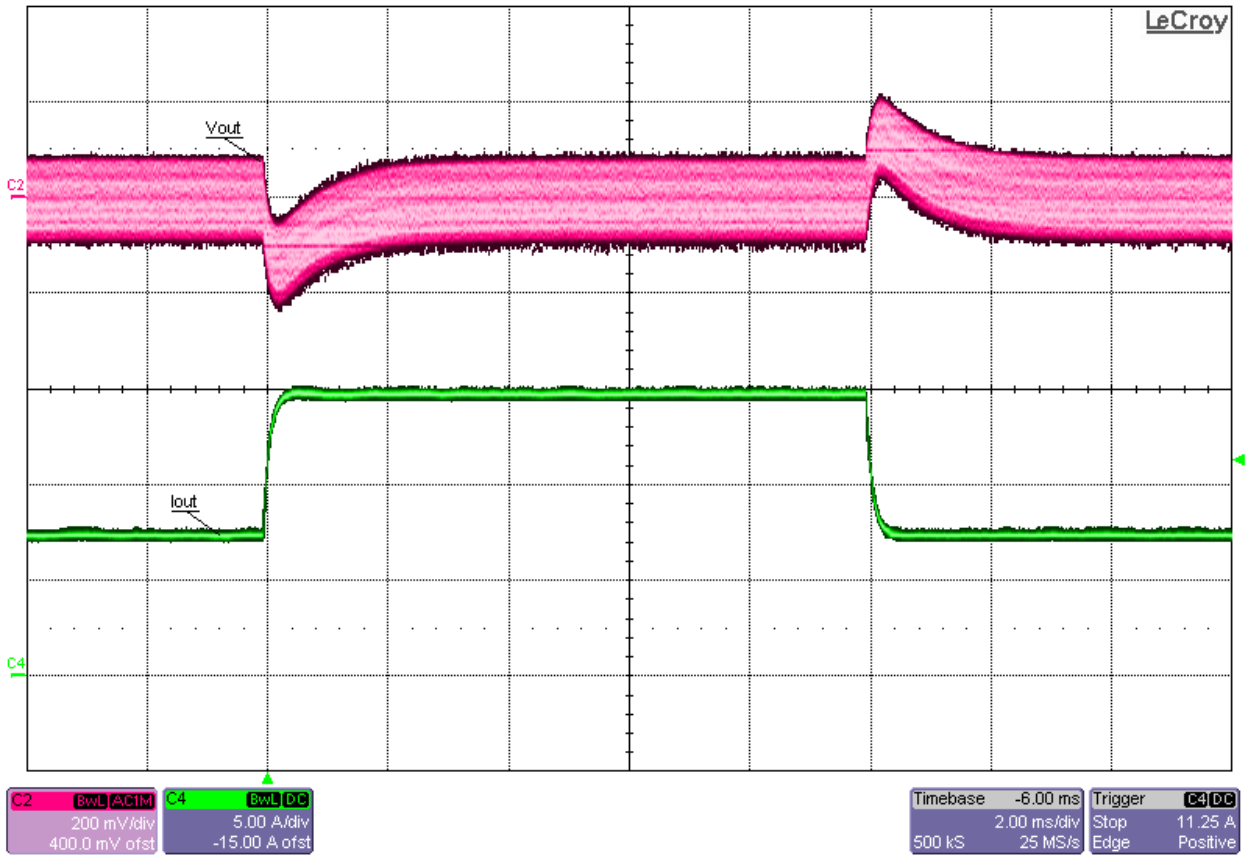
Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Efficiency (%)
30.41	1.091	20.561	1.556	33.17731	31.99292	96.4
30.41	2.121	20.559	3.06	64.49961	62.91054	97.5
30.409	3.151	20.558	4.558	95.81876	93.70336	97.8
30.407	4.183	20.558	6.058	127.1925	124.5404	97.9
30.406	5.222	20.559	7.56	158.7801	155.426	97.9
30.404	6.264	20.56	9.06	190.4507	186.2736	97.8
30.401	7.308	20.56	10.56	222.1705	217.1136	97.7
30.398	8.355	20.56	12.06	253.9753	247.9536	97.6
30.394	9.409	20.56	13.56	285.9771	278.7936	97.5
30.39	10.467	20.562	15.064	318.0921	309.746	97.4

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Efficiency (%)
32.01	1.037	20.571	1.554	33.19437	31.96733	96.3
32.01	2.018	20.569	3.058	64.59618	62.9	97.4
32.009	2.997	20.566	4.556	95.93097	93.6987	97.7
32.007	3.98	20.565	6.056	127.3879	124.5416	97.8
32.006	4.968	20.565	7.558	159.0058	155.4303	97.8
32.003	5.959	20.565	9.06	190.7059	186.3189	97.7
32	6.954	20.564	10.56	222.528	217.1558	97.6
31.997	7.951	20.564	12.06	254.4081	248.0018	97.5
31.993	8.955	20.564	13.56	286.4973	278.8478	97.3
31.989	9.963	20.564	15.064	318.7064	309.7761	97.2

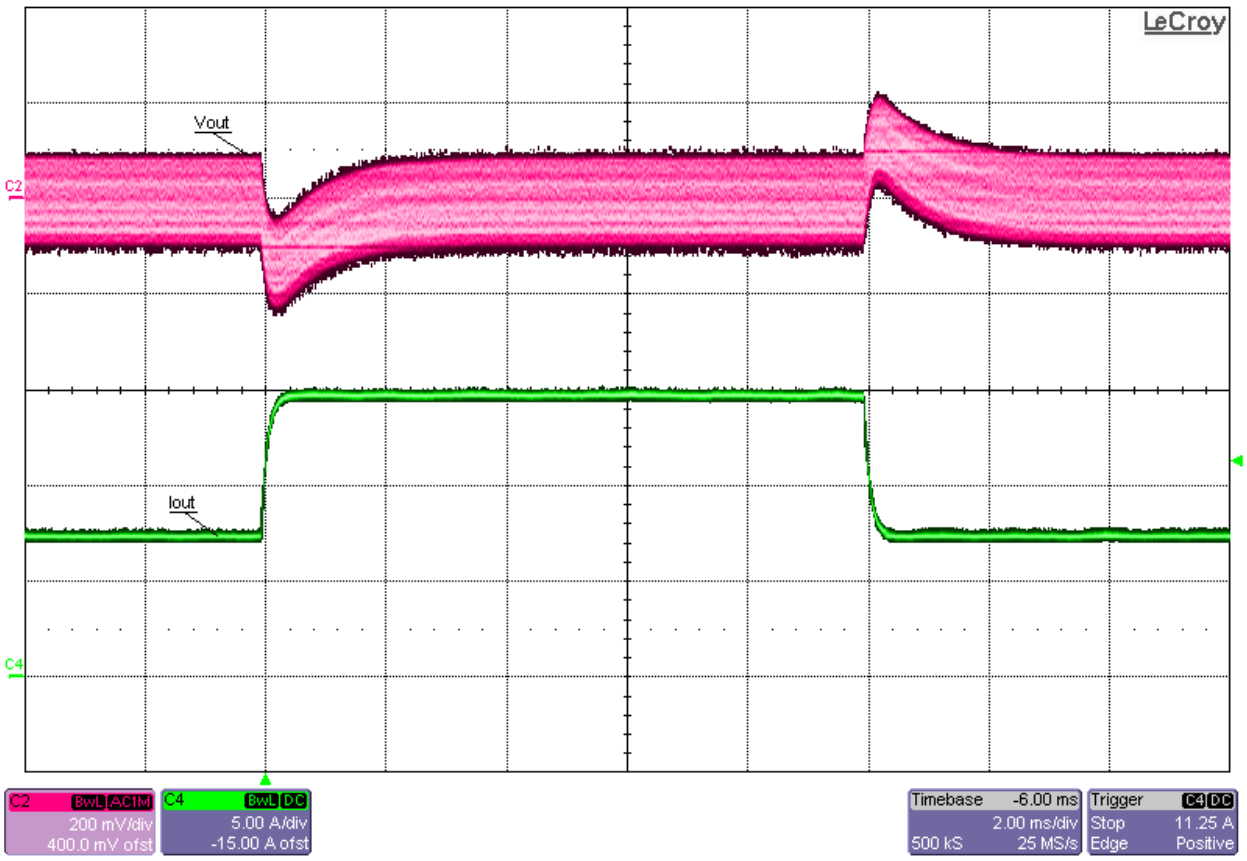
Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Efficiency (%)
33.609	0.986	20.573	1.554	33.13847	31.97044	96.5
33.608	1.926	20.571	3.056	64.72901	62.86498	97.1
33.607	2.859	20.569	4.558	96.08241	93.7535	97.6
33.606	3.797	20.568	6.056	127.602	124.5598	97.6
33.604	4.738	20.567	7.558	159.2158	155.4454	97.6
33.601	5.682	20.565	9.06	190.9209	186.3189	97.6
33.599	6.631	20.566	10.56	222.795	217.177	97.5
33.595	7.584	20.566	12.06	254.7845	248.026	97.3
33.592	8.542	20.568	13.562	286.9429	278.9432	97.2
33.588	9.504	20.568	15.066	319.2204	309.8775	97.1

6 Waveforms

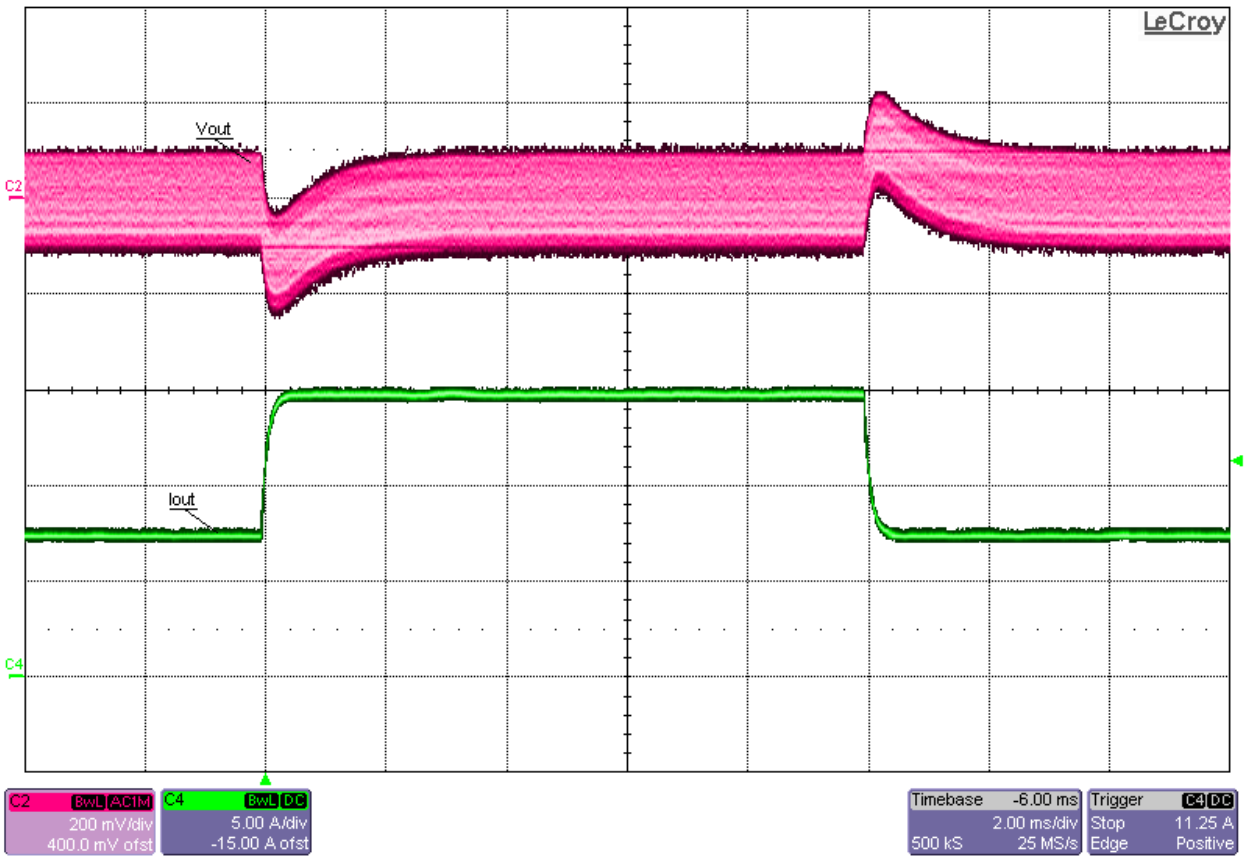
6.1 Load Transient Response



Load Transient Response at 30.4Vin and 50%-to-100% (7.5A-to-15A) Load Step

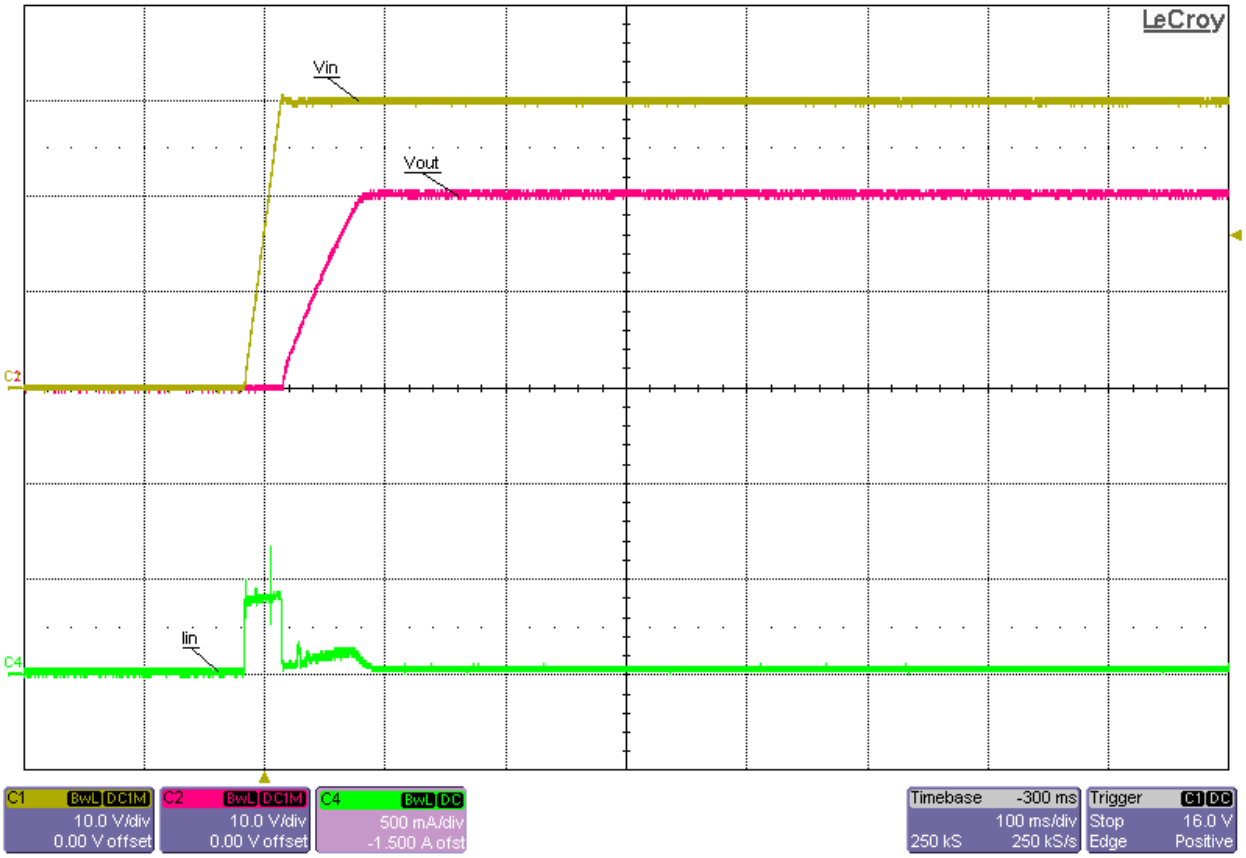


Load Transient Response at 32Vin and 50%-to-100% (7.5A-to-15A) Load Step

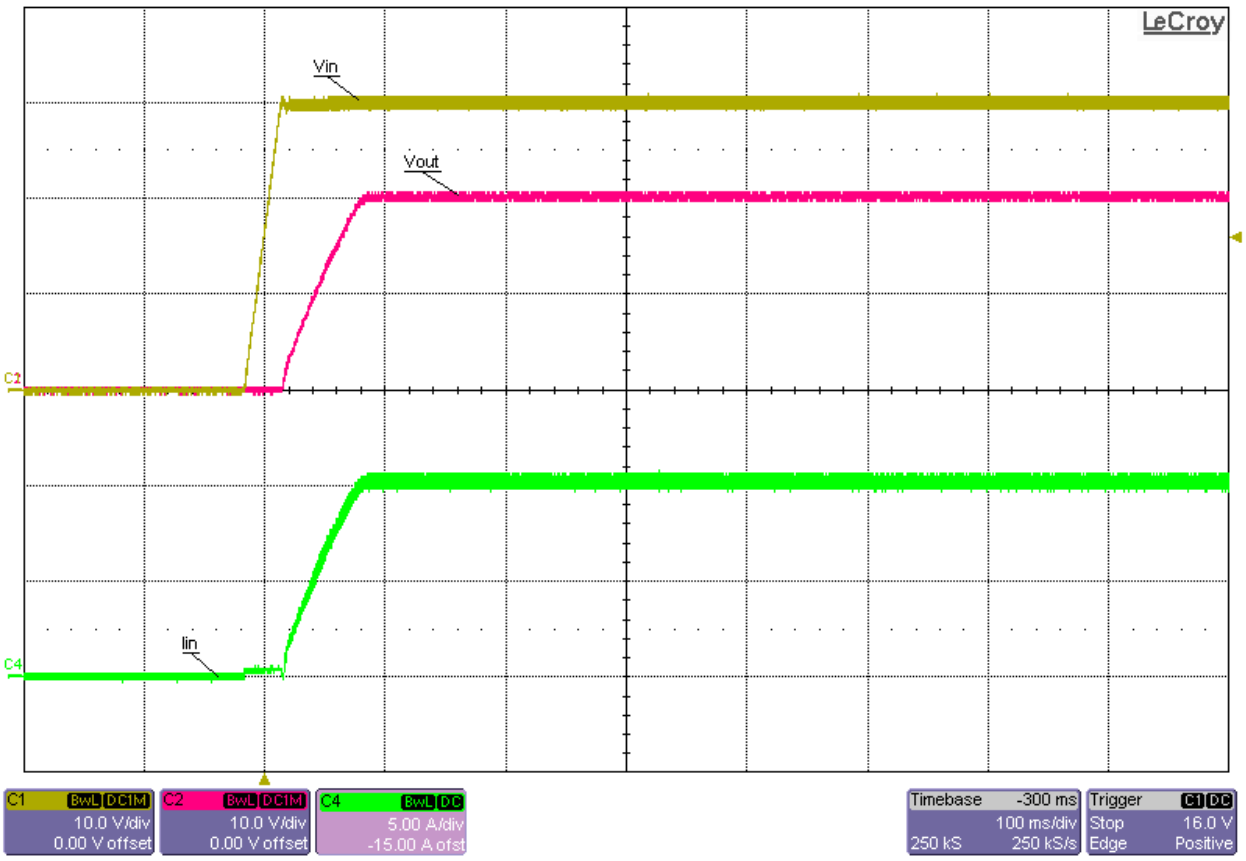


Load Transient Response at 33.6Vin and 50%-to-100% (7.5A-to-15A) Load Step

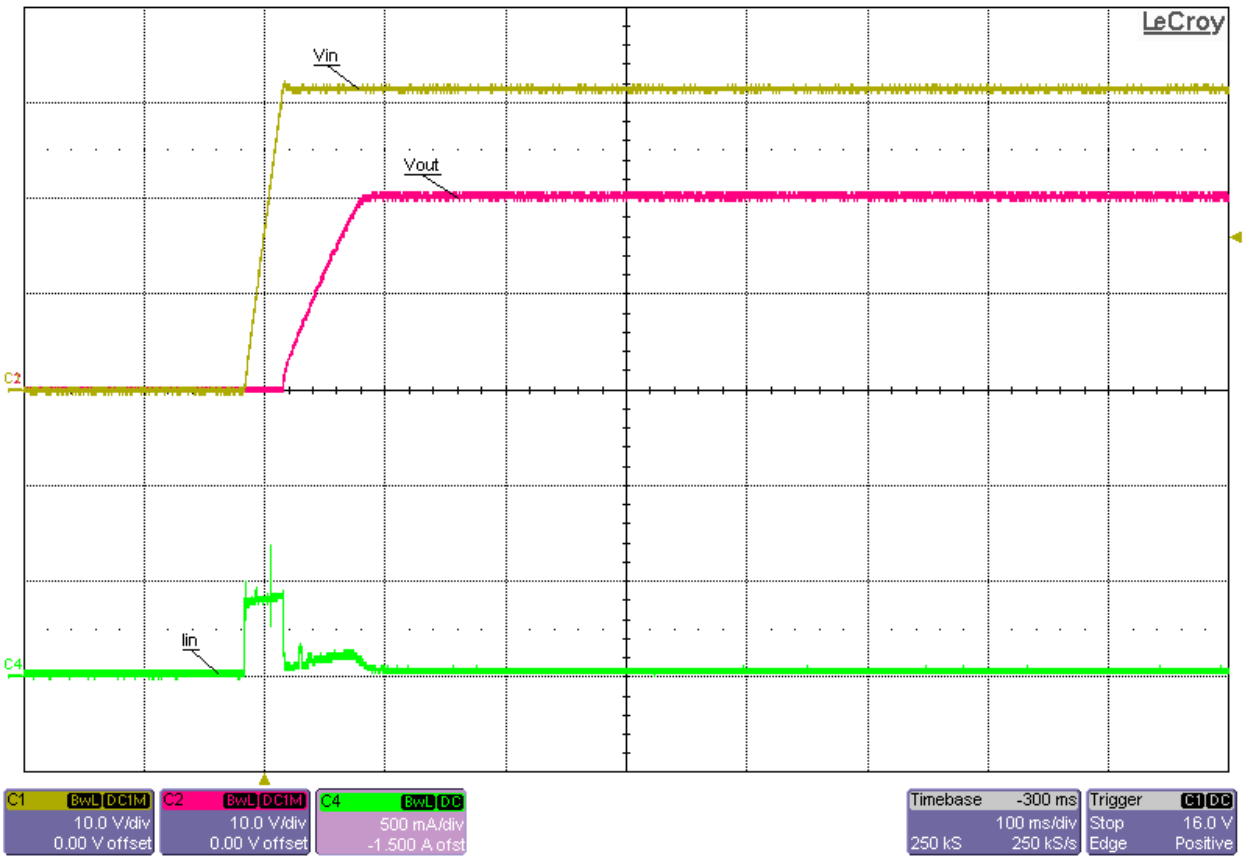
6.2 Startup



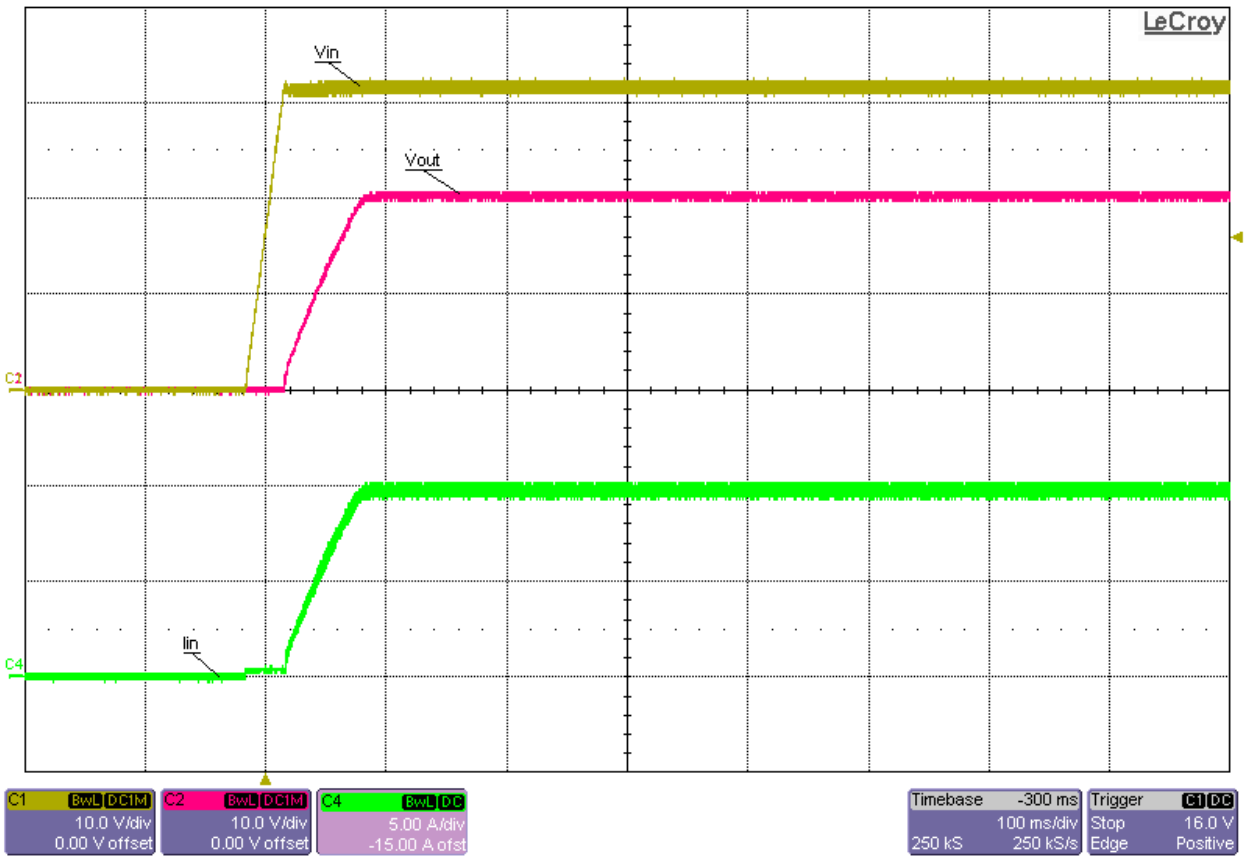
Startup into No Load at 30.4Vin



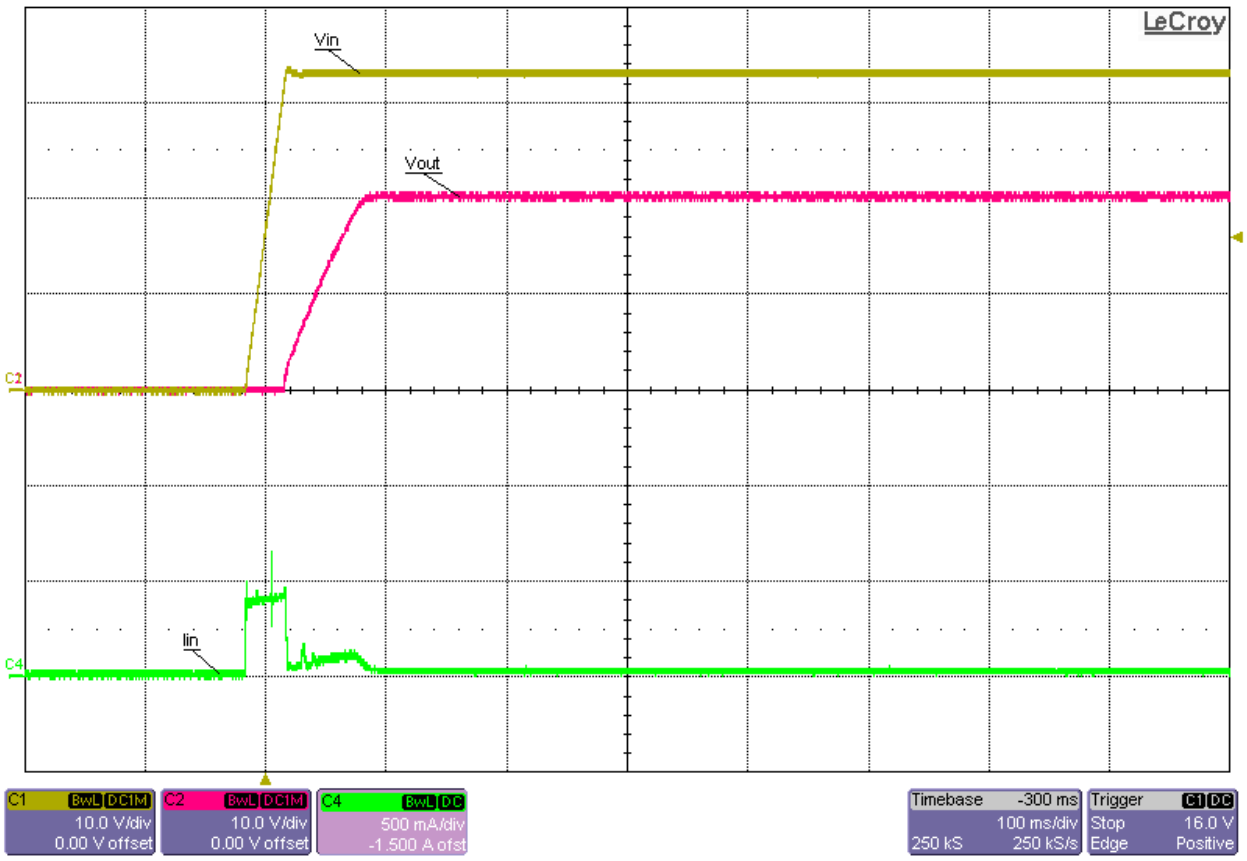
Startup into 15A Constant-Current Load at 30.4Vin



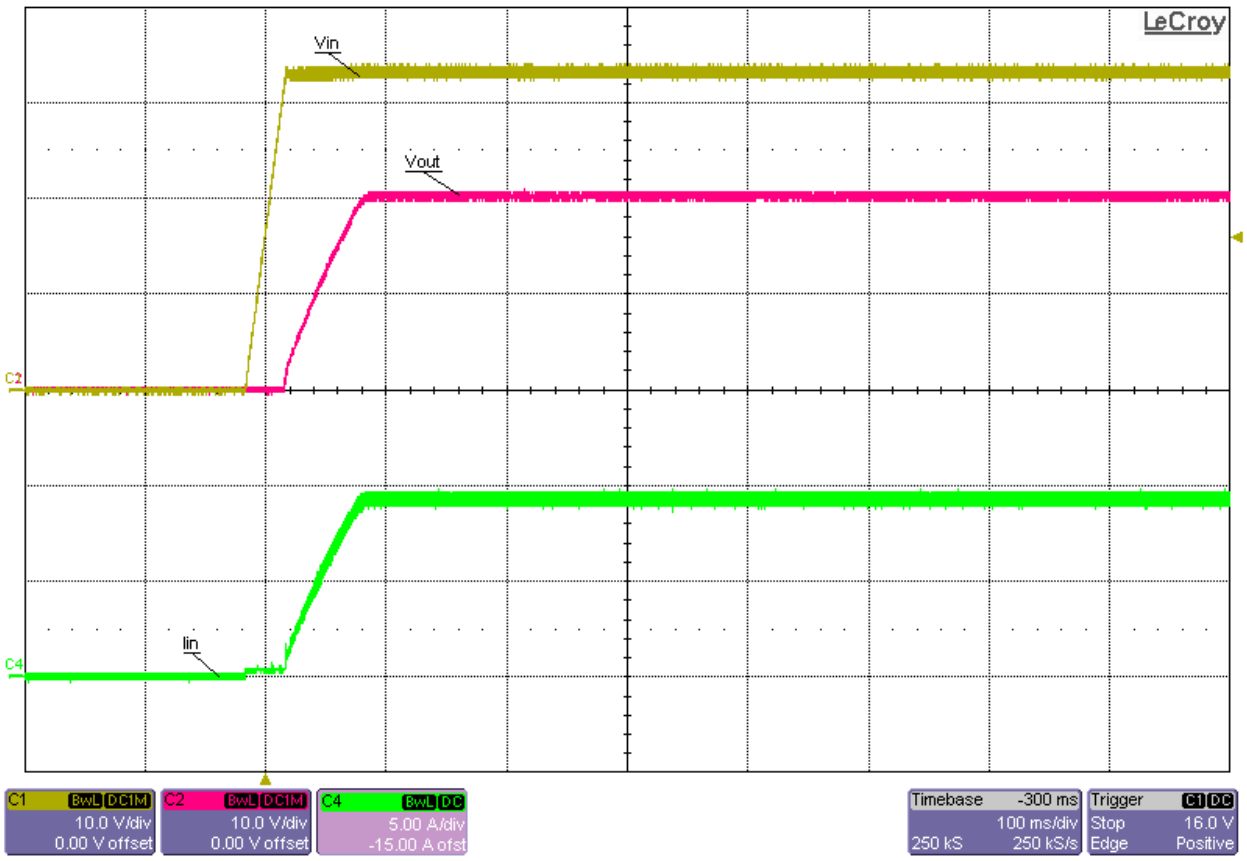
Startup into No Load at 32Vin



Startup into 15A Constant-Current Load at 32Vin

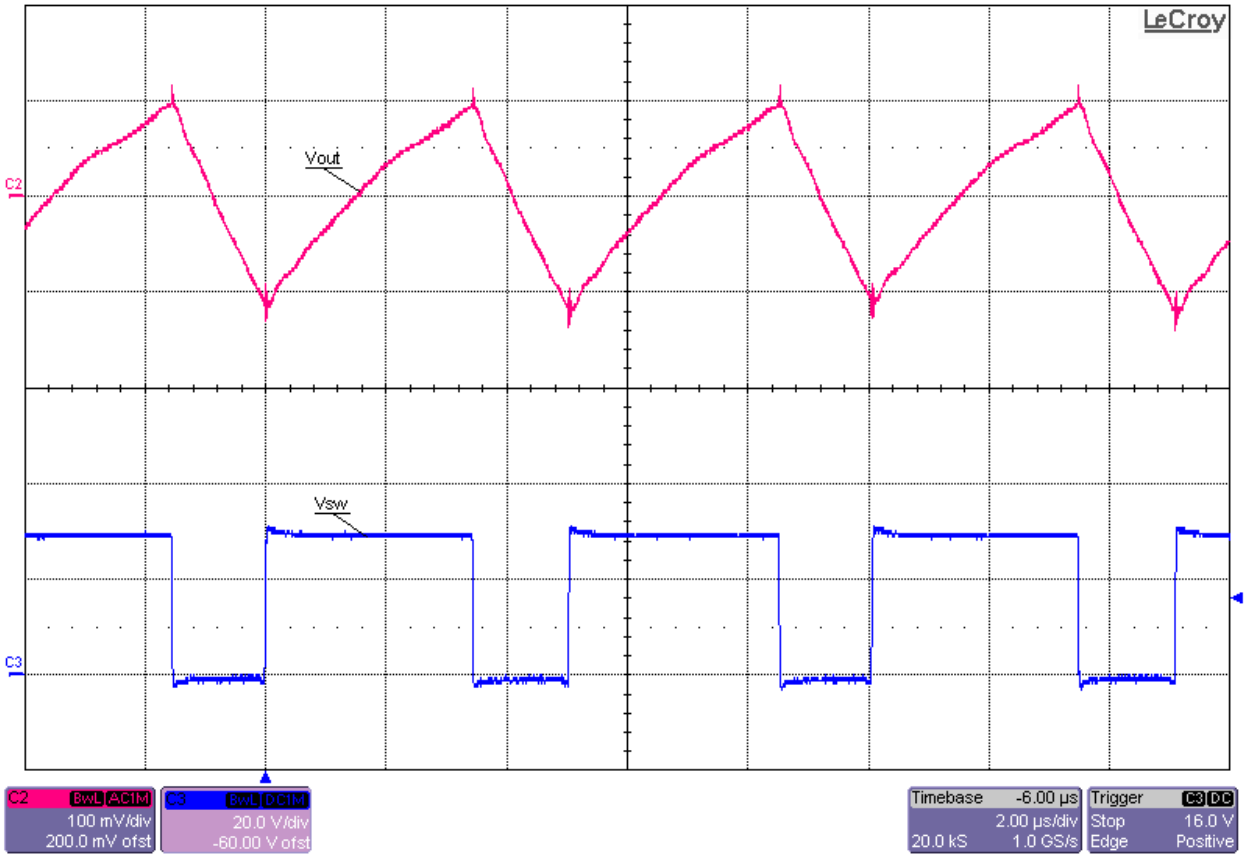


Startup into No Load at 33.6Vin

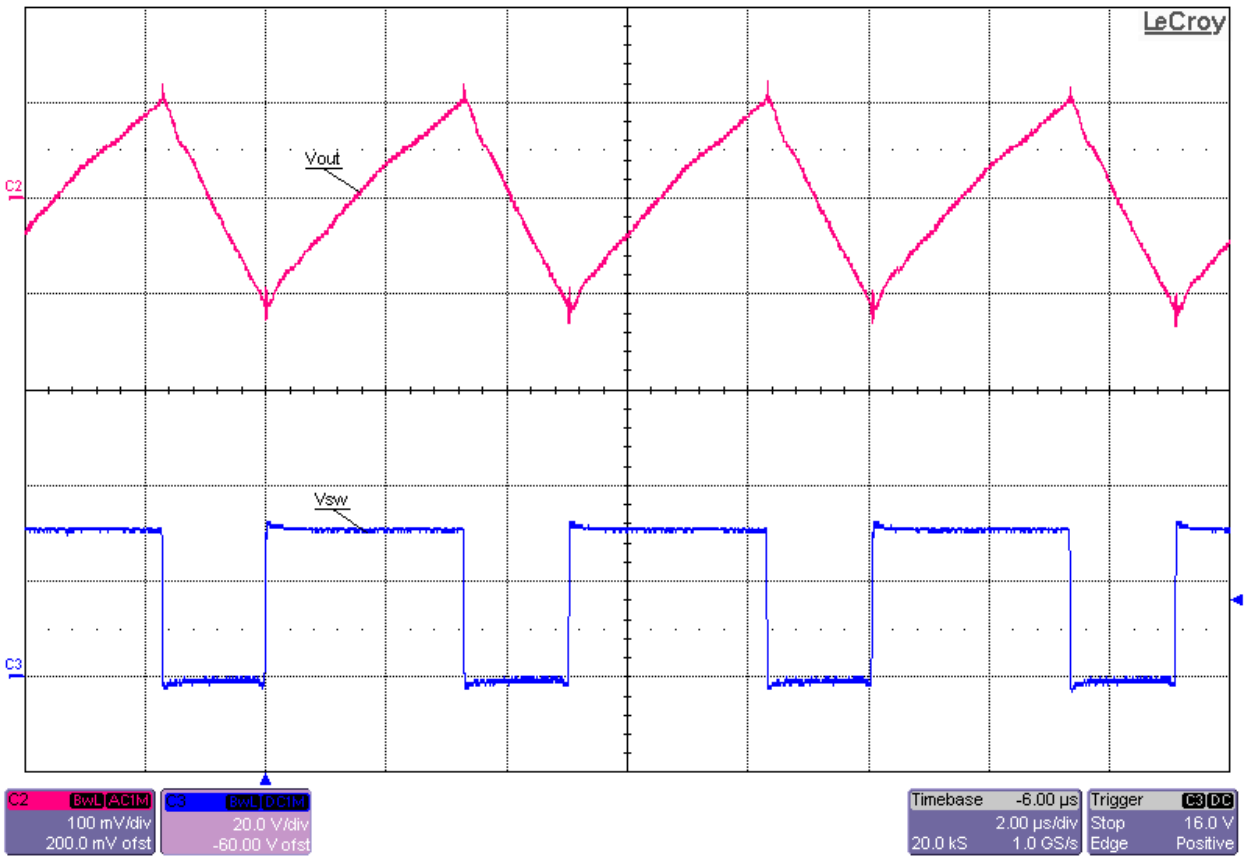


Startup into 15A Constant-Current Load at 33.6Vin

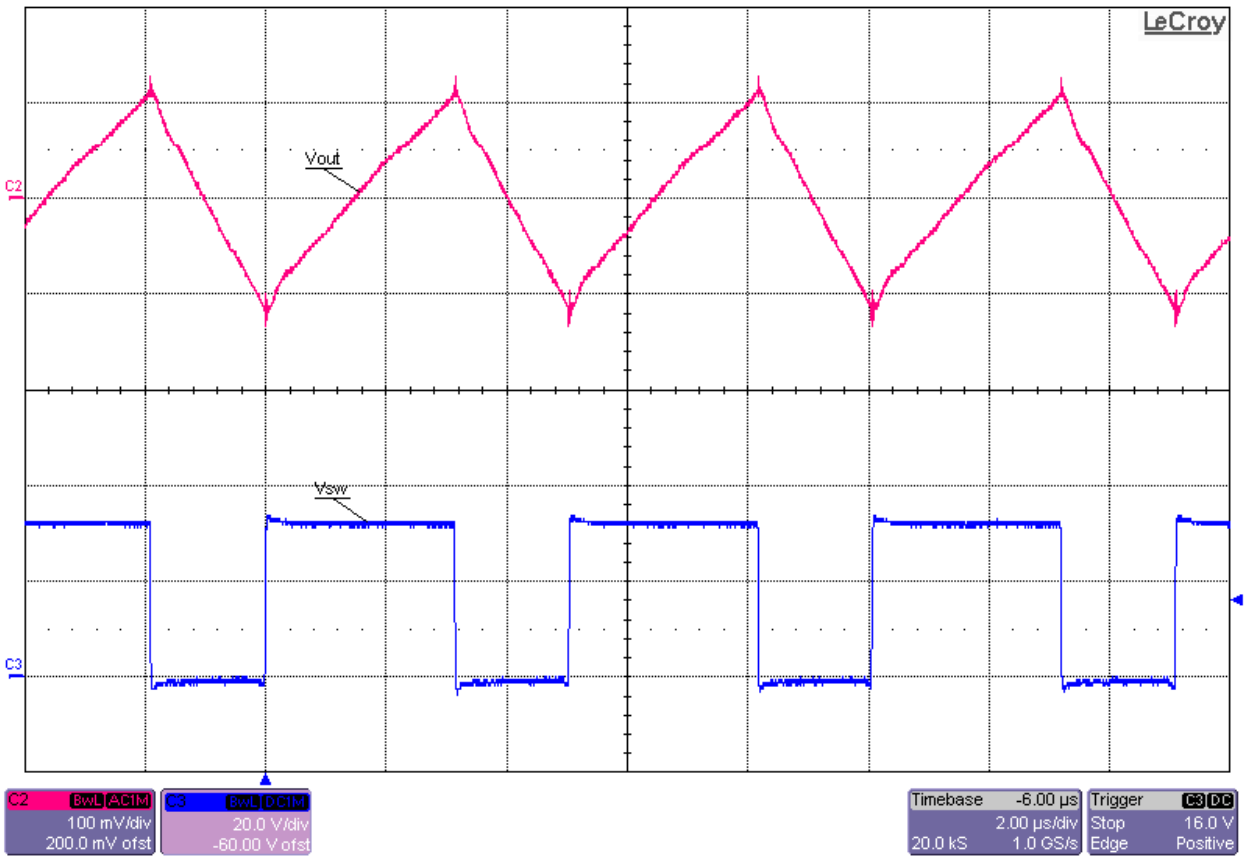
6.3 Output Voltage Ripple and Switch Node Voltage



Switch Node Voltage and Output Voltage Ripple at 30.4Vin and 15A Load (Vripple ≈ 220mVp-p)

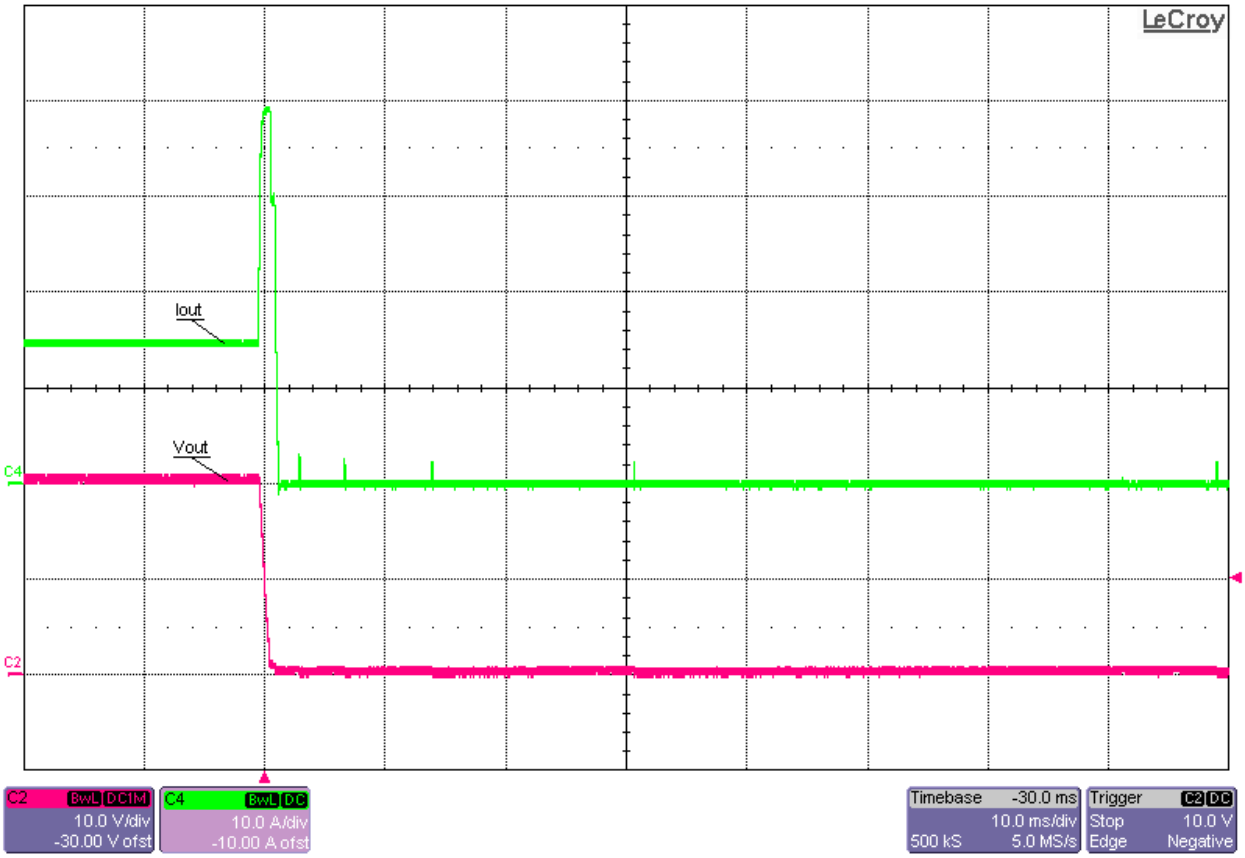


Switch Node Voltage and Output Voltage Ripple at 32Vin and 15A Load (Vripple ≈ 230mVp-p)

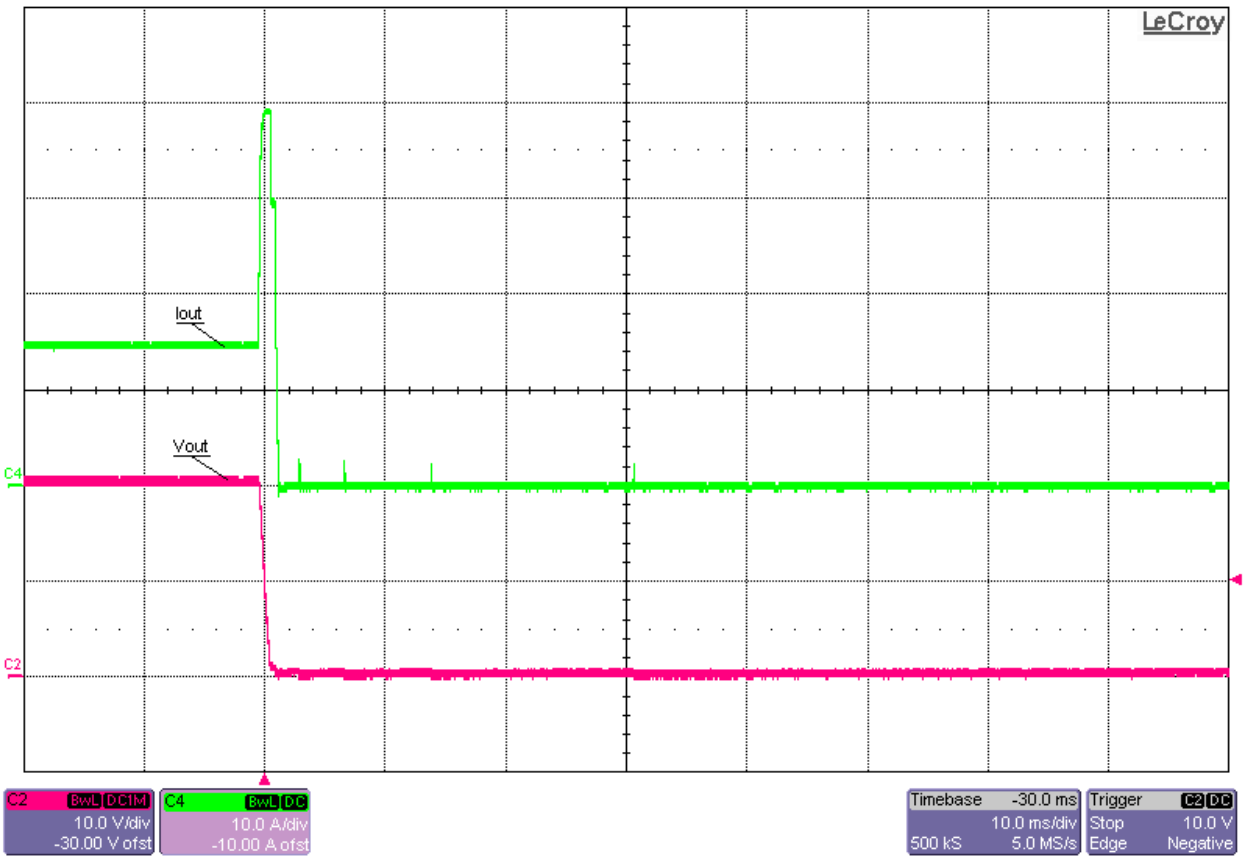


Switch Node Voltage and Output Voltage Ripple at 33.6Vin and 15A Load (Vripple ≈ 250mVp-p)

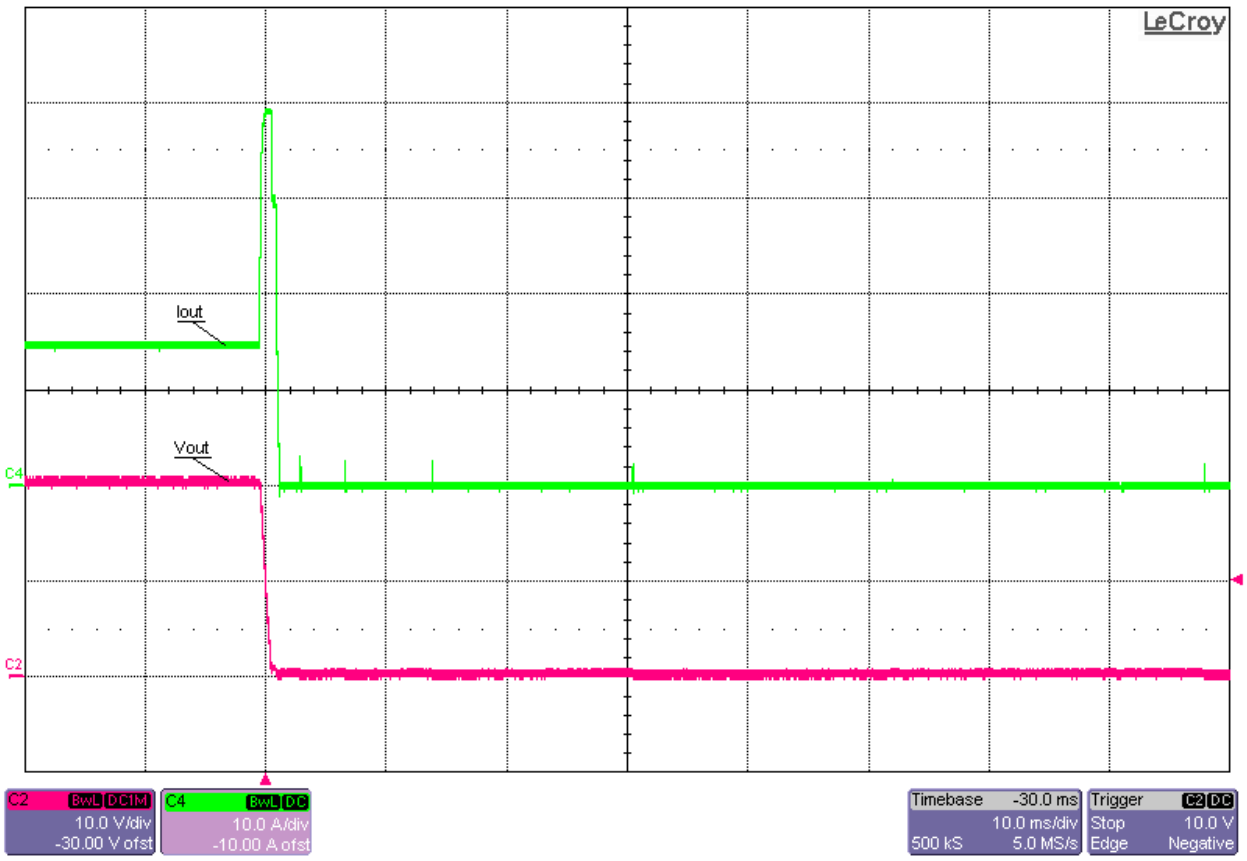
6.4 Short Circuit



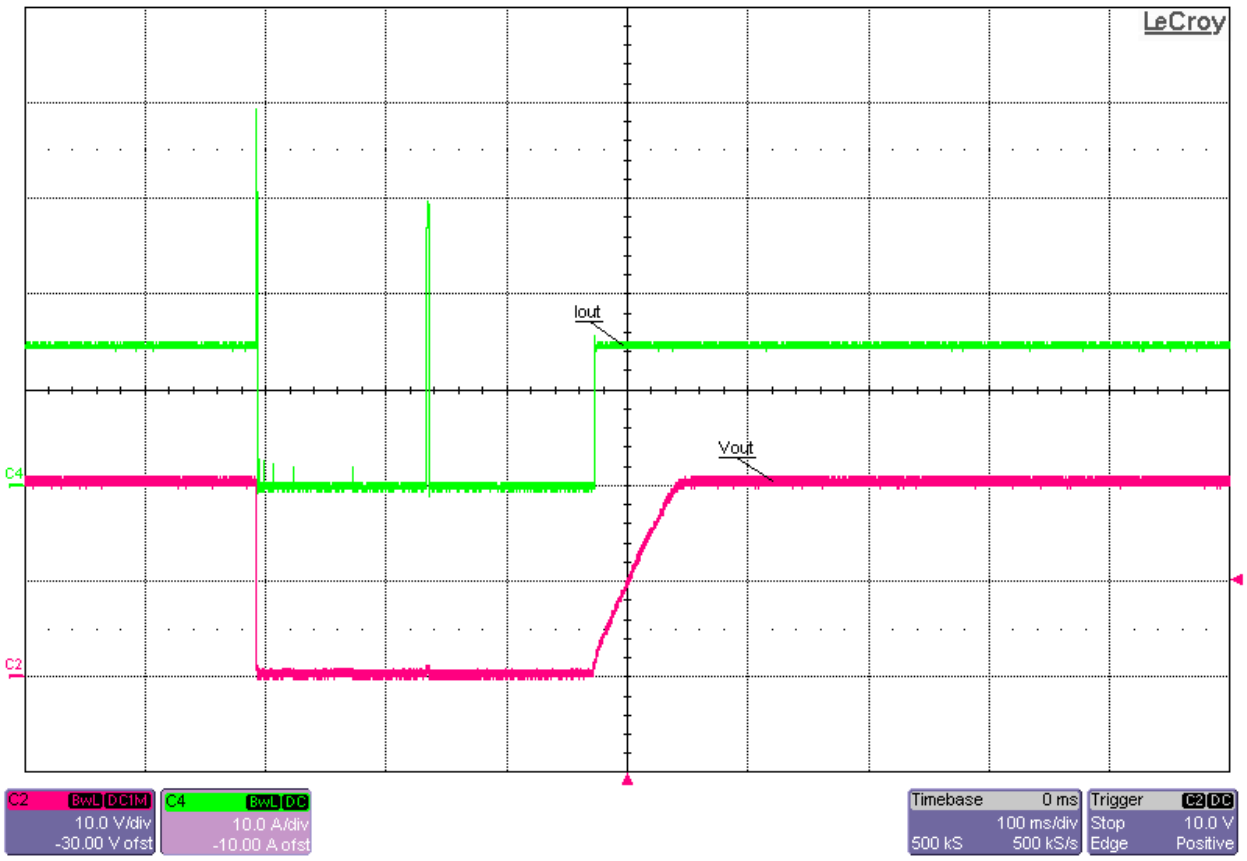
Short Circuit Applied at 30.4Vin from 15A Load



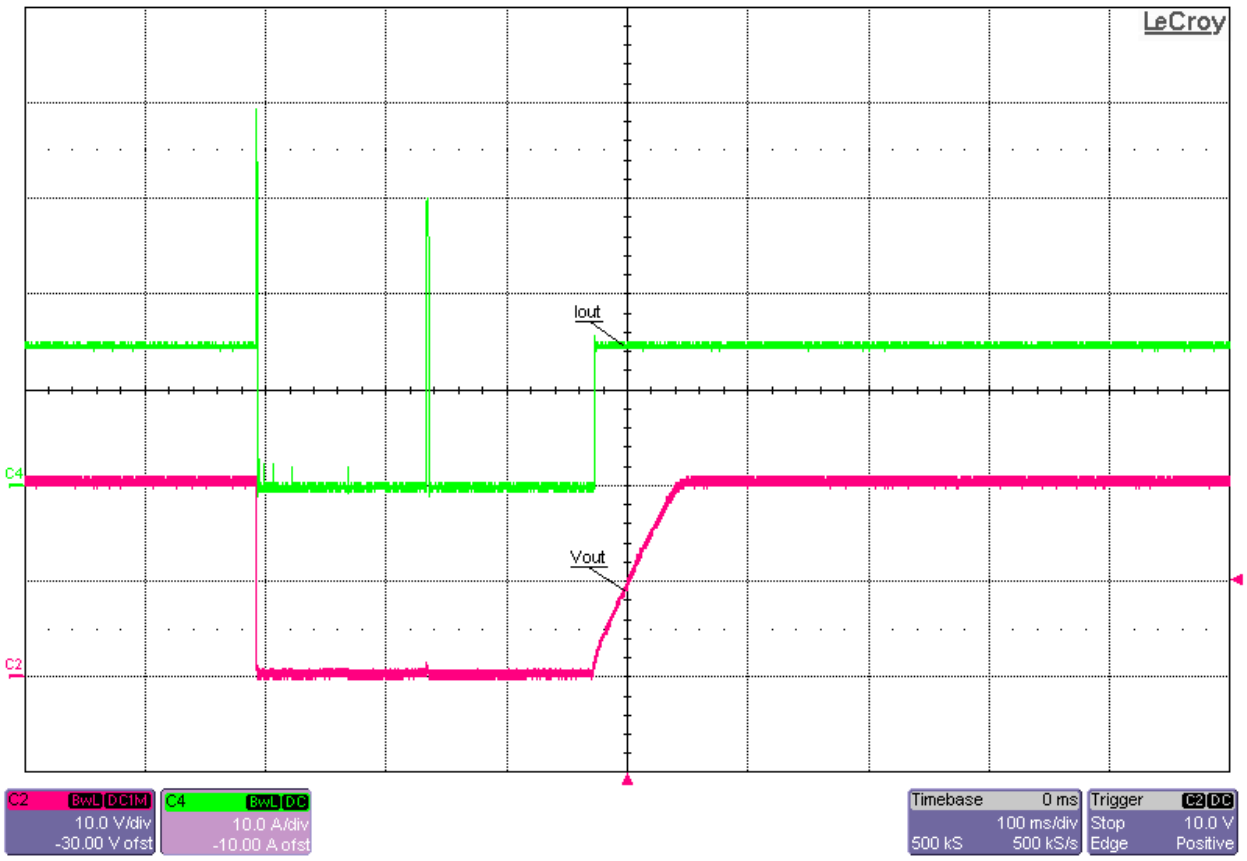
Short Circuit Applied at 32Vin from 15A Load



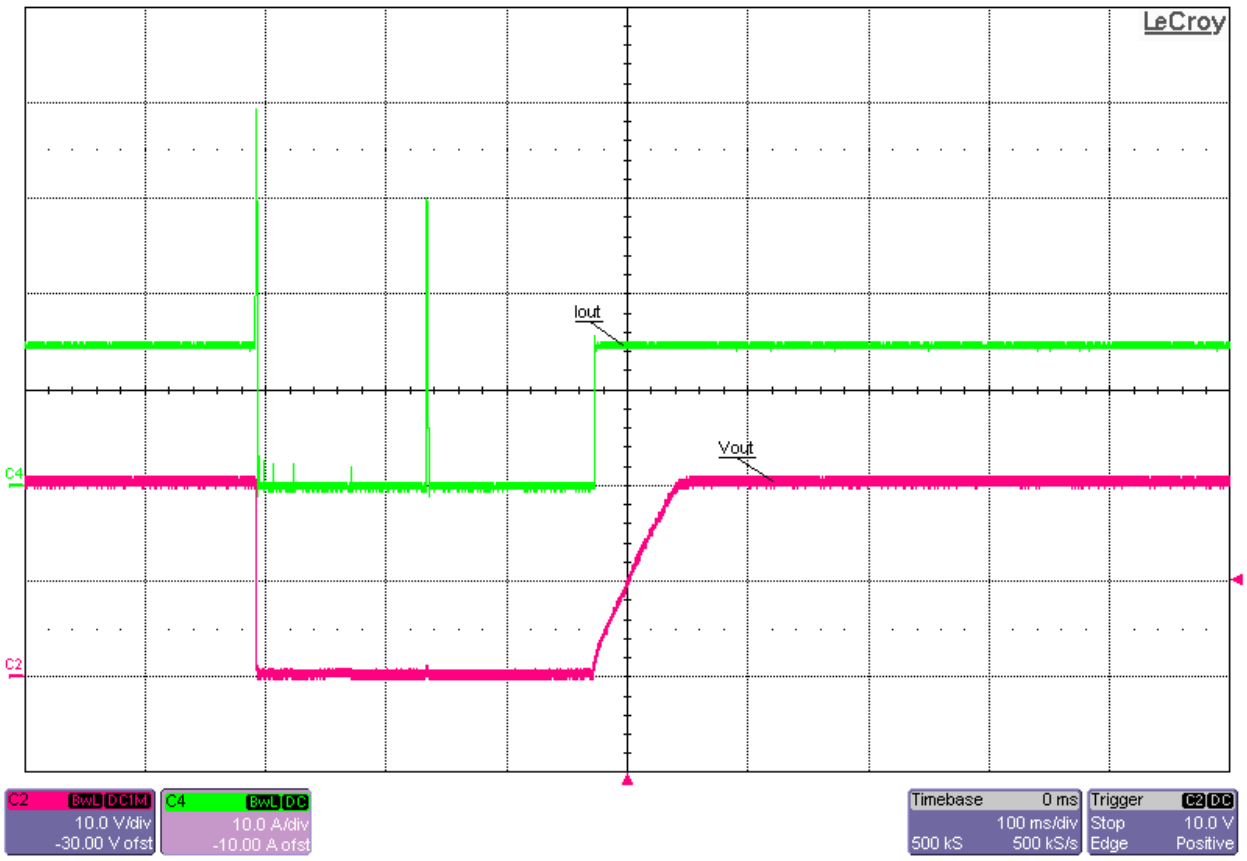
Short Circuit Applied at 33.6Vin from 15A Load



Short Circuit Released at 30.4Vin into 15A Load



Short Circuit Released at 32Vin into 15A Load



Short Circuit Released at 33.6Vin into 15A Load

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