LM5175 Synchronous 4-Switch Buck-Boost Converter

TI reference design number: PMP10624 REV A

Input: 9V to 42V DC
Output: Selectable 5V, 9V or 12V @ 3A

DC – DC Test Results

Table of Contents

1 Test Specifications

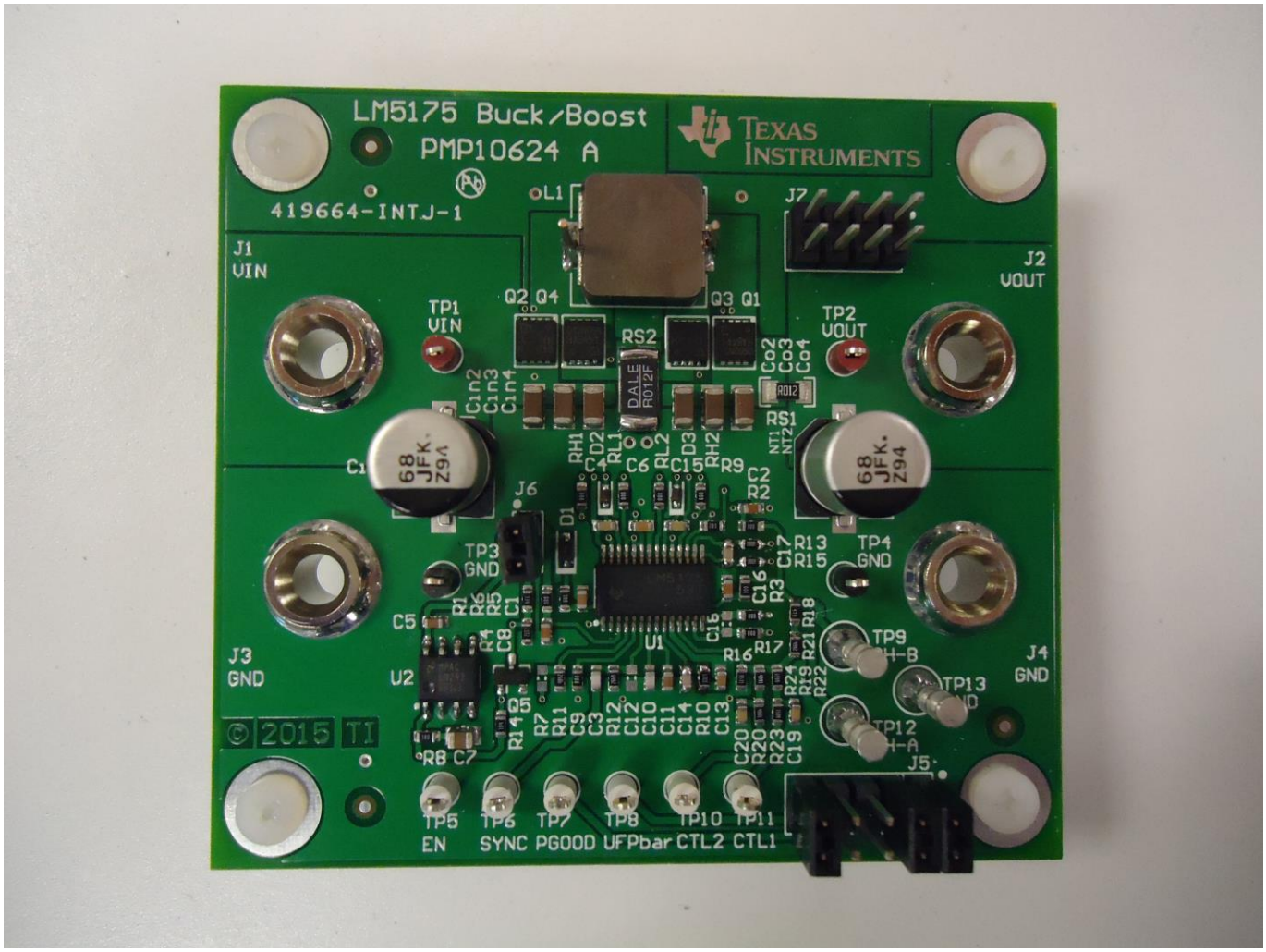
Vin min	**9V**
Vin max	**42V**
Vout	**Selectable 5V, 9V or 12V**
Iout	**3A**

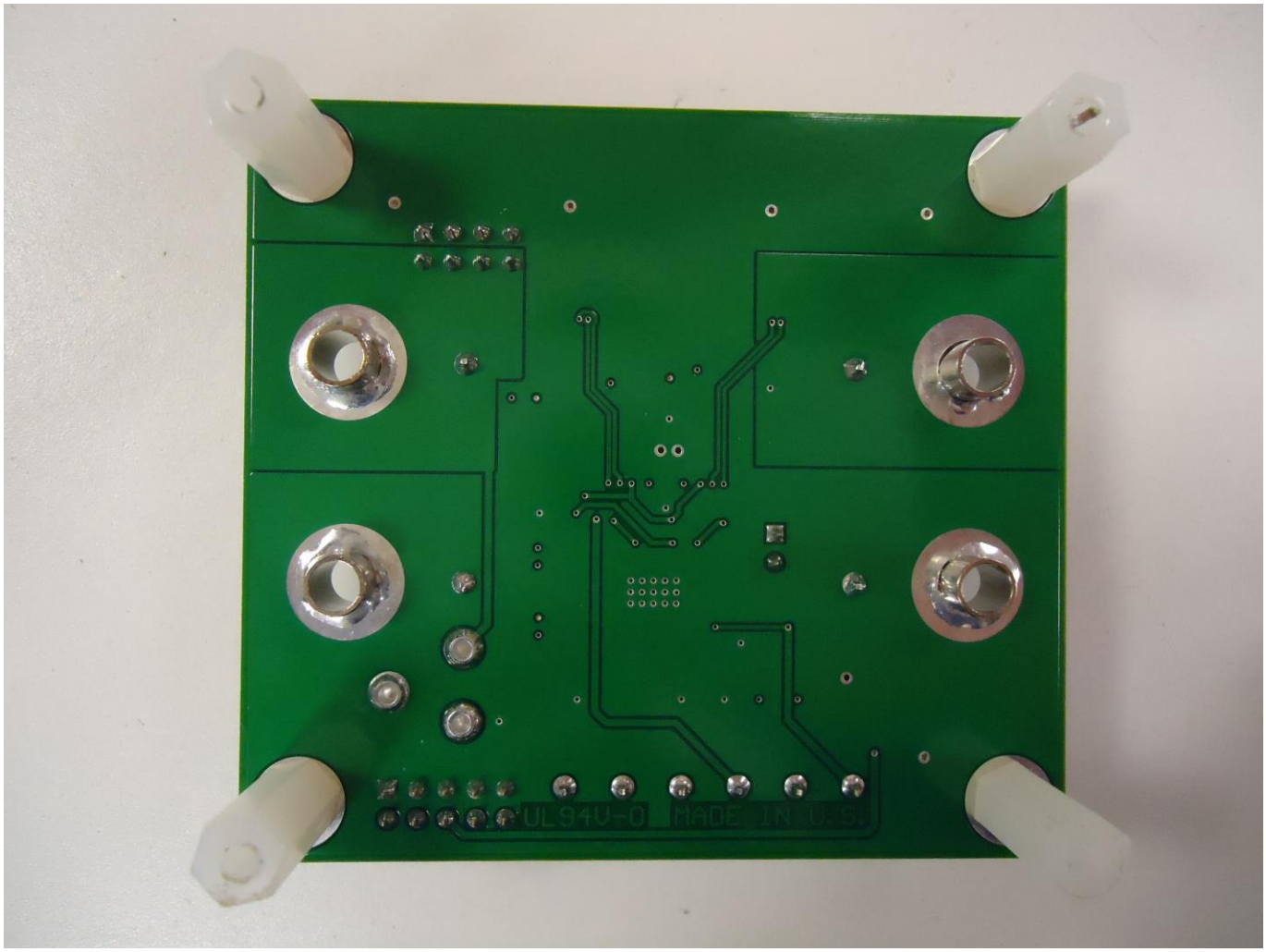
2 Circuit Description

PMP10624 is a synchronous 4-switch buck-boost converter which utilizes the LM5175 controller for USB type C applications. The output voltage can be selected for 5V, 9V or 12V at 3A using jumpers or open drain control switches. The LM5175 average current loop sets a maximum output current of 4A. Additional pulse-by-pulse current limiting is inherent in the current-mode controller. The board includes enable, synchronization and power good functions.

3 Board Photos

The design is built on PMP10624 Rev A printed circuit board. This is a 4-layer PCB with 1 oz. copper on external layers and 0.5 oz. copper on internal layers. PCB dimensions are 2.85 x 2.60 inch.

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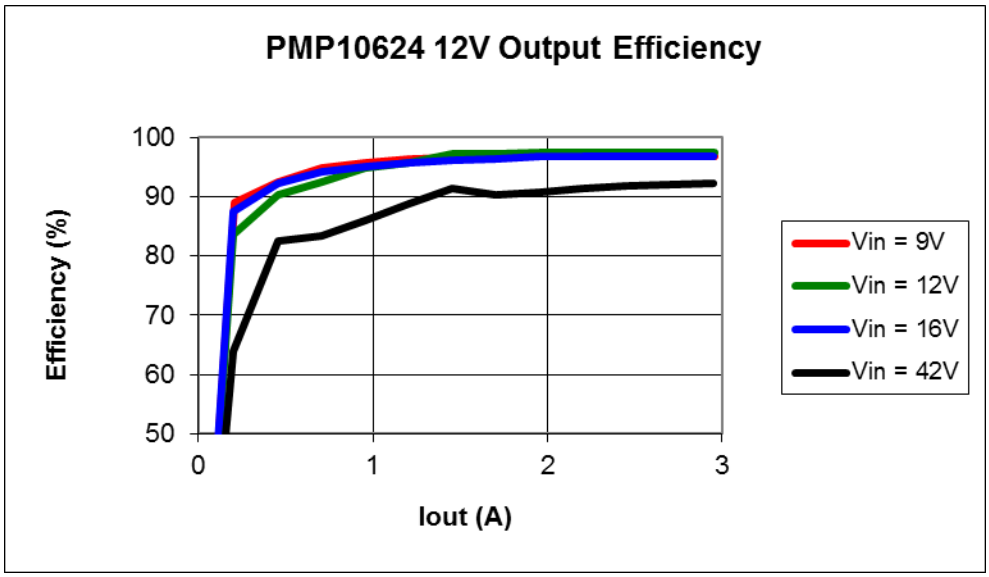
4 Efficiency

4.1 12V Output Efficiency Results



4.2 12V Output Efficiency Data

The output current is increased above the maximum value to test current limit.

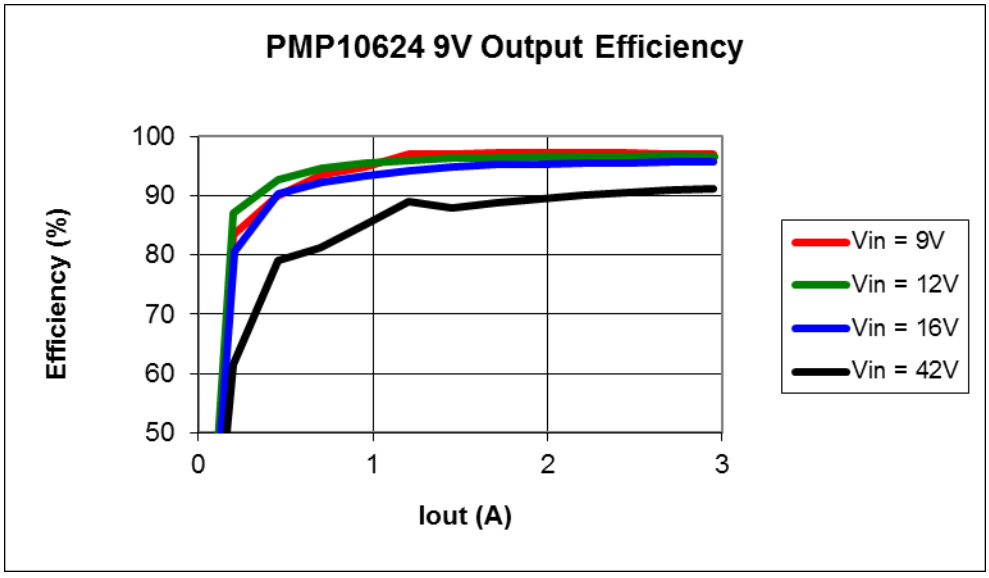
Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
9.002	0.004	11.953	0.000	0.04	0.00	0.04	0.000
9.002	0.315	11.964	0.211	2.84	2.52	0.31	89.024
9.002	0.661	11.965	0.460	5.95	5.50	0.45	92.498
9.002	0.994	11.964	0.709	8.95	8.48	0.47	94.798
9.002	1.330	11.963	0.958	11.97	11.46	0.51	95.723
9.002	1.668	11.964	1.209	15.02	14.46	0.55	96.331
9.002	2.006	11.963	1.458	18.06	17.44	0.62	96.589
9.002	2.344	11.964	1.707	21.10	20.42	0.68	96.786
9.002	2.682	11.964	1.956	24.14	23.40	0.74	96.928
9.002	3.026	11.964	2.208	27.24	26.42	0.82	96.977
9.002	3.368	11.964	2.456	30.32	29.38	0.94	96.916
9.002	3.712	11.965	2.705	33.42	32.37	1.05	96.857
9.002	4.058	11.963	2.955	36.53	35.35	1.18	96.771
9.001	0.665	1.417	3.455	5.99	4.90	1.09	81.791
9.002	0.363	0.524	3.825	3.27	2.00	1.26	61.336
9.002	0.363	0.523	3.825	3.27	2.00	1.27	61.219
9.002	0.363	0.523	3.824	3.27	2.00	1.27	61.203

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
12.002	0.032	11.965	0.000	0.38	0.00	0.38	0.000
12.002	0.243	11.965	0.204	2.92	2.44	0.48	83.692
12.002	0.502	11.965	0.455	6.03	5.44	0.58	90.358
12.003	0.761	11.965	0.706	9.13	8.45	0.69	92.479
12.002	1.006	11.961	0.957	12.07	11.45	0.63	94.804
12.002	1.257	11.960	1.207	15.09	14.44	0.65	95.686
12.002	1.491	11.956	1.455	17.89	17.40	0.50	97.211
12.003	1.746	11.957	1.705	20.96	20.39	0.57	97.278
12.002	2.001	11.957	1.956	24.02	23.39	0.63	97.385
12.002	2.256	11.958	2.207	27.08	26.39	0.69	97.469
12.002	2.511	11.958	2.456	30.14	29.37	0.77	97.451
12.002	2.767	11.958	2.706	33.21	32.36	0.85	97.437
12.002	3.022	11.958	2.955	36.27	35.34	0.93	97.424
12.002	0.509	1.417	3.454	6.11	4.89	1.21	80.116
12.002	0.283	0.525	3.822	3.40	2.01	1.39	59.076
12.002	0.283	0.525	3.820	3.40	2.01	1.39	59.045
12.002	0.283	0.525	3.819	3.40	2.00	1.39	59.029

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
16.010	0.021	11.955	0.000	0.34	0.00	0.34	0.000
16.009	0.174	11.955	0.204	2.79	2.44	0.35	87.552
16.010	0.368	11.958	0.454	5.89	5.43	0.46	92.146
16.010	0.559	11.957	0.705	8.95	8.43	0.52	94.191
16.010	0.749	11.957	0.954	11.99	11.41	0.58	95.126
16.009	0.938	11.957	1.203	15.02	14.38	0.63	95.790
16.009	1.128	11.958	1.453	18.06	17.37	0.68	96.217
16.009	1.318	11.958	1.702	21.10	20.35	0.75	96.458
16.009	1.509	11.959	1.953	24.16	23.36	0.80	96.682
16.009	1.701	11.959	2.202	27.23	26.33	0.90	96.704
16.008	1.892	11.960	2.452	30.29	29.33	0.96	96.826
16.008	2.084	11.960	2.701	33.36	32.30	1.06	96.832
16.008	2.276	11.960	2.950	36.43	35.28	1.15	96.838
16.009	0.393	1.417	3.448	6.29	4.89	1.41	77.657
16.009	0.218	0.526	3.819	3.49	2.01	1.48	57.559
16.009	0.218	0.526	3.818	3.49	2.01	1.48	57.544
16.009	0.218	0.525	3.817	3.49	2.00	1.49	57.420

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
42.017	0.008	11.994	0.000	0.34	0.00	0.34	0.000
42.017	0.091	11.987	0.204	3.82	2.45	1.38	63.955
42.016	0.157	11.985	0.454	6.60	5.44	1.16	82.486
42.016	0.241	11.980	0.704	10.13	8.43	1.69	83.291
42.015	0.317	11.978	0.955	13.32	11.44	1.88	85.886
42.014	0.387	11.978	1.206	16.26	14.45	1.81	88.844
42.014	0.454	11.975	1.454	19.07	17.41	1.66	91.283
42.013	0.538	11.972	1.704	22.60	20.40	2.20	90.255
42.013	0.614	11.969	1.955	25.80	23.40	2.40	90.709
42.012	0.687	11.967	2.202	28.86	26.35	2.51	91.300
42.011	0.761	11.965	2.451	31.97	29.33	2.64	91.729
42.010	0.836	11.965	2.701	35.12	32.32	2.80	92.019
42.009	0.910	11.963	2.951	38.23	35.30	2.93	92.348
42.016	0.174	1.420	3.450	7.31	4.90	2.41	67.011
42.017	0.102	0.532	3.868	4.29	2.06	2.23	48.015
42.017	0.101	0.532	3.866	4.24	2.06	2.19	48.465
42.017	0.101	0.531	3.865	4.24	2.05	2.19	48.361

4.3 9V Output Efficiency Results



4.4 9V Output Efficiency Data

The output current is increased above the maximum value to test current limit.

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
9.003	0.031	8.971	0.000	0.28	0.00	0.28	0.000
9.003	0.244	8.971	0.204	2.20	1.83	0.37	83.309
9.003	0.501	8.971	0.452	4.51	4.05	0.46	89.899
9.003	0.750	8.968	0.705	6.75	6.32	0.43	93.635
9.003	1.001	8.967	0.954	9.01	8.55	0.46	94.924
9.002	1.236	8.965	1.203	11.13	10.78	0.34	96.930
9.003	1.490	8.965	1.452	13.41	13.02	0.40	97.038
9.003	1.743	8.965	1.700	15.69	15.24	0.45	97.121
9.003	1.998	8.966	1.950	17.99	17.48	0.50	97.196
9.003	2.254	8.966	2.199	20.29	19.72	0.58	97.159
9.003	2.510	8.967	2.449	22.60	21.96	0.64	97.180
9.002	2.770	8.967	2.700	24.94	24.21	0.72	97.094
9.002	3.028	8.967	2.950	27.26	26.45	0.81	97.045
9.002	0.662	1.412	3.449	5.96	4.87	1.09	81.720
9.002	0.348	0.511	3.736	3.13	1.91	1.22	60.941
9.002	0.347	0.511	3.735	3.12	1.91	1.22	61.100
9.003	0.347	0.511	3.734	3.12	1.91	1.22	61.077

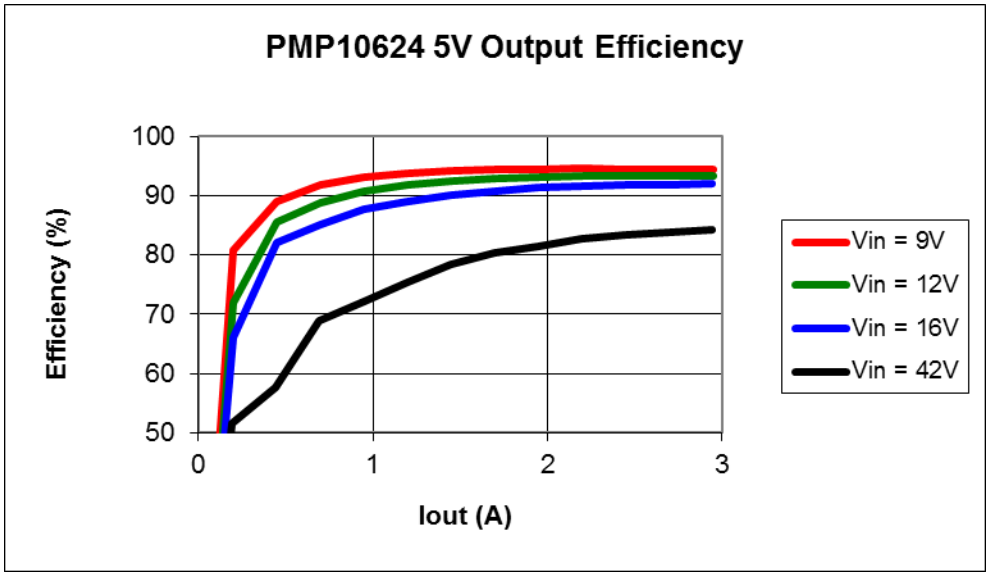
Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
12.003	0.019	8.962	0.000	0.23	0.00	0.23	0.000
12.003	0.174	8.965	0.203	2.09	1.82	0.27	87.138
12.003	0.366	8.965	0.454	4.39	4.07	0.32	92.648
12.003	0.557	8.964	0.705	6.69	6.32	0.37	94.525
12.003	0.747	8.964	0.955	8.97	8.56	0.41	95.476
12.003	0.938	8.964	1.205	11.26	10.80	0.46	95.939
12.003	1.129	8.964	1.456	13.55	13.05	0.50	96.312
12.003	1.321	8.965	1.705	15.86	15.29	0.57	96.401
12.003	1.514	8.965	1.957	18.17	17.54	0.63	96.544
12.003	1.705	8.966	2.205	20.47	19.77	0.70	96.604
12.002	1.897	8.966	2.454	22.77	22.00	0.77	96.639
12.002	2.090	8.967	2.705	25.08	24.26	0.83	96.697
12.002	2.285	8.967	2.955	27.42	26.50	0.93	96.620
12.002	0.508	1.412	3.453	6.10	4.88	1.22	79.968
12.003	0.271	0.511	3.736	3.25	1.91	1.34	58.691
12.003	0.271	0.511	3.734	3.25	1.91	1.34	58.659
12.003	0.271	0.510	3.733	3.25	1.90	1.35	58.529

PMP10624 Test Results

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
16.011	0.026	8.962	0.000	0.42	0.00	0.42	0.000
16.010	0.144	8.962	0.207	2.31	1.86	0.45	80.468
16.010	0.282	8.962	0.455	4.51	4.08	0.44	90.318
16.010	0.428	8.962	0.705	6.85	6.32	0.53	92.206
16.010	0.572	8.961	0.954	9.16	8.55	0.61	93.351
16.010	0.716	8.960	1.205	11.46	10.80	0.67	94.187
16.010	0.859	8.960	1.455	13.75	13.04	0.72	94.795
16.010	1.002	8.960	1.704	16.04	15.27	0.77	95.174
16.010	1.147	8.961	1.954	18.36	17.51	0.85	95.351
16.010	1.291	8.962	2.203	20.67	19.74	0.93	95.522
16.010	1.436	8.963	2.452	22.99	21.98	1.01	95.593
16.010	1.582	8.964	2.702	25.33	24.22	1.11	95.629
16.010	1.728	8.963	2.952	27.67	26.46	1.21	95.639
16.010	0.392	1.412	3.451	6.28	4.87	1.40	77.643
16.010	0.208	0.510	3.737	3.33	1.91	1.42	57.232
16.010	0.208	0.510	3.735	3.33	1.90	1.43	57.201
16.010	0.208	0.510	3.734	3.33	1.90	1.43	57.186

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
42.018	0.003	9.000	0.000	0.13	0.00	0.13	0.000
42.018	0.071	8.995	0.204	2.98	1.83	1.15	61.509
42.018	0.123	8.991	0.455	5.17	4.09	1.08	79.155
42.017	0.185	8.989	0.703	7.77	6.32	1.45	81.296
42.016	0.240	8.988	0.954	10.08	8.57	1.51	85.033
42.016	0.289	8.986	1.202	12.14	10.80	1.34	88.953
42.015	0.353	8.984	1.452	14.83	13.04	1.79	87.954
42.015	0.410	8.982	1.701	17.23	15.28	1.95	88.693
42.014	0.466	8.980	1.951	19.58	17.52	2.06	89.486
42.013	0.522	8.979	2.200	21.93	19.75	2.18	90.073
42.012	0.578	8.979	2.450	24.28	22.00	2.28	90.593
42.011	0.635	8.978	2.700	26.68	24.24	2.44	90.867
42.009	0.692	8.976	2.949	29.07	26.47	2.60	91.056
42.017	0.172	1.414	3.447	7.23	4.87	2.35	67.443
42.018	0.098	0.513	3.754	4.12	1.93	2.19	46.768
42.018	0.098	0.513	3.753	4.12	1.93	2.19	46.756
42.017	0.098	0.512	3.752	4.12	1.92	2.20	46.653

4.5 5V Output Efficiency Results



4.6 5V Output Efficiency Data

The output current is increased above the maximum value to test current limit.

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
9.003	0.026	4.977	0.000	0.23	0.00	0.23	0.000
9.003	0.136	4.977	0.199	1.22	0.99	0.23	80.890
9.003	0.279	4.977	0.449	2.51	2.23	0.28	88.966
9.003	0.421	4.977	0.699	3.79	3.48	0.31	91.786
9.003	0.563	4.977	0.948	5.07	4.72	0.35	93.085
9.003	0.706	4.977	1.197	6.36	5.96	0.40	93.728
9.003	0.850	4.977	1.448	7.65	7.21	0.45	94.174
9.003	0.995	4.978	1.698	8.96	8.45	0.51	94.359
9.003	1.140	4.978	1.948	10.26	9.70	0.57	94.483
9.003	1.285	4.979	2.197	11.57	10.94	0.63	94.554
9.003	1.432	4.979	2.447	12.89	12.18	0.71	94.503
9.003	1.579	4.979	2.697	14.22	13.43	0.79	94.461
9.003	1.728	4.979	2.947	15.56	14.67	0.88	94.317
9.002	0.660	1.410	3.448	5.94	4.86	1.08	81.828
9.003	0.329	0.498	3.621	2.96	1.80	1.16	60.880
9.003	0.329	0.497	3.620	2.96	1.80	1.16	60.741
9.003	0.329	0.497	3.618	2.96	1.80	1.16	60.707

PMP10624 Test Results

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
12.003	0.003	5.039	0.000	0.04	0.00	0.04	0.000
12.003	0.116	4.976	0.201	1.39	1.00	0.39	71.834
12.003	0.218	4.977	0.450	2.62	2.24	0.38	85.592
12.003	0.327	4.976	0.700	3.92	3.48	0.44	88.744
12.003	0.435	4.976	0.951	5.22	4.73	0.49	90.632
12.003	0.542	4.976	1.201	6.51	5.98	0.53	91.862
12.003	0.651	4.976	1.451	7.81	7.22	0.59	92.401
12.003	0.760	4.977	1.701	9.12	8.47	0.66	92.804
12.003	0.869	4.977	1.951	10.43	9.71	0.72	93.093
12.003	0.979	4.977	2.201	11.75	10.95	0.80	93.221
12.003	1.090	4.977	2.452	13.08	12.20	0.88	93.276
12.003	1.200	4.978	2.700	14.40	13.44	0.96	93.314
12.003	1.311	4.978	2.949	15.74	14.68	1.06	93.290
12.002	0.506	1.410	3.449	6.07	4.86	1.21	80.077
12.003	0.257	0.496	3.616	3.08	1.79	1.29	58.142
12.003	0.257	0.496	3.615	3.08	1.79	1.29	58.126
12.003	0.256	0.496	3.613	3.07	1.79	1.28	58.320

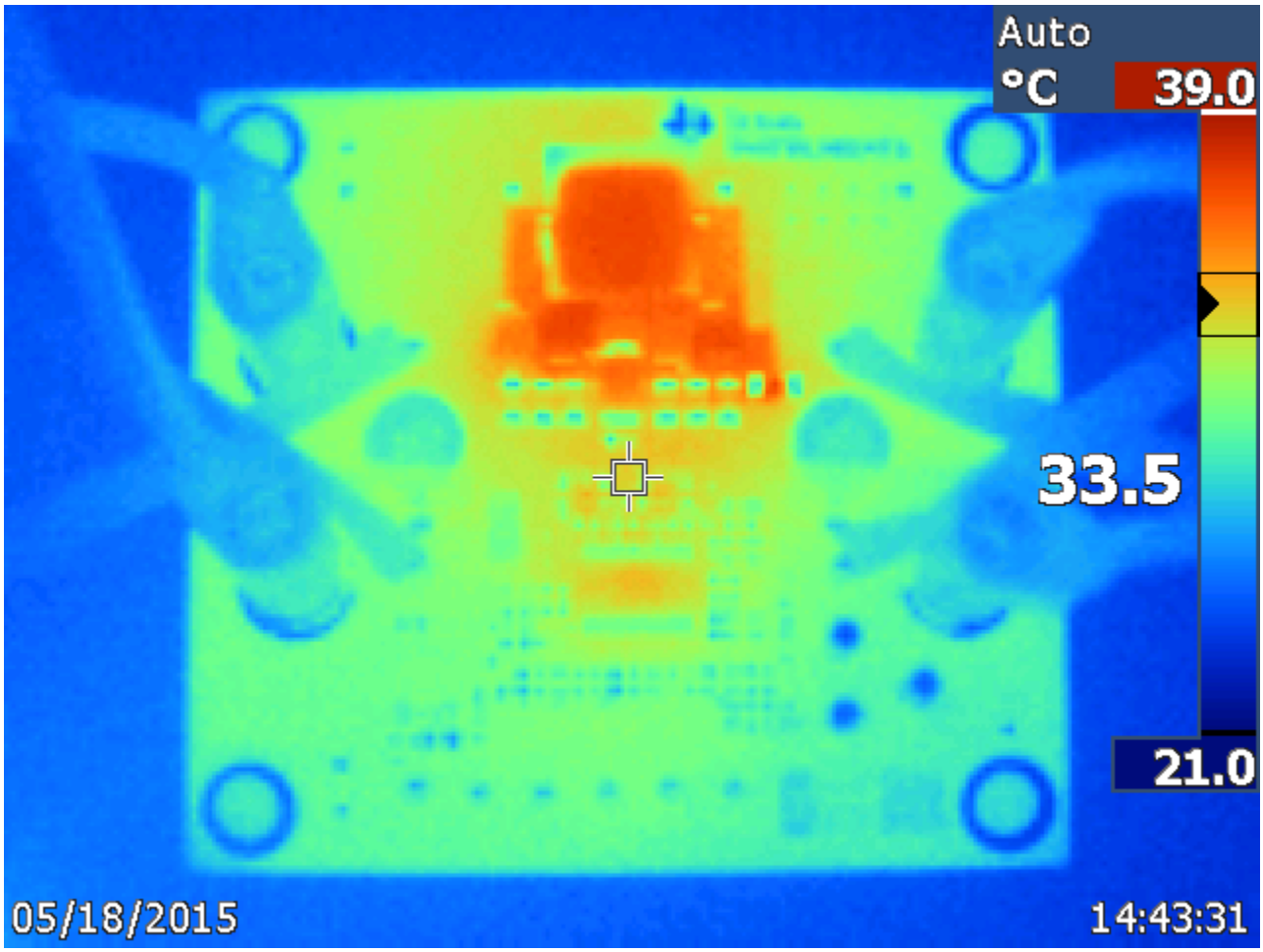
Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
16.010	0.008	5.036	0.000	0.13	0.00	0.13	0.000
16.010	0.093	4.977	0.198	1.49	0.99	0.50	66.185
16.010	0.170	4.977	0.449	2.72	2.23	0.49	82.106
16.010	0.255	4.977	0.699	4.08	3.48	0.60	85.214
16.010	0.337	4.976	0.950	5.40	4.73	0.67	87.616
16.010	0.418	4.976	1.198	6.69	5.96	0.73	89.078
16.010	0.499	4.976	1.447	7.99	7.20	0.79	90.127
16.010	0.580	4.976	1.695	9.29	8.43	0.85	90.830
16.010	0.662	4.976	1.945	10.60	9.68	0.92	91.317
16.010	0.745	4.977	2.194	11.93	10.92	1.01	91.550
16.009	0.827	4.977	2.442	13.24	12.15	1.09	91.800
16.009	0.911	4.977	2.693	14.58	13.40	1.18	91.901
16.009	0.995	4.977	2.943	15.93	14.65	1.28	91.954
16.010	0.391	1.410	3.443	6.26	4.85	1.41	77.551
16.010	0.196	0.496	3.616	3.14	1.79	1.34	57.156
16.010	0.196	0.496	3.614	3.14	1.79	1.35	57.125
16.010	0.196	0.496	3.613	3.14	1.79	1.35	57.109

PMP10624 Test Results

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
42.018	0.006	5.011	0.000	0.25	0.00	0.25	0.000
42.018	0.045	5.008	0.195	1.89	0.98	0.91	51.648
42.018	0.092	5.006	0.445	3.87	2.23	1.64	57.627
42.018	0.120	5.002	0.695	5.04	3.48	1.57	68.946
42.017	0.156	5.000	0.945	6.55	4.73	1.83	72.086
42.017	0.189	4.999	1.196	7.94	5.98	1.96	75.288
42.017	0.219	4.998	1.445	9.20	7.22	1.98	78.486
42.016	0.251	4.997	1.695	10.55	8.47	2.08	80.314
42.016	0.284	4.997	1.946	11.93	9.72	2.21	81.493
42.015	0.316	4.997	2.196	13.28	10.97	2.30	82.651
42.014	0.349	4.996	2.444	14.66	12.21	2.45	83.273
42.014	0.382	4.996	2.694	16.05	13.46	2.59	83.862
42.013	0.415	4.995	2.944	17.44	14.71	2.73	84.342
42.017	0.172	1.410	3.446	7.23	4.86	2.37	67.233
42.018	0.090	0.494	3.613	3.78	1.78	2.00	47.197
42.018	0.090	0.494	3.612	3.78	1.78	2.00	47.184
42.017	0.091	0.493	3.610	3.82	1.78	2.04	46.547

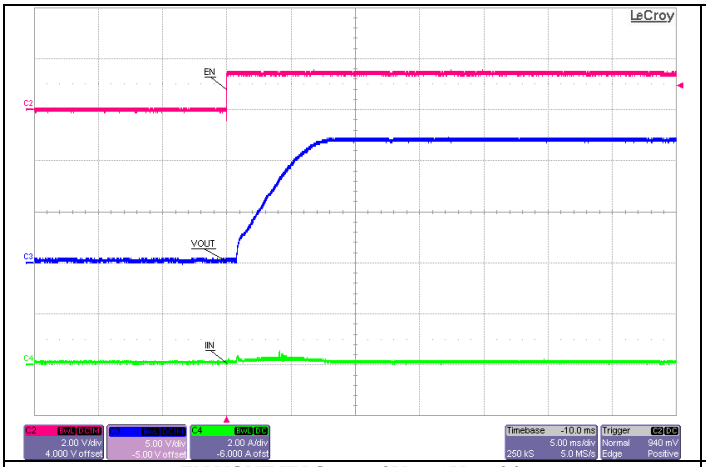
5 Thermal

5.1 12V Input, 12V at 3A Output

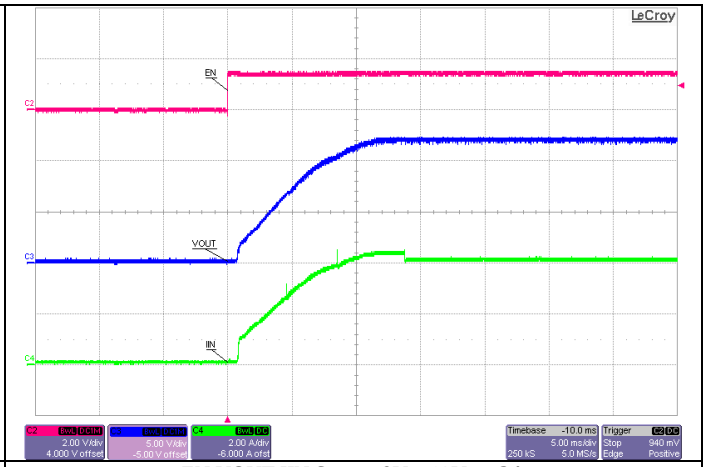


6 Startup

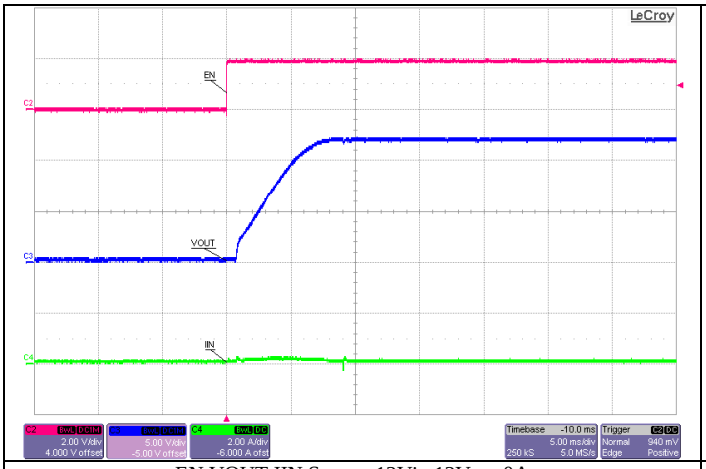
6.1 Startup from EN



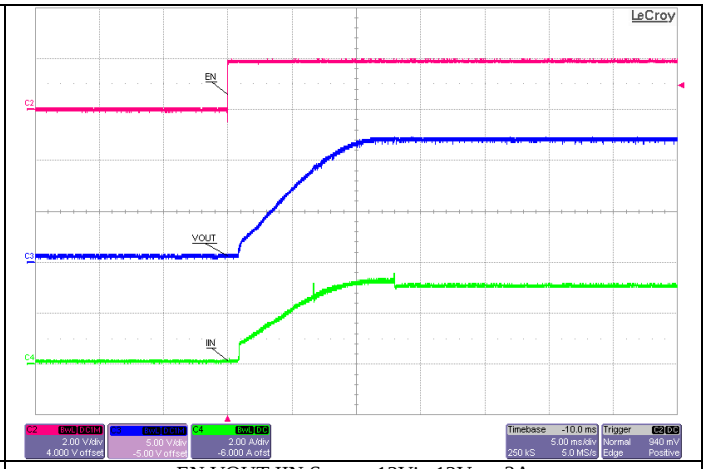
EN VOUT IIN Startup 9Vin 12Vout 0A



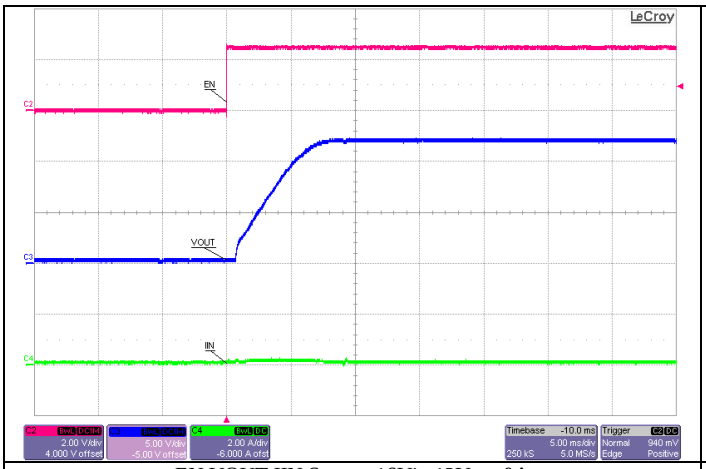
EN VOUT IIN Startup 9Vin 12Vout 3A



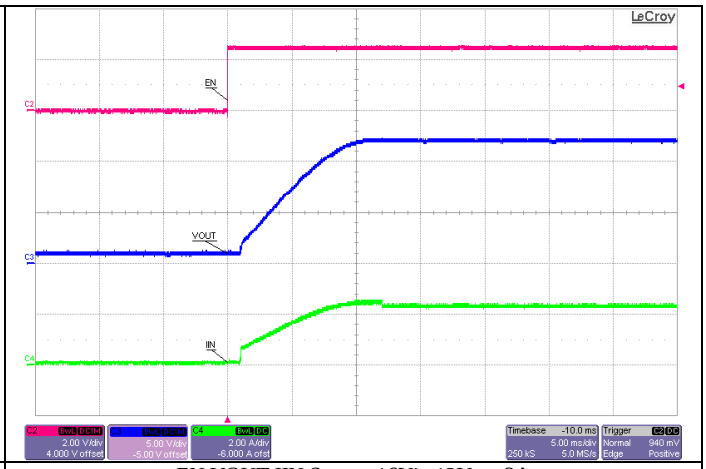
EN VOUT IIN Startup 12Vin 12Vout 0A



EN VOUT IIN Startup 12Vin 12Vout 3A



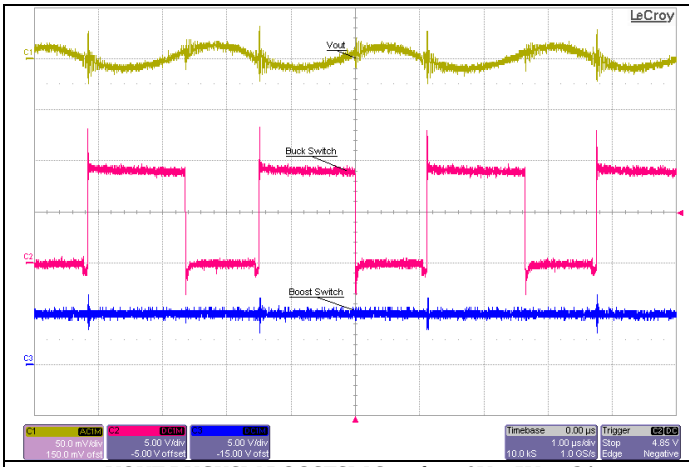
EN VOUT IIN Startup 16Vin 12Vout 0A



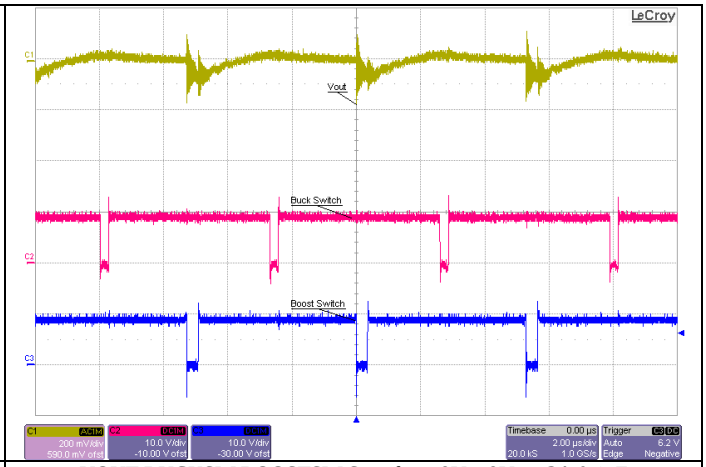
EN VOUT IIN Startup 16Vin 12Vout 3A

7 Switching and Ripple Voltage

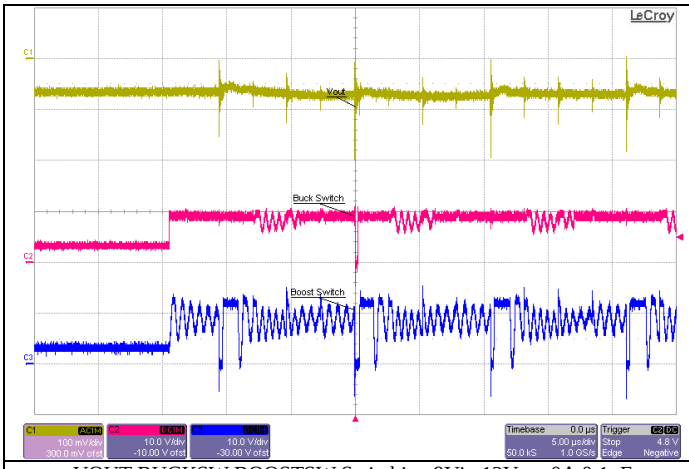
7.1 9V Input



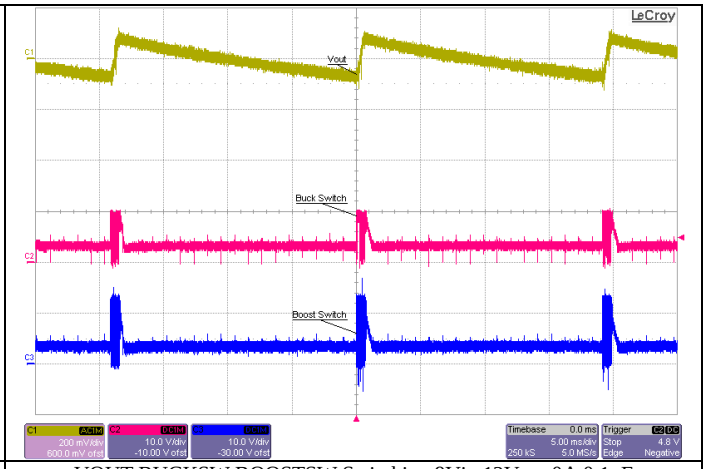
VOUT BUCKSW BOOSTSW Switching 9Vin 5Vout 3A



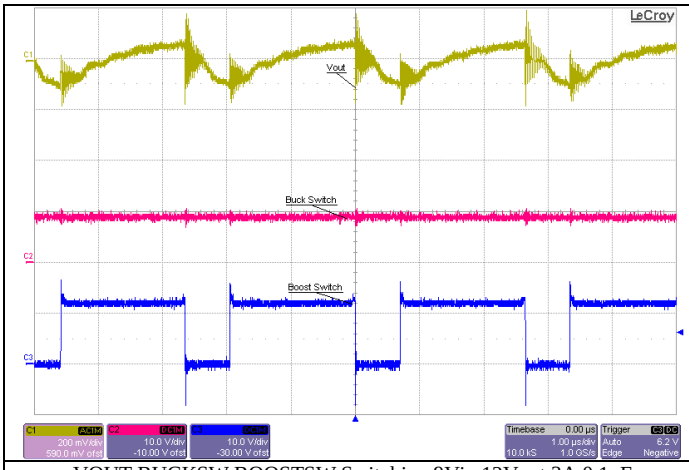
VOUT BUCKSW BOOSTSW Switching 9Vin 9Vout 3A 0.1uF



VOUT BUCKSW BOOSTSW Switching 9Vin 12Vout 0A 0.1uF

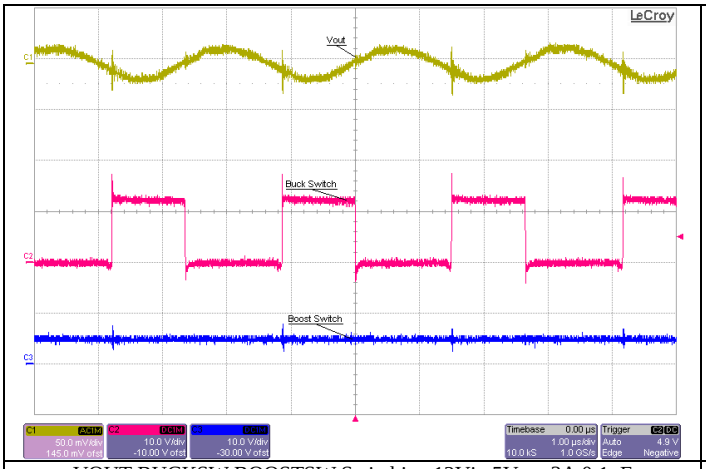


VOUT BUCKSW BOOSTSW Switching 9Vin 12Vout 0A 0.1uF

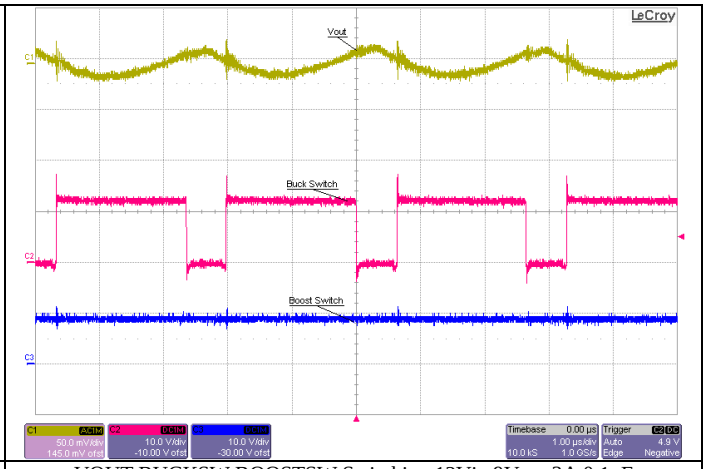


VOUT BUCKSW BOOSTSW Switching 9Vin 12Vout 3A 0.1uF

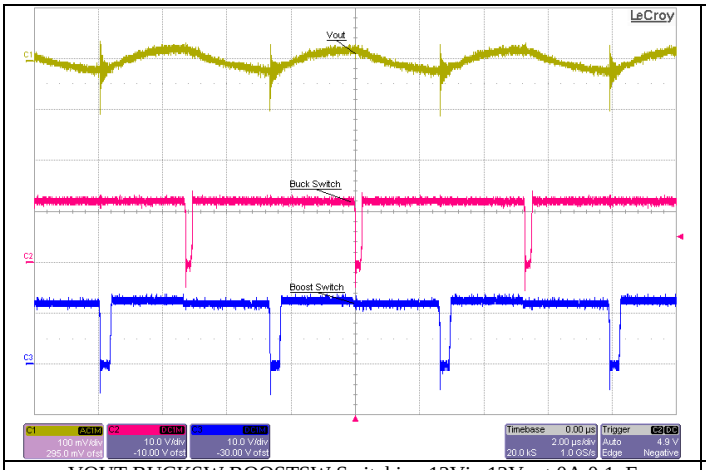
7.2 12V Input



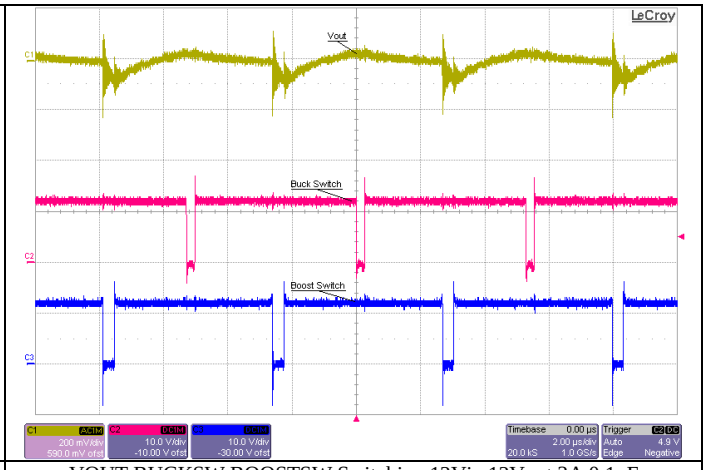
VOUT BUCKSW BOOSTSW Switching 12Vin 5Vout 3A 0.1uF



VOUT BUCKSW BOOSTSW Switching 12Vin 9Vout 3A 0.1uF

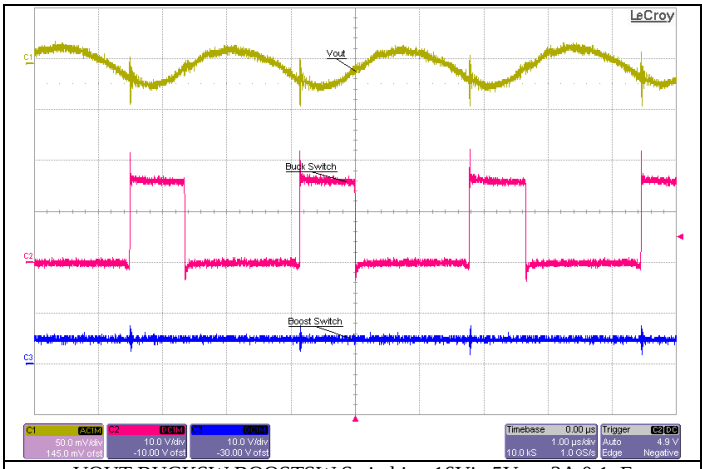


VOUT BUCKSW BOOSTSW Switching 12Vin 12Vout 0A 0.1uF

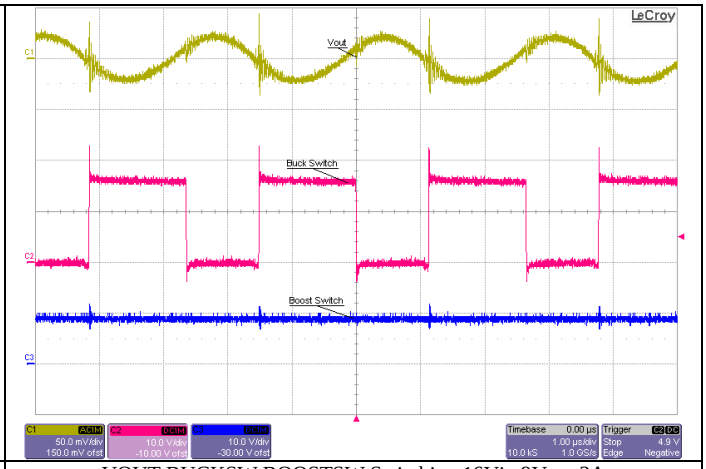


VOUT BUCKSW BOOSTSW Switching 12Vin 12Vout 3A 0.1uF

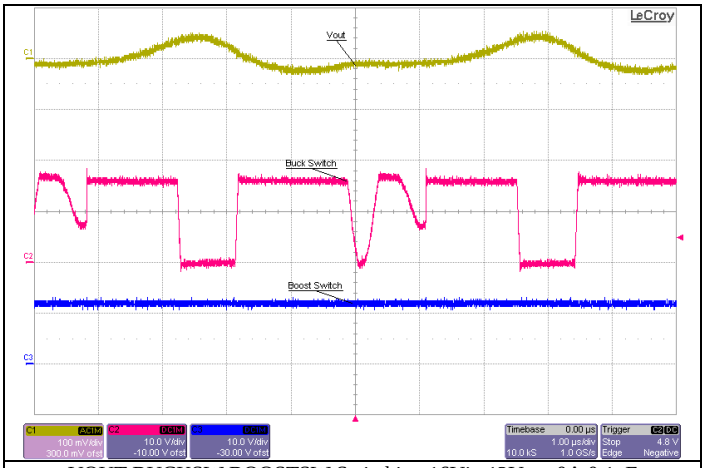
7.3 16V Input



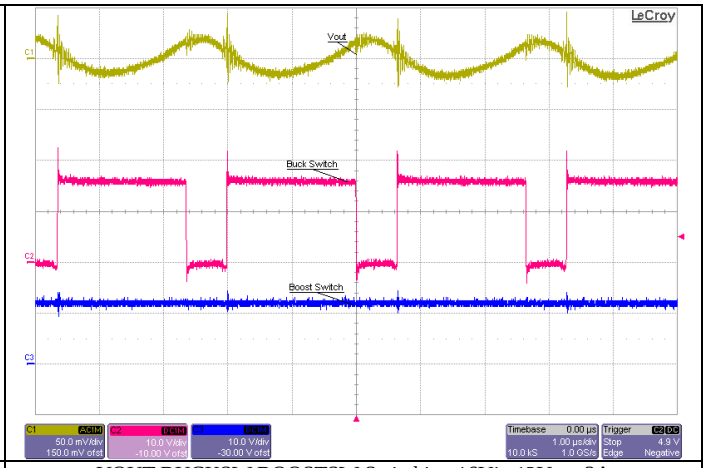
VOUT BUCKSW BOOSTSW Switching 16Vin 5Vout 3A 0.1uF



VOUT BUCKSW BOOSTSW Switching 16Vin 9Vout 3A

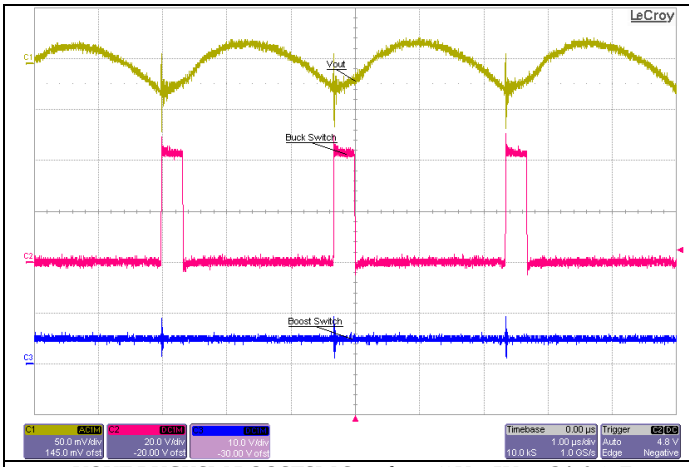


VOUT BUCKSW BOOSTSW Switching 16Vin 12Vout 0A 0.1uF

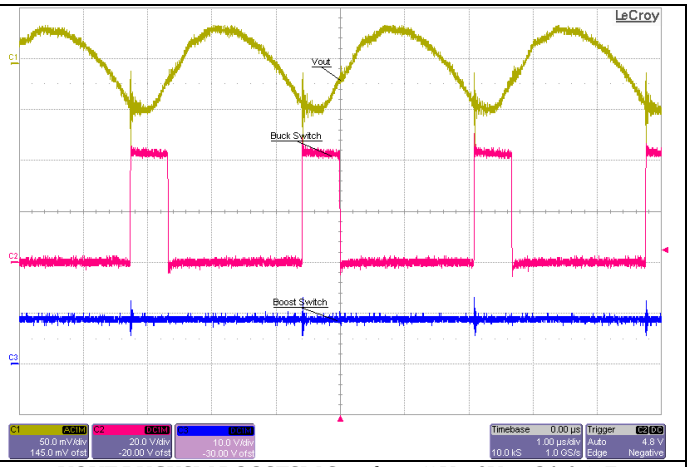


VOUT BUCKSW BOOSTSW Switching 16Vin 12Vout 3A

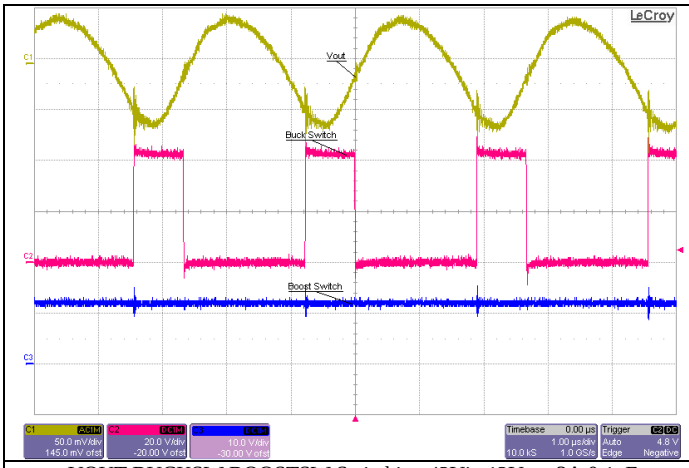
7.4 42V Input



VOUT BUCKSW BOOSTSW Switching 42Vin 5Vout 3A 0.1uF



VOUT BUCKSW BOOSTSW Switching 42Vin 9Vout 3A 0.1uF

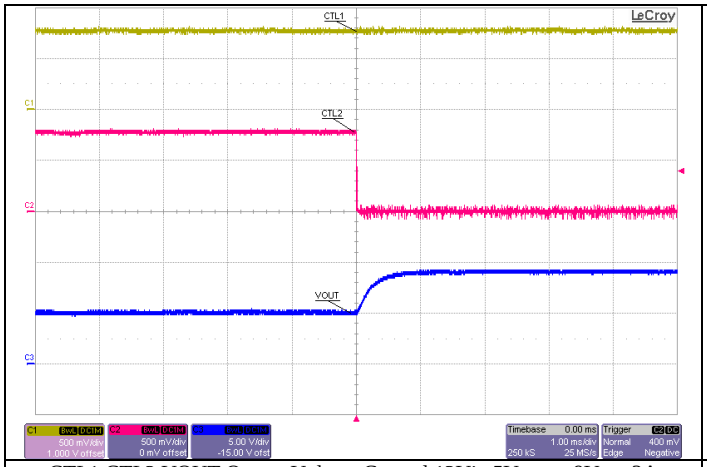


VOUT BUCKSW BOOSTSW Switching 42Vin 12Vout 3A 0.1uF

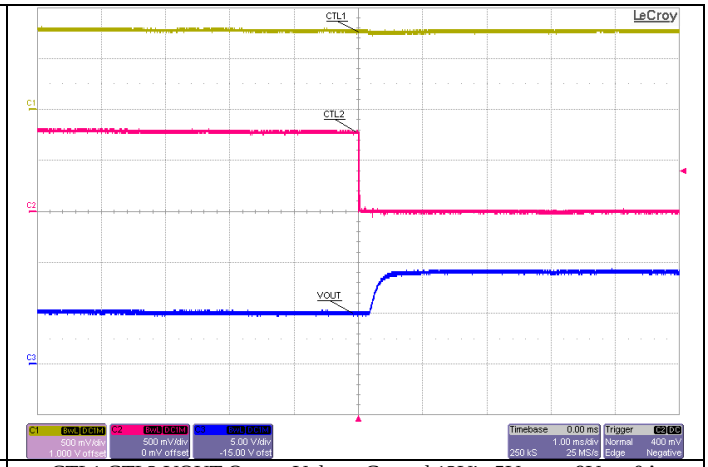
8 Output Voltage Control

All tests were performed at 12V input.

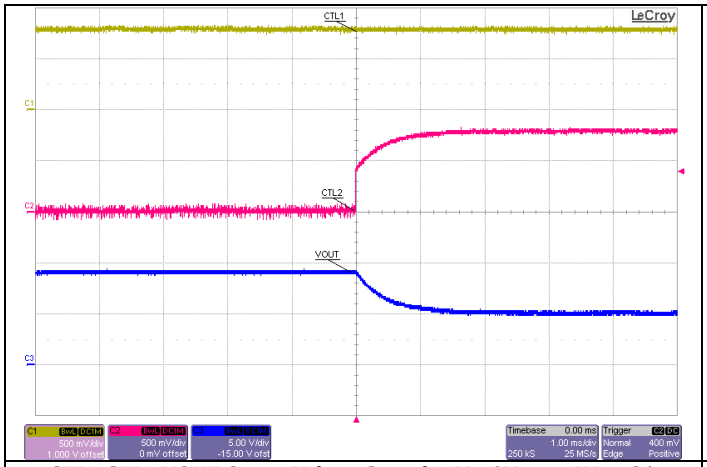
8.1 5V to 9V Output



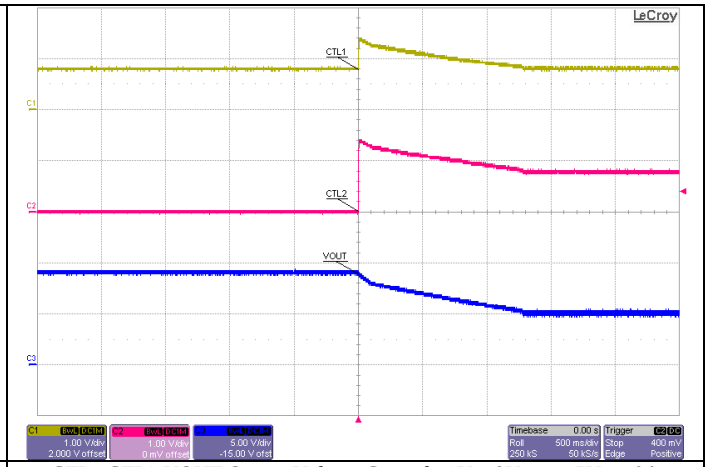
CTL1 CTL2 VOUT Output Voltage Control 12Vin 5Vout to 9Vout 3A



CTL1 CTL2 VOUT Output Voltage Control 12Vin 5Vout to 9Vout 0A

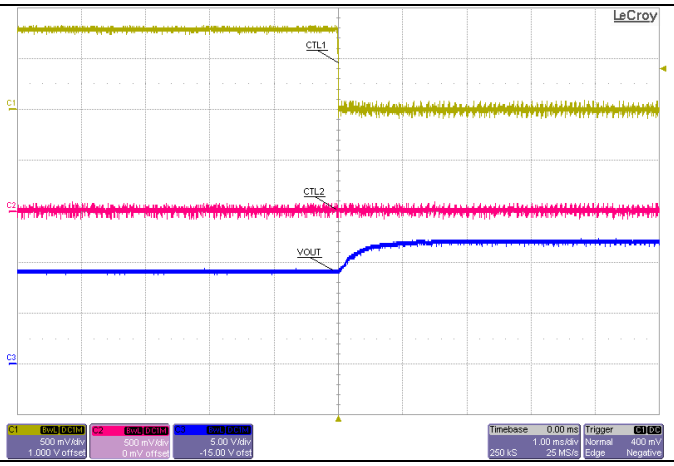


CTL1 CTL2 VOUT Output Voltage Control 12Vin 9Vout to 5Vout 3A

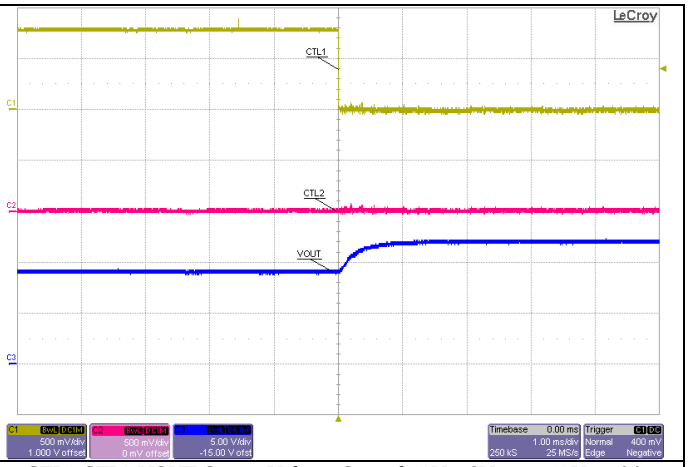


CTL1 CTL2 VOUT Output Voltage Control 12Vin 9Vout to 5Vout 0A

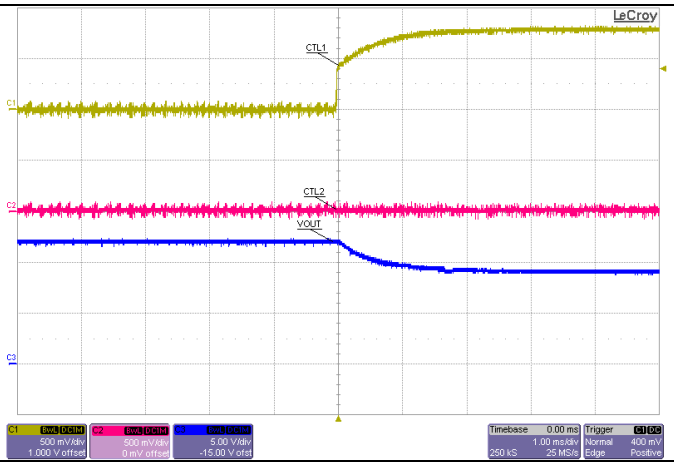
8.2 9V to 12V Output



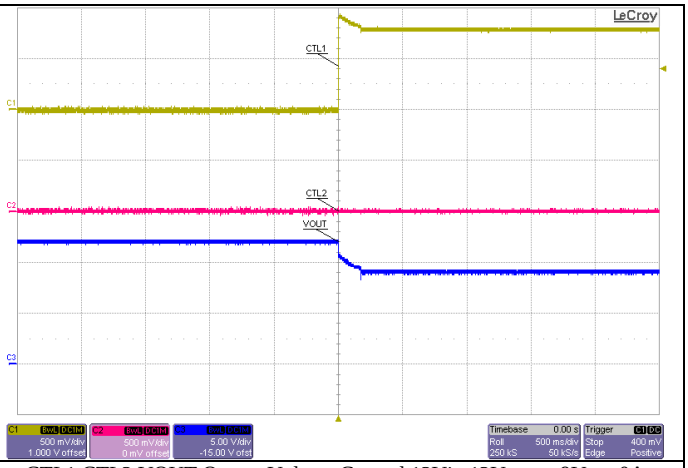
CTL1 CTL2 VOUT Output Voltage Control 12Vin 9Vout to 12Vout 3A



CTL1 CTL2 VOUT Output Voltage Control 12Vin 9Vout to 12Vout 0A

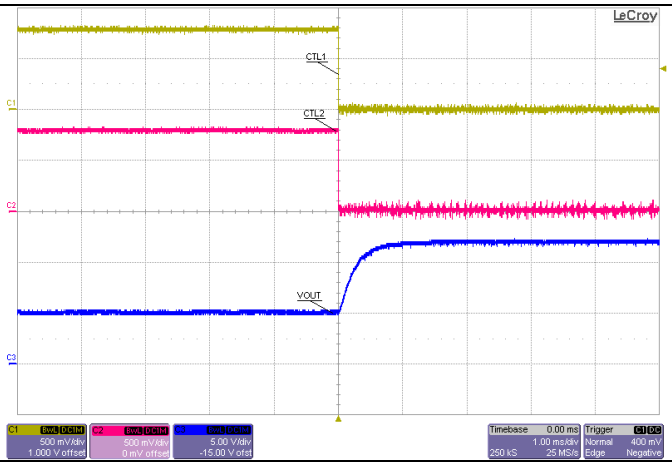


CTL1 CTL2 VOUT Output Voltage Control 12Vin 12Vout to 9Vout 3A

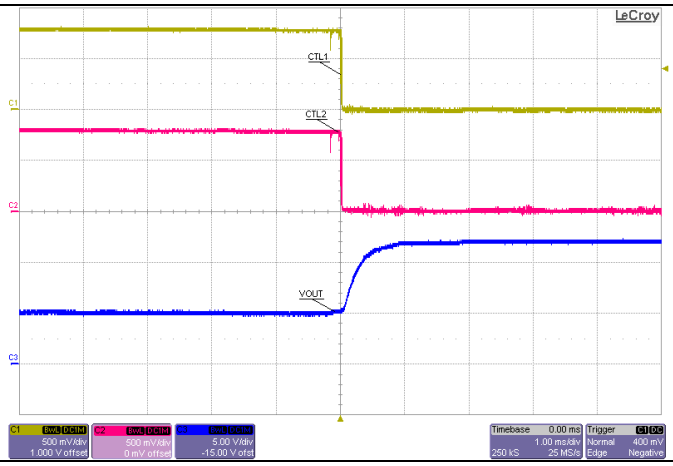


CTL1 CTL2 VOUT Output Voltage Control 12Vin 12Vout to 9Vout 0A

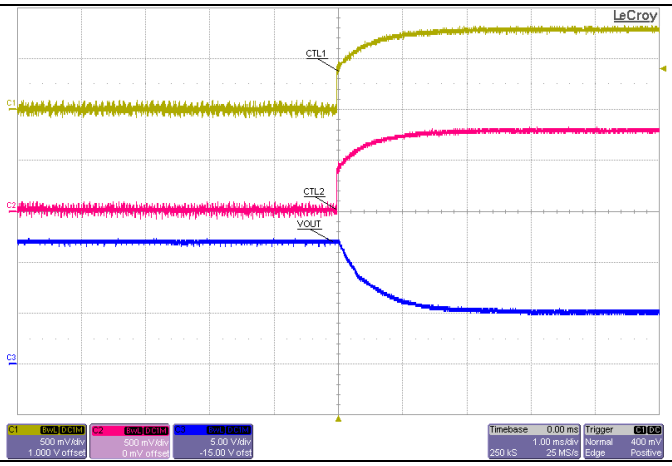
8.3 5V to 12V Output



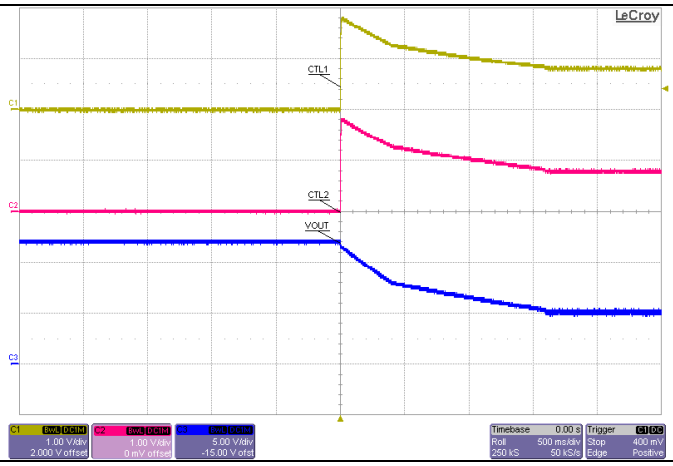
CTL1 CTL2 VOUT Output Voltage Control 12Vin 5Vout to 12Vout 3A



CTL1 CTL2 VOUT Output Voltage Control 12Vin 5Vout to 12Vout 0A



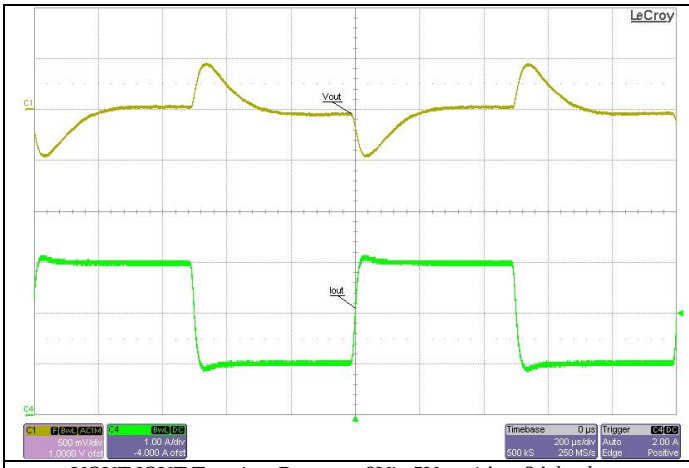
CTL1 CTL2 VOUT Output Voltage Control 12Vin 12Vout to 5Vout 3A



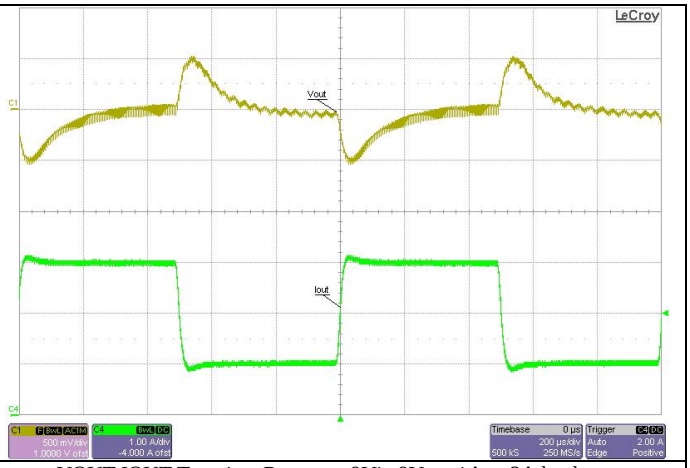
CTL1 CTL2 VOUT Output Voltage Control 12Vin 12Vout to 5Vout 0A

9 Load Transient Response

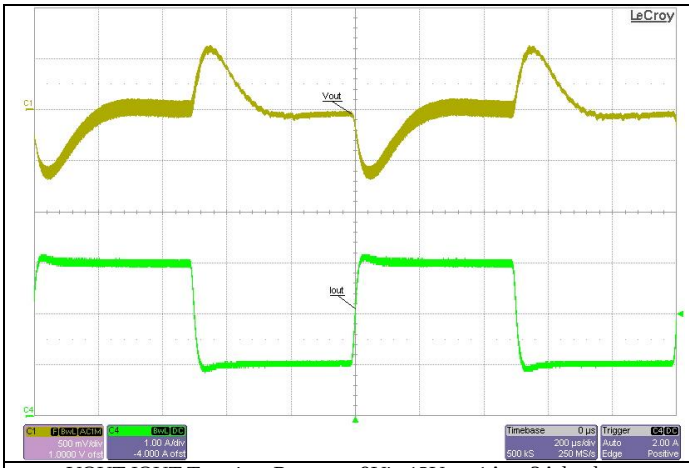
9.1 9V Input



VOUT IOUT Transient Response 9Vin 5Vout 1A to 3A load step

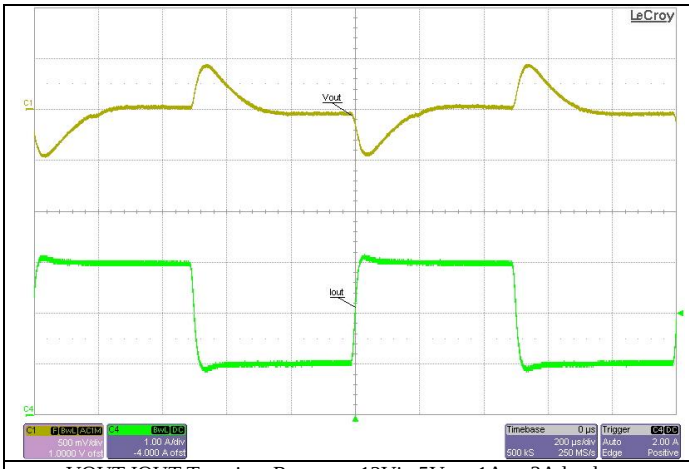


VOUT IOUT Transient Response 9Vin 9Vout 1A to 3A load step

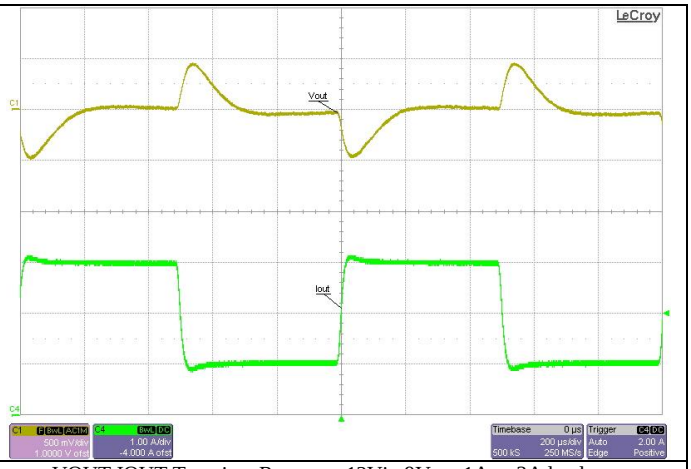


VOUT IOUT Transient Response 9Vin 12Vout 1A to 3A load step

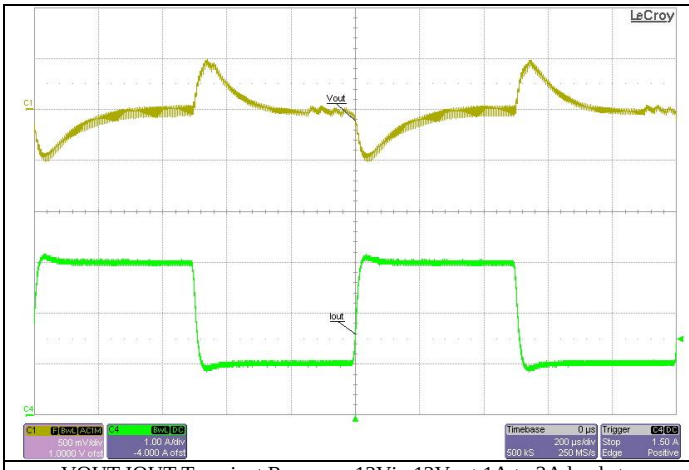
9.2 12V Input



VOUT IOUT Transient Response 12Vin 5Vout 1A to 3A load step

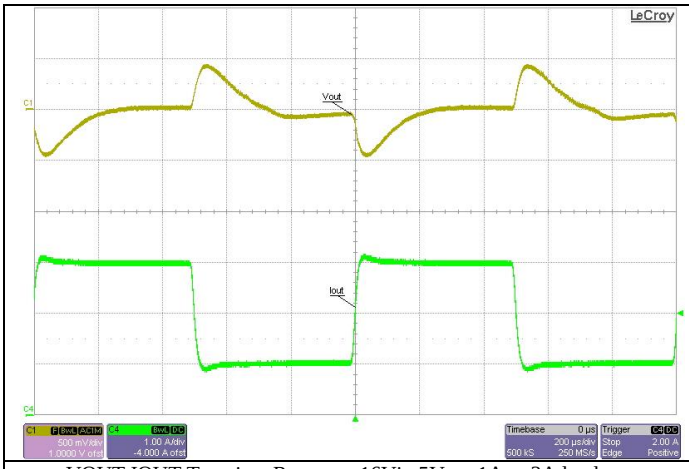


VOUT IOUT Transient Response 12Vin 9Vout 1A to 3A load step

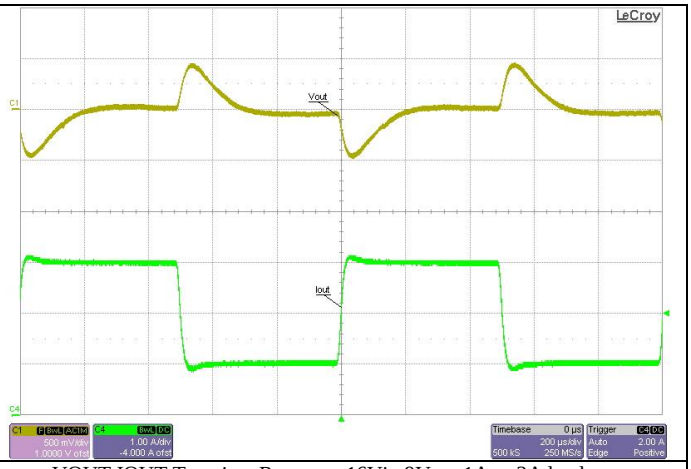


VOUT IOUT Transient Response 12Vin 12Vout 1A to 3A load step

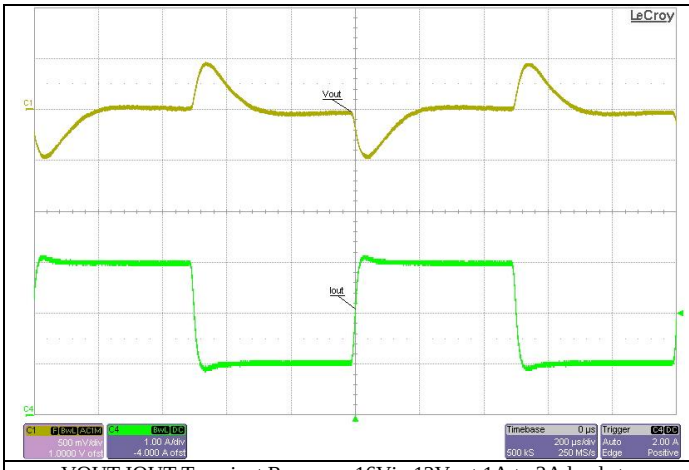
9.3 16V Input



VOUT IOUT Transient Response 16Vin 5Vout 1A to 3A load step

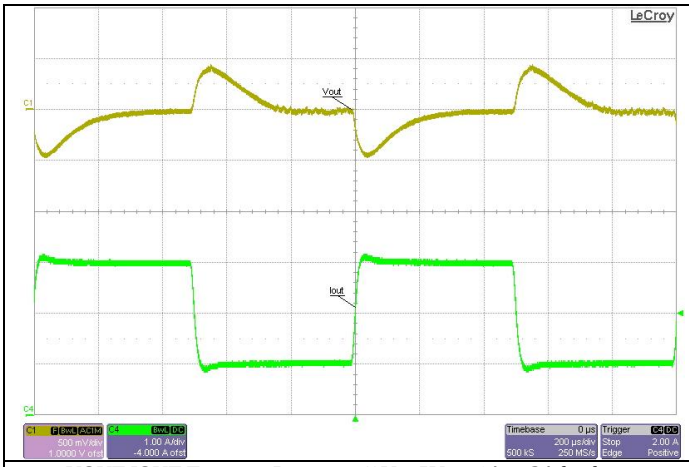


VOUT IOUT Transient Response 16Vin 9Vout 1A to 3A load step

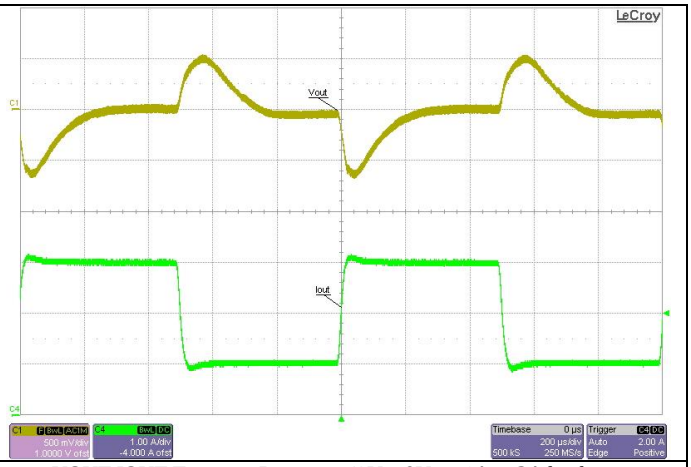


VOUT IOUT Transient Response 16Vin 12Vout 1A to 3A load step

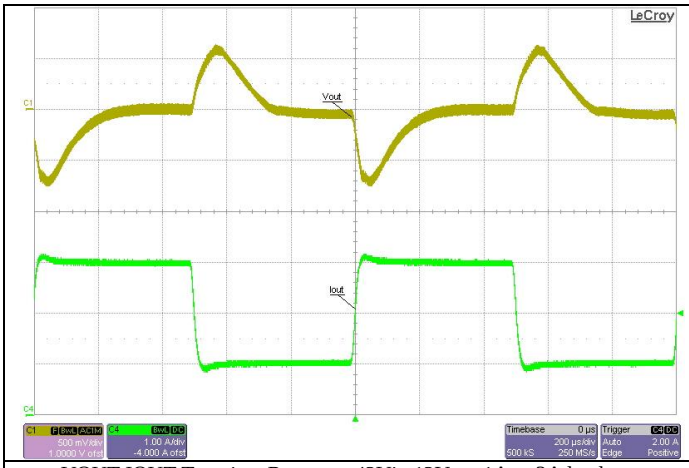
9.4 42V Input



VOUT IOUT Transient Response 42Vin 5Vout 1A to 3A load step



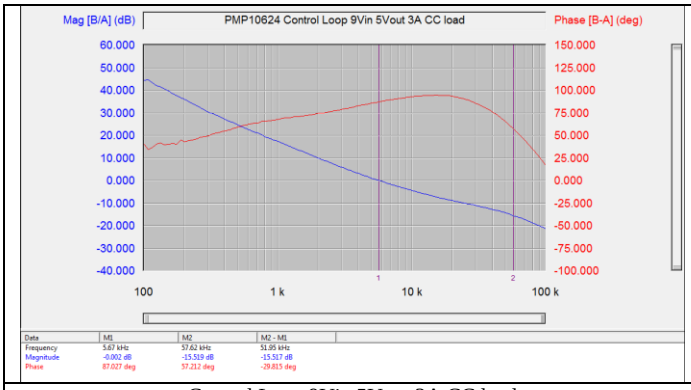
VOUT IOUT Transient Response 42Vin 9Vout 1A to 3A load step



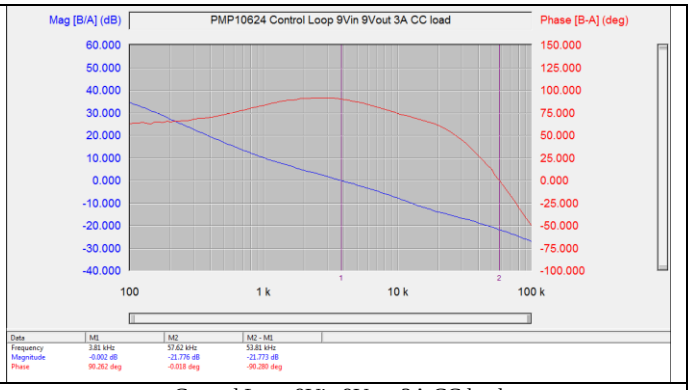
VOUT IOUT Transient Response 42Vin 12Vout 1A to 3A load step

10 Frequency Response

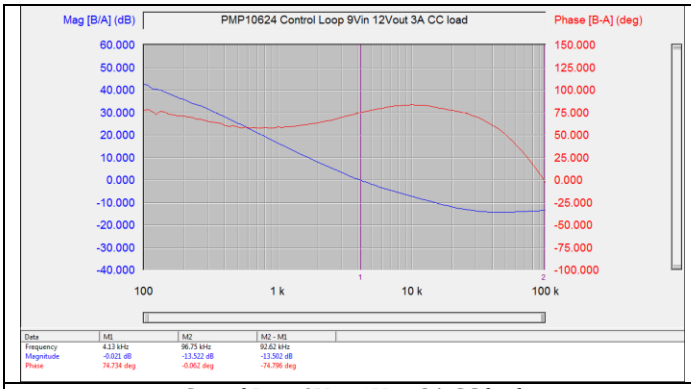
10.1 9V Input



Control Loop 9Vin 5Vout 3A CC load

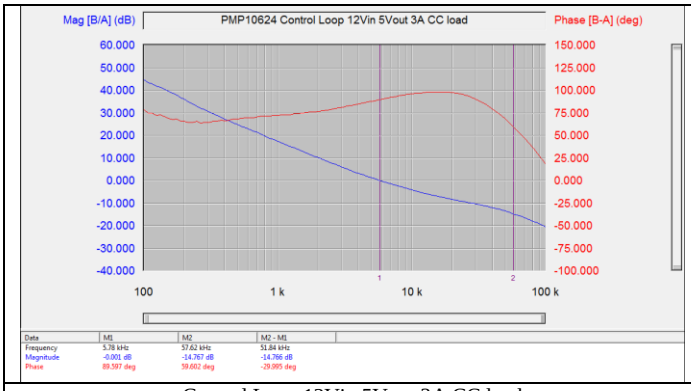


Control Loop 9Vin 9Vout 3A CC load

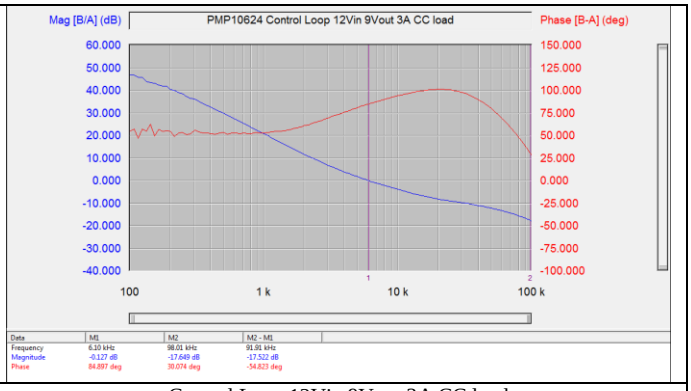


Control Loop 9Vin 12Vout 3A CC load

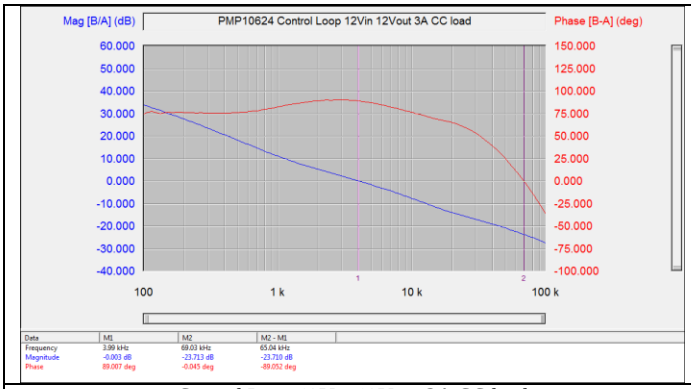
10.2 12V Input



Control Loop 12Vin 5Vout 3A CC load

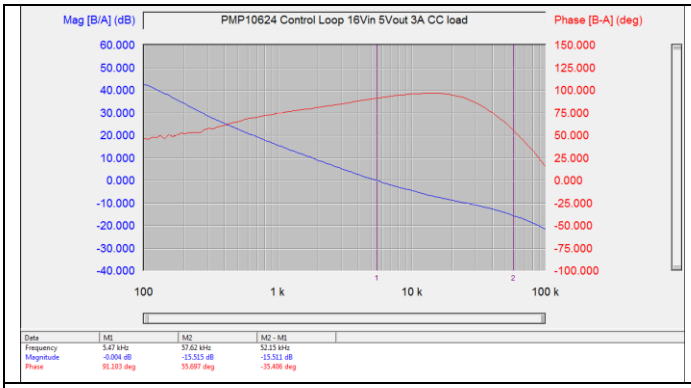


Control Loop 12Vin 9Vout 3A CC load

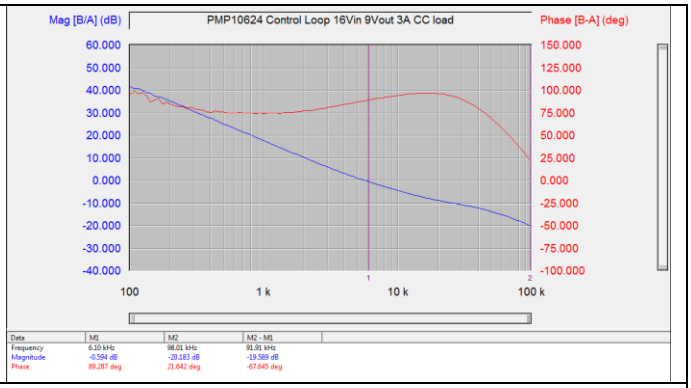


Control Loop 12Vin 12Vout 3A CC load

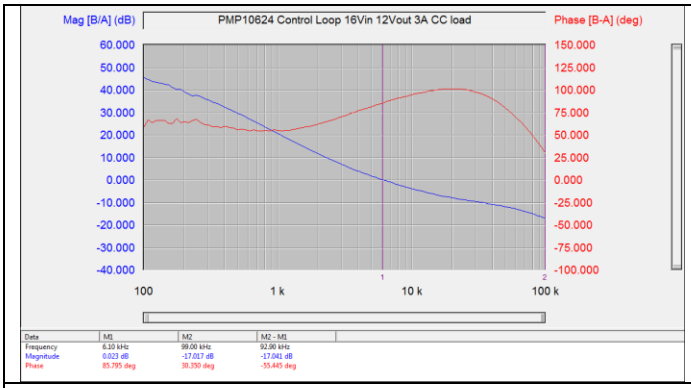
10.3 16V Input



Control Loop 16Vin 5Vout 3A CC load

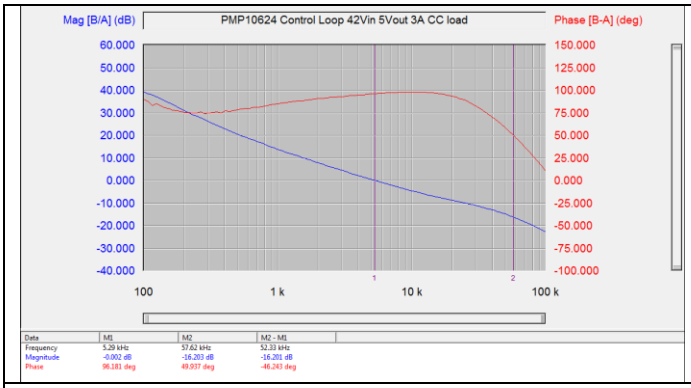


Control Loop 16Vin 9Vout 3A CC load

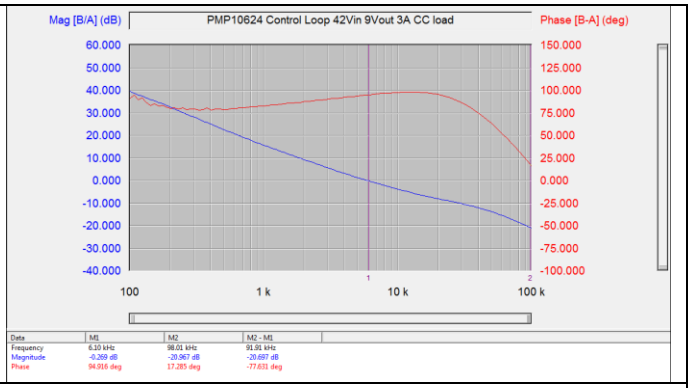


Control Loop 16Vin 12Vout 3A CC load

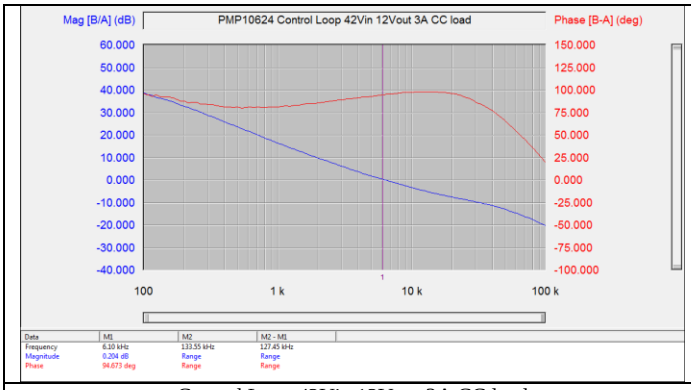
10.4 42V Input



Control Loop 42Vin 5Vout 3A CC load



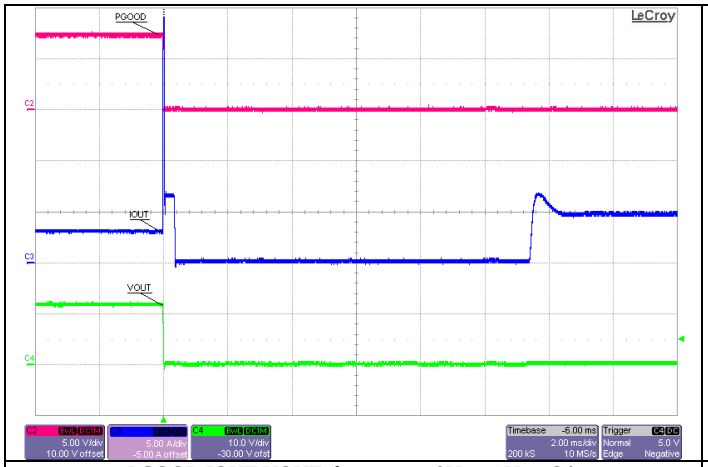
Control Loop 42Vin 9Vout 3A CC load



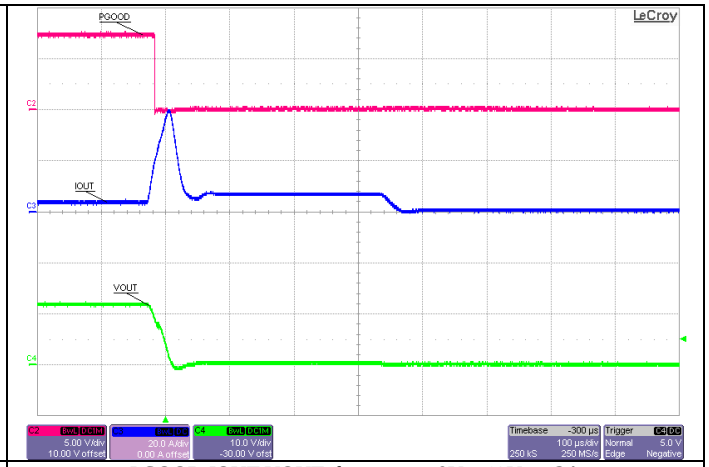
Control Loop 42Vin 12Vout 3A CC load

11 Short Circuit Tests

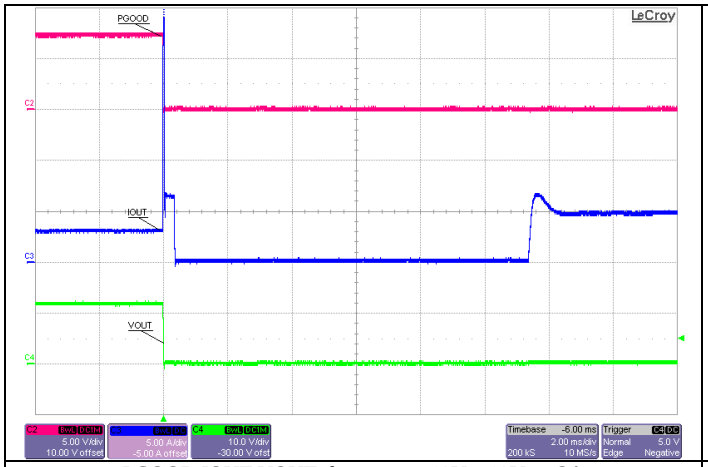
11.1 Output Short Circuit



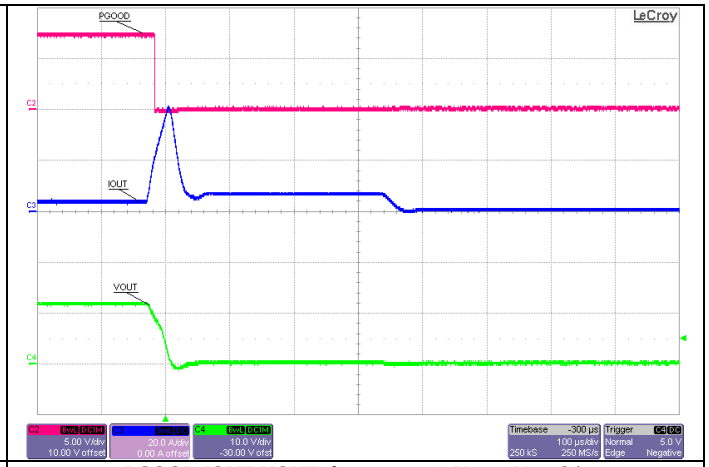
PGOOD IOUT VOUT short circuit 9Vin 12Vout 3A



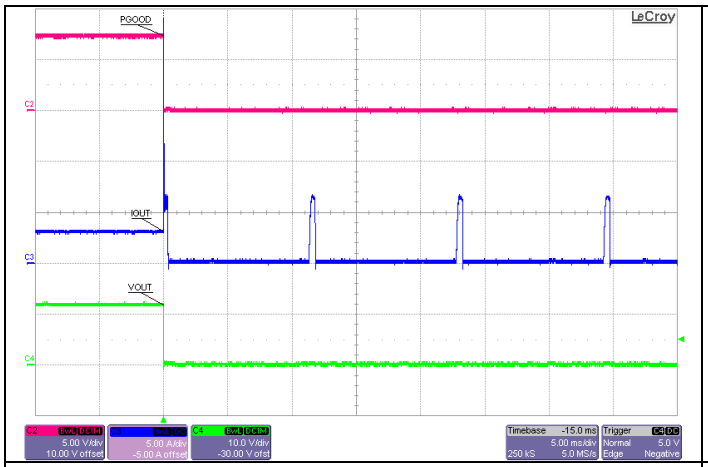
PGOOD IOUT VOUT short circuit 9Vin 12Vout 3A



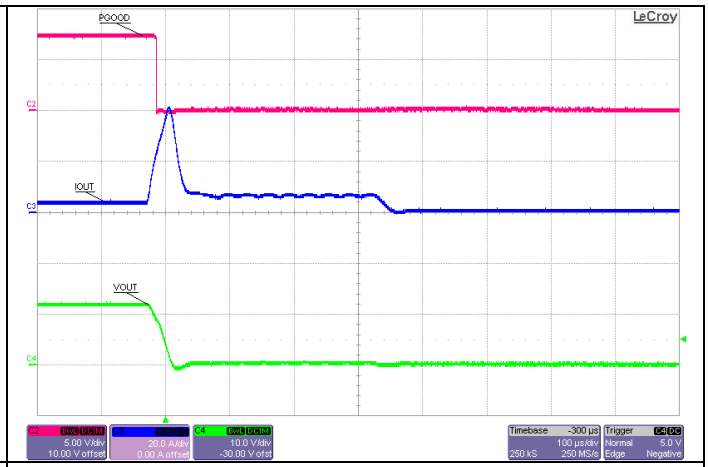
PGOOD IOUT VOUT short circuit 12Vin 12Vout 3A



PGOOD IOUT VOUT short circuit 12Vin 12Vout 3A

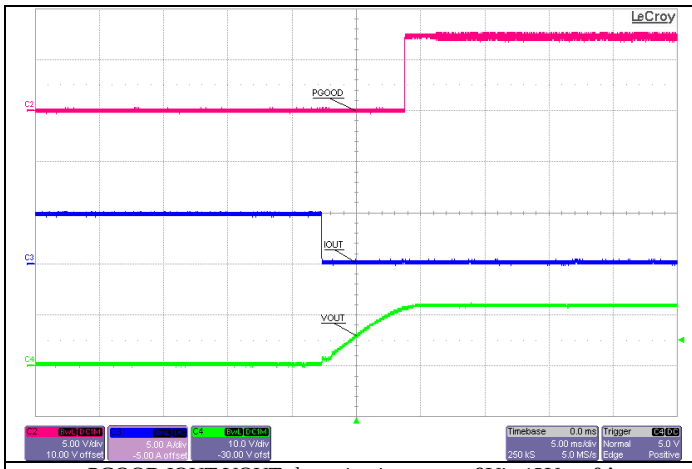


PGOOD IOUT VOUT short circuit 16Vin 12Vout 3A

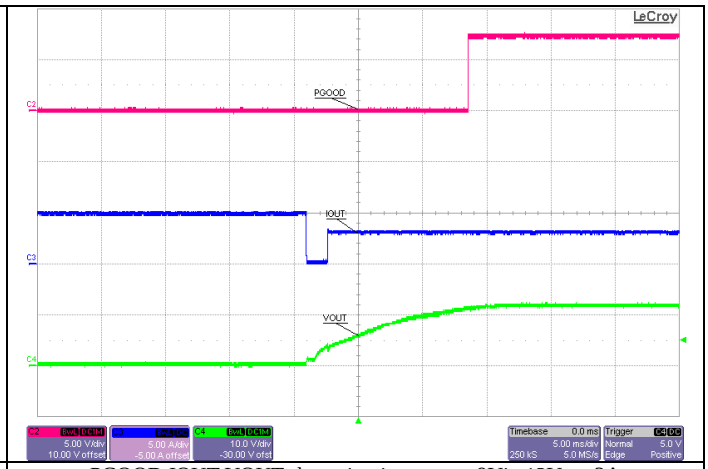


PGOOD IOUT VOUT short circuit 16Vin 12Vout 3A

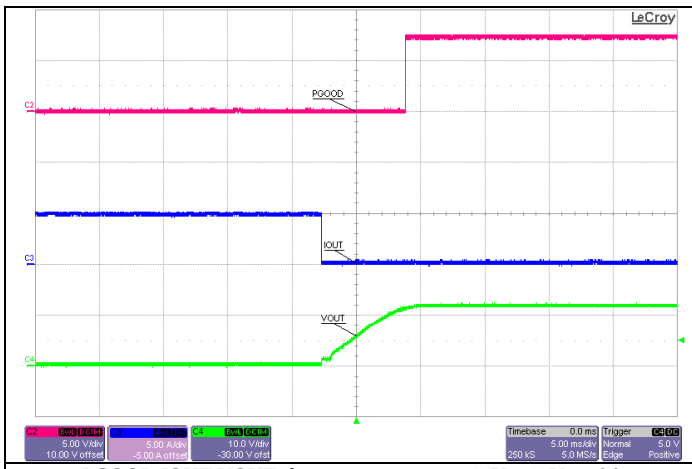
11.2 Output Short Circuit Recovery



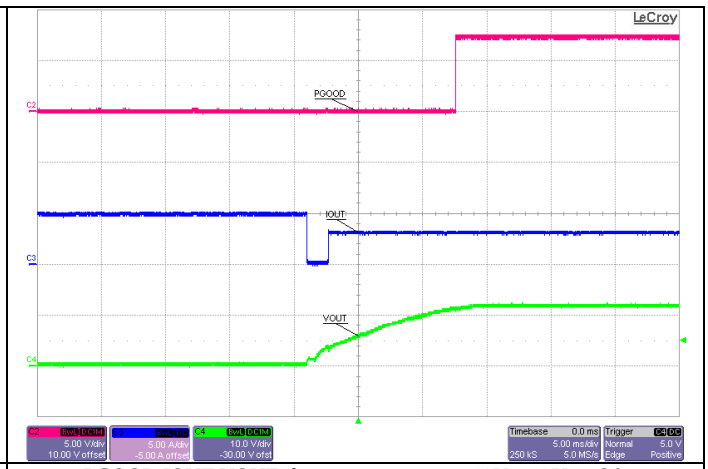
PGOOD IOUT VOUT short circuit recovery 9Vin 12Vout 0A



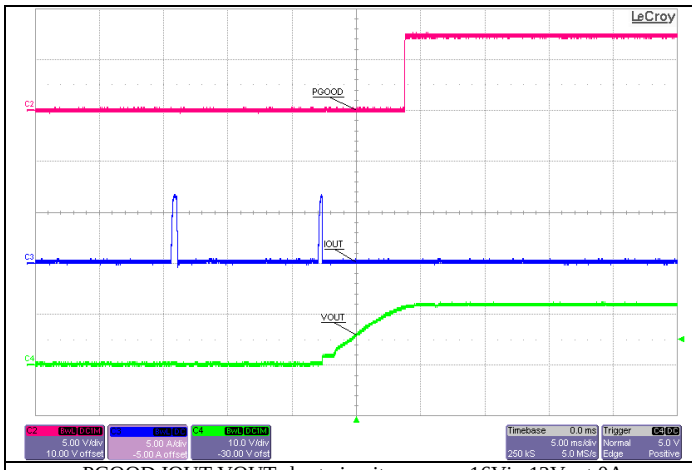
PGOOD IOUT VOUT short circuit recovery 9Vin 12Vout 3A



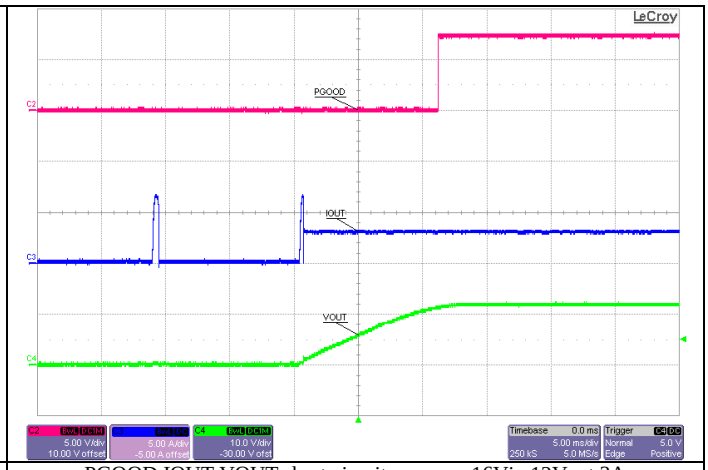
PGOOD IOUT VOUT short circuit recovery 12Vin 12Vout 0A



PGOOD IOUT VOUT short circuit recovery 12Vin 12Vout 3A



PGOOD IOUT VOUT short circuit recovery 16Vin 12Vout 0A



PGOOD IOUT VOUT short circuit recovery 16Vin 12Vout 3A

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