LM5175 Synchronous 4-Switch Buck-Boost Converter

TI reference design number: PMP10698 REV A

Input: 9V to 42V DC
Output: Selectable 5V, 12V or 20V @ 5A

DC – DC Test Results

Table of Contents

1 Test Specifications

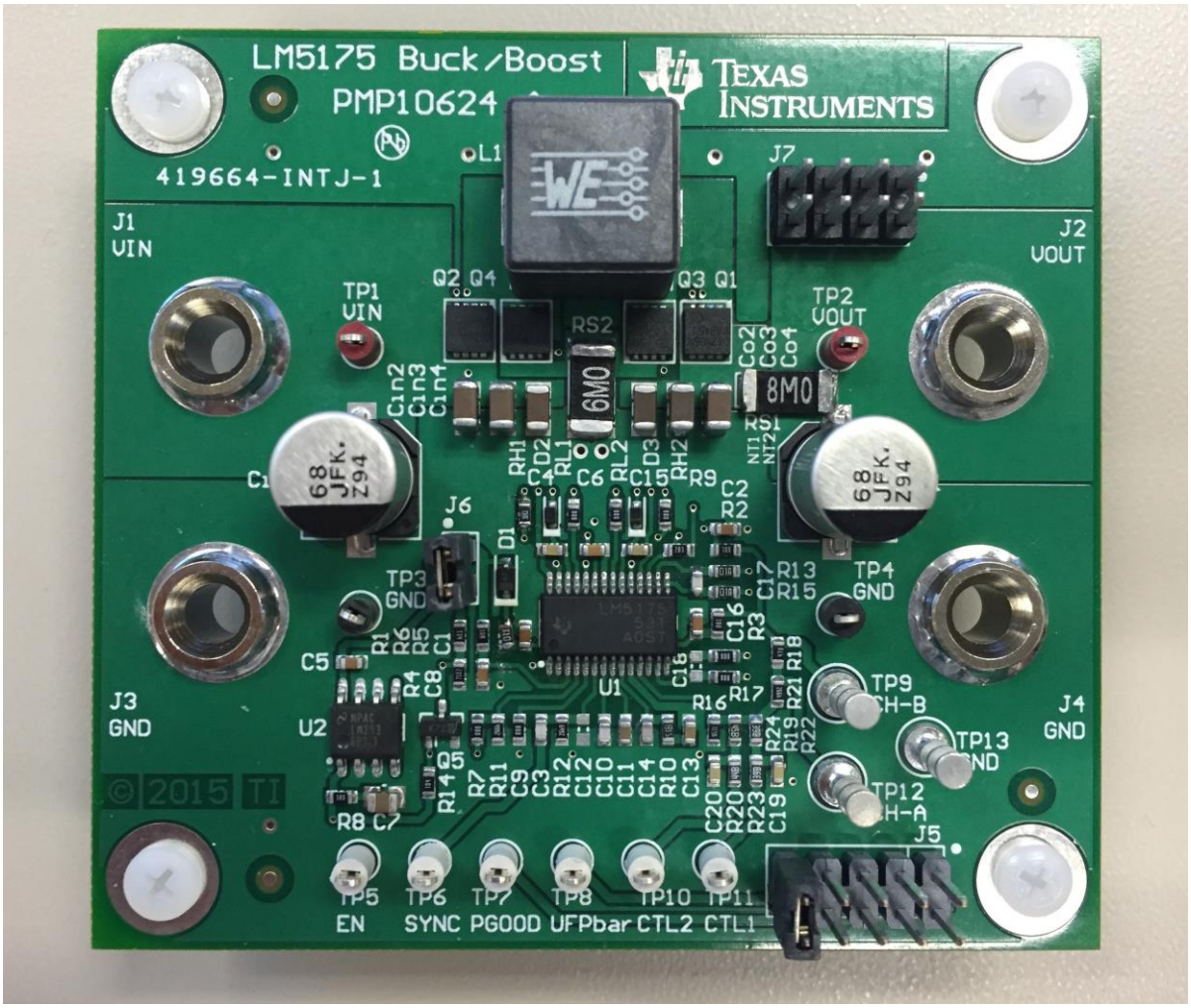
Vin min	**9V**
Vin max	**42V**
Vout	**Selectable 5V, 12V or 20V**
Iout	**5A**

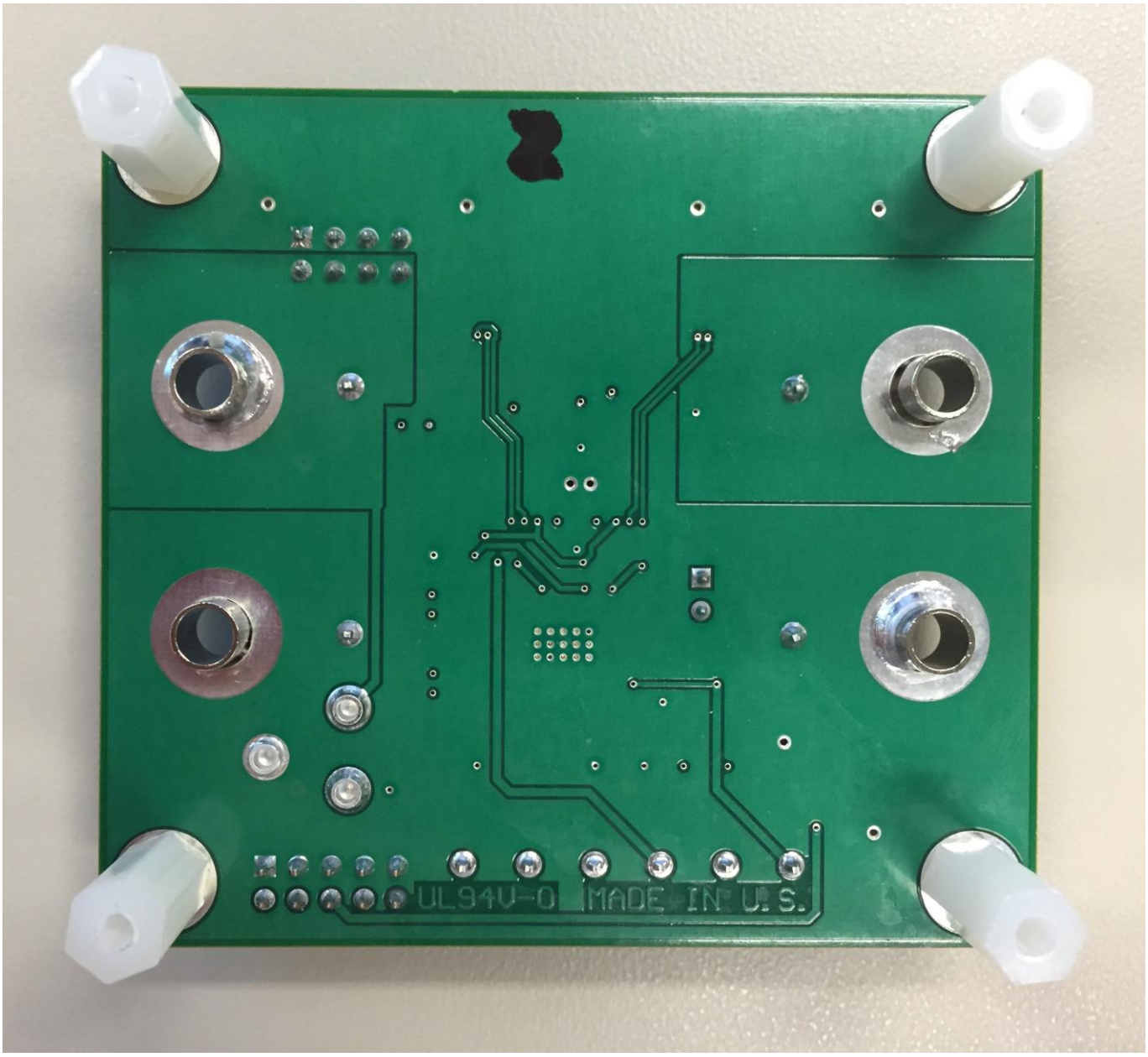
2 Circuit Description

PMP10698 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, 12V or 20V at 5A using jumpers or open drain control switches. The LM5175 average current loop sets a maximum output current of 6.25A. 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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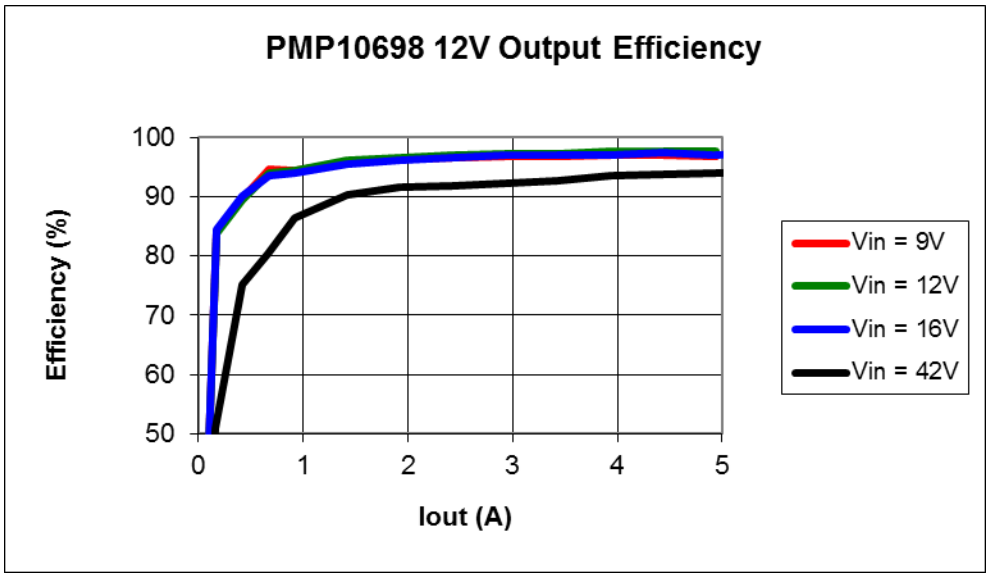
4 Efficiency

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 (%)
9.003	0.03	12.022	0	0.27	0.00	0.27	0
9.003	0.285	12.022	0.18	2.57	2.16	0.40	84.337
9.003	0.625	12.021	0.42	5.63	5.05	0.58	89.727
9.003	0.96	12.021	0.68	8.64	8.17	0.47	94.578
9.003	1.3	12.021	0.92	11.70	11.06	0.64	94.493
9.003	1.98	12.021	1.42	17.83	17.07	0.76	95.758
9.003	2.66	12.021	1.92	23.95	23.08	0.87	96.377
9.003	3.345	12.021	2.42	30.12	29.09	1.02	96.599
9.003	4.03	12.02	2.92	36.28	35.10	1.18	96.738
9.002	4.72	12.02	3.42	42.49	41.11	1.38	96.75
9.002	5.42	12.02	3.94	48.79	47.36	1.43	97.065
9.002	6.115	12.02	4.44	55.05	53.37	1.68	96.951
9.002	6.815	12.02	4.94	61.35	59.38	1.97	96.789
9.002	7.515	12.019	5.44	67.65	65.38	2.27	96.649
9.002	8.18	11.95	5.94	73.64	70.98	2.65	96.397
9.002	0.855	0.889	6.44	7.70	5.73	1.97	74.385
9.002	0.59	0.431	6.94	5.31	2.99	2.32	56.318
9.002	0.525	0.284	7.44	4.73	2.11	2.61	44.709
9.002	0.505	0.214	7.88	4.55	1.69	2.86	37.095

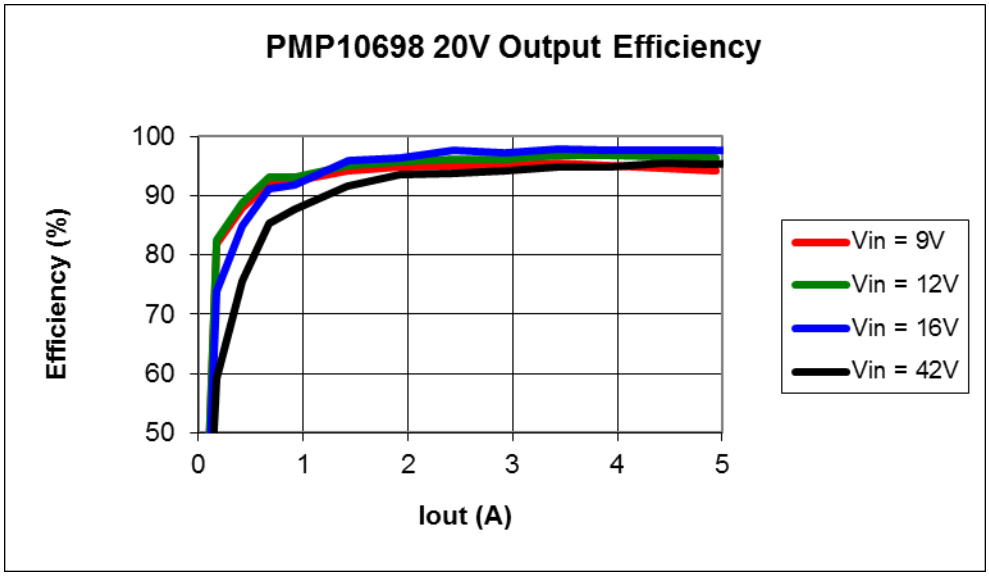
PMP10698 Test Results

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
12.003	0.025	12.014	0	0.30	0.00	0.30	0
12.003	0.215	12.015	0.18	2.58	2.16	0.42	83.805
12.003	0.47	12.015	0.42	5.64	5.05	0.60	89.451
12.003	0.725	12.015	0.68	8.70	8.17	0.53	93.887
12.003	0.975	12.015	0.92	11.70	11.05	0.65	94.453
12.003	1.48	12.015	1.42	17.76	17.06	0.70	96.042
12.003	1.99	12.016	1.92	23.89	23.07	0.82	96.587
12.003	2.495	12.016	2.42	29.95	29.08	0.87	97.099
12.003	3.005	12.015	2.92	36.07	35.08	0.99	97.269
12.003	3.52	12.015	3.42	42.25	41.09	1.16	97.256
12.003	4.035	12.015	3.94	48.43	47.34	1.09	97.743
12.003	4.55	12.015	4.44	54.61	53.35	1.27	97.68
12.002	5.065	12.015	4.94	60.79	59.35	1.44	97.638
12.002	5.585	12.015	5.44	67.03	65.36	1.67	97.509
12.002	6.075	11.953	5.94	72.91	71.00	1.91	97.379
12.002	0.665	0.896	6.44	7.98	5.77	2.21	72.297
12.002	0.46	0.438	6.94	5.52	3.04	2.48	55.058
12.002	0.4	0.285	7.44	4.80	2.12	2.68	44.168
12.002	0.38	0.214	7.88	4.56	1.69	2.87	36.975

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
16.01	0.16	12.015	0.18	2.56	2.16	0.40	84.428
16.01	0.35	12.015	0.42	5.60	5.05	0.56	90.056
16.01	0.545	12.016	0.68	8.73	8.17	0.55	93.644
16.009	0.735	12.016	0.92	11.77	11.05	0.71	93.95
16.01	1.115	12.016	1.42	17.85	17.06	0.79	95.583
16.009	1.5	12.016	1.92	24.01	23.07	0.94	96.074
16.009	1.88	12.016	2.42	30.10	29.08	1.02	96.617
16.009	2.26	12.016	2.92	36.18	35.09	1.09	96.977
16.009	2.645	12.016	3.42	42.34	41.09	1.25	97.05
16.009	3.03	12.016	3.92	48.51	47.10	1.40	97.104
16.008	3.42	12.016	4.44	54.75	53.35	1.40	97.45
16.008	3.805	12.016	4.92	60.91	59.12	1.79	97.058
16.008	4.195	12.015	5.44	67.15	65.36	1.79	97.332
16.008	4.56	11.961	5.92	73.00	70.81	2.19	97.003
16.009	0.52	0.906	6.44	8.32	5.83	2.49	70.088
16.009	0.35	0.44	6.94	5.60	3.05	2.55	54.498
16.009	0.305	0.285	7.44	4.88	2.12	2.76	43.426
16.01	0.29	0.214	7.88	4.64	1.69	2.96	36.32

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
42.017	0.04	12.035	0	1.68	0.00	1.68	0
42.017	0.09	12.034	0.16	3.78	1.93	1.86	50.917
42.017	0.16	12.034	0.42	6.72	5.05	1.67	75.182
42.017	0.235	12.033	0.66	9.87	7.94	1.93	80.431
42.016	0.305	12.032	0.92	12.81	11.07	1.75	86.38
42.016	0.45	12.031	1.42	18.91	17.08	1.82	90.357
42.015	0.6	12.029	1.92	25.21	23.10	2.11	91.617
42.015	0.755	12.026	2.42	31.72	29.10	2.62	91.746
42.014	0.905	12.025	2.92	38.02	35.11	2.91	92.348
42.013	1.055	12.023	3.42	44.32	41.12	3.21	92.769
42.012	1.205	12.022	3.94	50.62	47.37	3.26	93.565
42.011	1.355	12.021	4.44	56.92	53.37	3.55	93.761
42.009	1.505	12.02	4.94	63.22	59.38	3.84	93.919
42.008	1.655	12.018	5.44	69.52	65.38	4.15	94.038
42.006	1.795	11.945	5.94	75.40	70.95	4.45	94.102
42.017	0.23	0.92	6.42	9.66	5.91	3.76	61.118
42.017	0.17	0.529	6.94	7.14	3.67	3.47	51.397
42.016	0.16	0.401	7.44	6.72	2.98	3.74	44.38
42.017	0.125	0.198	7.28	5.25	1.44	3.81	27.445

4.3 20V Output Efficiency Results



4.4 20V Output Efficiency Data

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

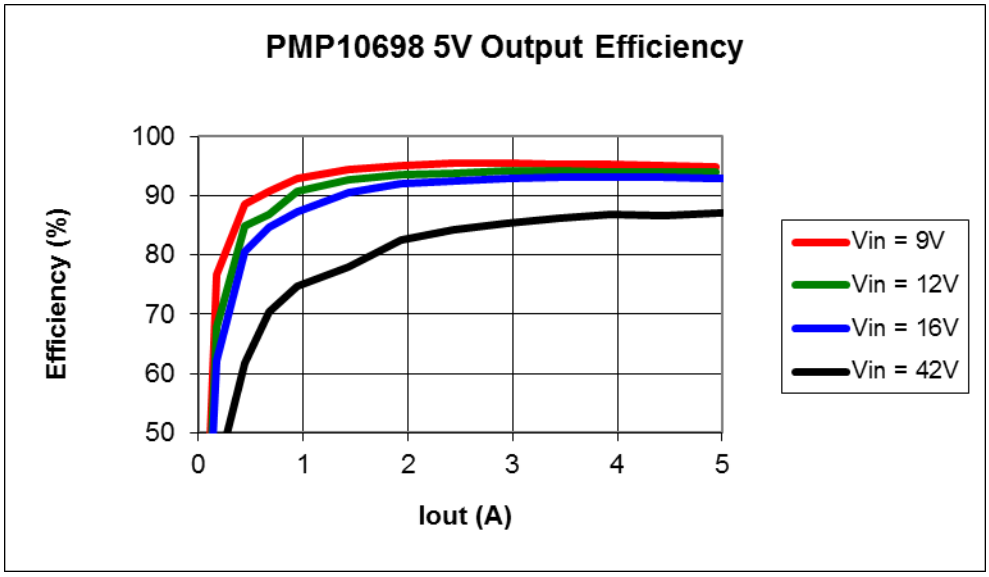
Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
9.002	0.49	20.064	0.18	4.41	3.61	0.80	81.876
9.002	1.065	20.064	0.42	9.59	8.43	1.16	87.898
9.002	1.645	20.062	0.68	14.81	13.64	1.17	92.125
9.002	2.215	20.062	0.92	19.94	18.46	1.48	92.566
9.002	3.36	20.062	1.42	30.25	28.49	1.76	94.186
9.002	4.51	20.06	1.92	40.60	38.52	2.08	94.867
9.002	5.67	20.06	2.42	51.04	48.55	2.50	95.11
9.002	6.845	20.06	2.92	61.62	58.58	3.04	95.061
9.002	8.03	20.06	3.44	72.29	69.01	3.28	95.463
9.002	9.24	20.061	3.94	83.18	79.04	4.14	95.025
9.002	10.46	20.061	4.44	94.16	89.07	5.09	94.594
9.002	11.69	20.061	4.94	105.23	99.10	6.13	94.173
9.002	12.925	20.046	5.44	116.35	109.05	7.30	93.725
9.002	7.175	10.482	5.94	64.59	62.26	2.33	96.398
9.001	1.035	1.129	6.44	9.32	7.27	2.05	78.046
9.001	0.82	0.725	6.94	7.38	5.03	2.35	68.17
9.002	0.695	0.481	7.44	6.26	3.58	2.68	57.2
9.002	0.645	0.355	7.94	5.81	2.82	2.99	48.546

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
12.002	0.06	20.064	0	0.72	0.00	0.72	0
12.002	0.365	20.064	0.18	4.38	3.61	0.77	82.441
12.002	0.79	20.063	0.42	9.48	8.43	1.06	88.872
12.002	1.22	20.062	0.68	14.64	13.64	1.00	93.169
12.002	1.65	20.062	0.92	19.80	18.46	1.35	93.202
12.002	2.495	20.061	1.42	29.94	28.49	1.46	95.13
12.002	3.355	20.06	1.92	40.27	38.52	1.75	95.65
12.002	4.21	20.059	2.42	50.53	48.54	1.99	96.07
12.002	5.075	20.059	2.92	60.91	58.57	2.34	96.162
12.002	5.94	20.058	3.44	71.29	69.00	2.29	96.785
12.002	6.81	20.058	3.94	81.73	79.03	2.71	96.69
12.002	7.685	20.057	4.44	92.24	89.05	3.18	96.55
12.002	8.565	20.057	4.94	102.80	99.08	3.72	96.386
12.002	9.45	20.052	5.44	113.42	109.08	4.34	96.177
12.002	8.61	16.854	5.94	103.34	100.11	3.22	96.88
12.002	0.795	1.134	6.44	9.54	7.30	2.24	76.538
12.002	0.63	0.725	6.94	7.56	5.03	2.53	66.543
12.002	0.54	0.483	7.44	6.48	3.59	2.89	55.446

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
16.01	0.07	20.059	0	1.12	0.00	1.12	0
16.01	0.305	20.059	0.18	4.88	3.61	1.27	73.942
16.01	0.62	20.058	0.42	9.93	8.42	1.50	84.87
16.01	0.935	20.058	0.68	14.97	13.64	1.33	91.116
16.01	1.255	20.058	0.92	20.09	18.45	1.64	91.842
16.01	1.88	20.06	1.44	30.10	28.89	1.21	95.972
16.01	2.495	20.058	1.92	39.94	38.51	1.43	96.411
16.01	3.13	20.057	2.44	50.11	48.94	1.17	97.661
16.009	3.765	20.056	2.92	60.27	58.56	1.71	97.162
16.01	4.405	20.056	3.44	70.52	68.99	1.53	97.829
16.01	5.05	20.055	3.94	80.85	79.02	1.83	97.732
16.01	5.695	20.054	4.44	91.18	89.04	2.14	97.656
16.01	6.34	20.053	4.94	101.50	99.06	2.44	97.595
16.009	6.985	20.05	5.44	111.82	109.07	2.75	97.54
16.009	7.495	19.66	5.94	119.99	116.78	3.21	97.327
16.009	0.62	1.151	6.44	9.93	7.41	2.51	74.68
16.009	0.495	0.736	6.94	7.92	5.11	2.82	64.457
16.009	0.415	0.487	7.44	6.64	3.62	3.02	54.537
16.009	0.41	0.486	7.44	6.56	3.62	2.95	55.089

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
42.015	0.055	20.052	0	2.31	0.00	2.31	0
42.015	0.145	20.051	0.18	6.09	3.61	2.48	59.243
42.015	0.265	20.05	0.42	11.13	8.42	2.71	75.633
42.015	0.38	20.05	0.68	15.97	13.63	2.33	85.396
42.015	0.5	20.049	0.92	21.01	18.45	2.56	87.802
42.015	0.74	20.048	1.42	31.09	28.47	2.62	91.564
42.015	0.98	20.046	1.92	41.17	38.49	2.69	93.476
42.015	1.23	20.044	2.42	51.68	48.51	3.17	93.862
42.015	1.48	20.041	2.92	62.18	58.52	3.66	94.11
42.015	1.72	20.039	3.42	72.27	68.53	3.73	94.835
42.015	1.97	20.038	3.92	82.77	78.55	4.22	94.901
42.015	2.215	20.036	4.44	93.06	88.96	4.10	95.591
42.015	2.46	20.036	4.92	103.36	98.58	4.78	95.375
42.015	2.705	20.032	5.44	113.65	108.97	4.68	95.885
42.015	2.93	19.852	5.92	123.10	117.52	5.58	95.467
42.016	0.295	1.32	6.44	12.39	8.50	3.89	68.584
42.016	0.235	0.88	6.94	9.87	6.11	3.77	61.853
42.016	0.205	0.626	7.44	8.61	4.66	3.96	54.073

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	0.025	4.98	0	0.23	0.00	0.23	0
8.999	0.13	4.98	0.18	1.17	0.90	0.27	76.624
9	0.275	4.98	0.44	2.48	2.19	0.28	88.533
9	0.415	4.98	0.68	3.74	3.39	0.35	90.667
9	0.56	4.98	0.94	5.04	4.68	0.36	92.881
8.999	0.845	4.981	1.44	7.60	7.17	0.43	94.325
9	1.13	4.981	1.94	10.17	9.66	0.51	95.016
9	1.415	4.982	2.44	12.74	12.16	0.58	95.454
9	1.705	4.982	2.94	15.35	14.65	0.70	95.452
8.999	2	4.982	3.44	18.00	17.14	0.86	95.222
8.999	2.29	4.982	3.94	20.61	19.63	0.98	95.251
9	2.585	4.983	4.44	23.27	22.12	1.14	95.098
8.999	2.885	4.983	4.94	25.96	24.62	1.35	94.815
8.999	3.18	4.983	5.44	28.62	27.11	1.51	94.726
8.999	3.475	4.967	5.94	31.27	29.50	1.77	94.348
9	0.5	0.384	6.44	4.50	2.47	2.03	54.955
9	0.385	0.188	6.88	3.47	1.29	2.17	37.329
9	0.385	0.188	6.88	3.47	1.29	2.17	37.329
9	0.385	0.188	6.88	3.47	1.29	2.17	37.329

PMP10698 Test Results

Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
12	0.03	4.98	0	0.36	0.00	0.36	0
12.001	0.11	4.98	0.18	1.32	0.90	0.42	67.903
12.001	0.215	4.98	0.44	2.58	2.19	0.39	84.923
12.001	0.325	4.98	0.68	3.90	3.39	0.51	86.824
12.001	0.43	4.98	0.94	5.16	4.68	0.48	90.713
12.001	0.645	4.98	1.44	7.74	7.17	0.57	92.643
12.001	0.86	4.98	1.94	10.32	9.66	0.66	93.608
12.001	1.08	4.981	2.44	12.96	12.15	0.81	93.77
12.001	1.295	4.981	2.94	15.54	14.64	0.90	94.227
12.001	1.515	4.981	3.44	18.18	17.13	1.05	94.242
12.001	1.74	4.981	3.94	20.88	19.63	1.26	93.982
12.001	1.96	4.981	4.44	23.52	22.12	1.41	94.021
12.001	2.18	4.981	4.94	26.16	24.61	1.56	94.052
12.001	2.405	4.982	5.44	28.86	27.10	1.76	93.901
12.001	2.625	4.965	5.94	31.50	29.49	2.01	93.618
12.001	0.39	0.387	6.44	4.68	2.49	2.19	53.249
12.001	0.295	0.187	6.88	3.54	1.29	2.25	36.34
12.002	0.295	0.187	6.88	3.54	1.29	2.25	36.337
12.002	0.295	0.187	6.88	3.54	1.29	2.25	36.337

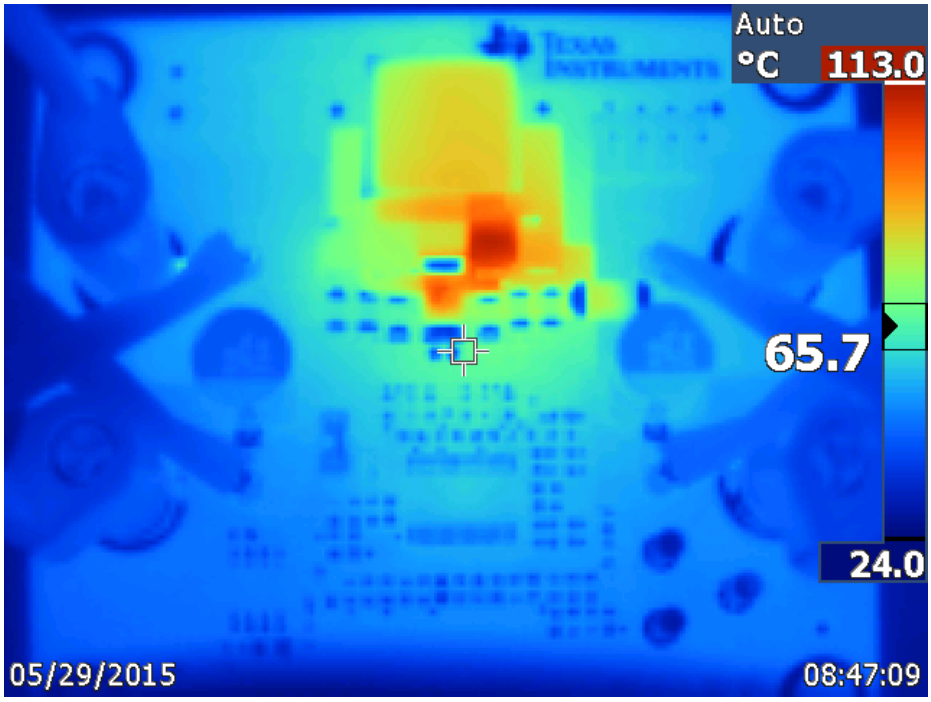
Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
16.009	0.03	4.98	0	0.48	0.00	0.48	0
16.009	0.09	4.98	0.18	1.44	0.90	0.54	62.215
16.009	0.17	4.981	0.44	2.72	2.19	0.53	80.53
16.009	0.25	4.98	0.68	4.00	3.39	0.62	84.612
16.009	0.335	4.98	0.94	5.36	4.68	0.68	87.287
16.009	0.495	4.98	1.44	7.92	7.17	0.75	90.495
16.009	0.655	4.98	1.94	10.49	9.66	0.82	92.135
16.009	0.82	4.98	2.44	13.13	12.15	0.98	92.564
16.009	0.985	4.98	2.94	15.77	14.64	1.13	92.849
16.009	1.15	4.98	3.44	18.41	17.13	1.28	93.052
16.009	1.315	4.98	3.94	21.05	19.62	1.43	93.204
16.009	1.485	4.98	4.44	23.77	22.11	1.66	93.008
16.009	1.655	4.98	4.94	26.49	24.60	1.89	92.853
16.008	1.82	4.98	5.44	29.13	27.09	2.04	92.986
16.008	1.985	4.962	5.94	31.78	29.47	2.30	92.757
16.01	0.295	0.39	6.44	4.72	2.51	2.21	53.179
16.01	0.225	0.187	6.88	3.60	1.29	2.32	35.715
16.01	0.225	0.187	6.88	3.60	1.29	2.32	35.715
16.01	0.225	0.187	6.88	3.60	1.29	2.32	35.715

PMP10698 Test Results

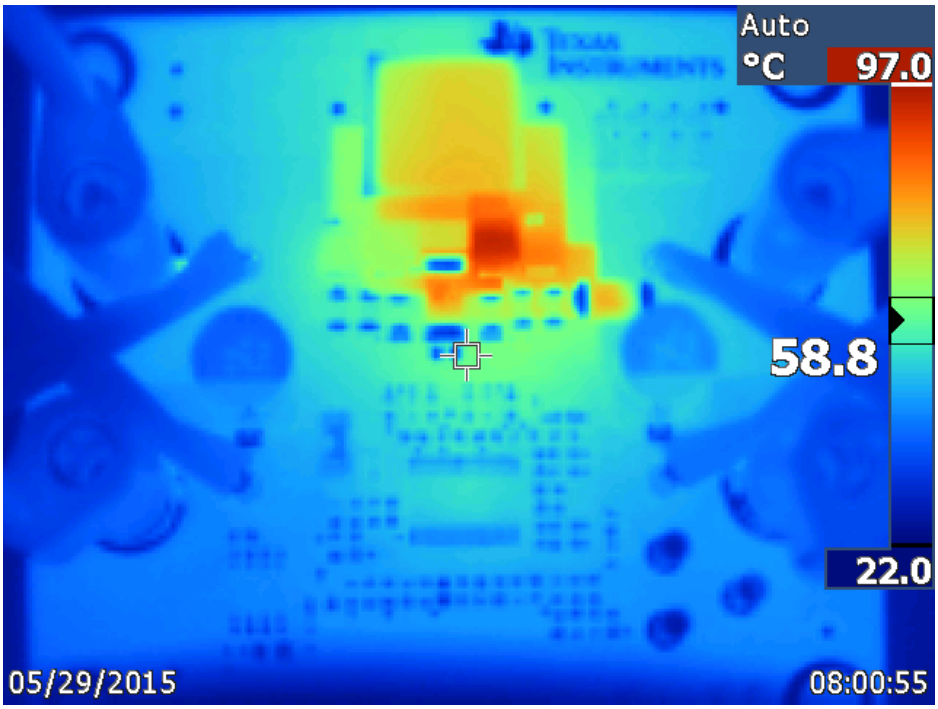
Vin (V)	Iin (A)	Vout (V)	Iout (A)	Pin (W)	Pout (W)	Pdis (W)	Efficiency (%)
42.018	0.03	5.007	0	1.26	0.00	1.26	0
42.018	0.05	5.006	0.18	2.10	0.90	1.20	42.89
42.018	0.085	5.006	0.44	3.57	2.20	1.37	61.672
42.018	0.115	5.005	0.68	4.83	3.40	1.43	70.434
42.018	0.15	5.005	0.94	6.30	4.70	1.60	74.646
42.018	0.22	5.003	1.44	9.24	7.20	2.04	77.935
42.017	0.28	5.003	1.94	11.76	9.71	2.06	82.499
42.017	0.345	5.002	2.44	14.50	12.20	2.29	84.196
42.017	0.41	5.001	2.94	17.23	14.70	2.52	85.348
42.016	0.475	5.001	3.44	19.96	17.20	2.75	86.2
42.015	0.54	5	3.94	22.69	19.70	2.99	86.83
42.015	0.61	5	4.44	25.63	22.20	3.43	86.62
42.014	0.675	5	4.94	28.36	24.70	3.66	87.096
42.013	0.74	4.999	5.44	31.09	27.19	3.90	87.472
42.012	0.805	4.97	5.94	33.82	29.52	4.30	87.292
42.018	0.135	0.415	6.44	5.67	2.67	3.00	47.116
42.018	0.125	0.258	6.94	5.25	1.79	3.46	34.091
42.017	0.13	0.223	7.44	5.46	1.66	3.80	30.375
42.018	0.12	0.199	7.3	5.04	1.45	3.59	28.811

5 Thermal

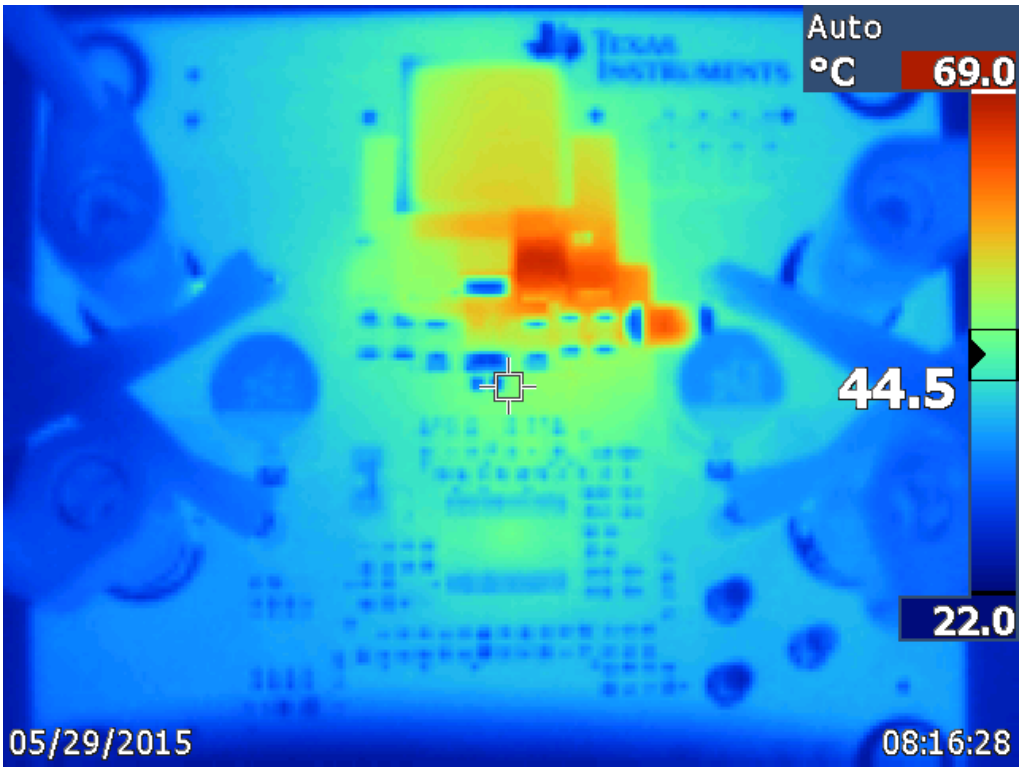
5.1 9V Input, 20V at 4A Output



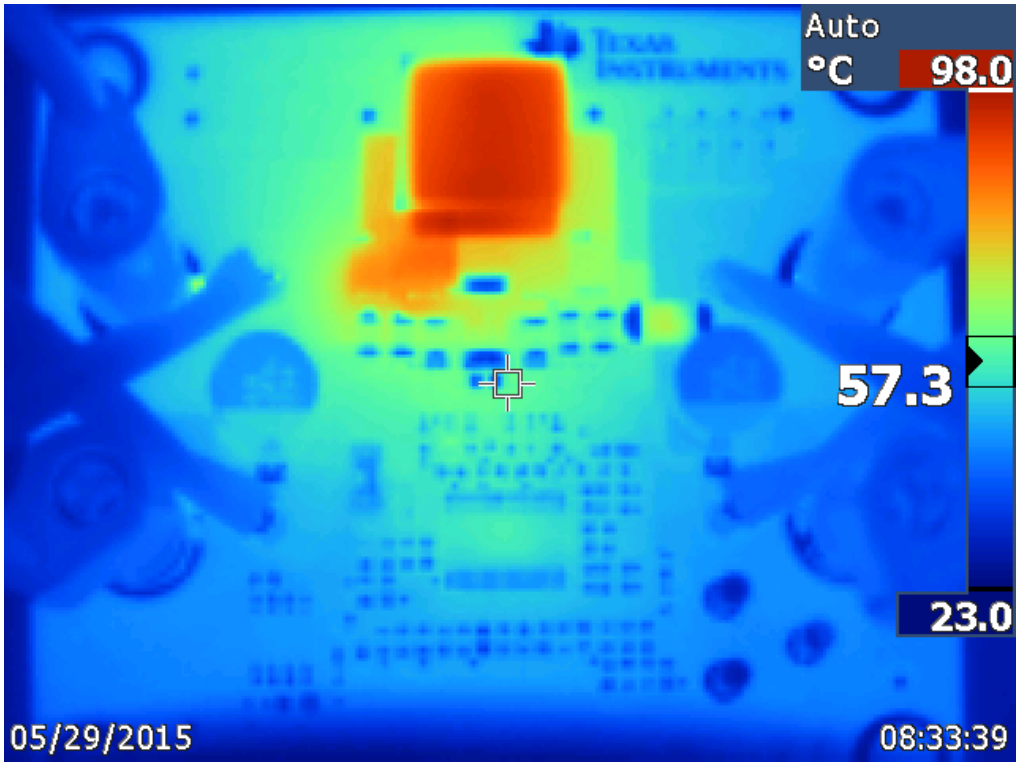
5.2 12V Input, 20V at 5A Output



5.3 16V Input, 20V at 5A Output

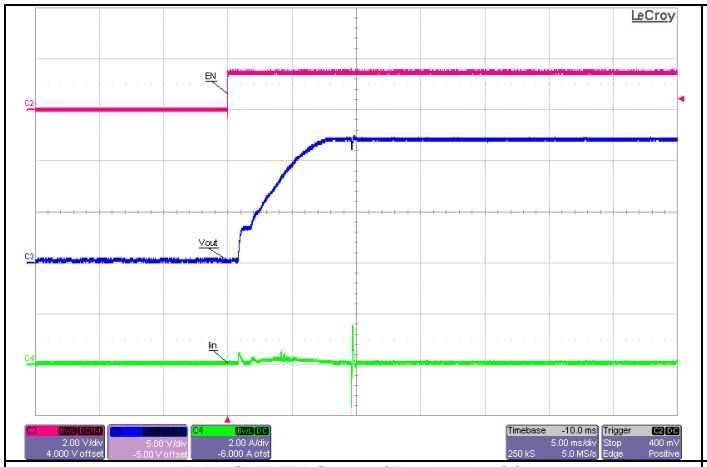


5.4 42V Input, 20V at 5A Output

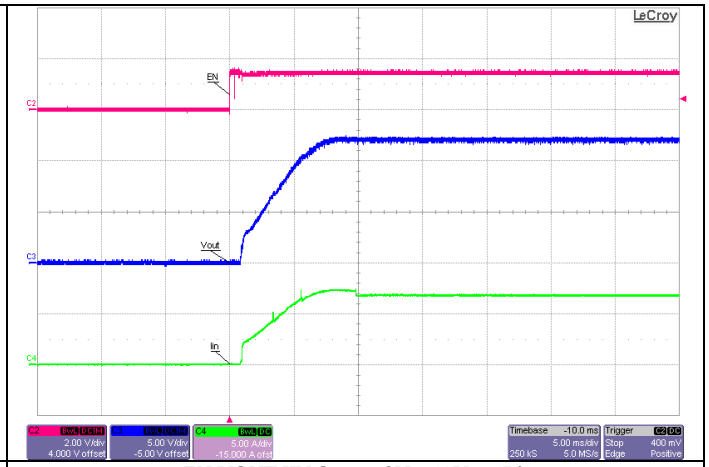


6 Startup

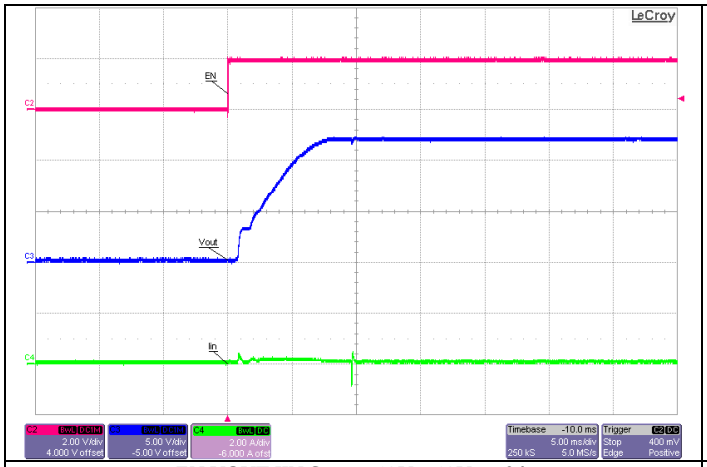
6.1 Startup from EN



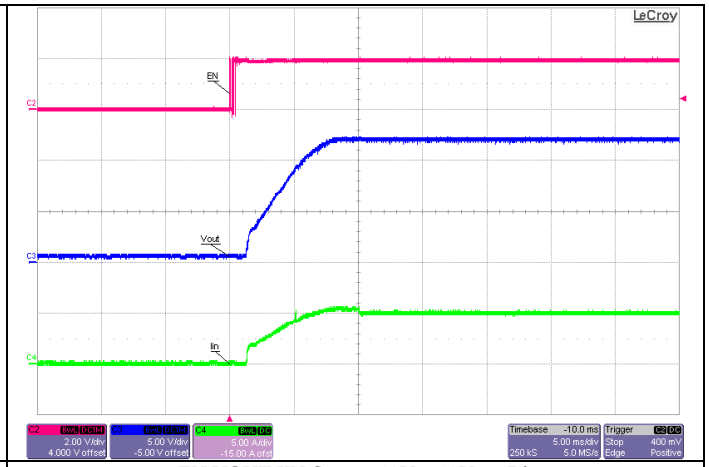
EN VOUT IIN Startup 9Vin 12Vout 0A



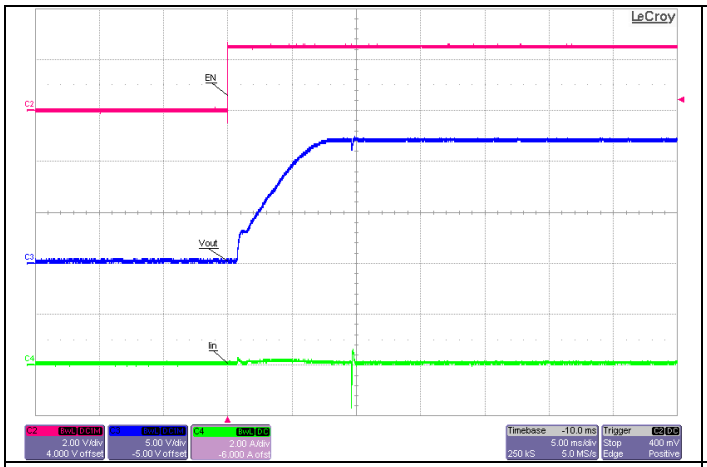
EN VOUT IIN Startup 9Vin 12Vout 5A



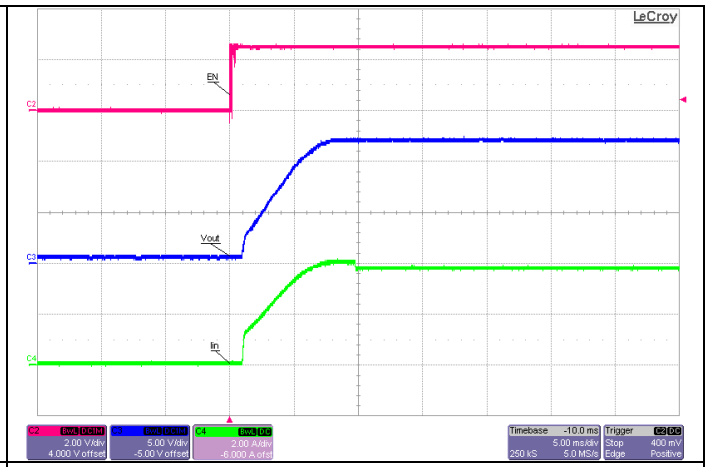
EN VOUT IIN Startup 12Vin 12Vout 0A



EN VOUT IIN Startup 12Vin 12Vout 5A



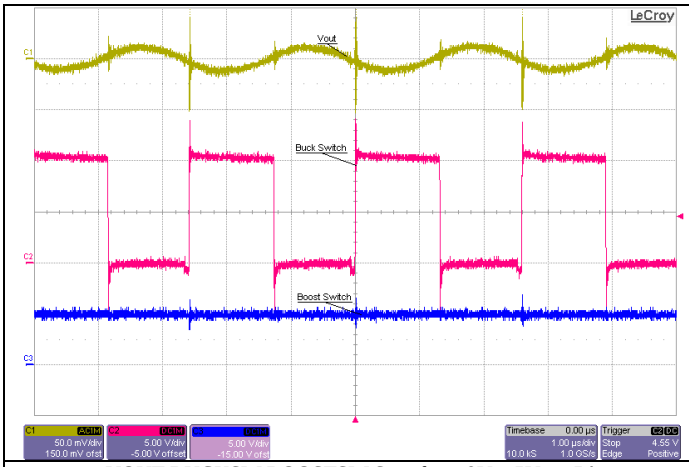
EN VOUT IIN Startup 16Vin 12Vout 0A



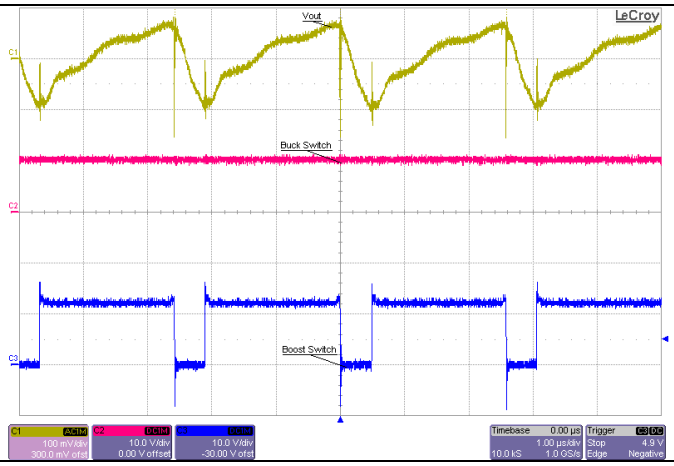
EN VOUT IIN Startup 16Vin 12Vout 5A

7 Switching and Ripple Voltage

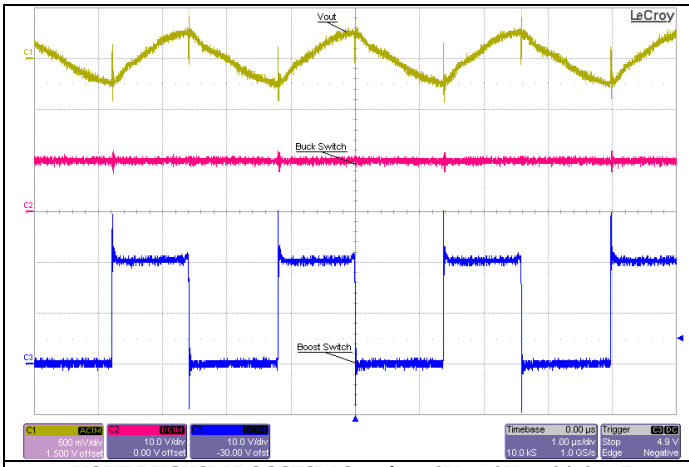
7.1 9V Input



VOUT BUCKSW BOOSTSW Switching 9Vin 5Vout 5A

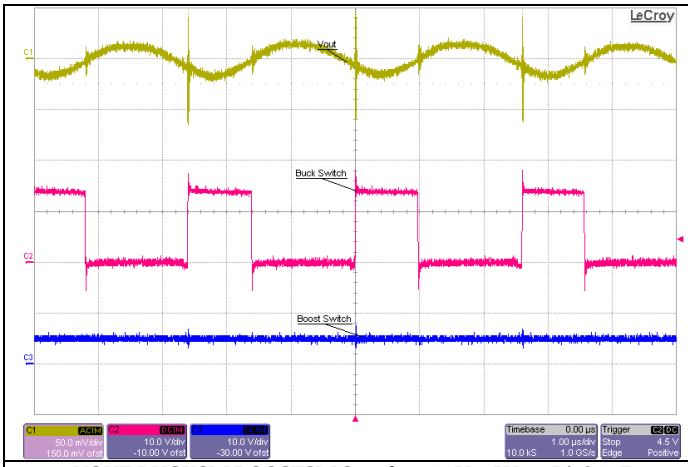


VOUT BUCKSW BOOSTSW Switching 9Vin 12Vout 5A 0.1uF

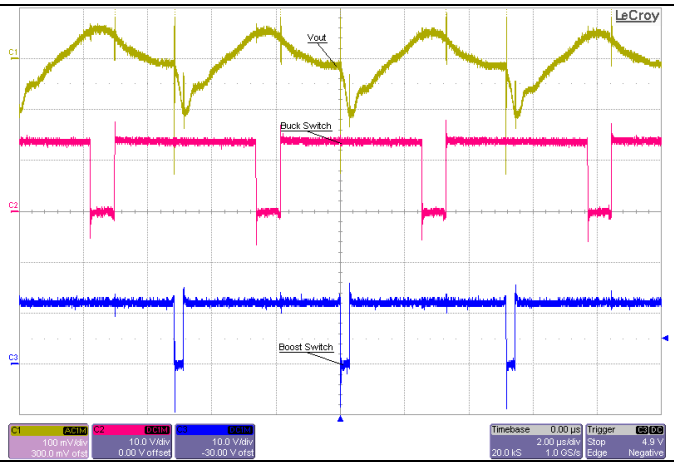


VOUT BUCKSW BOOSTSW Switching 9Vin 20Vout 0A 0.1uF

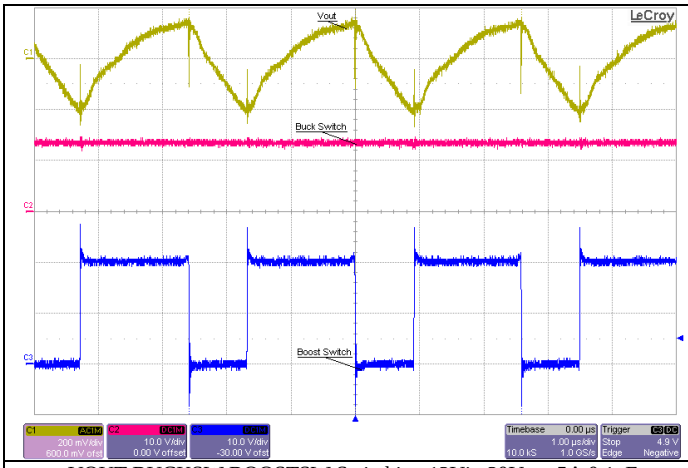
7.2 12V Input



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

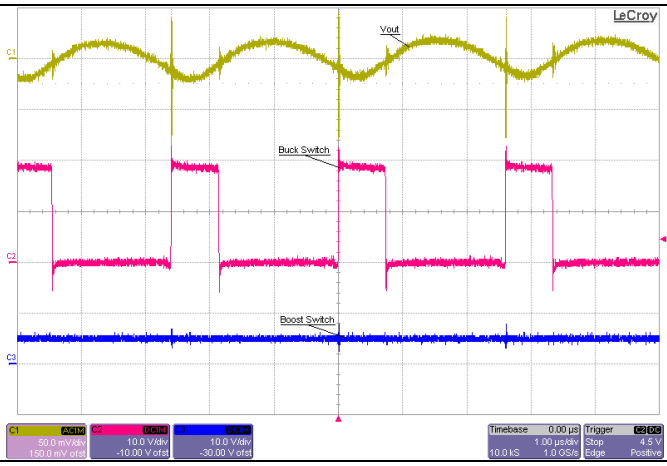


VOUT BUCKSW BOOSTSW Switching 12Vin 12Vout 5A 0.1uF

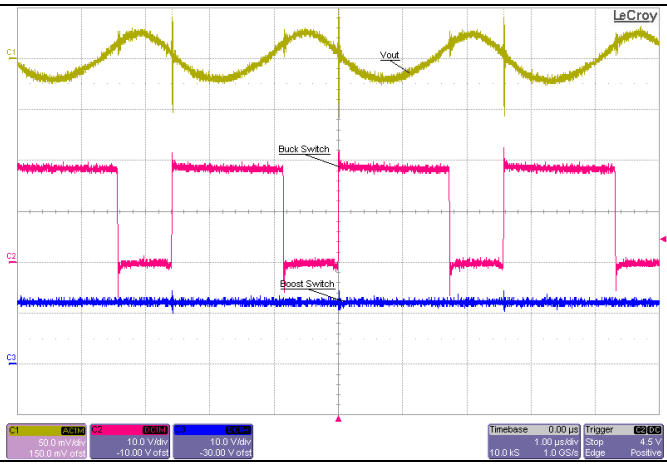


VOUT BUCKSW BOOSTSW Switching 12Vin 20Vout 5A 0.1uF

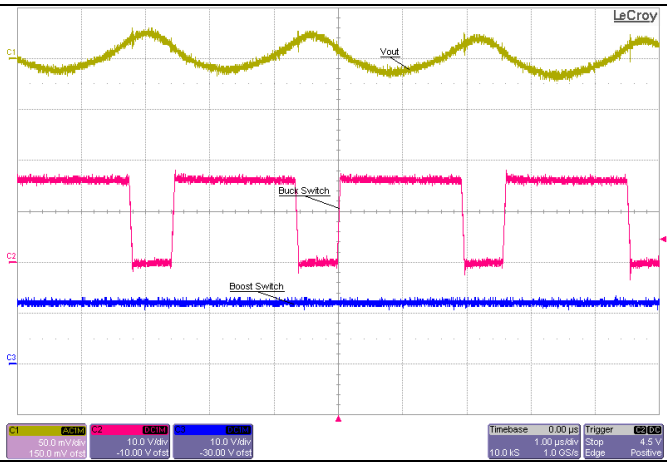
7.3 16V Input



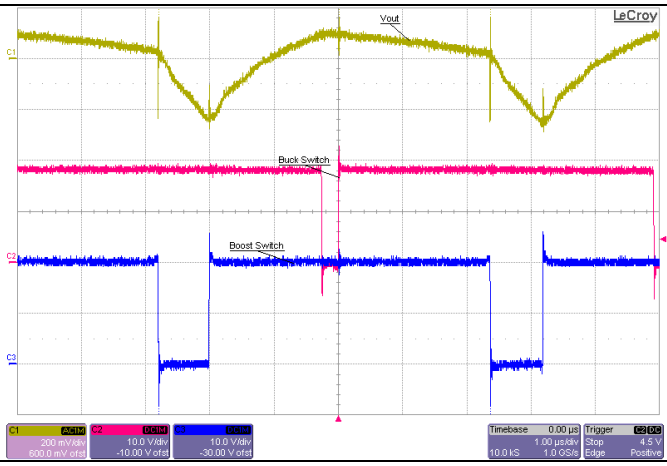
VOUT BUCKSW BOOSTSW Switching 16Vin 5Vout 5A 0.1uF



VOUT BUCKSW BOOSTSW Switching 16Vin 12Vout 5A

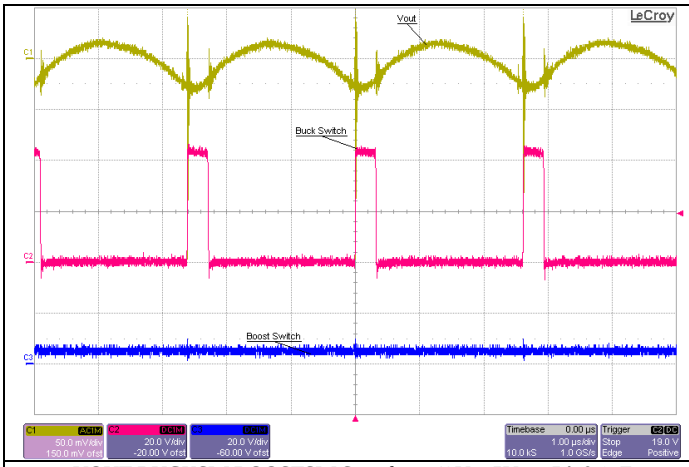


VOUT BUCKSW BOOSTSW Switching 16Vin 12Vout 0A 0.1uF

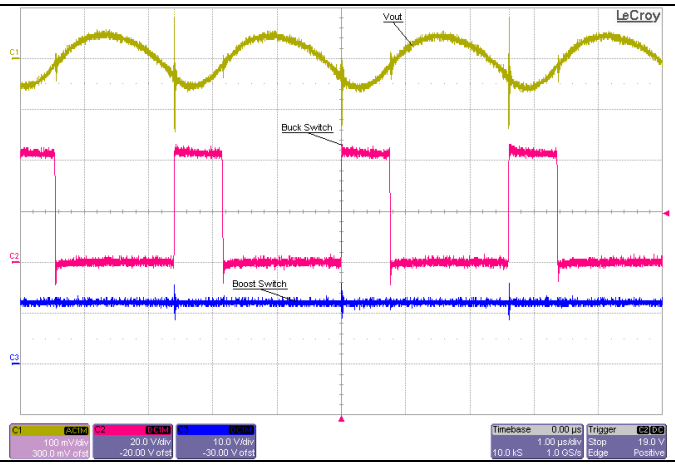


VOUT BUCKSW BOOSTSW Switching 16Vin 20Vout 5A

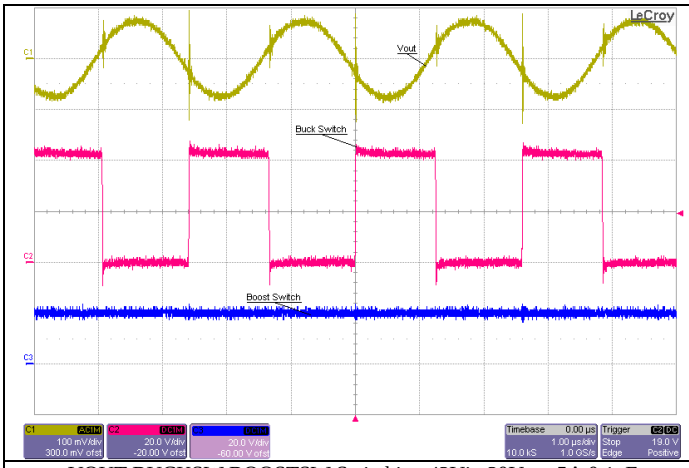
7.4 42V Input



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



VOUT BUCKSW BOOSTSW Switching 42Vin 12Vout 5A 0.1uF

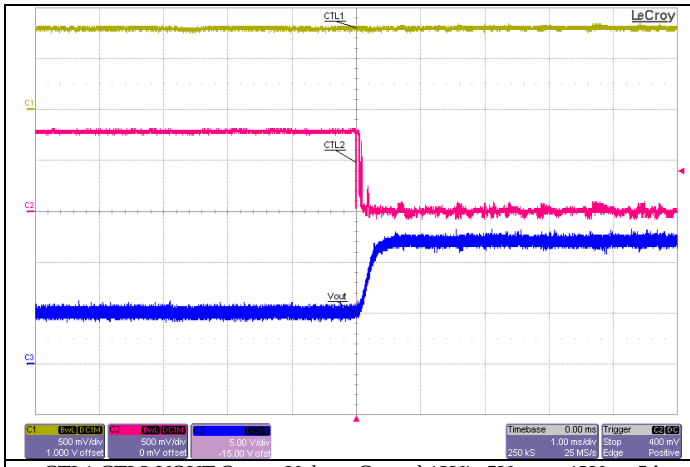


VOUT BUCKSW BOOSTSW Switching 42Vin 20Vout 5A 0.1uF

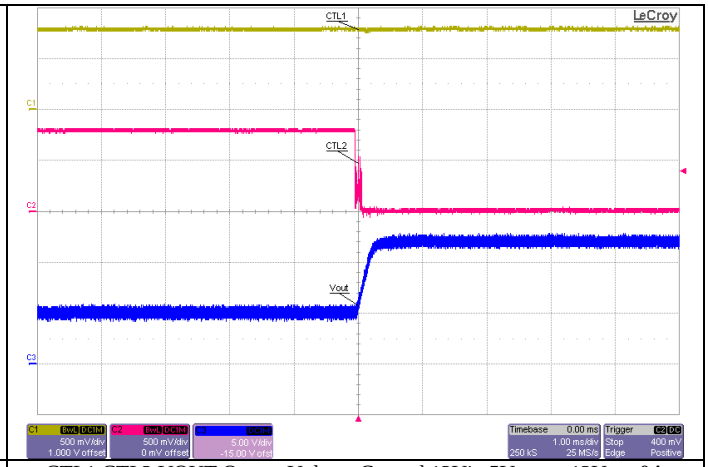
8 Output Voltage Control

All tests were performed at 12V input.

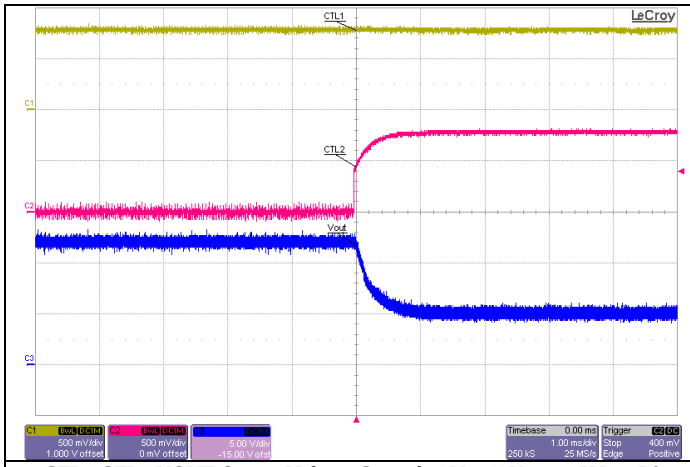
8.1 5V to 12V Output



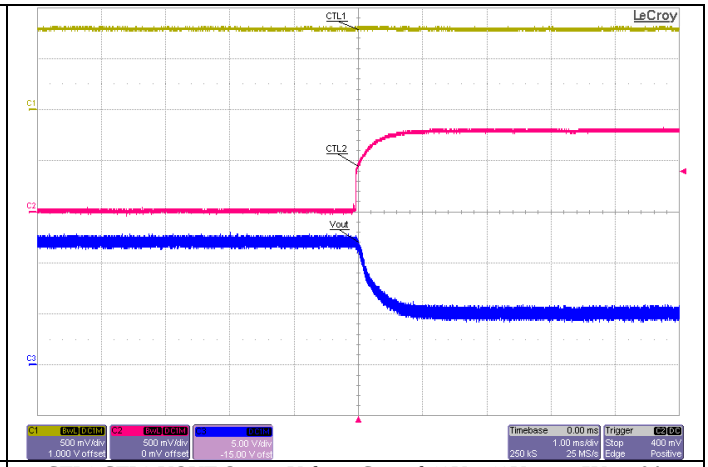
CTL1 CTL2 VOUT Output Voltage Control 12Vin 5Vout to 12Vout 5A



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

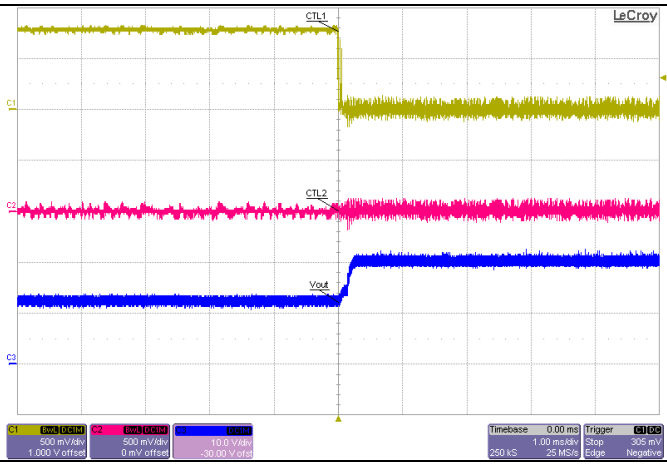


CTL1 CTL2 VOUT Output Voltage Control 12Vin 12Vout to 5Vout 5A

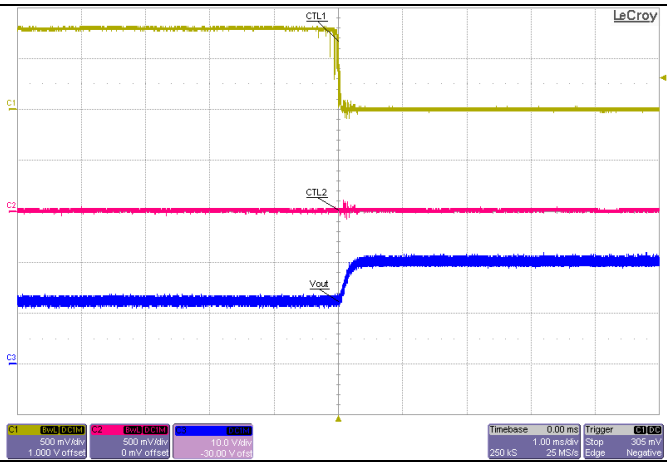


CTL1 CTL2 VOUT Output Voltage Control 12Vin 12Vout to 5Vout 0A

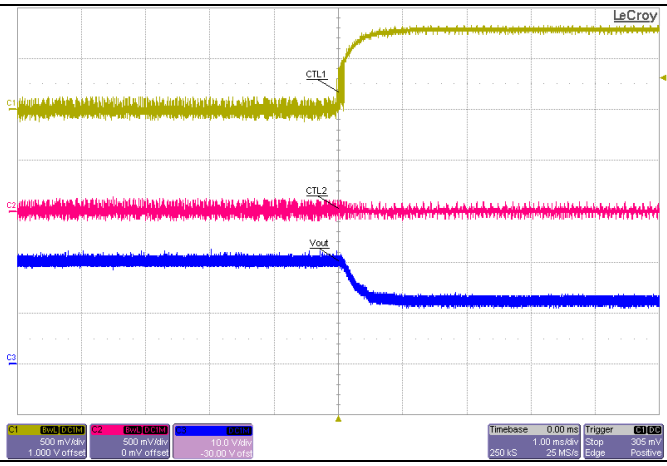
8.2 12V to 20V Output



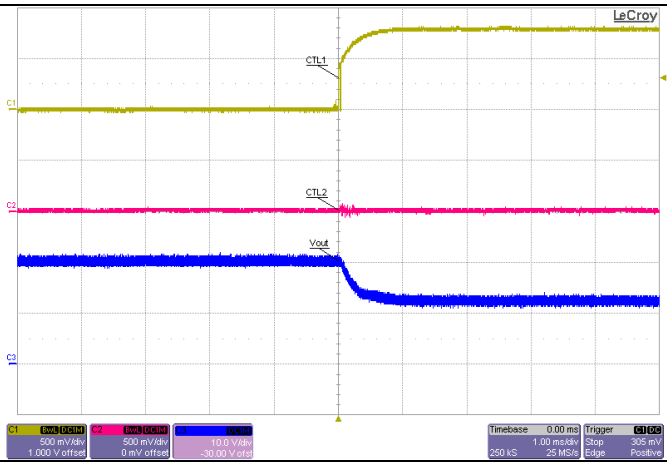
CTL1 CTL2 VOUT Output Voltage Control 12Vin 12Vout to 20Vout 5A



CTL1 CTL2 VOUT Output Voltage Control 12Vin 12Vout to 20Vout 0A

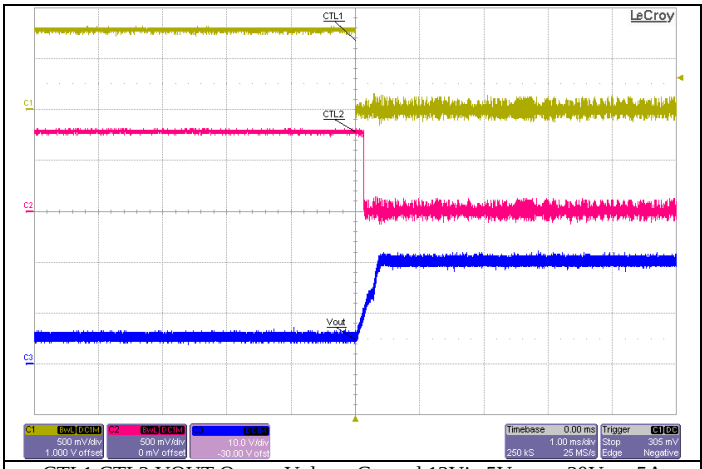


CTL1 CTL2 VOUT Output Voltage Control 12Vin 20Vout to 12Vout 5A

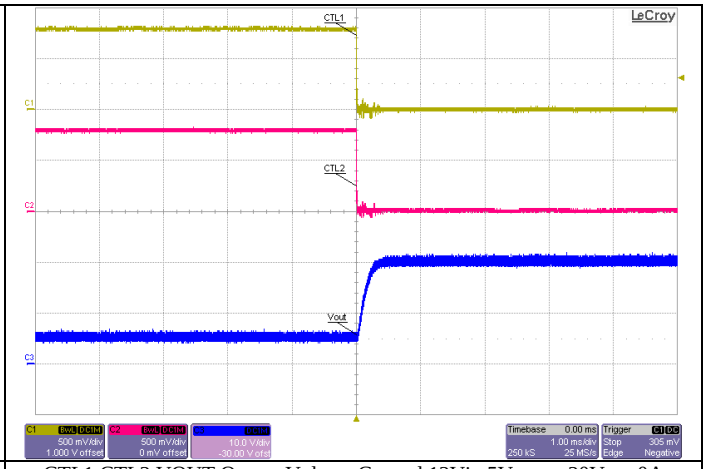


CTL1 CTL2 VOUT Output Voltage Control 12Vin 20Vout to 12Vout 0A

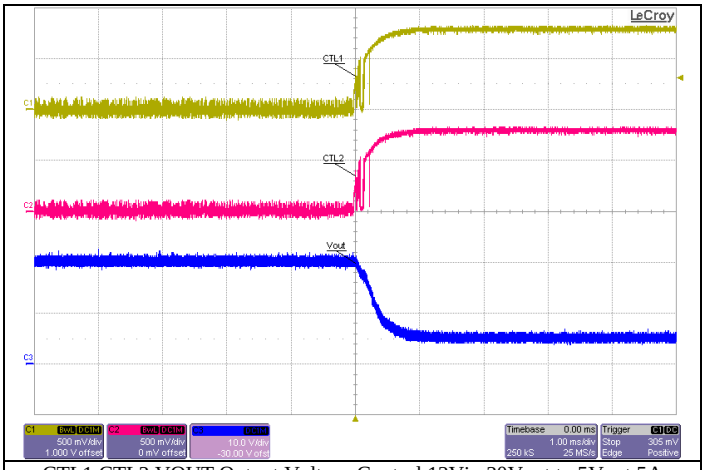
8.3 5V to 20V Output



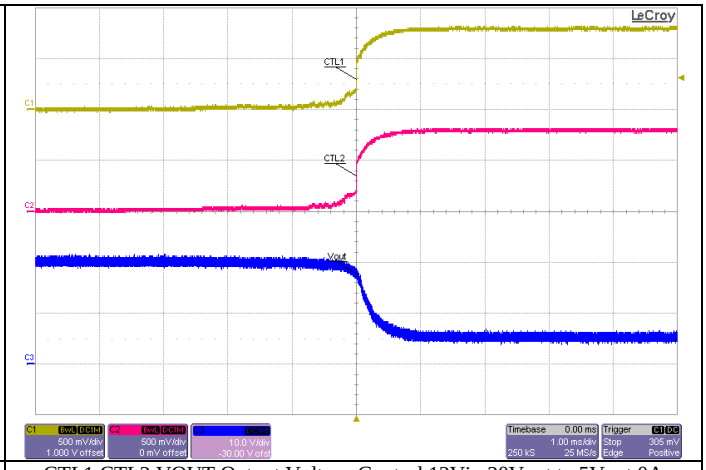
CTL1 CTL2 VOUT Output Voltage Control 12Vin 5Vout to 20Vout 5A



CTL1 CTL2 VOUT Output Voltage Control 12Vin 5Vout to 20Vout 0A



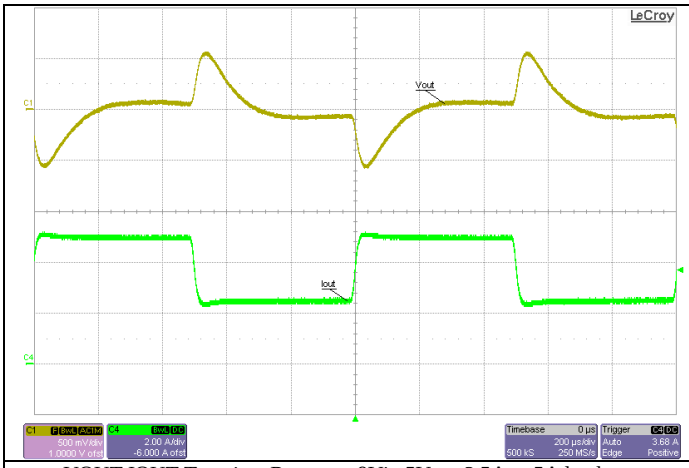
CTL1 CTL2 VOUT Output Voltage Control 12Vin 20Vout to 5Vout 5A



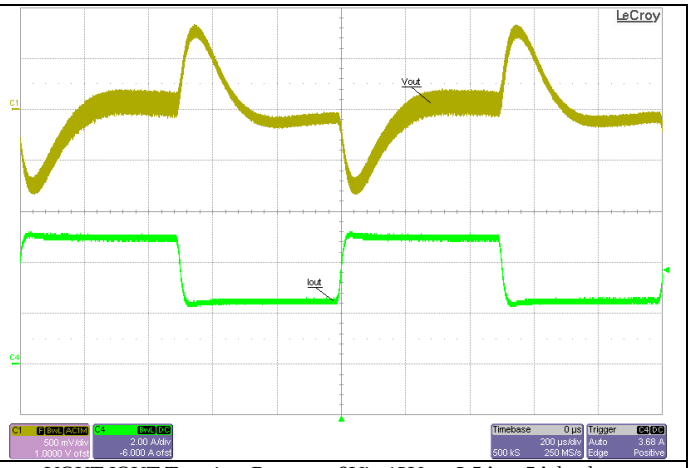
CTL1 CTL2 VOUT Output Voltage Control 12Vin 20Vout to 5Vout 0A

9 Load Transient Response

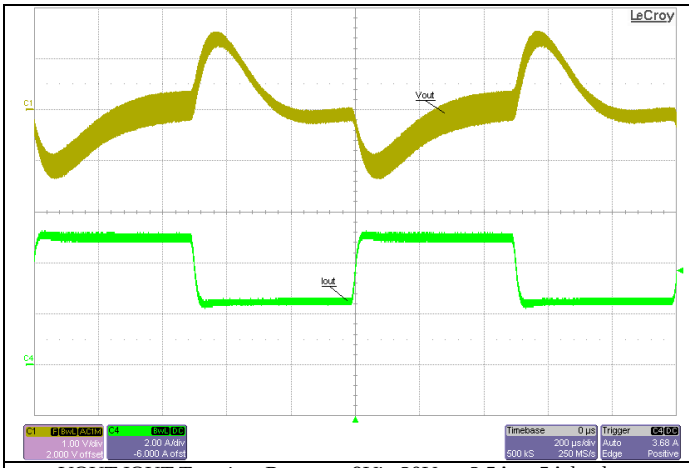
9.1 9V Input



VOUT IOUT Transient Response 9Vin 5Vout 2.5A to 5A load step

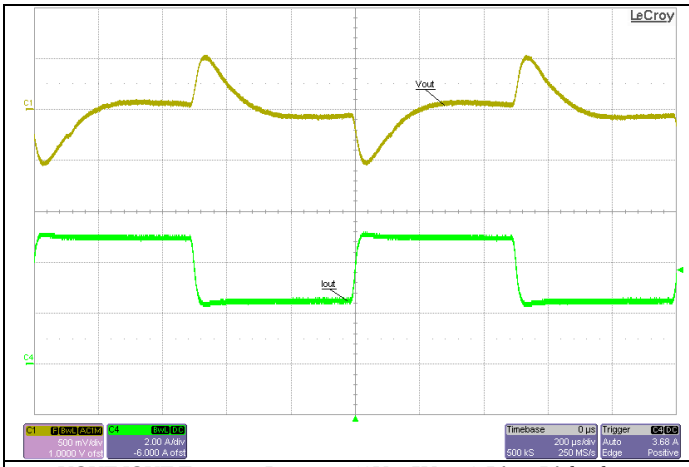


VOUT IOUT Transient Response 9Vin 12Vout 2.5A to 5A load step

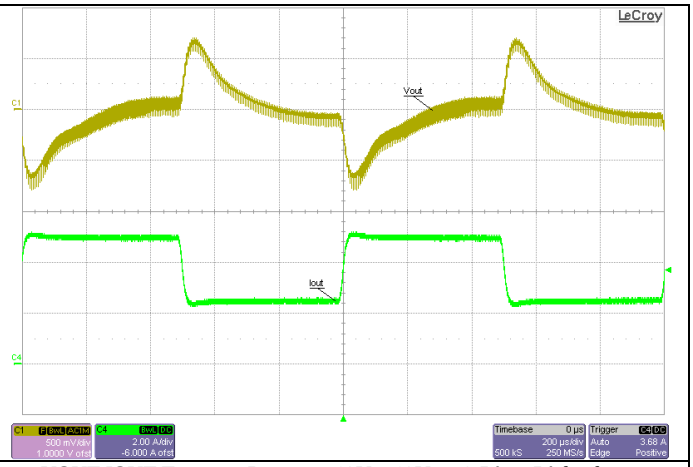


VOUT IOUT Transient Response 9Vin 20Vout 2.5A to 5A load step

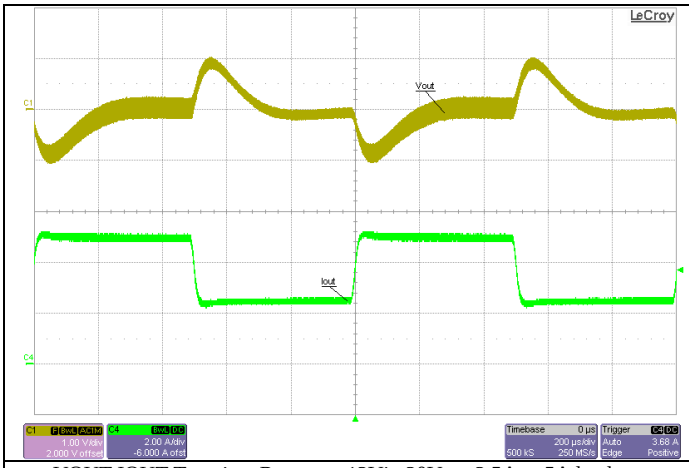
9.2 12V Input



VOUT IOUT Transient Response 12Vin 5Vout 2.5A to 5A load step

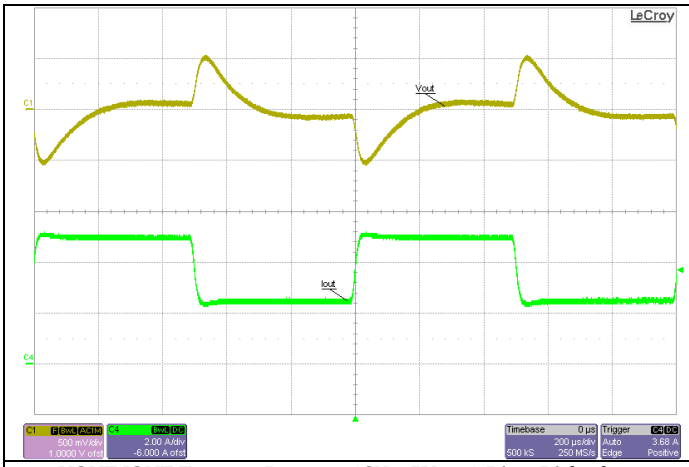


VOUT IOUT Transient Response 12Vin 12Vout 2.5A to 5A load step

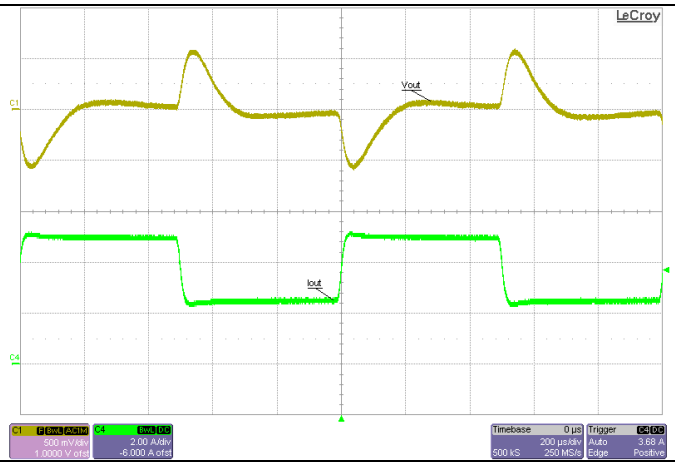


VOUT IOUT Transient Response 12Vin 20Vout 2.5A to 5A load step

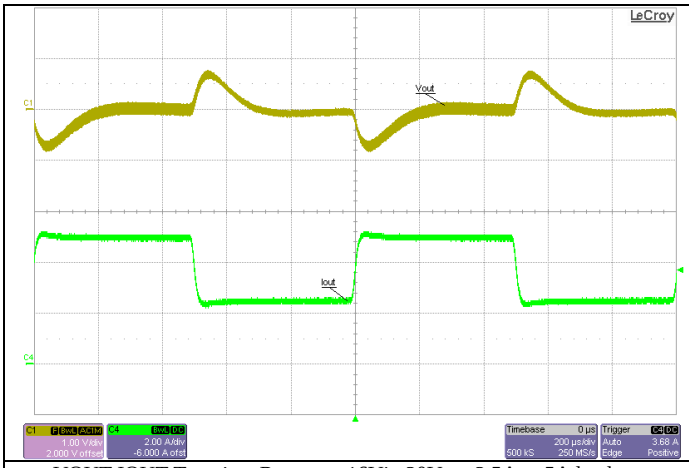
9.3 16V Input



VOUT IOUT Transient Response 16Vin 5Vout 2.5A to 5A load step

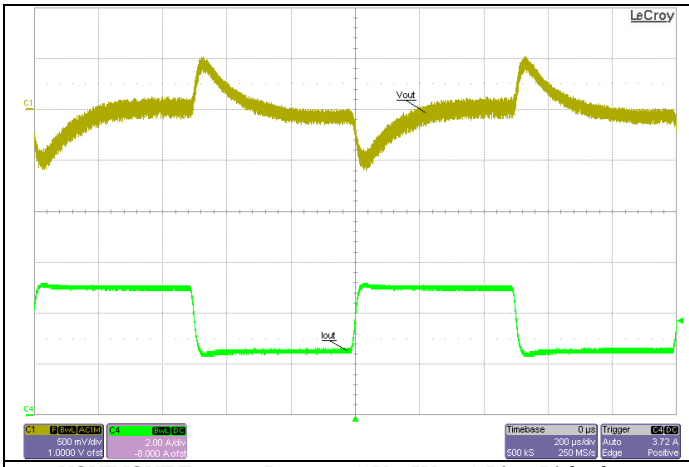


VOUT IOUT Transient Response 16Vin 12Vout 2.5A to 5A load step

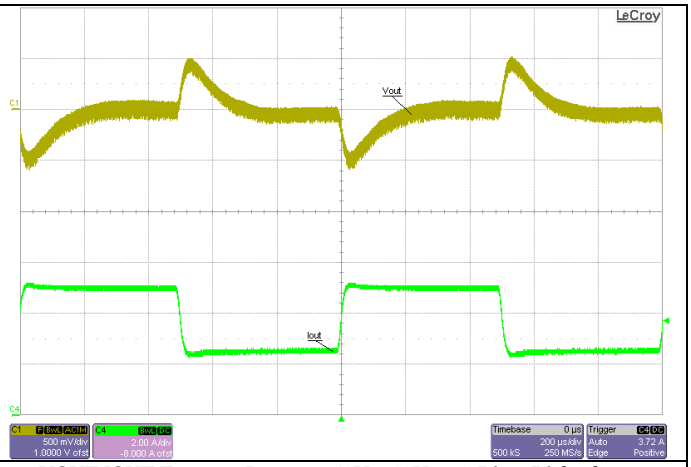


VOUT IOUT Transient Response 16Vin 20Vout 2.5A to 5A load step

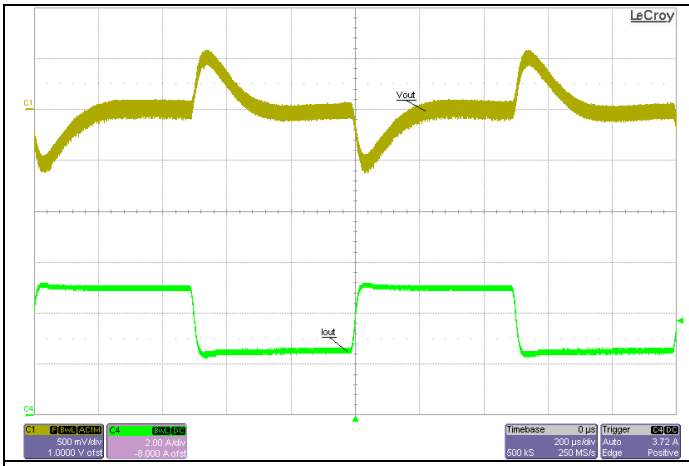
9.4 42V Input



VOUT IOUT Transient Response 42Vin 5Vout 2.5A to 5A load step



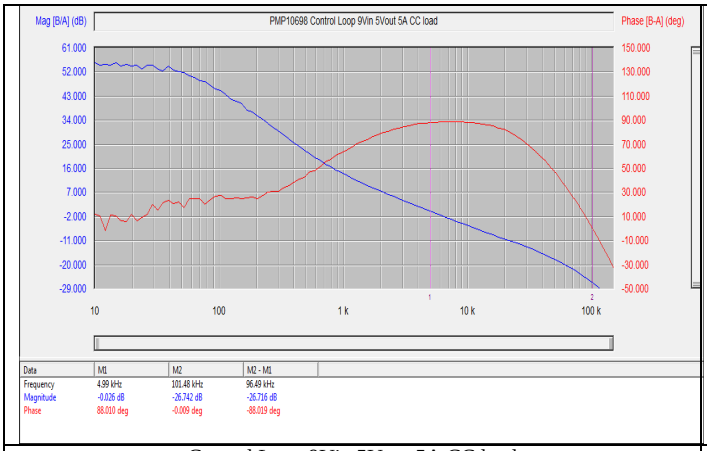
VOUT IOUT Transient Response 42Vin 12Vout 2.5A to 5A load step



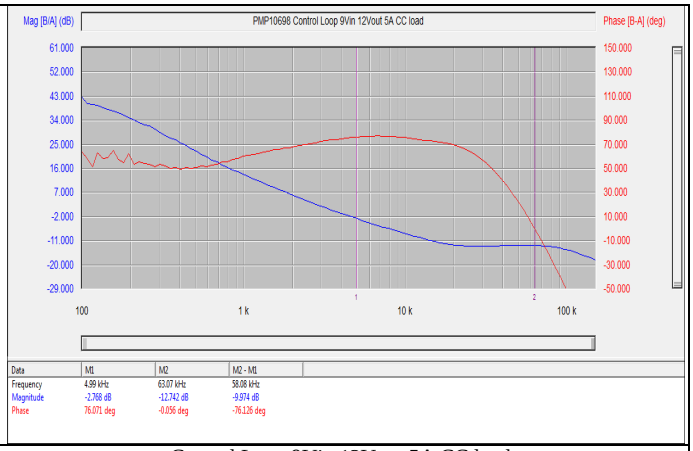
VOUT IOUT Transient Response 42Vin 20Vout 2.5A to 5A load step

10 Frequency Response

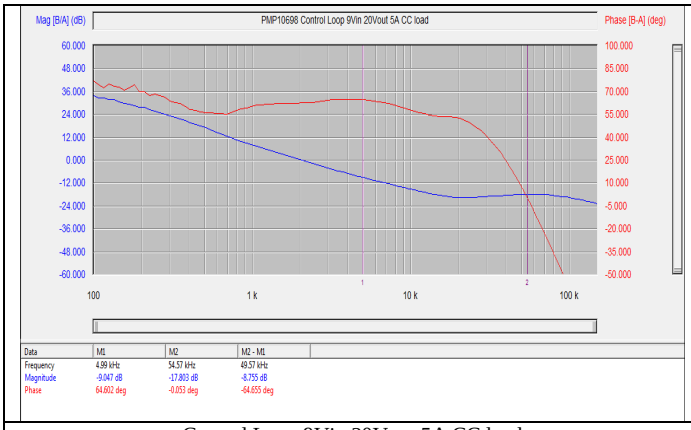
10.1 9V Input



Control Loop 9Vin 5Vout 5A CC load

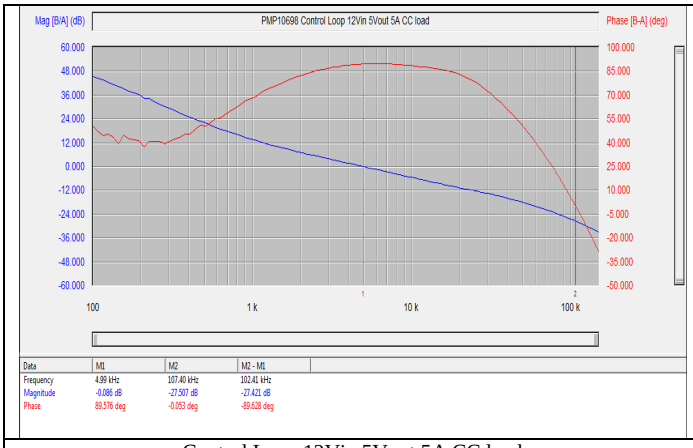


Control Loop 9Vin 12Vout 5A CC load

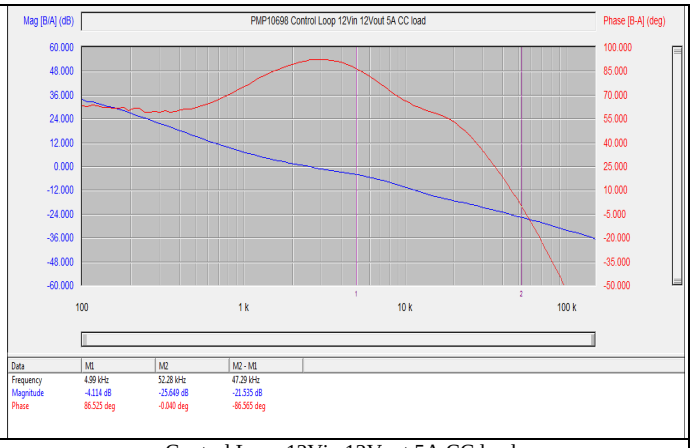


Control Loop 9Vin 20Vout 5A CC load

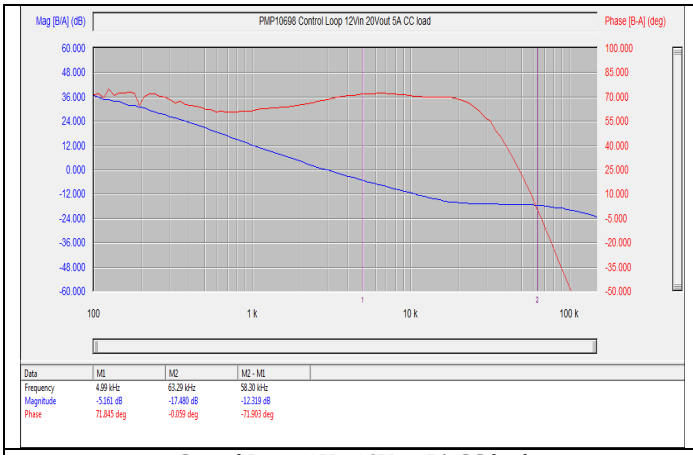
10.2 12V Input



Control Loop 12Vin 5Vout 5A CC load

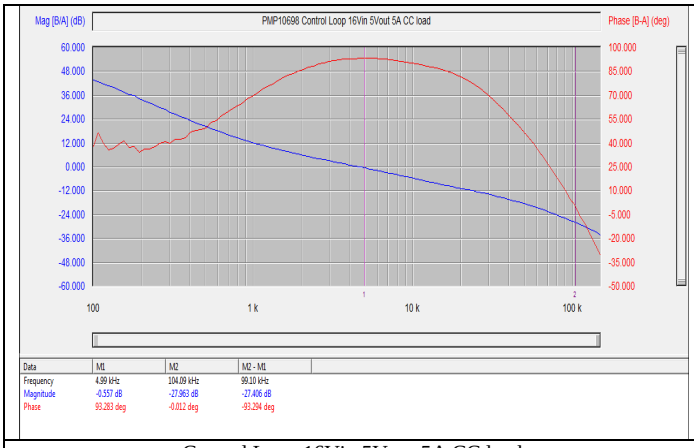


Control Loop 12Vin 12Vout 5A CC load

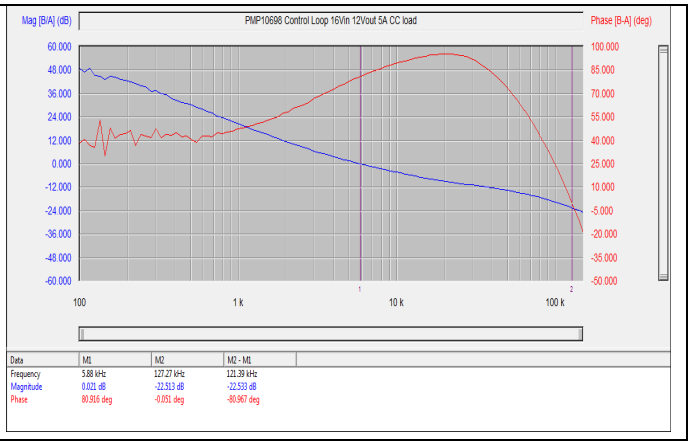


Control Loop 12Vin 20Vout 5A CC load

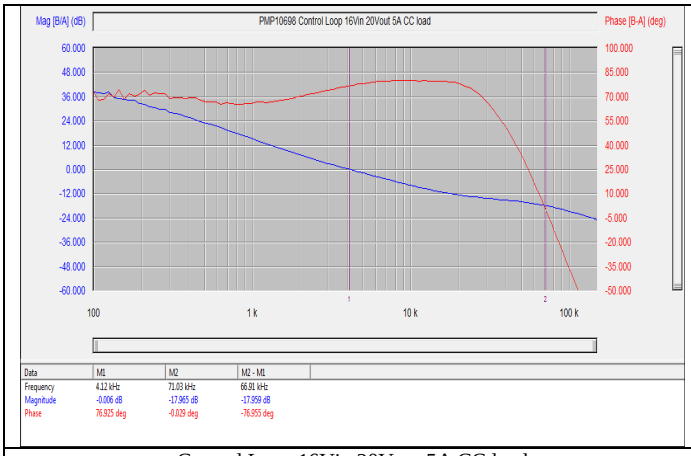
10.3 16V Input



Control Loop 16Vin 5Vout 5A CC load

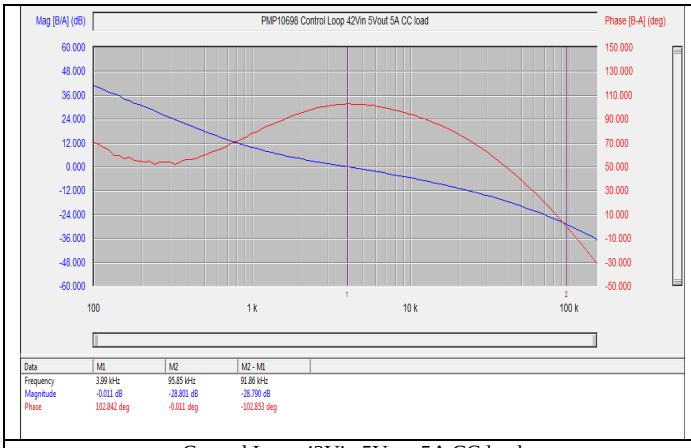


Control Loop 16Vin 12Vout 5A CC load

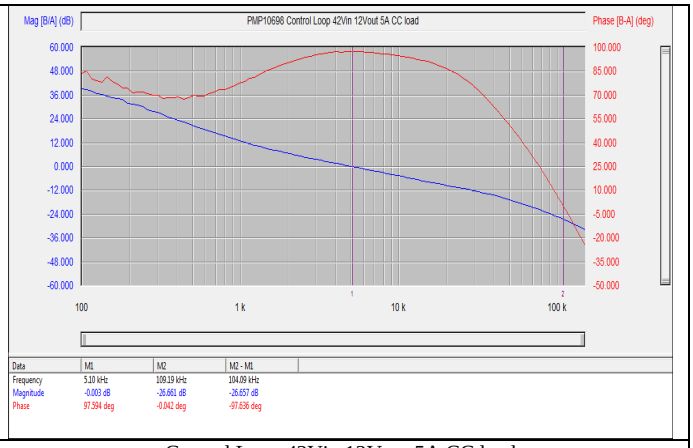


Control Loop 16Vin 20Vout 5A CC load

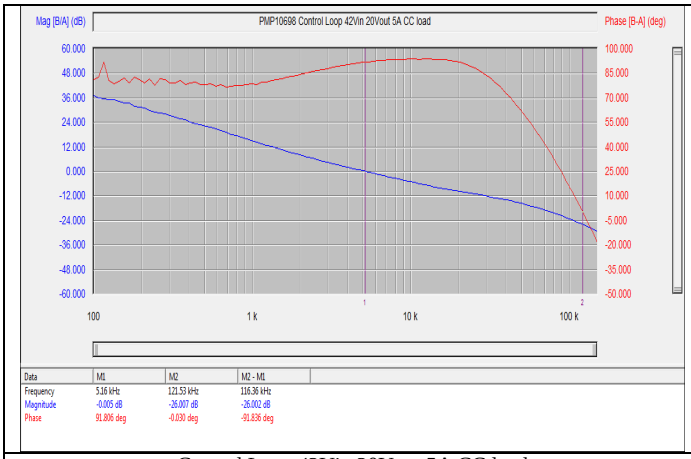
10.4 42V Input



Control Loop 42Vin 5Vout 5A CC load



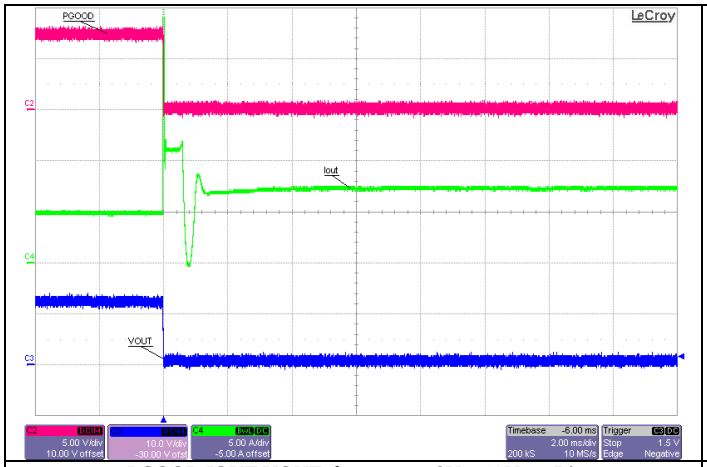
Control Loop 42Vin 12Vout 5A CC load



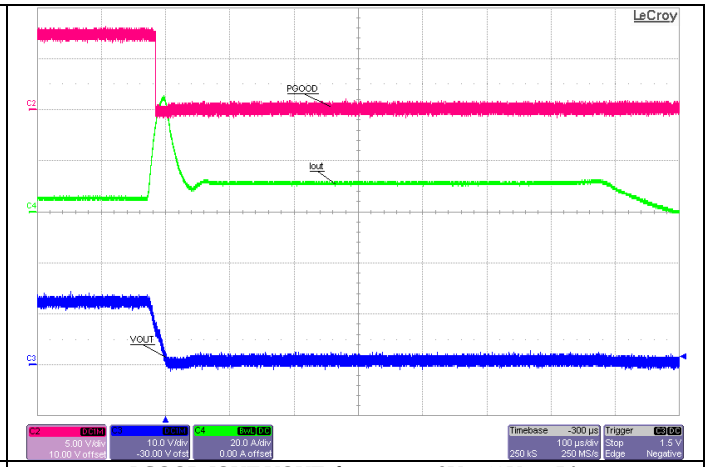
Control Loop 42Vin 20Vout 5A CC load

11 Short Circuit Tests

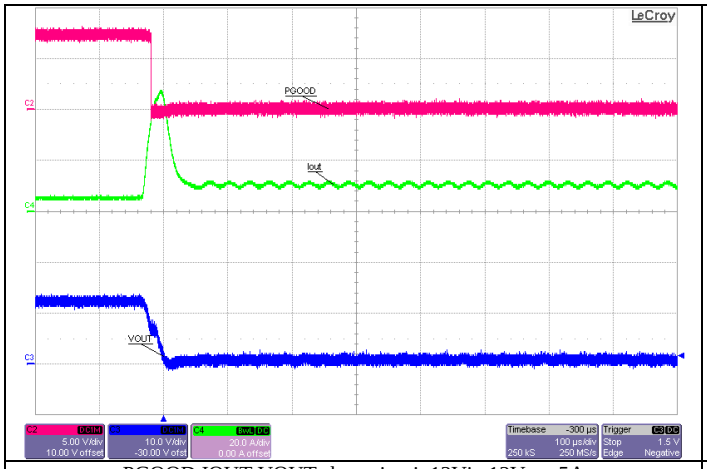
11.1 Output Short Circuit



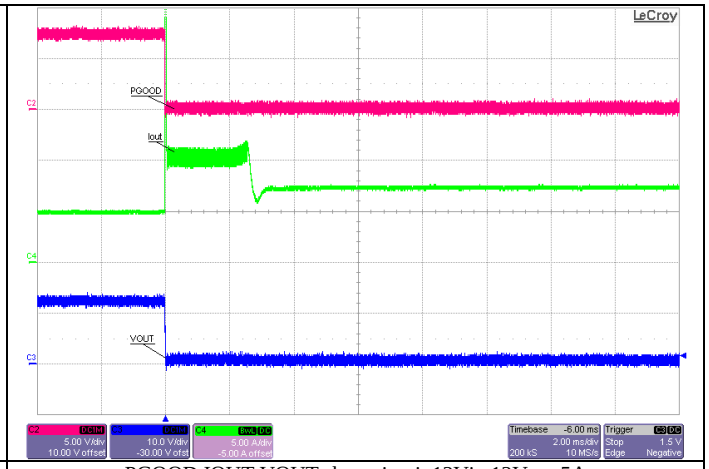
PGOOD IOUT VOUT short circuit 9Vin 12Vout 5A



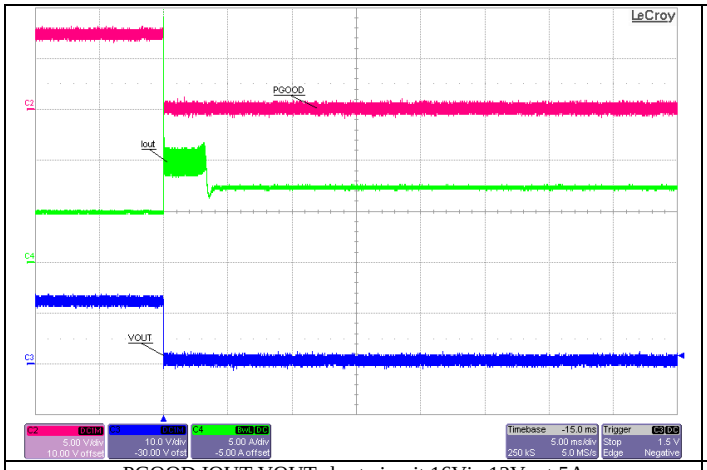
PGOOD IOUT VOUT short circuit 9Vin 12Vout 5A



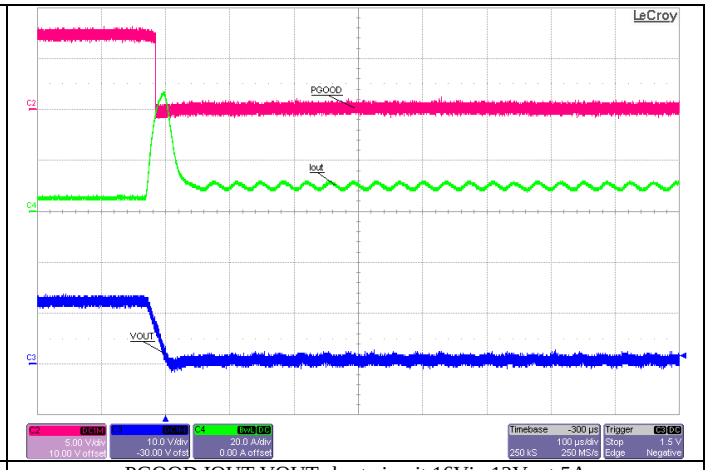
PGOOD IOUT VOUT short circuit 12Vin 12Vout 5A



PGOOD IOUT VOUT short circuit 12Vin 12Vout 5A

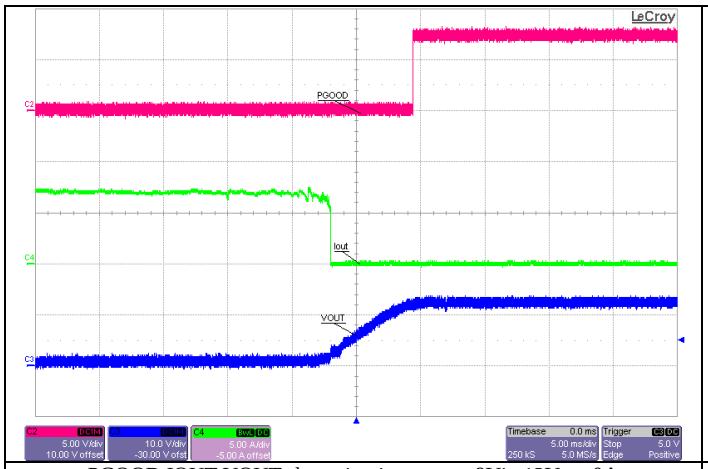


PGOOD IOUT VOUT short circuit 16Vin 12Vout 5A

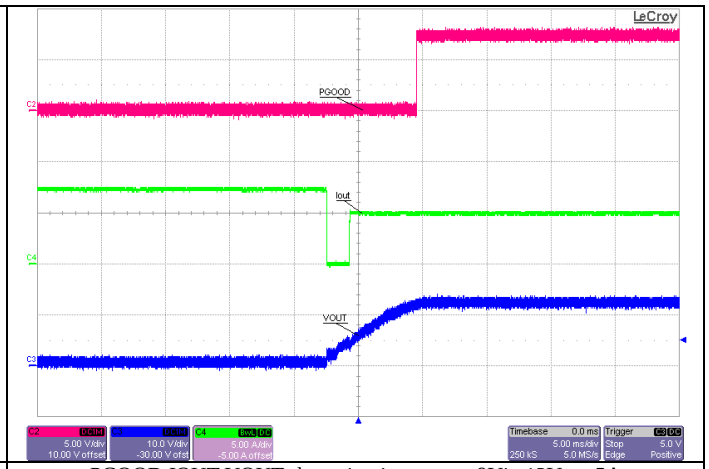


PGOOD IOUT VOUT short circuit 16Vin 12Vout 5A

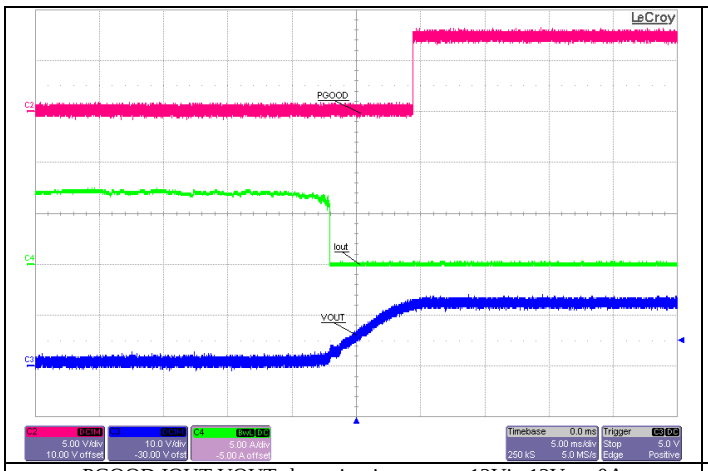
11.2 Output Short Circuit Recovery



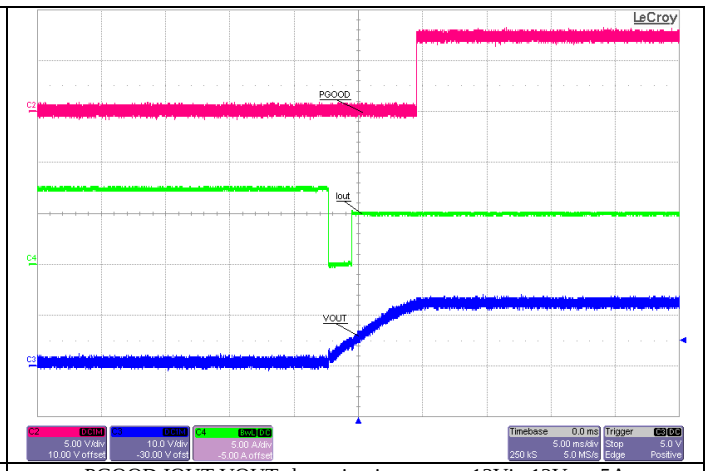
PGOOD IOUT VOUT short circuit recovery 9Vin 12Vout 0A



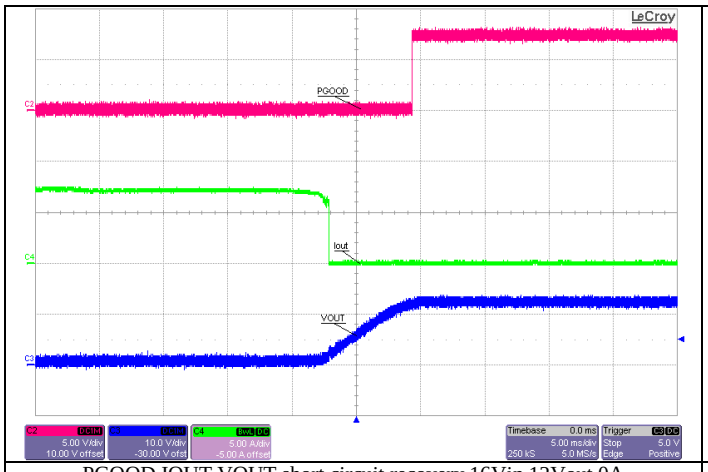
PGOOD IOUT VOUT short circuit recovery 9Vin 12Vout 5A



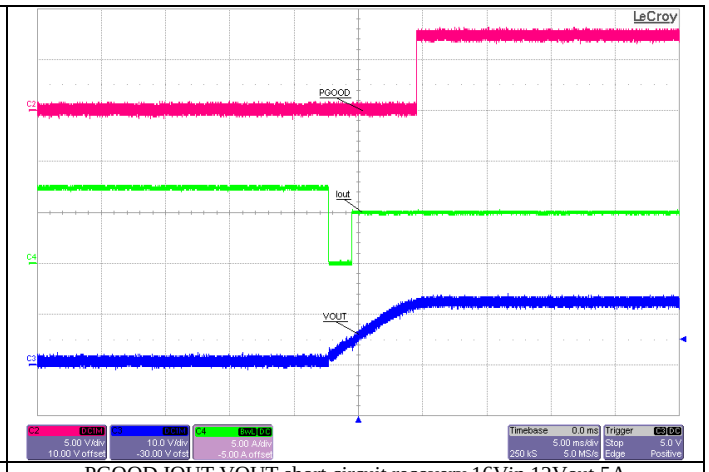
PGOOD IOUT VOUT short circuit recovery 12Vin 12Vout 0A



PGOOD IOUT VOUT short circuit recovery 12Vin 12Vout 5A



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



PGOOD IOUT VOUT short circuit recovery 16Vin 12Vout 5A

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