Variable Outputs 2-Cell Battery 200W Heater Element Power Stage Buck Boost Reference Design

TI reference design number: PMP20327

Input: 6V to 8.6V DC
Output: Selectable 1V to 10V @ 20A to 45A

DC – DC Test Results

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1 Test Specifications

Vin min	**6V**
Vin max	**8.6V**
Vout	**Selectable 1V to 10V**
Iout	**20A to 45A**
Fsw	**200kHz**

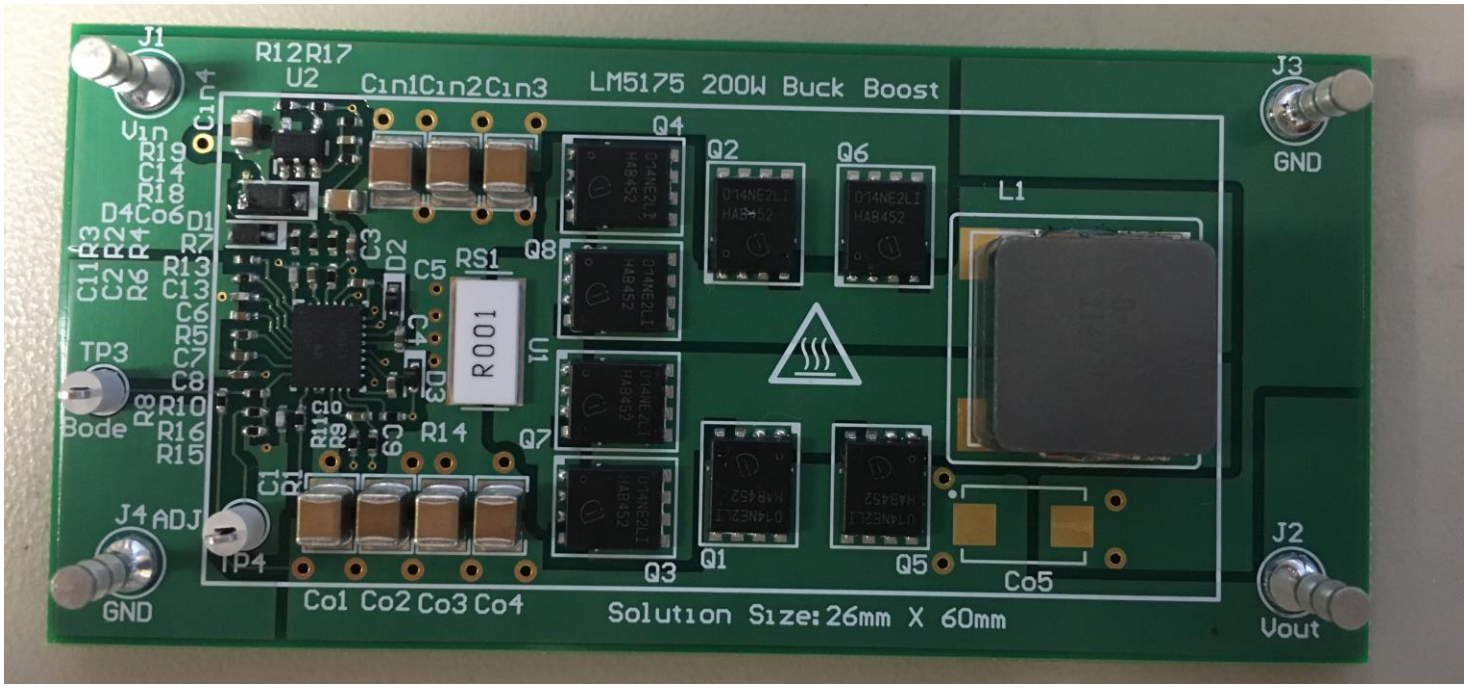
2 Circuit Description

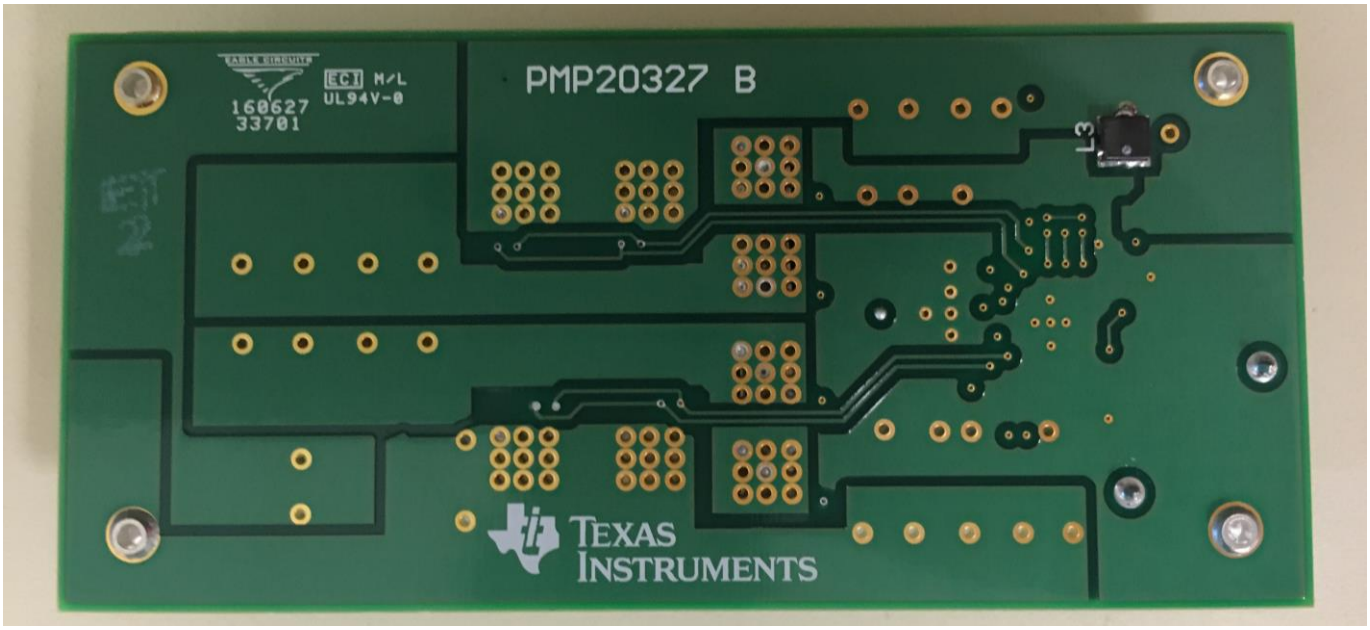
PMP20327 REVB is a synchronous 4-switch buck-boost converter which utilizes the LM5175 controller as a heater element power stage. The output voltage can be selected from 1V to 10V at 20A to 45A using a trim resistor at the FB pin with a 0.2V to 3.1V bias voltage. This design also uses a non-sync boost regulator LMR62014 to provide the bias power for LM5175 during low Vin operation. The LM5175 pulse-by-pulse current limiting is inherent in the current-mode controller. The board includes enable, synchronization and power good functions. This design supports resistive heating element ranging from 0.1Ω to 0.5Ω, table below summarizes the various 200W operating conditions:

Resistance (Ω)	Voltage (V)	Current (A)
0.1	4.47	45
0.2	6.32	32
0.3	7.75	26
0.4	8.95	22.5
0.5	10	20

3 Board Photos

The design is built on PMP20327 printed circuit board. This is a 4-layer PCB with 2 oz. copper on external layers and internal layers. PCB dimensions are 2.85 x 2.60 inch.

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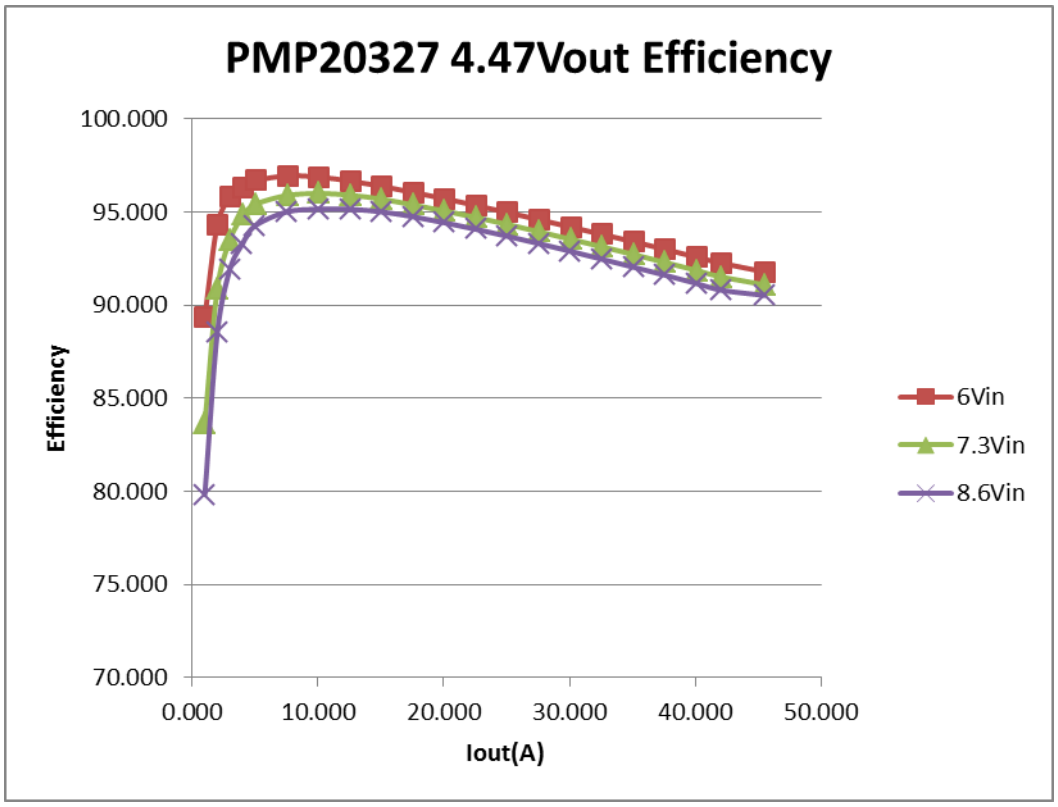
4 Efficiency

4.1 4.47V Output Efficiency Results



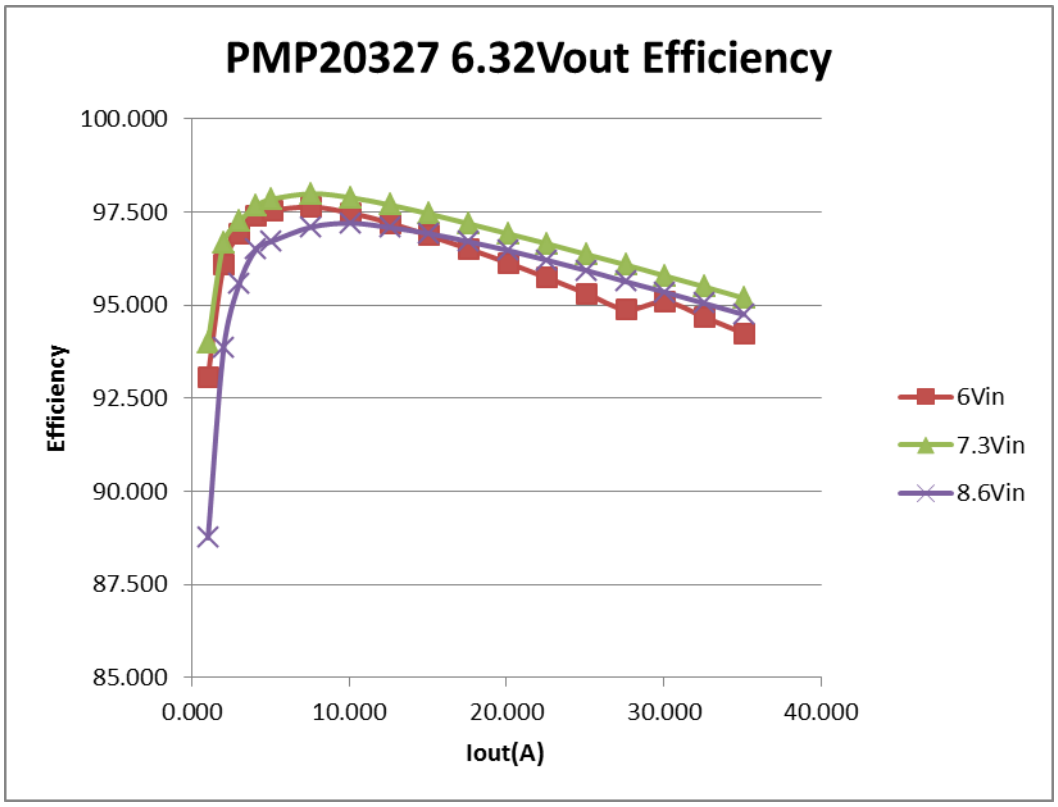
4.2 4.47V Output Efficiency Data

Vin(V)	Iin(A)	Vout(V)	Iout(A)	Pin(W)	Pout(W)	Losses(W)	Efficiency
6.002	0.086	4.471	0.000	0.516	0.000	0.516	0.000
6.001	0.835	4.470	1.002	5.011	4.479	0.532	89.384
6.001	1.582	4.469	2.004	9.494	8.956	0.538	94.336
6.001	2.335	4.468	3.004	14.013	13.423	0.590	95.790
6.001	3.155	4.466	4.084	18.934	18.238	0.696	96.324
6.001	3.912	4.465	5.084	23.477	22.698	0.779	96.683
6.001	5.818	4.463	7.584	34.915	33.845	1.070	96.936
6.001	7.739	4.461	10.086	46.444	44.991	1.452	96.874
6.001	9.675	4.459	12.586	58.060	56.118	1.942	96.656
6.001	11.629	4.457	15.090	69.786	67.257	2.529	96.376
6.001	13.596	4.455	17.588	81.588	78.359	3.229	96.042
6.001	15.577	4.453	20.092	93.474	89.465	4.009	95.711
6.001	17.573	4.450	22.592	105.450	100.537	4.913	95.341
6.001	19.586	4.448	25.094	117.531	111.613	5.918	94.965

6.001	21.616	4.445	27.596	129.709	122.677	7.032	94.579
6.001	23.663	4.443	30.100	141.994	133.739	8.255	94.186
6.001	25.725	4.441	32.600	154.365	144.784	9.581	93.793
6.000	27.804	4.439	35.102	166.835	155.822	11.013	93.399
6.000	29.899	4.436	37.604	179.398	166.824	12.575	92.991
6.000	32.013	4.434	40.104	192.084	177.810	14.274	92.569
6.000	33.718	4.432	42.110	202.312	186.621	15.691	92.244
6.000	36.612	4.432	45.496	219.676	201.627	18.050	91.784
7.303	0.117	4.471	0.000	0.854	0.000	0.854	0.000
7.303	0.733	4.470	1.002	5.353	4.479	0.874	83.668
7.303	1.348	4.469	2.002	9.844	8.946	0.898	90.879
7.302	1.964	4.467	3.002	14.342	13.410	0.932	93.504
7.303	2.630	4.466	4.078	19.206	18.212	0.994	94.822
7.303	3.255	4.465	5.080	23.770	22.682	1.088	95.422
7.302	4.828	4.460	7.580	35.256	33.806	1.450	95.888
7.302	6.410	4.457	10.082	46.808	44.932	1.876	95.993
7.302	8.004	4.454	12.584	58.449	56.053	2.396	95.901
7.302	9.612	4.451	15.088	70.190	67.161	3.030	95.684
7.302	11.232	4.448	17.586	82.018	78.223	3.795	95.373
7.302	12.867	4.445	20.090	93.956	89.306	4.650	95.051
7.302	14.513	4.443	22.590	105.975	100.358	5.617	94.700
7.302	16.175	4.440	25.094	118.111	111.412	6.700	94.328
7.302	17.852	4.437	27.596	130.357	122.446	7.910	93.932
7.302	19.544	4.435	30.098	142.711	133.482	9.229	93.533
7.302	21.252	4.433	32.600	155.182	144.520	10.663	93.129
7.302	22.974	4.431	35.102	167.752	155.532	12.221	92.715
7.302	24.708	4.428	37.602	180.411	166.495	13.916	92.287
7.302	26.459	4.425	40.106	193.195	177.465	15.729	91.858
7.302	27.871	4.423	42.108	203.507	186.226	17.282	91.508
7.302	30.252	4.422	45.500	220.892	201.216	19.676	91.092
8.606	0.128	4.479	0.000	1.102	0.000	1.102	0.000
8.606	0.653	4.477	1.002	5.620	4.486	1.134	79.829
8.606	1.177	4.476	2.004	10.129	8.969	1.160	88.545
8.606	1.700	4.474	3.006	14.630	13.449	1.181	91.928
8.606	2.226	4.468	4.000	19.157	17.871	1.286	93.286
8.606	2.754	4.466	5.002	23.701	22.339	1.362	94.254
8.606	4.094	4.460	7.504	35.232	33.470	1.762	95.000
8.606	5.486	4.456	10.082	47.213	44.924	2.289	95.153
8.606	6.842	4.453	12.582	58.882	56.022	2.860	95.143

8.606	8.210	4.449	15.088	70.654	67.124	3.531	95.003
8.606	9.589	4.445	17.588	82.520	78.178	4.342	94.738
8.606	10.982	4.442	20.090	94.508	89.232	5.276	94.418
8.606	12.385	4.438	22.590	106.580	100.257	6.324	94.067
8.606	13.801	4.434	25.094	118.767	111.275	7.492	93.692
8.606	15.230	4.431	27.594	131.065	122.279	8.786	93.296
8.606	16.673	4.428	30.096	143.480	133.273	10.206	92.887
8.605	18.130	4.425	32.596	156.017	144.250	11.766	92.458
8.605	19.600	4.422	35.102	168.665	155.225	13.440	92.031
8.605	21.082	4.419	37.604	181.415	166.182	15.232	91.604
8.605	22.580	4.416	40.106	194.304	177.121	17.183	91.156
8.605	23.788	4.414	42.108	204.695	185.861	18.834	90.799
8.605	25.768	4.412	45.494	221.738	200.720	21.018	90.521

4.3 6.32V Output Efficiency Results

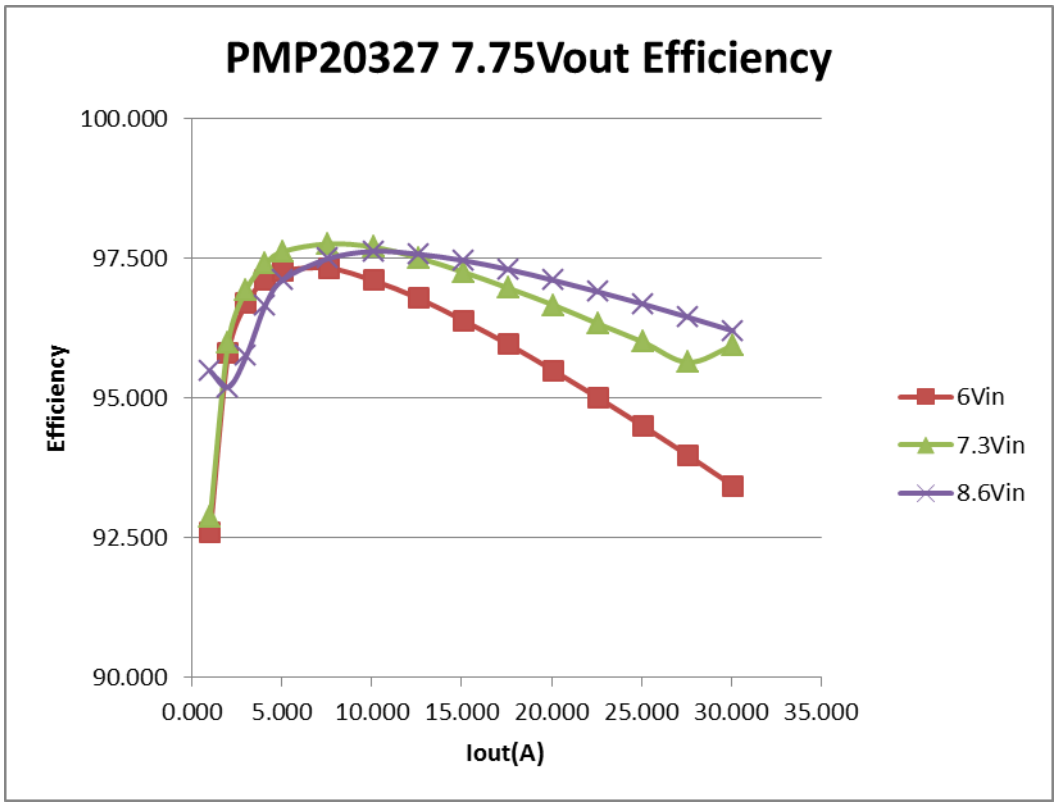


4.4 6.32V Output Efficiency Data

Vin(V)	Iin(A)	Vout(V)	Iout(A)	Pin(W)	Pout(W)	Losses(W)	Efficiency
6.001	0.071	6.331	0.000	0.426	0.000	0.426	0.000
6.001	1.140	6.330	1.006	6.841	6.368	0.474	93.077
6.001	2.204	6.329	2.008	13.226	12.708	0.519	96.078
6.001	3.273	6.328	3.008	19.642	19.034	0.607	96.909
6.001	4.424	6.327	4.086	26.547	25.852	0.695	97.382
6.001	5.495	6.326	5.084	32.974	32.162	0.812	97.537
6.001	8.189	6.324	7.586	49.139	47.976	1.164	97.632
6.001	10.903	6.323	10.086	65.426	63.771	1.655	97.470
6.001	13.641	6.321	12.588	81.856	79.565	2.291	97.201
6.001	16.406	6.318	15.092	98.449	95.358	3.091	96.860
6.001	19.187	6.316	17.592	115.134	111.114	4.019	96.509
6.000	21.998	6.314	20.096	131.996	126.891	5.106	96.132
6.000	24.830	6.313	22.594	148.989	142.626	6.363	95.729
6.000	27.693	6.310	25.096	166.160	158.363	7.797	95.308
6.000	30.585	6.308	27.600	183.511	174.114	9.397	94.879
6.000	33.296	6.310	30.104	199.775	189.959	9.815	95.087
6.000	36.213	6.308	32.606	217.269	205.689	11.581	94.670
6.000	39.157	6.306	35.108	234.930	221.396	13.534	94.239
7.303	0.056	6.326	0.002	0.409	0.013	0.396	3.094
7.302	0.927	6.325	1.006	6.769	6.363	0.406	93.997
7.302	1.799	6.324	2.008	13.137	12.699	0.437	96.670
7.302	2.678	6.322	3.008	19.555	19.015	0.540	97.238
7.302	3.618	6.321	4.082	26.419	25.802	0.617	97.666
7.302	4.494	6.320	5.080	32.815	32.107	0.708	97.842
7.302	6.697	6.318	7.584	48.902	47.918	0.984	97.988
7.302	8.913	6.316	10.086	65.083	63.705	1.377	97.884
7.302	11.141	6.314	12.586	81.351	79.467	1.883	97.685
7.302	13.384	6.312	15.088	97.728	95.232	2.496	97.446
7.302	15.639	6.309	17.590	114.195	110.977	3.218	97.182
7.302	17.907	6.307	20.092	130.752	126.716	4.035	96.914
7.302	20.184	6.304	22.594	147.380	142.432	4.948	96.643
7.302	22.478	6.302	25.096	164.127	158.149	5.978	96.358
7.301	24.783	6.300	27.598	180.950	173.854	7.095	96.079
7.301	27.102	6.297	30.100	197.882	189.530	8.352	95.779
7.301	29.433	6.294	32.602	214.903	205.206	9.697	95.488
7.301	31.782	6.292	35.104	232.048	220.876	11.172	95.185

8.606	0.097	6.321	0.002	0.835	0.013	0.822	1.514
8.606	0.834	6.319	1.008	7.177	6.370	0.808	88.749
8.606	1.571	6.318	2.008	13.519	12.686	0.833	93.838
8.606	2.310	6.317	3.008	19.879	19.000	0.879	95.580
8.606	3.103	6.316	4.080	26.704	25.770	0.934	96.503
8.606	3.853	6.315	5.078	33.158	32.068	1.090	96.712
8.606	5.726	6.310	7.582	49.275	47.843	1.433	97.093
8.606	7.606	6.308	10.086	65.454	63.620	1.835	97.197
8.606	9.497	6.305	12.584	81.728	79.340	2.387	97.079
8.606	11.402	6.303	15.088	98.121	95.096	3.025	96.917
8.606	13.316	6.300	17.588	114.592	110.813	3.779	96.702
8.605	15.244	6.298	20.092	131.178	126.544	4.635	96.467
8.605	17.183	6.296	22.592	147.865	142.246	5.619	96.200
8.605	19.134	6.294	25.096	164.652	157.945	6.707	95.927
8.605	21.096	6.291	27.596	181.539	173.600	7.939	95.627
8.605	23.071	6.288	30.100	198.529	189.284	9.245	95.343
8.605	25.057	6.286	32.602	215.614	204.924	10.690	95.042
8.605	27.056	6.284	35.104	232.814	220.577	12.238	94.743

4.5 7.75V Output Efficiency Results

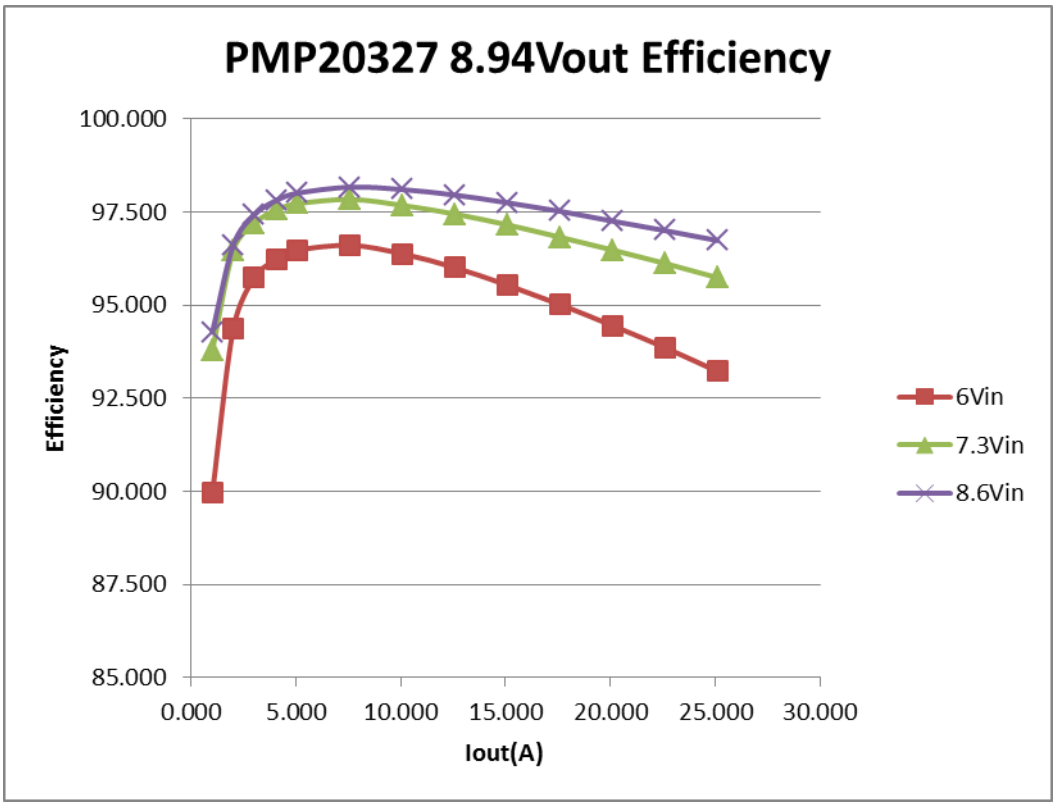


4.6 7.75V Output Efficiency Data

Vin(V)	Iin(A)	Vout(V)	Iout(A)	Pin(W)	Pout(W)	Losses(W)	Efficiency
6.001	0.104	7.763	0.004	0.624	0.031	0.593	4.976
6.001	1.408	7.762	1.008	8.449	7.824	0.625	92.603
6.001	2.711	7.762	2.008	16.268	15.585	0.683	95.803
6.001	4.026	7.761	3.010	24.158	23.361	0.798	96.698
6.001	5.444	7.761	4.088	32.668	31.726	0.942	97.118
6.000	6.761	7.760	5.086	40.569	39.467	1.102	97.284
6.000	10.081	7.759	7.588	60.490	58.873	1.617	97.326
6.000	13.433	7.757	10.090	80.604	78.270	2.334	97.104
6.000	16.816	7.756	12.592	100.902	97.661	3.241	96.788
6.000	20.238	7.755	15.094	121.432	117.049	4.384	96.390
6.000	23.694	7.754	17.596	142.168	136.431	5.737	95.965
6.000	27.193	7.752	20.098	163.156	155.808	7.348	95.496
6.000	30.728	7.751	22.598	184.366	175.161	9.205	95.007
6.000	34.308	7.750	25.100	205.840	194.519	11.321	94.500
6.000	37.933	7.749	27.602	227.585	213.876	13.709	93.976
5.999	41.609	7.748	30.104	249.633	233.242	16.391	93.434
7.302	0.076	7.759	0.004	0.555	0.031	0.524	5.593
7.302	1.153	7.757	1.008	8.419	7.819	0.600	92.875
7.302	2.224	7.756	2.010	16.240	15.590	0.650	95.998
7.302	3.298	7.756	3.010	24.082	23.345	0.737	96.938
7.302	4.453	7.755	4.084	32.515	31.671	0.845	97.402
7.302	5.530	7.754	5.084	40.379	39.421	0.958	97.627
7.302	8.236	7.752	7.584	60.137	58.792	1.345	97.763
7.302	10.959	7.750	10.088	80.020	78.182	1.838	97.703
7.302	13.699	7.748	12.588	100.025	97.536	2.488	97.512
7.302	16.463	7.746	15.092	120.205	116.907	3.298	97.256
7.302	19.241	7.744	17.592	140.492	136.235	4.256	96.971
7.301	22.044	7.742	20.096	160.953	155.591	5.362	96.669
7.302	24.863	7.740	22.594	181.538	174.879	6.660	96.331
7.301	27.707	7.738	25.098	202.294	194.210	8.083	96.004
7.301	30.576	7.736	27.600	223.239	213.512	9.727	95.643
7.301	33.254	7.738	30.104	242.790	232.944	9.846	95.945
8.606	0.045	7.753	0.006	0.387	0.047	0.341	12.013
8.606	0.951	7.753	1.008	8.184	7.815	0.369	95.487
8.605	1.900	7.744	2.010	16.350	15.565	0.785	95.196
8.606	2.829	7.745	3.010	24.345	23.312	1.034	95.754
8.606	3.800	7.744	4.082	32.701	31.611	1.090	96.666

8.605	4.708	7.743	5.082	40.515	39.350	1.165	97.126
8.605	6.995	7.741	7.582	60.195	58.690	1.506	97.499
8.605	9.291	7.739	10.086	79.952	78.056	1.896	97.628
8.605	11.598	7.738	12.586	99.806	97.388	2.417	97.578
8.605	13.919	7.736	15.090	119.777	116.740	3.038	97.464
8.605	16.247	7.734	17.590	139.810	136.041	3.769	97.304
8.605	18.592	7.732	20.094	159.987	155.365	4.622	97.111
8.605	20.945	7.730	22.594	180.229	174.648	5.582	96.903
8.605	23.311	7.728	25.096	200.589	193.939	6.650	96.685
8.605	25.690	7.726	27.598	221.057	213.209	7.848	96.450
8.604	28.084	7.724	30.100	241.648	232.479	9.169	96.206

4.7 8.94V Output Efficiency Results

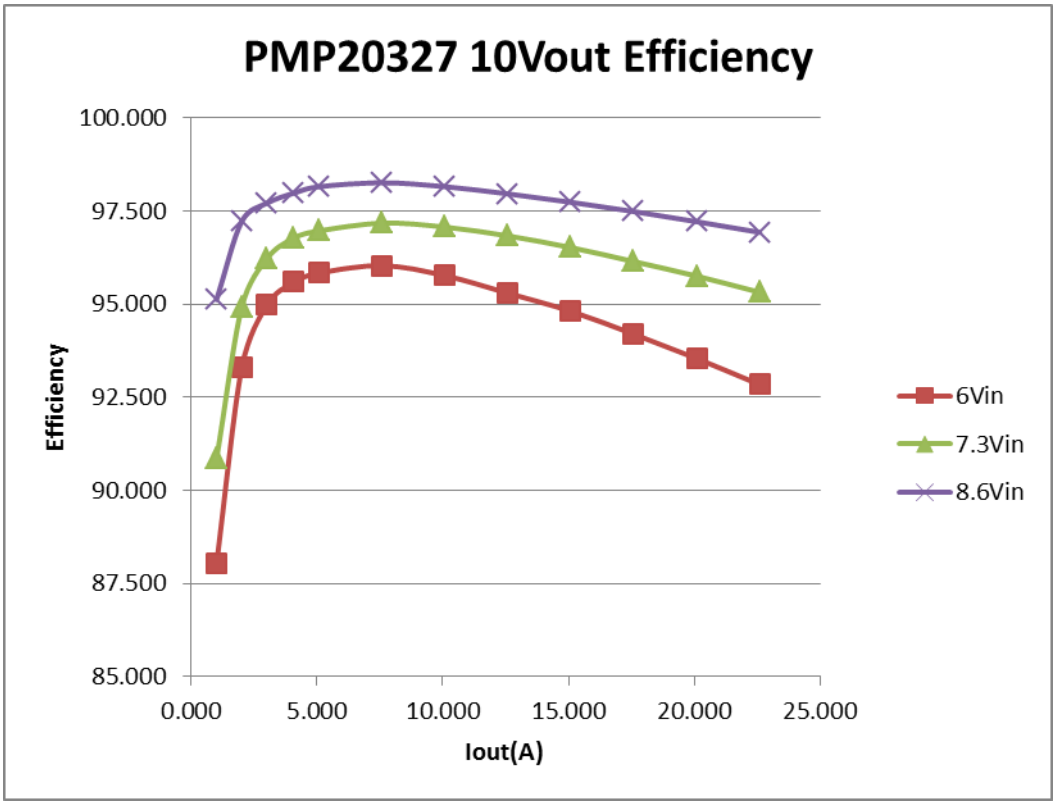


4.8 8.94V Output Efficiency Data

Vin(V)	Iin(A)	Vout(V)	Iout(A)	Pin(W)	Pout(W)	Losses(W)	Efficiency
6.001	0.171	8.947	0.006	1.026	0.054	0.972	5.232
6.001	1.674	8.947	1.010	10.045	9.037	1.008	89.961
6.000	3.176	8.947	2.010	19.057	17.983	1.075	94.360
6.000	4.688	8.946	3.010	28.130	26.928	1.202	95.729
6.000	6.334	8.946	4.088	38.006	36.571	1.434	96.226
6.000	7.863	8.946	5.088	47.182	45.517	1.665	96.471
6.000	11.712	8.945	7.590	70.277	67.890	2.387	96.604
6.000	15.609	8.944	10.092	93.659	90.265	3.395	96.375
6.000	19.553	8.943	12.594	117.319	112.632	4.688	96.004
6.000	23.552	8.943	15.096	141.314	135.000	6.314	95.532
6.000	27.601	8.942	17.596	165.602	157.347	8.255	95.015
6.000	31.716	8.941	20.100	190.288	179.723	10.565	94.448
6.000	35.884	8.941	22.600	215.291	202.071	13.220	93.859
5.999	40.124	8.941	25.100	240.724	224.409	16.315	93.223
7.302	0.086	8.945	0.006	0.628	0.054	0.574	8.546
7.302	1.319	8.944	1.010	9.631	9.034	0.598	93.794
7.302	2.552	8.944	2.010	18.635	17.977	0.658	96.469
7.302	3.793	8.943	3.010	27.696	26.918	0.778	97.192
7.302	5.129	8.942	4.086	37.451	36.537	0.914	97.560
7.302	6.371	8.942	5.084	46.520	45.459	1.061	97.720
7.302	9.496	8.940	7.588	69.337	67.837	1.500	97.837
7.302	12.643	8.938	10.088	92.314	90.169	2.146	97.675
7.302	15.814	8.937	12.590	115.470	112.518	2.952	97.444
7.302	19.013	8.936	15.094	138.826	134.873	3.953	97.152
7.302	22.232	8.934	17.592	162.329	157.170	5.159	96.822
7.301	25.483	8.933	20.096	186.062	179.511	6.551	96.479
7.301	28.758	8.931	22.598	209.972	201.822	8.150	96.118
7.301	32.065	8.930	25.100	234.112	224.134	9.978	95.738
8.606	0.060	8.941	0.006	0.516	0.054	0.463	10.390
8.606	1.113	8.940	1.010	9.578	9.030	0.548	94.275
8.606	2.161	8.938	2.010	18.597	17.966	0.631	96.608
8.605	3.211	8.938	3.012	27.632	26.920	0.712	97.424
8.606	4.336	8.937	4.084	37.314	36.498	0.816	97.814
8.606	5.387	8.936	5.084	46.358	45.432	0.926	98.003
8.606	8.023	8.934	7.586	69.042	67.775	1.267	98.165
8.605	10.674	8.932	10.088	91.852	90.108	1.744	98.101

8.605	13.336	8.930	12.588	114.760	112.411	2.350	97.953
8.605	16.019	8.928	15.092	137.846	134.740	3.106	97.746
8.605	18.712	8.926	17.592	161.019	157.023	3.996	97.519
8.605	21.426	8.924	20.094	184.374	179.313	5.062	97.255
8.605	24.150	8.922	22.594	207.810	201.577	6.233	97.001
8.605	26.895	8.920	25.098	231.424	223.863	7.560	96.733

4.9 10V Output Efficiency Results

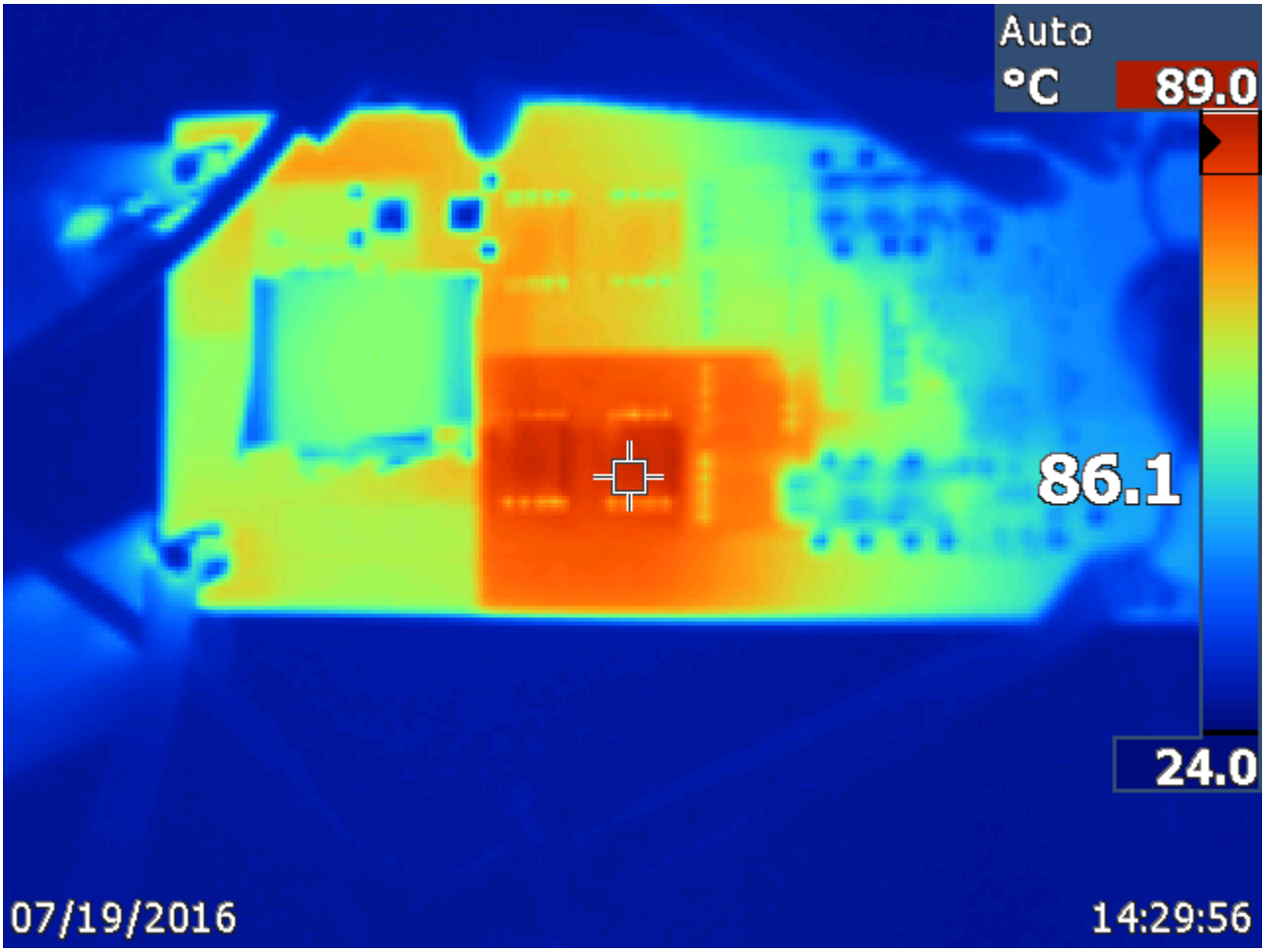


4.10 10V Output Efficiency Data

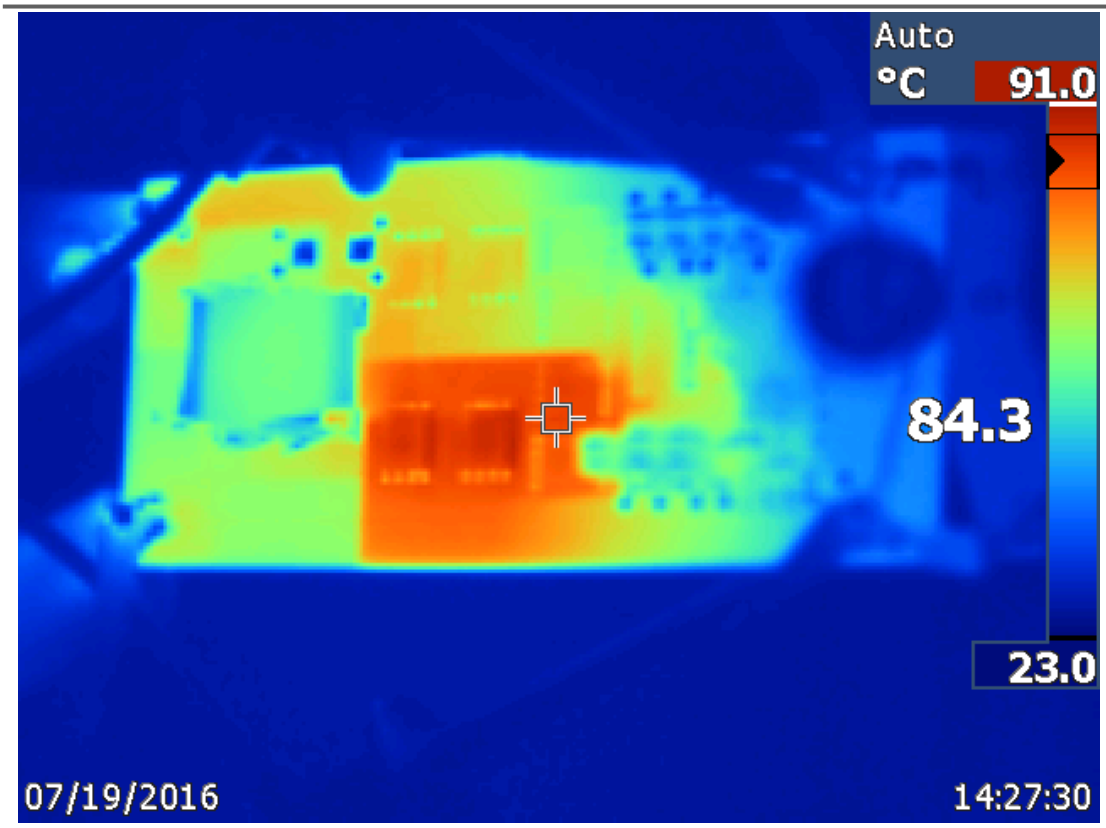
Vin(V)	Iin(A)	Vout(V)	Iout(A)	Pin(W)	Pout(W)	Losses(W)	Efficiency
6.001	0.231	10.006	0.006	1.386	0.060	1.326	4.331
6.001	1.913	10.006	1.010	11.479	10.106	1.373	88.037
6.001	3.596	10.005	2.012	21.578	20.131	1.447	93.294
6.000	5.288	10.005	3.012	31.730	30.136	1.595	94.975
6.000	7.131	10.005	4.088	42.788	40.902	1.887	95.591
6.000	8.853	10.005	5.088	53.121	50.907	2.214	95.832
6.000	13.182	10.005	7.592	79.095	75.958	3.137	96.034
6.000	17.572	10.005	10.092	105.435	100.968	4.467	95.763
6.000	22.026	10.004	12.588	132.157	125.934	6.223	95.291
6.000	26.555	10.004	15.098	159.323	151.047	8.276	94.806
6.000	31.151	10.005	17.596	186.893	176.039	10.854	94.193
5.999	35.834	10.005	20.100	214.984	201.091	13.893	93.538
5.999	40.597	10.005	22.600	243.545	226.105	17.440	92.839
7.302	0.143	10.003	0.006	1.044	0.060	0.984	5.748
7.302	1.523	10.003	1.010	11.121	10.103	1.018	90.846
7.302	2.901	10.002	2.010	21.182	20.105	1.078	94.912
7.302	4.285	10.002	3.010	31.288	30.105	1.183	96.220
7.302	5.783	10.001	4.086	42.227	40.864	1.363	96.773
7.302	7.184	10.001	5.086	52.457	50.864	1.592	96.964
7.302	10.694	10.000	7.588	78.086	75.877	2.209	97.172
7.302	14.234	9.998	10.090	103.931	100.883	3.048	97.068
7.302	17.805	9.997	12.592	130.004	125.884	4.120	96.831
7.301	21.414	9.996	15.096	156.353	150.906	5.447	96.516
7.301	25.054	9.995	17.596	182.931	175.872	7.059	96.141
7.301	28.735	9.994	20.100	209.798	200.883	8.915	95.751
7.301	32.452	9.993	22.598	236.927	225.826	11.101	95.315
8.606	0.065	10.002	0.006	0.559	0.060	0.499	10.728
8.605	1.234	10.001	1.010	10.619	10.101	0.518	95.120
8.605	2.405	10.000	2.012	20.696	20.121	0.575	97.221
8.605	3.582	9.999	3.012	30.825	30.118	0.707	97.708
8.605	4.843	9.999	4.084	41.676	40.835	0.842	97.980
8.605	6.018	9.998	5.084	51.788	50.830	0.958	98.150
8.605	8.971	9.996	7.588	77.198	75.852	1.346	98.256
8.605	11.940	9.995	10.090	102.745	100.846	1.899	98.152
8.605	14.925	9.993	12.590	128.431	125.809	2.622	97.958
8.605	17.932	9.991	15.094	154.308	150.809	3.499	97.732

8.605	20.952	9.989	17.594	180.293	175.755	4.538	97.483
8.605	23.996	9.988	20.098	206.487	200.730	5.758	97.212
8.605	27.057	9.986	22.598	232.817	225.660	7.157	96.926

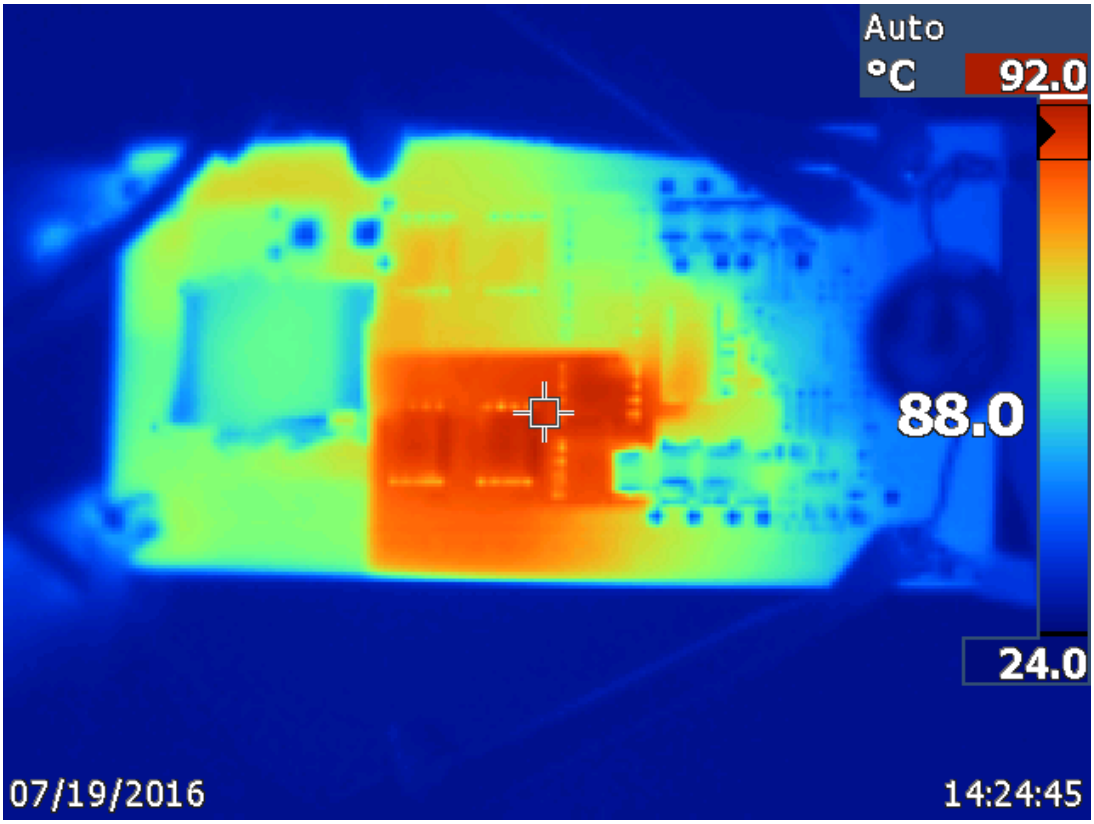
5 Thermal



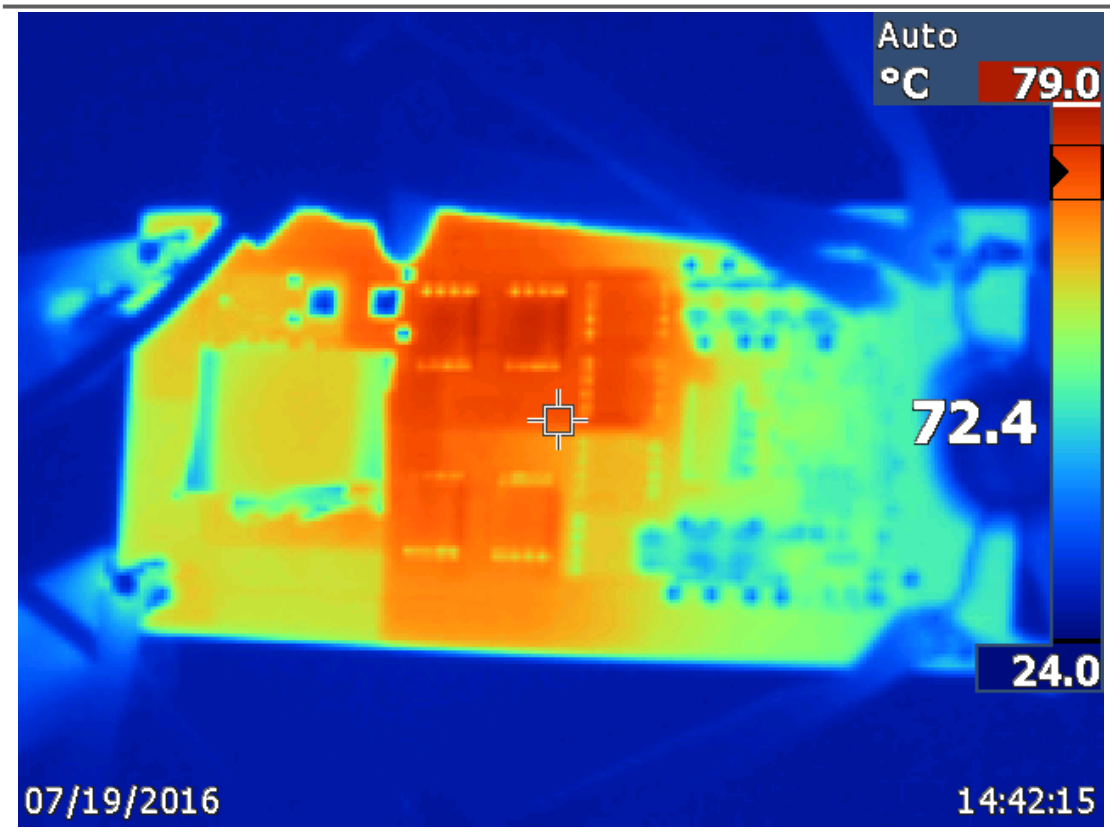
6Vin, 4.47Vout @ 200W continuous for 30 seconds without air flow.



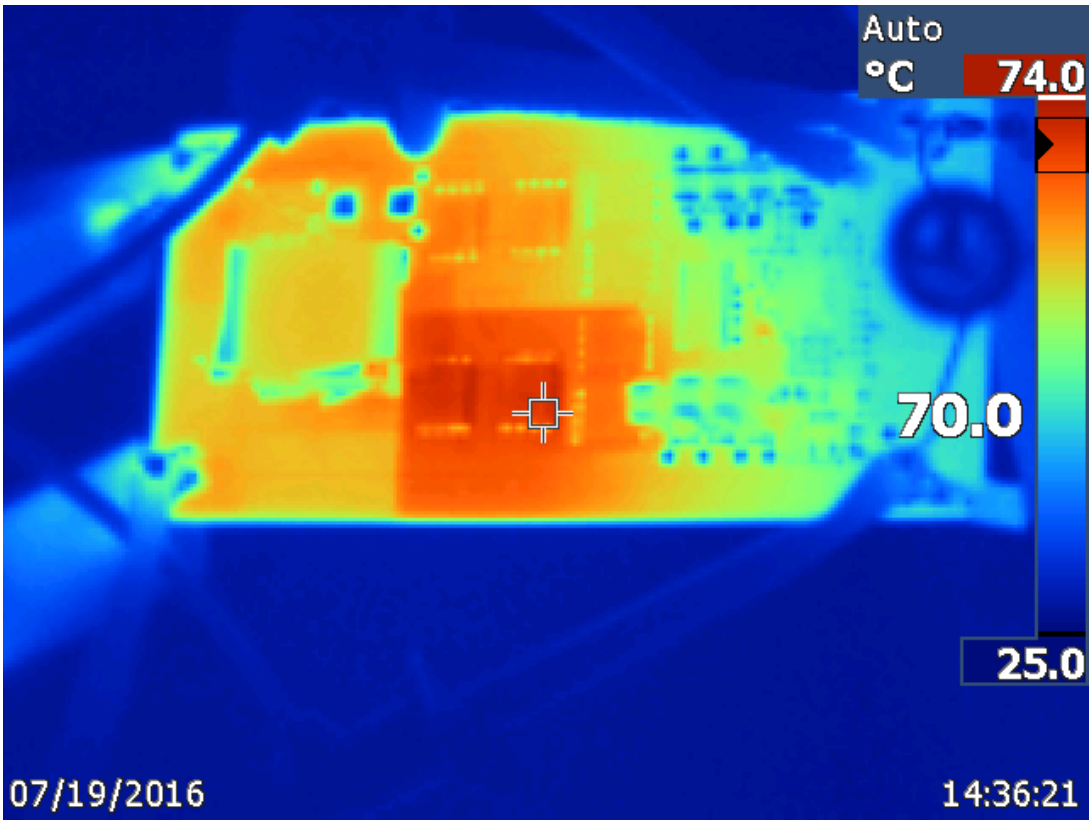
7.73Vin, 4.47Vout @ 200W continuous for 30 seconds without air flow.



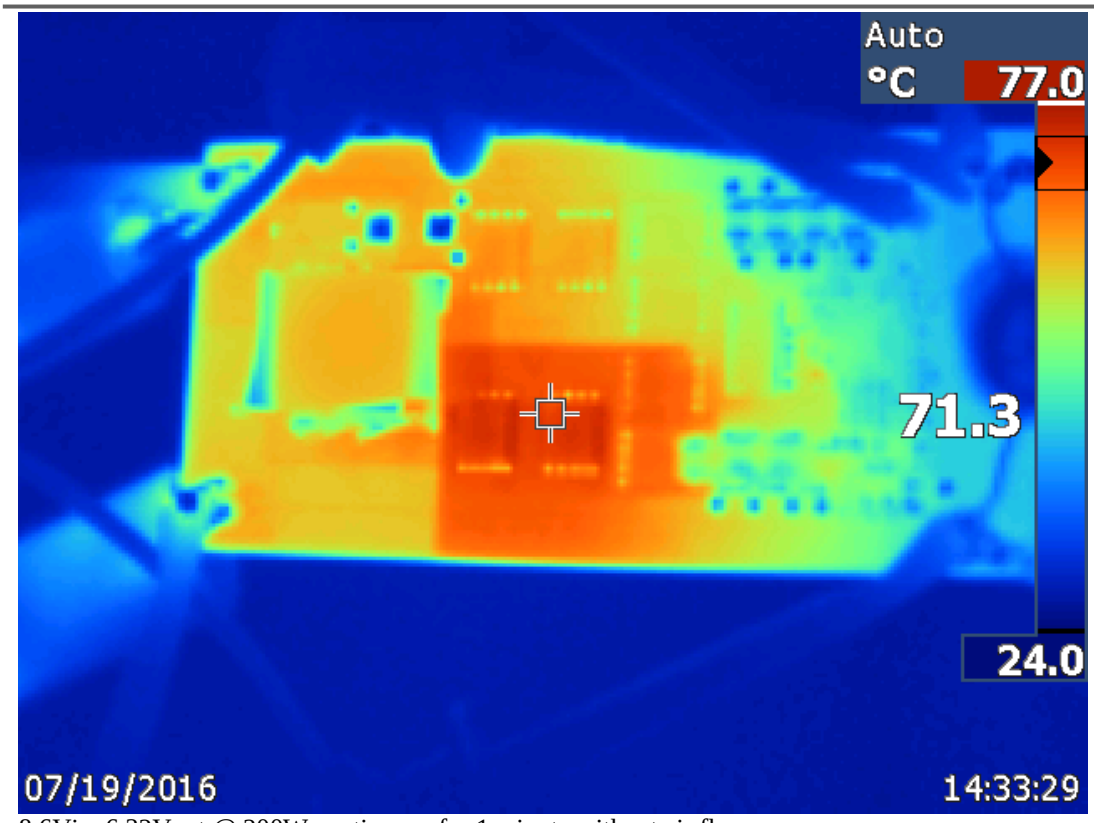
8.6Vin, 4.47Vout @ 200W continuous for 30 seconds without air flow.



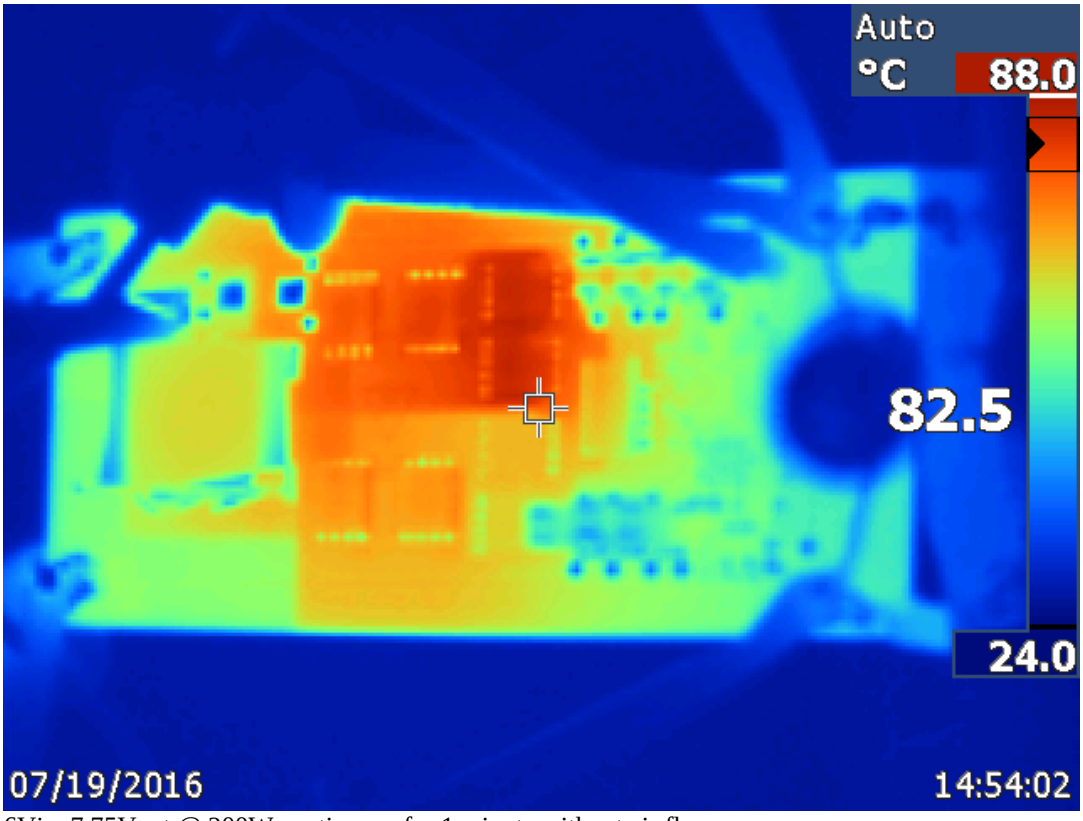
6Vin, 6.32Vout @ 200W continuous for 1 minute without air flow.



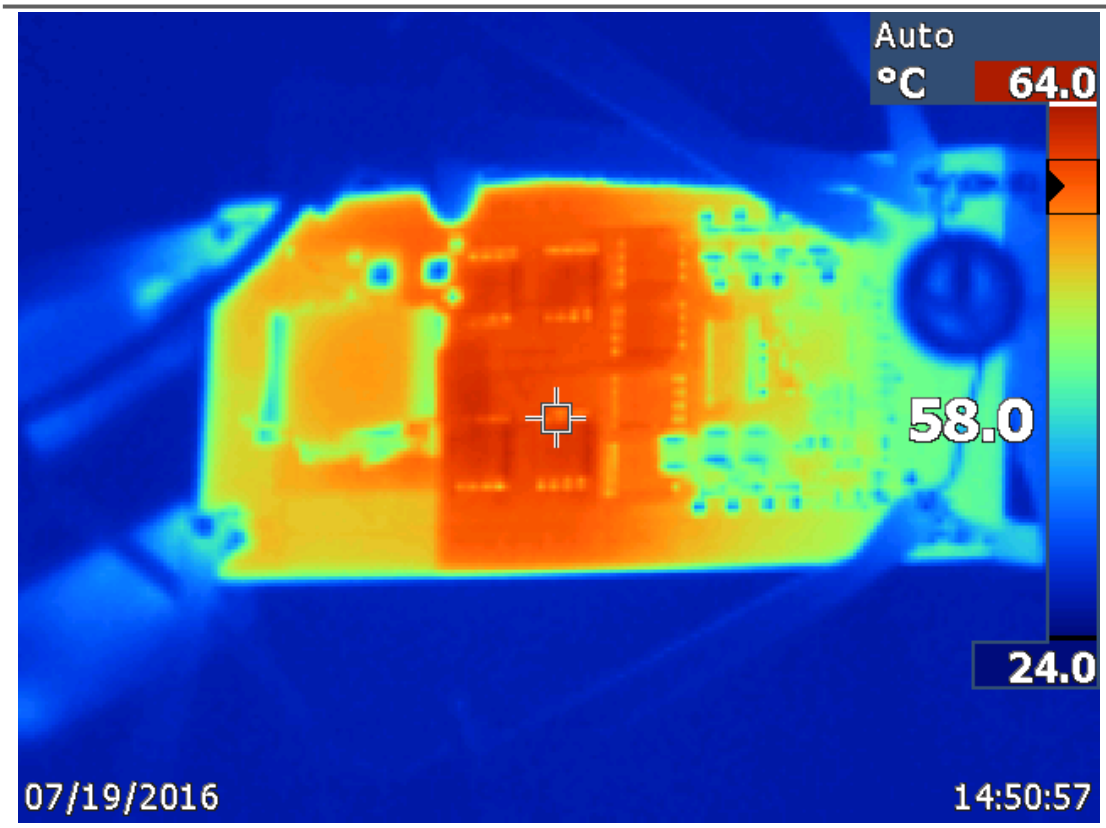
7.3Vin, 6.32Vout @ 200W continuous for 1 minute without air flow.



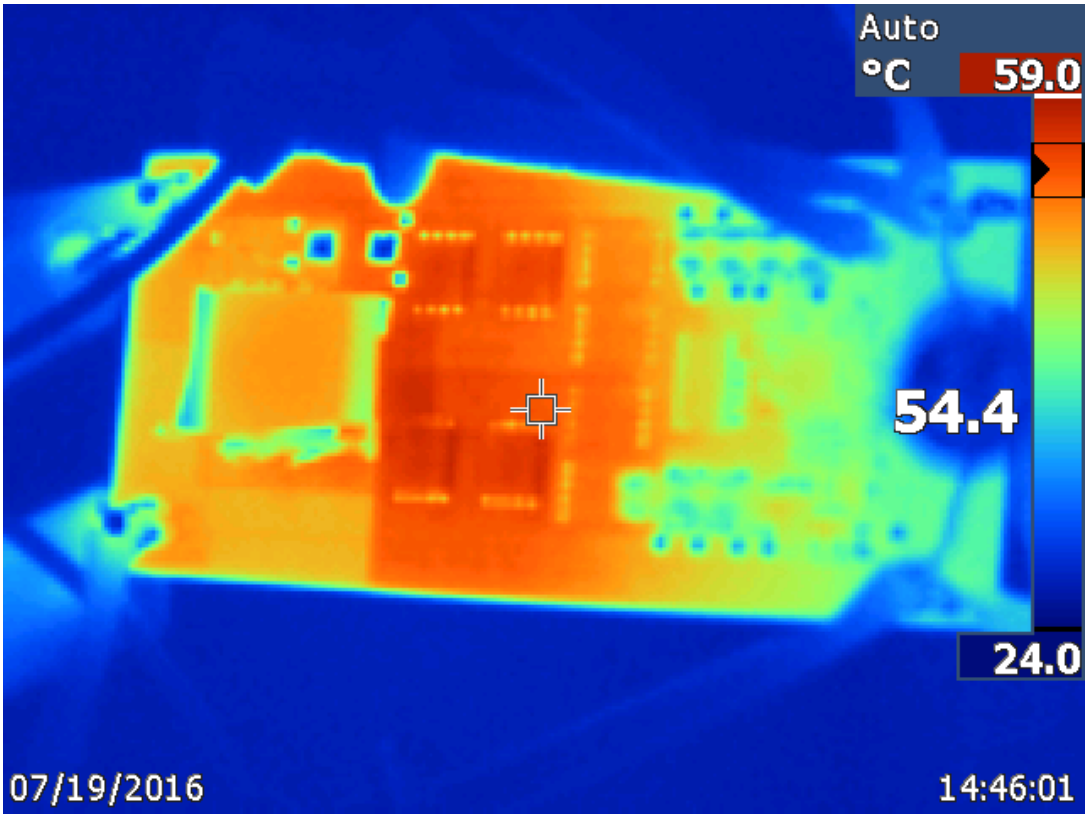
8.6Vin, 6.32Vout @ 200W continuous for 1 minute without air flow.



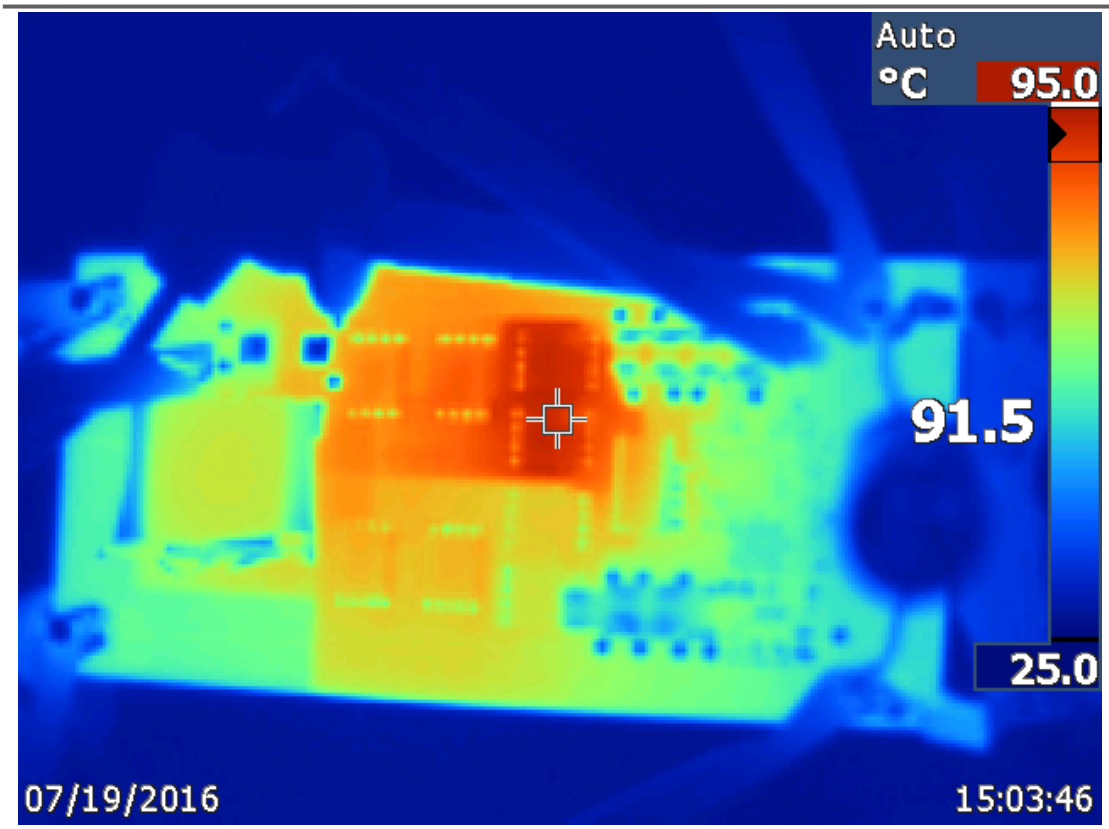
6Vin, 7.75Vout @ 200W continuous for 1 minute without air flow.



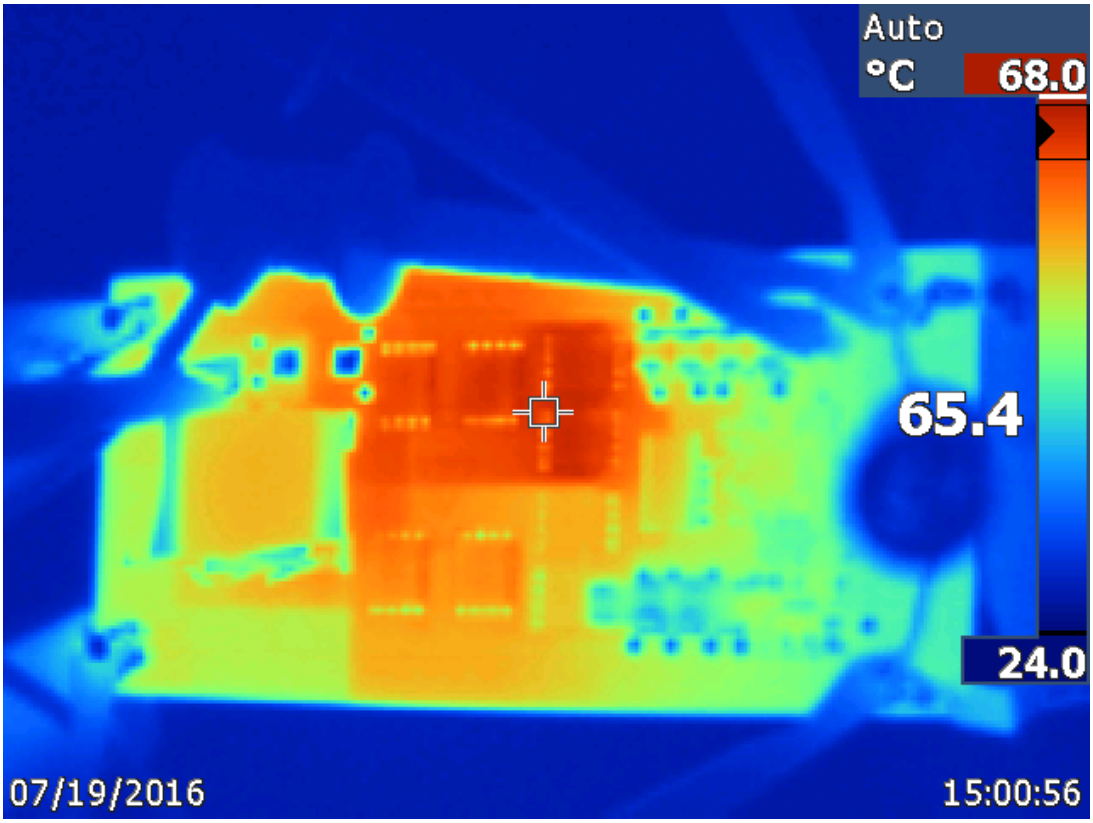
7.3Vin, 7.75Vout @ 200W continuous for 1 minute without air flow.



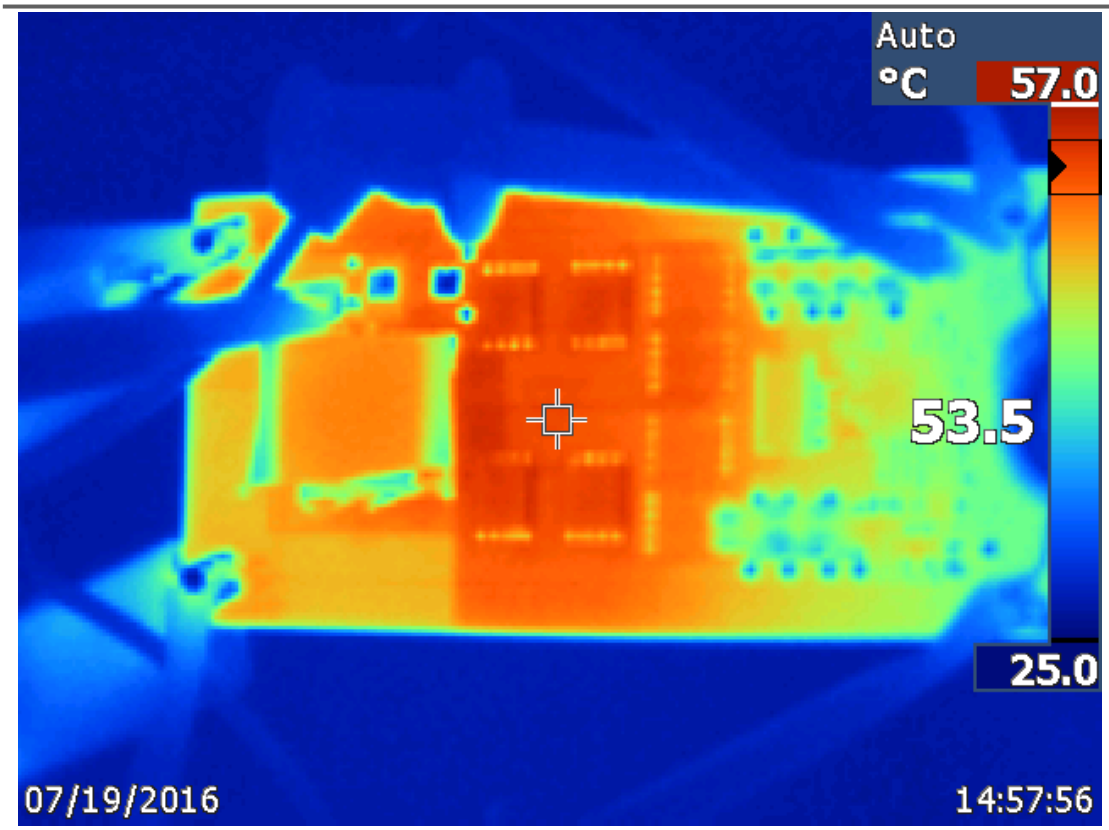
8.6Vin, 7.75Vout @ 200W continuous for 1 minute without air flow.



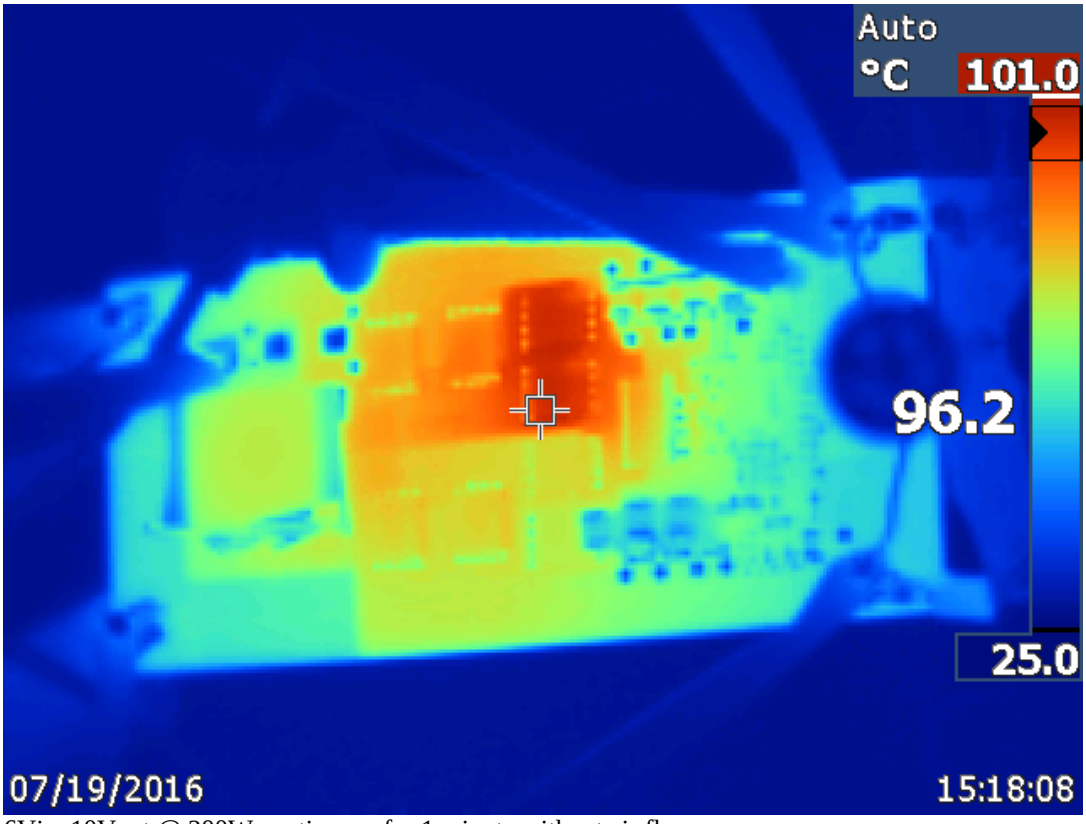
6Vin, 8.94Vout @ 200W continuous for 1 minute without air flow.



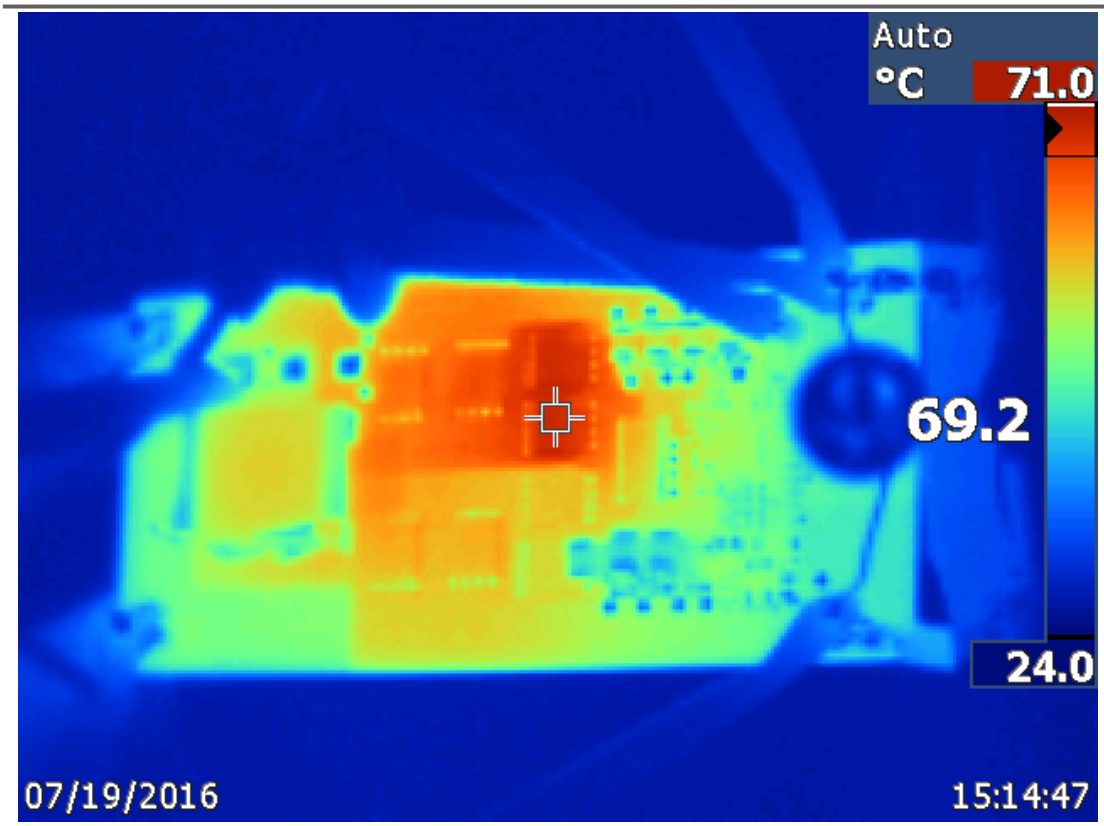
7.3Vin, 8.94Vout @ 200W continuous for 1 minute without air flow.



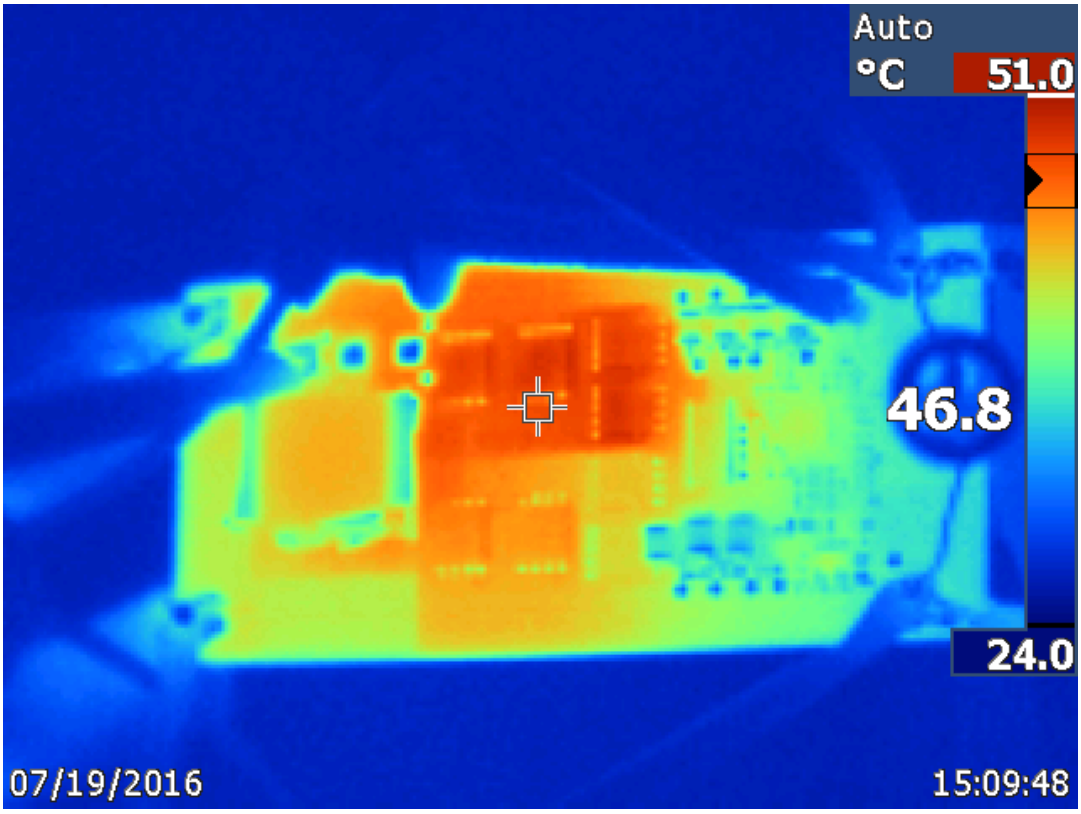
8.6Vin, 8.94Vout @ 200W continuous for 1 minute without air flow.



6Vin, 10Vout @ 200W continuous for 1 minute without air flow.



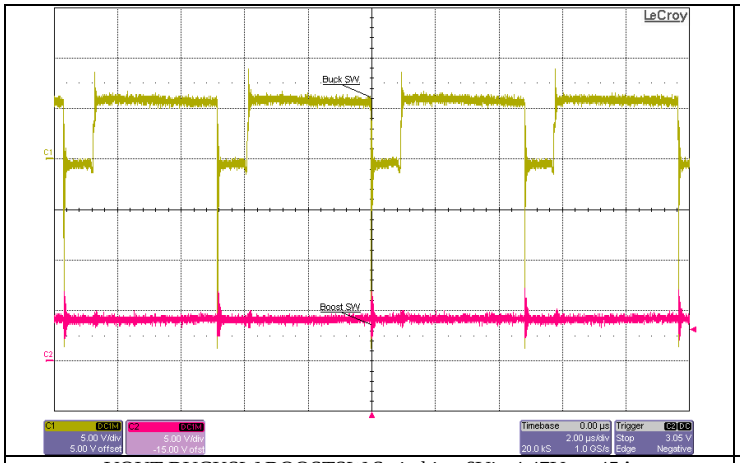
7.3Vin, 10Vout @ 200W continuous for 1 minute without air flow.



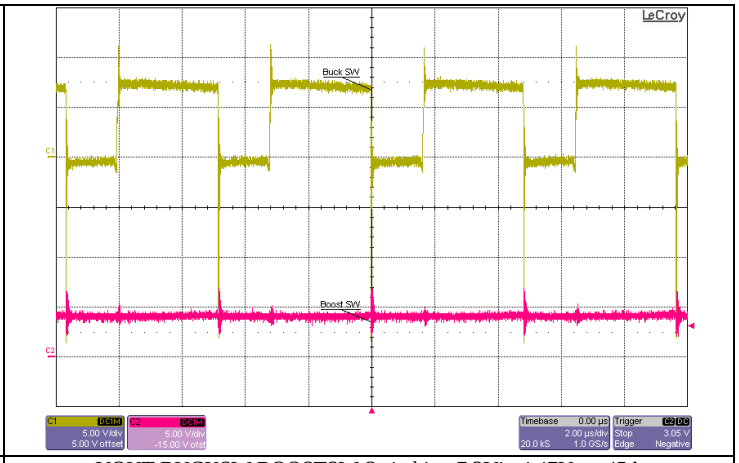
8.6Vin, 10Vout @ 200W continuous for 1 minute without air flow.

6 Switching

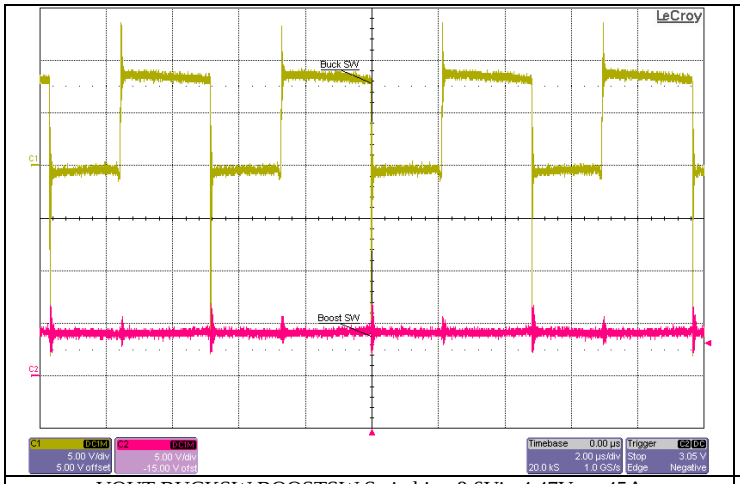
6.1 4.47V output



VOUT BUCKSW BOOSTSW Switching 6Vin 4.47Vout 45A

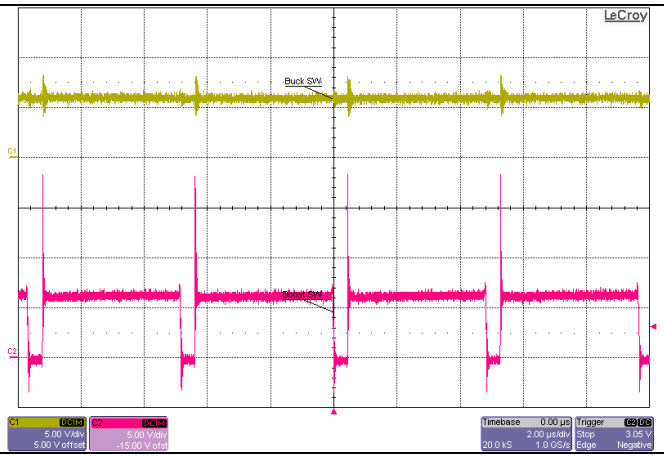


VOUT BUCKSW BOOSTSW Switching 7.3Vin 4.47Vout 45A

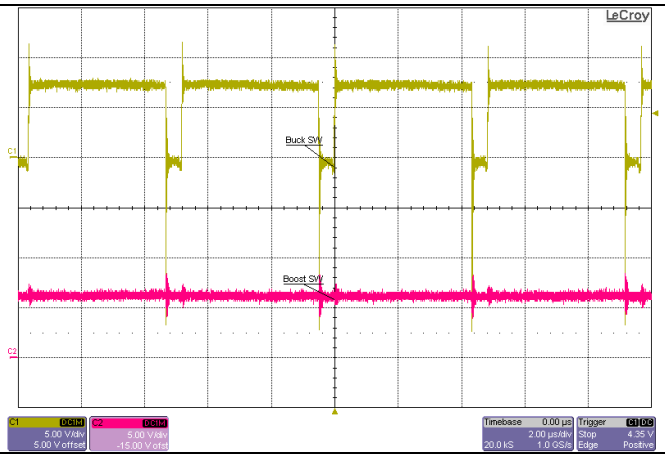


VOUT BUCKSW BOOSTSW Switching 8.6Vin 4.47Vout 45A

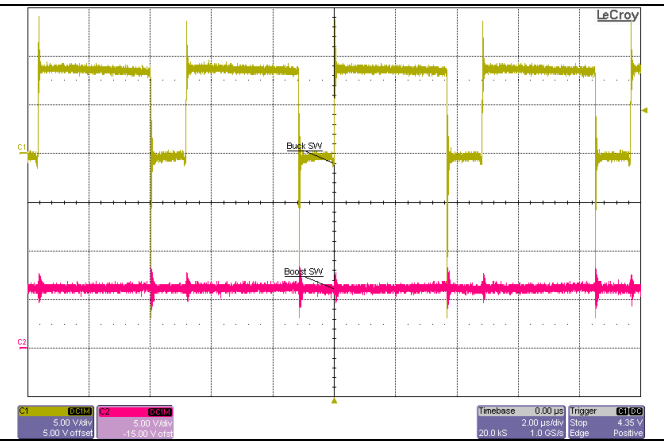
6.2 6.32V Output



VOUT BUCKSW BOOSTSW Switching 6Vin 6.32Vout 32A

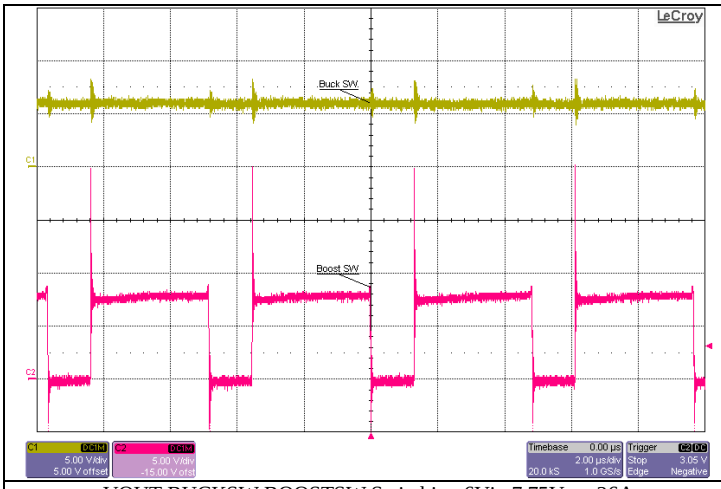


VOUT BUCKSW BOOSTSW Switching 7.3Vin 6.32Vout 32A

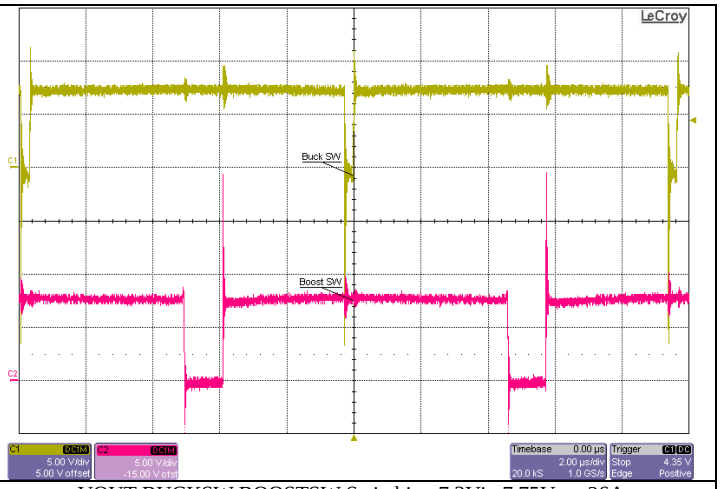


VOUT BUCKSW BOOSTSW Switching 8.6Vin 6.32Vout 32A

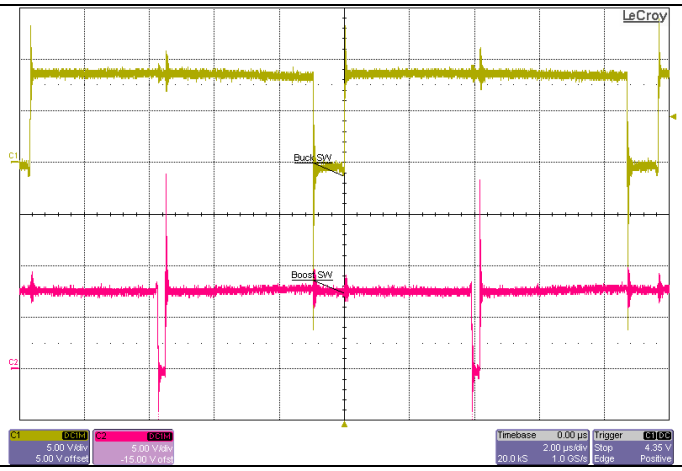
6.3 7.75V Output



VOUT BUCKSW BOOSTSW Switching 6Vin 7.75Vout 26A

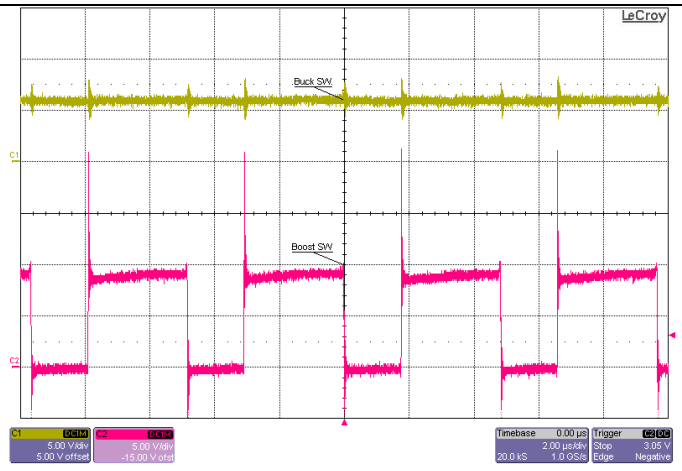


VOUT BUCKSW BOOSTSW Switching 7.3Vin 7.75Vout 26A

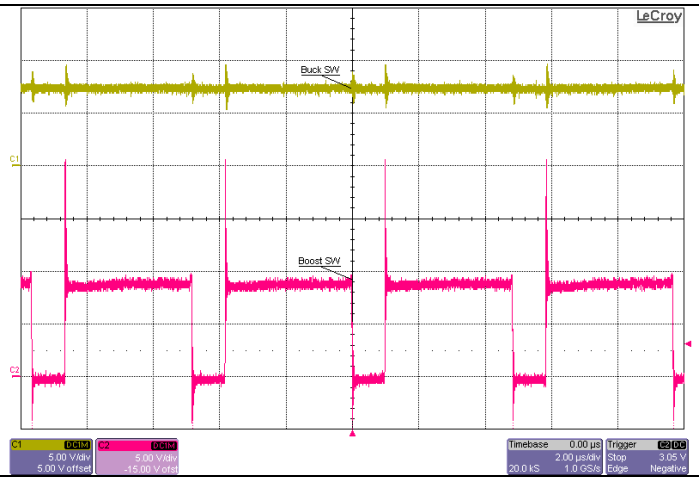


VOUT BUCKSW BOOSTSW Switching 8.6Vin 7.75Vout 26A

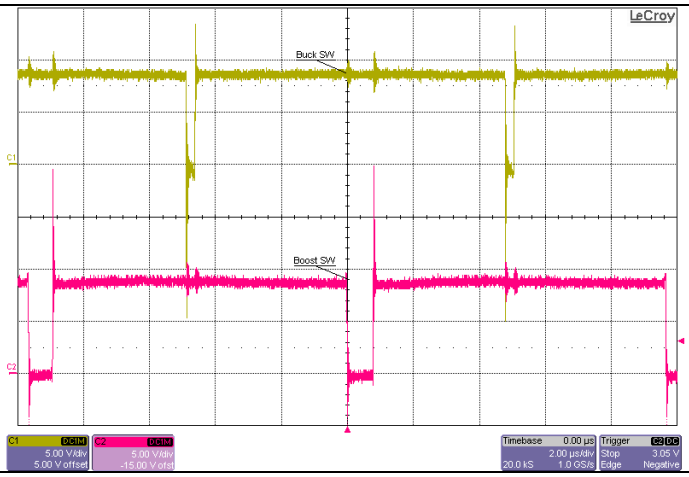
6.4 8.94V Output



VOUT BUCKSW BOOSTSW Switching 6Vin 8.94Vout 23A

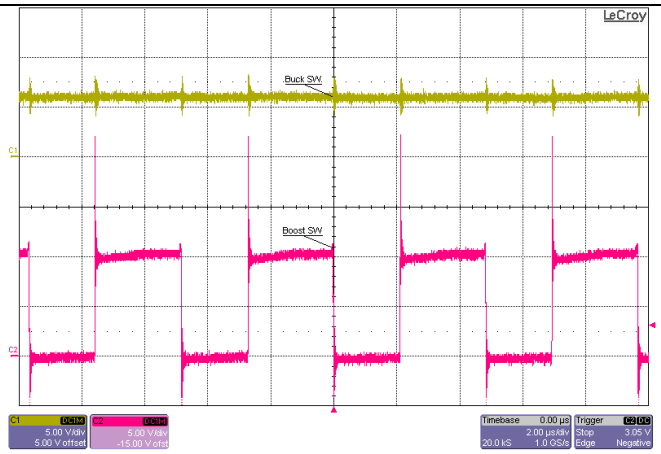


VOUT BUCKSW BOOSTSW Switching 7.3Vin 8.94Vout 23A

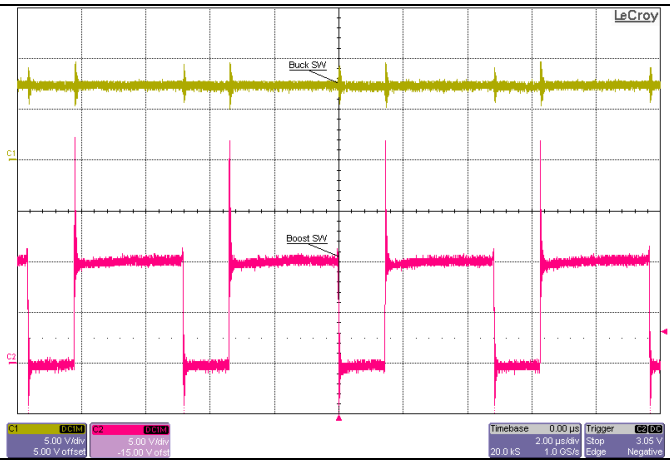


VOUT BUCKSW BOOSTSW Switching 8.6Vin 8.94Vout 23A

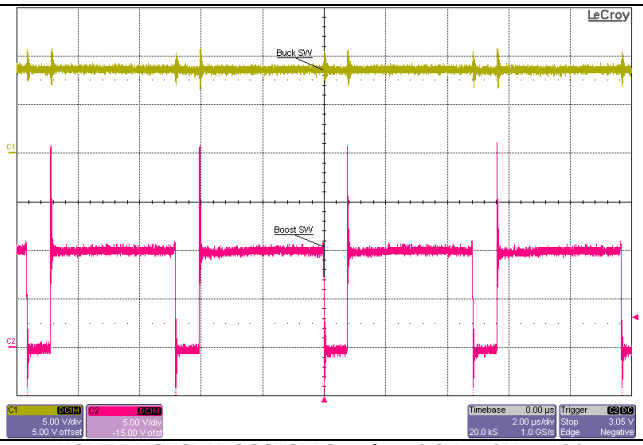
6.5 10V Output



VOUT BUCKSW BOOSTSW Switching 6Vin 10Vout 20A



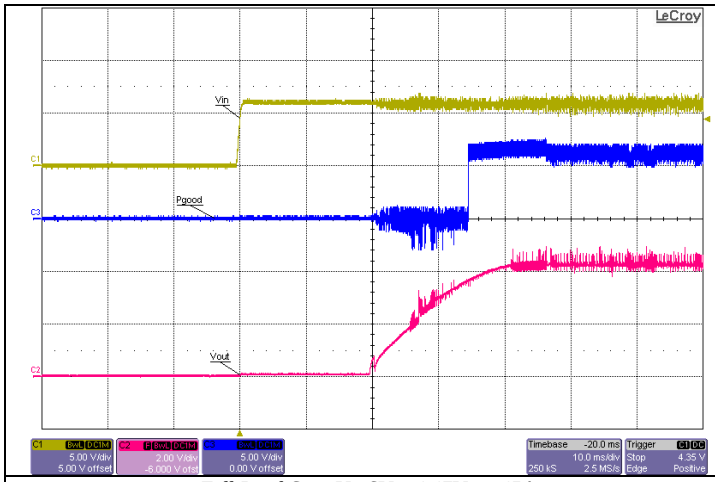
VOUT BUCKSW BOOSTSW Switching 7.3Vin 10Vout 20A



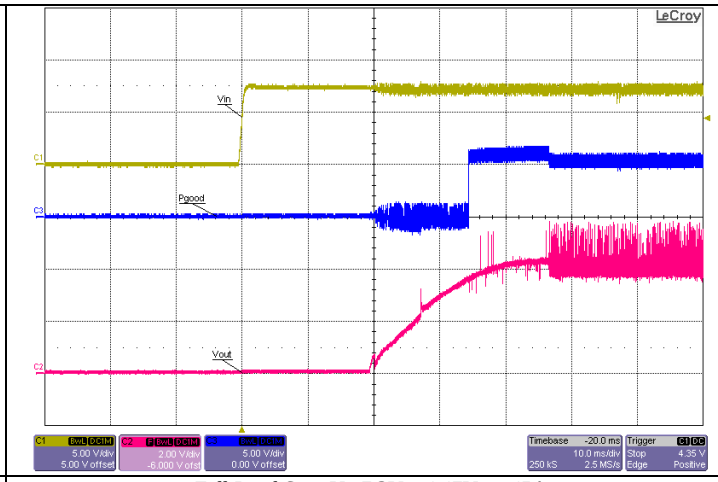
VOUT BUCKSW BOOSTSW Switching 8.6Vin 10Vout 20A

7 Start Up

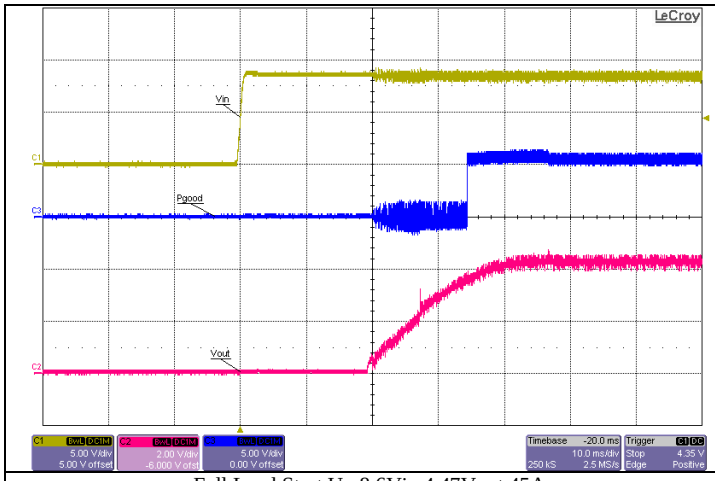
7.1 4.47V output



Full Load Start Up 6Vin 4.47Vout 45A

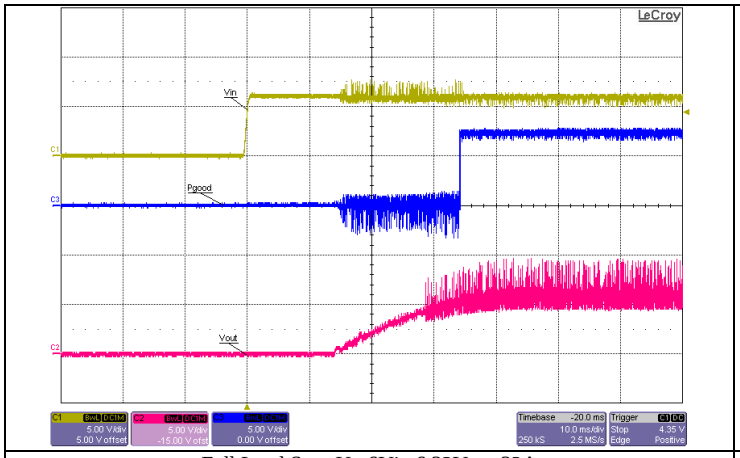


Full Load Start Up 7.3Vin 4.47Vout 45A

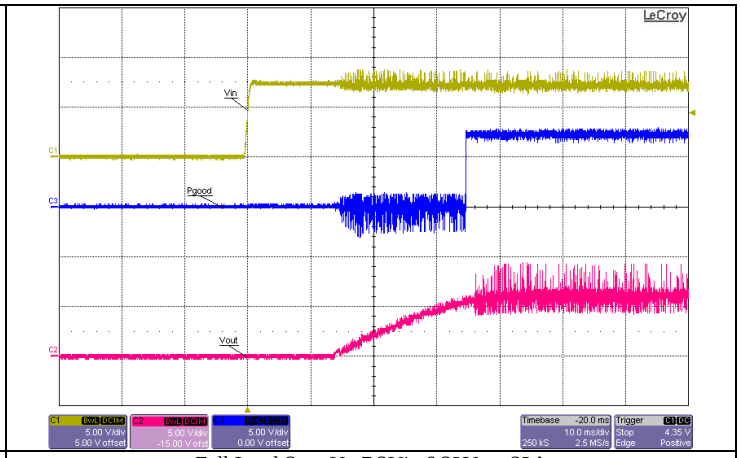


Full Load Start Up 8.6Vin 4.47Vout 45A

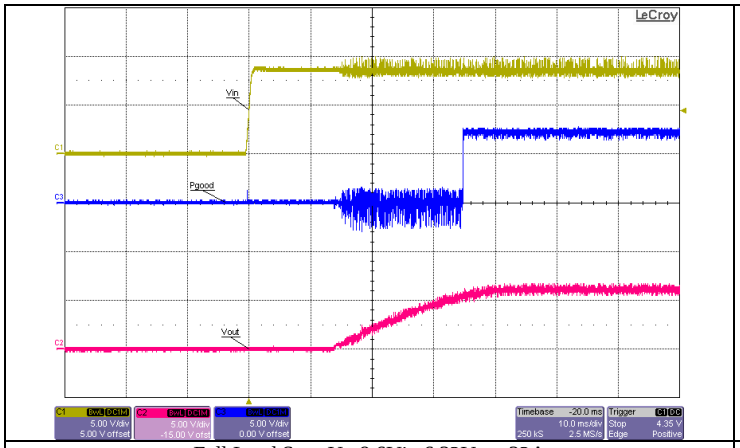
7.2 6.32V Output



Full Load Start Up 6Vin 6.32Vout 32A

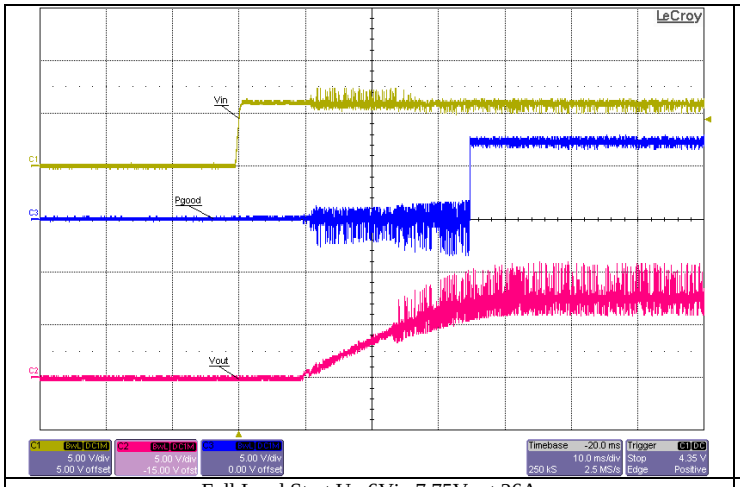


Full Load Start Up 7.3Vin 6.32Vout 32A

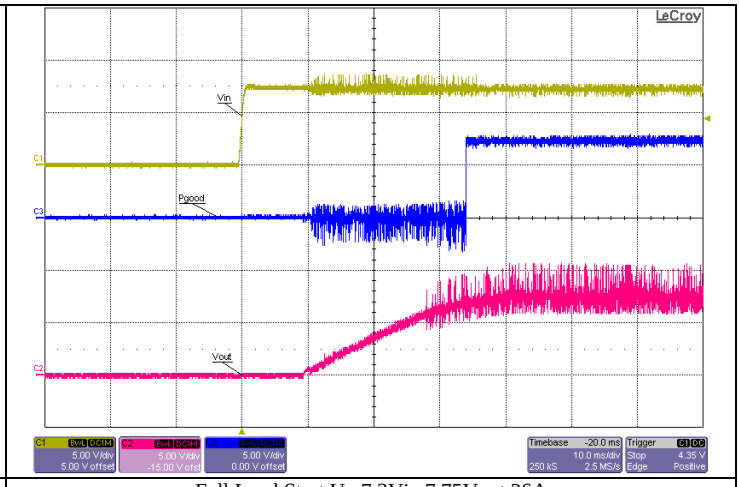


Full Load Start Up 8.6Vin 6.32Vout 32A

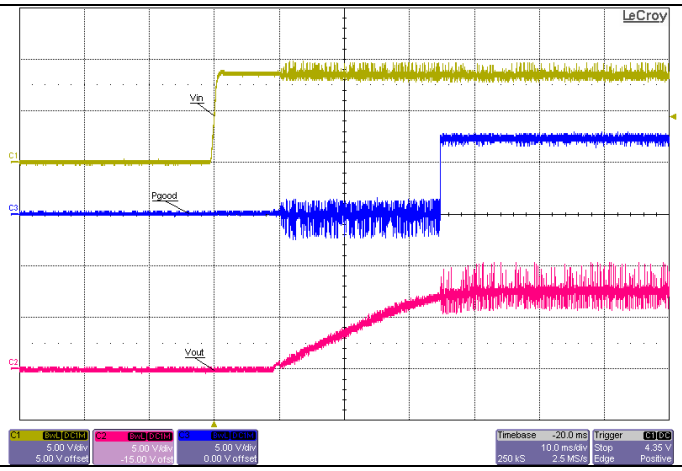
7.3 7.75V Output



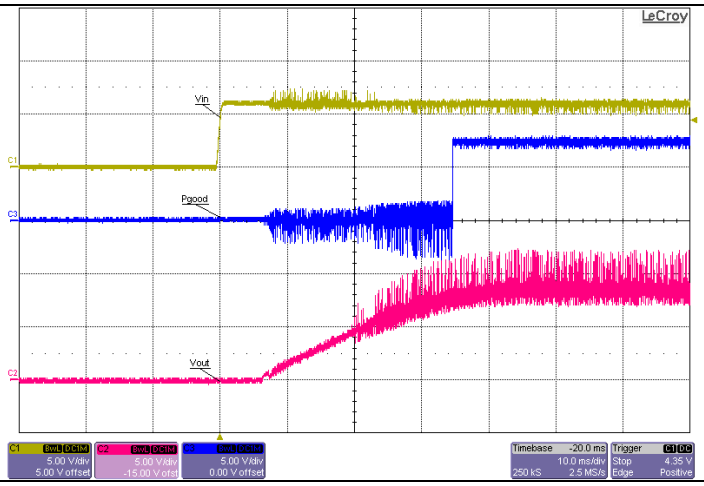
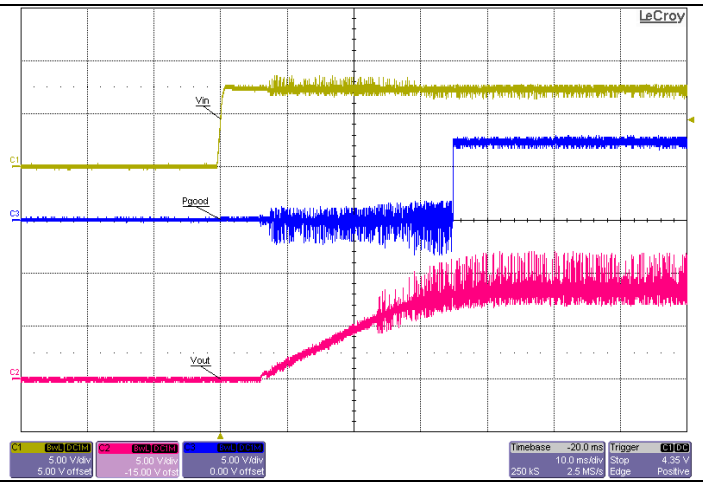
Full Load Start Up 6Vin 7.75Vout 26A

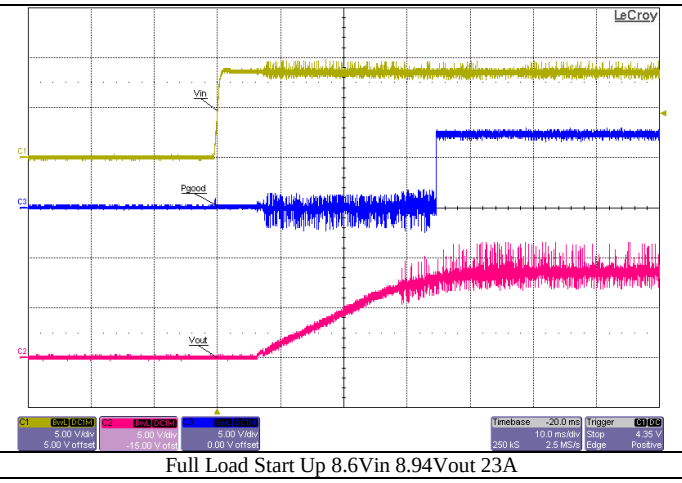


Full Load Start Up 7.3Vin 7.75Vout 26A

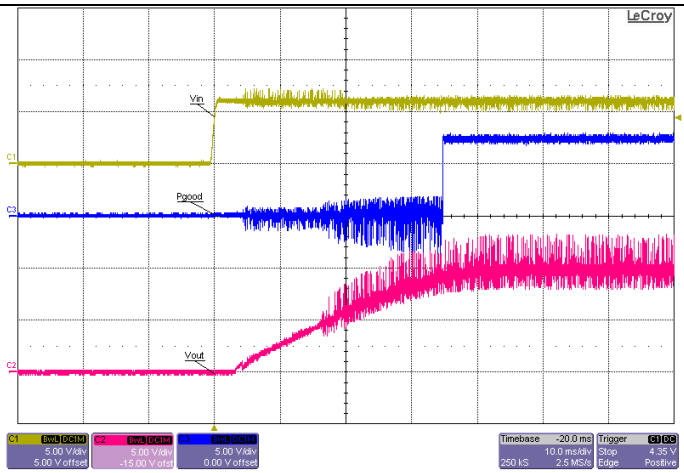
	
Full Load Start Up 8.6Vin 7.75Vout 26A	

7.4 8.94V Output

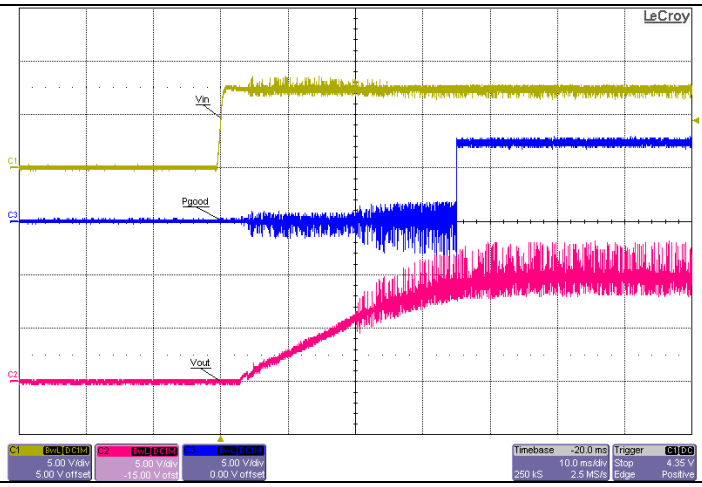
	
Full Load Start Up 6Vin 8.94Vout 23A	Full Load Start Up 7.3Vin 8.94Vout 23A

	
Full Load Start Up 8.6Vin 8.94Vout 23A	

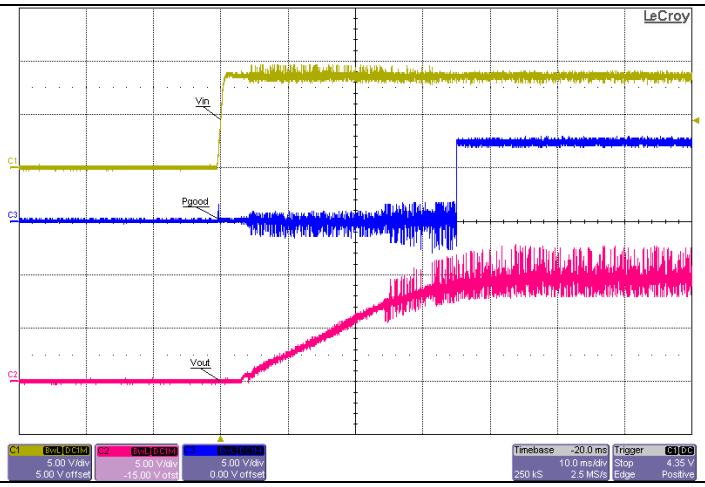
7.5 10V Output



Full Load Start Up 6Vin 10Vout 20A



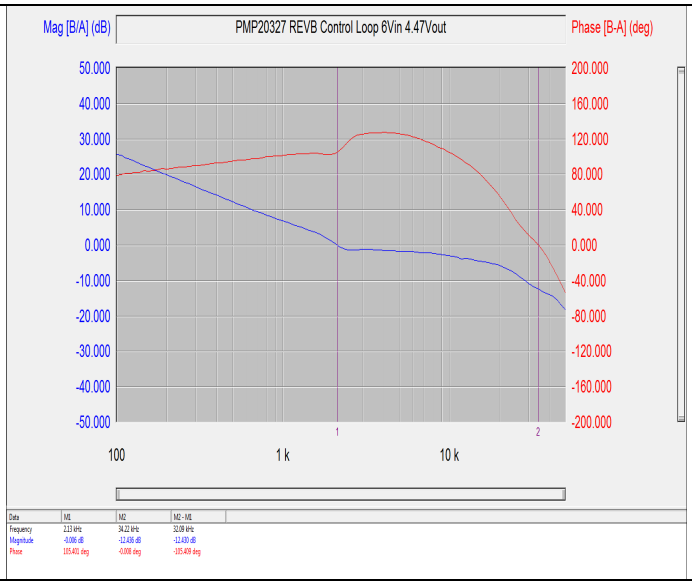
Full Load Start Up 7.3Vin 10Vout 20A



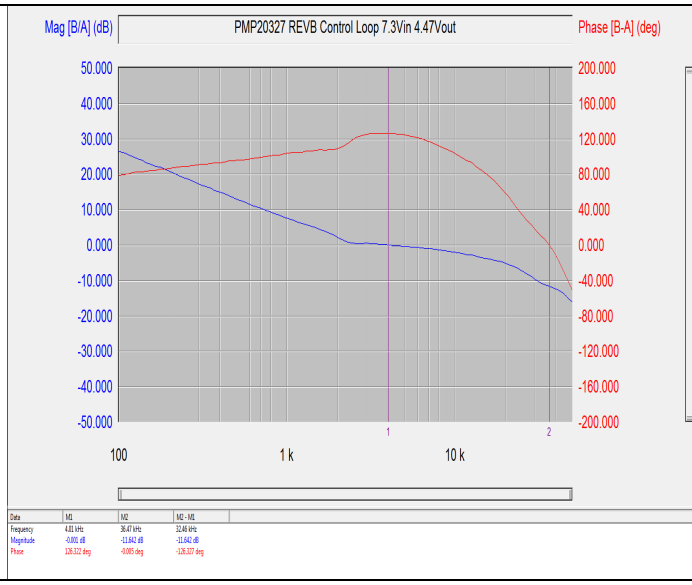
Full Load Start Up 8.6Vin 10Vout 20A

8 Frequency Response

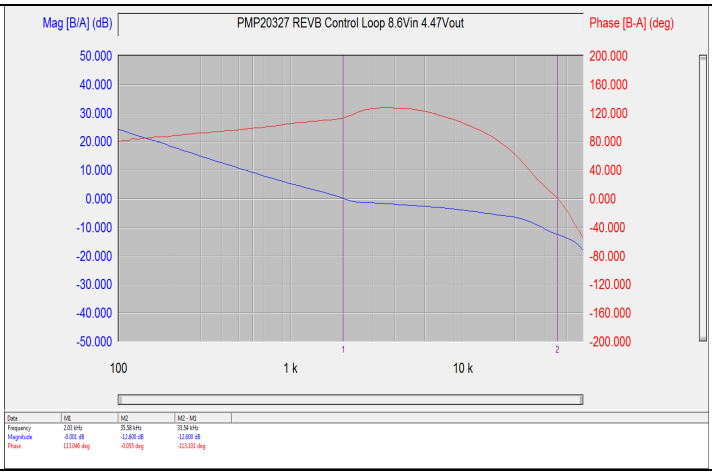
8.1 4.47V Output



Control Loop 6Vin 4.47Vout 45A CC load

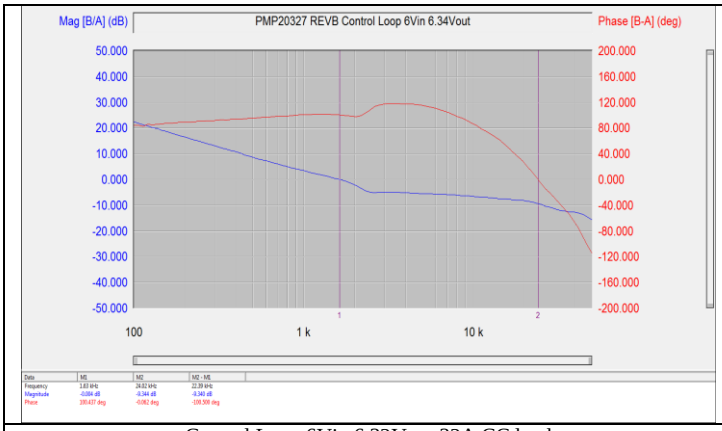


Control Loop 7.3Vin 4.47Vout 45A CC load

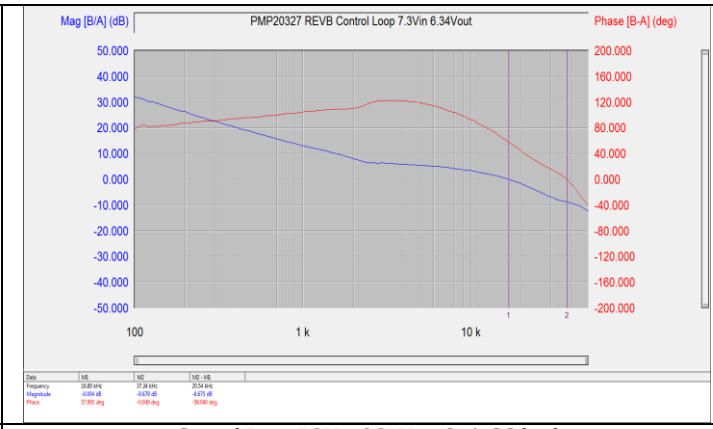


Control Loop 8.6Vin 4.47Vout 45A CC load

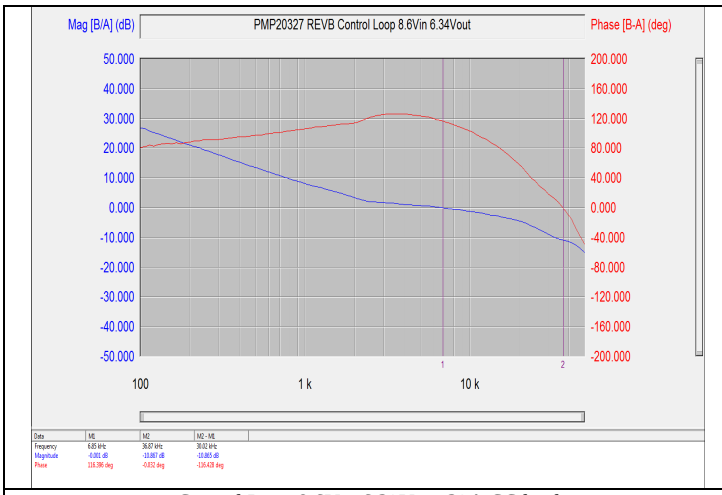
8.2 6.32V Output



Control Loop 6Vin 6.32Vout 32A CC load

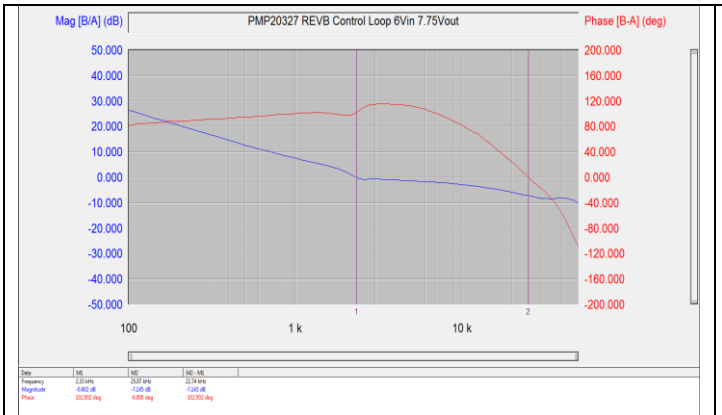


Control Loop 7.3Vin 6.32Vout 32A CC load

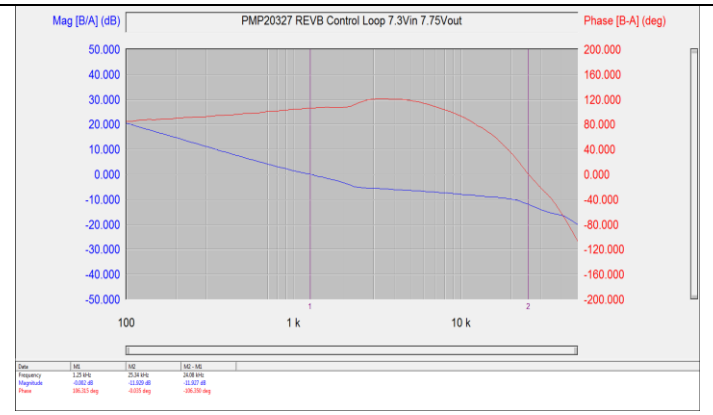


Control Loop 8.6Vin 6.32Vout 32A CC load

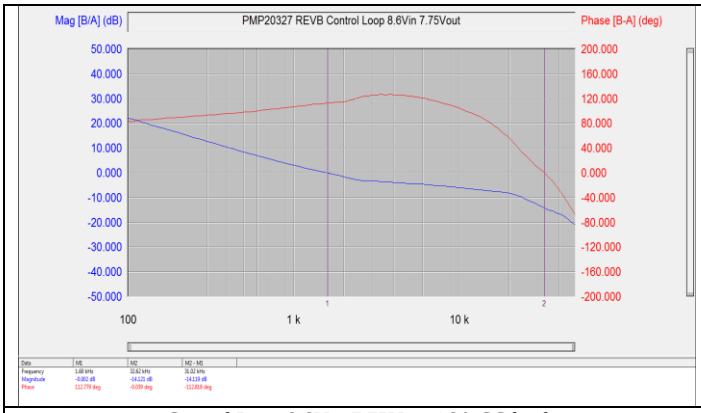
8.3 7.75V Output



Control Loop 6Vin 7.75Vout 26A CC load

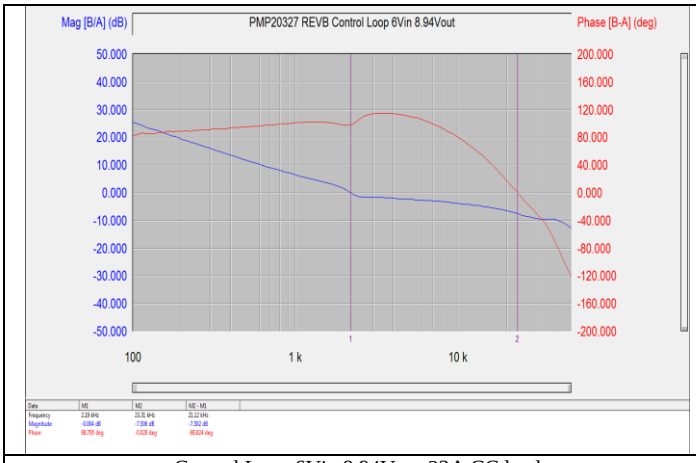


Control Loop 7.3Vin 7.75Vout 26A CC load

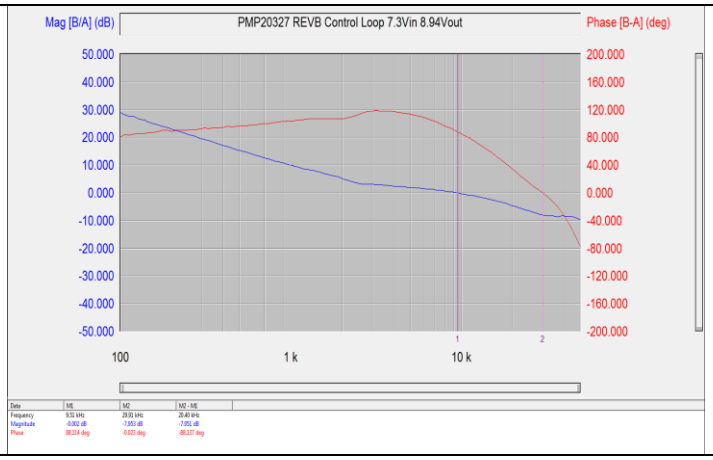


Control Loop 8.6Vin 7.75Vout 26A CC load

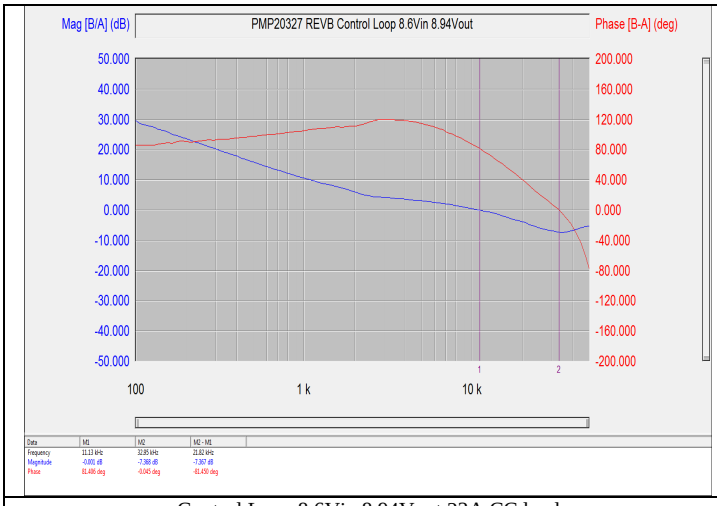
8.4 8.94V Output



Control Loop 6Vin 8.94Vout 23A CC load

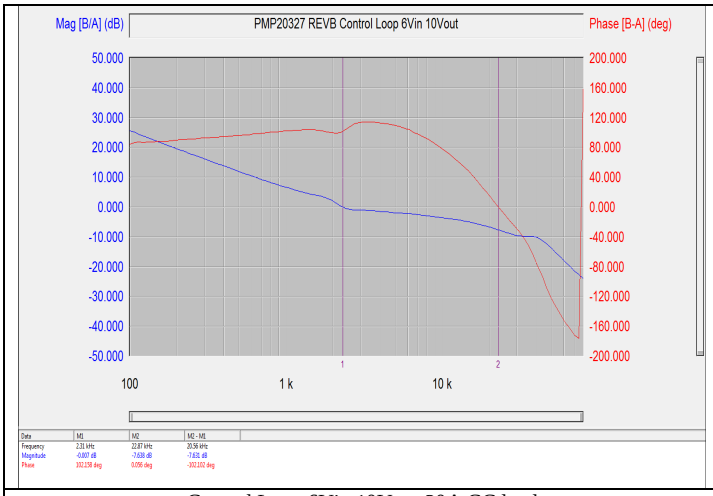


Control Loop 7.3Vin 8.94Vout 23A CC load

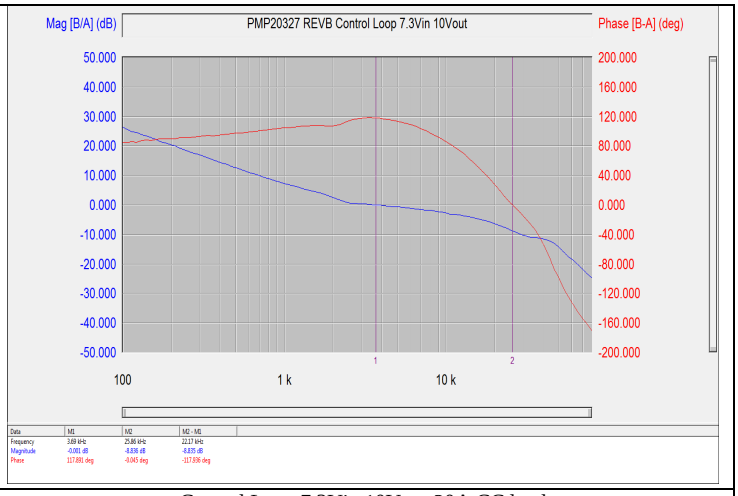


Control Loop 8.6Vin 8.94Vout 23A CC load

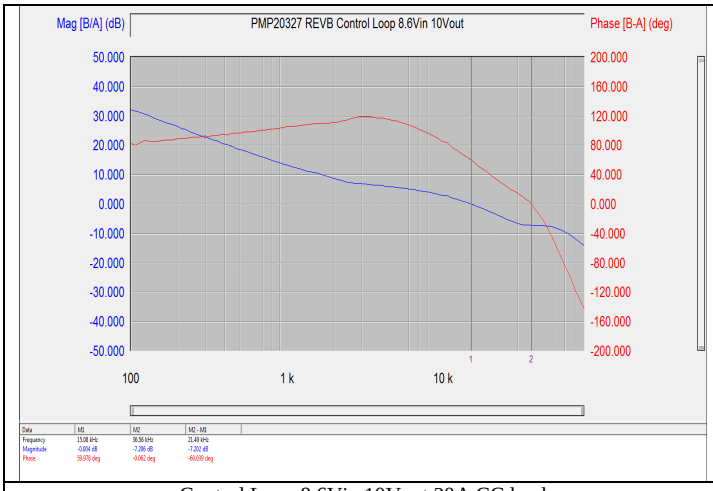
8.5 10V Output



Control Loop 6Vin 10Vout 20A CC load



Control Loop 7.3Vin 10Vout 20A CC load



Control Loop 8.6Vin 10Vout 20A CC load

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