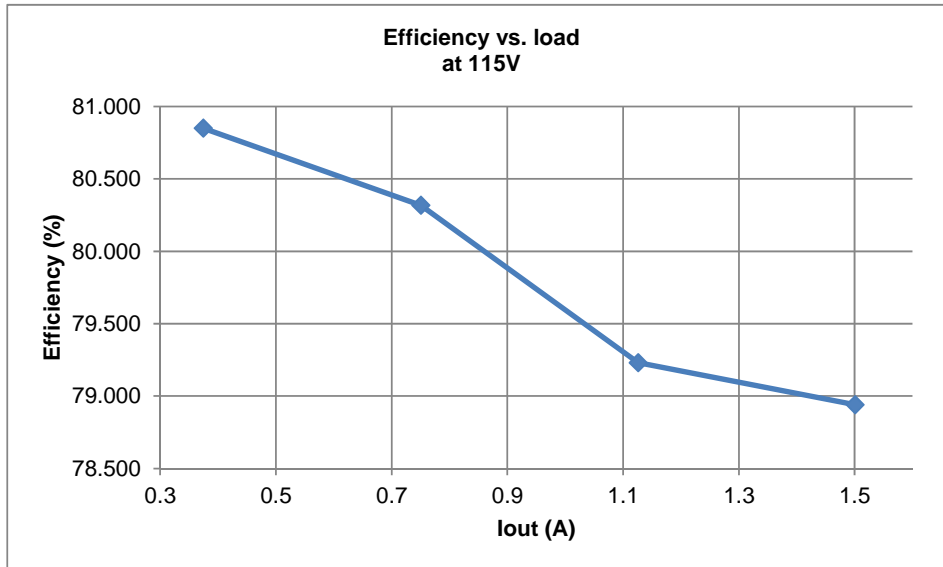


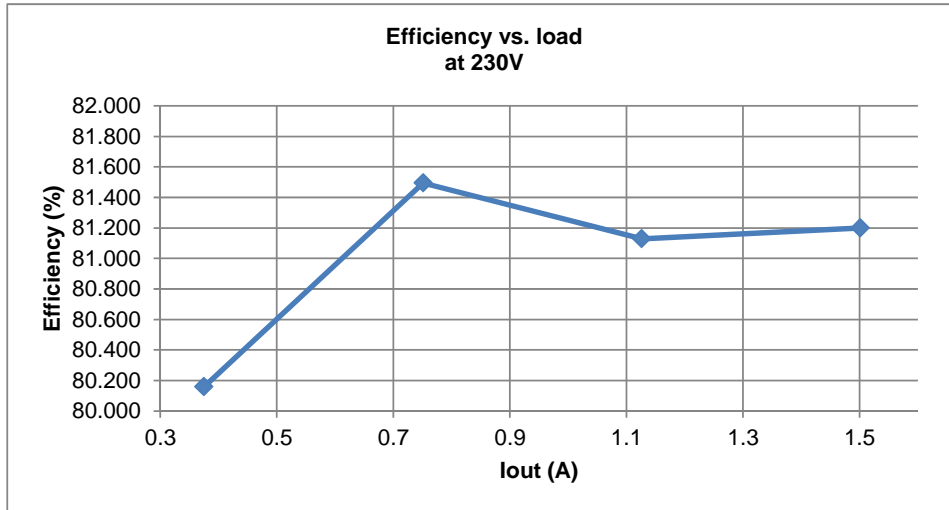
Average Efficiency Tests

Vin(V)	F(Hz)	Pin(W)	Iout(A)	Vout (V)	Pout (W)	Eff(%)	Avg Eff (%)
115	60	9.611	1.501	5.056	7.587	78.940	79.834
		7.163	1.126	5.042	5.676	79.230	
		4.700	0.751	5.030	3.775	80.317	
		2.333	0.375	5.023	1.886	80.849	
230	50	9.363	1.501	5.067	7.603	81.200	80.996
		7.005	1.126	5.049	5.683	81.129	
		4.640	0.751	5.037	3.781	81.495	
		2.353	0.375	5.023	1.886	80.159	

No Load Power

Vin(V)	Pin(mW)	Vout(V)
85	13.60	5.055
115	13.58	5.059
230	15.41	5.066
264	16.44	5.068





Load Regulation

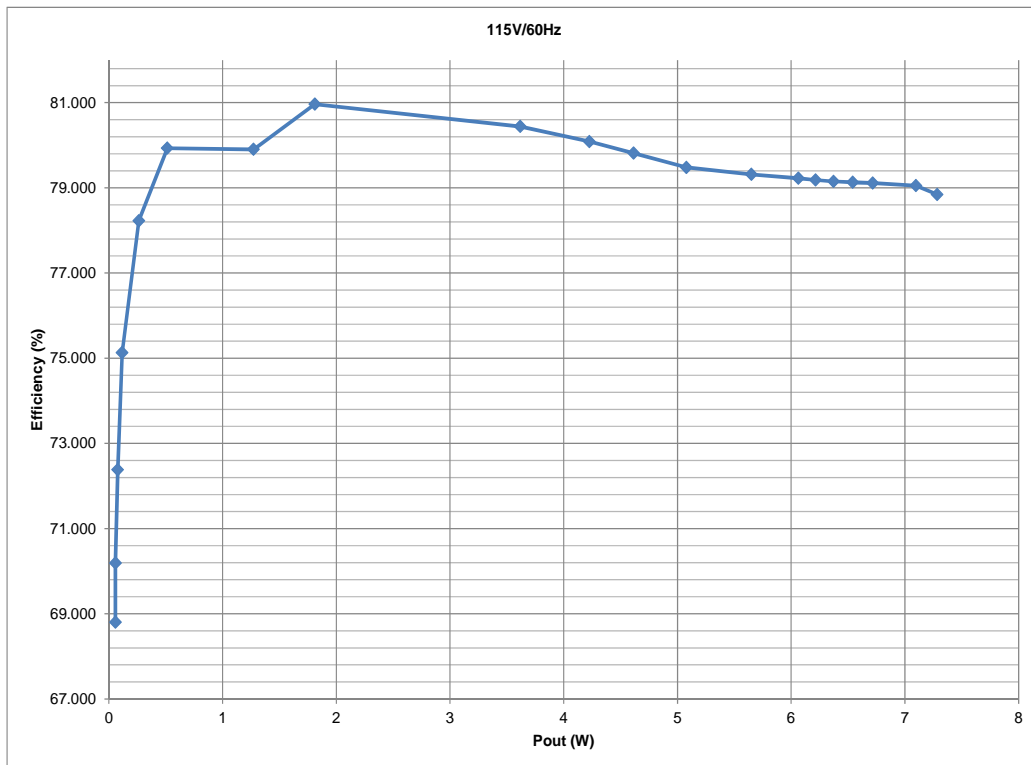
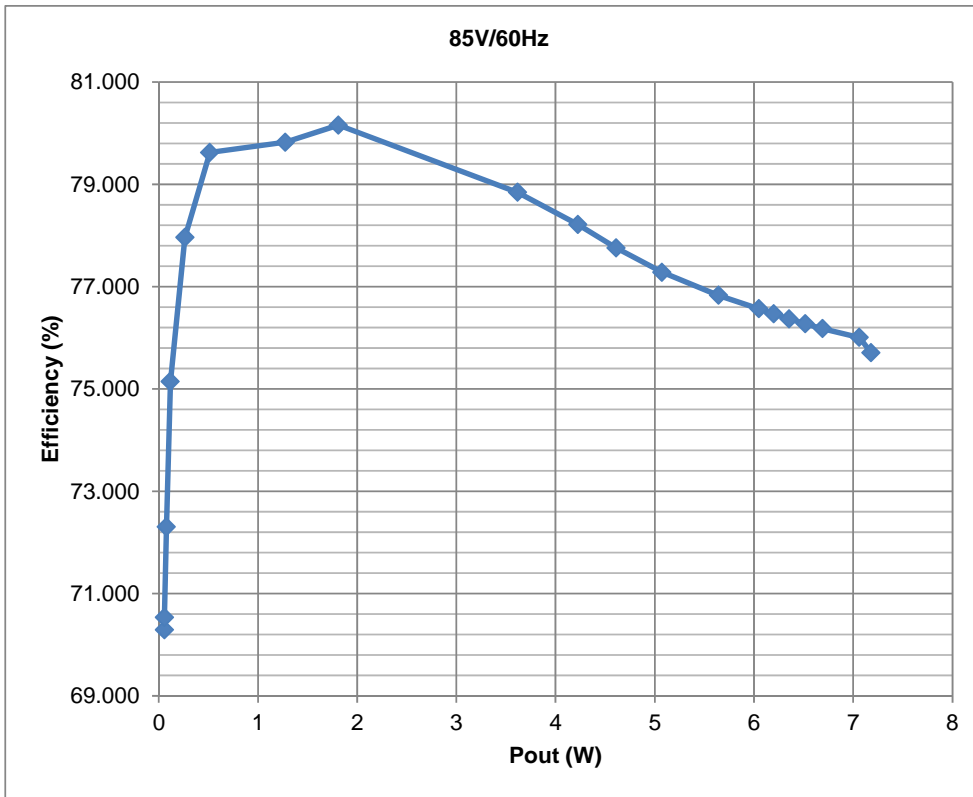
Vin (V)	Freq (Hz)	Iout (A)	Vout (V)	Pin (W)	Eff %	Vpp (V)	Vout spec (V)		
							Vout min	Vout max	Vout pp
85	47	0.000	5.05	0.02	15.1	0.068	4.75	5.25	0.200
		0.101	5.00	0.64	78.2	0.080			
		0.200	5.01	1.18	85.4	0.128			
		0.300	5.01	1.84	82.0	0.107			
		0.400	5.01	2.44	82.3	0.103			
		0.501	5.01	3.07	81.8	0.093			
		0.601	5.01	3.75	80.2	0.091			
		0.701	5.02	4.39	80.0	0.095			
		0.801	5.02	5.17	77.7	0.099			
		0.901	5.02	5.78	78.3	0.102			
		1.001	5.03	6.44	78.1	0.104			
		1.101	5.03	7.12	77.7	0.108			
		1.201	5.03	7.90	76.5	0.109			
		1.301	5.04	8.57	76.4	0.109			
1.401	5.04	9.25	76.3	0.119					
115	60	0.001	5.05	0.02	15.0	0.070	4.75	5.25	0.200
		0.100	5.00	0.64	78.4	0.082			
		0.200	5.01	1.23	81.9	0.132			
		0.300	5.01	1.82	82.9	0.110			
		0.400	5.02	2.43	82.8	0.108			
		0.501	5.01	3.07	81.6	0.100			
		0.601	5.02	3.69	81.7	0.090			
		0.701	5.02	4.40	80.0	0.093			
		0.801	5.02	5.05	79.6	0.098			
		0.901	5.03	5.66	79.9	0.101			
		1.001	5.03	6.29	80.0	0.104			
		1.101	5.03	6.98	79.3	0.108			

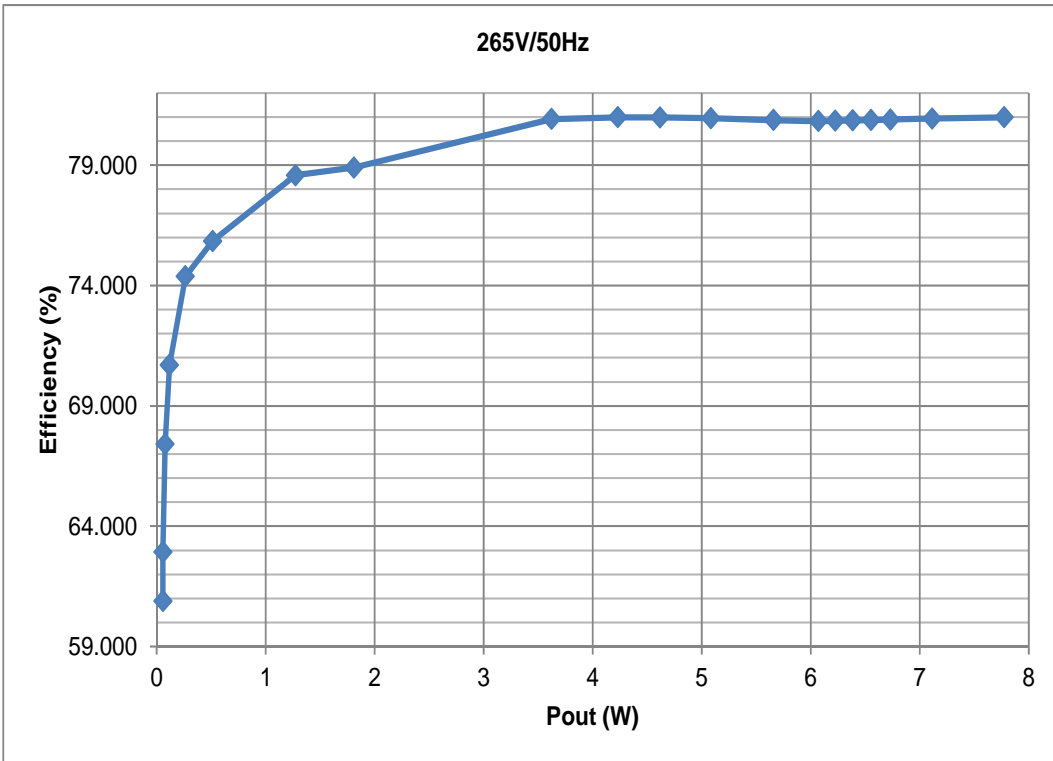
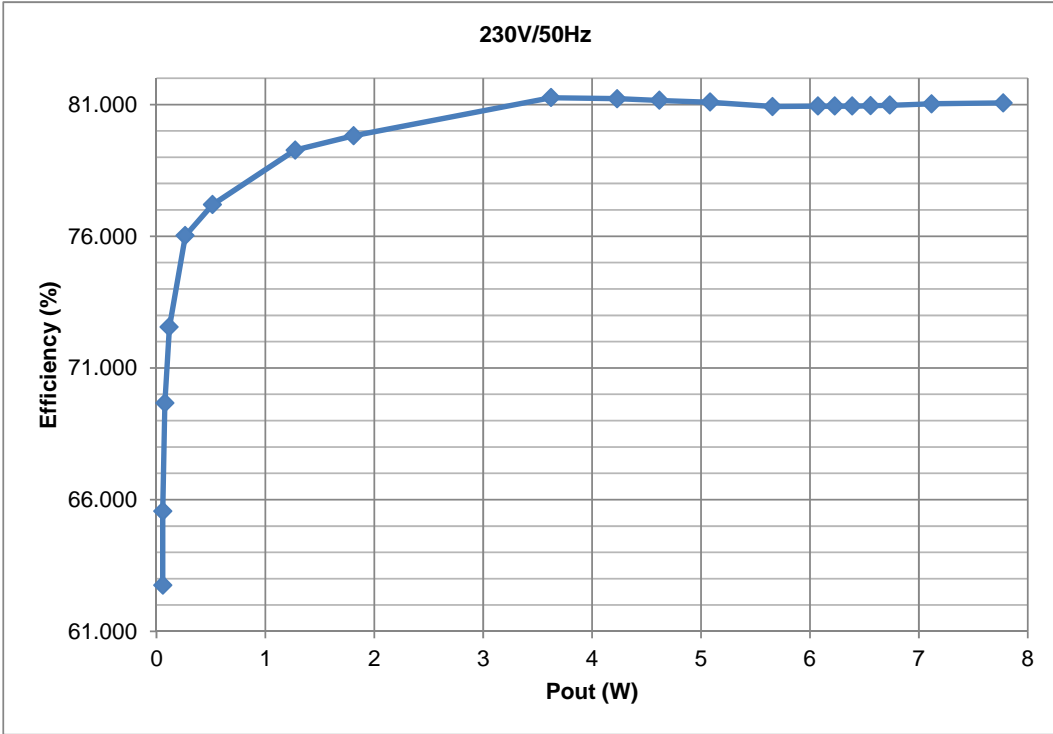
		1.201	5.04	7.61	79.5	0.112			
		1.301	5.04	8.25	79.5	0.115			
		1.401	5.05	8.97	78.8	0.115			
230	50	0.000	5.06	0.02	11.7	0.074	4.75	5.25	0.200
		0.100	5.01	0.66	75.9	0.095			
		0.200	5.01	1.24	80.9	0.141			
		0.300	5.01	1.85	81.6	0.147			
		0.400	5.01	2.52	79.6	0.113			
		0.501	5.02	3.12	80.4	0.111			
		0.601	5.02	3.72	81.0	0.103			
		0.701	5.02	4.36	80.7	0.100			
		0.801	5.03	4.97	80.9	0.101			
		0.901	5.03	5.59	81.0	0.100			
		1.001	5.03	6.15	81.9	0.104			
		1.101	5.04	6.87	80.7	0.107			
		1.201	5.04	7.48	80.9	0.115			
		1.301	5.05	8.09	81.2	0.116			
		1.401	5.05	8.76	80.8	0.118			
265	50	0.000	5.07	0.02	10.5	0.081	4.75	5.25	0.200
		0.101	5.01	0.67	74.8	0.096			
		0.200	5.01	1.28	78.4	0.141			
		0.300	5.02	1.90	79.3	0.149			
		0.400	5.01	2.54	79.0	0.112			
		0.501	5.02	3.14	79.9	0.112			
		0.601	5.02	3.74	80.7	0.102			
		0.701	5.02	4.33	81.2	0.101			
		0.801	5.02	4.99	80.6	0.102			
		0.901	5.03	5.59	81.0	0.103			
		1.001	5.03	6.19	81.3	0.105			
		1.101	5.03	6.88	80.6	0.108			
		1.201	5.04	7.47	81.0	0.113			
		1.301	5.05	8.11	80.9	0.115			
		1.401	5.05	8.72	81.1	0.117			

Vin (V)	Freq (Hz)	Rload (Ohm)	Pin (W)	Vout (V)	Iout (A)	Pout (W)	Eff (%)
85	47	600.00	0.083	5.032	0.012	0.058	70.291
		400.00	0.083	5.031	0.012	0.058	70.532
		250.00	0.107	5.028	0.015	0.078	72.303
		100.00	0.156	5.024	0.023	0.117	75.144
		50.00	0.339	5.012	0.053	0.264	77.961
		20.00	0.645	4.998	0.103	0.514	79.621
		14.00	1.597	5.017	0.254	1.275	79.821
		7.00	2.260	5.018	0.361	1.812	80.157
		6.00	4.589	5.022	0.720	3.618	78.842
		5.50	5.400	5.025	0.841	4.224	78.216
		5.00	5.928	5.027	0.917	4.609	77.757
		4.50	6.565	5.029	1.009	5.073	77.282
		4.20	7.344	5.032	1.121	5.642	76.832
		4.10	7.903	5.035	1.202	6.051	76.567
		3.30	9.292	5.037	1.402	7.062	76.007
		3.00	9.481	4.862	1.476	7.178	75.709
2.50	8.771	4.451	1.487	6.618	75.446		
1.90	7.387	3.711	1.487	5.518	74.694		

		1.60	5.740	2.813	1.484	4.174	72.722
		1.40	4.915	2.366	1.481	3.504	71.288
		1.20	4.369	2.066	1.478	3.053	69.880
		600.00	0.084	5.032	0.012	0.058	68.801
		400.00	0.083	5.030	0.012	0.058	70.193
		250.00	0.107	5.029	0.015	0.078	72.380
		100.00	0.155	5.023	0.023	0.117	75.129
115	60	50.00	0.337	5.011	0.053	0.264	78.225
		20.00	0.643	4.998	0.103	0.514	79.933
		14.00	1.592	5.014	0.254	1.272	79.902
		7.00	2.237	5.018	0.361	1.811	80.965
		6.00	4.498	5.022	0.720	3.618	80.441
		5.50	5.277	5.026	0.841	4.226	80.086
		5.00	5.781	5.029	0.917	4.614	79.814
		4.50	6.390	5.032	1.009	5.078	79.479
		4.20	7.125	5.037	1.122	5.651	79.315
		4.10	7.653	5.040	1.203	6.063	79.224
		4.00	7.847	5.041	1.233	6.214	79.184
		3.90	8.052	5.043	1.264	6.373	79.150
		3.80	8.265	5.045	1.296	6.541	79.132
		3.60	8.492	5.047	1.331	6.718	79.112
		3.30	8.979	5.049	1.406	7.098	79.052
		3.00	9.239	4.898	1.487	7.284	78.843
		2.50	8.471	4.458	1.489	6.637	78.355
		1.90	7.165	3.715	1.489	5.531	77.191
		1.60	5.588	2.818	1.486	4.186	74.915
		1.40	4.798	2.367	1.482	3.510	73.140
1.20	4.272	2.068	1.479	3.058	71.584		
		600.00	0.093	5.043	0.012	0.058	62.757
		400.00	0.089	5.040	0.012	0.058	65.557
		250.00	0.112	5.033	0.015	0.078	69.671
		100.00	0.161	5.026	0.023	0.117	72.552
230	50	50.00	0.347	5.013	0.053	0.264	76.021
		20.00	0.666	5.003	0.103	0.514	77.200
		14.00	1.607	5.017	0.254	1.274	79.270
		7.00	2.268	5.015	0.361	1.811	79.817
		6.00	4.457	5.025	0.721	3.622	81.258
		5.50	5.209	5.029	0.841	4.231	81.217
		5.00	5.691	5.032	0.918	4.619	81.157
		4.50	6.272	5.035	1.010	5.085	81.087
		4.20	6.989	5.039	1.122	5.656	80.923
		4.10	7.504	5.044	1.204	6.074	80.940
		4.00	7.694	5.047	1.234	6.228	80.940
		3.90	7.893	5.049	1.265	6.388	80.941
		3.80	8.099	5.051	1.298	6.557	80.952
		3.60	8.316	5.053	1.333	6.734	80.974
		3.30	8.785	5.057	1.408	7.118	81.024
		3.00	9.595	5.061	1.537	7.777	81.059
		2.50	8.368	4.479	1.496	6.700	80.068
		1.90	7.082	3.733	1.496	5.585	78.871
		1.60	5.535	2.830	1.492	4.222	76.286
		1.40	4.762	2.378	1.489	3.540	74.353
1.20	4.244	2.076	1.486	3.084	72.661		
		600.00	0.096	5.045	0.012	0.058	60.891
		400.00	0.092	5.042	0.012	0.058	62.922

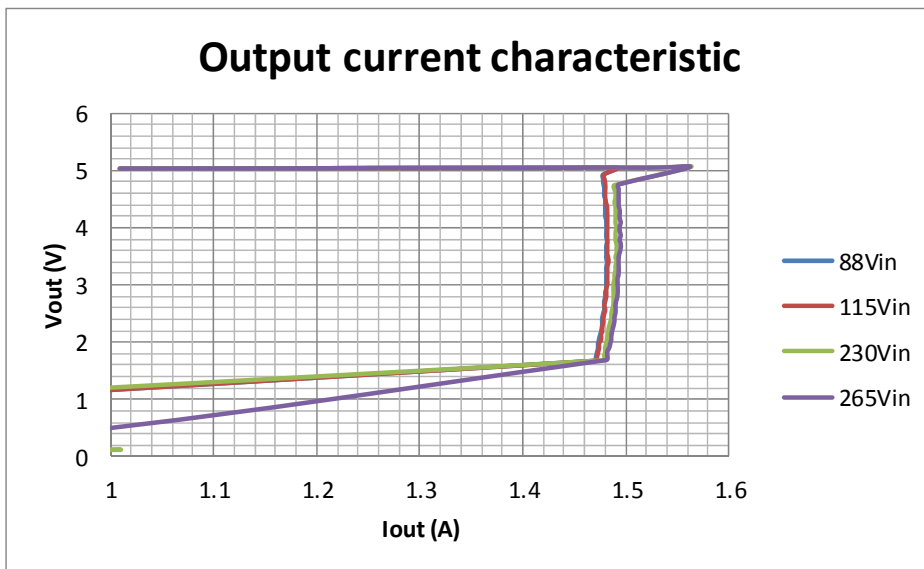
		250.00	0.115	5.034	0.015	0.078	67.414
		100.00	0.165	5.028	0.023	0.117	70.701
265	50	50.00	0.354	5.014	0.053	0.264	74.383
		20.00	0.678	5.005	0.103	0.514	75.850
		14.00	1.621	5.017	0.254	1.274	78.581
		7.00	2.294	5.015	0.361	1.810	78.902
		6.00	4.477	5.025	0.721	3.623	80.920
		5.50	5.225	5.030	0.841	4.231	80.987
		5.00	5.704	5.032	0.918	4.619	80.982
		4.50	6.283	5.036	1.010	5.086	80.954
		4.20	6.997	5.040	1.123	5.659	80.877
		4.10	7.510	5.043	1.204	6.071	80.830
		4.00	7.699	5.045	1.234	6.225	80.845
		3.90	7.896	5.048	1.265	6.386	80.869
		3.80	8.105	5.050	1.298	6.554	80.872
		3.60	8.322	5.052	1.332	6.732	80.892
		3.30	8.791	5.056	1.407	7.115	80.940
		3.00	9.602	5.061	1.536	7.777	80.991
		2.50	8.401	4.488	1.499	6.727	80.071
		1.90	7.119	3.743	1.500	5.613	78.841
		1.60	5.573	2.838	1.496	4.245	76.168
		1.40	4.792	2.384	1.492	3.557	74.225
1.20	4.271	2.080	1.488	3.095	72.465		





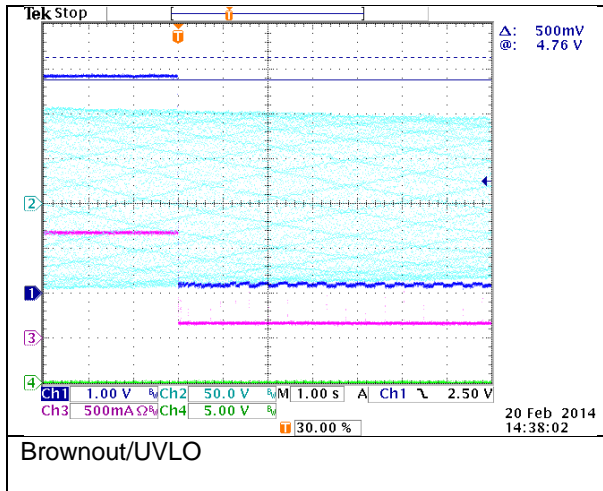
88Vin, lo	88Vin	115in, lo	115Vin	230Vin, lo	230Vin	265Vin, lo	265Vin
1.009	5.031	1.009	5.030	1.009	5.031	1.009	5.030
1.019	5.031	1.019	5.031	1.019	5.031	1.019	5.031
1.030	5.032	1.030	5.032	1.030	5.031	1.030	5.031
1.043	5.032	1.043	5.032	1.042	5.032	1.042	5.031
1.053	5.032	1.053	5.032	1.053	5.032	1.053	5.032
1.065	5.032	1.065	5.033	1.065	5.033	1.064	5.032
1.076	5.033	1.076	5.033	1.076	5.033	1.076	5.032
1.088	5.033	1.088	5.034	1.088	5.033	1.087	5.032
1.099	5.034	1.099	5.034	1.099	5.033	1.099	5.033
1.112	5.034	1.112	5.034	1.112	5.033	1.112	5.033
1.124	5.034	1.124	5.035	1.124	5.034	1.124	5.033
1.137	5.035	1.137	5.035	1.137	5.034	1.137	5.034
1.150	5.035	1.150	5.036	1.150	5.034	1.150	5.034
1.163	5.036	1.163	5.036	1.163	5.035	1.163	5.034
1.177	5.036	1.177	5.037	1.177	5.036	1.176	5.035
1.191	5.036	1.191	5.037	1.191	5.037	1.191	5.035
1.205	5.037	1.205	5.037	1.205	5.037	1.205	5.036
1.220	5.037	1.220	5.038	1.220	5.038	1.219	5.037
1.235	5.038	1.235	5.038	1.235	5.039	1.235	5.037
1.250	5.038	1.250	5.040	1.250	5.039	1.250	5.038
1.266	5.039	1.266	5.040	1.266	5.040	1.266	5.039
1.282	5.039	1.282	5.041	1.282	5.041	1.282	5.040
1.298	5.040	1.299	5.041	1.299	5.041	1.299	5.040
1.316	5.041	1.316	5.042	1.316	5.042	1.316	5.041
1.333	5.041	1.334	5.042	1.334	5.043	1.333	5.042
1.351	5.042	1.351	5.043	1.351	5.043	1.351	5.043
1.369	5.042	1.370	5.044	1.370	5.044	1.370	5.043
1.388	5.043	1.389	5.044	1.389	5.044	1.389	5.044
1.408	5.044	1.408	5.045	1.408	5.045	1.408	5.044
1.428	5.044	1.428	5.046	1.428	5.046	1.428	5.045
1.449	5.045	1.449	5.046	1.449	5.047	1.449	5.046
1.469	5.046	1.470	5.047	1.470	5.047	1.470	5.047
1.492	5.047	1.492	5.048	1.492	5.048	1.492	5.047
1.478	4.927	1.479	4.930	1.515	5.049	1.514	5.048
1.478	4.852	1.479	4.857	1.538	5.050	1.537	5.049
1.478	4.781	1.480	4.785	1.562	5.051	1.561	5.049
1.479	4.708	1.480	4.712	1.489	4.740	1.493	4.752
1.479	4.634	1.480	4.639	1.489	4.667	1.493	4.678
1.479	4.560	1.480	4.566	1.490	4.594	1.493	4.604
1.480	4.491	1.480	4.492	1.490	4.519	1.493	4.529
1.480	4.416	1.481	4.419	1.489	4.444	1.493	4.455
1.480	4.344	1.482	4.347	1.490	4.373	1.493	4.383
1.480	4.271	1.482	4.275	1.490	4.297	1.494	4.310
1.480	4.196	1.482	4.202	1.490	4.223	1.494	4.234
1.481	4.123	1.482	4.126	1.490	4.150	1.494	4.160
1.481	4.049	1.482	4.052	1.490	4.076	1.495	4.087
1.481	3.976	1.482	3.979	1.491	4.003	1.494	4.012
1.481	3.903	1.482	3.904	1.490	3.928	1.494	3.938
1.481	3.830	1.482	3.832	1.490	3.852	1.495	3.864
1.482	3.756	1.482	3.757	1.490	3.779	1.494	3.788
1.481	3.682	1.482	3.683	1.491	3.705	1.495	3.714
1.481	3.608	1.482	3.610	1.491	3.630	1.495	3.640
1.481	3.534	1.482	3.536	1.491	3.556	1.494	3.563
1.481	3.459	1.483	3.463	1.490	3.480	1.493	3.488

1.482	3.387	1.483	3.388	1.491	3.407	1.493	3.413
1.481	3.312	1.482	3.315	1.490	3.331	1.493	3.338
1.481	3.238	1.482	3.241	1.490	3.258	1.493	3.263
1.481	3.164	1.482	3.166	1.489	3.180	1.493	3.190
1.481	3.090	1.482	3.091	1.489	3.107	1.492	3.113
1.481	3.016	1.482	3.017	1.488	3.030	1.492	3.038
1.481	2.940	1.481	2.942	1.488	2.957	1.492	2.963
1.480	2.866	1.481	2.867	1.488	2.881	1.492	2.890
1.480	2.792	1.481	2.793	1.488	2.807	1.492	2.814
1.479	2.717	1.480	2.719	1.488	2.732	1.491	2.739
1.479	2.642	1.479	2.644	1.488	2.658	1.490	2.663
1.479	2.568	1.480	2.570	1.487	2.582	1.490	2.588
1.478	2.494	1.479	2.494	1.486	2.508	1.490	2.514
1.477	2.419	1.478	2.419	1.486	2.432	1.489	2.438
1.477	2.345	1.478	2.346	1.485	2.357	1.489	2.363
1.477	2.270	1.477	2.271	1.484	2.282	1.488	2.288
1.476	2.196	1.477	2.197	1.483	2.206	1.487	2.212
1.475	2.121	1.476	2.122	1.483	2.132	1.486	2.137
1.474	2.046	1.476	2.047	1.482	2.057	1.486	2.062
1.473	1.971	1.474	1.972	1.481	1.981	1.485	1.986
1.473	1.897	1.474	1.898	1.480	1.907	1.484	1.911
1.472	1.822	1.473	1.823	1.480	1.832	1.482	1.835
1.471	1.747	1.472	1.748	1.479	1.756	1.482	1.760
1.469	1.672	1.470	1.673	1.478	1.682	1.481	1.686
0.000	0.102	0.000	0.103	0.000	0.104	0.770	0.122
0.000	0.103	0.000	0.105	1.010	0.121	0.000	0.108
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

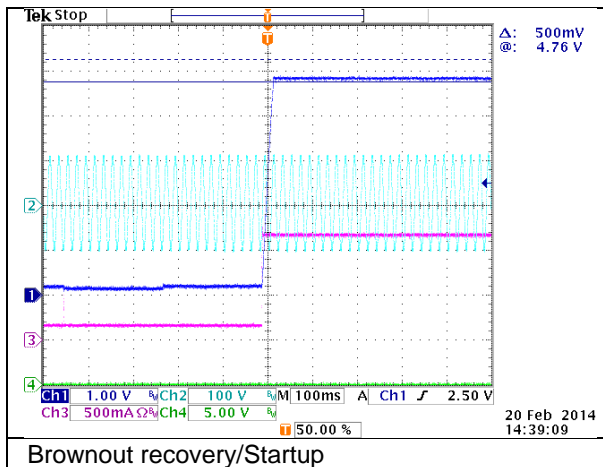


Brownout and Recovery

Vin_start (V)	F (Hz)	Vin_step (V)	Delay (ms)	Load (A)	V_UVLO (V)
90	50	1	1000	1.000	69

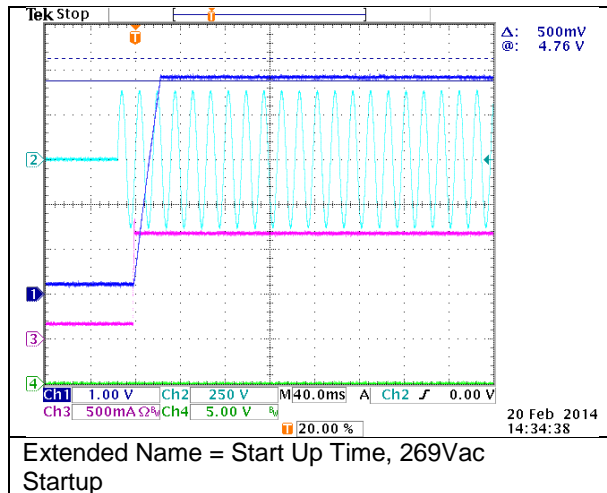
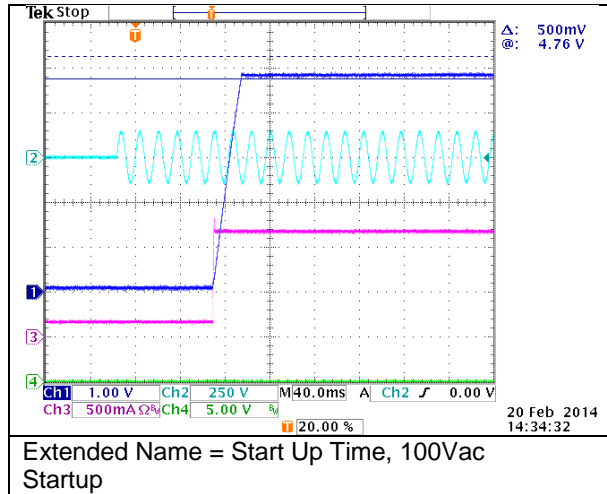


Vin_start (V)	F (Hz)	Vin_step (V)	Delay (ms)	Load (A)	Vout_trigger (V)	Vin_startup (V)
20.0	50	1.0	1000.0	1.000	3	75



Startup

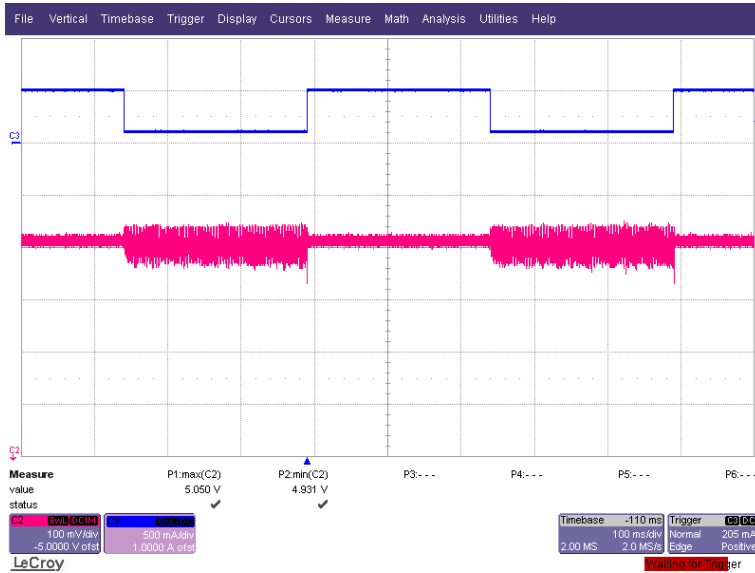
Vin (V)	F (Hz)	Load (A)	Startup time (ms); measured
100	60	1.000	110
269	63	1.000	37



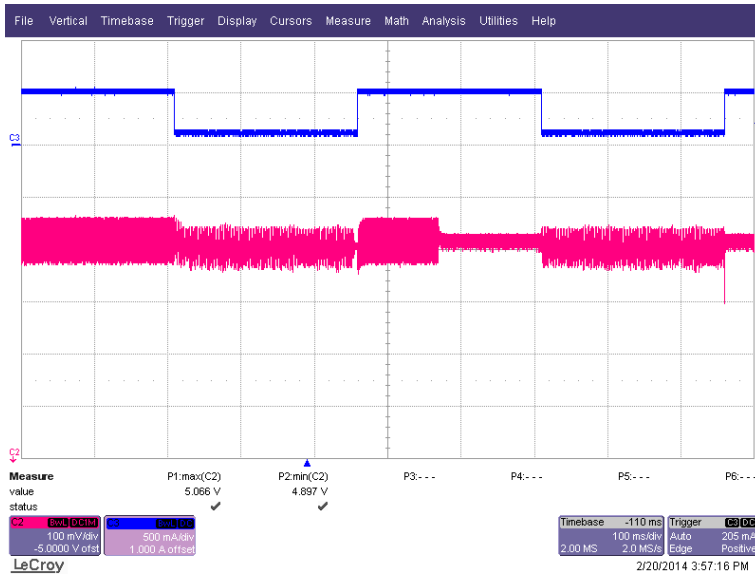
Step Load

Vin (V)	Load_1 (A)	Time_1 (ms)	Load_2 (A)	Time_2 (ms)	Slew rate (A/us)	Vpk min meas'd (V)	Vpk max meas'd (V)
85	0.100	250	0.5	250	0.250	4.931	5.050
265	0.100	250	0.5	250	0.250	4.897	5.066

85Vac

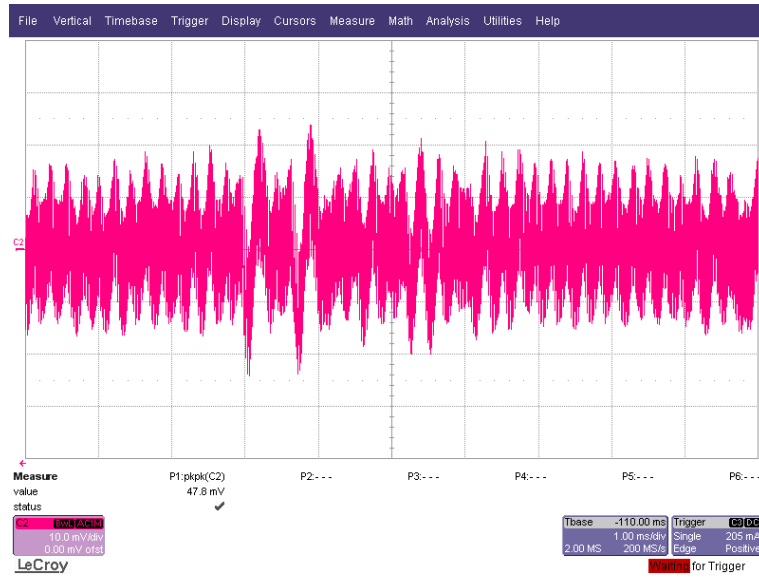


265Vac

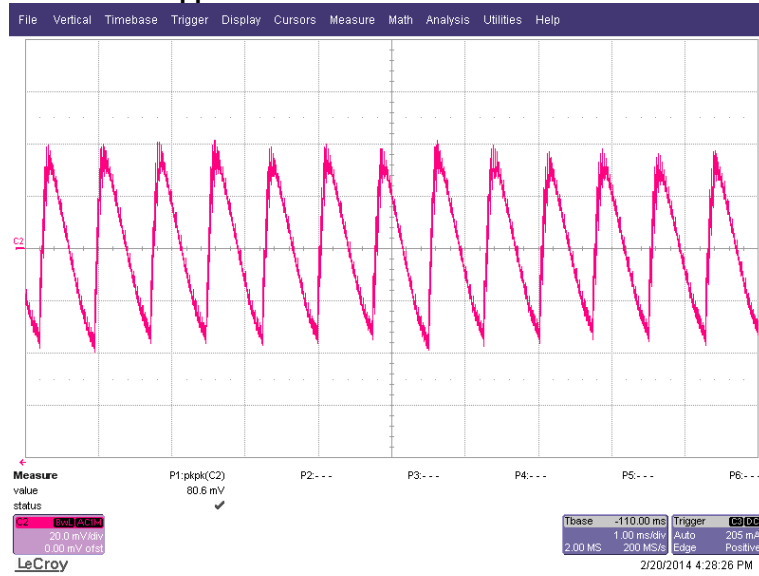


Output Ripple at 115Vac

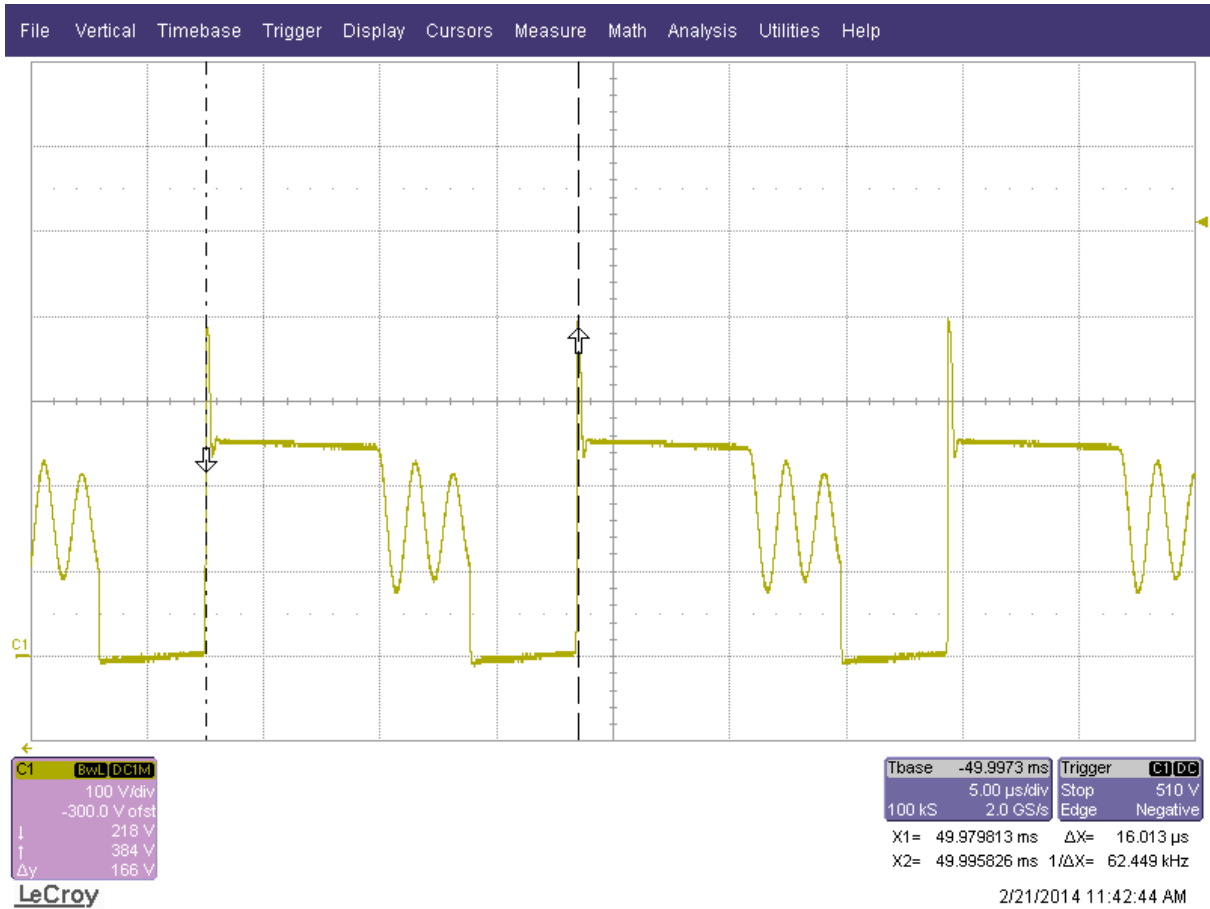
1.5A



Worst Case Ripple occurs around 300mA

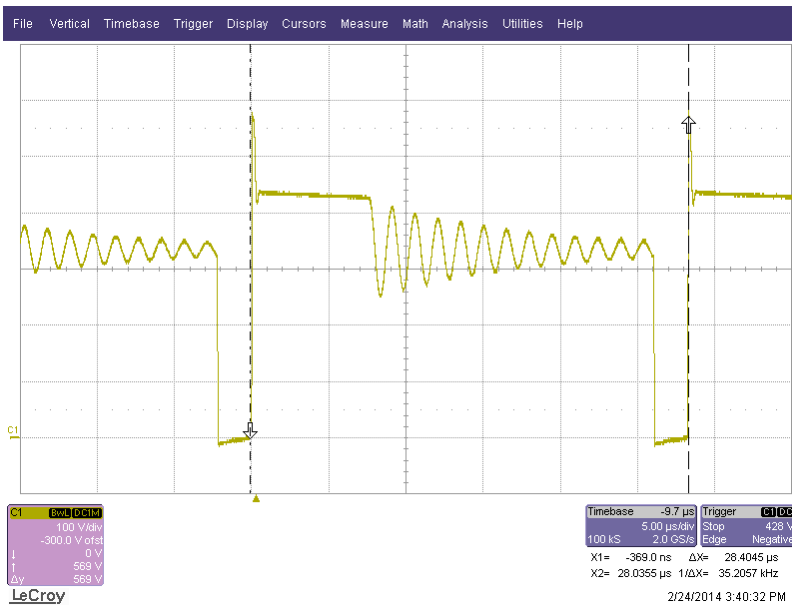


Drain Voltage at 1.5A 115Vac

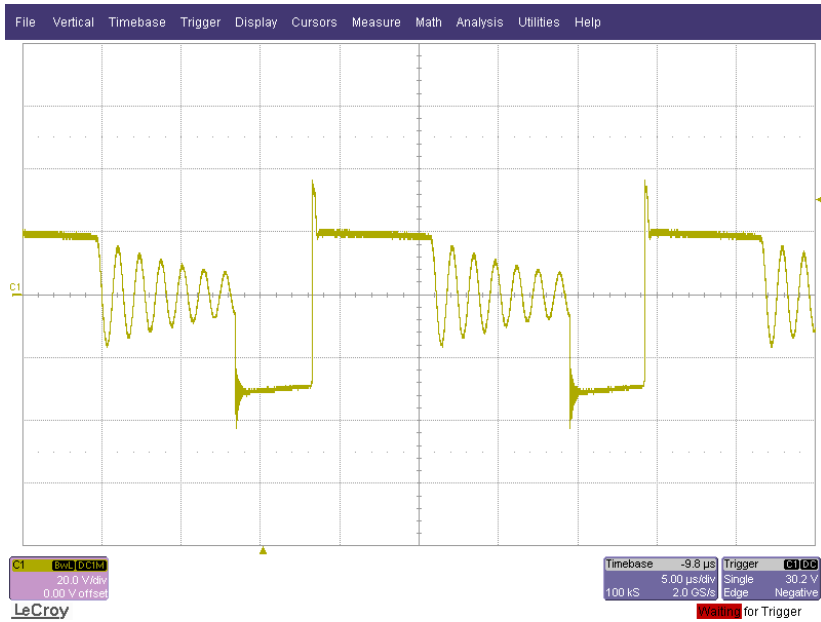


+

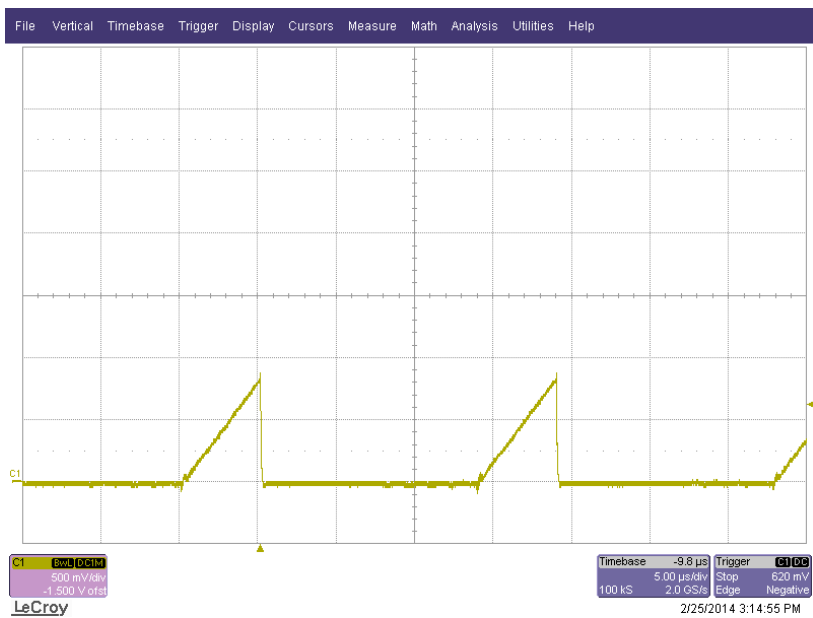
Drain Voltage at 1.5A 230Vac



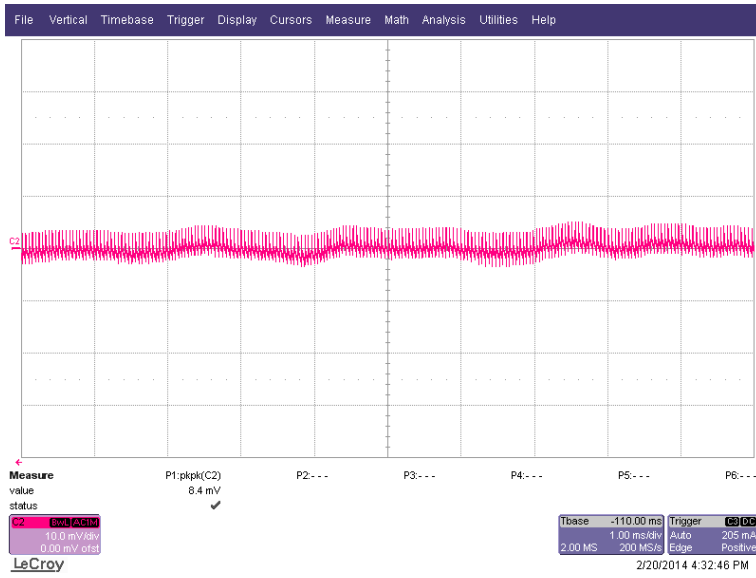
Voltage on auxiliary winding at 1.5A 115Vac



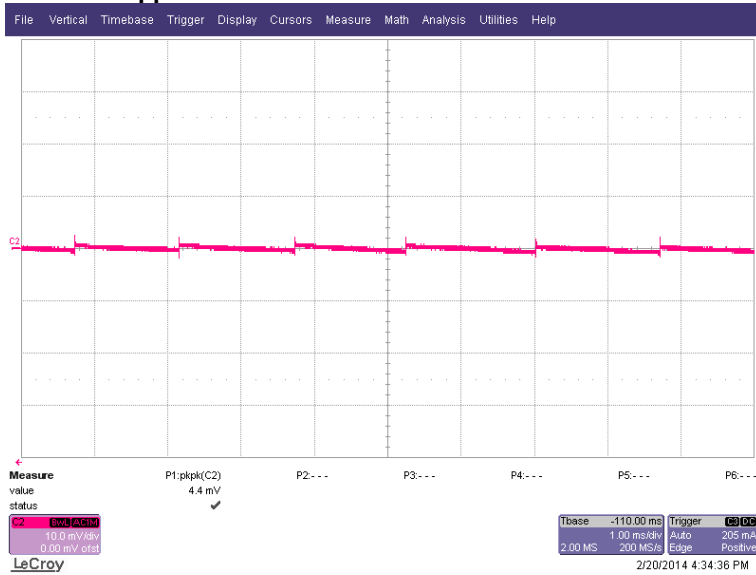
Voltage RIPK at 1.5A 115Vac



80mA Ripple



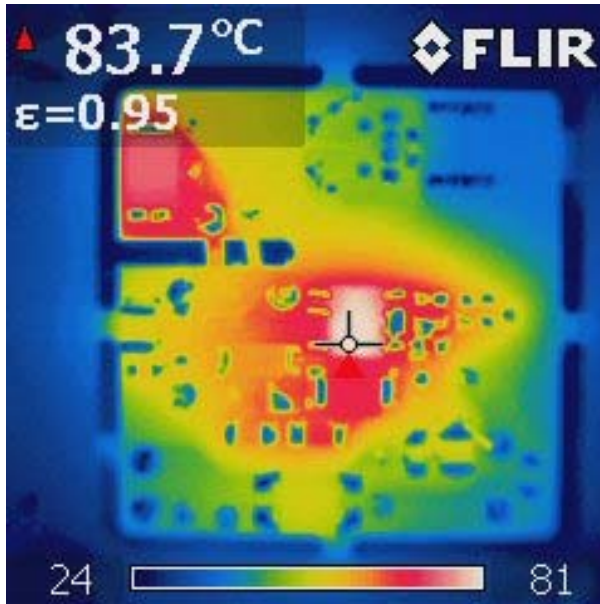
No Load Ripple



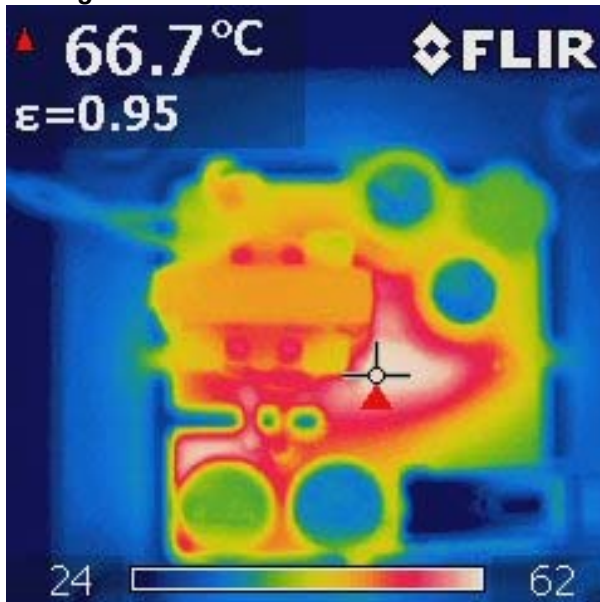
Thermal Images

90Vac 1.5A Load

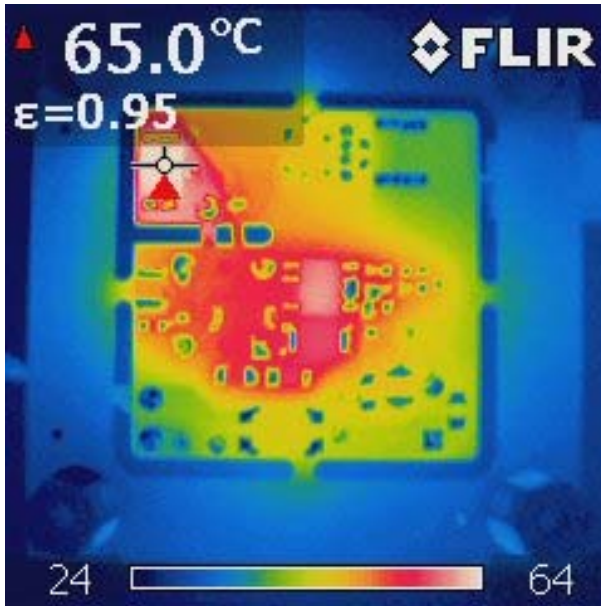
Surface mount side



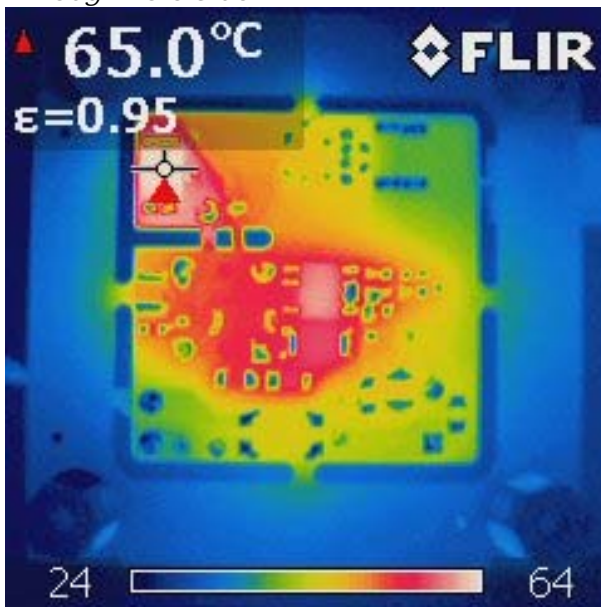
Through hole side



240Vac 1.5A Load
Surface mount side

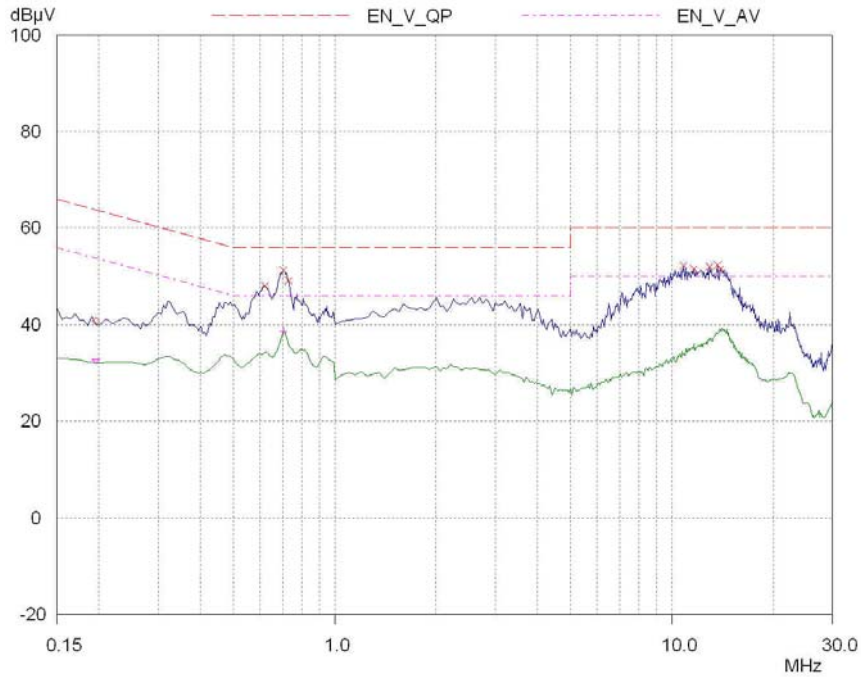


Through hole side

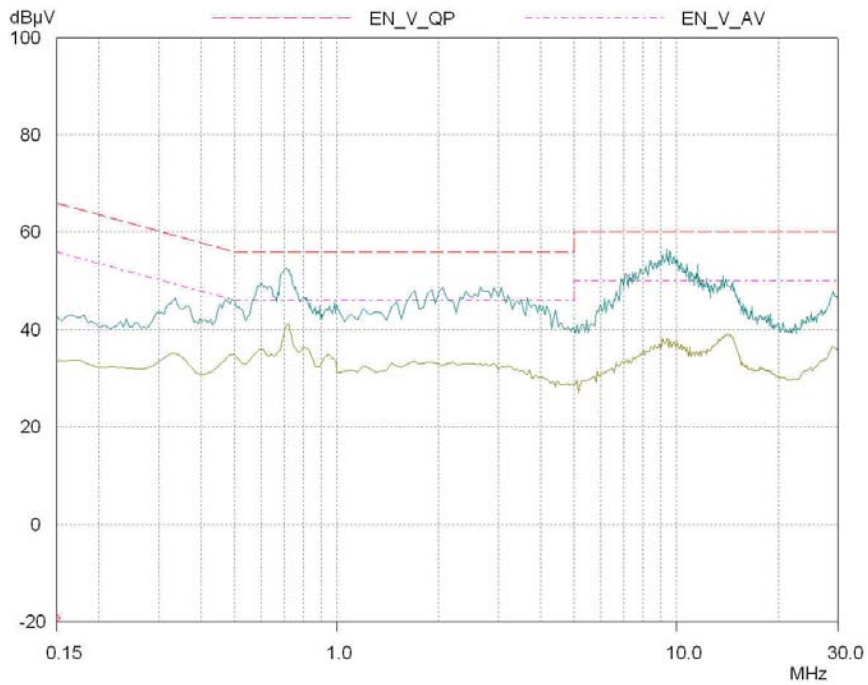


EMI

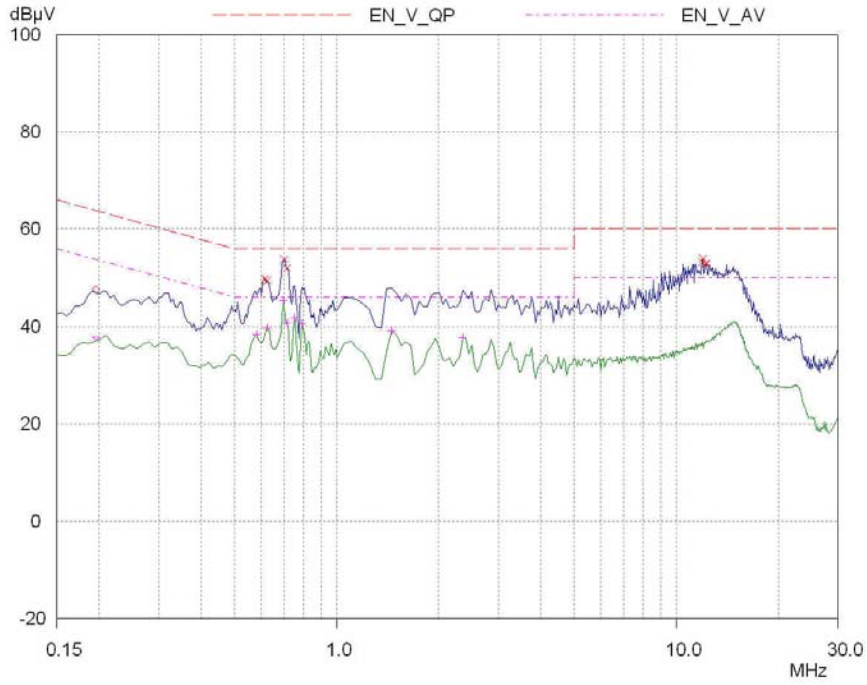
115Vac Ungrounded



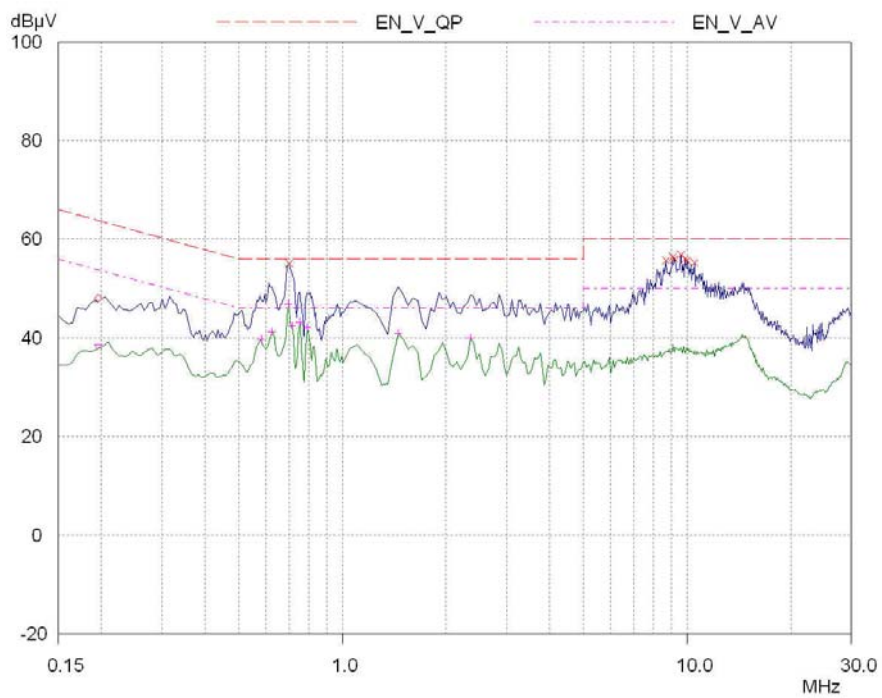
115Vac grounded



230Vac Ungrounded



230Vac grounded



IMPORTANT NOTICE FOR TI REFERENCE DESIGNS

Texas Instruments Incorporated ("TI") reference designs are solely intended to assist designers ("Buyers") who are developing systems that incorporate TI semiconductor products (also referred to herein as "components"). Buyer understands and agrees that Buyer remains responsible for using its independent analysis, evaluation and judgment in designing Buyer's systems and products.

TI reference designs have been created using standard laboratory conditions and engineering practices. **TI has not conducted any testing other than that specifically described in the published documentation for a particular reference design.** TI may make corrections, enhancements, improvements and other changes to its reference designs.

Buyers are authorized to use TI reference designs with the TI component(s) identified in each particular reference design and to modify the reference design in the development of their end products. HOWEVER, NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY THIRD PARTY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT, IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

TI REFERENCE DESIGNS ARE PROVIDED "AS IS". TI MAKES NO WARRANTIES OR REPRESENTATIONS WITH REGARD TO THE REFERENCE DESIGNS OR USE OF THE REFERENCE DESIGNS, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ACCURACY OR COMPLETENESS. TI DISCLAIMS ANY WARRANTY OF TITLE AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT, QUIET POSSESSION, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS WITH REGARD TO TI REFERENCE DESIGNS OR USE THEREOF. TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY BUYERS AGAINST ANY THIRD PARTY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON A COMBINATION OF COMPONENTS PROVIDED IN A TI REFERENCE DESIGN. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES, HOWEVER CAUSED, ON ANY THEORY OF LIABILITY AND WHETHER OR NOT TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, ARISING IN ANY WAY OUT OF TI REFERENCE DESIGNS OR BUYER'S USE OF TI REFERENCE DESIGNS.

TI reserves the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques for TI components are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

Reproduction of significant portions of TI information in TI data books, data sheets or reference designs is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards that anticipate dangerous failures, monitor failures and their consequences, lessen the likelihood of dangerous failures and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in Buyer's safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed an agreement specifically governing such use.

Only those TI components that TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components that have **not** been so designated is solely at Buyer's risk, and Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.